

Actrol PARTS

Catalogue & Technical Manual

SUPPLIERS TO REFRIGERATION, AIR-CONDITIONING
AND ALLIED INDUSTRIES.

A diverse range of products for domestic, commercial and industrial uses is stocked and promoted through our national network. Some of these products are produced by our sister companies in the Actrol Manufacturing Group or imported from international associates.



\$15.00



A Profile of and Tribute to The Man Behind our Catalogues

Stuart R. Leticq 37 Years On . . .

In the years 1940 to 1945, Stuart was a member of the Royal Australian Engineers, and it was there he first became interested and involved in Refrigeration. Stuart received his discharge from the Services in 1945 and joined Warburton Frankl Pty. Ltd.

During his 18½ years association with this Company, he progressed from the Spare Parts Division to become Service Manager and then Factory Manager.

In July 1962 he joined J.F.Reidy Pty. Ltd. at 175/177 King Street, Melbourne; who at this time was in the early stages of development. In Stuart's words — "with only a staff of 5, one had to be competent at everything from sweeping the floors to making managerial decisions". As the business expanded, they moved across the road to 170/180 King Street and Stuart became even busier. While here, he assisted in setting up the first Self-Service Refrigeration Parts Supply System in Australia and took over the Company Purchasing operation.

In July 1966, the Company moved to Lonsdale Street, Melbourne and remained there until 1977.

In September 1968, Stuart became involved in the issue of J.F.Reidy's 1st. Catalogue and then the subsequent revised Edition in 1972.

During this period, Stuart was not only involved in Company activities, but also found time to actively participate in AIRAH. Joining in 1964, he became a member of the Victorian Committee in 1966 and advanced to the Offices of Junior and Senior Vice-President during 1969/1970.

In 1970, while still actively participating in AIRAH, Stuart found that Company business was taking more and more of his time, and found it necessary to reduce his active participation.

In May 1976, J.F.Reidy Pty. Ltd. was taken over by ACTROL and Stuart was appointed Group Supply Manager for all branches throughout Australia.

In 1977 the Company moved to their present premises in Adderley Street, West Melbourne and during this time Stuart began work on the 3rd. and greatly enlarged Catalogue, which was issued in early 1978.

In September 1981, Stuart officially retired from Actrol, however, because of his extensive experience in the Industry and personal involvement with the previous Catalogues, he was retained by the Company to co-ordinate the production of the 4th. and current Catalogue and to continue in a consulting capacity on special projects.

The Management of Actrol Parts wishes to express their sincere thanks and gratitude to Stuart for his contribution to the Catalogues and his dedicated and untiring energy and commitment to the Company.

His many years service has undoubtedly made a valued contribution to the Refrigeration and Air Conditioning Industry.

INTRODUCTION

ACTROL PARTS CATALOGUE & TECHNICAL MANUAL NO. 4

CAT. NO.
327288

Issue 4 of our Catalogue provides you with, not only a Product Catalogue, but also a Technical and Reference Manual, containing a broader and more complete coverage of the Products, including many new Products, as well as a comprehensive Technical and Reference Section.

We believe the information contained in this Catalogue will assist you, save you time in looking elsewhere, and provide a long sought after source of information for our Industry.

Half of the Technical Section is devoted to "conversion" factors, both SI Metric and other Metric Units, including many old conversion factors still in use by Engineers, Designers and Servicemen today.

Included also are many Replacement Reference Tables together with Old/New - New/Old Equipment Part Numbers which have not been previously available. Also included are Product Cross Reference Charts plus a Quick Reference Section on Ammonia Refrigeration Products in the Main Index.

We do not wish to leave the impression that the products featured in this Catalogue is all that can be supplied. Obviously all product lines cannot be shown in complete detail, therefore we have available Manufacturers' Catalogues when additional information is needed.

We have endeavoured to make this comprehensive Catalogue a useful aid to the Industry's professional user in their day-to-day work activities, which reflects our continued efforts to upgrade service ability and expertise to meet anticipated increased demand from a rapidly developing Industry.

The management would like to thank our present clients for their patronage. If this is our first opportunity to serve you, we assure you that we will strive to handle any order entrusted to us to your complete satisfaction. Please accept our cordial invitation to visit us anytime you are in our vicinity.

HOW TO USE THIS CATALOGUE TO YOUR ADVANTAGE

As will be seen on the opposite page, the Catalogue comprises 9 colour coded Sections, each Section commencing with its respective coloured Index/Dividing sheet. All right hand pages are "tabbed" on the side with the Section No., enabling you to quickly "flip" to the Section in which you are interested.

QUICK REFERENCE TABLE OF CONTENTS

On opposite Page and Back Page - Designed for rapid identification and selection.

INDEXES

Each Section has its own individual Index printed on the coloured Dividing sheet.

The **MAIN INDEX**, which follows the front "QUICK REFERENCE TABLE OF CONTENTS", is a fully comprehensive and detailed Index covering **ALL** Sections of the Catalogue.

A **TRADE AND BRAND NAMES INDEX** has now been included and follows the **MAIN INDEX**.

CATALOGUE NUMBERS - designated "CAT. NO."

All items in this Catalogue either have, or have provision for Catalogue Numbers. The first three numerals of the Catalogue indicates the Catalogue Page on which that item can be found.

**CATALOGUE NUMBERS ARE EASILY IDENTIFIED BY THE SHADED
AND HEAVILY BORDERED AREAS**

PAGE NUMBERS

While following a numerical sequence, Catalogue Page Numbers do have gaps or provision for additional pages in the future.

(A numerical page number sequence shown in very small type at the foot of each page should be disregarded - this number is used only for internal Company purposes).

The majority of pages are now self-contained i.e. they include both details of the product and the ordering catalogue number. Where applicable, these pages are followed by **TECH. PAGES** - designed to provide you with fuller technical details on the products available.

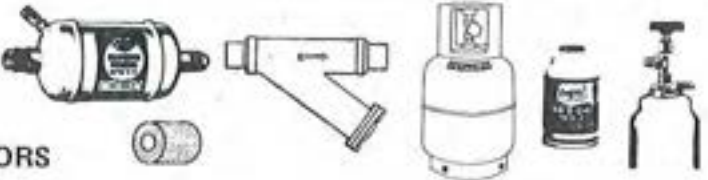
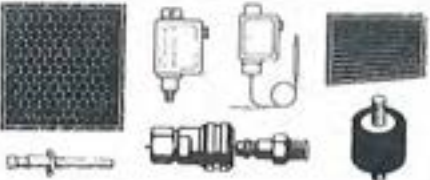
Each Technical Page has the words "TECH. PAGE" along side the main page number at top and bottom. Pages which are not "self-contained" refer clearly to a preceding "Catalogue Number Summary Page - For Ordering Purposes".

METRICS

Although Australian Industry is well advanced in the change-over to SI Metrics, many Manufacturers and Suppliers (with some exceptions), have yet to produce fully SI Metric information and literature on their products. This applies particularly to overseas Manufacturers both from American and European sources. Weights, measures and performance data is therefore presented primarily in the format or "units" in current use by the respective Manufacturers/Suppliers.

However, in many Tables and Charts, where space and time permitted, we have added so called "Soft Conversion" SI Metric data for your convenience. Additional compensation is also provided by the inclusion of many pages of Conversion Factors in the Engineering and Technical Data Section as well as on some individual pages throughout the Catalogue.

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FILTERS, DRIERS, STRAINERS DRYING AGENTS, DESICCANTS REFRIGERANTS, OILS, TEST KITS REFRIGERANT SERVICE AIDS CLEANERS, SOLVENTS, PROTECTORS 	Purple	2
LINE FITTINGS & TUBING PIPE INSULATION & ADHESIVES VALVES – CHECK, RELIEF, AMMONIA LIQUID/MOISTURE INDICATORS SIGHT GLASSES, VIBRATION ELIMINATORS 	Yellow	3
CABINET ACCESSORIES – HARDWARE COMPRESSORS & COND. UNITS – PARTS ADHESIVES, SEALANTS, MASTICS, TAPES INSULATION, COOL ROOM EQUIP. – FDC's SYSTEM COMPONENTS – AIR CURTAINS 	Orange	4
FAN BLADES & MOTORS, EXHAUST FANS MOTORS & STARTERS TERMINALS, BATTERIES RELAYS, OVERLOADS, CAPACITORS BOOKS, ELECTRICAL APPLIANCES 	Pink	5
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ENGINEERING & TECHNICAL DATA METRIC CONVERSION DESIGN INFORMATION FORMULAE, TABLES, CHARTS A USEFUL & PRACTICAL SECTION 	White	TECH
INDUSTRIAL EQUIPMENT – CONTROLS, SWITCHES VALVES, PUMPS, COUPLINGS, WATER TREATMENT OIL BURNER CONTROLS, ELECTRONIC COMPONENTS NOISE & VIBRATION CONTROL PRODUCTS, GRILLES FILTERS/FILTER MEDIUM, LABELS, FASTENERS 	Green	7
AUTOMOTIVE AIR CONDITIONING COMPRESSORS, CONDENSERS, EVAPORATORS VALVES, SWITCHES, RECEIVER-DRIERS CLUTCHES, FAN BLADES, ADAPTOR KITS TOOLS, EQUIPMENT & ACCESSORIES 	Gold	8

GENERAL TERMS AND CONDITIONS OF SALE

In these Terms and Conditions Seller means Actrol Industries Pty. Ltd., trading as Actrol Parts and Buyer means the buyer whose order for the purchase of goods is accepted by Seller.

1. ACCEPTANCE OF BUYER'S ORDER:

These terms and conditions shall apply to every sales contract and sale of goods between Seller and Buyer; any terms and conditions of Buyer's order deviating from or inconsistent with these terms and conditions are expressly rejected by Seller. This rejection also extends to any statement by Buyer that Buyer's terms and conditions shall prevail and to any stipulation by Buyer as to the manner of declaring such rejection.

A contract shall only be or be deemed to have been entered into between Seller and Buyer for the supply of goods when, upon an order having been placed upon Seller for goods, that order has been accepted by Seller (such acceptance of order may be made and communicated by Seller in writing or by overt act of acceptance). The provisions of this clause 1. shall apply to every quotation or offer by Seller for the supply of goods.

2. PRICES:

All prices shall be ex warehouse and shall not include insurance, delivery charges and sales tax. Seller may invoice the goods sold at its prices ruling on the date of each delivery.

3. PROPERTY:

The property and risk in the goods sold shall pass to Buyer when goods are loaded for consignment at Seller's warehouse whether by Carrier employed or engaged by Seller or Buyer. This shall also apply to any partial delivery of goods. If delivery of goods is delayed due to any circumstances beyond the control of Seller the property and risk pass to Buyer on the day when the goods were first ready for consignment from the Seller's warehouse.

4. INSURANCE:

Seller will insure goods and premium will be to the Buyer's Account unless otherwise instructed by Buyer.

5. PAYMENT:

Buyer shall pay cash on delivery for all goods delivered. If Seller shall extend credit to Buyer, payment for all goods sold will be within Thirty (30) days from the last day of the month in which each delivery was made. Interest shall be payable by Buyer on all amounts overdue to Seller at the rate of Ten (10) per centum per annum.

6. CONFIRMATION ORDERS:

Confirmation orders must be marked as such by Buyer if not Seller will consider Buyer's order as original.

7. CANCELLATION:

Cancellation of contract of sale between Buyer and Seller requires approval in writing from Seller otherwise the goods will be delivered to Buyer and Seller entitled to payment from Buyer.

8. ACCEPTANCE AND CLAIMS:

Acceptance of the goods delivered shall be deemed for all purposes to have taken place at the expiration of Fourteen (14) days from the date of each delivery.

No goods will be accepted for return unless agreed in writing by Seller prior to such return and then only upon conditions acceptable to Seller and at Buyer's entire risk as to loss or damage. Where Seller agrees to accept goods for return a restocking charge of 10% of the price of the goods returned will be made.

Seller's liability for a breach of any condition or warranty implied by Division 2 of Part V of the Trade Practices Act 1974 (other than a condition or warranty implied by Section 69 of that Act) is limited to such one or more of the following as Seller decides.

- (i) the replacement of the goods or the supply of equivalent goods;
- (ii) the repair of the goods;
- (iii) the payment of the cost of replacing the goods or of acquiring equivalent goods;
- (iv) the payment of the cost of having the goods repaired.

CONSUMER AND OTHER RIGHTS

These terms and conditions do not and shall not be taken as applying to exclude, restrict or modify in any manner whatsoever:-

- (a) the rights conferred on consumers and others by certain Commonwealth State and Territorial law that cannot lawfully be excluded, restricted or modified;
- (b) the rights and remedies conferred on a consumer by any such law;
- (c) the exercise of any such rights and remedies by a consumer; or
- (d) any mandatory condition or warranty implied by any such law in favour of a consumer which cannot be excluded by contract between the parties to the sale of goods. All provisions of these terms and conditions shall be and be read as being subject to all such rights and remedies of a consumer and not in derogation thereof and no part of this Clause can be waived by a consumer. Further, wherever any part of these terms and conditions would otherwise be inconsistent with the mandatory requirements of any such law, these terms and conditions shall, as far as possible, be construed so as to be consistent with such law and for that purpose to the extent necessary shall be of no force or effect (but without prejudice to and reserving the full force and effect of the remaining provisions hereof). The attention of consumers is drawn to their rights and remedies under all such laws.

9. SPECIAL ORDERS:

Buyer will place order in writing on Seller for non stock items. Seller will not accept return of non stock items unless Manufacturer agrees to accept return from Seller. Seller may deduct transport, handling and restocking charges from the credit due to Buyer.

10. SUBSTITUTION:

Seller reserves right to substitute some other make or brand with similar specification if item ordered by Buyer is not available. If Buyer is not satisfied goods may be returned to Seller for credit.

11. DELIVERY TIME:

Seller may deliver the goods by instalments or partial shipments and Buyer will accept each such delivery. Requirements of Buyer shall not be a condition or of the essence of the contract.

Seller shall be under no liability for direct or consequential loss or damage to Buyer arising from delay or postponement in delivery.

12. WARRANTY:

Goods sold shall have the benefit of any warranty given by the Manufacturer but Seller shall not be liable for any loss or damage direct or consequential arising out of any defects.

All Conditions and Warranties implied by Law or under Statute are hereby expressly negated so far as they lawfully can be.

13. REPAIRS:

Goods returned by Buyer to Seller for repair will be free of all charges to Seller and at Buyer's risk.

14. CLERICAL ERRORS:

Clerical errors in computations, typing or otherwise of Catalogue quotation acceptance offer invoice delivery docket credit note specification or Seller shall be subject to correction.

15. MODIFICATION:

All modifications and amendments to these Terms and Conditions shall be in writing and if otherwise shall not be binding upon Seller.

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IF IT IS NOT LISTED IN THIS CATALOGUE - ASK US ANYWAY. 'WE HAVE MANY OTHER ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST - WE CAN PROBABLY HELP YOU

REMEMBER

WE HAVE LARGE STOCK HOLDINGS OF SPARE PARTS INCLUDING PARTS FOR YOUR SUPERCEDED EQUIPMENT

SUPPLEMENTARY LITERATURE

EVEN THOUGH OUR CATALOGUE IS QUITE COMPREHENSIVE, WE CANNOT PRINT ALL THE INFORMATION IN THE VARIOUS MANUFACTURERS' LITERATURE - THESE ARE AVAILABLE ON REQUEST

WE ARE AS NEAR AS YOUR NEAREST TELEPHONE OR TELEX

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High Side Float	135/135-b,d
Hold Back — See Crankcase Press. Reg. Valves	
Hot Gas Defrost — Solenoid	123-f,g/126-c
Hot Gas By-Pass	117-b,c,d,e
Injection — Thermostatic	117-e
Inlet Pressure — See Evaporator Press. Reg. Valves	
Low Side Float	135/135-a,d
Manual Throttle	117-e
Oil Drain	135/135-d
Oil Feed	135/135-d
Outlet Regulators — See Crankcase Press. Regulating Valves	
Press. Regulating — Selection Guide	117/117-a
Reversing	125/126/126-a,b
Solenoid	121/121-a,b/122/ 122-a,b,c/123/ 123-a to i,m,n
Suction Pressure Regulating — See Crankcase Press. Reg. Valves	
Thermostatic Expansion	102 to 114/116
Throttle	117-e
Upstream — See Evaporator Press. Reg. Valves	
Water — Solenoid	122-b/123-h,j
Water Regulating	124/124-a,b,c,d,e

— W —

Water Regulating Valves	124 to 124-f
Water Solenoid Valves	122-b/123-h,j

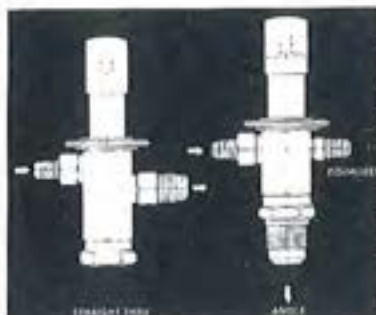
AUTOMATIC EXPANSION VALVES



THE ALCO ACP VALVE IS AN AUTOMATIC EXPANSION VALVE DEVELOPED FOR SMALL COOLING UNITS WHERE THE LOAD IS REASONABLY CONSTANT — For use with R12, R22, R500 & R502 only. Applications: Ideally suited for room air conditioners, domestic refrigerators, drink dispensers, food dispensers, ice cream cabinets, bottle coolers, home freezers, ice cube makers, ice cream freezers and milk coolers.

ACP

Automatic Expansion Valve for small cooling units.



FEATURES

- Fully adjustable from 0 - 550 kPa (0 - 80 psig).
- Covers multiple capacity ranges.
- No packing — no gaskets.
- Corrosion resistant construction.
- Small and compact adaptable for any installation.
- Flare or solder connections.
- Angle or straight-thru styles.
- Internal or external equalizer.
- Option of internal bleed hole for applications where a small low-torque compressor motor is utilized.
- Can be used as a hot gas by-pass valve

CAT. NO.	VALVE SIZE	CAPACITY* kW & Tons					
		R12		R22		R502	
		kW	Tons	kW	Tons	kW	Tons
ACP (E) 1		.91	.26	1.55	.44	1.02	.29
ACP (E) 2		1.20	.34	2.00	.57	1.34	.38
ACP (E) 3		1.90	.54	3.20	.91	2.15	.61
ACP (E) 4		2.71	.77	4.57	1.30	3.06	.87
ACP (E) 5		4.11	1.17	6.89	1.96	4.61	1.31
ACP (E) 6		5.59	1.59	9.39	2.67	6.26	1.78
ACP (E) 7		6.86	1.95	11.53	3.28	7.70	2.19
ACP (E) 8		7.84	2.23	13.19	3.75	8.79	2.50
ACP (E) 9		11.15	3.17	18.71	5.32	12.49	3.55

* Capacity: R12 @ 60 psi PD. R22/R502 @ 100 psi PD.

ALCO 'ACP' Leaflet with full details available on request



For use on R12 and R22. Plants with one Cooling Point only. Automatic Expansion Valves cannot be used on Pressure Controlled plants or on multi-temperature installations which require a Thermostatic Expansion Valve.

REFRIG	VALVE		NOMINAL * CAPACITY		ADJUST RANGE	CONNECTIONS		CARTRIDGE	
	CAT.NO.	TYPE	TONS	kW		INLET	OUTLET	CAT.NO.	TYPE
R 12	1014	AFC - 0	0.24	0.84	-41 to 221 kPa 12" - 32 PSI	1/4" FL	3/8" FL	11430	DS - 0
	1015	AFC - 1	0.34	1.20		1/4" FL	1/2" FL	11431	DS - 1
	1016	AFC - 2	0.67	2.36		1/4" FL	1/2" FL	11432	DS - 2
	1018	AFC - 4	2.70	9.50		1/2" FL	5/8" FL	11434	DSA - 4
R 22	1017	AFC - 1	0.34	1.20	97-441 kPa 14-64 PSI	3/8" FL	1/2" FL	11430	DS - 1
	1019	AFC - 6	5.40	19.00		1/2" FL	5/8" FL	11436	DSA - 6

* Nominal capacity Tons based on +5°C (41°F) Evap. Temp. and 38°C (100°F) Condensing Temperature.

AUTOMATIC FLOW REGULATORS

FIXED FLOW AUTOMATIC REGULATOR FOR AMMONIA & FLUOROCARBON REFRIGERANTS LIQUID OVERFEED (RECIRCULATION) SYSTEMS



ORIFICE SIZE MARKED ON NAME TAG

CONTAINS ONE MOVING PART



TYPE
FFR-2

This precision built, heavy duty, Fixed Flow Regulator maintains a constant, non-adjustable flow rate determined only by the selected orifice and independent of initial pressure drop or changes in the inlet or outlet pressure. It has no check valve function.

REGULATOR		STRAINER	FLANGED CONN.	ORIFICE			
CAT.NO.	TYPE			CAT.NO.	SIZE	CAT.NO.	SIZE
10151	FFR-2	No	1/2"	10155	4	10159	20
10152	FFR-2ST	Yes	Socket Weld	10156	6	10160	30
10153	FFR-2	No	3/4"	10157	10	10161	40
10154	FFR-2ST	Yes	Socket Weld	10158	15	10162	60

TYPE FFR-2 maintains a constant, non-adjustable flow rate. Has no check valve function.

The FFR Series may be used with R 12, R 22, R 502 and other similar fluids. Consult Supplier for Capacity Factors.

WHEN YOU ORDER — State Type of Regulator, Catalogue No., Orifice Size (Type FFR-2), Size and Style of Connections and with or without Strainer

ADJUSTABLE AUTOMATIC FLOW REGULATOR FOR AMMONIA LIQUID OVERFEED (RECIRCULATION) SYSTEMS

This precision built, heavy duty, self-contained, semi-steel bodied Automatic Flow Regulator maintains a constant, but adjustable flow rate of liquid to the evaporator. It also serves as a check valve to prevent back flow into the liquid line from the evaporator during pressure reversals such as occur during hot gas defrost.

(Not recommended for use with Fluorocarbon Refrigerants)

REGULATOR		STRAINER	CONNECTIONS
CAT. NO.	TYPE		
10163	AFR-3	NO	3/4" S.W. Flanges
10164	AFR-3-ST	YES	(1/2" S.W. also available)

CALIBRATED ADJUSTMENT. EASY TO SET.
FROST-FREE NECK



TYPE
AFR-3

BUILT-IN CHECK VALVE

FFR-2 & AFR-3 SPECIFICATIONS, CAPACITY AND APPLICATION DATA — REFER TECH. PAGE 101-a



AUTOMATIC FLOW REGULATORS



Refrigerating Specialties Company

FFR-2 AND AFR-3

SPECIFICATIONS

- Safe Working Pressure: 2069 kPa (300 psig)
- Pressure Drop Range: 34 to 414 kPa (5 to 60 psi)
Higher pressure drops up to 2069 kPa (300 psi) will not harm Regulator but can cause poor flow control
- Minimum Refrigerant Temperature: -45°C (-49°F)
- Maximum Refrigerant Temperature: 38°C (100°F)
- Materials: Body: Cast Semi-Steel
Internal Working Parts: Stainless Steel

TYPE FFR-2

FUNCTION

To maintain a constant non-adjustable flow rate. Has no check valve function. Suitable for Ammonia and Fluorocarbon Refrigerants.

CAPACITY — For Ammonia Refrigerant

FFR-2 Regulators have the following nominal flow capacities for pressure drops from 34 to 414 kPa (5 to 60 psi).

FFR-2 Orifice Number	CAPACITY		FLOW RATE		MASS FLOW *		
	kW	Tons	Litre/s	Imp. GPM	kg/sec	kg/min	lb/min
4	14.1	4	0.015	0.20	0.011	0.6	1.4
6	21.1	6	0.023	0.30	0.017	1.0	2.0
10	35.2	10	0.038	0.50	0.027	1.6	3.4
15	52.8	15	0.057	0.75	0.038	2.3	4.1
20	70.5	20	0.076	1.00	0.052	3.1	6.8
30	105.7	30	0.114	1.50	0.078	4.7	10.2
40	141.0	40	0.151	2.00	0.105	6.3	13.6
60	211.0	60	0.227	3.00	0.158	9.5	20.4
None 80	281.4	80	0.303	4.00	0.210	12.6	27.2

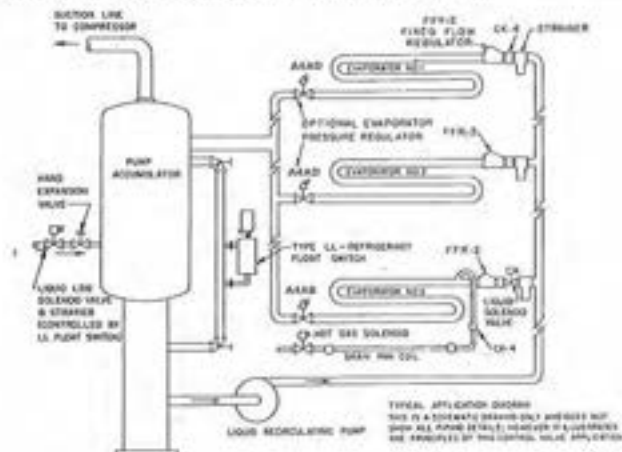
* For liquid density of 673 kg/m^3 (42 lb/ft^3), (Ammonia at -26°C (-15°F)). The precision of control required for typical systems makes corrections for density at other temperatures unnecessary.

SELECTION INFORMATION

To select the proper orifice multiply the evaporator load by the recirculation rate desired and choose the orifice with the rating closest to the calculated rating. Choosing an orifice with a lower number will decrease the recirculation rate, one with a higher number will increase it. For example: 25 kW (7 Tons) evaporator with recirculation rate of 4 = $4 \times 25 = 100 \text{ kW}$ (or 28 Tons), choose orifice No. 30 (nominal 105.5 kW or 30 Tons).

Two or more FFR-2 Regulators may be installed in parallel to obtain capacities greater than available from one. The total capacity delivered will be equal to the sum of capacities of each regulator. For example: 88 kW (25 Ton) load and 3 times recirculation equals 3×88 or 264 kW (or 3×25 or 75 Tons). A regulator with No. 60 orifice and another in parallel with No. 15 orifice would have a combined capacity of $211 + 52.8$ or 263.8 kW ($60 + 15$ or 75 Tons).

This table also allows selections of orifices based on volumetric or mass flow. Determine the litre/sec (gpm) or kg/min (lb/min) required and select the orifice number closest to the requirements. Solenoid valves, hand valves or strainers placed upstream of the FFR-2 Regulators must be properly sized to give a low pressure drop that will not cause flashing. The FFR regulators must have 100% liquid subcooled ammonia at the inlet with no flash gas present in order to give proper liquid flow control.



TYPE AFR-3

FUNCTION

To maintain a constant, but adjustable flow rate and to act as a check valve. Recommended for use with Ammonia only.

CAPACITY

AFR-3 Regulators have the following nominal flow capacities for pressure drops from 34 to 414 kPa (5 to 60 psi). For pressure drops above or below this range, the control variation may exceed the plus or minus 20% considered acceptable.

Indicator Scale	CAPACITY		FLOW RATE		MASS FLOW *		
	kW	Tons	Litre/s	IGPM	kg/s	kg/min	lb/min
5	17.6	5	0.019	0.25	0.013	0.8	1.7
10	35.2	10	0.038	0.50	0.027	1.6	3.4
20	70.5	20	0.076	1.00	0.052	3.1	6.8
30	105.7	30	0.114	1.50	0.078	4.7	10.2
40	141.0	40	0.151	2.00	0.105	6.3	13.6
50	176.3	50	0.189	2.50	0.132	7.9	17.0
60	211.0	60	0.227	3.00	0.158	9.5	20.4

* For liquid density of 673 kg/m^3 (42 lb/ft^3), (Ammonia at -26°C (-15°F)). The precision of control required for typical systems makes corrections for density at other temperatures unnecessary.

SELECTION INFORMATION

This regulator can be adjusted to maintain a constant flow rate from 0.019 to 0.227 Litre/sec (0.25 to 3.0 gpm) of liquid ammonia at pressure drops from 34 to 414 kPa (5 to 60 psi).

This is equivalent to a refrigeration effect range from 17.6 to 211.0 kW (5 to 60 Tons) at a recirculation rate of 1:1 (no overfeed) or 6 to 70 kW (1.7 to 20 Tons) at a recirculation rate of 3:1 (200% overfeed).

To set the regulator, multiply the evaporator load in tons by the desired recirculation rate and set the indicator scale to the resulting load. For example: 10 ton (evaporator load) $\times$ 3 (recirculation rate) = 30 (scale setting).

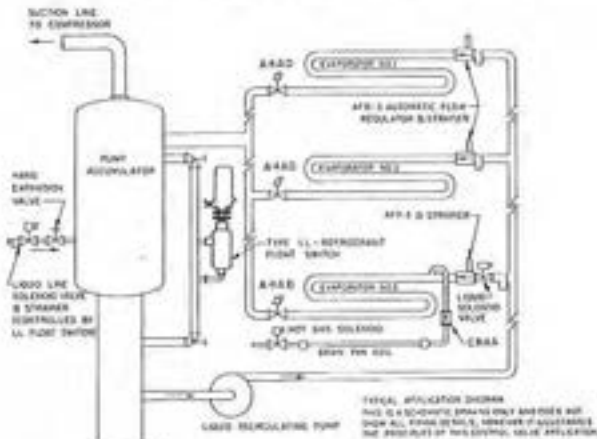
For Metric system usage convert load to Tons and proceed as above.

Two or more AFR-3 Regulators may be installed in parallel to obtain capacities greater than that available from one regulator. The total capacity delivered will be equal to the sum of the settings on each regulator.

CONVERSION FACTORS

kW to Tons (Refrig) — Multiply kW by 0.284

Tons (Refrig) to kW — Multiply Tons by 3.517



ORDERING PROCEDURE : TURN TO PAGE 101 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



THERMO EXPANSION VALVES

FOR R12, R22, R500, R502.

These Thermo Valves, with adjustable superheat and replaceable, interchangeable components are ideal for original equipment and field replacements in Air Conditioning and Refrigeration applications.

* Safe Working Pressure 3103kPa (450PSIG)

* Safe Working Temperature 149°C (300°F)



TCL



TJL



TER



TIR



THR

R 12			R 22			R 500			R 502			STD. CONN. SIZE	TYPE EQUAL & CAP LGTH.	ALL PURPOSE CAGE	
CAT NO	VALVE TYPE	TONS (kW) @ 60° PD	CAT NO	VALVE TYPE	TONS (kW) @ 100° PD	CAT NO	VALVE TYPE	TONS (kW) @ 60° PD	CAT NO	VALVE TYPE	TONS (kW) @ 100° PD			CAT NO	PART NO NEW OLD
1027	TCL(E) 1/4FW	0.25 (0.9)	10232	TCL(E) 1/2HW	0.5	10257	TCLE 25CW	0.25	10281	TCL(E) 1/4RW	0.25	3/8ODF	1/4SAE	102117	X22440-B1B XC709-B7B
1028	TCL(E) 1/2FW	0.5 (1.8)	10233	TCL(E) 1HW	1.0	10258	TCLE 75CW	0.75	10282	TCL(E) 1/2RW	0.5			102118	X22440-B2B XC709-B000B
1029	TCL(E) 1FW	1.0 (3.5)	10234	TCL(E) 2HW	2.0	10259	TCLE 100CW	1.5	10283	TCL(E) 1RW	1.0	X	EXT.	102119	X22440-B3B XC709-B00B
10210	TCL(E) 2FW	2.0 (7.0)	10235	TCL(E) 3HW	3.0	10260	TCLE 250CW	2.5	10284	TCL(E) 2RW	2.0	5/8ODF		102120	X22440-B4B XC709-B0B
						10261	TCLE 300CW	3.0				1/2ODF	5FL	102121	XC709-B6B
10212	TCL(E) 3FW	3.0 (10.6)	10237	TCL(E) 5HW	5.0	10262	TCLE 400CW	4.0	10286	TCL(E) 3RW	3.0	X		102122	X22440-B5B XC709-B1B
10213	TCL(E) 4FW	4.0 (14.1)	10238	TCL(E) 7HW	7.5	10263	TCLE 500CW	5.0	10287	TCL(E) 4RW	4.5	5/8ODF		102123	X22440-B6B XC709-B4B
						10264	TCLE 700CW	7.0						102124	XC709-B2B
10215	TCL(E) 6FW	6.5 (22.9)	10240	TCL(E) 10HW	10.0	10265	TCLE 800CW	7.5	10289	TCL(E) 7RW	7.0	5/8ODF	X	102125	X22440-B7B XC709-B3B
10216	TCL(E) 7FW	7.5 (26.4)	10241	TCL(E) 12HW	12.0	10266	TCLE 900CW	8.5	10290	TCL(E) 8RW	8.0			102126	X22440-B8B XC709-B5B
10217	TJLE 800FW	6.5 (22.9)	10242	TJLE 1400HW	10.9	10267	TJLE 1000CW	9.5	10291	TJLE 900RW	7.3	7/8ODF		102127	XC724-B4B
10218	TJLE 1100FW	8.3 (29.2)	10243	TJLE 1800HW	13.9	10268	TJLE 1400CW	13.0	10292	TJLE 1200RW	9.3			102128	XC724-B5B
10219	TER 13FW	13.0 (45.7)	10244	TER 22HW	22.0	10269	TER 15CW	15.0	10293	TER 14RW	14.0	7/8ODF	1/4SAE	102129	X9117-B6B
10220	TER 15FW	15.0 (52.8)	10245	TER 26HW	26.0	10270	TER 18CW	18.0	10294	TER 16RW	16.0	X	EXT.	102116	X9117-B7B
10221	TER 20FW	20.0 (70.3)	10246	TER 35HW	35.0	10271	TER 25CW	25.0	10295	TER 21RW	21.0				102130	X9117-B8B
10222	TER 25FW	25.0 (87.9)	10247	TER 45HW	45.0	10272	TER 30CW	30.0	10296	TER 27RW	27.0	1-1/8 ODM	10Ft.	102131	X9117-B9B
10223	TIR 35FW	35.0 (123)	10248	TIR 55HW	55.0	10273	TIR 40CW	40.0	10297	TIR 37RW	37.0			102132	X9166-B10B
10224	THR 45FW	45.0 (158)	10249	THR 75HW	75.0	10274	THR 52CW	52.0	10298	THR 48RW	48.0	1-1/8 ODM X 1-1/8 ODM		102133	X9144-B11B
10225	THR 55FW	55.0 (193)	10250	THR 100HW	100	10275	THR 65CW	65.0	10299	THR 60RW	60.0			102134	X9144-B13B

*Capacity in Tons or kW's is based on 4.4°C(40°F) evaporator temperature and 38°C(100°F) vapour free liquid entering the valve at pressure drops of — R12 & R500 414kPa (60PSIG), R22 & R502 690kPa (100PSIG).

ALCO POWER ELEMENT ASSEMBLIES									
VALVE TYPE	CAP. LENGTH	R 12		R 22		R 500		R 502	
		CAT.NO.	PART NO.	CAT.NO.	PART NO.	CAT.NO.	PART NO.	CAT.NO.	PART NO.
TCLE TJLE TJLE	5 ft.	102135	XB1019FW1B	102136	XB1019HW1B	102138	XB1019CW1B	102137	XB1019RW1B
	10 ft.	102148	XB1019FW2B	102150	XB1019HW2B	—	—	102106	XB1019RW2B
TER TIR THR	5 ft.	102139	XC726FW1B	102105	XC726HW1B	102142	XC726CW1B	102141	XC726RW1B
	10 ft.	102104	XC726FW2B	102140	XC726HW2B	102168	XC726CW2B	102107	XC726RW2B

Small Bulb Assemblies, longer Capillary lengths, specials — available on application.

ALWAYS SELECT TX VALVES FOR ACTUAL OPERATING CONDITIONS RATHER THAN NOMINAL VALVE CAPACITIES. THE REQUIRED TONNAGE AT THE DESIRED EVAP. TEMP. AND THE P.D. ACROSS THE VALVE SHOULD BE KNOWN.

REFER FOLLOWING TECH. PAGES 102 — a, b, c, d, e FOR TECHNICAL DETAILS AND CAPACITY TABLES.

T SERIES ALL PURPOSE THERMO® EXPANSION VALVES



OLD VS. NEW NOMENCLATURE

New cage assemblies are interchangeable with the old versions. To modernize our product, minor changes have been made in the construction of cage assemblies. The new constructions have been identified by a new cage assembly part number and a new valve type number.

OLD STYLE				NEW STYLE			
VALVE TYPE			CAGE ASSEMBLY PART NUMBER	VALVE TYPE			CAGE ASSEMBLY PART NUMBER
R-12	R-22	R-502		R-12	R-22	R-502	
TCL(E)25F	TCL(E)50H	TCL(E)25R	XC709-B7*	TCL(E)1/4F	TCL(E)1/2H	TCL(E)1/4R	X22440-B1*
TCL(E)50F	TCL(E)100H	TCL(E)50R	XC709-B000*	TCL(E)1/2F	TCL(E)1H	TCL(E)1/2R	X22440-B2*
TCL(E)100F	TCL(E)200H	TCL(E)100R	XC709-B00*	TCL(E)1F	TCL(E)2H	TCL(E)1R	X22440-B3*
TCL(E)200F	TCL(E)300H	TCL(E)200R	XC709-B0*	TCL(E)2F	TCL(E)3H	TCL(E)2R	X22440-B4*
TCL(E)250F	TCL(E)400H	TCL(E)250R	XC709-B6*	TCL(E)3F	TCL(E)5H	TCL(E)3R	X22440-B5*
TCL(E)300F	TCL(E)500H	TCL(E)300R	XC709-B1*	TCL(E)4F	TCL(E)7-1/2H	TCL(E)4-1/2R	X22440-B6*
TCL(E)400F	TCL(E)700H	TCL(E)450R	XC709-B4*	TCL(E)6-1/2F	TCL(E)10H	TCL(E)7R	X22440-B7*
TCL(E)600F	TCL(E)900H	TCL(E)650R	XC709-B2*	TCL(E)7-1/2F	TCL(E)12H	TCL(E)8R	X22440-B8*
TCL(E)650F	TCL(E)1000H	TCL(E)700R	XC709-B3*				
TCL(E)750F	TCL(E)1200H	TCL(E)800R	XC709-B5*				

NOTE: Delete letter 'E' from valve type for internally equalized valve. *Equalizer code letter 'A' (internal) or 'B' (external) is added to the basic numbers shown to make complete cage assembly part number.

SELECTION

To select a valve size from tables, first determine:

1. The required refrigeration load in tons.
2. The liquid inlet temperature.
3. The evaporator temperature.
4. The pressure drop across the valve.
5. If liquid refrigerant entering thermo valve is some temperature other than 100°F select the multiplier for refrigerant and temperature to correct the required refrigerant load in tons to table conditions. Multiply required load by multiplier.
6. Using required load, or corrected required load, enter extended capacity table for proper refrigerant at the system evaporator temperature.

7. Select the valve capacity under the proper pressure drop column that most closely matches the required refrigeration load.
8. Finally determine:
Refrigerant charge
Tubing length
Size and style of connections
Options required:
a. Motor overload protection
b. Rapid response bulb.
c. Internal bleed port.

SUPERHEAT ADJUSTMENT

Alco Thermo Valves are factory set for the static superheat settings listed below, unless orders specify otherwise:

FACTORY SUPERHEAT SETTINGS					
R12		R22		R502	
REFRIGERANT CHARGE	SUPERHEAT CODE	REFRIGERANT CHARGE	SUPERHEAT CODE	REFRIGERANT CHARGE	SUPERHEAT CODE
FW	6A	HW	6A	RW	6A
FW35	6A	HW65	6A	RW65	6A
FW15	10C	HW35	10C	RW35	10C

Superheat code explanation-Numerals indicate static superheat in degrees F. Letter indicates bulb bath temperature. (A=32°F, C=0°F)

To adjust valve to other superheat settings:

1. Remove seal cap on side of valve.
2. Turn the Adjusting Stem clockwise to increase the superheat and counter clockwise to decrease the superheat. (Approximately 1/2° F per turn.)
3. Reinstall Seal Cap.

MOTOR OVERLOAD PROTECTION (MOP)				
APPLICATION	R12	R22	R500	R502
COMMERCIAL	FW35	HW65	CW45	RW65
LOW TEMP.	FW15	HW35	CW20	RW35

VALVE NOMENCLATURE				
TER	22	H	W	65
Valve Type	Capacity in Tons	System Refrigerant F=R12 H=R22 R=R502	Charge & Bulb W-Standard WS-Rapid Response	MOP (Optional)

ORDERING PROCEDURE : TURN TO PAGE 102 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED.
SECTION 1

T-SERIES SINGLE OUTLET THERMO® VALVE EXTENDED CAPACITY TABLE FOR REFRIGERANT 12 (TONS)

VALVE SIZE	EVAPORATOR TEMPERATURE ° F																							
	+50						+40						+20						0					
	PRESSURE DROP ACROSS VALVE PSI																							
	40	60	80	100	125	150	60	80	100	125	150	175	80	100	125	150	175	60	80	100	125	150	175	
TCL010M	25	31	36	40	45	49	30	35	39	43	47	51	29	33	37	42	46	50	21	23	26	29	32	34
TCL015M	46	57	66	74	82	90	56	65	72	81	89	96	54	62	70	78	85	92	38	44	49	55	60	65
TCL020M	56	68	78	87	96	105	66	77	86	95	104	113	64	74	83	92	101	110	47	54	60	67	73	79
TCL025M	68	81	92	101	110	119	78	90	100	109	118	127	76	87	96	105	114	123	57	65	71	78	84	90
TCL030M	79	93	105	114	123	132	89	102	112	121	130	139	87	99	109	118	127	136	68	77	83	90	96	102
TCL035M	91	105	118	127	136	145	101	114	124	133	142	151	99	111	121	130	139	148	79	88	94	101	107	113
TCL040M	102	117	130	139	148	157	112	125	135	144	153	162	110	122	132	141	150	159	90	99	105	112	118	124
TCL045M	114	129	142	151	160	169	124	137	147	156	165	174	122	134	144	153	162	171	102	111	117	124	130	136
TCL050M	125	141	154	163	172	181	135	148	158	167	176	185	133	145	155	164	173	182	113	122	128	135	141	147
TCL055M	137	153	166	175	184	193	147	160	170	179	188	197	145	157	167	176	185	194	125	134	140	147	153	159
TCL060M	148	165	178	187	196	205	158	171	181	190	199	208	156	168	178	187	196	205	136	145	151	158	164	170
TCL065M	160	177	190	199	208	217	169	182	192	201	210	219	167	179	189	198	207	216	147	156	162	169	175	181
TCL070M	172	189	202	211	220	229	181	194	204	213	222	231	179	191	201	210	219	228	158	167	173	180	186	192
TCL075M	184	201	214	223	232	241	193	206	216	225	234	243	191	203	213	222	231	240	169	178	184	191	197	203
TCL080M	195	213	226	235	244	253	204	217	227	236	245	254	202	214	224	233	242	251	180	189	195	202	208	214
TCL085M	207	225	238	247	256	265	216	229	239	248	257	266	214	226	236	245	254	263	191	199	205	212	218	224
TCL090M	219	237	250	259	268	277	228	241	251	260	269	278	226	238	248	257	266	275	202	210	216	223	229	235
TCL095M	230	249	262	271	280	289	239	252	262	271	280	289	237	249	259	268	277	286	213	221	227	234	240	246
TCL100M	242	261	274	283	292	301	251	264	274	283	292	301	249	261	271	280	289	298	224	232	238	245	251	257
TCL105M	254	273	286	295	304	313	263	276	286	295	304	313	261	273	283	292	301	310	235	243	249	256	262	268
TCL110M	265	285	298	307	316	325	274	287	297	306	315	324	272	284	294	303	312	321	246	254	260	267	273	279
TCL115M	277	297	310	319	328	337	286	299	309	318	327	336	284	296	306	315	324	333	257	265	271	278	284	290
TCL120M	289	309	322	331	340	349	298	311	321	330	339	348	296	308	318	327	336	345	268	276	282	289	295	301
TCL125M	300	321	334	343	352	361	309	322	332	341	350	359	307	319	329	338	347	356	279	287	293	300	306	312
TCL130M	312	333	346	355	364	373	321	334	344	353	362	371	319	331	341	350	359	368	290	298	304	311	317	323
TCL135M	324	345	358	367	376	385	333	346	356	365	374	383	331	343	353	362	371	380	301	309	315	322	328	334
TCL140M	335	357	370	379	388	397	344	357	367	376	385	394	342	354	364	373	382	391	312	320	326	333	339	345
TCL145M	347	369	382	391	400	409	356	369	379	388	397	406	354	366	376	385	394	403	323	331	337	344	350	356
TCL150M	359	381	394	403	412	421	368	381	391	400	409	418	366	378	388	397	406	415	334	342	348	355	361	367
TCL155M	370	393	406	415	424	433	379	392	402	411	420	429	377	389	399	408	417	426	345	353	359	366	372	378
TCL160M	382	405	418	427	436	445	391	404	414	423	432	441	389	401	411	420	429	438	356	364	370	377	383	389
TCL165M	394	417	430	439	448	457	403	416	426	435	444	453	401	413	423	432	441	450	367	375	381	388	394	400
TCL170M	405	429	442	451	460	469	414	427	437	446	455	464	412	424	434	443	452	461	378	386	392	399	405	411
TCL175M	417	441	454	463	472	481	426	439	449	458	467	476	424	436	446	455	464	473	389	397	403	410	416	422
TCL180M	429	453	466	475	484	493	438	451	461	470	479	488	436	448	458	467	476	485	400	408	414	421	427	433
TCL185M	440	465	478	487	496	505	449	462	472	481	490	499	447	459	469	478	487	496	411	419	425	432	438	444
TCL190M	452	477	490	499	508	517	461	474	484	493	502	511	459	471	481	490	499	508	422	430	436	443	449	455
TCL195M	464	489	502	511	520	529	473	486	496	505	514	523	471	483	493	502	511	520	433	441	447	454	460	466
TCL200M	475	501	514	523	532	541	484	497	507	516	525	534	482	494	504	513	522	531	444	452	458	465	471	477
TCL205M	487	513	526	535	544	553	496	509	519	528	537	546	494	506	516	525	534	543	455	463	469	476	482	488
TCL210M	499	525	538	547	556	565	508	521	531	540	549	558	506	518	528	537	546	555	466	474	480	487	493	499
TCL215M	510	537	550	559	568	577	519	532	542	551	560	569	517	529	539	548	557	566	477	485	491	498	504	510
TCL220M	522	549	562	571	580	589	531	544	554	563	572	581	529	541	551	560	569	578	488	496	502	509	515	521
TCL225M	534	561	574	583	592	601	543	556	566	575	584	593	541	553	563	572	581	590	499	507	513	520	526	532
TCL230M	545	573	586	595	604	613	554	567	577	586	595	604	552	564	574	583	592	601	510	518	524	531	537	543
TCL235M	557	585	598	607	616	625	566	579	589	598	607	616	564	576	586	595	604	613	521	529	535	542	548	554
TCL240M	569	597	610	619	628	637	578	591	601	610	619	628	576	588	598	607	616	625	532	540	546	553	559	565
TCL245M	580	609	622	631	640	649	589	602	612	621	630	639	587	599	609	618	627	636	543	551	557	564	570	576
TCL250M	592	621	634	643	652	661	601	614	624	633	642	651	599	611	621	630	639	648	554	562	568	575	581	587
TCL255M	604	633	646	655	664	673	613	626	636	645	654	663	611	623	633	642	651	660	565	573	579	586	592	598
TCL260M	615	645	658	667	676	685	625	638	648	657	666	675	623	635	645	654	663	672	576	584	590	597	603	609
TCL265M	627	657	670	679	688	697	637	650	660	669	678	687	635	647	657	666	675	684	587	595	601	608	614	620
TCL270M	639	669	682	691	700	709	649	662	672	681	690	699	647	659	669	678	687	696	598	606	612	619	625	631
TCL275M	650	681	694	703	712	721	661	674	684	693	702	711	659	671	681	690	699	708	609	617	623	630	636	642
TCL280M	662	693	706	715	724	733	673	686	696	705	714	723	671	683	693	702	711	720	620	628	634	641	647	653
TCL285M	674	705	718	727	736	745	685	698	708	717	726	735	683	695	705	714	723	732	631	639	645	652	658	664

T-SERIES SINGLE OUTLET THERMO® VALVE EXTENDED CAPACITY TABLE FOR REFRIGERANT 22 (TONS)

VALVE SIZE	EVAPORATOR TEMPERATURE ° F																					
	+50						+40						+20						0			
	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150
TCL1E1/2H	.45	.51	.57	.62	.67	.72	.43	.50	.56	.61	.66	.71	.42	.49	.55	.60	.65	.69	.40	.46	.53	.57
TCL1E3/4H	.82	.95	1.1	1.2	1.3	1.4	.81	.94	1.1	1.2	1.3	1.4	.80	.92	1.0	1.1	1.2	1.3	.74	.83	.91	.98
TCL1E1H	1.7	2.0	2.2	2.4	2.6	2.8	1.7	1.9	2.1	2.3	2.5	2.7	1.6	1.8	2.0	2.2	2.4	2.6	1.5	1.7	1.9	2.1
TCL1E3H	3.1	3.6	4.0	4.4	4.7	5.1	3.1	3.5	4.0	4.3	4.7	5.0	3.0	3.4	3.9	4.2	4.6	4.9	2.8	3.1	3.4	3.7
TCL1E1H	4.5	5.2	5.8	6.3	6.8	7.3	4.4	5.1	5.7	6.3	6.8	7.2	4.3	5.0	5.6	6.1	6.6	7.0	4.0	4.5	5.0	5.3
TCL1E3/4H	6.5	7.5	8.4	9.2	9.9	10.6	6.4	7.4	8.3	9.1	9.8	10.5	6.3	7.2	8.1	8.8	9.5	10.2	5.9	6.5	7.2	7.7
TCL1E1H	8.9	10.3	11.5	12.6	13.7	14.6	8.8	10.2	11.4	12.5	13.5	14.4	8.7	10.1	11.2	12.2	13.1	14.0	9.0	10.3	11.4	12.3
TCL1E3/4H	10.8	12.5	13.9	15.2	16.5	17.6	10.7	12.3	13.6	14.8	15.9	16.9	10.6	12.2	13.4	14.5	15.5	16.5	10.7	12.3	13.5	14.5

VALVE SIZE	EVAPORATOR TEMPERATURE ° F																					
	-10						-20						-30						-40			
	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200
TCL1E1/2H	.37	.41	.44	.47	.50	.52	.31	.34	.37	.39	.42	.44	.26	.28	.31	.33	.35	.37	.22	.24	.26	.28
TCL1E3/4H	.70	.77	.83	.89	.94	.99	.65	.70	.75	.79	.83	.87	.49	.54	.58	.62	.66	.69	.41	.45	.49	.52
TCL1E1H	1.4	1.6	1.7	1.8	1.9	2.0	1.2	1.3	1.4	1.5	1.6	1.7	1.0	1.1	1.2	1.3	1.4	1.5	.85	.93	1.0	1.1
TCL1E3H	2.8	2.9	3.1	3.3	3.5	3.7	2.2	2.4	2.6	2.8	3.0	3.1	1.9	2.0	2.2	2.4	2.5	2.6	1.6	1.7	1.9	2.1
TCL1E1H	3.8	4.2	4.5	4.8	5.1	5.4	3.2	3.5	3.8	4.1	4.3	4.5	2.7	2.9	3.2	3.4	3.6	3.8	2.3	2.5	2.7	2.8
TCL1E3/4H	5.5	6.0	6.5	7.0	7.4	7.8	4.7	5.1	5.5	5.9	6.3	6.6	3.9	4.3	4.6	4.9	5.2	5.5	3.3	3.6	3.9	4.1
TCL1E1H	7.8	8.3	8.8	9.3	9.7	10.1	6.4	7.0	7.5	8.1	8.6	9.1	5.4	5.9	6.3	6.8	7.2	7.6	4.5	4.9	5.3	5.6
TCL1E3/4H	9.1	10.0	10.8	11.6	12.3	12.9	7.7	8.5	9.2	9.8	10.4	10.9	6.5	7.1	7.7	8.2	8.7	9.2	5.4	5.9	6.4	6.8

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE ° F																					
	+50						+40						+20						0			
	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150
TJLE1400HW	8.8	11.0	12.3	13.5	14.8	15.9	8.4	10.9	12.2	13.4	14.4	15.4	9.2	10.6	11.8	13.0	14.1	15.0	8.6	9.7	10.6	11.4
TJLE1800HW	12.2	14.1	15.7	17.2	18.6	19.9	12.0	13.9	15.0	16.4	17.7	18.7	11.7	13.6	14.7	15.9	17.0	17.9	19.2	11.0	12.3	13.5

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE ° F																					
	-10						-20						-30						-40			
	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200
TJLE1400HW	8.1	8.9	9.6	10.3	10.9	11.5	6.9	7.5	8.1	8.7	9.2	9.7	5.7	6.3	6.8	7.3	7.7	8.1	4.8	5.3	5.7	6.1
TJLE1800HW	10.3	11.3	12.2	13.1	13.9	14.6	8.7	9.6	10.3	11.1	11.7	12.4	7.3	8.0	8.7	9.3	9.8	10.3	6.1	6.7	7.3	7.8

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE																					
	+50° F						+40° F						+20° F						0° F			
	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150
TER 22HW	19.3	22.3	24.9	27.3	29.4	31.5	19.1	22.0	24.6	26.9	29.1	31.1	18.6	21.4	24.0	26.3	28.4	31.1	17.4	19.4	21.3	23.0
TER 28HW	27.8	28.3	29.4	32.2	34.8	37.2	27.5	28.0	29.1	31.8	34.4	36.8	27.9	28.3	29.3	31.0	32.5	35.8	29.5	29.9	29.2	27.2
TER 35HW	30.7	35.4	39.6	43.4	46.8	50.1	30.3	35.0	39.1	42.9	46.3	49.5	29.5	34.1	38.1	41.8	45.1	48.2	27.6	30.9	33.9	36.6
TER 45HW	38.4	45.5	50.9	55.8	60.2	64.4	38.0	45.0	50.3	55.1	59.5	63.6	38.0	43.9	49.0	53.7	58.0	62.0	35.0	38.7	43.5	47.0
TIR 55HW	48.2	55.6	62.2	68.2	73.6	78.7	47.6	55.0	61.5	67.4	72.8	77.8	46.4	53.6	59.9	65.6	70.0	75.8	43.5	48.6	53.2	57.5
THR 75HW	65.7	75.0	84.8	92.9	100.4	107.3	64.9	75.0	83.9	91.9	99.2	106.1	63.3	73.1	81.7	89.5	96.7	103.4	59.6	66.2	72.6	78.4
THR 100HW	87.6	101.2	113.1	123.9	133.8	143.1	86.6	100.0	111.8	122.5	132.3	141.4	84.4	97.4	109.0	119.3	128.9	137.8	79.0	88.3	96.7	104.5

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE																					
	-10° F						-20° F						-30° F						-40° F			
	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200
TER 22HW	16.4	17.9	19.3	20.7	21.9	23.1	15.2	16.4	17.5	18.6	19.6	20.7	12.7	13.7	14.6	15.5	16.4	17.2	10.6	11.5	12.3	13.0
TER 28HW	19.3	21.2	22.9	24.5	25.9	27.3	16.3	17.9	19.3	20.7	21.9	23.1	15.0	16.2	17.3	18.3	19.3	20.3	12.6	13.6	14.5	15.4
TER 35HW	26.0	28.5	30.8	32.9	34.9	36.8	22.0	24.1	26.0	27.8	29.5	31.1	20.2	21.8	23.3	24.7	26.0	27.3	16.9	18.3	19.5	20.7
TER 45HW	33.5	36.7	39.6	42.3	44.9	47.3	28.3	31.0	33.5	35.8	38.0	40.0	25.0	28.0	30.9	31.8	33.4	35.1	21.7	23.5	25.1	26.6
TIR 55HW	40.9	44.8	48.4	51.7	54.9	57.8	34.6	37.9	40.9	43.7	46.4	48.9	31.7	34.2	36.6	38.8	40.9	42.9	26.6	28.7	30.7	32.6
THR 75HW	55.8	61.1	66.0	70.5	74.8	78.9	47.2	51.7	55.8	59.6	63.3	66.7	43.2	46.7	49.9	52.9	55.8	58.5	36.2	39.1	41.8	44.3
THR 100HW	74.4	81.4	88.0	94.0	99.8	105.1	62.9	68.9	74.4	79.5	84.3	88.9	57.6	62.2	66.5	70.6	74.4	78.0	48.3	52.1	55.7	59.1

Valve capacities are based on 100° F, vapor free refrigerant liquid entering the valve. To determine the valve capacities for other temperatures of vapor free refrigerant liquid entering the valve, multiply the capacities listed above by the multiplier factors listed below. Nominal Capacities are shown in the outlined columns.

R22

REFRIGERANT LIQUID TEMP.	MULTIPLIER FACTOR
80° F	1.111
90° F	1.056
110° F	.944
120° F	.886
130° F	.828
140° F	.768



ORDERING PROCEDURE : TURN TO PAGE 102 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

T-SERIES SINGLE OUTLET THERMO® VALVE EXTENDED CAPACITY TABLE FOR REFRIGERANT 502 (TONS)

VALVE SIZE	EVAPORATOR TEMPERATURE ° F																							
	+50						+40						+20						0					
	PRESSURE DROP ACROSS VALVE PSI																							
	100	125	150	175	200	225	100	125	150	175	200	225	100	125	150	175	200	225	100	125	150	175	200	225
TCLH1/4R	.35	.39	.43	.46	.49	.53	.34	.38	.42	.45	.48	.51	.36	.39	.42	.45	.48	.51	.37	.40	.43	.45	.48	.50
TCLH1/2R	.64	.72	.78	.85	.91	.96	.63	.70	.77	.83	.89	.95	.67	.73	.79	.85	.90	.95	.68	.73	.78	.83	.87	.92
TCLH3/4R	1.3	1.5	1.6	1.8	1.9	2.0	1.3	1.4	1.5	1.7	1.8	1.9	1.4	1.5	1.6	1.7	1.8	1.9	1.4	1.5	1.6	1.7	1.8	1.9
TCLH1R	2.4	2.7	3.0	3.2	3.4	3.6	2.4	2.7	2.9	3.1	3.4	3.6	2.5	2.8	3.0	3.2	3.4	3.6	2.8	3.0	3.2	3.3	3.5	3.6
TCLH1 1/2R	3.5	3.9	4.3	4.6	4.9	5.2	3.4	3.8	4.2	4.5	4.8	5.1	3.6	4.0	4.3	4.6	4.9	5.1	3.7	4.0	4.2	4.5	4.8	5.0
TCLH2 1/2R	5.1	5.7	6.2	6.7	7.2	7.6	5.0	5.5	6.1	6.6	7.0	7.4	5.3	5.8	6.2	6.7	7.1	7.5	5.3	5.8	6.2	6.6	6.9	7.2
TCLH3R	7.0	7.8	8.5	9.2	9.9	10.5	6.8	7.6	8.4	9.0	9.6	10.2	7.3	8.0	8.6	9.2	9.7	10.3	7.4	7.9	8.5	9.0	9.5	10.0
TCLH4R	8.4	9.4	10.3	11.1	11.9	12.6	8.2	9.2	10.1	10.9	11.6	12.4	8.8	9.6	10.4	11.1	11.8	12.4	8.9	9.6	10.2	10.9	11.5	12.0

VALVE SIZE	EVAPORATOR TEMPERATURE ° F																							
	-10						-20						-30						-40					
	PRESSURE DROP ACROSS VALVE PSI																							
	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TCLH1/4R	.35	.38	.41	.43	.45	.48	.36	.38	.41	.43	.45	.47	.29	.31	.33	.35	.36	.38	.30	.32	.35	.36	.37	.39
TCLH1/2R	.60	.71	.76	.81	.85	.89	.68	.73	.77	.81	.85	.89	.54	.58	.61	.65	.68	.71	.43	.46	.49	.51	.54	.56
TCLH3/4R	1.2	1.5	1.6	1.8	1.9	2.0	1.4	1.5	1.8	1.7	1.7	1.8	1.3	1.2	1.3	1.3	1.4	1.5	1.0	1.0	1.1	1.1	1.2	
RELIEFR	2.5	2.7	2.9	3.0	3.2	3.4	2.5	2.7	2.9	3.0	3.2	3.3	2.0	2.2	2.3	2.4	2.6	2.7	1.6	1.7	1.9	2.0	2.0	2.1
TCLIE3R	3.6	3.8	4.1	4.4	4.6	4.8	3.7	3.9	4.2	4.4	4.6	4.8	2.9	3.1	3.3	3.5	3.7	3.8	2.4	2.5	2.7	2.8	3.0	3.1
TCLIE3 1/2R	5.2	5.6	6.0	6.3	6.7	7.0	5.3	5.7	6.0	6.4	6.7	7.0	4.3	4.6	4.8	5.1	5.3	5.6	3.4	3.7	3.9	4.1	4.3	4.5
TCLIE4R	7.1	7.7	8.2	8.7	9.2	9.6	7.3	7.8	8.3	8.8	9.2	9.6	5.9	6.3	6.6	7.0	7.4	7.7	4.7	5.0	5.3	5.6	5.9	6.2
TCLIE4H	8.6	9.3	9.9	10.5	11.1	11.6	8.8	9.4	10.0	10.6	11.1	11.6	7.1	7.6	8.0	8.5	8.9	9.3	6.2	6.7	6.9	7.4	7.7	8.1

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE ° F																							
	+50						+40						+20						0					
	PRESSURE DROP ACROSS VALVE PSI																							
	100	125	150	175	200	225	100	125	150	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225
TJLE00RW	7.5	8.3	9.1	10.0	10.5	11.2	7.3	8.2	8.9	9.6	10.3	10.9	7.8	8.5	9.2	9.8	10.4	11.0	7.9	8.5	9.1	9.7	10.1	10.6
TJLE1200RW	8.5	10.6	11.5	12.6	13.4	14.3	8.3	10.4	11.4	12.3	13.2	14.0	9.9	10.8	11.7	12.5	13.3	14.0	10.0	10.8	11.6	12.3	12.9	13.6

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE ° F																							
	-10						-20						-30						-40					
	PRESSURE DROP ACROSS VALVE PSI																							
	150	175	200	225	250	275	175	200	225	250	275	200	225	250	275	275	300	175	200	225	250	275	300	
TJLE00RW	7.6	8.2	8.8	9.3	9.8	1.3	7.8	8.4	8.8	9.4	9.8	10.2	8.3	8.7	9.1	9.5	10.0	8.2	8.6	9.0	9.4	9.8	10.2	
TJLE1200RW	8.7	10.5	11.2	11.9	12.5	13.1	10.0	10.7	11.3	11.9	12.5	13.1	8.8	9.4	9.9	10.5	11.0	10.8	11.4	12.0	12.5	13.1	13.6	

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE																												
	+50° F						+40° F						+20° F						0° F										
	PRESSURE DROP ACROSS VALVE (PSI)																												
	100	125	150	175	200	225	100	125	150	175	200	225	100	125	150	175	200	225	100	125	150	175	200	225	250	275			
TER 14RW	14.3	16.0	17.5	18.9	20.2	21.5	14.0	15.7	17.1	18.5	19.8	21.0	14.0	15.6	17.0	18.3	19.5	20.7	14.0	15.5	17.0	18.3	19.5	19.5	20.4				
TER 16RW	16.4	18.3	20.0	21.6	23.1	24.5	16.0	17.9	19.6	21.2	22.6	24.0	16.0	17.7	19.3	20.9	22.4	23.8	16.0	17.6	19.2	20.8	21.1	15.1	16.3	17.4	18.5	19.5	20.4
TER 21RW	21.5	24.0	26.3	28.4	30.4	32.2	21.0	23.5	25.7	27.8	29.7	31.5	22.4	24.5	26.5	28.3	30.0	31.6	22.8	24.5	26.1	27.7	29.2	30.7					
TER 27RW	27.6	30.9	33.8	36.5	39.0	41.4	27.0	30.2	33.1	35.7	38.2	40.5	28.7	31.5	34.0	36.4	38.6	40.8	29.1	31.4	33.6	35.6	37.6	39.4					
TER 33RW	37.8	42.3	46.3	50.0	53.5	56.7	37.0	41.4	45.3	48.9	52.3	55.5	39.4	43.1	46.6	49.8	52.8	55.7	39.9	43.1	46.1	48.4	51.5	54.0					
THR 48RW	49.1	54.9	60.1	64.9	69.4	73.6	48.0	53.7	58.8	63.5	67.9	72.0	51.1	56.0	60.5	64.6	68.6	72.7	51.7	55.9	59.7	63.4	66.8	70.0					
THR 60RW	61.3	68.6	75.1	81.1	86.7	92.0	60.0	67.1	73.5	79.4	84.9	90.0	63.9	70.0	75.6	80.8	85.7	90.3	64.7	69.8	74.7	79.2	83.5	87.6					
VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE																												
	-10° F						-20° F						-30° F						-40° F										
	PRESSURE DROP ACROSS VALVE (PSI)																												
	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300					
TER 14RW	14.6	15.8	16.9	17.9	18.9	19.8	15.0	16.1	17.0	18.0	18.8	19.7	12.0	12.9	13.7	14.4	15.1	15.8	9.7	10.3	10.9	11.5	12.1	12.6					
TER 16RW	16.7	18.0	19.3	20.4	21.6	22.6	17.2	18.4	19.5	20.5	21.5	22.5	13.8	14.7	15.6	16.4	17.2	18.0	11.0	11.8	12.5	13.2	13.8	14.4					
TER 21RW	20.6	23.0	25.3	27.4	30.5	34.1	22.5	24.1	26.6	28.9	31.5	34.0	18.1	19.3	20.5	21.6	22.6	23.6	14.5	15.5	16.4	17.3	18.2	19.0					
TER 27RW	28.2	30.4	32.5	34.5	36.4	38.1	28.0	31.0	32.8	34.6	36.3	37.9	23.2	24.8	26.3	27.7	29.1	30.4	18.6	19.9	21.1	22.2	23.3	24.4					
THR 33RW	38.6	41.7	44.6	47.3	49.9	52.3	39.7	42.5	45.0	47.5	49.8	52.0	31.8	34.0	36.1	38.0	39.9	41.7	25.6	27.3	28.9	30.5	32.0	33.4					
THR 48RW	50.1	54.1	57.8	61.3	64.7	67.8	51.5	55.1	58.4	61.8	64.6	67.4	41.3	44.1	46.8	49.3	51.7	54.0	33.1	35.4	37.5	39.6	41.5	43.3					
THR 60RW	62.8	67.6	72.3	76.7	80.8	84.8	64.4	68.8	73.0	77.0	80.7	84.3	51.6	55.2	58.5	61.7	64.7	67.5	41.4	44.2	46.9	49.4	51.9	54.4					

ALCO TECHNICAL DATA



POWER CHARGE FOR THERMAL SENSING ELEMENTS

Alco Controls has made a change in the temperature rating of their "W" charge from -46 to $+10^{\circ}\text{C}$ (-50 to $+50^{\circ}\text{F}$) TO -23 to $+10^{\circ}\text{C}$ (-10 to $+50^{\circ}\text{F}$).

The content of the "W" charge is unchanged and in many cases will perform well at low temperature. However with the world emphasis on energy conservation and a big shift to R502 in many low temperature and supermarket

applications, it was found that in this low temperature range of -46 to -23°C (-50 to -10°F) there are more efficient charges — the Alco "W-MOP" and "WZ" charges. Where the "W" charge has been used successfully in the past at low temperature it can continue to be used. If, however, improved performance is required in the low temperature range it is suggested that the Alco "W-MOP" or "WZ" charge be used.

ALCO EXPANSION VALVE CHARGES — TECHNICAL DETAILS

ALCO DESIGNATION	TYPE	MAJOR CHARACTERISTICS	TYPICAL APPLICATIONS
"W"	Gas Adsorption	- Flat S/H -23 to $+10^{\circ}\text{C}$ (-10 to $+50^{\circ}\text{F}$) - Rapid pull down - Rapid response to suction line temperature changes - Will not lose control in cross ambient conditions - MOP not available	Commercial Refrigeration Medium Temperature and Air Conditioning

MOP

Maximum Operating Pressure or as sometimes referred to as Motor Overload Protection is the ability of the TX Valve to close down, starve or completely shut-off if the suction pressure should approach a dangerously high predetermined limit condition. The Alco "W-MOP" charge can be supplied if needed for system protection: e.g. Immediately after defrost or on self-contained truck refrigeration systems.

CAUTION: The "W-MOP" charge will be effected by extreme cross ambient conditions. If this condition should exist, install an electric strip heater (available from your Alco Supplier) around top part of TX valve.

"W-MOP"	Gas Cross Charge	- Flat S/H -46 to -1°C (-50 to $+30^{\circ}\text{F}$) - Rapid pull down - Rapid response to suction line temperature changes - Will cross ambient (Refer MOP paragraph above)	Commercial Refrigeration Low and Medium Temperature
"WZ"	Liquid Cross Charge	- Decreased S/H with decreased evaporator temp. - Temp. range -46 to -12°C (-50 to $+10^{\circ}\text{F}$) - Slow pull down - Slow response to suction line temperature changes - Will not cross ambient - MOP not available	Commercial Refrigeration Low Temperature

ALCO CROSS-REFERENCE REPLACEMENT CHARGE SYMBOLS FOR THERMO-VALVES

OLD CHARGE SYMBOL	REPLACEMENT CHARGE SYMBOL	OLD CHARGE SYMBOL	REPLACEMENT CHARGE SYMBOL	OLD CHARGE SYMBOL	REPLACEMENT CHARGE SYMBOL	
AIR CONDITIONING		COMMERCIAL REFRIGERATION		LOW TEMPERATURE **		
REFRIGERANT 12						
F or FL	FW	F or FL	FW	---	---	
FZ		FZ		FZ	FW	
FX		FX		FX		
FC		FC		FC		
FW		FW		FW		
FG55		FG35	FW35	---	FW15	
FW55		FW25		FW15		
FG55		FG35		FG15		
FGA		---	---	---	---	
FLA		---	---	---	---	
FGS	FWS	FG535	FG535	---	---	
FWS		FWS	FW2	FWS	FWS	
REFRIGERANT 22						
H or HL	HW	H or HL	HW	---	---	
HZ		HZ		HZ	HW	
HX		HX		HX		
HC		HC		HC		
HW		HW		HW		
HG100		HG65	HW65	---	HW35	
HW100		HW65		HW35		
HQ100		HQ65		HQ35		
HGA		---	---	---	---	
HGA		---	---	---	---	
HW65	HWS	HW65	HW65	---	---	
HWS		HWS	HWS	HWS	HWS	
REFRIGERANT 502						
RL	RW	RL	RW	---	---	
RW		RW		RW	RW	
RW110		RW65		RW35		
RWS		RWS		RWS		
REFRIGERANT 500						
CL	CW	CL	CW	---	---	
CZ		CZ		CZ	CW	
CR		CR		CR		
CR65		CR45		CR20		
CG65		---		---		---
---		---		---		---

NOTES

** For LOW TEMPERATURE applications, improved performance may be obtained by use of "WZ" or "W-MOP" charges. Refer details at top of this page.

ORDERING

Prefix type of charge required by the Refrigerant Code letter:—

R12 = F R22 = H

R502 = R R500 = C

When ordering "W-MOP" also specify Suffix Code which is normally detailed on the pages covering the required valve type.



ZZ SERIES THERMO EXPANSION VALVES

FOR LOW TEMPERATURE APPLICATIONS

ZZ Series Thermo Valves are designed for mechanical refrigeration systems used for cooling low temperature chambers and cabinets, specifically where the desired evaporator temperature is below -40°C (-40°F).

FEATURES : Large Diaphragm Area provides proper control sensitivity.
External Superheat Adjustment.
Take apart construction for easy field servicing.
External Equalizer — 1/4 SAE Male Flare.

NOMINAL CAPACITIES															STD. CONN. SIZES
R12*			R13**			R13B1**			R14**			R22*			
Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	
1031	ZZC1FW	0.2	10313	ZZC1BG	1.0	10325	ZZC1DG	1.0	10337	ZZC1ZG	0.8	10349	ZZC1HW	0.7	3/8"ODF
1032	ZZC2FW	0.5	10314	ZZC2BG	2.5	10326	ZZC2DG	2.5	10338	ZZC1ZG	1.8	10350	ZZC1HW	1.5	X
1033	ZZC3FW	1.0	10315	ZZC4BG	4.0	10327	ZZC4DG	4.5	10339	ZZC2ZG	2.8	10351	ZZC2HW	2.5	5/8"ODF
1034	ZZC4FW	1.5	10316	ZZC6BG	6.0	10328	ZZC7DG	7.0	10340	ZZC5ZG	4.9	10352	ZZC4HW	4.0	1/2"ODF
1035	ZZC5FW	2.0	10317	ZZC9BG	9.0	10329	ZZC10DG	10.0	10341	ZZC6ZG	8.4	10353	ZZC6HW	6.0	X
1036	ZZC6FW	3.0	10318	ZZC13BG	13.0	10330	ZZC15DG	15.0	10342	ZZC10ZG	10.5	10354	ZZC8HW	8.0	5/8"ODF
1037	ZZR4FW	4.0	10319	ZZR16BG	16.0	10331	ZZR17DG	17.0	10343	ZZR15ZG	15.4	10355	ZZR10HW	10.0	7/8"ODF
1038	ZZR5FW	5.0	10320	ZZR20BG	20.0	10332	ZZR20DG	20.0	10344	ZZR18ZG	18.2	10356	ZZR12HW	12.0	
1039	ZZR6FW	6.0	10321	ZZR21BG	21.0	10333	ZZR23DG	23.0	10345	ZZR21ZG	21.0	10357	ZZR13HW	13.0		X
10310	ZZR8FW	8.0	10322	ZZR28BG	28.0	10334	ZZR30DG	30.0	10346	ZZR28ZG	28.0	10358	ZZR18HW	18.0	1-1/8"
10311	ZZR9FW	9.0	10323	ZZR34BG	34.0	10335	ZZR38DG	38.0	10347	ZZR35ZG	35.0	10359	ZZR21HW	21.0	ODM
10312	ZZR12FW	12.0	10324	ZZR48BG	48.0	10336	ZZR50DG	50.0	10348	ZZR49ZG	49.0	10360	ZZR30HW	30.0	

NOMINAL CAPACITIES															STD. CONN. SIZES
R170**			R502*			R503**			R504**			R1150**			
Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	Cat. No.	Valve Type	Tons	
	ZZC14EG	1.5	10361	ZZC14RW	0.7		ZZC10G	1.0		ZZC1QG	1.0		ZZC3VG	1.5	3/8"ODF
	ZZC34EG	3.5	10362	ZZC14RW	1.5		ZZC20G	2.0		ZZC24QG	2.6		ZZC4VG	3.9	X
	ZZC5EG	5.0	10363	ZZC24RW	2.5		ZZC34OG	3.5		ZZC4QG	4.0		ZZC6VG	6.0	5/8"ODF
	ZZC9EG	9.0	10364	ZZC34RW	3.5		ZZC60G	6.0		ZZC7QG	7.0		ZZC10VG	10.0	1/2"ODF
	ZZC14EG	16.0	10365	ZZC5RW	5.0		ZZC100G	10.0		ZZC12QG	12.0		ZZC18VG	18.0	X
	ZZC20EG	20.0	10366	ZZC8RW	8.0		ZZC130G	13.0		ZZC15QG	15.0		ZZC22VG	22.0	5/8"ODF
	ZZJR30EG	30.0	10367	ZZJR9RW	9.0		ZZJR200G	20.0		ZZJR22QG	22.0		ZZJR33VG	33.0	
	ZZER35EG	35.0	10368	ZZER11RW	11.0		ZZER230G	23.0		ZZER26QG	26.0		ZZER39VG	39.0	7/8"ODF
	ZZER40EG	40.0	10369	ZZER13RW	13.0		ZZER270G	27.0		ZZER30QG	30.0		ZZER45VG	45.0	X
	ZZER50EG	50.0	10370	ZZER18RW	18.0		ZZER360G	36.0		ZZER40QG	40.0		ZZER60VG	60.0	1-1/8"
	ZZER65EG	65.0	10371	ZZER19RW	19.0		ZZER450G	45.0		ZZER50QG	50.0		ZZER75VG	75.0	ODM
	ZZR94EG	94.0	10372	ZZR29RW	29.0		ZZR620G	62.0		ZZR70QG	70.0		ZZR105VG	105.0	

Nominal Capacities are based on a vapour free liquid entering the valve and the conditions listed in Table 1 below

POWER ASSEMBLY CHARGES

* "W" charges available for R12, R22 & R502 for Temp. Range -23 to 10°C (-10 to $+50^{\circ}\text{F}$).

"WZ" charges are recommended for the Temperature Range -46 to -12°C (-50 to $+10^{\circ}\text{F}$).

"W-MOP" pressure limiting charges are also available for refrigerants R12 and R502 in the following MOP ratings and for the temperature range -46 to -1°C (-50 to $+30^{\circ}\text{F}$):—

R12 FW-MOP15 FW-MOP35 FW-MOP55
R502 RW-MOP35 RW-MOP65 RW-MOP110

To order, add the MOP value after the "W-MOP" charge symbol.

**Gas pressure limiting "G" charges are listed for refrigerants R-13, R-13B1 with 125 psig M.O.P. rating.

To order, add 125 after the charge symbol "G".

TABLE 1

Refrig.	Liquid Temperature	Evaporator Temperature	P.D. Across Valve	
			psig	kPa
R-12	$+20^{\circ}\text{F}$ (-6.7°C)	-40°F (-40°C)	100	690
R-13	0°F (-17.8°C)	-40°F (-40°C)	150	1034
R-13B1	0°F (-17.8°C)	-40°F (-40°C)	150	1034
R-14	-100°F (-73.3°C)	-150°F (-101°C)	225	1551
R-22	$+20^{\circ}\text{F}$ (-6.7°C)	-40°F (-40°C)	150	1034
R-170	0°F (-17.8°C)	-40°F (-40°C)	150	1034
R-502	$+20^{\circ}\text{F}$ (-6.7°C)	-40°F (-40°C)	150	1034
R-503	0°F (-17.8°C)	-40°F (-40°C)	200	1379
R-504	$+20^{\circ}\text{F}$ (-6.7°C)	-40°F (-40°C)	100	690
R-1150	-40°F (-40°C)	-150°F (-101°C)	200	1379

REMOTE BULB TUBING

Standard tubing length is 5 ft. (1.5m) or 10 ft. (3m).

Gas-charged valves should be installed so that the power assembly will be warmer than the remote bulb to assure positive and accurate control from the bulb. Where severe cross-ambient conditions can exist, it may be necessary to use an Alco Strip Heater (PS1519-1) Cat.No. 10375. It should be wrapped around the power assembly body and secured with the fastening spring that is provided. This will assure positive control from the remote bulb. The Strip Heater is rated 15 Watts at 230V and is suitable for AC or DC voltages from 115 to 240 volts.

REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA



ZZ SERIES THERMO EXPANSION VALVES

EXTENDED CAPACITIES

These capacities are based on a vapour free liquid temperature entering the valve at 0°F (-17.8°C); a -40°F (-40°C) evaporator temperature; a maximum superheat change of 7°F (4°C) and standard factory setting. To determine the capacities for evaporator temperatures other than -40°F (-40°C), multiply the capacities listed for the available pressure drop by the correction factor shown in the appropriate table.

EXTENDED CAPACITIES FOR R-13 (IN TONS)														
VALVE TYPE	PRESSURE DROP ACROSS VALVE -- PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC1BG	.45	.58	.68	.77	.86	.93	1.00	1.06	1.12	1.18	1.24	1.29	1.34	1.39
ZZC2-1/2BG	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.09	3.22	3.35	3.47
ZZC4BG	1.79	2.31	2.73	3.10	3.42	3.72	4.00	4.26	4.50	4.73	4.95	5.16	5.37	5.56
ZZC6BG	2.68	3.46	4.10	4.65	5.14	5.58	6.00	6.39	6.75	7.10	7.43	7.74	8.05	8.34
ZZC8BG	3.80	4.91	5.81	6.58	7.28	7.91	8.50	9.05	9.56	10.08	10.52	10.96	11.41	11.81
ZZC13BG	5.59	7.22	8.54	9.68	10.70	11.63	12.50	13.31	14.06	14.79	15.47	16.12	16.77	17.37
CORRECTION FACTORS FOR R-13														
EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F													
	+20	0	-20	-40	-60	-80	-100							
-40	.8526	1.0000	1.1450	1.2830	1.4180	1.5510	1.6840							
-60	.8164	.9627	1.1070	1.2440	1.3800	1.5110	1.6640							
-80	.7775	.9225	1.0650	1.2020	1.3360	1.4680	1.5990							
-100	.7447	.8912	1.0370	1.1750	1.3060	1.4360	1.5640							
-120	.7183	.8645	1.0100	1.1480	1.2780	1.4060	1.5320							
-140	.6975	.8437	1.0000	1.1370	1.2660	1.3930	1.5180							
-160	.6825	.8287	.9890	1.1270	1.2560	1.3830	1.5080							
-180	.6725	.8187	.9740	1.1120	1.2400	1.3660	1.4900							
-200	.6669	.8133	.9640	1.1020	1.2300	1.3560	1.4800							

EXTENDED CAPACITIES FOR R-13B1 (IN TONS)														
VALVE TYPE	PRESSURE DROP ACROSS VALVE – PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC1DG	.44	.58	.68	.77	.86	.93	1.00	1.06	1.12	1.18	1.24	1.29	1.34	1.39
ZZC2-1/2DG	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.10	3.23	3.36	3.48
ZZC4-1/2DG	2.01	2.60	3.08	3.49	3.85	4.19	4.50	4.79	5.06	5.32	5.57	5.81	6.04	6.26
ZZC7DG	3.13	4.04	4.79	5.42	5.99	6.52	7.00	7.46	7.88	8.28	8.67	9.03	9.39	9.73
ZZC10DG	4.47	5.77	6.84	7.75	8.56	9.31	10.00	10.65	11.25	11.83	12.38	12.90	13.42	13.90
ZZC15DG	6.71	8.66	10.26	11.62	12.85	13.96	15.00	15.98	16.88	17.75	18.57	19.35	20.13	20.85

CORRECTION FACTORS FOR R-13B1								
EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F							
	+60	+40	+20	0	-20	-40	-60	-80
-40	.6894	.7946	.8980	1.0000	1.1009	1.2006	1.2990	1.3996
-60	.4113	.4771	.5417	.6057	.6687	.7312	.7929	.8538
-80	.2831	.3306	.3776	.4239	.4697	.5151	.5597	.6041
-100	.1675	.1973	.2267	.2556	.2843	.3128	.3408	.3686
-120	.0648	.0770	.0891	.1010	.1128	.1245	.1360	.1472

INSTALLATION INSTRUCTIONS

REMOTE BULB LOCATION

The external remote bulb meets the requirements of most installations. It should be clamped securely to the suction line near the evaporator outlet, and on a horizontal run. On lines under 7/8" OD the remote bulb may be installed on top of the line; on 7/8" OD and over, the remote bulb should be installed at the position of about 4 or 8 o'clock. (See Figure 1)

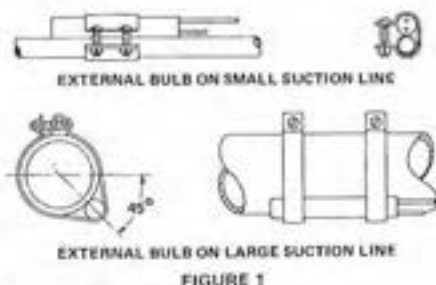


FIGURE 1

INSTALLATION INSTRUCTIONS CONTINUED NEXT PAGE

ORDERING PROCEDURE : TURN TO PAGE 103 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



ZZ SERIES THERMO EXPANSION VALVES

EXTENDED CAPACITIES

These capacities are based on a vapour free liquid temperature entering the valve at +20°F (-6.7°C); a -40°F (-40°C) evaporator temperature; a maximum superheat change of 70°F (4°C) and standard factory setting. To determine the capacities for evaporator temperatures other than -40°F (-40°C), multiply the capacities listed for the available pressure drop by the correction factor shown in the appropriate table.

EXTENDED CAPACITIES FOR R-22 (IN TONS)														
VALVE TYPE	PRESSURE DROP ACROSS VALVE – PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC3/4HW	.33	.43	.51	.58	.64	.70	.75	.80	.84	.89	.93	.97	1.01	1.04
ZZC1-1/2HW	.67	.87	1.02	1.16	1.28	1.40	1.50	1.60	1.69	1.77	1.86	1.93	2.01	2.08
ZZC2-1/2HW	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.09	3.22	3.35	3.47
ZZC4HW	1.79	2.31	2.73	3.10	3.42	3.72	4.00	4.26	4.50	4.73	4.95	5.16	5.37	5.56
ZZC6HW	2.46	3.17	3.76	4.26	4.71	5.12	5.50	5.86	6.19	6.51	6.81	7.09	7.38	7.64
ZZC8HW	3.58	4.62	5.46	6.20	6.85	7.45	8.00	8.52	9.00	9.46	9.90	10.32	10.74	11.12

CORRECTION FACTORS FOR R-22									
EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F								
	+60	+40	+20	0	-20	-40	-60	-80	-100
-40	.8302	.9162	1.0000	1.0809	1.1590	1.2347	1.3076	1.3788	1.4484
-60	.5639	.6241	.6827	.7393	.7940	.8468	.8979	.9478	.9964
-80	.4031	.4475	.4907	.5324	.5727	.6118	.6494	.6862	.7222
-100	.2975	.3313	.3642	.3960	.4268	.4565	.4852	.5132	.5406
-120	.2404	.2687	.2961	.3227	.3484	.3733	.3972	.4207	.4436

EXTENDED CAPACITIES FOR R-502 (IN TONS)														
VALVE TYPE	PRESSURE DROP ACROSS VALVE – PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC3/4RW	.34	.43	.51	.58	.64	.70	.75	.80	.84	.89	.93	.97	1.01	1.04
ZZC1-1/2RW	.67	.87	1.02	1.16	1.28	1.40	1.50	1.60	1.69	1.77	1.86	1.94	2.01	2.08
ZZC2-1/2RW	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.10	3.22	3.36	3.48
ZZC3-1/2RW	1.56	2.02	2.39	2.71	3.00	3.26	3.50	3.73	3.94	4.14	4.33	4.52	4.70	4.86
ZZC5RW	2.24	2.89	3.42	3.87	4.28	4.65	5.00	5.32	5.62	5.92	6.19	6.45	6.71	6.95
ZZC8RW	3.35	4.33	5.12	5.81	6.42	6.98	7.50	7.99	8.44	8.87	9.28	9.68	10.06	10.42
CORRECTION FACTORS FOR R-502														
EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F													
	+60	+40	+20	0	-20	-40	-60	-80						
-40	.7700	.8800	1.0000	1.1100	1.2200	1.3300	1.4400	1.5500						
-60	.4800	.5600	.6400	.7100	.7800	.8600	.9300	1.0000						
-80	.2900	.3400	.3900	.4400	.4900	.5400	.5800	.6300						
-100	.2400	.2700	.3000	.3400	.3700	.4000	.4400	.4800						

INSTALLATION INSTRUCTIONS CONTINUED

REMOTE BULB LOCATION

Do not under any circumstances locate the remote bulb where the suction line is trapped. (See Figure 2). If the liquid refrigerant collects at the point of remote bulb location, the Thermo Expansion Valve operation will be erratic and possibly the valve thought to be defective. Large fluctuations in superheat in the suction gas are usually the result of trapped liquid at the remote bulb location. Even on properly designed suction lines, it is sometimes necessary to move the remote bulb a few inches either way from the original location to obtain best valve action. Always locate the remote bulb on the evaporator side of any refrigerant liquid-to-suction heat exchanger.

REMOTE BULB WELL

When it becomes desirable to increase the sensitivity of the remote bulb to a change in the refrigerant gas temperature leaving the evaporator, it may be necessary to use a remote bulb well (See Figure 3). This is particularly true for short coupled installations and installations with large suction lines (2-1/8" OD or larger).

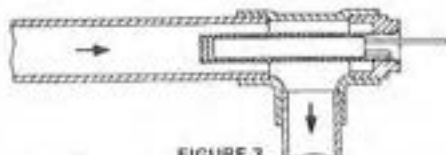


FIGURE 3

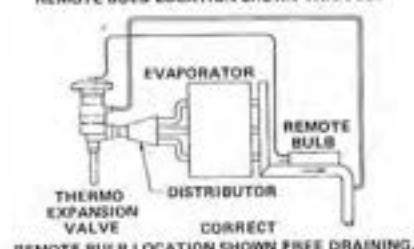
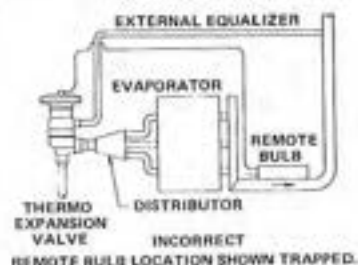


FIGURE 2

ORDERING PROCEDURE : TURN TO PAGE 103 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



FACTORY SET SUPERHEAT

Standard factory superheat setting is 6A (6°F at 32°F bulb bath temperature).

ANE SERIES R22 THERMO EXPANSION VALVES

ALCO ANE SERIES THERMO EXPANSION VALVES ARE DESIGNED ESPECIALLY FOR HEAT PUMP AND AIR CONDITIONING APPLICATIONS REQUIRING STABLE AND ACCURATE CONTROL OVER A WIDE RANGE OF OPERATING CONDITIONS

FEATURES

1. New HB charge meets compressor manufacturer's superheat requirements for both heat pump and air conditioning service.
2. Bleed type pressure equalization to accommodate PSC type compressors.
3. Factory set superheat prevents unauthorized field tampering.
4. Compact integral construction with straight through or angle connections adapts to any installation.
5. SAE Flare or ODF solder connections available.
6. Safe Working Pressure 450 psig. (3103 kPa).
7. Safe Working Temperature 300°F (149°C).
8. Also available for R12 (ANE/FW) and R502 (ANE/RW).

CAT. NO.	VALVE TYPE	NOM. CAP.* TONS R22 @ 100 PSI (690 kPa) PD.	CONNECTIONS ST. THRU or ANGLE SAE Flare or ODF Solder.		EXT. EQUAL CONN. INS.	REMOTE BULB TUBING LENGTH
			IN	OUT		
1041	ANE 1HB	1	3/8"	3/8"	1/4 SAE	30" OR 5 ft.
1042	ANE 1½HB	1½		3/8"		
1043	ANE 2HB	2		1/2"		
1044	ANE 2½HB	2½		1/2"		
1045	ANE 3HB	3	1/2"	5/8"		
1046	ANE 4HB	4		5/8"		
1047	ANE 5HB	5		5/8"		

* Nominal Capacities are based on 40°F (4.4°C) evaporator temperature and 100°F (37.8°C) vapour free liquid refrigerant entering the valve. 12.28T - 12/77.

VALVE SELECTION — TO SELECT A VALVE SIZE FROM TABLE 1 FIRST DETERMINE.

1. The required refrigerant load in Tons.
2. The temperature and pressure of the vapour free liquid refrigerant entering the valve.
3. Note that the capacities in Table 1 are based on 100°F (37.8°C) vapour free liquid refrigerant entering the valve. To convert a required load based on a liquid refrigerant temperature other than 100°F (37.8°C), divide said load by the appropriate factor in Table 2. This corrected required load will then be compatible with the extended capacities in Table 1.
4. The evaporator temperature.
5. The pressure drop across the valve.
6. Using the required load, or corrected required load, enter the extended capacity table (Table 1) for the proper refrigerant at the system evaporator temperature.
7. Select the valve capacity under the proper pressure drop column that most closely matches or slightly exceeds the required or corrected required refrigeration load.
8. Finally determine :
The remote bulb tubing length.
The size of the inlet and outlet ODF or SAE connections.

R22 EXTENDED CAPACITIES

TABLE 1

VALVE TYPE No.		EVAPORATOR TEMPERATURE — °F —																							
		50						40						20						0					
		PRESSURE DROP ACROSS VALVE — PSI —																							
		75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225
ANE1 HB	.88	1.0	1.1	1.2	1.3	1.4	.87	1.0	1.1	1.2	1.3	1.4	.79	.92	1.0	1.1	1.2	1.3	.72	.80	.88	.95	1.0	1.1	
ANE1½HB	1.3	1.5	1.7	1.9	2.0	2.2	1.3	1.5	1.7	1.8	2.0	2.1	1.2	1.4	1.5	1.7	1.8	1.9	1.1	1.2	1.3	1.4	1.5	1.6	
ANE2 HB	1.8	2.0	2.3	2.5	2.7	2.9	1.7	2.0	2.2	2.4	2.6	2.8	1.6	1.8	2.0	2.2	2.4	2.6	1.4	1.6	1.8	1.9	2.0	2.2	
ANE2½HB	2.2	2.5	2.8	3.1	3.3	3.6	2.2	2.5	2.8	3.1	3.3	3.5	2.0	2.3	2.6	2.8	3.0	3.2	1.8	2.0	2.2	2.4	2.5	2.7	
ANE3 HB	2.6	3.0	3.4	3.7	4.0	4.3	2.6	3.0	3.4	3.7	4.0	4.2	2.4	2.7	3.1	3.4	3.6	3.9	2.2	2.4	2.6	2.9	3.1	3.2	
ANE4 HB	3.5	4.0	4.5	5.0	5.4	5.7	3.5	4.0	4.5	4.9	5.3	5.7	3.2	3.7	4.1	4.5	4.8	5.2	2.9	3.2	3.5	3.8	4.1	4.3	
ANE5 HB	4.4	5.1	5.7	6.2	6.7	7.2	4.3	5.0	5.6	6.1	6.6	7.1	4.0	4.6	5.1	5.6	6.1	6.5	3.6	4.0	4.4	4.8	5.1	5.4	

VALVE TYPE No.	EVAPORATOR TEMPERATURE — °F —																							
	-10						-20						-30						-40					
	PRESSURE DROP ACROSS VALVE — PSI—																							
	125	150	175	200	225	250	125	150	175	200	225	250	150	175	200	225	250	275	150	175	200	225	250	275
ANE1 HB	.69	.75	.81	.87	.92	.97	.57	.63	.68	.73	.77	.81	.51	.55	.59	.62	.66	.69	.40	.43	.46	.49	.52	.54
ANE1½HB	1.0	1.1	1.2	1.3	1.4	1.5	.86	.94	1.0	1.1	1.2	1.2	.76	.82	.88	.93	.98	1.0	.60	.65	.69	.74	.78	.81
ANE2 HB	1.4	1.5	1.6	1.7	1.8	1.9	1.1	1.3	1.4	1.5	1.5	1.6	1.0	1.1	1.2	1.2	1.3	1.4	.80	.87	.93	.98	1.0	1.1
ANE2½HB	1.7	1.9	2.0	2.2	2.3	2.4	1.4	1.6	1.7	1.8	1.9	2.0	1.3	1.4	1.5	1.6	1.6	1.7	1.0	1.1	1.2	1.2	1.3	1.4
ANE3 HB	2.1	2.3	2.4	2.6	2.8	2.9	1.7	1.9	2.0	2.2	2.3	2.4	1.5	1.6	1.8	1.9	2.0	2.1	1.2	1.3	1.4	1.5	1.6	1.6
ANE4 HB	2.8	3.0	3.3	3.5	3.7	3.9	2.3	2.5	2.7	2.9	3.1	3.2	1.9	2.0	2.2	2.3	2.5	2.6	1.5	1.6	1.7	1.9	2.0	2.1
ANE5 HB	3.4	3.8	4.1	4.4	4.6	4.9	2.9	3.1	3.4	3.6	3.9	4.1	2.5	2.7	2.9	3.1	3.3	3.4	2.0	2.2	2.3	2.5	2.6	2.7

NOTE: Valve capacities are based on 100°F (37.8°C), vapour free liquid free refrigerant entering the valve. To determine the capacities for other temperatures of vapour free liquid refrigerant entering the valve, multiply the capacities listed above by the correction factors listed in Table 2 below. Nominal Capacities are shown in the outlined column.

TABLE 2

LIQUID TEMPERATURE °F (°C)	60 (15.6)	70 (21.1)	80 (26.7)	90 (32.2)	110 (43.3)	120 (48.9)	130 (54.4)	140 (60)
CORRECTION FACTOR	1.22	1.17	1.11	1.06	0.94	0.89	0.83	0.77



TRAE SERIES THERMO® EXPANSION VALVES

105



TRAE SERIES THERMO VALVES ARE DESIGNED ESPECIALLY FOR LARGE CAPACITY AIR CONDITIONING, REFRIGERATION AND CHILLER APPLICATIONS WHERE STABLE AND ACCURATE CONTROL, OVER WIDE LOAD AND EVAPORATOR TEMPERATURE RANGES, IS REQUIRED.

FEATURES

1. "W" charge for evaporator temperature range -23 to +10°C (-10 to +50°F)
"WZ" charge for evaporator temperature range -46 to -12°C (-50 to +10°F)
2. Balanced, Double-port design for smooth, stable control capability at low load conditions (down to 15% of nominal valve capacity).
3. Externally adjustable superheat
4. Integral body construction, straight through connections.
5. Safe Working Pressure 450 PSIG (3103 kPa).
6. Safe Working Temperature 300°F (148.9°C).
7. Ratings through 40 tons (R22) in one body size.
8. Designed specifically for R12, R22 and R502 applications.

TABLE 1									VALVE* BODY SIZE	LINE	
R 12			R 22			R502				CONNECTIONS	
CAT. NO.	VALVE TYPE	TONS @ 60psi PD.	CAT. NO.	VALVE TYPE	TONS @ 100psi PD.	CAT. NO.	VALVE TYPE	TONS @ 100psi PD.		ODF-SOLDER	
										INLET	OUTLET
1051	TRAE 7½FW	7½	1059	TRAE 10HW	10	10517	TRAE 8RW	8	1	5/8	
1052	TRAE 10FW	10	10510	TRAE 15HW	15	10518	TRAE 12RW	12		7/8	7/8
1053	TRAE 12FW	12	10511	TRAE 20HW	20	10519	TRAE 14RW	14		1-1/8	1-1/8
1054	TRAE 18FW	18	10512	TRAE 30HW	30	10520	TRAE 20RW	20		1-3/8	1-3/8
1055	TRAE 25FW	25	10513	TRAE 40HW	40	10521	TRAE 30RW	30			
1056	TRAE 30FW	30	10514	TRAE 50HW	50	10522	TRAE 35RW	35	2	7/8	7/8
1057	TRAE 35FW	35	10515	TRAE 60HW	60	10523	TRAE 40RW	40		1-1/8	1-1/8
1058	TRAE 40FW	40	10516	TRAE 70HW	70	10524	TRAE 50RW	50		1-3/8	1-3/8

Equalizer - 1/4" SAE External
Remote Bulb Tubing Length - 5ft.

12.33T - 12/77

Note: Nominal capacities are based on 40°F (4.4°C) evaporator temperature and 100°F (37.8°C) vapour free liquid refrigerant entering the valve. For other evaporator temps., liquid temps., and pressure drops across the valve, refer to next page.

VALVE SELECTION

1. The required refrigerant load in Tons.
2. The temperature and pressure of the vapour free liquid refrigerant entering the valve.
3. Note that the capacities in Table 2 are based on 100°F (37.8°C) vapour free liquid refrigerant entering the valve. To convert a required load based on a liquid refrigerant temperature other than 100°F (37.8°C), divide said load by the appropriate factor in Table 3. This corrected required load will then be compatible with the extended capacities in Table 2.
4. The evaporator temperature.
5. The pressure drop across the valve.
6. Using the required load, or corrected required load, enter the extended capacity table (Table 2) for the proper refrigerant at the system evaporator temperature.
7. Select the valve capacity under the proper pressure drop column that most closely matches or slightly exceeds the required or corrected required refrigeration load.
8. Finally determine :
The remote bulb tubing length.
The size of the inlet and outlet ODF connections.

SUPERHEAT ADJUSTMENT

Standard factory superheat setting for FW, HW, and RW charges is 6A (6°F at 32°F bulb bath temperature).

To adjust valve to other superheat settings.

1. Remove seal cap from bottom of valve. This will expose wrench flats (3/16-inch square) which are provided at the bottom of the adjusting stem.
2. Turn the adjusting stem in a clockwise direction (when viewed from bottom of valve) to increase the superheat and counter-clockwise to decrease superheat (approximately 2°F per turn, R22 applications).
3. When desired superheat setting is attained, reinstall seal cap.

NOTE: Allow adequate time between adjustments for system to stabilize before checking superheat.

SAFETY INSTRUCTIONS

1. Read Installation and Safety instructions thoroughly. Failure to follow instructions may result in valve failure, system damage, and/or personal injury.
2. Do not use on service conditions or fluids not specifically cataloged.
3. Foreign matter in the Thermo valve may cause diaphragm failure, flooding, or starving. To insure that the system is thoroughly clean and dry we recommend the use of a liquid line filter-drier and moisture liquid indicator.
4. Proper valve sizing is important. An over-sized valve may result in erratic control. An undersized valve may considerably reduce system capacity.

* TRAE BODY SIZE I

Available Tonnages: 10, 15, 20, 30, 40 - R22

* TRAE BODY SIZE II

Available Tonnages: 50, 60, 70 - R22

Refer to TECH. Page 105-a for Extended Capacity Tables.

TRAE SERIES CAPACITY TABLES

TABLE 2. EXTENDED CAPACITIES
R12 EXTENDED CAPACITIES (TONS)

VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																							
		50						40						20						0					
		PRESSURE DROP ACROSS VALVE -PSI-																							
40	60	80	100	125	150	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175		
TRAE 7½FW	6.2	7.5	8.7	9.7	10.9	11.8	7.4	8.5	9.6	10.7	11.7	12.6	7.1	8.2	9.2	10.2	11.2	12.1	5.9	6.8	7.6	8.5	9.3	10.	
TRAE 10FW	9.0	11.0	12.7	14.2	15.9	17.4	10.8	12.5	13.9	15.6	17.1	18.4	10.4	12.0	13.4	15.0	16.4	17.7	8.6	10.0	11.1	12.4	13.6	14.7	
TRAE 12½FW	10.0	12.2	14.1	15.8	17.7	19.4	12.0	13.9	15.5	17.3	19.0	20.5	11.5	13.3	14.9	16.6	18.2	19.7	9.6	11.1	12.4	13.8	15.1	16.4	
TRAE 18FW	15.2	18.6	21.4	24.0	26.8	29.3	18.2	21.0	23.5	26.3	28.8	31.1	17.5	20.2	22.5	25.2	27.6	29.8	14.5	16.8	18.7	21.0	23.0	24.8	
TRAE 25FW	20.8	25.5	29.4	32.9	36.8	40.3	25.0	28.9	32.3	36.1	39.5	42.7	24.0	27.7	31.0	34.6	37.9	41.0	20.0	23.0	25.8	28.8	31.5	34.1	
TRAE 30FW	28.1	34.5	39.8	44.5	49.8	54.5	33.8	39.0	43.6	48.8	53.4	57.7	32.4	37.4	41.9	46.8	51.3	55.4	27.0	31.1	34.8	38.9	42.6	46.1	
TRAE 35FW	30.6	37.5	43.3	48.5	54.2	59.3	36.8	42.5	47.5	53.1	58.2	62.8	35.3	40.8	45.6	51.0	55.8	60.3	28.4	33.9	37.9	42.4	46.4	50.2	
TRAE 40FW	35.5	44.7	51.6	57.7	64.5	70.6	43.8	50.6	56.5	63.2	69.2	74.8	42.0	48.5	54.2	60.7	66.4	71.8	35.0	40.4	45.1	50.4	55.3	59.3	
VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																							
		-10						-20						-30						-40					
		PRESSURE DROP ACROSS VALVE -PSI-																							
80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200		
TRAE 7½FW	5.7	6.3	7.1	7.8	8.4	9.0	4.6	5.2	5.8	6.3	6.8	7.3	3.7	4.2	4.6	5.1	5.5	5.9	2.9	3.3	3.6	4.0	4.3	4.6	
TRAE 10FW	8.3	9.2	10.3	11.3	12.2	13.1	6.8	7.6	8.4	9.2	10.0	10.7	5.4	6.1	6.8	7.4	8.0	8.6	4.2	4.8	5.3	5.8	6.3	6.7	
TRAE 12½FW	9.2	10.3	11.5	12.6	13.6	14.5	7.5	8.4	9.4	10.3	11.1	11.9	6.0	6.7	7.5	8.3	8.9	9.5	4.7	5.3	5.9	6.5	7.0	7.5	
TRAE 18FW	13.9	15.6	17.4	19.1	20.6	22.0	11.4	12.7	14.2	15.6	16.8	18.0	9.1	10.2	11.4	12.5	13.5	14.5	7.2	8.0	8.9	9.8	10.6	11.3	
TRAE 25FW	18.0	20.1	22.5	24.6	26.8	28.4	15.8	17.5	19.6	21.4	23.1	24.7	12.6	14.0	15.7	17.2	18.6	19.9	9.8	11.0	12.3	13.5	14.5	15.6	
TRAE 30FW	25.9	28.9	32.3	35.4	38.3	40.9	21.2	23.7	26.4	29.0	31.3	33.4	17.0	19.0	21.2	23.2	25.1	26.8	13.3	14.9	16.6	18.2	19.7	21.0	
TRAE 35FW	28.2	31.5	35.2	38.6	41.7	44.5	23.0	25.8	28.8	31.5	34.1	36.4	18.5	20.7	23.1	25.3	27.3	29.2	14.5	16.2	18.1	19.8	21.4	22.9	
TRAE 40FW	31.5	37.5	41.9	45.9	49.6	53.0	27.4	30.6	34.3	37.5	40.5	43.3	22.0	24.6	27.5	30.1	32.5	34.8	17.2	19.3	21.5	23.6	25.5	27.2	

R22 EXTENDED CAPACITIES (TONS)

R22 EXTENDED CAPACITIES (TONS)																								
VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																						
		50					40					20					0							
		PRESSURE DROP ACROSS VALVE -PSI-																						
75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225	
TRAE 10HW	10.3	11.9	13.3	14.6	15.8	16.9	10.2	11.8	13.2	14.5	15.6	16.7	10.0	11.5	12.9	14.8	15.2	16.3	10.4	11.6	12.7	13.7	14.7	15.5
TRAE 15HW	15.1	17.4	19.5	21.3	23.0	24.6	14.9	17.2	19.2	21.1	22.8	24.3	14.5	16.8	18.7	20.5	22.2	24.3	15.1	16.9	18.5	20.0	21.4	22.7
TRAE 20HW	18.8	19.4	21.7	23.8	25.7	27.5	16.6	19.2	21.5	23.5	25.4	27.2	16.2	18.7	20.9	22.9	24.8	26.5	16.9	18.9	20.7	22.4	23.9	25.4
TRAE 30HW	25.5	29.4	32.9	36.1	38.9	41.6	25.2	29.1	32.5	35.6	38.5	41.2	24.6	28.4	31.7	34.7	37.5	40.1	25.6	28.6	31.4	33.9	36.2	38.4
TRAE 40HW	35.0	40.5	45.2	49.6	53.5	57.2	34.6	40.0	44.7	49.0	52.8	56.6	33.8	39.0	43.6	47.8	51.6	55.2	35.2	39.4	43.1	46.6	49.8	52.8
TRAE 50HW	47.3	54.6	61.1	66.9	72.3	77.3	46.8	54.0	60.4	66.1	71.4	76.4	45.6	52.6	58.8	64.4	69.6	74.4	47.5	53.1	58.2	62.9	67.2	71.3
TRAE 60HW	51.6	59.6	66.6	73.0	78.8	84.3	51.1	58.9	65.9	72.1	77.9	83.3	49.7	57.4	64.2	70.3	75.9	81.2	51.8	58.0	63.6	68.6	73.3	77.8
TRAE 70HW	61.4	70.9	81.0	86.9	93.8	100.3	60.7	70.1	78.4	85.9	92.7	99.1	59.2	68.3	76.4	83.7	90.4	96.6	61.7	71.6	78.6	84.6	89.3	92.0
VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																						
		-10					-20					-30					-40							
		PRESSURE DROP ACROSS VALVE -PSI-																						
125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	275
TRAE 10HW	9.6	10.6	11.3	12.1	12.9	13.6	8.0	8.7	9.4	10.1	10.7	11.3	7.2	7.7	8.3	8.8	9.3	9.7	5.8	6.2	6.6	7.0	7.4	7.8
TRAE 15HW	14.0	15.3	16.5	17.7	18.8	19.8	11.6	12.7	13.8	14.7	15.6	16.5	10.4	11.3	12.1	12.8	13.5	14.1	8.4	9.1	9.7	10.3	10.8	11.4
TRAE 20HW	15.6	17.1	18.5	19.7	20.9	22.1	13.0	14.2	15.4	16.4	17.4	18.4	11.7	12.6	13.6	14.3	15.1	15.8	9.4	10.1	10.8	11.5	12.1	12.7
TRAE 30HW	23.6	26.9	28.0	29.9	31.7	33.4	19.6	21.6	23.3	24.9	26.4	27.8	17.7	19.1	20.4	21.6	22.8	23.9	14.2	15.3	16.4	17.4	18.3	19.2
TRAE 40HW	32.5	35.6	38.5	41.1	43.6	46.0	27.1	29.6	32.0	34.2	36.3	38.3	24.3	26.2	28.0	29.7	31.4	32.9	19.5	21.1	22.5	23.9	25.2	26.4
TRAE 50HW	43.9	48.1	51.9	55.5	58.9	62.1	36.5	40.0	43.2	46.2	49.0	51.7	32.8	35.4	37.9	40.2	42.3	44.4	26.4	28.5	30.4	32.3	34.0	35.7
TRAE 60HW	47.9	52.4	56.6	60.6	64.2	67.7	39.9	43.7	47.2	50.4	53.5	56.4	35.8	38.6	41.3	43.8	46.2	48.4	28.4	31.0	33.2	35.2	37.1	38.9
TRAE 70HW	52.0	62.4	67.4	72.1	76.4	80.6	47.4	52.0	56.1	60.0	63.6	67.1	42.6	46.0	49.1	52.1	54.9	57.6	34.2	37.0	39.5	41.9	44.2	46.3

R502 EXTENDED CAPACITIES (TONS)

R502 EXTENDED CAPACITIES (TONS)																								
VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																						
		50						40						20						0				
		PRESSURE DROP ACROSS VALVE -PSI-																						
		100	125	150	175	200	225	100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275
TRAE 8RW	8.5	9.5	10.4	11.2	12.0	12.7	8.3	9.3	10.2	11.0	11.7	12.5	8.8	9.7	10.5	11.2	11.9	12.5	9.2	9.9	10.6	11.2	11.8	12.4
TRAE 12RW	12.4	13.8	15.1	16.4	17.5	18.6	12.1	13.5	14.8	16.0	17.1	18.2	12.9	14.1	15.2	16.3	17.3	18.2	13.3	14.4	15.4	16.3	17.2	18.1
TRAE 14RW	13.8	15.4	16.9	18.3	19.5	20.7	13.5	15.1	16.5	17.9	19.1	20.3	14.4	15.7	17.0	18.2	19.3	20.3	14.9	16.1	17.2	18.2	19.2	20.2
TRAE 20RW	21.0	23.4	25.7	27.7	29.6	31.4	20.5	22.9	25.1	27.1	29.0	30.8	21.8	23.9	25.8	27.6	29.3	30.9	22.6	24.4	26.1	27.7	29.2	30.6
TRAE 30RW	28.7	32.1	35.2	38.0	40.6	43.1	28.1	31.4	34.4	37.2	39.7	42.2	29.9	32.8	35.4	37.8	40.1	42.3	31.0	33.5	35.8	38.0	40.0	42.0
TRAE 35RW	38.8	43.4	47.6	51.4	54.9	58.3	38.0	42.5	46.5	50.3	53.7	57.0	40.5	44.3	47.9	51.2	54.3	57.2	41.9	45.3	48.4	51.3	54.1	56.7
TRAE 40RW	42.3	47.3	51.8	56.0	59.8	63.5	41.4	46.3	50.7	54.8	58.5	62.1	44.1	48.3	52.1	55.7	59.1	62.6	45.7	49.3	52.7	55.9	58.9	61.8
TRAE 50RW	50.4	56.3	61.7	66.7	71.3	75.6	49.3	55.1	60.4	65.2	69.7	74.0	52.5	57.5	62.1	66.4	70.4	74.2	54.4	58.7	62.8	66.6	70.2	73.6
VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																						
		-10						-20						-30						-40				
		PRESSURE DROP ACROSS VALVE -PSI-																						
		150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TRAE 8RW	8.3	9.0	9.6	10.2	10.8	11.3	7.5	8.0	8.5	9.0	9.4	9.9	6.4	6.8	7.2	7.6	8.0	8.4	5.3	5.7	6.0	6.3	6.6	6.9
TRAE 12RW	12.7	13.1	14.0	14.9	15.7	16.5	11.0	11.7	12.4	13.1	13.7	14.4	9.3	9.9	10.5	11.1	11.7	12.2	7.7	8.2	8.7	9.2	9.7	10.1
TRAE 14RW	13.6	14.7	15.7	16.6	17.5	18.4	12.2	13.1	13.9	14.6	15.3	16.0	10.4	11.1	11.8	12.4	13.0	13.6	8.6	9.2	9.8	10.3	10.8	11.3
TRAE 20RW	20.6	22.3	23.8	25.2	26.6	27.9	18.6	20.0	21.1	22.2	23.3	24.3	15.8	16.8	17.9	18.8	19.8	20.6	13.1	14.0	14.8	15.6	16.4	17.1
TRAE 30RW	28.3	30.5	32.6	34.6	36.5	38.3	25.5	27.3	28.9	30.5	31.9	33.4	21.6	23.1	24.5	25.8	27.1	28.3	17.9	19.2	20.3	21.4	22.5	23.5
TRAE 35RW	38.2	41.3	44.1	46.8	49.3	51.7	34.4	36.8	39.1	41.2	43.2	45.1	29.2	31.2	33.1	34.9	36.6	38.2	24.2	25.9	27.5	29.0	30.4	31.7
TRAE 40RW	41.6	45.0	48.1	51.0	53.8	56.4	37.5	40.1	42.6	44.9	47.0	49.1	31.8	34.0	36.1	38.0	39.9	41.7	26.4	28.2	29.9	31.6	33.1	34.6
TRAE 50RW	49.6	53.5	57.2	60.7	64.0	67.1	44.7	47.8	50.7	53.4	56.0	58.5	37.9	40.5	43.0	45.3	47.5	49.6	31.4	33.6	35.7	37.6	39.4	41.2

TABLE 3. CORRECTION FACTORS

REFRIGERANT LIQUID TEMP. (°F)	CORRECTION FACTOR		
50	1.224	1.221	1.319
70	1.168	1.166	1.240
80	1.112	1.111	1.160
90	1.056	1.056	1.080
110	.943	.944	.915
120	.885	.886	.838
130	.828	.828	.756
140	.769	.768	.676

NOTE: Valve capacities are based on 100°F (37.8°C), vapour free liquid refrigerant entering the valve. To determine the capacities for other temperatures of vapour free liquid refrigerant entering the valve, multiply the capacities listed above by the correction factors listed in Table 3.

Nominal Capacities are shown in the outlined columns.

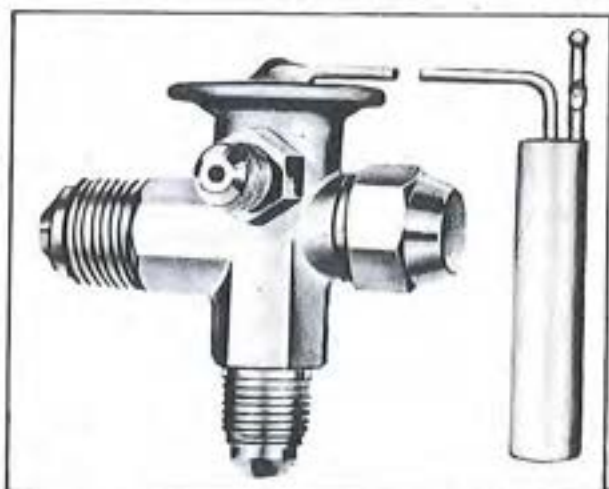
ORDERING PROCEDURE : REFER TO PAGE 105 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



RCD SERIES THERMO® EXPANSION VALVES FOR R12 - R22 - R502

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THE ALCO RCD AND RCDE SERIES EXPANSION VALVES ARE SPECIFICALLY DESIGNED FOR COMPACT REFRIGERATED DISPLAY CASES, REACH-IN AND WALK-IN COOLERS, AND OTHER COMMERCIAL APPLICATIONS RANGING FROM HIGH TO LOW TEMPERATURES



FEATURES

- Interchangeable and Removeable Cage Assemblies for Servicing and Capacity Determination
- "W" Charge for Evaporator Temp. Range -23 to +10°C (-10 to +50°F) "WZ" Charge for Evaporator Temp. Range -46 to -12°C (-50 to +10°F)
- Removeable Inlet Strainer
- Forged Brass Body
- All Position Mounting
- Small Compact — fits any Installation
- Corrosion Resistant materials — For Food Service Applications
- Internal (RCD) and External (RCDE) Equalizer

REFRIG.	CAT. NO.	TYPE RCD (Int. Equal)	CAT. NO.	TYPE RCDE (Ext. Equal)	NOMINAL * CAPACITY		LINE CONNECTIONS mm (ins.) SAE Inlet & Outlet	CAPILLARY TUBE LENGTH
					kW	Tons		
R12	1061	RCD¼FW	1067	RCDE¼FW	0.95	0.27	6 or 10 x 12 (1/4 or 3/8 x 1/2)	1.5 m 5 ft.
	1062	RCD½FW	1068	RCDE½FW	1.83	0.52		
	1063	RCD1FW	1069	RCDE1FW	3.52	1.00		
	1064	RCD1½FW	10610	RCDE1½FW	4.75	1.35		
	1065	RCD2FW	10611	RCDE2FW	6.86	1.95		
	1066	RCD3FW	10612	RCDE3FW	10.16	2.89		
R22	10613	RCD¼HW	10619	RCDE¼HW	1.51	0.43		
	10614	RCD1HW	10620	RCDE1HW	2.92	0.83		
	10615	RCD1½HW	10621	RCDE1½HW	5.63	1.60		
	10616	RCD2HW	10622	RCDE2HW	7.60	2.16		
	10617	RCD3HW	10623	RCDE3HW	10.97	3.12		
	10618	RCD5HW	10624	RCDE5HW	16.25	4.62		
R502	10625	RCD¼RW	10631	RCDE¼RW	1.06	0.30		
	10626	RCD½RW	10632	RCDE½RW	2.07	0.59		
	10627	RCD1RW	10633	RCDE1RW	3.97	1.13		
	10628	RCD1½RW	10634	RCDE1½RW	5.35	1.52		
	10629	RCD2RW	10635	RCDE2RW	7.70	2.19		
	10630	RCD3RW	10636	RCDE3RW	11.43	3.25		

12.34T Sept.1978

* Nominal Capacity based on +4°C (40°F) Evaporator Temperature and +38°C (100°F) vapour-free liquid refrigerant entering the valve at pressure drops of : R12 414 kPa (60 PSIG), R22 & R502 690 kPa (100 PSIG).

External Equalizer Connection 6 mm (¼") SAE.

MOTOR OVERLOAD PROTECTION If Required by Compressor Manufacturer			
APPLICATION	R12	R22	R502
COMMERCIAL	FW35	HW65	RW65
LOW TEMP.	FW15	HW35	RW35

SAFETY INSTRUCTIONS

Proper valve sizing is important. An over-sized valve may result in erratic control. An undersized valve may considerably reduce system capacity.
Do not exceed Safe Working Pressure 3100 kPa (450 PSIG)
Do not exceed Safe Temperature Limits 100°C (212°F)

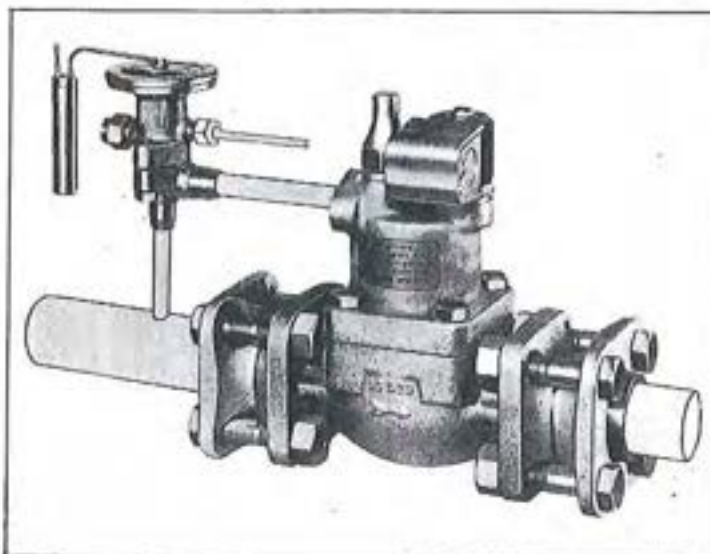
CAGE ASSEMBLY RATINGS & CAT. NO's							
CAGE NUMBER	CAT. NO.	NOMINAL CAPACITY — kW (Tons)					
		R12		R22		R502	
		kW	Tons	kW	Tons	kW	Tons
A	10637	0.88	¼	1.76	½	0.88	¼
B	10638	1.76	½	3.52	1	1.76	½
C	10639	3.52	1	5.28	1½	3.52	1
D	10640	5.28	1½	7.04	2	5.28	1½
E	10641	7.04	2	10.56	3	7.04	2
F	10642	10.56	3	17.60	5	10.56	3

FURTHER DETAILS AND MANUFACTURERS BULLETIN ON REQUEST



POS SERIES PILOT OPERATED THERMO® VALVES

FOR R12 - R22 - R500



The POS Series Valve is designed for large capacity applications in the Air Conditioning temperature range (above 0°C (32°F)), such as Chillers, where the evaporator has been designed for thermo expansion control from the superheat of the suction gas.

FEATURES

The POS series valve is piloted by a "T" series thermo valve and is controlled by an integral solenoid to provide positive liquid shut-off.

This piloted operated principle provides the advantage of a long stroke and the use of a characterized port for smooth modulation over the widest possible load range, maintaining positive control with loads reduced as low as 15% of nominal valve capacity.

The POS series valves are recommended for refrigeration systems having some form of compressor capacity reduction such as compressor cylinder unloading.

SYSTEM REFRIGERANT									SPECIFICATIONS				
R-12			R-22			R-500			SIZE AND STYLE OF CONNECTIONS		OVERALL DIMENSIONS		
CAT. NO.	VALVE TYPE	Nominal Capacity @ 60# PD.-Tons	CAT. NO.	VALVE TYPE	Nominal Capacity @ 100# PD.-Tons	CAT. NO.	VALVE TYPE	Nominal Capacity @ 60# PD.-Tons	Pilot Conn.	Line Conns.	Hgt.	Lgth.	Wdth. Body
1071	POS20F1	20.0	1072	POS20H1	20.0	1073	POS25C1	24.5	1/2" ODF (Integral) *1/2" Male Flare	1-1/8" ODF (2-Bolt, Flanged)	8 1/2"	6 3/4"	3 1/8"
1075	POS30F1	30.0	1074	POS30H1	30.0	1078	POS35C1	37.0		1-3/8" ODF (2-Bolt, Flanged)	8 1/2"	7 3/4"	4 1/8"
1079	POS40F1	40.0	1076	POS40H1	40.0	10710	POS50C1	49.4					
10711	POS50F1	50.0	10712	POS75H1	75.0	10714	POS60C1	61.6	1/2" ODF (Flanged) *1/2" Male Flare	1-5/8" ODF (4-Bolt, Flanged)	9 3/4"	10 3/4"	3 3/4"
10715	POS75F1	75.0	10713	POS100H1	100.0	10717	POS90C1	92.5		2-1/8" ODF (4-Bolt, Flanged)			
10718	POS100F1	100.0	10720	POS150H1	150.0	10722	POS125C1	123.4		2-5/8" ODF (4-Bolt, Flanged)			
10719	POS125F1	125.0	10721	POS200H1	200.0	10723	POS150C1	154.1		2-5/8" ODF (4-Bolt, Flanged)			
10724	POS150F1	150.0	—	—	—	10725	POS175C1	185.0		2-5/8" ODF (4-Bolt, Flanged)			
10726	POS200F1	200.0	—	—	—	10727	POS240C1	245.0			11 1/2"	13 7/8"	5 1/8"

* Available on request.

12.60 April 1980

PILOT THERMO VALVE							
SYSTEM REFRIGERANT						Standard Connections ODF	Pilot Solenoid Valve Voltages
R-12		R-22		R-500			
Cat. No.	Valve Type	Cat. No.	Valve Type	Cat. No.	Valve Type		
10210	TCLE2FW	10235	TCLE3HW	10260	TCLE250CW	3/8" x 3/8"	230V 50Hz 415V 50Hz Other Voltages to Special Order

ALCO POS SERIES CAGE ASSEMBLY						
Valve Type		Cat. No.	Part No.	Valve Type R-22	Cat. No.	Part No.
R-12	R-500					
POS20F1	POS25C1	10741	X7361-1	POS20H1	10749	X7361-15
POS30F1	POS35C1	10742	X7361-2	POS30H1	10748	X7361-16
POS40F1	POS50C1	10743	X7361-3	POS40H1	10746	X7361-17
POS50F1	POS60C1	10744	X5651-12	POS50H1	10747	X7361-18
POS75F1	POS90C1	10765	X5651-11	POS75H1	10767	X5651-1
POS100F1	POS125C1		X8508-1	POS100H1	10766	X5651-10
POS125F1	POS150C1		X8508-1	POS125H1		X5651
POS150F1	POS175C1		X5660	POS150H1		X8508-2
POS200F1	POS240C1		X6146	POS200H1		X8508-2

REMOTE BULB WELLS		
Cat. No.	Part No.	Conn. Size
10733	X5091-1	1 1/8" O.D.M.
10734	X5091-2	1 3/8" O.D.M.
10735	X5091-3	1 5/8" O.D.M.
10736	X5091-4	2 1/8" O.D.M.
10737	X5091-5	2 3/8" O.D.M.
10738	X5091-6	3 1/8" O.D.M.
10739	X5092-1	3/4" M.P.T.

When ordering specify the following :-

POS Valve Type Number : (Including integral Solenoid Valve voltage and frequency) Example: POS100F1 - 230 volts, 50 cycles.
Pilot Thermo Valve Type Number : (Example: TCLE 2 FW). Note: Unless otherwise specified the Pilot Valve will be supplied with 1.5 m (5 ft.) remote bulb tubing and the "W" power assembly charge for temperature range -23 to +10°C (-10 to +50°F).

SELECTION DETAILS & TABLES - Next Page



POS SERIES THERMO EXPANSION VALVES

SELECTION

1. Sizing the POS Valve

The POS Valve size is determined by the required capacity in tons of refrigeration and the pressure drop across the valve.

The pressure drop across the POS Valve will be the difference between discharge and suction pressures at the compressor, less the pressure drop in the liquid line and less the pressure drop through the evaporator, distributor, and suction line.

After determining the pressure drop across the POS Valve, select one having sufficient capacity for the load requirement at the calculated pressure drop. For example: Load requirement 100 tons capacity Refrigerant 12 at a 60 psi pressure drop. Consulting the Refrigerant 12 Capacity Table, we find under the 60 psi pressure drop column that a POS100F1 will be the proper valve.

2. Pilot Thermo Valve.

The pilot Thermo valve selection depends only on the system refrigerant. The recommended valves are listed on Page 107.

POS VALVE SELECTION TABLE

Valve Type	Pressure Drop Across Valve, psi												
	30	40	50	60	70	80	90	100	110	120	130	140	150
TONS OF REFRIGERATION, REFRIGERANT 12													
POS20F1	14.1	16.3	18.3	20.0	21.6	23.1	24.5	25.8	27.1	28.3	29.4	30.6	31.6
POS30F1	21.2	24.5	27.4	30.0	32.4	34.6	36.7	38.7	40.6	42.4	44.2	45.8	47.4
POS40F1	28.3	32.7	36.5	40.0	43.2	46.2	49.0	51.6	54.2	56.6	58.9	61.1	63.2
POS50F1	35.4	40.8	45.6	50.0	54.0	57.7	61.2	64.5	67.7	70.7	73.6	76.4	79.1
POS75F1	53.0	61.2	68.5	75.0	81.0	86.6	91.9	96.8	102.0	106.0	110.0	115.0	119.0
POS100F1	70.7	81.6	91.3	100.0	108.0	116.0	123.0	129.0	135.0	141.0	147.0	153.0	158.0
POS125F1	88.4	102.0	114.0	125.0	135.0	144.0	153.0	161.0	169.0	177.0	184.0	191.0	198.0
POS150F1	106.0	123.0	137.0	150.0	162.0	173.0	184.0	194.0	203.0	212.0	221.0	229.0	237.0
POS200F1	141.0	163.0	183.0	200.0	216.0	231.0	245.0	258.0	271.0	283.0	294.0	306.0	316.0
Valve Type	Pressure Drop Across Valve, psi												
	80	90	100	110	120	130	140	150	160	170	180	190	200
TONS OF REFRIGERATION, REFRIGERANT 22													
POS20H1	17.9	19.0	20.0	21.0	21.9	22.8	23.7	24.5	25.3	26.1	26.8	27.6	28.3
POS30H1	26.8	28.5	30.0	31.5	32.9	34.2	35.5	36.7	37.9	39.1	40.2	41.4	42.4
POS40H1	35.8	37.9	40.0	42.0	43.8	45.6	47.3	49.0	50.6	52.2	53.7	55.1	56.6
POS50H1	44.7	47.4	50.0	52.0	54.8	57.0	59.2	61.2	63.2	65.2	67.1	68.9	70.7
POS75H1	67.1	71.2	75.0	78.7	82.2	85.5	88.7	91.9	94.9	97.8	101.0	103.0	106.0
POS100H1	89.4	94.9	100.0	105.0	110.0	114.0	118.0	123.0	127.0	130.0	134.0	138.0	141.0
POS125H1	112.0	119.0	125.0	131.0	137.0	143.0	148.0	153.0	158.0	163.0	168.0	172.0	177.0
POS150H1	134.0	142.0	150.0	157.0	164.0	171.0	177.0	184.0	190.0	196.0	201.0	207.0	212.0
POS200H1	179.0	190.0	200.0	210.0	219.0	228.0	237.0	245.0	253.0	261.0	268.0	276.0	283.0
Valve Type	Pressure Drop Across Valve, psi												
	30	40	50	60	70	80	90	100	110	120	130	140	150
TONS OF REFRIGERATION, REFRIGERANT 500													
POS25C1	17.4	20.1	22.6	24.5	26.2	28.2	29.9	31.6	33.3	34.6	36.0	37.5	38.7
POS35C1	26.2	30.4	34.1	37.0	39.6	42.5	45.2	47.7	50.3	52.2	54.4	56.6	58.4
POS50C1	35.0	40.5	45.5	49.4	52.8	56.8	60.3	63.7	67.2	69.6	72.6	75.6	78.2
POS60C1	43.7	50.5	56.7	61.6	66.0	70.8	75.1	79.5	83.7	86.8	90.5	93.2	97.3
POS80C1	65.5	75.8	85.1	92.5	98.8	106.4	112.9	119.3	125.8	130.3	136.0	141.6	146.2
POS125C1	87.6	101.2	113.8	123.4	132.1	142.0	150.6	159.1	167.9	174.0	181.5	188.9	195.0
POS150C1	109.4	126.5	142.0	154.1	165.0	177.0	188.0	198.8	209.5	217.6	226.5	236.0	243.8
POS175C1	131.2	152.0	171.0	185.0	198.0	212.5	225.8	238.3	251.5	260.4	272.0	283.0	292.2
POS240C1	173.9	201.0	225.6	245.0	262.0	281.5	299.0	316.0	333.2	345.8	360.0	374.8	387.5

12.60 April 1980

NOTE : Capacities based on 4.4°C(40°F) evaporating temperature and 38°C(100°F) vapour free liquid entering the valve.

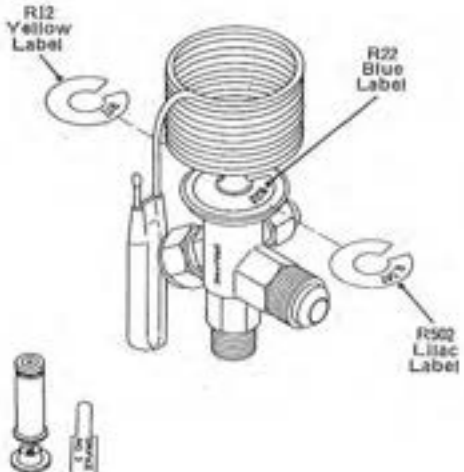
ORDERING PROCEDURE : REFER TO PAGE 107 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

Danfoss THERMOSTATIC EXPANSION VALVES

TYPE T2 and TE2 FOR R12, R22, R502

EXPANSION VALVES WITH INTERCHANGEABLE ORIFICE ASSEMBLY

(A Range of 6 Valves — each with a range of 7 Orifices for Capacity Variation)



Range: -40°C to $+10^{\circ}\text{C}$ (-40°F to $+50^{\circ}\text{F}$)

Valve colour coding — Yellow Label = R 12
Blue Label = R 22
Lilac Label = R502

T2 = Internally Equalized
TE2 = Externally Equalized

Superheat: Factory set for 6°C (11°F) at a bulb temperature of 0°C ($+32^{\circ}\text{F}$)

 1 rev $\sim 4^{\circ}\text{C}$ (7°F)

Connections: Angleway
T2 — Inlet x Outlet — $1/4'' \times 1/2''$ Flare
TE2 — Inlet x Outlet x Equal. Conn. — $1/4'' \times 1/2'' \times 1/4''$ Fl.
Capillary Tube Length 1.5 m (5 ft.)

VALVE				+	ORIFICE			=	CAPACITY			
REFRIG.	VALVE WITHOUT ORIFICE			PRESS.	+	ORIFICE			=	RATED		EQUIVALENT OLD VALVE TYPE
	CAT. NO.	MODEL	CODE NO.	EQUAL.		+ Filter + Cap. Tube Label	CAPACITY*					
						CAT. NO.	ORIFICE NO.	CODE NO.		kW	Tons	
R12	10848	TF :	68-3202	INT.	+	10827	0	68-2003	=	0.7	0.2	TF/TEF2-0.2
						10821	1	68-2004		1.0	0.3	TF/TEF2-0.3
						10822	2	68-2005		1.7	0.5	TF/TEF2-0.5
						10823	3	68-2006		3.5	1.0	TF/TEF2-1.0
	10849	TEF :	68-3204	EXT.		10824	4	68-2007		5.2	1.5	TF/TEF2-1.5
						10825	5	68-2008		7.0	2.0	TF/TEF2-2.0
						10826	6	68-2009		10.5	3.0	TF/TEF2-3.0
R22	10850	TX :	68-3206	INT.	+	10827	0	68-2003	=	1.0	0.3	TX/TEX2-0.3
						10821	1	68-2004		1.7	0.5	TX/TEX2-0.5
						10822	2	68-2005		2.8	0.8	TX/TEX2-0.8
						10823	3	68-2006		5.2	1.5	TX/TEX2-1.5
	10851	TEX :	68-3209	EXT.		10824	4	68-2007		8.0	2.3	TX/TEX2-2.3
						10825	5	68-2008		10.5	3.0	TX/TEX2-3.0
						10826	6	68-2009		15.0	4.5	TX/TEX2-4.5
R502	10852	TY :	68-3212	INT.	+	10827	0	68-2003	=	0.7	0.2	TY/TEY2-0.2
						10821	1	68-2004		1.0	0.3	TY/TEY2-0.3
						10822	2	68-2005		1.7	0.5	TY/TEY2-0.5
						10823	3	68-2006		3.5	1.0	TY/TEY2-1.0
	10853	TEY :	68-3215	EXT.		10824	4	68-2007		5.2	1.5	TY/TEY2-1.5
						10825	5	68-2008		7.0	2.0	TY/TEY2-2.0
						10826	6	68-2009		10.0	3.0	TY/TEY2-3.0

KK.10.A2.02/KD.11.A1.02/KN.11.F3.02

* Rated Capacity at $+5^{\circ}\text{C}$ (40°F) evap. temp. and 32°C (90°F) cond. temp.

Danfoss

THERMOSTATIC EXPANSION VALVES

TYPE TE5 FOR R12, R22, R500, R502

RANGE N: -40°C to +10°C (-40°F to +50°F).

TE5
Flare, angleway



TE5
Solder, straightway



TE5
Solder, angleway



Refrig	Rated Cap. Tons kW kcal/h	Valve type Press Equal	Assembled Valve						Orifice Assembly		Capacity table (British units) Capacity in tons						
			Cat.No. — Code No. — Connections		Cat.No. — Code No. — Connections		Cat.No. — Code No. — Connections				Evap. temp.		pressure drop across the valve				
			Flare angle-way inlet x outlet	Solder angle-way inlet x outlet	Solder straight-way inlet x outlet	Cat.No.	Code No.	Cat.No.	Code No.	Cat.No.	Code No.	°C	°F	40	100	150	200	225
R12	2 7.03 6000	TEF 5-2 Ext.	10951	68B6227 3/8" x 5/8"	10952	68B6233 1/2" x 5/8"	1092	68B6230 1/2" x 5/8"	10916	No. 1 68B2089	+10	+50	2.0	2.9	3.8		
											-7	+20	1.5	2.0	2.5		
											-18	0	1.2	1.5	1.8		
											-29	-20		1.05	1.3		
											-40	-40		0.57	0.7		
	3 10.6 9000	TEF 5-3 Ext.	1091	68B6228 3/8" x 5/8"	1094	68B6234 1/2" x 5/8"	1093	68B6231 1/2" x 5/8"	10917	No. 2 68B2090	+10	+50	2.8	3.9	4.7		
											-7	+20	2.4	3.0	3.5		
											-18	0	2.0	2.4	2.7		
											-29	-20		1.8	2.1		
											-40	-40		1.3	1.4		
	5 17.6 15000	TEF 5-5 Ext.	1096	68B6229 1/2" x 5/8"	1097	68B6235 1/2" x 7/8"	1098	68B6232 1/2" x 7/8"	10918	No. 3 68B2091	+10	+50	5.4	7.0	8.3		
											-7	+20	4.9	5.7	6.4		
										-18	0	4.1	4.6	5.1			
										-29	-20		3.5	3.7			
										-40	-40		2.3	2.4			
	8 28.1 24000	TEF 5-8 Ext.	10949	68B8077 5/8" x 7/8"	1099	68B8077 5/8" x 7/8"			10919	No. 4 68B2092	+10	+50	7.6	9.7	10.3		
											-7	+20	6.3	8.0	8.6		
											-18	0		6.9	7.4		
											-29	-20		5.6	5.9		
											-40	-40		4.2	4.6		
R22	3 10.6 9000	TEX 5-3 Ext.	10910	68B6281 3/8" x 5/8"	10911	68B6287 1/2" x 5/8"	10953	68B6284 1/2" x 5/8"	10916	No. 1 68B2089 was 68B2107	+10	+50	2.5	3.6	4.9	6.7	
											-7	+20	2.1	2.9	3.7	4.7	
											-18	0		2.2	2.7	3.5	
											-29	-20		1.0	1.9	2.4	
											-40	-40		0.9	1.1	1.4	
	4.5 15.8 13500	TEX 5-4.5 Ext.	10912	68B6282 3/8" x 5/8"	10913	68B6288 1/2" x 5/8"	10954	68B6285 1/2" x 5/8"	10917	No. 2 68B2090 was 68B2108	+10	+50	3.7	4.7	5.9	7.4	
											-7	+20	3.3	4.1	4.8	5.7	
											-18	0		3.5	4.0	4.7	
											-29	-20		2.8	3.2	3.7	
											-40	-40		2.0	2.3	2.7	
	7.5 26.4 22500	TEX 5-7.5 Ext.	10914	68B6283 1/2" x 5/8"	10915	68B6289 1/2" x 7/8"	10955	68B6286 1/2" x 7/8"	10918	No. 3 68B2091 was 68B2109	+10	+50	6.8	8.6	10.3	12.5	
											-7	+20	6.4	7.5	8.6	9.8	
										-18	0		6.7	7.6	8.6		
										-29	-20		5.3	6.0	6.9		
										-40	-40		3.5	3.9	4.4		
	12 42.2 36000	TEX 5-12 Ext.			10920	68B8078 5/8" x 7/8"			10919	No. 4 68B2092	+10	+50	10.0	13.7	15.1	15.9	16.8
											-7	+20	9.0	11.9	13.0	13.7	13.8
											-18	0	7.8	10.6	11.4	12.2	12.3
											-29	-20		9.2	10.0	10.7	10.8
											-40	-40		7.5	8.3	9.0	9.1
R502	2 7.03 6000	TEY 5-2 Ext.	10956	68B7089 3/8" x 5/8"			10943	68B7092 1/2" x 5/8"	10916	No. 1 68B2089 was 68B2143	+10	+50	2.5	3.1	3.7	4.1	4.4
											-7	+20	2.0	2.4	2.7	3.1	3.2
											-18	0		2.1	2.3	2.5	2.6
											-29	-20		1.6	1.8	2.0	2.0
											-40	-40		1.2	1.3	1.5	1.5
	3 10.6 9000	TEY 5-3 Ext.	10944	68B7090 3/8" x 5/8"			10921	68B7093 1/2" x 5/8"	10917	No. 2 68B2090 was 68B2144	+10	+50	2.8	3.5	4.1	4.7	5.0
											-7	+20	2.5	2.8	3.2	3.5	3.7
											-18	0		2.3	2.6	2.8	3.0
											-29	-20		1.7	1.9	2.1	2.3
											-40	-40		1.3	1.4	1.5	1.5
	5 17.6 15000	TEY 5-5 Ext.	10945	68B7091 1/2" x 5/8"			10922	68B7094 1/2" x 7/8"	10918	No. 3 68B2091 was 68B2145	+10	+50	5.7	6.8	7.8	8.8	9.3
											-7	+20	5.0	5.5	6.0	6.5	6.8
										-18	0		4.6	5.0	5.3	5.5	
										-29	-20		3.5	3.7	4.0	4.1	
										-40	-40		2.3	2.4	2.6	2.7	
Separate Power Element			R12 Cat.No.10923 Code No.68B3244				R22 Cat.No.10924 Code No.68B3250				R502 Cat. No. 10925 Code No. 68B3257						

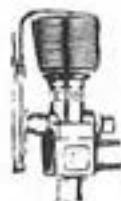


THERMOSTATIC EXPANSION VALVES

TYPE TE12 FOR R12, R22, R502.

RANGE N : -40 to +10°C (-40 to +50°F)

Maximum Bulb Temp. (Valve fitted) 100°C (+212°F). Maximum Test Press. 2758 kPa (400 psig).



ANGLE-WAY



STRAIGHT-WAY

Refrig.	Valve Type	Press. Equal. ¾" Fl.	Assembled Valve & Connections				Orifice Assembly		Separate Power Element	
			Solder Straight-way		Solder Angle-way					
			Cat.No.	Code No.	Cat.No.	Code No.	Cat.No.	Code No.	Cat.No.	Code No.
R12	TEF 12-8	ext.	1101	68B5019 7/8" X 1-1/8"			11023	No.3 68B2007	11016	68B3204
	TEF 12-12	ext.	1102	68B5020 7/8" X 1-1/8"	1104	68B5024 7/8" X 1-1/8"	11021	No.4 68B2008		
R22	TEX 12-18	ext.	1103	68B5138 7/8" X 1-1/8"	1108	68B5142 7/8" X 1-1/8"	11021	No.4 68B2008 was 68B2020	11017	68B3210
R502	TEY 12-8	ext.	11012	68B5233 7/8" X 1-1/8"			11023	No.3 68B2007 was 68B2067	11018	68B3218
	TEY 12-12	ext.	11013	68B5234 7/8" X 1-1/8"			11021	No.4 68B2008 was 68B2068		

Standard Capillary Length 3 m (10 ft.) — Standard.

KK.10.A2.02

Standard Capillary Length 3 m (10 ft.) — Standard.

KK.10.A2.02

Refrig.	Valve Type	Capacities in tons at:											Nominal Rated Capacity		
		Evap. Temp.		Pressure drop across the valve, psi.											
		°C	°F	40	60	80	100	125	150	175	200	225	tons	kW	kcal/h
R12	TEF 12-8	+10 +5 -7 -18 -29 -40	+50 +40 +20 0 -20 -40	7.6 7.4 7.0 6.6 5.7 4.3	8.2 8.0 7.4 6.8 5.8 4.3	8.9 8.7 7.8 7.0 5.9 4.4	9.6 9.4 8.2 7.1 6.0 4.5	10.4 10.2 8.6 7.3 6.0 4.5	11.3 11.0 9.2 7.5 6.2 4.5				8	28.1	24000
	TEF 12-12	+10 +5 -7 -18 -29 -40	+50 +40 +20 0 -20 -40	11.1 11.0 10.6 9.7 8.8 6.5	12.2 12.0 11.4 10.3 9.0 6.5	13.3 13.1 12.2 10.8 9.0 6.6	14.4 14.2 13.1 11.4 9.3 6.7	15.5 15.3 13.9 11.9 9.6 6.8	17.1 16.8 15.1 12.5 9.9 6.8				12	42.2	36000
R22	TEX 12-18	+10 +5 -7 -18 -29 -40	+50 +40 +20 0 -20 -40	14.8 14.6 14.3 14.6 13.0 10.2	16.0 15.5 15.4 14.6 13.0 10.2	17.3 16.8 16.3 15.6 13.9 10.2	18.7 18.1 17.6 16.5 13.9 10.7	20.5 20.0 19.2 17.7 15.5 11.2	22.5 22.0 20.5 19.0 16.3 11.8	25.0 24.5 23.0 20.5 17.0 12.3	27.5 26.5 25.0 22.0 17.0 12.3		18	63.3	54000
R502	TEY 12-8	+10 +5 -7 -18 -29 -40	+50 +40 +20 0 -20 -40	7.6 7.6 7.2 7.1 6.1 4.6	8.1 8.0 7.5 7.1 6.1 4.6	8.4 8.3 7.7 7.2 6.2 4.6	8.8 8.6 8.0 7.3 6.2 4.6	9.2 9.0 8.2 7.4 6.3 4.6	9.8 9.5 8.6 7.6 6.3 4.6	10.3 9.9 8.6 7.8 6.4 4.7	10.8 10.3 9.3 8.0 6.5 4.7	11.3 10.8 9.6 8.2 6.6 4.8	8	28.1	24000
	TEY 12-12	+10 +5 -7 -18 -29 -40	+50 +40 +20 0 -20 -40	11.2 11.4 10.8 10.3 9.1 7.1	11.9 12.0 11.3 10.3 9.1 7.1	12.5 12.6 11.7 10.6 9.1 7.1	13.3 13.2 12.3 11.1 9.3 7.1	14.0 13.8 12.8 11.3 9.4 7.1	15.0 14.7 13.6 11.8 9.7 7.2	15.8 15.4 14.3 12.3 10.0 7.3	16.6 16.2 14.8 13.2 10.2 7.3	17.6 17.0 15.5 13.2 10.4 7.4	12	42.2	36000

Valve capacity based on evaporating temperature +40°F (+5°C), condensing temperature +90°F (+32°C), with 7°F (4°C) subcooling ahead of valve.



TE 20
Solder, straightway

Valve Type	Press. Equal.	ASSEMBLED VALVE & CONNECTIONS				Orifice Assembly New (Old)		Separate Power Element New (Old)	
		Solder Straight-way		Solder Angle-way		Cat.No.	Code No.	Cat.No.	Code No.
		Cat.No.	Code No.	Cat.No.	Code No.				
TEF 20-20 R12	ext.	1111	68B8100 7/8" X 1-1/8"	1114	68B8101 7/8" X 1-1/8"	1116	68B2170 (68B1170)	1119	68B3270 (68B3070)
TEX 20-30 R22	ext.	1112	68B8116 7/8" X 1-1/8"	1115	68B8117 7/8" X 1-1/8"	1117	68B2172 (68B1172)	11110	68B3274 (68B3074)
TEY 20-20 R502	ext.	1113	68B8140 7/8" X 1-1/8"			1118	68B2175 (68B1175)	11111	68B3280 (68B3080)

KK.10.A2.02

Design

Valves consist of three main components:

1. Valve top part with capillary tube and bulb (power element).
2. Interchangeable orifice assembly.
3. Valve housing with connections.

This valve design gives easy fitting and service.

All valves are supplied with 10 ft. (3 m) capillary tube as standard with a bulb of dimensions which are adapted to modern requirements for compact design.

Permissible Pressures and Temperatures:

Maximum permissible bulb temperature: 100°C (212°F).

Maximum permissible test pressure: 400 psig (2758 kPa).

The high maximum test pressure allows the valve to remain in the line during pressure testing.

Identification

The power element has a coloured label on the top. The colour refers to the refrigerant for which the valve can be used:

YELLOW label = R 12.

BLUE label = R 22.

LILAC label = R 502.

The label indicates valve type, refrigerant and temperature range.

The power element has a strap-on label with indication of the rated capacity of the valve. The Orifice Assembly is marked on top of the spring cup.

Refrigerant	Evap Temp.		Capacities in tons									Nominal Rated Capacity		
			Pressure drop across the valve psi.											
	°C	°F	40	60	80	100	125	150	175	200	225	tons	kW	kcal/h
R 12	+10	+50	18.7	21.0	22.6	23.7	24.5	25.0				20	70.3	60000
	+5	+40	17.1	19.6	21.2	22.5	23.2	23.7						
	-7	+20	14.0	16.2	17.7	19.0	20.0	20.5						
	-18	0	10.3	11.8	13.2	14.2	14.9	15.2						
	-29	-20		8.2	8.8	9.2	9.5	9.8						
	-40	-40		6.8	7.4	7.7	8.0	8.2						
R 22	+10	+50	23.3	28.3	31.2	32.5	34.2	35.0	35.8	36.2		30	105.5	90000
	+5	+40	21.2	25.0	27.8	30.0	31.7	32.6	33.4	33.8				
	-7	+20	17.5	20.7	23.0	24.5	26.2	27.5	28.2	28.4				
	-18	0		17.0	18.7	20.0	21.0	21.7	22.1	22.5				
	-29	-20			14.2	15.0	15.8	16.5	17.0	17.2				
	-40	-40			12.2	12.8	13.5	13.8	14.2	14.5				
R 502	+10	+50	16.5	19.2	20.8	22.2	23.5	24.7	25.7	26.3	26.7	20	70.3	60000
	+5	+40	16.3	18.3	20.0	21.3	22.5	23.5	24.3	25.0	25.1			
	-7	+20		16.3	17.8	19.0	20.0	20.7	21.2	21.5	21.6			
	-18	0			14.5	15.5	16.2	16.7	17.0	17.2	17.4			
	-29	-20			11.0	11.5	11.8	12.2	12.5	12.5	12.5			
	-40	-40			8.7	9.2	9.5	9.9	10.0	10.0	10.0			

Valve capacity based on evaporating temperature +40°F (+5°C), condensing temperature +90°F (+32°C).



THERMOSTATIC EXPANSION VALVES

TYPE TE55 FOR R12, R22.



TE 55
Solder, straightway

DESIGN

Valve consists of three main components:

1. Valve top part with capillary tube and bulb (power element).
2. Interchangeable orifice assembly.
3. Valve housing with connections.

The two orifice assemblies which are specified in the capacity tables fit the same housing and power element.

All valves are supplied with 3 m (10 ft.) of capillary tube as standard.

ADJUSTMENT

Type TE 55 has a factory setting of 4°C (7°F) superheat at a bulb temperature of 0°C (+32°F) (range "N").

If necessary, this setting can be altered by turning the adjusting spindle. If the spindle is turned clockwise, the superheat is increased, and vice versa.

REFRIG	NOMINAL RATED CAPACITY			VALVE TYPE	PRESS. EQUAL	ASSEMBLED VALVE & CONNECTIONS SOLDER STRAIGHT-WAY		ORIFICE ASSEMBLY		SEPARATE POWER ELEMENT	
	TONS	kW	kcal/h			CAT.NO.	CODE NO.	CAT.NO.	CODE NO.	CAT.NO.	CODE NO.
R12	33	116.1	99000	TEF 55-33	Ext.	1121	68G5001 7/8"x1-1/8"	1128	68G2001	11215	68G3201
	55	193.4	165000	TEF 55-55	Ext.	1122	68G5002 7/8"x1-1/8"	1129	68G2002		
R22	50	175.9	150000	TEX 55-50	Ext.	1123	68G5033 7/8"x1-1/8"	11210	68G2005	11216	68G3205
	85	299	255000	TEX 55-85	Ext.	1124	68G5034 7/8"x1-1/8"	11211	68G2006		

KK.10.A2.02

REFRIG.	VALVE TYPE	Evap. Temp.		CAPACITY IN TONS AT:							
				PRESSURE DROP ACROSS THE VALVE — PSI							
		°C	°F	40	60	80	100	125	150	175	200
R12	TEF 55-33	+10	+50	36.0	41.0	44.2	46.7	48.5	49.7		
		+5	+40	33.5	38.5	41.7	44.3	46.0	47.0		
		-7	+20	28.5	32.5	35.3	37.8	39.7	40.8		
		-18	0	22.5	24.7	26.3	27.8	28.5	29.5		
		-29	-20	15.6	17.2	18.7	19.4	20.0	20.6		
		-40	-40		13.2	14.0	14.7	15.0	15.3		
	TEF 55-55	+10	+50	49.2	57.2	62.5	66.3	69.4	70.3		
		+5	+40	46.0	53.5	59.2	62.2	65.0	66.0		
		-7	+20	39.2	45.2	49.0	52.2	54.5	55.6		
		-18	0	31.2	35.0	37.5	39.4	40.6	41.7		
		-29	-20	22.0	24.4	26.0	27.2	28.5	29.2		
		-40	-40		19.4	20.6	21.3	22.0	22.3		
R22	TEX 55-50	+10	+50	41.2	46.9	51.3	55.2	59.0	62.1	63.8	64.1
		+5	+40	38.8	44.7	48.8	52.2	56.0	58.4	60.7	61.5
		-7	+20	33.1	38.5	42.8	46.0	49.0	50.8	52.5	
		-18	0		31.0	34.2	36.0	38.3	40.0	41.3	42.0
		-29	-20			26.3	27.8	29.6	30.8	32.0	32.5
		-40	-40				21.7	22.5	23.3	23.7	24.0
	TEX 55-85	+10	+50	72.5	84.0	93.0	100.0	106.0	112.0	115.0	118.0
		+5	+40	69.5	80.7	89.5	95.8	103.0	107.0	111.0	114.0
		-7	+20	62.0	70.5	78.3	84.6	90.0	94.7	97.9	100.0
		-18	0		59.0	64.0	68.3	72.5	75.6	77.5	77.9
		-29	-20			48.7	52.5	55.6	57.5	59.2	60.0
		-40	-40				40.0	42.0	44.0	45.0	45.6

Valve Capacity based on evaporating temperature +5°C (+40°F), condensing temperature +32°C (+90°F) with +4°C (+7°F) subcooling ahead of valve.

SAGINOMIYA THERMO EXPANSION VALVES

SERIES AFX, BFX, BHX AND ATX FOR R12, R22 AND R502



BFX

Saginomiya TX Valves are precision made to suit all applications.

Type AFX — fitted with internal equaliser.

Types BFX, BHX and ATX — fitted with external equaliser.

Types AFX and BFX — have bellows elements.

Types ATX & BHX — have diaphragm elements.

TEMPERATURE RANGE

0°C to -30°C

(32°F to -22°F)

Other Temperature Ranges available on application



ATX,

CAT. NO.	VALVE TYPE	NOM. CAP. TONS R12	PRESS. EQUAL. CONN.	AVAIL. CHARGE	PORT DIAM. (mm)	CAPILLARY LENGTH	CONNECTIONS	
	PART NO.						INLET	OUTLET
113101	AFX 3403 BRC	0.3	INT	C (CROSS)	1.2	1.2 m (4 ft.)	3/8" Flare	1/2" Flare
113102	AFX 3405 BRC	0.5			2.0			
113103	AFX 3410 BRC	1.0			2.3			
113104	AFX 3415 BRC	1.5			2.8			
113105	AFX 3420 BRC	2.0			3.7			
113106	AFX 3430 BRC	3.0			5.0			
113110	BFX 3403 BRC	0.3	EXT	C (CROSS)	1.2	1.2 m (4 ft.)	3/8" Flare	1/2" Flare
113111	BFX 3405 BRC	0.5			2.0			
113112	BFX 3410 BRC	1.0			2.3			
113113	BFX 3415 BRC	1.5			2.8			
113114	BFX 3420 BRC	2.0			3.7			
113115	BHX 45030 BRS	3.0			4.0	1.2 m (4 ft.)	1/2" Flare	5/8" Flare
113116	BHX 45040 BRS	4.0		S (SPEC.)	5.6			
113126	ATX 34006 DRL	0.6	EXT	L (LIQUID)	3.0	1.5 m (5 ft.)	3/8" Solder	1/2" Solder
113127	ATX 34013 DRL	1.3			4.0			
113128	ATX 34023 DRL	2.3			4.0			
113129	ATX 34035 DRL	3.5			5.0			
113130	ATX 57060 DRL	6.0			6.0	2.0 m (6.5 ft.)	5/8" OD Solder	7/8" OD Solder
113131	ATX 57080 DRL	8.0			8.0			
113132	ATX 71110 DRL	11.0			10.0			
113133	ATX 71140 DRL	14.0			11.0			
113134	ATX 71160 DRL	16.0			11.0			
113135	ATX 12220 DRL	22.0			11.6	3.0 m (10 ft.)	1" OD Solder	1" OD Solder
113136	ATX 12270 DRL	27.0			12.7			
113137	ATX 12330 DRL	33.0			13.8			
113138	ATX 12420 DRL	42.0			15.1			
113139	ATX 12500 DRL	50.0			16.1			

Nominal Capacities based on +5°C (+40°F) Evap. Temp. and +38°C (+100°F) Cond. Temp.

SAGINOMIYA TX VALVES ALSO AVAILABLE FOR REFRIGERANTS R22 & R502
MANUFACTURERS TECHNICAL DATA SHEETS AVAILABLE ON REQUEST

NOTE : FIRST 3 NUMERALS OF CAT. NO. INDICATES PAGE No.


»TERMEX«[®]
**THERMOSTATIC EXPANSION VALVE WITH
INTERCHANGEABLE CARTRIDGE**

CONSTRUCTION : The "TERMEX" thermostatic expansion valve is of unusual design, showing many improvements over previous models. The "TERMEX" is an all metal valve, having a body completely hermetically sealed. The interchangeable cartridge of the "TERMEX" represents an outstanding improvement. This cartridge contains all the most essential moving parts which may be subjected to aging and wear including the needle and seat assembly. Consequently by interchanging this cartridge it is possible to easily repair a valve in the field. By means of a test plug it can be ascertained whether the charge is intact, and it is only required to remove the cartridge to effect this test.

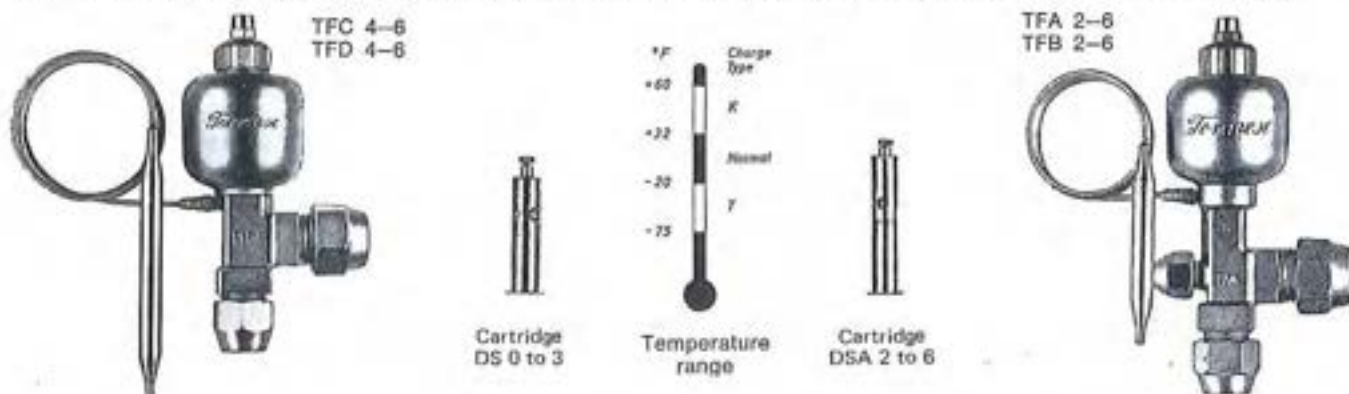
SELECTIVE CHARGES : The "TERMEX" is gas charged but contrary to previous charges, only the bulb is sensitive to temperature. Therefore the "TERMEX" may be installed in any temperature and in any position.

STANDARD CHARGE for Evaporation Temperatures Ranging from -30°C to 0°C (-20°F to $+32^{\circ}\text{F}$).

HIGH TEMP. CHARGE (Suffix letter K after valve number) for Evaporation Temperatures Ranging from 0°C to 16°C ($+30^{\circ}\text{F}$ to $+60^{\circ}\text{F}$).

LOW TEMP. CHARGE (Suffix letter T after valve number) for Evaporation Temperatures Ranging from -30°C to -60°C (-20°F to -75°F).

When ordering High Temp. or Low Temp. Valves make sure to quote the suffix letter K or T after valve number e.g. TFC6K, TFD6T, etc.



Temp.	Valve Type			Valve Type			Connections Flare		Press. Equal.	Capil'y	Cartridge		Test Plug				
Range	Cat.No.	R 12	Nom. Cap.	Cat.No.	R 22	Nom. Cap.	Inlet	Out- let	Conn.	Lgth.	Cat.No.	P/N	Cat.No.	P/N			
Standard Charge -30° to 0°C (-20 to +32°F)	1141	TFC 0	0.25		TFD 0	0.43	1/4" (3/8")	1/2"	INT.	1 m (3ft.)	11430	DS 0	11438	AF6			
	1142	1	0.33	1148	1	0.56					11431	1					
	1143	2	0.66	1149	2	1.12					11432	2					
	1144	3	1.20	11410	3	2.04					11433	3					
	1145	4	2.40	11411	4	4.08					1.5 m (5ft.)	11434			DSA4	11439	A211
	1146	5	3.40	11412	5	5.78						11435			5		
	1147	6	4.80	11413	6	8.16		11436	6								
	11460	TFA 2	0.60	11465	TFB 2	1.02	3/8" (1/2")	5/8"	EXT.	2 m (6ft.)	11447	DSA2	11438	AF6			
	11461	3	1.20	11466	3	2.04					11437	3					
	11462	4	2.40	11467	4	4.08					11434	4					
	11463	5	3.40	11468	5	5.78					11435	5					
	11464	6	4.80	11469	6	8.16					11436	6					
Low Temp. Charge -30° to -60°C (-20° to -75°F)	11414	TFC1T	0.66	11418	TFD1T	0.56	1/4" (3/8")	1/2"	INT	1 m (3ft.)	11431	DS 1	11438	AF6			
	11415	2T	1.20	11419	2T	1.12					11432	2					
	11416	3T	2.40	11420	3T	2.04					11433	3					
	11417	4T		11421	4T	4.08	3/8" (1/2")	5/8"		(5ft.)	11434	DSA4	11439	A211			
High Temp. Charge 0° to 16°C (+30 to +60°F)	11422	TFA 3K	1.20	11426	TFB 3K	2.04	3/8" (1/2")	5/8"	EXT.	2 m (6ft.)	11437	DSA 3	11438	AF6			
	11423	4K	2.40	11427	4K	4.08					11434	4					
	11424	5K	3.40	11428	5K	5.78					11435	5					
	11425	6K	4.80	11429	6K	8.16					11436	6					


FAS TYPE TKC (R12) - TKD (R22) - TKCZ (R502)
DIAPHRAGM TYPE THERMOSTATIC EXPANSION VALVE

Designed with pressure proved fine steel diaphragm, shorter cartridge, elongated capillary tube, otherwise the same function, connections and advantages as the Types TFC (D).

STANDARD CHARGE TEMP. RANGE - EXTERNALLY EQUALIZED

VALVE TYPE			VALVE TYPE			VALVE TYPE			CONN.Flare		CAP. LGTH.	CARTRIDGE	
CAT.NO.	R12	CAP.	CAT.NO.	R22	CAP.	CAT.NO.	R502	CAP.	IN	OUT		CAT.NO.	P/N
11483	TKC 0	0.23	11487	TKD 0	0.37	11491	TKCZ 0	0.29	$1/4"$ ($3/8"$)	$1/2"$	1.5 m (5 ft.)	11495	D 0
11484	1	0.33	11488	1	0.54	11492	1	0.42				11496	D 1
11485	2	0.65	11489	2	1.10	11493	2	0.85				11497	D 2
11486	3	1.30	11490	3	2.20	11494	3	1.70				11498	D 3

Nominal Capacities - Tons - Based on $+5^{\circ}\text{C}$ ($+40^{\circ}\text{F}$) Evap. Temp. and $+38^{\circ}\text{C}$ ($+100^{\circ}\text{F}$) Cond. Temp.
Limit Points:- R12 Valves up to 448kPa(65 psi), R22 Valves up to 621kPa(90 psi), R502 Valves up to 552kPa(80 psi).

ALCO'S VENTURI-FLO® REFRIGERANT DISTRIBUTOR

TECH. PAGE 115



DISTRIBUTOR OPERATING PRINCIPLES

The Venturi-Flo distributor consists of a converging section, a throat, and a diverging section as shown in Figure 2. The smooth contoured approach of the converging section (point A) avoids separation of the refrigerant flow from the walls in the transition between the approach and the throat (Point B). The diverging section (Point C) following the throat is used to reduce the high throat velocity of the refrigerant, converting the velocity energy of the refrigerant back to pressure energy. Referring to Figure 2 and the pressure datum line at the top, the inlet pressure (P_1) is reduced to a minimum pressure (P_2) because of the throat, and from this point the pressure then increases to the value (P_3) in the diverging section. The outlet pressure (P_3) is less than the inlet pressure (P_1) by an amount equal to the wall frictional losses. Thus the Venturi provides a smooth even refrigerant flow pattern with a minimum of turbulence and a minimum overall pressure loss.

Figure 1 illustrates the orifice plate or pressure drop type distributor. The pressure drop type consists of a straight approach to an orifice plate, which is a concentric hole in a metal plate. This distributor depends on the high pressure drop across the orifice and the resulting turbulence to provide distribution. The approaching refrigerant streamlines nearest the pipe walls (Point A) turns inward rather abruptly

at the upstream face of the plate, and flows parallel to the plate toward the orifice. This parallel fluid flow continues past the edge of the orifice (Point B) and is swept along through the orifice by the center mass of the refrigerant flow. The refrigerant flow continues through the orifice with the minimum jet area (Point C) forming downstream of the orifice plate. The uncontrolled expansion in the large downstream section (unlike the Venturi with a controlled expansion) causes a turbulent pattern to be set up between the minimum jet area, the orifice plate and the walls (Point D). Thus with the orifice plate the velocity energy is not reconverted to pressure energy, but rather is dissipated in violent turbulence in the downstream section.

From the above analysis, it can be seen that the Venturi-Flo distributor has two basic advantages over the orifice plate or pressure drop type. First of these is the pressure recovery feature which eliminates the high pressure drop common to the orifice plate type. This allows for closer and more economical valve sizing and more stable valve control. Secondly, the contour flow pattern channels the flow to the tubes which means even distribution; whereas, the orifice plate type depends upon pressure drop and the uncontrolled violent turbulence for distribution.

COMPARE THE FLOW

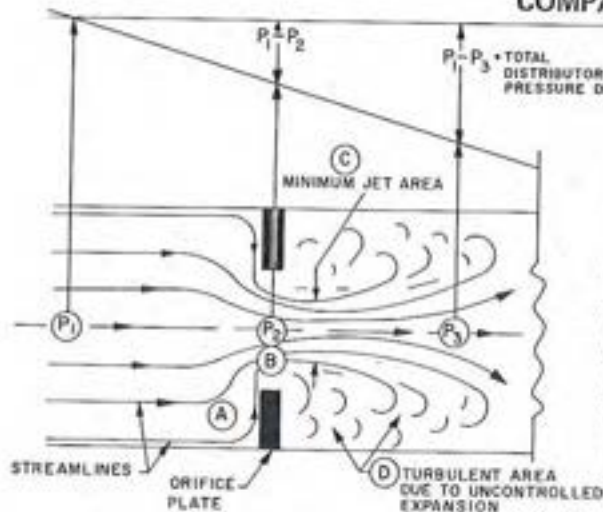


Fig. #1 — Flow Thru An Orifice Plate
No Pressure Recovery — High Pressure Drop

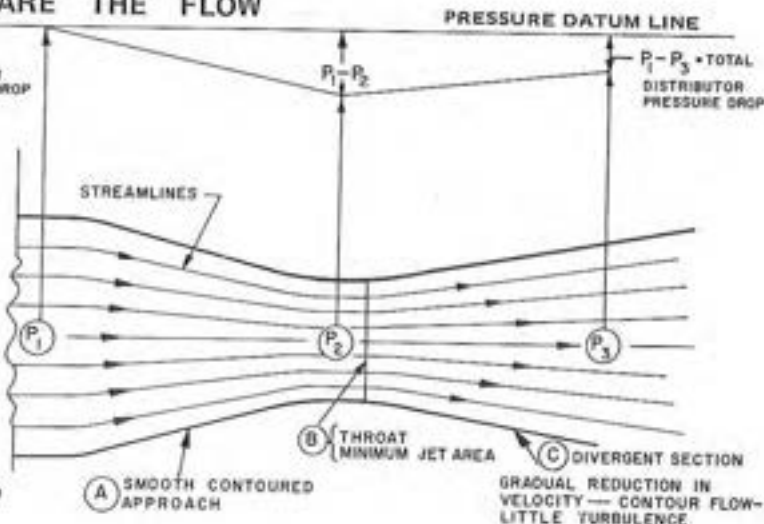


Fig. #2 — Flow Thru A Venturi
Pressure Recovery — Low Pressure Drop

REFER TO FOLLOWING PAGES FOR SELECTION DATA AND ORDERING

VENTURI - FLO REFRIGERANT DISTRIBUTORS



Number of Outlets	SIZE OUTLETS												Number of Outlets
	5/32"		3/16"		1/4"		5/16"		3/8"		1/2"		
	Cat.No.	Type No.	Cat.No.	Type No.	Cat.No.	Type No.	Cat.No.	Type No.	Cat.No.	Type No.	Cat.No.	Type No.	
2	11551	4-2.5-2 5-2.5-2	11526 11534	F4-3-2 5-3-2	11531 11541 115101	F4-4-2 F5-4-2 7-4-2		F4-5-2 5-5-2 7-5-2	115151	F4-6-2 7-6-2			2
3	11552 11522	4-2.5-3 5-2.5-3	11527 11535	F4-3-3 5-3-3	11532 11542 115102	F4-4-3 F5-4-3 7-4-3	115127	5-5-3 7-5-3		7-6-3	115167	11-8-3	3
4	11553	4-2.5-4 5-2.5-4	11528 11536	F4-3-4 5-3-4	11533 11543 115103	F4-4-4 F5-4-4 7-4-4	115128	F4-5-4 5-5-4 7-5-4		7-6-4	115168	11-8-4	4
5	11554	4-2.5-5 5-2.5-5	11529 11537 11579	F4-3-5 5-3-5 7-3-5	11544 115104	4-4-5 F5-4-5 7-4-5	115129	7-5-5 9-5-5		9-6-5	115169	11-8-5	5
6	11555	4-2.5-6 5-2.5-6	11530 11538 11580	F4-3-6 F5-3-6 7-3-6	11545 115105 115106	4-4-6 F5-4-6 7-4-6 9-4-6	115130	7-5-6 9-5-6	115155	9-6-6 11-6-6	115170	11-8-6	6
7	—	—	11539 11581	4-3-7 5-3-7 7-3-7	115107	7-4-7 9-4-7	115131	9-5-7 11-5-7	115156	11-6-7	115171	11-8-7	7
8	11557	4-2.5-8 5-2.5-8	11540	4-3-8 F5-3-8 7-3-8	115108	5-4-8 7-4-8 9-4-8	115132	9-5-8 11-5-8	115157	11-6-8		13-8-8	8
9	11558	4-2.5-9 5-2.5-9	11583	4-3-9 F5-3-9 7-3-9 9-3-9	115109	7-4-9 9-4-9 11-4-9	115133	11-5-9					9
10	11559	4-2.5-10 5-2.5-10 7-2.5-10	11584	7-3-10 9-3-10	115110	7-4-10 9-4-10 11-4-10	115134	11-5-10	115159	11-6-10		13-8-10	10
11	—	—	11585	7-3-11 9-3-11	115111	7-4-11 11-4-11	115135	11-5-11					11
12	11561	F5-2.5-12 7-2.5-12	11586	5-3-12 7-3-12 9-3-12	115112	7-4-12 9-4-12 11-4-12	115136	11-5-12	115161	11-6-12			12
13	11562	F5-2.5-13 7-2.5-13		7-3-13	115113	7-4-13 11-4-13	115137	11-5-13	115162	13-6-13		13-8-13	13
14	11563	F5-2.5-14 7-2.5-14	11588	7-3-14 9-3-14	115114	7-4-14 11-4-14	115138	11-5-14	—	—	—	—	14
15	—	—	—	7-3-15	115115	7-4-15 11-4-15	115139	11-5-15	—	—	—	—	15
16	—	—	11590	7-3-16 9-3-16	115116	7-4-16 11-4-16	115140	13-5-16	—	—	—	—	16
17	—	—	11591	7-3-17 9-3-17	115117	7-4-17 11-4-17	—	—	—	—	—	—	17
18	11567	7-2.5-18	11592	7-3-18 9-3-18	115118	7-4-18 11-4-18	115142	13-5-18	—	—	—	—	18
19	—	—	11593	9-3-19	115119	7-4-19 11-4-19	115143	13-5-19	—	—	—	—	19
20	11569	7-2.5-20	11594	7-3-20 9-3-20	115120	7-4-20 11-4-20	115144	13-5-20	—	—	—	—	20
21	—	—	—	—	115121	7-4-21 11-4-21	115145	13-5-21	—	—	—	—	21
22	—	—	—	—	115122	7-4-22 11-4-22	115146	13-5-22	—	—	—	—	22
23	—	—	—	—	115123	11-4-23	—	—	—	—	—	—	23
24	11573	7-2.5-24		7-3-24	115124	7-4-24 11-4-24	—	—	—	—	—	—	24

EXAMPLE OF TYPE NO.							
Solder Type	9	3	12	Flare Type	F5	4	6
	Size of Inlet Connection in 1/8ths, =1-1/8 ODM	Size of Outlets in 1/16ths =3/16 ODF	Number of Outlets		Size of Inlet Connection in 1/8ths, = 5/8 SAE Female Flare	Size of Outlets in 1/16ths, =1/4 ODF	Number of Outlets
							Flare fittings also available for Solder Type Distributors on special request.

REFER FOLLOWING PAGES FOR TECHNICAL AND SELECTION DATA

SECTION 1



TECH. PAGE 115-b

VENTURI - FLO DISTRIBUTOR SELECTION PROCEDURES

Nominal Ratings —

The Selection Tables following, list the nominal distributor capacities in tons of refrigeration at various evaporator temperatures for R-12, R-22 and R-502 refrigerants. These ratings are based on a 15 psi (103 kPa) drop across the distributor and vapor free solid liquid refrigerant, subcooled 1°F (6°C), entering the expansion valve. For R-502 capacities multiply R-12 capacities by 1.2.

Capacity Range —

The Alco distributor has an operating range from a minimum of 25% to a maximum of 150% of the nominal ratings without any loss of distributor efficiency. Do not exceed these limits without consulting your nearest Alco Supplier.

For example; a 9-3-10 distributor with a nominal rating of 5.0 tons R-12 at a 40°F (4.4°C) evaporating temperature has a minimum capacity of 1.25 tons R-12 (25%) and a maximum capacity of 7.5 tons R-12 (150%).

Pressure Drop —

The pressure drop across the Alco Venturi-Flo distributor will vary with load as shown in the following table:

Table No. 1

%Nominal Load	Pressure Drop		%Nominal Load	Pressure Drop	
	Psi	kPa		Psi	kPa
150	25	(172)	75	10	(69)
125	20	(138)	50	7.5	(52)
100	15	(103)	25	5	(35)

Taking the above example, the 9-3-10 distributor would have a 25 psi (172kPa) drop when used on a 7.5 ton R-12 application and a 5 psi (35kPa) drop when used on a 1.25 ton R-12 application.

Distributor Tube Length —

Distributor tubes should be of equal length for maximum distribution efficiency. Distributor tube lengths in excess of 36" (915 mm) will cause excessive pressure drops in the tubes with consequent losses in efficiency.

Distributor Selection —

To select an Alco Venturi-Flo distributor the evaporator temperature, refrigerant, number of circuits and total load in tons must be known. With this information the proper distributor can be selected from the normal capacity tables in the following manner:

Using the table with the designed evaporator temperature, read down the "Number of Outlets" column to the number of outlets required; then across on that line to the closest nominal total tonnage rating desired.

For example; a 17 ton R-12, 10 outlet distributor is required to operate at a 20°F (-6.7°C) evaporator temperature. Referring to the nominal capacity table for 20°F (-6.7°C) evaporator temperature and reading across on the 10 outlet line, we find that the closest nominal tons is 13.6 for 10 — 5/16" tube outlets.

Since the required capacity, 17 tons, is less than the maximum capacity allowable (13.6 x 150% = 20.5 tons), the distributor can now be selected from Page 115-a.

On the 10 (Number of Outlets) line, then across to the 5/16" Size Outlet column we find the proper Distributor selection of 11 — 5 — 10.

For designing systems with evaporator temperatures other than shown on the following pages, use the conversion scale below:

Evap. °F	+60	+50	+40	+35	+30	+25	+15	+10	+5	-10	-30
Temp °C	+16	+10	+4	+2	-1	-4	-9	-12	-15	-23	-34
Multi.											
Factor	1.30	1.14	1.00	.92	.83	.76	.62	.56	.51	.37	.25

Use the 40°F (+4.4°C) evaporator temperature rating as a base and multiply it by the multiplying factor shown above to find the rating at that temperature.

EXAMPLE: A 5 outlet, 5/16" tube distributor at 40°F (+4.4°C) for R-12 has a load rating of 10.0 Tons. At 35°F (1.7°C) the multiplying factor is .92. 10.0 Tons times .92 = 9.2 Tons rating at 35°F (1.7°C).

VENTURI-FLO DISTRIBUTOR NOMINAL CAPACITIES

EVAP TEMP	NUM BER OF OUT- LETS	SIZE OUTLETS — ODF																	
		5/32"			3/16"			1/4"			5/16"			3/8"			1/2"		
		TONS			TONS			TONS			TONS			TONS			TONS		
		R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502
+40°F +4.4°C	2	.50	.88	.45	1.0	1.8	.9	2.0	3.5	1.8	4.0	7.0	3.6	7.0	12.3	6.3	—	—	—
	3	.75	1.32	.68	1.5	2.6	1.4	3.0	5.3	2.7	6.0	10.5	5.4	10.5	18.4	9.5	15.0	26.3	13.5
	4	1.00	1.76	.90	2.0	3.5	1.8	4.0	7.0	3.6	8.0	14.0	7.2	14.0	24.5	12.6	20.0	35.0	18.0
	5	1.25	2.20	1.13	2.5	4.4	2.3	5.0	8.8	4.5	10.0	17.5	9.0	17.5	30.6	15.8	25.0	43.8	22.5
	6	1.50	2.64	1.35	3.0	5.3	2.7	6.0	10.5	5.4	12.0	21.0	10.8	21.0	36.8	18.9	30.0	52.5	27.0
	7	—	—	—	3.5	6.1	3.1	7.0	12.3	6.3	14.0	24.5	12.6	24.5	42.9	22.0	35.0	61.3	31.5
	8	2.00	3.52	1.80	4.0	7.0	3.6	8.0	14.0	7.2	16.0	28.0	14.4	28.0	49.0	25.2	40.0	70.0	36.0
	9	2.25	3.96	2.03	4.5	7.9	4.1	9.0	15.8	8.1	18.0	31.5	16.2	—	—	—	—	—	—
	10	2.50	4.40	2.25	5.0	8.8	4.5	10.0	17.5	9.0	20.0	35.0	18.0	35.0	61.3	31.5	50.0	87.5	45.0
	11	—	—	—	5.5	9.6	5.0	11.0	19.3	9.9	22.0	38.5	19.8	—	—	—	—	—	—
	12	3.00	5.28	2.70	6.0	10.5	5.4	12.0	21.0	10.8	24.0	42.0	21.6	42.0	73.5	37.8	—	—	—
	13	3.25	5.72	2.93	6.5	11.4	5.9	13.0	22.8	11.7	26.0	45.5	23.4	45.5	79.6	41.0	65.0	113.8	58.5
	14	3.50	6.16	3.15	7.0	12.3	6.3	14.0	24.5	12.6	28.0	49.0	25.2	—	—	—	—	—	—
	15	—	—	—	7.5	13.1	6.8	15.0	26.3	13.5	30.0	52.5	27.0	Capacity shown is the total distributor capacity for the indicated number of outlets. Ratings are based on average condensing temperature, 15 p.s.i.(103kPa) drop across the distributor, and 1°F (6°C) subcooled liquid refrigerant entering the expansion valve. NOTE: Do not select distributor for use on loads below 25% or above 150% of the above values.					
	16	—	—	—	8.0	14.0	7.2	16.0	28.0	14.4	32.0	56.0	28.8						
	17	—	—	—	8.5	14.9	7.7	17.0	29.8	15.3	—	—	—						
	18	4.50	7.92	4.05	9.0	15.8	8.1	18.0	31.5	16.2	36.0	63.0	32.4						
	19	—	—	—	9.5	16.6	8.6	19.0	33.3	17.1	38.0	66.5	34.2						
	20	5.00	8.80	4.50	10.0	17.5	9.0	20.0	35.0	18.0	40.0	70.0	36.0						
	21	—	—	—	—	—	—	21.0	36.8	18.9	42.0	73.5	37.8						
	22	—	—	—	—	—	—	22.0	38.5	19.8	—	—	—						
	23	—	—	—	—	—	—	23.0	40.3	20.7	—	—	—						
	24	6.00	10.6	5.40	12.0	21.0	10.8	24.0	42.0	21.6	—	—	—	For R-502 capacities, multiply R-12 capacities by 1.2					

FOR FINAL SELECTION OF DISTRIBUTOR TYPE No. and CATALOGUE NO. REFER TO PAGE 115-a

VENTURI - FLO DISTRIBUTORS

VENTURI-FLO DISTRIBUTOR NOMINAL CAPACITIES

EVAP TEMP	NUM BER OF OUT- LETS	SIZE OUTLETS																	
		5/32"			3/16"			1/4"			5/16"			3/8"			1/2"		
		TONS			TONS			TONS			TONS			TONS			TONS		
		R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502
+20 OF -6.7 °C	2	.34	.60	.31	.68	1.2	.61	1.4	2.4	1.3	2.7	4.8	2.4	4.8	8.3	4.3	—	—	—
	3	.51	.90	.46	1.0	1.8	.90	2.0	3.6	1.8	4.1	7.1	3.7	7.1	12.5	6.4	10.2	17.9	9.2
	4	.68	1.20	.61	1.4	2.4	1.3	2.7	4.8	2.4	5.4	9.5	4.9	9.5	16.7	8.6	13.6	23.8	12.2
	5	.85	1.50	.77	1.7	3.0	1.5	3.4	6.0	3.1	6.8	11.9	6.1	11.9	20.8	10.7	17.0	29.8	15.3
	6	1.02	1.80	.92	2.0	3.6	1.8	4.1	7.1	3.7	8.2	14.3	7.4	14.3	26.0	12.9	20.4	35.7	18.4
	7	—	—	—	2.4	4.2	2.2	4.8	8.3	4.3	9.5	16.7	8.6	16.7	29.2	15.0	23.8	41.7	21.4
	8	1.36	2.40	1.22	2.7	4.8	2.4	5.4	9.5	4.9	10.9	19.0	9.8	19.0	33.3	17.1	27.2	47.7	24.5
	9	1.53	2.70	1.38	3.1	5.4	2.8	6.1	10.7	5.5	12.2	21.4	11.0	—	—	—	—	—	—
	10	1.70	3.00	1.53	3.4	6.0	3.1	6.8	11.9	6.1	13.6	23.8	12.2	23.8	41.7	21.4	34.0	59.6	30.6
	11	—	—	—	3.7	6.5	3.3	7.5	13.1	6.8	15.0	26.2	13.5	—	—	—	—	—	—
	12	2.04	3.60	1.84	4.1	7.1	3.7	8.2	14.3	7.4	16.3	28.6	14.7	28.6	50.0	25.7	—	—	—
	13	2.21	3.90	1.99	4.4	7.7	4.0	8.8	15.5	7.9	17.7	30.9	15.9	30.9	54.2	27.8	44.2	77.5	39.8
	14	2.38	4.20	2.24	4.8	8.3	4.3	9.5	16.7	8.6	19.0	33.3	17.1	—	—	—	—	—	—
	15	—	—	—	5.1	8.9	4.6	10.2	17.9	9.2	20.4	35.7	18.4	—	—	—	—	—	—
	16	—	—	—	5.4	9.5	4.9	10.9	19.0	9.8	21.8	38.1	19.6	—	—	—	—	—	—
	17	—	—	—	5.8	10.1	5.2	11.6	20.2	10.4	—	—	—	—	—	—	—	—	—
	18	3.06	5.40	2.75	6.1	10.7	5.5	12.2	21.4	11.0	24.5	42.8	22.1	—	—	—	—	—	—
	19	—	—	—	6.5	11.3	5.9	12.9	22.6	11.6	25.8	45.2	23.2	—	—	—	—	—	—
	20	3.40	6.00	3.06	6.8	11.9	6.1	13.6	23.8	12.2	27.2	47.6	24.5	—	—	—	—	—	—
	21	—	—	—	—	—	—	14.3	25.0	12.9	28.6	50.0	25.7	—	—	—	—	—	—
	22	—	—	—	—	—	—	15.0	26.2	13.5	30.0	52.5	27.0	—	—	—	—	—	—
	23	—	—	—	—	—	—	15.6	27.4	14.0	—	—	—	—	—	—	—	—	—
	24	4.08	7.20	3.67	8.2	14.3	7.4	16.3	28.6	14.7	—	—	—	—	—	—	—	—	—
0 OF -17.8 °C	2	.22	.40	.19	.45	.79	.40	.90	1.6	.81	1.8	3.2	1.6	3.2	5.5	2.9	—	—	—
	3	.33	.60	.29	.68	1.2	.61	1.4	2.4	1.3	2.7	4.7	2.4	4.7	8.3	4.2	6.8	11.8	6.1
	4	.44	.80	.39	.90	1.6	.81	1.8	3.2	1.6	3.6	6.3	3.2	6.3	11.1	5.7	9.0	15.8	8.1
	5	.55	1.00	.49	1.1	2.0	.99	2.3	3.9	2.1	4.5	7.9	4.1	7.9	13.9	7.1	11.3	19.7	10.2
	6	.66	1.20	.59	1.4	2.4	1.3	2.7	4.7	2.4	5.4	9.5	4.9	9.5	16.6	8.6	13.5	23.6	12.2
	7	—	—	—	1.6	2.8	1.4	3.2	5.5	2.9	6.3	11.0	5.7	11.0	19.4	9.9	15.8	27.6	14.2
	8	.88	1.60	.79	1.8	3.2	1.6	3.6	6.3	3.2	7.2	12.6	6.5	12.6	22.2	11.3	18.1	31.5	16.3
	9	.99	1.80	.89	2.0	3.6	1.8	4.1	7.1	3.7	8.1	14.2	7.3	—	—	—	—	—	—
	10	1.10	2.00	.99	2.3	3.9	2.1	4.5	7.9	4.1	9.0	15.8	8.1	15.8	27.7	14.2	22.6	39.4	20.3
	11	—	—	—	2.5	4.3	2.3	5.0	8.7	4.5	9.9	17.3	8.9	—	—	—	—	—	—
	12	1.32	2.40	1.18	2.7	4.7	2.4	5.4	9.5	4.9	10.8	18.9	9.7	18.9	33.2	17.0	—	—	—
	13	1.43	2.60	1.28	2.9	5.1	2.6	5.9	10.2	5.3	11.7	20.5	10.5	20.5	36.0	18.5	29.4	51.2	26.5
	14	1.54	2.80	1.38	3.2	5.5	2.9	6.3	11.0	5.7	12.6	22.1	11.3	—	—	—	—	—	—
	15	—	—	—	3.4	5.9	3.1	6.7	11.8	6.0	13.5	23.6	12.2	—	—	—	—	—	—
	16	—	—	—	3.6	6.3	3.2	7.2	12.6	6.5	14.4	25.2	13.0	—	—	—	—	—	—
	17	—	—	—	3.8	6.7	3.4	7.7	13.4	6.9	—	—	—	—	—	—	—	—	—
	18	1.98	3.60	1.78	4.1	7.1	3.7	8.1	14.2	7.3	16.2	28.4	14.6	—	—	—	—	—	—
	19	—	—	—	4.3	7.5	3.9	8.6	15.0	7.7	17.1	29.9	15.4	—	—	—	—	—	—
	20	2.20	4.00	1.98	4.5	7.9	4.1	9.0	15.8	8.1	18.0	31.4	16.2	—	—	—	—	—	—
	21	—	—	—	—	—	—	9.5	16.6	8.6	18.9	32.9	17.0	—	—	—	—	—	—
	22	—	—	—	—	—	—	9.9	17.3	8.9	19.8	34.4	17.8	—	—	—	—	—	—
	23	—	—	—	—	—	—	10.4	18.1	9.4	—	—	—	—	—	—	—	—	—
	24	2.64	4.80	2.37	5.4	9.5	4.9	10.8	18.9	9.7	—	—	—	—	—	—	—	—	—



Capacity shown is the total distributor capacity for the indicated number of outlets. Ratings are based on average condensing temperature, 15 p.s.i. (103kPa) drop across the distributor, and 1°F (.6°C) subcooled liquid refrigerant entering the expansion valve.

NOTE: Do not select distributor for use on loads below 25% or above 150% of the above values.

For R-500 capacities, multiply R-12 capacities by 1.2.

FOR FINAL SELECTION OF DISTRIBUTOR TYPE No. and CATALOGUE NO. REFER TO PAGE 115-a

VENTURI - FLO DISTRIBUTORS

VENTURI-FLO DISTRIBUTOR NOMINAL CAPACITIES

UNIFORMED DISTRIBUTOR CAPACITIES																									
EVAP TEMP	NUM BER OF OUT- LETS	SIZE OUTLETS																							
		5/32"			3/16"			1/4"			5/16"			3/8"			1/2"								
		TONS			TONS			TONS			TONS			TONS			TONS								
		R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502						
-20 OF -28.9 °C	2	.14	.26	.12	.30	.53	.27	.60	1.1	.54	1.2	2.1	1.1	2.1	3.7	1.9	—	—	—						
	3	.21	.39	.18	.45	.79	.40	.90	1.6	.81	1.8	3.2	1.6	3.2	5.5	2.9	4.5	7.9	4.1						
	4	.28	.52	.26	.60	1.1	.54	1.2	2.1	1.1	2.4	4.2	2.2	4.2	7.4	3.8	6.0	10.5	5.4						
	5	.35	.65	.31	.75	1.3	.67	1.5	2.6	1.4	3.0	5.3	2.7	5.3	9.2	4.8	7.5	13.2	6.8						
	6	.42	.78	.37	.90	1.6	.81	1.8	3.2	1.6	3.6	6.3	3.2	6.3	11.1	5.7	9.0	15.8	8.1						
	7	—	—	—	1.1	1.8	.99	2.1	3.7	1.9	4.2	7.4	3.8	7.4	12.9	6.7	10.5	18.4	9.5						
	8	.56	1.04	.50	1.2	2.1	1.1	2.4	4.2	2.2	4.8	8.4	4.3	8.4	14.7	7.6	12.0	21.1	10.8						
	9	.63	1.17	.56	1.4	2.4	1.3	2.7	4.7	2.4	5.4	9.5	4.9	—	—	—	—	—	—						
	10	.70	1.30	.63	1.5	2.6	1.4	3.0	5.3	2.7	6.0	10.5	5.4	10.5	18.4	9.5	15.0	26.3	13.5						
	11	—	—	—	1.7	2.9	1.5	3.3	5.8	3.0	6.6	11.6	5.9	—	—	—	—	—	—						
	12	.84	1.56	.75	1.8	3.2	1.6	3.6	6.3	3.2	7.2	12.6	6.5	12.6	22.1	11.3	—	—	—						
	13	.91	1.69	.81	2.0	3.4	1.8	3.9	6.8	3.5	7.8	13.7	7.0	13.7	23.9	12.3	19.5	34.2	17.6						
	14	.98	1.82	.88	2.1	3.7	1.9	4.2	7.4	3.8	8.4	14.7	7.6												
	15	—	—	—	2.3	4.0	2.1	4.5	7.9	4.1	9.0	15.8	8.1												
	16	—	—	—	2.4	4.2	2.2	4.8	8.4	4.3	9.6	16.8	8.6												
	17	—	—	—	2.6	4.5	2.3	5.1	8.9	4.6	—	—	—												
	18	1.26	2.34	1.13	2.7	4.7	2.4	5.4	9.5	4.9	10.8	18.9	9.7												
	19	—	—	—	2.9	5.0	2.6	5.7	10.0	5.1	11.4	20.0	10.3												
	20	1.40	2.60	1.26	3.0	5.3	2.7	6.0	10.5	5.4	12.0	21.0	10.8												
	21	—	—	—	—	—	—	6.3	11.1	5.7	12.6	22.0	11.3												
	22	—	—	—	—	—	—	6.6	11.6	5.9	13.2	23.1	11.9												
	23	—	—	—	—	—	—	6.9	12.1	6.2															
	24	1.68	3.12	1.51	3.6	6.3	3.2	7.2	12.6	6.5															
	-40 OF -40 °C	2	.10	.18	.09	.21	.37	.18	.42	.76	.37	.84	1.5	.75	1.5	2.6	1.4	—	—	—					
3		.15	.27	.13	.32	.55	.28	.63	1.1	.56	1.3	2.2	1.2	2.2	3.9	2.0	3.5	5.5	3.2						
4		.20	.36	.18	.42	.76	.37	.84	1.5	.75	1.7	2.9	1.5	2.9	5.1	2.6	4.2	7.6	3.8						
5		.25	.45	.22	.53	.92	.47	1.1	1.8	.99	2.1	3.7	1.9	3.7	6.4	3.3	5.3	9.2	4.8						
6		.30	.54	.27	.63	1.1	.56	1.3	2.2	1.2	2.5	4.4	2.3	4.4	7.7	4.0	6.3	11.0	5.7						
7		—	—	—	.74	1.3	.66	1.5	2.6	1.4	2.9	5.2	2.6	5.1	9.0	4.6	7.4	12.9	6.7						
8		.40	.72	.36	.84	1.5	.75	1.7	2.9	1.5	3.4	5.9	3.1	5.9	10.3	5.3	8.5	14.7	7.7						
9		.45	.81	.40	.95	1.7	.85	1.9	3.3	1.7	3.8	6.6	3.4	—	—	—	—	—	—						
10		.50	.90	.45	1.1	1.8	.99	2.1	3.7	1.9	4.2	7.4	3.8	7.4	12.9	6.7	10.6	18.4	9.5						
11		—	—	—	1.2	2.0	1.1	2.3	4.1	2.1	4.8	8.1	4.1	—	—	—	—	—	—						
12		.60	1.08	.54	1.3	2.2	1.2	2.5	4.4	2.3	5.0	8.8	4.5	8.8	15.5	7.9	—	—	—						
13		.65	1.17	.58	1.4	2.4	1.3	2.7	4.8	2.4	5.5	9.6	5.0	9.6	16.7	8.6	13.8	24.0	12.4						
14		.70	1.26	.63	1.5	2.6	1.4	2.9	5.2	2.6	5.9	10.3	5.3	Capacity shown is the total distributor capacity for the indicated number of outlets. Ratings are based on average condensing temperature, 15 p.s.i. (103kPa) drop across the distributor, and 1°F (.6°C) subcooled liquid refrigerant entering the expansion valve. NOTE: Do not select distributor for use on loads below 25% or above 150% of the above values.											
15		—	—	—	1.6	2.8	1.5	3.2	5.5	2.9	6.3	11.0	5.7												
16		—	—	—	1.7	2.9	1.5	3.4	5.9	3.1	6.7	11.8	6.0												
17		—	—	—	1.8	3.1	1.6	3.6	6.3	3.2	—	—	—												
18		.90	1.62	.81	1.9	3.3	1.7	3.8	6.6	3.4	7.6	13.2	6.8												
19		—	—	—	2.0	3.5	1.8	4.0	7.0	3.6	8.0	14.0	7.2												
20		1.00	1.80	.90	2.1	3.7	1.9	4.2	7.4	3.8	8.4	14.7	7.7												
21		—	—	—	—	—	—	4.4	7.7	4.0	8.8	15.4	7.9												
22		—	—	—	—	—	—	4.6	8.1	4.1	9.2	16.1	8.3												
23		—	—	—	—	—	—	4.8	8.5	4.3	For R-500 capacities, multiply R-12 capacities by 1.2.														
24		1.20	2.16	1.08	2.5	4.4	2.3	5.0	8.8	4.5															

FOR FINAL SELECTION OF DISTRIBUTOR TYPE No. and CATALOGUE NO. REFER TO PAGE 115-a

THERMOSTATIC EXPANSION VALVES FOR AMMONIA (R717)



TYPE TG WITH FLANGE CONNECTIONS

Alco Thermo valves for ammonia have the same compact "come-apart" design features and rugged construction used in other Alco Thermo valves. A discharge tube in the outlet controls capacity, prevents frosting of valve, and retards erosion of pin and seat. Type TG valves are equipped with an integral inlet strainer.

Valve		Press. Equal.		Capacity (2)		Cage Assembly		Discharge Tube			Power Element	Conn. Size	Capillary	
Cat. No.	Type (1)	Type	Conn.	Tons	kW	Cat. No.	Part No.	Cat. No.	P/N	Orifice			Lgth.	Style
116126	TG1AZ	Ext-B	1/8"	1.0	3.5	116135	XC741-B0B(3)	116144	A7351	.031	Int. Equal.	1/2"	4.5m	Ext. Strap-on Type May also be used with Bulb Well
116127	TG1AZ	Int-A	NPT	1.0	3.5	116136	XC741-B0A(3)				XB1049AZ-3A			
116128	TG2AZ	Ext-B	Int.	2.0	7.0	116137	XC741-B1B(4)				Cat. No. 116152			
116129	TG2AZ	Int-A		2.0	7.0	116138	XC741-B1A(4)				Ext. Equal.			
116130	TG3AZ	Ext-B	1/4"	3.0	10.6	116139	XC741-B5B(4)	116145	A735-10	.039	XB1049AZ-3B	FPT	(15')	
116131	TG3AZ	Int-A	SAE	3.0	10.6	116140	XC741-B5A(4)				Cat. No. 116151			
116132	TG5AZ	Ext-B	Male	5.0	17.6	116141	XC741-B2B(4)	116146	A735-2	.046	Prefix 3 before A	or B = 4.5m (15')		
116133	TG7½AZ	Ext-B	Flare	7.5	26.4	116142	XC741-B2½B(4)	116147	A735-3	.062				
116134	TG10AZ	Ext-B	Ext.	10.0	35.2	116143	XC741-B3B(4)	116148	A735-5	.078	Capillary Lgth.			

- Power assembly charge symbol "Z" or "X" is suffixed to part number to obtain complete valve type number. "Z" Cross Charge is recommended for standard installations operating at either low or high temperature — Example: TG1AZ, TG10AZ. "Z" Superheat adjustment range is 1 to 11°C (2 to 20°F). "X" Charge is recommended for central station, truck installations, or special applications requiring high operating superheats — Example: TG2AX, TG20AX. "X" Superheat adjustment range is 10 to 22°C (18 to 40°F).
- Capacities are based on 30°C (86°F) condensing, -15°C (+5°F) evaporator, vapor free liquid at valve inlet and 965 kPa (140 psi) pressure drop across valve.
- These cage assemblies are identical except for discharge tube. Installation of proper discharge tube therefore determines capacity.
- These cage assemblies are identical except for discharge tube. Installation of proper discharge tube therefore determines capacity.

Larger valve sizes and Manufacturers Bulletin available on request.

11.10.1 — 10/76

Danfoss

TYPE TEA WITH FLANGE CONNECTIONS

Danfoss TX Valves for Ammonia have flange connections and can be supplied with or without external line strainer. Every valve is supplied with orifice assembly as specified in the Table below. All valves have external equalizer connections.

Range D : -50°C to 0°C (-58°F to +32°F).
Maximum Bulb Temperature 100°C (212°F).
Maximum Test Pressure 2758 kPa (400 PSIG).



TEA 20

CAT. NO.	ASSEMBLED VALVE TYPE	CODE NO.	CONN. Inlet & Outlet	NOMINAL * CAPACITY			CAP. LGTH.	ORIFICE ASSEMBLY	
				TONS	kW	kcal/h		CAT. NO.	CODE NO.
11626	TEA 20-1**	68G6000	1/2" Weld Flanges	1	3.5	3000	5 m (16.5')		68G2050
11627	TEA 20-2	68G6001		2	7.0	6000			6-0466**
11628	TEA 20-3	68G6002		3	10.6	9000		11636	68G2051
11629	TEA 20-5	68G6003		5	17.6	15000		11637	68G2052
11630	TEA 20-8	68G6004		8	28.1	24000		11638	68G2053
11631	TEA 20-12	68G6005		12	42.2	36000		11639	68G2054
11632	TEA 20-20	68G6006		20	70.3	60000		11640	68G2055
								11641	68G2056
SEPARATE POWER ELEMENT (All sizes)				CAT. NO. 116100			CODE NO. 68G3250		
SEPARATE FA15 STRAINER (All sizes)				CAT. NO. 11699			CODE NO. 6-0042		

* Nominal Capacity is the valve capacity at -15°C (+5°F) evaporator temperature and 32°C (+90°F) condensing temperature and based on approx. +4°C (+7°F) sub-cooling ahead of Valve.

** TEA 20-1 consists of orifice assembly 68G2050 PLUS separate discharge orifice Code No. 6-0466.

Capacities of any TEA 20 valves can be changed in the field by fitting any of the orifice assemblies mentioned above.

LARGER VALVE SIZES (TYPE TEA 85), FULL CAP. TABLES & LITERATURE AVAILABLE ON REQUEST. KK.10.A2.02

PRESSURE REGULATING VALVE SELECTION GUIDE

GENERAL DEFINITION: A device for regulating the flow of refrigerant, whether liquid or vapour in refrigeration and air conditioning systems.

This selection guide briefly describes the main types, their common names and identification of the "Makes" contained in this Catalogue.

It should be remembered that due to the wide variety of control systems in use, one type of valve may perform several functions; and when coupled with other types of control valves (Solenoid Valves, Check Valves etc.), their application may be extended. Therefore only the more common applications are detailed herein.

CAPACITY REGULATORS (Page 117)

ALSO KNOWN AS	HOT GAS BY-PASS REGULATORS/VALVES DISCHARGE BY-PASS REGULATORS/VALVES DISCHARGE PRESSURE REGULATORS/VALVES Often abbreviated to HGBP Regulator/Valve.
DESCRIPTION	Used to control the compressor capacity and prevent suction pressure from falling to objectionably low levels. May be used in systems with one or more evaporators where compressor itself has no capacity regulation or can extend compressor capacity reduction below the last step of cylinder unloading.
APPLICATION METHODS	— By-Pass to Suction Line — piped so that discharge gas is admitted to the suction line to flow against the direction of the suction gas. To prevent overheating of the compressor, a Liquid Injection Valve is sometimes required for de-superheating. — By-Pass to Evaporator Inlet — usually fitted between the TX valve and the refrigerant distributor. The advantage of this method is that the artificial load imposed on the evaporator causes the TX valve to respond to the increase in superheat, thus eliminating the need for the liquid injection valve. This type of system must be equipped with a Venturi-Flo refrigerant distributor (i.e. no restrictor orifice). — It is recommended that a solenoid valve be installed ahead of the by-pass regulator permitting the system to operate on an automatic pump-down cycle and also guarding against leakage during the "off" cycle.
ALSO USED FOR	By-Pass control valve for air cooled condensers.

ALCO	DANFOSS	FAS	FLOCON	REF. SPEC.	SINGER
CPHE - Directing Acting FAB - Integral Pilot Operated	CPC, PHC, CPCE + LG CPR + CPC - for air cooled condensers 6F - Manual Throttle Valve	LR, LRX	A9E, A9SE	A4AO	237

CRANKCASE PRESSURE REGULATING VALVES (Page 118)

ALSO KNOWN AS	HOLD BACK VALVES SUCTION PRESSURE REGULATORS STARTING REGULATORS OUTLET REGULATORS DOWNSTREAM REGULATORS Often abbreviated to CPRV
DESCRIPTION	A valve which regulates the suction pressure to a pre-determined maximum in order to prevent the compressor motor overloading — which may be due to any or all of the following:— — high load on start-up. — high suction pressure at termination of defrosting cycle. — surges in suction pressure. — prolonged operation at excessive suction pressures. — low voltage and high suction pressure conditions.
APPLICATION METHODS	Installed in the suction line ahead of the compressor, the valve establishes the maximum pressure at the compressor inlet, thus providing overload protection for the compressor motor. They may be used with multiple or single evaporator systems, either direct expansion or flooded evaporator designs.
ALSO USED FOR	High to Low side by-pass. By-Pass control for air cooled condensers.

ALCO	DANFOSS	FLOCON	REF. SPEC.	SINGER
OPR FA5	CPL PM/HSA + CVMO	A7A10, A720	A2B0, A4A0	237

PRESSURE REGULATING VALVE SELECTION GUIDE — Cont'd. next page.

PRESSURE REGULATING VALVE SELECTION GUIDE

— Cont'd. from previous page.

EVAPORATOR PRESSURE REGULATING VALVES (Page 119)

ALSO KNOWN AS	BACK PRESSURE REGULATOR/VALVE CONSTANT PRESSURE VALVE * UPSTREAM REGULATOR INLET PRESSURE REGULATOR SUCTION LINE REGULATOR Often abbreviated to EPR *Sometimes referred to as a Constant Pressure Regulator but should not be confused with the same "general" term applied to an automatic expansion valve.
DESCRIPTION	Used to maintain a constant evaporating pressure and hence a constant evaporator temperature plus protection against too low an evaporating pressure since the regulator closes when the pressure in the evaporator falls below the setting.
APPLICATION METHODS	Installed in the suction line near the evaporator outlet. Available in two main types — direct operated and pilot operated. Pilot operated Regulators may be integral types, or remote Pilot actuated either by pressure or temperature.
ALSO USED FOR	Freeze-up or frost protection. Maintaining evaporator pressure during a defrost. Providing a safety or pressure relief function.

ALCO	DANFOSS	FLOCON	REF. SPEC.	SINGER
IPR	CPP, CPT, PM + CVT	A7A	A2B, A2A	235
EPRV - Integral Pilot	PM + CVP/CVPP	A7A1	A4A	238
722 - Remote Pilot	HSA + CVM/CVMP/CVMT	A72	A4W	239

CONDENSER PRESSURE REGULATORS (Page 120)
for Air Cooled Condensers

ALSO KNOWN AS	HEAD PRESSURE CONTROL VALVES
DESCRIPTION	To maintain a constant and sufficiently high condensing pressure in air cooled condensers at low ambient temperatures. The valve must maintain liquid subcooling and prevent liquid line flash-gas and also provide adequate pressure at the inlet side of the TX valve to obtain sufficient pressure drop across the valve port.
APPLICATION METHODS	Dependant on the type of control circuit employed or recommended by the air cooled condenser manufacturer, the control may be either a single three-way modulating type valve or two separate valves to achieve the same function.

ALCO	DANFOSS	SINGER
HP5T, HP8T, HP14T	CPR + CPC	237 + 238

CONDENSER PRESSURE REGULATORS (Page 124)
for Water Cooled Condensers

ALSO KNOWN AS	PRESSURE CONTROLLED WATER VALVES TEMPERATURE CONTROLLED WATER VALVES
DESCRIPTION	The water valves are used for regulating the quantity of water in refrigeration systems with water cooled condensers. Using the water valves results in modulating regulation of the condensing pressure so that it is kept almost constant during operation.

DANFOSS	FAS	PENN
PRESSURE CONTROLLED WVFX, WVS TEMPERATURE CONTROLLED AVTA, WVTS	WR	PRESSURE ACTUATED V46 — 2 Way V48 — 3 Way TEMPERATURE ACTUATED V47

THERMOSTATIC INJECTION VALVES (Page 117)

ALSO KNOWN AS	LIQUID INJECTION VALVES.
DESCRIPTION	Used to prevent compressor overheating and high discharge temperatures when — 1. An R717 compressor operates either at low suction pressures or at high condensing temperatures. 2. A compressor operates both at low suction pressures and at high condensing temperatures — especially with R22. 3. A compressor operates with By-Pass to suction line hot-gas By-Pass.
APPLICATION METHODS	Liquid injected into a gas to be desuperheated should be injected in a manner which provides homogeneous mixing of the liquid and superheated gas. Preferred method is to pipe the hot gas and liquid injection into a Tee to permit good mixing before it enters the suction line. A good mix with the suction gas may be gained by injecting the liquid/hot gas mixture into the suction line at approx. a 45° angle against the flow of suction gas to the compressor.

DANFOSS — TEAT

CAPACITY REGULATING VALVES

HOT GAS BYPASS

117-b



CPH

ALCO
CONTROLS

DIRECT OPERATED REGULATORS

Type CP regulators offer significant ALCO features: "Take-apart" construction which allows easy serviceability without removing the body flange from the line, stainless steel diaphragm and a contoured power element, and the unique "U" gland packing material which eliminates stem friction and packing leaks. Types CPHE 3 thru 6 use a balanced double-ported cage assembly.

Vacuum service is obtainable by counterclock adjustment of side mounted adjusting screw.

A 1/2" SAE male flare External Equalizer is standard. Types CPHE 1 and 2 can be supplied with internal equalizer — omit "E" from the model number (CPH-1 or CPH-2).

Adjustment range is 0 to 552 kPa (0 to 80 psig). These valves are also available on special order with 0 to 276 kPa (0 to 40 psig) range.

VALVE TYPE		CONNECTIONS ANGLE STYLE**	BY-PASS CAPACITY *						CAGE ASSEMBLY		POWER ASSEMBLY	
CAT. NO.	MODEL		R12		R22		R502		CAT. NO.	Part No.	CAT. NO.	Part No.
			kW	Tons	kW	Tons	kW	Tons				
11751	CPHE-1	3/8" ODF x 5/8" ODF			1.8	0.5	1.8	0.5	102122	X22440-B5B	11764	X7118-4
11752	CPHE-2	1/2" ODF x 5/8" ODF			3.5	1.0	1.8	0.5	102126	X22440-B8B		
11753	CPHE-3		1.8	0.5	3.5	1.0	3.5	1.0	102115	X11873-B5B		
11754	CPHE-4	7/8" ODF x 1-1/8" ODM	3.5	1.0	7 to 14	2 to 4	7 to 10.6	2 to 3	102131	X9117-B9B	11763	X7428-2
11755	CPHE-5		7.0	2.0	14 to 21	4 to 6	10.6 to 14	3 to 4	102132	X9166-B10B		
11756	CPHE-6	1-1/8" ODMx1-1/8" ODM	10.6	3.0	17.6 to 24.6	5 to 7	14 to 21	4 to 6	102134	X9144-B13B		

* At Evap. Temp. Range +4°C to -40°C (+40°F to -40°F)

** Straight-thru connection style available on request

15.30.Dec.1977

MANUFACTURERS BULLETIN WITH FULL CAPACITY DETAILS AVAILABLE ON REQUEST

FA8



ALCO
CONTROLS

NOTE: These valves are externally equalized and available in 0-552 kPa (0-80 psig) range only.

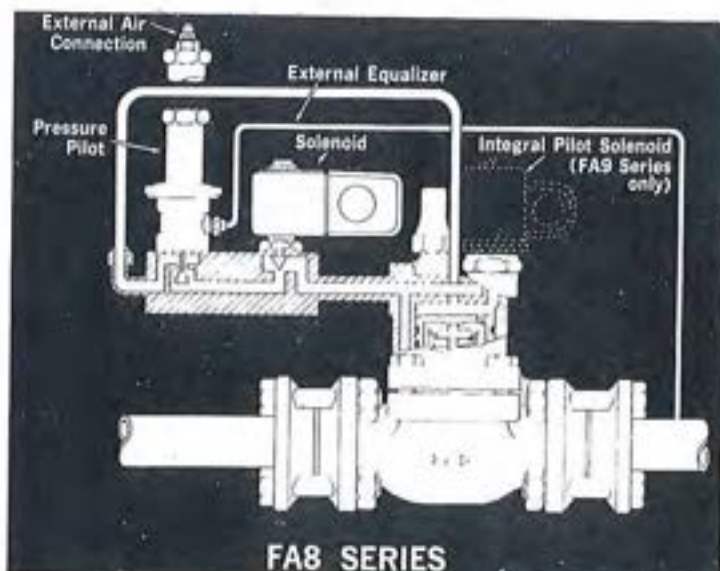
PILOT OPERATED REGULATORS

The FA8 regulator is a completely integral unit requiring no external connections other than the inlet and outlet connection and a 1/4" SAE male flare external equalizer connection. The FA8 is equipped with Teflon seat material and is designed for high discharge gas temperature. It is equipped with an integral solenoid and a CP type pilot assembly. When suction pressure falls below the set point of the pilot, the regulator will open, permitting hot gas to bypass from the system high side to the suction or low side. Vacuum service obtainable by counterclock adjustment of side mounted adjusting screw.

R12 — R22 — R502						R717					
Valve Type		Connections Flanged	By-Pass Capacity — Tons *			Valve Type		Port Size	Connect- ions	Cap. Tons	Cap.* cu.ft/h
CAT. NO.	Model		R12	R22	R502	CAT. NO.	Model				
	FA8-11F	7/8" ODF				11769	FA8-11H	3/8"	3/4" FPT	12.5	551
	FA8-12F	7/8" ODF	4 to 6	8 to 16	7 to 12	11770	FA8-12H	1/2"	3/4" FPT	31.3	1380
	FA8-13F	7/8" ODF	7 to 12	14 to 30	12 to 25	11771	FA8-13H	3/4"	3/4" FPT	54.0	2390
	FA8-14F	1-3/8" ODF	15 to 20	30 to 45	25 to 35	11772	FA8-14H	1"	1" FPT	126.0	5550
	FA8-15F	1-3/8" ODF	25	45 to 65	35 to 50	11773	FA8-15H	1-1/4"	1 1/2" FPT	143.8	6340
	FA8-16F	1-5/8" ODF	30 to 45	55 to 100	50 to 90	11774	FA8-16H	1-1/2"	1 1/2" FPT	223.5	9850
	FA8-18F	2-1/8" ODF	50 to 100	90 to 100	80 to 100	11775	FA8-18H	2"	2" FPT	377.0	16650

* Evap. Temp. Range +4°C to -40°C (+40°F to -40°F)

* Based on 38°C (100°F) Cond., 4°C (40°F) Evap. and isentropic compression



FA8 SERIES

SOLENOID COILS

CAT.NO.	TYPE	ELECTRICAL
123253	AMG	208 - 240 Volt 50/60 Hz, AC
123254	AMG	480 Volt 50/60 Hz, AC

The FA8 Series for Ammonia service is also one integral factory assembled unit containing the main regulator, a pressure pilot and a pilot solenoid for positive valve closure during pump down.

OPTIONAL FEATURES - available on special order.

When a pneumatic controller is required to provide temperature compensation, regulators may be ordered with a 1/2" SAE male flare external air connection (type EAC). This connection makes it possible to raise or lower the set point of the valve in a 1:1 ratio.

Example: An increase of 7 kPa (1 psi) air pressure will raise the set point 7 kPa (1 psi) above the spring setting.

The FA9 Series valves are identical to the FA8 except that they have an additional integral pilot solenoid as an automatic wide open feature. They are used on ammonia systems which require full compressor unloading on start-up.

Manufacturers Bulletins with full Capacity and Application details available on request.

(Bulletin 15.30, Dec. 1977 and 11.10 - 10/76 for R717)

CAPACITY REGULATING VALVES

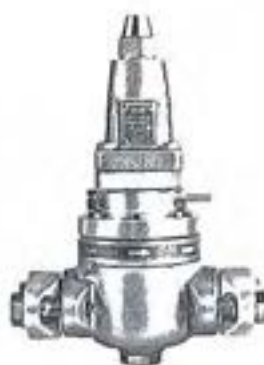
HOT GAS BYPASS

Type CPC For fluorinated refrigerants

Type PHC For fluorinated refrigerants and ammonia



CPC



PHC

Type CPC can be used as a Capacity Regulator for Hot Gas By-Pass purposes in systems with one or several evaporators where the compressor itself has no capacity regulation.

Type CPC can also be used for limitation of the compressor suction pressure in the downward direction. Furthermore, Type CPC can be used together with Type CPR for maintaining constant condensing and receiver pressure in conjunction with air-cooled condensers (Refer Page 120).

Type PHC is for use in systems with one or more evaporators where the compressor is not equipped with another form of capacity regulation, and on systems with capacity regulated one or two stage compressors where infinite regulation is required in the lowest stage. The PHC adapts suction capacity to meet momentary cold requirements and is suitable for both fluorinated refrigerants and ammonia.

VALVE TYPE			RANGE kPa (psig)	Conn.	NOMINAL CAPACITY *								Max. Test Press.	Max. Perm. Temp.
CAT. NO.	MODEL	CODE No.			R12		R22		R502		R717			
					kW	Tons	kW	Tons	kW	Tons	kW	Tons		
117126	CPC 12	34N0155	0 to 1275	1/2" ODS	12	3.3	22	6.3	19	5.3	—	—	2600	100°C
117127	CPC 15	34N0156		5/8" ODS	12	3.3	22	6.3	19	5.3	—	—	kPa	
117128	CPC 22	34N0158		7/8" ODS	12	3.3	22	6.3	19	5.3	—	—	(377)	
117129	CPC 28	34N0160	{0 to 185}	1-1/8" ODS	20	5.6	3.8	11.0	31	8.9	—	—	2350	(212°F)
117130	CPC 35	34N0161		1-3/8" ODS	20	5.6	3.8	11.0	31	8.9	—	—	(341)	
117156	PHC-3	26H2130	-50 to 600	3/4" W.F.	9.7	2.7	19	5.3	16	4.3	52	15	2800	140°C
117157	PHC-6	26H2133		3/4" W.F.	33	9.3	64	18	54	15	178	51	kPa	
117158	PHC-12	26H2136	{15" to 85}	1" W.F.	45	13	88	25	73	21	244	70	(400)		(284°F)

KK.30.A2.02

* The rated capacity indicates the regulator capacity at evap. temp. -10°C (+14°F) and condensing temp. +25°C (+77°F) at a reduction of suction pressure by 69 kPa (10 psi).

REFER TO MANUFACTURERS BULLETIN FOR COMPLETE CAPACITY AND APPLICATION DATA

Type CPCE + LG For fluorinated refrigerants

(Primarily designed for systems with one evaporator)



CPCE

Type CPCE Regulators are used to adapt compressor capacity to actual evaporator load. They are installed in a by-pass between the high and low pressure sides of a system. They are especially suitable for hot-gas injection at the evaporator inlet, between the TX valve and the liquid distributor. CPCE regulators are equipped with a connection for an external pilot line which is connected to the suction line immediately before the compressor, thus controlling

the degree of opening of the regulator by the compressor suction pressure, independent of the pressure drop on the evaporator side.

For hot-gas injection, a Liquid-gas Mixer Type LG should be used and is mounted between the expansion valve and the liquid distributor. The Liquid-gas Mixer can also be used in connection with hot-gas defrosting or with reverse-cycle systems.

VALVE TYPE			Range** kPa (psig)	CONN.	RATED CAPACITY *						Max. Perm. Temp.	Max. Perm. Press.
CAT. NO.	MODEL	CODE No.			R12		R22		R502			
					kW	Tons	kW	Tons	kW	Tons		
117131	CPCE 12	34N0081	0 to	1/2" Flare	4.2	1.2	12.1	3.4	11.0	3.1	140°C (284°F)	2760 kPa 400 psig
117132	CPCE 12	34N0082	586	1/2" Solder								
117133	CPCE 15	34N0083	(0 to	5/8" Solder	7.0	2.0	20.0	5.7	18.1	5.2		
117134	CPCE 22	34N0084	85)	7/8" Solder	10.6	3.0	29.7	8.4	27.1	7.7		

* Rated Capacity at suction temperature -10°C (+14°F) and condensing temperature +25°C (+77°F), after a suction temperature reduction of 4°C (7.2°F).

** Control pressure when regulator begins to open.



LG

The object of the LG is to create a homogeneous mixture of the hot-gas from the CPCE regulator and the liquid from the TX valve so that the function of the liquid distributor (next in the system) remains unimpaired.

LIQUID-GAS MIXER			CONNECTIONS FOR —		
CAT. NO.	MODEL	CODE NO.	Hot Gas ODF	Expansion Valve ODM	Liquid Distributor ODF
117135	LG 12-16	69G4001	1/2"	5/8"	5/8"
117136	LG 12-22	69G4002	1/2"	7/8"	7/8"
117137	LG 16-28	69G4003	5/8"	1-1/8"	1-1/8"
117138	LG 22-35	69G4004	7/8"	1-3/8"	1-3/8"

KK.30.A2.02

CAPACITY REGULATING VALVES

HOT GAS BYPASS

Hot Gas Bypass Regulators

Application as hot gas bypass regulators *only*.

- Pilot operated for close control at desired set point.
- Long-life diaphragm. No bellows to fail.
- Contoured plug for precise regulation at reduced capacities.
- Integral electric shut-off available (A9SE).
- External equalizer standard. Internal equalizer available on request.
- 2760 kPa (400 psig) safe working pressure.
- Lightweight and compact for easy handling.
- Sweat-in-place without disassembly for fast installation.
- In-line disassembly for fast service.

FLO-CON **Parker**



Type A9E

Externally
equalized



Type A9SE

Externally
equalized with
pilot solenoid

Hot gas bypass

For variable load control

The hot gas by-pass method delivers an artificial load to the compressor to replace a decrease in load at the evaporator. This helps prevent compressor operation at excessively low suction pressure which could result in oil pumping, short-cycling and temperature variations which, in turn, could lead to compressor failure, lack of oil return and frosted or iced evaporators.

The ideal method of hot gas by-pass on a single evaporator, single compressor system is at the evaporator inlet (Fig. 1). This permits good mixing of hot gas and liquid within the evaporator while still maintaining control of superheat in the suction line with the TX valve in its normal location. Improved return of oil to the compressor results from the increased refrigerant velocity in the evaporator.

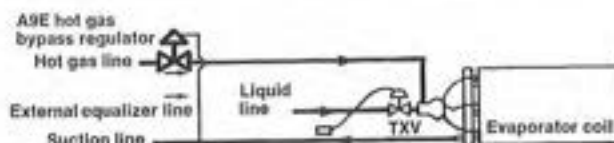


Fig. 1 Hot gas bypass to entrance of evaporator

The easiest method to add to an existing system is the application of hot gas to the evaporator outlet or compressor suction (Fig. 2). This can sometimes eliminate the need for a long hot gas line, but it does require liquid injection through a second TX valve into the suction line to de-superheat the hot gas.

- Ranges:**
- A** (Standard) — -34 to 830 kPa (10" to 120 psig).
 - B 550 to 1520 kPa (80 to 220 psig) available on application.

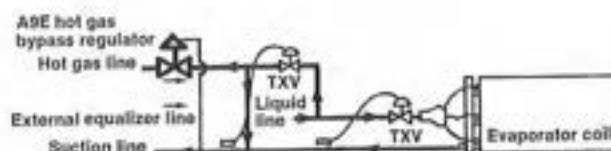


Fig. 2 Hot gas bypass to suction line

TYPE A9E	TYPE A9SE	PORT SIZE		CONN. SIZE		NOMINAL CAPACITY *						Press Range (A)**	Max. Refrig. Temp.		
						R12		R22		R502					
CAT. NO.	CAT. NO.	mm	Ins.	mm	Ins.	kW	Tons	kW	Tons	kW	Tons				
117300	117309	Red. 15	Red. 5/8	15	5/8	4.74	1.28	8.55	2.37	8.10	2.24	-34 to 830 kPa (10' to 120 psig)	93°C (200°F)		
117301	117310			22	7/8										
117302	117311			28	1-1/8										
117303	117312	15	5/8	15	5/8	14.8	4.0	26.4	7.4	25.3	7.0				
117304	117313			22	7/8										
117305	117314			28	1-1/8										
117306	117315	22	7/8	22	7/8	30.0	8.2	53.6	15.0	51.4	14.0				
117307	117316			28	1-1/8										
117308	117317	28	1-1/8	28	1-1/8	44.8	13.0	80.0	24.0	76.7	23.0				
ELECTRICAL SOLENOID COIL 240V. 50Hz.						CAT. NO.	119394	MAN. P/N 83-1000-28							

* Nominal Capacity based on 40°C (100°F) cond. temp. and discharge temp. of:— R12: 70°C (160°F), R22: 80°C (180°F), R502: 90°C (200°F).

SIZE VALVE BY EFFECTIVE PORT SIZE

REFER MANUFACTURERS BULLETIN FOR FULL SIZING, CAPACITY AND APPLICATION DATA.

CAPACITY REGULATING VALVES

HOT GAS BYPASS



Capacity Regulators for all non-corrosive refrigerants



The capacity regulator is a type of relief valve which is operated by a pressure difference between high and low sides. Up to a pre-set pressure, the valve is closed, allowing normal operation of the system. If the pressure begins to drop in the low side, however, the capacity regulator will open, and permit gas to overflow from the pressure side back to the suction side. These regulators cannot operate on a vacuum.

Adjustment:

Turn clockwise to open and raise the pressure.

Turn anti-clockwise to throttle and lower the pressure.

R12 — TYPE LR						R22 — Type LRX			Conn.	NOMINAL CAPACITY*				Max. Test Press.
Cat.No.	Model	Range psig	Cat.No.	Model	Range psig	Cat.No.	Model	Range psig		R12		R22		
										kW	Tons	kW	Tons	
117176	LR-10	0-40				117190	LRX-10		3/8" Flare	0.84	0.24	1.3	0.37	1482 kPa
117177	LR-12	0-65				117191	LRX-12		1/2" Flare	1.30	0.37	2.6	0.74	
117178	LR-16	0-65				117192	LRX-16		5/8" Flare	2.60	0.74	3.8	1.09	
117179	LR-19	0-40				117193	LRX-19		3/4" Flare	3.83	1.09	5.2	1.48	
117180	LR-20	0-40	117181	LR-20	22-66	117194	LRX-20	20-65	3/4" Flange	5.20	1.48	8.2	2.34	215 psig
117182	LR-22	0-40	117183	LR-22	22-66	117195	LRX-22		7/8" Flange	5.20	1.48	8.2	2.34	
117184	LR-25	0-65	117185	LR-25	0-40	117196	LRX-25		1" Flange	8.20	2.34	13.5	3.85	
117186	LR-32	0-40	117187	LR-32	22-66	117197	LRX-32		1 1/4" Flange	13.50	3.85	21.1	6.00	
117188	LR-40	0-40	117189	LR-40	22-66	117198	LRX-40		1 1/2" Flange	21.10	6.00	33.1	9.40	

* Nominal Capacity based on -10°C (14°F) evap. Temp. and pressure drop of 14 kPa (2 psig).

For R502 use capacities as for R22

THERMOSTATIC INJECTION VALVES



Type TEAT Thermostatic Injection Valves FOR R12, R22, R502, R717



TEAT

Type TEAT valves are used to inject refrigerant into the suction line of the refrigeration compressor. In this way the valves reduce the impermissibly high discharge temperatures which can occur when the refrigerant vapour in a refrigeration plant is compressed because of the appearance of superheated suction vapour in the compressor.

Type TEAT valves are used for :-

- Where a compressor runs either with a low suction pressure or with high condensing pressures.
- Where a compressor runs with both low suction pressure and high condensing pressures. This is especially applicable to plants using R22.
- Where a compressor receives strongly superheated suction vapour.
- Where a compressor runs with capacity regulation by hot gas by-pass.
- The regulation of media temperature, e.g. oil temperature in the oil cooler of a screw compressor.

VALVE TYPE			TEMP. RANGE °C	CONN. Flanged (Ins.)	RATED CAPACITY *								Cap. Length	Max. Bulb Temp.	Max. Test Press.			
CAT.NO.	MODEL	CODE NO.			R12		R22		R502		R717							
117169	TEAT 20-2	68G6062	55 to 85	½ x ½	0.9	0.25	1.5	0.44	1.1	0.31	6.4	1.8	7 m (16.5ft.)	150 °C (300°F)	3140kPa (455 psig) (on outlet side of valve)			
117172		68G6065	90 to 130															
117170	TEAT 20-8	68G6063	55 to 85	½ x ½	3.5	1.0	6.2	1.8	4.4	1.2	25.6	7.3						
117173		68G6066	90 to 130															
117171	TEAT 20-20	68G6064	55 to 85	½ x ½	10.0	2.5	15.4	4.4	10.8	3.1	64.0	18.0						
117174		68G6067	90 to 130															
117175	TEAT 85-85	68G6069	36 to 65	½ x ½	38.4	10.9	66.3	18.8	46.5	13.2	274.0	78.0						
18152	FA15	6 - 0042	Strainer for TEAT 20															
18154	FA20	6 - 0048	Strainer for TEAT 85															

* Rated Capacity at differential pressure 790 kPa (115 psi).

KK. 11. A2. 02



MANUAL THROTTLE VALVE - TYPE 6F FOR R12, R22, R502, R717

Type 6F is designed for use wherever Manual Regulation of the refrigerant supply is required



6F

VALVE TYPE			Orifice (mm)	Conn. Weld Flange	Cv Factor Imp. GPM	CAPACITY – TONS							
Cat. No.	Model	Code No.				Pressure Drop across Valve - psi							
						R12		R22		R502		R717	
						15	55	15	55	15	55	15	55
117201	6F	6F0010	1	½"	0.26	0.83	1.4	1.1	1.9	0.76	1.3	4.6	8.6
117202	6F	6F0030	3	½"	1.30	3.10	5.3	4.3	7.3	3.00	5.0	17.9	33.1
117203	6F	6F0060	6	½"	2.40	5.60	9.3	7.3	12.9	5.30	9.3	31.4	56.3

KK. 11. A2. 02

CRANKCASE PRESSURE REGULATING VALVES

ALSO KNOWN AS HOLD BACK VALVES, SUCTION PRESSURE, STARTING, OUTLET OR DOWNSTREAM REGULATORS

FA5 SERIES CRANKCASE PRESSURE REGULATORS



FA5



Alco FA5 series regulators are factory assembled units designed to limit compressor suction pressure and thus prevent motor over load. The integral pilot valve has 1/4" SAE male flare external equalizer pilot connection and is adjustable from 0 to 552 kPa (0-80 psig).

Often used as a hot gas defrost termination pressure regulator, it is tight seating and available with an optional integral pilot solenoid for positive shut off.

Selection. FA5 series regulators should normally be selected for the required capacity at the lowest pressure drop across the valve for economical compressor operation.

FA5 regulators should be used on any installation where compressor motor protection is required because of:

1. High starting loads.
2. Surges in suction pressure.
3. High suction pressure caused by hot gas defrost.
4. Prolonged operation at excessive suction pressures.
5. Low voltage and high suction pressure conditions.

The Suction Pressure Regulator cannot be used to limit the Evaporator Pressure.

TYPE		PORT SIZE	CONN. FLANGED FPT	RANGE	NOMINAL CAPACITY *							
CAT. NO.	MODEL				R12		R22		R502		R717	
					kW	Tons	kW	Tons	kW	Tons	kW	Tons
11869	FA5-11	3/8"	3/4"	0 - 552 kPa	1.8	0.5	2.6	0.75	2.0	0.57	5.6	1.6
11870	FA5-12	1/2"	3/4"		4.4	1.25	6.2	1.75	4.9	1.4	14.4	4.1
11871	FA5-13	3/4"	3/4"		7.7	2.2	12.0	3.4	8.8	2.5	26.0	7.4
11872	FA5-14	1"	1"	0 - 80 psig	14.1	4.0	21.8	6.2	15.8	4.5	43.3	12.3
11873	FA5-15	1-1/4"	1-1/4"		21.1	6.0	32.7	9.3	23.9	6.8	66.5	18.9
11874	FA5-16	1-1/2"	1-1/2"		31.7	9.0	48.9	13.9	35.9	10.2	104.0	29.5
11875	FA5-18	2"	2"		59.8	17.0	92.2	26.2	67.9	19.3	144.0	41.0

15.40, Sept. '75 & 11.10.10/76

* Nominal Capacity based on 38°C (100°F) liquid refrigerant, Temp., +4.4°C (40°F) evap. temp. and a 14 kPa (2 psi) pressure drop across the valve.

AVAILABLE ON REQUEST:

- Integral Pilot Solenoid (for positive shut-off).
- Teflon seat regulators
- Strainers

SOLENOID COIL

Type AMG 240 V, 50/60 Hz, AC

CAT. NO.

123253

CRANKCASE PRESSURE REGULATORS



FOR R12, R22, R502

— TYPE CPL

FOR R12, R22, R502, R717

— MAIN VALVE TYPES PM/HSA PLUS:

PILOT VALVE TYPE CVMO & TYPE 6F Throttle Valve.



CPL

The crankcase pressure regulator Type CPL is fitted in the suction line ahead of the compressor and is used for

1. Limiting the compressor suction pressure to a maximum.

The purpose is to protect the compressor motor against overload because of excessive suction pressure during start-up after lengthy standstill periods (high temperature in cold store) as well as during and after defrosting periods.

In low-temperature systems, CPL makes it possible to use a smaller motor which during normal operation will work with improved

efficiency since the motor size is better adapted to the load.

At the same time, the increased efficiency results in less heating of the motor. This is of great importance to suction gas-cooled hermetic and semihermetic compressors among others.

2. Maintaining a constant preset differential between the room temperature and the evaporating temperature during cooling.

In this way, drying-up of the room air is avoided. The result is reduced shrinkage of provisions.

VALVE TYPE			CONN. OD SOLDER	RANGE	NOMINAL CAPACITY *						MAX. TEMP.	MAX. TEST PRESS.
CAT. NO.	MODEL	CODE NO.			R12		R22		R502			
			kW	Tons	kW	Tons	kW	Tons				
11830	CPL 12	34N0135	1/2"	0 — 441 kPa	1.4	0.4	2.5	0.7	2.5	0.7	100°C (212°F)	2600 kPa
11832	CPL 15	34N0136	5/8"		2.1	0.6	3.9	1.1	3.9	1.1		
11835	CPL 22	34N0138	7/8"		4.9	1.4	8.1	2.3	8.1	2.3		
11837	CPL 28	34N0140	1-1/8"	0 — 64 psig	8.4	2.4	14.1	4.0	14.1	4.0		377 psig 2351 kPa
11839	CPL 35	34N0141	1-3/8"		13.0	3.7	21.1	6.0	21.1	6.0			341 psig

MAIN VALVE TYPE PM/HSA for R12, R22, R502, R717 — REFER EVAPORATOR PRESSURE REGULATING VALVES

PILOT VALVE TYPE CVMO — Range 0 to 690 kPa (0 - 100 psig) Conn. 1/4" weld. Code No. 27B1041

CAT. NO.

11851

THROTTLE VALVE TYPE 6F — REFER PAGE 117-e

KK. 30. A2. 02

* Nominal Capacity at -10°C (+14°F) evaporator temperature and +25°C (77°F) condensing temperature.

CRANKCASE PRESSURE REGULATING VALVES

ALSO KNOWN AS HOLD BACK VALVES, SUCTION PRESSURE, STARTING, OUTLET OR DOWNSTREAM REGULATORS

FLO-CON 

Crankcase Pressure Regulators

Application as crankcase pressure regulator only.

Type A7A10

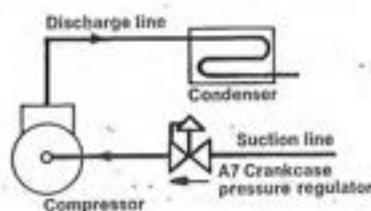
28-42mm
1-1/8"-1-5/8" ODS
connections



- Pilot operated for close control at desired set point.
- Low pressure drop, 10 kPa (1½ psi) at rated capacity, allows maximum compressor efficiency, saves energy.
- V-port allows precise regulation at greatly reduced capacities without need to reset.
- Inlet pressure remains constant within 10 kPa (1½ psi) of set point regardless of load fluctuations.
- Disc piston, sensitive to small pressure changes.
- Teflon seat for tight shut-off.
- Long-life diaphragms. No bellows to fail.
- Lightweight and compact for easy handling.
- Sweat-in-place without disassembly for fast installation.
- In-line disassembly for fast service.
- Gauge connection for 1/8" NPT "Schrader" fitting or equivalent for convenient access to upstream system pressure.

An A7 valve used as a crankcase pressure regulator closes as the outlet pressure rises, thereby avoiding compressor motor and condenser overloads during pull-down, post defrost or peak load periods. They can also be used to limit the overloading effect of any evaporator on a system.

Range: -34 to 620 kPa (10" to 90 psig)



VALVE TYPE		PORT SIZE		CONNECTION SIZE		NOMINAL CAPACITY *						PRESS. RANGE
CAT. NO.	MODEL	mm	ins.	mm	ins.	R12		R22		R502		
						kW	Tons	kW	Tons	kW	Tons	
11883	A7A10	28	1-1/8	28	1-1/8	19.3	5.5	27.1	7.7	21.1	6.0	-34 to 620 kPa (10" to 90 psig)
11884				35	1-3/8							
11885				42	1-5/8							
11886		35	1-3/8	35	1-3/8	21.1	6.0	29.9	8.5	23.2	6.6	
11887				42	1-5/8							
11888	A720	42	1-5/8	42	1-5/8	34.8	9.9	48.9	13.9	38.3	10.9	
11889		54	2-1/8	54	2-1/8	52.8	14.9	73.5	20.9	57.3	16.3	
11890				66	2-5/8							

611-a.7-81

* Nominal Capacity based on +5°C (+40°F) evap. Temp. and 14 kPa (2 psi) pressure drop across regulator.

SIZE VALVE BY EFFECTIVE PORT SIZE

REFER MANUFACTURERS BULLETIN FOR FULL SIZING, CAPACITY AND APPLICATION DATA

CRANKCASE PRESSURE REGULATING VALVES

ALSO KNOWN AS HOLD BACK VALVES, SUCTION PRESSURE, STARTING, OUTLET OR DOWNSTREAM REGULATORS



Parker

**Refrigerating
Specialties Company**

SMALL OUTLET PRESSURE REGULATORS — TYPE A2BO (For Ammonia, R12, R22, R502)



A2BO

Function: Controls Outlet Pressure.
Operation: Regulate at preset outlet pressure. Field adjustable. Open on dropping pressure.
Typical Applications: Gas pressure reducer — Liquid or oil pressure reducer.

SPECIFICATIONS

Body Material: Cast Semi-Steel.
Seat Material: Lapped metal to metal.
Diaphragm Material: Stainless Steel preformed.
Maximum Fluid Temperature: 105°C (220°F).
Minimum Fluid Temperature: -45°C (-50°F).
Design Pressure (SWP): 2069 kPa (300 psig.).

Regulator Type Range "V"		Flange Size and Style		Flow Coefficient	
Cat. No.	Model	Std.	Also Avail.	Kv	Cv
118176	A2BO1	1/2" SW	3/8"	0.09	0.1
118177	A2BO1-ST*		1/2"		
118178	A2BO2		3/4"		
118179	A2BO2-ST*	1/2" SW	FPT	0.17	0.2
118180	A2BO4		or		
118181	A2BO4-ST*	3/4" SW	SW	0.43	0.5

* Suffix "ST": Regulator complete with Strainer.

ADAPTOMODE®

CRANKCASE PRESSURE REGULATORS FOR AMMONIA, R12, R22, R502 and OTHER REFRIGERANTS and OIL



Type A4AO

The Adaptomode-Pressure Regulators use a unique modular construction which allows addition of adaptors and modules to provide virtually any control function for refrigeration application. The design uses internal flow paths and allows direct mounting of modular pilots, thus eliminating most external pilot piping.

These Regulators are pilot operated for precise control of pressure and are suitable for use with most refrigerants, oil and other approved fluids with similar pressure, temperature and corrosion characteristics. The design pressure (SWP) is 2069 kPa (300 psig). The regulators can be easily removed for service. Strainers can be supplied to close couple to the inlet of the regulators.

Standard Range "V": -68 kPa to 827 kPa (20" Hg. to 120 psig.)

Regulator Type		Port Size		Connections SW Flange		Strainer to suit Type RSF - Add.		Nominal Capacity*							
CAT. NO.	Model	Size		Std. Also Avail.		Cat. No.	Size	R12		R22		R502		R717	
		mm.	ins.	Std.	Also Avail.			kW	Tons	kW	Tons	kW	Tons	kW	Tons
118185	A4AO	20	3/4"	1/2"	1", 1 1/2"	121800	25mm	10.6	3.0	16.2	4.6	13.0	3.7	39	11
118186	A4AO	25	1"	1"	1 1/2", 1 3/4"	121800	25mm	14.8	4.2	22.5	6.4	18.3	5.2	53	15
118187	A4AO	32	1 1/4"	1 1/2"	1 3/4"	121802	32mm	25.7	7.3	38.7	11.0	32.0	9.1	92	26
118188	A4AO	40	1 5/8"	1 3/4"	2"	121803	50mm	49.2	14.0	73.9	21.0	59.8	17.0	172	49
118189	A4AO	50	2"	2"	1 3/4"	121803	50mm	73.9	21.0	113.0	32.0	91.5	26.0	257	73
118190	A4AO	65	2 1/2"	2 1/2"	—	121804	65mm	102.0	29.0	158.0	45.0	127.0	36.0	352	100
118191	A4AO	75	3"	3"	—	121805	75mm	148.0	42.0	225.0	64.0	183.0	52.0	528	150
118192	A4AO	100	4"	4"	—	121806	100mm	200.5	57.0	302.5	86.0	246.2	70.0	703	200
121100	Standard 230 Volt 50Hz Coil to suit Pilots (Manuf. Part No. 30 - 0041 - 06)														

* Nominal Capacity based on 14 kPa (2psi) Pressure Drop across regulator and —

R12, R22, R502: 4°C (40°F) Evap. Temp. R717: -7°C (20°F) Evap. Temp.

VARIATIONS ARE AVAILABLE ON REQUEST: —

A4AOS — Outlet Regulator with Shut-off feature

A4AOE — Outlet Regulator with remote sensing connection

A4AOM, P or T — Compensated Outlet Regulator, Motorised, Pneumatic or Temperature Operated.

If Strainer required quote additional Cat. No. and add suffix "ST" to Valve Type.

Optional Range "D": 517kPa to 1434kPa (75 psig to 280 psig)

FAST SERVICE

AS REAL SPECIALISTS IN REFRIGERATION, AIR CONDITIONING AND HEATING, WE STOCK THOUSANDS OF DIFFERENT PARTS, TOOLS AND SUPPLIES. WE BELIEVE THIS IS ONE OF THE MOST COMPLETE ASSORTMENT IN THE INDUSTRY. THIS LARGE INVENTORY, PLUS AN EXPERIENCED ORGANIZATION AND A MODERN STREAMLINED ORDER SYSTEM, ALWAYS ASSURES YOU OF FAST BUT CAREFUL SERVICE. WE DESPATCH OVER 90% OF ALL ORDERS ON THE DAY THEY ARE RECEIVED.

CRANKCASE PRESSURE REGULATING VALVES

ALSO KNOWN AS HOLD BACK VALVES, SUCTION PRESSURE, STARTING, OUTLET OR DOWNSTREAM REGULATORS

CRANKCASE PRESSURE REGULATORS

Crankcase pressure regulators are generally used to prevent compressor motor overload. By throttling the suction gas flow during high load conditions, the compressor motor is permitted to remain within current draw limitations. They also serve many other applications.



SINGER
CONTROLS DIVISION

MODELS 237A 237B 237C



MODEL 237A
LONG



MODEL 237B
SHORT



MODEL 237C

VALVE TYPE			Connections Size & Type	Operating Adjustment Range		Opening Point Setting kPa (psig)	Bellows Rating kPa (psig)
CAT. NO.	Model	Device No.		kPa	(psig)		
MODEL 237A OUTLET PRESSURE REGULATOR — 3/4" ORIFICE							
118101	237AW	237-105	1/2" Male Flare	-34 to 517	(10" to 75)	69 (10)	2930 (425)
118102	237AW	237-098	5/8" " "			103(15)	
118103	237AW	237-113	5/8" " "			69	
118104	237AW	237-089	5/8" ODF Short			(10)	
118105	237AWL	237-130	1/2" ODF Long			276(40)	
118106	237AWL	237-102	5/8" " "			69(10)	
118107	237AWL	237-108	5/8" " "			138(20)	
118108	237AWL	237-103	7/8" " "			69(10)	
118109	237AWL	237-139	7/8" " "			414(60)	
118110	237AWL	237-104	1-1/8" " "			—	
118111	237AWL	237-107	5/8" " "	0 to 1069	(0 to 155)	414(60)	2069(300)
118112	237AWL	237-111	7/8" " "	0 to 1207	(0 to 175)	—	
118113	237AWL	237-114	1-1/8" " "	-34 to 517	(10" to 75)	—	
118114	237AWL	237-190	7/8" " "				
118115	237AWL	237-109	7/8" " "				
MODEL 237B OUTLET PRESSURE REGULATOR — 1-1/4" ORIFICE							
118116	237B	237-362	7/8" ODF Short	0 to 276	(0 to 40)	—	1241 (180)
118117	237BL	237-301	7/8" ODF Long	69	(10	—	
118118	237BL	237-372	1-1/8" " "	to 310	to 45)	—	
118119	237BL	237-378	1-1/8" " "	138 to	(20 to	69(10)	
118120	237BL	237-375	1-1/8" " "	690	100)	345 (50)	
118121	237BL	237-376	1-3/8" " "	69	(10	—	
118122	237BL	237-373	1-3/8" " "	to 310	to 45)	—	
118123	237BL	237-379*	1-1/8" " "	0 to	(0 to	—	
118124	237BL	237-380*	1-3/8" " "	276	40)	124(18)	
118125	237BCL	237-348	1-1/8" " "			—	
118126	237BCL	237-359	1-3/8" " "	0 to 690	(0 to 100)	414(60)	2930 (425)
118127	237BVL	237-325	1-1/8" " "	345 to	(50 to	—	
118128	237BVL	237-317	1-1/8" " "	1241	180)	—	
118129	237BVL	237-316	1-3/8" " "	0 to 276	(0 to 40)	—	
118130	237BVL	237-351	1-1/8" " "				
* with 1/2" male flare gauge connection (with Dill valve) on inlet connecting spud							
MODEL 237C OUTLET PRESSURE REGULATOR — HIGH CAPACITY BUTTERFLY							
118131	237CW	237-701	1-1/8", 1-3/8" &	69 to 276	(10 to 40)	—	3206 (465)
118132	237CW	237-702	1-5/8" OD Refer	0 to 896	(0 to 130)	—	
118133	237CW	237-703	Flange Conn.	103 to 1276	(15 to 185)	793(115)	
118134	237CW	237-704	Kit Chart	172 to 1620	(25 to 235)	1207(175)	

FOR CAPACITY DATA REFER TECH. PAGE 119-h

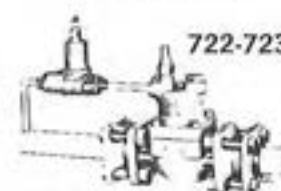
EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR

The Alco Series EPRV Evaporator Pressure Regulating Valves accurately maintain predetermined evaporator pressure regardless of sudden load or suction line changes. These valves can be successfully used on any refrigeration system fed by thermostatic expansion valves, high side or low side floats whenever a constant or minimum evaporator pressure or temperature is desired.

The EPRV Series is compact in design, requires little headroom, puts minimum weight on pipe lines, and is easily dismantled without removing body from the line. All have manual opening stems, are supplied with 1/4" FPT gauge port, and can be easily converted to an external pilot connection. One turn of pilot stem equals approx. 27 kPa (4 psi) change in system pressure.

The Alco Series 722 and 723 regulators must be used with a pilot valve. The type of pilot valve used determines the function and operating characteristics of the main regulator. Valves are supplied with 1/4" FPT pilot connection. Used with a 724 remote pressure pilot they perform as an evaporator pressure regulating valve. An EAC724 pilot may be used for pneumatic compensation. If a 935 temperature pilot is used, the valve functions as an evaporator pressure regulator except that it modulates in response to temperature changes at the remote bulb of the temperature pilot.



EPRV SERIES WITH INTEGRAL PILOT											
VALVE TYPE		PORT SIZE	CONN. FPT	NOMINAL CAPACITY*							
CAT. NO.	MODEL			R12		R22		R502		R717	
				kW	Tons	kW	Tons	kW	Tons	kW	Tons
119251	EPRV – 11	3/8"	3/4"	1.8	0.5	2.6	0.75	2.0	0.57	5.6	1.6
119252	EPRV – 12	1/2"	3/4"	4.4	1.25	6.2	1.75	4.9	1.4	14.4	4.1
119253	EPRV – 13	3/4"	3/4"	7.7	2.2	12.0	3.4	8.8	2.5	26.0	7.4
119254	EPRV – 14	1"	1"	14.1	4.0	21.8	6.2	15.8	4.5	43.3	12.3
119255	EPRV – 15	1-1/4"	1-1/4"	21.1	6.0	32.7	9.3	23.9	6.8	68.5	18.9
119256	EPRV – 16	1-1/2"	1-1/2"	31.7	9.0	48.9	13.9	35.9	10.2	104.0	29.5
119257	EPRV – 18	2"	2"	59.8	17.0	92.1	26.2	67.9	19.3	144.0	41.0

722 SERIES WITH REMOTE PILOT									
119261	722 – 11	3/8"	3/4"	Capacities same as EPRV Valves	PILOT VALVES				
119262	722 – 12	1/2"	3/4"		CAT. NO.	MODEL	Type	RANGE	
119263	722 – 13	3/4"	3/4"		119273	724 – 1	Press.	14 to 758kPa (2 to 110psig)	
119264	722 – 14	1"	1"		119274	724 – 2			
119265	722 – 15	1-1/4"	1-1/4"		119275	724 – 3			
119266	722 – 16	1-1/2"	1-1/2"			935-8-B	Temp.	-37 to -36°C (-35 to -15°F)	
119267	722 – 18	2"	2"			935-1-B	(R12	-26 to -12°C (-15 to +10°F)	
SOLENOID FOR SHUT-OFF – Refer Alco Solenoids						935-2-B	R22	-12 to -1°C (+10 to +30°F)	
*Nominal Capacity based on 38°C(100°F) liquid refrigerant temp., 4.4°C(40°F) evap. temp., 14kPa (2psi) P.D.						935-3-B	R502	-1 to +10°C(+30 to +50°F)	
						FA6 – 3	R717	-1 to +10°C(+30 to +50°F)	

SOLENOID FOR SHUT-OFF - Refer Alco Solenoids

*Nominal Capacity based on 38°C(100°F) liquid refrigerant temp., 4.4°C(40°F) evap. temp., 14kPa (2psi) P.D.

15.40, 9/75 & 11.10, 10/76

AVAILABLE ON REQUEST

Larger Valve sizes - EPRV and 723 Valve sizes 110, 112, 116, 120 and 124 (2 1/2" to 6").

External Strainers for all Valves.

Type EAC724 Pilot for pneumatic compensation.

Type MPR Remote Motorized Pilot - Electrically compensated.

Type FA1 Dual Evaporator Pressure Regulator - two pressure settings controlled by solenoid.

Type FA3 Evaporator Pressure Regulator with Suction Stop Pressure control or tight close combination.

Type EAC - Pneumatically Compensated - Automatic pressure reset from pneumatic controller.

Type MEPR - Electrically Compensated - Automatic pressure reset from potentiometer thermostat.

Type FA6 - Temperature Compensated - Self-contained automatic reset from remote bulb temperature.

Type FA7 - Temperature Compensated with pressure override for low limit or freeze-up protection.

119-a EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR



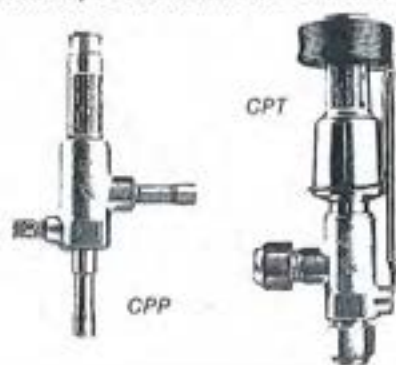
Evaporating pressure regulators.
For fluorinated refrigerants
Type CPP and Type CPT

TYPE CPP — PRESSURE TYPE — is fitted in the suction line after the evaporator and is used for :—

Maintaining a constant evaporating pressure.
Protection against too low an evaporating pressure.
The Regulator has modulating control.

TYPE CPT — TEMPERATURE TYPE — is fitted in the suction line after the evaporator and is designed to maintain the temperature of a cooled medium (air or liquid) constant.

The regulator can be used with one or several evaporators.



TYPE CPP CONSTANT PRESSURE VALVE												
VALVE TYPE			CONN.	OPERAT. RANGE	MAX. TEMP.	MAX. TEST PRESS.	NOMINAL CAPACITY *					
CAT. NO.	MODEL	CODE NO.					R12		R22		R502	
							kW	Tons	kW	Tons	kW	Tons
119201	CPP 12	34N0051	½" M.F.I.	0 to 586 kPa (0 to 85 psig)	100°C (212°F)	2600 kPa (377psig)	1.4	0.4	2.4	0.7	2.4	0.7
119202	CPP 15	34N0052	5/8" M.F.I.			2.2	0.6	3.9	1.1	3.9	1.1	
119203	CPP 22	34N0058	7/8" ODS			5.0	1.4	8.1	2.3	8.2	2.3	
119204	CPP 28	34N0060	1-1/8" ODS			8.5	2.4	14.0	4.0	14.0	4.0	
119205	CPP 35	34N0061	1-3/8" ODS			13.0	3.7	21.0	6.0	21.0	6.0	
TYPE CPT THERMOSTATIC REGULATOR VALVE												
119206	CPT 12	34N1005	½" ODS	-40°C to +25°C (-40°F to +77°F)	100°C (212°F)	2600 kPa (377psig)	SAME AS CPP VALVE ABOVE					
119207	CPT 15	34N1006	5/8" ODS			2351 kPa (341psig)						
119208	CPT 22	34N1008	7/8" ODS									
119209	CPT 28	34N1010	1-1/8" ODS									
119210	CPT 35	34N1011	1-3/8" ODS									

* Regulator Capacity at -10°C (+14°F) evap. temp., +25°C (+77°F) cond. temp.

KK.30. A2. 02



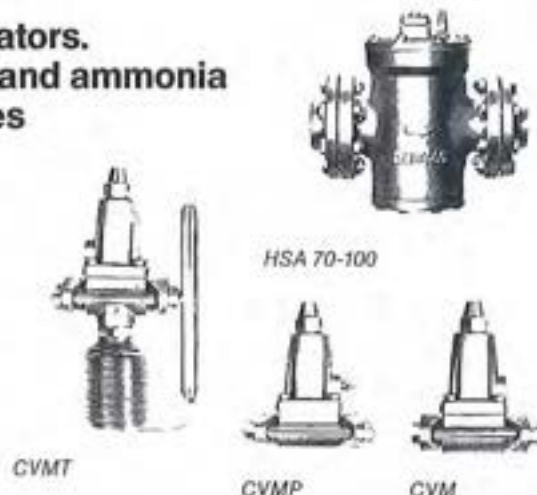
Evaporating pressure regulators.
For fluorinated refrigerants and ammonia
Type HSA + CVM pilot valves

These pilot controlled regulators are used for the regulation of evaporator pressure or temperature of the cooled medium.

Combinations of the main valve and a pilot provide :—

1. **HSA + CVM** = a constant pressure regulator with manual reference setting.
2. **HSA + CVMP** = a constant pressure regulator with pneumatic reference setting.
3. **HSA + CVMT** = a constant temperature with thermostatic reference setting.

This combination of main valve and separate pilot valve results in a high degree of flexibility as regards application and installation.



VALVE TYPE			CONN. WELD FLANGE	RANGE kPa/°C (psig/°F)	MAX. TEMP.	MAX. TEST PRESS.	NOMINAL CAPACITY *							
CAT. NO.	MODEL	CODE NO.					R12		R22		R502		R717	
							kW	Tons	kW	Tons	kW	Tons	kW	Tons
11922	HSA70	26G0008	3"	See Pilot Valves	140°C (284°F)	2758 kPa (400 psig)	110	31	160	46	130	37	425	120
11923	HSA100	26G0010	4"				190	55	280	80	230	64	740	210

PILOT VALVES

11935	CVM	27B1001	1/2"	0 to 690 (0 to 100)	140°C (284°F)	2758 kPa (400 psig)	Constant Pressure Regulator with Manual reference setting.							
11936	CVMP	27B1007	1/2"	0 to 690 (0 to 100)	140°C (284°F)	2758 kPa (400 psig)	Constant Pressure with Pneumatic reference setting.							
11946	CVMT	27B1034	1/2"	-25° to +20° (-13° to +68°)	140°C (284°F)	2758 kPa (400 psig)	Constant Temperature with Thermostatic reference setting							
11947	CVMT	27B1031	1/2"	-50° to -10° (-58° to +14°)	140°C (284°F)	2758 kPa (400 psig)								

SOLENOIDS

12251	EVR3	32F2033	1/2" FL		-40° to +105°	4600 kPa	For Fluorinated Refrigerants (R12, R22, R502)							
12276	EVRA3	32F3103	1/2" FL		-40° to +105°	5000 kPa	For Fluorinated Refrigerants & Ammonia (R12, R22, R502, R717)							
12267	Coil	18Z6702	—	240V 50HzAC			Replacement Solenoid Coil with Terminal Box							

KK.30/40/50. A2. 02

* Regulator Capacity at -10°C (+14°F) evap. temp., +25°C (+77°F) cond. temp. and pressure drop across valve 14 kPa (2psi)

EVAPORATOR PRESSURE REGULATING VALVES

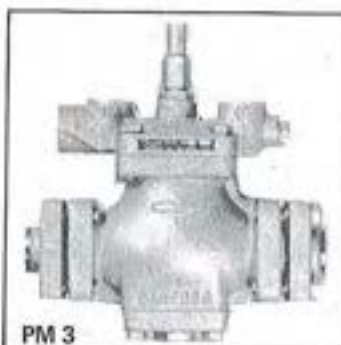
ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR

Danfoss

Evaporating pressure regulators.

For fluorinated refrigerants and ammonia

Type PM + CVP/CVPP and Type PM + CVT

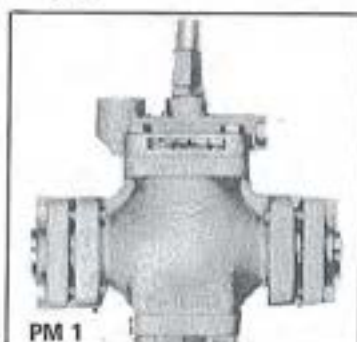


PM 3

Type PM + CVP/CVPP/CVT is used for the regulation of pressure and temperature in refrigeration, freezing and air conditioning plants using fluorinated refrigerants and ammonia. The PM is a servo-operated regulator with screwed-on pilot valves.

FLEXIBILITY FOR MANY APPLICATIONS

Dependent on the application required, the PM regulator may be fitted in suction lines, pressure lines, liquid lines, return lines (liquid/vapour), condensate lines and by-pass lines.



PM 1

PM 1 — Regulator for one screwed-on pilot valve. In addition, an external pilot valve can be used. The main valve function is determined exclusively by the selected pilot valve.

PM 3 — Regulator for up to three screwed-on pilot valves. In addition, an external pilot valve can be used.

The main valve function is determined exclusively by the selected pilot valves.



CVP
Constant
pressure
regulator



CVPP
Differential
pressure
regulator



CVT
Temperature
regulator



EVM
Solenoid
valve

MAIN VALVE TYPE			WELD FLANGE SETS			RATED SUCTION VAPOUR CAPACITY *							
CAT. NO.	MODEL	CODE NO.	CAT. NO.	SIZE	CODE NO.	R12		R22		R502		R717	
						kW	Tons	kW	Tons	kW	Tons	kW	Tons
119451	PM1 - 20	27F1001	119461	3/4"	27N1220	9.4	2.6	14	4.6	12	4.0	37	11
119452	PM1 - 25	27F1006		1"	27N1225	16.0	4.6	25	8.3	20	6.6	65	21
119453	PM1 - 32	27F1011	119462	1 1/4"	27N2332	26.0	7.3	39	13.0	31	10.0	100	33
			119463	1 1/2"	27N2340								
119454	PM1 - 40	27F1016	119464	1 1/2"	27N2440	45.0	15.0	67	22.0	55	18.0	180	60
			119465	2"	27N2450								
119455	PM3 - 20	27F1031	119461	3/4"	27N1220	9.4	2.6	14	4.6	12	4.0	37	11
119456	PM3 - 25	27F1032		1"	27N1225	16.0	4.6	25	8.3	20	6.6	65	21
119457	PM3 - 32	27F1033	119462	1 1/4"	27N2332	26.0	7.3	39	13.0	31	10.0	100	33
			119463	1 1/2"	27N2340								
119458	PM3 - 40	27F1034	119464	1 1/2"	27N2440	45.0	15.0	67	22.0	55	18.0	180	60
			119465	2"	27N2450								
119459	PM3 - 50	27F1035	119466	2"	27N2550	69.0	23.0	100	33.0	85	28.0	270	90
			119467	2 1/2"	27N2565								
119460	PM3 - 65	27F1036	119468	3"	27N2680	110.0	36.0	170	56.0	140	46.0	450	150

* Rated Capacity at -10°C (+14°F) evap. temp., +32°C (+90°F) cond. temp. and a pressure drop across the valve of 14 kPa (2psi).

KK. 30, A2. 02

PILOT VALVES	Type Description	Cat. No.	Code No.	RANGE kPa (psig) °C (°F)
	CVP Pressure Controlled	119470	27B1100	0 to 700 (0 to 100)
		119471	27B1101	-37 to 200 (11" to 28)
	CVPP* Differential Pressure Controlled	119472	27B1102	0 to 700 (0 to 100)
	CVT** Temperature Controlled	119473	27B1110	-40° to 0° (-40 to 32°)
		119474	27B1111	-10° to 25° (14° to 77°)
	EVM Solenoid Valve Coil	119469	27B1122	240V 50 Hz.
			18Z6700	AC

ACCESSORIES	Description	Cat. No.	Code No.
	Pressure Gauge Connection		Weld 27B2035 Flare 27B2041
	External Pilot Connector †		27F1045
	Blanking Plug for PM3		27F1046

† Includ. damping orifice, Code No. 27B2042

* The CVPP is used on the low pressure side of the refrigeration plant. On the high pressure side the external pilot connector + a CVPP Pilot Valve is used.

** Type CVT has adsorption charge. 5 m cap. tube.

EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR

Inlet Pressure Regulators

Applications as Liquid Drain Regulator, Discharge Gas or Evaporator Pressure Regulator.

FLO-CON

Parker

Maximum performance and efficiency

- Pilot operated for close control at desired set point.
- Low pressure drop. 10 kPa (1½ psi) at rated capacity allows maximum compressor efficiency, saves energy.
- V-port allows precise regulation at greatly reduced capacities without need to reset.
- Disc piston, sensitive to small pressure changes.
- Teflon seat for tight shut-off.
- Long life diaphragms. No bellows to fail.
- Available with pilot electric shut-off, pilot electric wide opening and differential pressure regulation.



Type A7A

Type A7A1S

with pilot solenoid

REGULATOR VARIATIONS AVAILABLE ON APPLICATION

- **ELECTRIC SHUT-OFF — 'S' Feature** — Regulating when energised — closed when de-energised. Types A7AS — A7A1S — A72S
- **ELECTRIC WIDE OPENING — 'B' Feature** — Wide open when energised — regulating when de-energised. Types A7AB — A7A1B — A72B

DIFFERENTIAL PRESSURE REGULATORS — Range 0 to 620 kPa (0 to 90 psig)

Opens on a rise in pressure difference — Closes when pressure difference is below set point. May be used in place of an A9 Hot Gas By-pass Regulator for Condenser Pressure Control in applications where the receiver pressure is allowed to "float" up and down with condensing temperature.

- **DIFFERENTIAL REGULATOR — 'L' Feature** — Maintains a set pressure difference between inlet and outlet. Types A7AL — A7A1L — A72L
- **ELECTRIC WIDE OPENING — 'BL' Feature** — Wide open when energised — regulating pressure differential when de-energised. Types A7A1BL — A72BL

EVAPORATOR (INLET) PRESSURE REGULATOR CAPACITIES

TYPE	PORT SIZE		CONN. SIZE		NOMINAL CAPACITY *						RANGE kPa (psig)
					R12		R22		R502		
	mm	ins.	mm	ins.	kW	Tons	kW	Tons	kW	Tons	
A7A or A7AS or A7AB	Red. 15	Red. 5/8	15	5/8	3.2	0.9	4.6	1.3	3.5	1.0	-34 to 2758 [10" to 400]
			22	7/8							
			28	1-1/8							
	15	5/8	15	5/8	6.7	1.9	9.5	2.7	7.4	2.1	
			22	7/8							
			28	1-1/8							
22	7/8	22	7/8	2.7	0.8	13.7	3.9	10.5	3.0		
		28	1-1/8								
		35	1-3/8								
A7A1 or A7A1S or A7A1B	22	7/8	22	7/8	13.7	3.8	19.0	5.4	14.8	4.2	
			28	1-1/8							
			35	1-3/8							
	28	1-1/8	28	1-1/8	19.3	5.5	27.1	7.7	21.1	6.0	
			35	1-3/8							
			42	1-5/8							
35	1-3/8	35	1-3/8	21.1	6.0	29.9	8.5	23.2	6.6		
		42	1-5/8								
		42	1-5/8								
A72 or A72S or A72B	42	1-5/8	42	1-5/8	34.8	9.9	48.9	13.9	32.3	10.9	
			54	2-1/8							
			66	2-5/8							
	54	2-1/8	54	2-1/8	62.4	14.9	73.5	20.9	57.3	16.3	
			66	2-5/8							
			76	3-1/8							

* Nominal Capacity based on 5°C (40°F) evap. temp. and 14 kPa (2psi) press. drop across regulator.

511 a, 7-81

SIZE VALVE BY EFFECTIVE PORT SIZE

REFER MANUFACTURERS BULLETIN FOR FULL SIZING, CAPACITY AND APPLICATION DATA

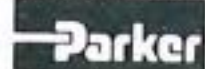
CATALOGUE ORDERING NUMBERS

PORT SIZE		CONN. SIZE		Inlet Pressure Regulator			Inlet Pressure Regulator with Pilot Electric Shut-off			Inlet Pressure Regulator with Electric Wide Opening			Differential Pressure Regulator			Differential Pressure Regulator with Electric Wide Opening	
				A7A	A7A1	A72	A7AS	A7A1S	A72S	A7AB	A7A1B	A72B	A7AL	A7A1L	A72L	A7A1BL	A72BL
mm	ins.	mm	ins.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
Red. 15	Red. 5/8	15	5/8	119600	—	—	119625	—	—	119650	—	—	119675	—	—	—	—
		22	7/8	119601	—	—	119626	—	—	119651	—	—	119676	—	—	—	—
		28	1-1/8	119602	—	—	119627	—	—	119652	—	—	119677	—	—	—	—
		35	1-3/8	119603	—	—	119628	—	—	119653	—	—	119678	—	—	—	—
15	5/8	22	7/8	119604	—	—	119629	—	—	119654	—	—	119679	—	—	—	—
		28	1-1/8	119605	—	—	119630	—	—	119655	—	—	119680	—	—	—	—
		35	1-3/8	119606	—	—	119631	—	—	119656	—	—	119681	—	—	—	—
		42	1-5/8	119607	—	—	119632	—	—	119657	—	—	119682	—	—	—	—
22	7/8	28	1-1/8	—	119608	—	—	119633	—	—	119658	—	—	119683	—	119700	—
		35	1-3/8	—	119609	—	—	119634	—	—	119659	—	—	119684	—	119701	—
		42	1-5/8	—	119610	—	—	119635	—	—	119660	—	—	119685	—	119702	—
		54	2-1/8	—	119611	—	—	119636	—	—	119661	—	—	119686	—	119703	—
28	1-1/8	35	1-3/8	—	119612	—	—	119637	—	—	119662	—	—	119687	—	119704	—
		42	1-5/8	—	119613	—	—	119638	—	—	119663	—	—	119688	—	119705	—
		54	2-1/8	—	119614	—	—	119639	—	—	119664	—	—	119689	—	119706	—
		66	2-5/8	—	119615	—	—	119640	—	—	119665	—	—	119690	—	119707	—
35	1-3/8	42	1-5/8	—	—	119616	—	—	119641	—	—	119666	—	—	119691	—	119708
		54	2-1/8	—	—	119617	—	—	119642	—	—	119667	—	—	119692	—	119709
		66	2-5/8	—	—	119618	—	—	119643	—	—	119668	—	—	119693	—	119710
		76	3-1/8	—	—	119619	—	—	119644	—	—	119669	—	—	119694	—	119711
42	1-5/8	54	2-1/8	—	—	119620	—	—	119645	—	—	119670	—	—	119695	—	119712
		66	2-5/8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		76	3-1/8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		86	3-3/8	—	—	—	—	—	—	—	—	—	—	—	—	—	—

SOLENOID COIL, PART NO. 83-1000-29 240V, 50Hz.

EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR



**Refrigerating
Specialties Company**

PILOT & SMALL REGULATORS

DESCRIPTION

The A2 Type Pressure Regulators are compact, direct diaphragm operated for use with refrigerant liquid or vapour. Suitable for use with Ammonia, R12, R22, R502 and certain other refrigerants, oil and other approved fluids with similar pressure, temperature and corrosion characteristics. The Regulators are for use where a small inlet pressure regulator is required.

SPECIFICATIONS

Body Material: Cast Semi-steel.
Seat Material: Lapped metal to metal.
Diaphragm Material: Stainless Steel pre-formed.
Maximum Fluid Temperature: 105°C (220°F).
Minimum Fluid Temperature: -45°C (-50°F).
Design Pressure (SWP): 2069 kPa (300 psig).

TYPES

- A2B2/A2B — Small Inlet Pressure Regulators or Pilots.
- A2A — Small Inlet Pressure Regulator.
- A2BK — Resealing Relief Regulator.
- A2BP — Pneumatic or Differential Regulator.
- A2BT/A2AT — Temperature Operated Regulator.

Suction Line Capacities - kW (Tons) at Evap. Temp. - R717

Type	-40°C (-40°F)	-29°C (-20°F)	-18°C (0°F)	-7°C (20°F)	4.4°C (40°F)
A2B	1.4(0.4)	1.8(0.5)	2.1(0.6)	2.5(0.7)	3.2(0.9)
A2A	—	5.3(1.5)	1.3(1.8)	7.4(2.1)	9.5(2.7)

Based on 30°C (86°F) liquid and 14 kPa (2 psi) press. drop.

Cat. No.	Type	Flange Sizes & Styles	
		Std.	Also Avail.
119730	A2B2	1/2" SW	3/8"
119731	A2B2-ST*	1/2" SW	
119732	A2B	1/2" SW	
119733	A2B-ST*	1/2" SW	1/2"
119734	A2A	3/4" SW	
119735	A2A-ST*	3/4" SW	3/4"
119736	A2BK	1/2" SW	
119737	A2BK-ST*	1/2" SW	FPT
119738	A2BP	1/2" SW	
119739	A2BP-ST*	1/2" SW	or
119740	A2BT	1/2" SW	
119741	A2BT-ST*	1/2" SW	SW
119742	A2AT	3/4" SW	
119743	A2AT-ST*	3/4" SW	

* Regulator complete with Strainer.



A4 SERIES PRESSURE REGULATORS (Ammonia, R12, R22, R502)

The A4 Series Adaptomode Pressure Regulators use a unique modular construction which allows addition of adaptors and modules to provide virtually any control function for refrigeration application.

Design Pressure 2069 kPa (300 psig)

NOMINAL SUCTION CAPACITIES* A4 REGULATORS										Flow	
PORT SIZE		R12		R22		R502		R717		Coefficient	
mm	ins.	kW	Tons	kW	Tons	kW	Tons	kW	Tons	Kv	Cv
20	3/4	10.6	3.0	16.2	4.6	13.0	3.7	38.7	11	6.2	7.2
25	1	14.8	4.2	22.5	6.4	18.3	5.2	52.8	15	8.6	10.0
32	1-1/4	25.7	7.3	38.7	11.0	32.0	9.1	91.4	26	15.0	17.5
40	1-5/8	49.2	14.0	73.9	21.0	59.8	17.0	172.0	49	28.6	33.4
50	2	73.9	21.0	113.0	32.0	91.4	26.0	257.0	73	42.4	49.5
65	2-1/2	102.0	29.0	158.0	45.0	127.0	36.0	352.0	100	60.0	70.0
75	3	148.0	42.0	225.0	64.0	183.0	52.0	528.0	150	86.0	100.0
100	4	201.0	57.0	302.0	86.0	246.0	70.0	703.0	200	116	135
125	5	302.0	86.0	457.0	130.0	387.0	110.0	1055.0	300	175	205
150	6	457.0	130.0	703.0	200.0	563.0	160.0	1653.0	470	270	315
200	8	914.0	260.0	1407.0	400.0	1125.0	320.0	3236.0	920	535	625

* Nominal Capacities — R12, R22, R502 : 4.4°C (40°F) Evap. Temp. and 14kPa (2psi) pressure drop.
— R717 : -7°C (20°F) Evap. Temp. and 14kPa (2psi) pressure drop.

A4 REGULATOR CAPACITIES — AMMONIA & OIL

HOT GAS DEFROST RELIEF CAPACITIES					
Nom. Relief Regulator sizes to be used with Refrig. Loads in Tons					
Port Size*		Evaporator Temperature			
mm	ins.	-7°C (20°F)	-18°C (0°F)	-29°C (-20°F)	-40°C (-40°F)
20	3/4	23	19	15	11
25	1	31	26	21	16
32	1-1/4	55	46	37	28
40	1-5/8	100	87	70	52
50	2	160	130	100	78
65	2-1/2	220	180	140	110
75	3	310	260	210	160

Nominal capacities are based on normal defrost times and defrost pressure of 483kPa (70psig). Defrost time will depend on amounts of liquid, frost and mass of evaporator as well as piping arrangement and connection locations. Next size larger regulator will shorten defrost time; next size smaller will lengthen time.

LIQUID CAPACITIES					
Typical Application : A4AL as pump relief regulator					
PORT SIZE		For 4.4°C (40°F) liquid and press. drops listed			
SIZE		69kPa (10psi) P.D.		138kPa (20psi) P.D.	
mm	ins.	lb/min.	US. gpm	lb/min.	US. gpm
20	3/4	140	29	210	42
25	1	200	41	290	58
32	1-1/4	350	71	500	100
40	1-5/8	700	140	960	190
50	2	990	200	1400	290
65	2-1/2	1400	290	2000	400
75	3	2000	410	2900	580

Correction factors for temperatures between -40° and 30°C (-40° and 86°F) are negligible.

TONS HOT GAS BY-PASS. Typical : Compressor suction loading

Port Size		Inlet Pressure	
		207 kPa (30psig)	1034 kPa (150psig)
		Outlet Pressure Range	
		0 to -51 kPa (0 to 15"Hg.)	
mm	ins.	310 to -51 kPa (45 psig to 15"Hg.)	
20	3/4	34	110
25	1	47	150
32	1-1/4	82	270
40	1-5/8	160	510
50	2	230	760
65	2-1/2	330	1100
75	3	470	1500

Based on near saturated inlet gas and 1034kPa (150psig) ratings for 30°C (86°F) condensing, 207kPa (30psig) ratings for -7°C (20°F) condensing. Correction not needed for other gas or liquid temps.

US GPM OIL CAPACITIES			
Typical : Screw compressor oil feed control			
Port Size		For 29.4° to 49°C (85° to 120°F) Oil (300 SSU viscosity) and press. drops listed	
		Pressure Drops : kPa (psi)	
mm	ins.	34kPa (5psi)	69kPa (10psi)
20	3/4	17	24
25	1	24	33
32	1-1/4	41	58
40	1-5/8	79	110
50	2	120	160
65	2-1/2	170	230
75	3	240	330

based on no foaming of oil through regulator.

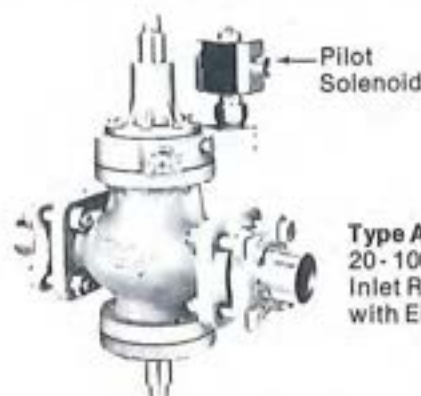
Refer Page 119-e for A4A Regulator Types, Sizes and Ordering Catalogue Nos.

Refer also to Page 119-f for A4A "Regulator Application Guide".

EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR

Refrigerating Specialties Company



Type A4AS
20 - 100 mm, 3/4" - 4"
Inlet Regulator
with Electric Shut-Off

AVAILABLE SIZES - TYPES - ORDERING CATALOGUE NOS.

PORT SIZE		Connections SW Flange		A4A	A4AS	A4AB	A4ABS	A4AD	A4AK	A4AL	Strainer to suit Add Cat. No. below Type RSF	
				Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.		
mm	ins.	Std.	Also Avail	No.	No.	No.	No.	No.	No.	No.	Size(mm)	Cat. No.
20	3/4	3/4	1, 1%	119750	119760	119770	119780	119790	119800	119810	25	121801
25	1	1	%, 1%	119751	119761	119771	119781	119791	119801	119811	25	121801
32	1-1/4	1-1/4	1%	119752	119762	119772	119782	119792	119802	119812	32	121802
40	1-5/8	1-1/2	2	119753	119763	119773	119783	119793	119803	119813	50	121803
50	2	2	1%	119754	119764	119774	119784	119794	119804	119814	50	121803
65	2-1/2	2-1/2	—	119755	119765	119775	119785	119795	119805	119815	65	121804
75	3	3	—	119756	119766	119776	119786	119796	119806	119816	75	121805
100	4	4	—	119757	119767	119777	119787	119797	119807	119817	100	121806

CONTINUED

PORT SIZE		Connections SW Flange		A4AR	A4AT	A4AT-LLR	A4AM	A4AP	Strainer to suit Add Cat. No. below Type RSF		LPD Feature* Add Cat. No. below
				Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.			
mm	ins.	Std.	Also Avail	No.	No.	No.	No.	No.	Size(mm)	Cat. No.	
20	3/4	3/4	1, 1%	119820	119830	119840	119850	119860	25	121801	Cat. No. 119738- 119748
25	1	1	%, 1%	119821	119831	119841	119851	119861	25	121801	
32	1-1/4	1-1/4	1%	119822	119832	119842	119852	119862	32	121802	
40	1-5/8	1-1/2	2	119823	119833	119843	119853	119863	50	121803	
50	2	2	1%	119824	119834	119844	119854	119864	50	121803	
65	2-1/2	2-1/2	—	119825	119835	119845	119855	119865	65	121804	
75	3	3	—	119826	119836	119846	119856	119866	75	121805	
100	4	4	—	119827	119837	119847	119857	119867	100	121806	

A4W SERIES (COMPACT BIG ONES) PRESSURE REGULATORS

PORT SIZE		Connection Welds directly in the line	A4W	A4WS	A4WB	Strainer to suit Add Cat. No. below Type RSF		LPD Feature* Add Cat. No. below
			Cat. No.	Cat. No.	Cat. No.			
mm	ins.					Size(mm)	Cat. No.	
125	5	5"	119870	119873	119876	125	121807	CAT. NO. 119738- 119748
150	6	6"	119871	119874	119877	150	121808	
200	8	8"	119872	119875	119878	200	121809	

200 V 50 Hz
Standard 230 Volt 50 Hz. Coil to suit Pilots (Manuf. Part No. 30 - 0041 - 06)
49-2015-24
201525

CAT. NO.
121100

* LPD Feature: The Low Pressure Drop (LPD) Package, when added to any of the standard Type A4 family of regulators will allow operation with 3.4 kPa (1/2 psi) pressure drop which can frequently result in considerable power savings, especially below -18°C (0°F).

NOTES

Refer Page 119-d for A2 Series Selection and Capacities + A4 Series Capacities.
Refer Page 119-f for Refrigerating Specialties Co. "Regulator Application Guide".

PRESSURE REGULATING VALVES



Parker
Refrigerating
Specialties Company

Regulator Application Guide

1

The A4 Family of Regulators includes valves which control inlet, outlet or differential pressure. Each regulator is available with an assortment of additional variations which enable one regulator to perform several functions. The

most common arrangements are listed in this Guide. The A4A Adaptomode® Series is available 20 - 100 mm (¾"-4") ports; the A4W Series is available 125 - 200 mm (5" - 8") ports.

Type Suffix	Type	Function	Operation	Typical Applications
	A4A	Control inlet pressure.	Regulate at preset inlet pressure. Can be field adjusted. Opens on a rising inlet pressure.	1. Evaporator pressure control. 2. Condenser pressure control. 3. Any inlet pressure control.
S	A4AS	Control inlet pressure or shut off regulator.	Regulating when electrically energized; closed when not energized.	1. Close for temperature control. 2. Close for defrosting.
B	A4AB	Control inlet pressure or wide open regulator.	Regulating when not electrically energized; wide open when energized.	1. Wide open for maximum cooling. 2. Regulating for defrost. 3. Regulating for temp. control.
BS	A4ABS	Control inlet pressure. Shut off or wide open regulator.	Can be electrically closed or opened.	1. Regulating for temp. control. 2. Wide open for max. cooling. 3. Close for defrosting.
D	A4AD	Dual pressure control.	Regulate at lower pressure when electrically energized; at higher pressure when not energized.	1. Higher pressure for defrost. 2. Higher pressure for temperature control. 3. Internal pressure relief.
K	A4AK	Reseating relief regulator.	Opens wide above set point. Repeatedly reseats after operation.	1. Defrost relief. 2. Non-atmospheric relief. 3. High to low relief.
O	A4AO	Control outlet pressure.	Regulate at preset outlet pressure. Can be field adjusted. Opens on a drop in outlet pressure.	1. Crankcase pressure regulation. 2. Hot gas bypass; booster loading. 3. Condenser pressure control.
L	A4AL	Control pressure difference across regulator.	Regulate pressure difference at or below a pre-set amount.	1. Liquid pump relief regulator. 2. Reduce liquid or vapour line pressure.
M	A4AM	Motor changes pressure set point.	Potentiometer thermostat re-adjusts set-point to match evaporator temp. to a varying load.	1. Precise control of process cooling. 2. Liquid chillers. 3. For load change compensation.
P	A4AP	Air pressure changes set-point. (1:1 ratio). Also available A4A3P for 3:1 ratio.	Pneumatic thermostat readjusts set-point to match evaporator temp. to a varying load.	1. Precise control of process cooling. 2. Liquid chillers. 3. For load change compensation.
T	A4AT	Temperature bulb controls regulator set point.	Increase in temperature opens regulator; decrease in temperature closes regulator.	1. Process cooling systems. 2. Liquid chillers. 3. Systems with load change.
Opt. LLR	for A4AT	Limit the low pressure	Extreme 'hunting' is prevented and evaporator pressure cannot go below this setting regardless of abnormal warming of the thermal bulb.	1. Process cooling systems. 2. Liquid chillers. 3. Systems with load change.
E	A4AE A4AOE etc.	Control at external pressure.	Same as standard regulator except controlled pressure is sensed away from regulator.	1. Low Pressure Drop (A4AE). 2. Hot gas bypass (A4AOE).
R	A4AR	Main regulator is controlled by separate pilots. (See p.8, Cat. CC - 10 - available on application.	Main regulator modulates, closes or opens in response to pilots.	1. Simple inventory of regulator & pilots. 2. Convenient placement of pilots. 3. Unusual pilots or circuits.
Z	A4AZ	Not a complete regulator. Body Assembly to which modules can be added.	Can be built into most of the A4A Variation regulators. Has a Modudapter® adaptor.	Versatile unit for inventory along with Modules on page 3, Cat. CC - 10 - available on application.

The possible combinations of A4 Regulator variations is quite numerous. The Electric Shut-off "S", Wide-opening "B" and Dual "D" variations are used frequently in combination with the Compensated "M", "P", and "T" Regulators, Outlet "O" or

Differential "L" Regulators, or with themselves. Also any type of regulator is available with the main regulator A4AR separated from its pilot control valves. See page 8, Cat. CC - 10 - available on application.

Refer Pages 119-d and 119-e for details of Regulators mentioned in above "Guide".

EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR

MODEL 235 EVAPORATOR PRESSURE REGULATING VALVE

- Capacity — R12 & R502 — 1/2 TON, R22 — 3/4 TON.
 Application — Operation of two or more evaporators at different temperatures with a single condensing unit.
 — Beverage coolers and various commercial applications to control the evaporator coil in the water chilling section.

Available with a visual means of accurately setting operating pressure without using a gauge.

MODEL 238 EVAPORATOR PRESSURE REGULATING VALVE

- Capacity — R12 — 1 TON.
 Application — Water chilling units.
 Air coils where frosting is not desired.
 Close regulation of humidity.

Non-visual adjustment by means of a slotted adjusting stem, sealed by plastic cap.

MODEL 239 INLET PRESSURE REGULATING VALVE

- Capacities — Refer following Tech. Pages.
 Application — Higher capacity evaporator pressure regulators.
 — High side pressure relief valve.
 — High side pressure control device on air cooled refrigeration system condensers.

Model 239A — Bellows type 3/4" orifice valve that operates in response to valve inlet pressure.
 When adjusted for a certain opening point, the valve remains closed until inlet pressure builds up to the set point.

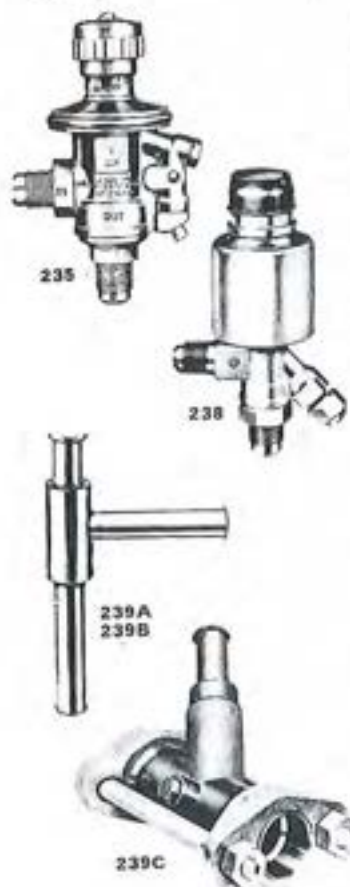
Model 239B — Similar to the 239A except for a 1 1/4" orifice.

Model 239C — Features a large refrigerant capacity in a relatively small valve body. It has a non-chattering, modulating butterfly type valve operator.



SINGER
CONTROLS DIVISION

MODELS 235 — 238 — 239A — 239B — 239C



VALVE TYPE			Connections Size & Type	Operating Adjustment Range		Opening Point Setting	Bellows Rating kPa (psig)
CAT. NO.	Model	Device No.		kPa	(psig)	kPa (psig)	
MODEL 235 & 238 EVAPORATOR PRESSURE REGULATOR							
119176	235SG	40375	1/2" M.F.I.	0 - 276	(0 - 40)	Marked on collar below Adjust. knob	
119177	235SG	40376	5/8" M.F.I.				
119178	235HG	50634	1/2" M.F.I.	138 - 403	(20 - 70)		
119179	238	238-005	1/2" M.F.I.	0 - 276	(0 - 40)		
MODEL 239A INLET PRESSURE REGULATOR - 3/4" ORIFICE							
119180	239AWL	239-137	5/8" ODS	172 - 1965	(25 - 285)	—	2930 (425)
119181	239AWL	239-508	7/8" ODS			—	
119182	239AWL	239-133	7/8" ODS	138 - 552	(20 - 80)	—	
119183	239AWL	239-136	7/8" ODS			—	
119184	239AWL	239-147	1-1/8" ODS			—	
119185	239AWL	239-158	7/8" ODS	103 - 1069	(15 - 155)	—	
119186	239AWL	239-139	7/8" ODS	620 - 2413	(90 - 350)	1724 (250)	
MODEL 239B INLET PRESSURE REGULATOR - 1 1/4" ORIFICE							
119187	239BL	239-301	1-3/8" ODS	414 - 1586	(60 - 230)	—	2069 (300)
119188	239BL	239-301*	1-3/8" ODS	35 - 414	(5 - 60)	—	
119189	239BL	239-307	1-3/8" ODS			—	
119190	239BL	239-309	1-1/8" ODS			—	
119191	239BL	239-317	1-1/8" ODS	414 - 1586	(60 - 230)	—	2930 (425)
119192	239BL	239-315	1-3/8" ODS	207 - 517	(30 - 75)	—	
* With 1/2" SAE male flare gauge connection (with Dill valve) on inlet spud							
MODEL 239C INLET PRESSURE REGULATOR - HIGH CAPACITY BUTTERFLY							
119193	239C	239-701*	1 1/2", 1 3/4" & 1 1/2" OD	103 - 620	(15 - 90)	—	2069
119194	239C	239-702*	Refer Flange Conn. Kit Chart	483 - 1379	(70 - 200)	—	(300)
119195	239C	239-703*		758 - 2000	(110 - 290)	—	2930 (425)
119196	239C	239-704*		1034 - 2517	(150 - 365)	—	
* With 1/2" SAE male flare gauge connection (with Dill valve) on inlet spud							

Flange Connection Kit (1 per Valve)

Cat. No.	Kit No.	Size
118135	179-519	1-1/8 ODF.S
118136	169-921	1-3/8 ODF.S
118137	179-067	1-5/8 ODF.S

FOR CAPACITY DATA REFER TECH. PAGE 119-e

CAPACITY RATING TABLES 'AP' TYPE 237, 239 VALVES


SINGER
CONTROLS DIVISION

CAPACITY CHARTS

Model 237 and 239 valve capacity ratings are shown in the following tables. Valves are rated for (1) high pressure gas, (2) refrigerant liquid, and (3) low pressure (suction) gas. The rating conditions are shown below each chart. At the various pressure drops the valve capacities listed are at maximum stroke .100". In selecting valves for any application it is suggested that valves be sized for the system maximum capacity requirement, with some safety factor included. Selecting a valve to provide the maximum capacity required at 2/3 or 3/4 of total valve rated capacity is generally recommended.

VALVE DIFFERENTIAL

Controls Division pressure regulating valves are either diaphragm or bellows type. System pressure operates the valve mechanism directly, not by means of a pilot mechanism. Therefore, all four models in this series are "differential" type valves, as a pressure differential exists (during operation) between valve opening point and valve operating point. All valves are adjustable and setting the valve for any application actually involves setting the valve's opening point. The operating pressure of inlet pressure regulating valves is above the opening point as the valves stroke open on inlet pressure increase.

The operating pressure of outlet pressure regulating valves is below the opening point as the valves stroke open on outlet pressure decreases.

EFFECT OF SYSTEM PRESSURES

Controls Division Models 237 and 239 pressure regulating valves employ two types of bellows as the flexible element:

1. A brass bellows (Models 237B, 239B).
2. A beryllium copper bellows, silver soldered to the valve body.

(Models 237A, 239A, 237C & 239C).

A more than adequate safety factor is allowed in maximum bellows pressure for normal system operation. However, warning tags or labels on all valves should be observed and care taken to avoid system pressures above the bellows design maximum. System pressure above this maximum will shorten bellows life considerably.

HIGH PRESSURE LIQUID REFRIGERANT CAPACITY (A, B and C Size Valves - Model 239 only)						
PRESSURE DROP ACROSS VALVE (PSI)	TONS OF REFRIGERATION					
	239A		239B		239C	
	R-12	R-22	R-12	R-22	R-12	R-22
1	6.80	9.20	11.60	15.60	30	38.6
2	8.60	11.60	16.40	22.10	42	54.5
4	10.70	14.40	23.50	31.80	60	77.1
9	14.30	19.30	35.20	47.70	90	115.5
16	17.20	23.20	47.00	63.60	120	154.0
25	19.90	26.80	58.00	78.30	150	192.5

Capacities are based on 37.8°C (100°F) condensing temperature and 4.4°C (40°F) evaporator temperature.

NOTE: For R502 Capacities, multiply R12 Capacity (above) by .875
For R500 Capacities, multiply R12 Capacity (above) by 1.15

HIGH PRESSURE (DISCHARGE) GAS CAPACITY (A, B and C Size Valves - 237 and 239)						
PRESSURE DROP ACROSS VALVE (PSI)	TONS OF REFRIGERATION					
	237A and 239A		237B and 239B		237C and 239C	
	R12	R22	R12	R22	R12	R22
2	2.30	3.50	4.50	7.15	11.65	17.75
4	2.85	4.40	6.60	10.20	16.50	25.00
9	3.55	5.80	9.90	15.40	24.80	37.95
16	4.70	6.95	13.20	20.65	34.00	50.20
25	5.60	8.65	16.50	25.60	41.20	62.70
36	6.70	10.35	20.00	30.80	49.50	75.00
50	11.50	17.60	22.70	35.70	58.30	88.80
75	14.10	21.60	27.90	43.80	71.50	108.50
100	16.20	24.80	32.10	50.30	82.50	125.00
125	18.10	27.80	35.90	56.50	92.00	140.00
150	19.80	30.40	39.50	61.80	101.00	153.50
175	21.50	32.90	42.60	66.80	109.00	165.50
200	23.00	35.20	45.50	71.50	116.50	177.30
250	25.80	39.50	52.00	80.00	130.00	
300		43.20		87.70	143.00	
350		46.70		94.80		
400		51.30		101.00		

Capacities given are for 37.8°C (100°F) saturated gas entering the valve and -6.7°C (20°F) evaporating temperature. Capacities are correct within 5% for saturated gas temperature between 26.7°C (80°F) and 71.1°C (160°F) at valve inlet, and for evaporator temperatures between 4.4°C (40°F) and -17.8°C (0°F).

NOTE: For R502 Capacities, multiply R12 Capacity (above) by 1.18
For R500 Capacities, multiply R12 Capacity (above) by 1.22

LOW PRESSURE (SUCTION) GAS CAPACITY (A, B, and C Size Valves – 237 and 239 only)							
Evap. Press. and Temperature	Pressure Drop Across Valve (PSI)	TONS OF REFRIGERATION					
		237A and 239A		237B and 239B		237C and 239C	
		R-12	R-22	R-12	R-22	R-12	R-22
69 PSIG R-22	½	.78	1.14	1.46	2.10	3.78	5.55
37 PSIG R-12	1	1.09	1.59	2.07	3.01	5.34	7.85
40°F	2	1.50	2.20	3.00	4.32	7.55	11.10
	5	2.40	3.49	4.80	6.88	11.95	17.60
	10	3.39	4.94	6.60	9.55	16.85	24.80
43.3 PSIG R-22	½	.61	.94	1.23	1.79	3.08	4.56
21. PSIG R-12	1	.87	1.31	1.73	2.53	4.35	6.45
20°F	2	1.21	1.82	2.43	3.60	6.16	9.14
	5	1.96	2.92	3.86	5.78	9.73	14.40
	10	2.76	4.12	5.40	8.02	13.77	20.40
24.1 PSIG R-22	½	.46	.72	.925	1.44	2.40	3.60
9.2 PSIG R-12	1	.66	1.04	1.35	2.08	3.40	5.10
0°F	2	.94	1.47	1.89	2.93	4.80	7.20
	5	1.55	2.37	3.10	4.75	7.60	10.60
	10	2.17	3.34	4.27	6.53	10.71	16.08
10.3 PSIG R-22	½	.32	.54	.73	1.13	1.86	2.84
0.6 PSIG R-12	1	.48	.79	1.02	1.65	2.63	4.02
-20°F	2	.70	1.12	1.43	2.26	3.72	5.66
	5	1.16	1.85	2.27	3.60	5.88	8.96
	10	1.63	2.60	3.22	5.14	8.30	12.65

NOTE: For R502 Capacities, multiply R12 Capacity (above) by 1.18
For R500 Capacities, multiply R12 Capacity (above) by 1.22

ABOVE VALVE CAPACITIES REFER TO THE FOLLOWING:

CRANKCASE PRESS. REG. VALVES - PAGE 118-c & EVAPORATOR PRESS. REG. VALVES - PAGE 119-e



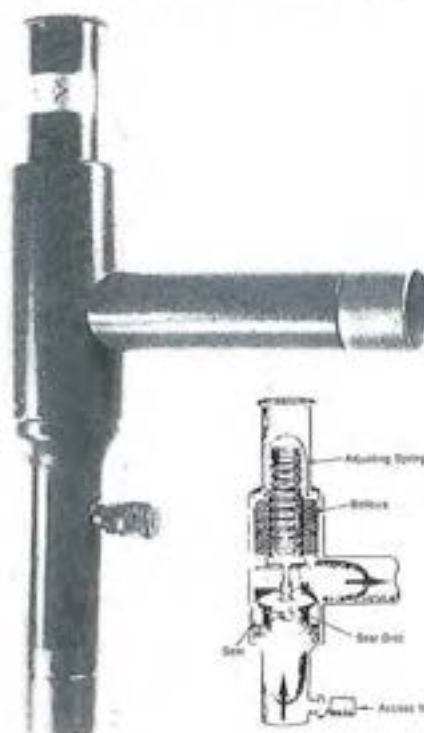
SMALL CAPACITY Pressure Regulators

IPR/OPR Product Line

FOR R12 — R22 — R502

EVAPORATOR PRESSURE REGULATING VALVES

ALSO KNOWN AS CONSTANT PRESS. VALVE, BACK PRESS., UPSTREAM, INLET PRESS., SUCTION LINE REGULATOR



The Alco Series IPR Evaporator Pressure Regulator is a Direct Acting Pressure Regulator which is designed to maintain a pre-determined minimum evaporator pressure regardless of load or suction line changes.

They are used on such applications as water chilling units, air coils where frost is not wanted, and systems where close humidity control is required. They can be used on multiple evaporator systems on one or more evaporators to maintain pressures higher than the common suction line.

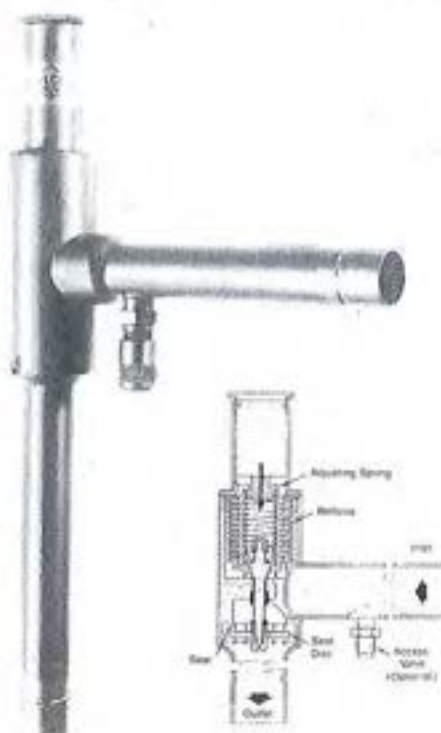
CAT. NO.	MODEL	OPERATING RANGE		CONNECTIONS ODF SOLDER INS.
		kPa	PSI	
	IPR - 6	0/345, 207/690	0/50, 30/100	5/8, 7/8, 1-1/8
	IPR - 10	0/345, 207/690	0/50, 30/100	7/8, 1-1/8, 1-3/8

MODEL	NOMINAL CAPACITY — kW & TONS *					
	R12		R22		R502	
	kW	TONS	kW	TONS	kW	TONS
IPR - 6	2.8	0.8	3.8	1.1	3.2	0.93
IPR - 10	5.9	1.7	7.9	2.3	6.6	1.91

* Nominal Capacity based on evap. temp. -1°C ($+30^{\circ}\text{F}$) and P.D. of 14 kPa (2 psi).

CRANKCASE PRESSURE REGULATING VALVES

ALSO KNOWN AS HOLD BACK VALVES, SUCTION PRESSURE, STARTING, OUTLET OR DOWNSTREAM REGULATORS



The Alco Series OPR Crankcase Pressure Regulator is designed to limit the crankcase pressure to a maximum pre-determined pressure to prevent overloading of the compressor motor.

The OPR is used in the suction line between the compressor and the evaporator and must be installed downstream of any other controls or accessories.

CAT. NO.	MODEL	OPERATING RANGE		CONNECTIONS ODF SOLDER INS.
		kPa	PSI	
	OPR - 6	0 / 414	0 / 60	5/8, 7/8, 1-1/8
	OPR - 10	0 / 414	0 / 60	7/8, 1-1/8, 1-3/8

MODEL	NOMINAL CAPACITY — kW & TONS *					
	R12		R22		R502	
	kW	TONS	kW	TONS	kW	TONS
OPR - 6	0.6	1.72	6.6	1.92	4.6	1.33
OPR - 10	12.2	3.54	13.7	3.94	9.5	2.74

* Nominal Capacity based on 38°C (100°F) condensing temperature, 5.6°C (42°F) superheat, 414 kPa (60 psi) setting, 69 kPa (10 psig) suction pressure and 14 kPa (2 psi) pressure drop.

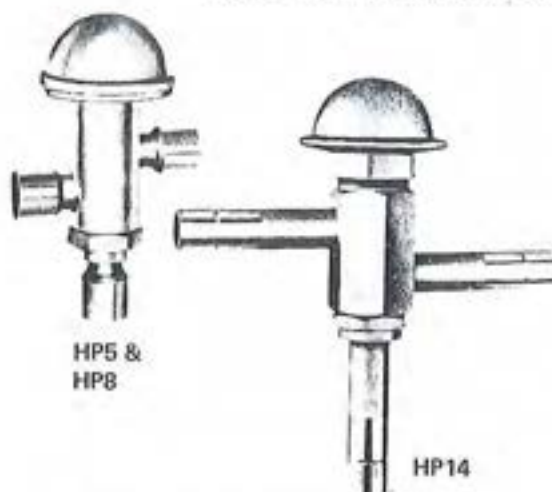
CONDENSING PRESSURE REGULATORS HEAD - WINTER - DISCHARGE PRESSURE CONTROLS FOR AIR COOLED CONDENSERS

120



HeadMaster HEAD PRESSURE CONTROL SERIES HP5, HP8 & HP14

DEVELOPED SPECIFICALLY TO MAINTAIN PROPER AIR COOLED CONDENSER PRESSURES DURING PERIODS OF LOW OUT-DOOR AMBIENT CONDITIONS.



The application of air cooled condensers for year round operation or during periods of low ambient, requires some means of control to maintain adequate condensing temperatures to ensure proper system operation. It is essential that proper liquid refrigerant pressure be controlled to:

1. Maintain liquid subcooling and prevent liquid line flash gas.
2. Provide adequate pressure at the inlet side of the Thermo valve to obtain sufficient pressure drop across the valve port.

The HeadMaster control is a three-way modulating valve which eliminates the need for special piping or multiple control valves. As a single unit it simplifies piping and reduces the installation costs.

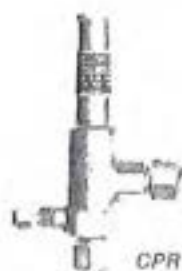
Metering discharge gas into the liquid produces a higher pressure at the condenser outlet, thus reducing the flow and allowing a level of condensed liquid to rise in the condenser. This flooding of the condenser with liquid reduces the available condenser surface. The result is to increase the operating temperature difference and produce a consistent condensing temperature.

R12		CONN. ODF	R22, R502	
CAT. NO.	TYPE		CAT. NO.	TYPE
12097	HP5T3-A	3/8"	12099	HP5T3-B
12098	HP5T4-A	1/2"	120100	HP5T4-B
120101	HP8T4-A	1/2"	120107	HP8T4-B
120102	HP8T5-A	5/8"	120108	HP8T5-B
120103	HP8T7-A	7/8"	120109	HP8T7-B
120104	HP14T7-A	7/8"	120110	HP14T7-B
120105	HP14T9-A	1-1/8"	120111	HP14T9-B
120106	HP14T11-A	1-3/8"	120112	HP14T11-B

NOMINAL CAPACITY — TONS *						
VALVE SERIES	REFRIG.	PRESSURE DROP — PSI				
		1	2	3	4	5
HP5	R12	1.7	2.4	3.0	3.4	3.8
HP8		4.6	6.5	8.0	9.2	10.3
HP14		11.7	16.5	20.2	23.6	26.4
HP5	R22	2.2	3.2	3.9	4.5	5.0
HP8		6.0	8.5	10.5	12.0	13.5
HP14		14.7	20.8	25.6	29.7	33.8
HP5	R502	1.5	2.1	2.6	3.0	3.3
HP8		3.9	5.5	6.7	7.8	8.7
HP14		10.1	14.3	17.6	20.5	23.0

* Nominal Capacity based on 35°C (100°F) liquid temperature and 5°C (40°F) evaporator temperature.

15.71 Sept. 1980



Danfoss

Condensing-Pressure Regulators for Air-Cooled Condensers. Types CPR + CPC

The regulator system CPR + CPC is used to maintain a constant and sufficiently high condensing pressure in air-cooled condensers at low ambient temperatures. The CPR regulator regulates the flow depending on the inlet pressure and closes when the pressure falls below the pressure setting. If the pressure falls below the setting of the CPR regulator, its degree of opening is reduced correspondingly. Consequently, the condenser is partially filled with liquid so that the effective condensing surface is reduced. Hence the condensing pressure required is restored. To determine the liquid charge in the system, it is necessary to consider the partial filling of the condenser during winter operation. Since the real regulating job during winter operation is to keep the receiver pressure at a suitably high value, Type CPR is combined with a regulator Type CPC 12 which is installed in the bypass line. The degree of opening of Type CPC is determined exclusively by the receiver pressure and the setting.

CAT. NO.	TYPE & SIZE	CODE NO.	CONN. ODS	RANGE	MAX. PERM. TEMP.	MAX. TEST PRESS.	NOMINAL MAX. LIQUID CAPACITY *					
							R12		R22		R502	
							TONS	kW	TONS	kW	TONS	kW
12084	CPR 12	34N0115	1/2"	71-250 PSIG	100°C (212°F)	377	2.4	8.4	3.1	10.9	2.1	7.4
12085	CPR 15	34N0116	5/8"			PSIG	4.0	14.1	5.0	17.6	3.7	13.0
12086	CPR 22	34N0118	7/8"			341	8.0	28.2	10.3	36.2	7.3	25.7
12087	CPR 28	34N0120	1-1/8"			PSIG	13.3	46.8	17.0	59.8	11.7	41.2
12088	CPR 35	34N0121	1-3/8"			PSIG	21.0	73.9	26.3	92.5	18.3	64.4
12089	CPC 12	34N0181	1/2"	0-185 PSIG	100°C (212°F)	377 PSIG	With pressure gauge connection.					

* Nominal Capacity indicated at -10°C (+14°F) evaporating temperature and +30°C (+86°F) condensing temperature.

KK.30.A2.02



Refrigerating
Specialties Company

FOR AMMONIA
ALSO SUITABLE FOR R12 - R22 - R502

APPLICATION & SELECTION GUIDE

Refrigerant Application	Refrigerant Temperature Range	VALVE MOST RECOMMENDED—Listed by Port Size												
		5 mm 3/16"	13 mm 1/2"	20 mm 3/4"	25 mm 1"	32 mm 1 1/4"	40 mm 1 1/2"	50 mm 2"	65 mm 2 1/2"	75 mm 3"	100 mm 4"	125 mm 5"	150 mm 6"	200 mm 8"
LIQUID	Conventional warm high pressure	S6N	S8F	S7A	S7A	S5A	S5A	S5A	S5A	S5A	S4A	S4W	S4W	S4W
	Above -50°C (-60°F)	S6N	S8F	S4A	S4A	S4A	S4A	S4A	S4A	S4A	S4A	S4W	S4W	S4W
SUCTION	Above -30°C (-25°F)	S6N	S8F	S7A	S7A	S5A	S5A	S5A	S5A	S5A	S4A	S4W	S4W	S4W
	Above -50°C (-60°F) Normally open	Use larger size →				CK-2	CK-2	CK-2	CK-2	CK-2	CK-2	CK-2	CK-2	—
	Above -50°C (-60°F) Normally closed	Use larger size →				S9A	S9A	S9A	S9A	S9A	S9W	S9W	S9W	S9W
HOT GAS DEFROST	Below 105°C (220°F)	S6N	S8F	S4A	S4A	S4A	S4A	S4A	S4A	S4A	S4A	S4W	S4W	S4W
HOT GAS BYPASS Compressor Unloading	Below 105°C (220°F)	S6N	S8F	S7A	S7A	S4A	S4A	S4AE	S4AE	S4AE	—	—	—	—

Recommendations assume no highly viscous oil, dirt, moisture or foreign substance in refrigerant; also no abnormal shock impact below -30°C (-25°F).



- FEATURES**
- S6N**: Direct operated - Electrically held open - No minimum pressure drop - Compact - Heavy duty.
 - S8F**: Pilot operated - All purpose solenoid - Low or high temperatures - Low pressure drop.
 - S4A**: Pilot operated - Positive spring closing - Excellent for hot gas or low temperature liquid.
 - S7A**: Pilot operated - Electrically held open - No minimum pressure drop - Excellent for medium temperature liquid or suction.
 - S5A**: Pilot operated - Low pressure drop - Excellent for medium temperature liquid or suction - Not for hot gas.
 - S4W**: Pilot operated - Positive spring closing - Excellent for hot gas or low temperature liquid - Compact and lightweight - Welds directly into the line.

GENERAL SPECIFICATIONS

Maximum opening pressure differential: 1896 kPa (275 psi)
Maximum fluid temperature: 105°C (220°F)
Design pressure: 2069 kPa (300 psig)
Metal seats lapped for low bubble tolerance
Manual opening stem - With or without strainers



VALVE		PORT SIZE		CONNECTIONS		STRAINER		FLOW COEFF.		Min. P.D. to wide open		Min. Fluid Temp	
CAT. NO.	TYPE	mm	ins.	Std.	Also Avail.	CAT. NO.	Size mm	kV	Cv	kPa	psi	°C	
121810	S6N	5	3/16	1/2	1/2	Strainer only for Port Sizes up to 13mm Type NTFF		0.5	0.6	0	0	-50	
121811	S6N-ST*	5	3/16	1/2	1/2			0.5	0.6	0	0	-50	
121812	S8F	13	1/2	1/2	1/2			2.3	2.7	7	1	-50	
121813	S8F-ST*	13	1/2	1/2	1/2	121800	13	2.3	2.7	7	1	-50	
For Strainer to suit Add Cat. No. —————						→ TYPE RSF							
121814	S4A	20	3/4	1/2	1, 1 1/4	121801	25	6.2	7.2	14	2	-50	
121815	S7A	20	3/4	1/2	1, 1 1/4			6.8	8.0	0	0	-30	
121816	S4A	25	1	1	1/2, 1 1/4			8.6	10.0	14	2	-50	
121817	S7A	25	1	1	1/2, 1 1/4	121802	32	8.6	10.0	0	0	-30	
121818	S4A	32	1 1/4	1 1/4	1 1/2			15.0	17.5	14	2	-50	
121819	S5A	32	1 1/4	1 1/4	1 1/2			16.3	19.0	7	1	-30	
121820	S4A	40	1-5/8	1 1/2	2	121803	50	28.6	33.4	14	2	-50	
121821	S5A	40	1-5/8	1 1/2	2			31.7	37.0	7	1	-30	
121822	S4A	50	2	2	1 1/2			42.4	49.5	14	2	-50	
121823	S5A	50	2	2	1 1/2	121804	65	43.7	51.0	7	1	-30	
121824	S4A	65	2 1/2	2 1/2	—			59.9	70.0	14	2	-50	
121825	S5A	65	2 1/2	2 1/2	—			70.2	82.0	7	1	-30	
121826	S4A	75	3	3	—	121805	75	86.0	100.0	14	2	-50	
121827	S5A	75	3	3	—			98.0	115.0	7	1	-30	
121828	S4A	100	4	4	—			139.0	162.0	14	2	-50	
						Welds Directly in the line							
						Type RSF							
121830	S4W	125	5	5	—	121807	125	193.0	225.0	14	2	-50	
121831	S4W	150	6	6	—	121808	150	304.0	355.0	14	2	-50	
121832	S4W	200	8	8	—	121809	200	621.0	725.0	14	2	-50	

* Suffix "ST" denotes valve complete with strainer

FULL RANGE OF SPARE/REPLACEMENT PARTS AVAILABLE CAPACITIES - Refer Tech. Page 121-C

SPECIFICATIONS	
Seat Material	
S6N (5) S4A (20-32) S5A (32)	Teflon
S8F (13) S7A (20-25)	Synthetic
S4A (40-100) S5A (40-75) S4W (125-200)	Metal
Body Material	
S6N, S8F	Steel
All Others	Semi-Steel

ELECTRICAL SOLENOID COILS	
CAT. NO.	Volts/Freq.
121100	230/50
121199	115/50
121197	32/50
121198	24/50
121196	230-6*/50
* Coil for 6V Pilot Light only	
Coil Insulation	
Moulded Waterproof Class B	


Parker
**Refrigerating
Specialties Company**

CONDENSER GAS POWERED SOLENOID VALVES FOR LOW TEMPERATURES AMMONIA

1

TYPE CK-2/CK-2A
PORTS: 32-150 mm (1 1/4" - 6")
Order Pilot Solenoid separately

TYPE S9A PORTS: 50-100 mm (2" - 4")
TYPE S9W PORTS: 125-200 mm (5" - 8")
Order Pilot Assembly separately

1. Very low pressure drop for low temperature.
2. Ideal for Overfeed or Flooded Systems.
3. Condenser gas powered piston and heavy return spring overcome viscous oil conditions.
4. Suitable to -50°C (-60°F).
5. Main valve can lie on its side for minimum pressure drop with two phase flow.
6. Use in Vertical or Horizontal lines.
7. Manual opening stem.

GENERAL SPECIFICATIONS

Maximum Opening Pressure Difference - 1896 kPa (275 PSIG)
 Design Pressure - 2069 kPa (300 PSIG)
 Maximum Fluid Temperature - 105°C (220°F)
 Minimum Fluid Temperature - -50°C (-60°F)
 Seat Material - CK-2 32mm (1 1/4") Port Size - Teflon; All others - Metal
 Body Material - Semi-steel

VALVE (Without Solenoid(s))		PORT SIZE		CONNECTIONS SW FLANGE		Description	PILOT SOLENOID(S)				FLOW COEFFICIENTS		
Cat. No.	Type	mm	ins.	Std.	Also Avail.		Cat. No.	Type	FLANGE CONNS.		Kv	Cv	
121840	CK-2	32	1¼	1¼	1½	Normally Open	121810	S6N	1/2"SW	To Suit all Solenoids 1/4", 3/8", 1/2" & 3/4" FPT or SW	16.3	19.0	
121841	CK-2A	40	1-5/8	1½	2	Normally Open					31.7	37.0	
121842	CK-2	50	2	2	1½	Normally Open					43.7	51.0	
121843	S9A	50	2	2	1½	Normally Closed	121836	S9(PA)	3/8"FPT		38.5	45.0	
121844	CK-2	65	2½	2½	—	Normally Open	121810	S6N	1/2"SW		70.2	82.0	
121845	S9A	65	2½	2½	—	Normally Closed	121836	S9(PA)	3/8"FPT		55.6	65.0	
121846	CK-2	75	3	3	—	Normally Open	121810	S6N	1/2"SW		103	120	
121847	S9A	75	3	3	—	Normally Closed	121836	S9(PA)	3/8"FPT		85.6	100	
121848	CK-2	100	4	4	—	Normally Open	121810	S6N	1/2"SW		171	200	
121849	S9A	100	4	4	—	Normally Closed	121836	S9(PA)	3/8"FPT		154	180	
121850	CK-2	125	5	5	—	Normally Open	121812	S8F	1/2"SW		244	285	
121851	CK-2	150	6	6	—	Normally Open					342	400	
				Welds Directly in the Line									
121854	S9W	125	5	5	—	Normally Closed	121836	S9(PA)	3/8"FPT	193	225		
121855	S9W	150	6	6	—	Normally Closed	121837	S9(PA)	1/2"FPT	304	355		
121856	S9W	200	8	8	—	Normally Closed	121838	S9(PA)	3/4"FPT	621	725		

NOTES: (1) S9 (PA) = S9 Pilot Assembly — refer illustration above. Under 100mm (4") Port Size one pilot or S9 Pilot Assembly can operate two CK-2(A) or two S9 valves. Actuating pressure must be at least 70 kPa (10psi) above valve inlet pressure.
 (2) CK-2/CK-2A and S9 Valves are supplied standard without Pilot Solenoid(s).
 (3) If separate Strainer required, select from Page 121-C.
 (4) SOLENOID COILS FOR ABOVE VALVES — As per Page 121.

ORDERING GUIDE: Specify Port Size, Type, Connection size and type with pilot actuating connection size and type, with or without pilot solenoid, Pilot solenoid Volts and Frequency and Pilot connection size and type. CK-2 and S9 Valves are supplied standard without pilot solenoid.

CAPACITIES — Refer Tech. Page 121-b



Parker

Refrigerating Specialties Company

AMMONIA SOLENOID VALVE CAPACITIES

Port Size	Type	Liquid Tons	Tons Suction for Evap. Temp. Listed												Tons HDT GAS Defrost			
			psi Pr. Drop		At 1 psi Pres. Drop				At 2 psi Pres. Drop				Supply for Evap. Temp. Listed					
			2	5	40°F	20°F	0°F	-20°F	40°F	20°F	0°F	-20°F	20°F	0°F	-20°F	-40°F		
5 mm	3/16"	S6N	15	24	—	—	—	—	—	—	—	—	—	1.9	1.8	1.3	1.0	
13 mm	1/2"	S8F	67	110	3.5	2.8	2.2	1.7	5.0	4.0	3.1	2.5	—	6.4	7.0	5.6	4.2	
20 mm	3/4"	S4A	180	280	—	—	—	—	13	11	8.3	6.3	23	19	15	11	—	
		S7A	200	320	10	8.4	6.6	5.0	15	12	9.2	7.0	25	21	17	13	—	
25 mm	1"	S4A	250	390	—	—	—	—	18	15	12	8.7	31	26	21	16	—	
		S7A	250	390	13	10	8.2	6.3	18	15	12	8.7	31	26	21	16	—	
32 mm	1 1/4"	S4A	440	690	—	—	—	—	32	26	20	15	55	46	37	28	—	
		S5A	470	750	25	20	16	12	35	28	22	17	—	—	—	—	—	
40 mm	1 1/2"	S4A	630	1300	—	—	—	—	67	49	38	29	100	87	70	52	—	
		S5A	620	1500	48	39	30	23	60	55	43	32	—	—	—	—	—	
50 mm	2"	S4A	1200	2000	—	—	—	—	92	73	57	43	160	130	100	78	—	
		S5A	1200	2000	67	54	42	32	94	76	59	44	—	—	—	—	—	
65 mm	2 1/2"	S4A	1700	2800	—	—	—	—	130	100	80	61	220	180	140	110	—	
		S5A	2000	3200	110	86	67	52	150	120	94	71	—	—	—	—	—	
75 mm	3"	S4A	2500	3900	—	—	—	—	180	150	120	87	310	260	210	160	—	
		S5A	2900	4500	150	126	94	72	210	170	130	100	—	—	—	—	—	
100 mm	4"	S4A	4000	6400	Use CK-2 or S9A				300	240	190	140	—	—	—	—	—	
125 mm	5"	S4W	—	—	Use CK-2 or S9W				420	330	260	200	—	—	—	—	—	
150 mm	6"	S4W	—	—	Use CK-2 or S9W				660	525	410	310	—	—	—	—	—	
200 mm	8"	S4W	—	—	Use CK-2 or S9W				1300	1100	830	630	—	—	—	—	—	

① Based on -7°C (20°F) liquid with no flashing through valve, -15°C (5°F) evaporator temperature and no liquid overfeed. For liquid overfeed multiply evaporator tons by recirculating rate and size valve to resultant tons. Use of -7°C (20°F) liquid for capacities in this table is sufficiently accurate for most liquid overfeed systems. To correct table values for 30°C (86°F) condensing and liquid multiply by 0.9.

② Based on 30°C (86°F) condensing temperature, and the evaporator temperatures listed. Shown for dry suction gas flow only. Capacities are maximum. No reserve is included.

for such excess load as pull-down, large oil volume, or liquid overfeed (recirculation).

③ Nominal evaporator capacities listed are based on normal defrost times, saturated hot gas inlet to valve of 7 kg/cm² (100 psig) or higher; and defrost pressure of 4.9 kg/cm² (70 psig). Defrost time will depend on amounts of liquid, frost and mass of evaporator as well as piping arrangement and connection locations. Next size larger valve will shorten defrost time; next size smaller will lengthen time.

FOR SUCTION LINES

Evap. Temp. °F Ev. Pres. psig	Pres. Drop Thru Valve psi	Tons CK-2		Normally Open		Close For Defrosting				
		32 mm 1 1/4"	40 mm 1 1/2"	50 mm 2"	65 mm 2 1/2"	75 mm 3"	100 mm 4"	125 mm 5"	150 mm 6"	200 mm 8"
20°F	1.0	23	45	62	100	140	240	350	490	Not Avail.
33.5	0.5	16	32	43	71	100	170	250	340	Not Avail.
0°F	1.0	19	37	51	80	110	200	280	400	Not Avail.
15.7	0.5	13	26	36	56	78	140	200	280	Not Avail.
-20°F	0.50	11	21	28	45	63	110	160	220	Not Avail.
3.6	0.25	7.6	15	21	32	45	80	110	160	Not Avail.
-40°F	0.50	8.2	16	22	35	48	86	120	170	Not Avail.
8.7 in hg	0.25	5.8	11	15	25	34	61	90	120	Not Avail.
Evap. Temp. °F Ev. Pres. psig	Pres. Drop Thru Valve psi	Tons S9A		Normally Closed		S9W Welds direct into line				
		32 mm 1 1/4"	40 mm 1 1/2"	50 mm 2"	65 mm 2 1/2"	75 mm 3"	100 mm 4"	125 mm 5"	150 mm 6"	200 mm 8"
0°F	1.0	Not Avail.	Not Avail.	45	64	89	180	220	350	720
15.7	0.50	Not Avail.	Not Avail.	32	46	63	130	160	250	510
-40°F	0.50	Not Avail.	Not Avail.	19	28	39	77	97	150	310
8.7 in hg	0.25	Not Avail.	Not Avail.	14	20	27	55	69	110	220

Capacities are based on liquid temperatures equal to evaporator temperatures. For Liquid over feed systems, nominal 2:1 to 5:1 ratio, use next size larger valve. See Page 121-b for flow coefficients Kv/Cv.

GRAVITY FLOODED

Capacities are nominal and are based on accepted industry practice concerning surge drum height and evaporator geometry.

Tons Gravity Flooded U. S. Capacities									
Port Size		Type	Liquid Leg	Gas Return for Evap. Temp.				20°F	0°F
mm	inch			20°F	0°F	-20°F	-40°F		
32 mm	1 1/4"	CK-2	4	2.6	2.1	1.6	1.2		
40 mm	1 1/2"	CK-2	6	4.0	3.2	2.4	1.8		
50 mm	2"	CK-2	11	9.7	7.7	5.9	4.5		
		S9A	11	9.7	7.7	5.9	4.5		
65 mm	2 1/2"	CK-2	18	16	12	9.6	7.3		
		S9A	18	16	12	9.6	7.3		
75 mm	3"	CK-2	30	27	21	16	12		
		S9A	30	27	21	16	12		
100 mm	4"	CK-2	60	57	45	35	27		
		S9A	60	57	45	35	27		
125 mm	5"	CK-2	105	100	82	63	48		
		S9W	105	100	82	63	48		
150 mm	6"	CK-2	160	170	130	100	78		
		S9W	160	170	130	100	78		
200 mm	8"	S9W	330	350	280	210	160		

ORDERING: REFER TO PAGES 121, 121-a and 121-c

REFRIGERANT STRAINER

FOR AMMONIA, R-12, R-22, R-502,
AND OTHER REFRIGERANTS



Refrigerating
Specialties Company

TYPE

RSF

NTFF

RSW



Typical Strainer
Close-Coupled to
Inlet of R/S Regulator,
or available separate.



FEATURES —

- Filters Dirt
- Stainless Steel Screen
- 60 Mesh Screen
- Can Be Close Coupled
- Heavy Duty
- Generous Screen Area
- Cleanable in Line
- Flanged

DESCRIPTION

These heavy duty, semi-steel bodied Refrigerant Strainers with stainless steel screens are designed especially for the protection of R/S Refrigerant Control Valves from dirt and other foreign material in refrigerant lines. The fine stainless screen mesh will collect particles above several thousandths of an inch in diameter. Generous screen areas provide maximum dirt capacity at minimum pressure drop. The strainers may be close coupled to R/S valves having same gasket size or used separately with appropriate companion flanges and adapter ring.

GENERAL SPECIFICATIONS

Design Pressure (SWP)	: 2069 kPa (300PSIG)
Maximum Refrigerant Temperature	: 105°C (220°F)
Minimum Refrigerant Temperature	: -50°C (-60°F)
Body Material	: Cast semi-steel
Screen Material	: Stainless Steel with openings 0.23 x 0.23 mm (0.009" x 0.009"); 0.2 mm (0.0075") wire

Periodic inspection and cleaning is necessary for reliable valve operation

STRAINER		USED ON PORT SIZES		CONNECTION SIZE (ins.)		SCREEN AREA	
CAT. NO.	TYPE & SIZE	mm	ins.	Std.	Also Avail.	sq. cm	sq. ins.
121800	NTFF 13mm (1/2")	5 & 13	3/16 & 1/2	1/2	3/4	39	6
121801	RSF 25mm (1")	20 & 25	3/4 & 1	1	1 1/4	116	18
121802	RSF 32mm (1 1/4")	32	1-1/4	1 1/4	1 1/2	230	36
121803	RSF 50mm (2")	40 & 50	1-5/8 & 2	2	1 1/2	500	78
121804	RSF 65mm (2 1/2")	65	2-1/2	2 1/2	—	570	88
121805	RSF 75mm (3")	75	3	3	—	570	88
121806	RSF 100mm (4")	100	4	4	—	650	101
Welds directly in the line — No flanges required.							
121807	RSW 125mm (5")	125	5	5	—	790	123
121808	RSW 150mm (6")	150	6	6	—	1410	219
121809	RSW 200mm (8")	200	8	8	—	1750	272

SAFE OPERATION

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the R/S Co. valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent R/S product bulletins and Bulletin RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage which could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid which can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must not be closed until the liquid is removed. Check valves must never be installed upstream of solenoid valves or regulators with electric shut-off, nor should hand valves upstream of solenoid valves or downstream of check valves be closed until the liquid has been removed. It is advisable to properly install relief devices in any section where liquid expansion could take place.

Avoid all piping of control arrangements which might produce thermal or pressure shock. For the protection of people and products, all refrigerant must be removed from the section to be worked on, before a valve, strainer, or other device is opened or removed.

REFER PAGES 121, 121-a and 121-b FOR R/S SOLENOID VALVES

NOTES

QUICK AS A FLASH

AND VERY CAREFUL. THAT'S OUR ORDER DEPARTMENT. WHETHER YOUR ORDER IS LARGE OR SMALL, IT WILL RECEIVE PROMPT AND EXACTING ATTENTION. WE DESPATCH OVER 90% OF ALL ORDERS ON THE SAME DAY THEY ARE RECEIVED.

Danfoss SOLENOID VALVES

122

Type EVR For fluorinated refrigerants

Used in refrigeration plants for — refrigerator and freezer display counters, cold stores and deep freeze stores, milk coolers, drinking water coolers and air conditioning plants.
Designed for use in Liquid, Suction and Hot Gas Lines.

Types EVRA, EVSA, HSA and PM

For fluorinated refrigerants and ammonia

EVRA — Can be used in Liquid, Suction and Hot Gas Lines. Often used as a pilot valve for the pilot-controlled Main Valves HSA and PM.

EVSA — Designed for use in Suction Lines — EVSA25 also for Liquid Lines. Can also be used in return lines (liquid/vapour) in refrigeration systems with pump recirculation.

HSA — Pilot controlled Main Valves used in Liquid & Suction Lines.
PM — Electrically controlled shut-off valves for refrigeration, freezing and air conditioning plants. Servo operated with screwed on pilot valves. Designed for use in Liquid, Suction, Hot Gas, Pressure, Return (liquid/vapour), Condensate, Pressure equalizing and by-pass Lines.

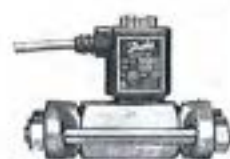
They also have a variety of uses for regulation of pressure and temperature, the Main Valve function being determined exclusively by the selected pilot valve.



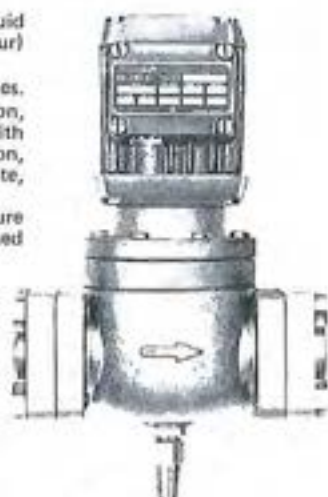
EVR 6, flare



EVRA 25



EVRA 3



EVSA 35



HSA/HSAR 70-100

Cat. No.	Type	Code No.	Conn. (ins.)	Type Seat	Opening Diff. Pressure kPa			Kv Factor	Max. Test Press. kPa	Temp. of Medium °C
					Min.	Maximum	Liq. Gas			

TYPE EVR — R12, R22, R502 FOR LIQUID, SUCTION, HOT GAS

DIRECT CONTROL

12251	EVR 2	32F2002	1/4" Flare	Teflon	0	1750	1850	0.16	4600	-40 to 100
	EVR 3	32F2033	1/4" Flare	Teflon	0	2100	2200	0.27	4600	-40 to 105

SERVO CONTROL

12253	EVR 6	32F2063	3/8" Flare	Teflon	5	2100	2200	0.8	4600	-40 to 105
12254	EVR 6	32F2083	3/8" Sold.					0.8		
12255	EVR 10	32F2103	1/2" Flare					1.9		
12256	EVR 10	32F2123	1/2" Sold.					1.9		
12257	EVR 15	32F2143	5/8" Flare					2.6		
12258	EVR 15	32F2163	5/8" Sold.					2.6		
12259	EVR 20	32F2213	7/8" Sold.					5.0		
12260	EVR 25	32F2263	1-1/8" Sold.					10.0		

EVRA Complete with Manual Lift Stem Less Coil

	EVR 15	32F1232	5/8" Sold.	Teflon	5	2100	2200	2.6	4600	-40 to 105
	EVR 20	32F1251	7/8" Sold.					5.0		

TYPE EVRA — AMMONIA (R717), R12, R22, R502 (Without Flanges)

(Direct Control for Liquid & Hot Gas — Servo Control for Liquid, Suction, & Hot Gas)

DIRECT CONTROL

12276	EVRA 3	32F3103	1/2, 3/4	Teflon	0	2100	2200	0.23	5000	-40 to 105
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SERVO CONTROL

12277	EVRA 10	32F3113	1/2, 3/4	Teflon	5	2100	2200	1.5	5000	-40 to 105
12278	EVRA 15	32F3123	1/2, 3/4					2.7		
12279	EVRA 20	32F3133	3/4, 1					4.5		
12280	EVRA 25	32F3143	3/4, 1					9.8		

WELD FLANGE SETS TO SUIT EVRA

12281		27N1115	1/2		Suits Sizes EVRA 3, 10 & 15					
12282		27N1120	3/4							
12283		27N1220	3/4							
12284		27N1225	1		Suits Sizes EVRA 20 & 25					

TYPE EVSA — AMMONIA (R717), R12, R22, R502

(EVSA 25 for Liquid & Suction — EVSA 35 & 50 for Suction)

FORCED SERVO CONTROL (With Inbuilt Strainer and Spindle for Manual Opening)

12218	EVSA 25	32Z0201	1" W.F.	Rubber	0	1750	1750	7.5	3500	-60 to 50
12219	EVSA 35	32Z0204	1 1/2" W.F.					18.5		
12220	EVSA 50	32Z0207	2" W.F.					29.0		

MAIN VALVES — PILOT CONTROLLED

TYPE HSA — AMMONIA (R717), R12, R22 & R502 (Liquid & Suction)

11922	HSA 70	26G0008	3" W.F.		14	1750	1750	87.5	2800	-60 to 60
11923	HSA 100	26G0010	4" W.F.					153.0		

TYPE PM1 & PM3 — AMMONIA (R717), R12, R22 & R502 (Liquid, Suction & Hot Gas)

Sizes: PM1 — 20, 25, 32, 40										
PM3 — 20, 25, 32, 40, 50, 65										
Refer next page for Capacities and Page 119-b for full details.										

KK.41.A2.02 & KC.30.A1.02

ELECTRICAL COIL DATA

Cat. No.	Code No.	Description (Encapsulated Coils)
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TO SUIT EVR (With Junction Box)

12267	18Z6702	240V, 50Hz, 10W.
12268	18Z6704	415V, 50Hz, 10W.
12265	18Z6707	24V, 50Hz, 10W.
12266	18Z6711	110/120V, 50Hz, 10W.

TO SUIT EVR 3 & 25

(With Junction Box)

12269	18Z6856	12V, DC, 20W.
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TO SUIT EVR 6 to 20

(With Junction Box)

12270	18Z6886	12V, DC, 20W.
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TO SUIT EVSA (With Junction Box)

122315	32Z8005	240V, 50Hz, 22W.
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CAPACITIES

Refer next Page

DANFOSS SOLENOID VALVE CAPACITIES

(FOR SOLENOID VALVES DETAILED ON PAGE 122)

VALVE TYPE	LIQUID LINE kW (Tons)				SUCTION LINE kW (Tons)				HOT GAS LINE m ³ /h (cu. ft/hr)			
	R12	R22	R502	R717	R12	R22	R502	R717	R12	R22	R502	R717
EVR 2	2.6 (0.7)	3.3 (0.9)	2.2 (0.6)	—	—	—	—	—	0.9 (31.8)	0.8 (28.2)	0.7 (24.7)	—
EVR 3	4.2 (1.2)	5.5 (1.6)	3.7 (1.1)	—	—	—	—	—	1.5 (53.0)	1.4 (49.4)	1.2 (42.4)	—
EVR 6	12.6 (3.6)	16.2 (4.6)	11.2 (3.2)	—	1.2 (0.3)	1.9 (0.5)	1.5 (0.4)	—	4.3 (151.8)	4.2 (148.3)	3.4 (120.0)	—
EVR 10	29.8 (8.5)	38.5 (10.9)	26.5 (7.5)	—	2.8 (0.8)	4.3 (1.2)	3.6 (1.0)	—	10.3 (364)	9.9 (350)	8.0 (282)	—
EVR 15	39.2 (11.1)	50.6 (14.4)	34.8 (9.9)	—	3.7 (1.1)	5.7 (1.6)	4.8 (1.4)	—	13.6 (480)	13.0 (459)	10.5 (371)	—
EVR 20	78.4 (22.3)	101.3 (28.8)	69.7 (19.8)	—	7.4 (2.1)	11.4 (3.2)	9.4 (2.7)	—	27.1 (957)	26.0 (918)	21.0 (742)	—
EVR 25	156.9 (44.6)	202.5 (57.6)	139.3 (39.6)	—	15.0 (4.3)	22.8 (6.5)	19.0 (5.4)	—	54.3 (1917)	52.0 (1836)	42.0 (1483)	—

Rated Capacities : Liquid & Suction based on 25°C evap. temp. and 15 kPa Press. Drop.
Hot Gas based on 35°C cond. temp., 100 kPa Press. Drop and hot gas temp. 60°C for R12/R502 & 90°C for R22.

VALVE TYPE	LIQUID LINE kW (Tons)				SUCTION LINE kW (Tons)				HOT GAS LINE m ³ /h (cu. ft/hr)			
	R12	R22	R502	R717	R12	R22	R502	R717	R12	R22	R502	R717
EVRA 3	3.4 (1.0)	4.4 (1.3)	3.0 (0.9)	21 (6.0)	—	—	—	—	1.2 (44)	1.2 (42)	1.0 (34)	2.7 (96)
EVRA 10	22 (6.3)	29 (8.3)	20 (5.7)	137 (39)	2.1 (0.6)	3.3 (0.9)	2.7 (0.8)	8.5 (2.4)	8.2 (288)	7.8 (275)	6.3 (222)	17.8 (627)
EVRA 15	41 (12)	52 (15)	36 (10)	249 (71)	3.8 (1.1)	5.9 (1.7)	4.9 (1.4)	15.4 (4.4)	14.7 (518)	14.0 (495)	11.3 (400)	32.0 (1128)
EVRA 20	67 (19)	87 (25)	60 (17)	414 (118)	6.5 (1.9)	9.9 (2.8)	8.1 (2.3)	26 (7.3)	24.5 (863)	23.4 (825)	18.9 (666)	53.3 (1881)
EVRA 25	148 (42)	191 (55)	131 (38)	904 (260)	14.2 (4.1)	22 (6.2)	17.9 (5.1)	56 (16)	53.2 (1879)	50.9 (1797)	41.1 (1451)	116.0 (4095)

Rated Capacities : Liquid & Suction based on -10°C evap. temp., 25°C liquid temp. ahead of valve and 15 kPa Press. Drop.
Hot Gas based on 35°C cond. temp., 100 kPa Press. Drop and hot gas temp. 60°C for R12/R502 & 105°C for R22/R717

EVSA 25	113 (32)	147 (42)	100 (29)	691 (197)	10.8 (3.1)	16.5 (12)	13.7 (9.7)	43 (30)	—	—	—	—
EVSA 35	—	—	—	—	27 (7.7)	41 (18)	34 (15)	105 (47)	—	—	—	—
EVSA 50	—	—	—	—	42 (12)	64 (18)	53 (15)	165 (47)	—	—	—	—

Rated Capacities : Liquid & Suction based on -10°C evap. temp., 25°C liquid temp. ahead of valve and 14 kPa Press. Drop.

HSA 70	1356 (386)	1755 (499)	1205 (343)	8269 (2353)	110 (31)	160 (46)	129 (37)	421 (120)	—	—	—	—
HSA 100	2373 (675)	3070 (874)	2117 (602)	14470 (4117)	194 (56)	280 (80)	226 (65)	737 (210)	—	—	—	—

Rated Capacities : Liquid & Suction based on -10°C evap. temp., 25°C liquid temp. ahead of valve and 14 kPa Press. Drop.

VALVE TYPE	LIQUID LINE kW (Tons)				SUCTION LINE kW (Tons)				HOT GAS LINE m ³ /h (cu. ft/hr)			
	R12	R22	R502	R717	R12	R22	R502	R717	R12	R22	R502	R717
PM1-20	70 (19.9)	90 (25.6)	62 (17.6)	430 (122)	7.7 (2.2)	12 (3.4)	9.5 (2.7)	31 (8.8)	29 (1024)	25 (883)	22 (777)	64 (2260)
PM3-20	120 (34.1)	155 (44.1)	110 (31.3)	740 (210)	14 (4.0)	20 (5.7)	17 (4.8)	54 (15.4)	51 (1801)	44 (1554)	38 (1342)	110 (3884)
PM1-32	190 (54)	250 (71.1)	170 (48.3)	1170 (333)	21 (6.0)	32 (9.1)	26 (7.4)	84 (23.9)	80 (2825)	69 (2436)	59 (2083)	170 (6003)
PM3-32	335 (95.3)	430 (122)	295 (83.9)	2030 (577)	37 (10.5)	55 (15.6)	45 (12.8)	150 (42.6)	140 (4943)	120 (4237)	100 (3531)	300 (10593)
PM3-50	510 (145)	660 (188)	455 (129)	3120 (887)	57 (16.2)	85 (24.2)	70 (19.9)	230 (65.4)	210 (7415)	190 (6709)	160 (5650)	470 (16596)
PM3-65	750 (213)	1090 (310)	845 (240)	5140 (1461)	94 (26.7)	140 (39.8)	110 (31.3)	370 (105)	360 (12712)	310 (10946)	260 (9181)	770 (27189)

Rated Capacities : Liquid based on -10°C evap. temp., 25°C liquid temp. ahead of valve and 10 kPa Press. Drop.
Suction based on -10°C evap. temp., 32°C cond. temp. and 14 kPa Press. Drop.
Hot Gas based on 35°C cond. temp., 100 kPa Press. Drop and hot gas temp. 60°C for R12/R22/R502 & 90°C for R717.

KK.41.A2.02 & KC.30.A1.02

Danfoss SOLENOID VALVES

TYPE EVSI FOR BRINE AND WATER

Type EVSI are servo-controlled solenoid valves which are normally closed when the coil is de-energised

ADVANTAGES

- LARGE CAPACITY • SMALL DIMENSIONS • EASY TO SERVICE
- LITTLE AFFECTED BY DIRT • LITTLE LIQUID HAMMER
- LONG WORKING LIFE • QUIET IN OPERATION



APPLICATIONS : Brine Refrigeration Plants, Air Conditioning and Heating Plants.



VALVE TYPE			CONN. BSP. INT.	kv** m ³ /h @ P.D. 100 kPa	OPENING DIFFERENTIAL PRESSURE kPa (PSI)		TEMP. OF MEDIUM °C (°F)	MAX. TEST PRESS. kPa (psig)
CAT. NO.	MODEL*	CODE NO.			MIN.	MAX.		
12241	EVSI 15	32U4507	½"	4	30 (4.3)	1000 (145)	-30°C to +100°C (-22°F to +212°F)	2000 (290)
12242	EVSI 20	32U4527	¾"	8				
12243	EVSI 25	32U4547	1"	11				
12244	EVSI 32	32U4567	1½"	16				
12245	EVSI 40	32U4587	1½"	22				
12246	EVSI 50	32U4607	2"	40				
	EVSI 65	16D4105	2½"	50	25 (3.6)	1000 (145)	-25°C to 90°C	2000 (290)
	EVSI 80	16D4106	3"	75				
	EVSI 100	16D4107	4"	130				

ELECTRICAL COIL DATA (Coils without Junction Box)		
CAT. NO.	CODE NO.	Volts/Freq.
122288	42N6526	220V, 50Hz.
122289	42N7502	240V, 50Hz.
122290	42N7505	415V, 50Hz.
122291	42N7550	12V. DC.
122292	42N7551	24V. DC.
122296	42N0156	Junction Box
POWER CONSUMPTION		
AC/DC		
9 Watts		

KN.41.D3.02 & KN.41.H3.02

* Solenoid valves for water and brine fitted with terminal box and encapsulated coil for use on 240V, 50Hz.

** kv value is the water flow volume in m³/h at a pressure drop across the valve of 100 kPa

FOR WATER										
VALVE TYPE	PRESSURE DROP ACROSS VALVE kPa & PSIG									
	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG
	35	5	69	10	172	25	345	50	690	100
	FLOW LITRES PER SEC. & IMPERIAL GALLS. PER MIN.									
	L/s	GPM	L/s	GPM	L/s	GPM	L/s	GPM	L/s	GPM
EVSI 15	0.48	6.3	0.91	12	1.51	20	2.27	30	3.33	44
EVSI 20	0.91	12.0	1.82	24	2.95	39	4.16	55	6.44	85
EVSI 25	1.44	19.0	2.50	33	4.01	53	5.60	74	7.80	103
EVSI 32	2.35	31.0	3.79	50	5.60	74	8.33	110	11.66	154
EVSI 40	3.33	44.0	5.00	66	7.80	103	11.13	147	16.13	213
EVSI 50	6.13	81.0	9.46	125	14.46	191	21.12	279	30.59	404
FOR BRINE										
EVSI 15	0.43	5.7	0.82	10.8	1.36	18.0	2.04	27.0	3.00	39.6
EVSI 20	0.82	10.8	1.64	21.6	2.66	35.1	3.74	49.5	5.80	76.5
EVSI 25	1.30	17.1	2.25	29.7	3.61	47.7	5.04	66.6	7.02	92.7
EVSI 32	2.12	27.9	3.41	45.0	5.04	66.6	7.50	99.0	10.49	138.6
EVSI 40	3.00	39.6	4.50	59.4	7.02	92.7	10.02	132.3	14.52	191.7
EVSI 50	5.52	72.9	8.51	112.5	13.01	171.9	19.01	251.1	27.53	363.6

CAPACITIES FOR SIZES 65, 80 AND 100 AVAILABLE ON APPLICATION

SAGINOMIYA SOLENOID VALVES

FOR R12, R22, R502.



Type MEV



Type REV

MEV SERIES — Direct Operated or Pilot Operated, 2 Way Normally Closed

REV SERIES — Pilot Operated, Normally Closed

VALVE TYPE		PORT SIZE mm	CONNECTIONS	RATED CAPACITY AT 14kPa (2psi) PD						MAX. WORK. PRESS.	
CAT. NO.	MODEL *			R12		R22		R502			
				kW	Tons	kW	Tons	kW	Tons		
MODEL MEV											
122426	MEV 502 BXF	5.0	1/4" M.Flare	6.0	1.7	7.4	2.1	4.9	1.4	2844 kPa (412psig)	
122427	MEV 503 BXF		3/8" M.Flare								
MODEL REV – without Manual Lift Stem											
122433	REV 703 BXF	7.0	3/8" M.Flare	12.3	3.5	15.5	4.4	10.2	2.9	2844 kPa (412psig)	
	REV 703 DXF		3/8" Sol./Tails								
122435	REV 1004 BXF	10.0	1/2" M.Flare	24.6	7.0	30.9	8.8	20.7	5.9		
	REV 1004 DXF		1/2" Sol./Tails								
122437	REV 1205 BXF	12.0	5/8" M.Flare	43.3	12.3	54.5	15.5	38.6	10.4		
	REV 1205 DXF		5/8" Sol./Tails								
122439	REV 1506 BXF	15.0	3/4" M.Flare	65.4	18.6	82.3	23.4	55.6	15.8		
	REV 1506 DXF		3/4" Sol./Tails								
	REV 2007 DXF	20.0	7/8" Sol./Tails	111.1	31.6	140.0	39.8	94.6	26.9		
	REV 2010 DXF		1" Sol./Tails								
	REV 2511 DXF	25.0	1-1/8" Sol./Tails	171.0	48.5	215.0	61.1	145.0	41.2		
	REV 2513 DXF		1-3/8" Sol./Tails								
	REV 3213 DXF	32.0	1-3/8" Sol./Tails	240.0	68.2	302.0	85.9	204.0	58.0		
	REV 3215 DXF		1-5/8" Sol./Tails								
SOLENOID COILS											
122447	MEV 322 BRSC	To suit MEV Models - 240V, 50Hz AC.									
122448	REV – 2	To suit REV Models - 240V, 50HZ AC.									

* REV Valves with Manual Lift Stem available on application.

SPEEDY SERVICE

WE ARE ORGANIZED TO MAKE PROMPT DELIVERY FROM OUR VAST STOCKS. WHETHER YOUR ORDER IS LARGE OR SMALL WE WILL EXERCISE GREAT CARE IN SELECTING AND PACKING YOUR ORDER. MORE THAN 90% OF ALL ORDERS RECEIVED ARE DESPATCHED THE SAME DAY WE AIM TO KEEP YOU AND YOUR JOB MOVING SATISFACTORILY

ALCO SOLENOID VALVES

TECH. PAGE 123

QUICK SELECTION CAPACITY TABLES — R12, R22, R502

FOR ALCO SOLENOID VALVES —

100RA — 228RB — 200RA — 240RA — 540RA

LIQUID REFRIGERANT CAPACITIES — TONS																
Valve Type	Port Size (In.)	R12					R22					R502				
		PRESSURE DROP ACROSS VALVE — PSI														
		2	3	4	5	10	2	3	4	5	10	2	3	4	5	10
100RA	7/64	0.8	0.98	1.13	1.26		1.04	1.27	1.47	1.64		0.69	0.85	0.98	1.10	
228RB	5/32	1.5	1.8	2.1	2.4	3.4	1.8	2.2	2.5	2.8	4.0	1.3	1.5	1.8	2.0	2.8
200RA	1/4	3.6	4.4	5.1	5.7	8.1	4.6	5.6	6.5	7.2	10.2	3.0	3.7	4.3	4.8	6.7
200RA	5/16	5.3	6.5	7.5	8.4	11.9	6.7	8.2	9.5	10.6	15.0	4.4	5.4	6.2	7.0	9.9
200RA	3/8	6.4	7.8	9.0	10.1	14.3	8.1	10.0	11.4	12.8	18.0	5.3	6.5	7.5	8.4	11.9
240RA 540RA	1/2	10.1	12.4	14.3	16.0	22.6	12.7	15.6	18.0	20.1	28.5	8.4	10.3	11.9	13.3	18.8
240RA 540RA	9/16*	15.0	18.4	21.2	23.7	33.5	19.0	23.3	26.9	30.1	42.5	12.5	15.3	17.7	19.8	27.9
240RA 540RA	9/16**	19.7	24.1	27.9	31.2	44.1	24.9	30.5	35.2	39.4	55.7	16.4	20.1	23.2	25.9	36.7
240RA 540RA	3/4	22.6	27.7	32.0	35.7	50.5	28.5	34.9	40.3	45.1	63.7	18.8	23.0	26.6	29.7	42.0
240RA 540RA	1	37.5	45.9	53.0	59.3	83.9	47.4	58.0	67.0	74.9	105.9	31.3	38.3	44.2	49.4	69.9
240RA	1 1/4	59.1	74.4	86.7	95.6	132.2	75.8	95.4	111.0	122.5	169.5	52.2	65.7	76.5	84.3	116.7

DISCHARGE CAPACITIES — TONS																
Valve Type	Port Size (ins.)	R12					R22					R502				
		PRESSURE DROP ACROSS VALVE — PSI														
		2	10	25	50	100	2	10	25	50	100	2	10	25	50	100
100RA	7/64	0.09	0.19	0.28	0.33	0.33	0.13	0.30	0.45	0.56	0.62	0.11	0.24	0.37	0.46	0.52
228RB	5/32	0.21	0.48	0.68	0.79	0.80	0.31	0.71	1.05	1.35	1.49	0.22	0.59	0.91	1.17	1.33
200RA	1/4	0.53	1.19	1.73	2.02	2.05	0.82	1.84	2.77	3.44	3.82	0.66	1.47	2.27	2.82	3.19
200RA	5/16	0.83	1.87	2.71	3.16	3.21	1.28	2.87	4.33	5.37	5.97	1.02	2.30	3.55	4.41	4.96
200RA	3/8	1.20	2.69	3.90	4.55	4.62	1.84	4.13	6.24	7.73	8.59	1.47	3.31	5.11	6.35	7.18
240RA 540RA	1/2	2.0	4.4	6.4	7.5	7.6	2.9	6.6	10.0	12.4	13.7	2.3	5.1	8.0	9.9	11.2
240RA 540RA	9/16*	2.7	6.0	8.8	10.2	10.4	4.0	8.9	13.4	16.7	18.5	3.1	6.9	10.8	13.4	15.1
240RA 540RA	9/16**	3.4	7.5	10.9	12.8	13.0	5.0	11.1	16.8	20.8	23.2	3.9	8.7	13.5	16.7	18.9
240RA 540RA	3/4	4.0	8.9	13.0	15.2	15.4	5.9	13.1	19.9	24.7	27.5	4.6	10.3	16.0	19.9	22.5
240RA 540RA	1	7.9	17.6	25.7	30.0	30.4	11.8	26.3	39.9	49.4	54.9	9.2	20.5	31.9	39.6	44.7
240RA	1 1/4	11.4	24.3	34.9	41.2		16.5	36.0	53.8	69.0	77.4	13.6	29.7	44.6	57.4	65.3

SUCTION GAS CAPACITIES — TONS																
Valve Type	Port Size (ins.)	R12					R22					R502				
		PRESSURE DROP ACROSS VALVE — PSI														
		2	5	10	15	20	2	5	10	15	20	2	5	10	15	20
240RA	1/2	1.4	2.2	3.0	3.7	4.2	2.1	3.3	4.6	5.6	6.4	1.6	2.6	3.7	4.5	5.2
240RA	9/16*	1.8	2.9	4.1	5.0	5.6	2.8	4.4	6.2	7.6	8.6	2.2	3.5	4.9	6.0	7.0
240RA	9/16**	2.3	3.6	5.1	6.2	7.0	3.5	5.5	7.7	9.4	10.7	2.7	4.3	6.1	7.5	8.7
240RA	3/4	2.7	4.3	6.0	7.4	8.3	4.1	6.5	9.1	11.2	12.7	3.3	5.2	7.3	8.9	10.3
240RA	1	5.4	8.6	12.1	14.9	16.6	8.2	13.0	18.4	22.5	25.5	6.6	10.4	14.7	18.0	20.8
240RA	1 1/4	7.7	11.7	15.3	17.1	17.9	11.5	17.6	23.8	27.8	30.5	9.4	14.6	19.8	23.2	25.5

* 5/8" ODF Connection ** 7/8" & 1-1/8" ODF Connection

EVAPORATOR TEMPERATURE CORRECTION FACTORS									
Evaporator Temp. °C (°F)	4.4 (40)	-1.1 (30)	-6.7 (20)	-12.2 (10)	-17.8 (0)	-23.3 (-10)	-28.9 (-20)	-34.4 (-30)	-40 (-40)
MULTIPLIER	1.00	.96	.92	.88	.84	.80	.77	.74	.71

All capacities and factors shown are based on normal condensing temperatures 38°C (100°F), isentropic compression plus 28°C (50°F), 4.4°C (40°F) evaporator, 18°C (65°F) suction gas and saturated liquid entering an expansion device per ARI Standard 760-80. For capacities at other operating conditions, use the appropriate correction factor given in above table. Factors apply to all three refrigerants given.

NOTE: 540 RA Valves are 2-Way NORMALLY OPEN — All other Valves are 2-Way NORMALLY CLOSED
Refer to following pages for Specifications, Ordering Catalogue Nos., Electrical Coil Data and Old v New Cross Reference

ALCO SOLENOID VALVES



THIS SERIES OF ALCO 2-WAY, NORMALLY CLOSED VALVES ESPECIALLY SUITED FOR LIQUID OR DISCHARGE GAS REFRIGERANT SERVICE. THEIR BASIC FUNCTION IS THE SAME AS MANUALLY OPERATED SHUT-OFF VALVES, BUT BEING SOLENOID ACTUATED, THEY CAN BE POSITIONED IN REMOTE LOCATIONS AND CONVENIENTLY CONTROLLED BY SUITABLE ELECTRICAL DEVICES.

FEATURES

- Operates in any position . . . Can be conveniently located in horizontal or vertical lines.
- Space-saving Integral Junction Box and Coil Housing . . . Saves cost of handy-box connections.
- Long life Moulded Coils provide water, shock and vibration protection to Coil Winding.
- Coil Assembly removable without shut-down of line pressure.
- Snap-on Coil Retainer . . . Easy to remove and install.

100RA



APPLICATION:

Small capacity systems where compact, direct acting hermetic valves are desirable. For 2069 kPa (300 psi) maximum operating pressure differential on AC and DC voltages and for standard refrigerants except Ammonia.

TYPE 100RA — DIRECT ACTING							
VALVE		PORT SIZE	MOPD kPa (PSI)	CONNECTION SIZE	MAX. FLUID TEMP. °C (°F)	SAFE WORK. PRESS. kPa (psig)	BURST PRESS. kPa (psig)
CAT. NO.	TYPE						
123101	100RA 252	7/64"	2069 (300)	1/4" ODF	141 (285)	3448 (500)	17240 (2500)
123102	100RA 253			3/8" ODF			
123103	100RA 254			1/2" ODF			
123104	100RA 2F2			1/4" SAE			
123105	100RA 2F3			3/8" SAE			
123106	100RA 2P2			1/4" NPTF			
13.30T - 9/75							
TYPE 228RB — PILOT OPERATED							
123107	228RB 353	5/32"	2069	3/8" ODF	107	3100	15510
13.34T - 8/72							

200RA 228RB



APPLICATION:

Larger systems requiring pilot operated serviceable valves. For 2069 kPa (300 psi) maximum operating pressure differential on AC and DC voltages and for standard refrigerants except Ammonia.

TYPE 200RA — PILOT OPERATED						
VALVE TYPE				PORT SIZE	CONNECTION SIZE	MOPD 2069 kPa 300 psi
WITH MANUAL STEM		LESS MANUAL STEM with Mtg. Brack. Prov.				
CAT. NO.	TYPE	CAT. NO.	TYPE			
123123	200RA 4P2—M	123138	200RA 4P2—T	1/4	1/4" NPTF	MAX.
123124	200RA 4P3—M	123139	200RA 4P3—T		3/8" "	FLUID
123125	200RA 453—M	123140	200RA 453—T		3/8"ODF-1/2"ODM	TEMP.
123126	200RA 454—M	123141	200RA 454—T		1/2" " - 5/8" "	141°C
123127	200RA 4F3—M	123142	200RA 4F3—T		3/8"SAE(MALE)	285°F
123128	200RA 5P3—M	123143	200RA 5P3—T		3/8" NPTF	SAFE
123129	200RA 554—M	123144	200RA 554—T	5/16	1/2"ODF-5/8"ODM	WORK
123130	200RA 555—M	123145	200RA 555—T		5/8" ODF	PRESS.
123131	200RA 5F4—M	123146	200RA 5F4—T		1/2"SAE(MALE)	3448 kPa
123132	200RA 5F5—M	123147	200RA 5F5—T		5/8" " "	(500psig)
123133	200RA 6P3—M	123148	200RA 6P3—T		3/8" NPTF	BURST
123134	200RA 654—M	123149	200RA 654—T		1/2"ODF-5/8"ODM	PRESS.
123135	200RA 655—M	123150	200RA 655—T	3/8	5/8"ODF	17240kPa
123136	200RA 6F4—M	123151	200RA 6F4—T		1/2"SAE(MALE)	(2500psig)
123137	200RA 6F5—M	123152	200RA 6F5—T		5/8" " "	

13.31T - 9/75

ELECTRICAL SOLENOID COIL DATA — COIL TYPE AMG

CAT. NO.	Nominal Voltage & Frequency	Applied Voltage & Frequency	VALVE TYPE — 100RA			VALVE TYPE 228RB			VALVE TYPE 200RA			WATTS (MAX)
			AMPERES VA			AMPERES VA			AMPERES VA			
			Inrush	Holding	Holding	Inrush	Holding	Holding	Inrush	Holding	Holding	
123251	24AC — 50/60	24/50	1.20	0.96	23	1.70	1.00	24	2.00	1.00	24.0	12
123252	120AC — 50/60	120/50	0.25	0.21	25	0.38	0.24	29	0.45	0.24	28.8	
123253	240AC — 50/60	240/50	0.16	0.10	24	0.20	0.14	33	0.24	0.14	33.6	
123254	480AC — 50/60	480/50	0.06	0.05	24	0.10	0.07	33	0.11	0.07	33.6	
123255	6DC	6DC	—	1.88	—	—	2.24	—	—	2.24	13.4	15
123256	12DC	12DC	—	0.93	—	—	1.11	—	—	1.11	13.3	
123257	24DC	24DC	—	0.46	—	—	0.55	—	—	0.55	13.2	

COIL INSULATION : 100RA & 200RA Class F Moulded, 228RB — "AC" Class B Moulded "DC" Class F Moulded.

NOTE: Coils are supplied with a Junction Box (coil type AMG). If desired, coils can be supplied with a Conduit Boss on special order (coil type AMC). Standard wire lead length of coils with Junction Box is 152 mm (6"). Wire lead length of coils with Conduit Boss is 457 mm (18").

CAPACITIES : Refer Tech. Page 123

ALCO SOLENOID VALVES

1



240RA



APPLICATION:
Large capacity systems requiring pilot operated service valves. For 2069 kPa (300 psi) maximum operating pressure differential on AC and DC voltages and for standard refrigerants except R717.

240RA SERIES						
2-WAY, NORMALLY CLOSED DIAPHRAGM VALVES						
FOR LIQUID, SUCTION OR HOT GAS REFRIGERANT SERVICE						
VALVE TYPE				PORT SIZE	CONNECTION SIZE	MOPD
WITH MANUAL STEM		LESS MANUAL STEM with Mtg. Bracket Provided				
CAT. NO.	MODEL	CAT. NO.	MODEL			
123182	240RA8T5-M	123187	240RA8T5-T	1/2"	5/8" ODF	2069 kPa
123183	240RA8T7-M	123188	240RA8T7-T		7/8" ODF	
123184	240RA9T7-M	123189	240RA9T7-T	9/16"	7/8" ODF	
	240RA9T9-M		240RA9T9-T		1-1/8" ODF	
123185	240RA12T7-M	123190	240RA12T7-T	3/4"	7/8" ODF	(300 psi)
	240RA12T9-M		240RA12T9-T		1-1/8" ODF	
123186	240RA16T9-M	123191	240RA16T9-T	1"	1-1/8" ODF	
	240RA16T11-M	123172	240RA16T11-T		1-3/8" ODF	
123168	240RA20S11-M		240RA20S11-T	1-1/4"	1-3/8" ODF	
123169	240RA20S13-M		240RA20S13-T		1-5/8" ODF	
123170	240RA20S17-M		240RA20S17-T		2-1/8" ODF	

540RA



APPLICATION:
For liquid or discharge gas refrigerant service where a normally open valve is desirable.

540RA SERIES							
PILOT OPERATED, 2 – WAY, NORMALLY OPEN VALVES FOR LIQUID OR DISCHARGE GAS REFRIGERANT SERVICE (NO MANUAL STEM)							
VALVE TYPE		PORT SIZE	CONNECTION SIZE	MOPD	MAX. FLUID TEMP.	SAFE WORK PRESS.	BURST PRESS.
CAT. NO.	MODEL						
123192	540RA 8T5–T	1/2"	5/8" ODF	1724 kPa	141°C (285°F)	3103 kPa (450 psig)	15514 kPa (2250 psig)
123193	540RA 9T5–T	9/16"	5/8" ODF				
123194	540RA 9T7–T		7/8" ODF				
123195	540RA 9T9–T		1-1/8" ODF				
123196	540RA 12T7–T	3/4"	7/8" ODF	(250 psi)			
123197	540RA 12T9–T		1-1/8" ODF				
123198	540RA 16T9–T	1"	1-1/8" ODF					(250 psi)
123199	540RA 16T11–T		1-3/8" ODF				

SERIES 702RA							
3 – WAY DIRECT – ACTING PILOT SERVICE ON LIQUID OR GAS REFRIGERANT SERVICE							
123200	702RA 01	1/16"	1/4" SAE MF	2069kPa (300 psi)	107°C (225°F)	2758kPa (400psig)	

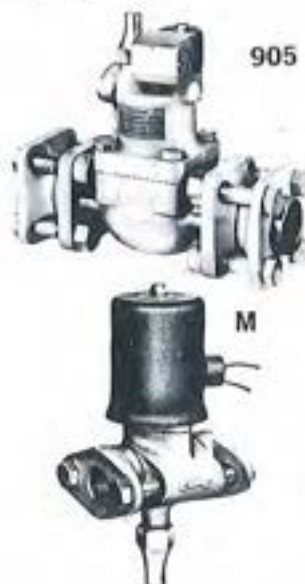
ELECTRICAL SOLENOID COIL DATA - COIL TYPE AMG

CAT. NO.	NOMINAL VOLTAGE & FREQUENCY	APPLIED VOLTAGE & FREQUENCY	SERIES 240RA & 540RA				SERIES 702RA			
			AMPS		VA	WATTS	AMPS		VA	WATTS
			Inrush	Holding	Holding	(Max)	Inrush	Holding	Holding	(Max)
123251	24 - 50/60	24/50	1.20	0.96	23	12	1.70	1.00	24	12
123252	120 - 50/60	120/50	0.25	0.21	25	12	0.38	0.24	29	12
123253	240 - 50/60	240/50	0.16	0.10	24	12	0.20	0.14	33	12
123254	480 - 50/60	480/50	0.06	0.05	24	12	0.10	0.07	33	12
123255	6 DC	6 DC	2.60	1.88	—	15	—	2.24	—	15
123256	12 DC	12 DC	1.31	0.93	—	15	—	1.11	—	15
123257	24 DC	24 DC	0.67	0.46	—	15	—	0.55	—	15

COIL INSULATION: CLASS F MOULDED EXCEPT 702RA IN AC - CLASS B MOULDED

NOTE: Coils are supplied with a Junction Box (coil type AMG). If desired, coils can be supplied with a Conduit Boss on special order (coil type AMC). Standard wire lead length of coils with Junction Box is 152 mm (6 inches). Wire lead length of coils with Conduit Boss is 457 mm (18 inches).

CAPACITIES: Refer Tech. Page 123



905



SOLENOID VALVES

for AMMONIA

M & DS SERIES — 2 WAY NORMALLY CLOSED

These valves, except for the direct acting M91 and DS, are all pilot operated, piston type for Ammonia liquid, suction or hot gas refrigeration service.
Max. Safe Work. Press. 2069 kPa (300 psig). Max. Fluid Temp. 107°C (225°F).

905/905H SERIES — 2 WAY NORMALLY CLOSED

For R12, R22, R502 & R717 suitable for liquid, suction or hot gas refrigerant service.

- FEATURES:**
- Available for AC or DC service — standard voltages.
 - Coil housing provides a junction box as standard and can be rotated to any desired position.
 - Come apart construction for easy cleaning and service.
 - Packless construction.
 - Synthetic seat disc for tight seating.
 - Manual opening stem.
 - Quiet operation.

Max. Safe Work. Press. 2758 kPa (400 psig). Max. Fluid Temp. 107°C (225°F).

FA4 SERIES — CONDENSER GAS POWERED

Dual solenoid version — spring loaded piston operated soft seat design using condenser gas to hold valve in open position, permitting the valve to be sized for full line size and operate at no pressure drop.

Max. Safe Work. Press. 2069 kPa (300 psig). Max. Fluid Temp. 107°C (225°F).

AMMONIA SYSTEM APPLICATION CHART

TYPE AND APPLICATION	PORT DIAMETER (INS.)							
	1/8	3/8	1/2	3/4	1	1-1/4	1-1/2	2
Direct Acting Liquid or Hot Gas for all applications including pilot duty.	M91F	—	—	—	—	—	—	—
Pilot Operated—Normal & subcooled liquid line service.	—	DS2184	M811	M511	—	—	—	—
Pilot Operated—with mechanical interlink for low pressure drop suction gas & liquid recirculating system.	—	—	M811	M511	—	—	—	—
Spring Closing—Piston operated, soft seat, suction service and low pressure liquid. Min. 2 psi P.D.	—	905-11	905-12	905-13	905-14	905-15	905-16	905-18
Condenser Gas Powered—Piston operated, soft seat design for liquid or gas legs on gravity or recirculating flooded systems where NO pressure drop permitted.	—	FA4-11	FA4-12	FA4-13	FA4-14	FA4-15	FA4-16	FA4-18
Hot Gas Defrost or Bypass Lines. (Min. 2 psi P.D.).	M91F	DS2184	M811	M511	905H-14	905H-15	905H-16	905H-18
Spring Closing—Piston operated design for hot gas bypass, hot gas defrost feed, or liquid service.	—	905H-11	905H-12	905H-13	905H-14	905H-15	905H-16	905H-18

VALVE TYPE		Port Size (ins.)	Connection Size (ins.)	MOPD (psi)		Manual Opening Stem	Recommended Strainer	
Cat. No.	Model			AC	DC		Cat. No.	Model
123201	M91F	1/8	1/2 FPT Flg	250	212	YES		JR32
123202	DS2184	3/8	3/8 NPT Fern	250	212	NO		
123203	M811	1/2	1/2 FPT Flg	250	212	YES		JR32
123204	M511	3/4	3/4 " "	250	212	YES		SR13
123205	905-11	3/8	1/2 " "	200	170	YES	ON APPLICATION	
123206	905-12	1/2	3/4 " "	200	170	YES		
123207	905-13	3/4	3/4 " "	200	170	YES		
123208	905-14	1	1 " "	200	170	YES		
123209	905-15	1 1/4	1 1/4 " "	200	170	YES		
123210	905-16	1 1/2	1 1/2 " "	200	170	YES		
123211	905-18	2	2 " "	200	170	YES		
123212	905H-11	3/8	1/2 " "	200	170	YES		
123213	905H-12	1/2	3/4 " "	200	170	YES		
123214	905H-13	3/4	3/4 " "	200	170	YES		
123215	905H-14	1	1 " "	200	170	YES		
123216	905H-15	1 1/4	1 1/4 " "	200	170	YES		
123217	905H-16	1 1/2	1 1/2 " "	200	170	YES		
123218	905H-18	2	2 " "	200	170	YES		
123219	FA4-11	3/8	3/4 " "			YES		
123220	FA4-12	1/2	3/4 " "			YES		
123221	FA4-13	3/4	3/4 " "			YES		
123222	FA4-14	1	1 " "			YES		
123223	FA4-15	1 1/4	1 1/4 " "			YES		
123224	FA4-16	1 1/2	1 1/2 " "			YES		
123225	FA4-18	2	2 " "			YES		

ELECTRICAL COIL DATA		
CAT. NO.	COIL TYPE	Volts/Freq.
M SERIES — Type X22606*		
123265	X22606-7118	24V — 50/60
123266	X22606-7218	120V — 50/60
123267	X22606-6918	240V — 50/60
123268	X22606-8818	480V — 50/60
123269	X22606-2118	6V — DC
123270	X22606-2218	12V — DC
123271	X22606-0418	24V — DC
123272	X22606-1018	115V — DC
DS SERIES — Type X22164*		
123273	X22164-7118	24V — 50/60
123274	X22164-7218	120V — 50/60
123275	X22164-6918	240V — 50/60
123276	X22164-8818	480V — 50/60
123277	X22164-2218	12V — DC
123287	X22164-1018	115V — DC
905/905H/FA4 SERIES* — Type AMG		
123251	AMG	24V — 50/60
123252	AMG	120V — 50/60
123253	AMG	240V — 50/60
123254	AMG	480V — 50/60
123255	AMG	6V — DC
123256	AMG	12V — DC
123257	AMG	24V — DC

* Specify Voltage and Frequency when ordering.

CAPACITIES — REFER TECH. PAGE 123-d



SOLENOID VALVES

AMMONIA CAPACITY TABLES

(FOR SOLENOID VALVES DETAILED ON PAGE 123-c)

LIQUID SERVICE CAPACITY

PORT SIZE	VALVE TYPE	LIQUID CAPACITY kW & TONS - R717									
		PRESSURE DROP ACROSS VALVE									
		14kPa (2psi)		28kPa (4psi)		41kPa (6psi)		55kPa (8psi)		69kPa (10psi)	
		kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
1/8"	M91F	32	9	45	12.7	55	15.6	63	18	70	20
3/8"	DS2184	74	21	106	30	130	37	148	42	169	48
1/2"	M811	137	39	193	55	236	67	274	78	306	87
3/4"	M511	352	100	506	144	619	176	717	204	893	254
1"	905H-14	717	204	1016	289	1242	353	1435	408	1604	456
1 1/4"	905H-15	1080	307	1526	434	1871	532	2163	615	2416	687
1 1/2"	905H-16	1618	460	2286	650	2800	796	3236	920	3615	1028
2"	905H-18	2866	815	4052	1152	4959	1410	5736	1631	6404	1821

SUCTION GAS CAPACITY

PORT SIZE	VALVE TYPE	SUCTION GAS CAPACITY kW & TONS - R717*													
		EVAPORATOR TEMPERATURE °C & °F													
		4.4°C(40°F)		-7°C(20°F)		-18°C(0°F)		-23°C(-10°F)		-29°C(-20°F)		-34°C(-30°F)		-40°C(-40°F)	
		kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
1/2"	M811	15.8	4.5	12.7	3.6	9.8	2.8	9.1	2.6	7.7	2.2	6.3	1.8	5.6	1.6
3/4"	M511	35.5	10.1	28.8	8.2	22.5	6.4	20.4	5.8	17.6	5.0	14.8	4.2	12.3	3.5
3/8"	905-11	7.7	2.2	6.3	1.8	5.3	1.5	4.6	1.3	4.2	1.2	3.2	0.9	2.5	0.7
1/2"	905-12	18.6	5.3	15.5	4.4	12.3	3.5	10.6	3.0	9.8	2.8	7.7	2.2	6.3	1.8
3/4"	905-13	52.1	14.8	41.9	11.9	32.7	9.3	27.8	7.9	25.7	7.3	20.4	5.8	16.5	4.7
1"	905-14	97.4	27.7	78.8	22.4	61.2	17.4	52.1	14.8	48.2	13.7	38.0	10.8	31.3	8.9
1 1/4"	905-15	147	41.8	119	33.8	92.8	26.4	78.4	22.3	72.5	20.6	57.3	16.3	46.8	13.3
1 1/2"	905-16	219	62.3	177	50.2	138	39.2	117	33.3	108	30.7	85.5	24.3	70.0	19.9
2"	905-18	390	110.8	314	89.4	245	69.8	208	59.2	192	54.6	152	43.2	124	35.3

* Capacity based on 30°C(86°F) cond. temp., evap. temps shown, 5.6°C(10°F) superheat and 7 kPa (1psi) pressure drop across valve except 14 kPa (2psi) on 905 Series.

SOLENOID COMPRESSOR DISCHARGE GAS CAPACITY

PORT SIZE	VALVE TYPE	NOMINAL DISCHARGE GAS CAPACITY m ³ /h & CFM – R717*												MAX. OPERATING PRESS. DIFF. **
		PRESSURE DROP ACROSS VALVE – kPa (psi)												
		14 (2)		69 (10)		138 (20)		276 (40)		414 (60)		483 (70)		
		m ³ /h	CFM	m ³ /h	CFM	m ³ /h	CFM	m ³ /h	CFM	m ³ /h	CFM	m ³ /h	CFM	
1/8"	M91F	6.5	3.8	15.6	9.2	20.9	12.3	26.0	15.3	27.4	16.1	27.5	16.2	1724kPa (250psi)
1/2"	M811	10.2	6.0	25.0	14.7	33.3	19.6	41.3	24.3	43.8	25.8	44.0	25.9	
3/4"	M511	22.9	13.5	55.7	32.8	75.1	44.2	92.8	54.6	98.6	58.0	99.1	58.3	
3/8"	905H-11	3.2	1.9	7.8	4.6	10.5	6.2	13.1	7.7	13.8	8.1	13.9	8.2	2069kPa (300psi)
1/2"	905H-12	7.6	4.5	18.7	11.0	25.0	14.7	30.9	18.2	32.8	19.3	33.0	19.4	
3/4"	905H-13	20.4	12.0	50.0	29.4	66.9	39.4	82.8	48.7	87.7	51.6	88.2	51.9	
1"	905H-14	38.2	22.5	93.6	55.1	125.1	73.6	155.1	91.3	164.1	96.6	165.2	97.2	
1 1/4"	905H-15	57.8	34.0	141.0	83.0	188.6	111.0	233.8	137.6	247.4	145.6	248.9	146.5	(300psi)
1 1/2"	905H-16	86.3	50.8	211.0	124.2	282.1	166.0	349.7	205.8	370.0	217.8	372.3	219.1	
2"	905H-18	152.9	90.0	373.7	219.9	500.0	294.0	620.0	364.6	655.4	385.7	659.5	388.1	

* Based on the solenoid valve inlet pressure corresponding to 24°C(75°F) saturation temp. and an inlet gas temp. of 35°C(95°F) (or 11°C(20°F) superheat).

** 15% less on DC (905 Series - 2069 kPa[300psi] for DC).

FA4 CAPACITIES kW & TONS - R717

PORT SIZE	VALVE TYPE	SUCTION LINE*				GRAVITY FLOODED SYSTEMS							
		3-5 kPa(0.5 psi) Press. Drop				LIQUID LEG		GAS RETURN LEG					
		-18°C(0°F)		-40°C(-40°F)				-7°C(20°F)		-18°C(0°F)		-7°C(-20°F)	
		kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
3/8"	FA4-11	2.6	0.75	1.5	0.43	-	-	-	-	-	-	-	-
1/2"	FA4-12	6.3	1.8	3.5	1.0	-	-	-	-	-	-	-	-
3/4"	FA4-13	16.9	4.8	9.5	2.7	-	-	-	-	-	-	-	-
1"	FA4-14	31.3	8.9	17.9	5.1	-	-	-	-	-	-	-	-
1 1/4"	FA4-15	47.1	13.4	27.4	7.8	17.6	5.0	8.8	2.5	7.0	2.0	5.3	1.5
1 1/2"	FA4-16	70.7	20.1	40.8	11.6	26.4	7.5	14.1	4.0	10.6	3.0	8.8	2.5
2"	FA4-18	125.2	35.6	72.5	20.6	35.2	10.0	35.2	10.0	28.1	8.0	21.1	6.0

* Suction line capacities based on saturated evap. temps., 5.6°C(10°F) superheat and press. drops shown.



SOLENOID VALVES

SERIES 3031RB SOLENOID VALVES FOR HEAT RECLAIM APPLICATIONS

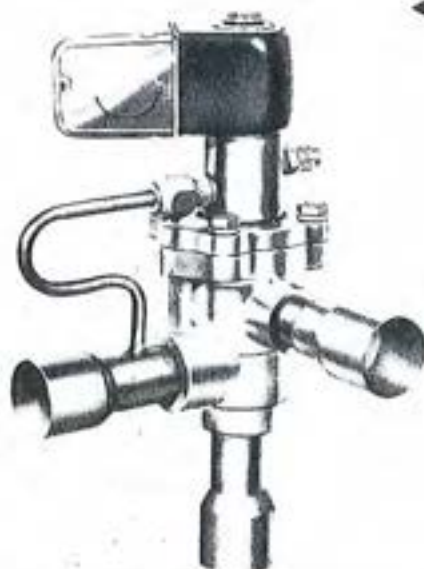
SOLENOID OPERATED 3-WAY VALVES, DESIGNED ESPECIALLY TO MEET THE REQUIREMENTS OF THE HIGH TEMPERATURES AND PRESSURES EXISTING IN COMPRESSOR DISCHARGE GAS APPLICATIONS. IT IS SPECIFICALLY DESIGNED TO DIVERT GAS TO AN AUXILIARY CONDENSER FOR HEAT RECLAIM APPLICATIONS.

FEATURES

- Tight seating, Rulon seat disc
- Quick, positive shifting
- Operates in any position
- Rugged internal construction with heavy duty forged brass bodies

ADVANTAGES

- 3-Way pilot eliminates high to low side bleed — higher system efficiency
- 3-Way pilot is field serviceable
- High capacity — less pressure drop — higher system efficiency
- All copper fittings — easy brazing



VALVE TYPE		PORT SIZE (ins)	CONNECTIONS (ins)	MOPD	SAFE WORK PRESS.	MAX. FLUID TEMP.	PILOT CONNECTION
CAT. NO.	MODEL						
123226	3031RB-12S7	3/4	7/8 ODF	2069	3103	149°C (300°F)	1/4" SAE Male Flare
123227	3031RB-12S9		1-1/8 ODF	kPa	kPa		
123228	3031RB-20S9	1-1/4	1-1/8 ODF	300	450		
123229	3031RB-20S11		1-3/8 ODF	psi	psig		

NOTE: 3031 SERIES VALVES AVAILABLE WITH BLEED PORT ON APPLICATION

13.50T. 6/78

ELECTRICAL SOLENOID COIL DATA — COIL TYPE AMG

CAT. NO.	NOMINAL VOLTAGE & FREQUENCY	APPLIED VOLTAGE & FREQUENCY	AMPS		VA (Holding)	WATTS (Max.)	Coil Insulation	NOTE
			Inrush	Holding				
123251	24 — 50/60	24/50	1.20	0.96	23	12	CLASS "F" Moulded	Coils are supplied with a Junction Box (coil type AMG). If desired, coils can be supplied with a Conduit Boss on special order (coil type AMC). Standard wire lead length of coils with Junction Box is 152 mm (6 inches). Wire lead length of coils with Conduit Boss is 457 mm (18 inches).
123252	120 — 50/60	120/50	0.25	0.21	25			
123253	240 — 50/60	240/50	0.16	0.10	24			
123254	480 — 50/60	480/50	0.06	0.05	24			
123255	6 DC	6 DC	—	2.38	—	15		
123256	12 DC	12 DC	—	1.19	—			
123257	24 DC	24 DC	—	0.59	—			

DISCHARGE GAS CAPACITIES* — kW (Tons)

SAT'D. EVAP. TEMP.		3031RB — 12 SERIES						3031RB — 20 SERIES					
		PRESSURE DROP ACROSS VALVE						PRESSURE DROP ACROSS VALVE					
		kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi
		14	2	28	4	41	6	14	2	28	4	41	6
°C	°F	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
R12													
4.4	40	24.3	6.9	34.5	9.8	42.2	12.0	63.0	17.9	89.3	25.4	109.4	31.1
7	20	23.2	6.6	33.1	9.4	40.4	11.5	60.5	17.2	85.5	24.3	104.8	29.8
18	0	22.2	6.3	31.3	8.9	38.7	11.0	58.0	16.5	81.9	23.3	100.2	28.5
-29	-20	21.1	6.0	29.9	8.5	36.6	10.4	55.2	15.7	78.1	22.2	95.7	27.2
-40	-40	20.0	5.7	28.5	8.1	34.8	9.9	52.4	14.9	74.2	21.1	90.7	25.8
R22													
4.4	40	35.2	10.0	49.6	14.1	60.8	17.3	91.4	26.0	129.4	36.8	158.3	45.0
7	20	34.1	9.7	48.5	13.8	59.4	16.9	89.0	25.3	125.9	35.8	154.4	43.9
18	0	33.4	9.5	47.1	13.4	57.7	16.4	86.5	24.6	122.4	34.8	149.8	42.6
-29	-20	32.4	9.2	45.7	13.0	55.9	15.9	83.7	23.8	118.5	33.7	145.3	41.3
-40	-40	31.3	8.9	44.0	12.5	53.8	15.3	80.9	23.0	114.6	32.6	140.3	39.9
R502													
4.4	40	29.2	8.3	41.1	11.7	50.6	14.4	76.0	21.6	107.3	30.5	131.5	37.4
7	20	27.8	7.9	39.4	11.2	48.2	13.7	72.1	20.5	102.3	29.1	125.2	35.6
18	0	26.4	7.5	37.3	10.6	45.4	12.9	68.2	19.4	96.7	27.5	118.5	33.7
-29	-20	24.6	7.0	34.8	9.9	42.9	12.2	64.4	18.3	90.7	25.8	111.1	31.6
-40	-40	23.2	6.6	32.7	9.3	40.1	11.4	60.1	17.1	84.8	24.1	103.8	29.5

* Capacities are based on a normal condensing temperature, isentropic compression +10°C (+50°F), evaporator temperature as shown, suction gas superheated to 18°C (65°F), and 38°C (100°F) saturated liquid entering the TX valve.

FOR OPERATION & APPLICATION DETAILS REFER TECH. PAGE 123-g



SOLENOID VALVES

123-f

SERIES 3041R PILOT-OPERATED SOLENOID VALVES FOR HOT GAS DEFROST APPLICATIONS

SOLENOID OPERATED 3-WAY VALVES, DESIGNED ESPECIALLY FOR SUCTION LINE USE ON COUNTERFLOW HOT GAS DEFROST APPLICATIONS. THE NORMALLY CLOSED PORT PROVIDES TIGHT CLOSURE OF THE HOT GAS DEFROST LINE DURING THE COOLING CYCLE. THE LOW PRESSURE DROP, NORMALLY OPEN PORT, PROVIDES TIGHT CLOSURE DURING THE DEFROST CYCLE.



FEATURES

- Tight-seating, Rulon seat disc
- Quick, positive shifting
- Operates in any position
- Rugged internal construction with heavy duty forged brass bodies

VALVE TYPE		PORT SIZE (ins)	CONNECTIONS (ins)	MOPD	SAFE WORK PRESS.	MAX. FLUID TEMP.	PILOT CONNECTION
CAT. NO.	MODEL						
123230	3041R-12S7	3/4	7/8 ODF	2089 kPa (300 psi)	3103 kPa (450 psig)	149°C (300°F)	1/4" SAE Male Flare or 1/4" ODF
123231	3041R-12S9		1-1/8 ODF				
123232	3041R-20S9	1-1/4	1-1/8 ODF				
123234	3041R-20S11		1-3/8 ODF				

13.51T. 3/70

ELECTRICAL SOLENOID COIL DATA — COIL TYPE 8MG

CAT. NO.	NOMINAL VOLTAGE & FREQUENCY	APPLIED VOLTAGE & FREQUENCY	AMPS		VA (Holding)	WATTS (Max.)	Coil Insulation	Wire lead length with standard Junction Box 152mm (6") Wire lead length with special Conduit Boss 457mm (18")
			Inrush	Holding				
123278	24 — 50/60	24/50	3.00	1.30	31	15	Class 'B' Potted	
123279	120 — 50/60	120/50	0.60	0.26				
123280	Dual 120—50/60	120/50	0.60	0.26				
	Voltage 240—50/60	240/50	0.30	0.13				
123281	240 — 50/60	240/50	0.30	0.13				
123282	480 — 50/60	480/50	0.16	0.07	—	19		
123283	6DC	6DC	—	3.30				
123284	12DC	12DC	—	1.60				
123285	24DC	24DC	—	0.80				

SUCTION GAS CAPACITIES * — kW (Tons)

SATURATED EVAPORATOR TEMPERATURE		PRESSURE DROP ACROSS VALVE — kPa (psi)															
		3.4kPa (1/2psi)				14kPa (2psi)				21kPa (3psi)				35kPa (5psi)			
		PORT SIZE — IN5.															
		3/4"		1-1/4"		3/4"		1-1/4"		3/4"		1-1/4"		3/4"		1-1/4"	
°C	°F	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
R12																	
4.4	40	5.3	1.5	14.1	4.0	11.3	3.2	30.9	8.8	13.4	3.8	35.5	10.1	16.5	4.7	45.7	13.0
-7	20	4.6	1.3	13.4	3.8	8.8	2.5	23.9	6.8	10.6	3.0	29.2	8.3	12.7	3.6	35.5	10.1
-18	0	3.5	1.0	9.1	2.6	6.7	1.9	18.6	5.3	7.7	2.2	21.8	6.2	9.5	2.7	26.4	7.5
-29	-20	2.8	0.8	7.4	2.1	4.9	1.4	13.7	3.9	5.6	1.6	16.2	4.6	6.3	1.8	17.9	5.1
-40	-40	1.8	0.5	4.6	1.3	2.8	0.8	7.4	2.1	2.8	0.8	8.1	2.3	2.8	0.8	8.1	2.3
R22																	
4.4	40	8.4	2.4	23.6	6.7	17.6	5.0	48.9	13.9	20.0	5.7	55.9	15.9	25.7	7.3	71.0	20.2
-7	20	7.0	2.0	17.9	5.1	13.4	3.8	34.8	9.9	15.8	4.5	41.8	11.9	20.0	5.7	52.8	15.0
-18	0	5.3	1.5	14.8	4.2	10.2	2.9	28.1	8.0	12.3	3.5	34.5	9.8	15.5	4.4	42.6	12.1
-29	-20	4.2	1.2	12.7	3.6	7.7	2.2	22.9	6.5	9.1	2.6	27.4	7.8	11.3	3.2	33.1	9.4
-40	-40	2.8	0.8	7.4	2.1	4.6	1.3	15.8	4.5	5.3	1.5	17.9	5.1	5.6	1.6	19.3	5.5
R502																	
4.4	40	4.2	1.2	12.3	3.5	13.4	3.8	36.9	10.5	16.5	4.7	45.7	13.0	21.4	6.1	58.7	16.7
-7	20	3.9	1.1	10.9	3.1	10.6	3.0	29.5	8.4	13.0	3.7	36.2	10.3	17.2	4.9	47.8	13.6
-18	0	3.5	1.0	9.5	2.7	8.1	2.3	22.5	6.4	9.8	2.8	27.1	7.7	12.3	3.5	34.5	9.8
-29	-20	2.8	0.8	7.7	2.2	6.3	1.8	17.2	4.9	7.4	2.1	20.4	5.8	9.1	2.6	25.3	7.2
-40	-40	1.4	0.4	4.9	1.4	3.9	1.1	10.6	3.0	4.2	1.2	12.0	3.4	4.9	1.4	13.4	3.8

*Capacities are based on normal condensing temperature 38°C(100°F) isentropic compression 10°C(50°F), evaporator temperature as shown, 18°C(65°F) suction gas and 38°C(100°F) saturated liquid entering the TX valve.

13.51T. 3/70

FOR OPERATION & APPLICATION DETAILS REFER TECH. PAGE 123-g

SECTION 1

123-f



SOLENOID VALVES SERIES 3000

OPERATION AND APPLICATION DATA

SERIES 3031RB FOR HEAT RECLAIM APPLICATIONS

OPERATION

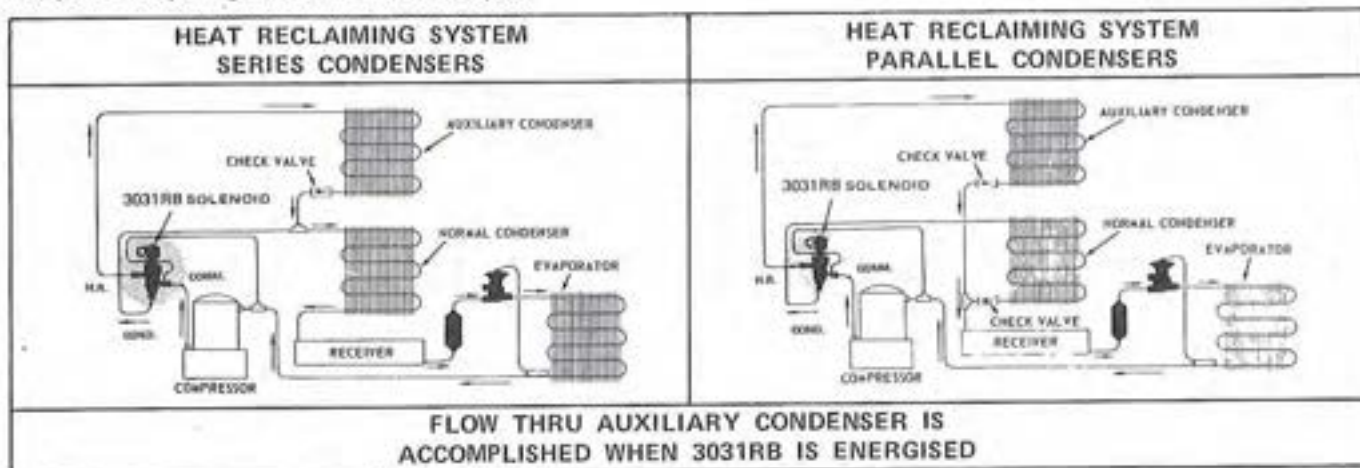
Operation of the 3031RB valve is governed by the position of the plunger in the 3-way pilot. It should also be remembered that the valve is pilot operated and therefore depends on the refrigerant gas to shift the piston assembly.

NORMAL OPERATION

With the solenoid coil de-energised the valve is in the normal operating mode and the refrigerant gas is diverted to the normal condenser. The volume directly above the piston assembly is open to suction pressure through the external pilot connection and the volume underneath the piston assembly is open to discharge pressure through the compressor discharge connection. This difference in pressure across the piston assembly results in the piston assembly being shifted upward, shutting the heat reclaim coil port and opening the normal condenser port.

HEAT RECLAIM OPERATION

Discharge gas flow to the heat reclaim condenser is accomplished by energising the solenoid coil. In this manner, discharge gas is allowed to fill the volume above the piston assembly through the 1/4" cap tube and the open bottom port in the 3-way pilot. Discharge gas is also allowed to fill the volume below the piston assembly through the compressor discharge connection. The pressure on both sides of the piston assembly is now equal and it is the piston spring which exerts force on top of the piston assembly and shifts it downward. The normal condenser port is now closed and the heat reclaim coil port is open. In both the energised and de-energised positions, constant bypass of discharge gas to suction is eliminated.

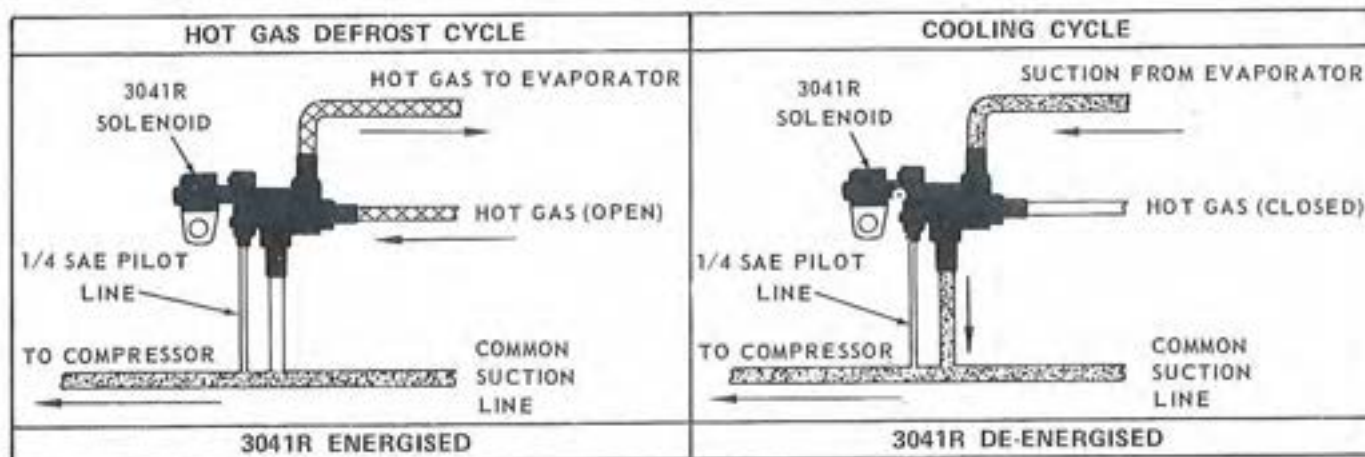


SERIES 3041R FOR HOT GAS DEFROST APPLICATIONS

OPERATION

When the 3041R solenoid is de-energised, the pilot line to the suction side of the compressor is closed. Discharge gas pressure escapes through the bleed port onto the top of the piston and drives it downward, closing the bottom seat. This allows the suction gas to flow in the normal direction to the compressor. When the solenoid is energised, the

pressure on top of the piston is reduced by the gas bleeding off to the suction line, enabling the piston to be driven upward against the top seat, closing off the suction line connection, which permits a reverse flow of the hot gas through the suction line to the evaporator for hot gas defrost.



FOR SELECTION, CAPACITY & ORDERING — REFER : 3031RB PAGE 123-e 3041R PAGE 123-f



SOLENOID VALVES FOR WATER

123-h

121



SERIES 121 DIRECT ACTING

2 - Way Normally closed valves especially suited for water (or steam) service.

SERIES 201 & 231 PILOT OPERATED

2 - Way Normally closed valves especially suited for water (or steam) service.

SERIES 241 PILOT OPERATED DIAPHRAGM TYPE

2 - Way Normally closed diaphragm valves especially suited for water (or air) service.

201



231



241



FEATURES

- * One coil fits all valve sizes
- * Operates in any position - horizontal or vertical lines
- * Coil assembly removeable without shut-down of line pressure
- * Long life moulded coils - Class F Insulation - Stand. on Water Service
- * Unique captive diaphragm for longer life (Series 241)
- * Deep drawn Stainless Steel enclosing tube (no weld points) — (Series 241).

SERIES 121 DIRECT ACTING

VALVE		Replaces old Valve No.	Port Size	Conn. Size NPTF	MOPD kPa (psi)		Max. AC Fluid Temp.	Safe Work. Press. kPa (psig)	Burst Press. kPa (psig)	Coil Type
CAT. NO.	MODEL				AC	DC				
123234	121WB5CP02	1021FBI-D	5/32"	1/4"	690 (100)	276 (40)	82°C (180°F)	6895 kPa (1000 psig)	34475 (5000)	AMG Refer next page
123235	121WB03P02	1021FBI-E	3/16"	1/4"	414 (60)	207 (30)				
123236	121WB04P02	1021FBI-F	1/4"	1/4"	138 (20)	35 (5)				

SERIES 201 & 231 PILOT OPERATED

13.41T — 12/74

123237	201WB04P02	5011FBI—F	1/4"	1/4"	1379 (200)	690 (100)	93°C (200°F)	3448 kPa (500psig)	17238 (2500)	AMG Refer next page
123238	201WB05P03	5011HBI—G	5/16"	3/8"						
123239	201WB06P03	5011HBI—H	3/8"	3/8"						
123240	231WB08P04	5021JBI—J	1/2"	1/2"	1724 (250)	1034 (150)	93°C (200°F)	2413 kPa (350 psig)	12066 (1750)	
123241	231WB12P06	5021KBI—K	3/4"	3/4"						
123242	231WB16P08	5021LBI—L	1"	1"						
123243	231WB20P10	5021MBI—M	1 1/4"	1 1/4"						
123244	231WB24P12	5021NBI—N	1 1/2"	1 1/2"						

13.42T — 11/73

SERIES 241 PILOT OPERATED DIAPHRAGM TYPE

VALVE		Port Size (ins.)	Conn. Size NPTF (ins.)	Maximum Operating Pressure Differential AC		Minimum Operating Pressure Differential AC		Max. AC Fluid Temp.	Safe Work. Press. kPa (psig)	Burst Press. kPa (psig)	Coil Type
CAT. NO.	MODEL			kPa	psi	kPa	psi				
123245	241WA10P03	5/8"	3/8"	1034	150	35	5	82°C (180°F)	2069 (300)	10343 (1500)	AMG Refer next page
123246	241WA10P04	5/8"	1/2"	1034	150	35	5				
123247	241WA12P06	3/4"	3/4"	1034	150	35	5				
123248	241WA16P08	1"	1"	862	125	35	5				

13.40T — 12/74

REFER NEXT PAGE FOR CAPACITY TABLES & ELECTRICAL DATA



SOLENOID VALVES

WATER SERVICE

CAPACITY TABLES

(FOR SOLENOID VALVES DETAILED ON PAGE 123-h)

121 SERIES	PRESSURE DROP ACROSS VALVE PORT kPa & PSIG											
	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG
	14	2	35	5	69	10	138	20	207	30	345	50
	FLOW — LITRES PER SEC. & IMPERIAL GALLS. PER MIN.											
PORT SIZE	l/s	GPM	l/s	GPM	l/s	GPM	l/s	GPM	l/s	GPM	l/s	GPM
$\frac{1}{8}$ "	.041	.54	.067	.88	.091	1.20	.127	1.68	.157	2.08	.206	2.72
$\frac{1}{4}$ "	.048	.63	.073	.96	.109	1.44	.151	2.00	.188	2.48	.242	3.20
$\frac{1}{2}$ "	.059	.78	.097	1.28	.133	1.76	.188	2.48	.230	3.04	—	—

201 231 SERIES	PRESSURE DROP ACROSS VALVE PORT kPa & PSIG											
	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG	kPa	PSIG
	35	5	69	10	172	25	345	50	690	100	1379	200
	FLOW — LITRES PER SEC. & IMPERIAL GALLS. PER MIN.											
PORT SIZE	L/s	GPM	L/s	GPM	l/s	GPM	l/s	GPM	l/s	GPM	l/s	GPM
$\frac{1}{8}$ "	0.17	2.2	0.23	3.0	0.36	4.8	0.51	6.8	0.73	9.6	1.03	13.6
$\frac{1}{4}$ "	0.22	2.9	0.30	4.0	0.48	6.4	0.68	9.0	0.97	12.8	1.37	18.1
$\frac{3}{8}$ "	0.30	4.0	0.42	5.5	0.71	9.4	0.94	12.4	1.33	17.6	1.89	24.9
$\frac{1}{2}$ "	0.48	6.4	0.67	8.8	1.06	14.0	1.50	19.8	2.12	28.0	3.00	39.6
$\frac{3}{4}$ "	0.97	12.8	1.34	17.7	2.12	28.0	3.00	39.6	4.24	56.0	6.00	79.2
1"	1.82	24.0	2.48	32.8	3.94	52.0	5.57	73.6	7.87	104.0	11.1	147.2
1 $\frac{1}{4}$ "	2.18	28.8	3.03	40.0	4.85	64.0	6.84	90.4	9.69	128.0	13.7	180.8
1 $\frac{1}{2}$ "	3.39	44.8	4.78	63.2	7.57	100.0	10.7	141.6	15.1	200.0	21.4	283.2

241 SERIES	CV FACTOR	PD ACROSS VALVE kPa & PSIG			
		kPa	PSIG	kPa	PSIG
		35	5	69	10
		FLOW LITRE/S & IMP. GPM			
VALVE No.		l/s	GPM	l/s	GPM
241WA 10 PO3	2.8	0.39	5.1	0.54	7.1
241WA 10 PO4	3.6	0.48	6.4	0.69	9.1
241WA 12 PO6	5.5	0.74	9.8	1.05	13.9
241WA 16 PO8	13.0	1.76	23.3	2.49	32.9

ELECTRICAL SOLENOID COIL DATA — COIL TYPE AMG														
CAT. NO.	Nominal Voltage & Frequency	Applied Voltage & Frequency	TYPE 121				TYPE 201 & 231				TYPE 241			
			AMPS		VA	Watts	AMPS		VA	Watts	AMPS		VA	Watts
			Inrush	Hold.	Hold.	Max.	Inrush	Hold.	Hold.	Max.	Inrush	Hold.	Hold.	Max.
123251	24AC — 50/60	24/50	1.43	0.96	23	12	1.20	0.96	23	12	2.25	0.86	20.7	9.7
123252	120AC — 50/60	120/50	0.32	0.21	25		0.25	0.21	25		0.52	0.20	24.0	11.1
123253	240AC — 50/60	240/50	0.16	0.10	24		0.16	0.10	24		0.27	0.12	29.3	14.6
123254	480AC — 50/60	480/50	0.07	0.05	24		0.06	0.05	24		0.14	0.06	28.8	12.5
123255	6DC	6DC	—	1.88	—	15	2.60	1.88	—	15	—	—	—	—
123256	12DC	12DC	—	0.93	—		1.31	0.93	—		—	—	—	—
123257	24DC	24DC	—	0.46	—		0.67	0.46	—		—	—	—	—

COIL INSULATION : CLASS F MOULDED

NOTE: Coils are supplied with a Junction Box (coil type AMG). If desired, coils can be supplied with a Conduit Boss on special order (coil type AMC). Standard wire lead length of coils with Junction Box is 152mm (6"). Wire lead length of coils with Conduit Boss is 457mm (18").



CROSS REFERENCE SOLENOID

ALCO OLD VALVES — vs — ALCO NEW VALVES

REFRIGERATION SOLENOID VALVES NUMERICAL CROSS REFERENCE

FOR REFRIGERANTS OTHER THAN AMMONIA

S1 SERIES



REPLACED BY

100R SERIES



REPLACED BY

100RA SERIES



OLD VALVE NUMBER	BASIC COIL NUMBER	VALVE NUMBER	BASIC COIL NUMBER	CURRENT VALVE NUMBER	BASIC COIL NUMBER
S101-5	XA1550	100R2S2	BGG	100RA2S2	AMG
S101-9		100R2S2		100RA2S2	
S101-7		100R2S2		100RA2S2	
S101-4		100R2S3		100RA2S3	
S120-1		100R2S4		100RA2S4	
S101		100R2F2		100RA2F2	
S101-2		100R2F2		100RA2F2	
S101-8		100R2F3		100RA2F3	
S101-3		100R2P2		100RA2P2	
S101-6		100R2P3		NONE	
S155		200R4S3		200RA4S3	
S155M		200R4S3M		200RA4S3M	
S120		200R4S4		200RA4S4	
S120C		200R4S4		200RA4S4	
S120M		200R4S4M		200RA4S4M	
S120-T		200R4S4M		200RA4S4M	
S115F		200R4F3		200RA4F3	
NONE		200R4P2		200RA4P2	
S115		200R4P3		200RA4P3	
S115-1		200R4P3		200RA4P3	
S115C		200R4P3		200RA4P3	
S115M		200R4P3M		200RA4P3M	
S115M-1		200R4P3M	BGG	200RA4P3M	
S155-1	XA1550	228R3S3	ABG	228RB3S3	AMG
S34-1 3/8" ODF	XA1550	200R4S3	BGG	200RA4S3	AMG
S34 3/8" ODF		200R4S3M		200RA4S3M	
S34-1 1/2" ODF		200R4S4		200RA4S4	
S34 1/2" ODF		200R4S4M		200RA4S4M	
S34-1 3/8" FPT		200R4P3		200RA4P3	
S34 3/8" FPT	XA1550	200R4P3M		200RA4P3M	
NONE	NONE	200R5S4		200RA5S4	
S34-1 5/8" ODF	XA1550	200R5S5		200RA5S5	
S34 5/8" ODF		200R5S5M		200RA5S5M	
S34-1 1/2" SAE		200R5F4		200RA5F4	
S34 1/2" SAE		200R5F4M		200RA5F4M	
NONE		200R5F5		200RA5F5	
NONE		200R5P3		200RA5P3	
S36-1 1/2" ODF		200R6S4		200RA6S4	
S37-1 5/8" ODF		200R6S5		200RA6S5	
S36-1 5/8" ODF		200R6S5		200RA6S5	
S37 5/8" ODF		200R6S5M		200RA6S5M	
S37F-1 1/2" SAE		200R6F4		200RA6F4	
S37F 1/2" SAE		200R6F4M		200RA6F4M	
S37F-1 5/8" SAE		200R6F5		200RA6F5	
S37F 5/8" SAE		200R6F5M		200RA6F4M	
S36-1 3/8" FPT	XA1550	200R6P3	BGG	200RA6P3	AMG
S221	XA1550	200R6S5M	BGG	200RA6S5M	AMG
S225		200R6S5M		200RA6S5M	
S225H		200R6S5M		200RA6S5M	
S225-1		200R6S5		200RA6S5	
S804-4		200R6S5		200RA6S5	
S804-3		200R6S4		200RA6S4	
S804-5		200R6P3		200RA6P3	
S896		230R9S7		230RA9S7 *	
S310-1	XA1550	230R9S7	BGG	230RA9S7 *	AMG

* See bottom chart on Tech. Page 123-k for Replacement 230RA Series.

ALCO SOLENOID VALVE CROSS REFERENCES — REFER ALSO TECH. PAGES 123-k & 123-l

REFRIGERATION SOLENOID VALVES NUMERICAL CROSS REFERENCE

FOR REFRIGERANTS OTHER THAN AMMONIA



M3 SERIES



R3 SERIES

REPLACED
BY

230R SERIES

REPLACED
BY

230RA SERIES

REPLACED
BY*
240RA
SERIES
*

OLD VALVE NUMBER	BASIC COIL NUMBER	VALVE NUMBER	BASIC COIL NUMBER	CURRENT VALVE NUMBER	BASIC COIL NUMBER
NONE	NONE	230R8S5	BGG	230RA8S5 *	AMG
NONE	NONE	230R9S5	↑	230RA9S5 *	↑
M635-1	XA1702	230R9S7	↑	230RA9S7 *	↑
M635H-1	↑	230R9S7	↑	230RA9S7 *	↑
M635	↑	230R9S7M	↑	230RA9S7M *	↑
M635H	↑	230R9S7M	↑	230RA9S7M *	↑
M344-1	↑	230R12S7	↑	230RA12S7 *	↑
M344H-1	↑	230R12S7	↑	230RA12S7 *	↑
M355-1	↑	230R12S7	↑	230RA12S7 *	↑
M355H-1	↑	230R12S7	↑	230RA12S7 *	↑
M355H	↑	230R12S7M	↑	230RA12S7M *	↑
M355	↑	230R12S7M	↑	230RA12S7M *	↑
M344	↑	230R12S7M	↑	230RA12S7M *	↑
M344H	XA1702	230R12S7M	BGG	230RA12S7M *	AMG
R345-1	XA1704	230R16S9	BGG	230RA16S9 *	AMG
R345H-1	↑	230R16S9	↑	230RA16S9 *	↑
R355-1	↑	230R16S9	↑	230RA16S9 *	↑
R355H-1	↑	230R16S9	↑	230RA16S9 *	↑
R345	↑	230R16S9M	↑	230RA16S9M *	↑
R345H	↑	230R16S9M	↑	230RA16S9M *	↑
R355	↑	230R16S9M	↑	230RA16S9M *	↑
R355H	↑	230R16S9M	↑	230RA16S9M *	↑
R11 1-1/8" ODF	↑	230R16S9M	↑	230RA16S9M *	↑
R1H 1-1/8" ODF	↑	230R16S9M	BGG	230RA16S9M *	↑
R12	↑	905-14	XA1550/BGG	905-14	↑
R61	↑	230R20S11M	BGG	230RA20S11M *	↑
R6H	↑	230R20S11M	BGG	230RA20S11M *	↑
R61-1	XA1704	④ 230R20S11T	BGG	④ 230RA20S11T *	AMG
R6H-1	XA1704	④ 230R20S11T	BGG	④ 230RA20S11T *	AMG
R62	↑	905-15	XA1550/BGG	905-15	↑
R62-1	↑	905-15	↑	905-15	↑
R21	↑	905H-16	↑	905H-16	↑
R21-1	↑	905H-16	↑	905H-16	↑
R22	↑	905-16	↑	905-16	↑
R22-1	↑	905-16	↑	905-16	↑
R2H	↑	905H-16	↑	905H-16	↑
R2H-1	XA1704	905H-16	XA1550/BGG	905H-16	↑
DS2360-1	XA1550	230R20S13 T	BGG	230RA20S13T *	AMG
DS2228	XA1714	230R20S17M	BGG	230RA20S17M *	AMG
S608-1	XA1550	100R2P3	BGG	200RA4P3	↑
9010-1R	AAG	228R3S3	ABG	228RB3S3	↑
9010-2R	AAG	702RA01	AMG	702RA001	↑
		100R2S2	BGG	100RA2S2	↑
		④ 100R2S3	BGG	④ 100RA2S3	AMG

- Specify the voltage/frequency rating.
- Replacement valves do not have flange connections. For flanged connections see the 905 series valves.
- For low pressure recirculated liquid use the 905-16.
- 230R and 230RA valves cannot be used for ammonia use.

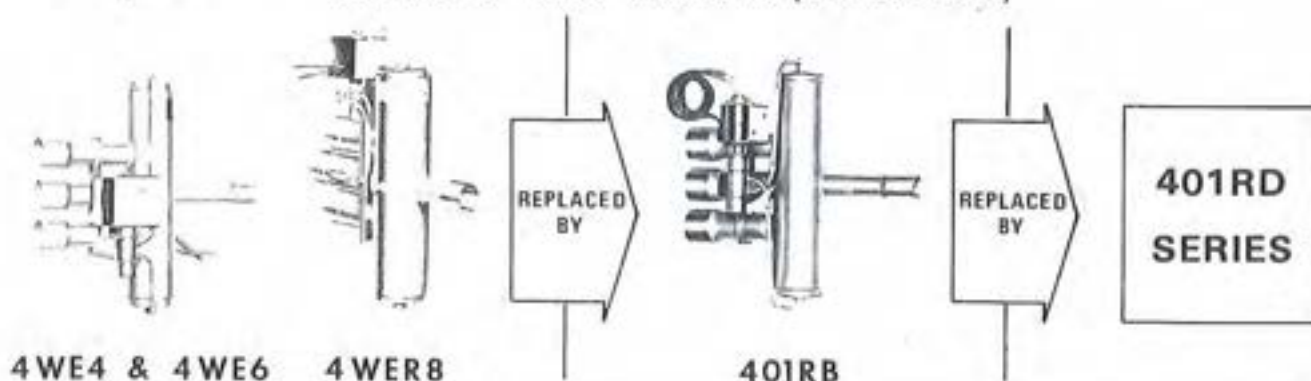
OLD 230 RA * TYPE NO.	REPLACEMENT 240 RA * TYPE NO.
230RA9S7	240RA9T7
230RA8S5	240RA8T5
230RA9S5	240RA9T5
230RA9S7M	240RA9T7M
230RA12S7	240RA12T7
230RA12S7M	240RA12T7M
230RA16S9	240RA16T9
230RA16S9M	240RA16T9M
230RA20S11M	240RA20T11M
230RA20S11T	240RA20T11T
230RA20S13T	240RA20T13T
230RA20S17M	240RA20T17M
AMG COIL	AMG COIL

ALCO SOLENOID VALVE CROSS REFERENCE — REFER ALSO TECH. PAGES 123-j & 123-i



4 WAY REVERSING VALVE CROSS REFERENCE

ACTIVE 4-WAY VALVES (old vs. new)

1


OLD TYPE NO.	REPLACED BY ③	REPLACED BY	REPLACED BY	CURRENT TYPE NO.
	4WER Series	401RB4 Series	401RB335	401RD435
	"	"	401RB3F46	401RD4F46
	"	"	401RB357	401RD457
		401RB5 Series	401RB5F36	401RD6F36
4WB4-45	4WE4-45 or 4WER4-45	401RB445	401RB5F45	401RD6F45
		401RB4F46	401RB5F46	401RD6F46
4WB4-47	4WE4-47 or 4WER4-47	—	—	—
		401RB4F47	401RB5F47	401RD6F47
4WB4-57	4WE4-57 or 4WER4-57	401RB457	401RB5F57	401RD6F57
			401RB5F67	401RD6F67
	4WE6 Series	401RB6 Series	401RB10F46	401RD10F46
	"	401RB6F47	401RB10F47	401RD10F47
	"	401RB6F57	401RB10F57	401RD10F57
4WB6-67	4WE6-67 or 4WER6-67	401RB667	401RB10F67	401RD10F67
4WB6-69	4WE6-69 or 4WER6-69	401RB669	401RB10F69	401RD10F69
4WB6-79	4WE6-79 or 4WER6-79	401RB679	401RB10F79	401RD10F79
	4WER8-F911	401RB-8F911	401RB-15F911	Still Current
BASIC COIL NO.				
X8400 ①	X8400 or X9268 (Epoxy) ① ④	AMF - Open Frame ① ②	AMF - Open Frame ① ②	AMF - Open Frame ① ②

① Specify the voltage/frequency rating.

② For field replacement on 401RB valves, order AMG ①

③ 4WER Series had removable pilot, 401RB Series does not have the removable Pilot Feature.

④ For field replacement on 4WE and 4WER valves, order X8321 Coil Kit to replace the X8400 Coil and X9594 Coil Kit to replace the X9268 Coil.

M91F SERIES



No Change

M511 SERIES


Replaces M5
No Exterior Physical Change

M811 SERIES


Replaces M8
No Exterior Physical Change

AMMONIA SOLENOID VALVE NUMERICAL CROSS REFERENCE

OLD VALVE NUMBER	BASIC COIL NUMBER	VALVE NUMBER	BASIC COIL NUMBER	CURRENT VALVE NUMBER	BASIC COIL NUMBER
M91F	XA1702	NONE	NONE	M91F	X22606
M5	↑	M511-1	XA1702	M511	↑
M5-H	↓	M511	↓	M511	↑
M8	↓	M811-1	↓	M811	↑
M8-H	XA1702	M811	XA1702	M811	X22606
R11	XA1704	905-14	XA1550/BGG	905-14 ②	AMG
R12	↑	905-14	↓	905-14 ②	↑
R1H	↑	905-14	↓	905-14 ②	↑
R61	↑	905-15	↓	905-15 ②	↑
R62	↑	905-15	↓	905-15 ②	↑
R6H	↑	905-15	↓	905-15 ②	↑
R21	↓	905-16	↓	905-16 ②	↓
R22	↓	905-16	↓	905-16 ②	↓
R2H	XA1704	905-16	XA1550/BGG	905-16 ②	AMG

① Specify the voltage/frequency rating

② Use the 905H series on high differential pressure whether liquid or discharge gas.

ALCO SOLENOID VALVE CROSS REFERENCE —

REFER ALSO TECH. PAGES 123-j & 123-k

COILS FOR ALCO SOLENOID VALVES

SUMMARY OF ALCO ELECTRICAL SOLENOID COILS

SOLENOID SERIES	CAT. NO.	COIL TYPE	VOLTS	FREQ.
100RA 228RB	123251	AMG	24	50/60
200RA 240RA	123252	AMG	120	50/60
540RA 702RA	123253	AMG	240	50/60
905/905H FA4	123254	AMG	480	50/60
3031RB	123255	AMG	6	DC
121 201	123256	AMG	12	DC
231	123257	AMG	24	DC
241	123251	AMG	24	50/60
	123252	AMG	120	50/60
	123253	AMG	240	50/60
	123254	AMG	480	50/60
FA5	123253	AMG	240	50/60
FA8	123253	AMG	240	50/60
	123254	AMG	480	50/60
M SERIES	123265	X22606 - 7118	24	50/60
	123266	X22606 - 7218	120	50/60
	123267	X22606 - 6918	240	50/60
	123268	X22606 - 8818	480	50/60
	123269	X22606 - 2118	6	DC
	123270	X22606 - 2218	12	DC
	123271	X22606 - 0418	24	DC
	123272	X22606 - 1018	115	DC
DS SERIES	123273	X22164 - 7118	24	50/60
	123274	X22164 - 7218	120	50/60
	123275	X22164 - 6918	240	50/60
	123276	X22164 - 8818	480	50/60
	123277	X22164 - 2218	12	DC
	123287	X22164 - 1018	115	DC
3041 R	123278	BMG	24	50/60
	123279	BMG	120	50/60
	123280	BMG	Dual 120/240	50/60
	123281	BMG	240	50/60
	123282	BMG	480	50/60
	123283	BMG	6	DC
	123284	BMG	12	DC
	123285	BMG	24	DC

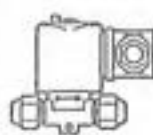
Above Electrical Solenoid Coils are also detailed against their respective Solenoid Valve Types on Pages:

SOLENOID VALVE SERIES	PAGE No.
FA8	117-b
FA5	118
100RA, 228RB, 200RA	123-a
240RA, 540RA, 702RA	123-b
M, DS, 905/905H, FA4	123-c
3031RB	123-e
3041R	123-f
121, 201, 231, 241	123-h/i

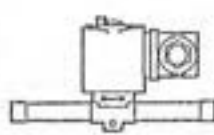


SOLENOID VALVES

26/5/88

Rev. 1
17/6

1020



1026



1064



1068



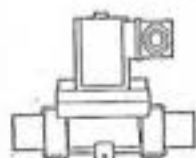
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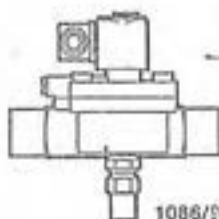
1076



1080



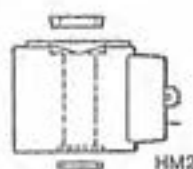
1086



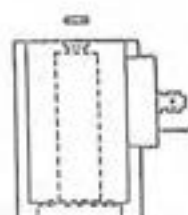
1086/5



1132



HM2



HS2

FOR REFRIGERATION & AIR CONDITIONING
R12 - R22 - R502 For Liquid, Suction, Hot Gas

CAT. NO.	MODEL	Conn.	Port Diam. mm	Opening Differential Pressure kPa (Psi)		Fluid Temp. °C	Safe Work. Press. kPa (Psi)	Kv** Factor m³/hr
				Min	Max (MaxP)			
NORMALLY CLOSED - DIRECT OPERATED								
12332	1020/2	1/4" FI.	2.5	0	2100 (305)	-35 to +110	4000 (580)	0.175
12334	1024/2	1/4" ODF	2.2	0 (0)	1800 (261)			0.150
12344	1020/3	3/8" FI.	3.0	0 (0)	1800 (261)			0.280
NORMALLY CLOSED - PILOT OPERATED								
12336	1064/3	3/8" FI.	6.5	5 (0.7)	2100 (305)	-35 to +110	4000 (580)	0.80
12340	1066/3	3/8" ODF	6.5					
12337	1070/4	1/2" FI.	12.5					2.20
	1076/4	1/2" ODF	12.5					2.61
12338	1070/5	5/8" FI.	12.5					
	1076/5	5/8" ODF	12.5	3 (0.4)	2100 (305)	-35 to +110	3200 (460)	4.30
12343	1080/6	3/4" FI.	17.0					5.11
	1086/6	3/4" ODF	17.0					
12344	1086/7	7/8" ODF 1 1/8" ODM	17.0	5 (0.7)	2100 (305)	-35 to +110	3200 (460)	10
	1086/9 *	1 1/8" ODF 1 3/8" ODM	25.5					
SUPPLIED COMPLETE WITH COIL, JUNCTION BOX & BRACKET								

* SUPPLIED COMPLETE WITH COIL, JUNCTION BOX & PACKET

** With Manual Lift Stem

FOR WATER, BRINE & AIR

CAT. NO.	MODEL	CONNS.	Port Diam. mm	Opening Differential Pressure kPa (Psi)		Fluid Temp. °C	Safe Work. Press. kPa (Psi)	Kv Factor m³/hr
				Min	Max (MaxP)			
NORMALLY CLOSED - PILOT OPERATED								
12322	1132/03	3/8" FPT	12.5	10 (1.5)	1700 (247)	-25/+110	4000 (580)	2.1
12323	1132/04	1/2" FPT						2.2
12324	1132/06	3/4" FPT	20.5	15 (2.2)	1200 (174)	-15/+110	3000 (430)	6.0
12325	1132/08	1" FPT						6.0
SUPPLIED COMPLETE WITH COIL & JUNCTION BOX								

* SUPPLIED COMPLETE WITH COIL & JUNCTION BOX

** Kv = Water Flow at 100 kPa (14.5 psi) Pressure Drop across valve

SOLENOID COILS

CAT. NO.	P/N	Power	Suits Models
12346	HM2/404240	240V	1020/2, 1026/2, 1020/3, 1064/3, 1066/3, 1070/4, 1076/4, 1070/5, 1076/5, 1086/4, 1132/03, 1132/04, 1132/06, 1132/08
12347	HS2/474240	54/60 Hz	1080/6, 1086/6, 1086/7 1060/2, 1060/3

REFER NEXT PAGE FOR CAPACITIES

CASTEL SOLENOID VALVES

R12 - R22 - R502



New Series of Solenoid Valves for use with Fluorinated Refrigerants
Featuring:
Compact design and encapsulated coil complete with junction box

Redesigned Junction Box Connector
Can be used in any of 3 or 4 positions by
turning through 90° increments.

VALVE		Conn.	Nominal Orifice mm	Opening Differential Pressure kPa (psi)		Fluid Temperature °C (°F)		Safe Working Pressure kPa (psig)
CAT. NO.	MODEL			min	max(MOPD)	min	max	
NORMALLY CLOSED — DIRECT OPERATED								
12358	1020/2	1/4" FI.	2	0 (0)	1800 (261)	-15 (+5)	+60 (+140)	4000 (580)
NORMALLY CLOSED — SERVO OPERATED								
12359	1080/3	3/8" FI.	10	5 (0.7)	2100 (305)	-35 (-31)	+110 (+230)	4000 (580)
12360	1080/4	1/2" FI.	10	5 (0.7)	2100 (305)	-35 (-31)	+110 (+230)	4000 (580)
12361	1080/5	5/8" FI.	12.5	5 (0.7)	2100 (305)	-35 (-31)	+110 (+230)	4000 (580)
12362	1080/6	3/4" FI.	17	3 (0.4)	2100 (305)	-35 (-31)	+110 (+230)	3200 (464)
SOLENOID COILS								
12370	1900/412	Type HM —	240V, 50Hz, AC — to suit Model 1020/2					
12371	1900/442	Type HS —	240V, 50Hz, AC — to suit Models 1080/					

LIQUID CAPACITIES*												
MODEL	R12				R22				R502			
	PRESSURE DROP ACROSS VALVE											
	15kPa(2.2psi)		35kPa(5psi)		15kPa(2.2psi)		35kPa(5psi)		15kPa(2.2psi)		35kPa(5psi)	
	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
1020/2	2.38	0.68	3.61	1.03	3.14	0.89	4.77	1.36	2.21	0.63	3.37	0.96
1080/3	20.6	5.8	31.3	8.9	26.7	7.6	40.7	11.6	18.6	5.3	28.8	8.2
1080/4	35.0	10.0	52.9	15.1	45.5	12.9	68.6	19.5	31.1	8.8	48.6	13.8
1080/5	41.5	11.8	62.8	17.9	54.0	15.4	81.6	23.2	38.3	10.9	57.8	16.5
1080/6	68.1	19.4	103.3	29.4	88.4	25.2	134.3	38.2	62.8	17.9	95.0	27.0

* LIQUID CAPACITY — based on a liquid temperature ahead of the valve of +25°C (+77°F) and evap. temp. —10°C (+14°F).

SUCTION GAS CAPACITIES*												
MODEL	R12				R22				R502			
	EVAPORATOR TEMPERATURE AT 15 kPa (2.2psi) P.D.											
	-30°C (-22°F)		+10°C (+50°F)		-30°C (-22°F)		+10°C (+50°F)		-30°C (-22°F)		+10°C (+50°F)	
	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
1080/3	1.33	0.38	2.85	0.81	1.98	0.56	4.19	1.19	1.57	0.45	3.61	1.03
1080/4	2.15	0.61	4.77	1.36	3.37	0.96	7.09	2.02	2.67	0.76	6.05	1.72
1080/5	2.56	0.73	5.70	1.62	4.01	1.14	8.49	2.41	3.14	0.89	7.21	2.05
1080/6	4.19	1.19	9.42	2.68	6.63	1.89	13.96	3.97	5.23	1.49	11.86	3.37

* SUCTION GAS CAPACITY — based on -30°C and +10°C evap. temp. at a pressure drop of 15 kPa (2.2psi) across the valve

HOT GAS CAPACITIES — m ³ /h*												
MODEL	R12				R22				R502			
	PRESSURE DROP — kPa at Condensing Temperature 35°C(95°F)											
	50	100	200	300	50	100	200	300	50	100	200	300
1020/2	0.58	0.82	1.2	1.6	0.52	0.73	1.1	1.35	0.4	0.6	0.9	1.15
1080/3	5.0	7.0	10.5	13.4	4.50	6.3	8.9	11.5	3.7	5.2	7.4	9.8
1080/4	8.5	12.0	17.7	22.8	7.65	10.8	15.3	20.0	6.3	8.9	12.6	17.0
1080/5	10.0	14.0	20.7	26.6	9.0	12.7	18.0	23.5	7.5	10.6	15.0	20.0
1080/6	16.6	23.4	34.6	45.0	15.0	21.1	29.9	39.0	12.5	17.6	24.9	33.2

* HOT GAS CAPACITY — Expressed in m³/h at 35°C (95°F) cond. temp. and various pressure drops across the valve and on a temperature of +60°C (140°F) superheated vapour ahead of the valve in the hot gas line.

WATER REGULATING VALVES

Danfoss

Condensing-Pressure Regulators for Water-Cooled Condensers Pressure-Contr. Water Valves, WVFX, WVS



WVFX 10-25



WVS 32-40

Design
Function.

General.

Application. The water valves are used for regulating the quantity of water in refrigeration systems with water-cooled condensers. Using the water valves results in modulating regulation of the condensing pressure so that it is kept almost constant during operation. When the refrigeration system is stopped, the cooling water flow is shut off automatically.

The pressure impulses from the condensing pressure are transmitted via the bellows element to the valve cone so that the valve - even at very small pressure variations - can adapt the quantity of water required by the condenser.

If in the case of fluorinated refrigerants it is desired to have a capillary tube for pipe connection, a 1 m (3.3 ft) capillary tube with 1/4" flared coupling nuts at either end can be obtained under code No. 60-0071. The valves are pressure-relieved in such a way that a variation in the water pressure will not affect their setting. To protect the refrigeration system against overload in case of failure of the cooling water supply to the water valve, a safety cut-out should be fitted on the pressure side of the refrigeration system.

DESCRIPTION		TYPE	CAT. NO.	CODE NO.	Medium	REFRIGERANT SIDE			WATER SIDE			Max. Test Press.	FLOW COEFF. Cv** Valve Imp. GPM	
						Conn.	PRESSURE RANGE To Begin Opening kPa (psig)	Completely Open kPa (psig)	Max. Test Press.	Medium	Conn. (Ins.)			Max. Operat. Press.
Press. Controlled	Directly Controlled	WVFX10	1241	3N1100	R12	1/4" Flare	345-1572 (50-228)	634-1862 (92-270)	2600 kPa 377 psig	Fresh Water, Brine	3/8 BSP	979 kPa 142 psig	979 kPa 142 psig	1.2
		WVFX15	1242	3N2100							1/2 "			1.8
		WVFX20	1243	3N3100							3/4 "			3.0
		WVFX25	1244	3N4100							1 "			4.8
		WVFX32	1245	3F1232							1 1/4 "			10.6
	Servo Controlled	WVFX40	1246	3F1240	R502	1/4" Flare or Weld Nipple	393-1669 (57-242)	690-1958 (100-284)	2600 kPa 377 psig	Fresh Water, Brine	1 1/2 "	979 kPa 142 psig	1572 kPa 228 psig	10.6
		WVS32	12411	16D3043	1 1/4 "						12.0			
		WVS40	12412	16D3034	1 1/2 "						20.0			
		WVS50	12413	16D3075	2W.Flg.						31.0			
		WVS65	12414	16D3076	2 1/2 "						44.0			
		WVS80	12415	16D3078	3 "						77.0			
		WVS100	12416	16D3089	4 "						121.0			
CAPILLARY 1m (3.3ft) with two 1/4" Flare coupling Nuts. Code No. 60-0071									CAT. NO.		13923			

Opening differential pressure : WVFX max. 979kPa (142 PSI), WVS32-40 min. 49kPa (7.1 PSI) max. 979kPa (142 PSI)

WVS50-100 min. 30kPa (4.3 PSI) max. 979kPa (142 PSI)

Differential Pressure range for WVS of 98-979kPa (14.2 - 142 PSI) with replacement servo spring available on request.

** The maximum Cv factor indicates the water capacity in Imp. gal/min when the valve is completely open at a pressure drop across it of 7 kPa (1 PSI).

RISE IN CONDENSING PRESS.ABOVE VALVE OPENING PRESS.		PRESSURE DROP ACROSS VALVE		FLOW — Imperial Galls. per Min. & litre/s													
				VALVE SIZE													
				WVFX 10		WVFX 15		WVFX 20		WVFX 25		WVFX 32		WVFX 40			
kPa	PSI	kPa	PSI	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s		
138	20	48	7	1.9	0.14	3.0	0.23	3.5	0.26	5.0	0.38	8.0	0.61	8.0	0.61		
		193	28	4.1	0.31	5.7	0.43	7.3	0.55	10.0	0.76	18.0	1.36	18.0	1.36		
		393	57	6.0	0.45	8.0	0.61	10.4	0.79	14.0	1.06	27.0	2.04	27.0	2.04		
207	30	48	7	2.7	0.20	4.0	0.30	5.0	0.38	7.5	0.57	14.0	1.06	14.0	1.06		
		193	28	5.5	0.42	7.8	0.59	10.4	0.79	15.5	1.17	28.0	2.12	28.0	2.12		
		393	57	7.8	0.59	11.0	0.83	14.5	1.10	22.0	1.67	41.0	3.10	41.0	3.10		
276	40	48	7	3.1	0.23	4.7	0.36	6.3	0.48	10.0	0.76	19.0	1.44	19.0	1.44		
		193	28	6.2	0.47	9.0	0.68	13.2	1.00	20.0	1.51	38.0	2.88	38.0	2.88		
		393	57	8.6	0.65	13.0	0.98	18.5	1.40	28.8	2.18	55.0	4.16	55.0	4.16		
				WVS 32		WVS 40		WVS 50		WVS 65		WVS 80		WVS 100			
35	5	48	7	14	1.06	18	1.4	30	2.3	53	4.0	75	5.7	110	8.3		
		193	28	34	2.57	36	2.7	54	4.1	78	5.9	130	9.8	190	14.4		
		393	57	58	4.39	51	3.9	72	5.5	95	7.2	185	14.0	280	21.2		
69	10	48	7	24	1.82	42	3.2	70	5.3	110	8.3	150	11.4	240	18.2		
		193	28	55	4.16	78	5.9	115	8.7	162	12.3	270	20.4	435	32.9		
		393	57	86	6.51	108	8.2	166	12.6	242	18.3	400	30.3	630	47.7		
104	15	48	7	25	1.89	56	4.2	82	6.2	124	9.4	210	15.9	335	25.4		
		193	28	58	4.39	108	8.2	166	12.6	231	17.5	390	29.5	635	48.1		
		393	57	88	6.66	153	11.6	233	17.6	333	25.2	580	43.9	910	68.9		

For detailed selections, capacities and applications refer Danfoss Bulletin KK.30.A2.02.

WATER REGULATING VALVES

Danfoss

Condensing-Pressure Regulators for Water-Cooled Condensers Temperature-Controlled Water Valves, AVTA, WVTS

1

Application. The thermostatic valve is suitable for regulating jobs where temperature control is required by means of a water or brine flow. This may apply, for example, to:

- temperature regulation in fresh water or brine cooling systems.
 - cooling water regulation for condensers in cooling systems where it is not desired to use pressure-controlled water valves.
- Thermostatic regulation gives an economical water consumption since the valves react even to small temperature variations.

The thermostatic water valves open on a rise in the bulb temperature.

Type AVTB closing on a rise in the bulb temperature, available on application Design Function.

General. When the temperature at the valve bulb increases, the pressure inside the bulb is increased, and this pressure increase is transmitted to the valve cone which opens to flow.

The valves are pressure-relieved in such a way that a change in the water pressure does not affect the valve setting. Besides, the valves work independently of the ambient temperature.

The universal charge gives correct function, no matter whether the valve body and bellows housing are warmer or colder than the bulb.

The valves are supplied with 2 m (6.7 ft) capillary tube and a capillary tube gland.



AVTA



WVTS 50 - 100

DESCRIPTION		VALVE TYPE			BULB SIDE		WATER SIDE						
		Model	Cat. No.	Code No.	Temp. Range	Max. Bulb Temp.	Medium	Conn.	Temp. Limits		Max. Operat. Press.	Max. Test Press.	Cv* Value Imp. GPM
									Water	Brine			
Temp. Controlled	Directly Controlled	AVTA 15	12485	3N2132	0 - 30°C (32-88°F)	55°C (131°F)	Fresh Water Brine	½" BSP Int.	Max. 110°C (230°F)	Max. 110°C (230°F)	1000 kPa 145 psig	1600 kPa 232 psig	1.7
		AVTA 20	12486	3N3132				¾" " "					2.9
		AVTA 25	12487	3N4132				1" " "					4.7
		AVTA 15	12476	3N2162	25-65°C (77-149°F)	85°C (185°F)		½" " "					1.7
		AVTA 20	12483	3N3162				¾" " "					2.9
		AVTA 25	12484	3N4162				1" " "					4.7
		AVTA 15	12488	3N2182	50 - 90°C (122-194°F)	110°C (230°F)		½" " "					1.7
		AVTA 20	12489	3N3182				¾" " "					2.9
		AVTA 25	12490	3N4182				1" " "					4.7
	Servo Controlled	WVTS 32	12496	16D3343	25 - 65°C (77-149°F)	85°C (185°F)	Fresh Water Brine	1½" " "	Max. 90°C (194°F)	Min. -25°C (-13°F)	1000 kPa 145 psig	1600 kPa 232 psig	11
		WVTS 40	12497	16D3304				1½" " "					21
		WVTS 50		16D3315				2" Weld Flg.					32
		WVTS 65		16D3316				2½" " "					44
		WVTS 80		16D3318				3" " "					74
		WVTS100		16D3319				4" " "					121

Opening differential pressure : AVTA max.690kPa(100PSI), WVTS 32- 40 min.49kPa(7.1PSI) max.393kPa(57PSI)

50-100 min.30kPa(4.3PSI) max.393kPa(57PSI)

Differential pressure range for WVTS of 98 - 979kPa(14.2 - 142PSI) with replacement servo-spring available on request.

*The max. Cv-factor indicates the water capacity in Imp.gal/min when the valve is completely open at a press. drop across it of 7kPa(1PSI)

REFER MANUFACTURERS BULLETIN KK.30.A2.02 FOR DETAILED CAPACITY AND APPLICATION DATA

Pressure Operated Water Valves FOR R12



This type of valve controls the flow of water to the condenser on water-cooled machines. It is a water-economizing valve which allows only the necessary quantity of water to pass in order that the correct condenser cooling may be achieved. It also cuts off the water flow when the unit is stopped.

The pressure line is tapped in between the compressor and its condenser, and a simple adjustment enables the flow of water to be modulated in relation to the pressure in the system.

VALVE		CONN.	CAPACITY		PRESS. RANGE kPa(PSIG)	MAX. PERMIT PRESS.		CAPILLARY	
CAT. NO.	Model		litre/s	Imp. GPM		Refrig.	Water	Length	Conn.
12417	WR 1/2	1/2 F. BSP	0.64	8.4	414-1551	2448kPa	1000kPa	1m	1/2" Flare
12418	WR 3/4	3/4 F. BSP	1.06	14.0	[60-225]	(355 PSIG)	(145 PSIG)	(3ft.4")	

WATER REGULATING VALVES

PENN

PRESSURE ACTUATED WATER REGULATING VALVES

Penn pressure actuated water regulating valves are modulating type valves. They are designed for various applications and are suitable for either open or hermetic refrigeration units.

Series V46 direct acting valves OPEN on pressure increase. They are designed primarily for regulation of water cooled refrigeration condensers.

Series V48 are designed specifically for condensing units cooled either by atmospheric or forced draft cooling towers. They are used on single or multiple condenser hookups to the tower to provide the most economical and efficient use of the tower.

Max. Water Supply Press. 1034 kPa (150 psig).

Max. Water Supply Temp. 77°C (170°F).

Max. Bellows Press. 1586 kPa (230 psig) for R-12 models.

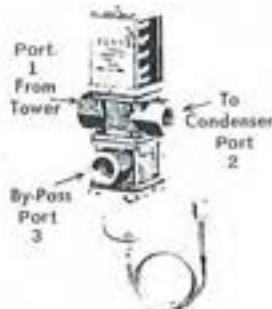
2206 kPa (320 psig) for R-22 and all range models.

V46 FACTORY SETTINGS				
Refrig.	Open. Press.		Min. Close Press.	
	kPa	psig	kPa	psig
R12, All Range	724	105	676	98
R22	1241	180	1193	173
Ammonia	1103	160	1055	153

V48 FACTORY SETTINGS				
Refrig.	Open. Press. Port 1 to Port 2		Closing Press. Port 1 to Port 3	
	kPa	psig	kPa	psig
R12	655	95	896	130
R22	1138	165	1482	215



SERIES V46



SERIES V48

REFRIG.	VALVE TYPE		CONN. (INS.)	OPENING POINT ADJUSTMENT RANGE		PRESSURE ELEMENT STYLE & CONN.	REPLACEMENT POWER ELEMENT		WATER VALVE RENEWABLE KIT	
	CAT. NO.	MODEL		kPa	psig		CAT. NO.	ELEMENT NO.	CAT. NO.	KIT NO.
V46 SERIES — 2 WAY										
R12 R22 R500 R502	12430	V46AA-1	3/8 NPT	483-1793	70-260	Style 13	12460	SEP91A-600R & SEC37A-601R*	12470	STT14A-600R
	12431	V46AB-1	1/2 "	483-1793	70-260	76cm (30") length with 1/2" Flare Nut Conn.	12461	SEP91A-602R & SEC37A-602R*	12472	STT15A-602R
	12432	V46AC-1	3/4 "	483-1793	70-260		12462	SEP91A-601R & SEC37A-602R*	12473	STT16A-601R
	12433	V46AD-1	1 "	483-1793	70-260		12463	SEP91A-603R & SEC37A-600R*		STT17A-609R
	12434	V46AE-1	1-1/2 "	483-1793	70-260					STT17A-601R
	12435	V46AR-1	1 1/2 Fig.	483-1793	70-260					
R12,R500	12436	V46AS-1	2 "	483-1172	70-170	Style 5	12466	SEP81A-602R		STT18A-600R
R22,R502	12438	V46AS-2	2 "	1103-1793	160-260	1/2" SAE	12467	SEP81A-601R		STT18A-601R
R12,R500	12437	V46AT-1	2 1/2 "	483-1172	70-170	Male Conn.	12466	SEP81A-602R		
R22,R502	12439	V46AT-2	2 1/2 "	1103-1793	160-260		12467	SEP81A-601R		
R717	12440	V46AB-11	1/2 NPT	690-1379	100-200	Style 15		SEP70A-603R	12472	STT15A-602R
	12441	V46AC-8	3/4 "	690-1379	100-200			SEP70A-601R	12473	STT16A-601R
	12442	V46AD-4	1 "	690-1379	100-200	1/2" NPT Female Conn.		SEP70A-604R		STT17A-609R
	12443	V46AE-4	1 1/2 "	690-1379	100-200					STT17A-601R
	12444	V46AR-2	1 1/2 Fig.	690-1379	100-200					STT18A-600R
	12445	V46AS-3	2 "	690-1379	100-200					STT18A-601R
	12446	V46AT-3	2 1/2 "	690-1379	100-200					
V48 SERIES — 3 WAY										
R12	12447	V48AB-1	1/2 NPT	586-758	85-110	Style 13	12461	SEP91A-602R & SEC37A-602R*	12471	STT15A-600R
	12448	V48AC-1	3/4 "	586-758	85-110		12462	SEP91A-601R & SEC37A-602R*		STT16A-600R
	12449	V48AD-1	1 "	586-758	85-110		12463	SEP91A-603R & SEC37A-600R*		STT17A-600R
	12450	V48AE-1	1 1/2 "	586-758	85-110					STT17A-603R
	12451	V48AF-1	1 1/2 "	586-758	85-110		Style 5	12466	SEP81A-602R		STT17A-604R
R22	12451	V48AB-2	1/2 "	1000-1310	145-190	Style 13	12461	SEP91A-602R & SEC37A-602R*	12471	STT15A-600R
	12452	V48AC-2	3/4 "	1000-1310	145-190		12462	SEP91A-601R & SEC37A-602R*		STT16A-600R
	12453	V48AD-2	1 "	1000-1310	145-190		12463	SEP91A-603R & SEC37A-600R*		STT17A-600R
	12454	V48AE-2	1 1/2 "	1000-1310	145-190					STT17A-603R
	12455	V48AF-2	1 1/2 "	1000-1310	145-190		Style 5	12467	SEP81A-601R		STT17A-604R

* Replacement element includes SEP element with 1/2" male SAE connector and SEC37A capillary kit with 2 flare nuts. Use only on valves specified.

REVERSE ACTING (V46) 2-WAY VALVES (Close on pressure increase) AVAILABLE ON REQUEST

TYPICAL RATINGS																		
TYPE	REFRIG	BASE * RATING PRESS.		WATER PD ACROSS VALVE		FLOW — litre/s and Imp. Gals/Min.												
						VALVE SIZE												
		kPa	PSIG	kPa	PSIG	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"
V46 2 WAY	R12	172	25	34.5	5	0.25	3.3	0.34	4.5	0.58	7.7	0.95	12.5	1.26	16.7	1.51	20.0	2.52
	R500			69	10	0.33	4.3	0.41	5.4	0.73	9.6	1.10	14.6	1.51	20.0	1.83	24.2	3.03
	R22, R502	276	40	34.5	5	0.35	4.6	0.44	5.8	0.73	9.6	1.14	15.0	1.61	21.3	1.92	25.4	3.26
	R717			69	10	0.47	6.2	0.59	7.8	1.01	13.3	1.45	19.2	2.05	27.1	2.40	31.7	4.03
V48 3 WAY	R12	207	30	48	7	—	—	0.42	5.5	0.95	12.5	1.58	20.8	2.18	28.8	2.84	37.5	—
				69	10	—	—	0.52	6.8	1.07	14.2	1.77	23.3	2.46	32.5	3.47	45.8	—
	R22	310	45	48	7	—	—	0.44	5.8	0.96	12.7	1.60	21.2	2.22	29.4	2.97	39.2	—
				69	10	—	—	0.54	7.1	1.10	14.6	1.66	24.6	2.52	33.3	3.56	47.1	—

*Base Rating Pressure is the pressure above opening valve pressure.

REFER TECH. PAGE 124-d (V46) and 124-e (V48) FOR DETAILED CAPACITY CHARTS AND VALVE SELECTION DATA

WATER REGULATING VALVES

TEMPERATURE ACTUATED MODULATING VALVES

PENN



SERIES V47
Temperature Valve
Threaded Type



SERIES V47
Temperature Valve
Flange Type

Temperature actuated valves regulate the flow of water, or other liquids not harmful to the valve, to maintain a desired temperature. They are widely used on industrial applications. Easy manual flushing. Valves are available in three temperature ranges and are furnished with 1.8 m (6 feet) of armored capillary and a Style 4 temperature bulb (1/2" NPT closed tank immersion).

In addition, an internal by-pass hole is drilled and tapped in the regulator body. A solid plug is installed in this hole and a drilled orifice (see table for size) is furnished in an envelope attached to valve. Valves open on temperature rise.

Max. Water Supply Pressure: 1034 kPa (150 psig).

Max. Water Supply Temperature: 77°C (170°F).

Max. Bulb Temp: 110°C (200°F) above max. range.

Capillary Length: 1.8 m (6 ft.)

VALVE TYPE		Pipe Size NPT	Range Opening Point		Bulb Size	Std. By-Pass Orifice Dia.	Replacement Power Element		Water Valve Renewable Kit	
Cat. No.	Model		°C	°F			Cat. No.	Element No.	Cat. No.	Kit No.
124101	V47AA-1	3/8"	46 to 82	115 to 180	11/16"x3-1/4"	.062		SET29A-622R	12470	STT14A-600R
124102	V47AA-2	3/8"	71 to 110	160 to 230	11/16"x3-1/4"	.062		SET29A-623R		
124103	V47AA-3	3/8"	24 to 57 Cross Ambient	75 to 135 Cross Ambient	11/16" x 6"	.062		SET29A-601R		
124104	V47AB-3	1/2"	46 to 82	115 to 180	11/16"x3-1/4"	.062		SET29A-624R	12472	STT15A-602R
124105	V47AB-4	1/2"	71 to 110	160 to 230	11/16"x3-1/4"	.062		SET29A-625R		
124106	V47AB-5	1/2"	24 to 57 Cross Ambient	75 to 135 Cross Ambient	11/16" x 10"	.062		SET29A-602R		
124107	V47AC-3	3/4"	46 to 82	115 to 180	11/16"x3-1/4"	.062		SET29A-626R	12473	STT16A-601R
124108	V47AC-4	3/4"	71 to 110	160 to 230	11/16"x3-1/4"	.062		SET29A-627R		
124109	V47AC-6	3/4"	24 to 57 Cross Ambient	75 to 135 Cross Ambient	11/16" x 10"	.062		SET29A-604R		
124110	V47AD-1	1"	24 to 110 Cross Ambient	75 to 135 Cross Ambient	11/16"x16-1/4"	.093		SET29A-605R	12474	STT17A-609R
124111	V47AD-2	1"	46 to 82	115 to 180	11/16" x 6"	.093		SET29A-629R		
124112	V47AD-3	1"	71 to 110	160 to 230	11/16" x 6"	.093		SET29A-630R		
124113	V47AE-1	1-1/4"	24 to 57 Cross Ambient	75 to 135 Cross Ambient	11/16"x16-1/4"	.093		SET29A-605R	12475	STT17A-610R
124114	V47AE-2	1-1/4"	46 to 82	115 to 180	11/16" x 6"	.093		SET29A-629R		
124115	V47AE-3	1-1/4"	71 to 110	160 to 230	11/16" x 6"	.093		SET29A-630R		
124116	V47AR-1	1-1/2"	24 to 57 Cross Ambient	75 to 135 Cross Ambient	11/16"x16-1/4"	.093		SET29A-605R	12476	STT18A-600R
124117	V47AR-2	1-1/2"	46 to 82	115 to 180	11/16" x 6"	.093		SET29A-629R		
124118	V47AR-3	1-1/2"	71 to 110	160 to 230	11/16" x 6"	.093		SET29A-630R		
124119	V47AS-1	2"	46 to 71	115 to 160	11/16" x 10"	.125		SET29A-632R	12477	STT18A-600R
124120	V47AS-2	2"	71 to 96	160 to 205	11/16" x 10"	.125		SET29A-633R		
124121	V47AS-3	2"	24 to 46 Cross Ambient	75 to 115 Cross Ambient	11/16" x 43/64"	.125		SET29A-606R		

* ASME Flange.

Bulb Wells to suit available on application.

TYPICAL RATINGS																	
Temperature Rise Above Valve Opening Pnt. °C °F		Water PD Across Valve kPa PSIG		FLOW — litre/s and Imp. Gals./Min.													
				VALVE SIZE													
				3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
				l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM	l/s	Imp. GPM
8.3	15	34.5	5	0.26	3.5	0.34	4.5	0.58	7.7	1.07	14.2	1.45	19.2	1.67	22.1	2.59	34.2
		69	10	0.32	4.3	0.41	5.4	0.73	9.6	1.26	16.7	1.70	22.5	2.02	26.7	3.03	40.0
		138	20	0.41	5.4	0.51	6.7	0.88	11.7	1.45	19.2	2.05	27.1	2.37	31.3	3.63	47.9
13.3	24	34.5	5	0.35	4.6	0.44	5.8	0.78	10.3	1.32	17.5	1.79	23.6	2.08	27.5	3.19	42.1
		69	10	0.46	6.1	0.59	7.8	1.01	13.3	1.64	21.7	2.27	30.0	2.65	35.0	4.04	53.3
		138	20	0.60	7.9	0.80	10.5	1.26	16.7	2.05	27.1	2.84	37.5	3.28	43.3	5.17	68.3
16.7	30	34.5	5	0.38	5.0	0.46	6.1	0.82	10.8	1.39	18.3	1.89	25.0	2.21	29.2	3.34	44.2
		69	10	0.51	6.7	0.63	8.3	1.07	14.2	1.74	22.9	2.40	31.7	2.84	37.5	4.35	57.5
		138	20	0.66	8.7	0.88	11.7	1.42	18.8	2.27	30.0	3.12	41.3	3.63	47.9	5.74	75.8

PENN SERIES V46 - 2 WAY - WATER REGULATING VALVES SELECTION CHARTS

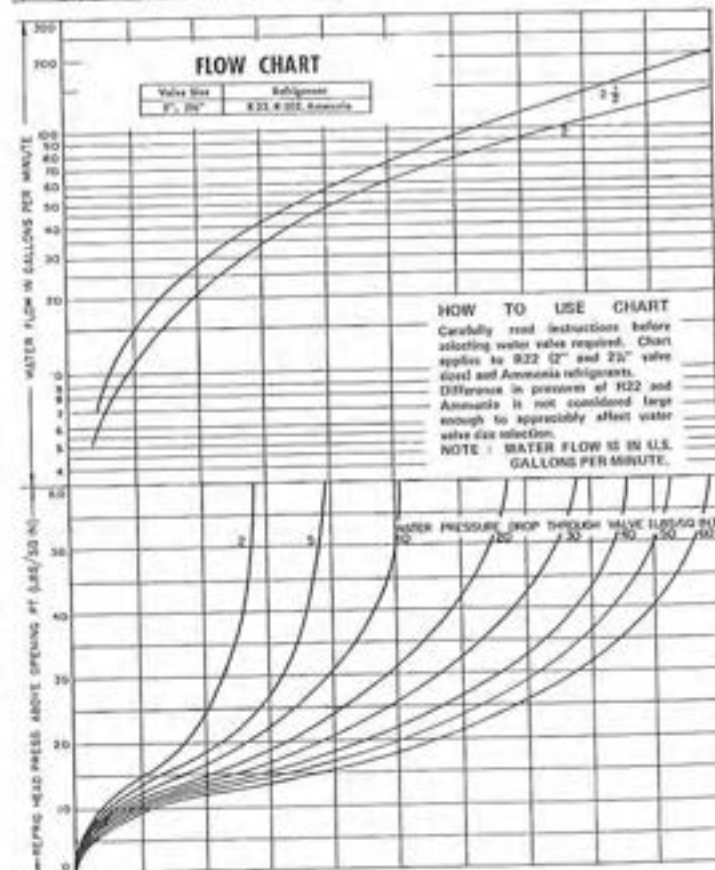
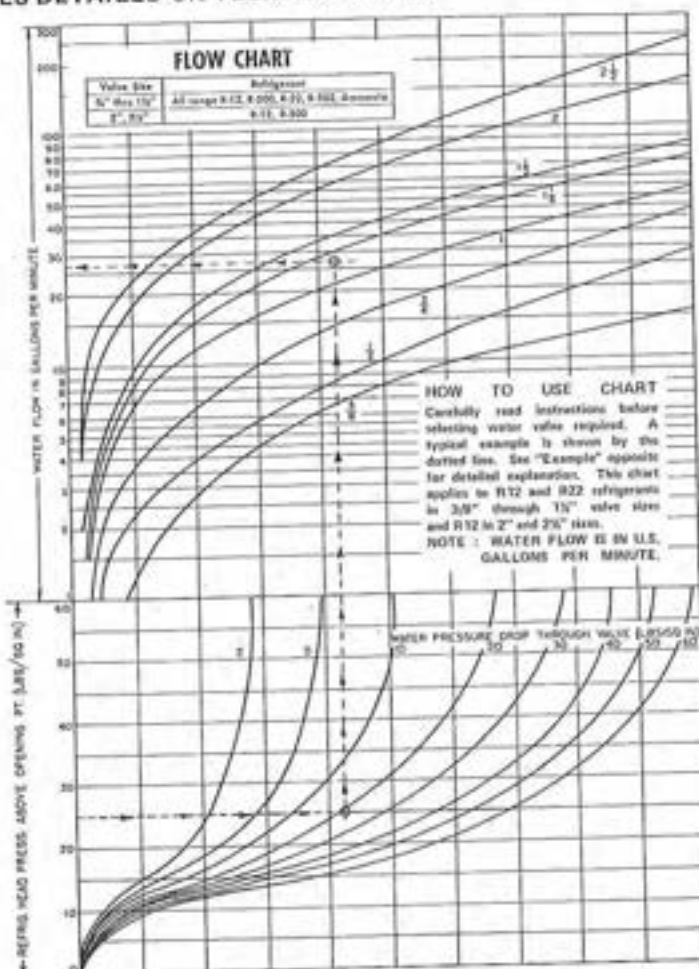
(FOR WATER REGULATING VALVES DETAILED ON TECH. PAGE 124-d)

TO SELECT WATER VALVE SIZE

- Determine maximum water flow required. The manufacturer of the condensing unit will usually provide tables, or calculations can be made from the following:
 - Maximum BTU's per hour to be removed. (Be sure to add heat gains in refrigeration equipment and heat of compression. If figures are not available it is customary to add 25% to the load for these heat gains.)
 - Incoming water temperature at time of maximum load.
 - Outlet water temperature; this must be lower than the condensing temperature of the refrigerant - use condensing unit manufacturer's data, or assume 10°F difference.
 - Flow (gals/min) = $\frac{(\text{Tons of Refrig.} \times 15,000 \text{ BTU/Hr.})}{500 \times (\text{Out. Temp.}^\circ\text{F} - \text{In. Temp.}^\circ\text{F})}$
- Draw horizontal line across upper half of Flow Chart through flow required as determined by 1-d above. (Note separate charts.)
- Determine refrigerant head pressure rise above valve opening point.
 - Valve closing point (to assure closure under all conditions) must be the refrigerant head pressure equivalent to the highest ambient air temperature expected at time of maximum load. Read this in pounds per sq. in. gauge from "Saturated Vapor Table" for refrigerant selected.
 - Read from same table the operating head pressure corresponding to selected condensing temperature.
 - Valve opening point will be about 7 psig above closing point.
 - Subtract opening pressure from operating pressure. This gives the head pressure rise.
- Draw horizontal line across lower half of Flow Chart through this value.
- Determine water pressure drop through valve - this is the pressure actually available to force water through the valve.
 - Determine minimum water pressure available from city mains or other source.
 - From condensing unit manufacturer's tables read pressure drop through condenser corresponding to required flow.
 - Add to this estimated or calculated drop through piping, etc., between water valve and condenser, and from condenser to drain (or sump of cooling tower).
 - Subtract total condenser and piping drop from available water pressure. This is the available pressure drop through valve.
- On lower half of curve, mark point on horizontal head pressure line drawn in corresponding to available water pressure drop through valve. Interpolate between curves, or pick curve for nearest lower drop for which curve is drawn (this gives an automatic safety factor).
- From this point draw line vertically upward until it intersects water flow line in upper half of Flow Chart.
- If intersection falls on a valve size curve this is the valve size.
- If intersection falls between two curves the required valve size is the larger of the two.

EXAMPLE

- The required flow for an R-12 system is found to be 27 U.S. gpm. Condensing pressure is 125 psig and maximum ambient temperature estimated at 86°F. City water pressure is 40 psig and manufacturer's table gives drop through condenser and accompanying piping and valves as 15 psi. Drop through installed piping approximately 4 psi.
- Draw line through 27 gpm - see dotted line, upper half of Flow Chart.
- Closing point of valve is pressure of R-12 corresponding to 86°F. ambient = 93 psig.
- Opening point of valve is 93 + 7 = 100 psig.
- Head pressure rise = 125 - 100 = 25 psi.
- Draw line through 25 psi - see dotted line, lower half of Flow Chart.
- Available water pressure drop through valve = 40 - 15 = 25 psi.
- Interpolate just over the 20 psi curve - circle on lower half of Flow Chart.
- Draw vertical line upward from this point to flow line - circle on Flow Chart marks this intersection.
- This intersection falls between curves for 1" and 1½" valves. 1½" valve is required.



ORDERING PROCEDURE: REFER TO PAGE 124 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

PENN SERIES V48 - 3 WAY - WATER REGULATING VALVES SELECTION CHART

(FOR WATER REGULATING VALVES DETAILED ON TECH. PAGE 124-d)

SELECTION OF VALVE SIZE

1. Determine the maximum water flow required through the condenser.

a. Check condenser manufacturer's recommendations for water flow or use recommended condenser water temperature rise in following calculation.

$$\text{galls/min/ton} = \frac{30}{(\text{water outlet temp. } ^\circ\text{F} - \text{water inlet temp. } ^\circ\text{F})}$$

b. The normal flow through a condenser used with a cooling tower is 3 U.S. gallons/min/ton.

c. Total flow (galls/min) = tons of refriger. x galls/min/ton.

2. Draw horizontal line across upper half of Flow Chart through flow required as determined by 1-C above.
3. Determine refrigerant head pressure rise above valve opening point. It is considered good practice in most applications to maintain a condensing temperature between 90°F and 105°F. This corresponds to a pressure range of 100 to 130 psig on R-12 and 170 to 215 psig on R-22. In general, therefore, the refrigerant head pressure rise above the opening point should be 30 psig with R-12 and 45 psig with R-22. Some manufacturers recommend a slightly higher head pressure range.
4. Note that there are two vertical pressure scales in the lower half of the Flow Chart; one for R-12 and one for R-22. Draw a horizontal line across lower half of Flow Chart through the value determined in 3 above. Be sure to use correct scale.
5. Determine allowable water pressure drop through valve. The pumping head should include the pressure drop through the valve (7 psig = 16 ft., 10 psig = 23 ft., 15 psig = 35 ft.).
6. On the lower half of curve, mark point on horizontal head pressure line where it intersects the allowable water pressure drop curve.
7. From this point draw line vertically upward until it intersects water flow line in upper half of Flow Chart.
8. If intersection falls on a valve size, this is the size.
9. If intersection falls between two curves, the required valve size is the larger of the two.

EXAMPLE:

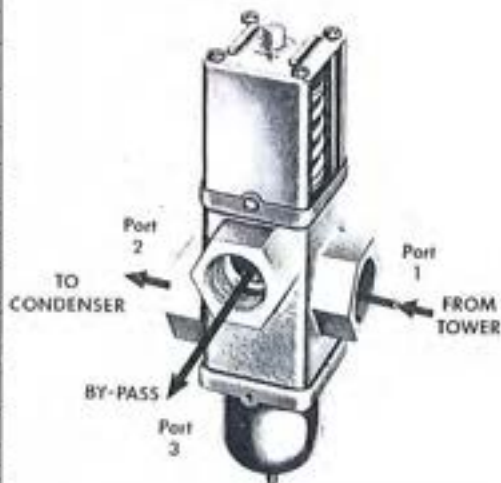
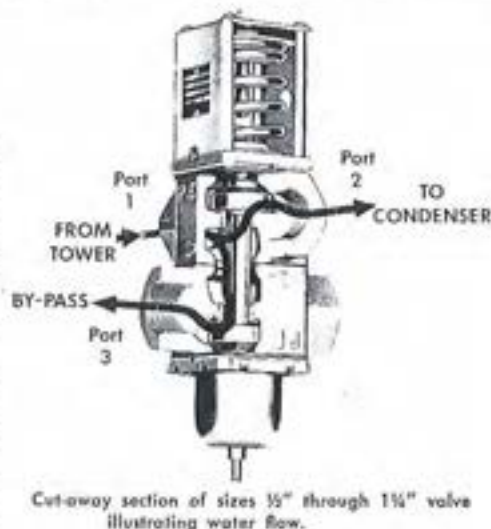
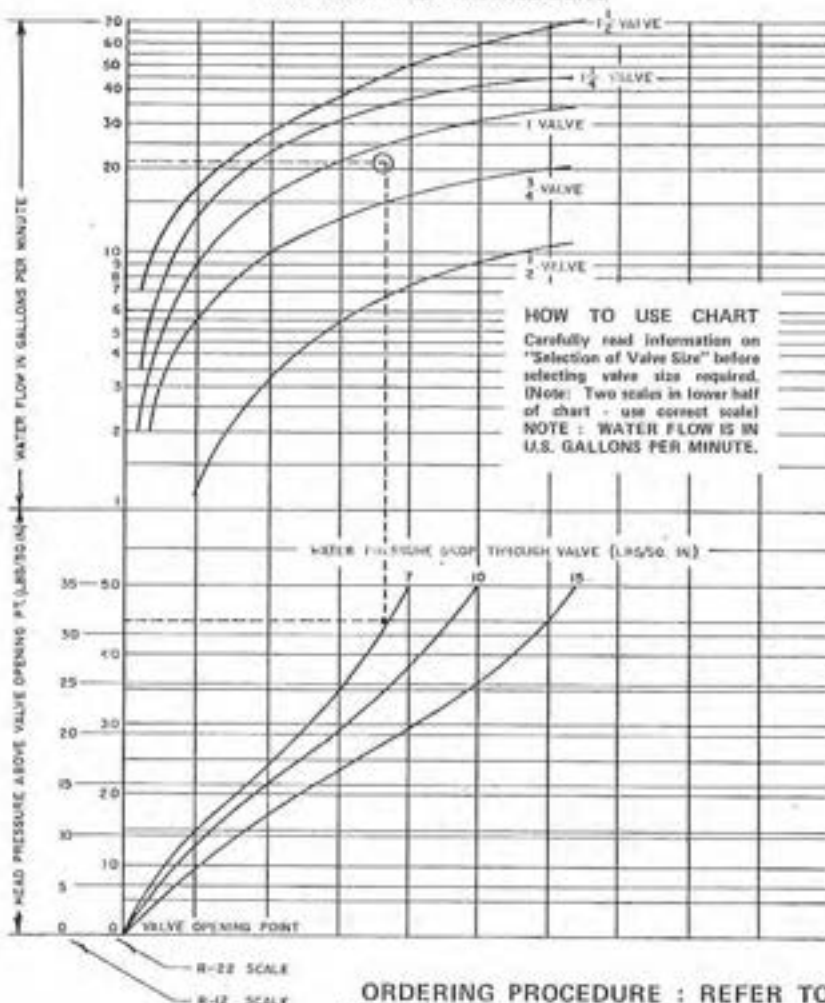
1. The required flow for an R-22 system is found to be 21 U.S. gpm. It is desirable to operate at a condensing temperature between 90°F and 105°F. Head pressure will be between 170 and 215 psig. Allowable water pressure drop is 7 psig.
2. Draw line through 21 U.S. gpm - see dotted line, upper half of Flow Chart.
3. Draw line through head pressure rise of 45 psig - see dotted line lower half of Flow Chart.
4. At intersection of lower horizontal line and pressure drop of 7 psig, draw a vertical line upward from this point to flow line - circle on Flow Chart marks this intersection.
5. This intersection falls between curves for 3/4" and 1" valves. A 1" valve is required.

NOTE: If a head pressure rise above the valve opening point is chosen at less than 45 psig for R-22 or less than 30 psig for R-12, the condenser by-pass will be partly open when the desired maximum flow is obtained through the condenser. In these cases, the pump flow required should be taken from the following table:

REQUIRED PUMP FLOW IN U.S. GPM.

Pressure Drop, psig	Valve Size				
	1/2"	3/4"	1"	1 1/4"	1 1/2"
7	8	20	27.5	38	53
10	10	23	32.5	46	64
15	12.5	28	39	56	78

FLOW CHART
R12 AND R22 REFRIGERANTS



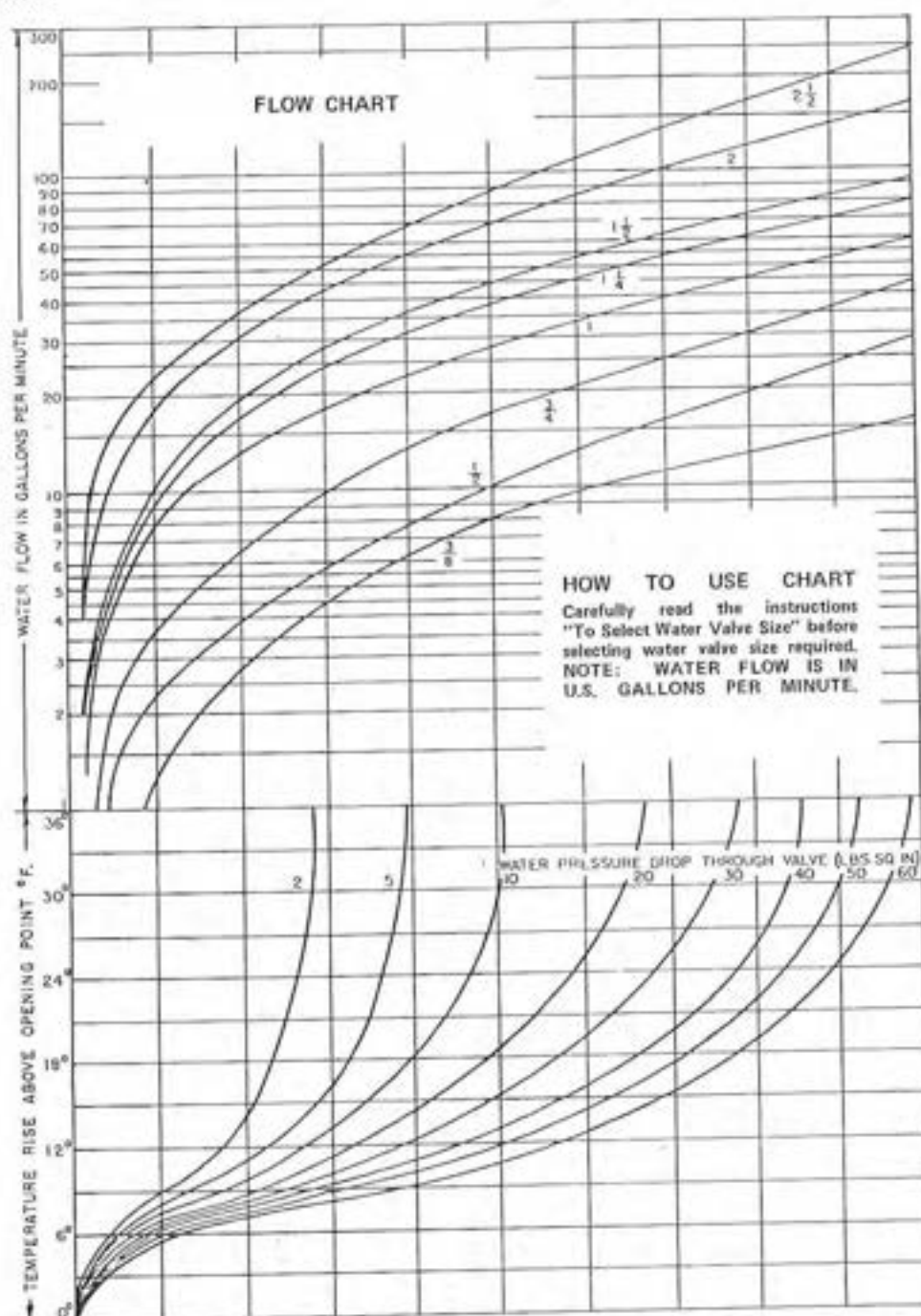
ORDERING PROCEDURE: REFER TO PAGE 124
AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

TEMPERATURE ACTUATED MODULATING WATER VALVES SELECTION CHART

(FOR WATER REGULATING VALVES DETAILED ON TECH. PAGE 124-e)

TO SELECT WATER VALVE SIZE

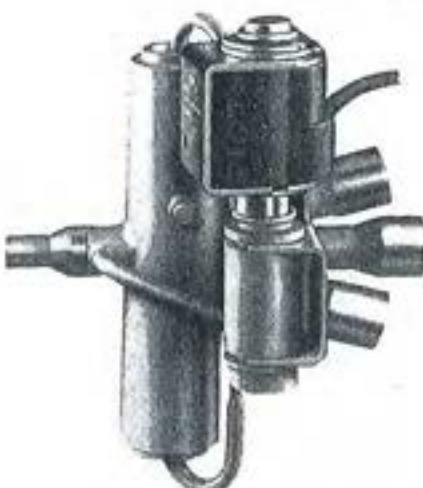
1. Determine the maximum water flow required and draw a horizontal line across upper half of Flow Chart thru this flow.
2. Determine the temperature rise above the valve opening point.
 - a. Valve closing point is the highest temperature at which it is desired to have no flow through the valve.
 - b. Valve opening point will be about 5°F. above the valve closing point.
 - c. Determine the temperature the valve is to maintain.
 - d. Subtract the temperature opening point from the operating temperature. This gives the temperature rise.
3. Draw horizontal line across lower half of Flow Chart through this value.
4. Determine the allowable pressure drop through the valve — this is the pressure actually available to force liquid through the valve.
5. On lower half of curve, mark point on drawn-in horizontal temperature line at pressure determined in Step 4. Interpolate between curves, or pick curve for nearest lower pressure drop for which curve is drawn (this gives an automatic safety factor).
6. From this point draw line vertically upward until it intersects drawn-in horizontal water flow line in upper half of Flow Chart.
7. If intersection falls on a valve size curve this is the valve size.
8. If intersection falls between two curves the required valve size is the larger of the two.



ORDERING PROCEDURE : REFER TO PAGE 124 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



REVERSING VALVES 401RD SERIES REVERSING VALVE FOR HEAT PUMPS



A PERFORMANCE - PROVEN, 4 - WAY REVERSING VALVE DESIGNED TO MEET THE GROWING NEEDS FOR ENERGY - CONSERVING REVERSE CYCLE COMFORT SYSTEMS. THE 401 HAS ONLY TWO MOVING PARTS

401RD RELIABILITY FEATURES

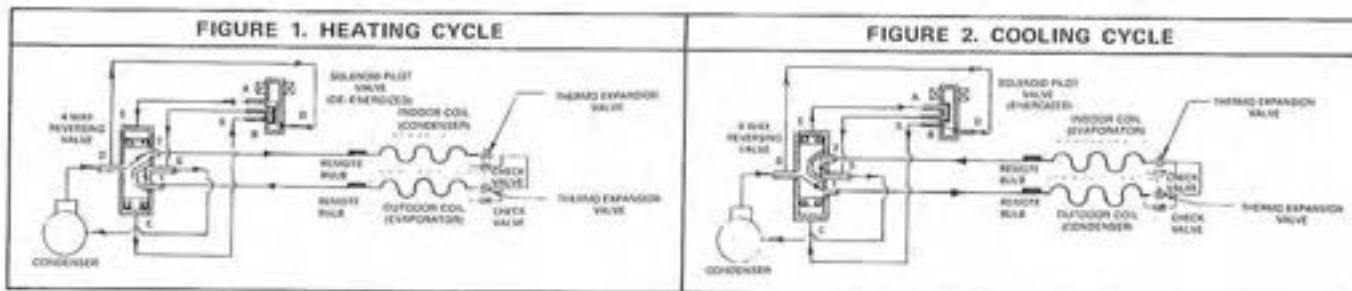
- 4 way pilot construction assures full system pressure differential acting across main slide during shifting.
- Reliability — 4 way pilot provides positive shifting at low system differential pressure.
- Large pilot ports to ensure immunity from system contaminants.
- High efficiency — higher capacity through suction and discharge — low leakage around slide.
- The steel drawn (one piece) enclosing tube on the pilot means increased valve life.

Maximum Operating Pressure Differential (MOPD) 2758 kPa (400 psi).

Maximum Safe Working Pressure 3448 kPa (500 psig).

VALVE		CONNECTIONS		NOMINAL CAPACITY *						ELECTRICAL COIL DATA	
CAT. NO.	MODEL	DISCHARGE	SUCTION & COILS	R12		R22		R502		CAT. NO.	TYPE
12518	401RD235	3/8" ODM	5/8" ODF	5.6	1.6	9.1	2.6	7.0	2.0	123288	240 V 50Hz.
12517	401RD2F35	3/8" ODF	5/8" ODF							COIL STYLE AMP Open Frame 13755-61-18 Amps Inrush 0.25 Holding 0.10 Max. Watts 10.2 VA Holding 24 Std. Coil Leads 18 AWG, 1/32" Insulation 600V, 125°C, 18" long Other Voltages on application	
12520	401RD345	1/2" ODM	5/8" ODF	6.7	1.9	10.9	3.1	8.1	2.3		
12519	401RD3F45	1/2" ODF	5/8" ODF								
12527	401RD435	3/8" ODM	5/8" ODF								
12528	401RD4F46	1/2" ODF	3/4" ODF	9.1	2.6	14.8	4.2	11.3	3.2		
12522	401RD457	5/8" ODM	7/8" ODF								
12521	401RD6F36	3/8" ODF	3/4" ODF								
1251	401RD6F45	1/2" ODF	5/8" ODF								
12510	401RD6F46	1/2" ODF	3/4" ODF	13.7	3.9	21.8	6.2	16.5	4.7		
12511	401RD6F47	1/2" ODF	7/8" ODF								
1252	401RD6F57	5/8" ODF	7/8" ODF								
12514	401RD10F47	1/2" ODF	7/8" ODF								
12515	401RD10F57	5/8" ODF	7/8" ODF	25.3	7.2	40.4	11.5	30.6	8.7		
1255	401RD10F79	7/8" ODF	1-1/8" ODF								

* Nominal Capacity based on 38°C (100°F) condensing temperature, 4.4°C (40°F) evaporator temperature and a 14 kPa (2 psi) pressure drop across the suction port.



Figures 1 and 2 show a schematic diagram of the 401 series valve on a typical reverse cycle heat pump system.

HEATING CYCLE

In Figure 1 the system is on the heating cycle with discharge gas flowing thru reversing valve ports "D" to "2" making the indoor coil the condenser. The suction gas is flowing from the outdoor coil (evaporator) thru reversing valve ports "1" to "S" and back to the compressor.

With the 4-way solenoid pilot de-energised the slide is positioned so as to connect ports "D" with "A" and "B" with "S". When the pilot is de-energised, high pressure discharge gas builds up on top of the main slide. The area below the main slide is isolated from the high pressure by "C" cup seal and exposed to low pressure suction gas. Thus, the unbalanced force, due to the difference between discharge and suction pressures acting on the full end area of the main slide holds the slide in the "Down" position as shown in Figure 1.

CAUTION

Depending on the manner in which the reversing valve is piped into the system, power failure to the pilot solenoid valve coil will cause the system to "fail safe" on either the heating or the cooling cycle. In Figures 1 and 2, the valve is piped to fail safe on heating. In order to fail safe on cooling, the indoor coil would be connected to reversing valve port "1" and the outdoor coil connected to reversing valve port "2".

COOLING CYCLE

When the coil is energised the slide in the pilot solenoid valve raises, now connecting pilot ports "D" with "B" and "A" with "S". With the pilot solenoid so positioned, the discharge pressure imposed on the top of the main slide, area "E", will flow thru pilot solenoid valve to the suction side of the system. At the "C" end of the main slide, high pressure discharge gas will accumulate so as to increase the pressure. An unbalanced force in an upward direction is again due to the difference between discharge and suction pressures acting on opposite ends of the main slide.

This unbalanced force moves the main slide to the "Up" position as shown in Figure 2 and the force unbalance across the area of the main slide holds the slide in the new position.

The system has now changed over to the cooling cycle with the discharge gas flowing thru reversing valve ports "D" to "1", making the outdoor coil the condenser with the suction gas flowing thru reversing valve port "2" to "S", making the indoor coil the evaporator.

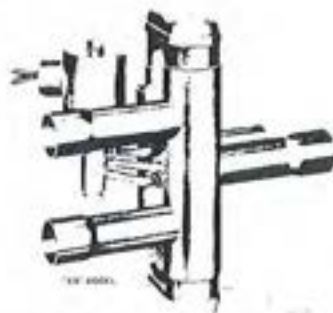
REVERSING VALVES



CHATLEFF REVERSING VALVES

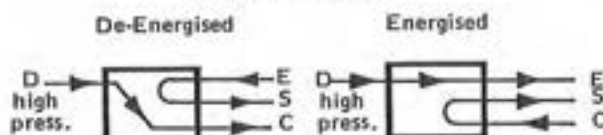
CR SERIES

Chatleff Reversing Valves are immediate-acting, quiet, and may be mounted in any position. "CR" Series Valves operate at a maximum differential of 2758 kPa (400 psi) to a minimum differential of 69 kPa (10 psi) at 15% low voltage. These valves are well suited for low-temperature refrigeration defrost as well as heat-pump duty.



VALVE		Conn. Sizes		Orifice Size		Nominal Capacity				Flow Press.		Static Press.		Solenoid Coil
		Suct. Cond. Evap.	Disch.			kW (Tons)				Operating Differential		Burst	Max. Case Operat.	
Cat. No.	Model			Disch.	Suct.	R12	R22	R500	R502	Max.	Min.			P/N S240F
1262	CR560G-2	1.26" to 1.13" ID	.748" to .750" OD	.531"	.890"	17.6 (5)	26.4 (7.5)	21.1 (6)	22.9 (6.5)	2758 kPa (400 psi)	207 kPa (30 psi)	17238 kPa (2500 psig)	3448 kPa (500 psig)	CAT. NO.
1263	CR770H-2	1.377" to 1.381" ID	1.126" to 1.13" OD	.750"	1.144"	33.4 (9.5)	52.8 (15)	45.7 (13)	49.2 (14)					12618

FLOW DIAGRAM



CONSTRUCTION.

Body — Brass.
Solenoid Plunger and Housing — Stainless Steel.
Ports — Copper Tubing
Internal Parts — Teflon, Brass, Aluminium and Steel.
Seats (Main Valve) — Teflon on Brass.
Seats (Pilot Valve) — Stainless Steel on Brass.



REVERSING VALVES

For Heat Pump Air Conditioning Systems

SOLENOID OPERATED

Types V26, V30 and V25 Reversing Valves are slide-type, 4-way valves which operate under full pressure of a Heat Pump system.

They are hermetically constructed, and operation is controlled by an EC type Solenoid Coil on a single Pilot Valve, which is an integral part of the Main Valve. These solenoid-operated Reversing Valves are suitable for Heat Pump, Central Air-Conditioning, and Window-Type Air Conditioners, using Refrigerants 12, 22 and 502. Other controls, such as a temperature-cycling control and a de-icer control, are required in addition to the Reversing Valve for automatic operation of the Heat Pump for cooling and heating.



VALVE TYPE		Port Size (ins.)	Connections ODS		Valve Body Dimensions mm (ins.)		Combined Leak Rate Pilot & Main Valve**	Capacity* kW (Tons)		Max. Operat. Press. Diff. (MOPD)	Min. Operat. Press.	Max. System Press.	Min. Burst Press.
			Disch.	Suct. & Coils	Length	Diam.		R12	R22 R502				
12620	V26-100	0.437	3/8"	1/2"	125.4	25.4	2000	6.2 (1.75)	8.8 (2.5)	2586 kPa (375 psi)	103 kPa (15 psig)	4137 kPa (600 psig)	20685 kPa (3000 psig)
12621	V26-150		3/8"	5/8"	(4-15/16)	(1)	cc/min.						
12622	V30-101	0.609	1/2"	3/4"	199.2	35	4000	12.3 (3.5)	17.6 (5.0)			3448 kPa (500 psig)	17927 kPa (2600 psig)
12623	V30-103		1/2"	7/8"	(7-27/32)	(1-3/8)	cc/min.						
12624	V25-500	0.785	1/2"	7/8"	220.7	44.5	6000	21.1 (6.0)	29.9 (8.5)			500 psig	2600 psig
12625	V25-750		3/4"	7/8"	(8-11/16)	(1-3/4)	cc/min.						
12626	V25-751		7/8"	1-1/8"									

** Dry air at 1034kPa (150 PSI) — valve body heated to 71°C (160°F).

Manufacturers literature available - Bulletin A1919 - 1.

* Capacity values are based on a 13.8kPa (2 PSI) pressure drop across the suction path of the valve at pumping rates occurring at 48.9°C (120°F) condensing temperature (14°C (25°F) superheat) and 4.4°C (40°F) evaporating temperature (5.6°C (10°F) superheat). The pressure differential across the valve may momentarily drop below the minimum 103 kPa (15 psig) value during reversal. However, if the system can produce a pressure differential of 103 kPa (15 psig) (or higher) across the valve, then reversal will be satisfactory.

ELECTRICAL COIL DATA				Coils are designed to operate valves at advertised pressures, at 10% over and 15% under the rated coil voltage at a 26.7°C (80°F) ambient temperature, with 30 ft./minute air movement over them.
CAT. NO.	COIL TYPE	VOLTS	FREQ.	
12627	EC121	240AC	50	
12629	EC137	12	DC	

REFER FOLLOWING TECH. PAGES 126-a & 126-b FOR REVERSING VALVE FIELD SERVICE INSTRUCTIONS



FIELD SERVICE INSTRUCTIONS FOR REVERSING VALVES

TECH. PAGE 126-a

These Field Service Instructions will aid recognition of a malfunctioning Heat Pump System equipped with a reversing valve.

FIELD PROBLEMS SIMPLIFIED

Heat pump equipment usually includes a reversing valve (added to a refrigerating system to create an "all season" heat pump) which is easily identified and blamed for many failures of the system.

Valves have been needlessly replaced without correcting the original trouble in the system, principally due to inadequate

testing and erroneous quick decisions.

A tabulated chart follows these instructions on Valve Troubles, which are so listed to be quickly analysed by "Touch" testing for "possible causes" with suggested "corrections", to simplify testing procedures and cut testing time.

OPERATION OF THE VALVE

The SOLENOID COIL on the 3-WAY PILOT VALVE forces the needles of the pilot valve to OPEN and CLOSE two port openings at the INSTANT of reversing operations for the 4-WAY MAIN VALVE.

Operating Sequence

- (1) An ENERGISED COIL (in the heating phase) forces two opposing pilot valve needles, "back needle" and "plunger needle", separated with stainless steel pins, to simultaneously CLOSE the "back" port and to KEEP OPEN the "front" port.

Notes: (a) The "outlet" port is the center bleeder tube (called "common capillary") which is brazed into the suction line tube and is a common bleed path for each outside port ("front" and "back" capillaries).

(b) The "inlet" tubes, called "back" and "front capillary" and each from its pilot port, are operating paths to the opposite end chambers of the main valve cylinder. These paths conduct the gas which bleeds through a metal screen from "bleeder holes" located in each piston as gas pressure changes occur within the end chambers.

- (2) Gas flows out of the RIGHT end chamber, decreasing in pressure there. High pressure gas from the system immediately builds up within the LEFT end chamber since no path is open for escape which was first closed by the needle valve at the pilot "back port".

Note: At the end of each stroke, one of the operating gas paths is closed to the pilot valve.

- (3) Difference in pressures between the two end chambers aids the "slide bracket" assembly to move instantly to the RIGHT by the pistons from the pressure differential of the system.

Note: In reversing operation, the "slide" port straddles one or the other of two openings (in section views "E" and "C" tubing schematically piped through the illustrated circled figures 3 and 4 respectively) as directed. The "suction tube" between "E" and "C" is always OPEN to the low pressure side of the system.

- (4) While in and during the operating phase of heating, both end chambers EQUALISE in pressure until the "solenoid coil" is DE-ENERGISED (into cooling or de-icing phase) when the opposite operation in reversing takes place within the PILOT and MAIN VALVES.

Notes: (a) During the transfer period, there is sufficient by-pass to prevent overloading the compressor due to an excessive head pressure.

(b) The valve reverses against running pressures with no mechanical or impact noises from the "slide", "slide bracket" or pistons; however, there is an instant of hissing gas as pressures equalise in both end chambers.

SYSTEM TROUBLES THAT AFFECT THE REVERSING VALVE

Any trouble in a heat pump, which will materially affect the normal operating pressures, may prevent the valve from shifting properly. For example, (1) a leak in the system resulting in a loss of charge, (2) a compressor which is not pumping properly, (3) a leaking check valve, (4) defective electrical system or (5) mechanical damage to the valve itself, each will indicate an apparent malfunction of the valve.

Make the following checks on the system and its components before attempting to diagnose any valve trouble by making the "Touch Test" method of analysis.

- (1) Make a physical inspection of the valve and solenoid coil for dents, deep scratches and cracks.
- (2) Check the electrical system. This is readily done by having the electrical system in operation so that the solenoid coil is energised.

In this condition, remove the lock nut to free the solenoid coil. Slide it partly off the stem and notice a magnetic force attempting to hold the coil in its normal position.

By moving the coil farther off the stem, a clicking noise will indicate the return of the "plunger" to its non-

energised position. When returning the coil to its normal position on the stem, another clicking noise indicates that the "plunger" responded to the energised coil.

If these conditions have not been satisfied, other components of the electrical system are to be checked for possible trouble.

- (3) Check the heat pump refrigeration system for proper operation as recommended by the manufacturer of the equipment.

After all of the previous inspections and checks have been made and determined correct, then perform the "Touch Test" on the reversing valve according to chart on the following page.

This test is simply performed by feeling the temperature relationships of the six (6) tubes on the valve and compare the temperature differences. Refer to the chart after the comparative temperatures have been determined for the "possible cause" and suggested "corrective action" to be taken.

If it is necessary to replace the valve, follow the "procedure for replacing the valve".

PROCEDURE FOR REPLACING THE VALVE

- (1) Remove the solenoid coil.
- (2) Heat the soldered joints (valve body is not to be heated above 120°C (250°F) to remove the valve.

Note: Exercise care to prevent the valve body being heated above 120°C (250°F). Exceeding this temperature may introduce contaminants into the system. The valve body can be protected from excessive heat by wrapping it with wet cloths and keeping them wet during the removal operation.

- (3) It is imperative when installing a new valve that the inside of all tubes of the valve and the system be protected and kept clean of moisture and all other foreign matter, such as: flux, dirt, dust, flakes of copper oxide, filings, metal chips, etc.
- (4) The valve must be protected (the same as out-lined in (2) above) from excessive heat (valve body is not to be heated over 120°C (250°F) when installed).

Notes: (a) Avoid rough handling of the valve to prevent dents or bends occurring on any portion of the valve.

(b) Keep the axis of the valve body in a horizontal plane which may be rotated to any angle around its axis.

(c) Make certain the limits of the valve capacity are not outside the specified "refrigerant-tonnage" of the system.

- (5) After the valve has been completely installed in the system and tested for leaks, return the solenoid coil to the pilot valve.

- (6) Recharge the unit with the weight of the refrigerant gas specified by the manufacturer, then determine that the unit is operating properly before attempting to operate the reversing valve.

Note: The valve will not operate properly on a partially charged system.

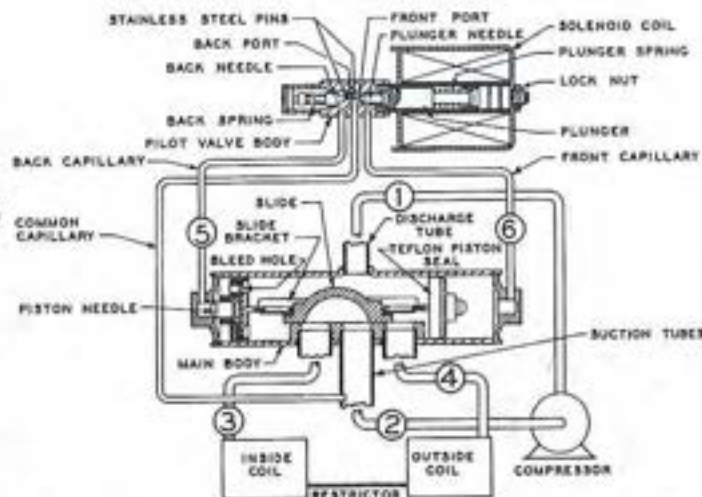
- (7) Cycle the valve at least a dozen or more times to check the proper operation of the system.



FIELD SERVICE INSTRUCTIONS FOR REVERSING VALVES

(Continued from previous page)

TOUCH TEST CHART



Sectional View of Reversing Valve, and with the six tubes numbered to match the chart for touch testing valve operation.

VALVE OPERATING CONDITION	Disch. Tube from Compr.	Suction Tube to Compr.	Tube to Inside Coil	Tube to Outside Coil	LEFT Pilot Back Capill. Tube	RIGHT Pilot Front Capill. Tube	Possible Causes	Corrections
NORMAL OPERATION OF VALVE								
Normal COOLING	Hot	Cool	Cool, as (2)	Hot, as (1)	*TVB	*TVB		
Normal HEATING	Hot	Cool	Hot, as (1)	Cool, as (2)	*TVB	*TVB		
MALFUNCTION OF VALVE								
Valve will not shift from cool to heat	Check electrical circuit and coil				No voltage to coil.		Repair electrical circuit.	
					Defective coil.		Replace coil.	
	Check refrigeration charge				Low charge.		Repair leak, recharge system.	
					Pressure differential too high.		Recheck system.	
	Hot	Cool	Cool, as (2)	Hot, as (1)	*TVB	Hot	Pilot valve OK. Dirt in one bleeder hole.	De-energise solenoid, raise head pressure, re-energise solenoid to break dirt loose. If unsuccessful, remove valve, wash out. Check on air before installing. If no movement, replace valve, add strainer to discharge tube, mount valve horizontally.
							Piston cup leak.	Stop unit. After pressures equalize, restart with solenoid energized. If valve shifts, re-attempt with compressor running. If still no shift, replace valve.
Start to shift but does not complete reversal	Hot	Cool	Cool, as (2)	Hot, as (1)	*TVB	*TVB	Clogged pilot tubes.	Raise head pressure, operate solenoid to free. If still no shift, replace valve.
	Hot	Cool	Cool, as (2)	Hot, as (1)	Hot	Hot	Both ports of pilot open. (Back seat port did not close.)	Raise head pressure, operate solenoid to free partially clogged port. If still no shift, replace valve.
	Warm	Cool	Cool, as (2)	Warm, as (1)	*TVB	Warm	Defective Compressor.	
	Hot	Warm	Warm	Hot	*TVB	Hot	Not enough pressure differential at start of stroke or not enough flow to maintain pressure differential.	Check unit for correct operating pressures and charge. Raise head pressure, if no shift, use valve with smaller ports.
							Body damage.	Replace Valve.
	Hot	Warm	Warm	Hot	Hot	Hot	Both ports of Pilot open.	Raise head pressure, operate solenoid. If no shift, replace valve.
Apparent leak in heating	Hot	Hot	Hot	Hot	*TVB	Hot	Body damage.	Replace valve.
							Valve hung up at mid-stroke. Pumping volume of compressor not sufficient to maintain reversal.	Raise head pressure, operate solenoid. If no shift, use valve with smaller ports.
	Hot	Hot	Hot	Hot	Hot	Hot	Both ports of Pilot open.	Raise head pressure, operate solenoid. If no shift, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	*TVB	**WVB	Piston needle on end of slide leaking.	Operate valve several times then recheck. If excessive leak, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	**WVB	**WVB	Pilot needle and piston on needle leaking.	Operate valve several times then recheck. If excessive leak, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	*TVB	*TVB	Pressure differential too high.	Stop unit. Will reverse during equalization period. Recheck system.
Will not shift from heat to cool							Clogged Pilot tube.	Raise head pressure, operate solenoid to free dirt. If still no shift, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	*TVB	Dirt in bleeder hole.	Raise head pressure, operate solenoid. Remove valve and wash out. Check on air before reinstalling. If no movement, replace valve. Add strainer to discharge tube. Mount valve horizontally.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	*TVB	Piston cup leak.	Stop unit, after pressures equalize, restart with solenoid de-energized. If valve shifts, re-attempt with compressor running. If it still will not reverse while running, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	Hot	Defective Pilot.	Replace Valve.
	Warm	Cool	Warm, as (1)	Cool, as (2)	Warm	*TVB	Defective compressor.	

NOTES: *Temperature of Valve Body. **Warmer than Valve Body.

VALVE OPERATED SATISFACTORILY PRIOR TO COMPRESSOR MOTOR BURN OUT — caused by dirt and small greasy particles inside the valve. To CORRECT: Remove valve, thoroughly wash it out. Check on air before reinstalling, or replace valve. Add strainer and filter-dryer to discharge tube between valve and compressor.

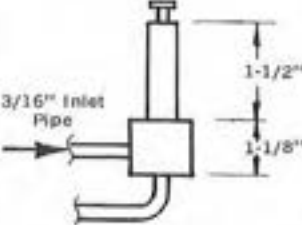
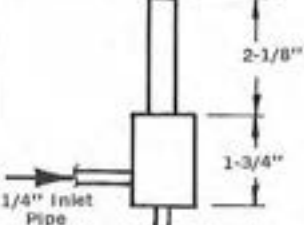
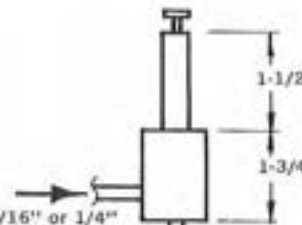
ORDERING DETAILS FOR RANCO REVERSING VALVES — REFER PAGE 126

HOT GAS DEFROST VALVES FOR HOUSEHOLD REFRIGERATORS

KELVINATOR

Since the introduction of hot gas defrost model refrigerators in 1955, several types of solenoid valves have been used. Each type of valve requires a particular coil. To obtain correct selection, refer to diagrams below. Note the variations in the external dimensions of the valves.

THREE REPLACEMENT VALVES ARE AVAILABLE

 'A' TYPE VALVE BLUE "A" type Valve No. RH883 3/16" inlet and outlet tubes. Use Solenoid Coil No. KA44673 (Bin No. PG332) Colour - BLUE Resistance 3100 - 3900 ohms. Used on all 1/8, 1/5 and 1/4 h.p. hot gas defrost refrigerators since 1955. Also used on Models 993 and 976.	 'C' TYPE VALVE GREEN "C" type Valve was originally supplied as RH850, but is no longer available. Solenoid Coil No. KA39753 (Bin No. PF538) Colour - GREEN is available for use where this type of valve is still fitted to a cabinet. Resistance 1300 - 1500 ohms.
 'B' TYPE VALVE RED "B" type Valve No. RH809 3/16" inlet and outlet tubes. Use Solenoid Coil No. KA38019 (Bin No. PF316) Colour - RED Resistance 2000 - 2500 ohms. Used only on 1/3 h.p. single refrigerant coil models with a F.C. fan. Available in either 3/16" or 1/4" inlet pipe. Used on 1968 models onwards.	 'B' type Valve No. RH850 1/4" inlet, 3/16" outlet tubes. Use Solenoid Coil No. KA38019 (Bin No. PF316) Colour - RED Resistance 2000 - 2500 ohms. For use on Models 888 and N220FA. NOTE: When coil is fitted to the valve, metal sleeve inside coil must be at the top of the coil. When replacing a coil, be sure the correct coil has been selected. 1. Check measurements of valve. 2. Then select the correct coil.

VALVE			SOLENOID COIL			
CAT. NO.	TYPE	P/N	CAT. NO.	P/N	BIN NO.	COLOUR
126100	A	RH883	126101	KA 44673	PG332	BLUE
126109	B	RH809	126108	KA 38019	PF316	RED
126110	B	RH850				
—	C	NLA	126103	KA 39753	PF538	GREEN

JAGA - CHATLEFF HOT GAS DEFROST VALVES

VALVE		ORIFICE (ins.)	COIL		CUSTOMER
CAT. NO.	MODEL		CAT. NO.	TYPE	
12631	HQ - 13	1/16	12614	S240B/P	SIMPSON - POPE
12648	HQ - 32	3/32	12665	S240HD/3T	GENERAL PURPOSE
12645	HG - LE	1/16			EMAIL/WESTINGHOUSE
12633	HG - LE3	3/32			EMAIL/WESTINGHOUSE
12632	HG - LK2	1/16	12659	S240HD/34Q	KIRBY
12634	HG - LK3	3/32			KIRBY
12635	HG - AS	1/16	See Above	S240HD/3T or 34Q	GENERAL PURPOSE

WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT.

LIQUID LEVEL CONTROLS

FS SERIES FLOAT SWITCHES



ALCO FS SERIES FLOAT SWITCHES ARE USED TO ACTIVATE CONTROL DEVICES WHICH MONITOR THE REFRIGERANT LEVEL IN RECEIVERS, ACCUMULATORS AND OTHER VESSELS. SUITABLE FOR USE WITH ALL COMMON REFRIGERANTS, INCLUDING AMMONIA.



The type FS Float Switch provides positive electrical switching action in response to changes in the level of a liquid. The permanent magnet mechanism actuates a single-pole double-throw hermetically-sealed glass tube mercury switch. (A precision snap-acting dry contact switch is available if required.)

The switch housing is gasket sealed to prevent infiltration of moisture laden air or corrosive gases. It is also isolated from the float chamber by a stainless steel enclosing tube. The electrical switch and switch mechanism can be easily replaced. Conduit connection can be rotated 360°.

The Float Switch is suitable for use with all common refrigerants having a specific gravity of 0.6 or more. The liquid level differential is factory set at maximum 33 mm (1-5/16") for a liquid specific gravity of 0.6. It can be adjusted to a minimum of 13 mm (1/2") although it is seldom necessary to do so.

TYPE		DESIGN RATING		ELECTRICAL SWITCH	CONDUIT CONN. NPT (INS.)	LEAD-IN WIRE LENGTH	LINE CONN. (INS.)	ELECTRICAL RATING			
		Liquid Temperature	Safe Work Press.					NON-INDUCTIVE		Motor HP	Pilot Duty VA
CAT.NO.	MODEL							Volts AC	Amps		
1271	FS1RA	+38 to -29°C (+100 to -20°F)	2069 kPa	SPDT Glass Tube Mercury Switch	1/2	610 mm	1/4" NPT or	240	2	1/10	250
1272	FS1RA-001	+38 to -46°C (+100 to -50°F)	(300 psig)	SPDT Precision Snap-acting Dry Contact Switch		(24")	1" Weld	240	4	1/4	—
12037	KF60001	Mercury Switch — FS1RA Series									
12038	KF60003	Dry Micro-Switch only — FS1RA Series									
12047	KF60002	Mercury Switch Mechanism "KIT" — FS1RA Series									
12048	KF60004	Dry Contact Switch for FS1RA-001									

Manufacturers Bulletin 16.20T — 12/75 available on request

Explosion Proof Type FS2RA and FS2RA-001 available on request



**Refrigerating
Specialties Company**

**REFRIGERANT
FLOAT SWITCH**
for AMMONIA

TYPE
LL LLSC
LLC LLX
LLS

and R-12, R-22, R-500, R-502

This float controlled, magnetically actuated, mechanically operated, HERMETICALLY SEALED switch assembly can maintain close control of liquid level. The rugged construction makes it relatively insensitive to disturbances of the refrigeration system or vibration of the attached pipe lines.

The electrical switch and operating mechanism are encapsulated within a transparent housing which HERMETICALLY SEALS the moving parts and switch from ambient conditions and yet allows observation of the switching motion for determination of the liquid level.

TYPICAL APPLICATIONS

To control liquid level in: • Liquid over-feed accumulators • Flooded surge drums • Flooded shell & tube chillers • High and low pressure receivers • Intercoolers • Transfer vessels • High or low level monitor.

FEATURES

1. Moving parts and switch Hermetically Sealed. Isolated from moisture, dust and tampering.
2. Visual observation of switching action.
3. Non-mercury, snap-acting switch.
4. Switch assembly can be replaced without opening to refrigerant pressure.
5. Suitable for all common refrigerants and similar liquids.
6. Can be externally actuated with permanent magnet to check electrical circuits.
7. Switch assembly fully rotatable to suit installation position.
8. Large available differential minimizes short cycling or actuation of switch by liquid surges.
9. Stainless steel Float Ball (factory checked for leakage prior to assembly).

ELECTRICAL RATING		
VOLTS	AMPS	PILOT DUTY
230	2	125 VA



LL WITH SIDE & BOTTOM CONNECTIONS

LLC WITH METAL COVER

FLOAT SWITCH		DESCRIPTION	DESIGN RATING			ELECT. SWITCH	CONN.	SPECIFIC GRAVITY RANGE	DIFF.
CAT. NO.	MODEL		LIQUID TEMP.	AMBIENT TEMP.	PRESS.				
12743	LL	Standard Hermetic	-45°C	-45°C					
12742	LLC	Same as LL plus metal cover	to	to	2069 kPa	SPDT	Combination	0.57	Adjustable
12744	LLS	Std. Herm. with side & side connections	+65°C	+50°C	(300 psig)	Snap-acting	3/4" NPT or 1" Butt Weld	to 1.70	1/2" — 2"
12745	LLSC	Same as LLS plus metal cover	(-50°F)	(-50°F)		non-mercury			Fact. Set 2"
12741	LLX	Explosion proof type	to	to					
12748	60-0109-02	Float Switch assembly for LLC, LLSC.	+150°F	+120°F					

Manufacturers Bulletins 610 and cc-10 available on request

Explosion proof LLXS and Low Temp. -75°C (-100°F), Types LLA, LLAC & LLAX available on request.

LIQUID LEVEL CONTROLS

Danfoss

Thermostatic Liquid Level Control For Ammonia Type TEVA

Type TEVA is designed for use as a liquid level control for flooded evaporators, intermediate receivers, and liquid separators.

Type TEVA consists of a thermostatic expansion valve equipped with a specially designed phial in which a low-voltage electric heater is fitted. This heater provides for the superheating of the thermostatic liquid level control independently of the temperature of the vapours drawn from the evaporator. The device comprises a weld connection to be fitted on the evaporator or receiver at the desired liquid level and the phial being fixed in this connection.

Maximum Test Pressure 2758 kPa (400 psig).

Capillary length 5 m (16.5 ft.).



LIQUID LEVEL CONTROL			Conn.	Rated Capacity*		Orifice Assembly	
Cat. No.	Model	Code No.		kW	Tons	Cat. No.	Code No.
1276	TEVA20-1**	68G6040	1/2"	3.5	1	12716	6-0466+
1277	TEVA20-2	68G6041		7.0	2	12717	68G2050
1278	TEVA20-3	68G6042		10.6	3	12718	68G2051
1279	TEVA20-5	68G6043		17.6	5	12719	68G2052
12710	TEVA20-8	68G6044		28.1	8	12720	68G2053
12711	TEVA20-12	68G6045		42.2	12	12721	68G2054
12712	TEVA20-20	68G6046	3/4"	70.3	20	12722	68G2055
12713	TEVA85-33	68G6047		116.1	33	12723	68G2056
12714	TEVA85-55	68G6048		193.4	55	12724	68G2057
12715	TEVA85-85	68G6049		299.0	85	12725	68G2058
							68G2059

* Rated Capacity is the capacity of the control at -15°C (+5°F) evaporating temperature and +32°C (+90°F) condensing temperature and is based on +4°C (+7°F) sub-cooling ahead of the control valve.

The capacities apply to the evaporating temperature range from 0 to -50°C (+32 to -58°F).

** TEVA 20-1 consists of TEVA 20-2 PLUS a separate discharge orifice Code No. 6-0466.

NOTE: Type TEVA replaces Type TVV. When replacing Type TVV with Type TEVA it is necessary to fit bulb conversion kit in bulb pocket.

ACCESSORIES		
Cat. No.	Code No.	Description
STRAINERS		
18152	6-0042	FA15 Suit TEVA20-1 thru 20-20
18154	6-0048	FA20 Suit TEVA 85-33 thru 85-85
POWER ELEMENTS with Electric Heater		
12759	68G3255	Suit TEVA 20-1 thru 20-20
12760	68G3256	Suit TEVA 85-33 thru 85-85
WELD BUSH FOR BULB		
12761	68G0026	Including coupling nut, seal cap and gasket
HEATER (Separate)		
12762	68G0037	24 Volt 10 Watt

Bulb Conversion Kit - TVV to TEVA		
Cat. No.	Code No.	Part
	32E0677	Seal
	68G0513	Union Nut
	68G0514	Interm. Ring
	66-0306	Seal

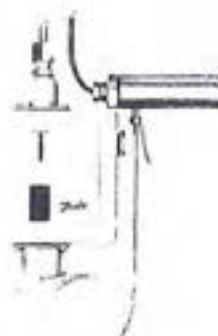
Danfoss

Liquid Level Alarm, Safety Cut-Out, Liquid Level Control For Fluorinated Refrigerants and Ammonia Type RT 280A

RT 280A is primarily designed as a liquid level alarm and safety cut-out preventing too high a liquid level in liquid separators. Secondly, RT 280A can also be used as a liquid level differential of up to ±40 mm (1.6") can be tolerated. RT 280A used as a safety cut-out ensures that a maximum permissible refrigerant liquid level is not exceeded in flooded evaporators, pump vessels or liquid separators.

RT 280A used as a liquid level control is designed to maintain a constant refrigerant liquid level in flooded evaporators, pump vessels or liquid separators.

RT 280A is based on RT 260A. Differential Pressure Control with the lower bellows element replaced by a power element with an electrically heated bulb. The signal from the bulb heating or cooling is converted into an electric on-off impulse after comparison with the reference pressure. The regulating principle is based on the heat conduction difference between the liquid and vapour phases of the refrigerant.



CONTROL			TEMPERATURE RANGES		
CAT. NO.	Model	Code No.	R12	R22, R717	R502
14251	RT280A	17D0040	-50 to +10°C (-58 to +50°F)	-50 to 0°C (-58 to +32°F)	-65 to -5°C (-83 to +23°F)

Switch Type	SPDT, 10(4)A, 380V, 12W, 220V, AC non-inductive 10A, 380V, inductive 4A 110-380V, full load.
Pressure Element	Press. Connection 3/8" BSP with dia. 6/dia. 10mm weld nipple Max. Test Press. 2455 kPa (356psig).
Power Element	Adsorption charge 2m (6.6ft) cap. tube, Max. permissible bulb temperature +60°C (+140°F).
Bulb with Electric Heater	24V, dc or ac (10W) designed for constant cut-in during operation of the system. 1.5m (5 ft.) connecting cable.

REFER NEXT PAGE FOR DANFOSS TYPE 38E
ELECTRONIC LIQUID CONTROL

LIQUID LEVEL CONTROLS



Electronic Liquid Control For Fluorinated Refrigerants and Ammonia Type 38E

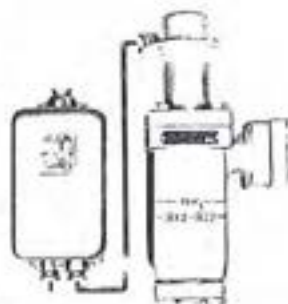
The liquid level control Type 38E is designed for regulating the liquid level, for example, in — flooded evaporators — low-pressure pump vessels in pump recirculation systems — pump vessels in "gas pump systems" — intermediate coolers, in two-stage refrigeration plants — condensers. 38E can also be used as a protection against too high or too low liquid levels.

The SPDT switch permits connection of an alarm or indication unit.

The liquid level control consists of two separate parts:-

1. A float housing of gas-tight cast iron with a ball float provided with an armature surrounded by a pilot coil.
2. An amplifier with a mains transformer.

When the ball float is raised or lowered by the liquid, the low-tension current through the pilot coil is affected. This effect is amplified by the transistor amplifier so that the contacts make or break circuit. The liquid level control only gives an impulse when the ball float passes the upper or lower position, i.e. the limits for the working differential set on the control. The differential is independent of the specific gravity of the liquid.



FLOAT HOUSING					AMPLIFIER						
Cat. No.	Model	Code No.	Conn.	Max. Test Press.	Cat. No.	Code No.	Volts	Freq.	Voltage Variation	Max. Permiss. Ambient	Description
12731	38E	38E0011	1" Weld Flg.	2841 kPa (412 psi)	12732	38E0220	230/380	50	+10% to -15%	55°C (+130°F)	Contacts make on drop in level
					12734	38E0230	220/380	50			Contacts make on rise in level

KK.10.A2.02

Liquid Level Setting: 40 mm (1.6") between minimum and maximum liquid levels.

Refrigerant Temperature Range: -40 to +55°C (-50 to +130°F).

Max. Pilot coil current 0.02 Amp and Voltage between supply cables max. 20V.

The SPDT switch contacts can break a circuit of max. 6A, 380V, 200VA.

FITTING

The average level is indicated in the float housing by the factory. On the basis of the level marks the float housing is fitted at a level corresponding to the average liquid level required.

The lower pipe of the float housing should be inclined towards the liquid separator in order to avoid formation of an oil seal which may hamper the movements of the ball float.

The amplifier can be fitted at any distance from the float housing.

The mains voltage to the pilot circuit is either connected to terminals 1 and 2 (220V) or to 1 and 3 (380V).

The pilot coil is connected to terminals 4 and 5.

Terminals 6 and 8 lead to the fixed contact of the amplifier, and terminal 7 leads to the moving contact.

EXAMPLE OF SETTING

The photos below show the scales of the two amplifier designs



Design (I)
(38E0220/38E0221)



Design (II)
(38E0230/38E0231)

SETTING THE LIQUID LEVEL AND DIFFERENTIAL

To set the control, remove the cover from the amplifier so that the knobs for level (N) and differential (D) can be operated.

The position of the level within the working range is set by rotating the knob N.

1. On the amplifier 38E0220/38E0221 (I) the "0" on the level scale corresponds to low level and the "5" to high level.
2. On the amplifier 38E0230/38E0231 (II) the "0" on the level scale corresponds to high level and the "5" to low level.

The knob D is set for the differential with which it is desired that the liquid level control should operate.

In this case the "0" always corresponds to the minimum differential — approx. 10 mm (0.4 in), and the "5" to the maximum differential — approx. 40 mm (1.6 in).

The working range of the liquid level control is determined by the free travel of the ball float, and so the sum total of the scale values, for liquid level and differential should not exceed 5 (N + D = max. 5). This maximum limit is observed automatically by the gears fitted on the scales.

REFER TO PREVIOUS PAGE FOR DANFOSS TYPE
TEVA AND RT280A LIQUID LEVEL CONTROLS

NOTE: FIRST 3 NUMERALS OF CAT. No.
INDICATES PAGE No.

Contacts 6—7 make circuit at the lower ball float position. With the setting shown for N (level) = "0" and D (differential) = "5", contacts 6 and 7 will make circuit at the absolutely lowest liquid level, and break it again when the liquid level has risen by approx. 40 mm (1.6 in).

Rotating the knob N in the clockwise direction raises the liquid level. When the knob is set for e.g. "5", the liquid level is raised to its maximum value at which contacts 6 and 7 break circuit. As the sum total of N + D cannot exceed "5", the knob D will in this case be set for "0" (min.) corresponding to a differential of approximately 10 mm (0.4 in).

Contacts 6—7 make circuit at the higher ball float position. With N="0" and D="5", contacts 6 and 7 will make circuit when the ball float passes its maximum liquid level and break it again when, in this case, the level has fallen by approx. 40 mm (1.6 in). Clockwise rotation of the knob N lowers the liquid level.

OUR LARGE SELECTION ANSWERS YOUR EVERY NEED — AND PRICED RIGHT, TOO!

ARMSTRONG REFRIGERATED PURGERS

WHY YOU MUST GET RID OF AIR AND NON-CONDENSIBLES

Air and non-condensable gases in a refrigerating system pass through with the refrigerant until they reach the condenser, where they are trapped by the liquid seal. They will raise Head Pressure, mainly because they are such good insulators i.e. they obstruct the normal heat transfer processes and the effective condenser surface is reduced with a consequent rise in condenser Head Pressure and Temperature. Each 4 lbs. of excess Head Pressure caused by air and other non-condensibles increases compressor power costs by approx. 2% and reduces compressor and system capacity by approx. 1%.

In addition excess head pressure puts strain on bearings, driving motor and belts; more likelihood of gasket failure and possibility of "explosions".

Higher temperature shortens the life of compressor valves and promotes breakdown of lubricating oil.

HOW TO GET RID OF AIR AND NON-CONDENSIBLES

Manual Purging is too expensive and too troublesome and may also infringe environmental Codes dependant on the refrigerant or gas being used. In addition, the wastage would be excessive as by purging off an unseparable mixture of air, non-condensibles and refrigerant, you would have to purge off a lot of compressed refrigerant gas to get rid of a very small amount of air and non-condensibles - and it would not be entirely effective anyway.

Refrigerated Purging - By allowing the vapour to pass into a special purging apparatus in which it is partially condensed by a coil at evaporator temperature and the density of the remainder, thereby reduced.

THE ARMSTRONG AUTOMATIC REFRIGERATED PURGER

This is a simple dependable refrigerated mechanism which converts contaminated refrigerant gas to chilled compressed air contaminated with low pressure refrigerant gas.

Automatically the compressed air is vented to the atmosphere and the condensed refrigerant discharges to the suction side of the system.

PURGER CAPACITY

When suction is above atmospheric an Armstrong Purger will handle a refrigeration system as large as 500 Tons.

If suction is below atmospheric the system size should be no larger than 250 Tons. Multiple purgers frequently are installed.

Ammonia Model 370H-1 is supplied with K1 Check Valve and K3 Differential Valve. See below for separate ordering.

CAT. NO.	TYPE	DESCRIPTION
12814	K1	Check Valve
12815	K3	Differential Valve

WHEN ORDERING - SPECIFY :

1. The refrigerant
2. Maximum High-Side Pressure - Liquid Specific Gravity and Gas Density.
3. Minimum Suction Pressure - Liquid Specific Gravity and Gas Density.
4. Are special construction materials required?

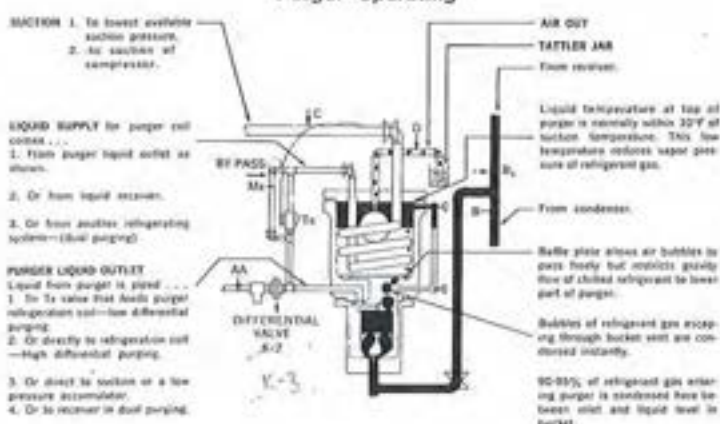
ADDITIONAL INFORMATION IS AVAILABLE ON REQUEST

ADVANTAGES WITH AN

ARMSTRONG AUTOMATIC REFRIGERATED PURGER

1. Lowest power cost.
2. Full system capacity.
3. Minimum refrigerant loss.
4. Minimum loss of time and labour.
5. No excuse not to purge.
6. Reduced wear and tear.
7. Immediate re-starting after repairs, no need to pump out system.
8. Reduced cooling water consumption in many instances.
9. Less chance of a so called "ammonia explosion".

Purger Operating



MATERIALS OF CONSTRUCTION

Series 370 Models

Cap and Coil Housing : Forged steel to meet ASTM-A-350 Grade LF-1 specifications for temperatures to -50°F (-45.6°C).

Bottom Body : 1030 Forged Steel.

Studs : ASTM-A-193 Grade B-7.

Note Cap, Housing and Body assembly safely will withstand hydraulic pressures of 450 psi. (3103 kPa.)

Baffle Plate : Stainless Steel.

Refrigeration Coil : 2.36 sq. ft. of external surface made of carbon steel or stainless steel tubing. See Table.

Air Release Mechanism : Carbon steel frame, stainless steel working parts.

Liquid Discharge Mechanism : Stainless Steel.

Series 371 Models

Cap : Carbon Steel.

*Coil Housing : ASTM-A-182-F11.

*Bottom Body : ASTM-A-182-F11.

Bolts, Studs : ASTM-A-193 Grade B-7.

Coil : Stainless Steel.

Working Parts : Stainless Steel.

*Steam Trap Forgings designed for operation at 900 psi (6206 kPa.) at 900°F (482°C) or 1200 psi (8274 kPa.) at 100°F (37.8°C).

Series 270-4 Models

Cap, Coil Housing and Bottom Body : Cast Bronze (ASTM-B-62-85-5-5-5).

Working Parts : Stainless Steel.

STANDARD MODELS

CAT.NO.	Refrigerant to be purged	Model No.	Coil Material
1281	Ammonia	370H-1	Carbon Steel
1282	Butadiene	370H-7	Carbon Steel
1283	Butane	370H-1	Carbon Steel
1284	CO ₂ to 300 psi	370-6	Stainless Steel
1285	CO ₂ to 800 psi	371-1	Stainless Steel
1286	Ethylene	370-4	Stainless Steel
1287	Methyl Chloride	370-8	Carbon Steel
1288	Propane	370-3	Carbon Steel
1288	Propene	370-3	Carbon Steel
1288	Propylene	370-3	Carbon Steel
1289	R-11	270-4	Copper
12810	R-13 to 600 psi	371-2	Stainless Steel
12811	R-12, 22, 502	370-2	Carbon Steel
12812	Sulfur Hexafluoride - SF ₆	371-2	Stainless Steel
12813	Vinyl Chloride	370-5	Stainless Steel

The different 370 and 371 model numbers cover purgers with bucket weights, float weights and orifice sizes for refrigerants of different specific gravities and operating pressures. For example, a No.370-2 R12 purger would not work on an ammonia system.

PHILLIPS FLOAT CONTROL VALVES

CATALOGUE NUMBER SUMMARY PAGE - FOR ORDERING PURPOSES

SERIES 101 LOW SIDE FLOAT VALVE - EXTERNAL MOUNTING ADJUSTABLE LEVEL			
REFRIG	CAT NO	VALVE TYPE	ORIFICE
R717	1352	101	1/8
	13511		5/32
	1355		3/16
R12 R22	1351	101F 101V	1/8
	13512		5/32
	1356		3/16
R717	1354	101A	1/4
	13521		5/16
	13523		3/8
R12 R22	1353	101AF 101AV	1/4
	13524		5/16
	13526		3/8

SERIES 300 LOW SIDE FLOAT VALVE - INSERT MOUNTING DIRECT FEED - FIXED LEVEL			
R717	13527	300H	3/32D
	13515		3/32
	13516		7/64
	13517		1/8
R717	13528	300A	9/64
	13519		5/32
	13518		3/16
	13529		7/32

SERIES 301 LOW SIDE FLOAT VALVE - INSERT MOUNTING REMOTE FEED - FIXED LEVEL			
R717	13539	301H	3/16
	13530		7/32
	13540		9/32
R717	13541	301A	3/16
	13542		7/32
	13531		9/32

SERIES 301-E LOW SIDE FLOAT VALVE - EXTERNAL MOUNTING REMOTE FEED - FIXED LEVEL			
R717	13576	301-E	3/32D
	13577		3/32
	13532		7/64
	13533		1/8
	13578		9/64
R717	13520	301-G	5/32
	13534		3/16
	13579		7/32
R717	13580	301-J	3/16
	13581		7/32
	13535		9/32
R717	13536	301-K	3/16
	13582		7/32
	13583		9/32

SERIES 701 FLOAT CONTROL PILOT OPERATED				
Refrig.	CAT NO	MAIN VALVE	Orifice	MET'G PLUG
R717	13544	701-JR5	3/8	230-25
	13547	701-S	9/16	245-25
	13569			445-25
R12	13543	701-JR5F	3/8	230-25
	13570			430-25
	13571			445-25
R22	13572	701SF	9/16	845-25
	13546		9/16	445-25
	13573			445-38
STRAINER				
	135249	S701-JR		
	135250	S701		
PILOT VALVES				
	13533	301-E	1/8	
	13555	101-VP-18	3/32	

SERIES 700-H HIGH SIDE FLOAT CONTROL — PILOT OPERATED			
Refrig.	CAT NO	MAIN VALVE	METERING PLUG
R717	13586	700-JRH	3°
	13587		5°
	13588		10°
R12	13589	700-JRHF	3°
	13590		5°
R22	13591		10°
	13592		15°
PILOT VALVE			
	13564	275-AP	1/8" Orifice

SERIES 270-A HIGH SIDE - REFRIGERANT CONTROL VALVE - OIL DRAIN VALVE Complete With Chamber			
Refrig.	CAT NO	VALVE TYPE	ORIFICE
R717	13594	270-A	1/16
	13553		3/32
	13595		1/8
R12	13596	270-AF	3/32
	13554		1/8
	13597		3/16
R22	13598	270-AF	1/16
	13599		3/32
	135100		1/8

SERIES 275-AF LOW SIDE OIL FEED/LEVEL VALVE Complete with Chamber			
Refrig.	CAT NO	VALVE TYPE	ORIFICE
R717	13565	275-AF	3/32
R12	13562		1/8
R22	13566		3/16

NOTE: CARTRIDGE KITS
* Indicates Valves and orifice sizes listed in this catalogue.

CARTRIDGE KITS			
CAT NO	KIT NO	SUITS VALVE	ORIFICE
135149	K152K	101*	5/64
135150			3/32
135151			7/64
135140			*1/8
135142			9/64
135141			*5/32
135142	K152L	101A*	*3/16
135145			*3/32
135146			*1/4
135147			*5/16
135147			*3/8
135147			13/32
135130	K310	300H* 301E* 300 300HM 300J 300P	*3/32D
135131			*3/32
135132			*7/64
135132			*1/8
135133			*9/64
135134			*5/32
135135	K310A	301G* 300AM 300YA	*3/16
135136			*7/32
135137			*3/16
135138			*7/32
135139			*9/32
135251			*1/16
135252	K270A1	270A*	5/64
135253			*3/32
135254	K270A2	270A*	*1/8
135255			*3/16
135256	K100	100	*3/32
135257			*1/8
135258			*3/16
135259			1/16
135260			5/64
135261			3/32
135262	K101AB	101AB	7/64
135263			1/8
135264			9/64
135265			5/32
135266			3/16
135267			3/8
135268	K152K26	101VP26Ch	1/2
135269			1/8
135270			3/32
135271			1/8
135270			3/16
135271			3/32
135272	K152KF26	101VPF26Ch	1/8
135101			1/16
135102			5/64
135103			3/32
135276			1/16
135277			5/64
135278	K280	225	3/32
135279			7/64
135280			1/8
135281			9/64
135282			5/32
135282			5/32

FIRST 3 NUMERALS OF CAT. No.
INDICATES PAGE No.

REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA

Phillips**FLOAT CONTROL VALVES****SERIES 101 LOW SIDE FLOAT VALVES****EXTERNAL MOUNTING - ADJUSTABLE LEVEL**

The Series 101 Low Side Float Valves for external mounting, are suitable for flooded chillers and other types of evaporators where level adjustment is desirable.

An external level adjusting stem is provided for raising or lowering the level to suit an installation.

Valves for R12 and R22 are fitted with a different spring and heavier float ball and seal cap for the adjusting stem. These are rugged, dependable float valves, suitable for all temperature levels.

LARGER SIZES AVAILABLE ON APPLICATION



SERIES
101

VALVE TYPE R717	R12 & R22	ORIFICE INS.	CONN.
101	101F 101V	1/8"	1/2" FPT
		5/32"	
		3/16"	
101A	101AF 101AV	1/4"	3/4" FPT
		5/16"	
		3/8"	

OPERATION : The Series 101 valves modulate the flow of the liquid refrigerant in direct response to the movement of the float immersed in the liquid. The float ball is linked through a forked lever to act upon a needle or a plunger directly over the orifice controlling the refrigerant flow. A spring is interposed over the needle, working opposite to the lever, and tends to support the weight of the float ball. Spring pressure can be regulated by an external adjusting stem to make the float ball lighter or heavier, causing the liquid level to be respectively lower or higher to any desired point within the range of the spring. Turning the adjusting stem counter-clockwise will raise the liquid level, while turning the stem clockwise will lower the level. Total level change, at a particular setting, from fully closed to fully open valve, is about 50mm (2") on the 101 and 101-A valves.

SERIES 300-H and 300-A LOW SIDE FLOAT VALVES**INSERT MOUNTING - DIRECT FEED - FIXED LEVEL**

These valves are designed for Ammonia, especially unit coolers and other evaporators where the cartridge and back seating feature is desirable. The working needle and seat are contained in a cartridge which may be replaced through the use of a secondary seat shut-off arrangement without pump down of the evaporator. Valve resetting is not required when changing cartridge. The liquid level is approximately at the middle of the valve mounting.

Valves for R12 and R22 are available on application. Also available on application are the Series 300-HM and 300-AM Valves - Similar to the Series 300-H and 300-A respectively, however a difference in linkage allows them to be mounted 25mm (1") lower on horizontal drums, making them particularly useful on low capacity evaporators using small diameter surge drums.

SERIES 301-H and 301-A LOW SIDE FLOAT VALVES**INSERT MOUNTING - REMOTE FEED - FIXED LEVEL**

Similar to the Series 300, but Remote Feed designed for Ammonia, for use with large capacity air units, milk tanks, ice builder coils and other evaporators, where the cartridge and back seating feature is desirable.

Valves for R12 and R22 are available on application.

OPERATION : The Low Side Series 300 and 301 Valves modulate the flow of liquid refrigerant in direct response to the movement of the float ball immersed in the liquid. The rounded end of the float rod acts on a cam needle and then a pusher, to operate a needle inside the valve cartridge containing the main control orifice. On a falling liquid level the weight of the float ball acts to open the cartridge orifice. On a rising level, the orifice closes due to the liquid inlet pressure and also the force of the spring in the cartridge. Stem on front of valve is backed out fully for normal valve operation.



SERIES
300H
300A

VALVE TYPE R717	ORIFICE INS.	CONN.
300H	3/32D	1/2" FPT
	3/32	
	7/64	
	1/8	
	9/64	
300A	5/32	3/4" FPT
	3/16	
	7/32	
301H	3/16	3/4" FPT
	7/32	
	9/32	
301A	3/16	3/4" FPT
	7/32	
	9/32	



SERIES
301H
301A

SERIES 301 - E, G, J, K LOW SIDE FLOAT VALVES**EXTERNAL MOUNTING - REMOTE FEED - FIXED LEVEL**

The Series 301 - E, G, J, K Low Side Float Valves, external mounting are applicable to all types of evaporators and vessels where liquid level adjustment is not necessary. These valves can also be applied to small flooded chillers. The needle and seat orifice are contained in an easily replaced cartridge and no valve resetting is required during a replacement operation.

OPERATION : The Series 301-E Valves modulate the flow of liquid refrigerant in direct response to the movement of the float immersed in the liquid. A cam needle acts on a pusher and operates a needle inside the cartridge containing the needle and orifice. Average liquid level would be at about the middle of the valve mounting, or somewhat below.

VALVE R717	ORIFICE INS	CONN.	VALVE R717	ORIFICE INS	CONN.
301-E	3/32D	1/2" FPT	301-J	3/16	3/4" FPT
	3/32			7/32	
	7/64			9/32	
	1/8		301-K	3/16	
	9/64			7/32	
301-G	5/32	3/4" FPT		9/32	
	3/16				
	7/32				



SERIES 301E
With Chamber

CAPACITIES : Refer Tech. Page 135-c

ORDERING PROCEDURE : REFER TO PAGE 135 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



FLOAT CONTROL VALVES

SERIES 701 FLOAT CONTROL - PILOT OPERATED

WITH SERIES 301 FIXED LEVEL PILOT or SERIES 101 ADJUSTABLE LEVEL PILOT

The Series 701 Valves are pilot operated, usually by a low side pilot float valve. The pilot operated valve meters the flow of liquid refrigerant to the evaporator in response to demand, as indicated from changes in the liquid level. It is a modulating type of control. The 701 valves are flanged, piston type, with manual lifting stem. The internal metering parts are sized for the load and operating condition, with the proper spring for each refrigerant. Teflon seat discs are standard, and are replaceable.

The pilot float valve is sized for each 701 body size and is available with either a Series 301 fixed level valve or a Series 101 adjustable level valve. The pilot valves are externally mounted.



MAIN VALVE R717	PORT SIZE INS	METERING PLUG	CONN. NPT	STRAINER (Optional)	EACH INSTALLATION REQUIRES MAIN VALVE PLUS:						
					SERIES 301 FIXED LEVEL PILOT FLOAT VALVE			OR	SERIES 101 ADJUST. LEVEL PILOT FLOAT VALVE		
					CODE NO.	ORIFICE	OUTLET		CODE NO.	ORIFICE	OUTLET
701-JR5	3/8	230.25	3/4"	5701-JR	301E	1/8"	1/2" FPT	OR	101-VP-18	3/32"	1/2" FPT
	3/8	430.25*									
	3/8	445.25*									
	9/16	845.25*									
701-S	9/16	245.25	1-1/4"	5701	301E	1/8"	1/2" FPT	OR	101-VP-18	3/32"	1/2" FPT
	9/16	445.25									
	9/16	445.38*									

* Metering Plug applicable for R12 and R22 only.

OPERATION : The PHILLIPS Type 701 valves are actuated by controlling pressures in the power cylinder above the piston. The pilot can be any control device having a small orifice, such as a float valve, TX valve, or magnetic solenoid placed between the evaporator and power cylinder. However, for modulating action, the pilot must be a naturally modulating type such as the float valve. The valve is opened by lowering the pressure above the piston, and closed by raising the pressure above the piston. The pilot orifice, in response to level changes performs the function of controlling the pressure in the power cylinder. A bleed port in the piston, with flow around the piston,

permits continuous flow of liquid to the chamber above the piston. Piston clearance is controlled at the factory. A pressure gauge in the pilot line can indicate valve action. When the pilot valve closes, the pressure in the cylinder builds up to high side pressure, closing the 701 valve. When the pilot valve opens the 701 also opens, since the cylinder pressure is released and approaches evaporator pressure. A constant intermediate pressure in the pilot line indicates a steady flow of refrigerant through the 701 valve. Pilot float valves for R12 and R22 have a seal cap above the adjusting stem and a weighted float ball.

AVAILABLE ON APPLICATION : LARGER SIZES and VALVES FOR R12 & R22

SERIES 700-H HIGH SIDE FLOAT CONTROL

PILOT OPERATED AND DIRECT FEED WITH SERIES 275-A PILOT FLOAT VALVE

The Series 700-H High Side Pilot Operated Valves are actuated by a pilot float valve. The pilot float valve feels the level in the receiver, or pilot receiver, or in the condenser drain line; modulating the main valve according to the condensing rate. The combination keeps the condensers drained, and individual sets of high side controls can be installed on each condenser, where it is not convenient to tie them together to a common drain header. The 700-H valves are flanged piston type, with manual lifting stem.

VALVES FOR R12 and R22 - AVAILABLE ON APPLICATION



MAIN VALVE			PILOT VALVE		
TYPE	METERING PLUG (DEGREES)	CONN.	TYPE	ORIFICE	CONN.
700 - JRH	3	3/4" FPT	275 - AP	1/8"	3/4" FPT
	5				
	10				
	15				

LARGER SIZES AVAILABLE ON APPLICATION

ORDERING PROCEDURE : REFER TO PAGE 135 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

REFRIGERATION SYSTEM RELIABILITY
ACTROL PARTS TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

PHILLIPS FLOAT CONTROL VALVE CAPACITIES

VALVE TYPE	ORIFICE (INS)	R717 AMMONIA						R12				R22			
		INLET PRESSURE						INLET PRESSURE				INLET PRESSURE			
		552 kPa (80 PSIG)		690 kPa (100 PSIG)		1103 kPa (160 PSIG)		552 kPa (80 PSIG)		862 kPa (125 PSIG)		552 kPa (80 PSIG)		1103 kPa (160 PSIG)	
		TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW
101 (R717)	1/8	16	56	18	63	21	74	2.4	8.4	2.7	9.5	3.9	13.7	4.5	15.8
(101F-R12)	5/32	20	70	22	77	26	91	3.0	10.6	3.5	12.3	4.9	17.2	5.6	19.7
(101V-R22)	3/16	25	88	28	99	33	116	3.9	13.7	4.3	15.1	6.2	21.8	7.1	25.0
101A (R717)	1/4	51	179	56	197	66	232	7.6	26.7	8.6	30.2	12	42.2	14	49.2
(101AF-R12)	5/16	65	229	71	250	85	299	9.6	33.8	11	38.7	16	56.3	18	63.3
(101AV-R22)	3/8	81	285	89	313	NR	NR	12	42.2	14	49.2	19	66.8	23	80.9
300H (R717)	3/32D	3.2	11.3	3.6	12.7	4.2	14.8	0.48	1.7	0.5	1.8	0.75	2.6	0.9	3.2
	3/32	5.1	17.9	5.6	19.7	6.6	23.2	0.75	2.6	0.9	3.2	1.2	4.2	1.4	4.9
	7/64	8.1	28.5	8.9	31.3	10	35.2	1.2	4.2	1.3	4.6	2.0	7.0	2.3	8.1
301E (R717)	1/8	10	35.2	11	38.7	13	45.7	1.5	5.3	1.7	6.0	2.4	8.4	2.9	10.2
	9/64	13	45.7	14	49.2	17	59.8	1.9	6.7	2.2	7.7	3.1	10.9	3.6	12.7
300A (R717)	5/32	16	56	18	63	21	74	2.4	8.4	2.7	9.5	4.0	14.1	4.5	15.8
	3/16	20	70	22	77	26	91	3.0	10.6	3.5	12.3	4.9	17.2	5.6	19.3
301G (R717)	7/32	26	91	28	98	33	116	3.9	13.7	4.3	15.1	6.2	21.8	7.1	25.0
301A 301H	3/16	33	116	36	127	42	148	4.8	16.9	5.5	19.3	7.8	27.4	9.0	31.7
301J 301K	7/32	41	144	45	158	52	183	6.0	21.1	6.8	23.9	9.7	34.1	11	38.7
(R717)	9/32	51	179	56	197	*	*	7.6	26.7	8.6	30.2	12	42.2	14	49.2
*301A & 301K	9/32	51	179	56	197	66	232	7.6	26.7	8.6	30.2	12	42.2	14	49.2

*Valve Types 301H and 301J with 9/32" orifice are not suitable for inlet pressures exceeding 690 kPa (100 PSIG) for Ammonia applications — Use either 301A or 301K.

VALVE TYPE	ORIFICE (INS)	METER- ING PLUG	R717 AMMONIA						R12				R22			
			INLET PRESSURE						INLET PRESSURE				INLET PRESSURE			
			690 kPa (100 PSIG)		931 kPa (135 PSIG)		1103 kPa (160 PSIG)		552 kPa (80 PSIG)		862 kPa (125 PSIG)		552 kPa (80 PSIG)		1103 kPa (160 PSIG)	
			TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW
701-JRS (R717)	3/8	230.25	89	313	96	338	100	352	12	42	14	49	20	70	23	81
701-JRSF (R12 & R22)		430.25	NOT APPLICABLE FOR AMMONIA						19	67	22	77	31	109	36	127
		445.25	NOT APPLICABLE FOR AMMONIA						27	95	31	109	44	155	51	179
	9/16	845.25	NOT APPLICABLE FOR AMMONIA						48	169	55	193	78	274	90	317
701-S (R717)	9/16	245.25	140	492	150	528	170	598	NOT APPLICABLE FOR R12				NOT APPLICABLE FOR R22			
701-SF (R12 & R22)		445.25	220	774	240	844	260	914	30	106	34	120	49	172	57	200
		445.38	NOT APPLICABLE FOR AMMONIA						53	186	61	215	86	302	100	352

VALVE TYPE	METERING PLUG (DEGREES)	R717 AMMONIA						R12				R22			
		INLET PRESSURE						INLET PRESSURE				INLET PRESSURE			
		138 kPa (20 PSIG)		414 kPa (60 PSIG)		690 kPa (100 PSIG)		414 kPa (60 PSIG)		690 kPa (100 PSIG)		414 kPa (60 PSIG)		690 kPa (100 PSIG)	
		TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW	TONS	KW
700-JRH (R717)	3	35	123	65	229	80	281	15	53	17	60	21	74	27	95
700-JRHF (R12 & R22)	5	50	176	NA	NA	NA	NA	21	74	23	81	30	106	38	134
	10	85	299	NA	NA	NA	NA	35	123	40	141	52	183	65	229
	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: "NA" — Valve not suitable for these inlet pressures. Valves with 15° metering plug suitable R12, R22 Low press. only.

Capacity values are maximum capacities with no liquid sub-cooling at evaporator temperatures from +4°C to -40°C (+40°F to -40°F). To develop the capacities, the outlet or evaporator pressure must be less than half the inlet pressure.

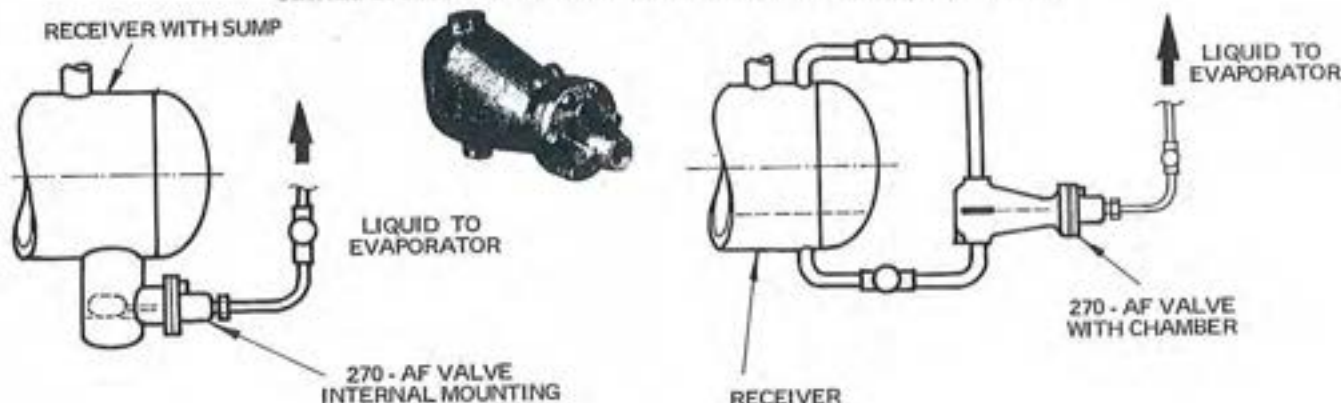
LIQUID SUB-COOLING FACTOR					
Sub-cooling °C (°F)	3 (5)	5.5 (10)	11 (20)	17 (30)	28 (50)
FACTOR	1.25	1.47	1.75	1.9	2.2

The valve capacities are calculated for operation with a saturated liquid condition at the entrance of the valve, and at condensing pressure. When the liquid is sub-cooled, the capacity of the valve is increased according to the amount indicated in the Table above. With variable loads, such as ice builders, receiving tanks and blast freezers etc., some extra capacity should be provided. To find the capacity of a particular valve, find the capacity under the appropriate refrigerant and inlet pressure and MULTIPLY by the appropriate Sub-cooling Factor in the Table above.

ORDERING PROCEDURE : REFER TO PAGE 135 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

PHILLIPS HIGH & LOW SIDE VALVES

FOR
REFRIGERANT CONTROL - OIL DRAIN - OIL FEED
SERIES 270-A & 270-AF DIRECT FEED - HIGH SIDE - REFRIGERANT CONTROL VALVES
SERIES 270-A FOR AMMONIA & SERIES 270-AF FOR R12 and R22



REFRIGERANT CONTROL APPLICATION OF SERIES 270-A HIGH SIDE FLOAT

REFRIGERANT CONTROL APPLICATION OF SERIES 270-A HIGH SIDE FLOAT															
CAPACITIES															
VALVE	ORIFICE (IN5)	AMMONIA						R12				R22			
		PRESSURE DROP ACROSS VALVE kPa (PSI)													
		552 (80)		690 (100)		1103 (160)		276 (40)		690 (100)		552 (80)		1103 (160)	
		kW	TON5	kW	TON5	kW	TON5	kW	TON5	kW	TON5	kW	TON5	kW	TON5
270-A	1/16	15.8	4.5	17.6	5.0	20.4	5.8	NOT RECOMMENDED				3.9	1.1	4.9	1.4
(R717)	3/32	35.2	10.0	38.7	11.0	45.7	13.0	4.6	1.3	6.0	1.7	8.8	2.5	10.6	3.0
270-AF	1/8	63.3	18.0	70.3	20.0	80.9	23.0	8.8	2.5	11.6	3.3	15.8	4.5	19.0	5.4
(R12, R22)	3/16	—	—	—	—	—	—	18.6	5.3	24.3	6.9	NOT RECOMMENDED			

SERIES 270-A HIGH SIDE OIL DRAIN VALVE



The 270-A High Side Float Valve, opening on a rise of liquid level, when connected to a discharge line oil separator will drain oil to the compressor crankcase, or to an oil reservoir. The valve construction is the simple needle and seat type with semi-steel body and cast semi-steel chamber.

VALVE	ORIFICE (INS)	CONNS.	CAPACITY R12, R22, R717 at	
			690 kPa (100PSI) PRESSURE DROP	
			Approx. Imp. G.P.M.	Approx. litre/s
270-A (R717)	3/32	3/4" FPT	1.25	0.1
270-AF (R12, R22)				

SERIES 275-AF LOW SIDE OIL FEED VALVE



The 275-AF Low Side Float Valve can be used to maintain the level of oil in the crankcase of a compressor. For multiple compressor applications a 275-AF valve should be installed on each compressor. Feed would be from an oil reservoir at a greater or equal pressure than the compressor crankcase. If the oil reservoir is at an equal pressure, it must be elevated at least 60 cm. (2 feet) above the desired compressor crankcase oil level so that gravity feed can take place. For low pressure or gravity feed, larger orifices than the standard 3/32" can be used in the valve.

VALVE	ORIFICE (INS)	CONNS.	M.O.P.D	OIL FLOW CAPACITY							
				PRESSURE DROP ACROSS VALVE							
				3 kPa (1 FT. HEAD)		69 kPa (10 PSI)		138 kPa (20 PSI)		276 kPa (40 PSI)	
				kPa	PSI	l/s	Imp.GPM	l/s	Imp.GPM	l/s	Imp.GPM
275-AF	3/32	3/4" FPT		414	60	.006	0.08	.032	0.42	.044	0.58
	1/8			241	35	.010	0.13	.051	0.67	.070	0.92
	3/16			103	15	.025	0.33	.126	1.67	NOT RECOMMENDED	

Note: For high pressure drop application, where low side float valve is required, use 301-E valve.

ORDERING PROCEDURE : REFER TO PAGE 135 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

PHILLIPS FLOAT CONTROL VALVES CARTRIDGE KITS

1

DESCRIPTION : These kits contain parts most frequently required for replacement. Each kit is individually packaged, with the Phillips KIT CATALOG NUMBER, and an orifice size (where applicable), indicated on the label.

ORDERING INSTRUCTIONS : Specify KIT by Actrol-Reidy's Catalogue No. from SUMMARY PAGE No. 135. It is also advisable to specify Orifice size, or Valve Serial No., or Load in Tons (or kW), AND REFRIGERANT.

FLOAT VALVES

KIT. CATALOG NUMBER	FOR VALVE NUMBERS	AVAILABLE ORIFICE SIZES
K100	100	1/16; 5/64; 3/32; 7/64; 1/8; 9/64; 5/32; 3/16
K101AB	101-AB	3/8; 1/2
K101B	101-B	3/8; 1/2; 5/8
K152K	101: 101VP-18" CHAMBER *	5/64; 3/32; 7/64; 1/8; 9/64; 5/32; 3/16: - *3/32
K152K26	101VP-26" CHAMBER	1/8
K152KF18	101F:) 18" CHAMBER 101VPF:)	3/32; 1/8; 3/16: 3/32:
K152KF26	101VPF-26" CHAMBER	1/8
K152L	101-A	1/4; 5/16; 3/8; 13/32
K201	201	1/16; 5/64; 3/32
K270A1	270-A	5/64; 3/32
K270A2	270-A	1/8; 3/16
K280	225; 225-B; 250-VP	1/16; 5/64; 3/32; 7/64; 1/8; 9/64; 5/32
K310	300; 300-H; 300-HM; 300-J; 300-P; 301-E	3/32D; 3/32; 7/64; 1/8; 9/64 — —
K310A	300-A; 300-AM; 300-YA; 301-G	5/32; 3/16; 7/32
K355	301; 301-A; 301-D; 301-H; 301-J; 301-K	3/16; 7/32; 9/32

PARTS CONTAINED IN PARTS KITS (SERVICE BULLETIN IS INCLUDED BUT NOT LISTED BELOW)

KIT CATALOG NUMBER	PART NUMBER & NAME OF PART (QUANTITY IN BRACKETS WHEN MORE THAN ONE OF SAME ITEM IS INCLUDED IN KIT.)
K100	2S & 3S Seat & Needle; 19 Gasket (2); 63 Gasket; 5-2 Spring.
K101AB	152B & 153B Seat & Plunger; 19B Gasket; 73 Gasket; 5AB45 Spring.
K101B	152B & 153B Seat & Plunger; 19B Gasket; 73 Gasket; 705A Spring.
K152K	152K Cartridge; 19 Gasket; 5-2A Spring; 63 Gasket.
K152L	152L Cartridge; 19 Gasket; 63 Gasket; 5-30A Spring (with orifices up to & including 3/8": a 5-4 Spring is supplied with 13/32" orifice.)
K152K26	152K Cartridge; 19 Gasket; 63 Gasket; 5-30A Spring.
K152KF18	152K Cartridge; 19 Gasket; 63 Gasket; 5-30 Spring.
K152KF26	152K Cartridge; 19 Gasket; 63 Gasket; 5-60L Spring.
K201	252 & 253 Seat & Needle; 73 Gasket; 11 Lever Pin; 205 Spring.
K270A1	262 & 403S Seat & Needle; 73 Gasket.
K270A2	262A & 263A Seat & Needle; 73 Gasket.
K280	280 Cartridge; 19 Gasket.
K310	310 Cartridge; 308 Pusher; 19 Gasket; 365 Gasket.
K310A	310A Cartridge; 308A Pusher; 365 Gasket.
K355	355 Cartridge; 365 Gasket.

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

"LEVEL EYE" SIGHT GLASS

The Phillips LEVEL EYE is an economical bulls-eye type sight glass. The unique reflex lens indicates the true level of a liquid without requiring a second lens.

Due to its configuration the lens appears dark in the presence of a liquid, and appears light when no liquid is present. The LEVEL EYE shows 38mm (1 1/2 inches) of liquid. For looking into a vessel, pairs of clear lens LEVEL EYES may be used.

For clear vision with refrigerant temperatures down to -29°C (-20°F), the standard (short) frost shield is usually frost free in average ambient conditions. With refrigerant temperatures below -29°C (-20°F) and ambient temperatures below 0°C (32°F) use the "Long" frost shield.

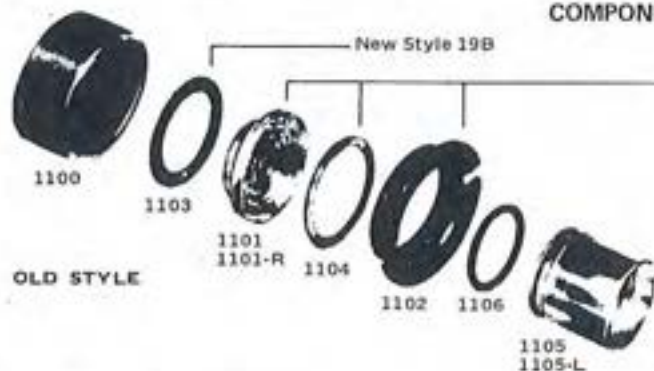
SPECIFICATIONS: The basic rating of the LEVEL EYE is 3448 kPa (500PSI) at temperatures from -29°C to 121°C (-20°F to 250°F).

APPLICATION: The LEVEL EYE is particularly suitable for refrigerant vessels such as receivers, inter-coolers, accumulators, oil separators and surge drums. The LEVEL EYE may be applied to vessels for other fluid types not injurious to the materials comprising the assembly.



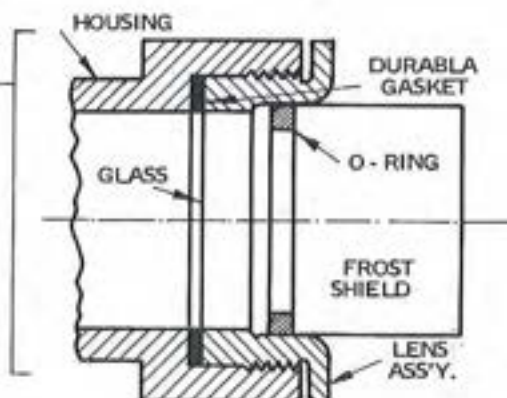
CAT. NO.	TYPE	HOUSING LENGTH	HOUSING TYPE	DESCRIPTION
13611	1100 - R	2"	Weld	Reflex Lens less frost shield
13613	1100L - R	4"		
13617	1100 - RN	2"	Weld	Reflex Lens with frost shield
13614	1100L - RN	4"		
13610	1100	2"	Weld	Clear Lens less frost shield
13612	1100L	4"		
13619	1100N	2"	Weld	Clear Lens with frost shield
13620	1100L - N	4"		

COMPONENT PARTS



NEW STYLE LEVEL EYE II

Combines 3 old style components into 1 new assembly with New Style 19B Gasket.



LEVEL EYE II

TO PREPARE FOR WELDING.

Remove durable gasket and lens. Housing can be welded into a 51 mm (2") hole, or over a 40 mm (1-9/16") hole.

TO ASSEMBLE.

Apply suitable oil to the 19B gasket and insert with lens. Tighten to 40 or 81J (30 or 60 ft.lbs) torque for use to 3447 or 6895 kPa (500 or 1000 PSI) respectively.

A light coating of oil on the frost shield, and/or a fine wire held over the O-ring while inserting (allowing air to escape) will aid insertion.

Withdraw wire if used.

IMPORTANT.

Test for pressure tightness before inserting the frost shield.

CAT. NO.	PART NO.	DESCRIPTION
1361	1100	2" Long housing - steel.
1362	1101 *	Clear lens, Glass.
1363	1101 - R *	Reflex lens, Glass.
1364	1102 *	Retainer, Steel.
1365	1103 **	Rubber Gasket Buna - N
1366	1104 *	Fibre Gasket.
1367	1105	Frost Shield, Lucite. Short.
1368	1105 - L	Frost Shield, Lucite. Long.
1369	1106	O-Ring, Buna N.
NEW STYLE LEVEL EYE II		
13618	1102C *	Clear Lens Assembly. Replaces 1101, 1102, 1104.
13615	1102R *	Reflex Lens Assembly. Replaces 1101-R, 1102, 1104
	19B **	Durable Gasket. Replaces 1103.

NOTES

1

MAKE IT AN ACTROL PART — YOU'LL APPRECIATE THE SERVICE AND BACKING

NOTES

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

PRESSURE CONTROLS

COMMERCIAL

Danfoss

Type KP



KP 1



KP 5A



KP 15

Application KP pressure controls are pressure-controlled electric switches which are used to safeguard against too low a suction pressure and too high a discharge pressure on compressors for refrigeration and air conditioning plants. KP pressure controls are also used for starting and stopping refrigeration compressors and condenser fans.

Design Function A KP pressure control contains a pressure-controlled, single-pole change-over switch whose contact position is dependent on the pressure in the inlet connector. The construction of the control is such that starting and stopping pressures can be set independently.

FOR R12, R22, R500, R502

TYPE	PRESSURE CONNECTION**				LOW PRESSURE (LP)				HIGH PRESSURE (HP)				Function on a Rise in Pressure
	1/4" Flare		1m Cap. Tube		RANGE PSIG	DIFF.* PSI	MAX. TEST PRESS PSIG	RESET	RANGE PSIG	DIFF.* PSI	MAX. TEST PRESS PSIG	RESET	
	CAT NO	CODE NO	CAT NO	CODE NO									

LOW PRESSURE CONTROLS

KP1	1391	60-1101	1392	60-1100	6"-107	10-36	284						Start
KP1 (MR)	1393	60-1103	1394	60-1102	28"-100	fixed 10		min					

HIGH PRESSURE CONTROLS

KP5	1395	60-1171	1396	60-1170					85-455	26-85	469		Stop
KP5 (MR)	1397	60-1173	1398	60-1172					85-455	fixed 43		max	

DUAL PRESSURE CONTROLS

KP15	1399	60-1241	13910	60-1240	6"-107	10-36			85-455	fixed 57			LP Start
KP15 (MR-H)	13911	60-1243	13912	60-1242	6"-107	10-36	284		85-455	fixed 57	469	max	
KP15 (MR-H&L)	13913	60-1245	13914	60-1244	28"-100	fixed 10		min	85-455	fixed 57		max	HP Stop

ACCESSORY — Capillary 1m with 1/4" Flare Nuts Code No. 60-0071

CAT. NO. 13923

FOR R12, R22, R500, R502, R717

TYPE	PRESSURE CONNECTION**				LOW PRESSURE (LP)				HIGH PRESSURE (HP)				Function on a Rise in Pressure
	1/4" Flare		1m Cap. Tube		RANGE PSIG	DIFF.* PSI	MAX. TEST PRESS PSIG	RESET	RANGE PSIG	DIFF.* PSI	MAX. TEST PRESS PSIG	RESET	
	CAT NO	CODE NO	CAT NO	CODE NO									

LOW PRESSURE CONTROLS

KP1A			13915	60-1160	6"-107	10-36	284						Start
KP1A (MR)			13916	60-1161	6"-100	fixed 10		min					

HIGH PRESSURE CONTROLS

KP5A			13917	60-1230					85-455	26-85	469		Stop
KP5A (MR)			13918	60-1231					85-455	fixed 43		max	

DUAL PRESSURE CONTROLS

KP15A			13919	60-1285	6"-107	10-36			85-455	fixed 57			LP Start
KP15A (MR-H)			13920	60-1286	6"-107	10-36	284		85-455	fixed 57	469	max	
KP15A (MR-H&L)			13921	60-1287	28"-100	fixed 10		min	85-455	fixed 57		max	HP Stop

ACCESSORIES

SMALL BRACKET — Code No. 60-1055	CAT. NO. 13924	LARGE BRACKET — Code No. 60-1056	CAT. NO. 13925
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* The Differential is the difference between starting and stopping pressures.

** Pressure Connections: R12, 22, 500, 502 available with flare connections (1/4" Flare) or fixed capillary tube connections (copper capillary tubes, 1m in length and with 1/4" Flare Nuts at both ends; R717 - Ammonia - available with steel capillary tubes, 1m in length).

Permissible ambient temperatures: -50°C to +65°C (+80°C for maximum 2 hours)

Switch: Single Pole change-over switch (SPOT).

Contact Rating: Alternating Current: Non-inductive Load 16A 380V.

Inductive Load 16A 380V.

L.R. (Locked Rotor) 112A = Max. Starting Current.

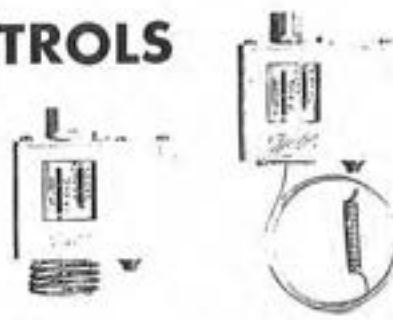
Direct Current: 12W, 220V ... pilot current.

KK.20.B1.02

TEMPERATURE CONTROLS

COMMERCIAL

Thermostats Type KP 61-77



KP 62

KP 61

Applications KP thermostats are temperature-controlled electric switches designed for temperature control of : Large refrigerators and refrigerated display counters, chest freezers and freezer display counters, commercial freezing systems, commercial refrigeration systems and air conditioning systems. KP thermostats can be connected direct to single-phase a.c. motors up to 2 hp, or they can be installed in control circuits for d.c. motors and larger a.c. motors.

Design Function A KP thermostat contains a temperature-controlled single-pole change-over switch whose contact position is dependent on the temperature of the sensor. The design of the thermostat is such that starting and stopping temperatures can be set independently. Temperature variations at the sensor cause pressure variations in the bellows. The main spring can be set to various pressures to balance the pressure in the bellows. The KP is designed so that the snap-function of the switch extends right to the bellows. Thus, the bellows has only two balanced positions, moving only when the cut-in or cut-out values are exceeded. The design of the KP affords the following advantages :
 — High contact ratings — Ultra-short bounce times — High degree of safety against pulsation.
 — Vibration-proof up to 4 g in the range 0 — 1000 Hz. — Long mechanical and electrical life.

TYPE	CAT NO	CODE NO	RANGE °C (°F)	DIFFERENTIAL AT —			CAP. TUBE LGTH.	BULB TYPE	CHARGE	RESET	MAX. AMBIENT TEMP.	MAX. BULB TEMP.				
				LOWEST TEMP SETTING	MID TEMP SETTING	HIGHEST TEMP SETTING										
KP61	14051	60L1100	-30 to +15	4 to 15	min 2	1.5 to 8	2m (6.5 ft.)	Capillary tube No bulb	Vapour Charge		°C -50 to +55	°C 100				
KP61	14052	60L1101					5m (16.5 ft.)									
KP61	14053	60L1102					2m (6.5 ft.)	Capillary tube and 3/8" coiled remote bulb.								
KP62	14054	60L1106	(-22 to +59)	(39 to 59)	(min 36)	(35 to 46)		Coiled Room bulb								
KP63	14055	60L1107	-50 to -10	5 to 15	min. 3	2 to 10	2m	Capillary tube No bulb								
KP63	14056	60L1108					(-58 to +14)	(41 to 59)					(min 37)	(36 to 50)	(6.5 ft.)	Capillary tube and 3/8" coiled remote bulb.
KP68	14057	60L1111	-5 to +35	4 to 15	min 2.5	2 to 10		Coiled Room bulb								
KP69	14058	60L1112					(23 to 95)	(39 to 59)					(min 36)	(36 to 50)		Capillary tube and 3/8" coiled remote bulb.
KP71	14059	60L1113	-5 to +20		2 to 10 (36 to 50)		2m (6.5 ft.)	3/8" diam. cylindrical remote bulb.					Adsorption Charge	min	°F -58 to +149	°F 212
KP71	14060	60L1115		(23 to 68)	fixed 3 (fixed 37)											
KP73	14061	60L1116	-25 to +15		2.5 to 12 (36 to 54)			3/8" diam. double contact bulb								
KP73	14062	60L1117		(-13 to +59)		8 to 20 (46 to 68)			1/4" diam. cylindrical remote bulb.							
KP75	14063	60L1120	10 to 45 (50 to 113)		2.5 to 10 (36 to 50)			25mm diam. duct bulb								
KP77	14064	60L1121	20 to 60 (68 to 140)		3.5 to 15 (38 to 59)			3/8" diam. cylindrical remote bulb.								

Brackets — Refer KP Pressure Controls

KK.20.81.02

Permissible ambient temperature for the Thermostat Housing : -50°C to +65°C (+80°C for maximum 2 hours)
 Switch/Contact rating : Same as for KP Pressure Controls.

TERMINOLOGY

Differential - is the difference between starting and stopping temperature.
 Mechanical differential (self-differential). The differential that is set with the differential spindle.
 Operating differential - is the one at which the plant operates. It is always larger than the mechanical differential.
 Operating differential depends on several factors :

1. Velocity of the medium. The higher the velocity of the air or liquid passing the bulb, the smaller the operating differential will be. Therefore the bulb must always be positioned where the air or liquid circulation is most rapid.
2. Temperature variation of the medium (variation of temperature per time unit). The thermal differential increases with a rising rate of temperature variation.
3. Heat transmission to the sensor. The best possible contact ought to be ensured between the sensor and the medium to be temperature-controlled. Difficulties can arise, especially if the sensor is inserted in a sensor pocket. The use of heat-conductive compound will, normally, result in satisfactory heat transmission.

NOTES

1

SPEEDY SERVICE

WE ARE ORGANIZED TO MAKE PROMPT DELIVERY FROM OUR VAST STOCKS. WHETHER YOUR ORDER IS SMALL OR LARGE WE WILL EXERCISE GREAT CARE IN SELECTING AND PACKING YOUR ORDER. MORE THAN 90% OF ALL ORDERS RECEIVED ARE DESPATCHED THE SAME DAY. WE AIM TO KEEP YOU AND YOUR JOB MOVING SATISFACTORILY.

Danfoss

PRESSURE CONTROLS

Type RT

Type RT is a most versatile instrument housed in a moulded dust-proof case. The pressure or temperature scale is clearly visible through a front window. Extreme versatility is obtained because of the range of interchangeable contacts listed below, that either "break" on fall, "make" on fall, control a signalling device or close two circuits simultaneously. S.P.D.T. contacts are also available for changing over from one circuit to another. The controls are made to suit all Refrigerants including Ammonia and are available for "manual reset" where required.

Types of switch

Code No.	Symbol	Description	Rating
17-4030 CAT. NO. 14127		Single-pole change-over switch (SPDT) with leakage-current proof terminal board. Fitted in all standard versions of Type RT. Momentary contact change-over.	Change-over switches 17-4030 are marked: 10 (4) A 380 V~ 12 W 220 V ~ and have the following ratings: ac non-inductive 10 A 380 V inductive 4 A 380 V full load 20 A 380 V locked rotor dc 12 W 220 V
17-4034 CAT. NO. 14128		Single-pole switch making two circuits at the same time on a rise in the pressure. Momentary contact change-over. With leakage-current proof terminal board.	Switches 17-4034 and 17-4036 are marked: 10 (3) A 380 V ~ 12 W 220 V ~ and have the following ratings: ac non-inductive 10 A 380 V inductive 3 A 380 V full load 20 A 380 V locked rotor dc* 12 W 220 V
17-4036 CAT. NO. 14129		Single-pole switch breaking two circuits at the same time on a rise in the pressure. Momentary contact change-over. With leakage-current proof terminal board.	* If the current is conducted through contacts 1 and 3, i.e. it is connected to terminals 1 and 3 but not 2, the max. permissible rating is increased to 90 W 220 V.

The various switches are shown in the position resulting from pressure drops, i.e. after downward movement of the main spindle of the RT control.

DESCRIPTION	CAT. NO.	TYPE	CODE NO. (1)	RANGE kPa (psig)	DIFFERENTIAL kPa (psi)	MANUAL RESET	Max.(2) TEST PRESS. kPa (psig)	PERMISS. AMBIENT TEMP.	PRESSURE CONNECTION
Refrigerants : R11, R12, R13 B1, R22, R114, R500, R502									
LP CONTROL	14276	RT1	17-5245	-80 to 500	40 to 160(5.8 to 23)	MIN.	2500 (362)	°C -40 to +70	1/4" Flare
	14277	RT1(MR)*	17-5246	(24" to 70)	fixed approx.40(5.8)				3/8" BSP External
	14280	RT200	17-5237	20 to 600	20 to 120(2.9 to 17)				
	14281	RT200(MR)*	17-5239	(2.9 to 87)	20 to 130(2.9 to 19)				
	14282	RT116	17-5203	100 to 1000					
	14283	RT116(MR)*	17-5199	(14 to 145)					
HP CONTROL	14278	RT5 (3)	17-5250	400 to 1700	100 to 400(14.5 to 58)	MAX.	3500 (508)	°F (-40 to +158)	1/4" Flare
	14279	RT5(MR) (3)*	17-5251	(58 to 246)	fixed approx.100(14.5)				3/8" BSP External
	14284	RT117	17-5295	1000to3000 (145 to 435)	60 to 400(8.7 to 58)				

Refrigerants: R717 as well as R11, R12, R13 B1, R22, R114, R500, R502									
LP CONTROL	14285	RT1A	17-5001	-80 to 500	40 to 160(5.8 to 23)	MIN.	2500 (362)	°C -40 to +70	3/8" BSP ext. +6/10 mm dia. weld nipple
	14286	RT1A(MR)*	17-5002	(24" to 70)	fixed approx.40(5.8)				
HP CONTROL	14288	RT5A	17-5046	400 to 1700	100 to 400(14.5 to 58)				
	14289	RT5A(MR)*	17-5047	(58 to 246)	fixed approx.100(14.5)	MAX.		(-40 to +158)	

Refrigerants : R11, R12, R13 B1, R22, R114, R500, R502									
Marine Designs	14292	RT5	17-5253	Same as LP & HP Controls listed above	Same as LP & HP Controls listed above		2500 (362)	°C -40 to +70	3/8" BSP External
	14293	RT116	17-5200				3500 (508)		
	14294	RT117	17-5296				2500 (362)		
	14295	RT200	17-5240					{°F} {-40 to +158}	

DESCRIPTION	CAT. NO.	TYPE	CODE (1) NO.	LP WORKING RANGE kPa (psig)	DIFF. RANGE kPa (psi)	MECH. DIFF. kPa (psi)	MAX. (2) TEST PRESS.	MAX. Bellows Temp.	PERMISS. AMBIENT TEMP.	PRESSURE CONNECTION
Refrigerants: R717 as well as R11, R12, R13 B1, R22, R114, R500, R502										
Diff. Press. Controls	14290	RT260A	17D-0021	-100 to 1200 (29.5" to 174)	50 to 400 (7 to 58)	30 (4.3)	2500 (362)	100°C (212°F)	70°C (158°F)	3/8" BSP ext. +6/10 mm dia. weld nipple
	14291	RT262A	17D-0025	-100 to 600 (29.5" to 87)	10 to 150 (1.4 to 22)	10 (1.4)	1200 (174)	100°C (212°F)	70°C (158°F)	

*Manual reset controls supplied at extra cost on application

(1) With SPDT switch, code No. 17-4030. (2) All pressure controls can withstand a full vacuum. (3) With a seal cap, code No. 17-0895, instead of a knob.

If the regulating bellows of the controls should break, it will have the effect of stopping the refrigeration compressor.

If the outer bellows should break, the breaking pressure of the controls will fall by approx. 392 kPa (57 psi) below the setting.

Accessories: Available on application.

KK.20. B1.02

TEMPERATURE CONTROLS


**Thermostats
Type RT**

RT THERMOSTATS ARE TEMPERATURE-CONTROLLED
ELECTRIC SWITCHES FOR USE IN REFRIGERATION
AND AIR CONDITIONING SYSTEMS



RT 3



RT 11



RT 140



RT 102

Function	Charge	Cat. No.	Type	Code No. (1)	Cap. Lgth. (m)	Range		Adjust. Mech. Differential		Max. Bulb Temp. (2)	Bulb Type and Remarks
						°C	°F	At Min. Temp. Setting °C	At Max. Temp. Setting °C		
Brine Surface or Room Thermo- stat	Vapour	14215	RT10	17-5077	2	-60/-30	-76/-22	1.5 - 11	1 - 5	150	Cylindrical Remote Bulb
		14216	RT10	17-5079	5	"	"	"	"	"	
		14213	RT9	17-5066	2	-45/-15	-49/+5	2 - 10	1 - 4	"	
		14214	RT9	17-5068	5	"	"	"	"	"	
		14221	RT13	17-5097	2	-30/0	-22/+32	1.1 - 7	0.8 - 4	"	
		1422	RT3	17-5014	2	-25/+15	-13/+59	1.5 - 9	"	"	
		1424	RT3	17-5015	3	"	"	"	"	"	
		1425	RT3	17-5016	5	"	"	"	"	"	
	Adsorp- tion	1423	RT3	17-5017	8	"	"	"	"	"	
		1421	RT2	17-5008	2	"	"	5 - 18	6 - 20	"	
		1429	RT7	17-5053	2	"	"	2 - 10	2 - 14	"	
		14210	RT7	17-5054	3	"	"	"	"	"	
		14218	RT12	17-5089	2	-5/+10	+23/+50	1 - 3.5	1 - 3	65	
		14223	RT14	17-5099	2	-5/+30	+23/+86	1.5 - 8	1.5 - 8	150	
		14224	RT14	17-5100	3	"	"	"	"	"	
		14225	RT14	17-5101	5	"	"	"	"	"	
Room Thermo- stats	Vapour	14228	RT15	17-5115	2	+8/+32	+46/+90	"	1.5 - 10	"	
		14217	RT11	17-5083	—	-30/0	-22/+32	1 - 8	0.6 - 4	70	Rigid Coiled Capillary Sensor
		14234	RT34	17-5118	—	-25/+15	-13/+59	1.2 - 12	1.2 - 12	"	
Air Duct T'stat	Adsorp.	1427	RT4	17-5036	—	-5/+30	+23/+86	1 - 7	0.6 - 4	"	Coiled Cap. Sensor on Mount. Flange
Disch. Line Thermo- stats	Adsorp- tion	14235	RT101	17-5003	2	+25/+90	+77/+194	2 - 11	3 - 24	300	Remote Bulb and Bulb Pocket
		14250	RT101	17-5006	3	"	"	"	"	"	Cap. Tube Bulb
		14237	RT101	17-5024	8	"	"	"	"	"	
		14238	RT102	17-5147	2	"	"	2 - 10	"	"	Remote Bulb and Pocket
	Partial	14242	RT107	17-5135	2	+70/+150	+158/+302	5 - 30	1.5 - 10	215	
		14243	RT107	17-5140	5	"	"	"	"	"	
						Mech. Diff.		Max Dead Zone			
Adjust. Dead Zone Thermo- stats	Adsorp- tion	14252	RT8L(3)	17L-0030	2	-20/+12	1.0°C	5	5	145	Remote Bulb
		14253	RT14L(3)	17L-0034	2	-5/+30	1.5°C	5	5	150	
	Vapour	14254	RT16L(3)	17L-0024		0/+38	1.0°C	5	2	100	Rigid Coiled Cap. Sensor
	Adsorp.	14255	RT140L(3)	17L-0031	2	+15/+45	1.2°C	6.8	6.8	240	Same as RT140
						LT Work Range					
Diff. T'stat	Adsorp.	14246	RT270	17D-0031	2 x 5	0/+15	fixed 2	-30 to +40°C		65	2 Remote Bulbs

(1) With SPDT switch Code No. 17-4030

(2) Ambient temperature for housing: -40 to +70°C

(3) With Dead Zone switch Code No. 17-4032

Accessories : Including Manual reset controls supplied at extra cost on application.

KK.20.B1.02

PENN PRESSURE CONTROLS

SERIES P20 — P67 — P70

P20 SERIES AIR CONDITIONING LIMIT

FIELD REPLACEMENT CONTROL

Field replacement Series P20 controls for R-12 and R-22. Dust-tight contact unit with Arctics connectors. 1 m (36") capillary with 1/8" sweat section. Screwdriver adjustment is provided. Mounting bracket supplied on all models.



P20DB-1



SERIES P67



P70AB-36



P70CA-81



P70AA-146



P70KA-11

Cat. No.	Type	Switch Action	Range of Cut-Out		Differential		Setting				Max. Bellows Pressure	
			kPa	psig	kPa	psi	Opens		Closes		kPa	psig
14355	P20BB-1	Open On Fall	48 to 1034	7 to 150	Manual Reset		276	40	Lockout Man. Reset		1724	250
14356	P20DB-1	Open On Rise	690 to 3103	100 to 450	Manual Reset		2758	400	Lockout Man. Reset		3103	450
14357	P20EB-1	SPDT	48 to 1034	7 to 150	172 Fixed	25 Fixed	276	40	448	65	1724	250
14358	P20EB-2	SPDT	690 to 3103	100 to 450	483 Fixed	70 Fixed	2758	400	2275	330	3103	450

P67 SERIES LOW PRESSURE

LOW AND LINE VOLTAGE - RANGE 20 to 207 kPa (3 TO 30 PSIG)

These two pole controls are designed for applications where air pressure operates an electric device. Typical uses include control of air compressors, fans, pilot lights etc. Double pole, single break models are supplied in both normally open and normally closed constructions. A four wire, two circuit block permits the main contacts to open; simultaneously closing the auxiliary contacts. Pressure element has 1/8" male NPT connector. Non-metallic diaphragm is positioned by air pressure. Range and differential settings are field adjustable.

Cat. No.	Type	Control Action	Scale Range *		Differential	
			kPa	psig	kPa	psig
14351	P67AA-8	DPST — Opens on pressure drop.	20 to 207	3 to 30	10 — 138 Adjustable	1 1/2 — 20 Adjustable
14352	P67CA-1	DPST — Opens on pressure rise.				
14353	P67EA-9	L - M2 contacts make on pressure rise — simultaneously the L - M1 contacts break				
14354	P67FA-6	L - M2 contacts break on pressure rise — simultaneously the L - M1 contacts make				

* Range is minimum cut-out to maximum cut-in on "Open Low" controls. It is minimum cut-in to maximum cut-out on "Open High" controls.

P70 SERIES

Cat. No.	Type	Switch Action	Range kPa (psig approx)	Differential		Pressure Connector	Limited Knob Adjust.	Max. Bellows Pressure	
				kPa	psi			kPa	psig

SINGLE POLE LOW PRESSURE

"ALL RANGE" FOR R12, R22, R500, R502

1436	P70AB-31	Close High Open Low	-70 to 700 (20" to 100)	Min. 41 Max. 345	Min. 6 Max. 50	1/2" Male Flare Conn.	Cut-out	2241	325
1437	P70AB-36	Close High Open Low	-70 to 700 (20" to 100)	Min. 41 Max. 345	Min. 6 Max. 50	3/8" Cap. with 1/4" Fl. Nut	Cut-out	2241	325
1438	P70CA-89	Open High Close Low	-70 to 700 (20" to 100)	Min. 41 Max. 345	Min. 6 Max. 50	3/8" Cap. with 1/4" Fl. Nut	None	2241	325

FOR AMMONIA

1434	P70AA-120	Close High Open Low	-70 to 700 (20" to 100)	Min. 41 Max. 345	Min. 6 Max. 50	1/2" Female NPT	None	2241	325
14311	P70CA-87	Open High Close Low	-70 to 700 (20" to 100)	Min. 41 Max. 345	Min. 6 Max. 50	1/2" Female NPT	None	2241	325

Adjusting knob supplied on differential (cut-out setting) to limit adjustments to 35 kPa (5psi) above or below normal setting.

SINGLE POLE HIGH PRESSURE

"ALL RANGE" FOR R12, R22, R500, R502

1439	P70CA-81	Open High Close Low	400 to 3100 (58 to 450)	Min. 414 Max. 1034	Min. 60 Max. 150	1/2" Male Flare Conn.	None	3275	475
14310	P70CA-86	Open High Close Low	400 to 3100 (58 to 450)	Min. 414 Max. 1034	Min. 60 Max. 150	3/8" Cap. with 1/4" Fl. Nut	None	3275	475
14313	P70DA-41	Open High Close Low	250 to 3000 (36 to 435)	Lockout (Requires Manual Reset)		3/8" Cap. with 1/4" Fl. Nut	None	3275	475

FOR AMMONIA

1433	P70AA-146	Close High Open Low	400 to 2000 (58 to 290)	Min. 138 Max. 690	Min. 20 Max. 100	1/2" Female NPT Conn.	None	2758	400
14312	P70CA-89	Open High Close Low	400 to 3100 (58 to 450)	Min. 414 Max. 1034	Min. 60 Max. 150	1/2" Female NPT Conn.	None	3275	475
14314	P70DA-43	Open High Close Low	250 to 3000 (36 to 435)	Lockout (Requires Manual Reset)		1/2" Female NPT Conn.	None	3275	475

HIGH PRESSURE CUT-OUT WITH ALARM CIRCUIT

"ALL RANGE" FOR R12, R22, R500, R502

14329	P70KA-11	L-M1 Close High L-M2 Open High 4-Wire 2-Circuit	400 to 3100 (58 to 450)	Lockout (Requires Manual Reset after Cut-out)		3/8" Cap. with 1/4" Fl. Nut		3275	475
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ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 143-f for English to Metric Cross Reference Chart.

CONVERSION: 1 bar = 100kPa
Refer Charts Pages 330/358-a/457

PENN PRESSURE CONTROLS

SERIES P70



P70LN-8, P70LN-11



P70LA-90



P70LB-12

P70 SERIES - Continued

Cat. No.	Type	Switch Action	LOW PRESSURE				HIGH PRESSURE				Pressure Connector	Limit Knob Adj.	Max. Bellows Pressure	
			Range		Differential		Range		Differential, Non-Adjust.				kPa	psig
			kPa	psig	kPa	psi	kPa	psig	kPa	psi				
SINGLE POLE DUAL PRESSURE														
"ALL RANGE" FOR R12, R22, R502														
14316	<u>P70LB-12</u>	SPST	-70 to 700	20" to 100	Min.41 Max. 345	Min. 6 Max.50	1000 to 3000	145 to 435	Under 2069, 379. Over 2069, 448.	Under 300, 55. Over 300, 65	36" Cap. with 1/2" Flare Nut	** Cut-out	2241L 3103H	325 Low 450 High
14317	<u>P70MA-46</u>	SPST	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	1000 to 3000	145 to 435	Lockout (Requires Manual Reset)		36" Cap. with 1/2" Flare Nut	None	2241L 3103H	325 Low 450 High
14319	<u>P70NA-19</u>	SPST	-70 to 700	20" to 100	Lockout - Manual Reset		1000 to 3000	145 to 435	Lockout (Requires Manual Reset)		36" Cap. with 1/2" Flare Nut	None	2241L 3103H	325 Low 450 High
** Adjusting knob supplied on differential (low side cutout setting) to limit adjustment 35kPa (5psi) above or below setting.														

** Adjusting knob supplied on differential (low side cutout setting) to limit adjustment 35kPa (5psi) above or below setting.

TRUCK REFRIGERATION - ADJ. DIFF. - WITH LOW LIMIT STOPS

14360	<u>P70LN-8</u>	SPST	Low Limit Stop Set 14kPa(2psig) for R502				Set and sealed at 2724kPa(395psig) for R502				48" Cap. with 1/2" Flare Nut	None	2241L 3103H	325 Low 450 High
14361	<u>P70LN-11</u>	SPST	Low Limit Stop Set -41kPa(12"Hg) for R12				Set and sealed at 2034kPa(295psig) for R12				48" Cap. with 1/2" Flare Nut	None	2241L 3103H	325 Low 450 High

FOR AMMONIA

14315	<u>P70LA-90</u>	SPST	-70 to 700	20" to 100	Min. 41 Max. 345	Min. 6 Max. 50	1000 to 3000	145 to 435	Under 2069, 379. Over 2069, 448.	Under 300, 55. Over 300, 65	1/2" Female NPT Conn.	None	2241L 3103H	325 Low 450 High
14318	<u>P70MA-47</u>	SPST	-70 to 700	20" to 100	Min. 41 Max. 345	Min. 6 Max. 50	1000 to 3000	145 to 435	Lockout (Requires Manual Reset)		1/2" Female NPT Conn.	None	2241L 3103H	325 Low 450 High

P70 SERIES 4 - WIRE 2 CIRCUIT CONTACT BLOCK

These controls have a 4 - wire, two circuit contact block with the main contacts controlling the main electrical load; the auxiliary contacts operate simultaneously to actuate a signal or auxiliary alarm. Main contacts (LINE - M2) open on pressure rise or pressure drop; simultaneously the auxiliary contacts (LINE - M1) operate in reverse action to the main contacts. The electrical contacts operate from pressure elements.

Cat. No.	Type	Switch Action	Range		Differential		Press. Conn.	Max. Bellows Pressure	
			kPa	psig	Min.	Max.		kPa	psig

FOR AMMONIA

SINGLE FUNCTION LOW PRESSURE

14337	<u>P70JA-25</u>	Open High	-70 to 700	20" to 100	41	6	345	50	1/2" Female NPT Conn.	2241	325
14338	<u>P70HA-4</u>	Open Low	-70 to 700	20" to 100	Auto-Reset				1/2" Female NPT Conn.	2241	325
14342	<u>P70GA-11</u>	Open Low	-68 to 690	20" to 100	41	6	345	50	1/2" Female NPT Conn.	2241	325

SINGLE FUNCTION HIGH PRESSURE

14339	<u>P70JA-21</u>	Open High	345 to 1655	50 to 240	138	20	690	100	1/2" Female NPT Conn.	1862	270
14340	<u>P70KA-13</u>	Open High	400 to 250 to 3100	55 to 36 to 450	Auto-Reset				1/2" Female NPT Conn.	3275	475

DUAL PRESSURE

14341	<u>P70QB-1</u>	Low Side - Open Low High Side - Open High	LP: 68 to 690 HP: 690 to 2930	LP: 20" to 100 HP: 100 to 425	41	6	345	50	1/2" Female NPT Conn.	2241	325
14344	<u>P70RB-1</u>	LP: Open Low HP: Open High	LP: 68 to 690 HP: 690 to 2930	LP: 20" to 100 HP: 100 to 425	Manual Reset				1/2" Female NPT Conn.	2241	325

ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales - Refer Tech. Page 143-f for English to Metric Cross Reference Chart.

PENN CONTINUED NEXT PAGE

NOTE: CONVERSION FOR CONTROLS CALIBRATED IN BARS.
PRESSURE: 1 bar = 100 kPa. VACUUM: -0.1 bar = -10 kPa.
Refer Page 457 for full details - Also Charts on Pages 330 and 358-a.

OUR COMPLETE INVENTORY ASSURES PROMPT SERVICE

PENN PRESSURE CONTROLS

SERIES P72 — P80

P72 SERIES



P72AA-31
P72CA-26



P72LB-4

Cat. No.	Type	Switch Action	Range		Differential		Press. Conn.	Knob Adjust.	Max. Bellows Pressure	
			kPa	psig	kPa	psi			kPa	psig

TWO POLE LOW PRESSURE "ALL RANGE" FOR R12, R22, R500, R502

14320	P72AA-31	DPST Close High Open Low	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	36"Cap.with 1/4"Flare Nut	None	2241	325
14321	P72AB-4	DPST Close High Open Low	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	36"Cap.with 1/4"Flare Nut	Cutout Adj. limited to 7 psi	2241	325

Adjusting knob supplied on differential (cutout setting) to limit adjustments to 35 kPa (5psi) above or below normal setting.

TWO POLE HIGH PRESSURE "ALL RANGE" FOR R12, R22, R500, R502

14322	P72CA-26	DPST Open High Close Low	400 to 3100	58 to 450	Min.414 Max.1034	Min.60 Max.150	36"Cap.with 1/4"Flare Nut		3275	475
14323	P72DA-7	DPST Open High Close Low	400 to 3100	58 to 450	Lockout (Requires Manual Reset)		36"Cap.with 1/4"Flare Nut		3275	475

Cat. No.	Type	Switch Action	Low Pressure		High Pressure		Press. Conn.	Knob Adjust.	Max. Bellows Pressure	
			Range	Differential	Range	Diff. (Non-Adjust.)			kPa	psig

TWO POLE DUAL PRESSURE "ALL RANGE" FOR R12, R22, R500, R502

14324	P72LA-12	DPST	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	1000 to 3000	145 to 435	Under 2069 379.Over 2069:448	Under 300:55 Over 300:65	36"Cap.with 1/4"Flare Nut	None	2241L 3275H	325 Low 475 High
14325	P72LB-4	DPST	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	1000 to 3000	145 to 435	Under 2069 379.Over 2069:448	Under 300:55 Over 300:65	36"Cap.with 1/4"Flare Nut	LP Cutout Adj.limited to 7 psi	2241L 3275H	325 Low 475 High
14326	P72MA-6	DPST	-70 to 700	20" to 100	Min.41 Max.345	Min.6 Max.50	1000 to 3000	145 to 435	Lockout (Requires Manual Reset)		36"Cap.with 1/4"Flare Nut	None	2241L 3275H	325 Low 475 High
14327	P72NA-4	DPST	-70 to 700	20" to 100	Lockout (Requires Manual Reset)		1000 to 3000	145 to 435	Lockout (Requires Manual Reset)		36"Cap.with 1/4"Flare Nut	None	2241L 3275H	325 Low 475 High

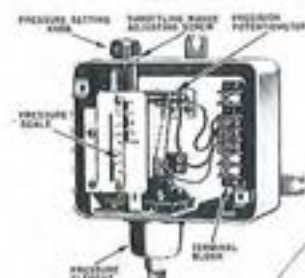
Adjusting knob supplied on differential, Type P72LB-1 (low side cutout setting) to limit adjust. 35kPa (5psi) above or below normal setting.

TRUCK REFRIGERATION — ADJ. DIFF. — WITH LOW LIMIT STOPS

14366	P72LQ-3	DPST	Low Setting Stop Set 40kPa (12"Hg) for R12		Set and sealed at 2034kPa (295psig) for R12		48"Cap.with 1/4"Flare Nut	None	2241L 3103H	325 Low 450 High
14367	P72LQ-4	DPST	Low Setting Stop Set 14kPa (2psig) for R502		Set and sealed at 2724kPa (395psig) for R502		48"Cap.with 1/4"Flare Nut	None	2241L 3103H	325 Low 450 High

P80 SERIES PROPORTIONAL PRESSURE CONTROLS

HEAVY DUTY DUST-TIGHT, SPLASH PROOF ENCLOSURE



TYPE P80ABA

Series P80 proportional pressure control positions a Series M80 motor actuator for control of air dampers, valves and similar devices. Adjustable throttling range on all models permits "on the job" selection of the correct throttling range for stable control. Controllers have a 1/4" male NPTF connector.

Cat. No.	Type	Range		Applica- tion	Potenti- ometer in Ohms	Throttling Range				Max. Element Pressure	
		kPa	psig			Min.	Max.	kPa	psi	kPa	psig

ONE POTENTIOMETER

14349	P80ABA-43	-70 to 500	20" to 80	R717	135	48	7	145	21	2241	325
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FLOATING ACTION — SPDT CONTACTS

14350	P80BAA-4	-70 to 500	20" to 80	R717	—	1.4	0.2	5.5	0.8	2241	325
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Electrical Rating: 24V, AC only.

ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 143-f for English to Metric Cross Reference Chart.

NOTE: CONVERSION FOR CONTROLS CALIBRATED IN BARS.
PRESSURE: 1 bar = 100 kPa. VACUUM: -0.1 bar = -10 kPa.
Refer Page 457 for full details — Also Charts on Pages 330 and 358-a.

THERE'S JUST NOT ENOUGH SPACE TO LIST ALL OF THE EQUIPMENT AND SERVICES WE CAN OFFER YOU
LET US KNOW ABOUT YOUR REQUIREMENTS

PENN P77/P78 Single and Dual Pressure Controls

For refrigeration, airconditioning and heatpump application

NEW!

Including Metric Scales



P77 Single Pressure Control

AMBIENT TEMPERATURE LIMITS

-50°C to +55°C
(+70°C Max. duration 2 hours)

ELECTRICAL RATING
10 FLA @ 240V, 50 Hz.

ADJUSTMENT

On most models* the range scale indicates the high switching point. To obtain low switch point deduct differential value from high switching point.

* Exceptions:

P77BCA and LP-side of P78PGA where the range scale indicates the low switching point.

FEATURES

- All models have splash-proof enclosure - Case & Cover: Aluminium diecast
- SPDT contacts standard on all P77 single pressure controls.
- All dual pressure controls have two alarm circuits for separate low pressure and high pressure cut-out indication.
- Ease of wiring and adjustment • Stable switching points • Leakproof bellows

SINGLE PRESSURE CONTROLS

Cat. No.	Type	Contact Function	Range		Differential		Press. Conn.	Max. Bellows Pressure
			kPa	psig	kPa	psi		

LOW PRESSURE CONTROLS FOR NON-CORROSIVE REFRIGERANTS

14380	P77AAA-9302	Diag. 1	-30 to 200	9" to 29	30 to 150	4.4 to 22	Style 5	400kPa 58 psig
14381	P77AAA-9300	Diag. 1	-50 to 700	15" to 102	50 to 300	7.3 to 44	Style 5	1400kPa 203 psig
14382	P77BCA-9300	Diag. 1	-50 to 700	15" to 102	Manual Reset		Style 5	1400kPa 203 psig
14385	P77AAA-9301	Diag. 1	100 to 1000	14.5 to 145	100 to 300	14.5 to 44	Style 5	1500kPa 218 psig

L.P. CONTROLS FOR AMMONIA & NON-CORROSIVE REFRIGERANTS

14383	P77AAA-9700	Diag. 1	-50 to 700	15" to 102	50 to 300	7.3 to 44	Style 15	1400kPa 203 psig
14384	P77BCA-9700	Diag. 1	-50 to 700	15" to 102	Manual Reset		Style 15	1400kPa 203 psig

H.P. CONTROLS FOR NON-CORROSIVE REFRIGERANTS

14387	P77AAA-9350	Diag. 2	300 to 3000	44 to 435	300 to 1200	44 to 174	Style 5	3300kPa 479 psig
14388	P77BEA-9350	Diag. 3	300 to 3000	44 to 435	Manual Reset		Style 5	3300kPa 479 psig
14386	P77AAA-9351	Diag. 2	350 to 2100	51 to 305	180 to 550	26 to 80	Style 5	3000kPa 435 psig

H.P. CONTROLS FOR AMMONIA & NON-CORROSIVE REFRIGERANTS

14389	P77AAA-9750	Diag. 2	300 to 3000	44 to 435	300 to 1200	44 to 174	Style 15	3300kPa 479 psig
14390	P77BEA-9750	Diag. 3	300 to 3000	44 to 435	Manual Reset		Style 15	3300kPa 479 psig

DUAL PRESSURE CONTROLS

Cat. No.	Type	Control Function	LOW PRESSURE				HIGH PRESSURE				Press. Conn.	Max. Bellows Pressure	
			Range		Differential		Range		Differential			kPa	psig
			kPa	psig	kPa	psi	kPa	psig	kPa	psi			

DUAL PRESSURE CONTROLS FOR NON-CORROSIVE REFRIGERANTS

14395	P78LCA-9300	Diag. 4	-50 to 700	15" to 102	50 to 300	7.3 to 44	300 to 3000	44 to 435	300 (fixed)	44 (fixed)	Style 5	1400L 3300H	203 Low 479 High
14397	P78MCA-9300	Diag. 4	-50 to 700	15" to 102	50 to 300	7.3 to 44	300 to 3000	44 to 435	Manual Reset		Style 5	1400L 3300H	203 Low 479 High
14399	P78PGA-9300	Diag. 4	-50 to 700	15" to 102	Man. Reset		300 to 3000	44 to 435	Manual Reset		Style 5	1400L 3300H	203 Low 479 High

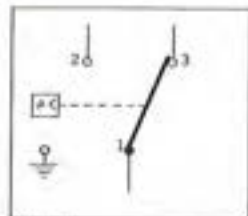
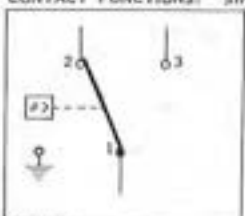
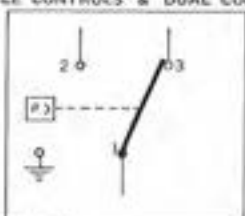
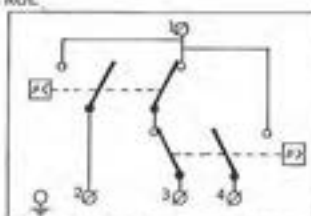
DUAL PRESSURE CONTROLS FOR AMMONIA AND NON-CORROSIVE REFRIGERANTS

14396	P78LCA-9700	Diag. 4	-50 to 700	15" to 102	50 to 300	7.3 to 44	300 to 3000	44 to 435	300 (fixed)	44 (fixed)	Style 15	1400L 3300H	203 Low 479 High
14398	P78MCA-9700	Diag. 4	-50 to 700	15" to 102	50 to 300	7.3 to 44	300 to 3000	44 to 435	Manual Reset		Style 15	1400L 3300H	203 Low 479 High

ACCESSORIES

14379	271-51	Mounting Bracket
14380	SPC-999	900mm Capillary with 2 Flare Nuts.

CONTACT FUNCTIONS: SINGLE CONTROLS & DUAL CONTROL

Diagram 1.
1-3 open on pressure decreaseDiagram 2.
1-2 open on pressure increaseDiagram 3.
1-3 open on pressure increaseDiagram 4.
LP 1-3 open on pressure decrease
1-2 close simultaneously
HP 1-3 open on pressure increase
1-4 close simultaneously

PRESSURE CONNECTORS

Style 5.
Male Connector
7/16 - 20 UNF for
1/8" 6 mm flare nut

Style 15.
Female Connector
1/2" - 18 NPT

SAGINOMIYA PRESSURE CONTROLS

TYPES SNS — HNS — DNS



TYPE SNS



TYPE HNS

TYPE SNS — Single Function Pressure Control for Universal Application.

TYPE HNS — Single Function Pressure Control for High Pressure Protection.

TYPE DNS — Dual Pressure Control for wide range Low and High Side Pressure Protection.

- For use with Fluorinated Refrigerants.
- Single Pole Double Throw mechanisms — double snap-action — reliable switching.
- Direct Flare Connections or Capillary types available.
- Standard 10 Amp Rating. 20 Amp Rated Models (SNS/DNS) available on application.



TYPE DNS

CAT. NO.	TYPE	SWITCH ACTION	RANGE		DIFFERENTIAL		CONNECTIONS
			kPa	psig	kPa	psi	

LOW AND HIGH PRESSURE — AUTO RESET — ADJUSTABLE DIFFERENTIAL

143101	SNS-C101X	SPDT	-60 to 100	18" to 14	15 to 50	2 to 7	1/2" SAE Male Flare
143102	SNS-C101XQ						1m Capillary with 1/2" SAE Flare Nut
143103	SNS-C102X	SPDT	-20 to 200	6" to 29	25 to 150	3.5 to 22	1/2" SAE Male Flare
143104	SNS-C102XQ						1m Capillary with 1/2" SAE Flare Nut
143105	SNS-C103X	SPDT	-60 to 300	18" to 44	35 to 200	5 to 29	1/2" SAE Male Flare
143106	SNS-C103XQ						1m Capillary with 1/2" SAE Flare Nut
143107	SNS-C106X	SPDT	-60 to 600	18" to 87	60 to 400	9 to 58	1/2" SAE Male Flare
143108	SNS-C106XQ						1m Capillary with 1/2" SAE Flare Nut
143113	SNS-C130X	SPDT	500 to 3000	73 to 435	300 to 1000	44 to 145	1/2" SAE Male Flare
143114	SNS-C130XQ						1m Capillary with 1/2" SAE Flare Nut

LOW AND HIGH PRESSURE — MANUAL RESET

143115	SNS-C102XM2	SPDT	-20 to 200	6" to 29	Manual Reset		1/2" SAE Male Flare
143116	SNS-C102XM2Q						1m Capillary with 1/2" SAE Flare Nut
143117	SNS-C106XM2	SPDT	-60 to 600	18" to 87	Automatic Operation		1/2" SAE Male Flare
143118	SNS-C106XM2Q						1m Capillary with 1/2" SAE Flare Nut
143119	SNS-C130XM2	SPDT	500 to 3000	73 to 435	on Pressure Decrease		1/2" SAE Male Flare
143120	SNS-C130XM2Q						1m Capillary with 1/2" SAE Flare Nut

HIGH PRESSURE — AUTO AND MANUAL RESET

143121	HNS-C130X	SPDT	800 to 3000	116 to 435	Fixed Approx. 4000 (58)		1/2" SAE Male Flare
143122	HNS-C130XQ						1m Capillary with 1/2" SAE Flare Nut
143123	HNS-C130XM1	SPDT	800 to 3000	116 to 435	Manual Reset, Auto. Operation on Press. Increase		1/2" SAE Male Flare
143124	HNS-C130XM1Q						1m Capillary with 1/2" SAE Flare Nut

CAT. NO.	TYPE	LOW SIDE				HIGH SIDE				CONNECTIONS
		RANGE		DIFFERENTIAL		RANGE		DIFFERENTIAL		
		kPa	psig	kPa	psi	kPa	psig	kPa	psi	

DUAL PRESSURE — AUTO RESET

143128	DNS-D306X	-60 to 600	18" to 87	55 to 400	8 to 58	800 to 3000	116 to 435	Fixed	Fixed	1/2" SAE Male Flare
143129	DNS-D306XQ									1m Cap. with 1/2" SAE Flare Nut
143130	DNS-D606X							400	58	1/2" SAE Male Flare
143131	DNS-D606XQ							Approx.	Approx.	1m Cap. with 1/2" SAE Flare Nut
143132	DNS-D706X							Fixed	Fixed	1/2" SAE Male Flare
143133	DNS-D706XQ							500 App.	73 App.	1m Cap. with 1/2" SAE Flare Nut

DUAL PRESSURE — MANUAL RESET — HIGH SIDE

143136	DNS-D306XM	-60 to 600	18" to 87	55 to 400	8 to 58	800 to 3000	116 to 435	Manual Reset Auto. Operation on Pressure Rise		1/2" SAE Male Flare
143137	DNS-D306XMQ									1m Cap. with 1/2" SAE Flare Nut
143138	DNS-D606XM									1/2" SAE Male Flare
143139	DNS-D606XMQ									1m Cap. with 1/2" SAE Flare Nut

DUAL PRESSURE — MANUAL RESET — HIGH AND LOW SIDE

143140	DNS-D606XMM	-60 to 600	18" to 87	Manual Reset Auto. Operation on Pressure Decrease		800 to 3000	116 to 435	Manual Reset Auto. Operation on Pressure Rise		1/2" SAE Male Flare
143141	DNS-D606XMMQ									1m Cap. with 1/2" SAE Flare Nut
143142	DNS-D706XMM									1/2" SAE Male Flare
143143	DNS-D706XMMQ									1m Cap. with 1/2" SAE Flare Nut

DUAL PRESSURE — MANUAL RESET — HIGH SIDE — WITH ALARM LIGHT

143144	DNS-D306XML	-60 to 600	18" to 87	55 to 400	8 to 58	800 to 3000	116 to 435	Man. Reset, Auto. Op. on Press. Rise		1/2" SAE Male Flare
143145	DNS-D306XMLQ									1m Cap. with 1/2" SAE Flare Nut

REFER NEXT PAGE FOR ELECTRICAL DETAILS

SAGINOMIYA PRESSURE CONTROLS

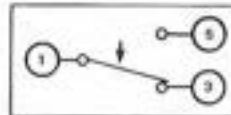
TYPES SNS — HNS — DNS

ELECTRICAL DETAILS

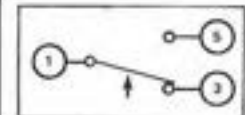
1

SINGLE LOW AND HIGH PRESSURE

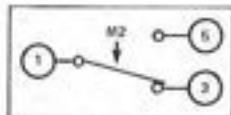
SNS - C1

Low & High
Pressure
Adjustable
Differential

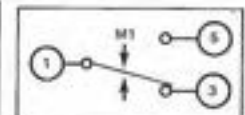
HNS - C1

High
Pressure
Auto
Reset

SNS - C1 ~ M2

Low & High
Pressure
Manual
Reset

HNS - C1 ~ M1

High
Pressure
Manual
Reset

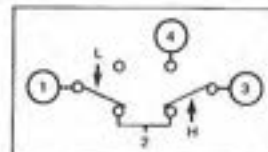
SNS { 1. Common Terminal
2. Close on Pressure Increase
3. Close on Pressure Decrease

HNS { 1. Common Terminal
2. Open on Pressure Increase
3. Open on Pressure Decrease

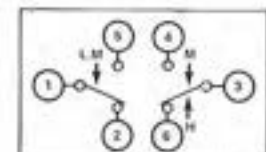
NOTE : In the above diagrams, each arrow marking indicates a direction of pressure rise.
"M1" signifies automatic operation on pressure increase and manual reset, and "M2" automatic operation on pressure decrease and manual reset.

DUAL PRESSURE

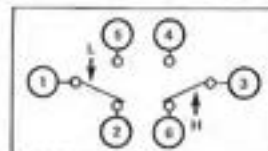
DNS - D3

Dual
Pressure
Auto
Reset

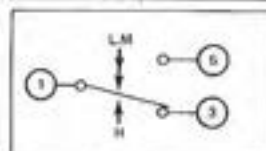
DNS - D6 MM

Dual
Pressure
Manual
Reset
on
High
&
Low
Side

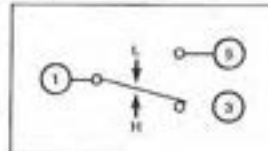
DNS - D6

Differential
on
High
Side
Fixed

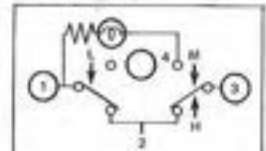
DNS - D7 MM

Dual
Pressure
Manual
Reset
on
High
&
Low
Side

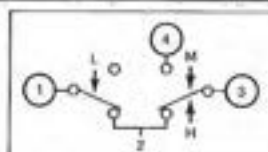
DNS - D7

Dual
Pressure
Manual
Reset
on
High
Side

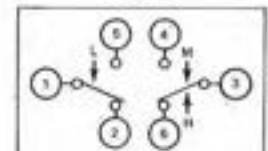
DNS - D3 ML

Dual Pressure
Manual Reset
High Side
with
Alarm Light

DNS - D3 M

Dual
Pressure
Manual
Reset
on
High
Side

DNS - D6 M

Dual
Pressure
Manual
Reset
on
High
Side

NOTE :

In the Dual Pressure Control diagrams, each arrow marking indicates a direction of switch action. "L" signifies Low Pressure Side, "H" High Pressure Side and "M" Manual Reset. (The arrow "↓ M" means that if pressure rises, reset may not be achieved unless it is made manually).

ELECTRICAL RATINGS (Main Operating Contacts)

MOTOR RATING	SINGLE LOW & HIGH PRESSURE	DUAL PRESSURE
125/250 VAC, 50/60 Hz	SNS - C1 & HNS - C1	DNS - D3, D6, D7
Running Current	10A	10A
Locked Rotor Amps	60A	60A
Non-Inductive Amps	10A	10A

REFER PREVIOUS PAGE FOR SELECTION AND ORDERING

PENN TEMPERATURE CONTROLS

SERIES A11 — A19



A11B-6

CAT. NO.	TYPE	Switch Action Application	Range		Differential		Bulb and Capillary	Range Adjust.
			°C	°F	°C	°F		

A11 SERIES LOW TEMPERATURE

TEMPERATURE — MAKE UP AIR HEATER COIL

14438	A11A-6	SPST Open Low	2 to 7	35 to 45	Manual Reset		20' of 1/8" O.D. Tubing	Screwdriver Slot
14461	A11B-6	SPST Open Low	2 to 7	35 to 45	4.4 (fixed)	8 (fixed)	20' of 1/8" O.D. Tubing	Screwdriver Slot

Maximum bulb temperature of A11A-6 and A11B-6 is 121°C (250°F)

A19 SERIES

REMOTE BULB

WIDE RANGE — ADJUSTABLE DIFFERENTIAL

1444	A19ABC-60	SPDT	10 to 55	50 to 130	1.9 to 8	3 1/2 to 14	3/8" x 5" 8' Cap.	Knob
14410	A19ABC-41	SPDT	-35 to 40	-31 to 104	1.7 to 6.7	3 to 12	3/8" x 4" 8' Cap.	Convertible
14457	A19ABC-67	SPDT	-35 to 40	-31 to 104	1.7 to 6.7	3 to 12	3/8" x 4" 20' Cap.	Convertible
14456	A19ABC-57	SPDT	-35 to 40	-31 to 104	1.7 to 6.7	3 to 12	3/8" x 4" 10' Cap.	Screwdriver Slot

FIXED DIFFERENTIAL

14462	A19AAA-43	SPST Open Low	0 to 43	32 to 110	1.9	3 1/2	12' Averaging 6' Cap.	Screwdriver Slot
14463	A19AAF-12	SPDT	-4 to 107	25 to 225	1.9	3 1/2	3/8" x 3" 10' Cap.	Screwdriver Slot

CASE COMPENSATED — FIXED DIFFERENTIAL

14428	A19AAC-51	SPDT	-15 to 25	5 to 77	2.8	5	3/8" x 4" 6' Cap.	Screwdriver Slot
14427	A19AAD-21	SPST Open Low	-35 to 10	-31 to 50	1.4	2 1/2	3/8" x 4" 7' Cap.	Screwdriver Slot

CLOSE DIFFERENTIAL

14450	A19AAD-5 (1)	SPST Open Low	-1 to 10	30 to 50 Milk Cooler	1.1	2	3/8" x 2-5/8" Tin Plated 6' Cap.	Screwdriver Slot
14458	A19AAF-45	SPDT	-35 to 40	-31 to 104	1.4	2 1/2	3/8" x 4" 6' Cap.	Screwdriver Slot
14469	A19AAF-44	SPDT	5 to 30	41 to 86	0.8	1 1/2	3/8" x 5-3/4" 6' Cap.	Screwdriver Slot

MANUAL RESET

14459	A19ACA-28	SPST Open Low	-35 to 40	-31 to 104	Manual Reset		3/8" x 4" 6' Cap.	Screwdriver Slot
14426	A19ACA-31	SPST Open Low	-35 to 40	-31 to 104	Manual Reset		3/8" x 4" 10' Cap.	Screwdriver Slot
14471	A19ADB-26	SPST Open High	40 to 120	104 to 248	Manual Reset		3/8" x 3W" 6' Cap.	Knob

Maximum bulb temperatures: A19ABC-60, 77°C (170°F); A19AAF-12, 135°C (275°F); A19AAD-5, 85°C (190°F); A19ADB-26, 143°C (290°F); All other A19's, 60°C (140°F).

(1) Case Compensated.

HIGH RANGE TEMPERATURE

14443	A19AAB-32	SPST Open High Remote Bulb Thermostat	0 to 43	32 to 110	1.9	3 1/2	3/8" x 4-3/4" copper 6' Cap.**	Screwdriver Slot Ext. Scale
14445	A19AAB-37	SPST Open High Oven Thermostat	40 to 150	104 to 302	3.9	7	3/16" x 10-1/8" copper 6' Cap.	Knob External Scale
14446	A19AAB-42	SPST Open High Oven Thermostat	100 to 290	212 to 554	5.6	10	3/16" x 5-5/8" copper 6' Cap.	Convertible
14444	A19AAC-44*	SPDT Dual Fuel Changeover + bulb shield	-35 to 10 + bulb shield	-31 to 50 + bulb shield	2.8	5	3/8" x 4" copper 6' Cap.**	Screwdriver Slot Int. Scale
14441	A19AAC-13	SPDT	40 to 120	104 to 248	2.8	5	3/8" x 3-7/8" copper 6' Cap.**	Screwdriver Slot Ext. Scale

* Locking cover and bulb shield assembly are standard on A19AAC-44

** With 3" bulb support.

SPECIAL PURPOSE — RUBBER COATED BULB AND CAPILLARY

14442	A19AAF-38	SPDT	5 to 32	41 to 90	0.8	1 1/2	3/8" x 5-3/4" Rubb. Coated 6' Cap.	Screwdriver Slot
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Maximum bulb temperature is 60°C (140°F)



A19ABC-41



A19AAB-42



A19AAC-13



A19AAF-38

ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

UNIVERSAL REPLACEMENT with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment. Remote bulb models complete with 5/8" mounting clip.

PENN CONTINUED NEXT PAGE

PENN TEMPERATURE CONTROLS

SERIES A19

A19 SERIES (Continued)

REMOTE BULB

CAT. NO.	Type	Switch Action Application	Range		Differential		Bulb & Capillary	Range Adjuster
			°C	°F	°C	°F		

THERMOSTATS FOR CROP DRYING

14447	<u>A19AAE-16</u>	SPST Open High	25 to 80	77 to 176	0.8 fixed	1 1/2 fixed	1-1/8" x 1-1/4" copper coiled 10' Cap.	Knob Ext. Scale
14464	<u>A19ABB-7</u>	SPST Open High	10 to 94	50 to 201	3 to 13 Adj.	6 to 24 Adj.	.29" x 2-1/2" 10' Cap.	Knob Ext. Scale

Max. Bulb Temperature : A19AAE-16, 93°C (200°F); A19ABB-7, 116°C (240°F)

HOT WATER TEMPERATURE

SPDT — WELL IMMERSION

Universal replacement control for open high, open low or SPDT applications. Liquid filled element provides rapid response to temperature change. Control furnished with well assembly for 1/2" fittings. Adjustable differential. All controls supplied with well assembly. Not available less well assembly.

CAT. NO.	Type	Switch Action Application	°C	°F	Differential °C	Differential °F	Well Conn.	Range Adjuster
14493	<u>A19ABC-26</u>	Open High Open Low (Operating and Circulator) SPDT	38 to 121	100 to 250	3 to 13	6 to 24	1/2"	Convertible
51152	<u>A19ABC-27</u>	Remote Mtg. (Operating and Circulator) SPDT	38 to 121	100 to 250	3 to 13	6 to 24	1/2" 6" Cap.	Convertible
51153	<u>A19ADB-27</u>	Open High with Lockout - Reset. Open on Rise	40 to 120	104 to 248	Manual Reset (Locks out High)		1/2"	Knob

Maximum Bulb Temperature : 143°C (290°F)

RAINPROOF ENCLOSURE

INDUSTRIAL THERMOSTAT

14436	<u>A19ANC-13</u>	SPDT	-15 to 65	5 to 149	3 (fixed)	6 (fixed)	.29" x 2-1/2" 10' Cap.	Screwdriver Slot
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Maximum Bulb Temperature : 88°C (190°F)

EXPLOSION PROOF

14460	<u>A19AUC-17</u>	SPDT	-35 to 10	-31 to 50	2.8	5	3/8" x 4-1/16" 6" Cap.	Knob
14455	<u>A19AUC-2</u>	SPDT	-7 to 27	20 to 80	1.9	3 1/2	3/8" x 4-31/32" 6" Cap.	Knob
14541	<u>A19BUC-3</u>	SPDT	-35 to 10	-31 to 50	2.8	5	Coiled	Knob
14542	<u>A19BUC-4</u>	SPDT	-7 to 27	20 to 80	1.9	3 1/2	Coiled	Knob

Maximum Bulb Temperature : 60°C (140°F)

COILED BULB THERMOSTATS

VENTILATING — HEATING

14453	<u>A19BAB-7</u>	SPST, Open High 'No Heat' position	0 to 35	32 to 95	1.9 fixed	3 1/2 fixed	1-3/8" x 2-1/4" Coiled	Knob
14454	<u>A19BAC-3</u>	SPDT	0 to 43	32 to 110	1.9 fixed	3 1/2 fixed	1-3/8" x 2-1/4" Coiled	Convertible
14539	<u>A19BAF-3</u>	SPDT	0 to 43	32 to 110	1.1 fixed	2 fixed	1-3/8" x 2-1/4" Coiled	Knob

COOLING

14429	<u>A19BBC-4</u>	SPDT	-35 to 40	-31 to 104	1.7 to 7	3 to 12	1-3/8" x 2-1/4" Coiled	Convertible
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Maximum Bulb Temperature : 60°C (140°F)

FLANGE MOUNTED DUCT THERMOSTATS

These duct thermostats are used on roof top units, make-up heaters, duct heaters and air handling systems of all types. They have SPDT snap-acting contact units and are unaffected by barometric pressure or cross ambient temperatures. Flat flange mounting with special coil element permits positioning the sensing bulb in appropriate position in the air stream.

Number of Stages

14543	<u>A19EAF-7</u>	SPDT	16 to 54	60 to 130	1.1	2	1
14544	<u>A19EAF-6</u>	SPDT	0 to 43	32 to 110	1.1	2	1

Maximum Bulb Temperature : A19EAF-7, 93°C (200°F); A19EAF-6, 60°C (140°F)

ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

➔ UNIVERSAL REPLACEMENT with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment.



A19ABC-26



A19ABC-27



A19ANC-13



A19AUC



A19BAC-3



TYPE A19EAF

PENN TEMPERATURE CONTROLS

SERIES A19 — A25 — A28

A19 SERIES (Continued)

CAT. NO.	Type	Application	Switch Action	Range		Differential		Adj. Stop		Bulb Lgth.	Max. Bulb Temp.
				°C	°F	Min.	Max.	Min.	Max.		

FAN OR CUT-OUT CONTROL

LIQUID EXPANSION

50864	A19EBA-7	Furnace Fan Control	Close High	10 to 120	50 to 248	5°C (9°F)	20°C (36°F)	63°C (145°F)	121°C (250°F)	15.2 cm (6")	143°C (290°F)
50863	A19EBB-1	Warm Air	Open High	38 to 177	100 to 350	5°C (9°F)	20°C (36°F)	116°C (240°F)	177°C (350°F)		190°C (375°F)
50865	A19EBC-1	Counter-Flow Warm Air Furn.	SPDT	38 to 177	100 to 350	5°C (9°F)	20°C (36°F)	116°C (240°F)	177°C (350°F)		190°C (375°F)
50866	A19EDB-3	Warm Air Limit which locks out	Open High	40 to 180	104 to 356	Manual Reset		116°C (240°F)	177°C (350°F)		190°C (375°F)

CAT. NO.	Type	Switch Action	Range		Differential		Bulb & Capillary	Range Adjust.	Max. Bulb Temp.	
			°C	°F	°C	°F			°C	°F

WATER CHILLER

WITH LOCKED CUT-OUT — ADJUSTABLE CUT-IN

14549	A19ZBA-3	SPST Close High Open Low	0 to 25	32 to 77	4 to 22 Adjust.	7 to 40 Adjust.	3/8" x 3-7/16" 6' Cap.	Knob	60	140
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Includes Part No. FTG13A-600R packing nut as standard.

DEFROST DURATION AND FAN DELAY

14451	A19ZBC-2	SPDT	7 to 29	45 to 85	—	—	19/64" x 3-1/8" 6' Cap.	Knob	60	140
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Fan delay temperature is factory set at -4°C (25°F)

A25 SERIES WARM AIR LIMIT CONTROL — MANUAL RESET

Normally located in return air duct system and wired to shut down air conditioning or ventilating fans when temperature of air becomes excessive, as from a fire. The reset is a "trip-free" type device and will not permit restart until the reset lever is released. Rod and tube type sensing element assures positive control action. Duct mounting flange is included.

CAT. NO.	Type	Switch Action	Range		Range Adjuster	Dial Stop	Max. Element Temp.	
			°C	°F			°C	°F
14448	A25AN-9	SPST Open High	-4 to 101	25 to 214	Knob	High Limit Set at 52°C (125°F)	149	300
14449	A25CN-4	SPDT	-4 to 101	25 to 214	Knob	High Limit Set at 52°C (125°F)	149	300

A28 SERIES 2-STAGE TEMPERATURE CONTROLS

CAT. NO.	Type	Switch Action	Range		Differential		Bulb & Capillary	Range Adjust.	Max. Bulb Temp.	
			°C	°F	°C	°F			°C	°F

COILED BULB — FIXED DIFFERENTIAL

14440	A28AA-5	2-SPDT	0 to 43	32 to 110	1.9 Ea. Stage 1.7 fixed between stages	3.0 Ea. Stage 3 fixed between stages	1-3/8" x 2-1/4" Coiled	Convertible	60	140
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AMBIENT COMPENSATED — FIXED DIFFERENTIAL

14434	A28AA-8	2-SPDT	-34 to 10	-30 to 50	2.8 Ea. Stage 1.7 fixed between stages	5 Ea. Stage 3 fixed between stages	3/8" x 4-1/16" 6' Cap.	Knob	60	140
14435	A28AA-67	2-SPDT	-5 to 28	23 to 82	1.9 Ea. Stage 1.7 fixed between stages	3.0 Ea. Stage 3 fixed between stages	3/8" x 4-31/32" 6' Cap.	Knob	60	140

WIDE RANGE — ADJUSTABLE INTERSTAGE DIFFERENTIAL

14466	A28AA-59	2-SPDT	0 to 43	32 to 110	2 Ea. Stage 1 to 4 Adj. between stages	3.0 Ea. Stage 2 to 7 Adj. between stages	12" Averag. 6' Cap.	Screwdriver Slot	60	140
14431	A28AA-65	2-SPDT	-35 to 40	-31 to 104	2.8 Ea. Stage 1 to 4 Adj. between stages	5 Ea. Stage 2 to 7 Adj. between stages	3/8" x 4-1/16" 8' Cap.	Convertible	60	140
14467	A28AA-70	2-SPDT	5 to 32	41 to 90	1.7 Ea. Stage 1 to 4 Adj. between stages	3 Ea. Stage 2 to 7 Adj. between stages	3/8" x 6" 6' Cap.	Knob	60	140
14468	A28AA-71	2-SPDT	15 to 60	59 to 140	2.8 Ea. Stage 1 to 4 Adj. between stages	5 Ea. Stage 2 to 7 Adj. between stages	3/8" x 4" 6' Cap.	Knob	110	230
14433	A28AJ-31	2-SPDT	-7 to 27	20 to 80	1 Ea. Stage 1 to 4 Adj. between stages	2 Ea. Stage 2 to 7 Adj. between stages	3/16" x 22" 6' Cap.	Knob	60	140

* Packing nut assembly available for direct immersion applications (Part No. FTG13A-600R).

PENN CONTINUED NEXT PAGE

ELECTRICAL RATINGS: Refer Tech. Page 143-9.

Underlined Models have Metric Scales — Refer Tech. Page 144-4 for English to Metric Cross Reference Chart.

UNIVERSAL REPLACEMENT with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment. Remote bulb models complete with 5/8" mounting clip.

PENN TEMPERATURE CONTROLS

SERIES A28 — A36 — A70

A28 SERIES 2 - STAGE TEMPERATURE CONTROLS (Continued)

DUCT THERMOSTATS

CAT. NO.	Type	No. Stages	Switch Action	Range		Differential Fixed				Max. Bulb Temp.
				°C	°F	Each Stage	Between Stage	°C	°F	
14473	A28AK-1	2	2 - SPDT Switches	-1 to 43	30 to 110	1.1	2	1.7	3	60°C (140°F)
14474	A28AK-2	2	2 - SPDT Switches	16 to 54	60 to 130	1.1	2	1.7	3	93°C (200°F)

A36 SERIES 4 - STAGE REMOTE BULB THERMOSTATS

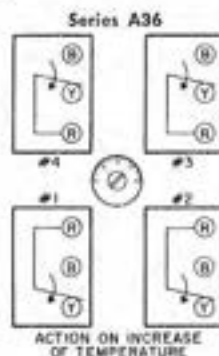
This 4-stage thermostat controls a multiple refrigeration compressor or unloading type compressor in an air conditioning or chiller installation. Case compensation provides uniform performance at ambient temps. from -18°C to +60°C (0°F to 140°F). Screwdriver slot adjuster with calibrated dial enables movement of entire staging band within the range. If enclosure required specify Part No. CSE57A-600.

CAT. NO.	Type	Switch Action	Range		Differential		Bulb & Capillary	Range Adjust.	Max. Bulb Temp.	
			°C	°F	°C	°F			°C	°F
14516	A36AHA-50	4 - SPDT Switches	13 to 35	55 to 95	2 Ea. Stage 1½ between stages (1)	3½ Ea. Stage 2.7 between stages (1)	3/8" x 5/8" 18" Cap. w/12" Nylon Armour	Screwdriver Slot Calibrated Dial	49	120
14517	A36AHA-52	4 - SPDT Switches	13 to 35	55 to 95	2 Ea. Stage 1½ between stages (1)	3½ Ea. Stage 2.7 between stages (1)	3/8" x 5/8" 6" Cap. w/12" Nylon Armour	Screwdriver Slot Calibrated Dial	49	120
14518	A36AHA-58	4 - SPDT Switches	-18 to 21	0 to 70	3 Ea. Stage 2 between stages (3)	5.4 Ea. Stage 3½ between stages (3)	3/8" x 4" 15' Braid Armour Cap.	Screwdriver Slot Calibrated Dial	49	120
14519	A36AHB-33	4 - SPDT Switches	-18 to 21	0 to 70	2 Ea. Stage 1½ between stages (2)	3½ Ea. Stage 2.7 between stages (2)	3/8" x 4" 15' Braid Armour Cap.	Screwdriver Slot Calibrated Dial	49	120

- (1) Calibrated at mid-switching point . . . computer room or comfort control.
 (2) Calibrated at low switching point . . . special close control chiller applications.
 (3) Calibrated at low switching point . . . standard chiller applications.



CSE57A-600



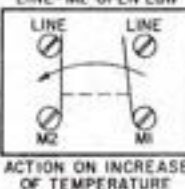
A70 SERIES 4 - WIRE 2 CIRCUIT TEMPERATURE

CAT. NO.	Type	Switch Action†	Range		Differential		Bulb & Capillary	Range Adjust.	Max. Bulb Temp.	
			°C	°F	°C	°F			°C	°F
14476	A70GA-12	Open Low	-10 to 15	15 to 55	2.8	5	20' of 1/8" OD Tubing	Screwdriver Slot	204	400
14437	A70GA-2	Open Low	0 to 25	35 to 80	1.7 to 17	3 to 30	3/8" x 3" 6' Cap.	Screwdriver Slot	121	250
14477	A70HA-1*	Open Low	-10 to 15	15 to 55	Manual Reset		20' of 1/8" OD Tubing	Screwdriver Slot	204	400
14478	A70HA-8	Open Low	0 to 25	35 to 80	Manual Reset		3/8" x 3" 6' Cap.	Screwdriver Slot	121	250
14479	A70KA-1	Open High	38 to 77	100 to 170	Manual Reset		3/8" x 10" 6' Cap.	Screwdriver Slot	116	240

* Low limit stop set and sealed at 1.7°C (35°F). Control responds only to the lowest temperature along any one foot of the entire 20 foot element or bellows cup.

† Main Contacts Line - M2.

Series A70G-A70H LINE-M2 OPEN LOW



A70GA-12

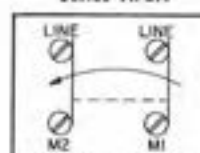
PENN TEMPERATURE CONTROLS

SERIES A70—A72

A70 & A72 SERIES HEAVY DUTY TEMPERATURE

CAT. NO.	Type	Switch Action	Range		Differential		Bulb & Capillary	Range Adjust.	Max. Bulb Temp.	
			°C	°F	°C	°F			°C	°F

Series A72A



ACTION ON INCREASE OF TEMPERATURE



A72



A72AA

ADJUSTABLE DIFFERENTIAL

14480	A70AQ-1†	SPST Close High Open Low	-23 to 18	-10 to 65	2 to 22	4 to 40	11/16" x 6-3/4" Cross Ambient 6' Cap.	Knob on Range Screw**	54	130
14411	A72AA-38	DPST Close High Open Low	-35 to 0	-30 to 32	2 to 25	4 to 45	3/8" x 3" 6' Cap.	Screwdriver Slot	93	200
14412	A72AA-39	DPST Close High Open Low	-10 to 15	15 to 55	1.7 to 17	3 to 30	3/8" x 3" 6' Cap.	Screwdriver Slot	93	200
14413	A72AA-3	DPST Close High Open Low	10 to 32	50 to 90	1.7 to 17	3 to 30	11/16" x 6-3/4" Cross Ambient 6' Cap.	Screwdriver Slot	57	135
14416	A72AA-43	DPST Close High Open Low	-9 to 13	15 to 55	1.7 to 17	3 to 30	7/8" x 4" Finned 6' Cap.	Screwdriver Slot	93	200
14417	A72AA-7	DPST Close High Open Low	10 to 32	50 to 90	1.7 to 17	3 to 30	1-1/2" x 5" Finned Cross Ambient 6' Cap.	Screwdriver Slot	57	135
14418	A72AA-40	DPST Close High Open Low	-25 to 20	-10 to 65	2 to 22	4 to 40	11/16" x 6-3/4" Cross Ambient 6' Cap.	Screwdriver Slot	54	130
14484	A72AP-1†	DPST Close High Open Low	-23 to 18	-10 to 65	2 to 22	4 to 40	11/16" x 6-3/4" Cross Ambient 6' Cap.	Screwdriver Slot	54	130

* Packing nut assembly for direct immersion applications available on request.

† Equipped with manual "PUSH TO START" button. Manual start feature is especially desirable on milk cooler jobs ... permits manual start of compressor when bulb temp. is between closing and opening setting of switch.

** Adjusting knob supplied on range screw to limit adjustment to 5°C (9°F) [raises or lowers both cut-in and cut-out points ... differential remains constant.]

COILED BULB THERMOSTATS

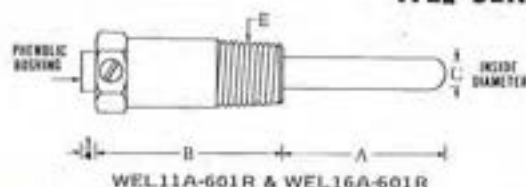
COOLING

14414	A72AA-4	DPST Close High Open Low	-9 to 13	15 to 55	1.7 to 17	3 to 30	Coiled - Copper (No Cap.)	Screwdriver Slot	93	200
14415	A72AA-41	DPST Close High Open Low	-35 to 0	-30 to 32	2 to 25	4 to 45	Coiled - Copper (No Cap.)	Screwdriver Slot	93	200

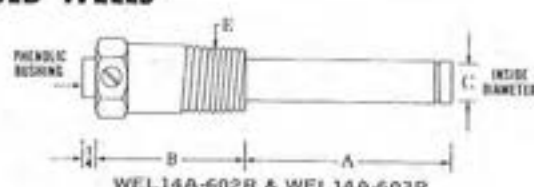
ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

WEL SERIES BULB WELLS



WEL11A-601R & WEL16A-601R



WEL14A-602R & WEL14A-603R

CAT. NO.	BULB WELL P/N	SUITS CONTROL				
14528	WEL16A-601R	A19AAD-5				
14532	WEL11A-601R	A19ANC-13				
14530	WEL14A-602R	A19AAB-32	A19AAC-13	A19AAC-51	A19AAD-21	A19AAF-12
		A19AAF-45	A19ABC-41	A19ABC-57	A19ABC-67	A19ACA-28
		A19ACA-31	A19ADB-26	A19AUC-17	A19ZBA-3	A28AA-8
		A28AA-65	A28AA-71	A36AHA-58	A36AAB-33	
14531	WEL14A-603R	A19AAF-44	A19AUC-2	A19ABC-60	A28AA-67	A36AHA-50
		A36AHA-52				

SPECIFICATIONS

Part No.	Dimensions			Pipe Thread Outside E	Material		Max. Temp.	Max. Press.	Type Solder Joint	Plating	See Note
	A	B	C		Connector	Tube					
WEL11A-601R	2-3/8"	2-5/16"	.299"	1/2"	Brass	Copper	121°C (250°F)	2069 kPa (300 psig)	Soft	—	1
WEL14A-602R	4-15/16"	1-13/16"	.430"	1/2"	Brass	Copper	121°C (250°F)	2069 kPa (300 psig)	Silver	Brite-Dip	2
WEL14A-603R	5-13/16"	1-13/16"	.430"	1/2"	Brass	Copper	121°C (250°F)	2069 kPa (300 psig)	Silver	Brite-Dip	2
WEL16A-601R	2-13/16"	1-13/16"	.375"	1/2"	Brass	Copper	121°C (250°F)	2069 kPa (300 psig)	Soft	—	2

NOTE: 1. With phenolic bushing; .093" slot.
2. With phenolic bushing; .125" slot.

SAGINOMIYA TEMPERATURE CONTROLS

TYPES TNS & CNS



Type TNS

GENERAL DESCRIPTION

- Type TNS provided with a differential adjustable mechanism.
- Type CNS provided with a fixed differential. Also manual reset models available.
- Double snap-action contact mechanism ensures reliable switching.
- Mounting bracket supplied as standard.
- With SPDT contact mechanism.

CAT. NO.	Type	Range		Differential		Switch Action	Capillary Length	Bulb Dimensions
		°C	°F	°C	°F			

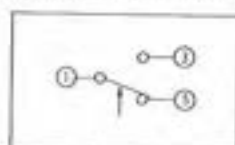
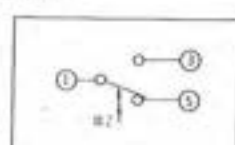
AUTO RESET – ADJUSTABLE DIFFERENTIAL

143151	TNSC100X	-25 to 0	-13 to 32	3 to 15	5.4 to 27	SPDT	1.5 m (5 ft.)	9.5 Dia. x 80 mm (3/8" Dia. x 3-5/32")
143152	TNSC114X	-15 to 15	5 to 59	3 to 15	5.4 to 27			
143153	TNSC134X	0 to 35	32 to 95	3 to 15	5.4 to 27			
143154	TNSC1010XC	-45 to 10	-49 to 50	4 to 20	7.2 to 36			12.7 Dia. x 100 mm (1/2" Dia. x 3-15/16")
143155	TNSC1034XC	-20 to 35	-4 to 95	4 to 20	7.2 to 36			
143156	TNSC1050X	25 to 55	77 to 131	4 to 20	7.2 to 36			
143157	TNSC1070X	45 to 75	113 to 167	4 to 20	7.2 to 36			
143158	TNSC1100X	65 to 105	149 to 221	5 to 20	9 to 36			
143159	TNSC1150X	95 to 150	203 to 302	5 to 20	9 to 36			

CLOSE DIFFERENTIAL – MANUAL RESET (Manual Reset operates on excessive low temperature)

143160	CNSC115XM2	-35 to -15	-31 to 5	Manual Reset	SPDT	1.5 m (5 ft.)	9.5 Dia. x 80mm (3/8" Dia. x 3-5/32")
143161	CNSC100XM2	-25 to 0	-13 to 32				
143162	CNSC114XM2	-15 to 15	5 to 59				
143163	CNSC134XM2	0 to 35	32 to 95				

CONTACT FUNCTIONS

TNS & CNS
Automatic Reset Type

CNS Manual Reset Type

1	Common Terminal
3	Close on Temperature Increase
5	Close on Temperature Decrease

ELECTRICAL RATINGS

Motor Rating	125/250V. AC
Running Current	10A
Locked Rotor Ampere	60A
Non-Inductive Ampere	10A

AVAILABLE ON APPLICATION

TNS SERIES with 20 Amp Contacts.
CNS SERIES (Close Diff.) Auto - Reset, Fixed Diff.
ALS SERIES (Close Diff.) Auto - Reset, Fixed Diff.

SAGINOMIYA TEMPERATURE CONTROLS

ELECTRONIC THERMOSTAT WITH
BUILT-IN TEMPERATURE INDICATOR**THERMO-EYE** Type ILE

REMOTE CONTROLLING AND VIVID READOUT OF TEMPERATURE



MAIN FEATURES

- BEST for Commercial Cold Storage Refrigerators, Freezers, Display Case or Prefab. Refrigerators.
- LED (Light Emitting Diode) Strip Readout of Sensed Temperature.
- LOCK BUTTON to prevent unauthorised tampering.
- LARGE CONTACT CAPACITY: 10A/240V.AC.
- WIRING CONNECTIONS can be made both from the bottom and back of the body.
- LARGE ROTATING DIAL for smooth and easy temperature setting.
- SENSOR LEAD can be extended to MAX. 100 metres.
- EASY and QUICK INSTALLATION with mounting bracket supplied.
- TEK THERMISTOR SENSOR with 2 m lead is supplied as standard.

SPECIFICATIONS

CAT. NO.	Part No.	Range	Voltage	Differential	Temperature Indication	Sensor		Ambient Temperature
						Cat. No.	Part No.	
143180	ILE-A920-ANA-1	-20 to +20°C	240V. AC	1.8 ± 0.7°C	-21 to +20°C	143185	TEK-320001 With 2 m Lead	-10 to +40°C on Use
143181	ILE-A900-ANA-1	-40 to 0°C	240V. AC	1.8 ± 0.7°C	-41 to 0°C	143186	TEK-85H001 With 2 m Lead	-20 to +70°C on Storage
143182	TEK-OOL902	10 m Extension Lead for Temperature Sensor						
143183	TEK-OOL903	50 m " " " " " " " "						
143184	TEK-OOL904	100 m " " " " " " " "						

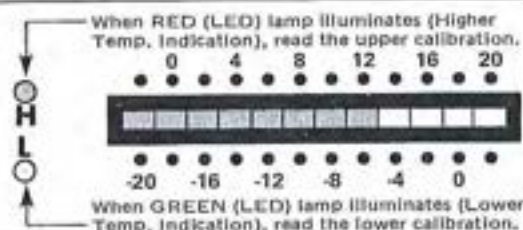
TEMPERATURE READOUT

Example: Range -20°C to 20°C

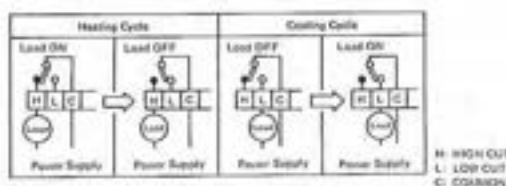
Temperature indicating LED flashes at interval of 2 deg.

When a sensed temperature is lower than -21°C, only the GREEN lamp will illuminate.

When a sensed temperature is higher than +20°C, all LED but the GREEN lamp will illuminate fully.

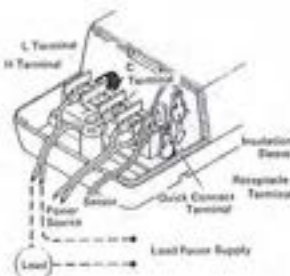


CONTACT FUNCTION



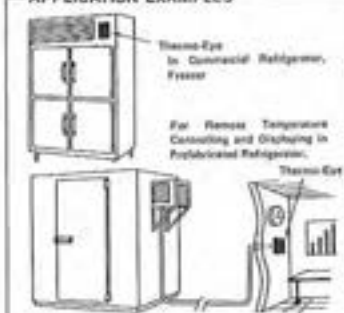
When sensed temperature rises higher than that of set temperature plus diff., shift of contact will be required as above.

WIRING

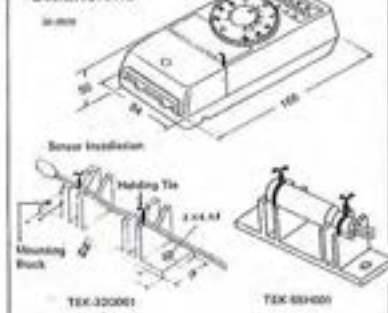


The drawing above shows the external wiring of application on opening of circuit at temperature increase (H & C terminals connection). Wiring to "H" terminal should be shifted to "L" terminal on low cut-out application as shown by black arrow mark. The setting temperature is at ON (Cut-in) position with the C & H connection and OFF (Cut-out) position with the C & L connection.

APPLICATION EXAMPLES



DIMENSIONS



PENN PRESSURE & TEMPERATURE CONTROLS

ELECTRICAL RATINGS

SELECTION COLUMN		
ALPHA/NUMERICAL ORDER		
TEMP/PRESS CONTROL	TABLE NO.	
A11	T	1
A19AAA	T	2
A19AAB	T	2
A19AAC	T	2
A19AAD	T	3
A19AAE	T	3
A19AAF	T	3
A19ABB	T	4
A19ABC-60	T	2
A19ABC-26	T	4
A19ABC-27	T	4
A19ABC-41	T	2
A19ABC-67	T	2
A19ABC-57	T	2
A19ACA	T	1
A19ADB	T	4
A19ANC	T	2
A19AUC	T	6
A19BAB	T	2
A19BAC	T	2
A19BAF	T	3
A19BBC	T	2
A19BUC	T	6
A19EAF	T	5
A19EBA	T	7
A19EBB	T	7
A19EBC	T	7
A19EDB	T	7
A19ZBA	T	1
A19ZBC	T	1
A25AN	T	8
A25CN	T	8
A28AA	T	1
A28AJ	T	9
A28AK	T	9
A28MA	T	1
A36AHA	T	10
A36AHB	T	11
A70AQ	T	12
A70GA	T	18
A70HA	T	18
A70KA	T	18
A72	T	13
A72AE	T	13
A72CE	T	13
P20	P	14
P67AA	P	15
P67CA	P	15
P67EA	P	18
P67FA	P	18
P70	P	16
P70AA	P	16
P70KA	P	18
P72	P	17
P74	P	16

T denotes Temp. Control
P " Press. Control

MOTOR RATINGS	AC FULL LOAD AMPS	AC LOCKED ROTOR AMPS	NON INDUCT. AMPS
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TABLE 1			
240V	8.0	48.0	8.0 *
*or Resistance Load Amps (Not Lamp Amps)			
A11, A19, A28 Pilot Duty — 125VA, 24 to 277 V.AC.			
A19ACA Pilot Duty — 125VA, 24 to 600 V.AC.			
Note: When used as a 2 circuit control the total connected load must not exceed 2000 VA.			

TABLE 2			
240V	8.0	48.0	*
* Non-Inductive or Resistance Load Amps ** (Not Lamp Amps) 22A, 120 to 277V.AC.			
Pilot Duty — 125 VA, 24 to 600 V.AC.			
** SPST and only one side of SPDT control.			

TABLE 3			
240V	3.0	18.0	*
* Non-Inductive or Resistance Load Amps (Not Lamp Amps) 10A, 24 to 277V.AC.			
Pilot Duty — 125 VA, 24 to 277 V.AC.			

TABLE 4			
240V	6.0	36.0	
Pilot Duty — 125VA, 24 to 600 V.AC.			

TABLE 5			
240V	3.0	18.0	10 *
* 120 to 277 V.AC.			
Pilot Duty — 125VA, 24 to 277V.AC.			

TABLE 6			
240V	8.0	48.0	22.0
Pilot Duty — 125VA, 24 to 600V. AC.			

TABLE 7			
240V	8.0	48.0	*
* At AC	A19EAB, EBB, EDB		22.0
Non-Ind.	A19EBC		16.0
Pilot Duty — 125VA, 24 to 600V.AC.			

TABLE 8			
240V	8.0	48.0	16 *
* at 120 to 277V.AC.			
Pilot Duty — 125VA, 24 to 600V.AC.			

TABLE 9			
240V	3.0	18.0	8.0 *
*or Resistance Load Amps (Not Lamp Amps)			
Pilot Duty — 125VA, 24 to 277V.AC.			
Note: When used as a 2 circuit control the total connected load must not exceed 2000VA.			

TABLE 10			
240V	5.0	30.0	8.0
Pilot Duty — 125VA, 120 to 277V. AC.			

TABLE 11			
240V	3.0	18.0	5.0
Pilot Duty — 125VA, 120 to 277V.AC.			

MOTOR RATINGS	AC FULL LOAD AMPS	AC LOCKED ROTOR AMPS	NON INDUCT. AMPS
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TABLE 12			
208/240V*	17.0	102.0	22.0
Pilot Duty — 125VA, 120 to 600V.AC, 57.5VA, 120 to 300V.DC.			
*Hermetic Units — 240V.AC, 20.0A FLA, 102A LRA			

TABLE 13			
240V* 1 Phase HP = 3	24	144.0	24.0
DC Non-Ind. Amps. 0.5			
Pilot Duty — 125VA, 120 to 600 V.AC, 57.5VA, 120 to 300V.DC.			
*These full load and locked rotor amps (not horsepower) ratings apply to hermetic compressors only.			

TABLE 14			
240V 1 Phase	8.0	48.0	
Max. Volts 300AC Suitable for 20-24 V.AC.			

TABLE 15			
240V 1 Phase	12.0	72.0	12.0
DC Non-Inductive 0.5			
Pilot Duty — 125 VA, 120 to 600V. AC, 57.5VA, 120 to 300V. DC.			

TABLE 16			
208/240V*	17.0	102.0	22.0
Pilot Duty — 125VA, 120 to 600V. AC, 57.5VA, 120 to 300V. DC.			
*Hermetic Units — 240V. AC, 20.0A FLA, 120A LRA.			

TABLE 17			
240V* 1 Phase HP = 3	24.0	144.0	24.0
DC Non-Inductive Amps 0.5			
Pilot Duty — 125VA, 120 to 600V. AC, 57.5VA, 120 to 300V. DC.			
* These full load and locked rotor amps (not horsepower) ratings apply to hermetic compressors only.			

TABLE 18		
POLE NUMBER	LINE M2 (MAIN)	LINE M1 (AUXIL.)
Motor Rating	240V	240V
AC Full Load Amps	8.0	3.0
AC Locked Rot.Amps	48.0	18.0
AC Non-Induct.Amps	8.0	6.0
Pilot Duty-both Poles	125VA, 24 to 600V.AC, 57.5VA, 120 to 300V.DC	

APPLICABLE TO :

Penn Pressure Controls
Penn Temperature Controls
Penn Head Pressure Controls
Penn Oil Protection Controls (Type P74)

Pages 143, 143-a, b, c.
Pages 144, 144-a, b, c, d.
Page 145.
Page 150.

REFER TECH. PAGE 144-f FOR ENGLISH TO METRIC MODEL CROSS REFERENCE CHART

PENN CONTROLS * ENGLISH TO METRIC

CATALOG MODEL CROSS REFERENCE

Many of the Penn range of Controls are now available with Metric Scales. Applicable Controls included in this Catalogue have the Model No. underlined e.g. A11A-6 (Was A11A-1)
Listed below is the "Old" Imperial/English Models, Cross Referenced to the new Metric Models.

Imperial/English Model	Range °F	Metric Model	Range °C
TEMPERATURE			
A11A-1	35 to 45	A11A-6	2 to 7
A11B-1	35 to 45	A11B-6	2 to 7
A19AAA-18	30 to 110	A19AAA-43	0 to 43
A19AAB-4	30 to 110	A19AAB-32	0 to 43
A19AAB-7	100 to 300	A19AAB-37	40 to 150
A19AAB-10	200 to 550	A19AAB-42	100 to 290
A19AAC-1	-30 to 50	A19AAC-44	-35 to 10
A19AAC-4	0 to 80	A19AAC-51	-15 to 25
A19AAC-9	100 to 240	A19AAC-13	40 to 120
A19AAD-12	-30 to 50	A19AAD-21	-35 to 10
A19AAE-3	80 to 180	A19AAE-16	25 to 80
A19AAF-4	40 to 90	A19AAF-38	5 to 32
A19AAF-20	-30 to 100	A19AAF-45	-35 to 40
A19AAF-21	40 to 90	A19AAF-44	5 to 30
A19ABB-2	50 to 200	A19AAB-7	10 to 94
A19ABC-4	50 to 130	A19ABC-60	10 to 55
A19ABC-11	100 to 240	A19ABC-26	38 to 121
A19ABC-12	100 to 240	A19ABC-27	38 to 121
A19ABC-24	-30 to 100	A19ABC-41	-35 to 40
A19ABC-36	-30 to 100	A19ABC-67	-35 to 40
A19ABC-37	-30 to 100	A19ABC-57	-35 to 40
A19ACA-14	-30 to 100	A19ACA-28	-35 to 40
A19ACA-15	-30 to 100	A19ACA-31	-35 to 40
A19ADB-1	100 to 240	A19ADB-26	40 to 120
A19ADB-2	100 to 240	A19ADB-27	40 to 120
A19ADN-1	100 to 240	A19ADN-5	40 to 120
A19ADP-1	100 to 240	A19ADP-3	40 to 120
A19ANC-1	0 to 150	A19ANC-13	-15 to 65
A19AUC-1	-30 to 50	A19AUC-17	-35 to 10
A19BAB-3	35 to 95	A19BAB-7	0 to 35
A19BAC-1	30 to 110	A19BAC-3	0 to 43
A19BAF-1	30 to 110	A19BAF-3	0 to 43
A19BBC-2	-30 to 100	A19BBC-4	-35 to 40
A19BUC-1	-30 to 50	A19BUC-3	-35 to 10
A19BUC-2	20 to 80	A19BUC-4	-5 to 28
A19EAF-1	60 to 130	A19EAF-7	15 to 55
A19EAF-2	30 to 110	A19EAF-6	0 to 43
A19EBA-1	50 to 250	A19EBA-7	10 to 120
A19EDB-1	100 to 350	A19EDB-3	40 to 180
A19ZBA-1	38 to 80	A19ZBA-3	0 to 25
A25AN-1	25 to 215	A25AN-9	-4 to 102
A25CN-1	25 to 215	A25CN-4	-4 to 102
A28AA-4	30 to 110	A28AA-5	0 to 43
A28AA-9	20 to 80	A28AA-67	-5 to 28
A28AA-28	30 to 110	A28AA-59	0 to 43
A28AA-29	-30 to 100	A28AA-65	-35 to 40
A28AA-36	40 to 90	A28AA-70	5 to 32
A28AA-37	60 to 140	A28AA-71	15 to 60
A28AJ-4	20 to 80	A28AJ-31	-5 to 28
A28MA-1	40 to 120	A28MA-4	5 to 50
A28MA-2	40 to 120	A28MA-3	5 to 50
A36AHA-3	10 to 90	Replaced by 4 New Models ▼	
A36AHB-3	10 to 90		
A36AHB-4	10 to 90		
		A36AHA-50	13 to 35
		A36AHA-52	13 to 35
		A36AHA-58	-18 to 21
		A36AHB-33	-18 to 21
A70GA-1	15 to 55	A70GA-12	-10 to 15
A70HA-2	35 to 80	A70HA-8	0 to 25
A72AA-1	-30 to 30	A72AA-38	-35 to 0
A72AA-2	15 to 55	A72AA-39	-10 to 15
A72AA-5	-30 to 30	A72AA-41	-35 to 0
A72AA-6	15 to 55	A72AA-43	-10 to 15
A72AA-20	-10 to 65	A72AA-40	-25 to 20
A72AE-1	20 to 90	A72AE-10	-5 to 30
A72CA-1	140 to 220	A72CA-25	60 to 100
A72CE-1	25 to 90	A72CE-6	-5 to 30
T22ABC-1	40 to 90	T22ABC-5	10 to 30
T22ABC-3	40 to 90	T22ABC-7	10 to 30
T22CBC-1	40 to 90	T22CBC-4	5 to 30
T22CBC-3	40 to 90	T22CBC-5	5 to 30
T22JAA-1	40 to 90	T22JAA-2	5 to 30
T22JCC-1	40 to 90	T22JCC-2	5 to 30
T22SDA-1	40 to 90	T22SDA-4	5 to 30
T22SEB-1	40 to 90	T22SEB-5	5 to 30
T22SFB-1	40 to 90	T22SFB-5	5 to 30
T23A-1	50 to 90	T23A-3	10 to 32
T23B-1	50 to 90	T23B-4	10 to 32
T23C-1	50 to 90	T23C-3	10 to 32
T25A-1	40 to 90	T25A-6	5 to 32

Imperial/English Model	Range °F	Metric Model	Range °C
TEMPERATURE (Continued)			
T25A-16	40 to 90	T25A-26	5 to 30
T26S-18	40 to 90	T26S-22	5 to 30
T26T-3	40 to 90	T26T-4	5 to 30
T36ABB	32 to 110	T36ABB-9250	0 to 43
T52AEA-1	50 to 90	T52AEA-2	10 to 30
T52CEA-1	50 to 90	T52CEA-2	8 to 32
T52DAA-1	50 to 90	T52DAA-2	8 to 32
T52DEA-1	50 to 90	T52DEA-2	8 to 32
Imperial/English Model Range psig Metric Model Range kPa			
PRESSURE			
P28AA-1	8 to 70	P28AA-41	50 to 500
P28AA-2	8 to 70	P28AA-42	50 to 500
P28AA-17	8 to 70	P28AA-43	50 to 500
P28AA-18	8 to 70	P28AA-44	50 to 500
P28AN-1	8 to 70	P28AN-22	25 to 5 kg.
P28DA-1	8 to 70	P28DA-7	50 to 500
P28GA-2	8 to 70	P28GA-6	50 to 500
P28NA-5	8 to 70	P28NA-15	50 to 500
P29NC-2	20" to 100	P29NC-43	-70 to 700
P29NC-3	20" to 100	P29NC-44	-70 to 700
P47AA-1	0 to 15	P47AA-21	0 to 100
P47AA-13	0 to 150	P47AA-15	0 to 1000
P47BA-2	20" to 50	P47BA-10	-1 to 4 kg/cm ²
P47BA-6	0 to 150	P47BA-9	0 to 10 kg/cm ²
P47GA-9	0 to 150	P47GA-25	0 to 1000
P47GA-10	0 to 15	P47GA-26	0 to 100
P67AA-1	3 to 30	P67AA-8	20 to 200
P67EA-5	3 to 30	P67EA-9	20 to 200
P67FA-5	3 to 30	P67FA-6	20 to 200
P70AA-5	20" to 100	P70AA-120	-70 to 700
P70AA-118	100 to 400	P70AA-129	700 to 2800
P70AA-119	50 to 300	P70AA-146	400 to 2000
P70AB-1	20" to 100	P70AB-31	-70 to 700
P70AB-2	20" to 100	P70AB-36	-70 to 700
P70CA-1	20" to 100	P70CA-80	-70 to 700
P70CA-2	50 to 450	P70CA-81	400 to 3100
P70CA-3	50 to 450	P70CA-86	400 to 3100
P70CA-4	20" to 100	P70CA-87	-70 to 700
P70CA-5	50 to 450	P70CA-89	400 to 3100
P70DA-1	50 to 450	P70DA-41	250 to 3000
P70DA-2	50 to 450	P70DA-43	250 to 3000
P70HA-3	20" to 100	P70HA-4	-70 to 700
P70JA-11	20" to 100	P70JA-25	-70 to 700
P70KA-1	50 to 450	P70KA-11	400 to 3100
P70KA-7	50 to 450	P70KA-13	250 to 3100
P70LA-2	20" to 100/ 100 to 425	P70LA-90	-70 to 700/ 1000 to 3000
P70LB-1	20" to 100/ 100 to 425	P70LB-12	-70 to 700/ 1000 to 3000
P70LN-9	20" to 50/ 100 to 425	P70LN-11	-70 to 350/ 1000 to 3000
P70MA-1	20" to 100/ 100 to 425	P70MA-46	-70 to 700/ 1000 to 3000
P70MA-2	20" to 100/ 100 to 425	P70MA-47	-70 to 700/ 1000 to 3000
P70NA-1	20" to 100/ 100 to 425	P70NA-10	-70 to 700/ 1000 to 3000
P72AA-1	20" to 100	P72AA-31	-70 to 700
P72AA-27	100 to 400	P72AA-32	700 to 2800
P72AB-1	20" to 100	P72AB-4	-70 to 700
P72CA-2	50 to 450	P72CA-26	400 to 3100
P72DA-1	50 to 450	P72DA-7	400 to 3100
P72LA-1	20" to 100/ 100 to 425	P72LA-12	-70 to 700/ 1000 to 3000
P72LB-1	20" to 100/ 100 to 425	P72LB-4	-70 to 700/ 1000 to 3000
P72MA-1	20" to 100/ 100 to 425	P72MA-6	-70 to 700/ 1000 to 3000
P72NA-1	20" to 100/ 100 to 425	P72NA-4	-70 to 700/ 1000 to 3000
P74AA-1	8 to 70	P74AA-2	50 to 450
P74BA-1	8 to 70	P74BA-14	50 to 450
P80ABA-21	20" to 80 Ammonia	P80ABA-43	-70 to 500
P80BAA-1	20" to 80	P80BAA-4	-70 to 500

This Cross Reference has been compiled to the best of our ability from available information. Further changes may have occurred between time of compilation/printing/distribution. We assume no liability for its use or misuse.

PRESSURE AND TEMPERATURE CONTROLS

COMMERCIAL

PENN HEAD PRESSURE CONTROLS

These controls are designed to maintain optimum head pressure on refrigeration and air conditioning installations. Single stage temperature models are for control of single speed fan motors or motor controller. Two-stage temperature models are for controlling the operation of two-speed fan motors or dual fans.

Temperature controls are enclosed in weather-proof cases and covers. The sensing element of the tower control is

neoprene coated to resist mechanical abrasion and chemical damage.

Pressure controls that start the fan as head pressure reaches the desired maximum and stop the fan when the head pressure drops to the allowed minimum are also available.

For controlling by water see Penn Series V46, V47 and V48 water valves.

COOLING TOWERS OR EVAPORATIVE CONDENSERS

CAT. NO.	Type	Switch Action	Range		Differential		Bulb & Capillary	Range Adjuster
			°C	°F	°C	°F		
TWO STAGE TEMPERATURE								
1451	<u>A28MA-4</u>	2-Stage 2-SPDT Switches	5 to 50	41 to 122	Factory Set 2.8°C (5°F) each stage 4.4°C (8°F) between stage.		3/8" x 4" Neoprene Coated 6' Cap.	Screwdriver Slot
Maximum Bulb temperature : 99°C (210°F)								



SINGLE STAGE TEMPERATURE

1452	<u>A72AE-10</u>	DPST Close High	-5 to 30	23 to 86	2.2 to 14	4 to 25	3/4" x 6-3/4" Neoprene Coated 6' Cap.	Internal Screwdriver Slot
1453	<u>A72CE-6</u>	DPST Open High	-5 to 30	23 to 86	2.2 to 14	4 to 25	3/4" x 6-3/4" Neoprene Coated 6' Cap.	Internal Screwdriver Slot
Maximum Bulb temperature : 77°C (170°F)								
Ambient temperature limits : -54 to 66°C (-65 to 150°F)								



A72AE-10
A72CE-6

PRESSURE

AIR COOLED CONDENSERS

CAT. NO.	Type	Switch Action	Range		Differential		Pressure Connector	Limited Knob Adjust.	Max. Bellows Pressure	
			kPa	psig	kPa	psi			kPa	psig
SINGLE POLE HIGH PRESSURE – HEAD PRESSURE FAN CYCLING										
14510	<u>P70AA-129</u>	Close High Open Low	700 to 2800	101 to 406	Min. 241 Max. 1379	Min. 35 Max. 200	36" Cap. with ½" Flare Nut	None	3448	500
TWO POLE HIGH PRESSURE – HEAD PRESSURE FAN CYCLING										
1459	<u>P72AA-32</u>	DPST Close High Open Low	700 to 2800	101 to 406	Min. 241 Max. 1379	Min. 35 Max. 200	36" Cap. with ½" Flare Nut		3448	500



P70AA-129

TEMPERATURE

CAT. NO.	Type	Switch Action	Range		Differential °C (°F)	Bulb and Capillary	Range Adjuster
			°C	°F			
TWO-STAGE TEMPERATURE							
14513	<u>A28MA-3</u>	2-Stage 2-SPDT Switches	5 to 50	41 to 122	Factory Set 2.8°C(5°F) each Stage 4.4°C (8°F) between stage.	3/8" x 4-1/16" 6" Cap.	Screwdriver Slot
Maximum Bulb temperature : 99°C (210°F)							

ELECTRICAL RATINGS: Refer Tech. Page 143-g.

Underlined Models have Metric Scales — Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

145-a



Ranco-trol Type C30

Wide Range Temperature Controls

for Commercial Refrigeration, Air Conditioning or Heating

TYPICAL APPLICATIONS

Frozen Food Cases, Display Cases,
Beverage Coolers, Milk Coolers,
Walk-in Boxes, Water Chillers,
Process Equipment,
Hot Water Heating Systems,
Solar Heating Systems.

FEATURES

- Temperature Ranges -34 to 121°C (-30 to 250°F). Three controls cover total range.
- Differential 2 to 28°C ($3\frac{1}{2}$ to 50°F). Infinitely adjustable.
- SPDT Switch. Heating/Cooling applications. Easily wired . . . three knockouts for maximum flexibility.
- Cut-in - Cut-out Pointers. Direct reading.
- Temperature Range Dial Stops. Infinitely adjustable high/low stops.
- Setpoint Adjustment. Knob, screwdriver or concealed setting in same control.
- Versatile Mounting. Convertible . . . enclosed or panel mount fits all competitive mountings.
- Entire Scale - Fully visible and window covered.
- A Universal Replacement. Styled and Sized for Readability and Adjustability.

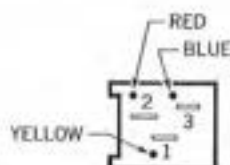
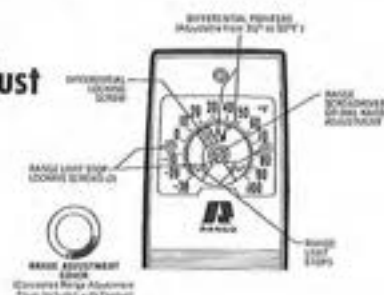


DESCRIPTION

The RANCO-TROL universal replacement controls cover a broad range of general purpose temperature control functions. They are designed for operating control applications with a high electrical rated SPDT switch for both heating and cooling. These compact controls are available with adjustable temperature ranges from -34 to 121°C (-30 to 250°F), adjustable differential of 2 to 28°C ($3\frac{1}{2}$ to 50°F) with dual differential pointers indicating the high and low cut-in and cut-out functions, and infinitely adjustable high and low range limit stops to restrict user

adjustment. Added features are a window covered, fully visible scale plate and range adjustment using a dial knob, screwdriver slot, or concealed setpoint options on each control. These controls are equipped with a self-retention NEMA Class 1, snap-on cover to prevent cover knock-off if retaining screw is not secured. Universal mounting holes which fit all competitive mountings are provided for enclosed mounting or optional skeleton frame construction for panel mounting. Three knockouts at top, bottom and back panels allow maximum flexibility in wiring.

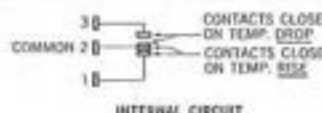
Easy To Adjust



VIEW SHOWING TERMINALS

ELECTRICAL RATINGS

Volts AC	240V
Full Load Amps	8A
Locked Rotor Amps	48A
Non-inductive or Resistive Load Amps	20A
Pilot Duty 125VA 24 to 240 VAC	
Note: All ratings apply to either pair of terminals (2-1 & 2-3)	



INTERNAL CIRCUIT

CAT. NO.	Current Model	Replaces Model	Adjustable Range $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	Factory Settings $^{\circ}\text{C}$ ($^{\circ}\text{F}$) (Terminals 2 and 1)		Adjustable Differential $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	Switch Action	Power Element		
				Cut-In	Cut-Out (Min. Diff. Setting 2°C [$3\frac{1}{2}^{\circ}\text{F}$])			Capillary Length	Bulb Type	Size
14520	C30 - 1102	C30 - C1100	-34 to 38 (-30 to 100)	12.2 (54)	10.3 (50.5)	2 to 28 (3.5 to 50)	SPDT	18.3 m (6 ft.)	Air Coil	1.56" O.D.
14521	C30 - 1103	C30 - C1101	-34 to 38 (-30 to 100)	12.2 (54)	10.3 (50.5)				Remote Bulb	3/8" x 5-3/8"
14522	C30 - 1181	C30 - C1180	10 to 82 (50 to 180)	49 (120)	47 (116.5)					
14523	C30 - 1251	C30 - C1250	49 to 121 (120 to 250)	88 (190)	86 (186.5)					



RANCO TYPE 'O' PRESSURE CONTROLS

RANCO 'O' SERIES COMMERCIAL REFRIGERATION & AIR CONDITIONING CONTROLS are available for Low Pressure, High Pressure and Dual Pressure Applications. Variations include Fixed and Adjustable Differential, operation on Rise and Fall of Pressure, Automatic Cycling or Manual Reset. Accessories include Mounting Brackets and Capillary Adaptors.



1

CAT. NO.	CODE NO.	FORMER CODE NOS.	ADJUSTABLE RANGE kPa (psig)	DIFFERENTIAL (High & Low Scale Limits Adj. or Fixed) kPa (psi)	POWER ELEMENTS
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SINGLE LOW PRESSURE

1471	016-8706 S.P.D.T.	Formerly : 016-1401 Replaces : 010-1401, 1831, 6003 011-1754, 1799 016-107, 120	-30.5 to 690 (9" to 100)	62 to 293 (9 to 57)	1/4" SAE Male 7/16" 20 UNF
1472	016-8713 S.P.D.T.	Formerly : 016-1402 Replaces : 010-1402, 1483, 1842, 6006	-30.5 to 690 (9" to 100)	62 to 293 (9 to 57)	.91 m Cap. 1/4" Fl. Nut

WITH MANUAL RESET LEVER

1473	016-8705 S.P.D.T.	Formerly : 016-6807 Replaces : 010-1867, 1925	-30 to 690 (9" to 100)	62 Fixed (9 Fixed)	1/4" SAE Male 7/16 - 20 UNF
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SINGLE HIGH PRESSURE

1476	016-166 S.P.D.T.	Formerly : — Replaces : No Replacement	345 to 1034 (50 to 150)	-34 to 276 (10" to 40)	.91 m Cap. 1/4" Fl. Nut
1474	016-8750 S.P.D.T.	Formerly : 016-6809 Replaces : 010-1894 011-1711, 1713 016-108*	700 to 3000 (100 to 430)	241 to 793 (35 to 115)	1/4" SAE Male 7/16" 20 UNF

WITH MANUAL RESET LEVER

1475	016-8751 S.P.D.T.	Formerly : 016-6806 Replaces : 010-1895 011-1712*, 1714 016-200*	700 to 3000 (100 to 430)	310 Fixed (45 Fixed)	1/4" SAE Male 7/16" 20 UNF
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CAT. NO.	CODE NO.	FORMER CODE NOS.	LOW PRESSURE		HIGH PRESSURE		POWER ELEMENTS
			Adjustable Range kPa (psig)	Adjustable Differential kPa (psi)	HP Cut-out Range kPa (psig)	Fixed Differential kPa (psi)	

DUAL PRESSURE

AUTOMATIC CYCLING

14727	017-8711 S.P.D.T.	Formerly : 017-6711 Replaces : 012-1506, 1549, 4105, 012-4106, 4107, 4109, 012-1554, 1609, 1637	-30.5 to 700 (9" to 100)	62 to 293 (9 to 57)	700 to 3000 (100 to 430)	345 (50)	.91 m Cap. 1/4" SAE Fl. Nut 7/16" - 20 UNF
14728	017-8701 S.P.D.T.	Formerly : 017-1550 Replaces : 012-4108, 1505, 4066, 012-1550	-30 to 700 (9" to 100)	62 to 293 (9 to 57)	700 to 3000 (100 to 430)	345 (50)	1/4" SAE Male 7/16" - 20 UNF

MANUAL RESET ON HIGH PRESSURE SIDE

14730	017-8705 S.P.D.T.	Formerly : 017-320 Replaces : 012-1551, 1552, 1605, 012-1546	-30.5 to 700 (9" to 100)	62 to 293 (9 to 57)	700 to 3000 (100 to 430)	345 (50)	1/4" SAE Male 7/16" - 20 UNF
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MANUAL RESET ON HIGH AND LOW PRESSURE SIDES

14732	017-8703 S.P.D.T.	Formerly : 017-321 Replaces : 012-1530*, 1594*, 1617*, 012-1595* 017-322	-30.5 to 700 (9" to 100)	62 to 293 (9 to 57)	700 to 3000 (100 to 430)	345 (50)	1/4" SAE Male 7/16" - 20 UNF
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NOTE: 1. * If Pressure Controls shown on chart fitted with Male 7/16" - 20 UNF Power Element Fittings are used as replacements for controls with (*) then Capillary Adaptors Part No. 2301742-1 (Was P/N 300982-5) should be used.

2. Where old series code numbers are listed showing the new replacement code numbers exact replacement of old control may not be possible in every case. Specifications should be carefully checked for suitability.

CAT. NO. 14870

RANCO SERIES 'O' CONTROL REFERENCES

Specifications of Old Types with Current Replacements — PRESSURE: Tech. Pages 147-a & 147-b. TEMPERATURE: Tech. Page 148-a.

Controls Cross Reference (by Brand) — PRESSURE: Tech. Page 147-c. TEMPERATURE: Tech. Page 148-b.

Temperature Controls — Current — Selection — Ordering : Page 148.

ACCESSORIES — Mounting Brackets and Capillary Adaptors: Refer Page 148.

ELECTRICAL RATINGS: Refer Page 148.

RANCO TYPE "O" PRESSURE CONTROLS

SPECIFICATIONS OF OLDER TYPES WITH CURRENT REPLACEMENTS



Old Code No.	Replaced by Code No.	Type	Switch Action	Range " Vac/ psi	Lowest Operat. Point	Differential psi	Factory Setting psi		Power Elements
							Cut-Out	Cut-In	

SINGLE LOW PRESSURE

AUTOMATIC RESET

010-1401	016-8706	SPST	Close on Rise	12" to 50	20"	5 to 35	15	25	1/4" SAE Male Elbow
010-1402	016-8713	SPST	Close on Rise	12" to 50	20"	5 to 35	15	25	3/16" Cap. 1/4" SAE Fl.Nut
010-1483	016-8713	SPST	Close on Rise	0 to 100	20"	10 to 40	50	60	3/16" Cap. 1/4" SAE Fl.Nut
010-1831	016-8706	SPST	Close on Rise	0 to 100	20"	10 to 40	50	60	1/4" SAE Male Elbow
010-1842	016-8713	SPST	Close on Rise	12" to 50	20"	5 to 35	15	25	4/8" Cap. 1/4" SAE Fl.Nut
010-6003	016-8706	SPST							
010-6006	016-8713	SPST							
011-1754	016-8706	SPST	Open on Rise	12" to 50	20"	5 to 35	25	15	1/4" SAE Male Elbow
011-1799	016-8706	SPST	Open on Rise	0 to 100	20"	10 to 40	30	20	1/4" SAE Male Elbow
016-107	016-8706	SPDT	Open or Close on Rise	0 to 100	20"	10 to 40	50	60	1/4" SAE Male Elbow
016-120	016-8706	SPDT	Open or Close on Rise	12" to 50		4 to 35	10	15	1/4" SAE Male Elbow
020-6002	*	DPST	Close on Rise	20" to 50		5 to 35			3/16" Cap. 1/4" SAE Fl.Nut
020-6004	*	DPST	Close on Rise	10" to 95		10 to 40			3/16" Cap. 1/4" SAE Fl.Nut
020-7002	*	DPST	Close on Rise	12" to 50		5 to 35	15	25	3/16" Cap. 1/4" SAE Fl.Nut
020-7004	*	DPST	Close on Rise	0 to 100		10 to 40	50	60	3/16" Cap. 1/4" SAE Fl.Nut

MANUAL RESET LEVER

010-1867	016-8705	SPST	Close on Rise	12" to 40		8 Fixed	15	M.R.	1/4" SAE Male Elbow
010-1925	016-8705	SPST	Close on Rise	0 to 90		10 Fixed	50	M.R.	1/4" SAE Male Elbow

SINGLE HIGH PRESSURE

AUTOMATIC RESET

010-1894	016-8750	SPST	Close on Rise	100 to 400	0	35 to 150	250	290	1/4" SAE Male Elbow
010-2054	*	SPST	Close on Rise	100 to 400	0	35 to 150	250	290	3/16" Cap. 1/4" SAE Fl.Nut
011-1711	016-8750	SPST	Open on Rise	150 to 450	0	35 to 150	290	250	3/16" Cap. 1/4" SAE Fl.Nut
011-1713	016-8750	SPST	Open on Rise	150 to 450	0	35 to 150	290	250	1/4" SAE Male Elbow
016-108	016-8750	SPDT	Open or Close on Rise	100 to 400	0	35 to 150	290	250	3/16" Cap. 1/4" SAE Fl.Nut
021-7406	*	DPST	Open on Rise	100 to 350		30 to 100			3/16" Cap. 1/4" SAE Fl.Nut

MANUAL RESET LEVER

010-1895	016-8751	SPST	Close on Rise	100 to 350		45 Fixed	250		1/4" SAE Male Elbow
011-1712	016-8751	SPST	Open on Rise	150 to 450		45 Fixed	290		3/16" Cap. 1/4" SAE Fl.Nut
011-1714	016-8751	SPST	Open on Rise	150 to 450		45 Fixed	290		1/4" SAE Male Elbow
016-200	016-8751	SPDT	Open or Close on Rise	150 to 450		40 Fixed	290		3/16" Cap. 1/4" SAE Fl.Nut
021-7480	*	DPST	Open on Rise	100 to 350		45 Fixed			3/16" Cap. 1/4" SAE Fl.Nut

DUAL TEMPERATURE & HIGH PRESSURE CUT-OUT

Old Code No.	Replaced by Code No.	Type	°F psi	Range °F/ psi	Lowest Operat. Point	Differential °F/ psi	Factory Settings °F/psi		Power Elements
							Cut-Out	Cut-In	

AUTOMATIC CYCLING

012-1534	*	SPST	°F	-15 to 40	-20°F	3 to 25 Adj.	-5	0	7/16" Cap. 3/8" φ Bulb
			psi	100 to 250		40 Fixed	190		1/4" SAE Male Elbow
012-1535	*	SPST	°F	0 to 55	-10°F		10	15	7/16" Cap. 3/8" φ Bulb
			psi	100 to 250			190		1/4" SAE Male Elbow
012-1536	*	SPST	°F	25 to 75	15°F	3 to 25 Adj.	40	44	7/16" Cap. 3/8" φ Bulb
			psi	100 to 250		40 Fixed	190		1/4" SAE Male Elbow

MILK COOLER APPLICATION

012-1514	*	SPST	°F	30 to 50	20°F		40	44	8/16" Cap. 3/8" φ x 9/16" Bulb
			psi	100 to 250			190		1/4" SAE Male Elbow

SPECIAL APPLICATIONS

022-7707	*	DPST	°F	-40 to 15		3.5 to 25 Adj.			7/16" Cap. 3/8" φ Bulb
			psi	100 to 250		40 Fixed			3/16" Cap. 1/4" SAE Fl. Nut
022-7709	*	DPST	°F	-10 to 55		3.5 to 25 Adj.			7/16" Cap. 3/8" φ Bulb
			psi	100 to 250		40 Fixed			3/16" Cap. 1/4" SAE Fl. Nut
022-6713	*	DPST	°F	40 to 105		3.5 to 25 Adj.			8/16" Cap. 3/8" φ x 9/16" C.A. Bulb
			psi	100 to 250		40 Fixed			3/16" Cap. 1/4" SAE Fl. Nut

* These Controls, or a replacement, are available from overseas on application. Refer also to Cross Reference Chart on Tech. Page 147-c. Where old series code numbers are listed showing the new replacement code numbers, exact replacement of old control may not be possible in every case. Specifications should be carefully checked for suitability.

NOTE: Refer to Page 147 for Current Controls - Selection - Ordering.

DUAL PRESSURE SPECIFICATIONS CONTINUED ON NEXT PAGE.

RANCO TYPE "O" PRESSURE CONTROLS **SPECIFICATIONS OF OLDER TYPES WITH CURRENT REPLACEMENTS** **(Continued)**



022

012



012



DUAL PRESSURE — LP Closes, HP Opens on Rise

Old Code No.	Replaced by Code No.	Type	LP HP	Range "Vac/ psi	Lowest Operat. Point	Differential psi	Factory Settings psi		Power Elements
							Cut-Out	Cut-In	
AUTOMATIC CYCLING									
012-1505	017-8701	SPST	LP	12" to 50	20"	5 to 35	15	25	2 x 1/4" SAE Male Elbow
			HP	100 to 250		40 Fixed	190	150	
012-1506	017-8711	SPST	LP	12" to 50	20"	5 to 35	15	25	2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	100 to 250		40 Fixed	190	150	
012-1549	017-8711	SPST	LP	0 to 100	20"	10 to 40	50	60	2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	150 to 450		65 Fixed	290	225	
012-1550	017-8701	SPST	LP	0 to 100	20"	10 to 40	50	60	2 x 1/4" SAE Male Elbow
			HP	150 to 450		65 Fixed	290	225	
012-1554	017-8711	SPST	LP	12" to 50	20"	5 to 35	15	25	2 x 48" Cap. 1/4"SAE Fl. Nut
			HP	100 to 247		50 Fixed	247	197	
012-1609	017-8711	SPST	LP	5 to 95	10"	10 to 40	40	50	2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	100 to 360		50 Fixed	360	360	
012-1637	017-8711	SPST	LP	5 to 95	10"	10 to 40	50	60	2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	250 to 450		60 Fixed			
012-4108	017-8701	SPDT							
012-4066	017-8701	SPDT							
022-6702	*	DPST	LP	20" to 50		5 to 35			2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	100 to 250		40 Fixed			
022-7702	*	DPST	LP	12" to 50	20"	5 to 35			2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	100 to 250		40 Fixed			
022-7704	*	DPST	LP	10 to 95		10 to 40			2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	100 to 360		50 Fixed			
022-7706	*	DPST	LP	0 to 100	20"	10 to 40			2 x 3/16" Cap. 1/4"SAE Fl. Nut
			HP	150 to 450		60 Fixed			

MANUAL RESET ON HIGH PRESSURE SIDE

012-1546	*	SPST	LP	12" to 50	20"	5 to 35	15	25	2 x 1/4" SAE Male Elbow
			HP	100 to 250		40 Fixed	190	150	
012-1551	017-8705	SPST	LP	0 to 100	20"	10 to 40	50	60	2 x 3/16" Cap. 1/4" SAE Fl. Nut
			HP	150 to 450		65 Fixed	290	225	
012-1552	017-8705	SPST	LP	5 to 95	10"		50	60	2 x 1/4" SAE Male Elbow
			HP	100 to 350					
012-1605	017-8705	SPST	LP	5 to 95	10"		40	50	2 x 3/16" Cap. 3" x 1/4" Sweat
			HP	100 to 360					
022-7802	*	DPST	LP	12" to 50	20"	5 to 35			2 x 3/16" Cap. 3" x 1/4" Sweat
			HP	100 to 250		40 Fixed			
022-7806	*	DPST	LP	0 to 100	20"	10 to 40			2 x 3/16" Cap. 3" x 1/4" Sweat
			HP	150 to 450		60 Fixed			

MANUAL RESET ON HIGH AND LOW PRESSURE SIDES

012-1530	017-8703	SPST	LP	0 to 100	20"		40	50	2 x 3/16" Cap. 3" x 1/4" Sweat
			HP	150 to 450					
012-1594	017-8703	SPST	LP	5 to 95	10"	10 Fixed	40	50	2 x 3/16" Cap. 1/4" SAE Fl. Nut
			HP	100 to 360		65 Fixed	350	285	
012-1595	017-8703	SPST	LP	12" to 50	20"	8 Fixed	15	23	2 x 3/16" Cap. 1/4" SAE Fl. Nut
			HP	100 to 220		50 Fixed	190	150	
012-1617	017-8703	SPST	LP	5 to 95	10"		40	48	2 x 3/16" Cap. 3" x 1/4" Sweat
			HP	250 to 425					
017-322	017-8703	SPDT							

ADDITIONAL/CURRENT PRESSURE CONTROLS — CODE NUMBER CHANGE ONLY

OLD CODE No.	NEW CODE No.	TYPE	OLD CODE No.	NEW CODE No.	TYPE
016-1401	016-8706	SPDT Single Low Pressure - Auto Reset	017-6711	017-8711	SPDT Dual Pressure - Auto Cycling
016-1402	016-8713		017-1550	017-8701	
016-6807	016-8705	SPDT Single Low Pressure - Manual Reset	017-320	017-8705	SPDT Dual Pressure - Manual Reset HP Side
016-6809	016-8750	SPDT Single High Pressure - Auto Reset	017-321	017-8703	SPDT Dual Press. - Manual Reset HP/LP Sides
016-6806	016-8751	SPDT Single High Pressure - Manual Reset			

* These Controls, or a replacement, are available from overseas on application. Refer also to Cross Reference Chart on Tech. Page 147-c. Where old series code numbers are listed showing the new replacement code numbers, exact replacement of old control may not be possible in every case. Specifications should be carefully checked for suitability.

NOTE: Refer to Page 147 for Current Controls — Selection — Ordering.

PRESSURE CONTROLS CROSS REFERENCE

This Cross Reference has been compiled as a Comparative Control Reference and we assume no liability for its use or misuse. Complete Specifications should be carefully checked against original before replacement. Refer also Notes at bottom of this page.

FUNCTION	RANCO		PENN**	DANFOSS	SAGINOMIYA
	OLD/ REPLACED	CURRENT (Formerly)*			
SINGLE LOW PRESSURE	010-1401 010-1831 010-6003 011-1754 011-1799 016-107 016-120	016-8706 (016-1401)*	P70AB-1/31 P70CA-1/80 P70AB-2/36 P77AAA-9300 P77AAA-9302	KP1 (60-1101) RT1 (17-5245)	SNS-C106X
SINGLE LOW PRESSURE	010-1402 010-1483 010-1842 010-6006	016-8713 (016-1402)*	P70AB-2/36	KP1 (60-1100)	SNS-C103XQ
SINGLE LOW PRESSURE WITH MANUAL RESET	010-1867 010-1925	016-8705 (016-6807)*		KP1 (60-1103) RT1 (17-5246)	SNS-C106XM2
SINGLE HIGH PRESSURE	010-1894 011-1711 011-1713 016-108	016-8750 (016-6809)*	P70CA-2/81 P70CA-3/86 P70AA-118/129 P77AAA-9350	KP5 (60-1171) KP5 (60-1170)	SNS-C130X
SINGLE HIGH PRESSURE		016-166	P77AAA-9301 P77AAA-9351	KP5 (60-1171) RT5 (17-5250)	
SINGLE HIGH PRESSURE WITH MANUAL RESET	010-1895 011-1712 011-1714 016-200	016-8751 (016-6806)*	P70KA-1/11 P70DA-1/41 P77BEA-9350	KP5 (60-1172) KP5 (60-1173) RT5 (17-5251)	HNS-C130XM1
AUTOMATIC CYCLING DUAL PRESSURE	012-1506 012-1549 012-1554 012-1609 012-1637 012-4105 012-4106 012-4107 012-4109	017-8711 (017-6711)	P70LB-1/12		DNS-D606XQ
AUTOMATIC CYCLING DUAL PRESSURE	012-1505 012-1550 012-4066 012-4108	017-8701 (017-1550)*	P72LB-1/4	KP15 (60-1240)	DNS-D606X
DUAL PRESSURE MANUAL RESET ON HP	012-1551 012-1592 012-1546 012-1605	017-8705 (017-320)*	P70MA-1/46	KP15 (60-1242) KP15 (60-1243)	DNS-D606XM
DUAL PRESSURE MANUAL RESET ON LP & HP	012-1530 012-1594 012-1595 012-1617 017-322	017-8703 (017-321)*	P70NA-1/10	KP15 (60-1245) KP15 (60-1244)	DNS-D606XMM
SINGLE HIGH PRESSURE	010-2054		P70AA-118/129		
DUAL PRESSURE	012-1506		P70LB-1/12	KP15 (60-1240)	
SINGLE PRESSURE	020-6002		P72AB-1/4		
	020-6004		P72AB-1/4		
	020-7002		P72AA-1/31 P72AA-1/31		
	020-7004		P72AB-1/4		
	021-7406		P72CA-2/26		
	021-7480		P72DA-1/7		
DUAL PRESSURE <i>012-4834 controlled by hi or low hi</i> <i>017-30 man reset 017-2705</i> <i>14728 auto. 017-5101</i>	022-6702		P72LB-1/4		
	022-7702		P72LA-1/12 P72LB-1/4		
	022-7704		P72LA-1/12		
	022-7706		P72LA-1/12 P72LB-1/4		
	022-7802		P72MA-1/6		
	022-7806		P72MA-1/6		

* Current Ranco Controls are shown in **BOLD** type. The Controls shown in brackets () * are identical with the current Control - Code Number change only has been made.

** Penn Controls - where applicable - show in suffix number both old P/N and current Metric P/N, e.g. P70AB-1 (old) / 31 (New Metric) Where more than one Replacement Comparative Control Make/Brand is shown - check specifications carefully for nearest match.

PRESSURE CONTROLS ARE DETAILED ON PAGES:

DANFOSS Type KP — Page 139 Type RT — Page 142
RANCO — Pages 147/a/b

PENN — Pages 143/a/b/c
SAGINOMIYA — Pages 143-d/e

RANCO TYPE 'O' TEMPERATURE CONTROLS



RANCO 'O' SERIES COMMERCIAL REFRIGERATION & AIR CONDITIONING CONTROLS are available for most Temperature Applications. Variations include Fixed and Adjustable Differential, operation on Rise and Fall of Temperature, Two Temperature Controls and Controls for special applications. Accessories include Mounting Brackets and Capillary Adaptors.

CAT. NO.	CODE NO.	FORMER CODE NOS.	ADJUSTABLE RANGE °C (°F)	DIFFERENTIAL (High & Low Scale Limits Adj. or Fixed) °C (°F)	POWER ELEMENTS
1481	016-6950 S.P.D.T.	Formerly : 016-1408 Replaces : 010-1408, 1417, 1419, 1433 016-103, 6801	-35 to -7 (-31 to 19.4)	1.7 to 12 (3 to 21)	2 m with 9.5 mm dia. Coiled Bulb
1482	016-6951 S.P.D.T.	Formerly : 016-1409 Replaces : 010-1409, 1415, 1416, 1418 016-104, 111 011-3019	-18 to 13 (0 to 55)	1.7 to 12 (3 to 21)	2 m with 9.5 mm dia. Coiled Bulb
1483	016-6954 S.P.D.T.	Formerly : 016-1410 Replaces : 010-1410, 1491, 1802, 1840 010-1903 011-1756	-5 to 25 (23 to 77)	1.7 to 12 (3 to 21)	2 m with 9.5 mm dia. Coiled Bulb
1485	016-6980 S.P.D.T.	Formerly : 016-6803 Supercedes : 010-1414, 1477, 2020, 6004 011-3071	-18 to 13 (0 to 55)	1.7 to 12 (3 to 21)	2 m with 14.5 mm ϕ Cross Ambient Bulb
1486	016-6981 S.P.D.T.	Formerly : 016-6804 Replaces : 010-2021, 6005	-5 to 25 (23 to 77)	1.7 to 12 (3 to 21)	2 m with 14.5 mm ϕ Cross Ambient Bulb
1487	016-6950-1 S.P.D.T.	Formerly : 016-6805 Supercedes : 010-6001	-35 to -7 (-31 to 19.4)	1.7 to 12 (3 to 21)	3.7 m with 9.5 mm dia. Coiled Bulb
1488	016-6985 S.P.D.T.	Formerly : 016-102✓ Replaces : 016-105, 112 011-1758	10 to 40 (50 to 105)	1.7 to 12 (3 to 21)	2 m with 14.5 mm ϕ Cross Ambient Bulb
1484	016-6951-1 S.P.D.T.	Formerly : 016-6601 Replaces : 010-6002	-18 to 13 (0 to 55)	1.7 to 12 (3 to 21)	4 m with 9.5 mm dia. Coiled Bulb
14811	108-100 S.P.S.T.	Ice Bank Control	No Adjustment	Phase Change at 0°C (32°F)	1.83 m with Special Bulb
14814	016-110 S.P.D.T.	Formerly : — Replaces : —	-5.3 to 6.6 (22.5 to 47.5)	0.85 Fixed (1.5 Fixed)	1.93 m with 9.5 mm ϕ Bulb
14816	016-8900 S.P.D.T.	Formerly : — Replaces : 010-1473	-17.8 to 12.8 (0 to 55)	4 to 31 (7 to 55)	2 m with 4.5 mm ϕ Bulb

TWO TEMPERATURE CONTROL

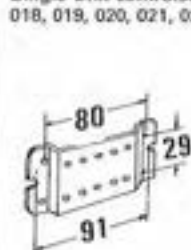
CAT. NO.	CODE NO.	AIR TEMP. SIDE		FACTORY SETTING		COIL TEMP. SIDE	
		Cut-Out Range °C (°F)	Power Element	Cut-Out Air Temp. °C (°F)	Cut-In Coil Temp. °C (°F)	Cut-In Range °C (°F)	Power Element
14813	019-1559	-12 to 15 (10 to 60)	1.93 m Cap. No Bulb	3.3 (38)	2.2 (36)	-6.7 to 15 (20 to 60)	2.44 m Cap. No Bulb

ACCESSORIES

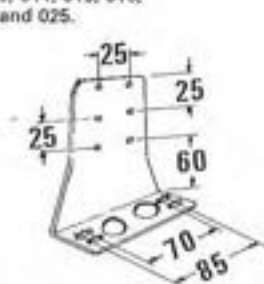
MOUNTING BRACKETS

Single Unit controls: 010, 011, 015, 016, 018, 019, 020, 021, 022, and 025.

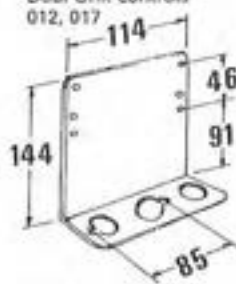
Dual Unit controls: 012, 017



TEMPERATURE
P/N 48129-1



PRESSURE
P/N 31696-1



DUAL PRESSURE AND
DUAL TEMPERATURE
P/N 31740-1

CAT. NO.	PART NO.	DESCRIPTION
14871	48129-1	Mounting Brackets (Refer Drawings at left for Type Selection)
14872	31696-1	
14873	31740-1	
14870	2301742-1 (Replaces 30982-3)	CAPILLARY ADAPTOR c/w 2 Flare Nuts

APPROVED ELECTRICAL RATINGS

Volts	Full Load Motor	Locked Rotor
010, 011, 012, 018, 019, S.P.S.T.		
240 AC	17A	102A
016, 017, S.P.D.T.		
240 AC	12A	72A

Where old series code numbers are listed showing the new replacement code numbers, exact replacement of old control may not be possible in every case. Specifications should be carefully checked for suitability.

RANCO SERIES 'O' CONTROL REFERENCES

Specifications of Old Types with Current Replacements — TEMPERATURE: Tech. Page 148-a. PRESSURE: Tech. Pages 147-a & 147-b.

Controls Cross Reference (by Brand) — TEMPERATURE: Tech. Page 148-b. PRESSURE: Tech. Page 147-c

Pressure Controls — Current — Selection — Ordering : Page 147.

RANCO TYPE "O" TEMPERATURE CONTROLS **SPECIFICATIONS OF OLDER TYPES WITH CURRENT REPLACEMENTS**



Remote Bulb



Cross-Ambient Bulb



Air Coil



Remote Air Coil



Straight Capillary

Old Code No.	Replaced By Code No.	Type	Switch Action	Range of	Lowest Operat. Point	Differential of	Factory Setting of		Power Element
							Cut-Out	Cut-In	

SINGLE TEMPERATURE — Auto Reset.**REMOTE 3/8" BULB, 3/32" CAPILLARY TUBE**

010-1408	016-6950	SPST	Close on Rise	-15 to 40	-20	3 to 25	-5	0	76" Cap.
010-1409	016-6951	SPST	Close on Rise	0 to 55	-10	3 to 25	10	15	76" Cap.
010-1410	016-6954	SPST	Close on Rise	25 to 75	15	3 to 25	40	44	76" Cap.
010-1417	016-6950	SPST	Close on Rise	-35 to 15	-40	3 to 25	-4	0	42" Cap.
010-1433	016-6950	SPST	Close on Rise	-35 to 15	-40	3 to 25	-4	0	76" Cap.
010-1840	016-6954	SPST	Close on Rise	30 to 90	19	5 to 27.5	50	60	76" Cap.
016-103	016-6950	SPDT	Open or Close on Rise	-30 to 20	-39	3 to 20	-13	-10	76" Cap.
016-104	016-6951	SPDT	Open or Close on Rise	0 to 55	-5	3 to 25	27	30	76" Cap.
016-105	016-6985	SPDT	Open or Close on Rise	50 to 105	37	3 to 25	66	70	76" Cap.
016-6801	016-6950	SPDT							

NO BULB, 3/32" CAPILLARY TUBE

010-1416	016-6951	SPST	Close on Rise	0 to 55	-10	3 to 25	30	34	76" Cap.
010-1419	016-6950	SPST	Close on Rise	-35 to 15	-40	3 to 25	-4	0	76" Cap.
011-1756	016-6954	SPST	Open on Rise	25 to 75	18	3 to 25	65	60	76" Cap.
011-1758	016-6985	SPST	Open on Rise	50 to 105	36	3 to 25	90	85	48" Cap.
011-3019	016-6951	SPST	Open on Rise	0 to 55	-10	3 to 25	20	15	76" Cap.
016-111	016-6951	SPDT	Open or Close on Rise	0 to 55	-5	3 to 25	15	20	76" Cap.
016-112	016-6985	SPDT	Open or Close on Rise	50 to 105	37	3 to 25	85	90	48" Cap.

CAPILLARY AND/OR COILED BULB

010-1416	016-6951	SPST	Close on Rise	0 to 55	-10	3 to 25	36	40	84" Cap. - Remote Coil
010-1418	016-6951	SPST	Close on Rise	0 to 55	-10	3 to 25	36	40	1 1/2" x 1 1/2" C.B.
010-1802	016-6954	SPST	Close on Rise	25 to 75	15	3 to 25	52	56	1 1/2" x 1 1/2" C.B.
010-1903	016-6954	SPST	Close on Rise	40 to 85	20	3 to 25	65	70	84" Cap. - Remote Coil
010-6001	016-6950-1								
010-6002	016-6951-1								
016-102	016-6985	SPDT	Open or Close on Rise	50 to 105	37	3 to 25	60.5	65	84" Cap. 3/8" x 9/16" Bulb Cross Ambient

FIXED DIFFERENTIAL

010-1490	*	SPST	Close on Rise	0 to 55	-6	3 Fixed	35	38	76" Cap. 3/8" x 1 1/2" Bulb
010-1491	016-6954	SPST	Close on Rise	25 to 75	22	3 Fixed	40	43	76" Cap. 3/8" x 1 1/2" Bulb
016-110	*	SPDT	Open or Close on Rise	22.5 to 47.5	20	1.5 Fixed	35.5	37	76" Cap. 3/8" x 1 1/2" Bulb

SPECIAL APPLICATIONS

010-1414	016-6980	SPST	Close on Rise	30 to 50	20	4 to 10	40	44	84" Cap. 3/8" x 9/16" Bulb Cross Ambient
010-1469	*	SPST	Close on Rise	-15 to 40	-20	3 to 25	-5	0	76" Cap. 3/8" x 1 1/2" Bulb Signal Circuit
010-1470	*	SPST	Close on Rise	-35 to 15	-40	3 to 25	-4	0	76" Cap. No Bulb
010-1473	016-8900	SPST	Close on Rise	0 to 50	-15	7 to 55	15	40	76" Cap. 3/8" x 1 1/2" Bulb Wide Cycle Defrost
010-1477	016-6980	SPST	Close on Rise	25 to 45	20	4 to 10	26	31	84" Cap. 3/8" x 9/16" Bulb Cross Ambient (Milk Cooler)
010-1829	*	SPST	Close on Rise	30 to 50	20	4 to 10	40	44	84" Cap. 3/8" x 9/16" Bulb Manual Start. (Milk Cooler)
010-2020	016-6980								
010-2021	016-6981								
010-6004	016-6980								
010-6005	016-6981								
011-3071	016-6980								
018-100	*	SPST	Close on Rise			Phase Change	Under 32	Over 32	72" Cap. Special Bulb Ice Bank for Milk Cooler
020-6007	*	DPST	Close on Rise	-40 to 15		3 to 25			76" Cap. 3/8" x 1 1/2" Bulb
020-6009	*	DPST	Close on Rise	-10 to 55		3 to 25			76" Cap. 3/8" x 1 1/2" Bulb
020-7007	*	DPST	Close on Rise	-40 to 15		3 to 25			76" Cap. 3/8" x 1 1/2" Bulb
020-7009	*	DPST	Close on Rise	-10 to 55		3 to 25			76" Cap. 3/8" x 1 1/2" Bulb
020-7012	*	DPST	Close on Rise	-10 to 55		3 to 25			84" Cap. 3/8" x 9/16" Bulb Cross Ambient
020-7013	*	DPST	Close on Rise	50 to 105		3.5 to 25	65	70	84" Cap. 3/8" x 9/16" Bulb Cross Ambient
020-7016	*	DPST	Close on Rise	-40 to 15		3.5 to 25			1 1/2" x 1 1/2" long Coiled Bulb
021-100	*	SPST	Open on Rise			Phase Change	Over 32	Und. 32	72" Cap. Spec. Bulb
025-100	*	SPDT	Open or Close on Rise	-35 to 40		1.5 Fixed	23.5	25	48" Cap. No Bulb

ADDITIONAL TEMPERATURE CONTROLS — CODE NUMBER CHANGE ONLY

Old Code No.	New Code No.	Old Code No.	New Code No.	Old Code No.	New Code No.	Old Code No.	New Code No.
016-102	016-6985	016-1409	016-6951	016-6801	016-6951-1	016-6804	016-6981
016-1408	016-6950	016-1410	016-6954	016-6803	016-6980	016-6805	016-6950-1

* These Controls, or a replacement, are available from overseas on application. Refer also to Cross Reference Chart on Tech. Page 148-b. Where old series code numbers are listed showing the new replacement code numbers, exact replacement of old control may not be possible in every case. Specifications should be carefully checked for suitability.

NOTE: Refer to Page 148 for Current Controls — Selection — Ordering.

TEMPERATURE CONTROLS CROSS REFERENCE

This Cross Reference has been compiled as a Comparative Control Reference and we assume no liability for its use or misuse. Complete Specifications should be carefully checked against original before replacement. Refer also Notes at bottom of this page.

FUNCTION	RANCO		PENN**	DANFOSS	SAGINOMIYA
	OLD / REPLACED	CURRENT (Formerly)*			
SINGLE TEMPERATURE	010-1407 010-1408 010-1419 010-1433 016-103 016-6801	016-6950 (016-1408)*	A19ABC-24/41	KP63 (60L-1108)	TNS-C1010XC
SINGLE TEMPERATURE	010-1409 010-1415 010-1416 010-1418 011-3019 016-104 016-111	016-6951 (016-1409)*	A19ABC-24/41 A72AA-6/43 A19BBC-2/4	KP61 (60L-1102) KP63 (60L-1108)	TNS-C114X
SINGLE TEMPERATURE	010-1410 010-1491 010-1802 010-1840 010-1903 011-1756	016-6954 (016-1410)*	A19ABC-24/41 A19BBC-2/4 A19BAB-3/7 A72AA-7	KP69 (60L-1112)	TNS-C134X
SINGLE TEMPERATURE	010-1414 010-1477 010-2020 010-6004 011-3071	016-6980 (016-6803)*	A19ABC-24/41		
SINGLE TEMPERATURE	010-2021 010-6005	016-6981 (016-6804)*	A72AA-7		
SINGLE TEMPERATURE	010-6001	016-6950-1 (016-6805)*	A19ABC-36/67	KP61 (60L-1102)	
SINGLE TEMPERATURE	011-1758 016-105 016-112	016-6985 (016-102)*			
SINGLE TEMPERATURE	010-6002	016-6951-1 (016-6601)*	A19ABC-36/67		
SINGLE TEMPERATURE ICE BANK CONTROL		108-100			
FIXED DIFFERENTIAL CONTROL		016-110			
SINGLE TEMPERATURE WIDE CYCLE DEFROST CONTROL	010-1473	016-8900			
TWO TEMPERATURE CONTROL		019-1559			
WIDE RANGE TEMPERATURE CONTROLS		C30-1102 (C30-C1100)*	A19ABC-24/41 A19AAB-4/32 A19ABC-40 A19ZBC-2 A19ZBC-7		
		C30-1103 (C30-C1101)*	A19BAC-1/3 A19BBC-2/4		
		C30-1181 (C30-C1180)*	A19ABC-4/60		
		C30-1251 (C30-C1250)*	A19AAC-9/13		
HEAVY DUTY TEMPERATURE	020-6007		A72AA-1/38		
	020-6009		A72AA-2/39		
	020-7007		A72AA-1/38		
	020-7009		A72AA-2/39		
	020-7012		A72AA-20/40		
	020-7013		A72AA-3		
COOLING - COILED BULB	020-7016		A72AA-5/41		

* Current Ranco Controls are shown in **BOLD** type. The Controls shown in brackets () * are identical with the current Control - Code Number change only has been made.

** Penn Controls - where applicable - show in suffix number both old P/N and current Metric P/N. e.g. A19ABC-24 (old) / 41 (New Metric) Where more than one Replacement Comparative Control Make/Brand is shown - check specifications carefully for nearest match.

TEMPERATURE CONTROLS ARE DETAILED ON PAGES :

DANFOSS Type KP61-77 — Page 140

PENN — Pages 144-a/b/c/d/145

RANCO — Pages 145-a/148/148-a

SAGINOMIYA — Pages 144-e/f

RANCO ICE BANK & LIQUID LEVEL CONTROLS

E20 PHOTO-ELECTRONIC BIN LEVEL CONTROL



The Type E20 Bin Level Control is designed to maintain, photoelectronically, the amount of ice in the storage bin of automatic ice-making machines at a set level.

Recommended operating distance between the light source and sensor units is 457mm (18") or less.

OPERATION : A parallel beam of light is projected across the storage bin at the level at which it is desired to maintain the stored ice. As the level of ice builds up and depletes, it makes and breaks the light beam, thereby controlling the compressor on-off function.

SPECIFICATIONS

VOLTAGE RANGE : 210 to 260 V.AC.
POWER CONSUMPTION : 8.0 Watts maximum (compressor on)
 2.4 Watts maximum (compressor off)
THERMAL RELAY : Ambient compensated 4.4°C to 49°C (40°F to 120°F)
TIME DELAY (Nominal) : 2 minutes at compressor turn-on
OPERATING RANGE : 457 mm (18") or less.
ELECTRICAL RATINGS : 240 V. AC, 20 A, Full Load, 84A, Locked Rotor.

CATALOGUE NO. 1491 : TYPE E20 - 2402

TYPE E24 Mod E37 ICE BANK/LIQUID LEVEL CONTROLS



L52-3016



E24

APPLICATION ICE BANK CONTROL

Vending Machines
 Drink Dispensers
 Industrial Ice Banks
 Milk Coolers

ICE HARVEST CONTROL

Commercial Ice Machines

LIQUID LEVEL CONTROL

Ice Machines
 Carbonators
 Industrial Processing
 Sump Pump

Designed to control thickness of ice or level of a conductive liquid in commercial ice bank, ice harvest or liquid level equipment. Provided with solid state circuitry, E24 senses difference in resistance between water and ice or air and liquid for commercial ice bank and liquid level applications.

Features zinc plated steel chassis, low voltage AC sensing — eliminating electrolysis, high capacity switching, and no first cycle effect for ice bank applications. Unaffected by normal water contaminants, line voltage fluctuations, or line noise. Liquid level or ice bank sensors provided with control.

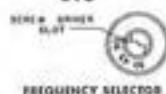
CAT. NO.	TYPE & CODE NO.	SWITCH ACTION	OPERATING VOLTAGE TERM. 7&8	CONTROL RELAY ELECT. RATINGS *		CONTROL CHASSIS CODE NO.	SENSOR	
				LOAD CONTACTS 1&2 NORM. OPEN	LOAD CONTACTS 1&3 NORM. CLOSED		LEAD LGTHS mm (ins)	LEAD CODE NO.
—	E24-2405	DPDT	240V.AC.	FL. 4A LR. 24A	FL. 2A LR. 12A	E24-2425	17.3cm (68")	L52-3016

* For higher electrical loads use contactor. Sensor contacts 4, 5 & 6 (differential level sensing) Pilot Duty only.

TYPE E15 DE-ICE CONTROLS



E15



FREQUENCY SELECTOR

APPLICATION

Designed to control removal of ice or frost from outside coil of central or window unit heat pump systems.

DESCRIPTION

Control package encompasses all necessary functions of a de-ice control with reliability and ease of application. Features frequency selection of de-ice cycle and field adjustment of termination temperature. Interlock requires an initiation temperature of 25°F or below at the event of time initiation. After a trial initiation period, interlock permits only one de-ice initiation per time period.

To select de-ice frequency, line up one of the numbers on knurled knob with edge of screwdriver slot. When knob is set at 30, timer will attempt to initiate de-ice every 30 minutes; set at 45, it will attempt every 45 minutes, etc.

CAT. NO.	TYPE CODE NO.	FEATURES	FOR ONE REVOLUTION OF SHAFT			INITIATION TEMP. °C(°F)	TERMINATION TEMPERATURE		ELECT. RATINGS
			TIME	INITIATIONS	TERMINATION		COLD CAM	WARM CAM	
1493	E15-2501	Adjustable Freq. & Term.	90 mins	1, 2 or 3	10 mins	-3.3°C(26°F) or below	13°C(55°F)	21°C(70°F)	240V. AC. 3 Watts.

OIL PROTECTION CONTROLS

Differential Pressure Controls
Types MP 55, 55A

Types MP 55 and 55A are designed for use as safety pressure controls on pressure-lubricated refrigeration compressors. The control stops the compressor after a preset interval if the oil pressure falls. Type MP 55 is used in refrigeration systems for fluorinated refrigerants such as R12, R22, R500, and R502.

Type MP 55A is designed for use in R717 (NH₃) refrigeration systems. It can also be used in plants working with fluorinated refrigerants.

MP 55 and 55A are equipped with a built-in thermal timing relay set for a fixed release time. The Control contains two separate electrical circuits. One of the advantages this gives is that the differential pressure control need no longer be the last link in the electrical circuit of the plant. This means that the control device (pressure control, thermostat) can be placed anywhere in the control circuit, before or after the differential pressure control. This leads to simpler, often less expensive, installation.



MP 55

Cat. No.	Type	Code No.	Release Time of Timing Relay	Working Range LP Conn. kPa (psig)	Differential Range kPa (psi)	Contact Differential kPa (psi)	Connection	Max. Permissible Bellows	
								Press. kPa (psig)	Temp. °C (°F)

FOR REFRIGERANTS R12, R13B1, R22, R500, R502

15067	MP55	6080171	60 sec.	-100 to 1200	30 to 450	20	1/2"	2200	100
15068	MP55	6080172	90 sec.	(30" to 174)	(4.3 to 65)	(2.9)	Flare	(319)	(212)

FOR REFRIGERANTS R717, R12, R13B1, R22, R500, R502

15069	MP55A	6080175	60 sec.	-100 to 1200	30 to 450	20	6/10 mm	2200	100
15070	MP55A	6080176	90 sec.	(30" to 174)	(4.3 to 65)	(2.9)	Weld Nipple	(319)	(212)

ELECTRICAL RATING: Pilot Duty 2A, 250V.

KK.20.B1.02

PENN

P74 SERIES LUBE OIL PROTECTION CONTROL

WITHOUT TIME DELAY

Series P74 measures pressure difference between two sources, same as Series P28, but does not incorporate time delay. For use on any application within the pressure and electrical ratings shown, where relationship between two pressures is critical to proper equipment operation.

P74AA-2 may be used with Series P28 on two refrigeration compressors operated by one double shaft motor to provide time delayed shutdown should lube oil pressure fall on either compressor.

FOR ALL REFRIGERANTS EXCEPT AMMONIA

Cat. No.	Type	Switch Action	Range		Pressure Connections	Max. Bellows Pressure (Momentary) kPa (psig)
			kPa	psig		
15036	<u>P74AA-2</u>	SPST Closes on Decrease in Press. Diff.	50 to 450 (Adjustable)	7 to 65 (Adjustable)	3/8" Cap. with 1/2" Flare Nut	2240 (325)
15035	<u>P74BA-14</u>	SPST Opens on Decrease in Press. Diff.	50 to 450 (Adjustable)	7 to 65 (Adjustable)	3/8" Cap. with 1/2" Flare Nut	2240 (325)

Electrical Ratings: Refer Tech. Page 144-g



SERIES P74

P45 SERIES LUBE OIL PROTECTION CONTROL

SPECIAL FOR COPELAND APPLICATION

WITH TIME DELAY

ELECTRICAL RATING—PILOT DUTY

Max. Bellows Pressure: 2930 kPa (425 psig)

Time Delay Heater Circuit	Pilot Duty
120/240V, A.C.	750 VA, 120/240V, AC

Cat. No.	Type	Time Delay	Heater Circuit Volts, AC	Type of Reset	Factory Setting *		Refrigerant	Pressure Connection
					kPa	psig		
15015	P45NCA-12	120 Sec.	120/240	Manual	62	9	Non-Corrosive	3/8" Cap. with 1/2" Flare Nut

* Switch differential approx. 35 kPa (5psi). Time delay relay energises at 62 kPa (9psi) pressure difference, de-energised at 96.5 kPa (14psi) difference. Time Delay Relay is not field replaceable.

Underlined Models have Metric Scales —
Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

PENN — Continued Next Page.



P45NCA-12

OIL PROTECTION CONTROLS

PENN Cont'd.



P29NC-43



P29NC-44

P29 SERIES LOW LIMIT PRESSURE CONTROL WITH TIME DELAY

P29NC has a time delay device and lockout requiring manual reset wired as an integral part of the switch. Standard time delay is 60 seconds. Completely compensated to provide uniform timing.

For pressure lubricated machinery. Provides protection of machinery against failure of lubrication system. Time delay prevents nuisance shut downs due to momentary fluctuations in oil pressure.

ELECTRICAL RATINGS: Pilot duty rating of 750 VA., 120/240 V.A.C. or 57.5 VA., 24 V.D.C. An external step down transformer for 440 and 550 V.A.C. applications must be of sufficient capacity to supply 13 VA. at 120 V. or 26 VA. at 240V. for time delay.

Cat. No.	Type	Switch Action	Min. to Max. Pressure to Open Contacts kPa (psig)	Press. Drop to Close Contacts kPa (psi)	Max. Bellows Pressure kPa (psig)	Pressure Connection	Time Delay Setting
1509	<u>P29NC-43</u>	SPST	-70 to 700 (20" to 101)	7 to 21 (1 to 3)	2241 (325)	1/4" Male Flare	60 sec. Factory Set
15010	<u>P29NC-44</u>	SPST	-70 to 700 (20" to 101)	7 to 21 (1 to 3)	2241 (325)	3/8" Copper Cap. Tube 1/4" Fl. Nut	60 sec. Factory Set

P28 SERIES LUBE OIL PROTECTION CONTROL WITH TIME DELAY

Provides dependable protection against major breakdowns on pressure lubricated refrigeration compressors by guarding against low lube oil pressure.

A built-in time delay switch, accurately compensated for ambient temperature, allows for pressure pick up on start and avoids nuisance shutdowns on pressure drops of short duration during the running cycle.

The time delay assembly (timer and terminal board) may be easily removed and replaced in the field. Time delay switch is a "trip-free" expansion rod device actuated by a resistance heater.

Models for 12V. or 24 V.A.C. or D.C. with 120 seconds timing available as standard. Models with other timings available on special order.



SERIES P28
Shown with
Manual Reset

Cat. No.	Type	Time Delay	Heater Circuit Volts. AC.	Type of Reset	Range*		Refrigerant	Pressure Connection
					kPa	psig		
1506	<u>P28AA-41</u>	90 sec.	120/240	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
1504	<u>P28AA-42</u>	60 sec.	120/240	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
15051	<u>P28AA-43</u>	120 sec.	120/240	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
15055	<u>P28AA-44</u>	45 sec.	120/240	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
1508	<u>P28AN-22</u>	90 sec.	120/240	Manual	.25 to 5kg	7 to 72	Ammonia	1/2" Female NPT
1505	<u>P28DA-7</u>	90 sec. with Safelite & Alarm Circuit	120/240	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
15052	<u>P28GA-6</u>	90 sec.	120/240	Auto.	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut
15053	<u>P28NA-15</u>	120 sec.	24V. AC or DC	Manual	50 to 500	7 to 72	Non-Corrosive All-Range	3/8" Cap. with 1/4" Flare Nut

* Switch differential approximately 35 kPa (5psi).

ELECTRICAL RATINGS — PILOT DUTY

Time Delay Heater Circuit	Pilot Circuit	Alarm Circuit *	Contact Rating ** 2 to 1; 2 to 3.
120/240V. A.C.	750 VA. 120/240V. A.C.	125VA. 120/240V. A.C.	10 Amps. 120V. A.C. 5 Amps. 240V. A.C.
12V. A.C. or D.C.	125VA. 24V. A.C.	125VA. 24V. A.C.	10 Amps. 24V. A.C.
24V. A.C. or D.C.	57.5VA. 24V. D.C.	57.5VA. 24V. D.C.	10 Amps. 24V. D.C.

* Must be same voltage as pilot circuit.

** Must be same voltage as time delay circuit.

Underlined Models have Metric Scales — Refer Tech. Page 144-f for English to Metric Cross Reference Chart.

RLY13A - TIME DELAY ASSEMBLY

The time delay assembly (timer and terminal board) in the P28 and P29 Series Controls may be removed and replaced in the field.

CAT. NO.	TYPE	VOLTAGE	TYPE OF RESET	TIMING IN SEC.	ALARM CIRCUIT
15030	RLY13A-600R	120/240V. AC	Manual	60	No.
15028	RLY13A-602R	120/240V. AC	Manual	90	No.
15031	RLY13A-608R	120/240V. AC	Automatic	90	No.
15032	RLY13A-616R	120/240V. AC	Manual	120	No.
15029	RLY13A-617R	120/240V. AC	Manual	45	No.



Time Delay Switch

OIL PROTECTION CONTROLS

TYPE P30

DIFFERENTIAL OIL PRESSURE CONTROL WITH TIME DELAY SWITCH



FUNCTION

The Type P30 Differential Oil Pressure Control provides protection for pressure-lubricated type refrigeration compressors, against the loss of lubricating oil pressure, which could cause severe bearing damage, resulting in a compressor breakdown.

FEATURES

- A. TIME DELAY CIRCUIT TO AVOID "NUISANCE" SHUT-DOWN.
- B. SAFELIGHT CONNECTION.
- C. ALARM CIRCUIT CONNECTION.
- D. MANUAL RESET.
- E. REPLACEABLE TIME DELAY SWITCH.
- F. FIELD ADJUSTABLE PRESSURE DIFFERENCE.

APPLICATION

The Type P30 Control, by means of two opposing, pressure-operated power element assemblies, senses the difference between the crankcase pressure, and the oil pump pressure. This difference in pressures is the "effective oil pressure" that is available to circulate the lubricating oil to the bearing surfaces.

A time delay switch allows the oil pressure to build up to a preset operating pressure on compressor start, and also prevents "nuisance" shut-down of the compressor on oil pressure drops of short duration.

CAUTION: The control should be mounted so that both bellows are above the liquid level of the equipment on which the control is used. This is to prevent possible accumulation of foreign matter inside the bellows.

CAT. NO.	TYPE	RANGE CUT-OUT PRESSURE DIFFERENTIAL (C.O.P.D.)		C.O.P.D. MINUS CUT-IN PRESS. DIFF.		MAXIMUM OVER PRESSURE		TIME DELAY (SECS.)	CAPILLARY TUBE LENGTH	ELECTRICAL RATING PILOT DUTY
		kPa	psi	kPa	psi	kPa	psi			
15049	P30-3801	35 to 414	5 to 60	Fixed 48	Fixed 7 Max.	2069	300	120	36"	720VA
15013	P30-3701	35 to 414	5 to 60	Fixed 48	Fixed 7 Max.	2069	300	90	Cap. Tube	@
15012	P30-3601	35 to 414	5 to 60	Fixed 48	Fixed 7 Max.	2069	300	60	1/2" Flare Nut	120 or 240
15050	P30-3501	35 to 414	5 to 60	Fixed 48	Fixed 7 Max.	2069	300	45	Both sides	VAC



Saginomiya

TYPE ONS – DIFFERENTIAL OIL PRESSURE CONTROL

providing protection against low lubricating oil pressure

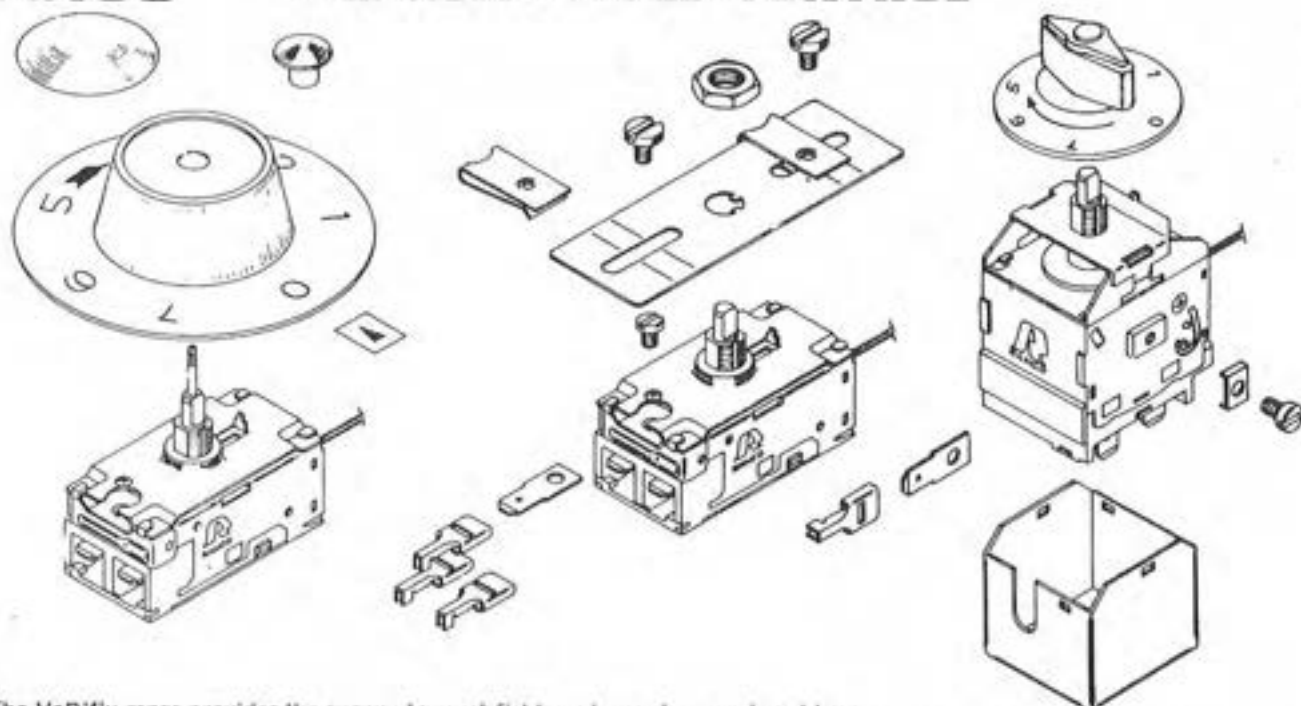
- FEATURES:**
- ★ For use with Fluorinated Refrigerants
 - ★ Single Pole Double Throw mechanisms — double snap-action ensures reliable switching
 - ★ Direct Flare Connections or Capillary types available
 - ★ Manual Reset & Built-in Time Delay switch options of 45, 90, 110 seconds
 - ★ Mounting Bracket supplied as Standard

Cat. No.	Type	Range of Differential		Differential of Differential		Limit of Diff. kPa (psig)	Time Delay Options*	Connections	Electrical Ratings 250V. AC.
		kPa	psi	kPa	psi				
	ONS-C106X	50 to 350	7 to 51	50 Approx.	7 Approx.	1500 (218)	45 sec. 90 sec. 110 sec.	1/2" SAE Male Flare	Running Current 3A Locked Rotor 10A Non-Inductive 3.5A
	ONS-C106XQ	50 to 350	7 to 51	50 Approx.	7 Approx.	1500 (218)	45 sec. 90 sec. 110 sec.	1 m. Cap. with 1/2" SAE Flare Nut	

* When ordering, specify Time Delay Option required.

NOTES

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES



The VaRifix range provides the answer to most field service replacement problems. The controls are supplied with a complete set of accessories, packed in individual cartons, for use in the servicing of domestic refrigerators, freezers and ice cream cabinets, water and bottle coolers. Each standard carton contains 84 controls. Each control can be fixed either by a centre bush, or by using the adaptable bracket, which provides mounting centres between 35 mm and 68 mm. This bracket can be mounted longitudinally or transversely as required.

Cat. No.	Control	Application	Cold Out °C (°F)	Cold In °C (°F)	Normal Out °C (°F)	Normal In °C (°F)	Warm In °C (°F)	Defrost Termination °C (°F)	Signal Operation °C (°F)	Capillary Length mm (ins)
15151	VC 1	Compressor Refrig.	-24 (-11.2)		-14 (+6.8)	-5 (+23)	+2 (+35.6)			1200 (47)
15152	VA 2	Electric Absorption Refrig.	-12 (+10.4)		-4.5 (+24)	-0.5 (+31)	+2.5 (+36)			2000 (78)
15153	VF 3	Freezer and Ice Cream Cabinet	-32 (-25.6)		-24 (-11.2)	-18 (-0.4)	-12 (+10.4)			2000 (78)
15154	VP 4	Compressor Refrig.	-26.5 (-15)		-18 (-0.4)	-9.5 (+15)	-4 (+24.8)	+5.5 (+42)		1200 (47)
15155	VS 5	Freezer with Standard Signal	-32 (-25.6)		-24 (-11.2)	-18 (-0.4)	-12 (+10.4)		Cut in 5.5 (10) above Cut in	2000 (78)
15156	VR 6	Freezer with Reverse Signal	-32 (-25.6)		-24 (-11.2)	-18 (-0.4)	-12 (+10.4)		Cut out 5.5 (10) above Cut in	2000 (78)
15157	VB 7	Bottle or Beverage Cooler	-3 (+26.6)	+2 (+35.6)			+12 (+53.6)			1200 (47)
15158	VW 8	Window Air Conditioner	+15.5 (+60)	+18 (+64.4)			+31.5 (+88)			1200 (47)
							Warm Out	Const. Cut-in		
15159	VT 9	Cycle Defrost Refrig.	-26 (-14.8)				-11 (+12.2)	+3.5 (+38.3)		1200 (47)

ELECTRICAL RATINGS :

VC1, VA2, VF3, VP4, VB7, VT9 - 6 amps. inductive 250V. A.C.
VS5, VR6 - Terminals 1 - 2. 6 amps. inductive 250V. A.C.
Signal switch terminals 1 - 3. 1 amp. inductive 250V. A.C.
VWB - 16 amps. inductive 250V. A.C.

REFER TO FOLLOWING TECH. PAGES FOR WIRING DIAGRAMS AND REPLACEMENT REFERENCE DETAILS

NOTE : FIRST 3 NUMERALS OF CAT. NO. INDICATES PAGE NO.

RANCO VaRiFiX ADAPTABLE CONTROL

CHART OF ACCESSORIES

ITEM	PART NO.	VC1, VA2, VF3 VB7, VW8	VP4	VS5, VR6	VT9
Captive Nut (2 off)	81184 - 2	X	X	X	X
Mounting Screw (2 off)	81951 - 1	X	X	X	X
Adaptable Bracket	390308 - 1	X	X	X	X
Centre Mounting Nut	58175 - 2	X	X	X	X
Datum Marker	82520 - 1	X	X	X	X
Dial Knob (Large)	80032 - 3	X	X	X	X
Dial Knob (Small)	80032 - 4	X	X	X	X
Push on Connector (4 off)	55892 - 1	X	X	X	X
Push Button	59116 - 1	X	X	X	X
Terminal Cover	301812 - 1	X	X	X	X
Connector Insulator (4 off)	81984 - 1	X	X	X	X
Instruction Leaflet	302393	X	X	X	X

REPLACEMENT REFERENCE

INCLUDES CONTROLS MANUFACTURED BY AUSTRALIAN
CONTROLS AND/OR OVERSEAS RANCO COMPANIES.
THESE CONTROLS ARE ALSO SUITABLE FOR MANY APPLIANCES
NOT ORIGINALLY FITTED WITH RANCO CONTROLS.

VC 1 COMPRESSOR CONTROL **CAT. NO. 15151** This is a usable replacement for the following
Ranco codes. It is also suitable for refrigerators not originally fitted with a Ranco control.

A52 100	A50 139	A50 193	A50 272	A50 525	A50 568
A52 101	A52 139	A50 194	A50 274	SA 526	SA 569
A50 104	A50 140	A50 196	A50 278	SA 527	SA 570
A52 106	A52 140	A50 197	A50 279	SA 528	SA 571
A50 107	A50 141	A50 199	A50 280	SA 529	SA 572
A50 108	A50 142	A50 200	A50 281	A50 529	A50 573
A50 109	A52 143	A50 201	A50 288	SA 533	SA 574
A52 109	A50 144	A50 202	A50 290	A50 534	A50 576
A50 110	A52 144	A50 206	A50 291	SA 535	SA 577
A52 110	A50 145	A50 209	A50 292	SA 536	A50 577
A50 111	A52 145	A50 210	A50 293	A50 536	SA 578
A52 111	A50 147	A50 213	A50 295	SA 537	SA 579
A52 112	A52 147	A50 216	A50 297	SA 538	A50 580
A50 113	A50 151	A50 217	A50 299	A50 539	SA 580
A52 113	A52 155	A50 220	A50 300	SA 540	SA 581
A50 114	A50 156	A50 221	A50 301	A10 540	SA 582
A50 115	A52 156	A50 222	A50 309	A50 541	SA 583
A50 116	A50 157	A50 223	A50 311	SA 543	SA 584
A52 116	A52 157	A50 224	A50 316	A50 543	A50 584
A50 117	A50 158	A50 225	A50 317	SA 544	A50 585
A52 117	A52 158	A50 226	A50 321	A50 544	A50 586
A50 118	A52 159	A50 227	A50 323	SA 545	A50 588
A50 119	A50 160	A50 228	A50 324	SA 546	SA 591
A52 119	A52 160	A50 230	SA 500	SA 547	A50 591
A52 120	A50 162	A50 233	SA 501	A50 547	SA 594
A50 121	A52 163	A50 234	SA 502	SA 548	SA 596
A52 121	A52 164	A50 235	SA 503	A50 548	SA 598
A50 122	A50 166	A50 237	SA 504	SA 549	SA 599
A52 122	A52 166	A50 238	SA 505	A50 549	A50 599
A50 123	A50 169	A50 239	SA 506	A50 551	A50 600
A50 124	A50 170	A50 240	SA 507	SA 552	SA 601
A50 125	A50 171	A50 242	SA 508	A50 552	SA 604
A52 125	A50 173	A50 243	SA 509	SA 553	A50 606
A50 126	A50 174	A50 244	SA 510	SA 554	A50 607
A52 127	A52 175	A50 250	SA 512	SA 555	A50 608
A50 128	A50 176	A50 251	SA 513	A50 555	A50 609
A50 129	A50 177	A50 252	SA 515	SA 556	A50 PO613
A52 129	A50 179	A50 253	SA 516	A50 556	A50 614
A50 133	A52 179	A50 255	SA 517	A50 559	SA 616
A50 134	A50 180	A50 258	SA 518	A50 561	SA 617
A52 134	A52 183	A50 263	SA 519	SA 562	SA 618
A50 135	A50 186	A50 264	SA 520	SA 563	SA 620
A50 136	A50 187	A50 267	SA 522	SA 564	SA 621
A50 137	A50 189	A50 268	SA 523	SA 565	SA 622
A50 138	A50 192	A50 271	SA 525	SA 568	SA 623

REFER TO PAGE 151 FOR FULL SPECIFICATIONS OF THE RANCO VaRiFiX ADAPTABLE CONTROLS

RANCO VARIFIX REPLACEMENT REFERENCE (CONT'D)

VC 1 COMPRESSOR CONTROL (Continued)

CAT. NO. 15151

SA 624	A10 968	A10 1067	A10 1214	A10 1474	A10 2121
SA 627	SA 969	A10 1068	SA 1217	A10 1475	A50 2131
SA 628	SA 972	SA 1070	SA 1218	SA 1503	A50 2204
SA 629	SA 973	A10 1071	SA 1220	A10 1575	A50 2205
SA 630	SA 974	A10 1072	A10 1227	SA 1613	A50 2206
SA 631	SA 975	A10 1073	A10 1228	A50 2000	A50 2208
SA 632	SA 977	SA 1074	SA 1233	A50 2002	A50 2209
SA 633	SA 978	SA 1076	SA 1234	A50 2003	A50 2211
SA 634	A10 979	A10 1077	A10 1241	A50 2005	A50 2213
SA 638	SA 980	A10 1083	SA 1242	A55 2005	A50 2214
SA 640	A10 980	SA 1085	SA 1244	A50 2007	A50 2216
SA 647	SA 983	A10 1087	A10 1245	A50 2008	A50 2217
SA 648	SA 984	A10 1088	A10 1248	A52 2012	A50 2220
SA 649	SA 985	SA 1090	A10 1252	A50 2015	A50 2274
SA 650	A50 1001	A10 1092	SA 1253	A50 2016	A50 2275
SA 651	SA 1002	A10 1096	SA 1254	A50 2017	A50 2277
SA 654	A10 1002	A10 1120	SA 1256	A50 2019	A50 2280
SA 655	SA 1003	A10 1126	SA 1258	A50 2020	A50 2284
SA 656	SA 1004	A10 1132	SA 1259	A50 2021	A50 2291
SA 658	A10 1005	A10 1151	SA 1260	A50 2022	A50 2297
A10 698	SA 1006	A10 1152	SA 1261	A50 2023	A50 2298
A10 701	SA 1014	SA 1153	SA 1262	A50 2024	A50 2301
SA 728	A10 1014	SA 1154	SA 1264	A50 2026	A50 2304
SA 731	SA 1015	A10 1158	SA 1270	A50 2027	A50 2307
SA 734	SA 1016	A10 1159	SA 1273	A50 2028	A50 2308
SA 736	A10 1016	SA 1165	SA 1278	A50 2029	SA 2511
SA 807	SA 1017	SA 1167	SA 1280	A50 2034	A10 2921
SA 808	A10 1017	SA 1168	SA 1286	A50 2035	SA 2922
A10 852	A10 1019	SA 1170	SA 1294	A50 2037	A10 2922
A10 862	SA 1021	SA 1171	SA 1302	A50 2040	A50 3000
A10 863	SA 1023	SA 1172	SA 1304	A50 2046	A50 3001
A10 866	SA 1025	SA 1173	SA 1311	A50 2056	A10 3719
A10 890	SA 1026	SA 1174	A10 1312	A50 2059	A10 3848
A10 917	SA 1029	SA 1175	A10 1321	A50 2060	A10 3851
A10 932	A10 1029	SA 1176	A10 1323	A50 2061	A10 3877
SA 940	SA 1030	SA 1177	A10 1353	A50 2064	A50 4909
A10 940	A10 1030	SA 1179	A10 1361	A50 2066	A50 5100
SA 941	A10 1034	A10 1182	A10 1362	A50 2069	A50 5107
SA 943	A10 1044	A10 1184	A10 1364	A50 2070	A50 5111
SA 945	SA 1047	SA 1190	A10 1365	A50 2072	A50 5116
A10 945	SA 1050	SA 1193	A10 1366	A50 2078	A50 5125
SA 946	A10 1051	A10 1193	A10 1372	A50 2082	A50 5128
SA 947	A10 1052	A10 1197	A10 1374	A50 2083	A50 5129
A10 947	A10 1053	SA 1199	A10 1377	A50 2100	A50 5239
A10 954	A10 1058	SA 1200	A10 1378	A50 2103	A50 5572
SA 955	SA 1060	A10 1200	A10 1383	A50 2107	A50 52284
SA 959	A10 1060	SA 1204	A10 1461	A50 2110	A50 52307
SA 960	A10 1062	SA 1205	A10 1462	A50 2111	A10 6128
A10 962	A10 1063	SA 1206	A10 1467	A50 2115	A50 7008
SA 964	A10 1064	A10 1211	A10 1469	A50 2118	
SA 966	A10 1065	A10 1212	A10 1473	A50 2119	

VA2 ABSORPTION CONTROL

CAT. NO. 15152

This is a usable replacement for the following

Ranco codes. It is also suitable for refrigerators not originally fitted with a Ranco control.

A52 102	A50 191	A50 310	SA 597	A10 1213	A50 2047
A52 103	A50 247	A50 322	A50 601	SA 1239	A50 2068
A52 104	A50 256	A50 528	SA 736	SA 1240	A50 2101
A52 105	A50 257	A50 532	SA 962	A10 1318	A50 2112
A52 135	A50 262	A50 538	SA 967	A10 1340	A50 2132
A52 138	A50 270	A50 557	SA 982	A10 1346	A50 2134
A50 146	A50 276	A50 567	A10 1040	A50 2012	A50 2296
A52 146	A50 282	A50 581	A10 1055	A55 2013	A10 6121
A50 155	A50 283	A50 582	SA 1183	A50 2033	
A50 190	A50 296	SA 593	SA 1213	A50 2041	

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RANCO VARIFIX REPLACEMENT REFERENCE (CONT'D)

VF3 ICE CREAM & FREEZER CONTROL

CAT. NO. 15153

This a usable replacement for

the following Ranco codes. It is also suitable for cabinets not originally fitted with a Ranco control.

A52 114	A50 307	SA 1231	A52 2008	A10 2120	SA 2823
A52 123	A50 308	SA 1232	A50 2009	A50 2120	SA 2886
A52 130	A50 315	A10 1236	A52 2009	SA 2126	SA 2906
A52 136	A50 319	SA 1255	A50 2010	A10 2126	A10 2913
A50 148	A50 526	SA 1266	A52 2010	SA 2127	A50 3006
A50 149	A50 527	SA 1301	A50 2011	SA 2128	A10 3507
A52 152	A50 533	SA 1304	A50 2013	SA 2129	A10 3515
A50 153	A50 535	SA 1306	A52 2013	A10 2129	A10 3685
A52 154	SA 539	SA 1308	A52 2014	SA 2131	A10 3732
A50 159	A50 542	SA 1309	A52 2015	SA 2133	A10 3738
A50 161	SA 551	A10 1313	A52 2016	SA 2135	A10 3755
A50 163	A50 553	A10 1316	A52 2017	A50 2136	A10 3782
A50 164	A50 558	A10 1319	A50 2018	SA 2136	A10 3819
A50 168	SA 561	A10 1320	A52 2019	A10 2138	A10 3824
A52 171	A50 562	SA 1322	A52 2020	SA 2139	A10 3827
A50 172	A50 565	A10 1343	A52 2021	A10 2140	A10 3847
A50 178	A50 569	A10 1345	A50 2031	A10 2141	A10 3849
A50 182	A50 572	A10 1360	A50 2032	SA 2142	A10 3882
A50 183	SA 575	A10 1363	A50 2039	SA 2143	A10 3906
A50 185	SA 576	A10 1368	A50 2042	SA 2144	A10 3909
A50 188	A50 579	A10 1381	A50 2043	A10 2145	A10 3920
A50 195	A50 583	A10 1385	A50 2044	A10 2146	A10 3921
A50 198	A50 594	A10 1452	A50 2048	A50 2203	A10 3926
A50 203	A50 598	A10 1457	A50 2049	A50 2210	A10 3927
A50 204	SA 600	A10 1458	A50 2050	A50 2219	A10 3933
A50 207	A50 603	A10 1478	A50 2052	A50 2276	A10 3936
A50 212	A50 610	A10 1479	A50 2053	A50 2278	A10 3937
A50 214	SA 635	A10 1484	A50 2058	A50 2279	A10 3950
A50 215	SA 636	A10 1485	A50 2062	A50 2281	A10 3952
A50 218	SA 637	A10 1489	A50 2063	A50 2282	A10 4907
A50 219	SA 646	SA 1503	A50 2067	A50 2283	A10 4914
A50 229	A10 889	A10 1503	A10 2101	A50 2285	A50 5104
A50 236	SA 953	SA 1511	A50 2104	A50 2289	A50 5112
A50 241	A50 1002	SA 1512	SA 2106	A50 2293	A50 5114
A50 246	SA 1008	SA 1513	A10 2106	A50 2306	A50 5119
A50 248	SA 1027	SA 1518	SA 2107	A50 2310	A50 5120
A50 249	SA 1028	SA 1521	A10 2108	A10 2441	A50 5121
A50 254	SA 1043	SA 1522	SA 2109	SA 2502	A50 5123
A50 259	A10 1056	A52 2000	A10 2109	A10 2502	A50 52293
A50 261	A10 1066	A50 2001	A50 2109	SA 2503	A10 6108
A50 265	A10 1069	A52 2001	A10 2110	SA 2506	A10 6112
A50 266	A10 1094	A55 2001	SA 2111	SA 2590	A10 6113
A50 269	A10 1095	A52 2002	A10 2111	SA 2591	A10 6116
A50 277	A10 1101	A52 2003	A10 2112	SA 2592	A10 6120
A50 285	A10 1181	A52 2004	A10 2113	SA 2593	A10 6131
A50 286	SA 1192	A52 2005	A50 2114	SA 2595	A10 6142
A50 287	A10 1202	A50 2006	A10 2116	A10 2649	
A50 298	A10 1215	A52 2006	A50 2117	SA 2701	
A50 302	A10 1224	A52 2007	SA 2118	SA 2782	

VP4 PUSH BUTTON DEFROST CONTROL

CAT. NO. 15154

This a usable replacement for

the following Ranco codes. It is also suitable for refrigerators not originally fitted with a Ranco control.

F20 100	F20 105	F20 110	F20 116	F50 122	F50 127
F50 100	F50 105	F50 110	F50 116	F20 123	F20 128
F20 101	F20 106	F20 111	F20 117	F50 123	F50 128
F50 101	F50 106	F50 111	F50 117	F20 124	F20 129
F20 102	F20 107	F20 112	F20 118	F50 124	F50 129
F50 102	F50 107	F20 113	F50 118	F20 125	F50 130
F20 103	F20 108	F50 113	F20 119	F50 125	F50 131
F50 103	F50 108	F20 114	F50 119	F20 126	F50 132
F20 104	F20 109	F20 115	F50 120	F50 126	F20 134
F50 104	F50 109	F50 115	F50 121	F20 127	F50 134

VP4 — Continued next Page

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RANCO VARIFIX REPLACEMENT REFERENCE (CONT'D)

VP4 PUSH BUTTON DEFROST CONTROL (Continued)

CAT. NO.

15154

F20 135	F50 164	F50 199	F50 236	F21 702	F50 2021
F50 135	F50 165	F50 200	F50 237	F21 703	F50 2022
F50 136	F50 166	F50 201	F50 238	F21 704	F50 2023
F20 137	F50 167	F50 204	F50 239	F21 705	F50 2024
F50 137	F50 168	F50 205	F50 240	F21 706	F50 2027
F20 138	F50 169	F50 206	F50 242	F21 707	F50 2028
F50 138	F50 170	F50 207	F50 244	F21 708	F50 2029
F20 139	F50 171	F50 208	F50 245	F21 709	F50 2030
F50 139	F50 173	F50 209	F50 246	F21 710	F50 2031
F50 140	F50 174	F50 210	F50 247	F21 711	F50 2032
F50 141	F50 175	F50 211	F50 248	F21 712	F50 2034
F20 142	F50 176	F50 212	F50 400	F21 713	F50 2037
F50 142	F50 177	F50 213	F21 501	F21 714	F50 2038
F50 144	F50 179	F50 214	F21 502	F21 715	F50 2039
F50 146	F50 180	F50 215	F21 503	F21 716	F50 2040
F50 147	F50 181	F50 216	F21 504	F50 2000	F50 2043
F50 148	F50 182	F50 217	F21 505	F50 2001	F50 2045
F50 149	F50 183	F50 218	F21 506	F50 2002	F50 2070
F50 150	F50 184	F50 219	F21 507	F50 2003	F50 2072
F50 151	F50 185	F50 221	F21 508	F50 2004	F50 2073
F50 152	F50 186	F50 222	F21 509	F50 2005	F50 2074
F50 153	F50 187	F50 223	F21 510	F50 2006	F50 2075
F50 154	F50 188	F50 225	F21 511	F50 2007	F50 2076
F50 155	F50 189	F50 227	F21 512	F50 2008	F50 2077
F50 156	F50 190	F50 228	F21 513	F50 2009	F50 2078
F50 157	F50 191	F50 229	F21 514	F50 2010	F50 2154
F50 158	F50 192	F50 230	F21 515	F50 2011	F50 3005
F50 159	F50 193	F50 231	F21 516	F50 2014	
F50 160	F50 194	F50 232	F21 517	F50 2015	
F50 161	F50 196	F50 233	F21 518	F50 2016	
F50 162	F50 197	F50 234	F21 700	F50 2019	
F50 163	F50 198	F50 235	F21 701	F50 2020	

VS5 STANDARD SIGNAL CONTROL

CAT. NO.

15155

This is a usable replacement for

the following Ranco codes. It is also suitable for cabinets not originally fitted with a Ranco control.

A54 100	A53 116	SA 2587	A54 2922	A10 3544	A10 3832
A54 101	A54 116	SA 2588	A54 2923	A10 3545	A10 3833
A53 102	A54 117	SA 2589	A54 2924	SA 3549	A10 3834
A54 102	A54 118	SA 2595	A54 2925	A10 3751	A10 3907
A54 103	A54 119	SA 2699	A54 2926	A10 3758	A10 3911
A54 104	A54 120	SA 2782	A54 2927	A10 3761	A10 3913
A53 105	A54 122	SA 2783	A54 2928	A10 3762	A10 3915
A54 105	A54 123	A54 2900	A10 3502	A10 3763	A10 3916
A54 106	A54 124	A54 2901	A10 3503	A10 3766	A10 3917
A54 108	SA 2500	A54 2902	A10 3513	A10 3780	A10 3918
A53 109	SA 2501	A54 2903	SA 3516	A10 3815	A10 3919
A54 109	SA 2512	A54 2907	A10 3523	A10 3817	A10 3923
A54 110	SA 2513	A54 2908	A10 3524	A10 3822	A10 3925
A54 111	SA 2517	A54 2910	A10 3526	A10 3823	A10 3928
A54 112	SA 2520	A54 2912	SA 3528	A10 3825	A10 3929
A54 113	SA 2522	A54 2914	SA 3532	A10 3826	A10 3930
A54 114	A10 2525	A54 2916	A10 3536	A10 3829	A10 3935
A53 115	SA 2538	A54 2917	SA 3541	A10 3830	A10 3938
A54 115	A10 2538	A54 2919	A10 3543	A10 3831	

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REFER TO PAGE 151 FOR FULL SPECIFICATIONS OF THE RANCO VaRafix ADAPTABLE CONTROLS

IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES, TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

RANCO VARIFIX REPLACEMENT REFERENCE (CONT'D)

VR6 REVERSE SIGNAL CONTROL

CAT. NO. 15156

This is a usable replacement for

the following Ranco codes. It is also suitable for cabinets not originally fitted with a Ranco control.

A53 100	SA 2516	A10 3520	A10 3756	A54 7003	A54 8216
A53 101	SA 2518	A10 3521	A10 3757	A54 7004	A54 8217
A53 103	SA 2519	A10 3625	A10 3759	A54 8200	A54 8218
A53 104	SA 2523	A10 3535	A10 3760	A54 8201	A54 8219
A53 108	SA 2524	A10 3537	A10 3764	A54 8202	A54 8223
A53 110	A10 2556	A10 3538	A10 3781	A54 8203	A54 8224
A53 111	A10 2900	SA 3539	A10 3792	A54 8204	A54 8225
A53 112	SA 2906	SA 3540	A10 3818	A54 8205	A54 8227
A53 113	SA 2950	SA 3542	A10 3821	A54 8206	A54 8228
A53 114	A10 3501	SA 3546	A10 3922	A54 8207	A54 8229
A53 117	A10 3504	SA 3547	A10 3932	A54 8209	
A53 118	A10 3505	A10 3548	A10 3934	A54 8210	
SA 516	A10 3508	SA 3752	A54 7000	A54 8211	
SA 2501	A10 3518	A10 3753	A54 7001	A54 8212	
SA 2515	A10 3519	A10 3754	A54 7002	A54 8214	

VB7 BOTTLE AND BEVERAGE COOLER CONTROL

CAT. NO. 15157

This is a usable

replacement for the following Ranco codes. It is also suitable for units not originally fitted with a Ranco control.

A52 108	A50 550	A10 1226	A10 1379	A10 1537	A50 2302
A52 118	A50 560	A10 1230	A10 1454	A10 1764	A10 2473
A52 141	A50 571	A10 1246	A10 1460	A10 1879	A10 2474
A52 148	A50 592	A10 1247	A10 1463	A50 2007	A10 2475
A52 149	A50 595	A10 1249	A10 1465	A50 2008	A10 2479
A50 154	A50 602	A10 1301	A10 1471	A10 2012	SA 2522
A50 165	A50 PO612	A10 1302	A10 1477	A50 2045	A10 5203
A52 167	SA 963	SA 1307	A10 1481	A50 2051	A10 6114
A52 169	A50 1000	A10 1310	A10 1488	A10 2084	A10 6117
A52 181	SA 1040	A10 1314	SA 1501	A10 2103	A10 6119
A50 205	A10 1160	A10 1354	A10 1501	A50 2128	A10 6126
A50 245	A10 1196	A10 1367	SA 1502	A50 2135	A10 6132
A50 320	A10 1198	A10 1369	A10 1502	A10 2172	A10 6145
A50 540	A10 1209	A10 1373	SA 1510	A50 2295	A10 6149

WV8 WINDOW AIR CONDITIONER CONTROL

CAT. NO. 15158

This is a usable

replacement for the following Ranco codes. It is also suitable for units not originally fitted with a Ranco control.

A52 124	A13 134	A52 170	SA 976	A10 1325	A10 1999
A52 131	A52 137	A52 178	A10 1315	A10 1451	A55 2018
A52 132	A52 162	A13 302	A10 1324	SA 1596	A55 7006
A52 133	A52 165				

VT9 TWO-TEMPERATURE REFRIGERATION CONTROL

CAT. NO. 15159

This is a usable

replacement for the following Ranco codes. It is also suitable for refrigerators not originally fitted with a Ranco control.

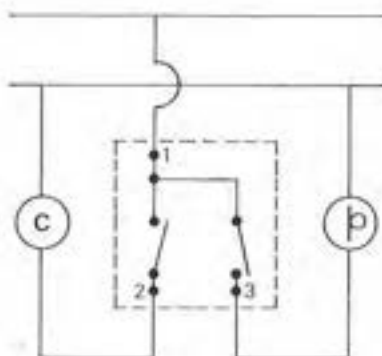
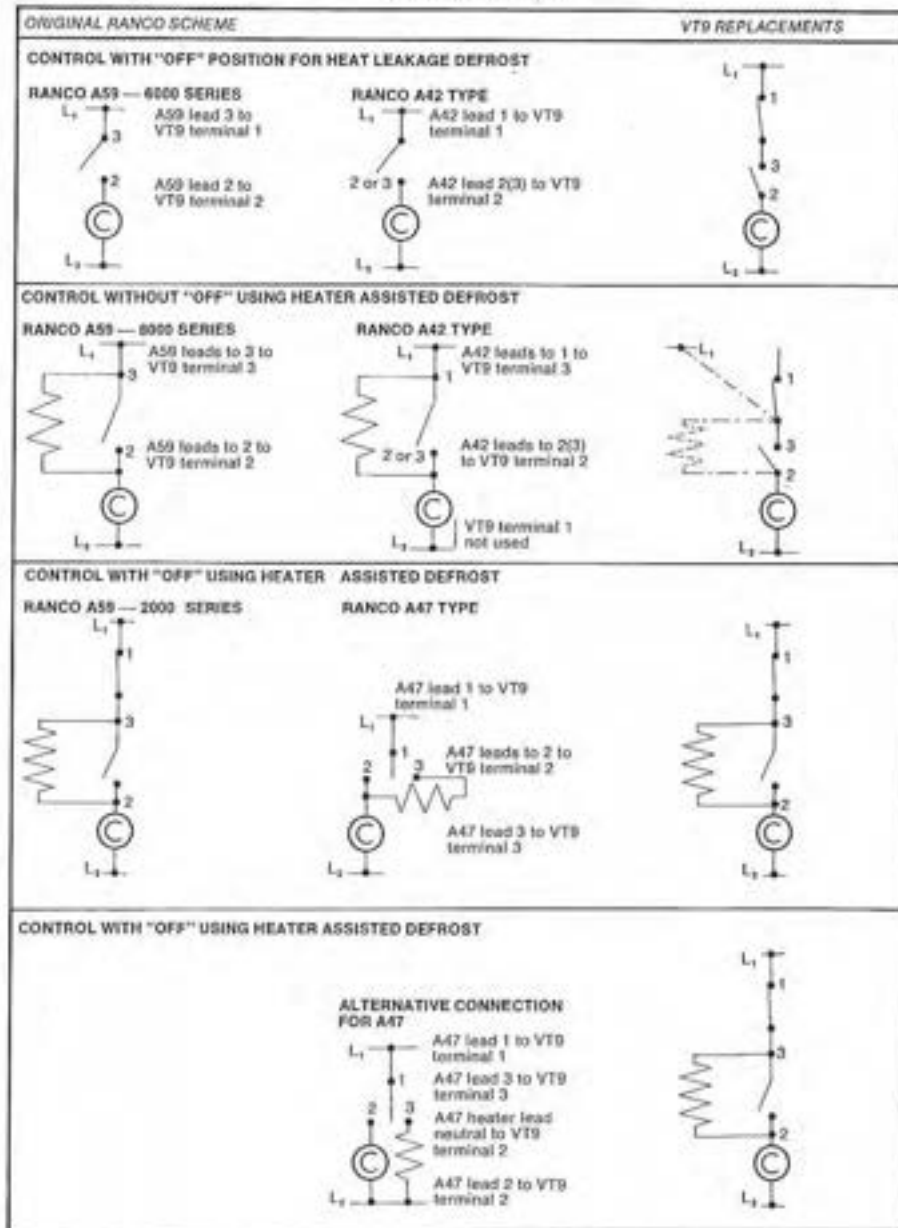
A59 106	A42 1011	A42 1032	A42 4050	A42 4107	A59 6005
A59 107	A47 1011	A47 1032	A42 4054	A42 4109	A59 6006
A59 108	A47 1012	A47 1035	A42 4056	A42 4110	A59 6007
A59 109	A42 1013	A59 2000	A42 4057	A42 4111	A59 6008
A59 110	A47 1013	A59 2001	A42 4060	A42 4114	A59 6009
A59 111	A47 1014	A59 2004	A42 4062	A42 4119	A59 6010
A59 112	A59 1014	A59 2006	A42 4063	A42 4120	A59 6011
A59 116	A42 1015	A59 2007	A42 4064	A42 4121	A59 8600
A59 125	A47 1015	A59 2008	A42 4065	A42 4122	A59 8601
A47 1002	A59 1015	A59 2009	A42 4068	A42 4124	A59 8602
A47 1003	A42 1016	A59 2010	A42 4069	A42 4146	A59 8603
A47 1004	A47 1016	A42 4007	A42 4078	A42 4160	A59 8604
A59 1004	A42 1017	A42 4015	A42 4080	A42 4161	A59 8605
A42 1005	A47 1017	A42 4022	A42 4084	A42 4162	A59 8606
A59 1005	A42 1018	A42 4023	A42 4093	A42 4163	A59 8607
A42 1006	A47 1018	A42 4024	A42 4096	A42 4164	A59 8608
A47 1006	A42 1019	A42 4030	A42 4101	A42 4165	A59 8609
A47 1008	A47 1019	A42 4036	A42 4102	A42 4167	
A47 1009	A59 1021	A42 4037	A42 4103	A59 6000	
A42 1010	A42 1025	A42 4047	A42 4105	A59 6003	

REFER TO PAGE 151 FOR FULL SPECIFICATIONS OF THE RANCO VaRafix ADAPTABLE CONTROLS

RANCO VARIFIX REPLACEMENT REFERENCE (CONT'D)

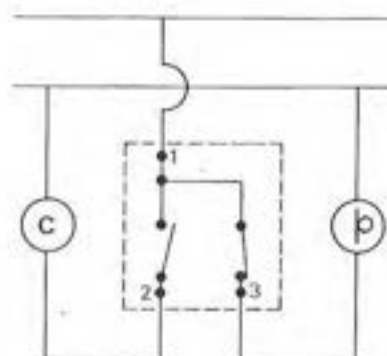
VT9 REPLACEMENT FOR TWO-TEMPERATURE DOMESTIC REFRIGERATORS

Circuit Options



WIRING DIAGRAM
FOR VS 5

Signal circuit normally open.



WIRING DIAGRAM
FOR VR 6

Signal circuit normally closed.

REFER TO PAGE 151 FOR FULL SPECIFICATIONS OF THE RANCO VaRafix ADAPTABLE CONTROLS



Service thermostats with built-in reliability for all refrigerator types

8 THERMOSTATS WILL DO...

Eight service kits from Danfoss are enough for thermostat service of all refrigerator types. The service thermostats and the necessary accessories are packed in practical blister packs with illustration of the contents, wiring diagram and application range.

All the service thermostats have a greater regulation range than standard thermostats. Therefore you can always service all refrigerator types, regardless of make.

The differentials of the service thermostats ensure sufficient standstill time, so any risk of damage to the compressors is eliminated.

All thermostats have a normal function i.e. they make the electrical circuit at a rise in temperature and break at a drop in temperature. In the '0' position the main switch, as well as any auxiliary switch, is cut-out.

Service Kit No. 1. REFRIGERATORS

Thermostat with normal function for conventional refrigerators.

Service Kit No. 2. REFRIGERATORS WITH PUSHBUTTON DEFROST

Thermostat with normal function and semi-automatic defrost function which is started manually and stops automatically after defrosting.

Service Kit No. 3. REFRIGERATORS WITH AUTOMATIC DEFROST

Thermostat with constant cut-in temperature (+3.5°C) for automatic defrost. The thermostat is equipped with an auxiliary switch which can, for example, cut out a defrost heating element when knob is turned to the '0' position.

Service Kit No. 4. ABSORPTION REFRIGERATORS

Thermostat with normal function and auxiliary switch which is cut-out when the knob is turned to the '0' position — the necessary functions for absorption cabinets with two heating elements.

Service Kit No. 5. FREEZERS WITHOUT SIGNAL

Thermostat with normal function. Can also be used for ice-cream cabinets.

Service Kit No. 6. CHEST FREEZERS WITH SIGNAL

Thermostat with normal function and signal function which is activated at too high cabinet temperatures. Active and/or passive signals. Can also be used for ice-cream cabinets.

Service Kit No. 7. UPRIGHT FREEZERS WITH SIGNAL

Thermostat with normal function and signal function which is activated at too high cabinet temperatures. Active and/or passive signals.

Service Kit No. 8. BOTTLE AND LIQUID COOLERS

Thermostat with normal function. Can also be used in refrigerated vending machines.

SPECIFICATION DATA

CAT. NO.	Service Kit No.	Code No.	TEMPERATURES °C				ACCESSORIES						Cap. Tube Length m	Remarks
			Warm Position Cut-In/Cut-Out	Cold Position Cut-In/Cut-Out	Signal	Defrosting	Big Knob	Small Knob	Push-Button	Mtg. Bracket	Seal Cap	Small Parts		
1512	1	90B7009	+2.5/-5	-13.5/-25			X	X		X		X	1.2	
1513	2	90B7041	0/-7.5	-11.5/-22		+6	X	X	X	X		X	1.2	
1514	3	90B7061	+3.5/-11	+3.5/-27			X	X		X		X	1.2	With auxiliary switch
1515	4	90B7020	+3.5/-1	-5/-11			X	X		X		X	1.5	With auxiliary switch
1516	5	90B7010	-7.5/-15	-21/-32.5				X		X	X	X	2.0	
1517	6	90B7033	-7.5/-15	-21/-32.5	-16			X		X	X	X	2.0	Signal with change-over switch
1518	7	90B7034	-13/-18	-23/-30	-18			X		X	X	X	2.0	Signal with change-over switch
1519	8	90B7011	+11.5/+6	-0.5/-8			X	X		X	X	X	2.0	

NOTES

1

WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE

RANCO DOMESTIC THERMOSTAT REPLACEMENTS

ORDERING CATALOGUE NO's FOR RANCO SERIES:

A10 - A22 - A30 - A33 - A50 - A54 - A59 - B11 - C12 - C17 - D52 - D62 - SA

CAT. NO.	RANCO CODE NO.	Availability (Replaces)	CAT. NO.	RANCO CODE NO.	Availability (Replaces)	CAT. NO.	RANCO CODE NO.	Availability (Replaces)
TYPE A10			TYPE A59 (Continued)			TYPE SA (Continued)		
152200	A10-1184	Normally ex stock	152242	A59-2515	(A42-4136) (A42-4146) (A42-4127) (A42-4128) (A42-4129) (A42-4130) (A42-4146) (A59-58008) (A59-58009) (A59-58010)	152349	SA 975	NLA Use SA1168
152261	A10-1403		152243	A59-2516		152350	SA 983	
152201	A10-2395		152244	A59-2517		152354	SA 1076	
152196	A10-6004		152245	A59-2518		152357	SA 1167	
152101	A10-6010		152246	A59-2519		152358	SA 1168	
152197	A10-6247		152247	A59-2520		152359	SA 1169	
152198	A10-6354		152248	A59-2521		152360	SA 1170	
152199	A10-6425		152249	A59-8800		152361	SA 1171	
152101	A10-6495	152250	A59-8801	152362		SA 1172	NLA Use SA1173	
TYPE A22			152251	A59-8802		152363	SA 1173	NLA Use SA1173
152144	A22-1040	Normally ex stock	152252	A59-8803		152364	SA 1174	NLA Use SA1174
152146	A22-1070		152253	A59-8804		152365	SA 1175	
152145	A22-2050		152254	A59-8805		152366	SA 1176	
152148	A22-2058		152255	A59-8807		152367	SA 1177	
152149	A22-2217	152257	A59-8808	152368		SA 1178	NLA Use SA1174	
TYPE A30			152258	A59-8809		152369	SA 1179	NLA Use SA1169
152124	A30-180	Normally ex stock	152259	A59-8810		152371	SA 1205	Use A50-5105
152131	A30-183		152372	SA 1206				
152132	A30-184		152373	SA 1217				
152133	A30-260		152374	SA 1218				
152134	A30-261		152375	SA 1220	NLA			
152126	A30-262		152376	SA 1244				
152125	A30-263		152377	SA 1253				
152127	A30-301		152378	SA 1254	Use A50-5117			
152128	A30-378		152379	SA 1255				
152130	A30-380		152380	SA 1256				
152129	A30-383		152381	SA 1257	Use A50-5112			
152135	A30-450		152382	SA 1258				
152136	A30-1017		152383	SA 1259				
152142	A30-1020		152384	SA 1260	Use A50-5103			
152137	A30-1025		152385	SA 1261				
152138	A30-1026		152386	SA 1262				
152121	A30-1837		152387	SA 1263	Use A50-5106			
152139	A30-1930		152388	SA 1264				
152122	A30-1963	152389	SA 1265					
152140	A30-3511	152390	SA 1266	Use A50-5111				
152141	A30-4013	152391	SA 1267					
TYPE A33			152392		SA 1268	Use A50-5106		
152151	A33-264	Normally ex stock	152393	SA 1269				
152152	A33-453		152394	SA 1270				
TYPE A50			152395	SA 1271	Use A50-5111			
152153	A50-239	Normally ex stock	152396	SA 1272				
152154	A50-160		152397	SA 1273				
152166	A50-5107		152398	SA 1274				
152167	A50-5108		152399	SA 1275				
152155	A50-5117		152400	SA 1276				
152159	A50-5126		152401	SA 1277				
152157	A50-5127		152402	SA 1278				
152156	A50-5145		152403	SA 1279				
152169	A50-5246		152404	SA 1280				
152168	A50-5572		152405	SA 1281				
TYPE A54			152406	SA 1282	Use A50-5106			
152161	A54-2903	Normally ex stock	152407	SA 1283				
152162	A54-2910		152408	SA 1284				
152268	A54-2925		152409	SA 1285				
152269	A54-2935		152410	SA 1286				
152270	A54-2936		152411	SA 1287				
152163	A54-8214		152412	SA 1288				
TYPE A59			152413	SA 1289	Use A50-5109			
152226	A59-2500	(A42-4141)	152414	SA 1290				
152227	A59-2501	(A42-4135)	152415	SA 1291				
152228	A59-2502	(A42-4139)	152416	SA 1292	Use A50-5110			
152229	A59-2503	(A42-4037)	152417	SA 1293				
152230	A59-2504	(A42-4044)	152418	SA 1294				
152231	A59-2505	(A42-4144)	152419	SA 1295	Use A50-5110			
152232	A59-2506	(A42-4133)	152420	SA 1296				
152233	A59-2507	(A42-4088/9)	152421	SA 1297				
152234	A59-2508	(A42-4140)	152422	SA 1298	Use A50-5110			
152235	A59-2508A	(A42-4076/7)	152423	SA 1299				
152236	A59-2509	(A42-4040)	152424	SA 1301				
152237	A59-2510	(A42-4043)	152425	SA 1302	Use A50-5110			
152238	A59-2511	Use A50-5126	152426	SA 1303				
152239	A59-2512		152427	SA 1304				
152240	A59-2513		152428	SA 1305				
152241	A59-2514		152429	SA 1306				
Continued next column			152430	SA 1307	Use A50-5126			
			152431	SA 1308				
			152432	SA 1309				
			152433	SA 1310				
			152434	SA 1311				
			152435	SA 1501	Use A50-5110			
			152436	SA 1502				
			152437	SA 1503	Use A50-5110			
			152438	SA 1504				

NOTE: For Ordering Ranco Varifix Adaptable Controls - Refer Page 151

REFER TO FOLLOWING TECH. PAGES FOR REPLACEMENT CHARTS, SPECIFICATIONS & SELECTION DATA

If item required is not listed, specify Ranco and/or Manufacturers Part Number.

IMPORTANT: HELP US TO HELP YOU

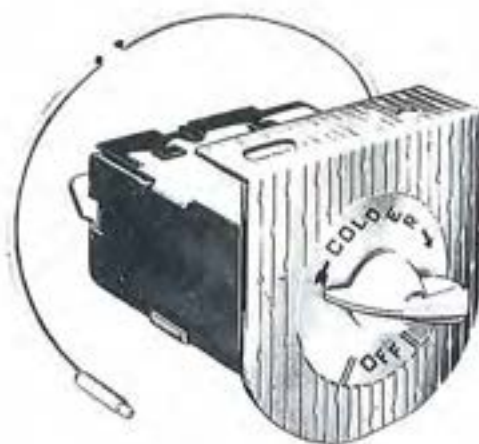
For replacement of old/obsolete Thermostats:

Either: Bring in the old/obsolete Thermostat for identification.

Or: Record all visible information off the Thermostat. e.g. Model, Make, Serial No., Type No., Any other information stamped on the Thermostat and submit this information when ordering.

RANCO DOMESTIC THERMOSTAT REPLACEMENTS

TYPE A10



TYPE A10-6010

The 'A10' is generally used in temperature ranges from a low of -40°C (-40°F) on freezer cabinets, to a high of 40.6°C (105°F) on air conditioning units, with adjustable differentials from 2.8°C (5°F) (on short ranges), to 13.9°C (25°F) (on all ranges) according to the control construction.

The single pole single throw, snap-acting toggle switch CLOSING on temperature RISE from the action of the temperature responsive power element at the COLDEST point of either the capillary tube end (as a bulb), or a solid or wound $3/8"$ diam. bulb.

The Type A10-6010 Automotive Air Conditioning controls have been designed to replace clutch-cycling controls on most hang-on type and under-dash mounted air conditioners.

This replacement control is a fin temperature sensing device, therefore at least 76mm (3") of the capillary tubing of the control should be inserted between the fins of the evaporator coil at the coldest point of the coil to ensure proper operation of the control.

TYPE A22

The SPDT switch and high electrical rating makes the Type A22 control suitable for a variety of applications. Among them are :

1. As a cycling control for Heat Pumps with manual selection of heating and cooling functions.
 2. Two speed Condenser Fan control.
 3. Two step electrical resistance heater.
- A22-1000 series has a wide differential - 3.9°C min. to 16.7°C max. (7°F min. to 30°F max.).
A22-2000 series is a narrow differential control - 2.2°C (4°F).

SWITCH TERMINALS :

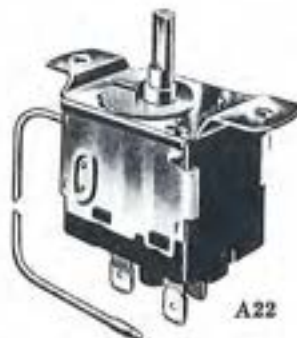
No.1 and No.2 CLOSE on DROP of temperature.

No.3 and No.2 CLOSE on RISE of temperature.

Terminal No.2 is common.

No RANGE adjustment is available on the control, however, limited altitude correction can be made, using the RANGE screw, located behind the end cover.

The adjustment is limited to $1/2$ turn clockwise. This raises the "cut-out" and "cut-in" points approx. 2.2°C (4°F). A maximum 11.1°C (20°F) range may be obtained with narrow differential applications.

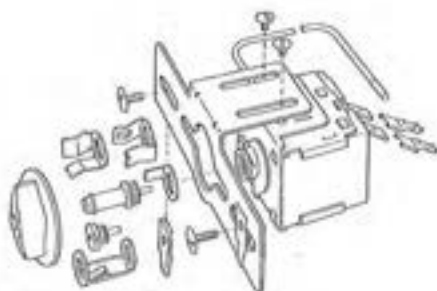


A22

DIFFERENTIAL screw adjustment, located in the insulator block, is for factory calibration use only, and is NOT to be adjusted in the field.

DIAL SHAFT ADJUSTMENT : The knob, attached to the dial shaft changes the "cut-out" and "cut-in" settings simultaneously, turning clockwise for Colder, or counter-clockwise for Warmer operation.

TYPE A30



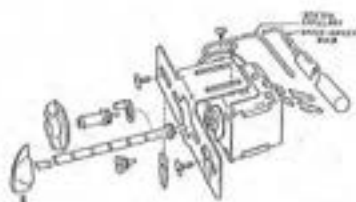
TYPE A30 ADAPTABLE REPLACEMENT FOR HOUSEHOLD REFRIGERATORS, WATER COOLERS, BEVERAGE COOLERS, FREEZER CABINETS, ICE CREAM CABINETS AND AIR CONDITIONERS

The "A30" Adaptable control is designed to replace many varieties of original equipment applications. Mounting is adjustable from $1-3/32"$ to $3-25/32"$ hole centres plus adjustable height. Various dial shafts, drivers, and terminals are provided to meet most applications.

ORDERING PROCEDURE : REFER TO PAGE 152 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

RANCO DOMESTIC THERMOSTAT REPLACEMENTS

TYPE A33



ADAPTABLE 'A33' REPLACEMENT

The 'A33' is a variation of the basic 'A10' control with a special power element for a narrow fixed differential. It is supplied with an adaptable mounting bracket and a parts package which allows the control to be adapted to a variety of mounting situations.

Mounting hole centres are adjustable from 1-1/32" to 3-25/32". The bracket may also be adjusted up to 7/8" vertically from the face of the control.

DIAL ROTATION: Rotating the dial shaft changes both the "cut-out" and "cut-in" settings simultaneously.

The SPST snap acting toggle switch closes on temperature rise. It is actuated by a vapor-pressure fill power element that is responsive to the coldest point along the capillary or the bellows.

TYPE C12

The C12-5000 series will perform one of two functions: Cooling only or heating only with changeover by a manual selector switch. The switch is basically a SPDT snap-acting toggle type. Normally closed contacts are toggled open on drop in temperature.

FIELD ADJUSTMENT IS NOT RECOMMENDED on the Range and Differential screws. However, there is a dial adjustment for a wide temperature range selection from 15.6 to 36.7°C (60 to 98°F) in a clockwise direction from "warm" to "cold" positions. The differential is fixed at a minimum of 1.7°C (3°F).

The bulb of the liquid filled power element is the controlling point regardless of the temperature at the bellows and capillary tubing. Ambient temperatures have an effect on the switch operation of the C12 control. 26.7°C (80°F) is the selected ambient temperature point used by the factory on control calibration. A change in ambient temperatures above or below 26.7°C (80°F) will shift the setting slightly lower or higher respectively.

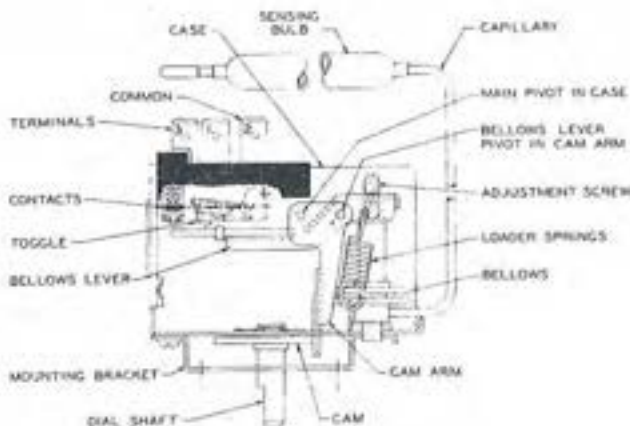
The C12-8000 series features a dial-within-a-dial arrangement with a cycling control and a rotary selector switch for cooling applications on an Air Conditioning unit.

Both control and rotary switch operate independently having a separate dial knob for each. The outer shaft is hollow for the rotary switch, and the inner shaft is solid for control operation.

Specifications and operation of the temperature control are the same as the C12-5000 series.

The dial knob on the hollow dial shaft rotates the selector switch to positions on the dial. Each switch has a "centre-off" position. There are 4, 6, or 8 standard selector positions on a 360° dial.

CROSS SECTION OF C12-5010 CONTROL



TYPE C17

The C17 controls are for Air Conditioning applications. Field adjustment is not generally recommended for any of the Series C17 Controls.

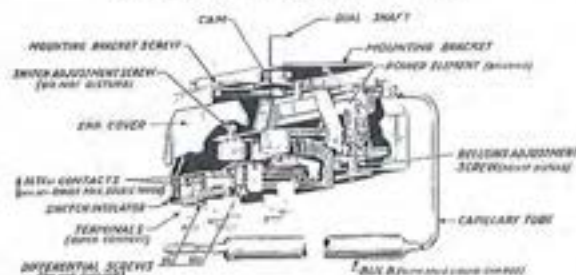
The SERIES C17-100 is a standard cycling control with two electrically separate switches for automatic change-over on heat pumps.

This control completes two electrical circuits in response to temperature changes for either automatic change-over on heat-cool cycling or on two-stage operations.

The SERIES C17-300 is the same as the C17-100, except one switch may be adjusted to cycle within the "cut-out" and "cut-in" events of the other (differential within a differential).

The SERIES C17-8000 control features a dial-within-a-dial arrangement with a rotary switch added to a standard cycling C17-100 series temperature control.

SECTION VIEW OF C17-100



TYPE	RANGE °C (°F)	DIFF. °C (°F)	CAPILL. LENGTH mm (ins)	SHAFT LENGTH INS	SWITCHING SEQUENCE					
					SWITCH 'A'			SWITCH 'B'		
					TERMS.	CUT-OUT °C (°F)	CUT-IN °C (°F)	TERMS.	CUT-IN °C (°F)	CUT-OUT °C (°F)
C17 - 140	16.7 (30)	2 (3%)	660 (26)	5/8	2 & 3	19.7 (67%)	17.8 (64)	4 & 5	21.7 (71)	19.7 (67%)
C17 - 182	12.8 (23)	2 (3%)	914 (36)	1-1/16	2 & 3	18.6 (65%)	16.7 (62)	4 & 5	20.6 (69)	18.6 (65%)
C17 - 192	7.8 (14)	2 (3%)	660 (26)	2-7/32	2 & 3	19.2 (66%)	17.2 (63)	4 & 5	21.1 (70)	19.2 (66%)
C17 - 221	9.2 (16%)	2.2 (4)	317 (12%)	29/32	2 & 3	20.6 (69)	18.3 (65)	4 & 5	21.7 (71)	19.4 (67)
C17 - 308	9.4 (17)	2 (3%)	660 (26)	2-7/32	2 & 1	18.3 (65)	20.3 (68%)	4 & 5	21.1 (70)	17.5 (63%)
C17 - 316	9.4 (17)	2 (3%)	914 (36)	7/8	2 & 1	18.3 (65)	20.3 (68%)	4 & 5	21.1 (70)	17.5 (63%)
C17 - 503	9.4 (17)	3.6 (6%)	1524 (60)	25/32	2 & 1	17 (62%)	18.9 (66)	4 & 5	19.7 (67%)	16.1 (61)
C17 - 8004	9.2 (16%)	2.2 (4)	457 (18)	1/2	2 & 3	20.6 (69)	18.3 (65)	4 & 5	21.7 (71)	19.4 (67)

ORDERING PROCEDURE: REFER TO PAGE 152 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

RANCO DOMESTIC THERMOSTAT REPLACEMENTS

TYPE B11

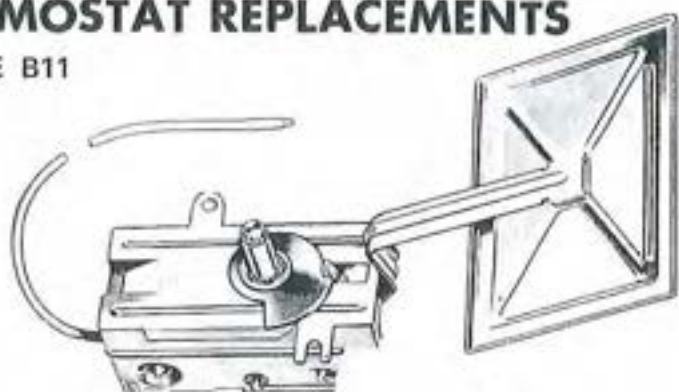
The Type "B11" Baffle Control (non-electric) is designed to control the compartment temperature of a forced draft type refrigerator by modulating the flow of cold air entering the compartment from the air supply duct. A change in compartment temperature modulates the baffle plate, increasing or decreasing air supply.

INSTALLATION

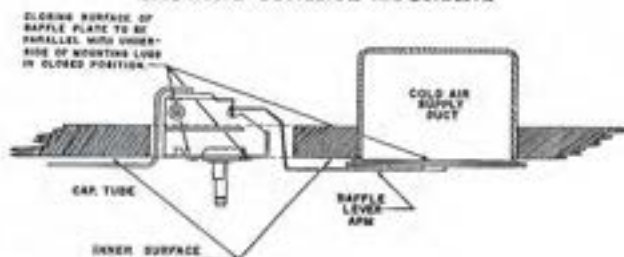
Install and position so that the baffle plate is aligned with the air supply duct opening; the baffle itself is self-aligning due to its swivel action mounting to the baffle cam. The temperature change from maximum open to closed position is 3.3°C (6°F).

Static air pressure in the air duct will slightly affect the closed position. In order to effect a reclosing of the baffle after an air pressure increase of .01" w.g. has opened it, a temperature decrease of approximately 0.6°C (0.1°F) must take place.

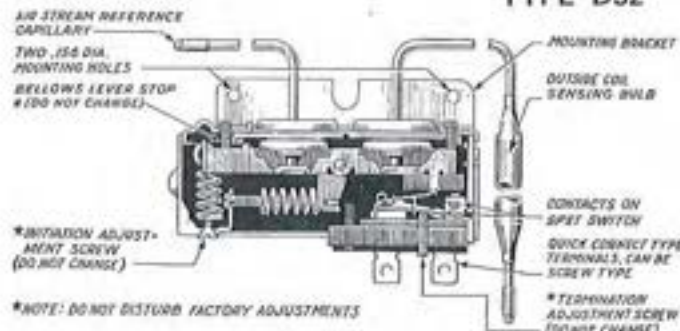
Barometric pressure changes affect the control to the extent that the device will shift setting approximately 0.3°C (0.5°F) per inch of mercury, or per 1000 feet of altitude. Ambient temperature variations do not affect the control setting.



CROSS SECTION VIEW
SHOWING CONTROL MOUNTING



TYPE D52



NOTES

Section View of the D52 with parts and assemblies identified. D50 is SPST.

The switch is shown in the DE-ICING PHASE with the normally closed contacts (# 2 and # 3) open.

The D52 control is designed to operate over the AMBIENT or REFERENCE temperature range of 40° to 10°F.

TYPE D62

The D62 controls are designed for refrigeration and air conditioning where a relatively wide differential and fixed setting (no range) are required. A typical application would be the defrosting of an air conditioning evaporator. Other applications are:

- Evaporator Defrost Control (without defrost heater)
- Evaporator Defrost Control (with defrost heater)
- Suction Line Temperature Control
- Control of Auxiliary Heaters in Heat Pumps
- Heat Boost Control during De-icing in Heat Pumps

OPERATION

The motion of the bellows is transferred directly to the toggle mechanism to operate the switch. There is no dial shaft adjustment on the D62.

Temperature Characteristics:

Operating temperature limits are -40°C (-40°F) (Lowest "cut-out") and +49°C (+120°F) (Highest "cut-in"), not in the same control.

Differentials are 11.1°C (20°F) (Minimum) to 4.4°C (40°F) (Maximum), not in one control.

Switch action is SPDT. The circuit closes on decrease in temperature to terminals No. 1 & No. 2 (opens on increase) and closes on increase to terminals No. 2 & No. 3 (opens on decrease). Either No. 1 or No. 3 terminal may be removed for SPST action.



TYPE D62 CONTROL

TYPE	NORMAL CUT - OUT		NORMAL CUT - IN		CAPILLARY LENGTH mm	USER & PART NO.
	°C	°F	°C	°F		
D62 - 4330	-5.6	22	5.6	42	1200	Servex 4059 - 128 - 01
D62 - 4331	-5.6	22	5.6	42	600	Kelv. KA 24452
D62 - 4332	-5.6	22	5.6	42	600	Kelv. KA 35658
D62 - 4333	-3.3	26	7.8	46	600	Kelv. KA 44156
D62 - 4334	+2.2	36	15.6	60	600	Email 247 - 102 - 0042
D62 - 4502	-5.6	22	5.6	42	600	General.

ORDERING PROCEDURE: REFER TO PAGE 152 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS



REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS

GUIDE TO CORRECT SELECTION OF REPLACEMENT CONTROLS

The Replacement Charts on the following pages show Manufacturers Original Part No. and Original RANCO Control fitted. If Original Control is not available, refer to the other two columns listing a "Functional Replacement Control" or an "Adaptable (VaRifix) Replacement Control".

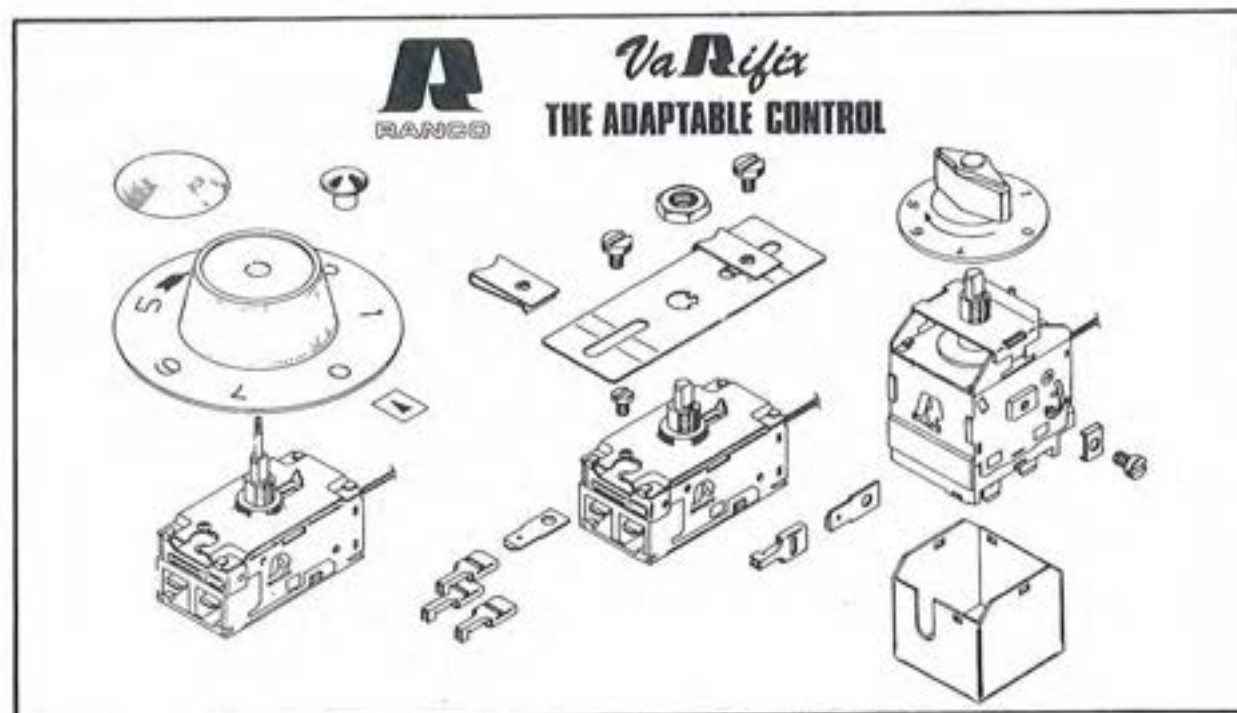
FUNCTIONAL REPLACEMENT : These are coded controls which may be an identical code to the original control, in which case it would be an exact replacement, or it will be a similar code indicating a control having only minor differences to the original.

ADAPTABLE REPLACEMENT : Is used to replace those controls no longer available; controls on long delivery times, particularly imported controls and other brands of controls. Nine VaRifix controls are available from which to select.

ORDERING CATALOGUE NO's for the Controls listed in the Charts are :-

VaRifix Adaptable Controls — Page 151
Other Controls — Page 152

Specifications for A50, A59, SA, SAM, F50 & F56 Series Thermostats — Refer Tech. Pages 152-p thru 152-u
Replacement Thermostats for Kelvinator, Leonard & HMV — Refer Tech. Pages 152-v, w, x.



NOTE : Where a Functional or Adaptable replacement is fitted to an appliance and detracts from its appearance or operation by way of mechanical fitting or use of standard knobs supplied with the control, Actrol Parts accepts no liability for any customer complaint or action as a result of fitting such replacement.



RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

TECH. PAGE **152-e**

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

ASTOR

ASTOR

1963 AFD, AFD/D, AFD/P, AFE, AFP, CS11			A50 - 5106	VC 1
AFJ, AFK, AFK/M, AFK/W, AFJ/A, AFM, CA11/W	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
BDA, BDC	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
1964 AFL, AFL P, AFP/DJ, AFP/MF	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
AFK/P, AFM/DJ, AFM/P, AFM/RD, AFQ/MF, AFS, AFS/RD	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
AJB, AJB/A	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AJA, AJA/A	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
AR31D, AR31D/A, AR31D/P, AR31DA/RS	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR41S	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AR41A	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
1965 AF11S	4061 - 010 - 01	A30 - 1017	A30 - 1017	
AR11P-A, AR11P-B, AR12P, PR109P	4061 - 006 - 01	F14 - 168	F14 - 203	
AR12S, AFL/A, AFL/B, AFP/C, AFP/C-P, AFP/C-S, AFP/SJ, PR99S, PR99S-C	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
AR12A, AFM/B, PR119A, AFQ/DJ	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
AJB-B, AJB-B/A	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AJB-A	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
AR210-B	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR31D/B, AR31D/J	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR41S/B	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AR41A/B	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
1966 AF14S	4061 - 010 - 01	A30 - 1017	A30 - 1017	
AR14P	4061 - 006 - 01	F14 - 168	F14 - 203	
AFA/A, AFP/C-DJ, AFP/DA, AFP/DA-DJ, PR11S	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
PR11A	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AR24S, PR119S	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AR24A, PR12A	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
AR34D, AR34DJ, AR34DP	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR44A	4085 - 111 - 04	SA 1262	A50 - 5103	VC 1
AR44D	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR54D, AR54DL	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
1967 AF15S, AFP11	4061 - 010 - 01	A30 - 1017	A30 - 1017	
AF35S	4061 - 010 - 03	A30 - 1026	A30 - 1026	
AF15FF	4061 - 010 - 02	A30 - 1025	A30 - 1025	
AF35FF	4061 - 010 - 05		A30 - 1026	
ARO5S, APS10S	4085 - 111 - 03	SA 1217	A50 - 5105	VC 1
APS10-A			A50 - 5106	VC 1
AR15S, AR15S-A, AHG11S, AMB11S	4085 - 111 - 03	SA 1217	A50 - 5106	VC 1
AMS11S-DJ, APS11S, AL15S, AFP/D, AFP/D-DA, AFP/D-MP, AFP/G, AFP/PS, AFP/MS	4085 - 111 - 09	SA 1273	A50 - 5106	VC 1
AR15A, AR15A A, APS11A, AMS11A	4085 - 111 - 03	SA 1217		
	4085 - 111 - 09	SA 1273	A50 - 5106	VC 1
AR25S, AL25S, ADN12S	4085 - 111 - 08	SA 1270		
	4085 - 111 - 04	SA 1262	A50 - 5106	VC 1
AR25A, AR25A-A, APS12A	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
AR35D, AR35D DJ	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR45S, APS14S	4085 - 111 - 08	SA 1270	A50 - 5106	VC 1
AR45A, APS14A, AMS14A	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
AR45D	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR55D, APS15D, AHG15D	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
AR55DF, ADJ15DF, APS15DF, AHG15DF, AR55DF/A, AR55DF/DJ	4061 - 018 - 02	A11 - 601	SA11 - 416	
1968 FB711, FB712	4061 - 010 - 01	A30 - 1017	A30 - 1017	
FB727, FB713, FB728, FB714	4061 - 010 - 03	A30 - 1026	A30 - 1026	
FB715, FB716	4061 - 010 - 02	A30 - 1025	A30 - 1025	
FB717, FB718	4061 - 010 - 05		A30 - 1026	

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS



REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL
ASTOR (Continued) ASTOR				
1968 (Continued) RB611, RB621S	4085 - 111 - 03	SA 1217	A50 - 5105	VC 1
RB613, RB635, RB614, RB623, RB627, LP11S, SP11S	4085 - 111 - 09	SA 1273	A50 - 5106	VC 1
RB615, RB616, RB633, SP11A	4085 - 111 - 09	SA 1273	A50 - 5106	VC 1
RB811	4085 - 111 - 08	SA 1270	A50 - 5106	VC 1
RB815, RB821, RB816, RB823, SP12A	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
RB831	4085 - 111 - 08	SA 1270	A50 - 5106	VC 1
RB833, RB854, RB825, RB817, RB818, SP14A	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
RB507, RB508, RB521, RB531, RB53S	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
RB501, RB502, RB529	4061 - 014 - 02 4061 - 018 - 02	B11 - 120 A11 - 601	SA11 - 416	
1969 FD721, FD732, RD722	4061 - 010 - 01	A30 - 1017	A30 - 1017	
FD723D, FD723B	4061 - 010 - 03	A30 - 1026	A30 - 1026	
FD725, FD726	4061 - 010 - 02	A30 - 1025	A30 - 1025	
FD735, FD736	4061 - 010 - 05		A30 - 1026	
RD621			A50 - 5105	VC 1
RD641/642, RD651B, RD651W	4085 - 111 - 09	SA 1273	A50 - 5106	VC 1
RD643, RD645, RD655	4085 - 111 - 09	SA 1273	A50 - 5108	VC 1
RD851, RD852W, RD861, RD855, RD856	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
RD863, RD854W	4085 - 111 - 08	SA 1270	A50 - 5103	VC 1
RD543	4085 - 083 - 14	A19 - 127	A59 - 8807	VT 9
RD541, RD542, RD551	4061 - 014 - 02 4061 - 018 - 02	B11 - 120 A11 - 601	SA11 - 416	
1970/1971 FE111S(741), FE112S(742)	4061 - 010 - 01	A30 - 1017	A30 - 1017	
FE131S, FE132S	4061 - 010 - 03	A30 - 1026	A30 - 1026	
RE101S(659), RE107S(DJ), RE617(DJ)	4061 - 088 - 01	A50 - 5105	A50 - 5105	VC 1
RE111S(661), RE117S(DJ), RE112S, RE639	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RE111A(665), RE112A, RE637	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RE121A(897), RE122A, RE877(PPL)	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RE131A(847), RE132A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RE135C(577), RE136C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RE149S	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RE141A(857), RE142A, RE149A, RE879	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RE155C(563), RE156C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RE151F(561), RE152F(562), RE553	4061 - 026 - 01	SA11 - 416	SA11 - 416	
1971 - 1973 FG111S, FG112S	4061 - 010 - 01	A30 - 1017	A30 - 1017	
FG131S, FG132S	4061 - 010 - 03	A30 - 1026	A30 - 1026	
RG101S, RG102S, RD101S	4061 - 088 - 01	A50 - 5105	A50 - 5105	VC 1
RG111S, RG112S, RD111S	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RG111A, RG112A	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RG121A, RG122A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RG131A, RG132A, RG133A, RG134A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RG135C, RG136C, RG137C, RG138C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RG141A, RG142A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RG155C, RG156C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RG151F, RG152F, RG153F, RG154F	4061 - 026 - 01	SA11 - 416	SA11 - 416	
1973 - 1976 FJ111S, FJ112S	4061 - 010 - 01	A30 - 1017	A30 - 1017	
FJ131S, FJ132S	4061 - 010 - 03	A30 - 1026	A30 - 1026	
RJ101S, RJ102S	4061 - 088 - 01	A50 - 5105	A50 - 5105	VC 1
RJ111S, RJ112S	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RJ111A, RJ112A	4061 - 035 - 01	A50 - 5106	A50 - 5106	VC 1
RJ121A, RJ122A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RJ133A, RJ134A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RJ135C, RJ136C, RJ137C, RJ138C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RJ141A, RJ142A	4061 - 034 - 01	A50 - 5103	A50 - 5103	VC 1
RJ155C, RJ156C	4061 - 025 - 01	A59 - 8807	A59 - 8807	VT 9
RJ151F, RJ152F	4061 - 026 - 01	SA11 - 416	SA11 - 416	

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

TECH. PAGE **152-g**

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

GENERAL ELECTRIC

GENERAL ELECTRIC

GA-1, GB-1, GB-3, GB-7, GC-1, GC-2, GC-3, GC-4	MRT - 128		SA 1253	VC 1
GD1, GD2, GD14	F.F.MRT - 134 FRZ.MRT - 133	SA12 - 1503 A30 - 3511		VC 1 VC 1
GG15	MRT - 134	SA12 - 1503		VC 1
GG12, GG152, GG10	MRT - 135	A42 - 4037	A59 - 2503	VT 9
GN10, GL13	MRT - 136	SA - 1258	A50 - 5117	VC 1
GN10P	GB - 277	F14 - 162	F56 - 5107	
GFU13, GFU9	MRT - 120	A13 - 1864	A13 - 1864	
GG12-2, GG15-1	MRT - 135	A42 - 4037	A59 - 2503	VT 9
GN9, GN10A, GL131, GL13A	MRT - 136	SA - 1258	A50 - 5117	VC 1
GL13P	GB-277	F14 - 162	F56 - 5107	VP 4
GF13	67131	A10 - 3537	A10 - 3537	
CA209, CA213S, CA213D	MRT - 120	A13 - 1864	A13 - 1864	
TA310, TA312, TB315, TB312 WG212, TA312R, GG122DJ	MRT - 135	A42 - 4037	A59 - 2503	VT 9
TA209, TA211, TA211A, TA213, TA213A, WLA13, GN10AW, GN101G	MRT - 136	SA - 1258	A50 - 5117	VC 1
TA211P, TA213P	GB - 277	F14 - 162	F56 - 5107	VP 4
"C" SERIES 1967 - 1968 TB12SC, TB15DC, TGB12C	MRT - 135	A42 - 4037	A59 - 2503	VT 9
TA9DC, TA9SC, TA11DC, TA11SC, TA13DC TA13SC	MRT - 136	SA - 1258	A50 - 5117	VC 1
CA9DC, CA11DC, CA13DC	MRT - 307	SA - 1272		VF 3
TBF12DC, TBF12SC, TBF15DC, TBF15SC	TF - 326			VA 2
TA11PC	GB - 277	F14 - 162	F56 - 5107	VP 4
"D" SERIES 1968 - 1969 TB12SD, TB12DD, TB12ED, TB15DD, TB15DC-2	MRT - 135	A42 - 4037	A59 - 2503	VT 9
TA9SD, TA9DD, TA13SD, TA13DD, TA11SD, TA11ED, TA11DD, TA11DC2	MRT - 136	SA - 1258	A50 - 5117	VC 1
CA9SD, CA11DD, CA13DD, CGA13SC	MRT - 307	SA - 1272		VF 3
TBF12SD, TBF12DD, TBF12SC, TBF12SC-2, TBF15SD, TBF15DD, TBF15CD, TBF15SC-2	TF - 326			VA 2
TA11PD, TA11PDM	GB - 277	F14 - 162	F56 - 5107	VP 4
TFF20	01 - 055 - 063 (Food Comp) 01 - 055 - 064 (Freezer)			
"E" SERIES 1969 - 1972 TB12SE, TB12SE2, TB12DE, TB15SE2, TB15DE	MRT - 135	A42 - 4037	A59 - 2503	VT 9
TA9MSE, TA11MSE, TA11MDE, TA11MEE, TA11ASE, TA11ADE, TA13MSE, TA13MDE, TA13ASE, TA13ADE	MRT - 136	SA - 1258	A50 - 5117	VC 1
TA11PDF, TA11PDE	GB - 277	F14 - 162	F56 - 5107	VP 4
TF12SE, TF12SE2, TF12DE, TF16SE, TF16SE2, TF16DE, TF16DE2, TF16CE	TF-326 Early TF16DE All Others 8 - 0100072 - 601	3ART5VC52		VA 2
"F" SERIES 1969 - 1973 CA9, CA11, CA13	MRT - 307	SA - 1272		VF 3
CAF12	CA - 334	3ART5VH2		VF 3
CB6, CB10, CB16	ZE32108B	A10 - 3756 A10 - 3760		VF 3
TB12EF, TB12SF, TB12DF, TB15SF, TB15DF, TB15XF	MRT - 135	A42 - 4037	A59 - 2503	VT 9
TA9MSF, TA11MEF2, TA11MSF, TA11ASF, TA11ADE, TA13MSF, TA13ASE, TA13ADF	MRT - 136	SA - 1258	A50 - 5117	VC 1
TF16SE2, TF16DE, TF16CE, TF12SE2, TF12SF, TF12DE	TF-326 Early TF16DE All Others 8 - 0100072 - 601	3ART5VC52		VA 2
TA9PSF, TA9PSF TA11PDF	8 - 0100528 - 601 GB - 277	F56 - 5234 F14 - 162	F56 - 5234 F56 - 5107	VP 4
1973 - 1976 TA9MSF	MRT - 136	SA - 1258	A50 - 5117	VC 1
TA11MSF	100652 - 601	A50 - 5117	A50 - 5117	VC 1
TA11MD, TA11ME, TA11AS, TA11AD	MRT - 136	SA - 1258	A50 - 5117	VC 1
TB12S, TB12D	100621 - 601	A59 - 2503	A59 - 2503	VT 9
TF12S, TF12D, TF12S2, TF16S, TF16S2, TF16D, TF16D2, TF16C	100072 - 601 100072 - 602 100072 - 603	3ART5VC52 3ART5VC78		VA 2

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS



REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

GENERAL ELECTRIC

(Continued)

GENERAL ELECTRIC

1973 - 1976 (Continued)				
TA13MS, TA13MD, TA13AS, TA13AD	100671 - 601	TF7 - 4089		VC 1
TA13PD	100513 - 601	F56 - 5107	F56 - 5107	
CA9	100653 - 601	SAX715		VF 3
CA11	100653 - 602	3ART5S37		
CA13	100653 - 603	3ART5S45		
CAF12SG	CA334	3ART5VH2		VF 3
1977 - 1978				
T280MSJ	100652 - 602	A50 - 5130	A50 - 5130	VA 2
T330	100652 - 601	A50 - 5117	A50 - 5117	VC 1
TB330, TB360, TB370, TB390, TB420, TB430	100621 - 601	A59 - 2503	A59 - 2503	VT 9
TF330, TF420	100072 - 601	3ART5VC52		VA 2
TF330K, TF430K	100072 - 604	3ART5VC87		VA 2
C230, C270, C340	100653 - 601	A50 - 5122	A50 - 5122	VF 3
GBT1, PT3, PT6, PT12	300060 - 604	A50 - 5118	A50 - 5118	VC 1
1979				
T280MSK	100652 - 604	A50 - 5152		
TB370, TB390, TB430	100621 - 601	A59 - 2503	A59 - 2503	VT 9
	100621 - 602	3ART5G56		
TF330, TF430	100072 - 604	3ART5VC87		VA 2

HALLSTROM

HALLSTROM

SK5, SK60, SK70, SK85			SA 1273	VC 1
H5, AV86, NV6, 605, BR9, 805, 905, 656, MS8, JN7			SA 1273	VC 1
704, 804			SA 1269	VC 1
BR11, S11, SK12			SA 1261	VC 1
R8, R7, S8, S9, S7			SA 1260	VC 1
KF1, SKF12			SA 1255	VF 3
HJ2, SK3			SA 1254	
SKSU			SA 1278	VC 1

KELVINATOR & LEONARD

KELVINATOR & LEONARD

M5W, AS5, ASB5, ASC5, AS6, SAS5, AS7, ASB7, KELVINETTE 1200, 12 c.f., 20 c.f., 30 c.f.	KA 12193	SA 518 SA 1076	A50 - 5126	VC 1
NHC, 245, 465, ASD7, 208, 209, 211, 218, 219, 227, 229	KA 7931	SA 501E	A50 - 5126	VC 1
217, 225, 226 (208, 218 Early Models)	KA 12965	SA 523	A50 - 5126	VC 1
419, 439, 447, 477, 485	KA 11574	SA 581 SA 728	A50 - 5126	VC 1
212, 213, 214, 216, 224, 230, 250, 252, 318, 368, 449, 463, 539, 560, 570, MO90VA, MO90WA, M260VC, 250MV3	KA 20704	SA 948E	A50 - 5126	VC 1
469, 482, 489, 682, 689	KA 26943	A26 - 164 A42 - 4129	A59 - 8804	VT 9
466, 476/66, 493, 518, 568, 577, 578, 579, 580, 676, 693, 694, C124SA, C124VA, C124WA	KA 27080	A26 - 163 A42 - 4126	A59 - 8801	VT 9
686	KA 33524	051B	A59 - 8802	VT 9
387, 388, 976, 993	KA 28737	A26 - 172 A42 - 4127	A59 - 8802	VT 9
486, 496, 508, 509, 519, 588	KA 32169	A26 - 181 A42 - 4128	A59 - 8803	VT 9
770, 778, 788, 790	KA 36873	SA 1277	SA 1277	VF 3
888, N220FA, N220EB	KA 38625	A52 - 154	A50 - 5572	VF 3
C160GC, C160GF	Z234099	A40 - 1006 A59 - 8601	A59 - 8801	VT 9
D600, D601, D602	203255	A42 - 1006 A59 - 8601	A59 - 8801	VT 9
769, C144HA, C144NA, C144WA, C180GA, C180WA, C125WB, C125RB	KA 40327	A42 - 4136	A59 - 8800	VT 9
C144SB	KA 47569	A42 - 4136	A59 - 8800	VT 9

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

KELVINATOR & LEONARD (Continued) KELVINATOR & LEONARD

C340RC, 340CR3, C340TC, C340YC, C340ZC, C340SE, C380HC, 380CH3, C380NC, C380SC, C380SE, C380TC, C480GC, 480CG3, C480NC, C480SC, C480SE	KA 51553 KA 45917	A59 - 8800	A59 - 8800	VT 9
779, 789, N180FA, N180SA, N180SB	KA 41664	SA 1283	A50 - 5108	VF 3
N480FC, 480NF3, N480TC	KA 45953	A50 - 5108	A50 - 5108	VF 3
N144FA, N144GA, N144WA, N144WB	KA 43265	SA 1293	A50 - 5109	VF 3
C380HF, C380CH6, C380SF	KA 57536	GE 5ART6AF1	A59 - 8808	
N510FF, 510NF6, N610FF, 610NF6	KA 57204	SAM 1311	SAM 1311	
N380FF, 380NF6	KA 56517	A50 - 5137	A50 - 5137	VF 3
C340RF, 340CR6, C480HF, C340FG, 390CF7 480CH6, C480SF, C480FG, 480CF7	KA 56069 KA 55944	A59 - 8808	A59 - 8808	VT 9
360MV6, M360VF	KA 54925	A50 - 5136	A50 - 5136	
C360HE, 360CH5, C310HF, 310CH6, C370HF, 370CH6, C410HF, 410CH6 Also used on Models — C160HG, 160CH7, C310HG, 310CH7, C350HG, 350CH7, C360HG, 360CH7, C410HG, 410CH	203793	A59 - 8609	A59 - 8809	VT 9
M138VA, M138WA	KA 41068	SA 1294	A50 - 5110	
M360VC, 360MV3	KA 49605	A50 - 5107	A50 - 5107	
N510FD, 510NF4, N610EE, 610NE5	KA 47397	SAM 1308	SAM 1308	
"LADY K", KA31M, KB31M	E71570	KCA/A6/B15		VC 1
"LADY K", K31RU/4, K31S/4, K33Z/4	E73934	KCA/T1/S27		VC 1
"LADY K", K31R/4	E74288	A50 - 125		VC 1
"LADY K", K33B/4, K33C/4, K33D/4	E75947 E74611	KCA/T2/S27		VC 1
"LADY K", K33E/4	E81965	KCA/T2/S27		VC 1
C350VC	2171 - 125	A59 - 2504	A59 - 2504	VT 9
450NG3, 500NG3	1229314			
400NG3, N450GC, N500GC	1228410	9530 N449		
N400GC, N500GC, N620GC, 620NG3	1231175	GE,	SAM 1308	
463, 560, 570	KA 28974	E11 - 2533	E11 - 2533	
439, 477, 485	KA 11573	E13 - 2500	E13 - 2500	
486, 496, 508, 509, 519, 588, 576, 686, 694	KA 29295	E11 - 2538	E11 - 2538	
976, 993	KA 28917	E11 - 2534	E11 - 2534	
770, 778, 788, 790	KA 36855	E11 - 2403	E11 - 2403	
888	KA 38069	DFC4H - 14A		
N220FA, N220EB, N600EC, 600NE3, 888	KA 42756	DFC4H - 14B		
779, 789, N180SA, N180SB N480FC, 480NF3, N480TC	KA 39531	DFS - 55B		
N140FA, N144GA, N144WA, N144WB, N380FC, N380GC, N380YC, 380NF3, N380TC, N510FD, 510NF4, N510FF, N380FF, 380NF6, 510NF6	KA 43881	GF539 - 29		
400NG3, 450NG3, 500NG3, N450 GC, N400GC, N500GC	1228443	FP539 - 21		
N620GC	1230355	GR539 - 21		
221, 267, 269, 275, 429, 467, 476/56	KA 13154	F14 - 113		
P360RC, 360PR3	KA 49606	F56 - 5102	F56 - 5102	
232, 241, 271, 272, 453, 462, 469	KA 20703	F14 - 119	F56 - 5104	
360PR6, P360RF	KA 54914	F56 - 5108	F56 - 5108	
N610EE, 610NE5, N610FF, 610NF6	KA 56413	NK539 - 21		
N380FF, 380NF6	KA 55041	K7Y		
N510FD, 510NFH, N610EE, 610NF6 610NE5, N510FF, 510NE6	KA 57201			
N380FF, 380NF6	KA 56455	B11 - 509	B11 - 509	
N510FD, 510NF4, N610EE, 610NE5, N510FF, 510NF6, N610FF, 610NF6	KA 56464	B11 - 508	B11 - 508	
P250VC, 250PV3, P250YC, P250TC	KA 46067	F56 - 5104	F56 - 5104	
P138NA, P138RA	KA 41069	F14 - 203	F56 - 5105	
888, N180FA, N180SA, N180SB, N220EB, N220FA, N380FC, N380GC, N380TC, N380YC, 380NF3, N480FC, N480TC, 480NF3, N600EC, 600NE3	KA 38627	B11 - 504	B11 - 504	
779, 789	KA 39138	B11 - 505	B11 - 505	
N144FA, N144GA, N144WA, N144WB	KA 45396	B11 - 505	B11 - 505	

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REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

KELVINATOR & LEONARD (Continued) KELVINATOR & LEONARD

N510FD, 510NF4	KA 47898	B11 - 507	B11 - 507	
N620GC, 620NG3	1226883	B11 - 132	B11 - 132	
993	KA 28649	L135-3 Fan Speed		
976	KA 32806	L135-3 Control		
N220EB, N600EC, 600NE3	KA 44800	FS - 100	FS - 100	
N600EC, 600NE3	KA 53980	C808/00		
FF6	273060	A10 - 1368	A54 - 8214	VR 6
FF60	320088	A10 - 1457 A10 - 1381	A54 - 8214	VR 6
FF60, FF60/1, FF100, FF100/1, FF160, FF160/1 FF220, FF220/1, AHF62, AHF102, AHF162, AHF224	321088	A10 - 3537	A54 - 8214	VR 6
H200GD, H160GC, H340GD, H430GC, H500GD, H600GC, H700GD, H200FF, H500FF, H700FF, H340FF	39113	A54 - 8214	A54 - 8214	VR 6
FF6, FF10	KA 14298	A10 - 3503 A54 - 2910 SA 2501	A54 - 2910	VS 5
FF85, FF86	KA 30018	A10 - 3545	A10 - 3545	VS 5
VF10	KA 14575	SA 775	A10 - 1201	VF 3
VF105	KA 17726	SA 2595	A10 - 1201	VF 3
VF231, VF236, VF436, VF337, VF338, VF537, VF538, F100LA	KA 25225	A10 - 1201	A10 - 1201	VF 3
F118LB, F310LC, F310HF, 310FL3, 310FH6	KA 45674	A55 - 1003	A55 - 1003	
F330LD	10 - 273	A50 - 583		VF 3
H250GD	10 - 404	A50 - 218		VF 3
FF13, FF15, FF22	KA 30115	A10 - 3537	A54 - 8214	VR 6
FF15, FF22, (Series CAV CAZ)	ZE 288028	A10 - 3756	A54 - 8214	VR 6

MALLEYS

MALLEYS

1960 M9, M10	SA 983			
1961 409, 411	SA 1206	SA - 1280		VC 1
1962 510, 512A, 512M	TC 28	SA - 1280		VC 1
1963 610F, 610A, 612F, 612A	TC 28	SA - 1280		VC 1
1964 710ME, 710F, 710A, 712A, 712AE 712C, 714C, 714M	TC 28 515364	SA - 1280 A59 - 2517		VC 1 VT 9
1965 810E, 810F, 810A, 812A 812C, 812M, 814C, 814M	SA 1206 515364	SA - 1280 A59 - 2517		VC 1 VT 9
1966 912AB 912CE 912K, 912KM, 914K, 914KM	SA 1206 515364 531608	SA - 1280 A59 - 2517 A50 - 5139		VC 1 VT 9 VA 2
1967 1010ME, 1010FE, 1010AE, 1010AB, 1012ME, 1012FE, 1012AE, 1012AB 1012CE, 1012CB, 1014CE, 1014CB 1012K, 1012KM, 1014K, 1014KM, 1012FD, 1012FDM, 1014FD, 1014FDM	SA 1206 515364 531608	SA - 1280 A59 - 2517 A50 - 5139		VC 1 VT 9 VA 2
1968 1110ME, 1110FE, 1110AE, 1110AB, 1112ME, 1112FE, 1112AE, 1112AB 1112CE, 1112CB, 1114CE, 1114CB 1112K, 1114K, 1115K, 1115KM	SA 1206 515364 531608	SA - 1280 A59 - 2517 A50 - 5139		VC 1 VT 9 VA 2
1969 1210M, 1210F, 1210A, 1212M, 1212F, 1212A, 1212AB 1212C, 1214C 1213K, 1215K	SA 1280 515364 531608	SA - 1280 A59 - 2517 A50 - 5139		VC 1 VT 9 VA 2

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

TECH. PAGE **152-k**

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

MALLEYS

(Continued)

MALLEYS

1970 011S, 011P, 011A, 013S, 013P, 013A, 013AB 013C, 015C 014K, 014KB, 016K, 016KB		SA 1286 515364 531608	SA 1286 A59 - 2517 A50 - 5139	VT 9 VA 2
1971 - 1972 111S, 111P, 111A, 113S, 113P, 113A, 113AB 113C-CN, 115C-CN 114K, 114KB, 114KBT, 116K, 116KB, 116KBT	C - 3776 - 179	SA 1286 ME380 - 11 531608	SA 1286 A50 - 5139	VC 1 VA 2
1973 - 1976 214K, 214KB, 214KBT, 216K, 216KB, 216KBT 114C, 114CN, 214C, 214CN, 116C, 116CN 111S, 111P, 111A, 113S, 113P, 113A, 113AB		531608 515364 SA 1286	A50 - 5139 A59 - 2517 SA 1286	VA 2 VT 9 VC 1
1977 214K, 214KB, 214KBT, 216K, 216KB, 216KBT 114C, 114CN, 214C, 214CN, 116C, 116CN 330AB 300S, 350S, 300SN, 350SN, 300ST, 350ST 350PT	3776 - 179 3297 - 797 3301 - 807	531608 515364 SA 1286 A50 - 5141 F50 - 5202	A50 - 5139 A59 - 2517 SA 1286 A50 - 5141 F50 - 5202	VC 1 VT 9 VC 1 VC 1 VP 4
WHF160T, WHF200D, NHF140DS, NHF200DS, RHF140D, RHF200D WHF53, WHF140C5, WHF200C5, NHF140, NHF200	4400 - 521 4400 - 012	A50 - 5142 A50 - 5104	A50 - 5142 A50 - 5104	VF 3 VF 3

METTERS

METTERS

1960 MQ560, SSQ70, MA76D, MSQ760, MS860	00 - 027 - 047	50B 023		VC 1
1961 MQ960, MOD960, MS1160, MQ1260, MQ1260DW, ST11, MB61, MQ1161	00 - 027 - 047	50B 023		VC 1
1962 M562, M1162, MA1162, M1362, MA1362, MA962, MO1161S, M1062, MA1062, SQ595 HC12, HC12A, HC14, HC14A, HC10, HC10A GKR62	00 - 027 - 047 00 - 085 - 047	50B 023 50B 085		VC 1 VC 1
1963 MA963, M963, M1063, MF963	00 - 027 - 047	50B 023		VC 1
1964 MST1564, MST1465 M1264, MA1264, M964, MA1064, M1064, MA1064/2, M1064/2, H415, HC412, HC410, HC405, HC410A M1464, MA1464, HC414, HC414A GKR64, M564 MF1064, HCF10 MST1266	00 - 081 - 047 00 - 061 - 047 00 - 085 - 047 00 - 085 - 047 00 - 079 - 047 00 - 083 - 047	A42 - 4044 50B 061 50B 085 50B 085 U 5079	A59 - 2504	VT 9 VC 1 VC 1 VF 3 VT 9
1965 M1165, MA1165, MS1164, M1265, MA1265, M1065 GKR65, M565 R1162, RA1162, R1362, RA1362	00 - 093 - 047 00 - 085 - 047 00 - 027 - 047	A10 - 1321 50B 085 50B 023		VC 1 VC 1 VC 1
1966 MA1266, MSA1265, M1066, MA1166, M10DP, MA1266D, MA1166D MFF1467 MF1166	00 - 093 - 047 01 - 023 - 047 01 - 007 - 047	A10 - 1321 SA 1269 SA 1266		VC 1 VC 1 VC 1
1967 M1067, MA1267, MA1167 MFF1267, MFF1467P MF1168, MF1267 M967 MFF1467W MST1266P	00 - 093 - 047 01 - 001 - 047 01 - 007 - 047 00 - 027 - 047 01 - 023 - 047 00 - 081 - 047	A10 - 1321 SA 1264 SA 1266 50B 023 SA 1269 A59 - 5104		VC 1 VC 1 VC 1 VC 1 VT 9 VT 9
1968 M1068, MA1167S, M1167S, M110, MA110, MA12 MF1268 M15	00 - 093 - 047 01 - 059 - 047 01 - 023 - 047			VC 1 VC 1 VC 1

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS



REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

METTERS

(Continued)

METTERS

1968 (Continued) MFF1287W, MFF12	01 - 001 - 047	SA 1264		VC 1
MST1468, MST12, MST140	00 - 081 - 047	A42 - 4044		VT 9
MF15	01 - 073 - 451			
MF14, MF110, MF120, MF11, MF1167F	01 - 007 - 047	SA 1266		VC 1
MD20, TFF20DE	01 - 055 - 063			
1969 MST120, MSW12, MST125, MST14, MSW140	00 - 081 - 047	A42 - 4044	A59 - 2504	VT 9
MF150W, MFR21, MF110, MF15, MRAW12, MRF11, MRK11	02 - 065 - 451	A50 - 2293		VC 1
MPN12, MRP12, MRP11	02 - 067 - 451	F56 - 103		
MD21	02 - 027 - 063A			
MR11, MRA11, MW110, MA120D, MR12, MAW120, MA110K, MAW120D, MRA12	02 - 031 - 451	KCA/E/11		
MD20D	01 - 055 - 063			
1970 MRP5				
MR11, MRA11, MRA12, M21, M21 I/M	02 - 031 - 451	KCA/E/11		
MRT12, MRT125, MRT12S	02 - 089 - 451	A42 - 4141	A59 - 2500	VT 9
M15A	01 - 023 - 451			
MST12, MST14A, MSTW144, MST140	00 - 081 - 047	A42 - 4044	A59 - 2504	VT 9
1971 MR11, MRA11, MR12, MRA12, MRAW12, MR11B, "TRIUMPH", MRA111, MRN112, MRA112	02 - 031 - 452	A50 - 2284		VC 1
MF150, MFR21, MF17, MRF12, MFR17	02 - 065 - 451	A50 - 2293		VF 3
MDF20	01 - 055 - 063			
MRP5	02 - 141 - 451			
MDT15, MDT13, MDT15K, MB12, MU17, MDT17, MDT12, MDT12K	02 - 089 - 451 02 - 157 - 451	A42 - 4141 3ART 6VG1	A59 - 2500	VT 9
MRP111, MRPN112, MG311S	02 - 067 - 451	F56 - 103		
MRAW112, MA311S, MA271S	02 - 165 - 451	A50 - 2284		
MRF111, MFR121, MF111, MF271S	02 - 065 - 451	A50 - 2293		VF 3
MF481S, MF621S, MF117	00 - 081 - 047	A42 - 4044	A59 - 2504	VT 9
MDTW15, MDTW17, MDT17K, MG15, MG17	02 - 157 - 451			
MDF15	02 - 123 - 047			
MRP55	02 - 195 - 451	F50 - 234		VF 4
MG12	02 - 031 - 451			
MCF75, MCF100, MCF130				
ME471S, ME431S	02 - 239 - 451	3ART 6VG1		VT 9
MJ471S	02 - 123 - 451	A50 - 440		VC 1
MS572S, MS571S	02 - 027 - 063			
MA271S, MA311S	02 - 165 - 451	A50 - 2284		VC 1
MA290S	757189	A50 - 5116	A50 - 5116	VC 1
MG311S	02 - 165 - 770	F56 - 103		
MF621S	00 - 081 - 047	A42 - 4044	A59 - 2504	VT 9
MF271S, MF271S-01, MF481S, MF481S-01	02 - 065 - 452	A50 - 2293		VF 3
MA290S, MA290S-01, MA290T, MA290T-01	R11 102774 R12 774369		A50 - 5116	VC 1
MG320S	759214	F56 - 5700		
ME280S, ME280T, ME280T-01	774436		A59 - 2516	VT 9
ME340S, ME340T	R21 729316 757190	A59 - 2512	A59 - 2512	VT 9
MJ360S, MJ360T	R14 737383		SAM - 1305	
ME460T	758915		A59 - 2519	VT 9

PHILIPS**PHILIPS**

1977 RL305S RL306S RL285A RL286A	4202 - 500 - 0553 4202 - 500 - 0702	A50 - 5140 (Round Shaft) A50 - 5144 (1" D" Shaft)	A50 - 5140 A50 - 5144	VA 2
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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

TECH. PAGE **152-m**

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

PHILIPS

(Continued)

PHILIPS

1977 (Continued)				
RL325A	4202 - 500 - 0140	A50 - 5131 (Round Shaft)	A50 - 5131	VC 1
RL326A	4202 - 500 - 0776	A50 - 5143 ("D" Shaft)	A50 - 5143	
RL365C, RL366C	4202 - 500 - 0498	A59 - 8809	A59 - 8809	VT 9
RL465C, RL466C	4202 - 500 - 0915	A59 - 8810	A59 - 8810	VT 9

RANK ARENA

RANK ARENA

1977				
RR150, RR250	DO 109	F50 - 5201	F50 - 5201	VP 4
RR260, RR155A, RR220	MCC108-5	A59 - 2521	A59 - 2521	VT 9
RR200	MCC114-2	A50 - 5134	A50 - 5133	VF 3
R70 Kit, R70C, R70W	MCC109-1	A50 - 52307	A50 - 52307	VC 1
RR120	MCC114-1	A50 - 5133	A50 - 5134	VF 3

RODEN/ICE COLD

RODEN/ICE COLD

1975				
RKA150, RKA250, RKC150	MCC111-1	F50 - 5200	F50 - 5200	VP 4
RUA120, IUA 120	MCC114-1	A50 - 5133	A50 - 5133	VF 3
RUA200, IUA200	MCC114-2	A50 - 5134	A50 - 5134	VF 3
2.500, RKA070	MCC109-1	A50 - 52307	A50 - 52307	VC 1
1976				
R150, R250	MCC111-1	F50 - 5200	F50 - 5200	VP 4
U120, U121	MCC114-1	A50 - 5133	A50 - 5133	VF 3
U200, U201	MCC114-2	A50 - 5134	A50 - 5134	VF 3
R70, K70	MCC109-1	A50 - 52307	A50 - 52307	VC 1
R220	MCC108-5	A59 - 2521	A59 - 2521	VT 9
1977				
NR150	DO 129	A50 - 5147	A50 - 5147	VC 1
NU120	MCC114-1	A50 - 5133	A50 - 5133	VF 3

SIMPSON - POPE

SIMPSON - POPE

5000-13, 5000-14, 5000-30, 5000-40, 5000-72	5000 - 01 - 762	E13 - 2507	E13 - 2532	
5000-48, 5000-60, 5000-61, 5000-66, 5000-67, 5000-74, 5000-78, 5000-84, 5000-87, 5000-88, 5000-89, 5000-129, 5000-133, 5000-136, 5000-137, 5000-143, 5000-145, 5000-147, 5000-148	5000 - 48 - 051	E13 - 2520	E13 - 2532	
5000-153, 5000-154, 5000-155, 5000-170, 5000-171, 5000-172	5000 - 153 - 015	E13 - 2536	E13 - 2532	
5030-114, 5030-117, 5030-118, 5030-119, 5030-135, 5030-144, 5030-174, 5030-175, 90-205, 90-255, 92-205, 94-205, 94-255, 90-206, 90-256, 92-206 92-216, 90-266, 92-216, 94-216, 94-266, 90-207, 90-257, 92-207, 94-207, 94-257, 90-208, 90-258, 92-208, 92-258, 94-208, 94-218, 94-258, 94-268, 90-209, 90-259, 92-209, 92-259, 94-219, 94-229 94-269, 94-279	5030 - 01 - 051	E13 - 2532	E13 - 2532	
5000-02, 5000-04, 5000-15, 5000-16, 5000-20, 5000-31, 5000-35	5000 - 02 - 702	F14 - 116	F14 - 202	
5000-109, 5000-111, 5000-127, 5000-128, 5000-134, 5000-139, 5000-140, 5000-142	5000 - 86 - 702	F14 - 161	F14 - 202	
5030-125, 5030-126	5030 - 03 - 006	F14 - 202	F14 - 202	
5000-09, 5000-10, 5000-11, 5000-12, 5000-17, 5000-18, 5000-19, 5000-30, 5000-32, 5000-33, 5000-34, 5000-36, 5000-46, 5000-47, 5000-54, 5000-55, 5000-57, 5000-58	5000 - 1 - 763	SA 969	SA 1220 SA 1205	VC 1
5000-40, 5000-42, 5000-43, 5000-44 5000-45, 5000-72, 5000-73	5000 - 1 - 764	SA 501	SA 1244	VC 1
5000-48, 5000-49, 5000-50, 5000-51, 5000-61, 5000-63, 5000-67, 5000-68	5000 - 48 - 052	SA 1085	SA 1205 SA 1244	VC 1

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS



REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

SIMPSON-POPE

(Continued)

SIMPSON-POPE

5000-60, 5000-62, 5000-68, 5000-69, 5000-70, 5000-74, 5000-75, 5000-78, 5000-80, 5000-84, 5000-87, 5000-88, 5000-89, 5000-110, 5000-129, 5000-131, 5000-132, 5000-133, 5000-136, 5000-137, 5000-138, 5000-143, 5000-146, 5000-147, 5000-148, 5000-150, 5000-155(s), 5000-169(s), 5000-145	5000 - 70 - 019	SA 1205	SA 1205	VC 1
5000-77, 5000-90, 5000-91, 5000-92, 5000-93, 5000-95, 5000-109	5000 - 77 - 001	SA 1218	SA 1244	VC 1
5000-121, 5000-179, 90-857, 90-858, 90-859	5000 - 121 - 026	SA 1257	SA 1257	VF 3
5000-153, 5000-154	5000 - 157 - 002		SA 1244	VC 1
5020-02, 5020-04, 5020-06	5020 - 02 - 736	SA 975	SA 1074	VC 1
5030-114, 5030-117, 5030-118, 5030-119, 5030-135, 5030-144, 5030-156(s), 5030-169(s), 5030-170, 5030-171, 5030-172, 5030-173, 5030-174, 5030-175, 5030-178, 90-106, 90-205, 90-255, 92-265, 94-205, 94-255, 90-106, 90-206, 90-256, 92-206, 90-216, 90-266, 92-216, 94-216, 94-266, 90-107, 90-207, 90-257, 90-267, 92-207, 94-207, 94-257, 90-108, 90-208, 90-258, 92-208, 92-258, 94-208, 94-218, 94-258, 94-268, 90-109, 90-209, 90-259, 92-209, 92-259, 94-229, 94-269, 94-279	5030 - 01 - 050	SA 1244	SA 1244	VC 1
5000-152, 5000-162, 93-405, 93-455, 93-416, 93-466, 93-407, 93-457, 93-408, 93-418, 93-458, 93-468	5000 - 152 - 037	A42 - 4130	A59 - 8805 Complete With Knob	VT 9
93-409, 93-419, 93-459, 93-469	541 - 1 - 100	A42 - 4130	A59 - 8805 With Knob	VT 9
93-609, 93-659	162 - 3 - 47	B11 - 503	B11 - 503	VC 1
93-609, 93-659	628 - 1 - 16	SA 1284	SA 1284	VC 1

WESTINGHOUSE

WESTINGHOUSE

SM79, SM99	R11 102774	A50 - 5116	VC 1
SM111, PSM99, PSM12	R12 104133	A50 - 5116	VC 1
ASM139	R21 729316	A59 - 2512	VT 9
RQD99, RAD99, RGD99	R11 102774	A50 - 5116	VC 1
RAD111, RBG121	R12 104133	A50 - 5116	VC 1
RCD139	R21 729316	A59 - 2512	VT 9
RGD121, RHD111, RHD111T	R12 104133	A50 - 5116	VC 1
RED143	R21 729316	A59 - 2512	VT 9
RHD99, RHD99T, RAE99	R11 102774	A50 - 5116	VC 1
RAE99T, RGE99, RGE99T	R11 102774	A50 - 5116	VC 1
RBE111, RGE121, RGE121T	R12 104133	A50 - 5116	VC 1
RCE139, RCE139T, REE143	R21 729316	A59 - 2512	VT 9
REE143T, RHE143, RHE143T	R21 729316	A59 - 2512	VT 9
RAF99, RGF99, RAF101, RGF101	R11 102774	A50 - 5116	VC 1
RAF121, RAF121A, RAF121B, RAF121C, RGF121	R12 104133	A50 - 5116	VC 1
REF122, REF143, RHF143	R21 729316	A59 - 2512	VT 9
RAG96, RAG97, RAG98, RAG100, RAG101, RAG102, RAG103, RAG122, RGG103	R11 102774	A50 - 5116	VC 1
REG140A, REG140B, REG142, REG142A, REG143	R21 729316	A59 - 2512	VT 9
RAH97, RAH98, RAH100, RAH103, RAH100/1, RGH103, RGH103/1	R11 102774	A50 - 5116	VC 1
RAH121, RAH121/1, RGH121	R12 104133	A50 - 5116	VC 1
RNH124/1	R10 739404	A50 - 5119	VF 3
REH122, REH122 01, REH142, REH143, REH143 1, RCH139	R21 729316	A59 - 2512	VT 9
RJH154, RJH156, RJH154/1, RJH156/1, RJH133, RJH142, RJH142/1	R14 737383	SAM 1305	
RJH173	R18 742223	SAM 1307	
RTH60TT, RTH70, RTH70-A, RTH80, RTH80-A	132 - 10391 - 02	F50 - 2026	VP 4
FVH525	R19 743018	A50 - 5120	VF 3
RNJ124, RNJ124/2, RNJ124/3	R10 739404	A50 - 5119	VF 3
RAJ97, RAJ98, RAJ100, RGJ103	R11 102774	A50 - 5116	VC 1
RAJ121, RGJ121	R12 104133	A50 - 5116	VC 1

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RANCO DOMESTIC THERMOSTATS REPLACEMENT CHARTS

REPLACEMENT CONTROLS FOR DOMESTIC REFRIGERATORS & FREEZERS (Continued)

REFRIGERATOR/FREEZER MODEL	ORIGINAL CONTROL		RANCO	
	MANUFACTURER'S PART NO.	SUPPLIER'S PART NO.	FUNCTIONAL REPLACEMENT CONTROL	ADAPTABLE REPLACEMENT CONTROL

WESTINGHOUSE

(Continued)

WESTINGHOUSE

RJJ142, RJJ142/1, RJJ156, RJJ156/01, RJJ153/2, RJJ153/3, RJJ153/21, RJJ153/31	R14 737383		SAM 1305	
RJJ153, RJJ153/1, RJJ153/01	R15 737759		SAM 1306	
RPJ105, REJ122, REJ122/01, REJ143, REJ143/01, REJ143/11, REJ143/2, REJ143/21	R21 729316		A59 - 2512	VT 9
RJJ173, RSJ203	R17 745196		A50 - 5123	VF 3
FVJ525	R19 743018		A50 - 5120	VF 3
FVJ315, FVJ310, FVJ310/2	R19 743018		A50 - 5120	VF 3
RAL100, RGL103	R11 102774		A50 - 5116	VC 1
RAL121	R12 104133		A50 - 5116	VC 1
RJL142, RJL156	R14 737383		SAM 1305	
RJL153	R15 737759		SAM 1306	
RSL204	R17 745196		A50 - 5123	VF 3
RJL172, RJL174	R18 742223		SAM 1307	
FVL525, FVL315, FVL310	R19 743018		A50 - 5120	VF 3
RPL105, REL122, REL133, REL143, REL154	R21 729316		A59 - 2512	VT 9
RNL124	R101 747083		A50 - 5119	VF 3
RAM100, RGM103	R11 102774		A50 - 5116	VC 1
RAM121	R12 104133		A50 - 5116	VC 1
RJM142, RJM155, RJM156	R14 737383		SAM 1305	
RJM153	R15 737759		SAM 1306	
RSM204	R17 745196		A50 - 5123	VF 3
RJM172, RJM174	R18 742223		SAM 1307	
FVM525, FVM315, FVM310	R19 743018		A50 - 5120	VF 3
REM122, REM133, REM154, RPM105	R21 729316		A59 - 2512	VT 9
RNM124	R101 747083		A50 - 5119	VF 3
RAP100, EAP090	R11 102774		A50 - 5116	VC 1
RAP131	R12 104133		A50 - 5116	VC 1
RJP142, RJP142/04, RJP156, RJP156/04	R14 737383		SAM 1305	
RSP184,	R17 745196		A50 - 5123	
RSP204	745101	B11 - 502		VF 3
RJP174, RJP174/04	R18 742223		SAM 1307	
FVP525, FVP310, FVP310/04	R19 743018		A50 - 5120	VF 3
RPP105, REP122, REP123, REP133, REP154, REP171, REP171/04, REP133/04, REP154/04, EEP130	R21 729316		A59 - 2512	VT 9
RNP134	R101 747083		A50 - 5119	VF 3
RSP184, RSP204/2	R17 745196 Plus 745101	B11 - 502	A50 - 5123	VF 3
RSP208/02	754669 + 756331			
EAP120, EGP120	759214			VP 4
EAP090/04	756193	A50 - 5116	A50 - 5116	VC 1
RA291S, RA321S	756193	A50 - 5116	A50 - 5116	VC 1
RE341S, RE351S, RE391S	755998	A59 - 2512	A59 - 2512	VT 9
RE461S	R21 756986		A59 - 2513	VT 9
RJ361S, RJ401S	R14 737383		SAM 1305	
RJ461S	R18 742223		SAM 1307	
RN311S	R10 756197	A50 - 5119	A50 - 5119	VF 3
RP261S	755998	A59 - 2512	A59 - 2512	VT 9
RS471S, RS511S, RS512S	756196	A50 - 5121	A50 - 5121	VF 3
FV251S, FV431S	756196	A50 - 5120	A50 - 5120	VF 3
COMPACT REFRIGERATOR/FREEZERS				
VF160R	769782		A50 - 2310	VF 3
VF160S	769833			VS 5
RT145S, RA195R	769541	0518 - 4163		
RT150S, RA195S	769652			
RT150S, RA195S	769609	F50 - 2169X		VP 4
RE230S, RE290S, RE325S	769673	0908 - 6276		
RE200R	769748	0908 - 6282		
RA291T, RA291T - 01	756193	A50 - 5116	A50 - 5116	VC 1
RE281T - 01, RE281T - 02	774436	A59 - 2516	A59 - 2516	VT 9
RE281T	774436	A59 - 2516	A59 - 2516	VT 9
RE351T, RE351T-01, RE391T-02, RE371T	755998	A59 - 2512	A59 - 2512	VT 9
RF280T	758714	A54 - P2936	A54 - P2936	VS 5
RJ461T - 01	756348	SA 1307	SAM 1307	
RN311T	756197	A50 - 5119	A50 - 5119	VF 3
RP261T	755998	A59 - 2512	A59 - 2512	VT 9

SPECIFICATION DATA ON FOLLOWING PAGES

ORDERING: VaRifix Adaptable Controls - Page 151 - Other RANCO Controls - Page 152

RANCO REFRIGERATOR/FREEZER THERMOSTATS SPECIFICATION DATA



A50 SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS			
			WARM IN °C	NORMAL IN °C	NORMAL OUT °C	COLD OUT °C
A50 - 5100	A.M.I.R.D.	1000	-1.0	-8.0	-18.0	-23.5
A50 - 5101	Email	600	-0.5	-7.0	-17.5	-24.0
A50 - 5102	Metters N.S.W.	400	8.0		-5.0	
A50 - 5103	Servex	400	-1.5	-7.0	-14.0	-19.0
A50 - 5104	Metric Refrig. P/L	800		-14.5	-20.5	
A50 - 5105	Servex	1000	-1.5	-6.0	-16.0	-18.5
A50 - 5106	Servex	1000	-3.5	-7.0	-17.0	-21.5
A50 - 5107	Kelvinator	1200	-0.5	-5.5	-18.5	-24.5
A50 - 5108	Kelvinator	400	-11.5	-14.5	-21.0	-24.5
A50 - 5109	Kelvinator	400	-12.8	-15.6	-22.2	-25.6
A50 - 5110	Kelvinator	1200	-0.3	-5.6	-18.3	-24.8
A50 - 5111	A.M.I.R.D.	1000	-1.0	-8.0	-18.0	-23.5
A50 - 5112	Email (N.S.W.)	600	-10.6	-13.9	-20.6	-23.9
A50 - 5113	A.M.I.R.D. New Zealand	1000	-10.5	-15.5	-23.5	-31.5
A50 - 5114	Bonair (New Zealand)	600	-13.5	-16.5	-22.0	-25.0
A50 - 5115	Servex	1000	-14.0	-16.5	-23.5	-35.0
A50 - 5116	Email Ltd.	600	-0.8	-7.2	-17.5	-25.5
A50 - 5117	G.E.K.A.	1000	-0.5	-6.5	-18.0	-27.0
A50 - 5118	G.E.Kirby	600		12.8	7.8	
A50 - 5119	Email	600	-3.9	-10.8	-22.4	-29.1
A50 - 5120	Email	600	-14.2	-17.5	-25.2	-28.5
A50 - 5121	Email Ltd.	600	-13.1	-16.4	-26.3	-29.6
A50 - 5122	G.E.Kirby	1000	-12.2	-13.9	-18.9	-21.1
A50 - 5123	Email Ltd.	600	-11.9	-15.3	-23.0	-26.3
A50 - 5124	Finch Refrigeration P/L	1800	0	-7.5	-12.0	-24.0
A50 - 5125	Fisher & Paykel	1000	-0.5	-5.5	-15.0	-23.5
A50 - 5126	Kelvinator	1000	-0.5	-5.5	-18.5	-24.5
A50 - 5127	Email Auburn N.S.W.	800		9.8	5.0	2.5
A50 - 5128	Metters	1000	-7.5	-10.0	-20.0	-22.0
A50 - 5129	General Motors N.Z.	1000	-1.1	-6.7	-19.7	-23.3
A50 - 5130	G.E.Kirby	800	3.5	-1.5	-7.5	-14.0
A50 - 5131	Phillips M.D.A.	800	-5.0	-8.0	-21.0	-25.0
A50 - 5132	New World	1600		-14.5	-20.5	
A50 - 5133	James N. Kirby	1000	-12.0	WARM OUT -21.0		-32.0
A50 - 5134	James N. Kirby	1600	-12.0	WARM OUT -21.0		-32.0
A50 - 5135	Bonair (New Zealand)	600	-13.5	-16.5	-22.0	-25.0
A50 - 5136	Kelvinator	1300	0	-5.5	-18.5	-28.0
A50 - 5137	Kelvinator	200	-13.0	-17.0	-23.0	-27.5
A50 - 5138	Kelvinator	800	-1.0	-7.0	-11.5	-17.5
A50 - 5139	Malleys	600	4.0	0.5	-5.0	-9.0
A50 - 5140	Phillips M.D.A.	800	1.3	-5.0	-17.0	-21.4
A50 - 5141	Malleys	400	-2.6	-7.3	-19.0	-27.0
A50 - 5142	Malleys	1600	-8.0	-15.0	-20.0	-29.5
A50 - 5143	Phillips M.D.A.	1000	0	-8.0	-21.0	-28.0
A50 - 5144	Phillips M.D.A.					
A50 - 5145	Simpson Pope N.Z.	1200	-12.5	-16.1	-18.0	-22.2
A50 - 5146	Email	600	14.0	11.0	7.0	3.0
A50 - 5147	Rank Nec	1000	-1.8	-7.2	-18.3	-25.0
A50 - 5148	Phillips M.D.A.	1200	-1.3	-5.0	-17.0	-21.5
A50 - 5149	Cool Air	800		-14.5	-20.5	
A50 - 5239	Frigidaire (New Zealand)	1000	-1.1	-6.7	-19.7	-23.3
A50 - 5246	Frigidaire (New Zealand)	1600	-5.8	-12.2	-18.9	-23.9
A50 - 5571	Kelvinator	800	16.0	13.5	9.0	6.0
A50 - 5572	Kelvinator	600	-8.5	-12.0	-19.0	-22.5
A50 - 52284	Metters	1000	2.0	-4.0	-12.5	-21.5
A50 - 52293	Metters	1000	-9.5	-16.5	-22.5	-32.5
A50 - 52307	Walter Barr N.S.W.	1000	-0.6	COLD IN - 10.6		-23.3

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ORDERING : Refer Page 152. Ranco VaRifex Adaptable Controls - Refer Page 151.

REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o and Tech. Pages 152-v thru 152-x.



RANCO REFRIGERATOR/FREEZER THERMOSTATS SPECIFICATION DATA

A59 SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	REPLACES	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS			
				NORMAL OUT °C	WARM OUT °C	COLD OUT °C	CONSTANT CUT-IN °C
A59 - 2500	Mettlers N.S.W.	A42 - 4141	1200	-17.2	-12.8 (Ref. only)	-21.7	5.0
A59 - 2501	G.M.H.	A42 - 4135	1000	-20.0	-15.6	-24.4	2.2
A59 - 2502	G.M. New Zealand Ltd.	A42 - 4139	800	-20.0	-15.6	-24.4	3.3
A59 - 2503	Kirby	A42 - 4037	1000	-23.3	-17.8	-28.9	2.8
A59 - 2504	Mettlers N.S.W.	A42 - 4044	1000	-21.1	-16.7	-25.6	3.3
A59 - 2505	G.M. New Zealand Ltd.	A42 - 4144	800	-22.2	-17.8	-26.7	3.3
A59 - 2506	GENERAL USE	A42 - 4133	1000	-7.0 Ref.	-4.5	-10.0	4.4
A59 - 2507	Frigidaire	A42 - 4088/ 4089	1400	-20.0	-15.6	-24.4	2.2
A59 - 2508	Kru Pty. Ltd.	A42 - 4140	1000	-7.0 Ref.	-4.5 Ref.	-10.0	4.4
A59 - 2508A	Kru Pty. Ltd.		1000	-6.5 Ref.	-3.5	-8.5 Ref.	5.4
A59 - 2509	Frigidaire G.M.H.	A42 - 4076/ 4077	1400	-20.0	-15.6	-24.4	2.8
A59 - 2510	Frigidaire	A42 - 4040/ 4043	1400	-20.0	-15.6	-24.4	2.2
A59 - 2511	A.M.I.R.D. (New Zealand)		800	-25.0	-20.0	-30.0	1.7
A59 - 2512	Email		1000	-21.0	-16.0	-26.0	3.5
A59 - 2513	Email Ltd.		1000	-20.0	-15.0	-25.0	3.5
A59 - 2514	General Motors N.Z.		1000	-20.0	-15.6	-24.4	3.3
A59 - 2515	General Motors N.Z.		1000	-22.2	-17.8	-26.7	3.3
A59 - 2516	Email Ltd. (Con. Prod. Div.)		1000	-24.0	-18.0	-30.0	3.5
A59 - 2517	Malleys		1200		-14.2	-24.5	2.8
A59 - 2518	Email (B/Town)		1200	-21.7	-17.5 Ref. only	-26.0	3.6
A59 - 2519	Email	A59 - 2512 A59 - 2513	1000	-18.3	-13.8	-23.3	3.5
A59 - 2520	Email		1400	-24.0	-18.0	-30.0	3.5
A59 - 2521	J.N. Kirby		1000	-22.5	-18.0	-28.0	5.0
A59 - 8800	Kelvinator	A42 - 4136	600	-23.9	-17.8	-28.3	2.8
A59 - 8801	Kelvinator	A42 - 4126	1200	-23.9	-17.8	-28.3	2.8
A59 - 8802	Kelvinator	A42 - 4127	1200	-22.2	-17.8	-26.7	2.8
A59 - 8803	Kelvinator	A42 - 4128	1200	-21.1	-16.7	-25.6	2.8
A59 - 8804	Kelvinator	A42 - 4129	800	-23.9	-19.4	-28.3	2.8
A59 - 8805	Simpson Pope	A42 - 4130	800	-21.7	-17.2	-26.1	2.8
A59 - 8807	Servex Elect. Vic.	A42 - 4146	1000	-17.0	-13.0	-20.0	4.4
A59 - 8808	Kelvinator		800	-23.9	-18.5	-29.0	4.0
A59 - 8809	Phillips M.D.A.		800	-17.0	-13.0	-21.0	4.5
A59 - 8810	Phillips M.D.A.		800	-24.0	-19.0	-29.0	4.5

SA SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS					
			NORMAL OUT °C	NORMAL IN °C	COLD OUT °C	COLD IN °C	WARM OUT °C	WARM IN °C
SA 501A	Kelvinator	400	-18.0	-7.0	-24.5			-2.0
SA 501E	Kelvinator 7931B	400	-18.3	-7.2	-24.7			-2.0
SA 523	Kelvinator 12965B	800	-14.5	-3.0	-17.0			-1.0
SA 529		800	-9.4	-2.8	-15.0			+7.8
SA 573	Pope 5000-01-764	400	-18.3	-7.2	-23.3			-1.7
SA 578	Frigidaire 7392015	1000	-16.0	-7.0	-21.0			-15.0
SA 581	Kelvinator KA 11574	200	-18.0	-7.0	-24.5			-2.0
SA 601	ACM	1000	-14.4	-7.2	-19.4			-1.1
SA 604	ACM	1200		-7.5	-25.0		-21.7	-1.0
SA 605	ACM	1800	-11.1	-3.3	-18.3			+3.3
SA 615	ACM	2200	-11.1	-3.3	-18.3			+3.3
SA 616	ACM	1000	-11.1	-3.3	-18.3			+3.3
SA 617	ACM	1000	-14.4	-6.7	-18.9			+2.8

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ORDERING : Refer Page 152. Ranco VaRifix Adaptable Controls - Refer Page 151.

REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o and Tech. Pages 152-v thru 152-x.

RANCO REFRIGERATOR/FREEZER THERMOSTATS **SPECIFICATION DATA** **SA SERIES THERMOSTATS (Continued)**



CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS					
			NORMAL OUT °C	NORMAL IN °C	COLD OUT °C	COLD IN °C	WARM OUT °C	WARM IN °C
SA 618	ACM	800	-12.2	-6.1	-16.7			+3.3
SA 619	ACM	1800	-10.0	-2.2	-14.4			+6.7
SA 620	ACM	800	-11.1	-3.3	-15.6			+5.6
SA 621	ACM	800	-10.0	-3.9	-14.4			+5.0
SA 622	ACM	1000	-10.0	-3.9	-14.4			+5.0
SA 623	ACM	800	-17.8	-7.4	-22.8			+2.8
SA 625	ACM	1800			-25.6		-11.1	-3.3
SA 626	ACM	800			-25.6		-11.1	-3.3
SA 627	ACM	1000			-23.3		-8.9	-2.8
SA 628	ACM	800			-23.3		-8.9	-2.8
SA 629	ACM	800	-12.0	-3.5	-19.0			+4.5
SA 630	ACM	1000	-11.1	-3.3	-17.8			+4.4
SA 631	ACM	800	-10.0	-2.2	-16.1			+5.6
SA 632	ACM	800	-13.3	-5.6	-20.0			+1.1
SA 633	ACM	1200	-18.9	-8.9	-27.2			0
SA 634	ACM	1000	-18.3	-13.3	-22.2			-8.3
SA 635	ACM	1800	-27.8	-16.7	-33.3			-11.1
SA 635E	ACM	1200	-26.7	-17.8	-31.9			-10.8
SA 636	ACM	1400	-27.8	-16.7	-33.3			-11.1
SA 637	ACM	1000	-27.8	-16.7	-33.3			-11.1
SA 638	ACM	800	-16.7	-6.7	-24.4			+4.4
SA 639	Frigidaire 7392014	1400	-13.5	-4.5	-19.0			+5.0
SA 641	Frigidaire 7395074	1400	-11.0	-2.0	-18.5			+6.0
SA 642	Frigidaire 7392238	1800	-13.3	-4.4	-19.1			+5.0
SA 728	Kelvinator Refer SA 581	400	-18.3	-7.2	-24.7	-12.5	-12.2	-2.0
SA 948	Kelvinator KA 20704	1200	-18.5	-5.5	-25.0			-0.5
SA 969	Pope 5000-01-763	400	-16.7	-7.8	-21.1			-5.9
SA 972	ACM	1000	-12.2	-3.3	-18.9			+4.4
SA 973	ACM	1000	-10.0	-2.2	-16.1			+5.6
SA 974	ACM	1000	-13.3	-5.6	-20.0			+1.1
SA 975	Pope 5020-02-736	600	-17.0	-5.3	-22.2			-1.4
SA 983	ACM	1000			-23.0		-8.5	-2.5
SA 984	ACM	1000	-13.3	-4.4	-20.0			+3.9
SA 1021	ACM	1000	-18.3	-10.6	-20.8			-5.6
SA 1074E	J.N.Kirby MRT123	800	-15.0	-5.0	-24.7			+5.3
SA 1076	Kelvinator KA 12193	600	-11.0	-3.0	-14.0			+7.0
SA 1085	Pope 5000-48-052	1200	-17.0	-5.3	-22.2			-1.4
SA 1090	J.N.Kirby	1000	-15.0	-5.0	-20.6			-1.1
SA 1167	ACM	1000	-15.0	-7.8	-25.6			-1.1
SA 1168	ACM	1200	-14.5	-7.5	-25.0			-1.0
SA 1169	ACM	2200	-11.0	-3.0	-18.0			+3.5
SA 1170	ACM	1000	-11.1	-3.3	-18.3			+3.3
SA 1171	ACM	800	-12.2	-6.1	-16.7			+3.3
SA 1172	ACM	1000	-10.0	-3.9	-14.4			+5.0
SA 1173	ACM	1000	-10.5	-3.0	-17.0			+4.5
SA 1174	ACM	1200	-18.5	-8.5	-27.0			0
SA 1175	ACM	800	-16.7	-6.7	-24.4			+4.4
SA 1176	Simpson Pope	400	-16.7	-7.8	-21.1			-5.3
SA 1177	ACM	1000	-13.3	-4.4	-22.2			+5.6
SA 1178	ACM	1800	-11.1	-3.3	-20.0			+6.1
SA 1179	ACM	800	-10.0	-2.2	-15.6			+8.3
SA 1204	Servex 4085-111-08	1000	-18.3	-8.1	-20.8			-3.3
SA 1205	Pope 5000-70-019	1200	-19.0	-10.5	-23.0			-5.0
SA 1206	Colda	1000	-14.5	-5.0	-20.0			-1.0
SA 1217	Servex 4085-111-03	1000	-16.5	-6.5	-19.0			-1.5
SA 1218	Pope 5000-77-001	1200	-18.0	-7.0	-23.3			-2.5
SA 1220	Pope 5000-40-139	400	-18.3	-9.4	-22.2			-3.9
SA 1244	Pope 5030-01-050	1600	-17.5	-6.0	-23.0			-2.5
SA 1253	J.N.Kirby MRT128	1000	-16.7	-6.7	-23.3			-1.1
SA 1254	Hallstrom	1400				-10.6	-3.3	0

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REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o and Tech. Pages 152-v thru 152-x.



RANCO REFRIGERATOR/FREEZER THERMOSTATS SPECIFICATION DATA

SA SERIES THERMOSTATS (Continued)

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS					
			NORMAL OUT °C	NORMAL IN °C	COLD OUT °C	COLD IN °C	WARM OUT °C	WARM IN °C
SA 1255	ACM	1600	-20.0	-14.5	-25.0			-11.5
SA 1256	Kelvinator	800	-18.3	-7.2	-24.7			-3.0
SA 1257	Pope 5000-121-026	1600			-25.6	-12.2		
SA 1258	J.N. Kirby MRT136	1000	-17.5	-5.0	-27.0			-0.5
SA 1259	Frigidaire 7393293	1000	-20.0	-6.5	-25.5			
SA 1260	Hallstrom	1000	-14.5	-4.5	-20.0			-1.5
SA 1261	Hallstrom	1000	-18.0	-5.5	-24.0			-0.5
SA 1262	Servex 4085-111-04	400	-16.0	-6.0	-18.5			-1.5
SA 1263	J.N. Kirby MCC110-1	400			-7.5	+2.5		+6.4
SA 1264	Mettters	800	-18.5	-5.5	-24.5			-0.5
SA 1265	Frigidaire 7399173	1200	-23.3	-16.7	-26.1			-13.9
SA 1266	Mettters 01-007-047	800	-23.9	-14.4	-31.1			
SA 1267	Frigidaire 7443900	1400	-19.0	-12.0	-23.5			-5.5
SA 1268	Kelvinator KA31872	400			-3.3	+8.9		
SA 1269	Mettters 01041047E	800	-15.5	-9.5	-19.0			-7.0
SA 1270	Servex 4085-111-08	400	-14.5	-7.0	-19.5			-1.5
SA 1271	ACM	1200	-26.7	-17.8	-31.9			-10.6
SA 1272	G.E. Kirby	1000			-26.1	-21.1		
SA 1273	Servex 4085-111-09	1000	-17.0	-7.0	-21.5			-3.5
SA 1274	G.E. Kirby MRT307	1000			-19.0	-14.0		
SA 1275	Mettters 01-059-047	800	-20.6	-13.6				
SA 1276	Vendo	1600			-7.0	+3.0		+6.5
SA 1277	Kelvinator KA 36673	200	-20.5	-14.0	-24.0			-11.5
SA 1278	Gen. Motors N.Z.	1000	-19.7	-6.7	-25.6			
SA 1279	Hallstrom	1600	-18.5	-5.5	-24.5			-0.5
SA 1280	Malleys	1000	-14.5	-5.0	-20.0			-1.0
SA 1281	J.N. Kirby	1000	+1.7	+5.6	+0.3			+7.5
SA 1282	Frigidaire 2827814	266	-18.9	-12.2	-23.3			-5.3
SA 1283	Kelvinator KA 41664	200	-21.1	-14.4	-24.4			-11.4
SA 1284	Pope 628-1-16	1600	-19.1	-13.6	-21.1			-7.2
SA 1285	G.E. Kirby 80-300060-601	800	+13.0	+8.0				
SA 1286	Malleys C3776-179	1000			-23.0	-13.0		+1.5
SA 1287	Pioneer	1200	-3.9	+0.8	-7.8			+4.1
SA 1288	Pioneer	2200	+0.3	+4.1	-3.6			+5.8
SA 1289	Arcus	1000	-18.5	-5.5	-28.0			+2.5
SA 1290	Arcus	1400	-17.2	-10.3	-22.0			-6.7
SA 1291	Arcus	1400	+2.5	+8.5	+0.5	+6.0		+10.0
SA 1292	Gen. Motors N.Z. 3337132	1600	-14.5	-3.5	-21.0			+7.0
SA 1293	Kelvinator KA43265	200	-22.2	-15.6	-25.6			-12.8
SA 1294	Kelvinator KA41068	1400	-18.3	-5.6	-24.7			-0.3
SA 1295	J.N. Kirby	1600	-20.0	-14.5	-25.0			-11.5
SA 1296	Gen. Motors N.Z. 3336720	1000	-23.3	-16.7	-26.1			
SA 1297	Hallstrom	1600	-11.0	-3.5	-18.5			+6.0
SA 1298	Sam Hort P/L	1000			+10.0	+3.5		
SA 1299	G.E. Kirby	1800	-17.0	-5.5	-27.0			-0.5
SA 1501	ACM	1200			+2.0	+6.5		+8.0
SA 1502	ACM	1200			-1.0	+3.5		+6.0
SA 1503	ACM	1200	-17.8	-12.2	-22.8			-7.8

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REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o and Tech. Pages 152-v thru 152-x.

IF IT IS NOT LISTED IN THIS CATALOGUE - ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

RANCO REFRIGERATOR/FREEZER THERMOSTATS

SPECIFICATION DATA

SAM SERIES THERMOSTATS



CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS				
			NORMAL OUT °C	NORMAL IN °C	COLD OUT °C	COLD IN °C	WARM IN °C
SAM 1300	G.E. Kirby Pty. Ltd.	1200			-19.0	-14.0	+1.7
SAM 1301	General Motors N.Z.	1000	-20.6	-14.7	-25.6		-11.7
SAM 1302	Servex Electrical	600	-15.0	-7.8	-25.6		0
SAM 1303	Arcus Metal Products	1400	-17.5	-12.5	-21.0		-6.5
SAM 1304	Valiant Refrigeration	1600	-22.0	-16.5	-27.0		-13.0
SAM 1305	Email Ltd.	400	-17.0	+4.0	-20.0		+6.9
SAM 1306	Email Ltd.	400	-19.0	0	-22.0		+3.5
SAM 1307	Email Ltd.	400	-17.5	-1.5	-19.5		+2.0
SAM 1308	Kelvinator Aust.	400	-21.5	-18.5	-23.5		-16.0
SAM 1309	General Motors N.Z.	1000	-19.7	-6.7	-25.6		+7.2
SAM 1310	Kelvinator Aust.	800	-24.4	-8.9			
SAM 1311	Kelvinator Aust.	400	-21.5	-18.5	-27.5		-16.0
SAM 1312	Mark IV Airconditioning	600			-3.5	+1.0	+14.5
SAM 1313	Mark IV Airconditioning	1000			-3.5	+1.0	+14.5
SAM 1314	Smiths Industries	400			-3.5	+1.5	+14.5
SAM 1315	Air International	400			-3.5	+1.5	+14.5
SAM 1316	Email Ltd.	400	+17.0	+4.0	-20.0		+6.9
SAM 1317	A.F. Gason Pty. Ltd.	600			-3.5	+1.0	+14.5
SAM 1318	A.F. Gason Pty. Ltd.	1000			-3.5	+1.0	+14.5
SAM 1319	Email Ltd.	400	-21.3	-4.6	-23.3		-1.0
SAM 1320	Mark IV Airconditioning	600			-3.5	+1.0	+14.5
SAM 1321	Smiths Industries Hi-Line Industries	600			-2.5	+2.0	+14.5
SAM 1322	Mark IV Airconditioning	1000			-3.5	+1.0	+14.5
SAM 1323	Motor Cool Pty. Ltd.	1000			-3.5	+1.0	+14.5

GENERAL PURPOSE & REPLACEMENT TYPE "SA" THERMOSTATS

CODE	CAPILLARY LENGTH mm (ins)	FACTORY TEMPERATURE SETTINGS					SUGGESTED USE
		COLD		NORMAL		WARM CUT-IN °C (°F)	
		CUT-OUT °C (°F)	CUT-IN °C (°F)	CUT-OUT °C (°F)	CUT-IN °C (°F)		
SA 1168	1200 (48")	-25.0 (-13.0)		-14.5 (+6.0)	-7.5 (+18.5)	-1.0 (+30.0)	General Refrigeration or Freezer
SA 1169	2200 (84")	-18.0 (-0.4)		-11.0 (+12.2)	-3.0 (+26.6)	+3.5 (+38.3)	General Refrigeration
SA 1173	1000 (36")	-17.0 (+1.4)		-10.5 (+13.1)	-3.0 (+26.6)	+4.5 (+40.0)	General Refrigeration
SA 1174	1200 (44")	-27.0 (-16.6)		-18.5 (-1.3)	-8.5 (+16.7)	0 (+32.0)	General Refrigeration or Freezer
SA 1501	1200 (48")	+2.0 (+35.6)	+6.5 (+43.7)			+8.0 (+46.4)	Water or Beverage Cooler
SA 1502	1200 (48")	-1.0 (+30.2)	+3.5 (+38.3)			+6.0 (+42.8)	Water or Beverage Cooler

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GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF THE ONE YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB, AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT IN OUR STOCK RANGE. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.



RANCO REFRIGERATOR/FREEZER THERMOSTATS SPECIFICATION DATA

SA11 SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS	
			NORMAL IN °C	NORMAL OUT °C
SA11 - 410	G.H. Stuart	1200 (Flat Coil)	+6.0	+1.0
SA11 - 411	McAlpine Refrigeration N.Z.	1400	+6.0	+1.0
SA11 - 412	Pioneer Refrigeration	2200	+3.5	-7.5
SA11 - 413	F.C. Lovelock	2200	+3.5	-7.5
SA11 - 414	Email	800	-18.0	-11.0
SA11 - 415	Email (Vic.)	800	-10.5	-3.5
SA11 - 416	Phillips M.D.A.	838 (Cross Ambient Bulb)	-15.6	-20.0
SA11 - 417	G.H. Stuart	1800	+7.5	-6.5

F50 SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS				
			WARM IN °C	NORMAL IN °C	NORMAL OUT °C	COLD OUT °C	DEFROST TERMINATION °C
F50 - 5200	Metters N.S.W.	1000	-1.5	-7.0	-18.0	-25.0	+6.0
F50 - 5201	Rank Nec Appliance	1000	-1.8	-7.2	-18.3	-25.0	+6.0
F50 - 5202	Malleys	400	-2.6	-7.3	-19.0	-28.0	+6.0
F50 - 5234	G.E. Kirby	1000	-1.5	-7.0	-18.0	-25.0	+7.0

F56 SERIES THERMOSTATS

CODE	ORIGINAL CUSTOMER	CAPILLARY LENGTH mm	TEMPERATURE SETTINGS				
			WARM IN °C	NORMAL IN °C	NORMAL OUT °C	COLD OUT °C	DEFROST TERMINATION °C
F56 - 5101	General Motors N.Z.	1000	-1.7	-5.6	-18.3	-24.7	+8.9
F56 - 5102	Kelvinator Aust.	1200	-0.3	-6.1	-18.0	-24.7	+5.6
F56 - 5103	Sovereign	1000	+1.5	+4.0	-13.0	-21.0	+5.5
F56 - 5104	Kelvinator Aust.	1000	-0.3	-5.6	-18.3	-24.7	+5.6
F56 - 5105	Kelvinator Aust.	1600	-0.3	-5.6	-18.0	-24.7	+5.6
F56 - 5106	Email Ltd.	600	0	-8.5	-18.5	-26.0	+5.5
F56 - 5107	G.E. Kirby	1000	+1.0	-5.0	-15.0	-25.0	+5.5
F56 - 5108	Kelvinator Aust.	1400	+1.0	-5.6	-18.3	-28.0	+5.6
F56 - 5109	Email Ltd.	600	-1.8	-7.2	-18.3	-25.0	+6.0

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RANCO SERVICE HINTS

CAUTION ON HANDLING CAPILLARY TUBING

Do not permit any portion of the power element capillary tube to TOUCH ANY PART OF THE EVAPORATOR which might be colder than the spot where the BULB or CAPILLARY TUBE (used as a bulb) is clamped.

Should the capillary tube be longer than required, coil up the excess tubing and tape it together to prevent rattling from vibration. Excessive vibration may cause power element failure.

Avoid making any sharp bends, kinks, strains and pinch marks on the capillary tube, and using it in the place of or as a piece of wire.

Provide a loop on the tubing to prohibit water following the capillary tube to the inside of the control and electrical switch, a condition sometimes found on window air conditioners.

CARE IN WIRING TO CONTROL TERMINALS

Check the total electrical load to be sure it is within limits of the rating stamped on the control.

It is recommended not to reform or cut-off any terminals in the Field. Quick-connect type terminals should not be drilled or tapped. Shift in temperature settings may develop.

Electrical leads should not be taut to the control terminals, and if water can follow the leads to the control, make a drip loop.

GENERAL CARE ON MOUNTING CONTROLS

A shift in control settings may occur and be caused by a bend, twist, or strain set up within the control by some adverse mounting arrangement.

A dial knob that is forced onto the replacement dial shaft may, when mounted, cause the temperature setting to shift.

Rough handling of the control, like pounding with a rubber mallet, may cause a setting shift or irreparable damage.

RANCO DOMESTIC THERMOSTATS

KELVINATOR - LEONARD - HMV



MODELS	THERMOSTAT		
	MANUF. Bin No.	MANUF. P/N	RANCO P/N
M5W, A55, ASB5, ASC5, AS6, SAS5, AS7, ASB7 Kelvinette 1200 12c.ft.20c.ft.30c.ft.	A105	KA12193	SA518, SA1076 Temp.
NHC, 245, 465, ASD7, 208, 218, 219, 209, 229, 211, 227	A83	KA7931	SA501E Temp.
225, 226, 217 (208, 218 Early Models).	A86	KA12965	SA523 Temp.
485, 447, 477, 419, 439	A112	KA11574	SA728, SA581 Temp.
449, 463, 212, 213, 214, 216, 224, 230, 250, 252, 368, 318, 539, 560, 570, MO90VA, MO90WA, M250VC, 250MV3 Now use PH458 (KA46000)	PC20	KA20704	SA948E Temp.
M250VC, 250MV3	PH458	KA46000	A50-5126 Temp.
489, 469, 482, 682, 689. Now use PC640 (SR2170)	PC544	KA26943	A26-164, A42-4129 Temp.
489, 469, 482, 682, 689	PC640	SR2170	A59-8804 Temp.
466, 476, 493, 577, 568, 578, 676, 693, 694, 518, 579, 580, C124SA, C124VA, C124WA. Now use PD841 (KA45963)	PD76	KA27080	A26-163, A42-4126 Temp.
C124SA, C124VA, C124WA	PD841	KA45963	A59-8801 Temp.
686 — Now use PD207 (KA28737)	PD695	KA33524	O51B Temp.
976, 993, 387, 388	PD207	KA28737	A26-172, A42-4127 A59-8802 Temp.
486, 496, 508, 588, 509, 519 Now use PD842 (SR2169)	PD432	KA32169	A26-181, A42-4128 Temp.
486, 496, 508, 588, 509, 519	PD842	SR2169	A59-8803 Temp.
778, 788, 770, 790	PF228	KA36673	SA1277 Temp.
888, N220FA, N220EB Now use PG506 (KA45899)	PF533	KA38625	A52-154 Temp.
888, N220FA, N220EB, N600EC, 600NE3	PG506	KA45899	A50-572 Temp.
C160GC, C160GF Now use CZ52 (203255)	CZ820	Z234099	
D600, D601, D602	CZ52	203255	A42-1006, A59-8601 Temp.
C160HG, 160CH7, C310HF, C310CH6, C310HG, 310CH7, C350HG, 350CH7, C360HE, 360CH5, C360HG, 360CH7, C370HF, 370CH6, C410HF, 410CH6, C410HG, 410CH7	CZ861	203793	A59-8609 Temp.
769, C144HA, C144NA, C144WA, C180GA, C180WA, C125WB C125RB, Now use PH300 (KA51553/KA45917)	PF777	KA40327	A42-4136 Temp.
C144SB Now use PH300 (KA51553/KA45917)	PG726	KA47569	A42-4136 Temp.
C340RC, 340CR3, C340TC, C340YC, C340ZC, C340SE, C380HC, 380CH3, C380NC, C380SC, C380SE, C380TC, C480GC, 480CG3, C480NC, C480SC, C480SE	PH300	KA51553 KA45917	A59-8800 Temp.
779, 789, N180FA, N180SA, N180SB Now use PH918 (KA57025)	PF683	KA41664	SA1283 Temp.
N180FC, 480NF3, N480TC Now use PH918 (KA57025)	PH213	KA45953	A50-5108 Temp.
N180FC, 480NF3, N480TC	PH918	KA57025	A50-5108 Temp.
N144FA, N144GA, N144WA, N144WB Now use PH917 (KA57026)	PG242	KA43265	SA1293 Temp.
N380FC, N380GC, 380NF3, N380TC, N380YC Now use PH917 (KA57026)	PH212	KA45954	A50-5109 Temp.
N380FC, N380GC, 380NF3, N380TC, N380YC	PH917	KA57026	A50-5109 Temp.
M138VA, M138WA Now use PG790 (SR1890) & 2 Clips V154	PG337	KA41068	SA1294 Temp.
M138VA	PG790	SR1890	A50-5110 Temp.
M360VC, 360MV3	PH29	KA49605	A50-5107 Temp.
C350VC Now use PK125	PK58	2171-125	A59-L0108 Temp.
C350VC	PK125		A59-2504 Temp.
450NG3, 500NG3 Now use PL71 (1228410)	PL205	1229314	
400NG3, N450GC, N500GC	PL71	1228410	9530 N449 Temp.
N400GC, N500GC, N620GC, 620NG3, Now use PH555 & PH556	PL567	1231175	GE Temp.
N510FD, 510NF4, N610EE, 610NE5	PH555	KA47397	SA1308 Temp.
C340RF, 340CR6, C340FG, 340CF7, C480HF, 480CH6, C480SF, C480FG, 480CF7	PJ61	KA56069 KA55944	A59-8808 Temp.
M360VF, 360MV6	PA41	KA54925	A50-5136 Temp.
C380HF, 380CH6, C380SF	PJ336	KA57536	SART6AF1 Temp.
N380FF, 380NF6	PJ341	KA56517	A50-5137 Temp.
N510FF, 510NF6, N610FF, 610NF6	PJ129	KA57204	SA1311 Temp.
Lady "K" KA31M, KB31M, Now use A438 (E81966)	A345	E71570	KCA1A6/B15 Temp.
Lady "K" K31RU/4, K315/4, K33Z/4 Now use A438 (E81966)	LK54	(E73934) (E75747)	KCA/T1/S27 Temp.
Lady "K" K31RU/4, K315/4, K33Z/4, KA31M, KB31M	A438	E81966	KCA/T1/S27 Temp.
Lady "K" K31R/4	LK57	E74288	A50-125 Temp.
Lady "K" K33B/4, K33C/4, K33D/4 Now use LK208 (E81965)	LK151	(E75947) (E74611)	KCA/T2/S27 Temp.
Lady "K" K33E/4	LK208	E81965	KCA/T2/S27 Temp.
463, 560, 570	PD104	KA28974	E11-2533 Auto.Defrost.
439, 477, 485	A111	KA11573	E13-2500 Auto.Defrost.
486, 496, 676, 686, 694, 588, 508, 509, 519	PD266	KA29295	E11-2538 Auto.Defrost.
976, 993	PD208	KA28917	E11-2534 Auto.Defrost.
778, 788, 770, 790	PF227	KA36855	E11-2403 Auto.Defrost.
888 Now use PF854 (KA42756)	PF540	KA38069	DFC4H-14A Auto.Defrost.
888, N220FA, N220EB, N600EC, 600NE3	PF854	KA42756	DFC4H-14B Auto.Defrost.
779, 789, N180SA, N180SB, N480FC, 480NF3, N480TC	PF635	KA39531	DFS-55B Auto.Defrost.
N140FA, N144GA, N144WA, N144WB, N380FC, N380GC, N380YC, 380NF3, N380TC, N380FF, 380NF6, N510FD	PG234	KA43881	GF539-29 Auto.Defrost.
400NG3, 450NG3, 500NG3, N450GC, N400GC, N500GC	PL157	1228443	FP539-21 Auto.Defrost.
N620GC	PL504	1230355	GR539-21 Auto.Defrost.
N610EE, 610NE5, N610FF, 610NF6 Now use PJ514 (KA59139)	PH769	KA56413	NK539-21 Auto.Defrost.
N610EE, 610NE5, N610FF, 610NF6	PJ514	KA59139	NK539-21 Auto.Defrost.

CONTINUED NEXT PAGE

ORDERING: Refer Page 152. Ranco VaRifex Adaptable Controls — Refer Page 151.

ADDITIONAL REPLACEMENT CHARTS: Refer Tech. Pages 152-d thru 152-o.

SPECIFICATIONS & TECHNICAL DATA: Refer Tech. Pages 152-a thru 152-c and Tech. Pages 152-p thru 152-u.



RANCO DOMESTIC THERMOSTATS

KELVINATOR - LEONARD - HMV

TECH. PAGE **152-w**

MODELS	THERMOSTAT		
	MANUF. BIN No.	MANUF. P/N	RANCO P/N
221, 267, 269, 275, 429, 467, 476/56	A87	KA13154	F14-113 Push Button
P360RC, 360PR3	PH202	KA49606	F56-5102 Push Button
232, 241, 271, 272, 453, 462, 469 Now use PH56(KA46067) & 2 clips V154	PC19	KA20703	F14-119 Push Button
234, 276, 377, 378, 453, 456, 557, 558, 348, P100 Now use PH56(KA46067) & 2 clips V154	PC581	KA29549	F14-166 Push Button
P250VC, 250PV3, P250YC, P250TC	PH56	KA46067	F56-5104 Temp. & Defrost
P360RF, 360PR6	PJ42	KA54914	F56-5108 Push Button
P138NA, P138RA, Now use PG789 (SR1891) & 2 clips V154	PG325	KA41069	F14-203 Temp. & Defrost
P138RA	PG789	SR1891	F56-5105 Temp. & Defrost
N144FA, N144GA, N144WA, N144WB, N380FC, N380GC, N380YC, N380TC, 380NF3	PG233	KA42962	M1Y Defrost Termination
N510FD, 510NF4, N610EE, 610NE5 Now use PJ128 (KA55041)	PH557	KA47922	20640D Y158 D'fst. Term.
N510FD, 510NF4, N510FF, 510NF6, N610EE, 610NE5, N610FF, 610NF6 Now use PJ128 (KA55041)	PJ227	KA57201	
N380FF, 380NF6	PJ128	KA55041	K7Y Defrost Termination
N620GC, 620NG3	PL620	1231478	C4V Defrost Termination
N400GC, N450GC Now use PL137 (1228589)	PL310	1227771	T3V Defrost Termination
400NG3, 450NG3, 500NG3, N500GC	PL137	1228589	L50 Defrost Termination
N620GC Now use PL620 (1231478)	PL456	1230220	L60 Defrost Termination
888, N180FA, N180SA, N180SB, N220EB, N220FA, N380FC, N380GC, N380YC, N380TC, 380NF3, N480FC, N480TC, 480NF3, N600EC, 600NE3, Now use PH903 (KA56455)	PF553	KA38627	B11-504 Baffle
N380FF, 380NF6	PH903	KA56455	B11-509 Baffle
779, 789 Now use PG548 (KA45396)	PF638	KA39138	B11-505 Baffle
N144FA, N144GA, N144WA, N144WB	PG548	KA45396	B11-505 Baffle
N510FD, 510NF4 Now use PH886 (Damper)	PH519	KA47898	B11-507 Damper
N510FD, 510NF4, N510FF, 510NF6, N610EE, 610NE5, N610FF, 610NF6	PH886	KA56464	B11-508 Damper
N620GC, 620NG3	PL361	1226883	B11-132 Damper
N450GC Can use PL57 (1228594)	PL287	1229017	Plastic Damper
400NG3, 450NG3, 500NG3 Can use PL287 (1229017)	PL57	1228594	Plastic Damper
993	PD215	KA28649	L135-3 Fan Speed
976	PF174	KA32806	L135-3 Fan Speed
N220EB, N600EC, 600NE3. Belts A120 Motor	PG602	KA44800	F5100 Fan Speed
N600EC, 600NE3 Belts A120 - 2 Motor	PH625	KA53960	C808/00 Fan Speed
FF6 Now use CZ344 (39113)	CZ503	273060	A10-1368 Temp.
FF60 Now use CZ344 (39113)	CZ666	320088	A10-1457, A10-1381 Temp.
FF60, FF220, FF60/1, FF100/1, FF160, FF160/1, FF220/1, AHF62, AHF102, AHF162, AHF224 Now use CZ344 (39113)	CZ640	321088	A10-3537 Temp.
H160GC, H200FF, H200GD, H340FF, H340GD, H430GC, H500FF, H500GD, H600GC, H700FF, H700GD With Signal Circuit	CZ344	39113	A54-8214 Temp.
H200FF, H340FF, H500FF, H700FF With Signal Circuit	CZ848	816001	A54-8232 Temp.
FF6, FF10 With Signal Circuit.	A113	KA14298	A10-3503, SA2501 A54-2910 Temp.
FF85, FF86 With Signal Circuit	A399	KA30018	A10-3545 Temp.
VF10 Now use A461 (SR1562)	A88	KA14575	SA775 Temp.
VF105 Now use A461 (SR1562)	A46	KA17726	SA2595 Temp.
VF10, VF105	A461	SR1562	A10-1201 Temp.
VF231, VF236, VF436, VF337, VF537, VF338, V538, VF434, F100LA	A343	KA25225	A10-1201x1337 SA-M1310 Temp.
F118LB, F310LC, 310FLJ, F310HF, 310FH6 Now use PG801	PG463	KA45674	A55-1003 Temp.
F330LD	CF54	10-273	A50-583 Temp.
H250GD	CF19	10-404	A50-218, A50-603 Temp.
FF13, FF15, FF22 Now use CZ344 (39113)	CZ385	KA30115	A10-3537 Temp.
FF15, FF22, (Series CAV CAZ) Now use CZ344 (39113)	CZ509	ZE288028	A10-3756 Temp.
AHF162, AHF224	CZ236	337094	Fast Freeze
VF436, VF537, VF538	V382	KA30240	Stemco MP22 Sig.Light
RAC 0504, 0506 Can use RW144	RW17	742053	DR15-C294635 Temp.
RAC 0542, 0562 Can use RW17	RW144	744176	Klixon 187C 144H01 Temp.
RAC 0822, ARJ08225 Now use RD439 (KA47627)	RD202	KA45431	A55-6008 Temp.
RAC 0822, ARJ08225	RD439	KA47627	A55-6016 Temp.
RAC 625 750	A1	KA17575	SCA378 Temp.
RAC 1000, 2531	A84	KA19225	C17-140 Temp.
RAC 1032 Now use RC505 (KA38991)	RC558	KA38993	Temp.
RAC 2503, 1021, 1031, 1032, 1042, 1531, 1542, 1661, 1661/3, 1521, 1721, 1742, 1742/3, 2042, 51D2, 51E2, 51E6, 51E7, 51E8, 51E-090, 51E-190, 51E-165, AK093M, AK123M, AR173M, AK203M, AW093M, AW123M, AW173M, AW203M, ARA10425, ARC15425, ARE17425, ARG20425, MDJ115, MDJ165 Late Models Now use RC652	RC505	KA38991	C17-505 Temp.
As for RC505	RC652	SR2079	C17-506 Temp.
RAC 1005, 1008, 1508, 1758, 51C3, 51C4, 51C6, 51C7, MDJ115R, MDJ165R Early Models.	RC350	KA31504	C17-308 Temp.
RAC 1002 to Serial No. 1241	RC298	KA31872	SA1268 Temp.
RAC 1002 From Ser./No. 1242, 1500, 1502, 1750, 1752	RC68	KA23510	C17-192 Temp.

CONTINUED NEXT PAGE

ORDERING : Refer Page 152. Ranco VaRifix Adaptable Controls - Refer Page 151.

ADDITIONAL REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o.

SPECIFICATIONS & TECHNICAL DATA : Refer Tech. Pages 152-a thru 152-c and Tech. Pages 152-p thru 152-u.

RANCO DOMESTIC THERMOSTATS

KELVINATOR - LEONARD - HMV



MODELS	THERMOSTAT		
	MANUF. BIN No.	MANUF. P/N	RANCO P/N
RAC 51D3, 51D4, 51D6, 51E4, 51E6, 51E7, 51E8, 1051, 1081, 1082, 1581, 1582, 1781, 1782, 2082, 51E-090R, 51E-190R, 51E-165R, AK126M, AW126M, AK096M, AW096M, AK176M, AW176M, AK206M, AW206M, ARB1082S, ARD1582S, ARF1782S, ARH2082S, MDJ115R, MDJ165R Late Models.	RC537	KA38992	C17-506 Temp.
RAC A23R1 Now use RD868	AD6111	219-1240	TWK-55G0002 Temp.
RAC A23R1	RD868	219-1341	T6060B1104 Temp.
RAC 51F1, 51F2, 51F4, 51F6, 51F7, 51F8, 51F1E, 51F6E, 51F7E, 51F8E, ARK, ARL, ARM, ARN, ARP, ARR, ARV, ARW, ARX, ARY, ARAA, ARAB, ARAC, ARAD, ARAE, ARAG, CN185C, CN185D, EN185C, EN185D, 185BC6, 185BE6, EN180G, CF230G, EN230G, RF230G, CT235C, CT235D, EN235C, EN235D, ER235C, ER235D, RF235C, RF235D, RF310G, CF320E, EN320C, EN320D, RF320C, RF320D, 320BC6, 320BE6, 320BR6, CN400F, EN400F, CF400G, EN400G, RF440G, CF450C, CF450D, CF450F, EL450C, EL450D, EL450F, EN450C, EN450D, EN450F, RF450C, RF450D, RF450F, 450BC6, 450BE6, 450BR6, RF500G, CF510G, EN510G, EN515D, RF515D, 515BE6, 515BR6	RD474	KA49975	CB28-3900 Temp.
RAC K3-825 Now use RE12 (G117510)	RE11	X111148	3ART 17L4 Temp.
RAC K41235, K41235A, KAC41255, KAC41255A, KAC41455, KAC41755, LAC41255, SD41255, SD41255A	RE12	G117510	3ART17L9 Temp.
RAC CE150F, 150BC6	RE298	X503715	3ART44RB1A7 Temp.
RAC 1005, 1008, 1500, 1508, 1750, 1758, 1081, 1581, 1781, 51C4, 51D4, 51C6, 51D6, 51C7, 51D7, MDJ115R, MDJ165R, 1501, 51C3, 51D3	RC124	KA24452	D62-4331 Heater
RAC H1000 less heater Now use RC124 (KA24452)	A85	KA19227	D52-503 De-Ice
RAC H1000 HA1000 less heater Now use RC124 (KA24452)	RB245	KA21928	D52-503 De-Ice
RAC 1082, 1582, 1782, 2082, 51E-090R, 51E-165R, 51E-190R, AK096M, AK126M, AK176M, AK206M, AW096M, AW126M, AW176M, AW206M, A23R1, 51E4, 51E6, 51E7, 51E8, 51F4, 51F6, 51F7, 51F8, ARL, ARN, ARR, ARX, ARAA, ARAC, ARAE, ARB1082S, ARD1582S, ARF1782S, ARH2082S, RF235C, RF235D, RF320C, RF320D, RF450C, RF450D, RF515D, CF450D, RF230G, RF310G, 320BR6, RF440G, RF450F, CF450C, CF450F, 450BC6, 450BR6, RF500G, 515BR6	RC617	KA44156	D62-4333 De Ice
RAC 1042, 1082, 1742, 1742/3, 1782, 2042, 2082, 51E090, 51E090R, 51E165, 51E165R, 51E190, 51E190R, AK093M, AK096M, AK173M, AK176M, AK203M, AK206M, A23R1 Now use RD826 (KA53718)	RD17	KA42001	20610L-Y69 Heater O/load.
RAC 51E2, 51E4, 51E6, 51E7, 51E8, 51F2, 51F4, 51F6, 51F7, 51F8, 51F1E, 51F6E, 51F7E, 51F8E, 1542, 1582, ARK, ARL, ARM, ARN, ARP, ARR, ARAD, ARAE, AW093M, AW096M, AW123M, AW126M, AW173M, AW176M, AW203M, AW206M, AK123M, AK126M, ARA1042S, ARB1082S, ARC1542S, ARD1582S, ARE1742S, ARF1782S, ARG2042S, ARH2082S, EN185C, EN235C, EN320C, EN450C, EN515D, ER235C, RF235C, RF320C, RF450C, RF515D, Now use RD826 (KA53718).	RD355	KA46866	20611L-Y122 Heater O/load.
RAC 51F2, 51F4, 51F6, 51F7, 51F1E, 51F6E, 51F7E, ARW, ARX, ARY, ARAA, ARAB, ARAC, EN180G, EN185D, 185BE6, EN230G, RF230G, EN235D, ER235D, RF235D, RF310G, EN320D, RF320D, 320BC6, 320BE6, 320BR6, EN400F, EN400G, RF440G, CF450C, CF450D, CF450F, EL450C, EL450D, EL450F, EN450D, EN450F, RF450D, RF450F, 450BC6, 450BE6, 450BR6, RF500G, EN510G, 515BE6, 515BR6	RD826	KA53718	20601L-Y171 Heater O/load.
RAC 2531	RWC98		B155F Hot Gas
RAC KC2555Q, LC2555Q, SD2555Q, KAW2575K	RE246	X501678	Thermo Disc.
Kirby Colda Rota Frig. President. Now use M855 (SA1168)	M648		SA1167 Temp.
Kirby Colda Rota Frig. President	M855		SA1168 Temp.
Servex STC Coldstream President	M653		SA1173 Temp.
Pope Now use M652 (SA1174)	M647		SA1176, SA1174 Temp.
STC Now use M652 (SA1174)	M663		SA1177 Temp.
Kirby Pope STC	M652		SA1174 Temp.
Frigidaire	M658		SA5578 Temp.
General Use Now use A105 (KA12193 with A23 (Knob) & A400 (Escutcheon)	A69		SA1076 Temp.
General Use	A103		RJS-830 Temp.
Freezers	A422		SA1168 Temp.

ORDERING : Refer Page 152. Ranco VaRifix Adaptable Controls -- Refer Page 151.

ADDITIONAL REPLACEMENT CHARTS : Refer Tech. Pages 152-d thru 152-o.

SPECIFICATIONS & TECHNICAL DATA : Refer Tech. Pages 152-a thru 152-c and Tech. Pages 152-p thru 152-u.

TELEPHONE YOUR ORDERS



IF FIRM PRICES ARE REQUIRED, CALL US
FOR A QUOTATION.

NOTES

1

FIGURE THE ODDS

BECAUSE WE BELIEVE OUR STOCK IS ONE OF THE LARGEST AND MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY, THE MATHEMATICAL ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACPAR THAN ANYWHERE ELSE.

IF TIME IS MONEY, WHY WASTE IT BY LOOKING ELSEWHERE.

NOTES

[illegible]

ONE STOP BUYING

NOW-A-DAYS, THE RELATIVELY HIGH PAY RATES OF MECHANICS AND SERVICEMEN MAKES IT UNECONOMIC TO RUN AROUND TO DIFFERENT SUPPLY HOUSES FOR ODD BALL ITEMS. YOU CAN FIND MOST ANYTHING FOR REPAIR OR INSTALLATION OF REFRIGERATION, AIR CONDITIONING AND HEATING AT YOUR ACPAR CENTRE.

PARAGON TIME CONTROLS

600 SERIES DEFROST CONTROLS

TIME INITIATED - TIME TERMINATED



CAT.
NO.
1551

AN EXCLUSIVE DESIGN FOR
REFRIGERATION DEFROST SYSTEMS
WITH PUMP DOWN, DRAIN,
OR FAN DELAY CYCLES

- Defrost initiation adjustable from 1 to 8 cycles per day
- Delay or pump down cycle adjustable from 0-30 minutes
- Defrost duration adjustable from 3-45 minutes
- Drain or fan delay cycle adjustable from 3-15 minutes
- Field-proven heavy-duty synchronous timing motor
- Unequaled versatility and accuracy

Four circuit sequence switching for water spray and hot gas or electric heat fan delay defrosting
SPECIFICATIONS.

Defrost Initiation:

Adjustable from 1-8 cycles per day; minimum 3 hours between successive cycles

Delay or Pump Down Cycle:

Adjustable from 0-30 minutes; 3 min. graduation; for stopping fans, reducing refrigerant pressure, or hot gas pump down cycle

Defrost Cycle:

Adjustable from 3-45 minutes; 3 min. graduation

Drain or Fan Delay Cycle:

Adjustable from 3-15 minutes; 3 min. graduation

Sequence Switching:

2NO 2NC

Switch Ratings:

10 Amps, 345 VA pilot duty 120-240 VAC.
Switches 2-4 and 3-4 carry 1/2 HP rating

Enclosure:

Heavy steel gasketed case; grey wrinkle finish, knockouts on bottom, side, and back; hasp and staple for padlock.

Shipping Weight:

4 1/2 pounds. (2.2 kg)

Model Selection:

Model 632-21 (240 Volts, 50Hz) replaces 631

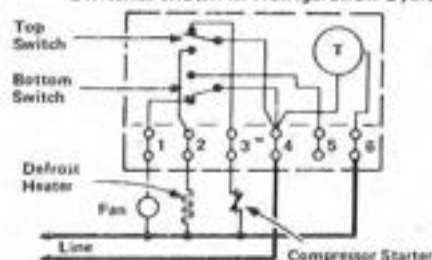
Dimensions: (Approx.)

9-5/8" high x 5-3/8" wide x 5-1/31" deep
(245mm) (137mm) (128mm)

SUGGESTED WIRING DIAGRAMS (Switches shown in refrigeration cycle)

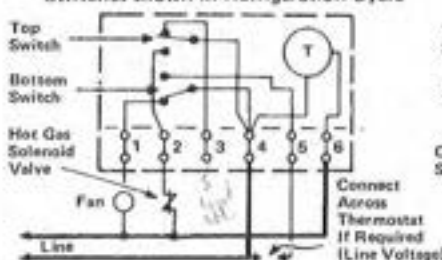
MODEL 632 - 21

Switches shown in Refrigeration Cycle



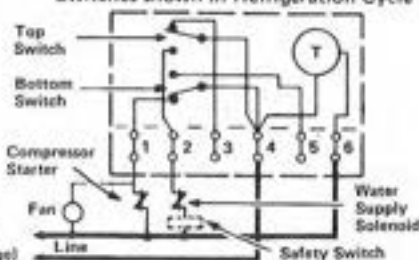
Wiring Diagram for Elec. Heat Defrosting with Fan Delay.

Switches shown in Refrigeration Cycle



Wiring Diagram for Hot Gas Defrosting with Fan Delay.

Switches shown in Refrigeration Cycle



Wiring Diagram for Water Spray Defrosting.

These are only suggested methods of wiring the defrosting time control. External wiring should be connected in accordance with local electrical codes. All auxiliary switches are to be supplied by others.

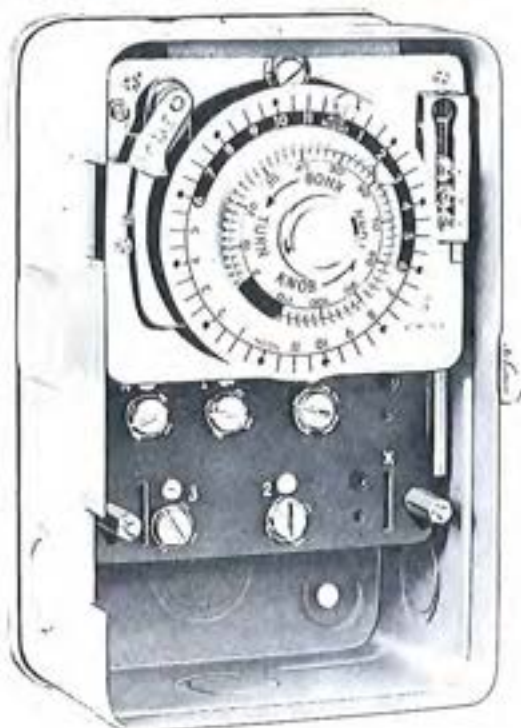
PARAGON TIME CONTROLS

8040 SERIES DEFROST CONTROLS

FOR BASIC DEFROST SYSTEMS
USING TIME INITIATION
AND TIME TERMINATION

CAT.
NO.
15517

- Positive slider bar switch action
- EXCLUSIVE 40 Amp, 2HP contacts
- Choice of four contact arrangements for electric heat, hot gas, or compressor shutdown defrost
- EXCLUSIVE heavy duty synchronous timing motor
- Simplified setting of both defrost initiation and duration
- King size terminal screws accommodate up to No. 8 wire



SPECIFICATIONS.

Frequency of Defrost Initiation:
Adjustable from 1 to 6 cycles per day; minimum of 4 hours between successive operations

Duration of Defrost Cycle:
Adjustable from 4 to 110 minutes in 2 minute increments.

Accuracy of Defrost Duration:
+ or - 2 minutes

Switch Rating:
40 Amps, 2 HP per pole; 690 VA pilot duty
120-240 Volts, AC

Operating Voltage:
240 Volts, 50Hz.

Case:
Heavy steel enclosure. Grey wrinkle finish. Knockouts on bottom, back and sides. Hasp and staple for padlock. Available on bracket for sub-panel mounting.

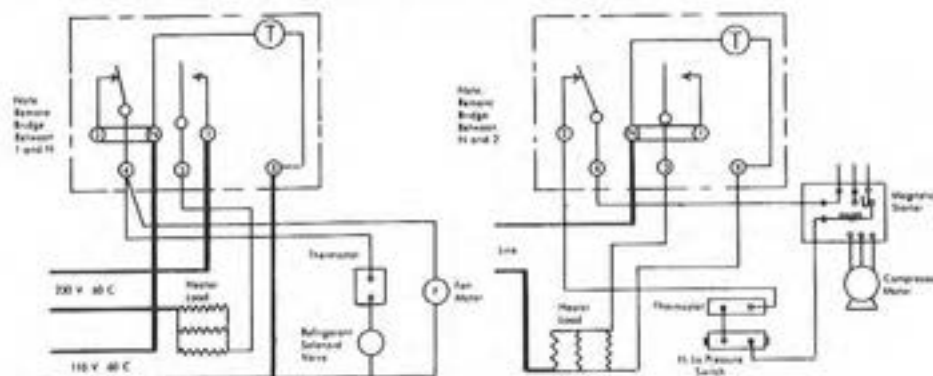
Motor:
Heavy duty synchronous industrial type

Shipping Weight:
3½ pounds. (1.6 kg)

Dimensions: (Approx.)
7-3/8" high x 4-11/16" wide x 4" deep
(188mm) (119mm) (102mm)

Model	Replaces Model No.	Volts 50 Hz	Description	Switch Arrangement Contacts			Adj.Length Of Defrost
				2-4	1-3	3-N	
8045-21	8015	240	For Electric Heat, Hot Gas, or Compressor Shutdown Defrosting	Closed	Open	None	4-110 Min.

WIRING DIAGRAMS FOR ELECTRIC HEAT DEFROSTING



PARAGON TIME CONTROLS

8140 SERIES DEFROST CONTROLS

TIME INITIATED, REMOTE TEMPERATURE
OR PRESSURE TERMINATED

1

DEFROST CYCLE IS CONTROLLED
BY LOAD CONDITIONS
FOR MAXIMUM ECONOMY

- Works with an external temperature or pressure sensor
- Back-up Mechanical Defrost Termination protects against sensor malfunction
- Choice of three contact arrangements for electric heat, compressor shutdown, or hot gas defrost
- EXCLUSIVE 40 Amp, 2HP contacts
- Positive slider bar switch action

MODEL 8143-21	MODEL 8145-21
CAT. NO. 15516	CAT. NO. 15515

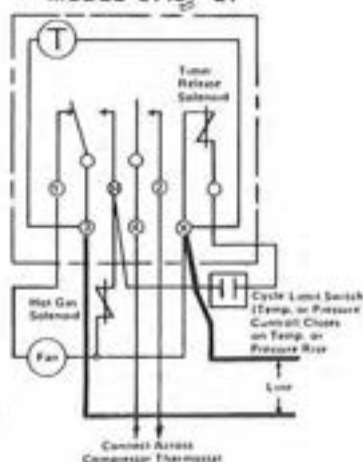
SPECIFICATIONS.

Frequency of Defrost:
1 to 6 cycles per day. A minimum of 4 hours between successive defrost cycles.
Adjustable Back-up Defrost Termination:
Adjustable from 4-110 mins. in 2 min. increments.
Switch Ratings Per Pole:
40 Amp, 2HP, 690 VA Pilot Duty, 120-240 Volts AC.
Operating Voltage:
240 Volt, 50Hz.

Motor:
Heavy duty, synchronous industrial type.
Case:
Heavy steel enclosure. Grey wrinkle finish. Knockouts at bottom, back and sides. Hasp and staple for padlock.
Shipping Weight:
3 1/2 lbs. (1.7 kg).
Dimensions: (Approx.)
7-3/8" high x 4-11/16" wide x 4" deep.
(188mm) (119mm) (102mm)

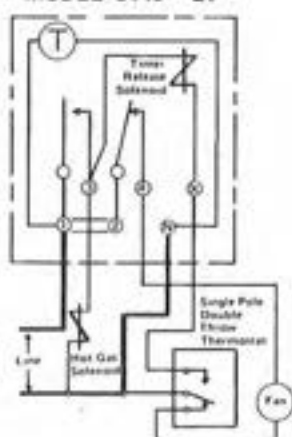
MODEL	REPLACES	VOLTS 50 Hz	NORMAL POSITION OF CONTACTS DURING REFRIGERATION CYCLE		
			CONTACT N-3	CONTACT 1-3	CONTACT 2-4
8143-21	8104	208/240	Open	Closed	Open
8145-21	8106	208/240	None	Open	Closed

HOT GAS DEFROSTING
MODEL 8143-21



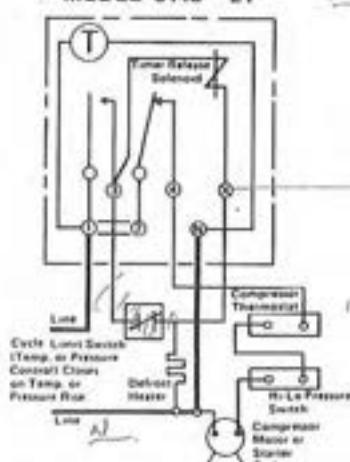
Wiring using 120V or 240V single phase line with compressor thermostat shorted out during defrost.

HOT GAS DEFROSTING
MODEL 8145-21



Wiring using the differential of a SPDT thermostat to delay the fan after defrost.

HOT GAS DEFROSTING
MODEL 8145-21



Normally closed thermostat used with defrost heater. Wiring using 120V or 240V single phase line compressor voltage common to timer.

These are only suggested methods of wiring the defrosting time control. External wiring should be connected in accordance with local electrical codes. All auxiliary switches are to be supplied by others. Switches are shown in refrigeration cycle.

PARAGON TIME CONTROLS

8240 SERIES DEFROST CONTROLS

DEFROST IS TERMINATED BY AN INTEGRAL PRESSURE BELLOWS FOR MAXIMUM EFFICIENCY AND ECONOMY

- EXCLUSIVE direct read out dial for cut-in pressure
- Wide range of cut-in pressure adjustability
- Back-up Mechanical Defrost Termination protects against sensor failure
- EXCLUSIVE modular pressure bellows
- Positive slider bar switch action
- Three contact arrangements for hot gas, electric heat, or compressor shutdown defrost
- EXCLUSIVE 40 Amp, 2 HP contacts
- Field-proven heavy-duty timing motor

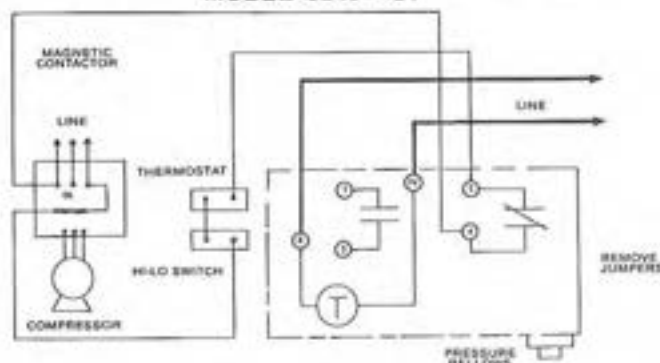


MODEL	REPLACES	VOLTS 50 Hz	NORMAL POSITION OF CONTACTS DURING REFRIGERATION CYCLE		
			CONTACT 2-4	CONTACT 1-3	CONTACT N-3
8245-21	8206 - 8226	208-240	CLOSED	OPEN	NONE

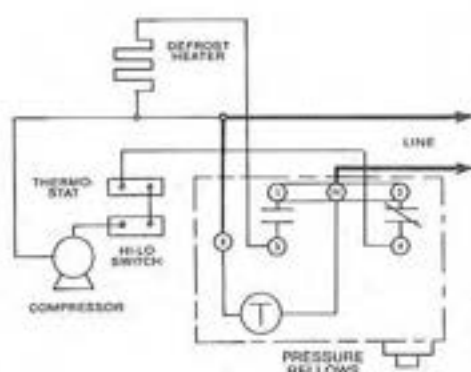
CAT.
NO.

15514

Wiring Diagrams for Compressor Shut-Down Defrosting
MODEL 8245 - 21



Wiring for Compressor Motor with Magnetic Starter.
Clock Motor Independent of Load Circuit.



Wiring Using Single Phase Line for Electric Heat System. Without Magnetic Starter.

SPECIFICATIONS

Frequency of Defrost :
1 to 6 cycles per day. A minimum of 4 hours between successive defrost cycles.

Back-up Defrost Termination :
Adjustable from 4 - 110 minutes in 2 minute increments.

Switch Ratings Per Pole :
40 amp, 2 HP, 690 VA Pilot Duty, 120 - 240 Volts AC.

Pressure Settings :
All models have adjustable cut-in pressure setting dial calibrated from 36 - 110 pounds (248 - 758 kPa) for R12, R22, R502.

Case :
Heavy steel enclosure. Grey wrinkle finish. Knockouts on top.

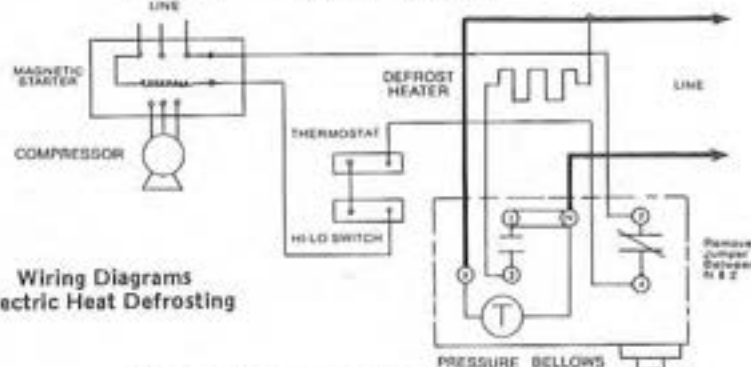
Operating Voltage :
240 Volt, 50 Hz, AC.

Motor :
Heavy duty, synchronous industrial type.

Shipping Weight :
6-1/2 lbs. (3 kg)

Dimensions :
8-3/4" high x 7" wide x 4-1/8" deep,
(222mm) (178mm) (105mm)

Wiring Diagrams
for Electric Heat Defrosting



Wiring for Compressor Motor with Magnetic Starter and Heater Load. Clock Motor Common to Heater Circuit with Independent Compressor Motor Circuit.

These are only suggested methods of wiring the defrosting time control. External wiring should be connected in accordance with local electrical codes. All auxiliary switches are to be supplied by others.

PARAGON TIME CONTROLS



ADVANTAGES

Eliminates Pitted or Sticking Contacts —

Each movable spring brass blade is independently channeled; each cadmium alloy contact and brass blade is free floating.

All stationary contact areas are eliminated.

Exclusive slider bar assures positive switching; each contact "makes" on a spring platform.

Complete Operational Check —

You don't have to depend on just the standard manual trip lever to check for circuit operation. The dial has a spring clutch which allows you to freely rotate the control through its complete cycle to check operation of all trippers and circuits.

Skip-a-Day Dial

The Skip-a-Day option will omit the regular ON-OFF program on any day or days of the week you choose. A typical application is business lighting where a store is only open six days per week; the daily schedule would be omitted on Sunday by merely inserting a pin in the Skip-a-Day wheel, while the regular schedule would occur on all other days.

4000 SERIES 24 HOUR TIME CONTROL

VERSATILE 24-HOUR TIME CONTROLS
FOR LIGHTING, PUMPS, BLOWERS, MOTORS,
AND MANY OTHER APPLICATIONS

- 40 Amp. Tungsten Rating;
4800 Watts
- Free-floating Contacts;
Positive Switching
- Powerful Lubricated-for-Life Motor
- Tough, Moulded Phenolic
Terminal Block
- Dial Clutch for Positive Cycle Check
- King-size Terminal Screws
- Skip-a-Day

CAT. NO.

1566

SPECIFICATIONS

Model:
4004 - 21S

Switch Rating:
40 Amps. Tungsten per pole, 208-240 Volts, 1HP at
208-240 Volts, 690 V.A. pilot duty.

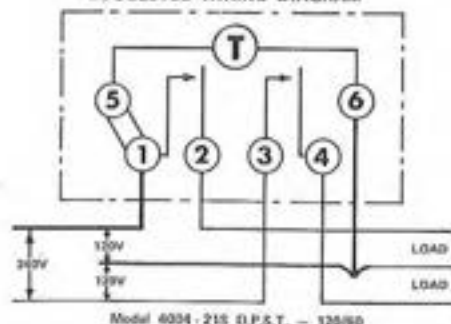
Motor:
208-240 Volts, 50 Hz

Operation:
Up to 14 (7 ON, 7 OFF) operations possible per day.
90 minutes minimum between operations. Two
trippers furnished as standard.

Dimensions: (Approx.)
9-5/8" high x 5-3/8" wide x 5-1/32" deep
(245 mm) (137 mm) (128 mm)

Shipping Weight:
4 1/2 lbs. (2.2 kg)

SUGGESTED WIRING DIAGRAM



PARAGON RM SERIES

MODULAR MULTIPLE CIRCUIT DEFROST CONTROLS

EXCLUSIVE SOLENOID TERMINATION
4 TO 24 CIRCUITS

EXCLUSIVE TIME INITIATION OFFSET
6 - 106 MINUTE DEFROST PERIODS

TWO SPDT SNAP SWITCHES PER MODULE

The modular Paragon RM Series has every feature required for store-wide defrost systems. Program modules, with or without solenoids, are fully adjustable and all have two 10A SPDT switches. Two frame sizes accept 4 and 8 Program Modules, respectively, and any frame can be coupled to another to form a master-slave system. Up to 24 circuits can be driven from one reliable Paragon hysteresis motor. Service, if it becomes necessary, is simple and fast, thanks to complete modularity. Program Modules can be changed in moments, without tools.

SIMPLIFIED PROGRAMMING

Each Program Module has a 24 - hour dial with time of day indication for initiation programming, and a 2 - hour dial for defrost duration control.

EXCLUSIVE TIME INITIATION OFFSET

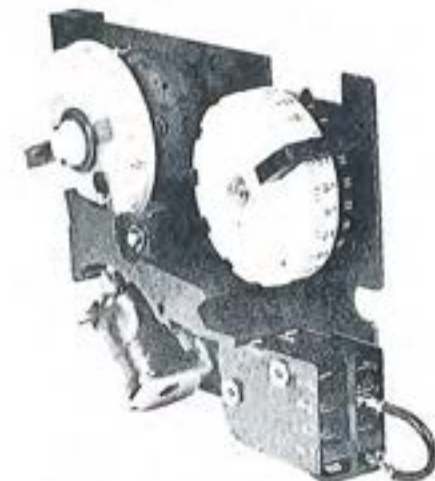
RM Series Program Modules provide complete capability for defrost load distribution with exclusive Time Initiation Offset. Deep tripper slots are located at 2 hour intervals around each 24 - hour dial. Each slot represents a possible defrost period. RM Series Program Modules are furnished in four distinct series of program times: Even hours (2.00, 4.00, etc.), Odd hours (1.00, 3.00, etc.), Even half-hours (2.30, 4.30, etc.), and Odd half-hours (1.30, 3.30, etc.). Defrost cycles can be automatically offset by at least one half-hour between adjacent units. Field personnel cannot inadvertently set all equipment to defrost simultaneously.

EXCLUSIVE INTEGRAL SOLENOID TERMINATION

Paragon RM Series Program Modules may be ordered with integral solenoid termination. This feature permits termination of defrost upon closure of an external pilot device such as a thermostat or pressure switch. No additional relays for interlocking or holding circuits are required.

Solenoid terminated modules are mechanically interchangeable with time terminated modules, and can be mixed as required in any frame assembly. On solenoid terminated modules the 106 minute dial serves as a mechanical back-up system, limiting the defrost period to a preset duration if the external pilot device fails to operate for any reason. These modules will also terminate defrost immediately if the pilot device is closed at the initiation of the defrost cycle.

Solenoids are intermittent duty and must be wired in series with one of the normally-open switch contacts. This wiring is preassembled on each module.



CAT. NO.	TIMER DRIVE MODULE
15626	P/N A 878 - 21

CAT. NO.	FRAME MODULE
15627	4 FRAME P/N A 879 - 99
15628	8 FRAME P/N A 880 - 99

PROGRAM MODULES

TIME	WITHOUT SOLENOID TERMINATION		WITH SOLENOID TERMINATION	
	CAT. NO.	PART NO.	CAT. NO.	PART NO.
EVEN HOURS (2.00, 4.00 etc.)	15629	A 876 - 99	15633	A 877 - 21
EVEN ½ HOURS (2.30, 4.30 etc.)	15630	B 876 - 99	15634	B 877 - 21
ODD HOURS (1.00, 3.00 etc.)	15631	D 876 - 99	15635	D 877 - 21
ODD ½ HOURS (1.30, 3.30 etc.)	15632	E 876 - 99	15636	E 877 - 21

TECHNICAL DATA - Next Page

WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT

PARAGON RM SERIES

TECH. PAGE 155-f

MODULAR MULTIPLE CIRCUIT DEFROST CONTROLS - TECH. DATA

SPECIFICATION DATA

FRAME MODULES

Capacity: 4 or 8 circuit available.
Mounting: Two snap-in base brackets per frame section; 7/32" diameter mounting holes for No. 12 screws.

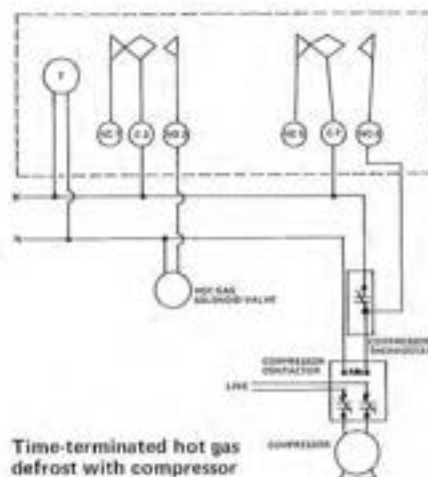
MOTOR MODULES

Motor: Heavy-duty synchronous industrial type with permanently lubricated gear train.
Torque: Up to 24 Program Modules can be driven with one motor.
Input Voltage: 240 Volts, 50 Hz, AC.
Terminals: Two 3/4" male push on terminals.

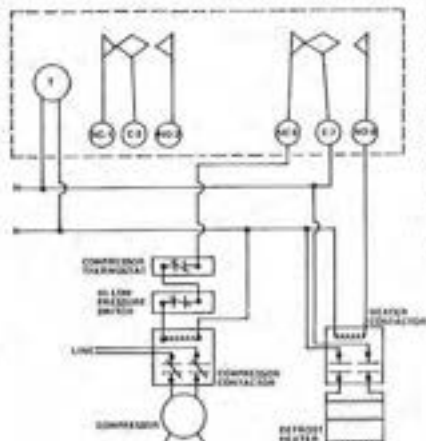
PROGRAM MODULES

Defrost Initiation: Adjustable from 1 - 12 defrost operations per circuit, per day; minimum 2 hours required between successive operations.
Mechanical Defrost Termination: Adjustable from 6 - 106 minutes in one minute increments.
Solenoid Termination: Optional; instantaneous transfer if solenoid is energized at time of defrost initiation.
Switches: Two SPDT snap switches per Module.
Switch Rating: 10 Amps, 1/3 HP, 120-240 VAC; 345VA Pilot Duty.
Switch Terminals: 3/16" male push on terminals; a factory-installed bridge is standard on Modules equipped with integral solenoids to complete the interlocking connection.

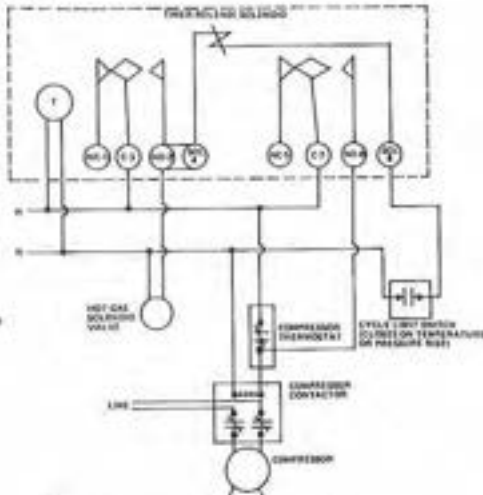
SUGGESTED WIRING DIAGRAMS



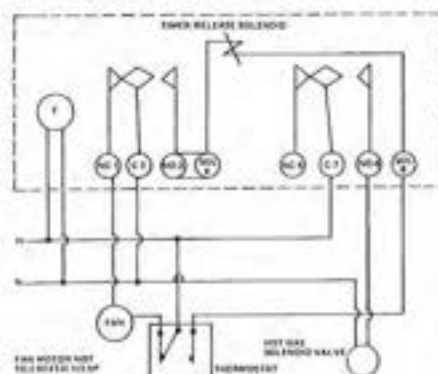
Time-terminated hot gas defrost with compressor thermostat by-passed during defrost cycle.



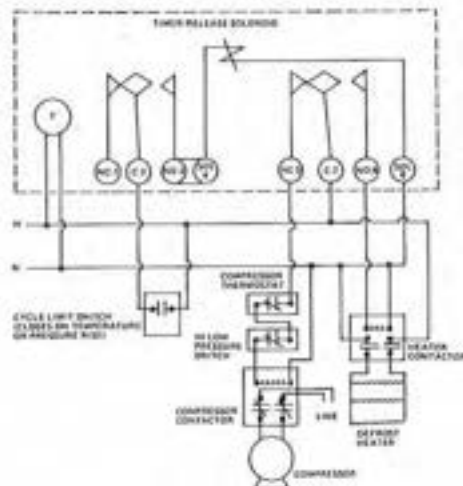
Time-terminated electric heat defrost.



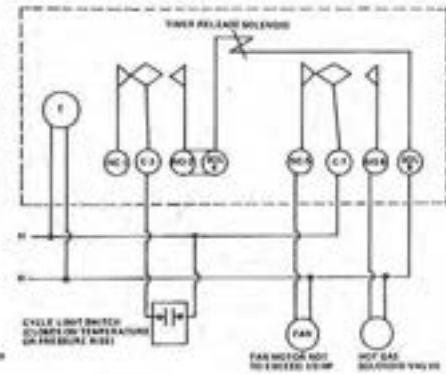
Remote temperature or pressure terminated hot gas defrost with compressor thermostat by-passed during defrost cycle.



Remote temperature or pressure terminated hot gas defrost using differential of SPDT thermostat to delay fan after defrost termination.



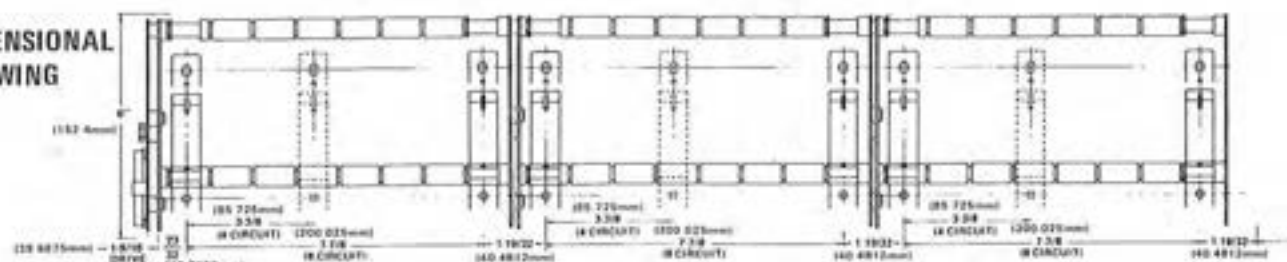
Remote temperature or pressure terminated electric heat defrost.



Remote temperature or pressure terminated hot gas defrost with auxiliary fan circuit.

These are only suggested methods of wiring the defrosting time control. External wiring should be connected in accordance with local electrical codes. All auxiliary switches are to be supplied by others.

DIMENSIONAL DRAWING



REFER PREVIOUS PAGE FOR ADDITIONAL DETAILS AND ORDERING CAT. NO's.

New AMF Paragon EC 100 Series Anti-condensate Heater Controller

FOR CONTROL OF REFRIGERATED DISPLAY CASES
HELPING YOU MANAGE ENERGY - EFFICIENTLY

Long a leader in commercial refrigeration-freezer controls, AMF Paragon presents a new, unique method of conserving energy - and power costs - with the EC100 Anti-condensate Heater Controller. Depending upon geographical location, the EC100 system can pay for itself in months. And, your customers will be able to identify foods clearly through the doors at a fraction of the normal cost to you.

AMF Paragon Anti-condensate Heater Controllers can readily be installed on new equipment or retrofitted on most existing equipment. Ideal for medium (refrigerator) to low (freezer temperature) cases. With the exception of the humidity sensor, all components are located in the back room, and display cases need not be disturbed during installation.

The secret is in the pulse.



Instead of providing a constant flow of power to your Anti-condensate Heaters, the new Paragon system goes on for a second—just enough to keep the heaters warm—then off for 1 to 3 seconds, as required.

You save one-sixth to one-half the cost of operating Anti-condensate Heaters. And, the more energy costs go up, the more you save!

Just enough heat to eliminate condensation.

Because the pulse is regulated by in-store humidity conditions, you never build up excess heat—or allow the display case surface area to cool sufficiently to permit condensation. You're always assured of "sweat-free" surfaces. An added benefit exists: by reducing the heat to the case, the cost of cooling is also lowered.



Precision control. Accurate...reliable.

The entire Paragon EC100 system consists of a sensitive humidity sensor, a solid state control module and reliable solid state switching devices. You get years of trouble-free service—and energy savings, too!

The RH Sensor.

An exceptionally sensitive styrene copolymer relative humidity sensor, strategically located within the store, monitors store humidity conditions and provides a continuous signal to the heater control module.

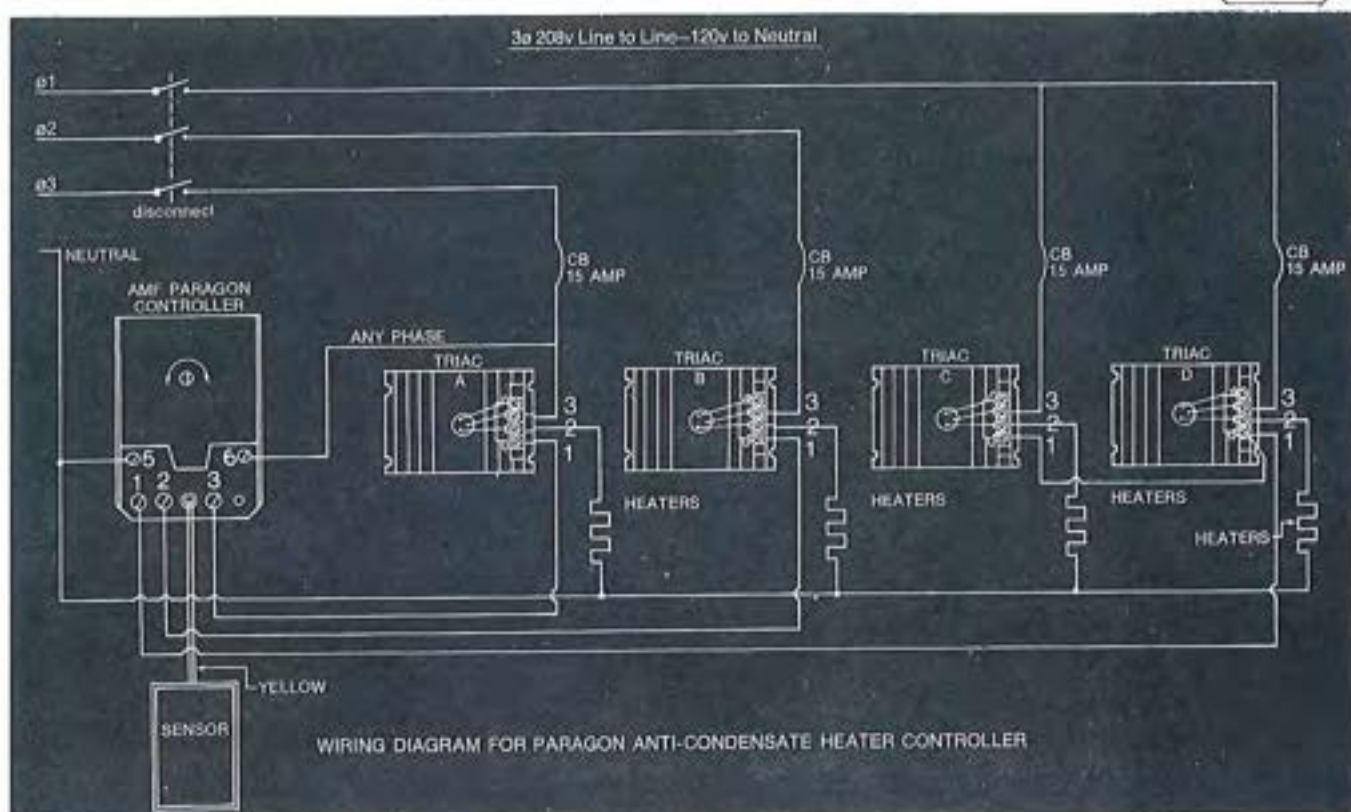
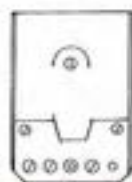


Solid state heater control module.

Monitors the relative humidity sensor input and regulates the on-time of the heaters to optimize power consumption.

Solid state switches.

Rapid on-off devices that last for years. Rapid switching is required to prevent thermal cycling of the heaters. Up to 24 can be used in one system along with a control module and humidity sensor.



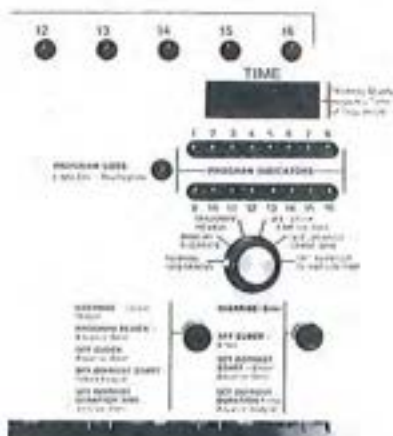
AMF Paragon

EC 800 Electronic Defrost Control

1

Superior performance through solid state electronic design

The EC800 Programmable defrost controller combines the operating simplicity of electromechanical RM's with the reliability, accuracy and flexibility made possible only by electronic design.



Easy Installation

The EC800 is voltage rating field selectable, making it easy to install in new equipment or retrofit in existing units. DPDT output relays on all circuits and 1/4 inch quick connect terminals for application flexibility.

External Terminate Provided

Each output circuit has provisions for defrost termination by closure of a remote thermostat or pressure switch. The external terminate shortens defrost durations, eliminates the need for mechanical solenoids (present in electromechanical RM's).

24 Hour Battery Carryover

This security device maintains the EC800 program for a minimum of 24 hours following a power loss.

Programming Capabilities

Program Base — 24 hour reference repeat program.

Defrost Start Times — available every 15 minutes on quarter hour, 96 per day, only one output per start time.

Defrost Durations — independent for each output, 5-180 minute range.

Number of Circuits — three models available, 8, 12 or 16 outputs.

Output — DPDT relay, 1 amp resistive, 240 VAC each circuit. .250" quick connect terminals.

Input — Can be wired for either 100, 120, 200, 208 or 240 volt AC, 50-60 Hz. Field selectable.

Terminals — #4-40 slotted screw which will accommodate #20-#14 AWG wire.

External Termination of Defrost — .250" quick connect terminals each circuit.

The terminate requires an isolated external N.O. contact that closes when termination of an output load is desired.

Power Outage Carryover — A minimum of 24 hours memory carryover is provided by means of a Ni-Cad rechargeable battery. The memory back-up will maintain the control program and time of day at power loss. During the power outage the LED displays will not be lit.

Program Loss Alarm — A DPDT alarm relay will energise in the event of a loss of the program memory. The program loss indicating light will also be lit. Terminals and output of this relay are the same



Designed specifically for commercial refrigeration

Each quarter hour defrost scheduling capability (96 per day), automatic staggering of defrost starts, defrost durations 5 to 180 minutes, simple program override or modification. The EC800 is easily and quickly programmed by refrigeration service and authorized supermarket personnel.

Solid State Reliability

Electronic programming assures greater reliability of operation, and a longer performance life by eliminating mechanical wear on gears and trippers.

Accurate Programming to the Minute

Defrost initiates and durations can be programmed quickly and accurately, reducing the possibility of damage to foods and increasing potential energy savings.

Visual Indicators at a Glance

Test programs immediately, before they run. Just press the appropriate button and review an entire day's program. Check initiate and terminate status quickly.

Program Loss Alarm Circuit

An emergency alarm signals to indicate loss of program memory due to a manual clearing of the program or a power loss extending beyond the battery carryover period. The alarm may be connected to a visual or audible alert.

Proportional Defrost Provision

The EC800 provides maximum application flexibility with the "proportional defrost" provision which senses store humidity (dewpoint) and varies intervals between defrosts accordingly. Proportional defrost assures minimum chance of food shock, maintains staggering, increases energy savings, makes possible optimum use of reclaim heat available from refrigeration system. More reclaim heat is available for store heating during cold winter months when humidity is usually low. Optional proportional defrost module can be installed or easily added later without disturbing display cases.

SPECIFICATIONS

as the other relays. The relays will de-energise and the program loss light will go off when an updated clock time is entered into the controller.

Accuracy — Time of day is accurate as line frequency with power applied. Programming resolution is to the minute.

Environmental — Temperature — Ambient operating temperature range is 0 - 60°C.

Humidity — 10 - 90% relative humidity (noncondensing).

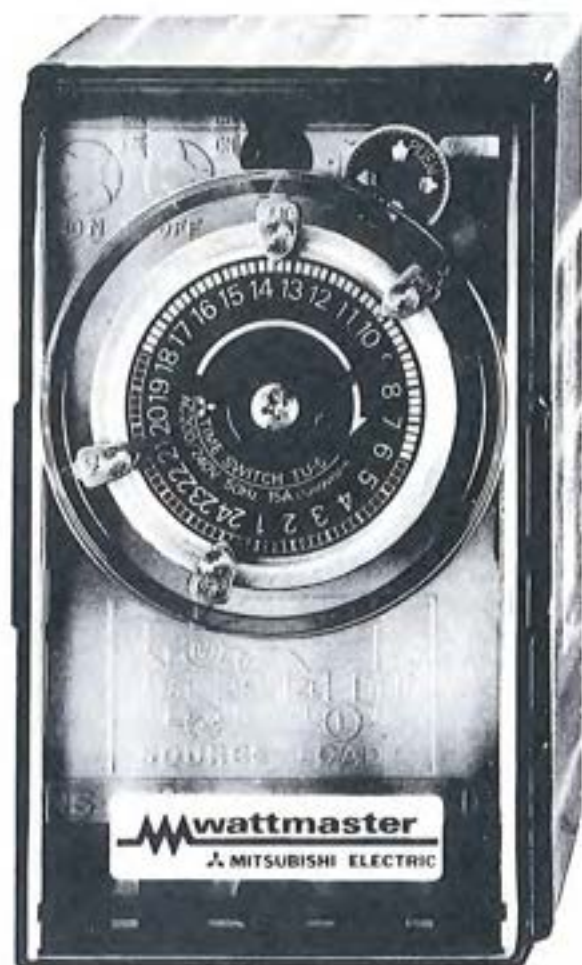
Access — Unit has a two position key lock to secure all programming modes from unauthorized personnel. One position is "normal" operation mode and in this position the key can be removed. When locked in the "normal" operation position, movement of the selector knob will have no effect on the operation of the EC800. Placing the key lock in the 2nd. position will allow access to modes such as manual override, program review, set clock time of day, set defrost start time and set defrost duration time.

Memory Erase — Memory erase button is concealed behind a small access hole in the front panel which can be actuated by the insertion of a small screwdriver blade. It carries no identification on the front panel, but its function is described in the operating and installation instructions.

CAT. NO.	MODEL	No. CIRCUITS/OUTPUTS
	EC800	8
	EC800	12
	EC800	16

Wattmaster TU-5

The compact, budget priced time switch with override.



This surface mounted, synchronous 24 - hour time switch is precision manufactured by Mitsubishi for Wattmaster Sales Pty. Ltd.

It has a number of features, including an override switch, not generally found in timers in the lower priced bracket.

The TU-5 is a general purpose time switch, providing one-day cycle time control for applications such as air conditioning and refrigeration equipment, lighting, electric furnaces, water sprinkling, irrigation, display windows, stirring machines, artificial daylight cultivation, automatic vending machines etc.

You simply set the manual screw-type trips to the desired time. By increasing the number of ON and OFF trips to 26 pieces, it is possible to make 13 ON and 13 OFF operations.

The TU-5 is a front mounting time switch, simple and easy to install.

FEATURES AND SPECIFICATIONS

CAT. NO.	Size	67 mm x 110 mm	Induction Motor Load	2 HP
15530	Ambient Temperature	-10°C to +50°C	Power Consumption	4VA
	Minimum Time Period	53 minutes	Override Switch	Yes
	Voltage	240V	Max. Switching Periods	13
	Frequency	50/60 Hz.	Voltage Tolerance	-15% to +10%
	Resistive Load	15A	Switching Indicator	Yes

THE BITTERNESS OF POOR QUALITY REMAINS LONG AFTER THE SWEETNESS OF LOW PRICE IS FORGOTTEN

NOTES

1

SPEEDY SERVICE

WE ARE ORGANIZED TO MAKE PROMPT DELIVERY FROM OUR VAST STOCKS. WHETHER YOUR ORDER IS SMALL OR LARGE WE WILL EXERCISE GREAT CARE IN SELECTING AND PACKING YOUR ORDER. MORE THAN 90% OF ALL ORDERS RECEIVED ARE DESPATCHED THE SAME DAY. WE AIM TO KEEP YOU AND YOUR JOB MOVING SATISFACTORILY.

NOTES

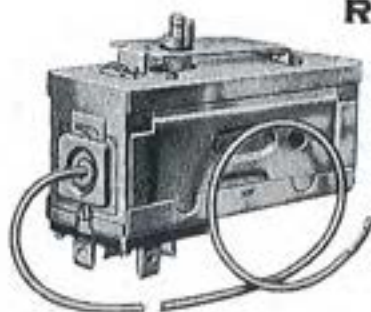
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DEFROST TIMERS — DOMESTIC

RANCO TYPE E11, E13



The E11 and E13 Timers are an automatic defrost control initiating the defrost cycle by time and terminating the defrost cycle by temperature. It can be used in both domestic and commercial refrigeration applications where regular defrosting is required.

Features :: The Controls feature both time-safe and fail-safe characteristics. Time-safe feature provides defrost termination automatically after the in-built time-safe period if defrost temperature is not reached in that period. Fail-safe feature of power element prevents defrost initiation when power element loses its charge or becomes broken.

Cat. No.	Timer Part No.	Availability	Defrosts per 24 Hrs.	Time Safe Mins.	Initiation		Terminate		Cap. Length ins.	Manuf. Part No.	Make of Refrig.
					°C	°F	°C	°F			

E11 ELECTRIC ELEMENT DEFROST TIMER

15922	E11-2403	Ex. Overseas	4	22%	-1.7	29	7.2	45	48	KA36855	Kelvinator
15923	E11-2515	Ex. Overseas	2	45	-1.7	29	5.6	42	72	—	Gen. Elect/Kirby
1597	E11-2526	Ex. Overseas	1	45	-1.7	29	5.6	42	36	—	Gen. Elect/Kirby
1599	E11-2533	Ex. Overseas	3	45	-2.8	27	5.6	42	84	KA28974	Kelvinator
15910	E11-2534	Ex. Overseas	3	45	-5.0	23	3.3	38	84	KA28917	Kelvinator
15911	E11-2538	Ex. Overseas	3	45	-2.8	27	5.6	42	36	KA29295	Kelvinator
15924	E11-2546	Ex. Overseas	2	30	-1.1	30	8.9	48	84	7443898	Frigidaire

E13 HOT GAS DEFROST TIMER

15915	E13-2530	Ex. Overseas	1	60	-1.7	29	7.8	46	36	MRT-131	Gen. Elect/Kirby
15914	E13-2532	Ex. Overseas	1	60	-2.8	27	5.6	42	60	5030-01-051	Simpson-Pope
15913	E13-2539	Ex. Overseas	1	45	-1.7	29	8.9	48	76	7395541	Frigidaire
15919	E13-2545	Ex. Overseas	1	60	-1.7	29	5.6	42	36	—	Gen. Elect/Kirby



PARAGON NO. 499

Paragon No. 499 Domestic Refrigerator Defrost Control can be wired for electric heat or hot gas defrosting.

The terminal board accommodates a female plug for ease of connection and assembly by the refrigerator manufacturer. The control is rated 1/3 HP - 5-Amp - 240 V. AC.

TIME INITIATING TIME TERMINATING MODELS

CAT. NO.	TIMER MODEL	DEFROST PERIOD AND TOTAL CYCLE TIME	MAKE OF REFRIGERATOR
15951	L769 - 21	21 Mins. every 12 Hours	MALLEYS
15952	A769 - 21	21 Mins. every 6 Hours	KELVINATOR
15953	NK539 - 21	21 Mins. every 4 Hours	KELVINATOR
15954	GK539 - 21	21 Mins. every 6 Hours	METTERS
15955	NF539 - 4	30 Mins. every 12 Hours	WESTINGHOUSE
15956	F769 - 21	25 Mins. every 6 Hours	WESTINGHOUSE

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

DEFROST TIMERS - DOMESTIC & COMMERCIAL

TRI MODEL DFS TIME INITIATING - TEMPERATURE TERMINATING MODELS

(PREVIOUSLY KNOWN AS JAGA)

FUNCTION: Initiates defrost operation at a fixed cycle and terminates thermostatically when predetermined temperature is reached.

If the defrost termination temperature is not reached after a certain period of time, defrost operation is automatically terminated by the function of timer at a predetermined time. (Time Safe).

Defrost initiation time can be manually set at the correct time of day, when the refrigeration unit is put in operation or after power failure.

FEATURES: Timer combined with thermostat for the most advanced defrost system for household and commercial refrigerators, freezers and other refrigerating units. Applicable for any defrost system such as off compression cycle, electric heater and hot gas system.



Cat. No.	Timer Model	No. Defrosts in 24 Hours	Termination Temperature	Termination by Time Cam	Capillary Length	Customer	Part No.
15937	DFS51A	1	5° ± 1.5° (41°F)	60 mins. ± 10 mins.	42"	Westinghouse Astor Malley's Whirlpool G.E. Kirby	739332 4087 - 002 - 02 3293 - 753 8 - 0100515 - 602
15938	DFS51GC	1	10° ± 1.7° (50°F)	60 mins. ± 10 mins.	90"	Metters	02 - 033 - 430
15940	DFS54DB	3	4.4° ± 2° (40°F)	45 mins. ± 8 mins.	72" *	Simpson-Pope	574 - 1 - 72
15939	DFS55B	4	7.2° ± 2° (45°F)	20 mins. ± 5 mins.	48"	Kelvinator	KA39531
15948	DFS53A	6	7.8° ± 1.5° (46°F)	20 mins. ± 7 mins.	48" *	Commercial Applications	
15945	DFS53C	6	5° ± 1.5° (41°F)	30 mins. ± 7 mins.	84"	Commercial Applications	
15949	DFS55C	4	5° ± 1.5° (41°F)	20 mins. ± 5 mins.	60"	Commercial Applications	
15946	DFS54	3	5° ± 1.5° (41°F)	30 mins. ± 7 mins.	60"	Commercial Applications	

* Cross Ambient Bulb

Initiating Temperature All Timers: -3°C Min (26.6°F)

SANKYO MODEL DFC

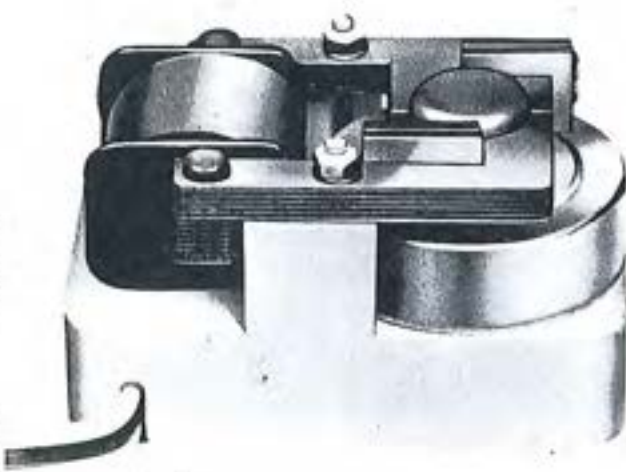
(PREVIOUSLY KNOWN AS JAGA)

TIME INITIATING - TIME TERMINATING MODELS

FUNCTION: Automatically initiates defrost period at a preset time and terminates at completion of fixed duration defrost cycle.

Defrost initiation time can be set manually to required time of day, when refrigeration unit is installed, to suit the loading of the unit or after power failure.

FEATURES: Heavy duty, long life and reliable performance at low cost. Wide application for household and commercial refrigerators, freezers and electrical appliances, or any other application requiring an automatic "switch on" and "switch off" function.



Cat. No.	Timer Model	Defrosts in 24 Hours	Defrost Period & Total Cycle Time	Customer	Part No.
15926	DFC4H14B	6	14 mins. ± 2 mins. every 4 hours	Kelvinator	KA42756
15927	DFC6H20A	4	20 mins. ± 2.5 mins. every 6 hours.	Astor	4087 - 010 - 01
15930	DFC6H25D	4	25 mins. ± 2.5 mins. every 6 hours	Astor	4087 - 020 - 00
15935	DFC8H20G	3	20 mins. ± 3.5 mins. every 8 hours	G.E. Kirby	8-0100515-601
15928	DFC12O5	2	30 mins. ± 5 mins. every 12 hours	Frigidaire	7445336
15929	DFC12O5F	2	30 mins. ± 5 mins. every 12 hours	Westinghouse	743022
15931	DFC12O6	4	25 mins. ± 2.5 mins. every 6 hours	Westinghouse	742537
15932	DFC12O6E	4	25 mins. ± 2.5 mins. every 6 hours	Westinghouse	742537
15936	DFC24H30A	1	30 mins. ± 5 mins. every 24 hours	Frigidaire	2827816

NOTES

PICK-UP COUNTERS EVERYWHERE

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.

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SECTION 2 INDEX

ON REVERSE SIDE

REPLACEABLE FILTER - DRIER CORES/BLOCKS

D- 48 Standard Capacity Block: This block provides system protection from water and acids in the majority of general purpose applications.

H- 48 High Capacity Block: A filter-drier block similar to the D- 48 except with much greater water capacities for critical applications or where system conditions indicate the presence of an abnormal amount of water.

H- 100 High Capacity Block: A filter-drier block with high water capacities designed to work on both liquid and suction line applications.

W- 48 Burnout Block: A filter-drier block possessing water capacities comparable to the H- 48 high capacity block, and also featuring activated carbon to afford optimum contaminant cleanup following a motor burnout. This ingredient also provides wax and resin control on R-22 and R-502 low temperature applications.

W- 100 Burnout Block: The filter-drier block possessing high water capacities and including activated carbon for rapid system cleanup following a motor burnout. This model is equally effective for control of waxes on low temperature R-22 and R-502 service.



REPLACEABLE FILTER - DRIER BLOCKS

Cat. No.	Type	Description	Filter Area		Suits Nominal Shell Diam.		Water Capacity — Drops *					
							R12		R22		R502	
			cm ²	ins. ²	mm	ins.	24°C (75°F)	52°C (125°F)	24°C (75°F)	52°C (125°F)	24°C (75°F)	52°C (125°F)
16911	D- 48	Std. Capacity	445	69	115	4 1/2	774	340	293	223	340	223
1691	H- 48	High Capacity	445	69	115	4 1/2	964	558	524	436	558	436
1692	H- 100	High Capacity	710	110	153	6	870	1050	980	810	1050	810
1693	W- 48	Burnout Block	445	69	115	4 1/2	775	515	480	400	515	430
1694	W- 100	Burnout Block	710	110	153	6	1750	1120	1000	810	1110	875

* Water capacities are based on an end point dryness of 15 PPM for R12, 60 PPM for R22 and 30 PPM for R502.
20 Drops of Water = 1 gram = 1 cc.

HENRY 'DRI-COR' Replaceable Filter-Drier Cores

CAT. NO.	TYPE	DESCRIP.	CORE LENGTH	TO SUIT SHELL DIA.
1695	B48C	Std. Dri-Cor	120.7 mm	139.7 mm
1696	B48CM	Hi-Cap Dri-Cor	(4 1/2")	(5 1/2")

REPLACEABLE CORES

Fully activated moulded cores. Spring assembled. All Henry Refrigerant Filter-Drier Cores are fully re-activated, hermetically sealed in key operated metal containers. Each container contains new sealing gasket.

Filter-Drier flow capacity is the same for Standard Dri-Cor and Hi-Capacity Dri-Cor Filter Driers.

For extra Drying Capacity the Hi-Capacity Cores are required.

CAUTION: Since excessive pressure drop in the Filter-Drier will reduce system efficiency and can damage refrigerant vapour cooled motor-compressors, it is extremely important to know when to change cores.

Maximum recommended pressure drops are shown in the Table.

IMPORTANT: Following a motor burn-out it is necessary to use a Type B48 CM Hi-Capacity Dri-Cor Filter-Drier Core for cleaning up the system.

MAXIMUM RECOMMENDED PRESSURE DROP DURING CLEAN-UP			
Refrigerant	APPLICATION		
	AIR COND.	COMMERC.	LOW TEMP.
R12 & R500	55kPa(8psi)	41kPa(6psi)	14kPa(2psi)
R22 & R502	96kPa(14psi)	62kPa(9psi)	21kPa(3psi)

KMP REPLACEABLE KORES

CAT. NO.	TYPE	DIMENSIONS		
		Length	Int. Diam.	Ext. Diam.
1698	KMP - 48B	139.7 mm	44.5 mm	95.3 mm
1699	PFE - 48	(5 1/2")	(1 3/4")	(3 3/4")

FILTER DRIER KORE KMP - 48B

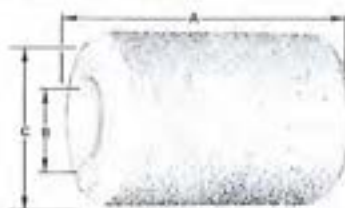
The KMP Hi-Capacity Filter Kore can be used with all 4 1/2" O.D. shells. It features low pressure drop, and maximum moisture and acid capacity. Shipped in hermetically sealed can ready for installation.

CERAMIC FILTER ELEMENT PFE - 48

The KMP Hi-Capacity Filter Kore Element can be used with all 4 1/2" O.D. shells. It provides extended surface area and the patented in-depth ceramic filters. Filtration to 10 microns is obtained with negligible pressure drop.

PARKER FILTER DESICCANT CORE PCW - 48 High Capacity Core

This hi-efficiency desiccant filter core is designed exclusively for liquid line use only. Shipped in hermetically sealed cans, complete with triple gaskets for interchangeability with all other 4 1/2" shell diameters.



Replaceable Filter-Cores

CAT. NO.	TYPE	DIMENSIONS — mm (ins.)		
		A Overall Length	B Hole Diam.	C Outside Diam.
16910	PCW - 48	139.7 (5 1/2")	44.5 (1 3/4")	95.3 (3 3/4")

Heldon

FILTER - DRIER CORES
Refer Page 174

hudson

DRIER CORE
Refer Page 176



LIQUID LINE DRIERS

TYPE DX FILTER DRIERS with Solid Core



APPLICATION

The Filter Drier Type DX with solid core is designed for use in refrigeration and air-conditioning systems for all normal fluorinated refrigerants.

DX effectively removes —

Moisture - The solid core adsorbs and retains the moisture present in the refrigeration system so that ice formation in the expansion valve is avoided.

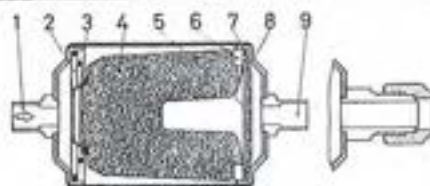
Harmful acids - The solid core retains the harmful acids formed in the refrigeration system so that motor burn-out due to corrosion is prevented.

Foreign matter, sludge, and oil decomposition products - The solid core removes this matter by depth filtration, thus ensuring that the refrigeration system will not stop due to obstruction of valve orifices, pressure-equalizing holes, capillary tubes, and similar equipment.

Design

The filter drier has a relatively large diameter resulting in a suitably low velocity of flow and a resultant small pressure drop. Formation of powder is eliminated since the solid core particles cannot move relative to each other.

1. Inlet
2. Spring
3. Spring retainer
4. Solid core
5. Monel filter gauze
6. Gasket
7. Gasket
8. Perforated plate
9. Outlet



Technical Data, Code Nos., and Capacities

Refrigerants: R12, R22, R502

Test pressure: 2760kPa (400 psig)

Cat. No.	Type DX	Conn. M.Fl.	Code No.	Capacity of refrigeration and deepfreeze systems in kW (tons)			Capacity of air-conditioning systems with a separate refrigeration compressor in kW (tons)			Capacity of an air-conditioning unit with a factory-installed refrigeration compressor in kW (tons)		
				R12	R22	R502	R12	R22	R502	R12	R22	R502
1701	032	1/4	23U1200	0.95 (0.27)	0.95 (0.27)	0.95 (0.27)				2.64 (0.75)	3.52 (1)	2.64 (0.75)
1702	052	1/4	23U1201	1.16 (0.33)	1.16 (0.33)	1.16 (0.33)	2.64 (0.75)	2.64 (0.75)	2.64 (0.75)	3.52 (1)	3.52 (1)	3.52 (1)
1703	053	3/8	23U1202	1.16 (0.33)	1.16 (0.33)	1.16 (0.33)	3.52 (1)	5.28 (1.5)	3.52 (1)	7.03 (2)	7.03 (2)	7.03 (2)
1704	082	1/4	23U1203	1.76 (0.5)	1.76 (0.5)	1.76 (0.5)	2.64 (0.75)	3.52 (1)	2.64 (0.75)	3.52 (1)	3.52 (1)	3.52 (1)
1705	083	3/8	23U1204	3.52 (1)	3.52 (1)	3.52 (1)	7.03 (2)	7.03 (2)	7.03 (2)	10.6 (3)	14.1 (4)	8.79 (2.5)
1706	084	1/2	23U1205	3.52 (1)	3.52 (1)	3.52 (1)	7.03 (2)	7.03 (2)	7.03 (2)	14.1 (4)	17.6 (5)	14.1 (4)
1707	162	1/4	23U1206	3.52 (1)	5.28 (1.5)	2.64 (0.75)	3.52 (1)	5.28 (1.5)	3.52 (1)			
1708	163	3/8	23U1207	7.03 (2)	7.03 (2)	7.03 (2)	10.6 (3)	10.6 (3)	7.03 (2)	14.1 (4)	17.6 (5)	10.6 (3)
1709	164	1/2	23U1208	7.03 (2)	10.6 (3)	7.03 (2)	10.6 (3)	14.1 (4)	10.6 (3)	17.6 (5)	26.4 (7.5)	17.6 (5)
17010	165	5/8	23U1209	7.03 (2)	10.6 (3)	7.03 (2)	14.1 (4)	17.6 (5)	14.1 (4)	26.4 (7.5)	35.2 (10)	26.4 (7.5)
17011	303	3/8	23U1210	10.6 (3)	14.1 (4)	7.03 (2)	10.6 (3)	14.1 (4)	10.6 (3)			
17012	304	1/2	23U1211	14.1 (4)	17.6 (5)	10.6 (3)	17.6 (5)	17.6 (5)	17.6 (5)	26.4 (7.5)	26.4 (7.5)	17.6 (5)
17013	305	5/8	23U1212	17.6 (5)	26.4 (7.5)	17.6 (5)	26.4 (7.5)	26.4 (7.5)	17.6 (5)	35.2 (10)	53 (15)	26.4 (7.5)

REFER NEXT PAGE FOR ADDITIONAL TECH. DATA, DIMENSIONS AND WEIGHTS

OUR COMPLETE INVENTORY ASSURES PROMPT SERVICE



TYPE DX FILTER DRIERS with Solid Core

Technical Data

Type DX	Solid core				Refrigerant liquid capacity l/min at $\Delta p = 13.7 \text{ kPa}$	Refrigerant liquid capacity lMPgal/min at $\Delta p = 2 \text{ psi}$	R 12		R 22		R 502	
	surface		volumen				Drying capacity in kg refrigerant at $+25^\circ\text{C}$ (77°F) 1)	Water capacity in drops 2)	Drying capacity in kg refrigerant at $+25^\circ\text{C}$ (77°F) 1)	Water capacity in drops 2)	Drying capacity in kg refrigerant at $+25^\circ\text{C}$ (77°F) 1)	Water capacity in drops 2)
	cm ²	sq. in.	cm ³	cu. in.								
032	50	7.8	50	3	2.8	0.62	3.9	45	1.5	30	1.6	30
052	75	11.6	80	5	2.9	0.64	7.3	80	2.9	60	3.2	65
053					7.9	1.7						
082	110	17	130	8	2.4	0.53	10.5	120	4.2	85	4.6	95
083					9.5	2.1						
084					11.6	2.5						
162					2.7	0.60						
163	180	28	250	16	10.2	2.2	27.9	305	11.0	220	12.2	240
164					12.8	2.8						
165					16.4	3.6						
303					11.9	2.6						
304	320	50	500	30	14.0	3.1	48.9	535	19.4	380	21.4	420
305					19.5	4.3						

1) The drying capacity is based on ARI standard 710-64 (Air-Conditioning and Refrigeration Institute), which is used when the actual water content is unknown.

Moisture content in refrigerant after drying:

for R 12 = 565 PPM

for R 22 = 1050 PPM

for R 502 = 1020 PPM

PPM indicates mg H₂O/kg refrigerant.

Moisture content in refrigerant after drying:

for R 12 = 15 PPM

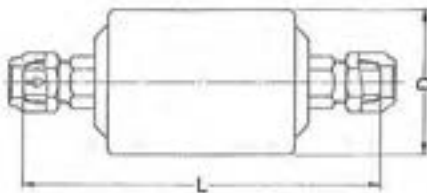
for R 22 = 60 PPM

for R 502 = 30 PPM

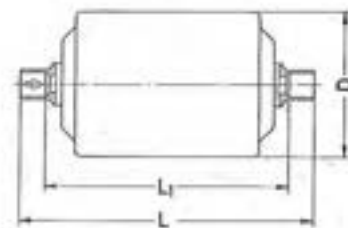
2) The water capacity refers to the maximum water quantity which the drier can retain at the temperature and state of equilibrium in question (20 drops ~ 1 g H₂O).

Dimensions and Weight

DX with flare connection



DX with solder connection



Type	L		D		Weight	
	mm	in	mm	in	kg	lb
032	107	4.21	42	1.65	0.2	0.4
052	114	4.49	51	2	0.4	0.9
053	139	5.12	51	2	0.5	1.1
082	140	5.51	51	2	0.4	0.9
083	158	6.14	51	2	0.5	1.1
084	161	6.34	51	2	0.7	1.5
162	154	6.06	75	2.95	0.9	2.0
163	179	6.69	75	2.95	1.0	2.2
164	175	6.89	75	2.95	1.0	2.2
165	184	7.24	75	2.95	1.1	2.4
303	246	9.69	75	2.95	1.4	3.1
304	251	9.88	75	2.95	1.5	3.3
305	260	10.24	75	2.95	1.5	3.3

ORDERING — REFER TO PAGE 170 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

TYPE EK-PLUS® LIQUID LINE FILTER - DRIERS



- Corrosion resistant finish
- Superior filtration from new labyrinth maze filter
- Built-in wax removal capability

ACID REMOVAL

The removal of acid is important to the protection and prevention of breakdown. With its high quality modern blend of desiccants, the EK-PLUS filter-drier has the ability to provide positive system protection against acids. It adsorbs and retains harmful acids which is a must to ensure long system life.

FILTRATION

A unique labyrinth type matrix captures and retains solid contaminants better than other filter designs. Better protection from dirt, scale, chips, varnish, flux, etc.

- * EK-PLUS — NEW — EVEN BETTER THAN THE FAMOUS "EK" FILTER-DRIER
- * POSITIVE SILENT CUSHION FLOW
- * POSITIVE LIQUID FILTRATION
- * POSITIVE "NO SWEAT" INSTALLATION
- * POSITIVE MOISTURE, ACID AND WAX REMOVAL

FEATURES

- Positive quick connections
- Full flow fittings for low pressure drop
- Rugged steel shells for shock resistance
- High moisture and acid removal capacity
- Safe Working Pressure: 3448 kPa (500 psig.)

MOISTURE REMOVAL

Assures a dry refrigerant system by adsorbing and retaining moisture. Carefully balanced blend of desiccants provide greater water capacities than conventional block-type driers.

WAX REMOVAL

They have the significant feature of a carbon agent to meet the requirements of commercial refrigeration systems. Capable of removing excessive quantities of wax in the liquid refrigerant before entering and blocking the TX valve. This is made available at no sacrifice to the moisture and acid removal capability.

LIQUID LINE RATINGS FOR HERMETIC TYPE EK — PLUS FILTER — DRIERS

CAT. NO.	MODEL	UNIT SIZE	CONNECTIONS (INS.)	FLOW CAPACITY (1)						WATER CAP.(2) DROPS WATER (3)					
				kW @ 13.8 kPa P.D.			TONS @ 2 PSI P.D.			REFRIGERANT					
										LIQUID LINE TEMP. °C					
				R12	R22	R502	R12	R22	R502	24	52	24	52	24	52
1712	EK-032	3	1/4 SAE Flare	7.0	9.5	6.3	2.0	2.7	1.8	43	35	35	30	37	32
1715	EK-032S		1/4 ODF - 3/8 ODM	10.9	14.1	9.5	3.1	4.0	2.7						
	EK-032FM		1/4 SAE Fl.-Female In	6.7	8.8	6.0	1.9	2.5	1.7						
	EK-032MF		1/4 SAE Fl.-Female Out	6.7	8.8	6.0	1.9	2.5	1.7						
	EK-033		3/8 SAE Flare	14.8	19.3	13.0	4.2	5.5	3.7						
	EK-033S	5	3/8 ODF - 1/2 ODM	16.9	22.5	15.1	4.8	6.4	4.3	82	64	61	50	65	54
1718	EK-052		1/4 SAE Flare	7.4	9.8	6.7	2.1	2.8	1.9						
1719	EK-052S		1/4 ODF - 3/8 ODM	10.9	14.4	9.5	3.1	4.1	2.7						
17110	EK-053		3/8 SAE Flare	17.6	22.9	15.1	5.0	6.5	4.3						
17113	EK-053S		3/8 ODF - 1/2 ODM	21.8	28.8	19.0	6.2	8.2	5.4						
17114	EK-082	8	1/4 SAE Flare	7.7	10.2	6.7	2.2	2.9	1.9	140	106	98	80	106	87
17115	EK-082S		1/4 ODF - 3/8 ODM	11.3	14.8	9.8	3.2	4.2	2.8						
17116	EK-083		3/8 SAE Flare	17.9	23.2	15.5	5.1	6.6	4.4						
17117	EK-083S		3/8 ODF - 1/2 ODM	22.5	29.5	19.7	6.4	8.4	5.6						
17118	EK-084		1/2 SAE Flare	29.9	39.4	26.0	8.5	11.2	7.4						
17119	EK-084S	16	1/2 ODF - 5/8 ODM	32.0	42.2	28.1	9.1	12.0	8.0	247	198	190	160	201	171
17120	EK-162		1/4 SAE Flare	7.7	10.2	6.7	2.2	2.9	1.9						
	EK-162S		1/4 ODF - 3/8 ODM	11.3	14.8	9.8	3.2	4.2	2.8						
17121	EK-163		3/8 SAE Flare	18.3	24.3	16.2	5.2	6.9	4.6						
17122	EK-163S		3/8 ODF - 1/2 ODM	26.0	34.1	22.5	7.4	9.7	6.4						
17123	EK-164	30	1/2 SAE Flare	31.7	41.8	27.8	9.0	11.9	7.9	481	378	361	300	425	323
17124	EK-164S		1/2 ODF - 5/8 ODM	40.8	53.5	35.5	11.6	15.2	10.1						
17125	EK-165		5/8 SAE Flare	41.5	54.5	36.2	11.8	15.5	10.3						
17126	EK-165S		5/8 ODF	55.2	72.8	48.5	15.7	20.7	13.8						
	EK-167S		7/8 ODF	67.5	88.6	58.7	19.2	25.2	16.7						
17128	EK-303	41	3/8 SAE Flare	20.4	26.7	17.6	5.8	7.6	5.0	618	499	486	410	515	438
	EK-303S		3/8 ODF - 1/2 ODM	27.4	35.9	23.9	7.8	10.2	6.8						
17129	EK-304		1/2 SAE Flare	35.9	47.1	31.3	10.2	13.4	8.9						
17130	EK-304S		1/2 ODF - 5/8 ODM	44.7	58.7	39.0	12.7	16.7	11.1						
17131	EK-305		5/8 SAE Flare	45.7	60.1	40.1	13.0	17.3	11.4						
17132	EK-305S	75	5/8 ODF	60.8	80.2	53.1	17.3	22.8	15.1	1485	1070	961	750	1050	833
	EK-306S		3/4 ODF	65.8	86.5	57.3	18.7	24.6	16.3						
	EK-307S		7/8 ODF	68.6	90.4	60.1	19.5	25.7	17.1						
	EK-309S		1-1/8 ODF	79.8	104.8	69.6	22.7	29.8	19.8						
	EK-413		3/8 SAE Flare	20.7	27.1	17.9	5.9	7.7	5.1						
17136	EK-414	41	1/2 SAE Flare	40.8	53.5	35.5	11.6	15.2	10.1	618	499	486	410	515	438
17137	EK-414S		1/2 ODF - 5/8 ODM	46.1	60.5	40.1	13.1	17.2	11.4						
17138	EK-415		5/8 SAE Flare	56.3	73.9	49.2	16.0	21.0	14.0						
17139	EK-415S		5/8 ODF	64.4	84.8	56.3	18.3	24.1	16.0						
17140	EK-417S		7/8 ODF	87.6	115.4	76.7	24.9	32.8	21.8						
17141	EK-419S	75	1-1/8 ODF	93.6	123.1	81.9	26.6	35.0	23.3	1485	1070	961	750	1050	833
17142	EK-757S		7/8 ODF	87.6	115.4	76.7	24.9	32.8	21.8						
17143	EK-759S		1-1/8 ODF	93.6	123.1	81.9	26.6	35.0	23.3						

- Per ARI Standard 710-80, flow rates are based on 30°C (86°F) liquid refrigerant temperature; —15°C (5°F) saturated temperature @ 8.6 grams/sec/kW (4.0 lbs/min/ton) for R-12; 6.3 grams/sec/kW (2.9 lbs/min/ton) for R-22; 9.5 grams/sec/kW (4.4 lbs/min/ton) for R-502.
- Water capacities are based on: End Point Dryness of 15 Parts Per Million for R-12; End Point Dryness of 60 Parts Per Million for R-22; End Point Dryness of 30 Parts Per Million for R-502.
- 20 drops of water = 1 gram = 1 cc.

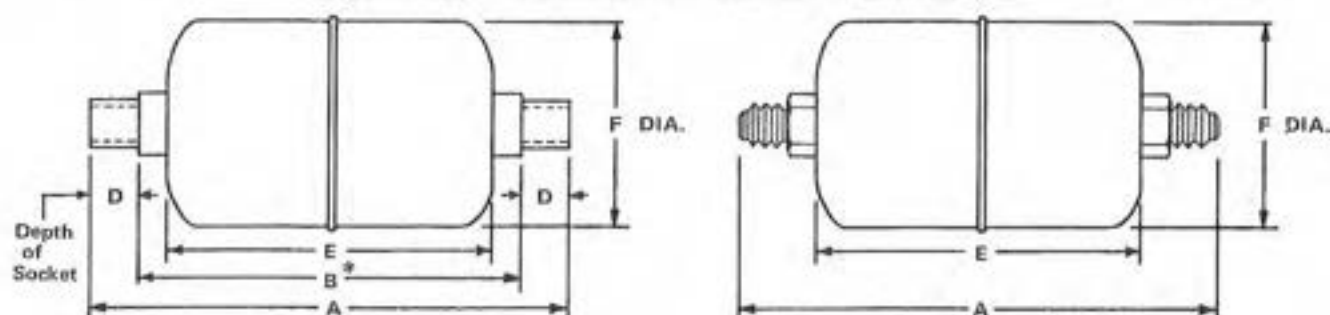
REFER NEXT TECH. PAGE FOR ADDITIONAL TECHNICAL DATA, DIMENSIONS AND WEIGHTS
REFER PAGE 169 FOR ALCO REPLACEMENT FILTER-DRIER BLOCKS



TYPE EK-PLUS® LIQUID LINE FILTER - DRIERS TECHNICAL DATA

UNIT SIZE	REFRIGERANT LIQUID CONTAINED IN TYPE EK-PLUS FILTER-DRIERS					
	WEIGHT OF REFRIGERANT - GRAMS (OUNCES)					
	R12		R22		R502	
	LIQUID TEMPERATURE		LIQUID TEMPERATURE		LIQUID TEMPERATURE	
	24°C (75°F)	52°C (125°F)	24°C (75°F)	52°C (125°F)	24°C (75°F)	52°C (125°F)
3	82.2 (2.9)	73.7 (2.6)	73.7 (2.6)	65.2 (2.3)	76.5 (2.7)	68.0 (2.4)
5	189.8 (6.7)	172.8 (6.1)	172.8 (6.1)	155.8 (5.5)	178.5 (6.3)	158.6 (5.6)
8	257.8 (9.1)	235.1 (8.3)	235.1 (8.3)	212.5 (7.5)	243.6 (8.6)	215.3 (7.6)
16	495.8 (17.5)	450.4 (15.9)	450.4 (15.9)	405.1 (14.3)	467.4 (16.5)	413.6 (14.6)
30	813.0 (28.7)	739.4 (26.1)	739.4 (26.1)	665.7 (23.5)	767.7 (27.1)	679.9 (24.0)
41	1133.0 (40.0)	1031.0 (36.4)	1031.0 (36.4)	920.7 (32.5)	1071.0 (37.8)	946.2 (33.4)
75	2051.0 (72.4)	1864.0 (65.8)	1864.0 (65.8)	1677.0 (59.2)	1938.0 (68.4)	1714.0 (60.5)

HERMETIC TYPE EK-PLUS DIMENSIONAL DATA



*B Indicates Laying Length

MODEL	CONNECTIONS SIZE & TYPE (Ins.)	DIMENSIONS — Inches					SHIPPING Wt. kg (lbs)
		A	B	D	E	F (1)	
EK-032	1/4 SAE Flare	4-3/8	—	—	2-9/16	1-5/8	0.23 (1/2)
EK-032S	1/4 ODF - 3/8 ODM	3-7/8	3-1/8	3/8			
EK-032FM	1/4 SAE Fl. - Female In	3-5/8	—	—			
EK-032MF	1/4 SAE Fl. - Female Out	4-13/16	—	—			
EK-033	3/8 SAE Flare	4-11/16	3-3/16	7/16	3	2-5/8	0.4 (7/8)
EK-033S	3/8 ODF - 1/2 ODM	4-1/16	—	—			
EK-052	1/4 SAE Flare	4-13/16	—	—			
EK-052S	1/4 ODF - 3/8 ODM	4-5/16	3-9/16	3/8			
EK-053	3/8 SAE Flare	5-1/8	—	—	3-13/16	2-5/8	0.57 (1 1/4)
EK-053S	3/8 ODF - 1/2 ODM	4-1/2	3-5/8	7/16			
EK-082	1/4 SAE Flare	5-5/8	—	—			
EK-082S	1/4 ODF - 3/8 ODM	5-1/8	4-3/8	3/8			
EK-083	3/8 SAE Flare	5-15/16	—	—	4-3/4	2-5/8	0.68 (1 1/2)
EK-083S	3/8 ODF - 1/2 ODM	6-3/16	—	—			
EK-084	1/2 SAE Flare	5-5/16	4-7/16	7/16			
EK-084S	1/2 ODF - 5/8 ODM	5-3/8	4-3/8	1/2			
EK-162	1/4 SAE Flare	6-9/16	5-5/16	3/8	7-1/2	3-1/16	1.7 (3 3/4)
EK-162S	1/4 ODF - 3/8 ODM	6-1/16	5-5/16	3/8			
EK-163	3/8 SAE Flare	6-7/8	5-5/16	3/8			
EK-163S	3/8 ODF - 1/2 ODM	6-1/4	5-3/8	7/16			
EK-164	1/2 SAE Flare	7-1/16	—	—	7-5/8	3-9/16	2.2 (4 1/2)
EK-164S	1/2 ODF - 5/8 ODM	6-5/16	5-5/16	1/2			
EK-165	5/8 SAE Flare	7-1/2	—	—			
EK-165S	5/8 ODF	6-1/2	5-1/4	5/8			
EK-167S	7/8 ODF	7-3/16	5-9/16	3/4	13-1/16	3-9/16	3.4 (7 1/2)
EK-303	3/8 SAE Flare	9-5/8	—	—			
EK-303S	3/8 ODF - 1/2 ODM	9	8-1/8	7/16			
EK-304	1/2 SAE Flare	9-7/8	—	—			
EK-304S	1/2 ODF - 5/8 ODM	9-1/8	8-1/8	1/2	7-1/2	3-1/16	1.7 (3 3/4)
EK-305	5/8 SAE Flare	10-5/16	—	—			
EK-305S	5/8 ODF	9-5/16	8-1/16	5/8			
EK-306S	3/4 ODF	9-11/16	8-7/16	5/8			
EK-307S	7/8 ODF	9-7/8	8-3/8	3/4	7-5/8	3-9/16	2.2 (4 1/2)
EK-309S	1-1/8 ODF	10-3/16	8-3/8	15/16			
EK-413	3/8 SAE Flare	9-3/4	—	—			
EK-414	1/2 SAE Flare	10	—	—			
EK-414S	1/2 ODF - 5/8 ODM	9-1/4	8-1/4	1/2	7-5/8	3-9/16	2.2 (4 1/2)
EK-415	5/8 SAE Flare	10-7/16	—	—			
EK-415S	5/8 ODF	9-7/16	8-3/16	5/8			
EK-417S	7/8 ODF	10	8-1/2	3/4			
EK-419S	1-1/8 ODF	10-5/16	8-1/2	15/16	13-1/16	3-9/16	3.4 (7 1/2)
EK-757S	7/8 ODF	15-7/16	13-15/16	3/4			
EK-759S	1-1/8 ODF	15-3/4	13-15/16	15/16			

(1) Dimension does not include weld bead.

ORDERING : REFER TO PAGE 171 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

171-b THE BFK SERIES BI-DIRECTIONAL HEAT PUMP FILTER-DRIER

Another Alco
Answer for the
expanding heat-
pump market.



Reduces complex piping and resulting costs



★ Two basic sizes —

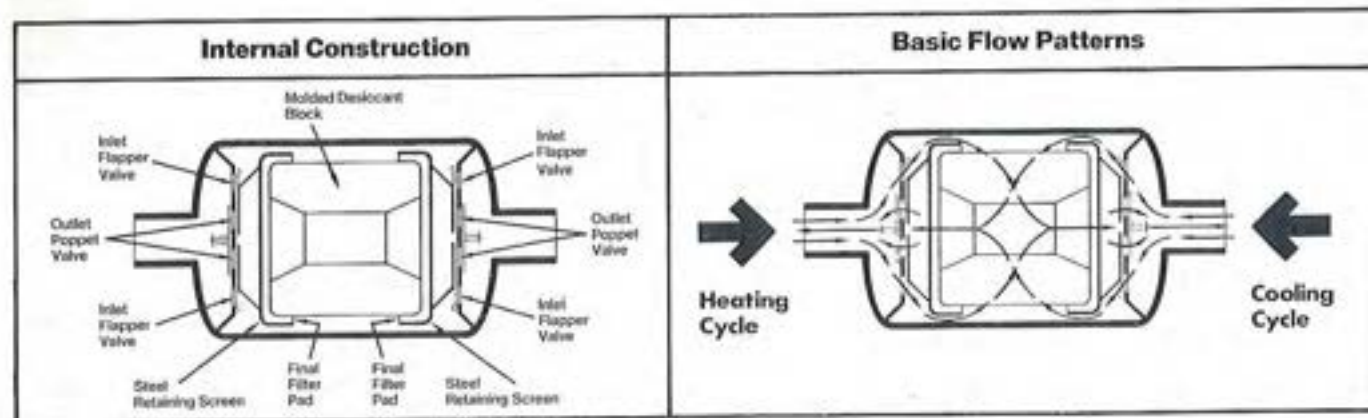
BKF 08 — Shell Length 98.4 mm (3-7/8")
Shell Diam. 58.7 mm (2-5/16")

BKF 16 — Shell Length 115.9 mm (4-9/16")
Shell Diam. 73 mm (2-7/8")

★ Dimensionally equivalent to Alco's conventional single-flow filter-driers.

FEATURES

- System protection in heating and cooling cycles summer and winter, with one compact unit.
- Internal check valves allow flow and filtration in either direction.
- Eliminates need for external check valves.
- Lightweight. These compact units may be installed in any position.
- Provides effective removal of moisture, acid and solid contaminants.
- Reduces system complexity and resulting costs.
- May be mounted in any position.
- Reduces compressor maintenance.



Unit Size	CAT. NO.	MODEL	Connections	Flow Capacity kW (Tons)/R22 @ 14kPa (2psi) P.D.		Water Capacity (Drops)	Acid Capacity (mg)	Filter Area cm ² (ins ²)	Desiccant Volume cm ³ (ins ³)	Liquid Refrigerant Capacity by Weight gm (ozs) R22	
				kW	Tons					24°C (75°F)	52°C (125°F)
08	17151	BKF 083	3/8" SAE	22.5	6.4	89	2050	106.5 (16.5)	75.4 (4.6)	218.1 (7.7)	195.5 (6.9)
		BKF 083S	3/8" ODF	25.3	7.2						
	17152	BKF 084	1/2" SAE	32.0	9.1						
		BKF 084S	1/2" ODF	33.4	9.5						
	17153	BKF 085	5/8" SAE	38.7	11.0						
		BKF 085S	5/8" ODF	40.4	11.5						
16	17154	BKF 163	3/8" SAE	22.9	6.5	133	6800	182.6 (28.3)	163.9 (10.0)	402.3 (14.2)	359.8 (12.7)
		BKF 163S	3/8" ODF	26.0	7.4						
	17155	BKF 164	1/2" SAE	38.3	10.9						
		BKF 164S	1/2" ODF	40.4	11.5						
	17156	BKF 165	5/8" SAE	41.5	11.8						
		BKF 165S	5/8" ODF	43.3	12.3						

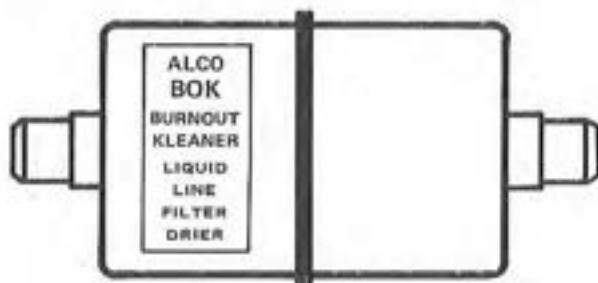


BOK 171-c

BURNOUT KLEANER

LIQUID LINE FILTER — DRIER

Alco's "BOK" Burnout Kleaner Series are specifically designed to protect the refrigerant system from the liquid and solid contaminants that are present following a compressor burnout. They incorporate a moulded block specially blended for maximum acid and moisture removal and a special agent to control waxes and harmful resins.



MOISTURE REMOVAL

The BOK high capacity block was designed for the tough moisture problems. Molecular sieve used in the BOK adsorbs and retains water quantities far in excess of other commonly used desiccants.

ACID REMOVAL

The removal of acid is important in the prevention of motor winding deterioration and system breakdown. With its high quality blend of desiccants, the BOK filter-drier has the ability to provide positive system protection against acids which is a must to ensure long system life. It adsorbs and retains harmful acids which is essential in cleaning up the system following a compressor burnout.

FEATURES

- Full Flow Fittings For Low Pressure Drop.
- Corrosion Resistant Shell Finish and Fittings.
- Rugged Steel Shell (Shock Resistant Construction).
- Extra Moisture and Acid Removal Capacity.
- Safe Working Pressure 3450 kPa (500 psig).
- Burst Pressure 17240 kPa (2500 psig).

WAX REMOVAL

The BOK series have the significant feature of a carbon agent to meet the latest special requirements of commercial refrigeration systems. This agent is capable of removing excessive quantities of wax in the liquid refrigerant before it is able to enter and block the expansion valve. This added bonus protection is made available at no sacrifice to the moisture and acid removal capabilities.

FILTRATION

The geometry of the block exposes maximum surface area to the refrigerant with the flow directed and balanced. This provides even distribution of filtered material resulting in a minimum pressure drop and at the same time offers excellent protection against harmful solid contaminants (dirt, scale, chips, etc.) in the refrigerant system.

LIQUID LINE RATINGS FOR SEALED TYPE BOK BURNOUT KLEANER

CAT. NO.	Model	Unit Size	Connections	Flow Capacity (1)						Water Capacity (2) Drops Water (3)						Filter Area cm ² (ins. ²)
				kW @ 13.8 kPa Press. Drop			Tons @ 2 psi Press. Drop			Refrigerant						
										R12 R22 R502						
										Liquid Line Temperature °C						
				R12	R22	R502	R12	R22	R502	24	52	24	52	24	52	
17160	BOK-082	8	1/4" SAE	6.0	7.7	5.3	1.7	2.2	1.5	142	83	78	65	83	65	148.4 (23)
17161	BOK-083		3/8" SAE	15.8	20.7	14.1	4.5	5.9	4.0							
17162	BOK-162	16	1/4" SAE	6.0	7.7	5.3	1.7	2.2	1.5	274	152	142	116	152	116	219.4 (34)
17163	BOK-163		3/8" SAE	17.6	23.2	15.8	5.0	6.6	4.5							
	BOK-163S		3/8" ODF x 1/2" ODM	23.9	31.3	21.5	6.8	8.9	6.1							
17164	BOK-164		1/2" SAE	35.2	46.1	31.3	10.0	13.1	8.9							
	BOK-164S		1/2" ODF x 5/8" ODM	42.2	55.2	37.6	12.0	15.7	10.7							
17165	BOK-165		5/8" SAE	52.7	69.3	47.1	15.0	19.7	13.4							
	BOK-165S		5/8" ODF	52.7	69.3	47.1	15.0	19.7	13.4							
17166	BOK-303	30	3/8" SAE	17.6	23.2	15.8	5.0	6.6	4.5	499	284	265	221	284	221	354.8 (55)
17167	BOK-304		1/2" SAE	40.8	53.5	36.2	11.6	15.2	10.3							
	BOK-304S		1/2" ODF x 5/8" ODM	44.7	58.4	39.7	12.7	16.6	11.3							
17168	BOK-305		5/8" SAE	55.6	72.8	49.6	15.8	20.7	14.1							
	BOK-305S		5/8" ODF	59.8	78.4	53.5	17.0	22.3	15.2							
17169	BOK-414	41	1/2" SAE	42.2	55.2	37.6	12.0	15.7	10.7	643	368	345	287	368	287	438.7 (68)
17170	BOK-415		5/8" SAE	66.8	87.9	59.8	19.0	25.0	17.0							
	BOK-417S		7/8" ODF	82.6	106.9	72.8	23.5	30.4	20.7							

- (1) Flow Capacities based on 30°C (86°F) liquid refrigerant temperature, -15°C (5°F) saturated temperature, 8.6 grams/sec/kW (4.0 lbs/min./ton) for R12; 6.3 grams/sec/kW (2.9 lbs/min./ton) for R22; 9.5 grams/sec/kW (4.4 lbs/min./ton) for R502.
 (2) Water capacities are based on an End Point Dryness of 15 ppm for R12; 60 ppm for R22 and 30 ppm for R502.
 (3) 20 drops of water = 1 gram = 1cc.

SUGGESTED SELECTION GUIDE FOR SEALED TYPE BOK BURNOUT KLEANER

BOK MODEL	NOMINAL SYSTEM kW and Tons																	
	REFRIGERATION						AIR - CONDITIONING											
	Low Temp./Commercial						Field Replacement						O.E.M. Self-Contained					
	R12		R22		R502		R12		R22		R502		R12		R22		R502	
	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons	kW	Tons
BOK-082	2	½					3	¾	3½	1	3	¾	3½	1	5½	1½	3½	1
BOK-083	3½	1	3½	1	3½	1	7	2	7	2	7	2	11	3	14	4	11	3
BOK-162	3½	1	5½	1½	3	¾	3½	1	5½	1½	3½	1	7	2	9	2½	7	2
BOK-163/163S	7	2	7	2	7	2	11	3	11	3	7	2	14	4	18	5	11	3
BOK-164/164S	7	2	11	3	7	2	11	3	18	5	11	3	18	5	26	7½	18	5
BOK-165/165S	7	2	11	3	7	2	18	5	18	5	14	4	26	7½	35	10	26	7½
BOK-303	11	3	11	3	7	2	11	3	14	4	11	3	14	4	18	5	14	4
BOK-304/304S	11	3	18	5	11	3	18	5	26	7½	18	5	26	7½	26	7½	18	5
BOK-305/305S	14	4	18	5	18	5	26	7½	26	7½	18	5	35	10	53	15	26	7½
BOK-414	18	5	18	5	18	5	18	5	26	7½	18	5	26	7½	26	7½	18	5
BOK-415	26	7½	26	7½	26	7½	26	7½	35	10	18	5	35	10	53	15	26	7½
BOK-417S	35	10	35	10	26	7½	35	10	35	10	26	7½	53	15	53	15	44	12½

DIMENSIONS: Identical with the Alco "EK" Series for the same Model Numbers — Refer Tech. Page 171-a

TYPE ASF SUCTION LINE FILTERS, TYPE ASD SUCTION LINE FILTER-DRIERS "THE COMPRESSOR PROTECTORS" FOR R12 - R22 - R500 - R502

TYPE ASF SUCTION LINE FILTERS

Modern compressor design demands cleaner systems for proper operation. Contaminants, such as metal chips, burrs, copper or iron oxides, varnish, flux and dirt, must not be allowed to enter the compressor motor windings or crankcase.

Compressor manufacturers recommend the installation of suction line filters to protect their equipment. Alco suction line filters installed near the compressor suction provide this pollution protection.



TYPE ASD SUCTION LINE FILTER - DRIERS

Alco Suction Line Filter-Driers have all the features of suction filters plus the added capability of moisture and acid removal. The filter area is identical to the ASF models.

A generous blend of carefully selected desiccants is added to the ASD models to provide maximum moisture and acid removal. This includes protection from moisture and organic or inorganic acids resulting from burnouts or chemical changes in the system refrigerant or oil.

ASD models are specially suited for system clean-up after a burnout, or when major repair work has been performed.



CAT. NO.	ASF SUCTION LINE FILTER	CAT. NO.	ASD SUCTION LINE FILTER-DRIER	CONN.	FILTER AREA		EFFECTIVE DESICCANT VOLUME	
					cm ²	ins ²	cm ³	ins ³
	ASF 21S3-V		ASD 21S3-V	3/8" ODF	135.5	21	122.9	7.5
	ASF 21S4-V		ASD 21S4-V	1/2" ODF	135.5	21	122.9	7.5
1721	ASF 35F5-V	1728	ASD 35F5-V	5/8" SAE	225.8	35	204.8	12.5
1722	ASF 35S5-V	1729	ASD 35S5-V	5/8" ODF	225.8	35	204.8	12.5
1723	ASF 45S6-V	17210	ASD 45S6-V	3/4" ODF	290.3	45	245.8	15.0
1724	ASF 45S7-V	17211	ASD 45S7-V	7/8" ODF	290.3	45	245.8	15.0
1725	ASF 56S9-V	17212	ASD 56S9-V	1-1/8" ODF	361.3	56	334.3	20.4
1726	ASF 90S11-V	17213	ASD 90S11-V	1-3/8" ODF	590.6	90	575.2	35.1
1727	ASF 100S13-V	17214	ASD 100S13-V	1-5/8" ODF	845.2	100	611.2	37.3

NOTE: All sizes equipped with 1/2" inlet access valve as standard.

SUCTION LINE RATINGS

FLOW CAPACITY IN TONS AT LISTED CONDITIONS *

MODEL NO.	FLOW CAPACITY IN TONS AT LISTED CONDITIONS													
	R12					R22					R502			
	EVAPORATOR TEMPERATURE °C (°F)													
	4.4 (40)	-6.7 (20)	-17.8 (0)	-29 (-20)	4.4 (40)	-6.7 (20)	-17.8 (0)	-29 (-20)	-40 (-40)	4.4 (40)	-6.7 (20)	-17.8 (0)	-29 (-20)	-40 (-40)
	PRESSURE DROP kPa (psi)													
	13.8 (2)	10.3 (1.5)	6.9 (1)	3.4 (0.5)	20.7 (3)	13.8 (2)	10.3 (1.5)	6.9 (1)	3.4 (0.5)	20.7 (3)	13.8 (2)	10.3 (1.5)	6.9 (1)	3.4 (0.5)

TYPE ASF SUCTION LINE FILTER

ASF 21S3-V	1.2	.75	.52	.40	2.4	1.3	.89	.74	.53	2.2	1.1	.70	.46	.34
ASF 21S4-V	2.0	1.3	.92	.71	4.1	2.3	1.6	1.2	.94	3.8	2.0	1.2	.82	.60
ASF 35F5-V	2.3	1.5	1.0	.80	4.7	2.6	1.8	1.3	1.0	4.4	2.3	1.4	.93	.68
ASF 35S5-V	3.3	2.2	1.5	1.2	6.6	3.7	2.6	1.9	1.6	6.1	3.2	2.0	1.4	1.0
ASF 45S6-V	4.8	3.1	2.2	1.6	9.8	5.5	3.7	2.7	2.2	9.1	4.7	2.9	1.9	1.4
ASF 45S7-V	6.2	4.0	2.8	2.1	12.8	7.1	4.8	3.5	2.8	11.9	6.1	3.8	2.5	1.8
ASF 56S9-V	7.8	5.0	3.3	2.5	16.2	8.8	5.8	4.1	3.3	15.2	7.7	4.7	3.0	2.1
ASF 90S11-V	9.0	5.8	4.0	3.0	18.3	10.1	6.8	4.9	3.9	17.0	8.8	5.4	3.5	2.6
ASF 100S13-V	9.3	6.0	4.1	3.1	19.0	10.6	7.1	5.1	4.1	17.8	9.1	5.6	3.7	2.7

TYPE ASD SUCTION LINE FILTER - DRIER

ASD 21S3-V	1.1	.62	.51	.39	2.3	1.3	.87	.64	.52	2.1	1.1	.68	.45	.33
ASD 21S4-V	1.9	1.2	.83	.63	3.8	2.1	1.4	1.0	.83	3.6	1.8	1.1	.74	.53
ASD 35F5-V	2.2	1.4	1.0	.75	4.4	2.5	1.7	1.2	1.0	4.1	2.1	1.3	.88	.64
ASD 35S5-V	2.9	1.9	1.3	1.0	5.8	3.2	2.2	1.6	1.3	5.4	2.8	1.7	1.1	.84
ASD 45S6-V	3.9	2.5	1.7	1.3	8.0	4.4	3.0	2.1	1.7	7.4	3.8	2.3	1.5	1.1
ASD 45S7-V	4.7	3.0	2.0	1.5	9.7	5.3	3.5	2.5	2.0	9.1	4.6	2.8	1.8	1.3
ASD 56S9-V	5.4	3.4	2.3	1.7	11.2	6.1	4.0	2.9	2.3	10.5	5.3	3.2	2.1	1.5
ASD 90S11-V	5.9	3.7	2.5	1.8	12.2	6.7	4.4	3.0	2.4	11.5	5.8	3.5	2.2	1.6
ASD 100S13-V	6.4	4.0	2.7	2.0	13.2	7.2	4.7	3.3	2.6	12.4	6.3	3.8	2.4	1.7

* All ratings in accordance with ARI Standard 730-80. Based on 40°F evap. sat. temp., 50°F vapour leaving evap., 65°F vapour entering filter/filter-drier and 90°F liquid entering evap.

METRIC CONVERSION: Tons x 3.517 = kW.

kW x 0.28433 = Tons

REFER PAGE 169 FOR ALCO REPLACEABLE FILTER-DRIER BLOCKS



ASK BLOCK STYLE SUCTION LINE FILTER — DRIERS FOR R12 — R22 — R500 — R502

ALCO'S "ASK" FILTER-DRIER SERIES FOR SUCTION LINE SERVICE WAS DESIGNED ESPECIALLY FOR SMALLER SYSTEMS. THESE SEALED DRIERS INCORPORATE A MOULDED BLOCK OF ACTIVATED ALUMINA AND MOLECULAR SIEVE FOR EFFECTIVE CONTROL OF ACIDS AND MOISTURE.

2



FEATURES

- Full Flow Fittings For Low Pressure Drop
- Inlet Pressure Access Valve
- Corrosion-Resistant Epoxy Paint Finish
- Rugged Shock Resistant Steel Shells
- Safe Working Pressure: 3450 kPa (500 psig)
- Burst Pressure: 17240 kPa (2500 psig)

MOISTURE REMOVAL

The ASK high capacity block was designed for the tough moisture problems. Molecular sieve used in the ASK adsorbs and retains water quantities far in excess of other commonly used desiccants.

FILTRATION

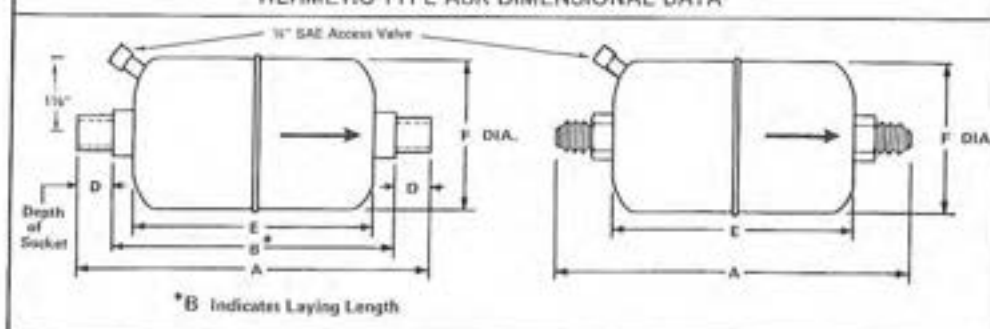
The geometry of the block exposes maximum surface area to the refrigerant with the flow directed and balanced. This provides even distribution of filtered material resulting in a minimum pressure drop and at the same time offers excellent protection against harmful solid contaminants (dirt, scale, chips, etc.) returning to the compressor with possible serious consequences.

ACID REMOVAL

The removal of acid is important in the prevention of motor winding deterioration and system breakdown. With its high quality blend of desiccants, the ASK filter-drier has the ability to provide positive system protection against acids which is a must to ensure long system life.

CAT. NO.	MODEL	CONNECTIONS	SUGGESTED SYSTEM SIZE kW (HP)						FILTER AREA	EFFECTIVE FILTER VOLUME
			R12		R22		R502			
			kW	HP	kW	HP	kW	HP		
17220	ASK 164-V	1/2" SAE	0.93	1%	1.87	2%	1.49	2	219.4 cm ² 34 ins ²	262.2 cm ³ 16 ins ³
17221	ASK 164S-V	1/2" ODF								
17222	ASK 165-V	5/8" SAE	1.12	1%	2.05	2%	1.68	2%		
17223	ASK 165S-V	5/8" ODF								
17224	ASK 166S-V	3/4" ODF	1.31	1%	2.24	3	1.87	2%		
17225	ASK 167S-V	7/8" ODF	1.49	2	2.61	3%	2.24	3		

HERMETIC TYPE ASK DIMENSIONAL DATA



*B Indicates Laying Length

MODEL	CONNECTIONS	DIMENSIONS — INS.					SHIPPING WEIGHT
		A	B	D	E	F (1)	
ASK 164-V	1/2" SAE	6-15/16"	—	—	4-5/8"	2-7/8"	4.4 kg
ASK 164S-V	1/2" ODF	6-3/16"	5-3/16"	1/2"			
ASK 165-V	5/8" SAE	7-7/16"	—	—			(2 lbs)
ASK 165S-V	5/8" ODF	6-3/8"	5-1/8"	5/8"			
ASK 166S-V	3/4" ODF	6-3/4"	5-1/2"	3/4"			
ASK 167S-V	7/8" ODF	6-15/16"	5-7/16"	3/4"			

(1) Dimension does not include weld bead.



ADKS REPLACEABLE BLOCK TYPE LIQUID LINE FILTER-DRIERS (SHELLS ONLY)

FOR R12 - R22 - R500 - R502

Alco ADKS Replaceable Block Type Filter-Driers offer high liquid line flow capacities for larger air-conditioning and refrigeration jobs. The moulded replaceable blocks provide efficient moisture adsorption and rapid acid removal. The blocks in conjunction with the shell's internal filter provides maximum filtration with low pressure drops.



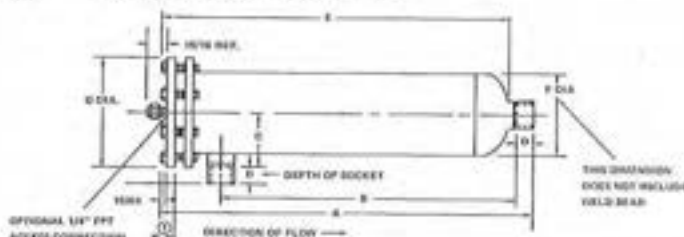
FEATURES

- Simplified internal hardware for ease of installation.
- Full flow fittings for low pressure drop.
- Corrosion resistant epoxy paint finish.
- Rugged steel shells for durability.
- Choice of Standard, Hi-Capacity or Burnout Cores.
- Internal Filter.
- 1/4" FPT access connection on all models (suffix 'T')
- Safe Working Pressure 3448 kPa (500 psig)
- Burst Pressure 17238 kPa (2500 psig)

LIQUID LINE RATINGS FOR REPLACEABLE BLOCK TYPE ADKS FILTER-DRIERS

LIQUID LINE RATINGS FOR REPLACEABLE BLOCK TYPE ADKS FILTER-DRIERS																		
CAT. NO.	MODEL ADKS Shell	Unit Size	Conns. (ODF)	Flow Capacity (1)						Water Capacity (2) Drops Water (3)						Filter Area cm ² (ins. ²)	No. & Type of Drier Blocks Req'd.	
				kW @ 13.8 kPa Press. Drop			Tons @ 2 psi Press. Drop			Refrigerant								
										Liquid Line Temp. °C								
				R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	R502			
	ADKS-485T	48	5/8"	67	81	60	19	23	17	655	550	501	436	542	461	445 (69)	1	D-48 H-48 W-48
	ADKS-487T		7/8"	88	109	77	25	31	22									
17440	ADKS-489T		1-1/8"	95	120	88	27	34	25									
	ADKS-4811T		1-3/8"	106	134	102	30	38	29									
	ADKS-4813T		1-5/8"	116	148	113	33	42	32									
	ADKS-967T	96	7/8"	151	190	134	43	54	38	1310	1100	1002	872	1084	922	890 (138)	2	D-48 H-48 W-48
	ADKS-969T		1-1/8"	183	229	162	52	65	46									
	ADKS-9611T		1-3/8"	204	253	176	58	72	50									
17441	ADKS-9613T		1-5/8"	225	285	197	64	81	56									
	ADKS-9617T		2-1/8"	274	345	239	78	98	68									
	ADKS-1449T	144	1-1/8"	222	278	197	63	79	56	1965	1650	1503	1308	1626	1383	1336 (207)	3	D-48 H-48 W-48
	ADKS-14411T		1-3/8"	260	327	232	74	93	66									
17442	ADKS-14413T		1-5/8"	299	369	257	85	105	73									
	ADKS-14417T		2-1/8"	362	447	310	103	127	88									
	ADKS-19211T	192	1-3/8"	320	408	285	91	116	81	2620	2200	2004	1744	2168	1844	1781 (276)	4	D-48 H-48 W-48
	ADKS-19213T		1-5/8"	376	471	334	107	134	95									
	ADKS-19217T		2-1/8"	457	573	405	130	163	115									
	ADKS-30013T	300	1-5/8"	422	531	376	120	151	107	4037	3390	3078	2679	3337	2838	2129 (330)	3	H-100 W-100
	ADKS-30017T		2-1/8"	513	644	457	146	183	130									
	ADKS-40017T	400	2-1/8"	549	686	489	156	195	139	5383	4520	4105	3572	4450	3784	2839 (440)	4	H-100 W-100
17443	ADKS-40021T		2-5/8"	619	774	552	176	220	157									

- (1) Flow Capacities based on 30°C (86°F) liquid refrigerant temperature, -15°C (5°F) saturated temperature, 8.6 grams/sec/kW (4.0 lbs/min./ton) for R12; 6.3 grams/sec/kW (2.9 lbs/min./ton) for R22; 9.5 grams/sec/kW (4.4 lbs/min./ton) for R502.
- (2) Water capacities are based on an End Point Dryness of 15 ppm for R12; 60 ppm for R22 and 30 ppm for R502.
- (3) 20 drops of water = 1 gram = 1cc.



PRELIMINARY INSTALLATION INSTRUCTIONS

1. The ADKS may be installed in any position. Allow sufficient clearance from the flanged end to permit removal of the shells internal hardware — Refer Dimension 'H'.
2. Flow must be in the direction of the arrow on the shell label.
3. Remove the internal hardware while soldering or brazing the connections. This will avoid any heat damage to the nylon internal hardware.

ADKS DIMENSIONAL DATA — ins.

MODEL	A	B	C	D	E	F	G	H*
ADKS-489T	9-17/32	5-1/4	2-29/32	15/16	8-3/32	4-1/2	6-1/16	7-3/4
ADKS-9613T	15-9/32	10-13/16	2-29/32	1-1/8	13-5/8	4-1/2	6-1/16	13-19/32
ADKS-14413T	20-13/16	16-11/32	2-29/32	1-1/8	19-3/16	4-1/2	6-1/16	18-7/8
ADKS-40021T	33-1/8	26-23/32	4-13/16	1-15/32	29-31/32	6	7-9/16	28-7/8

* "H" Dimension is the clearance required to change the internal hardware assembly. Dimensions of full range available on request.

REPLACEABLE CORES FOR ADKS SHELLS

CAT. NO.	Replaceable Core Type	Description	SUITS ADKS SHELLS	
			No. Cores Required	ADKS Shell Models
16911 1691 1693	D - 48 or H - 48 or W - 48	Std. Capacity High Capacity Burnout Block	1 for Models:—	485T 487T 489T 4811T 4813T
			2 for Models:—	967T 969T 9611T 9613T 9617T
			3 for Models:—	1449T 14411T 14413T 14417T
			4 for Models:—	19211T 19213T 19217T
1692 1694	H - 100 or W - 100	High Capacity Burnout Block	3 for Models:—	30013T 30017T
			4 for Models:—	40017T 40021T

NOTE: Full details of Alco Replaceable Cores are shown on Page 169.

NOTES

2

WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE
NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

Heldon

FILTER - CORE DRYER



COMPLETE WITH
FLARE NUTS & COPPER BONNETS

CAT. NO.	TYPE	PART NUMBER Flare Solder Type Type	Connection Size	Volume cu. in.	Surface Area sq. in.	Body Diam. A	Laying Length Flare Solder Type B Type L	WATER CAPACITY IN DROPS 20 DROPS = 1 GRAM = 1 CC						REFRIGERANT FLOW CAPACITY IN TONS AT MAXIMUM PRESSURE DROP OF 2 P.S.I.			SELECTION RECOMMENDATIONS IN HORSE POWER					
								Refrigerant 12		Refrigerant 22		Refrigerant 502		Refrigerant			Refrigerant 12		Refrigerant 22		Refrigerant 502	
								75°F.	125°F.	75°F.	125°F.	75°F.	125°F.	12	22	502	Commercial Refrigeration and Low Temperature Equipment	Air Cond.	Commercial Refrigeration and Low Temperature Equipment	Air Cond.	Commercial Refrigeration and Low Temperature Equipment	Air Cond.
1731	032	7000	1/2				4 1/2							1.7	2.0	1.6	1/4	1/4	1/4	1	1/4	1/4
17320	032S	7020	1/2				3 1/2							1.7	2.0	1.6	1/4	1/4	1/4	1	1/4	1/4
17342	033	7045	3/8	3	9 1/2	1 1/2	4 1/2	55	40	40	28	42	30	3.6	4.4	3.1	1/2	1/2	1/2	1	1/2	1/2
17347	033S	7065	3/8				3 1/2							4.0	4.9	3.4	1/2	1/2	1/2	1	1/2	1/2
17340	052	7041	1/2				4 1/2							1.9	2.3	1.7	1/2	1	1/2	1	1/2	1
17343	052S	7061	1/2				3 1/2							1.9	2.3	1.7	1/2	1	1/2	1	1/2	1
17341	053	7042	1/2	5	15	2 1/2	5 1/2	115	76	64	52	86	63	4.0	4.9	3.4	1/2	2	1/2	2	1/2	2
17344	053S	7062	1/2				3 1/2							4.8	5.8	4.1	1/2	2	1/2	2	1/2	2
1732	082	7001	1/2				5 1/2							2	2.4	1.7	1/2	1	1/2	1	1/2	1
17321	082S	7021	1/2				4 1/2							2	2.4	1.7	1/2	1	1/2	1	1/2	1
1733	083	7002	1/2	9	21	2 1/2	6 1/2	155	104	90	71	101	76	4.7	5.8	4.0	1	2	1	2	1	1 1/2
17322	083S	7022	1/2				4 1/2							5.6	6.9	4.7	1	2	1	2	1	1 1/2
17317	084	7017	1/2				6 1/2							9.0	11.1	7.7	1	2	1 1/2	2	1	1 1/2
17337	084S	7037	1/2				4 1/2							9.8	12.1	8.3	1	2	1 1/2	2	1	1 1/2
1734	162	7003	1/2				6 1/2							2	2.4	1.7	1	2	1 1/2	2	1	1 1/2
17323	162S	7023	1/2				5							2	2.4	1.7	1	2	1 1/2	2	1	1 1/2
1735	163	7004	1/2				6 1/2							4.9	5.9	4.1	2	4	2	5	2	3
17324	163S	7024	1/2				5							5.9	7.1	5.0	2	4	2	5	2	3
17318	164	7018	1/2	17	33	3	6 1/2	250	190	150	133	190	128	11.4	13.9	9.7	2	5	3	7 1/2	2	5
17338	164S	7038	1/2				5							12.2	15.1	10.3	2	5	3	7 1/2	2	5
17319	165	7019	1/2				7 1/2							14.8	18.0	12.6	3	7 1/2	5	10	4	7 1/2
17339	165S	7039	1/2				5 1/2							15.9	19.4	13.4	3	7 1/2	5	10	4	7 1/2
1736	303	7005	1/2				9 1/2							5.3	6.2	4.0	3	5	3	5	2	4
17325	303S	7025	1/2				8							6.3	7.7	5.3	3	5	3	5	2	4
1737	304	7006	1/2				9 1/2							11.4	13.9	9.7	3	7 1/2	5	7 1/2	3	5
17326	304S	7026	1/2				8							12.2	15.1	10.3	3	7 1/2	5	7 1/2	3	5
1738	305	7007	1/2	34	57	3	10 1/2	494	326	274	220	336	280	15.6	19.0	13.2	5	10	7 1/2	15	5	7 1/2
17327	305S	7027	1/2				8							16.5	20.1	14.8	5	10	7 1/2	15	5	7 1/2
17316	306	7015	1/2				10 1/2							18.1	22.0	15.5	7 1/2	10	10	15	7 1/2	10
17335	306S	7035	1/2				8							19.3	23.5	16.4	7 1/2	10	10	15	7 1/2	10
17345	307S	7063	1/2				8 1/2							22.1	26.7	18.8	10	15	10	20	10	12
1739	413	7008	1/2				9 1/2							10	12.2	9.2	7 1/2	10	5	7 1/2	7 1/2	10
17328	413S	7028	1/2				8 1/2							10	12.2	9.2	7 1/2	10	5	7 1/2	7 1/2	10
17310	414	7009	1/2				10							11.0	13.4	9.4	7 1/2	10	5	7 1/2	7 1/2	10
17329	414S	7029	1/2				8 1/2							11.6	13.9	9.7	7 1/2	10	5	7 1/2	7 1/2	10
17311	415	7010	1/2	47	70	3 1/2	10 1/2	721	493	388	353	489	478	15.6	19.0	13.2	7 1/2	10	7 1/2	10	7 1/2	7 1/2
17330	415S	7030	1/2				8 1/2							16.7	20.3	14.2	7 1/2	10	7 1/2	10	7 1/2	7 1/2
17316	416	7016	1/2				10 1/2							20.3	25.1	17.2	7 1/2	10	10	15	7 1/2	10
17336	416S	7036	1/2				8 1/2							21.5	25.5	18.2	7 1/2	10	10	15	7 1/2	10
17346	417S	7064	1/2				8 1/2							25.0	29.6	21.2	12	15	12	15	10	12
17312	754	7011	1/2				15 1/2							21.0	24.0	18.0	10	15	10	15	7 1/2	12
17331	754S	7031	1/2				13 1/2							21.4	24.5	18.0	10	15	10	15	7 1/2	12
17313	755	7012	1/2				15 1/2							24.0	26.0	19.2	10	15	15	20	7 1/2	12
17332	755S	7032	1/2	83	127	3 1/2	13 1/2	1279	903	660	560	890	772	24.7	26.8	19.5	15	20	20	20	15	20
17314	756	7013	1/2				15 1/2							27.0	29.8	23.3	15	20	20	20	15	20
17333	756S	7033	1/2				13 1/2							27.9	31.6	24.3	15	20	20	20	15	20
17334	757S	7034	1/2				13 1/2							29.0	35.4	24.6	20	20	25	25	15	15

The above data is based on test procedure as specified in ARI Standard 710.

As a general rule to relate pounds of refrigerant in the system to Horsepower or Tonnage, allow 8 lbs. per Horsepower or Ton for refrigerant 12, and 6 lbs. per Horsepower or Ton for refrigerants 22 and 502.

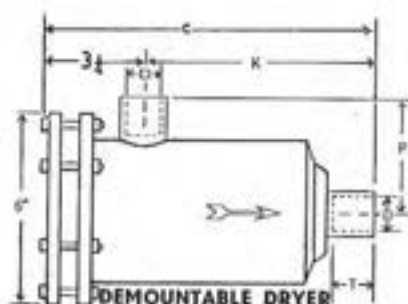
The E.P.D. of refrigerant 12 is 15 P.P.M. (Parts per million) while the E.P.D. for refrigerants 22 and 502 is 60 P.P.M.

BURN-OUT FILTER CORE DRYERS — for use in the Suction Line



CAT. NO.	PART NO.	FLARE SIZE	LAYING LGTH.	BODY DIAM.	CAPACITY
17348	7070 - HH	3/8"	167mm (6-9/16")	44.5 mm (1 1/4")	UP TO 7 kW (2 Tons)
17349	7071 - HH	1/2"	173mm (6-13/16")		
17350	7072 - HH	5/8"	186mm (7-5/16")		

SUPPLIED WITH JUMPER TUBE



Heldon

DEMOUNTABLE DRYERS (SHELLS ONLY) WITH REPLACEABLE CORES

SOLDER CONNECTIONS

CAT. NO. Shell Only	PART NUMBER	No. of Cores	Size of Core, Ø	Volume of Desiccant cu. ins.	Surface Filter Area sq. ins.	Dimes. K	Dimes. P	Overall Length C	Socket Depth T	WATER CAPACITY IN DROPS 20 DROPS = 1 GRAM = 1 CC						REFRIGERANT FLOW CAPACITY IN TONS AT MAXIMUM PRESSURE DROP OF 2 P.S.I.			SELECTION RECOMMENDATIONS IN HORSE POWER						
										Refrigerant 12		Refrigerant 22		Refrigerant 502		Refrigerant	Commercial Refrigeration and Low Temperature Equipment	Air Cond.	Commercial Refrigeration and Low Temperature Equipment	Air Cond.	Commercial Refrigeration and Low Temperature Equipment	Air Cond.			
										75°F.	125°F.	75°F.	125°F.	75°F.	125°F.								12	22	502
1741	7150-12	1	3/4	48	64	5 1/2	3 3/8	8 1/2	3/8	1148	810	720	560	800	690	17.5	20	13.5	7 1/2	10	10	15	5	7 1/2	
1742	7150-14	1	7/8			5 3/8	3 3/8	8 1/2	3/4							20	24	17	10	15	15	20	7 1/2	12	
1743	7150-18	1	1 1/8			5 13/16	3 3/8	9 5/8	1							26.5	32	22	10	15	15	20	10	12	
1744	7150-22	1	1 1/2			5 13/16	3 3/8	9 5/8	1							29.3	35.4	24	15	20	25	30	12	15	
1745	7150-26	1	1 5/8			6 1/8	3 3/8	9 5/8	1 1/8							30	36	26	15	20	25	30	12	15	
1746	7250-14	2	7/8	96	128	11 1/2	3 3/8	14 1/2	3/4	2420	1710	1440	1120	1700	1550	34	41	29	15	20	25	30	15	20	
1747	7250-18	2	1 1/2			11 5/8	3 3/8	14 13/16	1							41	50	35	25	30	35	40	15	25	
1748	7250-22	2	1 3/4			11 5/8	3 3/8	14 13/16	1							47	57	38	25	30	35	40	20	25	
1749	7250-26	2	1 5/8			11 13/16	3 3/8	14 13/16	1 1/8							51	60	40	30	40	40	50	25	30	
17410	7250-34	2	2 1/8			12 1/8	4 1/8	15 1/8	1 1/2							56	70	51	30	40	40	50	25	30	
17411	7350-14	3	7/8	144	192	16 13/16	3 3/8	20 5/8	3/4	3650	2570	2160	1680	2500	2350	42	50	34	30	40	40	50	25	30	
17412	7350-18	3	1 1/2			17 1/8	3 3/8	20 1/2	1							50	60	43	30	40	40	50	25	35	
17413	7350-22	3	1 3/4			17 1/8	3 3/8	20 3/4	1							58	71	50	40	50	50	60	30	40	
17414	7350-26	3	1 5/8			17 1/2	3 3/8	20 1/2	1 1/8							60	73	48	50	60	60	75	40	50	
17415	7350-34	3	2 1/8			17 3/4	4 1/8	21	1 1/2							85	105	78	50	60	60	75	40	50	
17421	7450-14	4	7/8	192	256	22 1/2	3 3/8	25 1/2	3/4	4800	3380	2880	2240	3300	3000	42	51	34	30	40	40	50	25	30	
17422	7450-18	4	1 1/2			22 5/8	3 3/8	25 13/16	1							51	60	43	30	40	40	50	25	30	
17423	7450-22	4	1 3/4			22 3/8	3 3/8	25 13/16	1							72	88	61	50	60	60	75	40	50	
17424	7450-26	4	1 5/8			22 11/16	3 3/8	25 13/16	1 1/8							84	102	71	60	75	75	90	50	60	
17425	7450-34	4	2 1/8			23 1/8	4 1/8	26 7/8	1 1/2							109	130	87	90	100	100	110	75	90	

NOTE: CORES NOT INCLUDED WITH ABOVE DEMOUNTABLE DRIERS — MUST BE ORDERED SEPARATELY

TWO REPLACEABLE CORES		
Supplied in hermetically sealed can complete with new sealing gasket		
CAT. NO.	PART NO.	DESCRIPTION
17429	7600	STANDARD REPLACEABLE CORE
17420	7600 HH	BURN - OUT REPLACEABLE CORE

MICRO - GUARD FILTER - DRIERS

hudson

TYPE	FLARE CONNECTIONS				SOLDER CONNECTIONS		CONN. SIZE	FILTER AREA	
	WITHOUT NUTS		WITH NUTS					SQ. CM.	SQ. INS.
	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N			
032	—	FL032	1751	A16600	17525	A16640	1/4"	75.8	11.75
052	—	FL052	1753	A16606	17526	A16646		109.7	17.00
082	—	FL082	1755	A16608	17527	A16648		164.5	25.50
162	—	FL162	1758	A16612	—	—		233.9	36.25
033	—	FL033	1752	A16601	17528	A16641	3/8"	75.8	11.75
053	—	FL053	1754	A16607	17529	A16647		109.7	17.00
083	—	FL083	1756	A16609	17514	A16649		164.5	25.50
163	—	FL163	1759	A16613	17523	A16653		233.9	36.25
303	—	FL303	17518	A16618	17530	A16658		422.6	65.50
413	—	FL413	17519	A16623	17531	A16663		483.9	75.00
084	—	FL084	1757	A16610	17515	A16650	1/2"	164.5	25.50
164	—	FL164	17510	A16614	17516	A16654		233.9	36.25
304	—	FL304	17512	A16619	17532	A16659		422.6	65.50
414	—	FL414	17520	A16624	17533	A16664		483.9	75.00
165	—	FL165	17511	A16615	17534	A16655	5/8"	233.9	36.25
305	—	FL305	17513	A16620	17535	A16660		422.6	65.50
415	—	FL415	17517	A16625	17536	A16665		483.9	75.00
306	—	FL306	17521	A16621	—	—	3/4"	422.6	65.50
416	—	FL416	17522	A16626	—	—		483.9	75.00
307	—	—	—	—	17537	A16662	7/8"	422.6	65.50
417	—	—	—	—	17524	A16667		483.9	75.00

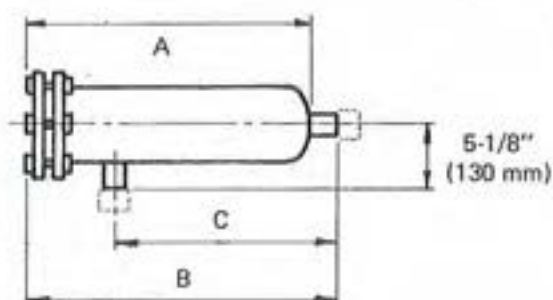
DIMENSIONS & CAPACITIES

TYPE	LAYING LENGTH				BODY DIAMETER		CAPACITY @ 14 kPa (2 psi) P.D.					
	FLARE		SOLDER				R12		R22		R502	
	mm	ins	mm	ins	mm	ins	kW	Tons	kW	Tons	kW	Tons
032	108	4¼	77.8	3-1/16	44.5	1¾	7.0	2.0	8.4	2.4	5.6	1.6
052	117.5	4-5/8	85.7	3-3/8	60.3	2-3/8	5.6	1.6	6.7	1.9	4.6	1.3
082	142.9	5-5/8	111.1	4-3/8	60.3	2-3/8	7.0	2.0	8.4	2.4	5.6	1.6
162	158.8	6¼	—	—	76.2	3	6.3	1.8	7.4	2.1	4.9	1.4
033	120.7	4¾	77.8	3-1/16	44.5	1¾	12.7	3.6	15.1	4.3	10.2	2.9
053	128.6	5-1/16	87.3	3-7/16	60.3	2-3/8	15.8	4.5	19.0	5.4	12.7	3.6
083	154.0	6-1/16	111.1	4-3/8	60.3	2-3/8	16.2	4.6	19.3	5.5	13.0	3.7
163	171.5	6¾	128.6	5-1/16	76.2	3	20.4	5.8	24.3	6.9	16.2	4.6
303	246.1	9-11/16	203.2	8	76.2	3	17.6	5.0	21.1	6.0	14.1	4.0
413	244.5	9-5/8	208.0	8-3/16	88.9	3½	17.6	5.0	21.1	6.0	14.1	4.0
084	160.3	6-5/16	112.7	4-7/16	60.3	2-3/8	32.4	9.2	38.7	11.0	25.7	7.3
164	160.3	6-5/16	127.0	5	76.2	3	32.4	9.2	38.7	11.0	25.7	7.3
304	250.8	9-7/8	203.2	8	76.2	3	35.2	10.0	42.2	12.0	28.1	8.0
414	255.6	10-1/16	206.4	8-1/8	88.9	3½	36.9	10.5	44.3	12.6	29.5	8.4
165	184.2	7¾	128.6	5-1/16	76.2	3	49.9	14.2	59.8	17.0	39.7	11.3
305	258.8	10-3/16	203.2	8	76.2	3	49.9	14.2	59.8	17.0	39.7	11.3
415	263.5	10-3/8	208.0	8-3/16	88.9	3½	51.0	14.5	61.2	17.4	40.8	11.6
306	212.7	8-3/8	—	—	76.2	3	61.5	17.5	73.9	21.0	49.2	14.0
416	263.5	10-3/8	—	—	88.9	3½	64.4	18.3	77.0	21.9	51.3	14.6
307	—	—	212.7	8-3/8	76.2	3	70.3	20.0	84.4	24.0	56.3	16.0
417	—	—	215.9	8½	88.9	3½	73.9	21.0	88.6	25.2	59.1	16.8

hudson

REPLACEABLE CORE DRIERS

Manufactured in accordance with Unfired Pressure Vessel Code AS1210.



CAT. No.	TYPE No.	PART No.	CONN. INS.	NO CORES	FILTER AREA	
					SQ. CM	SQ. INS
1761	486	A16320	3/4	1	412.9	64
1762	487	A16321	7/8			
1763	489	A16322	1-1/8			
1764	4811	A16323	1-3/8			
1765	4813	A16324	1-5/8			
1766	967	A16325	7/8	2	825.8	128
1767	969	A16326	1-1/8			
1768	9611	A16327	1-3/8			
1769	9613	A16328	1-5/8			
17610	9617	A16329	2-1/8			
17611	1447	A16330	7/8	3	1238.7	192
17612	1449	A16331	1-1/8			
17613	14411	A16332	1-3/8			
17614	14413	A16335	1-5/8			
17615	14417	A16336	2-1/8			
17616	1927	A16340	7/8	4	1651.6	256
17617	1929	A16341	1-1/8			
17618	19211	A16342	1-3/8			
17619	19213	A16343	1-5/8			
17620	19217	A16344	2-1/8			
17621	DRIER CORE	A7070	International Size nom. 3-3/4" x 1-3/4" x 5-3/8" Supplied C/W replacement 'o' Rings and Gasket.			

DIMENSIONS & CAPACITIES

TYPE No.	DIMENSIONS						COPPER* UNION P/N	CAPACITY @ 14kPa (2 PSI) P.D.					
	A		B		C			R12		R22		R502	
	mm	ins	mm	ins	mm	ins		kW	TONS	kW	TONS	kW	TONS
486	190.5	7-1/2	260.4	10-1/4	158.8	6-1/4	W24041	63	18	81	23	56	16
487							W24042	81	23	106	30	70	20
489							W24044	116	33	144	41	99	28
4811							W24046	123	35	155	44	109	31
4813							—	130	37	162	46	116	33
967	330.2	13	400.1	15-3/4	298.5	11-3/4	W24042	151	43	193	55	134	38
969							W24044	190	54	239	68	165	47
9611							W24046	211	60	264	75	183	52
9613							—	229	65	288	82	201	57
9617							W24051	239	68	299	85	211	60
1447	450.9	17-3/4	520.7	20-1/2	419.1	16-1/2	W24042	176	50	225	64	151	43
1449							W24044	225	64	281	80	197	56
14411							W24046	257	73	331	94	225	64
14413							—	303	86	376	107	253	72
14417							W24051	317	90	387	110	281	80
1927	609.6	24	679.5	26-3/4	577.9	22-3/4	W24042	148	42	179	51	120	34
1929							W24044	179	51	211	60	151	43
19211							W24046	264	75	338	96	232	66
19213							—	324	92	394	112	288	82
19217							W24051	387	110	464	132	359	102

*Driers with 1-5/8" Copper Connection are standard, other sizes supplied with loose unions as listed.

VIRGINIA FILTER - DRIERS


MODEL AH HI - SIDE FILTER - DRIER
 For Liquid Line Drying
 and Contaminant Removal

Through the use of a new inlet filter media and an ingenious method of enclosing it to prevent compression, by a spring loading feature, the dirt holding capacity at 14 kPa (2psi) has been increased 10 times. This provides low pressure drop and unsurpassed filtration capacity.

The Activated Alumina desiccant beads provide high capacity for moisture, inorganic acids, organic acids and oil breakdown materials. Spring loaded construction provides a rigid desiccant bed and a rugged shock proof drier.

Widespread use on transportation refrigeration has proved its durability.

All models are coated with a new corrosion resistant paint (500 hour salt spray finish), all models have large wrench flats.

With wide OEM acceptance, all models have standard laying lengths and 17238 kPa (2500 psi) Burst Pressure.

CAT. NO.	MODEL	CONN. INS.	DIMENSIONS			CAPACITY 14kPa (2 psi) PD		
			mm	(ins)		kW (Tons)		
			O/A	LAYING	DIAM	R12	R22	R502
1771	AH-032	1/4 FL	108 (4.25)	108 (4.25)	41.2 (1.62)	6.7 (1.9)	8.8 (2.5)	6.0 (1.7)
1772	AH-052	1/4 FL	117.4 (4.62)	117.4 (4.62)	50.8 (2.00)	6.7 (1.9)	8.8 (2.5)	6.0 (1.7)
1773	AH-053	3/8 FL	130 (5.12)	130 (5.12)	50.8 (2.00)	15.5 (4.4)	21.1 (6.0)	14.1 (4.0)
1774	AH-082	1/4 FL	139.7 (5.50)	139.7 (5.50)	63.5 (2.50)	6.7 (1.9)	8.8 (2.5)	6.0 (1.7)
1775	AH-083	3/8 FL	152.4 (6.00)	152.4 (6.00)	63.5 (2.50)	15.8 (4.5)	21.8 (6.2)	14.4 (4.1)
1776	AH-084	1/4 FL	157.5 (6.20)	157.5 (6.20)	63.5 (2.50)	23.9 (6.8)	33.1 (9.4)	21.8 (6.2)
1777	AH-162	1/4 FL	158.8 (6.25)	158.8 (6.25)	63.5 (2.50)	6.7 (1.9)	8.8 (2.5)	6.0 (1.7)
1778	AH-163	3/8 FL	171.5 (6.75)	171.5 (6.75)	63.5 (2.50)	17.6 (5.0)	24.3 (6.9)	15.8 (4.5)
1779	AH-164	1/4 FL	176.3 (6.94)	176.3 (6.94)	63.5 (2.50)	32.0 (9.1)	43.6 (12.4)	29.2 (8.3)
17710	AH-304	1/2 FL	252.7 (9.95)	252.7 (9.95)	72.9 (2.87)	31.3 (8.9)	42.9 (12.2)	28.8 (8.2)

MODEL AL LO - SIDE FILTER - DRIER

For Suction Line Contaminant Removal, Rework and Motor Burn-Out Clean-Up. Designed to provide negligible pressure drop at the high flow rate of suction gas. The blended mixture of Activated Alumina and molecular sieve desiccant provides enormous capacity for water, hydrochloric acid, organic acids and oil breakdown products. Pressure drop can be checked by means of the access valve on the inlet side of the drier.

The use of internal heat shields allows the drier to be installed with any of the low or high melting point brazing alloys, with no danger of burning the filter.

Extremely effective in cleaning up systems after hermetic motor burn-outs. A liquid line drier at least one size larger than normal is placed in the liquid line and the 'AL' Lo-Side Drier is installed as closely as possible to the compressor.

SPECIAL PRECAUTIONS:

1. On Heat Pump and Hot Gas Defrost Systems, the drier must be installed between the reversing valve and the compressor.
2. The drier must be installed according to the direction of flow arrow on the label.
3. It is recommended that the Lo-Side Filter Drier be installed ahead of the accumulator if there is an accumulator in the suction line.

17716	AL12-3V	3/8 FL	130 (5.12)	130 (5.12)	72.9 (2.87)	1.8 (0.5)	3.2 (0.9)	2.6 (0.75)	
17717	AL12-3SV	3/8 Solid	111.8 (4.40)	89.4 (3.52)	72.9 (2.87)	1.8 (0.5)	3.2 (0.9)	2.6 (0.75)	
17718	AL12-4V	1/4 FL	135.1 (5.32)	135.1 (5.32)	72.9 (2.87)	4.2 (1.2)	7.0 (2.0)	5.6 (1.6)	
17719	AL12-4SV	1/4 Solid	113.3 (4.46)	87.9 (3.46)	72.9 (2.87)	4.2 (1.2)	7.0 (2.0)	5.6 (1.6)	
17720	AL24-5SV	5/8 Solid	175.8 (6.92)	150.1 (5.91)	72.9 (2.87)	5.3 (1.5)	8.8 (2.5)	6.3 (1.8)	
17721	AL30-6SV	1/2 Solid	211.6 (8.33)	179.6 (7.07)	72.9 (2.87)	7.0 (2.0)	10.6 (3.0)	8.8 (2.5)	
17722	AL30-7SV	7/8 Solid	217.9 (8.58)	179.6 (7.07)	72.9 (2.87)	8.8 (2.5)	15.8 (4.5)	10.6 (3.0)	
17723	AL44-9SV	1-1/8 Solid	240.5 (9.47)	193.6 (7.62)	82.6 (3.25)	14.3 (4.0)	21.1 (6.0)	17.6 (5.0)	
17724	AL75-11SV	1-3/8 Solid	332.7 (13.10)	283.5 (11.16)	82.6 (3.25)	19.3 (5.5)	28.1 (8.0)	24.6 (7.0)	
17725	AL75-13SV	1-5/8 Solid	339.6 (13.37)	283.5 (11.18)	82.6 (3.25)	28.1 (8.0)	38.7 (11.0)	29.9 (8.5)	

WAX CAPACITY

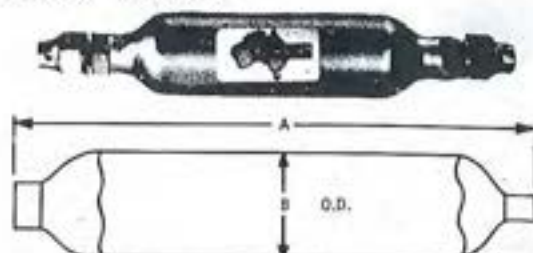
17726	AHC-163F	3/8 FL	171.5 (6.75)	171.5 (6.75)	63.5 (2.5)	4.3 grams			
17727	AHC-164F	1/4 FL	176.3 (6.94)	176.3 (6.94)	63.5 (2.5)	4.3 grams			
17728	AHC-165F	5/8 FL	184.2 (7.25)	184.2 (7.25)	63.5 (2.5)	4.3 grams			
17729	AHC-303F	3/8 FL	247.7 (9.75)	247.7 (9.75)	72.9 (2.87)	10.8 grams			
17730	AHC-304F	1/4 FL	252.7 (9.95)	252.7 (9.95)	72.9 (2.87)	10.8 grams			
17731	AHC-305F	5/8 FL	260.4 (10.25)	260.4 (10.25)	72.9 (2.87)	10.8 grams			
17732	AHC-414F	1/4 FL	255.8 (10.07)	255.8 (10.07)	82.6 (3.25)	14.7 grams			
17733	AHC-415F	5/8 FL	263.4 (10.37)	263.4 (10.37)	82.6 (3.25)	14.7 grams			

WE WILL BE GLAD TO QUOTE ON LARGE QUANTITIES

KIRBY HIGH-SIDE FILTER DRYERS

INCORPORATING MOLECULAR SIEVE

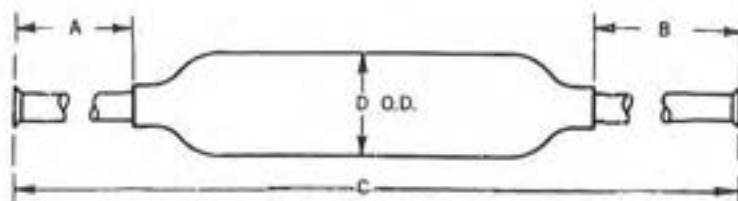
Kirby High-Side Filter Dryers incorporate sodium aluminium silicate, a desiccant which has an extremely high moisture capacity. This capacity is only slightly reduced at higher temperatures—hence their suitability for liquid line operation. A fine mesh monel screen acts as a highly efficient filter without restricting refrigerant flow.



CAT. NO.	MODEL NO.	INLET CONNECTION mm	OUTLET CONNECTION mm	OVERALL DIMENSIONS		DESICCANT WEIGHT g
				A (mm)	B (mm)	
1781	MRA 231 - 10	6.48	2.84	148	17.4	15.0
1782	MRA 231 - 11	4.88	2.24	95	17.4	7.5
1783	MRA 231 - 12	6.48	2.24	95	17.4	7.5
1784	MRA 231 - 72	6.48	2.84	148	17.4	15.0
17858	MRA 232 - 1	6.48	4.88	115	17.4	10.0
17859	MRA 232 - 2	6.48	4.88	130	24.0	20.0
17860	MRA 232 - 3	6.48	4.88	160	24.0	30.0

SERVICE DRYERS

A range of dryers to provide for normal field replacements. Lengths of copper tube are inserted into the ends of the service dryer body, and these connector tubes are then crimped and sealed. The crimped portion of each tube is easily removed prior to installation of the dryer.



CAT. NO.	MODEL NO.	CONNECTIONS		OVERALL DIMENSIONS				DESICCANT WEIGHT g	SCREEN AREA cm ² (ins ²)
		INLET ins	OUTLET ins	mm		(ins)			
				A	B	C	D		
1785	MRA 215 — 1	1/4 OD	1/4 OD	203.2 (8)	203.2 (8)	520.7 (20 3/4)	25.4 (1)	15	12.3 (1.9)
1786	MRA 215 — 2	1/4 OD	1/4 OD	203.2 (8)	203.2 (8)	565.2 (22 1/4)	25.4 (1)	25	12.3 (1.9)
1787	MRA 215 — 3	1/4 OD	3/16 OD	203.2 (8)	203.2 (8)	520.7 (20 3/4)	25.4 (1)	15	12.3 (1.9)
1788	MRA 215 — 4	1/4 OD	3/16 OD	203.2 (8)	203.2 (8)	565.2 (22 1/4)	25.4 (1)	25	12.3 (1.9)

FAST SERVICE

AS REAL SPECIALISTS IN REFRIGERATION, AIR CONDITIONING AND HEATING, WE STOCK THOUSANDS OF DIFFERENT PARTS, TOOLS AND SUPPLIES. WE BELIEVE THIS IS ONE OF THE MOST COMPLETE ASSORTMENT IN THE INDUSTRY. THIS LARGE INVENTORY, PLUS AN EXPERIENCED ORGANIZATION AND A MODERN STREAMLINED ORDER SYSTEM, ALWAYS ASSURES YOU OF FAST BUT CAREFUL SERVICE. WE DESPATCH OVER 90% OF ALL ORDERS ON THE DAY THEY ARE RECEIVED.



K.M.P. DRIERS

The KMP CERAMIC FILTER-Kore with 100% Molecular Sieves is a non-refillable type.

Available in 7 models with drying capacities up to 67 kW (19 tons) on Refrigerant 12 and 81 kW (23 tons) on Refrigerant 22.

The Shell is constructed of Heavy Gauge Steel incorporating the use of copper plated fittings for both flare and solder type connections and tested to 17238 kPa (2500 PSIG).

Dryer ratings for Refrigerant 12 are based on the amount of refrigerant in a system that can be maintained in equilibrium at 15 PPM after removal of 5 drops of water (550 PPM) per lb.

The ratings for Refrigerant 22 are based on the amount of refrigerant in a system that can be maintained in equilibrium at 60 PPM after the removal of 9 drops of water (990 PPM) per lb.

The total refrigerant charge, if known, should be the actual basis for selection of dryer size. Where the amount of refrigerant charge is not known, it should be assumed as being 8 pounds per ton for Refrigerant 12 and 6 pounds per ton for Refrigerant 22.

The Refrigerant Flow Capacity should be taken into consideration which is the maximum flow of liquid refrigerant (in tons) that a dryer will pass at 14 kPa (2 PSI) pressure drop.

CERAMIC FILTER-KORE MOLECULAR SIEVE DRYER

CAT.NO.	MODEL NUMBER	INLET PT.	SWEAT		ORIGIN	DIA.	FEET PER MIN.	REFRIGERANT 12				REFRIGERANT 22				REFRIGERANT FLOW CAP. 3 PSI PRESSURE DROP IN TONS				KMP RECOMM. MINIMUM TONNAGE
			1/4"	3/8"				DRYING CAP. IN LBS. 24 HRS.		WATER CAP. IN DROPS		DRYING CAP. IN LBS. 24 HRS.		WATER CAP. IN DROPS		R-12		R-22		
								72"	120"	72"	120"	72"	120"	72"	120"	6-12"	8-24"	6-12"	8-24"	
1791	032	1/4"			4 1/4"	1 1/4"	10	7.0	6.9	35.3	34.4	4.1	2.9	36.4	26.2	1.5	1.8	1	3/4	
1792	0325	1/4"	1/4"	3/8"	3 1/4"	1 1/4"	10	7.0	6.9	35.3	34.4	4.1	2.9	36.4	26.2	1.5	1.8	1	3/4	
1793	052	1/4"			4 1/4"															
1794	0525	1/4"	1/4"	3/8"	4 1/4"															
1795	053	1/4"			5"	2 1/4"	17	14.6	14.4	73.8	71.8	8.5	6.1	76.0	54.8	5.3	6.4	2	1 1/2	
1796	0535	1/4"	3/8"	1/2"	4 1/4"															
1797	082	1/4"			5 1/4"															
1798	0825	1/4"	1/4"	3/8"	5 1/4"															
1799	083	1/4"			6 1/4"	2 1/4"	27	23.8	23.6	120	117	13.9	9.9	124	89.0	8.9	7.0	3	2 1/2	
17910	0835	1/4"	3/8"	1/2"	5 1/4"															
17911	084	1/2"			6 1/4"															
17912	0845	1/2"	1/2"	3/4"	5 1/4"															
17913	162	1/4"			6 1/4"															
17914	1625	1/4"	1/4"	3/8"	5 1/4"															
17915	163	1/4"			6 1/4"															
17916	1635	1/4"	3/8"	1/2"	6 1/4"	2 1/4"	33	38.5	38.0	194	189	22.5	16.0	200	144	7.7	9.2	5	4	
17917	164	1/2"			6 1/4"															
17918	1645	1/2"	1/2"	3/4"	6 1/4"															
17919	165	1/2"			7 1/4"															
17920	1655	1/2"	3/8"	1/2"	6 1/4"															
17921	303	1/2"			8 1/4"	2 1/4"	59	68.5	67.6	345	336	40	28.5	356	256	8.0	9.6	8 1/2	7	
17922	3035	1/2"	3/8"	1/2"	8 1/4"															
17923	304	1/2"			9 1/4"															
17924	3045	1/2"	1/2"	3/4"	9 1/4"															
17925	305	1/2"			10 1/4"															
17926	3055	1/2"	3/8"	1/2"	9 1/4"															
17927	414	1/2"			9 1/4"															
17928	4145	1/2"	1/2"	3/4"	8 1/4"	3	67	81.6	80.6	412	402	47.6	33.9	424	305	15.7	18.8	10	8	
17929	415	1/2"			9 1/4"															
17930	4155	1/2"	3/8"	1/2"	8 1/4"															
—	754	1/2"			12 1/2"															
17931	7545	1/2"	1/2"	3/4"	11 1/4"															
17932	755	1/4"			12 3/4"	3	82	154	152	776	757	90	64	800	576	19.2	23.0	19	15	
17933	7555	1/4"	3/8"	1/2"	11 1/4"															
17934	756	1/4"			13"															
17935	7565	1/4"	3/8"	1/2"	12 1/4"															

KMP MOTOR BURN-OUT CLEAN-UP DRYER

KMP Motor Burn-out Clean-up Dryers are designed to remove sludge from a sealed unit system following a motor burn-out. The Clean-up Drier is fitted in the suction line and must only be left in the line for 3 days, otherwise the build-up of sludge could cause excessive pressure drop across the drier. A jumper tube is supplied too, if necessary, to fill up the space left in the line when the clean-up drier is removed.

CAT. NO.	MODEL	CONN.	LENGTH
17945	MB - 20	1/2" I.D. Solder	6-9/16"
17944	UP TO	7/8" I.D. Solder	6-13/16"
17941	2 TON	3/8" Flare	6-9/16"
17942	(7 kW)	1/2" Flare	6-13/16"
17943	SYSTEMS	5/8" Flare	7-5/16"

KMP SLD CLEAN - UP DRIER - Suction line filter-drier

A solid core suction line filter-drier designed for system clean-up - large outside diameter resulting in a shorter 'lay-in' length, plus access valves on both inlet and outlet for checking pressure drop.

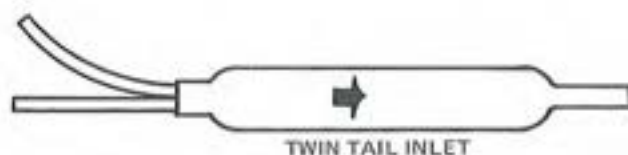
CAT. NO.	MODEL	CONN. (Solder)	DESICCANT VOLUME		FILTER AREA		DIMENSIONS INCHES			CAPACITY 14 kPa (2PSI) P.D.					
										R12		R22		R502	
			cu.cm	cu.ins	sq.cm	sq.ins	O/A	Cutout	Diam	kW	TONS	kW	TONS	kW	TONS
17958	SLD 13-55V	5/8"	221	13.5	168	26	5.25	4	4	8.8	2.5	10.6	3.0	8.8	2.5
17959	SLD 27-75V	7/8"	443	27.0	316	49	7.85	6-3/32	4	21.1	6.0	28.1	8.0	17.6	5.0
17960	SLD 27-95V	1-1/8"	443	27.0	316	49	7.90	5-29/32	4	24.6	7.0	31.7	9.0	24.6	7.0
17961	SLD 54-115V	1-3/8"	885	54.0	568	88	12.08	10-1/16	4	38.7	11.0	47.5	13.5	36.9	10.5
17962	SLD 54-135V	1-5/8"	885	54.0	568	88	12.08	10-1/16	4	45.7	13.0	56.3	16.0	44.0	12.5

KMP AND KEY DRIERS

NON REFILLABLE ALL PURPOSE MOLECULAR SIEVE DRIERS



KMP DRIERS		TECHNICAL DATA			KEY DRIERS	
CAT. NO.	TYPE	CAPACITY GRAMS	CONNECTIONS		CAT. NO.	MODEL
			INLET	OUTLET		
WITH 3" TAILS (Type 1 Inlet — Straight) (Type 2 Outlet — Angled)					WITH TAILS	
18086	1535 - 10G	10	1/4"	3/16"	18014	3612
18078	1535 - 15G	15	1/4"	3/16"	1809	3604
18089	1535 - 15G	15	1/4"	1/4"	18010	3617
18079	1535 - 15G	15	5/16"	3/16"	18011	3605
18085	1535 - 20G	20	1/4"	3/16"	18022	3611
18095	1535 - 20G	20	1/4"	1/4"	—	—
18056	1535 - 25G	25	1/4"	3/16"	—	—
18093	1535 - 25G	25	1/4"	1/4"	—	—
18088	1535 - 50G	50	1/4"	3/16"	—	—
WITHOUT TAILS					WITHOUT TAILS	
18065	1535 - 10G	10	3/16"	Capillary	—	—
18076	1535 - 10G	10	1/4"	Capillary	1803	3601
18039	1535 - 10G	10	3/16"	2.8 - 2.9mm Angle Conn	—	—
18077	1535 - 10G	10	3/16"	3/16"	18012	3603
18084	1535 - 10G	10	1/4"	3/16"	1802	3610
18055	1535 - 10G	10	1/4"	1/4"	—	—
18082	1535 - 15G	15	1/4"	Capillary	1806	3608
18097	1535 - 15G	15	3/16"	3/16"	—	—
18083	1535 - 15G	15	1/4"	3/16"	1804	3609
18081	1535 - 15G	15	1/4"	1/4"	1805	3607
—	—	15	5/16"	3/16"	18011	3605
18037	1535 - 20G	20	1/4"	2.8 - 2.9mm Angle Conn	—	—
18080	1535 - 20G	20	1/4"	3/16"	1807	3606
18057	1535 - 25G	25	1/4"	1/4"	—	—
18087	1535 - 50G	50	1/4"	3/16"	1808	3615



TWIN TAIL INLET

TWIN TAIL (INLET) DRIERS

- 1st. Connection = Inlet
- 2nd. Connection = Charging/Vac. Port
- 3rd. Connection = Outlet

KMP DRIERS		TECHNICAL DATA			KEY DRIERS	
CAT. NO.	TYPE	CAPACITY GRAMS	CONNECTIONS		CAT. NO.	MODEL
			1st. and 2nd.	3rd.		
18091	1535 - 10G	10	3/16" + 3/16"	3/16"	—	—
18090	1535 - 15G	15	1/4" + 1/4"	1/4"	18013	2612
18092	1535 - 15G	15	5/16" + 1/4"	3/16"	—	—

REFER NEXT PAGE FOR :
LITTLE GIANT SERVICE DRIERS
COPPER / ALUMINIUM CONNECTORS
KMP and KELVINATOR STRAINERS

DRIERS

ACPAR / KMP LITTLE GIANT SERVICE DRIER



LITTLE GIANT

This service drier with Molecular Sieve desiccant has been designed to eliminate the worst moisture problems encountered in general field service work. It is small, but with plenty of capacity to handle units up to .25 kW (1/3 HP) with R12 and .37 kW (1/2 HP) with R22. Made from 19 mm (3/4") copper tubing and fitted with tube

connections of 6.35 mm (1/4") OD silver brazed in place. The inlet fits either 6.35 mm (1/4") or 4.7 mm (3/16"), and the outlet has been spun down to accommodate capillary tube. The tubes are easily cut, swaged, flared or bent to accommodate on the job adaption. Total length of the drier is 232mm (9-1/8") from break-off to break-off.

ACPAR CAT. NO.	KMP CAT. NO.	INLET TUBE SIZE	OUTLET TUBE SIZE	CAPACITY GRAMS	WATER CAPACITY — DROPS			DRYING CAPACITY kW (Tons)		
					R12	R22	R502	R12	R22	R502
18048	18018	1/4" OD 3/16" ID	.089/.092 Cap. Tube	10	37.5	34.5	34.5	1.16 (0.33)	1.76 (0.50)	1.16 (0.33)

COPPER/ALUMINIUM CONNECTORS



Cat.No.	Inlet	Outlet
18040	1/4"	1/4"
18045	3/16"	3/16"
18041	1/4"	1/4" + 5/16"
18042	1/4"	1/4" + 3/16"
18046	1/4"	3/16"
18043	1/4"	1/4" + Cap.
18044	3/16"	3/16" + Cap.

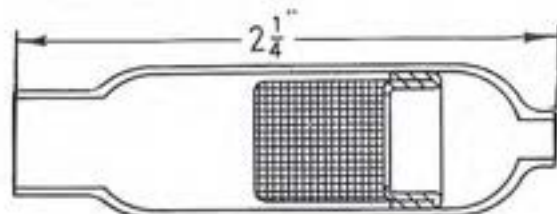
These connectors are designed to be used for connecting an aluminium evaporator with the suction side of a compressor in a hermetic system.

Produced from high quality soft copper and aluminium tube with O.D. 7.93 mm (5/16") and wall thickness of 1.27 mm (0.05").

Because of the special soldering process and strict control necessary, joints can be guaranteed even under the toughest conditions. End of copper tube can be expanded or spun down, so as to fit O.D. of capillary tube. Recommended length of copper and aluminium : 100 mm (4") each.

STRAINERS

KMP TYPE-297



CAT. NO.	Model	Type Screen	Conns.	Wall Thickness	Filter Area	Hydrostatic Test
18019	297	150 Mesh Monel formed cup construction	1/4" ODF x Capillary	0.07 mm (0.028")	6.5 cm ² (1 in. ²)	18617 kPa 2700 psig

Kelvinator



CAT. NO.	Type	Part No.	Connections
18020	E34	KA1517	1/4" x 1/4" ODM

ACTROL PARTS — TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

NOTES

2

WE ARE AS NEAR AS YOUR NEAREST TELEPHONE — WE HAVE TELEX TOO

Danfoss

STRAINERS

TYPE FA STRAINERS

For Direct Fitting on Danfoss Valves

FA-15 and 20
without flangesSUPPLIED WITH BOLTS,
NUTS AND GASKETS.

CAT. NO.	TYPE	CODE NO.	SUITS VALVE TYPE/SIZE	STRAINER AREA		MAX. TEST PRESS.
				cm ²	ins. ²	
18151	FA-15	6-0043	Bolts onto CV Pilot Valves, EVJA3, EVJDA10 & 15, EVRA10 & 15.	40	6.2	2600 kPa
18152	FA-15	6-0042	Bolts onto TEA20, TEAT20 and TEVA20.	40	6.2	
18156	FA-15	6-0052	C/W 1/2" Weld Flanges	40	6.2	377 psig
18153	FA-20	6-0046	Bolts onto EVJDA20 & 25.	60	9.3	
18154	FA-20	6-0048	Bolts onto TEA85, TEAT85 and TEVA85.	60	9.3	

Heldon

STRAINERS

Flare



Cat. No.	Part No.	O.D. of Tube Flare	Length
18115	3400	1/4"	2"
18116	3401	1/4"	3"
18117	3426	1/4"	6"
18118	3410	3/8"	5"
18119	3420	1/2"	6"
18120	3430	5/8"	6"
18121	3431	3/4"	6"

NON DEMOUNTABLE SOLDER STRAINERS



Copper

Cat. No.	Part No.	Sweat Size	Body Length
18122	3451	1/4"	3"
18123	3452	3/8"	3"
18124	3453	1/2"	4"
18125	3454	5/8"	4"
18126	3455	3/4"	6"
18127	3457	7/8"	6"
18128	3456	1"	6"
18129	3450	1-1/8"	6"

DEMOUNTABLE STRAINERS

Brass Construction — Stainless Steel Gauze



Right Angle Connections

CAT. NO.	PART NO.	SIZE	MESH SIZE	SCREEN AREA SQ. INS.
18136	3484-10	5/8"	100	15
18137	3484-14	7/8"	80	20
18138	3484-18	1-1/8"	80	25
18139	3484-22	1-3/8"	80	40
18140	3484-26	1-5/8"	80	40
18141	3484-34	2-1/8"	80	64
18142	3484-42	2-5/8"	80	86



In-Line Connections

CAT. NO.	PART NO.	SIZE	MESH SIZE	SCREEN AREA SQ. INS.
18143	3481-10	5/8"	100	15
18144	3481-14	7/8"	80	20
18145	3481-18	1-1/8"	80	25
18146	3481-22	1-3/8"	80	40
18147	3481-26	1-5/8"	80	40
18148	3481-34	2-1/8"	80	64
18149	3481-42	2-5/8"	80	86

Other Mesh Sizes Available on Request.

STRAINERS

— hudson



"Y" TYPE STRAINERS

HELDON		HUDSON		Size O.D. Sold.	Mesh Size	Screen Area	
CAT. NO.	Part No.	CAT. NO.	Part No.			cm ²	ins. ²
1821H	3485/14	1821L	12002	7/8"	80	123	19
1822H	3485/18	1822L	12004	1-1/8"	80	155	24
1823H	3485/22	1823L	12006	1-3/8"	80	207	32
1824H	3485/26	1824L	12008	1-5/8"	80	207	32
18224H	3485/34	18224L	12009	2-1/8"	80	387	60
18223	3485/42	—	—	2-5/8"	60	548	85

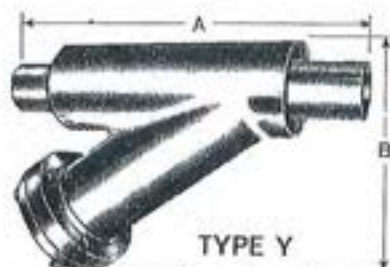
LINE STRAINERS



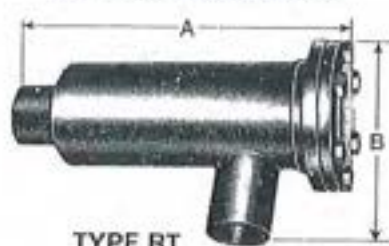
CAT. NO.	Part No.	M to M Flare	Screen Area		O/A Length	Screen Size
			cm ²	ins. ²		
18217	A1525	1/4"	41.3	6.4	5-13/16"	100
18218	A1526	3/8"	52.2	8.09	7"	100
18220	A1527	1/2"	52.2	8.09	7-1/8"	100
18222	A1528	5/8"	52.2	8.09	7-1/8"	100

STRANEX

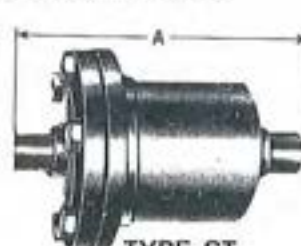
SOLDER CONNECTIONS



TYPE Y



TYPE RT



TYPE ST

TYPE Y					
Cat. No.	Conn. ins.	Dimensions		Screen Area	
		A	B	cm ²	ins. ²
18230	5/8" O.D. Fem.	6 7/8"	4 1/2"	77.4	12
18231	7/8" "	7"	5 1/4"	129.0	20
18232	1 1/8" "	8 1/4"	6"	154.8	24
18233	1 3/8" "	10 1/2"	7"	225.8	35
18234	1 5/8" "	10 3/4"	7"	258.1	40
18235	2 1/8" "	12 1/2"	9"	387.1	60
18236	2 5/8" "	14 1/2"	9 1/2"	548.4	85

TYPE RT					
Cat. No.	Conn. ins.	Dimensions		Screen Area	
		A	B	cm ²	ins. ²
18237	5/8" O.D. Fem.	6 3/4"	3 1/4"	77.4	12
18238	7/8" "	7 1/4"	3 1/2"	129.0	20
18239	1 1/8" "	8"	4 1/8"	154.8	24
18240	1 3/8" "	9 1/4"	4 7/8"	225.8	35
18241	1 5/8" "	9 1/2"	5"	258.1	40
18242	2 1/8" "	12 1/4"	6 1/4"	387.1	60
18243	2 5/8" "	13 1/4"	7 1/2"	548.4	85

TYPE ST				
Cat. No.	Conn. ins.	Dims. A	Screen Area	
			cm ²	ins. ²
—	3/8" O.D. Fem.	4 1/4"	77.4	12
—	1/2" "	4 3/8"	77.4	12
18244	5/8" "	4 5/8"	77.4	12
18245	7/8" "	7 1/8"	129.0	20

REFERENCE TO OTHER STRAINERS IN THIS CATALOGUE

Alco Solenoid Valves (Ammonia)

— Strainer Types JR32 and SR13

Refer Page 123-c

Refrigerating Specialties/Parker

— Strainer Types RSF, NTFF and RSW

Refer Page 121-c

NOTES

MAKE IT AN ACTROL PART — YOU'LL APPRECIATE THE SERVICE AND BACKING

DRYING AGENTS & DESICCANTS

ACTIVATED ALUMINA

One of the most widely used absorption type desiccants. With a rigid, granular porous structure, will not powder or disintegrate even when reaching saturation point. It is highly porous and offers a high ratio of drying surface to desiccant bulk. Suitable for permanent installation in liquid line driers.

CAT. NO. 1831	1 kg Container
CAT. NO. 1835	2 kg Container
CAT. NO. 1832	3 kg Container
CAT. NO. 1834	5 kg Container
CAT. NO. 1833	12.5 kg Container

CALCIUM CHLORIDE — FUSED

Fused into granular form, calcium chloride forms a high moisture absorbing material particularly suitable for temporary use in a service dehydrator following installation of new equipment. Owing to calcium chloride's tendency to break down and powder on becoming saturated it is important that the service dehydrator be removed from the line in a reasonably short period after initial plant start-up — say 10 to 15 hours.

CAT. NO. 1836	1 kg Jar
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CALCIUM CHLORIDE — FLAKED FOR BRINE

When mixed with water to the required specific gravity (density), provides a widely used low freezing point solution for many refrigeration applications.

CAT. NO. 1838	20 kg Tins
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THAWZONE

A liquid neutralizer and dehydrant for moisture control in refrigeration systems. Added to the refrigerant it acts fast and harmlessly, neutralizing acid and preventing oil breakdown. Chemically dries all fluorinated refrigerants (R12, R22 etc.). Frees frozen systems, does not leave any residue, will not clog capillary tubes or expansion valves.

CAT. NO. 18330	4 oz. Bottle
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SILICA - GEL

Silica-Gel is a manufactured highly porous form of desiccant which can attract and hold a high proportion of its weight in water vapour. The desiccant does not break down or powder when saturated and can be re-activated by heating to approx. 150°C (300°F) under vacuum.

CAT. NO.	MESH	TYPE/No.	SIZE CONTAINER
18310	8 - 20	No. 540	1½ lb. Container
18311	8 - 20	No. 550	6 lb. Container
18316	5 - 10	Type A	500 gram Container
18319	5 - 10	Type A	5 kg Container
18318	5 - 10	Type A	10 kg Container
18317	5 - 10	Type A	12.5 kg Container

MOLECULAR SIEVES

Molecular Sieves is a fairly recent development in water absorbing materials and has the capacity to absorb many times more water per given weight than other forms of drying agents. Can be re-activated by purging with dry (-18°C [0°F] dewpoint) 246°C (475°F) air at 96 kPa (14psi), or heating to 150°C (400°F) under vacuum.

CAT. NO. 18313	1 kg Jars
CAT. NO. 18314	5 kg Tins

LIQUID DEHYDRANT DRY OUT with Vacumatic Kap



Enables insertion of EXACT amounts of dehydrant into the system. DRY OUT's special formula is an acid neutralizer, an oil stabilizer and an aluminium reaction inhibitor.

Bottle screws DIRECTLY onto the manifold — enters system slowly — provides you with "¼ of an ounce" control. Unique design of Vacumatic Kap prevents over or under charging of liquid dehydrants.

CAT. NO. 18331	No. DO-3 Bottle
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SOLVENTS

'VIRGINIA' No. 10 DEGREASING SOLVENT

A highly effective degreasing solvent expressly designed to meet the requirements of the refrigeration and air-conditioning service and maintenance trades. Non-corrosive. Fast drying. Flashpoint (as shipped) 74°C (165°F). Dielectric strength: 20,000V.

CAT. NO. 18334	16 oz. Pressurized Can (D210)
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REFRIGERANT 11

A popular flushing solvent, particularly following a motor burn-out in sealed unit systems. Boiling point 23.8°C (74.8°F). Available in Cans, Drums, Cylinders — Refer Refrigerants Pages 185/185-a.

CHLOROTHENE N.U.

An effective non-flammable solvent having a boiling point of approx. 74°C (165°F). Readily dissolves oils, greases, waxes, resin fluxes, rubber, lacquers, etc. yet will not damage the highly polished metal surfaces as found in refrigeration compressors. (Refer also Tech. Page 183-a).

CAT. NO. 18322	5 kg Tins
CAT. NO. 18321	30 kg Drums

TRICHLOROETHYLENE

Another popular solvent with a wide range of cleaning and flushing properties. Boiling point 87°C (189°F).

CAT. NO. 18326	5 Litre Tins
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REFRIGERATION SERVICE AIDS

TRACE

REFRIGERANT LEAK DETECTOR

Trace offers the simplest method of detecting refrigerant leaks. Merely add Trace to the refrigerant, and inspect for red spots. Trace works even when you are away.

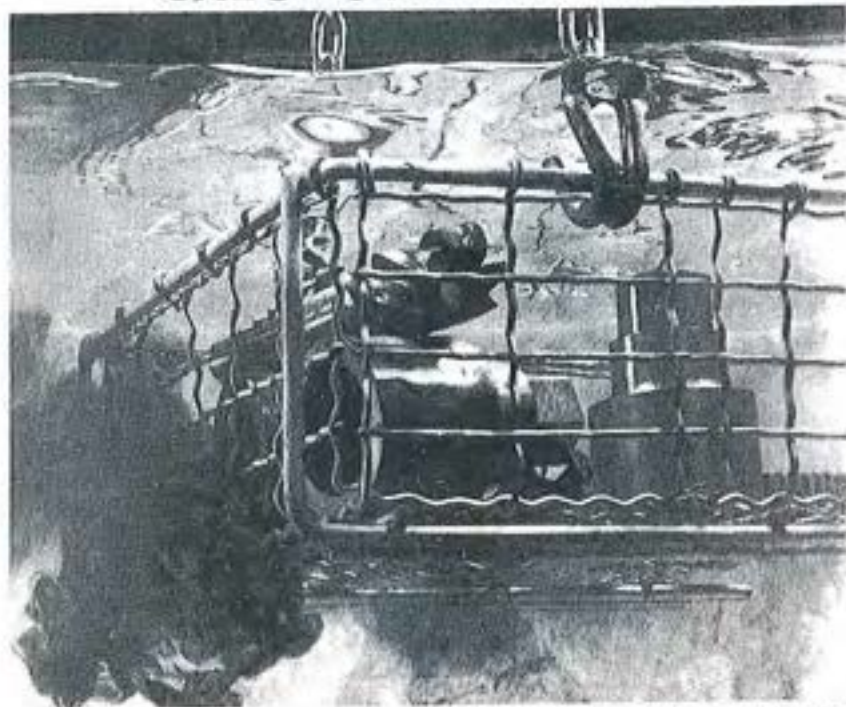
CAT. NO. 18337	4 oz. Tin
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METHANOL

Methyl Alcohol, known as Methanol is a pure, clean, dry, synthetic alcohol, free from moisture and foreign matter, water-white in colour, highly inflammable with very low freezing point. It is especially recommended for use in all Halide Leak Detectors.

CAT. NO. 1839	500 ml. Container
CAT. NO. 18312	5 Litre Container

CHLOROTHENE NU. CLEANING SOLVENT



**cuts greases and oils,
cleans with a spray
a dip or a wipe**

Chlorothene* NU cleans stubborn dirt, oils and greases where other cleaning solvents often fail.

It's versatile: equally effective for spray, dip, wipe or bucket cleaning. It's fast: dries rapidly, leaves no residue. It's safe: low toxicity for enclosed areas; no fire or flash point. It's gentle: harmless to sensitive, corrosion-prone metals — even to yarns, threads finished cloth.

WHEN TO USE CHLOROTHENE NU

... any place or time during manufacture when a product or the machinery producing it is soiled with grease, tar, wax, adhesives, or oil. Chlorothene NU solvent cold-cleans products and machinery safely and effectively.

USES

CLEANING ELECTRIC MOTORS

Chlorothene NU cleans electric motors efficiently, especially when spray equipment is used. The mechanical force of the spray combined with the high solvent power of Chlorothene NU speeds motor cleaning. Either in-place or bench cleaning is feasible.

Insulating varnishes such as Lecton and Formvar are not harmed by Chlorothene NU. Certain asphaltic varnishes will soften or dissolve quickly. Some silicone varnishes, whether applied directly to the wire or over cotton-covered wire, are softened within a minute or so. Air dried varnishes in general should be checked for effect before employing Chlorothene NU full scale.

CLEANING GAS CYLINDERS

The high solvent power, low toxicity, reduced flammability hazard and low non-volatile residues of Chlorothene NU make it an excellent solvent for cleaning gas cylinders or equipment used in the manufacture of compressed gas. It is especially valuable as a non-corrosive agent for detecting leaks in gas cylinders.

MOLD CLEANER

From dental molds to tyre molds, Chlorothene NU cleans with a solvent power that dissolves almost all release agents.

RUBBER CLEANING

Rubber may be wiped clean with Chlorothene NU; prolonged contact with Chlorothene NU causes natural rubber and most synthetics to swell.

ULTRASONIC CLEANING

Chlorothene NU approaches the ideal as a solvent for ultrasonic cleaning. Its lack of flash or fire point, excellent solvency at room temperature, low toxicity, ease in distilling, and good ability to cavitate are the properties Chlorothene NU brings to ultrasonic cleaning.

PHOTOGRAPHIC FILM CLEANING

Chlorothene NU is safely and successfully used to clean film. Efficient cleaning is accomplished in a wide variety of film cleaning equipment; manufacturers' instructions for use should be observed.

ADDITIONAL APPLICATIONS FOR CHLOROTHENE NU:

- * Ignition drying.
- * Dilution of polyglycols in the rubber industry.
- * Analytical solvent replacing carbon tetrachloride.
- * Removing layout ink in pattern and fabrication shops.
- * Quench bath to cool small electronic parts.
- * Welding expanded polystyrene.
- * Solvent in rubber cement formulations replacing benzene and toluene.
- * Carrier for silicone paper coating.
- * Liquid glue formulations.
- * Solvent for insecticides.
- * Plastic and rubber mold release carrier.
- * Electric razor cleaner.
- * Clothing spot remover.
- * Solvent for germicides and insecticides in aerosols.
- * Reducing slipping of drive belts by removing glaze and increasing friction.
- * Removing ink from plastic scrap prior to reprocessing.
- * Non-flammable or lowered fire hazard solvent systems for epoxides.
- * Carrier for protective coatings such as those used on machinery.
- * Solvent for printing inks.
- * Solvent in many contact adhesive applications.
- * Polystyrene solvent.
- * Carrier in a graphite plating process.
- * Shoe cleaner (handling soles after mfg.).
- * Business machine cleaning.
- * Cleaning fiberglass.
- * Formulation of lapping compounds.

VAPOR DEGREASING SOLVENT.

Chlorothene NU solvent is not recommended for general vapor degreasing. As with past grades of inhibited 1, 1,1 - trichloroethane, some use latitude in specialty vapor degreasing applications exists for Chlorothene NU.

FIRE EXTINGUISHING AGENT.

Chlorothene NU is not an effective fire extinguishing agent or a component of fire extinguishing fluids and should not be used for this purpose.

LIMITATIONS

5 kg Tins	CAT. NO. 18322	30 kg Drums	CAT. NO. 18321
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NOTES

2

QUICK AS A FLASH

AND VERY CAREFUL. THAT'S OUR ORDER DEPARTMENT. WHETHER YOUR ORDER IS LARGE OR SMALL, IT WILL RECEIVE PROMPT AND EXACTING ATTENTION. WE DESPATCH OVER 90% OF ALL ORDERS ON THE SAME DAY THEY ARE RECEIVED.

NOTES

[illegible]

TELEX FOR FAST SERVICE

TELEX FOR FAST SERVICE

TO GIVE OUR CUSTOMERS EVEN FASTER SERVICE WE HAVE INSTALLED TELEX IN MOST OF OUR BRANCHES. IF YOU ARE A TELEX SUBSCRIBER YOU CAN SEND YOUR ORDER DIRECT BY TELEX. TELEX NUMBERS ARE LISTED AT THE FRONT OF THIS CATALOGUE.

OILS

SUNISO REFRIGERATION OILS HAVE BEEN SPECIALLY PREPARED TO WITHSTAND THE HIGH SPEEDS AND LOW TEMPERATURES ENCOUNTERED IN MODERN REFRIGERATING AND AIR CONDITIONING COMPRESSORS. THE OIL IS NEARLY COMPLETELY DRY, HAVING LESS THAN 30 PARTS OF WATER PER MILLION PARTS OF OIL.

FEATURES

Chemical Stability, to resist chemical reaction with the refrigerant or any other material normally present in the system.
Thermal Stability, to eliminate excessive hard carbon deposits at compressor hot spots such as valves or discharge ports.
Low Wax Content, to prevent separation of flocculent material from the oil-refrigerant mixture at the low temperature points in the system.
Low Pour Point, to prevent separated oil from congealing in refrigerant lines.

High Dielectric Strength, to ensure good insulating properties. In hermetic units, the oil-refrigerant mixture serves as an insulator between the motor and the compressor body.

Proper Viscosity, even when diluted with refrigerant so as to ensure high film strength at elevated operating temperatures and while providing good fluidity under coldest operating conditions.

No Contamination, to prevent scarring of bearing surfaces, plugging of lines or oil ports and general deterioration.

LOW TEMPERATURE PROPERTIES

Refrigeration oils carried with the refrigerant through the system must be compatible with the refrigerant at low temperatures and must not separate waxlike deposits which can clog a system. There are two laboratory tests which are used to measure the low temperature performance of oil.

The more meaningful of these is the wax precipitation, or flocc-point test.

The second test is the ASTM pour point test. It determines the lowest temperature at which the oil flows.

Refer Suniso Specifications tabled below.

SELECTION

Unless otherwise specified by the compressor manufacturer, the grade of oil to select can usually be based on the following :-

GRADE 3GS

All NEW compressors during the run-in period.

All compressors of LESS than 3.5 kW (1 Ton) capacity.

All LOW TEMPERATURE applications with suction temperature of -40°C to -90°C (-40°F to -130°F).

For use with fluorinated refrigerants, Ammonia and all other refrigerants. Also for SCREW COMPRESSORS.

GRADE 4GS

All compressors (run-in) other than Ammonia of 3.5 kW (1 Ton) capacity and over, and employed on normal applications with suction temperature of -40°C (-40°F) and higher.

GRADE 4SA (VAPOR POINT -60°F)

All Ammonia compressors (run-in) of 3.5 kW (1 Ton) capacity and over and employed on normal applications with suction temperature of -40°C (-40°F) and higher including some Screw Compressors.

GRADE 5GS

CAR AIR CONDITIONING COMPRESSORS. To be used only when specified by the compressor manufacturer, or when a higher viscosity oil is required for any special reason or purpose.

SUNLUBE R31

For high vacuum pumps.

SUNVIC &

SUNOCO OCNUS

For reciprocating and centrifugal compressors as and when specified by the Compressor Manufacturer.

Refer next page for centrifugal compressor oil information.

OIL TYPE	GRADE	5 LITRE CANS	20 LITRE DRUMS	205 LITRE DRUMS
		CAT. NO.	CAT. NO.	CAT. NO.
SUNISO	3GS	1842	1843	1844
SUNISO	4GS	1848	1849	18410
SUNISO	4SA	—	18419	18420
SUNISO	5GS	18415	18416	18417
SUNISO	R31	18423	—	—

SPECIFICATIONS

PROPERTY	METHOD *	SUNISO GRADE			
		3GS	4GS	5GS	4SA
Viscosity, SUS/100°F (37.8°C)	D2161	150 — 160	280 — 300	500 — 530	285 — 305
Flash, COC, °F (°C)	D92	330 (165.6) min.	340 (171.1) min.	360 (182.2) min.	390 (199) min.
Pour Point °F (°C)	D97	-40 (-40) max.	-35 (-37.2) max.	-30 (-34.4) max.	-29.2 (-34) max.
Floc Point °F (°C)	J-58 **	-60 (-51.1) max.	-50 (-45.6) max.	-40 (-40) max.	-40 (-40) max.
Colour	D1500	L 1.0 max.	L 1.0 max.	L 1.5 max.	L 2.0 max.
Gravity, API	D287	22.0 — 24.0	20.5 — 23.0	19.5 — 22.0	26.0 — 27.0
Total Acid No. mg KOH/g	D974	0.05 max.	0.05 max.	0.05 max.	0.05 max.
Dielectric Strength, KV	D877	25 min.	25 min.	25 min.	25 min.
Aniline Point, °F (°C)	L611*	155 — 165 (68-74)	158 — 168 (70-76)	160 — 170 (71-77)	180 — 190 (82-88)

* ASTM unless otherwise specified. ** Sun method.

Oils Continued next Page.

OILS

MOBIL VACUUM PUMP OIL

5 litre Cans

CAT. NO. 18413

Mobil Vacuum Pump Oil is a high quality straight mineral oil. Its low vapour pressure and other characteristics make it especially suitable for use in vacuum pumps where high vacuums are required. This is a dehydrated oil and containers should be kept well sealed to prevent contamination by moisture.

SPECIFICATIONS

SPECIFIC GRAVITY AT 15°C	POUR POINT	FLASH POINT	VISCOSITY AT 40°C	VISCOSITY AT 100°C	ISO VISCOSITY GRADE	VISCOSITY INDEX	COLOUR ASTM
0.88	-18°C max.	260°C min.	68/74 cSt.	8.6 cSt.	68	95 min.	1.0 max.

IMPERIAL VACUUM PUMP OIL

A high quality Vacuum Pump Oil

1 Quart Cans — No. 205-P

CAT. NO. 18421

ROBINAIR DEEP VACUUM GREASE

A special low vapour pressure lubricant for deep vacuum valves

No. 13033

CAT. NO. 184150

CENTRIFUGAL & SCREW COMPRESSOR OILS

Listed below are some of the oils available as used in various makes of Centrifugal and Screw type compressors.

We do not make recommendations on the particular type and grade of oil to suit these compressor types and will only supply your nominated selection without acceptance of any responsibility for its use or misuse.

SEE WARNING NOTE BELOW

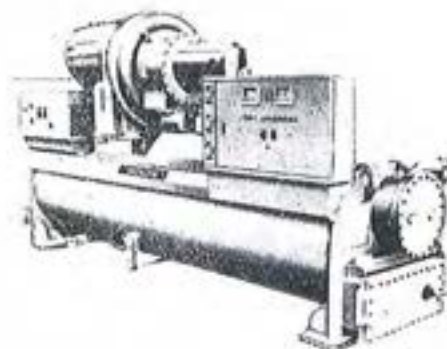
CENTRIFUGAL COMPRESSOR OILS		
CAT. NO.	DRUMS AVAILABLE IN	DESCRIPTION
184138	20 litre	CALTEX CAPELLA "D"
184139	60 litre	
184140	209 litre	
184126	20 litre	MOBIL (HEAVY) DTE
184127	205 litre	
184132	205 litre	SHELL T68 (Was Turbo 33)
184134	20 litre	SHELL TELLUS 33
184135	60 litre	
184136	205 litre	
18415	5 litre	SUNISO * 5GS
18416	20 litre	
18417	205 litre	

SCREW COMPRESSOR OILS		
CAT. NO.	DRUMS AVAILABLE IN	DESCRIPTION
184129	20 litre	CASTROL ICEMATIC 299 (Was 499)
184130	205 litre	
1842	5 litre	SUNISO * 3GS
1843	20 litre	
1844	205 litre	
1848	5 litre	SUNISO * 4GS
1849	20 litre	
18410	205 litre	
18419	20 litre	SUNISO * 4SA
18420	205 litre	
* SUNISO OILS — Refer also Page 184 for Cat. Nos. & Tech. Page 184-a.		

WARNING

THE SELECTION AND USE OF THE PROPER OIL IN CENTRIFUGAL AND SCREW COMPRESSORS IS MOST IMPORTANT. THE COMPRESSOR MANUFACTURERS'/SUPPLIERS' RECOMMENDATIONS SHOULD BE STRICTLY FOLLOWED.

TYPICAL CENTRIFUGAL, SCREW AND RECIPROCATING CHILLER SETS AND COMPRESSOR SETS



ACID TEST KITS FOR REFRIGERATION OIL

ACID ALERT



CAT. NO. 18442

The NEW ALCO "ACID ALERT" Refrigeration Oil Test Kit is a disposable kit for one, accurate, positive, convenient and inexpensive test. It is easy and simple to use and may be disposed of after the test results are obtained. No confusion with multiple colours or colour comparators — **JUST PURPLE PURPLE** — No acid present. Clear or NOT identical with purple band on box — Acid is present and remedial action must be taken.

PROCEDURE

1. Pour contents of small bottle into large bottle. Bottom layer of mixture should be **PURPLE**, identical to **PURPLE** band on box.
2. Fill small bottle completely with oil being tested.
3. Immediately, pour oil sample into large bottle, cap and shake well.

4. Allow the phase separation (Two Layers) to develop. This should take 2 to 3 minutes. If the bottom layer loses its **PURPLE** colour entirely or if its colour is not identical to the **PURPLE** band on the box, the sample has an acid number of 0.05 or more.
5. Oils having an acid number of 0.05 or more are unsatisfactory and the system must be cleaned up by means of an oversized liquid line filter-drier and a suction line filter-drier.

The above phase separation allows ease of determining the test results even when checking badly discoloured oil. There is no need to make marginal judgements — the oil is either safe or unsafe.

2

CAUTION
POISONOUS
FLAMMABLE

CAT. NO. 18439

VIRGINIA

TKO REFRIGERATION OIL ACID TEST KIT

Fastest way of telling whether compressor oil is safe or acidic. One Bottle! Fill with oil up to line on bottle neck and shake. Purple is safe. Yellow is acidic. Ultra sensitive colour change guarantees accurate test. Inexpensive. Charge off on each job. Colour comparator in every box.

Colour changes at neutralization number of 0.05. If oil is very dark and acidic, colour may be more orange than yellow. If light coloured oil gives orange colour, oil acidity is marginal. INHIBITED centrifugal oils will give false acidic test.

PROCEDURE:	ADD OIL AND SHAKE	
	IF COLOUR REMAINS PURPLE OIL IS SAFE	IF YELLOW/ORANGE COLOUR DEVELOPS OIL IS ACIDIC



Accurate "On The Job" Oil Sample Test Method: Henry Acid Test Kits provide a simple and reliable means for detecting the presence of acid in refrigeration oil with Distinctive Colour Separation.

When acid is present in a refrigeration system, the oil in the system acts as a scavenger and picks up the acid. Field and laboratory experience have indicated that measurement of the acid concentration of a sample of oil, taken from a system, is a reliable method of determining the extent of contamination in the system. Periodic checks of the oil, with the acid test kit, during a cleanup procedure will indicate when the acid and contamination in the system have been reduced to a safe operating level.

CAT. NO. 18440

"UNI-KIT" ACID TESTER No. UK90

The Henry Uni-Kit Acid Tester is a disposable kit, for one accurate test. Use it then discard it. Save time, work, dollars. Take it with you on all your calls.

Each test solution vial in the Uni-Kit contains exactly the right amount of solution to be mixed with the oil in one filled oil sample tube. When these precisely calibrated amounts of testing solutions are brought together in the shake-out tube, you have the properly proportioned mixture for an accurate acid test. If the fluid is "pink", the refrigerant oil is safe. If the fluid is "colourless" you have a clear warning of high acid level.

Exclusive HENRY Feature: The Hermetically Sealed Glass Ampule.*

* Only the Henry UK-90 UNI-KIT gives you this hermetically sealed ampule. Contains a test solution that stays factory fresh. The long life, simple, accurate shake test that assures positive colour identification even when performed on dark contaminated refrigerant compressor oil.

CAT. NO. 18442

"UNI-COR" ACID TEST KIT No. UC8700

The Uni-Cor Acid Test Kit consists of three separate solutions: a titration solvent solution, a neutralizing solution, and an indicating solution. It also includes a graduated mixing tube, plastic beakers for convenience in pouring the solutions and a plastic bottle for collecting the oil sample. All component parts, together with complete instructions for performing the test, are packaged in a compact, convenient carrying case.

The test is performed simply by combining the oil sample and solutions in specified amounts in a mixing tube, shaking, and observing the colour after the ingredients have been allowed to stand for a few minutes. One-half ounce of oil is sufficient to make a test.

The Henry shake test procedure has a unique and exclusive feature in that it provides for separation of the ingredients after the mixture is allowed to stand for a few minutes. A mixture of oil and solvent rises to the top of the mixing tube and a column of clear liquid settles to the bottom of the mixing tube. This lower column is the test indicator which turns "pink" when the oil is acceptable and remains "colourless" when the oil is unacceptable. This feature permits tests to be performed on dark and discoloured refrigerant oils and still provide accurate results.

The kit contains an extra amount of the solvent solution which can be used to rinse and clean the mixing tube and oil containers after each test. Replacement solutions are available.



This kit contains enough of each solution to perform 25 tests.

ACCURATE
"Shake Test"
ANALYSIS

PINK
is SAFE.

WATER CLEAR
indicates ACID.

PROTECTIVE, CLEANING & LUBRICATING FLUIDS

PENTALUBE

PENTALUBE 26

FOR ELECTRICAL EQUIPMENT

REMOVES MOISTURE, PROTECTS, PENETRATES, LUBRICATES

Pentalube 26 is a special formulation designed specifically to protect and maintain the operating efficiency of all electrical equipment. It forms a film . . . a water resistant moisture barrier which guards against corrosion, prevents deterioration and improves electrical contacts.

Formula 26 supports the insulating properties of non-conductive materials. Is highly efficient in the lubrication of moving parts and safeguards stored equipment.

APPLICATIONS

AIR CONDITIONERS, ALARMS, ANTENNA INSULATORS, BATTERY TERMINALS, BLOWERS, BUS BARS, CABLES, CAPACITORS, CIRCUIT BREAKERS, COILS, CONTACTORS, CONTROL GEAR, CROSS BARS, CONTROLS, ELECTRONIC COMPONENTS, ELECTRONIC ORGANS, ELEVATORS, ELECTRONIC CIRCUITS, FANS, FUSE HOLDERS, GENERATORS, HOISTS, HOUSINGS, INSULATION, LIFT TRUCKS, METALS, METERS, MOTORS, MULTIPLE CONNECTORS, OSCILLATORS, POKER MACHINES, RADIOS, RADIO CONTROLS, PORTABLE TOOLS, RECEPTACLES, RECTIFIERS, RELAYS, SOLENOIDS, SLOT MACHINES, SWITCHGEAR, SWITCHES, TERMINALS, TESTERS, TELEPHONE SWITCHBOARDS, TV TUNERS, TRANSFORMERS, TRANSMITTERS, VOLUME CONTROLS, ETC., ETC.



PENTALUBE 76

FOR COMMUNICATION, ELECTRICAL, ELECTRONIC EQUIPMENT

DISPLACES MOISTURE, PENETRATES, DEGREASES

INSTANTLY CLEANS PRECISION EQUIPMENT WITH COMPLETE SAFETY

PENTALUBE 76 - as a spray, it provides a constant source of fresh FREON® T.F. solvent - preventing the contamination so often a problem with dipping and bath cleaning methods.

PENTALUBE 76 - offers a unique combination of high oil solvency with a pronounced washing action due to a low surface tension (19 Dynes/CM @ 25°C).

PENTALUBE 76 - spray is completely volatile - it evaporates fast (boiling point 47.6°C) and clean, leaving no residue. Non-conductive. Completely displaces water from electrical equipment making it immediately operational.

SPECIALLY RECOMMENDED FOR - instruments, relays, distribution panels, switching devices, controls, tuners, cam-operated equipment.

IN THESE INDUSTRIES - Automotive, Electrical, Electronics, Aircraft, Power, Telephone, TV and Radio, Office Equipment, Laboratories, Field Service.



PENTALUBE 56

FOR AUTOMOTIVE, MARINE, FARM, HOME USE

STARTS WET ENGINES, PENETRATES, PROTECTS, LUBRICATES

PENTALUBE 56 is an all purpose protective lubricant which has the ability to remove water - impregnate metal and form a film which lubricates and guards against rust and corrosion.

PENTALUBE 56 is used on both mechanical and electrical parts. Will not harm paintwork or chrome . . . displacing moisture caused by condensation and drying after degreasing.

Use inside doors for rust protection and free movement of windows. Use on hinges and locks . . . it lubricates and eliminates squeaks.

APPLICATIONS - Aerials, Air Conditioners, Alternators, Ball Joints, Battery terminals, Brackets, Brake Assemblies, Bushings, Carburettor Linkage, Chokes, Chrome Parts, Coils, Distributors, Exhaust Systems, Generators, Heat Risers, Hinges, Linkages, Locks and Latches, Motors, Nuts and Bolts, Poker Machines, Shock Absorbers, Slot Machines, Spark Plugs, Springs, Starters, Switches and Controls, Tie Rods, Tools etc.



PENTALUBE 36

FOR METALS AND MACHINERY

INHIBITS RUST CORROSION AND PREVENTS PLASTER BURN ON

ALUMINIUM AND CHROME FITTINGS - LUBRICATES AND PROTECTS

A special formulation designed for the protection of metals and machinery. It has the ability to penetrate and form a water resistant film which guards against corrosion. Pentalube 36 can be used on Aluminium, Steel, Iron, Copper, Brass, Magnesium, Plated Surfaces.

APPLICATIONS - ENGINEERING - Tools, Instruments, Dies, Jigs, Sub-Assemblies, Precision Machined Surfaces, Storage and Transport of Machinery.

BUILDING - Aluminium Windows and Doors, Chrome Fittings, Taps, Hardware, Stainless Steel Sinks, Sliding Door Tracks, etc.



TYPE	175 GRAM AEROSOL PRESSURE CAN	400 & 300 GRAM AEROSOL PRESSURE CAN	500 GRAM AEROSOL PRESSURE CAN	5 LITRE CAN
	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
PENTALUBE 26	—	18436 (400 g)	—	18437
PENTALUBE 76	—	—	18434	—
PENTALUBE 56	18430	18428 (300 g)	—	18429
PENTALUBE 36	—	—	—	—

HAND CLEANERS & PROTECTORS



Helps protect the hands from the harmful and unpleasant effects of paint, grime, grease, carbon, oil, printers' inks and dyes, tar, fine metal dust and many other industrial soils that can injure the skin.

Protectolene is a stable, concentrated, highly efficient water soluble cream of the combined emulsifier and solvent type containing soothing emollients.

DIRECTIONS FOR USE : Rub then rinse. To ensure maximum efficiency and protection with Protectolene all that is required is to rub it in thoroughly. It is important that particular attention be paid to skin crevices and around fingernails. Once the cream is properly spread all over the soiled hands, rinse with water then dry. If water is unavailable, simply wipe hands on clean rag, cotton waste or paper towelling.

2

PROTECTOLENE							
100 GRAM TUBE	500 GRAM TIN	1.75 kg. TIN	3.5 kg. TIN	DISPENSER UNIT AND EMPTY CAN 3.5 kg.	DISPENSER CAN 3.5 kg.	19 kg. DRUM	50 kg. DRUM
CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
18458	18451	18452	18453	18457	18456	18454	18455

WHITE GENIE ANTISEPTIC INDUSTRIAL HAND CREAM

WHITE GENIE contains especially selected oils plus the miracle germ killer hexachloraphine, to protect hands and to assist in the control of industrial dermatitis and kindred ailments.

DIRECTIONS

Apply a small quantity of WHITE GENIE to the hands, rub in well then either rinse or wipe off.

WHITE GENIE effectively sterilizes grease, grime, dirt, carbon black, inks, semi-dry paint and most dyes and is ideally suited for mechanics, plumbers, engineers, painters, fitters, printers and commercial artists, etc.

WHITE GENIE				
450 GRAM TINS	4 kg. TINS	16 kg. TINS	4 kg. DISPENSERS	16 kg. DISPENSERS
CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
18463	18464	18465	18466	18467

BON GARD ANTISEPTIC HAND GEL

WHATEVER INDUSTRY, WHATEVER SIZE, BON GARD IS THE IDEAL PROTECTIVE GEL IN PROTECTING WORKERS' HANDS AND ARMS AGAINST THE TOUGHEST WORK GRIME, GREASE, PAINT, METAL DUST, CARBON, DUPLICATION INK, AND EVEN THE MOST INGRAINED DIRT

Bon Gard antiseptic protective gel fights infection! It's a pure white gel that you simply rub on and wipe off - with or without water. Bon Gard leaves only a layer of pure lanolin on the skin - protecting even the toughest working man's hands against dryness and infection.

Bon Gard contains Lanolin Esters, an effective Emollient to relieve the condition of skin irritation. Bon Gard also contains Chloroxylenol, an active germicidal ingredient which aids healing of cuts and assists in prevention of industrial dermatitis.

BON GARD							
450 GRAM TIN	3.75 kg. TIN	4 kg. TIN	19 kg. DRUM	50 kg. DRUM	180 kg. DRUM	3.75 kg. DISPENSER	19 kg. DISPENSER
CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
18468	18469	18470	18471	18472	18473	18474	18475

OUR COMPLETE INVENTORY ASSURES PROMPT SERVICE

VIRGINIA METAL CLEANERS & SCALE REMOVERS



VIRGINIA METAL CLEANING DETERGENT

For cleaning grease and dirt-contaminated fin coils, evaporators, metal filters and fan blades.

Excellent for use on electronic air filters.

Emulsified for better penetrating and coating properties.

Apply as a spray, full strength or diluted, then rinse away with water.

Packed: 1 Gal. Polyethylene Bottles — No. WD1



VIRGINIA ICE MACHINE CLEANER

Liquid — for fast penetration and quick removal of scale.

Packed: Half-Pint Bottles — No. H418



VIRGINIA LIQUID SCALE REMOVER

For fast penetration of hard-to-remove scales. Special anti-foam reagent included if control of foaming is needed. Special inhibitor included to provide excellent protection for all metal parts of the equipment system.

Packed: 1 Gal. Bottles — No. WL1



VIRGINIA SOLID SCALE REMOVER (V-803)

Removes scale quickly. Protects metal from damage. A dry 97% sulfamic acid formulation, specially inhibited, to protect such vulnerable metal surfaces as aluminium, hot zinc dip coated and galvanized. Packed in polyethylene lined, weather-proof containers.

Packed: 10 lb. Drum — No. WS10

VIRGINIA

METAL CLEANING DETERGENT	ICE MACHINE CLEANER	LIQUID SCALE REMOVER	SOLID SCALE REMOVER
1 Gal. Polyethylene Bottles No. WD1	Half Pint Bottles No. H418	1 Gal. Bottles No. WL1	10 lb. Drum No. WS10
CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
18449	18448	18446	18447

NOTES

2

ONE STOP BUYING

NOW-A-DAYS, THE RELATIVELY HIGH PAY RATES OF MECHANICS AND SERVICEMEN MAKES IT UNECONOMIC TO RUN AROUND TO DIFFERENT SUPPLY HOUSES FOR ODD BALL ITEMS. YOU CAN FIND MOST ANYTHING FOR REPAIR OR INSTALLATION OF REFRIGERATION, AIR CONDITIONING AND HEATING AT YOUR ACPAR CENTRE.

NOTES

[illegible]

PICK-UP COUNTERS EVERYWHERE

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.

REFRIGERANTS

THE REFRIGERANTS LISTED BELOW ARE AVAILABLE IN :

- A. — CYLINDERS, TANKS OR DRUMS.
Related to quantity ordered.
- B. — THROWAWAY OR DISPOSABLE CYLINDERS AND CANS.
Refrigerants R12, R22, R114 and R502 are available in non-returnable/non-refillable throwaway or disposable cylinders and cans. (Refer Tech. Page 185-b).
- C. — DEPOSITS.
As manufacturers deposit conditions vary from time to time, deposits charged will be in accordance with the conditions ruling at the date of sale.
- D. — CUSTOMER CYLINDERS.
When CUSTOMER CYLINDERS are forwarded for filling, they must be clearly labelled with Customer's name, type of refrigerant and method of return.
The Company reserves the right to refuse to fill a customer cylinder if same does not conform to "Code" requirements.

PRECAUTIONS : Never mix refrigerants unless a plant was originally so charged by the manufacturer. Mixed refrigerants boil or condense over different ranges of temperatures. Experiments indicate that under carefully controlled conditions some mixed refrigerants may have certain benefits. Among these are azeotropes which are mixtures which have a constant boiling point under constant pressure. Field charging of the individual components of mixtures should not be attempted. One exception to the use of mixtures occurs with R22 and some manufacturers advise the addition of a small amount of R12 to a plant charged with R22 in order to help an oil return scheme to work. This is quite in order and will not upset the R22 characteristics because only some 2 to 3% of R12 is added. For successful operation you must use a guaranteed pure, dry refrigerant and it must be charged into a guaranteed clean, dry and air-free system.

FILLING OF CYLINDERS

Cylinders may be filled to a maximum weight in accordance with the following table:-

REFRIGERANT	FILLING RATIO	REFRIGERANT	FILLING RATIO
R11	1.36	R40	0.82
R12	1.15	R113	
R13	0.96	R114	1.31
R13B1	1.15	R500	1.00
R14		R502	1.04
R21	1.15	R503	
R22	1.03	R764	1.23

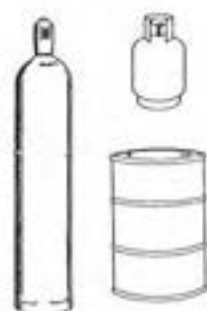
MAXIMUM NET WEIGHT FILLED
= Water Capacity of Cylinder kg (lbs)
Multiplied by FILLING RATIO

Filling Ratios as per -
Australian Standard 2030 - 1977
SAA GAS CYLINDERS CODE

SPECIFICATIONS AND APPLICATIONS OF REFRIGERANTS.

REFRIG.	CHEMICAL NAME	FORMULAE	BOILING POINT °C °F	APPLICATION
R 11	Trichlorofluoromethane	CCl ₃ F	+23.6 (+74.8)	Refrigerant used in large centrifugal compressors. Also flushing solvent for sealed-unit systems after motor burn-out.
R 12	Dichlorodifluoromethane	CCl ₂ F ₂	-29.8 (-21.6)	Universal refrigerant for all types of compressors and for all applications.
R 13	Chlorotrifluoromethane	CClF ₃	-81.4 (-114.6)	Used in cascade with R12 or R22 to attain temperatures approaching -101°C (-150°F).
R 13B1	Bromotrifluoromethane	CBF ₃	-57.8 (-72.0)	Probably the lowest temperature, highest vapour pressure refrigerant with which it is feasible to operate a single stage unit. Favoured for specialised applications such as simulating conditions at high altitudes.
R 14	Tetrafluoromethane (Carbon tetrafluoride)	CF ₄	-128.0 (-198.4)	Extremely high pressure, low temperature refrigerant for highly specialised applications. Used in a three-stage cascade system with R22 & R13 to attain ultra-low temperature.
R 21	Dichlorofluoromethane	CHCl ₂ F	+8.9 (+48.0)	Has very limited use — mainly used in vapour pressure control instruments.
R 22	Chlorodifluoromethane	CHClF ₂	-40.8 (-41.4)	Universal refrigerant particularly for L.T. applications. Higher capacity permits the use of smaller equipment. Refrigerant for standard commercial applications but now being superseded by chloro-fluoro-hydrocarbons.
R 40	Methyl-Chloride	CH ₃ CL	-23.3 (-10.0)	Refrigerant used in many earlier standard commercial applications but now being superseded by chloro-fluoro-hydrocarbon refrigerants. Note: Only available in States where the use of it is not banned.
R 113	Trichlorotrifluoroethane	CCl ₂ F.CClF ₂	+47.6 (+117.6)	Very low vapour pressure refrigerant used in centrifugal compressors. Also a useful flushing and dry cleaning solvent.
R 114	Dichlorotetrafluoroethane	CClF ₂ .CClF ₂	+ 3.6 (+38.4)	Moderately low vapour pressure refrigerant used in small rotary compressors.
R 500	74.2% —R12, 25.8% —R152A,	—	-33.3 (-28.0)	An azeotropic mixture of R12 and R152A giving higher performance in airconditioning systems.
R 502	48.8% —R22, 51.2% —R115,	—	-45.6 (-50.1)	An azeotropic mixture of R22 and R115 giving increased capacity at considerably lower discharge temperatures.
R 503	59.9% —R13, 40.1% —R23,	—	-88.6 (-127.6)	An azeotropic mixture of R13 and R23 offering significantly greater refrigerating performance than either refrigerant alone. R503 is still very much in the development stage but there are strong indications that its use as the low stage refrigerant in cascade systems will be of considerable benefit in attaining the low temperatures required for environmental test chambers, pharmaceutical processing etc.
R 764	Sulphurdioxide	SO ₂	-10.6 (+13.0)	General refrigerant for early model small reciprocating compressors.
R 717	Ammonia	NH ₃	-33.3 (-28.0)	A widely used refrigerant in the larger sizes of industrial vapour-compression systems as well as absorption systems.

REFRIGERANTS & REFRIGERATION SERVICE AIDS



REFRIGERANT

AVAILABLE IN :

Cylinders — 11 kg, 22 kg, 43 kg, 65 kg.

Drums — 800 kg.

Special Sizes on application

Filling Ratios — Refer Tech. Page 185-a

REFRIGERANT	CAT. NO.
R 12	1851
R 22	1852
R 11	18530
R 13	18531
R113	18533
R114	18534
R500	18535
R502	18536
SO ₂ (Sulphur Dioxide)	18537
R13B1	18540
Methyl - Chloride	18541

AMMONIA (R717)
(LIGHT WEIGHT CYLINDERS)
Other sizes on application

REFRIGERANT	CYL. SIZE	CAT. NO.
AMMONIA	24 kg	18520
(R717)	35 kg	18521

LIQUEFIED PETROLEUM GAS (LPG) also available

LIQUEFIED PETROLEUM GAS (LPG)
(Customer Cylinders filled to order)

CAT. NO.	18539
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VIRGINIA
CAN-O-GAS®

FREON® - A Du Pont TM.

The handy refrigerant in the throwaway container

- Easy, reliable way to add refrigerant to:
automotive air conditioners water coolers
window air conditioners vending machines
freezers ice cream cabinets
refrigerators

	CAT. NO.
R12 14 oz. Can No. CF121FT (Flat Top)	18584
R22 1 lb. Can No. CF221ST (Screw Top)	18564
R22 2 lb. Can No. CF222ST (Screw Top)	18561
R114 1 lb. Can	18562
R502 1 lb. Can	18563
DYTEL® CONCENTRATE 14 oz. Can	

* DYTEL CONCENTRATE — DYTEL® is a bright red dye used for detecting leaks in air conditioning and refrigeration systems

- Easy to use — has good solubility and stability with the refrigerants and oils — at low and high temperatures.
- It pinpoints the leaks — the red colour appears at the location of the leak, sometimes in a matter of minutes. Locates both large and also multiple leaks close together.
- It is a liquid — no solid residues to cause plugging of expansion devices, strainers, or filter-driers.
- It is non-inflammable — can be used in areas where a flammable atmosphere may present a hazard as with some types of leak detectors.
- It is non-reactive — has no effect on metals, oils, or insulation materials in refrigeration systems. Does not affect performance of liquid line moisture indicators.
- Especially useful for automotive air conditioning.



VIRGINIA CAN-O-GAS® SAFETY RELIEF TOP CAN

Refrigerant 12, 14 oz. Can with Safety Relief Tapping Ring Top to prevent accidental bursting of can due to excessive internal pressure during charging. Pierce tapping of can through plastic ring.

14 oz. Can	CAT. NO. 18584
Plastic Safety Tapping Ring	CAT. NO. 18585

REFRIGERANTS & REFRIGERATION SERVICE AIDS

DISPOSABLE REFRIGERANT CYLINDERS



FREON® - A Du Pont TM.

CAT. NO.	REFRIGERANT	CYLINDER SIZE	PART No.
185103	R12	15 lb.	G12/15
185104	R12	30 lb.	G12/30
185105	R12	50 lb.	G12/50
185106	R22	15 lb.	G22/15
185107	R22	30 lb.	G22/30
185108	R22	50 lb.	G22/50
185111	R502	15 lb.	G502/15
185109	R502	30 lb.	G502/30
185110	R502	50 lb.	G502/50
185115	R11	30 lb.	G11/30

IMPERIAL TAP-A-CAN® Valves

FEATURES

- BALL CHECK
- LONG LASTING DURABILITY
- POSITIVE SHUT-OFF
- QUALITY FORGED BRASS BODY
- HARDENED STEEL PIERCING NEEDLE

Spud-Can Type
339-C

339-C Tap-A-Can Valve for use with male spud screw top cans. $\frac{1}{4}$ " flare connection fits standard charging lines. 64293 Gasket for 339-C.

Clamp
Partially
OpenClamp Locked
Closed. Valve
Prevents Clamp
From Opening.Universal Type
338-C

338-C Universal Tap-A-Can Valve fits all refrigerant cans — both plain and threaded spud top. $\frac{1}{4}$ " flare connection fits standard charging lines. 80470-01 Gasket for 338-C.

CAT. NO.	DESCRIPTION	MANUF. P/N
18568	Tap-A-Can Valve	338-C
18572	Gasket for 338-C	80470-01
18574	Tap-A-Can Valve	339-C
18567	Gasket for 339-C	64293

ROBINAIR REFRIGERANT CAN DISPENSING VALVES

"TAPS ALL" VALVE

Fits all flat top or threaded top cans. Installed in a second by simply pressing the cam type locking device. Positive cam action locking device insures against accidental blow-off. Unit has quality forged brass valve body, hardened tool steel piercing needle, rugged metal handle and replaceable gasket.

Pt. No. 11001 Valve.

Pt. No. 11001-26 Gaskets (package of 12).



DISPENSING VALVE FOR 12-lb. DISPOSABLE CYLINDERS

Dispos-A-Can (DuPont Trade Name) valve with quick seal cap has a needle that upsets Schrader core in cylinder top. Precision machined all brass construction with moulded plastic handle. Needle is tool steel. Valve body is designed to provide a handle for carrying the disposable cylinder.

Pt. No. 14381 Dispensing Valve.

Pt. No. 40001 Gasket.



Valve Pt. No. 11001

CAT. NO. 18575

Valve Pt. No. 14381

CAT. NO. 18577

NOTES

SPEEDY SERVICE

WE ARE ORGANIZED TO MAKE PROMPT DELIVERY FROM OUR VAST STOCKS. WHETHER YOUR ORDER IS LARGE OR SMALL WE WILL EXERCISE GREAT CARE IN SELECTING AND PACKING YOUR ORDER. MORE THAN 90% OF ALL ORDERS RECEIVED ARE DESPATCHED THE SAME DAY WE AIM TO KEEP YOU AND YOUR JOB MOVING SATISFACTORILY

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FLARE NUTS — PLAIN				FLARE NUTS — SHORT BARREL			FLARE NUTS — FROST-PROOF			FLARE NUTS — FROST-PROOF GROOVED		
												
SIZE	CAT. NO.	HELDON	HUDSON	CAT. NO.	HELDON	HUDSON	CAT. NO.	HELDON	HUDSON	CAT. NO.	HELDON	HUDSON
3/16	1901	807	1651	19011	857	—	19021	907	1701	—	—	—
1/4	1902	800	1652	19012	850	1671	19022	900	1702	19032	950	1830
5/16	1903	801	1653	19013	851	1670	19023	901	1703	—	—	—
3/8	1904	802	1654	19014	852	1672	19024	902	1704	19034	951	1832
1/2	1905	804	1656	19015	854	1673	19025	904	1706	19035	952	1833
5/8	1906	805	1657	19016	855	1674	19026	905	1707	19036	953	1834
3/4	1907	806	1658	19017	856	1675	19027	906	1708	19037	954	1835
7/8	1908	810	1659	19018	860	—	19028	910	1709	—	—	—
FLARE NUTS — PLAIN REDUCING				FLARE NUTS — FROST-PROOF REDUCING			FLARE NUTS — FROST-PROOF — GROOVED — REDUCING			FLARE NUTS — LIGHT TUBE REDUCING		
												
1/4 3/16	—	—	—	—	—	—	—	—	—	19071	Brass 870	Steel 8705
5/16 1/4	19041	1000	1751	19051	1100	1801	—	—	—	—	—	1770
3/8 1/4	19042	1001	1752	19052	1101	1802	19062	1150	—	19072	871	8715
3/8 5/16	19043	1006	1753	19053	1106	—	—	—	—	19073	872	8725
1/2 3/8	19044	1002	1754	19054	1102	1803	19064	1151	—	19074	873	8735
5/8 3/8	19045	1005	—	19055	1105	—	—	—	—	—	—	—
5/8 1/2	19046	1003	1755	19056	1103	1804	19066	1152	—	19076	874	8745
3/4 5/8	19047	1004	1756	19057	1104	1805	19067	1153	—	19077	875	8755
FLARE NUTS — LIGHT TUBE PLAIN (EXT'D BRASS)				FLARE NUTS — PLAIN STEEL			COPPER BONNETS			COPPER FLARE WASHERS		
												
1/8	19081	880	—	19091	8805	—	—	—	—	—	—	—
3/16	19082	881	1660	19092	8815	—	—	—	—	—	—	—
1/4	19083	882	1661	19093	8825	1821*	190103	3000	1901	190113	3050	1951
5/16	19084	883	1662	19094	8835	1822*	190104	—	1907	—	—	—
3/8	19085	884	1663	19095	8845	1823*	190105	3001	1902	190115	3051	1952
1/2	19086	886	1665	19096	8865	—	190106	3002	1903	190116	3052	1953
5/8	19087	887	1666	19097	8875	—	190107	3003	1904	190117	3053	1954
3/4	19088	888	1667	19098	8885	—	190108	3004	1905	190118	3054	1955
7/8	19089	889	—	19099	8895	—	—	—	—	—	—	—
1"	19090	890	—	19100	8905	*Zinc Pltd.	—	—	—	—	—	—
FLARE SEAL CAP NUTS				FLARE SEAL PLUGS			BSP PIPE PLUGS			COPPER FLAT WASHERS		
												
1/8	—	—	—	—	—	—	190141	3100*	2051*	I.D. O.D.	—	—
3/16	190121	2907	1850	190131	2806	2000	—	—	—	1/4 7/16	190153	C7/4 1970
1/4	190122	2900	1851	190132	2800	2001	190142	3101*	2052	5/16 1/2	190154	C8/5 1971
5/16	190123	2905	1852	190133	2805	2002	—	—	—	3/8 9/16	190155	C9/6 1972
3/8	190124	2901	1853	190134	2801	2003	190143	3102*	2053	7/16 3/4	190156	C12/7 1973
7/16	—	—	—	190135	2807	—	—	—	—	1/2 7/8	—	—
1/2	190126	2902	1855	190136	2802	2004	190144	3103*	2054	5/8 7/8	190158	C14/10 1974
5/8	190127	2903	1856	190137	2803	2005	—	—	—	3/4 1	—	—
3/4	190128	2904	1857	190138	2804	2006	190145	3104*	2055	7/8 1 1/4	—	—
7/8	—	—	—	—	—	—	—	—	—	1 1 1/4	190161	C20/16 —
1	—	—	—	—	—	—	190146	3105*	—	—	—	—

* Tinned on application

LINE FITTINGS - BRASS

UNIONS					UNIONS					UNIONS				
Double Flare					Double Flare Reducing					Male Flare to Male BSP				
														
Size	Cat.No.	Heldon	Hudson		Size	Cat.No.	Heldon	Hudson		Size	Cat.No.	Heldon	Hudson	
Flare	Flare				Flare	Flare				Flare	MBSP			
1/8	1/8	1911	1208	—	1/4	3/16	19161	1317	—	3/16	1/8	191121	1524	2698
3/16	3/16	1912	1207	2601	5/16	1/4	19162	1300	2651	3/16	1/4	191122	1529	2699
1/4	1/4	1913	1200	2602	3/8	3/16	19163	—	—	3/16	3/8	191123	—	—
3/8	3/8	1914	—	2602HD	3/8	1/4	19164	1301	2652	3/16	1/2	191124	—	—
5/16	5/16	1915	1201	2603	3/8	5/16	19165	1313	2655	1/4	1/8	191125	1500	2702
3/8	3/8	1916	1202	2604	1/2	1/4	19166	1302	2653	*1/4	1/8LT	191126	—	2703
1/2	1/2	1917	1204	2606	1/2	5/16	19167	1309	2656	1/4	1/4	191127	1501	2704
5/8	5/8	1918	1205	2607	1/2	3/8	19168	1303	2657	*1/4	1/4LT	191128	—	2705
3/4	3/4	1919	1206	2608	5/8	1/4	19169	1304	2654	1/4	3/8	191129	1502	2706
7/8	7/8	19110	1209	2609	5/8	3/8	19170	1305	2659	1/4	1/2	191130	1503	2707
1	1	19111	1210	—	5/8	1/2	19171	1306	2661	1/4	3/4	191131	1534	—
Male Flare to Female Flare					3/4	1/2	19172	1307	2662	5/16	1/8	191132	1504	2708
					3/4	5/8	19173	1308	2663	5/16	1/4	191133	1505	2709
Flare	F.Flare				7/8	3/4	19174	1310	—	5/16	3/8	191134	1538	2728
3/16	1/4	19112	1616	—	1"	3/4	19175	1311	—	5/16	1/2	191135	1530	—
1/4	1/8	19113	—	—	1"	7/8	19176	1312	—	3/8	1/8	191136	1506	2710
1/4	3/16	19114	—	2752	Male Flare to Parallel Male BSP with Copper Gasket					3/8	1/4	191137	1507	2711
1/4	1/4	19115	1619	A2753						3/8	3/8	191138	1508	2712
1/4	5/16	19116	1602	2753	Flare	BSP				3/8	1/2	191139	1509	2713
1/4	3/8	19117	1604	2754	1/4	1/4	19181	1230	—	3/8	3/4	191140	1525	2714
1/4	1/2	19118	1607	2755	1/4	3/8	19182	1234	—	3/8	1-1/4	191141	1526	—
1/4	5/8	19119	1610	2756	3/8	3/8	19183	1235	—	1/2	1/8	191142	1523	A2715
1/4	3/4	19120	1622	—	3/8	1/2	19184	1231	—	1/2	1/4	191143	1511	2716
5/16	1/4	19121	1620	—	1/2	1/2	19185	1232	—	1/2	3/8	191144	1512	2717
5/16	3/8	19122	—	2758	1/2	3/4	19186	1236	—	1/2	1/2	191145	1513	2718
5/16	1/2	19123	—	—	5/8	1/2	19187	1233	—	1/2	3/4	191146	1514	2719
3/8	1/4	19124	1600	2760	5/8	3/4	19188	1237	—	1/2	1"	191147	1535	—
3/8	5/16	19125	1603	2761	3/4	3/4	19189	1238	—	5/8	1/4	191148	1515	2720
3/8	3/8	19126	1627	—	Male Flare to Female BSP					5/8	3/8	191149	1516	2721
3/8	1/2	19127	1608	2762						5/8	1/2	191150	1517	2722
3/8	5/8	19128	1611	2763	Flare	F.BSP				5/8	3/4	191151	1518	2723
3/8	3/4	19129	—	—	3/16	1/8	19191	—	—	5/8	1"	191152	1527	—
1/2	1/4	19130	1601	2764	3/16	1/4	19192	—	—	5/8	1-1/4	191153	1539	—
1/2	5/16	19131	—	—	3/16	3/8	19193	—	—	3/4	3/8	191154	1537	—
1/2	3/8	19132	1605	2766	3/16	1/2	19194	—	—	3/4	1/2	191155	1519	2724
1/2	7/16	19133	1606	—	1/4	1/8	19195	1400	2801	3/4	3/4	191156	1520	2725
1/2	1/2	19134	1624	—	1/4	1/4	19196	1401	2802	3/4	1"	191157	1531	2726
1/2	5/8	19135	1612	2768	1/4	3/8	19197	1402	2803	7/8	3/4	191158	1540	2727
1/2	3/4	19136	1617	2769	1/4	1/2	19198	1414	—	1"	3/4	191159	1533	—
5/8	1/4	19137	1621	—	5/16	1/8	19199	1403	2804	1	1	191160	1528	—
5/8	3/8	19138	1615	—	5/16	1/4	191100	1417	2805	1	1-1/4	191161	1532	—
5/8	1/2	19139	1609	2770	5/16	3/8	191101	1418	2806	1-1/4	1-1/4	191162	1543	—
5/8	3/4	19140	1618	2771	3/8	1/8	191102	1421-2	2807	Male BSP to Male BSP				
3/4	1/2	19141	1614	2772	3/8	1/4	191103	1406	2808					
3/4	5/8	19142	1613	2773	3/8	3/8	191104	1407	2809	BSP	BSP			
1	3/4	19143	1623	—	3/8	1/2	191105	1408	2810	1/8	1/8	191171	1734	2735
Female Flare to Female Flare					3/8	3/4	191106	1404	A2810	1/4	1/4	191172	1735	2736
					1/2	1/4	191107	1419	2811	3/8	3/8	191173	1731	2737
F.Flare					1/2	3/8	191108	1412	2812	1/2	1/2	191174	1732	2738
1/4	1/8	19144	—	—	1/2	1/2	191109	1415	2813	3/4	3/4	191175	1736	2739
1/4	1/4	19145	1760	2851	1/2	3/4	191110	1405	2814	1"	1"	191176	1744-3	—
5/16	5/16	19146	—	—	5/8	3/8	191111	1413	—	1-1/4	1-1/4	191177	1743-3	—
3/8	1/4	19147	1763	—	5/8	1/2	191112	1411	2815	Reducing				
3/8	3/8	19148	1762	2853	5/8	3/4	191113	1409	2816	1/4	1/8	191181	1738	2881
1/2	3/8	19149	1764	—	3/4	1/2	191114	1416	—	3/8	1/8	191182	1733	—
1/2	1/2	19150	1761	2855	3/4	3/4	191115	1410	2817	3/8	1/4	191183	1741-3	2882
5/8	5/8	19151	—	2856						1/2	1/4	191184	1730	2885
										1/2	3/8	191185	1740-3	2883
										3/4	1/2	191186	1737	2884

LINE FITTINGS - BRASS

UNIONS					UNIONS					UNIONS				
Female BSP to Female Flare					Female Flare to Male BSP					Female BSP to Female BSP (Gas Couplings)				
														
Size	Cat. No.	Heldon	Hudson		Size	Cat. No.	Heldon	Hudson		Size	Cat. No.	Heldon	Hudson	
F.BSP	F.Flare				F.Flare	BSP				F.BSP	F.BSP			
1/8	1/4	1921	1743	—	1/4	1/8	19261	1660	—	1/8	1/8	192131	1726	2900
1/4	1/4	1922	1742	—	1/4	1/4	19262	1662	—	1/4	1/4	192132	1720	2901
3/8	3/8	1923	1741	—	3/8	3/8	19263	1668	—	1/4	1/2	192133	1721	—
3/8	1/2	1924	1740	—	1/2	1/4	19264	1663	—	3/8	1/4	192134	1722	—
Male BSP to Female BSP (Gas Bushings)					1/2	1/2	19265	1667	—	3/8	3/8	192135	1723	2902
					5/8	3/4	19266	1661	—	1/2	3/8	192136	1725	—
Male BSP to Solder					Female BSP to Solder									
M.BSP	F.BSP				B.S.P.	Tube				F.BSP	Tube			
1/8	1/8	19211	1755	—	1/8	1/4	19271	60365	W23500	1/8	1/4	192141	60247	—
1/8	1/4	19212	1752	—	1/4	1/4	19272	60300	W23510	1/4	1/4	192142	60248	—
1/8	3/8	19213	1763-4	—	1/4	5/16	19273	60366	—	1/4	5/16	192143	60250	—
1/4	1/8	19214	1751	2875	1/4	3/8	19274	60301	W23512	1/4	3/8	192144	60251	—
1/4	1/4	19215	1758	—	1/4	1/2	19275	60303	W23513	1/4	1/2	192145	60254	—
1/4	3/8	19216	1782-4	—	1/4	5/8	19276	60306	—	1/4	5/8	192146	60257	—
1/4	1/2	19217	1781-4	—	1/4	3/4	19277	60310	—	1/4	3/4	192147	60261	—
3/8	1/8	19218	1767-4	2881	3/8	1/4	19278	60367	—	3/8	1/4	192148	60249	—
3/8	1/4	19219	1766-4	2876	3/8	3/8	19279	60302	W23521	3/8	3/8	192149	60252	—
3/8	1/2	19220	1762-4	—	3/8	1/2	19280	60304	W23522	3/8	1/2	192150	60255	—
1/2	1/8	19221	1756	2880	3/8	5/8	19281	60307	W23523	3/8	5/8	192151	60258	—
1/2	1/4	19222	1757	2879	3/8	3/4	19282	60311	—	3/8	3/4	192152	60262	—
1/2	3/8	19223	1754	2877	1/2	3/8	19283	60368	W23530	1/2	3/8	192153	60253	—
1/2	1/2	19224	1768-4	—	1/2	1/2	19284	60305	W23531	1/2	1/2	192154	60200	—
3/4	1/4	19225	1759	—	1/2	5/8	19285	60308	W23532	1/2	5/8	192155	60201	—
3/4	3/8	19226	1760-4	A2877	1/2	3/4	19286	60312	W23533	1/2	3/4	192156	60203	—
3/4	1/2	19227	1750	2878	1/2	7/8	19287	60393	W23534	1/2	7/8	192157	—	—
1	3/4	19228	1765-4	2882	1/2	1	19288	60315	—	1/2	1	192158	60204	—
1.1/4	3/8	19229	1753	—	1/2	1.1/8	19289	—	—	1/2	1.1/8	192159	—	—
1.1/4	1	19230	1783-4	2885	1/2	1.1/4	19290	60319	—	1/2	1.1/4	192160	60207	—
Male Flare to Solder					1/2	1.1/2	19291	60324	—	1/2	1.1/2	192161	60211	—
					3/4	1/2	19292	60369	W23540	3/4	1/2	192162	60256	—
Flare	Tube				3/4	5/8	19293	60370	W23541	3/4	5/8	192163	60269	—
1/4	1/4	19231	1700	W23010	3/4	3/4	19294	60314	W23542	3/4	3/4	192164	60202	—
1/4	5/16	19232	—	W23011	3/4	7/8	19295	60373	W23543	3/4	7/8	192165	60264	—
1/4	3/8	19233	1701	W23012	3/4	1	19296	60317	W23544	3/4	1	192166	60205	—
1/4	1/2	19234	1710	—	3/4	1.1/8	19297	60375	W23545	3/4	1.1/8	192167	60266	—
1/4	5/8	19235	1709	—	3/4	1.1/4	19298	60321	—	3/4	1.1/4	192168	60208	—
5/16	1/4	19236	—	—	3/4	1.1/2	19299	60326	—	3/4	1.1/2	192169	60212	—
5/16	5/16	19237	—	W23021	1	5/8	192100	60371	W23550	1	5/8	192170	60260	—
5/16	3/8	19238	—	—	1	3/4	192101	60372	W23551	1	3/4	192171	60263	—
3/8	5/16	19239	—	—	1	7/8	192102	60374	W23552	1	7/8	192172	60265	—
3/8	3/8	19240	1702	W23031	1	1	192103	60318	W23553	1	1	192173	60206	—
3/8	1/2	19241	1703	W23032	1	1.1/8	192104	60376	W23554	1	1.1/8	192174	60267	—
3/8	5/8	19242	—	W23033	1	1.1/4	192105	60322	—	1	1.1/4	192175	60209	—
3/8	3/4	19243	1713	—	1	1.3/8	192106	60378	W23555	1	1.3/8	192176	60269	—
1/2	3/8	19244	1715	W23040	1	1.1/2	192107	60327	—	1	1.1/2	192177	60213	—
1/2	1/2	19245	1704	W23041	1	1.5/8	192108	60381	W23556	1	1.5/8	192178	60272	—
1/2	5/8	19246	1705	W23042	1	1.3/4	192109	60330	—	1	1.3/4	192179	60273	—
1/2	3/4	19247	1720-24	W23043	1	2	192110	60334	—	1	2	192180	60217	—
1/2	1	19248	1711	—	1.1/4	1.1/8	192111	60377	—	1.1/4	1.1/8	192181	60268	—
5/8	3/8	19249	—	—	1.1/4	1.1/4	192112	60323	W23559	1.1/4	1.1/4	192182	60210	—
5/8	1/2	19250	1714	W23051	1.1/4	1.3/8	192113	60379	W23561	1.1/4	1.3/8	192183	60270	—
5/8	5/8	19251	1706	W23052	1.1/4	1.1/2	192114	60328	—	1.1/4	1.1/2	192184	60214	—
5/8	3/4	19252	1707	W23053	1.1/4	1.5/8	192115	—	—	1.1/4	1.5/8	—	—	—
5/8	7/8	19253	—	W23054	1.1/4	1.3/4	192116	60331	—	1.1/4	1.3/4	192186	60274	—
3/4	1/2	19254	—	—	1.1/4	2	192117	60335	—	1.1/4	2	192187	60218	—
3/4	5/8	19255	1712	W23061	1.1/2	2.1/2	192118	50345	—	1.1/4	2.1/2	192188	60227	—
3/4	3/4	19256	1708	W23062	1.1/2	1.1/8	192119	60399	—	1.1/2	1.1/8	—	—	—
3/4	7/8	19257	—	W23063	1.1/2	1.1/2	192120	60329	—	1.1/2	1.1/2	192190	60215	—
3/4	1.1/8	19258	1716	—	1.1/2	1.5/8	192121	—	(W23571)	1.1/2	1.5/8	—	—	—
7/8	7/8	19259	—	—	1.1/2	1.3/4	192122	60332	—	1.1/2	1.3/4	192192	60275	—
					1.1/2	2	192123	60336	—	1.1/2	2	192193	60219	—
					1.1/2	2.1/4	192124	60341	—	1.1/2	2.1/4	—	—	—
					1.1/2	2.1/2	192125	60346	—	1.1/2	2.1/2	192195	60228	—
					1.1/2	3	192126	60351	—	1.1/2	3	192196	60234	—
					Larger sizes on application					Larger sizes on application				

3

LINE FITTINGS - BRASS

ELBOWS					ELBOWS					ELBOWS				
Double Flare					Male BSP to Male BSP					Male Flare to Solder				
														
Size	Cat.No.	Heldon	Hudson		Size	Cat.No.	Heldon	Hudson		Size	Cat.No.	Heldon	Hudson	
Flare	Flare				M.BSP	M.BSP				Flare	Tube			
3/16		1931	1806	2100	1/8	1/8	19371	2150-6	2315	1/4	1/4	193141	2137	W20500
1/4		1932	1800	2101	1/4	1/4	19372	2140	2316	1/4	5/16	193142	2138	—
5/16		1933	1801	2102	3/8	1/4	19373	2145	—	5/16	1/4	193143	2139	—
3/8		1934	1802	2103	3/8	3/8	19374	2142	2317	5/16	5/16	193144	2140-7	20506
1/2		1935	1803	2105	1/2	1/4	19375	2147	—	3/8	1/4	193145	2141-7	—
5/8		1936	1804	2106	1/2	3/8	19376	2146	—	3/8	5/16	193146	2142-7	20511
3/4		1937	1805	2107	1/2	1/2	19377	2143	2318	3/8	3/8	193147	2143	20512
7/8		1938	1809	2108	3/4	3/8	19378	2148	—	3/8	1/2	193148	2143-7	—
1		1939	1807	—	3/4	1/2	19379	2149	—	1/2	1/4	193149	2144-7	—
Male Flare to Female Flare					1	3/4	19380	2144	—	1/2	5/16	193150	2145-7	—
					1	1	19381	2141	—	1/2	3/8	193151	2146-7	—
Female BSP to Male BSP					Female BSP to Female BSP					1	1/2	193152	2130	20518
										1	1/2	193153	2131	20519
Flare	F.Flare				F.BSP	M.BSP				1	3/4	193154	—	20520
1/4	1/4	19311	2120	—	1/8	1/8	19385	2163	2329	5/8	3/8	193155	2147-7	—
3/8	1/4	19312	2125	—	1/8	1/4	19386	2173-9	—	5/8	1/2	193156	2135	—
3/8	5/16	19313	2140-5	—	1/4	1/8	19387	2174-9	—	5/8	5/8	193157	2132	20527
3/8	3/8	19314	2124	2301	1/4	1/4	19388	2160	2330	5/8	3/4	193158	2133	20528
1/2	1/4	19315	2126	—	1/4	3/8	19389	2161	2340	3/4	1/2	193159	2148-7	—
1/2	3/8	19316	2123	—	3/8	1/4	19390	2166	2340	3/4	5/8	193160	2149-7	—
1/2	1/2	19317	2121	2302	3/8	3/8	19391	2162	2331	3/4	3/4	193161	2136	20537
5/8	1/4	19318	2127	—	3/8	1/2	19392	2167	—	3/4	7/8	193162	2150-7	20538
5/8	3/8	19319	2128	—	1/2	1/4	19393	2168	—	3/4	1	193163	2151-7	—
5/8	1/2	19320	2129	—	1/2	3/8	19394	2169	—	3/4	1.1/8	193164	2152-7	—
5/8	5/8	19321	2122	—	1/2	1/2	19395	2164	2332	3/4	1.1/4	19365	2162-7	—
3/4	3/8	19322	2130-5	—	1/2	3/4	19396	2165	—	7/8	5/8	193166	2153-7	—
3/4	1/2	19323	2131-5	—	3/4	1/2	19397	2170-9	—	7/8	3/4	193167	2154-7	—
3/4	5/8	19324	2132-5	—	3/4	3/4	19398	2171-9	2333	7/8	7/8	193168	2155-7	—
7/8	1/2	19325	2133-5	—	3/4	1	19399	2172-9	—	7/8	1	193169	2156-7	—
7/8	5/8	19326	2134-5	—	Female BSP to Female BSP					7/8	1.1/8	193170	2157-7	—
7/8	3/4	19327	2135-5	—						1	3/4	193171	2158-7	—
1	5/8	19328	2136-5	—	Male Flare to Male BSP					1	7/8	193172	2159-7	—
1	3/4	19329	2137-5	—						1	1	193173	2160-7	—
Male Flare to Female BSP					Male BSP to Solder									
														
Flare	F.BSP				F.BSP	F.BSP				M.BSP	Tube			
1/4	1/8	19331	2185	—	1/8	1/8	193101	2043	—	1/8	1/4	193181	2155	W 21000
1/4	1/4	19332	2187	2249	1/4	1/4	193102	2040	2345	1/4	1/4	193182	2156	W 21005
1/4	3/8	19333	2186	2250	3/8	3/8	193103	2041	2346	1/4	5/16	193183	2157	W 21006
5/16	1/8	19334	2171	—	1/2	1/2	193104	2042	2347	1/4	3/8	193184	2158	W 21007
5/16	1/4	19335	2188	—	3/4	3/4	193105	2044	—	1/4	1/2	193185	2159	W 21008
3/8	1/4	19336	2190-20	2251	Male Flare to Male BSP					3/8	1/4	193186	2154	W 21015
3/8	3/8	19337	2181	2252						3/8	5/16	193187	2160-8	W 21016
3/8	1/2	19338	2192-20	A2252						3/8	3/8	193188	2153	W 21017
1/2	1/4	19339	2180	—	Female BSP to Female BSP					3/8	1/2	193189	2161-8	W 21018
1/2	3/8	19340	2182	2253						3/8	5/8	193190	2162-8	W 21019
1/2	1/2	19341	2189	A2253	Male BSP to Solder					1/2	1/4	193191	2163-8	W 21025
1/2	3/4	19342	2173	—						1/2	5/16	193192	2164-8	W 21026
5/8	3/8	19343	2183	—	Male Flare to Male BSP					1/2	3/8	193193	2165-8	W 21027
5/8	1/2	19344	2184	2255						1/2	1/2	193194	2151	W 21028
5/8	3/4	19345	2174	—	Female BSP to Female BSP					1/2	5/8	193195	2166-8	W 21029
3/4	1/2	19346	2193-20	—						3/4	3/4	193196	2152	W 21030
3/4	3/4	19347	2191-20	—	Male Flare to Male BSP					3/4	3/8	193197	2167-8	W 21040
1	1/2	19348	2194-20	—						3/4	1/2	193198	2168-8	W 21041
1	3/4	19349	2195-20	—	Female BSP to Female BSP					3/4	5/8	193199	2169-8	W 21042
Double Flare Reducing										3/4	3/4	193200	2150	W 21043
					Male Flare to Male BSP					3/4	7/8	193201	2170-8	W 21044
Flare	Flare									3/4	1	193202	2171-8	W 21045
3/8	1/4	19351	1900	2151	Female BSP to Female BSP					3/4	1.1/8	193203	2172-8	W 21046
1/2	1/4	19352	1901	—						1	3/4	193204	2173-8	W 21050
1/2	3/8	19353	1902	2152	Male Flare to Male BSP					1	7/8	193205	2174-8	W 21051
5/8	1/4	19354	1905	—						1	1	193206	2175-8	W 21052
5/8	3/8	19355	1906	—	Female BSP to Female BSP					1	1.1/8	193207	2176-8	W 21053
5/8	1/2	19356	1903	2153										
3/4	3/8	19357	1907	—	Male Flare to Male BSP									
3/4	1/2	19358	1908	—										
3/4	5/8	19359	1904	—	Female BSP to Female BSP									
7/8	5/8	19360	1909	—										
7/8	3/4	19361	1910	—	Male Flare to Male BSP									
1	5/8	19362	1911	—										
1	3/4	19363	1912	—	Female BSP to Female BSP									
														
					Male Flare to Male BSP									
														
					Female BSP to Female BSP									
														

LINE FITTINGS - BRASS

ELBOWS

Solder to Solder

Size	Cat.No.	Heldon	Hudson
Tube	Tube		
1/4	1/4	1941	2100
5/16	5/16	1942	2105
3/8	3/8	1943	2101
1/2	1/2	1944	2102
5/8	5/8	1945	2103
3/4	3/4	1946	2104
7/8	7/8	1947	2106
1	1	1948	2107

Tees

3 Way Flare

1 LINE 2 LINE 3 BRANCH

1	2	3		
1/8	1/8	1/8	19411	2208
3/16	3/16	3/16	19412	2207
1/4	1/4	1/4	19413	2200
5/16	5/16	5/16	19414	2201
3/8	3/8	3/8	19415	2202
7/16	7/16	7/16	19416	2203
1/2	1/2	1/2	19417	2204
5/8	5/8	5/8	19418	2205
3/4	3/4	3/4	19419	2206
1	1	1	19420	2210

Reducing to Branch

1/4	1/4	3/16	19425	—
3/8	3/8	3/16	19426	—
3/8	3/8	1/4	19427	2400
1/2	1/2	1/4	19428	2401
1/2	1/2	5/16	19429	2407
1/2	1/2	3/8	19430	2402
5/8	5/8	1/4	19431	2405
5/8	5/8	3/8	19432	2408
5/8	5/8	1/2	19433	2403
3/4	3/4	1/4	19434	2409
3/4	3/4	3/8	19435	2410
3/4	3/4	1/2	19436	2404
3/4	3/4	5/8	19437	2406

Increasing to Branch

1/4	1/4	3/8	19441	2600
3/8	3/8	1/2	19442	2601
3/8	3/8	5/8	19443	2607
1/2	1/2	5/8	19444	2602
1/2	1/2	3/4	19445	2606
5/8	5/8	3/4	19446	2603

Reducing to Line and Branch

3/8	1/4	1/4	19451	2777
1/2	1/2	1/4	19452	2779
1/2	3/8	3/8	19453	2780-10
5/8	1/2	1/2	19454	2772
3/4	1/2	1/2	19455	2783-10
3/4	5/8	5/8	19456	2784-10

Increasing to Line and Branch

3/16	1/4	1/4	19461	—
3/16	3/8	3/8	19462	—
1/4	3/8	3/8	19463	2774
1/4	1/2	1/2	19464	2775
1/4	5/8	5/8	19465	2776
3/8	1/2	1/2	19466	2778
1/2	5/8	5/8	19467	2781-10
5/8	3/4	3/4	19468	—

Sundry

1/4	3/4	1/4	19471	2773
3/4	1/4	3/4	19472	2770
3/4	5/8	3/4	19473	2771

TEES

1 LINE 2 LINE 3 BRANCH
Flare Line to
Female Flare Branch

Size	Cat.No.	Heldon	Hudson
1	2	3	
1/4	1/4	1/4	19475
2440 2540			
Flare Line to BSP Branch			
3/16	3/16	1/8	19481
1/4	1/4	1/8	19482
1/4	1/4	1/8	19483
5/16	5/16	1/8	19484
3/8	3/8	1/8	19485
2709 2700 2501			
2700A 2502			
2714 —			
2717 —			
1/4	1/4	1/4	19486
5/16	5/16	1/4	19487
3/8	3/8	1/4	19488
1/2	1/2	1/4	19489
2701 2503			
2722-30 —			
2702 2507			
2713 —			
1/4	1/4	3/8	19490
3/8	3/8	3/8	19491
1/2	1/2	3/8	19492
5/8	5/8	3/8	19493
2705 —			
2706 2508			
2703 2510			
2715 —			
3/8	3/8	1/2	19494
1/2	1/2	1/2	19495
5/8	5/8	1/2	19496
3/4	3/4	1/2	19497
2711 —			
2707 2511			
2704 2513			
2716 —			

Flare Line to BSP Line to Flare Branch

1/2	1/2	3/4	19498	2710
5/8	5/8	3/4	19499	2708
3/4	3/4	3/4	194100	2712

1/2	1/2	3/4	19498	2710
5/8	5/8	3/4	19499	2708
3/4	3/4	3/4	194100	2712

* Long Taper BSP

Flare Line to BSP Line to Flare Branch

1/4	1/4	1/4	194101	2740
3/4	1/4	3/4	194102	2741
3/8	3/8	3/8	194103	2743
1/2	1/2	1/2	194104	2744
3/4	3/4	3/4	194105	2745

Flare Line to Female BSP Branch

1/4	1/4	1/8	194106	2723
3/8	3/8	1/8	194107	2733-32
1/4	1/4	1/4	194108	2720
3/8	3/8	1/4	194109	2721
1/2	1/2	1/4	194110	2722

M.BSP Line to M.BSP Branch

1/8	1/8	1/8	194111	2652
1/4	1/4	1/4	194112	2651
3/8	3/8	1/4	194113	2657
3/8	3/8	3/8	194114	2655
1/2	1/2	3/8	194115	2650
1/2	1/2	1/2	194116	2654
3/4	3/4	3/4	194117	2656
1	1	1	194118	2653

TEES

Female BSP Line to Female BSP Branch

1 LINE 2 LINE 3 BRANCH

Size	Cat.No.	Heldon	Hudson
1	2	3	
1/8	1/8	1/8	194121
1/4	1/4	1/4	194122
3/8	3/8	3/8	194123
1/2	1/2	3/8	194124
1/2	1/2	1/2	194125
3/4	3/4	3/4	194126
2762 —			
2760 2535			
2764 2536			
2763 —			
2761 2537			
2766 —			

3 Way Solder

SAME - LINE AND BRANCH

3/16	3/16	3/16	194131	2306
1/4	1/4	1/4	194132	2300
5/16	5/16	5/16	194133	2305
3/8	3/8	3/8	194134	2301
1/2	1/2	1/2	194135	2302
5/8	5/8	5/8	194136	2303
3/4	3/4	3/4	194137	2304

Reducing on Branch

1/4	1/4	3/16	194141	2513
5/16	5/16	1/4	194142	2510
3/8	3/8	1/4	194143	2500
1/2	1/2	1/4	194144	2508
1/2	1/2	3/8	194145	2504
5/8	5/8	1/4	194146	2515
5/8	5/8	3/8	194147	2506
5/8	5/8	1/2	194148	2501
3/4	3/4	3/8	194149	2516
3/4	3/4	1/2	194150	2507
3/4	3/4	5/8	194151	2502

Increasing on Branch

1/4	1/4	3/8	194152	2512
3/8	3/8	1/2	194153	2514
1/2	1/2	5/8	194154	2503
1/2	1/2	3/4	194155	2509
5/8	5/8	3/4	194156	2505

Reducing Line x Branch

1/4	3/16	3/16	194161	2531
1/4	3/16	1/4	194162	2530
3/8	1/4	1/4	194163	2533
3/8	1/4	3/8	194164	2532
1/2	3/8	3/8	194165	2535
1/2	3/8	1/2	194166	2534
5/8	3/8	3/8	194167	2538
5/8	1/2	1/2	194168	2537
5/8	1/2	5/8	194169	2536
3/4	1/2	3/8	194170	2540
3/4	1/2	1/2	194171	—
3/4	1/2	5/8	194172	2539
3/4	5/8	5/8	194173	2541
3/4	5/8	3/4	194174	2542

LINE FITTINGS - BRASS

VALVES DIAPHRAGM - PACKLESS

2-WAY & 3-WAY LINE

	2-WAY LINE - MALE FLARE							
	SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		CASTEL	
	FLARE				CAT. NO.	P/N	CAT. NO.	P/N
	1/4	1952	420	—	195226	15000	195121	6210/2
	5/16	1953	421	—	195227	15001	—	—
	3/8	1954	422	—	195228	15002	195122	6210/3
	1/2	1955	423	—	195229	15003	195123	6210/4
	5/8	1956	424	A15004	—	—	195124	6210/5
	3/4	1958	—	A15025	—	—	195125	6210/6
	3/4 Full Flo	1957	425	A15005	—	—	—	—

	2-WAY LINE - FEMALE SOLDER							
	SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		CASTEL	
	OD TUBE				CAT. NO.	P/N	CAT. NO.	P/N
	1/4	19511	520	—	195233	15006	195126	6220/2
	5/16	19512	521	—	195234	15007	—	—
	3/8	19513	522	—	195235	15008	195127	6220/3
	1/2	19514	523	—	195236	15009	195128	6220/4
	5/8	19515	524	A15010	—	—	195129	6220/5
	3/4 Red.Flo	19516	525	A15012	—	—	—	—
	3/4 Full Flo	19517	528	A15011	—	—	195130	6220/6
	7/8 Red.Flo	19510	—	A15013	—	—	195159	6220/7
	7/8 Full Flo	19518	526	A15014	—	—	—	—

	2-WAY LINE - FEMALE SOLDER WITH COPPER EXTENSIONS							
	SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		CASTEL	
	OD TUBE				CAT. NO.	P/N	CAT. NO.	P/N
	1/4	19521	560	—	195242	15015	—	—
	5/16	19522	561	—	195243	15016	—	—
	3/8	19523	562	—	195244	15017	—	—
	1/2	19524	563	—	195245	15018	—	—
	5/8	19525	564	A15019	—	—	—	—
	3/4 Red.Flo	19526	565	A15021	—	—	—	—
	3/4 Full Flo	19528	568	A15020	—	—	—	—
	7/8 Red.Flo	19527	—	A15022	—	—	—	—
	7/8 Full Flo	19529	566	A15023	—	—	—	—

	2-WAY LINE - MALE BSP		
	SIZE	CAT. NO.	HELDON P/N
	M.BSP		
	1/4	19532	410
	3/8	19533	411
	1/2	19534	412
	3/4	19535	413

	2-WAY LINE - FEMALE BSP		
	SIZE	CAT. NO.	HELDON P/N
	F.BSP		
	1/8	19536	370
	1/4	19537	371
	3/8	19538	372
	1/2	19539	373

	3-WAY LINE - MALE FLARE							
	SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		CASTEL	
	FLARE				CAT. NO.	P/N	CAT. NO.	P/N
	1/4	19551	210	—	195251	15100	195146	6260/2
	5/16	—	—	—	195252	15101	—	—
	3/8	19553	212	—	195253	15102	195147	6260/3
	1/2	19554	213	A15103	—	—	195148	6260/4
	5/8	19555	214	A15104	—	—	—	—

	3-WAY LINE - FEMALE SOLDER					
	SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT	
	OD Tube				Cat. No.	P/N
	1/4	19561	310	—	195256	15106
	5/16	—	—	—	195257	15107
	3/8	19563	312	—	195258	15108
	1/2	19564	313	A15109	—	—
	5/8	—	—	A15110	—	—
	3/4	19566	315	—	—	—

	3-WAY LINE - FEMALE SOLDER WITH COPPER EXTENSIONS		
	SIZE	CAT. NO.	HELDON P/N
	OD Tube		
	1/4	19571	320
	5/16	19572	321
	3/8	19573	322
	1/2	19574	323
	5/8	19575	324
	3/4	19576	325

LINE FITTINGS - BRASS **DIAPHRAGM VALVES - PACKLESS** **2-WAY ANGLE**

2-WAY ANGLE — MALE FLARE SIDE TO MALE BSP BOTTOM								
SIZE		CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		CASTEL	
FLARE	BSP				CAT. NO.	P/N	CAT. NO.	P/N
1/4	1/4	19581	100	—	—	15199	195149	6230/22
1/4	3/8	19582	101	—	—	15200	—	—
1/4	1/2	19583	102	—	—	—	—	—
3/8	1/4	19584	103	—	—	—	—	—
3/8	3/8	19585	104	—	—	15201	195150	6230/33
3/8	1/2	19586	105	A15202	—	—	—	—
1/2	1/4	19587	110	—	—	—	—	—
1/2	3/8	19588	106	—	—	—	—	—
1/2	1/2	19589	107	A15203	—	—	195151	6230/44
1/2	3/4	—	—	A15205	—	—	—	—
5/8	1/4	19590	111	—	—	—	—	—
5/8	3/8	19591	108	—	—	—	—	—
5/8	1/2	19592	109	A15204	—	—	—	—
3/4	1/2	19593	113	—	—	—	—	—
3/4	3/4	19594	112	A15206	—	—	—	—



3

2-WAY ANGLE — SOLDER SIDE TO MALE BSP BOTTOM							
SIZE		CAT. NO.	HELDON P/N	HUDSON P/N	HUDSON COMPACT		
OD Tube	BSP				CAT. NO.	P/N	
1/4	1/4	195101	120	—	—	—	—
1/4	3/8	195102	121	—	—	—	—
1/4	1/2	195103	122	—	—	—	—
3/8	1/4	195104	123	—	—	15207	—
3/8	3/8	195105	124	—	—	15208	—
3/8	1/2	195106	125	A15209	—	—	—
1/2	1/4	195107	126	—	—	—	—
1/2	3/8	195108	127	—	—	—	—
1/2	1/2	195109	128	A15210	—	—	—
1/2	5/8	—	—	A15211	—	—	—
1/2	3/4	—	—	A15212	—	—	—
5/8	1/4	195110	129	—	—	—	—
5/8	3/8	195111	130	—	—	—	—
5/8	1/2	195112	131	—	—	—	—
3/4	1/4	195113	132	—	—	—	—
3/4	3/8	195114	133	—	—	—	—
3/4	1/2	195115	134	—	—	—	—
3/4	3/4	—	—	A15213	—	—	—



2-WAY ANGLE — SOLDER SIDE WITH COPPER EXT., MALE BSP BOTTOM			
SIZE		CAT. NO.	HELDON P/N
OD Tube	BSP		
1/4	1/4	195201	135
1/4	3/8	195202	136
1/4	1/2	195203	137
3/8	1/4	195204	138
3/8	3/8	195205	139
3/8	1/2	195206	140
1/2	1/4	195207	141
1/2	3/8	195208	142
1/2	1/2	195209	143
5/8	1/4	195210	144
5/8	3/8	195211	145
5/8	1/2	195212	146
3/4	1/4	195213	147
3/4	3/8	195214	148
3/4	1/2	195215	149



LINE FITTINGS - BRASS

PACKED CAPPED VALVES

2-WAY LINE & 2-WAY ANGLE



2-WAY LINE - MALE FLARE						
SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	CASTEL		SIZE
FLARE				CAT. NO.	P/N	FLARE
1/4	19641	190	1151	19639	6010/2	1/4
3/8	19642	191	1152	195131	6410/3	3/8
1/2	19643	192	1153	195132	6410/4	1/2
5/8	19644	193	1154	195133	6410/5	5/8
3/4	—	—	—	195134	6410/6	3/4



2-WAY LINE - FEMALE SOLDER						
SIZE	CAT. NO.	HELDON P/N	HUDSON P/N	CASTEL		SIZE
O.D. TUBE				CAT. NO.	P/N	O.D. TUBE
1/4	19646	195	1155	195135	6420/2	1/4
3/8	19647	196	1156	195136	6420/3	3/8
1/2	19648	197	1157	195137	6420/4	1/2
5/8	19649	198	1158	195138	6420/5	5/8
3/4	19650	199	—	195139	6420/6	3/4
7/8	—	—	—	195140	6420/7	7/8



2-WAY LINE - BACKSEATING - FEMALE SOLDER								
SIZE	HELDON		HUDSON COMPACT		CASTEL		SIZE	
O.D. TUBE	WITH 'T' HANDLE		WITH CAP NUT		WITH 'T' HANDLE		O.D. TUBE	
	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N
3/4	1961	160	196301	1000	196307	1000T	—	—
7/8	1962	165	196302	1001	196308	1001T	195141	6510/7
1	1963	162	196303	1002	196309	1002T	—	—
1-1/8	1964	161	196304	1003	196310	1003T	195142	6510/9
1-3/8	1965	163	196305	1004	196311	1004T	195143	6510/11
1-5/8	1966	164	196306	1005	196312	1005T	195144	6510/13
2-1/8	1967	166	19610L	1166	1967	1166T	195145	6510/17
2-5/8	1968	167	19611L	1167	1968	1167T	195160	6510/21
3-1/8	—	—	19612L	1168	1969	1168T	—	—

FEMALE SOLDER WITH COPPER TAILS

SIZE	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	SIZE
3/4	—	—	196313	1010	196319	1010T	—	—	3/4
7/8	—	—	196314	1011	196320	1011T	—	—	7/8
1	—	—	196315	1012	196321	1012T	—	—	1
1-1/8	—	—	196316	1013	196322	1013T	—	—	1-1/8
1-3/8	—	—	196317	1014	196323	1014T	—	—	1-3/8
1-5/8	—	—	196318	1015	196324	1015T	—	—	1-5/8

FEMALE BSP

SIZE	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	SIZE
3/4	19611	170	—	—	—	—	—	—	3/4
1	19612	171	—	—	—	—	—	—	1

HUDSON 'T' HANDLE VALVE CAPS

HUDSON T HANDLE VALVE CAPS		CASTEL MOUNTING FEET	
P/N 1000/41 Suits 3/4, 7/8, 1	196332	P/N 6590/A Suits 7/8, 1-1/8	195164
P/N 1003/41 Suits 1-1/8, 1-3/8, 1-5/8	196333	P/N 6590/B Suits 1-3/8, 1-5/8	195165
P/N 1231 Suits 2-1/8, 2-5/8, 3-1/8	196334	P/N 6590/B Suits 2-1/8, 2-5/8	195165



2-WAY ANGLE - BACKSEATING - FEMALE SOLDER

SIZE	HELDON		HUDSON COMPACT		CASTEL		SIZE
OD TUBE	WITH 'T' HANDLE		WITH CAP NUT		WITH 'T' HANDLE		OD TUBE
	Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N	
7/8	19621	300	196325	1101	19619	1101T	195161 6530/7
1-1/8	19622	301	196326	1103	19620	1103T	195162 6530/9
1-3/8	19623	302	196327	A15302	19623L	A15302T	195163 6530/11
1-5/8	19624	303	196328	A15303	19624L	A15303T	—
2-1/8	19625	304	196329	A15304	19625L	A15304T	—
2-5/8	19626	305	196330	A15305	19626L	A15305T	—
3-1/8	—	—	196331	A15306	19627L	A15306T	—

HUDSON 'T' HANDLE VALVE CAPS

P/N	TH	CAT. NO.
P/N 1003/41 Suits Valve Sizes 7/8, 1-1/8	196333	
P/N 1215 Suits Valve Sizes 1-3/8, 1-5/8	196335	
P/N 1231 Suits Valve Sizes 2-1/8, 2-5/8, 3-1/8	196334	



LINE FITTINGS - BRASS

PACKED CAPPED VALVES

2-WAY LINE 'Y' TYPE & 2-WAY ANGLE

2-WAY LINE - 'Y' TYPE FEMALE SOLDER				
SIZE	HUDSON COMPACT			
	WITH CAP NUT		WITH 'T' HANDLE	
	CAT. NO.	P/N	CAT. NO.	P/N
1-1/8	19613	1053	19616	1053T
1-3/8	19614	A10504	19617	A10504T
1-5/8	19615	A10506	19618	A10506T
HUDSON 'T' HANDLE VALVE CAPS				CAT. NO.
P/N 1003/41 Suits 1-1/8				196333
P/N 1215 Suits 1-3/8, 1-5/8				196335



2-WAY ANGLE - MALE FLARE SIDE TO BSP BOTTOM									
SIZE		CAT. NO.	HELDON P/N	HUDSON P/N	CASTEL*		SIZE		
FLARE	BSP				CAT. NO.	P/N	FLARE	BSP	
1/4	1/4	19672	600	1251	196176	6110/22	1/4	1/4	
1/4	3/8	19673	601	1252	196177	6110/23	1/4	3/8	
1/4	1/2	19674	611	—	—	—	1/4	1/2	
3/8	1/4	19675	602	1253	196183	6110/32	3/8	1/4	
3/8	3/8	19676	603	1254	196178	6110/33	3/8	3/8	
3/8	1/2	19677	610	1250	—	—	3/8	1/2	
3/8	3/4	19678	612	—	—	—	3/8	3/4	
1/2	3/8	19679	604	1255	196179	6110/43	1/2	3/8	
1/2	1/2	19680	608	1256	196180	6110/44	1/2	1/2	
1/2	3/4	19681	613	—	—	—	1/2	3/4	
5/8	3/8	19682	605	—	—	—	5/8	3/8	
5/8	1/2	19683	606	1258	196181	6110/54	5/8	1/2	
5/8	3/4	19684	615	—	—	—	5/8	3/4	
3/4	1/2	19685	607	—	—	—	3/4	1/2	
3/4	3/4 Red.	19686	609	—	—	—	3/4	3/4 Red.	
3/4	3/4 Full	19687	619	1259	196182	6110/66	3/4	3/4 Full	

* Castel Connections - Flare Side x N.P.T. Bottom

2-WAY ANGLE - BACKSEATING - TAPPED FOR GAUGE									
MALE FLARE SIDE TO BSP BOTTOM					MALE BSP SIDE TO MALE FLARE BOTTOM				
SIZE		HELDON			SIZE		HELDON		
FLARE	BSP	CAT. NO.	P/N		BSP	FLARE	CAT. NO.	P/N	
1/4	1/4	19691	650		1/4	1/4	196121	670	
1/4	3/8	19692	651		1/4	3/8	196123	672	
3/8	1/4	19693	652		1/4	1/2	196124	674	
3/8	3/8	19694	653		3/8	1/4	196125	671	
3/8	1/2	19695	658		3/8	3/8	196127	673	
1/2	1/4	19696	654		3/8	1/2	196128	675	
1/2	3/8	19697	655		1/2	3/8	196129	678	
1/2	1/2	19698	657		1/2	1/2	196130	677	
5/8	3/8	19699	659		1/2	5/8	196131	676	
5/8	1/2	196100	656		3/4	3/8	196132	680	
					3/4	5/8	196133	679	

2-WAY ANGLE STAINLESS STEEL SPINDLE BACKSEATING TAPPED FOR GAUGE CONNECTION				
CONNECTIONS		CAT. NO.	HUDSON P/N	
SIDE	BOTTOM			
1/2M.BSP	5/8M.FL.	19669	A15295	
5/8F.Sol.	5/8F.Sol.	19665	A15296	
5/8M.FL.	5/8F.Sol.	19666	A15297	
3/4M.BSP	3/4M.FL.	19667	A15268	
3/4M.FL.	3/4M.BSP	19668	A15270	
7/8F.Sol.	3/4M.BSP	19662	A15272	
7/8F.Sol.	7/8F.Sol.	19663	A15274	

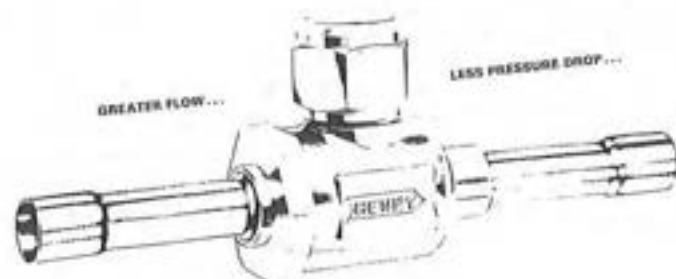
2-WAY ANGLE MALE BSP SIDE TO MALE FLARE BOTTOM				
SIZE		CAT. NO.	HELDON P/N	HUDSON P/N
BSP	FLARE			
1/4	1/4	196101	620	—
1/4	3/8	196102	622	—
3/8	1/4	196103	621	—
3/8	3/8	196104	623	—
3/8	1/2	196105	624	—
3/8	5/8	196106	625	—
1/2	1/4	196107	631	—
1/2	3/8	196108	630	A15261
1/2	1/2	196109	628	A15260
1/2	5/8	196110	626	A15264
1/2	3/4	196111	627	—
3/4	3/8	196112	632	—
3/4	1/2	196113	633	—
3/4	3/4 Red.	196114	629	—
3/4	3/4 Full	196115	639	—

LINE FITTINGS - BRASS



HENRY

BALL VALVES FOR REFRIGERATION AND AIR CONDITIONING APPLICATIONS

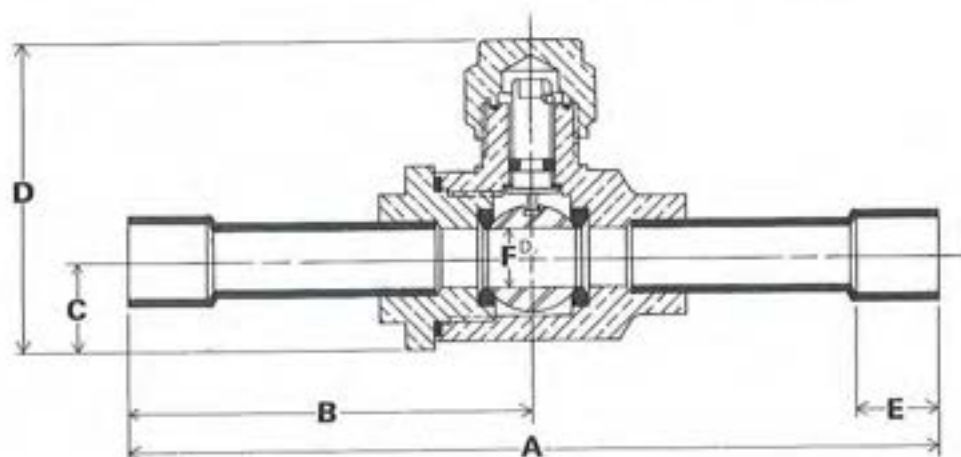


CONSTRUCTION

- Forged brass body
- Brass seal cap with Teflon gasket
- Extended copper solder connections
- Chromium plated ball
- Teflon ball seals
- Blow-out proof stem design
- "O" Ring stem seal
- Plated stem with stamped flow arrow

CHECK THESE FEATURES:

- ★ Light weight — straight thru flow
- ★ Fast, only quarter turn for full open or closed
- ★ Valve position indicators
 1. Arrow on body shows flow direction
 2. Arrow on stem points downstream when valve is open
 3. Arrow on stem points across the line of flow when valve is closed
- ★ Stops on valve stem ensures precise positioning of valve in open or closed position
- ★ No need to dismantle valve for brazing
- ★ Seal cap patented double seal
- ★ Pressure in valve body is automatically vented to upstream side when valve is shut off
- ★ Maximum working pressure 3450 kPa (500 psig)
- ★ Temperature range: -40°C to 132°C (-40°F to 270°F)



SIZES AND DIMENSIONS — INCHES

CAT. NO.	PART No.	O.D.S. CONN.	A	B	C	D	E	F Diam.
196215	900203	3/8	5-1/2	2-27/32	23/32	2-9/32	5/16	1/2
196216	900204	1/2	6-3/8	3-9/32	23/32	2-9/32	3/8	1/2
196217	900205	5/8	6-3/8	3-9/32	23/32	2-9/32	1/2	1/2
196218	900307	7/8	7-7/16	3-23/32	29/32	2-11/16	3/4	11/16
196219	900309	1-1/8	8-15/16	4-15/32	29/32	2-11/16	29/32	11/16
196220	900409	1-1/8	9-1/8	4-3/4	1"	3-7/32	29/32	13/16
196221	900411	1-3/8	9-7/8	5-1/8	1"	3-7/32	1"	13/16
196222	900511	1-3/8	10	5	1-5/16	3-29/32	1"	1-1/4
196223	900513	1-5/8	10-1/4	5-1/8	1-5/16	3-29/32	1-3/32	1-1/4
196224	900617	2-1/8						

LINE FITTINGS - BRASS

VALVES - SUNDRY

COMPRESSOR SERVICE VALVES
MALE FLARE CONNECTIONS



Size Flare	Bolt Hole Centres	CAT. NO.	Heldon P/N	Hudson P/N
1/4	1-5/8	1973	700	—
3/8	1-5/8	1977	701	1302
1/2	1-5/8	19710	702	1303
1/2	1-3/4	19711	705	—
5/8	1-5/8	19714	703	1304
5/8	1-3/4	19715	707	—
3/4	1-5/8	19718	—	1319
HEAVY FORGED BODY				
5/8	1-5/8	19721	719	—
3/4	1-5/8	19723	716	1305

COMPRESSOR SERVICE VALVES
SOLDER CONNECTIONS



Size O.D. Tube	Bolt Hole Centres	CAT. NO.	Heldon P/N	Hudson P/N
3/8	1-5/8	19737	771	—
1/2	1-5/8	19741	772	1317
5/8	1-5/8	19745	773	1318
HEAVY FORGED BODY				
5/8	1-5/8	19751	726	—
3/4	1-5/8	19753	724	1308
7/8	1-5/8	19755	721	1309
7/8	1-3/4	19756	722	—
1	1-5/8	19757	725	1338
1-1/8	1-5/8	19759	723	—
1-1/8	1-3/4	19760	727	—

COMPRESSOR SERVICE VALVES
FLANGED - 2 1/2" CENTRES
WITH O.D. SOLDER ADAPTORS



SIZE O.D. Tube	CAT. NO.	Heldon P/N	Hudson P/N
Valve Complete with Solder Adaptor			
1	19761	750	11004
1-1/8	19762	751	11000
1-1/4	19763	753	11001
1-3/8	19764	752	11002
1-1/2	19765	754	—
1-5/8	19766	755	11007
HEAVY DUTY			
1-3/8	197151	—	11006
1-5/8	197152	—	11007
LIGHT DUTY			
1	197153	—	11101
1-1/8	197154	—	11102
1-1/4	197155	—	11103
1-3/8	197156	—	11104

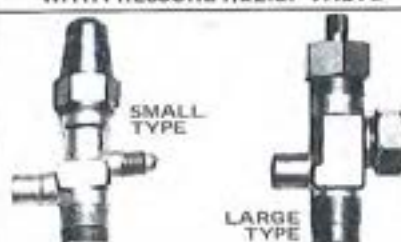
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POST VALVES
MALE FLARE TO FEMALE SOLDER



Size Flare	O.D. Tube	CAT. NO.	Hudson P/N
3/8	3/8	197116	14201

CYLINDER VALVES
WITH PRESSURE RELIEF VALVE



CONNECTIONS		CAT. NO.	Heldon P/N	Hudson P/N
Side	Bottom			
1/4 Fl.	1/4 NPT	19790	—	1384
1/4 Fl.	3/8 BSP	19794	—	1380
1/4 Fl.	1/2 BSP	19793	—	1388
LARGE TYPE				
3/4M.BSP	3/4NPTG	19795	592	A1359

PURGE OR TRYCOCK VALVES



Size M.BSP	CAT. NO.	Heldon P/N	Hudson P/N
1/8	197111	3800	1291
1/4	197112	3801	—

FUSIBLE SAFETY PLUGS



Size BSP	Temperature °C	°F	CAT. NO.	Heldon P/N	Hudson P/N
UNTINNED					
1/8	55	130	197127	3256	—
1/8	71	160	197121	—	2065
1/8	93	200	197122	3250	—
1/8	96	205	197128	—	2063
1/8	138	280	197123	3257	2064
1/4	58	136	197129	3259	2069
1/4	66	151	197130	—	2067
1/4	71	160	197124	3255	2066
1/4	93	200	197125	3251	—
1/4	96	205	197131	—	2068
3/8	135	275	197132	3258	—
1/2	71	160	197133	3252	—
3/4	93	200	197134	3253	—
TINNED					
1/8	55	130	197135	3156	—
1/8	71	160	197136	3154	2022
1/8	93	200	197137	3150	—
1/8	96	205	197138	—	2020
1/8	138	280	197139	3157	2021
1/4	58	136	197140	3159	2026
1/4	71	160	197141	3155	2023
1/4	93	200	197142	3151	—
1/4	96	205	197143	—	2025
3/8	135	275	197144	3158	—
1/2	71	160	197145	3152	—
3/4	93	200	197146	3153	—

CYLINDER ADAPTORS
WITH LEAD WASHERS



SIZE		CAT. NO.	Heldon P/N	Hudson P/N
Flare	F.BSP			
1/4	3/8	197107	1456	2820
1/4	1/2	197101	1452	2821
1/4	5/8	197106	1450	—
1/4	3/4	197103	1451	2822
3/8	1/8	—	1458	—
3/8	1/4	—	1459	—
3/8	3/8	—	1457	—
3/8	1/2	197102	1463-1	—
3/8	5/8	197108	1455	—
3/8	3/4	197104	1461	—
1/2	3/8	—	1454	—
1/2	5/8	—	1453	—
1/2	3/4	197105	1460-1	—
5/8	3/4	—	1462-1	—
3/4	3/4	—	1467-1	—

PURGE VALVE KEY



Size Square	CAT. NO.	Heldon P/N	Hudson P/N
3/16"	197113	—	4363

GAS CYLINDER SEAL CAPS
WITH LEAD WASHERS



Size F.BSP	CAT. NO.	Heldon P/N	Hudson P/N
1/2	19797	1493	2075
5/8	197109	1494	—
3/4	19798	1495	2076

Other Sizes on Application

LINE FITTINGS - SUNDRY

SWIVEL CONNECTORS (FORGED NUTS)



CAT. NO.	SIZE (ins.)	Heldon P/N	Hudson P/N
1981	1/4	1180	2861
1982	3/8	1181	2862
1983	1/2	1182	2863
1984	5/8	1183	2864
1985	3/4	1184	2865

CROSS PIECES—FORGED

Male Flare All Over



CAT. NO.	SIZE (ins.)	HUDSON P/N
1986	1/4	2551
1987	3/8	2552
1988	1/2	2553

QUICK-ACTING COUPLERS



CAT. NO.	SIZE	Heldon P/N	Hudson P/N
19813	1/4" Short Type	—	2833
19811	1/4" Long Type	—	2831
19851	3/8" Short Type	3601	—
19852	1/2" Short Type	3602	—
19853	5/8" Short Type	3603	—
19814	Rubbers-Short Type	—	2834
19812	Rubbers-Long Type	—	2832
19854	Replacement Neoprene Gasket	3600R	—

Heldon HEAT EXCHANGE TEE

The Heldon Heat Exchange Tee is designed to fit over a 1/2" O.D. line and take a 3/4" O.D. tube one end only. When two tees are therefore joined together by a piece of 3/4" O.D. tube of any length, the result is a heat exchanger having a 1/2" inner tube and a 3/4" outer shell. The capacity would depend on the length of the 3/4" tube.

PART NO. 19707

CAT. NO. 19818

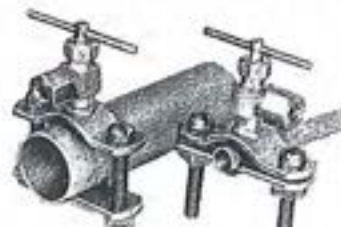


SADDLE TAPPING VALVE

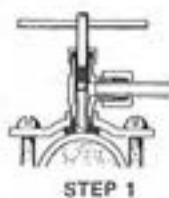
NO - SHUTTING OFF VALVES - DRAINING LINES - DRILLING INTO TUBING

PART NO. STV2

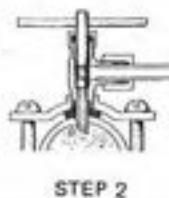
CAT. NO. 19820



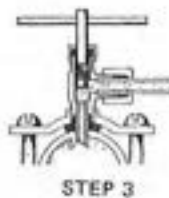
A WORKING VALVE IN 3 MINUTES



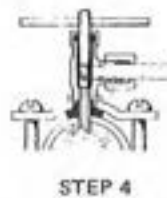
STEP 1



STEP 2



STEP 3



STEP 4

- STEP 1. Clamp STV-2 on tube and connect line
STEP 2. Turn handle to pierce tube
STEP 3. Back off to open valve
STEP 4. Turn in again to close valve

SPECIFICATIONS Part No. — STV2.

Construction - Brass Valve body and Spindle, Stainless Steel Handle and Piercing lance, "Iridited" Steel Clamps
For 3/8" to 1-1/8" O.D. Copper Tube (1/4" to 1" nominal)
Outlet - 1/4" Compression Fitting
Capacity - 44 gallons per hour (45 lbs. water pressure)

BULLET 3 IN 1 Piercing Valve

The Only Multi-Size Valve
with a PERMANENT GASKET!



BULLET 3 IN 1 is the smallest complete piercing valve with its own key. ONLY 2" CLEARANCE IS REQUIRED FOR INSTALLATION AND OPERATION!



INSTALL ON
ROUND SUCTION
LINES OR
UNION TUBING



INSTALL ON
HIGH SIDE
PERMANENT



THE DOUBLE V
MAKES A SEAL
VALVE WITH ITS
OWN SEAT. HIGH
COMPRESSION
GASKET DOES NOT
PINCH. NEVER LEAKS.

ONE SIZE FOR
1/4" - 5/16"
3/8" TUBING

PART NO. BPV31

CAT. NO.

19821

IMPERIAL Line Piercing Valves

TAP-A-LINE VALVES™ Universal Line Piercing Valves

Provide a quick and economical way to tap a line at any point for charging, testing or purging hermetically sealed units. Valve fits $\frac{3}{16}$ thru $\frac{3}{8}$ " O.D. tubing and has $\frac{1}{4}$ " flare connections for charging lines.

Valve clamps on tubing line, one end of charging line is attached to $\frac{1}{4}$ " flare connection on valve and other end to testing unit or refrigerant drum. Valve stem is turned forward until sharp needle pierces tubing. Stem is then backed off for testing or charging. After service is completed, valve is closed and left on line for future service.

Valve has T-Grip handle and forged brass body. Sealing gasket is confined to prevent falling out. V-block centers valve on tube, and is attached to nut so that it can't be lost.

CAT. NO.	PART NO.	DESCRIPTION
19824	341-C	Line Piercing Valve
19858	67842	Seal Gasket



3

3 in 1 Piercing Valve

Fast, easy, secure installation. Provides access to line at any point for charging, testing or purging. Two valves cover $\frac{3}{16}$ " to $\frac{3}{8}$ " O.D. tubes. Has depressor valve and needle valve shut-off.

Valve clamps on tubing line with two captive slotted head screws; positive built-in mechanical stop for each tube size eliminates tightening guesswork. To pierce tube, thread down the combination $\frac{1}{4}$ " flare port, stem and needle using knob furnished or a suitable wrench; back off stem and connect depressor type hose for testing or charging. After service is completed, valve is closed and left on line for future service. Dust cap provided.

Three-point sealing (needle-type valve, gasket and check valve) prevents leakage. Neoprene seal withstands temperatures near 300°.

CAT. NO.	PART NO.	DESCRIPTION
19822	541-C	Fits 3/16", 1/4" & 5/16" O.D. Tubes
19823	542-C	Fits 3/8", 1/2" & 5/8" O.D. Tubes

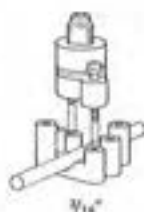


541-C



542-C

FITS THREE SIZES

 $\frac{3}{16}$ " $\frac{1}{4}$ " $\frac{5}{16}$ "

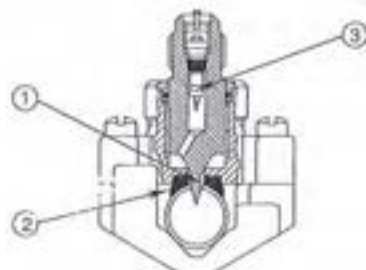
Two primary and one secondary sealing points assure leak-proof installation and operation.

PRIMARY SEALING

1. Needle valve shut-off with positive metal-to-metal seat provides leak-proof in-the-body seal.
2. Rubber gasket forms a tight leak-proof seal between tubing and valve.

SECONDARY SEALING

3. Check valve seals flow passage.



Cat. No.	Type	Description
19815	A-1	For 1/4, 5/16 and 3/8 in. tube. New A-1 valve incorporates a disappearing needle which automatically retracts to permit unrestricted flow. Standard 8/32 hex wrench and 2 inserts included with each valve.
19816	A-2	For 3/8, 1/2 and 5/8 in. O.D. tubing. Includes all features of A-1. Two inserts included.



A-1



No. A-2

WATSCO
ADJUSTABLE
LINE TAP VALVES



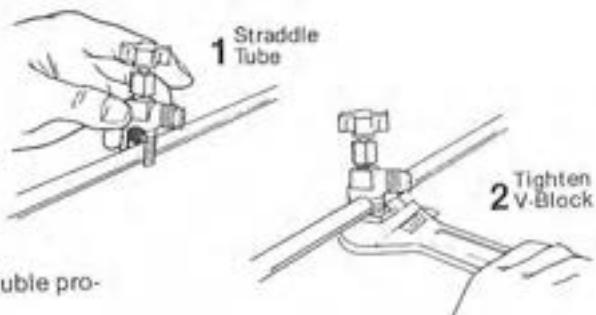
Tube piercing valves

Engineered for convenience, durability, and dependability — easy 2-step installation

Simple application eliminates:

1. Screws, nuts or bolts
2. Special control devices
3. Special wrenches or handles
4. All guesswork...is it open...is it closed...how many turns?

All HP and QP valves are furnished with Quick Seal Caps for double protection.



The preferred tube piercing valve

Redesigned forged brass body.

Improved nut and wedge assembly.

No special tools required.

Robinair HP Valves are used more than any other similar valve because they are the most trouble free and easiest to use. No special tools or parts are required.

They can be installed in any position, even while system is under pressure, on copper, aluminium, thin wall brass tube, wherever air, liquid or gas flow is required. Use in refrigeration for testing, in industry for controlling water to humidifiers and many other applications. One piece forged brass body construction.

CAT. NO.	PART NO.	DESCRIPTION
19838	40288	Fits 3/16", 1/4", 5/16" and 3/8" OD Tube. 1/4" SAE Conn. Size
19861	40291	Three Seal Gaskets for P/N 40288



40288

The QP tube piercing valve

Features special built-in refrigerant check

No special tools required.

Easiest to use.

This valve features a special built-in flow check and has same high quality and features as other models. It is designed specially for refrigeration use, but is suitable for similar applications in other industries. Valve is open only when unit is serviced with charging line or quick coupler having a valve depressor. For use on copper, aluminium or thin wall brass tubing.

CAT. NO.	PART NO.	DESCRIPTION
19865	40330	Fits 3/16", 1/4", 5/16" and 3/8" OD Tube. 1/4" SAE Conn. Size
19861	40291	Three Seal Gaskets for P/N 40330



Fits 3/16", 1/4", 5/16" and 3/8" O.D. Tube

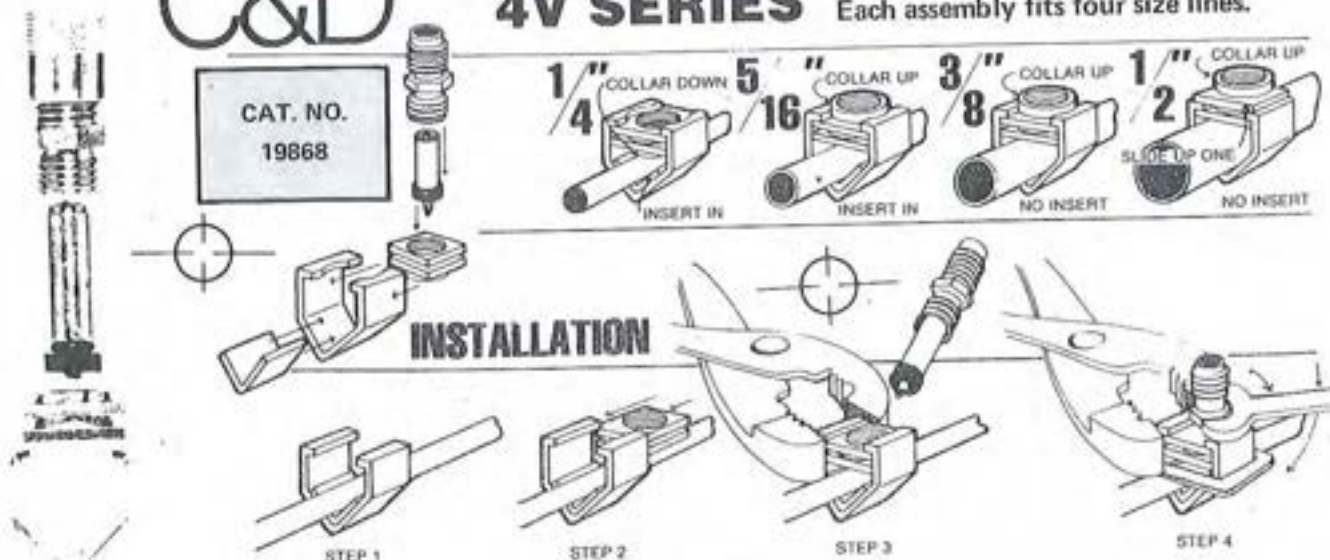
C&D

4V SERIES

A complete line tap valve.
Each assembly fits four size lines.



INSTALLATION



LINE FITTINGS - COPPER

SOLDER COUPLINGS/UNIONS



REDUCING SOLDER COUPLINGS/UNIONS



I.D. BOTH ENDS (FEMALE TO FEMALE)				INSIDE DIAM. TO INSIDE DIAM. (FEMALE TO FEMALE)									
CAT. NO.	INS. DIA. "C"	HELDON	HUDSON	CAT. NO.	INS. DIA. "D"	INS. DIA. "E"	HELDON	HUDSON	CAT. NO.	DIMS. "D"	DIMS. "E"	HELDON	HUDSON
1991	3/16"	5103	W22003	19929	1/4"	3/16"	—	W22002	19927	1-5/8"	1-1/4"	5566	—
1992	1/4"	5100	W22000	19930	3/8"	1/4"	5559	W22020	19960	1-5/8"	1-3/8"	5520	W22111
1993	5/16"	5101	W22010	19931	1/2"	3/8"	5572	W22032	19961	1-5/8"	1-1/2"	5522	—
1994	3/8"	5102	W22022	19989	5/8"	3/8"	—	W22040	19962	1-3/4"	1-1/4"	5577	—
1995	1/2"	5104	W22033	19932	5/8"	1/2"	5513	W22041	19963	1-3/4"	1-1/4"	5553	—
1996	5/8"	5105	W22042	19933	3/4"	3/8"	5599	W22050	19994	1-3/4"	1-5/8"	5523	—
1997	3/4"	5106	W22053	19934	3/4"	1/2"	5573	W22051	19964	2"	1-1/8"	5569	—
1998	7/8"	5107	W22063	19935	3/4"	5/8"	5519	W22052	19965	2"	1-1/2"	5580	—
1999	1"	5108	W22074	19990	7/8"	3/8"	—	W22059	19966	2"	1-5/8"	5554	—
19910	1-1/8"	5109	W22084	19936	7/8"	1/2"	5595	W22060	19995	2-1/8"	7/8"	—	W22124
19911	1-1/4"	5110	W22090	19937	7/8"	5/8"	5576	W22061	19996	2-1/8"	1-1/8"	—	W22126
19912	1-3/8"	5111	W22101	19938	7/8"	3/4"	5565	W22062	19967	2-1/8"	1-3/8"	5556	W22128
19913	1-1/2"	5112	W22106	19939	1"	1/2"	5512	W22070	19968	2-1/8"	1-5/8"	5558	W22130
19914	1-5/8"	5113	W22113	19940	1"	5/8"	5578	W22071	19969	2-1/2"	1-1/8"	5568	—
19915	1-3/4"	5114	—	19941	1"	3/4"	5518	W22072	19970	2-1/2"	1-1/4"	5575	—
19916	2"	5116	W22120	19942	1"	7/8"	5574	W22073	19971	2-1/2"	1-3/8"	5594	—
19917	2-1/8"	5117	W22132	19943	1-1/8"	1/2"	5550	W22079	19972	2-1/2"	1-5/8"	5538	—
19918	2-1/2"	5120	—	19944	1-1/8"	5/8"	5563	W22080	19973	2-1/2"	2"	5609	—
19919	2-5/8"	5121	W22144	19945	1-1/8"	3/4"	5570	W22081	19974	2-1/2"	2-1/8"	5571	—
19920	3"	5124	—	19946	1-1/8"	7/8"	5524	W22082	19997	2-5/8"	1-1/8"	—	W221391
19921	3-1/4"	5126	—	19991	1-1/8"	1"	5542	W22083	19998	2-5/8"	1-3/8"	—	W221392
19922	3-1/2"	5127	—	19992	1-1/4"	3/4"	5611	W22086	19999	2-5/8"	1-5/8"	5621	W22139
19923	4"	5130	—	19947	1-1/4"	1"	5528	W22088	19975	2-5/8"	2-1/8"	5584	W22141
				19948	1-1/4"	1-1/8"	5567	W22089	19976	3"	1-1/8"	5587	—
				19949	1-3/8"	5/8"	5551	W22095	19977	3"	2"	5544	—
				19950	1-3/8"	3/4"	5593	—	19978	3"	2-1/8"	5562	—
				19951	1-3/8"	7/8"	5552	W22097	19979	3"	2-1/2"	5555	—
				19952	1-3/8"	1"	5579	—	19980	3"	2-5/8"	5590	—
				19953	1-3/8"	1-1/8"	5517	W22099	19981	3-1/2"	1-3/8"	5557	—
				19954	1-3/8"	1-1/4"	5525	—	19982	3-1/2"	2-1/8"	5598	—
				19955	1-1/2"	7/8"	5564	—	19983	3-1/2"	2-5/8"	5561	—
				19956	1-1/2"	1"	5585	—	19984	3-1/2"	3"	5560	—
				19957	1-1/2"	1-1/4"	5514	—	19985	4"	2-1/2"	5597	—
				19958	1-1/2"	1-3/8"	5527	—	19986	4"	2-5/8"	5588	—
				19993	1-5/8"	7/8"	—	W22108	19987	4"	3-1/2"	5596	—
				19959	1-5/8"	1-1/8"	5586	W22109	19988	4-1/8"	2-5/8"	5589	—



WE ARE AS
NEAR AS YOUR
NEAREST TELEPHONE

3

IDEAL LINE FITTINGS - COPPER

SOLDER COUPLINGS/UNIONS

INSIDE DIAM. BOTH ENDS FEMALE TO FEMALE – SOLDER

CAT. NO.	INSIDE DIAM. C	IDEAL P/N
1992A	1/4"	R060
1994A	3/8"	R061
1995A	1/2"	R062
1996A	5/8"	R063
1997A	3/4"	R064
1998A	7/8"	R065
1999A	1"	R066
19910A	1-1/8"	R067
19912A	1-3/8"	R068
19914A	1-5/8"	R069
19917A	2-1/8"	R070
19919A	2-5/8"	R071
	3-1/8"	R072

REDUCING SOLDER COUPLINGS/UNIONS



INSIDE DIAM. TO INSIDE DIAM. FEMALE TO FEMALE - SOLDER

CAT. NO.	INSIDE DIA. D	INSIDE DIA. E	IDEAL P/N	CAT. NO.	INSIDE DIA. D	INSIDE DIA. E	IDEAL P/N
19930A	3/8"	1/4"	R110	19991A	1-1/8"	1"	R124
19931A	1/2"	3/8"	R111	19949A	1-3/8"	5/8"	R125
19989A	5/8"	3/8"	R112	19951A	1-3/8"	7/8"	R126
19932A	5/8"	1/2"	R113	19953A	1-3/8"	1-1/8"	R127
19933A	3/4"	3/8"	R114	19959A	1-5/8"	1-1/8"	R128
19934A	3/4"	1/2"	R115	19960A	1-5/8"	1-3/8"	R129
11935A	3/4"	5/8"	R116	19996A	2-1/8"	1-1/8"	R130
11936A	7/8"	1/2"	R117	19967A	2-1/8"	1-3/8"	R131
11937A	7/8"	5/8"	R118	19968A	2-1/8"	1-5/8"	R132
11938A	7/8"	3/4"	R119	19998A	2-5/8"	1-3/8"	R134
11943A	1-1/8"	1/2"	R120	19999A	2-5/8"	1-5/8"	R135
11944A	1-1/8"	5/8"	R121	19975A	2-5/8"	2-1/8"	R133
11945A	1-1/8"	3/4"	R122		3-1/8"	2-5/8"	R136
11946A	1-1/8"	7/8"	R123				

LINE FITTINGS - COPPER

COPPER REDUCING BUSHES

O.D.
MALE END

OUTSIDE
DIA.
"A"



INSIDE
DIA.
"B"

I.D.
FEMALE END

CAT. NO.	O.D. DIMS "A"	I.D. DIMS "B"	HELDON	HUDSON	CAT. NO.	O.D. DIMS "A"	I.D. DIMS "B"	HELDON	HUDSON	CAT. NO.	O.D. DIMS "A"	I.D. DIMS "B"	HELDON	HUDSON
2001	3/8"	1/4"	5277	W24007	20051	1-1/2"	1-3/8"	5227	—	200105	2-5/8"	1-3/8"	5235	—
2002	1/2"	1/4"	5275	—	20052	1-1/2"	2"	5283	—	200106	2-5/8"	1-1/2"	5270	—
2003	1/2"	3/8"	5278	W24011	20053	1-9/16"	1-7/8"	4989	—	200107	2-5/8"	1-5/8"	5209	W24062
2004	5/8"	3/8"	5296	W24015	20054	1-5/8"	5/8"	5289	—	200108	2-5/8"	2"	5288	—
2005	5/8"	1/2"	5213	W24016	20059	1-5/8"	1-1/8"	5204	W24044	200109	2-5/8"	2-1/8"	5210	W24064
2006	5/8"	7/8"	4977	W240171	20060	1-5/8"	1-1/4"	5257	—	200110	2-5/8"	3-1/2"	4961	—
2007	5/8"	1-1/8"	5268	W240172	20061	1-5/8"	1-3/8"	5220	W24046	200111	2-7/8"	1-5/8"	4995	—
2008	3/4"	1/2"	5200	—	20062	1-5/8"	1-1/2"	5222	—	200112	2-7/8"	2-1/8"	5285	—
2009	3/4"	5/8"	5219	W24020	20063	1-5/8"	1-3/4"	5223	W24041	200117	3"	1-5/8"	5280	—
20010	3/4"	1-1/8"	4987	—	20064	1-3/4"	7/8"	4963	—	200118	3"	2"	5239	—
20011	7/8"	1/2"	5246	—	20065	1-3/4"	1"	5290	—	200119	3"	2-1/8"	5248	—
20012	7/8"	5/8"	5264	W24026	20066	1-3/4"	1-1/8"	4990	—	200120	3"	2-1/2"	5211	—
20013	7/8"	3/4"	5249	W24027	20067	1-3/4"	1-3/8"	5265	—	200121	3"	2-5/8"	5262	—
20014	7/8"	1-1/8"	5255	—	20068	1-7/8"	1-1/8"	4982	—	200122	3"	2-7/8"	4981	—
20015	7/8"	1-3/8"	5267	—	20069	1-7/8"	1-1/2"	4970	—	200123	3-1/8"	1-5/8"	5266	—
20016	7/8"	1-1/2"	4976	—	20070	1-7/8"	1-5/8"	4971	—	200124	3-1/8"	2-1/8"	5238	—
20017	1"	1/4"	4973	—	20071	1-15/16"	1-1/8"	4998	—	200125	3-1/8"	2-5/8"	5237	—
20018	1"	1/2"	5212	—	20072	2"	3/4"	5229	—	200126	3-1/8"	2-7/8"	5293	—
20019	1"	5/8"	5273	—	20073	2"	1"	5216	—	200127	3-1/8"	3"	5274	—
20020	1"	3/4"	5201	W24028	20074	2"	1-1/8"	5243	—	200128	3-1/8"	3-1/4"	5294	—
20021	1"	7/8"	4964	W24029	20075	2"	1-1/4"	5231	—	200129	3-1/4"	2-1/8"	5230	—
20022	1-1/8"	1/2"	5279	W24030	20076	2"	1-3/8"	5251	—	200130	3-1/4"	2-5/8"	4999	—
20023	1-1/8"	5/8"	5272	W24031	20077	2"	1-1/2"	5205	—	200131	3-1/4"	3-1/8"	5240	—
20024	1-1/8"	3/4"	5218	W24032	20078	2"	1-5/8"	5291	—	200132	3-1/2"	2-1/8"	4985	—
20025	1-1/8"	7/8"	5224	W24033	20079	2"	1-3/4"	5287	—	200133	3-1/2"	2-5/8"	5260	—
20030	1-1/8"	1"	5242	W24034	20080	2"	1-13/16"	5299	—	200134	3-1/2"	3"	5250	—
20031	1-1/8"	1-1/8"	5254	—	20081	2"	1-7/8"	5298	—	200135	3-1/2"	3-1/8"	5241	—
20032	1-1/8"	1-3/8"	4980	—	20082	2"	2-1/8"	4968	—	200136	3-1/2"	3-1/4"	5281	—
20033	1-1/4"	1/2"	5284	—	20083	2-1/8"	1-1/8"	5206	—	200137	3-5/8"	2-1/8"	5297	—
20034	1-1/4"	5/8"	5269	—	20088	2-1/8"	1-3/8"	5221	W24054	200138	3-5/8"	2-5/8"	5256	—
20035	1-1/4"	3/4"	5252	—	20089	2-1/8"	1-1/2"	4984	—	200139	3-5/8"	3"	4975	—
20036	1-1/4"	7/8"	5253	—	20090	2-1/8"	1-5/8"	5207	W24056	200140	3-5/8"	3-1/8"	4965	—
20037	1-1/4"	1"	5202	W24047	20091	2-1/8"	1-3/4"	5276	—	200141	3-5/8"	3-1/2"	5286	—
20038	1-1/4"	1-1/8"	4986	W24048	20092	2-1/8"	1-7/8"	4988	—	200146	3-3/4"	3-1/2"	4991	—
20039	1-3/8"	5/8"	5295	—	20093	2-1/8"	2"	4997	—	200147	4-1/8"	2-5/8"	4969	—
20040	1-3/8"	3/4"	5245	—	20094	2-1/8"	2-3/8"	4959	—	200148	4-1/8"	3-5/8"	4994	—
20041	1-3/8"	7/8"	5228	W24036	20095	2-1/8"	2-5/8"	4966	—	200149	4-1/8"	4"	4992	—
20042	1-3/8"	1"	5259	W24037	20096	2-1/4"	2"	5232	—	200150	4-1/4"	3-5/8"	4983	—
20043	1-3/8"	1-1/8"	5217	W24038	20097	2-3/8"	3"	4978	—	200151	4-1/2"	2-5/8"	4993	—
20044	1-3/8"	1-1/4"	5282	W24039	20098	2-1/2"	1-1/4"	5215	—	200152	4-5/8"	4-1/2"	4932	—
20045	1-1/2"	1/2"	5225	—	20099	2-1/2"	1-1/2"	5233	—	200153	4-3/4"	3-1/2"	4958	—
20046	1-1/2"	3/4"	5226	W240387	200100	2-1/2"	2"	5208	—	200154	5"	3"	4934	—
20047	1-1/2"	7/8"	5271	—	200101	2-1/2"	2-1/8"	4974	—	200155	5"	3-1/2"	4931	—
20048	1-1/2"	1"	5214	W240389	200102	2-1/2"	2-3/8"	4979	—	200156	5"	4"	4960	—
20049	1-1/2"	1-1/8"	5258	—	200103	2-1/2"	2-5/8"	5263	—	SIZES NOT LISTED AVAILABLE ON REQUEST				
20050	1-1/2"	1-1/4"	5203	—	200104	2-5/8"	1-1/8"	5234	—					

IDEAL LINE FITTINGS - COPPER

COPPER REDUCING BUSHES



OUTSIDE DIAM. TO INSIDE DIAM. O.D. MALE TO I.D. FEMALE SOLDER CONNECTIONS			
CAT. NO.	O.D. DIM. A	I.D. DIM. B	IDEAL P/N
2001A	3/8"	1/4"	R075
2002A	1/2"	1/4"	R076
2003A	1/2"	3/8"	R077
2004A	5/8"	3/8"	R078
2005A	5/8"	1/2"	R079
2008A	3/4"	1/2"	R080
2009A	3/4"	5/8"	R081
	7/8"	3/8"	R082
2011A	7/8"	1/2"	R083
20012A	7/8"	5/8"	R084
20013A	7/8"	3/4"	R085
20022A	1-1/8"	1/2"	R086
20023A	1-1/8"	5/8"	R087
20024A	1-1/8"	3/4"	R088
20025A	1-1/8"	7/8"	R089
20039A	1-3/8"	5/8"	R090
20041A	1-3/8"	7/8"	R091
20043A	1-3/8"	1-1/8"	R092
	1-5/8"	7/8"	R093
20059A	1-5/8"	1-1/8"	R094
20061A	1-5/8"	1-3/8"	R095
20083A	2-1/8"	1-1/8"	R096
20088A	2-1/8"	1-3/8"	R097
20090A	2-1/8"	1-5/8"	R098
200109A	2-5/8"	2-1/8"	R099

PRODUCT PRICE AND QUALITY

SOMETIMES PRICES OF SIMILAR PRODUCTS, BUT OF DIFFERENT BRANDS MAY VARY
THE MOST EXPENSIVE IS NOT ALWAYS THE BEST

QUALITY IS THE CRITERIA

ALL ACTROL PARTS PRODUCTS OFFERED ARE TOP QUALITY IRRESPECTIVE OF BRAND OR PRICE

LINE FITTINGS - COPPER

90° COPPER ELBOWS
FEMALE TO FEMALE



To Take O.D. of Copper Pipe
SAME SIZE BOTH ENDS

45° COPPER ELBOWS
FEMALE TO FEMALE



To Take O.D. of Copper Pipe

90° COPPER ELBOWS
MALE TO FEMALE



To Take O.D. of Copper Pipe one
end and I.D. other end.

CAT. NO.	INSIDE DIAM.	HELDON	HUDSON	CAT. NO.	INSIDE DIAM.	HELDON	HUDSON	CAT. NO.	O.D.	I.D.	HELDON	HUDSON
2011	1/4"	5000	W20000	20134	3/8"	5302	W20203	20159	3/8"	3/8"	5352	W20410
2012	5/16"	5001	W20002	20135	1/2"	5304	W20204	20160	1/2"	1/2"	5354	W20412
2013	3/8"	5002	W20005	20136	5/8"	5305	W20205	20161	5/8"	5/8"	5355	W20415
2015	1/2"	5004	W20009	20137	3/4"	5306	W20206	20162	3/4"	3/4"	5356	W20417
2017	5/8"	5005	W20014	20138	7/8"	5307	W20207	20163	7/8"	5/8"	5386	—
20110	3/4"	5006	W20022	20139	1"	5308	W20208	20164	7/8"	7/8"	5357	W20420
20112	7/8"	5007	W20028	20140	1-1/8"	5309	W20209	20165	1"	1"	5358	—
20115	1"	5008	W20033	20141	1-1/4"	5310	W20210	20166	1-1/8"	1-1/8"	5359	W20422
20117	1-1/8"	5009	W20043	20142	1-3/8"	5311	W20211	20167	1-1/4"	1-1/4"	5360	—
20118	1-1/4"	5010	W20100 *	20143	1-1/2"	5312	W20212	20168	1-3/8"	1-3/8"	5361	W20430
			W20310	20144	1-5/8"	5313	W20213	20169	1-1/2"	1-1/2"	5362	—
20119	1-3/8"	5011	and W20108 *	20145	1-3/4"	5314	W20214	20170	1-5/8"	1-5/8"	5363	W20440
20120	1-1/2"	5012	W20115 *	20146	2"	5316	W20216	20171	1-3/4"	1-3/4"	5364	—
			W20315	20147	2-1/8"	5317	W20217	20172	2"	2"	5366	—
20121	1-5/8"	5013	and W20126 *	20148	2-1/2"	5320	W20220	20173	2-1/8"	2-1/8"	5367	—
20122	1-3/4"	5014	—	20149	2-5/8"	5321	W20221	20174	2-1/2"	2-1/2"	5370	—
20123	2"	5016	W20135 *	20150	3"	5324	W20224	20175	2-5/8"	2-5/8"	5371	—
			W20320	—	3-1/8"	5325	—	20176	3"	3"	5374	—
20124	2-1/8"	5017	and W20149 *	20151	3-1/4"	5326	W20226	20177	3-1/2"	3-1/2"	5377	—
201156	2-3/8"	—	W20151 *	20162	3-1/2"	5327	W20228	—	3-5/8"	3-5/8"	5394	—
20125	2-1/2"	5020	W20152 *	—	3-5/8"	5344	—	—	—	—	—	—
			W20325									
20126	2-5/8"	5021	and W20159 *									
20127	3"	5024	W20165 *									
—	3-1/8"	5025	—									
20128	3-1/4"	5026	—									
20129	3-1/2"	5027	W20170 *									
—	3-5/8"	5044	—									
20130	3-3/4"	5028	—									
20131	4"	5029	W20180 *									
—	5"	5046	—									
—	6"	5048	—									

* Long Radii.

REDUCING ONE END

CAT. NO.	I.D.	I.D.	Heldon	Hudson
2014	1/2"	3/8"	5034	W20008
2016	5/8"	1/2"	5035	W20013
2018	3/4"	1/2"	5036	W20020
2019	3/4"	5/8"	5037	W20021
20111	7/8"	3/4"	5038	W20027
20113	1"	3/4"	5039	W20031
20114	1"	7/8"	5041	—
20116	1-1/8"	1"	5042	—

NOW FOR EVEN FASTER
SERVICE WE HAVE
INSTALLED TELEX
SERVICE IN MOST OF
OUR BRANCHES

TO GIVE OUR CUSTOMERS
EVEN FASTER SERVICE WE
HAVE INSTALLED TELEX IN
MOST OF OUR BRANCHES. IF
YOU HAVE TELEX YOU CAN
SEND YOUR ORDER DIRECT
BY THIS MEANS. OUR
BRANCH TELEX NUMBERS
ARE LISTED AT THE FRONT
OF THIS CATALOGUE

TELEPHONE
YOUR
ORDERS



We are as near as your
nearest telephone.

IDEAL LINE FITTINGS - COPPER

**90° COPPER ELBOWS
FEMALE TO FEMALE**



TO TAKE O.D. OF COPPER PIPE
SAME SIZE BOTH ENDS
FEMALE TO FEMALE - SOLDER

CAT. NO.	INSIDE DIAM.	IDEAL P/N
2011A	1/4"	R000
2013A	3/8"	R001
2015A	1/2"	R002
2017A	5/8"	R003
20110A	3/4"	R004
20112A	7/8"	R005
20115A	1"	R006
20117A	1-1/8"	R007
20118A	1-1/4"	R008
20119A	1-3/8"	R009
20120A	1-1/2"	R010
20121A	1-5/8"	R011
20124A	2-1/8"	R012
20126A	2-5/8"	R013
	3-1/8"	R014
20131A	4"	R015
	6"	R016

**45° COPPER ELBOWS
FEMALE TO FEMALE**



TO TAKE O.D. OF COPPER PIPE
SAME SIZE BOTH ENDS
FEMALE TO FEMALE - SOLDER

CAT. NO.	INSIDE DIAM.	IDEAL P/N
20134A	3/8"	R020
20135A	1/2"	R021
20136A	5/8"	R022
20137A	3/4"	R023
20138A	7/8"	R024
20140A	1-1/8"	R025
20142A	1-3/8"	R026
20144A	1-5/8"	R027
20147A	2-1/8"	R028
20149A	2-5/8"	R029
	3-1/8"	R030

WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE
NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

LINE FITTINGS - COPPER

COPPER RETURN BENDS



NOT SWAGED
(Tube to Tube)



OD IS REDUCED TO FIT A SPECIFIED
BORE SIZE (Male to Male)



SWAGED TO TAKE OD OF COPPER PIPE
(Female to Female)

CAT. NO.	O.D.	Centres	Heldon	Hudson
2021	3/8"	2-1/4"	5410	—
2022	1/2"	1-5/16"	5423	—
2023	1/2"	1-1/2"	5428	W24710
2024	1/2"	1.8"	5422	—
2025	1/2"	2"	5404	—
2026	1/2"	2-1/2"	5411	—
2027	1/2"	3-1/8"	5412	—
—	5/8"	1-25/64"	—	W24725*
—	5/8"	1-25/64"	—	W24727*
—	5/8"	1-3/4"	—	W24731
2028	5/8"	1.8"	5409	—
2029	5/8"	1-7/8"	5401	—
20210	5/8"	2"	5400	W24733
20211	5/8"	2-1/32"	5408	—
20212	5/8"	2-1/2"	5414	W24735
20213	5/8"	3"	5413	—
20214	5/8"	3-1/2"	5405	—
20215	3/4"	1.8"	5415	—
20216	3/4"	2"	5416	—
20217	3/4"	2-1/4"	5402	—
20218	3/4"	2-3/4"	5419	—
20219	3/4"	3-1/2"	5406	—
20220	7/8"	2-1/4"	5417	—
20221	1"	2-1/4"	5403	—
20222	1-1/8"	2-7/16"	5425	—

* Depth = 1-1/8"

** Depth = 1-1/4"

CAT. NO.	O.D.	Centres	Heldon	Hudson
20223	3/8"	2-1/4"	5440	—
20224	1/2"	1-5/16"	5453	—
20225	1/2"	1-1/2"	5458	—
20230	1/2"	1.8"	5452	—
20231	1/2"	2"	5434	—
20232	1/2"	2-1/2"	5441	—
20233	1/2"	3-1/8"	5442	—
—	.550"	1.8"	—	W24632
—	.550"	2"	—	W24633
20234	5/8"	1.8"	5439	—
20235	5/8"	1-7/8"	5431	—
20236	5/8"	2"	5430	W24651
20237	5/8"	2-1/32"	5438	—
20238	5/8"	2-1/2"	5444	—
20239	5/8"	3"	5443	—
20240	5/8"	3-1/2"	5435	—
20241	3/4"	1.8"	5445	—
20242	3/4"	2"	5446	—
20243	3/4"	2-1/4"	5432	—
20244	3/4"	2-3/4"	5449	—
20245	3/4"	3-1/2"	5436	—
20246	7/8"	2-1/4"	5447	—
20247	1"	2-1/4"	5433	—
20248	1-1/8"	2-7/16"	5455	—

CAT. NO.	Centres	Centres	Heldon	Hudson
20249	3/8"	2-1/4"	5470	W24517
20250	1/2"	1-5/16"	5483	—
20251	1/2"	1-1/2"	5488	W24518
20252	1/2"	1.8"	5482	—
20253	1/2"	2"	5464	W24520
20254	1/2"	2-1/2"	5471	—
20259	1/2"	3-1/8"	5472	—
—	5/8"	1-3/4"	—	W24530
20260	5/8"	1.8"	5469	—
20261	5/8"	1-7/8"	5461	—
20262	5/8"	2"	5460	W24533
20263	5/8"	2-1/8"	5468	—
20264	5/8"	2-1/2"	5474	W24540
20265	5/8"	3"	5473	—
—	5/8"	3-1/4"	—	W24537
20266	5/8"	3-1/2"	5465	—
20267	3/4"	1.8"	5475	—
—	3/4"	1-7/8"	—	W24544
20268	3/4"	2"	5476	W24545
20269	3/4"	2-1/4"	5462	W24546
20270	3/4"	2-3/4"	5479	—
20271	3/4"	3-1/2"	5466	W24555
20272	7/8"	2-1/4"	5477	—
—	7/8"	3-1/2"	—	W24570
—	1"	2"	—	W24575
20273	1"	2-1/4"	5463	—
20274	1-1/8"	2-7/16"	5485	—
—	1-1/8"	3-1/2"	—	W24590

PLASTIC END CAPS FOR COPPER TUBE (To fit inside end of tube)

CAT. NO.	TUBE OD
202114	1/4"
202115	3/8"
202116	1/2"
202117	5/8"
202118	3/4"
202119	7/8"
202120	1"
202121	1-1/8"
202124	1-1/4"
202122	1-3/8"
202125	PM4

COPPER TUBE END CAPS (STOP ENDS)



To Take O.D. of Copper Pipe

CAT. NO.	O.D.	Heldon	Hudson
20288	3/8"	66150	W24302
20289	1/2"	66100	W24303
20290	5/8"	66192	W24304
20291	3/4"	66102	W24305
20292	7/8"	66153	W24306
20293	1"	66103	W24307
20294	1-1/8"	66130	W24308
20295	1-1/4"	66104	W24309

CAT. NO.	O.D.	Heldon	Hudson
20296	1-3/8"	66131	W24310
20297	1-1/2"	66154	W24311
20298	1-5/8"	66132	W24312
20299	1-3/4"	66155	—
202100	1-7/8"	66140	—
202101	2"	66115	W24313
202102	2-1/8"	66133	W24314
202103	2-3/8"	66119	—
202104	2-1/2"	66118	—
202105	2-5/8"	66134	W24316
202106	2-7/8"	66121	—
202107	3"	66122	—
202108	3-1/8"	66135	—
202109	3-1/4"	66136	—
202110	3-1/2"	66156	—
202111	4"	66157	W24325
202112	5"	66120	—
202113	6"	66151	—

LINE FITTINGS - COPPER



WROUGHT COPPER TEES

To Take O.D. of Copper Pipe.



LINE 1, 2 & BRANCH - SAME (Female)

CAT. NO.	1, 2, 3	Heldon P/N	Hudson P/N	IDEAL	
				CAT. NO.	P/N
2031	3/16"	6003	W21493		
2032	1/4"	6000	W21500	2032A	R140
2033	5/16"	6001	W21503		
2034	3/8"	6002	W21505	2034A	R141
2035	1/2"	6004	W21510	2035A	R142
2036	5/8"	6005	W21520	2036A	R143
2037	3/4"	6006	W21530	2037A	R144
2038	7/8"	6007	W21540	2038A	R145
2039	1"	6008	W21567	2039A	R146
20310	1-1/8"	6009	W21551	20310A	R147
20311	1-1/4"	6010	W21566		
20312	1-3/8"	6011	W21568	20312A	R148
20313	1-1/2"	6012	W21583		
20314	1-5/8"	6013	W21584		
20315	1-3/4"	6014	—		
20316	2"	6016	W21601		
20317	2-1/8"	6017	W21602		
20318	2-1/2"	6020	W21622		
20319	2-5/8"	6021	W21623		
20320	3"	6024	—		
20321	3-1/8"	6025	W21652		
20322	3-1/4"	6026	—		
20323	3-1/2"	6027	—		
20324	3-5/8"	6028	W21660		
20325	4"	6029	—		
20326	4-1/8"	6034	W21670		

INCREASING ON BRANCH

CAT. NO.	LINE 1, 2	BRANCH 3	HELDON	HUDSON
20353	1/4"	5/16"	—	W21501
20354	5/16"	3/8"	—	W21509
20355	3/8"	1/2"	—	W21514
20356	1/2"	5/8"	—	W21527
20357	5/8"	3/4"	—	W21536
20358	3/4"	1"	—	W21547

INCREASING ON LINE & BRANCH

CAT. NO.	LINE 1	L & B 2, 3	HELDON	HUDSON
20361	3/16"	1/4"	—	W21496
20362	3/16"	5/16"	—	W21497
20363	3/8"	1/2"	—	W21512
20364	1/2"	5/8"	—	W21524



To Take O.D. of Copper Pipe.

REDUCING ON BRANCH

CAT. NO.	LINE 1, 2	BRANCH 3	HELDON	HUDSON
20329	1/4"	3/16"	—	W21499
20330	5/16"	1/4"	6101	W21504
20331	3/8"	1/4"	6102	W21506
20327	3/8"	5/16"	—	W21508
20332	1/2"	1/4"	6103	W21515
20333	1/2"	3/8"	6104	W21511
20328	5/8"	1/4"	—	W21523
20376	5/8"	3/8"	—	W21522
20334	5/8"	1/2"	6105	W21521
20335	3/4"	3/8"	6140	W21533
20336	3/4"	1/2"	6135	W21532
20337	3/4"	5/8"	6106	W21531
20338	7/8"	3/4"	6107	—
20377	1"	1/2"	—	W21550
20378	1"	3/4"	—	W21549
20339	1"	7/8"	6108	—
20340	1-1/8"	1"	6109	—
20341	1-1/4"	1-1/8"	6110	—
20342	1-3/8"	1-1/4"	6111	—
20343	1-1/2"	1-3/8"	6112	—
20344	1-5/8"	1-1/2"	6113	—
20345	1-3/4"	1-5/8"	6114	—
20346	2"	1-7/8"	6116	—
20347	2-1/8"	2"	6117	—
20348	2-1/2"	2-3/8"	6120	—
20349	2-5/8"	2-1/2"	6121	—
20350	3"	2-7/8"	6124	—
20351	3-1/2"	3-3/8"	6127	—

REDUCING ON LINE & BRANCH

CAT. NO.	LINE 1	L & B 2, 3	HELDON	HUDSON
20382	5/16"	3/16"	—	W21495
20383	5/16"	1/4"	—	W21502
20384	3/8"	1/4"	—	W21507
20385	3/4"	1/2"	—	W21537

Y PIECE (3 WAY CONNECTORS)

CAT. NO.	'A'	'B'	HELDON	HUDSON
20366	5/8"	5/8"	6501	—
20367	3/4"	5/8"	6503	—
20368	7/8"	5/8"	6502	W22350
20369	1"	5/8"	6504	—
20370	1"	3/4"	6508	—
20371	1-1/8"	5/8"	6505	—
20372	1-1/8"	3/4"	6509	—
20373	1-1/8"	7/8"	6500	W22360
20374	1-1/4"	5/8"	6506	—
20375	1-3/8"	5/8"	6507	—

NOTES

3

TELEX FOR FAST SERVICE

TO GIVE OUR CUSTOMERS EVEN FASTER SERVICE WE HAVE INSTALLED TELEX IN MOST OF OUR BRANCHES. IF YOU ARE A TELEX SUBSCRIBER YOU CAN SEND YOUR ORDER DIRECT BY TELEX. TELEX NUMBERS ARE LISTED AT THE FRONT OF THIS CATALOGUE.

NOTES

PICK-UP COUNTERS EVERYWHERE

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.

SCHRADER/ACCESS VALVES & FITTINGS

THESE ACCESS FITTINGS MAKE IT POSSIBLE TO QUICKLY AND INEXPENSIVELY INSTALL A PERMANENT ACCESS PORT ON ANY REFRIGERATION SYSTEM TO FACILITATE SERVICING, CHARGING, EVACUATING, TESTING, ETC.

HALF UNION TYPE :



CAT.NO	MAKE	P/N	DESCRIPTION
20782A	IMPERIAL	GU1-4A	1/4"OD Tube 1/8"NPT
20782	ROBINAIR	40400	1/8"MPT or 1/4"OD Sold.
20751	"	40401	1/4" .. 5/16" " "
20757	HUDSON	2825	1/8" MBSP
20758	"	CO32311	.224"MS W/o Core & Cap.
20770	HELDON	11093	1/4 MF x 1/4 OD

SOLDER UNION TYPE :



20778A	IMPERIAL	GU53-4	1/4"
20773	ROBINAIR	40416	1/8" OD
20752	ROBINAIR	40417	3/16" OD
20778	ROBINAIR	40418	1/4" OD
20753	ROBINAIR	40419	5/16" OD
20754	ROBINAIR	40420	3/8" OD

MULTI-SIZE SOLDER UNION :



20783A	IMPERIAL	GU53-34	3/16OD or 1/4 Sold, Fitting
20784A	IMPERIAL	GU53-46	1/4 OD or 3/8 Sold, Fitting
20785A	IMPERIAL	GU53-58	5/16OD or 1/2 Sold, Fitting
20786A	IMPERIAL	GU53-68	3/8 OD or 1/2 Sold, Fitting
20787A	IMPERIAL	GU53-346	3/16OD or 1/4 or 3/8 S/Fitt.
20783	ROBINAIR	40426	3/16OD or 1/4 Sold, Fitting
20784	ROBINAIR	40427	1/4 OD or 3/8 Sold, Fitting
20787	ROBINAIR	40435	3/16OD or 1/4 or 3/8 S/Fitt.
20785	ROBINAIR	40428	5/16OD or 1/2 Sold, Fitting
20786	ROBINAIR	40429	3/8 OD or 1/2 Sold, Fitting

FEMALE FLARE COUPLING WITH COPPER GASKET :



207114	ROBINAIR	40410	1/4" Male Flare Conn.
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MALE FLARE UNION WITH FORGED NUT :



207115	ROBINAIR	40404	For 1/4OD Flared Tube
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STANDARD SOLDER TYPE TEE - ACCESS ON BRANCH :



20779A	IMPERIAL	GT2-4	1/4 OD Tube or 3/8 Sold.Fitt.
20780A	IMPERIAL	GT2-6	3/8 OD Tube or 1/2 Sold.Fitt.
20779	ROBINAIR	40382	1/4 OD Tube or 3/8 Sold.Fitt.
20772	ROBINAIR	40383	5/16OD Tube or 3/8 Sold.Fitt.
20780	ROBINAIR	40384	3/8 OD Tube or 1/2 Sold.Fitt.
20774	ROBINAIR	40390	1/4SAE M.F.I. & 1/8MPT on run
20771	HELDON	9767	1/4 Flare x 1/4 Flare

HELDON COMPRESSION UNIONS

20764	26045	1/4 x 5/32
20765	26060	1/4 x 3/16
20767	9508	1/4 x 1/4
20766	9555	5/16 x 1/4
20768	9552	5/16 x 5/16

VALVE CORE REMOVER :



CAT.NO	MAKE	P/N	DESCRIPTION
207107	IMPERIAL	G6300	
207116	ROBINAIR	40535	
20781	"	40536	With 6 Valve Cores.

REPLACEMENT VALVE CORES :



207106	IMPERIAL	G6400	
207120	ROBINAIR	40352	Bag of 6 Cores.
20759	HUDSON	5344	HELDON 8864

ROBINAIR QUICK SEAL CAPS



Finger tight sealing of 1/4" and 3/8" male flare connections. No wrenches or pliers required. Same gaskets as charging lines.

207118	40572	Bag of 6 Quick Seal Caps
20762	40083	6 Replacement Gaskets for above

ROBINAIR QUICK COUPLER VALVE OPENER TYPE



These adapters are designed to "upset" Schrader type access valves. All adapt to 1/4" SAE.

19827	40560	Straight 1/4" SAE
19826	40563	90° Elbow Flare
19846	10462	45° Elbow Connections
20762	40083	6 Replacement Gaskets

90° SWIVEL ADAPTER

A 90° swivel adapter may be used for many applications. It eliminates awkward bending of charging lines when connecting charging or testing units in hard to reach places. Adapter has 1/4" Kwik-Kupler connection with valve core on one end and 1/4" male flare on the other end.



20775	IMPERIAL	10-C	90° Swivel Adaptor.
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ROBINAIR QUICK COUPLER STYLE VALVE WITH VALVE DEPRESSOR.



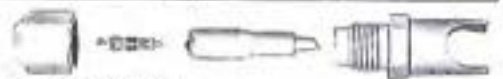
207121	40379	1/4 Male Flare x 1/4 Female Flare Quick Coupler.
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SWIVEL TEE 1/4 FLARE TYPE 2 MALE FLARE - 1 FEMALE FLARE SWIVEL



20755	ROBINAIR	40396	Access on branch, Female Swivel on one end of run
20756	ROBINAIR	40399	Access on one end of run Female Swivel on Branch

COPPER TO COPPER BRAZED LINE TAP VALVE



Steel pin with core penetrates line and is locked into valve body in one operation, simply by tightening cap.

CAT. NO.	IMPERIAL P/N	DESCRIPTION
207101	GP53 - 4	1/4 O.D. Tube
207102	GP53 - 5	5/16 O.D. Tube
207103	GP53 - 6	3/8 O.D. Tube
207104	GP53 - 8	1/2 O.D. Tube
207105	GP53 - 10	5/8 O.D. Tube

REFER TECH. PAGE 207-3 FOR
IMPERIAL & ROBINAIR PART NO. CROSS REFERENCE
OLD TO NEW - NEW TO OLD

IMPERIAL & ROBINAIR CROSS REFERENCE

OLD TO NEW - NEW TO OLD

ROBINAIR

OLD	NEW	NEW	OLD
4610-2	40552	10462	SAME
4610-4A	40553	10468	SAME
4610-4B	40555	10469	SAME
4610-6	40554	40082	CH-100-6
4610-54	40560	40083	CH-109-6
4615-2	40561	40084	CH-110
4615-54	40563	40106	CM-1
4620-4	40569	40288	HP-41
4620-4-6	40572	40289	HP-41A
4620-4AC	40570	40303	HP-810
4620-6	40571	40306	HP-810-8-3
10462	SAME	40330	QP-14
10468	SAME	40336	QP-810
10469	SAME	40351	VC-5344
10551	40535	40352	VC-5344-6
CH-100-6	40082	40359	VPS3-4
CH-109-6	40083	40360	VPS3-5
CH-110	40084	40361	VPS3-6
CM-1	40106	40363	VPS3-8
HP-41	40288	40365	VPS3-10
HP-41A	40289	40369	VQ-4AS
HP-810	40303	40371	VQF-4S
HP-810-8-3	40306	40372	VQF-4AS
QP-14	40330	40373	VQ-48S
QP-810	40336	40379	VQ-4S
V6S-AA	40527	40382	VT2-4
V6300	40535	40383	VT2-5
V6301	40536	40384	VT2-6
VC-5344	40351	40390	VT3-4A
VC-5344-6	40352	40396	VT54-4
VPS3-4	40359	40398	NONE
VPS3-5	40360	40399	VTS6-4
VPS3-6	40361	40400	VU1-4A
VPS3-8	40363	40401	VU1-4B
VPS3-10	40365	40404	VU2-4
VQ-4S	40379	40410	VUR3-44
VQ-4AS	40369	40416	VUS3-2
VQ-48S	40373	40417	VUS3-3
VQF-4AS	40372	40418	VUS3-4
VQF-4S	40371	40419	VUS3-5
VT2-4	40382	40420	VUS3-6
VT2-5	40384	40426	VUS3-34
VT2-6	40383	40427	VUS3-46
VT3-4A	40390	40428	VUS3-58
VT54-4	40396	40429	VUS3-68
VTS6-4	40399	40435	VUS3-346
VU1-4A	40400	40527	V6S-AA
VU1-4B	40401	40535	V6300
VU2-4	40404	40536	10551
VUR3-44	40410	40552	V6301
VUS3-2	40416	40553	4610-2
VUS3-3	40417	40554	4610-4A
VUS3-4	40418	40555	4610-6
VUS3-5	40419	40560	4610-4B
VUS3-6	40420	40561	4610-54
VUS3-34	40426	40563	4615-2
VUS3-46	40427	40569	4615-54
VUS3-58	40428	40570	4620-4
VUS3-68	40429	40571	4620-4AC
VUS3-346	40435	40572	4620-6
NONE	40398		4620-4-6

IMPERIAL

OLD	NEW
VU1-4A	GU1-4A
VU1-4B	GU1-4B
VUS3-2	GUS3-2
VUS3-3	GUS3-3
VUS3-4	GUS3-4
VUS3-5	GUS3-5
NONE	GUS3-6
VUS3-34	GUS3-34
VUS3-46	GUS3-46
VUS3-58	GUS3-58
VUS3-68	GUS3-68
VUS3-346	GUS3-346
VT2-4	GT2-4
NONE	GT2-5
NONE	GT2-6
NONE	GT2-10
NONE	GT2-456
(QC-4R) V6300	G6300

SOME ROBINAIR & IMPERIAL EQUIVALENTS

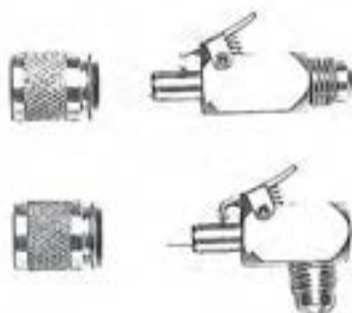
OLD		NEW	
ROBINAIR	IMPERIAL	ROBINAIR	IMPERIAL
VU1-4A	VU1-4A	40400	GU1-4A
VU1-4B	VU1-4B	40401	GU1-4B
VUS3-2	VUS3-2	40416	GUS3-2
VUS3-3	VUS3-3	40417	GUS3-3
VUS3-4	VUS3-4	40418	GUS3-4
VUS3-5	VUS3-5	40419	GUS3-5
VUS3-6	NONE	40420	GUS3-6
VUS3-34	VUS3-34	40426	GUS3-34
VUS3-46	VUS3-46	40427	GUS3-46
VUS3-58	VUS3-58	40428	GUS3-58
VUS3-68	VUS3-68	40429	GUS3-68
VUS3-346	VUS3-346	40435	GUS3-346
VT2-4	VT2-4	40382	GT2-4
VT2-5	NONE	40383	GT2-5
VT2-6	NONE	40384	GT2-6
—	NONE	—	GT2-10
—	NONE	—	GT2-456
V6300	V6300	40535	G6300

These Cross References have been compiled to the best of our ability from available Robinair and Imperial literature.

We assume no liability for its use or misuse.

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

IMPERIAL Kwik Coupler



INSTANT Connection

- Push to connect
- Pull to disconnect

AUTOMATIC Operation

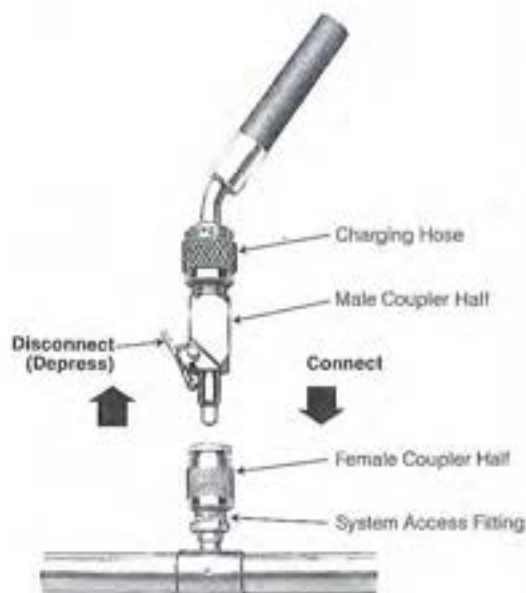
- Seals perfectly without skilled manipulation
- Depresses all core valves without adjustment

The Kwik Coupler set is intended for use with refrigeration air conditioning service manifold high and low side hoses, when connecting to core valve type service fittings. Conventional threaded connecting is converted to push-pull operation which is faster, easier and positive sealing at all times. Valve cores are depressed automatically without adjustments or loss of refrigerant. Disconnecting is also accomplished without loss of refrigerant.

An automatic shutoff valve retains refrigerant pressure in a disconnected hose. This feature permits transferring high side hose refrigerant through the service manifold into the low side, thereby eliminating waste and hazardous high pressure discharge. Hoses can also be stored under low side pressure to prevent contamination, if desired.

Features

- Automatic full depression of core valves without adjustment, regardless of core position.
- Coupler halves separately connect to access fitting and hose end, then easy push/pull operation automatically opens or closes system without loss of refrigerant.
- Automatic shutoff of hose ends permits discharging high side hose through manifold into low side.
- Eliminates hazardous discharge of refrigerant and oil from high side of system when disconnecting hose.
- Simplifies operation of charging critical amount of refrigerant into small systems.
- Prevents freezing hand when disconnecting—especially servicing heat pumps in cold weather.
- Hoses can be stored under slight pressure, if desired, to prevent contamination.
- Core depressors in hose ends no longer necessary—speeds servicing of systems with hand valves.



Connecting Illustration

CAT. NO.	PART NO.	DESCRIPTION
207109	16 - C	Straight Coupler (45° Flare) 1/4 Female x 1/4 Male
207110	17 - C	90° Elbow Coupler (45° Flare) 1/4 Female x 1/4 Male
207111	18 - C	(Set) Includes 16 - C and 17 - C.

QUICK AS A FLASH

AND VERY CAREFUL. THAT'S OUR ORDER DEPARTMENT. WHETHER YOUR ORDER IS LARGE OR SMALL, IT WILL RECEIVE PROMPT AND EXACTING ATTENTION. WE DESPATCH OVER 90% OF ALL ORDERS ON THE SAME DAY THEY ARE RECEIVED.

NOTES

SEP 8 2 1/2 00

GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

COPPER TUBING AND CLIPS

HARD DRAWN COPPER TUBE
REFRIGERATION QUALITYDEHYDRATED & SEALED
Available in 6M. lengths
Sold per Metre

CAT. NO.	SIZE : Metric		SIZE : Imperial	
	O.D. mm	Wall T. mm	O.D. ins	Gauge
208106	6.4	0.91	1/4	20
208107	9.5	1.20	3/8	18
208108	9.5	0.91	3/8	20
208109	12.7	1.20	1/2	18
208110	12.7	0.91	1/2	20
208111	15.9	1.20	5/8	18
208112	15.9	0.91	5/8	20
208113	19.1	1.20	3/4	18
208114	19.1	0.91	3/4	20
208115	22.2	1.20	7/8	18
208116	22.2	0.91	7/8	20
208117	25.4	1.20	1	18
208118	25.4	0.91	1	20
208119	28.6	1.20	1-1/8	18
208120	28.6	0.91	1-1/8	20
208121	31.8	1.20	1-1/4	18
208122	31.8	0.91	1-1/4	20
208123	38.1	1.20	1-1/2	18
208124	38.1	0.91	1-1/2	20
208125	34.9	1.20	1-3/8	18
208126	34.9	0.91	1-3/8	20
208127	41.3	1.20	1-5/8	18
208128	44.5	0.91	1-3/4	20
208129	44.5	1.20	1-3/4	18
208130	47.6	0.91	1-7/8	20
208131	47.6	1.20	1-7/8	18
208132	50.8	1.60	2	16
208133	50.8	1.20	2	18
208134	50.8	0.91	2	20
208135	54.0	1.60	2-1/8	16
208136	54.0	1.20	2-1/8	18
208137	54.0	0.91	2-1/8	20
208138	57.2	1.60	2-1/4	16
208139	57.2	1.20	2-1/4	18
208140	57.2	0.91	2-1/4	20
208141	60.3	1.60	2-3/8	16
208142	60.3	1.20	2-3/8	18
208143	60.3	0.91	2-3/8	20
208144	63.5	1.60	2-1/2	16
208145	63.5	1.20	2-1/2	18
208146	63.5	0.91	2-1/2	20
208147	66.7	1.60	2-5/8	16
208148	66.7	1.20	2-5/8	18
208149	66.7	0.91	2-5/8	20
208150	76.2	1.60	3	16
208151	76.2	0.91	3	20
208152	41.3	0.91	1-5/8	20

IMPERIAL POLY-TUBE RACK



Up to 10 tubes can be held in a compact, orderly manner with these tubing racks. Furnished in black polyethylene.

CAT. No. 20832 Type 14-P : Poly-Tube Rack for 1/4" O.D. tubing. Has lips for fastening rack to a base with screws. Also longitudinal grooves for channel mounting.**CAT. No. 20833** Type 16-P : Poly-Tube Rack for 3/8" O.D. tubing. Lips and grooves.**CAT. No. 20834** Type 26-P : Poly-Tube Rack for 1/2" O.D. tubing. Holds 6 tubes. Lips and grooves.

NOTE
As stocks are drawn both from local and overseas sources where standards differ slightly, the values as shown can only be considered as approx. Prices of copper tubing are constantly changing in accordance with the world price of raw copper. Prices of tubing therefore can only be quoted as at date of delivery.

CAPILLARY TUBING
0.77mm(22G)Wall thickness
Sold per Metre

CAT. NO.	NOMINAL I.D.		TOL
	mm	ins	
20835	0.43	.017	16/19
20836	0.66	.026	24/27
20837	0.74	.029	28/31
20838	0.79	.031	28/31
20854	0.86	.034	32/34
20839	0.91	.036	35/38
20840	0.97	.038	35/38
20841	1.02	.040	39/42
20842	1.07	.042	39/42
20857	1.12	.044	43/46
20843	1.14	.045	43/46
20844	1.17	.046	43/46
20845	1.24	.049	47/50
20846	1.27	.050	47/50
20855	1.37	.054	51/54
20847	1.40	.055	55/58
20858	1.45	.057	55/58
20848	1.50	.059	59/62
20849	1.52	.060	59/62
20859	1.63	.064	63/66
20850	1.78	.070	67/70
20851	1.91	.075	75/78
20852	2.03	.080	79/82
20856	2.29	.090	87/90

SOFT ANNEALED COPPER TUBING
DEHYDRATED & SEALED
Available in 18 m Coils
Sold per Metre

CAT. NO.	SIZE : Metric		SIZE : Imperial	
	O.D. mm	Wall T. mm	O.D. ins	Gauge
20893	3.2	0.71	1/8	22
20894	4.8	0.91	3/16	20
20895	7.9	0.91	5/16	20
20896	6.4	0.91	1/4	20
20897	9.5	0.91	3/8	20
20898	12.7	0.91	1/2	20
20899	15.9	0.91	5/8	20
208100	19.1	0.91	3/4	20
20889	22.2	0.91	7/8	20

STEEL TUBING FOR AMMONIA
6.4 mm O.D. x 0.9 mm Wall
(1/4" O.D. x 20G)
CAT. NO. 20876

FISCHER PIPE SADDLES & WALL PLUGS

PIPE SADDLES				WALL PLUGS		
CAT. NO.	SIZE		TYPE NO.	CAT. NO.	LENGTH ins	TYPE NO.
	mm	ins				
20860	4-8	5/32-5/16	SCH48	20873	3/4	S 4
20861	8-12	5/16-1/2	SCH812	20874	1	S 5
20862	12-16	1/2-5/8	SCH1216	20875	1-3/16	S 6
20863	16-23	5/8-7/8	SCH1623	20871	1-5/8	S 8
20864	23-32	7/8-1-1/4	SCH2332	20872	2	S10
20865	32-42	1-1/4-1-5/8	SCH3242			
20866	42-54	1-5/8-2-1/8	SCH4254			

SINGLE

SIZE	CAT. NO.	HELDON	HUDSON
1/4	2081	102950	4401
5/16	2082	102951	4402
3/8	2083	102952	4403
1/2	2084	102953	4404
5/8	2085	102954	4405
3/4	2086	102955	4406
7/8	2087	102956	4415
1	2088	102957	4416
1-1/8	2089	102958	4417
1-1/4	20810	102959	-
1-3/8	20811	102960	4418
1-1/2	20812	102965	-
1-5/8	20813	102967	4419
1-3/4	20814	102966	-
2	20815	102961	-
2-1/8	20816	102968	-
2-1/2	20817	102962	-
2-5/8	20818	102969	-
3	20819	102963	-
3-1/2	20820	102964	-



DOUBLE

SIZE	CAT. NO.	HELDON	HUDSON
1/4 1/4		-	4420
1/2 1/4	20825	102970	4407
5/8 1/4	20826	102973	4408
5/8 3/8	20827	102971	4410
3/4 3/8	20828	102972	4409

TRIPLE

SIZE	CAT. NO.	HELDON	HUDSON
1/4 1/4 1/4		-	4421
1/4 1/4 1/4	20831	102980	4411

MULTI

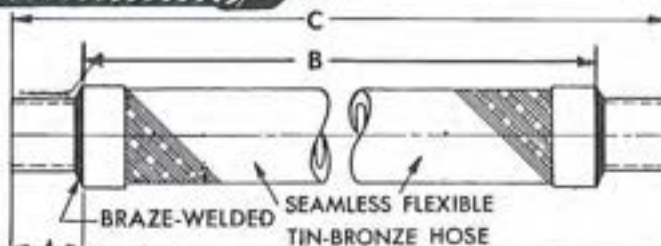
SIZE	No. Pipes	CAT. NO.	HUDSON
1/4	4		4422
1/4	5		4423
1/4	6		4424

VIBRATION ELIMINATORS

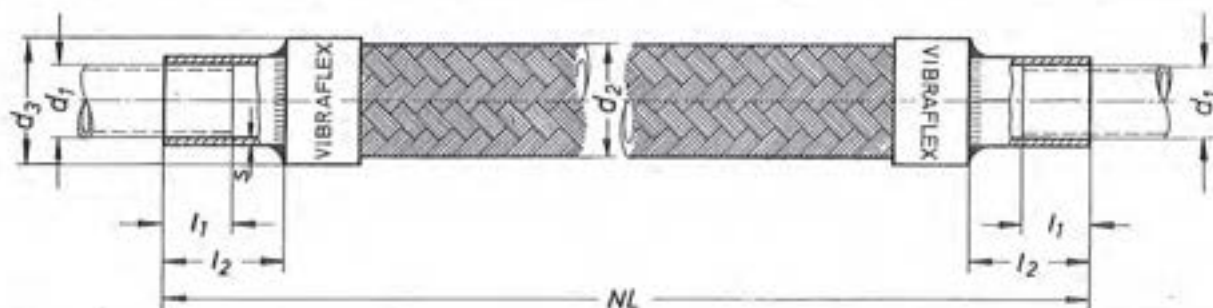
WITH FEMALE ENDS



Constructed of Seamless Flexible Bronze Hose — Bronze Wire Braid Covering — Copper Ferrules and Standard Copper Tube Ends. Tube ends are attached to the hose, braid and ferrules with high temperature brazing alloys — not affected by heat of silver soldering on installations.



TO FIT COPPER TUBING HAVING		ID FLEXIBLE HOSE	A LENGTH OF COPPER TUBE END	B LENGTH OF FLEXIBLE HOSE	C OVERALL LENGTH	PACKLESS		ANACONDA	
ACTUAL OD	NOMINAL ID					CAT. NO.	SIZE	CAT. NO.	SIZE
1/4"	1/8"	3/16"	1/2"	6"	7"	20926	VAF-1	2091	3618 FX
1/4"	1/8"	1/4"	1/2"	6 1/2"	7 1/2"	20927	VAF-2	2092	1418 FX
3/8"	3/8"	5/16"	5/8"	7"	8 1/4"	20928	VAF-3	2093	5614 FX
1/2"	3/8"	3/8"	3/4"	7 1/2"	9"	20929	VAF-4	2094	3838 FX
5/8"	1/2"	1/2"	7/8"	8"	9 3/4"	20930	VAF-5	2095	1212 FX
3/4"	5/8"	1/2"	1"	8"	10"	20931	VAF-6		1258 FX
7/8"	5/8"	3/4"	1-1/8"	9"	11 1/4"	20932	VAF-7	2097	3458 FX
1-1/8"	3/4"	3/4"	1 1/4"	9"	11 1/2"	20933	VAF-8	2098	3434 FX
1-3/8"	1"	1"	1 1/2"	10"	13"	20934	VAF-9	2099	1010 FX
1-5/8"	1 1/4"	1 1/4"	1-5/8"	11 1/2"	14 1/4"	20935	VAF-10	20910	5454 FX
1-7/8"	1 1/2"	1 1/2"	2"	13"	17"	20936	VAF-11	20911	6464 F
2-1/8"	2"	2"	2 1/4"	15"	20"	20937	VAF-12	20912	2020 F
2-5/8"	2 1/4"	2 1/4"	3"	18"	24"	20938	VAF-13	20916	5252 F
3-1/8"	3"	3"	3 1/4"	20"	27"	20939	VAF-14	20913	3030 F
3-5/8"	3 1/2"	3 1/2"	4"	24"	32-5/8"	20940	VAF-15	20914	7272 F
4-1/8"	4"	4"	4 1/4"	24"	33-3/8"	20941	VAF-16	20915	4040 F
5-1/8"	5"	5"	5 1/4"	30"	41"	20942	VAF-17	20917	5050 FS
6-1/8"	6"	6"	6 1/4"	36"	49"	20943	VAF-18	20918	6060 FS



NOM. DIA.	CONNECTION FOR OD OF TUBE		S	BRAZING LENGTH		l2	d2	d3	NOM. LENGTH ±6	HYDRA VIBRAFLEX	
	ins	mm		ins	mm					CAT. NO.	SIZE
6	1/4	6,4	1	5/16	8	14	11,7	14	180	20951	2613-12-6
8	3/8	9,5	1	5/16	8	16	14,3	17	200	20952	2613-12-8
10	1/2	12,7	1	3/8	10	20	16,7	20	220	20953	2613-12-10
12	5/8	15,9	1	1/2	13	22	19,3	22	250	20954	2613-12-12
16	3/4	19,1	1	5/8	16	25	23,8	26	250	20955	2613-12-16
20	7/8	22,2	1	3/4	19	32	28,7	32	280	20956	2613-12-20
25	1-1/8"	28,6	1,5	29/32	23	36	35,2	38	320	20957	2613-12-25
32	1-3/8	34,9	1,5	31/32	25	40	44,0	48	360	20958	2613-12-32
40	1-5/8	41,3	1,5	1-3/32	28	50	62,3	66	450	20959	2613-12-40
50	2-1/8	54,0	2	1-11/32	34	63	75,0	80	500	20960	2613-12-50

REFER TO TECH. PAGE 209-a FOR APPLICATION AND FITTING DATA.

VIBRATION ELIMINATORS

APPLICATION

Oscillations, vibrations and the resulting noise are not only a nuisance, but also considerably shorten the service life of the materials subjected to them. Rigidly installed piping within machines and assemblies which is subjected to vibration may therefore fracture or show other signs of failure after a short period. This endangers the reliability in service and the economic operation of a plant.

For all such cases, the fitting of Vibration Eliminators is advisable. These purpose-designed elements prevent the transmission of oscillations and in addition reduce noise.

Vibration Eliminators are mainly used in refrigerating engineering, for cooling installations, air conditioning units, refrigerating systems etc. They are resistant to the usual cooling agents such as R12, R13, R22, R24, R114, R502 and similar, but not to NH_3 . The vibration absorbers are designed for a nominal pressure of 25 atg and a temperature range from -70°C to $+200^\circ\text{C}$ (-94°F to $+392^\circ\text{F}$).

FITTING

The vibration absorbers are fitted in suction and pressure piping of refrigeration compressors in the immediate vicinity of the shut-off valves. The direction of oscillation must always be noted before fitting, since the hoses only absorb movements which run perpendicular to the hose axis. To fit the hoses, it is therefore often first necessary to bring the piping connections into the correct fitting position for the hoses by means of suitable elbow pieces (fig. 1).

If fitted correctly, the vibrations are picked up and absorbed by the compressor-side hose end, while the other hose end, which is connected to the downstream piping run, remains steady apart from minor residual vibrations. However, to prevent the transmission of these residual vibrations to the piping system, a reliable anchor has to be fitted at this point, directly behind the hose, which is provided with a noise reducing insert.

In the case of additional vibrations in the direction of the hose axis, the fitting of only one vibration absorber is not sufficient, because the hose and the brazed joint would be subjected to excessive compressive or tensile stresses by the vibrational forces. For these applications, two vibration absorbers have to be fitted in a 90° arrangement (fig. 2).

Vibration Eliminators must be connected free from stress and the two hose connections must not be offset in relation to each other. The vibration absorbers must not be stretched or compressed either during fitting or in operation. The longitudinal changes of the piping brought about by temperature variations must be absorbed by expertly fitted metal hoses or expansion joints specially designed for this purpose.

If condensate should form on the outside of the hoses, particularly when they are fitted into suction piping with sub-zero operating temperatures, the hoses must be connected horizontally. If fitted vertically, condensate may collect in the lower hose fitting as a result of repeated switching on and off, which would deform and destroy the hose when it freezes. In these cases it is generally best to wind a waterproof tape around the hoses.

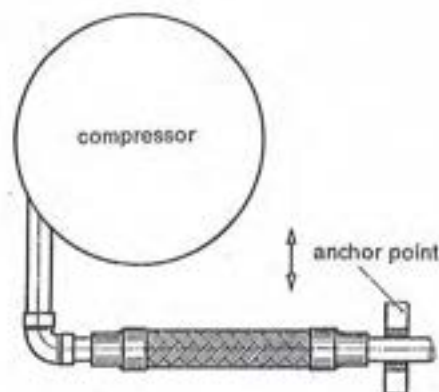


Fig. 1

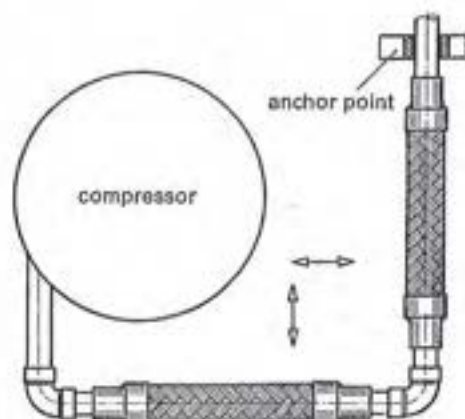


Fig. 2

REFER TO PAGE 209 FOR SELECTION AND ORDERING DETAILS

BRIDGESTONE ACTROL-FLEX

flexible pipe insulation



what is ACTROL-FLEX?

Actrol-Flex is an unsurpassed insulation for a wide variety of refrigeration, air conditioning and heating systems.

It is extruded in continual lengths from a modified vinyl formulation with properties which are superior to conventional insulants. Actrol-Flex pipe insulation is available in a wide range of sizes from 10 mm to 76 mm (3/8" to 3") Inside Diameter.

Actrol-Flex, with its low vapour permeability and with a temperature range of -73.3°C to $+104.4^{\circ}\text{C}$ (-100°F to 220°F) meets the most rigorous demands made on flexible pipe insulation.

It prevents sweating of cold water lines in commercial and industrial buildings as well as in homes and also prevents heat loss from hot water lines. With a high degree of flexibility and outstanding tensile strength, Actrol-Flex is invaluable to manufacturers of air conditioning and refrigeration units.

PHYSICAL PROPERTIES		
temperature range	—73.3°C to 104.4°C (—100°F to 220°F)	
flame resistance	self-extinguishing	
ozone resistance	good	
flexibility	* excellent	
odor	negligible	
oil resistance	no swelling or softening	
* Actrol-Flex becomes hard at —30°C (—20°F); it will increase in brittleness as the temperature drops below —30°C. This normal hardening characteristic does not affect thermal efficiency or resistance to water vapour transmission.		
• SPECIFICATIONS — meets or exceeds specifications for most military and OEM applications including the popular MIL-P-15280D and General Services Administration Specification HH-1-60573 (GSA-FFS).		
PROPERTY	MIL-P-15280D	Actrol-Flex
K. factor — BTU/in/ft ² /hr/°F	.30 max.at 75°F.	.28
density — lbs/ft ³	5-10	7
water absorpt.—lbs/ft cut surface	0.1 max.	0.1
compression set —% of deflection	24 max.	16
tensile strength—lbs/in ²	40 min.	80
moisture vapor absorption—lbs/ft ²	.02 max.	.02
water vapor transmission — grain/hr/ft ² (in. of Hg. in)	.30 max.	.1

INSIDE DIAMETER		10 mm (3/8") WALL	13 mm (1/2") WALL	19 mm (3/4") WALL
mm	ins.	CAT. NO.	CAT. NO.	CAT. NO.
10	3/8"	2101	21023	—
13	1/2"	2102	21024	—
16	5/8"	2103	21025	—
19	3/4"	2104	21026	21048
22	7/8"	2105	21027	21049
25	1"	2106	21065	—
27	1-1/16"	2107	21028	21050
29	1-1/8"	2108	21029	21051
33	1-5/16"	21010	21031	21052
35	1-3/8"	21011	21032	21053
38	1-1/2"	21012	21033	—
42	1-21/32"	21014	21035	21055
48	1-29/32"	—	21036	21056
50	2"	21016	21037	—
54	2-1/8"	21017	21038	21057
60	2-3/8"	—	21039	21058
67	2-5/8"	—	21040	—
76	3"	—	21041	—

AVAILABLE IN 2 METRE (6.6 ft.) LENGTHS

PRE-SLIT ACTROL-FLEX

Actrol-Flex is normally supplied unslit. However, for insulating existing pipe systems, pre-slit Actrol-Flex can be supplied for a slight additional charge. It can be easily and conveniently slipped over existing lines, fittings and joints. The longitudinal slit is then joined with —

TEMPFLEX LA6B ADHESIVE

Refer Page 210-c for available sizes

PIPE & SHEET INSULATION, TAPES AND ADHESIVES — CONTINUED ON FOLLOWING PAGES

ACPAR PARTS — TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

ARMAFLEX SHEET INSULATION



Armaflex II Sheet is always applied with the smooth side out. It is easy to cut to fit around piping or projections.

DESCRIPTION

Armstrong Armaflex II Sheet Insulation is a flexible, foamed plastic material incorporating the three most desirable properties of a low-to-medium temperature insulation: high insulation efficiency, high resistance to water vapour and ease of application. It is particularly adaptable to insulating of large tanks of all shapes, ductwork, irregular vessels, and oversize piping.

Armaflex II Sheets may be applied with full adhesive coverage to metal surfaces that will operate as high as 82°C (180°F). When used within recommended usage ranges, Armaflex II Sheet thicknesses have been calculated to prevent condensation on cold surfaces. Temperatures below freezing point may require application of the sheet in multiple layers.

When used for pipe insulation, with adhesive at joints only, Armaflex II Sheets can be applied to lines that will operate as high as 104°C (220°F).

ADVANTAGES

High Insulating Efficiency — Armaflex II Sheets have a low thermal conductivity of 0.26 Btu/hr. sq.ft. (F/in) at 70°F mean temperature. Because this material resists deterioration, efficiency remains high.

High Resistance to Water Vapour and Air Transmission — Uniformly sized closed cell structure seals out air and moisture.

Fast, Easy Application — Armaflex II Sheets can be applied directly to clean, dry metal surfaces with Armstrong 520 Adhesive. Conventional mechanical supports are unnecessary. High resistance to water vapour and air transmission eliminates the need for a separate vapour barrier, but outdoor installations should be protected with a vinyl lacquer type coating.

ARMAFLEX II SHEET INSULATION SHOULD ALWAYS BE APPLIED WITH THE SMOOTH OR SKIN SIDE OUT.

3

ARMAFLEX II SHEET			
CAT. NO.	THICKNESS		SHEET SIZE
	mm	ins.	
21071	6	1/4"	1.2 mm x 2.9 mm Approx. 4 ft. x 3 ft.
21072	9	3/8"	
21073	13	1/2"	
21074	19	3/4"	
21075	25	1"	

ARMAFLEX PIPE INSULATION

Similar in specification to Armaflex II Sheet Insulation, Armaflex Pipe Insulation is flexible for fast easy applications. Can be slipped on in tubular form before piping is in place or slit and snapped over piping already installed.

Supplied in 2 Metre Lengths.

INSIDE DIAMETER		9 mm (3/8") WALL	13 mm (1/2") WALL	19 mm (3/4") WALL
mm	ins.	CAT. NO.	CAT. NO.	CAT. NO.
10	3/8"	210151	210176	210201
12	1/2"	210152	210177	210202
15	5/8"	210153	210178	210203
20	3/4"	210154	210179	210204
22	7/8"	210155	210180	210205
25	1"	210156	210181	210206
27	1-1/16"	210157	210182	210207
28	1-1/8"	210158	210183	210208
32	1-1/4"	210159	210184	210209
35	1-3/8"	210160	210185	210210
40	1-1/2"	210161	210186	210211
42	1-5/8"	210162	210187	210212
48	1-15/16"	210163	210188	210213
51	2"	210164	210189	210214
54	2-1/8"	210165	210190	210215
60	2-3/8"	210166	210191	210216
67	2-5/8"	210167	210192	210217
76	3"	210169	210194	210219
80	3-3/16"	—	210198	—
89	3-1/2"	—	210195	210220
101	4"	—	210196	210221
114	4-1/2"	—	210197	210222

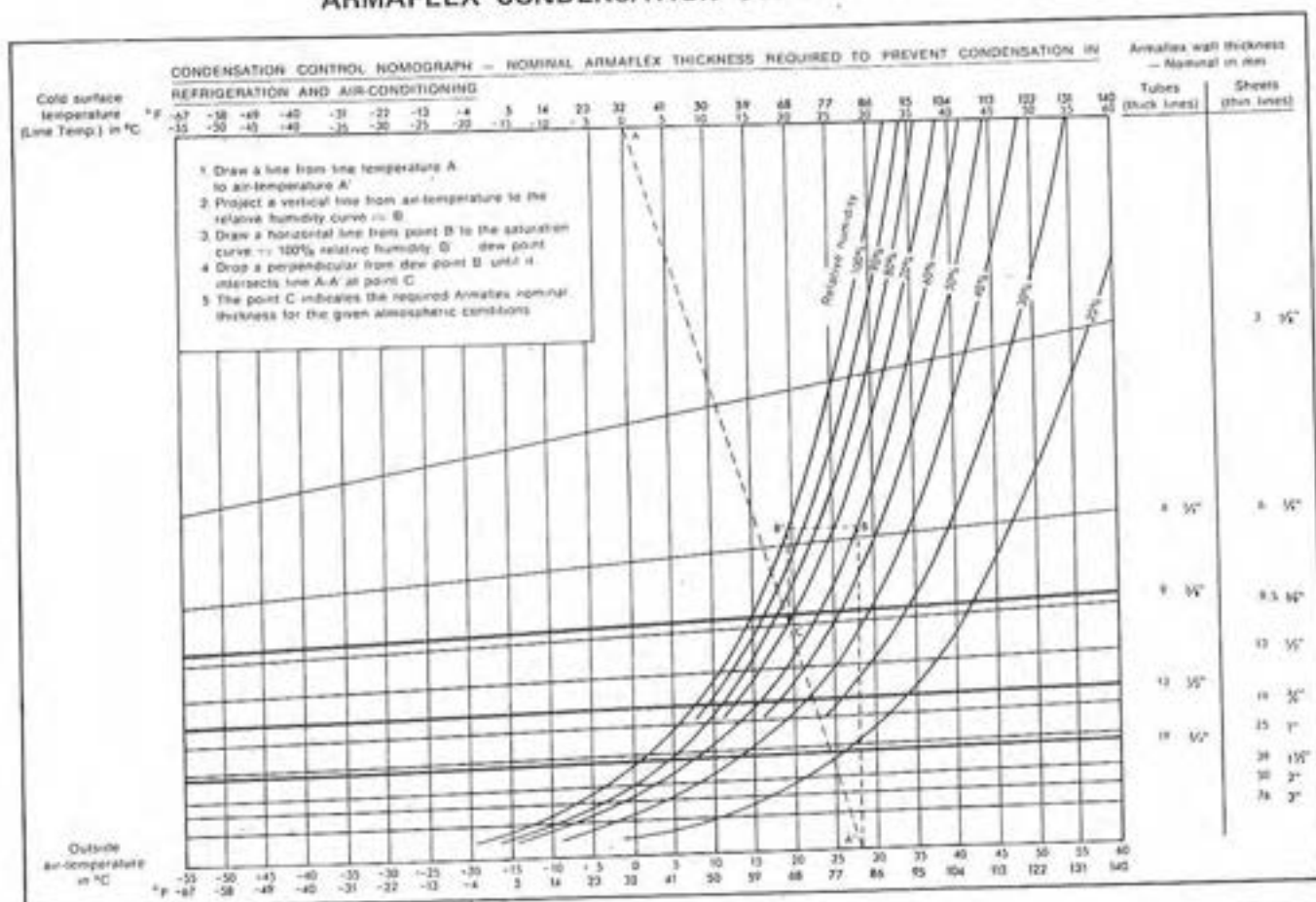
FOR ARMSTRONG CONDENSATION CONTROL NOMOGRAPH — Refer Page 210-b
 FOR CORRESPONDING SIZES OF COPPER AND IRON PIPES — Refer Page 210-b
 FOR ARMSTRONG 520 ADHESIVE AND INSULATING TAPE — Refer Page 210-c

YOUR ONE STOP SOURCE FOR ACPAR PARTS

ARMAFLEX INSULATION

TECHNICAL DATA

ARMAFLEX CONDENSATION CONTROL NOMOGRAPH



CORRESPONDING SIZES OF COPPER TUBE & IRON PIPE FOR ARMAFLEX PIPE INSULATION											
ARMAFLEX PIPE SIZE I.D.		TUBING AND PIPE SIZE				ARMAFLEX PIPE SIZE I.D.		TUBING AND PIPE SIZE			
		COPPER TUBE		IRON PIPE				COPPER TUBE		IRON PIPE	
		O.D. TUBE		NOM. BORE				O.D. TUBE		NOM. BORE	
mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.
10	3/8"	10	3/8"	—	—	42	1-5/8"	—	—	32	1-1/4"
12	1/2"	12	1/2"	—	—	48	1-15/16"	—	—	40	1-1/2"
16	5/8"	16	5/8"	—	—	51	2"	51	2"	—	—
20	3/4"	20	3/4"	—	—	54	2-1/8"	—	—	—	—
22	7/8"	22	7/8"	15	1/2"	60	2-3/8"	—	—	50	2"
25	1"	25	1"	—	—	67	2-5/8"	—	—	—	—
27	1-1/16"	—	—	20	3/4"	76	3"	—	—	65	2-1/2"
28	1-1/8"	—	—	—	—	80	3-3/16"	—	—	—	—
32	1-1/4"	32	1-1/4"	—	—	89	3-1/2"	—	—	80	3"
35	1-3/8"	—	—	25	1"	101	4"	—	—	—	—
40	1-1/2"	40	1-1/2"	—	—	114	4-1/2"	—	—	100	4"

VIRGINIA VASCOCEL SHEET INSULATION

AN IMPROVED UNICELLULAR INSULATION WITH A NEW LOW K - FACTOR OF 0.23/0.24 AVERAGE AND A WATER VAPOUR TRANSMISSION RATE OF 0.050 PERM.

CAT. NO.	THICKNESS		PART No.	SHEET SIZE ins.
	mm	ins.		
21092	10	3/8"	R780	36" x 48"
21093	12	1/2"	R781	36" x 48"
21094	20	3/4"	R782	36" x 48"

ADHESIVE FOR VASCOCEL SHEET INSULATION — REFER PAGE 210-c

INSULATION TAPE

ARMAFLEX TAPE

Armaflex Insulation Tape is applied by removing release paper as the tape is spirally wrapped around the piping or fittings and pressed firmly in place. Pressure-sensitive adhesive, factory applied to the Armaflex Insulation Tape, adheres firmly and forms a long-lasting bond with metal surfaces.

Thermal conductivity, Btu/hr sq ft (deg F/in.)

75 F mean temperature 0.27

90 F mean temperature 0.276

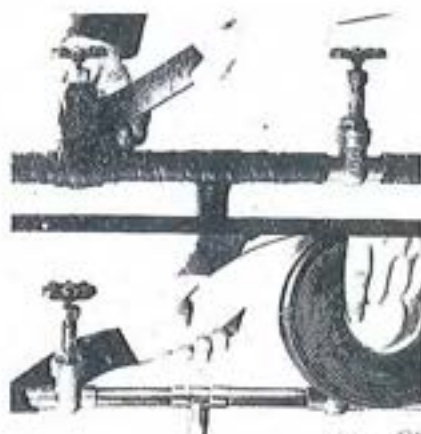
Upper temperature use limit, deg F up to 180

Water vapor permeability, perm-in. 0.1

Water absorption,

28-day immersion, % by volume less than 4

Ozone resistance good



use 210910

CAT. NO. 21089 30 ft. Roll - 1/8" thick x 2" wide - self-adhering



PRESSTITE INSULATION TAPE

Use to wrap expansion valve, thermal sensing bulb, suction lines or other parts to protect from engine heat. Insulates and seals. Stops water drip. Sticks to all metal and rubber parts. Self-adhering.

CAT. NO. 21087 30 ft. Roll - 1/8" thick x 2" wide - No. PT1

VIRGINIA FOAM INSULATION TAPE

A unicellular insulation tape with a K-Factor of 0.26 at 75 degrees F. and water vapor transmission rate of 0.07 perm. An easy to use tape that presents a neat, smooth finish appearance.

CAT. NO. 21088 30 ft. Roll - 1/8" thick x 2" wide - No. K501



BLACK MASTIC TAPE P/N 3841

Used for insulating pipes and fittings where space and/or shape prevent the use of pipe or sheet type insulation.

2" x 1/4"
in 4.5 kg Packs

CAT. NO.
21086

INSULATION ADHESIVE

TEMPFLEX LA6B ADHESIVE

Used to seal all seams and butt joints of Actrol-Flex Pipe Insulation

CAT. NO. 210116 500 ml Can

CAT. NO. 210117 1 Litre Can

CAT. NO. 210118 4 Litre Can



ARMSTRONG 520 ADHESIVE

Used to seal all seams and butt joints of Armaflex Pipe and Sheet Insulation

CAT. NO. 210105 500 ml Tin

CAT. NO. 210106 1 Litre Tin

CAT. NO. 210108 4 Litre Tin

VIRGINIA VASCOCEL ADHESIVE

Used in conjunction with Virginia Vascocel Sheet Insulation

CAT. NO. 210109 1 Pint Can. No. VAP

CAT. NO. 210110 1 Quart Can. No. VAQ

STYRENE FOAM * ADHESIVE

An adhesive for use with Styrene Foam Insulation

CAT. NO. 210113 20 Litre Drum

* Styrene Foam Sheet - Refer Page 232-a

NOTES

GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

CHECK VALVES

NON-CHATTERING CHECK VALVE



CAT. NO.	SIZE	HELDON P/N
----------	------	------------

FLARE CONNECTIONS

2131	1/4"	3300
2132	3/8"	3301
2133	1/2"	3302
2134	5/8"	3303

SOLDER CONNECTIONS

2135	1/4" O.D.	3353
2136	3/8" O.D.	3351
2137	1/2" O.D.	3350
2138	5/8" O.D.	3352

SOLDER CONNECTIONS
WITH COPPER EXTENSIONS

21311	1/4" O.D.	3370
21312	3/8" O.D.	3371
21313	1/2" O.D.	3372
21314	5/8" O.D.	3373

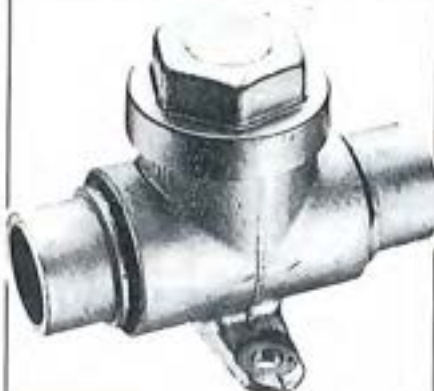
MALE GAS CONNECTIONS
NPT OR BSP

21316	1/4"	3306
21317	3/8"	3305
	1/2"	3307

NON-CHATTERING CHECK VALVE
ANGLE TYPE — TEFLON SEATS
Female Gas Connections — BSP or NPT

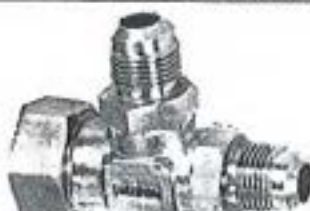
CAT. NO.	SIZE	HELDON P/N
----------	------	------------

21324	1/8"	4232
21325	1/4"	4233
21326	3/8"	4234
21327	1/2"	4235
21328	3/4"	4236

STRAIGHT THROUGH CHECK VALVE
FEMALE SOLDER

CAT. NO.	SIZE	HELDON P/N
----------	------	------------

21375	3/4"	4249
21376	7/8"	4250
21377	1"	4251
21378	1-1/8"	4252
21379	1-3/8"	4253
21380	1-5/8"	4254
21381	2-1/8"	4255

NON-CHATTERING CHECK VALVE
ANGLE TYPE — TEFLON SEATS
MALE FLARE CONNECTIONS

CAT. NO.	SIZE	HELDON P/N
----------	------	------------

21319	1/4"	4200
21320	3/8"	4201
21321	1/2"	4202
21322	5/8"	4203
21323	3/4"	4204

NON-CHATTERING CHECK VALVE
ANGLE TYPE — TEFLON SEATS
Solder Connections with Copper Extensions

CAT. NO.	SIZE	HELDON P/N
----------	------	------------

21330	1/4"	4208
21331	3/8"	4209
21332	1/2"	4210
21333	5/8"	4211
21334	3/4"	4212
21335	7/8"	4213
21336	1"	4214
21337	1-1/8"	4215
21338	1-1/4"	4216
21339	1-3/8"	4217
21340	1-1/2"	4218
21341	1-5/8"	4219
21342	2-1/8"	4220

NON-CHATTERING CHECK VALVE
ANGLE TYPE — TEFLON SEATS
SOLDER CONNECTIONS

CAT. NO.	SIZE	HELDON P/N
----------	------	------------

21362	1/4"	3382
21363	3/8"	3383
21364	1/2"	3384
21365	5/8"	3385
21366	3/4"	3386
21367	7/8"	3387
21368	1"	3388
21369	1-1/8"	3389
21370	1-1/4"	3390
21371	1-3/8"	3391
21373	1-5/8"	3393
21374	2-1/8"	3394



CHATLEFF CHECK VALVES

FEATURES

Positive pressure operation.
Instant action — Non-chattering, even under extremely low flow 3.4 kPa (1/2 psi).
Operates efficiently at either high or low pressures.
Maximum temperature range -268°C to +260°C (-450°F to +500°F).
Hermetically sealed — Operates in all positions.
CONSTRUCTION: Extruded brass throughout with copper extension tubes. The sealing surface is Teflon seated on brass. Each unit is 100% leak tested and flow tested before shipment.

*MODEL CH-1400

Body: Meehanite casting. Seating — Teflon on steel.
Ports: Steel, 2" to 4" I.D. as specified by the user.
Screw-in type sealing on "O" Rings.
Internal Orifice: Total area 4% sq. ins.
Mounting: Vertical (Standard).
Overall Size: 4-7/8" Diam. x 7-13/16".

CAT. NO.	Model No.	Connection Ports In & Out	Internal Orifice Ins.
21344	CH-1	3/8" I.D.	7/16
21345	CH-2	1/2" I.D.	7/16
21346	CH-3	5/8" I.D.	5/8
21347	CH-4	3/4" I.D.	5/8
21348	CH-5	7/8" I.D.	5/8
21349	CH-6	1-1/8" I.D.	15/16
21350	CH-7	1-3/8" I.D.	15/16
21352	CH-1200	1-5/8" O.D.	1-1/2
21356	*CH-1400	2" to 4 1/2" I.D.	

CHECK VALVES

STRAIGHT THROUGH — MALE FLARE

SIZE FLARE	HELDON		HUDSON		CASTEL*		SIZE FLARE
	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	
1/4"	21454	3363	—	—	21476	3110/2	1/4"
5/16"	21455	3364	—	—	—	—	5/16"
3/8"	21456	3365	—	—	21477	3110/3	3/8"
1/2"	21457	3366	—	—	21478	3110/4	1/2"
5/8"	—	—	—	—	21479	3110/5	5/8"
3/4"	—	—	21410	1467	21480	3110/6	3/4"

* Castel Check Valves supplied complete with 2 Flare Nuts.

* Castel Check Valves supplied complete with 2 Flare Nuts.

STRAIGHT THROUGH — FEMALE SOLDER

SIZE O.D.	HUDSON		CASTEL		SIZE O.D.	
	CAT. NO.	P/N	CAT. NO.	P/N		
7/8"	21413	A13735	21481	3120/7	7/8"	
1-1/8"	21414	A13736	21482	3120/9	1-1/8"	
1-3/8"	21415	A13737	21483	3120/11	1-3/8"	
1-5/8"	21416	A13738	21484	3120/13	1-5/8"	
2-1/8"	21417	A13739	21485	3120/17	2-1/8"	
2-5/8"	—	—	21486	3120/21	2-5/8"	

	HUDSON		
	ANGLE — MALE FLARE		
	SIZE FLARE	CAT. NO.	PART No.
	1/4"	2141	1462
	3/8"	2142	1464
	1/2"	2143	1465
	5/8"	2144	1466

	HUDSON		
	ANGLE — FEMALE SOLDER		
	SIZE O.D.	CAT. NO.	PART No.
	1/2"	2148	9003
	5/8"	2149	9004

	HUDSON		
	ANGLE — FEMALE SOLDER		
	SIZE O.D.	CAT. NO.	PART No.
	1-3/8"	21420	A15737
	1-5/8"	21421	A15738
	2-1/8"	21422	A15739

CASTEL CHECK VALVE — EXTENDED ENDS SOLDER CONNECTIONS		
		
SIZE O.D.	CAT. NO.	CASTEL PART No.
1/4"	21487	3130/2
3/8"		3130/3
1/2"		3130/4
5/8"		3130/5
3/4"		3130/6

CHATLEFF

RESTRICTOR CHECK VALVES

CAT. NO.	TYPE	ORIFICE ins.	CAPACITY TONS R22
21451	RCV-125	1/8	Up to 2.5
21452	RCV-187	3/16	2.5 to 7.0



Construction and Specifications

Body — Heavy wall solid drawn brass tube Alloy A.
 Seat — 70/30 brass rod machined to fine limits.
 Ports — Refrigeration quality copper tube.
 Valve Plunger & Needle — Stainless steel 0.303 cold drawn.
 Static Burst Pressure — 17238 kPa (2500 psi).
 Max. Operating Press. — 3448 kPa (500 psi).

Danfoss

CHECK VALVES Type NRV

The Check Valve Type NRV can be fitted at any point in liquid, suction, and hot-gas lines in freezing, refrigeration, and air-conditioning systems for fluorinated refrigerants (R12, R22, R502, etc.). NRV is equipped with a special-type damping piston ensuring silent operation. The valve is also suitable for installation in pipe lines where pulsations may occur, for example, in the pressure

line from a compressor and in pipe line arrangements for reversal of heat pump installations.

NRV cannot be stripped down.

The valve body of the NRV solder design must be wound round with a wet rag during soldering. Solder of a melting point not higher than 620°C (1150°F) should be used.



NRV 6-15

CAT. NO.	Type	Design		Conn.	Code No.	(5) Flow Factor		(1) P.D. kPa (PSI)	Temp. of medium °C (°F)	Max. Test pressure kPa (psig)
						kv	Cv			
21458	NRV 6	straight - way	flare	1/4	20-1001	0.56	0.54	6.9	-50 to +100	2758
21459	NRV 10			3/8	20-1002	1.38	1.33	(1)		
21460	NRV 12			1/2	20-1003	1.97	1.90	4.8		
21461	NRV 15			5/8	20-1004	3.60	3.48	(0.7)		
21463	NRV 10S			3/8	20-1011	1.38	1.33	6.9 (1)		
21464	NRV 12S	angle- way	Solder	1/2	20-1012	1.97	1.90	4.8	(-58 to +212)	(400)
21465	NRV 15S			5/8	20-1013	3.60	3.48	(0.7)		
21466	NRV 22S			7/8	20-1020	8.50	8.22	4.1		
21467	NRV 28S			1-1/8	20-1021	19.0	18.38	(0.6)		
21468	NRV 35S			1-3/8	20-1022	29.0	28.05			



NRV 6S-15S



NRV 22S-35S

Type	(2) Rated liquid capacity tons (TR)			(3) Rated suction vapour cap. tons (TR)			(4) Rated hot-gas capacity cu. ft/h		
	R 12	R 22	R 502	R 12	R 22	R 502	R 12	R 22	R 502
NRV 6	1.7	2.2	1.5	0.2	0.2	0.2	30.7	27.5	23.7
NRV 10	4.1	5.3	3.6	0.4	0.6	0.5	75.9	67.8	58.2
NRV 12	5.8	7.6	5.3	0.5	0.7	0.6	108	96.7	83.0
NRV 15	10.6	13.9	9.6	0.8	1.2	1.0	198	178	152
NRV 22	25.0	32.8	22.7	1.9	2.9	2.4	466	420	360
NRV 28	55.9	73.5	50.6	4.4	6.5	5.5	1045	935	801
NRV 35	85.4	113	77.5	6.6	9.9	8.3	1596	1430	1221

Type NRVA

The Check Valve Type NRVA is suitable for industrial freezing, refrigeration, and air-conditioning systems for use with both fluorinated refrigerants (R12, R22, R502, etc.) and Ammonia. NRVA has a special type damping piston ensuring silent operation and making the valves suitable for use in pipe lines where pulsations may occur. The check valve can be used in liquid, suction, and hot-gas lines.

Type NRVA has been designed in such a way as to allow easy stripping-down for service.

The individual parts of the valve are retained in the valve body by bayonet locks.

The spring and the sliding surfaces of the piston are positioned in such a way that they are not affected by the refrigerant flow through the valve.



NRVA 65



NRVA 32

CAT. NO.	Type	Weld flange Conn. ins.	Code No.	(5) Flow Factor		(1) P.D. kPa (PSI)	Temp. of medium °C (°F)	Max. Test pressure kPa (psig)
				kv	Cv			
21469	NRVA 15	1/2	20-2000	5	4.8	6.9 (1)	-60 to +140	2758
21470	NRVA 20	3/4	20-2001	6	5.8			
21471	NRVA 25	1	20-2002	19	18.4			
21472	NRVA 32	1-1/4	20-2003	20	19.3			
21473	NRVA 40	1-1/2	20-2004	44	42.6			
21474	NRVA 50	2	20-2005	44	42.6			
21475	NRVA 65	2-1/2	20-2006	75	72.6		+284	

Type	(3) Rated liquid capacity tons (TR)				(3) Rated suction-vapour capacity tons (TR)				(4) Rated hot-gas capacity cu. ft/h			
	R 717 (NH ₃)	R 12	R 22	R 502	R 717 (NH ₃)	R 12	R 22	R 502	R 717 (NH ₃)	R 12	R 22	R 502
NRVA 15	129	21	28	19	7.6	1.9	2.8	2.4	971	388	353	300
NRVA 20	150	25	32	21	8.9	2.2	3.3	2.8	1126	452	409	349
NRVA 25	477	78	102	71	28	6.9	10.4	8.8	3565	1433	1303	1108
NRVA 32	626	103	134	93	37	9.0	13.7	11.6	4695	1885	1712	1458
NRVA 40	1290	212	278	192	76	19	28	24	9708	3883	3530	3036
NRVA 50												
NRVA 65	2195	361	473	326	130	32	48	41	16485	6601	6001	5154

(1) P.D. = the minimum pressure difference at which the valve is completely open.

(2) Evap. temp. -10°C (+14°F), Liquid temp. +25°C (+77°F) and P.D. 6.9kPa (1 PSI).

(3) Liquid temp. +25°C (+77°F), P.D. 6.9kPa (1PSI) for NRV 6-10 and 4.8kPa (0.7PSI) for NRV 12-35.

(4) Cond. temp. +25°C (+77°F), Hot Gas temp. +60°C (+140°F) and P.D. 6.9 kPa (1 PSI).

(5) kv factor is the water flow in m³/h at a pressure drop across the valve of 100 kPa (14.5 PSI)

Cv factor is the water flow in Imperial gal/min at a pressure drop across the valve of 6.9 kPa (1 PSI).



NRVA 15

CHECK VALVES

APPLICATION & SELECTION GUIDE

Type	Features	Typical Applications
CK-1	Piston type. Manual opening stem.	1. Slow speed compr. disch. lines. 2. Liquid lines. 3. Suction lines down to -30°C (-25°F). 4. For horizontal lines only.
CK-3	Spring loaded. Teflon seat.	1. Hot gas lines from pan to evaporator. 2. Liquid lines. 3. Valve mounts in any position.
CK-4A	Light spring loaded. Corrosion resistant, lapped metal seats. Flanged in-line.	1. Liquid lines. 2. High speed compr. disch. lines, (Not recommended for slow speed compr. disch. lines). 3. Pump discharge Lines. 4. Suction lines down to -55°C (-60°F). 5. Hot gas lines from pan to evaporator. 6. Valve mounts in any position.

SPECIFICATIONS: CK-1 — CK-3 — CK4A

TYPE	BODY MATERIAL	SEAT MATERIAL	FLUID TEMP. LIMITS	DESIGN PRESS. (SWP)	STRAINER
CK-1	Semi-Steel	Teflon (20-32) Semi-Steel (40-100)	-30°C to 105°C (-25°F to 220°F)	2069kPa (300psig)	Available See Page 121-c
CK-3	Steel	Teflon	"	"	"
CK4A	Steel (13-32) Ductile Iron (50-200)	Stainless Steel	-55°C to 105°C (-60°F to 220°F)	2069kPa (300psig)	Available See Page 121-c

CK-1



Cat. No.	Type	Port Size		Conn. Weld Flg.	Flow Coeff. Cv
		mm	ins.		
21426	CK-1	20	3/4	3/4	9.5
21427	CK-1	25	1	1	10.0
21428	CK-1	32	1-1/4	1-1/4	19.0
21428A	CK-1	40	1-5/8	1-1/4	37.0
21429	CK-1	50	2	2	51.0
21430	CK-1	65	2-1/2	2-1/2	82.0
21431	CK-1	75	3	3	120.0
21432	CK-1	100	4	4	200.0
21433	CK-1	125	5	5	285.0
21434	CK-1	150	6	6	400.0

FEATURES

Manual opening stem. Low pressure drop. Gravity closing.
Excellent Discharge Check Valve.
For Suction or liquid as low as -30°C (-25°F).

Use only in horizontal line.

LARGER SIZES AVAILABLE ON APPLICATION.

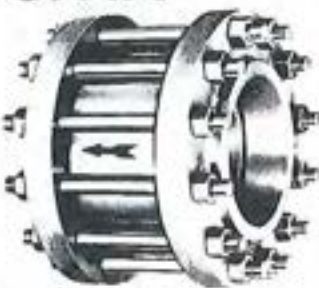
CK-3 IN-LINE CHECK VALVES



Cat. No.	Type	Conn. FPT	Flow Coeff. Cv
21446	CK-3	1/2"	9.5
21447	CK-3	3/4"	10.5
21448	CK-3	1"	11.5

These simple, low cost, screw end Check Valves contain steel seats with teflon discs and have cadmium plated steel bodies. They are spring loaded to ensure positive and tight closing characteristics. They are suitable for liquid and hot gas. They are ideal for branch hot gas lines from a single hot gas solenoid valve to prevent liquid cross-over between evaporators during refrigeration. They are also recommended in the hot gas connection from the drain pan to the evaporator for prevention of drain pan frosting.

CK4A



CAT. NO.	VALVE TYPE	PORT SIZE		CONN. Weld Flg.
		mm	ins.	
21435	CK4A-2	13	1/2	1/2"
21436	CK4A-3	20	3/4	3/4"
21437	CK4A-4	25	1	1"
21438	CK4A-6	32	1 1/4	1 1/4"
21439	CK4A-8	50	2	2"
21440	CK4A-9	65	2 1/2	2 1/2"
21441	CK4A-10	75	3	3"
21442	CK4A-16	100	4	4"
21443	CK4A-20	125	5	5"
21444	CK4A-24	150	6	6"
21445	CK4A-32	200	8	8"

*ANSI 300 lb. Slip-on Weld Neck Flange.

FEATURES

Installs in any position. Low pressure drop.
Spring closing. Light weight — Compact.
In-Line Flanged
For Liquid, Suction, hot gas or oil.
Lapped metal to metal seat.
Can be close-coupled to outlet of R/S Control Valves.

CK4A CHECK VALVE CAPACITIES IN EVAPORATOR TONS*															
Refrig.	CONDITIONS		PRESSURE		CK4A PORT SIZE										
	°F	Eqv. °C/kPa	DROP		1/2"	3/4"	1"	1 1/4"	2"	2 1/2"	3"	4"	5"	6"	8"
	psig	kPa	psi	kPa	EVAPORATOR TONS†										
R12	110°F Liquid	43°C	6.75	5.2	6.60	14.0	25.9	37.9	50.0	140	220	410	550	890	1500
	20°F Suction (110°F Liquid)	-7°C	10	69	24.50	50.0	92.0	130.0	210.0	480	770	1400	1900	3100	5400
	57°F Sat. (20°F Exp.)	14°C	6.75	5.2	6.70	1.5	2.7	3.8	5.7	11	24	44	59	90	160
	110°F Liquid	43°C	6.75	5.2	1.25	2.5	4.6	6.7	10.0	24	39	74	98	140	270
	110°F Liquid	43°C	10	69	4.30	8.9	16.0	24.0	38.0	88	140	260	350	570	990
R22	110°F Liquid	43°C	6.75	5.2	8.60	18.0	32.0	48.0	72.0	180	280	530	710	1200	2000
	110°F Liquid	43°C	10	69	31.20	63.0	110.0	160.0	240.0	600	1100	2000	2700	4300	7400
	-15°F Suction (110°F Liquid)	-26°C	6.75	5.2	0.68	1.4	2.6	3.8	5.7	14	22	42	56	91	160
	110°F Liquid	43°C	6.75	5.2	1.70	3.5	6.4	9.3	14.0	34	55	100	140	220	380
	110°F Sat. (15°F Exp.)	-26°C	10	69	5.90	11.0	20.0	34.0	50.0	120	200	380	500	810	1400
R502	110°F Liquid	43°C	6.75	5.2	5.70	12.0	22.0	32.0	48.0	120	190	350	470	750	1300
	110°F Liquid	43°C	10	69	21.00	44.0	80.0	120.0	180.0	440	710	1300	1800	2900	5000
	-15°F Suction (110°F Liquid)	-26°C	6.75	5.2	0.55	1.2	2.1	3.1	4.4	11	18	34	45	73	130
	110°F Liquid	43°C	6.75	5.2	1.20	2.5	4.7	6.9	10.0	25	40	76	100	160	280
	110°F Sat. (15°F Exp.)	-26°C	10	69	8.90	17.0	32.0	48.0	72.0	180	300	550	750	1200	2000
R717	110°F Liquid	43°C	6.75	5.2	52.00	110.0	200.0	290.0	440.0	1100	1700	3200	4300	—	—
	110°F Liquid	43°C	10	69	190.00	400.0	720.0	1050.0	1500.0	3800	6200	—	—	—	—
	0°F Suction (86°F Liquid)	-18°C	6.75	5.2	2.40	5.0	9.2	13.0	19.0	50	80	150	200	320	500
	110°F Liquid	43°C	6.75	5.2	5.00	10.0	18.0	26.0	37.0	100	160	300	410	650	1100
	110°F Sat. (15°F Exp.)	-18°C	10	69	18.00	36.0	66.0	100.0	150.0	370	600	1100	1500	2400	4200

* Capacity Conversion: Tons x 3.517 = kW — kW x 0.28433 = Tons

Liquid Capacities based on -5°C (23°F) liquid, 5.2 kPa (0.75 psi) pressure drop. Correction factors for other commonly used temperatures are near 1.0 and may be neglected.

Discharge Gas Capacities based on 1069 kPa and 100°C (155 psig and 210°F). Nominal capacity ranges are based on pressure drop range of approx. 13.8 to 34.5 kPa (2 to 5 psi).

Do not oversize; select for pressure drop at or above 13.8 kPa (2 psi).

Suction Gas Capacities based on 5.2 kPa (0.75 psi) pressure drop.

Note: For CK-4A Valve sizes 1/2" to 4", pressure drop to open is 5.2 kPa (0.75 psi). For sizes 5" to 8" pressure drop to open is 4.1 kPa (0.6 psi).

Type CK-2 Condenser Gas Powered Solenoid Valve may also be used as a Check Valve — Refer Page 121-a

NOTES

3

FAST SERVICE

AS REAL SPECIALISTS IN REFRIGERATION, AIR CONDITIONING AND HEATING, WE STOCK THOUSANDS OF DIFFERENT PARTS, TOOLS AND SUPPLIES. WE BELIEVE THIS IS ONE OF THE MOST COMPLETE ASSORTMENT IN THE INDUSTRY. THIS LARGE INVENTORY, PLUS AN EXPERIENCED ORGANIZATION AND A MODERN STREAMLINED ORDER SYSTEM, ALWAYS ASSURES YOU OF FAST BUT CAREFUL SERVICE. WE DESPATCH OVER 90% OF ALL ORDERS ON THE DAY THEY ARE RECEIVED.

HENRY PRESSURE RELIEF VALVES

Type 523
Relief ValveType 524
Relief Valve

DESIGN FEATURES :

1. Positive Pressure Relief.
2. Consistent operation at marked pressure setting.
3. Excellent reseating characteristics.
4. A special process reduces valve seat "stickage" to the absolute minimum.
5. Valve stem properly guided for minimum friction.
6. Suitable for Refrigerants 12, 22, 500 and 502.
7. Factory sealed.

Whenever conditions permit, it is advisable to have the relief valve pressure setting (which must not exceed the design working pressure of the vessel) at least 25 percent higher than the normal maximum operating pressure for the refrigerant used.

STRAIGHT-THRU BRASS BODY - FOR R12, R22, R500, R502.

CAT.NO.	MODEL	CONNECTIONS		CAPACITY - grams air/sec. (pounds air/min.)			
				Standard Pressure Settings kPa (PSI)			
		INLET	OUTLET	1241 (180)	1620 (235)	2069 (300)	2413 (350)
21511	5231	3/8" MPT	3/8" FL.			72.6 (9.6)	84.7 (11.2)
21512	5231A	3/8" MPT	1/2" FL.	77.9 (10.3)	99.8 (13.2)	126.3 (16.7)	145.9 (19.3)
21513	5232	1/2" MPT	5/8" FL.		145.2 (19.2)	183.0 (24.2)	212.4 (28.1)
21518	5242 - 3/4	3/4" MPT	3/4" FPT		214.7 (28.4)	271.4 (35.9)	314.5 (41.6)
21519	5244 - 1	1" MPT	1" FPT		382.5 (50.6)	482.3 (63.8)	559.4 (74.0)

ANGLE PRESSURE RELIEF VALVE - FOR AMMONIA

CAT.NO.	MODEL	CONNECTIONS		CAPACITY g. air/sec. (lbs. air/min)	
				Std. Press. Settings kPa (PSI)	
		INLET	OUTLET	1034 (150)	2069 (300)
21526	560 - A	1/2" FPT	3/4" FPT	85.4 (11.3)	164.8 (21.8)
21528	570 - A	3/4" FPT	1" FPT	117.9 (15.6)	226.0 (29.9)
21530	580 - A	1" FPT	1-1/4" FPT	136.8 (18.1)	263.1 (34.8)

3 - WAY DUAL SHUT-OFF VALVES - FOR R12, R22, R500, R502, R717 (AMMONIA)

For Dual Relief Valves and Drier By-Pass Installations or Applications requiring simultaneous opening of one line and closing of another.

Three-Way Dual Shut-off Valve Inlets are shown at the bottom of the illustration. Tight shut-off can be obtained at either extreme of stem position, closing off either the left or right outlet port. When the valve stem is in an intermediate position, the flow is through both outlet ports.

A dual relief valve installation consists of one three-way shut-off valve and two relief valves so arranged that both relief valves cannot be shut off from the protected pressure vessel at the same time. This permits safe removal of either relief valve for repair or replacement, while the vessel is protected and under pressure. EACH relief valve must have sufficient capacity to provide the necessary discharge flow when used alone.

The design of this Three-Way Valve provides full discharge area through the valve regardless of stem position, assuring maximum protection. Furthermore this design provides for convenient parallel mounting of the two relief valves and fulfills Australian Code requirements.

Pressure vessels greater than 0.3m³ (10.5 c.ft.) internal volume require a Dual Relief Valve assembly consisting of:-

3-Way Dual Shut-off Valve with two (2) parallel Relief Valves, each Relief Valve having sufficient capacity when used alone.

Type 545
Relief Valve

Australian Government Dept. of Housing and Construction - Quote "Specifications" - Pressure relief devices fitted on pressure vessels in refrigeration systems containing more than 45kg (99 lbs.) of refrigerant shall be fitted with pressure relief valves incorporating a rupture disc in the outlet. Relief valves shall be equal to Henry Type 545.

Complete with rupture disc cartridge. For high side to atmosphere discharge. Pressure setting range 1034 to 2413 kPa (150 to 350 PSI).

SIDE INLET -
BOTTOM
OUTLET

Two three-way valves, installed with drier bypass line, permit installation or removal of service drier without air/dirt or moisture entering line.

Type 802-A
Parallel Mounting
DUCTILE IRON VALVEPARALLEL MOUNTING - CAPPED TYPE, BOTTOM INLET
3103kPa (450 PSI) Working Pressure, Maximum Temp. Rating 149°C(300°F)

CAT. NO.	MODEL	SIZE CONNECTIONS	BODY MATERIAL	DIMENSIONS - INCHES				Weight kg. (lbs)
				Inlet Center To ELBOW CENTER	CAP END	INLET FACE TO OUTLET FACES	OUTLET PORT CENTERS	
21524	8021A	1/2" FPT	Ductile Iron	1-7/8	4-5/8	2-7/8	3	1.4(3)
21523	8022A	3/4" FPT	Ductile Iron	2-5/16	5-1/8	3-3/8	3-5/8	2.0(4 1/2)
21525	8022A-B	1" FPT	Ductile Iron	2-3/8	6-1/2	3-1/2	4-3/16	2.7(6)

RELIEF VALVE - Combination Diaphragm and Rupture Disc,
Forged Brass Body For R12, R22, R500, R502.

DOUBLE PROTECTION-FOR MAXIMUM SAFETY. An exclusive Henry design with built-in replaceable rupture disc cartridge in outlet port. Provides additional protection against loss of refrigerant.

CAT.NO.	MODEL	SIZE CONNECTIONS		DIMENSIONS - INCHES			WEIGHT kg. (lbs)
				CENTER TO FACE SIDE	TO BOTTOM	OVER-ALL HEIGHT	
21547	5454	1/2" MPT	5/8" Flare	2	2-3/4	6-9/16	.85 (1-7/8)
21550	5551	A replacement disc cartridge for Model No. 5454 Relief Valve.					

IMPORTANT: Orders must specify valve pressure setting; refrigerant; also rupture disc bursting pressure and operating temperature. RUPTURE PRESSURES - 1034 to 2413kPa (150 to 350 PSI). Unless otherwise specified the bursting pressure for the rupture disc will be furnished at the same pressure setting as the relief valve and set at 22.2°C (72°F) our standard setting temperature.

STANDARD : Pressure Relief Valves are designed to satisfy S.A.A. Refrigeration Code 1677 - 1974

SINGLE—STRAIGHT THROUGH



SINGLE—ELBOW



DUAL



Cat. No.	Inlet MBSP.	Outlet M.Flare	Orifice mm	Part No.
21630	1/4"	3/8"	5	3000
21632	3/8"	1/2"	5	3002
21633	1/2"	5/8"	7	3003
21635	3/4"	3/4"	10	3005
—	1"	1-1/4"	15.5	3006
—	M.P.T.	M.P.T.		

Cat. No.	Inlet MBSP.	Outlet	Orifice mm	Part No.
—	1/8"	Plain	5	3007

Cat. No.	Inlet FBSP.	Outlet FBSP.	Relief Valves	Part No.
—	1/2"	3/8"	2x30003	3020

STANDARD PRESSURE SETTINGS		OTHER PRESSURE SETTINGS AVAILABLE		PRESSURE VESSEL DESIGNATION	PRESSURE VESSEL DESIGNATION OR TYPE
MPa	PSIG	MPa	PSIG	CB3 (OLD CODE)	AS1677 (NEW CODE)
0.7	101				R12 Low Side
		1.0	145		R12 High Side — Water Cooled
		1.2	174		R22 Low Side
		1.3	188		R502 Low Side
		1.4	203		R12 High Side — Air Cooled
		1.6	232		R22 High Side — Water Cooled
1.8	261				R502 High Side — Water Cooled
2.0	290			R22 High Side	
2.2	319			R502 High Side	
		2.3	333		R22 High Side — Air Cooled
		2.4	348		R502 High Side — Air Cooled
2.7	391				Terry Vessels
2.78	398				Kelvinator Vessels
3.0	433				Terry Vessels

SELECTION OF PRESSURE RELIEF VALVES

With the application of the Unfired Pressure Vessel Code AS1210 to the Air Conditioning and Refrigeration Industry, it has become necessary for pressure relief valves to be fitted to all pressure vessels incorporated in these systems.

The following Table and Graph have been generated to assist in the selection of pressure relief valves. This data has been compiled using Code AS1210, section 8.6 formula $G_a = \frac{29.84 \times 10^6 F A^{0.82}}{L.C. \sqrt{ZK}} \frac{1}{M}$ with the following assumed factors.

Bare uninsulated vessels, compressibility factor of 1 at flowing conditions, cylindrical vessels with semi-ellipsoidal ends, discharge characteristics of R12 refrigerant.

SEQUENCE : Determine outside dimensions of vessel. Apply these dimensions to Area Factor Table and at the intersection of the two values determine the Area Factor. Apply Area Factor and Vessel design pressure to graph; the curve to the right of the intersection of these values indicates the correct pressure relief valve selection.

NOTE : Where intersection point falls between curves - selection should always be made to the right of the point.

AREA FACTOR TABLE

1/2" OUTSIDE DIAMETER OF VESSEL - METRE

	.102	.120	.132	.150	.173	.203	.236	.273	.324	
.25	.14	.16	.18	.20	.22	.24	.26	.28	.30	30"
.40	.20	.23	.25	.27	.29	.31	.33	.35	.37	36"
.45	.22	.25	.27	.29	.31	.33	.35	.37	.39	38"
.50	.24	.27	.29	.31	.33	.35	.37	.39	.41	40"
1.01	.41	.45	.47	.50	.53	.55	.57	.60	.62	48"
1.14	.45	.51	.53	.57	.60	.63	.65	.68	.70	48"
1.22	.47	.54	.56	.61	.64	.67	.70	.73	.75	48"
1.52	.56	.65	.67	.73	.76	.80	.83	.86	.89	60"
1.61	.65	.75	.77	.84	.87	.91	.94	.97	.1.00	72"
1.93	.66	.78	.80	.88	.91	.95	.98	1.01	1.04	72"
2.14	.74	.85	.87	.96	.99	1.03	1.06	1.10	1.13	84"
2.44	.83	.96	.98	1.08	1.11	1.15	1.18	1.22	1.25	96"
2.74	.91	1.04	1.06	1.17	1.20	1.24	1.27	1.31	1.34	108"
	4"	6-3/4"	6"	8"	10-3/4"	10"	12-3/4"	12"	14-3/4"	

OUTSIDE DIAMETER - INCHES

NOTE: For R22 Refrigerant Area Factor may be reduced by 20%

EXAMPLE

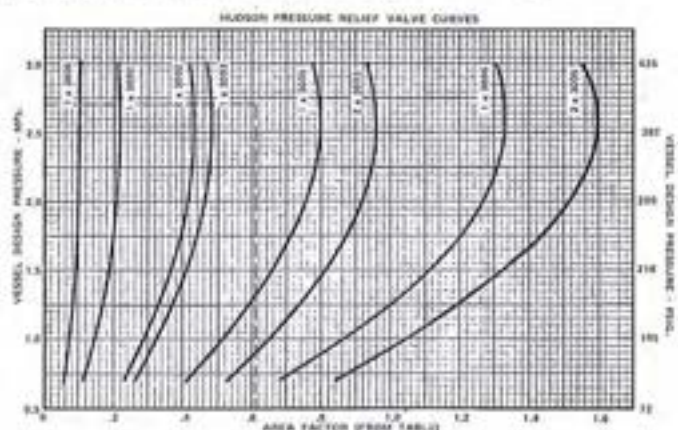


VESSEL OUTSIDE DIAMETER 0.152m (6") D
VESSEL OVERALL LENGTH 1.22m (48") L
DESIGN PRESSURE OF VESSEL 2.7MPa (392 psig)
FROM TABLE AREA FACTOR = .61

The intersection of these values falls between Model 3003 & 3005 curves, therefore Model 3005 pressure relief valve is required.

When ordering pressure relief valves quote Catalogue No., Model No. and pressure setting required, e.g. 3005/2.7.

Pressure selection should be guided by design pressure stamped on vessel information plate.



NOTES

[illegible]

FIGURE THE ODDS

BECAUSE WE BELIEVE OUR STOCK IS ONE OF THE LARGEST AND MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY, THE MATHEMATICAL ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACPAR THAN ANYWHERE ELSE.

LIQUID & MOISTURE INDICATORS

DEFINITIONS

LIQUID AND MOISTURE INDICATORS - A combined Liquid Indicator (Sight Glass) and Moisture Indicator.

MOISTURE INDICATORS - A piece of equipment installed in the liquid line of a refrigeration system for the purpose of providing visual indication of the presence of moisture or water in the system. Basically it consists of a transparent port containing a substance reactive by change of colour to the presence and degree of moisture. The function of a moisture indicator is often combined with that of a conventional Liquid Indicator (Sight Glass).

LIQUID INDICATORS also known as **SIGHT GLASSES** - Defined as a fitting installed at those parts of a refrigeration system where it is desirable or essential to be able to check the presence or state of either refrigerant or oil. Depending on where it is installed, it can also be referred to as **INDICATORS, REFRIGERANT LEVEL INDICATORS** or **OIL GAUGE**. When fitted in the liquid line, refrigerant shortage is indicated by the presence of bubbles.

EYE-SPY MOISTURE-LIQUID INDICATOR (AMI SERIES)



SIZE	SINGLE PORT					
	FLARE TYPE				SOLDER TYPE	
	Male Flare x Male Flare		Male Flare x Female Flare		ODF Solder x ODF Solder	
	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N
1/4"	21766	AMI-1MM2	21773	AMI-1FM2	—	—
3/8"	21767	AMI-1MM3	21774	AMI-1FM3	—	—
1/2"	21768	AMI-1MM4	21775	AMI-1FM4	—	—
5/8"	21769	AMI-1MM5	—	—	—	—
7/8"	—	—	—	—	21771	AMI-1SS7
1-1/8"	—	—	—	—	21772	AMI-1SS9

OPERATION AND APPLICATION

The Alco Eye-Spy Moisture-Liquid Indicator was designed to provide an accurate method of determining the moisture content of a refrigeration or air-conditioning system and to also indicate bubbles or flash gas in the system liquid line. Distinct and accurately calibrated colours in the Eye-Spy indicator element and on the colour reference label indicate safe, caution and unsafe system operating conditions. Only one indicator element is required for all common refrigerants. The indicator element is highly sensitive to moisture and will gradually change colour in direct relation to an increase or decrease in the moisture content of the system. The safe, caution and unsafe system operating conditions are then easily determined by matching the element colour with the four colours displayed on the reference label. Refer Chart below.

This colour shift will take place as often as there is a change in the system moisture content.

The time required for a colour shift in the Eye-Spy indicator is dependent upon the individual installation. A minimum period of 12 hours is recommended after installation of the Eye-Spy before attempting to determine the system moisture content.

Eye-Spy's indicator element is chemically engineered for long life and reliability. It is more resistant to damage by free water or motor burnout contaminants than impregnated paper type indicators.

NOTE

The indicator element will indicate an unsafe condition before installation of the Eye-Spy. This is normal and simply reflects the normal room humidity condition. The exclusive fused glass eye-piece in Eye-Spy provides a clear, wide angle view of the liquid refrigerant flow so that bubbles or flash gas are easily seen. This may indicate an insufficient liquid subcooling or some form of restriction in the liquid line.

INSTALLATION

1. The Eye-Spy Moisture-Liquid Indicator may be installed anywhere in the liquid line and in any position. Normally it is installed downstream of the Filter-Drier and immediately ahead of the Thermo expansion valve.
2. Eye-Spy indicators with ODF connections should be disassembled prior to being brazed into the line. The simplified construction and "O" ring seal make it very easy to remove and replace the indicator assembly.
3. The forged brass construction permits the use of any soft solder or commonly used brazing alloys. When soldering or brazing, direct flame away from the Eye-Spy body.
4. Replace the indicator assembly. **CAUTION** : Do not overtighten. This is an "O" ring seal and does not require excessive tightening.

MOISTURE CONTENT COLOR CODE

	LIQUID TEMP (DEG. F)											
	VERY DRY			DRY TO CAUTION			CAUTION TO WET			VERY WET		
	R12	R22	R502	R12	R22	R502	R12	R22	R502	R12	R22	
	PARTS PER MILLION - WATER											
75	1.4	4	2.6	5	15	10	15	45	30	25	75	50
100	2.5	10	5	9	30	18	27	90	54	43	195	90
125	4	16	8	15	60	30	45	180	90	70	300	150

LIQUID & MOISTURE INDICATORS

Heldon

SIZE	FLARE TYPE			
	SINGLE PORT		DOUBLE PORT	
	Male Flare x Male Flare		Male Flare x Male Flare	
	CAT. NO.	P/N	CAT. NO.	P/N
1/4"	2171	7800	—	—
3/8"	2172	7801	—	—
1/2"	2173	7802	—	—
5/8"	2174	7803	2176	7823
3/4"	2175	7804	2177	7824



SOLDER TYPE — SINGLE PORT

SIZE O.D.	CAT. NO.	P/N
1/4"	21710	7810
3/8"	21711	7811
1/2"	21712	7812
5/8"	21713	7813
3/4"	21714	7814
7/8"	21715	7839
1"	21716	7840
1-1/8"	21717	7841
1-1/4"	21718	7842
1-3/8"	21719	7843
1-1/2"	21720	7844
1-5/8"	21721	7845
2"	21722	7846
2-1/8"	21723	7847

DEMOUNTABLE TYPE
WITH ADAPTOR TO SWEAT INTO LINE

SPIGOT SIZE	CAT. NO.	PART No.
7/8"	21725	7850



SOLDER TYPE — SINGLE PORT

BY-PASS INSTALLATION
(in Pre-formed Tubes for By-pass Installation)

SIZE	CAT. NO.	P/N
3/8"	21726	7860



SOLDER TYPE — DOUBLE PORT

Solder x Solder		
SIZE	CAT. NO.	P/N
7/8"	21730	7829
1"	21731	7830
1-1/8"	21732	7831
1-1/4"	21733	7832
1-3/8"	21734	7833
1-1/2"	21735	7834
1-5/8"	21736	7835
2"	21737	7836
2-1/8"	21738	7837



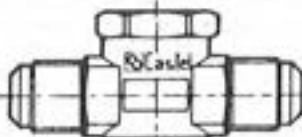
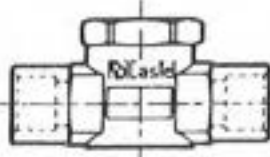
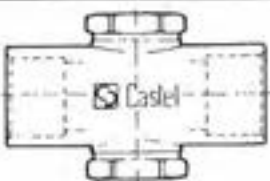
GAS CONNECTION

MALE GAS

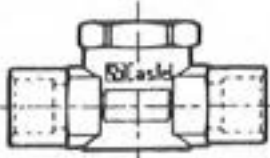
SIZE	CAT. NO.	P/N
1/8"	21742	7870
1/4"	21743	7871
3/8"	21744	7892
1/2"	21745	7873
3/4"	21746	7874
1"	21747	7875
1-1/4"	21748	7876
1-1/2"	21749	7877
2"	21750	7878

MOISTURE CONTENT P P M									
LINE TEMP.	REFRIGERANT 11 & 12			REFRIGERANT 22 & 40			REFRIGERANT 500		
	24°C (75°F)	38°C (100°F)	52°C (125°F)	24°C (75°F)	38°C (100°F)	52°C (125°F)	24°C (75°F)	38°C (100°F)	52°C (125°F)
Dry ●	BELOW	BELOW	BELOW	BELOW	BELOW	BELOW	BELOW	BELOW	BELOW
Green ●	5	10	20	30	45	60	40	60	100
Caution ●									
Chartreuse ●	ABOVE	ABOVE	ABOVE	ABOVE	ABOVE	ABOVE	ABOVE	ABOVE	ABOVE
Wet ●	5	10	20	30	45	60	40	60	100
Yellow ●									

Castel LIQUID & MOISTURE INDICATORS

 Supplied with 2 Flare Nuts	MALE FLARE TYPE - SINGLE PORT		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	217101	3710/22
	3/8"	217102	3710/33
	1/2"	217103	3710/44
	5/8"	217104	3710/55
	3/4"	217105	3710/66
	FEMALE SOLDER TYPE - SINGLE PORT		
	SIZE - O.D. TUBE	CAT. NO.	PART No.
	1/4"	217126	3720/2
	3/8"	217127	3720/3
	1/2"	217128	3720/4
	5/8"	217129	3720/5
	3/4"	217130	3720/6
	7/8"	217131	3720/7
	1-1/8"	217132	3720/9
 Supplied with 1 Flare Nut	FEMALE TO MALE FLARE TYPE - SINGLE PORT		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	217110	3750/22
	3/8"	217111	3750/33
	1/2"	217112	3750/44
	5/8"	217113	3750/55
	3/4"		3750/66
	FEMALE SOLDER TYPE - DOUBLE PORT		
	SIZE - O.D. TUBE	CAT. NO.	PART No.
	1-1/8"	217123	3730/9
	1-3/8"	217124	3730/11
	1-5/8"	217125	3730/13

Castel LIQUID INDICATORS - SIGHT GLASSES

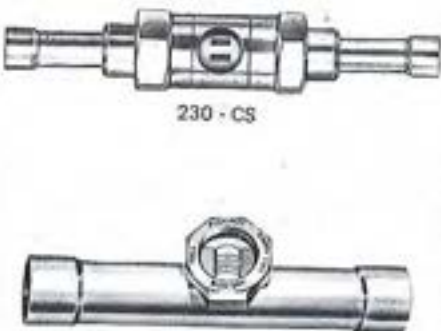
 Supplied with 2 Flare Nuts	MALE FLARE TYPE		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	217115	3610/22
	3/8"	217116	3610/33
	1/2"	217117	3610/44
	5/8"	217118	3610/55
	3/4"	217119	3610/66
	FEMALE SOLDER TYPE		
	SIZE - O.D. TUBE	CAT. NO.	PART No.
	1/4"	217133	3620/2
	3/8"	217134	3620/3
	1/2"	217135	3620/4
	5/8"	217136	3620/5
	3/4"	217137	3620/6
	7/8"	217138	3620/7
	1-1/8"	217139	3620/9
 Supplied with 1 Flare Nut	FEMALE TO MALE FLARE TYPE		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	217146	3650/22
	3/8"	217147	3650/33
	1/2"	217148	3650/44
	5/8"	217149	3650/55
	3/4"	217150	3650/66

Working Pressure (S.W.P.): 3450 kPa (500 psig)

Note: Flare Nuts, where applicable, are supplied separately and not mounted on the Indicators.

LIQUID & MOISTURE INDICATORS IMPERIAL

	MALE FLARE TYPE - SINGLE PORT		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	21751	230 - C - 04
	3/8"	21752	230 - C - 06
	1/2"	21753	230 - C - 08
	5/8"	21754	230 - C - 10

 230 - CS 475 - CS	FEMALE SOLDER TYPE - SINGLE PORT		
	SIZE - O.D. TUBE	CAT. NO.	PART No.
	1/4"	21755	230 - CS - 04
	3/8"	21756	230 - CS - 06
	1/2"	21757	230 - CS - 08
	5/8"	21758	230 - CS - 10
	3/4"	21759	475 - CS - 12
	7/8"	21760	475 - CS - 14
	1-1/8"	21761	475 - CS - 18
	1-3/8"	21762	475 - CS - 22
	1-5/8"	21763	475 - CS - 26
	2-1/8"	21764	475 - CS - 34

IMPERIAL TYPES 230-C — 230-CS

Color Coded DUBL-CHEK® Liquid and Moisture Indicators.
Sensing element tells at a glance if there is moisture in the refrigeration system—also shows whether the system is fully charged.

Refrigerant	Liquid Line Temperature	Moisture Content in PPM		
		Green (Dry)	Chartreuse (caution)	Yellow (wet)
R12	75	Below 5	5 to 15	Above 15
	100	Below 10	10 to 30	Above 30
	125	Below 20	20 to 50	Above 50
R502	75	Below 10	10 to 45	Above 45
	100	Below 20	20 to 65	Above 65
	125	Below 30	30 to 110	Above 110
R22	75	Below 30	30 to 90	Above 90
	100	Below 45	45 to 130	Above 130
	125	Below 60	60 to 180	Above 180

SENSING ELEMENT
IN SIGHT GLASS
APPEARS:



FULL
Clear view
of refrigerant.



LOW
Red lines appear
in sight glass.



**MOISTURE
PRESENT**
Right 1/2 appears
yellow.



DRY
Sensing element
all green.

In determining the approximate liquid line temperature, refer to human body temperature. Put your hand on the line and if it feels cool, use 75°F; if it is body temperature, use 100°F; if it feels hot, use 125°F.

IMPERIAL TYPE 475 - CS

Color Coded Liquid and Moisture Indicator

Color coding appears blue when dry, pink when moisture is present. The word "FULL" appears plainly in black letters on a white background when the system is fully charged. "FULL" disappears when refrigerant is low.

Special "O" ring seals glass to body to assure leak proof performance.

Furnished with snap-in plastic cap to protect indicator.

Pat. No. 2,811,128; Pat. Can. 1959.



FULL
System is
fully charged



EMPTY
System needs
charging

LIQUID & MOISTURE INDICATORS

Danfoss TYPE SGI

Refrigerants

R 12, R 22, R502

Maximum permissible temperature
+60°C (+140°F)

	MALE FLARE TYPE - SINGLE PORT			
	SIZE - FLARE	CAT. NO.	TYPE	CODE NO.
	1/4"	21825	SGI - 6	14 - 0012
	3/8"	21826	SGI - 10	14 - 0016
	1/2"	21827	SGI - 12	14 - 0020
	SOLDER TYPE - SINGLE PORT			
	SIZE - O.D. TUBE	CAT. NO.	TYPE	CODE NO.
	1/4"	21831	SGI - 6S	14 - 0034
	3/8"	21832	SGI - 10S	14 - 0035
	1/2"	21830	SGI - 12S	14 - 0036
	5/8"	21828	SGI - 18S	14 - 0037
	7/8"	21833	SGI - 22S	14 - 0039

All the SGI types are made of hot brass stamping. However, the solder design has copper solder connections. The designs aim at dimensions resulting in a large visual diameter and, at the same time, a minimum pressure drop across the sight glass. SGI is available with straightway connections for flare and solder.

SGI has flats for keeping counter with a spanner during fitting of the flare design. All connections are blanked off when delivered. The glass is fixed in the housing by beading. The teflon seal under the glass ensures the tightness of the joint.

SGR can be obtained with parallel thread or external taper pipe thread.

The moisture indicator (1) in SGI consists of a chemical salt, the colour of which changes according to the moisture content of the refrigerant flow. The colour change is reversible, which means that it is affected both by increases and decreases in the moisture content.

The table below shows the indicator colour with different moisture contents. The values apply to liquid temperatures of from approx. +20°C to approx. +40°C (+70°F to +105°F).

Refrigerant	Moisture content PPM* mg H ₂ O/kg refrigerant		
	green-dry max.	neutral colour	yellow-wet min.
R 12	15	15-25	35
R 22	60	16-125	125
R 502	50	30-65	65

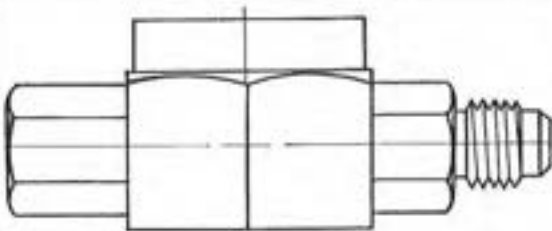
* PPM = parts per million (1/1000 000)

The values indicated under "green-dry" are considered as maximum permissible values to ensure full protection against harmful effects of the moisture content.

When the green colour begins to fade, the colour change has started, and the indicator must be closely watched.

If the colour changes to yellow, the filter drier must be replaced.

VIRGINIA DRY-EYE MOISTURE INDICATORS - for Liquid Line Moisture Detection

	MALE FLARE TO FEMALE FLARE - SINGLE PORT		
	SIZE - FLARE	CAT. NO.	TYPE NO.
	1/4"	21839	LDE 2MF
	3/8"	21840	LDE 3MF
	1/2"	21841	LDE 3MF
	5/8"	21842	LDE 5MF

Virginia Dry-Eye Universal Element Moisture Indicators show at a glance whether a refrigeration or air conditioning system is safely dry or dangerously wet. The indicating element in the centre of the large optically clear sight glass shows blue when dry and pink when wet. The colours are reversible and will change either blue or pink depending on the system condition. The sight glass permits easy viewing of bubbles which may

indicate pressure drop or a low charge in the system. The indicator body is copperplated steel and all non-flare surfaces are coated with a 500 hour Salt Spray paint finish. The glass is fused into the body with the glass surface flush with the top of the body to provide a smooth cleanable surface. A cap is provided to prevent dirt accumulation on the glass. Dimensions conform to ARI Standard 725P.

Liquid and Moisture Indicators

Temperature range — 40 to 160°C tested to 2.79 MPa



CONNECTION SIZE	CAT. NO.	PART No.	OVERALL LENGTH
MALE FLARE — SINGLE PORT WITH DUST COVER			
1/4"	21870	3430	72 mm
3/8"	21871	3431	78 mm
1/2"	21872	3432	84 mm
5/8"	21873	3433	90 mm
3/4"	21874	3434	96 mm
MALE TO FEMALE FLARE — SINGLE PORT WITH DUST COVER			
1/4"	21875	3450	72 mm
3/8"	21876	3451	78 mm
1/2"	21877	3452	84 mm

CONNECTION SIZE	CAT. NO.	PART No.	OVERALL LENGTH
FEMALE SOLDER — SINGLE PORT WITH DUST COVER			
1/4"	21878	3440	52 mm
3/8"	21879	3441	56 mm
1/2"	21880	3442	57 mm
5/8"	21881	3443	55 mm
3/4"	21882	3444	56 mm
7/8"	21883	3445	87 mm
1-1/8"	21884	3446	104 mm
FEMALE SOLDER — DOUBLE PORT WITH DUST COVER			
7/8"	21885	3465	87 mm
1-1/8"	21886	3466	104 mm
1-3/8"	21887	3467	126 mm
1-5/8"	21888	3468	145 mm
2-1/8"	21889	3469	157 mm

Liquid Indicators

Temperature range — 40 to 160°C tested to 2.79 MPa

CONNECTION SIZE	CAT. NO.	PART No.	OVERALL LENGTH
MALE FLARE — SINGLE PORT WITH DUST COVER			
1/4"	21890	3400	72 mm
3/8"	21891	3401	78 mm
1/2"	21892	3402	84 mm
5/8"	21893	3403	90 mm
3/4"	21894	3404	96 mm

CONN. SIZE	CAT. NO.	PART No.	OVERALL LENGTH	CUT OUT LENGTH
FEMALE SOLDER — SINGLE PORT WITH DUST COVER				
1/4"	21895	3410	68 mm	52 mm
3/8"	21896	3411	72 mm	56 mm
1/2"	21897	3412	76 mm	57 mm
5/8"	21898	3413	81 mm	55 mm
3/4"	21899	3414	87 mm	56 mm
7/8"	21900	3415	125 mm	87 mm
1-1/8"	21901	3416	150 mm	104 mm

OIL LEVEL SIGHT GLASS — STEEL MALE BSP PARALLEL



CONNECTION SIZE	CAT. NO.	PART No.
3/4"	218102	3481

REPLACEMENT PARTS

CAT. NO.	PART No.	DESCRIPTION
218106	3400/3	Indicating Element Assembly
218107	3400/6	"O" Ring
218108	3400/5	Dust Cover

LIQUID RECEIVER INDICATOR — STEEL MALE BSP TAPER



CONNECTION SIZE	CAT. NO.	PART No.
1/2"	218103	3490
3/4"	218104	3491
1"	218105	3492

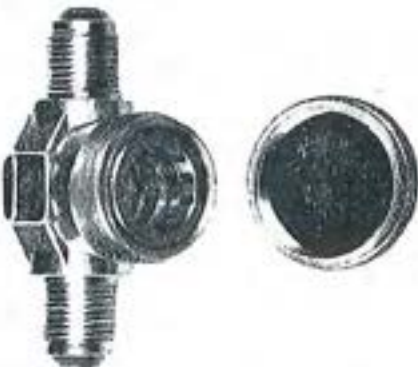
MOISTURE - COLOUR INDICATION IN PPM AT LIQUID LINE SPECIFIC TEMPERATURES

System Refrigerant		R12		R22		R502	
Liquid Line Temperature		24°C	52°C	24°C	52°C	24°C	52°C
System Condition-Indicator Colour		Below 5	Below 15	Below 30	Below 60	Below 10	Below 30
DRY	BLUE	5 - 15	15 - 50	30 - 110	60 - 220	10 - 50	30 - 120
CAUTION	GREY	Above 15	Above 50	Above 110	Above 220	Above 50	Above 120
WET	PINK						

Immediate steps should be taken to protect the system when the moisture indicating element shows "Wet". Good system protection may be obtained by use of a Hudson Filter Drier and Suction Line Filter Drier. The sight glass moisture indicator should normally be installed between a Hudson Ceramic Filter Core Drier and a refrigerant control device.

LIQUID INDICATORS - SIGHT GLASSES

Heldon

	SIGHT GLASS - FLARE TYPE - CAPPED		
	SIZE - FLARE	CAT. NO.	PART No.
	1/4"	2191	3700
	5/16"	2192	3705
	3/8"	2193	3701
	1/2"	2194	3702
	5/8"	2195	3703
	3/4"	2196	3704

	SIGHT GLASS - SOLDER TYPE - COPPER EXTENSIONS		
	SIZE - O.D. TUBE	CAT. NO.	PART No.
	1/4"	21912	3750
	3/8"	21913	3751
	1/2"	21914	3752
	5/8"	21915	3753
	3/4"	21916	3754

	SIGHT GLASS - WITH GAS BOTTOM CONNECTION		
	SIZE BSP or NPT	CAT. NO.	PART No.
	1/4"	2197	3760
	3/8"	2198	3761
	1/2"	2199	3762
	3/4"	21910	3763
	- With adaptor to sweat into line	21911	3764

3

LIQUID LEVEL GAUGES



HENRY LIQUID LEVEL GAUGES - Recommended for use on accumulators, liquid receivers, oil reservoirs, or similar vessels where it is important to keep an accurate liquid level check.

TYPE 502

Gauge Set. Seal cap type. Female pipe thread connections. For all refrigerants, including Ammonia (R717).

Type 502 liquid level gauge valves contain a safety ball check to prevent excessive loss of refrigerant in case the gauge glass is broken while the system is pressurized and the gauge valves are in the open position. High pressure glass tubing protected by metal guard.

ORDERING INFORMATION:

Gauge sets with standard 15" mounting centers will be furnished unless special glass lengths are required. For special lengths orders must specify exact glass lengths required or mounting centers of Gauge Set. Specify whether dimension is exact Glass or Guard Length or mounting centers of Gauge Set.

Recommended maximum working pressures for glass lengths.

1" to 20" 2896kPa (420 PSI)
21" to 30" 2344kPa (340 PSI)
31" to 40" 2000kPa (290 PSI)

For mounting centers greater than 40" it is recommended that multiple gauge sets be used.
Max. temp. rating 66°C (150°F).

PACKED TYPE - CAPPED - FORGED STEEL GAUGE SET -
Plated Finish - complete with glass and slotted steel guard.

CAT. NO.	TYPE	SIZE CONNECTIONS	DIMENSIONS – INCHES			WEIGHT POUNDS
			SIZE GLASS	MOUNTING CENTERS		
				STANDARD	MINIMUM	
21939	5024 (set)	1/2" FPT	1/2 x 13-3/8	15	6-1/8	2-1/4

WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT

NOTES

TELEX FOR FAST SERVICE

TO GIVE OUR CUSTOMERS EVEN FASTER SERVICE WE HAVE INSTALLED TELEX IN MOST OF OUR BRANCHES. IF YOU ARE A TELEX SUBSCRIBER YOU CAN SEND YOUR ORDER DIRECT BY TELEX. TELEX NUMBERS ARE LISTED AT THE FRONT OF THIS CATALOGUE.

NOTES

3

PICK-UP COUNTERS EVERYWHERE

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.



CAT. NO.	VALVE TYPE	SIZE (INS)	TYPE CONN.
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CAT. NO.	VALVE TYPE	SIZE (INS)	TYPE CONN.
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CAT. NO.	VALVE TYPE	SIZE (INS)	TYPE CONN.
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STOP VALVES

AMMONIA

R12-R22-R502

STRAIGHT GLOBE

2211	YKA 11111	1/4-3/8	W.Fl.
2212	"	3/4	"
2213	"	1	"
2214	"	1-1/4	"
2215	"	1-1/2	"
2216	"	2	"
2217	"	2-1/2	"
2218	"	3	"
2219	"	3-1/2	"
2219	"	4	"
22110	"	5	"
22111	"	6	"
22112	"	8	"
22173	YKA 11121	1/4-3/8	W.Fl.
22159	YKA 11113	1/4-3/8	S.V.
22160	"	3/4	"
22161	"	1	"
22162	"	1-1/4	"
22163	"	1-1/2	"
22171	YKA 11123	1/4-3/8	S.V.

STRAIGHT GLOBE

22113	YKF 11111	1/4-3/8	W.Fl.
22114	"	3/4	"
22115	"	1	"
22116	"	1-1/4	"
22117	"	1-1/2	"
22118	"	2	"
22119	"	2-1/2	"
22120	"	3	"
22121	"	3-1/2	"
22121	"	4	"
22122	"	5	"
22123	"	6	"
22124	"	8	"
22174	YKF 11121	1/4-3/8	W.Fl.
22164	YKF 11113	1/4-3/8	S.V.
22165	"	3/4	"
22166	"	1	"
22167	"	1-1/4	"
22168	"	1-1/2	"
22172	YKF 11123	1/4-3/8	S.V.

EXPANSION VALVES

AMMONIA

STRAIGHT GLOBE

221255	YKA 11211	1/4-3/8	W.Fl.
221256	"	3/4	"
221257	"	1	"
221258	"	1-1/4	"
221259	"	1-1/2	"
221260	"	2	"
22181	YKA 11221	1/2	W.Fl.
221237	YKA 11213	1/4-3/8	S.V.
221238	"	3/4	"
221239	"	1	"
221240	"	1-1/4	"
221241	"	1-1/2	"
221242	"	2	"
22179	YKA 11223	1/2	S.V.

RIGHT ANGLE GLOBE

221249	YKA 21211	1/4-3/8	W.Fl.
221250	"	3/4	"
221251	"	1	"
221252	"	1-1/4	"
221253	"	1-1/2	"
221254	"	2	"
22169	YKA 21221	1/4-3/8	W.Fl.
22183	"	1/2	"

RIGHT ANGLE BALL

221123	YKA 22203	1/4x1/4	S.V.
221124	"	3/8x1/4	"
221125	"	1/2x1/4	"
221126	"	3/8	"
221127	"	1/2	"
221128	"	3/4	"
221129	"	1	"
221130	"	1-1/4	"

RIGHT ANGLE GLOBE

22125	YKA 21111	1/4-3/8	W.Fl.
22126	"	3/4	"
22127	"	1	"
22128	"	1-1/4	"
22129	"	1-1/2	"
22130	"	2	"
22131	"	2-1/2	"
22132	"	3	"
22133	"	3-1/2	"
22133	"	4	"
22134	"	5	"
22135	"	6	"
22175	YKA 21121	1/2	W.Fl.
22147	YKA 21113	1/4-3/8	S.V.
22148	"	3/4	"
22151	"	1	"
22152	"	1-1/4	"
22153	"	1-1/2	"
22177	YKA 21123	1/2	S.V.

RIGHT ANGLE GLOBE

22136	YKF 21111	1/4-3/8	W.Fl.
22137	"	3/4	"
22138	"	1	"
22139	"	1-1/4	"
22140	"	1-1/2	"
22141	"	2	"
22142	"	2-1/2	"
22143	"	3	"
22144	"	3-1/2	"
22144	"	4	"
22145	"	5	"
22146	"	6	"
22176	YKF 21121	1/2	W.Fl.
22154	YKF 21113	1/4-3/8	S.V.
22155	"	3/4	"
22156	"	1	"
22157	"	1-1/4	"
22158	"	1-1/2	"
22178	YKF 21123	1/2	S.V.

RIGHT ANGLE BALL

221116	YKF 22103	1/4x1/4	S.V.
221117	"	3/8x1/4	"
221118	"	1/2x1/4	"
221119	"	3/8	"
221120	"	1/2	"
221121	"	3/4	"
221122	"	1	"
221122	"	1-1/4	"

R12-R22-R502

STRAIGHT GLOBE

221261	YKF 11211	1/4-3/8	W.Fl.
221262	"	3/4	"
221263	"	1	"
221264	"	1-1/4	"
221265	"	1-1/2	"
221266	"	2	"
22182	YKF 11221	1/2	W.Fl.
221243	YKF 11213	1/4-3/8	S.V.
221244	"	3/4	"
221245	"	1	"
221246	"	1-1/4	"
221247	"	1-1/2	"
221248	"	2	"
22180	YKF 11223	1/2	S.V.

RIGHT ANGLE GLOBE

22170	YKF 21221	1/4-3/8	W.Fl.
22184	"	1/2	"

RIGHT ANGLE BALL

221131	YKF 22203	1/4x1/4	S.V.
221132	"	3/8x1/4	"
221133	"	1/2x1/4	"
221134	"	3/8	"
221135	"	1/2	"
221136	"	3/4	"
221137	"	1	"
221138	"	1-1/4	"

PISTON CHECK VALVES

AMMONIA - R12-R22-R502

STRAIGHT PATTERN

22197	YKAF 11611	1/2	W.Fl.
22198	"	3/4	"
22199	"	1	"
221100	"	1-1/4	"
221101	"	1-1/2	"
221102	"	2	"

221103	YKAF 11611	2-1/2	W.Fl.
221104	"	3	"
221105	"	3-1/2	"
221105	"	4	"
221106	"	5	"
221107	"	6	"

SEE NEXT PAGE FOR CONTINUATION



CAT. NO.	TYPE	SIZE (INS.)	TYPE CONN.
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RELIEF VALVES

RIGHT ANGLE BALL

221184	YKAF22403	1/2	S.V.
221185	"	3/4	"

RIGHT ANGLE GLOBE

221192	YKAF21411	1/2	W. FL.
221193	"	3/4	"
221194	"	1	"
221195	"	1.1/4	"
221196	"	1.1/2	"
221197	"	2	"

STRAIGHT GLOBE

221186	YKAF11411	1/2	W. FL.
221187	"	3/4	"
221188	"	1	"
221189	"	1.1/4	"
221190	"	1.1/2	"
221191	"	2	"

DUAL STOP VALVES

COMPLETE WITH RELIEF VALVES

221198	YKA16128	3/4	
221199	YKAF16129	3/4	
221200	YKAF16130	1	
221201	YKAF16111	1.1/2	
221202	YKAF16118	1.1/2	

BURSTING DISCS

221203	AMMONIA R12, R22, R502	3/4"	
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CHLORINE STOP VALVES

WITH BELLOW SEAL

221267	YKC11111	1/2	W. FL.
221268	"	3/4	"
221269	"	1	"
221270	"	1.1/4	"
221271	"	1.1/2	"
221272	"	2	"
221273	"	3	"
221274	"	4	"

WITHOUT BELLOW SEAL

221275	YKC11111-A	1/2	W. FL.
221276	"	3/4	"
221277	"	1	"
221278	"	1.1/4	"
221279	"	1.1/2	"
221280	"	2	"
221281	"	3	"
221282	"	4	"

1/2" LIQUID LEVEL GAUGE

221233	YKA27500	Valves only
221234	YKA27504	Complete
221235	YKF27500	Valves only
221236	YKF27504	Complete

CAT. NO.	TYPE	SIZE (INS.)	TYPE CONN.
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SOLENOID VALVES

SOLENOID VALVE ONLY

221139	YKAF13001	W x 1/2
221140	"	3/4
221141	"	1
221142	"	1.1/4
221143	"	1.1/2
221144	"	2
221145	"	2.1/2

SOLENOID + STRAINER

221146	YKAF13005	1/2
221147	"	3/4
221148	"	1
221149	"	1.1/4
221150	"	1.1/2
221151	"	2
221152	"	2.1/2

STOP - STRAINER - SOLENOID

221153	YKA13008	1/2
221154	"	3/4
221155	"	1
221156	"	1.1/4
221157	"	1.1/2
221158	"	2
221159	"	2.1/2
221160	YKF13008	1/2
221161	"	3/4
221162	"	1
221163	"	1.1/4
221164	"	1.1/2
221165	"	2
221166	"	2.1/2

STOP-STRAINER-SOLENOID-STOP

221167	YKA13006	1/2
221168	"	3/4
221169	"	1
221170	"	1.1/4
221171	"	1.1/2
221172	"	2
221173	"	2.1/2
221174	YKF13006	1/2
221175	"	3/4
221176	"	1
221177	"	1.1/4
221178	"	1.1/2
221179	"	2
221180	"	2.1/2
221425	YKAF13006	1/2
221426	"	3/4
221427	"	1
221428	"	1.1/4
221429	"	1.1/2
221430	"	2
221431	"	2.1/2

SOLENOID COILS

221181	A1	240V
221182	M3-A	50Hz
221277	M3-A5	50Hz
221183	M10	50Hz

CAT. NO.	TYPE	SIZE (INS.)	TYPE CONN.
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FLANGES

WELD FLANGES

221432	YKAF10011	W-3/8-W
221433	"	1/2
221434	"	3/4
221435	"	1
221436	"	1.1/4
221437	"	1.1/2
221438	"	2
221439	"	2.1/2
221440	"	3
221441	"	4
221442	"	5
221443	"	6
221444	"	8

SCREWED FLANGES

221204	YKAF10012	W-3/8-W
221205	"	3/4
221206	"	1
221207	"	1.1/4
221208	"	1.1/2
221209	"	2
221210	"	2.1/2
221211	"	3
221212	"	3 1/2 to 4
221213	"	5
221214	"	6
221215	"	8

ADAPTOR FLANGES
MS. COPPER PLATED for SOLDER CONN.

221216	W-3/8-W
221217	3/4
221218	1
221219	1.1/4
221220	1.1/2
221221	2
221222	2.1/2
221223	3
221224	3 1/2 to 4
221225	5

STRAINERS

"T" - AMMONIA, R12, R22, R502

22185	YKAF14001	1/2	W. FL.
22186	"	3/4	"
22187	"	1	"
22188	"	1.1/4	"
22189	"	1.1/2	"
22190	"	2	"
22191	"	3	"

"Y" - AMMONIA, R12, R22, R502

22192	YKAF15001	1	W. FL.
22193	"	1.1/4	"
22194	"	1.1/2	"
22195	"	2	"
22196	"	2.1/2	"

1/2" R.A. CHARGING - PRESSURE GAUGE - AIR PURGE VALVES

Cat. No.	TYPE	DESCRIPTION
221229	YKA22303	1/2" RA Valve - Charge/Press. Gauge
221232	YKA11823	1/2" Gauge Valve - Back Seating

Cat. No.	TYPE	DESCRIPTION
221230	YKA22703	1/2" Air Purge Valve
221231	YKA22803	Pressure Gauge Valve

REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA



VALVES FOR AMMONIA & R12 - R22 - R502

IDENTIFICATION CIPHER

PREFIX: YKA=AMMONIA YKF=R12,R22,R502 YKAF=AMMONIA,R12,R22,R502
YKC=CHLORINE

TYPE	PATTERN	FUNCTION	BONNET	ENDS
Straight 1	Globe 1	Stop 1	Bolted 1	Flanged Welded 1
Right Angle 2	Ball 2	Expansion 2	Screwed 2	Flanged Screwed 2
	Solenoid 3	Charging 3		Screwed 3
	T Strainer 4	Safety Relief 4		Adaptor Flanges 7
	Y Strainer 5	Liquid Level 5		Table H or J 0
	Dual 6	Piston Check 6		
	Gauge Glass 7	Air Purge 7		
	Float 8	Pressure Gauge 8		

COMBINATIONS

LIQUID LEVEL GAUGE GLASS VALVES ONLY YKA (or F)27500 c/w TUBE & GUARD 27504

SOLENOID VALVES c/w STRAINERS=YKAF 13005

SOLENOID UNITS (Stop Strainer Solenoid Stop)=YKAF 13006

DUAL STOP VALVE c/w 1/2" SAFETY RELIEF VALVES=YKAF 16128

DUAL STOP VALVE c/w 1/2" SAFETY RELIEF VALVES=YKAF 16129

SUFFIX/SIZE OF VALVE

EXAMPLE 1/2" AMMONIA VALVE, Straight Stop, Bolted Bonnet, Weld Flanges=YKA11111/1/2"

WHEN ORDERING VALVES PLEASE NOTE LAST DIGIT OF CODE DENOTES TYPE OF FLANGE OR END OF VALVE, example YKA11111=WELD FLANGES, YKA11112=SCREWED FLANGES, YKA11113=SCREWED VALVE, YKF11117=ADAPTOR FLANGES, YKAF PREFIX SUITABLE FOR AMMONIA, R12,R22,R502 etc.

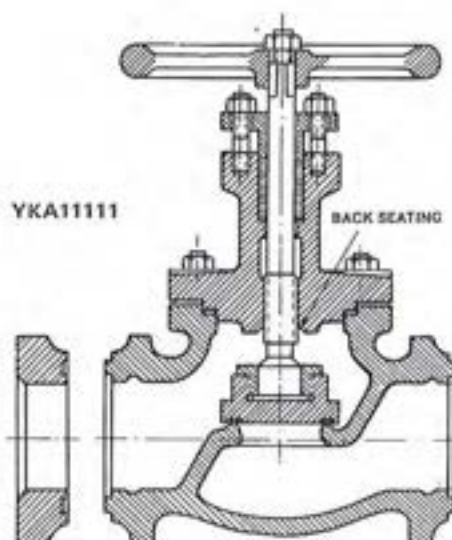
STOP VALVES

Precision built from semi-steel (AS B190) castings.

Maximum pressure 300 psi (2069 kPa) at 121°C (250°F).

Back seating enables repacking of glands under pressure. Full bore orifice ensures minimum pressure drop.

Ball Pattern Stop Valves - Steel bodies complete with hardened and plated spindles. Designed for liquid headers, oil drain etc.



COMPANION FLANGE



VALVE TYPE	DESCRIPTION	BONNET	CONNECTION TYPE	AVAILABLE SIZES	INS
AMMONIA					
YKA 11111	Straight Globe	Bolted	Weld Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	
YKA 11121	Straight Globe	Screwed	Weld Flanges	1/4 - 3/8 - 1/2	
YKA 11113	Straight Globe	Bolted	Screwed Valve Body	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2	
YKA 11123	Straight Globe	Screwed	Screwed Valve Body	1/4 - 3/8 - 1/2	
YKA 21111	Right Angle Globe	Bolted	Weld Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6	
YKA 21121	Right Angle Globe	Screwed	Weld Flanges	1/2	
YKA 21113	Right Angle Globe	Bolted	Screwed Valve Body	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2	
YKA 21123	Right Angle Globe	Screwed	Screwed Valve Body	1/2	
YKA 22103	Right Angle Ball	Screwed	Screwed Valve Body	1/4 x 1/4, 3/8 x 1/4, 1/2 x 1/4, 3/8, 1/2, 3/4, 1, 1 1/4	
R12 - R22 - R502 ETC.					
YKF 11111	Straight Globe	Bolted	Weld Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	
YKF 11121	Straight Globe	Screwed	Weld Flanges	1/4 - 3/8 - 1/2	
YKF 11113	Straight Globe	Bolted	Screwed Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2	
YKF 11123	Straight Globe	Screwed	Screwed Flanges	1/4 - 3/8 - 1/2	
YKF 21111	Right Angle Globe	Bolted	Weld Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6	
YKF 21121	Right Angle Globe	Screwed	Weld Flanges	1/2	
YKF 21113	Right Angle Globe	Bolted	Screwed Flanges	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2	
YKF 21123	Right Angle Globe	Screwed	Screwed Flanges	1/2	
YKF 22103	Right Angle Ball	Screwed	Screwed Valve Body	1/4 x 1/4, 3/8 x 1/4, 1/2 x 1/4, 3/8, 1/2, 3/4, 1, 1 1/4	

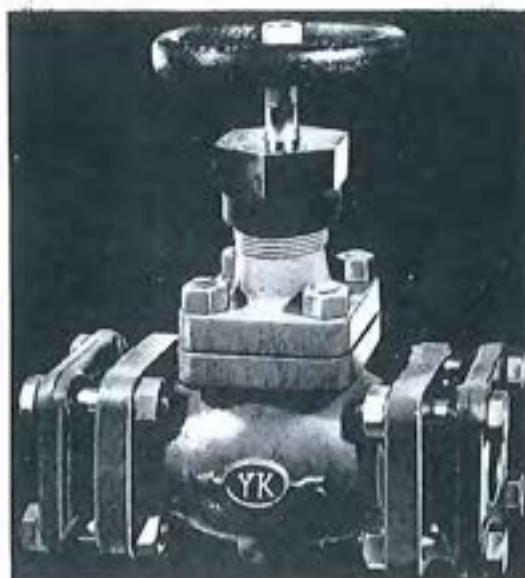
YK EXPANSION VALVES FOR AMMONIA & R12 - R22 - R502

VALVES OF BACKSEATING DESIGN ENABLING GLANDS TO BE REPACKED UNDER PRESSURE. RENEWABLE STEEL SEAT INSERT SCREWED INTO BODY.

SWIVEL TYPE HARDENED TAPERED NEEDLE VALVE SHOE FITTED TO SIZES 3/4" AND OVER. 1/4", 3/8" AND 1/2" ARE OF ONE PIECE WITH HARDENED NEEDLE SEAT.

VALVES FOR R12, R22, R502 etc. ARE SUPPLIED WITH SEAL CAPS. SUITABLE FOR METERING SERVICE OF INDUSTRIAL FLUIDS. NON-CORROSIVE TO CAST IRON AND STEEL.

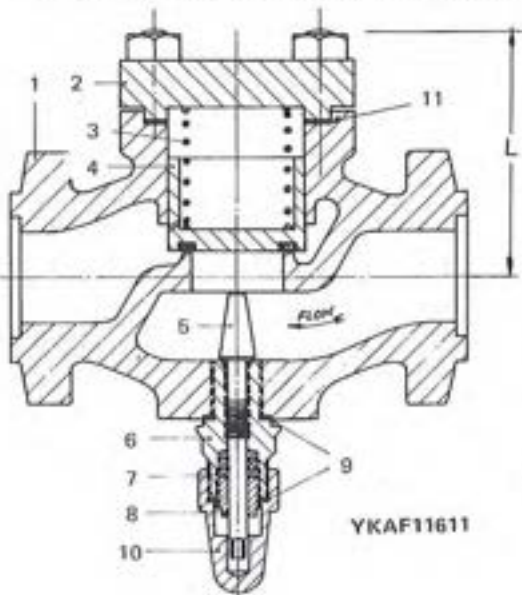
DIRECTION OF FLOW SHOULD BE FROM UNDER VALVE SEAT.



VALVE TYPE	DESCRIPTION	BONNET	CONNECTION TYPE	AVAILABLE SIZES — INS.
AMMONIA				
YKA 11211	Straight Globe	Bolted	Weld Flange	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2
YKA 11221	" "	Screwed	" "	1/2
YKA 11213	" "	Bolted	Screwed Body	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2
YKA 11223	" "	Screwed	" "	1/2
YKA 21211	Right Angle Globe	Bolted	Weld Flange	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2
YKA 21221	" "	Screwed	" "	1/4 - 3/8 - 1/2, 1/2
YKA 22203	Right Angle Ball		Screwed Body	1/4 x 1/4, 3/8 x 1/4, 1/2 x 1/4, 3/8, 1/2, 3/4, 1, 1 1/4
R12, R22, R502 ETC.				
YKF 11211	Straight Globe	Bolted	Weld Flange	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2
YKF 11221	" "	Screwed	" "	1/2
YKF 11213	" "	Bolted	Screwed Body	1/4 - 3/8 - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2
YKF 11223	" "	Screwed	" "	1/2
YKF 21221	Right Angle Globe	"	Weld Flange	1/4 - 3/8 - 1/2, 1/2
YKF 22203	Right Angle Ball		Screwed Body	1/4 x 1/4, 3/8 x 1/4, 1/2 x 1/4, 3/8, 1/2, 3/4, 1, 1 1/4

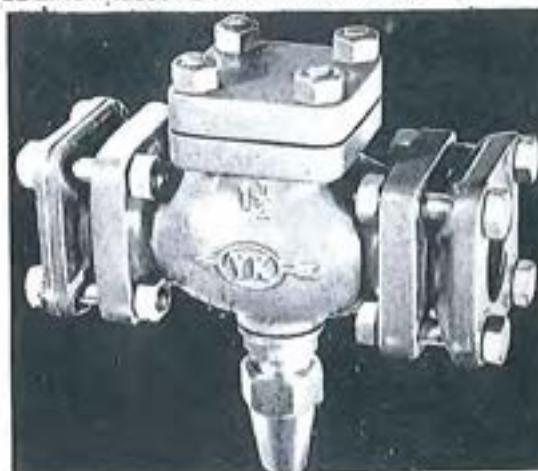
PISTON CHECK VALVES FOR AMMONIA & R12 - R22 - R502

DESIGNED FOR TIGHT CLOSURE AT ALL PRESSURES. FULL SIZE PORTS INSURE MINIMUM PRESSURE DROP. SUITABLE FOR COMPRESSOR DISCHARGE IN VERTICAL OR HORIZONTAL LINES. TEFLON SEATS UNAFFECTED BY HIGH OR LOW TEMPERATURES. SEAT LIFT PERMITS OPENING OF VALVE AGAINST FULL LINE PRESSURE TO REVERSE FLOW.



- 1 Body
- 2 Cover
- 3 Spring
- 4 Piston
- 5 Seat Lift Spindle
- 6 Bonnet
- 7 Gland Packing
- 8 Gland
- 9 Gaskets
- 10 Seal Cap
- 11 Gasket

YKAF11611



SIZES 1/2" — 5"

	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"
L	2 1/2"	2 1/2"	3"	3 1/2"	3 1/2"	4 1/2"	5"	5 1/2"	6 1/2"	6 1/2"		



RELIEF VALVES

PACKED GLANDS ENABLE VALVES TO BE ADJUSTED UNDER LINE PRESSURE WHEN USED FOR LIQUID AMMONIA BYPASS DUTY. RENEWABLE STEEL SEATS, SIZES 1/2" TO 2".
PRESSURE RANGE - 135 TO 320 PSI (930 TO 2206 kPa).

- YKAF 22403 - Right Angle Ball Pattern.
All steel construction.
Similar Valves fitted to 3/4" and 1" Dual Stop Valves.
Sizes - 1/2" and 3/4" Screwed Connections.
- YKAF 21411 - Right Angle Globe Pattern.
Disc and coil springs.
Bolted Bonnet. Weld Flange Connections.
1 1/4" and 1 1/2" fitted to 1 1/2" Dual Stop Valve.
Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2".
- YKAF 11411 - Straight Globe Pattern.
Screwed Bonnet. Weld Flange Connections.
Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2".



DUAL STOP VALVES

COMPLETE WITH RELIEF VALVES AND OPTIONAL BURSTING DISCS ARRANGED SO THAT EACH VALVE MAY BE REMOVED FOR REPAIRS OR INSPECTION LEAVING ONE VALVE ALWAYS IN SERVICE.

BURSTING DISCS 1/2" TO 3" DIAPHRAGMS TO SUIT APPLICATION AND PRESSURE RANGE OF ALL REFRIGERANTS. COMBINED WITH SAFETY VALVES, SYSTEM IS PERMANENTLY SEALED AGAINST LEAKAGE WHERE EXCESSIVE VIBRATION IS PRESENT.

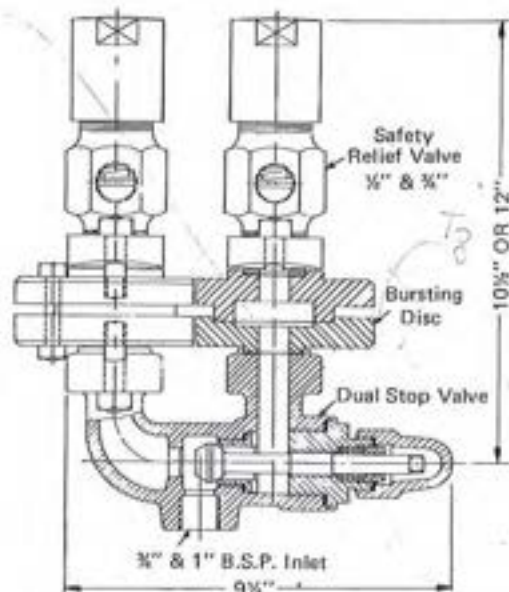
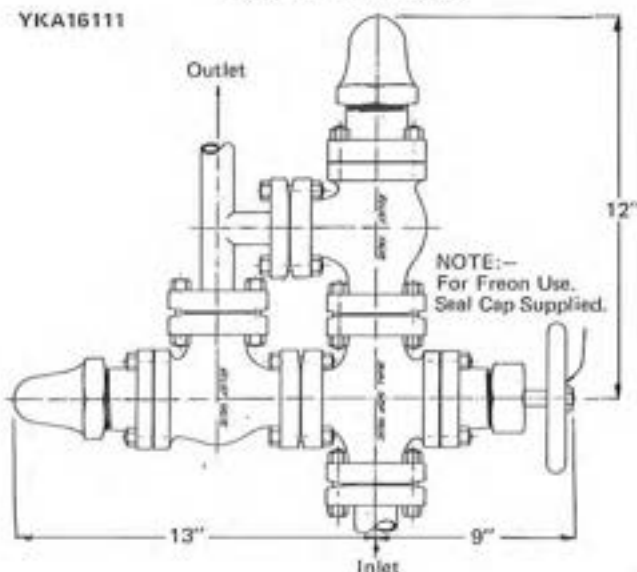


3/4" Relief Valves YKAF16128
1/2" Relief Valves YKAF16129

- YKA 16128 - 3/4" Fitted with 2 x 3/4" Relief Valves.
- YKAF 16129 - 1/2" Fitted with 2 x 1/2" Relief Valves.
- YKAF 16130 - 1" Fitted with 2 x 3/4" Relief Valves.
- YKAF 16111 - 1 1/2" Fitted with 2 x 1 1/4" Relief Valves.
- YKAF 16118 - 1 1/2" Fitted with 2 x 1 1/2" Relief Valves.

1 1/2" Dual Stop Valve, complete with
1 1/4" or 1 1/2" Relief Valves.

YKA16111





SOLENOID VALVES

TECH. PAGE **221-e**

YK Solenoid Valves are suitable for the control of all refrigerants, water, brine, air, oil, steam and chemicals with viscosity up to SAE 10. They are equipped with manual operating stem, synthetic seats impervious to all refrigerants, oil, water and brine. Coils are vacuum impregnated for protection against moisture and designed for continuous operation.

It is recommended that a line strainer be fitted to every solenoid valve.

Max. Operating Pressure 300 psig (2069 kPa) except 2" Valve - 250 psig (1724 kPa).

TYPES AND SIZES

Solenoid Valve only - YKAF 13001

Sizes - as per Table below.

Solenoid - Strainer Combination - YKAF 13005

Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2"

Stop - Strainer - Solenoid Combination -

YKA 13008 - Ammonia

YKF 13008 - R12, R22, R502 etc.

Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2"

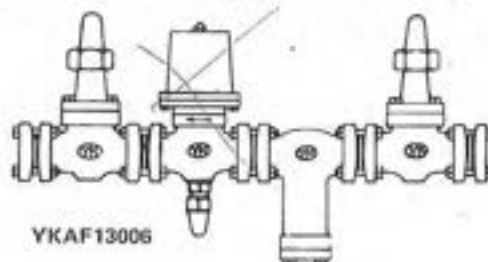
Stop - Strainer - Solenoid - Stop Combination -

YKA 13006 - Ammonia

YKF 13006 - R12, R22, R502 etc.

YKAF 13006 - Ammonia & R12 etc.

Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2"



SOLENOID VALVE AND STRAINER COUPLED TO ISOLATING STOP VALVES AS ONE UNIT



3

YKAF 13001 SOLENOID															
Refrig	PORT SIZE		Orifice INS	AVAILABLE CONNECTIONS (INS)	CAPACITY — TONS								ELECTRICAL COIL DATA		
	INS	MM			LIQUID LINE			Section Line @ 1 PSIG P.D.							
					PRESS. DROP PSIG			EVAP. TEMP. °F							
					2	3	4	40	20	0	-20				
R717	¼	8	5/32	¼ - 3/8 - ½	5.5	6.6	7.1					240 V 50 Hz AC			
R717	½	15	¼	¼ - 3/8 - ½	9.3	11.3	13.3								
R12	½	15	½	½ - ¾ - 7/8	10	12	14	1.1	0.8	0.6	0.5	Valve Orifice Size	Coil Type	Liquid & Suction Duty Coil Current Draw At 240V	
R22	½	15	¾	½ - ¾ - 7/8	15	17	19	1.5	1.2	1.0	0.8				
R717	½	15	½	¼ - 3/8 - ½	28	34	40	3.3	2.7			5/32		A1 130 Ma	
R12	¾	20	11/16	7/8 - 1-1/8	32	35	39	3.6	3.0	2.3	1.8	¾	M.3A	A1 130 Ma	
R22	¾	20	11/16	7/8 - 1-1/8	38	45	49	5.5	4.4	3.6	2.8				
R717	¾	20	11/16	¾ - 1	70	85	95	15.0	11.0	9.0	7.0	¾	M.3A5	M3A 200 Ma	
R12	1	25	1-1/16	1-1/8 - 1-3/8	40	48	56	5.0	4.0	3.2	2.5	1	M10	M10 1/2 500 Ma	
R22	1	25	1-1/16	1-1/8 - 1-3/8	50	60	68	7.5	6.0	5.0	3.8	1¼	M10	M10 1¼ 520 Ma	
R717	1	25	1-1/16	1 - 1½	130	160	180	17.0	14.0	11.0	9.0	1½	M10	M10 1½ 520 Ma	
R12	1¼	32	1-1/16	1-3/8 - 1-5/8	60	70	79	7.5	5.5	4.4	3.4	1½	M10	M10 1½ 520 Ma	
R22	1¼	32	1-1/16	1-3/8 - 1-5/8	70	90	105	11	9	7.2	5.7	2	M10	M10 2 600 Ma	
R717	1¼	32	1-1/16	1¼ - 1½	190	235	275	28	23	18.5	14.5				
R12	1½	40	1½	1-5/8 - 2-1/8	100	115	—	11	8	6.4	4.9				
R22	1½	40	1½	1-5/8 - 2-1/8	125	140	—	17	14	11.0	8.7				
R717	1½	40	1½	1½ - 2	340	400	—	42	35	28.0	22.0				
R12	2	50	2	2-1/8 - 2-5/8	140	—	—	16	11	8.7	6.8				
R22	2	50	2	2-1/8 - 2-5/8	170	200	—	24	19	16	12				
R717	2	50	2	2	500	550	—	70	58	46	37				
R12	2½	65	2½	2-5/8 - 3-1/8	200	—	—	25	18	14	11				
R22	2½	65	2½	2-5/8 - 3-1/8	263	298	—	38	31	25	20				
R717	2½	65	2½	2½	700	850	—	104	85	68	54				
SPECIAL COILS FOR HIGH OR LOW VOLTAGE AVAILABLE ON APPLICATION															

ORDERING PROCEDURE : REFER TO PAGE 221-a AND QUOTE CATALOGUE NO. OF ITEM REQUIRED



CHLORINE STOP VALVES 1/2" - 4"

VALVES ARE SUPPLIED WITH EXTERNAL BRIDGE. STAINLESS STEEL OR MONEL METAL SPINDLES. RENEWABLE SPINDLE NUT. VALVE SEATS OF STAINLESS STEEL OR MONEL. VALVE BODY CASTINGS CARBON OR STAINLESS STEEL.

VALVE DISC INSERT FIBRE GLASS REINFORCED TEFLON. GLAND PACKING TEFLON VEE RINGS.

BELLOW SEALS IN STAINLESS STEEL AND TEFLON. MAX. PRESSURE 150 PSI (1034 kPa).

SIMILAR VALVES ALSO AVAILABLE FOR GENERAL USE WITHOUT BELLOW SEAL. PRESSURE RATING 700 PSI (4827 kPa), TEMP. 0° to 450° (-18° to 232°C).

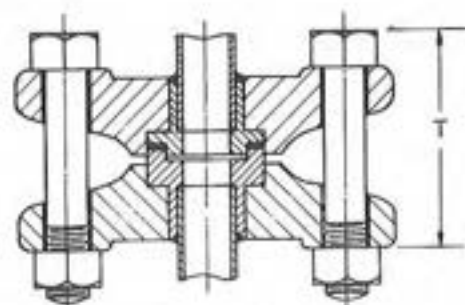
YKC 11111 - With bellow seal

Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 3", 4"

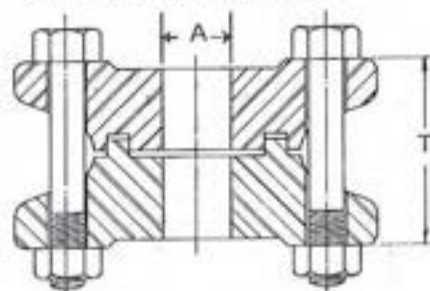
YKC 11111-A - Without bellow seal

Sizes - 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 3", 4"

FLANGES



COPPER TUBE ADAPTOR FLANGES TO SUIT ALL STANDARD PIPE DIMENSIONS.



AMMONIA FLANGES
OVAL, SQUARE & ROUND
AVAILABLE IN BOTH SLIP-ON
WELDING - YKA10011
OR SCREWED - YKA10012



A	1/2"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
T	1 1/2"	1 3/4"	2"	1 7/8"	2 1/8"	2 1/2"	2 3/4"
A	2 1/2"	3"	3 1/2" & 4"		5"	6"	8"
T	2"	3"	3 3/8"		2 1/2"	2 1/2"	3"

"A" Dimension suits all standard Ammonia pipe.

WELD FLANGES - YKAF 10011

Sizes - 1/4" - 3/8" - 1/2" - 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 5", 6", 8"

SCREWED FLANGES - YKAF 10012

Sizes - 1/4" - 3/8" - 1/2" - 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 5", 6", 8"

ADAPTOR FLANGES

Mild Steel Copper Plated for Solder Connections.

Sizes - 1/4" - 3/8" - 1/2" - 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 5"

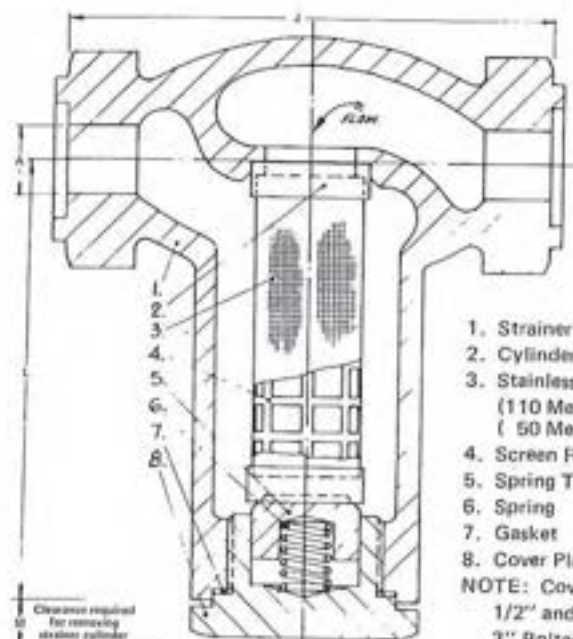
All Flanges supplied in Pairs

ORDERING PROCEDURE : REFER TO PAGE 221-a AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

WE WILL BE GLAD TO QUOTE ON LARGE QUANTITIES



"T" STRAINERS FOR AMMONIA - R12 - R22 - R502



1. Strainer Body
 2. Cylinder End Ring
 3. Stainless Steel Screen (110 Mesh - Liquid / 50 Mesh - Suction)
 4. Screen Reinforcement
 5. Spring Tension Sleeve
 6. Spring
 7. Gasket
 8. Cover Plate
- NOTE: Cover Plate for 1/2" and 3/4" Screwed 3" Bolted

A	1/2"	3/4"	3"
J	3-1/4"	5-3/8"	11-1/4"
L	4-5/8"	5-5/8"	7"
M	5"	6-1/4"	8-1/2"

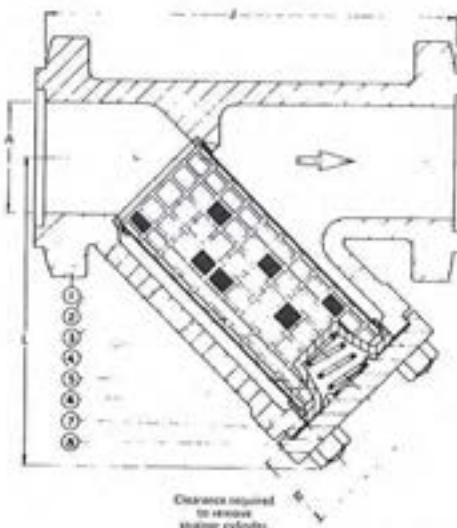
ALL LINE STRAINERS COMPLETE WITH COMPANION FLANGES.
STRAINERS CAN BE COUPLED TO STOP AND SOLENOID VALVES AS ONE UNIT.



YKAF14001

3

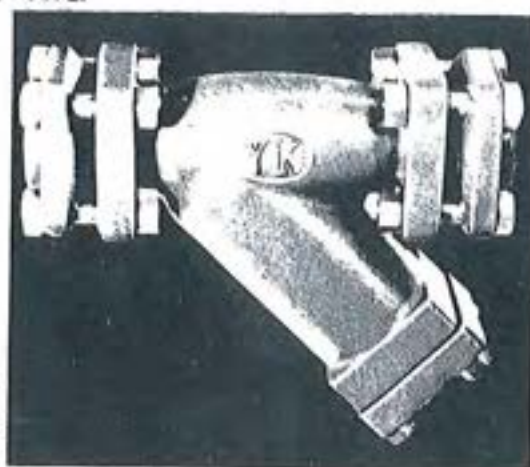
"Y" STRAINERS FOR AMMONIA - R12 - R22 - R502



1. Strainer Body
 2. Cylinder End Ring
 3. Stainless Steel Screen (110 Mesh - Liquid / 50 Mesh - Suction)
 4. Screen Reinforcement
 5. Spring Tension Sleeve
 6. Spring
 7. Gasket
 8. Cover Plate
- NOTE: Cover Plate for 1/2" and 3/4" Screwed 1" - 2-1/2" Bolted

A	1"	1-1/4"	1-1/2"	2"	2-1/2"
J	5-5/8"	7-1/4"	7-1/4"	7-3/4"	9-5/8"
L	5-1/2"	5-3/4"	5-3/4"	7"	7-1/2"
M	6-3/4"	6-3/4"	6-3/4"	6-3/4"	7-3/8"

"Y" TYPE STRAINERS (SERIES 2) DESIGNED FOR MINIMUM PRESSURE DROP TO SUIT SUCTION LINE AND LIQUID RECIRCULATION DUTY. ALL STRAINER CYLINDERS INTERCHANGEABLE WITH (SERIES 1) "T" TYPE.

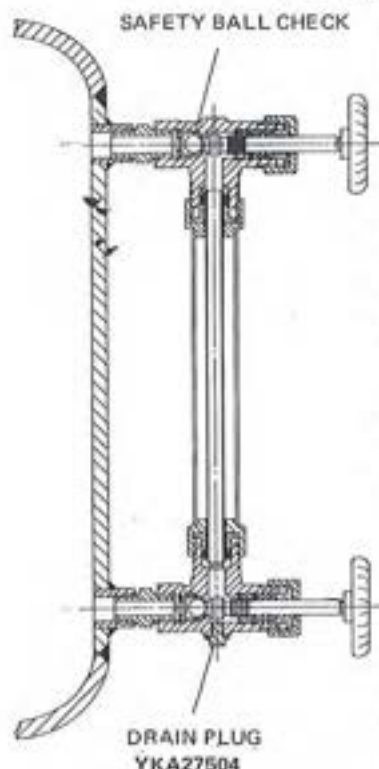


YKAF15001

ORDERING PROCEDURE : REFER TO PAGE 221-a AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

OUR BIG SELECTION ANSWERS YOUR EVERY NEED AND PRICED RIGHT TOO

1/2" LIQUID LEVEL GAUGE VALVES FOR AMMONIA - R12 - R22 R502



FORGED STEEL VALVE BODIES WITH HARDENED SPINDLE. SAFETY BALL CHECK AUTOMATICALLY SHUTS OFF ESCAPING GAS WHEN GLASS TUBE IS BROKEN. VALVES ARE OF BACK SEATING DESIGN ENABLING GLANDS TO BE REPACKED WITH VALVES UNDER PRESSURE. CLEAR PLASTIC GAUGE GLASS GUARDS. LENGTH OF GUARD = CENTRE DISTANCE OF VALVES MINUS 4 1/4". LENGTH OF GLASS = CENTRE DISTANCE OF VALVES MINUS 2 1/4". VALVES FOR R12, R22, R502 ETC. SUPPLIED WITH SEAL CAP NUTS.

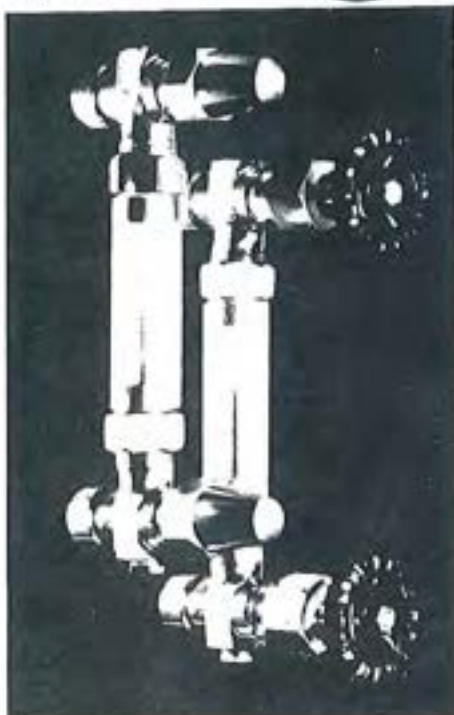
NOTE : VALVE SPINDLE SHOULD BE IN FULLY OPEN POSITION TO ENSURE RESEATING OF SAFETY BALL CHECK. 1/8" BSP CONNS.

AMMONIA

YKA 27500 - pair Valves
YKA 27504 - pair Valves complete with Tube Guard to 3' centre.

R12, R22, R502 etc.

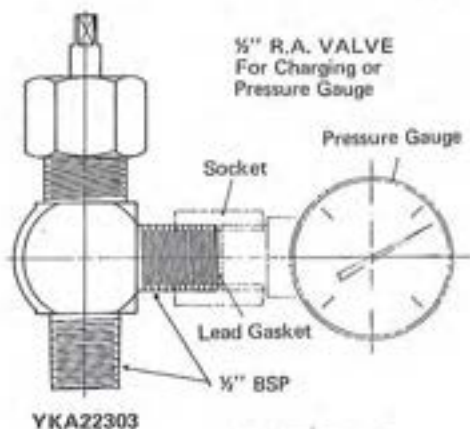
YKF 27500 - pair Valves
YKF 27504 - pair Valves complete with Tube Guard to 3' centre.



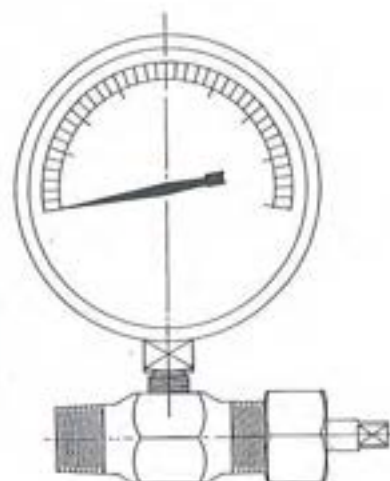
YKF27504

YKA27504

1/2" R.A. CHARGING - PRESSURE GAUGE - AIR PURGE VALVES



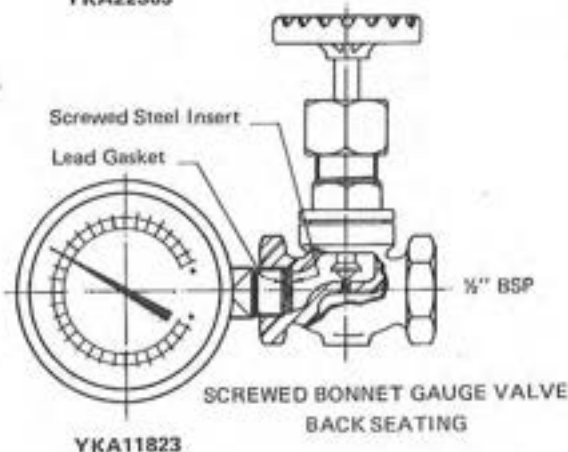
YKA22703



PRESSURE GAUGE VALVES

VALVES ARE FITTED WITH HARDENED NEEDLE TYPE SPINDLES TO REDUCE PULSATIONS IN GAUGE BODIES SCREWED 1/4" x 1/4" BSP INLET. 1/4" BSP OUTLET.

YKA22803



1/2" x 1/2" BSP

1/2" AIR PURGE VALVE

ORDERING PROCEDURE : REFER TO PAGE 221-a AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

Sabroe valves

CATALOGUE NUMBER SUMMARY PAGE - FOR ORDERING PURPOSES

CAT.NO.	VALVE TYPE	SIZE	P/N
2221	SW ANGLE	3/8"	2411-001
2222	"	1/2"	2411-002
2223	"	3/4"	2411-003
2224	"	1"	2411-004
2225	"	1-1/4"	2411-005
2226	"	1-1/2"	2411-006
2227	"	2"	2411-007
2228	"	2-1/2"	2411-103
2229	"	3"	2411-104
22210	"	4"	2411-019
22211	"	5"	2411-020
22212	"	6"	2411-021
22213	"	8"	2412-005
22214	"	10"	2412-006
22215	"	12"	2412-009
22216	SSW STRAIGHT	1"	2411-008
22217	"	1-1/4"	2411-009
22218	"	1-1/2"	2411-010
22219	"	2"	2411-011
22220	"	2-1/2"	2411-105
22221	"	3"	2411-106
22222	"	4"	2411-029
22223	"	5"	2411-030
22224	"	6"	2411-031



ANGLE VALVE, TYPE SW



STRAIGHT VALVE, TYPE SSW

REFER TO FOLLOWING TECH. PAGE FOR GENERAL SPECIFICATIONS AND SELECTION DATA

SABROE SW

SABROE's production programme also includes a complete series of stop valves, type S, in sizes from 6 to 150 mm.

The stop valves are suitable for all refrigerants and all non-corrosive liquids and gases.

Detailed pamphlet is available on request.



Sabroe valves for

all refrigerants and
all non-corrosive
liquids and gases

ANGLE VALVE,
TYPE SW

STRAIGHT VALVE, TYPE SSW



STRAIGHT VALVE, TYPE SSWH



ANGLE VALVE, TYPE SWH

ANGLE VALVE,
TYPE SNHANGLE VALVE,
TYPE SNLANGLE VALVE,
TYPE SWLANGLE VALVE,
TYPE SN

STRAIGHT VALVE, TYPE SSWL

S-VALVES, EXPLANATION OF TYPE NOMINATION

SN angle valve with welding nipple (N), union nut and hand wheel
SW angle valve with welding branches (W) and hand wheel
SSW straight valve (S) with welding branches (W) and hand wheel

..H similar to above mentioned, but with cap (H) instead of hand wheel
..H do.
...H do.

..L similar to above mentioned, but with hand wheel and extended spindle (L) with special packing for low temperatures
..L do.
...L do.

APPLICATION

Valves which are operated regularly. Temperatures from 200°C to minus 30°C

Service valves which are infrequently operated. Temperatures from 200°C to minus 50°C

Valves which are operated regularly, and specially for use in insulated pipelines. Temperatures from 200°C. to minus 50°C

Hand regulating valves type RW are identical in design and quality to valve type SW and can be used under the same operating conditions to obtain fine adjustment of the mass flow.

HAND REGULATING VALVE,
TYPE RW

SABROE S-valves are designed to meet the high quality and strict rules which the international Classification Societies specify for refrigeration installations.

SABROE S-valves are all-steel and can be used for all refrigerants and other non-corrosive liquids and gases.

The high technical quality is testified by the following details:

spindle

- polished stainless steel: perfect for O-ring sealing
- no axial movement: dirt cannot be carried into the packing gland
- in fully opened position the valve is back-seated: spindle packing may be replaced during operation
- spindle packing, normal: neoprene O-rings, 200°C to minus 30°C
low temperature: teflon U-ring 200°C to minus 50°C

valve cone

- secured against turning: best condition for permanent tightness
- teflon tightening ring: perfect tightness at minimum closing momentum by hand
- built-in metallic stop: prevents damage to tightening ring, if the valve is closed by too much force

valve housing

- with welding branches for direct welding into steel pipes (the internal part of the valve is easily removed during welding to avoid possible damage to tightening ring)
- made from special steel approved for operation at low temperatures
- pressure tested at 48 ato (kp per sq.cm)
- tightness tested at 24 ato (kp per sq.cm)

ORDERING PROCEDURE : REFER TO PAGE 222 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

MANUFACTURERS LITERATURE AVAILABLE ON APPLICATION

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CABINET ACCESSORIES AND PARTS

SPECIAL DOMESTIC CABINET PARTS

Orders for special domestic cabinet parts will be welcomed and receive our very prompt attention. Delivery will be made as specified on the order subject, of course, to availability.

To ensure that correct parts are supplied at all times, so avoiding costly delays and returns, it is **ESSENTIAL** that the following information be supplied —

1. **ACCURATE DESCRIPTION** of the part or parts.
2. **COLOUR** of part if applicable.
3. Whether **RIGHT HAND** or **LEFT HAND** opening if door parts.
4. **MAKE AND MODEL** of the refrigerator **TAKEN FROM THE NAMEPLATE.**

IF THE ABOVE INFORMATION IS NOT SUPPLIED YOUR ORDER MAY HAVE TO BE REFERRED BACK.

KEROSENE BURNERS WICKS AND GLASSES

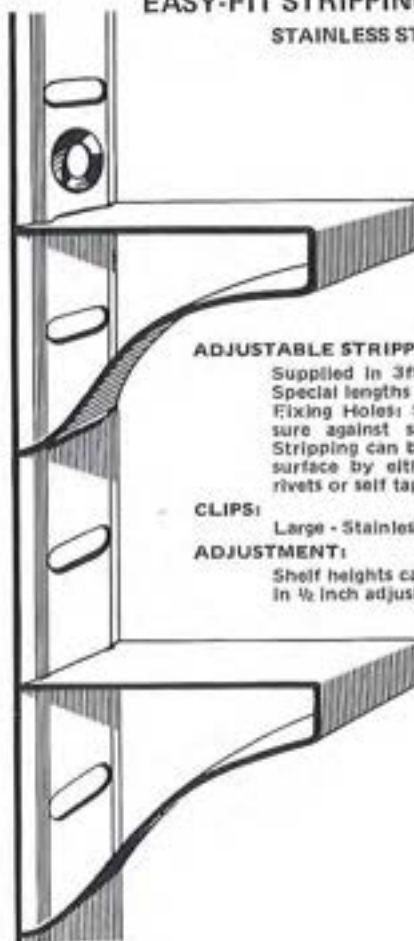


CAT.NO.	DESCRIPTION	SUITS
2301	Burner Assy.	Cold Flame, Electrolux, Prefect, Silent Knight etc.
2302	Wick	
2303	Wick—12yd. Lgth.	
2304	Burner Glass	
2305	Burner Assy.	Kelvinator Icemaster, Dominion, Etc.
2306	Wick	
2307	Burner Glass	
2308	Flue Brush	Airstream " " " "
2309	Glass Metal Rings	
23015	Wicks No. 21	
23016	Burner Glass	
23022	No. 16 Glasses	
23023	Wicks, No. 16	

WE ARE AS
NEAR AS YOUR
NEAREST TELEPHONE



EASY-FIT STRIPPING AND CLIPS STAINLESS STEEL



ADJUSTABLE STRIPPING:

Supplied in 3ft., 4ft., or 5ft. lengths.
Special lengths on application.
Fixing Holes: Spaced 5 1/2" apart en-
sure against sag away from walls.
Stripping can be fixed to almost any
surface by either wood screws, pop
rivets or self tappers.

CLIPS:

Large - Stainless Steel.

ADJUSTMENT:

Shelf heights can be raised or lowered
in 1/2 inch adjustments.

CAT. NO.	DESCRIPTION
23026	Adjustable Supports — 3ft. Lengths.
23027	Adjustable Supports — 4ft. Lengths.
23028	Adjustable Supports — 5ft. Lengths.
23037	Large Clips.

CABINET ACCESSORIES AND PARTS



DOOR & CABINET SWITCHES

CAT. NO.	TYPE	PLUNGER		SWITCH ACTION
		LENGTH	COLOUR	
233133	S30	1/4"	White	SPST
233122	S30	7/16"		
233123	S30	9/16"		
233120	S31	1/4"		
233121	S31	9/16"		
	S32	On Applic.		Press Off
233130	S40	3/8"		
233131	S40	7/16"		
233132	S40	1/2"		
233137	S50	9/16"		
	S30	Hex. Nuts		
	S31	Push-in Retainer		



INTERIOR LIGHT GLOBES

Cat. No.	Watts	Volts	Conn.	Type
23113	15	240	BC	Gen. Purp.
23114	15	240	ES	Gen. Purp.
23115	15	240	BC	Pilot
23116	15	240	ES	Pilot
23117	15	240	S-BC	Pilot
23118	15	240	S-ES	Pilot

SWITCHES FOR DOMESTIC REFRIGERATORS – KELVINATOR – LEONARD – HMV

Cat. No.	BIN NO	PART NO	TYPE	PRODUCT MODEL
	Z41	KA13715	Light	NHC.208, 209, 217, 218, 219, 225, 226, 227, 229, 245, 267, 269, 275, 419, 429, 439, 449, 465, 467, 469, 476, 477, 485, Now use PC267.
	Z43	KA8541	Light	SA55, ASD7, A56, Now use PC267.
23124	Z44	KA8543	Light	A55, A5B5, A57, A5B7, M5W, Now use PC267.
23124	PC267	KA23403	Light	209, 211, 219, 221, 230, 241, 250, 271, 489, 689, Metal
23127	PC418	KA25717	Light	212, 213, 214, 215, 224, 230, 232, 241, 252, 271, 272, 453, 462, 463, 482, 489, 653, 682, 689, 993, Now use PF774.
23125	PD508	KA32747	Light	216, 276, 318, 348, 368, 377, 378, 379, 456, 539, 557, 558, 560, 570, MO90VA, Now use PF774.
	PD78	KA27115	Light	493, 496, 693, 694, White Plastic, Now use PD472.
23126	PD472	KA32748	Light	466, 476/66, 486, 676, 686, 976, 387, 388, 508, 509, 518, 519, 568, 577, 578, 579, 580, 588, P100VA, P100WA, C124SA, C124VA, C124WA, 250PV3, P250TC, P250VC, P250YC, 250MV3, M250VC, Grey Plastic.
23125	PF774	KA41882	Light	769, C125RB, C125WB, P138NA, P138RA, P138VA, M138WA, C144HA, C144NA, C144WA, C144SB, C180GA, C180WA, 340CR3, C340RC, C340TC, C340YC, C340ZC, 340CR6, C340RF, C340SE, 380CH3, C380HC, C380NC, C380SC, C380TC, C380SE, 480CG3, C480GC, C480NC, C480SC, C480SE.
23129	PL299	1227756	Light	N450GC, N400GC, Now use PL94.
23129	PL94	1229158	Light	400NG3, 450NG3, N450GC, 500NG3, N500GC, 620NG3, N620GC.
	PK70	2171-005	Light	C350VC.
	CZ864	203825	Light	310CH6, C310HF, 360CH5, C360HE, 370CH6, C370HF, 410CH6, C410HF.
23127	PF229	KA36856	Light & Fan	770, 778, 779, 788, 789, 888, N144FA, N144GA, N144WA, N144WB, N180FA, N180SA, N180SB, N220EB, N220FA, 360PR3, P360RC, 360MV3, M360VC, 360MV6, M360VF, 360PR6, P360RF, 380NF3, N380FC, N380GC, N380TC, N380YC, 380NF6, N380FF, 480NF3, N480FC, N480TC, 510NF4, N510FD, 510NF6, N510FF, 600NE3, N600EC, 610NE5, N610EE, 610NF6, N610FF.
	PD525	KA32746	Freezer Fan	486, 508, 509, 519, 588, 676, 686, 770, 778, 788, 976, Now use PD184.
23128	PD184	KA27616	Freezer Fan	496, 694, 779, 993, N144GA, N144WA, N144WB, N180SA, N180SB, N380GC, N380TC, N380YC, White Plastic.
	PF315	KA36802	Butter Heat	508, 578, 580, 588, 788, 789, 888, C124WA, C125WB, P138NA, C144HA, C144NA, N144FA, N144WA, N144WB, C180GA, C180WA, N180FA, N180SB, N220FA, N220EB, C340VC, C340ZC, C340SE, 380CH3, C380HC, C380NC, C380SC, C380TC, C380SE, 480CG3, C480GC, C480SC, C480SE, 480NF3, N480FC, N480TC, 510NF4, N510FD, 600NE3, N600EC, 610NE5, N610EE, C480NC.
	PJ127	KA55003	Butter Heat	380NF6, N380FF, 340CR6, C340RF, 510NF6, N510FF, 610NF6, N610FF.
	CZ871	203832	Butter Heat	310CH6, C310HF, 360CH5, C360HE, 370CH6, C370HF, 410CH6, C410HF.
	PH30	KA49451	Summer & Wint.	360MV3, M360VC, 360MV6, M360VF, 360PR3, P360RC, 360PR6, P360RF.
	CZ236	337094	Fast Freeze	AHF162, AHF224, H430GC, H600GC.
	CF57	10-221	Fast Freeze	F330LD.

I-SOL-ATE DEODORISERS

I-Sol-Ate by its absorbing action enables RAW FISH, MEAT, GARLICK, ONIONS, PINEAPPLE, CHEESE, ETC. to be stored together without the odour of one contaminating the other.

I-Sol-Ate has an active life of approx. 6 months, at which time the container should be re-placed.

2 oz. Containers

CAT. NO. 2312

ICE CUBE TRAYS

CAT. NO.



Available on application.



Silicone Sealants of the 80's

231-a

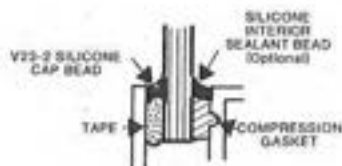
Modern design and technological change within the building, construction and allied industries require that silicone sealants are long lasting, versatile and capable of performing to a high degree of efficiency over a wide spectrum of applications.



**RTV
Acetic Cure
Silicone Sealant
V23-2**

Multi Purpose Glass & Ceramics

Z-BOND V23-2 is a one component R.T.V. curing silicone sealant that will provide a joint seal to a variety of construction components such as aluminium, glass, wood and ceramic tiles. V23-2 was however especially designed for use within the glazing and allied industries, and has been used to provide the seal between aluminium/aluminum in high rise curtain walling fabrication. The sealant is ideal for use in glass suspended glazing systems where a highly elastomeric sealant is required to accommodate the extreme movement factor which is often experienced in this application. The sealant's weatherability characteristics enable it to retain the design properties even after years of exposure to the effects of ultraviolet, rain, and temperature extremes. The adhesion and elongation properties of V23-2 ensure joint seals are weatherproofed against the elements.



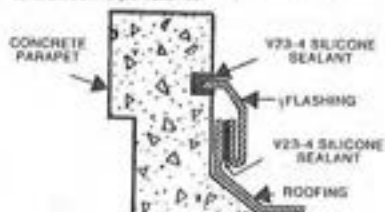
EXTERIOR GLAZING



**RTV
Low Modulus
Non Acetic
Silicone Sealant
V23-4**

Masonry & Metal Expansion Joints

Z-BOND V23-4 is a one component neutral cure low modulus silicone sealant which has been specifically designed for exterior jointing applications where a premium seal is required. The low modulus characteristics inherent to V23-4 ensures that the sealant has excellent recovery properties, which reduces considerably stresses which occur when jointing components are subjected to severe expansion/contraction that are common in critical areas on high rise structures. V23-4 is capable of accommodating cyclic movement up to $\pm 25\%$ of original joint width without any adverse effect on the sealant. Fig. 1 To ensure maximum performance of sealant to expansion joints, correct proportions in relation to width and depth are extremely important, see Fig. 2. Due to the neutral cure of V23-4 there is no acetic release during curing and therefore V23-4 will not cause chemical interaction when used on coated steels (zincalume type cladding), concrete, cement based masonry and limestone. V23-4 is virtually unaffected by severe sunlight, rain, frost and airborne pollutants.



FLASHING ON STONE CORNICE



**RTV
Non Acetic
Silicone Sealant
V23-60**

Zincalume & Metal Cladding

Z-BOND V23-60 is a one component neutral curing silicone sealant that is rapid curing and can be used to provide a premium seal to almost all metal roofing and siding components including coated steel, i.e. zincalume, aluminium, galvanized iron, lead and copper. The sealant has been fully approved by John Lysaght for use as a jointing sealant for use with their building components. V23-60 unlike some other rapid curing types is a neutral cure system and subsequently will not cause rusting or corrosion to metal building components. When cured V23-60 exhibits excellent bonding qualities, and will dry to a clear joint line thus ensuring versatility, and a "no mess" sealant junction. Another use of V23-60 is the caulking of laminated glass panels where butt jointing is required. The sealant is capable of withstanding cyclic movement up to $\pm 25\%$ of original joint width. Fig. 1 The sealant will not crack or craze and has excellent weathering properties.



RIVETED OR NAILED LAP SEAM

FIG. 1 TOTAL JOINT MOVEMENT
= 10mm in 20mm JOINT = 50% TOTAL MOVEMENT

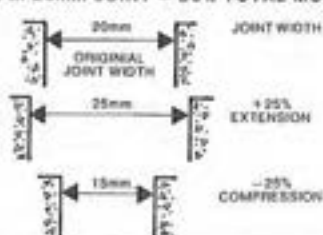
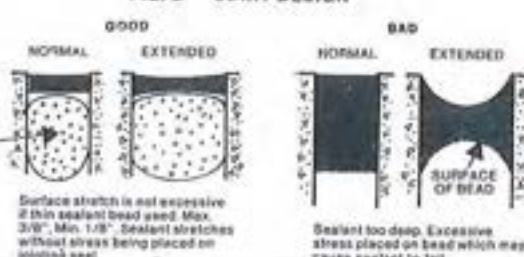


FIG. 2 JOINT DESIGN



Z-BOND V23-2	Z-BOND V23-4	Z-BOND V23-60
CAT. NO. 2319	CAT. NO. 23145	CAT. NO. 2311
CARTRIDGE GUN Model S4		
CAT. NO. 23110		

LA~CO SEALANTS

FOR REFRIGERATION, HEATING & PLUMBING INDUSTRIES on any threaded pipe or fitting

APPLICATION CHART
LA-CO PIPE THREAD COMPOUNDS

X = Recommended Use

	T-O-T	PIPE-TITE-STIK	OXY-TITE	SLIC-TITE TEFLON PASTE & STIK
WATER	X	X	X	X
GAS	X	X	X	X
STEAM	X	X	X	X
AIR	X	X	X	X
BUTANE		X		X
PROPANE		X		X
GASOLINE		*X		X
OILS		*X		X
ACIDS		*X		X
ALKALIES			X	X
FREON 12 & 22		*X		X
AMMONIA		*X	X	X
SO ₂		*X		X
BRINE		X	X	X
ALCOHOL		X		X
ALIPHATIC SOLVENTS		*X		X
AROMATIC SOLVENTS				X
PERCHLORO- ETHYLENE				X
KETONES				X
ESTERS				X
OXYGEN			X	

*For best results, let dry overnight after assembly.

OXY-TITE®

FOR OXYGEN
SYSTEMS

For sealing threads on regulators, gauges, valves, piping on oxygen, oxy-acetylene systems. Use as it comes — no mixing. Non-hardening. Permits easy disassembly, withstands pressures to 2000 psi. Meets spec. MIL-T-5542-B. Two grades available: OXY-TITE Regular and OXY-TITE Siliconized for super lubricity.



70 g Can

CAT. NO.

231132

LA-CO
Slit-tite®PASTE OF
TEFLON®
THREAD
COMPOUND

236 ml Can

CAT. NO.

231130

For high-speed production and large pipe sizes. Made of pure Teflon combined with high-grade non-reactive lubricant. Non drying. Non-toxic. Recommended for: Hydraulics, hydronics, pneumatics, process piping, air-conditioning and refrigeration, brines, ammonia, freons, fuel oils and gasoline, LP gases, solvent systems. Also for water, natural gas, steam, air. Pressures to 10,000 P.S.I. Temp. to +500° F. Not for use with oxygen.

*DuPont Registered Trademark



LA-CO

PIPETITE-STIK®

PIPE THREAD COMPOUND

Universal Pipe Thread Compound. Non-toxic, positive. QUICK! Use for water, steam, oil, gas, air, refrigerants, LP gas, Freon, sulphur dioxide, ammonia, gasoline, acid, brine, tar. Easy to use... gives a positive joint every time. Contains no lead or injurious chemicals. Approved by LP Gas companies. Listed U.L. for butane, propane, gasoline.

SIZES	Regular 11/16" x 4 1/2"	Jumbo 1 1/2" x 4 1/2"
Cat. No.	231126	231127



One quick stroke of the brush and T-O-T is on

IN THE EASY-TO-USE
BRUSH-IN-CAP CAN

LA-CO T-O-T®

Pipe Thread Compound

Siliconized for Speed Spreading

LA-CO T-O-T is non-hardening and non-toxic, contains no lead and is safe for food lines. Will not spill or drip... no waste. Use for water, steam, air, gas, dilute acids and alkalis. T-O-T is the same great product but now siliconized for even better performance.

Effective in blazing heat and freezing cold.

SIZES	236 ml Can	2.2 kg Tin
CAT. NO.	231128	231129

LA-CO Slit-tite®
STIK OF TEFLON®Universal Thread Compound for
Service Men, Professional Mechanics.

So easy to use... merely rub Slit-tite Stik liberally across male threads.

• Positive seal for any metal or plastic thread application • Designed for service and maintenance, easily carried in pocket or tool kit • Clean, washes off easily from hands, clothing, equipment • Contains no solvents, never hardens or dries out • Nothing to spill, spoil, stir • Eliminates brushes, cans, tubes and mess • Anti-seize, prevents galling on soft aluminum, brass parts • Non-toxic, tasteless, safe for potable water, and food systems • Use on same applications as Slit-Tite paste above.

SIZE 11/16" x 4 1/2"

CAT. NO. 231131

LA~CO SEALANTS



LA~CO Oyltite-Stik®

STOP OIL LEAKS... WITHOUT DRAINING SYSTEM!

Applies from outside—repair completed in minutes. Use on gasoline, oil, kerosene, grease, vegetable oils, tar, cooling oils, any petroleum-based product. No tools needed. The stick itself is the applicator. For fuel storage tanks, oil-filled transformers, gear cases, transmissions, etc. U.S. Govt. Stock #8030-935-5841. Low pressure.

SIZE 11/16" x 4"

CAT. NO. 231134

LA~CO Slic-tite™

TEFLON® CORD

TEFLON
PACKING
AND

GASKET-SEALANT CORD

IN *Visu-kit* "REMINDER PACK"
EQUIPPED WITH SELF-CUTTER

Use for any packing or gasket application, no matter what metal, plastic, fluids or gases are involved. Slic-tite, with its fibrous construction, provides greater ease of application. It is non-toxic—safe for foods. For temperatures —450°F. to +550°F. Exclusive Visu-kit dispenses and cuts only amount needed. Sizes: 3/32", 1/16", 1/8". Lengths: up to 50'. Eliminates stocking of gasket sizes. Made of virgin Teflon.

*Trademark of DuPont Co.



Stuffing box and valve stems



Flange gasket

CAT. NO.	SIZE — SPOOLS
231136	3/32" x 50 ft.
231137	1/16" x 20 ft.
231138	1/8" x 10 ft.



LA~CO KRAKSTIK®

STOP WATER LEAKS... WITHOUT DRAINING SYSTEM!

No heating of work or stick. Use on metal or plastic. Traps, downspouts, radiators, soil pipes, laundry tubs, holes in castings, concrete-wall seepage. For water, steam, gas, acid, brine. Low pressure. For plumbers, fitters, home repair.

SIZE 1" x 4"

CAT. NO. 231133



4

LA~CO
HEAT-SEAL Stik®MAKES A CURED EPOXY REPAIR
IN SECONDS... RESTORE
SERVICE IMMEDIATELYMELTS AND
CURES IN ONE
OPERATION

- Use on aluminum evaporators and tubing, welded joints, process systems, laboratory glassware
- For any metal, glass or ceramics

Seals small leaks instantly. Withstands refrigerants, oil, gas, water, air, chemicals, solvents. Use on pressure and vacuum systems. An ideal tool for refrigeration and air-conditioning servicemen, pipe-fitters, welders, laboratory technicians. An easy-to-use maintenance product for every industry. Temp. to 350° F. Pressure to 250 psi.

SIZE 3/8" x 4 1/2"

CAT. NO. 231135

SEALANTS



VIRGINIA

PERMAGUM SLUGS — WHITE — SEALING COMPOUND

A heavy duty sealing compound to protect openings and seams, copper tube and hose entries against air, moisture and loss of insulating efficiency. Non-shrinking, odourless, does not harden with age. White Permagum will not attack plastics or rubber and can be painted with oil-based paints immediately after applying.

Packed : White — 2 lb. Slugs — No. PP22

CAT. NO. 231146

PERMAGUM CORDS — SEALING COMPOUND

Gray-white Permagum extruded in cords (or beaded) forms. All purpose utility sealant. Same product as white Permagum Slugs. Non-staining, odourless and never hardens. In two sizes.

Packed : 3/16" Cords — 100 Lin. ft. Rolls — No. PP33

CAT. NO. 231147

Packed : 3/8" Cords — 20 Lin. ft. Rolls — No. PP36

CAT. NO. 231148



LEAK LOCK

SPECIALLY DESIGNED to keep joints pressure-tight under the extreme conditions of vibration, temperature variation, and corrosion normal to refrigeration and air conditioning equipment.

PERMANENTLY FLEXIBLE to absorb compressor vibration and thermal expansion and contraction that often causes failure of other joint compounds.

REMAINS UNAFFECTED by refrigerants, oils, petrol, and most chemicals, as well as low or high temperatures, moisture, or pressure.

FLEXIBLE JOINT SEALER

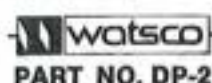
PREVENTS LOOSENING of nuts, bolts, plugs and fittings caused by vibration, thereby keeping flare fittings pressure-tight, mechanically.

PREVENTS CORROSION and resulting "freezing" of fastenings.

EASY TO USE Leak Lock "flows on" and adheres to any clean surface, rough or smooth, and stays where it's applied : Never dries or "runs" before a joint is ready to assemble.

Pocket Size Tube

CAT. No. 231139



"super poxee"

SUPER POXEE KIT CONTAINS

- Tube Poxee No. 1
- Tube Poxee No. 2
- Vial Methyl Ethyl Ketone
- Emery cloth
- Mixing spatulas
- Aluminium foil patch

Super Poxee is a rapid set, fast cure, two part epoxy. Developed as an all purpose repair material, Super Poxee repairs or joins all — metals, plastics, glass, wood, etc. Ideal for repairing aluminium refrigerator evaporator leaks. Also recommended for repairs on boats, automobiles, household items, etc., any place that requires material strength and strong adhesion.

Super Poxee will initially set in 7 to 10 minutes and cure to 75% mechanical strength in one hour. For maximum solvent resistance to R-12 and R-22 an 8 hour cure at room ambient should be used. — NO EXTERNAL HEAT REQUIRED. Super Poxee produces its own exothermic heat which provides the ultimate in regulated heat for curing.

When used for repairing a refrigerant line, be sure system is pressure free. The aluminium foil included in the Super Poxee kit may be used to cover repair of a refrigerator evaporator improving the appearance.

It is IMPORTANT that surfaces be prepared according to instructions before mixing Super Poxee to insure time for application.

HOW TO USE

1. Clean surface with emery cloth.
2. Wash cleaned area with Methyl Ethyl Ketone using clean cloth.
3. Measure equal amounts of "Super Poxee" (1) and (2) on a clean dry surface.
4. Thoroughly mix and apply with a spatula.

CAUTION : KEEP OUT OF REACH OF CHILDREN!

No. DP-2 SUPER POXY KIT

CAT. NO. 231140

RedEpoxy®
Aluminum Sealer

A heat-cured epoxy sealer and patching compound for use on evaporators and all metal surfaces. It is a combination of two powerful resins and incorporates a unique reaction-activated colour change that allows it to be cured with an open flame. RedEpoxy can be completely cured to 100% of its final properties in less than 5 minutes.

RedEpoxy is a two part system. One component is yellow, the other is red, and when they are mixed, a uniform red paste results.

This paste is thixotropic, has a long pot life and will wet clean metal surfaces. When heat is applied the resins react and bond to the wetted metal. As the curing reaction progresses, a decolorizing reaction proceeds simultaneously and the colour changes from red to gold. When the red colour is completely gone and the resin is gold in colour, the cure is complete. The heat is then removed and the repair allowed to cool. Curing may be carried out with a propane torch or hot-air gun.

1 oz. Kit

CAT. NO. 231154

STAYBOND A120 REFRIGERATOR MASTIC

Staybond A120 is a non-setting, non-skinning pure white mastic designed specifically for use by the Refrigerator Industry. Staybond A120 is formulated from modified synthetic rubber and selected inert pigments largely consisting of silicone and aluminium oxides, the vehicle is a high specification mineral oil. Staybond A120 has excellent handling qualities and can be easily applied by hand or with knife or trowel.

Odourless — No Taint — Non Corrosive

CAT. NO.	PACKS
23165	250 ml (500 g)
23166	2 Litre (4 kg)
23167	40 kg Pack



WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE

MASTICS - ADHESIVES

VIRGINIA

PRESSTITE INSULATION MASTIC

A cellular emulsion recommended as a weather-proofer, for rust-preventive, and coating to stop surface condensation and dripping.

APPLICATION : Apply by brush or trowel to coat pipes, metal or wooden tanks, concrete, brick, cork and plastered surfaces.

Packed : 1 Gal. Cans — No. PM11

CAT. NO. 231149

**PRESSTITE THERMAL MASTIC**

A heat-conducting compound that replaces solder as a heat-transfer accelerant when coils are mechanically mounted to plates or liners. Easily and quickly applied with putty knife or caulking gun. Never hardens — will not buckle or warp plates or liners. Increases heat transfer nearly four times the rate obtained with mechanical mounting only.

Packed : 1 Gal. Cans — No. PM21

CAT. NO. 231150



4

PETROCHEM MASTIC "E"

An emulsified bitumen based odourless mastic adhesive with similar properties to Petrochem Hi-Tak but slower in drying. Also suitable for vapour sealing and pipe lagging. Impervious to most chemicals, salts, etc.

23 Litre Containers

CAT. NO. 231172

PETROCHEM "HI-TAK"

Emulsion type semi-contact, non-inflammable, non-toxic, adhesive — waterproof when set.

Suitable for the adhesion of Polyurethane, Polystyrene, Cork, Onozote, and other insulating and acoustic materials, to cement rendered surfaces, bricks, cement blocks, timber and hardboard, etc.

Recommended for the adhesion of scrim covered insulation bats to steel ductwork and such like applications.

Retains adhesive qualities at temperatures in excess of 93°C (200°F) and as low as -34°C (-30°F).

23 Litre Containers

CAT. NO. 231171

PETROCHEM ADPOL

An adhesive for sticking Polystyrene to Polystyrene such as for multiple layers of Polystyrene Foam slabs in the construction of Cool Rooms.

23 Litre Containers

CAT. NO. 231173

SELLEYS THERMO PASTE

A thermal conducting paste especially suited for assisting heat transference in the construction of solar heat collectors and similar applications.

350 g Cartridge
(for use with Type J Gun)

CAT. NO. 2315

25 kg Drums

CAT. NO. 2314

PETROCHEM TRANSTHERM PASTE

Used to transfer the "cold" from the coil to the inner linings of commercial deep freeze cabinets.

Coils are usually held in place by saddles which are spot welded to the inner lining. The Transtherm Paste is then spread as a fillet to give continuous contact for "cold transfer" from the coils to the lining.

23 Litre Containers

CAT. NO. 231174

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

CAULKING & SEALING COMPOUNDS

FRIGLASTIC & PETROCHEM "B.I.P."

A pliable material free from odours, designed for sealing cracks, small holes, joints, etc. in refrigerated cabinets and ductwork. Will not harden or crack even at low temperatures.

TYPE	DESCRIPTION	SIZES	CAT. NO.
FRIGLASTIC	A pliable "white" compound.	500 ml Tin	23173
		4 Litre Tin	23174
		20 Litre Drum	23175
PETROCHEM "B.I.P."	A permanently plastic sealing compound based on Bitumen Impregnated Polyurethane. Suitable for all forms of sealing, cabinets, ductwork, joints etc.	15 Metre Packs in the following mm sizes	
		3 x 19 mm	231156
		3 x 38 mm	231157
		6 x 25 mm	231158
		13 x 13 mm	231159
		13 x 19 mm	231160
		13 x 25 mm	231161
		13 x 51 mm	231162
		19 x 19 mm	231163
		19 x 25 mm	231164
		19 x 38 mm	231165
		19 x 51 mm	231166
		25 x 25 mm	231167
		25 x 38 mm	231168
		25 x 51 mm	231169
		25 x 76 mm	231170

SEALANTS

REX PAK THREAD - SEAL NO. 1.

For all Pipe Joints, Screwed Connections, Flanges and Gaskets.

Pressures to 41370 kPa (6000 psig).

Temperatures to 288°C (550°F)

The universal all-purpose compound suitable for 85% of services :-

Non-Shrinking, Non-Cracking, Non-Hardening, Insoluble, Inhibits rust and corrosion. The metallic lead base seals all voids.

FEATURES

- ★ Is effective for the life of the connection.
- ★ Never hardens — won't crack on temperature changes.
- ★ Withstands severe vibrations.
- ★ Prevents seizing and galling.
- ★ Protects against rust and corrosion.
- ★ More economical than ordinary compounds.

Available in 250 ml Brush Top Tins

CAT. NO. 231142



PTFE THREAD SEALANT TAPE NO. 950

WHAT IS NO. 950 ?

- ★ An entirely new PTFE resin tape for thread sealing, superseding the conventional linen tapes or liquid compounds.
- ★ The most suitable tape for sealing all types of pipe such as made of lead, iron, stainless steel, plastics, etc.

WHY CHOOSE NO. 950 ?

- ★ Never affected by any chemicals or solvents.
- ★ Because of NITOFLO's minimum coefficient of friction, pipe screws in easily and snugly. Also easy to remove.
- ★ For its self-fusing property, just one turn of lapping it around the thread joint makes a perfect and positive seal.

HOW TO USE NO. 950

- ★ No. 950 is used by taping it around the thread joint and pressing it by finger. Then simply screw the pipe over No. 950.

Available in Rolls 12 mm x 10 m

CAT. NO. 231143



OUR BIG SELECTION ANSWERS YOUR EVERY NEED AND PRICED RIGHT TOO



TAPES

415 REINFORCED FOIL TAPE

Uses: Primarily used for sealing aluminium foil covering on air conditioning ductwork. For insulating and protecting applications in building industry, horticulture, pastoral and associated fields. General holding, sealing and strapping applications when high strength and adhesion required.

Construction: Aluminium foil paper lamination reinforced by glass fibre filaments. The high tack adhesive is protected by a paper interliner.

Characteristics: Very high adhesion values, tensile and high tear strength — fire resistant.

CAT. NO. 23141	48 mm width x 33 m Prod. No. 180068
CAT. NO. 23139	72 mm width x 33 m Prod. No. 180025
CAT. NO. 23140	96 mm width x 33 m Prod. No. 180009
CAT. NO. 23156	150 mm width x 33 m Prod. No. 180076

455 ALUMINIUM FOIL TAPE

Uses: Vapour sealing on air-conditioning ductwork. Heat and light reflecting. Interference shielding. Splicing of Aluminium Foil. Holding applications in the Appliance industry. Sealing of Roof Sarking.

Construction: A 50 micron Aluminium Foil backing coated with a high tack, long ageing adhesive and laminated to a Siliconed paper interliner wound on the inside.

Characteristics: Thin and fairly conformable, good ageing properties. Excellent vapour barrier, high electrical and thermal conductivity. Good reflective properties.

CAT. NO. 231116	48 mm width x 50 m Prod. No. 205850
CAT. NO. 231117	72 mm width x 50 m Prod. No. 205869

537 POLYPROPYLENE PACKAGING TAPE

Uses: Sealing light to medium cartons and boxes of all types. Ideal for export packing and food industry applications because it is both waterproof and odourless.

Construction: Special grade polypropylene film with a heat resistant adhesive.

Characteristics: Good dead stretch and tear resistance. Unaffected by moisture. Good bursting strength and excellent edge tear resistance. Flexible and stable under varying climatic conditions.

CAT. NO. 231110	36 mm width x 75 m	Fawn/White/
CAT. NO. 231111	48 mm width x 75 m	Transparent

550 BLACK POLYTHENE TAPE

Uses: Reduces corrosion effects on above or below ground pipe and steel work. For an anti-electrolytic corrosion barrier between dissimilar metals in roof and other constructions. Joining builders and painters drop sheets. Sealing or waterproofing applications in the building and general manufacturing industry.

Construction: Flexible, heavy duty polythene backing with natural rubber based adhesive.

Characteristics: Backing of black heavy duty polythene film has excellent weathering and waterproofing properties and chemical resistance. A strong permanent type adhesive system. Matches the long term nature of the backing.

CAT. NO. 23160	48 mm width x 30 m Prod. No. 183334
CAT. NO. 23161	72 mm width x 30 m Prod. No. 183318
CAT. NO. 23162	96 mm width x 30 m Prod. No. 183326

250 PACKAGING TAPE

Uses: Sealing cartons of all kinds, wrapping and sealing other types of packaging. 250 is used in masking for sandblasting and metal spray masking.

Construction: A high strength saturated flatback rope paper backing with a high tack natural rubber based adhesive.

Characteristics: Excellent adhesion, good quick stick, high tensile strength, abrasion resistant, good climatic performance.

CAT. NO. 23153	48 mm width x 50 m Prod. No. 207020
CAT. NO. 23154	72 mm width x 50 m Prod. No. 207047
CAT. NO. 23155	96 mm width x 50 m Prod. No. 207063

404 FOAM SEALING TAPE

Uses: Many uses in industry for cushioning — gaskets — sound deadening — protecting — sealing against dusts and draughts.

Construction: Polyether foam plastic laminated to a high strength rope paper backing. The high tack adhesive is protected by a paper liner.

Characteristics: Excellent resilience — good sound absorption and ageing properties — good breaking strength.

CAT. NO. 231101	15 mm width x 12 mm thick x 2 m Prod. No. 179590
CAT. NO. 231102	24 mm width x 12 mm thick x 2 m Prod. No. 179493

NORTON

408 POLYTHENE FOAM TAPE

Uses: Dust sealing electric light fittings, weather sealing around window frames, door and cover closures in automotive, aircraft and other transport vehicles. Cushioning sliding glass doors. Sound absorption and protection. Sealing against noise and dust in partition work. Protection of instruments and other fragile components during shipping or storage.

Construction: Made from a controlled expansion foamed polythene backing produced by a special electron irradiation process with a strong adhesive system.

Characteristics: Water resistant and good long term exterior ageing, excellent insulation properties. Excellent elastic recovery, outstanding weather and solvent resistance.

CAT. NO. 231104	12 mm width x 20 m Prod. No. 179647
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410 VINYL FOAM TAPE

Uses: Cushioning, gaskets, sound deadening, protection, sealing against dust and draughts in building and transport vehicles. Sealing against light emission.

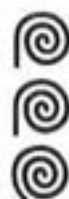
Construction: Partly closed cell plasticised polyvinyl chloride resin based foam. The high tack adhesive is protected by a paper liner.

Characteristics: Moisture resistant, highly resistant to mildew and other fungi attack. High degree of conformability — can be turned at right angles on small radius. Odourless.

CAT. NO. 231105	9 mm width x 3 mm thick x 20 m Prod. No. 179868
CAT. NO. 231106	12 mm width x 3 mm thick x 20 m Prod. No. 179922

USE OUR TELEX SERVICE FOR YOUR ORDER

TAPES



PRECISION Aluminium Foil Tape

no. 400 tape

ALUMINIUM FOIL TAPE
50 MICRON DEAD SOFT
HIGH HOLDING POWER

Uses:	Insulation and sealing in appliances and air conditioning and refrigeration industries.
Colour:	Silver
Construction:	
Backing:	2 Mil. (50 micron) dead soft aluminium foil for good strength and excellent conformability.
Adhesive:	High tack synthetic adhesive for permanent bonding.
Liner:	Easy peel silicone release liner ensures trouble free application.
Physical Properties:	
Thickness with liner:	7 mils
Thickness without liner:	4.5 mils
Tensile:	85 N/24 mm
Adhesion:	Exceeds 27N/24 mm
Elongation at break:	5%

Characteristics: Excellent reflection of both heat and light. Low moisture vapour transmission. Permanent adhesive gives long ageing both indoors and outdoors. Very high co-efficient of heat transmission. Very high co-efficient of expansion.

CAT. NO.	WIDTH mm	LENGTH m
231122	24	55
231123	48	55
231124	72	55
231125	96	55

SILVER Plasticised PVC Ducting Tape

SPECIAL FEATURES:

1. Flame resistant, it will not support combustion.
2. Ideal for both warm and cold air ducts; either high or low velocity systems and dust collecting systems.
3. Low MVT rate allows its use as a vapour barrier seal on both rigid and flexible insulation material with plastic, foil and paper coatings.
4. Conformability provides increased heating efficiency by sealing irregular surfaces tightly.

CAUTION:

Do not use without mechanical methods to support the ductwork.

COLOURS AVAILABLE:

Silver Grey only.

TYPICAL APPLICATIONS:

1. Building Industry.
2. Joining sisalation, joining polythene for concrete underlay, taping joints in air-conditioning ductwork.
3. As a barrier between dissimilar metals in order to discourage electrolytic reaction.

METHOD OF APPLICATION:

By hand, directly from the naked roll.

CAT. NO.	WIDTH	LENGTH
23148	2"	33 m
23149	3"	33 m



CHARACTERISTICS:

Diameter of Core:	75 mm
Backing Material:	Plasticised PVC
Thickness:	0.18 mm
Tensile Strength:	6.6 kg/25 mm
Elongation at Break:	150 - 200%
Adhesive Power:	45 g/25 mm
Temperature Resistance:	(upper limit) 70°C
Dielectric Breakdown:	7000 (ASTM) Volts
Dielectric Strength:	1000 (ASTM) Volts/mil

PVC Insulation Tape - Black

CAT. NO.	WIDTH	LENGTH
231145	3/4"	20 Yards

WE WILL BE GLAD TO QUOTE ON LARGE QUANTITIES

Compatibility with other Materials

Loctite resins can be used in conjunction with all metals, natural rubbers, glass and ceramics; will not harm thermosetting plastics, including phenolic, urea, melamine, alkyd or epoxy; nor nylon, polyethylene or saron. The adhesives/sealants will soften and sometimes craze vinyl, cellulosic, styrene and methacrylate plastics, will also soften varnish finishes. Baked-enamel finishes are not harmed by initial contact but should be wiped clean within an hour. Cured resins do not affect any of these materials.

222 SCREWLOCK

Adhesive/Sealant — low strength product for small diameter screws.

Functions & Benefits

Low strength locking of screws having long thread engagements.
Low strength locking of adjustment screws allows adjustment anytime without loss of locking benefit.
Stops loosening due to vibration or shock loading.
Seals threads against leakage of fluids and gases.

Properties

Will undo with normal tools.
Does not wick into adjoining parts.
Fills gaps to .13 mm (.005").
Cure Speed*: Fixture 20 minutes Full 6 hours.
Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231200	10 ml	22220
231201	50 ml	22250
231202	250 ml	22270

241 BEARING MOUNT

General purpose strength product for mounting bearings, bushes, sleeves, oil seals etc.

Functions & Benefits

Can be used in pressfit or slipfit situations to prevent unwanted movement.
Prevents fretting corrosion.
Improves heat transfer.
Seals outside diameter of oil seals.
Retains oil seals in high pressure applications.
Reduces downtime and maintenance costs.

Properties

Medium strength.
Allows removal with press or standard pullers.
Excellent chemical resistance.
Cured strength 7000 - 14000 kPa (1000 - 2000 psi).
Fills gaps to .13 mm (.005").
Cure speed*: Fixture 20 minutes Full 6 hours.
Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231203	10 ml	24120
231204	50 ml	24150
231205	250 ml	24170

277 HIGH STRENGTH (H. V.)

High strength product for large diameter fasteners.

Features & Benefits

Locks fasteners over 25 mm (1") diameter.
Protects assemblies from high shear loads as well as high vibration and shock levels.
Eliminates tack welding.
Suitable for studs assembled in through-holes.
Suitable for large diameter studs on giant power presses.
Suitable for front end suspension frame bolts.
Suitable for hydraulic cylinder piston-rod and tie-rod nuts.
Suitable for turntable bearing bolts and axle bolts.

Properties

High strength — Will need extra effort to undo.
Shear strength 26200 kPa (3800 psi).
Fills gaps to .25 mm (.01").
Cure speed*: Fixture 30 minutes Full 6 hours.
Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231214	50 ml	27750
231215	250 ml	27770

What are Loctite Adhesives/Sealants?

Loctite anaerobic adhesive/sealants are single-component polyester-type resins furnished as liquids which self-harden into tough structural solids when confined between close-fitting metal parts. These resins are formulated to give a wide range of strengths, viscosities, and degrees of adhesion for various locking, retaining, bonding and sealing applications. Loctite adhesives/sealants are packaged ready-for-use in plastic bottles and require no mixing.

262 STUDLOCK

Heavy duty product for studs and for threadlocking in severe operating conditions.

Functions & Benefits

Stops loosening due to vibration and shock loading.
Seals threads against leakage of fluids and gases.
Prevents thread corrosion and seizure.

Properties

High strength — will need extra effort to undo.
Does not wick into adjoining parts.
Excellent chemical resistance.
Fills gaps to .13 mm (.005").
Cure speed*: Fixture 20 minutes Full 6 hours.
Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231209	10 ml	26220
231210	50 ml	26250
231211	250 ml	26270

242 NUTLOCK

General purpose adhesive for nuts, bolts, screws etc. — medium strength.

Functions & Benefits

Best strength for nuts under all operating conditions.
Stops loosening due to vibration and shock loading.
Seals threads against leakage of fluids and gases.
Prevents thread corrosion and seizure.
Best product to overcome or prevent backlash in splines & keyways.

Properties

Will undo with normal tools.
Does not wick into adjoining parts.
Excellent chemical resistance.
Fills gaps to .13 mm (.005").
Cure speed*: Fixture 20 minutes Full 6 hours.
Temperature range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231206	10 ml	24220
231207	50 ml	24250
231208	250 ml	24270

271 HIGH STRENGTH (M. V.)

An adhesive/sealant high strength product for small diameter studs and bolts and suitable for Refrigeration and Air Conditioning Equipment, Systems and Fittings.

Functions & Benefits

Locks fasteners up to 25 mm (1") diameter.
Permits hand assembly of studs.
Ends cracked castings caused by interference fit stresses.
Permanently seals studs against leakage and corrosion.
Re-anchors loosened studs and stops loosening due to vibration and shock loading.

Offers sealing with maximum solvent resistance to the action of Refrigerants R11, R12, R22, Ammonia and Sulphur Dioxide.
Resists the corrosive action of fuels, lubricants and most industrial liquids and gases.

Properties

High strength — Will need extra effort to undo.
Does not wick into adjoining parts.
Shear strength 17240 kPa (2500 psi).
Fills gaps to .18 mm (.007").
Cure speed*: Fixture 20 minutes Full 1-2 hours.
Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PART No.
231212	50 ml	27150
231213	250 ml	27170

* NOTE: Cure Speed — Curing times for Fixture and Full can be shortened by the use of Loctite Primers — Details available on application
LOCTITE Products continued next page

601 RETAINING COMPOUND

Self-hardening liquid for Retaining or Mounting Cylindrical Parts (including bearings, pulleys, wheels, bushings, gears, cams, rotors, sprockets, sleeves, pins, couplings etc.)

Functions & Benefits

Load transmitting grade for parts needing removal for maintenance or repair.

Stops fretting corrosion and corrosion lock-up.

Properties

Allows removal with press and pullers.

Excellent chemical resistance.

High cured strength 14000 - 21000 kPa (2000 - 3000 psi).

Fills gaps to .13 mm (.005").

Cure speed*: Fixture 10 minutes Full 1-6 hours.

Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO.	SIZE	PROD. No.
231222	10 ml	60120
231223	50 ml	60150
231224	250 ml	60170

567 MASTER PIPE SEALANT

Stops leakage in all types of process piping, instrumentation connections, service piping and threaded pipe, plugs and fittings up to 260°C (500°F).

Functions & Benefits

Instant sealing Teflon (Teflon is Registered Trade Mark of Dupont Corporation).

Safe to use. Product will not foul valves, orifices etc.

Allows positioning of valves, elbows, gauges, T-pieces.

Excess product will not cure and can be washed off for painting.

Prevents loosening and leakage due to vibration or shock loading.

Eliminates thread corrosion.

Will seal water pipe, mild steel piping, stainless, monel and aluminium connections.

Reduces galling and seizure problems with stainless steel and aluminium threads.

Properties

Low strength for easy pipe dismantling.

Seals to moderate pressures instantly and to maximum pipe working pressure —

Carbon Steel: Fixture 30 minutes Full 4 hours.

Stainless Steel: Fixture 3 hours Full 24 hours.

Excellent chemical resistance.

Temperature Range: -55 to 260°C (-65 to 500°F).

AGA approved No. 2590 — all gases.

CAT. NO. 231221	Size 50 ml	PROD. No. 56747c
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495 SUPER BONDER

General purpose Instant Adhesive.

Functions & Benefits

Eliminates many mechanical fasteners.

Replaces expensive jigs and fixtures.

Replaces slower curing adhesives.

Requires no mixing.

Bonds rubber, metal and plastics in most combinations.

Properties

Intended for use on close fitting parts with gaps not exceeding

.08 mm (.003").

Bond strengths up to 27.6 MPa (4000 psi) attained after cure.

Reaches handling strength in less than 30 seconds on most materials.

CAT. NO. 231219	Size 3 g	PROD. No. 13199c
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515 MASTER GASKET

General purpose use primarily for making gaskets, also suitable for coating and repairing gaskets.

Functions & Benefits

Best grade to seal metal to metal flanges against leakage and movement.

Seals all potential leak paths caused by surface machining marks, damage, minor distortion.

Eliminates gasket compression set problems and need to re-tighten.

Makes joints structurally strong by eliminating soft gaskets.

Overcomes gasket shear problems in high torque assemblies.

Semi-flexible to absorb load flexing of assembled units.

AGA approved No. 3207 — all gases.

Properties

Easy to apply — Will not cure until parts are assembled — Does

not cure outside joint — Excess will wash off to allow painting.

Internal excess will harmlessly dissolve in oils, fuels etc.

Excellent chemical resistance.

High shear strength 13790 kPa (3000 psi).

Fills gaps: Unprimed .25 mm (.01") — Primed 1.3 mm (.05")

Cure speed*: Fixture 1 hour Full 12 hours.

Temperature Range: -55 to 149°C (-65 to 300°F).

CAT. NO. 231220	Size 50 ml	PROD. No. 51531c
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290 WICK IN

Penetrating product for already assembled fasteners — Penetrates clearances between assembled parts by capillary action.

Functions & Benefits

Special low viscosity grade for post application.

Ideal for adjustment screws.

Low viscosity allows sealing of weld and casting porosity.

Recommended as a preventative maintenance tool by permitting

threadlocking of fasteners without disassembly.

Capillary action draws the low viscosity liquid into assembled

threads where it cures to a medium-to-high strength bond. This

increases resistance of bolts and screws to loosening and removal.

Properties

Will adjust or remove with normal tools.

Fills gaps to .13 mm (.005").

Cure speed: Fixture 10 minutes Full 1-2 hours.

Temperature Range: -55 to 204°C (-65 to 400°F).

CAT. NO.	SIZE	PROD. No.
231216	10 ml	29020
231217	50 ml	29050
231218	250 ml	29070

QUICK METAL

Creamy non-running gel for spreading onto parts to repair worn areas and to restore correct fit.

Functions & Benefits

Fast cure for quick repair. High strength for durable repairs. Works

like a bonding metallizer.

For worn shafts, housings, keyways, couplings, stops bearing spin-

out, repairs loose set screws.

Properties

Resistant to oils, cutting fluids and chlorinated solvents.

Fills gaps to .51 mm (.02") diameter.

Cured strength 20.7 MPa (3000 psi).

Cure speed*: Fixture 10-30 minutes Full 1-2 hours.

CAT. NO. 231225	Size 50 ml Tube	Prod. No. 66040
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* NOTE: Cure Speed — Curing times for Fixture and Full can be shortened by the use of Loctite Primers — Details available on application

TECHNICAL DATA

HARDENING

The hardening action of Loctite adhesive/sealants does not depend on the evaporation of solvents or the mixing of a catalyst. Placed between mating metal surfaces Loctite products harden automatically, from the inside out, by a new type of chemical reaction known as an "anaerobic" cure. Anaerobic means "without air", the air dissolved in the liquid inhibits the chemical reaction from proceeding.

When the products are confined between metal parts which exclude air, the chemical reaction begins, aided by catalytic action of the metal surfaces, causing the liquid to harden and form a tough structural solid.

CURE TIME

There are many factors that affect the speed of cure of anaerobic adhesive/sealants. The surface catalytic activity of the parts to be bonded, bond-line thickness, temperature, part cleanliness, all affect curing time. Surface Activity — Copper and brass surfaces provide very fast cures. Iron and steel are fast. Aluminium is slow. If faster cure is required, the use of Loctite Primers is recommended — available on application. Bond-line Thickness — Thin bond lines .01mm cure faster than thicker bond lines. Temperature — The higher the temperature the faster the cure. Cleanliness — Cures are faster on clean surfaces. Oil and dirt slow the cure.

DISASSEMBLY

Correct grade selection will allow disassembly with normal tools or equipment in most cases.

Cured Loctite anaerobic adhesives/sealants, in assembled parts, cannot be dissolved.

Application of heat over 150°C can be utilized to ease disassembly of parts in high strength applications.

Heating to over 250°C will destroy the strength properties of the cured material. This is not the case with special high temperature Loctite anaerobic products.



THERMAL INSULATION - BATTS - SHEETS - ROLLS

BRADFORD

FLEXIBLE FIBREGLASS & TYPE A ROCKWOOL

For external Insulation of Ducts

Efficient insulation is a critical requirement for the transport of heated or cooled air.

Where there are no problems of noise control within the system and where the ductwork is concealed from view, the most convenient and economical method of minimising heat loss is by the use of external insulation.

External insulation is normally supplied as flexible mineral wool blankets which have advantages in fixing. However, where applications demand it, the more robust semi-rigid form is available. Batts and blankets are available in both mineral wool types. The recommended grades for external insulation of ducts are Type A Fibretex Rockwool and Flexible Tuff-skin Fibreglass; both materials have approximately the same thermal efficiency.

FIRE RESISTANCE

The Early Fire Hazard Indices for both Flexible Tuff-skin Fibreglass and Type A Fibretex Rockwool are:

Ignitability	0
Spread of Flame	0
Heat Evolved	0
Smoke Developed	0

Authority: The Experimental Building Station of the Dept. of Housing and Construction.

Test Method: Australian Standard 1530, Part 3 - 1975: "Test for Early Fire Hazard Properties of Materials".

STANDARD SIZES AND WEIGHTS

PRODUCT	STD. SIZE (Nominal)	THICKNESS mm	CAT. NO.	WEIGHT (kg/m ³)
Flexible Fibreglass Blankets	30 m x 1200 mm	25		0.55
		38		0.61
		50		0.80
Type A Rockwool Blankets	6 m x 750 mm	25		1.30
		38		1.95
		50		2.60
Type A Rockwool Batts	1500 x 900 mm	25		1.30
		38		1.95
		50		2.60

TECHNICAL DATA

SERVICE TEMPERATURE

Sub zero to 350°C (660°F) hot face maximum.

THERMAL CONDUCTIVITY

Product	Thermal Conductivity
Flexible Fibreglass	0.034 W/m.K at 20°C (0.235 Btu.in/ft ² h°F at 68°F)
Type A Rockwool	0.035 W/m.K at 20°C (0.245 Btu.in/ft ² h°F at 68°F)

Authority: CSR Building Materials Research Laboratories (NATA Registered).

Test Method: ASTM Designation C518-70: "Thermal Conductivity of Materials by means of the Heat Flow Meter".

AVAILABLE ON APPLICATION

Internal Duct Lining Insulation, Acoustical Insulation and "Faced" Insulation products.



**BORAL
INSULWOOL**

AIR CONDITIONING & INDUSTRIAL INSULATION

FIBREGLASS AIR CONDITIONING DUCTWORK INSULATION

DESCRIPTION AND ADVANTAGES

Insulwool fibreglass air conditioning ductwork insulation materials have been designed specifically for this section of the heating and ventilating industry.

The materials are made from extremely fine, flexible glass fibres and thermosetting resins to give a strong, lightweight yet resilient blanket which is dimensionally stable. They have excellent thermal and acoustic characteristics because of the uniform fibre distribution and the high tensile strength gives superior handling properties.

APPLICATION

Flexible Duct Insulation

Available in rolls for wrapping and sheeting all types of ductwork carrying heated or cooled air and requiring thermal and/or acoustic insulation.

Semi-rigid Duct Insulation

Supplied faced or unfaced and usually applied internally to rectangular ducts requiring efficient acoustic insulation.

Rigid Duct Insulation

Normally faced and applied internally or externally to larger ducts and fan housings where a rigid batt is required.

THERMAL CONDUCTIVITY

At a mean of 24°C (75°F) -

Flexible	0.240 BTU/hr ft ² (°F/inch)
Semi-rigid	0.235 " " "
Rigid	0.230 " " "

FLAMMABILITY

Ignitability Index	0
Spread of Flame Index	0
Heat evolved Index	0
Early Fire Hazard Index	0
Smoke Developed Index	1

Australian Standard A30-1958, as conducted by the Commonwealth Experimental Building Station, North Ryde, NSW.

PRODUCT	WIDTH mm	LENGTH	THICKNESS mm	CAT. NO.
Flexible Roll	1200	15 m	25	
		30 m	25	
		20 m	38	
		15 m	50	
Density 22 kg/m ³	1200	10 m	75	
			25	
		2400 mm	38	
			50	
Light Indust. Semi-Rigid Batts	1200		75	
			25	
		1800 mm	38	
			50	
Density 26 kg/m ³	1200		75	
			25	
			38	
			50	

PRODUCT	WIDTH mm	LENGTH	THICKNESS mm	CAT. NO.
Semi-Rigid Board	1200	2400 mm	25	
			38	
			50	
			25	
Density 34 kg/m ³	1200	1800 mm	38	
			50	
			25	
			38	
Rigid Board	1200	2400 mm	25	
			38	
			50	
			25	
Density 48 kg/m ³	1200	1800 mm	38	
			50	
			25	
			38	

TEMPERATURE RANGE: 340°C Max. (644°F)

TAPES, ADHESIVES & SEALANTS

For Tapes, adhesives and sealants suitable for all insulation applications:
Refer to Pages 210-c and 231-a thru 231-j

Olympic THERMAL INSULATION Styrene Foam

PRODUCT DESCRIPTION

Expanded Polystyrene or Styrene Foam, as it is more generally referred to, is a rigid, light-weight, white THERMOPLASTIC low temperature thermal insulant of microcellular construction, comprising closed cell styrene foam beads welded together to form blocks from which sheets or pipe casings are cut.

Isolite Building Grade Styrene Foam sheets are all marked:—

BUILDING GRADE REFER ASK 156/F ISOLITE CLASS

The Class letter is included in the appropriate place. This marking fulfils the agreement made between the National Styrene Foam Manufacturers Division of the Plastics Institute of Australia and the Commonwealth Experimental Building Station, Commonwealth Department of Works, North Ryde, and included in Appendix C of Report No. 52/75/386L issued by the C.E.B.S. Standard Grade styrene foam which is **FLAMMABLE** must NOT under any circumstances be used in Building Construction or Refrigeration applications.

It is Important to Note:—

- BUILDING GRADE only is recommended for use in Building Construction or Refrigeration applications.
- BUILDING GRADE only fulfils the self-extinguishing requirements of Appendix F of Australian Standard K 156-1965.
- BUILDING GRADE only complies with clause 1332 of the Uniform Building Regulations of Victoria in respect of the use of Foamed Plastic Insulants in buildings.
- **WARNING.** Surface finishes and post-treatments (for example PAINTS) may IMPAIR self-extinguishing properties and render styrene foam product **UNSUITABLE** for use in Building Industry.

Recommended Applications

Class S Standard Strength—for use where good physical properties allied with low cost are required. Compressive strength, thermal conductivity and moisture vapour transmission are all of a standard suitable for use in most building or refrigeration purposes.

PHYSICAL PROPERTY	CLASS S				TEST * Method Appendix
	UNITS BRITISH		UNITS SI **		
Cross-breaking strength (min.)	lb/in ²	25	kPa	172	A
Compressive strength at 10% (min.)	lb/in ²	12	kPa	83	B
Water vapour permeability at 38 °C (100°F) and 90 per cent r.h. (max.)	gr in/ ft ² h in	2.7	g/m ² 24h	45	C
Thermal conductivity (max.)	btu.in/ ft ² h°F	0.25	W/mK	0.036	D
Dimensional stability at 80°C(176°F) Max	%	0.75	%	0.75	E

SPECIFICATIONS: The schedule of physical properties relates to polystyrene in block, board or sheet form not less than 1/2 inch thick.

* Physical properties are obtained from tests conducted to A.S.K156-1965.

** S.I. (International System) Units as currently being considered by Standards Association of Australia for inclusion in amendments to A.S. K156.

AVAILABLE SIZES — CLASS S				
CAT. NO.	STD. THICKNESS		STANDARD SHEET SIZES	
	mm	ins.	mm	Feet (Nominal)
2321	15	.59	3600 x 1200	12 x 4
2322	20	.79	3600 x 600	12 x 2
2323	25	.98	3600 x 300	12 x 1.
2324	40	1.58	1800 x 1200	6 x 4
2325	50	1.97	1800 x 600	6 x 2
2326	75	2.95	1800 x 300	6 x 1
2327	100	3.94	1200 x 1200	4 x 4
2328	125	4.92	1200 x 900	4 x 3
2329	150	5.91	1200 x 600	4 x 2
23210	200	7.87	1200 x 300	4 x 1
23211	225	8.86	900 x 600	3 x 2

Recommended thicknesses based on the use of Class S Isolite when used in conjunction with correctly designed refrigeration systems are as follows:—

ISOLITE THICKNESS		TEMPERATURE RANGE	
mm	ins(nom)	°C	°F
25	1	30 to 18	85 to 65
50	2	21 to 10	70 to 50
75	3	13 to 2	55 to 35
100	4	4 to -7	40 to 20
125	5	-4 to -15	25 to 5
150	6	-12 to -23	10 to -10
175	7	-21 to -29	-5 to -20
200	8	-26 to -34	-15 to -30
225	9	-32 to -40	-25 to -40
250	10	-37 to -46	-35 to -50

ALSO AVAILABLE ON APPLICATION ARE :

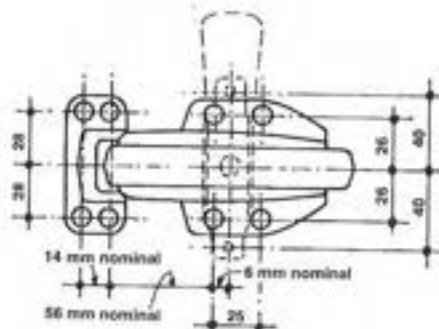
ISOLITE Styrene Foam Sectional Pipe Insulation
ISOTHANE (Urethane) Sectional Pipe Insulation

REFRIGERATION HARDWARE

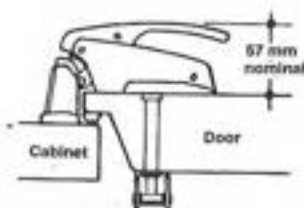
MEDIUM DUTY LOCKS AND STRIKES

FOR COMMERCIAL CABINETS AND COOLROOMS

EFCO

R57 SERIES
LOCKS AND LATCHES

TRACTION LOCK

R5712-V17A
RELEASE

R5724 FLUSH STRIKE

R5723 STRIKE
ADJUSTABLE OFFSETR5722 STRIKE
ADJUSTABLE OFFSETR5725 STRIKE
DOUBLE FIXED OFFSET

4

OPERATION : R5710	— Lock only. Not lockable. When used with 60° std. strike, door can be forced open from inside with 14 kg (2lb) pressure.
R5712	— Lock complete with inbuilt safety release plate. Note — Lock will release from inside with padlock fitted.
R5713	— Traction Lock only otherwise similar to R5710.
R5715	— Traction Lock otherwise similar to R5712.

CAT. NO.	NEW PART NO.	OLD P/N	DESCRIPTION	SPECIFICATION	FINISH
23382	R5710	K57	Lock	Body and Handle - Zinc machine cast Rollers - Nylon	CHROME PLATED
23391	R5712	K57R	Lock with Release Plate	As for R5710, Safety Release Rod - Wood	
23388	R5713	K57	Traction Lock	As for R5710	
23394	R5715	K57R	Tract. Lock with Release Plate	As for R5712	
233100	R5712-V17A	K57	Inside Release	Steel	Zinc Plated
23372	R5613-50C	K56R	Traction Bar	Brass Tube, 25 mm diam. 914 mm long.	
23383	R5722	K57	60°Std.Strike,Adj.Offset 19-25 mm used with locks where safety regulations require burst open emergency exit.	Body - Zinc machine cast. Note - Must be	CHROME PLATED
23386	R5724	K57	Flush Strike Fixed Offset 22 mm	Body - brass	
23385	R5723	K57	90°Strike,Adj.Offset 19-25 mm	Body - Zinc machine cast	
23384	R5725	K57	Strike - Double fixed offset 22 mm	Body - brass	
23396	WR5710-V2	K57	Lock Handle Only		
23397	R5713-V27		Traction Handle Only		
23398	R5710-V13		Spring		
23399	R5722-V12		Strike Screws		
233180	R5710-V15		Nylon Roller		
233179	R5710-V10		Pin		

All EFCO products shown in this catalogue are manufactured in Imperial sizes
Dimensions shown are nominal Metric equivalents

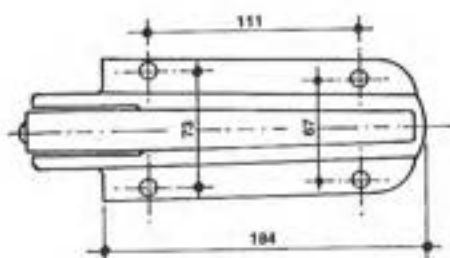


REFRIGERATION HARDWARE

HEAVY DUTY LOCKS AND STRIKES

FOR COMMERCIAL COOLROOMS AND COLD STORES

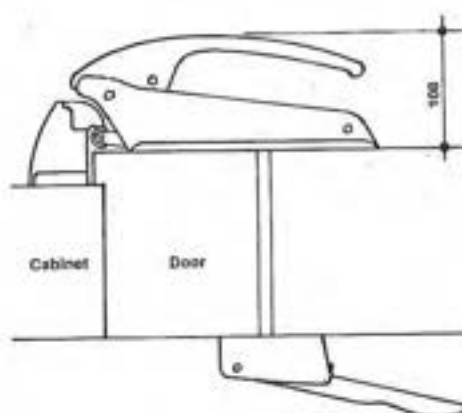
R 5612
SAFETY RELEASE LOCK



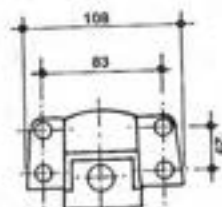
R 5613
SAFETY RELEASE TRACTION LOCK



R5612-V26A
RELEASE



R 5622 AND R 5623
ADJUSTABLE OFFSET STRIKES



OPERATION : R 5612 LOCK — Spring Loaded roller provides gasket compression. Lockable on outside by padlock. Complete with inside safety release.
Note : Lock will release from inside with padlock fitted

R 5613 — As for R 5612

TRACT. LOCK — Handles of locks and safety releases are connected by 25 mm Diameter traction bars.

CAT. NO.	NEW PART NO.	OLD P/N	DESCRIPTION	SPECIFICATION	FINISH
23369	R5612	K56R	Lock	Body, Handle & Toggle - Zinc machine cast Roller - Nylon Safety Release Rod - aluminium	CHROME PLATED
23360	R5613	K56R	Traction Lock	As for R5612 except handle which is cast bronze	Galvanised
23370	R5612-V26A	K56R	Inside Release	Steel	CHROME PLATED
23372	R5613-50C	K56R	Traction Bar	Brass tube, 25mm diam. 914mm long	CHROME PLATED
23371	R5622	K56R	Strike 0-16mm Adj. Offset.	Body and Tongue - Zinc machine cast.	CHROME PLATED
23364	R5623	K56R	Strike 16-32mm " "	Offset is adjusted by micro-screw	CHROME PLATED
23365	WR5612-2	K56R	Lock Handle Only		
23366	R5612-V20		Torsion Spring		
23368	R5612-V3A		Lock mechanism including Nylon Roller (Toggle Only).		
23373	R5612-V4A		" " " " " " (Toggle Assembly)		
23367	R5612-V10		Nylon Roller		
23374	R5612-V13		Pin		

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THE BITTERNESS OF POOR QUALITY REMAINS LONG AFTER THE SWEETNESS OF LOW PRICE IS FORGOTTEN

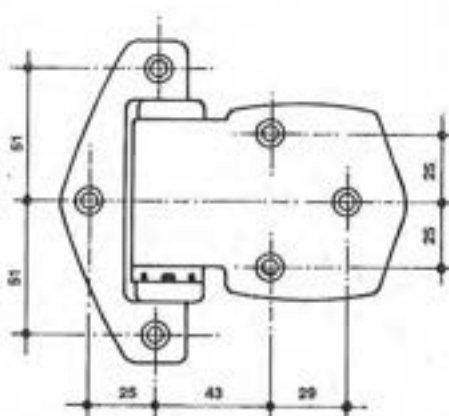
REFRIGERATION HARDWARE

LIGHT AND MEDIUM DUTY HINGES

R31
TENSION HINGE



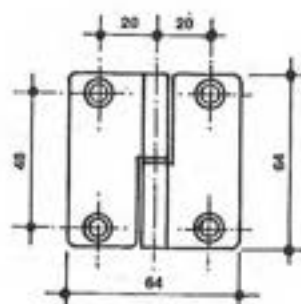
R40
ADJUSTABLE HINGE



R36
HINGE



Illustrated with optional cover ferrules fitted.



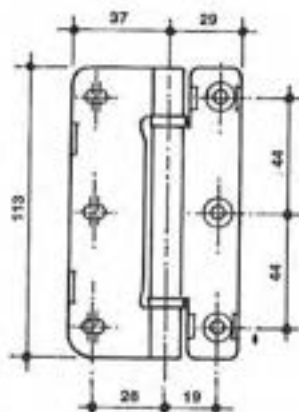
Right hand illustrated

R52
HINGE

R52-2C OPTIONAL COVER



R52-8C OPTIONAL COVER



HANDING:

Handed. Please state hand when ordering.



CAT. NO.	NEW PART NO.	OLD P/N	DESCRIPTION	OFFSET	APPLICATION — OPERATION SPECIFICATIONS	FINISH
2335	R31	Same	TENSION HINGE (Not handed)	19mm	Designed for use on drop-down cabinet doors. Adjustable tension loaded spring designed to counter balance door. Body, flap and tension adjusting collar - zinc machine cast. Pin - steel, zinc plated.	CHROME PLATED
23316	R40	R40A	ADJUSTABLE HINGE (Not handed)	Adj. 19mm to 25mm	Designed for use on medium size offset cabinet doors. Body and flap - zinc machine cast. Bushes - Nylon. Pin - steel, zinc plated.	
233176	R40-36C		Packing Piece for R40			
2337	R36 (RH)	Same	HINGE	NIL	Designed for use on small refrig. and cabinet doors. Lift off face to face mounting with optional cover ferrules. Hinge - steel. Cover ferrules - brass.	
2338	R36 (LH)					
2339	R36-V8C				For use with R36 Hinge	
23337	R52	R52E	HINGE (Not handed)	NIL	Designed for use on small refrig. and cabinet doors. Face to face mounting with optional covers for both blades to conceal fixing. Hinge - steel. Covers - brass.	
23346	R52-8C	R52E	Small Cover		For use with R52 Hinge	
23347	R52-2C		Large Cover		For use with R52 Hinge	

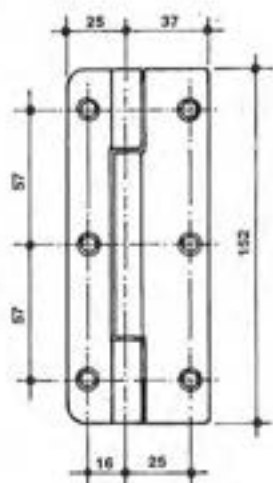
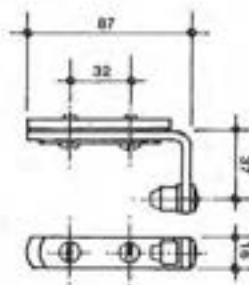
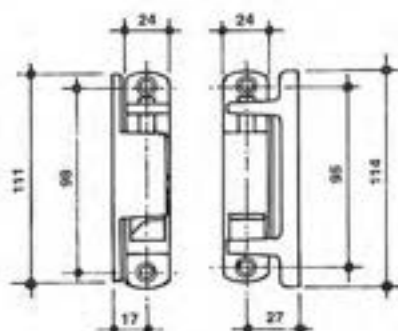
All EFCO products shown in this catalogue are manufactured in Imperial sizes
Dimensions shown are nominal. Metric equivalents



REFRIGERATION HARDWARE

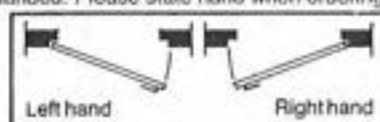
LIGHT AND MEDIUM DUTY HINGES

R100 HINGE

R183
PIVOT HINGER187
RISING HINGE

Right hand illustrated

HANDING:
Handed. Please state hand when ordering.



CAT. NO.	NEW PART NO.	OLD P/N	DESCRIPTION	OFFSET	APPLICATION — OPERATION SPECIFICATIONS	FINISH
233126	R100	R100E	HINGE (Not handed)	NIL	Designed for use on refrigerator and cabinet doors. Face to face fixing Flaps - brass. Pin - steel.	CHROME PLATED
233150	R183	Same Note: Centre Hinge NLA	PIVOT HINGE (Top & Bottom) (Not handed)	NIL	Designed for use on medium size face-on cabinet doors. Pivot for both top and bottom of face-on doors, adjustable for gasket pressure. Supplied with tapping plate, backing strip, cover strip and screws. Tapping plate - steel, zinc plated. Backstrip & bushes - Nylon.	
233154	R187(RH)	Same	RISING HINGE (RH & LH)	NIL	Designed for use on self-service cabinets. Self closing rising hinge. Opens to 180°. Designed to close door from approx. 90°. Supplied with packing strips and Tapping plates.	
233155	R187(LH)				Hinge flaps - zinc machine cast. Rising cams - delrin.	
233168	R187-V8	R187			Packing Strips for R187.	
233169	R187-V9C	R187			Tapping Plates for R187.	

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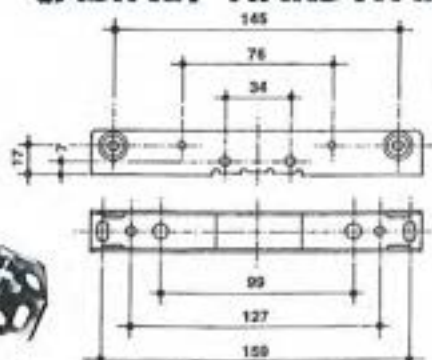
GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

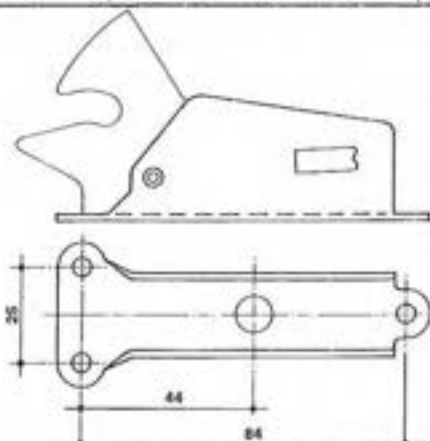


REFRIGERATION HARDWARE CABINET HARDWARE

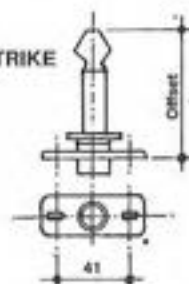
R1161 LATCH MOVEMENT



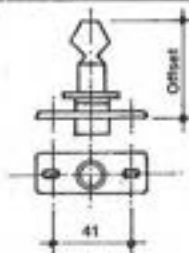
R1191 LATCH MOVEMENT



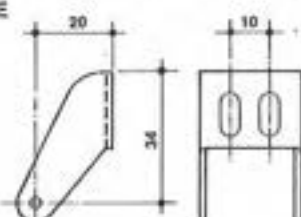
R1162 STRIKE



R1163 STRIKE



R1192 STRIKE

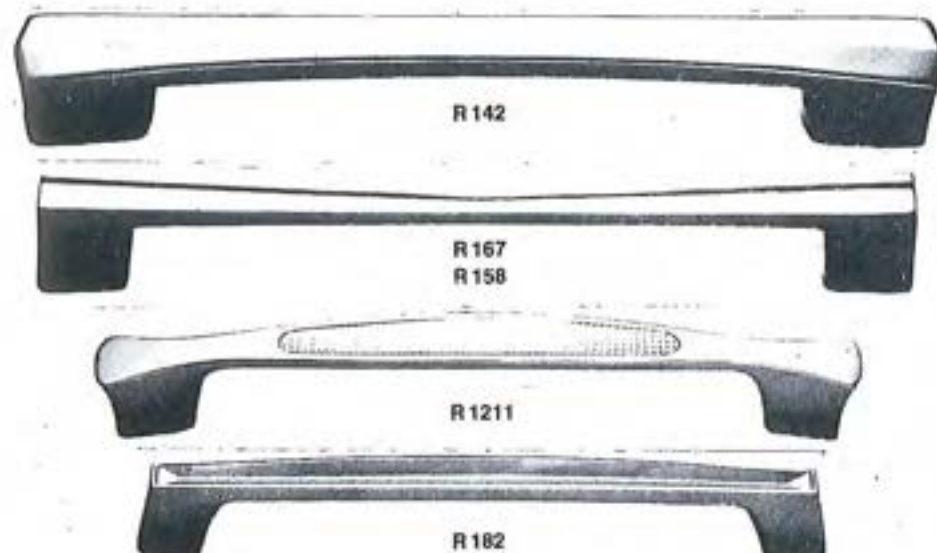


4

CAT. NO.	NEW P/N	OLD P/N	DESCRIPT.	DETAILS
233127	R1161	R116A	LATCH	For mounting inside cabinets. Conforms with safety requirements of easy escape from interior of cabinet. Double rollers with double springs provide gasket compression. Spring tension 7.3 kg (1 lb) not adjustable. Body — steel zinc plated. Rollers — Nylon.
233128	R1162	R116B	STRIKE	For use with R1161 Latch. Face mounted. Adjustable offset 25-70 mm. Zinc machine cast. Chrome finish.
233129	R1163	R116J	STRIKE	For use with R1161 Latch. Face mounted. Adjustable offset 25-54 mm. Zinc machine cast. Chrome finish.
233132	R1191	R119	LATCH	For mounting inside cabinets. Conforms with safety requirements for easy escape from interior of cabinet. Spring loaded toggle action. Body — steel zinc plated. Beak — Nylon.
233131	R1192	R119	STRIKE	For use with R1191 Latch. Face mounted. Adjustable offset 0-5 mm. Mounting Bracket — Stainless steel. Roller — Nylon. Finish — Satin Stainless Steel.

HANDLES

FINISH: CHROME PLATED
MATERIAL: ZINC MACHINE CAST



CAT. NO.	Part No.	Clearance mm	Mount. Hole Centres mm	O/A Lenth. mm
233146	R142	40	222	260
233147	R158	40	220	262
233148	R167	40	470	506
233145	R182	34	197	215
233134	R1211	43	222	250
233181	R61*			75

* Not Illustrated

233-e

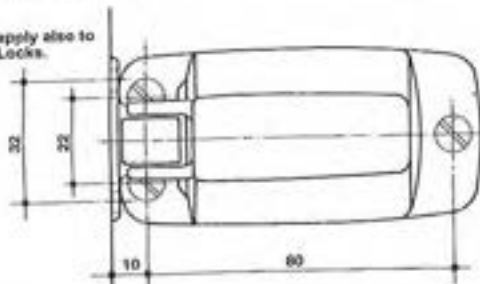
EFCO

REFRIGERATION HARDWARE

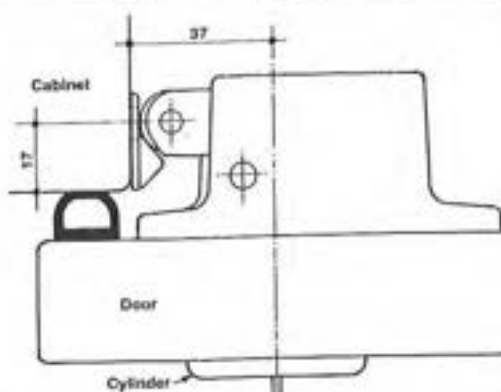
LATCHES, LOCKS AND PARTITION FASTENERS

R 1951
MAGNETIC
LATCHR 1952
MAGNETIC
LOCK

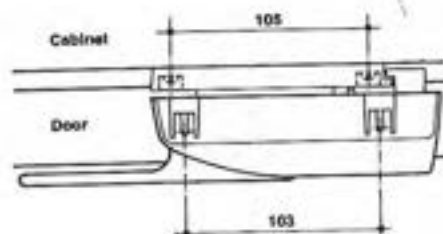
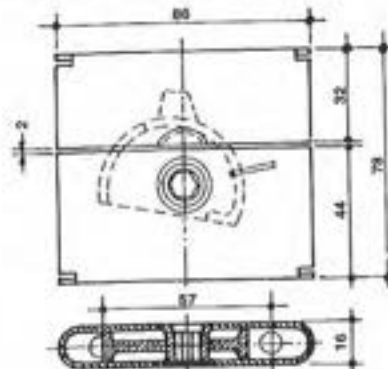
R 196 SERIES LATCHES

Dimensions apply also to
R196 Series Locks.

R 196 SERIES LOCKS



R 161 PARTITION FASTENER



CAT. NO.	NEW PART NO.	OLD P/N	DESCRIPTION	ADJUST.	APPLICATION - OPERATION SPECIFICATIONS	FINISH
233157	R1951	R195	MAGNETIC LATCH		For use with face-on type doors on display cabinets in conjunction with R187 Hinges. Edge fixed to door, magnetic attraction holds latch against base plate (mean pressure 8.18kg) Pulling handle operates pin to break attraction (force required 1300g)	CHROME PLATED
233156	R1952	R195	MAGNETIC LOCK		MAGNETIC LOCK OPERATION : Same as above but key operates toggle which engages in strike plate. Lock must be fitted with cylinder at the bottom as illustrated	
233158	V2001		LOCK		Lock Cylinder	
233159	R1951-V13A		STRIKE		Strike Assembly	
	R1951-V17C		TRACTION ADAPTER		Fits over end of handle of Magnetic Latch/Lock and is joined by 17mm I.D. bar.	
233162	R1961	R196 Light Spring	R196 SERIES LATCHES	6.8 to 16.3 kg	For use inside cabinets. Spring loaded roller, adjustable for spring tension. Body and strike - zinc machine cast.	ZINC PLATED
233165	R1962	R196 Hvy. Spring		12.7 to 31.6 kg	Roller - Nylon.	
233163	R1963	R196 Light Spring	R196 SERIES LOCKS	6.8 to 16.3 kg	For use inside cabinets. Spring loaded roller, adjustable for spring tension. Operated by key from outside. Uses standard rim night latch cylinder (supplied). Master keying or keying alike available to order. Press button safety release from inside.	
233166	R1964	R196 Heavy Spring		12.7 to 31.6 kg	Body and Strike - zinc machine cast. Roller and safety release - Nylon. Cylinder - brass, 6-pin tumbler.	
233149	R161	Same	PARTITION FASTENER		For use in the erection of pre-fabricated coolrooms. Mortised into edge or face of panel, eccentric cam pulls sections together and locks in place. Tightened by hexagonal key - not supplied as standard	
233174	V2101C	R162 Key	KEY		Case and Strike - steel, zinc plated. Cam - zinc machine cast. Key - steel 6.4 mm across flats.	ZINC PLATED
233139	V2301C	R161 Grey Butt.	PLUG		Hexagonal Key for R161. Grey plastic, for filling key hole in panel - for use with R161.	

All EFCO products shown in this catalogue are manufactured in Imperial sizes
Dimensions shown are nominal Metric equivalents

KASON REFRIGERATOR HARDWARE

1245 CAM-LIFT REVERSIBLE HINGES

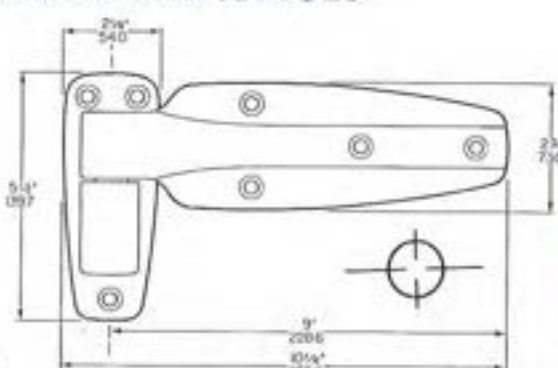


SPECIFICATIONS

Material : High-pressure die-cast zinc.
Finish : Chrome plated.
Offsets : Flush and 1-1/8" (28.6mm).
Weight : 6lbs. (2.7kg) per pair.
 Drilled and countersunk for 1/4" (6.0mm) flat head screw.

"Switch-Hitter" hinges? Right! Because our new 1245 hinges are completely reversible in just minutes. And that neat little feature makes these new hinges easier to inventory, faster to install, helps eliminate installation mistakes!

Each hinge is of cam-life design, with cams made of self-lubricating nylon, precision moulded to deliver perfect rise. All contact is nylon-to-nylon which guarantees smooth, trouble-free door operation; there is no nylon-to-metal contact. And the "lift action" helps eliminate wear on the gasket, even where irregular floors are involved.



CAT. NO.

Flush
233240Offset
233241

Each hinge is self-closing because of the cam action which returns the door smoothly, firmly to the closed position. However, the built-in "dwell-stop" is designed to keep the door open if swung beyond the 90 degree position.

Each hinge has a lift-off feature for more efficient, more economical installation and shipping. Doors fitted with these hinges can be lifted off without removal of hinge parts. Also, doors without sweeper gaskets can be used in right or left hand positions even after straps have been fastened to the door.

Look at how easy it is to reverse these Kason Switch - Hitter Hinges!



To reverse the 1245 lift strap from flange.



Remove pin assembly.



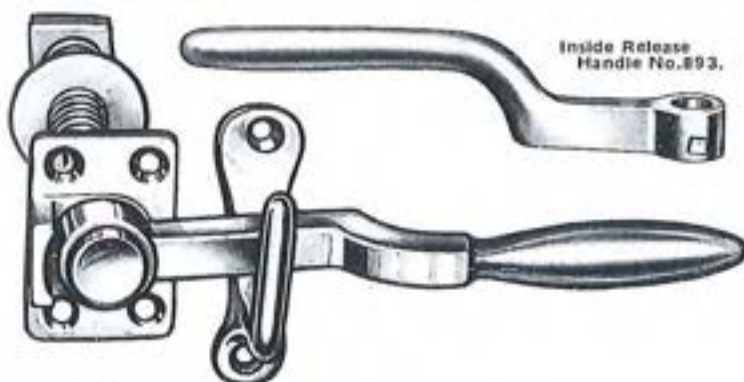
Pop out the cap.



Turn strap 180°, reinsert pin assembly in strap.



Reposition strap into flange, and replace cap.



Inside Release Handle No. 893.

SPECIFICATIONS

METALS : Lever Handles in Brass Chromium plated. Offset Block is high pressure Zinc die-casting.

OFFSETS : Flush.

Rods for inside release handles are threaded 7". Drilled and countersunk for No. 10 screws.

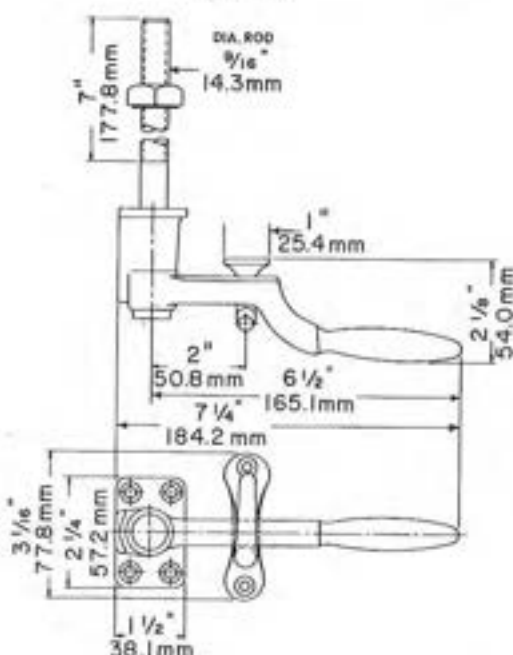
Weight per lever — approx. 1-7/8lbs. (.85kg).

CAT. NO. 233236

WEDGE TYPE LEVER

WITH INSIDE RELEASE HANDLE

No. 878



KASON REFRIGERATOR HARDWARE

SLIMLINE EDMOUNT LATCH

With Inside Release Handle for walk-in doors.

Your walk-ins can look even better with these handsome Slim-line Edgemount Latches. The No. 176 mounts on the edge of the door. No holes need be drilled into the face of the door. No danger of entrapment whether door is locked or simply latched. Door can be opened from inside with unique release mechanism.

Designed for lightweight foamed doors.

Adjustable Strike

Strikes for 176 latch assemblies are furnished with 4-way adjustment feature. A serrated plate is an integral part of the release mechanism; permits rigid up and down positioning of the strike to compensate for door sag. A turn of the screw assures in and out adjustments to accommodate varying gasket sizes and to adjust for gasket wear.

Inside Release Handle

Handle, face plate, and rod are made of a tough, non-conductive, non-corrosive material. Specify wall thickness with order.

SPECIFICATIONS

Material: Die-cast zinc

Finish: Highly polished chromium plated

Inside Release Handle.

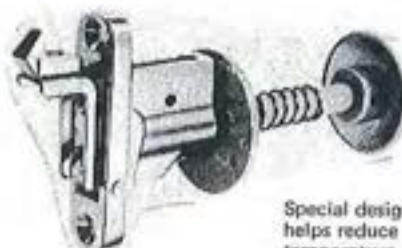
Material: Housing and strike are die-cast zinc. Flange and knob are cyclac.

Rod is nylon.

Finish: Highly polished chromium plated.

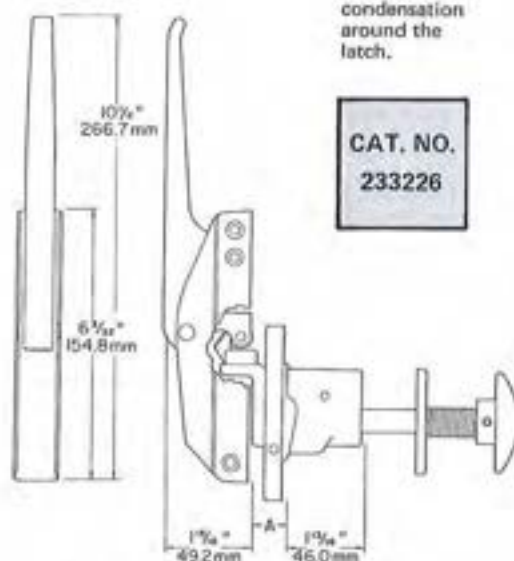
Screw Sizes: Housing drilled and countersunk for $\frac{1}{4}$ " (6.0mm) flat head screws. Flange drilled for No.10 (5.0mm) round head screws.

Weight: Approx. 12.5 lbs. (5.7kg) per carton.



Special design helps reduce temperature loss and condensation around the latch.

CAT. NO.
233226

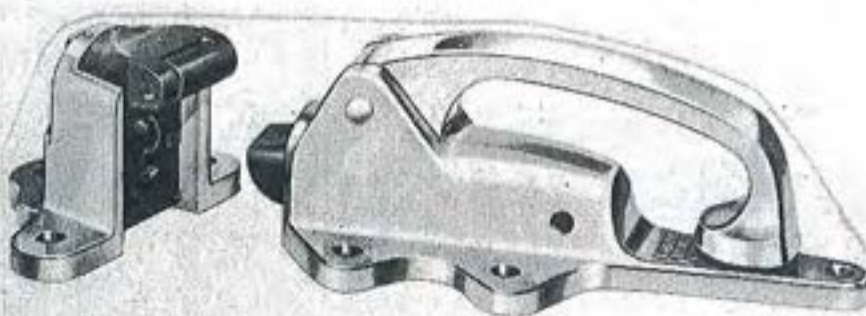


"A" is adjustable from $25/32$ " (19.8 mm) to $1-3/32$ " (27.8 mm)

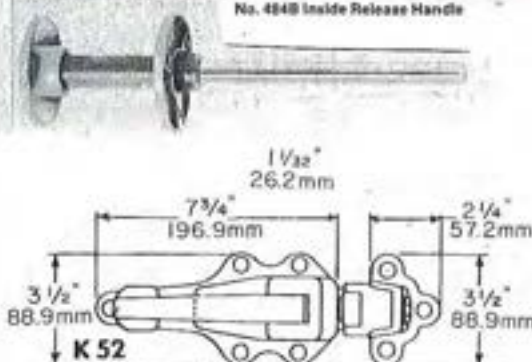
No. 176
Series

HEAVY DUTY IRON LATCHES No. K-52

CAT. NO. 233227



No. 4848 Inside Release Handle



FOR MEDIUM SIZE DOORS

WEIGHT: Approximately 6 3/4 lbs. (3.1kg) per box.

DRILLED & COUNTERSUNK: Body is drilled and countersunk for No. $\frac{1}{4}$ " screws. Strike is drilled for $5/16$ " lag screws.

Latch can be used for either right or left-hand doors.

Provision is made on latch for attaching padlock.

SPECIFICATIONS

METALS: Body & Strike Housings - Cast iron. Handle - Malleable iron.

FINISH: KASONIZED.

OFFSETS: Adjustable Strikes furnished for the range of $\frac{3}{8}$ " to $1-3/8$ ".

INSIDE RELEASE HANDLES

MATERIAL: Rod: steel. Sleeve: Cyclac.

FINISH: KASONIZED

INSULATORS: Cyclac.

Latch No. K-52 is furnished with release handles for standard 6" (152.4 mm) doors.

KASON REFRIGERATOR HARDWARE COOLROOM LOCK SETS

K56 — HEAVY DUTY & K58 — MEDIUM DUTY



K56

K58

No. 484
INSIDE RELEASE
HANDLE

Adjustable strikes
assure perfect door
seals. Adjustments
from $\frac{3}{4}$ " (19.1mm)
to $1\frac{1}{2}$ " (38.1mm)

CAT. NO.
233235



ABSOLUTE SAFETY

Complete safety is assured and Inside Release functions even when padlocked outside.

EASY POSITIVE ACTION

The No. 56 Latch is mechanically perfected to provide easy action for opening and closing refrigerator doors. Latch is released from inside or outside with minimum pressure or pull. Latch pulls into positive airtight closure with each simple operation.

COMPACT SIZE — RUGGED CONSTRUCTION

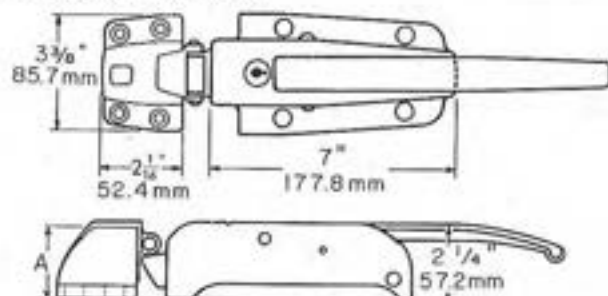
No. 56 Series Latches project only $2\frac{1}{4}$ " from the door surface. Especially designed in keeping with the trend for lighter doors.

FREE-ACTING HANDLE

Latching action of the 56 Series works independently of handle. There is no kick or jarring of handle when door is slammed shut.

PILFER-PROOF

No. 56 Latch is fool-proof and pilfer-proof. When padlocked latch cannot be jimmied open nor can the tongue be forced to release latch.



SPECIFICATIONS

Material: Body and strike: high pressure die-cast zinc
Handle: forged brass, malleable iron, or forged aluminium.

Finish: Highly polished chromium, brushed chrome, Two-tone chrome
All lacquered
Lacquered latch with polished chrome handle

Offsets: Adjustable from:
 $1/8$ " (3.2mm) below flush to $1/4$ " (6.4mm) above flush.

$3/4$ " (19.1mm) to $1\frac{1}{2}$ " (38.1mm) above flush.

Weight: 8 lbs. (3.6kg) per latch.

CAT. NO.	
Offset	233233
Flush	233234

ABSOLUTE SAFETY

Latch can be opened from the inside with inside release handles... even if the latch is padlocked outside.

UNIQUE DESIGN FOR SMOOTHEST ACTION

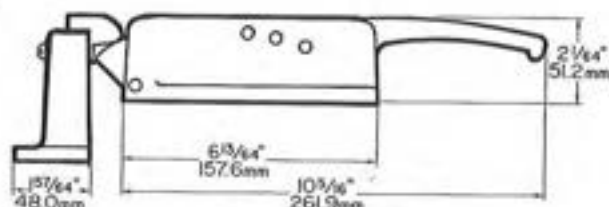
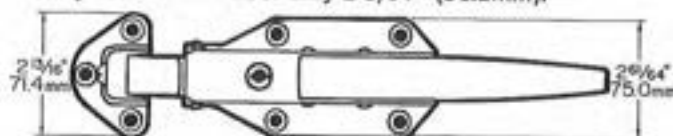
New radial tongue design with rolling-pivot action guarantees smooth, positive closure; eliminates the clatter characteristic of conventional bolt-action mechanisms as they hit the strike. In our opinion, these 58's have the smoothest latching action in the business!

PILFER-PROOF

Unique design insures that the tongue cannot be depressed when the latch is padlocked.

FREE-ACTING HANDLE

The latch action works independently of the handle. Projects from the door only $2\frac{1}{64}$ " (51.2mm).



SPECIFICATIONS

Material: Body, handle and strike are high-pressure die-cast zinc.

Finish: Highly-polished chromium-plated, brushed chrome, or baked enamel.

Offsets: Adjustable from:
 $3/4$ " (19.1 mm) to $1\frac{1}{2}$ " (38.1 mm) above flush

Weight: 3 lbs. (1.36 kg)

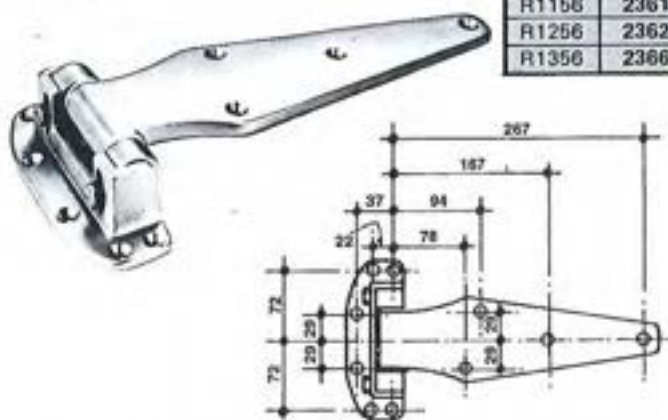


REFRIGERATION HARDWARE

MEDIUM AND HEAVY DUTY HINGES

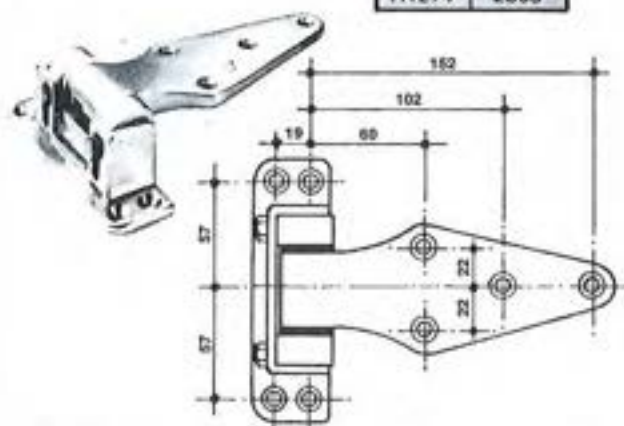
R56 SERIES
ADJUSTABLE OFFSET HINGES

CAT. NOS.	
R1156	2361
R1256	2362
R1356	2366



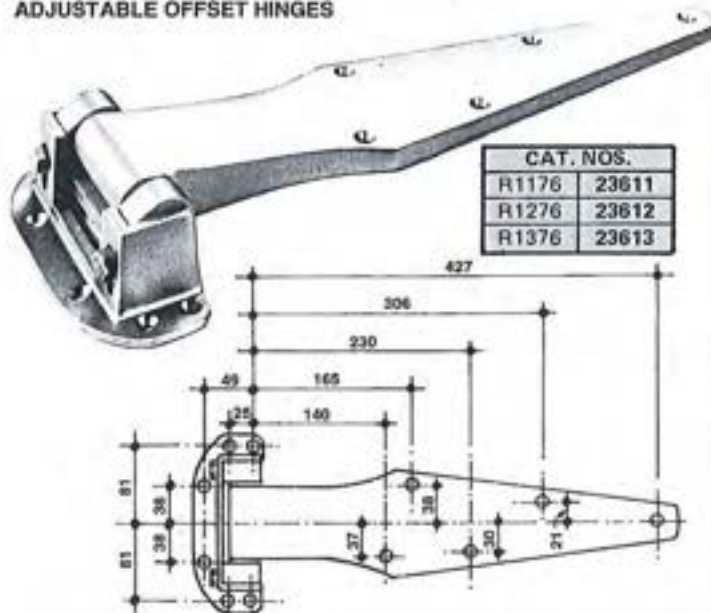
R74 SERIES
ADJUSTABLE OFFSET HINGES

CAT. NOS.	
R1174	2367
R1274	2368



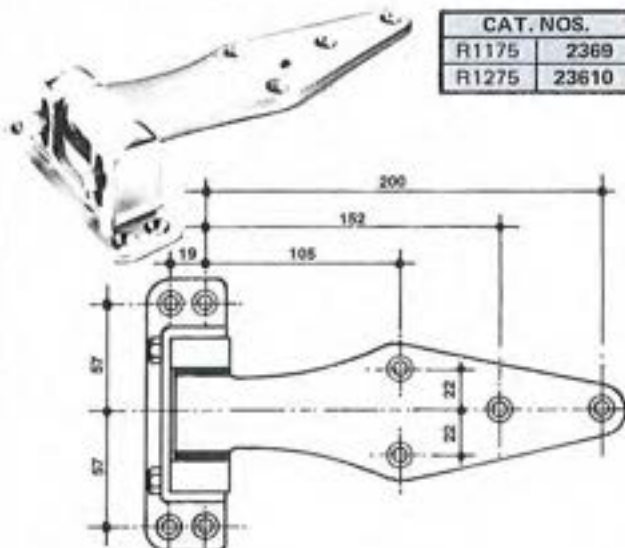
R76 SERIES
ADJUSTABLE OFFSET HINGES

CAT. NOS.	
R1176	23611
R1276	23612
R1376	23613



R75 SERIES
ADJUSTABLE OFFSET HINGES

CAT. NOS.	
R1175	2369
R1275	23610

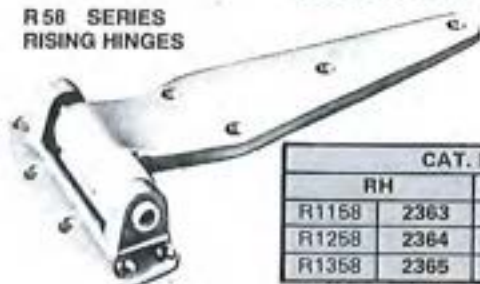


CAT. NO.	NEW P/N	OLD P/N	DESCRIPTION	OFFSET	APPLICATION — OPERATION SPECIFICATIONS	FINISH
R56 SERIES					For use on commercial refrigerators and coolrooms. Adjustable Offset (Blade Length 11" approx.) Body & flap - cast brass. Bushes - delrin. Pin - St. Steel.	CHROME PLATED
2361	R1156	1056R	ADJ. OFFSET	0-16mm		
2362	R1256	1056R	HINGES	16-32mm		
2366	R1356	1056R	(Not handed)	32-48mm		
R74 SERIES					For use on commercial refrigerators and coolrooms. Adjustable Offset (Blade Length 6½" approx.). Body & flap - cast brass. Bushes - delrin. Pin - St. Steel.	
2367	R1174	1074R	ADJ. O/S HINGES	0-16mm		
2368	R1274	1074R	(Not handed)	16-32mm		
R75 SERIES					For use on commercial refrigerators and coolrooms Adjustable Offset (Blade Length 8½" approx.). Body & flap - cast brass. Bushes - delrin. Pin - St. Steel.	
2369	R1175	1075R	ADJ. O/S HINGES	0-16mm		
23610	R1275	1075R	(Not handed)	16-32mm		
R76 SERIES					For use on commercial refrigerators and coolrooms. Adjustable Offset (Blade Length 17½" approx.). Body & flap - cast brass. Bushes - delrin. Pin - St. Steel.	
23611	R1176	1076R	ADJ. OFFSET	0-16mm		
23612	R1276	1076R	HINGES	16-32mm		
23613	R1376	1076R	(Not handed)	32-48mm		

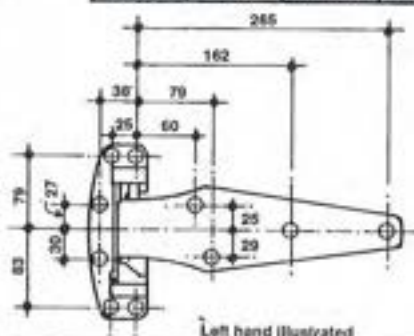
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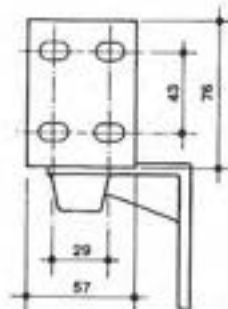
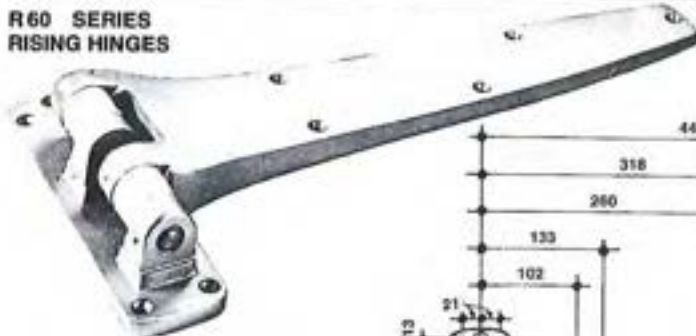
MEDIUM AND HEAVY DUTY HINGES CONTINUED NEXT PAGE.

REFRIGERATION HARDWARE MEDIUM AND HEAVY DUTY HINGES

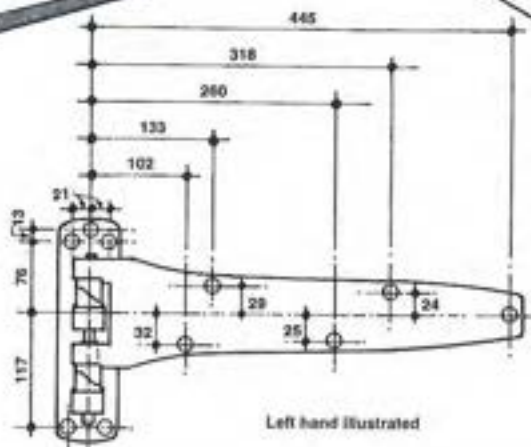
**R58 SERIES
RISING HINGES**


CAT. NOS.			
RH		LH	
R1158	2363	R1158	23620
R1258	2364	R1258	23621
R1358	2365	R1358	23622

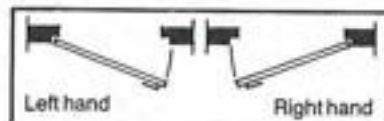

**R1080
PIVOT HINGE**

**CAT. NO.
23624**

**R60 SERIES
RISING HINGES**


CAT. NOS.	
R1160	23614
R1260	23615


HANDING:

Handed. Please state hand when ordering.



4

CAT. NO.	NEW P/N	OLD P/N	DESCRIPTION	OFFSET	APPLICATION — OPERATION SPECIFICATIONS	FINISH	
R58 SERIES					Designed for use on commercial refrigs. & coolrooms. Rising flap hinge with fixed offset opens at 180°. Designed to close door from approx. 90° open. Body & flap - cast brass. Rising cams - delrin, Pin - St. Steel.	CHROME PLATED	
2363	R1158	1058R	RISING HINGES (RH ONLY)	Flush			
2364	R1258	1058R		19mm			
2365	R1358	1058R		28mm			
23620	R1158	1058R	RISING HINGES (LH ONLY)	Flush			
23621	R1258	1058R		19mm			
23622	R1358	1058R		28mm			
23619	WR1158RH-V6		Bottom Cam				RH Nylon Bush Set for R58 Series.
	WR1158RH-V5		Top Cam.				
23618	WR1158LH-V8		Bottom Cam				LH Nylon Bush Set for R58 Series.
	WR1158LH-V9		Top Cam.				
R60 SERIES					For use on large commercial refrigerators & coolrooms. Rising flap hinge with fixed offset opens at 180°. Designed to close door from approx. 90° open. Body & flap - cast brass, Rising cams - delrin, Pin - St. Steel.	CHROME PLATED	
23614	R1160*	1060R	RISING HINGES (RH & LH)	Flush			
23615	R1260*	1060R		19mm			
23624	R1080*	—	PIVOT HINGE (RH & LH)	NIL	Designed for use on commercial coolrooms. Face to edge mounting, lift off type. Unequal length pins for ease of mounting. Opens to 180°, rising pivot gives self-closing action from approx. 90° open. Body & flap - aluminium. Rising Cams - delrin, Pin - St. Steel.	NATURAL	

* State RH or LH when ordering.

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[illegible]

NOW-A-DAYS, THE RELATIVELY HIGH PAY RATES OF MECHANICS AND SERVICEMEN MAKES IT UNECONOMIC TO RUN AROUND TO DIFFERENT SUPPLY HOUSES FOR ODD BALL ITEMS. YOU CAN FIND MOST ANYTHING FOR REPAIR OR INSTALLATION OF REFRIGERATION, AIR CONDITIONING AND HEATING AT YOUR ACPAR CENTRE.

FLEXIBLE DUCTING

ALUMINIUM DUCTING-HAND BENDABLE



1. Can be bent, straightened, rebent as needed for installation purposes.
2. Good air handling characteristics in air conditioning applications.
3. Friction loss and sound generation values are small.
4. Equally good for both positive and negative pressure applications.
5. Helically corrugated wall gives high resistance to crushing.
6. Bends by hand but is resistant to puncturing and damage.
7. Lightweight, durable and self-supporting in spans.
8. All aluminium construction - is non-combustible.
9. Is easy to cut, couple or connect.

CONSTRUCTION:

The ducting has a single ply wall which is helically corrugated. Seam is 4 ply folded flat and crimped. Average wall thickness is 0.006.



TENSILE STRENGTH:

All sizes and types of tests to 50 lbs. minimum tensile without rupture.

RUPTURE RESISTANCE FROM BENDING:

The time and cost saving feature of this ducting is its bendability by hand. In normal installations, some adjustment of bends made in the ducting may be needed. The ducting qualities provide for this. It can be sharply bent, straightened and re-bent several times without damage.

The ducting is supplied with or without factory installed Bradford "Tuffskin" insulation.

ORDERING DATA

VENTFLEX IS AVAILABLE IN THE FOLLOWING SIZES IN STANDARD 3 m (10 ft) LENGTHS

CAT. NO.	SIZE No.	BENDING RADIUS mm (ins.)
	4	102 (4)
	5	127 (5)
	6	152 (6)
	7	229 (9)
	8	254 (10)
	9	279 (11)
	10	330 (13)
	11	355 (14)
	12	406 (16)

When ordering specify insulated or un-insulated

For further technical details apply for Manufacturers Bulletin available on request.

Also available in Type G - Galvanised Steel and Type S - Stainless Steel.

BORAL INSULWOOL



Glass-Flex SL is a factory fabricated lightweight, flexible air duct with outstanding thermal insulation and acoustical properties. It brings a new meaning to the word "flexible" in the heating and air-conditioning industry in Australia. Glass-Flex SL has the unique property of being compressible lengthwise making possible compressive packaging, so minimising storage and transport costs and largely eliminating loss of product through damage in handling.

Glass-Flex flexible duct is recommended for use as a complete duct system or connector on supply and return air lines in residential, industrial and commercial air-conditioning and ventilating systems; in addition, it can be used as runouts to registers, diffusers and mixing boxes.

GLASS FLEX SL FLEXIBLE AIR DUCT

Glass-Flex SL is factory fabricated from a resilient helix of zinc coated spring steel wire. It is internally lined with a tough Aluminium laminate, insulated with Insulwool Fibreglass insulation, and jacketed with a tough Polyethylene sleeve.

TEMPERATURE LIMIT

Glass-Flex SL is capable of continuous operation with air temperatures up to 80°C (176°F).

THERMAL INSULATION

Glass-Flex SL is insulated with Insulwool Fibreglass with minimum Thermal Resistance of 0.6 m² K/W. Nominal thickness of insulation 25 mm.

SIZE

(a) Diameter

Glass-Flex SL is supplied in nominal diameters listed below.

The duct is made slightly oversize to facilitate installation.

Inside Diameter

GLASS-FLEX SL 25	
CAT. NO.	Nom. Diam. mm (ins.)
23852	100 (4")
23853	125 (5")
23854	150 (6")
23855	175 (7")
23856	200 (8")
23857	225 (9")
23858	250 (10")
23859	300 (12")
23861	350 (14")
23862	400 (16")
23863	450 (18")
23872	500 (20")

(b) Length

All diameters are supplied in standard 3 metre lengths.

ALSO AVAILABLE ON APPLICATION

- Glass-Flex SL 50 - 50 mm insulation and polythene jacket
- Glass-Flex 4 Zero 25 - 25 mm insulation and aluminium laminate jacket
- Glass-Flex 4 Zero 50 - 50 mm insulation and aluminium laminate jacket
- Glass-Flex LP181 - uninsulated, with aluminium laminate jacket

REFRIGERATOR DOOR GASKETS

EXTRUDED RUBBER

				
02 BK 09RG CAT. NO. 2391	03 BK 09RG CAT. NO. 2392	04 BK 09RG CAT. NO. 2393	05 BK 09RG CAT. NO. 2394	10 BK 09RG CAT. NO. 2395
				
11 BK 09RG CAT. NO. 2396	12 BK 09RG CAT. NO. 2397	20 BK 09RG CAT. NO. 2399	21 BK 09RG CAT. NO. 23910	26 BK 09RG CAT. NO. 23912
				
27 BK 09RG CAT. NO. 23913	28 BK 09RG CAT. NO. 23914	29 BK 09RG CAT. NO. 23915	31 BK 09RG CAT. NO. 23917	32 BK 09RG CAT. NO. 23918
				
33 BK 09RG CAT. NO. 23919	34 BK 09RG CAT. NO. 23920	36 BK 09RG CAT. NO. 23922	37 BK 09RG CAT. NO. 23923	38 BK 09RG CAT. NO. 23924
				
39 BK 09RG CAT. NO. 23925	40 GY 09RG CAT. NO. 23926	41 BK 09RG CAT. NO. 23927	42 BK 09RG CAT. NO. 23928	45 BK 09RG CAT. NO. 23931

REFRIGERATOR DOOR GASKET AND CABINET COLLAR RUBBER

EXTRUDED RUBBER

 46 BK 09RG CAT. NO. 2401	 48 BK 09RG CAT. NO. 2403	 49 BK 09RG CAT. NO. 2404	 50 BK 09RG CAT. NO. 2405
 51 BK 09RG CAT. NO. 2406	 52 BK 09RG CAT. NO. 2407	 53 GY 09RG CAT. NO. 2408	 54 BK 09RG CAT. NO. 2409
 55 BK 09RG CAT. NO. 24010	 56 BK 09RG CAT. NO. 24011	 57 GY 09RG CAT. NO. 24012	 PVC 32 BLACK CAT. NO. 24015 WHITE CAT. NO. 24017
 PVC 53 NATURAL CAT. NO. 24016	 HVE 610 2 LEG CAT. NO. 24024	 RU/324 3 LEG - As used on Rudnev Cool Rooms CAT. NO. 24022	 Windlace Fabric Coated Sponge Rubber Cool Room Door Gasket 72A 53400 CAT. NO. 24025

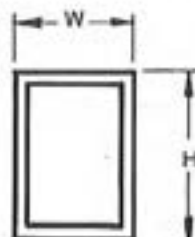
RF-2 2434



MAGNETIC DOOR GASKETS - REFER NEXT PAGE

MAGNETIC DOOR GASKET FABRICATION SERVICE

We have special facilities for fabricating complete pre-joined Magnetic Door Gaskets to your specification quickly. All we require is a sketch or drawing showing the outside dimensions as illustrated below.



These Magnetic Gaskets are used on the majority of modern domestic refrigerator doors.

- ★ Replaces worn or damaged magnetic door gaskets.
- ★ Replaces obsolete locks and catches.
- ★ Suitable for other appliances where door locks or catches are not fitted.

COMPRISES : A PVC gasket section in 3.96 m (13 ft.) lengths which become magnetic when the matching Magnetic Filler, also in 3.96 m (13 ft.) lengths, is inserted.

Note: Although it is possible to effect joins on site or in the factory, great care and skill is necessary to obtain a clean and precise joint.

With our special facilities you can not only save time but be assured of a top quality job with perfect joints.

	UNIROYAL	RBM
DESCRIPTION	CAT. NO.	CAT. NO.
MAGNETIC GASKET complete with FILLER	24031	24031A
MAGNETIC FILLER ONLY 290241	24032	24032A
MAGNETIC GASKET ONLY 290258	24033	24033A

THE DIFFICULT GASKETS WE FABRICATE IMMEDIATELY
THE IMPOSSIBLE ONES TAKE A LITTLE LONGER

Fomofill®

General Purpose Foam

cavity filling foam, seals & insulates

to fill hollow-spaces, holes, joints and cracks, a semi-rigid filler. Excellent adhesion and chemical properties.

FOMOFILL is a general gap filler; in prefab buildings filling gaps in structural elements and skeletal joints, around pipes, joints and bends, around cooling systems. It can also be used for preparing boats and floats; general household renovation and insulation, repair of roofing perimeter and flashing; insulation against heat loss, sound insulation, as reinforcement for finished articles in interior and exterior construction, for potting, designing and hobby use.

FOMO stops air infiltration, air leakage, adds strength, insulates for heat and sound - **SAVE ENERGY** - use around windows, doors, base plates, siding, sheeting and joints, plumbing fixtures and refrigeration and air conditioning systems

TYPICAL PROPERTIES AT 20°C (68°F) AND 50% RH

	FOMOFILL		FOMOFIX	
Free Rise Density	27.2 kg/m ³	1.7 lbs/ft ³	32 kg/m ³	2 lbs/ft ³
Appearance	Semi-rigid		Rigid	
Tack Free	20 minutes		30 minutes	
% of Cavity to Fill	40%		40%	
Closed Cell Content	60% to 80%		80%	
Tensile Strength	120 kPa	12.1 PSI	96.5 kPa	14.0 PSI
Elongation at Break	38%		33%	
Shear Strength	39.3 kPa	5.7 PSI	53.1 kPa	7.7 PSI
Dimensional Stability — —15 to 100°C (5 to 38°F)	1—2%		1%	
Water Uptake/Vol.	6%		4%	
K Factor (Aged)	.21		.24	
Shelf Life at 20°C	12 Months		12 Months	
Colour	Amber		Amber	
Toxicity	Non Toxic in normal use			
Adhesion	Good on all surfaces except PE, Teflon & Silicon			
Chemical Resistance	Good to Excellent			
Approx. Foam Vol. per 18oz. Can	15 litres	4 Galls	10 litres	2.8 Galls
" " " 35oz. Can	30 litres	8 Galls	20 litres	5.5 Galls
Cubic Cap. per 18oz. Can	0.5 ft ³		0.4 ft ³	

TEMPERATURE — ATMOSPHERIC HUMIDITY

During application the temperature of the spray can should be between 68°F-77°F, regardless of the surrounding temperature. Below this requirement, warming in a hand-hot water bath is recommended. Heating above 120°F is strictly to be avoided!

Sufficient atmospheric humidity is important! The foam needs this humidity in order to react well. Deep, dry cavities and those with little air inlet should be slightly moistened to give a damp, though not wet, surface. Remaining dampness disappears upon foam reaction. Too much wetness, however reduces the adhesion and generates voids.

Fomofix®

Assembly Foam

foamable construction adhesive & sealant

for assembling, sticking, filling, plugging and insulation a rigid assembly foam serving as a foamable construction adhesive with high mechanical properties and an excellent adhesion to other materials

FOMOFIX Assembly Foam is the ideal froth for mounting, fixing, glueing, sealing, thermal and sound insulation of all building materials, bricks, wood, etc.

FOMOFIX has high tackiness for long periods and can withstand high loads. These properties together with its high mechanical workability make FOMOFIX an ideal adhesive for Construction Applications.



APPLICATION

Take note of the can temperature! Shake the can thoroughly once more. Always keep the valve away from the body, pointing downwards, and begin foaming in the lowest part of cavity.

After extrusion from the nozzle or extension FOAM begins to rise slowly in all directions. The amount extruded more or less triples in size during a period of about 60 minutes. Therefore fill only about 40% of the cavity. A closed skin forms on the surface, which is tack-free after 20-30 minutes. The foam, however, continues to rise slowly.

POST TREATMENT

In less than 24 hours FOMO one-component-polyurethane-foams can be fully trimmed, painted, plastered or finished by conventional methods.

PRODUCT	SIZE	CAT. NO.	YIELD OF FOAM
FOMOFILL	18 oz. Can	2421	Up to 15 Litres (3.3 Imp. Gal.)
	35 oz. Can	2422	Up to 30 Litres (6.6 Imp. Gal.)
FOMOFIX	18 oz. Can	2425	Up to 10 Litres (2.2 Imp. Gal.)
	35 oz. Can	2426	Up to 20 Litres (4.4 Imp. Gal.)

THERMAL INSULATION

POLYURETHANE POURING FOAM - TYPE G

SELF EXTINGUISHING RIGID FOAM FOR BUOYANCY, INSULATION, PACKING, ETC.

The material is supplied in two cans marked A and B. When mixed together in equal proportions foaming occurs, and produces a closed cell structure which sets to form a rigid polyurethane foam of approximate density of 32 to 36 kg/m³ (2 to 2½ lbs/ft³) i.e. each cubic metre or cubic foot of foam will produce 27.3 kg (60 lbs) buoyancy. The foam is not affected by water, oil or petrol. Polyester resin may be applied directly to it, thus making fibreglassing a simple operation, or paints and adhesives may be used on the set foam.

Originally designed for low temperature insulation, the closed cells also make it ideal for use as a buoyancy material, cores in light weight sandwich construction, potting and encapsulation of electric and electronic components, reinforcement, void filling, wreath rings, models, etc. It has also found great use in the making of stage props, because of its strength and lightness. Adhesion to metals, wood and many plastics is excellent.

DIRECTIONS FOR USE:

Into two similar shaped vessels pour equal quantities of A and B, and then pour B (the thinner liquid) into A. Rapidly stir the mixture for approximately 20 seconds by hand (a shorter period if using a mechanical stirrer, such as a mixer fitted to an electric drill) and then pour into the cavity to be filled, distributing as equally as possible over the bottom. Foaming should commence within one minute of first mixing, and the foam will be set within a quarter of an hour. The second layer may then be poured if necessary.

The cavity into which the foam is to be poured should be dry, clean and free from dirt to obtain the best bonding and foam performance. If the space is enclosed, vent holes must be made to allow escape of air, and thus permit the foam to rise. It is better to under-fill and top up afterwards in order to prevent pressures developing. Wax the mould to enable removal after pouring if this is required. Foam will not penetrate paper, and this may be used to cover any parts to be kept clean. Moulds lined with paper allow the block to be lifted out after setting.

Tools, spills of foam etc., may be cleaned with acetone before it sets. The material is difficult to remove from cloth, and old clothes should be worn. Due to the difficulty in cleaning mixing vessels, it is advisable to use disposable containers or those made from polythene, to which the foam will not stick. Plastic cups may be used, but wax containers are not recommended. The resultant density of the foam is in some degree dependant on the amount poured. Small quantities will produce a more dense foam than larger quantities, and so not give the same volume per kg. (lb.). Material allowed to expand freely (open pours) will be less dense than if foaming occurs in confined areas. When pouring in thin panels the following gives an indication of the increase of density to be expected:-

Application	Panel Thickness mm (ins)	Final Density kg/m ³ (lbs/ft ³)	Free Rising Density kg/m ³ (lbs/ft ³)
Refrigerators	25.4 - 38.1 (1 - 1.5)	43.3 - 51.3 (2.7 - 3.2)	32 (2.0)
Freezers	50.8 - 69.9 (2 - 2.75)	38.4 - 44.9 (2.4 - 2.8)	32 (2.0)
Building Panels	38.1 - 61 (1.5 - 2.4)	51.3 - 57.7 (3.2 - 3.6)	32 (2.0)

This increase of density of small pours and in narrow cavities is explained by the breakdown of bubbles to form a skin in contact with the mould which, having higher density, influences the final density of the pour, as it amounts to a greater percentage of the total. This breakdown is again influenced by the temperature of the mould and the thermal conductivity which may drain away the exothermic heat generated and so reduce the heat available to expand the blowing agent. Warm moulds will thus give a less dense foam. Another reason for heavier foams is friction requiring more effort to lift the foam. The optimum temperature for a mould is from 29.4 to 48.9°C (85 to 120°F). It is not desirable to attempt to blow a foam more than 30 cms. (12") in height under normal usage. Pouring foam may be used in conjunction with solid blocks of polyurethane foam, or with buoyancy tanks.

Pouring foam Type "G" is brown in colour. It may be painted if appearance is of importance, and it is recommended that it be covered, particularly if the skin has been cut away in trimming, to expose the cells, as abrasion will break it up. Fibreglass timber or painted canvas may be used. This grade of polyurethane foam is self-extinguishing, i.e., the flame will die out if the source of burning is removed. Naturally, if petrol is spilt on it and ignited, it will burn until the supply of petrol is exhausted.

STORAGE AND TRANSPORT:

As the foam contains a blowing agent which vaporises at a low temperature, it should be kept in a cool place and should not be consigned by air freight because of the lower atmospheric pressures, which could possibly damage the cans. Part A should not be opened when the material is above 21°C (70°F), as loss of the blowing agent may occur.

CLEANING:

As the material is chemically resistant and insoluble once cured, it is essential that cleaning up should be done before this happens. Acetone or lacquer thinners may be used.

SUMMARY:

- (1) Prepare mould or cavity, fencing off with waxed stiff cardboard or similar sheeting.
- (2) Estimate quantity of material to be used, allowing 32 to 36 kg/m³ (2 to 2½ lbs, per cubic foot).
- (3) Measure out A and B in separate containers.
- (4) Pour B into A and mix thoroughly.
- (5) Pour into cavity and distribute before foaming commences. Allow to expand, set, and then top up if necessary.
- (6) Trim if necessary. Break up scraps and include in next pour.

SAFETY PRECAUTIONS:

All foaming operations should be conducted in the open or in well ventilated areas - forced ventilation should be used in confined areas. Avoid breathing of vapours. The use of rubber gloves and goggles or face shield is highly recommended as a precautionary measure. The use of a respirator is imperative in spraying operations. Part B is classified as a toxic material. Avoid contact with skin, eyes or clothing. Avoid breathing of vapours. In case of contact with eyes, flush with plenty of pure water and get immediate medical attention. Wash skin or clothing immediately with alcohol then with plenty of soap and water.

CAT.NO.	AVAILABLE IN
24222	1.25 kg. KITS
24223	2.50 kg. KITS
24224	5.00 kg. KITS
24225	44.00 kg. DRUMS

FIGURE THE ODDS

BECAUSE WE BELIEVE OUR STOCK IS ONE OF THE LARGEST AND MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY, THE MATHEMATICAL ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACPAR THAN ANYWHERE ELSE.

IF TIME IS MONEY, WHY WASTE IT BY LOOKING ELSEWHERE.

THERMAL INSULATION

Insta-foam® froth-pak® kits



INSTA-FOAM FROTH-PAK URETHANE offers excellent THERMAL INSULATION VALUES. The thermal insulation qualities of INSTA-FOAM URETHANE at 1.75lbs/cu.ft. are among the best available for today's ENERGY CONSERVATION INDUSTRY.

URETHANE FOAM DISPENSING SYSTEMS FOR:

- ROOF REPAIR • WINDOW-DOOR CAULKING
- TANK REPAIR • REFRIGERATION INSULATION
- CONSTRUCTION JOINTS • RAIL CAR REPAIR
- PIPE FITTINGS - JOINT - ELL'S • VOID FILLER
- REEFER - TRUCK - REPAIR • PACKAGING
- HOPPER CAR SEALANT • BLOCKING BRACING
- DUCT WORK SEALANT • PIPE CHASE CAULKING
- IN-PLACE GASKETING • VIBRATION DAMPENING
- MARINE FLOTATION • BOARD STOCK SEALANT

CAT. NO.	KIT SIZE	BOARD FEET PRODUCED
24210	FP-9.5 (Small Vol.)	9.5
24211	FP-180 (Medium Vol.)	180
	FP-600 (Large Vol.)	600

FROTH-PAK kits are available in three sizes, each complete with all required chemical components, dispensing equipment and instructions



FP-9.5 (Small Volume)



FP-180 (Medium Volume)



FP-600 (Large Volume)

Small-Volume kits are provided with two spray nozzles, each nozzle with a pair of plastic hoses. These attach in the compartment at the bottom of the kit. Medium & Large-Volume kits include 10 spray nozzles, a gun-and-hose assembly, wrench and a small tube of Vaseline. These are packed in the base of the Medium-Volume kits and in a separate carton with Large-Volume kits.

4

FIXOPUR®

Assembling- and filling foam

Product Description

Fixopur is a one-component polyurethane foam in an aerosol can. By pressing the foaming-head, a stream of sticky foam, pre-reacted by a propellant gas, exudes. By absorbing humidity, the foam cures

within about 3 hours depending on the width of the joint. The foam should not be subjected to loads until at least 8 hours after processing. During the first hour, while the foam is still sticky, volume expansion takes place.

CAT. NO.	SIZE	TYPE No.	EXPANDED VOLUME FREE RISE	DENSITY
24220	1 kg. Kit	FP - 1000	Approx. 40 Litres per Can	Approx. 20 kg/m ³

UREPACK Synthetic Resin Pouring Foam Kits

CAT. NO.	KIT SIZE	KIT COMPRISES	FREE CAPACITY
24212	1 Litre	Part A 1 x 500 ml Part B 1 x 500 ml	0.06 m ³ (2 ft. ³)
24213	2 Litre	Part A 1 x 1 Litre Part B 1 x 1 Litre	0.11 m ³ (4 ft. ³)

CAT. NO.	KIT SIZE	KIT COMPRISES	FREE CAPACITY
24214	4 Litre	Part A 1 x 2 Litre Part B 1 x 2 Litre	0.23 m ³ (8 ft. ³)
24215	8 Litre	Part A 1 x 4 Litre Part B 1 x 4 Litre	0.42 m ³ (15 ft. ³)

FINIFIX Expanding Polyurethane Foam Spray Pack

CAT. NO. 2427

750 gram Can

[illegible]

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

COMPRESSOR SPECIFICATIONS

The following compressor specifications have been compiled from manufacturers data sheets and to the best of our knowledge are correct. However, no responsibility can be accepted for any errors of inaccuracies.

MAKE AND MODEL	BORE INS.	RING WIDTH INS.	PIN DIAM INS.	NO. OF CYLS	SHAFT SIZE INS.	OIL CHARGE PINTS	NO. OF BELTS	H.P. RANGE
BARBERIE								
Single	1.1/4	—	1/2	1	5/8	1/2	1	1/6
Twin	1.1/4	—	1/2	2	5/8	1/2	1	1/4
BRUNNER — (GORDON)								
S340	1.1/2	COMP 3/32 OIL 1/8	1/2	2	11/16	1.3/4	2	1/4 — 1/2
R330	1.13/16	1/8	1/2	2	11/16	1.3/4	2	3/4
R500	2.1/8	1/8	5/8	2	7/8	2.1/4	2	3/4 — 1
R650	2.1/2	1/8	3/4	2	1.1/8	3.1/4	2	1-3
R2002	3.1/4	1/8	3/4	2	1.1/4	4	3-4	2-5
R5002	3.1/4	1/8	3/4	4	1.1/4	6	4	5-10
R10000	4.1/4	1/8C 3/16D	1.1/8	4	2	16	5	10-20
R20000	4.1/4	1/8C 3/16D	1.1/8	4	2	28	7	20-30
BITZER								
NO.2 COMPRESSOR	1.574	METRIC SIZES		2				
NO.3 COMPRESSOR	1.968			2	18MM.	1.7/8	1-A	3/4-1
NO.4 COMPRESSOR	2.559			2	18MM.	1.1/3	1-B	3/4-1.1/2
NO.5 COMPRESSOR	2.346			2	20MM.	1.1/3	1-B	1.1/2-2
NO.6 COMPRESSOR	4.139			2	30MM.	1.1/3	1-B	2-3
NO.7 COMPRESSOR	4.724			2	35MM.	2.1/4	2-B	2-5
NO.BK2 COMPRESSOR	4.724			2	40MM.	3.1/2	2-B	2-5
COLDSTREAM-BELT DRIVEN								
CH	1.9/16	—	• 1/2	1	1/2	1.1/8	1	1/6
KB	1.3/4	—	• 1/2	1	1/2	1.1/4	1	1/4 — 1/3
P	1.9/16	—	• 1/2	2	7/8	2.3/4	1	1/3 — 1/2
Q	1.3/4	—	• 1/2	2	7/8	2	2	3/4 — 1
M	2	—	• 1/2	2	7/8	2	2	1-2
T-TB	2	ALL MODELS	• 1/2	2	7/8	2.1/4	2	2-3
J-JB	2.5/16	COMP 3/32	• 1/2	2	7/8	2.3/8	2	3-5
R, Prior to 1948	2.9/16	OIL - 1/8	3/4	2	15/16	4.3/4	3	3-5
RO	3.1/16		3/4	2	1.1/8	5	3	5
O, Prior to 1948	3.1/16		3/4	2	15/16	4.3/4	3	2-3
OU	3.1/16		3/4	2	1.1/8	5	3	1.1/2 — 10
COLDSTREAM-SEMI-SEALED								
CY	1.9/16			1		3/4		1/6
KY	1.9/16			1		3/4		1/3
BY	1.9/16			1		3/4		1/2
NY	1.9/16			1		3/4		3/4
NX	2			1		3/4		1.1/2
BU	2			2		2		2
NU	2			2		2		3
NZ	2.1/4			1		3/4		2-3
NE	2.1/4			2		2.1/2		3
EMMCO (EARLY MODELS)								
A,EA	1.1/2	1/8	7/16	1	5/8	1/2	1	1/6
C,CD,SC	1.1/2	1/8	7/16	2	5/8	1	1	1/4
B	1.11/16	1/8	7/16	1	5/8	1/2	1	1/4
D,ED	1.11/16	1/8	7/16	2	5/8	1	1	1/3
SE,SEF	1.13/16	1/8	1/2	2	5/8	2	2	1/2 — 3/4
DE	2	1/8	7/16	2	5/8	1	1	1/3
DX	2	1/8	1/2	2	5/8	1.1/2	1-2	1/3 — 1/2
E,EF	2	1/8	1/2	2	5/8	2	2	1/2 — 3/4
SF	2.1/4	1/8	1/2	2	3/4	2	2	1
F,FF	3	3/16		2	7/8	3	3	2-3
EMMCO (LATER MODELS)								
R,L	1.1/4	—	1/2	1	5/8	1	2	1/8 — 1/6
S	1.1/4	—	1/2	2	5/8	1.1/2	1	1/4
G,K	1.1/4	—	1/2	2	5/8	1.3/2	1	1/4
AS,RS	1.1/2	—	1/2	1	5/8	1/3	2	1/6 — 1/4
J,M	1.1/2	—	1/2	2	5/8	1.3/2	1	1/3
CS	1.1/2	—	1/2	2	5/8	7/8	1-2	1/4 — 1/3
ES	1.13/16	1/8	5/8	2	7/8	1.3/4	2	1/2 — 3/4
N,P	1.13/16	1/8	5/8	2	7/8	2.3/4	2	3/4 — 1
T	2.1/4	1/8	3/4	2	1.3/16	3.1/4	2	1.1/2
U	2.3/4	3/16	3/4	2	1.3/16	3.1/4	2	2-3
Q	3.1/4	3/16	1	2	1.3/8	5	2	3-5

* Original equipment pin — Actual diameter .499”.

USE ACPAR PARTS TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

COMPRESSOR SPECIFICATIONS

MAKE AND MODEL	BORE INS.	RING WIDTH INS.	PIN DIAM. INS.	NO. OF CYLS.	SHAFT SIZE INS.	OIL CHARGE PINTS	NO. OF BELTS	H.P. RANGE
ECKERSLEY (ZERO-HEAT)								
A	1.1/2	1/8	—	2	5/8	1.1/2	1	1/4
B	1.5/8	1/8	—	2	5/8	1.1/2	1	1/3
BH	1.13/16	1/8	—	2	5/8	—	1	1/2
C2, D2	2	1/8	—	2	7/8	5.1/2	2	3/4 - 1
E2, F2	2.3/8	1/8	—	2	7/8	5.1/2	3	1.1/2 - 2
EE2, FF2	2.3/8	1/8	—	4	1	10.1/2	4	3 - 4
ELLIS & JUDGES								
A	1.5/8	1/8	1/2	2	5/8	3/4	1	1/3
AA	1.3/4	1/8	1/2	2	5/8	3/4	1	1/2
B	1.7/8	1/8	1/2	2	3/4	2	2	1/2
C	2.1/4	1/8	1/2	2	3/4	2	2	3/4
D	2.1/4	1/8	1/2	4	3/4	4	2	2
E	2.1/4	1/8	1/2	6	3/4	6	2	3
CC	2.3/8	1/8	1/2	2	3/4	2	2	1
DD	2.3/8	1/8	1/2	4	3/4	4	2	2 - 3
EE	2.3/8	1/8	1/2	6	3/4	6	2	5
TP	1.3/4	—	9/16	2	1	2	2	1 - 5
VP	1.3/4	—	9/16	4	1	2	3	2 - 7.1/2
FRIGIDAIRE								
AD016/25, AF020/25	1.1/4	—	—	2	5/8	1/2	1	1/6
AA/5, 547/8, 748	1.1/2	—	—	2	5/8	1/2	1	1/6
A/AF125	1.1/2	—	—	2	5/8	1	1	1/4
A,B,G,S, early	1.1/2	—	—	2	5/8	1.1/4	1	1/4 - 1/3
AD/AF133	1.1/2	—	—	2	5/8	1.1/4	1	1/3
AF250/375, AD/WD2	1.3/4	1/8	—	2	15/16	2.7/8	1 - 2	1/2 - 1
N.Y.	1.7/8	1/8	—	2	5/8	2.7/8	1	1/3
N.O.	2.1/8	1/8	—	2	5/8	2.7/8	1	1/2
AD/WD4, AF4100	2.1/8	1/8	—	2	15/16	2.1/2	2	1.1/2
AD/WD6	2.1/2	1/8	—	2	15/16	—	2	2 - 3
JACK FROST (GORDON)								
OR	1.5/8	1/8	7/16	2	5/8	1.1/2	2	1/4 - 1/2
R	2	1/8	1/2	2	3/4	2.1/2	2	1/2 - 3/4
RA	2	1/8	1/2	4	29/32	4	3	1.1/2 - 2
RA4	2.1/4	3/16	9/16	2	13/16	3	2	1 - 1.1/2
RA4	2.1/4	3/16	9/16	4	29/32	5	3	2 - 3
BV4	2.1/2	3/16	11/16	4	15/16	3	5	5 - 7.1/2
HALLMARK								
2A	1.3/8	—	3/8	2	3/4	1.1/2	—	1/3
2B	1.5/8	—	1/2	2	13/16	2	—	1/2 - 3/4
2C	2	—	9/16	2	15/16	3	—	3/4 - 1
3C	2	—	9/16	3	15/16	4	—	1 - 2
2D	2.1/2	1/4	3/4	2	1.5/16	5	—	2
3D	2.1/2	1/4	3/4	3	1.5/16	6	—	3
4D	2.1/2	1/4	3/4	4	1.5/16	8	—	4 - 5
TW1	4	5/16	1.1/4	2	1.7/8	12	—	6 - 10
TW2	4	5/16	1.1/4	3	1.7/8	14	—	8 - 12
JOMOCO								
RC-13	1.1/4	—	1/2	1	5/8	3/4	1	1/6
RC-50	1.1/4	—	1/2	2	5/8	1.1/8	1	1/5 - 1/4
RC-19	1.1/2	—	1/2	1	5/8	3/4	1	1/6 - 1/5
RC-30	1.1/2	—	1/2	2	5/8	1.1/8	1	1/3
RC-60	1.11/16	—	1/2	2	5/8	1.1/8	1	1/2
KELVINATOR								
SA	1.1/4	—	1/2	1	5/8	3/4	1	1/6
SB, SSB	1.1/4	—	1/2	2	5/8	1.1/2	1	1/4
SO, SSG	1.1/2	—	1/2	2	5/8	1.3/4	1	1/3
H,GH	1.11/16	—	1/2	2	5/8	1.1/4	1	1/3 - 1/2
PFBA	1.13/16	1/8	5/8	2	5/8	1.3/4	2	3/4
K	2.1/4	1/8	3/4	2	7/8	3	2	3/4 - 1
Y	2.3/4	1/8	3/4	2	1.3/16	3.1/4	2	1.1/2 - 2
T	3.1/4	3/16	1	2	1.3/8	4.7/8	2	3 - 5
83	3.150	—	—	3	—	—	3B	10 - 15
84	3.150	—	—	4	—	—	4B	15 - 20
86	3.150	—	—	6	—	—	4B	20 - 25

MAKE IT AN ACTROL PART — YOU'LL APPRECIATE THE SERVICE AND BACKING

COMPRESSOR SPECIFICATIONS

MAKE AND MODEL	BORE INS.	RING WIDTH INS.	PIN DIAM. INS.	NO. OF CYLS.	SHAFT SIZE INS.	OIL CHARGE PINTS	NO. OF BELTS	H.P. RANGE
Kirby — Tecumseh — Belt Driven								
HQ 1000	1.7/8			2	7/8	325 C.C.	1	—
CG (HGC)	1.7/8			2	7/8	325 C.C.	2	3/4 — 2
CH (VFT)	1.3/4			4	1	739 C.C.	2	2 — 3
CJ (VFTL)	1.3/4			4	1	1478 C.C.	2	2 — 5
P (N.L.A.)	2.1/2			3	1.1/4	7.1/2 PTS	2	3 — 5
CK (RA)	3.1/4			3	1.1/4	8 PTS	4	5 — 10
CM (SA)	4			3	2.1/4	14 PTS	6	10 — 20
Terry (Belt Driven)								
E	1.515	—	1/2	1	1/2	1	1	1/6
K	1.515	—	1/2	2	3/4	3/4	2	—
VL	1.515	—	1/2	2	5/8	1.1/4	1	1/3
BR	1.5/8	—	1/2	1	1/2	1	1	3/4
YL	1.5/8	—	1/2	2	5/8	1.1/4	1	1/2
D	1.5/8	—	1/2	2	5/8	2.1/4	2	1/2 — 3/4
C	1.3/4	—	1/2	1	5/8	1.1/8	1	1/3
X	1.3/4	—	1/2	2	5/8	1.1/4	1	3/4
U, UHR, ETC	1.7/8	—	1/2	2	15/16	1.1/4-2.1/4	2	1 — 1.1/2
RR, RRF	2"	—	9/16	2	15/16	2.1/4	2-3	5 — 1.1/2
A, J, F, P	2.3/4	1/8	7/8	2	1.3/16	3.1/2	3	2 — 10
V8, V4S	2.3/4	1/8	7/8	4	1.3/8	4.1/2	5	5 — 20
KU	1.656	3/32	5/8	2	1.5/16	1	2A	1 — 2
RA	2.25	1/8	11/16	2	1.1/4	2.75	3A	2 — 5
PJ	2.75	1/8	7/8	2	1.1/4	3.5	3B	3 — 10
PJS	2.75	1/8	7/8	2	1.1/4	3.5	3B	3 — 10
JY	2.75	1/8	7/8	2	1.1/4	3.5	3B	3 — 7 1/2
PV	2.75	1/8	7/8	2	1.1/4	3.5	3B	5 — 10
V5	2.75	1/8	7/8	4	1.3/8	4.5	4B	7 1/2 — 15
Terry-Comel (Belt Driven)								
65				2	16 MM	1	1 — A	3/4 — 1.1/2
125				2	20 MM	2.1/2	2 — A	1 — 2
200				2	20 MM	3.1/3	2 — A	2 — 4
355				2	25 MM	3.2/3	3 — A	3 — 5
Terry — Semi Sealed								
SX Series	1.3/8			1		1		
SD Series	1.5/8			1		1		
TY Series	1.3/8			2		1		
TR Series	1.515			2		1		
TM Series	1.5/8			2		1.3/4		
TG, TL, Series	1.7/8			2		1.3/4 — 3		
G, Q, QG Series	1.7/8			4		4.1/2 — 5		
R2 Series	2			2		3		
R4 Series	2			4		4.1/2		
Universal Cooler								
A, AA	1.1/2	1/8	7/16	1	15/16	1	1	1/6
CC, DD	1.1/2	1/8	7/16	2	15/16	1	1	1/4
FF	1.3/4	1/8	7/16	2	15/16	1	1	1/3
J Standard Twin	1.13/16	5/32	9/16	2	15/16	1	1	1/3
K Super Twin	2.1/4	5/32	9/16	2	15/16	2	1	1/2 — 3/4
L Royal Twin	2.1/4	5/32	9/16	2	15/16	2.7/8	1	3/4 — 1
M Master Twin	2.1/4	5/32	9/16	2	1.1/4	4.3/4	2	1 — 1.1/2
N Imperial Twin	2.1/4	5/32	9/16	2	1.1/4	5.1/4	2	1.1/2 — 2
P Standard 3 Cyl.	2.1/2	1/8		3	1.1/4	7.1/2	2	2 — 3
R Super 3 Cyl.	3.1/4	1/8		3	1.1/4	8	4	3 — 5
VELOC								
No. 2 Compressor								
3 Compressor								
4 Compressor								
5 Compressor								
6 Compressor								
7 Compressor								
WERNER — BELT DRIVEN								
G	1.5/8	1/8	7/16	2	11/16	1.1/2	2	1/3
JR, JJ	1.5/8	1/8	7/16	2	11/16	1.3/4	2	1/3
D	1.5/8	1/8	7/16	2	11/16	2.1/4	2	1/3
JB	1.3/4	1/8	7/16	2	11/16	1.3/4	2	1/2
M, N, NM	2	1/8	5/8	2	11/16	1.1/2	2	1/2 — 3/4
PP	2	1/8	5/8	2	1	4	2	3/4 — 1
Z	2	1/8	5/8	2	1	3.1/2	3	1
V, RV	2.1/2	1/8	5/8	2	1	3	4	3
W, RW	2.1/2	1/8	5/8	3	1	3.1/2	3	1.1/2
VV	2.3/4	1/8	5/8	2	1	2.1/4	4	3
WW	2.3/4	1/8	5/8	2	1	2.1/2	2	2
H-W	3.1/4	3/16	1	2	1.1/4	4	3	4
T-LT	3.1/4	3/16	1	3	1.1/4	5	3	5 — 7.1/2
SS	3.1/16	Comp 3/32	3/4	2	1	2.3/4	3	5
TV	3.1/16	Oil 5/32	3/4	4	1.1/4	6	4	10
TT	2.1/4	1/8	3/4	2	1.3/16	3	2	1 — 1.1/2
UU	2.3/4	1/8	3/4	2	1.3/16	3.1/4	2	1.1/2 — 2
QQ	3.1/4	3/16	1	2	1.3/8	4.7/8	2	3 — 5

SEE BITZER

BITZER COMPRESSORS AND CONDENSING UNITS

FOR R12 AND R502



Bitzer compressors are constructed according to the counter flow principle and are the result of over 30 years' experience in the manufacture of refrigerating and air-conditioning machinery. The compressors are adaptable for R12, R22 and R502 applications with the respective range of the application being contingent on the speed of rotation of the compressor. Compressors Type 6 and 7 are provided with a screw-in thread for a heating cartridge in the oil sump. The cartridge is supplied as an extra.

All compressors from Type 3 up are equipped with bronze bearings and from Type 4 up with piston rings. All surfaces and bearings are accurately honed to fine limits to guarantee long life and trouble-free service.

FURTHER TECHNICAL DETAILS AND ENGINEERING RECOMMENDATIONS ON APPLICATION.

GENERAL COMPRESSOR SPECIFICATIONS (APPROXIMATE TO NEAREST ORIGINAL METRIC VALUES)

CAT. No.	MANUF. MOD. No.	BORE in.	STROKE in.	No. OF CYLS	PUMPED VOL. cu.ft./Rev.	SPEED RANGE		OIL CHGE Imp. pts.	SERVICE VALVES		FLY WHEEL		CONNECT. N.P.T.F.	
						Min.	Max.		Disch.	Suct.	Diam. O.D.	G.R.-Sect.	Gauge	Oil Ret.
2531	2	1-574	1-181	2	0-002652	450	1000	1-0	FL.	FL.	10 1/2"	1-B	1/2"	1/2"
2532	3	1-968	1-574	2	0-005538	430	1000	1-5	FL.	FL.	10 1/2"	1-B	1/2"	1/2"
2533	4	2-559	1-968	2	0-011710	350	740	2-2	FL.	FL.	15"	2-B	1/2"	1/2"
2534	5	3-346	2-362	2	0-02403	300	590	3-5	FL.	SL.	17 1/2"	2-B	1/2"	1/2"
2535	6	4-139	2-953	2	0-04596	300	550	8-5	SL.	2-1/2 SL.	17 1/2"	3-B	1/2"	1/2"
2536	7	4-724	3-346	2	0-06782	350	505	10-6	SL.	2-1/2 SL.	19 1/2"	4-B	1/2"	1/2"
2537	BK-2	4-724	2-598	2	0-05268	750	1300	10-6	SL.	2 1/2 SL.	19 1/2"	5-B	1/2"	1/2"

CONDENSING UNIT SPECIFICATIONS AND CAPACITIES — REFRIGERANT 502

CONDENSING UNIT SPECIFICATIONS AND CAPACITIES — REFRIGERANT 22														
CAT. No.	COMPRESSOR				CAPACITY B.T.U./HR. AT SATURATED SUCTION GAS TEMPERATURE °F.									
	MANUF. MOD. No.	COND. SIZE	R.P.M.	C.F.H.	-45	-35	-25	-15	-10	-5	0	+5	+10	+15
25311	2-02	E32	500	80	730	1065	1430	1890	2170	2470	2780	3170	3475	3855
25312			900	143	1314	1917	2574	3402	3906	4446	5004	5706	6255	6939
25313	3-02	E32	675	224	2092	2943	4010	5366						
25314			675	224					6156	7020	7898	8843	9855	10868
25315	4-02	E33	900	299	2790	3924	5346	7155	8208	9360	10530	11790	13140	14490
25316			900	299	2790	3924	5346	7155	8208	9360	10530	11790	13140	14490
25317	4-02	E42	590	415	4002	5616	7620	10820	11810	13320	15120	17100	19200	21360
25318			740	520	4936	6926	9398							
25319	5-02	E43	740	520				12580	14578	16428	18648	21090	23680	26340
25320			415	600	5810	8176	10956	14359	16185	18343	20833	23282		
25321	5-02	E53	500	721	7200	9850	13200	17300	19500	22100				
25322			550	792	7700	10835	14520	19030	21450					
25323	5-02	E54	590	851	8400	11820	15840	20760					26300	30835
25324			415	600										26300	30835
25325	5-02	E54	500	721							25100	28050	31700	37150
25326			550	792							24310	27610		
25327	6-02	E55	590	851										
25328			550	792										
25329	6-02	EH66	590	851										44580
25330			350	965	9205	12985	17430	23205	26425	29995				
25331	6-02	E66	415	1144	11288	15936	21373	28345	32370	36728				
25332			500	1379	13150	18550	24900	33150						
25333	6-02	EH66	550	1517	14465	20405	27390							
25334			350	965								33775	37800	43950	48200
25335	7-02	E76	415	1144							41293	46480	49800	53950
25336			500	1379						37750	42850	48250	54000	58500	63500
25337	7-02	EH66	550	1517					36465	41525	47135	53075	59400	
25338			550	1517										64350	69850
25339	7-02	E76	420	1709	16674	23646	31668	41160	46200	52920	59640			
25340			420	1709									67200	72660	79800
25341	7-02	E76	490	1994	19850	28150	37700	49000	55000	63000	71000	80000	86500	

NOTE.—R12 CAPACITIES FOR UNITS WITH COMPRESSORS 2-12 TO 7-12 CONTINUED OVERLEAF
CAPACITIES BASED ON 90°F. AMBIENT AIR TEMP. (BASIC UNITS 105°F. CONDENSING), 5°F. LIQUID SUB-COOLING AND ADEQUATE HEAT EXCHANGE CONDITIONS
TO ENSURE MODERATE AND DRY SUPERHEATED SUCTION GAS RETURN INTO COMPRESSOR.
FOR EACH 10°F. INCREASE IN AMBIENT AIR TEMPERATURE, DECREASE CAPACITY BY APPROX. 6%.

QUICK AS A FLASH

AND VERY CAREFUL. THAT'S OUR ORDER DEPARTMENT. WHETHER YOUR ORDER IS LARGE OR SMALL, IT WILL RECEIVE PROMPT AND EXACTING ATTENTION. WE DESPATCH OVER 90% OF ALL ORDERS ON THE SAME DAY THEY ARE RECEIVED.

BITZER COMPRESSORS AND CONDENSING UNITS

FOR R12 AND R502



Bitzer condensing units are manufactured in a range of sizes and types to suit all applications from 1/2 to 35 H.P.

The compressors are twin cylinder and the condenser sizes can be varied to cover applications from -30°F. to +45°F. using the same size compressor. B.T.U. output is in accordance with the speed of the compressor.

All units have heavy steel frame, integral liquid receiver and belt guard for complete protection.

A Catalogue Number is given for every combination. Once having made your selection you only need to quote the catalogue number to obtain your exact requirement.

FURTHER TECHNICAL DETAILS AND ENGINEERING RECOMMENDATIONS ON APPLICATION.

CONDENSING UNIT SPECIFICATIONS AND CAPACITIES — REFRIGERANT R12

CAT. No.	COMPRESSOR				CAPACITY B.T.U./HR. AT SATURATED SUCTION GAS TEMPERATURE °F.									
	MANUF. MOD. No.	COND. SIZE	R.P.M.	C.F.H.	-30	-20	-10	0	+10	+20	+25	+35	+40	+45
2541	2-12	E32	600	95	1026	1260	1614	2184	2796	3600	4176	5406	6420	7140
2542			755	120	1283	1583	2018	2730	3495	4500	5220	6758	8025	8925
2543			970	154	1659	2037	2609	3531	4520	5820	6751	8740		
2544	3-12	E33	970	154									10379	11543
2545			430	143	1406	1896	2550	3294	4214	5289	5934	7353	8170	8858
2546			590	196	1929	2596	3499	4519	5782	7257	8142	10089		
2547		E32	755	251	2453	3308	4448	5745	7350	9220				
2548			810	269	2649	3572	4803	6205						
2549			970	322	3172	4277	5752	7430						
25410		E33	590	196									11210	12154
25411			755	251						10350	12825	14250	15450	
25412			810	269				7938	9963	11178	13851	15390	16686	
25413	4-12	E42	970	322				9506	11931	13386	16587			
25414			445	313	3074	4118	5544	7216	9240	11616	13112			
25415			590	415	4390	5522	7430	9676	12390	15576				
25416		E43	740	520	5506	6926	9324	12136						
25417			445	313								16280	17776	19404
25418			590	415							17582	21830	23836	26019
25419		E53	740	520					15540	19536	22052			
25420			445	313								27380	29896	32634
25421			590	415								24056	27590	
25422	5-12	E53	310	447	4557	5921	7936	10354	13516	17484	19561			
25423			405	584	5954	7736	10368	13527	17658	22842				
25424			500	721	7350	9550	12800	16700	21800					
25425		E54	550	793	8085	10505	14080	19470						
25426			405	584						25556	31428	36045		
25427			500	721						28200	31550			
25428		E55	550	793					23980	31020	34705			
25429			405	584										38273
25430			500	721								38800	44500	
25431	6-12	E55	550	793								42680		
25432			310	855	9920	11470	15000	19220	24955	31620	35340			
25433			355	979	11200	12950	16940	21735	28175					
25434			465	1282	14720	17020	22264	28520						
25435			500	1379	16000	18500	24200	31000						
25436			550	1517	17600	20350	26620							
25437		E66	310	855								43400	48670	
25438			355	979						35700	39900	49000		
25439			465	1282					37030	46920	52440			
25440			500	1379					40250	51000				
25441			550	1517				34100	44275					
25442			310	855										53940
25443	EH66	E66	355	979									54950	60900
25444			465	1282								64406		
25445			500	1379							57000			
25446		E76	550	1517						56100	62700			
25447			465	1282									72200	80000
25448			500	1379								70000	78500	87000
25449	7-12	E66	550	1517								77000	86350	95700
25450			365	1485	14400	18900	25236	33120						
25451			420	1709	16800	22050	29442							
25452		EH66	500	2035	19900	26250								
25453			365	1485					42480	52920	57960			
25454			420	1709				38682	49560	61740				
25455		E76	500	2035			35050	46050						
25456			365	1485								75640	79920	90720
25457			420	1709							67620	83580	93240	105840

CAPACITIES BASED ON 90°F. AMBIENT AIR TEMP., 110°F. CONDENSING TEMP., 5°F. LIQUID SUB-COOLING AND ADEQUATE HEAT EXCHANGE CONDITIONS TO ENSURE MODERATE AND DRY SUPERHEATED SUCTION GAS RETURN INTO COMPRESSOR.
FOR EACH 10°F. INCREASE IN AMBIENT AIR TEMPERATURE DECREASE CAPACITY BY APPROX. 4%.

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

COLDSTREAM COMPRESSORS AND CONDENSING UNITS

OPEN TYPE - BELT DRIVEN

COMPRESSOR SPECIFICATIONS

CAT. NO.	MODEL	HP RANGE	NO. CYLS.	BORE INS.	STROKE INS.	SWEPT VOL. c.m.s/rev	OIL CHARGE PINTS
2554	JB	3-5	2	2.31	2.75	23.1	2.38
2555	RO	7.5	2	3.06	2.5	36.9	5
2556	OC	7½-10	2	3.06	3.5	51.6	5

CONDENSING UNIT SPECIFICATIONS - R12

CAT. NO.	UNIT MODEL	COND MODEL	COMP RPM	MOTOR HP	CAPACITY - SUCTION TEMP.			
					-30°F (-34.4°C)	0°F (-17.8°C)	+20°F (-6.7°C)	+40°F (+4.4°C)
25520	OC439	G36	860	10	18620	36270	54200	—
25521	OC400	G36	800	10	17280	33750	50500	—
25519	OC360	F30	720	7.5	15590	30330	45400	69300
25518	OC300	F24	600	7.5	12930	25290	37900	57700
25517	OC240	E18	480	5.5	10370	20250	30300	46200
25516	RO300	F24	800	5.5	12930	25290	37900	57700
25515	RO240	E18	640	7.5	10370	20250	30300	46200
25514	RO180	E12	480	4	7770	15180	22720	34650
25513	JB160	C11	730	4	6910	13500	20200	30800
25545	JB128	C11	600	3	5530	10800	16200	24600
25512	JB110	C11	500	3	4750	9270	13900	21200
25546	JB090	C11	410	2	3890	7580	11370	17340

ROTOSEALED-ELECTRO MAGNETICALLY DRIVEN

COMPRESSOR SPECIFICATIONS

CAT. NO.	MODEL	NO. CYLS.	BORE INS.	STROKE INS.	Swept Vol. c.ft/rev	Oil Charge Pints
25551	CD	1	1.56	0.63		0.75
25552	HD	1	1.56	0.94		0.75
25553	LX	1	2.00	0.88	0.75	0.75
25554	AX	1	2.00	1.19	1.00	0.75
25555	AZ	1	2.25	1.19	1.50	0.75
25535	NZ	1	2.25	1.50	2.00	0.75
25537	NU	2	2.00	1.50	3.00	2.00
25538	NE	2	2.25	1.50	4.00	2.50

CONDENSING UNIT SPECIFICATIONS - R12

CAT. NO.	UNIT MODEL	COND MODEL	MOTOR TYPE	MOTOR CAPACITY — SUCTION TEMP.				
				NOM	—30°F	0°F	+20°F	+40°F
				HP	(-34.4°C)	(-17.8°C)	(-6.7°C)	(+4.4°C)
25559	LX-F2	F2	Single Phase	3/4	1550	3060	4700	7115
25560	AX-H3	H3	240V	1	2100	4140	6340	9630
25561	AZ-J4	J4	50CY	1.1/2	2690	5300	8120	12310
25562	AX-H3	H3	Three Phase	1	2100	4140	6340	9630
25563	AZ-J4	J4		1.1/2	2690	5300	8120	12310
25564	NZ-G5	G5		2	3370	6620	10150	15410
25565	NU-A11	A11		3	5380	10600	16260	24670
25566	NE-G13	G13	50CY	4	6730	13250	20300	30830

All Capacities in BTU/HR based on 90°F (32.3°C) ambient with design range condenser.

SUPERSEDED COLDSTREAM EQUIPMENT — Reference purposes only

COMPRESSORS

OPEN TYPE — BELT DRIVEN

MODEL	HP RANGE	NO. CYLS.	BORE INS.	STROKE INS.	OIL CHARGE PINTS
G	1	2	1.75	1.5	2
M	1½-2	2	2	1.5	2
TB	3	2	2	2.5	2½

ROTOSEALED-ELECTRO MECHANICALLY DRIVEN

MODEL	NO. CYLS.	BORE INS.	STROKE INS.	HP	OIL CHARGE PINTS
CY	1	1.562	0.625	1/3	3/4
KY	1	1.562	0.75	1/2	3/4
BY	1	1.562	1.062	1/2	3/4
NY	1	1.562	1.5	3/4	3/4
BU	2	2.0	1.062	3	2

CONDENSING UNITS

OPEN TYPE — BELT DRIVEN

UNIT MODEL	RPM	Liq. Rec. Capac. lbs.	CAPACITY - BTU/HR. SUCT. TEMP. °F			
			-20	0	+20	+40
Q39/130	610	15	2100	3500	5500	8700
M60/130	700	15	3200	5300	8400	13400
M75/190	895	15	4000	6700	10500	16700
TB99/200	730	18	5400	8900	14000	22300

ROTOSEALED-ELECTRO MECHANICALLY DRIVEN

UNIT MODEL	RPM	Liq. Rec. Capac. lbs.	CAPACITY - BTU/HR. SUCT. TEMP. °F			
			-20	0	+20	+40
KY18/55	1425	5	950	1600	2500	4600
BY26/74		5	1400	2300	3650	5800
NY36/84		5	1950	3200	5000	8000
BU90/176		13	4800	8000	12600	20000

NOTES

4

WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE

Danfoss

HERMETIC COMPRESSORS



CAT. NO.	TYPE	DETAILS	CODE No.	Capacity Watts	Displac. cm ³ /rev.	
TYPE TL COMPRESSORS — OIL COOLED						
	TL3A/LST	M/LBP	With oil only	102B2004	54	3.13
	TL4A/LST	M/LBP	With oil only	102B2005	70	3.86
257100	TL5A/LST	M/LBP	With oil only	102B2010	96	5.08
TYPE FR COMPRESSORS — OIL COOLED						
25793	FR7.5A/LST	LBP	With oil cool. coil	103L2714	125	6.93
25794	FR8.5A/LST	LBP	With oil cool. coil	103L2814	145	7.95
25796	FR8.5A/LST	LBP	With oil only	103L2804	145	7.95
25795	FR8.5B/HST	H/LBP	With oil only	103L2854	555	7.95
25797	FR8.5B/LST	H/LBP	With oil cool. coil	103L2864	555	7.95
25798	FR10A/LST	M/LBP	With oil cool. coil	103L2914	165	9.05
TYPE SC COMPRESSORS — OIL COOLED						
25799	SC10B/HST	H/LBP	With oil only	104L2510	770	10.30
25765	SC12A/LST	LBP	With oil cool. coil	104L2680	225	12.90
25783	SC12B/HST	H/LBP	With oil only	104L2670	960	12.90
25787	SC15B/HST	H/LBP	With oil only	104L2830	1115	15.30
25788	SC18B/HST	H/LBP	With oil only	104L2110	1275	17.70
25768	SC21B/HST	H/LBP	With oil only	104L2310	1485	20.95
TYPE BD2.5 COMPRESSORS — 12 & 24 VOLT D.C.						
25789	BD2.5	M/LBP	12 Volt. D.C.	102Z3010	40	
25790	BD2.5	M/LBP	24 Volt. D.C.	102Z4010	40	

KELVINATOR COMPRESSORS

OPEN TYPE — BELT DRIVEN



CAT. NO.	COMP. MODEL	NOM. HP	NO. OF CYLS.	BORE INS.	STROKE INS.	DISP. CU. IN. REV.	OIL CHGE PINTS	SERVICE VALVES		FLY-WHEEL DIAM. INS.
								SUCT.	DISCH.	
2571	SG	1/3	2	1.1/2	1.5/16	4.7	1.1	1/2"	3/8"	10
25771	H	1/2 - 3/4	2	1.11/16	2	7.5	1.8	5/8"	3/8"	12.1/2
2573	K	1 - 1 1/2	2	2.1/4	2.1/2	17.9	3.3	5/8"	1/2"	16.3/8
2574	Y	2 - 3	2	2.3/4	3.1/2	41.5	4.4	1"	5/8"	20.1/4
2575	T	5	2	3.1/4	4	66.4	6.2	1.1/4"	1"	20.1/4
2572	H42		2	1.11/16	2	8.9	1.8	5/8"	1/2"	
25772	K62		2	2.1/4	2.1/2	19.9	3.3	3/4"	5/8"	
25773	Y72		2	2.3/4	3.1/2	41.5	4.4	1"	3/4"	
25774	T82		2	3.1/4	4	66.4	6.2	1.1/4"	1"	

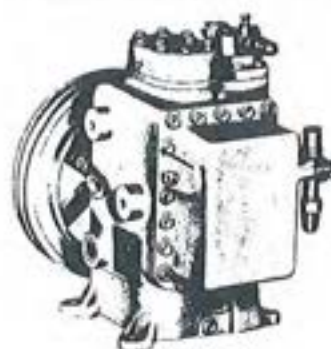
ELLIS & JUDGES COMPRESSORS

Main features and specifications of the TP and VP are as follows —

Two Compressors only covering a range from 1 to 7 1/2 H.P. on R12, R22, R500 and R502. Speed range up to 1700 R.P.M. suitable either for belt drive or direct drive.

Positive displacement oil pump and large 40oz oil reservoir.

Bearings of "CLIVITE" 25 for high speed and long life.

MODEL TP
TWIN CYLINDERMODEL VP
FOUR CYLINDER

COMPRESSOR SPECIFICATIONS AND CAPACITIES

MODEL	H.P. RANGE	BORE INS.	STROKE INS.	No OF CYLS.	DISP. CU. IN. REV.	OIL CHGE	FLYWHEEL		COMP REVS.	CAPACITY BTU/HR AT SUCT. TEMP. °F							
							DIAM.	GROOVES		R12				R22			
										-20	0	+20	+40	-20	0	+20	+40
TP	1-5	1.3/4	1.3/4	2	8.4	40 oz	10.1/2"	2 - B	500	1650	3100	5500	8400	2000	4100	7500	13000
									1000	3900	6200	10600	17000	4900	9100	15700	25500
									1500	5000	9200	15800	27600	8000	15000	24000	37500
VP	2-7.1/2	1.3/4	1.3/4	4	16.8	40 oz	10.1/2"	2 OR - B 3	500	3300	6200	11000	16800	4000	8200	15000	26000
									1000	7800	12400	21200	34000	9800	18200	31500	51000
									1500	10000	18400	31800	55200	16000	30000	48000	75000

CAPACITIES BASED ON CONDENSING TEMP. 100 F.

KIRBY - TECUMSEH COMPRESSORS

MODEL SERIES	CAT. NO.	MODEL	MODEL		ELECT.*	APPLICATION			CAPAC.**
			HP	TYPE		RANGE	REFRIG	CONTROL	
AE	25819	AE1322A	1/16	RSIR	1	LST	R12	CAP	63
	2581	AE1227	1/12	RSIR	1	LST	R12	CAP	78
	2582	AE82A7	1/8	RSIR	1	LST	R12	CAP	90
	2584	AE6ZD7 †	1/6	RSIR	1	LST	R12	CAP	110
	2586	AE5ZF9 †	1/5	RSIR	1	LST	R12	CAP	150
	2588	AE4ZF11 †	1/4	RSIR	1	LST	R12	CAP	180
	2589	AE4ZG12 †	1/4	RSIR	1	LST	R12	CAP	220
	25820	AE1385A †	1/4	RSIR	1	LST	R12	CAP	250
	25814	AE1411A †	1/4	RSIR	1	LST	R12	CAP	330
	25815	AE2411A	1/4	CSIR	1	LST	R12	CAP/TX	330
	2585	AE67ZD7	1/6	RSIR	1	MST	R12	CAP	250
	2587	AE59ZF9	1/5	RSIR	1	MST	R12	CAP	340
	25812	AE6416A	1/4	RSIR	1	MST	R12	CAP	480
	25813	AE7416A	1/4	CSIR	1	MST	R12	CAP/TX	480
	25821	AE7423A	1/3	CSIR	1	MST	R12	CAP/TX	660
	2583	AE6ZA7	1/6	RSIR	1	HST	R12	CAP	345
	25810	AE3425A	1/4	RSIR	1	HST	R12	CAP	730
	25811	AE4425A	1/4	CSIR	1	HST	R12	CAP/TX	730
	25818	AE5462E	1/2	PSC	1	HST	R22	CAP	1800
AJ	25832	AJ2416A	1/3	CSIR	1	LST	R12	CAP/TX	480
	25836	AJ2422A	1/2	CSIR	1	LST	R12	CAP/TX	650
	25842	AJ2427A	3/4	CSR	1	LST	R12	CAP/TX	790
		AJ2425J	1/2	CSIR	1	LST	R502	CAP/TX	735
	25834	AJ2435J	3/4	CSR	1	LST	R502	CAP/TX	1025
	25831	AJ2448J *	1.0	CSR	1	LST	R502	CAP/TX	1355
	25830	AJ7428A	1/3	CSIR	1	MST	R12	CAP/TX	820/1495
	25833	AJ7434A *	1/2	CSIR	1	MST	R12	CAP/TX	1000
	25835	AJ7445A *	3/4	CSIR	1	MST	R12	CAP/TX	1300
	25843	AJ7457A	1.0	CSR	1	MST	R12	CAP/TX	1700
	25838	AJ5483E	3/4	PSC	1	HST	R22	CAP	2435
	25839	AJ5510E	1.0	PSC	1	HST	R22	CAP	2945
	25840	AJ5513E	1.1/4	PSC	1	HST	R22	CAP	3750
	25837	AJ5515E	1.1/2	PSC	1	HST	R22	CAP	4468
	25845	AJ5516E	1.1/2	PSC	1	HST	R22	CAP	4762
AH	25844	AH2434A	1.0	CSR	1	LST	R12	CAP/TX	1000
	25829	AH2434A	1.0	3 PH	5	LST	R12	CAP/TX	1000
		AH2467J	1.1/2	CSR	1	LST	R502	CAP/TX	1955
		AH2467J	1.1/2	3 PH	5	LST	R502	CAP/TX	1955
	25846	AH4514A *	1.1/2	CSR	1	M/HST	R12	CAP/TX	2125/4185
	25861	AH4514A *	1.1/2	3 PH	5	M/HST	R12	CAP/TX	2125/4185
		AH2492J	2	3 PH	5	LST	R502	CAP/TX	2700
	25860	AH4521A *	2	CSR	1	M/HST	R12	CAP/TX	3150/6207
	25851	AH4521A *	2	3 PH	5	M/HST	R12	CAP/TX	3150/6207
	25847	AH5518E	1.3/4	PSC	1	HST	R22	CAP	5100
	25862	AH5518E	1.3/4	3 PH	5	HST	R22	CAP/TX	5100
	25848	AH5520E	2	PSC	1	HST	R22	CAP	5600
	25863	AH5520E	2	3 PH	5	HST	R22	CAP/TX	5600
	25849	AH5523E	2.1/4	PSC	1	HST	R22	CAP	6400
	25850	AH5533E	3.0	3 PH	5	HST	R22	CAP/TX	9890
AG		AG4534A	2.8	3 PH	5	M/HST	R12	CAP/TX	8206
		AG4543A	3.5	3 PH	5	M/HST	R12	CAP/TX	10500
	25864	AG5553F	4.0	3 PH	5	HST	R22	CAP/TX	13000
	25865	AG5561F	5.0	3 PH	5	HST	R22	CAP/TX	14900
	25866	AG5568F	6.0	3 PH	5	HST	R22	CAP/TX	16500
AN	25883	AN5590E	7.5	3 PH	5	HST	R22	CAP/TX	22400
	25884	AN5610E	8.3	3 PH	5	HST	R22	CAP/TX	24200
	25885	AN5612E	10.0	3 PH	5	HST	R22	CAP/TX	29500
	25886	AN5614E	12.0	3 PH	5	HST	R22	CAP/TX	33400

† These compressors are fitted with an Oil Cooler which must be used unless a fan is fitted to circulate air around the compressor body.

* Electrical Code : 1 = 240 Volt 50 Hz. 5 = 415 Volt 50 Hz.

** Refer next Page for Capacity Rating Conditions and Cross Reference Table.

'AE' SERIES



'AJ' SERIES



'AH' SERIES



'AG' SERIES



KIRBY TECUMSEH COMPRESSORS

** HERMETIC COMPRESSORS — PERFORMANCE RATING BASIS (Cont'd from Page 258)

CONDITIONS	LST	MST	HST
Ambient Temp. °C	32	35	35
Condensing Temp. °C	55	55	55
Liquid Entering Temp. °C	32	47	47
Return Vapour Temp.	At Ambient °C Entering Compressor		
Nominal Capacity W & Power Input kW	At -23.3	-6.7	+7.2
	(*C Suction Temperature)		
Range °C — R12	-35 to -10	-20 to +5	-15 to +10
— R502	-40 to -15	—	—
— R22	—	-15 through to +10	—

Indicated Compressor Capacity W (watts) and Power Input kW (kilowatts) are established from Calorimeter Tests with values $\pm 5\%$ based on Specific Rating Conditions and Nominated Refrigerant. Actual Compressor Application should be in accordance with Kirby Recommendations.

CAPACITY CORRECTION — Hermetic Compressors

Since the actual Application Conditions will vary from "Performance Rating Conditions", some capacity correction will always be required.

The following factors may be used with sufficient accuracy, and should be applied in order to establish the Compressor Capacity" at design conditions.

(a) For changed Condensing Temperature :-

Increase capacity 6% for each 5°C lower condensing.

Decrease capacity 6% for each 5°C higher condensing.

(b) For changed Liquid Entering Temperature :-

Increase capacity 1% for each 1°C lower liquid entering.

Decrease capacity 1% for each 1°C higher liquid entering.

(c) For Lower Return Vapour Temperature :-

The changes here to "Compressor Capacity" are generally marginal and may be disregarded in the initial assessment.

CROSS REFERENCE CHART

OBSOLETE MODELS	RECENTLY DISCONTINUED	CURRENT MODEL
K3, K5, P91, P91L		AE8ZA7
K10, K10B, K10C, CA4, CA10, CA13, P8112L, P8112, P6112		AE6ZD7
K11		AE7416A
AP4112/C5		
CB1, CB2, CB3		
CJ4	AK1410A	AE1411A
AUTH5, U4P12	AK1413A	
P61		AE6ZA7
AP4312/5P		AE1411A
P6312, P5312		AE52F9
AP4312/C5	AK2410A	AE2411A
AP41H		AE3425A
AP3311	AK7419A	AE7423A
	AK7422A	
AP4112/5P		AE6416A
AU76	AK5469E	AE5462E
	AK5457E	
K7		
CC1, CC2, CC3	AJ4448A	AJ7428A
AU26, AU36		
AU2612		AJ7434A
AU2P12, AU2T12		AJ2422A

REPLACEMENT COMPRESSORS

OBSOLETE MODELS	RECENTLY DISCONTINUED	CURRENT MODEL
AU3612		AJ2416A
AU7P12, B7P16		AJ7445A
B7T16		AJ2427A
B1T16		AJ7457A
B1T16 (R502)		AJ2448J
CJ3		
AU1612 (R22)		AJ5483E
AU1P12		AJ5510E
AUT12		AJ5513E
B32T16	AH5516E	AJ5516E
B1U18		AH2434A
B32U18		AH4514A
B74T18		AH5518E
B21U18		AH5520E
CL31Y14		AH5533E
CL21Y14		AH4521A
	CL26ZA17	AG4534A**
	CL31ZH17	
	CL41ZA17	AG5553F**
	CL51ZH17	AG5561F**
AUR13*, AE1318A*, B1P16*, B21T18*, AE827*		
* These models eliminated without replacement		
** Also use KCC101-1 Valve Conversion Kit		

MOUNTING CONVERSION KITS

CAT. NO.	KIT NO.	CONVERTS:
25869	M322	P Series to AE Series
25872	M417-2	AU Series to AK Series
25871	M417-4	AU Series to AJ Series
25874	M417-6	AH Series to AJ Series
	M417-10*	AU Series to AJ Series

* Special — Metters

CAT. NO.	KIT NO.	CONVERTS:
25870	M417-1	P Series to AK Series
25873	M417-3	U4P12 Series to AE Series
25876	M417-5	CL Series to AH Series
25875	M417-7	B Series to AJ Series
25877	M417-9	AK Series to AE Series



L'UNITÉ HERMÉTIQUE S.A. COMPRESSORS

Licence
Tecumseh



MODELS AEZ/CAEZ



MODELS AE/CAE



MODELS AJ/CAJ/TAJ

LOW BACK PRESSURE MODELS (240 Volt 50 Hz.)

CAT. NO.	MODEL	HP (1)	Refrig.	Cylinder Displacement cm ³ /rev	Motor Type (2)	Expansion Device (3)	Cooling (4)	CAPACITY - WATTS (BTU/HR) (5)				
								EVAPORATING TEMPERATURE				
								-40°C -40°F	-35°C -31°F	-23.3°C -10°F	-15°C +5°F	-10°C +14°F
258103	AEZ1332A	1/10	12	4.05	RSIR	C	N/F		18 (60)	73 (248)	121 (412)	155 (532)
258104	AEZ1336A	1/8	12	4.50	RSIR	C	N/F		29 (100)	90 (308)	143 (488)	178 (608)
258105	AEZ1343A	1/6	12	5.50	RSIR	C	N/F		41 (140)	108 (368)	179 (612)	223 (760)
258106	AEZ1360A	1/5	12	7.55	RSIR	C	OC		65 (220)	158 (540)	246 (840)	302 (1032)
	AEZ1360A	1/5	12	7.55	RSIR	C	N/F					
258107	AEZ1380A	1/4	12	8.85	RSIR	C	OC		94 (320)	204 (696)	317 (1080)	387 (1320)
	AEZ1380A	1/4	12	8.85	RSIR	C	N/F					
258100	CAE4ZF11	1/4	12	8.85	CSIR	C/V	F					
	AE1410A	1/3	12	12.05	RSIR	C	OC		117 (400)	276 (940)	434 (1480)	528 (1800)
258108	AE1410A	1/3	12	12.05	RSIR	C	F					
25895	CAE2410A	1/3	12	12.05	CSIR	C/V	F					
25896	CAE2412A	3/8	12	14.15	CSIR	C/V	F		158 (540)	346 (1180)	498 (1700)	621 (2120)
25894	AE1417L	1/2	502	11.30	RSIR	C	F	117 (400)	176 (600)	422 (1440)	645 (2200)	821 (2800)
258111	CAJ2428L	1/2	502	15.20	CSIR	C/V	F	176 (600)	264 (900)	633 (2160)	997 (3400)	1243 (4240)
258115	CAJ2T12	1/2	12	26.15	CSIR	C/V	F		235 (800)	621 (2120)	985 (3360)	1231 (4200)
258112	CAJ2448L	3/4	502	26.15	CSR	C/V	F	322 (1100)	469 (1600)	997 (3400)	1548 (5280)	1934 (6600)

Note: Three Phase Models available on application.

NOTES: (1) CONVERSION: HP multiplied by 746 = WATTS
 (2) MOTOR TYPE: RSIR = Resistance Start Induction Run
 CSR = Capacitor Start Induction Run
 TRI = Three Phase
 C = Capillary Tube
 V = Expansion Valve
 N = Natural Air Flow F = Fan Cooled
 OC = With Oil Cooler
 (3) EXPANSION DEVICE:
 (4) COOLING:
 (5) CAPACITY: Ambient Temperature +32°C (+90°F), Return Gas Temperature +32°C (+90°F), Condensing Temperature +54.5°C (+130°F), Liquid Temperature entering expansion valve +32°C (+90°F)
 CONVERSION: BTU/HR multiplied by 0.293 = WATTS WATTS multiplied by 3.412 = BTU/HR

REFER PAGE 258-c FOR MEDIUM/HIGH BACK PRESSURE MODELS & PAGE 258-d FOR AIR CONDITIONING MODELS



L'UNITE HERMETIQUE S.A. *Licence Tecumseh*

COMPRESSORS



MODELS AE/CAE



MODELS AJ/CAJ/TAJ

(240 Volt 50 Hz.)

MEDIUM/HIGH BACK PRESSURE MODELS

CAT. NO.	MODEL	HP (1)	Refrig.	Cylinder Displacement cm ³ /rev	Motor Type (2)	Expansion Device (3)	Cooling (4)	CAPACITY - WATTS (BTU/HR) (5)				
								EVAPORATING TEMPERATURE				
								-25°C -13°F	-15°C +5°F	0°C +32°F	+7.2°C +45°F	+15°C +59°F
258110	CAE59ZF9	1/5	12	7.55	CSIR	C/V	F		293 (1000)	539 (1840)	686 (2340)	868 (2960)
258101	CAE412F11	1/4	12	8.85	CSIR	C/V	F		375 (1280)	686 (2340)	891 (3040)	1161 (3960)
258102	CAE4470L	1/2	502	13.25	CSR	C/V	F		762 (2600)	1524 (5200)	1993 (6800)	2603 (8880)
258113	CAJ4452A	1/3	12	15.20	CSIR	C/V	F	252 (860)	516 (1760)	1137 (3880)	1524 (5200)	2052 (7000)
258114	CAJ4461A	1/2	12	18.30	CSIR	C/V	F	287 (980)	621 (2120)	1313 (4480)	1782 (6080)	2403 (8200)
258116	CAJ4492A	3/4	12	29.95	CSIR	C/V	F	446 (1520)	950 (3240)	1993 (6800)	2579 (8800)	3517 (12000)
258117	CAJ4511A	1	12	32.70	CSR	C/V	F	727 (2480)	1348 (4600)	2638 (9000)	3517 (12000)	4631 (15800)

Note: Three Phase Models available on application.

NOTES: (1) CONVERSION: (2) MOTOR TYPE:

- (3) EXPANSION DEVICE:
(4) COOLING:
(5) CAPACITY:

CONVERSION:

HP multiplied by 746 = WATTS
RSIR = Resistance Start Induction Run
CSR = Capacitor Start and Run

C = Capillary Tube
N = Natural Air Flow F = Fan Cooled

Ambient Temperature +32°C (+90°F), Return Gas Temperature +32°C (+90°F), Condensing Temperature +54.5°C (+130°F), Liquid Temperature entering expansion valve +32°C (+90°F)
BTU/HR multiplied by 0.293 = WATTS

WATTS multiplied by 0.001333 = HP

CSIR = Capacitor Start Induction Run

TRI = Three Phase

V = Expansion Valve

OC = With Oil Cooler

WATTS multiplied by 3.412 = BTU/HR

REFER PAGE 258-b FOR LOW BACK PRESSURE MODELS & PAGE 258-d FOR AIR CONDITIONING MODELS

ACTROL KEEPS YOU UP-TO-DATE

WE ARE CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS
TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT



L'UNITÉ HERMÉTIQUE S.A. Licence Tecumseh

COMPRESSORS

258-d



MODELS AJ/CAJ/TAJ



MODELS AE/CAE



MODELS AH/TAH



STANDARD AIR CONDITIONING MODELS (240 Volt 50 Hz.)

CAT. NO.	MODEL	Refrig.	Cylinder Displacement cm ³ /rev	Motor Type (2)	Expansion Device (3)	Cooling (4)	CAPACITY WATTS (BTU/HR) (5)			
							EVAPORATING TEMPERATURE			
							-10°C +14°F	0°C +32°F	+7.2°C +45°F	+9.4°C +49°F
258118	AJ5510F	22	18.60	PSC/CSR	C	F	997 (3400)	1729 (5900)	2380 (8120)	2697 (9200)
258119	AJ5512E	22	21.75	PSC/CSR	C	F	1266 (4320)	2052 (7000)	2796 (9540)	3165 (10800)
258120	AJ5513E	22	24.20	PSC/CSR	C	F	1466 (5000)	2345 (8000)	3207 (10940)	3576 (12200)
258120	AJ5515E	22	25.95	PSC/CSR	C	F	1700 (5800)	2638 (9000)	3576 (12200)	3986 (13600)
258121	AJ5518E	22	32.70	PSC/CSR	C	F	2169 (7400)	3400 (11600)	4572 (15600)	5135 (17520)
258122	AJ5519E	22	34.45	PSC/CSR	C	F	2345 (8000)	3634 (12400)	4842 (16520)	5452 (18600)
258133	AH5524E	22	43.50	PSC/CSR	C	F	2579 (8800)	4221 (14400)	5745 (19600)	6378 (21760)
258135	AH5527E	22	49.10	PSC/CSR	C	F	2814 (9600)	4807 (16400)	6595 (22500)	7386 (25200)
258137	AH5531E	22	56.65	PSC/CSR	C	F	3517 (12000)	5686 (19400)	7597 (25920)	8383 (28600)

Note: Three Phase Models available on application.

HIGH EFFICIENCY AIR CONDITIONING MODELS (240 Volt 50 Hz.)

CAT. NO.	MODEL	Refrig.	Cylinder Displacement cm ³ /rev	Motor Type (2)	Expansion Device (3)	Cooling (4)	CAPACITY WATTS (BTU/HR) (5)			
							EVAPORATING TEMPERATURE			
							0°C +32°F	+7.2°C +45°F	+9.4°C +49°F	+15°C +59°F
	AE8475E	22	11.70	PSC	C	F	1126 (3840)	1782 (6080)	1817 (6200)	2228 (7600)
	AJ8494E	22	14.25	PSC	C	F	1348 (4600)	2052 (7000)	2275 (7760)	2872 (9800)
	AJ8514E	22	20.95	PSC	C	F	2228 (7600)	3095 (10560)	3400 (11600)	4338 (14800)
	AJ8516E	22	23.95	PSC	C	F	2521 (8600)	3611 (12320)	3986 (13600)	5041 (17200)
	AJ8520E	22	29.00	PSC	C	F	3142 (10720)	4291 (14640)	4690 (16000)	5862 (20000)

NOTES: (1) CONVERSION: HP multiplied by 746 = WATTS
 (2) MOTOR TYPE: RSIR = Resistance Start Induction Run
 CSR = Capacitor Start and Run
 C = Capillary Tube
 N = Natural Air Flow F = Fan Cooled
 (3) EXPANSION DEVICE:
 (4) COOLING:
 (5) CAPACITY:
 Standard Air Conditioning Models.
 Ambient Temperature +35°C (+95°F), Return Gas Temperature +35°C (+95°F), Condensing Temperature +54.5°C (+130°F), Liquid Temp. entering expansion valve +46.1°C (+115°F).
 High Efficiency Air Conditioning Models.
 Ambient Temperature +35°C (+95°F), Return Gas Temperature +18.3°C (+65°F), Condensing Temperature +48.9°C (+120°F), Liquid Temp. entering expansion valve +37.8°C (+100°F).
 BTU/HR multiplied by 0.293 = WATTS WATTS multiplied by 3.412 = BTU/HR

CONVERSION:
 REFER PAGE 258-b FOR LOW BACK PRESSURE MODELS & PAGE 258-c FOR MEDIUM/HIGH BACK PRESSURE MODELS

COMPRESSOR CROSS REFERENCE

REFRIGERATION

(240 Volt 50 Hz.)

REFRIGERATION UP TO 1000 WATTS CAPACITY (3412 BTU/HR)												
SINGLE PHASE UNITS — LOW BACK PRESSURE MODELS												
RATED CAPACITY AT -23.3°C (-10°F) EVAPORATING TEMP., 54.5°C (130°F) CONDENSING TEMP.												
R12 UNITS — 50 Hz. POWER SUPPLY												
L'UNITE HERMETIQUE COMPRESSORS						KIRBY COMPRESSORS						
Comp. Cooling	Exp. Device	Motor Type	Nom. HP	Compressor Model	WATTS	CAPACITY RANGE WATTS	WATTS	Compressor Model	Nom. HP	Motor Type	Exp. Device	Comp. Cooling
						60 - 70	63	AE1322A	1/16	RSIR	C	N
N/F	C	RSIR	1/10	AEZ1322A	73	71 - 80	78	AE1227	1/12	RSIR	C	N
N/F	C	RSIR	1/8	AEZ1336A	90	81 - 90	90	AE6ZA7	1/8	RSIR	C	N
						91 - 100						
N/F	C	RSIR	1/8	AEZ1343A	108	101 - 110	110	AE6ZD7	1/6	RSIR	C	OC
						111 - 120						
						121 - 130						
						131 - 140						
						141 - 150	150	AE5ZF9	1/5	RSIR	C	OC
OC	C	RSIR	1/5	AEZ1360A	158	151 - 160						
N/F	C	RSIR	1/5	AEZ1360A	158							
						161 - 170						
						171 - 180	180	AE4ZF11	1/4	RSIR	C	OC
						181 - 190						
						191 - 200						
OC	C	RSIR	1/4	AEZ1380A	204	201 - 220						
N/F	C	RSIR	1/4	AEZ1380A	204							
F	C/V	CSIR	1/4	CAE4ZF11	204		220	AE4ZG12	1/4	RSIR	C	OC
						221 - 240						
						241 - 260	250	AE1385A	1/4	RSIR	C	OC
OC	C	RSIR	1/3	AE1410A	276	261 - 280						
F	C	RSIR	1/3	AE1410A	276							
F	C/V	CSIR	1/3	CAE2410A	276							
						281 - 300						
F	C/V	CSIR	3/8	CAE2412A	346	301 - 350	330	AE1411A	1/4	RSIR	C	OC
							330	AE2411A	1/4	CSIR	C/V	F
						351 - 400						
						401 - 450						
						451 - 500	480	AJ2416A	1/3	CSIR	C/V	
						501 - 550						
						551 - 600						
F	C/V	CSIR	1/2	CAJ2T12	621	601 - 650	650	AJ2422A	1/2	CSIR	C/V	
						651 - 700						
						701 - 750						
						751 - 800	790	AJ2427A	3/4	CSR	C/V	
						801 - 850						
						851 - 900						
						901 - 950						
F	C/V	CSR	3/4	CAJ2446L	997	951 - 1000	1000	AH2434A	1	CSR	C/V	

NOTES: Motor Types — RSIR = Resistance Start Induction Run. CSIR = Capacitor Start Induction Run. CSR = Capacitor Start and Run.

Expansion Device — C = Capillary Tube V = TX Valve C/V = Capillary or TX Valve

Compressor Cooling — N = Natural Air Flow. F = Fan Cooled. OC = With Oil Cooler.

CONVERSION: HP multiplied by 746 = Watts. Watts multiplied by 0.001333 = HP.
Watts multiplied by 3.412 = BTU/HR. BTU/HR multiplied by 0.2931 = Watts.

L'UNITE HERMETIQUE COMPRESSORS — Refer Page 258-b. KIRBY COMPRESSORS — Refer Page 258

This Cross Reference has been compiled as a comparative reference only and we assume no liability for its use or misuse. Capacities and technical data shown are based on manufacturers published data E & O.E.

NOTES

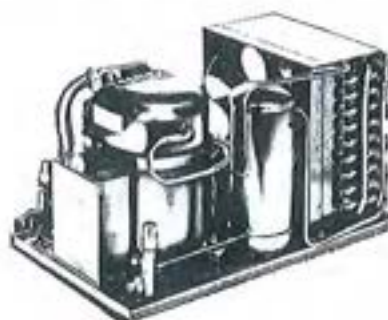
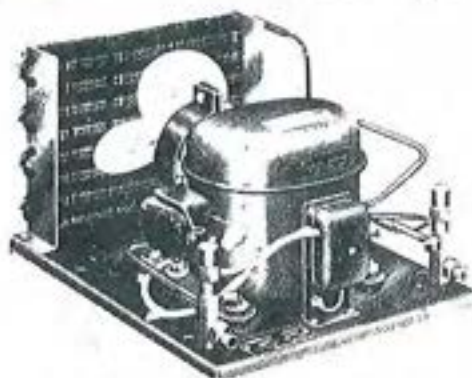
4

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

NOTES

WE ARE AS NEAR AS YOUR NEAREST TELEPHONE — WE HAVE TELEX TOO

KIRBY - TECUMSEH CONDENSING UNITS



"AE" SERIES AIR COOLED CONDENSING UNITS

This compact series of condensing units is designed for a wide range of applications, particularly where machine space is limited. Suitable for low temperature use, such as refrigerators and freezers, they are also available for medium and high temperature applications for dehumidifiers, vending machines, water coolers, etc. The two-pole Tecumseh Model AE hermetic compressors used on these units have been specially designed, each for its particular application. Plug-on relays and spring-retained overloads, conveniently located for easy installation and service, are also features of these units, and all compressors are mounted on rubber grommets to reduce the running noise level and vibration.

SPECIFICATIONS - 240V. 50 Hz.

	CAT. NO.	MODEL	COMP.	NOM. HP	MOTOR TYPE	APPLICATION			DISP. CM ³ /r	CONN. LINES		Comp. Oil Charge ml
						RANGE	REFRIG.	CONT.		SUCT. mm	LIQ. mm	
LOW TEMP. MODELS	2591	AE5ZF9L	AE5ZF9	1/5	RSIR	LST	R12	CAP	7.57	9.6	6.4	592
	2596	AE2411AA	AE2411A	1/4	CSIR	LST	R12	CAP	14.14	9.6	6.4	651
	2597	AE2411AB	AE2411A	1/4		LST	R12	TX				
MED. TEMP. MODELS	2592	AE6ZD7M	AE6ZD7	1/6	RSIR	L-M	R12	CAP	5.47	9.6	6.4	384
	2593	AE5ZF9M	AE5ZF9	1/5	RSIR	L-M	R12	CAP	7.57	9.6	6.4	592
	2594	AE7416AA	AE7416A	1/4	CSIR	L-M	R12	CAP	10.25	9.6	6.4	503
	2595	AE7416AB	AE7416A	1/4		L-M	R12	TX				
	25911	AE7423AA	AE7423A	1/3	CSIR	M-H	R12	CAP	14.14	9.6	6.4	651
	25912	AE7423AB	AE7423A	1/3		M-H	R12	TX				
HIGH TEMP. MODELS	2598	AE6ZA7H	AE6ZA7	1/6	RSIR	M-H	R12	CAP	4.49	9.6	6.4	384
	2599	AE4425AA	AE4425A	1/4	CSIR	M-H	R12	CAP	8.88	9.6	6.4	503
	25910	AE4425AB	AE4425A	1/4		M-H	R12	TX				

Application Notes: 1. Suffix 'B' in Model = Liquid Receiver fitted.

2. The return vapour temperature at the compressor inlet should not exceed 20°C (34°F) maximum above evap. temp.

"AJ" SERIES AIR COOLED CONDENSING UNITS

The Tecumseh 'AJ' Series high starting torque, air-cooled, hermetic Condensing Units are available for low, medium, and high suction temperature applications, and are suited to both capillary tube and expansion valve systems.

A base mounted junction/electrical component box is provided for ease of testing and service in the field.

To meet Australian climatic conditions, these units have been extensively tested through a range of ambient temperatures up to 43°C.

SPECIFICATIONS - 240 V. 50Hz

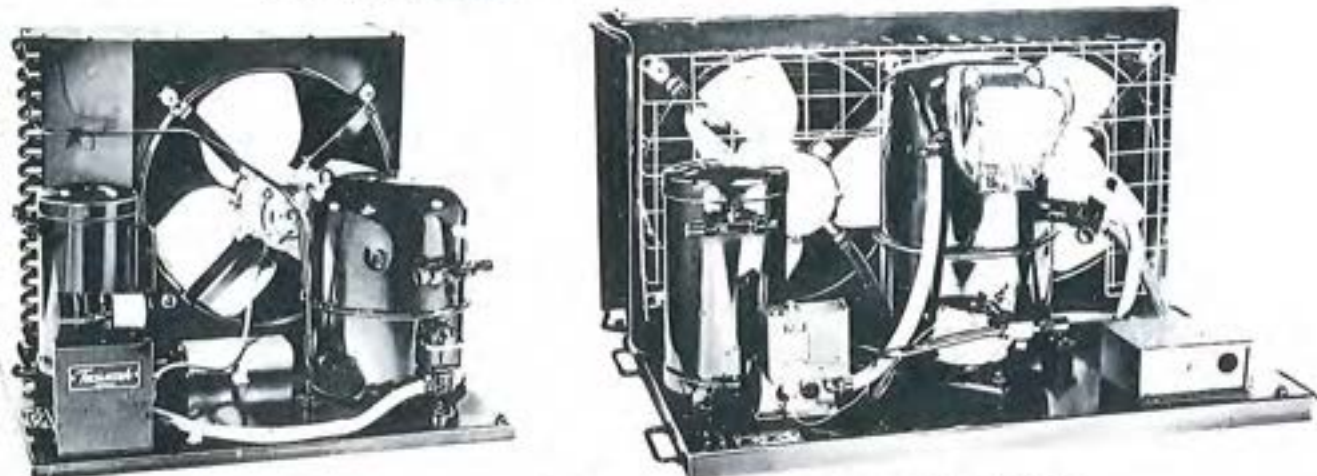
CAT. NO.	MODEL	COMP.	NOM. HP	MOTOR TYPE	APPLICATION			Displ. cm ³ /rev	CONN. LINES		Comp. Oil Charge ml
					Range	Refrig.	Control		Suction mm	Liquid mm	
25913	AJ2416AA	AJ2416A	1/3	CSIR	LST	R12	CAP	19.75	12.7	6.4	890
25914	AJ2416AB						TX				
25915	AJ2422AA	AJ2422A	1/2	CSIR	LST	R12	CAP	26.10	12.7	6.4	890
25916	AJ2422AB						TX				
25917	AJ2427AA	AJ2427A	3/4	CSR	LST	R12	CAP	34.24	15.9	9.5	890
25918	AJ2427AB						TX				
	AJ2425JA	AJ2425A	1/2	CSR	LST	R502	CAP	18.30	12.7	6.4	890
	AJ2425JB						TX				
	AJ2435JA	AJ2435A	3/4	CSR	LST	R502	CAP	22.60	15.9	6.4	890
25929	AJ2435JB						TX				
25919	AJ2448JA	AJ2448A	1	CSR	LST	R502	CAP	32.60	15.9	9.5	890
25920	AJ2448JB						TX				
25927	AJ7428AA	AJ7428A	1/3	CSIR	MST	R12	CAP	18.30	9.5	6.4	890
25928	AJ7428AB						TX				
25921	AJ7434AA	AJ7434A	1/2	CSIR	MST	R12	CAP	19.75	12.7	6.4	890
25922	AJ7434AB						TX				
25923	AJ7445AA	AJ7445A	3/4	CSIR	MST	R12	CAP	26.10	15.9	9.5	890
25924	AJ7445AB						TX				
25925	AJ7457AA	AJ7457A	1	CSR	MST	R12	CAP	34.20	15.9	9.5	890
25926	AJ7457AB						TX				

Application Notes:

- (1) Suffix 'B' in Model = Liquid Receiver fitted
- (2) R502 Models should be fitted with crankcase pressure regulator
- (3) The return vapour temperature at the compressor inlet should not exceed 20°C (34°F) maximum above evaporator temperature.

CAPACITY DATA - REFER Tech. Page 259-b

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK



'AH' & 'TAH' SERIES AIR COOLED CONDENSING UNITS

The Tecumseh line of AH and TAH Condensing Units offers a range of models from 1 to 6 HP with R12, R22, R502, designs available. All compressors in this series are fitted with an anti slug device, to assist in protecting the compressor from damage due to liquid or oil slugging. An Internal Pressure Relief Valve is also fitted to R22 models to guard against higher than normal discharge pressures. A line break internal motor protector is fitted to compressor motors in this series. Other features include Rotolock Suction Service Valves and moisture sealed compressor terminal covers. An electrical junction box, base mounted is provided.

CAT. NO.	MODEL	COMP.	NOM. HP	MOTOR TYPE	APPLICATION			Displ. cm ³ /rev	CONN. LINES		Comp. Oil Charge ml
					Range	Refrig.	Control		Suction mm	Liquid mm	
25974	AH2434AA	AH2434A	1	CSR	LST	R12	CAP	48.9	15.9	9.5	1630
25975	AH2434AB	AH2434A	1	CSR	LST	R12	TX	48.9	15.9	9.5	1630
	AH2467JB	AH2467J	1.5	CSR	LST	R502	TX	48.9	15.9	9.5	1630
	AH2492JB	AH2492J	2	3 PH	LST	R502	TX	74.03	22.5	9.5	1630
25983	TAH2468AB	AH2434A	2 x 1	3 PH	LST	R12	TX	2x48.9	15.9	9.5	1630
25977	AH4514AB	AH4514A	1.5	CSR	M/HST	R12	TX	48.9	15.9	9.5	1630
25976	AH4514AB	AH4514A	1.5	3 PH	M/HST	R12	TX	48.9	15.9	9.5	1630
25987	AH4521AB	AH4521A	2	CSR	M/HST	R12	TX	74.03	22.2	9.5	1630
25978	AH4521AB	AH4521A	2	3 PH	M/HST	R12	TX	74.03	22.2	9.5	1630
25984	TAH4542AB	AH4521A	2 x 2	3 PH	M/HST	R12	TX	2x74.03	22.2	12.7	1630
25981	AH5520EA	AH5520E	2	PSC	HST	R22	CAP	43.44	15.9	9.5	1335
25980	AH5520EB	AH5520E	2	3 PH	HST	R22	TX	43.44	15.9	9.5	1335
25982	AH5533EB	AH5533E	3	3 PH	M/HST	R22	TX	74.03	22.2	9.5	1630
25985	TAH5566EB	AH5533E	2 x 3	3 PH	M/HST	R22	TX	2x74.03	22.2	12.7	1630

'AG', 'CL' & 'TCL' SERIES AIR COOLED CONDENSING UNITS

The Kirby AG, CL and TCL Series Air Cooled Condensing Units are available for medium and high suction temperature applications with R12 and R22 with some models suitable for low suction temperature applications on R502. AG Series Compressors have a linebreak internal overload motor protector. CL Series Compressors have an internal thermostat built into the motor windings for accurate and sensitive control of motor temperature. This thermostat in combination with external supplementary overloads provides fully automatic inherent protection. These components connected in the pilot circuit control the contactor. Other features include Rotolock or Base Service Valves, moisture sealed terminal covers and a high pressure cut-out control.

CAT. NO.	MODEL	COMP.	NOM. HP	MOTOR TYPE	APPLICATION			Displ. cm ³ /rev	CONN. LINES		Comp. Oil Charge ml
					Range	Refrig.	Control		Suction mm	Liquid mm	
	AG4534AB	AG4534A	2.8	3PH	M/HST	R12	TX	100.8	22.2	12.7	1925
	AG4543AB	AG4543A	3.5	3PH	M/HST	R12	TX	124.4	22.2	12.7	1925
	AG5533FB1	AG5533F	4.0	3PH	M/HST	R22	TX	100.8	22.2	12.7	1335
	AG5561FB1	AG5561F	5.0	3PH	M/HST	R22	TX	112.5	22.2	12.7	1335
259101	CL5122HTK2	CL512H17	5.0	3PH	M/HST	R22	TX	116.2	22.2	12.7	1654
259103	TCL5112HTK1*	2xCL2612ZA17	2 x 2.5	3PH	M/HST	R12	TX	2 x 92.9	22.2	12.7	2 x 1654
259107	TCL6112HTK1*	2xCL312H17	2 x 3.0	3PH	M/HST	R12	TX	2 x 116.2	22.2	12.7	2 x 1654

Application Notes:

1. Suffix 'B' in Model = Liquid Receiver fitted.
2. R502 Models should be fitted with crankcase pressure regulator.
3. Units marked with an asterisk (*) are suitable for R502 refrigerant applications.
4. The return vapour temperature at the compressor inlet should not exceed 20°C (34°F) maximum above evaporator temperature.

AIR CONDITIONING CONDENSING UNITS

These are units designed with the capability to handle split system air conditioning applications and offer the following features: Easily accessible control panel - High efficiency condenser - Reverse cycle models - Crankcase heater - Compressor fitted with internal pressure relief valve - Internal protector fitted to compressor motor - Unit base anti-rust treated and drained - De-icing control - Suction line accumulator - Low pressure switch - Low unit height - Ventilated, stormproof and sound absorbing cover.

CAT. NO.	MODEL	COMP.	NOM. HP	MOTOR TYPE	APPLICATION			Displ. cm ³ /rev	CONN. LINES		Comp. Oil Charge ml
					Range	Refrig.	Control		Suction mm	Liquid mm	
259111	AH5520EA	AH5520E	2.0	PSC	HST	R22	CAP.	43.4	12.7	9.6	1335
	AH5523EA	AH5523E	2.25	PSC	HST	R22	CAP.	49.0	12.7	9.6	1335
	AH5523EA	2xAH5523E	2 x 2.5	PSC	HST	R22	CAP.	2 x 49.0	2 x 12.7	2 x 9.6	2 x 1335
	AJ5516EA	2xAJ5516E	2 x 1.5	PSC	HST	R22	CAP.	2 x 34.2	2 x 12.7	2 x 9.6	2 x 890
259113	AH5533EA	AH5533E	3.0	3PH	HST	R22	CAP.	74.1	19.0	12.7	1626
	AG5553FA	AG5553F	4.0	3PH	HST	R22	CAP.	100.8	19.0	12.7	1335
	AG5561FA	AG5561F	5.0	3PH	HST	R22	CAP.	112.5	19.0	12.7	1335

KIRBY - TECUMSEH CONDENSING UNITS

CAPACITY RATINGS

(FOR UNITS DETAILED ON PAGES 259 AND 259-a)

CONDENSING UNIT CAPACITIES — W (WATTS)														
MODEL	Refrig.	Applic. Range	Motor Type	SATURATED SUCTION TEMPERATURE — °C										
				—40	—35	—30	—25	—20	—15	—10	—5	0	+5	+10
AE SERIES														
AE5ZF9L	R12	LST	RSIR	—	87	113	146	185	228	278	—	—	—	—
AE2411AA/AB	R12	LST	CSIR	—	220	287	371	469	580	707	—	—	—	—
AE6ZD7M	R12	L/MST	RSIR	—	—	—	—	138	170	207	250	299	357	—
AE5ZF9M	R12	L/MST	RSIR	—	—	—	—	190	234	286	344	412	492	—
AE7416AA/AB	R12	L/MST	CSIR	—	—	—	—	291	360	439	529	633	756	—
AE7423AA/AB	R12	M/HST	CSIR	—	—	—	—	380	470	573	691	828	987	—
AE6ZA7H	R12	M/HST	RSIR	—	—	—	—	118	146	178	214	256	306	364
AE4425AA/AB	R12	M/HST	CSIR	—	—	—	—	251	310	378	445	545	651	775
AJ SERIES														
AJ2416AA/AB	R12	LST	CSIR	—	262	342	441	559	690	841	—	—	—	—
AJ2422AA/AB	R12	LST	CSIR	—	338	441	569	720	888	1083	—	—	—	—
AJ2427AA/AB	R12	LST	CSR	—	475	620	799	1011	1248	1522	—	—	—	—
AJ2425JA/JB	R502	LST	CSR	—	380	520	650	815	980	—	—	—	—	—
AJ2435JA/JB	R502	LST	CSR	—	545	690	870	1070	1300	—	—	—	—	—
AJ2448JA/JB	R502	LST	CSR	640	848	1083	1368	1691	2040	—	—	—	—	—
AJ7428AA/AB	R12	MST	CSIR	—	—	—	—	546	675	824	992	1188	1417	1685
AJ7434AA/AB	R12	MST	CSIR	—	—	—	—	631	780	952	1146	1372	1638	—
AJ7445AA/AB	R12	MST	CSIR	—	—	—	—	768	960	1170	1411	1689	2016	—
AJ7457AA/AB	R12	MST	CSR	—	—	—	—	990	1223	1493	1779	2152	2569	—
AH & TAH SERIES														
AH2434AA/AB	R12	LST	CSR	—	638	833	1075	1360	1680	2049	—	—	—	—
AH2467JB	R502	LST	CSR	870	1156	1476	1865	2304	2780	—	—	—	—	—
AH2492JB	R502	LST	3PH	1330	1768	2256	2851	3523	4250	—	—	—	—	—
AH4514AB	R12	M/HST	CSR/3PH	—	—	—	—	1540	1904	2322	2790	3351	3998	4760
AH4521AB	R12	M/HST	CSR/3PH	—	—	—	—	2029	2505	3056	3682	4408	5260	6262
AH5520EA/EB	R22	HST	PSC/3PH	—	—	—	—	—	2622	3136	3703	4346	5041	5912
AH5533EB	R22	M/HST	3PH	—	—	—	—	3666	4444	5315	6275	7363	8541	10017
TAH2468AB	R12	LST	3PH	—	1148	1496	1932	2445	3017	3680	—	—	—	—
TAH4542AB	R12	M/HST	3PH	—	—	—	—	4130	5100	6222	7497	8974	10706	12740
TAH5566EB	R22	M/HST	3PH	—	—	—	—	7313	8864	10601	12516	14688	17037	19980
AG SERIES														
AG4534AB	R12	M/HST	3PH	—	—	—	—	—	—	4060	4980	5950	7050	8100
AG4543AB	R12	M/HST	3PH	—	—	—	—	—	—	5700	7000	8400	9900	11450
AG5553FB	R22	M/HST	3PH											
AG5561FB	R22	M/HST	3PH											

PERFORMANCE RATING BASIS: Ambient Temperature 32°C, 20°C Return vapour (inherent subcooling).

AIR CONDITIONING UNITS					
AH5520EA	R22	HST	PSC	5400 Watts	AIR CONDITIONING RATING CONDITIONS Ambient temperature 35°C Saturated suction temperature 7.5°C Vapour leaving 14°C Return vapour entering Compressor 20°C (inherent sub-cooling of liquid)
AH5523EA*	R22	HST	PSC	12400 Watts	
AJ5516EA	R22	HST	PSC	4700 Watts	
AH5533EA	R22	HST	3 PH	9200 Watts	
AG5553FA	R22	HST	3 PH	12400 Watts	
AG5561FA	R22	HST	3 PH	14100 Watts	

* NOTE: Model AH5523EA comprises two individual High-sides each of which operates independent of the other. Where applied to a common load each High-side requires its own separate Evaporator circuit. This arrangement can provide for either 50% or 100% capacity for the area design load.
 N.B.: These units must not be connected in parallel.



L'UNITÉ HERMÉTIQUE S.A. Licence Tecumseh

FAN COOLED CONDENSING UNITS



MODELS AEZ/CAEZ



MODELS AJ/CAJ/TAJ



MODELS AE/CAE

LOW BACK PRESSURE MODELS (240 Volt 50 Hz.)

CAT. NO.	MODEL	HP (1)	Refrig.	Motor Type (2)	Expansion Device (3)	CAPACITY - WATTS (BTU/HR) (4)				
						EVAPORATING TEMPERATURE				
						-40°C -40°F	-35°C -31°F	-23.3°C -10°F	-15°C +5°F	-10°C +14°F
25948	CAE4ZF11BR	1/4	12	CSIR	C/V		117 (400)	223 (760)	317 (1080)	363 (1240)
25947	AE1410AB	1/3	12	RSIR	C		141 (480)	281 (960)	387 (1320)	469 (1600)
25940	CAE2410ABR	1/3	12	CSIR	C/V					
25942	CAE2412ABR	3/8	12	CSIR	C/V		176 (600)	352 (1200)	498 (1700)	586 (2000)
25941	AE1417LB	1/2	502	RSIR	C	211 (720)	293 (1000)	498 (1700)	645 (2200)	739 (2520)
25943	CAJ2428LBR	1/2	502	CSIR	C/V	293 (1000)	410 (1400)	721 (2460)	967 (3300)	1126 (3840)
25952	CAJ2T12BR	1/2	12	CSIR	C/V		381 (1300)	750 (2560)	1102 (3760)	1348 (4600)
25955	CAJ2446LBR	3/4	502	CSR	C/V	469 (1600)	645 (2200)	1114 (3800)	1524 (5200)	1759 (6000)

Note: Three Phase Units available on application.

- NOTES: (1) CONVERSION: HP multiplied by 746 = WATTS
 (2) MOTOR TYPE: RSIR = Resistance Start Induction Run
 CSR = Capacitor Start and Run
 C = Capillary Tube
 (3) EXPANSION DEVICE: C = Capillary Tube
 (4) CAPACITY: Ambient Temperature +32°C (+90°F), Return Gas Temperature +32°C (+90°F), Temperature of refrigerant at condenser outlet and at expansion valve inlet within the condensing limits of the unit.
- WATTS Multiplied by 0.001333 = HP
 CSIR = Capacitor Start Induction Run
 TRI = Three Phase
 V = Expansion Valve
- CONVERSION: BTU/HR multiplied by 0.293 = WATTS
 WATTS multiplied by 3.412 = BTU/HR
- REFER NEXT PAGE FOR MEDIUM/HIGH BACK PRESSURE MODELS & PAGES 258-b/c/d FOR COMPRESSORS

IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
 WE HAVE MANY ITEMS AND ACCESSORIES, TOO NUMEROUS TO LIST
 WE CAN PROBABLY HELP YOU



L'UNITÉ HERMÉTIQUE S.A. Licence Tecumseh

FAN COOLED CONDENSING UNITS



MODELS AJ/CAJ/TAJ



MODELS AE/CAE

MEDIUM/HIGH BACK PRESSURE MODELS (240 Volt 50 Hz.)

CAT. NO.	MODEL	HP (1)	Refrig.	Motor Type (2)	Expansion Device (3)	CAPACITY - WATTS (BTU/HR) (4)				
						EVAPORATING TEMPERATURE				
						-25°C	-15°C	0°C	+7.2°C	+15°C
						-13°F	+5°F	+32°F	+45°F	+59°F
25945	CAE59ZF9HR	1/5	12	CSIR	C/V		287 (980)	475 (1620)	586 (2000)	703 (2400)
25949	CAE41ZF11HR	1/4	12	CSIR	C/V		340 (1180)	575 (1960)	703 (2400)	888 (2960)
25946	CAE4470LHR	1/2	502	CSR	C/V		844 (2880)	1407 (4800)	1759 (6000)	2063 (7040)
25950	CAJ4452AHR	1/3	12	CSIR	C/V	396 (1350)	645 (2200)	1055 (3600)	1290 (4400)	1583 (5400)
25951	CAJ4461AHR	1/2	12	CSIR	C/V	469 (1600)	762 (2600)	1290 (4400)	1583 (5400)	1993 (6800)
25953	CAJ4492AHR	3/4	12	CSIR	C/V	645 (2200)	1055 (3600)	1817 (6200)	2251 (7680)	2697 (9200)
25954	CAJ4511AHR	1	12	CSR	C/V	879 (3000)	1407 (4800)	2345 (8000)	2931 (10000)	3517 (12000)

Note: Three Phase Units available on application.

NOTES: (1) **CONVERSION:** HP multiplied by 746 = WATTS
 (2) **MOTOR TYPE:** RSIR = Resistance Start Induction Run
 CSR = Capacitor Start and Run
 C = Capillary Tube
 (3) **EXPANSION DEVICE:**
 (4) **CAPACITY:** Ambient Temperature +32°C (+90°F), Return Gas Temperature +32°C (+90°F), Temperature of refrigerant at condenser outlet and at expansion valve inlet within the condensing limits of the unit.

WATTS Multiplied by 0.001333 = HP
 CSIR = Capacitor Start Induction Run
 TRI = Three Phase
 V = Expansion Valve

CONVERSION: BTU/HR multiplied by 0.293 = WATTS
 WATTS multiplied by 3.412 = BTU/HR

REFER PREVIOUS PAGE FOR LOW BACK PRESSURE MODELS & PAGES 258-b/c/d FOR COMPRESSORS

KIRBY - TECUMSEH "BELT-DRIVEN" COMPRESSORS

MODEL CG



MODEL CJ



MODEL CK



MODEL CM



TWIN CYLINDER MODELS : Model CG (Replaces HGC 1000) is designed for standard commercial refrigeration application. Cast iron crankcase and cylinder head contribute to toughness while aluminum connecting rods and pistons eliminate unneeded weight. Extra large suction and discharge muffler chambers lower operating noise level. Main bearings are ball type and a new method of lubrication — by differential pressure — removes the need for an oil pump. All rotating parts are statically and dynamically balanced.

FOUR CYLINDER MODELS : The Model CH (Replaces VFT) is designed with a built-in lowside oil separator, centrifugal pressure oiling system and high volumetric efficiency. Applications range

from ultra-low temperatures for food preservation to air conditioning using R12 and R22. The Model CJ (Replaces VFTL) is similar to the CH except it is equipped with a positive displacement oil pump and includes a larger oil reservoir. This model is suitable for direct drive.

THREE CYLINDER MODELS : The three cylinder compressors (Models CK and CM) (Replacing RA and SA) cover the 3 to 20 H.P. range. Model CK for 5, 7½ and 10 H.P. and model CM for 7½, 10, 15 and 20 H.P. All are designed for large heavy duty applications. The CK is lubricated by splash feed and the CM has an internal oil pump for positive pressure lubrication (3 Cylinder Model P has been discontinued).

SPECIFICATIONS												
CAT. NO.	MODEL	HP	BORE INS.	STROKE INS.	NO CYLS.	DISPL.	SHUT OFF VALVES		OIL CHARGE	REFRIG.	RPM	
							SUCTION	DISCH.			MIN.	MAX.
2604	CG	1 — 2	1-7/8	1-7/8	2	10.35	5/8" FI.	1/2" FI.	650 cc	R12	500	1500
2605	CH	2 — 3	1-3/4	1-3/4	4	16.80	1-1/8" ODS	5/8" FI.	739 cc	R12	500	1700
										R22	500	1525
2606	CJ	2 — 3 — 5	1-3/4	1-3/4	4	16.80	1-1/8" ODS	5/8" FI.	1478 cc	R12	500	1700
										R22	500	1525
2607	P*	3 — 5	2-1/2	3	3	44.20	1-1/8" ODS	5/8" FI.	7½ PTS	R12	435	760
2608	CK	5-7½-10	3-1/4	3	3	74.60	1-3/8" ODS	1-1/8" ODS	8 PTS	R12	435	850
2609	CM	10-15-20	4	4-1/4	3	160.20	2-1/8" ODS	1-5/8" ODS	14 PTS	R12	400	700

ALL COMPRESSORS EXCEPT MODELS VFT AND VFTL ARE DESIGNED FOR BI-DIRECTIONAL ROTATION

* P Model has been discontinued.

BTU PER HOUR VS. COMPRESSOR SPEED

MODEL	BTU/HOUR AT VARIOUS HEAD PRESSURES										
	EVAPORATING TEMPERATURE °F.										
	Head	RPM	40°	30°	20°	10°	0°	-10°	-20°	-30°	-40°
CG Replaces HGC 1000	120 #	500	19400	8250	6500	5200	3800	2800	2100	1550	1100
		1000	20500	16750	13100	10300	7800	5800	4400	3150	2270
		1500	29000	23600	18750	14700	11600	8600	6300	4600	3400
	150 #	500	9300	7500	6000	4450	3300	2500	1750	1250	900
		1000	18600	14900	11800	9000	7000	5000	3550	2550	1800
		1500	26500	21250	16800	13000	10200	7400	5350	3800	2800
CH & CJ R12 Replaces VFT & VFTL	120 #	500	14800	13800	11000	8000	6200	4500	3300	2200	1300
		1000	34000	27200	21200	16100	12400	9200	7800	4800	3200
		1500	55200	40800	31600	24200	18400	13800	10000	7200	4800
	150 #	500	15600	12200	9400	7200	5600	4800	3800	2700	1800
		1000	35700	24000	18600	14400	10900	8000	5600	3800	2400
		1500	46000	36000	27600	21400	16200	12000	8700	6000	4000
CH & CJ R22 Replaces VFT & VFTL	200 #	500	26000	19500	15000	11100	8200	6000	4500	3000	2000
		1000	51000	40400	31500	24000	18200	13500	9800	6800	4600
		1500	75000	62000	48000	38000	30000	22000	16000	11000	8700
	250 #	500	21200	16200	12000	8070	6200	4500	3400	2300	1500
		1000	41700	34600	26500	20700	15600	11300	8000	5700	3800
		1500	67000	53000	42700	35200	27000	20400	13400	10000	6200
P (Obsolete)	120 #	430	39700	31500	24500	19500	15000	11100	8000	6000	4300
		700	61000	48300	38300	30500	23200	17500	12800	9700	7400
CK Replaces RA	120 #	450	67000	53000	41700	33000	25300	19000	13800	10300	7900
		700	104000	82000	64800	51000	34300	29500	21500	16200	12000
CM Replaces SA	120 #	450	146000	119000	94000	74000	53000	34000	28000	19000	11000
		700	240000	197000	155000	122000	88000	66000	48000	34000	21000

RATING CONDITIONS : NOTE - All capacity Data is based on the following conditions : —

1. All rating figures are nominal with acceptable limits, plus and minus 5%.
2. Conditions : Ambient 32.2°C (90°F). Return Gas 18.3°C (65°F). No subcooling of liquid before expansion.
3. For each 5.6°C (10°F) increase in Ambient decrease capacity by 6%. For each 5.6°C (10°F) decrease in Ambient increase capacity by 6%.

REFER NEXT PAGE FOR AUTOMOTIVE AIR CONDITIONING COMPRESSORS

KIRBY-TECUMSEH

AUTOMOTIVE AIR CONDITIONING COMPRESSORS

260-a

The Twin Cylinder Model HG 1000 compressor is designed especially for automotive air conditioning. Design features are similar to the Twin Cylinder Models described on Page 260.



HG 1000

SPECIFICATIONS									
CAT. NO.	MODEL - P/N	BORE	STROKE	No. CYLS.	DISPL. cm ³ /rev	SHUT OFF VALVES		OIL CHARGE	REFRIG.
						SUCT.	DISCH.		
2602	HG1000 Less Service Valves	47.6 mm (1-7/8")	47.6 mm (1-7/8")	2	169.6	5/8" Fl.	1/2" Fl.	325 ml	R12
2603	HG1000V With Service Valves								
26010	MA6A	Magnetic Clutch 6" 12V. DC. (A Section)							
26011	MA7A	Magnetic Clutch 7" 12V. DC. (A Section)							
26012	MA7B	Magnetic Clutch 7" 12V. DC. (B Section)							

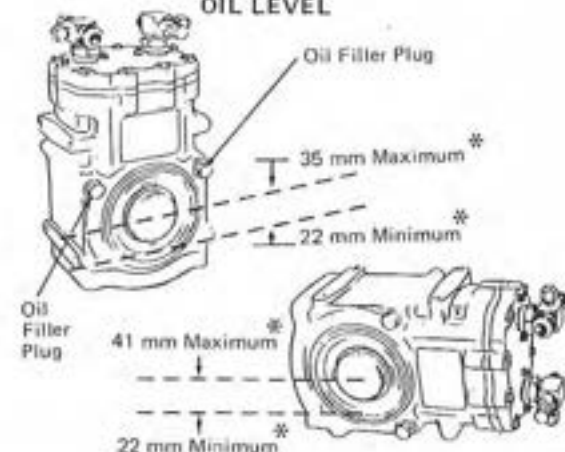
RPM RANGE 500 - 6000

BTU PER HOUR VS. COMPRESSOR SPEED

MODEL No.	COMP. SPEED R.P.M.	150 PSIG HEAD PRESSURE			180 PSIG HEAD PRESSURE			240 PSIG HEAD PRESSURE		
		EVAP. TEMPERATURE °F.			EVAP. TEMPERATURE °F.			EVAP. TEMPERATURE °F.		
		20°	30°	40°	20°	30°	40°	20°	30°	40°
HG 1000	500	6100	7700	9660	5450	7000	8660	4320	5640	6960
	1000	12300	15640	19260	11200	14200	17630	8640	11280	14270
	1500	18200	23380	28770	16600	21000	26000	12960	17250	21400
	2000	23500	30020	37060	21700	27290	33640	18070	22630	28000
	2500	27800	35200	43500	25800	32300	39600	21500	27000	33300
	3000	30950	39050	47930	28800	35730	44000	23840	30190	37490

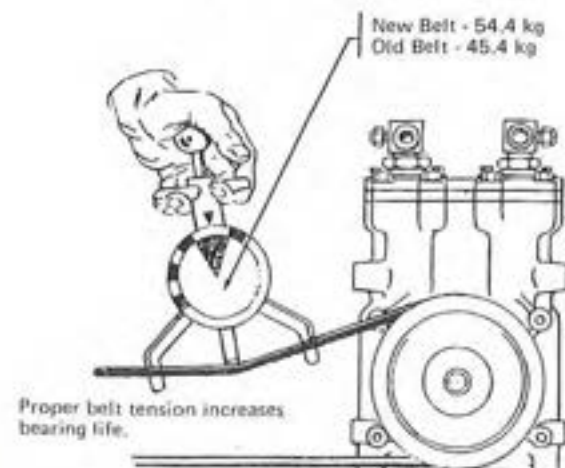
RATING CONDITION : As specified on Page 260.

COMPRESSOR OIL LEVEL

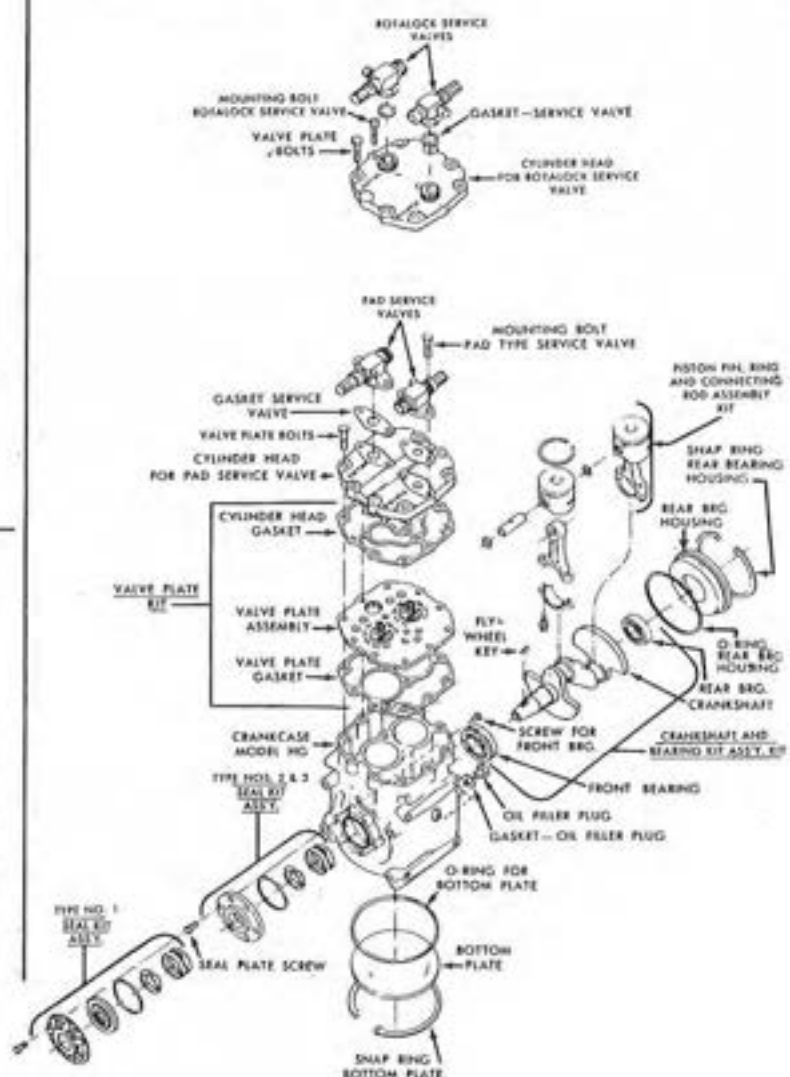


* Levels indicated after compressor has been installed and operated

BELT TENSION



EXPLODED VIEW MODEL HG1000 BELT-DRIVEN COMPRESSOR



KIRBY - TECUMSEH "PACKAGED" REFRIGERATION UNITS

LOW PROFILE DROP-IN PACKAGED SYSTEMS R12

MEDIUM TEMPERATURE:

Designed for 2°C (35°F) Storage Temperature and
8°C (14°F) Average Evaporator Temperature Difference.

LOW TEMPERATURE:

Designed for -15°C (5°F) Storage Temperature and
5.4°C (8°F) Average Evaporator Temperature Difference.

FEATURES

- ★ Packaged one-piece factory sealed system assembly complete with all controls
- ★ Fully wired ready to plug into standard power point
- ★ Minimum protrusion into storage area
- ★ Positive directional cold air distribution in refrigerated space is continuous for even storage temperature.

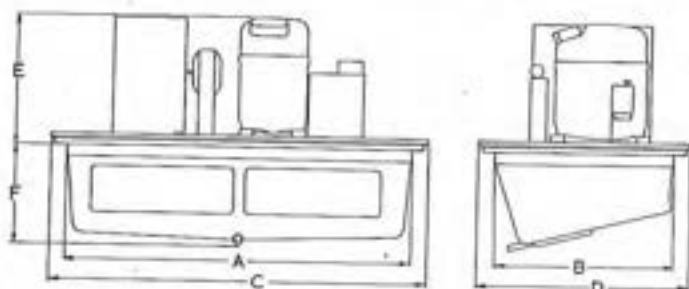


MODEL UJBF2

MEDIUM TEMPERATURE DROP-IN SYSTEMS — 240 Volts. AC. 50 Hz. 1 Phase — LOW PROFILE

CAT. NO.	MODEL	NOM. HP	COMPRESSOR	UNIT FL AMPS	NOM. CAPACITY		NORMAL SETTING	WEIGHT	
					WATTS	BTU/HR		kg	lbs.
26129	UECK2	1/4	AE7416A	2.6	440	1500	Cut-in	28	62
26132	UECL1	1/3	AE7423A	3.4	590	2010	4.5°C	34	75
26130	UJAU2	1/3	AJ7428A	4.0	750	2550	Cut-out	45	99
26131	UJAV1	1/2	AJ7434A	4.5	940	3200	-8.5°C	48	106

Off-Cycle Defrost — Rating Basis 32°C (90°F) Ambient



DIMENSIONS — mm

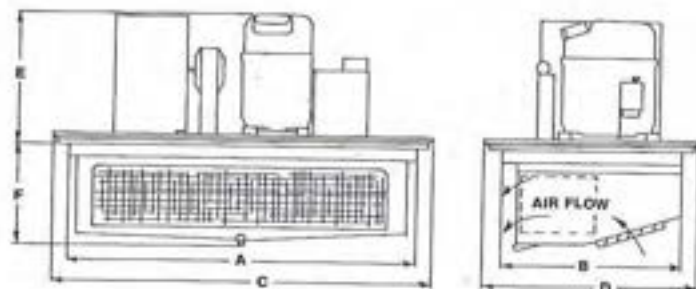
Model	A	B	C	D	E	F	Wt. kg
UECK2	495	420	580	505	310	190	28
UECL1	810	420	895	505	310	235	34
UJAU2	810	420	895	505	310	235	45
UJAV1	1030	420	1115	505	350	260	48

For hole size add 10 mm to dimensions 'A' & 'B' for clearance
Access hole must be cut square

LOW TEMPERATURE DROP-IN SYSTEMS — 240 Volts. AC. 50 Hz. 1 Phase — LOW PROFILE

CAT. NO.	MODEL	NOM. HP	COMPRESSOR	UNIT FL AMPS	NOM. CAPACITY		NORMAL SETTING	WEIGHT	
					WATTS	BTU/HR		kg	lbs.
26126	UJBF2	1/3	AJ2416A	3.9	450	1535	Cut-in	46	101
26127	UJBG2	1/2	AJ2422A	4.3	590	2012	-12°C	54	119
26128	UJBH2	3/4	AJ2427A	4.8	830	2830	Cut-out	70	154
	UJBK2	1	AJ2448J		1380	4692	-18°C		

Defrost Control: Time Initiated — Temperature terminated — Evap. Fan Delay
Rating Basis: 32°C (90°F) Ambient, -22.5°C (-8°F) Saturated Suction Temperature



DIMENSIONS — mm

Model	A	B	C	D	E	F	Wt. kg
UJBF2	635	425	680	470	330	185	46
UJBG2	635	505	680	550	330	250	54
UJBH2	825	545	870	590	370	290	70
UJBK2							

For hole size add 10 mm to dimensions 'A' & 'B' for clearance
Access hole must be cut square

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

KIRBY - TECUMSEH "PACKAGED" REFRIGERATION UNITS

STANDARD DROP-IN PACKAGE REFRIGERATION SYSTEMS

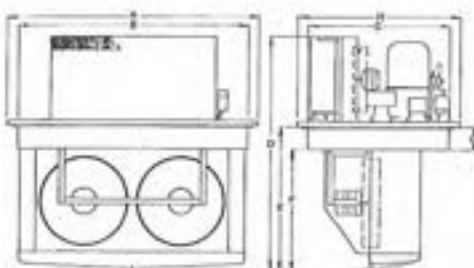
FOR
R12Units are plug-mounted with a flexible gasket seal and require no bolting down.
Designed for maximum efficiency at ambients from 10°C(50°F) to 43°C(110°F).

CAT. NO.	MODEL	Comp.	Nom. Power		FL Amps	Designed for: °C		Nom. Capacity		Normal Setting
			kW	HP		Storage	Evap. TD	WATTS	BTU/HR	
26150	UJBA1	AJ7434A	0.77	1/2	5.2	+2	7	960	3280	Cut-in
26133	UJBB1	AJ7445A	0.97	3/4	6.3	+2	7	1100	3760	5.5°C
26134	UJBC1	AJ7457A	1.30	1	6.6	+2	7	1520	5170	
26148	UHA2	AH4514A	1.61	1 1/8	12.0	+2	8	2350	8020	Cut-out
26149	UHB2	AH4521A	1.97	2	12.75	+2	8	3200	10920	-1°C

240 Volt, 50 Hz, Single Phase

"DROP-IN" DIMENSIONS mm

MODEL	A	B	C	D	E	F	G	H	WL, kg
UJBA1	760	650	535	835	480	375	105	540	70
UJBB1	760	650	535	835	480	375	105	540	75
UJBC1	760	650	535	920	590	465	105	540	84
UHA2	1170	1070	850	1085	670	565	105	750	115
UHB2	1170	1070	650	1085	670	565	105	750	130

For Hole in room top add 15 mm to dimensions 'B' & 'C' for clearance.
Access hole must be cut square.FOR
R12

STANDARD PUSH-UP PACKAGE REFRIGERATION SYSTEMS

Similar to the plug-mounted Drop-in Units but with a reverse mounting flange.



CAT. NO.	MODEL	Comp.	Nom. Power		FL Amps	Designed for: °C		Nom. Capacity		Normal Setting
			kW	HP		Storage	Evap. TD	WATTS	BTU/HR	
26141	UJBA61	AJ7434A	0.77	1/2	5.2	+2	7	960	3280	Cut-in
26142	UJBB61	AJ7445A	0.97	3/4	6.3	+2	7	1100	3760	5.5°C
26143	UJBC61	AJ7457A	1.30	1	6.6	+2	7	1520	5170	
26144	UHA62	AH4514A	1.61	1 1/8	12.0	+2	8	2350	8020	Cut-out
26145	UHB62	AH4521A	1.97	2	12.75	+2	8	3200	10920	-1°C

240 Volt, 50 Hz, Single Phase

FOR
R12

STANDARD SLIDE-IN/PUSH-IN PACKAGE REFRIGERATION SYSTEMS

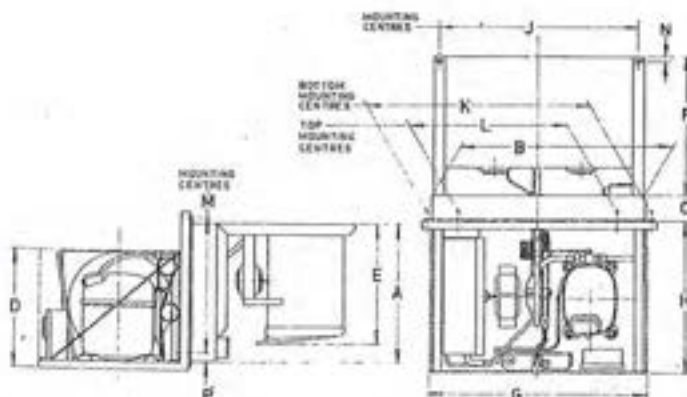
Units are plug-mounted with a flexible gasket seal, entire assembly bolted into place with six bolts.
Designed for maximum efficiency at ambients from 10°C(50°F) to 43°C(110°F).

CAT. NO.	MODEL	Comp.	Nom. Power		FL Amps	Designed for: °C		Nom. Capacity	
			kW	HP		Storage	Evap. TD	WATTS	BTU/HR
26135	UJAB21	AJ7434A	.818	1/2	5.3	+2	8	790	2695
26136	UJAB23	AJ7445A	.907	1/2	5.0	+12.5	5.5	1420	4845
26137	UJAA21	AJ7428A	.969	3/4	6.3	+2	8	1035	3530

240 Volt, 50 Hz, Single Phase

"SLIDE-IN" DIMENSIONS mm

Models	A	B	C	D	E	F	G
UJAB21	420	650	75	356	375	415	645
UJAB23	H	J	K	L	M	N	P
UJAA21	450	610	680	460	415	16	19

Hole in room wall to be 660 mm wide x 430 mm high.
The access hole must be cut square

FEATURES

- * FACTORY ASSEMBLED AND TESTED
- * LOW PRESSURE SAFETY CONTROL
- * CONTROLS FACTORY SET — CAN BE VARIED TO SUIT — BY CUSTOMER
- * R.A.P.H. CONTROL FOR FAN CYCLING ON ALL TWIN FAN CONDENSING UNIT MODELS
- * NO WIRING REQUIRED
- * THERMOSTATICALLY CONTROLLED

DROP-IN & PUSH-UP APPLICATIONS

MEDIUM TEMPERATURE MODELS 2°C ROOM TEMP.

- Capillary Control • No bolting down required on Drop-in's

DROP-IN MODELS		PUSH-UP MODELS		Condensing Unit Model	Nom. Cap. Watts	Aver. T.D. °K
CAT. NO.	UNIT MODEL	CAT. NO.	UNIT MODEL			
26151	CP33MCD	26164	CP33MCP	A33-12LM	747	8.5
26152	CP50MCD	26165	CP50MCP	A50-12M	1177	7.5
	CP51MCD		CP51MCP	A50-12M	1260	5.5
26153	CP75MCD	26166	CP75MCP	A75-12M	1583	7.0
26154	CP100MCD	26167	CP100MCP	A100-12M	1767	8.0
	CP101MCD		CP101MCP	A100-12M	1978	5.5
	CP125MCD*		CP125MCP*	A100-12H	1993	5.5
	CP145MCD*		CP145MCP*	A150-12H	2521	7.5
26155	CP150MCD	26168	CP150MCP	A150-12M	2674	8.0
	CP152MCD	26169	CP152MCP	A150-12MS	2674	8.0
26156	CP160MCD*		CP160MCP*	A160-12M	3253	7.5
26157	CP175MCD	26170	CP175MCP	A175-12M	4059	7.5



MODEL CP160 LTD

LOW TEMPERATURE MODELS -18°C ROOM TEMP.

- HP safety control • TX Valve Control • Fan Delay Control
- Electric Defrost - Time Initiated - Pressure Terminated
- D.L.I. Approved Liquid Receiver • Liquid Sightglasses

DROP-IN MODELS		PUSH-UP MODELS		Condensing Unit Model	Nom. Cap. Watts	Aver. T.D. °K
CAT. NO.	UNIT MODEL	CAT. NO.	UNIT MODEL			
26158	CP33LTD	26171	CP33LTP	A33-12LM	381	5.5
26159	CP50LTD*	26172	CP50LTP*	A50-12L	769	6.0
26161	CP75LTD*	26174	CP75LTP*	A75-12L	982	5.5
26162	CP100LTD*	26175	CP100LTP*	A100-12L	1348	5.0
26163	CP150LTD*	26176	CP150LTP*	A150-12L	1539	6.0
	CP155LTD*		CP155LTP*	A150-502L	1978	5.5
	CP160LTD*		CP160LTP*	A160-502L	2403	6.0



MODEL CP100 MCP

SLIDE-IN APPLICATIONS

MEDIUM TEMPERATURE 2°C ROOM TEMP.

SLIDE-IN MODELS		Condensing Unit Model	Nominal Capacity Watts	Average T.D. °K
CAT. NO.	UNIT MODEL			
	CP51MCS	A50-12M	1253	5.6
	CP75MCS	A75-12M	1583	7.0
	CP100MCS	A100-12M	1767	8.0
	CP101MCS	A100-12M	1978	5.5
	CP125MCS*	A100-12H	1993	5.5
	CP145MCS*	A150-12H	2521	7.5
	CP150MCS	A150-12M	2674	8.0
	CP160MCS*	A160-12M	3253	7.5
	CP175MCS	A175-12M	4059	7.5

LOW TEMPERATURE -18°C ROOM TEMP.

		Condensing Unit Model	Nominal Capacity Watts	Average T.D. °K
	CP75LTS*	A75-12L	982	5.5
	CP100LTS*	A100-12L	1348	5.0
	CP150LTS*	A150-12L	1539	6.0
	CP155LTS*	A150-502L	1978	5.5
	CP160LTS*	A160-502L	2403	6.0

MEDIUM TEMPERATURE

- Capillary Control

LOW TEMPERATURE

- HP safety control • TX Valve Control • Fan Delay Control
- Electric Defrost - Time Initiated - Pressure Terminated
- D.L.I. Approved Liquid Receiver • Liquid Sightglasses



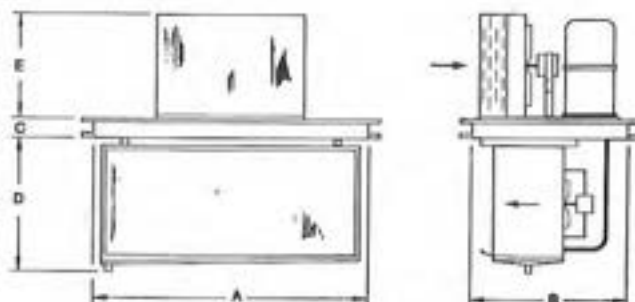
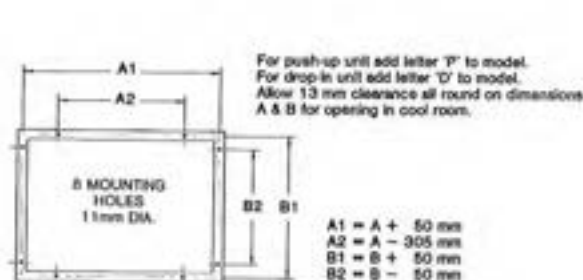
MODEL CP150 MCS

NOTES: * Accessible hermetic models All Models Single Phase
Medium Temperature Applications use Capillary Tube Control — Low Temperature Models use TX Valve Control
REFER NEXT PAGE FOR DIMENSIONS AND WEIGHTS

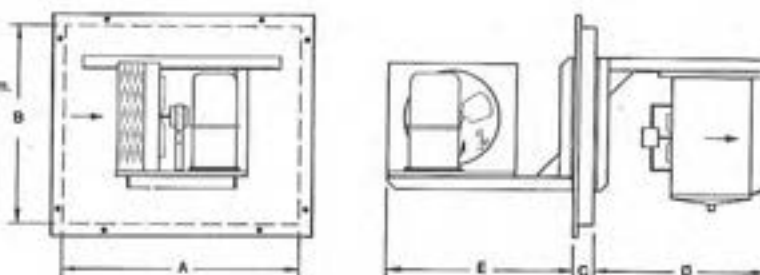
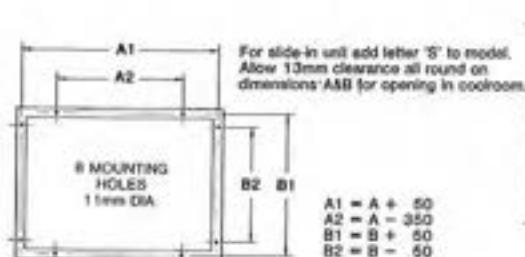
COOLPAK

DIMENSIONAL DATA

COOLPAK packaged cool & cold room refrigeration systems



COOLPAK MODEL	CONDENSING UNIT MODEL	ALL DIMENSIONS IN mm					MASS NETT kg	(ACTUAL) PACKED kg
		A	B	C	D	E		
MEDIUM TEMPERATURE MODELS 2°C ROOM TEMPERATURE								
CP33MC	A3312LM	660	415	76	145	300	51	91
CP50MC	A5012M	1118	610	76	145	350	65	110
CP51MC	A5012M	813	610	76	515	350	75	123
CP75MC	A7512M	813	610	76	515	350	82	132
CP100MC	A10012M	813	610	76	515	350	85	135
CP101MC	A10012M	813	610	76	515	350	88	138
• CP125MC	A10012H	813	610	76	515	400	113	163
• CP145MC	A15012H	813	610	76	515	400	117	167
CP150MC	A15012M	813	610	76	515	500	100	155
• CP152MC	A15012MS	813	610	76	515	400	102	157
• CP160MC	A16012M	1118	610	76	515	400	131	189
CP175MC	A17512M	1118	610	76	515	500	128	186
LOW TEMPERATURE MODELS -18°C ROOM TEMPERATURE								
CP33LT	A3312LM	813	610	155	210	300	55	95
CP50LT	A5012L	1118	610	155	210	350	66	131
CP75LT	A7512L	813	610	155	395	350	100	150
CP100LT	A10012L	1220	534	155	395	350	106	156
• CP150LT	A15012L	1220	534	155	395	400	127	182
• CP155LT	A150502L	1220	534	155	395	400	136	194
• CP160LT	A160502L	1220	534	155	395	400	136	194



MEDIUM TEMPERATURE MODELS 2°C ROOM TEMPERATURE								
CP51MCS	A5012M	813	610	76	600	570	107	167
CP75MCS	A7512M	813	610	76	600	570	113	173
CP100MCS	A10012M	813	610	76	600	570	116	176
CP101MCS	A10012M	813	610	76	600	570	118	178
• CP125MCS	A10012H	813	610	76	600	670	142	202
• CP145MCS	A15012H	813	610	76	600	670	146	206
CP150MCS	A15012M	813	610	76	600	700	130	190
• CP160MCS	A16012M	1118	610	76	600	670	158	218
CP175MCS	A17512M	1118	610	76	600	700	156	216
LOW TEMPERATURE MODELS -18°C ROOM TEMPERATURE								
CP75LTS	A7512L	813	610	155	600	570	131	191
CP100LTS	A10012L	1220	534	155	600	570	137	197
• CP150LTS	A15012L	1220	534	155	600	670	157	217
• CP155LTS	A150502L	1220	534	155	600	570	163	223
• CP160LTS	A160502L	1220	534	155	600	570	163	223

• THESE UNIT MODELS ARE FITTED WITH TWIN FANS

TERRY COMPRESSORS & CONDENSING UNITS

OPEN TYPE - BELT DRIVEN

TERRY COMPRESSORS COMPLETE WITH FLYWHEEL — OLD MODELS

CAT. NO.	Compressor Model No.	Nom. HP	Max. Revs	LINE SIZES (ins.)			FLYWHEEL			RECEIVER			
				Liquid	Suction	Disch.	Diam. Ins.	Gr.	Sect.	Diam. Ins.	Length Ins.	Capacity 80%	
												R12	R502
2623	CB65	1	840	3/8	1/2	3/8	8.66	1	A	4	29 1/2	11 lb.	10 1/2 lb.
2624	CB125	2	700	3/8	5/8	1/2	10.43	2	A	6	41	34 1/2 lb.	32 lb.
2625	CB200	3	700	1/2	3/4	5/8	10.43	2	A				
2626	CB355	5	700	1/2	7/8	3/4	15.35	3	A				

TERRY COMPRESSORS COMPLETE WITH FLYWHEEL — CURRENT MODELS

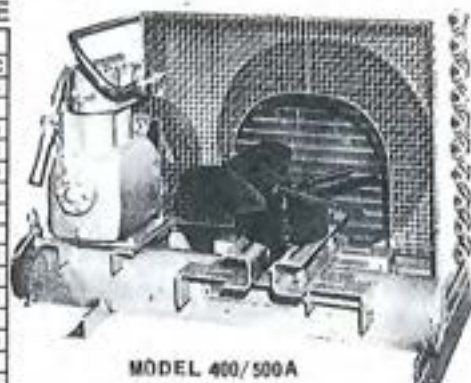
CAT. NO.	Comp. Model	No. of Cyls.	RPM Min. - Max.	Swept Vol @Max Rev m ³ /h	Displac. per Rev L	Oil Charge L	Flywheel O.D. mm	Vee Belt Drive	Refrig.	CAPACITY — WATTS		
										Sat. Suction Temp °C		
										-35	-15	+10
2627	RAS	2	400-1000	15.63	0.260	1.56	254	3A	R12	1500	4625	11975
									R22	—	7650	18425
									R502	3025	7725	—
2621	PJS	2	400-1440	37.84	0.437	1.99	305	3B	R12	3500	10750	28200
									R22	—	16500	43275
									R502	6325	17625	—
2622	VS	4	400-1000	52.56	0.876	2.56	305	4B	R12	4500	14875	38375
									R22	—	29200	58600
									R502	6750	24490	—

TERRY CONDENSING UNITS FOR R12 AND R502 — AIR COOLED

CAPACITY — WATTS AT SATURATED SUCTION TEMPERATURE

CAT. NO.	MODEL	COND. Model	COMP. Model	COMP. RPM	R12			R502		
					-35°C	-15°C	+5°C	-40°C	-25°C	-15°C
26256	300A3A	3A	RAS	450	—	—	—	1158	2066	3444
				500	780	2289	4689	—	—	—
				600	—	—	—	1553	2843	4440
26257	300A4	4	RAS	700	1076	3200	6571	1802	3319	5173
				800	1251	3658	7491	2059	3795	5979
				900	1431	4213	8562	2358	4301	6786
26258	300A5	5	RAS	600	1502	4176	9086	2345	4579	6851
				700	1758	4836	—	—	—	—
				800	—	—	—	—	—	—
26259	400A5	5	PJS	500	1246	3517	7840	2022	3883	5642
				700	1905	4982	10111	2638	5457	8133
				800	2052	5862	11797	2931	6111	9086
26260	400A4	4	PJS	500	1246	3517	7840	2022	3883	5642
				700	1905	4982	10111	2638	5457	8133
				800	2052	5862	11797	2931	6111	9086
26263	500A6	6	PJS	900	2271	6448	13115	3480	6411	10258
				1000	2491	7180	—	3810	7693	11320
				1100	2711	7840	—	—	—	—
26266	600A7	7	PJS	1100	—	—	—	4103	8060	11577
				1200	2784	8573	17292	—	—	—
				1300	3077	9159	—	—	—	—
26268	700A8	8	PJS	1400	3224	9672	—	—	—	—
				1500	—	—	—	—	—	—
				1600	—	—	—	—	—	—
26270	800A9	9	PJS	1400	3370	9892	20296	—	—	—
				1500	—	—	—	—	—	—
				1600	—	—	—	—	—	—
26271	800A10	10	PJS	1400	3710	10879	22325	4770	10943	17202
				1500	—	—	—	4103	8280	12310
				1600	—	—	—	4636	8829	13665
26272	850A8	8	VS	700	3810	10404	—	5569	11101	16413
				800	4250	11577	—	—	—	—
				900	4543	12603	—	—	—	—
26273	900A9	9	VS	800	—	—	—	6338	12639	—
				1000	5422	14727	—	—	—	—
				1100	—	—	—	—	—	—
26275	1000A10	10	VS	1000	—	—	—	—	—	—
				1100	—	—	—	—	—	—
				1200	—	—	—	—	—	—
26276	1000A16	16	VS	1000	—	14980	30540	7155	15697	24343
				1100	—	16300	31360	7195	15246	24784
				1200	—	—	—	—	—	—

Capacities based 32°C Ambient, 18°C Suction return vapour temp. and inherent sub-cooling.



MODEL 400/500A



MODEL 850/1000A

BELT DRIVEN COMPRESSOR UNITS FOR R12, R22, R502

CAT. NO.	UNIT MODEL	COMP. MODEL	RPM RANGE
26283	300B	CB205	400 - 700
26285	750B	PJS	400 - 1400
26286	1000B	VS	400 - 1000

REFER ALSO Tech. Page 262-b FOR ADDITIONAL TERRY - COPELAND UNITS AVAILABLE ON REQUEST

BELT DRIVEN WATER COOLED COMPRESSOR UNITS — FOR R12, R22, R502

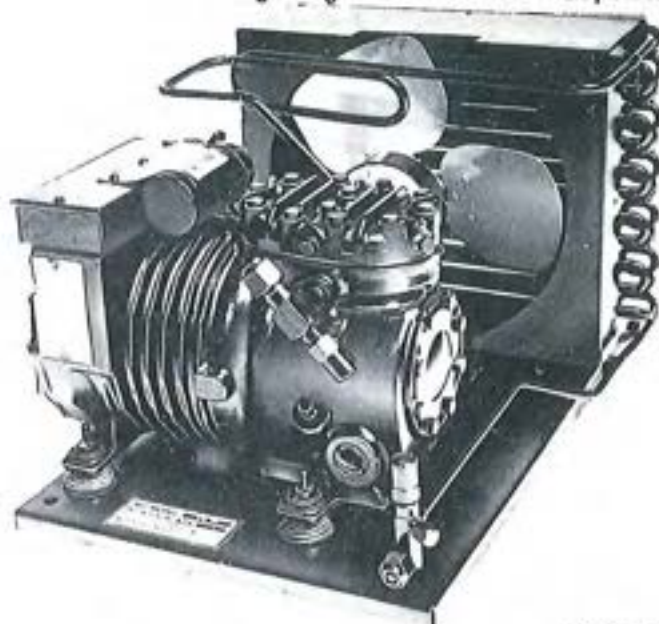
CAT. NO.	UNIT MODEL	COMP. MODEL	RPM RANGE
26289	300W 8	RAS	400 - 1000
26290	300W 9	RAS	400 - 1000
26293	750W 9	PJS	400 - 1400
26294	750W10	PJS	400 - 1400
26295	750W11	PJS	400 - 1400
26296	750W12	PJS	400 - 1400
26297	1000W10	VS	400 - 1000
26298	1000W11	VS	400 - 1000
26299	1000W12	VS	400 - 1000
262100	1000W13	VS	400 - 1000
262101	1000W14	VS	400 - 1000

TERRY COMPRESSOR "CHANGE-OVER" SERVICE

We provide a change-over facility on many models of Terry Compressors
Details gladly supplied on request.

TERRY HERMETIC AIR COOLED CONDENSING UNITS

Using Single Phase 50 Hz. Copelaweld® and Copelametic® Compressors



DESIGN FEATURES

HIGH STARTING TORQUE COMPRESSOR MOTORS
SUITABLE FOR CAPILLARY TUBE AND EXPANSION
VALVE APPLICATIONS
COMPACT DESIGN
LARGE CONDENSER
QUIET OPERATION

BALANCED FANS
INHERENT MOTOR PROTECTION
SUCTION SERVICE VALVE
LIQUID POST VALVE
D.L.I. APPROVED LIQUID RECEIVER
Available as an extra not fitted

4

LOW TEMPERATURE						CAPACITY - WATTS					
CAT. NO.	UNIT MODEL	COMPRESSOR MODEL	REFRIG.	DISPL. m ³ /hr	COMP. RPM	SATURATED SUCTION TEMPERATURE					
						-40°C	-35°C	-30°C	-25°C	-20°C	-17.8°C
26226	A3312LM*	JFH1-0033-1AG	R12	3.02	2900	147	176	237	320	405	433
26227	A5012L	KAH2-0050-CAG	R12	4.73	1450	235	359	513	711	914	961
26228	A7512L	KAA2-0075-CAG	R12	5.99	1450	363	504	672	879	1067	1158
26229	A10012L	KAL2-0100-CAG	R12	7.33	1450	469	639	872	1131	1414	1561
26230	A15012L	KAT2-0100-CAG	R12	9.17	1450	615	847	1134	1427	1729	1876
	A100502L	KAJ3-0100-CAG	R502	5.12	1450	615	843	1092	1363	1678	1820
	A150502L	KALB-0150-CAG	R502	7.33	1450	891	1114	1436	1839	2321	—
	A160502L	KATB-0150-CAZ	R502	9.17	1450	1064	1429	1890	2389	2960	3215
MEDIUM TEMPERATURE						CAPACITY - WATTS					
CAT. NO.	UNIT MODEL	COMPRESSOR MODEL	REFRIG.	DISPL. m ³ /hr	COMP. RPM	SATURATED SUCTION TEMPERATURE					
						-20°C	-15°C	-10°C	-5°C	-3.9°C	
26226	A3312LM*	JFH1-0033-1AG	R12	3.02	2900	405	507	654	822	853	
26232	A5012M	RSN2-0050-1AG	R12	3.81	2900	657	821	1011	1222	1268	
26233	A7512M	RSH2-0050-1AG	R12	4.71	2900	873	1084	1339	1624	1685	
26234	A10012M	RRL2-0075-CAG	R12	5.77	2900	879	1150	1509	1896	1978	
26235	A15012M	SSE4-0100-CAZ	R12	9.57	2900	1445	1810	2301	2836	2953	
	A15012MS	SSE4-0100-CAZ	R12	9.57	2900	1445	1810	2301	2836	2953	
	A16012M	KATB-0150-CAZ	R12	9.17	1450	1846	2301	2792	3429	3587	
26236	A17512M	YSC4-0150-CFG	R12	15.06	2900	2096	2579	3341	4250	4455	
	A17512M†	YSC4-0150-CFG	R12	15.06	2900	2096	2579	3341	4250	4455	
HIGH TEMPERATURE						CAPACITY - WATTS					
CAT. NO.	UNIT MODEL	COMPRESSOR MODEL	REFRIG.	DISPL. m ³ /hr	COMP. RPM	SATURATED SUCTION TEMPERATURE					
						-15°C	-10°C	-5°C	0°C	+5°C	+10°C
	A10012H	KAJ3-0100-CAG	R12	5.12	1450	1257	1561	1898	2242	2682	3056
	A15012H	KALB-0150-CAZ	R12	7.33	1450	1744	2191	2718	3326	3986	4689

* Dual Temperature Model

† Extra large Liquid Receiver fitted.

Capacity Conditions: 32°C Ambient, 18°C Return Vapour Temperature

CONVERSION: MULTIPLY WATTS BY 3.412 TO OBTAIN BTU/HR. MULTIPLY BTU/HR BY 0.293 TO OBTAIN WATTS

TERRY-COPELAND

COMPRESSORS — COMPRESSOR UNITS — CONDENSING UNITS

The 262 Series of Pages lists only a few of the wide range of Compressors, Compressor Units and Condensing Units available from Terry/Luke. On application we would be pleased to supply any units from this range — Literature containing full details is available on application.

APPLICATION TEMPERATURE RANGE				CODE	Suction Temp. Rating at —	
APPLICATION	°F	°C			°F	°C
HIGH TEMP.	+45 Max - 0 Min	+ 7.2 Max -17.8 Min	H		+40	+ 4.4
MEDIUM TEMP.	+25 Max - 5 Min	+ 3.9 Max -20.6 Min	M		+20	- 6.7
LOW TEMP.	- 5 Max -40 Min	-20.6 Max -40.0 Min	L		-30	-34.4
EXTRA LOW TEMP.	-20 Max -40 Min	-28.9 Max -40.0 Min	E		-40	-40
TWO STAGE	0 Max -40 Min	-17.8 Max -40.0 Min	T		-40	-40
TWO STAGE — EXTRA LOW T.	-30 Max -88 Min	-34.4 Max -66.7 Min	U		-40	-40

TERRY ACCESSIBLE HERMETIC AIR COOLED CONDENSING UNITS

Refrig.	Applic. Temp.	CAPACITY RANGE		No. Models Avail.
		BTU/HR	kW	
R12	H	17900 — 172500	5.25 — 50.56	10
	M	21200 — 50700	6.21 — 14.86	7
	L	7130 — 26500	2.09 — 7.77	6
R22	H	18350 — 184750	5.38 — 54.15	9
	M	10625 — 123700	3.11 — 36.25	13
R502	M	14750 — 146000	4.32 — 42.79	11
	L	9520 — 48800	2.79 — 14.30	10
	E	11550 — 12300	3.39 — 3.61	2

Refer Terry Bulletin — Form No. 1280-384-R1 July '79

TERRY ACCESSIBLE HERMETIC WATER COOLED CONDENSING UNITS

Refrig.	Applic. Temp.	CAPACITY RANGE		No. Models Avail.
		TONS	kW	
R12	H	2.79 — 19.6	9.81 — 68.93	8
	H Tand.	23.3 — 39.2	81.94 — 137.86	3
	M	1.05 — 11.0	3.69 — 38.69	17
R22	L	0.61 — 2.23	2.15 — 7.84	6
	H	5.3 — 36.5	18.64 — 128.36	10
	H Tand.	43.1 — 73	151.57 — 256.72	5
R502	M	0.96 — 21.03	3.38 — 73.96	18
	T	1.36 — 2.19	4.78 — 7.70	2
	U	0.86 — 3.73	3.02 — 13.12	4
R502	M	1.37 — 22.18	4.82 — 78.01	13
	L	0.77 — 5.86	2.71 — 20.61	11
	E	0.93 — 0.95	3.27 — 3.34	2
R502	T	1.13 — 1.56	3.97 — 5.49	2
	U	1.0 — 4.37	3.52 — 15.37	4

Refer Terry Bulletin — Form No. 1280-360-R1 June '79

TERRY ACCESSIBLE HERMETIC COMPRESSOR UNITS REFRIGERANT COOLED — Nom. HP Range 2 to 40

Single Compressor Models			Tandem Compressor Models		
Refrig.	Applic. Temp.	No. Models	Refrig.	Applic. Temp.	No. Models
R12	H	10	R12	H	6
	M	5		M	4
	M/L	1		L	3
R22	L	5	R22	H	9
	H	13		M	1
	M	5		T	2
R502	T	2	R502	U	3
	U	3		M	9
	M	13		L	10
R502	L	11		T	2
	E	1		U	3
	T	2			
	U	3			

Refer Terry Bulletin — Form No. 1280-337-R2 June '78

R22 TERRY COPELAND WELDED HERMETIC COMPRESSORS FOR AIR CONDITIONING APPLICATION

Type	HP Range	CAPACITY RANGE		No. Models Avail.
		BTU/HR	kW	
J Line	1/2 - 1	5800 — 10000	1.70 — 2.93	5
R Line	1 - 1 1/2	10400 — 15800	3.05 — 4.63	4
S Line	2 - 2 1/2	16600 — 26200	4.86 — 7.67	5
Y Line	3 - 5	33200 — 51875	9.72 — 15.19	4
B Line	7 1/2 - 12	74700 — 120350	21.87 — 35.24	3

Refer Terry Bulletin — Form No. 1280-386-R1

TERRY-COPELAND ACCESSIBLE HERMETIC COMPRESSORS

Compressor Type	No. Cyls.	Refrig.	Applic. Temp.	HP Range	No. Models Avail.
ER	2	R12	H	2	1
		R22	H	2 and 3	2
		R502	M	2	1
3R	2	R12	M	2 and 3	2
		R22	M	3	1
		R502	M	3	1
NR	2	R12	H	3	1
		R22	M	3 and 5	2
		R502	M	3	1
MR	2	R12	H	3	1
		R22	M	3 and 5	2
		R502	M	3	1
9R	3	R12	H	5	1
		R22	M	5	1
		R502	M	5	1
4R	4	R12	H	7 1/2 and 10	2
		R22	M	5 and 7 1/2	2
		R502	M	7 1/2	1
6R	6	R12	H	7 1/2	1
		R22	M	10 and 15	2
		R502	M	7 1/2	1
TANDEM 44	2 x 4	R12	H	10 and 15	2
		R22	M	20 to 30	3
		R502	M	20 to 30	3
TANDEM 66	2 x 6	R12	H	10 and 15	2
		R22	M	20 to 30	3
		R502	M	20 to 30	3

Refer Terry Bulletins — Form Nos:

ER & 3R, 1280-338-R2 Jan '80
MR, 1280-333-R2 June '78
4R, 1280-335-R2 June '79
T44, 1280-340-R2 Oct '80

NR, 1280-339-R2 June '80

9R, 1280-334-R2 June '80

6R, 1280-336-R2 Feb '78

T66, 1280-341-R2 Oct '80

REFER PAGES 262 & 262-a FOR OPEN TYPE BELT DRIVEN COMPRESSORS AND CONDENSING UNITS AND COPELAND HERMETIC AIR COOLED CONDENSING UNITS

"SUMMIT" CONDENSING UNITS**"M" SERIES Specifications and Capacities**

Model	H.P.	Bore Ins.	Stroke Ins.	Disp. Cubic Ins. Per Rev.	Condenser Surface Area		Applic.	Motor	Refrig.	Suct. Line Ins.	Dis. Line Ins.	Oil Chg. Fl. Ozs.	Evap. Suct. Temp. (Btu./Hr. 90° Room Temp.)						
					Pr'y □	Sec'y □							-20°	-10°	0°	+10°	+20°	+30°	+40°
8 ML	1/8			-624	1-89	16-85	L.B.P.	S.P.	12	1/4	1/4	22-02	350	500	620	780	940		
8 MLR	1/8			-624	1-89	16-85	L.B.P.	S.P.	12	1/4	1/4	22-02	350	500	620	780	940		
6 ML	1/6	1-3/16	3/4	-830	1-89	16-85	L.B.P.	S.P.	12	1/4	1/4	22-02	470	660	820	1,030	1,250		
6 MLR	1/6	1-3/16	3/4	-830	1-89	16-85	L.B.P.	S.P.	12	1/4	1/4	22-02	470	660	820	1,030	1,250		
4 M 2 PL	1/4	"	"	-830	1-89	16-85	L.B.P.	C.S.I.R.	12	1/4	1/4	22-02	880	1,060	1,370	1,730	2,070		
4 M 2 PLR	1/4	"	"	-830	1-89	16-85	L.B.P.	C.S.I.R.	12	1/4	1/4	22-02	880	1,060	1,370	1,730	2,070		
4 M 2 PM	1/4			-624	1-89	16-85	M.B.P.	C.S.I.R.	12	1/4	1/4	22-02			1,000	1,320	1,670	2,050	2,450
4 M 2 PMR	1/4			-624	1-89	16-85	M.B.P.	C.S.I.R.	12	1/4	1/4	22-02			1,000	1,320	1,670	2,050	2,450

"S" SERIES Specifications and Capacities

Model	H.P.	Bore Ins.	Stroke Ins.	Disp. Cubic Ins. Per Rev.	Condenser Surface Area		Applic.	Motor	Refrig.	Suct. Line Ins.	Dis. Line Ins.	Oil Chg. Fl. Ozs.	Evap. Suct. Temp. (Btu./Hr. 90° Room Temp.)						
					Pr'y □	Sec'y □							-20°	-10°	0°	+10°	+20°	+30°	+40°
5 4 M	1/4	1-1/4	7/8	1-070	1-89	16-85	M.B.P.	C.S.I.R.	12	3/8	5/16	3 Pts.				1,580	1,870	2,190	
5 4 MR	1/4	1-1/4	7/8	1-070	1-89	16-85	M.B.P.	C.S.I.R.	12	3/8	5/16	3 Pts.				1,580	1,870	2,190	
5 4 L	1/4	1-1/4	1-1/32	1-250	1-89	16-85	L.B.P.	C.S.I.R.	12	3/8	5/16	3 Pts.	700	920	1,180	1,500	1,860		
5 4 LR	1/4	1-1/4	1-1/32	1-250	1-89	16-85	L.B.P.	C.S.I.R.	12	3/8	5/16	3 Pts.	700	920	1,180	1,500	1,860		
5 3 M	1/3	1-3/8	1-1/32	1-530	3-68	32-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,100	2,600	3,080	3,640
5 3 MR	1/3	1-3/8	1-1/32	1-530	3-68	32-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,100	2,600	3,080	3,640
5 3 L	1/3	1-1/2	1-1/32	1-830	3-68	32-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,200	1,610	1,980	2,480	2,795		
5 3 LR	1/3	1-1/2	1-1/32	1-830	3-68	32-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,200	1,610	1,980	2,480	2,795		
5 3 L 2 P	1/3	1-3/8	7/8	1-290	3-68	32-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,480	1,880	2,500	3,130	3,870		
5 3 L 2 PR	1/3	1-3/8	7/8	1-290	3-68	32-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,480	1,880	2,500	3,130	3,870		
5 3 M 2 P	1/3	1-1/4	7/8	1-070	3-68	32-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,740	3,360	3,960	4,540
5 3 M 2 PR	1/3	1-1/4	7/8	1-070	3-68	32-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,740	3,360	3,960	4,540
5 2 L	1/2	1-3/4	1-1/32	2-500	4-93	43-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,560	1,975	2,500	3,185	3,870		
5 2 LR	1/2	1-3/4	1-1/32	2-500	4-93	43-80	L.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.	1,560	1,975	2,500	3,185	3,870		
5 2 M	1/2	1-1/2	1-1/32	1-830	4-93	43-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,500	3,020	3,640	4,370
5 2 MR	1/2	1-1/2	1-1/32	1-830	4-93	43-80	M.B.P.	C.S.I.R.	12	1/2	5/16	3 Pts.				2,500	3,020	3,640	4,370
5 75 M	3/4	1-3/4	1-1/32	2-500	4-93	43-80	M.B.P.	P.S.C.	12	1/2	5/16	3 Pts.				3,185	3,870	4,600	5,550
5 75 MR	3/4	1-3/4	1-1/32	2-500	4-93	43-80	M.B.P.	P.S.C.	12	1/2	5/16	3 Pts.				3,185	3,870	4,600	5,550
				BTU/HR.															
5 100 H 2 P	1	1 1/2	1 1/2	1-830			H.B.P.	P.S.C.	22	1/2	5/16	3 Pts.	Specially Designed for Air Conditioning						

Motor Key—S.P.: Split Phase. C.S.I.R.: Capacitor Start Induction Run. 3 PH.: 3 Phase. P.S.C.: Permanent Split Capacitor.

For each 10 (F) increase in ambient temperature decrease capacity by 6%.

"SUMMIT" CONDENSING UNITS



"T" SERIES Specifications and Capacities

Model	H.P.	Bore In.	Stroke In.	Disp. Cubic In. Per Rev.	Condenser Surface Area		Applic.	Motor	Refrig.	Suct. Line In.	Dis. Line In.	Oil Chg.	Evap. Suct. Temp. (Btu./Hr. 90° Room Temp.)						
					Pr'y □	Sec'y □							-20°	-10°	0°	+10°	+20°	+30°	+40°
T2L	1/2	1-3/8	1-3/64	3-100	4-93	43-80	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	1,860	2,454	3,070	3,530	4,500		
T2LR	1/2	1-3/8	1-3/64	3-100	4-93	43-80	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	1,860	2,454	3,070	3,530	4,500		
T75M	3/4	1-1/2	1-3/64	3-700	7-06	63-00	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,070	6,130	7,420	8,860
T75MR	3/4	1-1/2	1-3/64	3-700	7-06	63-00	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,070	6,130	7,420	8,860
T75MTF	3/4	1-1/2	1-3/64	3-700	6-80	60-60	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,070	6,130	7,420	8,860
T75MTFR	3/4	1-1/2	1-3/64	3-700	6-80	60-60	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,070	6,130	7,420	8,860
T75L	3/4	1-5/8	1-3/64	4-342	7-06	63-00	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	2,440	3,270	4,115	5,110	6,170		
T75LR	3/4	1-5/8	1-3/64	4-342	7-06	63-00	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	2,440	3,270	4,115	5,110	6,170		
T75LTF	3/4	1-5/8	1-3/64	4-342	6-80	60-60	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	2,440	3,270	4,115	5,110	6,170		
T75LTFR	3/4	1-5/8	1-3/64	4-342	6-80	60-60	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	2,440	3,270	4,115	5,110	6,170		
T100M	1	1-5/8	1-3/64	4-342	7-06	63-00	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,655	6,940	8,275	9,890
T100MR	1	1-5/8	1-3/64	4-342	7-06	63-00	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,655	6,940	8,275	9,890
T100MTF	1	1-5/8	1-3/64	4-342	9-10	80-90	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,655	6,940	8,275	9,890
T100MTFR	1	1-5/8	1-3/64	4-342	9-10	80-90	H.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.				5,655	6,940	8,275	9,890
T100L	1	1-3/4	1-3/64	5-036	7-06	63-00	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	3,125	3,960	5,010	6,385	7,760		
T100LR	1	1-3/4	1-3/64	5-036	7-06	63-00	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	3,125	3,960	5,010	6,385	7,760		
T100LTF	1	1-3/4	1-3/64	5-036	6-80	60-60	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	3,125	3,960	5,010	6,385	7,760		
T100LTFR	1	1-3/4	1-3/64	5-036	6-80	60-60	L.B.P.	C.S.I.R.	12	5/8	3/8	3-5 Pts.	3,125	3,960	5,010	6,385	7,760		
T150MTF	1-1/2	1-3/4	1-3/64	5-036	11-30	101-00	H.B.P.	P.S.C.	12	5/8	3/8	3-5 Pts.				6,385	7,760	8,485	10,030
T150MTFR	1-1/2	1-3/4	1-3/64	5-036	11-30	101-00	H.B.P.	P.S.C.	12	5/8	3/8	3-5 Pts.				6,385	7,760	8,485	10,030
													BTU./HR.						
T150H	1-1/2	1-5/8	1-3/64	4-342	16-850		H.B.P.	P.S.C.	22	5/8	3/8	3-5 Pts.	Specially Designed for Air Conditioning						
T200H	2	1-3/4	1-3/64	5-036	20-000		H.B.P.	P.S.C.	22	5/8	3/8	3-5 Pts.	Specially Designed for Air Conditioning						

Motor Key—S.P.: Split Phase. C.S.I.R.: Capacitor Start Induction Run. 3 Ph.: 3 Phase. P.S.C.: Permanent Split Capacitor.

"AS" SERIES Specifications and Capacities

Model	H.P.	Bore In.	Str. In.	No. Cyl.	Cubic In. Per Rev.	Cubic Feet Per Min.	Cubic Feet Per Hr.	Cubic In. Per Min.	Condenser Surface Area		Evaporator Suction Temp. (Btu./Hr. 90° Room Temp.)											
									Pr'y □	Sec'y □	-35°	-20°	-10°	0°	10°	20°	30°	40°	45°	50°		
AS100L	1	1-3/4	1-1/2	2	7-21	6-01	360	10,382	7-06	63-00	2,600	4,050	5,800	7,750								
AS100M	1	1-1/2	1-1/2	2	5-30	4-41	265	7,633	7-06	63-00				5,815	7,290	8,945	10,820	12,700	13,600	14,870		
AS150L	1-1/2	2	1-1/2	2	9-42	7-85	471	13,564	10-75	107-50	3,400	5,250	7,600	10,100								
AS150M	1-1/2	1-3/4	1-1/2	2	7-21	6-01	360	10,382	10-75	107-50				7,900	9,900	12,150	14,700	17,250	18,750	20,200		
AS200L	2	2-1/4	1-1/2	2	11-93	9-94	596	17,176	16-36	163-00	4,350	6,650	9,600	12,800	16,200							
AS200M	2	2	1-1/2	2	9-42	7-85	471	13,564	16-36	163-00				10,300	12,900	15,900	19,200	22,500	24,500	26,400		
AS300L	3	1-3/4	1-1/2	4	14-42	12-02	720	20,764	23-40	208-50	5,300	8,050	11,600	15,500	19,600	24,250						
AS300M	3	2-1/4	1-1/2	2	11-93	9-94	596	17,176	23-40	208-50				13,050	16,350	20,100	24,300	28,500	31,000	33,400		
AS400L	4	2	1-1/2	4	18-84	15-70	942	27,129	28-40	253-00	6,800	10,550	15,150	20,250	25,600	31,650						
AS400M	4	1-3/4	1-1/2	4	14-42	12-02	720	20,764	28-40	253-00				15,800	19,700	24,350	29,400	34,500	37,500	40,400		
AS500M	5	2	1-1/2	4	18-84	15-70	942	27,129	34-00	303-00				20,650	25,900	31,750	38,350	45,050	49,000	52,750		
AS500L	5	2-1/4	1-1/2	4	23-86	19-88	1,192	34,352	34-00	303-00	8,700	14,300	19,300	25,600	32,400							
AS750H	7-1/2	2-1/4	1-1/2	4	23-86	19-88	1,192	34,352						33,930	42,510	52,260	63,180	74,100	80,600	86,840		

Refrigerant all models F12 EXCEPT MODEL AS750H—F22 For each 10°F. increase in Ambient Temperature Decrease Capacity by 6%

COMPRESSOR PARTS

PISTONS, RINGS, PINS, CONN. RODS, AND SHAFTS

MAKE & MODEL	BORE Ins	CATALOGUE NOS. and MANUFACTURERS PART NOS.													
		PISTON		PISTON RINGS		PISTON PIN		CONN. ROD OR ECC. STRAP		CRANKSHAFT OR ECC. SHAFT		ECCENTRIC SHEAVE			
				COMP										OIL	
		Cat.No.	P/N	Cat.No.	P/N	Cat.No.	P/N	Cat.No.	P/N	Cat.No.	P/N	Cat.No.	P/N	Cat.No.	P/N
BITZER															
Comp. No. 2		265130	2033	—	—	—	—		2034	265136	2035		2037		2036
Comp. No. 3		265131	3033	—	—	—	—		3034	265137	3035		3037	265144	3036
Comp. No. 4		265132	4033		4058	—	—		4034	265138	4035		4037	265145	4036
Comp. No. 5		265133	5033		5058	—	—		5034	265139	5035		5037	265146	5036
Comp. No. 6		265134	6033		6058	—	—		6034	265140	6035		6037	265147	6036
Comp. No. 7		265135	7033		7058	—	—		7034	265141	7035		7037	265148	7036
BRUNNER — GORDON															
S140	1.1/2	2651	S140-71	2656	S140-76	26512	S140-78	26521	S140-34	26530	S140-131	26535	S140-39	26539	S140-66
R330	1.13/16	2652	R330-71	2657	R330-76	26513	R330-77	26522	R330-34	26530	S140-131	26535	S140-39	26539	S140-66
						26514	R330-78								
R500	2.1/8	2653	R500-71	2658	R500-76	26515	R500-77	26523	R500-34	26531	R500-131	26536	R500-39	26540	R500-66
						26516	R500-78								
	2.1/2	2654	R650-71	2659	R650-76	26517	R650-77	26524	R650-34	26532	R650-131	26537	R650-39	26541	R650-66
						26518	R650-78								
	3.1/4	2655	R2002-71	26510	R2002-76	26519	R2002-77	26525	R2002-34	26533	R2002-131	26538	R2002-39	26542	R2002-66
						26520	R2002-78								
	3.1/4	2655	R2002-71	26510	R2002-76	26519	R2002-77	26525	R2002-34	26534	R2002-131	26538	R2002-39	26542	R2002-66
						26520	R2002-78								
COLDSTREAM — BELT DRIVEN															
CH	1.9/16	26544	13C13	—	—	—	—	26575	16A14	26588	11A7	26594	8A1	265100	10A2
KB Plain Type with Rings	1.3/4	26545	13C6					26576	16A15	26588	11A7	26594	8A1	265100	10A2
		26546	13D20	26559	12A22	26568	12A21								
P Plain Type with Rings	1.9/16	26547	13C3					26575	16A14	26589	11A3	26595	8B10	265101	10B1
		26548	13D10	26560	12A9	26569	12A10								
Q	1.3/4	26545	13C6	—	—	—	—	26576	16A15	26588	11A7	26596	8B2	265102	10B8
M	2	26549	13D9	26561	12A12	26570	12A13	26577	16A16	26588	11A7	26596	8B2	265102	10B8
T - TB	2	26549	13D9	26561	12A12	26570	12A13	26578	16A5	26590	11A4	26596	8B2	265103	10B2
J	2.5/16	26550	13D30	26562	12A15	26571	12A16	26579	16A11	26591	11A10	26596	8B2	265104	10B3
R	2.9/16	26551	13D21	26563	12A23	26572	12A24	26580	16A8	26592	11B4	26597	8C9	—	—
O	3.1/16	26552	13D22	26564	12A25	26573	12A11	26581	16A9	26592	11B4	26597	8C9	—	—
JB Seal Side Thrust Side	2.5/16	26553	13D54					26579	16A11	26591	11A10	26596	8B2	265104	10B3
		26554	13D55	26565	12A15	26571	12A16								
RY	2.3/4	26555	13D47	26566	12A56	26574	12A57	26582	16A49	26592	11B4	26598	8C15	—	—
OB	3.1/16	26556	13D40	26567	12A25	26573	12A11	26581	16A9	26592	11B4	26598	8C15	—	—
RO	3.1/16	26556	13D40	26567	12A25	26573	12A11	26581	16A9	26593	11B10	26599	8C26	—	—
COLDSTREAM — ROTOSEALED															
CY Plain Top Profiled Top	1.9/16	265105	13C15					265117	16A40	—	11A13	—	—	265122	10A15
		265106	13C20												
KY Plain Top Profiled Top	1.9/16	265105	13C15					265117	16A40	—	11A16	—	—	265123	10A11
		265106	13C20												
NY	1.9/16	265105	13C15					265117	16A40	—	11A19	—	—	265124	10A14
BY	1.9/16	265105	13C15					265117	16A40	—	11A18	—	—	265125	10A13
FY	1.9/16	265105	13C15					265117	16A40	—	11A17	—	—	265126	10A12
NY	1.9/16	265105	13C15					265117	16A40	—	11A21	—	—	265127	10A16
BY	1.9/16	265107	13C24					265117	16A40	—	11A18	—	—	265125	10A13
NX	2	265108	13C25					265118	16A48	—	11A24	—	—	265126	10A12
BX	2	265108	13C25					265118	16A48	—	11A23	—	—	265125	10A13
FX	2	265108	13C25					265118	16A48	—	11A22	—	—	265127	10A16
NY	1.9/16	265107	13C24					265117	16A40	—	11A17	—	—	265126	10A12
FY	1.9/16	265107	13C24					265117	16A40	—	11A21	—	—	265127	10A16
NZ	2.1/4	265109	13C28					265119	16A53	—	11A24	—	—	265126	10A12
NL Thrust Side Motor Side	2.1/4	265109	13C28					265120	16A47	—	11B12	265121	8C13	—	—
		265110	13C29				11B13								
NU Thrust Side Motor Side	2	265111	13C26					265118	16A48	—	11B12	265121	8C13	—	—
		265112	13C27				11B13								

COMPRESSOR PARTS

PISTONS, RINGS, PINS, CONN. RODS, AND SHAFTS

MAKE & MODEL	BORE Ins.	CATALOGUE NOS. and MANUFACTURERS PART NOS.													
		PISTON		PISTON RINGS				PISTON PIN		CONN. ROD OR ECC. STRAP		CRANKSHAFT OR ECC. SHAFT		ECCENTRIC SHEAVE	
				COMP		OIL									
		Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N	Cat. No.	P/N
ELLIS & JUDGES															
A	1.5/8	2661	P9	2667	P21			26612	BM27	26617	P8	26620	P46	26626	P45
AA	1.3/4	2662	P247	2668	P248			26612	BM27	26617	P8	26620	P46	26626	P45
B	1.7/8	2663	BM5	2669	P99			26613	P101	26618	P88	26621	P97	26627	P93
C	2.1/4	2664	P298	26610	P100			26614	P102	26618	P88	26621	P97	26627	P93
CC	2.3/8	2665	P299	26611	P63			26615	P78	26618	P88	26621	P97	26627	P93
D	2.1/4	2664	P298	26610	P100			26614	P102	26618	P88	26622	P57	26627	P93
DD	2.3/8	2665	P299	26611	P63			26615	P78	26618	P88	26622	P57	26627	P93
E	2.1/4	2664	P298	26610	P100			26614	P102	26618	P88	26623	P58	26627	P93
EE	2.3/8	2665	P299	26611	P63			26615	P78	26618	P88	26623	P58	26627	P93
T-TP	1.3/4	2666	BMN2					26616	BMN48	26619	BMN15	26624	BMN49	26628	BMN59
V-VP	1.3/4	2666	BMN2					26616	BMN48	26619	BMN15	26625	BMN50	26629	BMN60
FRIGIDAIRE															
A133	1.1/2	26630	SA3694	—	—	—	—	26637	636983	26641	630713	26645	637600	26650	1125771
AD2	1.3/4	26631	5499140	26634	635927	—	—	26638	1131883	26642	1137810	26646	637601	—	—
AD3	1.3/4	26631	5499140	26634	635927	—	—	26638	1131883	26642	1137810	26647	637602	—	—
AD4	2.1/8	26632	SA3736	26635	98320	—	—	26639	1131884	26643	1138958	26648	637603	—	—
AD6	2.1/2	26633	5499142	26636	634910	—	—	26640	1131885	26644	1138969	26649	5447002	—	—
KELVINATOR															
SA	1.1/4	26660	20759	—	—			26674	3614		49725		49729	—	—
SB, SSB	1.1/4	26660	20759	—	—			26674	3614		49725		49762	—	—
SG, SSG	1.1/2	26661	20243	—	—				20244		49725		49762	—	—
H	1.11/16	26662	49565	—	—				20244		49502		49566	—	—
PFBA	1.13/16	26663	49531	26668	49535				49532		N5835		3366	—	—
K	2.1/4	26664	49530	26669	49534				3340		49536		49546	—	—
Y	2.3/4	26665	49582	26670	49584				49583		49585		49591	—	—
T	3.1/4	26666	49632	26671	49634				49633		49635		49642	—	—
83	3.150	26667	GA63	26672	GA66	26673	GA67		GA64		GA68		GA71	—	—
84	3.150	26667	GA63	26672	GA66	26673	GA67		GA64		GA69		GA72	—	—
86	3.150	26667	GA63	26672	GA66	26673	GA67		GA64		GA69		GA73	—	—
TERRY — BELT DRIVEN															
E	1.515		90-12	—	—				95-11		85-16		35-11		40-11
V, VL	1.515		90-12	—	—				95-11		85-16		35-12		40-13
K	1.515		90-12	—	—				95-11		85-19		30-12	—	—
B, BR	1.5/8		90-13	—	—				95-14		85-16		35-11		40-12
Y, YL	1.5/8		90-13	—	—				95-14		85-16		35-12		40-13
D	1.5/8		90-13	—	—				95-14		85-29		35-10		40-19
DU	1.5/8		90-13	—	—				95-14		85-28		35-16		40-19
C	1.3/4		90-18	—	—				95-15		85-16		35-11		40-12
X	1.3/4		90-18	—	—				95-15		85-16		35-12		40-13
UW* Piston Pin	1.7/8		90-20	—	—				95-16		85-28		35-16		40-19
U, UHR, UHF etc. 9/16" Piston Pin	1.7/8		90-17	—	—				95-17		85-39		35-16		40-19
R, RR etc.	2		90-31		105-1				95-21		85-34		35-16		40-21
A, AL, J, JL, F, FI, etc.	2.3/4		90-24		105-3				95-10		85-12		30-11	—	—
P, PF etc.	2.3/4		90-10		105-3				95-10		85-12		30-18	—	—
V4, V4F, V4H etc.	2.3/4		90-24		105-3				95-10		85-10		30-10	—	—
Piston & Conn. Rod Assembly															
KU	1.656				105-11						110-63		30-30		
RA	2.25				105-10				266329		110-62		30-25		
PJ	2.75				105-3				266328		110-64		30-31		
PJS	2.75				105-3				266328		110-64		30-35		
JY	2.75				105-3				266328		110-64		30-29		
PY	2.75				105-3				266328		110-64		30-29		
VS	2.75				105-3				266330		110-65		30-36		
V45	2.75				105-3				266330		110-65		30-24		

COMPRESSOR PARTS SHAFT SEALS

MAKE DESCRIPTION MODEL	SHAFT SIZE	CAT. NO.	MANUF. P/N	ALTERNATIVE REPLACEMENT GUIDE							
				BELLOWS TYPE			MECHANICAL TYPE				
				DANFOSS	FRIGIDAIRE	KELV	FLEXIBOX	ROTARY			
BARBERIE											
All Models	5/8	26718		39-001	SA50135	22415	1588-42R	1115*			
BRUNNER											
S140, R330	11/16	2671	S140-159				1746-10R	3373			
R500	7/8	2672	R500-159					4369			
R650	1 1/8	2673	R650-159					9376			
R2002	1 1/4	2674	R2002-159				3176-40R	9377			
COLDSTREAM											
CH, KB	1/2	2675	151A5				R1270-4R	2292			
P, Q, M, T, J, JB	7/8	2676	151A3								
R.O. Prior to 1949	15/16	2677	151A4								
R.O. After 1949	1 1/8	2678	151A8								
RO, OB, RY	1 1/8	2679	151A12								
EMMCO ELECTRIC											
4B, Hole/Diaphragm Type	1/2						1270-4R	2292			
A,B,C,CD,D,DE,E,ED,SC etc. early models	5/8	26718		39-001	SA50135	22415	1588-42R	1115*			
A5,C5,GH,K,L,M,R,S etc. late models	5/8	26718		39-001	SA50135	22415	1588-42R	1115*			
N, P, ES	7/8	26719				49838	2223-6R	4120*			
T, U	1 3/16	26720				49839	3016-17R	14117*			
Q	1 3/8	26721				49840	3493-10R	14119*			
ELLIS & JUDGES											
A, AA	5/8	26711	BM90				1588-42R	1115*			
B, C, D, CC, DD, EE	3/4	26712	BM169								
T, V, TP, VP		26713	BMN63								
FRIGIDAIRE											
All models with 5/8 shaft	5/8	26715	SA50135	39-001	SA50135	22415	1588-42R	1115*			
All models with 15/16 shaft	15/16	26716	2854178	39-002	2854178	--	2381-18R	5110			
HALLMARK											
1AH, 2B series	13/16						2064-5R	4196			
2AH, 2C, 3C series	15/16						2381-8R				
2 1/2 x 2 1/2 — 2, 3, 4 Cylinder	1 15/16						3334-3R				
KELVINATOR (LEONARD)											
BELLOWS TYPE											
MODEL	SHAFT SIZE	REPLAC. SEAL		COVER GASKET		SEAT		SEAT GASKET		COVER	
		CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N	CAT. NO.	P/N
H	5/8	26718	22415		49507	26766	122510	26762	22418		22420
K	7/8	26719	49838		49515	26765	49832	26761	49833		49788
Y	1 3/16	26720	49839		49601	26767	49834	26763	49835		49600
T	1 3/8	26721	49840		49652	26768	49836	26764	49837		49813
ROTARY TYPE											
H42	5/8	26732	FA116		49507					26744	KA37495
K62	7/8	26733	FA117		49515					26745	KA37497
Y72	1 3/16	26734	FA118		49601					26746	KA37499
T82	1 3/8	26735	FA119		49652					26747	KA37501
42	3/4	26736	FA130		49507						KA40864
72	1 1/4	26737	FA131		49601						KA40874
83	30mm	26730	GA48		GA20						GA18
84*	30mm	26730	GA48		GA20						GA18
84**	35mm	26731	GA49		GA20						GA19
86	35mm	26731	GA49		GA20						GA19
* Before serial No. 22903 ** After serial No. 22903											

* Before serial No. 22903

** After serial No. 22903

GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

COMPRESSOR PARTS SHAFT SEALS

MAKE DESCRIPTION MODEL	SHAFT SIZE	CAT. NO.	MANUF. P/N	ALTERNATIVE REPLACEMENT GUIDE				
				BELLOWS TYPE			MECHANICAL TYPE	
				DANFOSS	FRIGIDAIRE	KELV	FLEXIBOX	ROTARY
KIRBY-TECUMSEH (STERNE)								
HQ, CG	7/8	2684	K665-8					
VFT, VFTL, CJ, CH	1	2683	K612-8					
RA, P, CK	1 1/4	2681	K509-5					
SA, CM	2 1/4	2682	K509-9					
VELOC-BITZER								
COMP. NO. 2, 3		26830	2045					
" " 4		26831	4045					
" " 5		26832	5045					
" " 6		26833	6045					
" " 7		26834	7045					
UNIVERSAL COOLER								
Compressors with threaded cap (Not an outside seal)	5/8							4282
B, C, D, E, F, All compressors with threaded cap	11/16						1746-4R	3280
WERNER								
Early Model B	5/8		M27-2					
Early Model G, M, N	11/16		M41-2					
J, L, JB, JJ, L	11/16		M40-2				1746-10R	3373
Early Model C	7/8		C40-2					
L, P, W, Y, Z, RP, RW, RY, PP, WW, YY, SS	1		L40-2					
TT, UU	1 3/16					49839		14117
QQ	1 3/8					49840		14119
TERRY								
MAKE DESCRIPTION MODEL	SHAFT SIZE	SEAL KIT		SEAL PLATE		Alternative Replacement Guide		
		CAT. NO.	P/N	CAT. NO.	P/N	BELLOWS TYPE	MECHANICAL TYPE	
						KELV	FLEXIBOX	ROTARY
E, B, BR, C	1/2	—	NA	—	—		1270-4R	2292
V, VL, Y, YL	5/8	—	NA	—	—		1588-42R	1115
D series	5/8	26815	171-26	—	NA		1588-42R	1115
K, KF	3/4	26812	170-79		160-12			
U Early 3-3/8 OD Plate	15/16	2688	170-78	26858	160-17		2381-18R	(RH)
U Late, R	15/16	2688	170-78	26857	160-13		2381-18R	(RH)
RHFL, RPFL, GHFL	1 3/16	2687	170-77	26856	160-11			
KU	15/16	26818	170-91	—	—			
RA	1 1/4	26819	170-81	—	—			
A, AF, J, JF, F, FF, P, PF PH, PHWA	1 3/16	2686	170-76	26856	160-11			
V4, V4F, V4H, V4HF, V4W, V4WF	1 3/8	2685	170-94		160-10			
V45, V4P, VS	1 3/8	2685	170-94	—	—			
V4PWA	1 3/8	26825	170-101	—	—			
PJ, PY, JY, PYWA, PJS	1 1/4	26820	170-95	—	—			
V4PWA, V4HWA (NH ₃ only)	1 3/8	26825	170-101					
TERRY — COMEF								
CB65	16mm	26821	170-96					
CB125	20mm	26822	170-97					
CB200	20mm	26823	170-98					
CB355	25mm	26824	170-99					

NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

COMPRESSOR PARTS

VALVE PLATE ASSEMBLIES AND GASKETS

MAKE AND MODEL	VALVE PLATE ASSEMBLY	GASKET TOP PLATE	GASKET CYL. HD.	GASKET VALVE PLATE	COMPLETE GASKET SET
	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
BARBERIE					
SINGLE CYLINDER	2691		26971	269111	—
TWIN CYLINDER	2692		26972	269112	—
BITZER					
NO. 2 COMPRESSOR	27121		27145	27165	271121
NO. 3 COMPRESSOR	27122		27146	27166	271122
NO. 4 COMPRESSOR	27123		27146	27167	271123
NO. 5 COMPRESSOR	27124		27147	27168	271124
NO. 6 COMPRESSOR	27125		27148	27169	271125
NO. 7 COMPRESSOR	27126		27149	27170	271126
BRUNNER — GORDON					
S140 R330	26923		26985	269137	269187
R500	26924		26986	269138	269188
R650	26925		26987	269139	269189
R2002, R5002	26926		26988	269140	269190
COLDSTREAM — BELT DRIVEN					
CH	2693		26973	269113	269161
KB	2693		26973	269114	269162
P	2694		26974	269115	269163
Q	2694		26974	269116	269164
M	2694		26974	269117	269165
T	2694		26974	269117	269166
J	2695	26951	26975	269118	269167
R	2696	26952	26976	269119	269168
O	2697	26953	26976	269120	269169
RY	2698		26976	269121	269170
OB	2697		26976	269120	269171
JB	2699		26977	269122	269172
RO	2697		26976	269120	269173
COLDSTREAM — ROTO SEALED					
CY, KY	26912		26973	269127	269177
HY	26913		26973	269128	269178
BY,FY,NY (CAST-IN SERVICE VALVES)	26914		26973	269128	269178
BY,FY,NY (DETACHABLE)	26915		26981	269129	269179
NX, BX, FX	26916		26981	269130	269180
NZ	26917		26981	269131	269181
NL	26918		26982	269132	269182
NU	26919		26982	269133	269183
BU	26920		26982	269133	269183
ELLIS & JUDGES					
A, AA	26929		26991	269143	269193
B	26930		26992	269144	269194
C, D, E	26931		26993	269145	269195
CC, DD, EE	26931		26994	269145	269196
T,V,TP,VP=(KIRBY-TEC, VFT,VFTL)	26932		26995	269146	269197
EMMCO/ELECTRICE — BELT DRIVEN					
R, L (KELVINATOR SA)	26935		26998		269200
RS, AS	26936		26999		269201
CS	26937		269100		269202
ES	26938		269101		269203
S, G, K (KELVINATOR SB)	26939	26955	269102		269204
J, M (KELVINATOR SG)	26937	26956	269100		269205
N, P (KELVINATOR FB)	26938	26957	269101		269206
T (KELVINATOR K)	26940	26958	269103		269207
U (KELVINATOR Y)	26941	26959	269104		269208
Q (KELVINATOR T)	26942	26960	269105		269209

OUR COMPLETE INVENTORY ASSURES PROMPT SERVICE

COMPRESSOR PARTS

VALVE PLATE ASSEMBLIES AND GASKETS

MAKE AND MODEL	VALVE PLATE ASSY.	GASKET TOP PLATE	GASKET CYL. HD.	GASKET VALVE PLATE	COMPLETE GASKET SET
	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
FRIGIDAIRE					
K, L, N, O, P, R	2701		27045	27075	—
AF133, AD133, ADO 25	2702		27046	27076	—
AF250, AH250, AF375, AD2, AD3	2703		27047	27077	—
AD4	2704		27048	27078	—
AH4, AH6 (ENGLISH COMP.)	2704		27049	27079	—
5, 6, 5G, 6H, AD6	2704		27048	27080	—
KELVINATOR					
SA (EMMCO R, L)	26935		26998	—	269200
SB, SSB (EMMCO S, G, K)	26939	26955	269102	—	269204
SG, SSG (EMMCO J, M)	26937	26956	269100	—	269205
H, GH	26943	26956	269100	27085	270115
PFBA — FB	26938	26957	269101	—	270116
K (EMMCO T)	26940	26958	269103	—	270117
Y (EMMCO U)	26941	26959	269104	—	269208
T (EMMCO Q)	26942	26960	269105	—	269207
83	NOT USED	—	—	—	270118
84	" "	—	—	—	270119
85	" "	—	—	—	270120
KIRBY TECUMSEH — BELT DRIVEN					
HA	27015	—	—	—	270122
HAC	27016	—	—	—	270123
HG	27017	—	27055	27091	270124
HGC & CG	27018	—	27055	27091	270124
VFT = (E & J)T,V.) & CH	27019	—	26995	269146	270125
VFTL = (E & J)TP, VP) & CJ	27019	—	26995	269146	270126
P	27020	—	27057	27092	270127
RA & CK	27021	—	27058	27093	270128
SA & CM	27022	—	27059	27094	270129
SUMMIT					
ALL "AS" SERIES COMPRESSORS	27025		27061	27096	270131
TERRY — BELT DRIVEN					
KU	27040		27071	270110	—
RA	27039		27064	270111	270207
PJ, PJS	27035		27065	270112	270208
JY	27035		27065	270112	270210
PY, PYWA	27037		27069	270107	270209
V4S, VS	27035		27065	270112	270205
V4P, V4PWA	27037		27069	270107	270211
V4, V4H, V4F, V4HF	27037		27069	270107	271118
V4HF, V4H 25% and 50% Unloaded					270202
V4HF, V4H 75% Unloaded					270203
V4WF, V4W	27037		27069	270107	271119
V4HWA	27037		27069	270107	270204
P, PF, PH, PHF, PHWA	27037		27069	270107	270197
P Series 50% Unloaded					270200
PW, PWF	27037		27069	270107	270199
A, AF, J, JF, F, FF, AW, AWF, JW	27035		27065	270112	27098
JWF, FW, FWF, JT, JFT					
R, RR, RF, RRF	27038		27070	270108	271112
U, UF, URF, UFL, UR	27032		27086	270103	270142
UH, UHR, UHF	27115		27087	27161	270143
UHRF	27115				270143
K, KF	27026		27068	270106	27097
TERRY — COMEF					
CB65	270171	—	—	—	270214
CB125	270172	—	—	—	270215
CB200	270173	—	—	—	270216
CB355	270174	—	—	—	270217

OUR BIG SELECTION ANSWERS YOUR EVERY NEED AND PRICED RIGHT TOO

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COMPRESSOR PARTS VALVE PLATE ASSEMBLIES AND GASKETS

MAKE AND MODEL	Valve Plate Assy.	Gasket — Top Plate	Gasket Cyl. Hd.	Gasket — Valve Plate	Complete Gasket Set
	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
TERRY/WERNER EMMCO — SEMI-SEALED					
SD	2717		27176	27159	27187
TM	27118		27177	270102	27192
TL, TL1F, TL3, TL3F	27032		27178	270103	27193
TG1, TG3, TG1FL, TG3FL	27032		27179	270103	27197
QG3L, QG3FL	27032		27180	270103	271102
TG3FT, TG3F, TG3H, TG3FM, GF4Y	27115		27066	270104	271100
TY, TR, TYF, TRF	27026				
TR3F					27192
QH3, QG3H, QG3F	27115		27066	270104	271106
LF4AA	27027		—	—	27181
R2L, R2FL, R2FLT, R2FY	27038		27070	270108	271105
R4P, R4FP, R4FOA, R4ROA2	27038		27070	270108	271109
Note: VALVE PLATE ASSY. comprises — Valve Plate Assembly, Suction Valves, Pins, Valve Plate and Cylinder Head Gaskets, Bolt Sealing Washers					
VELOC — SEE BITZER					
WERNER — OPEN TYPE					
PP	—		27151	27172	—
WW, YY	—		27152	27173	—
JJ, JB	—		27153	27174	—
TT	26940	26958	269103	269154	—
UU	26941	26959	269104	269155	—
QQ	26942	26960	269105	269156	—
WESTINGHOUSE — AUSTRALISE					
2S, 2M, 10S, 10M	27129		27154	27175	—
3S, 3M, 4S, 4M	27130		27155	27176	—

SERVICE VALVE GASKETS

CAT. NO.	BOLT HOLE CENTRES	CENTRE HOLE DIAMETER
271141	1.1/2"	1/2"
271142	1.5/8"	9/16" (Sult Beer Coolers)
271143	1.5/8"	3/4"
271144	1.3/4"	5/8"
271145	2"	5/8"
271146	2.3/4"	1.3/8"
271148	1.5/8"	1" Terry 445-6
271149	2.3/4"	1.3/4" Terry 445-5
271150	1.5/8"	5/8" Terry 445-7



GASKET MATERIAL

HIGH QUALITY OIL RESISTANT GASKET MATERIAL

- AVAILABLE IN
- Rolls 3 ft. wide — Sold per pound weight
 - Cut in Square Foot pieces.

THICKNESS	PER POUND*	SQ. FT. PIECES
INS.	CAT. NO.	CAT. NO.
1/64"	271151	271155
1/32"	271152	271156
1/16"	271153	271157

*In Rolls, 3 ft. wide — Specify length required when ordering.

ACPAR PARTS — TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

COMPRESSOR PARTS VALVES-SUCTION AND DISCHARGE

ACTUAL SIZE ILLUSTRATIONS ON FOLLOWING PAGES. 173 TO 177

MAKE AND MODEL	SUCTION CAT. NO.	DISCH. CAT. NO.	MAKE AND MODEL	SUCTION CAT. NO.	DISCH. CAT. NO.
BARBERIE All Models	27229	2724	KIRBY — TECUMSEH, STERNE UNIVERSAL COOLER, HALLMARK HA, HAC HG HGC & CG VFT, VFTL & CH, CJ P RA & CK SA & CM	27274 27275 27276 27216 27277 27278 27285	27273 27273 27273 27282 27279 27284 27286
BITZER COMPRESSOR NO. 2, 3 COMPRESSOR NO. 4, 5 COMPRESSOR NO. 6, 7	27219 27217 27217	2721 2726 2727	SUMMIT — SEMI-SEALED AS100 AS150, 200, 300, 400, 500, 750	27223 27225	27281 27281
BRUNNER-GORDON S140, R330 R500, R650 R2002, R5002	27243 27220 27246	2728 2728 27270	TERRY — OPEN TYPE E, BR, C, V, VL, Y, YL, X — VALVE REED SETS* KU RA PJ, PJS, VS JY, V4S, A, J, F, AW, AWF, JW, JWF FW, FWF, JT, JFT PY, PYWA, V4P, V4PWA, V4, V4H, V4F V4HF, V4WF, V4W, V4HWA, P, PF, PH, PHF, PW, PWF, PHWA R, RR, RF, RRF U, UF UH, UHR, UHF K, KF	27215	27256 272117 272118 272119 272112 272115 272111 272107 272109 272105
COLDSTREAM-OPEN TYPE CH, KB P, T, Early Flapper Type P, Q, M, T, Later Bridge Type J JB R RY O OB	27215 27215 27215 27215 27226 27227 — 27240 27240	27256 27253 2725 27258 — 27258 27258 27255	TERRY-COMEF CB65 CB125 CB200 CB355		272123 272124 272125 272126
COLDSTREAM-ROTOSEALED BY, NY, FY, HY, NT (Cast in Service Vlvts.) BY, NY, FY (Detachable Service Vlvts.) CY, KY FX BX, BU, NX, NU NZ NL	27215 27247 27224 — 27252 27226 27249	2725 27213 27254 27213 27213 27213 27213	TERRY — SEMI-SEALED SA TB, T2, TZ, TY, TR1, TR3 DCS, SS, SX G2FLA, H2FLA, G4FGA — VALVE REED SETS* SD TM TL, TL1F, TL3, TL3F, TG1, TG3, TG1FL, TG3FL, QG3L, QG3FL TG3FT, TG3F, TG3H, TG3FM, GF4Y, QH3, QG3H, QG3F LF4AA R2L, R2FL, R2FLT, R2FY, R4P R4FP, R4FOA, R4ROA2	27234 27234 — 27288	27256 2724 27256 27251 272103 272106 272107 272109 272110 272111
ELLIS AND JUDGES A, AA B, C, CC, D, DD, E, EE Early — C, CC, D, DD, E, EE Late T, V, TP, VP	27232 27262 27238 27244	2724 27253 27212 27282	VELOC — SEE BITZER		
EMMCO ELECTRIC — OPEN TYPE A, B, C, D, DE, E, E4, SC, SE, DX F, FW, SF R, S, G, K, AS, LA, RA, RS J, M, CS T (Same as Kelvinator K) U (" " " Y) Q (" " " T)	27271 27269 27229 27234 27238 27239 27241	27263 27266 — 27260 27212 27211 27229	WERNER — OPEN TYPE PP WW, YY JB, JJ TT (Same as Kelvinator K) UU (" " " Y) QQ (" " " T)	27230 27250 27237 27238 27239 27241	2723 2723 2723 27212 27211 2729
EMMCO — SEMI SEALED VLF, RLF, RFG, TY, TRI L3L, M3F, WG3L, WM3F L3F, L3G, G3F, WG3F, TL3, TM3 G3F, WG3F, TG3	27234 27235 27235	2724 27214 27212	WERNER — SEMI-SEALED SX SD TY, TR1, TR3 TL1, TM1, TM3, TL3, TL3F, TL3FL TG3FL, TG3, TG3FM TG3H, QG3L	— — 27234 27235 27235	27256 2724 2724 27214 27212
FRIGIDAIRE — VALVE IN PISTON G, SAE, SAU A, B, G, SAE, FICC, Etc. Late C, D, W5100, Etc. K, L, P, Y, Etc. — SOLID PISTON A4, 5, 547, 8, 748, AD016, 25 AD133, A125, 133, AF125, 133 AD WD2, AD WD3, A AF375 AD WD4, AD WD6, AF WF4100	27260 27265 — — 27231 27233 27245 27248	27221 27221 27258 27263 27221 27221 27257 27257	* TERRY VALVE REED REPLACEMENT SETS Each set consists of: Discharge and Suction Reeds, Reed Springs, Retaining pins, Teflon retaining washers if necessary. Cylinder Head and Valve Plate Gaskets for one Valve Plate refit.		
GORDON (JACK FROST) ORTK RTK, RATK, OTK, R4TK O, OR, ORT, R, RT RA, RAT G	27272 27271 27266 27267 27234	27261 27263 27221 27221 —	NOTE IF THE MODEL OF YOUR COMPRESSOR IS NOT LISTED ABOVE — TRY US ANYWAY OUR ORGANIZATION HAS STOCKS OF VALVES NOT POSSIBLE TO LIST HERE. CHECK WITH US — WE WILL TRY TO HELP YOU		
KELVINATOR SA, SB SQ, SSG H FB, PFBA K Early	27228 27234 27234 27235 27238	2724 2724 27214 27214 27212			
KELVINATOR SUCTION VALVE AND GASKET SET K, K62 Y, Y72 T, T82		272135 272136 272137			

VALVES

272-a

ILLUSTRATIONS ACTUAL SIZE — Ordering Catalogue No. Shown



4

272-b

VALVES

ILLUSTRATIONS ACTUAL SIZE — Ordering Catalogue No. Shown



VALVES

ILLUSTRATIONS ACTUAL SIZE — Ordering Catalogue No. Shown



Copeland® COMPRESSOR SPARE PARTS

CAT. NO.	PART NO.	COMPRESSORS PART USED ON
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VALVE PLATE KITS

278101	998-0661-00	4RA(7½&10HP) 6RA(10&20HP)
278102	998-0661-06	EAB, EAC, EAV, EAL, ERA, ERC & ERF.
278103	998-0661-08	9RA, 9RC, 9RP, 9RS(7½&10HP)
278104	998-0661-09	9RB, 9RJ (5&7½HP)
278105	998-0661-12	ALL "H" SERIES
278106	998-0661-14	EAA, EAD & EAJ
278107	998-0661-16	ALL "K" SERIES EXCEPT KAE
278108	998-0661-17	MRJ (5HP), MRH (7½HP)
278109	998-0661-18	ERJ (2HP)
278110	998-0661-20	3R (3HP)
278111	998-0661-23	MRA (5HP)
278112	998-0661-28	83 OPEN COMP.
278113	998-0661-36	9TK (5HP)
278114	998-0661-37	ALL "L" & "NR"(3 to 5 HP)
278115	998-0661-41	9RS1 (7½ & 15 HP)
278116	998-0661-42	KAE (% & ½ HP)
278117	998-0661-45	9RT (15HP)
278118	998-0661-49	4RL (15HP), 6RL (25HP)
278119	998-0661-50	MRB (5HP)
278120	998-0661-51	4RH, 4RK, 6RH, 6RK & 6RP
278121	998-0661-62	4RA(20HP), 4RE(10 & 20HP) 6RA(30HP), 6RE, 6RB & 6RN
278122	998-0661-54	MRC (5HP)
278123	998-0661-56	4RJ, 4RR, 6RJ, 6RR & 6RS
278124	998-0661-57	6RT (30HP)

GASKET SETS

278136	998-0669-00	4RA, 4RE, 6RA, 6RB, 6RE & 6RN
278137	998-0669-06	HAK
278138	998-0669-07	HAK & HAT
278139	998-0669-12	KAE & KAH
278140	998-0669-13	KAJ
278141	998-0669-14	KAA & KAK
278142	998-0669-15	KAL & KAT
278143	998-0669-16	LAE & LAH
278144	998-0669-18	LAL (3HP)
278145	998-0669-23	ALL MR(5HP)
278146	998-0669-24	ALL 3A (2 & 3 HP)
278147	998-0669-25	ALL 3R (3HP)
278148	998-0669-27	ALL ERJ (2HP)
278149	998-0669-28	EAJ, EAL, EAV & ERF
278150	998-0669-31	EAA, EAC & ERA
278151	998-0669-33	LWH (3HP)
278152	998-0669-37	ALL 9R & 9T
278153	998-0669-44	83 OPEN COMP
278154	998-0669-49	ALL NR (3 to 5HP)
278155	998-0669-52	MRH (7½HP)
278156	998-0669-54	4RH, 4RK, 4RL, 6RH, 6RK, 6RL, 6RP & 6TM
278157	998-0669-55	4RJ, 4RR, 6RJ, 6RR, 6RS & 6RT

COOLING FAN KITS

278351	550-0210-00	4R (EXCEPT 4RL)
278352	550-0210-02	4RL
278353	550-0211-00	6R (EXCEPT 6RL & 6RT)
278354	550-0213-00	NR
278355	550-0214-00	MR
278356	550-0215-00	6RL & 6RT
278357	998-1307-00	9R

230 VOLT FAN MOTORS

278365	050-0167-00	ALL 4R, 6R, 9R, MR & NR
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FANS

278370	083-0077-00	ALL 4R, 6R, 9R, MR & NR
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CAT. NO.	PART NO.	COMPRESSORS PART USED ON
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VALVE PLATE GASKETS

278171	020-0097-00	HAK & HAT
278172	020-0103-00	MRA, MRF (5HP)
278173	020-0103-02	MRH (7½HP)
278174	020-0103-04	MRB & MRC (5HP)
278175	020-0113-00	3RK (3HP)
278176	020-0115-00	4RA, 4RE, 6RA, 6RB, 6RE & 6RN
278177	020-0123-00	EAL, EAV & ERF
278178	020-0123-03	EAA, EAC, ERA & ERC
278179	020-0123-04	ERJ
278180	020-0125-00	LAL (3HP)
278181	020-0125-02	NRM & NRN
278182	020-0125-04	NRL
278183	020-0125-05	NRB
278184	020-0128-00	9RB, 9RC, 9RP(5to10HP), 9TL(5&7½HP)
278185	020-0128-01	9RA, 9RJ(5&7½HP), 9TK(5HP)
278186	020-0128-04	9RS (7½ & 10HP)
278187	020-0132-00	KAJ
278188	020-0132-03	KAE & KAH
278189	020-0132-04	KAA & KAK
278190	020-0132-05	KAL & KAT
278191	020-0320-00	9RS & 9RT (15HP)
278192	020-0433-00	4RH, 4RK, 6RH, 6RK, 6RP & 6TM
278193	020-0487-00	4RL & 6RL
278194	020-0499-00	6RT
278195	020-0499-01	4RJ, 4RR, 6RJ, 6RR & 6RS

CYLINDER HEAD GASKETS

278201	020-0052-00	ALL 3A & 3R
278202	020-0071-00	ALL "H"
278203	020-0089-00	ALL L & NR
278205	020-0099-00	ALL K
278206	020-0114-00	ALL 4R & 6R
278207	020-0122-00	ALL EA & ER
278208	020-0127-00	9RA, 9RB, 9RC, 9RJ, 9RS(5to10HP)
278209	020-0134-00	ALL MR
278210	020-0270-00	9TK(5HP), 9TL(5&7½HP)
278211	020-0321-00	9RS (15HP)
278212	020-0404-00	9RP (7½&10HP)
278213	020-0408-00	9RT (15HP)

OIL PUMP KITS (Including gasket)

278221	998-0007-01	NR, MR, 9R
278222	998-0008-02	4R, 6R

230 VOLT CRANKCASE HEATERS

278326	018-0007-01	3A, 3R, EA, ER, MR, NR & LA (CLAMP ON TYPE)	65 WATT
278327	018-0007-06	4R, 6R & 9R (CLAMP ON TYPE)	65 WATT
278328	018-0007-11	4R, 6R & 9R (CLAMP ON TYPE)	100 WATT
278329	018-0015-00	RR & SR	42 WATT
278330	018-0017-00	PRA	75 WATT
278331	018-0018-00	YR	100 WATT
278332	018-0021-01	4R & 6R (DEEP SUMP MODELS)	200 WATT
278333	018-0022-00	BR	60 WATT
278334	518-0001-02	9R (IMMERSION TYPE)	65 WATT
278335	518-0002-02	4R&6R "	100 WATT
278336	998-0118-01	H&K (CLAMP ON TYPE)	50 WATT

HEATER CLIPS

278345	032-0091-00	LA, MR, NR, 3A, 4R, 6R & 9R	2 REQD.
278346	032-0091-01	EA, ER & 3R	2 REQD.
278347	074-0581-00	4R & 6R (DEEP SUMP MODELS)	1 REQD.

Copeland® COMPRESSOR SPARE PARTS 278-a

CAT. NO.	PART NO.	COMPRESSORS PARTS USED ON
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MOTOR PROTECTORS

278226	071-0086-09	9RJ-5HP TFC
278227	071-0086-14	NRL-5HP TFD
278228	071-0086-17	MRA & MRF-5HP TFD, 9RB, 9RJ & 9TK-5HP TFD
278229	071-0086-22	9RC-7½HP TFC
278230	071-0086-20	MRA-7½HP TFD/M/X, 9RA, 9RB, 9RP & 9RS-7½HP TFD
278231	071-0086-37	NRB & NRN-3HP TFD
278232	071-0086-29	9RJ-5HP TFE
278233	071-0086-35	MRA & MRC-5HP TFD
278234	071-0086-38	MRA-5HP TFC
278235	071-0090-03	3RK & LAL-3HP TAD
278236	071-0090-07	KAJ-1HP TAD
278237	071-0090-08	ERA, ERJ & EAL-2HP TAD
278238	071-0090-10	ERF-3HP TAD
278239	071-0090-27	KAT-1½HP TAD
278240	071-0092-16	KAT-1½HP CAS
278241	071-0092-19	KAE-½HP CAG
278242	071-0092-21	KAJ-1HP CAG
278243	071-0127-131	SSE4-1HP CAG
278244	071-0127-141	RRH2-1HP & 1½HP PAG
278245	071-0127-081	SRC4-2HP PAG
278246	071-0127-111	SRD4-2HP PAG
278247	071-0127-161	RRL4-1½HP PAZ
278248	071-0127-201	RRJ2-1½HP PAI, RRL4-1½HP PAI
278249	071-0127-221	RSH-½HP IAG
278250	071-0127-321	SRB4-2HP PAG, SRB4-1½HP PAG
278251	071-0127-361	RRH4-1½HP PAZ
278252	071-0329-151	RRG4-1HP PAG
278253	071-0338-04	9RS & 9RT-15HP THD/M
278254	071-0339-02	9RC, 9RP & 9RS-10HP THD/M
278255	071-0339-03	9RC, 9RP & 9RS-10HP THY/E
278256	071-0339-13	9RS & 9RT-15HP THY/E
278257	071-0339-161	PRA-7½HP THE
278258	071-0339-191	PRA-7½HP THM/D
278259	071-0370-211	JRR4-1HP PAZ
278260	071-0376-01*	4R-7½, 10, 15, 20 & 30HP, 6R-10, 20 & 30HP
278261	071-0397-001*	BRK-12HP TSD/E
278262	998-0071-00*	ALL MODELS WITH FSM/FSD MOTOR CODE
278263	998-0571-001*	BRE-7½HP TSD/E, BRG-9HP TSD/E
278364	071-0092-27	KAA-½HP CAG
278265	071-0329-131	RRL2-½HP CAG
278266	071-0369-201	JFH-1/3HP IAG

† COPELAWELD * SOLID STATE MODULE

RELAYS

278301	040-0001-10	SSE4-1HP CAG, YSC4-1½HP CFG
278302	040-0001-14	SRC4-2HP PFG, SRC4-2HP PAG
278303	040-0001-27	RRH2-1HP PAG, RRG4-1HP, RRJ2-1½HP PAI SRD4-2HP PAG SRK4-2½HP PFG, JRR4-1HP PAZ, RRL4-1½HP PAZ SRB4-2HP PAG, RRL4-1½HP PAI RRL-½HP CAG
278304	040-0001-30	KAE-½HP CAG, KAH-½HP CAG KAA-½HP CAG
278305	040-0001-31	KAJ-1HP CAG, KAT-1½HP CAS KAL-1HP CAG KAT-1HP CAG
278306	040-0088-02	RSH-½HP IAG, RSN-½HP IAG
278307	040-0097-01	ALL EMM MOTORS (4R, 6R & 9R)
278308	040-0090-05	JFH-1/3HP IAG
278309	540-0110-00	4R-25HP TSE, 6R-35 & 40HP TSE ALL FSM/FSD MODELS BRE-7½HP TSD/TSE BRG-9HP TSD/TSE

CAT. NO.	PART NO.	COMPRESSORS PARTS USED ON
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START CAPACITORS

278276	014-0006-00	KAT-1½HP CAS
278277	014-0008-50	KAE-½HP CAG, KAH-½HP CAG, KAA-½HP CAG
278278	014-0008-51	SSE4-1HP CAG, YSC4-1½HP CFG
278279	014-0008-64	RSH-½HP IAG, RSN-½HP IAG, RSH-½HP IAG, RRL-½HP CAG
278280	014-0008-78	KAJ-1HP CAG, KAL-1HP CAG, KAT-1HP CAG
278281	014-0008-72	JFH-½HP IAG

RUN CAPACITORS

278286	014-0001-00	KAJ-1HP CAG, KAL-1HP CAG, KAT-1HP CAG
278287	014-0001-04	RRG4-1HP PAG, JRR4-1HP PAZ, RRL-½HP CAG
278288	014-0002-00	KAT-1½HP CAS
278289	014-0002-02	RRH2-1HP PAG, RRH4-1½HP PAZ
278290	014-0002-06	SRB4-2HP PAG
278291	014-0002-07	SRC4-2HP PFG, SRC4-2HP PAG, SRD4-2HP PAG
278292	014-0002-09	RRJ2-1½HP PAI, RRL4-1½HP PAZ, RRL4-1½HP PAI YSC4-1½HP CFG
278293	014-0002-10	SRK4-2½HP PFG
278294	514-0179-01	KAE-½HP CAG
278295	014-0011-01	KAH-½HP CAG
278296	014-0011-02	KAA-½HP CAG

CAPACITY CONTROL KITS

278376	998-0016-01	9RS-7½ & 10HP, 9RC-7½ & 10HP
278377	998-0017-02	9RS-15HP
278378	998-0119-10	ALL 4R & 6R (EXCEPT 4R-30HP & 6R-40HP)
278379	998-0119-18	4R-30HP & 6R-40HP

REPAIR KITS

278390	998-0017-03	ALL 9R (COMPLETE REPLACE- MENT PIPE & VALVE KIT)
278391	998-0045-00	ALL 9R (CONTROL VALVE RE- PAIR KIT)

SOLENOID VALVES WITH COIL

278401	510-0212-03	(ALCO) 4R & 6R
278402	020-0485-00	GASKET TO SUIT ABOVE
278403	510-0243-03	(SPORLAN) 4R & 6R
278402	020-0485-00	GASKET TO SUIT ABOVE

SOLENOID VALVES WITHOUT COIL

278408	510-0212-00	(ALCO) 4R & 6R
278402	020-0485-00	GASKET TO SUIT ABOVE
278409	510-0243-00	(SPORLAN) 4R & 6R
278402	020-0485-00	GASKET TO SUIT ABOVE

SOLENOID SPINDLE

278415	528-1074-00	ALL 9R
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SOLENOID COILS

278418	023-0026-00	(CHATLEFF) 9R (OLD TYPE)
278419	023-0037-02	(ALCO) 9R
278420	023-0039-02	(ALCO) 4R & 6R
278421	023-0041-02	(SPORLAN) 4R & 6R

VEE BELTS

A SECTION						B SECTION					
13mm x 8mm (1/2" x 5/16") ANGLE 40°						17mm x 11mm (21/32" x 25/64") ANGLE 40°					
CAT. NO.	METRIC BELT SIZE	IMP. BELT SIZE	CAT. NO.	METRIC BELT SIZE	IMP. BELT SIZE	CAT. NO.	METRIC BELT SIZE	IMP. BELT SIZE	CAT. NO.	METRIC BELT SIZE	IMP. BELT SIZE
2791	A540	A20	27953	A1840	A71	27992	B610	B22%	279141	B2070	B80
2792	A570	A21	27954	A1860	A72	27993	B650	B24	279142	B2100	B81
2793	A590	A22	27955	A1890	A73	27994	B700	B26	279143	B2130	B82
2794	A620	A23	27956	A1920	A74		B730	B27	279144	B2150	B83
2795	A640	A24	27957	A1940	A75	27995	B750	B28	279145	B2180	B84
2796	A670	A25	27958	A1960	A76	27996	B800	B30	279146	B2200	B85
2797	A700	A26	27959	A2020	A78	27997	B830	B31	279147	B2250	B87
2798	A720	A27	27960	A2050	A79		B850	B32	279148	B2280	B88
2799	A740	A28	27961	A2070	A80	27998	B880	B33	279149	B2330	B90
27910	A770	A29	27962	A2090	A81	27999	B910	B34	279150	B2350	B91
27911	A790	A30	27963	A2120	A82	279100	B930	B35	279151	B2400	B93
27912	A820	A31	27964	A2140	A83	279101	B960	B36	279152	B2460	B95
27913	A850	A32	27965	A2170	A84	279102	B980	B37	279153	B2480	B96
27914	A870	A33	27966	A2220	A85	279103	B1000	B38	279154	B2500	B97
27915	A890	A34	27967	A2240	A87		B1030	B39	279155	B2560	B99
27917	A920	A35	27968	A2270	A88	279104	B1060	B40	279156	B2580	B100
27918	A950	A36	27969	A2320	A90	279105	B1080	B41	279157	B2610	B101
27919	A970	A37	27970	A2370	A92	279106	B1100	B42	279158	B2660	B103
27920	A990	A38	27971	A2400	A93	279107	B1130	B43	279159	B2700	B105
27921	A1020	A39	27972	A2420	A94	279108	B1160	B44	279160	B2760	B107
27922	A1050	A40	27973	A2480	A96	279109	B1180	B45	279161	B2790	B108
27923	A1070	A41	27974	A2500	A97	279110	B1210	B46	279162	B2840	B110
27924	A1100	A42	27975	A2520	A98		B1240	B47	279163	B2890	B112
27926	A1130	A43	27976	A2550	A99	279111	B1260	B48	279164	B2940	B114
27927	A1150	A44	27977	A2570	A100	279112	B1290	B49	279165	B2960	B115
27928	A1180	A45	27978	A2620	A102	279113	B1310	B50	279166	B2990	B116
27929	A1200	A46	27979	A2700	A105	279114	B1340	B51	279167	B3010	B117
27930	A1230	A47	27980	A2780	A108	279115	B1370	B52	279168	B3090	B120
27931	A1250	A48		A2830	A110	279116	B1390	B53	279169	B3200	B124
27932	A1280	A49	27981	A2880	A112	279117	B1410	B54	279170	B3290	B128
27933	A1300	A50		A2950	A115	279118	B1440	B55	279171	B3370	B131
27934	A1330	A51	27982	A2980	A116	279119	B1460	B56	279172	B3390	B132
27935	A1360	A52	27983	A3080	A120	279120	B1490	B57	279173	B3500	B136
27936	A1380	A53	27984	A3190	A124	279121	B1510	B58	279174	B3600	B140
27937	A1410	A54		A3210	A125	279122	B1540	B59	279175	B3700	B144
27938	A1430	A55	27985	A3290	A128	279123	B1560	B60		B3850	B150
27939	A1460	A56		A3330	A130		B1590	B61	279176	B3900	B152
27940	A1480	A57	27986	A3480	A136	279124	B1620	B62	279177	B4060	B158
27941	A1510	A58	27987	A3590	A140	279125	B1640	B63		B4100	B160
27942	A1530	A59	27988	A3690	A144	279126	B1670	B64	279178	B4160	B162
27943	A1550	A60		A3840	A150	279127	B1690	B65	279179	B4260	B166
27944	A1580	A61	27989	A3940	A154	279128	B1720	B66	279180	B4310	B168
27945	A1610	A62		A4040	A158	279129	B1740	B67	279181	B4430	B173
27946	A1640	A63	27990	A4420	A173	279130	B1760	B68	279182	B4610	B180
27947	A1660	A64	27991	A4470	A175		B1790	B69	279183	B4710	B184
27948	A1690	A65	REFER NEXT PAGE FOR OTHER V-BELT SECTIONS			279131	B1820	B70	279184	B4790	B187
27949	A1710	A66				279132	B1850	B71	279185	B4950	B193
27950	A1760	A68				279133	B1870	B72	279186	B5000	B195
27951	A1790	A69				279134	B1900	B73	279187	B5220	B204
27952	A1810	A70				279135	B1920	B74	279188	B5370	B210
PULLEYS						279136	B1950	B75	279189	B6080	B238
A range of Standard Pulleys are held in stock — Enquire						279137	B1970	B76	279190	B6140	B240
Others available on application						279138	B2000	B77	279191	B6840	B268
Refer TECH. PAGE 279-b for Ordering Requirements						279139	B2020	B78	279192	B6900	B270
						279140	B2050	B79	279193	B7660	B300

VEE BELTS

C SECTION						M SECTION					
22mm x 14mm (7/8" x 9/16") ANGLE 40°						10mm x 6mm (3/8" x 1/4") ANGLE 40°					
CAT No.	METRIC BELT SIZE	IMP. BELT SIZE	CAT No.	METRIC BELT SIZE	IMP. BELT SIZE	CAT No.	METRIC BELT SIZE	IMP. BELT SIZE	CAT No.	METRIC BELT SIZE	IMP. BELT SIZE
279194	C1070	C40		C2850	C110		Z530	M20		Z1170	M45
279195	C1120	C42	279228	C2900	C112	279261	Z560	M21		Z1190	M46
279196	C1150	C43		C3000	C116		Z570	M21½		Z1220	M47
279197	C1180	C44	279229	C3100	C120	279262	Z625	M23½		Z1240	M48
279198	C1200	C45	279230	C3230	C125	279263	Z635	M24		Z1290	M50
279199	C1230	C46	279231	C3310	C128		Z660	M25		Z1320	M51
279200	C1280	C48	279232	C3410	C132		Z680	M26		Z1350	M52
279201	C1350	C51		C3510	C136	279264	Z700	M27		Z1370	M53
279202	C1380	C52		C3610	C140	279265	Z730	M28		Z1400	M54
	C1430	C54		C3660	C142		Z760	M29		Z1420	M55
279203	C1450	C55	279233	C3710	C144		Z780	M30		Z1450	M56
	C1480	C56	279234	C3760	C146		Z810	M31		Z1500	M58
	C1500	C57		C3860	C150	279266	Z840	M32		Z1540	M60
	C1530	C58	279235	C3910	C152		Z860	M33		Z1570	M61
279204	C1560	C59		C3960	C154	279267	Z890	M34		Z1630	M63
279205	C1580	C60	279236	C4060	C158	279268	Z920	M35		Z1680	M65
	C1600	C61		C4110	C160	279269	Z940	M36		Z1750	M68
279206	C1650	C63	279237	C4160	C162		Z960	M37		Z1930	M75
	C1680	C64	279238	C4320	C168	279270	Z990	M38		Z2310	M90
279207	C1700	C65		C4370	C170	279271	Z1010	M39			
279208	C1780	C68	279239	C4450	C173	279272	Z1040	M40			
279209	C1830	C70	279240	C4630	C180	279273	Z1060	M41			
279210	C1860	C71		C4750	C185	279274	Z1080	M42			
279211	C1880	C72	279241	C5010	C195		Z1120	M43			
	C1930	C74	279242	C5230	C204		Z1140	M44			
279212	C1950	C75	279243	C5380	C210	SPB SECTION WAS BETA/SV 16mm x 13mm (5/8" x 17/32")					
	C1980	C76	279244	C5530	C216						
279213	C2040	C78	279245	C5740	C224	CAT No.	BELT DESIGNATION NOW	WAS	CAT No.	BELT DESIGNATION NOW	WAS
	C2080	C80	279246	C5760	C225		SPB 1260	500		SPB 3340	1320
279214	C2110	C81	279247	C5840	C228		1340	530		3550	1400
	C2160	C83	279248	C6090	C238		1410	560		3800	1500
279215	C2200	C85	279249	C6150	C240		1590	630		4060	1600
	C2260	C87	279250	C6550	C256		1800	710		4310	1700
	C2290	C88	279251	C6850	C268		2020	800		4560	1800
279216	C2340	C90	279252	C6910	C270		2150	850		4820	1900
279217	C2390	C92	279253	C7060	C276		2280	900		5070	2000
279219	C2420	C93	279254	C7610	C298		2410	950		5380	2120
	C2470	C95	279255	C7680	C300		2530	1000		5680	2240
279220	C2490	C96	279256	C8370	C328		2680	1060		5990	2360
279221	C2520	C97	279257	C8420	C330		2840	1120		6340	2500
279223	C2570	C99	279258	C9140	C358		2990	1180		7100	2800
279224	C2600	C100	279259	C9190	C360		3170	1250		7990	3150
279225	C2620	C101	279260	C10660	C418	SPP SECTION WAS DELTA/SV 25mm x 23mm (1" x 29/32")					
279226	C1720	C105									
279227	C2800	C108					SPP 2520	1000		SPP 5670	2240
SPZ SECTION WAS ALPHA/SV 10mm x 8mm (3/8" x 5/16")							2830	1120		6330	2500
							3160	1250		7100	2800
CAT No.	BELT DESIGNATION NOW WAS		CAT No.	BELT DESIGNATION NOW WAS			3540	1400		7990	3150
	SPZ 630	250		SPZ 1800	710		4050	1600		9000	3550
	710	280		1900	750		4560	1800		10140	4000
	800	315		2030	800		5060	2000		11410	4500
	900	355		2160	850	SPC SECTION 22mm x 18mm					
	1010	400		2280	900						
	1140	450		2410	950	CAT. No.	BELT	CAT. No.	BELT	CAT. No.	BELT
	1270	500		2540	1000		SPC 2000		SPC 4000		SPC 8000
	1340	530		2690	1060		2240		4500		9000
	1420	560		2840	1120		2500		5000		10000
	1520	600		2990	1180		2800		5600		11200
	1600	630		3170	1250		3150		6300		11800
	1700	670		3550	1400		3550		7100		12500

VEE BELTS

GENERAL INFORMATION

Space does not permit inclusion of detailed design and selection information and the user is recommended to use manufacturers readily available literature on this aspect.

A, B, C & M Section V-Belts are Catalogued herein.

D & E Section V-Belts are available on application.

R Section V-Belts — for Refrigerators, Washing Machines etc. — are no longer available and the Chart below shows the nearest equivalent Commercial type. However, no guarantee of belt life or performance can be given under these circumstances as the angle of the belt and pulley may be at slight variance. Where no nearest equivalent is shown, it means that no commercial belts will substitute satisfactorily and we suggest you check in such cases re the possibility of having new pulleys fitted to match available V-Belt Sections.

SPZ (Alpha/3V), SPB (Beta/5V), SPP (Delta/8V) and SPC Section V-Belts are designed to provide Compact Drive Systems and are generally capable, when selected correctly, of handling up to three times as much power in a given space as the traditional V-Belt Drives.

R. SECTION EQUIVALENTS					
OLD R NO.	IMP. SIZE EQUIV.	OLD R NO.	IMP. SIZE EQUIV.	OLD R NO.	IMP. SIZE EQUIV.
R.100	B.38	R.138	B.60	R.171	A.52
R.106	C.75	R.140	B.57	R.172	A.50
R.107	C.78	R.142	B.46	R.173	A.42
R.108	C.81	R.143	B.45	R.174	A.35
R.110	C.55	R.146	B.44	R.175	A.34
R.112	C.65	R.147	B.35	R.176	A.32
R.115	C.48	R.148	B.42	R.177	B.35
R.118	C.46	R.149	—	R.178	—
R.119	C.51	R.150	B.38	R.179	A.35
R.120	C.48	R.151	B.38	R.181	A.68
R.124	—	R.157	B.33	R.182	A.33
R.125	—	R.158	B.33	R.183	A.30
R.127	C.70	R.160	—	R.185	A.27
R.128	B.51	R.163	A.38	R.186	—
R.129	C.60	R.164	—	R.190	M.32
R.130	B.52	R.165	B.48	R.191	M.34
R.131	B.52	R.167	A.51	R.192	M.35
R.132	B.33	R.168	A.56	R.193	M.36
R.136	B.63	R.169	A.65	R.194	—
R.137	B.105	R.170	A.60	—	—

PULLEY ORDERING REQUIREMENTS

1. Diameter, PCD (Pitch Circle Diameter)
2. Number of Sections and Type e.g. A, B, C etc.
3. Bore and keyway requirements
4. Boss details — flush, extended etc.

SERVICE FACTORS FOR V-BELT DRIVES

TYPES OF DRIVEN MACHINES		TYPES OF DRIVING UNITS					
		A.C. motors; normal torque squirrel cage, synchronous and split phase. D.C. motors; shunt wound. Internal combustion engines over 600 RPM.		A.C. motors; high torque, high slip, repulsion-induction, single phase, series wound and slip ring. D.C. motors; series wound and compound wound. Single-cylinder engines and internal combustion engines under 600 RPM, line shafts, clutches, brakes, direct on line starting			
				Operational hours per day			
		10 and under	Over 10 to 16 inclusive	Over 16 and continuous service	10 and under	Over 10 to 16 inclusive	Over 16 and continuous service
Special cases	For speed-up and reversing drives subtract 25 per cent from the factors, except where high torque is not present on starting						
Light duty	Agitators for liquids, blowers and exhausters Centrifugal pumps and compressors Fans up to 10 h.p.	1.0	1.1	1.2	1.1	1.2	1.3
Medium duty	Fans over 10 h.p. Generators Line shafts Machine tools Punches, presses, shears Positive displacement rotary pumps	1.1	1.2	1.3	1.2	1.3	1.4
Heavy duty	Piston compressors Piston pumps Positive displacement blowers Saw-mill and woodworking machinery	1.2	1.3	1.4	1.4	1.5	1.6

NOMENCLATURE

A, B, C, D, E, M Section V-Belts

Imperial Belt Size e.g. A30, B50

Number = Internal Length (Circumference) in Inches.

Metric Belt Size e.g. A790, B1310

Number = Nominal Pitch Length (Circumference) in mm.

SPZ, SPB, SPP, SPC Section V-Belts

Old Numbers e.g. 3V250

Number = Outside Length (Circumference) Divided by 10.

New Numbers e.g. SPZ630

Number = Nominal Pitch Length (Circumference) in mm.

BASIC PULLEY & BELT FORMULAE

DIAM. DRIVER = $\frac{\text{DIAM. DRIVEN} \times \text{RPM DRIVEN}}{\text{RPM DRIVER}}$

DIAM. DRIVEN = $\frac{\text{DIAM. DRIVER} \times \text{RPM DRIVER}}{\text{RPM DRIVEN}}$

RPM DRIVER = $\frac{\text{DIAM. DRIVEN} \times \text{RPM DRIVEN}}{\text{DIAM. DRIVER}}$

RPM DRIVEN = $\frac{\text{DIAM. DRIVER} \times \text{RPM DRIVER}}{\text{DIAM. DRIVEN}}$

EFFECTIVE OUTSIDE BELT LENGTH (L)

$$L = 2C + 1.57(D + d) + \frac{(D - d)^2}{4C}$$

Where C = Centre distance between pulleys

D = Large diameter pulley

d = Small " "

COOL ROOMS AND COOL ROOM EQUIPMENT

GENERAL NOTES ON SELECTION

The various estimating charts for Cool Room heat loads are widely differing in final results due to the difficulty in obtaining accurate information regarding operational conditions. The main sources of heat load in a refrigerated space are —

1. Wall Heat Leakage
2. Air Changes (Door openings and infiltration)
3. Product Load
4. Electrical Load (Lights, Fan Motors etc.)
5. Product Respiration

Listed below are Selection Charts for WALK-IN FREEZERS [-17.8°C (0°F)] and WALK-IN COOL ROOMS [1.7°C (35°F)]

-17.8°C(0°F) SELECTION CHART FOR WALK-IN FREEZERS -17.8°C(0°F)

Loads based on — 6" Cork Insulation or Equivalent
35°C(95°F) Outside Temperature [52.8°C (95°F) TD]
18 Hours Compressor Operation

Outside Dimensions of Freezer in Feet W L H	COLD STORAGE (No Product Freezing)		FOOD FREEZING LOAD kg(lbs) PER 24 HRS (Product entering at 4.4°C (40°F))							
			136kg (300lbs)		341kg (750lbs)		682kg (1500lbs)		1364kg (3000lbs)	
	LOAD — 18 HOUR COMPRESSOR OPERATION									
	BTU/Hr.	Watts	BTU/Hr.	Watts	BTU/Hr.	Watts	BTU/Hr.	Watts	BTU/Hr.	Watts
6 x 6 x 9	3,950	1158	6,150	1802	9,450	2770				
6 x 7 x 9	4,350	1334	6,750	1978	10,050	2945				
6 x 8 x 9	4,850	1421	7,050	2066	10,350	3033				
6 x 9 x 9	5,150	1509	7,350	2154	10,650	3121				
6 x 10 x 9	5,500	1612	7,700	2257	11,000	3224				
7 x 7 x 9	4,900	1436	7,100	2081	10,400	3048				
7 x 8 x 9	5,300	1553	7,500	2198	10,800	3165				
7 x 9 x 9	5,600	1641	7,800	2286	11,100	3253	16,600	4865		
7 x 10 x 9	6,150	1802	8,350	2447	11,650	3414	17,150	5026		
7 x 12 x 9	6,800	1993	9,000	2638	12,300	3605	17,800	5217		
8 x 8 x 9	5,700	1671	7,900	2315	11,200	3283	16,700	4895		
8 x 9 x 9	6,250	1832	8,450	2477	11,750	3444	17,250	5056		
8 x 10 x 9	6,650	1949	8,850	2594	12,150	3561	17,650	5173		
8 x 12 x 9	7,350	2154	9,550	2799	12,850	3766	18,350	5378		
8 x 14 x 9	8,200	2403	10,400	3048	13,700	4015	19,200	5627		
9 x 9 x 9	6,650	1949	8,850	2594	12,150	3561	17,650	5173		
9 x 10 x 9	7,050	2066	9,250	2711	12,550	3678	18,050	5290		
9 x 12 x 9	7,900	2315	10,100	2960	13,400	3927	18,900	5539		
9 x 14 x 9	8,750	2564	10,950	3209	14,250	4176	19,750	5788		
9 x 16 x 9	9,450	2770	11,650	3414	14,950	4382	20,450	5994		
10 x 10 x 9	7,450	2183	9,650	2828	12,950	3795	18,450	5407	29,450	8631
10 x 12 x 9	8,500	2491	10,700	3136	14,000	4103	19,500	5715	30,500	8939
10 x 14 x 9	9,300	2726	11,500	3370	14,800	4338	20,300	5950	31,300	9174
10 x 16 x 9	10,000	2931	12,200	3576	15,500	4543	21,000	6155	32,000	9379
10 x 18 x 9	11,100	3253			16,600	4865	22,100	6477	33,100	9701
12 x 12 x 9	9,400	2755			14,900	4367	20,400	5979	31,400	9203
12 x 14 x 9	10,350	3033			15,805	4632	21,350	6257	32,350	9481
12 x 16 x 9	11,250	3297			16,750	4909	22,250	6521	33,250	9745
12 x 18 x 9	12,300	3605			17,800	5217	23,300	6829	34,300	10052
12 x 20 x 9	13,000	3810			18,500	5422	24,000	7034	35,000	10258
14 x 14 x 9	11,350	3326			16,850	4938	22,350	6550	33,350	9774
14 x 16 x 9	12,500	3663			18,000	5275	23,500	6887	34,500	10110
14 x 18 x 9	13,400	3927			18,900	5539	24,400	7151	35,400	10375
14 x 20 x 9	14,250	4176			19,750	5788	25,250	7400	36,250	10624
16 x 16 x 9	13,550	3971			19,050	5583	24,550	7195	35,550	10419
16 x 18 x 9	14,500	4250			20,000	5862	25,500	7474	36,500	10698
16 x 20 x 9	15,400	4513			20,900	6125	26,400	7737	37,400	10961 *
18 x 18 x 9	15,500	4543			21,000	6155	26,500	7767	37,500	10990 *
18 x 20 x 9	16,750	4909			22,250	6521	27,750	8133	38,750	11357 *
20 x 20 x 9	17,800	5217			23,300	6829	28,800	8441	39,800	11665 *

1.7°C(35°F) SELECTION CHART FOR WALK-IN COOL ROOMS 1.7°C(35°F)

Loads based on — 4" Cork Insulation or Equivalent
35°C (95°F) Outside Temperature [36.7°C (60°F) TD]
16 Hours Compressor Operation

Outside Dimensions Cool Room, Feet W L H			AVERAGE USAGE		HEAVY USAGE	
			LOAD — 16 HOUR COMPRESSOR OPERATION			
			BTU/Hr.	Watts	BTU/Hr	Watts
6 x 6 x 9			3,050	894	3,650	1070
6 x 7 x 9			3,500	1026	4,200	1231
6 x 8 x 9			3,800	1114	4,650	1363
6 x 9 x 9			4,200	1231	5,100	1495
6 x 10 x 9			4,600	1348	5,600	1641
7 x 7 x 9			3,900	1143	4,750	1392
7 x 8 x 9			4,350	1275	5,300	1553
7 x 9 x 9			4,750	1392	5,800	1700
7 x 10 x 9			5,150	1509	6,400	1876
7 x 12 x 9			5,900	1729	7,350	2154
8 x 8 x 9			4,800	1407	5,850	1715
8 x 9 x 9			5,250	1539	6,450	1890
8 x 10 x 9			5,700	1671	7,100	2081
8 x 12 x 9			6,600	1934	7,950	2330
8 x 14 x 9			7,500	2198	9,300	2726
9 x 9 x 9			5,750	1685	7,150	2096
9 x 10 x 9			6,250	1832	7,750	2271
9 x 12 x 9			7,300	2140	9,050	2652
9 x 14 x 9			8,200	2403	10,500	3077
9 x 16 x 9			9,050	2652	11,700	3429

Outside Dimensions Cool Room, Feet W L H			AVERAGE USAGE		HEAVY USAGE	
			LOAD — 16 HOUR COMPRESS. OPERATION			
			BTU/Hr.	Watts	BTU/Hr.	Watts
10 x 10 x 9			6,850	2008	8,400	2462
10 x 12 x 9			7,800	2286	9,650	2828
10 x 14 x 9			8,900	2608	11,200	3283
10 x 16 x 9			9,650	2828	12,300	3605
10 x 18 x 9			10,600	3107	13,400	3927
12 x 12 x 9			9,050	2652	11,100	3253
12 x 14 x 9			10,000	2931	12,700	3722
12 x 16 x 9			11,000	3224	13,900	4074
12 x 18 x 9			12,100	3546	15,300	4484
12 x 20 x 9			13,200	3869	16,200	4748
14 x 14 x 9			11,150	3268	14,100	4132
14 x 16 x 9			12,350	3620	15,500	4543
14 x 18 x 9			13,500	3957	16,900	4953
14 x 20 x 9			14,750	4323	18,100	5305
16 x 16 x 9			13,500	3957	17,100	5012
16 x 18 x 9			14,850	4352	18,000	5275
16 x 20 x 9			16,100	4719	20,000	5862
18 x 18 x 9			16,300	4777	20,200	5920
18 x 20 x 9			17,500	5129	21,700	6360
20 x 20 x 9			19,300	5657	23,100	6770

NOTES: 1. Increase or decrease cooler loads by 10% for every 5° increase or decrease in temp. difference between cooler temp. and outside temp. Do not use for more than 10° variance.

2. Load figures shown above have a safety factor applied which covers normal usage, product cooling and other sources of heat gain, such as lighting, occupancy, etc.

SEE FURTHER NOTES IN TECHNICAL SECTION

FORCED DRAFT COOLERS

COLDSTREAM - FOR R12 AND R22



KOLDFLO EVAPORATORS F.D.C.

REFRIGERATOR APPLICATIONS - ABOVE 35°F (1.7°C)

The Coldstream FROST FILTER BANK include a built in heat exchanger and heavy aluminium fins and housing with heavy gauge copper tubing.

Hourly ratings in btu/hour are based on laboratory tests in dry air at average temperature differences of 10°F, 12°F and 15°F (6.0°C, 6.7°C and 8.3°C). Normal usage involves moisture in the room and appropriate allowance should be made for actual conditions.

For daily btu capacity, Multiply model number of evaporator by 1,000. The answer (varying with conditions) will be the capacity of the evaporator at about 17°F (9.4°C) average temperature difference operating on an off cycle defrost with wet surface evaporator and with a condensing unit operating 40 minutes in the hour or 16 hours per day.

CAT. NO.	MODEL FOOT-HI	MODEL DOUBLE FOOT-HI	BTU/HR at Average TD			FANS				CORE	
			6.0°C (10°F)	6.7°C (12°F)	8.3°C (15°F)	QTY.	DIAM.	WATTS	CFM	SQ.FT	CODE
2911	K2R094		390	4700	5650	2	10"	100	1200	64	B 8/26
2912	K2R137		570	6300	8550	2	10"	100	1150	105	C 8/26
2913	K2R168		700	8400	10500	2	10"	100	1100	146	D 8/26
2914	K2R198		820	9800	12300	2	10"	100	1250	95	C 8/36
2915	K2R240		1000	12000	15000	2	10"	100	1200	208	D 8/36
29115		VR250	1040	12500	15600	1	16"	180	1700	210	C16/26
29116		VR305	1270	15300	19000	1	16"	180	1650	292	D16/26
2916	K3R360		1500	18000	22500	3	10"	150	1800	303	D 8/54
29117		V2R422	1760	21100	26400	2	16"	360	3300	294	C16/36
2917	K4R480		2000	24000	30000	4	10"	200	2400	417	D 8/72
29118		V2R528	2200	26400	33000	2	16"	360	3200	417	D16/36
2918	K5R600		2500	30000	37500	5	10"	250	3000	522	D 8/90
29119		V3R633	2640	31700	39600	3	16"	540	4950	449	C16/54
2919	K6R720		3000	36000	45000	6	10"	300	3600	626	D8/108
29120		V3R792	3300	39600	49500	3	16"	540	4800	626	D16/54
29121		V4R1056	4400	52800	66000	4	16"	720	6400	835	D16/72

FREEZER APPLICATIONS - BELOW 35°F (1.7°C)

The Coldstream FROST FILTER BANK on these F.D.C. is double that on evaporators for higher temperature rooms. Also included are built in heat exchanger, low heat electric defrost heaters (quickly replaceable), heavy aluminium fins and housing with heavy gauge copper tubing.

Hourly ratings in btu/hour, shown at 10°F and 12°F (5.6°C and 6.7°C) average temperature difference assume light frosting and suitable allowance must be made if heavier frosting is permitted.

For daily btu capacity, multiply model number of evaporator by 1,000. The answer (varying with conditions) will be the capacity of the evaporator at about 12°F (6.7°C) average temperature difference operating with time initiated pressure terminated electric defrost with a condensing unit operating 50 minutes in the hour or 20 hours per day.

CAT. NO.	MODEL FOOT-HI	MODEL DOUBLE FOOT-HI	BTU/HR at Av. TD		HEATER WATTS	FANS				CORE	
			5.6°C (10°F)	6.7°C (12°F)		QTY.	DIAM.	WATTS	CFM	SQ.FT	CODE
29126	K2F056		3300	3960	1500	2	10"	100	1200	64	B 8/26
29127	K2F096		4800	5760	1500	2	10"	100	1150	105	C 8/26
29128	K2F118		5900	7080	1500	2	10"	100	1100	146	D 8/26
29129	K2F140		7000	8400	1500	2	10"	100	1250	95	C 8/36
29130	K2F168		8400	10080	1500	2	10"	100	1200	208	D 8/36
29140		VF176	8800	10560	3000	1	16"	180	1700	210	C16/26
29141		VF214	10700	12840	3000	1	16"	180	1650	292	D16/26
29131	K3F252		12600	15120	3000	3	10"	150	1800	303	D 8/54
29142		V2F296	14800	17790	3000	2	16"	360	3300	294	C16/36
29132	K4F336		16800	20160	3000	4	10"	200	2400	417	D 8/72
29143		V2F370	18500	22200	3000	2	16"	360	3200	417	D16/36
29133	K5F420		21000	25200	4500	5	10"	250	3000	522	D 8/90
29144		V3F444	22200	26640	4500	3	16"	540	4950	449	C16/54
29134	K6F504		25200	30240	4500	6	10"	300	3600	626	D8/108
29145		V3F554	27700	33264	4500	3	16"	540	4800	626	D16/54
29146		V4F740	37000	44400	4500	4	16"	720	6400	835	D16/72

FORCED DRAFT COOLERS REPCO-BOHN

"TOP-AIR"

FEATURES

- Low silhouette.
- Grained aluminium cabinets - light weight.
- Fan motor harness with moulded male plug provided inside unit.
- Expansion valve inside cabinet.
- Fan motors sealed and lubricated for life.
- Stainless steel screws to prevent rust streaks.



MODEL TA - TL
MEDIUM TEMP.

NOTE

All fan motors & heaters rated on
240 volts — 1 Ph. — 50 Hz.



MODEL TE
LOW TEMP.

MODEL TA — MEDIUM TEMPERATURE

APPLICATIONS : Display type Refrigerators, Back Bar Units, Under Counter Cabinets, wherever space is at a premium.

CAT. NO.	MODEL No.	WATTS AT 5.6K	AIR L/s	SECONDARY SURFACE m ²	FAN MOTORS		OVERALL DIMENSIONS — mm		
					No. OFF	WATTS TOTAL	H	W	D
29151	100TA	293	58.6	2.193	1	30	115	420	355
29152	130TA	381	80.2	2.824	2	60	115	520	355
29153	170TA	498	99.1	3.400	2	60	115	610	381
29154	230TA	674	141.6	4.580	3	90	115	800	381
29155	300TA	879	169.9	5.946	3	90	115	1016	381
29156	400TA	1172	283.1	7.153	2	130	185	965	450

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MODEL TL — LOW TEMPERATURE — AUTO DEFROST

FEATURES:

Mechanical contact between heater element and drip tray ensures a warm tray during defrost cycle. Defrost terminates on coil temperature, eliminating excessive defrost period. Built-in fan delay ensures chilled and dry coil before returning to normal cooling cycle. Quick access to defrost heaters and controls from bottom of unit by removing drip tray. Full operating and installation details plus wiring diagram inside cabinet.

APPLICATIONS :

Display type Refrigerators, Ice Cream Cabinets, Bakery Freezers, Commercial Freezers.

CAT NO	MODEL No.	WATTS AT 5.6K	AIR L/s	SECONDARY SURFACE m ²	FAN MOTORS		O/A DIMENSIONS — mm			DEFROST WATTS TOTAL
					No. OFF	WATTS TOTAL	H	W	D	
29166	92TL	270	61.3	1.914	1	30	115	419	358	500
29167	120TL	352	87.3	2.453	2	60	115	521	358	600
29168	155TL	464	103.8	3.400	2	60	115	610	381	700
29169	210TL	615	141.6	4.394	1	65	165	610	419	900

MODEL TE — LOW TEMPERATURE — AUTO DEFROST

FEATURES :

A drip tray heater is provided to ensure a warm drip tray during defrost cycle. The drain fitting is a flared connection and can be rotated through 360°. Defrost terminates on coil temperature, eliminating excessive defrost period. Built-in fan delay ensures chilled and dry coil before returning to normal cycle. All models provided with equalizing connection for expansion valve. Quick access to defrost heaters, controls and fan motors from bottom of unit by removing drip tray or fan panel.

APPLICATIONS :

Full operating and installation details included, together with wiring diagram inside cabinet. Display type Refrigerators, Commercial Freezers, Walk-in Cold Rooms.

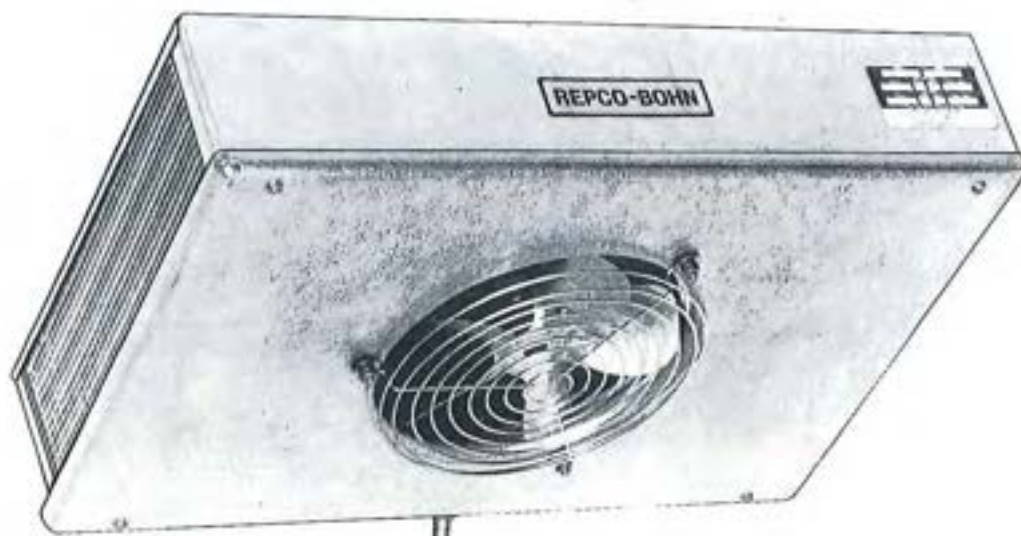
CAT. NO.	MODEL No.	WATTS AT 5.6K	AIR L/s	SECONDARY SURFACE m ²	FAN MOTORS		O/A DIMENSIONS — mm			DEFROST HEATER WATTS
					No. OFF	WATTS TOTAL	H	W	D	
29159	290TE	850	236.0	5.844	2	130	184	789	470	1335
29160	350TE	1025	283.1	7.163	2	130	184	965	470	1535
29161	520TE	1524	434.2	9.225	3	195	184	1248	470	1985
29162	700TE	2052	717.3	11.120	3	300	184	1759	521	2750

FORCED DRAFT COOLERS

REPCO-BOHN Model T.A.S

"TOP-AIR"

medium temperature unit cooler



APPLICATION

This is a low silhouette unit that will mount in the top of a refrigerator. It is particularly designed for bottle or glass storage cabinets, under bar or back bar cabinets where a low profile unit with positive lateral airflow for even cabinet cooling is essential and where space is at a premium.

FEATURES

- Attractive leather grained aluminium cabinet, light weight and corrosion resistant.
- Fan motor wiring harness with quick disconnecting moulded plug.
- Electrical Certificate of suitability CS 357N.
- Room inside cabinet for expansion valve or capillary tube.
- Stainless steel screws to prevent rust streaks.
- Suction line accumulator located inside cabinet as an integral part of unit.
- Drain connection at rear of unit.
- Knockouts provided to allow flexibility for connections.
- Flat plate type fins, widely spaced, with full collars covering copper tube for greater efficiency, longer life and ice-up-free service.
- Fan motors sealed and lubricated for life and impedance protected.
- Evaporators protected with exclusive Bohn-Kote finish.
- LARGE 200mm DIAMETER FAN

CAPACITY DATA

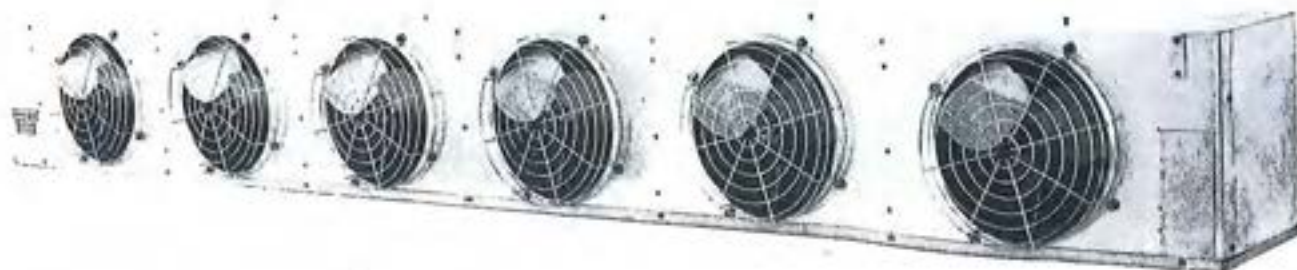
CAT. NO.	MODEL No.	CAPACITY		AIR FLOW		FAN MOTOR		OVERALL DIMENSIONS - mm		
		WATTS @ 5.6K TD	BTU/HR @ 10°F TD	L/s	CFM	No. OFF	WATTS TOTAL	H	W	D
291166	TAS 250	735	2500	142	300	1	65	130	575	385
291167	TAS 300	900	3000	142	300	1	65	130	575	385

Note: All Fan Motors rated on 240 Volts - 1 Ph. - 50 Hz.

THE BITTERNESS OF POOR QUALITY REMAINS LONG AFTER THE SWEETNESS OF LOW PRICE IS FORGOTTEN

FORCED DRAFT COOLERS

REPCO-BOHN Model A.D.T.H. "TRIM-AIR" medium temperature unit cooler



APPLICATION

The Repco-Bohn 'Trim Air' is a low silhouette unit cooler only 375 mm in height and mounts flush to the ceiling. This unit is ideal for coldrooms where space and headroom is a premium.

With a normal operating range of 1.5°C and above, they are ideally suited for all commercial walk-in coolrooms particularly where ceiling heights are restricted.

The Repco-Bohn 'Trim-Air' is an induced draught unit cooler with the air being drawn over the coil which greatly assists in even air distribution throughout the coolroom and over the coil.

FEATURES

- Repco-Bohn Model H3 Heat Exchanger internally fitted. (Refer to data sheet for performance.)
- Attractive light grained aluminium cabinet, light in weight and with slotted hangers for easy installation.
- Fully factory wired for easy installation.
- Fan motor harness with moulded male plugs provided inside unit for quick service and connection.
- Electrical certificate of suitability CS 357N.
- Low silhouette only 375 mm high.
- Fan motor, guard and blades easily removed from the front of the unit.

- Fan motors located within cabinet space.
- Interchangeable fans and motors for complete range.
- Space for expansion valve with cabinet and all coils supplied with equalizing connection.
- Rounded corners on cabinet and drip tray for easy cleaning.
- Sloped drip tray from each end with centre drain connection for positive condensate outlet.
- Rustproof hardware and stainless steel screws throughout to maintain quality and appearance.
- Plate type fins with full collars covering copper tube for greater efficiency and longer life.
- Generous coil and fan capacities giving dependable accurate ratings.
- Complete range of nine models from 1640-9903 watts at 5.6K.
- Full operating instructions and installation details included together with wiring diagram inside cabinet.
- Fan motors sealed and lubricated for life and impedance protected.
- 305mm fan blade fitted to all models.
- Fan dividers on each fan section gives better coil performance.

4

CAPACITY DATA

CAT. NO.	MODEL No.	WATTS AT 5.6K	AIR L/s	FAN MOTORS		OVERALL DIMENSIONS — mm			MODEL HEAT EXCHANGER
				No. OFF	WATTS TOTAL	H	W	D	
29176	560 ADTH	1640	349.2	1	100	375	737	289	H3-100
29177	760 ADTH	2226	637.1	2	200	375	1016	289	H3-100
29178	940 ADTH	2754	637.1	2	200	375	1016	289	H3-100
29179	1120 ADTH	3281	698.4	2	200	375	1245	289	H3-150
29180	1370 ADTH	4014	1047.6	3	300	375	1753	289	H3-200
29181	1680 ADTH	4922	1047.6	3	300	375	1753	289	H3-200
29185	1830 ADTH	5361	1396.8	4	400	375	2261	289	H3-300
29182	2250 ADTH	6592	1396.8	4	400	375	2261	289	H3-300
29183	2810 ADTH	8233	1746.1	5	500	375	2769	289	H3-500
29184	3380 ADTH	9903	2035.2	6	600	375	3277	289	H3-500

Note: All Fan Motors rated on 240 Volts — 1 Ph. — 50 Hz.

291-d

FORCED DRAFT COOLERS

REPCO-BOHN Model L.E.T.H. "TRIM-AIR" low temperature unit cooler



APPLICATION

The Repco-Bohn 'Trim Air' is a low silhouette unit cooler only 375mm in height and mounts flush to the ceiling. This unit is ideal for coldrooms where space and headroom is a premium.

With a normal operating range of plus 1.0°C down to minus 29°C they are ideally suited for all commercial walk-in coldroom applications from butchers through to freezers and ice cream stores.

These units incorporate all the features of the Repco-Bohn EL defrost system with defrost termination, fan delay and high temperature limit safety thermostats, factory wired and terminating in a junction box on the cabinet.

A drip tray heater is also provided to ensure a warm drip tray during defrost cycle.

The drain fitting is a 1/2" male flare connection.

FEATURES

- Repco-Bohn Model H3 Heat Exchanger internally fitted. (Refer to data sheet for performance.)
- Electrical certificate of suitability CS 357N.
- Defrost terminates on coil temperature, eliminating excessive defrost period.
- Built-in fan delay ensures chilled dry coil before returning to normal cooling cycle.
- Built high limit safety thermostat on defrost cycle.

- 305mm fan blades on all models.
- Fan divider on each fan section gives better coil performance
- Fully factory wired for easy installation.
- Fan motor harness with moulded male plugs provided inside unit for quick service and connection.
- Fan motor, fan spider and blades easily removed as a complete assembly from the front of the unit.
- Fan motors located within cabinet space.
- Interchangeable fans and motors for complete range.
- Space for expansion valve within cabinet and all coils supplied with equalizing connection.
- Attractive light grained aluminium cabinet, light weight and with hangers for easy mounting.
- Rounded corners on cabinet and drip tray for easy cleaning.
- Sloped drip tray from each end with centre drain connection for positive condensate outlet.
- Rustproof hardware, stainless steel screws throughout to maintain quality and appearance.
- Plate type fins with full collars covering copper tube for greater efficiency and longer life.
- Generous coil and fan capacities giving dependable accurate ratings.
- Complete range of ten models from 1319 to 7913 watts at 5.6K (evaporation suction temperature minus 28.9°C).

CAPACITY DATA

CAT. NO.	MODEL No.	WATTS AT 5.6K	AIR L/s	FAN MOTORS		OVERALL DIMENSIONS - mm			DEFROST HEATER WATTS	MODEL HEAT EXCH.
				No. OFF	WATTS TOTAL	H	W	D		
29188	LETH 45*	1319	349.2	1	100	375	737	289	1000	H3-100
29195	LETH 63*	1845	637.1	2	200	375	1016	289	1600	H3-100
29189	LETH 72*	2110	637.1	2	200	375	1016	289	1600	H3-150
29190	LETH 90*	2638	698.4	2	200	375	1245	289	2000	H3-200
29196	LETH 111*	3552	1047.6	3	300	375	1753	289	3000	H3-200
29191	LETH 135*	3957	1047.6	3	300	375	1753	289	3000	H3-200
29197	LETH 148**	4336	1396.8	4	400	375	2261	289	4000	H3-300
29192	LETH 180**	5275	1396.8	4	400	375	2261	289	4000	H3-300
29193	LETH 225**	6545	1746.1	5	500	375	2769	289	5000	H3-500
29194	LETH 270**	7913	2035.2	6	600	375	3277	289	6000	H3-500

Note:

* Fan Motors and Defrost Heaters rated on 240 Volts - 1 Ph. - 50 Hz.

** Fan Motors rated on 240 Volts - 1 Ph. - 50 Hz. Heaters rated on 415 Volts - 3 Ph. - 50 Hz.

FORCED DRAFT COOLERS

REPCO-BOHN Models T.E., T.L., and L.E.T. low temperature electric defrost system



REPCO-BOHN
DEFROST SYSTEM

BOHN low temperature unit coolers are equipped with exclusive BOHN-EL electric defrost system. This unique system utilizes high quality tubular heaters having exceptionally long life. The Incoloy (high nickel-steel alloy) sheath gives lasting protection from oxidation and corrosion. The heaters snap into slots provided in the finned surface of the coil. They are easily removed when servicing is required.

A defrost termination thermostat and fan delay control plus a heater safety control fitted on all models. These controls and heater elements are factory wired to a junction box.

The positive heat source provided by the electric heaters insures complete defrosting under all conditions. The factory set defrost control automatically adjusts the length of defrost to the frost loading conditions.

Units incorporating this reliable, completely automatic defrost system are extremely easy to install and service.

The fast defrost obtained by the use of the BOHN-EL system minimizes box and product temperature rise during the defrost cycle.

SEQUENCE OF OPERATION

In the following description, Switch "A" and "B" are located in the timer to be used with the BOHN-EL defrost system. (Paragon 8145/21).

Switch "A" controls current to the compressor motor or the holding coil of the compressor motor starter and the unit cooler fan motors.

Switch "B" controls current to the defrost heater(s) or to the holding coil of a magnetic contactor handling the defrost heater amperage.

STEP "A" — During Normal Refrigeration Operation:

1. Switch "A" in timer is closed. Switch "B" in timer is open.
2. Defrost termination control switch in unit is open. Fan delay control switch in unit is closed.
3. The defrost heater is off.
4. Compressor operates in accordance with the demands of the refrigeration system temperature and/or pressure controls.
5. The unit cooler fan operates continually.
6. Frost builds up slowly on the evaporator.

STEP "B" — During Defrost Operation:

1. Defrosting of evaporator is started automatically by the timer at predetermined times.
2. Timer mechanically opens switch "A" which breaks the circuit to the compressor and fan motor, thereby shutting them off, and closes switch "B", thereby permitting current to flow to the heater.
3. The heaters, recessed in slots, give up heat directly to the fins of the evaporator. This heat raises coil and refrigerant temperature to 0°C, causing the frost to melt.
4. Frost on evaporator is melted and defrost water drips into drain pan and flows down the drain.
5. When frost has completely melted from the coil, the coil starts to warm up beyond 0°C.

STEP "C" — Coil Re-cooling Operation:

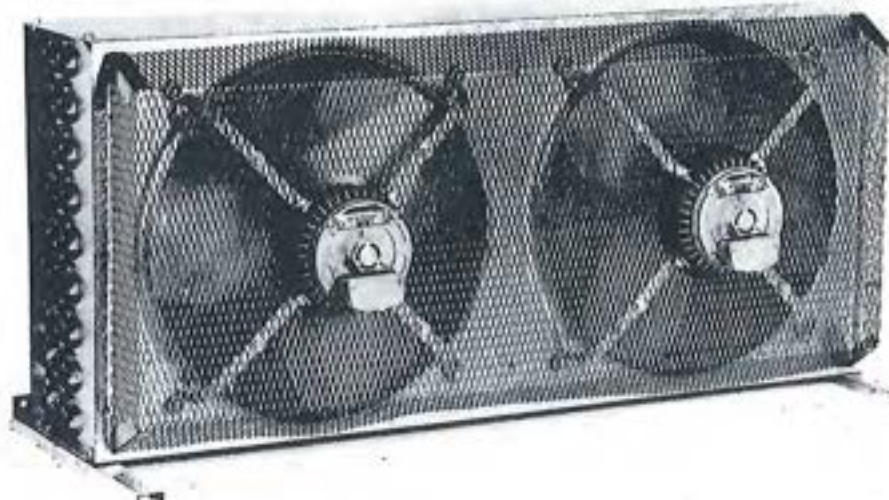
1. When the coil temperature warms up to 13°C the defrost termination control closes, which allows the current to flow to the solenoid in the timer, which then energizes and trips the timer switch back to its normal position (switch "A" closed, switch "B" open). The fan delay control also opens at 4.5°C.
2. The compressor now starts.
3. The fan motor remains off because switch in fan delay control is open. This prevents warm air from being blown into the refrigerated space.
4. Evaporator coil cools down approaching operating temperature. Super heated gas only passes to the compressor.

STEP "D" — Return to Normal Refrigeration Operation:

1. When the coil temperature reaches minus 1°C the fan control switch closes. This allows current to flow to the fan motor and the unit is now back in operation as in step "A".

USE OUR TELEX SERVICE FOR YOUR ORDER

291-f REPCO-BOHN Remote air cooled condenser



SPECIFICATIONS

CASE: Heavy gauge aluminium.
FAN: Heavy duty aluminium with plated steel boss.
MOTOR: Totally enclosed, 3 phase standard (single phase optional).
MOTOR MOUNT: Resilient rubber mounted for quieter operation.
COIL: Repco Bohn staggered 12.7 mm O.D. copper tube configuration with corrugated cross section, rippled edge fins.
PACKING: Single fan models supplied in cartons. Twin and 3 fan models supplied in crates.

IMPORTANT ORDERING REQUIREMENTS

1. State Horizontal or Vertical configuration.
2. State direction of Air Flow required — i.e. Blowing or sucking through coil.
3. Single or Three Phase Motors.

CAPACITY AND DESIGN DATA

CAT. NO.	MODEL No.	CAPACITY		Fin Series	No. Rows	No. Fans	Fan Diam. mm	Airflow		Face Vel. m/s	Connections		Motor Amps (rated)	Weight kg
		WATTS @16.7K	BTU/HR @30°F					L/s	CFM		Inlet mm	Outlet mm		
291116	RC 15	4650	15875	8	1	1	508	1400	2970	4.0	12.7	12.7	0.68	19.0
291117	RC 23	6920	23630	6	2	1	508	1350	2860	3.8	12.7	12.7	0.68	20.6
291118	RC 30	9050	30895	10	2	1	508	1300	2765	3.7	12.7	12.7	0.68	22.5
291119	RC 40	11860	40480	10	3	1	508	1200	2550	3.4	22.2	15.9	0.68	26.2
291120	RC 48	14080	48085	10	4	1	508	1145	2430	3.2	22.2	15.9	0.68	29.6
291121	RC 61	18100	61780	10	2	2	508	2605	5525	3.7	28.5	19.0	1.36	40.9
291122	RC 80	23720	80965	10	3	2	508	2405	5100	3.4	28.5	19.0	1.36	47.5
291123	RC 96	28180	96190	10	4	2	508	2295	4865	3.2	31.7	22.2	1.36	54.4
291124	RC 122	35820	122260	10	3	3	508	3630	7700	3.4	31.7	25.4	2.04	57.9
291125	RC 160	47080	160695	10	5	3	508	3390	7185	3.2	31.7	25.4	2.04	90.8

COMPREHENSIVE SELECTION INFORMATION AND MANUFACTURERS LITERATURE AVAILABLE ON REQUEST

Model H heat exchanger



APPLICATION : The Repco-Bohn heat exchanger is specifically designed for commercial refrigeration and is sized to match Condensing unit H.P. ratings. When engineered and installed correctly they will improve system efficiency with increased performance. The heat exchanger subcools liquid which assists expansion valve operation and ensures superheated suction gas. It further prevents liquid slugs returning in the suction line and eliminates sweating.

FEATURES : All heat exchangers use a convolute bronze tube as suction line and a heavy gauge copper body as liquid circuit. Dehydrated, sealed and pressure tested to 3100 kPa. Working pressure 206 kPa.

Conditions for performance data as listed :

1. Minus 18°C coolroom with unit operating at minus 23.5°C S.S.T. and 40.5°C saturated condensing, 9.4 to 12.2K of liquid subcooling obtained.
2. 1.5°C coolroom with unit operating at minus 54°C S.S.T. and 46°C saturated condensing, 6 to 9K of liquid subcooling obtained.

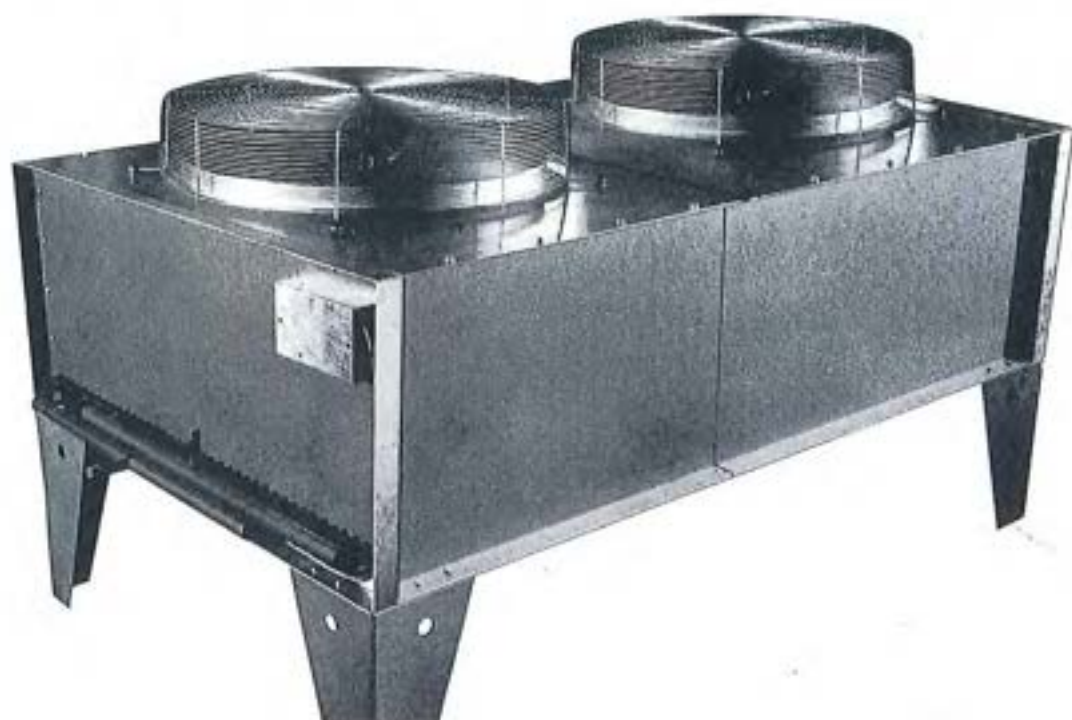
CAT. NO.	REPCO BOHN MODEL No.	NOM. COND. UNIT Watts	FOR MINUS 18°C COOLROOM				FOR 1.5°C COOLROOM			
			R12		R502		R12		R22	
			Cond. Unit Cap. Watts	Increase due to Heat-X Watts	Cond. Unit Cap. Watts	Increase due to Heat-X Watts	Cond. Unit Cap. Watts	Increase due to Heat-X Watts	Cond. Unit Cap. Watts	Increase due to Heat-X Watts
291151	H3-75	559	996	97	—	—	1876	150	—	—
291152	H3-100	746	1553	141	1612	188	2491	214	—	—
291153	H3-150	1118	2198	211	2198	281	4396	322	5862	246
291154	H3-200	1491	2784	278	2931	375	5129	428	7327	328
291155	H3-300	2237	4396	419	4396	566	7327	645	8792	492
291156	H3-500	3728	7034	700	7327	941	12603	1073	16120	824
291157	H3-750	5593	9672	979	9525	1319	19050	1500	21981	1152
291158	H3-1000	7457	13775	1398	17937	1382	24912	2140	26377	1644

SELECTION CHART TO MATCH HEAT EXCHANGER TO TL & TE UNITS	
UNIT	HEAT-X
92TL	H3-75
120TL	H3-75
155TL	H3-75
210TL	H3-75
290TE	H3-100
350TE	H3-150
520TE	H3-200
700TE	H3-300
990TE*	H3-300

* Obsolete Model

REPCO-BOHN

Remote direct drive air cooled condenser



4

Features:

Specifically engineered for outdoor installations the Repco-Bohn condensers comprise carefully selected and matched components to provide unexcelled performance and economy of operation.

All motors are inherently protected against locked rotor burn-out and high ambient conditions.

Multiple **LOW NOISE TWO SPEED** fans with low tip speed and deep-formed venturi provide one of the quietest and most efficient condensers in the industry.

Case construction is all aluminium for resistance against corrosion.

Single or multiple circuits available.

Vertical air discharge. (Horizontal discharge on request only).

Standard production — copper tube coils with rippled aluminium fins (copper fins available on request).

Zinc plated, resilient rubber-mounted supports.

Special circuits available for all types of fluid cooling.

CAT. NO.	MODEL	No. Fans	AIR FLOW				F.L. Amps 415/3/50		Total Heat Reject. (R22)@ 16.5K - kW		12.7mmφ Tubes High Total	Rows Deep
			L/s		CFM		Hi	Lo	Hi	Lo		
			Hi	Lo	Hi	Lo						
291235	RDD18	2	8260	6077	17500	12875	3.9	2.2	66.6	56.4	38	3
291236	RDD21	2	8213	6042	17400	12800	3.9	2.2	74.5	63.3	38	3
291237	RDD24	2	7741	5711	16400	12100	3.9	2.2	88.2	74.3	38	4
291238	RDD26	2	7717	5688	16350	12050	3.9	2.2	92.6	77.0	38	4
291239	RDD29	2	7257	5357	15375	11350	3.9	2.2	100.2	82.6	38	5
291240	RDD35	3	11647	8602	24675	18225	5.9	3.3	124.4	105.8	38	4
291241	RDD42	3	10915	8071	23125	17100	5.9	3.3	145.2	120.4	38	5
291242	RDD44	3	10880	8036	23050	17025	5.9	3.3	150.2	123.9	38	5
291243	RDD53	4	15434	11375	32700	24100	7.8	4.4	185.1	154.1	38	4
291244	RDD58	4	14514	10714	30750	22700	7.8	4.4	200.4	165.2	38	5

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

PARTS FOR FORCED DRAFT COOLERS REPCO-BOHN

CAT. NO.	MANUF. P/N	DESCRIPTION	TO SUIT MODEL
291176	1198001	Large Motor	Various
291178	1203001	Small Motor	TA, TL
291181	1204001	Motor Mount	TA, TL, TE, TAS
291180	1199001	" "	700 & 990 TE/ All old ADT
291179	1200001	" "	All LET, ADT
291182	1220001	Fan Guard - 5 1/2" Dia.	TA, TL
291183	1205001	" " - 8" Dia.	TA, TL, TE, TAS
291184	1221001	" " - 10" Dia.	700 & 990 TE/ All old ADT
291185	1208001	" " - 12" Dia.	All LET, ADT
291186	1160007	Fan Blade - 5 1/2" Dia.	TA, TL
291187	1160005	" " - 8" Dia.	TA, TL, TE
291189	1160006	" " - 10" Dia.	700 & 990 TE
291190	1160002	" " - 12" Dia.	All LET, ADT
291191	1168001	Defrost/Fan Delay T/S	Various
291192	1167001	Safety Thermostat	Various
291193	1227002	Defrost Heater	92 TL
291194	1227003	" "	120 TL
291195	1227004	" "	155 TL
291196	1227001	" "	210 TL
291197	1222001	" "	290 TE
291201	1222002	" "	350 TE
291202	1222003	" "	520 TE
291203	1224001	" "	700 TE
291204	1229001	" "	990 TE
291204A	1229002	" "	990 TE
291205	1228001	" "	LET 45
291206	1228002	" "	LET 63 & 72
291207	1228003	" "	LET 90

CAT. NO.	MANUF. P/N	DESCRIPTION	TO SUIT MODEL
291208	1228004	Defrost Heater	LET 111 & 135
291209A	1231001	" "	LET 148 & 180
291209	1231004	" "	LET 148 & 180
291210A	1231002	" "	LET 225
291210	1231005	" "	LET 225
291211	1231003	" "	LET 270
291211A	1231006	" "	LET 270
291212	1223001	Drain Pan Heater	TE Models
291213	1225001	" " "	700 TE
291214	1225002	" " "	990 TE
291215	1226001	" " "	LET 45
291216	1226005	" " "	LET 53 & 72
291217	1226002	" " "	LET 90
291218	1226003	" " "	LET 111 & 135
291219	1226004	" " "	LET 148 & 180
291220	1230001	" " "	LET 225
291220A	1230002	" " "	LET 225
291221	1230003	" " "	LET 270
291221A	1230004	" " "	LET 270
291200A	1302001	Defrost Heater Clip	All LET
291200	1232001	" " "	All TL, TE
291222		240 Volt Motor	RACC
291223		415 Volt Motor	RACC
291224		18" Fan Blade	RACC
291225		20" Fan Blade	RACC
	1160003	30" Fan Blade	RDD
	1159001	415 Volt Motor	RDD
	1158001	Fan Guard	RDD

Note: When ordering fan blades, state sucking or blowing, air flow through coil.

UNIT MODEL No.	DRAIN PAN HEATER P/N	DRAIN PAN WATTS EACH	No. REQUIRED	DEFROST ELEMENT P/N	ELEMENT WATTS EACH	No. REQUIRED	NUMBER HEATER CLIPS
92 TL	NIL	NIL	—	1227002	500	1	2
120 TL	NIL	NIL	—	1227003	600	1	2
155 TL	NIL	NIL	—	1227004	700	1	2
210 TL	NIL	NIL	—	1227001	900	1	2
290 TL	1223001	135	1	1222001	1200	1	3
350 TE	1223001	135	1	1222002	1400	1	3
520 TE	1223001	135	1	1222003	1850	1	3
700 TE	1225001	550	1	1224001	2200	1	4
900 TE	1225002	750	1	1229001	1000	1	2
				1229002	2000	1	2
LET 45	1226001	250	1	1228001	250	3	6
LET 72	1226005	400	1	1228002	400	3	6
LET 90	1226002	500	1	1228003	500	3	6
LET 135	1226003	750	1	1228004	750	3	6
LET 180	1226004	1350	1	1231001	675	2	4
				1231004	675	2	4
LET 225	1230001	830	1	1231002	835	2	4
	1230002	830	1	1231005	835	2	4
LET 270	1230003	1000	1	1231003	1000	2	4
	1230004	1000	1	1231006	1000	2	4

FAST SERVICE

AS REAL SPECIALISTS IN REFRIGERATION, AIR CONDITIONING AND HEATING, WE STOCK THOUSANDS OF DIFFERENT PARTS, TOOLS AND SUPPLIES. WE BELIEVE THIS IS ONE OF THE MOST COMPLETE ASSORTMENT IN THE INDUSTRY. THIS LARGE INVENTORY, PLUS AN EXPERIENCED ORGANIZATION AND A MODERN STREAMLINED ORDER SYSTEM, ALWAYS ASSURES YOU OF FAST BUT CAREFUL SERVICE. WE DESPATCH OVER 90% OF ALL ORDERS ON THE DAY THEY ARE RECEIVED.

NOTES

4

FIGURE THE ODDS

BECAUSE WE BELIEVE OUR STOCK IS ONE OF THE LARGEST AND MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY, THE MATHEMATICAL ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACPAR THAN ANYWHERE ELSE. IF TIME IS MONEY, WHY WASTE IT BY LOOKING ELSEWHERE.

MULLER FORCED-DRAFT COOLERS



CABINET UNITS LOW & NORMAL TEMPERATURE

CSN AND CDN SERIES — NORMAL TEMPERATURE — FOR R12, R22 & R502

FEATURES: Extremely shallow profile conserves valuable shelf space in cabinets and walk-in refrigerators.

Hammered Aluminium finish — Light weight.

Easy to install — accessible tubing connections simplify installation. Knock-outs provided for tube and electrical entry from either side.

Sharp angle on drain pan discourages accumulation of ice, dirt and debris.

CAT. NO.	MODEL	CAPACITY			Air Flow L/s	Fin Series	Fan Diam mm	Fan RPM (No)	Total Motor Input Watts	Overall Dimensions — mm		
		WATTS @ 1K T.D	WATTS @ 5K T.D	BTU/HR @ 10°F T.D						H	W	D
292126	CSN 64	64	320	1200	65	8	178	2400(1)	30	125	425	410
292127	CSN 74	74	370	1400	70	8	178	2400(1)	30	125	525	410
292128	CSN 106	106	530	2000	120	8	178	2400(2)	60	125	615	410
292129	CSN 130	130	650	2500	130	8	178	2400(2)	60	125	805	410
292130	CSN 180	180	900	3400	180	8	178	2400(3)	90	125	1020	410
292131	CDN 130	130	650	2500	120	8	254	1300(1)	50	190	555	472
292132	CDN 180	180	900	3400	160	8	254	1300(1)	50	190	765	472
292133	CDN 240	240	1200	4600	220	8	254	1300(2)	100	190	915	472
292134	CDN 320	320	1600	6200	300	8	254	1300(2)	100	190	1265	472

CSL AND CDL SERIES — LOW TEMPERATURE — AUTO DEFROST — FOR R12, R22 & R502

FEATURES: Similar to CSN and CDN but for Low Temperature applications.

Rapid Fin defrosting — Frost is melted by Incoloy sheathed heating elements inserted into slots in the lower face of the finned coil providing direct metallic contact between the heating elements and the aluminium fins. Defrost with fan delay is safely controlled by pre-wired, built-in thermostats.

APPLICATIONS: Cabinets and Walk-in Refrigerators, Freezers.

CAT. NO.	MODEL	CAPACITY			Air Flow L/s	Fin Series	Fan Diam mm	Fan RPM (No)	Total Motor Input Watts	Total Defrost Heater Watts	Overall Dimensions — mm		
		WATTS @ 1K T.D	WATTS @ 5K T.D	BTU/HR @ 10°F T.D							H	W	D
292135	CSL 53	53	265	1000	70	6	178	2400(1)	30	350	125	425	410
292136	CSL 63	63	315	1200	75	6	178	2400(1)	30	450	125	525	410
292140	CDL 100	110	550	2100	130	6	254	1300(1)	50	995	190	555	472
292141	CDL 150	150	750	2900	170	6	254	1300(1)	50	1370	190	765	472
292142	CDL 200	200	1000	3800	240	6	254	1300(2)	100	1680	190	915	472
292143	CDL 270	270	1350	5200	310	6	254	1300(2)	100	2390	190	1265	472
292144	CDL 370	370	1850	7000	430	6	254	1300(3)	150	3120	190	1615	472

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

FORCED DRAFT COOLERS

Muller

LO-LINE UNIT COOLER V SERIES

FOR R12, R22 & R502

MLV SERIES — Normal Temperature

MLVE SERIES — With Electric Defrost for Low Temperature applications.

Complete accessibility to motors and fan blades. Quickly detachable fan guards. May be mounted within 3" of Coolroom walls. Far superior on Airside by virtue of improved plenum design - coupled with positive drain pan discharge.

CABINET — All parts are fabricated of heavy gauge hammered aluminium. Slotted hangers are furnished for easy installation. Fan and motor assembly is rigidly attached to the unit.

MOTOR AND FANS — Shaded pole type motors with ball bearings

are furnished on all units. Heavy duty propeller type fans are statically balanced and individually gauged for contour alignment.

HEAT EXCHANGER — Tube within-tube type heat exchanger is an integral part of each Lo-Line unit.

MLV SERIES — NORMAL TEMPERATURE

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Fan Diam. mm	Air Throw m	No.	Motor Data		Heat BTU/24 Hrs	Overall Dimensions — mm		
		WATTS @ 5K T.D	BTU/HR @ 10°F T.D					Total Amps	Total Watts		H	W	D
29287	MLV050	1300	5000	340	305	10	1	1.1	160	13100	388	706	490
29288	MLV072	1850	7200	680	305	12	2	2.2	320	26200	388	1176	490
29289	MLV100	2600	10000	680	305	12	2	2.2	320	26200	388	1176	490
29290	MLV150	3900	15000	1020	305	14	3	3.3	480	39300	388	1646	490
29291	MLV200	5200	20000	1360	305	16	4	4.4	640	52500	388	2116	490
29292	MLV250	6500	25000	1700	305	18	5	5.5	800	65600	388	2586	490
29293	MLV300	7800	30000	2040	305	20	6	6.6	960	78700	388	3056	490

MLVE SERIES — LOW TEMPERATURE

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Fan Size mm	Air Throw m	Motor Data				Heaters Total Watts	Overall Dimensions — mm		
		WATTS @ 5K T.D	BTU/HR @ 10°F T.D				No.	Total Amps	Total Watts	Heat BTU/24 Hrs		H	W	D
29276	MLVE035	900	3500	340	305	10	1	1.1	160	13100	1525	388	706	490
29277	MLVE050	1300	5000	680	305	12	2	2.2	320	26200	2650	388	1176	490
29278	MLVE070	1800	7000	680	305	12	2	2.2	320	26200	2650	388	1176	490
29279	MLVE105	2700	10500	1020	305	14	3	3.3	480	39300	3775	388	1646	490
29280	MLVE140	3600	14000	1360	305	16	4	4.4	640	52500	4900	388	2116	490
29281	MLVE175	4500	17500	1700	305	18	5	5.5	800	65600	5725	388	2586	490
29282	MLVE210	5400	21000	2040	305	20	6	6.6	960	78700	6290	388	3056	490

OUR BIG SELECTION ANSWERS YOUR EVERY NEED AND PRICED RIGHT TOO

292-b

MULLER

FORCED DRAFT COOLERS

M.U.A. PACEMAKER UNIT COOLERS



APPLICATIONS

- WALK-IN COOLERS
- MEAT STORAGE
- PRODUCE STORAGE
- DAIRY STORAGE
- WAREHOUSES
- SUPERMARKETS

BUILT-IN HEAT EXCHANGER

Tube-within-tube type heat exchanger is an integral part of each Pacemaker Unit Cooler.

FOR R12, R22 & R502

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Fan Diam. mm	No. Fans	Air Throw m	Motor Data			Overall Dimensions - mm		
		WATTS @ 5K T.D.	BTU/HR @ 10°F T.D.					Amps Rated	Watts Input	RPM	H	W	D
29230	MUA450	1190	4500	430	356	1	8.2	.82	52	1340	432	625	495
29232	MUA680	1790	6800	470	356	1	9.1	1.1	75	1350	432	625	495
29233	MUA870	2300	8700	780	356	2	8.8	.82	52	1340	432	1069	495
29234	MUA1100	2900	11000	810	356	2	9.1	.82	52	1340	432	1069	495
29235	MUA1350	3560	13500	940	356	2	10.4	1.1	75	1340	432	1069	495
29236	MUA1700	4490	17000	1600	457	2	9.4	2.5	188	1410	629	1349	525
29237	MUA2300	6070	23000	1790	457	2	10.4	2.5	188	1340	629	1349	525
29238	MUA3400	8980	34000	2120	508	2	10.1	2.5	188	1300	819	1349	525
29239	MUA4400	11600	44000	2780	457	3	9.4	2.5	188	1370	819	1755	525
29228	MUA6000	15850	60000	4250	508	4	10.1	2.5	188	1300	819	2505	525
29229	MUA8000	21100	80000	5320	508	5	9.1	2.5	188	1300	819	3086	525

LOW TEMP. FOR
R12, R22 & R502

EP HOT ROD ELECTRIC DEFROSTING



FEATURES

REPLACEABLE HEATING ELEMENTS - Electric heating elements (finned coil and drain pan) easily removed from front, back and bottom for inspection and maintenance without removing the coil or dropping the Unit Cooler. Only minimum space at either end required. Incoloy Sheathed Pan Heaters and Coil Face Heaters for long life and rapid defrost.

POSITIVE DRAIN PAN DE-ICING - Aluminium drain pan heated electrically with Incoloy Sheathed Heating Elements, held within the pan by formed aluminium reinforcing members. Positive drainage is assured by the side to side pitch provided by the mounting hanger design.

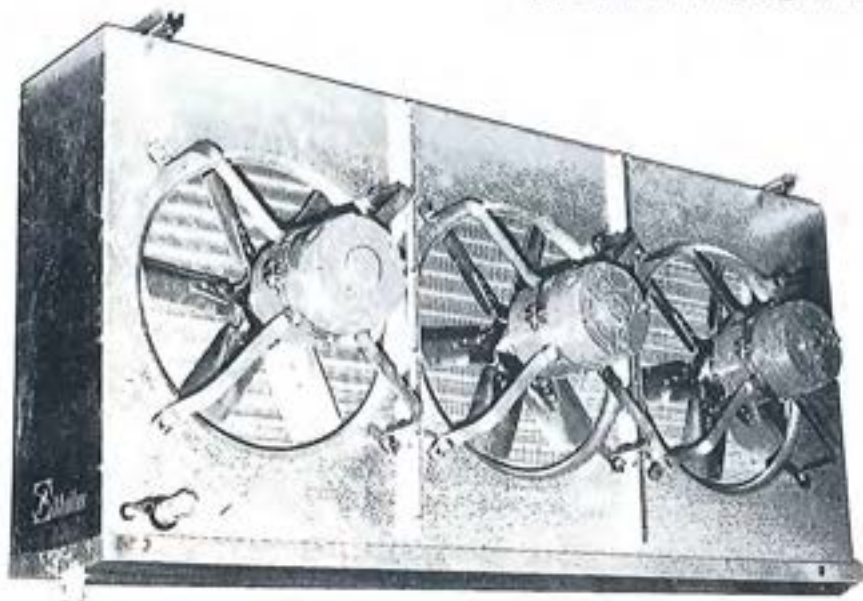
RAPID FIN DEFROSTING - Frost is melted by Incoloy Sheathed Heating Elements inserted into slots in the front and rear faces of the finned coil providing direct metallic contact between the heating elements and the aluminium fins.

HEAT EXCHANGER - All units are fitted with built-in heat exchanger.

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Fan Diam. mm	No. Fans	Air Throw m	Motor Data			Total Heater Watts	Overall Dimensions - mm		
		WATTS @ 5K T.D.	BTU/HR @ 10°F T.D.					Amps Rated	Watts Input	RPM		H	W	D
29216	EP 451	1190	4500	390	356	1	7.6	1.1	75	1270	1800	432	625	495
29217	EP 601	1580	6000	740	356	2	8.2	.82	52	1350	2300	432	1069	495
29219	EP 901	2380	9000	770	356	2	8.5	1.1	75	1300	3200	432	1069	495
29220	EP 1201	3170	12000	1610	457	2	9.1	2.5	188	1410	3450	629	1349	525
29221	EP 1601	4220	16000	1790	457	2	10.4	2.5	188	1340	5250	629	1349	525
29222	EP 2401	6330	24000	2120	508	2	10.4	2.5	188	1300	6750	819	1349	525
29223	EP 3601	9500	36000	2780	457	3	9.4	2.5	188	1370	8100	819	1755	525
29214	EP 4801	12660	48000	3730	457	4	9.7	2.5	188	1370	10800	819	2279	525

Muller M.A.F. M.A.F.E. AXIAL FAN UNIT COOLERS

HEAVY DUTY APPLICATIONS



FOR R12, R22 & R502

M.A.F. — NORMAL TEMPERATURE

M.A.F.E. — LOW TEMPERATURE

APPLICATIONS

- Walk-in Coolers • Dairy Storage
- Meat Storage • Produce Storage

FEATURES

Standard Equipment includes the Muller Tube-Within-A-Tube Heat Exchanger. Cabinet — Rugged, heavy duty construction of decorator style aluminium. Fans & Motors — 3-phase totally enclosed weatherproof, resilient mounted 560W motors matched to axial flow multiblade fans producing greater air velocities and throw.

Coils — 4 fin per inch aluminium fin on 5/8" O.D. copper tube featuring the Muller deep ripple fin for increased heat transfer.

4

M.A.F. AXIAL FAN UNIT COOLERS — NORMAL TEMPERATURE — FOR R12, R22 & R502

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Air Throw m	Fan Diam. mm	No. Fans	Fan RPM	Motor Data		Overall Dimensions — mm		
		WATTS @ 5K T.D.	BTU/HR @ 10°F T.D.						Total Amps	Total Watts	H	W	D
29259	MAF3400	8980	34000	2600	19	508	2	1425	2.8	1120	895	1349	580
29260	MAF4400	11600	44000	3450	20	457	3	1425	4.2	1680	895	1755	580
29261	MAF6500	17140	65000	5300	22	508	4	1425	5.6	2240	895	2505	580
29262	MAF8500	22400	85000	6650	24	508	5	1425	7.0	2800	895	3086	580

M.A.F.E. AXIAL FAN UNIT COOLERS — LOW TEMPERATURE — FOR R12, R22 & R502

Replaceable Heating Elements — Electric heating elements (finned coil and drain pan) easily removed from front, back and bottom for inspection and maintenance without removing the coil or dropping the Unit Cooler. Only minimum space at either end required. Incoloy Sheathed Pan Heaters and Coil Face Heaters for long life and rapid defrost.

Positive Drain Pan De-Icing — Aluminium drain pan heated electrically with Incoloy Sheathed Heating Elements, held within the pan by formed aluminium reinforcing members. Positive drainage is assured by the side to side pitch provided by the mounting hanger design.

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Air Throw m	Fan Diam. mm	No. Fans	Fan RPM	Motor Data		Total Heater Watts	Overall Dimensions — mm		
		WATTS @ 5K T.D.	BTU/HR @ 10°F T.D.						Total Amps	Total Watts		H	W	D
29264	MAFE3400	8980	34000	2600	19	508	2	1425	2.8	1120	6858	895	1349	580
29265	MAFE4400	11600	44000	3450	20	457	3	1425	4.2	1680	8900	895	1755	580
29266	MAFE5500	14500	55000	5400	22	508	4	1425	5.6	2240	12900	895	2505	580
29267	MAFE6500	17150	65000	5300	22	508	4	1425	5.6	2240	12900	895	2505	580
	MAFE8500	22430	85000	6650	24	508	5	1425	7.0	2800	15600	895	3086	580

Note: Model MAFE8500 not recommended for use with R12. Refer Manufacturer for further information.

292-d

MULLER M.A.C. AIR COOLED CONDENSER

Designed for Commercial
Refrigeration and Air
Conditioning Applications

PRINCIPAL FEATURES

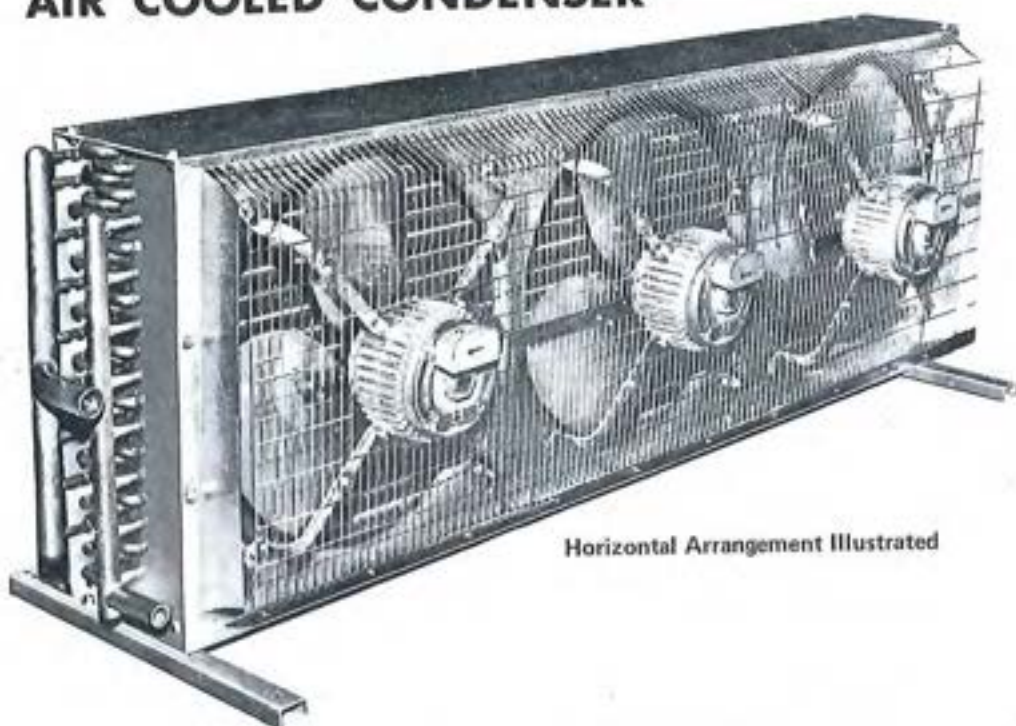
Versatility of air flow.
Horizontal or Vertical air
flow by positioning universal
mounting legs supplied with
each unit.

Motors totally enclosed all
weatherproof.

Fan guard for protection.

All aluminium construction
to resist corrosion.

Protective guard for coil face.



Horizontal Arrangement Illustrated

CAT. NO.	MODEL	CAPACITY		Air Flow L/s	Fan Diam. mm	No. Fans	Coil Data			Motor Amps Rated	Weight kg
		WATTS @15K T.D	BTU/HR @30°F T.D				Face Area m²	No. Rows	Fin Series		
292101	MAC 1	3750	14100	1275	508	1	0.33	1	8	0.54	15
292102	MAC 1½	5625	21300	1225	508	1	0.33	2	6	0.54	19
292103	MAC 2	7650	29100	1200	508	1	0.33	2	10	0.54	19
292104	MAC 2½	9000	33900	1120	508	1	0.33	3	8	0.54	23
292105	MAC 3	10950	41400	1095	508	1	0.33	3	12	0.54	23
292106	MAC 4	15300	57900	2400	508	2	0.66	2	10	1.08	38
292107	MAC 5	20100	76500	2240	508	2	0.66	3	10	1.08	46
292108	MAC 6½	23850	90300	2140	508	2	0.66	4	10	1.08	54
292109	MAC 8	30600	115500	3400	508	3	0.99	3	10	1.62	68
292110	MAC 10	40200	152250	3160	508	3	0.99	5	10	1.62	78

Telephone
your orders



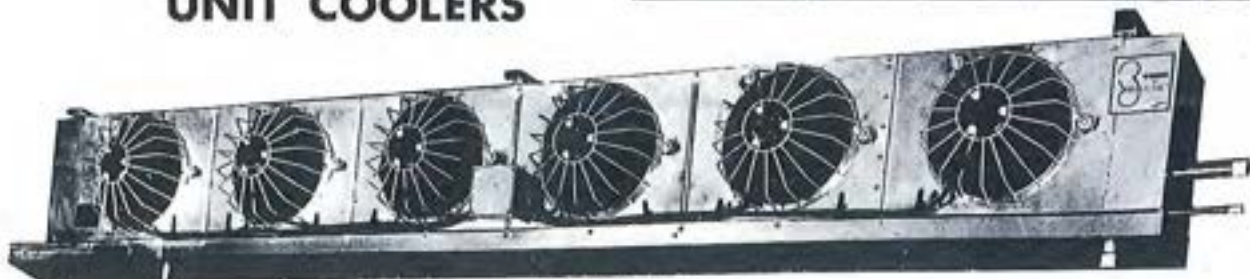
WE ARE AS NEAR AS YOUR NEAREST TELEPHONE.

USE OUR TELEX SERVICE FOR YOUR ORDER

FORCED DRAFT COOLERS

LOW PROFILE

UNIT COOLERS

YORK
RECOLD

FEATURES

Low Profile Unit coolers are ceiling suspended units designed for high and low temperature applications using Refrigerant -12, 22 or 502. The Low Profile Unit provides diffused cooling. Air is distributed at low velocity across the ceiling and is circulated evenly to every corner.

Above 34°F (1°C) Applications

High Temp.

Below 34°F (1°C) Applications

Low Temp.

Model LH Air Defrost - 8 FPI

Model LLE Electric Defrost - 4 FPI

Model LSC Air Defrost - 4 FPI

MECHANICAL SPECIFICATIONS - STANDARD UNIT

HOUSING - Aluminium satin finish, reinforced construction for vibration and noise reduction.

DRAIN PAN - Aluminium on Models LH, LSC, and LLE

COOLING COIL - Staggered seamless copper tubes are expanded into aluminium fins.

FANS - Heavy duty propeller type with direct drive.

MOTORS - Standard 240 volt 50 Hz 1/30 H.P. pre-wired.

HEAT EXCHANGER - Built-in heat exchanger (Tube within tube type) for all models.

ELECTRIC DEFROST HEATER ELEMENTS - Model LLE - include factory mounted 240 volt electric defrost heater element.

RATINGS AND PHYSICAL DATA

CAT. NO.	Model	Cap. 1°F (.55°C) TD BTUH	Cap. 12°F (6.7°C) TD BTUH	Fans CFM	Refrigerant Charge (Lbs.)	Approx. Weight (Lbs.)	Heater Watts	Fan Motor Data	
								Qty.	Amps 240V
2931	LH 1	500	6000	550	3	42	-	1	0.66
2932	LH 2	1000	12000	1100	5	70	-	2	1.32
2933	LH 3	1500	18000	1650	7	100	-	3	1.98
2934	LH 4	2000	24000	2200	9	132	-	4	2.64
2935	LH 5	2500	30000	2750	11	162	-	5	3.30
2936	LH 6	3000	36000	3300	13	195	-	6	3.96
2937	LSC 1	350	4200	600	3	38	-	1	0.66
2938	LSC 2	700	8400	1200	5	60	-	2	1.32
2939	LSC 3	1050	12600	1800	7	89	-	3	1.98
29310	LSC 4	1400	16800	2400	9	112	-	4	2.64
29311	LSC 5	1750	21000	3000	11	145	-	5	3.30
29312	LSC 6	2100	25200	3600	13	175	-	6	3.96
29313	LLE 1	350	4200	600	3	40	995	1	0.66
29314	LLE 2	700	8400	1200	5	60	1930	2	1.32
29315	LLE 3	1050	12600	1800	7	90	2800	3	1.98
29316	LLE 4	1400	16800	2400	9	122	3800	4	2.64
29317	LLE 5	1750	21000	3000	11	152	4800	5	3.30
29318	LLE 6	2100	25200	3600	13	175	5780	6	3.96

Use externally equalized expansion valves:

1. On LH, LSC and LHE when the coil loading is greater than 24,000 BTUH

2. On LLV and LLE when the coil loading is greater than 18,000 BTUH

On all other coils and conditions use internally equalized expansion valves.

PATTON FORCED DRAFT COOLERS

ABS PLASTIC CASING UNIT COOLERS
HYGIENIC — ATTRACTIVE — LOW PROFILE
"CH" — MEDIUM TEMPERATURE MODELS
"CL" — LOW TEMPERATURE MODELS

FEATURES

1. Stylish low profile shape — ideal for reach-in cabinets and walk-ins.
2. High impact white ABS plastic casing minimizes noise transmission and possibility of rattles — no sharp edges. Easily cleaned and discourages dirt and oxide accumulation ever present with metal casing coolers. The durable moulded plastic casing blends perfectly with modern interior cabinet design.
3. Hinged drain tray allows easy access to fan motors and electrics.
4. Refrigerant connections alongside coil discharge permits mounting of cooler adjacent to walls.
5. Lightweight, simple to install. Plastic connection facilitates easy hookup for drain.
6. Efficient rippled fin/staggered tube, evaporator coil together with smooth pattern airflow permits maximum cooling.
7. Contoured bottom tray and angled drain allows positive disposal of condensate.
8. Heating elements nested into evaporator coil maximise heat transfer for rapid defrosting on low temperature models. Limit thermostat assures safe operation.

CAT. NO.	MODEL	CAPACITY		FANS		AIRFLOW		Connections		Overall Dimensions — mm			Weight kg
		WATTS @ 5K	BTU/HR @10°F	Input Watts	No.	L/s	CFM	Liq. O.D.	Suct. O.D.	H	W	D	
MEDIUM TEMPERATURE													
29326	CH140	371	1400	30	1	85	180	3/8"	3/8"	140	530	415	4.7
29327	CH200	529	2000	60	2	116	245	3/8"	3/8"	143	620	415	5.6
29328	CH250	661	2500	60	2	158	335	3/8"	1/2"	146	810	415	7.1
29329	CH340	900	3400	90	3	207	440	3/8"	1/2"	148	1030	415	9.8
LOW TEMPERATURE													
29330	CL120	317	1200	30	1	85	180	3/8"	3/8"	140	530	415	4.8
29331	CL170	450	1700	60	2	116	245	3/8"	3/8"	143	620	415	5.7
29332	CL210	556	2100	60	2	158	335	3/8"	1/2"	146	810	415	7.3
29333	CL290	767	2900	90	3	207	440	3/8"	1/2"	148	1030	415	10.0

SPEEDY SERVICE

WE ARE ORGANIZED TO MAKE PROMPT DELIVERY FROM OUR VAST STOCKS. WHETHER YOUR ORDER IS SMALL OR LARGE WE WILL EXERCISE GREAT CARE IN SELECTING AND PACKING YOUR ORDER. MORE THAN 90% OF ALL ORDERS RECEIVED ARE DESPATCHED THE SAME DAY. WE AIM TO KEEP YOU AND YOUR JOB MOVING SATISFACTORILY.

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

PARTS FOR FORCED DRAFT COOLERS

MULLER FDC SPARE PARTS

CAT No.	No. Req'd	SUITS MODEL	WATTS	MFG. P/N
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CSL/CDL CABINET CEILING COOLER COIL HEATERS

294146	1	CSL53	350	83321W-1
294147	1	CSL63	450	83321W-2
294148	1	CSL90	600	83321W-3
294149	1	CSL110	800	83321W-4
294150	1	CSL150	1200	83321W-5
294151	1	CDL100	770	83821W-1
294152	1	CDL150	1140	83821W-2
294153	1	CDL200	1400	83821W-3
294154	1	CDL270	1990	83825W-1
294155	1	CDL370	2600	83825W-2
294156	1	CDL520	3000	83825W-3

DRAIN PAN HEATERS

294157	1	CDL110	225	83824W-1
294158	1	CDL150	225	83824W-2
294159	1	CDL200	225	83824W-3
294160	1	CDL270	225	83824W-4
294161	1	CDL370	225	83824W-5
294162	1	CDL520	225	83824W-6

CEILING COOLERS

LOW TEMP. COIL ELEMENTS

29492	1	C101L		18344W-1
29493	1	C141L		18344W-2
29494	1	C191L		18344W-3
29495	1	C251L		18344W-4

MULLION COOLERS

LOW TEMP COIL ELEMENTS

294114		MJ111L		
294115		MJ141L		
294116		MJ181L		

LOW TEMP DRAIN PAN ELEMENTS

294117		MJ111L		
294118		MJ141L		
		MJ181L		

MLVE LO-LINE V SERIES FDC COIL HEATERS

294163	1	MLVE035		21560Y-1
294164	1	MLVE050		21560Y-2
	1	MLVE070		21560Y-2
294165	2	MLVE105		21561Y-1
294166	2	MLVE140		21561Y-2
294167	2	MLVE175		21561Y-3
294168	2	MLVE210		21561Y-4

DRAIN PAN HEATERS

294169	1	MLVE035		80171Y-1
294170	1	MLVE050		80171Y-2
	1	MLVE070		80171Y-2
294171	1	MLVE105		80171Y-3
294172	1	MLVE140		80171Y-4
294173	1	MLVE175		80171Y-5
294174	2	MLVE210		80172Y

NOTE

REPLACEMENT
FAN BLADES AND MOTORS

FAN BLADES — Refer Page 306

MOTORS — Refer Page 310

NOTE: FIRST 3 NUMERALS OF CAT. No.
INDICATES PAGE No.

MULLER FDC SPARE PARTS

CAT No.	No. Req'd	SUITS MODEL	LENGTH INS.	WATTS	MFG. PART No. MULLER	GRIMWOOD
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EP HOT ROD SERIES FDC COIL HEATERS

29471	2	EP301	21.1/4	650	17834Y-1	90774-G1
29472	2	EP451	21.1/4	900	17834Y-2	90774-G2
29473	2	EP601	38.3/4	1150	17834Y-3	90774-G3
	2	EP771	38.3/4	1150	17834Y-3	90774-G3
29475	2	EP901	38.3/4	1600	17834Y-4	90774-G4
29476	2	EP1201	47.3/4	3450	17834Y-5	90775-G1
29477	2				17835Y-1	90774-G5
29478	2	EP1601	47.3/4	5250	17834Y-6	90775-G2
29479	2				17835Y-2	90774-G6
29480	4	EP2401	47.3/4	1687	17836Y	90776
29481	8	EP3601	63.3/4	1012	17837Y-1	90777
29482	8	EP4801		1350	17837Y-2	

DRAIN PAN HEATERS

29483	1	EP301		300	17833W-1	90773-G1
	1	EP451		300	17833W-1	90773-G1
	1	EP601		500	17833W-2	90773-G2
29485	1	EP771		500	17833W-2	90773-G2
	1	EP901		500	17833W-2	90773-G2
	1	EP1201		750	17833W-3	90773-G3
29488	1	EP1601		750	17833W-3	90773-G3
	1	EP2401		750	17833W-3	90773-G3
29491	1	EP3601		900	17833W-4	90773-G4
	1	EP4801			17833W-5	

HOT ROD H SERIES FDC COIL HEATERS

29425	6	H301	17	150	16275Y-1	90137
29426	6	H481	21	235	16275Y-2	90186
29427	6	H601	33.1/2	300	16275Y-3	90090
	8	H821	33.1/2	300	16275Y-3	90090
29428	6	H941	39	465	16275Y-4	90184
29429	8	H1201	43	400	16275Y-5	90182
29430	10	H1601	47	450	16275Y-6	90180
	13	H3201	47	450	16275Y-6	90180
29431	11	H3201	61	600	16275Y-7	90178

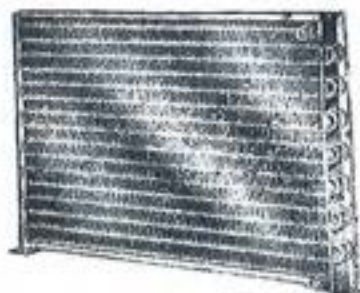
DRAIN PAN HEATERS

29432	2	H301		100	16206Y-1	90077
	4	H601, 821		100	16206Y-1	90077
	2	H481		135	16206Y-2	90198
29433	4	H941		135	16206Y-2	90198
	5	H1201, 1601, 2401		135	16206Y-2	90198
	7	H3201		135	16206Y-2	90198

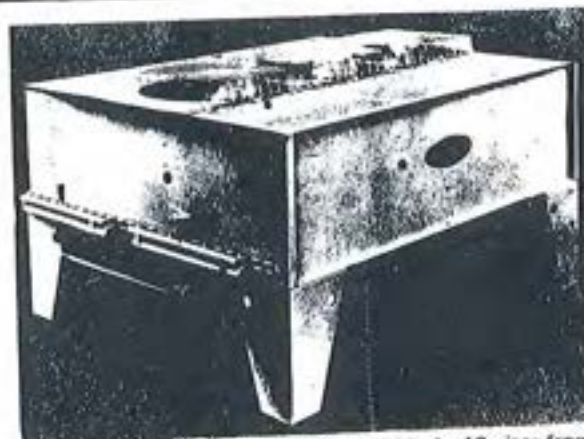
RECORD FDC SPARE PARTS

CAT. NO.	PART NO.	DESCRIPTION & MODEL
29451	024A-00031-003	Motor (BP112C)
29450	026A-00077	Fan Blade HD
29453	026A-00261	Fan Guard
29465	028A-00028	Grommet Fan Guard
COMBINATION COIL — DEFROST & DRAIN PAN HEATER (NEW STYLE)		
294127	025A-00073	Suits LLE1, LHE1
294128	025A-00074	Suits LLE2, LHE2
294129	025A-00075	Suits LLE3, LHE3
294130	025A-00076	Suits LLE4, LHE4
294132	025A-00078-001	Suits LLE5, LHE5 — Conn. end RH
294133	025A-00078-002	Suits LLE6, LHE6 — Conn. end RH
	025A-00478	Suits LLE5, LHE5 — LH end
294131		Suits LLE6, LHE6 — LH end
COIL DEFROST HEATERS ONLY (OLD STYLE)		
29461	100-323-001	Heater Rod — Suits LLE1
29462	100-323-002	Heater Rod — Suits LLE2, LLE5
29463	100-323-003	Heater Rod — Suits LLE3, LLE6
29464	100-323-004	Heater Rod — Suits LLE4
29465	100-323-005	Heater Rod — Suits LLE3, LLE6 — LH
DRAIN PAN HEATERS ONLY (OLD STYLE)		
29456	100-324-002	Suits LLE2, LLE5 — RH
29457	100-324-003	Suits LLE3, LLE6
29458	100-324-004	Suits LLE4
29459	100-324-005	Suits LLE5, LLE6 — LH
29455	100-325-000	Suits LLE1

STANDARD AIR COOLED CONDENSER COILS



CAT. NO.	KIRBY PART NO.	FACE DIMENSION mm	FIN PITCH mm	NO. OF ROWS	CONNECTIONS	
					IN (mm)	OUT (mm)
2952	MRC404	305 x 560	3.9	4	9.5	9.5
2953	MRC451-1	508 x 578	4.2	4	15.9	12.7
	MRC468	102 x 521	3.9	2	9.7	9.7
2954	MRC469	457 x 813	3.9	4	12.7	9.5
2955	MRC470	635 x 1067	3.9	3	15.9	12.7
2956	MRC471	635 x 1067	3.9	4	15.9	12.7
	MRC473	254 x 230	3.9	2	9.5	9.5
2957	MRC474	508 x 578	4.2	2	12.7	12.7
2958	MRC475	457 x 813	3.9	3	12.7	9.5
2959	MRC485	203 x 254	3.9	2	9.5	9.5
29510	MRC493	318 x 521	4.2	3	12.7	12.7
29511	MRC494	318 x 521	4.2	4	12.7	12.7
29512	MRC495	318 x 521	4.2	5	12.7	12.7
29513	MRC496	203 x 273	3.9	1	9.5	9.5
29514	MRC499	318 x 521	4.2	2	12.7	12.7
	MRC559-1	127 x 132	3.2	6	9.5	9.5
	MRC565-1	127 x 110	3.2	5	9.5	9.5
	MRC566-1	152.4 x 110	3.2	5	9.5	9.5
	MRC573-1	127 x 132	3.2	6	9.5	9.5
	MRC577-1	413 x 520	2.5	2	12.7	12.7
	MRC580-1	485 x 1440	2.5	2	12.7	22.2
	MRC585-1	381 x 113.4	2.5	3	15.9	15.9
29516	MRC735	203 x 229	3.9	2	9.5	9.5
29520	MRC757	381 x 754	2.5	3	12.7	12.7
29521	MRC778-1	381 x 1134	2.5	3	12.7	12.7
29522	MRC779-1	254 x 280	3.9	2	9.5	9.5
29523	MRC779-2	254 x 280	3.9	3	9.5	9.5
29524	MRC779-3	254 x 280	3.9	4	9.5	9.5
	MRC779-4	254 x 280	3.9	5	9.5	9.5
29525	MRC780-2	305 x 350	3.9	3	9.5	9.5
29526	MRC780-3	305 x 350	3.9	4	9.5	9.5
	MRC782-1	355 x 132	3.9	6	9.5	9.5
	MRC785-1	254 x 430	4.2	3	12.7	12.7
	MRC789-1	476 x 890	4.2	3	12.7	16.0
	MRC790-1	476 x 890	4.2	5	12.7	12.7
	MRC797-1	508 x 660	2.5	3	12.7	12.7
	MRC798-1	508 x 660	2.5	4	12.7	12.7
	MRC794-1	382 x 754	3.9	4	12.7	12.7
	MRC800-1	203 x 120	2.1	1	9.5	9.5
	MRC802-1	254 x 430	4.2	4	9.7	9.7
	MRC803-1	317.5 x 905	3.9	3	12.7	12.7



Muller AMD and AMB Aircon are available in 16 sizes from 8 to 130 nominal tons. Units through AMB 60 are available in either vertical or horizontal air flow models; larger units for vertical air flow only. Each unit consists of multiple propeller fans with independent motors, motor supports, condenser coil and a heavy gauge gal. iron casing for maximum corrosion protection. Models designated AMD (8 - 40 tons) have direct driven fans. Fans are aluminium with zinc-plated steel centre hub. Models designated AMB (45 - 130 tons) have belt driven fans, with individual 440-3-50 motors. Motors are positioned within the casing for safety and weather protection. Drive assembly consists of easily adjustable motor mount, heavy duty mandrel bearing, drive pulleys and belts. Fans are of steel construction with zinc-plating and Iridite finish. These air cooled condensers are designed to provide the lowest possible roof height with less architectural treatment required to conceal the unit.

MULLER AIRCON
AIR-COOLED REFRIGERANT CONDENSER

SINGLE OR MULTIPLE CIRCUITS AVAILABLE

VERTICAL OR HORIZONTAL AIR DISCHARGE MODELS

HEAVY DUTY CONSTRUCTION

DESIGNED FOR OUTDOOR INSTALLATIONS

AVAILABLE ON APPLICATION

CONDENSER CAPACITY
TOTAL HEAT REJECTION BTU/HR.

CAT. NO.	MODEL	CAPACITY	
		R12 @ 30°F TD	R22 @ 30°F TD
	AMD 8	110,000	115,500
	AMD 10	145,000	152,250
	AMD 15	202,100	212,100
	AMD 20	263,000	276,150
	AMD 25	351,000	368,550
	AMD 30	406,000	426,300
	AMD 35	453,000	475,650
	AMD 40	520,000	546,000
	AMB 45	612,000	642,600
	AMB 50	689,000	723,450
	AMB 60	795,000	834,750
	AMB 70	918,000	963,900
	AMB 80	1,046,000	1,098,300
	AMB 90	1,250,000	1,312,500
	AMB 105	1,431,000	1,502,500
	AMB 130	1,760,000	1,848,000

To alter Standard TD — Divide Capacities shown by 30 and multiply by required TD.

4

[illegible]

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.

CONDENSERS WATER COOLED



REFRIGERATION COMPONENTS

SERIES RCC CHEM. CLEANABLE SHELL & COIL CONDENSER

Effectively dampens hot gas pulsations and is therefore ideal for use as a condenser muffler. Ideal as a Booster Condenser on air cooled equipment or as a component on built-up or specialized refrigeration and air conditioning systems.

DESIGN AND TEST PRESSURES

Design 2MPa
Test 3MPa

SPECIFICATIONS

Shell : Material to ASTM A53 Gr B Seamless Pipe.

End Material : Carbon steel AS B250-1-28.

Internal Surfaces : Shot blasted.

Tubes : Extruded surface 1/4" Copper tubes having 19 fins per inch.

APPROVALS — BOTH TYPES

Design, materials and assembly are in complete compliance with AS1210 — 1977, and AS1677 — 1974 for unfired pressure vessels and are tested, inspected and stamped accordingly.

FOR USE WITH R12, R22, R500, R502

SERIES RCC MECH. CLEANABLE SHELL & TUBE CONDENSER

Ideal for use as a condenser muffler, adequate storage and pump down capacity allows the condenser to be used as a liquid receiver for most standard applications. Removable water heads provide ready access for tube inspection, cleaning and replacement.

DESIGN AND TEST PRESSURES

Design 1.8MPa) —Shell Side 0.69MPa) —Water Side
Test 2.7MPa) 1.38MPa)

SPECIFICATIONS

Shell : Steel. Shot blasted internal surfaces.

Water Heads : Removable cast iron, epoxy resin coated. Dual pass.

Tubes : Extruded surface 1/4" copper tube having 19 fins per inch.

Tubes sealed and rolled to tube sheets. Removable either end.

Tube Sheets : Low carbon steel, machined and grooved for rolled tube construction.

Tests : Pressure tested, dehydrated with a holding charge of dry Nitrogen.

CHEMICALLY CLEANABLE WATER COOLED CONDENSERS

CAT. NO.	MODEL	TYPE	NOMINAL CAPACITY				CONNECTIONS		DIMENSIONS	
			at 20°F TD		at 30°F TD		REFRIG. IN & OUT	WATER IN & OUT	LGTH/HT.	DIAM.
			TONS	KW	TONS	KW				
29786	RCC-1.5	Vert.	1.1	4.0	1.7	6.0	3/4" MBSP	3/4" MBSP	400	114
29787	RCC-3	Vert.	2.3	8.0	3.4	12.0			680	114

MECHANICALLY CLEANABLE WATER COOLED CONDENSERS

MECHANICALLY CLEANABLE WATER COOLED CONDENSERS											
CAT. NO.	MODEL	NOM. TONS	STORAGE CAP.*OPER.CHARGE				CONNECTIONS			DIMENSIONS	
			R22 kg	R12 kg	R22 kg	R12 kg	REFRIG.		WATER IN & OUT	mm	
							IN	OUT		LGTH.	DIAM
29776	RCC 10	10	66	73	9	10	2" BSP	7/8" BSP	1-1/2" BSP	1644	273
29777	RCC 15	15	62	68	9	10		1-1/8" BSP		1644	273
29778	RCC 20	20	58	64	9	10				1644	273
29779	RCC 25	25	67	74	11	12				1969	273
29780	RCC 30	30	64	71	11	12	2-1/2" BSP	1-3/8" BSP	2" BSP	2013	324
29781	RCC 40	40	90	99	15	16				1-5/8" BSP	2013	324
29782	RCC 50	50	82	91	15	16		3" BSP			2-1/2" BSP	2016	356
29783	RCC 60	60	100	110	18	20	2-1/8" BSP		2-1/2" BSP	2321	356
29784	RCC 75	75	113	125	21	24					

* Refrigerant storage capacity based on 80% of internal volume with liquid at 32°C.

A Range of 12 Models RCC1236 - RCC4848 — 3 to 16.4 Tons (10.5 to 57.7 kW) available on application

Note: All mechanically cleanable condensers are available in Marine Construction with stainless steel tube sheets, gun metal water boxes and 90/10 cupro nickel tubes — further details on application

TERRY

- * Tubes: 19 fins/inch, 5/8" root dia., 3/4" ends, removable.
- * Tube sheets: low carbon steel ground both sides.
- * Construction: refrigerant side to SAA code and DLI requirements.
- * Working pressure: 2206 kPa (320 psig) shell side, 345 kPa (50 psig) tube side.
- * Mechanically cleanable tubes.
- * Mounting brackets are standard.
- * Performance in accordance with ARI Standard 450/69.
- * Suitable for use as condenser receivers.

CAT. NO.	MODEL	CODE	Passes	PUMP DOWN 80%				CONNECTIONS REFRIGERANT	
				R12		R502		IN SWT	OUT BSPF
				kg	lbs	kg	lbs		
297126	424- 8-8	W1	8	3.6	8.0	3.2	7.1	5/8"	1/2"
297127	436- 8-8	W2	8	5.4	12.0	4.8	10.7	7/8"	
297128	636-12-6	W3	6	13.6	30.0	12.0	26.7	1-1/8"	
297129	636-16-6	W4	6	13.2	29.0	11.6	25.8		
297130	836-20-6	W5	6	23.6	52.0	20.8	46.3		
297131	836-24-6	W6	6	23.1	51.0	20.4	45.4		
297132	836-34-6	W7	6	21.0	46.4	18.7	41.2	3/4"	

CAPACITY RATINGS

Notes : If receiver capacity is required, add 7 to the CODE NO. i.e. W1 = W8
W7 = W14 etc.

Capacities shown are total Heat of Rejection.

Ratings are based on water velocity of 10 f.p.s./tube
i.e. 6.33 lmp, G.P.M./Tube.

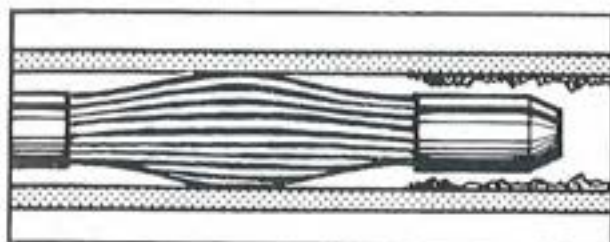
MODEL	CODE NO.	TOWER WATER		MAINS WATER		Imperial G.P.M.	PRESS. DROP P.S.I.
		85°F (29.4°C) IN	95°F (35°C) OUT	65°F (18.3°C) IN	95°F (35°C) OUT		
		105°F (40.6°C) Cond. BTU/Hr		105°F (40.6°C) Cond. BTU/Hr			
424- 8-8	W1	31,690		47,520		6.33	8.6
436- 8-8	W2	47,740		71,590		6.33	7.8
636-12-6	W3	71,400		107,080		12.66	7.6
636-16-6	W4	95,470		143,180		12.66	5.1
836-20-6	W5	119,540		179,270		18.99	10.2
836-24-6	W6	143,210		214,770		25.32	13.8
836-34-6	W7	202,980		304,410		31.65	11.6

CONDENSERS - WATER COOLED EQUIPMENT AND TOOLS



Expando

The Adjustable Condenser Tube Cleaner



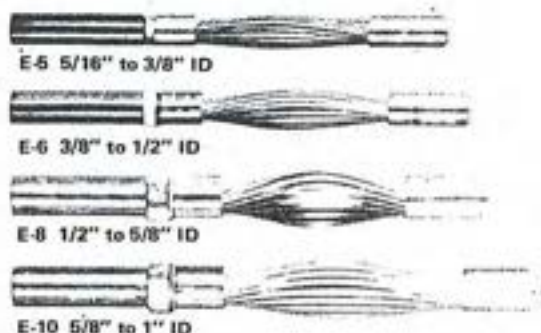
The fast, thorough, economical way to remove mineral scale and sludge from inside water-cooled condenser tubes.

Saves Time-Consuming Brushing or Flushing

Expando attaches to a threaded rod which fits into an Expando handle or your electric drill. With a reaming action, the tough stainless steel blades scrape everywhere inside the tube, providing a free, unrestricted flow.

Virtually clogproof, this tool may be expanded or reduced in diameter to fit scale deposits — not just the tube.

The E - 16 Model (1" I.D. to 2" I.D.) is mainly used for cleaning boiler tubes.



CAT. NO.	WAGNER MODEL No.	DESCRIPTION
29718	E - 5	5/16" to 3/8" I.D. Tubes
29719	E - 6	3/8" to 1/2" I.D. Tubes
29720	E - 8	1/2" to 5/8" I.D. Tubes
29721	E - 10	5/8" to 1" I.D. Tubes
	E - 16	1" to 2" I.D. Tubes
ACCESSORIES		
	EB - 6	Blades for E - 5 and E - 6
	EB - 8	Blades for E - 8
	EB - 10	Blades for E - 10
	EC - 56	Couplings for E - 5 and E - 6
	EC - 810	Couplings for E - 8 and E - 10
	EE - 30	Rods - 30" (762 mm)
	EE - 48	Rods - 48" (1220 mm)
	EH - 1	Handle

NOTES

OUR STOCK OF COMPONENTS, EQUIPMENT AND SYSTEMS FOR AIR CONDITIONING, HEATING, COMMERCIAL AND INDUSTRIAL REFRIGERATION IS UNSURPASSED THROUGHOUT AUSTRALIA

COOLING TOWERS

LAKE SIDE



SERIES SA

Packaged Induced Draft SA Towers for smaller applications are available in eight Models. Protectively treated materials, coupled with direct drive fans, give these units durability and service.

Lakeside Water Cooling Towers are available in a range of designs and sizes to handle the efficient cooling of 3 to 6500 gallons of water per minute. The designs cover "single airstream" (air into tower on one face only), "dual airstream" (air into tower on two faces with vertical discharge) and "counter flow" (air into tower by multiple arrangements of air inlets) which gives great flexibility of design and provide a wide choice of plan areas, heights and air intake and discharge arrangements to handle any water cooling problem.

All construction materials are specially chosen for cooling tower service and sized to ensure ruggedness and lasting strength.

Packaged towers can be supplied completely knocked down for installation in remote or difficult places.

MODEL	FAN MOTOR HP.	FAN			Overall Dims., -ins.		
		DIA. INS.	RPM	CFM	W	L	H
SA1600	1/4	16	1390	1540	43	24-3/4	43
SA1601	1/4	16	1390	1540	59	24-3/4	43
SA1620	1/2	18	1390	2500	59	24-3/4	48
SA1603	1/2	18	1390	2500	59	24-3/4	54
SA1640	3/4	18	1390	3500	59	24-3/4	60
SA1605	3/4	22	1390	4300	59	30-3/4	65
SA1660	3/4	22	1390	4300	65	30-3/4	67
SA1607	1	30	890	7400	60-3/4	48-3/4	72
SA1680	1	30	890	7400	72-3/4	48-3/4	72

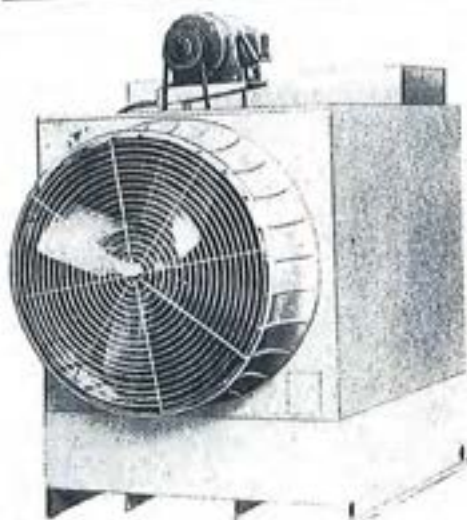
RECOMMENDATIONS AND QUOTATIONS TOGETHER WITH TECHNICAL LITERATURE GLADLY SUPPLIED ON REQUEST.

MARLEY

AQUATOWER MODELS 4500 & 4500R

Heavy gauge steel used throughout to fabricate basins and casings. Wide-spaced steel air inlet louvers following slope of fill sheet preclude water splash out and scale clogging. High efficiency, film type cooling is provided by use of non-combustible PVC plate type fill.

All steel utilized in the manufacture of Aquatowers is galvanized.



MODEL	TONS*	PUMP HEAD FT.	IMPERIAL GALLS./MIN.		WEIGHT	
			MIN.	MAX.	SHIPPING LBS.	OPERAT. LBS.
4513	5	3.51	10.0	16.7	270	490
4515	8	4.77	15.0	24.2	304	539
4517	10	5.07	18.3	30.0	364	669
4519R	15	7.16	32.5	52.5	444	769

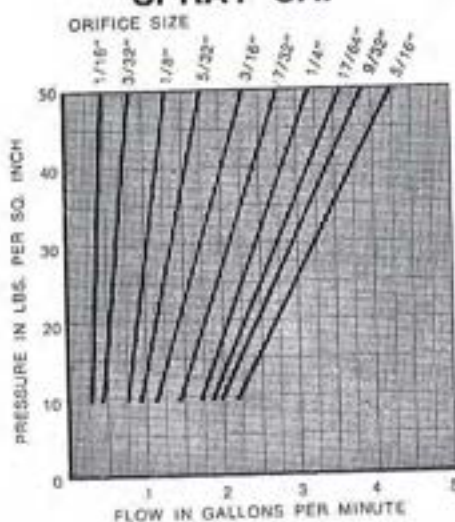
* Tons of Refrigeration at 250 BTU/MIN/Ton at 2 1/2 Imp.GPM/Ton.

LARGER SIZES AND TYPES AVAILABLE ON APPLICATION.

HUDSON



SPRAY CAP



SPRAY BASES AND CAPS



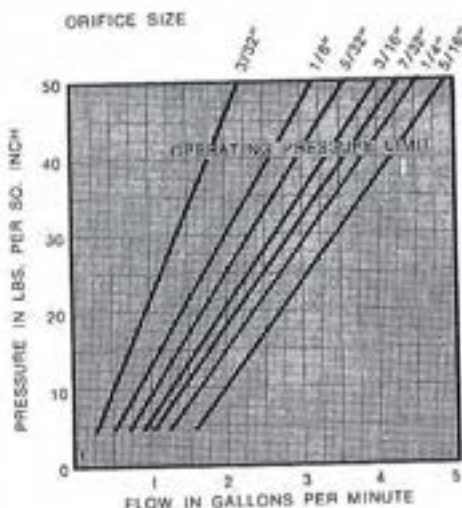
SPRAY BASE

CAT. NO.	HOLE SIZE	PART NO.
SPRAY BASE		
29812	3/8" BSPF, Inlet	7200
29813	1/2" F. Solid, Inlet	7201
SPRAY CAP.		
29814	Blank	7209
29815	1/16"	7210
29816	3/32"	7211
29817	1/8"	7212
29818	5/32"	7213
29819	3/16"	7214
29824	7/32"	7219
29820	1/4"	7215
29821	17/64"	7216
29822	9/32"	7217
29823	5/16"	7218
CAN'T CLOG SPRAY CAPS.		
2984	3/32"	7221
2985	1/8"	7222
2986	5/32"	7224
2987	3/16"	7226
2988	7/32"	7227
2989	1/4"	7228
29810	5/16"	7230

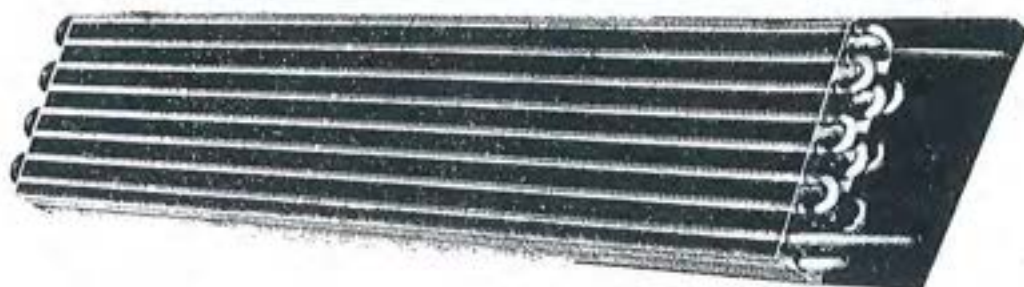


"CAN'T CLOG" SPRAY CAPS

WITH "BUNA N" ORIFICE



CROSS FIN EVAPORATORS



Cross Fin Evaporators can be supplied in a range of Brands & Sizes and Types to suit customer requirements. The chart below covers the Muller XA (Aluminium Fin) and XC (Copper Fin) series and is reproduced as a general guide only of Cross Fin evaporator capacities on R12.

Manufacturers Technical Bulletins together with details of price, availability, etc. will gladly be supplied on request.

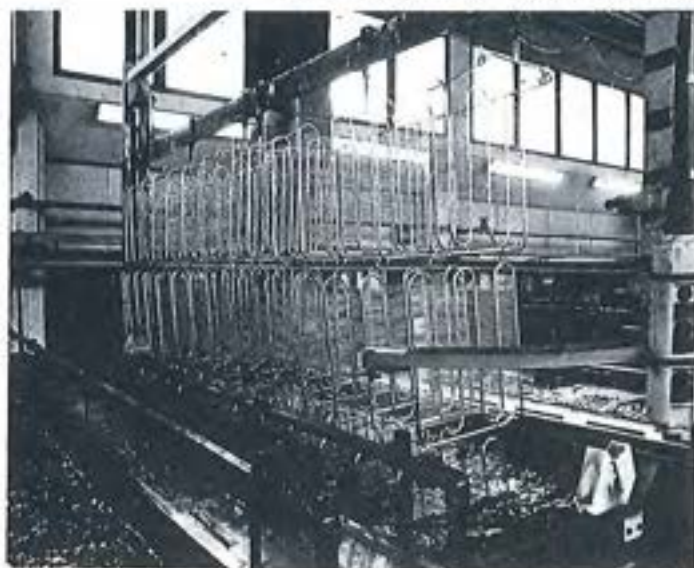
Dimensions in Inches (including Return Bends)			Total Surface — Sq. Feet			B.T.U./Hr. at 24° TD.			Dimensions in Inches (including Return Bends)			Total Surface — Sq. Feet			B.T.U./Hr. at 24° TD.		
Depth	Hgt.	Lgth.	2 F.P.I.	3 F.P.I.	4 F.P.I.	2 F.P.I.	3 F.P.I.	4 F.P.I.	Depth	Hgt.	Lgth.	2 F.P.I.	3 F.P.I.	4 F.P.I.	2 F.P.I.	3 F.P.I.	4 F.P.I.
2½	6	24	9.2	12.7	16.1	380	516	646	3½	6	24	13.9	19.2	24.4	575	779	978
(8 Tubes)	36		14.7	20.3	25.8	609	825	1034	(12 Tubes)	36		22.2	30.7	39	920	1247	1565
"	"	48	20.2	27.9	35.5	837	1135	1422	"	"	48	30.6	42.2	53.7	1266	1715	2152
"	"	60	25.8	35.5	45.1	1066	1444	1808	"	"	60	38.9	53.6	68.3	1611	2183	2739
"	"	72	31.3	43.1	54.8	1294	1754	2197	"	"	72	47.3	65.1	82.9	1956	2651	3326
"	"	84	36.8	50.7	64.5	1523	2064	2585	"	"	84	55.6	76.6	97.6	2301	3119	3913
"	"	96	42.3	58.3	74.2	1752	2373	2973	"	"	96	63.9	88.1	112.2	2647	3587	4500
"	"	108	47.8	65.9	83.8	1980	2683	3361	"	"	108	72.3	99.6	126.9	2992	4055	5087
"	"	120	53.4	73.5	93.5	2209	2993	3749	"	"	120	80.6	111.1	141.5	3337	4522	5674
2½	7½	24	10.9	15.8	20.2	450	644	810	3½	7½	24	17.4	24	30.5	720	975	1222
(10 Tubes)	36		17.4	25.3	32.3	720	1031	1296	(15 Tubes)	36		27.8	38.4	48.8	1152	1561	1955
"	"	48	23.9	34.8	44.4	990	1418	1782	"	"	48	38.3	52.8	67	1583	2147	2688
"	"	60	30.5	44.4	56.6	1261	1805	2268	"	"	60	48.7	67.1	85.3	2017	2732	3422
"	"	72	37	53.9	68.7	1531	2192	2754	"	"	72	59.2	81.5	103.6	2449	3318	4155
"	"	84	43.5	63.4	80.8	1801	2578	3240	"	"	84	69.6	95.9	121.9	2881	3903	4888
"	"	96	50	72.9	92.9	2071	2965	3726	"	"	96	80	110.3	140.2	3313	4489	5622
"	"	108	56.6	82.4	105	2342	3352	4212	"	"	108	90.5	124.7	158.5	3745	5075	6355
"	"	120	63.1	91.9	117.2	2612	3739	4698	"	"	120	100.9	139	176.8	4178	5660	7089
2½	10½	24	15.2	21.1	28.2	630	858	1130	3½	10½	24	23.2	33.6	42.8	960	1365	1714
(14 Tubes)	36		24.4	33.8	45.1	1008	1374	1809	(21 Tubes)	36		37.1	53.7	68.4	1536	2185	2743
"	"	48	33.5	46.4	62	1386	1889	2487	"	"	48	51	73.8	94	2113	3004	3772
"	"	60	42.6	59	79	1764	2404	3166	"	"	60	65	94	119.7	2689	3824	4801
"	"	72	51.8	71.7	95.9	2142	2920	3845	"	"	72	78.9	114.1	145.4	3265	4644	5830
"	"	84	60.9	84.4	112.8	2520	3435	4523	"	"	84	92.8	134.2	171	3841	5463	6858
"	"	96	70	97	129.7	2898	3950	5201	"	"	96	106.7	154.4	196.7	4418	6283	7887
"	"	108	79.1	109.7	146.6	3276	4465	5880	"	"	108	120.6	174.5	222.4	4994	7102	8916
"	"	120	88.3	116.5	163.8	3655	4740	6560	"	"	120	134.6	194.6	248	5570	7922	9945
2½	12	24	18.4	25.4	32.2	761	1032	1292	3½	12	24	27.9	38.3	48.8	1153	1559	1956
(16 Tubes)	36		29.4	40.6	51.6	1218	1651	2068	(24 Tubes)	36		44.6	61.3	78	1845	2495	3131
"	"	48	40.5	55.8	70.9	1675	2270	2844	"	"	48	61.3	84.3	107.4	2537	3431	4305
"	"	60	51.5	71	90.3	2132	2890	3619	"	"	60	78	107.3	136.6	3229	4366	5479
"	"	72	62.6	86.2	109.7	2590	3509	4395	"	"	72	94.7	130.3	165.9	3921	5327	6653
"	"	84	73.6	101.4	129	3047	4128	5171	"	"	84	111.4	153.3	195.2	4613	6238	7827
"	"	96	84.6	116.7	148.3	3504	4747	5946	"	"	96	128.2	176.3	224.5	5305	7174	9001
"	"	108	95.7	131.9	167.6	3961	5367	6722	"	"	108	144.9	199.3	253.8	5997	8110	10175
"	"	120	106.7	147	187	4418	5986	7498	"	"	120	161.6	222.3	283	6689	9045	11349

NOTE: For capacities at various T.D.'s, divide the rating listed by 24 and multiply by the T.D. concerned.

FREEZER SHELVES SYSTEMS

KMP

Available only on an OEM or "Quantity Order" basis, FREEZER SHELF SYSTEMS are manufactured on the most modern equipment available for — surface treatment — in order to satisfy the high requirement for protection against corrosion, automatic equipment for bending of tubes and steel wire welding equipment.



MATERIAL AND SURFACE SPECIFICATIONS

TUBES : Both double and single wall tubes of Mecano-Bundy quality are used. Cleanliness and dryness of tubes satisfy AGK 8964 or DIN 8964. From 1974, single wall tubes according to DIN 8905 will mainly be used. Outer diameter of tube used is 8 mm $\pm$ 0.1 mm.

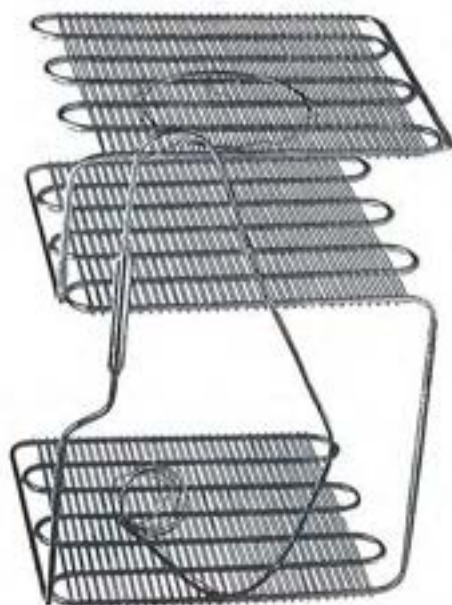
WIRE : Steel wire, specially made for later surface treatment is used. Main wire sizes used are 1.5 mm and 2.00 mm diameter. Length tolerance is $\pm$ 1.00 mm.

SURFACE TREATMENT : After completing the programized cleansing procedure in the surface treatment plant, the Freezer Shelves Systems are covered electrolytically by a layer of minimum 15 My zinc. After initial inspection of the Systems they are dip-lacquered in "akryl paint" with later baking-in of this lacquer in a thickness of 7 My at a temperature of 160°C.

The Systems are supplied in ranges right from individual shelves up to assembled systems of maximum 8 shelves. Refer sketch at top right.

According to customers' requirements, the Systems can alternatively be supplied complete with heat exchanger and accumulator — Refer sketch below.

The Systems are leak tested after the welding/soldering operation, under tempered water, using an internal pressure of 98 kPa with dry nitrogen. After the leak testing, the ends of the Systems are sealed off. Supply of Systems with a holding charge of dry nitrogen is available as a customer option.

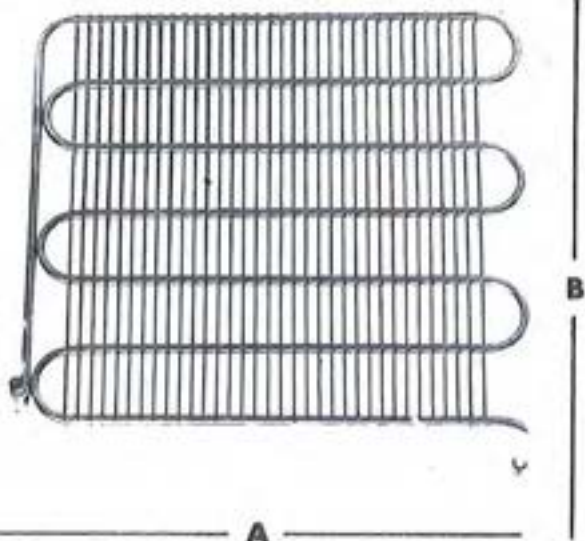
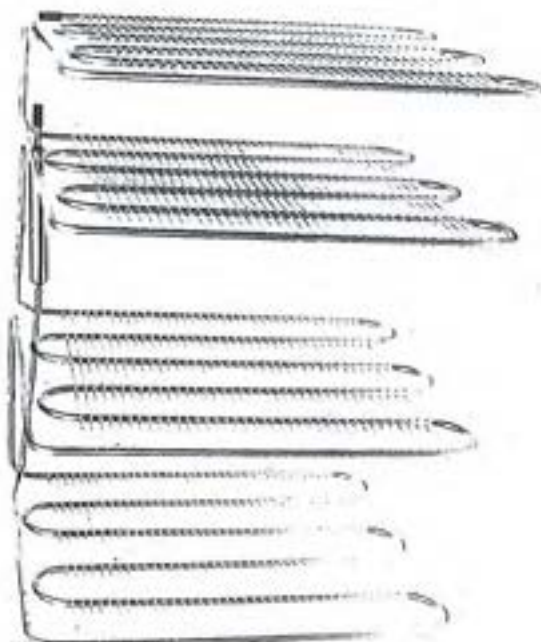


IMPORTANT

For a uniform surface treatment :
Width A and Depth B of shelves (Refer sketch at bottom right) should not exceed :

A : 500 mm B : 460 mm
Minimum acceptable wire pitch = 6 mm.
Minimum distance between shelves = 200 mm.
Total height shelf system = 1450 mm.
Tolerance of height between shelves $\pm$ 2 mm.
Tolerance of total height $\pm$ 2 mm.

ENQUIRIES WELCOME



INSTANTANEOUS BEVERAGE COOLERS

COLDSTREAM—TYPE 360Q

GENERAL DATA—FLOATING HORIZONTAL REFRIGERANT CONTROL VALVE WITHOUT VERTICAL CHATTERBOX ACTION, REPLACABLE NEEDLE (STELLITE TIPPED) AND STAINLESS STEEL SEAT.
BEVERAGE COILS—STAINLESS STEEL SELF DRAINING.
REFRIGERANT R12, FULLY CHARGED EX FACTORY. (ADD SERVICE LINES ONLY)
EQUIPPED WITH RELIEF VALVE.
OUTER CASE ZINCANNEAL STEEL. FINISH—HAMMERTONE GREY.

CAT. NO.	MODEL	NO. OF CIRCUITS	DIMENSIONS		REFRIG. CONN.		BEV'GE CONN.
			DIAM.	HGT.	INLET	OUTLET	
30030	360 Q1	1	10"	16"	3/8" Fl.	3/4" Fl.	3/4" BSP.
30031	360 Q2	2	10"	19 1/2"			
30032	360 Q3	3	10"	20 1/2"			



TEMPRITE—TYPE 2T & 3T

MODEL 2T175 : Two circuits

MODEL 3T140 : Three circuits

Approved by State authorities and conforms to AS1210 and AS1677 Codes.
All models fitted with approved pressure relief valves.

CAT. NO.	MODEL	Litres/hour		DIMENSIONS mm			CONNECTIONS			NET WEIGHT kg.
		Bev. Inlet Temp. 10°C	26°C	DIAM.	HGT.	O/A HT*	LIQ. INLET	SUCT. OUTLET	BEV.	
30033	2T 175B	505	175	260	360	450	3/8" Fl.	5/8" Fl.	7/8" N.F. Thread.	22.8
30037	3T 140B	500	140	260	425	520				27.0

* Overall height including pressure relief valve.
Refrigerating Temperature 0.5°C, Beverage Outlet 3.5°C, Cond. Temp. 45°C
Pressure vessel design 1.2 mPa.



4

TERRY—TYPE 2P

DLI APPROVED

GENERAL DATA—REFRIGERANT CONTROL VALVE FITTED WITH REPLACEABLE STAINLESS STEEL NEEDLE AND SEAT ASSY.
BEVERAGE COILS—304 STAINLESS STEEL, SELF DRAINING.
REFRIGERANT R12.
EQUIPPED WITH RELIEF VALVE
OUTER CASE—GALV. SHEET STEEL. FINISH—LACQUER GREY.

CAT. NO.	TYPE NO.	NO. OF COILS	DIMENS. O/A		REFRIG. CONN.		BEV'GE CONN.	CAPACITY GALL./HR REFRIG. TEMP. 34°F		
			DIAM.	HGT.	INLET	OUTLET		BEV'GE INLET TEMP. °F.		
30034	2P	2	11.3/4"	15.1/2"	3/8" FL.	5/8" FL.	7/8"-14NF.	50	60	70
								71	1 COIL	38
									2 COILS	39
								102	54	39

CAPACITY BASED ON FLOW RATE 75G.P.H. BEVERAGE OUTLET TEMPERATURE 38°F.



TEMPRITE F750 VALVE.



Factory pressure settings.

Primary cap adjustment:
(factory sealed)
197-200 kPa
(28.5-29.0 psig)

Secondary adjustment:
(screw under sealing cap)
220-225 kPa
(32.0-32.5 psig)

Secondary adjustment:
(variable in field)
Decrease 10 kPa (1.5 psi)
Increase 45 kPa (6.5 psi)

Refrigerant connections:
3/8" male flare

Packed weight: 2.16 kg

COOLER SPARES

CAT. NO.	MANF. P/N	DESCRIPTION	SUIT
3001	134A11	Needle	Coldstream R12 Float Valve
3002	139A3	Seat	
3003	6181	Header Gasket	
3004	92826	Det. Valve Gasket	
3005	3121	Float Gasket (Small)	Permacold
3006	3124/3	Float Gasket (Large)	
3007	M55LD (NLA)	Needle/Seat Assy. Cart. L. Duty	Temprite Terry
3008	M70HD (NLA)	" " " " H. Duty	
3009	J257	Needle/Seat Assy. Cartridge	Terry Temprite
30010		Use C699 Temprite	
30011	545 - 5	Fusible Plug	
30012	D248	" "	

CONSTANT PRESSURE VALVES FOR BEVERAGE COOLERS

CAT. NO.	VALVE		CONN. FLARE	RECOMMENDED COOLER SIZE
	MAKE	TYPE		
119176	AP	235	1/2"	1 TAP
119177		235	5/8"	2 TAP
119201	Danfoss Temprite & Terry	CPP12	1/2"	1 TAP
119202		CPP15	5/8"	2 TAP
30025		F750	5/8"	1 OR 2 TAP

OIL SEPARATORS FOR R12 — R22 — R502



OIL SEPARATORS

Manufactured to Unfired Pressure Vessel Code AS 1210

FOR R12 R22 R502

CAT. NO.	PART No.	CAPACITY — TONS						Refrigerant Connections Ins.	Oil Return Connections Ins.	Dimensions L x W mm	Mass Empty kg
		R12		R22		R502					
		EVAP. TEMP. °C									
		—35	5	—35	5	—40	5				
INTERNAL FLOAT — EXTERNAL INSULATION — ADJUSTABLE BRACKETS											
30130	14160	0.2	1.0	0.4	1.5	0.5	1.5	3/8 M. Flare	1/4 M. Flare	300 x 125	3.63
30131	14161	0.5	3.0	1.0	5.0	1.5	5.0	5/8 F. Sblid. Steel	1/4 M. Fl. Brass	380 x 125	4.53
EXTERNAL FLOAT WITH INTERCONNECTING ISOLATING VALVE — EXT. INSULATION — ADJUST. BRACKETS											
30133	14183	1.0	7.5	1.5	10.0	2.0	11.0	1-1/8 F. Solid Steel	1/4 M. Fl. Brass	615 x 165	6.40
EXTERNAL FLOAT WITH INTERCONNECTING ISOLATING VALVE — INTEGRAL BRACKETS											
30134	14186	6.0	10.0	6.0	13.0	9.0	14.0	1-3/8 F. Solid Steel	1/4 M. Fl. Brass	630 x 200	12.48
30137	14191	8.0	15.0	9.0	25.0	10.0	25.0	1-5/8 F. Solid Steel	1/4 M. Fl. Brass	670 x 250	20.67

KELVINATOR OIL SEPARATORS

CAT. NO.	MODEL	PART No.	SUITS MODELS	REFRIGERANT
30146	C 696	KA40811	H42B, H42-641, A1775, TF2	R22
30144	G 312	KA36112	H42B, H42-641, K62B, K62-421 to 701, Y72-361, A2210 to A6630	R12, 22, 502
30145	G 313	KA36129	Y72-491 to 591, Y72B, T82	R12, 22, 502



Oil separators. Type OUB For fluorinated refrigerants

CAT. NO.	Code No.	MODEL OUB1	Rated Plant Capacity *					
			kW			Tons		
			R12	R22	R502	R12	R22	R502
3011	40B-0010	Oil Separator Without Connections	2.3	3.1	3.5	0.7	0.9	1.0
CONNECTIONS — ORDER SEPARATELY								
3012	40B-0133	3/8" Flare Anglway	Ordering Examples : (By CAT. NO.) 3011 + 2 x 3012 or 3013 3011 + 2 x 3014 or 3015					
3013	40B-0135	1/2" Flare Anglway						
3014	40B-0140	3/8" Solder Straightway						
3015	40B-0142	1/2" Solder Straightway						

* Capacity based on Evaporator Temperature -15°C and Condensing Temperature +30°C.



OIL RESERVOIR

WITH SIGHT GLASSES
TO AS 1210Inlet & Outlet
Connection 3/8" FlareDimensions
L x W 700 x 153 mmOil Capacity:
High Level 6.1 L
Low Level 3.2 L

Mass (empty) 10.8 kg

Part No. 14151

CAT. NO. 30126

HUDSON

OIL LEVEL REGULATOR

TO AS 1210



Inlet Connection 1/4" Male Flare

Outlet to match sight glass flare

Dimensions
L x W 160 x 150 mm

Mass (empty) 2.45 kg

To ensure correct flanges specify
compressor make and model.

Part No. 14150

CAT. NO. 30127

DISCHARGE MUFFLERS — HIGH SIDE FLOATS

CAT. NO.	PART No.	NOMINAL RATING TONS	CONNECTION FEMALE SOLDER
30158	27300	2	3/8"
30159	27301	3	1/2"
30160	27302	5	5/8"
30161	27303	7 - 10	7/8"
30162	27304	10 - 15	1-1/8"
30163	27305	15 - 25	1-3/8"
30164	27306	25 - 50	1-5/8"
30165	27307	50 - 75	2-1/8"
30166	27308	75 - 100	2-5/8"
30167	27309	100 - 125	3-1/8"

HUDSON DISCHARGE MUFFLER
TO AS 1210REFAC SPUN COPPER
DISCHARGE MUFFLER

CAT. NO.	PART No.	INLET Female Solder	OUTLET Female Solder	SYSTEM SIZE TONS	Overall Length	Body Length	Body Diameter
30169	200015 - 1	3/8"	3/8"	2	7-3/4"	6-1/4"	2"
30170	200015 - 2	1/2"	1/2"	3	7-3/4"	6-1/4"	2"
30171	200015 - 3	5/8"	5/8"	5	7-3/4"	6-1/4"	2"

4

FOR R12, R22, R502

Manufactured to unfired pressure vessel code AS 1210.

Provides optimum oil return to compressor crankcase under a wide range of conditions.

Alternative Mounting facilities:

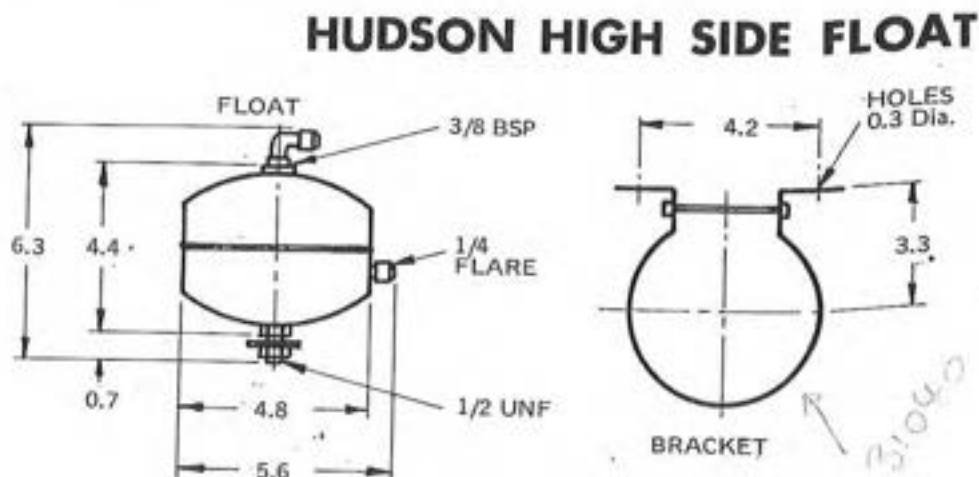
Wrap around bracket.

Bottom stud mount.

BSP to flare elbow provided to facilitate piping.

Part No. 14181

CAT. NO. 30139

HUDSON OIL RETURN FLOAT CHAMBER
TO AS 1210

Inlet Connection 3/8" F.BSP

Oil Return Connection 1/4" Male Flare

Dimensions L x W 135 x 125 mm

Mass (empty) 1.42 kg

Part No. 14180

CAT. NO. 30150



EQUALIZER TANKS TO AS 1210



HUDSON

CAT. NO.	Part No.	Conn. Male Flare	Volume L	Dims. Length x Diam. mm
3021	1641	1/2"	15	622 x 205
3022	1642	5/8"	15	

KELVINATOR

CAT. NO.	Part No.	Description	Conn. Male Flare	Dimensions Length x Diam. mm
3023	G409	No. E1	5/8"	686 x 200
3024	G291	No. 2	5/8"	990 x 355
3025	C757	As fitted to TP2 Silica Gel Charge	1/2"	324 x 152

IDEAL SUCTION LINE P-TRAPS



CAT. NO.	PART No.	SIZE
302141	R050	5/8"
302142	R051	3/4"
302143	R052	7/8"
302144	R053	1-1/8"
302145	R054	1-3/8"
302146	R055	1-5/8"
302147	R056	2-1/8"



LIQUID RECEIVERS

KIRBY FOR R12 — R22 — R502

CAT. NO.	KIRBY Part No.	CAPACITY kg Holding 80% Full	Connections - mm IN (OD) OUT (OD)	Dimensions - mm Height Diam
3029	MRD131-2	1.6 (R12)	6.5 6.5	270 100
30210	MRD131-3	1.9 (R12)	6.5 6.5	320 100
3028	MRD131-7	4.4 (R12)	12.7 9.5 Valve	322 150
3027	MRD138-1	8.8 (R12)	12.7 12.7 Valve	560 150

HELDON

CAT. NO.	Part No.	Length ins.	Diam. ins.	Conn.
30271	10224	21-3/4	4	As Req'd
30270	10152	35-1/2	5	
30267	10225	28	5-1/2	
30268	10226	32	6	
30269	10267	36	8-1/2	

KELVINATOR

CAT. NO.	MODEL	TYPE	LIQ. CAPACITY*		CONNECTIONS		DIMENSIONS		RELIEF
			R12	R502	INLET	OUTLET	HEIGHT mm (ins)	DIAM. mm (ins)	VALVE NO.
SEALED UNITS									
30211	G403	Vert.	1 kg	0.9 kg	1/4" Copper Tails		195 (7-5/8)	102 (4)	
30215	G404	Vert.	2 kg	1.9 kg	1/4" Copper Tails		316 (12-1/2)	102 (4)	
R12 — R22 — R502									
30260	G405		5 kg	4.7 kg	3/8" ODS	1/2" ODS	740 (29)	102 (4)	H314
30261	G406		20 kg	18.7 kg	1/2" ODS	1/2" ODS	813 (32)	200 (8)	H315
30213	G407		23 kg	21.5 kg	5/8" ODS	5/8" ODS	914 (36)	200 (8)	H315
30214	G408		30 kg	28.0 kg	5/8" ODS	5/8" ODS	1182 (47)	200 (8)	H316

* Capacities based on 80% pump down at 40°C (105°F) saturated liquid.

REFRIGERATION COMPONENTS

CAT. NO.	MODEL	Type	Volume L	Min. Op. Charge kg		Storage Cap.* kg		Connections	
				R12/502	R22/500	R12/502	R22/500	IN	OUT
302283	RCR-2V	Vert.	11.0	1.5	1.5	11.0	9.8	5/8"	1/2"
302284	RCR-3V	Vert.	17.0	1.5	1.5	17.0	15.2	3/4"	5/8"
302285	RCR-4V	Vert.	35.0	2.5	2.0	35.0	31.5	3/4"	5/8"
302286	RCR-5V	Vert.	46.0	2.5	2.0	46.0	41.3	1-1/8"	7/8"
302287	RCR-6V	Vert.	57.0	2.5	2.0	57.0	51.2	1-1/8"	7/8"
302276	RCR-15	Horiz.	42.5	14.0	12.0	42.0	38.0	1-3/8" ID	1-1/8" ID
302277	RCR-25	Horiz.	70.8	16.0	14.5	72.0	64.0	1-3/8" ID	1-1/8" ID
302278	RCR-35	Horiz.	99.1	20.1	18.5	100.0	89.0	1-5/8" ID	1-3/8" ID
302279	RCR-50	Horiz.	141.6	23.0	20.0	142.0	127.0	1-5/8" ID	1-3/8" ID
302280	RCR-70	Horiz.	198.2	32.0	29.0	198.0	178.0	2-1/8" ID	1-5/8" ID
302281	RCR-100	Horiz.	283.2	45.0	41.0	284.0	254.0	2-1/8" ID	1-5/8" ID

* Refrig. Storage Capacity based on 80% volume with liquid at 40°C.

SELECTION

The minimum operating charge is calculated to provide a positive liquid seal in the receiver to prevent refrigerant gas entering the liquid line to the cooling coil. When selecting the receiver, calculate the total operating charge including all piping, condensers and cooling coils. The minimum operating charge of the receiver should also be included in this calculation. The refrigerant storage capacity allows for 20% of total volume for refrigerant expansion.

ACCUMULATORS



ACCUMULATORS

Copper

HELDON

CAT. NO.	Part No.	Diam.	Length	Inlet - Outlet I.D. Solder
302301	4100	1-1/4"	8-1/4"	5/16"
302302	4101	1-3/8"	8-3/4"	5/16" - 1/4"
302303	4102	1-1/2"	8-3/4"	3/8" - 1/4"
302304	4103	2-1/2"	9"	5/8"
302305	4104	1-3/4"	9"	5/8"
302306	4105	1-1/2"	8-5/8"	3/8"
302307	4106	1-3/4"	8-1/2"	3/8"
302308	4107	1-1/2"	11"	1/2"
302309	4108	1-3/4"	6"	1/2"
302310	4109	1-1/2"	8-5/8"	1/2"

HUDSON

302311	27010	25 mm	356 mm	3/8"
302312	27030	30 mm	378 mm	3/8"
302313	27053	35 mm	381 mm	1/2"

REFAC

CAT. NO.	Part No.	Diam.	Length	Inlet - Outlet I.D. Solder
302314	100054-2	1"	3"	1/4"
302315	100066-1	1"	8"	1/4"
302316	100054-1	1"	4-3/16"	3/8"
302317	100035	1"	6"	3/8"
302318	112021-1	1-1/8"	10"	3/8"
302319	118019-1	1-3/16"	6"	1/4"
302320	118019-3	1-3/16"	6"	3/8"
302321	118019-4	1-3/16"	6"	1/2"
302322	137019	1-3/8"	7"	1/4"
302323	137026-2	1-3/8"	6-5/16"	3/8"
302324	137032-1	1-3/8"	10-5/8"	3/8"
302325	162004-3	1-5/8"	6"	3/8"
302326	162002	1-5/8"	9"	3/8"
302327	162016	1-5/8"	6-11/16"	1/2"
302328	200004-1	2"	5"	3/8"
302329	200004-3	2"	10-1/2"	1/2"

SUCTION LINE ACCUMULATORS

HUDSON

Maximum ratings are based on a pressure drop through the accumulator of 7 kPa (1 psi)
Minimum ratings are selected to ensure adequate oil return through the accumulator

Minimum ratings are selected to ensure adequate oil return through the accumulator																
WITHOUT LIQUID LINE		WITH LIQUID LINE		Suction Line Conns. Female Solder	Liquid Line (if fitted) Female Solder	Refrigerant Holding Capacity kg			Rating — Tons @ —18°C Evap. Temp.						Dims. L x W mm	Mass empty kg
CAT. NO.	Part No.	CAT. NO.	Part No.						R12		R22		R502			
						R12	R22	R502	Max	Min	Max	Min	Max	Min		
302337	27350	302345	27360	3/4"	5/8"	3.9	3.6	3.8	0.7	0.11	1.5	0.16	1.4	0.16	355 x 125	5.4
302338	27351	302346	27361	7/8"	5/8"	3.8	3.5	3.7	1.0	0.26	2.3	0.39	2.0	0.39	355 x 125	5.5
302339	27352	302347	27362	1-1/8"	5/8"	6.2	5.7	5.9	2.1	0.37	4.3	0.56	4.0	0.56	445 x 155	8.6
302340	27353	302348	27363	1-3/8"	5/8"	12.3	11.3	11.7	3.8	1.00	7.7	1.60	7.0	1.60	475 x 205	13.4
302341	27354	302349	27364	1-5/8"	7/8"	11.9	11.0	11.4	6.0	1.00	12.5	1.60	12.0	1.60	475 x 205	13.5
302342	27355	302350	27365	2-1/8"	7/8"	16.9	15.6	16.1	14.0	2.60	27.3	4.30	26.0	4.30	685 x 205	18.2
302343	27356	302351	27366	2-5/8"	1-1/8"	32.2	29.7	30.8	22.0	4.20	42.0	7.00	40.0	7.00	730 x 275	26.3
302344	27357	302352	27367	3-1/8"	1-3/8"	37.9	35.0	36.2	37.0	6.80	60.0	11.00	60.0	11.00	890 x 275	30.8

HELDON

WITHOUT LIQUID LINE		WITH LIQUID LINE		Body Diam. ins.	Body Length ins.	Suction Pipe Size ins.	Liquid Line Size ins.	Capacity — lbs. Refrig.		
CAT. NO.	Part No.	CAT. NO.	Part No.					R12	R22	R502
302353	11031-60	302361	11031	4-3/4	11-1/4	3/4	1/2	5.1	4.5	4.9
302354	11055-60	302362	11055	4-3/4	11-1/4	1-1/8	1/2	5.1	4.5	4.9
302355	11043-60	302363	11043	6	15	1-1/8	1/2	12.3	11.0	12.0
302356	13322-60	302364	13322	8-1/2	15	1-3/8	1/2	23.6	17.1	18.6
302357	13079-60	302365	13079	8-1/2	15	1-3/8	5/8	23.6	17.1	18.6
302358	10896-60	302366	10896	8-1/2	15	1-5/8	5/8	23.6	17.1	18.6
302359	13323-60	302367	13323	8-1/2	15	1-5/8	3/4	23.6	17.1	18.6
302360	10895-60	302368	10895	8-1/2	15	2-1/8	3/4	23.6	17.1	18.6

KIRBY

CAT. NO.	PART NO.	CAPACITY R12 kg	BODY DIAM. mm	BODY LENGTH mm	CONNECTIONS — mm	
					IN I.D.	OUT I.D.
302372	MRD205-1	2.4	119	227	19.2	19.2
302373	MRD205-11	3.2	119	290	19.2	19.2
302374	MRD205-21	1.7	80	324	16.0	16.0
302375	MRD206-1	5.9	158	312	22.4	22.4
302376	MRD205-31	4.0	119	350	22.4	22.4

4

HEAT EXCHANGERS

ADVANTAGES

- Increases over-all system capacity
- Improves expansion valve performance
- Prevents liquid refrigerant return to compressor
- Reduces oil troubles
- Provides better operation of low temperature jobs
- Eliminates flash gas in liquid line
- Can eliminate necessity for insulating suction lines.

FRIGEMATIC TYPE HX AND FX



DO NOT MIXE FX WITH ANYONE ELSE'S

THE ONLY ONE MADE (Frigematic)

NO LIQUOR TRADE

CAT. NO.	MFR/P/N	NOM. CAP TONS	Connections Ins.		DIAM. Ins.	LGTH. O'AL Ins.
			LIQ.	SUCT.		
30216	HX11F	1 - 2	1/4FL	1/2FL	1.3/4	12.1/2
30217	HX12F		1/4FL	5/8FL		
30218	HX21F	2 - 3	3/8FL	5/8FL	1.3/4	12.1/2
30219	HX22F		1/2FL	3/4FL		
30220	HX11S	1 - 2	1/4SL	1/2SL	1.3/4	12.1/2
30221	HX12S		1/4SL	5/8SL		
30222	HX21S	2 - 3	3/8SL	5/8SL	1.3/4	15.1/2
30223	HX22S		1/2SL	3/4SL		
30224	HX23S	5 - 7.1/2	1/2SL	7/8SL	1.3/4	23.1/2
30225	HX51S		5/8SL	1.1/8SL		
30226	HX52S	8	5/8SL	1.3/8SL	2.1/2	22
30231	FX8		3/4SL	1.5/8SL		
30232	FX10	10	7/8SL	2.1/8SL	3	25
30233	FX15	15		2.1/8SL	3	31
30234	FX20	20	1.1/8SL	2.5/8SL	3.1/2	34
30235	FX25	25		2.5/8SL	3.1/2	40
30236	FX30	30	1.1/8SL	2.5/8SL	3.1/2	46
				2.5/8SL	3.1/2	46

Type HX is patented spiral counterflow design.

Type FX is inner film linear suction flow and spiral liquid flow jacket design.

DANFOSS



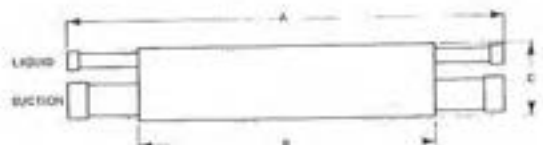
CAT. NO.	TYPE	CODE NO.	DIMENSIONS INS.		CONNECTIONS OD SOLDER	
			DIAM.	LENGTH	LIQUID	SUCTION
30244	HE 0.5	15D0002	1. 3/32	6.13/16	1/4"	1/2"
30245	HE 1.0	15D0004	1. 3/16	10. 3/8	3/8"	5/8"
30246	HE 1.5	15D0006	1. 7/16	12. 3/4	1/2"	3/4"
30247	HE 4.0	15D0008	1.15/16	14. 1/2	1/2"	1.1/8"
30248	HE 8.0	15D0010	2. 3/8	16	5/8"	1.5/8"

HUDSON



CAT. NO.	MFG/P/N	TONS CAP. AT -7°C EVAP. TEMP.	DIMENSIONS mm		CONNECTIONS FEMALE SOLDER	
			W	L	LIQUID	SUCTION
302330	27320	1 to 2	46	318	1/4"	1/2"
302331	27321	1 to 2	46	318	1/4"	5/8"
302332	27322	2 to 3	46	394	3/8"	5/8"
302333	27323	2 to 3	46	394	1/2"	3/4"
302334	27324	2 to 3	46	394	1/2"	7/8"
302335	27325	5 to 7	46	597	5/8"	1.1/8"
302336	27326	5 to 7	46	597	5/8"	1.3/8"

IDEAL



CAT. NO.	MODEL (HP)	CONNECTIONS O.D. SOLDER		DIMENSIONS — INS.		
		LIQUID	SUCTION	A	B	C
302132	1/4 - 1/2	1/4"	1/2"	9-1/4	5-1/2	1-3/8
302133	3/4 - 1	3/8"	5/8"	15	9-1/2	1-5/8
302134	1 - 1-1/2	3/8"	7/8"	18-1/2	11-3/8	1-5/8
302135	2 - 3	1/2"	1-1/8"	20-1/4	13	3-3/8
	3 - 5	5/8"	1-3/8"	21-1/2	14-5/8	3-1/2

CAPACITY RATINGS — EVAPORATOR CAPACITY — kW (BTU/HR)

MODEL (Horsepower)	SUCTION TEMPERATURE ENTERING HEAT EXCHANGER							
	4.4°C 40°F	-1.1°C 30°F	-6.7°C 20°F	-12.2°C 10°F	-17.8°C 0°F	-23°C -10°F	-29°C -20°F	-34°C -30°F
1/4 - 1/2	1.23 (4200)	1.03 (3500)	0.85 (2900)	0.70 (2400)	0.56 (1900)	0.47 (1600)	0.38 (1300)	0.29 (1000)
3/4 - 1	3.75 (12800)	3.19 (10900)	2.67 (9100)	2.14 (7300)	1.73 (5900)	1.36 (4650)	1.14 (3900)	0.97 (3300)
1 - 1-1/2	5.36 (18300)	4.60 (15700)	3.84 (13100)	3.08 (10500)	2.43 (8300)	1.96 (6700)	1.61 (5500)	1.47 (5000)
2 - 3	9.56 (32600)	7.97 (27200)	6.51 (22200)	5.22 (17800)	4.34 (14800)	3.52 (12000)	2.87 (9800)	2.26 (7700)
3 - 5	20.37 (69500)	17.18 (58600)	14.07 (48000)	11.49 (39200)	9.23 (31500)	7.50 (25600)	6.01 (20500)	4.81 (16400)

MULLER FAN COIL UNITS

THIRLINE II

Seasonmaker



TYPE TSF CONSOLE MODEL



TYPE TSH HIDEAWAY

MODELS

- TSF — Standard Floor Mounted Console Unit
 TSB — Basic Unit for building into counterwork or furred-in installations
 TSC — Complete Units for exposed Ceiling Mounting
 TSH — Hideaway Unit for installation within ceiling space.

COOLING CAPACITY — STANDARD CHILLED WATER COIL

NOMINAL RATINGS — STANDARD 3 ROW COIL											
UNIT TYPE & SIZE	MOTOR RPM	UNIT SIZE	TOTAL MOTOR INPUT WATTS	TOTAL MOTOR AMPS	AIR FLOW L/s	Water Flow L/s (8°C Rise Cooling)	Water Press. Drop kPa	WATER			
								CAPACITY — WATTS			
								COOLING		HEATING	
								7°C Ent. Water 25°C D.B. and 19°C W.B.		80°C Ent. Water	
								Total	Sens.	10°C Ent. Air	20°C Ent. Air
TSF021, TSC021, TSB021	920	021	50	0.3	100	0.06	2	1450	1090	5800	5000
TSF031, TSC031, TSB031	920	031	60	0.3	150	0.10	6	2500	1710	8590	7390
TSF041, TSC041, TSB041	920	041	105	0.6	200	0.15	15	3770	2460	11600	10100
TSF061, TSC061, TSB061	920	061	120	0.6	300	0.20	27	5030	3400	17000	14600
TSF081, TSC081, TSB081	920	081	195	1.0	400	0.32	22	7760	5010	24400	21000
TSH021	920	021	60	0.3	100	0.06	2	1360	1020	5630	4860
TSH031	920	031	68	0.3	150	0.08	3	1980	1460	7440	6400
TSH041	920	041	107	0.6	200	0.13	10	3240	2190	9850	8490
TSH061	920	061	120	0.6	300	0.21	26	5070	3340	15100	13000
TSH081	920	081	188	1.0	400	0.25	11	6260	4250	21600	18600

Note: Air Volumes based on high speed fan operation with normal unit appurtenance and 240/50/1 electrical service.

COOLING CAPACITY — DIRECT EXPANSION COILS — R12 - R22 3 ROW

UNIT SIZE	DIRECT EXPANSION CAPACITIES — WATTS R12 & R22											
	ENTERING AIR 25°C D.B. & 19°C W.B.						ENTERING AIR 30°C D.B. & 21°C W.B.					
	Suction 4°C		Suction 7°C		Suction 10°C		Suction 4°C		Suction 7°C		Suction 10°C	
	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.
021	2280	1390	1770	1180	1170	950	2810	1810	2280	1590	1660	1360
031	3320	2030	2580	1720	1770	1409	4030	2620	3330	2330	2490	2010
041	4430	2710	3550	2340	2530	1940	5300	3480	4440	3120	3440	2730
061	6340	3910	4990	3330	3410	2730	7720	5060	6360	4480	4830	3910
081	8590	5290	6990	4630	5070	3880	10300	6790	8610	6100	6770	5420

CAT.NO.	MODEL	CAT.NO.	MODEL	CAT.NO.	MODEL	CAT.NO.	MODEL	AVAILABLE ON
3031	TSF 021	3036	TSC 021	30311	TSB 021	30316	TSH 021	APPLICATION
3032	TSF 031	3037	TSC 031	30312	TSB 031	30317	TSH 031	Direct Exp. Models
3033	TSF 041	3038	TSC 041	30313	TSB 041	30318	TSH 041	High Capacity 4 Row
3034	TSF 061	3039	TSC 061	30314	TSB 061	30319	TSH 061	Heating & Cooling coils
3035	TSF 081	30310	TSC 081	30315	TSB 081	30320	TSH 081	Reheat 1 Row Coils

SPECIFY THE FOLLOWING WHEN ORDERING

TYPE : TSF — TSB — TSC — TSH
 SIZE : 021 — 031 — 041 — 061 — 081 (Suffix "C" for DX)
 MEDIUM : Chilled Water or Direct Expansion

HANDING : LH or RH — Refers to cooling coil connections
 when facing front of unit.

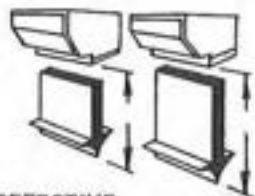
REMOTE MTD.SWITCH : Available for TSB, TSC & TSH units.

BELT DRIVE LARGE CAPACITY SEASONMAKERS AVAILABLE ON APPLICATION

TECO AIR CURTAINS



NC-13-LA NC-53B-LA
NC-14-LA NC-54B-LA



EFFECTIVE
INSULATING DISTANCE

FUNCTIONS

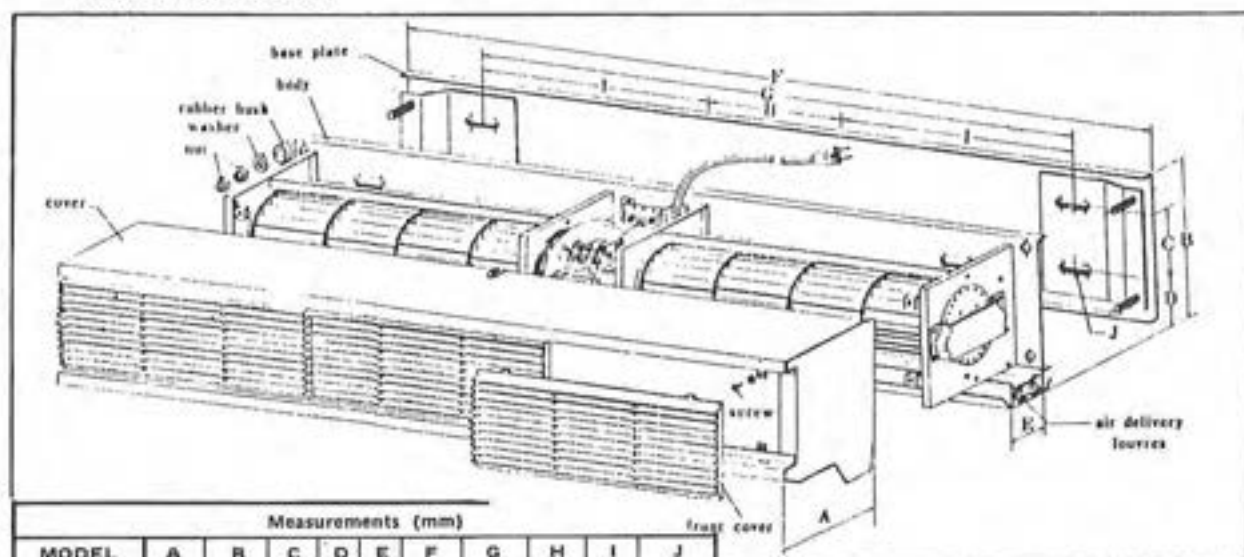
1. **Heat Insulation** — Prevents cool air from escaping when warm air moves in during summer. Savings in electricity. Effects maximum coldness with minimum power consumption.
2. **Coldness Insulation** — During winter, prevents warm air from escaping and cold air from moving in. Maintains a comfortable working temperature.
3. **Prevention** — Prevents entry of insects, odours, dusts, etc. and promotes a clean environment and physical health.

FEATURES

1. Smart appearance. Small size, easy installation.
2. Durable high performance fans.
3. Easy hand adjustment of air direction. Quiet operation.
4. Low power consumption with TECO class E motors.

APPLICATIONS

Public Establishments — Stores, Theatres, Restaurants, Hospitals, Offices, etc.
Industries — All factories with air-conditioned facilities, Pharmaceutical, Chemical, Food-Processing etc.
Residential — All houses, Apartments etc.



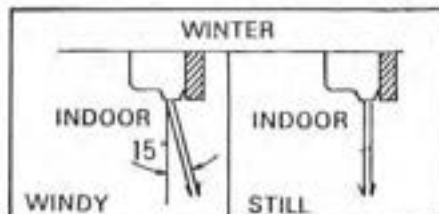
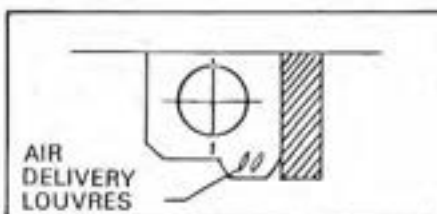
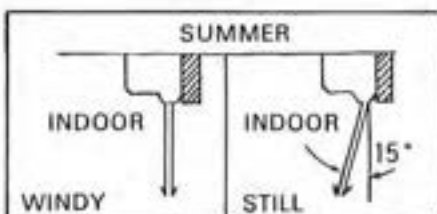
Measurements (mm)

MODEL	A	B	C	D	E	F	G	H	I	J
NC-13-LA	200	207	80	80	40	905	720	—	—	12x47
NC-14-LA	200	207	80	80	40	1205	1020	—	—	12x47
NC-53B-LA	265	265	150	90	70	910	800	170	315	12x22
NC-54B-LA	265	265	150	90	70	1210	1100	170	465	12x22

SPECIFICATIONS

CAT.NO.	MODEL	WIDTH		EFFECTIVE CURTAIN VERTICAL LENGTH		DIA.FAN BLADES mm	POWER SUPPLY	WATTS	WEIGHT kg
		mm	FT	m	FT				
3041	NC-13-LA	905	3	2.5	8.2	110	220 Volt 50 Hz A.C.	95	18
3042	NC-14-LA	1205	4	2.5	8.2	110		120	21
3043	NC-53B-LA	910	3	3.0	9.8	150		125	31
3044	NC-54B-LA	1210	4	3.0	9.8	150		180	36

AIR FLOW ADJUSTMENTS



The direction of air flow affects efficiency of the Air Curtain. Please follow these instructions for optimum efficiency.

Summer: 1. On windy days allow the air to blow vertically downward.

2. On still days, adjust the air to blow at an inward angle of approximately 15°.

Winter: 1. On windy days, allow the air to blow at an outward angle of approximately 15°.

2. On still days, allow the air to blow vertically downward.

Insect & Smoke Prevention: 1. When indoor and outdoor temperatures are alike, allow the air to blow vertically downward, directly on to the ground.

2. When indoor and outdoor temperatures differ, adjust air flow according to the above instructions.

NOTE: The directional air flow louvers can be easily adjusted by hand.

WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL
MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT



TEMP. - CONTROL MODELS - MC 8/36 - MC 11/48 - MC 11/22

1. Conditionaire "Temperature Control" Jet Air Curtains form an invisible barrier between hot and cold.
2. The Air Curtain minimises convection currents in and out of heated or cooled areas.
3. Prevents fogging in zero or sub zero rooms.
4. Prevents excessive ice build up on evaporative coils.
5. Allows free access of people and/or merchandise in and out of heated or cooled areas.
6. Can be used to hold heated air in and cold air out with an open door.
7. Can be used to hold cold air in and heated air out with an open door.
8. Reduces considerably refrigeration requirements for cold rooms where the door is constantly open to traffic flow.
9. Reduces the cost of operation of cold rooms and shortens time for defrosting.
10. Provides an air barrier across an open door to contain heat or cold and allow free access.

CAT. NO.	MODEL	NOMINAL LENGTH OUTLET GRILL	HEIGHT	DEPTH	MOTOR - 50 CYCLE					GROSS OUTLET GRILL L x T	AVERAGE START VELOCITY	NETT UNIT WT	CASE SIZE inch/mm
					H.P. kw	F.L.A.	Volts	Speed	Phase				
30417	MC8/36	36" 914 mm	14" 355 mm	14" 355 mm	.33 .246	2.1	240	960 94 Rad/s	1	36" x 3" 914 x 76	26 FPS 7.92 m/s	58 lb 26.3 kg	48 x 18 x 20 1219 x 457 x 508
30418	MC11/48	48" 1219 mm	19" 482 mm	19" 482 mm	.33 .246	2.1	240	960 94 Rad/s	1	48" x 3" 1219 x 76	31 FPS 9.45 m/s	77 lb 34.8 kg	57 x 24 x 24 1447 x 609 x 609
30419	MC11/22	22" 558 mm	19" 482 mm	19" 482 mm	.33 .246	2.1	240	960 94 Rad/s	1	22" x 5" 558 x 127	44 FPS 13.45 m/s	54 lb 24.5 kg	31 x 25 x 23 787 x 635 x 584



CONTAMINATION CONTROL MODELS - MC16

The Conditionaire MC16 Range of Air Curtains have been designed to discharge a high velocity narrow jet of air over the face of a door and are usually installed with grilles angled out 15 to 20 degrees to provide a powerful industrial air door with above average velocity. They are used to repel insects, dirt, dust, winds etc. and are approved by the Department of Primary Industry for usage in the meat industry for fly exclusion. Standard units can be fitted with motors up to 5 H.P. For selected start velocities and design criteria, refer to Manuf. Bulletins available on request.

CAT. NO.	MODEL	NOMINAL LENGTH OUTLET GRILL	HEIGHT	DEPTH	MOTOR 415 VOLT 50 CYCLE	GROSS OUTLET AREA L x T	NETT UNIT WEIGHT	CASE SIZE
30411	MC16/36	36"	27"	28"	OPEN PROTECTED DRIP-PROOF H.P. 1 - 2 - 3 - 5	36" x 4"	151 lb.	47 x 32 x 32
30412	MC16/42	42"	27"	28"		42" x 4"	162 lb.	52 x 32 x 32
30413	MC16/48	48"	27"	28"		48" x 4"	171 lb.	58 x 32 x 32



CONDITIONAIRE "THERMO - CURTAIN"

This compact unit projects a controlled sheet of tempered air downward over an open doorway or entrance to seal off outside adverse conditions and temperatures and maintain a warm comfortable interior climate. Thermo-Curtain permits an un-interrupted flow of traffic and completely eliminates congested entrances - doors are left open at all times. HOW THERMO-CURTAIN WORKS - The Conditionaire Thermo-curtain forces tempered air, at temperatures between 43°C and 60°C (110°F and 140°F) downwards. This sheet of warmed air counteracts and absorbs the cold air inspill and at the same time accelerates natural warm convection currents inside. The result is a warm comfortable interior.

CAT. NO.	MODEL	BURNER RATING MJ	OUTLET AIR TEMP. °C (°F)	AIR OUTPUT CFM	OUTLET VEL. FPM	MOTOR HP (Approx.)	OPERAT. NOISE LEVEL	WEIGHT kg	WIDTH mm	SAFETY DEVICES (both units)
30414	HTC 900	42	43 to 60	1800	2400	1/3	55 db	45	949	Fall Safe DSI, Ignition
30415	HTC 1200	56	(110 to 140)	2400	2400	1/3	65 db	60	1200	Pressure switch Klixon O/Heat Switch

Standard units - gas fired - steam and electric heated available on application

CONDITIONAIRE MODEL HMC - 16 - 36 HEATED AIR CURTAIN

SPECIFICATION

Model No.	HMC-16-36
Capacity	2124 litres/sec.
Burner rating	185 MJ
Motor	2.4 KW 415 V
Operating Noise Level	75DB
Safety Devices	As Stated
Weight Crated	141 kg
Unrated	122 kg

CAT. NO. 30416

FEATURES :

LARGE UNIT(S) FOR INDUSTRIAL DOORWAYS

Allows free access for people, goods and mobile equipment, yet maintains a hot air barrier. Large heat output provides heating to premises and cuts down other heating requirements. Basic outlet width is three feet but by adding a transform duct this width can be extended to five feet.

APPLICATIONS :

Industrial Buildings, Factories, Warehouses, Transport Terminals, Workshops - all buildings with large doorways.

OPERATION :

The operation of the unit is fully automatic. Instant lighting is achieved by means of electric ignition. Automatic gas shutdown is built in on temperature rise within the premises to minimise gas usage and to provide desired controllable working conditions.

SAFETY FEATURES :

If flame failure occurs, the gas is instantly cut off by a flame sensing rod incorporated in the system. In the case of electrical or mechanical failure, a pressure switch fails the gas solenoid safe.

304-b

VIRCHEM[®] AIR DOORS

Air doors for all seasons

COMMERCIAL TYPE HEATED and UNHEATED



VIRCHEM AIR DOORS have a self-contained one piece housing, fire retardant and corrosion proof, incorporated with a double extended shaft motor, direct drive double width and double inlet squirrel cage blower wheels and fan housings.

Wedge shaped discharge nozzle containing adjustable air deflectors with a 40° girth sweep front to back.

Housing is of sufficient strength for fastening to wall on both ends without any intermediate support. Air intake is protected against inclement weather. Standard models require a minimum space of 318 mm (12 1/2") and EHV models require 407 mm (16") over door header.

EASY INSTALLATION: VIRCHEM AIR DOORS are bolted to wall with four fasteners and connected to electric power source.

AIR DIRECTIONAL CONTROL: Adjustable vanes at outlet nozzle direct air to compensate for possible draft conditions through door openings. When used over a refrigeration door to retain cold temperature, proper directional adjustment is important for maximum efficiency.

AIR VELOCITY CONTROL: Adjustable louvre damper controls

are provided on STANDARD and HEATED MODELS in order to adjust rate of air flow. When used over a refrigeration door to retain cold temperature, proper velocity adjustment is important for maximum efficiency. Velocity Control can reduce air velocity up to 80% with louvers in totally closed position.

HEAVY DUTY ELECTRIC MOTOR: Continuous duty type motor, totally enclosed with sealed lubricated ball bearings, resilient mounted and protected by an automatic thermal overload switch.

FIRE RETARDANT AND CORROSION PROOF: Steel models are of 18 gauge paintlock metal and doubly protected with grey rust preventative coating. All interior parts are safeguarded against inclement weather. Heated models have polycarbonate cabinets.

NOISE LEVEL: The VIRCHEM AIR DOORS operate under a low noise level in the interest and comfort of personnel working in the immediate vicinity. Noise levels available on request.

HIGH PERFORMANCE: VIRCHEM AIR DOORS are scientifically engineered to exceed exacting U.S. government required specifications, to provide the highest quality material for long life and unsurpassed performance.

MODEL AVAILABILITY

CAT. NO.	MODEL*	Length		Motor H.P.	Electrical Volts/Hz	Nozzle Velocity	
		mm	ins.			m/s	FPM
STANDARD MODELS							
30421	36	915	36	1/2	240/50	15.7	3100
30422	48	1219	48	1/2	240/50	13.6	2680
EXTRA HIGH VELOCITY (EHV) MODELS							
30425	EHV38	965	38	1½	240/50	22.9	4500
30424	EHV48	1219	48	1½	240/50	19.6	3850
HEATED AIR DOORS							
CAT. NO.	MODEL*	Length		Motor H.P.	Capacity / Electrical		
		mm	ins.		Watts	(Btu/hr)	Volts/Amps
30423	38C-1	965	38	1/2	9000	30700	240V/38A
30420	48C-1	1219	48	1/2	9000	30700	240V/38A

* Model Number designates Length of Housing in inches. Add 75 mm (3") for control box.

NOTE: Data shown is for 60Hz 1750 RPM motors — Reduce capacities 10% for 50Hz power.

ADVANTAGES

- Keeps insects, dust, dirt and fumes out.
- For use over freezer and cooler doors to reduce humidity and prevent loss of cold air.
- Doors may be left open eliminating the nuisance of opening and closing automatic and manual doors.
- Reduces air conditioning costs.
- Open doors are conducive to attracting customers.
- Less risk of accidents yet speed up customer or personnel traffic.
- Keeps premises clean and sanitary.

SELECTION DATA

TO ASSURE MAXIMUM OPERATIONAL EFFICIENCY USE RECOMMENDED MODELS FOR VARIOUS DOOR SIZES

STANDARD MODELS

Purpose: Barrier to insects and dust.

Door Widths up to	Door Heights up to	Use Model No.
915 mm (36")	2.8 m (9 ft.)	36
1219 mm (48")	2.8 m (9 ft.)	48

REFRIGERATION DOORS

Purpose: Prevent loss of refrigerated air - Reduce Humidity.

Coolers: -4 to +18°C (+25 to +60°F)

Door Widths up to	Door Heights up to	Use Model No.
915 mm (36")	2.54 m (10 ft.)	36
1219 mm (48")	2.54 m (10 ft.)	48

* Track Rail thru doorway.

FREEZERS

-28 to -7°C (-20 to +20°F)

Door Widths up to	Door Heights up to	Use Model No.
915 mm (36")	2.0 m (8 ft.)	36

† For higher refrigeration doors refer to EHV models.

NOTE: Over wider door openings, use in multiples side by side spaced not more than 150 mm (6") between units. (Refer Questions and Answers next page - Item 4)

EXTRA HIGH VELOCITY (EHV) MODELS

Purpose: Barrier to insects, dust and refrigeration control.

Door Widths up to	Door Heights up to	Use Model No.
1067 mm (42 ft.)	2.8 m (11 ft.)	EHV38
1372 mm (48 ft.)	2.8 m (11 ft.)	EHV48

Notes: Virchem Air Doors will hold winds up to a maximum of 24 KPH (15 MPH) but cannot be completely stopped when there is an exhaust system in the building (negative pressure). Also, a severe wind tunnel effect will arise if other outside doors, windows or roof ventilators are completely open. Cold weather can be best deterred at door opening if direct fired gas heaters are ducted toward the intake of the Virchem Air Door.

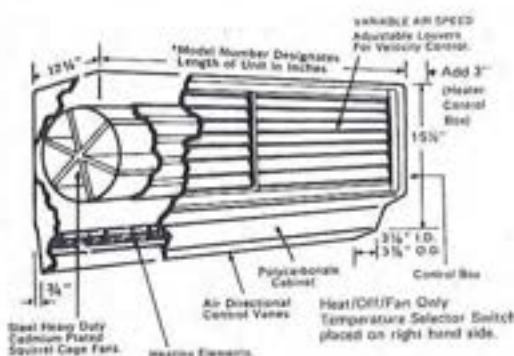
HEATED AIR DOORS

(With Polycarbonate Cabinets)

FOR USE IN ALL SEASONS

1. **WITH HEATER ON:** Over entrance doors as protection against cold wintry drafts entering indoor heated areas. Contributes warmth to existing heating systems.
2. **WITH FAN ON ONLY:** In warm weather to prevent loss of air conditioning and provide an effective barrier against insects and dust.

Door Widths up to	Door Heights up to	Use Model No.
965 mm (38")	2.0 m (8 ft.)	38C-1
1219 mm (48")	2.0 m (8 ft.)	48C-1



1. Should the Virchem Air Doors be mounted inside or outside of the doorway?

Virchem Air Doors will operate efficiently regardless of which side of the doorway they are mounted. However, there are general rules to remember as follows:

- Either side of the door opening is acceptable when used for insect problems or over refrigerated coolers. When used over freezer doors outside installation is necessary as the fans tend to gather moisture and freeze.
- If there are people working inside, near the door opening, an outside installation is suggested because of the humming sound from motor/fans in operation.
- When using the Virchem Air Doors as a thermal barrier in a factory or store, e.g. for preventing loss of air conditioning in summer or keeping out the cold air in winter, inside installation is recommended.

2. Is there any difference in the sound level if a Virchem Air Door is installed outside or inside?

Yes. If high level of sound is a problem, mount the Virchem Air Door outside as the sound will dissipate.

3. How far above the doorway header should Virchem Air Doors be mounted?

12 to 50 mm (1/2" to 2") above the door opening whenever possible. The closer to the door opening the more effective the Virchem Air Doors. When there is an obstruction in the way, the Virchem Air Doors should be hung above it and away from the wall. If there is clearance of more than 100 mm (4") between the obstruction and the wall, the nozzle may be positioned to fit in that opening.

4. When more than one Virchem Air Door is installed over a doorway, how close together should they be mounted?

They can be mounted next to each other but if the door is wider than the Virchem Air Doors, the Standard model may be spaced approximately 150 mm (6") apart. The EHV model may be mounted as far as 250 mm (10") apart.

5. How far beyond the edge of the housing does the air spread extend and what is the depth?

The air leaves the exhaust nozzle at a very high velocity. It extends up to 150 mm (6") on each side of the EHV model. The depth of the curtain of air is about 610 mm (2') when measured 1.83 m (6') from the nozzle.

6. How do you mount a Virchem Air Door over a meat track that comes out through the center of the door opening?

Sometimes one unit can be utilized over the door opening on top of the track, but very often obstructions make this impractical. When this occurs, one unit on each side of the track would be more efficient because installation is then possible closer to the top of the door opening. A clearance of 75 mm (3") to 100 mm (4") on each side between the track and the Virchem Air Door is advised to prevent interference with meat being sent through.

How do you mount Virchem Air Doors over a large warehouse roll-up door?

Installation instructions are sent with each unit explaining the fabrication of brackets for a roll-up door.

8. If there is an obstruction over the doorway, how far away from the wall can a Virchem Air Door be installed & still function effectively?

Not more than 200 mm (8") for refrigeration and 355 mm (14") for insects. Sometimes the Virchem Air Door air outlet may be installed so it sets between the obstruction and the wall. Precaution is necessary to prevent the obstruction from deflecting the flow of air.

9. How do you clear existing utility lines and tracks over the doorway when you mount a Virchem Air Door?

Adjustable mounting brackets may have to be fabricated for standard models. This brings the unit 65 mm (2 1/2") farther out from the wall. The brackets can also be used to tilt the Virchem Air Door outward or inward, whichever is necessary to compensate for draft conditions. On all EHV models adjustable mounting brackets are furnished as standard equipment.

10. How long does it take to install a Virchem Air Door?

The average time required for inexperienced personnel to install a unit is two hours. After the second or third installation the time can usually be cut to one hour.

11. Why do Virchem Air Doors have adjustable air directional vanes?

The directional vanes will with proper adjustment maximize operational efficiency. For example, the vanes can be turned outward to compensate for drafts and repel insects entering the building or adjusted according to the temperature of the room. The colder the room the more the directional vanes would have to be pointed straight down to compensate for the cold air trying to escape at the floor level.

12. Why do Virchem Air Doors have adjustable louvers at the air intake?

The adjustable air intake louvers provide maximum efficiency for different requirements. When used as a barrier to insects, louvers should be set at the maximum open position for full volume of air. When used over refrigeration doors, the louvers can be adjusted to regulate the velocity and volume of air at the air outlet. This is important in order to form an air box with the warm outside air. The louvers should be set so the air barely hits the floor. The colder the air the stronger and stiffer the barrier should be.

EHV models do not contain velocity control louvers as standard equipment. When used for temperature control they must be ordered at extra charge.

13. What happens to the air when it hits the ground?

When using Virchem Air Doors for insect and dust control, the directional vanes in the air outlet nozzle should be directed outward not only to repel the insects and dust but to prevent inward air flow at floor level.

As the air reaches the floor it will divide simultaneously sending the air inward and outward and causing a draft both ways at the floorline.

If mounted on the outside of the doorway, and used for the purpose of holding cold air in refrigerated rooms when the door is open, the directional vanes should be slanted slightly outward. Mounted on the inside of a cooler the vanes should be turned slightly into the refrigerated room.

It is important to remember that when Virchem Air Doors are used over refrigeration it is absolutely necessary to adjust the velocity control so the airstream gently hits the floor with the least amount of disturbance. Hitting the floor too hard will cause a vacuum reaction which will pull the cold air out of the refrigerated room and defeat the intended purpose of the Air Doors.

14. If the velocity of an EHV model is too great how can it be cut down?

By restricting the intake of air using pieces of metal or plywood. However, Virchem Air Doors should not have restrictions placed at the air intake when used for the purpose of repelling insects and dust. The EHV models may be ordered with a velocity control. This is usually required over high refrigeration doors or when used to separate rooms at different temperatures. There is an additional charge for velocity controls on EHV models.

15. When the louvers are completely closed will the motor be starved for air and therefore overload?

No. On the contrary, the motor will be working under a lighter load. When the louvers are closed there is no air to load the fan blades which allows them to operate "free wheeling". This is a fundamental characteristic of the "forward curved" fan wheels.

16. Which Virchem Air Door models require a cover when mounted outside?

Weatherproof covers are necessary and therefore supplied as standard equipment with the EHV models and do not cost extra. They are unnecessary with Standard models as the design protects them from inclement weather.

17. Are there any situations which could cause Virchem Air Doors to operate poorly or not at all?

Yes. There are three applications to be avoided.

- Virchem Air Doors will not perform satisfactorily if there is an exhaust fan in operation as it will cause a negative pressure within the building. The curtain of air will be strongest near the nozzle and weakest at the floor. Since air entering the building always seeks the least line of resistance, it will flow into the building a few feet from the floor at the door opening.
- A wind tunnel effect will prevent Virchem Air Doors from operating properly. A wind tunnel occurs when there are two open doors on opposite sides of a building.
- A Virchem Air Door mounted on the outside of a building will not prevent the entrance of cold air into the building. They must be mounted inside a heated room.

18. If a warehouse is heated, and you want to hold in the warm air, where do you mount the Virchem Air Door?

On the inside over the top of the door opening. Also, whenever possible direct the warm air heaters toward the intake of the Air Door. This method of keeping out the cold air is only effective when the inside room is heated.

19. When a Virchem Air Door is mounted over a cooler doorway can the door itself be removed and the air curtain allowed to operate continuously?

Yes. Virchem Air Doors are equipped with continuous duty motors and will run for many years trouble free.

20. What happens when a forklift or truck goes through a doorway which has the Virchem Air Doors mounted over it? Is the air curtain still effective?

When used over warehouse doors for the purpose of keeping insects out, the forklift will not seriously effect the efficiency of the Virchem Air Doors.

When used over refrigeration doors the air curtain is temporarily ineffective because the forklift disturbs the airflow which is deflected and changes the balance of air pressure.

21. What is a Micro Switch and when is it used?

A Micro Switch is used to energize the air curtain when a door is opened and cuts off when the door is closed.

A Micro Switch is installed when a door is not in constant use such as some receiving and cold storage doors.

It is preferable to allow the Virchem Air Door to operate continuously and not to install a Micro Switch if there is heavy in and out traffic.

22. Should the customer use a thermal overload protection switch in the electrical circuit?

No! All motors are equipped with an automatic thermal overload switch for protection against burn out. The motor will automatically stop if for any reason the motor is overheating.

Probably causes of overheating are:

- Wrong voltage being fed to the motor
- Excessive vibration in fans caused by debris caught in the vanes.
- Motor dirty. Air cannot get to motor housing for proper cooling.
- Wiring hookup not properly followed.

23. Where are the junction boxes?

EHV models have a junction box on each motor. In the case of multiple motors, they are tied into a single junction box by an electrician. All Standard models have a junction box on the right front of the air door.

Polycarbonate models are supplied with a junction box that can be attached wherever most functional.

24. If air leaving the nozzle does not seem to have much velocity what could be the cause?

The cause is probably incorrect rotation of the fans. If this is the problem, the wires to the motors need to be reversed for correct rotation.

25. What type of maintenance do Virchem Air Doors require?

All motors have sealed lifetime lubricated bearings making greasing or oiling unnecessary.

Blowing dust off the fans twice a year with an air hose is advisable if Virchem Air Doors are to perform at top efficiency.

[illegible]

ACTROL KEEPS YOU UP - TO - DATE
WE ARE CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS
TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT

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ON REVERSE SIDE

CONDENSING UNIT FANS

It would be impossible to list a full range of Condensing Unit Fans in this Catalogue and therefore only a few popular sizes are listed below.

However, Fans (and pulleys) for any make of Condensing Unit can be supplied to special order provided the following information is given :

1. Make and Model No. of Condensing Unit taken from the Name Plate.
2. Fan — Diameter and Number of Blades, Direction of Rotation, Air Flow Direction and if applicable, Hub Length.
3. Pulley — Outside Diameter, Bore and Number and Section of grooves.

CAT. NO.	DIAMETER	DESCRIPTION	SUITS UNITS
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COLDSTREAM

3051	14"	3 Blade	Q39, M60, 75
3052	18"	3 Blade	TB99, JB110, 160, RO180 etc.
3053	20"		RO225, 270, OB270, 300, 360

KELVINATOR — DOMESTIC — FREEZER

30551	5"	Plastic Bin No. PD330 P/N KA30447	993, 976, N510FD, 510NF4, N610EE, 610NE5, N510FF, 510NF6, N610FF, 610NF6
30552	4"	Plastic Bin No. PD324 P/N KA30373	486, 496, 508, 509, 519, 588, 676, 686, 694, 770, 778, 779, 788, 789, 790, 888, N144GA, N144FA, N144WA, N144WB, N180FA, N180SA, N180SB, N220EB, N220FA, 380NF3, N380FC, N380GC, N380FF, 380NF6, N380TC, N380YC, 480NF3, N480FC, N480TC, 600NE3, N600EC
30554	4"	Plastic Bin No. PL85 P/N 1208204	400NG3, N400GC, 450NG3, N450GC, 500NG3, N500GC — Now use PD324
30556	5"	Plastic Bin No. PL372 P/N 1228882	62NG3, N620GC
30557	4"	Plastic Bin No. CF83 P/N 10-376	H250GD, F330LD — Now use CF91 & CF93

TERRY

30514	19"	P/N 150-24 20° 4 blade steel with centre spider	Most A, J, P units, PJ2, PJ3, PJ4, PJ6 V454, V456, 300A4 - 1000A
30515	17"	P/N 150-25 20° 4 blade steel with centre spider	U Series 175H to 250L, Acc. Sealed 153/151H to 303FL
30513	14"	P/N 150-22 20° 4 blade steel with centre spider	U Series 100L, 150L, 150H, RA2, RA4, RA6, 100A - TRU300A3
30512	12 1/2"	P/N 150-4 2 1/2" wide steel	KU1, KU2, KU3
30516	18"	P/N 150-395 3 blade 5/8" bore A.C.W.R.D.	303FH, 403FH, 603FM, 803FH 603FH with 8" deep cowlings

Note: The above fans will also suit some earlier Terry Range Units.

BITZER

CAT. NO.	DIAMETER
30542	15"
30543	17"
30544	19"

KELVINATOR — COMMERCIAL

CAT. NO.	DIAMETER	PART No.
30526	9 1/2"	E71
30527	12"	E246
30528	14"	E247
30529	16"	E344

CAT. NO.	DIAMETER	PART No.
30531	19"	E345
30532	19"	E346
30533	19"	E341

RADLON

REPLACEMENT FAN BLADES — WITHOUT HUBS				
CAT. NO.	DIAMETER		PITCH	DESCRIPTION
	mm	INS.		
30591	170	6 3/4"	26°	Plastic Blade *
30592	200	8"	26°	Plastic Blade *
30593	230	9"	26°	Plastic Blade *
30594	250	10"	26°	Plastic Blade *
30595	300	12"	20°/30°	Aluminium Blade (Suction or Blowing)
30596	350	14"	20°/30°	Aluminium Blade (Suction or Blowing)

* NOTE: When ordering Plastic Blades, Motor Rotation must be stated —
I.e. CCW = Counter Clockwise (Suction) CW = Clockwise (Blowing).

RADLON FAN MOTORS
REFER PAGE 310-c

FAN BLADES FOR FORCED DRAFT COOLERS

MULLER

CAT. NO.	MULLER PART NO.	SIZE	KELV. BIN NO.	SUITS MODELS	Note: Suffix Numbers in brackets eg (1),(2), etc. indicates number of fan blades fitted to that particular model.
3061	862 - 717 *	178mm (7")	MM490	CSN64(1), CSN74(1), CSN106(2), CSN130(2), CSN180(3) CSL53(1), CSL63(1), CSL90(2), CSL110(2), CSL150(3) MJ110H(1), MJ140H(1), MJ180H(2), MJ220H(2) Old Series C100H(1), C135H(1), C175H(2), C230H(2), C310H(3) Old Series C101L(1), C141L(2), C191L(2), C251L(3)	
3068	862 - 83761V	254mm (10")	MM145	CDN130(1), CDN180(1), CDN240(2), CDN320(2) CDL100(1), CDL150(1), CDL200(2), CDL270(2), CDL370(3), CDL520(4)	
30626	862 - 1045F	254mm (10")	MM52	Old Series RLC - 050(1), 072(2), 100(2), 150(3), 200(4), 250(5), 300(6) Old Series ELC - 035(1), 050(2), 070(2), 105(3), 140(4), 175(5), 210(6)	
3062	862 - 80781W	305mm (12")	MM106	MLV - 050(1), 072(2), 100(2), 150(3), 200(4), 250(5), 300(6) MLVE - 035(1), 050(2), 070(2), 105(3), 140(4), 175(5), 210(6)	
30611	862 - 1036	254mm (10")	MM334	RA260(1)	
30612	862 - 1228	305mm (12")	MM335	RA350(1), RA450(1)	
3063	862 - 1420	345mm (14")	MM332	UA - 450, 580, 870, 1100 MUA - 450(1), 580(1), 870(2), 1100(2) Hot Rod H - 301(1), 601(2), 821(2) Hot Gas GA - 323, 663, 853 EP - 301(1), 601(2), 771(2)	
3064	862 - 1428	345mm (14")	MM18	UA - 680, 1350 MUA 680(1), 1350(2) Hot Rod H - 481(1), 941(2) Hot Gas GA - 513, 1023 EP - 451(1), 901(2)	
30613	862 - 1416AC	345mm (14")		RA580(1)	
30614	862 - 1422AC	345mm (14")		RA680(1)	
30615	862 - 1424AC	345mm (14")		RA870(1)	
30616	862 - 1428AC			RA1050(1)	
3065	862 - 1814	467mm (18")	MM597	UA1700 MUA1700(2) Hot Gas GA1313 EP1201(2)	
3066	862 - 1820	467mm (18")	MM253	UA4400 MUA2300(2), MUA4400(3) Hot Rod H1201(2), H3201(3) Hot Gas GA3623 EP1601(2), EP3601(3) RC1, 1½, 2, 2½, 3	
30617	862 - 1816	467mm (18")		RA1400(1), RA2400(2)	
30618	862 - 1824	467mm (18")	MM702	RA1800(1)	
3067	862 - 2016	508mm (20")	MM254	UA2300, UA3400 MUA3400(2) Hot Rod H1601(2), H2401(2) Hot Gas GA1823, GA2653 EP2401(2) RC4, 5, 6, 7, LAC10, MAC	
	862 - 1820	467mm (18")		Remote Condenser RC1, 1½, 2, 2½, 3 Reverse Flow	
	862 - 2016	508mm (20")		Remote Condenser RC4, 5, 6, 7 Reverse Flow	

PARTS FOR OLD SERIES H.T.C. ROTAJET EVAPORATIVE CONDENSERS

FAN BLADES					
CAT. NO.	MODEL	PART NO.	BLADE DIAM.	NO. BLADES	PITCH DEGREES
30638	FEC 2.5	15-8-4/3R/35°	14½"	4	35
30639	FEC 4	15-8-8/3R/35°	14½"	8	35
30640	FEC 6	18-8-4/3R/35°	17½"	4	35
30641	FEC 8	15-8-8/3R/35°	14½"	8	35
30642	FEC 12	18-8-4/3R/35°	17½"	4	35
CENTRIFUGAL WATER SLINGER					
30645	SMALL SLINGER - Suits Models FE - 2.5, 4, 8.				
30646	LARGE SLINGER - Suits Models FE - 6, 12.				

TECH. DATA - REFERENCE ONLY			
HEAT REJECTION BTU/HR *	COIL AREA SQ. FT.	AIR VOL. CFM	WATER EVAP. ** G.P.H.
30,000	21.5	750	3.0
48,000	34.6	1200	4.8
72,000	51.5	1800	7.2
96,000	69.2	2400	9.6
144,000	103.0	3600	14.4

* At 100°F Cond. 73°F W.B. entering air.

** Actual water evaporated - Total water used would be plus bleed-off

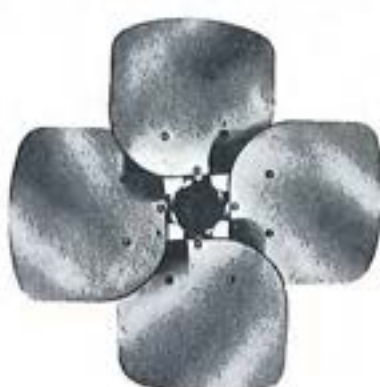
IF IT IS NOT LISTED IN THIS CATALOGUE - ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

FAN BLADES

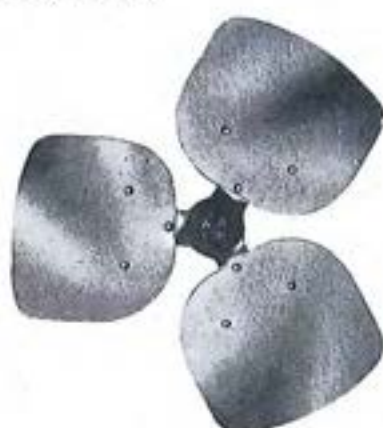
BRINSMEAD & FAN BLADES PTY. LTD.



TYPE "V"
FLANGE MOUNTING SERIES



TYPE "X"
HEAVY DUTY SERIES



TYPE "T"
UNIVERSAL SERIES

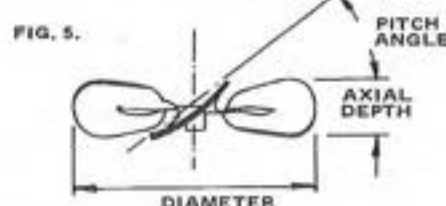
HOW TO ORDER :

1. When ordering specify complete Part No. & Catalogue No.

2. PART NUMBERING SYSTEM :

A - 10 - 3 - 30 - R - 3/8

— Diameter in inches or mm.
— Rotation ref paragraph 3 (R-Right Hand (CW)
(L-Left Hand (ACW))
— Pitch Angle in degrees - ref paragraphs 4 & 5.
— Number of Blades - ref paragraph 5.
— Boss position - ref paragraph 3 (A:Boss Away)
(N:Boss Near)



3. ROTATION AND BOSS POSITION :

Both the fans rotation and boss position are determined when facing the blade from its discharge side, irrespective of its relationship to the drive motor.

Table 1 has been provided as an aid in determining the correct rotation and boss position.

NOTE: Drive motor rotation is determined facing its shaft end.

4. PITCH ANGLE:

Where the pitch angle (ref fig 5) is not available leave this section of the part number blank and state separately the axial depth in inches (ref fig 5).

NOTE: If the axial depth is important include both dimensions.

5. NEW APPLICATIONS :

Where exact blade specifications are not known specify as much of the part number as possible plus the following data:

- Motor - Type i.e. shaded pole, capacitor run, split or three phase
Speed in RPM
Power in watts output or horsepower (HP).
- Air flow required in CFM or litre/s.
- Static air pressure in inches water gauge or Pa.

TABLE 1.

MOTOR ROTATION AND RELATIONSHIP TO FAN	CORRECT BLADE PART NUMBER	MOTOR ROTATION AND RELATIONSHIP TO FAN
CLOCKWISE	A-00-0-00-R	ANTICLOCKWISE
ANTICLOCKWISE	A-00-0-00-L	CLOCKWISE
CLOCKWISE	N-00-0-00-R	ANTICLOCKWISE
ANTICLOCKWISE	N-00-0-00-L	CLOCKWISE

ALUMINIUM BLADES

CAT. NO.	FAN BLADES P/L PART No. WITH BOSS	BLADE DIAMETER	PITCH DEGREES	BORE	On Anticlockwise Motor (Viewed from Motor end)		On Clockwise Motor (Viewed from Motor end)	
					AIR DIRECTION	BOSS POSITION	AIR DIRECTION	BOSS POSITION
3073	A10530R	10" L.D.	30	5/16"	Reverse	Away	Forward	Near
30797	N10329R	10" L.D.	31	5/16"	Reverse	Near	Forward	Away
3071	A7530R	7" L.D.	30	5/16"	Reverse	Away	Forward	Near
3072	A8530R	8" L.D.	30	5/16"	Reverse	Away	Forward	Near
3074	N8534R	8" L.D.	34	5/16"	Reverse	Near	Forward	Away
3075	N8534L	8" L.D.	34	5/16"	Forward	Away	Reverse	Near
3076	N9534R	9" L.D.	34	5/16"	Reverse	Near	Forward	Away

FAN BLADES



CAT. NO.	FAN BLADES P/L PART NO.	BRINSMEAD PART NO.	BLADE DIAMETER	PITCH DEGREES	BORE	On Anticlockwise Motor (Viewed from motor end)		On Clockwise Motor (Viewed from motor end)	
						AIR DIRECTION	BOSS POSITION	AIR DIRECTION	BOSS POSITION
3078	A96315R	209	9 1/2" L.D.	15	5/16"	Reverse	Away	Forward	Near
3079	N8328R	210	8" L.D.	25	5/16"	Reverse	Near	Forward	Away
30710	N8334L	211	8" L.D.	33	5/16"	Forward	Away	Reverse	Near
30711	N10318L	212	10" L.D.	15	5/16"	Forward	Away	Reverse	Near
30712	A12315R	213	12" L.D.	15	5/16"	Reverse	Away	Forward	Near
30713	A12315L	215	12" L.D.	15	5/16"	Forward	Near	Reverse	Away
30714	N96324L	217	9 1/2" L.D.	33	5/16"	Forward	Away	Reverse	Near
30715	N7328L	219	7" L.D.	25	5/16"	Forward	Away	Reverse	Near
30716	A12320R	220	12" H.D.	19	5/16"	Reverse	Away	Forward	Near
30717	A16320R	221	16" H.D.	19	9/16"	Reverse	Away	Forward	Near
30718	A10328L	223	10" L.D.	26	5/16"	Forward	Near	Reverse	Away
30719	N12315L	225	12" L.D.	15	5/16"	Forward	Away	Reverse	Near
30720	N1038L	226	10" L.D.	8	5/16"	Reverse	Near	Forward	Away
30721	A8315R	227	8" L.D.	15	5/16"	Reverse	Away	Forward	Near
30722	A7 1/2 329L	229	7 1/2" L.D.	29	5/16"	Forward	Near	Reverse	Away
30723	A1038L	231	10" L.D.	8	5/16"	Forward	Near	Reverse	Away
30724	N8330L	232	8" L.D.	29	5/16"	Forward	Away	Reverse	Near
30725	A10329L	233	10" L.D.	33	5/16"	Forward	Near	Reverse	Away
30726	N10329L	235	10" L.D.	36	5/16"	Forward	Away	Reverse	Near
30727	N838R	236	8" L.D.	8	5/16"	Reverse	Near	Forward	Away
30728	A838R	237	8" L.D.	8	5/16"	Reverse	Away	Forward	Near
30729	N8328R	238	8" L.D.	25	5/16"	Reverse	Near	Forward	Away
30730	N838L	240	8" L.D.	8	5/16"	Forward	Away	Reverse	Near
30731	N10329R	241	10" L.D.	33	5/16"	Reverse	Near	Forward	Away
30732	A10329R	242	10" L.D.	36	5/16"	Reverse	Away	Forward	Near
30796		428	8" L.D.						
307101	N9324R	433	12" L.D.						
30733	A10329R	446	10" L.D.	33	5/16"	Reverse	Away	Forward	Near
30734	N8329L	479	8" L.D.	26	5/16"	Forward	Away	Reverse	Near
30735	A7318R	482	7" L.D.	15	5/16"	Reverse	Away	Forward	Near
30736	A7328R	486	7" L.D.	25	5/16"	Reverse	Near	Forward	Away
30737	N10315R	489	10" L.D.	15	5/16"	Reverse	Near	Forward	Away
30738	N735R	492	7" L.D.	4	5/16"	Reverse	Near	Forward	Away
30739	N12320R	493	12" H.D.	19	5/16"	Reverse	Away	Forward	Near
30740	A7330R	514	7" L.D.	28	5/16"	Reverse	Away	Forward	Near
30741	A838L	515	8" L.D.	8	5/16"	Forward	Near	Reverse	Away
30742	A738L	516	7" L.D.	8	5/16"	Forward	Near	Reverse	Away
30743	A14310R	517	14" L.D.	15	5/16"	Reverse	Away	Forward	Near
30744	A14310L	518	14" L.D.	15	5/16"	Forward	Near	Reverse	Away
30745	A8328L	553	8" L.D.	25	5/16"	Forward	Near	Reverse	Away
30746	A9329R	593	9" L.D.	33	5/16"	Reverse	Away	Forward	Near
30747	A14320R	594	14" H.D.	19	5/16"	Reverse	Near	Forward	Away
30748	N7315R	595	7" L.D.	15	5/16"	Reverse	Near	Forward	Away
30749	A738R	603	7" L.D.	8	5/16"	Reverse	Away	Forward	Near
30750	A10328R	605	10" L.D.	27	5/16"	Reverse	Away	Forward	Near
30751	A12320L	606	12" H.D.	19	5/16"	Forward	Near	Reverse	Away
30752	A14326R	620	14" H.D.	26	5/16"	Reverse	Away	Forward	Near
30753	N10334L	629	10" H.D.	40	5/16"	Forward	Away	Reverse	Near
30754	A7332R	631	7" L.D.	31	5/16"	Reverse	Away	Forward	Near
30755	N14331L	632	14" H.D.	31	9/16"	Forward	Away	Reverse	Near
30756	N7318L	634	7" L.D.	15	5/16"	Forward	Near	Reverse	Away
30757	N12320L	635	12" H.D.	19	5/16"	Forward	Away	Reverse	Near
30758	A96318L	644	9 1/2" L.D.	15	5/16"	Forward	Near	Reverse	Away
30759	A12316L	646	12" L.D.	16	5/16"	Forward	Near	Reverse	Away
30760	N7 1/2 334L	647	7 1/2" L.D.	34	5/16"	Forward	Away	Reverse	Near
30761	N8332L	648	8" L.D.	32	5/16"	Forward	Near	Reverse	Away
30762	A7320L	668	7" L.D.	18	5/16"	Forward	Near	Reverse	Away
30763	N15320L	669	15" H.D.	19	9/16"	Forward	Away	Reverse	Near
30764	N16320L	670	16" H.D.	19	5/16"	Forward	Away	Reverse	Near
30765	N16320L	671	16" H.D.	19	5/16"	Forward	Away	Reverse	Near
30766	N12320R	677	12" H.D.	19	5/16"	Reverse	Near	Forward	Away
30767	N15320R	678	15" H.D.	19	1/2"	Reverse	Near	Forward	Away
30768	N15332R	679	15" H.D.	31	1/2"	Reverse	Near	Forward	Away
30769	A10329L	683	10" L.D.	30	5/16"	Forward	Away	Reverse	Near
30770	N7330L	684	7" L.D.	29	5/16"	Forward	Away	Reverse	Near

FAN BLADES CONTINUED NEXT PAGE
SECTION 5

FAN BLADES



CAT. NO.	FAN BLADES P/L PART NO.	BRINSMEAD PART NO.	BLADE DIAMETER	PITCH DEGREES	BORE	On Anticlockwise Motor (Viewed from motor end)		On Clockwise Motor (Viewed from motor end)	
						AIR DIRECTION	BOSS POSITION	AIR DIRECTION	BOSS POSITION
30771	A12332R	686	12" H.D.	31	5/16"	Reverse	Away	Forward	Near
30772	N16320R	687	16" H.D.	19	9/16"	Reverse	Near	Forward	Away
30773	N7332R	688	7" L.D.	31	5/16"	Reverse	Near	Forward	Away
30774	A16320L	689	16" H.D.	19	9/16"	Forward	Near	Reverse	Away
30775	A10332R	692	10" H.D.	36	5/16"	Reverse	Away	Forward	Near
30776	N12323R	697	12" H.D.	22	5/16"	Reverse	Near	Forward	Away
30777	A10320L	698	10" H.D.	19	5/16"	Forward	Near	Reverse	Away
30778	A12330L	700	12" H.D.	30	5/16"	Forward	Near	Reverse	Away
30779	A10329L	703	10" L.D.	30	5/16"	Reverse	Away	Forward	Near
30780	N10326L	715	10" L.D.	30	5/16"	Forward	Away	Reverse	Near
30781	N16320R	718	16" H.D.	19	9/16"	Reverse	Near	Forward	Away
30782	N8325R	722	8" L.D.	23	5/16"	Reverse	Near	Forward	Away
30783	N12320L	737	12" H.D.	19	1/2"	Forward	Away	Reverse	Near
30784	A10329L	738	10" L.D.	36	5/16"	Forward	Near	Reverse	Away
30785	A7328L	739	7" L.D.	25	5/16"	Forward	Near	Reverse	Away
30786	N10332R	740	10" H.D.	36	5/16"	Reverse	Near	Forward	Away
30787	A8328R	741	8" L.D.	26	5/16"	Reverse	Away	Forward	Near
30788	A14331R	742	14" H.D.	31	9/16"	Reverse	Away	Forward	Near
30789	A8328R	751	8" L.D.	26	5/16"	Reverse	Away	Forward	Near
30790	N12332L	752	12" H.D.	33	9/16"	Forward	Away	Reverse	Near
30791	N14336R	759	14" H.D.	36	9/16"	Reverse	Near	Forward	Away
30792	N16331R	760	16" H.D.	31	9/16"	Reverse	Near	Forward	Away
30793	N10329R	761	10" L.D.	31	5/16"	Reverse	Near	Forward	Away
30794	A16320L	763	16" H.D.	19	5/16"	Reverse	Away	Forward	Near
30795	N10329R	794	10" L.D.	31	5/16"	Reverse	Near	Forward	Away
307103	N8324L	815	8" L.D.	21	5/16"	Forward	Away	Reverse	Near
307104	N15320L	851	15" H.D.	19	9/16"	Forward	Away	Reverse	Near
307105	A9320R	865	9" L.D.	19	5/16"	Reverse	Away	Forward	Near
307106	N14320R	946	14" H.D.	22	5/16"	Reverse	Near	Forward	Away
307107	N12322L	950	12" H.D.	21	5/16"	Forward	Away	Reverse	Near
307108	A16320L	970	16" H.D.	19	9/16"	Forward	Near	Reverse	Away
307109	A16320R	973	16" H.D.	19	9/16"	Reverse	Away	Forward	Near
307110	A12316L	981	12" H.D.	16	1/2"	Forward	Near	Reverse	Away
307112	N14331R	1012	14" H.D.	31	9/16"	Reverse	Near	Forward	Away
307113	A14316L	1013	14" H.D.	19	5/16"	Forward	Near	Reverse	Away
307114	N14310L	1044	14" L.D.	15	5/16"	Forward	Away	Reverse	Near
307115	N14312R	1074	14" L.D.	22	5/16"	Reverse	Near	Forward	Away
307116	N7318R	1269	7" L.D.	8	5/16"	Reverse	Near	Forward	Away
307117	A7318R	1270	7" L.D.	16	5/16"	Reverse	Away	Forward	Near
307118	A7326R	1271	7" L.D.	24	5/16"	Reverse	Away	Forward	Near
307119	N8316R	1272	8" L.D.	16	5/16"	Reverse	Near	Forward	Away
307120	N8326L	1273	8" L.D.	24	5/16"	Forward	Away	Reverse	Near
307126	A14336L	1455	14" H.D.	36	9/16"	Forward	Near	Reverse	Away
307127	A14315R	1488	14" L.D.	15	3/8"	Reverse	Away	Forward	Near
307128	N96318R	1747	9 1/2" L.D.	15	1/4"	Reverse	Near	Forward	Away
307129	A16332R	2233	16" H.D.	31	1/2"	Reverse	Away	Forward	Near
307130	A14326R	2372	14" H.D.	26	1/2"	Reverse	Away	Forward	Near
307131	N14326R	2414	14" H.D.	26	9/16"	Reverse	Near	Forward	Away
307132	A14326R	2725	14" H.D.	26	9/16"	Reverse	Away	Forward	Near
307133	A96332R	2800	9 1/2" L.D.	31	5/16"	Reverse	Away	Forward	Near
307134	A16320R	2818	16" H.D.	19	1/2"	Reverse	Away	Forward	Near
307135	N9330L	3200	9" L.D.	30	5/16"	Forward	Away	Reverse	Near
307136	A8336R	3204	8" L.D.	36	5/16"	Reverse	Away	Forward	Near
307137	N10332R	3209	10" L.D.	30	5/16"	Reverse	Near	Forward	Away
307138	N10324R	3212	10" H.D.	25	5/16"	Reverse	Near	Forward	Away
307139	A10332R	3274	10" H.D.	30	5/16"	Reverse	Away	Forward	Near
307140	N12330L	3295	12" H.D.	30	5/16"	Forward	Away	Reverse	Near
307141	N12329R	3313	12" H.D.	31	5/16"	Reverse	Near	Forward	Away
307142	A9330L	3644	9" L.D.	30	5/16"	Forward	Near	Reverse	Away
307143	A8332R	3718	8" L.D.	31	5/16"	Reverse	Away	Forward	Near
307144	N10329L	3892	10" L.D.	31	5/16"	Forward	Away	Reverse	Near
307145	N16330R	3898	16" H.D.	29	1/2"	Reverse	Near	Forward	Away
307146	N16320R	5297	16" H.D.	19	1/2"	Reverse	Near	Forward	Away
307147	N16320R	5298	16" H.D.	19	1/2"	Reverse	Near	Forward	Away

AXIAL FLOW FAN BLADES (ROTORS)

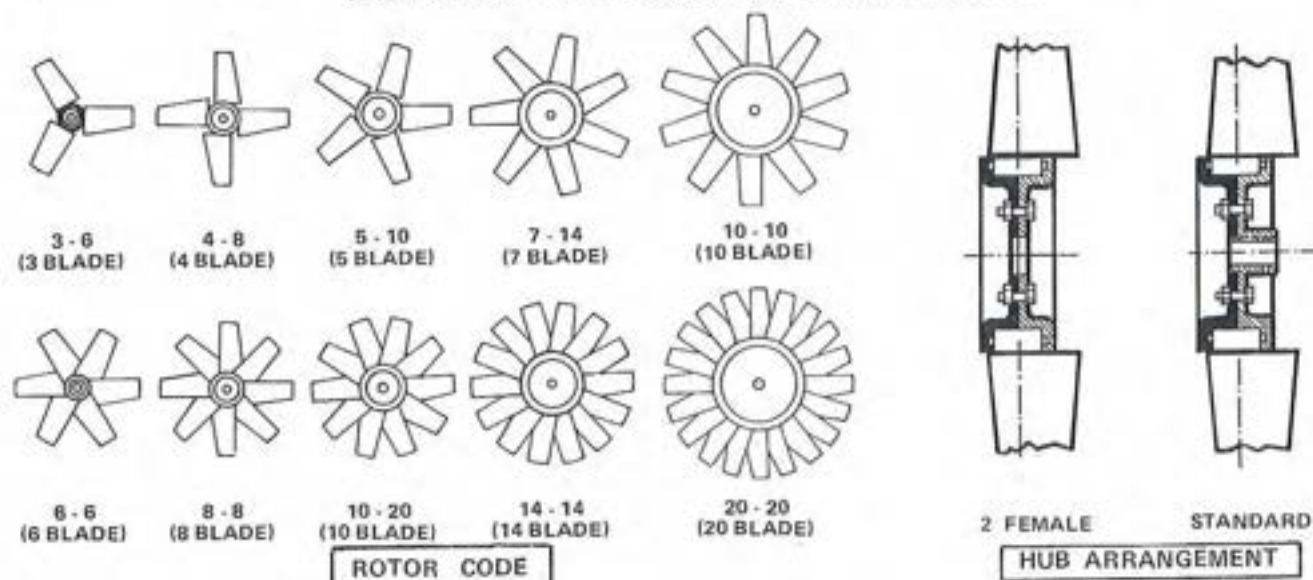
MULTI-WING



MATERIAL : POLYPROPYLENE BLADES — ULTRA-VIOLET STABILISED, ALUMINIUM HUBS.
 TEMP. RANGE : -23 to +71°C (-10 to +160°F)
 MAX. TIP SPEED : 18000 FEET PER MINUTE
 BALANCING : NORMALLY NOT REQUIRED

COMPLETE INTERCHANGEABILITY OF COMPONENT PARTS
 ORDERING PROCEDURE

TO ENSURE THAT THE ASSEMBLY OR PARTS ARE DELIVERED EXACTLY TO SPECIFICATION
 IT IS IMPORTANT THAT THE CODING AS SET OUT BELOW BE USED



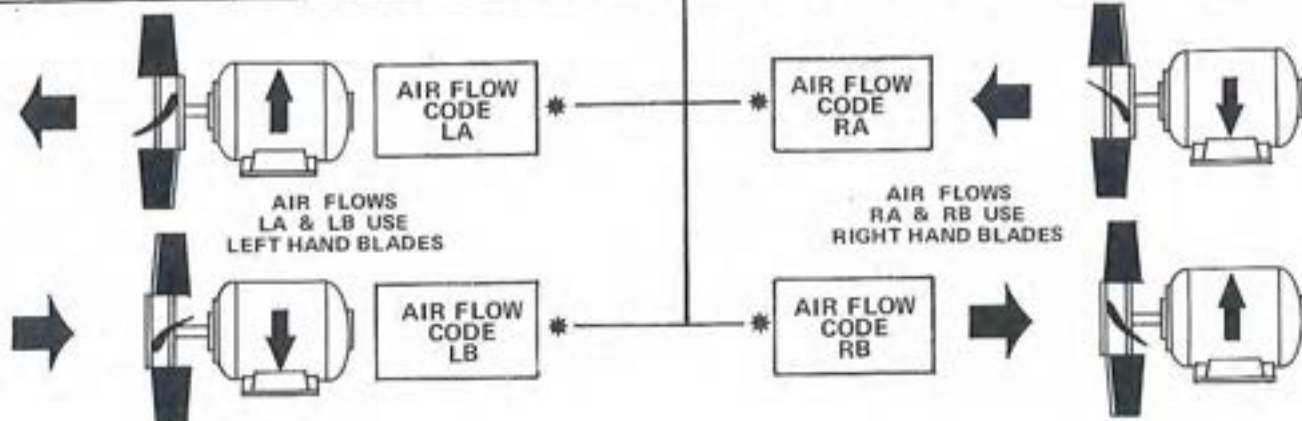
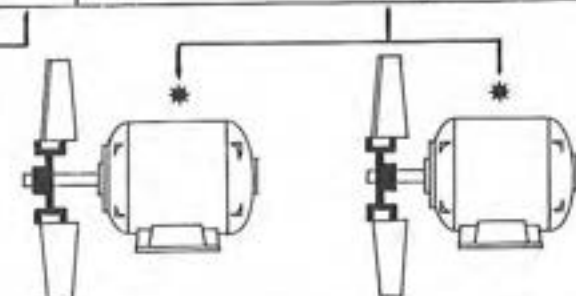
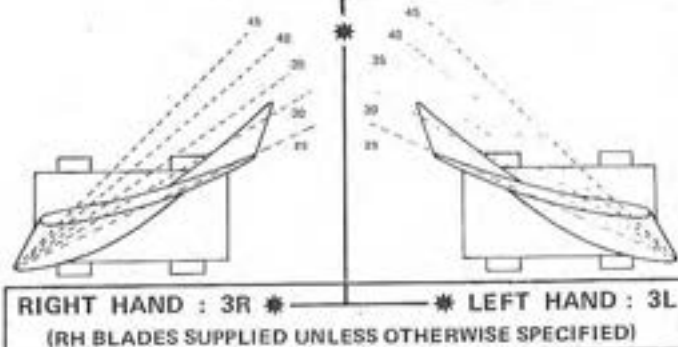
EXAMPLE ROTOR ONLY

SPECIFY WHEN ORDERING

EXAMPLE BLADES ONLY

1	26" Actual	7-14	3L	30°	LB	24mm	8 x 3.5	Inside	Standard
QUANTITY	DIAMETER ACTUAL OR NOMINAL	ROTOR CODE	BLADE TYPE	BLADE ANGLE	AIR FLOW CODE	BORE	KEYWAY WIDTH X SIDE DEPTH	BOSS INSIDE OR OUTSIDE	HUB ARRGT. STANDARD OR 2 FEMALE
3	26" Actual	7-14	3L	30°	LB	Cut Blades only			

BLADE ANGLE MOULDED ON BLADE



FAN MOTORS

BETTS 'A' SERIES - SLEEVE BEARING MOTOR

SHADED POLE - 4 POLE - THREADED SHAFT - 240 VOLT 50 Hz.

CAT. NO.	MODEL	WATTS OUTPUT	STACK mm
3091	A101 - 28A	4	17
	A107 - 21A	8	26
3092	A121 - 07A	12	26 (with O/L)
3099	A120 *	4	17

* Motor as A101 but fitted with spider mounting bracket and 7" plastic blade.

APPLICATIONS :

COMMERCIAL AND DOMESTIC REFRIGERATION.

ROOM HEATERS.

VENTILATING FANS.

ELECTRONIC EQUIPMENT COOLING.



BETTS - "FM" SERIES FAN MOTORS

30D STANDARD RANGE

4 POLE - SHADED POLE - BALL BEARING

EVAPORATOR & CONDENSER APPLICATIONS

The BETTS "FM" range of 240 volts 50Hz. motors (CS573N certificate of suitability) offering outputs from 10 to 60 Watts are available in either Clock or Anti-Clockwise Rotation and are ideally suited to all types of fan load applications. All motors are fitted with 140°C rated automatic resetting thermal overload protectors and single row, deep groove, double sealed, noise tested ball bearings with lifetime lubrication.

CAT. NO.	MODEL	PART No.	VOLTS AC 50Hz	AMPS	WATTS Output	RPM Nom.	DIMENSIONS - mm			BRINSMEAD EQUIV.	REPLACES
							Shaft Dia.	Body Dia.	Body Lgth.		
30910	FM1-A	30D501-61A	240	0.3	10	1300	7.925	102.0	69.7	BG2 & 6	D101, D143, D155
30911	FM1-C	30D501-61C					7.912				D102, D106, D142
3093	FM2-A	30D502-61A	240	0.5	20	1300	"	"	65.7	-	-
3094	FM2-C	30D502-61C					"				
30912	FM3-A	30D503-61A	240	0.75	40	1300	"	"	72.7	BG3 & 7	D156, F103B/20A
30913	FM3-C	30D503-61C					"				-
30914	FM4-A	30D504-61A	240	0.9	50	1300	"	"	78.7	-	-
30915	FM4-C	30D504-61C					"				
3095	FM5-A	30D505-61A	240	1.0	60	1300	"	"	84.7	-	-
3096	FM5-C	30D505-61C					"				

NOTE: ALL ABOVE MOTORS ARE ON BASIS OF MINIMUM QUANTITY PURCHASE ONLY

BETTS '35F' SERIES

SHADED POLE TOTALLY ENCLOSED
BALL BEARING MOTORS
CLASS "E" INSULATION

APPLICATIONS

AIR CIRCULATORS
ROOM AIR CONDITIONERS
PACKAGED AIR CONDITIONERS

Nominal RPM 1400 Amps 1.4
Mounting - Round body with lugs -
3 mounting holes 9/32" Dia. on 6 1/2" PCD.



CAT. NO.	MODEL	VOLTS AC	WATTS Output	KIRBY Model	BRINSMEAD Model
	35F117-05A	240	75	MPB421B	E323A
	35F117-06A	240	75	MPB4220	-
	35F118-05A	415	75	MPB4250	E319A
	35F118-07A	415	75	MPB4260	-
31089	35F117-10A	240	75	-	E287A
31090	35F117-10C	240	75	-	E287C 32FE003
	35F121-01C	240	70	-	32FE005

FAN MOTORS BETTS SPECIAL RANGE

CAT. NO.	MODEL	BRINSMEAD No.	VOLTS AC	WATTS OUTPUT
30916	30D507 - 70C		415	10
30917	30D508 - 70A		415	20
30933†	30D509 - 70C	BG4C	415	40
31076†*	30D521 - 70A	BP123A	240	16
	30D503 - 70C		240	
31080†*	30D503 - 71C	BP112C	240	25
31079†*	30D501 - 76C	BP40C	240	10
	30D501 - 74C		240	
31077†*	30D505 - 70C	BP146C	240	37.5
	30D522 - 70A		240	20 (TEFC)

† CAT. NO's refer to Brinsmead equivalent AND * indicates they are on basis of Minimum Quantity Purchase Only.

BETTS 'C' SERIES

2 POLE - SHADED POLE - 240 VOLT 50 Hz. MOTOR

CAT. NO.	MODEL	BEARINGS	WATTS OUTPUT
31053	FAC 234	Sleeve	4
	40C019 - 02A	Ball	6
	40C024 - 01A	Ball	10

BETTS 'D MAX' - 39D - STANDARD RANGE

240 VOLT 50 Hz. MOTOR

SHADED POLE - 4 POLE - SLEEVE BEARING



The "D MAX" range of 240 volt 50 Hz. motors offering outputs from 10 to 60 watts are available in either Clockwise or Anti-Clockwise rotation and are ideally suited to all types of load applications. All motors are fitted with 140°C rated automatic resetting thermal overload protectors and self-aligning sleeve bearings with lifetime lubrication (Approx. 40,000 Hours).

APPLICATIONS

CONDENSER FAN (Commercial & Domestic Refrigeration)
VENTILATING FANS - ROOM HEATERS - RANGE HOODS
ELECTRONIC EQUIPMENT COOLING - MIXERS
AND OTHER LIGHT POWER APPLICATIONS

MOTOR SELECTION CHART

BLADE PITCH	BLADE DIAMETER					
	Typical 3 Bladed Fabricated Commercial Propeller Fan					
	200 mm	230 mm	250 mm	300 mm	350 mm	400 mm
10°	D501 (59.0)	D501 (83.1)	D501 (106)	D501 (189)	D502 (307)	D503 (519)
15°	D501 (71.0)	D501 (106)	D501 (142)	D501 (247)	D503 (425)	D504 (613)
20°	D501 (85.0)	D501 (123)	D501 (165)	D502 (283)	D503 (519)	D505 (708)
25°	D501 (106)	D501 (151)	D501 (212)	D502 (354)	D504 (613)	—
30°	D501 (130)	D501 (189)	D501 (260)	D503 (448)	D505 (708)	—
35°	D501 (156)	D501 (217)	D502 (283)	D503 (519)	—	—
40°	D501 (189)	D502 (260)	D502 (330)	D505 (590)	—	—
45°	D502 (236)	D502 (307)	D503 (378)	—	—	—

NOTE: Figures shown in brackets represent approximate Litre/second (L/s) Air Flow free in air at 1300 RPM.

Conversion: Multiply L/s by 2.1186 = CFM. Multiply CFM by 0.472 = L/s

CAT. NO.	MODEL	WATTS OUTPUT	AMPS	RPM
	39D501-21A	10	0.3	1300
	39D501-21C			
	39D502-21A	20	0.5	1300
	39D502-21C			
	39D503-21A	40	0.75	1300
	39D503-21C			
	39D504-21A	50	0.9	1300
	39D504-21C			
	39D505-21A	60	1.0	1300
	39D505-21C			

FAN MOTORS

BRINSMEAD



GENERAL PURPOSE FRACTIONAL HORSE POWER

Applications include Refrigeration condenser fans — Evaporator fans — Water coolers — Controlled temperature display cabinets — Drink dispensers — Pumps — Reduction gear boxes — Domestic heating and all Air movement applications.

ROTATION — CLOCKWISE OR ANTI-CLOCKWISE (SHAFT END)

MOTOR COLOURS — BLACK: ANTI-CLOCKWISE. GREY: CLOCKWISE

SUPPLY LEAD — P.V.C., 26" OUTSIDE MOTOR.

CAT. NO.	TYPE	VOLTS	AMPS	OUTPUT		RPM (NOM)	DIMENSIONS — INCHES				MOUNTING	BEAR.
				WATTS	HP		SHAFT DIAM.	SHAFT LENGTH	BODY DIAM.	BODY LENGTH		
30926	BG1-A	240	0.3	10	0.013	1300	5/16	1 1/4	4.1/16	2. 7/16	7 Points 3/16" BSW each end	Ball
30927	BG1-C											
30928	BG2-A	240	0.3	13	0.017	1300	5/16	1 1/4	4.1/16	2.19/32	"	Ball
30929	BG2-C											
30930	BG3-A	240	0.7	40	0.054	1300	5/16	1 1/4	4.1/16	3. 3/32	"	Ball
30931	BG3-C											
* 30932	BG4-A	415	0.3	40	0.054	1300	5/16	1 1/4	4.1/16	3. 3/32	"	Ball
* 30933	BG4-C											
* 30934	BG5-A	240	0.3	13	0.017	3 Speed	5/16	1 1/4	4.1/16	2.19/32	"	Ball
* 30935	BG5-C											
* 30936	BG6-A	240	0.3	13	0.017	1300	5/16	1 1/4	4.1/16	2.19/32	"	Ball
* 30937	BG6-C											
* 30938	BG7-A	240	0.7	40	0.054	1300	5/16	1 1/4	4.1/16	3.3/32	"	Ball
* 30939	BG7-C											

NOTE — When ordering:— Motor should be suffixed by "A" (A.C.W.) or "C" (C.W.) which determines rotation — shaft end, e.g. — BG1C (clockwise)

- * MOTORS MARKED WITH ASTERISK (*) ARE ON BASIS OF MINIMUM QUANTITY PURCHASE ONLY.
Motors NOT marked with (*) are Off-Shelf Items.

FURTHER BRINSMEAD FAN MOTORS ARE LISTED ON PAGE 310-d

BRINSMEAD FAN MOTOR REPLACEMENTS — REFER TECH. PAGES 310-e, 310-f, 310-g and 310-h

KELVINATOR DOMESTIC FAN MOTORS

CAT. NO.	BIN No.	PART No.
30950	PH668	KA53811
30951	PH667	KA53637
30953	PD674	SR786
30955	RC415	KA31869
30958	RC264	—
30960	RC251	KA25990

CAT. NO.	BIN No.	PART No.
30962	RC263	KA28723
30964	L237	KA28825
30966	PH666	KA53539
30968	RD870	KA58575
30969	RF113	KA60453

ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

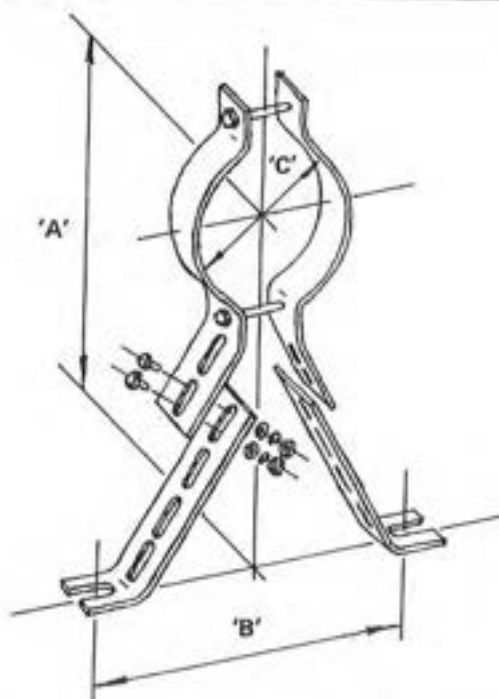
YOU CAN PURCHASE ALL KINDS OF COMPONENTS AND EQUIPMENT FROM US AT A SAVING IN PRICE
ASK US FOR A QUOTATION

OUR STOCK OF COMPONENTS, EQUIPMENT AND SYSTEMS FOR AIR CONDITIONING, HEATING, COMMERCIAL AND INDUSTRIAL REFRIGERATION IS UNSURPASSED THROUGHOUT AUSTRALIA

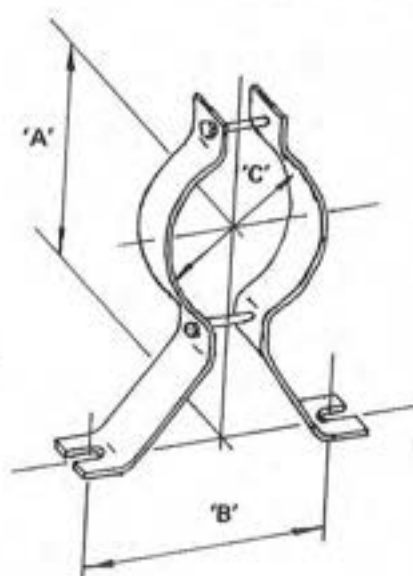
FAN MOTORS & MOUNTING BRACKETS

FAN MOTOR SELECTION CHART							
BLADE PITCH	MAKE CFM	BLADE DIAMETER					
		(Typical 3 bladed fabricated commercial propeller fan)					
		8"	9"	10"	12"	14"	16"
10°	Betts	FM1	FM1	FM1	FM1	FM2	FM3
	Brinsmead	BG1	BG1	BG1	BG2	BG3	BG3
	CFM	(125)	(175)	(225)	(400)	(650)	(1100)
15°	Betts	FM1	FM1	FM1	FM1	FM3	FM4
	Brinsmead	BG1	BG1	BG1	BG2	BG3	32FE005
	CFM	(150)	(225)	(300-340)	(500-525)	(900)	(1300)
20°	Betts	FM1	FM1	FM1	FM2	FM3	FM5
	Brinsmead	BG1	BG1	BG1	BG3	BG3	32FE005
	CFM	(180)	(260)	(350)	(600-700)	(1100)	(1500-1600)
25°	Betts	FM1	FM1	FM1	FM2	FM4	—
	Brinsmead	BG1	BG1	BG2	BG3	32FE005	32FE003
	CFM	(225)	(320)	(450-475)	(750-820)	(1300)	(1900)
30°	Betts	FM1	FM1	FM1	FM3	FM5	—
	Brinsmead	BG1	BG2	BG2	BG3	32FE005	—
	CFM	(275)	(400)	(550)	(950-1000)	(1500)	—
35°	Betts	FM1	FM1	FM2	FM3	—	—
	Brinsmead	BG2	BG2	BG3	BG3	32FE003	—
	CFM	(330)	(460)	(600)	(1100)	(1700)	—
40°	Betts	FM1	FM2	FM2	FM4	—	—
	Brinsmead	BG2	BG3	BG3	32FE005	—	—
	CFM	(400)	(550)	(700)	(1180-1250)	—	—
45°	Betts	FM1	FM2	FM3	—	—	—
	Brinsmead	BG2	BG3	BG3	32FE003	—	—
	CFM	(500)	(650)	(800)	(1270)	—	—

NOTE: Figures shown in brackets represent approximate CFM air flow free in air at 1300 r.p.m.



ADJUSTABLE LIGHT DUTY
Material : 1½" x 14 BG. MS.



STANDARD LIGHT DUTY
Material : 1½" x 14BG. MS.

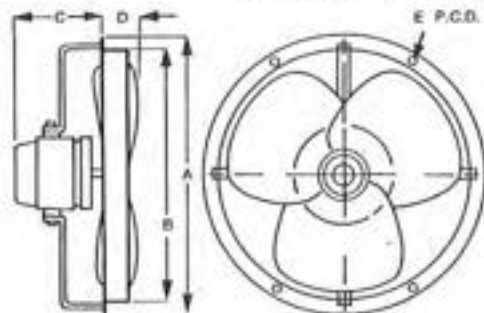


**COMPLETE CLAMP
BOLTS AND NUTS**

TYPE	CAT. NO.	MFG. PART NO.	CENTRE HEIGHT 'A'		FEET CENTRES 'B'		MOTOR DIAM. 'C'
			MAX.	MIN.	MAX.	MIN.	
STANDARD LIGHT DUTY	30918	FB7	5.5/16"		6.1/2"		4"
STANDARD LIGHT DUTY	30919	FB8	7.1/4"		6.3/4"		4"
ADJUSTABLE LIGHT DUTY	30920	FB19	10.1/4"	4.11/16"	8.3/4"	4.5/16"	4"

ALL FEET MOUNTING SLOTS & HOLES SUIT 5/16" MAX. DIAM. BOLTS.

HEAVY DUTY RING MOUNTED EXHAUST FANS



FEATURES

AVAILABLE IN FORWARD OR REVERSE AIR DIRECTION

- ★ Ease of Installation
- ★ Standard mounting
- ★ Fully tested balanced blades
- ★ Maximum air delivery with minimum power input and noise level
- ★ Economical cost
- ★ Locally available stock
- ★ Minimum maintenance

CAT. NO.	MODEL	SIZE		Nom. Speed RPM	Elect. Volts Hz.	Free Air Displacement		Watts Input Free Air	Amps Input Free Air	DIMENSIONS — mm					
		mm	ins.			L/s	CFM			A	B	C	D	E	Mtg. Hole
3101	XHR12	305	12	1420	240/50	470	1000	90	0.7	375	324	168	35	352.5	7
3102	XHR16	406	16	1400	240/50	752	1600	180	1.4	508	427	184	41	473	9

MODEL	NOM. SPEED RPM	PERFORMANCE DATA												Sound Pressure Level at Free Air dB(A) at 3 metres
		AIR DISPLACEMENT — L/s						AIR DISPLACEMENT — CFM						
		System Resistance — mm WG						System Resistance — ins. WG						
		Free Air	0.094	0.187	0.374	0.56	0.748	Free Air	0.05	0.1	0.2	0.3	0.4	
XHR12	1420	470	423	352	202	—	—	1000	900	750	430	—	—	47
XHR16	1400	752	705	658	634	446	305	1600	1500	1400	1350	950	650	53



WALL OR CEILING MOUNT EXHAUST FANS



KE 250

BE 200



UE 300

CAT. NO.	MODEL	SIZE (Dia. mm)	CAPACITY		Hole Size (Dia. mm)	APPLICATIONS
			m ³ /hr	ft ³ /hr		
3108	BE 200	200	373	13,350	245	OFFICE, KITCHEN, LOUNGE FAMILY ROOM, LAUNDRY ENSUITE/BATHROOM
3109	KE 250	250	583	20,820	295	
31010	UE 300	300	660	23,600	345	OFFICE, WORKSHOP LARGE KITCHEN LOUNGE, FAMILY ROOM

Electrical Rating: 240 Volt AC 50Hz.

RECOMMENDED AIR CHANGES PER HOUR					
DAIRIES	10	LIVING AREAS	5	SELECTION EXAMPLE Office 4 x 3.5 x 2.4 m High Volume = 33.6 m ³ Required Air Changes = 10/hr Total Vol/hr = 33.6 x 10 = 336 @ 336 m ³ /hr Select BE 200	
FACTORIES	8	OFFICES	10		
HOTEL BARS	15	RESTAURANTS	25		
LOUNGES	15	SCHOOL CLASSROOMS	4		
KITCHENS	25	SHOPS	15		
LABORATORIES	15	HEAVY SMOKING AREAS	17.5		

SIMPLE FACTS FOR SATISFACTORY FAN SELECTION AND INSTALLATION.

- Locate Fans to blow with prevailing winds, wherever possible.
- If fans are located above windows, ensure windows are closed when fan is operating otherwise air is simply recirculated and effectiveness in the working area is reduced.
- Fumes or air removed by Fans must be replaced by equivalent amounts of fresh air and proper openings provided in the space being ventilated to permit entry of this fresh air.
 - Locate such intake areas to take advantage of positive pressure produced by prevailing winds.
 - Provide intake areas at least 20% greater than the area of the exhaust orifice.
- Locate Fans with respect to intake areas so that maximum scavenging effect will be obtained by fresh air sweeping over the working areas.
- Where steam, excessive heat and odours are encountered, locate Fans near the ceiling and if possible or practical, hood the source to obtain an air velocity of at least 100 ft. per minute through face of hood.
- It is often advisable to use two or more smaller Fans in place of one large Fan to provide better air distribution and more flexible operation.
- Insect screening is not recommended for use with exhaust Fans. Such screening will materially reduce the effective air removal by the Fan and will require frequent cleaning to prevent subsequent overloading of the Fan motor.

MULLER FAN MOTORS

CAT. NO.	MOTOR MAKE & FRAME NO.	KELV. BIN. NO.	SUITS MODEL
----------	------------------------	----------------	-------------

SINGLE PHASE

310103	W'House 32FE012 Brins. E390(b)	MM330	Radial - RA260(1), RA350(1), RA450(1)
310102	Westinghouse 32FE005 GMF KQBG3A12/4B Brinsmead E387C(b)	MM327 MM484	UA450, 580, 870, 1100 MUA450(1), 580(1), 870(2), 1100(2) Hot Rod H301(1), 601(2), 821(2) Hot Gas GA323, 663, 853 EP301(1), 601(2), 771(2) Radial RA580(1), 680(1)
310101	Westinghouse 32FE003 GMF KQBG3A15/4AB Brinsmead E326(b)	MM328 MM485	UA680, 1350 MUA680(1), 1350(2) Hot Rod H481(1), 941(2) Hot Gas GA513, GA1023 EP451, EP901 Radial RA870(1) RA1050(1)
310113	Westinghouse 42FE1003S(a) GMF RKEQBG4B16/4AB	MM329 MM486	UA1700, 2300, 3400 MUA1700(2), 2300(2), 3400(2) Hot Rod H1201(2), H1601(2), H2401(2) Hot Gas GA1313, 1823, 2653 EP1201(2), 1601(2), 2401(2) Radial RA1400(1), 1800(1), 2400(2)
31083	GMF LYEQBD2C16-4 Brinsmead BP136C	MM51	All RLC and ELC Coolers
31077	Brinsmead BP146C	MM105	All MLV and MLVE Coolers
31051	Eilback (c) 5/8" Stack D Frame Betts Cowl Mounted	MM593	All Ceiling and Mullion Unit Coolers
31059	Betts 3/4" Stack D Frame Cowl Mounted	MM143	Cabinet Unit Coolers - Normal Temp. CSN Series - Low Temp. CSL Series
31060	Brinsmead BP154A	MM144	Cabinet Unit Coolers - Normal Temp. CDN Series - Low Temp. CDL Series
(a)	Superseded Capacitor Start/Run Motors were fitted to early production units - MM248 type 42FLL3003S fitted UA1700 and UA4400 MM249 type 42FLL3004S fitted UA2300 and UA3400		
(b)	Brinsmead motors no longer available - substitute with Westinghouse or GMF Motor		
(c)	Back mounted motors no longer available - use cowl mounted motor.		
-	Westinghouse 42FLL3004S (C.S.C.R) Brinsmead 42FE3036	MM249	Remote Condensers (optional) RC and LAC10 Series

THREE PHASE

-	Westinghouse 42FS002 Brinsmead 42FS011	MM464	UA450, 580, 680, 870, 1100, 1350 MUA450(1), 580(1), 680(1), 870(2), 1100(2), 1350(2) Hot Rod H301(1), 481(1), 601(2), 821(2), 941(2) Hot Gas GA323, 513, 663, 853, 1023 EP301(1), 451, 601(2), 771(2), 901 Radial RA580(1), 680(1), 870(1), 1050(1)
-	Westinghouse 42FS001 Brinsmead 42FS015 GMF RKT84A11/4B	MM485 MM596	UA1700, 2300, 3400, 4400 MUA1700(2), 2300(2), 3400(2), 440 Hot Rod H1201(2), 1601(2), 2401(2), 3201 Hot Gas GA1313, 1823, 2653, 3623 EP1201(2), 1601(2), 2401(2), 3601 Radial RA1400(1), 1800(1), 2400(2) Remote Condenser - RC Series and LAC10
31062	GMF RJETBG4P8/4B Can use MM596	MM116	Remote Condenser MAC Series
-	Pope 4435-206-502S/D BS Frame 56	MM119	Rotojet Condenser FEC Series

MULLER INTER CHANGING MOTORS - REFER NEXT PAGE

FIGURE THE ODDS

BECAUSE WE BELIEVE OUR STOCK IS ONE OF THE LARGEST AND MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY, THE MATHEMATICAL ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACPAR THAN ANYWHERE ELSE.

IF TIME IS MONEY, WHY WASTE IT BY LOOKING ELSEWHERE.

MULLER FAN MOTORS (Cont'd)

INTERCHANGING MOTORS

WESTINGHOUSE SINGLE PHASE TO G.M.G. SINGLE PHASE

UA, GA & H Series - Completely interchangeable on all coolers manufactured after October, 1966. These have slots, in lieu of holes, in mounting arms at fan shroud. Slotted mounting arms available 3 per 14" motor P/No. 16209Y (Kit No.1.) 4 per 18" and 20" motor P/No. 16210Y (Kit No.2.).

RA Series - Completely interchangeable. Remove motor spacers.

G.M.F. SINGLE PHASE TO WESTINGHOUSE SINGLE PHASE

UA, GA & H Series - Completely interchangeable.

RA Series - 14" interchangeable. 18" and 20" motors require motor spacers.
4 per motor P/No. 16851Z (Kit No. 3.)

G.M.F. OR WESTINGHOUSE SINGLE PHASE TO G.M.F. OR WESTINGHOUSE 3 PHASE

UA, GA & H Series - 14" require 3 special arms P/No. 15595Y and 3 spacers P/No. 153272 per motor (Kit No. 4.). 18" and 20" are completely interchangeable.

RA Series - 14" 3 phase motor to suit Radial Series will not be manufactured.

18" & 20" are completely interchangeable but remote junction box to be fitted with 3 way terminal strip in lieu of 2 way and 4 core leads in lieu of 3 core.

REMOTE CONDENSER: G.M.F. OR WESTINGHOUSE 3 PHASE TO WESTINGHOUSE CAPACITOR START/RUN

Completely interchangeable. Capacitor start/run motors **only** to be used. Capacitor must be covered. S.A.A. regulations. Cover P/No. 16893Y.

REMOTE CONDENSER: G.M.F./WESTINGHOUSE 3 PHASE TO WESTINGHOUSE/G.M.F. 3 PHASE

G.M.F. to Westinghouse completely interchangeable. Westinghouse to G.M.F. interchangeable provided slotted motor arms fitted. Slotted arms available, 4 per 18" and 20" motor P/No. 16210Y (Kit No. 2)

BRINSMEAD SINGLE PHASE TO WESTINGHOUSE SINGLE PHASE

Brinsmead motors last fitted to FDC in 1963. Adaptor ring required to convert to Westinghouse P/No. 15491W. 1 kit per motor (Kit No. 5.). Brinsmead fan blades cannot be fitted to Westinghouse motors.

MOTOR CONVERSION KITS

CAT. NO.	BIN NO.	KIT NO.	DESCRIPTION
	MM491	1	3 x 14" Slotted Brackets
	MM492	2	4 x 18" and 20" Slotted Brackets
	NLA	3	4 Spacers
	NLA	4	3 Arms, 3 Spacers
	NLA	5	1 Adaptor Ring, Screws, Washers, Nuts



MULLION UNIT COOLER
NORMAL TEMPERATURE



CABINET UNIT
LOW & NORMAL TEMP.



MUA PACEMAKER SERIES
NORMAL TEMPERATURE

FAN MOTORS

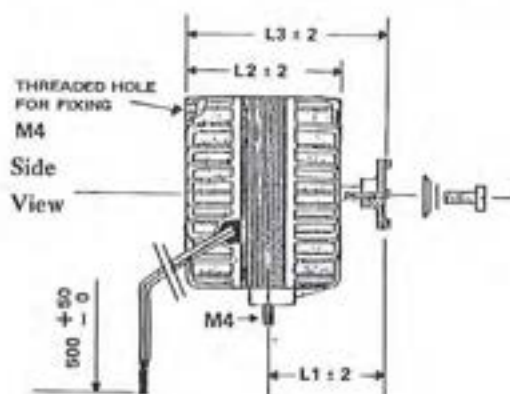
ELECTROHOME OPEN FRAME & FROST FREE FAN MOTORS - 240 VOLT 50 Hz.



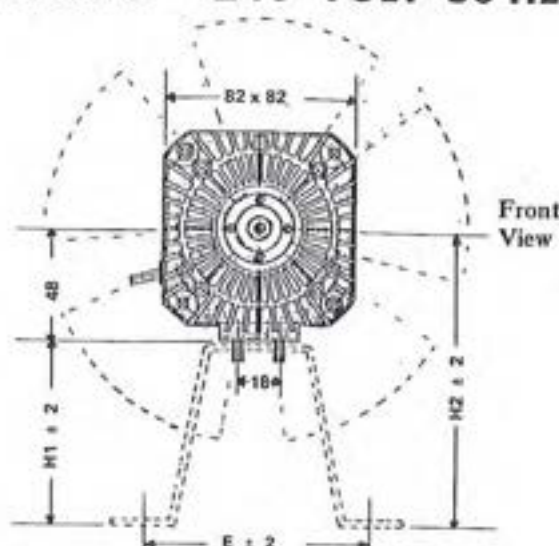
CAT. NO.	MODEL	Rotation	Amps	RPM	Watts Output	APPLICATION
OPEN FRAME FAN MOTORS						
31054	2858-206-020	ACW	0.15	2500	4.3	SUITS MULLER CDN & CDL SERIES FDC's
31056	2858-206-026	CW	0.15	2500	4.3	SUITS REPCO-BOHN TA & TL SERIES FDC's
FROST FREE FAN MOTORS FOR DOMESTIC REFRIGERATORS						
31055	2858-005-001	CW	0.09	2300	1.7	DIRECT REPLACEMENT FOR KELVINATOR AND MANY OTHER DOMESTIC "FROST-FREE" REFRIGERATORS

RADLON FAN MOTORS - TYPE 'RM'

SHADED POLE - TOTALLY ENCLOSED - 240 VOLT 50 Hz.



DIMENSIONS IN mm



TECHNICAL DATA

Threaded holes for fixing - 3 on back cover

Position: Can be mounted and will operate with shaft in ANY position.

Speed: 1300 RPM approx. depending on the fan blade used.

Temperature: Can be used for ambient temperatures from -30° to $+50^{\circ}\text{C}$ (-22° to $+122^{\circ}\text{F}$).

Lubrication: Will operate for several years WITHOUT lubrication (long life lubrication).

Rotation: CCW = Counter clockwise (Suction Type)

Insulation: Class E

CW = Clockwise (Blower Type).

CAT. NO.	MODEL	Rotation	WATTS OUTPUT	AMPS	SUGGESTED BLADES		DIMENSIONS — mm					
					Dia. mm	Pitch	L1	L2	L3	H1	H2	E
IMPEDANCE PROTECTED MOTORS												
31036	RM/7	CCW	7	0.19	230	26°	51	67	87	89	137	140
31037	RM/7	CW										
31038	RM/10	CCW	10	0.33	250	26°	51	67	87	89	137	140
31039	RM/10	CW										
OVERLOAD PROTECTED MOTORS (KLIXON)												
31040	RM/11	CCW	11	0.39	250	26°	51	67	87	89	137	140
31041	RM/11	CW										
RADLON MOTOR WITH BRACKETS — TOTALLY ENCLOSED												
31032	RM/17	CCW	17									
RADLON MOTORS FOR USE ON L'UNITE HERMETIQUE CONDENSING UNITS												
31033			75									
31034			90									

RADLON FAN BLADES - Refer Page 305

BRINSMEAD FAN MOTORS

CAT. NO.	TYPE	VOLTS	AMPS	OUTPUT		RPM (Nom)	DIMENSIONS — INCHES				MOUNTING	BEAR.
				WATTS	HP		SHAFT DIAM.	SHAFT LENGTH	BODY DIAM.	BODY LENGTH		
* 31076	BP123/1A	240	0.40	16	0.021	1300	5/16	6-3/16 Shaft end 1/4 BSW Thread		3-1/16	4 Points 3/16" BSW each end	Ball
* 31077	BP146-C	240	1.10	37.5	0.05	1300	5/16	1-1/4		3-27/32	4 3/16" BSW Screws at rear	Ball
* 31078	BP119-A	240	0.50	18.5	0.025	1300	5/16	3		4-1/2	4 Points 3/16" BSW at front	Ball
* 31079	BP40-A	240	0.40	10	0.013	1300	5/16	15/16		2-5/8	Foot Mounted 3-3/8" bolt centres	Ball
* 31080	BP112-C	240	0.60	25	0.033	1300	5/16	1-1/4		2-13/16	3 Points 1/4" BSW at rear	Ball
* 31081	BP113-A	240	0.30	7.5	0.01	1300	5/16	1-1/4		3-3/16	2 Points 1/4" BSW Bracket 5" centres	Ball
⊕ 31082	BP127-A	240	0.30	7.5	0.01	1300	5/16	1-1/4		2-1/2	Clamp	Ball
* 31083	BP136-C	240	0.60	22.5	0.03	1300	5/16	2-3/8		3-1/8	4-3/16" BSW Screws at front	Ball
⊕ 31084	BP137-A	240	0.20	5	0.006	1300	5/16	1-1/4		2-11/32	3 Points 3/16" BSW at rear	Ball
⊕ 31088	BP129-A Was MX330A	240	0.30	40	0.054	2 Speed	5/16	1-1/4		3-7/8	Clamp	Ball
△ 31089	E287-A	240	1.30	80	0.107	1360	9/16	2-1/8		5-1/4	3 Points 5/16" BSW on housing	Ball
△ 31090	E287-C	240	1.30	80	0.107	1360	9/16	2-1/8		5-1/4	3 Points 5/16" BSW on housing	Ball
⊕ 31095	E376-A	240	0.60	25	0.033	1300	5/16	1-7/8		4-1/8	"	Ball
⊕ 31096	E376-C	240	0.60	25	0.033	1300	5/16	1-7/8		4-1/8	"	Ball
⊕ 31092	E354-A	240	1.10	55	0.074	1300	5/16	1-5/16		3-9/16	4 Points 3/8" BSW at front	Ball
⊕ 31093	E354-C	240	1.10	55	0.074	1300	5/16	1-5/16		3-9/16	4 Points 3/8" BSW at front	Ball
310101	32FE003	240	1.50	67	0.09	1350	5/16	1-1/4 Clockwise Rotation		4-7/8	3 Points 5/16" BSW on housing	Ball
310102	32FE005	240	1.20	37.5	0.05	1380	5/16	1-1/4 Clockwise Rotation		4-7/8	3 Points 5/16" BSW on housing	Ball
* 310103	32FE012	240	0.62	25	0.033	1330	5/16	2-1/2 *End Shaft to bracket-Clockwise Rot.		7-1/2*	4 Slotted holes to fit 1/4" BSW Screw	Ball
⊕ 310104	32FE057	240	0.65	40	0.054	1350	5/16	1-1/4 Clockwise Rotation		3-15/16	3 Points 5/16" BSW on housing	Ball
* 310105	32FE062	240	0.99	37.5	0.05	1380	5/16	1-1/4 Anticlockwise Rotation		4-7/8	"	Ball
* 310106	32FE088	240	1.30	37.5	0.05	1380	5/16	1-1/4 Clockwise Rotation		4-7/8	"	Ball
⊕ 310111	42FE017	240	0.99	37.5	0.05	920	1/2x2	6-7/32x2 Double Spindle		5-9/16	Resilient	Sleeve
⊕ 310113	42FE1003	240	2.77	179	0.24	1260	1/2	2-1/2 Clockwise Rotation		6-1/8	4 Points 3/8" BSW on housing	Ball
⊕ 310114	42FE1016	240	0.67	20	0.027	1360	5/16	1-5/16 Anticlockwise Rotation		3-13/16	Clamp	Ball
⊕ 310117	42FE1036	240	0.98	48.5	0.065	1360	9/16	2-1/8 Anticlockwise Rotation		5-1/2	3 Points 3/8" BSW on housing	Ball
⊕ 310121	42F5001	415	0.68	186	0.25	1340	1/2	2-1/2		6-1/8	4 Points 3/8" BSW on housing	Ball
⊕ 310122	42F5008	415	0.25	60	0.08	1350	5/16	7/8 Helical Geared		4-9/16	4 Points 3/16" BSW at front	Ball
⊕ 310123	42F5011	415	0.23	75	0.1	1360	9/16	1-11/16		5-7/16	3 Points 3/8" BSW on housing	Ball
⊕ 310126	42FLL2031	240										
⊕ 310127	42FLL2058	240	1.30	97	0.13	920	1/2x2	5-15/16x2 Dble.Spindle.Capacitor 4MFD.440VAC		6-1/8	Resilient	Sleeve
⊕ 310132	42FLL3036	240	1.45	242	0.28	1340	1/2	2-1/2 Capacitor 6.5MFD. 370 VAC		6-1/8	4 Points 3/8" BSW on housing	Ball
⊕ 310133	42FLL3019	240	0.99	89.5	0.12	1420	1/2x2	6-7/16x2 Dble.Spindle.Capacitor 4MFD.440VAC		5-1/8	Resilient	Sleeve
⊕ 310134	42FLL3023	240	1.45	242	0.28	1340	1/2x2	2-15/16x2 Dble.Spindle.Capacitor 6.5MFD.370VAC		6-1/8	Resilient	Sleeve
⊕ 310135	42FLL3025	240	0.99	134	0.18	1340	1/2x2	5-13/16x2 Dble.Spindle.Capacitor 6.5MFD.370VAC		5-5/8	Resilient	Sleeve
⊕ 310136	42FLL3033	240	0.65	60	0.08	1350	1/2x2	6-7/16x2 Dble.Spindle.Capacitor 4MFD.440VAC		5-1/8	Resilient	Sleeve

IMPORTANT : All above motors rely on cooling from a fan blade fitted to the motor shaft.
DO NOT use these motors to drive other mechanisms.

* Indicates Motors on basis of Minimum Purchase Quantity Only.

△ These Motors are now BETTS — Refer centre of next page 310-e.

⊕ Indicates Motors now out of production.

MOTOR IDENTIFICATION

Type FE = Shaded Pole. Type FLL = Permanent Split Capacitor (PSC). Type FS = 3 Phase 415V.

Direction of Rotation — Suffixed by "A" Anti-clockwise or "C" Clockwise as viewed from shaft end

BRINSMEAD MOTOR REPLACEMENT CHARTS

FOR YOUR CONVENIENCE AND REFERENCE THE FOLLOWING PAGES LIST A WIDE RANGE OF BOTH CURRENT AND SUPERCEDED BRINSMEAD FAN MOTORS. THE CHARTS SHOW AVAILABILITY AND REPLACEMENT MODELS. MOTOR SERIES LISTED ARE : BP - M - 42FE - 42FL

BP SERIES MOTOR REPLACEMENTS

MODEL NUMBER	AVAILABILITY/REPLACEMENT
BP 2	BG3
BP 6	BG3
BP16	Current
BP17	BG3
BP18	BG3
BP19	Current
BP20	NIL
BP21	BP19
BP22	NIL
BP23	BG2
BP26	BG2
BP27	NIL
BP28	BG2
BP30	BG3 Mounting by Customer
BP31	BG2
BP32	BG3 Mounting by Customer
BP33	Current
BP34	BG3
BP35	NIL
BP36	BG2
BP37	BG2
BP38	BG2
BP39	NIL
BP40	Current
BP41	BP19 Mounting by Customer
BP43	BG3
BP44	BG2 Mounting by Customer
BP45	BG2
BP46	BG3
BP47	BG2
BP48	BG2 Mounting by Customer
BP49	BG2 " " "
BP50	BG2
BP51	BG4
BP52	BP19
BP53	BG2 Mounting by Customer
BP54	NIL
BP55	NIL
BP56	BP19
BP57	NIL
BP58	BG2
BP59	BG2
BP60	NIL
BP61	NIL
BP62	BG2 Mounting by Customer
BP63	BP19
BP64	BP19
BP65	BG2
BP66	BG3
BP67	BG2
BP68	BG2
BP69	BG4
BP70	BG2
BP71	NIL

NOTE

Brinsmead Model E287A
Now Replaced by
BETTS Model F117-10A

CAT. NO. 31089

Brinsmead Model E287C
Now Replaced by
BETTS Model F117-10C

CAT. NO. 31090

MODEL NUMBER	AVAILABILITY/REPLACEMENT
BP72	NIL
BP73	BG3
BP74	NIL
BP75	NIL
BP76	BG2
BP77	BP19
BP78	BG4
BP79	BG2
BP80	BG2
BP81	NIL
BP82	NIL
BP83	BP19
BP84	NIL
BP85	BG2
BP86	BG2
BP87	BG2
BP88	BG2
BP89	BG2
BP90	BG3
BP91	BG3
BP92	BG3
BP93	BG2
BP94	BG2
BP95	BG2
BP96	BG2
BP97	NIL
BP98	BG2
BP99	BG2
BP100	NIL
BP101	BG3
BP102	NIL
BP103	NIL
BP104	NIL
BP105	BG2
BP106	BG2
BP107	BG2
BP108	NIL
BP109	BG1
BP110	NIL
BP112	Current
BP113	Current
BP114	BP27
BP115	NIL
BP116	Current
BP117	NIL
BP118	NIL
BP119	NIL
BP120	NIL
BP121	NIL
BP122	BG3
BP123	BP123/1A
BP123/1A	Current
BP124	Current
BP125	NIL

BRINSMEAD MOTOR REPLACEMENTS CONTINUED NEXT PAGE

ORDERING PROCEDURE: REFER TO PAGES 309-b and 310-c AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

BRINSMEAD MOTOR REPLACEMENT CHARTS

M SERIES MOTOR REPLACEMENTS

Obsolete Model	REPLACEMENT
M 1	BG2
M 2	BG2
M 3	BG2
M 4	BG2
M 5	NIL
M 6	BG2
M 7	BG2
M 8	BG2
M 9	BG2
M 10	BG2
M 11	BG2 plus mounting by customer.
M 12	BG2 plus shaft extension by cust.
M 13	NIL
M 14	E287
M 15	BG2
M 16	BG2 plus mounting by customer.
M 17	BG2 plus mounting by customer.
M 18	BG2 plus mounting by customer.
M 19	NIL
M 20	NIL
M 21	BG2
M 22	E287
M 23	BP40
M 24	BG2
M 25	BG3 plus mounting by customer.
M 26	BG2 plus mounting by customer.
M 27	BG3
M 28	BG3 plus mounting by customer.
M 29	BG2 plus mounting by customer.
M 30	BG2
M 31	BG2 plus mounting by customer.
M 32	NIL
M 33	BG2 plus mount. bracket by cust.
M 34	NIL
M 35	NIL
M 36	BG3 plus mounting by customer.
M 37	NIL
M 38	BG2 plus mounting by customer.
M 39	BG3 plus mounting by customer.
M 40	BG2
M 41	BG2
M 42	NIL
M 43	BG2 plus mounting by customer.
M 44	BG3
M 45	NIL
M 46	BG2 plus mounting by customer.
M 47	BG3
M 48	BG2 plus mounting by customer.
M 49	NIL
M 50	NIL

Obsolete Model	REPLACEMENT
M 51	BG5C 3 Speed.
M 52	BG2 plus 285 to 240V transformer by customer.
M 53	NIL
M 54	NIL
M 55	BG2 plus mounting by customer.
M 56	BG2
M 57	BP40
M 58	BG3 plus shaft extension by cust.
M 59	BG2 plus mounting by customer.
M 60	BG2 plus mounting by customer.
M 61	BP19 plus mounting by customer.
M 62	NIL
M 63	BP19 plus mounting by customer.
M 64	BG4
M 65	BG4
M 66	NIL
M 67	NIL
M 68	NIL
M 69	BP40
M 70	BP132C plus mount. by cust.
M 71	BP132C plus mount. by cust.
M 72	BG2
M 73	NIL
M 74	BG4
M 75	NIL
M 76	BG2 plus mounting by customer.
M 77	BG2 plus mounting by customer.
M 78	BP40
M 79	BG2
M 80	BG2
M 81	BG2
M 82	NIL
M 83	BG2
M 84	BG3 plus mounting by customer.
M 85	BG2 plus mounting by customer.
M 86	BG3
M 87	BG2
M 88	NIL
M 89	NIL
M 90	NIL
M 91	NIL
M 92	NIL
M 93	BP113
M 94	BG2 plus mounting by customer.
M 95	NIL
M 96	BG2 plus mounting by customer.
M 97	BG4
M 98	NIL
M 99	BG3
M 100	BP132C plus mounting by cust.

Obsolete Model	REPLACEMENT
M101	BG2 plus mounting by customer.
M102	BG3 plus mounting by customer.
M103	BG1 or 2 plus mount. by customer.
M104	BG2
M105	NIL
M106	NIL
M107	BG2 plus shaft extension by cust.
M108	NIL
M109	BG2
M110	BG2
M111	BG2 plus mounting by customer.
M112	BG2 plus mounting by customer.
M113	BG2
M114	BG2 plus mounting by customer.
M115	NIL
M116	BG3 plus mounting by customer.
M117	BG3
M118	BG2 plus mounting by customer.
M119	NIL
M120	NIL
M121	NIL
M122	NIL
M123	E387
M124	BG2 plus mounting by customer.
M125	BG2
M126	BG2
M127	BG3 plus mounting by customer.
M128	NIL
M129	BG2 plus mounting by customer.
M130	BP113
M131	NIL
M132	NIL
M133	BG3 plus mounting by customer.
M134	E287 plus 5/16" dia. shaft & mount. by customer.
M135	NIL
M136	32FE012
M137	NIL
M138	NIL
M139	BG2 plus mounting by customer.
M140	BG2 plus mounting by customer.
M141	BG2
M142	BG2
M143	NIL
M144	NIL
M145	BG3 plus mounting by customer.
M146	BG2 plus mounting by customer.
M147	BG2
M148	BP16 pump assembly.
M149	NIL
M150	NIL

BRINSMEAD MOTOR REPLACEMENTS CONTINUED NEXT PAGE

ORDERING PROCEDURE: REFER TO PAGES 309-b and 310-c AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

BRINSMEAD MOTOR REPLACEMENT CHARTS

M SERIES MOTOR REPLACEMENTS — Cont'd.

Obsolete Model	REPLACEMENT
M151	BG5C 3 Speed.
M152	E287
M153	BG3 plus shaft ext. & mount. by customer.
M154	NIL
M155	NIL
M156	NIL
M157	BG4
M158	E287 plus mount. & connect. to (415V) 240V supply by customer.
M159	E287 plus mount. & connect. to (415V) 240V supply by customer.
M160	E287 plus mounting by customer.
M161	E287
M162	BG5C
M163	NIL
M164	BG2 plus mounting by customer.
M165	NIL
M166	NIL
M167	NIL
M168	BG2 plus mounting by customer.
M169	NIL
M170	NIL (415V)
M171	BG3 plus shaft extension by cust.
M172	BG4
M173	E287 plus mounting by customer.
M174	NIL
M175	E387 plus connect. to 240V supply (415V) by customer.
M176	BG2 plus mounting by customer.
M177	BG2
M178	BG3 plus 120V to 240V transformer by customer.
M179	NIL
M180	NIL
M181	NIL
M182	BG2 plus mounting by customer.
M183	BG2 plus mounting by customer.
M184	BG2 plus mounting by customer.
M185	BG2 plus mounting by customer.
M186	BG3 plus mounting by customer.
M187	BP40 plus mounting by customer.
M188	BG2
M189	NIL
M190	NIL
M191	BG2 plus mounting by customer.
M192	E287
M193	BG2 plus mounting by customer.
M194	NIL
M195	NIL
M196	NIL
M197	NIL
M198	BG2 plus mounting by customer.
M199	BG2
M200	BG2 plus mounting by customer.

Obsolete Model	REPLACEMENT
M201	BG3 plus mounting by customer.
M202	BG2 plus mounting by customer.
M203	BG2 plus mounting by customer.
M204	BG2 plus mounting by customer.
M205	BG3 plus mounting by customer.
M206	NIL
M207	BP16 pump assembly plus 190V to 240V transformer by customer.
M208	NIL (415V)
M209	BG3 plus mounting by customer.
M210	BG2 plus 1/2" diam. shaft by cust.
M211	BG2 plus mounting by customer.
M212	BP16 pump assembly.
M213	BP19
M214	NIL
M215	BG2 plus mounting by customer.
M216	BG2 plus mounting by customer.
M217	NIL
M218	NIL
M219	BG5C 3 Speed.
M220	E287 plus mount. by customer.
M221	BP19
M222	NIL
M223	BG2 plus mounting by customer.
M224	BP123/1A plus mount. by cust.
M225	NIL
M226	NIL
M227	NIL
M228	BG2 plus mounting by customer.
M229	E287 plus mounting by customer.
M230	NIL
M231	NIL
M232	BG2 plus mounting by customer.
M233	BP40
M234	NIL (415V)
M235	BP123/1A plus mount. by customer
M236	NIL
M237	NIL
M238	NIL
M239	BG2 plus mounting by customer.
M240	BG2 plus shaft extension & mount. by customer.
M241	BG2 plus shaft ext. by customer.
M242	BP19 plus mounting by customer.
M243	BG2 plus mounting by customer.
M244	BG2 plus shaft extension & mount. by customer.
M245C	BG5C Three speed motor.
M246	BG3 plus mounting by customer.
M247	NIL
M248	NIL
M249	BG2 plus mounting by customer.
M250	E287 plus mounting by customer.

Obsolete Model	REPLACEMENT
M251	BG2
M252	NIL
M253	E287 plus mount. & connect. to (415V) 240V by customer.
M254	NIL
M255	NIL transformer by customer.
M256	BG2 plus mounting by customer.
M257	BG2 plus mounting by customer.
M258	BG2 plus mounting by customer.
M259	BG2 plus mounting by customer.
M260	BG2
M261	NIL
M262	E287 plus mounting by customer.
M263	NIL
M264	BP19 plus mounting by customer.
M265	E287
M266	BP19 plus mounting by customer.
M267	BG2 mount. & shaft ext. by cust.
M268	BG2 plus mount. & shaft extension by customer.
M269	E287 plus mount. & shaft ext. by customer.
M270	NIL
M271	E387 plus mounting by customer.
M272	BG2 plus mounting by customer.
M273	NIL
M274	NIL
M275	BG5C Three speed.
M276	BG2 plus shaft extension & cooling fan by customer.
M277	NIL
M278	E287
M279	NIL
M280	BG2
M281	NIL
M282	NIL
M283	NIL
M284	BG2
M285	BG2 plus mounting & shaft ext. by customer.
M287	BG2 plus mounting & 110V to (110V) 270V transformer by customer. (60Hz)
M287	E287
M288	BG3
M289	E287 plus mounting by customer.
M290	BG5C
M292	BG2 plus mount. & 32V to 340V transformer by customer.
M293	NIL
M294	BG2
M295	E287 plus mount. & shaft ext. & (415V) connect. 240V supply by cust.
M296	NIL
M297	NIL
M298	E387 plus mounting by customer.
M299	NIL
M300	BG3 plus 115V to 290V transform. (115V) by customer. (60Hz)
M301	BG2 plus 115V to 290V transform. (115V) by customer. (60Hz)
M302	BG2
M303	BG2 plus 110V to 240V transform. (110V) by customer. (50Hz)

BRINSMEAD MOTOR REPLACEMENTS CONTINUED NEXT PAGE

ORDERING PROCEDURE: REFER TO PAGES 309-b and 310-c AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

SECTION 5

Tech. Page 310-g

BRINSMEAD MOTOR REPLACEMENT CHARTS

42FE & 42FLL SERIES REPLACEMENTS

OBSOLETE MODEL	REPLACEMENT
42FE 009	NIL
42FE 011	NIL
42FE 015	NIL
42FE 016	NIL
42FE 017	NIL
42FE 018	NIL
42FE 019	NIL
42FE 021	NIL
42FE 022	NIL
42FE 023	NIL
42FE 024	NIL
42FE 026	NIL
42FE 027	NIL
42FE 028	NIL
42FE 029	NIL
42FE 030	NIL
42FE 031	NIL
42FE 032	NIL
42FE 035	NIL
42FE 036	NIL
42FE 039	NIL
42FE 040	NIL
42FE 042	NIL
42FE 043	NIL
42FE 044	NIL
42FE 053	NIL
42FE 1000	NIL
42FE 1002	NIL
42FE 1003	NIL
42FE 1004	NIL
42FE 1006	NIL
42FE 1012	Current
42FE 1013	NIL
42FE 1014	NIL
42FE 1015	NIL
42FE 1016	Current
42FE 1017	NIL
42FE 1018	NIL
42FE 1019	NIL
42FE 1020	42FE 1012
42FE 1021	NIL
42FE 1025	NIL
42FE 1027	NIL
42FE 1028	NIL
42FE 1030	NIL
42FE 1031	NIL
42FE 1034	NIL
42FE 1035	42FE 1012 Customer to Modify mounting & change boss.
42FE 1036	NIL
42FE 1037	NIL
42FE 1038	NIL
42FE 1039	NIL
42FE 1046	NIL
42FE 1050	NIL
42FE 1051	NIL
42FLL2005	NIL
42FLL2007	NIL
42FLL2008	Current

OBSOLETE MODEL	REPLACEMENT
42FLL2009	NIL
42FLL2010	42FLL2008
42FLL2012	NIL
42FLL2013	NIL
42FLL2014	42FLL2008 + 2 MFD 440V Capacitor.
42FLL2015	NIL
42FLL2016	42FLL2008
42FLL2018	NIL
42FLL2021	NIL
42FLL2024	NIL
42FLL2025	NIL
42FLL2028	42FLL2008 + 2 MFD 440V Capacitor Customer to Remove extra shaft.
42FLL2029	42FLL2008 + 2 MFD 440V Capacitor.
42FLL2030	NIL
42FLL2031	NIL
42FLL2032	42FLL2008 Customer to Remove extra shaft and modify mounting.
42FLL2033	42FLL2008 + 2 MFD 440V Capacitor.
42FLL2037	NIL
42FLL2041	NIL
42FLL2042	NIL
42FLL2046	42FLL2008 + 2 MFD 440V Capacitor.
42FLL2048	NIL
42FLL2049	NIL
42FLL2050	NIL
42FLL3003	NIL
42FLL3004	NIL
42FLL3009	NIL
42FLL3010	42FLL3062
42FLL3011	NIL
42FLL3013	NIL
42FLL3014	NIL
42FLL3015	NIL
42FLL3016	NIL
42FLL3017	NIL
42FLL3018	NIL
42FLL3019	NIL
42FLL3021	NIL
42FLL3023	NIL
42FLL3024	NIL
42FLL3025	NIL
42FLL3026	NIL
42FLL3030	NIL
42FLL3031	NIL
42FLL3032	NIL
42FLL3033	NIL
42FLL3034	NIL
42FLL3036	NIL
42FLL3039	NIL
42FLL3040	NIL
42FLL3043	NIL
42FLL3047	NIL
42FLL3048	NIL
42FLL3049	42FLL3062
42FLL3058	NIL
42FLL3062	Current
42FLL3063	42FLL3062
42FLL3065	NIL
42FLL3066	NIL
42FLL3067	NIL

ORDERING PROCEDURE : REFER TO PAGE 310-c
& QUOTE CATALOGUE NO. OF ITEM REQUIRED

ELECTRIC MOTORS

Totally Enclosed Fan Cooled — Cage Standardised Metric Range



STANDARDS : Except where indicated, all motors comply with BS 2613:1970 and have a maximum temperature rise (measured by the resistance method) of 80 Deg. C for Class 'B' insulation.

The motors comply with BS 3979 Appendix A which standardises shaft sizes and fixing dimensions. The details are also in conformity with IEC recommendation 72-1 and 72-2 (except for fixing hole diameters in some sizes).

CONSTRUCTION

Stator Frame and Endshields : These are of cast iron or aluminium, and in the case of foot mounted motors, the frame and feet are cast in one piece.

Cores : Both stator and rotor cores consist of high quality magnetic steel stampings.



TEFC MOTORS : TEFC motors are specially suitable for installations in dusty and dirty situations where the use of ventilated motors is impracticable because of the presence of dirt, fluff, metal swarf, cutting compound, etc.

The windings and all working parts of TEFC motors are completely enclosed, and a current of cooling air is forced over the carcase by a fan which is mounted on the motor shaft at the non-driving end and protected by a cover.

STARTING : Motors up to 2.2kW (3 HP) have three terminals for direct-on-line starting. Larger sizes have six terminals suitable for direct-on-line or star-delta starting.

REVERSING : Standard motors may be run clockwise (standard) or anti-clockwise, and are suitable for infrequent reversing. To reverse a three-phase motor, interchange any two of three mains supply lines at motor or starter terminals.

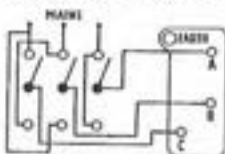
STARTING CHARACTERISTICS

- Direct-on-line starting— Starting torque 175/250% full load torque (according to speed).
— Starting current 500/750% full load current (according to speed).
Star-delta starting — Starting torque 50/90% full load torque (according to speed).
— Starting current 175/250% full load current (according to speed).

Special starting characteristics available on request.

MOTOR TYPE	CAT. NO.	kW	HP	SPEED RPM	FRAME	SHAFT SIZE mm
METRIC TOTALLY ENCLOSED THREE PHASE 415 Volt, 50 Hz. Voltage Variation: Will operate satisfactorily plus or minus 6% from the rated voltage.		0.18	1/4	1380	D71	14
		0.25	1/3	1350	D71a	14
		0.37	1/2	1360	D71b	14
	31151	0.55	3/4	1400	D80a	19
	31152	0.75	1.0	1400	D80b	19
	31153	1.10	1.5	1420	D90S	24
	31154	1.50	2.0	1420	D90L	24
	31155	2.20	3.0	1420	D100La	28
	31156	3.00	4.0	1420	D100Lb	28
	31157	4.00	5.5	1440	D112M	28
		5.50	7.5	1445	D132S	38
		7.50	10.0	1445	D132M	38

REVERSING THREE PHASE MOTORS



To reverse a three phase machine it is only necessary to reverse two of the incoming lines.

NOTE

**FOR TECO & MECHTRIC MOTORS
&
TECO BENCH GRINDERS
TURN TO PAGE 327**



ELECTRIC MOTORS

ALL MOTORS 1500 RPM — BALL BEARING — FOOT MOUNTED

Padet

**Drip Proof
SINGLE PHASE**

CAPACITOR START 230/250V. 50 Hz.

PERFORMANCE : To B.S.170:1962 and A.S.C74 - 1965.
Class 'E' Insulation.
DIMENSIONS : To B.S.2048 Part 1 : 1961 & A.S. C350 Part 1 : 1963.



CAT. NO.	kW	HP	TYPE	SHAFT DIAM.	FRAME	CAPACITOR	
						MFD	VOLTS
3126	0.12	1/6	ESB5C6/4S	5/8"	B56	135	150
3127	0.18	1/4	ESB5C4/4S			135	150
3128	0.25	1/3	ESB5C3/4S			130-150	150
3129	0.37	1/2	ESB5C2/4S			175-200	150
31210	0.55	3/4	ESB5C0/4S			200-250	150
31211	0.75	1	ESB5C1/4S	3/4"	B66	80	275
			ESB5C15/4RS			5T. 80	275
31212	1.1	1.1/2	CAP.ST. & RUN			RUN 10	440

THREE PHASE 400/440 VOLT 50HZ. DRIP PROOF

PERFORMANCE : Frame B56 to A.S. C74 - 1965. Class 'E' Insulation.
Frames C162, C164, C182 to B.S. 2613: 1957 and A.S. C319 :
1958. Class 'E' Insulation.
DIMENSIONS : Frame B56 to B.S. 2048 Part 1. 1961 & A.S. C350 Part 1. 1963.
Frames C162, C164, C182 to B.S. 2960 Parts 1 & 2 and A.S. C332
Parts 1 and 2.



CAT. NO.	kW	HP	TYPE	SHAFT DIAM.	FRAME
31213	0.18	1/4	ETB5C4/4	5/8"	B56
31214	0.25	1/3	ETB5C3/4		
31215	0.37	1/2	ETB5C2/4		
31216	0.55	3/4	ETB5C0/4		
31217	0.75	1	CTB5C1/4	3/4"	C162
31218	1.1	1.1/2	CTB5C15/4		C164
31219	1.5	2	CTB5C20/4	1.1/8"	C182



INTEGRAL HP METRIC MOTORS

THREE PHASE TEFC 400/440 V. A.C. 50 Hz.



CAT. NO.	kW	HP	SHAFT SIZE mm	FRAME
	.75	1	19	D80
	1.5	2	24	D90L
	2.2	3	28	MD100L
	4	5.5	28	D112M

Performance:

To A.S.1359: 1974, B.S.2613: 1957, maximum continuous rating (M.C.R.) with permissible temperature rise not exceeding 75°C (resistance method) in ambient temperature not exceeding 40°C.

Models:

TEFC only. Designed to provide (1) maximum protection against dust and abrasive matter under dirty running conditions and (2) maximum heat dissipation through well designed air circulation for ventilation and cooling.

Frame Dimensions:

To A.S. 1017: 1971 and B.S. 3979 for metric motors. See outline dimension drawings.

Frame:

Cast iron. Designed with deep ribs for maximum heat exchange. Equipped with lifting eye.

Bearings:

Heavy duty semi-sealed ball bearings.

Lubrication:

Bearings factory packed with lithium grease. On frame sizes D132S-D200L and over, grease nipples and drain plugs are also provided.

Terminal Box:

Generously proportioned to permit easy connection. Four position type rotatable through 360° to simplify installation.

RELAYS AND OVERLOADS

COLDSTREAM - COMMERCIAL FRIGIDAIRE - DOMESTIC

KELVINATOR, LEONARD, H.M.V. - DOMESTIC

CATALOGUE NUMBER SUMMARY PAGE - FOR ORDERING PURPOSES
COLDSTREAM — COMMERCIAL

RELAY		
CAT. No.	PART No.	FOR MODEL
3131	410K1	400A201, 400B205
3132	410K2	400A301
3133	410K3	400B302 Use 410K4
3134	410K4	400B402
3135	410K5	400C401
3136	410K7	Use 410K9
3137	410K9	
3139	144G2	323C7, 323R5, 323J1 Use 410K1
31311	410K6/144G5	323J4. Use 410K1
31313	144D10	323E5
31310	Relay Cover only.	

OVERLOAD		
CAT No.	PART No.	FOR MODEL
31315	320D1	400A201-203, 400B201-205 400F203-204-302-304-406 400M304-405
31316	320D2	400A301 400B302-402
31317	320D3	400C401
31318	320A6	323C7
31319	320A10	323S1
31320	320A7	323R5
31321	320A5	323J1
31322	320A9	323J2

FRIGIDAIRE RELAYS — DOMESTIC

CAT No.	FRIGIDAIRE PART No.	TYPE	HP
31330	1128822	YG2	1/14, 1/12, 1/10
31331	5495684A	YG2	1/8
31332	5495575	YG2	1/6
	5486940		
31333	5489054	YG3	7/32
31334	5850745		
31335	5494823	YG4	4/10
	5485703		
	5851032		
31336	7391678	Hot Wire	1/8

KELVINATOR, LEONARD, HMV RELAYS — DOMESTIC

CAT No.	KELV. BIN No.	TYPE
31341	L54	Kirby MC13-A3, AG3
31342	L268	Klixon Y3005-04
31343	L245	Klixon Y3005-218-25
	PF920	Klixon Y3005-17
	PG683	Klixon Y3005-22
	L316	Klixon ME556-6
	L332	Klixon ME617-6
31344	PD263	Klixon Y3005-128-37
31345	PD213	Klixon Y3005-135-37
31354	PF273	Klixon Y3005-06
	PG130	Klixon Y3005-18
	PG684	Klixon Y3005-23
31355	PF548	Klixon Y3CR-1
	PG46	Klixon Y3005-16
	PG682	Klixon Y3005-21
	PL181	GE 3ARR12-PP192
	PL194	Klixon 3CR-203-133
	PL479	Klixon 3CR-203-143
	PG785	Klixon Y3005-25
	L325	Klixon ME535-2
	L327	Klixon ME556-2
	L333	Klixon ME617-2
	C247	Necchi M2040J Comp.
	LK199	Necchi M2040J Comp.
	GN30	Necchi M2040J Comp.

CAT No.	KELV. BIN No.	TYPE
	GN52	Necchi M2040J/048
	L213	Ranco SH60-6075 CH60-6154
	L285	Necchi M2030J Comp
	GN29	Necchi M2030J Comp
	LK200	Klixon ME556-3
	L268	Klixon Y3005-04
	L293	Klixon Y3305-09
	C2502	Necchi M2060J, M2060J
	GN31	Necchi " "
	GN51	Necchi M2050J/058
	L57	Ranco SH60-6016
	L300	Klixon Y3005-12
	L71	Kirby MC16T1-MC16AH1
	C2622	Necchi A2270
	GN40	Necchi A2270
	C2639	Necchi A2280
	GN41	Necchi A2280
	C2664	Necchi A2290
	GN42	Necchi A2290
	C278	HMS125-2305
	C2839	S125-2305A
	L319	Klixon ME556-1
	L331	Klixon ME617-1
	L339	Klixon ME556-5

CAT No.	KELV. BIN No.	TYPE
	C2223	Necchi M2080
	GN33	Necchi M2070, M2080 M2080J Type 083
	GN53	Necchi M2080J/088
	C2797	Klixon ME535-1
	C2798	Klixon ME535-5
	L323	Klixon ME535-6
	CF33	Klixon
	CF30	Danfoss
	L283	Klixon Y3005-11
	GN87	Klixon MTRP0001-01
	GN88	Klixon 040-091
	GN89	Klixon 040-092
	GN90	Klixon 040-104
	GN91	Klixon 040-113
	GN92	Klixon 040-120
	GN93	Klixon 040-133
	GN94	Klixon 040-135
31467	GN95	Klixon 040-122
31468	GN96	Klixon 041-114
31469	GN97	Klixon 040-127
	GN98	Klixon 041-118
31470	GN99	Klixon 040-143
31471	GN100	Klixon 041-135

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REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA

RELAYS, OVERLOADS AND CAPACITORS

COLDSTREAM - COMMERCIAL

Model No.	Compressor	Type	Stator Stack Laminations	Stator Stack & Cells	Stack Lgh. Ins.	Nom. H.P.	Nameplate		Overload P/N	Relay P/N	Capacitor 240V.	Superseded Models & Pmts		
							Amps.	Volts-Cy				Model	Overload	Relay
400A201	CY - KY	Split Phase	402A9	401A201	2.1/2"	1/3	3.1	240/50	32001	410K1	-	323C7 323P7 323P8	320A6	144G2
400A203	CY - KY	Split Phase	402A8	401A203	2.1/4"	1/3	2.6	240/50	32001	-	-	323C5		144D7
400B201	CY - KY	Cap. Start	402A8	401B201	2.1/4"	1/3	2.6	240/50	32001	-	80MFD	323C1		144D7
400B205	CY-KY-HY	Cap. Start	402A9	401B205	2.1/2"	1/2	4.45	240/50	32001	410K1	80MFD	400B205		
400A301	BY	Split Phase	402A8	401A301	3.1/2"	1/2	5.6	240/50	32002	410K2	-	323S1	320A10	144D13
400B302	BY	Cap. Start	402A6	401B302	3.1/2"	1/2	4.4	240/50	32002	410K3	100MFD	323H5 323E5	320A7	144G2 144D10
400B402	NY	Cap. Start	402A7	401B402	4.1/2"	3/4	6.5	240/50	32002	410K4	100MFD	323J1	320A5	144G2
400C401	NX	Cap. Start Cap. Run	402A7	401C401	4.1/2"	1.1/2	10.0	240/50	32003	410G5	100MFD 10MFD	323J2 323J4	320A9	144G3 144G5
400F203	KY	THREE PHASE	402A9	401F203	2.1/2"	1/2	3.1	415/50	2/32001			400F201		
400F204	CY - KY		402A8	401F204	2.1/4"	.35	0.7					400F202		
400F302	NX		402A6	401F302	3.1/2"		3.6					400F301		
400F304	BY - NY		402A6	401F304	3.1/2"		2.4					323H1 400F303		
400F406	NX - NZ		402A7	401F406	4.1/2"		4.5					400F402		
400M304	NU		402B1	401M304	3.1/2"	2.9	5.2					400M301 400M302		
400M405	NU - NE		402B2	401M405	4.1/8"	3.3/4	6.1					400M401 400M402		

FRIGIDAIRE - DOMESTIC

TYPE "YG" RELAYS WITH INBUILT OVERLOAD FITTED TO METER USER COMPRESSORS.		RELAYS AND OVERLOADS FITTED TO MODELS WITH KIRBY COMPRESSORS.					
FRIGIDAIRE P/N	RELAY		RELAY		OVERLOAD		COMP. H.P.
	TYPE	R.P.	KIRBY P/N	FRIGIDAIRE P/N	KIRBY P/N	FRIGIDAIRE P/N	
1128822	YG-2	1/16, 1/12, 1/10	ME535/3	7443111	ME380/8	7443110	1/8
5495684		1/8	ME535/1	7395507	ME380/10	7395505	1/6
7391678	Hot Wire		ME535/5	7395510	ME380/11	7395506	1/5
5486940	YG-2	1/6					
5495575							
5489054	YG-3	7/32	ME658/2	7443866	ME380/11	7395506	1/4
5850745							
5494823	YG-4	4/30					
SUIT MODELS							
595, 596							
DX105, S105, SX105, SX106, DX106							
CDC12-64, DC12-64, CP14T-64, DX125							
UF105, CDC125, DC125, CDC145, DC145, CDC146, CDC126, DX126							
FPCD146							

KELVINATOR, LEONARD, H.M.V. - DOMESTIC

RELAY			SUIT MODELS
BIN NO.	PART NO.	TYPE	
L54	KA5401	Kirby MC13 - A3 MC13 - AG3	M5W, AS5, ASB5, ASC5, SA55, AS6, AS7, ASB7, ASD7, NHC KD Air Dryer, K96 Bev. Cooler.
L268	KA35621	Klixon Y3005 - 04	208, 209, 211, 212, 213, 214, 215, 216, 217, 218, 219, 221, 224, 225, 226, 227, 229, 230, 232, 234, 241, 245, 250, 262, 267, 269, 271, 272, 275, 276, 318, 348, 368, 377, 378, 379, 419, 429, 439, 447, 449, 453, 462, 463, 465, 467, 469, 476, 477, 485, 539, 557, 558, P100WA 1/8 HP Compact Compressor, Clamp L251.
L245	KA30138	Klixon Y3005 - 218 - 25	387, 388, 463, 466, 476/86, 482, 489, 493, 518, 560, 568, 570, 577, 578, 579, 580, 682, 689, 693, 769, C124WA, VF105, VF231, VF236, VF237, VF338, VF436, VF537, VF538, FF6, FF13, FF15, FF85, FF100, FF100/1, FF160, FF160/1, AHF102, AHF162, H270GC, H430GC, H340GD, H500GD, S44 Compressor, Clamp L251. Can use PF920.
PF920	KA40774	Klixon Y3005 - 17	F100LA, F118LA, F118LB, C124SA, C124VA, C124WA, C144HA, C144NA, C144WA, C144SB, C125RB, C125WB, C180GA, C180WA, VF338, VF538, S54 Bracket Mtd. Comp. with Earth.
PG683	KA47150	Klixon Y3005 - 22	F100LA, F118LA, F118LB, C124SA, C124VA, C124WA, C144HA, C144NA, C144WA, C144SB, C125RB, C125WB, C180GA, C180WA, VF338, VF538, 310FL3, F310LC, 340CR3, C340RC, C340TC, C340SE, C340YC, C340ZC, 380CH3, C380HC, C380NC, C380SC, C380TC, C380SE, 480CG3, C480GC, C480NC, C480SC, C480SE, Less Earth.

Continued Next Page

ORDER PROCEDURE : REFER TO PAGE 313 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

RELAYS

KELVINATOR, LEONARD, H.M.V. - DOMESTIC (CONTINUED)

RELAY			SUITS MODELS
BIN NO.	PART NO.	TYPE	
L316		Klixon ME556-6	C124SA, C124VA, C124WA, C144HA, C144NA, C144WA, AHF102, AHF162, H270GC, F330LD, H430GC, H500GD, H700GD, Tecumseh Compressor.
L332		Klixon ME617-6	H270GC. Now use L316.
PD263	KA29465	Klixon Y3005-128-37	486, 496, 508, 519, 588, 676, 686, 694, 509 Clamp L251.
PD213	KA28693	Klixon Y3005-135-37	976, 993 Clamp L251.
PF273	KA36992	Klixon Y3005-06	770, 778, 779, 788, 789, 790 Can use PG130 Clamp L251.
PG130	KA40775	Klixon Y3005-18	N144FA, N144GA, N144WA, N144WB, N180FA, N180SA, With Earth.
PG684	KA47151	Klixon Y3005-23	N144FA, N144GA, N144WA, N144WB, N180FA, N180SA, N180SB, 380NF3, N380FC, N380GC, N380TC, N380YC, 480NF3, N480FC, N480TC. Less Earth.
PF548	KA38180	Klixon Y3CR-1	888, N220FA, N220EB, N600EC, 600NE3, N510FD, 510NF4, N610EE, 610NE5.
PG46	KA40773	Klixon Y3005-16	MO90VA, MO90WA, P100VA (P100WA Bckt. Mtd.) P138RA, M138VA, M138WA With Earth. Now use PG682.
PG682	KA47149	Klixon Y3005-21	MO90VA, MO90WA, P100VA (P100WA Bckt. Mtd.) P138RA, M138VA, M138WA 250MV3, M250VC, 250PV3, P250TC, P250VC, P250YC, 360MV3, M360VC, 360PR3, P360RC. Less Earth.
PL181	1113992	GE 3ARR12-PP192	400NG3, N400GC.
PL194	1114206	Klixon 3CR-203-133	450NG3, N450GC, 500NG3, N500GC.
PL479	1114207	Klixon 3CR-203-143	620NG3, N620GC.
PG785	KA49174	Klixon Y3005-25	C180GA.
L325		Klixon ME535-2	C160GC. Now use L327.
L327		Klixon ME556-2	D602, C160GC, H200GD.
L333		Klixon ME617-2	D602, C160GC. Now use L327.
CZ47	209087	Necchi M2040J Comp.	D600. Now use GN30.
LK199	534530/3	Necchi M2040J Comp.	D600, D601, D602, AHF62 "Lady K" K33D/4, K33E/4. Now use GN30.
GN30	534530/3	Necchi M2040J Comp.	D600, D601, D602, AHF62, C160GC "Lady K", K33D/4, K33E/4, H160GC.
GN52	534535/3	Necchi M2040J Type 048	C160GC, H160GC, H200GD, H250GD.
L213	E58530	Ranco SH60-6075 CH60-6154	"Lady K" KA31M, K831M, K31R/4, K31RU/4 K31S/4.
L285	534730/3	Necchi M2030J Comp.	"Lady K" K33D/4 (100 cabs. only). Now use GN29.
GN29	534730/3	Necchi M2030J Comp.	"Lady K" K33D/4.
LK200		Klixon ME556-3	"Lady K" K33D/4, K33E/4. Tecumseh Comp.
L268	KA35621	Klixon Y3005-04	"Lady K" With 588 Kelvinator Compressor.
L293	KA40039	Klixon Y3305-09	FF5, FF60, H200GD, 554 Comp. Clamp L251.
CZ502	534540/3	Necchi M2050J M2060J	FF5, FF60, FF60/1 Necchi Comp. Now use GN31.
GN31	534540/3	Necchi M2050J M2060J	FF5, FF60, FF60/1, H160GC Early Production.
GN51	534546/3	Necchi M2050J Type 058	H160 GC Late Prod. C350VC, 350CV3, H220GD, H340GD.
L57	KA17048	Ranco SH60-6016	FF6, 555SIM, VF10, VF105, 455SIM. Now use L300.
L300	KA41905	Klixon Y3005-12	FF6, 555SIM, VF10, VF105, 455SIM. Clamp L251.
L71	KA6103	Kirby MC16T1-MC16AH1	FF6, 555SEM.
CZ622	534870/3	Necchi A2270	FF100, FF100/1, AHF162, Now use GN40.
GN40	534870/3	Necchi A2270	FF100, FF100/1, AHF162, H430GC.
CZ639	534880/3	Necchi A2280	FF160, FF160/1, AHF224, Now use GN41.
GN41	534880/3	Necchi A2280	FF160, FF160/1, AHF224, H600GC.
CZ664	534890/3	Necchi A2290	FF220, FF220/1. Now use GN42.
GN42	534890/3	Necchi A2290	FF220, FF220/1.
CZ78	209111	HMS125-2305	FF60. National Compressor. Now use CZ839.
CZ839	209111	S125-2305A	H200GD.
L319		Klixon ME556-1	H200GD, H340GD, AHF62, AESZF9, Kirby Comp.
L331		Klixon ME617-1	H160GC. Now use L339.
L339		Klixon ME556-5	H500GD.
CZ223	534822/4	Necchi M2080	AHF102, AHF162, Early Prod. Now use GN33.
GN33	534822/4	Necchi M2070 M2080 M2080J Type 083	AHF102, AHF162, H270GC, H430GC.
GN53	534588/1-4	Necchi M2080J Type 088	H270GC, H340GD, H430GC, H500GD, H700GD.
CZ797		Klixon ME535-1	H200GD, Kirby Comp. Now use L319.
CZ798		Klixon ME535-5	H500GD. Now use L339.
L323		Klixon ME535-6	H340GD, H500GD, H700GD. Can use L316.
CF33	10-282	Klixon	F330LD.
CF30	10-420	Danfoss	H250GD.
L283	KA38673	Klixon Y3005-11	S33N Comp., FF220-0, FF22-1, FF220, FF220-1, H700GD
GN87		Klixon MTRP.0001-01	Necchi Comp. M2-5J
GN88		Klixon 040-091	" " M3J
GN89		Klixon 040-092	" " M3-5J
GN90		Klixon 040-104	" " M4J
GN91		Klixon 040-113	" " M5J H200GD
GN92		Klixon 040-120	" " M7J M7KJ, H200GD, H340GD
GN93		Klixon 040-133	" " M9J M9KJ, H340GD, H500GD, H700GD
GN94		Klixon 040-135	" " M11 M11K
GN95		Klixon 040-122	" " A9 A9K
GN96		Klixon 041-114	" " A9V
GN97		Klixon 040-127	" " A11, A11K
GN98		Klixon 041-118	" " A11V
GN99		Klixon 040-143	" " A9R, A13, A13K
GN100		Klixon 041-135	" " A9RV, A13V

ORDER PROCEDURE : REFER TO PAGE 313 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

Kelvinator RELAYS AND OVERLOADS

CATALOGUE NUMBER SUMMARY PAGE - FOR ORDERING PURPOSES

RELAYS

OVERLOADS

CAT. NO.	BIN NO.	TYPE
	L70	
31413	L71	Kirby MC.16.T.1
31415	L163	" MC.18.L.2
31417	L176	" MC.20.V.1
31418	L185	" MC.28.S.1
31416	L164	" MC.28.U.1
31419	L120	KAL Assembly
	L57	Ranco SH60-6016
31414	L174	" SH65-6561
	L58	" SC396
31421	C217	" SH60-6067
31461	L178	" SH65-6573
	L208	" SH65-6582
	L209	" SH65-6583
	L179	" SH65-6572
	L252	" SH60-6076
	L299	Klixon Y3005-13
31423	L300	" Y3005-12
	L311	" Y3005-20
31343	L245	" Y3005-01
3142	L293	" Y3005-09
31429	L294	" Y3005-10
31426	L290	" Y3005-08
31460	L291	" Y3005-07
31426	L293	" Y3005-11
	C533	" Y3005-05
31462	L295	" Y3005-14
31464	L264	" 6409-3Y-150
3146	L266	" 6409-3Y-154
3147	L261	" 6409-3Y-169
3148	L255	" 6409-3Y-175
31355	PF348	" YC3R-1
	CZ622	Necchi A2270
	CZ639	" A2280
	CZ664	" A2290
3144	L223	Key Voltage Type
31420	L182	" " "
3141	L180	" " "
3143	L218	" " "
	W347	" " "
	W563	" " "
3149	AH447	Hendry A11/2/467
31410	AH448	" F11/2/614
31411	AH449	" F11/2/615
31412	AH461	" B11/2/478
ROOM AIR CONDITIONER RELAYS		
31419	L120	KAL Assembly
	R196	Key Voltage Type
	RB159	
31420	L182	Key Voltage Type
31428	L199	GE
	RC262	Relay Start. Kit
	RC628	Klixon 6409-3Y-183
	RWC48	New Air 12-8XX
	RD352	Contactors
	AH615	Contactors

CAT. NO.	BIN NO.	TYPE
	L31	Klixon B23
31441	R8328	" MTA6804
31442	RC161	" CRA6802
31443	L205	" CRA6805
31448	L244	" CRA9801
31444	L214	" CRA6812
		ME501-2
	RC125	" MEA6835
31440	R173	Derwent G
	RW4	
	RW71	Klixon CRA6826
	RW18	Buss. Wrl.
	RW43	Derwent M4
	L194	Klixon MEA6814
	CR166	" HSE-A7
	LK201	" MRA6834
31435	L228	" MTA6802
31432	C276	" MRA6804
31433	L102	" MRA6803
31430	L103	" MRA6800
31431	L249	" MTA6805
31434	L221	" CRA6806
31450	L274	" MRA6891
31449	L273	" MRA6890
31447	L270	" MRA6889
	L317	" ME380-31
31438	AH456	MRA 6876 (1)
31439	AH457	MRA 9902 (1)
31436	AH245	MRA 6852 (1)
31437	AH153	MRA 6853 (1)
	AH153	MRA 6853 (1)
	AH152	MRA 9957 (1)
	AH245	MRA 6852 (1)
	AH153	MRA 6853 (1)
	AH153	MRA 6853 (1)
	AH617	MRA 6882 (2)
	AH618	MRA 6883 (2)
	AH619	CRA 6827 (2)
	AH620	CRA 6828 (2)
	AH621	CRA 6829 (2)
(1) Models fitted with single overload		
(2) Models fitted with two overloads		
See TECH. Page 314-b.		
	RW147	Klixon L110-3UOV
	RW141	" CRA6847
	RE1	" CST16AKN-134
	RE14	" ME781-1
	RE2	" CST16AKM-134

CAT. NO.	BIN NO.	TYPE
	RE15	Klixon ME663-4 ME781-13
	RE240	Klixon
	RE267	" ME381-10
	RE142	" CRA9951-133
	RE266	" ME663-3
	L324	" ME380-25QC
	L320	" ME380-22
	L334	" ME618-1
	L337	" ME380-10
	L335	" ME618-9
	L328	" ME380-14
	L336	" ME618-3
	L338	" ME380-9
	CF31	" MRP77GV-6
	CF34	" MRP59
		AMK3119
	CZ799	" ME380-11
	CZ800	" ME380-33
31496	GN109	" MSP388HSH
31497	GN111	" MRP339HX
31498	GN113	" MSP63HSH
	PL179	"
		MRA 6963-160
	P1480	Klixon
		MRA 7958-160
	CR166	Klixon HSE-A7
	CL53	" RA1920
	CL54	" RA1921
31493	GN105	TOO 13-12
31494	GN106	Klixon MRP431HN
31483	GN107	" MRP419HX
31484	GN108	" MRP410HX
31496	GN109	" MSP388HSH
31485	GN110	" MRP390HX
31497	GN111	" MRP339HX
31486	GN112	" MRP63HN
31498	GN113	" MSP63HSH
31487	GN114	" MRP62AMN
31488	GN115	" MRP351HV
31489	GN116	" MRP62HX
31490	GN117	" MRP63HV
31491	GN118	" MRP59AMX
31492	GN119	" MRP58HX
31493	GN120	" MRP39AMM
	GN45	" MRT26AMN

NOTE : FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA

KELVINATOR RELAYS — COMMERCIAL

Bin No.	Part No.	Type	Relays for Unit Models
L70	KA19605		FF6 FF85 S44N Comp. Now Superseded By L245 KA30138
L71	KA6103	Kirby MC.16.T.1	A5s5s1M FF6 Ext. Mounted Compressor
L163	1068495	Kirby MC.18.L.2	A4D4CS N4D4CS 4HSR 6HDS 8HDS
L176	KA20643	Kirby MC.20.V.1	4D4H
L185	KA22482	Kirby MC.28.S.1	3D3H (Can use L164)
L164	1068496	Kirby MC.28.U.1	A3D3CS
L120	KA13703	KAL Assembly	NDRC BC1 BC2 3D2H 2D2H KA12 KA15
L57	KA17048	Ranco SH60-6016	FF6-5s5s1M VF10 VF105 4s5s1M Now Superseded By L300 KA41905
L174	KA14185	Ranco SH65-6561	A5s5s1M Now Superseded By L299 KA41904
L58	KA17373	Ranco SC396	2CB 2CBH Hot & Cold Disp. S88N Now Superseded By L311 KA43576
C217	KA21364	Ranco SH60-6067	C7M W/Cooler (Clamp L49) Now Superseded By L295 KA40143
L178	KA21001	Ranco SH65-6573	S54F S44F S34F FF5 FF60-554 Comp. Now Superseded By L293 KA40039
L208	KA24806	Ranco SH65-6582	S44C S34C Now Superseded By L294 KA40141
L209	KA24807	Ranco SH65-6583	S33C Now Superseded By L291 KA39386
L179	KA20613	Ranco SH65-6572	S33F FF10 Now Superseded By L290 KA39387
L252	KA21002	Ranco SH60-6076	S33N FF22 Now Superseded By L283 KA38673
L299	KA41904	Klixon Y3005-13	A5s5s1M
L300	KA41905	Klixon Y3005-12	FF6 5s5s1M VF10 VF105 4s5s1M
L311	KA43576	Klixon Y3005-20	2CB 2CBH Hot & Cold Dispenser S88N
L245	KA30138	Klixon Y3005-01	S54N S44N HF86 FF6 FF85 FF13 FF15 VF105/60 VF231 VF236 VF434 FF100 FF100/1 FF160 FF160/1 S44 Comp.
L293	KA40039	Klixon Y3005-09	S54F S44F S34F (FF5 FF60 S54 Comp.) CC44 Use Relay Clamp L251 KA31029
L294	KA40141	Klixon Y3005-10	S44C S34C Use Relay Clamp L251 "
L290	KA39387	Klixon Y3005-08	S33F FF10 Use Relay Clamp L251 "
L291	KA39386	Klixon Y3005-07	S33C Use Relay Clamp L251 "
L283	KA38673	Klixon Y3005-11	S33N FF22-0 FF22-1 FF220 FF220/1 H700GD Use Relay Clamp L251 "
C533	KA37035	Klixon Y3005-05	T7 T11 W/Coolers Use Relay Clamp L553 KA36998
L295	KA40143	Klixon Y3005-14	C7M W/Cooler Use Relay Clamp L553 "
L264	KA32551	Klixon 6409-3Y-150	S5033P Use Relay Cover L256 KA32283
L266	KA32315	Klixon 6409-3Y-154	S5050P S7550P K17M T16 T20 CC5050 50/400 Use Relay Cover L256 "
L261	KA32289	Klixon 6409-3Y-169	S7575P S1075P Use Relay Cover L256 "
L255	KA32282	Klixon 6409-3Y-175	S1010P BC2/60 TP2 Use Relay Cover L256 "
PF548	KA38180	Klixon YC3R-1	CC33T 33T/SF 33T/140 33T/225 33T/SF/225 33T/SF/SW 5W33T
C2622	5348703	Necchi A2270	FF100 FF100/1 Necchi Compressor Now Use GN40
C2639	5438803	Necchi A2280	FF160 FF160/1 Necchi Compressor Now Use GN41
C2664	5348903	Necchi A2290	FF220 FF220/1 Necchi Compressor Now Use GN42
L223	KA27120	Key Voltage Type	S5033FL Use Relay Cover L243 KA25406
L182	KA21949	Key Voltage Type	S5050L S5050H S7550L S1010H KA17 BC2/60 Use Relay Cover L243 "
L180	KA21563	Key Voltage Type	S7575H S7575L S1075L Use Relay Cover L243 "
L218	KA25323	Key Voltage Type	S1015FH Use Relay Cover L243
W347	KA19510	Key Voltage Type	W68 W88 TP2 (Can use W563 W/M Only)
W563	KA23481	Key Voltage Type	W69 W89 610 620 (Can use Contactor RD352)
AH447	KA30528	Hendrey A11/2/467	S75H S75L 1775 2275 1 Phase Acc. Hermetic
AH448	KA30529	Hendrey F11/2/614	S100H S100L S150H 2210 3110 3115 1 Phase Acc. Hermetic
AH449	KA30530	Hendrey F11/2/615	S150L S315 1 Phase Acc. Hermetic Now Use AH448
AH461	KA30551	Hendrey B11/2/476	S200H S200L S300H S300L 4720 6320 6330 7930 1 Phase Acc. Hermetic
ROOM AIR CONDITIONER RELAYS			
L120	KA13703	KAL Assembl	RAC625 (Includes L194 Overload)
R196	KA17882	Key Voltage Type	RAC750
RB159	KA19226		RAC1000 (91 Units Only) Now Use L182 KA21949
L182	KA21949	Key Voltage Type	RAC1000
L199	KA24201	GE 3ARR3-EB 3AB3	RAC1750 CSCR Type Compressor
RC262		Relay Starting Kit	RAC1750 1758 PSC Type Compressor
RC628	KA44356	Klixon 6409-3Y-183	RAC1661
RWC48	HN61K1033	New Air 12-BXX	RAC2503 2531
RD352	KA46860	Contactor	RAC A23R1
AH615	KA44856	Contactor	RAC 1742/3 EL450D

ORDER PROCEDURE : REFER TO PAGE 314 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

KELVINATOR OVERLOADS

BIN NO.	PART NO.	TYPE	SUITS MODEL
AH 456	KA31874	MRA6876	75H 75L 1775 2275 Single Phase
AH 457	KA31875	MRA9902	100H 100L 2210 3110 Single Phase
AH 245	KA25756	MRA6852	150H 3115 Single Phase
AH 153	KA25997	MRA6853	150L 200H 200L 300H 300L Single Phase
AH 153	KA25997	MRA6853	5315 4720 6320 6330 7930 Single Phase
AH 152	11/2/470	MRA9957	100H — Terminal Box Connections in line
AH 245	KA25756	MRA6852	75H 75L 100H 100L 150H Three Phase
AH 153	KA25997	MRA6853	150L 200H 200L 300H 300L Three Phase
AH 153	KA25997	MRA6853	400H 400L 500H 500L 600H Both Phases
AH 617	KA33339	MRA6882	75H 75L 1775 2275 Three Phase
AH 618	KA33340	MRA6883	100H 100L 2210 3110 Three Phase
AH 619	KA33341	CRA6827	150H 150L 3115 5315 Three Phase
AH 620	KA33343	CRA6828	200H 200L 4720 6320 Three Phase
AH 621	KA33344	CRA6829	300H 300L 6330 7930 Three Phase
C 276	KA23172	Klixon MRA6804	K17M S5050H
CF 31	10-421	Klixon MRP77GV-6	H250GD
CF 34	10-283	Klixon MRP59 AMK3119	F330LD
CL 53	1500201	Klixon RA1920	Copeland Compressor 1/2 HP
CL 54	150313	Klixon RA1921	Copeland Compressor 1/3 HP
CR 166		Klixon HSE-A7	Carrier Compressors
CZ 799		Klixon ME380-11	360CH5 C360HE H500GD (Kirby Comp.)
CZ 800		Klixon ME380-33	H500GD H700GD (Kirby Comp.)
GN 45	5358024	Klixon MRT26AMN	Necchi Compressor N2520 N2550
GN 105		T0013-12	" " M2. 5J
GN 106		Klixon MRP431HN	" " M3J
GN 107		Klixon MRP419HX	" " M3. 5J
GN 108		Klixon MRP410HX	" " M4J
GN 109		Klixon MSP388HSH	" " M5J. H200GD
GN 110		Klixon MRP390HX	" " M7J-CF
GN 111		Klixon MRP339HX	" " M7J-CN M7KJ M11 H200GD. H0340GD
GN 112		Klixon MRP63HN	" " M9J
GN 113		Klixon MSP63HSH	" " M9KJ. 360CH5. C360HE. H340GD. H500GD. H700GD
GN 114		Klixon MRP62AMN	" " M11K
GN 115		Klixon MRP351HV	" " A9. A9V
GN 116		Klixon MRP62HX	" " A9K
GN 117		Klixon MRP63HV	" " A11. A11V
GN 118		Klixon MRP59AMX	" " A11K
GN 119		Klixon MRP58HX	" " A13. A13V. A9R. A9RV
GN 120		Klixon MRP39AMM	" " A13K
L 31		Klixon B23	1/4 HP 240V 50C Leland Motor
L 102	KA22351	Klixon MRA6803	S5050L S7550L
L 103	KA23001	Klixon MRA6800	S7575H S7575L S1075L
L 194	KA23171	Klixon MEA6814	NDRC BC1 BC2 3D2H KA12 KA15 RAC625 Now use L120 Relay
L 205	KA23727	Klixon CRA6805	RAC HA1750 B32T18 Comp. Type CSCR
L 214	KA26784	Klixon CRA6812)	RAC H1750 H1758 1752 B74T18 Comp. 1721 1742 1781 51C7 51E7E
		ME501-2)	51D7 51E-165 MDJ165 MDJ165R AK173M AW173M ARE17425
L 221	KA25322	Klixon CRA6806	S1015FH
L 228	KA27148	Klixon MTA6802	S5033L
L 244	KA25930	Klixon CRA9801	RAC HA1750 B32T18 Comp. Type PSC
L 249	KA31289	Klixon MTA6805	BC1/60 BC2/60 S1010H Now use L349
L270	KA35963	Klixon MRA6889	S1010P BC2/60 TP2 S1075Q
L 273	KA35964	Klixon MRA6890	S7575P S1075P
L 274	KA35965	Klixon MRA6891	S5033P S5050P S7550P K17M T16 T20 CC5050 50/400
L 317		Klixon ME380-31	C124 C144 (Tecumseh Comp.) AHF102. AHF162. C360HE 360 CH5
			H340GC H430GD H500GD H700GD
L 320		Klixon ME380-22	AHF62 H200GD H340GD AE5ZF9 Kirby Comp. Now use L337
L 324		Klixon ME380-25OC	AHF102 AHF162 Now use L317 with L330 Terminal

ORDER PROCEDURE : REFER TO PAGE 314 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

Continued next page

Kelvinator OVERLOADS

BIN NO.	PART NO.	TYPE	SUITS MODEL
L 328		Klixon ME380-14	D5 Now use L338
L 334		Klixon ME618-1	H160GC
L 335		Klixon ME618-9	H270GC Now use L317
L 336		Klixon ME618-3	D602 C160GC Now use L338
L 337		Klixon ME380-10	AHF62 H160HC
L 338		Klixon ME380-9	D602 C160GC H200GD
LK 201		Klixon MRA6834	"Lady K" K33D/4 K33E/4 (Tecumseh Comp.)
PL 179	1114229	Klixon MRA6963-160	400NG3 N400GC 450NG3 N450GC 500NG3 N500GC Now use PL560
PL 480	1114286	Klixon MRA7958-160	N620GC 620NG3
R 173	KA16942	Derwent "G"	RAC750
RB 328	KA29527	Klixon MTA6804	RAC H1000 HA1000 HD1000 HE1000 HF1000
RC 126	KA24366	Klixon MEA6835	Heater RAC 625 750 1002 1005 1008 1508 1758 1502 1752 HA1500 HA1750 1021 1051 1081 1521 1581 1661 1661/3 1721 1781 51C2 51D2 51C3 51D3 51C4 51D4 51C6 51D6 51C7 51D7 MDJ115 MDJ115R MDJ165 MDJ165R
RC 161	KA24549	Klixon CRA6802	RAC HA1500 51C6 (1508 to S/No. 1929)
RE 1	G145296-20	Klixon CST16AKN-134	RAC K3-825 (AJ610JT Compressor)
RE 2	G145296-25	Klixon CST16AKM-134	RAC K4-1255 K4-1235 K4-1235A SD4-1255 (AJ600JT Comp.)
RE 14		Klixon ME781-1	RAC K3-825 (AJ5510E Compressor)
RE 15	Klixon	ME683-4 ME781-13	RAC K4-1255 K4-1235 K4-1235A SD4-1255 (AJ5513E Comp.)
RE 142	G145296-27	Klixon CRA9951-133	RAC KAC41455 (AJ200KT Comp.)
RE 240	Y145296-40	Klixon	RAC KC2555Q LC2555Q SD2555Q (AE5465E Comp.)
RE 266		Klixon ME683-3	RAC KAC41455 (AJ5515E Comp.)
RE 267		Klixon ME381-10	RAC KC2555Q LC2555Q SD2555Q (AE546ZE Comp.)
RW 4	742175		RAC 0503 0504 0506 (Compressor) Now use RW71
RW 18	744022	Buss-Wit	RAC 0506 (Heater)
RW 43	HH12 HR1803	Derwent M4	RAC 2503
RW 71	744011	Klixon CRA6826	RAC 0503 0504 0506 (Compressor)
RW 141	748331	Klixon CRA6847	RAC 0532 0542 0562 (Compressor)
RW 147	744187	Klixon L110-3UOV	RAC0562 (Heater)

5

DONOVAN CONTACTOR — AH159 KA30069 — 3 Phase
— AH441 KA30531 — 1 Phase

BIN NO.	PART NO.	CODE	PRODUCT MODEL
AH 160	11/2/497M	M	75H 75L Three Phase
AH 161	11/2/497P	P	100H 100L Three Phase
AH 212	11/2/497S	S	150L Three Phase
AH 421	11/2/497Q	Q	150H Three Phase Use AH 162
AH 163	11/2/497T	T	200H 200L Three Phase
AH 165	11/2/497X	X	300H 300L Three Phase
AH 325	KA30076	Y	400H 400L Three Phase; 150H 3115 Single Phase
AH 326	KA30077	AA	500H 500L Three Phase
AH 327	KA30078	AB	600H Three Phase; 150L 5315 Single Phase
AH 459	KA30549	AE	200H 200L 4720 6320 Single Phase
AH 460	KA30550	AJ	300H 300L 6330 7930 Single Phase

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ORDER PROCEDURE : REFER TO PAGE 314 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

RELAYS AND OVERLOADS

KIRBY - TECUMSEH

CATALOGUE NUMBER SUMMARY PAGE FOR ORDERING PURPOSES
RELAYS OVERLOADS

CAT. NO.	RELAY
3151	ME440-1
3155	ME470-2
3159	ME556-1
31510	ME556-2
31511	ME556-3
31512	ME556-4
31513	ME556-5
31514	ME556-6
31515	ME556-7
31516	ME556-8
31517	ME556-9
31518	ME556-10
31519	ME556-11
31520	ME556-12
31525	ME606-1
31526	ME607-1
31527	ME607-2
31528	ME607-3
31532	ME608-1
31533	ME608-2
31538	ME609-1
31539	ME609-2
31542	ME692-2
31545	ME697-2
31546	ME697-6
31551	ME727-1
31552	ME727-2
31553	ME727-3
31554	ME727-4
31556	ME727-6
31557	ME727-7
31558	ME727-8
31559	ME727-9
31560	ME727-10
31564	ME732-1
31566	ME732-3
31567	ME732-4
31568	ME732-5
31569	ME732-6
31570	ME732-7
31571	ME732-8
31573	ME732-10
31579	ME785-17
31580	ME785-18
31581	ME785-19

CAT. NO.	OVERLOAD
315151	ME288-2
315152	ME288-3
315153	ME288-4
315154	ME288-5
315156	ME288-7
315157	ME288-8
315158	ME288-9
315161	ME350-1
315162	ME380-1
315163	ME380-2
315164	ME380-3
315165	ME380-4
315166	ME380-5
315167	ME380-6
315168	ME380-7
315169	ME380-8
315170	ME380-9
315171	ME380-10
315172	ME380-11
315173	ME380-12
315174	ME380-13
315175	ME380-14
315176	ME380-15
315177	ME380-16
315178	ME380-17
315179	ME380-18
315180	ME380-19
315181	ME380-20
315182	ME380-21
315183	ME380-22
315184	ME380-23
315185	ME380-24
315186	ME380-25
315187	ME380-26
315188	ME380-27
315189	ME380-28
315190	ME380-29
315191	ME380-30
315192	ME380-31
315193	ME380-32
315194	ME380-33
315195	ME380-34
315196	ME380-35
315197	ME380-36
315198	ME380-37
315199	ME380-38
315200	ME380-39

CAT. NO.	OVERLOAD
315205	ME125-11
315207	ME381-1
315208	ME381-3
315209	ME381-5
315210	ME381-7
315211	ME381-9
315212	ME381-10
315213	ME381-11
315214	ME381-12
315215	ME381-13
315220	ME501-2
315221	ME501-3
315222	ME501-4
315226	ME587-1
315227	ME587-2
315228	ME587-3
315229	ME587-4
315234	ME652-1
315236	ME663-1
315237	ME663-2
315238	ME663-3
315240	ME663-5
315241	ME663-6
315242	ME663-7
315243	ME663-8
315244	ME663-9
315248	ME731-1
315249	ME732-2
315251	ME781-1
315252	ME781-2
315253	ME781-3
315254	ME781-4
315255	ME781-5
315256	ME781-6
315257	ME781-7
315258	ME781-8
315259	ME781-9
315260	ME781-10
315261	ME781-11
315262	ME781-12
315263	ME781-13

ORDERING PROCEDURE : From the following Technical Pages —

Locate Compressor Model in Left Hand column — Proceed across and select Relay and/or Overload and order by CAT. NO. as shown above.

If Relay or Overload is not listed above, order by Kirby Part No.

REFER TO FOLLOWING TECH. PAGES FOR DETAILED SPECIFICATIONS AND SELECTION DATA

KIRBY - TECUMSEH

RELAYS, OVERLOADS AND CAPACITORS

HERMETIC COMPRESSOR ELECTRICAL COMPONENTS REFERENCE LIST

The Listings which follow are arranged to provide ready reference for electrical component selection. The Compressor Model No. and B.M. No. are located on the compressor serial name plate.

EXPLANATORY NOTES AND ABBREVIATIONS:

1. COMPRESSOR

The Model No. identifies the particular model within each series. B.M. No. specifically identifies variations to detail and voltage requirements. Where applicable, a number of B.M. Nos. may be grouped by voltage and common components.

2. MOTOR DETAILS

Columns are self-explanatory for volts, hertz and phase. -
TYPE: RSIR = Resistance start induction run (low torque start).

CSIR = Capacitor start induction run (high torque start).

CSR = Capacitor start capacitor run (high torque start).

PSC = Permanent split capacitor (low torque start).

3 PH = Polyphase 415 volts AC (high torque motor).

3. ELECTRICAL COMPONENTS

(a) The lower listing of Part No. for each B.M. group and voltage classification will generally represent current component, depending upon whether SC (screw connect) or QC (quick connect) terminals are used.

Other Part Nos. listed for the particular group indicate previously used component (still suitable if held).

(b) Part Nos. in parenthesis are specific - refer to Remarks column.

(c) SC and QC components are of equal performance and may be interchanged subject to terminal type conversion.

4. STARTING KITS

May only be used where indicated, or otherwise approved. These additional components are only intended to assist lazy starting that may be associated with voltage drop at start up of low torque motors. Starting kits must not be indiscriminately used as some motor windings are not suitable for this addition and windings damage could result.

Details available on application - Refer also Kirby Refrigeration Service Book.

AE SERIES - KIRBY-TECUMSEH

HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

5

COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES - AE
Model No.	B.M. No.	Type	Phase	Volts/Hz	OVERLOAD PROTECTOR		START RELAY		Remarks
AE1322A	E702-2 E753-2 E618-2	RSIR	1	240/50	ME380-12	ME817-12	ME535-4 ME556-4	ME814-4 ME824-4 ME833-4	QC Relays are alternatives - subject to availability.
	E645-2 E646-2 E757-2	RSIR	1	240/50	ME380-12	ME817-12	ME556-13	ME814-13 ME824-13 ME833-13	QC Relays are alternatives - subject to availability.
AE12Z7	E102-2 E751-2 E601-2	RSIR	1	240/50	ME618-5 ME380-12	ME817-12	(ME697-4) ME617-4 ME535-4 ME556-4	ME814-4 ME824-4 ME833-4	(Special Relay for E102-2 - New Zealand) QC Relays are alternatives - subject to availability.
	E643-2 E644-2 E756-2	RSIR	1	240/50	ME380-12	ME817-12	ME556-13 (ME697-13)	ME814-13 ME824-13 ME833-13	QC Relays are alternatives - subject to availability. (Special Relay for E643 - New Zealand)
	E408-2 E605-2	RSIR	1	200/50- 230/60	ME380-8	ME817-8	ME535-3 ME556-3	ME814-3 ME824-3 ME833-3	QC Relays are alternatives - subject to availability.
	E116-2 E626-2	RSIR	1	220/50	ME380-2	ME817-12	ME535-4 ME556-4	ME814-4 ME824-4 ME833-4	QC Relays are alternatives - subject to availability.

ORDER PROCEDURE : REFER TO PAGE 315 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

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AE SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

HERMETIC COMPRESSOR ELEMENTS - KIRBY PART NO.									
COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES - AE
					OVERLOAD PROTECTOR		START RELAY		
Model No.	B.M. No.	Type	Phase	Volts/Hz	SC	QC	SC	QC	Remarks
AE1227 Continued	E412-2 E754-2	RSIR	1	115/60	ME380-19	ME817-19	ME535-6 ME556-6	ME814-6 ME824-6 ME833-6	QC Relays are alternatives - subject to availability.
AE1385A	E503-1 E503-2 E615-1	RSIR	1	240/50	ME380-25 ME380-31	ME817-31	ME535-6 ME556-6 (ME732-5)	ME814-6 ME824-6 ME833-6	QC Relays are alternatives - subject to availability. (Special Relay for E503 - New Zealand)
	E639-1	RSIR	1	200/50- 230/60	ME380-29 ME380-31	ME817-31	ME556-12	ME814-12 ME833-12	QC Relays are alternatives - subject to availability.
	E616-1 E637-1	RSIR	1	220/50	ME380-25 ME380-31	ME817-31	ME535-6 ME556-6	ME814-6 ME824-6	QC Relays are alternatives - subject to availability.
AE8ZA7	E103-2 E103-1 E602-2 E752-2	RSIR	1	240/50	ME380-8	ME618-4 ME817-8	ME535-3 ME556-3 (ME693-3)	ME617-3 ME814-3 ME824-3 ME833-3	QC Relays are alternatives - subject to availability. (Special Relay for E103-2 - New Zealand)
	E113-2 E627-2	RSIR	1	220/50	ME380-9	ME817-9	ME535-2 ME556-2	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability.
	E403-2 E606-2	RSIR	1	200/50- 230/60	ME380-13	ME817-13	ME535-2 ME556-2 (ME697-2)	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability. (Special Relay for E403 - New Zealand)
	E413-2 E608-2 E755-2	RSIR	1	115/60	ME380-18	ME817-18	ME535-11 ME556-11	ME814-11 ME824-11 ME833-11	QC Relays are alternatives - subject to availability.
(AE8Z7)	E120-2	RSIR	1	240/50	ME380-8		ME732-3 ME556-3		(NOTE: Discontinued Model)
AE6ZA7	E109-1 E109-2 E630-2 E701-2	RSIR	1	240/50	ME618-6 ME380-13	ME817-13	ME535-2 ME556-2	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability.
	E409-1 E409-2 E607-2	RSIR	1	200/50- 230/60	ME380-13	ME817-13	ME535-2 ME556-2	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability.
	E419-1 E419-2 E609-2	RSIR	1	115/60	ME380-20	ME817-20	ME535-7 ME556-7	ME814-7 ME824-7 ME833-7	QC Relays are alternatives - subject to availability.
AE67ZD7	E105-1 E105-2 E506-1	RSIR	1	240/50	ME380-35	ME618-1 ME817-35	ME535-1 ME556-1	ME617-1 ME814-1 ME824-1 ME833-1	QC Relays are alternatives - subject to availability.

ORDER PROCEDURE : REFER TO PAGE 315 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

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AE SERIES - KIRBY-TECUMSEH
HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS — Kirby Part No.				SERIES — AE
Model No.	B.M. No.	Type	Phase	Volts/Hz	OVERLOAD PROTECTOR		START RELAY		
					SC	QC	SC	QC	Remarks
AE6ZD7	E104-1	RSIR	1	240/50	ME380-14	ME817-14	ME535-2 ME556-2	ME814-2 ME833-2 ME824-2	QC Relays are alternatives - subject to availability.
	E104-2 E642-2	RSIR	1	240/50	ME380-9	ME817-9	ME535-2 ME556-2	ME814-2 ME833-2 ME824-2	QC Relays are alternatives - subject to availability.
	E110-2	RSIR	1	240/50	ME380-13	ME817-13	ME535-2 ME556-2	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability.
	E110-1 E636-1 E619-1	RSIR	1	240/50	ME380-24	ME817-24	ME535-2 ME556-2 (ME697-2)	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability. (Special Relay for E110-1 - New Zealand)
	E118-1 E628-1	RSIR	1	220/50	ME380-24	ME817-24	ME535-2 ME556-2		
	E410-1 E610-1	RSIR	1	200/50- 230/60	ME380-10	ME817-10	ME535-2 ME556-2 (ME732-1)	ME814-2 ME824-2 ME833-2	QC Relays are alternatives - subject to availability. (Special Relay for E410-1 - New Zealand)
	E420-1 E621-1	RSIR	1	115/60	ME380-17	ME817-17	ME535-7 ME556-7	ME814-7 ME824-7 ME834-7	QC Relays are alternatives - subject to availability.
AE5ZF9	E106-1 E106-2 E603-1	RSIR	1	240/50		ME618-1 ME380-35 ME817-35	ME535-1 ME556-1 ME7321-2 (ME697-1)	ME817-1 ME814-1 ME824-1 ME833-1	QC Relays are alternatives - subject to availability. (Special Relay for E106-1 - New Zealand)
	E406-1 E611-1	RSIR	1	200/50- 230/60	ME380-11	ME817-11	ME535-5 ME556-5 (ME697-5)	ME814-5 ME824-5 ME833-5	QC Relays are alternatives - subject to availability. (Special Relay for E406-1 - New Zealand)
	E416-1 E622-1	RSIR	1	115/60	ME380-16	ME817-16	ME535-8 ME556-8	ME814-8 ME824-8 ME833-8	QC Relays are alternatives - subject to availability.
AE59ZF9	E107-1 E107-2 E507-1	RSIR	1	240/50	ME380-11	ME618-2 ME817-11	ME535-5 ME556-5	ME817-5 ME814-5 ME824-5 ME833-5	QC Relays are alternatives - subject to availability.
	E417-2	RSIR	1	200/50- 230/60	ME380-25 ME380-31 ME380-11	ME817-11	ME535-5 ME556-5	ME814-5 ME824-5 ME833-5	QC Relays are alternatives - subject to availability.
AE4ZF11	E604-1 E115-1	RSIR	1	240/50	ME380-11	ME817-11	ME535-6 ME556-6 (ME732-6) (ME697-6)	ME814-6 ME824-6 ME833-6	QC Relays are alternatives - subject to availability. (Special Relays for E115-1 - Export)

ORDER PROCEDURE : REFER TO PAGE 315 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

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AE SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS – Kirby Part No.				SERIES – AE
Model No.	B.M. No.	Type	Phase	Volts/Hz	OVERLOAD PROTECTOR		START RELAY		Remarks
					SC	QC	SC	QC	
AE4ZF11 Continued	E108-1	RSIR	1	240/50	ME380-11		ME556-5		
	E114-1C	CSIR *	1	240/50	ME380-11	ME817-11	ME732-2 ME732-5		
	E623-1	RSIR	1	115/60	ME380-26		ME556-10		
	E404-1 E629-1	RSIR	1	220/50	ME380-31	ME817-31	ME535-6 ME556-6	ME814-6 ME824-6 ME833-6	QC Relays are alternatives - subject to availability.
	E411-1 E612-1	RSIR	1	200/50- 230/60	ME380-31		ME535-5 ME556-5		
AE4ZG12	E117-1 E614-1	RSIR	1	240/50	ME380-31	ME817-31	ME535-5 ME556-5 (ME732-5) (ME897-5)	ME814-5 ME824-5 ME833-5	QC Relays are alternatives - subject to availability. (Special Relays for E117-1 - Export)
	E505-1 E617-1	RSIR	1	240/50	ME380-31	ME817-31	ME535-6 ME556-6 (ME897-5) (ME732-5)	ME814-6 ME824-6 ME833-6 ME860-6	QC Relays are alternatives - subject to availability. (Special Relays for E505-1 - Export)
	E638-1	RSIR	1	200/50	ME380-31	ME817-31	ME556-5	ME814-5 ME824-5 ME833-5	QC Relays are alternatives - subject to availability.
(AE1318A)	E504	RSIR	1	240/50	ME380-12		ME556-4		(NOTE: Discontinued Model)
AE1350A	E655-2	RSIR	1	240/50	ME817-24		ME833-5		
AE1360A	E649-2	RSIR	1	240/50	ME380-11		ME556-5		QC
AE1370A	E650-2	RSIR	1	240/50	ME380-31		ME556-9		QC

COMPRESSOR		MOTOR			ELECT. COMPONENTS — Kirby Part No.				SERIES — AE
Model No.	B.M. No.	Type	Phase	Volts/Hz	Overload	Start	CAPACITORS		
					Protector	Relay	Start	Run	Remarks
AE5462E	E634-2	PSC	1	240/50	ME381-10	Not Req.	Not Req.	ME782-3	SC 15/400 Run
	ME817-10				ME782-2			SC 12/400 Run	
	E635-2							ME822-12	QC 12/440 Run
	E640-2							ME822-13	QC 15/440 Run
								ME832-15	QC 15/440 Run
AE3425A	E500-1	RSIR	1	240/50	ME380-31	ME536-6 ME556-6 ME814-6 ME833-6	Not Req.	Not Req.	SC Starting Kit MPE-10 approved for this Model.
	ME817-31				SC				
	E500-2								QC
									QC Alternative Relays

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

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AE SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES -- AE
Model No.	S.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
							Start	Run	
AE3430B	E414-2	RSIR	1	115/60	ME380-26	ME556-10	Not Req.	Not Req.	SC
	E620-2	RSIR	1	200/50-230/60	ME380-28	ME525-12 ME556-12	Not Req.	Not Req.	
AE4425A	E502-1C E502-2C	CSIR	1	240/50	ME380-25 ME380-31	ME658-5 ME732-4	ME740-4 ME825-8	Not Req.	QC 40/240 Start Capacitor QC 40/240 Start Capacitor
AE1410B	E624-1 E415-1	RSIR	1	200/50-230/60	ME380-29 ME817-29	ME585-12 ME556-12 ME814-12 ME824-12 ME833-12	Not Req.	Not Req.	SC SC QC QC Alternative Relays QC
	E625-1	RSIR	1	115/60	ME380-30 ME817-30	ME535-10 ME556-10 ME814-10 ME824-10 ME833-10	Not Req.	Not Req.	SC SC QC QC Alternative Relays QC
AE1411A	E631-1 E641-1	RSIR	1	240/50	ME380-33 ME817-33	ME556-6 ME535-6 ME814-6 ME824-6 ME833-6	Not Req.	Not Req.	SC QC QC Alternative Relays QC
AE2411A	E632-1C E632-2C	CSIR	1	240/50	ME380-31 ME817-31	ME732-4	ME740-4 ME825-7	Not Req.	SC 40/240 Start QC 40/240 Start
AE6416A	E119-1 E119-2	RSIR	1	240/50	ME380-31 ME817-31	ME535-6 ME556-6 ME833-6	Not Req.	Not Req.	SC SC QC
AE6419B	E613-2	RSIR	1	200/50-230/60	ME380-28 ME817-28	ME556-12 ME833-12	Not Req.	Not Req.	SC QC
AE7416A	E501-1C E501-2C E703-2C	CSIR	1	240/50	ME380-31 ME817-31	ME732-4	ME740-4 ME825-7	Not Req.	SC 40/240 Start QC 40/240 Start QC 40/240 Start
	E647-2C	CSIR	1	200/50-230/60	ME380-27	ME732-4	ME825-8		QC 40/240 Start
AE7423A	E633-2C E648-2C	CSIR CSIR	1 1	240/50	ME380-34	ME732-10	ME825-7 ME825-8	Not Req.	QC 40/240 Start QC 40/240 Start
	E648-2C	CSIR	1	200/50-230/60	ME380-34	ME732-10	ME825-8 ME825-12		QC 40/240 Start QC 40/240 Start

ORDER PROCEDURE : RELAYS AND OVERLOADS -- REFER TO PAGE 315
CAPACITORS -- REFER TO PAGE 326-f

Note: Cornell-Dubilier Capacitors are detailed on Pages 326-d and 326-e

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AJ SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES - AJ
Model No.	B.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
							Start	Run	
AJ2416A	J602-C J612-C	CSIR	1	240/50	ME781-6	ME124-6 ME785-17	ME740-4 ME826-4	Not Req.	SC QC 40/240 Start QC
AJ2422A	J606-C J616-C	CSIR	1	240/50	ME781-5	ME124-17 ME727-5 ME785-17	ME740-6 ME826-6	Not Req.	QC 60/240 Start QC 60/240 Start
(AJ4448A)	J603-C	CSIR	1	240/50	ME781-6	ME124-16 ME785-17	ME740-4	Not Req.	SC (NOTE: Discontinued Model)
AJ2427A	J609-1C J609-C	CSR	1	240/50	ME781-11	ME727-10	ME740-3 ME826-5 ME825-9	ME782-1 ME822-11	SC 60/240 Start 10/400 Run QC 60/240 Start
AJ2435J	J622-C	CSR	1	240/50	ME781-11	ME727-10	ME826-5	ME822-11	60/240 Start 10/400 Run
AJ2448J	J605-C	CSR	1	240/50	ME781-12	ME727-10	ME740-5 ME826-5	ME782-9 ME822-14	QC 60/240 Start 20/400 Run QC 60/240 Start 20/400 Run
AJ7428A	J611-C J601-C	CSIR	1	240/50	ME781-6	ME124-16 ME785-17	ME740-4 ME826-4	Not Req.	QC 40/240 Start QC 40/240 Start
AJ7434A	J604-C J614-C	CSIR	1	240/50	ME781-5	ME124-17 ME727-5 ME785-17	ME740-6 ME826-6	Not Req.	QC 60/240 Start QC 60/240 Start
	J621-C	CSIR	1	200/50- 230/60	ME781-14	ME785-21	ME826-6		QC 60/240 Start
AJ7445A	J617-C	CSIR	1	240/50	ME781-9 ME781-10	ME124-18 ME785-18	ME740-6 ME826-6	Not Req.	QC 60/240 Start SC 60/240 Start QC 60/240 Start
AJ7457A	J608-C J608-1C	CSR	1	240/50	ME781-10	ME727-7	ME740-5 ME826-5	ME782-3 ME822-13	QC 60/240 Start 15/400 Run QC 60/240 Start 15/400 Run
AJ5483E	J105 J110	PSC	1	240/50	ME781-4	Not Req. (ME727-7)	Not Req. (ME740-1)	ME335-27 ME782-1 ME822-11	QC 10/400 Run QC 10/400 Run (These additional parts used in Start Kit MPE15 to assist low volts starting) (25/240 Start Capacitor)
AJ5510E	J104 J114	PSC	1	240/50	ME781-1	Not Req.	Not Req.	ME335-28 ME782-3 ME822-13	QC 15/400 Run QC 15/400 Run QC 15/400 Run
	J122 J442	PSC	1	220/50	ME781-2	Not Req. (ME727-7)	Not Req. (ME740-1)	ME335-28 ME782-3 ME822-13	QC 15/400 Run QC 15/400 Run QC 15/400 Run (These additional parts used in Start Kit MPE15 25/240 Start)

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

Note: Cornell-Dubilier Capacitors are detailed on Pages 326-d and 326-e

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AJ SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS – Kirby Part No.				SERIES – AJ
Model No.	B.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
							Start	Run	
AJ5510G	J125	PSC	1	100/50-115/60	ME781-8	Not Req.	Not Req.	ME822-14	QC 20/400 Run
	J124	PSC	1	200/50-230/60	ME781-7	Not Req.	Not Req.	ME782-3 ME822-13	QC 15/400 Run QC 15/400 Run
AJ5512G	J118	PSC	1	200/50-230/60	ME781-3	Not Req.	Not Req.	ME335-28 ME782-3 ME822-13	SC 15/400 Run QC 15/400 Run QC 15/400 Run
	J123	PSC	1	100/50-115/60	ME781-8 ME663-8	Not Req.	Not Req.	ME335-33 ME782-5	SC 25/400 Run SC 25/400 Run
AJ5513E	J103 J113 J405	PSC	1	240/50	ME663-4 ME781-13	Not Req. (ME727-6)	Not Req. (ME740-1)	ME335-22 ME782-4 ME782-9	SC 20/400 Run QC 20/400 Run QC 20/400 Run (These additional parts used in Start Kit MPE12 to assist low volts starting) (25/240 Start Capacitor)
	J121 J421 J403	PSC	1	220/50	ME663-3	Not Req. (ME727-6)	Not Req. (ME740-1)	ME335-32 ME782-4 ME782-9 ME822-14	SC 20/400 Run QC 20/400 Run QC 20/400 Run (These additional parts used in Start Kit MPE12 to assist low volts starting) (25/240 Start Capacitor) QC 20/400 Run
AJ5515E	J101 J111 J401 J109	PSC	1	240/50	ME663-3	Not Req. (ME727-8)	Not Req. (ME740-1)	ME335-29 ME782-6 ME822-16	SC 30/440 Run QC 30/440 Run QC 30/440 Run (These additional parts used in Start Kit MPE14 to assist low volts starting) (25/240 Start Capacitor)
	J119 J404	PSC	1	220/50	ME663-9	Not Req. (ME727-8)	Not Req. (ME740-1)	ME335-33 ME782-5	SC 25/400 Run SC (These additional parts used in Start Kit MPE14 to assist low volts starting) (25/240 Start Capacitor)
AJ5515G	J117	PSC	1	200/50-230/60	ME663-5	Not Req.	Not Req.	ME335-32 ME782-4 ME782-9 ME822-14	SC 20/400 Run QC 20/400 Run QC 20/400 Run QC 20/400 Run
AJ5516E	J102 J112 J402	PSC	1	240/50	ME663-3	Not Req.	Not Req.	ME335-30 ME822-17	SC 35/440 Run QC 35/440 Run
AJ5518G	J115	PSC	1	200/50-230/60	ME663-6	Not Req.	Not Req.	ME335-33 ME782-5	SC 25/400 Run QC 25/400 Run
AJ5519G	J116	PSC	1	200/50-230/60	ME663-7	Not Req.	Not Req.	ME335-33 ME782-5	SC 25/400 Run QC 25/400 Run

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

WE HAVE LARGE STOCK HOLDINGS OF PARTS FOR YOUR SUPERCEDED EQUIPMENT

CONTINUED FROM PREVIOUS PAGE

AH SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS — Kirby Part No.				SERIES — AH
Model No.	B.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
							Start	Run	
AH2434A	H608-1C H608-C	CSR	1	240/50	Internal	ME727-4	ME740-7 ME826-7 ME825-13	ME782-3 ME822-13	SC 120/240 Start 15/400 Run QC QC 120/240 Start 15/400 Run
	H608-1K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	
AH4514A	H606-C	CSR	1	240/50	Internal	ME727-4	ME740-5 ME825-9 ME826-5	ME782-4 ME782-9 ME822-14	QC 60/240 Start 20/400 Run QC 60/240 Start 20/400 Run QC 60/240 Start 20/400 Run
	H607-K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	
(AH2455A)	H610-C H616-C	CSR	1	240/50	Internal	ME727-8	ME740-7	ME782-6	SC 120/240 Start 30/440 Run (NOTE: Discontinued Model — Replaced by AH4521A)
	H611-K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	
AH4521A	H119-1K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	SC
	H615-C	CSR	1	240/50	Internal	ME727-1	ME825-9 ME826-5	ME822-16	QC 60/240 Start 30/440 Run
(AH7511A)	H615-C	CSR	1	240/50	Internal	ME727-1	ME740-5	ME782-6	SC 60/240 Start 30/440 Run (NOTE: Discontinued Model - Replaced by AH4521A)
(AH5516E)	H101 H104 H108 H114 H601	PSC	1	240/50	Internal	Not Req. (ME727-8)	Not Req. (ME740-1)	ME335-21 ME335-33 ME782-5	SC (NOTE: Discontinued Model) SC 25/400 Run SC (These additional parts used in Start Kit MPE14 to assist low volts starting) (20/240 Start Capacitor)
AH5518E	H102 H105 H109 H115 H602 H651	PSC	1	240/50	Internal	Not Req. (ME727-8)	Not Req. (ME740-5)	ME335-6 ME335-29 ME782-6 ME822-16	SC 30/440 Run SC 30/440 Run QC 30/440 Run QC 30/440 Run (These additional parts used in Start Kit MPE16 to assist low volts starting) (60/240 Start Capacitor)
	H626	PSC	1	220/50	Internal	Not Req.	Not Req.	ME782-6 ME822-16	QC 30/440 Run QC 30/440 Run
	H655-K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	

ORDER PROCEDURE : RELAYS AND OVERLOADS -- REFER TO PAGE 315
CAPACITORS -- REFER TO PAGE 326-f

Note: Cornell-Dubilier Capacitors are detailed on Pages 326-d and 326-e

CONTINUED FROM PREVIOUS PAGE

AH SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES - AH
Model No.	S.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
							Start	Run	
AH5520E	H103 H106 H110 H116 H118	PSC	1	240/50	Internal	Not Req. (ME727-1)	Not Req. (ME740-5)	ME335-6 ME335-29 ME782-6 ME822-6 ME822-17	SC 30/440 Run SC 30/440 Run SC 30/440 Run (These additional parts used in Start Kit MPE11 to assist low volts starting) (60/240 Start Capacitor) QC 35/440 Run
	H653-K H107-K H117-K H613-K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	
	H623 H624	PSC	1	220/50	Internal	Not Req. (ME727-2)	Not Req. (ME740-5)	ME335-30 ME822-17	SC 35/440 Run QC 35/440 Run (These additional parts used in Start Kit MPE18 to assist low volts starting) (60/240 Start Capacitor)
AH5523E	H111 H604 H654	PSC	1	240/50	Internal	Not Req. (ME727-2)	Not Req. (ME740-5)	ME335-30 ME822-17	SC 35/440 Run (These additional parts used in Start Kit MPE11 to assist low volts starting) (60/240 Start Capacitor) QC 35/440 Run
	H625 H628	PSC	1	220/50	Internal	Not Req.	Not Req.	ME335-30 ME822-17	SC 35/440 Run QC 35/440 Run
	H618-K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	
AH5524G	H627	PSC	1	200/50- 230/60	Internal	Not Req.	Not Req.	ME782-7 ME822-17	QC 35/440 Run QC 35/440 Run
AH5533E	H113-1K H614-1K H617-1K	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	

**ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f**

NOTES

IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

CONTINUED FROM PREVIOUS PAGE

CL & AG SERIES - KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

COMPRESSOR		MOTOR			ELECT. COMPONENTS - Kirby Part No.				SERIES - CL
Model No.	B.M. No.	Type	Phase	Volts/Hz	Overload Protector	Start Relay	CAPACITORS		Remarks
(CL21Y14)	L108-K L108-1K L118-K L118-1K	3 PH	3	415/50	Internal Plus (ME587-4)	Not Req.	Not Req.	Not Req.	(NOTE: Discontinued Model) (Supplementary External Overloads)
(CL31Y14)	L102-K L102-1K L112-K L112-1K	3 PH	3	415/50	Internal Plus (ME587-1)	Not Req.	Not Req.	Not Req.	(NOTE: Discontinued Model) (Supplementary External Overloads)
CL26ZA17	L110-K L110-1K L120-K L120-1K	3 PH	3	415/50	Internal Plus (ME587-1)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
CL31ZH17	L103-K L103-1K L113-K L113-1K	3 PH	3	415/50	Internal Plus (ME758-1)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
CL41ZA17	L104-K L104-1K L114-K L114-1K	3 PH	3	415/50	Internal Plus (ME758-2)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
CL51ZH17	L106-K L106-1K L116-K L116-1K	3 PH	3	415/50	Internal Plus (ME758-3)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
CL41ZA17-T (CL5550G)	T.Prod.	3 PH	3	415/50	Internal Plus (ME587-2)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
CL51ZH17-T (CL5582G)	T.Prod.	3 PH	3	415/50	Internal Plus (ME587-3)	Not Req.	Not Req.	Not Req.	(Supplementary External Overloads)
AG5553E&F	T.Prod.	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	Internal Line Break on all three legs - cannot be bypassed.
AG5526E&F	T.Prod.	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	Internal Line Break on all three legs - cannot be bypassed.
AG5568E&F	T.Prod.	3 PH	3	415/50	Internal	Not Req.	Not Req.	Not Req.	Internal Line Break on all three legs - cannot be bypassed.

ORDER PROCEDURE : RELAYS AND OVERLOADS - REFER TO PAGE 315

CAPACITORS - REFER TO PAGE 326-f

Note: Cornell-Dubilier Capacitors are detailed on Pages 326-d and 326-e

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

OBSOLETE MODELS KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

The charts and information on the following pages cover the application of electrical components to Kirby-Tecumseh Hermetic Compressors. The compressor model number is located on the right hand side of the serial plate, and the basic compressor bill of material number is located on the top left hand corner of the serial plate.

Resistances and current ratings shown are nominal values only and may vary due to production requirements.

LEGEND

In the tables on succeeding pages, reference is made to a number of special requirements the details of which are designated by various signs as per the legend below.

- * Indicates current replacement part.
- § Indicates part used on starting kit.
- † Indicates part supplied by customer.
- (S) Indicates special application – use only part indicated.
- (QC) Indicates Quick Connect Terminals.

AK SERIES – SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS – OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	B.M. No.	Power Supply			Part No.	µF	Part No.	µF
AK1410A	K102-1 K102-2 K400-1	240 V/50 Hz	ME617-6 (QC) ME697-6 (S) ME535-6 *ME556-6	ME618-12 (QC) *ME380-15				
	K118-1	240 V/50 Hz	*ME556-6	*ME380-28				
AK1413A	K103-1 K103-2 K107-2	240 V/50 Hz	ME617-9 (QC) ME697-9 (S) ME535-6 ME535-9 *ME556-9 ME658-6 *ME732-6	ME618-11 (QC) *ME380-5 ME380-5	ME110-5 *ME740-4	40		
	K401-1	240 V/50 Hz	ME617-9 (QC) ME535-9 *ME556-9	ME618-11 (QC) *ME380-5				
AK5457E	K105-2	240 V/50 Hz		ME731-1			ME335-19 ME335-27 ME746-1 *ME782-1	10/400
AK5469E	K104-2 K402-2	240 V/50 Hz		ME731-2			ME335-26 ME335-31 *ME782-2	12/400
AK7419A	K120-2C	240 V/50 Hz	ME658-7 *ME732-7	ME380-27	ME110-5 *ME740-4	40		
AK2410A	K106-1C K106-2C	240 V/50 Hz	ME658-4 *ME732-4	ME380-15	ME110-5 *ME740-4	40		
AK7422A	K117-2C	240 V/50 Hz	ME732-10	ME380-32	ME740-4	40		

For replacement quick connect overloads order equivalent overload with screwed terminals plus ME211-34 terminal.
For replacement quick connect relays order equivalent relay with screwed terminal plus ME211-33 terminal.

**ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f**

KIRBY-TECUMSEH

HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

B SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	S.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
B7P16	B107-C B107-1C	240 V/50 Hz	ME287-6 ME470-1 ME653-1 ME653-2 ME737-1 *ME785-19	ME350-1	ME110-12 *ME740-7	120		
B7T16	B104-1C	240 V/50 Hz	ME287-6 ME470-1 ME653-1 ME653-2 ME737-1 *ME785-19	ME288-5	ME110-12 *ME740-7	120		
B1T16	B108-C B108-1C	240 V/50 Hz	ME287-6 ME470-1 ME470-3 *ME727-4	ME288-7	ME110-12 *ME740-7	120	ME335-1 ME335-28 ME746-2 *ME782-3	15/400
B1T18	B284-1C	240 V/50 Hz	ME287-6 ME470-1 ME470-3 *ME727-4	ME350-1	ME110-12 *ME740-7	120	ME335-1 ME335-28 ME746-2 *ME782-3	15/400
B1P16	B400-1C	240 V/50 Hz	ME470-1 *ME727-4	ME288-7	ME110-12 *ME740-7	120	ME335-28 ME746-2 *ME782-3	15/400
B1U18	B105-C B105-1C	240 V/50 Hz	ME287-6 ME470-1 ME470-3 *ME727-4	ME288-7	ME110-12 *ME740-7	120	ME335-1 ME335-28 ME746-2 *ME782-3	15/400
B32U18	B297-C	240 V/50 Hz	ME287-2 *ME727-6	ME288-8	ME110-12 *ME740-7	120	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
B32T16	B101-C	240 V/50 Hz	ME287-2 ME287-5 *ME727-9	*ME288-2 ME288-3	ME110-10 *ME740-5	60	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
	B295-C	240 V/50 Hz	ME287-2 ME287-5 *ME727-6	ME288-9	ME110-12 *ME740-7	120	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
	B402-C	220 V/50 Hz	§	*ME288-2 ME288-3	§	120	§	30/370
	B289 B296-A B299 B301 B301-A	240 V/50 Hz	ME124-15§ *ME727-2§	ME501-2	ME110-14§ ME110-15§ *ME740-3§	40	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
	B291	230 V/60 Hz		ME501-3			§	30/400
B74T18	B102-C	240 V/50 Hz	ME287-2 ME287-5 *ME727-9	*ME288-2 ME288-3	ME110-10 *ME740-5	60	ME335-6 ME335-16 ME335-29 ME746-3 *ME782-6	30/400

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

Note: Cornell-Dubilier Capacitors are detailed on Pages 326-d and 326-e

KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

B SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	B.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
B74T18	B298-C	240 V/50 Hz	ME287-2 *ME727-9	*ME288-2 ME288-3	ME110-12 *ME740-7	120	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
	B312	240 V/50 Hz	ME124-15§ *ME727-2§	ME501-2	ME110-14§ *ME740-3§	40	ME335-17 *ME782-5	25/440
	B304	240 V/50 Hz	ME124-15§ *ME727-2§	ME501-2	ME110-14§ *ME740-3§	40	ME335-6 ME335-29 ME746-3 *ME782-6	30/400
	B292	220 V/50 Hz		ME501-2			ME335-6 ME335-29 ME746-3 *ME782-6	30/400
B21U18	B103-C	240 V/50 Hz	ME287-3 ME287-4 ME287-7 ME287-8 *ME727-9	ME288-4	ME110-12 *ME740-7	120	ME335-15 *ME335-30	35/440
	B300 B303 B303-A	240 V/50 Hz	ME124-15§ *ME727-2§	ME501-2	ME110-14§ *ME740-3§	40	ME335-18 *ME335-30	35/440
	B290	230 V/60 Hz		ME501-4			§	35/370
	B21T18	230 V/60 Hz	ME470-2	ME501-3	ME110-8	150	ME335-23	17.5/370

B SERIES - THREE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			OVERLOAD	REMARKS
Model No.	B.M. No.	Power Supply		
B7P16	B313-K B313-1K	415 V/50 Hz 3Ø	INTERNAL	
B7T16	B314-1K	415 V/50 Hz 3Ø	INTERNAL	
B1T16	B319-K B319-1K	415 V/50 Hz 3Ø	INTERNAL	
B1U18	B315-K B315-1K	415 V/50 Hz 3Ø	INTERNAL	
B32T16	B316-K B309-K	415 V/50 Hz 3Ø	INTERNAL	
B74T16	B306-K B293-K	415 V/50 Hz 3Ø	INTERNAL	
B21U18	B311-K	415 V/50 Hz 3Ø	EXTERNAL ME534-1	
	B307-K B317-K B317-AK	415 V/50 Hz 3Ø	INTERNAL	
B32U18	B308-1K B318-K	415 V/50 Hz 3Ø	INTERNAL	

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

SECTION 5

Tech. Page 315-m

KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

P SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	S.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
P91L	P310-2 P400-2	240 V/50 Hz	ME124-6 ME366-3 ME382-2 *ME607-3	ME125-11				
P91	P290-2 P401-2	240 V/50 Hz	ME124-5 ME366-2 ME382-1 *ME607-2	ME125-8 ME125-9 ME380-1 *ME380-6				
P8112L	P210-1 P210-2 P402-1 P402-2	240 V/50 Hz	ME366-2 ME382-1 *ME607-2	ME380-6				
P61	P215-2 P403-2	240 V/50 Hz	ME366-1 ME383-1 *ME607-1	ME380-1				
P6112L (P8112)	P200-1 P200-2 P404-1 P404-2	240 V/50 Hz	ME124-2 ME124-3 ME366-1 ME383-1 *ME607-1	ME125-3 ME125-4 ME125-6 *ME380-3				
P6312	P101-1 P101-2 P405-1 P405-2	240 V/50 Hz	ME124-2 ME124-3 ME366-1 ME383-1 *ME607-1	ME125-2 ME125-7 *ME380-2				
P5312	P390-1 P390-2 P406-1 P406-2	240 V/50 Hz	ME366-1 ME383-1 *ME607-1	ME125-2 ME125-7 *ME380-2				
AP41	P330-1C P330-2C P407-1C P407-2C	240 V/50 Hz-210 V/40 Hz	ME124-2 ME124-3 ME405-1 *ME609-1	ME125-2 ME125-7 *ME380-2	ME110-1 *ME740-4	40		
AP41H	P325-2C P408-2C	240 V/50 Hz	ME405-2 *ME609-2	ME380-7	ME110-1 *ME740-4	40		
AP4112	P321-1C P321-2C P411-1C P411-2C	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15	ME110-1 *ME740-4	40		
	P417-2C	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15	ME110-6 *ME740-6	60		
	P326-1 P326-2 P410-1 P410-2	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15				
	P500-1 P500-2	200 V/50 Hz-230 V/60 Hz	ME405-2 *ME609-2	ME380-15				

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f

KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

AP SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	B.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
AP4311	P475-1	240 V/50 Hz	ME609-2	ME380-21				
AP4312	P241-1C P241-2C P413-1C P413-2C	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15	ME110-1 *ME740-4	40		
	P416-1C P416-2C	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15	ME110-2 *ME740-6	60		
	P240-1 P240-2 P412-1 P412-2	240 V/50 Hz	ME124-4 ME405-2 *ME609-2	ME125-5 ME125-10 ME380-4 *ME380-15				
	P419-1 P419-2	208 V/50 Hz-230 V/60 Hz	ME405-2 *ME609-2	ME380-15				
AP3112	P418-2C	240 V/50 Hz	ME440-1	ME380-5	ME110-11 *ME740-2	25		
AP3311	P380-2C P414-2C P414-1C	240 V/50 Hz	ME440-1	ME380-5	ME110-11 *ME740-2	25		
AT45	T101-1 T111-1	240 V/50 Hz	ME697-6 (S) ME535-6 *ME556-6	ME380-15				

AU SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	B.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
UA4P12	U300-1 U351-1	240 V/50 Hz	ME365-1 ME384-1 *ME606-1	ME406-4 *ME381-9				
AU36	U304-2C U346-2C U345-2C	240 V/50 Hz	ME404-1 *ME608-1	ME381-8 *ME381-10	ME110-5 *ME740-4	40		
AU3612	U301-1C U347-1C	240 V/50 Hz	ME608-1	ME381-11 *ME381-12	ME110-5 *ME740-4	40		
	U301-2C U347-2C	240 V/50 Hz	ME124-9 ME404-1 *ME608-1	ME406-3 *ME381-3	ME110-5 *ME740-4	40		
AU26	U349-2C U350-2C	240 V/50 Hz	ME124-10 ME404-2 *ME608-2	ME381-10	ME110-6 *ME740-6	60		
AU2612	U303-2C U344-2C	240 V/50 Hz	ME124-20 ME404-2 *ME608-2	ME381-7	ME110-6 *ME740-6	60		
AU2P12	U302-2C U342-2C	240 V/50 Hz	ME124-10 ME404-2 *ME608-2	ME381-8 *ME381-11	ME110-6 *ME740-6	60		
AU2T12	U348-2C U341-2C	240 V/50 Hz	ME124-11 *ME727-3	ME381-8 *ME381-11	ME110-5 *ME740-5	60	ME335-19 ME335-27 ME746-1 *ME782-1	10/400

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-I

KIRBY-TECUMSEH HERMETIC COMPRESSOR ELECTRICAL COMPONENTS

AU SERIES - SINGLE PHASE ELECTRICAL COMPONENT PART NUMBERS - OBSOLETE

COMPRESSOR			START RELAY	OVERLOAD	START CAPACITOR		RUN CAPACITOR	
Model No.	B.M. No.	Power Supply			Part No.	uF	Part No.	uF/V
AU7P12	U352-2C U353-2C	240 V/50 Hz	ME124-11 ME388-4 ME675-1 *ME727-3	ME381-10	ME110-10 ME110-12 *ME740-5	80	ME335-19 ME335-27 ME746-1 *ME782-1	10/400
AU76	U343-2	240 V/50 Hz		ME381-10			ME335-19 ME335-27 ME746-1 *ME782-1	10/400
AU1612	U125-2 U508-2	240 V/50 Hz	ME124-7§ ME124-8§ ME727-3§	ME381-5	ME110-9§ *ME740-1§	25	ME335-1 ME335-28 ME746-2 *ME782-3	15/400
	U510-2	240 V/50 Hz		ME381-13			ME335-28 ME746-2 *ME782-3	15/400
AU1P12	U101-2 U250-2 U354-2	240 V/50 Hz	ME124-7§ ME124-8§ ME727-3§	ME125-12 ME406-1 *ME381-1	ME110-9§ *ME740-1§	25	ME335-1 ME335-28 ME746-2 *ME782-3 ME335-8(S) ME335-24(S)	15/400 15 + 4/400 20/400
	U450-2 U509-2	200 V/50 Hz-230 V/60 Hz	ME124-15§ *ME727-1§	ME652-1	ME110-9§ *ME740-1§	25	ME335-1 ME335-28 ME746-2 *ME782-3	15/400
AUT12	U505-2 U507-2 U601-2	240 V/50 Hz	ME692-1§	ME663-2	ME110-14§ ME110-15§ *ME740-3	40	ME335-1 ME335-28 ME746-2 *ME782-3 ME335-22 ME335-29 ME746-3 *ME782-6	15/400 30/400
	U504-2 U506-2	200 V/50 Hz-230 V/60 Hz		ME663-1			ME335-21 ME335-33 *ME782-5	25/400
AUR13	U501-2 U503-2	240 V/50 Hz	ME692-1§	ME663-2	ME110-14§ ME110-15§ *ME740-3§	40	ME335-22 *ME782-6	30/400
	U500-2 U502-2	200 V/50 Hz-230 V/60 Hz		ME663-1			ME335-21 ME335-33 *ME782-5	25/400

ORDER PROCEDURE : RELAYS AND OVERLOADS — REFER TO PAGE 315
CAPACITORS — REFER TO PAGE 326-f



L'UNITÉ HERMÉTIQUE S.A. Licence *Tecumseh*
COMPRESSORS

315-q

RELAYS AND OVERLOADS

(FOR 240 Volt 50 Hz. UNITS)

COMPRESSOR MODEL	RELAY		OVERLOAD	
	PART No.	CAT. NO.	PART No.	CAT. NO.
LOW BACK PRESSURE MODELS				
AEZ1332A	HKB182	315131	MRP325HV - 3007	
AEZ1336A	HKB182	315131	MRP379HV - 3007	315126
AEZ1343A	HKB256	315132	MRP380AMK - 3007	315127
AEZ1360A (OC) (N/F)	HKB325	315133	MRP380AMK - 3007	315127
AEZ1380A (OC) (N/F)	HKB455	315134	MRP304AMN - 3007	315128
CAE4ZF11	HKB525	315137	MRP63AMK - 3007	315124
AE1410A (OC) (F)	HKB590	315135	MRP61AMK - 3007	315129
CAE2410A	HKB650	315136	MRT39AMHD - 3007	315130
CAE2412A	HKB650	315136	MRT39AMHD - 3007	315130
AE1417L	-		-	
CAJ2428L	GE3ARR2KAF - 176B	315117	MRT16APK - 3021	315118
CAJ2T12	GE3ARR2KAF - 176B	315117	MRT22ALK - 3021	315123
CAJ2446L	GE3ARR3A10AB3		MRT20ALKD - 3021	315122
MEDIUM / HIGH BACK PRESSURE MODELS				
CAE59ZF9	HKB395		MRP59AMHD - 3007	
CAE41ZF11	HKB590	315135	MRP36AMHD - 3007	315121
CAE4470L	-		-	
CAJ4452A	GE3ARR2KAF - 176B	315117	MRT20ALKD - 3021	315122
CAJ4461A	GE3ARR2KAF - 176B	315117	MRT20ALKD - 3021	315122
CAJ4492A	GE3ARR2KAF - 182B	315119	MRT16AHKE - 3021	315125
CAJ4511A	GE3ARR3A3AV3	315120	MRT16AHKE - 3021	315125
STANDARD AIR CONDITIONING MODELS				
AJ5510F	GE3ARR3B10AS3		MRT24AJN - 3021	
AJ5512E	GE3ARR3B10AS3		MRT18AJN - 3021	
AJ5513E	GE3ARR3B4AA3		MST18AJN - 3021	
AJ5515E	GE3ARR3B6AV3		MST00AJRH - 3109	
AJ5518E	GE3ARR3B10AS3		CST00AJN - 3006	
AJ5519E	GE3ARR3B10AS3		CST16AHSH - 3006	
AH5524E	GE3ARR3U3P2		Internally Protected	
AH5527E	GE3ARR3U3P2		Internally Protected	
AH5531E	GE3ARR3U3P2		Internally Protected	
NOTE: FOR HIGH EFFICIENCY AIR CONDITIONING MODELS, THREE PHASE MODELS AND UNLISTED MODELS REFER L'UNITÉ HERMETIQUE MANUAL "Electrical Characteristics of Compressors" No. F.T. 287 C				

L'UNITÉ HERMETIQUE COMPRESSORS ARE DETAILED ON PAGES 258-b, 258-c, and 258-d
 L'UNITÉ HERMETIQUE CONDENSING UNITS ARE DETAILED ON PAGES 259-c and 259-d

RELAYS AND OVERLOADS

R.E. & KIRBY-TECUMSEH CROSS REFERENCE

CATALOGUE NUMBER SUMMARY PAGE - FOR ORDERING PURPOSES

RELAYS

CAT. NO.	R.E. P/N	Replaces Kirby "ME" P/N	CAT. NO.	R.E. P/N	Replaces Kirby "ME" P/N
3231	KT1R	535-4, 556-4, 617-4	32322	KT24R	658-5, 732-5
3232	KT2R	535-3, 556-3, 617-3	32323	KT25R	658-2, 732-2
3233	KT3R	535-2, 556-2, 617-2	32346	KT27R	658-8, 732-8
3234	KT4R	535-1, 556-1, 617-1	32326	KT28R	658-3, 732-8
3235	KT5R	535-5, 556-5, 617-5	32327	KT30R	
3236	KT6R	124-6, 366-3, 382-2, 607-3, R8, R23	32328	KT31R	
3237	KT7R	124-5, 366-2, 382-1, 607-2, R4, R29	32329	KT32R	
3238	KT8R	124-2, 124-3, 366-1, 383-1, 405-1, 607-1, 609-1	32330	KT34R	727-6
3239	KT9R	124-4, 405-2, 609-2	32331	KT35R	732-10
32310	KT10R	653-1, 653-2, 737-1, 785-19	32332	KT36R	658-4, 732-4
32311	KT11R	440-1	32333	KT37R	536-6, 556-6, 617-6
32312	KT12R	535-6, 556-6, 617-6	32334	KT38R	535-6, 535-9, 556-9, 617-9
32313	KT13R	365-1, 384-1, 606-1	32335	KT39R	658-6, 732-6
32314	KT14R	124-9, 404-1, 608-1	32336	KT40R	658-7, 732-7
32315	KT15R	124-10, 124-20, 404-2, 608-2	32337	KT41R	124-16
32316	KT16R	124-11, 384-4, 675-1, 727-3	32338	KT42R	124-17, 727-5, 785-17
32317	KT17R	124-7, 124-8, 727-3	32339	KT43R	124-18, 785-18
32324	KT18R	692-1	32340	KT44R	727-10
32318	KT19R	287-6, 727-4	32341	KT45R	727-7
32319	KT20R	727-2, 727-9	32342	KT46R	727-4
32320	KT21R	124-15, 727-2	32343	KT47R	658-1, 732-1
32321	KT22R	727-9	32344	KT48R	727-1
32325	KT23R	470-2	32345	KT49R	727-8

OVERLOADS

CAT. NO.	R.E. P/N	Replaces Kirby "ME" P/N	CAT. NO.	R.E. P/N	Replaces Kirby "ME" P/N
32351	KT1P	380-12, 618-5	32381	KT31P	288-8
32352	KT2P	380-8, 618-4	32382	KT32P	288-4
32353	KT3P	380-13, 618-6	32383	KT33P	501-3
32354	KT4P	380-9, 380-14, 380-24, 618-3, 618-10	32384	KT34P	534-1
32355	KT5P	380-10, 380-22, 618-1	32385	KT35P	
32356	KT6P	380-11, 618-2, 618-9	32387	KT40P	
32357	KT7P	125-11	32388	KT41P	731-1
32358	KT8P	125-8, 125-9, 380-1, 380-6	32389	KT42P	731-2
32359	KT9P	125-2, 125-7, 380-2	32390	KT43P	781-6
32360	KT10P	125-3, 125-4, 125-6, 380-3	32391	KT44P	781-5
32361	KT11P	125-5, 125-10, 380-4, 380-15	32392	KT45P	
32362	KT12P	380-7	32393	KT46P	781-4
32363	KT13P	380-5	32394	KT47P	781-1
32364	KT14P	380-21	32395	KT48P	380-27
32365	KT15P	381-9, 406-4	32385	KT49P	380-28
32366	KT16P	381-11, 381-12	32396	KT50P	663-4, 781-13
32367	KT17P	381-3, 406-3	32397	KT51P	663-3
32368	KT18P	381-6, 381-10	32398	KT52P	381-13
32369	KT19P	381-7	323101	KT59P	380-32
32370	KT20P	125-12, 381-1, 406-1	323102	KT60P	781-11
32371	KT21P	381-8, 381-11	323103	KT61P	618-12
32372	KT22P	380-1	323104	KT62P	380-23, 380-25, 380-31, 618-9
32373	KT23P	381-5	323105	KT63P	618-11
32374	KT24P	663-2	323106	KT64P	781-12
32375	KT25P	350-1	323107	KT65P	781-9, 781-10
32376	KT26P	288-5	323108	KT66P	380-34
32377	KT27P	288-7	32399	KT67P	380-33
32378	KT28P	288-3	323110	KT70P	288-2
32379	KT29P	288-9	323112	KT71P	
32380	KT30P	501-2			

HOT WIRE RELAYS - KIRBY and R E - REFER TO AND ORDER FROM PAGE 323-b

R E ELECTRICATS RELAY/OVERLOAD - REFER TO AND ORDER FROM PAGE 323-b

RELAYS AND OVERLOADS

KIRBY-TECUMSEH & R.E. CROSS REFERENCE
RELAYS OVERLOADS

KIRBY RELAY	REPLAC. R.E.
ME124 - 2	KT8R
- 3	KT8R
- 4	9R
- 5	7R
- 6	6R
- 7	17R
- 8	17R
- 9	14R
- 10	15R
- 11	16R
- 15	21R
- 16	41R
- 17	42R
- 18	43R
- 20	15R
ME287 - 6	KT19R
ME365 - 1	KT13R
ME366 - 1	KT8R
- 2	7R
- 3	6R
ME382 - 1	KT7R
- 2	6R
ME383 - 1	KT8R
ME384 - 1	KT13R
ME388 - 4	KT16R
ME404 - 1	KT14R
- 2	15R
ME405 - 1	KT8R
- 2	9R
ME440 - 1	KT11R
ME470 - 2	KT23R
ME535 - 1	KT4R
- 2	3R
- 3	2R
- 4	1R
- 5	5R
- 6	12R
- 7	37R
- 8	38R
- 9	38R
ME556 - 1	KT4R
- 2	3R
- 3	2R
- 4	1R
- 5	5R
- 6	12R
- 7	37R
- 8	38R
- 9	38R
ME606 - 1	KT13R
ME607 - 1	KT8R
- 2	7R
- 3	6R
ME608 - 1	KT14R
- 2	15R
ME609 - 1	KT8R
- 2	9R

KIRBY RELAY	REPLAC. R.E.
ME617 - 1(QC)	KT4R
- 2	3R
- 3	2R
- 4	1R
- 5	5R
- 6	12R
- 7	37R
- 8	38R
ME653 - 1	KT10R
- 2	10R
ME658 - 1	KT47R
- 2	25R
- 3	28R
- 4	36R
- 5	24R
- 6	39R
- 7	40R
- 8	27R
ME675 - 1	KT16R
ME692 - 1	KT18R
ME727 - 1	KT48R
- 2	21R
- 3	20R
- 4	16R
- 5	17R
- 6	46R
- 7	19R
- 8	42R
- 9	34R
- 10	45R
- 11	49R
- 12	20R
- 13	22R
- 14	44R
ME732 - 1	KT47R
- 2	25R
- 3	28R
- 4	36R
- 5	24R
- 6	39R
- 7	40R
- 8	27R
- 9	35R
ME737 - 1	KT10R
ME785 - 17	KT42R
- 18	43R
- 19	10R
R4	KT7R
R8	6R
R23	6R
R29	7R

KIRBY OVERLOAD	REPLAC. R.E.
ME125 - 2	KT9P
- 3	10P
- 4	10P
- 5	11P
- 6	10P
- 7	9P
- 8	8P
- 9	8P
- 10	11P
- 11	7P
- 12	20P
ME288 - 2	KT70P
- 3	28P
- 4	32P
- 5	26P
- 6	27P
- 7	31P
- 8	29P
ME350 - 1	KT25P
ME380 - 1	KT8P
- 2	22P
- 3	9P
- 4	10P
- 5	11P
- 6	13P
- 7	8P
- 8	12P
- 9	2P
- 10	4P
- 11	5P
- 12	6P
- 13	1P
- 14	3P
- 15	4P
- 16	11P
- 17	14P
- 18	5P
- 19	62P
- 20	4P
- 21	62P
- 22	48P
- 23	49P
- 24	62P
- 25	62P
- 26	48P
- 27	49P
- 28	62P
- 29	59P
- 30	67P
- 31	66P

KIRBY OVERLOAD	REPLAC. R.E.
ME381 - 1	KT20P
- 2	17P
- 3	23P
- 4	18P
- 5	19P
- 6	21P
- 7	15P
- 8	18P
- 9	16P
- 10	21P
- 11	16P
- 12	52P
ME406 - 1	KT20P
- 2	17P
- 3	15P
ME501 - 2	KT30P
- 3	33P
ME534 - 1	KT34P
ME618 - 1(QC)	KT5P
- 2	6P
- 3	4P
- 4	2P
- 5	1P
- 6	3P
- 7	6P
- 8	62P
- 9	4P
- 10	63P
- 11	61P
ME663 - 2	KT24P
- 3	51P
- 4	50P
ME731 - 1	KT41P
- 2	42P
ME781 - 1	KT47P
- 2	46P
- 3	44P
- 4	43P
- 5	65P
- 6	65P
- 7	60P
- 8	64P
- 9	50P



IF FIRM PRICES ARE REQUIRED,
CALL US FOR A QUOTATION.

WE WILL BE GLAD TO QUOTE ON LARGE QUANTITIES

ORDER PROCEDURE : REFER TO PAGE 323 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED
SECTION 5

Tech. Page 323-a

REPLACEMENT RELAYS & OVERLOADS HOT WIRE RELAYS

The Hot Wire Relays listed below suit many early model refrigerators including Colda, Crossley, Charles Hope, Hallstrom, Kelvinator, Lindberg - Foster, Pope, S T C, Viscount, etc. as well as commercial units using hot-wire type relays.

When ordering please quote full details from the relay being replaced
as it is important that the heater amperage rating be the same.

KIRBY					R.E.		
PART NO.	CAT. NO.	AVAILABILITY	MOTOR		PART NO.	CAT. NO.	DESCRIPTION SUITS COMPRESSOR MODEL
			HP	AMPS			
MC13A1	3221	/	1/8	1.3	RE13RCP	32214	Kirby K3, K5, K10, K10B, CA4, CA8, CA10 STC 1/8 HP
MC16T1	3222	/	1/5	1.6	RE16RCP	32215	Kirby Tecumseh P6312, West LMN, Barb. Summit 1/6 HP I.S.M., STC 1/6 HP, Sarnatic B8S36L.C6546
MC18L1	3223	NLA	1/6	1.8	KR8RCP	32220	Kelvinator 4D4C
MC20V1	3224	NLA	1/4	2.0	KR9RCP	32221	Kelvinator 4D4H
MC21C1	3225	/	1/4	2.1	KY2RCP	32218	Kirby K6, K11, K11A, CB2, CB3
MC231-1	3226	NLA	1/3	2.8	Use Kirby P/N MC21C1		
MC36E1	3227	NLA	1/2	3.6	BE3RCP	32216	Barberie Summit 1/3 HP I.S.M., 3.33
MC50F1	3228	NLA	1/2	5.0	BE4RCP	32217	Barberie Summit 1/2 HP 1, 2, 37, 51
MC55M1	3229	NLA	1/2	5.5	KY5RCP	32219	
MC65K1	32210	NLA	3/4	6.5	KY5RCP	32219	
MC75Q1	32211	NLA	3/4	6.5	KY5RCP	32219	
MC28U1	32212	NLA	3/4	7.5	KR10RCP	32222	Kelvinator 3D3C
					KR11RCP	32224	Kelvinator 3D3H
					KR12RCP	32225	Kelvinator 3D2H, 2D2H, BC2
					KY4RCP		Kirby K7, CC2, (LBP), (MBP) K7A CC3, (MBP)
					KR6RCP		Kelvinator A5s5s, 5s5s, E.M.

R.E. SOLID STATE RELAY/OVERLOAD COMBINATIONS TO REPLACE HOT WIRE RELAYS

CHOOSE BY HP. OR AMPERAGE — MOUNTS IN ANY POSITION — COMPLETE WITH WIRES AND DIAGRAM

R.E. PART NO.	CAT. NO.	HP	AMPS	DESCRIPTION
AR10	323126	1/12 & 1/10	1.0	RELAY OVERLOAD COMBINATION Recommended for Refrigeration Sealed Unit Application
AR8	323127	1/8	1.3	
AR6	323128	1/6	1.6	
AR4	323129	1/4	2.5	
AR3	323130	1/3	3.0	
AR2	323131	1/2	4.0	
AR7	323132	3/4	5.4	
MR10	323133	1/12 & 1/10	1.0	RELAY OVERLOAD COMBINATION PUSH BUTTON MANUAL RESET TYPE Recommended for General Electric Motor Application
MR8	323134	1/8	1.3	
MR6	323135	1/6	1.6	
MR4	323136	1/4	2.5	
MR3	323137	1/3	3.0	
MR2	323138	1/2	4.0	
MR7	323139	3/4	5.4	

NOTE : AT LEAST 45 SECONDS MUST BE ALLOWED BETWEEN STARTS. DO NOT USE WITH A RUN CAPACITOR
REFER PAGE 323 and 323-a FOR R E REPLACEMENT RELAYS & OVERLOADS TO SUIT KIRBY-TECUMSEH

OVERLOADS AND RELAYS

R.E. REPLACEMENT RELAYS & OVERLOADS TO SUIT BARBERIE-SUMMIT

RELAYS

CAT. NO.	MODEL	MANUF. NO.	RE NO.
324127	1/8HP I.S.M.	CX5	BE3R
3242	8S.U. 6S.U. 5S.U.	CX4	BE4R
3241	8D.U. 6D.U.	CX37	BE5R
3243	1/4HP I.S.M. (4 & 5)	CX6 (5.6)	BE6R
324126	1/4HP Pancake (4S.U.)	CX64	BE7R
324128	1/4HP Pancake K.M.	KX50	BE8R
3244	1/3HP I.S.M. (3 & 33)	CX7 (7.8)	BE9R
3245	1/2HP I.S.M. (2, 1, 51, 37)	CX8G(10.5)	BE10R
3246	3/4HP I.S.M. (3/4, 6, 36)	CX9(15.0)	BE11R
3246	3/4HP Twin (6, 7, 20, 38)	CX9(15.0)	BE11R
3246	1HP Twin (29)	CX9(15.0)	BE11R
3247	1HP Twin (8, 11, 30, 41)	CX10(19.0)	BE12R
324129	1.1/2HP Twin (11)		BE14R

NOTE : FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

OVERLOADS

CAT. NO.	MODEL	MANUF. NO.	RE NO.
324151	1/8HP I.S.M. Domestic		BE3P
32412	1/8HP P'cake 8S.U. Dom.	X4	BE4P
32412	1/8HP P'cake 6S.U.	X4	BE4P
32412	1/5HP P'cake 5S.U.	X4	BE4P
324152	1/8HP P'cake 8D.U.	MRP63HX	BE3P
324153	1/6HP P'cake 6D.U.	MRP63HX	BE3P
32414	1/4HP I.S.M. (4, 5)	X6	BE6P
324154	1/4HP P'cake 4S.U.	MRA6829	BE7P
324155	1/4HP P'cake K.M.	MRA6851	BE8P
32415	1/3HP I.S.M. (3, 33)	X7	BE9P
32416	1/2HP I.S.M. (2, 1, 51, 37, 1C, 2C)	X8	BE10P
32417	3/4HP I.S.M. (36, 6, 3/4)	X9	BE11P
32418	3/4HP Twin (20, 7, 38)	X11	BE12P
32418	1HP Twin (29, 8)	X11	BE12P
32419	1HP Twin (41, 30)	X12	BE13P
324156	1HP Two Pole	X13	BE14P
324157	1.1/2HP Twin (43, 27)	X14	BE15P
32420	1.1/2HP Twin (11)	X16	BE16P
32422	2HP Twin (25)	X15	BE17P

R.E. REPLACEMENT RELAYS & OVERLOADS TO SUIT STERNE-TECUMSEH

RELAYS

CAT. NO.	MODEL	MANUF. NO.	RE NO.
324133	P1219	C6360-9587	ST2R
324134	AM1227, P91, P8112, P61, P6112	C6360-1977, R8.23	ST3R
32460	P6312, P5312, P5312	C6360-116	ST4R
324135	AP43, AP4111	C6360-1407	ST5R
32462	S4614, C4614	C6360-231	ST7R
32463	C3N16	C6360-145	ST8R
32464	C2T16	C6360-159	ST9R
32465	B2616, B7616, B1616, B1T16, B1U18	CX180	ST11R
32468	B32T16, B32T18, B32U18	CX270	ST12R
324136	AT43	C9660-040-123	ST17R
324137	AT45	C9660-013-125	ST18R
324138	AT3512	C9660-013-140	ST19R
324139	CAT2612		MS50R
324140	AM43		MS74R

OVERLOADS

CAT. NO.	MODEL	MANUF. NO.	RE NO.
324158	P1219	MRA9918	ST2P
324159	P91	MRA9970	ST3P
324160	P8112, P6112, P61	MRA9966	ST4P
32469	P6312, P5312	MRA9941	ST5P
324161	AP43, AP4111 (Fan Cool)	MRA9937	ST6P
324162	AP43	MRA9927	ST7P
32471	S4614, C4614	MRA9969	ST8P
32472	S3N16, C3N16	MRA9979	ST9P
32473	S2T16, C2T16	MRA9943	ST10P
324163	B2616	MRA9876	ST11P
32474	C7616, B7616, B1616	CRM49JX	ST12P
32475	B32T16, B32T18	CRM40JX	ST13P
32475	B1T16	CRM40JX	ST13P
324165	K1U18, K32T16	MRK0E07	ST20P
324165	K32T18, K21U18	MRK0E07	ST20P

DANFOSS STARTING DEVICE

CAT. NO.	CODE No.	COMPRESSOR TYPE	DESCRIPTION
	104F0006	SC	Starting Device less Base & Plug
	104N0020	SC	Electrical Mounting Base & Plug
	—	SC	Electrical Retaining Clip
	103N0002	TL/FR/SC	Starting Device c/w Term. Screw Straight
	103N0011	TL/FR/SC	Starting Device c/w Term. Screw Angled
	103N1002	TL/FR/SC	Cord Relief
	103N1004	TL/FR/SC	Cord Relief
	103N2002	TL/FR/SC	Cover
	103N2003	TL/FR/SC	Cover
	112-0800	TL	Mounting Kit
	117U-5021	FR/SC	Start Capacitor
	117-7343	TL/FR/SC	3 Pin Plug

This electrical equipment, which gives the compressor a low starting torque, comprises a PTC starting device, a cord relief and a cover with locking clamp. The PTC starting device can be used on the following compressors. TL2A, TL2.5A, TL3A, TL4A, TL5A, TL2.5B, TL3B, TL4B, TL5B, FR7.5A, FR10A, FR7.5B, FR8.5B, FR10B, SC12A, SC15A, SC10B, SC12B.

The compressors can be used in refrigeration systems with capillary tube regulation where pressure equalizing is attained between the suction and discharge sides of the refrigeration system in each standstill period.

The PTC starting device requires that the standstill time of the compressor is not under 5 minutes since this is the time necessary for the PTC to cool down before each new start.

Starting devices 103N0011 and 103N0002 are electrically identical. 103N0011 has side access screw connections which cannot be used on SC compressors owing to the location of the current lead-in.

RELAYS, OVERLOADS AND CAPACITORS

TERRY ACCESSIBLE SEALED COMPRESSORS

RELAYS, OVERLOADS, CAPACITORS & ELECT. KITS

COMP.	APPLIC.	MOTOR CODE	RELAY			OVERLOAD		CAPACITOR *	KIT	
			CAT. NO.	TERRY P/N	MFG. P/N	CAT. NO.	TERRY P/N		CAT. NO.	TERRY P/N

USING HOT WIRE RELAY WITH OVERLOAD

SD	L	R	32433	1075- 5	MC35 AC1	—	—	Start 190-230mfd.150V		1415-13
SD	M-H	R	32434	1075- 6	MC39 AD1	—	—	Start " " " "		1415-14

USING KLIXON RELAYS

SD	L-M-H	R	32446	1075-48	C6360-158	32437	1145-9	Start 190-230mfd.150V		1415-22
TM1	M	Q-V	32445	1075-15	6409-4-184		1145-6	Start 200mfd. 275V.		1415-24
TM1	H	Q-V	32445	1075-15	6409-4-184		1145-6	Start 200mfd. 275V. Run 30mfd. 330V.		1415-26
TL1	L-M-T	Q	32445	1075-15	6409-4-184		1145-6	Start 200mfd. 275V.		1415-24

USING RBM TYPE RELAYS (F128116 — 1345D with Capacitor Bleed Resistor)

TM1	M	Q-V	32430	1075- 2	As above		1145-6	Start 200mfd. 275V.		1415-19
TM1	H	Q-V	32430	1075- 2	"		1145-6	Start 200mfd. 275V. Run 30mfd. 330V.		1415-20
TL1	L-M	Q	32430	1075- 2	"		1145-6	Start 200mfd. 275V.		1415-19
TL1	H	Q	32430	1075- 2	"		1145-5	Start 200mfd. 275V. Run 30mfd. 330V.		1415-20
TL1F	T	Q	32430	1075- 2	"		1145-5	Start 200mfd. 275V. Run 30mfd. 330V.		1415-20
TG1	L-M-H	X	32430	1075- 2	"		13 AMP	Start 200mfd. 275V. Run 20mfd. 415V.	—	—

APPLICATION :

L = Low Temperature Range
M = Medium Temperature Range
H = High Temperature Range
T = Truck Transport

*NOTE :

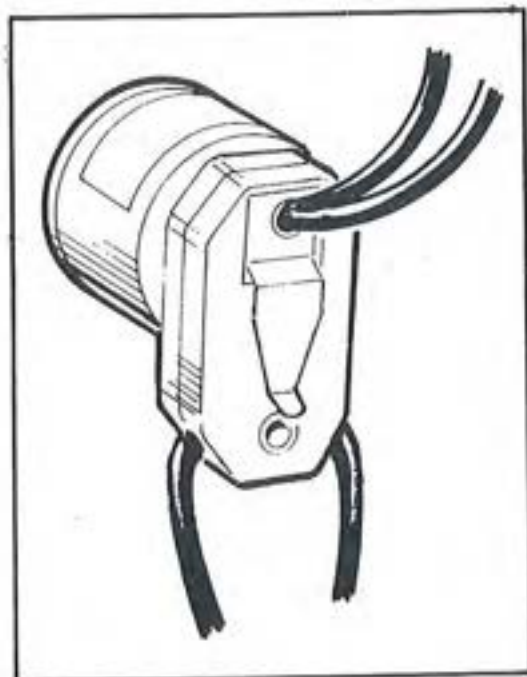
Select above Capacitors from
CORNELL-DUBILIER Range detailed
on Page 326 - d.

REFRIGERATION



ELECTRICALS PTY. LTD.

TYPE 'SR' RELAY/OVERLOAD COMBINATION



- Replaces almost every make relay and overload combination including hot wire relays and centrifugal starting switches from 1/12 H.P. to 3/4 H.P.
- Calibrated in Australia for Australian conditions in individual stages.
- Select by H.P. or Full Load Current.
- Quick clip-on or screw mount — multi-positional.
- No starting contacts to fit or wear.
- Vibration and shock resistant.
- Long operating life.
- Overload protection.
- Simple wiring connections.

CAT. NO.	MODEL	VOLTS	H.P.	F.L. AMPS
324201	SR12	240	1/12	0.6
324202	SR10	240	1/10	0.8
324203	SR8	240	1/8	1.0
324304	SR6	240	1/6	1.3
324305	SR5	240	1/5	1.5
324306	SR4	240	1/4	2.0
324307	SR3	240	1/3	3.0
324308	SR2	240	1/2	4.0
324309	SR7	240	3/4	5.5

NOTE: At least 45 seconds must be allowed between Starts.
Do not use with a Run Capacitor.

SOLID STATE**RELAYS, OVERLOADS AND CAPACITORS**

ALL UNITS
230/240 VOLTS AC

- ★ NO STARTING CONTACTS TO PIT OR WEAR.
- ★ MAY BE DIRECTLY SUBSTITUTED FOR CONTACT STARTERS SUCH AS CENTRIFUGAL, MAGNETIC AND THERMAL TYPE STARTING SWITCHES.
- ★ ACOUSTICALLY AND ELECTRICALLY NOISE FREE.
- ★ VIBRATION AND SHOCK RESISTANT.
- ★ LONG OPERATING LIFE AND LOW COST.

CAT. NO.	DESCRIPTION
SOLID STATE RELAY ICG-220	
32451	APPLICATION: One size for all compressors from 1/12 H.P. thru 1/2 H.P. Will replace most current type relays. FEATURES: Easy to install . . . can be mounted on the fence of the compressor with quick "snap-on-bracket" . . . or installed in any convenient location by using screws through the mounting holes. Can be used with or without a start capacitor.
SOLID STATE RELAY PO-230	
32458	APPLICATION: One size for all compressors from 1/12 H.P. thru 1/2 H.P. Replaces ALL push-on current type relays. For use on compressors with "pin-type" terminals. Can be used on ALL capacitor and non-capacitor start motors. FEATURES: Lowest resistance solid state relay. FASTEST COOL DOWN TIME of ALL solid state relays. Will restart balanced system WITHIN ONE MINUTE. Quick and easy to install.
SOLID STATE RELAY & OVERLOAD RO SERIES	
32454 32459 32455	APPLICATION: Replaces ALL Hermetic refrigerator compressor relay and overload units from 1/12 H.P. thru 1/3 H.P. Can be used in conjunction with a start capacitor. Relay and Overload . . . in One Combination Unit. Pre-wired for FAST, SIMPLE installation. Attached mounting clip makes installation easy. Superior locked rotor protection eliminates start winding overheating. MODEL RO-82 1/12, 1/10, 1/8 H.P. MODEL RO-62 1/6, 1/5 H.P. MODEL RO-42 1/4, 1/3 H.P.
SOLID STATE STARTING RELAY & CAPACITOR RSC-20 . . . "The Big Relay"	
32459A	APPLICATION: One size for all compressors from 1/12 H.P. thru 1/2 H.P. for both domestic and commercial Refrigerators and Freezers. The installation of a start capacitor in series with the start winding in order to overcome starting problems was common practice. Then manufacturers started using push-on relays which left no practical way to install a start capacitor. NOW . . . this problem has been solved with a NEW Combination Relay and Start Capacitor — "The Big Relay". FEATURES: A Combined Solid State Starting Relay and Capacitor. . . Completely Pre-wired for a fast, simple hook-up . . . Installs quickly and easily by just pushing the three female pin terminals on to the compressor terminals. Replaces current type relays. Provides added boost for hard start and unbalanced systems. Prevents low voltage starting problems. NO ADDITIONAL Wires Required.

CAPACITORS

A REFERENCE GUIDE TO THE USE OF AC MOTOR START AND RUN CAPACITORS

(EXTRACTS FROM CORNELL-DUBILIER BULLETINS)

Servicing and Replacing AC Motor Start Capacitors

Capacitor Design and Reliability



Cornell-Dubilier Motor Starting Electrolytic Capacitors are designed to operate for a minimum of 50,000 starts. They are manufactured with high purity aluminum foils, separated by electrolyte saturated, chemically pure paper for low power factors. Units are protected against vibration stresses internally and are provided with a cover-seal made up of a rubber phenolic laminate with a positive-pressure safety vent and are furnished in high-impact phenolic cases.

Temperature Ratings

The maximum ambient temperature rating at the recommended duty cycle is $+65^{\circ}\text{C}$ ($+150^{\circ}\text{F}$). Cornell-Dubilier Capacitors will function satisfactorily at temperatures up to $+85^{\circ}\text{C}$ ($+185^{\circ}\text{F}$), provided the duty cycles and voltage conditions are adjusted accordingly.

Sub-zero temperatures do not affect the operation of the capacitors. Changes in characteristics due to low temperature are temporary. At below zero temperatures, the capacitors will lose capacitance and increase in power factor, but these changes do not seriously affect their ability to start the motor at temperatures as low as -40°C (-40°F). The higher power factor at low temperatures represents power lost in the capacitor, which creates heat, warming the capacitor almost instantaneously.

Application

Capacitor start motors are designed for high starting torque but require an extra "push" provided by the capacitor in order to start. The function of the capacitor is to provide out-of-phase starting current to the starting winding, forcing the motor to operate as a two-phase motor during the starting period. The starting capacitor is not intended for continuous duty and should not be used more frequently than 60 one-second, 30 two-second, or 20

three-second starts per hour. These duty cycles are based on the necessity for proper heat dissipation to insure maximum life.

As the motor reaches full operating speed, the starting winding and capacitor are taken out of the circuit by either a centrifugal switch or a voltage or current-sensitive relay.

The average time for a motor to reach full operating speed is approximately one second. Rarely does it require more than three seconds to reach full operating speed, even for motors as large as 6 or 7 horsepower.

Failure Modes

Motor starting capacitors have proven to be very reliable if recommended operating ratings are not exceeded. Conditions which shorten life and increase failure rate are:

- Duty cycle greater than recommended
- High operating temperatures
- Application of voltages in excess of ratings
- Overloading, preventing motor from reaching running speed promptly
- Physical damage to case or terminals
- Failure of starting switch to open promptly when motor reaches running speed
- Worn or frozen motor bearings causing excessive loads on the start cycles
- Low line voltage preventing motor from reaching running speed
- Incorrect capacitance rating (seldom encountered except where previous replacement was incorrect)
- Improper voltage rating (again seldom encountered except where previous replacement was incorrect). A higher voltage rating may be used, but never a lower rating.

Motor Start Replacement

Replacement of a defective capacitor should be made by using an equivalent unit. When this is not available, the new unit should have the same capacitance rating and a voltage rating equal to or higher than the defective unit. The motor nameplate voltage bears little or no relationship to the required voltage rating of the capacitor, because the motor designer has several options at his disposal which can determine the rating required.

If the original capacitance and voltage ratings appear on the capacitor, replacement is a simple matter. If only a part number appears, it will probably be found under the appropriate manufacturer's listing. If the part numbers and ratings are obliterated, as occasionally occurs during service, the replacement task becomes a little more difficult.

Whenever replacement is attempted, an AC voltmeter should be used to monitor the voltage across the capacitor.

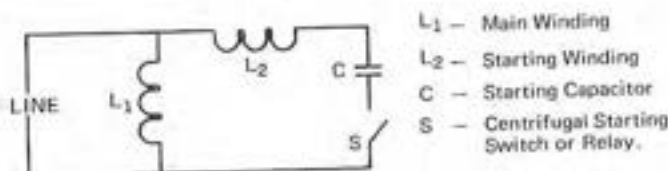


Figure A

(Continued next page)

CAPACITORS

SERVICING AND REPLACING AC MOTOR START CAPACITORS — Continued

Testing Motor Start Capacitors

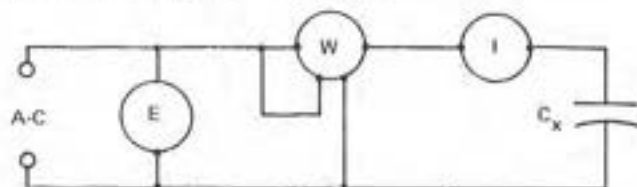
When motor start capacitors are tested to determine their serviceability, the values of two characteristics are desired: the capacitance and power factor.

Measurements should not be attempted with the use of capacitor bridges, normally used for DC capacitors, as erroneous values will be obtained. For accuracy, all tests must be conducted with the capacitors at +25°C (+77°F). Capacitors shipped or stored during cold weather should be allowed to reach this temperature before measurements are performed. Voltage should be applied for the minimum time required to obtain a reading (less than 10 seconds) in order not to distort the measurements with an internal temperature rise. A satisfactory measurement method is shown in Figure B.

If only capacitance measurements are desired, the wattmeter may be omitted and the capacitance calculated with the formula:

$$\frac{2650 \times \text{amperes}}{\text{volts}} = \text{mfd.}$$

For convenience, the measurement voltage may be 110 volts.



- E — AC Voltmeter
W — AC Wattmeter
I — AC Ammeter
C — Capacitor

Figure B

In order to measure power factor, three instruments (See Fig. B) are required and care must be exercised to insure all are first-class. Power factor must be measured at full rated voltage and may be calculated with the formula:

$$\frac{\text{watts}}{\text{volts} \times \text{amperes}} \times 100 = \% \text{ PF}$$

Typical power factors are less than 10%.

Servicing AC Motor Running Capacitors

Capacitor Design and Reliability

One of the most reliable components used in electrical equipment is the motor running capacitor. The heart of this device is made with the finest dielectric papers and oil impregnants available, carefully processed by vacuum-heat treatment and then hermetically sealed in a sturdy metal container. The shelf-and-operating life of the running capacitor is generally well in excess of ten years.

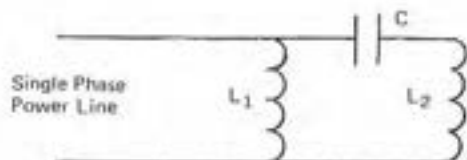
Description: CDE Motor Running Capacitors are constructed with oil impregnated paper dielectric, and hermetically sealed in drawn metal cases. They are designed for continuous duty at 60 hz AC for temperatures up to 70°C. Capacitors are oval or rectangular in shape and have U.L. approved gray enamel paint finish. Standard tolerance is $\pm 10\%$. Some units are internally fused and can be identified by suffix "-F" after the catalog stock number. Outside foil section is marked by an embossed (-) in the cover of the can.

Terminals: Standard terminals are dual quick-connect, furnished with molded phenolic insulating cups. Terminals are adaptable to the standard $\frac{1}{4}$ " female quick-connect used on wiring harnesses but also have eyes and notches for making solder connections.

Mounting: CDE Motor Run Capacitors can be mounted interchangeably with any original mounting for units of equivalent or smaller size.

Running Capacitor Application

Different than the start capacitor which is used only 3 to 10 seconds during each motor operation, the running capacitor is designed to withstand continuous voltage for many thousands of hours. Its primary function is to reduce the line current while greatly improving the torque characteristics of a motor. This is accomplished by using the 90° phase relationship between the capacitor current and voltage in conjunction with the motor windings so that the motor will give two phase operation when connected to a single phase circuit. The capacitor also reduces the line current to the motor by improving the power factor of the load.



- L₁ — Phase 1 winding
L₂ — Phase 2 winding
C — Running Capacitor

Service Applications:

These units are used in continuous duty application such as air conditioning, refrigeration, fans, business machines and wherever motor run or small power factor correction capacitors are needed.

Failure Modes

Field results have shown very infrequent failure of well designed, properly manufactured oil-paper capacitors. Conditions which shorten the life and increase the failure rate are shown below:

- Excessively high power line voltages.
- High operating temperatures.
- Application of voltages in excess of ratings.
- Overloading motor.
- Physical damage to case or terminals.

The main failure mode found in running capacitors is short circuit between terminals due to dielectric breakdown. Occasionally open circuit units may be found, also short circuit to case. It is rare that capacitance change is a cause of failure in running capacitors.

(Continued next page)

CAPACITORS

SERVICING AC MOTOR RUNNING CAPACITORS — Continued

Identification of Failed Capacitors

Difficulty in starting a motor, high line current, and cutout of the overload switch may indicate a faulty capacitor. These conditions may also be caused by other factors. The methods listed below, in the absence of sophisticated test equipment, may be used to check running capacitor performance. Caution should be taken to avoid direct contact with terminals. Disconnect the capacitor from the circuit and check as follows:

Short Circuit: Any capacitor found to have a bulging of the terminal cover or excessive deformation of the metal container probably has become short circuited. While this does not happen in all cases, short circuits usually may be detected by the following tests described in the test section:

- Capacitance test at either 115 VAC or 230 VAC
- Ohmmeter test
- Discharge test at 115 or 230 VAC

Open Circuit: This type of defect results from mechanical damage to internal connections. Capacitors in this category are usually found on the capacitance test, lamp test, or ohmmeter test.

Grounded: Use lamp continuity test between each terminal and the case. Shorted capacitors are also frequently found to be grounded due to damage of internal insulation.

Capacitance: Most running capacitors will not fail because of capacitance change. Oval cased units are usually made with a single capacitor element so that no change is possible. Rectangular cased units are frequently made with multiple capacitor elements which may become disconnected individually from the circuit to the terminals. A simple capacitance check can readily determine if this condition exists. Running capacitors should be within $\pm 10\%$ of the marked capacitance rating.

Oil Leaks: All running capacitors are permanently hermetically sealed against oil leakage or penetration of moisture from the atmosphere. Any capacitor found to leak any substantial amount of oil should be replaced. A small oil slick near the terminal or at the seam is generally not harmful.

Test Procedures

These test methods are not as effective as using a capacitance meter, dielectric strength tester and a megger, but will generally detect faulty running capacitors.

Capacitance Test

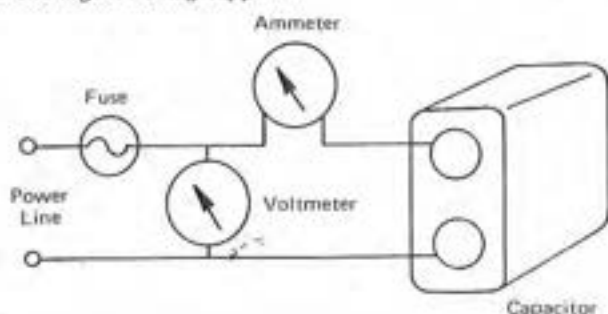
This may be conducted on running capacitors by using the circuit shown below. A simple calculation using the current and voltage obtained will give the value of capacitance with sufficient accuracy.

When testing for shorted capacitors, use a circuit breaker in place of the fuse. Shorted capacitors will give an excessively high current reading and will trip the circuit breaker. Use an ammeter and current limiting devices higher than the current rating of the capacitor as shown. Of course a fuse may be used — but it will be destroyed if the capacitor is shorted.

Ohmmeter Test

Shorted capacitors may frequently be detected by the use of an ohmmeter. Adjust ohmmeter to highest resistance scale and connect prods to capacitor terminals. Indicator

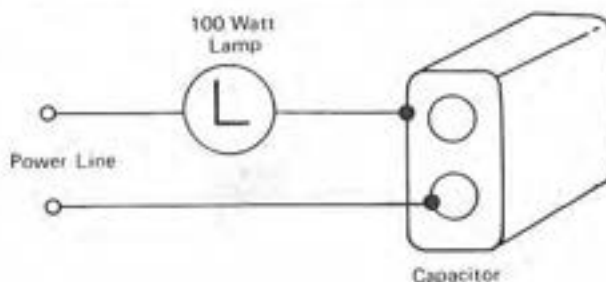
should move to zero then will increase to infinity in a few minutes for a satisfactory capacitor. When the indicator remains at zero or reads less than 1,000,000 ohms, the capacitor may be considered to be shorted. The capacitance test will more effectively detect shorted capacitors because of the higher voltage applied.



Capacitance in MFD	Amps 115V Line	Amps 230V Line
5	.22	.44
10	.44	.88
15	.66	1.32
20	.88	1.72
25	1.1	2.2
30	1.32	2.64
40	1.76	3.52

Lamp Continuity Test

This may be used to detect grounded and open-circuited capacitors. When the test prods are connected between each terminal and the case, no lamp indication signifies a satisfactory capacitor. A lighted lamp, however dim, identifies a grounded unit. The test for open circuit is just the reverse. When the prods are connected between terminals, no light indicates an open circuited unit, but any light in the lamp shows continuity in the circuit. Tests may be made at 115 or 230 VAC but lamp must have a corresponding rating. Do not use this test to check short circuits between terminals as the results may be misleading.



Discharge Test

This is a very crude test but may be used successfully in many cases where other test equipment is not available. Apply power line voltage to capacitor terminals through lamp continuity test. Remove voltage and discharge capacitor with a screwdriver looking closely at the point where the screwdriver first makes contact with the terminals being tested. A small spark should be seen at least once in ten repetitive tests if the capacitor is neither open or short circuited. Absence of a spark may indicate the capacitor is open or short circuited. Caution should be taken to avoid direct contact with terminals.

(Continued next page)

CAPACITORS

CAPACITOR REPLACEMENTS

Replacement of a defective Capacitor should, of course be made by using an identical unit - not necessarily the same brand, but a replacement which has the same capacitance rating with a voltage equal to or higher than the failed unit. The replacement of a dual capacitor may be made by using two separate units of the equivalent ratings.

Any deviation from the original capacitance values should be avoided as this will alter the operating characteristics of the motor and may result in early failure.

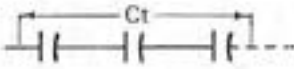
When the required capacitance values are not available, it is possible in an emergency to connect several capacitors in series or parallel to obtain the desired microfarads. This applies to both start and run capacitors to provide the desired characteristics if the voltage and MFD are properly selected.

SERIES CONNECTION

When two capacitors having the same MFD rating are connected in series, the resulting total capacitance will be one half the rated capacitance of a single capacitor.

The voltage rating of similar capacitors connected in series is equal to the sum of the voltage of the two capacitors. However, since the voltage across individual capacitors in series will vary with the rating of the capacitor, for emergency field replacements, it is recommended that only capacitors of like voltage and capacitance be connected in series to avoid the possibility of damage due to voltage beyond the capacitor limits.

The formula for determining capacitance (MFD) when capacitors are connected in series is as follows :-

$$C_t = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots}$$


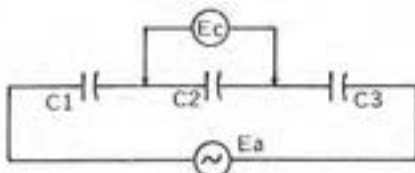
where C_t = Total capacitance in a circuit.

C_1, C_2, C_3 etc. are the values of individual Capacitors.

Example : Required - 15 MFD 370 VAC Capacitor.
Available - Quantity of 30 MFD 370 VAC Capacitors.

$$\begin{aligned} \text{Series connection - } C_t &= \frac{1}{\frac{1}{30} + \frac{1}{30}} = \frac{1}{\frac{2}{30}} = \frac{30}{2} \\ &= 15 \text{ MFD} \end{aligned}$$

The formula for determining Voltage Rating when Capacitors are connected in series is as follows :-

$$E_c = \frac{E_a \times C_t}{C}$$


where E_c = Voltage across individual capacitor in series.

E_a = Applied voltage

C_t = Total capacitance of the series combination.

C = Capacitance of the individual capacitors

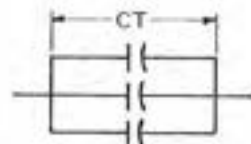
$$\text{Same Example : } E_c = \frac{370 \times 15}{30} = 185$$

PARALLEL CONNECTION

When capacitors are connected in parallel, their MFD rating is equal to the sum of the individual ratings. The voltage is equal to the smallest rating of the individual capacitors.

Capacitors in Parallel formula :

$$C_t = C_1 + C_2 + C_3 + \dots$$



where C_t = the total capacitance in a circuit.

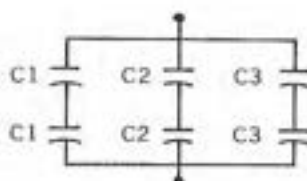
C_1, C_2, C_3 etc. are the values of the individual capacitors.

Example : Required - 40 MFD 370 VAC
Available - 5 MFD 370 VAC, 15 MFD 370 VAC, and 20 MFD 370 VAC.

$$\begin{aligned} C_t &= 5 + 15 + 20 = 40 \text{ MFD} \\ \text{VAC} &= 370 \end{aligned}$$

SERIES AND PARALLEL CONNECTION

Example : Required - 45 MFD 440 VAC
Available - Quantity of 30 MFD 370 VAC.



$$\begin{aligned} \text{Series } \frac{1}{\frac{1}{30} + \frac{1}{30}} &= 15 \end{aligned}$$

Therefore 3 Sets in parallel = 15 + 15 + 15 = 45 MFD.
Voltage : Since Cornell-Dubilier Capacitors may be used up to 740 VAC., this combination is satisfactory for 45 MFD 440 VAC.

SERVICE CHECK

After installing a replacement running capacitor, as a final check, test the voltage developed across the capacitor while the motor is operating. The voltage measured should not exceed the rating of the capacitor installed. Where abnormal line voltage or other conditions cause the capacitor to operate a higher than rated voltage, use next higher voltage rated capacitor.

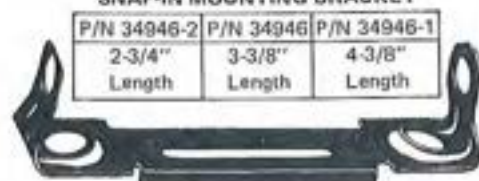
CAPACITORS WITH BLEED-RESISTORS

Start capacitors are sometimes fitted with bleed-resistors to prevent sticking relay contacts and/or erratic relay operation - especially where short cycling is likely to occur. This is due to the starting Capacitor discharging through the relay contacts as they close, following a very short running cycle. The resistor will permit the capacitor charge to bleed down at a much faster rate, preventing arcing and overheating of the relay contacts.

5



SNAP-IN MOUNTING BRACKET



ETWCB Capacitor with plastic end cap and snap-in mounting bracket.

COMPLETE ASSEMBLY



MOTOR START CAPACITORS

CAT. NO.	CDE PART No.	MFD	VOLTS AC	CASE SIZE		BRACKET	
				DIAM.	LENGTH	P/N	LENGTH
326176	ETW 25-250A	25 - 30	250	36.5 mm (1-7/16")	69.9 mm (2-3/4")	34946-2	2-3/4"
326177	ETW 30-250A	30 - 36	250				
326178	ETW 36-250	36 - 43	250				
326179	ETW 43-250	43 - 53	250	36.5 mm (1-7/16")	85.7 mm (3-3/8")	34946	3-3/8"
326180	ETW 53-250A	53 - 64	250				
	ETW 56-250	56 - 72	250				
326181	ETW 64-250	64 - 77	250				
326182	ETW 72-250	72 - 88	250				
326183	ETW 88-250A	88 - 108	250	46 mm (1-13/16")	85.7 mm (3-3/8")	34946	3-3/8"
326184	ETW 108-250A	108 - 130	250				
326185	ETW 124-250A	124 - 149	250				
326186	ETW 130-250A	130 - 156	250				
326187	ETW 145-250A	145 - 174	250	52.4 mm (2-1/16")	85.7 mm (3-3/8")	34946	3-3/8"
326188	ETW 161-250A	161 - 193	250	46 mm (1-13/16")	111.1 mm (4-3/8")	34946-1	4-3/8"
326189	ETW 189-250A	189 - 227	250				
326192	ETW 216-250A	216 - 259	250	52.4 mm (2-1/16")	111.1 mm (4-3/8")	34946-1	4-3/8"
326193	ETW 243-250A	243 - 292	250				
326190	ETW 145-330A	145 - 174	330/400	52.4 mm (2-1/16")	111.1 mm (4-3/8")	34946-1	4-3/8"
326197	ETW 108-165	108 - 130	150/165	36.5 mm (1-7/16")	85.7 mm (3-3/8")	34946	3-3/8"
326198	ETW 145-165A	145 - 174	150/165				
326199	ETW 161-165	161 - 193	150/165	46 mm (1-13/16")	85.7 mm (3-3/8")	34946	3-3/8"
326200	ETW 189-165	189 - 227	150/165				



END CAP

P/N	P/N
30086	34618-2
1-7/16"	2-1/16"
Diam.	Diam.
P/N	P/N
34618-3	34618-4
1-13/16"	2-9/16"
Diam.	Diam.

* Dubilier Capacitors are suitable for use 10% over rated voltage capacity.

MOTOR RUN CAPACITORS

"Soggy Foil" Metallized Capacitors

Types KKSF, KTSF and KBSF

Cornell Dubilier's new type "SOGGY FOIL" AC Capacitor represents a unique type of construction using a polypropylene dielectric and metallized electrodes vacuum deposited on both sides of a paper substrate. This new product is smaller in size, lighter in weight and of significantly improved performance over conventional paper-dielectric oil or metallized film types.

SELF HEALING — The new capacitor has Self-Healing properties in the event of dielectric breakdown due to excessive voltage stress result from vaporizing the electrode material around the point of failure. The self-healing operation is accomplished in milliseconds without damage to the dielectric structure. Soggy Foil capacitors

may have many self-healing operations without affecting their operation in most circuits. Pressure activated circuit interrupters are also built into the capacitors to give maximum assurance the cases will not rupture at end-of-life.

CAPACITOR TOLERANCE — $\pm 10\%$

NON-PCB DIELECTRIC FLUID — Corona free operation with environmental compatibility.

OPERATING TEMPERATURE RANGE — -55°C to 70°C .

LEAK-PROOF QUICK CONNECT TERMINALS — Phenolic cup insulated terminals compression welded with silicone bushings assures permanent oil tight seal.

CAT. NO.	CDE PART No.	MFD	VOLTS AC	DIMENSIONS — INS.	
				BASE (Oval)	HEIGHT
326201	KKSF 44U405 QPI	4.0	440	2.16 x 1.31	2.00
326202	KKSF 44U505 QAPI	5.0	440	2.16 x 1.31	2.00
326203	KKSF 44U605 QAPI	6.0	440	2.16 x 1.31	2.00
326204	KKSF 44U755 QAPI	7.5	440	2.16 x 1.31	2.25
326205	KKSF 44U105 QAPI	10.0	440	2.16 x 1.31	2.75
326206	KKSF 44U155 QAPI	15.0	440	2.16 x 1.31	3.75
326207	KTSF 44U205 QAPI	20.0	440	2.91 x 1.91	2.75
326208	KTSF 44U255 QAPI	25.0	440	2.91 x 1.91	3.25
326209	KTSF 44U305 QAPI	30.0	440	2.91 x 1.91	3.75
326210	KBSF 44U355 QPI	35.0	440	3.66 x 1.97	4.25
326211	KBSF 44U405 QPI	40.0	440	3.66 x 1.97	4.75
326212	KBSF 44U455 QPI	45.0	440	3.66 x 1.97	5.50
326213	KBSF 44U505 QPI	50.0	440	3.66 x 1.97	6.00
326214	KBSF 44U555 QPI	55.0	440	3.66 x 1.97	6.50
326215	KBSF 44U605 QPI	60.0	440	3.66 x 1.97	7.00

IMPORTANT NOTE

THE USE OF PCB (POLYCHLORINATED BIPHENYLS) IN THE MANUFACTURE OF MOTOR RUN CAPACITORS HAS BEEN BANNED BY THE AUSTRALIAN GOVERNMENT — (Notice No. 73/65).

REPLACEMENT CAPACITORS (NON-PCB) SHOULD BE USED USE EITHER ABOVE "SOGGY FOIL" CAPACITORS OR THOSE SHOWN ON NEXT PAGE (326-e).



MOUNTING BRACKETS & RUBBER BOOTS
Available on application



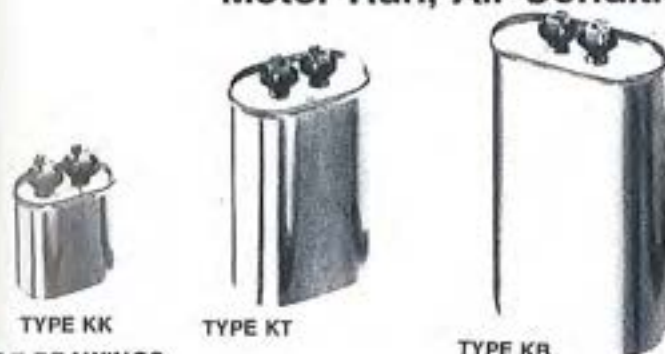


CAPACITORS

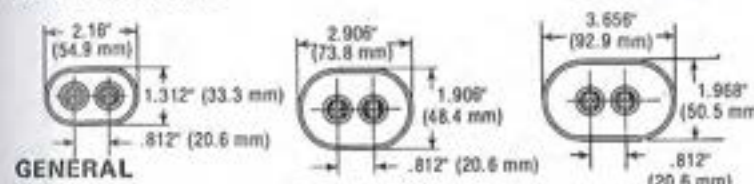
DYKANOL

NON-PCB AC CAPACITORS Types KKN, KTN, KBN, KNN

Motor Run, Air Conditioning Replacement Line



BASE DRAWINGS



Dykanol XN is a biodegradable, low toxicity, dielectric fluid developed by Cornell Dubilier Electronics for paper and film-paper dielectric capacitors. It meets all requirements for environmental compatibility. Dykanol XN has an excellent field service record for use in many applications during the past four years.

FLAMMABILITY CHARACTERISTICS

Dykanol XN does not have Dykanol XL's nonflammable properties. It does, however, have a flash point temperature of 210°C, which is higher than XL, and a fire point temperature of 221°C.

INTERNAL PROTECTIVE DEVICE

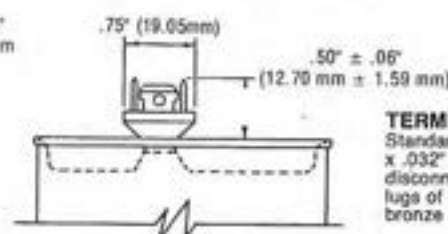
All capacitors listed in this bulletin are furnished with an internal protective device. Flat oval cased capacitors are listed under Underwriters Laboratories File No. E56959 Project No. 77CH601. The protective device virtually eliminates the occurrence of case rupture and expulsion of internal materials from capacitors at end-of-life.

Proper functioning of the protective device depends upon outward movement of the terminals from the case. At least 3/8 inch minimum clearance above the capacitor terminals must be provided in the installation.

FEATURES

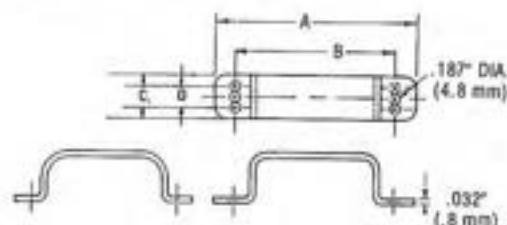
- Drawn Seamless Case
- Welded Terminal Assembly
- Extensive Line
- Leak-Proof, Cone Cup Insulator Terminal Bushings
- Quick-Connect Terminals
- Operating Temperature +55°
- Tolerance $\pm 10\%$
- Cases are Unpainted
- Terne Plate Steel
- Dykanol XN Dielectric Fluid

TERMINALS



TERMINAL TYPE
Standard terminal .25" wide x .032" four blade quick disconnect universal type lugs of tin plated silicone bronze or brass.

Wrap-around Mounting Brackets



Case Style*	CDE Part No.	DIMENSIONS (Inches)			
		A	B	C	D
KK	30393-5	3.046	2.546	.75	—
KT	30393-9	3.812	3.312	.75	—
KB	30393-10	4.562	4.062	.75	—

CAT. NO.	CAP Mfd.	Part Number	Base	Max. Case Height	
				Inches	(mm)
440 Volts AC – Single Section					
326277	2	KKN2-44PI	KK	2.062	52.37
326278	3	KKN3-44PI	KK	2.500	63.50
326279	4	KKN4-44PI	KK	3.125	79.38
326280	5	KKN5-44PI	KK	3.750	95.25
326281	6	KKN6-44PI	KK	4.250	107.95
326282	7.5	KKN7.5-44PI	KK	5.125	130.18
326283	10	KTN10-44PI	KT	3.750	95.25
326284	12.5	KTN12.5-44PI	KT	4.500	114.30
326285	15	KTN15-44PI	KT	5.250	133.35
326286	17.5	KTN17.5-44PI	KT	6.000	152.40
326287	20	KTN20-44PI	KT	6.750	171.45
326288	30	KBN30-44PI	KB	7.500	190.50
326289	35	KBN35-44PI	KB	8.500	215.90
326290	25	KBN25-44PI	KB	6.250	158.75

370 Volt AC Capacitors available on application.

CAPACITORS

KIRBY

START CAPACITORS

CAT. NO.	PART No.	REPLACES PART No.	MFD	VOLTS	REMARKS	OBSOLETE
3265	ME825-1*	ME740-1	25	240	With Resistor	ME110-9
3269	ME825-5*	ME740-3	40	240	With Resistor	ME114-14 & -15
3263	ME825-7	ME740-4	40	240	No Resistor	ME110-1 & -5
3266	ME825-9*	ME740-5	60	240	With Resistor	ME110-10
3264	ME825-4	ME740-6	60	240	No Resistor	ME110-2 & -6
3268	ME825-13*	ME740-7	120	240	With Resistor	ME110-12
3267	ME825-3	ME740-2	25	240	No Resistor	ME110-11

* Indicates fitted with 15k Ω 2W discharge resistor.

RUN CAPACITORS

CAT. NO.	PART No.	Includes Clamp P/N	MFD	VOLTS	Replaces P/N	OBSOLETE
32615	ME822-71	MUA423-1	10	440	ME822-31	ME782-1, ME335-19 & -27
32617	ME822-72	MUA423-1	15	440	ME822-33	ME782-3, ME335-1, -2 & -28
32618	ME822-73	MUA423-1	20	440	ME822-34	ME782-9, ME335-24 & -32
32620	ME822-75	MUA423-2	30	440		ME782-6, ME335-29
32621	ME822-76	MUA423-2	35	440	ME822-7	ME782-7, ME335-30

START & RUN CAPACITORS FOR KELVINATOR MODELS

MFD	VOLTS	TYPE	SUITS MODELS
35	440	Start	RAC A23R1
40	220	Start	S5050P, S7550P, T16, T20, CC5050, 50/400, K17M from Ser. No. 3742
40 — 46	220	Start	S5050H, S5050L, S7550L, KM17M to Ser. No. 3741
45	240	Start	S5033L
45 — 55	250	Start	S5033P
50 — 60	220	Start	S44C, S34C
55	275	Start	A3D3CS
55 — 60	275	Start	RAC 1661
55 — 65	250	Start	S44C, S34C, S7575H, S7575L, S1075L, S7575P, S1075P
60	275	Start	1HP Acc. Herm. 1 Phase
60 — 70	220	Start	S33C
75	275	Start	A4D4CS, N4D4CS, A4D4H, A3D3H, 4HSR, 6HDR, 8HDR
76 — 92	220	Start	RAC H1000, BC2/60, S1010H
80	220	Start	S1010P, TP2
90	275	Start	A3D2CS, A2D2HS, NDRC, BC1, BC2, KA12, KA15, RA625
100	250	Start	S1015FH
100	275	Start	1½HP Acc. Herm. 1 Phase
130	275	Start	RAC 750
150	150	Start	½HP Motor
160	275	Start	¾ to 3HP Acc. Herm. 1 Phase
160	350	Start	RAC 1750
5	400	Run	¾ to 1HP Acc. Herm. 1 Phase
8 — 9	440	Run	S5033FL
10	350	Run	S5050H, S5050L, S7550L, S7575H, S7575L, S1075L, K17M to Ser. No. 3741
			S5033P, S5050P, S7550P, S7575P, S1075P, T16, T20, K17M from Ser. No. 3742
10	400	Run	CC5050, 50/400, RAC0822, ARJ08225
10	440	Run	1HP to 3HP Acc. Herm. 1 Phase
15	370	Run	RAC H1000, BC2/60, S1010H, HA/B/C/D/E/F — 1000, 1002, 1005, 1008, 1021, 1031, 1032, 1042, 1051, 1081, 1082, 2503, 2531, 51C2, 51C3, 51C4, 51D2, RAC 1750 (Sterne CSCR Comp), 2503 (Comp. No. 2) S1010P, TP2

Continued next page.

**SELECT CAPACITORS FOR ABOVE KELVINATOR MODELS
FROM CORNELL-DUBILIER, PAGE 326-d**

CAPACITORS

START & RUN CAPACITORS FOR KELVINATOR MODELS

MFD	VOLTS	TYPE	SUITS MODELS
15	400	Run	RAC 51D3, 51D4, 51E2, 51E4, 51F1, 51F1E, ARA, ARB, ARV, ARAG, 51E090, 51E090R, AK093M, AK096M, AW093M, AW096M, CN185C, CN185D, EN185C, EN185D, KC2555Q, LC2555Q, SD2555Q
15	440	Run	RAC750
20	370	Run	RAC1500, 1502, 1508, 1521, 1531, 1542, 1581, 1582, 1661, 2531, 51C6, 51D6, 51F6, 51F6E, 51F2, 1758, 2503 — Comp. No. 1
20	400	Run	RAC51F4, ARC, ARD, ARK, ARL, ARM, ARN, ARW, ARX, ARY, ARAA, MDJ115, MDJ115R, AK123M, AK126M, AW123M, AW126M, CT235C, CT235D, EN235C, EN235D, EN320C, EN320D, ER235C, ER235D, RF235C, RF235D, RF320C, RF320D
20	440	Run	RAC1750 (B32 — T18 Comp.), 51015FH
25	440	Run	RAC1750, 1758, 51C7 (B74 — T18 — B312 Comp.)
30	370	Run	RAC1721, 1742, 1752, 1758, 1781, 1782, 2042, 2082, 51C7, 51D7, 51E7E, 51E8E, 51F7, 51F7E, 51F8, 51F8E, 51E165, 51E165R, 51E190, 51E190R, AK173M, AK176M, AK203M, AK206M, AW173M, AW176M, AW203M, AW206M, MDJ165, MDJ165R, ARE, ARF, ARG, ARH, ARP, ARR, ARAA, ARAC, ARAD, ARAE, CF450D, EN450C, EN450D, EN515D, RF450C, RF450D, RF515D (B74 — T18 — B304 Comp.)
2	440	Fan	1 HP to ½ HP, Acc. Herm. 1 Phase
2.5 & 5	330	Fan	RAC H1000
3.5	440	Fan	RAC 1661, 1661/3
4	440	Fan	RAC 1002, 1005, 1008, 1021, 1051, 1081, 1502, 1508, 1521, 1581, 51C2, 51C3, 51C4, 51D2, 51D3, 51D4, 51C6, 51D6, MDJ115, MDJ115R RAC 1500 (for RC251 Motor only) RAC 1031, 1032, 1042, 1531, 1542, 1582, 1742, 1742/3, 1782, 2042, 2082, 0822, 51E2, 51E4, 51E6E, 51E7E, 51E8E, 51E090, 51E165, 51E165R, 51E190, 51E190R, 51F1, 51F1E, 51F2, 51F4, 51F6, 51F6E, 51F7, 51F7E, 51F8, 51F8E, AK093M, AK123M, AK126M, AK173M, AK176M, AK203M, AK206M, AW093M, AW096M, AW123M, AW126M, AW173M, AW176M, AW203M, AW206M, ARA, ARB, ARC, ARD, ARE, ARF, ARG, ARH, ARJ, ARK, ARL, ARM, ARN, ARP, ARR, ARV, ARW, ARX, ARY, ARAA, ARAA, ARAC, ARAD, ARAE, ARAG, EN185C, EN185D, EN235C, EN235D, EN320C, EN320D, EN450C, EN450D, EN515D, ER235C, EL450D, CN185C, CN185D, CT235C, CT235D, CF450D, RF235C, RF235D, RF320C, RF320D, RF450C, RF450D, RF515D RAC 2503, 2531 (Cond. Fan — Double spades) RAC 2503, 2531 (Evap. Fan — Eyelets) Peerless Coolers for M199 Motor
6	440	Fan	RAC HA/B/C/D/E/F 1000 RAC 1500 (For RC181 Motor only) RAC 1500, 1750
8	400	Fan	RAC A23R1
15 x 3	440	Fan & Run	RAC K3825
20 x 3	400	Fan & Run	RAC K41235, K41235A, KAC41255, LAC41255, SD41255
20 x 3	440	Fan & Run	RAC K41255
25 x 3	400	Fan & Run	RAC KAC41455
35 x 3	400	Fan & Run	RAC KAC41755

SELECT CAPACITORS FOR ABOVE KELVINATOR MODELS
FROM CORNELL-DUBILIER, PAGE 326-d

OUR STOCK OF COMPONENTS, EQUIPMENT AND SYSTEMS FOR AIR CONDITIONING, HEATING, COMMERCIAL AND INDUSTRIAL REFRIGERATION IS UNSURPASSED THROUGHOUT AUSTRALIA

IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU



CAT. NO.	DESCRIPTION	CODE NO.	DETAILS
327226	CHT16 Motor Starter	47L1230	220V, 16A O/reset.
327230	CT10 " "	47B1227	10A " "
327244	CT10 " "	47B1207	10A 1 - O/reset
327245	CT10 " "	47B1208	10A " "
327246	CT10 " "	47B1209	10A " "
327242	CHT16 Mot. Start Case	47L0017	2 PB (Start-Stop/Reset).
327240	CT10 " " " "	47B0017	" " " " " "
327241	CT10 " " " "	47B0018	1 PB (Stop/Reset)
327231	CT10 Contactor	37B0171	
327229	CH16 " "	37L0021	
327243	CH10 Contactor Case	37B0261	
327232	C6 Control Relay	37B0151	
327233	T16 Thermal Relay	47L0070	
327235	240 Volt Coil	37B6473	For C6, CH6, C10, CH10, CH16, CH25
327234	415 Volt Coil	37B6479	" " " " " " " "

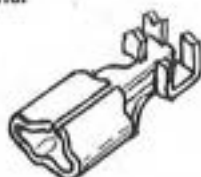
1K.40.A2.02

Other Danfoss Motor Control Gear available on application.

R.E. QUICK CONNECT TERMINALS

RE 1T Fusite Pin Terminal
Packet of 30

CAT. NO. 32750



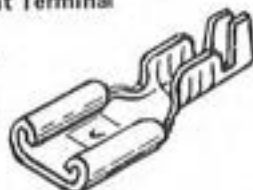
RE 2T Female Flag Terminal
(right angle)
Packet of 30

CAT. NO. 32751



RE 3T Female Straight Terminal
Packet of 30

CAT. NO. 32752



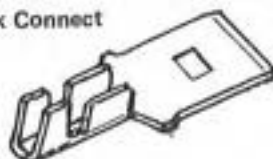
RE 4T Eyelet 5/32" Diameter
Packet of 30

CAT. NO. 32753



RE 9T Male Tab Quick Connect
Packet of 30

CAT. NO. 32757



RE 5T Eyelet 3/16" Diameter
Packet of 30

CAT. NO. 32754



RE 1-2T Mixed Terminals
Packet of 30

CAT. NO. 32755

RE 1B Terminal Seal Bushes
Packet of 15
(Can be used as charging hose bushes)

CAT. NO. 32761



RE 1-2-3T Mixed Terminals
Packet of 30

CAT. NO. 32756



MALLORY**DURACELL® Popular Alkaline Batteries**

Suffix "B" denotes Blister Card



MN1300



MN1400



MN1500



MN1604

**Blister Card Types**

CAT. NO.	CODE No.	DESCRIPTION
327163	MN1300B2	D Size — 2 Pack
327166	MN1400B2	C Size — 2 Pack
327169	MN1500B2	AA Size — 2 Pack
327168	MN1500B4	AA Size — 4 Pack
327170	MN1604B	9 Volt

MALLORY**General Purpose Batteries**

CAT. NO.	CODE NO.	DESCRIPTION
327150	M13FB2	1.5V D Size — 2 Pack
327152	M14FB2	1.5V C Size — 2 Pack
327154	M15FB4	1.5V AA Size — 4 Pack

CAT. NO.	CODE NO.	DESCRIPTION
327158	M1604B	9 Volt — 1 Pack
327156	M908	6 Volt Lantern
327157	M918	6 Volt Lantern

MALLORY**Heavy Duty Batteries**

CAT. NO.	CODE NO.	DESCRIPTION
	M13HD-2	1.5V D Size — 2 Pack
	M14HD-2	1.5V C Size — 2 Pack

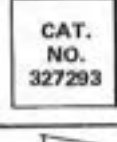
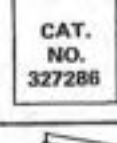
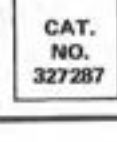
CAT. NO.	CODE NO.	DESCRIPTION
	M15HD-4	1.5V AA Size — 4 Pack
	M1604HD-1	9 Volt — 1 Pack

Battery Cross Reference Guide

VOLTS-TYPE	MALLORY	EVEREADY	JAPANESE
1.5 D	MN1300	E95	AM-1
1.5 C	MN1400	E93	AM-2
1.5 AA	MN1500	E91	AM-3
9	MN1604	—	—

VOLTS-TYPE	MALLORY	EVEREADY	JAPANESE
1.5 AAA	MN2400	E92	AM-4
N	MN9100	E90	AM-5
1.5 Button	PX825	EPX825	PX825

TECHNICAL BOOKS — PUBLICATIONS

 CAT. NO. 327297	SAMS ABC's OF AIR CONDITIONING Covers the theory and operation of air conditioners, common applications, the electrical system, tools and equipment, and repairing of air conditioners. It deals with principles, components, and practices which are common to all air conditioners. Also covers laws governing temperature, heat transfer, behaviour of liquids and gases, cooling by evaporation, effects of pressure and vacuum, and types of air conditioning systems. 126 pages. 5 1/2" x 8 1/2" with soft cover. Fully illustrated.
 CAT. NO. 327298	SAMS ABC's OF ELECTRICITY Starts with the basic principles of electricity and covers subjects like electrons, simple laws of electricity, how electricity is generated, and how basic electrical and electronic circuits are constructed. Has chapters on Electricity, Batteries, Magnetism, and Alternating Current Theory. Easy to understand, is completely illustrated. 96 pages. 5" x 8 1/2" with soft cover.
 CAT. NO. 327296	SAMS ABC's OF ELECTRIC MOTORS AND GENERATORS A basic introduction to motors and generators, describing how they operate and what they do. Starting with magnetic fields and electric currents it covers AC and DC motors and generators. 126 pages. 5 1/2" x 8 1/2" with soft cover.
 CAT. NO. 327294	SAMS ABC's OF CAPACITORS Written in easy to understand language it explains how various types of capacitors are constructed, their typical characteristics and applications, how to select replacements, and practical methods of testing and measuring capacitors. Has chapters on What Is A Capacitor, Capacitor Theory, Capacitor Construction, Capacitor Application, Capacitor Replacement, and Capacitor Testing. Complete with illustrations and electrical circuits. 96 pages. 5 1/2" x 8 1/2" with soft cover.
 CAT. NO. 327295	SAMS FIX YOUR SMALL APPLIANCES These books go into detailed directions to repair small appliances with wiring diagrams of connections and photographs of parts. No. 27422 Vol. 1 includes table ovens, rotisseries, skillets, waffle irons, coffee makers, irons, toasters, bottle warmers, heaters, hair dryers, and blankets. No. 27423 Vol. 2 includes fans, carving knives, can openers, knife sharpeners, shoe polishers, sewing machines, mixers, blenders, grinders, hair dryers, vacuum cleaners, and shavers. Paper back 5-3/8" x 8 1/2", 160 Pages. 27422 Vol. 1 Fix Your Small Appliances. 27423 Vol. 2 Fix Your Small Appliances.
 CAT. NO. 327299	SAMS HOW TO REPAIR MAJOR APPLIANCES Describes the repair and maintenance of major home appliances, including refrigerators, freezers, washing machines, clothes dryers, ranges, dish washers, garbage disposers, air conditioning, water heaters, and electric appliance motors. Fully illustrated. 216 pages. 5 1/2" x 8 1/2" with soft cover.
 CAT. NO. 327285	USING SI UNITS IN HEATING, AIR CONDITIONING AND REFRIGERATION Professor W.F. Stoecker shows how the Standard International (SI) metric system applies to the HVAC and refrigeration fields with 56 examples. Included are the psychrometric chart and P-H diagrams for R-12, R-22 and R-717, all in SI units. 48 pp. 14 ill. 21 tables. 8 1/2" x 11. soft cover.
 CAT. NO. 327279	IMPERIAL AUTOMOTIVE AIR CONDITIONING SERVICE MANUAL Covers all phases of servicing automobile air conditioners. Has chapters on Basic Theory; Description of Systems Components; Testing Equipment; Performance Testing & Specifications; Testing the System; Compressor and Clutch Servicing; GM Air Assembly Servicing; Temperature Control Systems. Complete with illustrations and charts. Over 162 pages. With soft cover. Size 7" x 11"
 CAT. NO. 327293	ROBINAIR SERVICE MANUAL NO. 10561
 CAT. NO. 327286	MODERN REFRIGERATION AND AIR CONDITIONING
 CAT. NO. 327287	BASIC REFRIGERATION — Guy King

TECHNICAL BOOKS — PUBLICATIONS

RE HANDBOOK OF REFRIGERATION SEALED UNIT ELECTRICALS This handbook, compiled by Refrigeration Electricals Pty. Limited, is provided specifically for the refrigeration service mechanic, to assist him in the day to day problems he encounters in the rapidly growing field of sealed unit refrigeration service. If a replacement relay, overload or capacitor is required, merely identify it alongside the appropriate motor compressor and order by the 'Refrigeration Electricals Pty. Limited' part number.	 CAT. NO. 327292
KIRBY REFRIGERATION SERVICE BOOK — 1980 EDITION The purpose of this Service Book is to provide the Refrigeration and Air Conditioning Engineer with helpful information concerning the installation and servicing of Kirby-Tecumseh Compressors. The information in this Kirby Service Book is generally related to the Compressor and to items and conditions affecting the installation, operation and servicing of the Compressor. Useful Technical Data and Tables are included.	 CAT. NO. 327291
HOW TO DESIGN HEATING-COOLING COMFORT SYSTEMS Applying the 1972 ASHRAE Comfort Standards, Joe Olivieri shows you five ways to solve a typical design problem — heat and cool a large, one-storey medical clinic — using a fancoil, throughwall, baseboard, multizone or double duct system. 320 pp. 289 ill. 63 tables. cloth.	 CAT. NO. 327276
HOW TO HAVE AIR-CONDITIONING AND STILL BE COMFORTABLE Herb Laube evaluates the merits and demerits of air conditioning systems — based on 40 years of executive level experience with the economics, design and operation of comfort systems. 254 pp. 14 tables. cloth.	 CAT. NO. 327284
HOW TO MAKE IT IN THE SERVICE BUSINESS Read Ray Schneider and you'll agree that you need intelligence, persistence and an unfailing sense of humour to last out the first year in your own air conditioning and refrigeration service business. 192 pages. cloth bound.	 CAT. NO. 327278
NEW WAYS TO SOLVE YOUR REFRIGERATION AND AIR CONDITIONING SERVICE PROBLEMS Let Carl Geist show you the "thinking man's" approach to solving problems. 256 pages. 126 ill. 4 tables. cloth.	 CAT. NO. 327277
GETTING STARTED IN HEATING AND AIR CONDITIONING SERVICE — REVISED Allen Russell updates service training with a book that analyzes controls and systems, introduces you to the serviceman's tools and instruments and gives you a detailed view of components. 224 pp. 363 ill. 13 tables. cloth.	 CAT. NO. 327283
LICENSED OPERATOR'S KEY TO REFRIGERATION For the reader who needs to know ammonia refrigeration systems — with their cycle and safety controls — and the man studying for his 3rd class Refrigeration Operator's License. 218 pp. 123 ill. 9 tables. 5½ x 8½. cloth bound.	 CAT. NO. 327282
MARINE REFRIGERATION AND FISH PRESERVATION John Mead shows you which systems to use, what temperatures to hold, and what a system for these 50 to 100 foot boats should cost. 256 pp. 137 ill. 17 tables. cloth.	 CAT. NO. 327281
PRINCIPLES OF REFRIGERATION by R.J. Dosselt.	 CAT. NO. 327280
ACTROL PARTS 1983 CATALOGUE & TECHNICAL MANUAL No. 4. If you are reading this item — you already know how valuable, useful and almost indispensable the role this Manual plays in the Refrigeration and Air Conditioning Industry. Recommend it to your friends and associates.	 CAT. NO. 327288

WE ARE ADDING TO THE RANGE CONTINUALLY — COME AND "BROWSE"

ELECTRIC MOTORS

TECO

STANDARDISED METRIC RANGE
TOTALLY ENCLOSED FAN COOLED SQUIRREL CAGE
THREE PHASE INDUCTION MOTORSTEFC, Foot-mounted Three-phase,
Squirrel-cage MotorDrip-proof Single-phase
Squirrel-cage Motor

CAT. NO.	kW	HP	SPEED RPM	FRAME	SHAFT Diam. mm
327351	0.18	1/4	1400	63	11
327352	0.37	1/2	1400	71	14
327353	0.75	1	1410	80	19
327354	1.5	2	1435	90L	24
327355	2.2	3	1430	100L	28
327356	3.7	5	1430	112M	28
327357	5.5	7.1/2	1460	132S	38
327358	7.5	10	1460	132M	38
327359	11	15	1465	160M	42
327360	15	20	1470	160L	42
327361	18.5	25	1470	180M	48
327362	22	30	1455	180L	48
327363	0.18	1/4	935	71	14
327364	0.37	1/2	945	80	19
327365	0.75	1	930	90S	24
327366	1.5	2	935	100L	28
327367	2.2	3	955	112M	28
327368	3.7	5	950	132M	38
327369	5.5	7.1/2	970	132M	38
327370	7.5	10	960	160M	42
327371	11	15	960	160L	42
327372	15	20	960	180L	48
327373	18.5	25	970	200L	55
327374	22	30	975	200L	55
327401	0.18	1/4	2800	63	11
327402	0.37	1/2	2800	71	14
327403	0.75	1	2800	80	19
327404	1.5	2	2780	90S	24
327405	2.2	3	2800	90L	24
327406	3.7	5	2860	112M	28
327407	5.5	7.1/2	2900	132S	38
327408	7.5	10	2900	132S	38
327409	11	15	2900	160M	42
327410	15	20	2880	160M	42
327411	18.5	25	2900	160L	42
327412	22	30	2950	180M	48

TECO 240 VOLT SINGLE PHASE MOTORS
CAPACITOR START.

CAT. NO.	kW	HP	SPEED RPM	FRAME	SHAFT Diam. mm
327376	0.18	1/4	1500	DQW-B4	
327377	0.25	1/3	1500	DQW-B4	
327378	0.37	1/2	1500	DQW-B4	
327379	0.55	3/4	1500	DQW-B4	
327380	0.75	1	1500	DQW-B4	

TECO BENCH GRINDERS

6 inch & 8 inch 230 Volt Single Phase



Bench Grinder

CAT. NO.	SIZE
327390	8"
327391	6"

NOTE : FIRST 3 NUMERALS OF CAT. No.
INDICATES PAGE No.WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL
MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT

ELECTRIC MOTORS

MECHTRIC

 TYPE "SE"
 STANDARDISED METRIC RANGE THREE PHASE
 SQUIRREL CAGE MOTORS
 TOTALLY ENCLOSED FAN COOLED

INSULATION: Class "E" insulation with maximum temperature rise of 75°C above ambients of 40°C is used in the range of standard "SE" motors.

COOLING: The "SE" motors are cooled by air stream forced along side the external frame-ribs by a fan mounted on shaft at the non-drive end of motor. Air stream is independent from the direction of rotation.

VOLTAGE VARIATION: The "SE" motors will operate satisfactorily with voltage variations up to plus or minus 10% but providing that the frequency remains constant.



CAT.NO.	kW	HP	SPEED RPM	FRAME	SHAFT SIZE mm
327326	0.75	1.0	1380	80	19
327327	1.1	1.5	1410	90S	24
327328	1.5	2.0	1415	90L	24
327329	2.2	3.0	1415	100L	28
327330	3.0	4.0	1405	100L	28
327331	4.0	5.5	1420	112M	28
327332	5.5	7.5	1440	132S	38
327333	7.5	10.0	1445	132M	38
327334	11.0	15.0	1450	160M	42
327335	15.0	20.0	1445	160L	42

2 POLE, 6 POLE AND 8 POLE MOTORS AVAILABLE ON APPLICATION

ELECTRIC MOTOR HINTS

QUICK DIAGNOSIS OF MOTOR AILMENTS

(From Brook Motors Publication - "Installation and Maintenance of Electric Motors").

Inspection at regular intervals and full use of testing instruments are chapter and verse of efficient motor maintenance. And between inspections, alertness to the first signs of motor ailments can nip a great deal of trouble in the bud. Common trouble symptoms — for which it pays to be on the look-out — are listed below. Remember, if you lack the time or facilities to handle your own inspection and service properly — or if your motors fail to respond to your own servicing — it is best to consult a reputable motor servicing shop.

SYMPTOMS YOU CAN SEE		
Symptom	Possible Causes	Cure
1. Motor won't start.	Usually line trouble—single phasing at starter. Load too heavy. Disconnect motor to see if it starts without load.	Correct. Check source of power supply. DON'T merely try to make it go—while motor sits there and "fries"! Reduce load—or replace motor with unit of greater capacity.
SYMPTOMS YOU CAN HEAR		
2. Excessive hum.	Uneven air-gap. Measure with feelers. Unbalanced rotor. Check on parallel bars.	Replace bearings—before introduction of scraping noise indicates rotor is rubbing against stator. Balance with solder on band — or weight attached by cap screw and lock washer.
3. Regular clicking.	Foreign matter in air gap.	Take out rotor; remove matter.
4. Rapid knocking.	Misalignment — probably causing shoulder of shaft to pound periodically against bearing end.	Realign set until knocking disappears.
5. Brush "chatter".	Extreme motor vibration.	See Items 6 and 7 below.
SYMPTOMS YOU CAN FEEL		
6. Vibration	Misalignment. Vibration in driven machine. Run motor disconnected for check.	Realign set. Eliminate source in machine, if possible. Or change to a flexible belt drive may be in order.
7. Vibration following motor repair	Rotor out of balance due to holes drilled or weights shifted ... new rotor coil or coils.	Balance rotor.
8. Motor over-heating (Check with thermometer — don't depend on hand).	Overload. Measure load; compare with nameplate ratings. Dirt in motor. Check flow of ventilating air. Rotor rubbing on stator. Shorted stator windings. Earth.	Check for excessive friction in motor, drive or machine. Reduce load, or replace motor with unit of greater capacity. Blow out motor. Use solvent on wound section if necessary. Replace bearings. Test with wattmeter and correct. Locate with test lamp or growler and repair.
9. Bearing over-heating.	Misalignment. Too much tension in chain or belt drive. Excessive end thrust.	Realign set. And in this — as in all cases of bearings over-heating — keep shafts turning until bearing is cooled... to prevent "freezing". Reduce tension to point of adequacy. Reduce thrust from drive or machine. (Shaft should be permitted reasonable "axial" float). Or if motor is off level, shim-up lower end to take thrust off its bearing.

TEMPERATURE TESTS

If the motor becomes hot, take temperature tests as follows — Hang one thermometer (reading 0—110°C. or 0—230°F.) in the room near the machine, if possible in the current of cooling air being drawn into the machine; this will give the ambient temperature.

Place one or more thermometers in contact with the hottest stationary parts of the machine, such as bearing bushes, field coils, stator, etc. The correct method is to place the bulb of the thermometer firmly against the machine and then wrap a piece of cotton-wool firmly round the bulb against the part of the machine surrounding the bulb.

Leave these in position until temperatures cease to rise, also leave them in position after stopping machine, as temperature may rise after machine has been stopped.

CHECKING WINDING TEMPERATURES

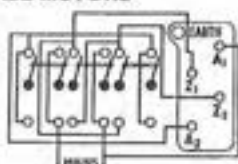
Should a maintenance engineer have doubts about the temperature rise of a motor, the following method will be found an accurate check on temperature in the hottest part of the winding, and does not require a thermometer or dismantling of the machine. Using a battery D.C. ammeter and volt meter the resistance of the motor winding can be taken when cold. If it is again measured at the maximum motor temperature, the temperature rise can be taken by reference to the chart.

Thus, if a stator winding has a resistance of 26 ohms cold and 30.2 ohms after the motor has been on load, this gives an increase of 16% in resistance, which by the chart indicates a rise in temperature of 22°C (72°F).



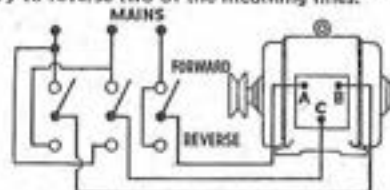
REVERSING SINGLE PHASE MOTORS

In the case of single phase motors it is necessary to reverse the starting winding relative to the running winding. Consequently any links between the starting and running winding should be removed.



REVERSING THREE-PHASE MOTORS

It is common knowledge that to reverse a three-phase machine it is only necessary to reverse two of the incoming lines.



The use of a triple-pole change-over switch enables this to be done frequently, and without damage to the motor, by simply throwing the handle over from one position to the other.

KAMBROOK*

ELECTRICAL PRODUCTS

	PART No.	CAT. NO.	DESCRIPTION
	TF1	32725	TROUBLE FINDER LAMP Super practical Poly Trouble Lamp with 3-pin socket moulded into base. Just plugs in to existing extension lead.
	X3 (3 metres)	32726	EXTENSION LEADS Standard 10 Amp Extension Leads complete with 3-pin plug and socket. (1.5, 5, 10, 15, 20 and 30 metre lengths available on application).
	EX7 (7 metres)	32727	
	EL1 (7 metres)	32738	EXTENSION LEAD PACK Portable roll-it-away power point. Use whatever length of cord you need to plug-in your drill, electric saw or whatever and when you're finished, roll it up! Two sizes: EL1 — 7 metres flex and EL3 — 12 metres flex.
	EL3 (12 metres)		
	KD14		POWER ADAPTOR For the Tradesman and the Handyman. Tough and rugged the Kambrook Power Adaptor converts an extension lead into four separate power points.
	KD18	32739	FLAT PACK POWER BOARD Australia's most widely used multiple power point. The portable power board with four outlets each controlled by Double Pole Switches with Safety Shutters. Neon light indicates when the power is on. Just plug it in to your existing power point.
	KD17	32742	SAFETY FOUR OUTLET Convert your single or double power points into four convenient outlets. There's no cutting or drilling necessary — the Safety Four uses the same fixing centres as your old powerpoint. Double pole switches include safety shutters.
	KD30	32778	LIGHT AND POWER REEL The 3-IN-ONE from Kambrook. It's an extension lead with two power outlets and light. Perfect for workshops, handymen and tradesmen.
	KD20	32779	POWER REEL It's 7 metres of flex on a reel with the famous Kambrook 4 outlet Flat Pack. Every tradesman and handyman needs one of these.

KAMBROOK*

ELECTRICAL PRODUCTS

	PART No.	CAT. NO.	DESCRIPTION
	KD33		DRILL TIDY WITH 3 OUTLETS A Portable, Lightweight unit designed to hold an electric drill plus a lot of work tools and drill bits. Complete with 3 point powerboard and 5 metres of flex. An extremely useful unit for tradesmen and servicemen.
		32749	3 - CORE FLEX Sold per metre
	S2	32746	SAFETY PLUG Prevents young children tampering with live power points. All you do is push safety plug into power point. To remove, insert key, turn and pull.
	KD44	32780	PLUG - IN TIMER The super-simple Kambrook 24 hour timer that just plugs-in to your powerpoint. Ideal for security lighting in the office, workshop or home. Swivel action plug makes it easy to fit any powerpoint, anywhere.
	PB3		3 OUTLET POWER BOARD & TIMER The solution to the annoying problem of not enough power points. One outlet only is time switched for added convenience and security. Complete with handy length of flex and plug.
	KD41	32781	MULTI - PURPOSE TIMER Specially designed for wall mounting. Features two time switches. These time-switched outlets turn alarm circuits, lights etc. on and off three times each 24 hours.
	K6	32773	ELECTRIC URN Unique, practical and with 50 cup capacity. Very functional for busy people. All the boiling water you need for a day full of cuppa's.
	KD50	32774	HOT PLATE Your extra cook-top. Superbly practical and functional styling. Ideal for table top cooking, caravans, patios or even for those small heating jobs in the workshop or factory. Finger-tip simmerstat for instant heat control and powerful 2100 Watt element.
	K9/9	32775	WHISTLER KETTLE Australia's favourite electric kettle. It whistles continuously at boil. Safety cut-out for boil-dry protection. Detachable cord and 2.5 litre capacity.

327-h

FROSTEX



for Drain Lines
Fan Cowlings
Display Casings
Drip Trays

FreezGard

Self-regulating Heating Tape

INTRODUCTION

FreezGard Heating Tape is designed to be permanently secured to metallic or thermoplastic piping systems and equipment to prevent freezing and frost build-up. For use in dry, ordinary areas only. This heating tape differs from other pipe heating systems due to the physical construction of the heating element. Electrical properties of the FreezGard heating element are such that a thermostat is not necessary for use with this system. The unique self-regulating heating element controls its own heat output in response to temperature changes. As the temperature drops, the heating element increases its output; as the temperature rises, the heating element decreases its output at every point along its length. FreezGard parallel circuit construction allows the heating tape to be cut to length without affecting its heating properties.

Limitation of Use

The heating tape is intended for installation on metallic or thermoplastic pipe. It can be used for indoor or outdoor applications where the system will be covered by non-combustible thermal insulation. The heating tape is intended for freeze protection of piping systems that have a maximum pipe temperature of 90°C. Any one run is limited to a maximum heating tape length of 152 metres (500 ft.) for 240 volts.

FEATURES

Unique Construction: Heat is generated in the unique patented core between parallel conductors.

Cut to Length: Parallel circuit allows you to quickly custom-make the heater you need at the job with ordinary tools. No special voltage transformers or tools needed.

Self-Regulating: Controls its own thermal output in response to the surrounding temperature. No need for thermostats.

Safe: Self-regulation means no hot spots or burnouts, even where overlapped. No hot spots means it can be used with rubber foam insulation or with PVC pipe rated at 60°C.

Rapid Installation: Simple connection and termination components allow quick assembly.

Cost Saving: Replaces an entire inventory of fixed-length heaters. Eliminates service calls to pre-determine heater installation requirements. Stops call-backs related to heater failure. No waste: the remaining piece from one package can be easily spliced to heat tape from another package.

Flexible: Wraps easily around pipe and fittings even at the lowest temperatures.

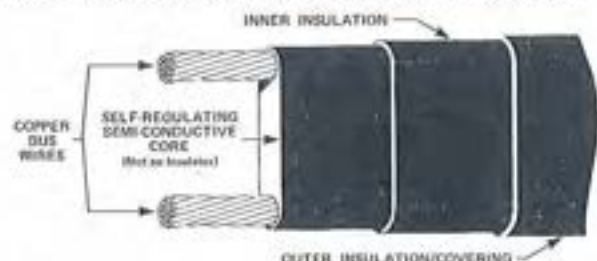
HOW DOES IT WORK

Electricity flows from one conductor to the other wherever the graphite core network permits. While the core material is cold and dense there are many paths through the network, the current flow is large and much heat is produced.

The core material expands as it heats. In expanding the graphite core network is drawn thin, disrupting some electrical paths. As the heating and expansion

continue, more paths are disrupted. The heat output falls off and the system reaches a state of self-controlled thermal stability.

If the ambient temperature drops, the core responds by cooling, contracting and reconnecting electrical paths and producing more compensating heat. This is the self-limiting phenomenon. It occurs independently at each point along the heating tape.



DIAGRAMMATIC ILLUSTRATION OF ELECTRICITY FLOW BETWEEN COPPER CONDUCTORS

CAT. NO.	DESCRIPTION	SIZE - P/N
32740	FreezGard Self-Regulating Heating Tape 15.2 m (50 ft)	P/N RS-2 Sold per metre
32736	ATUM Heat Shrinkable tubing, meltable adhesive inner wall	SIZE 3/1 * Sold per metre
32737	ATUM Heat Shrinkable tubing, meltable adhesive inner wall	SIZE 12/4 * Sold per metre
32741	Power Connection Kit and End Seal	P/N FCT-5**

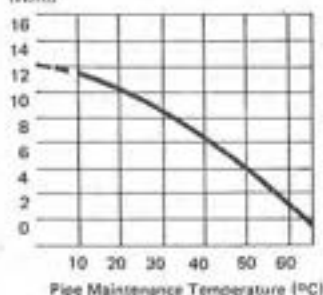
* SIZE (expanded/recovered - Diam. in mm)

** Contents of FCT-5 Kit:

- 2 x 50 mm lengths of ATUM 12/4
- 1 x 75 mm length of ATUM 12/4
- 2 x 25 mm lengths of ATUM 3/1
- 4 x insulated crimp sleeves

TECHNICAL DATA	
Service Voltage	240V AC
Nominal Thermal Rating @ 10°C (50°F) *	13 Watts/m (4 Watts/ft)
Maximum Circuit Length	152 metres (500 ft)
Circuit Breaker Sizing:	
If started at -10°C (50°F)	.1 Amp/m (.03 Amp/ft)
If started at -20°C (0°F)	.13 Amp/m (.04 Amp/ft)
If started at -30°C (-20°F)	.16 Amp/m (.05 Amp/ft)
Exposure Temperature:	
Continuous - Power On	65°C (150°F)

Thermal Output Rating (W/m)



-10°C + 30% heat

FreezGard Self-regulating Heating Tape

SELECTION PROCEDURE

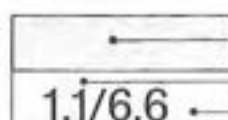
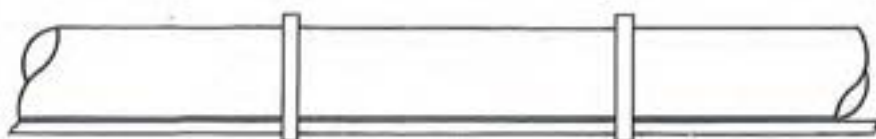
1. Determine the pipe or tubing size to be used, insulation thickness, and lowest ambient temperature.

2. Refer to the following tables to calculate the footage and spiral pitch of FreezGard heater required for each foot of pipe.

Note: When only 1.0 foot of FreezGard heating tape is needed per foot of pipe, spiralling is not required. In such cases, install a straight length of heating tape. Locate the heating tape on the bottom of the pipe whenever possible.

Warning: The FreezGard heating tape and the thermal insulation must remain dry at all times during installation and use. The insulation should be waterproofed with all joints and seams thoroughly sealed.

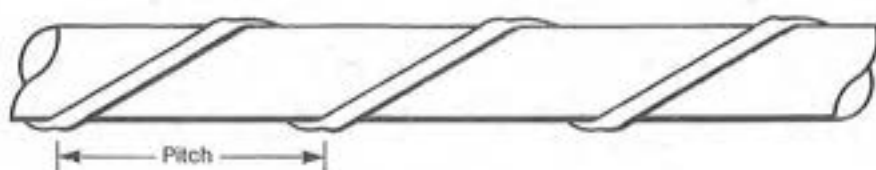
3. Find the total footage of FreezGard heating tape needed by multiplying the measured pipe length by the amount of heating tape per foot of pipe found in the table.



Install straight along pipe

Feet of heater per foot of pipe

Spiral pitch in inches



Pipe Size	Nominal, Inches	1/8"	1/4"	3/8"	1"	1 1/4"	1 1/2"	2"	2 1/2"
Tubing Size	Nominal, Inches	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
No Insulation* (To be used for indoor applications only)									
Ambient Temperature °F	10				1.2/6.8	1.5/5.0	1.7/4.6	2.7/3.1	3.8/2.6
	0			1.3/4.4	1.7/3.3	2.2/2.9	2.5/2.8	3.8/2.1	
	-10	1.5/2.2	1.7/2.2	2.1/2.0	2.5/2.0	3.2/1.8	3.8/1.7		
	-20	2.1/1.4	2.4/1.4	2.9/1.4	3.5/1.3				
	-30	3.4/7.8							
	-40								
3/4" Thick Insulation									
Ambient Temperature °F	10						1.1/13.8	1.3/9.5	1.5/8.4
	0					1.1/12.2	1.4/6.5	1.6/6.3	1.9/5.8
	-10				1.2/6.8	1.3/6.7	1.6/5.1	2.0/4.5	2.3/4.5
	-20			1.2/5.5	1.4/4.6	1.6/4.5	1.9/3.9	2.3/3.8	2.7/3.8
	-30		1.1/6.6	1.3/4.4	1.5/4.0	1.8/3.7	2.2/3.2	2.6/3.3	3.0/3.3
	-40		1.2/4.5	1.5/3.3	1.7/3.3	2.0/3.2	2.5/2.8	2.9/2.9	3.4/2.9
1/2" Thick Insulation									
Ambient Temperature °F	10							1.1/17.1	1.3/11.3
	0						1.2/9.6	1.4/8.0	1.7/6.8
	-10					1.1/12.2	1.4/6.5	1.7/5.7	1.9/5.8
	-20				1.2/6.8	1.3/6.7	1.6/5.1	1.9/4.9	2.2/4.8
	-30			1.2/5.5	1.3/5.4	1.5/5.0	1.9/3.9	2.2/4.0	2.5/4.1
	-40		1.1/6.6	1.3/4.4	1.5/4.0	1.7/4.1	2.1/3.4	2.5/3.4	2.8/3.6
3/4" Thick Insulation									
Ambient Temperature °F	10							1.1/17.1	1.2/14.2
	0							1.1/13.8	1.3/9.4
	-10						1.1/12.2	1.3/7.6	1.5/7.0
	-20					1.1/9.8	1.2/8.4	1.5/5.7	1.7/5.7
	-30				1.1/9.8	1.2/8.4	1.5/5.7	1.7/5.7	2.0/5.4
	-40			1.1/8.0	1.2/6.8	1.4/5.7	1.6/5.1	1.9/4.9	2.2/4.8

Tables are based on the use of glass fiber or rubber foam insulation with a K factor of 0.26 Btu/hr-°F-ft²/in. @ 50°F.

*The No Insulation Table is for temporary, indoor situations only. Permanent installation without thermal insulation is not

recommended. A non-insulated system requires excessive heating tape and uses more wattage.

CONVERSION °F to °C						
°F	10	0	-10	-20	-30	-40
°C	-12.2	-17.8	-23	-29	-34	-40

ADDITIONAL SELF-REGULATING HEATER TAPES

A large range of additional Self-Regulating Heater Tapes are available with higher Thermal Ratings and construction to suit a wide variety of industrial process heating and temperature maintenance applications.

Details available on request

Installation Instructions - Refer next page

FreezGard Self-regulating Heating Tape

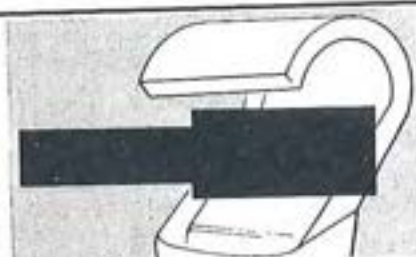
Frostex
Installation Instructions

Installation
Instructions using
FCT-5 Kit or
Contractor
Cut-to-length Heat
Shrinkable Tubing

1. SELECT LENGTH OF FROSTEX — Refer Previous Page.
Fix heating tape to bottom of pipe or spiral if necessary.
Loop several times around valves.

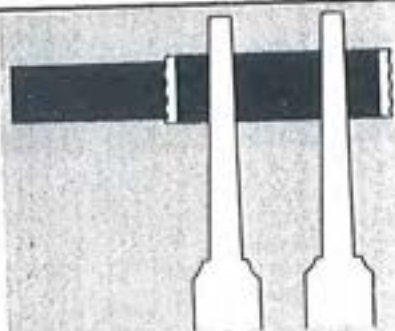


END SEAL: NOTE: WATER INGRESS THROUGH IMPERFECT SEALS MAY LEAD TO FAILURE



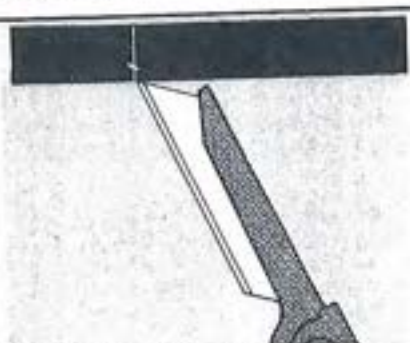
2. SHRINK ON END SEAL

NOTE: Never connect the conductors together.
Slip a 50 mm heat shrinkable sleeve over the strip so that about 15 mm projects beyond the cut end. Heat the sleeve with cigarette lighter until it shrinks tightly around strip.



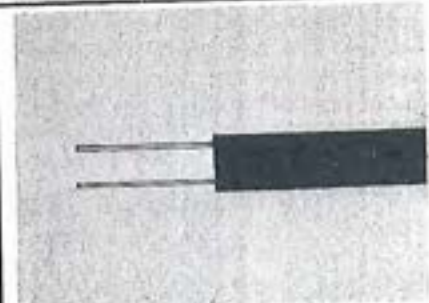
3. SEAL END SEAL

Using a pair of pliers, squeeze the sleeve at the ends until adhesive appears at the edges.



4. REMOVE INSULATION

Remove outer and inner insulation 20 mm from the end.



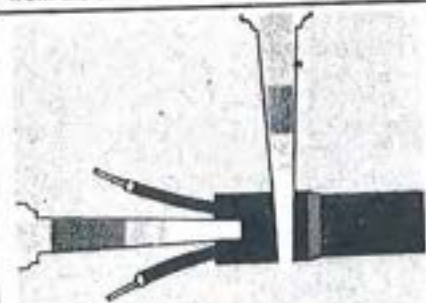
5. CLEANLY EXPOSE THE PARALLEL CONDUCTORS

This may be achieved by making a cut either side of the conductors and pulling the conductors away from the core using pliers. Cut out the centre web.



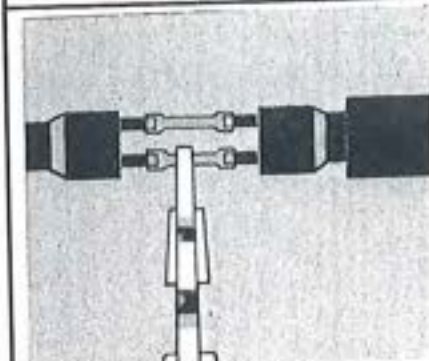
6. INSULATE CONDUCTORS

Slip the small diameter heat shrinkable sleeves over the conductors. Heat the sleeves until they shrink tightly around the conductors.



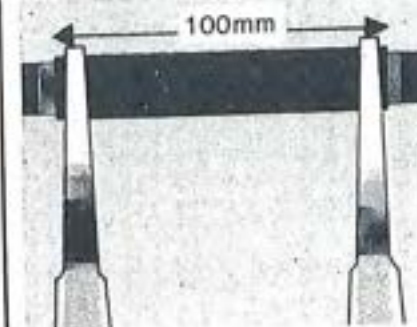
7. SEAL THE CRUTCH

Slide a 50 mm heat shrink tube over the end. Heat and shrink. Whilst still hot, use pliers to squeeze the sleeve at the positions shown to seal the area between the conductors and make the strip water-tight.



8. APPLY CRIMP SLEEVES

Slide the 75 mm heat shrinkable sleeve over strip. Position the crimp sleeves over the conductors and crimp the barrels firmly into place.



9. COMPLETION

Position the 75 mm heat shrinkable sleeve centrally over the connection. Starting from the middle, shrink firmly into place. Squeeze the ends of the sleeve with pliers until adhesive appears at the edges.

10. INSULATION

Frostex must always be insulated to be safe and cost effective.

PRECAUTIONS

During installation, do not bare the wires and twist them together as this will result in an electrical short circuit.

During installation or use, if the heat tape is damaged, it should be replaced not repaired. Once the conductors are damaged they cannot be repaired.

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— V —

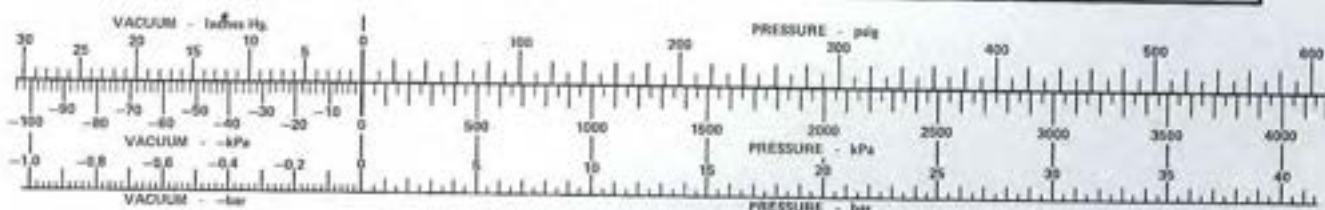
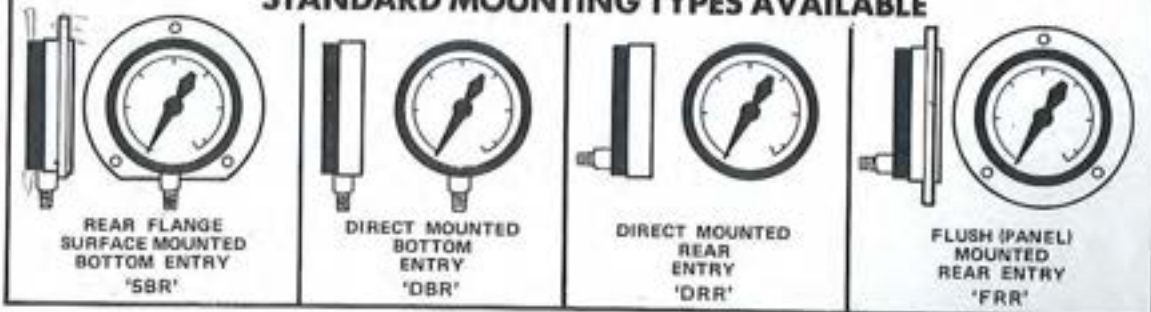
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GAUGES - PRESSURE AND COMPOUND FOR R12, R22, R502, AND R717 (AMMONIA)

STANDARD MOUNTING TYPES AVAILABLE



FLOYD

SPECIFICATIONS

CASE: Metal
FINISH: Satin Black Case—Chrome Bezel, (R717 - Hammer-tone Grey - Chrome Bezel)
DIAL: White, Scales - Pressure - Black, Temperature - Red
BOURDON: Phosphor Bronze (R717 - Stainless Steel)
MOVEMENT: Brass, Adjustable Stainless Steel Linkage (R717 - N.P. Brass or Stainless Steel)
ACCURACY: To AS 1349 - 1973.



AMMONIA

COMPOUND
4" (100mm) DIAMETER
BRITISH UNITS

CAT. NO.	RANGE
----------	-------

(SBA) REAR FLANGE
SURFACE MOUNTED
BOTTOM ENTRY 3/8" M. BSP

330176	30" - 0 - 350
330177	30" - 0 - 150

(FRA) FLUSH (PANEL)
MOUNTED, FRONT
FLANGE, REAR
ENTRY 3/8" M. BSP

330178	30" - 0 - 300
--------	---------------

with °F Temp. Scale.

S.I. METRIC

CAT. NO.	RANGE
----------	-------

(SBA) REAR FLANGE
SURFACE MOUNTED
BOTTOM ENTRY 3/8" M. BSP

330182	-100 - 0 - 2500
330183	-100 - 0 - 1000

(FRA) FLUSH (PANEL)
MOUNTED, FRONT
FLANGE, REAR
ENTRY 3/8" M. BSP

330184	-100 - 0 - 2000
--------	-----------------

with °C Temp. Scale.

R12 - R22 - R502

TYPE	BRITISH UNITS - PSI & °F			S.I. METRIC kPa & °C		
	CAT. NO.	RANGE PSI	TEMP. °F	CAT. NO.	RANGE kPa	TEMP. °C

2 1/2" (63mm) DIAMETER

(DBSR) DIRECT MOUNT, BOTTOM ENTRY 1/8" BSP STEEL CASE

PRESSURE	33089	0 - 300	R12	330151	0 - 2000	R12
		0 - 200	Oil Gauge	330152	0 - 1600	Oil Gauge
COMPOUND		30" - 0 - 150	R12	330153	-100 - 0 - 1000	R12
		30" - 0 - 150	R22	330154	-100 - 0 - 1600	R22
PRESSURE *	33069	0 - 500	R12/22/502	33077	0 - 3000	R12/22/502
COMPOUND *	33070	30" - 0 - 250	R12/22/502	33076	-100 - 0 - 1600	R12/22/502

(SBSR) REAR FLANGE SURFACE MOUNTED BOTTOM ENTRY 1/8" BSP

PRESSURE	3302	0 - 350	R22	330155	0 - 2500	R22
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(FRR) FLUSH (PANEL) MOUNTED, FRONT FLANGE REAR ENTRY 1/4" FLARE

PRESSURE	3301	0 - 300	R12	330156	0 - 2000	R12
	3305	0 - 350	R22	330157	0 - 2500	R22
COMPOUND	33090	0 - 200	Oil Gauge	330158	0 - 1600	Oil Gauge
	33010	30" - 0 - 150	R12	330159	-100 - 0 - 1000	R12
	33011	30" - 0 - 200	R22	330160	-100 - 0 - 1600	R22

* (FRR TYPE)

4" (100mm) DIAMETER

(FRR) FLUSH (PANEL) MOUNTED, FRONT FLANGE, REAR ENTRY 1/4" FLARE

PRESSURE	33018	0 - 300	R12	330161	0 - 2000	R12
	33019	0 - 350	R22	330162	0 - 2500	R22
COMPOUND	33016	0 - 300	R502	330163	0 - 3000	R502
	33017	0 - 200	Oil Gauge	330164	0 - 1600	Oil Gauge
COMPOUND	33026	30" - 0 - 150	R12	330165	-100 - 0 - 1000	R12
	33027	30" - 0 - 200	R22	330166	-100 - 0 - 1600	R22
	33028	30" - 0 - 200	R502	330167	-100 - 0 - 1600	R502

(SBSR) REAR FLANGE SURFACE MOUNTED REAR ENTRY 1/4" FLARE

PRESSURE	33014	0 - 300	R12	330168	0 - 2000	R12
	33015	0 - 350	R22	330169	0 - 2500	R22
COMPOUND	33024	0 - 300	R502	330170	0 - 3000	R502
	33013	0 - 200	Oil Gauge	330171	0 - 1600	Oil Gauge
COMPOUND	33021	30" - 0 - 150	R12	330172	-100 - 0 - 1000	R12
	33022	30" - 0 - 200	R22	330173	-100 - 0 - 1600	R22
	33023	30" - 0 - 200	R502	330174	-100 - 0 - 1600	R502

330-a

GAUGES - PRESSURE AND COMPOUND FOR R12, R22, R502

IMPERIAL DIRECT MOUNTED GAUGES

NEW UNBREAKABLE CRYSTALS
LEXAN® CRYSTALS ON
REFRIGERATION GAUGES



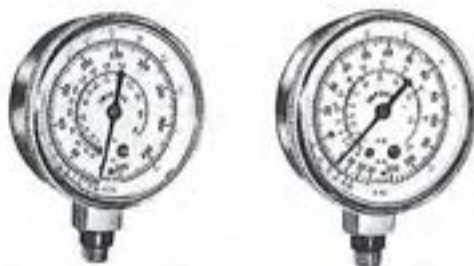
Now you get all the advantages of an unbreakable crystal on most Imperial refrigeration gauges.

The unbreakable feature protects face of gauge from damage because of a broken crystal . . . eliminates the nuisance of having to replace the ordinary glass crystal. (While the crystals will withstand abuse, gauges are sensitive instruments and should be handled with care.)

The new unbreakable crystal is threaded to gauge case. Simply unscrew crystal for access to calibration screw on face of gauge. (Chrome plated gauges have glass crystals.)

* Reg. Trade Mark General Electric Co.

EASY
CALIBRATION
JUST UNSCREW CRYSTAL



CAT. NO.	MODEL	SIZE	TYPE	RANGE kPa	TEMP. °C REFRIG.	FINISH
33034	423-CK	2 1/2"	Pressure	0 - 3400	R12, R22, R502	Red Paint
33035	425-CK	2 1/2"	Compound	-100-0-1700	R12, R22, R502	Blue Paint

QUEEN GAUGES

DUAL SCALE — kPa / PSI — PRESSURE & COMPOUND GAUGES



CAT. NO.	TYPE	SIZE	RANGE	TEMP. °C REFRIG.
33037	Pressure	2 1/2"	0 - 3400 kPa 0 - 500 PSI	R12, R22, R502
33038	Compound	2 1/2"	-100 - 0 - 1700 kPa 30" - 0 - 240 PSI	R12, R22, R502

WE BELIEVE IN CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT MANUFACTURED BY REPUTABLE AND TRUSTWORTHY COMPANIES. WE BACK THIS BY LARGE STOCK HOLDINGS AND RELIABLE SERVICE

GAUGES - PRESSURE AND COMPOUND FOR R12, R22, R502, AND R717 (AMMONIA)

ROBINAIR & MARSH REFRIGERATION GAUGES



2 1/2" Diam. Dual Scale, Direct Mounted, Bottom Entry - 1/8" MPT					
MAKE	TYPE	MODEL	CAT. NO.	RANGE	TEMP./REFRIG.
ROBINAIR	Pressure	14763	33074	0 - 3500 kPa 0 - 500 PSI	°C R12,22,502
	Compound	14762	33073	-100 - 0 - 1700 kPa 30" - 0 - 250 PSI	°C R12,22,502
MARSH	Pressure	W0023	33070	0 - 3500 kPa 0 - 500 PSI	°C R12,22,502
	Compound	W0011	33069	-100 - 0 - 1700 kPa 30" - 0 - 250 PSI	°C R12,22,502



BUDENBERG AMMONIA GAUGES

4" (100mm) Diam. Steel Tube, Stainless Steel Movement					
TYPE	MOUNTING	MODEL	CAT. NO.	RANGE	TEMP.
COMPOUND	Rear	56F	33063	30" - 0 - 150 PSI	°F R717
	Flange	56F	33063	-100 - 0 - 1000 kPa	°C R717
	Surface	56F	33064	30" - 0 - 200 PSI	°F R717
	Mounted	56F	33054	-100 - 0 - 1600 kPa	°C R717
	3/8" BSP	56F	33065	30" - 0 - 300 PSI	°F R717
	Bott. Entry	56F	33055	-100 - 0 - 2500 kPa	°C R717

PRESSURE GAUGES (NO TEMPERATURE SCALE)

MAKE	SIZE	TYPE	MOUNTING & CONNECTIONS	MODEL	IMPERIAL - PSI		S.I. METRIC - kPa	
					CAT. NO.	RANGE PSI	CAT. NO.	RANGE kPa
FLOYD	2 1/2"	Pressure	DIRECT MOUNT		330126	0 - 5		
					330127	0 - 10		
					330128	0 - 15		0 - 100
					330129	0 - 30		0 - 160
					330130	0 - 50		0 - 250
					330131	0 - 60		0 - 400
					330132	0 - 80		0 - 600
					330133	0 - 100		0 - 800
					330134	0 - 150		0 - 1000
					330135	0 - 160		
					330136	0 - 200		0 - 1600
					330137	0 - 250		
					330138	0 - 300		0 - 2500
					330139	0 - 400		
					330140	0 - 500		
					330141	0 - 600		0 - 4000

IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES, TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

THERMOMETERS

MAKE	CAT. NO.	P/N	RANGE	FILL	DESCRIPTION
------	----------	-----	-------	------	-------------

POCKET THERMOMETERS

BACHARACH	3317	12-5013C	-45/+50°C	Red Spirit	Glass Yellow b'ground, Metal Case & clip.
	3318	12-5013B	-45/+50°C	Mercury	"
	3311	14781	-30/+50°C	Mercury	Glass White b'ground, Pocket tube & clip.
ROBINAIR	3312	14782	-10/+110°C	Mercury	"
	3313	14681	-30/+50°C	Red Spirit	"
	3314	14682	-10/+110°C	Red Spirit	"
	33174	M10620	-40/+60°C	Red Spirit	Metal Case & Clip 135mm (5-5/16") long
ZEAL	33175	M10621	0/+60°C	"	"
	33176	M10622	-10/+110°C	"	"
	33177	M10623	-40/+140°F	"	"
	33178	M10624	+30/+140°F	"	"
	33179	M10625	+30/+220°F	"	"
	33180	P10620	-40/+60°C	"	Plastic Case & Clip 135mm (5-5/16") long
	33181	P10621	0/+60°C	"	"
	33182	P10622	-10/+110°C	"	"
	33183	P10623	-40/+140°F	"	"
	33184	P10624	+30/+140°F	"	"
	33185	P10625	+30/+220°F	"	"
	33196	M10630	-30/+50°C	Mercury	Metal Case & Clip 135mm (5-5/16") long
	33197	M10631	0/+60°C	"	"
	33198	M10632	-10/+110°C	"	"
	33199	M10633	-20/+120°F	"	"
	331100	M10634	+30/+140°F	"	"
	331101	M10635	+30/+220°F	"	"
	331103	P10630	-30/+50°C	"	Plastic Case & Clip 135mm (5-5/16") long
	331104	P10631	0/+60°C	"	"
	331105	P10632	-10/+110°C	"	"
	331106	P10633	-20/+120°F	"	"
	331107	P10634	+30/+140°F	"	"
	331108	P10635	+30/+220°F	"	"

DIAL THERMOMETERS - POCKET TYPE

DOBBIE	33117	PT50	-40/+70°C		1" Dial 5" Stem. Pocket tube & Clip.
ROBINAIR	33113	40859	-40/+160°F		"
	33114	10599	0/+220°F		"
ZEAL	33282	MC25	-10/+110°C		"

DIAL THERMOMETER - WITH ADJUSTABLE CLAMP

DOBBIE	33115	GT100	0/+250°C		1 1/2" Dial, Tel-Tru.St. Steel, 8" Stem.
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ROOM OR WALL MOUNTED THERMOMETERS

ZEAL	33289	12283	0/+50°C	Red Spirit	222x51x19mm Plastic Frame.
	33291	12083	-40/+60°C	"	200x35x10 Plastic Frame. Refrig. Use
	33286	12319	+10/+220°C	Mercury	Confectionery Application.

GENERAL & SPECIAL PURPOSE THERMOMETERS

ZEAL	33193	10530	-10/+110°C	Mercury	Stirring Rod Type. 305mm (12") long
	33194	10531	-10/+250°C	"	"

NOTE: Where °F type Thermometers only are listed above, ask for °C type equivalents when ordering.

OTHER RANGES AND TYPES ALSO AVAILABLE ON REQUEST

Illustration Reference

1. Robinair Pocket Thermometer
2. Robinair Dial Pocket Thermometer
3. Zeal Pocket Thermometer Dial
4. Dobbie Adjustable Clamp for attaching to side of vessel or resting on flat surface
5. Zeal Wall Mounted Thermometer
6. Zeal Stirring Thermometer with reinforced tip

HYGROMETERS & SLING PSYCHROMETERS

BACHARACH SLING PSYCHROMETER

Indicates accurately the percent of relative humidity without reference to charts.

Features

- Slide rule construction quickly converts temperature to R. H.
- Built-in water reservoir holds sufficient water for several hours testing.
- Thin-bulb design gives fast thermal response.
- Thermometers are made of shock-resistant glass; stems have deep-etched numerals and 1° scale divisions for easy reading.
- Designed for portability.

This unique Sling Psychrometer accurately determines percent relative humidity without necessity of consulting complex tables. A water reservoir eliminates the need to



wet the wick each time a reading is taken. It can be whirled freely. A built-in slide rule calculator correlates wet and dry bulb thermometer indications for direct reading of R. H. measurement. Thermometer case telescopes in to handle for protection when not in use.

Applications

Measurement of comfort conditions in air conditioned environments, hospital operating rooms, etc.

Tests in industrial atmospheres where high or low humidity may be critical in manufacturing processes.

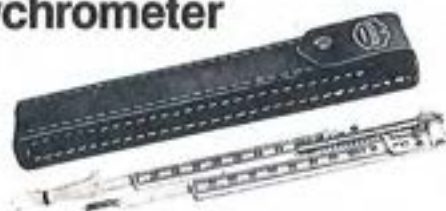
School Athletic Departments use it to determine safe conditions for practice.

CAT. NO.	BACHARACH CODE NO.	TEMP. RANGE	FILL	Spare Part — Thermometer	
				CAT. NO.	CODE NO.
33131	12 - 7013	-5 to +50°C	MERCURY	33129	12 - 0265



Used to determine relative humidity. Has quality mercury thermometers with magnifying lenses. Leatherette case and complete instructions included.

Weksler sling psychrometer



ROBINAIR
NO. 12149

CAT. NO.
33123



Kane-May

KM450 The versatile, low cost, digital electronic thermometer.

With a four probe choice for solids, semi-solids, gases, liquids, or powders.

The new Kane-May KM450 with a low price that means good, accurate thermometers no longer have to be shared or restricted.

POCKET SIZE

The KM450 accepts four different probes —. Simply plug in the appropriate probe, switch on, and you can measure the temperature of gases, liquids, powders, solids or semi-solids. 12.5 mm high numbers ranging from -30°C to 450°C. With 1°C accuracy, resolution and repeatability. And automatic battery-life warning.



CAT. NO.	TYPE	DESCRIPTION
33295	KM450	DIGITAL THERMOMETER
33296	KA1/45	Air/Liquid Probe
33297	KS1/45	Surface Probe
33298	KC1/45	Chisel Probe
33299	KA5/45	Smoke Probe
332100	KP1/45	PTFE Thermocouple of 1 metre length

TEMPERATURE MEASUREMENT	
Range	-30°C to 450°C
Digital display	High contrast 12.5 mm Liquid Crystal Display. Minus sign automatically indicates sub-zero temperature.
Resolution	1°C
Instrument accuracy at ambient temperature of 23°C (±5°C)	Readings above -10°C ±0.7% of reading ±1°C At -30°C ±1.5°C error (typical)
Repeatability	±1°C
Ambient temperature operating range	0°C to 45°C
Typical temperature coefficient (of reading)	±0.015% per °C
Accuracy of cold junction compensation	±1°C
Battery type	9 volt dry battery type PP3
Battery life	160 hours
Automatic battery test	Warning symbols automatically displayed when battery replacement necessary.
Dimensions and weight	115 x 70 x 38 mm, 140 g with battery.

HYGROMETERS & SLING PSYCHROMETERS

BACHARACH SLING PSYCHROMETER

Indicates accurately the percent of relative humidity without reference to charts.

Features

- Slide rule construction quickly converts temperature to R. H.
- Built-in water reservoir holds sufficient water for several hours testing.
- Thin-bulb design gives fast thermal response.
- Thermometers are made of shock-resistant glass; stems have deep-etched numerals and 1° scale divisions for easy reading.
- Designed for portability.

This unique Sling Psychrometer accurately determines percent relative humidity without necessity of consulting complex tables. A water reservoir eliminates the need to



wet the wick each time a reading is taken. It can be whirled freely. A built-in slide rule calculator correlates wet and dry bulb thermometer indications for direct reading of R. H. measurement. Thermometer case telescopes in to handle for protection when not in use.

Applications

Measurement of comfort conditions in air conditioned environments, hospital operating rooms, etc.

Tests in industrial atmospheres where high or low humidity may be critical in manufacturing processes.

School Athletic Departments use it to determine safe conditions for practice.

CAT. NO.	BACHARACH CODE NO.	TEMP. RANGE	FILL	Spare Part — Thermometer	
				CAT. NO.	CODE NO.
33131	12 - 7013	-5 to +50°C	MERCURY	33129	12 - 0265



Used to determine relative humidity. Has quality mercury thermometers with magnifying lenses. Leatherette case and complete instructions included.

Weksler sling psychrometer



ROBINAIR
NO. 12149

CAT. NO.
33123



Kane-May

KM450 The versatile, low cost, digital electronic thermometer.

With a four probe choice for solids, semi-solids, gases, liquids, or powders.

The new Kane-May KM450 with a low price that means good, accurate thermometers no longer have to be shared or restricted.

POCKET SIZE

The KM450 accepts four different probes —. Simply plug in the appropriate probe, switch on, and you can measure the temperature of gases, liquids, powders, solids or semi-solids. 12.5 mm high numbers ranging from -30°C to 450°C . With 1°C accuracy, resolution and repeatability. And automatic battery-life warning.



CAT. NO.	TYPE	DESCRIPTION
33295	KM450	DIGITAL THERMOMETER
33296	KA1/45	Air/Liquid Probe
33297	KS1/45	Surface Probe
33298	KC1/45	Chisel Probe
33299	KA5/45	Smoke Probe
332100	KP1/45	PTFE Thermocouple of 1 metre length

TEMPERATURE MEASUREMENT	
Range	-30°C to 450°C
Digital display	High contrast 12.5 mm Liquid Crystal Display. Minus sign automatically indicates sub-zero temperature.
Resolution	1°C
Instrument accuracy at ambient temperature of 23°C ($\pm 5^{\circ}\text{C}$)	Readings above -10°C $\pm 0.7\%$ of reading $\pm 1^{\circ}\text{C}$ At -30°C to 150°C error (typical)
Repeatability	$\pm 1^{\circ}\text{C}$
Ambient temperature operating range	0°C to 45°C
Typical temperature coefficient (of reading)	$\pm 0.015\%$ per $^{\circ}\text{C}$
Accuracy of cold junction compensation	$\pm 1^{\circ}\text{C}$
Battery type	9 volt dry battery type PP3
Battery life	150 hours
Automatic battery test	Warning symbols automatically displayed when battery replacement necessary.
Dimensions and weight	115 x 70 x 38 mm. 140 g with battery.

THERMOMETERS

FLOYD



SPECIFICATION			
ACTUATION :	Vapour Pressure system.	CASE :	Metal.
FINISH :	Satin Black - Chrome Bezel.	DIAL :	White - Black Figures.
BOURDON :	Phosphor Bronze.	MOVEMENT :	Brass.
FITTINGS :	Plain Bulb - N.P.	CAPILLARY :	Copper - N.P.
ACCURACY :	± 1% for final 2/3 scale. ± 2% for first 1/3 scale.		

CAT. No.	SIZE	MOUNTING	RANGE	CAP. LENGTH
33235	2" (50 mm)	Flush Dial	-40 to +30°C	6 ft. (1.8 m)
33236	4" (100 mm)	Flush Dial		6 ft. (1.8 m)
33237	2" (50 mm)	Rear Flange		6 ft. (1.8 m)
33238	4" (100 mm)	Rear Flange		10 ft. (3 m)
33239	4" (100 mm)	Rear Flange		25 ft. (7.6 m)

ROBINAIR SERVICEMAN TYPE THERMOMETER

This expansion bulb thermometer is used to take remote temperature readings from -25 to +35°C. Its features include a 1.5 m (5 ft.) flexible lead and 2 1/4" dial.

Robinair P/N 12078

CAT. NO. 33219

TEDDINGTON ALL CHROME THERMOMETER

4" diam. Dial — Range -40 to +40°C. Chrome plated case, back flange mounting, 3 m (10 ft.) capillary with bottom entry.

Type No. KDA/B/22

CAT. NO. 33215

ZEAL Slim-Line VAPOUR PRESSURE

REFRIGERATION DIAL THERMOMETERS
DUAL SCALE

SPECIFICATIONS

CASE :	Pressed steel, finished matt black.
BEZEL :	Chromium plated brass.
DIAL :	White — inner °F Scale Black, outer °C Scale Red.
CAPILLARY :	3 m (10 ft.)
BULB :	Bright finish brass 83mm (3 1/4") long x 13mm (1/2") diam.
SCALES :	-40 to +90°F and -40 to +30°C.



The latest addition to the increasingly popular 'Slim-Line' range of Dial Indicating Thermometers. Designed specially for the Refrigeration Industry after intensive research, the three basic patterns incorporate features considered essential by the Industry. Strong, robust construction — top quality materials and workmanship — accurate.



CAT. NO.	PART No.	DIAL SIZE	TYPE OF CASE
33274	RV50PF	51 mm (2")	Flush mounting case
33275	RV100PF	102 mm (4")	Flush mounting case
33276	RV100FB	102 mm (4")	Flanged back case

ZEAL BEER AND WINE HYDROMETER

FOR THE AMATEUR BREWER AND WINE MAKER

These designs, developed specially for the Amateur Brewer and Wine Maker after exhaustive laboratory tests and field trials, are ideally suited for use in the very popular hobby of Home Brewing and Wine Making. The bold, clear scales makes the taking of readings simplicity itself and, although not unbreakable, their plastic construction makes them more robust than the traditional glass hydrometers.



BEER HYDROMETER SPECIFICATIONS

Hydrometer Body	Blue polystyrene.
Scale	White polystyrene with black figures and graduations.
Range	0.990/1.100° Specific Gravity. Sub-divided every 0.005°, figured every 0.050° and 0/13% Potential Alcohol by Volume, sub-divided every 1% figured every 5%. Calibrated every 15.6°C (60°F).
Container	Packed in individual cylindrical translucent blue plastic containers.
Instructions	Full instructions for use are supplied with each instrument.
Dimensions (approx.)	
Hydrometer length	232 mm (9-1/8")
Hydrometer width	19 mm (3/4")
Scale length	110 mm (4-5/16")
Body length	122 mm (4-3/16")
Container length	248 mm (9-3/4")
Container diameter	25 mm (1")
Weight (approx.)	
Hydrometer	22 g (3/4 oz.)
In carton	44 g (1-1/2 ozs.)

ZEAL
PART NO.
15463
CAT. NO.
33287

WINE HYDROMETER SPECIFICATIONS

Hydrometer Body	Red polystyrene.
Scale	White polystyrene with black figures and graduations.
Range	0.990/1.150° Specific Gravity. Sub-divided every 0.005°, figured every 0.050° and 0/20% Potential Alcohol by Volume, sub-divided every 1% figured every 5%. Calibrated at 15.6°C (60°F).
Container	Packed in individual cylindrical translucent blue plastic containers.
Instructions	Full instructions for use are supplied with each instrument.
Dimensions (approx.)	
Hydrometer length	232 mm (9-1/8")
Hydrometer width	19 mm (3/4")
Scale length	110 mm (4-5/16")
Body length	122 mm (4-3/16")
Container length	248 mm (9-3/4")
Container diameter	25 mm (1")
Weight (approx.)	
Hydrometer	22 g (3/4 oz.)
In carton	44 g (1-1/2 ozs.)

ZEAL
PART NO.
15461
CAT. NO.
33288

333 AMPERE, VOLTAGE & RESISTANCE METERS 50 CYCLE A.C.

KEW SNAP 4 AC Volt-Ohm-Ammeter



The instrument can measure leakage current as it is especially designed for measurement of AC current from 2mA to 300A.

Model 2401
Model 2411

	Model 2411	Model 2401
Ranges:	AC Current 100/500mA/10/100/300A	
AC Voltage	800V	
Resistance	1 kΩ (150 at mid-scale)	
Accuracy:	AC Current Within ±3% of full scale value	
AC Voltage	Within ±3% of full scale value	
Resistance	Within ±3% of scale length	
Dimensions:	200L x 87W x 30D mm	200L x 87W x 30D mm
Weight:	Approx. 440g	Approx. 400g
Conductor Size:	40mm max.	45mm max.

KEW SNAP 5 AC Volt-Ammeter



Clamp meter with the meter compartment that snaps into five different positions for a 360 degree rotation.

Model 2501
Model 2505

	Model 2501 Formerly Snap-5 A1	Model 2505
Ranges:	AC Current 500A	15/50/300A
AC Voltage	150/300/600V	150/300V
Accuracy:	AC Current Within ±3% of full scale	
AC Voltage	Within ±3% of full scale	
Dimensions:	180L x 65W x 30D mm	
Weight:	Approx. 340g	
Conductor Size:	20mm max. outside diameter	

KEW SNAP 8 AC Volt-Ohm-Ammeter



Rotary scale clamp meters that permit quick and accurate measurements without reading error.

Model 2803

	Model 2803 Formerly 830
Ranges:	AC Current 5/15/40/100/300A 50/10/1000A in ranges with 40/10/1000A
AC Voltage	150/300/600V
Resistance	2kΩ (150 at mid-scale)
Accuracy:	AC Current Within ±3% of full scale
AC Voltage	Within ±3% of full scale
Resistance	Within ±3% of scale length
Dimensions:	214L x 87W x 30D mm
Weight:	Approx. 440g
Conductor Size:	30mm max. outside diameter

KEW SNAP 10 AC Volt-Ohm-Ammeter



Rotary scale clamp meter that permits quick and accurate measurements without reading error.

Model 2103

	Model 2103 Formerly 1030
Ranges:	AC Current 10/30/100/300/1000A
AC Voltage	150/300/150V
Resistance	2kΩ (150 at mid-scale)
Accuracy:	AC Current Within ±3% of full scale
AC Voltage	Within ±3% of full scale
Resistance	Within ±3% of scale length
Dimensions:	200L x 87W x 45D mm
Weight:	Approx. 880g
Conductor Size:	50mm max. outside diameter

KEW SNAP 9 Volt-Ohm-Ammeter



Rotary scale clamp meters that permit quick and accurate measurements without reading error. Readings are presented on one scale only at a time reducing the possibility of error.

Model 2904

Model 2903

	Model 2904	Model 2903 Formerly Model 930
Ranges:	AC Current 15/30/100/300/900A	15/30/1150V
AC Voltage	150/300/150V	
Resistance	2kΩ (150 at mid-scale)	
Accuracy:	AC Current Within ±3% of full scale	
AC Voltage	Within ±3% of full scale	
Resistance	Within ±3% of scale length	
Dimensions:	270L x 73W x 33D mm	230L x 77W x 45D mm
Weight:	Approx. 460g	Approx. 560g
Conductor Size:	50mm max. outside diameter	40mm max. outside diameter

KEW SNAP 777 AC Volt-Ohm-Ammeter



Digital Clamp Meter

Model 2001

	Model 2001
Ranges:	AC Current 1/500A (200V/1000A, 2 ranges automatic)
AC Voltage	750V (200V/150V, 2 ranges automatic)
Resistance	2/200Ω (200Ω/2000Ω, 2 ranges automatic)
Accuracy:	AC Current Within ±1.5% of full scale (200A & 1000A) Within ±2% of full scale (1/500A) between 750A and 1000A
AC Voltage	Within ±1% of full scale (200V & 750V)
Resistance	Within ±1.5% of full scale (200Ω & 2000Ω)
Flash Hold	Within ±3% of full scale on all ranges except for ohm ranges (accuracy guaranteed for 30 seconds)
Dimensions:	214L x 77W x 36D mm
Weight:	Approx. 600g
Conductor Size:	50mm max. outside diameter

KEW SNAP 6 AC Volt-Ohm-Ammeter



Model 2606 and 2607 have tear-drop shaped transformer jaws for maximum ease of use in tight places or crowded switch boxes.

Model 2606



Clamp meter with a swivel meter compartment that snaps into five different positions for a 360 degree rotation.

Model 2605

	Model 2606	Model 2607	Model 2605 (Formerly Model 630)	Model 2604 (Formerly Model 620)
Ranges:	AC Current 5/15/40/100A	15/40/100/300A	15/40/300A	5/25/125A
AC Voltage	150/300/600V		150/300V or 300/600V	
Resistance	15kΩ (150Ω at mid-scale)		300Ω (150Ω at mid-scale)	
Temperature	-20°C to +150°C (Model 2606, 2607 only) (Optional temperature probe Model 7041 required)			
Accuracy:	AC Current Within ±3% of full scale			
AC Voltage	Within ±3% of full scale			
Resistance	Within ±3% of scale length			
Temperature	Within ±5°C (+20°C to +100°C) Within ±10°C (other ranges)			
Dimensions:	180L x 65W x 27D mm		180L x 62W x 25D mm	
Weight:	Approx. 250g		Approx. 250g	
Conductor Size:	33mm max. outside diameter		20mm max. outside diameter	

KEW SNAP

CAT. NO.	SIZE	MODEL
3331	4	2401
3332	5	2411
33325	5	2501
		2505
33326	6	2606
		2607
3333	8	2803
33324	9	2903
33323	10	2904
33322	777	2103
		2001

ACCESSORIES

CAT. NO.	DESCRIPTION
33313	Fuse Carrier
33314	Test Lead
33315	Fuse/Battery & Carrier Kit
33316	Leather Case (Size 8)

ANNIE ANALYSERS AND TESTERS



A-12X



A-2X



A-20



A-8X



A-14

CAT. NO.	DESCRIPTION/SPECIFICATIONS
3343	MODEL A-12X COMPLETE HERMETIC UNIT & ELECTRICAL SYSTEMS ANALYSER — AMP/VOLT/OHM METER — 220/250 VOLT Rocks free stuck or frozen units by reversing motor rotation. Functions as auxiliary capacitor, checks windings for shorts, opens, continuity and grounds. Has bank of starting capacitors, 3 ranges 75 to 380 MFD. Ammeter: 0 — 25 Amps, Dual scale. Voltmeter: 0 — 350V, Dual scale. Capacitor Analyser: 0 — 550 MFD, Dual scale. Ohmmeter: 0 — 200 ohms. Relay Analyser: 0 — 350 potential volts. Polyethylene Case: 12" x 12" x 5 1/2". Weight: 3.9 kg (8 1/2 lbs). Other Features: Neon power indicator, panel mounted breaker.
33421	MODEL A-2X HERMETIC ANALYSER — 220/250 VOLT Economical Hermetic Analyser — Rocks free frozen or stuck units by reversing motor rotation. Checks windings for shorts, opens, continuity and grounds. Functions as auxiliary capacitor, with bank of starting capacitors, 3 Ranges 75 to 380 MFD. Three independent testing circuits. Polyethylene case: 11" x 9" x 5 1/2". Light Weight: 2.3kg (5 lbs). Other Features: Neon power indicator, panel mounted breaker.
33422	MODEL A3 HERMETIC UNIT & CAPACITOR ANALYSER — 240 VOLT Rocks free stuck or frozen units by reversing motor rotation. Checks windings for shorts, opens, continuity and grounds. Functions as auxiliary capacitor, with bank of starting capacitors, 3 ranges 75 — 380 MFD. Ammeter: 0 — 25 Amps, Dual scale. Capacitor Analyser: 0 — 550 MFD Dual scale. Voltmeter: 0 — 350V Dual scale. Polyethylene case: 11" x 9" x 5 1/2". Light weight: 2.4 kg (5 1/2 lbs). Other Features: Neon power indicator, panel mounted breaker.
33418	MODEL A-20 HIGH CAPACITY MULTI-PHASE HERMETIC ANALYSER FEATURES: Heavy duty reversing switch manually starts, reverses and runs hermetic units up to 15 HP. Stuck or frozen units can be rocked free. Low range battery operated ohmmeter identifies hermetic terminals for start, run and common. Also checks winding resistance and tests for shorts, opens, continuity and grounds. Bank of starting capacitors 50 — 350 MFD. Auxiliary test leads. High capacity 4 wire power cord with large clips. Three line indicating lamps identify hot legs for correct hook-up. Electrical Capacity: 1 Phase 50 Amps 7 1/2 HP, 3 Phase 50 Amps 15 HP, 110 — 277 Volts AC 50/60 Cycle. Polyethylene Case: 12" x 12" x 5 1/2". Weight: 5 kg (11 lbs).
3341	MODEL A-4X CAPACITOR TESTER — 220/250 VOLT 50 Hz. FEATURES: Checks capacitors for opens, shorts, leaks and grounds. Dual Scale Ranges, 0 — 60 MFD and 0 — 600 MFD. Can be used as continuity checker, and immediately identifies unmarked capacitors. Panel mounted fuse. Discharges at end of test. Polyethylene Case: 11" x 8" x 4 1/2". Lightweight: 1.25 kg (2 1/2 lbs).
3342	MODEL A-8X FOUR LOCATION ELECTRONIC THERMOMETER FEATURES: Used extensively for air conditioning/refrigeration service work. Thermistor controlled dual range, 4 locations, -45°C to 40°C and 40°C to 120°C. Complete with 2 general purpose probes with 4.5 m (15 ft.) lead. 4 input jacks for measuring temperature at 4 locations simultaneously. Polyethylene Case: 11" x 8" x 4 1/2". Lightweight: 1.5 kg (3 1/2 lbs).
33419	MODEL A-15X HIGH TEMPERATURE ELECTRONIC THERMOMETER. FEATURES: Thermocouple probe — 20°C to 700°C — 1.2 m (4 ft.). Probe easily used in self-cleaning ovens — easily detachable for multiple readings. Polyethylene Case: Compact, will fit in tool box.
33417	MODEL A-14 MICRON VACUUM GAUGE FEATURES: Temperature compensation control from 4°C to 50°C. Meter reads from atmosphere down to 10 microns — Relates microns and inches to 29.92" Hg. Graduations in inches, millimetres and microns. Range: inches to 10 microns. Polyethylene Case: 11" x 8" x 4 1/2". Lightweight: 1.4 kg (3 lbs).

ACCESSORIES

CAT. NO.	PART NO.	DESCRIPTION — USED IN MODELS	CAT. NO.	PART NO.	DESCRIPTION — USED IN MODELS
33424	2G051	Master Switch A2, 3, 12.	33436	PJ-1	Phono Jack A8
	HD-1	Master Switch A20	33461	CAP108	Capacitor 108 MFD A2, 3, 12, 20
33425	GH281	Capacitor Switch All Hermetic Units		CAP189	Capacitor 189 MFD A2, 3, 12, 20
33423	100-S	Start Switch A2, 3, 12	33441	M1-A	Amp Meter A3, 12
	100-L	Start or Test Switch A4	33442	M1-O	Ohm Meter A3, 12
	2FC63	Selector Switch A4	33443	M1-V	Volt Meter A3, 12
	2GGP50	Function Switch A12		A-15	Hi-Temp Meter A15
	2GM60	Volt Scale Switch A12		M3-T	Temp. Meter A8
33429	RS6-2	Rotary Switch A8		M3-V	Vacuum Meter A14
33426	RA8-2	Rocker Assembly Board	33440	M4-O	Ohm Meter A4, 20
33427	OHM-1	Ohms Control	33439	M5-TC	Temp. Meter 3 Volt A8
33430	MG70K	Voltage Control A12	3345	P-1	15' General Purpose Probe
33449	TR-120/240	Transformer-Relay A12	3347	P-2	30' " " " "
33448	TR-10	Transformer - Current A4, 12	3348	P-3	15' Air Probe
	CB-1	Circuit Breaker A2, 3, 12	3349	P-4	30' " " " "
	BG70-R	Neon Lamps, Red, Amber, A or C		P-30x	30' Probe Extension Cable
	TS-4	Diode. All Models		HT-3	3' Disposable Probe A15
33455	PC1-2	Power Cord A4	33414	HT-4	4' Standard Probe A15
	PC2-3	Power Cord A2, 3, 12	33410	S1	Sensor Element A14
33456	LC1-2	Lead Cable A14	3344	ABC-30	Fuses (box 5) A3, 12
	CA-220	Cord Adaptor A2, 3, 12	33413	ABC-20	Fuses (box 5) All other Mods.
33437	B175	Battery Holder A8, 12		HKP	Fuse Holder All Models
	B176	Battery Holder A14			

BACHARACH PORTABLE INSTRUMENTS

TEMPSCRIBE RECORDERS

CATALOGUE NUMBER SUMMARY PAGE FOR ORDERING PURPOSES

REMOTE TEMP. RECORDING With Bulb Type Element		TIME OPERATION RECORDING With Electro-Magnet Element		ON LOCATION TEMP. RECORDING With Bi-Metal Element		TEMP. & TIME RECORDER With Bulb Type Element & Electro-Magnet Element	
BACH. CODE NO.	CAT. NO.	BACH. CODE NO.	CAT. NO.	BACH. CODE NO.	CAT. NO.	BACH. CODE NO.	CAT. NO.

COMPLETE RECORDERS

14-2211 *	335314	14-3611		14-1011	335337	14-3311	
14-2311 *	335315			14-1211	335338	14-3211	
14-2411 *	335316			14-1511	335339	14-3011	
14-2511 *	335317			14-1711	335340	14-2911	
14-2611	335318			14-2011	335341		
14-2711	335319			14-2111	335342		
14-2791	335320			14-2191	335343		
14-2210 *	335321			14-1010	335344		
14-2410 *	335322			14-1201	335345		
14-2610	335323			14-1501	335346		
14-2710	335324			14-1910	335347		
14-2790	335325						
14-4005	33511						

DOOR WITH ELEMENT

14-7025 *	335302	14-7033		14-7015	335326	14-7038	
14-7019 *	335303			14-7006	335327	14-7039	
14-7020 *	335304			14-7008	335328	14-7040	
14-7021 *	335305			14-7010	335329	14-7041	
14-7022	335306			14-7012	335330		
14-7023	335307			14-7013	335331		
14-7067	335308			14-7016	335332		
14-7024	335309						

CHART DRIVE CASE

14-7031	335300	14-7031	335300	14-7031	335300	14-7031	335300
14-7030	335301			14-7030	335301		

CHARTS (BOX OF 100)

14-0075 **	335351	14-0062		14-0045	335363	14-0082	
14-0070 **	335352			14-0048	335364	14-0083	
14-0069 **	335353			14-0051	335365		
14-0071 **	335354			14-0054	335366		
14-0091	335355			14-0057	335367		
14-0090	335356			14-0058	335368		
14-0088	335357			14-0089	335369		
14-0068 **	335358			14-0044	335370		
14-0080 **	335359			14-0047	335371		
14-0101	335360			14-0050	335372		
14-0207	335361			14-0066	335373		
14-0092	335362						
14-0076							

ACCESSORIES

CODE NO.	CAT. NO.	DESCRIPTION	MANOMETER FLUID	
14-0009	33529	Bottle of Red Ink.	Bottle Manometer Fluid	CAT. NO. 3351
14-4065		Carrying Case.	Dwyer Red Gauge Fluid	CAT. NO. 33569
14-0016	33550	Replacement Pens.	40z. Jars.	

TEMPSCRIBE RECORDERS — For Selection and Technical Details Refer Pages 335-a & 335-b.

- * °F units available ex overseas on special application.
 ** Some °F Charts are still available ex stock. Non stock °F Charts can be supplied against a minimum order quantity of 500.
 To obtain this service you must supply an unused sample chart in FLAT (not folded) condition.

OUR COMPLETE INVENTORY ASSURES PROMPT SERVICE

BACHARACH PORTABLE INSTRUMENTS

TEMPSCRIBE CHART RECORDER

Interchangeable chart drives and measuring elements
for 26 standard combinations.

FEATURES

- * Convenient size.
- * Measures temperatures between -30°C and $+50^{\circ}\text{C}$ (-30°F and 130°F).
- * Styled for portable use or wall mounting.
- * Accurate, dependable and reasonably priced.
- * Modular design; chart drives and measuring elements completely interchangeable.
- * Self-contained; all chart drives powered by spring-wound clocks.

APPLICATION

Tempscribe Recorders make permanent, accurate chart records of temperatures or operation of electrical equipment. The chart records are written automatically and continuously without requiring the presence of an observer; they provide facts which will lead to product improvement, economical operation, greater safety and better service.



19 INTERCHANGEABLE MEASURING ELEMENTS 2 INTERCHANGEABLE CHART DRIVES

The Tempscribe Recorder consists of two basic assemblies: the back case containing the chart drive; and the front case, or door, containing the measuring element. The door is hinged to the back case, and removal of the door merely requires lifting out the hinge pin. Any door may be assembled with any back case. This unique design enables the user to transfer or interchange the measuring elements in the various types of Tempscribe Recorders. Thus it is possible to replace any temperature element with another or to interchange a temperature element with the electro-magnet element for time-operation records. Tempscribes are now available in 26 popular combinations of measuring elements and chart drives for time-operation records and temperature records. These combinations include various temperature spans within limits of -30°C to $+50^{\circ}\text{C}$ and -30°F to 130°F and time spans of 24 hours or 7 days for one chart rotation.



BI-METAL ELEMENT
for on-location
temperature records



BULB ELEMENT
for remote
temperature records



TWO-PEN-ELEMENT
for temperature
and operation records



**ELECTRO-MAGNET
ELEMENT**
for time-operation records

6

TEMPSCRIBE RECORDER WITH BULB-TYPE ELEMENT

Recommended for remote temperature recording
Element comprises temperature-sensitive bulb and 6 ft.
capillary tubing which transmits temperature impulse from

bulb to recorder. Place recorder at any convenient viewing
point. Makes 7-day or 24-hour temperature time record
showing occurrence and duration of temp. fluctuations.
Standard capillary tube is 6 ft.

TEMPERATURE RECORDER WITH BULB-TYPE ELEMENT

Chart Rotation	Case With Spring Chart Drive Including Bottle of Ink	Time Division	Chart			Bacharach Code Door With Bulb-Type Element, 6' Capillary Tubing and Mounting Reel	Bacharach Code Nos. for Complete Kit Including Case, Door, Mounting Reel, 100 Charts, Bottle of Ink	CAT. NO. Complete Kit
			Temp. Division	Bacharach Code Box of 100 Charts	Range			
24 Hours	14-7031	15 Minutes	5°F	14-0075**	-30 to $+120^{\circ}\text{F}$	14-7025*	14-2211*	335314
			2°F	14-0070**	-30 to $+50^{\circ}\text{F}$	14-7019*	14-2311*	335316
			2°F	14-0069**	$+10$ to $+90^{\circ}\text{F}$	14-7020*	14-2411*	335316
			2°F	14-0071**	$+50$ to $+130^{\circ}\text{F}$	14-7021*	14-2511*	335317
			1°C	14-0081	-35 to $+10^{\circ}\text{C}$	14-7022	14-2611	335318
			1°C	14-0080	$+5$ to $+50^{\circ}\text{C}$	14-7023	14-2711	335319
			2°C	14-0088	-30 to $+50^{\circ}\text{C}$	14-7067	14-2791	335320
7 Days	14-7030	3 Hours	5°F	14-0068**	-30 to $+120^{\circ}\text{F}$	14-7025*	14-2210*	335321
			2°F	14-0080**	$+10$ to $+90^{\circ}\text{F}$	14-7020*	14-2410*	335322
			1°C	14-0101	-35 to $+10^{\circ}\text{C}$	14-7022	14-2610	335323
			1°C	14-0207	$+5$ to $+50^{\circ}\text{C}$	14-7023	14-2710	335324
			2°C	14-0092	-30 to $+50^{\circ}\text{C}$	14-7067	14-2790	335325

* $^{\circ}\text{F}$ units available ex overseas on special application.

** Some $^{\circ}\text{F}$ Charts are still available ex stock. Non stock $^{\circ}\text{F}$ Charts can be supplied against a minimum order quantity of 500.
To obtain this service you must supply an unused sample chart in FLAT (not folded) condition.

BACHARACH PORTABLE INSTRUMENTS

TEMPSCRIBE RECORDER WITH BULB-TYPE ELEMENT — Cont'd.

BIOLOGICAL REFRIGERATION RECORDER; PLASMA & WHOLE BLOOD STORAGE MODELS

Chart Rotation	Case With Spring Chart Drive Including Bottle of Ink	Chart			Range	Bacharach Code Door with Bulb-Type Element, and 10' Capillary Tubing	Bacharach Code Nos. for Complete Kit including Case, Door, 100 Charts, Bottle Ink	CAT. NO. Complete Kit
		Time Division	Temp. Division	Bacharach Code Box of 100 Charts				
7 Days	14-7030	3 Hours	1°C	14-0076	-5 to +15°C	14-7024	14-4005	

See also Code Nos. 14-2610 and 14-2611 previous page.

Accessories for all Tempscribe Instruments: Extra Bottle of Red Ink (14-0009). Optional Carrying Case (14-4065).

TEMPSCRIBE RECORDER WITH ELECTRO - MAGNET ELEMENT

Recommended for recording electrical operation.

This time-operation Recorder is suitable for recording operation carried out by interrupting an electric circuit. When the circuit to the magnet is closed, the pen arm connected to the magnet is actuated and moves the pen across the chart about 1/4" to the "on" position on the chart. It remains there as long as the circuit is energized. When the current is cut off, the spring-loaded pen arm returns to its "off" position.

The chart record produced shows time, frequency and duration of electrical operation.

Leads are provided for connection in parallel with the load across the line to the electrical unit under test. This style has two separate connections — for 110/220 volts AC/DC and for 25-volts AC/DC.

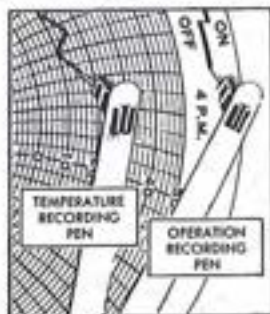
Electrical Connection	Chart Rotation	BACHARACH CODE				Chart Time Division	Parallel Connection Voltage Rating AC/DC
		Complete Recorder	Door with Electro-Magnet Element	Case with Chart Drive	Box of 100 Charts		
Parallel	24 Hours	14-3611 CAT.NO.	14-7033	14-7031	14-0062	15 Minutes	110/220 Volt Plug: 80 V. Min. 230 V. Max. 12/25 Volt Plug: 8.5 V. Min. 25 V. Max.

ON LOCATION TEMPERATURE RECORDING — TEMPSCRIBE RECORDER WITH BI-METAL ELEMENT

Recommended for on-location temperature recording.

A bi-metallic coil directly exposed to surrounding air permits up to 7-day temperature-time record. This record shows highest and lowest temperature, duration of extremes, frequency and spread of fluctuations. Thermal response is fast and dependable.

Chart Rotation	Case With Spring Chart Drive	Chart			Range	Bacharach Code Door With Bi-Metal Element	Bacharach Code for Complete Recorder including Case, Door, 100 Charts Bottle of Ink	CAT. NO. Complete Kit
		Time Division	Temp. Division	Bacharach Code Box of 100 Charts				
24 Hours	14-7031	15 Minutes	5°F	14-0045**	-30 to +120°F	14-7015*	14-1011*	335337
			2°F	14-0048**	-10 to + 50°F	14-7006*	14-1211*	335338
			2°F	14-0051**	+40 to +100°F	14-7008*	14-1511*	335339
			2°F	14-0054**	+70 to +130°F	14-7010*	14-1711*	335340
			1°C	14-0057	-25 to + 10°C	14-7012	14-2011	335341
			1°C	14-0058	+ 5 to + 40°C	14-7013	14-2111	335342
7 Days	14-7030	3 Hours	2°C	14-0089	-30 to + 50°C	14-7016	14-2191	335343
			5°F	14-0044**	-30 to +120°F	14-7015*	14-1010*	335344
			2°F	14-0047**	-10 to + 50°F	14-7006*	14-1210*	335345
			2°F	14-0050**	+40 to +100°F	14-7008*	14-1510*	335346
			2°C	14-0066	-30 to + 50°C	14-7016	14-1910	335347



TEMPSCRIBE RECORDER WITH BULB-TYPE ELEMENT & ELECTRO-MAGNET ELEMENT

Recommended for recording temperatures & electrical operation simultaneously.

This Tempscribe Recorder writes records of temperatures and electrical operation simultaneously on the same chart. Construction and design of the two measuring systems are identical to those of the respective single pen recorders. Two styles are available; the electrical operation element can be obtained in either series or parallel connection.

Electrical Connection	Chart Rotation	Case With Spring Chart Drive	Chart			Range	Bacharach Code Door With Bulb Type and Electro-Magnet Element and 6' Capillary Tubing and Mounting Reel	Bacharach Code Complete Recorder including Case, Door, Mounting Reel 100 Charts Bottle of Ink	CAT. NO. Complete Kit.
			Time Division	Temp. Division	Bacharach Code Box of 100 Charts				
Parallel	24 Hours	14-7031	15 Minutes	2°F	14-0082	-30 to + 50°F	14-7038	14-3311	
					14-0083	-30 to +120°F	14-7039	14-3211	
Series	24 Hours	14-7031	15 Minutes	2°F	14-0082	-30 to + 50°F	14-7040	14-3011	
					14-0083	-30 to +120°F	14-7041	14-2911	

* °F units available ex overseas on special application.

** Some °F Charts are still available ex stock. Non stock °F Charts can be supplied against a minimum order quantity of 500. To obtain this service you must supply an unused sample chart in FLAT (not folded) condition.

ORDERING PROCEDURE : REFER TO PAGE 335 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

BACHARACH PORTABLE INSTRUMENTS

FLORITE AIR VELOCITY METER MODELS MRF AND MLD

Obtains accurate air velocity readings almost anywhere.

Features

- Instantaneous, direct readings of air velocity without timing or calculations.
- Scale lock holds reading until lock is released.
- Magnetic damping levels out insignificant variations in air velocity.
- The longest scale of any mechanical velocity meter.
- Chart converts air velocity readings to cubic feet per minute without calculations.

This instrument is simply held in the air stream, either in an open area or against the face of a flat-surfaced register, so that the air current is flowing directly into the face of the instrument. No stop watch, curves or calculations of any kind are necessary.

Model MRF features the longest scale (8") available on any mechanical air velocity meter. For added accuracy and recheck, a built-in scale lock retains readings when necessary. Florite automatically averages air velocity over an



area of 3" in diameter or square.

Model MLD is identical to Model MRF except for its scale range and "air scoop" inlet. Designed for measuring air flow from round or square ceiling diffusers having discharge openings of at least $\frac{1}{4}$ x 3 inches.

Applications

Measurement of grill velocities on heating and cooling installations to balance air distribution.

Measure air flow in experiments and lab work.

Measure air flow in connection with ceramics, textile and other manufacturing processes.

Measurement of surface wind velocities.

Measurement of velocity of cooling air through generators, motors, and electronic machinery.

Measurement of air velocities in testing ventilating systems in schools, hospitals, mines and factories.

Checking flow conditions of exhaust hoods and other fume removal equipment.

HOW TO ORDER :

CAT. NO.	Bacharach Code Complete Kit	Model	Range	Kit Includes	
				Grille Velocity Finder	Carrying Case
33512	16-7001	Florite MRF	0-1000 fpm	16-0107	16-0005
335376	16-7002		Dual Scale 0-3000 fpm 0-35 mph		
335377	16-7003		Dual Scale 0-300 meters per min. 0-5 meters per sec.		
335378	16-7004		Dual Scale 0-1000 meters per min. 0-16 meters per sec.		
33513	16-7005	Florite with Air Inlet Scoop MLD	0-2500 fpm		16-0006
335380	16-7006		0-750 meters per min.		

FLORET AIR VELOCITY INDICATOR

Features

- Can be used on floors and base-board registers and diffusers, side wall registers or any other air discharge opening.
- Instant readings from any held position.
- Entirely self-contained . . . needs no hose, probe or other auxiliary parts for measuring air velocity.
- Readings are in feet per minute or meters per second.

The Floret is the ideal pocket size air flow indicator for applications where readability to 50 ft./min. is adequate. It has many specific uses including checking air flow in clean rooms, fume hoods, refrigeration units, or any other air discharge opening. Can be used for checking air flow through openings as small as $\frac{1}{4}$ " diameter.

Pocket size air flow indicator.



The Floret can be held in any position while making a test. It gives direct readings instantly; no leveling or "zero balancing" required. Scale range: 0-1000 ft./min. Instrument size: $4\frac{1}{2}$ " high x $2\frac{1}{2}$ " wide x 1" deep. Supplied in pocket case.

Applications

Reach-in refrigerators, display cases, walk-in coolers, other types refrigeration units, spotting objectionable air movements in rooms, detecting leaks around doors and windows, checking air flow at registers, grills, diffusers and convectors, checking air flow over and through electronic equipment.

HOW TO ORDER :

CAT.NO.	Bacharach Code (Including Case)	Range
335381	16-7009	0-1000 fpm
33514	16-7010	0-300 meters per min.

BACHARACH PORTABLE INSTRUMENTS

AIR FILTER SERVICE INDICATORS

Monitors the performance of air filters to assure clean air and efficient operation of air conditioning equipment.

Features

- Maintains high air filtering efficiency.
- Reduces inspection and service costs.
- Dependable, trouble-free operation.
- Easy to install.
- Assures top performance of air conditioning systems.
- Field adjustable.
- Used in ships, aircraft and railroad cars.

Bacharach Air Filter Indicators are easy to install. They are particularly suitable for central heating and cooling systems, packaged air conditioners in stores and office buildings, room conditioners, unit ventilators and similar cooling and ventilating appliances.

A variety of models are available. Some with a visual



mechanical signal and others with both mechanical signal and electrical contacts for connection to remote circuits.

Applications

Use of these indicators guards the operating efficiency of an installation. They accurately sense and automatically signal when it is time to change the air filter. Filter replacement costs are minimized—washing of per-

manent-type filters is done only when necessary; replace-ment-type filters are never discarded too soon.

Bacharach Air Filter Indicator Model MRD is also used to assure minimum air velocity to comply with OSHA Regulations Part 1910.107 covering spray finishing using flammable and combustible materials.

CAT. NO.	Bach. Code Nos.	Model	Visual Mechanical	Signal Reset		Type of Mounting		Electrical Switch Contact Ratings			Application
				Manual	Auto-matic	Unit Source	Cast Alum. Housing	Contact Ratings of Mechanical Switches — Normally Open Amps	Contact Ratings of Models with Magnetic Mercury Bulb Switches — Normally Open Amps	Contact Ratings of Models with Magnetic Mercury Bulb Switches — Normally Closed Amps	
335385	18-7017	MDF	✓	✓		✓		No Contacts			Note 1
33518	18-7016	MEF	✓		✓	✓		26 VAC or DC Single Pole 0.25 amps			
335386	18-7015	MBF	✓	✓		✓		No Contacts			
33515	18-7004	MED	✓	✓		✓		No Contacts			Note 2
33516	18-7006	MND	✓	✓			✓	No Contacts			Note 3
335387	18-7005	MXE	✓	✓			✓	115VAC 4 amps. 230VAC 2 amps. 115VDC 2 amps. Single Pole			Note 4
33517	18-7009	MFD	✓	✓			✓		115VAC 0.30 115VDC 0.15 230VAC 0.15 230VDC 0.07		Note 5
335388	18-7013	MRD	✓	✓			✓			115VAC 1.0 115VDC 0.5 230VAC 0.5 230VDC 0.25	Note 6

APPLICATION NOTES

- NOTE 1: Domestic heating and air conditioning applications. May be single connected or differentially connected across filter. See tabulation for self resetting features and remote signal capability. Range of adjustment : 0.10" to 1.0" W.
- NOTE 2: Domestic heating and air conditioning applications. Single connection downstream of filters only.
- NOTE 3: General applications. Adjustable for suction pressure differentials between 0.06 and 3.5" W.
- NOTE 4: Industrial and commercial applications. Adjustable over suction differential press. range of .06 to 3.5" W.
- NOTE 5: Industrial and commercial applications requiring remote signal. Adjustable over suction differential pressure range of .12" to 3.5" W.
- NOTE 6: Normally closed signal feature used in conjunction with paint spray booth applications where air to spray gun is cut off when booth filters fail to meet minimum air passage required.

THE BITTERNESS OF POOR QUALITY REMAINS LONG AFTER THE SWEETNESS OF LOW PRICE IS FORGOTTEN

BACHARACH PORTABLE INSTRUMENTS

SERDEX HUMIDITY/TEMPERATURE RECORDER

Circular chart recorder for providing permanent record of humidity and temperatures.

Features

- Rapid response to humidity changes.
- Wide temperature tolerances from 0°F to +130°F (-18°C to +54.5°C).
- Completely self-contained.

The recorder incorporates the patented Serdex conically-shaped membrane diaphragm humidity element. The temperature sensing element is a precision bi-metal coil. The Serdex recorder is self-contained and equipped with a spring-wound chart drive. The 6"



diameter chart has 2% R.H. and 2°F divisions for 24-hour rotation models. The circular chart recorder is also available for recording relative humidity only, and correction charts for R.H. can be provided for temperatures below +32°F.

Applications

Monitors humidity where it is important to preserve materials and prevent deterioration. Extremely valuable when installed in computer rooms, labs, etc.

CAT. NO.	Bacharach Code Complete Recorder Includes One Box of Charts and Ink	Serdex Recorder Type	Specifications			Chart				Ink (One Bottle)	
			Scale Range	Temp. Range	Rotation	Divisions			Box of 100 Charts	Red	Purple
33523	22-7042	Relative Humidity and Temperature	0-100% R.H.	0 to +100°F	24 Hr.	15 Min.	2°F	2%	22-0082	22-0077	22-0079
335390	22-7078			0 to +100°F	7 Day	3 Hr.	5°F	5%	22-0419		
335391	22-7018			-10 to +90°F	7 Day	3 Hr.	5°F	5%	22-0063		
335392	22-7052			-16 to +40°C	7 Day	3 Hr.	2°C	5%	22-0285		
33520	22-7015	Relative Humidity Only	None	None	24 Hr.	15 Min.		2%	22-0083	None	22-0079
335393	22-7017			None	7 Day	3 Hr.		2%	22-0081		

SERDEX HUMIDITY/TEMPERATURE INDICATORS

Two-pointer instrument for simultaneous indication of relative humidity and temperature.



Features

- Completely self-contained, no piping or external power source is required.
- Rapid response to humidity changes.
- Wide temperature tolerances from 0°F to +130°F (-18°C to +54.5°C).
- Easy to read scale.

The Serdex Indicator is furnished as a portable instrument, or with a flanged case for surface mounting. Completely self-contained, no piping or external power source is required. The sensing element is a highly-sensitive, conically-shaped membrane diaphragm. It gives almost instant re-

sponse to humidity changes. Its reliable operating characteristics are retained in ambient temperatures from 0°F to +130°F (-18°C to +54.5°C). Lag constant is less than 4 sec. for 63% of indicated range covered in an air stream velocity of 800 ft./min. (approx. 260 m./min.). Serdex Indicators are available for measuring humidity in the range of 15 to 95% R.H.

Applications

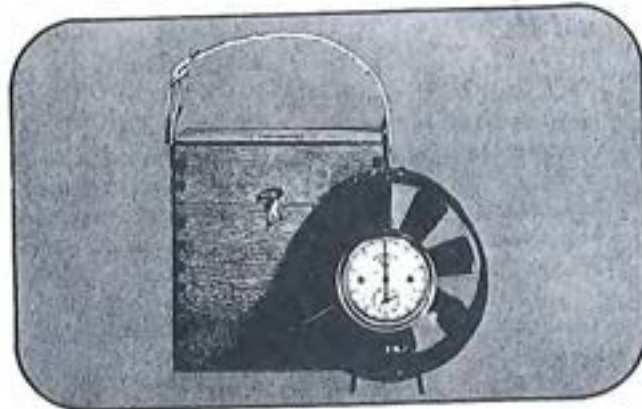
Checking and adjusting ventilating, refrigeration, humidification, dehumidification systems.

CAT. NO.	Bacharach Code	Serdex Indicator Type	Scale Width (Inches)	Specifications Scale Range	Temperature Range
33524	*22-7056	Relative Humidity and Temperature, Precision Model	3%	0-100% R.H.	0 to +130°F
	*22-7076				-5 to +55°C
33521	*22-7069	Relative Humidity Only, Precision Model	2%		
33522	**22-7006	Relative Humidity Only, Utility Model			

* Precision Model Flange Mtg. Kit 22-0237 fits openings 5-1/8" x 4-3/8".

** Not illustrated.

ZEAL AIR VELOCITY METERS & BAROMETERS



No 770

BIRAM AIRMETER (Vane Anemometer)

This instrument is most useful for accurate measurements of wind speed, 0-1000 meters max.

It can be used to record air movement for mine shafts, tunnels, air conditioning systems, micrometeorological studies, etc.

Specifications

Major Dial: 1 to 100 meters

Minor Dial: 1000 meters

Minimum Indication: 1 meter

Size: 110 long X 50 wide X 120mm high

Weight: 0.5 kgs.

IN WOODEN BOX FOR PORTABILITY

CAT. NO. 33564

**PORTABLE ELECTRONIC ANEMOMETER
TYPE SAV-22A**

Ideally suited to all heating, ventilating and air conditioning applications such as measurement of air velocity in ducts or grill exit velocities. Also ideal for meteorological and engineering studies of air movement in the open.

Standard Ranges: 0-5, 0-40 meters/sec.

0-10, 0-500mm Aq

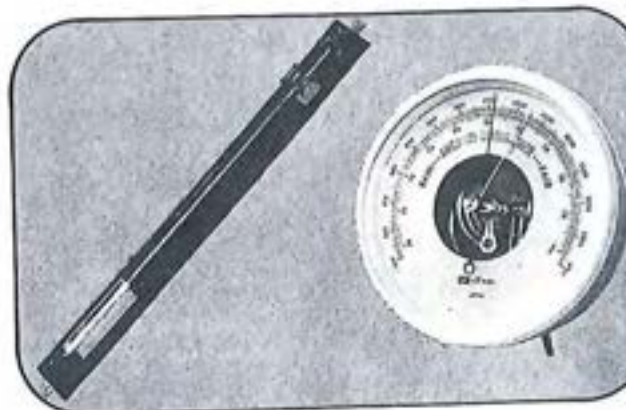
Temperature Compensation: 0-120 C.

Battery: DC9V

Size: 160 wide X 325 long X 100mm high

Weight: 4.3 kgs.

CAT. NO.



No 314

Fortin MERCURY BAROMETER

CAT. NO.

Standard Fortin Mercury Barometer for precise measurement of atmospheric pressure.

* Officially tested with certificate, Accuracy, within 0.5 mmHg. 115 cm in overall length.

* Fit for official test. Accuracy within 0.5 mmHg. Available two sizes; 115 cm and 105 cm long.

No 312

ANEROID BAROMETER

CAT. NO.

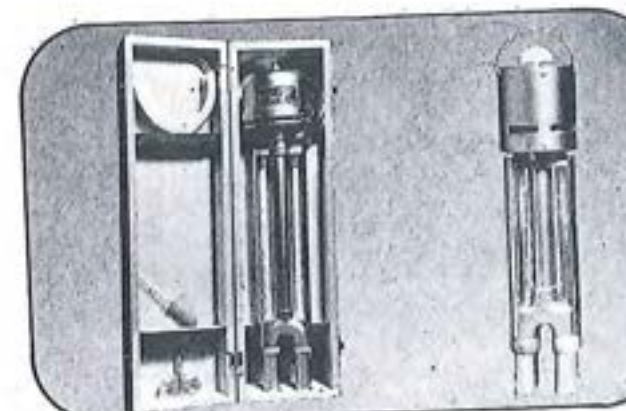
Actual pressure can be measured from sea level to 1,500 feet.

Dual or triple scale of mbar and mmHg, plus temperature Range: -20 to 50°C

Size: 5" (12.5 cm) and 6" (15 cm)

Also available in Metric reading.

CAT. NO.

**Assmann's ASPIRATION PSYCHROMETER**

For most precise measurement of humidity. Mercury filled wet and dry bulb thermometers are placed in ventilator with spring wound or battery operated fan. Boxed with fittings and table for determination of humidity in ventilation.

Cat No: 121 - Battery op. 123: Spring Wound

Temperature range -30 to 50°C in 1/5° divs.

Size: 450 long X 125 wide X 115 mm high

Weight: 3.5 kgs.

Junior type (smaller Psychrometer) is also available spring-wound (Cat No. 122) or battery operated (Cat No. 125) Thermometer Refill tubes available in matched pairs.

MICROMECH RECORDING WEATHER INSTRUMENTS

RECORDS AIR TEMPERATURE, PRESSURE & RELATIVE HUMIDITY

- FEATURES: ★ MODERN STREAMLINED STYLING
 ★ WHITE ENAMEL AESTHETIC APPEARANCE
 ★ DURABLE PERSPEX FRONT
 ★ SIMPLIFIED ADJUSTMENT CONTROLS SIDE BY SIDE
 ★ EASY, CONVENIENT HANDLE FOR PORTABILITY
 ★ COMPLETELY REMOVABLE COVER

MM-01 THERMOHYGROGRAPH



Air temperature and relative humidity are simultaneously recorded on the same chart.

Temperature Sensor

Sensor: Aged bimetallic strip

Temperature Scales: $-15+40^{\circ}\text{C}$, or $-10+50^{\circ}\text{C}$, or $-40/20^{\circ}\text{C}$.

Accuracy: $\pm 1\%$

Humidity Sensor

Sensor: Human Hair

Range: 0 to 100%

Accuracy: $\pm 1\%$ between 20 to 80% approximately 3% at extremes

Chart Drive: Spring-wound clock

Drum Rotation: 7-day or 24-hour by alternative gear provided

Size: 320 long X 150 wide X 280mm high

Weight: 4 kgs (Instrument only)

Charts and ink for one year's use supplied

SPARE CHART PAPER, BOTH 7 DAY AND 24 HOUR AVAILABLE

CAT. NO. 33575

MM-02 THERMOGRAPH



Temperature is recorded on the chart by means of a sensitive curved bimetallic strip.

Specifications

Sensing Element: Aged bimetallic strip

Scales available: $-15+40^{\circ}\text{C}$, or $-10+50^{\circ}\text{C}$.

Accuracy: $\pm 1\%$

Clock Drive: Spring-wound Clock

Drum Rotation: 7-day or 24-hour by alternative gear provided

Size: 320 long X 150 wide X 280mm high

Weight: 4 kgs. (Instrument only)

Charts and ink for one year's use supplied

SPARE CHART PAPER, BOTH 7 DAY AND 24 HOUR AVAILABLE

CAT. NO. 33576

MM-03 HYGROGRAPH



This model uses the human hair as the sensor for relative humidity.

Specifications

Range: 0-100%

Sensor: Human hair

Accuracy: $\pm 1\%$ between 20 and 80% approximately 3% at extremes

Chart Drive: Spring-wound Clock

Drum Rotation: 7-day or 24-hour by alternative gear provided

Size: 320 long X 150 wide X 280mm high

Weight: 4 kgs. (Instrument only)

Charts and ink for one year's use supplied

SPARE CHART PAPER, BOTH 7 DAY AND 24 HOUR AVAILABLE

CAT. NO. 33577

MM-04 BAROGRAPH



This Barograph is a precision recording instrument.

Specifications

Sensor: 14-cell, 2 in. diameter aneroid

Accuracy: $\pm 0.2\%$ of range

Sensitivity: ± 0.2 millibar

Operating range: Sea Level to 3,600 metres

Lag Time: 0.1 sec.

Chart Scales: 940 to 1045 millibars

Temperature Compensation: Bimetallic strip

Chart Drive: Spring-wound clock

Drum Rotation: 7-day or 24-hour by alternative gear provided

Size: 320 long X 150 wide X 280mm high

Weight: 4 kgs. (Instrument only)

Charts and ink for one year's use supplied

SPARE CHART PAPER, BOTH 7 DAY AND 24 HOUR AVAILABLE

CAT. NO. 33578

ANALYSERS AND TESTERS

PALEC POWER ANALYSER A True Dynamometer Instrument

for INDUSTRIAL MAINTENANCE, SERVICE & PRODUCTION

AN INVALUABLE AID IN—

POWER FACTOR CORRECTION — LOW POWER FACTOR IS ELECTRICAL ENEMY NO.1.
FIND AND CORRECT THIS COSTLY ELECTRICAL WASTE.

PLANT MAINTENANCE & TROUBLE SHOOTING — REFRIGERATORS, AIR CONDIT-
IONERS, WASHING MACHINES AND ALL MOTORISED EQUIPMENT.

MEASURES — VOLTS, AMPS, WATTS. POWER FACTOR — KVA & KVAR(Reactive).

CAT. NO.	MODEL NO.	RANGES			DIMS. (INS.)
		VOLTS A.C.	AMPS. A.C.	WATTS A.C.	
3381	PA2	0-125/250/500	0-2/5/20	9 RANGES (3 FOR EACH VOLTAGE RANGE)	9x7 1/8x4
3382	PA2 Power Lead	EXTRAS AVAILABLE TO SPECIAL ORDER — A. STAR RESISTANCE BOX FOR 3 PHASE TESTING. B. CURRENT & POTENTIAL TRANSFORMERS FOR RANGE EXTENSION.			



PALEC OHMMETER 4 RANGE UNIVERSAL

APPLICATIONS — RESISTANCE TESTING OF MOTOR & TRANSFORMER WINDINGS,
HEATING ELEMENTS, ETC.
EARTH CONTINUITY TESTING OF ELECTRICAL APPLIANCES, HOUSE
WIRING, ETC.
THE UNIT HAS INTEGRALLY MOUNTED BATTERY.

METER — 4 1/2" RECTANGULAR TYPE WITH SCALE COLOUR CODED WITH PANEL MARKINGS.

COMPLETE WITH TEST LEADS AND INTEGRALLY MOUNTED BATTERY
LEATHER CARRYING CASE AVAILABLE AS OPTIONAL EXTRA.

CAT. NO.	MODEL NO.	RANGES	HALF SCALE	FULL SCALE	DIMENSIONS (INS.)
3383	OM2	LOW OHMS x 1 LOW OHMS x 10 HIGH OHMS x 1 HIGH OHMS x 10	1 OHM 10 OHMS 100 OHMS 1000 OHMS	10 OHMS 100 OHMS 10,000 OHMS 100,000 OHMS	7 1/2 x 6 x 2 1/2



KEWMEG-500 INSULATION TESTER & VOLTMETER

CAT. NO. 3388

This rugged, self-contained instrument has been designed for convenient and independent trouble-free operation, particularly in the field. Housed in a durable, shock-proof plastic case, the KEWMEG 500 needs no external power—stabilised high voltage for insulation measurement is provided by the rectified output of a transistorised oscillator. The taut band suspension type movement is friction free and shock proof.

OTHER FEATURES

PUSH BUTTON RANGE SELECTION. . . any of the three voltmeter ranges of the resistance range can be selected by depressing the appropriate push-button.
ON-OFF INDICATION. . . a neon lamp indicator lights when the instrument is switched on, preventing battery wastage by reminding the user to switch off after use.

BATTERY CHECK BUTTON. . . gives immediate indication when battery should be replaced.

SPECIFICATIONS

MEASURING RANGE

ACCURACY

DIELECTRIC STRENGTH POWER SOURCE OUTSIDE DIMENSIONS WEIGHT ACCESSORIES

- Insulation Tester: 500 volts/100 megohms.
Effective Measurement Range: 0.1-100 megohms (Mid-scale 2 megohms)
AC Voltage: 0-150/300/600V
- Insulation Tester: Effective measuring range 0.1-50 megohms; Better than $\pm 5\%$ of the indicated value. At the other points: Better than $\pm 10\%$ of the indicated value. AC Voltage: Better than $\pm 3\%$ of full scale value.
- Between the circuit and the housing: 2200V AC (1 min.)
- Eveready 815 or equivalent (B required)
- 210 x 110 x 60mm
- 750g
- One set of measuring leads (Line Probe: Earth lead).
Carrying case.
Operation Manual.



A FAST ACCURATE TESTER

For Checking Non-Energized Equipment

MODEL CT2 - Designed for testing continuity, shorts, opens. Signal light at point of contact makes it unnecessary for operator to move eyes from point of contact to determine defect. Accelerates speed in point to point testing.

10 ohm, two battery type especially recommended for testing of diodes such as used in electronic circuits and automobile alternators but not necessarily limited to this application only; excellent for testing wire assemblies, switches, relays, fuses, circuit breakers, armatures, thermostats, etc.

Typical test for alternator diodes would be as follows:

SHORTS AND OPENS: Connect tester across diode. Then reverse tester connections. If light glows both ways, diode is shorted. If no light appears, diode is open.

POLARITY CHECK: Light glows only when probe touches negative (-) lead and alligator is clipped to positive (+) lead. (For convenience in production testing, battery polarity can be reversed so light glows when probe touches positive lead.)

CONTINUITY TESTING: Circuit wiring, light glows when resistance is less than 10 ohms. No light if resistance exceeds 10 ohms.

Bulb No. 222, Battery Size AA.

CAT. NO.	MODEL	DESCRIPTION	OHMS
33811	CT2	Double Battery Type * with Bulb No. 222	10

* Batteries NOT included. Use standard size AA penlight battery.

PROBE-PROTECTOR INCLUDED.

New! Vinyl extrusion Probe-Protector slips over Probe when circuit tester is not being used. This prevents accidental contact with metal that could create a circuit and minimizing unnecessary battery burn-out.



NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES



UNIVERSAL THERMOCOUPLE TEMP-TESTER

FOR THE APPLIANCE SERVICEMAN AND FOR SHOPS REPAIRING AND SERVICING REFRIGERATORS, AIR CONDITIONERS, HEATERS, DRYERS AND ALL TYPES OF APPLIANCES AUTOMATICALLY ADJUSTS FOR ROOM TEMPERATURE

12850 CAT. NO. 33818

A tester providing fine accuracy in high temperature ranges. Furnished in rugged Texon case with one general lead.

Optional surface leads and liquid leads also available.

ACCURACY: $\pm 2\%$ of full scale.

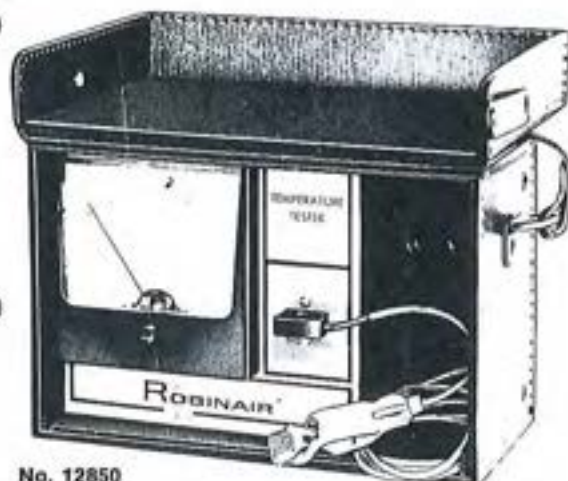
METER: $3\frac{1}{2}''$ Dual Scale.
0° to 650°F and 0° to 340°C.

CAT. NO.	PART NO.	DESCRIPTION
33924	43896	General Lead
33925	43897	Surface Lead
—	43898	Liquid Lead

No. 43897
(was 12850-2)



No. 43898
(was 12850-3)



No. 12850



Volt/Amp/Wattmeter

14865

CAT. NO. 33819

Normal and peak switch setting enables servicemen to read both normal and peak conditions. Comes in durable black plastic case and can be hung from a hook for easy handling. Capable of holding peak current readings.

SPECIFICATIONS

Voltmeter

Dual Range Voltage: 120/240 AC

Accuracy: $\pm 1\%$ ± 1 digit

Ammeter

Dual Range: Low 0-9.9 Amps Resolution 10 milliamps

High 0-99.9 Amps Resolution 100 Milliamps

Accuracy: $\pm 1\%$ ± 1 digit

Wattmeter

Dual Range: Low 0-999 Watts Resolution 1 Watt

High 0-9.99 Kilowatts

Accuracy: $\pm 2\%$ ± 1 digit



IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES, TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

JEMCO MULTITESTERS

- FEATURES :
1. Meter Overload Protection.
 2. Meter Shock Proof Device.
 3. Stable indication due to special circuit applied to the rotary switch.
 4. Excellent frequency characteristics.
 5. D.C. Polarity reversing switch.
 6. Large Zero adjuster.
 7. Serviceable at an angle of 30° or 40° utilizing carrying handle as a stand.
 8. 10A DC and AC Range.
 9. 50M Ohms Max. resistance range.



CARRYING CASE
US-TYPE
CAT. NO. 33839



MODEL US-100 20K Ω/V

CAT. NO. 33836

Meter overload protection, shock-proof device

Color of Cabinet & Panel : Black or Grey

For laboratories schools and servicemen

MEASUREMENT RANGES :

DC Voltage : 0-0.25, 1, 2.5, 10, 50, 250, 1,000V (20K Ω/V)

AC Voltage : 0-2.5, 10, 50, 250, 1,000V (5K Ω/V)

DC Microamp. : 0-50μA (250mV drop)

DC Milliamp. : 0-1, 25, 500mA (250mV drop)

DC Ampere : 0-10A (250mV drop)

AC Ampere : 0-10A (250mV drop)

Resistance : 0-5, 50, 500K Ω, 5, 50M Ω (Center scale 50)

R×1, R×10, R×100, R×1K, R×10K

Decibels : -20 - +10, +22, +36, +50dB (0dB 1mW 600Ω)

Batteries : 1.5V (UM-3)×2, 22.5V (BL-015)×1

Net weight : 500g



MODEL US-105 50K Ω/V

CAT. NO. 33837

Fuse for all circuit protection except 500mA, 10A at terminal

Meter overload protection, shock-proof device

Color Cabinet Panel : Black or Grey

For laboratories schools and servicemen

MEASUREMENT RANGES :

DC Voltage : 0-0.25, 1, 2.5, 10, 50, 250V (50K Ω/V), 1,000V (20K Ω/V)

AC Voltage : 0-2.5, 10, 50, 250, 1,000V (10K Ω/V)

DC Microamp. : 0.25μA (250mV drop)

DC Milliamp. : 0-1, 25, 500mA (250mV drop)

DC Ampere : 0-10A (250mV drop)

AC Ampere : 0-10A (250mV drop)

Resistance : 0-20, 200K Ω, 2, 20, 200M Ω (Center scale 100)

R×1, R×10, R×100, R×1K, R×10K

Decibels : -20 - +10, +22, +36, +50dB (0dB 1mW 600Ω)

Batteries : 1.5V (UM-3)×2, 22.5V (BL-015)×1

Net weight : 550g

6



CARRYING CASE
TH-12
CAT. NO. 33840



MODEL TH-12 20K Ω/V

CAT. NO. 33838

Slide switch operated

Meter overload protection, shock-proof device

Color of Cabinet & Panel : Grey

For schools and amateurs

MEASUREMENT RANGES :

DC Voltage : 0-0.25, 2.5, 10, 50, 250, 1,000V (20K Ω/V)

AC Voltage : 0-10, 50, 250, 1,000V (5K Ω/V)

DC Microamp. : 0-50μA (250mV drop)

DC Milliamp. : 0-25, 250mA (250mV drop)

Resistance : 0-3, 30, 300K Ω, 3M Ω (Center scale 25)

×1, ×10, ×100, ×1K

LI : 52mA, 5.2mA, 520μA, 52μA

LV : 1.5V

Decibels : -20 - +22, +36, +50dB (0dB 1mW 600Ω)

Batteries : 1.5V (UM-3)×1

Dimensions : 132×100×38mm

Net weight : 280g

JEMCO MULTITESTERS

JEMCO MULTITESTER WITH INBUILT THERMOMETER

MODEL US-110-T 100K Ω /V

FEATURES

CAT. NO. 33841

1. A thermometer is included.
This tester, by use of an accessory probe (TP-11) that is attached to it, can directly measure and indicate any temperature between -50°C and 250°C on the private scale of two exclusive ranges. The scale is prepared in special color, so that it may be discerned from the others and the measured values can easily be read. The thermometer is very convenient for the measurement of, for example, the internal temperature of various electrical equipments, temperature of liquids, and surface temperature or even internal temperature of solids.
2. Zero adjustment of OHMS range.
An exclusive PUSH SWITCH is newly adopted for the purpose of 0 Ω adjustment of OHMS range. This push switch, in conjunction with a volume control, enables the zero adjustment to be done very easily, and the set point adjustment of the TEMPERATURE range as well.
3. Extent of measurement by OHMS range.
Five ranges plus 1.
Capable of fine and broad range measurement from 0.1 Ω to 200M Ω , and further, by use of extra power source of 1,000V DC, up to 21,000 M Ω .
4. Meter scales of DC VOLT/CURRENT and AC VOLT.
Both DC VOLT/CURRENT and AC VOLT measurements can be made on a single scale.
You need no more care about the proper selection of scales as were necessary in former types of similar tester.
5. The tester is provided with the means for protecting it against overload or impulse.
All ranges are equipped with fuses in order to avoid the burn-out of internal circuit due to the misuse of the tester.
6. A 100mV/10 μA range is added, which makes a measurement of very small value (2mV/0.2 μA at least) possible. Further, a thermistor is equipped in the meter to minimize the error resulted from the variation of ambient temperature.
7. Convenient for carrying, with a handle attached.
By turning this handle to the back, this multitester can be used in its stand position.
8. The scale length is 82mm on the DC scale, which is near to a large type of a tester.
9. A switch is added to change the polarity of DC range. This switch can change the polarity, without the reconnection of TESTLEADS, immediately when the pointer deflects in opposite direction during use. This function is very useful in checking such as TV & FM electronic circuits.
10. Resistors of tolerance 1% are used.



SPECIFICATIONS

*SENSITIVITY

DC 100,000 OHMS/VOLT
AC 2,000 OHMS/VOLT

*RANGES

DC VOLTAGES : 0~ $\pm$ 0.1/0.5/2.5/10/50/250/1,000V
AC VOLTAGES : 0~10/50/250/1,000V
DC CURRENTS : 0~ $\pm$ 10 μA /0~ $\pm$ 1/100mA
OHMS : Range

Range	X10	X100	X1K	X10K	X1M
Meas. area	0.1 Ω ~2K Ω	1 Ω ~20K Ω	10 Ω ~200K Ω	100 Ω ~2M Ω	10K Ω ~200M Ω
Center scale	10 Ω	100 Ω	1K Ω	10K Ω	1M Ω

TEMPERATURES : -50°C ~ $+250^{\circ}\text{C}$
TIME RESPONSE : Within 15 seconds (in water)
NON POLARITY :
DECIBELS : -20 ~ $+22$ / -6 ~ $+36$ / $+8$ ~ $+50$ dB
0 dB=1mW 600 Ω

*ACCURACY

DC RANGES : $\pm 2\%$
AC RANGES : $\pm 3\%$
OHMS RANGES : $\pm 3\%$ (scale length)
TEMP. RANGES : At 0°C $\pm 1.7^{\circ}\text{C}$ /25 $^{\circ}\text{C}$ $\pm 1.5^{\circ}\text{C}$ /100 $^{\circ}\text{C}$ $\pm 2.0^{\circ}\text{C}$ /200 $^{\circ}\text{C}$ $\pm 4.8^{\circ}\text{C}$

*SIZE & WEIGHT

148(175)X105X52mm 550g

SIMPSON

TEMPERATURE MEASURING INSTRUMENTS



Model 385-3L For Three Probes

Model 388-3L For Three Probes

Model 389-3L For Three Probes

Model 387 Appliance Tester

MODEL 385-3L TEMPERATURE METER

Model 385-3L is ideal for those fast, accurate temperature checks from -50°F to $+70^{\circ}\text{F}$. Light weight, portable, fits easily in your hand. Three lead model. Takes temperature readings in three different locations with a simple flick of the selector knob. Standard Model has Fahrenheit scale. Supplied with one No. 0010, 15 ft. thermistor lead and operator's manual.

Size: $3" \times 5\frac{1}{4}" \times 2\frac{1}{4}"$.

RANGE & ACCURACY

-50°F . to $+70^{\circ}\text{F}$.
 $\pm 1^{\circ}\text{F}$. @ Center Scale
 $\pm 2^{\circ}\text{F}$. @ Either End

PROBES, LEADS AND CARRYING CASES

DESCRIPTION	P/N	CAT. NO.
TEMPERATURE METER	385-3L	3391
Surface Temperature Probe	0780	33915
Free Air Temperature Probe	0789	33911
Additional Thermistor Lead	0010	3394
30 Ft. Thermistor Lead	0216	33912
50 Ft. Thermistor Lead	0415	33913
100 Ft. Thermistor Lead	0416	33914
150 Ft. Thermistor Lead	0417	33917
Ever-Ready Leather Carrying Case	7034-1	3395

MODEL 388-3L THERM-O-METER®

Simpson's popular wide range Therm-O-Meter tester measures the temperature of practically anything within -50°F to $+1000^{\circ}\text{F}$. Standard model has combination $^{\circ}\text{C}$ and $^{\circ}\text{F}$ scale. Sensing Element: Thermocouple (Iron-Constantan). Supplied with internal battery and one 8' general purpose probe No. 0190 and operator's manual. Order additional probes as required.

Size: $7\frac{15}{16}" \times 6" \times 2\frac{15}{16}"$

-50°F . to $+1000^{\circ}\text{F}$.
 $\pm 1\frac{1}{2}$ Scale Divisions

THERM-O-METER	388-3L	3392
General Purpose Type	0190	33918
Surface Temperature Probe Type (1000 $^{\circ}\text{F}$. Max.)	0187	33910
Rugged Service Lead (8 ft.)	0496	33916
Ever-Ready Vinyl Carrying Case	6936-B	3396

MODEL 389-3L**DUAL RANGE THERM-O-METER®**

Model 389-3L temperature tester, using three leads, makes temperature readings in three different locations at the same time; i.e., in a refrigerator, one lead could be connected to the evaporator plate, another to the wall of the food compartment and the third in the center of the food compartment. Readings are made quickly in 15 to 30 seconds depending on the medium being checked. Supplied with $^{\circ}\text{C}$ and $^{\circ}\text{F}$ scale.

Supplied with one general purpose thermistor lead No. 0010 and operator's manual. Order additional leads as required.

Size: $7\frac{15}{16}" \times 6" \times 2\frac{15}{16}"$.

-50°F . to $+100^{\circ}\text{F}$.
 $+100^{\circ}\text{F}$. to $+250^{\circ}\text{F}$.
 Within $\pm 2^{\circ}\text{F}$.

D.R. THERM-O-METER	389-3L	3393
Surface Temperature Probe	0790	33915
Free Air Temperature Probe	0789	33911
Additional Thermistor Lead	0010	3394
30 Ft. Thermistor Lead	0216	33912
50 Ft. Thermistor Lead	0415	33913
100 Ft. Thermistor Lead	0416	33914
150 Ft. Thermistor Lead	0417	33917
Ever-Ready Vinyl Carrying Case	6936-A	3397

APPLIANCE TESTER

MODEL 387 MILLIVOLTMETER
 Make gas unit servicing faster, more accurate. Use Simpson's Millivoltmeter. Simply place the probe across the thermocouple terminals and test for the correct value. Checks Safety Thermocouples on Gas-Fired Units.

- Furnaces
- Boilers
- Heaters
- Hot Water Heaters
- Dryers
- Refrigerators

Size: $3" \times 5\frac{1}{4}" \times 2\frac{1}{4}"$.

0-10, 0-30, 0-100,
 0-300, 0-1000 Millivolts
 $\pm 3\%$ of Full Scale

MILLIVOLT METER	387	—
Test Prods and Spade Terminals	8379	—
Alligator Clips and Spade Terminals	8376	—
Ever-Ready Vinyl Carrying Case	8073	—

339-a**ROBINAIR®****TEST INSTRUMENTS****Four jack-dual range temperature tester
for all refrigerator servicemen
14845**

Range: -45.6°C to 37.8°C Low
37.8°C to 148.9°C High

Accuracy: -17°C to +93°C ±1°
Balance of scale ±2°C

Display: Large 4 1/4" x 3 3/8" meter

Size: 10" x 7 1/2" x 3 3/8"

Leads: Has 4 jacks for detachable leads. Unit is supplied with two 43913 15-ft. general purpose leads. Additional leads available, Part Nos. 43913 through 43918.

Operates on 1 "D" cell alkaline battery (not included). Unit is self-contained in portable carrying case.

**14845****43914 Surface Lead****43915 Free Air Lead**

CAT. NO.	PART No.	DESCRIPTION
3399	14845	TEMPERATURE TESTER
33921	43914	Surface Lead
33922	43915	Free Air Lead
33923	43913	4.6 m (15 ft.) General Purpose Lead
	43916	9.1 m (30 ft.) General Purpose Lead
	43917	15.2 m (50 ft.) General Purpose Lead
	43918	30.5 m (100 ft.) General Purpose Lead

Capacitor analyzer

No. 13015 **CAT. NO. 33919**

Read Microfarads Direct on Three Scales: 1-20; 21-49 and 50-2000 Mfd.

SPECIFICATIONS: Three Scale: 1-20 Mfd., 21-49 Mfd., 50-2000 Mfd.

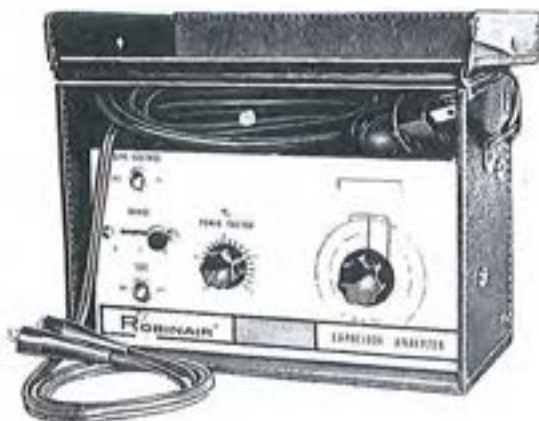
Power Factor % Selector Range: 0-20

Volts: 115 VAC or 230 VAC 50-60 Cycle (toggle switch option)

Wt: 5 lbs., Size: 9" x 6" x 4"

Case: Durable Texon

Accurately measures both capacitance and power factor. Performance of any electrolytic capacitor changes with shelf or use life and should be analyzed for sufficient capacitance and related power factor. Incorporates a "solid state" rectifier resulting in an instrument built for rugged use. Each capacitor tested is automatically discharged when the spring return toggle switch is returned to the "off" position. Checks capacitors for being shorted, open, or intermittent.

**GET THE RIGHT PRODUCT**

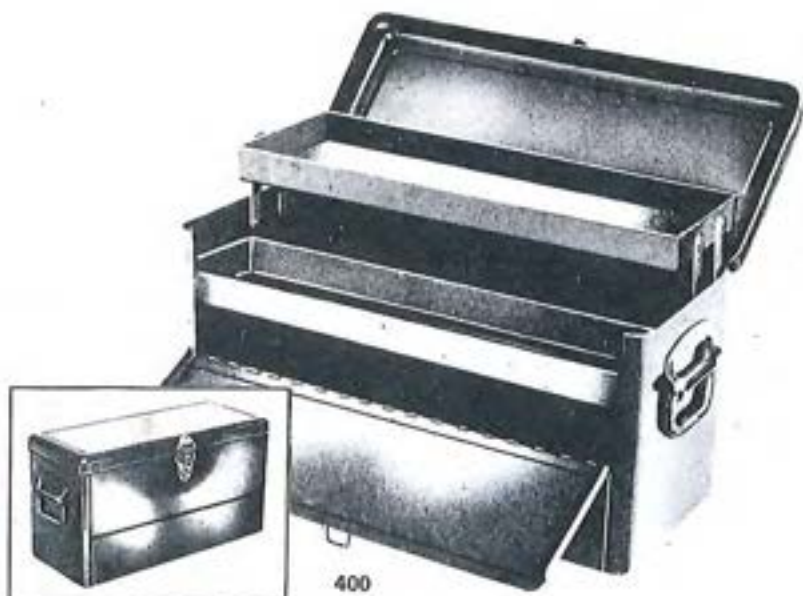
NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

TOOL BOXES



CAT. NO.	MFG. P/N	SIZE L x W x Ht. mm (ins)	DESCRIPTION
34621	200	425 x 170 x 165 (16 1/2 x 6 3/4 x 6 1/2)	Box without Tray
34622	210	425 x 170 x 165 (16 1/2 x 6 3/4 x 6 1/2)	With removable half-sliding Tray.
34625	220	425 x 170 x 165 (16 1/2 x 6 3/4 x 6 1/2)	With cantilever Tray.
34623	310	445 x 210 x 175 (17 1/2 x 8 1/4 x 7)	With removable half-sliding Tray.
34624	320	445 x 210 x 175 (17 1/2 x 8 1/4 x 7)	With cantilever Tray.
34629	400	495 x 210 x 260 (19 1/2 x 8 1/4 x 10 1/4)	Heavy duty tool box with ample tool and accessory storage space. With cantilever Tray, removable sliding Tray and drop front. Lockable latch, sturdy carrying handles.
34630	510	490 x 205 x 210 (19 1/4 x 8 x 8 1/4)	With removable half-sliding Tray.
34631	520	490 x 205 x 210 (19 1/4 x 8 x 8 1/4)	With cantilever tray.
34632	700	530 x 255 x 230 (21 x 10 x 9)	Large capacity with fixed base compartment and 4 double cantilever Trays. H.D. carrying handle.
34634	Daytek Small	381 x 171 x 140 (15 x 6 3/4 x 5 1/2)	Small size Tool Box. No Tray.
34635	Daytek Med.	400 x 241 x 165 (15 3/4 x 9 1/2 x 6 1/2)	Med. size Tool Box. Including Tray.
34636	Daytek Large	483 x 241 x 197 (19 x 9 1/2 x 7 3/4)	Large size Tool Box. Including Tray.

OTHER SIZES & TYPES AVAILABLE ON APPLICATION



USE ONLY GOOD TOOLS

CHEAP TOOLS ARE A POOR INVESTMENT AND CAN CAUSE ENDLESS GRIEF AND STRIFE ON THE JOB. IN COMPARING OUR PRICES ON TOOLS AND EQUIPMENT, REMEMBER WE DO NOT SELL CHEAP AND SHODDY TOOLS. OUR TOOLS ALL CARRY NATIONAL AND INTERNATIONAL BRAND NAMES AND ARE THE VERY "FINEST".

EQUIPMENT AND TOOLS

FLARING SWAGING AND PINCH-OFF TOOLS

VICE-GRIP Locking Hand Tools

1 VISE-GRIP Pinch-Off Tool.

Jaws are designed to pinch-off and lock onto copper tubing or rubber fuel, refrigerant or coolant hoses. A perfect temporary "shut-off" valve. The Model RR Pinch-Off Tool is 8" long — jaws open to 1".



2 Straight jaw models.

Modern versions of the original VISE-GRIP locking pliers.

Straight jaws for most nuts and many "clamping" jobs. Jaws on 10" Model 10R open to 1½" — jaws on the 7" Model 7R open to 1-1/8".



2 Curved jaw models without wire cutters.

Four-point contact on any size nut. Jaws on 10" Model 10CR open to 1-7/8" and to 1-5/8" on 7" Model 7CR.

3 Curved jaw models with wire cutters.

The built-in wire cutters will cut anything up to a ¼" bolt. Jaw adjustments: 1-7/8" for 10" Model 10WR, 1-5/8" for 7" Model 7WR and 1-1/4" for 5" Model 5WR.

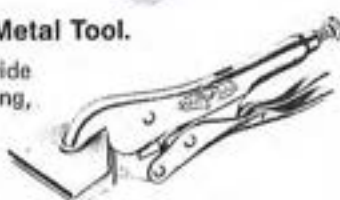
3 Fast-locking "C" Clamps.

One hand squeeze can apply more pressure than you can get with an ordinary "C" Clamp. Jaws open to 2" for 6" Model 6R, 3¼" for 11" Model 11R and 7" for 18" long-reach Model 18R.



1 VISE-GRIP Sheet Metal Tool.

Special jaws are over 3" wide to make all kinds of bending, forming, clamping and crimping quick and easy. Model 8R is 8" long and jaws open to 1½".



1 VISE-GRIP Welding Clamp.

Deep-throated U-shaped jaws lock and hold work in proper alignment — even when material is not identical in thickness. Model 9R is 9" long, jaws open to 1-5/8".



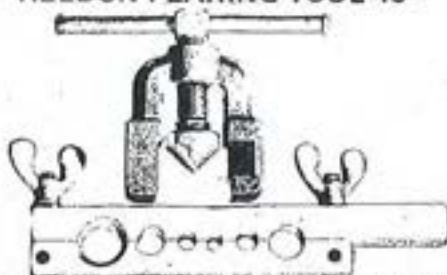
1 VISE-GRIP Chain Clamp.

Locks and holds anything chain can be wrapped around. Model 20R is 9" long with 19" chain. 18" extension chain available.



CAT. NO.	PART No.	DESCRIPTION
3486	RR	Pinch-Off Tool
34815	7R	Straight Jaw Locking Pliers
348126	10R	Straight Jaw Locking Pliers
348129	7CR	Curved Jaw Locking Pliers Without Wire Cutters
348128	10CR	Curved Jaw Locking Pliers Without Wire Cutters
348132	5WR	Curved Jaw Locking Pliers With Wire Cutters
348131	7WR	Curved Jaw Locking Pliers With Wire Cutters
348130	10WR	Curved Jaw Locking Pliers With Wire Cutters
348137	6R	Fast Locking "C" Clamps
348136	11R	Fast Locking "C" Clamps
348135	18R	Fast Locking "C" Clamps
348133	8R	Sheet Metal Tool
348134	9R	Welding Clamp
348138	20R	Chain Clamp
348140		18" Extension Chain for 20R Chain Clamp

HELDON FLARING TOOL 45°



Forged steel yoke, Hardened block, Hard chrome flaring cone.

SIX SIZES IN THE ONE TOOL —
1/4" — 5/16" — 3/8" — 1/2" — 5/8" — 3/4" O.D.

Part No. 1162

CAT. NO. 3481

RIGID FLARING TOOL 45°



Part No. 459

9 SIZES IN
THE ONE TOOL

1/8" — 3/16" — 1/4" — 5/16" — 3/8"
7/16" — 1/2" — 5/8" — 3/4" O.D.

CAT. NO. 3482

ROBINAIR SWAGING TOOL



Made of fatigue-proof steel with precision ground bright chrome finish.

EXPANDS—3/16", 1/4", 5/16", 3/8",
1/2" and 5/8" Tube.

P/N 12479

CAT. NO. 34813

ROBINAIR SWAGING KIT
WITH INTERCHANGEABLE TIPS

This kit of tools was designed for convenience and ease of use. It has interchangeable tips in the 4 most widely used sizes, 1/4", 3/8", 1/2" and 5/8".

Light, tough plastic handle will take a lot of hard use.

Part No. 14311 Kit consists of handle and 4 interchangeable tips.

CAT. No. 34814

IMPERIAL PINCH-OFF TOOL
WITH RE-ROUNDING HOLES

For temporary closing of tubing. This tool will also open up the tubing and round it back into shape after the job is completed.

Part No. 105-FF for 1/4", 5/16", 3/8" and 1/2"
O.D. Tubing.

CAT. NO. 34845

6

EQUIPMENT AND TOOLS

IMPERIAL FLARING AND SWAGING TOOLS



193-S

SWAGING TOOL KITS



195-SA

Enlarges end of tubing so it can be used to make solder joints without fittings.

CAT. NO.	PART NO.	DESCRIPTION
34816	195-SA	Kit with flaring bar and 4 swaging tools for 1/4", 3/8", 1/2" and 5/8" O.D. tubing.
34818	193-S	4 Swaging Tools only for 1/4", 3/8", 1/2" and 5/8" O.D. tubing.

SWAGING PUNCHES ONLY



93-S



94-S

CAT. NO.	P/N	O.D. Size	CAT. NO.	P/N	O.D. Size
34819	93-S	3/16"	34826	93-S	5/8"
34820	93-S	1/4"	34827	93-S	3/4"
34821	93-S	5/16"		93-S	7/8"
34822	93-S	3/8"	34825	94-S	1/2", 5/8"
34823	93-S	1/2"			7/8"

SCREW-TYPE SWAGING TOOL



Far easier to work within close quarters than punch type tools. No punch to drop, no chance of doing a poor job. Perfect swage alignment of tube every time. Adapters change quickly. For 1/2", 5/8" & 7/8" OD Tube. In plastic kit.

CAT. NO. 34824

FLARING (45°) & SWAGING TOOL



Flares or swages. Converts quickly Screw type feed. Ideal close quarters tool. Two bars included cover 9 sizes. Swivel type swaging adapters and spreader cone are hard chrome finished for easy operation. Self-centering, slip-on forged steel yoke.

CAT. NO.	P/N	DESCRIPTION
34833	275-FS	Flares 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. Includes 5 Swage adapters for 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", O.D. in plastic kit.

PRODUCTION FLARING & SWAGING TOOL



Flares and Swages 6 Sizes of soft copper, aluminum or brass tubing. Portable — can be used anywhere there is a vice or bench. Change sizes quickly. Self-gauging for accurate flare size or swage depth.

45° and 37° for 3/16", 1/4", 5/16", 3/8", 1/2" & 5/8" OD tubing. Supplied with 45° and 37° flaring cones and 6 swaging adapters.

CAT. NO. 34874

NOTE: FLARING ANGLES — Refrig/Air Cond. Work 45° — Plumbing Work 37°

FLARING TOOL 45°

P/N 300 — FA



Flares 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. Tubing.

CAT. NO. 34834

9 IN 1 FLARING TOOL 45°

P/N 900 — FB



Flares and automatically burnishes 9 sizes of tubing — 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", and 3/4" O.D. Tubing. Tube sizes are clearly marked on both faces of chrome plated die bar.

CAT. NO. 34839

ECONOMY 45° FLARING TOOL

P/N 296 — FA



Flares 7 sizes of tubing. Easy operating swivel-type, hard chrome finished cone to assure smooth flares. Sizes — 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" O.D. Tubing.

CAT. NO. 34888

FLARING TOOL WITH QUICK SLIP-ON YOKE 45°

P/N 195 — FC



Exceptional ease and speed of operation. Yokes made of forged steel. Flares — 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" O.D. Tubing.

CAT. NO. 34832

ROL-AIR® FLARING TOOL



Flares — 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" OD Tubing.

45° P/N 500-FA

CAT. NO. 34838

"Grabber" ROL-AIR® FLARING TOOL



Universal application. Unique, self-adjusting tube holding mechanism, permits flaring any size tubing 3/16" thru 5/8". Innovative single opening design is more compact and easier to use than conventional multi-opening flaring bars. Yoke slips over top of bar, then locks into position with slight turn. Satin and black nickel finish. ONE OPENING HOLDS ALL SIZES 3/16" to 5/8" O.D.

45° P/N 525-F

CAT. NO. 34829

EQUIPMENT AND TOOLS IMPERIAL FLARING AND SWAGING TOOLS

WIDE RANGE FLARING (45°) KIT



Compact kit holds 2 flaring bars and one yoke for flaring 9 tube sizes. Self-centering forged steel yoke has latest slip-on feature. Hard chrome finished, swivel-type flaring cone reduces effort required. Positive clamping action of flaring bars eliminates tube movement. Satin finish nickel chrome plated.

CAT.NO.	PART NO.	DESCRIPTION
34836	375 - FS	Flares - 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. Tubing. In plastic kit
34837	376 - FS	Flares - 1/2", 5/8" and 3/4" O.D. Tubing.

FLARING TOOLS (45°) FOR LARGER SIZES



Flares larger tube sizes. Quick slip-on yoke. Hard chrome finished, swivel flaring cone reduces effort required. Positive clamping action of flaring bar eliminates tube movement. Satin finish nickel-chrome plated.

CAT.NO.	PART NO.	DESCRIPTION
34831	203 - FA	Flares - 5/8", 3/4", 7/8" and 1-1/8" O.D. Tubing.
34830	103 - FS	Flares - 3/4", 7/8" and 1" O.D. Tubing.

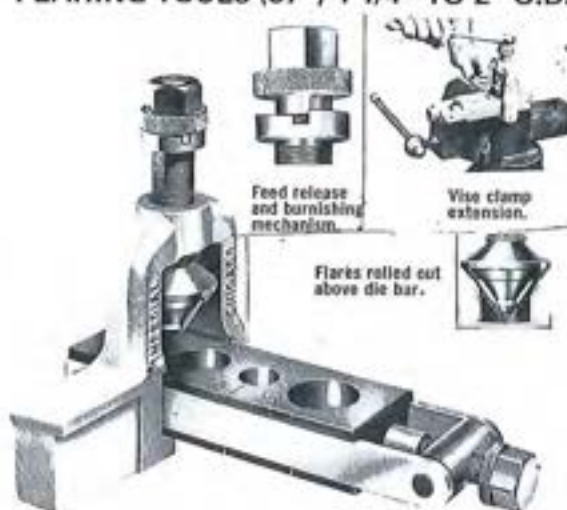
FLARING TOOL (37°)



Forms 37° flares to AN Standards in steel, stainless steel (including MIL-T-6845), titanium and other metal tubing. Positive stop gauge assures correct size of flare. Special burnishing action polishes flare face. 3 rollers in flaring cone roll out 37° flare above die block. Roller action cuts effort required; maintains original wall thickness; eliminates stress concentration. Extension on yoke for clamping in vise. Satin chrome and black nickel finish. Furnished in plastic kit.

CAT.NO.	PART NO.	DESCRIPTION
34879	400 - F	Flares - 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. Tubing.
	402 - FA	Flaring and Reaming Kit. Contains No. 400-F Flaring Tool and No. 401-FA Reaming Yoke for 1/4", to 5/8" O.D. Tubing. In Plastic Kit.

FLARING TOOLS (37°) 1-1/4" TO 2" O.D.

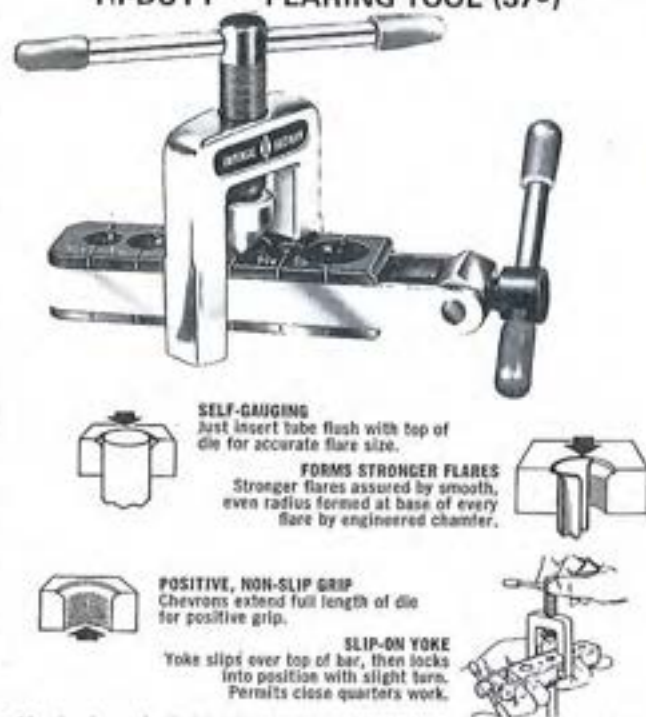


For Soft Steel, Copper, Aluminium, Annealed Stainless Steel Tubing

3 cylinders in flaring cone roll out 37° flare above die block. Flares soft steel, copper, aluminium and fully annealed stainless steel tubing. Roller action cuts effort required; maintains original wall thickness; eliminates stress concentration. Automatic burnishing action. Vise clamp extension on yoke. Heat treated dies clamp tubing without marking it. Satin chrome and black nickel finish. Supplied in steel kit.

CAT.NO.	PART NO.	DESCRIPTION
34877	537 - F	Flares and Burnishes - 3/4", 7/8", 1" and 1-1/4" O.D. Tubing.
34878	637 - F	Flares and Burnishes - 1-1/4", 1-1/2" and 2" Tubing.

HI-DUTY® FLARING TOOL (37°)



- SELF-GAUGING**
Just insert tube flush with top of die for accurate flare size.
- FORMS STRONGER FLARES**
Stronger flares assured by smooth, even radius formed at base of every flare by engineered chamfer.
- POSITIVE, NON-SLIP GRIP**
Chevrons extend full length of die for positive grip.
- SLIP-ON YOKE**
Yoke slips over top of bar, then locks into position with slight turn. Permits close quarters work.

Hard chrome finished cone makes exceptionally smooth, high strength flares with a radius at base of flare - instead of the sharp angle formed by ordinary tools. New slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. New feed screw design provides smoother, easier operation. Positive gripping and self-gaging of tube for exact flare size. Sliding die blocks lock in place by lever clamp action. Satin chrome and black nickel finish.

Flares - 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. Tubing.

P/N 437 - FA

CAT. NO. 34876

NOTE: FLARING ANGLES - Refrig./Air Cond. Work 45° - Plumbing Work 37°

SECTION 6

348-b

EQUIPMENT AND TOOLS

IMPERIAL FLARING AND SWAGING TOOLS

HEAVY DUTY FLARING TOOL (37°)



Forms 37° flares in annealed stainless steel (MIL-T-8845 or AMS5668), cold drawn stainless steel and annealed copper or aluminum tubing. Ideal for use where considerable number of 37° flares in stainless steel tubing must be made every day. Built to withstand continuous rugged service. Ball thrust bearing flaring cone mechanism reduces effort required. Hardened tool steel die features non-slip grip of tubing, even after repetitive flaring. Bar has vise extension.

PART No. 447 - F for 1/8", 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. Tubing.

CAT. No. 34880



DOUBLE FLARING TOOL (45°)

For welded or brazed soft steel tubing (such as Bundy). Also makes single or double flares on other soft tubing.

P/N 251-F - For 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. Tubing.

CAT. No. 34842

DOUBLE FLARING TOOL KIT (45°)



For brazed steel and other tubing. Overcomes tendency of brazed steel tubing to split when flared. Tool also single flares. Complete in plastic kit.

P/N 93-FB Double flares 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. Tubing.

CAT. No. 34840

AUTO. AIR COND. DOUBLE FLARING TOOL (45°)



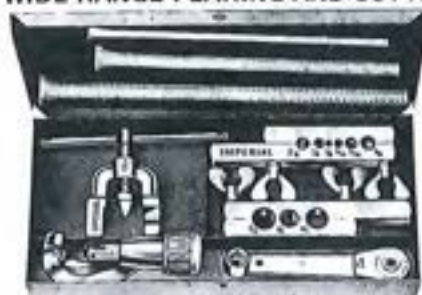
P/N 195-FB Double flares 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. Tubing having not over .135 inch wall. Complete in metal kit.

CAT. No. 34841

Designed for automotive air conditioning service. Makes double flares in soft copper or aluminum tubing (wall thickness to .035"). Easy operating ball bearing swivel-type hard chrome-finished flaring cone. Quick slip-on yoke. Flaring bar offers positive grip of tubing. Makes flare with double-thick, double-strength walls. Also makes single flares and oversize flares.

WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

WIDE RANGE FLARING AND CUTTING TOOL KITS



P/N 120-F

CAT. No.
34885

P/N 121-F

(Illustrated)

CAT. No.
34887

No. 120-F WIDE RANGE FLARING AND CUTTING KIT (45°)

Contains : No. 274-FC Cutting Tool, and No. 375-FS Wide Range Flaring Tool for tube sizes 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. In plastic carrying case.

No. 121-F ALL PURPOSE TUBING TOOL KIT Contains tools listed above plus three No. 102-F Bending Springs for 1/4", 3/8" and 1/2" O.D. tubing; and the No. 123-C Ratchet Wrench with 1/4" ratchet, 3/16" and 1/4" square opening and 1/2" hex. in handle. In steel carrying case.

ROBINAIR PINCH - OFF TOOL



CAT. NO. 3487

POSITIVE
PINCH-OFF ON TUBING
UP TO 3/8" O.D.

The only Pinch-Off Tool available to provide the field serviceman with a seal that duplicates the factory seal. The tool's unique design employs screw-type action, with ball bearings accepting the thrust for thread safety and ease of operation. Turn the screw with the handle provided or with a ratchet wrench and the tube is easily de pressed to a positive pinch-off without being weakened, cut or perforated. It is ideal for closing off compressor process tubes.

FLARING (45°) AND CUTTING TOOL KITS



All kits include Part No. 274-FC Tube Cutter, for tubing from 1/8" to 1-1/8" O.D.

Flaring Tools included are as listed below.

CAT. NO.	PART NO.	Flaring Tool P/N Included
34881	1226-FA	195-FC
34882	123-FA	300-FA
34886	124-FA	500-FA

NOTE

FLARING ANGLES : Refrig./Air Cond. Work 45°
Plumbing Work 37°

EQUIPMENT AND TOOLS REPLACEMENT PARTS FOR IMPERIAL FLARING AND SWAGING TOOLS

Note : Complete Tool Part Nos. are listed in numerical order.

Complete TOOL P/N	PART CAT.NO.	REPLAC P/N	PART DESCRIPTION
93 — FB	34851	32638	Yoke Assembly
	34867	32640	Compressor Cone
		36849	Bolt for Open End of Bar
		36850	Bolt for Pivot End of Bar
	34892	38381	Bar Assembly
		38388	3/16" Adapter
	34858	38584	Wing Nut (2 required)
		68012	1/4" Adapter
		68013	5/16" Adapter
	34872	68014	3/8" Adapter
103 — FS	34869	68015	1/2" Adapter
		28357	Bolt for Open End of Bar
		38586	Bolt for Pivot End of Bar
		28359	Wing Nut (2 required)
	34857	38903	Yoke Assembly
		38904	Compressor Cone Only
		38905	Bar Assembly
		278—FS	Individual Swaging Adapters Specify Size: 1/2, 5/8 or 7/8" O.D.
		32644	Rivet
		36849	Bolt—open end of bar (6-sided)
194 — S		36850	Bolt—pivot end of bar (4-sided)
	34858	38584	Wing Nut
		78858-01	Yoke Assembly
		69947	Bar Assembly
		28357	Bolt
		28359	Wing Nut (2 required)
		38586	Bolt
	34856	64250	Yoke Assembly
		64252	Compressor Cone
		64253	Bar Assembly
195 — FB		68012	1/4" Adapter
		68013	5/16" Adapter
	34872	68014	3/8" Adapter
	34869	68015	1/2" Adapter
	34870	68016	5/8" Adapter
	34871	68017	3/4" Adapter
		32644	Rivet (2 required)
	34858	38584	Wing Nut (2 required)
	34865	64462	Compressor Cone
		73938	Bolt (2 required)
195 — FC		75531	Bar Assembly
	34848	75534	Yoke Assembly
		28357	Bolt for open end of bar
		28358	Rivet
		28359	Wing Nut
		38586	Bolt for pivot end of bar
	34857	38903	Yoke Assembly
		38904	Compressor Cone
		70603	Bar Assembly
	251 — F	34891	63587 Pair of Die Blocks in Base
275 — FS		34863	278-FS 3/16, 1/4, 3/8" O.D. (1 Adapter)
		34860	278-FS 1/2" O.D. (Adapter)
		34861	278-FS 5/8" O.D. (Adapter)
		34862	278-FS 3/4" O.D. (Adapter)
		34858	38584 Wing Nut (2 required)
	34843	78858-01	Yoke Assembly without cone or adapters
		34868	38600 Compressor Cone
	34859	38766	Bar for 1/8", 3/16", 1/4", 5/16", 3/8" and 7/16" O.D. Tubing
	34849	38767	Bar for 1/2", 5/8" and 3/4" O.D. Tubing
		30009	Rivet
296 — FA		36849	Bolt for open end of bar (6 sided)
		36850	Bolt for pivot end of bar (4-sided)
	34858	38584	Wing Nut
		64464	Bar Assembly
	34847	71470	Yoke Assembly

Complete TOOL P/N	PART CAT.NO.	REPLAC P/N	PART DESCRIPTION
300 — FA	34846	79134-01	Yoke Assembly
	34865	64462	Compressor Cone
	34896	79133-01	Die Holder Assembly
	34867	32640	Compressor Cone
		36849	Bolt for Open End of Bar
		36850	Bolt for Pivot End of Bar
	34858	38584	Wing Nut (4 required)
	34859	38766	Flaring Bar for 1/8", 3/16", 1/4", 5/16", 3/8" and 7/16" O.D.
	34849	38767	Flaring Bar for 1/2", 5/8" and 3/4" O.D.
	34844	38769	Yoke Assembly
375 — FS		60232	Gauge Retaining Screw Spring
		60233	Gauge Retaining Screw
		61818	Gauge
		61825	Drive Nut Retaining Screw
		79249-01	Die Holder Assembly Complete
		68050	Drive Nut Retaining Spring
		68146	Flaring Cone Roller Retaining Cap
		69063	Yoke Assembly Complete
		69064	Flaring Cone
		69065	Flaring Cone Rollers (3 required)
376 — FS		79146-01	Yoke Assembly
		68128	Compressor Cone
		79147-01	Die Holder Assembly
		79248-01	Die Holder Assembly
		73146	Yoke Assembly
	34855	78992-01	Yoke Assembly
	34869	67863	Compressor Cone
	34890	78987-01	Die Holder Assembly
		79150-01	Yoke Assembly
		68009	Compressor Cone
400 — F		79151-01	Die Holder Assembly
		34893	80851-01 Yoke Assembly
		34894	80867-01 Cone
		80852-01	Tube Holding Assembly
		80868-01	Yoke Assembly
		80869-01	Cone
		80852-01	Tube Holding Assembly
		79234-01	Die Holder Assembly Complete
		61948	Yoke Assembly Complete
		61952	Rollers for Flaring Cone (3 required)
437 — FA		79174-01	Set of Dies Only
	34866	70348	45° Flaring Cone Only
		70349	37° Flaring Cone Only
		560-S	Swaging Adapters Only Specify Size Required: 3/16", 1/4", 5/16", 3/8", 1/2" or 5/8" O.D.
		70469	Guide
		64219	Yoke Assembly Complete
		64227	Rollers for Flaring Cone (3 required)
		79268-01	Die Holder Assembly Complete
447 — F			
500 — FA			
507 — FA			
525 — F			
527 — F			
537 — F			
555 — FS			
637 — F			

NOTE : ITEMS SHOWN WITH CAT. NOS.
ARE THE NORMALLY STOCKED ITEMS
OTHERS AVAILABLE EX OVERSEAS

TELEPHONE YOUR ORDER

GAS CYLINDERS



All Cylinders are manufactured in accordance with SAA Codes and supplied complete with built-in Relief Valves.

CAT. NO.	WATER CAP. kg	TYPE P/N	FILLING RATIO					
			1.36	1.15	1.03	1.07	0.53	
			REFRIGERANT CAPACITY kg					
			R11	R12	R22	R502	R717	
RHEEM								
3941	11	VPR	15	12.5	11.0	11.8	5.8	
3942	22	VPR	30	25.0	22.5	23.5	11.7	
3493	43	VPR	59	50.0	44.0	46.0	23.0	
3498	65	VPR	89	75.0	67.0	70.0	34.0	
3499	108	VPR	147	124.2	111.2	115.6	57.6	
HUDSON								
34918	4.5	1631		5.2	4.7	4.9		
34919	9.1	1632		10.5	9.4	9.7		
34920	22.0	1633		25.0	22.5	23.5		
34921	65.0	1634		75.0	67.0	70.0		

TRANSFERS FOR GAS CYLINDERS

For the convenient branding of cylinders, tanks, etc. with the refrigerant contained therein. Black lettering.

CAT. NO.	DESCRIPTION
3494	R12 with Red background.
3495	R22 with Yellow background.
34922	R502.
34923	R500.

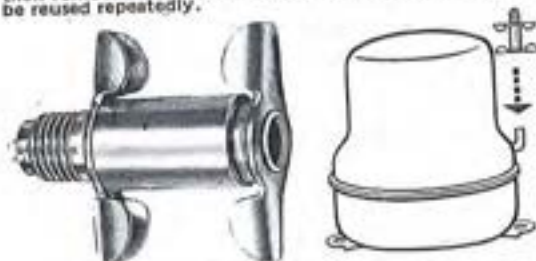
SEALED UNIT CHARGING TOOLS

A special tool (and spare parts) designed to fit on to various makes of Compressors for charging purposes.

CAT. NO.	PART NO.	DESCRIPTION
34937	MR664	Kirby Charging Valve Tool less hose & fitt.
34939	MR659	Kirby Charging Valve Tool c/w hose
34929	MR428	Kirby Charging Hose and Fittings
34935	MR716-1	Kirby Bush Charging Valve 1/4 Flare
34942	MR517	Kirby "O" Ring Seals
34940	ST41	Frigidaire
34941	M1	Kelvinator
34938	2834	Rubber Seals for 1/4" Charging Lines

IMPERIAL - PROCESS TUBE ADAPTER FOR CHARGING AND TESTING

Offers a convenient method of making a service connection to a hermetic unit. Also ideal for providing a connection in testing coils, tubing installations, etc. Handles pressures to 100psi (690kPa). To connect to a hermetic system, pinch-off tube is cut off and Adapter is slipped over cut end of tube and tightened. Synthetic rubber seal of Adapter grips outside of tube. This gives a 1/4" male flare connection to the system for purging, charging or testing. After system is recharged, tube is pinched off next to Adapter, which is then removed and tube cut off and sealed with solder. Adapter can be reused repeatedly.



CAT. NO.	PART NO.	TUBE OD (INS)	FLARE END OD (INS)
349140	241-F-03	3/16	1/4
34961	241-F-04	1/4	1/4
349138	241-F-05	5/16	1/4
349139	241-F-06	3/8	1/4

IMPERIAL - TUBING TEST PLUGS



For temporary shut-off of tubing without pinching it off or installing a valve. Especially handy for plumbing, heating, refrigeration and instrumentation when trouble shooting for leaks. Light weight, fast acting, dependable. Insert Plug in tube end and tighten wing nut. Synthetic rubber expander seals tube and holds pressures to 100 psi. (690 kPa).

CAT. NO.	O.D. SIZE	PART NO.	WEIGHT g.
34978	1/4"	140 - F	14
34979	3/8"		21
34980	1/2"		28
34981	5/8"		43
34982	3/4"		57
34983	7/8"		85
34984	1-1/8"		113
34985	1-3/8"		113
34986	1-5/8"		142

IMPERIAL - TUBING TEST CAPS



For shutting off tube ends temporarily without pinching off or installing a valve. Used for working pressures to 100 psi. (690 kPa). No need to deburr tubing. Can be used even when tube surface is rough. Also, wall thickness of tube is unimportant. Place Cap over tube end and tighten wing nut. Synthetic rubber seal of Cap grips outside of tube.

CAT. NO.	O.D. TUBE	PART NO.
34971	1/4"	240 - F
34972	5/16"	

IMPERIAL - SINGLE GAUGE CHARGING AND TESTING UNIT



A compact single gauge unit which will perform a variety of charging and testing operations. Body is forged brass, with 1/4" O.D. flare connections. Supplied with wheel handle not assembled.

466-C - Charging and Testing Unit with 425-CB 2 1/2" compound gauge 30" - 0 - 250 lbs. pressure. Metric gauge also available.

401-C - Charging and Testing Unit without gauge.

CAT. NO.	PART NO.
34990	466 - C
34991	401 - C

UNIWEED CHARGING AND TESTING MANIFOLD



- Quick Action - 1/4 Turn Full Open - 1/4 Turn Closed
- Solid Brass Forged Body
- Extended Valve Stems
- Quick Seal Long Life Seats
- Gauge Connections 1/8 NPT. Hosts 1/4 Flare

CAT. NO. 349195

NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

EQUIPMENT AND TOOLS

IMPERIAL CHARGING LINES AND COUPLINGS



CHARGING LINES — COLOUR CODED 1/4" SAE KWIK-KUPLER CONNECTION

Three colours — red, blue and yellow — provide easy identification of lines for high side, low side and charge. Colour coding matches that of the Gould-Imperial Analyzer. Cover is pin pricked to prevent build-up of gas — an important safety feature. Kwik-Kupler connections with knurled nuts provide easy, fingertip connections. 45° elbow end has valve core depressor for use with depressor valve port on System Analyzer and automotive air conditioning systems.

STANDARD LINES 36" LENGTH — 45° ELBOW END

MRE CAT. NO.	IMPERIAL CAT. NO.	IMPERIAL PART NO.	DESCRIPTION
34930A	34930	303 - FTB	Set 3 Charging Lines, Blue, Red, Yellow
349107A	349107	336 - FTB	Blue Charging Line
349108A	349108	336 - FTR	Red Charging Line
34927A	34927	336 - FTY	Yellow Charging Line
—	349109	79583 - 01	Seal Gasket
—	349110	79573 - 01	Core Depressor

60" LENGTH — 90° ELBOW END

—	349115	360-FTY-90	Yellow
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LONG LINES — 45° ELBOW END

349143A	349143	348 - FTB	48" Lengths — Blue
34924A	34924	348 - FTY	48" Lengths — Yellow
349144A	349144	348 - FTR	48" Lengths — Red
349145A	349145	360 - FTB	60" Lengths — Blue
349146A	349146	360 - FTR	60" Lengths — Red
34925A	34925	360 - FTY	60" Lengths — Yellow
349161A	349161	372 - FTB	72" Lengths — Blue
349162A	349162	372 - FTR	72" Lengths — Red
34926A	34926	372 - FTY	72" Lengths — Yellow
349163A	349163	396 - FTB	96" Lengths — Blue
349164A	349164	396 - FTR	96" Lengths — Red
349165A	349165	396 - FTY	96" Lengths — Yellow
349166A	349166	3144 - FTB	144" Lengths — Blue
349167A	349167	3144 - FTR	144" Lengths — Red
34933A	34933	3144 - FTY	144" Lengths — Yellow
34932A	34932		Set 3 Chrg. Lines - 72" Blue, Red, Yellow

BIG JOB CAPACITY LINE — 3/8" HOSE

3/8" hose in three lengths for larger jobs or applications where reduced charging time is desired. 3/8" Kwik-Kupler ends. Available in Yellow only.

349112	536 - FTY	36" Length.
349113	548 - FTY	48" Length.
349114	560 - FTY	60" Length.
349111	79583-01	Seal Gasket.
349117	79583-02	" "

BULK CHARGING HOSE AND ATTACHABLE COUPLINGS

Imperial "Make-UP" Charging Lines are especially advantageous when servicing portable units where long lines or special end fittings are needed. Also ideal for other hard-to-get-at applications.

Hose has Buna N tube, braid reinforcement, neoprene cover. It is refrigerant, oil and abrasive resistant.

Has burst strength of 1600 lbs, which is far more than needed in actual service.

34993	98 - FT	100 ft. Reel Charging Hose (2-50 ft. lengths).
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ATTACHABLE COUPLINGS

KWIK — KUPLER — FEMALE FLARE SWIVEL

34994	97 - FT	1/4" Flare Swivel.
34995	63433	Extra Gasket.

FLARE SWIVEL NUT

34996	92 - FT	1/4" Female Flare.
34997	93 - FT	3/8" " "

MALE FLARE CONNECTOR

34998	89 - FT	1/4" Male Flare.
34999	94 - FT	3/8" " "

MALE PIPE THREAD CONNECTOR

349100	90 - FT	1/8" Male P.T.
349101	91 - FT	1/4" " "
	95 - FT	SLEEVE
	96 - FT	NUT



336-FTB
45° Elbow
Valve Core
Depressor End



360-FTY-90
90° Elbow
Valve Core
Depressor End



98-FT



97-FT

90-FT, 91-FT



92-FT, 93-FT

95-FT



89-FT, 94-FT



96-FT

EQUIPMENT AND TOOLS

IMPERIAL
SERVICE MANIFOLDS — SYSTEM ANALYZERSSERIES 450/460 FLAT-BACK
4-PORT, 2-VALVE SYSTEM ANALYZER

Deep Vacuum Valve Design
Diaphragm valve design operates with finger-tip precision. One turn to full open.

T-Grip Controls
Non-slip even with oily fingers.

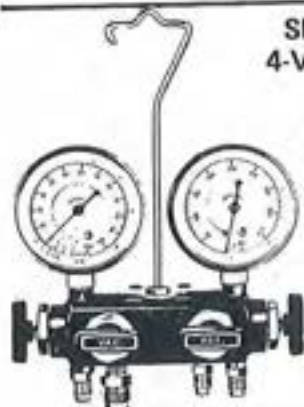
Complete Colour Coding

Built-In Hose Closures
Hose end screws into special body fittings.

4-Port Connections
Permit connecting vacuum, low side, high side and refrigerant lines at the same time. 4th. port with depressor valve provides vacuum connection. Connections are 1/4" flare.

Tough Gauge Crystals
Impact resistant Lexan. Front recalibration.

CAT. NO.	MODEL	DESCRIPTION
34960	453 - CB	Analyzer Manifold only without Gauges or Charging Lines.
34992	461 - CB	Analyzer with Gauges and 3 — 36" Charging Lines.
34987	462 - CB	Same as 461 - CB but with Plastic Carrying Case/Kit.

SERIES 620-C MAX-VAC®
4-Valve SYSTEM ANALYZER

4-Valve Efficiency
Vacuum, low side, high side and refrigerant lines are individually connected and controlled.

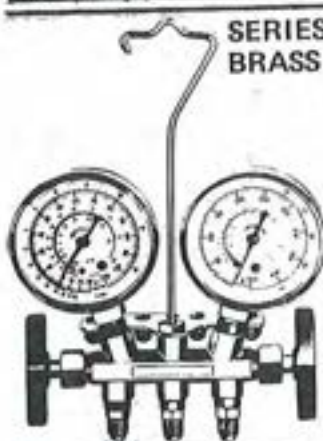
No need to switch charging lines.

Deep Vacuum Valve Design
Proven diaphragm type, soft seat valves require only finger-tip pressure to close completely. One turn to full open. Superior for deep vacuum service.

4-Times Faster Evacuation
3/8" vacuum port and oversize internal passages evacuate systems four times faster than ordinary manifolds. 3/8" port has greater area than combined inlets of high and low side lines.

60" Charging Lines — Standard
Includes one 3/8" line, three 1/4" lines

CAT. NO.	MODEL	DESCRIPTION
349179	620 - C	Manifold with Gauges - No Lines.

SERIES 490 CONVERTIBLE
BRASS SERVICE MANIFOLD

Tough Gauge Crystals
Impact resistant Lexan. Front recalibration.

Unique Swivel Hanger

Soft-Seat Valves
Brass stems with long wearing soft tips seat tightly, with finger-tip pressure.

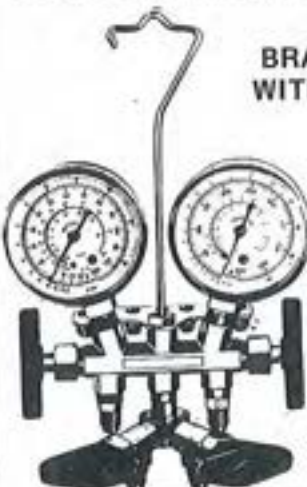
T-Grip Controls
Non-slip even with oily fingers.

Brass Hose End Closure Bracket

Complete Colour Coding

2-Valve or 4-Valve Operation
Choose the conventional 2-valve style, or add the unique Plus-2 converter for more convenient 4-valve operation. All connections are 1/4" flare.

CAT. NO.	MODEL	DESCRIPTION
34977	494 - C	Manifold only without gauges or Charging Lines.
349182	495 - C	Manifold with gauges but without Charging Lines.
349181	496 - C	Manifold with gauges and 3 — 36" Charging Lines.

SERIES 490 2-PLUS-2
BRASS SERVICE MANIFOLD
WITH 4-VALVE OPERATION

4-Valve Operation
Vacuum, low side, high side and refrigerant lines are individually connected and controlled. No need to switch charging lines.

Tough Gauge Crystals
Impact resistant Lexan. Front recalibration.

Unique Swivel Hanger

Brass Hose End Closure Bracket

Soft-Seat Valves
Brass stems with long wearing soft tips seat tightly, with finger-tip pressure.

T-Grip Controls
Non-slip even with oily fingers.

CAT. NO.	MODEL	DESCRIPTION
349174	493 - C	Manifold with gauges and 4 — 60" Charging Lines and Carrying Case.

491-C Plus-2 Converter

Instantly adapts 2-valve units to 4-valve operation. Converts any two valve side handle manifold. No need to switch charging lines. Connections are 1/4" flare.

CAT. NO. 349150



1. Remove center fitting.



2. Thread adapter into port.

3. Thread valves into adapter.

640-C HIGH CAPACITY SERVICE MANIFOLD

SPECIFICALLY DESIGNED FOR
FAST SYSTEM EVACUATION

CAT. NO. 349170



Up to 30-Times Faster Evacuation
Oversize 1/2" internal passages. Evacuate systems as much as thirty times faster than conventional manifolds on systems with large access fittings. Evacuates six times faster on systems with 1/4" core valve fittings.

Vacuum Sensor Port
Electronic vacuum gauge sensor port and valve control simplifies use with micron gauges.

5-Valve Efficiency
Vacuum pump, vacuum gauge, low side, high side and refrigerant supply valve controls. No need to switch charging lines.

T-Grip Controls
Ice handles on valves give non-slip operation, even with oily fingers.

Deep Vacuum Valve Design
Soft seat valves require only finger-tip pressure to close completely. One turn to full open. Superior for deep vacuum service.

Impact Resistant Crystals
Solid brass gauge cases. Impact resistant crystals on gauges. Front recalibration.

Carrying Case and Hoses
Includes case, two 1/2" x 60" and one 1/4" x 60" long hoses and two 1/4" to 1/2" adapters.



ROBINAIR® EQUIPMENT AND TOOLS

"DUO-TEST" CHARGING HOSES 1/4" S.A.E.



SINGLE HOSES

FEATURES INCLUDE :

All brass barb and ferrule. Long quick coupler nut for easy finger tightening. Improved quality rubber covered hose is extremely flexible, and impervious to common refrigerants. Has a max. working pressure of 500 psi (3448 kPa) and average burst pressure of 2000 psi (13790 kPa). Moulded gasket is easy to replace but won't pop out. Free swivelling Quick Coupler eliminates binding or kinking of hose when tightening.

Valve depressor supplied in elbow end of all 1/4" lines. Can be easily removed if not required or for replacement.

New 45° bend on barb.

Colour Coded Sets : Colour coding eliminates line tracing during testing, evacuation or recharging. Speeds up service work, cuts costs. Packaged in sets or supplied individually.

Each hose has valve depressor in elbow end.

CAT. NO.	PART No.	DESCRIPTION
34949	40035	Set 3 - 36" - White, Blue, Red
349196	40037	1 - 36" - Blue (Single Hose)
349197	40042	1 - 36" - Red (Single Hose)
349198	40043	1 - 36" - White (Single Hose)
34943	40044	1 - 36" - Yellow (Single Hose)
34945	40083	Set 6 - 1/4" Gaskets

CAT. NO.	PART No.	DESCRIPTION
349199	40056	Set 3 - 72" - White, Blue, Red
349201	40064	1 - 72" - Blue (Single Hose)
349202	40066	1 - 72" - Red (Single Hose)
349203	40067	1 - 72" - White (Single Hose)
34946	40068	1 - 72" - Yellow (Single Hose)
394204	40082	6 Replacement Valve Depressors

HEAVY DUTY 1/4" HOSES : For R22 intermittent charging and testing. Recommended for permanent application with R12. These hoses are of heavy construction, will not collapse under high vacuum and will provide long and reliable service. Maximum working pressure of 350 psi (2413 kPa) and average burst pressure of 1750 psi (12066 kPa).

CAT. NO.	PART No.	DESCRIPTION
34944	40045	36" Hose with 1/4" Quick Coupler on one end (Single Hose)

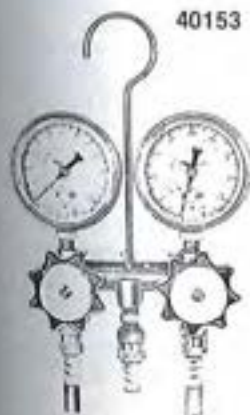
LARGE DIAMETER HOSE 3/8" S.A.E. : For R22 intermittent charging and testing. Recommended if faster evacuation or transfer of refrigerant is desired. Heavy construction but flexible, with long service rubber outer covering. Have 3/8" S.A.E. Quick Couplers. 350 psi (2413 kPa) working pressure and 1750 psi (12066 kPa) burst pressure.

CAT. NO.	PART NO.	DESCRIPTION
34957	40096	36" Hose with 3/8" Straight Quick Coupler (Single Hose).
34958	40099	60" " " " " " " " " " " " "
349205	40084	Replacement Gaskets.

CHARGING AND TESTING MANIFOLDS



40153



40166

The ideal unit for testing, evacuating, recharging or setting controls. Available with standard 2 1/2" diameter colour coded gauges. Gauges have restriction screw, front recalibrator and temperature scale for Refrigerant 12, 22 and 502. Compound gauge (blue case) has 30" vacuum to 120 PSI with retard to 250 PSI. Pressure gauge (red case) has 0 to 500 PSI range, 1/8" FPT gauge connections; other connections are 1/4" SAE male flare.

All brass forged body, compact, lightweight yet designed for rugged use.

Special stem seats and double "O" ring seals provide positive leakproof shut-off.

Stem seats, "O" rings and flare connections can be replaced.

Machined for maximum flow, with only 2 1/2 turns of hand wheel.

Equivalent Metric gauges available.

CAT.NO.	PART NO.	DESCRIPTION
34976	40153	Manifold bar, complete with hook, hose holder, colour coded gauges and colour coded 36" hoses.
34975	40166	Manifold bar with colour coded gauges.

EQUIPMENT AND TOOLS **ROBINAIR®****HOSE HOLDERS**

Attaches to back of Double Port unit. Keeps hose dry and free from dirt when not in use.

CAT. NO. 349188

PART NO. 40223

Fits P/N 40166 Unit.



40107

FOUR-WAY CONVERSION KITS

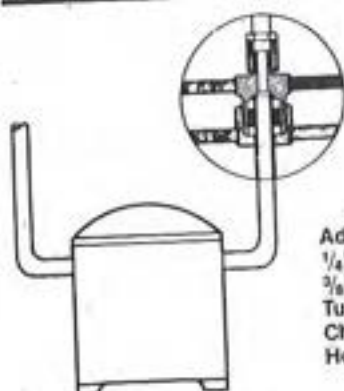
40107 Converts any Robinair double port manifold into a permanent 4-way unit. Consists of conversion elbow, and 2 service valves. Valve connection $\frac{1}{4}$ " S.A.E. Male Flare

CAT. NO. 349187

PART NO. 40107

PROCESS TUBE FITTINGS

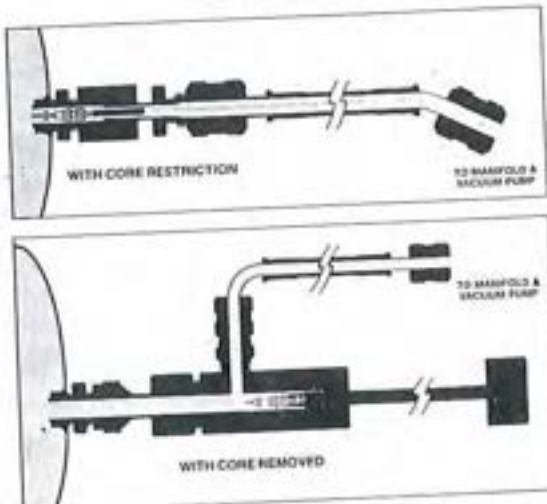
Designed to provide the fastest and easiest means of connecting charging lines to process tubes for evacuating and recharging a system. Design assures an absolute seal between tubing and charging hose. Eliminates flaring and the possibility of tube chips getting into the system. Simply cut off process tube seals, insert tube into proper size adapter, tighten to seal, attach charging line, evacuate and recharge. After recharging use companion tool 12396 Pinch-Off Tool **CAT. NO. 3487** to crimp tubing. Remove Process Fitting and solder the end of the process stub.



Adapts $\frac{3}{16}$ "
 $\frac{1}{4}$ " $\frac{5}{16}$ " and
 $\frac{3}{8}$ " Copper
Tubing to a
Charging
Hose



CAT. NO.	PART NO.	DESCRIPTION
34950	12458	PROCESS TUBE ADAPTER KIT Adapts 3/16", 1/4", 5/16" & 3/8" tubing to charging hose.
REPLACEMENT SEALS - 2 each required.		
349208	43536	3/8"
349209	43537	5/16"
349210	43538	1/4"
349211	43539	3/16"
REPLACEMENT WASHERS - 4 each required.		
349212	43540	3/8"
349213	43541	5/16"
349214	43542	1/4"
349215	43543	3/16"
349216	43546	Plastic Box.

Access valve core remover and replacer

Designed specifically for use when evacuating or recharging any system using "Schrader" type access valves. This tool removes the valve core and holds it back out of the way, inside the tool to eliminate restriction and provide full flow. Use of this tool makes it possible to evacuate and recharge in half the time normally required. Replacement "O" Rings and gaskets supplied with tool.

A. With core upset method a considerable restriction results, slowing down evacuation and recharging.

B. The "core removal" method provides maximum flow greatly reducing the time required to perform this important service operation.

New flat type "O" ring to seal on flare fittings. Two "O" rings to seal shaft with oil wick to keep shaft lubricated.

CAT. NO.	PART NO.
34959	10515
Replacement "O" Ring Kit	
349217	40708



EQUIPMENT AND TOOLS CHARGING EQUIPMENT

349-e

HUDSON

CHARGING CYLINDER

Graduated in metric and imperial units
for refrigerants R12, R22 and R502.

CAT. NO.	CAPACITY		DIMENSIONS L x W mm	MASS (Empty)	PART NO.
	grams	ozs.			
34911	1100	38.8	560 x 70	3.06 kg	A15500
34910	2360	83.3	580 x 100	4.31 kg	A15501



ROBINAIR®

Dial-a-charge® charging cylinders

Duplicate factory accuracy when recharging systems in the field
Accuracy $\pm 1/4$ oz.

Dial-A-Charge Charging Cylinders permit the serviceman to easily compensate for volume fluctuations resulting from temperature variations. They allow the serviceman to buy refrigerant in economical drums and provide accuracy in recharging, eliminating and over and under charging which might require call backs.

These cylinders are provided with heating elements. The use of the cylinders with the heating element allows the serviceman to overcome equalization of pressure between the system and the charging cylinder and reduce time required to recharge.

Cylinders with heating elements eliminate the need to warm with a heating blanket, or immerse the cylinder in a container of hot water or heat the base with a torch.

Simply "dial" the calibrated plastic shroud so the pressure heading at the top of the shroud corresponds to the gauge reading and the cylinder is ready to charge. Cylinders have shut-off valves with Teflon seats for finger tip control in charging systems to factory specifications, and are accurate to $1/4$ oz. of refrigerant when charging system.

WARNING

Due to the chemical nature of most refrigerants, high ambient and working temperatures will cause high pressures within the cylinder. To eliminate this potentially dangerous condition all Robinair Charging Cylinders are equipped with automatic pressure relief valves for your safety.

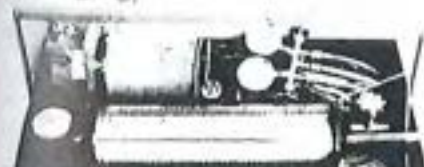
CAT. NO.	PART No.	CAPACITY GRAMS	GAUGE	GRADUATION INCREMENTS
34916	20310	1100	kPa/PSI	25 g
34912	20311	2200	kPa/PSI	25 g
34913	20312	4400	kPa/PSI	50 g
REPLACEMENT PARTS				
	14764	Cylinder Pressure Gauge kPa/PSI		
	14322	Replacement Heating Element		
34951	43291	Sight Glass		
34952	10746	1100	Gasket Kits : Sight Glass and Inner Cylinder	
34953	10747	2200		
34954	10748	4400		

ROBINAIR®

CHARGING STATIONS

TAKE YOUR SERVICE SHOP TO THE JOB

6



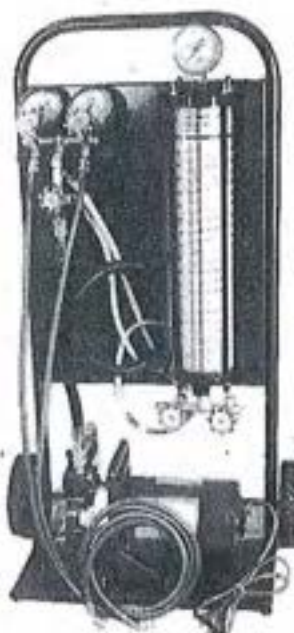
ROBI-PAK P/N 49001

These portable charging kits are designed as the ideal service aid for appliance and automotive repair shops. Consists of:
15096 High Vacuum Pump
43769 5 lb. Charging Cylinder
40163 Gauge Manifold Set

These portable charging stations are designed as the ideal service aid for appliance and automotive repair shops. They are also used by some servicemen to make home repair calls. Utilizing the 15096 Vacuum Pump and one of the heated Dial-A-Charge Charging Cylinders along with the necessary manifold, gauges, lines, etc., these units require only one hook-up to dehydrate and recharge a refrigerant system. For appliance repair, they are ideal for window air conditioners, freezers, refrigerators, etc. since they are mobile and can be taken to the job. This same feature makes them the only practical piece of equipment available for garage mechanics working on automotive air conditioners.

The carts are constructed with 5/8" square steel handles, framing rigid sheet metal support plates and mounted on 1" x 8" wheels.

CAT. NO.	PART No.	CYLINDER CAPACITY lbs.	PUMP CAPACITY CFM	DESCRIPTION
349125	13105	5	1	PORTABLE CHARGING STATION
349126	13106	10	1	
349133	49001	5	1	ROBI-PAK CHARGING KIT



13105

EQUIPMENT AND TOOLS IMPERIAL SERVICE KITS

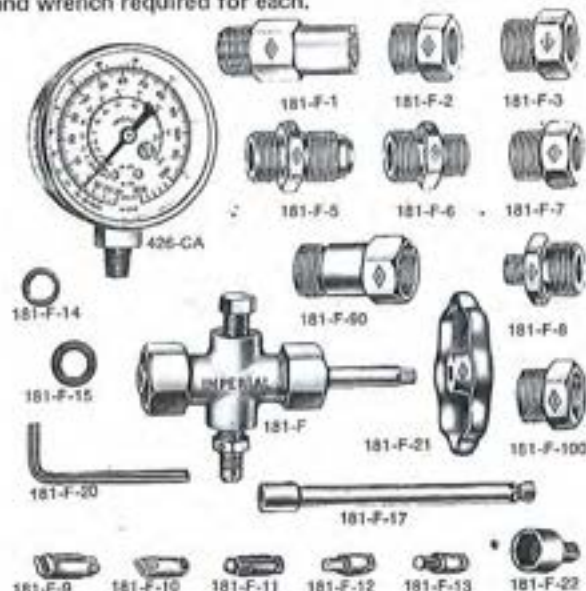
SERVICE VALVE KIT FOR HERMETIC UNITS

For charging, purging and testing hermetically sealed units. Valve equipped with wheel handle for easy operation. Has chrome plated compound retard gauge. Reads from 30" to 120 lbs., retard to 250 lbs. Has temperature scale for R-12, R-22, and R-502. Recalibration screw on gauge face. Metric Gauge available.



289-F

Kit furnished complete in special metal case so arranged that wheel handle and gauge need not be removed from valve when placed in box. Includes 9 adapters, 6 wrenches, 5 gaskets, plug for gauge connection; also a set screw wrench for loosening valve on machines requiring spline wrench. Chart on cover lists units serviced and adapter and wrench required for each.



CAT. NO. 34970	No. 182-F	Service Valve Kit without gauge.
CAT. NO. 34968	No. 289-F	Service Valve Kit with 2 1/2" compound.



181-F-18

ADAPTER for servicing refrigerators, freezers and air conditioning units. Adapter attaches to compressor valve body and is used with a compound gauge to indicate low side pressures while diagnosing and servicing the system.

CAT. NO. 34969 PART NO. 181-F-18

AIR CONDITIONING SERVICE KIT



P/N	CONTENTS OF KIT. Description
10-C	90° swivel adapter.
124-C	4-way ratchet wrench.
336-FTB	3' blue charging line.
336-FTR	3' red charging line.
338-C	Tap-A-Can dispensing valve.
372-FTV	6' yellow charging line.
380-G	One pair safety goggles.
495-C	Brass charging manifold with pressure and compound retard gauges.
602-T	Dial Fahrenheit thermometer —1-3/8" face. -40° to +160°F in 2° increments.
5100	Complete service manual for air conditioning systems in cars and light trucks.

Here's all you need to handle air conditioning service jobs. Imperial's master service kit includes a professional charging manifold, complete with gauges and charging lines; Tap-A-Can safety dispensing valve for tapping refrigerant cans; 4-way ratchet wrench, goggles, thermometer and a 90 degree Swivel Adapter for use in automotive air conditioning applications. A complete Auto Air Conditioning Service Manual covering service and repair techniques is included.

CAT. NO. 349178 PART NO. 490-F Air Cond. Service Kit.

KWIK-CHARGE® Liquid Low Side Charger

Provides fast, safe charge essential when using tracing dye



Up to 8 times faster than vapor charging
One charger services all units 1/2 ton or larger
No need to heat refrigerant cylinder
No pressure drop in cylinder
Built-in check valve opens for drawing unrestricted vacuum



Kwik-Charge accepts liquid refrigerant charges into low side of the system. Charging rate is up to eight times faster than vapour charging. In addition, liquid charging is required when using tracing dye. Kwik-Charge is attached to the low side of the charging manifold. Charging hose is connected from Kwik-Charge outlet to low side of refrigeration system. Internal Kwik-Charge metering element reduces liquid flow to a level below capacity of compressor. This assures a safe, fast charge without endangering the compressor. A built-in ball check valve automatically opens when drawing a vacuum to assure rapid, unrestricted evacuation. Can be used with all fluorinated hydrocarbon refrigerant systems.

CAT. NO. 349186 Kwik-Charge W/Female S.A.E. Flare Inlet, W/Male S.A.E. Flare Outlet.

EQUIPMENT AND TOOLS

INSPECTION MIRRORS



Invaluable for inspecting that "hard to see" place, particularly after soldering or brazing to make sure the metal has flowed right round the joint.

CAT. NO.	MAKE	P/N	DESCRIPTION
3501	ZEAL	1187K	Std. Fixed Head.
35063	ROBINAIR	14145	Adjust. Head, Illuminated Battery powered. 12 1/2" long O/A.

USE ONE HAND TO READ SERIAL NUMBERS
INSPECT INACCESSIBLE AREAS AND JOINTS.
USE AS FLASHLIGHT

INSPECTION LIGHT

CAT. NO.
35014



NOW! PIN-POINT LEAKS
ACCURATE • ELIMINATES
ALL GUESS WORK!

MODEL NO. ELD

Made entirely of durable Aluminium alloy.
Light extending tube — complete with reflecting mirror.
Contains 2 standard pen light batteries.

Unique push-button or continuous lock lighting switch. Can be used as a flashlight (Mirror and flashlight can be separated for individual applications).
Also used to inspect blind spots on sweat joints.

WATSCO SEARCH® LEAK DETECTOR FOAM

A special chemical that forms a thick foam in the container when shaken. When the foam is dispensed to a suspected area per medium of the plastic nozzle any leak is quickly located by the formation of large bubbles.

CAT. NO. 3502

4 oz. Plastic Container

LEAK DETECTOR SPIRIT

A high quality spirit suitable for all spirit burning leak detectors.

CAT. NO.	
3503	1/4 Gall. Container.
3504	1 Gall. Container.

PHILIPS INDICATING SCREWDRIVER



A small 5" (13 cm) Screwdriver invaluable when carrying out electrical repairs. The neon indicator tube located in the handle glows when the un-insulated end of the blade comes in contact with an active terminal or wire. Suitable for all voltages between 110 and 500.

CAT. NO. 3507

PART NO. 7800-15

CAT. NO. 3508

Replac. Neon Tube

SOCKET SCREW (ALLEN) KEYS



A set of 8 Keys on ring 1/16, 5/64, 3/32, 1/8, 5/32, 3/16, 7/32 and 1/4. The special spring "clip-on" device makes it easy to remove and replace the keys on the ring which ensures you have the right key on the job at all times.

CAT. NO. 3506

PART NO. MASTER
SET 1A

IMPERIAL
INNER - OUTER TUBE REAMER

Reams both inside and outside edges of tube with three hollow ground tool steel cutters. Fluted body is shaped to fit comfortably in palm. 208-FSS has high speed steel cutters.

208-F for copper, aluminium and brass tubing.

208-FSS for aircraft grade stainless steel tubing, hard or soft copper, aluminium, brass and steel tubing.

Reaming capacity — 3/16 to 1-1/2" O.D.

CAT. NO. 3509

PART NO. 208 - F

CAT. NO. 35010

PART NO. 208 - FSS

JOKARI . WIRE STRIPPING PLIERS

REVOLUTIONARY NEW TIME SAVER NO ADJUSTMENT FOR SIZES 1/32" TO 1/4" CABLE NO DAMAGE TO INNER CONDUCTORS



A new, improved type for stripping without adjustment solid conductors and stranded wires from 0.75 to 6.0 mm (1/32" to 1/4").
Easy and simple to use - Clean and smooth cut - No damage to stranded wires or inner conductors - job done within seconds.
Continuously ready for use because of its additional tension spring.
Equipped with wire cutter.

CAT. NO. 35074



STRIPPING WITHIN SECONDS — THAT'S IT

USE OUR TELEX SERVICE FOR YOUR ORDER

CAT. NO.

THIN WALL HEX SOCKET**(G.M. Compressors)**

This socket is used to remove and tighten compressor shaft nut. Outside diameter of socket is ground to a special size to assure getting on the nut without interference with other parts. $\frac{3}{8}$ " drive.



10416 9/16

CLUTCH HUB HOLDING TOOL**(G.M. Compressors 4, 5 and 6 cylinder)**

When compressor has failed electrically and clutch cannot be energized or when servicing on a work bench, compressor shaft nut cannot be loosened unless clutch hub is held, 10418 does the job.



10418

BELT TENSION GAUGE

For checking strand tension of belts to air conditioning compressors, power steering, fans and generators. Faster . . . easier . . . more accurate because of many new features. Positive stop insures accurate readings and repeatability. Use of reset button and lazy hand pointer enables the technician to reach awkward locations, make a check and remove the gauge to take his reading. All steel constructed case makes gauge rugged and durable, able to withstand real punishment in your service area. Packaged complete with belt strand tension specifications, in pounds.



10640

 P/N
10500
CAT. NO.
35059

 10500
10550
GM-6 CYLINDER COMPRESSOR TOOL KIT

The three popular types of compressors currently used on U.S. auto air conditioning systems are:

1. G.M. Frigidaire/Delco air conditioning — 10500
2. York Models A-206, 209 and 210 — 10550
3. Tecumseh HG850 and HG1000 — 10550

Two economical tool sets have been developed for field servicing of shaft bearings and seals for the above models — 10500 and 10550. Each tool is a necessity, and a definite time saver.

40672 — Molded plastic storage case with convenient molded tray.


 P/N
10550
CAT. NO.
35616

 P/N
40672
CAT. NO.
10522 UNIVERSAL COMPRESSOR TOOL KIT

This kit is comprised of Robinair's two popular Compressor Tool Kits, 10500 & 10550, plus G. M. 5 Cylinder Compressor Tools, Chrysler, "EPR" Tool and Snap Ring Pliers.

Services:

Shaft Seals Clutches Retainer Rings "EPR" Valves
Bearings "O" Rings Pulleys Checks Oil Level

Applicable to COMPRESSORS:

G.M.—Frigidaire York Models A-206, 209 & 210
• Tecumseh Models HG 850 & HG 1000 • Chrysler Air Temp

Kit consists of: 10520 Tool Board, 10500 GM Compressor Tool Set and 10550 York & Tecumseh Compressor Tool (less cases). Set, 40687 & 40689 GM 5 Cylinder Hub Drive Plate Remover and Installer Tools, 10551 EPR Remover and Installer (Chrysler Products), and Snap Ring Pliers #21, #22, #23 and #26.



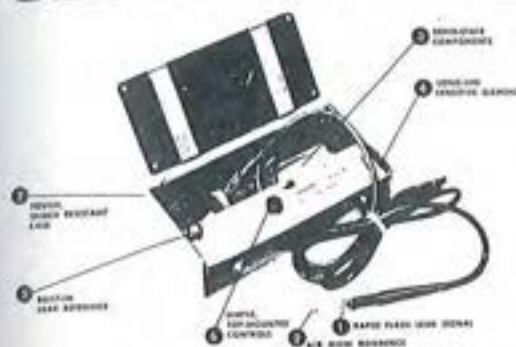
THERE'S JUST NOT ENOUGH SPACE TO LIST ALL OF THE EQUIPMENT AND SERVICES WE CAN OFFER YOU
LET US KNOW ABOUT YOUR REQUIREMENTS

EQUIPMENT AND TOOLS

LEAK DETECTORS

351

GENERAL ELECTRIC 'H-10A' -ELECTRONIC TYPE - 240V. A.C.



The G.E. H-10A Leak Detector draws in sample air through the probe tip. There is an instantaneous signal flash when you are near a leak. The faster the light flashes, the closer you are to the leak. An easy-to-see ball float built into the probe gives you a constant check on airflow through the probe. Solid state components add long life and minimise maintenance. The sensitive platinum element seldom requires replacement. When it does, a replacement simply plugs in. Has handy top-mounted controls for quick settings and adjustments. The H-10A's sensitivity is easily regulated with the Hi-Low switch. Hi can be used for most jobs; Low is for auto. air conditioner leaks.

SPECIFICATIONS

Power Supply: 240 volts, 50 cycles, 12 watts.
Sensitivity: 0.5 oz/year of R12 on Hi. 1.0 oz/year of R12 on Low.
Response Time: Approx. 1 second.
Reference Leak: R11 (refillable) Approx. life, 1 year.
Warm-up Time: Approx. 1 minute.
Dimensions: 114 x 86 x 216 mm (4.5 x 2.6 x 8.5 inches). Weight: 1 kg (2.2 lb).

CAT. NO. 3512 MODEL H-10A G.E. ELECTRONIC LEAK DETECTOR

REPLACEMENT PARTS FOR MODEL H-10 & NEW MODEL H-10A					
CAT. NO.	PART No.	DESCRIPTION	CAT. NO.	PART No.	DESCRIPTION
35115	1250K46G0700	Sensitive Element	35114	4777K45G0700	Maintenance Kit
	1474K14G0701	Bellows Assembly (H-10A)	35112	4777K46G0700	Reference Leak Refill
	1474K40G0700	Bellows Assembly (H-10)	35121	4869K18P0002	NE-2H (Probe Tip)
35117	1609K45G0700	Body Assy. Lead w/o Probe Tip	35122	4869K40P0001	Glow Lamp (AR9/K4A)
	1609K45G0702	Body Assembly (H-10A)	35111	5844K40P0002	Balance Potentiometer
35125	1621K16G0700	FS-2, P.C.B. (H-10)		5932K10G0001	Pump Assembly (H-10A)
	1623K35G0001	P.C.B. (H-10A)		6705K96P0012	IN648 Diode
35118	1654K42G0700	Reference Leak Assembly (H-10)		7840K42P0001	Speaker
35151	1654K42G0704	Reference Leak Assembly (H-10A)	35119	8159K40P0028	FS-2 Sensitivity Switch
	2164K23P0002	Tan Case (H-10)		8159K40P0070	Sensitivity Switch (H-10A)
	2164K33P0002	Case & Cover Assembly (H-10A)	35116	8511K41G0700	Probe Tip
	3731K41G0700	Pump Solenoid	35123	8600K53P0004	FS-2 Transformer
	3731K41G0702	Pump Solenoid (H-10A)	NOTE: Some Parts are common to both Models H-10 & H-10A		



LEAK DETECTOR

- Portable • Battery Powered • Audible and Visible Detection • Audible signal increases in pitch when pinpointing leak • Rugged construction • Flexible 356 mm (14") Probe • Coiled cord extends to 1.02 m (40") • Balance control • Low battery indicator • 2 position High-Low switch permits leak detection in contaminated areas • Supplied with protective carrying case.

SPECIFICATIONS

Power Supply: 4 AA size batteries (not included) Sensitivity: 1/5 oz. per year
Response Time: Instantaneous Weight: 0.7 kg (24 oz.) with batteries
Battery Life: Up to 80 hours (alkaline batteries) Operating Temperature: 0°C to 38°C (32°F to 100°F)
Dimensions: 178 x 76 x 38 mm (7" x 3" x 1.5")

CAT. NO. 35126	P/N 14850	CAT. NO.	P/N 46450 Replacement Sensing Element
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6

New Leak Detector for Refrigeration Engineers

HALOTECK

- Rapid Response • Audio Output
- No Warm-up Time • Only one control
- Sensitive to less than 1/10th. oz. per year
- Battery Operated • Lightweight • Built-in Test Leak
- Completely new design sensor tip insensitive to draughts

The Halotek is a rugged, completely portable gas leak detector which will detect refrigerant and other halogenated gases down to 1/10th. oz per year. The instrument is ready for use immediately it is switched on and will not be adversely affected by large concentrations of halogenated gases in the atmosphere. A completely new design of sensor tip is a special feature of the Halotek. It provides almost instantaneous response which is unrivalled by most other detectors. The new sensor also eliminates draught problems which have previously created severe difficulties. For noisy areas, use the earphone accessory and simply plug into jack socket provided.

SPECIFICATIONS

Sensitivity: Better than 1/10th oz/yr. R12. Response Time: 0.1 sec. to 1 oz/yr. leak R12
Battery: 9 volt alkaline (PP3 size) Battery Life: 30 hours normal use
Duty Cycle: Continuous Operating Temperature: 0°C to 40°C
Check Leak: Nominally 1/5 oz/yr (14 g/yr) Probe Length: 240 mm (9.5")
Weight: 305 g (10.7 oz) with batteries and spares
Spares Supplied: 1 spare sensor, 1 pack filters, 1 check leak

CAT. NO.	TYPE No.	DESCRIPTION
35146	78.000	Halotek Leak Detector
ACCESSORIES/REPLACEMENT PARTS		
35148	78.100	Maintenance Kit - Comprises: 2 Sensors, 1 pack Filters, 2 Alkaline Batteries
35149	78.200	Earphone
	78.300	Pack of 5 Sensors
35147	13.500	Leak Check

EQUIPMENT AND TOOLS

tif 5000: Automatic Halogen Leak Detector...
so simple to operate, all you do is turn it on.


Sophisticated electronics make this the most automatic Leak Detector you can buy. Simply turn it on and begin searching for leaks. A computer-like beeping signal increases in both speed and frequency as the leak source is approached. So sensitive to halogen, it detects leaks as small as 1/2 ounce per year. It automatically recalibrates itself when turned off and on. Two C-cell batteries provide cordless operation for over 300 service calls.

FEATURES

- No calibration required
- Finds leaks in contaminated atmospheres
- Super-sensitive: responds to minute traces of halogen gas (3 PPM) 1/2 oz. year leak-rate
- Auto-set control: re-sets to any ambient level
- Cordless: operates on two C-cell batteries (3 volts)
- Sensor not poisoned by large doses of refrigerant
- Instant on — no warm up
- Constant power indication
- No dangerous or poisonous gases are generated
- Long flexible stainless probe for hard-to-reach areas.

Price includes: Earphone, Extra Sensing Tip, Tip Protector, Leak Source, 6 Filter Cloths, 2 "C" Cell Batteries and Carrying Case.

SPECIFICATIONS

Weight: 0.8 kg with batteries Dimensions: 203 x 76 x 46 mm (8" x 3" x 1.8")
 Probe Length: 317.5 mm (12 1/2") Warm-up Time: Instant
 Operating Temperature Range: 0°C to 38°C (32°F to 100°F)
 Battery Life: Approx. 70 hours, normal usage (alkaline batteries)
 Control: One Duty Cycle: Continuous, no limitation

CAT. NO.	TIF5000 PART No.	HLD440 PART No.	DESCRIPTION
35138	TIF5000	Obsolete	Automatic Halogen Leak Detector
REPLACEMENT PARTS & OPTIONAL ACCESSORIES			
35135	TIF446	HLD446	Earphone
35129	TIF447	HLD447	Carrying Case
35132	TIF444	HLD444	Maintenance Kit — Includes items listed below
35130	TIF441	HLD441	2 Sensing Tips
35131	TIF442	HLD442	3 Sensing Tip Protectors
35134	TIF443	HLD443	1 Leak Source
35127	TIF445	HLD445	12 Filter Cloths

tif 4000: Electronic Sightglass...

a far superior, electronic method of charging refrigeration systems.



What is an Electronic Sight Glass?

It's a revolutionary new tool for charging refrigeration systems. The TIF4000 is a small, portable, battery operated instrument which actually detects bubbles through refrigerant tubing with ultrasonic waves. It emits an audible signal letting you know when a system is precisely charged.

How does it work?

Simply secure the clamps of the TIF4000 onto the refrigerant tubing and begin charging the system. The clamps are fast and easy to get on and off and will not harm tubing. An ultrasonic wave is passed between the two clamps as the instrument "looks" through the tubing for bubbles. The TIF4000 then audibly signals you when the system is full.

An absolute requirement for capillary systems which have no sight glass whatsoever, the 4000 also is necessary when charging household and commercial refrigerators/freezers, packaged systems such as window/room air conditioning units and many late model automobiles with factory air.

The TIF4000 is also ideal for expansion valve systems. It is much more convenient and accurate to "hear" when the system being charged is full.

FEATURES

- Optimizes refrigerant charge
- Detects flash gas and bubbles in liquid line
- Detects droplets in suction line
- Detects starved evaporators
- Checks for refrigerant floodback
- Maximizes evaporator capacity
- Useful for multiple evaporator balancing
- Aids in adjusting thermostatic expansion valves
- Operates on any metal tubing
- Cordless operation
- Transducer clamps fit tubing from 1/8" to 1 1/2" diameter
- Low battery indicator

Price includes: Carrying Case, Service Hook, 9-Volt Transistor Battery and Matched Set of Transducers.

SPECIFICATIONS

Weight: 0.4 kg with battery Dimensions: 203 x 76 x 46 mm (8" x 3" x 1.8")
 Transducer cord length: 1.1 m (42") Two second continuous audible alarm
 Response time: 4 seconds initially Battery Life: 30 hours
 Operating Temperature Range: 0°C to 38°C (32°F to 100°F)

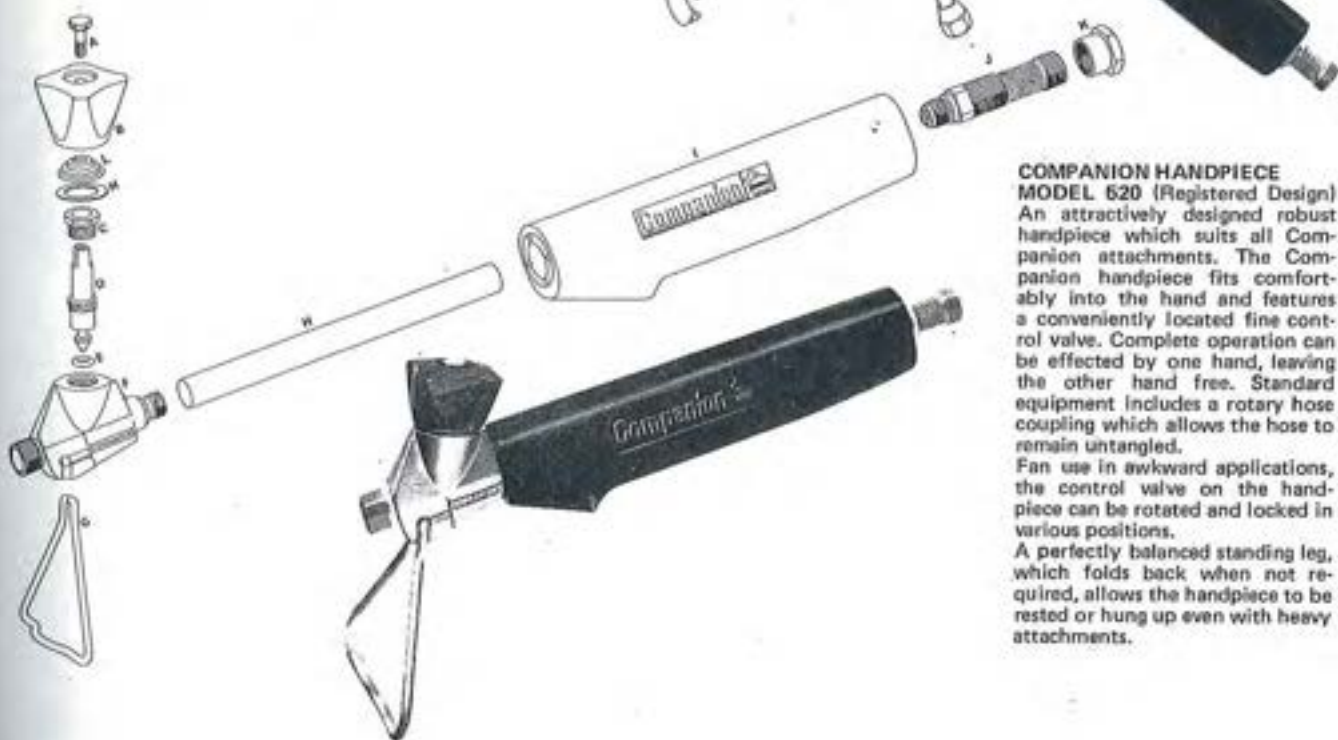
CAT. NO.	PART No.	DESCRIPTION
3519	TIF4000	ELECTRONIC SIGHT GLASS
REPLACEMENT PARTS		
	TIF4007	Carrying Case
	TIF4001	Service Hook
	TIF4004	Matched Set of Transducers

EQUIPMENT AND TOOLS

SIEVERT "COMPANION" LEAK DETECTORS

604 COMPANION LEAK DETECTOR

Completely new design. Small, neat and highly efficient. This extremely sensitive leak detector is used to detect and locate leaks in refrigeration installations. It has a flexible detection tube and can be used on all refrigeration plants employing non-inflammable gases of the halogen type. Comprises 520 handpiece and 776 leak detector attachment.



COMPANION HANDPIECE

MODEL 520 (Registered Design)

An attractively designed robust handpiece which suits all Companion attachments. The Companion handpiece fits comfortably into the hand and features a conveniently located fine control valve. Complete operation can be effected by one hand, leaving the other hand free. Standard equipment includes a rotary hose coupling which allows the hose to remain untangled.

For use in awkward applications, the control valve on the handpiece can be rotated and locked in various positions.

A perfectly balanced standing leg, which folds back when not required, allows the handpiece to be rested or hung up even with heavy attachments.

CAT. NO.	PART No.	DIAG. REF.	DESCRIPTION
35278	604		MODEL 604 LEAK DETECTOR COMPLETE
35274	77601	B	Burner Tube and
	77602	A	Burner Outer Assembly
35237	77610	C	Catalyst
35238	77611	D	Catalyst Screw
35267	73701	H	Burner Inner
35280	776		Leak Detector Head Assembly Use with cylinder size of choice plus 806 hose & 520 Handle Piece
35268	73732		Nipple
35270	55110		Neck Tube
35260	806		6ft. Hose with couplings (Old Type)
35261	1401		Soldering Bit

CAT. NO.	PART No.	DIAG. REF.	DESCRIPTION
352100	520		Model 520 Handpiece Complete
35281	52025	A	Hand Piece Screw
35282	52024	B	Control Knob
35283	52023	C	Cover Nut
35284	52031	D	Valve Spindle
35285	52032	E	"O" Ring
35286	52022	F	Valve Body
35287	52011	H	Tube
35288	52001	I	Handle
35289	52040	J	Rotary Connection Assembly

35232	9568		Primus to Sievert Adaptor
35273	561		Straight Neck Tube

USE ONLY GOOD TOOLS

CHEAP TOOLS ARE A POOR INVESTMENT AND CAN CAUSE ENDLESS GRIEF AND STRIFE ON THE JOB. IN COMPARING OUR PRICES ON TOOLS AND EQUIPMENT, REMEMBER WE DO NOT SELL CHEAP AND SHODDY TOOLS. OUR TOOLS ALL CARRY NATIONAL AND INTERNATIONAL BRAND NAMES AND ARE THE VERY "FINEST".

EQUIPMENT AND TOOLS

LEAK DETECTORS

SIEVERT "COMPANION" L.P. GAS OPERATED

SPARES FOR OLD STYLE UNITS



CAT. NO.	P/N	DESCRIPTION
35237	16876	Catalyst
35238	16907	Catalyst Screw
35239	938	Burner (Uses 16429 Nipple)
	16779	Screw
35245	16606	Knob
35246	16607	Screw. Note: Screwed into valve spindle No. 16608 with No. 13983 "O" Ring Seal
35247	16608	Valve Spindle
35259	13983	"O" Ring Seal
35260	806	Hose — 6 ft.
	16605	Stop Nut
352100	E3	Hand piece (support)

PRIMUS PARTS

CAT. NO.	PART No.	DESCRIPTION
352101	2000	Cylinder 1/2 lb. Capacity
35232	9568	Adaptor — Primus to Sievert

COMPANION NECK TUBE BURNERS



This burner design gives a conical flame shape. Ideal for local heating. For sheltered jobs requiring a powerful and relatively confined flame. Designed to operate at 28 PSI design pressure.

CAT. NO.	NEW PART NO.	OLD PART NO.	APPLICATION
35248	950	2950	A small burner for the handyman. Soft soldering and work with plastics.
35250	951	2951	For silver and soft soldering jobs, lead wiping etc.
35252	952	2952	Most powerful burner in this series. For brazing, small tube bending and annealing.

PRIMUS AND COMPANION GAS CYLINDERS



2000 (PRIMUS)



480 (COMPANION)



3967 (COMPANION)



3965 (COMPANION)

COMPANION BURNERS

Effective metal to metal seal on Companion Burners eliminates the use of lead washers. Most Companion Burners are designed for peak performance with propane gas supplied at 40 PSI. Built-in stability allows operation from 28 to 120 PSI supply pressure. All burners are available with alternative connection threads to suit old model equipment. Burners numbered 740 to 744 have stainless steel burner tubes and unique air flow cooling for indefinite life.

CAT. NO.

35293



MODEL 742 A broad flame. For heavy soldering work, brazing and annealing.

35292



MODEL 741 Gives a broad bushy flame designed for electrical soldering, brazing and annealing work.



35294



35295



35296



MODELS 737, 738 AND 739 — are brass burners with a needle shaped flame. Precision heating for instruments, jewellery and fine soldering work.

PARTS

A	— Burner Tube
B	— Burner Inner
C	— Nipple
D	— Gauze
E	— Burner Nut

CAT. NO.	PART No.	CAPACITY kg
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PRIMUS

352101	2000	0.34
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COMPANION

35255	480	4.5
35256	3967	1.0
35257	3965	2.0
35258	481	9.0

EQUIPMENT AND TOOLS

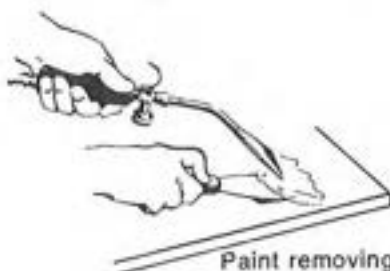
COMPANION HANDYMAN KIT



Do a professional job on jewellery work, copper enamelling, waxing skis, silver soldering and many more. Kit connects to any Companion Gas Cylinder. Includes handpiece, soldering iron, pencil point and conical flame burners, paint remover, hose and spanner. Companion's Handyman Kit enables you to do a professional job of removing paint from roofs, fences and window frames, soft soldering toys, radios, guttering, silver soldering copper and brass pipes, sheet copper, annealing wrought iron, copper and brass tubes. And a hundred and one other jobs. Companion have a kit to handle any job.

KIT NO. 400

CAT. NO. 352420



Paint removing



Silver soldering

HALOGAZ HALIDE LAMP LEAK DETECTOR

FEATURES

A proven principle providing safe operation.
Low gas consumption.
Ease and speed of putting into operation.
Heavy gauge copper burner for long life.
Simplicity of operation.

SPECIFICATIONS

Height — 31 cm (12 1/2"). Diameter — 99 mm (4").
Operating Weight — 920 g (2 lbs).
Length of Rubber Hose — 75 cm (30").
Duration of Charge — Approx. 5 Hours.

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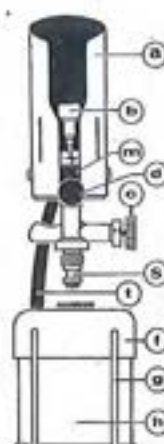
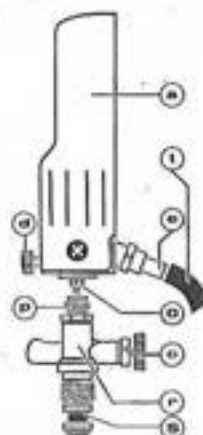
HALOGAZ
LEAK
DETECTOR
LESS
CARTRIDGE

CAT. NO.
35226

CARTRIDGE
ONLY

CAT. NO.
35228

35220



CAT. NO.	PART No.	DIAG. REF.	DESCRIPTION
35226	16616		HALOGAZ 200 DETECTOR (Less Cartridge)
35228	C200		CARTRIDGE ONLY
352361	2603	a	Flame Guard
35227	2600	b	Burner Unit
352362	2601	e	Hose Nipple

CAT. NO.	PART No.	DIAG. REF.	DESCRIPTION
352363	2796	d	Rotating Sleeve
35225	2756		Jets
352365	2755	r	Jet and Tap Unit
352366	4183		Washer
352367	2575	h	Cartridge Holder
352116	2602	t	Rubber Hose

EQUIPMENT AND TOOLS
BRAZING AND SOLDERING TORCHES

TurboTorch® propane

TurboTorch

"Total LP" Gas Contractor's Kit

Operates on Propane, Mapp, Apache, HP, Flarex, etc.



TurboTorch

"Total LP" Gas Service Kit

Operates on Propane, Mapp, Apache, HP, Flarex, etc.



TurboTorch

"Total LP" Gas Starter Kit

Operates on Propane, Mapp, Apache, HP, Flarex, etc.



The "Total LP" TurboTorch is a newly developed line of TurboTorches specifically designed to burn all of the major LP gases. The new "Total LP" TurboTorch eliminates the need for a torch for each of the LP gases. The adjustable regulator can be set for each LP gas at the correct pressure needed for ideal performance. The torch kit operates with any tank equipped with a Standard POL fitting.

Using LP propane gas, the new "Total LP" torch is considered the most economical, the lightest and the highest performing air/gas LP torch available. It is ideal for soft soldering and silver soldering as well as general heating of copper tubing and steel pipe. The "Total LP" Torch, utilizing propane as a fuel, will produce a target heat of approximately 982°C (1800°F), a very satisfactory heat range for plumbing rough-in and soft soldering of copper tubing.

CAT. NO.	PART NO.	ITEM	DESCRIPTION
352286	LP-1	Contractor's Kit	Contains P4 tip, P6 tip, H-1 handle, H-9 hose, R-2 pressure regulator. For soft soldering 10 mm to 150 mm, silver soldering 6 mm to 50 mm.
352287	LP-2	Service Kit	Contains P3 tip, P5 tip, H-1 handle, H-9 hose, R-2 pressure regulator. For soft soldering 6 mm to 62 mm, silver soldering 3 mm to 37 mm.
352288	LP-3	Starter Kit	Contains P4 tip, H-1 handle, H-9 hose, R-2 pressure regulator, HA5-P4 heat shield. For soft soldering 10 mm to 37 mm, silver soldering 6 mm to 25 mm.
352289	LP-4	Master Brazing Kit	Contains P5 tip, P6 tip, P7 tip, P8 tip, H-1 handle, H-24 hose, R-2 pressure regulator, L-1 striker, C-2 carrying case. For soft soldering 25 mm to 200 mm, silver soldering 25 mm to 200 mm.
352290	T-2	Tip	Size of flame: 6 mm. For soft soldering 3 mm to 10 mm, silver soldering 1.5 mm to 6 mm. Uses .035 kg propane/hr.
352291	T-3	Tip	Size of flame: 15 mm. For soft soldering 6 mm to 25 mm, silver soldering 3 mm to 10 mm. Uses .073 kg propane/hr.
352292	T-4	Tip	Size of flame: 12 mm. For soft soldering 10 mm to 37 mm, silver soldering 6 mm to 12 mm. Uses .12 kg propane/hr.
352293	T-5	Tip	Size of flame: 20 mm. For soft soldering 25 mm to 62 mm, silver soldering 12 mm to 37 mm. Uses .30 kg propane/hr.
352294	T-6	Tip	Size of flame: 25 mm. For soft soldering 37 mm to 150 mm, silver soldering 25 mm to 50 mm. Uses .645 kg propane/hr.
352296	T-8	Tip with Handle	Size of flame: 45 mm. For soft soldering over 200 mm, silver soldering 50 mm to 200 mm. Uses 2.43 kg propane/hr.

Continued next page.

EQUIPMENT AND TOOLS

TurboTorch® Propane — Continued

CAT. NO.	PART NO.	ITEM	DESCRIPTION
352297	T - 6P - MT	Turbo Tank (Empty)	Refillable steel LPG tank. For use with Propane. 6 lb. Capacity. (NO LONGER AVAILABLE)
352298	R - 5	Pressure Regulator (Fixed)	For all propane tanks. Complete with POL adaptor and excess flow check valve.
352299	H - 1	Handle	With quick-disconnect and needle valve. Fits P2 thru P7 tips; also fits LD-1 leak detector, SI-1, SI-2, SI-3 soldering irons.
352301	H - 12	Hose 3.6 m	Leachproof propane hoses; fit H-1 handle, T-8 tip, R-5 adjustable LP regulator.
352302	H - 24	Hose 7.3 m	
352303	HS - 11	Heat Amplifier Shield	Fits P3 tip. Increases heat and cuts soldering time by 40%. Allows work within 6 mm of finished surface without scorching.
352304	HS - 11	Heat Amplifier Shield	Fits P4 tip. Increases heat and cuts soldering time by 40%. Allows work within 6 mm of finished surface without scorching.
352341	L - 1	Striker	Single flint, cup type.
352344	F - 1	Flints	Box of six flints for striker L - 1.
352345	OH	O-Ring	Extra O-rings for H-1 and G-2 handles. (Package of 6).
352346	OT	O-Ring	Extra O-rings for tips P2 thru P7 and A3 thru A64. (Package of 6).
352308	OR - P2 thru OR - P9	Orifices	Spare orifices for all Turbo Torch propane tips specify size when ordering.
352310	RPK	Propane Replacement Parts Kit.	Contains 2 each OR-P2 thru OR-P6 orifices, 6 OH O-rings for handle, 6 OT O-rings for tips.

SPY. 5™ Refrigerant Leak Detector

A compact, rugged, sensitive refrigerant leak detector capable of detecting leaks as small as 0.5 oz. per year. Designed to overcome problems encountered with the electronic leak detector and give consistent, reliable, trouble-free performance without batteries or electronic parts. Ideal for the air conditioning and refrigeration installer or serviceman.

SPY. 5 eliminates the problems of the old type halide detectors because it uses primary swirl combustion which uses all the air pulled through the search hose for combustion. The old type introduced air at the burner. This gives the SPY. 5 a more precise blend of gas/air, and produces quicker and more sensitive results.

The TurboTorch SPY. 5 requires no calibration; is unaffected by machinery room noise; detects with "background refrigerant" present; recovers from large

leaks in seconds; and is easily maintained in the field.

The TurboTorch SPY. 5 is a foolproof, durable, sensitive instrument for refrigerant leak detection, and actually rivals the performance of the most expensive electronic detectors on the market today. Operates on small SB-1, 6 oz.

bottle of purity propane. Replacement of orifice module as unit now incorporated for easier field service.

SPY. 5 Master Kit: Total kit packaged in fully protected foam lined steel carrying case with all accessories needed to maintain the unit.



CAT. NO. 352335

SPY. 5 Master Model Kit contains:

SPY. 5 leak detector
SB-1 Propane tank
RL 5 reference leak
SP-FT spare flametube
SP-BR flametube brush
SP-H3 sniffer hose
SP-ST sniffer tube
SP-WS windscope

Accessories available in addition to parts in the kit:
SP-BM base orifice replacement module

**SPY.5™ is a trademark of Wingshield Inc.

EQUIPMENT AND TOOLS

BRAZING AND SOLDERING TORCHES

TurboTorch® acetylene



TurboTorch

Air/Acetylene Instrument Repair Kit

The smallest unit on the market, ideal for small, delicate repairs.



TurboTorch

Air/Acetylene Refrigeration Kit

Soft solders to 31½" — Silver Solders to 2½"



What is an Acetylene TurboTorch? When should you buy it?

The acetylene TurboTorch is designed for soldering and brazing. TurboTorch acetylene employs a small concentrated hot flame that is twice as hot as secondary air/acetylene torches. TurboTorch acetylene is particularly designed for the person who needs an intensely hot concentrated flame for jobs such as air conditioning and repair work. It is also very effective on standard plumbing jobs where speed is important. In most cases it matches the speed of oxy-acetylene torches while actually producing a better-brazed joint at ½ the cost, with ½ the equipment. TurboTorch air/acetylene eliminates the need of an extra oxygen bottle; and not only cuts costs but also makes for a much more portable unit for field installations and repairs.

The proven capabilities of TurboTorch acetylene, such as soldering copper tubing with "water in the line" and bronze brazing cast iron pipe fittings in the field has put TurboTorch acetylene up as the Number 1 torch in the field.

TurboTorch

Air/Acetylene Plumber's Kit

Soft solders to 3" — Silver Solders to 1½"



TurboTorch

Air/Acetylene Starter Kit

Soft solders to 1" — Silver Solders to ½"



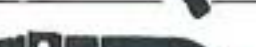
CAT. NO.	PART NO.	ITEM	DESCRIPTION
352311	X - 1	Instrument Repair Kit.	Contains A-2 tip, G-2 handle, AR-2 regulator, AH-12 hose.
352313	X - 3	Plumbing & Refrigeration Kit.	Contains A-3, A-11 tips, G-2 handle, AR-2 regulator, AH-9 hose. For soft soldering 6 mm to 75 mm, silver soldering 3 mm to 37 mm.
352314	X - 4	Air Cond. & Refrigeration Kit.	Contains A-5 and A-14 tips, G-2 handle, AR-2 regulator, AH-9 hose and HAS-A5 heat shield amplifier. For soft soldering up to 100 mm, silver soldering up to 50 mm.
352329	X - 5	Starter Kit.	Contains A-5 tip, G-2 handle, AR-2 regulator, AH-12 hose, AS-5 heatshield, silver solders to 12mm.

Continued next page.

EQUIPMENT AND TOOLS

TurboTorch® Acetylene — Continued

352-f

CAT. NO.	PART NO.	ITEM	DESCRIPTION
352316	A3	Tip 	Size of flame 6 mm. For soft soldering 6 mm to 25 mm, silver soldering 3 mm to 10 mm. Uses 3.6 cu.ft. fuel/hr.
352317	A5	Tip 	Size of flame 15 mm. For soft soldering 20 mm to 37 mm, silver soldering 10 mm to 25 mm. Uses 5.7 cu.ft. fuel/hr.
352318	A8	Tip 	Size of flame 10 mm. For soft soldering 25 mm to 50 mm, silver soldering 12 mm to 25 mm. Uses 8.3 cu.ft. fuel/hr.
352319	A11	Tip 	Size of flame 22 mm. For soft soldering 37 mm to 75 mm, silver soldering 25 mm to 37 mm. Uses 11.0 cu.ft. fuel/hr.
352320	A14	Tip 	Size of flame 12 mm. For soft soldering 50 mm to 100 mm, silver soldering 25 mm to 50 mm. Uses 14.5 cu.ft. fuel/hr.
352321	A32	Tip 	Size of flame 20 mm. For soft soldering over 75 mm, silver soldering 37 mm to 100 mm. Uses 33.2 cu.ft. fuel/hr.
352322	A64	Tip 	Size of flame 20 mm. For soft soldering over 200 mm, silver soldering 50 mm to 150 mm. Uses 64.0 cu.ft. fuel/hr.
352323	AR - 2	Pressure Regulator (Fixed) 	Locked at 96 kPa (14 psi), one gauge. Fits "B" tanks and 10 mm - 24 L.H. hose nut.
352325	AH - 12	Hose 3.64 m 	22 mm acetylene hoses, with 10 mm - 24 L.H. nuts. Fit G-1, G-2 handles; AR-2, AR-3 & AR-4 pressure regulators.
352326	AH - 24	Hose 7.27 m	
352328	G - 2	Handle 	With quick disconnect and integral needle valve. Fits all Turbo Torch acetylene tips and ALD-1 leak detector.
352336	HAS - A3	Heat Amplifier Shield, 	Increases heat and cuts soldering time by 40%. Allows work within 6 mm of finished surface without scorching. Fits A-3 Tip.
352337	HAS - A5	"	Fits A-5 Tip.
352338	HAS - A8	"	Fits A-8 Tip (Same as HAS-P3).
352339	HAS - A11	"	Fits A-11 Tip (Also PMK-1 Turbo Torch PM).
352340	HAS - A14	"	Fits A-14 Tip (Same as HAS-P4).
352341	L - 1	Striker 	Single flint, cup type.
352342	SA	Snappy Adaptor. 	Screws into any standard threaded handle adapting it to Turbo Torch tips. Provides the advantages of Turbo Torch at lowest cost.
352305	CA - 100	Adaptor	Brass cylinder adaptor between regulator and Acetylene cylinder
352344	F - 1	Flints 	Box of six flints for L-1 striker.
352345	OH	O-Rings 	Extra O-rings for G-1, G-2 handles and H-1 handle (Package of 6)
352346	OT	O-Rings 	Extra O-rings for tips A-3 thru A-64 and P-2 thru P-7. (Package of 6)
352347	OR - A3 thru OR - A64	Orifices 	Spare orifices for all Turbo Torch acetylene tips. Specify size when ordering.
352349	RAK	Acetylene Replacement Parts Kit. 	Contains 2 each OR-A3 thru OR-A14 orifices, 6 OH O-rings for handle, 6 OT O-rings for tips.
352351	V - 3	Handle Valve. 	Replacement valve for G-2 handle.

6

EQUIPMENT AND TOOLS

SOLDERS, BRAZING ALLOYS AND FLUXES

SOLDERING AND BRAZING DEFINED

Soldering — A joining process using a filler metal with working temperature below 427°C (800°F), and below the melting point of the base metal.

Brazing — A joining process using a filler metal with working temperature above 427°C (800°F), but below the melting point of the base metal.



HEATING SOURCE

Most soldering and brazing alloys can be applied with a portable, light weight torch. Many repairs, in fact, can be performed with a small propane hand torch. (On occasion oxyacetylene, or heavier duty acetylene or propane torches may be better suited for in-shop work, but such equipment should not be normally necessary for field repairs.

PRECLEANING THE JOINT AREA

Surface oxides must be removed for sound joining of metals. Cleaning is divided into two categories:

Mechanical — Joint areas should be abraded with materials such as plumber's sandpaper, emery cloth or steel wool.

CAUTION: Always slant tubing downward when abrading so that shavings are not introduced into the system.

Chemical — In service trade applications, mechanical cleaning is usually adequate. If it is necessary to swab the interior surfaces of hard drawn tubing, a solvent such as "Freon-113" should be used. In refrigeration applications avoid using carbon tetrachloride or other chlorinated solvents.

POSTCLEANING

Most fluxes permit quick, easy and complete postcleaning. Remove flux residue with hot water saturated cloth. **NOTE:** In refrigeration repairs, remove flux residue as soon as system is put under pressure, not before.

FILLER METALS MOST COMMONLY EMPLOYED

Silver Brazing Alloys (usually given the misnomer "silver solders")
Copper - Silver - Phosphorus Brazing alloys
Copper - Phosphorus Brazing Alloys
Aluminium Brazing Alloys
Soft Solders

PURPOSE OF A FLUX

To dissolve and sweep away surface films and oxides during the brazing or soldering process.

To prevent oxides from forming.

To "signal" moment when temperature is reached to apply the brazing alloy or solder.

To promote fluid flow and increase adhesion of the filler metal.

Fluxes are formulated for specific applications. Each flux is precisely calibrated with an activity range corresponding to the flow point of the filler metal.

In refrigeration applications, the service engineer needs a flux with sufficient activity, yet one that will not be drawn into the system.

GENERAL PURPOSE SOLDERS

CAT. NO.	MANUF. & TYPE	AVAILABLE IN	DESCRIPTION	RECOMM'D FLUX
3531	50/50	450 g Sticks	A general purpose solder with a melting point of approx. 200°C (400°F)	Duzall
3532	RESIN CORE SOLDER	450 g Reels 1.6 m	A general purpose solder cored with a resin flux. Ideal for small electrical work etc. where a non-corrosive flux is desirable.	Duzall
3533	95/5	450 g Reels	A solder specially suited for low temperature pipeline work. Composed of 95% Tin and 5% Antimony. It has a melting point of 246°C (475°F). It makes a stronger bond, and does not tend to decompose at low temperatures like 50/50 solder. Can be used with common fluxes but must be applied with a blow torch — not a soldering iron.	General Purpose
3537	ALL STATES No. 430	450 g Spools	Unique, high strength solder for joining all metals except white metals, colour matches stainless and adheres to chrome plate. Cadmium free. Working temperature 221°C (430°F)	Duzall
3539	ALL STATES 430 KIT	KIT	Dynagrip Solder Kit, containing No. 430 Solder and Duzall Flux.	Included

GENERAL PURPOSE FLUXES

CAT. NO.	MANUF. & TYPE	AVAILABLE IN	DESCRIPTION
3538	ALL STATES	125 ml. Jar	Duzall Flux. Versatile, general purpose liquid soldering flux. Highly active — sweeps away oxides. Formulated for application with No. 430 solder, but will improve wetting and overall performance of all soft solders.
35346	DUZALL	250 ml. Jar	
35352	LACO FLUX REGULAR	113 g Jar	General purpose flux whose detergent action eliminates tedious physical cleaning such as filing, steel-wooling, sanding, wire-brushing or scraping. Completely acid free. Use with 40/60, 50/50, 60/40 or 95/5 string or bar solder. For Copper, Brass, Bronze, Galv. Iron, Sheet Lead, Zinc, Nickel, Tin, Silver, Cast Iron, Steel, Ferrous Metals etc.
35353		56 g Jar	
35355	ALL STATES 509	4 oz. Tin	Flux for use with No. 509 Strongset Aluminium Alloy.

SILVER BRAZING FLUXES

35351	LACO SILVER SOLDER FLUX	170 g Plastic Container	Non-acid . . . self-cleaning. Will not harden or crystallize — For all silver soldering in 538° to 927°C (1000° to 1700°F) heat range.
35315	CONWELD Silver Brazing FLUX No. 2	200 g Jar	For steels and dissimilar metals — produces excellent joints on carbon steel, stainless steel, nickel alloys, copper and brass. Dissimilar metals in these groups can be easily brazed. Melting point 450°C (842°F) approx.
35347	HARRINGTON SOLFLO NO. 2	150 g Jar	For general use with silver brazing alloys — For non-ferrous to ferrous. Flux residues are water and air soluble.
35362	HARRINGTON SOLFLO NO. 3		Same properties as SOLFLO 2 but of a chemically stronger composition and for use in cases of heavy oxidizing.
35311	ALL STATES NO. 5.200	250 g	Developed to overcome complex problems in silver brazing. Dissolves and removes oxides. Affords complete protection to metals up to 982°C (1800°F).
35312		150 g	Superior wetting action. 5.200 is homogenized and does not crystallize.

EQUIPMENT AND TOOLS

SOLDERS, BRAZING ALLOYS AND FLUXES

CAT. NO.	MANUF. & TYPE	AVAILABLE IN	DESCRIPTION	RECOMMEND. FLUX
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ALUMINIUM ALLOYS

35334	ALL STATES *STRONGSET NO. 509	500g Spools	For joining aluminium to aluminium or aluminium to dissimilar metals. "Takes" to anodized aluminium without removing the anodizing. Yields unbelievable physical properties for a solder range alloy. Working Temp. 265°C (509°F).	509
35336	ALL STATES NO. 509 KIT	STRONGSET KIT	Contains 4ft. of 1/16" diam. solder and 1/2 fluid oz. of No. 509 flux. Specially suited to refrigeration and air conditioning applications.	Included
35318	ALL STATES SEALCOR FLUX CORED ALLOY	1/8" Rod	A special aluminium rod with the flux contained in the core where it is protected from moisture and rough handling. It can be used on all weldable grades of aluminium including cast, sheet and wrought aluminiums. Has a wide operating range, at high temperatures, it flows freely, but at low temperatures, its high viscosity enables it to be used for build up and filling gaps. Working temperature 593°C (1100°F).	Included
35341	ALL STATES NO. 31 ALLOY	3/32" Rod	Basically developed for joining light gauge aluminium. This alloy is very fluid and has a capillary action similar to silver brazing alloys. Not recommended for the following grades (U.S.) of aluminium — 2011, 2014, 2017, 2024 and 7075. Working temperature 580°C (1075°F).	No. 31 or Equivalent
35356	ALL STATES NO. 33 ALLOY		For brazing aluminium castings. Has a controlled flow and yields high tensile strengths with good build up properties. Recommended for surface brazing of all types of weldable aluminium castings, filling blow or sand holes, building up worn or missing sections, salvaging overmachined parts and joining aluminium castings to sheet and plate aluminium. Working temperature 566°C (1050°F).	No. 31 or Equivalent
35359	ALL STATES NO. 430 PASTE SOLDER	225g Plastic Jars	Same as above except that No. 430 Solder in mesh form has been premixed with an active flux extending its range of applications.	Included
35344	ALL STATES NO. 34 SMOOTHCOE EXTRUDED ALUMINIUM ELECTRODE	1/8"	This electrode is a premium quality core wire with an extruded coating that is dense and free of air holes often associated with dip coated electrodes. This combination of core wire and coating gives a very quiet arc which will deposit a dense, smooth spatter-free weld in all positions with good colour match to the base metal. Recommended for sheets, plates and castings of 1/8" thickness or heavier. Very useful for repairing cracks, building up missing sections, cladding and reinforcing. DC Reverse Polarity (Electrode +) — All position	Not Required
35321	RED E POK	KIT	RED E POK Aluminium Repair Kit	

COPPER ALLOYS

35316	ALL STATES LOW FUMING BRONZE	1/8" Bare	For fabricating or repairing steels, cast iron, copper base metals, galvanised and malleable irons or any combination of these metals. Available in Bare and Flux-coated forms. The flux-coated rods have a waterless coating that gives a superior cleaning action and promotes wetting qualities. Working temp. 900°C (1650°F) approx.	Brazaloy NONE
35317		3/32" Flux Coated		
35325	ALL STATES NO. 41FC FLUX COATED	1/8" Rod	Premium General Purpose rod that is very easy to apply in many applications. A broad working temperature range permits use as either a bead forming or thin flowing alloy. Applications include joining or overlaying steel, cast iron, brass, bronze, galvanised and malleable irons or combinations. Brass or bronze may be fusion welded. Working temp. 760° to 900°C (1400° to 1650°F)	NONE REQUIRED
35332	ALL STATES SILFLO NO. 5	3/32" Round	Used where close fit-up cannot be maintained. Joint clearance .001" to .005". Working temperature range 704° to 816°C (1300° to 1500°F)	

SILVER ALLOYS

35313	HARRINGTONS EASYFLO 45	1.5 mm Rod	For use on close tolerance, capillary or lap joints involving copper, copper alloys, steel and ferrous alloys. Used in both production and maintenance applications. Has a lowest melting point formulation, especially suitable for joining thin sections. Used widely in refrigeration, air conditioning and general industry. 45% Silver Content. Melting Range 607° to 620°C (1125° to 1148°F).	Ferrous Alloys Solflo 3 Non-Ferrous Solflo 2
35310	SILFOS Silver Solder		Has ability to braze copper without the use of a flux. Silfos is the most ductile of the silver copper phosphorus group of alloys and is widely used wherever copper base alloys are joined. Melting range 645° to 700°C (1193° to 1292°F)	Not Required
35327	ALL STATES 101FC Flux Coated Rod	1/16"	A general purpose 45% silver brazing alloy. No. 101FC (Flux coated rod) is designed to have a very narrow working temperature so the alloy constituents do not liquify and separate when heated slowly such as in furnace brazing. Has excellent capillary flow on ferrous and non-ferrous metals or combinations of both (excluding white metals). Good corrosion resistance. Working temperature 607° to 618°C (1125° to 1145°F).	Not Required

PHOSPHOROUS ALLOYS

35371	HARRINGTON No. P74		Premium grade alloy, low melting point, most ductile. Good penetration, will stand more stress than any other alloy in this group. Suitable for automatic and furnace brazing. Recommended for copper to copper joints in refig. systems. No fluxes required on copper to copper joints, only on non-ferrous metals. 15% Silver Content. Melting range 641°C (1186°F).	Solflo 2 on Copper Alloys
35370	HARRINGTON No. P75		Commonly used on small bore copper pipes. Will accept considerable thermal stress. Self fluxing on copper to copper. Under no circumstances to be used on ferrous metals. Melting range 641° to 666°C (1186° to 1231°F).	Solflo 2 on Copper Alloys
35372	HARRINGTON No. P78		Commonly used for large diameter pipework using expanded joints. Especially designed for copper fabrication work and low pressure hot water system tanks. Self fluxing on copper to copper. Under no circumstances to be used on ferrous metals. Melting range 645° to 769°C (1193° to 1416°F).	Copp. to Copper None Req'd. Copper Alloys Solflo 2

EQUIPMENT AND TOOLS

SPANNERS AND WRENCHES

SIDCHROME ADJUSTABLE WRENCHES

CHROME PLATED



CAT. NO.	PART NO.	SIZE — Length		JAW OPENING	
		mm	ins.	mm	ins.
3541	2435-2	100	4	13	1/2
3542	2436-0	150	6	18	23/32
3543	2437-9	200	8	23	29/32
3544	2438-7	250	10	27	1-1/16
3545	2439-5	300	12	32	1-1/4
3546	2440-8	375	15	40	1-9/16
3547	2441-6	450	18	46	1-13/16

ROBINAIR ALLEN WRENCH (KEY) SET

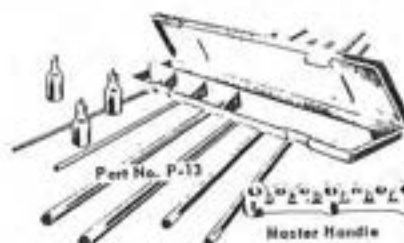


12394

This popular tool combines 7 popular socket sizes into one compact tool. Sizes: 3/64, 1/16, 5/64, 3/32, 1/8, 5/32 and 3/16.

CAT. NO. 35461

WATSCO COMBINATION MAGNETIC HEX WRENCH & PHILLIPS TYPE SCREWDRIVER SET



A TOOL 9" LONG SPECIALLY DESIGNED TO ALLOW THE USER TO REACH ANY REMOTE SET SCREW

Set consists of six 9 inch magnetic hex wrenches made of chrome vanadium steel, 3 Phillips type screwdriver tips and master handle.

SET COMPRISES:

Magnetic Hex Wrenches - 3/32", 1/8", 5/32", 3/16", 7/32", 1/4".
Screwdriver Tips - No. 1, No. 2, No. 3.
Master Handle.

CAT. NO. 35459

GET THE RIGHT PRODUCT

NO SENSE ACCEPTING A SUBSTITUTE PART INSTEAD OF ONE THAT YOU WANT TO BUY BUT WHICH IS NOT CARRIED IN STOCK BY MOST SUPPLY HOUSES. THE PART THAT YOU THINK "WILL DO" MAY ULTIMATELY COST YOU YOUR PROFIT ON THE JOB AS WELL AS A LOST CUSTOMER. PICK OUT THE RIGHT PART YOU WANT FROM THIS CATALOGUE AND CHANCES ARE GOOD THAT WE'LL HAVE IT. IF NOT, WE WILL GET IT FOR YOU AS QUICKLY AS POSSIBLE.

FLARE NUT SPANNER



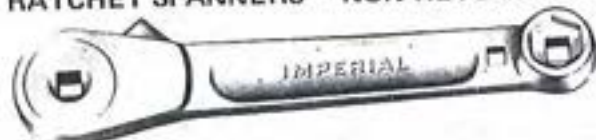
MAKE	CAT. NO.	MANUF. PART NO.	SIZE (INS.)	
			A/F	FLARE NUT
KING DICK	35413	RES224	3/4 x 1	1/4 x 1/2
	35414	RES228	7/8 x 1-1/8	3/8 x 5/8
	35415	RES236	1-1/8 x 1-3/8	5/8 x 3/4
BONNEY	35422	RF54		1/2 x 1/4
	35423	FR55		3/8 x 5/8
BELTZER	35409	1949	3/4 x 7/8	1/4 x 3/8
	35410	1949	1 x 1-1/8	1/2 x 5/8

RATCHET SPANNERS — REVERSIBLE



MAKE	CAT. NO.	PART NO.	DESCRIPTION
BRITTOOL	35416	D72/20T	1 End - 1/4 Sq. Rev. Ratchet Opp. End - 1/2 A/F Ring Spanner plus 3/16, 1/4, 5/16 Squares. Length O/A 159mm (6W").
ROBINAIR	35425	10559	One End — 1/2, 9/16 Hex Opp. End — 3/16, 1/4 SQ.
BONNEY	35421	RF45A	Same as Robinair.
IMPERIAL	35427	124 — C	Same as Robinair.
	35429	127 — C	1/4", 3/8", 3/16", 5/16" SQ. For hard to reach places.

RATCHET SPANNERS — NON-REVERSIBLE



IMPERIAL	35428	125 — C	One End - 1/4" Square. Opp. End - 3/16, 1/4, 5/16 Sq. plus 9/16 Hex.
	35426	123 — C	1/4" Sq. Drive and raised face Handle has 3/16 and 1/4 Sq. and 1/2" Hex.

IMPERIAL KWIK-TITE® RATCHET WRENCHES



The Imperial Kwik-Tite Ratchet Wrench speeds installation of tube fittings and valves, hex, nuts, bolts and fasteners. This unusual wrench, with its open jaw design, makes it easy to slip onto fittings and fasteners — even in tight quarters. Flips quickly into tightening position with a sure grip on all hex. surfaces. 12 point contact distributes torque pressures evenly on the flats of the hex. — not at the corners. Eliminates warping and distortion of fittings and fasteners. Because of the Kwik-Tite ratchet action, tightening jobs are easier and faster. Jaws are forged steel, handles of heavy gauge spring steel and chromium plated.

CAT. NO.	SIZE	PART NO.	DESCRIPTION
35476	3/8"	199-F-06	5-3/8" Long
35477	7/16"	199-F-07	5-5/16" Long
35479	5/8"	199-F-10	7-1/32" Long
35478	11/16"	199-F-11	7-1/8" Long
35480	7/8"	199-F-14	9-3/32" Long
35481	KIT	299 - F	Kit in Roll up Vinyl Pack 3/8, 1/2, 5/8, 3/4, 7/8 and 1"
35482	KIT	399 - F	Kit in Roll up Vinyl Pack 1/2, 9/16, 5/8 and 3/4"

EQUIPMENT AND TOOLS

SOCKETS, SPANNERS AND WRENCHES

BRITool 1/4" AND 3/8" SQ. DRIVE REFRIG. SERVICE SOCKET AND WRENCH SET



Contains a full range of specialised sockets together with stand and sockets and essential accessories. Housed in steel case — Red finish. Case size 222x82x25mm (8 7/8"x3 1/8"x1 in).

CAT. No. 35418 Part No. NF 108L (24 pieces)

BRITool 1/4" SQ. DRIVE SOCKET SETS.



CAT. NO.	PART NO.	DESCRIPTION
354345	NA416C	7 Accessories as specified, 17 Hexagon Sockets, BA sizes: 0 1 2 3 4 5 6 7 8 American sizes Inches: 3/16 7/32 1/4 9/32 5/16 11/32 3/8 7/16 A/F
		7 ACCESSORIES D50 Spinner Handle D74 Ratchet Handle D79 Swivel Handle D91 Universal Joint D93 Flexible Extension D94 Extension 4in D95 Extension 8in
354346	NA110C	4 Accessories as specified, 9 Hexagon Sockets, BA sizes: 0 1 2 3 4 5 6 7 8
354347	NA716N	4 Accessories as specified, 21 Hexagon Sockets, BA sizes: 0 2 4 6 8 American sizes Inches: 3/16 7/32 1/4 9/32 5/16 11/32 3/8 A/F Metric sizes: 4-4, 5-5, 5-6-7-8-9-10 mm
		4 ACCESSORIES D70 "T" Handle Square Drive D75 Spinner Handle D93 Flexible Extension D94 Extension 4in

BRITool ACCESSORIES

CAT. NO.	PART NO.	DESCRIPTION
3/8" SQ. DRIVE ACCESSORIES		
35462	A93	Flexible Extension 203 mm (8")
35463	A97	Extension Rod 152 mm (6")
35468	AB525	1/4" W. Socket
35469	AB562	9/16" A/F Socket
35470	AB750	3/4" A/F Socket
1/2" SQ. DRIVE ACCESSORIES		
354277	E42	Speed Brace 432 mm (17")
354278	E56	Bar Handle 12.7 x 305 mm (1/2" x 12")
354279	E63	Short "T" Adaptor 48 mm (1 7/8")
354280	E74 / 40T	Ratchet Handle 254 mm (10")
354281	E97	Extension 152 mm (6")

BRITool COMBINATION WRENCHES

TYPE	CAT. NO.	SIZE	PART NO.
WHITWORTH	354349	3/8"	RJ710
	354350	7/8"	RJ1480
	354314	7 mm	RJM7
	354315	8 mm	RJM8
	354316	9 mm	RJM9
	354317	10 mm	RJM10
	354318	11 mm	RJM11
	354319	12 mm	RJM12
	354320	13 mm	RJM13
	354321	14 mm	RJM14
METRIC	354322	15 mm	RJM15
	354323	16 mm	RJM16
	354324	17 mm	RJM17
	354325	18 mm	RJM18
	354326	19 mm	RJM19
	354327	5/16"	RJ312
	354328	3/8"	RJ375
	354329	7/16"	RJ437
	354330	1 1/2"	RJ500
	354331	9/16"	RJ562
A/F	354332	5/8"	RJ625
	354333	11/16"	RJ687
	354334	3/4"	RJ750

BRITool OPEN JAW WRENCHES

TYPE	CAT. NO.	SIZE	PART NO.
METRIC	354282	6 x 7 mm	6JM67
	354283	8 x 9 mm	6JM89
	354284	10 x 11 mm	6JM1011
	354285	12 x 13 mm	6JM1213
	354286	14 x 15 mm	6JM1415
	354287	16 x 17 mm	6JM1617
	354288	18 x 19 mm	6JM1819
	354289	1 1/4" x 5/16"	6J2531
	354290	5/16" x 3/8"	6J3137
	354291	3/8" x 7/16"	6J3743
A/F	354292	7/16" x 1/2"	6J4350
	354293	1/2" x 9/16"	6J5056
	354294	9/16" x 5/8"	6J5662
	354295	5/8" x 11/16"	6J6268
	354296	11/16" x 3/4"	6J6875
	354297	3/4" x 7/8"	6J7587

BRITool RING WRENCHES

TYPE	CAT. NO.	SIZE	PART NO.
METRIC	354298	6 x 7 mm	9RB67
	354299	8 x 9 mm	9RB89
	354300	10 x 11 mm	9RB1011
	354301	12 x 13 mm	9RB1213
	354302	14 x 15 mm	9RB1415
	354303	16 x 17 mm	9RB1617
	354304	18 x 19 mm	9RB1819
	354305	1 1/4" x 5/16"	2RB2531
	354306	5/16" x 3/8"	2RB3137
	354307	3/8" x 7/16"	2RB3743
A/F	354308	7/16" x 1/2"	2RB4350
	354309	1/2" x 9/16"	2RB5056
	354310	9/16" x 5/8"	2RB5662
	354311	5/8" x 11/16"	2RB6268
	354312	11/16" x 3/4"	2RB6875
	354313	3/4" x 7/8"	2RB7587

EQUIPMENT AND TOOLS

SCREWDRIVERS AND PLIERS

SIDCHROME SCREWDRIVERS



TYPE	CAT. NO.	SIZE		PART NO.	MFGS. NO.
		mm	ins.		
ROUND BLADE	35496	38x6.30	1-1/2x1-1/4	4598-9	5.131-98
	35498	44x3.15	1-3/4x1-1/8	4531-3	5.130-98
	35497	150x4	6x5/32	4527-6	5.117-06
	35494	100x5	4x3/16	4528-4	5.125-04
	35493	150x5	6x3/16	4529-2	5.125-06
	35492	150x6.3	6x1/4	4534-8	5.131-06
	35491	200x6.3	8x1/4	4535-6	5.131-08
	35488	200x8	8x5/16	4539-9	5.132-08
	35487	250x10	10x3/8	4546-0	5.133-10
	35485	100x8	4x5/16	4673-8	5.134-04
SQUARE BLADE	35484	250x10	10x3/8	4678-9	5.146-10
RECESS HEAD	35495	75x5 No.1	3x3/16	4761-8	5.271-03
	35490	100x6.3 No.2	4x1/4	4763-4	5.272-04
	35489	150x8 No.3	6x5/16	4764-2	5.273-06

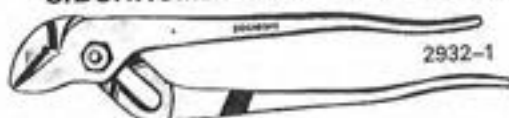
ROBINAIR MAGNETIC SCREWDRIVER SET

12920

Single handle and shank complete with four magnetic bits (two Phillips, two regular). Bits may be stored inside the handle.

CAT. NO. 35460

SIDCHROME MULTI-GRIP PLIERS



CAT. NO.	DESCRIPTION	PART NO.
354119	Interlocking 165 mm (6 5/8")	2931-3
354120	Interlocking 250 mm (10")	2932-1

ROBINAIR CRIMPING PLIERS



Part No. 14226 - A quality tool for crimping insulated terminals on wire sizes 10 to 12 and 14 to 20 and all sizes of non-insulated terminals. Non-insulated terminals are crimped with a "B" crimp to assure positive contact. This tool will also crimp ignition terminals and strips wire from size 10 through 20. Tool has cushioned hand grips.

CAT. NO. 35466

ROBINAIR HOSE CLAMP PLIERS

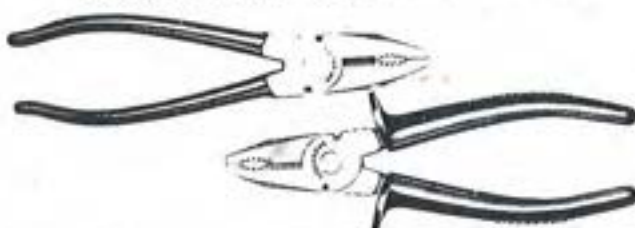
14160

These special hose clamp pliers facilitate removal and replacement of hose clamps. The heads swivel for accessibility.



CAT. NO. 35471

SIDCHROME COMBINATION PLIERS



TYPE	CAT. NO.	SIZE		PART NO.
		mm	ins.	
PLAIN HANDLES	354101	160	6 1/2	2901-4
	354102	180	7 1/4	2902-2
	354103	200	8	2903-0
INSULATED HANDLES	354104	160	6 1/2	2904-9
	354105	180	7 1/4	2905-7
	354106	200	8	2906-5

SIDCHROME LONG NOSE PLIERS (POINTY NOSED PLIERS)



TYPE	CAT. NO.	SIZE		PART NO.
		mm	ins.	
PLAIN HANDLES	354113	140	5 1/2	2914-5
	354114	170	6 1/2	2915-3
	354115	200	8	2916-1
INSULATED HANDLES	354116	140	5 1/2	2918-8
	354117	170	6 1/2	2919-6
	354118	200	8	2920-9

SIDCHROME DIAGONAL CUTTING PLIERS (SIDE - CUTTERS)



TYPE	CAT. NO.	SIZE		PART NO.
		mm	ins.	
PLAIN HANDLES	354107	140	5 1/2	2907-3
	354108	170	6 1/2	2908-1
	354109	200	8	2910-2
INSULATED HANDLES	354110	140	5 1/2	2911-0
	354111	170	6 1/2	2912-9
	354112	200	8	2913-7

ROBINAIR SNAP RING PLIERS (CIRCLIP PLIERS)



CAT. NO.	PART NO.	DESCRIPTION
35464	14161	Internal No. 21
35465	14164	External No. 24
35457	14163	Internal No. 23
35456	14166	External No. 26

ACPAR PARTS - TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY

EQUIPMENT AND TOOLS

TWIST DRILLS

SILVER BULLET TWIST DRILLS



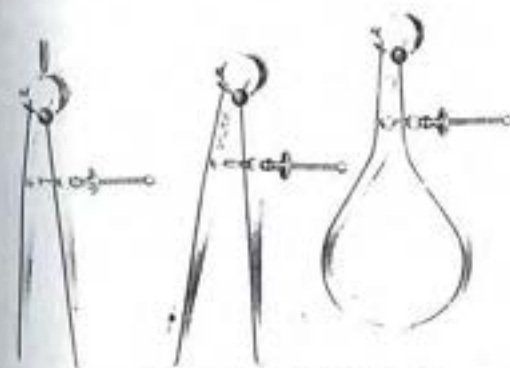
CAT. NO.	SIZE	DECIMAL EQUIV.
354126	1/16"	.0625
354127	5/64"	.078125
354128	3/32"	.09375
354129	7/64"	.109375
354130	1/8"	.125
354131	9/64"	.140625
354132	5/32"	.15625
354133	11/64"	.171875
354134	3/16"	.1875
354135	13/64"	.203125
354136	7/32"	.21875
354137	15/64"	.234375
354138	1/4"	.25
354139	17/64"	.265625
354140	9/32"	.28125
354141	19/64"	.296875
354142	5/16"	.3125
354143	21/64"	.328125
354144	11/32"	.34375
354145	23/64"	.359375
354146	3/8"	.375
354147	25/64"	.390625
354148	13/32"	.40625
354149	27/64"	.421875
354150	7/16"	.4375
354151	29/64"	.453125
354152	15/32"	.46875
354153	31/64"	.484375
354154	1/2"	.5

Larger sizes on application

MISCELLANEOUS TOOLS

MANY OTHER TOOLS, TOO NUMEROUS TO LIST FULLY, ARE AVAILABLE

- A FEW OF THESE ARE ILLUSTRATED -
ENQUIRIES WELCOME



WELLS & WELLS CO. INC.
1000 W. 10th St. - Chicago, Ill.

WELLS & WELLS CO. INC.
1000 W. 10th St. - Chicago, Ill.

NAME IT AND WE'VE PROBABLY GOT IT IN OUR WIDELY ASSORTED STOCK

EQUIPMENT AND TOOLS

TUBE MANIPULATING TOOLS

SPRING TYPE TUBE BENDERS



IMPERIAL

Budget priced tools for hand bending soft copper and aluminum tubing to any shape without collapsing walls. Special spring steel, nickel finished. End belled for quick tube removal. Each tool bends one size.

CAT. NO.	TUBE O.D.	LENGTH	PART NO.
35579	1/4"	10"	102-F-04
35580	5/16"	10"	102-F-05
35581	3/8"	10"	102-F-06
35582	1/2"	12"	102-F-08
35583	5/8"	12"	102-F-10
35584	3/4"	12"	102-F-12

IMPERIAL TUBE BENDER SETS

CAT. NO.	NO. IN SET	TUBE OD SIZES (INS)	PART NO.
35588	6	1/4, 5/16, 3/8, 7/16, 1/2, 5/8,	101-F
35589	4	1/4, 3/8, 1/2, 5/8,	163-F
35590	3	1/4, 5/16, 3/8,	112-F

RIDGID BENDING SPRINGS

CAT. NO.	TUBE OD	PART No.
35568	1/4"	0-1375
35569	5/16"	0-1376
35570	3/8"	0-1377
35571	7/8"	0-1378
35572	1/2"	0-1379
35573	5/8"	0-1380
35574	3/4"	0-1381
35575	7/8"	0-1382

RAST COPPER TUBE EXPANDER

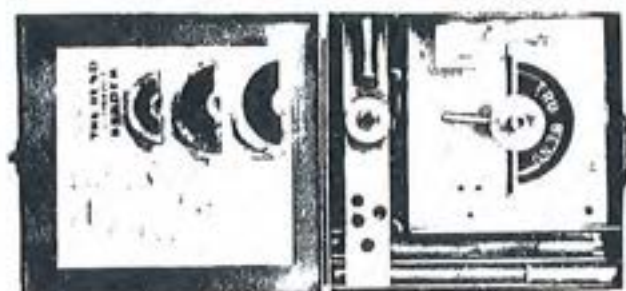


MODEL K

The RAST expander is designed to expand the ends of annealed copper tubing so that one tube will accurately slide into the other to ensure a perfect joint. The amount of expansion required is governed by the tube wall thickness.

CAT. NO.	SIZE	DESCRIPTION
3552	MODEL K KIT NO.5	Kit with 4 Heads — 3/8", 1/2", 5/8", 3/4"
3553	3/8"	Head — Standard Size
3554	1/2"	" " " "
3555	5/8"	" " " "
3556	3/4"	" " " "
3557	7/8"	" " " "
3558	1"	" " " "
3559	1-1/8"	" " " "
35510	1-1/4"	" " " "
35511	1-3/8"	" — Large Size
35512	1-1/2"	" " " "
35513	1-5/8"	" " " "
35514	1-3/4"	" " " "
35515	1/2"	Coxing Head.
35516	1 1/4" to 4"	" " Model A1.

"TRU-BEND" TUBE BENDER KIT



A versatile tube bending outfit packed in steel case measuring 13"x13"x3-1/2". Will handle all copper tubes from 3/8" to 1" O.D. Can be clamped to bench or other convenient position.

CAT. NO. 3551

IMPERIAL GEAR-TYPE TUBE BENDER

CAT. NO. 35543



Size of Kit: 16x7x6 1/2"



Tool is designed to be clamped in vise.



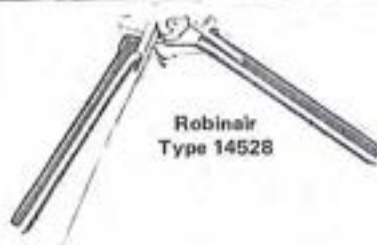
Makes bends up to 180° in stainless steel tubing, conforming to Specification MIL-T-6845. Precision construction maintains original diameter of tube within 5% at bend. Also bends copper, aluminum and other types of tubing.

Calibrated dial indicates angle of bend.

No. 700-F Gear-Type Tube Bender for 1/4, 5/16, 3/8, 1/2, 5/8 and 3/4" O.D. tubing. Wt. (in steel case) 32 lbs.

Tubing Wall Thickness and Bend Radii for Stainless Steel (MIL-T-6845) Tubing

(In some cases these wall thicknesses can be exceeded for copper and aluminum tubing. Experimentation is suggested to determine what thicknesses can be bent successfully.)	O.D. Tube in.	Wall Thickness in.	Bend Radius to Center of Tube in.
	1/4	.016 to .049	5/8
	5/16	.020 to .065	7/8
	3/8	.028 to .083	1 1/8
	1/2	.035 to .083	1 1/4
	5/8	.042 to .083	1 1/2
	3/4	.049 to .083	1 3/4



Robinair Type 14528

LEVER TYPE TUBE BENDERS

Effortlessly bends soft copper and thin walled steel tubing without crimping, flattening or scratching.

MAKE	CAT. NO.	TUBE O.D.	CENTRE RADIUS	PART NO.
HELDON	35535	1/4"	9/16"	151
	35536	5/16"	11/16"	152
	35537	3/8"	15/16"	153
	35538	1/2"	1 1/4"	154
	35539	5/8"	1 3/4"	155
	35540	3/4"	2 1/4"	156*
ROBINAIR 4 IN 1	355111	3/16"		
		1/4"		
		5/16"		
		3/8"		14528

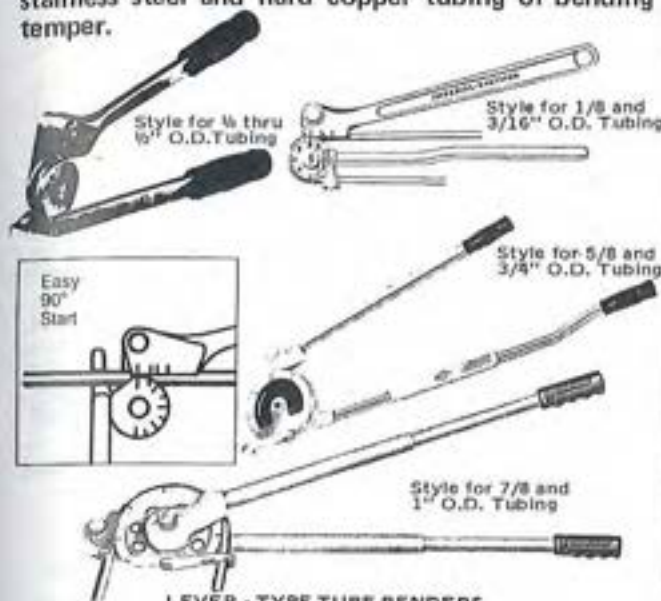
* With adjustable positioning handle.

EQUIPMENT AND TOOLS

IMPERIAL TUBE BENDING TOOLS

LEVER TYPE TUBE BENDERS

For bending annealed copper, aluminium, steel, stainless steel and hard copper tubing of bending temper.



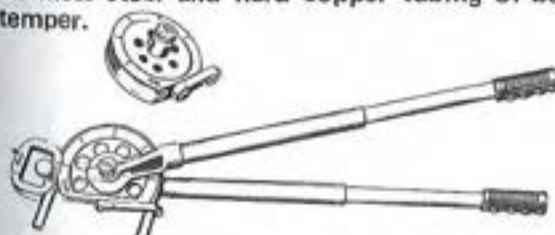
LEVER TYPE TUBE BENDERS

Each tool bends one size. Open side type which slips over tube at any point. Makes smooth short radius bends up to 180° with minimum effort. No marking, scraping or flattening of tubing. Calibrated to show angle of bend. Fixed hook tube benders supplied for 1/4 to 1/2 O.D. sizes have easy 90° start — require much less effort to make fast, accurate bends. Wide fixed hook simplifies operation, holds tubing securely.

CAT. NO.	TUBE O.D.	CENTRE RADIUS	PART NO.
35599	3/16"	7/16"	364 - FH - 03
35591	1/4"	9/16"	364 - FHA - 04
355106	5/16"	11/16"	364 - FHA - 05
35592	3/8"	15/16"	364 - FHA - 06
35593	1/2"	1-1/2"	364 - FHA - 08
35594	5/8"	2-1/4"	364 - FHA - 10
35595	3/4"	3"	364 - FHA - 12
355104	7/8"	3"	364 - FHA - 14
355105	1"	3-1/2"	364 - FHA - 16

2 - IN - 1 TUBE BENDERS

For bending annealed copper, aluminium, steel, stainless steel and hard copper tubing of bending temper.



Each tool adapts swiftly to two sizes by changing forming wheel and block. Bends any angle to 180°. Long handles reposition during bend for best leverage. Calibrations show precise bend angle. Each bender handles two tube sizes as shown.

CAT. NO.	TUBE O.D.	CENTRE RADIUS	PART NO.
355107	5/8"	2-1/4"	361 - FHA
	7/8"	3"	
355101	1/2"	1-5/8"	362 - FHA
	5/8"	2-1/4"	
355108	3/4"	3"	363 - FHA
	7/8"	3"	
355102	5/8"	2-1/4"	365 - FHA
	3/4"	3"	

WIDE RANGE TUBE BENDERS

For bending annealed copper, aluminium, steel, stainless steel and hard copper tubing of bending temper.



Each tool quickly adapts to all sizes in its range by changing forming wheel and block. Long handles re-position during bend for best leverage. Calibrations show precise bend angle. Individual benders supplied for 1/4 and 5/16 O.D. sizes. Supplied in steel tool kit with space for other tools.

CAT. NO.	NO. SIZES	TUBE O.D.	CENTRE RADIUS	PART NO.
35596	7	1/4"	9/16"	260 - FHA
		5/16"	11/16"	
		3/8", 1/2"	1-5/8"	
		5/8"	2-1/4"	
		3/4", 7/8"	3"	
35598	4	3/8", 1/2"	1-5/8"	360 - FHA
		5/8"	2-1/4"	
		3/4"	3"	
35597	6	1/4"	9/16"	350 - FHA
		5/16"	11/16"	
		3/8", 1/2"	1-5/8"	
		5/8"	2-1/4"	
		3/4"	3"	

"Imp"® 3-in-1 Tube Benders



METRIC SIZE

For bending annealed copper, aluminium, steel, stainless steel and hard copper tubing of bending temper.

Innovative multi-tube-size design does the work of three conventional lever-type benders. Calibrated markings for making accurate left-hand, right-hand and offset bends. 90° start requires less effort — makes bending fast and easy. Wide, fixed hook simplifies operation, holds tubing securely. Open side — slips on tubing at any point. Black and chrome finish. For bending annealed copper, aluminium, brass, steel, stainless steel and other metals.

CAT. NO.	TUBE O.D.		CENTRE RADIUS		PART NO.
	mm	INS	mm	INS	
355100	3	1/8	14.2	9/16	367 - FH
	4	3/16			
	6	1/4			
355109	6	1/4	17.5	11/16	368 - FH
	8	5/16			
		3/8			

EQUIPMENT AND TOOLS **TUBE AND HOLE CUTTING TOOLS**

ROBINAIR TUBE CUTTERS



14270



14649

14270 Midget tube cutter 1/8" through 1/2". Compact and easy to use. Accurately cuts hard and soft tubing 1/8" through 1/2" OD. Ideal for close quarters requires only 1-1/4" clearance.

44779 Replacement cutter wheel and screw For 14270 and 14337

14337 Tubing cutter A high quality tool designed for long life and effortless performance. Cutter wheel is replaceable. Features flare cut-off and includes deburring tool. Cuts 3/16" through 1-1/8" OD tubing.

CAT. NO	PART NO
35620	14270
35622	44779
35621	14649



ROBINAIR YORK AND TECUMSEH COMPRESSOR TOOL KIT

PART NO. 10550

CAT. NO. 35616

10546 Clutch spanner wrench



Also services Eaton, Pitts and Warner clutches.

10547 Seal installer and Seal plate aligner



10548 Clutch removing bolts



10549 Compressor seal puller



10549-25 Pkg. of 4 replacement fingers.

10545 Oil dip stick



NOTES

ACTROL PARTS

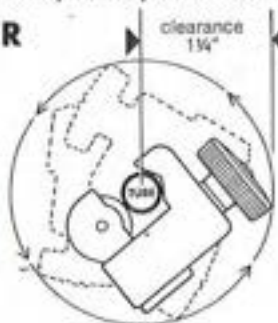
A DEPENDABLE SOURCE FOR THE WIDEST RANGE OF REFRIGERATION, AIR CONDITIONING AND HEATING COMPONENTS, EQUIPMENT AND SYSTEMS

EQUIPMENT AND TOOLS

IMPERIAL TUBE CUTTERS

For hard or soft copper, aluminum, brass, thin wall steel, stainless steel, monel, titanium and other tubing.

"IMP"® TUBE CUTTER



"Imp"® Tube Cutter $\frac{1}{8}$ " – $\frac{3}{4}$ " O.D.

Designed for use in tight quarters where other cutters won't fit. Requires only $1\frac{1}{4}$ " swing radius. Satin finish.

127-FB "Imp" Tube Cutter for $\frac{1}{8}$ to $\frac{3}{4}$ " (4-15mm) O.D. tubing ($\frac{1}{8}$ – $\frac{1}{2}$ " nom.)

CAT. NO. 35636

JUNIOR TUBE CUTTER



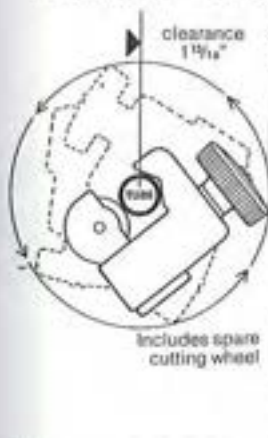
Junior Tube Cutter $\frac{1}{8}$ " to $\frac{3}{4}$ " O.D.

Exceptionally handy in close quarters. Makes quick clean, right-angle cuts without flattening the tube. Enclosed feed mechanism. Satin finish.

227-FA Junior Tube Cutter for $\frac{1}{8}$ to $\frac{3}{4}$ " (4-19mm) O.D. tubing ($\frac{1}{8}$ – $\frac{1}{2}$ " nom.)

CAT. NO. 35637

"BIG IMP" TUBE CUTTER



Includes spare cutting wheel

"BIG IMP" Tube Cutter $\frac{3}{8}$ " – $1\frac{1}{2}$ " O.D.

Big capacity, small size. Designed for use in tight quarters where other cutters won't fit. Requires only $1\frac{1}{4}$ " swing radius. Black finish brushed highlights.

174-F "Big Imp" Tube Cutter for $\frac{3}{8}$ to $1\frac{1}{2}$ " (10-28mm) O.D. tubing. ($\frac{1}{4}$ – $1\frac{1}{2}$ " nom.)

CAT. NO. 35642

HI-DUTY® TUBE CUTTERS



HI-DUTY® Tube Cutters $\frac{1}{8}$ " – $1\frac{1}{2}$ "

Makes clean, right angle cuts with no burrs or chips to clog tubing. Has satin finish nickel-chrome plated body.

274-FC Hi-Duty Tube Cutter for $\frac{1}{8}$ to $1\frac{1}{2}$ " (4-28mm) O.D. tubing. ($\frac{1}{8}$ – $1\frac{1}{2}$ " nom.)

CAT. NO. 35638

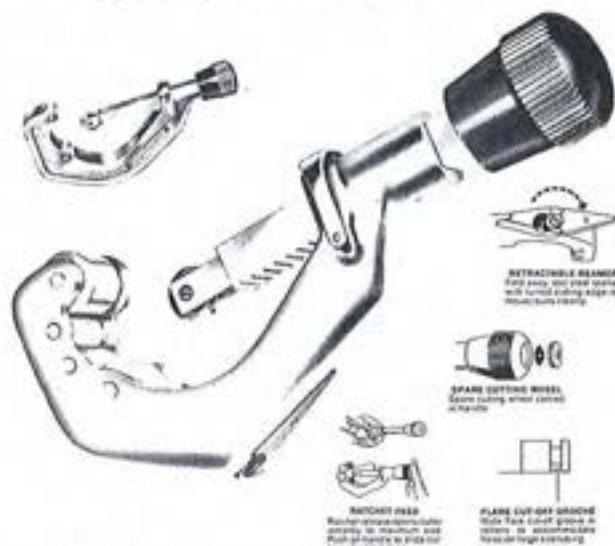
312-FB Hi-Duty Tube Cutter for $\frac{1}{4}$ to $1\frac{1}{2}$ " (7-41mm) O.D. tubing. ($\frac{1}{8}$ – $1\frac{1}{2}$ " nom.)

CAT. NO. 35639

374-FC Combination Tube Constrictor and Cutter for $\frac{1}{8}$ " to $1\frac{1}{2}$ " (4-28mm) O.D. tubing. Includes roller for making brazed connections.

CAT. NO. 35640

ADJUST-O-MATIC TUBE CUTTER



Adjust-O-Matic Tube Cutters $\frac{3}{8}$ " – $4\frac{1}{2}$ " O.D.

Ratchet feed mechanism speeds up cutting operation – opens quickly to insert tubing, slides to cutting position instantly. Extra wide rollers with flare cut-off groove stabilize tubing. Has fold away reamer. Enclosed screw-type feed mechanism, light weight body. Chrome plated handle, blue hammertone enamel body.

206-FA Adjust-O-Matic Tube Cutter for $\frac{3}{8}$ to $2\frac{1}{2}$ " (10-66mm) O.D. tubing. ($\frac{1}{4}$ – $2\frac{1}{2}$ " nom.)

CAT. NO. 35641

406-FA Hi-Duty Tube Cutter for 2 to $4\frac{1}{2}$ " (51-104mm) O.D. tubing. (2-4" nom.)

CAT. NO. 35676

REPLACEMENT PARTS – REFER PAGE 356-c

EQUIPMENT AND TOOLS IMPERIAL TUBE CUTTERS

For Cutting Plastic Tubing and Pipe, and Rubber Hose Without Wire Reinforcing.



No. 312-FBP • $\frac{1}{8}$ to 1" O.D.

HOSE & PLASTIC TUBE CUTTER

Makes clean, right-angle cuts. Leaves Hytron or rubber hose and plastic tubing round, ready for use. Over-size fixed position cutting wheel is super sharp for perfect cuts. For new cutting surface, just loosen retaining screw, rotate cutting wheel slightly and tighten in new position. Satin finish nickel-chrome plated body, polished handle.

No. 312-FBP Cutter for Hytron hose and plastic tubing in sizes from $\frac{1}{8}$ to 1" (4-25 mm) O.D. Wt. 7 oz.

CAT. NO. 35678



Adjust-O-Matic Tube Cutter $\frac{1}{4}$ " - 2" Pipe.

A tool designed especially to provide a superior method of cutting rigid plastic pipe and tubing—PVC (polyvinyl chloride), ABS (acrylonitrile butadiene styrene) and others. Cuts pipe sizes of $\frac{1}{4}$ to 2" ($\frac{3}{8}$ - $2\frac{3}{8}$ " O.D.) Handles wall thicknesses through $\frac{1}{4}$ ".

Specially designed thin, sharp, rotating cutting wheel is made of hardened steel. Four rollers provide good support for pipe or tubing. Groove in rollers at point of cut minimizes friction and provides space for raised bead. This cutter employs Imperial Adjust-O-Matic ratchet feed mechanism to provide fast operation. Opens quickly to insert tubing-feed rack slides to cutting position.

206-FAP Adjust-O-Matic Tube Cutter for Plastic Pipe and Tubing—pipe sizes $\frac{1}{4}$ to 2" ($\frac{3}{8}$ to $2\frac{3}{8}$ "—10-60mm O.D.)

CAT. NO. 35680



Adjust-O-Matic Tube Cutter $1\frac{1}{4}$ " - 4" Pipe.

A tool designed especially for cutting large sizes of rigid plastic pipe and tubing. Used for DWY, water lines and industrial process lines. Cuts PVC, ABS and other types of plastic pipe in sizes of $1\frac{1}{4}$ to 4" ($1\frac{3}{4}$ - $4\frac{1}{2}$ " O.D.)—wall thicknesses through $\frac{1}{4}$ ".

Has specially designed thin, sharp rotating cutting wheel and three rollers described above. Offers all the advantages of 206-FAP described above.

406-FAP Adjust-O-Matic Tube Cutter for Plastic Pipe and Tubing—pipe sizes $1\frac{1}{4}$ to 4" ($1\frac{3}{4}$ - $4\frac{1}{2}$ "—45-114mm O.D.)

CAT. NO. 35681

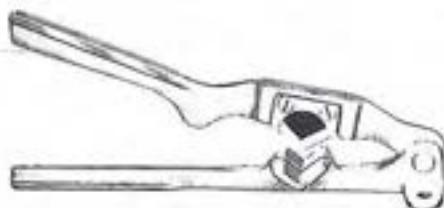


"Snimp"® Plastic Tubing Shear $\frac{1}{8}$ " - $\frac{1}{2}$ " O.D.

Here's the most compact shear available—only 2 $\frac{3}{8}$ " overall. "Snimp" easily cuts nylon, Poly-Flo, polypropylene and other plastic tubing. Also cuts non-wire reinforced synthetic hose. Shear is spring-loaded for safety—closes automatically completely covering cutting edge of blade. Replaceable hardened steel blade produces clean, right-angle cuts. "Snimp" can be bench or wall mounted.

307-FP "Snimp" Plastic Tube and Hose Shear for $\frac{1}{8}$ to $\frac{1}{2}$ " (1-13mm) O.D. hose or tubing

CAT. NO. 35631



Plastic Tubing & Hose Shear $\frac{1}{8}$ " - $1\frac{3}{16}$ " O.D.

Excellent for cutting plastic tubing and non-wire reinforced synthetic hose. Shearing action produces a clean cut. Hardened steel cutting blade is replaceable. Tool can be bench or wall mounted or carried in tool kit.

327-FP Plastic Tube and Hose Shear for $\frac{1}{8}$ to $1\frac{3}{16}$ " (4-20mm) O.D. hose or tubing.

CAT. NO. 35630

REPLACEMENT PARTS - REFER PAGE 356-c.

EQUIPMENT AND TOOLS

REPLACEMENT PARTS FOR IMPERIAL TUBE CUTTERS

QUICK SELECTION CHART FOR MOST FREQUENTLY USED PARTS

TOOL SELECTION CHART FOR MOST FREQUENTLY USED PARTS							
PART	CAT. NO.	REPLAC. PART NO.	TOOL ON WHICH PART IS USED	PART	CAT. NO.	REPLAC. PART NO.	TOOL ON WHICH PART IS USED
CUTTING WHEELS	35643	32633	127-F, 127-FA, 127-FB, 227-F, 227-FA, 274-F, 374-F	H-O CUTTING WHEEL	35646	75046	174-F, 274-FB, 274-FC, 312-FB, 374-FB, 374-FC
	35655	60769	274-FA, 312-F, 312-FA, 374-FA		35654	70119	274-FA, 312-F, 312-FA
	35669	68257	227-FP, 227-FAP	REAMER BLADE	35664	79318-01	206-FA, 274-F, 274-FA, 274-FB, 274-FC, 312-F, 312-FA, 312-FB, 374-F, 374-FA, 374-FB, 374-FC
	35652	69966	406-F		CONSTRICT ROLLER	35661	66418	374-F, 374-FA
	35653	70120	206-F	35647		76637	374-FB, 374-FC
	35672	72474	312-FP, 312-FBP	CUTTING BLADE		81156-01	307-FP
	35645	74761	206-FA			77615	327-FP
	35651	74833	406-FA				
	35644	75015	174-F, 274-FB, 274-FC, 312-FB, 374-FB, 374-FC				
		77857-01	206-FAP				
	79284-01	406-FAP					

COMPLETE LISTING OF COMPONENT PARTS — Complete Tool P/N in numerical order

[illegible]

NOTE: ITEMS SHOWN WITH CAT. NO.'S ARE THE NORMALLY STOCKED ITEMS - OTHERS AVAILABLE EX OVERSEAS.

EQUIPMENT AND TOOLS

SURE-TREAD LADDERS

DUAL PURPOSE
STEP
EXTENSION
LADDERHANDYMAN'S
MATE
&
TRADESMAN'S
MATE

Here is the ladder of many uses — it can be converted in seconds from a step ladder to an extension ladder. All you do is close the steps and slide the back section up to the desired height and lock it into the rung pick up hooks. It can also be separated into two small single ladders.

The 'Handyman's Mate' is constructed with an open channel section of structural aluminium, whereas the 'Tradesman's Mate' is constructed from a box type section of structural aluminium for added strength. Both types incorporate our heavy duty 'Suretread' non-slip treads which are hydraulically machined into the stiles for added rigidity. The back section has serrated non-slip rungs, securely machined into stiles. Non-slip rubber feet, and protective rubber buffer at the top won't damage or mark delicate floors and walls.

The perfect aluminium ladder for the mobile tradesman or the man at home.

HANDYMAN'S MATE

Code	Ladder Hgt.	Max. Exten.
H/Mate 6	6ft. — 1.82m	10ft. — 3.05m
H/Mate 7	7ft. — 2.13m	12ft. — 3.66m
H/Mate 8	8ft. — 2.44m	14ft. — 4.27m

TRADESMAN'S MATE

Code	Ladder Hgt.	Max. Exten.
HD SEL 6	6ft. — 1.82m	10ft. — 3.05m
HD SEL 7	7ft. — 2.13m	12ft. — 3.66m
HD SEL 8	8ft. — 2.44m	14ft. — 4.27m

CAT.NO.	MANUF.CODE NO.
35719	H'MATE 6
35720	H'MATE 7
35721	H'MATE 8
35722	HD SEL 6
35723	HD SEL 7
35724	HD SEL 8

KELSO SKID TRUCKS



STAIR CLIMBING TYPES

KT 16 - 9	KT 20 - 9	KT 27 - 9
CAT. NO. 3572	CAT. NO. 3573	CAT. NO. 3574

All Trucks have rotating 3-wheeled brackets to transfer load from step to step with minimum effort. Quick acting ratchet and nylon webbing holds load in place.

KT 16 - 9 STAIR CLIMBER TRUCK.

Equipped with rubber tyred auxiliary wheels for easy loading and increased manoeuvrability. Plastic covering on face of truck protects load from damage. Height 48 1/2" Width 19 1/2" Shoe 14" x 7". Load 200 kg. (440lbs.).

KT 20 - 9 APPLIANCE AND TELEVISION TRUCK.

Similar in design to KT 16 - 9 except construction is of special lightweight tubing. Height 48 1/2" Width 19 1/2" Shoe 14" x 7". Load 150 kg. (330lbs.).

KT 27 - 9 REFRIGERATOR TRUCK.

Specially designed for moving refrigerators in homes and flats. Equipped with rubber tyred auxiliary wheels for easy loading and increased manoeuvrability. Plastic covering on face of truck protects load from damage. Height 60" Width 24" Shoe 18" x 7". Load 200 kg. (440lbs.).



KT 26 - 1 REFRIGERATOR TRUCK.

General purpose type - non-stair-climbing type. Quick acting ratchet and nylon webbing holds load in place. Hgt. 60" Width 24" Shoe 18"x7". Load 200 kg. (440lbs.).

CAT. NO. 35716

REFRIGERATOR COVERS - QUILTED



Permits the local transporting of domestic refrigerators without damage.

Size : 34"x34"x60" High
(86.4x86.4x152.4cm)

CAT. NO.
3571

VACUUM & HIGH VACUUM PUMPS

WHAT IS VACUUM AND WHAT ARE THE "UNITS" IN WHICH IT IS MEASURED

Vacuum can be simply described as any pressure below atmospheric pressure.

A perfect vacuum is a space without any pressure. If the space is at some intermediate pressure (or vacuum) lower than atmospheric pressure, it is referred to as a partial vacuum.

In refrigeration practice the degree of vacuum has been normally expressed in inches of mercury ("Hg) — commonly referred to as "inches vacuum".

Alternative absolute units were microns, the international TORR (1 millimetre of mercury) and inches of mercury (absolute).

The change over to S.I. Metrics replaces all these units with one only — the pascal (Symbol Pa) and its multiples, the kilopascal (kPa) = 1000 pascals, and megapascals (MPa) = 1000 kilopascals or 1,000,000 pascals.

(A pascal is defined as the pressure or stress which arises when a force of one newton is applied over an area of one square metre (N/m²).

Before proceeding further, an understanding of the units previously used, and the "new" pascal becomes necessary.

The unit TORR requires a simpler explanation than many given in previous references. In mathematical terms it is the absolute unit denoting degree of vacuum and is equivalent to:—

1.0		millimetre of mercury (mm.Hg)
1.93368×10^{-2}	(0.0193368)	pounds per sq. inch (lb/in ²)
1.33322×10^{-2}	(133.322)	pascals (Pa) (or N/m ² —see above definition).
1.33322×10^{-1}	(0.133322)	kilopascals (kPa)
1.33322×10^{-4}	(0.000133)	megapascals (MPa)
3.93701×10^{-2}	(0.0393701)	inches of mercury ("Hg)
10^{-3}	(0.001)	microns

Vacuum pumps are currently rated either in microns or TORR. We see ratings such as 1×10^{-3} TORR, 5×10^{-4} TORR, 25×10^{-3} TORR etc.

The change over to S.I. Metrics will express these ratings in Pascals (Pa).

The following Table shows the relationships between the different Units.

Note that the Table shows both absolute and gauge equivalents. Also note that in general, including Conversion Tables shown on the next page unless otherwise specified are in absolute units.

Values of units may differ slightly from Table to Table but such slight variances can be disregarded in practical terms.

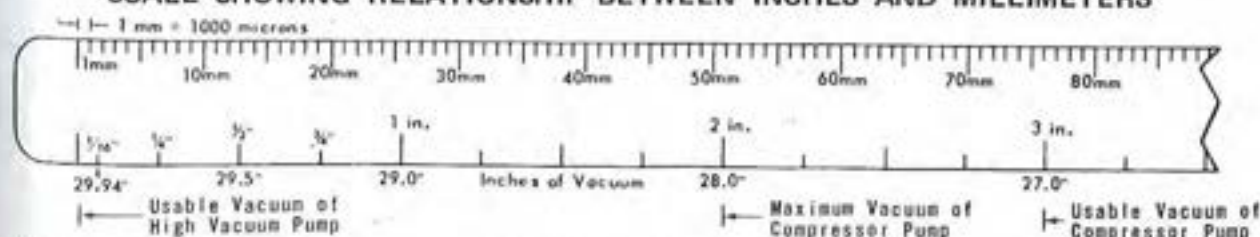
ABSOLUTE UNITS						GAUGE UNITS	
MICRONS	TORR (mm Hg)		"Hg	Pa	kPa	VACUUM "Hg	VACUUM —kPa
	Expressed as *	Actual Value					
760,000	760	760	30	1015920	101.592	0	0
500,000	500	500	19.685	66661.1	66.6611	10.31	— 34.91
250,000	250	250	9.8425	33330.5	33.3305	20.16	— 68.27
100,000	100	100	3.93701	13332.2	13.3322	26.06	— 88.25
75,000	75	75	2.95275	9990	9.99	27.05	— 91.60
50,000	50	50	1.96850	6660	6.66	28.03	— 94.92
25,000	25	25	0.98425	3330	3.33	29.02	— 98.27
20,000	20	20	0.78740	2660	2.66	29.21	— 98.92
15,000	15	15	0.59055	1990	1.99	29.41	— 99.59
10,000	10	10	0.39370	1330	1.33	29.61	— 100.27
5,000	5	5	0.19685	667	0.667	29.80	— 100.91
4,000	4	4	0.15748	533	0.533	29.84	— 101.05
3,000	3	3	0.11811	400	0.400	29.88	— 101.18
2,000	2	2	0.07874	267	0.267	29.92	— 101.32
1,000	1	1	0.03937	133	0.133	29.96	— 101.45
750	75×10^{-2}	0.75	0.02953	99	0.099	29.97	— 101.49
500	5×10^{-1}	0.50	0.01969	67	0.067	29.98	— 101.52
250	25×10^{-2}	0.25	0.00984	33	0.033	29.990	— 101.56
100	1×10^{-1}	0.10	0.00394	13	0.013	29.996	— 101.58
50	5×10^{-2}	0.05	0.00197	6.6	0.0066	29.998	— 101.58
25	25×10^{-3}	0.025	0.00098	3.3	0.0033	29.9990	— 101.59
10	1×10^{-2}	0.01	0.00039	1.3	0.0013	29.9996	— 101.59
5	5×10^{-3}	0.005	0.00019	0.7	0.0007	29.9998	— 101.59
1	1×10^{-3}	0.001	0.00004	0.13	0.00013	29.9999	— 101.59
0.5	5×10^{-4}	0.0005	0.00002	0.07	0.000065	29.9999	— 101.59

* Actual expression of small (or large) values varies depending on the standard adopted by individual manufacturers —
e.g. 25×10^{-3} and 2.5×10^{-2} are the same (i.e. 0.025)

Australian Standard AS1376 - 1973 "Conversion Factors" states that "Factors from 0.1 to 1,000,000 are expressed directly" and Factors outside this range are expressed with the multiplier 10 raised to a power which is a multiple of 3.

NOTES : Barometric Pressure — In meteorology, barometric pressure is now expressed in millibars (S.I. Metric Standard) and uses the symbol mb, where 1 mb = 100 Pa. To obtain millibars MULTIPLY Pascals by 0.001. Millibars are included in a conversion table on next page.

SCALE SHOWING RELATIONSHIP BETWEEN INCHES AND MILLIMETERS



GENERAL : During evacuation, it is now accepted practice to reduce the pressure in a system to below 100 microns. (This is equivalent to .01 Torr, 29.996 Inches Mercury Vacuum [gauge], —101.58 kPa [gauge])

* REFER FOLLOWING PAGES FOR VACUUM CONVERSION TABLES AND FUNDAMENTALS OF DEHYDRATING A REFRIGERANT SYSTEM INCLUDING SELECTION OF VACUUM PUMPS
REFER ALSO ENGINEERING & TECHNICAL DATA SECTION PAGES 457 & 458.

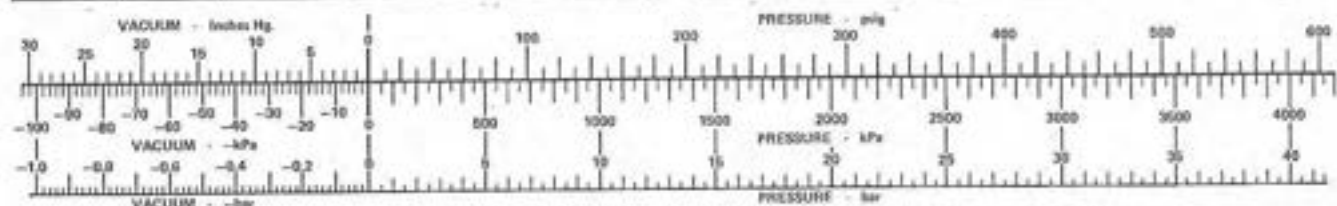
VACUUM PRESSURE CONVERSION TABLES

UNITS	TORR Millimetre of Mercury (mm.Hg)	Centimetre of Mercury (cm.Hg)	Inch of Mercury ("Hg)	Foot of Water (ft.H ₂ O)	pound force per square inch (lb/in ²)	kilogramme force per square centimetre (kg/cm ²)	kilopascal (kPa)	millibar (mb)
1 Millimetre of Mercury (mm.Hg)	1	0.1	0.039 370	0.044 69	0.019 337	$1.359\ 51 \times 10^{-3}$	0.133 322	1.333 224
1 Centimetre of Mercury (cm.Hg)	10	1	0.393 701	0.446 9	0.193 368	$1.359\ 51 \times 10^{-2}$	1.333 224	13.332 24
1 inch of mercury ("Hg)	25.4	2.54	1	1.132 92	0.491 154	0.034 532	3.386 39	33.863 9
1 foot of water (ft.H ₂ O)	22.419 8	2.241 98	0.882 671	1	0.433 5	304.8×10^{-4}	2.989 07	29.890 7
1 pound force per square inch (lb/in ²)	51.714 9	5.171 49	2.036 02	2.306 7	1	0.070 307	6.894 76	68.947 6
1 kilogramme force per square centimetre (kg/cm ²)	735.559	73.555 9	28.959 0	32.808 4	14.223 3	1	98.066 5	980.665
1 kilopascal (kPa)	7.500 62	0.750 062	0.295 300	0.334 55	0.145 038	$1.019\ 72 \times 10^{-3}$	1	10
1 millibar (mb)	0.750 062	0.075 006	0.029 530	0.033 455	0.014 504	$1.019\ 72 \times 10^{-3}$	0.1	1

kPa	Inches of Mercury	mm. of Mercury	p.s.i.	Vacuum Inches of Mercury	Inter- national Millibar	kPa	Inches of Mercury	mm. of Mercury	p.s.i.	Vacuum Inches of Mercury	Inter- national Millibar
.034	.01	.254	.00491	29.911	.3386	23.705	7	177.8	3.438	22.921	237.0
.068	.02	.508	.00982	29.901	.6772	27.091	8	203.2	3.930	21.921	270.9
.102	.03	.762	.01474	29.891	1.016	30.477	9	228.6	4.421	20.921	304.8
.135	.04	1.016	.01965	29.881	1.354	33.864	10	254.0	4.912	19.921	338.6
.169	.05	1.270	.02456	29.871	1.693	37.250	11	279.4	5.403	18.921	372.4
.203	.06	1.524	.02947	29.861	2.032	40.637	12	304.8	5.894	17.921	406.3
.237	.07	1.778	.03438	29.851	2.370	44.023	13	330.2	6.386	16.921	440.2
.271	.08	2.032	.03930	29.841	2.709	47.409	14	355.6	6.877	15.921	474.0
.305	.09	2.286	.04421	29.831	3.048	50.796	15	381.0	7.368	14.921	507.9
.339	.1	2.540	.04912	29.821	3.386	54.182	16	406.4	7.859	13.921	541.7
.677	.2	5.080	.0982	29.721	6.773	57.568	17	431.8	8.350	12.921	575.6
1.016	.3	7.620	.1474	29.621	10.16	60.955	18	457.2	8.842	11.921	609.4
1.355	.4	10.16	.1965	29.521	13.54	64.341	19	482.6	9.333	10.921	643.3
1.693	.5	12.70	.2456	29.421	16.93	67.728	20	508.0	9.824	9.921	677.2
2.032	.6	15.24	.2947	29.321	20.32	71.114	21	533.4	10.315	8.921	711.0
2.370	.7	17.78	.3438	29.221	23.70	74.500	22	558.8	10.806	7.921	744.9
2.709	.8	20.32	.3930	29.121	27.09	77.887	23	584.2	11.298	6.921	778.7
3.048	.9	22.86	.4421	29.021	30.48	81.273	24	609.6	11.789	5.921	812.6
3.386	1	25.40	.4912	28.921	33.86	84.659	25	635.0	12.280	4.921	846.5
6.773	2	50.80	.9824	27.921	67.72	88.046	26	660.4	12.771	3.921	880.3
10.159	3	76.20	1.474	26.921	101.6	91.432	27	685.8	13.262	2.921	914.2
13.546	4	101.6	1.965	25.921	135.4	94.818	28	711.2	13.754	1.921	948.0
16.932	5	127.0	2.456	24.921	169.3	98.205	29	736.6	14.245	0.921	981.9
20.318	6	152.4	2.947	23.921	203.2	101.591	30	762.0	14.736	0.000	1015.9

kPa	mm Hg	Inches Hg	P.S.I.	Millibar
.067	0.5	.0197	.00966	.6664
.133	1	.0394	.01934	1.333
.267	2	.0787	.03868	2.666
.400	3	.1181	.05802	3.999
.533	4	.1575	.07736	5.332
.667	5	.197	.09670	6.665
.800	6	.236	.1160	7.998
.933	7	.2756	.1354	9.331
1.067	8	.315	.1547	10.664
1.200	9	.3543	.1741	11.997
1.333	10	.394	.1934	13.330
1.600	12	.4724	.2321	15.996
1.867	14	.5512	.2708	18.662
2.133	16	.6299	.3094	21.328
2.400	18	.7087	.3481	23.994
2.667	20	.787	.3868	26.660
3.333	25	.9843	.4835	33.325
4.000	30	1.1811	.580	39.990
4.667	35	1.378	.677	46.655
5.333	40	1.575	.774	53.320
6.000	45	1.772	.870	59.985

kPa	mm Hg	Inches Hg	P.S.I.	Millibar
6.667	50	1.969	.967	66.650
8.000	60	2.362	1.160	79.980
9.333	70	2.756	1.354	93.310
10.666	80	3.149	1.547	106.64
11.999	90	3.543	1.740	119.97
13.332	100	3.937	1.934	133.30
19.998	150	5.906	2.900	199.95
26.664	200	7.874	3.870	266.60
33.331	250	9.843	4.833	333.25
39.997	300	11.81	5.80	399.90
46.663	350	13.78	6.76	466.55
53.329	400	15.75	7.74	533.20
59.995	450	17.72	8.70	599.85
66.661	500	19.69	9.67	666.50
73.327	550	21.65	10.63	733.15
79.993	600	23.62	11.60	799.80
86.659	650	25.59	12.56	866.45
93.325	700	27.56	13.54	933.10
99.992	750	29.53	14.50	999.75
106.658	755	29.73	14.597	1066.42
101.325	760	29.921	14.696	1013.1



REFER PREVIOUS PAGE FOR VACUUM & HIGH VACUUM PUMPS TECH. DATA
REFER ALSO ENGINEERING & TECHNICAL DATA SECTION PAGES 457 & 458.

FUNDAMENTALS OF DEHYDRATING A REFRIGERATION SYSTEM INCLUDING SELECTION OF VACUUM PUMPS

358-b
TECH. PAGE

MOISTURE IN A REFRIGERANT SYSTEM

While it is important to realize that moisture in an air conditioning system is directly or indirectly the real cause of more problems and complaints than all other causes combined, it is equally important to learn why it is such.

Basically, moisture can be classified as visible and invisible. *Visible moisture* is water that can be seen with the eye: liquid water, such as rain, clouds, steam, etc. Occasionally, liquid water is found in systems but this is rather unusual. *Invisible moisture* is water vapor which cannot be seen with the eye. This form of moisture is found everywhere, in all solids, liquids and gases. Its content in the air is expressed in terms of relative humidity. It is this invisible moisture which causes the greatest trouble in air conditioning systems.



INNOCENT DROP OF WATER

A single drop of water may look harmless, but to an air conditioning system it is a monster, the number one enemy to be combated by refrigeration service specialists. And what makes it so formidable an enemy is the fact that moisture can get into a system easily and is hard to get out.



MOISTURE TO ICE CRYSTALS

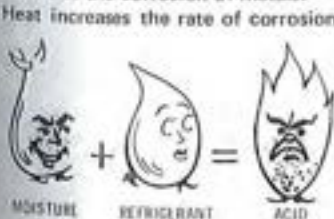
Here is what it does to a system. First of all, it creates the problem of "freeze-ups". Moisture will be picked up by the refrigerant and become entrained in the refrigerant line in a fine mist from which ice crystals form at the point of expansion (expansion valve). These ice crystals will retard or stop the flow of the refrigerant, causing a reduction or complete cessation of cooling. As the expansion valve warms, due to the lack of refrigerant, the ice melts and passes through the expansion valve. The refrigerant will then start again until the moisture returns to the expansion valve and once more builds a formation of ice crystals. The result is intermittent cooling.

Whether or not a "freeze-up" actually occurs depends primarily upon the amount of water and the size of the ice particles formed. But a "freeze-up" is not the only problem caused by moisture. Moisture can also induce corrosion, which can present serious trouble because often the effects of corrosion are not apparent until the real damage has occurred. For example, moisture alone in the form of water can cause rust after a period of time. However, moisture plus the refrigerant creates much more corrosion trouble. Refrigerants such as R12 containing chlorine will slowly hydrolyze with water and form hydrochloric acids. This acid greatly increases the corrosion of metals.

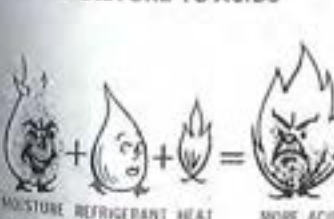


MOISTURE TO CORROSION

Heat increases the rate of corrosion due to acids because at higher temperatures the acid forming process is accelerated. This acid, of course, attacks all the materials it contacts, the rate of corrosion of the individual materials being determined by their corrosion-resistant qualities. Steel will generally corrode at lower moisture levels than copper or brass.



MOISTURE TO ACIDS



INCREASING ACID DUE TO HEAT

Refrigerant oil presents another problem caused by moisture. Refrigerant oil is an exception to the rule that "oil and water don't mix". In fact, refrigerant oil has an affinity for moisture and will absorb it rapidly if left open to the atmosphere. Water changed into acid emulsifies with refrigerant oil, the two forming an intimate mixture of exceedingly fine globules. This effect is called "sludging" of the oil and greatly reduces its lubricating ability. Corrosion becomes troublesome from the operating standpoint when the metallic surface is eaten away and a solid, detachable

product is formed. This formation is commonly known as a "sludge".



ACID EFFECTS ON METALS



MOISTURE TO SLUDGE

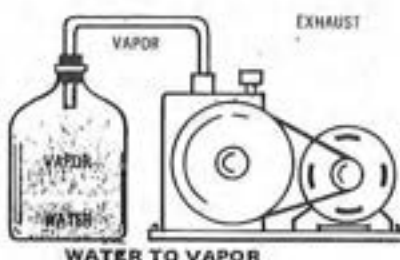
Sludge exists as slimy liquids, fine powders, granular solids or sticky solids and can cause a variety of problems. They can plug fine strainers, expansion valves and capillary tubes. And because they usually contain acids they corrode whatever they cling to, accelerating damage.

Thus can be seen what a monster moisture really is in an air conditioning system. It causes freeze-up and corrosion. It results in valve failures. It forms acids which form sludges which, in turn, clog screens, valves and tubes. Little wonder it is regarded as air conditioning system enemy number one!

To eliminate moisture problems it is necessary to take precautions and actions which will assure a moisture free system. And one of the most effective ways to eliminate moisture from a system is through the use of a high vacuum pump.

EFFECTS OF PRESSURE AND TEMPERATURES ON THE BOILING POINTS OF WATER

A high vacuum pump is capable of removing all moisture from a hermetic system because of its effectiveness in lowering pressures to the boiling point of water.



WATER TO VAPOR

(For those being introduced here to high vacuum work, it should be stated that a vacuum pump does not "suck out" the liquid moisture, but rather causes it to boil into a vapor state at which time it can be removed like free air.)

To control her universe, Mother Nature has many laws, which we term as natural laws.

Through the years, man has discovered new methods of using these laws to his advantage. The use of a vacuum pump to boil water is not a new discovery of natural laws. However, the understanding of those laws and their application, together with your mechanical ability and the necessary tools will permit you to properly dehydrate a refrigerant system.

The planet Earth is surrounded by matter in the gaseous state composed of about 78% nitrogen, 21% oxygen and 1% a mix of rare gases. Together they form our atmosphere, which extends approximately 600 miles above the earth and is held to the earth by gravity. Being a gas, the atmosphere has weight, and that weight is measured, as is any fluid whether liquid or gas, in pounds per square inch (P.S.I.).



ATMOSPHERIC PRESSURE

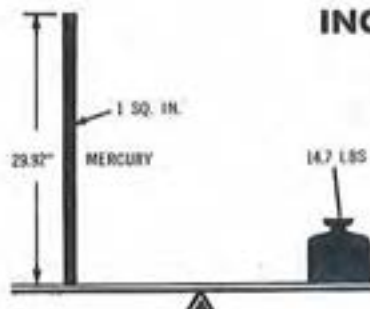
If we were to take a square inch column of the air extending six hundred miles above the earth, its weight and pressure exerted on the earth at sea level would be 14.7 P.S.I. This is called atmospheric pressure. Any pressure above atmospheric pressure is referred to as gauge pressure. Pressures below are referred to as vacuum.

This same square inch column of air exerting 14.7 P.S.I. can support a one inch square column of mercury (Hg) 29.92 inches high. This concept can best be understood by comparing it to a teeter-totter. When a one inch square column of Hg 29.92" high is placed on one end of the teeter-totter, and a 14.7 lb. weight on the other end, the board will be balanced.

Atmospheric pressure is different at different elevations. As stated, 600 miles of atmosphere at sea level is equivalent to 14.7 P.S.I. and/or 29.92 inch column of mercury (Hg).

6

FUNDAMENTALS OF DEHYDRATING A REFRIGERATION SYSTEM INCLUDING SELECTION OF VACUUM PUMPS



The most important law of Mother Nature affecting dehydration work is that governing the boiling points of water at various pressures. It is common knowledge that water at sea level will boil if heated to 212°F. The following table is not common knowledge however, and yet it is our guide to tackling dehydration work.

**BOILING TEMPERATURES OF WATER AT
CONVERTED PRESSURES**

Temperature °F	Temperature °C	Inches of Mercury	Microns*	Pounds Sq. In. (Pressure)
212	100	29.92	759,968	14.696
205	96	25.00	635,000	12.279
194	90	20.69	525,526	10.162
176	80	13.98	355,092	6.866
158	70	9.20	233,680	4.519
140	60	5.88	149,352	2.888
122	50	3.64	92,456	1.788
104	40	2.17	55,118	1.066
86	30	1.25	35,560	.614
80	26.7	1.00	25,400	.491
76	24.4	.90	22,860	.442
72	22.2	.80	20,320	.393
69	20.6	.70	17,780	.344
64	17.8	.60	15,240	.295
59	15	.50	12,700	.246
53	11.7	.40	10,160	.196
45	7.2	.30	7,620	.147
32	0	.18	4,572	.088
21	-6.1	.10	2,540	.049
6	-14.4	.05	1,270	.0245
-24	-31.1	.01	254	.0049
-35	-37.2	.005	127	.00245
-60	-51.1	.001	25.4	.00049
-70	-56.7	.0005	12.7	.000245
-90	-67.8	.0001	2.54	.000049

*Remaining pressure in system in microns

1,000 inch = 25,400 microns = 2,540 CM = 25.40 MM

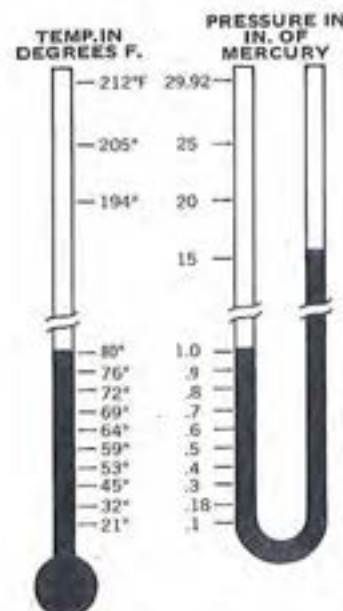
.100 inch = 2,540 microns = .254 CM = 2.54 MM

.039 inch = 1,000 microns = .100 CM = 1.00 MM

Keeping in mind the above facts regarding pressure created by the earth's atmosphere, it can be seen from this chart that as atmospheric pressure is lowered, so is the boiling point of water. It can be concluded, therefore, that there are three ways of eliminating moisture from a refrigerant system by the boiling process:

1. Transport the system to a higher elevation where the ambient temperature is sufficient to boil water at the existing P.S.I.
 2. Apply heat to the system causing the moisture it contains to boil.
 3. Employ a high vacuum pump to reduce the pressure to the boiling point of water at the ambient temperature of the day.
- Needless to say, the first two choices are impractical and must be discarded. Thus, it is quite apparent why a high vacuum pump is an essential service aid to every refrigeration serviceman.

SELECTING HIGH VACUUM PUMPS



To make the following discussion easier to understand, it would be best from this point on to think of pressure (P.S.I.) as the amount of mercury it will support; e.g., atmosphere pressure is 29.92 inches Hg instead of 14.7 P.S.I. This will permit us to use the diagram as a visual aid when determining the vacuum which must be attained to boil water under various ambient temps.

As can be seen in the diagram, a vacuum pump capable of eliminating all but one inch of pressure is able to remove moisture at an ambient temperature of 80°F or over. While any pump pulling within one inch of atmospheric pressure can eliminate moisture, it must also be capable of holding that vacuum throughout the dehydration process. In addition, it must pull that vacuum on the entire system and not simply at the intake of the pump.

Before considering the variables affecting a high vacuum pump's performance, we should first review some general classifications of vacuum pumps relative to their ability to remove moisture by the boiling process.

VACUUM PUMPS—AIR COMPRESSOR TYPE

Because of air compressors were designed to remove large volumes of air rather than to remove all but a small amount of pressure, this type of unit will not eliminate any moisture by the boiling method. At best, it cannot pull more than 28 inches of mercury and consequently should not be considered suitable for high vacuum work.

VACUUM PUMPS — COMPRESSOR TYPE

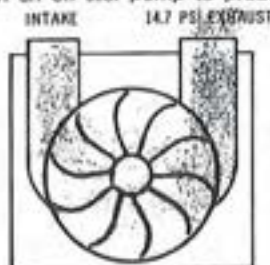
For clarification, compressor type vacuum pumps should be separated into two categories: piston type and rotary vane type.

Under ideal conditions, a piston-type compressor might pull a vacuum of 28.2 inches of mercury which will boil water at an ambient temperature of 110°F or over. But it is questionable whether or not it can hold this vacuum once moisture condenses into its oil. Quite a number of these vacuum pumps have been sold as evacuator and are used in conjunction with a true high vacuum pump. By themselves they cannot remove moisture by the boiling method under normal ambient conditions.

A rotary-type compressor can usually pull a vacuum of 29.83". Some pull as low as 29.82". This vacuum will remove moisture by the boiling method. However, because of their limited capacity (.4 to .8 CFM), these pumps are limited to refrigerator and freezer type service work. They are also used in the automotive air conditioning service field.

HIGH VACUUM PUMPS — SINGLE STAGE

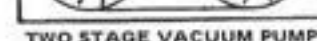
There are available single stage high vacuum pumps which pull down to within 15 microns under laboratory conditions. These pumps discharge directly into the atmosphere and because of the higher discharge pressure, lower vacuums are not possible at the intake of the pump. In addition, most single stage units are not able to purify the oil being circulated and become contaminated quickly. The ability of an oil seal pump to produce a good vacuum depends upon the



ONE STAGE VACUUM PUMP

HIGH VACUUM PUMPS — TWO STAGE

Compound two stage vacuum pumps are capable of pulling down extremely low pressures, such as .1 micron. While they will not pull down to this point under field conditions, they can continuously pull down to 50 microns for prolonged periods of time. Because they are two stage in construction, they can be equipped with a gas ballast or vented exhaust.



TWO STAGE VACUUM PUMP

GAS BALLAST OR VENTED EXHAUST

The gas ballast or vented exhaust feature is a valving arrangement which permits relatively dry air from the atmosphere to enter the second stage of the pump. This air combines with the "wet" vapors passing through the pump from the refrigerant systems and helps to prevent the moisture from condensing into a liquid and mixing with the vacuum pump oil.

This may sound complex, but actually it is relatively simple. A comparison should help explain it. Imagine a damp towel being twisted until water drops out. This can be compared to a high vacuum pump which is not equipped with a gas ballast. Moisture being pulled from a wet refrigerant system is compressed internally in the vacuum pump and condenses into a liquid. Now imagine that same damp towel entwined with a dry towel and then twisted. It would take a considerable amount of twisting before any water would drop out.

FUNDAMENTALS OF DEHYDRATING A REFRIGERATION SYSTEM (Cont'd) INCLUDING SELECTION OF VACUUM PUMPS

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TECH. PAGE

Thus the process of the vented exhaust arrangement. It permits the moisture laden air passing through the pump to mix with relatively dry air to such a degree that compression does not cause condensation.

The damp towel comparison also illustrates why this valving feature cannot handle large amounts of moisture. If the towel is almost saturated with water, even the introduction of the completely dry towel will not prevent some of the water from dropping out when the two are compressed.



Because of the "severe" application of a vacuum pump when used to "boil water", it is necessary to select a quality two stage model equipped with a vented exhaust to achieve adequate performance over a long period of time. It should be emphasized, however, that even with the best pump available, regular maintenance has to be performed.

IMPORTANT - OIL CHANGING

Frequent oil changes should be anticipated and considered as the single most important factor in a preventative maintenance program. As stated previously, even a pump equipped with a vented exhaust cannot handle large amounts of moisture without some being condensed into the oil. If allowed to remain inside the pump, this moisture will attack the metal components and result in lock ups or loss of efficiency and/or capacity. Normally, oil changes will not be required during a single dehydration job. But it would be well to change oil after each major pump down.

FACTORS AFFECTING THE SPEED AT WHICH A PUMP CAN DEHYDRATE A REFRIGERANT SYSTEM

Several factors influence the "pumping speed" of a high vacuum pump, and thus the time required to remove all moisture from a refrigerant system. Some of the most important are: the cubic feet capacity of the system itself; the amount of moisture (both visible and invisible) contained within the system; the ambient temperature present; internal restrictions within the system; and external restrictions between the system and the vacuum source.

Unfortunately, nearly all the controlling factors are dictated. The OEM's determine the cubic feet capacity of the systems and their internal restrictions. Malfunctions and inefficiencies result from the presence of moisture. And Mother Nature controls the ambient temperature of the day. Consequently the only factors under the control of the serviceman are the external restrictions between the system and the vacuum pump. Nevertheless, this one factor is very important and warrants more discussion.

Let us assume that all other variable factors affecting pump down-time are equal. Within a system variable pressures attempt to balance. In this balancing, the higher pressure "flows" towards the lower pressure. The higher pressure in the system will flow toward the vacuum pump until it is reduced or in balance with the 100 microns of pressure. The speed at which it will flow is controlled by the I.D. and length of the connecting line. For example, it takes eight times as long to pull a given vacuum through a 1/4" diameter line as it does through a 1/2" diameter line. And it takes twice as long to pull this vacuum through a 6' line as it does a line 3' long.

Because of the external restrictions created by using standard hook-up components, frequently the size of the connecting line or access valve determines the most practical vacuum pump to purchase. Money can be wasted by buying a vacuum pump which has more capacity than can be utilized. The most practical vacuum pump to buy is one which is capable of eliminating pressure to below the boiling point of water as fast as it can flow to the vacuum source. If the restrictions, internal or external, hold back the flow to a speed at which a 1.2 or 3 CFM pump can effectively eliminate the pressure, a larger capacity pump is not required.

When determining the size (C.F.M. capacity) of the pump to meet your needs, remember that it is the length and diameter of the line to dehydrate which should dictate the size pump to buy, and not the HP of the refrigerant system.

Generally, the majority of refrigerant systems must be dehydrated through a 1/2" I.D. line or access valve. Consequently, the 1.2 to 3 CFM capacity pump will handle most applications. Where it is possible to use a larger I.D. connecting line, a larger pump is recommended.

HOW VACUUM CAN BE MEASURED

In the refrigeration industry, vacuum is measured with a standard compound gauge, closed end manometer or a thermistor vacuum gauge. Keeping in mind that it is vacuum and its relationship to the boiling points of water we are attempting to measure, we can refer back to the Table to see the relationship between pressure in terms of inches of Hg, millimeters and microns.

A standard bourdon tube compound gauge is a rugged type designed to read low pressures in inches of vacuum. It is suitable for reading vacuums, e.g., 28" Hg. However, it cannot be expected to read millimeters or microns, and, because of this, is not suitable for use with high vacuum pumps.

A closed end U tube mercury manometer can be read with good accuracy in millimeters. With one millimeter equal to 1000 microns, it is possible to read 500 microns with this gauge. It is, however, a fairly delicate instrument, making it more suitable for laboratory or shop work rather than for field service.

Thermistor vacuum gauges are designed for use with high vacuum pumps and can be read accurately in microns. They are considered a must as companion instruments for high vacuum dehydration of a refrigerant system. Though they are instruments, there are several on the market rugged enough for field service work.

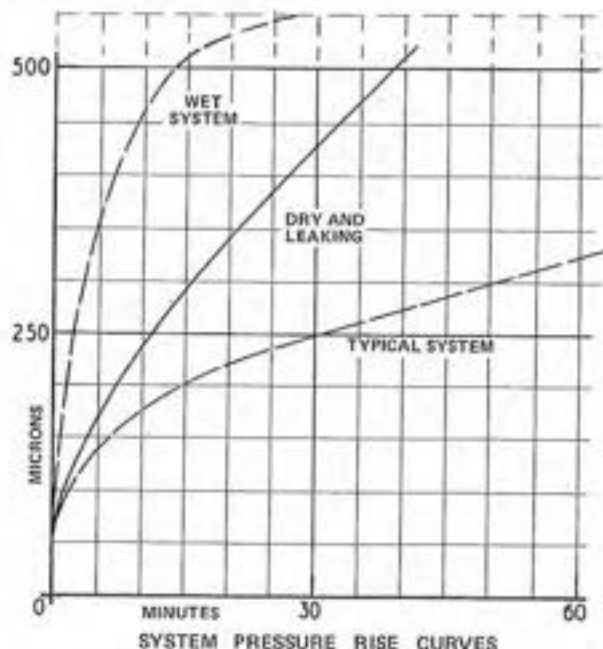
When reading vacuum, you should remember that the location of the vacuum gauge tube will affect the reading. The closer to the vacuum source, the lower will be the reading.

When reading the vacuum created in a refrigerant system, you should isolate the vacuum pump with a good vacuum valve and allow the pressure in the system to balance before taking a final reading.

If the pressure will not balance off, it is an indication of a leak. If it does balance off, but at a pressure which is too high, it is an indication of moisture, and more pumping time is required.

TESTING FOR DRYNESS

During evacuation the vacuum should be reduced to below 100 microns. When the system is thought to be dry it should be isolated from the pump with the gauge still in the system. If the pressure rises above 500 microns (.5 torr) in an hour then the system is not dry, or leaks. A leak is indicated when the pressure rises at a constant rate, for example 100 microns (.1 torr) every five minutes. If the rate varies, for example 300 in the first 5 minutes, 100 in the next 5 and 50 in the next 5, then it is wet and must be evacuated for a longer time, (refer Chart below).

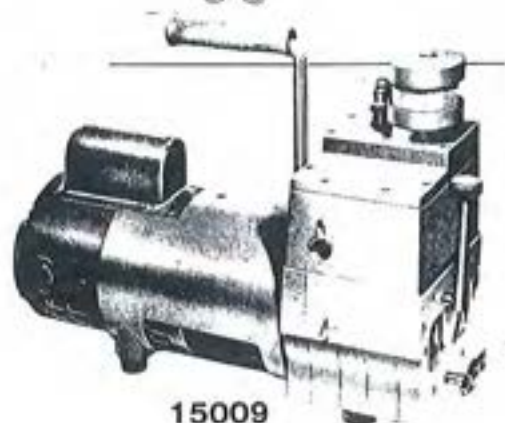


Compiled from :-
"Fundamentals of Dehydrating a Refrigerant System" by Robinair Manufacturing Corporation.
"A Guide to Refrigeration System Dehydration" by Dynvac P/L.

REFER PREVIOUS PAGES 358 AND 358-a FOR FURTHER INFORMATION AND VACUUM CONVERSION TABLES
REFER ALSO ENGINEERING & TECHNICAL DATA SECTION PAGES 457 & 458

EQUIPMENT AND TOOLS

HIGH VACUUM PUMPS



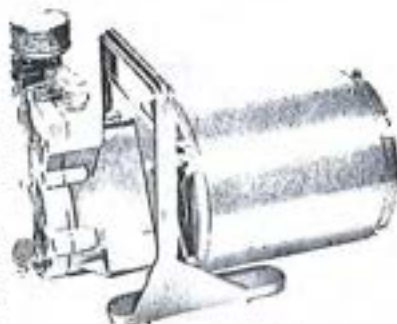
15009

Available in two-stage, dual stage, single-stage and switchable models. Robbi-Vac high vacuum pumps, designed specifically for the air conditioning and refrigeration serviceman, are available in a complete line of field-proven single and two-stage models, in both belt and direct drive.

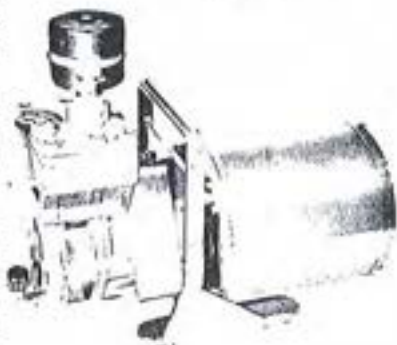
These pumps incorporate an oil injection system which constantly circulates the oil to provide a positive seal, and a vented exhaust that decreases the possibility of vapour condensation within the pump. Such standard features help all Robbi-Vac pumps remain relatively free from contamination throughout the evacuation process. Comparative evaluations show that Robbi-Vac pumps remove moisture faster than any competitive pumps tested.

Each Robbi-Vac pump is backed by Robbinair's extensive manufacturing experience in the field of vacuum, and each pump is thoroughly tested to ensure that the serviceman receives the quality he expects from Robbinair.

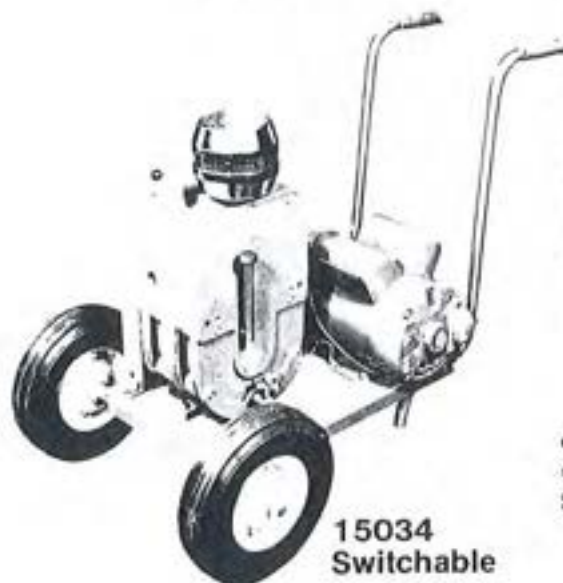
Robbinair also offers switchable models that combine the advantages of a large capacity single stage pump with the low ultimate capabilities of a two-stage pump. This unique feature enables the serviceman to evacuate larger systems rapidly to a low micron level, simply by manually switching the valve located on the pump.



15096



15091

15034
Switchable

FEATURES

- Oil Injection • Vented Exhaust • Exhaust Filter • Small Oil Capacity • Motor Mounted Switch • Reciprocating Vane • Will Start at 0°C (32°F) Temperatures • Portability • Carrying Handle

All Pumps are shipped with a charge of oil and an additional container of oil.

CAT. NO.	MODEL No.	No. STAGES	DRIVE	MOTOR SIZE (HP)	VACUUM PUMP SPEED	FREE AIR DISPLAC. CFM	VACUUM UNDER FIELD COND. MICRONS	OIL CAPACITY (OZS)	OPERAT. TEMP. °C	WEIGHT kg
SINGLE STAGE										
36225	15006	1	Direct	1/3	1425	3.0	75	2%	66	18.4
	15025	1	Belt	1/3	700	1.2	25	2%	57	20.9
36226	15096	1	Direct	1/4	1425	1.0	75	3/4	57	8.2
TWO STAGE										
36224	15009	2	Direct	1/3	1425	3.0	15	5	66	26.6
36227	15029	2	Belt	1/3	700	1.2	15	5	57	28.0
	15085	2	Direct	1/4	1425	1.1	50	2	57	8.6
	15090	Dual	Direct	1/4	1425	2.2	75	2	57	8.6
36013	15086	2	Direct	1/4	1425	1.0	25	2	57	8.8
36014	15091	2	Direct	1/4	1425	2.0	40	2	57	8.8
SWITCHABLE										
36229	15015	1 Parallel 2 Series	Direct	1/3	1425	3 Series 5 Parallel	15	5	66	26.6
36228	15034	1 Parallel 2 Series	Belt	1 1/2	1050	9 Series 15 Parallel	15	14	66	80.0
LITHIUM BROMIDE										
	15017	2	Direct	1/3	1425	3	500	5	66	26.6

NOTE: FOR JIGTOOL VACUUM PUMPS — Refer Page 362

EQUIPMENT AND TOOLS

IMPERIAL

Vacuum Pumps



230-P

Compact, lightweight pumps designed to operate quickly and dependably.

Imperial Vacuum Pumps are designed for the professional who wants to be adequately sure of dehydrating the systems he services and eliminate call backs.

Rugged construction

These direct drive, rotary vane pumps are manufactured to give years of dependable service. Pumps have no exposed moving parts. Stator and rotor are made of rugged cast iron alloy with a high nickel content.

Oil is vacuum fed to ensure proper lubrication and pumping efficiency. Ample oil capacity handles contaminants more effectively. Rubber feet minimise vibration and noise. Units have convenient carrying handle.



221-P

CAT. NO.	Model	No. of Stages	Capacity		Vacuum Microns	Oil Capacity (ozs)	Intake Port OD Male Flare	HP	Elect. Data	RPM	Dimensions			Weight kg
			CFM	L/m							Height	Length	Width	
36024	202 - P	1	1.5	42	100	19	3/8"	1/3	240/50	1425	9 1/4"	14"	5 1/2"	14.5
36025	204 - PA	2	6.2	177	25	128	3/4"	3/4	240/50	950	14"	23"	10"	46.4
	209 - P	2	4.3	125	25	56	3/4"	1/2	240/50	1425	12"	20 1/2"	7 1/2"	25.5
	221 - P	1	0.8	21	100	9	3/8"	1/10	240/50	1425	8 1/4"	10 7/8"	4 1/2"	7.3
36020	230 - P	2	1.5	42	25	19	3/8"	1/3	240/50	1425	9 7/8"	14 1/2"	5 1/2"	18.2

J/B FastVac™

DEEP VACUUM PUMP

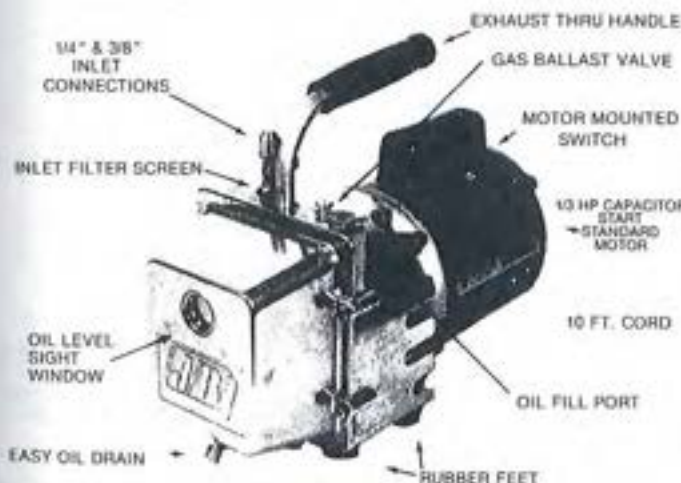
MODEL DV-85C

PORTABLE DEEP VACUUM PUMP
TWO STAGE • GAS BALLAST • DIRECT DRIVE
 Designed for rugged service conditions to give years of dependable service

- Increased Capacity 2.5 CFM (71 L/m) [50 Hz. Rating]
- Compact/Lightweight 10.9 kg (24 lb.)
- 2 stage Guaranteed Vacuum - 25 microns • Gas Ballast
- Direct Drive • Completely Field Repairable • Iron & Steel Running Parts • Aluminium Housing • Proven Durability

SPECIFICATIONS

Pump Speed (50 Hz)	1425 rpm
Free Air Displacement (50 Hz)	2.5 CFM (71 L/m)
Ultimate Vacuum	Guaranteed 25 microns or better
Motor 1/3 HP 1425 RPM, single phase, 240 Volt 50 HZ, capacitor start, thermal overload protected	Approx 1 pint/1 shot
Oil capacity	60°C ± 10°C (150°F ± 18°F)
Operating Temperature	1/4" & 3/8" male flare
Intake port	13-1/8" D x 9-1/2" H
Overall dimensions (handle)	10.9 kg (24 lb.)
Net Weight	



COMPLETELY FIELD REPAIRABLE IN MINUTES WITH THE NEW

J/B VacPak™ CARTRIDGE

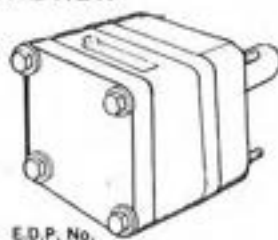
VAC PAK KIT CONSISTS OF

- Rotor-Center Plate-Shaft Assembly
- Intake Stator
- Exhaust Stator
- Exhaust Valve
- End Plate
- Vanes

Completely assembled ready to install.

Also Included:

- 1 Shaft Seal • 1 Housing Gasket • 4 Rubber Feet



Part No.

D10086

E.D.P. No.

10086

All Vac Pak Kits are assembled and factory tested to perform to the same specs as the DV-85. All running parts are iron and steel for maximum durability.

MODEL DV - 85C
DEEP VACUUM
PUMP

CAT. NO.

36030

VACPAK
CARTRIDGE

CAT. NO.

36031

EQUIPMENT AND TOOLS

HIGH VACUUM GAUGES

'DYNAVAC' MODELS

TM2

TM3

CG2



Dynavac gauges are the result of extensive involvement with the manufacture of vacuum equipment suited entirely to Australian conditions. The accessory outlet lets you fit a potentiometric chart recorder and switching controller without effort.

Modular Design — Only 5 1/2" high, by either 1/4 or 1/2 rack wide, the gauges can be either rack mounted or free standing. Accessories are fully compatible too — enabling future requirements to be catered for easily.

Rack Mountable — With the purchase of a 19" x 5 1/4" high standard rack mounting frame, up to 4 1/2 rack gauges can be immediately

rack mounted. When purchasing a rack mounting frame with a gauge, the standard gauge case can be deleted with a consequent cost saving. **Maintenance** — Components are readily available if required. All instruments feature plug-in epoxy glass printed circuit boards, and ready access to preset adjustments. All circuitry is solid state utilizing integrated circuits where applicable. **Standard Cases** — All instruments are supplied with a solid case with a flexible handle and feet that don't fall off and can't scratch bench tops. The case also prevents dust, tools and other articles from falling into the gauge.

SPECIFICATIONS

	TM2	TM3	CG2
OPERATING PRINCIPLE	Thermal conductivity by thermistors		Thermal conductivity and cold cathode ionization.
PRESSURE RANGE	10 Torr to 10 ⁻³ Torr in 1 range	50 Torr to 10 ⁻³ Torr and 10 ⁻¹ to 10 ⁻³ Torr	10 Torr to 10 ⁻³ and 10 ⁻³ to 10 ⁻⁸ Torr and 10 ⁻⁸ to 10 ⁻⁹ Torr
SENSING HEADS	Thermistor type TM2H with cord-control will accept up to 2 heads	Thermistor type TM3H with cord-control will accept up to 2 heads	Thermistor type TM2H, cold cathode ionization type CCH, with cords.
DIMENSIONS	4-3/8" wide (1/4 rack) x 5-1/4" high x 10-1/4" deep		
POWER	200 — 250 V. A.C. 50 Hz.		
AMBIENT	10°C to 50°C (50°F to 122°F)		
AUXILIARY OUTLET	10 MV, for recorder + output for Dynavac C1 Controller		
VACUUM FITTING	3/8" Refrigeration Flare		3/8" Refrig.Flare and 3/4" for CCH.

CAT. NO.	MODEL ACCESSORY	DESCRIPTION
3611	TM2	High Vacuum Gauge.
3614	TM3	" " "
3613	CG2	" " "
36111	TM2H	Thermistor head to suit TM2, TM4, CG2, IG10, Vactest, TM1B, TM1 or CG1 (specify).
36112	TM3H	Thermistor head to suit TM3
36113	TM4H	Strain gauge head to suit TM4
36114	TCH	Thermo couple gauge head to suit TC1
36115	CCH	Ionization head to suit CG2 and CG1

DYNVAC VACTEST THERMISTOR VACUUM GAUGE



Electronic vacuum gauges are essential equipment when using high performance vacuum pumps. They provide the only way for testing whether systems are dry and leaktight.

The DYNVAC gauge is a rugged, portable, battery-operated gauge of proven design, supplied complete with gauge head and cord.

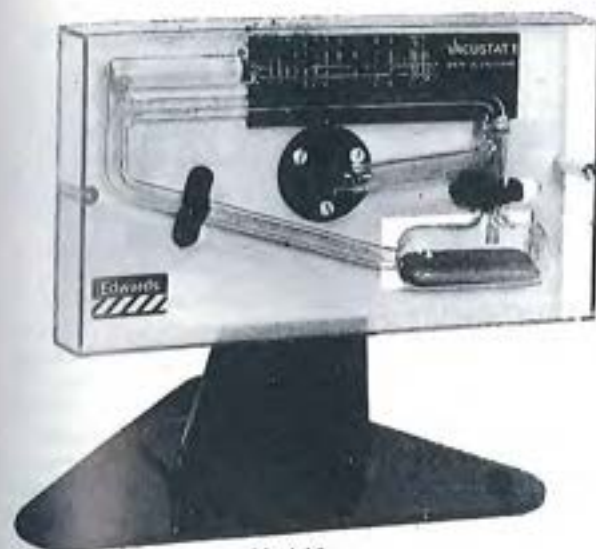
- Wide range (10,000 — 1 microns).
- Vacuum Reading 1000 times accuracy of 2" dial gauge.
- Gauge head repairable.
- Simple to use (only 1 control).
- 3/8" flare gauge head fitting.
- Uses 9V Eveready 765 battery.
- Heavy duty case with shoulder strap.
- 9 1/2" L x 7" H x 4 1/4" Deep.

CAT NO. 3612

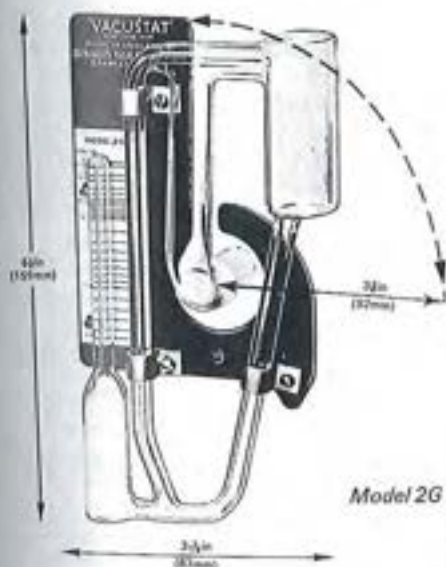
EQUIPMENT AND TOOLS

VACUUM GAUGES

EDWARDS VACUSTATS — RANGE 10 to 10^{-3} Torr



Model 1



Model 2G

The Edwards series of Vacustats comprises a family of three miniature McLeod gauges designed for general laboratory or industrial duties.

The gauge is operated by rotation of the head within the rotary seal incorporated in the unit. Normally the head is positioned with the capillary and measuring scale horizontal and when it is desired to make a measurement the head is rotated through 90° to bring the tube and scale upright. The rotation causes the mercury to move within the glassware and isolate a fixed volume of the gas whose pressure is to be measured. This quantity of gas is then compressed into the closed capillary tube, and when the mercury volume in the open capillary is level with the zero mark on the measuring scale, the system pressure is given by measuring the height of the mercury column in the closed capillary against the scale which is calibrated directly in Torr.

The three units are as follows:

Model 1 is a free-standing bench unit covering the pressure range 10 to 10^{-3} torr.

Model 2 is of similar construction but covers the pressure range 1 to 10^{-3} torr.

Model 2G is a lightweight glass head for mounting direct onto the vacuum system. Range 1 to 10^{-3} torr.

Technical data

	Model 1	Model 2	Model 2G
Range (torr)	10 to 10^{-3}	1 to 10^{-3}	1 to 10^{-3}
Mercury charge	100g	150g	150g
Weight	900g	900g	85g
Dimensions (mm)			
Fascia	105 x 180	105 x 180	—
Height	220	220	159
Base	Triangular with 3 feet on 190 pitch circle radius		—
Width	—	—	87
Radial clearance	—	—	92
Vacuum connection	Supplied with 1/8" vacuum union using a VIT 2A 'O' ring for 1/4" (6.4mm) entry of 1/8" nominal bore x 0.205" (5.4mm) external ϕ copper tube to BS659. A nozzle adaptor can be fitted to the union for 7mm bore flexible tubing. B14 cone.		
Models 1 and 2			
Model 2G only			

CAT. NO.	PART NO.	PRODUCT DESCRIPTION
3615	07-D063-11-000	Vacustat Model 1
3616	07-D063-12-000	" " 2
3617	07-D064-02-000	" " 2G
3619	09-H034-00-001	Mercury — triple distilled, 0.23 kg.

ROBINAIR® THERMISTOR VACUUM GAUGE



14010 Battery Operated

Range : 25,000-0 microns

Accuracy : 10 microns ± 2.5 microns

50 microns ± 7.5 microns

500 & up $\pm 10\%$

Battery operated : 6 "D" cell

Battery life : 250-300 hours

Compensated for Ambient Temp. : From 30°F to 120°F (-1.1°C to 48.9°C)

This new quality Thermistor Vacuum Gauge has a unique type bridge circuit which compensates for changes in ambient temperature and variance in battery voltage.

This instrument with a wide range of 25,000-0 microns provides a means of monitoring the pull down of the vacuum pump on a system. It is also far more accurate than most vacuum type instruments now offered for field service. Will also indicate leaks in a system if the instrument shows increasing pressure reading.

Two types of operation are provided on instrument — the null method which provides greatest accuracy, and a direct meter reading which gives a continuous monitoring of evacuation progress in the system.

CAT. NO. 36116



javac

JIGTOOL

EQUIPMENT AND TOOLS

HIGH VACUUM PUMPS



THE NEW "J" SERIES OF JIGTOOL VACUUM PUMPS

The highly successful and popular range of Jigtool High Vacuum Pumps including the Refrigeration Series, have undergone detailed modifications designed to reduce weight, improve running speed, increase ultimate vacuum and reduce running costs — the end result is the new "J" Series.

The new models are identified by a new colour range. All models are now metallic blue on metallic silver base and guard, with colour coded labels identifying the range.

The unique Vacpak has in concept remained unchanged with the exception of increased bearing areas, improved porting and oiling. It is now in component form, investment cast, a process used in aviation for turbine blades.

The vacuum pump housing has been re-designed on all pumps to incorporate a vertical oil sight glass, new instruction labels and reduced weight for cooler operating temperature.

Whilst these detailed changes would suggest the vacuum pump is completely different, it is not the case. The proven principles still stand, low running speeds, large bearings and swept areas, high volume oil reservoir and easily accessible

gas ballast and suction fitting. Coupled to the well known easily serviceable and replaceable Vacpak cartridge, this makes the "J" Series the number one choice of industry and research centres throughout the world.

JIGTOOL REFRIGERATION SERIES

These units have always been high performance, low cost units and with the release of the "J" Series the features are further enhanced.

For example, the JDR double stage Refrigeration Service units have the following improvements:

Improved flow rates — quicker pump down time by 10-15%. Higher vacuums — faster removal at low pressure. Weight reductions — improved portability. Larger oil reservoirs — less frequent oil changes. Improved gas ballast — increased vapour pumping.

A new Refrigeration Service is the JSR200, a 215 litre/min single stage unit with all the "J" features plus:

A new higher vacuum from a single stage pump, low purchase price considering capabilities and low weight.

FEATURES

- Refined porting to maximise molecular gas flow giving faster pump down time
- Improved oil visibility
- Improved exhaust baffling
- Increased oil capacity
- Less frequent oil change requirements
- Cooler running
- Improved gas ballasting for faster elimination of condensable vapours
- Increased size second stage in larger series
- PLUS — The unique VACPAK® vacuum cartridge

REFRIGERATION SERIES

- New die-cast aluminium scale trap

All Refrigeration Service Units are fitted with a scale trap incorporating charging/nitrogen sweep valve, pump isolation valve, leak detector, compound vacuum/pressure gauge, and system connection hoses.

CAT. NO.	MODEL	CAPACITY L/min.	PUMP RPM	OIL CHARGE Litre	MOTOR HP	SUCTION FITTING OD mm	WEIGHT kg	ACCESS'Y FITTING	REPLAC. VACPAK® CARTRIDGE CAT. NO.
SINGLE STAGE — Vacuum — Better than 50×10^{-3} torr (6.5 Pa) (50 microns)									
36210	Direct 60	60	1440	0.5/0.7	1/3	20	12.5	Optional	
SINGLE STAGE — Ultimate Vacuum 20×10^{-3} torr (2.64 Pa) (20 microns)									
36213	JS60	60	800	0.9	1/3	20	19	—	36282
	JSR60*	60	800	0.9	1/3	20	21	Manifold	
	JS120	120	800	0.7	1/3	20	21	—	36285
	JSR120*	120	800	0.7	1/3	20	23	Manifold	
	JS200	215	660	1.3	1/3	25	24	—	
36221	JSR200*	215	660	1.3	1/3	25	26	Manifold	
DOUBLE STAGE — Ultimate Vacuum 1×10^{-3} torr (.13 Pa) (1 micron)									
36214	JD60	60	800	0.7	1/3	20	21	—	36283
36215	JDR60*	60	800	0.7	1/3	20	23	Manifold	
36218	JD120	120	800	1.3	1/3	20	24	—	36286
36219	JDR120*	120	800	1.3	1/3	20	26	Manifold	
36220	JD200	215	660	1.7	1/2	25	34	—	36288
36222	JDR200*	215	660	1.7	1/2	25	36	Manifold	

NOTES:

* All "R" (Refrigeration Series) units are fitted with a scale trap incorporating charging/nitrogen sweep valve, pump isolation valve, leak detector, compound vacuum gauge and system connection hoses. All units feature replaceable VACPAK® Cartridge. All motors 240 Volt 50 Hz. with 1.8 m (6 ft.) lead.

RECOMMENDED OIL — SUNISO 3GS — Refer Page 184.

REPLACEMENT SERVICE FOR VACPAK® CARTRIDGES

VACPAK® Cartridges can be Reconditioned — a Replacement Service is available. Service facilities also exist for reconditioning Jigtool Vacuum Pumps and Accessories. Details available on application — Please identify Pump i.e. Model and Serial No.

NEW JAVAC VACUUM PUMP — "DIRECT 60" — See Technical details in Table above and full details on Page 824

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NOTE: ALSO INDEXED ON THIS PAGE ARE REFERENCES TO ADDITIONAL ENGINEERING AND TECHNICAL DATA LOCATED IN OTHER SECTIONS OF THIS CATALOGUE. SUCH REFERENCES ARE MARKED WITH AN ASTERISK *

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**ENGINEERING
AND TECHNICAL DATA**

SECTION INDEX

ON REVERSE SIDE

CONVERSION DATA

Conversion Factors, Tables and Charts are, and have been available in many formats and publications over the years. The introduction of SI METRICS in Australia means that many of the "old" units will eventually disappear. The first Table lists the more common "everyday" SI Metric conversion units as used in the Refrigeration, Air Conditioning and Heating Industry. Following pages list these and many more conversion units in detail. It is always useful, however, to be able to convert some of these "old" units to those units with which we are more familiar. The second Table therefore presents for your convenience, a set of conversion factors which we consider the best and most comprehensive selection available. These factors have been compiled from many different sources.

MULTIPLY TO GO METRIC - DIVIDE BY SAME FACTOR TO REVERSE

MEASUREMENT	CONVERSION	FACTOR	MEASUREMENT	CONVERSION	FACTOR
LENGTH	Inches $\leftrightarrow$ mm	25.4	PRESSURE	PSI $\leftrightarrow$ Pa	6894.76
	Inches $\leftrightarrow$ cm	2.54		PSI $\leftrightarrow$ kPa	6.895
	Mile $\leftrightarrow$ km	1.609		PSI $\leftrightarrow$ MPa	0.006895
AREA	In ² $\leftrightarrow$ cm ²	6.4516		ft.hg $\leftrightarrow$ kPa	2.99
VOLUME	In ³ $\leftrightarrow$ cm ³	16.387		Ins.Hg O $\leftrightarrow$ kPa	0.249
	Gall (Imp) $\leftrightarrow$ l	4.5461		Atmos $\leftrightarrow$ kPa	101
	Gall (US) $\leftrightarrow$ l	3.7854		Torr $\leftrightarrow$ Pa	133.32
FLOW (Air)	CFM $\leftrightarrow$ litre/s	0.472		Torr $\leftrightarrow$ kPa	0.13332
FLOW (Liquid)	GPM (Imp) $\leftrightarrow$ litre/s	0.07571		Ins.Hg $\leftrightarrow$ Pa	3386
	GPM (US) $\leftrightarrow$ litre/s	0.06308		Ins.Hg $\leftrightarrow$ kPa	3.386
ENERGY (Work)	BTU $\leftrightarrow$ kJ	1.055	VELOCITY	ft/sec $\leftrightarrow$ m/s	0.3048
ENTHALPY	BTU/lb $\leftrightarrow$ kJ/kg	2.326		ft/min $\leftrightarrow$ m/s	0.00508
HEAT FLOW	BTU/hr $\leftrightarrow$ Watt	0.29307	WEIGHT (Mass)	lbs $\leftrightarrow$ kg	0.4536
	Ton (Ref) $\leftrightarrow$ kW	3.517		$\leftrightarrow$	
POWER	H.P. $\leftrightarrow$ kW	0.746		$\leftrightarrow$	
THERMAL CONDUCTIVITY	BTU/hr.ft. ² °F $\leftrightarrow$ W/mK	1.73		$\leftrightarrow$	
THERMAL RESISTANCE	Sq.ft. ² °Fhr/BTU $\leftrightarrow$ m ² K/W	0.1761		$\leftrightarrow$	

CONVERSION FACTORS

MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
ATMOSPHERES	76.0	cms. of mercury	Cubic centimetres	0.001759	Pints (liq.) Imperial
Atmospheres	29.92	inches of mercury	Cubic centimetres	0.002113	Pints (liq.) U.S.
Atmospheres	33.90	feet of water	Cubic centimetres	8.801x10 ⁻⁴	Quarts (liq.) Imperial
Atmospheres	1.0333	kg/cm ²	Cubic centimetres	0.001057	Quarts (liq.) U.S.
Atmospheres	14.696	lbs/in ² (PSI)	CUBIC FEET	2.832x10 ⁻⁴	Cubic cms.
Atmospheres	1.058	Tons/sq.ft.	Cubic feet	1728	Cubic inches
Atmospheres	762.480	mmHg (TORR)	Cubic feet	0.02832	Cubic metres
Atmospheres	101.325	kPa	Cubic feet	0.03704	Cubic yards
BARRELS-LIQUID	31.5	Gallons-Liquid (US)	Cubic feet	6.22889	Gallons Imperial
BARRELS-OIL	42	Gallons-Oil (US)	Cubic feet	7.48052	Gallons U.S.
BRITISH THERMAL UNITS	0.2520	Kilogram-calories	Cubic feet	28.32	litres
British Thermal Units	777.5	Foot-lbs.	Cubic feet	49.827	Pints (liq.) Imperial
British Thermal Units	3.927x10 ⁻⁴	Horse-power-hrs.	Cubic feet	59.84	Pints (liq.) U.S.
British Thermal Units	107.5	Kilogram-metre	Cubic feet	24.914	Quarts (liq.) Imperial
British Thermal Units	2.928x10 ⁻⁴	Kilowatt-hrs.	Cubic feet	29.92	Quarts (liq.) U.S.
B.T.U./MIN	12.96	Foot-lbs/sec	CUBIC FEET/MINUTE	472.0	Cubic cms/sec.
B.T.U./min	0.02356	Horse-power	Cubic feet/minute	0.1038	Gallons/sec. Imperial
B.T.U./min	0.01757	Kilowatts	Cubic feet/minute	0.1247	Gallons/sec. U.S.
B.T.U./min	17.57	Watts	Cubic feet/minute	0.4720	litres/sec.
CENTARES (CENTIARES)	1	Square metres	Cubic feet/minute	62.43	Lbs. of water/min.
CENTIGRAMS	0.01	Grams	CUBIC FEET/SECOND	0.5382	Milli.Galls/day Imp.
CENTILITRES	0.01	Litres	Cubic feet/second	0.646317	Milli.Galls/day U.S.
CENTIMETRES	0.3937	Inches	Cubic feet/second	373.733	Galls/min. Imperial
Centimetres	0.01	Metres	Cubic feet/second	448.831	Galls/min. U.S.
Centimetres	10	Millimetres	CUBIC INCHES	16.39	Cubic centimetres
CENTIMTRS. OF MERCURY	0.01316	Atmospheres	Cubic inches	5.787x10 ⁻⁴	Cubic feet
Centimtrs. of mercury	0.4461	Feet of water	Cubic inches	1.639x10 ⁻⁵	Cubic metres
Centimtrs. of mercury	136.0	Kgs./sq. metre	Cubic inches	2.143x10 ⁻⁵	Cubic yards
Centimtrs. of mercury	27.85	Lbs./sq.ft.	Cubic inches	0.0036	Gallons Imperial
Centimtrs. of mercury	0.1934	Lbs./sq. inch	Cubic inches	0.004329	Gallons U.S.
CENTIMETRES/SECOND	1.969	Feet/min.	Cubic inches	0.01639	litres
Centimetres/second	0.03281	Feet/sec.	Cubic inches	0.02883	Pints (liq.) Imperial
Centimetres/second	0.036	Kilometres/hr.	Cubic inches	0.03463	Pints (liq.) U.S.
Centimetres/second	0.6	Metres/min.	Cubic inches	0.01442	Quarts (liq.) Imperial
Centimetres/second	0.02237	Miles/hr.	Cubic inches	0.01732	Quarts (liq.) U.S.
Centimetres/second	3.728x10 ⁻⁴	Miles/min.	CUBIC METRES	10 ⁶	Cubic centimetres
CMS./SEC./SEC.	0.03281	Feet/sec./sec.	Cubic metres	35.31	Cubic feet
CUBIC CENTIMETRES	3.531x10 ⁻⁵	Cubic feet	Cubic metres	61.023	Cubic inches
Cubic centimetres	0.06102	Cubic inches	Cubic metres	1.308	Cubic yards
Cubic centimetres	10 ⁻⁶	Cubic metres	Cubic metres	220	Gallons Imperial
Cubic centimetres	1.308x10 ⁻⁶	Cubic yards	Cubic metres	264.2	Gallons U.S.
Cubic centimetres	2.199x10 ⁻⁴	Gallons (Imperial)	Cubic metres	10 ³ = 1000	litres
Cubic centimetres	2.642x10 ⁻⁴	Gallons (US)	Cubic metres	1759.45	Pints (liq.) Imperial
Cubic centimetres	0.001	litres	Cubic metres	2113	Pints (liq.) U.S.
			Cubic metres	880.14	Quarts (liq.) Imperial
			Cubic metres	1057	Quarts (liq.) U.S.

TECH

CONVERSION FACTORS (Continued)

MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
CUBIC YARDS	7.646x10 ⁸	Cubic centimetres	GALLONS WATER IMP.	10.02	Pounds of water
Cubic yards	27	Cubic feet	GALLONS WATER U.S.	8.3453	Pounds of water
Cubic yards	46,656	Cubic inches	GALLONS/MIN. IMPERIAL	0.02675	Cubic feet/sec.
Cubic yards	0.7646	Cubic metres	Gallons/min. Imperial	0.07575	litres/sec.
Cubic yards	168.2	Gallons Imperial	Gallons/min. Imperial	10.7133	Cubic feet/hr.
Cubic yards	202	Gallons U.S.	GALLONS/MIN. U.S.	0.02228	Cubic feet/sec.
Cubic yards	764.6	litres	Gallons/min. U.S.	0.06308	litres/sec.
Cubic yards	1345.6	Pints (liq.) Imperial	Gallons/min. U.S.	8.9208	Cubic feet/hr.
Cubic yards	1616	Pints (liq.) U.S.	GALLS. WATER/MIN.IMP.	6.4414	Tons Water/24hrs.
Cubic yards	672.7	Quarts (liq.) Imperial	GALLS. WATER/MIN.U.S.	6.0086	(2240lb/Ton)
Cubic yards	807.9	Quarts (liq.) U.S.			Tons Water/24hrs.
CUBIC YARDS/MIN.	0.45	Cubic feet/sec.			(2000lb/Ton)
Cubic yards/min.	2.804	Galls/sec. Imperial	GRAINS (TROY)	1	Grains (Avoir.)
Cubic yards/min.	3.367	Galls/sec. U.S.	Grains (troy)	0.06480	Grams
Cubic yards/min.	12.74	litres/sec.	Grains (troy)	0.04167	Pennyweights(troy)
DECIGRAMS	0.1	Grams	Grains (troy)	0.00208	Ounces (troy)
DECILITRES	0.1	Litres	GRAINS/IMPERIAL GALL.	14.286	Parts/Million
DECIMETRES	0.1	Metres	GRAINS/U.S. GALL.	17.118	Parts/Million
DEGREES (ANGLE)	60	Minutes	Grains/U.S. Gall.	142.86	lbs/million galls.U.S.
Degrees (angle)	0.01745	Radians	GRAMS	980.7	Dynes
Degrees (angle)	3600	Seconds	Grams	15.43	Grains
DEGREES/SEC.	0.01745	Radians/sec.	Grams	0.001	Kilograms
Degrees/sec.	0.1667	Revolutions/min.	Grams	1000	Milligrams
Degrees/sec.	0.002778	Revolutions/sec.	Grams	0.03527	Ounces
DEKAGRAMS	10	Grams	Grams	0.03215	Ounces (troy)
DEKALITRES	10	Litres	Grams	0.002205	Pounds
DEKAMETRES	10	Metres	GRAMS/CM.	0.0056	Pounds/inch.
DRAMS	27.34375	Grains	GRAMS/CM.CM.	62.43	Pounds/cubic foot
Drams	0.0625	Ounces	Grams/cm.cm.	0.03613	Pounds/cubic inch
Drams	1.771845	Grams	GRAMS/LITRE	58.417	Grains/gal.U.S.
FATHOMS	6	Feet	Grams/litre	8.345	Pounds/1000gals.U.S.
FEET	30.48	Centimetres	Grams/litre	0.062427	Pounds/cubic foot.
Feet	12	Inches	Grams/litre	1000	Parts/million
Feet	0.3048	Metres	HECTOGRAMS	100	Grams
Feet	1/3	Yards	HECTOLITRES	100	Litres
FEET OF WATER	0.02950	Atmospheres	HECTOMETRES	100	Metres
Feet of water	0.8826	Inches of mercury	HECTOWATTS	100	Watts
Feet of water	0.03048	Kgs./sq.cm.	HORSE-POWER	42.44	B.T.Units/min.
Feet of water	62.43	Lbs./sq.ft.	Horse-power	33,000	Foot-lbs/min.
Feet of water	0.4335	Lbs./sq.inch	Horse-power	550	Foot-lbs/sec.
FEET/MIN.	0.5080	Centimetres/sec.	Horse-power	1.014	Horsepower(metric)
Feet/min.	0.01667	Feet/sec.	Horse-power	10.70	kg.-calories/min.
Feet/min.	0.01829	Kilometres/hr.	Horse-power	0.7457	Kilowatts
Feet/min.	0.3048	Metres/min.	Horse-power	745.7	Watts
Feet/min.	0.01136	Miles/hr.	HORSE-POWER (BOILER)	33,479	B.T.U./hr.
FEET/SEC./SEC.	30.48	Cms./sec./sec.	Horse-power (boiler)	9.803	Kilowatts
Feet/sec./sec.	0.3048	Metres/sec./sec.	HORSE-POWER-HOURS	2547	Brish.Thermal Units
FOOT-POUNDS	1.286x10 ⁻³	Brish.Thermal Units	Horse-power-hours	1.98x10 ⁶	Foot-lbs.
Foot-pounds	0.050x10 ⁻⁷	Horse-power-hrs.	Horse-power-hours	641.7	Kilogram-calories
Foot-pounds	3.241x10 ⁻⁴	Kilogram-calories	Horse-power-hours	2.737x10 ⁶	Kilogram-metres
Foot-pounds	0.1383	Kilogram-metres	Horse-power-hours	0.7457	Kilowatt-hours
Foot-pounds	3.766x10 ⁻⁷	Kilowatt-hrs.	INCHES	2.540	Centimetres
FOOT-POUNDS/MIN.	1.286x10 ⁻³	B.T.Units/min.	INCHES OF MERCURY	0.03342	Atmospheres
Foot-pounds/min.	0.01667	Foot-pounds/sec.	Inches of mercury	1.133	Feet of water
Foot-pounds/min.	3.030x10 ⁻⁶	Horse-power	Inches of mercury	0.03453	Kgs./sq.cm.
Foot-pounds/min.	3.241x10 ⁻⁴	Kg.-calories/min.	Inches of mercury	70.73	Lbs./sq. ft.
Foot-pounds/min.	2.260x10 ⁻⁵	Kilowatts	Inches of mercury	0.4912	Lbs./sq. inch
FOOT-POUNDS/SEC.	7.717x10 ⁻³	B.T.Units/min.	INCHES OF WATER	0.002458	Atmospheres
Foot-pounds/sec.	1.818x10 ⁻³	Horse-power	Inches of water	0.07355	Inches of mercury
Foot-pounds/sec.	1.945x10 ⁻²	Kg.-calories/min.	Inches of water	0.002540	Kgs./sq. cm.
Foot-pounds/sec.	1.356x10 ⁻³	Kilowatts	Inches of water	0.5781	Ounces/sq. inch
GALLONS IMPERIAL	4545.6	Cubic Centimetres	Inches of water	5.202	Lbs./sq. foot
Gallons Imperial	0.1606	Cubic feet	Inches of water	0.03613	Lbs./sq. inch
Gallons Imperial	277.4	Cubic inches	KILOGRAMS	980.665	Dynes
Gallons Imperial	0.00454	Cubic metres	Kilograms	2.205	Lbs.
Gallons Imperial	0.00594	Cubic yards	Kilograms	0.001102	Tons(short)
Gallons Imperial	4.5456	litres	Kilograms	1000	Grams
Gallons Imperial	8	Pints Imperial	KGS./METRE	0.6720	Lbs./foot
Gallons Imperial	4	Quarts Imperial	KGS./SQ. CM.	0.9678	Atmospheres
Gallons Imperial	1.20095	Gallons U.S.	Kgs./sq. cm.	32.81	Feet of water
GALLONS U.S.	3785	Cubic centimetres	Kgs./sq. cm.	28.96	Inches of mercury
Gallons U.S.	0.1337	Cubic feet	Kgs./sq. cm.	20.48	Lbs./sq. foot
Gallons U.S.	231	Cubic inches	Kgs./sq. cm.	14.22	Lbs./sq. inch
Gallons U.S.	0.003785	Cubic metres	KGS./SQ. MILLIMETRE	10 ⁶	Kgs./sq. metre
Gallons U.S.	0.004951	Cubic yards	KILOLITRES	1000	Litres
Gallons U.S.	3.785	litres			
Gallons U.S.	8	Pints U.S.			
Gallons U.S.	4	Quarts U.S.			
Gallons U.S.	0.83267	Gallons Imperial			

CONVERSION FACTORS (Continued)

MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
KILOMETRES	10 ³	Centimetres	OUNCES	16	Drams
Kilometres	3281	Feet	Ounces	437.5	Grains
Kilometres	1000	Metres	Ounces	0.0625	Pounds
Kilometres	0.6214	Miles	Ounces	28.349527	Grams
Kilometres	1094	Yards	Ounces	0.9115	Ounces (troy)
KILOMETRES/HR.	27.78	Centimetres/sec.	Ounces	2.790x10 ⁻⁶	Tons (long)
Kilometres/hr.	54.68	Feet/min.	Ounces	2.835x10 ⁻⁵	Tons (metric)
Kilometres/hr.	0.9113	Feet/sec.	OUNCES, TROY	480	Grains
Kilometres/hr.	0.5396	Knots	Ounces, troy	20	Pennyweights(troy)
Kilometres/hr.	16.67	Metres/min.	Ounces, troy	0.08333	Pounds (troy)
Kilometres/hr.	0.6214	Miles/hr.	Ounces, troy	31.103481	Grams
KMS./HR./SEC.	27.78	Cms./sec./sec.	Ounces, troy	1.09714	Ounces, (Avoir)
Kms./hr./sec.	0.9113	Ft./sec./sec.	OUNCES (FLUID)	1.805	Cubic inches
Kms./hr./sec.	0.2778	Metres/sec./sec.	Ounces (fluid)	0.02957	Litres
KILOWATTS	56.92	B.T.Units/min.	OUNCES/SQ. INCH	0.0625	Lbs./sq. inch
Kilowatts	4.425x10 ⁻⁴	Foot-lbs./min.	PARTS/MILLION	0.0584	Grains/U.S.gal.
Kilowatts	737.6	Foot-lbs./sec.	Parts/million	0.07016	Grains/Imp. gal.
Kilowatts	1.341	Horse-power	Parts/million	8.345	Lbs./million gal.
Kilowatts	14.34	Kg.-calories/min.	PENNYWEIGHTS (TROY)	24	Grains
Kilowatts	1000	Watts	Pennyweights(troy)	1.55517	Grams
KILOWATT-HOURS	3415	Britsh. Thermal Units	Pennyweights(troy)	0.05	Ounces (troy)
Kilowatt-hours	2.655x10 ⁶	Foot-lbs.	Pennyweights(troy)	0.0041667	Pounds (troy)
Kilowatt-hours	1.341	Horse-power hrs.	POUNDS	16	Ounces
Kilowatt-hours	860.5	Kilogram-calories	Pounds	256	Drams
Kilowatt-hours	3.671x10 ⁶	Kilogram-metres	Pounds	7000	Grains
LITRES	1000	Cubic centimetres	Pounds	0.0005	Tons (short)
Litres	0.03531	Cubic feet	Pounds	453.5924	Grams
Litres	61.02	Cubic inches	Pounds	1.21528	Pounds (troy)
Litres	0.001	Cubic metres	Pounds	14.5833	Ounces (troy)
Litres	0.001308	Cubic yards	POUNDS (TROY)	5760	Grains
Litres	0.21997	Gallons Imperial	Pounds (troy)	240	Pennyweights(troy)
Litres	0.2642	Gallons U.S.	Pounds (troy)	12	Ounces (troy)
Litres	1.7597	Pints(Imperial)	Pounds (troy)	373.24177	Grams
Litres	2.113	Pints(Imperial) U.S.	Pounds (troy)	0.822857	Pounds (avoir)
Litres	0.8801	Quarts(Imperial)	Pounds (troy)	13.1657	Ounces (avoir)
Litres	1.057	Quarts(Imperial) U.S.	Pounds (troy)	3.6735x10 ⁻⁴	Tons (long)
LITRE/MIN.	5.886x10 ⁻⁴	Cubic ft./sec.	Pounds (troy)	4.1143x10 ⁻⁴	Tons (short)
Litre/min.	0.003666	Galls./sec. Imperial	Pounds (troy)	3.7324x10 ⁻⁴	Tons (metric)
Litre/min.	0.004403	Galls./sec. U.S.	POUNDS OF WATER	0.01602	Cubic feet
METRES	100	Centimetres	Pounds of Water	27.68	Cubic inches
Metres	3.281	Feet	Pounds of Water	0.09976	Gallons Imperial
Metres	39.37	Inches	Pounds of Water	0.1198	Gallons U.S.
Metres	0.001	Kilometres	POUNDS OF WATER/MIN.	2.670x10 ⁻⁴	Cubic ft./sec.
Metres	1000	Millimetres	POUNDS/CUBIC FOOT	0.01602	Grams/cubic cm.
Metres	1.094	Yards	Pounds/cubic foot	16.02	Kgs./cubic metre
METRES/MIN.	1.667	Centimetres/sec.	Pounds/cubic foot	5.787x10 ⁻⁴	Lbs./cubic inch
Metres/min.	3.281	Feet/min.	POUNDS/CUBIC INCH	27.68	Grams/cubic cm.
Metres/min.	0.05468	Feet/sec.	Pounds/cubic inch	2.768x10 ⁻⁴	Kgs./cubic metre
Metres/min.	0.06	Kilometres/hr.	Pounds/cubic inch	1728	Lbs./cubic foot
Metres/min.	0.03728	Miles/hr.	POUNDS/FOOT	1.488	Kgs./metre
METRES/SEC.	196.8	Feet/min.	Pounds/foot	178.6	Grams/cm.
Metres/sec.	3.281	Feet/sec.	POUNDS/SQ. FOOT	0.01602	Feet of water
Metres/sec.	3.6	Kilometres/hr.	Pounds/sq. foot	4.883x10 ⁻⁴	Kgs./sq. cm.
Metres/sec.	0.06	Kilometres/min.	Pounds/sq. foot	6.945x10 ⁻³	Pounds/sq. inch
Metres/sec.	2.237	Miles/hr.	POUNDS/SQ. INCH	0.06804	Atmospheres
Metres/sec.	0.03728	Miles/min.	Pounds/sq. inch	2.307	Feet of Water
MICRONS	10 ⁻⁶	Metres	Pounds/sq. inch	2.036	Inches of mercury
MILES	1.609x10 ³	Centimetres	Pounds/sq. inch	0.07031	Kgs./sq. cm.
Miles	5280	Feet	QUARTS (DRY) U.S.	67.20	Cubic inches
Miles	1.609	Kilometres	QUARTS (LIQ.) IMPERIAL	69.3185	Cubic inches
Miles	1760	Yards	QUARTS (LIQ.) U.S.	57.75	Cubic inches
MILES/HR.	44.70	Centimetres/sec.	TEMP. (°C)+273	1	Abs. temp. (°C)
Miles/hr.	88	Feet/min.	Temp. (°C)+17.78	1.8	Temp. (°F)
Miles/hr.	1.467	Feet/sec.	Temp. (°F)+460	1	Abs. temp. (°F)
Miles/hr.	1.609	Kilometres/hr.	Temp. (°F)-32	5/9	Temp. (°C)
Miles/hr.	0.8684	Knots	TONS (LONG)	1016	Kilograms
Miles/hr.	26.82	Metres/min.	Tons (long)	2240	Pounds
MILES/MIN.	2682	Centimetres/sec.	Tons (long)	1.12000	Tons (short)
Miles/min.	88	Feet/sec.	TONS (METRIC)	1000	Kilograms
Miles/min.	1.609	Kilometres/min.	Tons (metric)	2205	Pounds
Miles/min.	60	Miles/hr.	TONS (SHORT)	2000	Pounds
MILLIERS	1000	Kilograms	Tons (short)	32000	Ounces
MILLIGRAMS	0.001	Grams	Tons (short)	907.18486	Kilograms
MILLILITRES	0.001	Litres	Tons (short)	2430.56	Pounds (troy)
MILLIMETRES	0.1	Centimetres	Tons (short)	0.89287	Tons (long)
Millimetres	0.03937	Inches	Tons (short)	29166.66	Ounces (troy)
MILLIGRAMS/LITRE	1	Parts/million	Tons (short)	0.90718	Tons (metric)
MINUTES (ANGLE)	2.909x10 ⁻⁴	Radians			

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MULTIPLY TO GO METRIC - DIVIDE BY SAME FACTOR TO REVERSE

MEASUREMENT	CONVERSION	FACTOR	MEASUREMENT	CONVERSION	FACTOR
LENGTH	Inches $\leftrightarrow$ mm	25.4	PRESSURE	PSI $\leftrightarrow$ Pa	6894.76
	Inches $\leftrightarrow$ cm	2.54		PSI $\leftrightarrow$ kPa	6.895
	Mile $\leftrightarrow$ km	1.609		PSI $\leftrightarrow$ MPa	0.006895
AREA	In ² $\leftrightarrow$ cm ²	6.4516		ft.hd $\leftrightarrow$ kPa	2.99
VOLUME	In ³ $\leftrightarrow$ cm ³	16.387		Ins.H ₂ O $\leftrightarrow$ kPa	0.249
	Gall (Imp) $\leftrightarrow$ l	4.5461		Atmos $\leftrightarrow$ kPa	101
	Gall (US) $\leftrightarrow$ l	3.7854		Torr $\leftrightarrow$ Pa	133.32
FLOW (Air)	CFM $\leftrightarrow$ litre/s	0.472		Torr $\leftrightarrow$ kPa	0.13332
FLOW (Liquid)	GPM (Imp) $\leftrightarrow$ litre/s	0.07571		Ins.Hg $\leftrightarrow$ Pa	3386
	GPM (US) $\leftrightarrow$ litre/s	0.06308		Ins.Hg $\leftrightarrow$ kPa	3.386
ENERGY (Work)	BTU $\leftrightarrow$ kJ	1.055	VELOCITY	ft/sec $\leftrightarrow$ m/s	0.3048
ENTHALPY	BTU/lb $\leftrightarrow$ kJ/kg	2.326		ft/min $\leftrightarrow$ m/s	0.00608
HEAT FLOW	BTU/hr $\leftrightarrow$ Watt	0.29307	WEIGHT (Mass)	lbs $\leftrightarrow$ kg	0.4536
	Ton (Ref) $\leftrightarrow$ kW	3.517		$\leftrightarrow$	
POWER	H.P. $\leftrightarrow$ kW	0.746		$\leftrightarrow$	
THERMAL CONDUCTIVITY	BTU/hr.ft. ² .°F $\leftrightarrow$ W/mK	1.73		$\leftrightarrow$	
	Sq.ft. ² .°F/hr/BTU $\leftrightarrow$ m ² K/W	0.1761		$\leftrightarrow$	

CONVERSION FACTORS

MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
ATMOSPHERES	76.0	cms. of mercury	Cubic centimetres	0.001759	Pints (liq.) Imperial
Atmospheres	29.92	Inches of mercury	Cubic centimetres	0.002113	Pints (liq.) U.S.
Atmospheres	33.90	feet of water	Cubic centimetres	8.801x10 ⁻⁴	Quarts (liq.) Imperial
Atmospheres	1.0333	kg/cm ²	Cubic centimetres	0.001057	Quarts (liq.) U.S.
Atmospheres	14.696	lbs/in ² (PSI)	CUBIC FEET	2.832x10 ⁻⁴	Cubic cms.
Atmospheres	1.058	Tons/sq.ft.	Cubic feet	1728	Cubic inches
Atmospheres	762.480	mmHg (TORR)	Cubic feet	0.02832	Cubic metres
Atmospheres	101.325	kPa	Cubic feet	0.03704	Cubic yards
BARRELS—LIQUID	31.5	Gallons—Liquid (US)	Cubic feet	6.22889	Gallons Imperial
BARRELS—OIL	42	Gallons—Oil (US)	Cubic feet	7.48052	Gallons U.S.
BRITISH THERMAL UNITS	0.2520	Kilogram-calories	Cubic feet	28.32	litres
British Thermal Units	777.5	Foot-lbs.	Cubic feet	49.827	Pints (liq.) Imperial
British Thermal Units	3.927x10 ⁻⁴	Horse-power-hrs.	Cubic feet	59.84	Pints (liq.) U.S.
British Thermal Units	107.5	Kilogram-metre	Cubic feet	24.914	Quarts (liq.) Imperial
British Thermal Units	2.928x10 ⁻⁴	Kilowatt-hrs.	Cubic feet	29.92	Quarts (liq.) U.S.
B.T.U./MIN	12.96	Foot-lbs./sec	CUBIC FEET/MINUTE	472.0	Cubic cms/sec.
B.T.U./min	0.02356	Horse-power	Cubic feet/minute	0.1038	Gallons/sec. Imperial
B.T.U./min	0.01757	Kilowatts	Cubic feet/minute	0.1247	Gallons/sec. U.S.
B.T.U./min	17.57	Watts	Cubic feet/minute	0.4720	litres/sec.
CENTARES (CENTIARES)	1	Square metres	Cubic feet/minute	62.43	Lbs. of water/min.
CENTIGRAMS	0.01	Grams	CUBIC FEET/SECOND	0.5382	Mill.Galls/day Imp.
CENTILITRES	0.01	Litres	Cubic feet/second	0.646317	Mill.Galls/day U.S.
CENTIMETRES	0.3937	Inches	Cubic feet/second	373.733	Galls/min. Imperial
Centimetres	0.01	Metres	Cubic feet/second	448.831	Galls/min. U.S.
Centimetres	10	Millimetres	CUBIC INCHES	16.39	Cubic centimetres
CENTIMTRS. OF MERCURY	0.01316	Atmospheres	Cubic inches	5.787x10 ⁻⁴	Cubic feet
Centimtrs. of mercury	0.4461	Feet of water	Cubic inches	1.639x10 ⁻⁶	Cubic metres
Centimtrs. of mercury	136.0	Kgs./sq. metre	Cubic inches	2.143x10 ⁻⁶	Cubic yards
Centimtrs. of mercury	27.85	Lbs./sq.ft.	Cubic inches	0.0036	Gallons Imperial
Centimtrs. of mercury	0.1934	Lbs./sq. inch	Cubic inches	0.004329	Gallons U.S.
CENTIMETRES/SECOND	1.969	Feet/min.	Cubic inches	0.01639	litres
Centimetres/second	0.03281	Feet/sec.	Cubic inches	0.02883	Pints (liq.) Imperial
Centimetres/second	0.036	Kilometres/hr.	Cubic inches	0.03463	Pints (liq.) U.S.
Centimetres/second	0.6	Metres/min.	Cubic inches	0.01442	Quarts (liq.) Imperial
Centimetres/second	0.02237	Miles/hr.	Cubic inches	0.01732	Quarts (liq.) U.S.
Centimetres/second	3.728x10 ⁻⁴	Miles/min.	CUBIC METRES	10 ⁶	Cubic centimetres
CMS./SEC./SEC.	0.03281	Feet/sec./sec.	Cubic metres	35.31	Cubic feet
CUBIC CENTIMETRES	3.531x10 ⁻⁵	Cubic feet	Cubic metres	61.023	Cubic inches
Cubic centimetres	0.06102	Cubic inches	Cubic metres	1.308	Cubic yards
Cubic centimetres	10 ⁻⁶	Cubic metres	Cubic metres	220	Gallons Imperial
Cubic centimetres	1.308x10 ⁻⁶	Cubic yards	Cubic metres	264.2	Gallons U.S.
Cubic centimetres	2.199x10 ⁻⁴	Gallons (Imperial)	Cubic metres	10 ³ = 1000	litres
Cubic centimetres	2.642x10 ⁻⁴	Gallons (US)	Cubic metres	1759.45	Pints (liq.) Imperial
Cubic centimetres	0.001	litres	Cubic metres	2113	Pints (liq.) U.S.
			Cubic metres	880.14	Quarts (liq.) Imperial
			Cubic metres	1057	Quarts (liq.) U.S.

TEMPERATURE INTERVALS CONVERSION

ALSO CALLED

VALUES OF SINGLE DEGREES PROPORTIONAL PARTS

TEMPERATURE EQUIVALENTS

A VALUABLE REFERENCE FOR CONTROL TEMPERATURE DIFFERENTIALS
DEGREES FAHRENHEIT TO KELVINS OR DEGREES CELSIUS AND VICE VERSA

Note : The international unit of temperature interval is the Kelvin, symbol K. A temperature interval of one degree Celsius is identical with a temperature interval of 1 K.

When the central value in any row of these temperature conversion tables is taken to be in °F, its equivalent value in K or °C is shown on the left; when the central value is in K or °C, its equivalent in °F is shown on the right.

Basis : 5 K = 5°C = 9°F (exactly)

K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C	K or °C	← °F → K or °C
0.06	0.1	0.18	3.67	6.6	11.9	7.28	13.1	23.6	10.89	19.6	35.3	14.50	26.1	47.0	23.9	43.0	77.4		
0.11	0.2	0.36	3.72	6.7	12.1	7.33	13.2	23.8	10.94	19.7	35.5	14.56	26.2	47.2	24.2	43.5	78.3		
0.17	0.3	0.54	3.78	6.8	12.2	7.39	13.3	23.9	11.00	19.8	35.6	14.61	26.3	47.3	24.4	44.0	79.2		
0.22	0.4	0.72	3.83	6.9	12.4	7.44	13.4	24.1	11.06	19.9	35.8	14.67	26.4	47.5	24.7	44.5	80.1		
0.28	0.5	0.90	3.89	7.0	12.6	7.50	13.5	24.3	11.11	20.0	36.0	14.72	26.5	47.7	25.0	45.0	81.0		
0.33	0.6	1.08	3.94	7.1	12.8	7.56	13.6	24.5	11.17	20.1	36.2	14.78	26.6	47.9	25.3	45.5	81.9		
0.39	0.7	1.26	4.00	7.2	13.0	7.61	13.7	24.7	11.22	20.2	36.4	14.83	26.7	48.1	25.6	46.0	82.8		
0.44	0.8	1.44	4.06	7.3	13.1	7.67	13.8	24.8	11.28	20.3	36.5	14.89	26.8	48.2	25.8	46.5	83.7		
0.50	0.9	1.62	4.11	7.4	13.3	7.72	13.9	25.0	11.33	20.4	36.7	14.94	26.9	48.4	26.1	47.0	84.6		
0.56	1.0	1.80	4.17	7.5	13.5	7.78	14.0	25.2	11.39	20.5	36.9	15.00	27.0	48.6	26.4	47.5	85.5		
0.61	1.1	1.98	4.22	7.6	13.7	7.83	14.1	25.4	11.44	20.6	37.1	15.06	27.1	48.8	26.7	48.0	86.4		
0.67	1.2	2.16	4.28	7.7	13.9	7.89	14.2	25.6	11.50	20.7	37.3	15.11	27.2	49.0	26.9	48.5	87.3		
0.72	1.3	2.34	4.33	7.8	14.0	7.94	14.3	25.7	11.56	20.8	37.4	15.17	27.3	49.1	27.2	49.0	88.2		
0.78	1.4	2.52	4.39	7.9	14.2	8.00	14.4	25.9	11.61	20.9	37.6	15.22	27.4	49.3	27.5	49.5	89.1		
0.83	1.5	2.70	4.44	8.0	14.4	8.06	14.5	26.1	11.67	21.0	37.8	15.28	27.5	49.5	27.8	50.0	90.0		
0.89	1.6	2.88	4.50	8.1	14.6	8.11	14.6	26.3	11.72	21.1	38.0	15.33	27.6	49.7	28.3	51.0	91.8		
0.94	1.7	3.06	4.56	8.2	14.8	8.17	14.7	26.5	11.78	21.2	38.2	15.39	27.7	49.9	28.9	52.0	93.6		
1.00	1.8	3.24	4.61	8.3	14.9	8.22	14.8	26.6	11.83	21.2	38.3	15.44	27.8	50.0	29.4	53.0	95.4		
1.06	1.9	3.42	4.67	8.4	15.1	8.28	14.9	26.8	11.89	21.4	38.5	15.50	27.9	50.2	30.0	54.0	97.2		
1.11	2.0	3.60	4.72	8.5	15.3	8.33	15.0	27.0	11.94	21.5	38.7	15.56	28.0	50.4	30.6	55.0	99.0		
1.17	2.1	3.78	4.78	8.6	15.5	8.39	15.1	27.2	12.00	21.6	38.9	15.61	28.1	50.6	31.1	56.0	100.8		
1.22	2.2	3.96	4.83	8.7	15.7	8.44	15.2	27.4	12.06	21.7	39.1	15.67	28.2	50.8	31.7	57.0	102.6		
1.28	2.3	4.14	4.89	8.8	15.8	8.50	15.3	27.5	12.11	21.8	39.2	15.72	28.3	50.9	32.2	58.0	104.4		
1.33	2.4	4.32	4.94	8.9	16.0	8.56	15.4	27.7	12.17	21.9	39.4	15.78	28.4	51.1	32.8	59.0	106.2		
1.39	2.5	4.50	5.00	9.0	16.2	8.61	15.5	27.9	12.22	22.0	39.6	15.83	28.5	51.3	33.3	60.0	108.0		
1.44	2.6	4.68	5.06	9.1	16.4	8.67	15.6	28.1	12.28	22.1	39.8	15.89	28.6	51.5	33.9	61.0	109.8		
1.50	2.7	4.86	5.11	9.2	16.6	8.72	15.7	28.3	12.33	22.2	40.0	15.94	28.7	51.7	34.4	62.0	111.6		
1.56	2.8	5.04	5.17	9.3	16.7	8.78	15.8	28.4	12.39	22.3	40.1	16.00	28.8	51.8	35.0	63.0	113.4		
1.61	2.9	5.22	5.22	9.4	16.9	8.83	15.9	28.6	12.44	22.4	40.3	16.06	28.9	52.0	35.6	64.0	115.2		
1.67	3.0	5.40	5.28	9.5	17.1	8.89	16.0	28.8	12.50	22.5	40.5	16.11	29.0	52.2	36.1	65.0	117.0		
1.72	3.1	5.58	5.33	9.6	17.3	8.94	16.1	29.0	12.56	22.6	40.7	16.17	29.1	52.4	36.7	66.0	118.8		
1.78	3.2	5.76	5.39	9.7	17.5	9.00	16.2	29.2	12.61	22.7	40.9	16.22	29.2	52.6	37.2	67.0	120.6		
1.83	3.3	5.94	5.44	9.8	17.6	9.06	16.3	29.3	12.67	22.8	41.0	16.28	29.3	52.7	37.8	68.0	122.4		
1.89	3.4	6.12	5.50	9.9	17.8	9.11	16.4	29.5	12.72	22.9	41.2	16.33	29.4	52.9	38.3	69.0	124.2		
1.94	3.5	6.30	5.56	10.0	18.0	9.17	16.5	29.7	12.78	23.0	41.4	16.39	29.5	53.1	38.9	70.0	126.0		
2.00	3.6	6.48	5.61	10.1	18.2	9.22	16.6	29.9	12.83	23.1	41.6	16.44	29.6	53.3	39.4	71.0	127.8		
2.06	3.7	6.66	5.67	10.2	18.4	9.28	16.7	30.1	12.89	23.2	41.8	16.50	29.7	53.5	40.0	72.0	129.6		
2.11	3.8	6.84	5.72	10.3	18.5	9.33	16.8	30.2	12.94	23.3	41.9	16.56	29.8	53.6	40.6	73.0	131.4		
2.17	3.9	7.02	5.78	10.4	18.7	9.39	16.9	30.4	13.00	23.4	42.1	16.61	29.9	53.8	41.1	74.0	133.2		
2.22	4.0	7.20	5.83	10.5	18.9	9.44	17.0	30.6	13.06	23.5	42.3	16.67	30.0	54.0	41.7	75.0	135.0		
2.28	4.1	7.38	5.89	10.6	19.1	9.50	17.1	30.8	13.11	23.6	42.5	16.73	30.1	54.2	42.2	76.0	136.8		
2.33	4.2	7.56	5.94	10.7	19.3	9.56	17.2	31.0	13.17	23.7	42.7	16.78	30.2	54.4	42.8	77.0	138.6		
2.39	4.3	7.74	6.00	10.8	19.4	9.61	17.3	31.1	13.22	23.8	42.8	16.84	30.3	54.6	43.3	78.0	140.4		
2.44	4.4	7.92	6.06	10.9	19.6	9.67	17.4	31.3	13.28	23.9	43.0	16.89	30.4	54.8	43.9	79.0	142.2		
2.50	4.5	8.10	6.11	11.0	19.8	9.72	17.5	31.5	13.33	24.0	43.2	16.95	30.5	55.0	44.4	80.0	144.0		
2.56	4.6	8.28	6.17	11.1	20.0	9.78	17.6	31.7	13.39	24.1	43.4	17.01	30.6	55.2	45.0	81.0	145.8		
2.61	4.7	8.46	6.22	11.2	20.2	9.83	17.7	31.9	13.44	24.2	43.6	17.06	30.7	55.4	45.6	82.0	147.6		
2.67	4.8	8.64	6.28	11.3	20.3	9.89	17.8	32.0	13.50	24.3	43.7	17.12	30.8	55.6	46.1	83.0	149.4		
2.72	4.9	8.82	6.33	11.4	20.5	9.94	17.9	32.2	13.56	24.4	43.9	17.17	30.9	55.8	46.7	84.0	151.2		
2.78	5.0	9.00	6.39	11.5	20.7	10.00	18.0	32.4	13.61	24.5	44.1	17.23	31.0	56.0	47.2	85.0	153.0		
2.83	5.1	9.18	6.44	11.6	20.9	10.06	18.1	32.6	13.67	24.6	44.3	17.28	31.1	56.2	47.8	86.0	154.8		
2.89	5.2	9.36	6.50	11.7	21.1	10.11	18.2	32.8	13.72	24.7	44.5	17.34	31.2	56.4	48.3	87.0	156.6		
2.94	5.3	9.54	6.56	11.8	21.2	10.17	18.3	32.9	13.78	24.8	44.6	17.39	31.3	56.6	48.9	88.0	158.4		
3.00	5.4	9.72	6.61	11.9	21.4	10.22	18.4	33.1	13.83	24.9	44.8	17.45	31.4	56.8	49.4	89.0	160.2		
3.06	5.5	9.90	6.67	12.0	21.6	10.28	18.5	33.3	13.89	25.0	45.0	17.50	31.5	57.0	50.0	90.0	162.0		
3.11	5.6	10.1	6.72	12.1	21.8	10.33	18.6	33.5	13.94	25.1	45.2	17.56	31.6	57.2	50.6	91.0	163.8		
3.17	5.7	10.3	6.78	12.2	22.0	10.39	18.7	33.7	14.00	25.2	45.4	17.61	31.7	57.4	51.1	92.0	165.6		
3.22	5.8	10.4	6.83	12.3	22.1	10.44	18.8	33.8	14.06	25.3	45.5	17.67	31.8	57.6	51.7	93.0			

TEMPERATURE CONVERSION

DEGREES FAHRENHEIT TO DEGREES CELSIUS AND VICE VERSA

When the central value in any row of these temperature conversion tables is taken to be in °F, its equivalent value in °C is shown on the left. When the central value is in °C, its equivalent in °F is shown on the right.

Basis: $9 \times \text{column } 1 = 5 (\text{column } 2 - 32^\circ)$

$5 (\text{column } 3 - 32^\circ) = 9 \times \text{column } 2$

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-268	-450	-	-56.7	-70	-94.0	-20.6	-5	23.0	15.6	60	140.0	51.7	125	257.0	87.8	190	374.0		
-262	-440	-	-56.1	-69	-92.2	-20.0	-4	24.8	16.1	61	141.8	52.2	126	258.8	88.3	191	375.8		
-257	-430	-	-55.6	-68	-90.4	-19.4	-3	26.6	16.7	62	143.6	52.8	127	260.6	88.9	192	377.6		
-251	-420	-	-55.0	-67	-88.6	-18.9	-2	28.4	17.2	63	145.4	53.3	128	262.4	89.4	193	379.4		
-246	-410	-	-54.4	-66	-86.8	-18.3	-1	30.2	17.8	64	147.2	53.9	129	264.2	90.0	194	381.2		
-240	-400	-	-53.9	-65	-85.0	-17.8	0	32.0	18.3	65	149.0	54.4	130	266.0	90.6	195	383.0		
-234	-390	-	-53.3	-64	-83.2	-17.2	1	33.8	18.9	66	150.8	55.0	131	267.8	91.1	196	384.8		
-229	-380	-	-52.8	-63	-81.4	-16.7	2	35.6	19.4	67	152.6	55.6	132	269.6	91.7	197	386.6		
-223	-370	-	-52.2	-62	-79.6	-16.1	3	37.4	20.0	68	154.4	56.1	133	271.4	92.2	198	388.4		
-218	-360	-	-51.7	-61	-77.8	-15.6	4	39.2	20.6	69	156.2	56.7	134	273.2	92.8	199	390.2		
-212	-350	-	-51.1	-60	-76.0	-15.0	5	41.0	21.1	70	158.0	57.2	135	275.0	93.3	200	392.0		
-207	-340	-	-50.6	-59	-74.2	-14.4	6	42.8	21.7	71	159.8	57.8	136	276.8	93.9	201	393.8		
-201	-330	-	-50.0	-58	-72.4	-13.9	7	44.6	22.2	72	161.6	58.3	137	278.6	94.4	202	395.6		
-196	-320	-	-49.4	-57	-70.6	-13.3	8	46.4	22.8	73	163.4	58.9	138	280.4	95.0	203	397.4		
-190	-310	-	-48.9	-56	-68.8	-12.8	9	48.2	23.3	74	165.2	59.4	139	282.2	95.6	204	399.2		
-184	-300	-	-48.3	-55	-67.0	-12.2	10	50.0	23.9	75	167.0	60.0	140	284.0	96.1	205	401.0		
-179	-290	-	-47.8	-54	-65.2	-11.7	11	51.8	24.4	76	168.8	60.6	141	285.8	96.7	206	402.8		
-173	-280	-	-47.2	-53	-63.4	-11.1	12	53.6	25.0	77	170.6	61.1	142	287.6	97.2	207	404.6		
-168	-270	-454	-46.7	-52	-61.6	-10.6	13	55.4	25.6	78	172.4	61.7	143	289.4	97.8	208	406.4		
-162	-260	-436	-46.1	-51	-59.8	-10.0	14	57.2	26.1	79	174.2	62.2	144	291.2	98.3	209	408.2		
-157	-250	-418	-45.6	-50	-58.0	-9.4	15	59.0	26.7	80	176.0	62.8	145	293.0	98.9	210	410.0		
-151	-240	-400	-45.0	-49	-56.2	-8.9	16	60.8	27.2	81	177.8	63.3	146	294.8	99.4	211	411.8		
-146	-230	-382	-44.4	-48	-54.4	-8.3	17	62.6	27.8	82	179.6	63.9	147	296.6	100.0	212	413.6		
-140	-220	-364	-43.9	-47	-52.6	-7.8	18	64.4	28.3	83	181.4	64.4	148	298.4	100.6	213	415.4		
-134	-210	-346	-43.3	-46	-50.8	-7.2	19	66.2	28.9	84	183.2	65.0	149	300.2	101.1	214	417.2		
-129	-200	-328	-42.8	-45	-49.0	-6.7	20	68.0	29.4	85	185.0	65.6	150	302.0	101.7	215	419.0		
-123	-190	-310	-42.2	-44	-47.2	-6.1	21	69.8	30.0	86	186.8	66.1	151	303.8	102.2	216	420.8		
-118	-180	-292	-41.7	-43	-45.4	-5.6	22	71.6	30.6	87	188.6	66.7	152	305.6	102.8	217	422.6		
-112	-170	-274	-41.1	-42	-43.6	-5.0	23	73.4	31.1	88	190.4	67.2	153	307.4	103.3	218	424.4		
-107	-160	-256	-40.6	-41	-41.8	-4.4	24	75.2	31.7	89	192.2	67.8	154	309.2	103.9	219	426.2		
-101	-150	-238	-40.0	-40	-40.0	-3.9	25	77.0	32.2	90	194.0	68.3	155	311.0	104.4	220	428.0		
-96	-140	-220	-39.4	-39	-38.2	-3.3	26	78.8	32.8	91	195.8	68.9	156	312.8	105.0	221	429.8		
-90	-130	-202	-38.9	-38	-36.4	-2.8	27	80.6	33.3	92	197.6	69.4	157	314.6	105.6	222	431.6		
-84	-120	-184	-38.3	-37	-34.6	-2.2	28	82.4	33.9	93	199.4	70.0	158	316.4	106.1	223	433.4		
-79	-110	-166	-37.8	-36	-32.8	-1.7	29	84.2	34.4	94	201.2	70.6	159	318.2	106.7	224	435.2		
-73.3	-100	-148.0	-37.2	-35	-31.0	-1.1	30	86.0	35.0	95	203.0	71.1	160	320.0	107.2	225	437.0		
-72.8	-99	-146.2	-36.7	-34	-29.2	-0.6	31	87.8	35.6	96	204.8	71.7	161	321.8	107.8	226	438.8		
-72.2	-98	-144.4	-36.1	-33	-27.4	0.0	32	89.6	36.1	97	206.6	72.2	162	323.6	108.3	227	440.6		
-71.7	-97	-142.6	-35.6	-32	-25.6	0.6	33	91.4	36.7	98	208.4	72.8	163	325.4	108.9	228	442.4		
-71.1	-96	-140.8	-35.0	-31	-23.8	1.1	34	93.2	37.2	99	210.2	73.3	164	327.2	109.4	229	444.2		
-70.6	-95	-139.0	-34.4	-30	-22.0	1.7	35	95.0	37.8	100	212.0	73.9	165	329.0	110.0	230	446.0		
-70.0	-94	-137.2	-33.9	-29	-20.2	2.2	36	96.8	38.3	101	213.8	74.4	166	330.8	110.6	231	447.8		
-69.4	-93	-135.4	-33.3	-28	-18.4	2.8	37	98.6	38.9	102	215.6	75.0	167	332.6	111.1	232	449.6		
-68.9	-92	-133.6	-32.8	-27	-16.6	3.3	38	100.4	39.4	103	217.4	75.6	168	334.4	111.7	233	451.4		
-68.3	-91	-131.8	-32.2	-26	-14.8	3.9	39	102.2	40.0	104	219.2	76.1	169	336.2	112.2	234	453.2		
-67.8	-90	-130.0	-31.7	-25	-13.0	4.4	40	104.0	40.6	105	221.0	76.7	170	338.0	112.8	235	455.0		
-67.2	-89	-128.2	-31.1	-24	-11.2	5.0	41	105.8	41.1	106	222.8	77.2	171	339.8	113.3	236	456.8		
-66.7	-88	-126.4	-30.6	-23	-9.4	5.6	42	107.6	41.7	107	224.6	77.8	172	341.6	113.9	237	458.6		
-66.1	-87	-124.6	-30.0	-22	-7.6	6.1	43	109.4	42.2	108	226.4	78.3	173	343.4	114.4	238	460.4		
-65.6	-86	-122.8	-29.4	-21	-5.8	6.7	44	111.2	42.8	109	228.2	78.9	174	345.2	115.0	239	462.2		
-65.0	-85	-121.0	-28.9	-20	-4.0	7.2	45	113.0	43.3	110	230.0	79.4	175	347.0	115.6	240	464.0		
-64.4	-84	-119.2	-28.3	-19	-2.2	7.8	46	114.8	43.9	111	231.8	80.0	176	348.8	116.1	241	465.8		
-63.9	-83	-117.4	-27.8	-18	-0.4	8.3	47	116.6	44.4	112	233.6	80.6	177	350.6	116.7	242	467.6		
-63.3	-82	-115.6	-27.2	-17	1.4	8.9	48	118.4	45.0	113	235.4	81.1	178	352.4	117.2	243	469.4		
-62.8	-81	-113.8	-26.7	-16	3.2	9.4	49	120.2	45.6	114	237.2	81.7	179	354.2	117.8	244	471.2		
-62.2	-80	-112.0	-26.1	-15	5.0	10.0	50	122.0	46.1	115	239.0	82.2	180	356.0	118.3	245	473.0		
-61.7	-79	-110.2	-25.6	-14	6.8	10.6	51	123.8	46.7	116	240.8	82.8	181	357.8	118.9	246	474.8		
-61.1	-78	-108.4	-25.0	-13	8.6	11.1	52	125.6	47.2	117	242.6	83.3	182	359.6	119.4	247	476.6		
-60.6	-77	-106.6	-24.4	-12	10.4	11.7	53	127.4	47.8	118	244.4	83.9	183	361.4	120.0	248	478.4		
-60.0	-76	-104.8	-23.9	-11	12.2	12.2	54	129.2	48.3	119	246.2	84.4	184	363.2	120.6	249	480.2		
-59.4	-75	-103.0	-23.3	-10	14.0	12.8	55	131.0	48.9	120	248.0	85.0	185	365.0	121.1	250	482.0		
-58.9	-74	-101.2	-22.8	-9	15.8	13.3	56	132.8	49.4	121	249.8	85.6	186	366.8	121.7	251	483.8		
-58.3	-73	-99.4	-22.2	-8	17.6	13.9	57	134.6	50.0	122	251.6	86.1	187	368.6	122.2	252	485.6		
-57.8	-72	-97.6	-21.7	-7	19.4	14.4	58	136.4	50.6	123	253.4	86.7	188	370.4	122.8	253	487.4		
-57.2	-71	-95.8	-21.1	-6	21.2	15.0	59	138.2	51.1	124	255.2	87.2	189	372.2	123.3	254	489.2		

TEMPERATURE CONVERSION

	← →		← →		← →		← →		← →		← →		← →		← →		← →		← →
OC	OF OC	OF	OC	OF OC	OF	OC	OF OC	OF	OC	OF OC	OF	OC	OF OC	OF	OC	OF OC	OF	OC	OF OC
123.9	255	491.0	165.6	330	626.0	207.2	405	761.0	246.9	480	896.0	290.6	555	1031.0	482	900	1652		
124.4	256	492.8	166.1	331	627.8	207.8	406	762.8	249.4	481	897.8	291.1	556	1032.8	488	910	1670		
125.0	257	494.6	166.7	332	629.6	208.3	407	764.6	250.0	482	899.6	291.7	557	1034.6	493	920	1688		
125.6	258	496.4	167.2	333	631.4	208.9	408	766.4	250.6	483	901.4	292.2	558	1036.4	499	930	1706		
126.1	259	498.2	167.8	334	633.2	209.4	409	768.2	251.1	484	903.2	292.8	559	1038.2	504	940	1724		
126.7	260	500.0	168.3	335	635.0	210.0	410	770.0	251.7	485	905.0	293.3	560	1040.0	510	950	1742		
127.2	261	501.8	168.9	336	636.8	210.6	411	771.8	252.2	486	906.8	293.9	561	1041.8	516	960	1760		
127.8	262	503.6	169.4	337	638.6	211.1	412	773.6	252.8	487	908.6	294.4	562	1043.6	521	970	1778		
128.3	263	505.4	170.0	338	640.4	211.7	413	775.4	253.3	488	910.4	295.0	563	1045.4	527	980	1796		
128.9	264	507.2	170.6	339	642.2	212.2	414	777.2	253.9	489	912.2	295.6	564	1047.2	532	990	1814		
129.4	265	509.0	171.1	340	644.0	212.8	415	779.0	254.4	490	914.0	296.1	565	1049.0	538	1000	1832		
130.0	266	510.8	171.7	341	645.8	213.3	416	780.8	255.0	491	915.8	296.7	566	1050.8	543	1010	1850		
130.6	267	512.6	172.2	342	647.6	213.9	417	782.6	255.6	492	917.6	297.2	567	1052.6	549	1020	1868		
131.1	268	514.4	172.8	343	649.4	214.4	418	784.4	256.1	493	919.4	297.8	568	1054.4	554	1030	1886		
131.7	269	516.2	173.3	344	651.2	215.0	419	786.2	256.7	494	921.2	298.3	569	1056.2	560	1040	1904		
132.2	270	518.0	173.9	345	653.0	215.6	420	788.0	257.2	495	923.0	298.9	570	1058.0	566	1050	1922		
132.8	271	519.8	174.4	346	654.8	216.1	421	789.8	257.8	496	924.8	299.4	571	1059.8	571	1060	1940		
133.3	272	521.6	175.0	347	656.6	216.7	422	791.6	258.3	497	926.6	300.0	572	1061.6	577	1070	1958		
133.9	273	523.4	175.6	348	658.4	217.2	423	793.4	258.9	498	928.4	300.6	573	1063.4	582	1080	1976		
134.4	274	525.2	176.1	349	660.2	217.8	424	795.2	259.4	499	930.2	301.1	574	1065.2	588	1090	1994		
135.0	275	527.0	176.7	350	662.0	218.3	425	797.0	260.0	500	932.0	301.7	575	1067.0	593	1100	2012		
135.6	276	528.8	177.2	351	663.8	218.9	426	798.8	260.6	501	933.8	302.2	576	1068.8	599	1110	2030		
136.1	277	530.6	177.8	352	665.6	219.4	427	800.6	261.1	502	935.6	302.8	577	1070.6	604	1120	2048		
136.7	278	532.4	178.3	353	667.4	220.0	428	802.4	261.7	503	937.4	303.3	578	1072.4	610	1130	2066		
137.2	279	534.2	178.9	354	669.2	220.6	429	804.2	262.2	504	939.2	303.9	579	1074.2	616	1140	2084		
137.8	280	536.0	179.4	355	671.0	221.1	430	806.0	262.8	505	941.0	304.4	580	1076.0	621	1150	2102		
138.3	281	537.8	180.0	356	672.8	221.7	431	807.8	263.3	506	942.8	305.0	581	1077.8	627	1160	2120		
138.9	282	539.6	180.6	357	674.6	222.2	432	809.6	263.9	507	944.6	305.6	582	1079.6	632	1170	2138		
139.4	283	541.4	181.1	358	676.4	222.8	433	811.4	264.4	508	946.4	306.1	583	1081.4	638	1180	2156		
140.0	284	543.2	181.7	359	678.2	223.3	434	813.2	265.0	509	948.2	306.7	584	1083.2	643	1190	2174		
140.6	285	545.0	182.2	360	680.0	223.9	435	815.0	265.6	510	950.0	307.2	585	1085.0	649	1200	2192		
141.1	286	546.8	182.8	361	681.8	224.4	436	816.8	266.1	511	951.8	307.8	586	1086.8	654	1210	2210		
141.7	287	548.6	183.3	362	683.6	225.0	437	818.6	266.7	512	953.6	308.3	587	1088.6	660	1220	2228		
142.2	288	550.4	183.9	363	685.4	225.6	438	820.4	267.2	513	955.4	308.9	588	1090.4	666	1230	2246		
142.8	289	552.2	184.4	364	687.2	226.1	439	822.2	267.8	514	957.2	309.4	589	1092.2	671	1240	2264		
143.3	290	554.0	185.0	365	689.0	226.7	440	824.0	268.3	515	959.0	310.0	590	1094.0	677	1250	2282		
143.9	291	555.8	185.6	366	690.8	227.2	441	825.8	268.9	516	960.8	310.6	591	1095.8	682	1260	2300		
144.4	292	557.6	186.1	367	692.6	227.8	442	827.6	269.4	517	962.6	311.1	592	1097.6	688	1270	2318		
145.0	293	559.4	186.7	368	694.4	228.3	443	829.4	270.0	518	964.4	311.7	593	1099.4	693	1280	2336		
145.6	294	561.2	187.2	369	696.2	228.9	444	831.2	270.6	519	966.2	312.2	594	1101.2	699	1290	2354		
146.1	295	563.0	187.8	370	698.0	229.4	445	833.0	271.1	520	968.0	312.8	595	1103.0	704	1300	2372		
146.7	296	564.8	188.3	371	699.8	230.0	446	834.8	271.7	521	969.8	313.3	596	1104.8	710	1310	2390		
147.2	297	566.6	188.9	372	701.6	230.6	447	836.6	272.2	522	971.6	313.9	597	1106.6	716	1320	2408		
147.8	298	568.4	189.4	373	703.4	231.1	448	838.4	272.8	523	973.4	314.4	598	1108.4	721	1330	2426		
148.3	299	570.2	190.0	374	705.2	231.7	449	840.2	273.3	524	975.2	315.0	599	1110.2	727	1340	2444		
148.9	300	572.0	190.6	375	707.0	232.2	450	842.0	273.9	525	977.0	315.6	600	1112.0	732	1350	2462		
149.4	301	573.8	191.1	376	708.8	232.8	451	843.8	274.4	526	978.8	321.1	610	1130.0	738	1360	2480		
150.0	302	575.6	191.7	377	710.6	233.3	452	845.6	275.0	527	980.6	326.7	620	1148.0	743	1370	2498		
150.6	303	577.4	192.2	378	712.4	233.9	453	847.4	275.6	528	982.4	332.2	630	1166.0	749	1380	2516		
151.1	304	579.2	192.8	379	714.2	234.4	454	849.2	276.1	529	984.2	337.8	640	1184.0	754	1390	2534		
151.7	305	581.0	193.3	380	716.0	235.0	455	851.0	276.7	530	986.0	343.3	650	1202.0	760	1400	2552		
152.2	306	582.8	193.9	381	717.8	235.6	456	852.8	277.2	531	987.8	348.9	660	1220.0	766	1410	2570		
152.8	307	584.6	194.4	382	719.6	236.1	457	854.6	277.8	532	989.6	354.4	670	1238.0	771	1420	2588		
153.3	308	586.4	195.0	383	721.4	236.7	458	856.4	278.3	533	991.4	360.0	680	1256.0	777	1430	2606		
153.9	309	588.2	195.6	384	723.2	237.2	459	858.2	278.9	534	993.2	365.6	690	1274.0	782	1440	2624		
154.4	310	590.0	196.1	385	725.0	237.8	460	860.0	279.4	535	995.0	371	700	1292	788	1450	2642		
155.0	311	591.8	196.7	386	726.8	238.3	461	861.8	280.0	536	996.8	377	710	1310	793	1460	2660		
155.6	312	593.6	197.2	387	728.6	238.9	462	863.6	280.6	537	998.6	382	720	1328	799	1470	2678		
156.1	313	595.4	197.8	388	730.4	239.4	463	865.4	281.1	538	1000.4	388	730	1346	804	1480	2696		
156.7	314	597.2	198.3	389	732.2	240.0	464	867.2	281.7	539	1002.2	393	740	1364	810	1490	2714		
157.2	315	599.0	198.9	390	734.0	240.6	465	869.0	282.2	540	1004.0	398	750	1382	816	1500	2732		
157.8	316	600.8	199.4	391	735.8	241.1	466	870.8	282.8	541	1005.8	404	760	1400	843	1550	2822		
158.3	317	602.6	200.0	392	737.6	241.7	467	872.6	283.3	542	1007.6	410	770	1418	871	1600	2912		
158.9	318	604.4	200.6	393	739.4	242.2	468	874.4	283.9	543	1009.4	416	780	1436	899	1650	3002		
159.4	319	606.2	201.1	394	741.2	242.8	469	876.2	284.4	544	1011.2	421	790	1454	927	1700	3092		
160.0	320	608.0	201.7	395	743.0	243.3	470	878.0	285.0	545	1013.0	427	800	1472	954	1750	3182		
160.6	321	609.8	202.2	396	744.8	243.9	471	879.8	285.6	546	1014.8	432	810	1490	982	1800	3272		
161.1	322	611.6	202.8	397	746.6	244.4	472	881.6	286.1	547	1016.6	438	820	1508	1010	1850	3362		
161.7	32																		

TECHNICAL DATA

PRESSURE—VACUUM TREATISE

Pascal (Pa) — SI unit for pressure

Australia has adopted the pascal (symbol Pa) as the unit for pressure.
Decimal multiples used in practice are kilo ($k = 10^3$) and mega ($M = 10^6$) which are known as kilopascal (kPa) and megapascal (MPa).

The pascal replaces . . .

pound-force per square foot	1 lbf/ft ²	=	47.880 259 Pa	kilogram-force per sq. mm.	1 kgf/mm ²	=	9.806 65 MPa
pound-force per square inch	1 lbf/in ²	=	6.894 757 3 kPa	millimetre of water	1 mmH ₂ O	=	9.789 039 2 Pa
ton-force per square foot	1 tonf/ft ²	=	0.107 251 78 MPa	inch of water	1 inH ₂ O	=	0.248 641 60 kPa
kilopound-force per square inch	1 kip/in ²	=	6.894 757 3 MPa	foot of water	1 ftH ₂ O	=	2.983 699 2 kPa
ton-force per square inch	1 tonf/in ²	=	15.444 256 MPa	torr	1 torr	=	0.133 322 37 kPa
kilogram-force per sq. metre	1 kgf/m ²	=	9.806 65 Pa	inch of mercury	1 inHg	=	3.386 383 7 kPa
kilogram-force per sq. cm.	1 kgf/cm ²	=	98.066 5 kPa	bar	1 bar	=	100 kPa

(Bold type indicates an exact conversion factor)

PRESSURE & COMPOUND (Pressure & Vacuum) GAUGES

While pressure and compound gauges reading in psi and inches Hg will be around for quite a while, the Australian Standard AS1349 - 1973 for Bourdon Tube Pressure and Vacuum Gauges specifies scales within the pressure range of -100 kPa to +100,000 kPa with the unit of pressure, the kilopascal (kPa).

The conversion from psi and inches Hg to kPa is best illustrated by the chart below. It should be noted that for vacuum ranges 30" to 0, the SI Metric kilopascals become a minus quantity — i.e. from -100 to 0 kPa.

SPECIAL NOTE: It should also be noted that some Pressure Controls imported from Europe are calibrated in bars — a non SI Metric Unit. A "bar line" conversion has been added to the chart below to assist in the setting of such controls.



While there is a wealth of information, Tables, Charts etc. available on conversion data from 0 psi upward, to kPa, very little information is currently available for the so called "Vacuum" range.

Note: Australian Standard AS1947-1976 — "Metric Units for Use in Mechanical Engineering and Related Fields" states — "In general expressions describing pressures below ambient pressures, the term 'vacuum' may be used, but quantified expressions such as 'at a vacuum of 30 kPa' are not to be used."

Using the concept of gauge pressure, a pressure below ambient pressure should be expressed as a negative value e.g. -30 kPa. Alternatively it may be expressed as e.g. 30 kPa below ambient pressure.

The following Table is therefore presented and upon which the above chart is based.

ENGLISH TO METRIC VACUUM CONVERSION TABLE

NOTE: The number in the center column refers to the vacuum either in "Hg or -kPa when it is desired to convert into either scale. If converting from "Hg to -kPa the equivalent vacuum will be found in the right column while if converting from -kPa to "Hg the answer will be found in the left column.

Inches Hg	↕	-kPa	Inches Hg	↕	-kPa	Inches Hg	↕	-kPa	Inches Hg	↕	-kPa	Inches Hg	↕	-kPa
.2953	1	- 3.386	6.201	21	- 71.11	12.11	41	-	18.01	61	-	23.92	81	-
.5906	2	- 6.773	6.497	22	- 74.50	12.40	42	-	18.31	62	-	24.21	82	-
.8859	3	-10.159	6.792	23	- 77.89	12.70	43	-	18.60	63	-	24.51	83	-
1.181	4	-13.546	7.087	24	- 81.27	12.99	44	-	18.90	64	-	24.81	84	-
1.477	5	-16.932	7.382	25	- 84.66	13.29	45	-	19.19	65	-	25.10	85	-
1.772	6	-20.318	7.678	26	- 88.05	13.58	46	-	19.49	66	-	25.40	86	-
2.067	7	-23.705	7.973	27	- 91.43	13.88	47	-	19.79	67	-	25.69	87	-
2.362	8	-27.091	8.268	28	- 94.82	14.17	48	-	20.08	68	-	25.99	88	-
2.658	9	-30.477	8.564	29	- 98.21	14.47	49	-	20.38	69	-	26.28	89	-
2.953	10	-33.864	8.859	30	-101.60	14.77	50	-	20.67	70	-	26.58	90	-
3.248	11	-37.250	9.154	31	-	15.06	51	-	20.97	71	-	26.87	91	-
3.544	12	-40.637	9.450	32	-	15.36	52	-	21.26	72	-	27.17	92	-
3.839	13	-44.023	9.745	33	-	15.65	53	-	21.56	73	-	27.46	93	-
4.134	14	-47.409	10.04	34	-	15.95	54	-	21.85	74	-	27.76	94	-
4.430	15	-50.795	10.34	35	-	16.24	55	-	22.15	75	-	28.05	95	-
4.725	16	-54.182	10.63	36	-	16.54	56	-	22.44	76	-	28.35	96	-
5.020	17	-57.569	10.93	37	-	16.83	57	-	22.74	77	-	28.64	97	-
5.315	18	-60.955	11.22	38	-	17.13	58	-	23.03	78	-	28.94	98	-
5.611	19	-64.341	11.52	39	-	17.42	59	-	23.33	79	-	29.23	99	-
5.906	20	-67.728	11.81	40	-	17.72	60	-	23.62	80	-	29.53	100	-

METRIC CONVERSION

Pressure, stress: Pounds-force per square inch to kilopascals

Basis: 1 lb = 0.453 592 37 kg (exactly) 1 N = 1 kg.m/s²g_n = 9.806 65 m/s² (exactly)

lbf/in ²	0	1	2	3	4	5	6	7	8	9
	kilopascals (kPa)									
0	—	6.89476	13.7895	20.6843	27.5790	34.4738	41.3685	48.2633	55.1581	62.0528
10	68.9476	75.8423	82.7371	89.6318	96.5266	103.421	110.316	117.211	124.106	131.000
20	137.895	144.790	151.685	158.579	165.474	172.369	179.264	186.158	193.053	199.948
30	206.843	213.737	220.632	227.527	234.422	241.317	248.211	255.106	262.001	268.896
40	275.790	282.685	289.580	296.475	303.369	310.264	317.159	324.054	330.948	337.843
50	344.738	351.633	358.527	365.422	372.317	379.212	386.106	393.001	399.896	406.791
60	413.685	420.580	427.475	434.370	441.264	448.159	455.054	461.949	468.843	475.738
70	482.633	489.528	496.423	503.317	510.212	517.107	524.002	530.896	537.791	544.686
80	551.581	558.475	565.370	572.265	579.160	586.054	592.949	599.844	606.739	613.633
90	620.528	627.423	634.318	641.212	648.107	655.002	661.897	668.791	675.686	682.581
100	689.476	696.370	703.265	710.160	717.055	723.950	730.844	737.739	744.634	751.529
110	758.423	765.318	772.213	779.108	786.002	792.897	799.792	806.687	813.581	820.476
120	827.371	834.266	841.160	848.055	854.950	861.845	868.739	875.634	882.529	889.424
130	896.318	903.213	910.108	917.003	923.897	930.792	937.687	944.582	951.477	958.371
140	965.266	972.161	979.056	985.950	992.845	999.740	1006.63	1013.53	1020.42	1027.32
150	1034.21	1041.11	1048.00	1054.90	1061.79	1068.69	1075.58	1082.48	1089.37	1096.27
160	1103.16	1110.06	1116.95	1123.85	1130.74	1137.63	1144.53	1151.42	1158.32	1165.21
170	1172.11	1179.00	1185.90	1192.79	1199.69	1206.58	1213.48	1220.37	1227.27	1234.16
180	1241.06	1247.95	1254.85	1261.74	1268.64	1275.53	1282.42	1289.32	1296.21	1303.11
190	1310.00	1316.90	1323.79	1330.69	1337.58	1344.48	1351.37	1358.27	1365.16	1372.06
200	1378.95	1385.85	1392.74	1399.64	1406.53	1413.43	1420.32	1427.21	1434.11	1441.00
210	1447.90	1454.79	1461.69	1468.58	1475.48	1482.37	1489.27	1496.16	1503.06	1509.95
220	1516.85	1523.74	1530.64	1537.53	1544.43	1551.32	1558.22	1565.11	1572.00	1578.90
230	1585.79	1592.69	1599.58	1606.48	1613.37	1620.27	1627.16	1634.06	1640.95	1647.85
240	1654.74	1661.64	1668.53	1675.43	1682.32	1689.22	1696.11	1703.01	1709.90	1716.79
250	1723.69	1730.58	1737.48	1744.37	1751.27	1758.16	1765.06	1771.95	1778.85	1785.74
260	1792.64	1799.53	1806.43	1813.32	1820.22	1827.11	1834.01	1840.90	1847.79	1854.69
270	1861.58	1868.48	1875.37	1882.27	1889.16	1896.06	1902.95	1909.85	1916.74	1923.64
280	1930.53	1937.43	1944.32	1951.22	1958.11	1965.01	1971.90	1978.80	1985.69	1992.58
290	1999.48	2006.37	2013.27	2020.16	2027.06	2033.95	2040.85	2047.74	2054.64	2061.53
300	2068.43	2075.32	2082.22	2089.11	2096.01	2102.90	2109.80	2116.69	2123.59	2130.48
310	2137.37	2144.27	2151.16	2158.06	2164.95	2171.85	2178.74	2185.64	2192.53	2199.43
320	2206.32	2213.22	2220.11	2227.01	2233.90	2240.80	2247.69	2254.59	2261.48	2268.38
330	2275.27	2282.16	2289.06	2295.95	2302.85	2309.74	2316.64	2323.53	2330.43	2337.32
340	2344.22	2351.11	2358.01	2364.90	2371.80	2378.69	2385.59	2392.48	2399.38	2406.27
350	2413.17	2420.06	2426.95	2433.85	2440.74	2447.64	2454.53	2461.43	2468.32	2475.22
360	2482.11	2489.01	2495.90	2502.80	2509.69	2516.59	2523.48	2530.38	2537.27	2544.17
370	2551.06	2557.95	2564.85	2571.74	2578.64	2585.53	2592.43	2599.32	2606.22	2613.11
380	2620.01	2626.90	2633.80	2640.69	2647.59	2654.48	2661.38	2668.27	2675.17	2682.06
390	2688.96	2695.85	2702.74	2709.64	2716.53	2723.43	2730.32	2737.22	2744.11	2751.01
400	2757.90	2764.80	2771.69	2778.59	2785.48	2792.38	2799.27	2806.17	2813.06	2819.96
410	2826.85	2833.75	2840.64	2847.53	2854.43	2861.32	2868.22	2875.11	2882.01	2888.90
420	2895.80	2902.69	2909.59	2916.48	2923.38	2930.27	2937.17	2944.06	2950.96	2957.85
430	2964.75	2971.64	2978.54	2985.43	2992.32	2999.22	3006.11	3013.01	3019.90	3026.80
440	3033.69	3040.59	3047.48	3054.38	3061.27	3068.17	3075.06	3081.96	3088.85	3095.75
450	3102.64	3109.54	3116.43	3123.33	3130.22	3137.11	3144.01	3150.90	3157.80	3164.69
460	3171.59	3178.48	3185.38	3192.27	3199.17	3206.06	3212.96	3219.85	3226.75	3233.64
470	3240.54	3247.43	3254.33	3261.22	3268.11	3275.01	3281.90	3288.80	3295.69	3302.59
480	3309.48	3316.38	3323.27	3330.17	3337.06	3343.96	3350.85	3357.75	3364.64	3371.54
490	3378.43	3385.33	3392.22	3399.12	3406.01	3412.90	3419.80	3426.69	3433.59	3440.48

lbf/in ²	kPa
0.1	0.689 48
0.2	1.378 95
0.3	2.068 43
0.4	2.757 90

lbf/in ²	kPa
0.5	3.447 38
0.6	4.136 85
0.7	4.826 33
0.8	5.515 81
0.9	6.205 28

NOTE: This table may also be used to convert kip/in² to MPa without any change in the position of the decimal marker; e.g. 1 kip/in² = 6.894 76 MPa.

Reproduced from Australian Standard 1377.5 — 1973 Conversion Tables Part 5 — Force, Pressure, Stress and Second Moment of Area, with the permission of the Standards Association of Australia.

METRIC CONVERSION

HEAT TRANSFER

THERMAL CONDUCTIVITY

Conversion of k Factors from Btu.in./ft².h°F to W/m.C

Btu	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.10	0.0144	0.0159	0.0173	0.0187	0.0202	0.0216	0.0231	0.0245	0.0260	0.0274
0.20	0.0288	0.0303	0.0317	0.0332	0.0346	0.0361	0.0375	0.0389	0.0404	0.0418
0.30	0.0433	0.0447	0.0462	0.0476	0.0490	0.0505	0.0519	0.0534	0.0548	0.0562
0.40	0.0577	0.0591	0.0606	0.0620	0.0635	0.0649	0.0663	0.0678	0.0692	0.0707
0.50	0.0721	0.0736	0.0750	0.0764	0.0779	0.0793	0.0808	0.0822	0.0837	0.0851
0.60	0.0865	0.0880	0.0894	0.0909	0.0923	0.0937	0.0952	0.0966	0.0981	0.0995
0.70	0.1010	0.1024	0.1038	0.1053	0.1067	0.1082	0.1096	0.1111	0.1125	0.1139
0.80	0.1154	0.1168	0.1183	0.1197	0.1212	0.1226	0.1240	0.1255	0.1269	0.1284
0.90	0.1298	0.1312	0.1327	0.1341	0.1356	0.1370	0.1385	0.1399	0.1413	0.1428
1.00	0.1442	0.1457	0.1471	0.1486	0.1500	0.1514	0.1529	0.1543	0.1558	0.1572
1.10	0.1587	0.1601	0.1615	0.1630	0.1644	0.1659	0.1673	0.1687	0.1702	0.1716
1.20	0.1731	0.1745	0.1760	0.1774	0.1788	0.1803	0.1817	0.1832	0.1846	0.1861
1.30	0.1875	0.1889	0.1904	0.1918	0.1933	0.1947	0.1961	0.1976	0.1990	0.2005
1.40	0.2019	0.2034	0.2048	0.2062	0.2077	0.2091	0.2106	0.2120	0.2135	0.2149
1.50	0.2163	0.2178	0.2192	0.2207	0.2221	0.2236	0.2250	0.2264	0.2279	0.2293
1.60	0.2308	0.2322	0.2336	0.2351	0.2365	0.2380	0.2394	0.2409	0.2423	0.2437
1.70	0.2452	0.2466	0.2481	0.2495	0.2510	0.2524	0.2538	0.2553	0.2567	0.2582
1.80	0.2596	0.2611	0.2625	0.2639	0.2654	0.2668	0.2683	0.2697	0.2711	0.2726
1.90	0.2740	0.2755	0.2769	0.2784	0.2798	0.2812	0.2827	0.2841	0.2856	0.2870
2.00	0.2885	0.2899	0.2913	0.2928	0.2942	0.2957	0.2971	0.2985	0.3000	0.3014

Example 1: To convert 0.29 Btu.in./ft².h°F read across from 0.20 in left hand column and down from 0.09 in top line i.e. = 0.0418 W/m.C.

THERMAL CONDUCTANCE

Conversion of U Values from Btu/ft².h°F to W/m².C

Btu	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.00	0.000	0.007	0.114	0.170	0.227	0.284	0.341	0.397	0.454	0.511
0.10	0.568	0.625	0.681	0.738	0.796	0.852	0.909	0.966	1.022	1.079
0.20	1.136	1.192	1.249	1.306	1.363	1.420	1.476	1.533	1.590	1.647
0.30	1.703	1.760	1.817	1.874	1.931	1.987	2.044	2.101	2.158	2.215
0.40	2.271	2.328	2.385	2.442	2.499	2.555	2.612	2.669	2.726	2.782
0.50	2.839	2.896	2.953	3.009	3.066	3.123	3.180	3.237	3.293	3.350
0.60	3.407	3.464	3.521	3.577	3.634	3.691	3.748	3.804	3.861	3.918
0.70	3.975	4.032	4.088	4.145	4.202	4.259	4.315	4.372	4.429	4.486
0.80	4.543	4.599	4.656	4.713	4.770	4.827	4.883	4.940	4.997	5.054
0.90	5.110	5.167	5.224	5.281	5.338	5.394	5.451	5.508	5.565	5.621
1.00	5.678	5.735	5.792	5.849	5.905	5.962	6.019	6.076	6.132	6.189
1.10	6.246	6.303	6.360	6.416	6.473	6.530	6.587	6.644	6.700	6.757
1.20	6.814	6.871	6.927	6.984	7.041	7.098	7.155	7.211	7.268	7.325
1.30	7.382	7.439	7.495	7.552	7.609	7.666	7.722	7.779	7.836	7.892
1.40	7.950	8.006	8.063	8.120	8.177	8.233	8.290	8.347	8.404	8.461
1.50	8.517	8.574	8.631	8.688	8.745	8.801	8.858	8.915	8.972	9.028
1.60	9.085	9.142	9.199	9.256	9.312	9.369	9.426	9.483	9.539	9.596
1.70	9.653	9.710	9.767	9.823	9.880	9.937	9.994	10.051	10.107	10.164
1.80	10.221	10.278	10.334	10.391	10.448	10.505	10.562	10.618	10.675	10.732
1.90	10.789	10.845	10.902	10.959	11.016	11.073	11.129	11.186	11.243	11.300
2.00	11.357	11.413	11.470	11.527	11.584	11.640	11.697	11.754	11.811	11.868

Example 1: To convert 0.32 Btu/ft².h°F read across from 0.30 in left hand column and down from 0.02 in top line i.e. = 1.817 W/m².C.

DESIGN VALUES FOR THERMAL RESISTANCE

Thermal Resistance Values for General Building Materials

Material	Nominal Thickness L (mm)	Resistance R (m ² .K/W)
Lining Boards, Sheets, Panels		
Asbestos Cement Products: Standard Sheet "Wunderflex, Hardiflex" etc.	4.5	0.017
Fibrous Plaster: Standard Sheet	6	0.023
Gypsum Plasterboard: "Gyproc"	9.5	0.026
Hardboard: "Timbrock, Masonite", etc.	10	0.057
Particle Board: Standard "Pyneboard"	13	0.074
Plywood:	3.2	0.022
	4.8	0.033
	5.5	0.038
Softboard: Standard "Cane-ite"	10	0.087
	13	0.113
	16	0.139
	4	0.025
	6	0.037
	9	0.055
	12	0.074
Flooring Materials		
Carpet: With Standard Fibrous Underfelt With Rubber Underlay	9.5	0.19
	12.7	0.254
	19	0.388
Ceramic Tile:	25	0.014
Cork Tile:	6	0.14
Floor Felt: Standard Jute Underfelt	13	0.27
Linoleum:	3	0.015
PVC Tiles: "Vinylflex"	3	0.004
	2	0.003
Timber Flooring: Softwood Hardwood	19	0.173
	19	0.10
Roofing Materials		
Asbestos Cement: Standard Sheet	5.5	0.021
Sheet Metal, all types:		Neg.
Tiles, burnt clay	16 min	0.018
Tiles, concrete	16 min	0.01
Cladding Materials		
Asbestos Cement Sheet:	4.5	0.017
	6	0.023
Glass: Window and plate	3	0.004
	6.5	0.008
Timber Weatherboards: Softwood Hardwood	16 av.	0.145
	16 av.	0.084
Masonry, Concrete		
Bricks: Common	76	0.106
	110	0.153
Concrete bricks, dense sand and gravel aggregate	76	0.042
	110	0.066
Concrete blocks — cored: Dense sand and gravel aggregate	100	0.126
	150	0.147
	200	0.176
	300	0.207
Plastering Materials		
Cement or Gypsum Plaster: Sand Aggregate	13	0.018
	19	0.026

CONDENSATION CONTROL

When considering condensation control, it may be necessary to calculate the temperature of the internal wall or ceiling surface when the outside temperature is at the lowest level anticipated. The appropriate formula is:

$$t_s = t_i - \frac{Q R_i}{f_i}$$

Where

- t_s = internal surface temperature (°C)
 t_i = inside air temperature (°C)
 Q = calculated heat flow per square metre per second (W/m²)
 R_i = resistance of inside air film (m².C/W)
 f_i = inside surface heat transfer coefficient (W/m².C).

If the internal surface temperature calculated in this manner is less than the anticipated dew point temperature, there will be the risk of condensation forming on the surface. This can promote mould growth and the accumulation of dust and stains, and lead to the eventual breakdown of paint and paper finishes.

It is therefore recommended that sufficient insulation material be added to raise the surface temperature of the wall or ceiling above the dew point. Under extremely cold conditions, the use of a vapour barrier should be considered. This is located immediately behind the facing sheet with the objective of preventing the migration of moisture vapour from within the living space into the wall and ceiling cavities. If this happens, the thermal resistance of the insulation can be seriously reduced and structural damage can result.

The Table can be used as a guide in establishing the lowest anticipated dew point temperature. It lists the dew point temperatures for a range of inside air temps. and relative humidities.

Room Temperature (Dry Bulb) °C	Dew Point Temperatures, °C							
	Relative Humidity, Percent							
	20	30	40	50	60	70	80	90
5	-0.6	0.0	0.7	1.4	2.0	2.9	3.7	4.3
10	2.5	3.6	4.5	5.5	6.5	7.5	8.3	9.2
15	5.9	7.3	8.6	9.8	10.9	12.0	13.0	14.1
20	9.3	10.9	12.3	13.9	15.2	16.5	17.7	18.9
25	12.4	14.4	16.2	18.0	19.5	21.1	22.4	23.7
30	15.7	18.0	20.1	22.1	23.8	25.5	27.2	28.6
35	18.9	21.7	24.0	26.3	28.2	30.1	32.0	33.6

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METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS

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Quantity in Imperial or Common Unit	x Factor	=	SI Unit
Space and Time Length	thou' (mil)	x 2.54×10^{-5} 2.54×10^1	= m = μ m metre micrometre
	inch	2.54×10^{-2} 2.54×10^1	= m = mm metre millimetre
	foot	3.048×10^{-1}	= m metre
	yard (British Standard)	9.144×10^{-1}	= m metre
	mile	1.609×10^3	= m metre
		1.609	= km kilometre
Area	square inch	x 6.452×10^{-4} 6.452×10^2	= m ² = mm ² square metre square millimetre
	square foot	9.290×10^{-2}	= m ² square metre
	square yard	8.361×10^{-1}	= m ² square metre
	square mile	2.590×10^6 2.590	= m ² = km ² square metre square kilometre
	acre	4.047×10^3 4.047×10^{-3}	= m ² = km ² square metre square kilometre
Volume	cubic inch	x 1.639×10^{-5} 1.639×10^1	= m ³ = mL cubic metre millilitre
	cubic foot	2.832×10^{-2} 2.832×10^1	= m ³ = L cubic metre litre
	cubic yard	7.646×10^{-1}	= m ³ cubic metre
	pint†	5.683×10^{-4} 5.683×10^{-1}	= m ³ = L cubic metre litre
	gallon†	4.546×10^{-3} 4.546	= m ³ = L cubic metre litre
	gallon (US)	3.785×10^{-3} 3.785	= m ³ = L cubic metre litre
	litre	1 x 10^{-3}	= m ³ cubic metre
Motion Velocity	foot/second	x 3.048×10^{-1}	= m/s metre/second
	foot/minute	5.080×10^{-3}	= m/s metre/second
	mile/hour	4.470×10^{-1}	= m/s metre/second
	knot	5.148×10^{-1}	= m/s metre/second
Acceleration	foot/second ²	x 3.048×10^{-1}	= m/s ² metre/second squared
Frequency	cycle/second	x 1	= Hz hertz

† All measures quoted are Imperial unless otherwise stated.
* All factors in bold print are exact values.

Continued next Page

METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS (Cont'd)

Quantity in Imperial or Common Unit		x Factor	=	SI Unit
Mass and Density Mass	ounce	$\times 2.835 \times 10^{-2}$ 2.835×10^1	= kg = g	kilogram gram
	pound	4.536×10^{-1}	= kg	kilogram
	ton	1.016×10^3	= kg	kilogram
	ton (short)	9.072×10^2	= kg	kilogram
	ton (metric)	$1 \times 10^3^*$	= kg	kilogram
	grain	6.479×10^{-5} 6.479×10^1	= kg = mg	kilogram milligram
Mass per unit length	pound/foot	$\times 1.488$	= kg/m	kilogram/metre
Mass per unit area	pound/foot ²	$\times 4.882$	= kg/m ²	kilogram/square metre
Density (specific mass)	pound/foot ³	$\times 1.602 \times 10^1$	= kg/m ³ = g/l	kilogram/cubic metre = gram/litre
	pound/inch ³	2.768×10^4	= kg/m ³ = g/l	kilogram/cubic metre = gram/litre
	pound/gallon	9.978×10^1	= kg/m ³ = g/l	kilogram/cubic metre = gram/litre
Specific volume	foot ³ /pound	$\times 6.243 \times 10^{-2}$	= m ³ /kg	cubic metre/kilogram
Flow rate Mass flow rate	pound/minute	$\times 7.560 \times 10^{-3}$	= kg/s	kilogram/second
	pound/hour	1.260×10^{-4}	= kg/s	kilogram/second
Mass flow per unit area	pound/foot ² hour	$\times 1.356 \times 10^{-3}$	= kg/m ² s	kilogram/square metre second
	pound/inch ² hour	1.953×10^{-1}	= kg/m ² s	kilogram/square metre second
Volume flow rate	cubic foot/second	$\times 2.832 \times 10^{-2}$ 2.832×10^1	= m ³ /s = l/s	cubic metre/second litre/second
	cubic foot/minute	4.719×10^{-4} 4.719×10^{-1}	= m ³ /s = l/s	cubic metre/second litre/second
	gallon/minute	7.577×10^{-5} 7.577×10^{-2}	= m ³ /s = l/s	cubic metre/second litre/second
	gallon/hour	1.263×10^{-6} 1.263×10^{-3}	= m ³ /s = l/s	cubic metre/second litre/second
	gallon/minute (US)	6.309×10^{-5} 6.309×10^{-2}	= m ³ /s = l/s	cubic metre/second litre/second
	gallon/hour (US)	1.052×10^{-6} 1.052×10^{-3}	= m ³ /s = l/s	cubic metre/second litre/second
	cubic metre/minute	1.667×10^{-2} 1.667×10^1	= m ³ /s = l/s	cubic metre/second litre/second
	cubic metre/hour	2.778×10^{-4} 2.778×10^{-1}	= m ³ /s = l/s	cubic metre/second litre/second
	litre/minute	1.667×10^{-5} 1.667×10^{-2}	= m ³ /s = l/s	cubic metre/second litre/second
	litre/hour	2.778×10^{-7} 2.778×10^{-4}	= m ³ /s = l/s	cubic metre/second litre/second
Momentum Momentum	pound foot/second	$\times 1.383 \times 10^{-1}$	= kg.m/s	kilogram metre/second
Moment of inertia	pound foot ²	$\times 4.214 \times 10^{-2}$	= kg.m ²	kilogram metre squared
Moment of momentum (an- gular momentum)	pound foot ² /second	$\times 4.214 \times 10^{-2}$	= kg.m ² /s	kilogram metre squared/ second

* All factors in bold print are exact values.

Continued next page

METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS (Cont'd)

Quantity in Imperial or Common Unit	x Factor	=	SI Unit
Force and Torque			
Force (weight)			
pound force	x 4.448	= N	newton
poundal	1.383×10^{-1}	= N	newton
kilogram force	9.807	= N	newton
dyne	1×10^{-5} *	= N	newton
Torque (moment of force)			
pound force foot	x 1.356	= N.m	newton metre
Pressure and Stress			
Pressure			
pound force/inch ²	x 6.895×10^3	= Pa	pascal
pound force/foot ²	4.788×10^1	= Pa	pascal
kilogram force/centimetre ²	9.807×10^{-1}	= Pa	pascal
inch H ₂ O (4°C)	2.491×10^2	= Pa	pascal
foot H ₂ O (4°C)	2.989×10^3	= Pa	pascal
millimetre H ₂ O (4°C)	9.807	= Pa	pascal
inch Hg (0°C)	3.386×10^3	= Pa	pascal
bar	1×10^5	= Pa	pascal
millimetre Hg	1.333×10^2	= Pa	pascal
torr	1.333×10^2	= Pa	pascal
atmosphere (standard)	1.013×10^5	= Pa	pascal
Pressure drop per unit length			
foot H ₂ O/100 feet	x 9.810×10^1	= Pa/m	pascal/metre
inch H ₂ O/100 feet	8.176	= Pa/m	pascal/metre
Stress			
pound force/inch ²	x 6.895×10^3	= Pa	pascal
pound force/foot ²	4.788×10^1	= Pa	pascal
ton force/inch ²	1.544×10^7	= Pa	pascal
ton force/foot ²	1.073×10^5	= Pa	pascal
Viscosity			
Dynamic viscosity (absolute)			
poise (dyne second/centimetre ²)	x 1×10^{-1}	= Pa.s	pascal second
pound force second/foot ²	4.788×10^1	= Pa.s	pascal second
pound force hour/foot ²	1.724×10^5	= Pa.s	pascal second
pound/hour/foot	4.14×10^{-4}	= Pa.s	pascal second
Kinematic viscosity			
stokes (centimetre ² /second)	x 1×10^{-4}	= m ² /s	metre squared/second
inch ² /second	6.452×10^{-4}	= m ² /s	metre squared/second
foot ² /second	9.290×10^{-2}	= m ² /s	metre squared/second
foot ² /minute	1.548×10^{-3}	= m ² /s	metre squared/second
metre ² /hour	2.778×10^{-4}	= m ² /s	metre squared/second
Redwood No. 1 and No. 2 seconds	No direct conversion		
SAE grades	No direct conversion		
Temperature —	See separate Tables		

* All factors in bold print are exact values.

Continued next page

METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS (Cont'd)

Quantity in Imperial or Common Unit	x Factor	=	SI Unit
Heat			
Energy, work, quantity of heat	British Thermal Unit (Btu)	x 1.055×10^3 (see note below) 1.055	= J = kJ joule (1 J = 1 N.m = 1 W.s) kilojoule
	horsepower hour	2.685×10^6 2.685	= J = MJ joule megajoule
	kilowatt hour	3.6×10^6 3.6	= J = MJ joule megajoule
	therm (100,000 Btu)	1.055×10^8 1.055×10^{-1}	= J = GJ joule gigajoule
	foot pound force	1.356	= J joule
	metre kilogram force	9.807	= J joule
	kilocalorie (frigorie)	4.187×10^3 4.187	= J = kJ joule kilojoule
	thermie	4.187×10^6	= J joule
NOTE: The British thermal unit is temperature dependent; for instance, the energy required to raise the temperature of one pound of water from 39°F to 40°F (Btu ₃₉) is equal to 1059.52 joule, whereas the mean value over the range 32°F to 212°F (Btu _{mean}) is equal to 1055.79 joule. The International Steam Tables use a value of 1055.06 joule (Btu _{IT}) and this value has been used for all the conversions involving the Btu. On this basis one Btu _{IT} per pound is equal to 2.326×10^3 joule per kilogram exactly. The calorie is temperature dependent in the same way as is the Btu. For example at 15°C it is equal to 4.1847 joule and at 20°C to 4.1868. The mean calorie is equal to 4.18605 absolute joules and the calorie _{IT} to 4.18689 absolute joules. In addition, the Calorie has been taken in practice to be equivalent to 1000 calories.			
Heat flow-			
Power, heat flow rate	Btu/hour	x 2.931×10^{-1} 2.931×10^{-4}	= W = kW watt (W = J/s = N.m/s) kilowatt
	horsepower	7.457×10^2 7.457×10^{-1}	= W = kW watt kilowatt
	horsepower (metric)	7.355×10^2	= W watt
	foot pound force/second	1.356	= W watt
	ton refrigeration (12,000 Btu/h)	3.516×10^3 3.516	= W = kW watt kilowatt
	kilocalorie/hour	1.163 1.163×10^{-3}	= W = kW watt kilowatt
Intensity of heat flow rate	Btu/hour foot ²	x 3.155	= W/m ² watt/square metre
	watts/foot ²	1.076×10^1	= W/m ² watt/square metre
	kilocalorie/hour metre ²	1.163	= W/m ² watt/square metre
Thermal conductivity	Btu inch/hour foot ² °F	x 1.442×10^{-1}	= W/m.°C watt/metre degree Celsius
	kilocalorie/hour metre °C	1.163	= W/m.°C watt/metre degree Celsius
Thermal conductance	Btu/hour foot ² °F	x 5.678	= W/m ² °C watt/square metre degree Celsius
	kilocalorie/hour metre ² °C	1.163	= W/m ² °C watt/square metre degree Celsius
Thermal resistivity	foot ² hour °F/Btu inch	x 6.934	= m.°C/W metre degree Celsius/watt
	metre hour °C/kilocalorie	8.598×10^{-1}	= m.°C/W metre degree Celsius/watt
Thermal resistance	foot ² hour °F/Btu	x 1.761×10^{-1}	= m ² °C/W square metre degree Celsius/watt
	metre ² hour °C/kilocalorie	8.598×10^{-1}	= m ² °C/W square metre degree Celsius/watt
Thermal diffusivity	foot ² hour	x 2.581×10^{-5}	= m ² /s square metre/second
	metre ² hour	2.778×10^{-4}	= m ² /s square metre/second

* All factors in bold print are exact values.

Continued next page

METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS (Cont'd)

Quantity in Imperial or Common Unit		x Factor	=	SI Unit
Heat energy content Heat capacity	Btu/°F	x 1.899 x 10 ³	= J/°C	joule/degree Celsius
	kilocalorie/°C	4.187 x 10 ³	= J/°C	joule/degree Celsius
Specific enthalpy	Btu/pound	x 2.326 x 10 ³ *	= J/kg	joule/kilogram
	kilocalorie/kilogram	2.326	= kJ/kg	kilojoule/kilogram
Specific heat capacity (Thermal capacity per unit mass)		4.187 x 10 ³	= J/kg	joule/kilogram
		4.187	= kJ/kg	kilojoule/kilogram
	Btu/pound °F	x 4.187 x 10 ³	= J/kg.°C	joule/kilogram degree Celsius
		4.187	= kJ/kg.°C	kilojoule/kilogram degree Celsius
Entropy	kilocalorie/kilogram °C	4.187 x 10 ³	= J/kg.°C	joule/kilogram degree Celsius
		4.187	= kJ/kg.°C	kilojoule/kilogram degree Celsius
	Btu/°R	x 1.899 x 10 ³	= J/K	joule/kelvin
	kilocalorie/K	4.187 x 10 ³	= J/K	joule/kelvin
Specific entropy	Btu/pound °R	x 4.187 x 10 ³	= J/kg.K	joule/kilogram kelvin
		4.187	= kJ/kg.K	kilojoule/kilogram kelvin
Latent heat (specific energy)	kilocalorie/kilogram K	4.187 x 10 ³	= J/kg.K	joule/kilogram kelvin
		4.187	= kJ/kg.K	kilojoule/kilogram kelvin
	Btu/pound	x 2.326 x 10 ³	= J/kg	joule/kilogram
		2.326	= kJ/kg	kilojoule/kilogram
Volumetric calorific value	kilocalorie/kilogram	4.187 x 10 ³	= J/kg	joule/kilogram
	foot pound force force/pound	2.989	= J/kg	joule/kilogram
	Btu/foot ³	x 3.726 x 10 ⁴	= J/m ³	joule/cubic metre
		3.726 x 10 ⁻²	= MJ/m ³	megajoule/cubic metre
Specific heat (volume basis)	kilocalorie/metre ³	4.187 x 10 ³	= J/m ³	joule/cubic metre
		4.187 x 10 ⁻³	= MJ/m ³	megajoule/cubic metre
	Btu/foot ³ °F	x 6.707 x 10 ⁴	= J/m ³ .°C	joule/cubic metre degree Celsius
		6.707 x 10 ⁻²	= MJ/m ³ .°C	megajoule/cubic metre degree Celsius
	kilocalorie/metre °C	4.187 x 10 ³	= J/m ³ .°C	joule/cubic metre degree Celsius
		4.187 x 10 ⁻³	= MJ/m ³ .°C	megajoule/cubic metre degree Celsius

* All factors in bold print are exact values.

Continued next page

METRIC UNITS AND CONVERSION FACTORS FOR SERVICE ENGINEERS (Cont'd)

Quantity in Imperial or Common Unit		x Factor	=	SI Unit
Moisture content Vapour permeability	pound foot/hour pound force	$\times 8.62 \times 10^{-6}$	=	kg.m/N.s kilogram metre/newton second
		8.62×10^{-3}	=	$\mu\text{g.m/N.s}$ microgram metre/newton second
	grain inch/square foot hour inch of mercury (perm-inch)	1.45×10^{-12}	=	kg.m/N.s kilogram metre/newton second
Vapour permeance	pound/hour pound force	$\times 2.834 \times 10^{-5}$ 2.834×10^{-4}	=	kg/N.s kilogram/newton second $\mu\text{g/N.s}$ microgram/newton second
	pound inch ² /foot ² /hour pound force	1.965×10^{-7}	=	kg/N.s kilogram/newton second
	grain/square foot hour inch mercury (perm.)	5.72×10^{-11}	=	kg/N.s kilogram/newton second
	grain/square foot hour millibar	1.94×10^{-9}	=	kg/N.s kilogram/newton second
Moisture content	pound/pound	$\times 1$	=	kg/kg kilogram/kilogram
	grain/pound	1.428×10^{-1}	=	g/kg gram/kilogram
Moisture flow rate	grain/square foot hour	$\times 1.94 \times 10^{-7}$	=	kg/m ² .s kilogram/square metre second
	pound/square foot	1.357×10^{-3}	=	kg/m ² .s kilogram/square metre second
Mass transfer coefficient	foot/hour	$\times 8.47 \times 10^{-5}$	=	m/s metre/second
Light				
Luminous intensity	candle (International)	$\times 9.810 \times 10^{-1}$	=	cd candela
Illumination	foot candle	$\times 1.076 \times 10^1$	=	lx lux
	lumen/foot ²	1.076×10^1	=	lx lux
Luminance	foot lambert	$\times 3.426$	=	cd/m ² candela/square metre
	candela/inch ²	1.550×10^3	=	cd/m ² candela/square metre
Electricity				
Already largely SI				

* All factors in bold print are exact values.

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OUTDOOR DESIGN CONDITIONS

SUMMER & WINTER

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INTRODUCTION

This section presents data for outdoor design conditions. Table 1 contains data relating to 3 p.m. dry-bulb temperatures (summer) and 8 a.m. dry-bulb temperatures (winter). This table and some of the accompanying text are self-explanatory and are extracted from the Air Conditioning System Design Manual published by the Australian Government Department of Construction. They are reprinted here with the permission of the Government publishing office.

SUMMER OUTDOOR DESIGN CONDITIONS

For comfort and non-critical process installations it is customary to choose outdoor 3 p.m. dry-bulb temperatures which individually are exceeded on 10 days in the year. (The temperatures listed in Table 1 allow for the standard deviation, e.g. for Sydney [Mascot Airport] the design dry-bulb of 30.5°C occurs on 6 days with standard deviation of plus or minus 4°C). The locations for which complete, statistically valid information is available are marked with an asterisk. Figures listed for other locations are approximations or are based on incomplete information.

For critical process installations summer outdoor design conditions are based on dry-bulb and wet-bulb temperatures which individually are exceeded on 0.25% of the plant operating hours. Table 1 provides for two sets of temperature values, one for 24 hour operation and the other for operation between 8.00 a.m. and 6.00 p.m. every day of the year.

Outdoor summer design conditions for critical process installations should be discussed with and agreed to by the client.

WINTER OUTDOOR DESIGN CONDITIONS

For comfort and non-critical process installations it is customary to choose the 8 a.m. dry-bulb temperature which is not exceeded on 10 days in the year. (Temperatures listed in Table 1 allow for the standard deviation). The locations for which complete, statistically valid information is available, are marked with an asterisk. Figures listed for other locations are approximations or are based on incomplete information.

The design outdoor relative humidity should be taken as 80%.

For critical process installations, winter outdoor design conditions are based on the dry-bulb temperature which is not exceeded 0.25% of the plant operating hours. Table 1 provides for two temperature values, one for 24 hours operation and the other for operation between 8.00 a.m. and 6.00 p.m. every day of the year.

Outdoor winter design conditions for critical process installations should be discussed with and agreed to by the client.

TABLE 1 — OUTDOOR DESIGN CONDITIONS — SUMMER AND WINTER

Location City or Town and Meteorological Station Locality	Summer						Winter			Elev. Above Sea Level	Latit- ude	Average Daily Range	Yearly Range
	Comfort or Non-Critical Process Installations	Critical Process Installations				Comfort or Non- Critical Process Installations	Critical Process Installations						
		24 Hour Operation	8.00 a.m.- 6.00 p.m. Operation		24 Hour Operat.		8.00am- 6.00pm Operat.						
			(°CDB)	(°CWB)				(°CDB)	(°CWB)					(°CDB)	(°CDB)
VICTORIA													
Bairnsdale	34.0	21.5	—	—	—	—	2.0	—	—	15	37° 49'	12.0	31.5
Ballarat	34.0	20.5	—	—	—	—	-1.0	—	—	437	37° 35'	14.0	35.0
Benalla	39.0	22.0	—	—	—	—	1.5	—	—	171	36° 34'	16.0	36.0
Bendigo	36.5	22.0	—	—	—	—	1.0	—	—	223	36° 46'	14.5	35.5
Melbourne * (Essendon Airport)	34.5	21.0	35.5	22.0	37.0	23.0	4.5	1.5	3.0	35	37° 49'	11.5	30.0
Mildura airport *	38.0	23.5	39.5	24.0	40.5	24.0	4.5	1.5	2.0	54	34° 11'	16.0	33.5
Sale airport	35.5	22.0	—	—	—	—	2.0	—	—	9	38° 6'	14.5	33.5
Seymour airport	36.5	21.0	—	—	—	—	1.0	—	—	142	37° 2'	16.5	35.5
TASMANIA													
Hobart airport *	26.0	19.0	30.0	20.5	31.5	21.0	3.0	0.5	1.5	54	42° 53'	9.5	23.5
Launceston airport	28.5	20.0	—	—	—	—	3.0	—	—	81	41° 27'	13.0	25.5
SOUTH AUSTRALIA													
Adelaide (Parafield airport) *	36.0	21.0	36.5	23.0	38.0	23.5	6.5	3.5	5.5	43	34° 56'	13.0	29.5
Mt. Gambier	35.0	20.5	—	—	—	—	4.0	—	—	42	37° 50'	11.5	31.0
Woomera airport *	39.5	22.0	40.5	24.0	41.5	24.5	5.0	3.5	5.0	165	31° 00'	—	34.5
NORTHERN TERRITORY													
Alice Springs airport*	39.5	23.5	40.5	24.5	41.0	24.5	3.5	1.5	3.5	580	23° 38'	14.0	36.0
Darwin airport*	34.5	28.5	34.5	28.5	35.0	29.0	18.5	—	—	10	12° 30'	7.0	16.0
Katherine	40.5	28.0	—	—	—	—	10.0	—	—	106	15° 30'	—	30.5
Tennant Creek	40.5	25.0	—	—	—	—	11.5	—	—	328	19° 34'	12.5	29.0
NEW SOUTH WALES													
Albury	39.5	22.0	—	—	—	—	1.5	—	—	165	36° 06'	16.5	37.5
Casino	39.0	24.0	—	—	—	—	6.0	—	—	24	28° 51'	13.0	33.0
Cessnock	35.0	23.5	—	—	—	—	7.0	—	—	12	32° 54'	13.5	28.0
Cooma	29.5	19.5	—	—	—	—	-4.0	—	—	690	36° 14'	15.0	33.5
Dubbo	39.0	23.0	—	—	—	—	1.5	—	—	265	32° 18'	15.5	37.0
Grafton	35.0	24.0	—	—	—	—	6.0	—	—	6	29° 43'	12.0	29.0
Griffith	35.0	23.0	—	—	—	—	4.5	—	—	128	34° 17'	15.0	30.5
Inverell	38.0	21.5	—	—	—	—	0.5	—	—	604	29° 47'	16.0	37.0
* Locations with no recorded data													

* Locations for which complete, statistically valid data are available.

Continued next page

OUTDOOR DESIGN CONDITIONS SUMMER & WINTER (Cont'd)

TABLE 1 - OUTDOOR DESIGN CONDITIONS - SUMMER AND WINTER (Continued)

TABLE 1 - OUTDOOR DESIGN CONDITIONS - SUMMER AND WINTER (Continued)													
Location City or Town and Meteorological Station Locality	Summer						Winter			Elev. Above Sea Level	Latitude	Average Daily Range	Yearly Range
	Comfort or Non-Critical Process Installations	Critical Process Installations				Comfort or Non- Critical Process Installations	Critical Process Installations						
		24 Hour Operation	8.00 a.m.- 6.00 p.m. Operation	24 Hour Operat.	8.00am- 6.00pm Operat.								
							(°CDB)	(°CWB)	(°CDB)					(°CWB)	(°CDB)	(°CWB)
(°CDB)	(°CWB)	(°CDB)	(°CWB)	(°CDB)	(°CWB)	(°CDB)	(°CDB)	(°CWB)	(m)	(°Sth.)	(°CDB)	(°CWB)	
NEW SOUTH WALES (Continued)													
Lismore	35.0	24.0	—	—	—	—	9.0	—	—	11	28° 48'	11.5	26.0
Lithgow	32.0	23.0	—	—	—	—	1.5	—	—	920	33° 30'	14.5	30.5
Maitland	35.0	24.0	—	—	—	—	6.0	—	—	6	32° 44'	13.0	29.0
Morree	40.5	23.0	—	—	—	—	4.5	—	—	209	29° 28'	16.0	36.0
Newcastle	32.0	23.5	—	—	—	—	4.5	—	—	34	32° 35'	6.0	28.0
Orange	35.0	21.5	—	—	—	—	0.5	—	—	868	33° 17'	17.0	34.5
Parkes	38.0	21.5	—	—	—	—	4.5	—	—	316	33° 06'	14.5	33.5
Sydney (Mascot airport*)	30.5	23.0	33.5	24.0	35.5	24.0	7.0	4.5	7.0	42	33° 51'	7.5	23.5
Tamworth	38.0	21.5	—	—	—	—	-1.0	—	—	378	31° 06'	15.5	39.0
Taree	35.0	24.0	—	—	—	—	7.0	—	—	9	31° 55'	12.0	28.0
Wagga Wagga	39.0	22.0	—	—	—	—	1.5	—	—	187	36° 07'	15.5	37.0
Windsor	36.0	24.0	—	—	—	—	1.5	—	—	12	33° 51'	—	34.5
Wollongong	32.0	23.0	—	—	—	—	7.0	—	—	10	34° 25'	9.0	26.0
WESTERN AUST.													
Albany	32.0	21.0	—	—	—	—	7.0	—	—	12	35° 02'	8.5	26.0
Broome airport *	38.5	29.0	39.5	29.5	40.0	29.5	16.5	9.5	9.0	11	17° 57'	6.5	21.5
Bruce Rock	36.5	21.5	—	—	—	—	4.5	—	—	—	31° 51'	—	32.5
Bunbury	33.5	22.5	—	—	—	—	7.0	—	—	5	33° 18'	13.0	26.0
Carnarvon airport *	34.0	26.0	38.5	26.0	40.0	26.5	12.0	7.0	7.0	5	24° 54'	8.5	21.5
Collie	36.0	23.0	—	—	—	—	3.5	—	—	184	33° 21'	17.0	33.0
Corrigan	36.5	21.5	—	—	—	—	4.5	—	—	—	32° 18'	—	32.5
Derby	40.5	28.5	—	—	—	—	10.0	—	—	16	17° 18'	8.5	30.5
Geraldton	36.0	24.0	—	—	—	—	10.0	—	—	4	28° 45'	10.0	26.0
Kalgoorlie *	40.0	23.0	40.5	24.0	40.5	24.0	5.5	0.0	0.0	380	30° 45'	16.0	35.0
Kununurra	40.5	28.5	—	—	—	—	12.0	—	—	46	15° 46'	—	28.5
Northam	39.0	22.0	—	—	—	—	4.5	—	—	149	31° 40'	16.5	34.5
Perth (Guildford airport) *	36.0	24.0	39.0	25.0	39.0	25.5	9.0	3.5	3.5	60	31° 57'	12.0	27.0
Port Hedland airport	39.5	28.5	—	—	—	—	15.0	—	—	8	20° 19'	8.5	24.5
Wyndham	40.5	29.5	—	—	—	—	12.0	—	—	7	15° 27'	8.5	28.5
Anna Plains airport	41.0	29.0	—	—	—	—	—	—	—	3	19° 15'	9.5	—
A.C.T.													
Canberra airport *	34.0	21.0	34.0	21.0	35.0	21.5	0.5	-4.5	-1.5	560	35° 17'	15.0	33.5
QUEENSLAND													
Amberley airport	35.5	26.0	—	—	—	—	10.0	—	—	26	27° 25'	—	25.5
Brisbane (Eagle Farm airport)*	31.0	25.0	32.0	25.5	34.0	25.5	10.5	6.5	10.5	42	27° 28'	9.0	20.5
Cairns airport	33.0	26.5	—	—	—	—	17.0	—	—	5	16° 55'	8.5	15.5
Charleville airport *	39.0	24.0	39.5	24.0	40.0	24.5	5.0	0.0	4.5	294	26° 25'	15.0	34.0
Cloncurry airport *	41.0	25.5	41.5	26.0	41.5	26.5	10.0	6.0	11.0	193	20° 43'	12.5	31.0
Rockhampton airport *	36.0	26.5	36.0	26.5	36.5	27.0	11.0	4.0	11.0	11	23° 24'	10.0	25.0
Toowoomba airport	31.0	22.0	—	—	—	—	—	—	—	586	27° 33'	12.0	—
Townsville airport *	32.0	26.0	34.0	27.0	34.5	28.0	13.0	9.0	13.0	3	19° 14'	11.0	19.0
PAPUA NEW GUINEA													
Lae Airport	33.5	28.0	—	—	—	—	20.0	—	—	8	6° 48'	—	13.5
Madang airport	33.0	28.0	—	—	—	—	—	—	—	6	5° 00'	7.0	—
Port Moresby (Jackson's airport) *	33.5	28.5	34.0	37.0	34.0	27.0	22.0	—	—	38	9° 29'	7.5	11.0
Rabaul airport	33.5	28.5	—	—	—	—	21.5	—	—	13	4° 12'	9.0	11.5

* Locations for which complete, statistically valid data are available.

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PRESSURE-TEMPERATURE CHART

Refrigeration and Air Conditioning Metric Data

For an interim period, refrigeration mechanics will have either imperial or metric manifold gauges. This chart therefore provides pressure/temperature relationships for refrigerant gases for both systems of units. The chart may be used for totally metric working, or to convert from imperial to metric working.

It should be noted that the values in the chart may vary marginally for gases of differing manufacture and that above 1000 kilopascals these values have been rounded to 3 significant figures.

(ACTROL NOTE: Manifold gauges are now available with dual scales, i.e. graduated in both kPa and PSI).

Pressure - Temperature Chart



Produced
by
the
Metric
Conversion
Board

Under the heading inHg pressures in bold type are vacuum pressures in inches of mercury and in light type pounds force per square inch.

°C	°F	R11		R12		R22		R500		R502		R717	
		kPa	inHg psi	kPa	inHg psi	kPa	inHg psi	kPa	inHg psi	kPa	inHg psi	kPa	inHg psi
-70	-94.0			-89	26.3	-81	23.9	-87	25.7	-74	21.8	-90	26.7
-66	-86.8			-86	25.3	-78	22.1	-83	24.5	-69	19.6	-87	25.6
-62	-79.6			-81	24.0	-68	20.1	-78	23.0	-65	17.0	-82	24.3
-58	-72.4	-100	29.5	-76	22.4	-59	17.5	-71	21.0	-47	13.9	-76	22.6
-54	-65.2	-99	29.3	-70	20.8	-49	14.5	-64	18.9	-35	10.2	-69	20.5
-50	-58.0	-99	29.1	-62	18.4	-37	10.9	-55	16.2	-20	5.9	-61	17.9
-46	-50.8	-98	28.9	-53	15.7	-23	6.7	-44	13.0	-3	0.8	-50	14.7
-42	-43.6	-97	28.6	-43	12.7	-6	1.7	-33	9.7	17	2.5	-37	10.9
-38	-36.4	-96	28.2	-31	9.1	14	2.0	-18	5.5	40	5.8	-22	6.4
-34	-29.2	-94	27.8	-17	5.0	36	5.3	-3	0.9	67	9.7	-3	1.0
-30	-22.0	-92	27.2	-1	0.3	62	9.0	16	2.3	97	14	18	2.6
-26	-14.8	-91	26.9	8	1.2	76	11	27	3.9	113	16	30	4.4
-22	-7.6	-90	26.5	17	2.5	92	13	38	5.5	131	19	43	6.3
-18	-0.4	-89	26.2	27	4.0	108	16	49	7.1	149	22	57	8.3
-14	6.8	-87	25.8	38	5.5	125	18	62	9.0	169	24	72	11
-10	14.0	-86	25.3	50	7.2	144	21	75	11	190	28	89	13
-6	21.2	-84	24.8	62	9.0	163	24	90	13	212	31	106	15
-2	28.4	-82	24.2	75	11	184	27	105	15	235	34	125	18
0	32.0	-80	23.0	88	13	205	30	121	18	260	38	145	21
1	33.8	-78	22.4	103	15	229	33	139	20	286	41	167	24
2	35.6	-76	22.4	118	17	253	37	156	23	313	45	190	28
3	37.4	-73	21.6	134	19	279	40	175	25	342	50	214	31
4	39.2	-71	20.8	151	22	306	44	195	28	372	54	240	35
5	41.0	-68	20.0	169	24	335	49	216	31	404	59	268	39
6	42.8	-65	19.1	187	27	365	53	239	35	437	63	298	43
7	44.6	-61	18.1	207	30	396	57	262	38	472	68	329	48
8	46.4	-59	17.6	218	32	413	60	275	40	490	71	345	50
9	48.2	-58	17.0	228	33	430	62	287	42	508	74	362	53
10	50.0	-56	16.5	239	35	447	65	300	44	527	76	379	55
11	51.8	-54	15.9	250	36	464	67	313	45	547	79	397	58
12	53.6	-52	15.3	261	38	482	70	326	47	566	82	415	60
13	55.4	-50	14.7	273	40	501	73	340	49	586	85	434	63
14	57.2	-47	14.0	285	41	520	75	353	51	607	88	454	66
15	59.0	-45	13.4	297	43	539	78	366	53	628	91	474	69
16	60.8	-43	12.7	309	45	559	81	383	56	650	94	494	72
17	62.6	-41	12.0	322	47	579	84	399	58	672	97	515	75
18	64.4	-38	11.3	335	49	600	87	414	60	694	101	537	78
19	66.2	-36	10.5	348	51	621	90	430	62	717	104	559	81
20	68.0	-33	9.8	362	52	643	93	446	65	741	107	581	84
21	69.8	-30	9.0	376	55	665	96	462	67	764	111	605	88
22	71.6	-28	8.1	390	57	688	100	480	69	789	114	629	91
23	73.4	-25	7.3	404	59	711	103	498	72	814	118	653	95
24	75.2	-22	6.4	419	61	735	107	516	75	839	122	678	98
25	77.0	-19	5.5	435	63	759	110	534	77	865	125	704	102
26	78.8	-16	4.6	450	65	783	114	553	80	891	129	731	106
27	80.6	-12	3.7	466	68	809	117	570	83	918	133	758	110
28	82.4	-9	2.7	482	70	834	121	588	86	946	137	786	114
29	84.2	-6	1.7	499	72	861	125	611	89	974	141	814	118
30	86.0	-2	0.8	516	75	887	129	631	92	1000	145	843	122
31	87.8	1	0.2	533	77	915	133	651	94	1030	150	873	127
32	89.6	5	0.7	550	80	943	137	671	97	1060	154	904	131
33	91.4	9	1.3	568	82	971	141	693	101	1090	158	935	136
34	93.2	13	1.9	586	85	1000	145	715	104	1120	163	967	140
35	95.0	17	2.4	605	88	1030	149	737	107	1150	167	1000	145
36	96.8	21	3.0	624	91	1060	154	759	110	1180	172	1030	150
37	98.6	25	3.7	644	93	1090	158	782	113	1220	177	1070	155
38	100.4	34	4.9	664	99	1150	167	830	120	1280	186	1140	165
39	102.2	43	6.3	725	105	1220	177	880	128	1350	196	1210	176
40	104.0	53	7.7	768	111	1290	187	932	135	1420	207	1290	187
41	105.8	63	9.2	813	118	1360	197	985	143	1500	217	1370	199
42	107.6	74	11	859	125	1430	208	1040	151	1580	229	1460	211
43	109.4	88	12	907	132	1510	219	1100	159	1650	240	1540	224
44	111.2	97	14	957	139	1590	230	1160	168	1740	252	1630	237
45	113.0	110	16	1010	146	1670	242	1220	177	1820	264	1730	251
46	114.8	123	18	1060	154	1750	254	1280	185	1910	277	1830	265
47	116.6	137	20	1120	162	1840	267	1350	196	2000	290	1930	280
48	118.4	151	22	1180	170	1930	280	1420	206	2090	304	2040	296
49	120.2	165	24	1230	179	2030	294	1490	216	2190	318	2150	312
50	122.0	181	26	1300	188	2120	308	1560	226	2290	332	2270	329
51	123.8	198	29	1360	197	2220	322	1640	238	2390	347	2390	346
52	125.6	215	31	1420	207	2330	337	1720	249	2500	363	2510	364

Conversion Factors

Air Flow Rate
litre per second (L/s or litre/s)
1 l/s/min (1 cfm)

= 0.472 L/s
= 0.000 472 m³/s

Air Flow Rate per Area
litre per square metre second (L/m².s)
1 l/s/m² (1 cfm/sq ft)

= 0.08 L/m².s
= 0.000 08 m³/m².s

Feeling Factors

square metre kelvin per watt (m².K/W)
1 m².K/W
0.000 5 m².K/W
0.001 m².K/W

= 0.176 m².K/W
= 0.000 0881 m².K/W
= 0.000 176 m².K/W

Heat Flow

watt
= joule per second
(W = J/s)
1 Btu/h
1 ton (refrigeration)

= 0.293 W
= 3.517 kW

Liquid Flow

cubic metre per second (m³/s = 1000 L/s)
or litre per second (L/s)

1 imperial gal/min
1 US gal/min
1 imperial gal/h

= 0.0758 L/s
= 0.0631 L/s
= 0.001 26 L/s

Loading Rate

watt per square metre (W/m²)
1 Btu/h/m²

= 3.15 W/m²

Coefficient of Heat Transfer

watt per square metre kelvin (W/m².K)
1 Btu/h².F

= 5.68 W/m².K

Pressure

pascal (Pa)
1 lbf/in² (1 psi)
1 in Hg
1 in H₂O
1 ft H₂O
1 kgf/cm²
1 mmHg (= 1 torr)

= 6.89 kPa
= 3.39 kPa
= 0.249 kPa
= 2.98 kPa
= 98.1 kPa
= 0.133 kPa

Velocity Range

metre per second (m/s)
3 ft/s (3 f/s)
10 ft/s

= 0.914 m/s
= 3.05 m/s

TECHNICAL DATA

PROPERTIES OF REFRIGERANTS

Number or Name	Formula	Molecular Weight	Boiling Point at 1 atm		Freezing Point		Critical Temp.		Relative Latent Heat of saturated vapour at boiling point R11 = 1.0	Relative Vap. Specific Heat at 138kPa abs. (20 psia) R11 = 1.0	Vapour Density		* Toxicity Class	Flammability	Oil Miscibility
			°C	°F	°C	°F	°C	°F			@ 21.1°C g/L	@ 70°F lb/cu.ft.			
R.11	CCl ₃ F	137.38	+23.8	+74.9	-111.1	-168	+198.0	+388.4	1.00	1.00	5.37	0.335	5a	None	Miscible
R.12	CCl ₂ F ₂	120.93	-29.8	-21.6	-157.8	-252	+112.0	+223.6	0.99	0.91	33.5	2.091	6	None	Miscible
R.13	CClF ₃	104.47	-81.4	-114.6	-181.1	-294	+28.8	+83.9	0.98	0.81	277.8	17.34	6	None	Partial
R.14	CF ₄	88.01	-128.0	-198.3	-183.9	-299	-45.7	-90.2	0.99	0.74			6	None	Partial
R.21	CHFCl ₂	102.9	+8.9	+48.1	-135.0	-211	+178.5	+353.3	1.05	0.73	6.95	0.434	4 or 5	Slight	Miscible
R.22	CHClF ₂	86.48	-40.8	-41.4	-160.0	-256	+96.0	+204.8	1.04	0.69	39.68	2.477	5a	None	Partial
R.23	CHF ₃	70.0	-82.0	-115.7	-155.0	-247	+25.6	+78.1	1.05	0.62			6	None	Partial
R.113	CCl ₃ F CClF ₂	187.39	+47.6	+117.6	-35.0	-31	+214.1	+417.4	1.03		2.96	0.185	4 to 5	None	Miscible
R.114	CClF ₂ CClF ₂	170.94	+3.8	+38.8	-93.9	-137	+145.7	+294.3	1.01	1.52	14.02	0.875	6	None	Partial
R.115	CClF ₂ CF ₃	154.5	-38.7	-37.7	-106.1	-159	+79.9	+175.9	1.00	1.38	65.79	4.107	6	None	Partial
R.13B1	CBrF ₃	148.93	-57.8	-72.0	-167.8	-270	+67.0	+152.6	0.98	0.84	119.17	7.439	6	None	Miscible
R.142b	CH ₃ CClF ₂	100.5	-9.8	+14.4	-131.1	-204	+137.1	+278.8	0.99	1.04	13.62	0.850	5a	Flammable	Miscible
R.152a	CH ₃ CHF ₂	66.05	-25.0	-13.0	-117.0	-178.6	+113.5	+236.3	1.03	0.86	16.24	1.014	6	Flammable	Miscible
R.1318	C ₂ F ₆	200.04	-5.8	+21.5	-41.4	-42.5	+115.3	+239.6	1.06	1.98	25.1	1.587	6 est.	None	Partial
R.216	CClF ₂ CF ₃ CClF ₂	220.93	+35.7	+96.24	-129.4	-193.7	+180.0	+355.98	1.02		5.56	0.347	6 est.	None	Partial
R.500	12 + 152a 73.3/26.2w/w	av. 99.31	-33.5	-28.3	-158.9	-264	+105.5	+221.9	1.00	0.87	32.99	2.059	5a	None	Miscible
R.502	22 + 115 48.8/51.2w/w	av. 111.6	-45.4	-49.8			+90.0	+194	1.02	0.92	57.91	3.615	5a	None	Partial
R.503	23 + 13 59.9/40.1w/w	av. 87.3	-68.7	-127.6			+19.5	+67.1	0.97	0.71			6	None	Partial
R.504	32 + 115 48.2/51.8w/w	av. 79.2	-57.2	-71.0			+66.4	+151.5	1.06	0.73	71.59	4.469	6	None	Partial
R.717	NH ₃	17.03	-33.3	-28.0	-77.8	-108	+133.0	+271.4	1.15	0.45	6.92	0.432	2	Flammable	
Ethane	CH ₃ CH ₃	30.068	-88.8	-127.85	-182.8	-297	+32.2	+90.008	0.95	0.59	89.25	5.571	5b	Flammable	Miscible
Propane	CH ₃ CH ₂ CH ₃	44.097	-42.1	-43.73	-132.1	-205.8	+96.8	+206.26	0.97	0.93	18.78	1.172	5b	Flammable	Miscible
n-Butane	CH ₃ CH ₂ CH ₂ CH ₃	58.134	-0.5	+31.1	-138.5	-217.3	+152.0	+305.62	0.99		5.48	0.342	5b	Flammable	Miscible

* TOXICITY CLASS - REFER NEXT PAGE

* TOXICITY CLASS - REFER NEXT PAGE

TECHNICAL DATA

PROPERTIES OF REFRIGERANTS

TOXICITY CLASS — COMPARATIVE LIFE HAZARD * (As applicable to Chart on Page 469)

CLASS	DEFINITION	EXAMPLES
1	Gases or vapors which in concentrations of the order of 1% to 1% for durations of exposure of the order of 5 minutes are lethal or produce serious injury.	Sulfur dioxide
2	Gases or vapors which in concentrations of the order of 1% to 1% for durations of exposure of the order of 1/2 hour are lethal or produce serious injury.	Ammonia, methyl bromide
3	Gases or vapors which in concentrations of the order of 2 to 2 1/2% for durations of exposure of the order of 1 hour are lethal or produce serious injury.	Bromochloromethane, carbon tetrachloride, chloroform, methyl formate.
4	Gases or vapors which in concentrations of the order of 2 to 2 1/2% for durations of exposure of the order of 2 hours are lethal or produce serious injury.	Dichloroethylene, methyl chloride, ethyl bromide.
Between 4 and 5	Appear to classify as somewhat less toxic than Group 4.	Methylene chloride, ethyl chloride.
5a	Gases or vapors much less toxic than Group 4 but more toxic than Group 6.	R-113, R-21.
5b	Gases or vapors which available data indicate would classify as either Group 5a or Group 6.	R-11, R-22, R-114B2, carbon dioxide.
6	Gases or vapors which in concentrations up to at least about 20% by volume for durations of exposure of the order of 2 hours do not appear to produce injury.	Ethane, propane, butane. R-13B1, R-12, R-114.

* Underwriters' Laboratories, Chicago, Illinois.

NOTE: The Properties of Refrigerants listed on the previous page, including their Toxicity Class (defined above) is of American origin. Comparison with Australian ratings should not be made as they appear to be a reverse set of numbers i.e. High Toxicity USA — Class 1, — Victoria Aust. — Class 6.
e.g. Victoria Class 6 — Supertoxic, 5 — Extremely Toxic, 4 — Very Toxic, 3 — Moderately Toxic, 2 — Slightly Toxic, 1 — Practically Non-Toxic. Further details may be obtained from your State Health Departments.

GENERAL RULES FOR HANDLING FLUOROCARBON REFRIGERANTS

Keep Cylinders Upright

Keep cylinders in a cool, dry place, away from the direct rays of the sun. Rust developed from outside or damp storage locations may cause cap to stick. Cylinder Valve may be injured.

Do Not Force Connections

Cylinder connections should fit easily and snugly. Never force them. Use correct tools. Stripped threads can cause leaks and possible loss of refrigerant.

Protection — Handle Carefully

Cylinders should not be used for "rollers" or supports. Cuts and abrasions may result. Care in handling cylinders will prolong their life.

Read Labels

Because colour of cylinders cannot be relied upon for positive identification, labels should always be read carefully. Colour blindness might interfere with proper identification. If still in doubt other methods of identification are available from the manufacturer/supplier.

Visual Examination

Each time a cylinder is returned or delivered for re-charging, it should be carefully examined for evidence of corrosion, cuts, dents, bulges, condition of threads, valves etc. to ensure suitability for further service. State Codes also provide for examination and testing of cylinders to ensure their continued use.

Never Transfer

Refrigerant cylinders are labelled and identified for a particular refrigerant. Never put a different refrigerant into a cylinder labelled for another refrigerant.

Keep Away from Fire

No part of any cylinder should ever be subjected to direct flame, steam or temperatures exceeding 52°C (125°F). If necessary to warm cylinder to promote more rapid discharge, extreme caution should be taken — an easy and safe way is to place bottom part of cylinder in a container of warm or hot water not over 52°C (125°F).

Behaviour in Presence of Open Flame

All commercially available fluorinated hydrocarbon refrigerants are non-flammable and non-explosive — an extremely important safety feature.

These refrigerants will decompose, however, if subjected to sufficiently high temperatures. Over 540°C (1000°F) is required for decomposition, and since the average flame temperature is higher, decomposition may occur. It should be noted that only the refrigerant vapour that actually passes through the flame will be affected.

When fluorinated hydrocarbon refrigerants are decomposed by high temperature, they form hydrogen chloride, hydrogen fluoride and small quantities of other gases which may cause ill effects if inhaled in sufficient quantities.

Generally the pungent odour of these products give ample warning of their presence.

Ventilation

Since many materials such as soldering flux, oil, dirt and all refrigerants decompose at the flame temperatures used in soldering, the area in which repair is carried out should be properly ventilated to remove the products of decomposition and combustion of all materials. An adequately ventilated work area is good practice at any time, but especially when an open flame of a leak detector or welding torch is to be used in the presence of "fluorocarbon" refrigerants.

Check Pressure

The pressure within the cylinder must be greater than in the system to cause the refrigerant to flow into the system. Pressure should be checked before charging.
CAUTION: Pressure should never exceed 1158 kPa (168PSI) gauge.

FIRST AID TREATMENT

When handled properly the "fluorocarbon" refrigerants are safe, non-poisonous, non-flammable and harmless to materials. However since they are capable of producing extreme "cold", certain precautions should be taken in case of accident. The following procedures should be taken:

Contact With Eyes

If liquified "fluorocarbon" refrigerant comes in contact with the eyes —
Firstly — put drops of sterile mineral oil in the eyes as an irritant (diluent/flushing agent).
Secondly — If the irritation continues, wash the eyes with either a weak boric acid solution or a sterile salt solution, not exceeding 2% sodium chloride (common salt). After first aid treatment attendance at a hospital or to a doctor is recommended. Avoid rubbing or irritating the eye(s) further.

Contact With Skin

Should liquified "fluorocarbon" refrigerant come in contact with the skin, treat the injury the same as though the skin had become frostbitten or frozen, i.e. warm area affected as rapidly as possible. Fingers should be immersed in water as hot as the normal hand can bear 43°C (110°F). Many First Aid books still quite wrongly teach that return to warmth must be gradual.

Lack of Oxygen

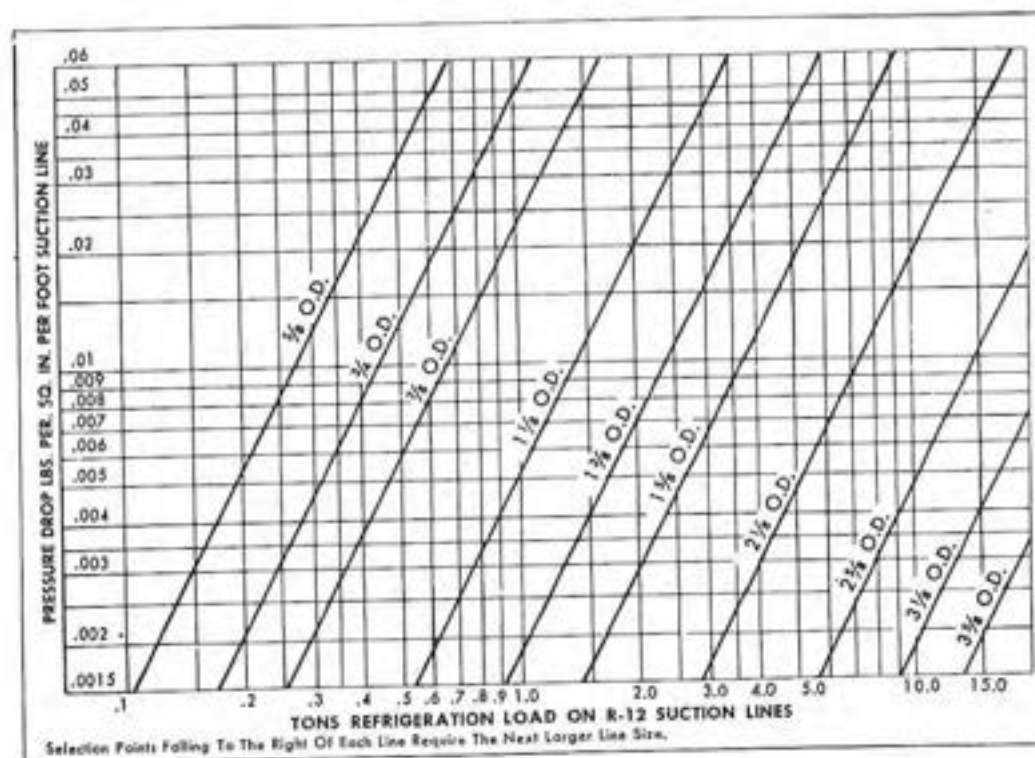
Oxygen is needed to support life. A person working in a space where the oxygen has been displaced by any gas, including "fluorocarbon" refrigerants, may be overcome if there is not sufficient oxygen present. Should this occur, immediately remove the person to "open air" or a properly ventilated space and apply artificial respiration.

TECHNICAL DATA

R-12

Pressure Drop in Suction Lines

AT 20° SUCTION TEMPERATURE



suction line sizes for R-12
(O.D. IN INCHES)

Net Evaporator Capacity	Suction Temperature																			
	40°				20°				0°				-20°				-40°			
	Total Equivalent Length of Suction Line, Feet																			
	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150
3000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
6000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
9000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
12,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
18,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
24,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
30,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
36,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
42,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
48,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
54,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
60,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
72,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
90,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
120,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
150,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
180,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
210,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
240,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
300,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8

CONVERSION FORMULAE FOR ABOVE CHART AND TABLE

LBS./SQ. IN X 6.895 = kilopascals (kPa)
 TONS REFRIG. LOAD X 3.517 = kilowatts (kW)
 TONS REFRIG. LOAD X 12000 = BTU's
 BTU X .0000833 = TONS REFRIG.
 BTU X .0002931 = kW
 FEET X .3048 = metres (m)

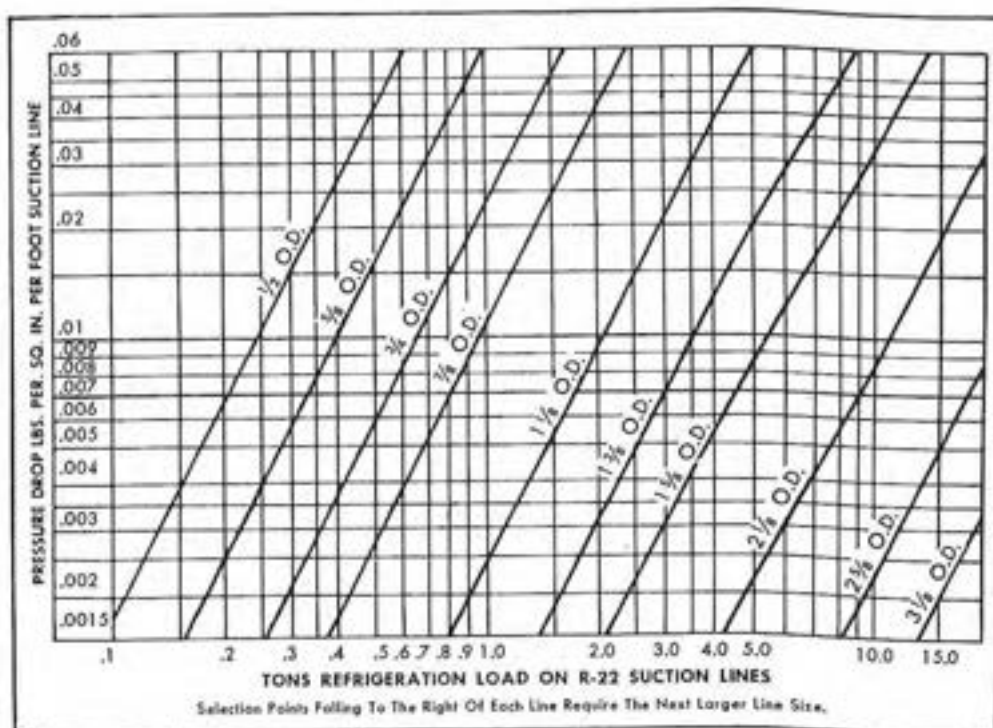
Suction Temperatures	
°F	°C
40	+ 4.4
20	- 6.7
0	-17.8
-20	-28.9
-40	-40.0

TECHNICAL DATA

R-22

Pressure Drop in Suction Lines

AT 20° SUCTION TEMPERATURE



suction line sizes for R-22

(O.D. IN INCHES)

Net Evaporator Capacity	Suction Temperature																			
	40°				20°				0°				-20°				-40°			
	Total Equivalent Length of Suction Line, Feet																			
	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150
3,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
6,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
9,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
12,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
18,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
24,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
30,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
36,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
42,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
48,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
54,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
60,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
72,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
90,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
120,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
150,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
180,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
210,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
240,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
300,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8

CONVERSION FORMULAE FOR ABOVE CHART AND TABLE

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 TONS REFRIG. LOAD X 12000 = BTU's
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 BTU X .0002931 = kW
 FEET X .3048 = metres (m)

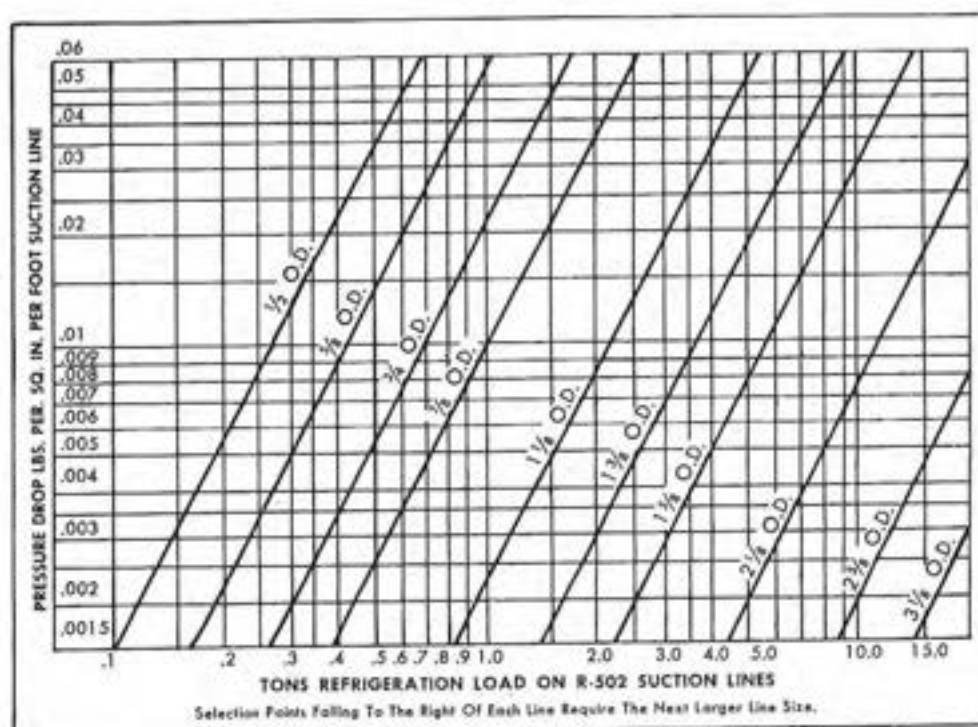
Suction Temperatures	
°F	°C
40	+ 4.4
20	- 6.7
0	-17.8
-20	-28.9
-40	-40.0

TECHNICAL DATA

R-502

Pressure Drop in Suction Lines

AT 20° SUCTION TEMPERATURE



suction line sizes for R-502

(O.D. IN INCHES)

Net Evaporator Capacity	Suction Temperature																			
	40°				20°				0°				-20°				-40°			
	Total Equivalent Length of Suction Line, Feet																			
	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150	25	50	100	150
3,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
6,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
9,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
12,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
18,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
24,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
30,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
36,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
42,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
48,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
54,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
60,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
72,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
90,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
120,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
150,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
180,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
210,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
240,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
300,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8

CONVERSION FORMULAE FOR ABOVE CHART AND TABLE

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 TONS REFRIG. LOAD X 12000 = BTU's
 BTU X .0000833 = TONS REFRIG.
 BTU X .0002931 = kW
 FEET X .3048 = metres (m)

Suction Temperatures	
°F	°C
40	+ 4.4
20	- 6.7
0	-17.8
-20	-28.9
-40	-40.0

TECHNICAL DATA

recommended 2000 - 3500 ft.

liquid line sizes

Net Evaporator Capacity	Total Equivalent Length of Liquid Line, Feet							
	REFRIGERANT—12				REFRIGERANT—22			
	25	50	100*	150	25	50	100*	150
3000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
4500	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
6500	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
8500	3/8	3/8	3/8	1/2	3/8	3/8	3/8	3/8
12,000	3/8	3/8	1/2	1/2	3/8	3/8	3/8	1/2
18,000	3/8	1/2	1/2	1/2	3/8	3/8	1/2	1/2
24,000	1/2	1/2	1/2	3/8	3/8	1/2	1/2	1/2
30,000	1/2	1/2	3/8	3/8	3/8	1/2	1/2	3/8
36,000	1/2	3/8	3/8	3/8	1/2	1/2	3/8	3/8
42,000	1/2	3/8	3/8	3/8	1/2	1/2	3/8	3/8
48,000	1/2	3/8	3/8	3/8	1/2	3/8	3/8	3/8
54,000	3/8	3/8	3/8	3/8	1/2	3/8	3/8	3/8
60,000	3/8	3/8	3/8	3/8	1/2	3/8	3/8	3/8
72,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
90,000	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
120,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	1 1/8
150,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
180,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
210,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
240,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	1 1/8	1 1/8	1 1/8
300,000	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8

*Line Sizes Indicated Are Suitable For Condenser to Receiver Applications

discharge line sizes

Net Evaporator Capacity	Total Equivalent Length of Hot Gas Line, Feet							
	R12				R22 & R502			
	25	50	100	150	25	50	100	150
3000	3/8	3/8	1/2	1/2	3/8	3/8	3/8	3/8
4500	3/8	1/2	1/2	1/2	3/8	3/8	3/8	1/2
6500	1/2	1/2	3/8	3/8	3/8	1/2	1/2	1/2
8500	1/2	1/2	3/8	3/8	3/8	1/2	1/2	1/2
12,000	1/2	3/8	3/8	3/8	1/2	1/2	3/8	3/8
18,000	3/8	3/8	3/8	3/8	1/2	3/8	3/8	3/8
24,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	3/8
30,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	3/8
36,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	3/8
42,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	1 1/8
48,000	3/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
54,000	3/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
60,000	3/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
72,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	1 1/8	1 1/8	1 1/8
90,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	1 1/8	1 1/8	1 1/8
120,000	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
150,000	1 1/8	1 1/8	1 1/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
180,000	1 1/8	1 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
210,000	1 1/8	1 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
240,000	1 1/8	1 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 1/8	2 1/8
300,000	1 1/8	2 1/8	2 1/8	2 1/8	1 1/8	1 1/8	2 1/8	2 1/8

weight of R-12 in copper lines in operation

(POUNDS PER 100 LINEAR FEET)

Net Evaporator Capacity	Total Equivalent Length of Hot Gas Line, Feet							
	R12				R22 & R502			
	25	50	100	150	25	50	100	150
3000	1/2	1/2	3/8	3/8	3/8	3/8	1/2	1/2
4500	1/2	3/8	3/8	3/8	1/2	1/2	1/2	3/8
6500	3/8	3/8	3/8	3/8	1/2	1/2	3/8	3/8
8500	3/8	3/8	3/8	3/8	1/2	3/8	3/8	3/8
12,000	3/8	3/8	3/8	1 1/8	3/8	3/8	3/8	3/8
18,000	3/8	3/8	1 1/8	1 1/8	3/8	3/8	3/8	1 1/8
24,000	3/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
30,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	3/8	1 1/8	1 1/8
36,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	1 1/8	1 1/8	1 1/8
42,000	1 1/8	1 1/8	1 1/8	1 1/8	3/8	1 1/8	1 1/8	1 1/8
48,000	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
54,000	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
60,000	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
72,000	1 1/8	1 1/8	1 1/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
90,000	1 1/8	1 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
120,000	1 1/8	2 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 1/8	2 1/8
150,000	1 1/8	2 1/8	2 1/8	2 1/8	1 1/8	1 1/8	2 1/8	2 1/8
180,000	2 1/8	2 1/8	2 1/8	2 1/8	1 1/8	1 1/8	2 1/8	2 1/8

For Suction Temperatures Less Than -20°F, The Next Larger Line Size Must Be Used.

Line Size OD Inches	Liquid Line	Hot Gas Line	Suction Line at Evaporator Temperatures				
			40	20	0	20	40
1/2	8.1	0.34	.02	.04	.06	.09	.13
3/8	12.9	0.54	.04	.06	.10	.14	.20
3/8	19.4	0.81	.06	.10	.15	.22	.31
3/8	26.9	1.13	.08	.14	.21	.30	.42
1 1/8	45.9	1.93	.15	.23	.33	.51	.72
1 1/8	69.9	2.93	.21	.35	.53	.78	1.10
1 1/8	99.0	4.15	.30	.50	.75	1.10	1.56
2 1/8	172	72.2	.55	.87	1.31	1.92	2.71
2 1/8	266	11.14	.82	1.34	2.02	2.95	4.18
3 1/8	379	15.90	1.20	1.91	2.89	4.22	5.97
3 1/8	513	21.52	1.61	2.59	3.91	5.71	8.08
4 1/8	666	27.96	2.09	3.36	5.08	7.42	10.50

NOTE:

Equivalents for R-22 and R-502.

1 Liquid line—Multiply values in table by .91 for R-22, and by .94 for R-502.

2 Hot gas and suction line—Multiply values in table by average values of 1.20 for R-22, and by 1.80 for R-502.

equivalent feet of pipe

FOR VALVES AND FITTINGS

Line Size, Inches	IPS	3/8"	1/2"	3/4"	1"	1 1/8"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"
	OD	3/8"	1/2"	3/4"	1 1/8"	1 3/8"	1 5/8"	2 1/8"	2 3/8"	3 1/8"	3 3/8"	4 1/8"	5 1/8"	6 1/8"	8 1/8"	10 1/8"	12 1/8"
Globe Valve (Open)		14	16	22	28	36	42	57	69	83	99	118	138	168	225	280	335
Angle Valve (Open)		7	9	12	15	18	21	28	34	42	49	57	70	83	117	140	165
Standard Elbow —90°		1	2	2	3	4	4	5	7	8	10	12	14	16	20	26	31
Standard Elbow —45°		1	1	1	2	2	2	2	3	4	5	6	7	8	10	13	16
Standard Tee (Thru Side Out.)		3	4	5	6	8	9	12	14	17	20	22	28	34	44	56	65

IPS—iron pipe size. OD—outside diameter of tubing.

Values shown are average values based on standard weight pipe.

NOTE:

Right angle, forged fittings give a high pressure drop and their use in suction lines should in general be discouraged.

TECHNICAL DATA

CAPILLARY TUBE LENGTH - CONVERSION CHART

"Capillary Tube Length Conversion Chart" is designed to enable users of capillary tubing to use the standard sizes which are readily available through refrigeration wholesalers.

While many original equipment manufacturers and condensing unit manufacturers recommend specific lengths and diameters of capillary tubing for their units, these tube sizes are not always readily available, except on special order.

This conversion chart enables the user to translate the recommended length into that of a tube diameter that can be quickly obtained. In using the chart, it is recommended that conversions be made using factors falling between the heavy black lines. In addition, it is highly recommended that the minimum length of capillary used be 3 feet.

To use Chart :

1. Locate "recommended capillary tube I.D." in left-hand column.
2. Read across and find conversion factor under "available capillary tube" size.
3. Multiply the given length of the recommended tube by the conversion factor of the available tube.
4. The resultant length of tube will give the same flow characteristics as the original recommended tube.

For Example: Recommended capillary tube 6 Ft. of .040" I.D.

Locate .040 in left-hand column and reading across gives the following conversion factors:—

For .036 I.D. tubing — factor 0.62 For .044 I.D. tubing — factor 1.55

Multiply the recommended cap. tube length of 6 Ft. by the conversion factors, which gives the following results:—
3'9" of .036" I.D. and 9'4" of .044 I.D. Either of these two cap. tubes will give the same results as the original cap. tubes will give the same results as the original cap. tube of 6 Ft. of .040 I.D.

Recommended TUBE I.D.	AVAILABLE TUBE I.D.													
	.028	.031	.036	.042	.044	.050	.055	.059	.064	.070	.075	.080	.085	.090
.024	1.44													
.025	1.20													
.026	1.00	2.24												
.028	.72	1.59												
.030	.52	1.16												
.031	.45	1.00	2.00											
.032		.86	1.75											
.033		.75	1.54											
.034		.65	1.35											
.035		.58	1.16	2.31										
.036		.50	1.00	2.10										
.037		.45	.90	1.79	2.22									
.038		.39	.80	1.59	1.92									
.039		.35	.71	1.41	1.75									
.040		.31	.62	1.25	1.55									
.041		.28	.56	1.12	1.38	2.50								
.042		.25	.50	1.00	1.24	2.23								
.043		.23	.45	.87	1.11	1.98								
.044		.20	.39	.81	1.00	1.79								
.045			.35	.73	.90	1.60								
.046			.32	.67	.82	1.47	2.27							
.047				.59	.74	1.31	2.06							
.048				.54	.67	1.20	1.87							
.049				.49	.61	1.09	1.69							
.050				.45	.56	1.00	1.56	2.14						
.051				.41	.51	.93	1.44	1.96						
.052					.47	.85	1.32	1.78						
.053					.43	.78	1.20	1.64						
.054					.39	.70	1.09	1.52	2.18					
.055					.36	.64	1.00	1.38	2.00					
.056						.60	.94	1.27	1.85					
.057						.55	.87	1.17	1.72					
.058						.51	.80	1.07	1.56					
.059						.47	.73	1.00	1.44	2.18				
.060						.43	.67	.93	1.33	2.04				
.064						.32	.50	.69	1.00	1.50	2.07			
.070							.33	.46	.67	1.00	1.37	1.84		
.075									.48	.73	1.00	1.37	1.75	
.080										.54	.74	1.00	1.32	1.71
.085											.57	.76	1.00	1.29
.090												.43	.62	1.00
.095													.46	.60
.100														.48
.105														.49

AIR SUPPLY 100 PSIG — FLOW CUBIC FT. PER MIN.

Capillary Tube I.D.	CAPILLARY TUBE LENGTH				
	8 ft.	10 ft.	12 ft.	14 ft.	16 ft.
.026	.140	.125	.110	.100	.090
.031	.230	.205	.182	.170	.157
.036	.350	.310	.280	.257	.240

AIR SUPPLY 50 PSIG — FLOW CUBIC FT. PER MIN.

Capillary Tube I.D.	CAPILLARY TUBE LENGTH				
	8 ft.	10 ft.	12 ft.	14 ft.	16 ft.
.042	.260	.230	.210	.190	.177
.049	.370	.350	.315	.290	.270
.054	—	—	.412	.380	.355

APPROXIMATE PRESSURE CONTROL SETTINGS FOR VARIOUS TYPES OF APPLICATIONS WHEN USING SO₂, METHYL CHLORIDE, OR R12 REFRIGERANTS

TYPE OF EQUIPMENT	SO ₂				METHYL CHLORIDE				R12			
	CUT-IN		CUT-OUT		CUT-IN		CUT-OUT		CUT-IN		CUT-OUT	
	PSI	kPa	"Hg/PSI	kPa	PSI	kPa	PSI	kPa	PSI	kPa	PSI	kPa
Ice Cream Cabinet	0	0	14"	-47	11	76	3/4	3.5	16 1/2	114	4 1/2	31
Ice Cream and Combination Cabinet (Thermo-Syphon Type)	1	7	14"	-47	11 1/2	76	3/4	3.5	17 1/2	121	4 1/2	31
Domestic or Household Cabinet with flooded Evaporator	5	35	8"	-27	18	124	3 1/2	24	25	172	9	62
Commercial Food Storage Cabinet with flooded Evaporator of Ice Making Type	5	35	10"	-34	18	124	2 1/2	17	25	172	8	55
Ditto with Cross Fin Evaporator (Non-Ice Making Type)	10	69	8"	-27	24	165	3 1/2	24	32	221	9	62
Bottle Cabinet (Beer) with Cross Fin Evaporator	12	83	6"	-20	28	193	6	41	37	255	12	83
Butcher's Cold Room with Cross Fin Evaporator	10	69	8"	-27	24	165	3 1/2	24	32	221	9	62
Butcher's Cold Room with forced Draught Cooler	10	69	2"	-7	24	165	8	55	32	221	14	97
Multiple Installations in Flats. (Evaporators flooded Ice Making Type)	4	28	10"	-34	17	117	2 1/2	17	29	200	8	55
Beer Coolers (Beer Coils Submerged in Sweet Water bath with flooded or Dry Evaporators)	15	103	5	-35	32	221	18	124	41	283	25	172
Milk Cooler (Brine Tank in cold room, with circulating system and Aerator flooded or dry system Evaporators)	8	55	0	0	22	152	11	76	30	207	17	117
Instantaneous Beer Cooler	22	152	12	83	42	290	28	193	52	369	37	255

It should be clearly noted that the above approximate settings are for installations which are correctly balanced, i.e. where evaporator coil and condensing unit both have capacity equalling but not exceeding total load, and where balanced conditions do not exist some alteration in pressure control settings may be necessary.

For instance if evaporator does not have capacity equal to load, pressure control settings may have to be lowered. If condensing unit capacity is less than cabinet load, setting may have to be raised.

In the case of multiple installations of cabinets held at different temperatures, and temperature of one cabinet maintained by means of a suction line pressure reducing valve, pressure control maintaining temperature of lowest cabinet and controlling operation of unit may have to be widened to prevent short cycling.

An example would be a multiple installation of an Ice Cream cabinet and Food Storage cabinet; the Food Storage cabinet refrigerated with an ice making coil : For such an installation pressure control setting on an SO₂ machine would probably be about 2 to 3 psi (14 to 21 kPa) Cut-in and 14" vac. (-47kPa) Cut-out.

APPROXIMATE PRESSURE CONTROL SETTINGS - U.S.A. Data

Vacuum — <i>Italic Figures</i>		Gage Pressure—Light Figures						Vacuum — <i>Italic Figures</i>		Gage Pressure—Light Figures					
APPLICATION		REFRIGERANT						APPLICATION		REFRIGERANT					
		12		22		717				12		22		717	
		Out	In	Out	In	Out	In			Out	In	Out	In	Out	In
Ice Cube Maker—Dry Type Coil		4	17	16	37	—	—	Beverage Cooler, Blower Dry Type		15	34	34	64	24	55
Sweet Water Bath—Soda Fountain		21	29	43	56	33	45	Retail Florist—Blower Coil		28	42	55	77	44	67
Beer, Water, Milk Cooler, Wet Type		19	29	40	56	—	—	Meat Display Case, Defrost Cycle		17	35	37	66	—	—
Ice Cream Trucks, Hardening Rooms		2	15	13	34	5	24	Meat Display Case—Open Type—Time Clock		11	27	27	53	—	—
Eutectic Plates, Ice Cream Truck		1	4	11	16	4	8	Dairy Case—Open Type		10	35	26	66	—	—
Walk In, Defrost Cycle		14	34	32	64	23	55	Frozen Food—Open Type		7	5	4	17	—	—
Reach In, Defrost Cycle		19	36	40	68	30	57	Frozen Food—Open Type—Thermostat		2" f.	10" f.	—	—	—	—
Vegetable Display, Defrost Cycle		13	35	30	66	—	—	Frozen Food—Closed Type		1	8	11	22	—	—
Vegetable Display Case—Open Type		16	42	35	77	—	—								

COOLROOM DESIGN DATA

BALANCING THE SYSTEM

The application of air cooling lowside in refrigeration work is basically an air conditioning problem. It so happens that the refrigeration industry has certain standards which make the adaptation fairly easy, as compared to the adaptation of a coil to air conditioning work.

In the proper application of a coil, it is most important to make sure that there is a balance between the condensing unit and the lowside. The temperature difference between the air to be passed over the coil and the refrigerant temperature in the coil is the point which determines the conditions which will be maintained in a given cooler.

For the general purpose refrigerator, involving meats, vegetables and dairy products, it is common procedure to balance the lowside to the condensing unit at a 15°F (8.3°C) temperature difference; that is, they are balanced to maintain a temperature difference between the refrigerant in the coil and the air temperature of 15°F (8.3°C). It has been learned by experience that, if this is done, one may expect to maintain in a cooler 80%–85% relative humidity, which is a good range.

A coil which is selected for a wide temperature difference will therefore maintain a lower relative humidity in service, whereas one which is selected for too close a temperature

difference will produce relative humidities which are higher than required for practical operation and surface sliming may result on stored meat products during winter periods when loads are reduced. It has been determined over years of practice that coils should be selected to balance between 12° and 15°F (6.7° and 8.3°C) temperature difference for general purpose refrigerated storage coolers.

On straight vegetable coolers where higher humidities are desired, the coil should be selected to balance the compressor at a 10°F (5.6°C) temperature difference, as such will produce an average relative humidity of 90% within the refrigerated space. The same recommendation applies to florists' display boxes, and in both cases, the maintenance of a high relative humidity in long term storage is beneficial whereas some exception with reference to meat products is noted above.

On low temperature units, if one stops to consider that the amount of dehumidification is in proportion to the temperature difference, it is obvious that the closer the temperature difference, the less frost accumulation. We strongly recommend that coils for low temperature work be selected to balance the condensing unit at a 10°F (5.6°C) temperature difference or less.

PROPER SIZING OF EXPANSION VALVES

The selection and installation of thermal expansion valves is of utmost importance for best coil performance. Valve capacity must be at least equal to the coil load rating and never more than twice that value. Any valve which is substantially oversized will tend to be erratic in operation and this will penalize both coil performance and rated capacity output. Liquid line strainers should always be installed ahead of all thermal expansion valves.

Thermal valves are normally rated with R-12 refrigerant at 40°F (4.4°C) evaporator temperature, 10°F (5.6°C) superheat, and 60psi (414kPa) differential (pressure at valve inlet minus pressure at valve outlet). For capacities at other differentials, or when used with other refrigerants such as R-22 and R-502, the valve manufacturer's ratings must be consulted and closely followed in reference to Capacity Correction Factors.

Although it is frequently assumed that when thermal expansion valves are used in low temperature applications,

some increased capacity results due to a higher pressure differential, this is not always true because of variations in valve design. It is always advisable under wide range conditions to secure the valve manufacturer's recommendations.

As a further precautionary note, the power element charges of all thermal expansion valves must be properly selected for operating temperature ranges and the type of refrigerant used in the system.

Thermo valves should be located as close as possible to evaporator inlet and bulbs attached or inserted at a point where refrigerant will not trap in the suction line. Keep bulbs away from tees in common suction lines so that one valve will not affect any other valve.

Externally equalized valves should be used on all multi-circuited evaporators. In general internally equalized valves are applied with single circuited coils except when excessive pressure drops are encountered.

PRODUCT LOAD

Products placed in a refrigerated room at a temperature higher than the storage temperature will lose heat until it reaches the storage temperature. The product load will be affected by one or more of the following factors: (1) Specific Heat (2) Latent Heat of Fusion and (3) Heat of Respiration.

specific heat is the amount of heat removal required to lower 1 lb. of product 1°F. It has two values, one above freezing, the other below freezing due to the change in state which occurs. The specific heat of various products are given on next page.

latent heat of fusion is the amount of heat removal required to freeze 1 lb. of product. It should be noted that the latent heat has a definite relationship to the water content of a product. Most food products have a freezing temperature in the range of 26°F (–3.3°C) to 31°F (–.6°C). If the exact

freezing temperature is unknown, it may be assumed to be 28°F (–2.2°C). Freezing temperatures and latent heats of fusion for various products are given on next page.

heat of respiration is the amount of heat given off by products such as fresh fruits and vegetables during storage. Since the products are alive, they continually undergo a change in which energy is released in the form of heat. The amount of heat liberated varies with the type and temperature of the product. Heat or respiration rates for various products are given on next page.

Miscellaneous All electrical energy dissipated by lights, motors, heaters, and etc., located in the refrigerated area must be included in the heat load. Each watt is equal to 3.42 BTU per hr. An item oftentimes overlooked is the fan motor on a unit cooler. Heat equivalents of electric motors vary as to size of motor.

COOLROOM DESIGN DATA

Product Storage Data

Product	Quick Freeze Temp.	Storage Temp.		Humidity % R.H.	Specific Heat		Latent Heat	Freezing Point	Respiration BTU/lb. Per Day
		Long	Short		Above Freezing	Below Freezing			
Apples	-15	30-32	38-42	85-88	0.86	0.45	121	28.4	0.72
Asparagus	-30	32	40	85-90	0.94	0.48	134.0	29.8	5.75
Bacon, Fresh		0-5	36-40	80	0.50	0.30	29	25.0	....
Bananas		56-72	56-72	85-95	0.80	0.42	108.0	28.0	4.18
Beans, Green		32-34	40-45	85-90	0.91	0.47	128	29.7	3.37
Beans, Dried		36-40	50-60	70	0.30	0.24	18	28	....
Beef, Fresh, Fat	-15	30-32	38-42	84	0.60	0.35	79	28	....
Beef, Fresh Lean	-15	30-32	38-42	85	0.77	0.40	100	29	....
Beets		32-35	45-50	95-98	0.86	0.47	129	31.1	0.91
Blackberries	-15	31-32	42-45	80-85	0.88	0.46	122	28.9	....
Broccoli		32-35	40-45	90-95	0.92	0.47	130	29.2	....
Butter	+15	....	40-45	....	0.64	0.34	15	30.0	....
Cabbage	-30	32	45	90-95	0.94	0.47	132	31.2	....
Carrots	-30	32	40-45	95-98	0.86	0.45	126	29.6	1.73
Cauliflower		32	40-45	85-90	0.93	0.47	132	30.1	....
Celery	-30	31-32	45-50	90-95	0.95	0.48	135	29.7	2.27
Cheese, American	+15	32-38	39-45	....	0.64	0.36	79	17.0	2.34
Cherries		31-32	40	80-85	0.87	0.45	120	26.0	1.32
Chocolate Coatings		45-50	....	....	0.3	0.55	40	95-85	....
Corn, Green		31-32	45	85-90	0.80	0.43	108	28.9	4.1
Cranberries		36-40	40-45	85-90	0.90	0.46	124	27.3	....
Cream (40%)		34	40-45	....	0.85	0.40	90	28.0	....
Cucumbers		45-50	45-50	80-85	0.97	0.49	137	30.5	....
Dates, Dry Cured		28	55-60	50-60	0.36	0.26	29	4.1	....
Eggs, Fresh	-10	30-31	38-45	....	0.76	0.40	100	27.0	....
Eggplants		45-50	46-50	85-90	0.94	0.47	132	30.4	....
Flowers		35-40	....	85-90	....	....	....	32.0	....
Fish, Fresh, Iced	-15	25	25-30	....	0.76	0.41	101	30.0	....
Fish Dried		30-40	....	60-70	0.56	0.34	65	....	....
Furs		32-34	40-42	40-60	....	0.4	....	....	....
Furs, To Shock		15	15	....	....	....	....	....	....
Grapefruit		32	45-50	85-90	0.91	0.46	126	28.4	0.54
Grapes		30-32	35-40	80-85	0.88	0.44	116	26.3	0.42
Ham, Fresh		28	36-40	80	0.68	0.38	86.7	27.0	....
Honey		31-32	45-50	....	0.35	0.26	26	....	0.71
Ice Cream	-20	....	0-10	....	0.78	0.45	96	27.0	....
Lard		32-34	40-45	80	0.52	0.31	90	....	....
Lamb		32-34	34-42	82	0.67	0.30	83.5	29.0	....
Lemons		32	55-58	80-85	0.92	0.46	127	28.1	0.41
Lettuce		32	45	90-95	0.96	0.48	136	31.2	3.69
Liver, Fresh		32-34	36-38	83	0.72	0.40	93.3	29.0	....
Lobster, Boiled		25	36-40	....	0.81	0.42	105	....	....
Meat, Brined		31-32	40-45	....	0.75	0.36	75.0	....	....
Melons		34-40	40-45	75-85	0.94	0.48	132	29.0	1.74
Milk		34-36	40-45	....	0.93	0.49	124	31.0	....
Mushrooms		32-35	55-60	80-85	0.93	0.47	130	30.2	4.0
Nut Meats		32-50	35-40	65-75	0.29	0.24	14	20.0	0.5
Oleomargarine		34-36	....	....	0.48	0.34	35	15.0	....
Onions		32	50-60	70-75	0.91	0.46	124	30.1	0.5
Oranges		32-34	50	85-90	0.90	0.46	124	28.0	0.7
Oysters, Shell		....	32-35	....	0.83	0.44	116	27.0	....
Parinips	-30	32-34	34-40	90-95	0.84	0.46	112	28.9	....
Peaches, Fresh		31-32	50	85-90	0.90	0.46	124	29.4	0.87
Pears, Fresh		29-31	40	85-90	0.86	0.45	118	28.5	0.60
Peas, Green		32	40-45	85-90	0.79	0.42	106	30.0	....
Peppers		32	40-45	85-90	0.94	0.47	....	30.1	0.76
Pineapples, Ripe		40-45	50	85-90	0.88	0.45	122	29.4	....
Plums		31-32	40-45	80-85	0.88	0.45	123	28.0	....
Pork, Fresh		30	36-40	85	0.68	0.38	86.5	28.0	....
Potatoes, White	-30	36-50	45-60	85-90	0.87	0.43	111	28.9	0.72
Poultry, Dressed	-10	28-30	29-32	....	0.79	0.37	106	27	....
Pumpkins		50-55	55-60	70-75	0.92	0.47	130	30.1	....
Quinces		31-32	40-45	80-85	0.88	0.45	122	28.1	....
Raspberries		31-32	40-45	80-85	0.85	0.45	122	30.1	2.75
Sausage, Fresh		31-36	36-40	80	0.89	0.56	93	26	....
Sauerkraut		33-36	36-38	85	0.92	0.47	129	26	....
Squash		50-55	55-60	70-75	0.92	0.47	130	30.1	....
Spinach		32	45-50	85	0.94	0.48	132	30.3	....
Strawberries	15	31-32	42-45	80-85	0.92	0.47	129	29.9	3.3
Tomatoes, ripe		40-50	55-70	85-90	0.95	0.48	134	30.4	0.63
Turnips		32	40-45	95-98	0.93	0.40	137	30.5	0.29
Veal	-15	28-30	36-40	....	0.71	0.39	91	29	....
Vegetables, Mixed		32	40-45	90-95	0.90	0.45	130	30	2.0

TECHNICAL DATA

WIND CHILL INDEX (CHILL FACTOR)

During the winter months, the chill index temperature, or "chill factor", combines temperature and wind speed. The chill factor is calculated and released by the United States Weather Bureau through the usual weather forecasting channels. The chill factor is based on both temperature and wind speed. For example, at a temperature of -18°C (0°F) and a wind speed of 16 KPH (10 MPH), the

chill index is -30°C (-22°F). Human flesh exposed to the atmosphere freezes at about -32°C (-25°F).

The Table below shows the chill factor in degrees corresponding to the wind speed. Note that, at a temperature of -18°C (0°F), with a wind speed of 64 KPH (40 MPH), the chill factor mounts to -48°C (-54°F). This temperature will quickly freeze exposed flesh.

WIND CHILL INDEX

	AMBIENT TEMPERATURE															
	$^{\circ}\text{C}$ $^{\circ}\text{F}$	4 40	2 35	-1 30	-4 25	-7 20	-9 15	-12 10	-15 5	-18 0	-21 -5	-23 -10	-26 -15	-29 -20	-32 -25	-34 -30
Wind Velocity KPH MPH	EQUIVALENT TEMPERATURE IN STILL AIR															
Calm (0)	$^{\circ}\text{C}$ $^{\circ}\text{F}$	4 40	2 35	-1 30	-4 25	-7 20	-9 15	-12 10	-15 5	-18 0	-21 -5	-23 -10	-26 -15	-29 -20	-32 -25	-34 -30
8 5	$^{\circ}\text{C}$ $^{\circ}\text{F}$	3 37	1 33	-3 27	-6 21	-9 16	-12 12	-14 7	-17 1	-21 -6	-24 -11	-26 -15	-29 -20	-32 -26	-35 -31	-37 -35
16 10	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-2 28	-6 21	-9 16	-13 9	-17 2	-19 -2	-23 -9	-26 -15	-30 -22	-33 -27	-35 -31	-39 -38	-43 -45	-47 -52	-50 -58
24 15	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-6 22	-9 16	-11 11	-17 1	-21 -6	-24 -11	-28 -18	-32 -25	-36 -33	-40 -40	-43 -45	-46 -51	-51 -60	-54 -65	-57 -70
32 20	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-8 18	-11 12	-16 3	-20 -4	-23 -9	-27 -17	-31 -24	-36 -32	-40 -40	-43 -46	-47 -52	-51 -60	-56 -68	-60 -76	-63 -81
40 25	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-9 16	-14 7	-18 0	-22 -7	-26 -15	-30 -22	-34 -29	-38 -37	-43 -45	-47 -52	-50 -58	-55 -67	-59 -75	-64 -83	-67 -89
48 30	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-16 13	-15 5	-19 -2	-24 -11	-28 -18	-32 -26	-36 -33	-41 -41	-45 -49	-49 -56	-53 -63	-57 -70	-61 -78	-66 -87	-70 -94
56 35	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-11 11	-16 3	-20 -4	-25 -13	-29 -20	-33 -27	-37 -35	-42 -43	-47 -52	-51 -60	-55 -67	-58 -72	-64 -83	-68 -90	-72 -98
64 40	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-12 10	-17 1	-21 -6	-26 -15	-30 -22	-34 -29	-38 -36	-43 -45	-48 -54	-52 -62	-56 -69	-60 -76	-66 -87	-70 -94	-74 -101

Wind chill index reveals that increasing the wind velocity greatly increases the chill effect. With a temperature of -18°C (0°F) and a wind velocity of 32 kph (20 mph), the effect on the human body is the same as it would be if the person were in a temperature of -40°C (-40°F).

FREEZING POINT OF COMMON EUTECTIC SOLUTIONS

FREEZING POINT		CALCIUM CHLORIDE		SODIUM CHLORIDE		ALCOHOL (METHYLATED SPIRIT)		ETHYLENE GLYCOL		GLYCERINE	
$^{\circ}\text{F}$	$^{\circ}\text{C}$	Lbs. Flake Calcium per gallon (Imp.) of Brine	Specific Gravity	Lbs. Sodium Chloride per gallon (Imp.) of Brine	Specific Gravity	% Alcohol	% Water	% Ethylene Glycol	% Water	% Glycerine	% Water
24	-4.4	1.30 lbs.	1.070	.766 lbs.	1.050	13%	87%	13%	87%	19%	81%
20	-6.7	1.77 "	1.095	1.118 "	1.072	18%	82%	17%	83%	24.7%	75.3%
15	-9.4	2.13 "	1.123	1.485 "	1.095	23.3%	76.7%	21.6%	78.9%	30.0%	70.0%
10	-12.2	2.50 "	1.149	1.866 "	1.118	27.3%	72.7%	25.5%	74.5%	35.0%	65.0%
5	-15.0	2.75 "	1.165	2.187 "	1.138	31.0%	69.0%	29.2%	70.8%	39.4%	60.6%
0	-17.8	3.12 "	1.181	2.535 "	1.157	34.6%	65.4%	32.7%	67.3%	43.9%	56.1%
-5	-20.6	3.37 "	1.194	2.787 "	1.172	37.7%	62.3%	35.6%	64.4%	48.0%	52.0%
-10	-23.3	3.60 "	1.208			40.8%	59.2%	38.6%	61.4%	51.5%	48.5%
-15	-26.1	3.83 "	1.220			43.5%	56.5%	41.5%	58.5%	55.2%	44.8%
-20	-28.9	4.00 "	1.230			46.4%	53.6%	44.1%	55.9%	59.0%	41.0%
-25	-31.7	4.28 "	1.242			49.0%	51.0%	46.6%	53.4%	60.9%	39.1%

TIME OF FREEZING ICE WITH -10°C (14°F) BRINE

Weight of Blocks	Size of Can	Time of Freezing
50 lbs. (22.7 kg)	6" x 12" x 26"	15 hrs.
100 " (45.4 ")	8" x 16" x 32"	30 "
150 " (68.0 ")	8" x 16" x 42"	30 "
200 " (90.7 ")	11" x 22" x 32"	50 "
300 " (13.6 ")	11" x 22" x 44"	50 "
400 " (181.4 ")	11" x 22" x 57"	50 "

TECHNICAL DATA

QUICK WAY TO ESTIMATE LENGTH OF MATERIAL IN ANY ROLL



Users of material that comes in rolls are often faced with the problem of estimating how much material remains in a partly used roll or if the original roll contains the full claimed length.

There are numerous formulas for computing lengths in rolls, but most of them are more or less complicated.

Here is a simple solution:

1. Make one measurement "B" (as shown in the diagram).
2. Count the number of turns.
3. Multiply these two together.
4. Then multiply this result by 0.2618.

The result is the length of the roll in feet.

For example, if the diameter "D" is 12 inches, and the number of turns is 15, the roll contains: $12 \times 15 \times 0.2618 = 37.4$ feet.

This holds true regardless of whether the material is paper, copper tube, leather, or anything else. The thickness of the material does not make any difference. Even if the roll is so tightly wound that there is no visible hole through it, the rule still holds true. The same applies if it is loosely wound.

AIR MIXTURES

1. FOR DRY BULB TEMPERATURES

Problem: What is the final temperature when 9875 liters of air at 40°C is mixed with 4200 liters of air at 3°C.

Answer: Multiply (liters) x its temperature in each case — Add these totals and divide by total volume.

$$= (9875 \times 40) + (4200 \times 3) = (395000 + 12600) = 407600$$

$$\text{Alternatively } \frac{9875 \times 40}{9875 + 4200} + \frac{4200 \times 3}{9875 + 4200} = 36.3^\circ\text{C}$$

2. FOR DRY BULB AND WET BULB TEMPERATURES

Plot both points on a psychrometric chart — Draw line between them.

Calculate DRY BULB TEMPERATURE as per 1, above.

Project the resulting Dry Bulb Temperature on the psychrometric chart until it intersects the previously drawn line.

The intersection point gives you the Mixture Wet Bulb Temperature.

SELECTING THE RIGHT HACKSAW BLADE FOR THE JOB



Blades are made with a varying number of teeth per inch, ranging from 14 to 32. Selection of the blade should be based upon material to be cut. Blades with 18 teeth per inch are the best for general use, but there is no such thing as an "all-purpose" blade.

USE 14 TEETH PER INCH

WOOD

PIPE

PIPE

PIPE

PIPE

PIPE

USE 24 TEETH PER INCH

COPPER

BRASS

STEEL

STEEL

STEEL

STEEL

USE 18 TEETH PER INCH

PIPE

PIPE

PIPE

PIPE

PIPE

PIPE

USE 32 TEETH PER INCH

THIN SHEET METAL

THIN SHEET METAL

THIN SHEET METAL

THIN SHEET METAL

THIN SHEET METAL

THIN SHEET METAL

WHAT YOU NEED FOR SERVICING

BASIC TOOLS AND SUPPLIES FOR SERVICING SMALL HERMETIC SYSTEMS

WRENCHES

- Torque handle 3/8" drive.
- Speed handle 3/8" drive.
- Swivel handle 3/8" drive.
- T-handle 3/8" drive for sockets.
- 8" adjustable open end wrench.
- Set of Allen setscrew wrenches.
- Refrigeration ratchet wrench, 3/16", 7/32" and 1/4" with square openings.
- 1/2", 3/4", 7/8" & 1" 15 deg. open-end wrenches.
- 1/2" box wrench.
- 1/2" T-socket wrench.
- Set sockets, 12 point, 7/16" to 1" with 3/8" drive.

PLIERS

- 6" combination.
- Wire cutters.
- Slit nose.

HAMMERS

TUBING TOOLS

- Bending springs for 1/4", 3/8" and 1/2" OD tubing.
- Flaring tool to 1/2" capacity.
- Tube cutter.
- Pinch-off tool.
- Swaging tool.

SCREWDRIVERS

- 3" regular, insulated handle.
- 6" regular, insulated handle.
- 8" regular, insulated handle.
- 3" Phillips, insulated handle.
- 6" Phillips, insulated handle.
- 8" Phillips, insulated handle.

REFRIGERANT TOOLS

- High vacuum pump.
- Service cylinder for R12.
- Service cylinder for R22.
- Service cylinder for R502.
- 1 purging line 1/4" dia. x 4.6 m (15 ft.) equipped with hand shut-off needle valve and check valve.
- Capillary tube cleaner.
- Capillary tube sizing kit.
- Soldering-brazing torch, either LP fuel-air, acetylene-air or oxyacetylene.
- Gauge manifold.
- Process tube adaptors.
- Bending springs.
- Charging hoses (3).

INSTRUMENTS

Many special testing instruments are needed for refrigeration service work. Some of the basic instruments are listed below:

BASIC INSTRUMENTS

- Pressure recorder.
- Temperature recorder.
- Off-on recorder.
- Watt recorder.
- Electronic leak detector.
- Compound gauge (kPa or dual scale).
- Pressure gauge (kPa or dual scale).
- Thermometer —30°C to 100°C.
- Voltmeter.
- Ammeter.
- Ohmmeter.

how to determine superheat

1. Determine suction pressure with accurate gauge at evaporator outlet. On close coupled installations, suction pressure may be read at compressor suction connection.
2. From pressure-temperature tables, determine saturation temperature at observed suction pressure.
3. Measure temperature of suction gas at thermo valve remote bulb location.
4. Subtract saturation temperature read from tables in step No. 2 from temperature measured in step No. 3. Difference is superheat of suction gas.

EXAMPLE

Refrigerant 12

Temperature

here is 45°F

less 37°F

8°F

Superheat



A. Suction Pressure @ Compressor

B. Estimated Suction Line Loss

C. Suction Pressure @ Bulb

REFRIGERATION
COMPONENTS
GROUP



YOU CAN GET ALL THE ABOVE ITEMS AT YOUR NEAREST ACTROL PARTS WAREHOUSE. WE BELIEVE OUR STOCK IS ONE OF THE LARGEST & MOST COMPREHENSIVE IN THE ENTIRE INDUSTRY. THE ODDS OF FINDING WHAT YOU WANT, WHEN AND WHERE YOU WANT IT, HAVE TO BE BETTER AT ACTROL THAN ANYWHERE ELSE. IF TIME IS MONEY, WHY WASTE IT BY LOOKING ELSEWHERE.

GENERAL PLASTICS DATA

PLASTICS PRIMER

In the rapidly expanding technology of plastics, it is important that the characteristics and properties of these materials be fully understood so that they can be utilised to their fullest extent and to avoid at the same time the consequences of misapplication and failure. WHAT ARE PLASTICS? What are these materials which have found their way into our homes, offices and factories?

A definition is difficult in a few words as there are a wide variety of materials which go to make up plastics.

One definition is that plastics are essentially organic materials and which at some stage of their manufacture are capable of flowing by the application of heat and pressure. Organic materials are those chemicals which contain a high percentage of carbon in their structure.

Almost all chemicals used in the manufacture of plastics are produced synthetically, and the largest proportion are produced in association with the petroleum industry.

The basic chemicals used to form the various plastics are known as "monomers". These monomer units are made to link together into long chains by special processes resulting in materials called "polymers". The process of producing these polymers is known as polymerisation and generally results in the formation of a solid material.

Broadly, all plastics can be subdivided into two main categories, namely —

- (1) Thermo-plastic materials.
- (2) Thermo-setting materials.

Thermo-plastics are described as plastics which achieve a more plastic or softer condition under the application of heat and as the temperature is reduced, the material cools and returns to its original state. They can be softened (heated) and hardened (cooled) repeatedly with no appreciable change in physical properties — e.g., Celluloid (cellulose nitrate), Cellulose acetate, Perspex (polymethyl methacrylate), Polyethylene, Polypropylene, Polystyrene, Polyvinyl Chloride (PVC) and Nylon.

Thermo-setting plastics are those materials which soften and become plastic upon heating, but which harden or solidify when the heating is continued. After solidifying, no further heating will cause them to soften again. If the heating becomes excessive, however, they undergo chemical decomposition and degradation — e.g. Bakelite (phenol-formaldehyde), Urea-formaldehyde, Melamine formaldehyde, Polyester resins and Epoxy resins.

This points out a basic difference in manufacturing techniques. Thermo-plastics can be fabricated merely by subjecting the material to heat and forming it whilst still in a softened state to a desired shape. Thermo-setting plastics, however, require a mould of some type into or on which the plastic is introduced and a complete part is produced after the plastic has been cured to give a final set.

Plastics were at one time mainly worked in the form of powders by processes of injection or compression moulding, but today they are being widely applied in the form of sheets, rods and tubes, as well as in the form of laminates in which they are reinforced with fibrous materials or combined with sheets of metal, wood, paper or fabric. Just as the properties of metals are predictable, so are the properties of plastics. They are synthetic but are not substitutes. They stand on their own merit and only take the place of other materials because of specific advantages.

GENERAL PROPERTIES
PVC

Unplasticised, rigid polyvinyl chloride (PVC) is now firmly established as the most satisfactory plastic material for use in constructing exhaust systems to handle the corrosive fumes and gases normal to many industrial plants and processes. Ductwork, piping, hoods and fans are all constructed with PVC.

There are several reasons why this material is used for such purposes. PVC is one of the oldest and better known formulations in the plastic field. There is a great deal of experience with its use, generally its corrosion resistance is very good and physically its structural characteristics are adequate for most situations. Temperature resistance is rather limited, but no more so than others in the vinyl group — except for some of the more recent developments, however the cost of PVC compared with other vinyls is generally resolved in favour of PVC.

CORROSION RESISTANCE

Polyvinyl-Chloride is resistant to chemical attack by an extremely wide range of corrosive agents which destroy other construction materials. It is important to keep in mind, however, that no plastic will necessarily provide protection across the entire range of a corrosion problem. Consequently care must be exercised in the selection of a plastic to withstand a certain environment.

In general PVC's resistance to acids is excellent, extending even to strong oxidising acids, in high concentrations. Resistance to attack by alkalis and alkaline salts is very good. Although certain organic compounds such as acetone, aromatic hydrocarbons, chlorinated compounds, ethers, esters and ketones exhibit a solvent or swelling effect (absorption and subsequent swelling is a characteristic of thermoplastic corrosion), there are many others in regular use for which PVC is completely satisfactory. These include vegetable and animal oils, aliphatic hydro-carbons and most alcohols.

FABRICATION

Rigid polyvinyl chloride can be machined, sawn, cut, drilled, punched and also formed and bent like most metals. Joining to itself is possible by hot air (fusion) welding, solvent welding (cementing), and by use of PVC nuts and bolts.

Rigid PVC which is completely rigid at room temperature changes at about 175°F (80°C) from rigid to a rubbery, highly elastic state. From this point up to about 270°F (130°C) it is possible to form various semi-finished sections and to maintain the obtained form by cooling below the softening point at 175°F (80°C).

The hot air welding process is probably the most important joining method for rigid PVC. It is similar to the oxy-acetylene welding process, except that it is flameless and a hot air stream constitutes the source of heat. The welding process takes place on the surface of the base material and the welding filler rod. The filler rod is fused on to the joint to be welded by the heat from the welding gun and moderate pressure exerted by the operator's hand.

POLYETHYLENE

Polyethylene (also called Polythene) is used in the ventilation industry for such applications as tanks, tank covers, tank linings, ducts, fume hoods, etc. It replaces PVC in some cases for exhaust hoods and ducts, when the temperature is too high for PVC.

Polyethylene is available in two main types —

1. Conventional or low density Polyethylene — also referred to as Branch or Regular Polyethylene. The material is made by high temperatures and high pressures.
2. High density or Linear Polyethylene which is made by a different process, which involves lower temperatures and pressures than Conventional Polyethylene.

Linear Polyethylene is mostly used in the ventilation industry, and is characterised by such properties as — high gloss, rigidity up to 240°F (120°C), higher impact strength than PVC, outstanding resistance to attack and permeation by moisture vapour, gases, chemicals and oils, and toughness over a wide temperature range.

CORROSION RESISTANCE

The material is inert to most gases and chemicals, and is very resistant to strong acids, especially hydrofluoric acid, nitric acid and hydrochloric acid. It is not affected by strong alkalis.

FABRICATION

Polyethylene can be worked with common wood work or machine tools if the usual precautions taken with any thermoplastic are observed.

It may be welded with hot nitrogen gas or hot air. Polyethylene requires a welding temperature of approximately 400°F (204°C) compared with approximately 230°F (110°C) for PVC.

No practical solvent welding technique is possible with Polyethylene

PRECAUTIONS

Polyethylene has been found to be unsuitable for outdoor exposure unless it is pigmented with carbon black as a ultra-violet screener. The unpigmented material degrades as a result of exposure to the combination of weathering conditions, but unpigmented material may be used inside plants where there is no high intensity of ultra-violet light.

Polyethylene's most noticeable defect is a tendency towards stress cracking with age in certain environments.

POLYPROPYLENE

Polypropylene is made in a somewhat similar manner to High Density Polyethylene but using a propylene monomer. In relation to PVC and PE, the different molecular structure of Polypropylene produces an even greater hardness and rigidity together with a much higher working range temperature characteristic. Polypropylene's main advantage in the corrosive fume extraction field, apart from its excellent chemical resistant quality is its ability to withstand higher temperatures than either PVC or PE.

CORROSION RESISTANCE

The material has very high resistance to chemicals such as acids, alkalis, solvents and highly oxidizing materials.

FABRICATION

Polypropylene is exceptionally workable. It can be hot air welded, machined, swaged, bent, flanged and pressed under heat. No practical solvent welding technique is possible with PP.

PRECAUTIONS

It should be noted that Polypropylene is sensitive to copper, manganese, cobalt, chrome and their alloys. These metals reduce the durability properties of PP especially at elevated temperatures. Therefore contact with these metals should be avoided. Although the material is not specifically stabilised in respect of ultra-violet rays, a limited amount of protection is inherent enabling outdoor use when conditions are not extreme.

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WALL THERMOSTATS

PENN T52 SERIES MULTI-STAGE WALL THERMOSTATS

AUTOMATIC CHANGEOVER — LOW VOLTAGE

CAT. NO.	TYPE	Application	SWITCHES	
			SYSTEM	FAN
5011	T52AEA-2	1 stage heating 1 stage cooling	Auto-Heat-Off-Cool	Auto-On
5012	T52BEA-1	1 stage heating 2 stage cooling	Auto-Heat-Off-Cool	Auto-On
5013	T52CEA-2	2 stage heating 1 stage cooling	Auto-Heat-Off-Cool	Auto-On
50128	T52DAA-2	2 stage heating 2 stage cooling	None (1)	None (1)
5014	T52DEA-2	2 stage heating 2 stage cooling	Auto-Heat-Off-Cool	Auto-On

(1) Systems on auto, Fan can be wired for auto operation in cooling mode.



SERIES T52

For air conditioning systems where automatic switch-over of multiple heating and cooling stages is required.

Range: Heating 10°C to 30°C (50°F to 85°F)
Cooling 8°C to 32°C (46°F to 90°F)

Electrical Rating: 0.8 amp max. at 24V. AC.

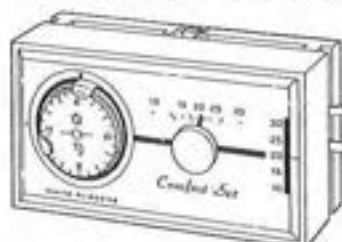
Anticipation: Heating 0.3 to 0.8 amps, adjustable.
Cooling fixed.

TO ORDER: Specify Catalogue Number only. For adaptor plate specify Penn No. PLT35A-600.

Underlined Models have Metric Scales.

Refer Tech. Page 144-h for English to Metric Cross Reference Chart

TYPE 1F72 - 10 LOW VOLTAGE AUTOMATIC COMFORT SET THERMOSTAT



FOR HEATING ONLY OR COOLING ONLY SYSTEMS

The 1F72-10 Comfort-Set thermostat combines temperature control and a Solid State Timer to automatically lower or raise room temperature to pre-determined set-points for one or more periods of time every 24 hours. By using the Program Advance Switch, the set-point can be temporarily changed without making permanent changes to the timer program, or adjusting the temperature levels. The thermostat uses sensitive spiral bimetal elements, sealed mercury contacts and is equipped with an adjustable heat anticipator to provide narrow-differential control of room temperature. The Comfort-Set will replace most existing 24 volt, two-wire heating or cooling thermostats without the need for running additional wires or using additional transformers or power-packs.

SPECIFICATIONS

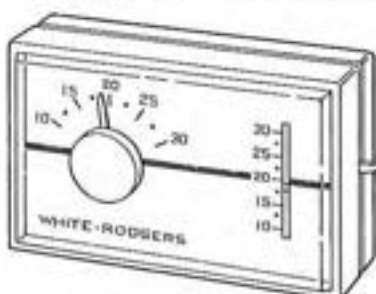
Electrical Rating: 24 Volt 50 Hz. 0.15 to 1.0 Amps.
Heat Anticipator: Adjustable for 0.15 to 1.0 Amps.
Cool Anticipator: Fixed for 0 to 1.5 Amps. 30V max.
Temperature Range: 10° to 30°C
Temperature Selectors: Hi - Red Low - Blue
Mounting: Wiring wall plate mounts on wall.
Dimensions: 3 1/2" High x 6-1/16" Wide x 2-5/16" Deep.
Timer: Automatically raises or lowers room temperature to set-points selected by Hi and Low temperature levels for one or more periods of time every 24 hours.
Minimum set-up or set-back interval is 2 hours.
Program Advance Switch allows temporary program changes without affecting timer settings. Program Advance Switch should NOT be used within one hour before or after a timer reset point.
Powered by a rechargeable battery (maintained at full charge by 24 volt thermostat circuit).
Timer dial turns counter-clockwise during operation.
Dial is divided into AM/PM time sections.
Adjustable plastic pointers (indicators) select reset times.
RED for SET-UP BLUE for SET-BACK
Accessories Available: Adaptor plate assembly P/N 61-2021 For mounting on vertical or horizontal outlet box, and to cover wall marks. Switching Sub-base: P/N S25-1 To convert heating and cooling operation. Replacement Battery: See battery and inside thermostat cover for replacement part numbers.

CAT. NO.



WHITE-RODGERS CONTROLS

TYPE 1F36 - 342 HEAT - COOL THERMOSTAT



This thermostat is designed for use on two-wire heating or cooling systems. It utilizes a SPDT sealed-mercury switch and a sensitive spiral bimetal element. Both the heating and cooling circuits are anticipated to provide narrow differential control of room temperature. When used with Sub-base S21-3, this thermostat can control combination heating and cooling systems and provide System and Fan switch functions. Included with this thermostat is a terminal wallplate that allows the thermostat to be wired for heating only, or cooling only, and when used with an external System switch, combination heating and cooling applications.

SPECIFICATIONS

Temperature Range: 10° to 30°C
Differentials: Heating -1°C Cooling -1 1/2°C
Electrical Rating: 30 VAC Max.
Anticipation: Heating Adj. 0.15 to 1.0A Cooling Fixed 0 to 1.5A
Circuits: "R" and "4" - Heating (Open on Rise)
"R" and "Y" - Cooling (Close on Rise)
A jumper between terminals "0" and "4" must be added on wall-plate for cooling operation.
Thermostat Dimensions: 2 1/2" High x 4 1/2" Wide x 1 1/2" Deep.
Note: For heat-cool combinations with system and fan switches on sub-base, use S21-3 sub-base.
Refer wiring diagrams for heat-cool combinations without using sub-base.

CAT. NO.

FURTHER DETAILS, OPERATION, INSTALLATION, CALIBRATION ETC. OF THESE WHITE-RODGERS THERMOSTATS AVAILABLE ON APPLICATION

WALL THERMOSTATS

PENN LINE VOLTAGE WALL THERMOSTATS

HEATING, COOLING OR HEATING AND COOLING

For control of residential, commercial or industrial heating or year 'round air conditioning. Heat or cold anticipators not required. Liquid charged temperature sensing element and highly efficient diaphragm and leverage provides close control of temperature.

T26S-18 and T26T-3, with thermometer are universal replacement models for heating, cooling or heating and cooling and include horizontal mounting faceplate kit. Converts to key adjustment by removing and retaining knob for the key. Bimetal thermometer supplied as standard.



T22
With Selector Switch



T22
With Concealed
Adjustment



T25A-1
Two-Stage



T26
Vertical Faceplate

CAT. NO.	TYPE	Type of Adjustment	Application	Selector Switch	RANGE °C (°F)	Differential Approx. °C (°F)	
						Heating	Cooling

HEATING

5031	T22AAA-1	Knob	SPST	"Off-Auto"	10 to 30 (50 to 86)	1 (1%)	—
5032	T22ABC-5	Knob	SPST	"Auto-Off-Fan"		1 (1%)	—
50838	T22ABC-7	Concealed	SPST, Medium Duty	"Auto-Off-Fan"	5 to 30 (40 to 90)	1.7 (3)	—
50326	T22BBC-1	Knob				1.7 (3)	—
50327	T22BBC-3	Concealed	SPST, Heavy Duty	"Auto-Off-Fan"		1.7 (3)	—
50328	T22CBC-4	Knob				1.7 (3)	—
50329	T22CBC-5	Concealed					

COOLING

5035	T22JAA-2	Knob	SPST	"Off-Auto"	5 to 30 (50 to 86)	—	1.3 (2%)
5036	T22JCC-2	Knob	SPST	"Auto-Off-Fan"		—	1.3 (2%)

HEATING AND COOLING

5038	T22SDA-4	Knob	SPDT, permits shutdown of system at the thermostat.	"Off-Auto"	5 to 30 (40 to 90)	1 (1%)	1.3 (2%)
5039	T22SEB-5	Knob	SPDT, used when same device controls heating and cooling.	"Heat-Off-Cool"		1 (1%)	1.3 (2%)
50310	T22SFB-5*	Knob	SPDT, used to control separate loads on heating and cooling.	"Heat-Off-Cool"		1 (1%)	1.3 (2%)
50313	T22TFB-1*	Knob	SPDT, heavy duty. Used to control separate loads on heating and cooling.	"Heat-Off-Cool"		1.7 (3)	1.7 to 2.2 (3 to 4)
50314	T26S-22**	Knob	SPDT	None		1 (1%)	1.3 (2%)
50315	T26T-4**	Knob	SPDT, Heavy Duty	None		1.7 (3)	1.7 to 2.2

TWO-STAGE

50318	T25A-6	Knob	2 SPDT switches 2 stage Heating, Cooling or one stage Heating and one stage Cooling	None	5 to 30 (40 to 90)	1 (1%)	1.3 (2%)
50332	T25A-2E	Concealed				1.7 (3)	Between Stages

FOUR STAGE

50345	T36ABB-9250	Concealed	4 SPDT Switches	None	0 — 43 (32-109.4)	1 (1%) Fixed Each Stage	1 (1%) Fixed b/n Stages
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* Can also be used where one unit provides both heating and cooling by adding a jumper between terminals 2 and 3.
** Includes faceplate for horizontal mounting. The plate is for "on-the-job" installation over vertical plate.

FAN COIL THERMOSTATS WITH FAN AND SYSTEM SELECTORS

These line voltage thermostats control heating, cooling or combination heating and cooling systems. They operate fan motors, relays or valves on fan-coil units. All thermostats have a 3-speed fan selector switch. The attractive T23 thermostats have a one piece beige gray cover with insulating two tone panel. Dual Voltage switching is provided (120/240V, A.C.) without need of anticipators to achieve the extremely close control. Field adjustable high and low stops are an integral feature. Mounting is on a standard, double outlet box.

CAT. NO.	TYPE	SWITCHES		RANGE °C (°F)	DIFFERENTIAL °C (°F)	
		FAN	SYSTEM		HEATING	COOLING
50330	T23A-2	"Low-Med-High"	"Heat-Off-Cool"	10 to 32 (50 to 90)	1 (1%)	1.3 (2%)
50331	T23B-4	"Low-Med-High"	"Auto-Off"		1 (1%)	1.3 (2%)

Heating-Cooling, Sequenced (automatic changeover; separate valves for heating and cooling).

These thermostats control line voltage fan coil or baseboard valves on heating, cooling and heating-cooling systems. Thermostats can control one or two valves directly. Heating and cooling anticipation are provided. Snap-acting contacts are operated by a bi-metal sensing element. Sequenced models provide a dead-band between heating and cooling cycles.

CAT. NO.	TYPE	FAN SWITCH	RANGE °C (°F)	ELECTRICAL
50322	T28DA-1 (1)	None	12.8 — 35	.16A, 240V, A.C.
50325	T28DD-1 (1)	Off-Hi-Med-Lo	(55 — 95)	Fan Switch 2.2A.

(1) "Off" position of fan switch interlocks to turn off cooling.
Differential: Sequenced models have 3.3°C (6°F) differential from Heat on to Cool on.

Underlined Models have Metric Scales — Refer Tech. Page 144-h for English to Metric Cross Reference Chart.
➔ **UNIVERSAL REPLACEMENT** — Replaces some Honeywell, White-Rodgers and Robertshaw Controls. Refer Manufacturers literature for full details.



T23A-1



T28DD

WALL THERMOSTATS

503-a

TYPE TWK ROOM THERMOSTATS

Danfoss

TWK is designed for direct control of either a cooling or a heating surface.

Temperature range 0°C to 30°C; 32°F to 86°F

Mechanical differential approx. 1.5°C=2.7°F

Coupling stability < 0.2°C=0.4°F

Thermal accelerator

220 V parallel

Rating

locked rotor

full load

non-inductive load

Type of switch

single-pole change-over switch (SPDT)

42 A 250 V~

6 A 250 V~

10 A 380 V~

CAT. NO.	TYPE	DESIGN	CODE NO.
50365	TWK	220 V parallel accelerator, SPDT change-over switch	55G0000



SUNNE THERMOSTATS — Low or Line Voltage

CAT. NO.	MODEL	APPLICATION	RANGE	SCALE	DIFFERENTIAL		ELECTRICAL RATINGS
					HEATING	COOLING	
50382	TC126-007	SPDT	10° to 32°C	Warmer/ Cooler	0.5°C	1°C	240V 50Hz, 4.9 FLA 29.4 LRA 22.0 RES
50383	TC126-005			Tamperproof			
50385	TC126-008			Tamperproof			
50384	TJ126-004	2 - SPDT	Warmer/ Cooler	0.5°C	1°C		
50387	TJ126-003	Switches with	10° to 32°C			Warmer/ Cooler	
50386	TJ126-005	1°C Deadband	Tamperproof				
CAPILLARY THERMOSTATS							Capillary Lgth.
50379	TA103-024	Heating	5° to 40°C				24"
50388	TC103-006	Heat/Cool	10° to 45°C				60"
50380	TE103-003	Heating	5° to 40°C				60"
50389	TH104-008	25A 2 Stage	15° to 35°C				24"



SATCHWELL ROOM THERMOSTATS — Low & Line Voltage

ROOM THERMOSTATS

Types TLX and TLM

Accurately control space temperature by switching suitable mains or low voltage equipment. Types are available for the control of motorised valves, relays, circulating pumps, boiler firing controls, fans and other devices. Suitable for conduit box or surface mounting. Type TLM are heavy duty thermostats suitable for the direct control of heating loads up to 20A.

Approximate size:

90mm high x 86mm wide x 46mm deep.

Accessories:

Ventilated cover for protection against damage, Weather resistant case for exterior use.

For full specification see leaflet DS 1.01.



CAT. NO.	TYPE	SCALE	THERMOSTAT ACTION	RATING	SPECIAL FEATURES
503101	TLX2251	3° to 27°C	On-Off	1A, 24V ac	Adjustable to suit loads of 0.2A to 1.0A
503102	TLX2223	Marked 1 to 5	On-Off	1A, 24V ac	Adjustable to suit loads of 0.2A to 1.0A
503103	TLX2358	3° to 27°C	Changeover	2A, 220-240V ac	Concealed setting & 'Auto/Off' Switch
503106	TLX2356	3° to 27°C	Changeover	2A, 220-240V ac	
503107	TLX2381	3° to 27°C	Changeover	2A, 220-240V ac	With thermometer
503104	TLX2322	Marked 1 to 5	Changeover	2A, 220-240V ac	
503105	TLX2359	3° to 27°C	Changeover	2A, 220-240V ac	With 'deadzone' action
503108	TLX2284	3° to 27°C	On-Off	6A, 220-240V ac	With thermometer
503109	TLX2222	Marked 1 to 5	On-Off	6A, 220-240V ac	
503110	TLX2654	3° to 27°C	On-Off	6A, 220-240V ac	Temperature setback
503111	TLM2253	3° to 27°C	On-Off	20A, 220-240V ac	
503112	TLM2604	3° to 27°C	On-Off	20A, 220-240V ac	Indicated 'On' position
503113	TLM2628	3° to 27°C	On-Off	20A, 220-240V ac	Indicated 'Off' position
503114	TLM2655	3° to 27°C	On-Off	20A, 220-240V ac	Temperature setback
503115	TLM2206	Marked 1 to 5	On-Off	20A, 220-240V ac	
503118	TLM2257	-15° to +10°C	On-Off	20A, 220-240V ac	
503119	TLM2453	3° to 27°C	On-Off	20A, 220-240V ac	Concealed setting
503120	TLM2402	3° to 27°C	On-Off	20A, 220-240V ac	Non-ventilated cover
503121	TLM2802	10° to 40°C	Changeover	Main contact 20A, back contact 5A, 220-240V ac	

HUMIDITY CONTROLS

PENN W42, W43, W45 SERIES HUMIDISTATS



W42AA-1



W43

Vert. Faceplate



W43

Horiz. Faceplate



W45

SPDT contact action provides control of humidifying or dehumidifying equipment with the same control. Flush mounting bracket to fit standard outlet box regularly supplied.

The W42AA-1 mounts on a flat surface or on a standard 2" x 4" outlet box. Dial lock feature. Packed in reshippable carton. The W42 features a human hair sensing element.

Types W43A and W45AA have field adjustable high and low limit stops. Stops can be set for locked setting.

W43A-14 is a universal replacement model which includes a horizontal faceplate kit. Converts to key adjustment by removing and retaining knob for the key. The W43 features a human hair sensing element.

Type W45AA-2 is designed for agricultural and industrial applications where high humidity control is required. A typical application is fruit and vegetable storage areas. The W45 features a Cellulose Acetate Butyrate sensing element.

Max. Operating Ambient: 100° F.

TO ORDER: Specify Catalog Number only.

Type W43A, W45AA

Motor Ratings	120 V.	208 V.	240 V.
A.C. Full Load Amps.	6.0	3.5	3.0
A.C. Locked Rotor Amps.	36.0	21.0	18.0
Pilot Duty — 125 VA.	24 to 277 V. A.C.		

Type W42AA: Pilot Duty only — 125 VA. at 120/240 V. A.C.

CAT. NO.	TYPE	SWITCH ACTION	RANGE	DIFF. % R.H. APPROX.	VOLTAGE
5061	W42AA-1	SPDT	10 to 90% R.H.	4	Low or Line
5062	W43A-14*	SPDT	0 to 70% R.H.	4	Low or Line
5065	W45AA-2**	SPDT	50 to 90% R.H.	4	Low or Line

* Includes faceplate for horizontal mounting. The plate is for "on-the-job" installation over vertical plate. Can field convert to concealed adjustment, specify plate kit PLT213-6 (vertical) or PLT213-5 (horizontal).

** Can field convert for horizontal mounting by ordering faceplate kit PLT222-4.

Danfoss

Hygrostats Types EKH 20 and 30

Type EKH 20 is a two-stage hygrostat with adjustable differential. EKH 20 can be used either to humidify or dehumidify the air. Type EKH 30 is a three-stage hygrostat with adjustable dead zone and a differential which is half the value of the dead zone setting. EKH 30 can be used to control both humidification and dehumidification. Furthermore EKH 30 can be used for controlling two-stage humidification or two-stage dehumidification.

Technical data

Control unit

Type	EKH 20	EKH 30
Regulation	2-stage	3-stage
Range	45 - 95 % RH	
Differential (DIFF)	1 - 8 % RH adjustable	$\frac{1}{2} \times \text{Nz-value}$
Dead zone (Nz)	2 - 8 % RH adjustable	
Dial graduation	approx. 1 $\frac{1}{2}$ per dividing line	
Ambient temperature	-15 - +60°C (+5 - +140°F)	
Mains voltage	220/240 V ~ +10 -15 % 50/60 Hz	
Rating	max. 4 A at 250 V	
Power consumption	6 VA	
Output relays	One SPDT req.	Two SPDT req.
Electrical life	VDE Class II	
Screwed cable entries	Pg 13.5	
Enclosure	IP 54 to IEC 144 and DIN 40050	
Shock and vibration proofness	2 g in the range from 0 - 1000 Hz	

Sensors

Ranges at 25°C (77°F) sensor temperature	45 - 65 % RH (red marking) 60 - 80 % RH (yellow marking) 75 - 95 % RH (blue marking)
Sensor temperature range	0 - +40°C (+32 - +104°F)
Ambient temperature range	-15 - +60°C (+5 - +140°F)



Control unit

Room sensor holder
ESRHDuct sensor holder
ESDHSensor socket
ESMHSensor element
ESEN

CAT. NO.	DESCRIPTION	CODE NO.
50626	Control unit Type EKH 20	84B0002
50627	Control unit Type EKH 30	84B0003
50631	Room sensor holder Type ESRH	84B0021
50633	Duct sensor holder Type ESDH	84B0023
50632	Sensor socket Type ESMH For use when sensing element is mounted on control unit	84B0022
50628	Sensing element, red marking 45-65% RH	84B0103
50629	Sensing element, yellow marking 60-80% RH	84B0104
50630	Sensing element, blue marking 75-95% RH	84B0105

GENERAL PURPOSE INDUSTRIAL THERMOSTATS


Thermostats
Type RT

Danfoss Type RT Thermostats are temperature-controlled electric switches for use in refrigeration and air-conditioning systems and in many industrial applications.



RT 140



RT 102



RT 107



RT 16L



RT 140L

RT 270
differential thermostat

CAT. NO.	TYPE	CODE (1) No.	CAP. LENGTH m	RANGE		ADJ. MECHANICAL DIFFERENTIAL		(2) MAX. BULB TEMP. °C	BULB TYPE & REMARKS
				°C	°F	AT MIN. TEMP. SETT. °C	AT MAX. TEMP. SETT. °C		
1427	RT4	17-5036	—	-5/+30	+23/+86	1 - 7	0.6 - 4	70	Rigid Coil Sensor
14223	RT14	17-5099	2	"	"	1.5 - 8	1.5 - 8	150	Cyl. Remote Bulb
14224	RT14	17-5100	3	"	"	"	"	"	"
14225	RT14	17-5101	5	"	"	"	"	"	"
14226	RT14	17-5102	8	"	"	"	"	"	"
50833	RT14	17-5103	10	"	"	"	"	"	"
14235	RT101	17-5003	2	+25/+90	+77/+194	2 - 11	3 - 24	300	Remote B & Pocket
14250	RT101	17-5006	3	"	"	"	"	"	"
14237	RT101	17-5024	8	"	"	"	"	"	"
50811	RT101	17-5025	10	"	"	"	"	"	"
14238	RT102	17-5147	2	"	"	2 - 10	"	"	Cap. Tube Bulb
5082	RT103	17-5155	—	+10/+45	+50/+113	1.5 - 12	1.5 - 12	70	Rigid Coil Sensor
14242	RT107	17-5135	2	+70/+150	+158/+302	5 - 30	1.5 - 10	215	Remote B & Pocket
14243	RT107	17-5140	5	"	"	"	"	"	"
50842	RT120	17-5205	2	+120/+215	+248/+419	"	"	260	Cyl. Remote Bulb
50843	RT120	17-5206	5	"	"	"	"	"	"
50844	RT120	17-5207	8	"	"	"	"	"	"
50822	RT123	17-5220	2	+150/+250	+302/+482	"	"	300	"
50823	RT124	17-5227	2	+200/+300	+392/+572	"	"	350	"
5083	RT140	17-5236	2	+15/+45	+59/+113	1.5 - 9	1.5 - 11	240	Coiled/Mtg. Flange
14246	RT270	17D-0031	2 x 5	0/+15	Fixed 2	LT Work. Range -30/+40		65	2 Remote Bulbs
WITH ADJUSTABLE DEAD ZONE					Mech. Diff.	Max. Dead Zone			
14254	RT16L (3)	17L-0024		0/+38	1.0	5	2	100	Rigid Coil Cap Sens.
14255	RT140L (3)	17L-0031	2	+15/+45	1.2	6.8	6.8	240	Coiled/Mtg. Flange

(1) With SPDT Switch Code No. 17-4030

CAT. NO. 14127

(2) Ambient temperature for housing: -40 to +70°C.

(3) With Dead Zone Switch Code No. 17-4032

CAT. NO. 14128

Accessories available on application.

ACTROL PARTS

A DEPENDABLE SOURCE FOR THE WIDEST RANGE OF REFRIGERATION, AIR CONDITIONING AND HEATING COMPONENTS, EQUIPMENT AND SYSTEMS

GENERAL PURPOSE INDUSTRIAL THERMOSTATS

PENN TEMPERATURE CONTROLS



A19AAC-44



A19AAC-13



A19ADN-5



A19AAE-16



A19ANC-13



A19AAB-42

CAT. NO.	TYPE	SWITCH ACTION APPLICATION	RANGE		DIFFERENTIAL		BULB & CAPILLARY	RANGE ADJUST.
			°C	°F	°C	°F		
HIGH RANGE TEMPERATURE								
† 50851	A19AAB-32	SPST, Open High Remote Bulb Thermostat	0 to 43	32 to 110	1.9	3½	3/8" x 4¼" copper 6' Cap. **	Screwdriver Slot External Scale
† 50853	A19AAB-37	SPST, Open High Oven Thermostat	40 to 150	104 to 302	3.9	7	3/16" x 10-1/8" copper 6' Cap.	Knob External Scale
† 50854	A19AAB-42	SPST, Open High Oven Thermostat	100 to 290	212 to 554	5.6	10	3/16" x 5-5/8" copper 6' Cap.	Convertible
†* 50855	A19AAC-44	SPDT Dual Fuel Changeover	-35 to +10 plus bulb shield	-31 to +50	2.8	5	3/8" x 4" copper 6' Cap. **	Screwdriver Slot Internal Scale
† 50856	A19AAC-13	SPDT	40 to 120	104 to 248	2.8	5	3/8" x 3-7/8" copper 6' Cap. **	Screwdriver Slot External Scale
50861	A19ADN-5	SPST Open High	40 to 120	104 to 248	Manual Reset		3/8" x 3" 6' Cap.	Concealed Screwdriver Slot
50862	A19ADP-3	SPDT	40 to 120	104 to 248	Manual Reset Locks Out High		3/8" x 3" 6' Cap.	Concealed Screwdriver Slot
* Locking cover and bulb shield assembly are standard on Type A19AAC-44. ** With 3" bulb support. Maximum bulb temperature: A19AAB-32 and A19AAC-44, 60°C (140°F); A19AAB-44, 177°C (350°F); A19AAB-42, 327°C (620°F); A19AAC-13, A19ADN-5 and A19ADP-3, 143°C (290°F).								

DIRECT MOUNTED — MEDIUM TEMPERATURE

50858	A19AAF-27	SPDT	10 to 55	50 to 130	1.1 Min. Adjust.	2 Min. Adjust.	.29" x 2-11/16" Well, Direct Immersion NPT	Knob
Maximum bulb temperature 77°C (170°F).								

WIDE RANGE — ADJUSTABLE DIFFERENTIAL

50857†	A19ABC-60	SPDT	10 to 55	50 to 130	1.9 to 8	3½ to 14	3/8" x 5" 8' Cap.	Knob
Maximum bulb temperature 77°C (170°F).								

THERMOSTATS FOR CROP DRYING

50859†	A19AAE-16	SPST Open High	25 to 80	77 to 176	0.8 Fixed	1½ Fixed	1-1/8" x 1 1/4" Copper-coiled 10' Cap.	Knob Ext. Scale
Maximum bulb temperature 93°C (200°F).								

INDUSTRIAL THERMOSTAT RAINPROOF ENCLOSURE

50860†	A19ANC-13	SPDT	-15 to 65	5 to 149	3 Fixed	6 Fixed	.29" x 2 1/2" 10' Cap.	Screwdriver Slot
Maximum bulb temperature 88°C (190°F).								

FAN OR LIMIT LIQUID EXPANSION

CAT. NO.	TYPE	APPLICATION	SWITCH ACTION	RANGE		DIFFERENT.		ADJ. STOP		BULB LGTH.	MAX. BULB TEMP.
				°C	°F	MIN.	MAX.	MIN.	MAX.		
50864	A19EBA-7	Furnace Fan Control	Close High	10 to 120	50 to 248	5°C (9°F)	20°C (36°F)	63°C (145°F)	121°C (250°F)	152 mm (6")	143°C (290°F)
50863	A19EBB-1	Warm Air Limit	Open High	38 to 177	100 to 350	5°C (9°F)	20°C (36°F)	116°C (240°F)	177°C (350°F)		190°C (375°F)
50865	A19EBC-1	Counter-Flow Warm Air Furnace	SPDT	38 to 177	100 to 350	5°C (9°F)	20°C (36°F)	116°C (240°F)	177°C (350°F)		190°C (375°F)
50866	A19EDB-3	Warm Air Limit Which Locks Out	Open High	40 to 180	104 to 356	Manual Reset		116°C (240°F)	177°C (350°F)		190°C (375°F)

ELECTRICAL RATINGS:

Refer Tech Page 144-g.

For A19ADN-5 and A19ADP-3 Refer Table No. 2 Tech. Page 144-g.

Underlined Models have Metric Scales. Refer Tech. Page 144-h for English to Metric Cross Reference Chart.

➔ **UNIVERSAL REPLACEMENT** with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment. Remote bulb models complete with 5/8" mounting clip.

Note: Cat. Nos. marked with (†) are ALSO detailed in the Refrig./Air Conditioning Section 1 of this Catalogue — Refer Table Below.

TYPE	INDUST. SECT. CAT. NO.	REFRIG. AIR COND. CAT. NO.	TYPE	INDUST. SECT. CAT. NO.	REFRIG. AIR COND. CAT. NO.
A19AAB-32	50851	14443	A19AAC-13	50856	14441
A19AAB-37	50853	14445	A19ABC-60	50857	14444
A19AAB-42	50854	14446	A19AAE-16	50859	14447
A19AAC-44	50855	14444	A19ANC-13	50860	14436



A19EBA, A19EBB, A19EBC

BOILER THERMOSTATS

Danfoss



KT



DTS



DTO

TYPE	CAT. NO.	CODE NO.	TEMPERATURE		BULB POCKET			Contact System SPST TPST (Cut-out on a rise in temp.)	Contact Load
			Range as marked on the control	Differential	Thread BSP-F	LENGTH			
						in.	mm.		
KT Boiler T'Stat	5115	59B0125	25-95°C	6°C	1/2"	4.3/8	110	SPST	6A, 380V, AC 0.5A, 250V, DC
	5116	59B0126				6	150		
DTO High Temp. Cut-out + Boiler T'Stat	51114	59F0185	93°C	15°C	3/4"	3.1/2	90	TPST	6A, 380V, AC 0.5A, 250V, DC (High Temp. Cut-out 6A, 250V, DC)
			25-95°C	6°C				SPST	
	51116	59F0192	100°C	10°C	3/4"	4.3/8	110	SPST	
	51117	59F0193	63-87°C	6°C	3/4"	6	150	SPST	
DTM High Limit T'Stat + Boiler T'Stat	51118	59F0150	50-110°C	11°C	1/2"	4.3/8	110	SPST	6A, 380V, AC 0.5A, 250V, DC
			25-95°C	6°C					
DTS High Temp. Cut-out + Boiler Thermostat	51124	59F0182	25-95°C	6°C	1/2"	4.3/8	110	SPST Safety T'Stat Cut-out 110°C	6A, 380V, AC 0.5A, 250V, DC
	51125	59F0183	25-95°C	6°C	1/2"	4.3/8	110	SPST Safety T'Stat Cut-out 100°C	

PENN



A19ABC-26



A19ABC-27

Universal replacement control for open high, open low or SPDT applications. Liquid filled element provides rapid response to temperature change. Control furnished with well assembly for 1/2" tappings. Adjustable differential. A truly universal replacement. All controls supplied with well assembly. Not available less well assembly.

Maximum Bulb Temperature: 290° F.

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.	240 V.
A.C. Full Load Amps.	10.0	6.0
A.C. Locked Rotor Amps.	60.0	36.0
Pilot Duty — 125 VA. 24 to 600 V. A.C.		

CAT. NO.	Type	Switch Action Application	Range		Differential		Well Conn.	Range Adjuster
			°C	°F	°C	°F		
51151*	A19ABC-26	Open High Open Low (Operating and Circulator) SPDT	40 to 120	104 to 248	3 to 13	6 to 24	1/2"	Convertible
51152*	A19ABC-27	Remote Mtg. (Operating and Circulator) SPDT	40 to 120	104 to 248	3 to 13	6 to 24	1/2" 6" Cap.	Convertible
51153*	A19ADB-27	Open High with Lockout - Reset Open on Rise	40 to 120	104 to 248	Manual Reset (Locks out High)		1/2"	Knob

Maximum Bulb Temperature: 143°C (290°F).

* Also detailed in Refrig./Air Cond. Section 1.

Underlined Models have Metric Scales — Refer Tech. Page 144-h for English to Metric Cross Reference Chart.

→ UNIVERSAL REPLACEMENT with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment.

OUR BIG SELECTION ANSWERS YOUR EVERY NEED AND PRICED RIGHT TOO

SURFACE THERMOSTAT TYPE AT

Type AT is a simple and sturdy Surface Thermostat which is easily and quickly installed. It is designed to control the temperature of any hot water pipe or heated surface to which the metal base of the thermostat is attached.

A Surface Thermostat is particularly useful as the method of mounting obviates the necessity of draining the system of water.

As will be seen from the temperature range of the instrument, 30-90°C (80-200°F), a primary application of the AT is to control and regulate Boiler Temperature when the instrument is located on the flow pipe of the boiler. The lagging of the pipe should simply be stripped off at the intended point of fitting and the thermostat can then be secured to the pipe by means of the two spiral bands supplied with the thermostat.

CONSTRUCTION

The bimetal temperature element is contained in a cast aluminum metal base and actuates the switch through deflections caused by temperature variations.

The totally enclosed switch is the well proven Danfoss "Mini Contact" which has a Single Pole Changeover (S.P.D.T.) contact system with positive snap action.

The tight fitting cover is made of moulded plastic for best insulation and is secured by two screws.

A particular advantage and design feature is the changeover switch action, Breaking Circuit on Rise of Temperature, and, on the other pole, Making Circuit on Rise of Temperature.

The AT Thermostat may therefore be used to control a Two-Position (On-Off) Damper Motor or Motorised Valve, (3-wire connection), or, more usually, in conjunction with another primary controller, when the AT unit serves as a secondary low or high limit control to the primary controller.

INSTALLATION

The location selected must be properly representative of the temperature to be controlled. Remove any insulation material (lagging) from the pipe, as shown in the sketch. Before fitting the thermostat on the pipe, the pipe surface should be thoroughly cleaned. A capsule of metallic paste is provided with each thermostat. The paste has a high thermal conductivity and should be liberally applied between the contact surfaces of the thermostat base and cleaned pipe surface. The thermostat should be secured to the pipe by means of the two spiral bands supplied with the thermostat.

The pipe should then be re-insulated, so that the lagging reaches up to and covers the base of the thermostat. The two spiral bands provided are suitable for pipes of 1/2" - 3". It does not matter whether the thermostat is mounted on a vertical or horizontal pipe, above or below the pipe, provided that proper thermal contact is made between the pipe surface and the thermostat base.

DIFFERENTIAL

The test differential of the thermostat is about 3°C (5.5°F). In practice an operating differential of 6° to 10°C (10° to 18°F) must be anticipated (under adverse conditions possibly more), due to the nature of the surface of the riser pipe, the wall thickness of the pipe, the flow conditions etc.



Switch S.P.D.T., 6A 440V a.c.
0, 1A 250 V d.c.

Temperature range : 30-90°C
(80-200°F).

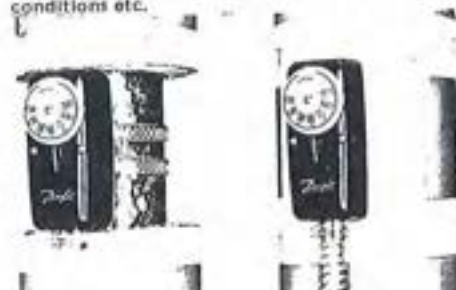
Operating differential : 6-10°C
(10-18°F).

Max. ambient temperature is 100°C
(212°F).

Max. temperature of contact base is
125°C (255°F).

Code No. 41E0000 (Celsius scale).

CAT. NO. 5131.



PENN HOT WATER STRAP-ON

SPDT strap-on surface type hot water control for direct or reverse action. May be used as either an open high control or as an open low control. The terminals of the contact unit are color coded to simplify installation. May be mounted on either horizontal or vertical riser pipe.

ELECTRICAL RATINGS

Motor Ratings	120 V.	240 V.
A.C. Full Load Amps.	10.0	6.0
A.C. Locked Rotor Amps.	60.0	36.0
Pilot Duty — 125 VA., 120 to 240 V. A.C.		



A19DAC-9

CAT. NO.	TYPE	SWITCH ACTION	RANGE °C (°F)	Differential °C (°F) FIXED	MOUNTING
51351	A19DAC-9	SPDT	38 to 116 (100 to 240)	5.6 (10)	Clamp-on Strap Supplied

Max. Case Ambient Temp. 60°C (140°F). Max. Sensing Element Temp. 143°C (290°F)

A25 SERIES WARM AIR LIMIT CONTROL — MANUAL RESET

Normally located in a return air duct system and wired to shut down air conditioning or ventilating fans when the temperature of the air becomes excessive, as from a fire.

The reset is a "trip-free" type device and will not permit restart until the reset lever is released. Rod and tube type sensing element assures positive control action. Duct mounting flange is included.

ELECTRICAL RATINGS

Motor Ratings	120 V.	208 V.	240 V.	277 V.
A.C. Full Load Amps.	16.0	9.2	8.0	—
A.C. Locked Rotor Amps.	96.0	55.2	48.0	—
Non-Inductive	16.0 Amps. at 120/277 V. A.C.			
Pilot Duty — 125 VA. 24 to 600 V. A.C.				

CAT. NO.	TYPE	SWITCH ACTION	RANGE °C (°F)	RANGE ADJUSTER	DIAL STOP
51355*	A25AN-8	SPST Open High	-4 to 102 (25 to 215)	Knob	High Limit Set at 52°C (125°F)
51356*	A25CN-4	SPDT	-4 to 102 (25 to 215)	Knob	High Limit Set at 52°C (125°F)

Maximum Element Temperature 149°C (300°F)

HOT WATER SINGLE FUNCTION TWO POLE — HEAVY DUTY

CAT. NO.	TYPE	SWITCH ACTION	RANGE °C (°F)	Differential °C (°F)	WELL CONN. SIZE	ELECTRICAL RATING
51368	A72CA-25	Open on Rise	60 to 104 (140 to 220)	3.0 (5)	1/2" NPT	Refer Table 13 Tech. Page 144-g

Maximum bulb temperature: 121°C (250°F).

* Cat. Nos 51355 (A25AN-8) & 51356 (A25CN-4) ALSO in Refrig./Air Cond. Section 1 as Cat. Nos. 14448 & 14449.

Underlined Models have Metric Scales — Refer Tech. Page 144-h for English to Metric Cross Reference Chart.

UNIVERSAL REPLACEMENT with removable knob and tension clip for conversion to knob, screwdriver or concealed adjustment.

A25AN-8,
A25CN-4

A72CA-1

HYDRONIC AND WARM AIR CONTROLS

Satchwell

STEM TYPE THERMOSTATS

STEM TYPE THERMOSTATS

W Series — Immersion and Air Types

The W Range provides on-off control of electric heaters, solenoid valves, motorised valves or damper actuators. Types WRR and WTN have manual reset for high limit applications.

Construction:

WR, WRR:

Die-cast metal base with moulded plastic switch cover.

WT, WTN, WPS, WTO, WPO:

Die-cast metal base and cover.

WT, WTN, WTO:

Waterproofed to CEE 2-drop requirements.

Stem:

Aluminium brass and nickel-iron.

Pocket:

(Immersion Types) Corrosion — resisting bronze screwed 1/2" BSP (Mild Steel and Stainless Steel available).

S.P.C.O. Switch Rating:

Main contact: 15A, 250-440V ac

Back contact: 5A, 250-440V ac

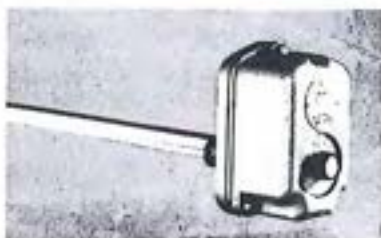
Approximate head size:

WR and WRR

87mm high x 68mm wide x 82mm deep.

WT, WTN & WPS

132mm high x 87mm wide x 95mm deep.



Immersion Types WR, WRR, WT, WTN and WPS				
CAT. NO.	THERMOSTAT TYPE	SCALE °C	STEM LENGTH	SETTING KNOB
5135	WR2201	5 to 105	300mm	Exposed
5136	WR2254	50 to 150	300mm	Exposed
5137	WRR2203	50 to 150	300mm	Exposed
5138	WT2251	5 to 105	300mm	Concealed
5139	WT2254	50 to 150	300mm	Concealed
51310	WT2206	80 to 200	300mm	Concealed
51311	WT2256	50 to 300	300mm	Concealed
51312	WT2451	0 to 65	450mm	Concealed
51313	WTN2203	25 to 130	300mm	Concealed
51314	WPS2352	5 to 110	300mm	Exposed
Air Types WTO and WPO				
	THERMOSTAT	SCALE °C	STEM LENGTH	SETTING KNOB
51315	WTO2252	-15 to +110	300mm	Concealed
51316	WTO2256	50 to 300	300mm	Concealed
51317	WTO2452	0 to 80	450mm	Concealed
51318	WTO2651	0 to 50	600mm	Concealed
51319	WPO2301	-20 to +100	300mm	Exposed

Approximate size:

132mm high x 87mm wide x 95mm deep.

For full specification see leaflet DS 1.05.

THIS CATALOGUE INCLUDES ONLY A SMALL SELECTION OF AVAILABLE SATCHWELL EQUIPMENT

We will be pleased to supply additional information on the comprehensive range available, together with Technical literature

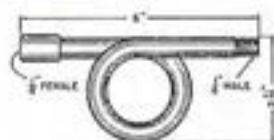
WE BELIEVE IN GOOD QUALITY PARTS AND EQUIPMENT, RELIABLE SERVICE, BACKED BY LARGE STOCK HOLDINGS SUPPLIED BY REPUTABLE AND TRUSTWORTHY COMPANIES

Controls available with SPST, DPST or 4-wire, two circuit contact units. Contacts for line or low voltage. Pressure connector: $\frac{1}{4}$ " male NPT (0 - 103 kPa only) [0 - 15 psig]; $\frac{1}{4}$ " female NPT (all other ranges).

Part No. TBG16A-600 Siphon is supplied with all controls except models with 0 to 103 kPa (0 to 15 psig) range.



SERIES P47



PART NO. TBG16A-600

Regularly supplied with steam pressure controls for service over 15 lbs. gauge pressure.

CAT. NO.	TYPE	NUMBER OF POLES	RANGE		DIFFERENTIAL				MAX. ALLOW. PRESSURE	
			kPa	PSIG	MIN.		MAX.		kPa	PSIG
					kPa	PSI	kPa	PSI		
CONTACTS OPEN ON RISE - AUTOMATIC RESET										
5161	P47AA-21	1	0 to 103	0 to 15	7	1	55	8	345	50
5164	P47AA-22	1	345 to 1655	50 to 240	138	20	690	100	2069	300
5162	P47AA-23	1	-68 to 345	20" to 50	34	5	241	35	1241	180
51631	P47AA-15	1	0 to 1034	0 to 150	83	12	276	40	2241	325
5165	P47CA-3	2	-68 to 345	20" to 50	34	5	241	35	1241	180
5166	P47CA-7	2	0 to 1034	0 to 150	83	12	276	40	2241	325

CONTACTS OPEN ON RISE - MANUAL RESET

5167	P47AB-1	1	0 to 103	0 to 15	Manual Reset				345	50
5168	P47AB-2	1	-68 to 345	20" to 50	Manual Reset				1241	180
5169	P47AB-3	1	345 to 1655	50 to 240	Manual Reset				2069	300
51610	P47AB-4	1	0 to 1034	0 to 150	Manual Reset				2241	325
51612	P47CB-1	2	-68 to 345	20" to 50	Manual Reset				1241	180
51613	P47CB-2	2	345 to 1655	50 to 240	Manual Reset				2069	300
51611	P47HB-1	2	0 to 103	0 to 15	Manual Reset				345	50

CONTACTS CLOSE ON RISE - AUTOMATIC RESET

51614	P47BA-1	1	0 to 103	0 to 15	7	1	55	8	345	50
516151	P47BA-10	1	-68 to 345	20" to 50	34	5	241	35	1241	180
516161	P47BA-5	1	0 to 1034	0 to 150	83	12	276	40	2241	325

SPDT - 4 WIRE TWO CIRCUIT* - AUTOMATIC RESET

51619	P47GA-23	Two	0 to 1034	0 to 150	83	12	276	40	2241	325
51617	P47GA-26	Single	0 to 103	0 to 15	7	1	55	8	345	50
51618	P47GA-11	Pole	-68 to 345	20" to 50	34	5	241	35	1241	180
51620	P47GA-12	Contacts	345 to 1655	50 to 240	138	20	690	100	2069	300

* Main contacts (Line M2) open on rise, simultaneously auxiliary contacts (Line M1) close.

Note: 1 Metric version "Range" is in units of kg/cm² - approx. equivalents in kPa and PSIG are shown in Table above.

Electrical Ratings: Refer Manufacturers literature.

Underlined Models have Metric Scales - Refer Tech. Page 144-h for English to Metric Cross Reference Chart.

Danfoss



RT 113

SPDT CONTACT SYSTEMS

Changing over from one circuit to another
10(4)A
380V.AC
12W
220V.DC.
Code No.
17-4030

CAT. NO. 14127

CAT. NO.	TYPE	CODE (1) NO.	RANGE kPa (PSIG)	DIFFERENT. kPa (PSI)	MAX.(2) TEST PRESS. kPa (PSIG)	PERMISS. AMBIENT TEMP. °C (°F)	PRESS. CONNECTION
51638 (14276)*	RT 1	17-5245	-81 to 490 (24" to 71)	49 to 159 (7.1 to 23)	2455 (356)	-40/+70 (-40/+158)	1/4" Flare
51631 (14278)*	RT5(3)	17-5250	193 to 1669 (28 to 242)	98 to 393 (14.2 to 57)	2455 (356)	-40/+70 (-40/+158)	1/4" Flare
51628	RT112	17-5191				-40/+70 (-40/+158)	
51627	RT113	17-5196				-40/+70 (-40/+158)	
51630 (14282)*	RT116	17-5203	98 to 979 (14 to 142)	19 to 127 (2.8 to 18.5)	2455 (356)	-40/+70 (-40/+158)	3/8" BSP External
51639 (14284)*	RT117	17-5295	979 to 2944 (142 to 427)	59 to 293 (8.5 to 57)	3448 (500)	-40/+70 (-40/+158)	3/8" BSP External
51626	RT121	17-5215				-40/+70 (-40/+158)	3/8" BSP External
51629 (14280)*	RT200	17-5237	19 to 586 (2.8 to 85)	19 to 117 (2.8 to 17)	2455 (356)	-40/+70 (-40/+158)	3/8" BSP External

DESCRIPTION	CAT. NO.	TYPE	CODE(1) NO.	LP WORKING RANGE	DIFF. RANGE	MECH. DIFF.	MAX(2) TEST PRESS.	PERMISSIBLE AMBIENT TEMP.	PRESSURE CONNECTION
Diff. Press. Controls	51632 (14290)*	RT260A	17D-0021	-100 to 1175kPa (29.5" Hg to 170 psig)	49 to 392 (7 to 57)	fixed 30 (fixed 4.3)	2455 (356)	70°C	3/8" BSP ext. + 1/4" 10mm weld nipple
	51633 (14291)*	RT262A	17D-0025	-100 to 588 (29.5" Hg to 85 psig)	10 to 147 (1.4 to 21)	fixed 10 (fixed 1.4)	1175 (170)	70°C	

(1) With SPDT switch, code No. 17-4030. (2) All pressure controls can withstand a full vacuum. (3) With a seal cap, code No. 17-0895, instead of a knob.

* CAT. NO. in (brackets) are those used in Refrig/Air Cond. Section 1.

PENN

AIR COMPRESSOR SWITCHES

P16 SERIES HEAVY DUTY AIR COMPRESSOR SWITCHES

PRESSURE RANGES TO 1380 kPa (200 PSIG)

Pressure switch for air compressors and other pressure equipment.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	2 H.P.	3 H.P.	1 H.P.
240	3 H.P.	5 H.P.	1 H.P.
440-550	5 H.P.	5 H.P.	—
32	—	—	1/2 H.P.



CAT. NO.	TYPE	Range Min. Cut-in to Max. Cutout kPa (psig)	Diff. Adj. kPa (psi)		Factory Set.		No. of Poles	Pressure Connector FNPTF
			Min.	Max.	Open kPa (PSI)	Close kPa (PSI)		

NO VALVE

5201	P16AA-10	138 to 1379 (20 to 200)	165 (24)	455 (66)	1034 (150)	827 (120)	2	1/4"
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2-WAY VALVE

5202	P16BA-1	138 to 1379 (20 to 200)	165 (24)	455 (66)	1034 (150)	827 (120)	2	1/4"
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Contacts OPEN on rise on the above listed switches.

STANDARD DUTY AIR COMPRESSOR SWITCHES

5208	P61NA-3	620 to 1034 (90 to 150)	172 (25)	276 (40)	862 (125)	655 (95)	2	1/4"
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STANDARD SWITCHES LOW PROFILE ENCLOSURE

"Low profile" case makes switch easy to wire. Two pole, single throw contacts open on rise. Pressure switch for domestic water systems, air compressors (not requiring mechanical release valves and where pressure does not exceed 70 psig). Also for miscellaneous applications which are not harmful to the Buna-N diaphragm or the plated steel diaphragm housing.

P61BA-3 is supplied with separate "snap-in" pulsation orifice for universal replacement on all pumps.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	1 H.P.	1 H.P.	—
240	1 H.P.	1 H.P.	—
32	—	—	1/4 H.P.



52012	P61BA-3	103 to 483 (15 to 70)	103 (15)	172 (25)	276 (40)	138 (20)		1/4"
52015	P61BC-1*	103 to 483 (15 to 70)	103 (15)	172 (25)	276 (40)	138 (20)		1/4"

* With manual "OFF" lever.

Danfoss TRIPLE-POLE PRESSURE SWITCHES

TYPES PS and PSU

The pressure switches, Types PS and PSU, are designed for automatic control of compressors and pressurised water plants. Type PSU, fitted with an unloader valve is designed for pressure relief on starting.



$I_e = 9A (AC_3)$ at
 $U_e = 500V \sim$

CAT. NO.	TYPE	CODE NO.	CUT-OUT PRESS. RANGE		MINIMUM DIFFERENTIAL		MAXIMUM DIFFERENTIAL	
			kPa	PSIG	kPa	PSI	kPa	PSI
52027	PS 4B	31E0171	96 - 393	14 - 57	59 - 69	8.5 - 10	393	57
52031	PS 9B	31E0175	245 to	35.5 to	117 - 179	17 - 26	931	135
52032	PSU 9B	31E0176	931	135				
52035	PS 15B	31E0179	690 to	100 to	165 - 227	24 - 33	979	142
52036	PSU 15B	31E0180	1469	213				

TELEX FOR FAST SERVICE

TO GIVE OUR CUSTOMERS EVEN FASTER SERVICE WE HAVE INSTALLED TELEX IN MOST OF OUR BRANCHES. IF YOU ARE A TELEX SUBSCRIBER YOU CAN SEND YOUR ORDER DIRECT BY TELEX. TELEX NUMBERS ARE LISTED AT THE FRONT OF THIS CATALOGUE.

PENN PUMP PRESSURE SWITCHES

1 H.P. STANDARD

240 V. 10 A
Cover and Earth Screw



P61AA

Compact, NEMA 1 case. Two pole, single throw contacts open on pressure rise. Pressure switch for domestic water systems, air compressors (not requiring mechanical release valves and where pressure does not exceed 483 kPa [70 psig]). Also for miscellaneous applications which are not harmful to the Buna-N diaphragm or the plated steel diaphragm housing. P61AA-6 supplied with separate "snap-in" pulsation orifice for universal replacement. If pulsation isn't needed it can be discarded.

CAT. NO.	TYPE	RANGE MIN. CUT-IN TO MAX. CUT-OUT		DIFFERENTIAL ADJUSTMENT				PULSATION ORIFICE
				MINIMUM		MAXIMUM		
		kPa	PSIG	kPa	PSI	kPa	PSI	
5223	P61AA - 6	103 to 483	15 to 70	103	15	172	25	Yes (Snap-in)

UNIVERSAL REPLACEMENT — Replaces: Square D FSG-2, Furnas 69BA8, 69WA44.

P61 SERIES PRESSURE SWITCH WITH INDICATOR

For pumps and air compressors (not requiring release valves). Two pole pressure switch opens contacts on pressure rise. Long life pressure indicating gauge indicates pressure at switch, regardless of switch setting.

Pressure Connector: 1/4" FNPTF.

Pulsation Orifice: No.

240 V. 10 A. Cover and Earth Screw

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	1 H.P.	1 H.P.	1/4 H.P.
240	1 H.P.	1 H.P.	—
32	—	—	—



P61DA-6

CAT. NO.	TYPE	RANGE MIN. CUT-IN TO MAX. CUT-OUT kPa (PSIG)	DIFFERENTIAL kPa (PSI)
5224	P61DA-6	103 to 483 (15 to 70)	103 to 207 (15 to 30)

LOSS OF PRIME PROTECTION WITH MANUAL LEVER

This two-pole pressure switch opens an electrical circuit should the pressure fall below the switch set point. A typical application is for use on unattended pumping units where protection against loss of water is desired. A built-in lever permits the switch contacts to be manually closed to start the equipment. Switch contacts remain closed during safe operating pressures.

240 V. 10 A.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	1 H.P.	1 H.P.	—
240	1 H.P.	1 H.P.	—
32	—	—	1/4 H.P.



P61BH-1

CAT. NO.	TYPE	RANGE kPa (psig)	FACTORY SETTING		PRESSURE CONNECTOR FNPTF
			CLOSES	OPENS kPa (psig)	
5225	P61BH-1	62 to 172 (9 to 25)	Manual	62 (9)	1/4"

REVERSE ACTION

Pressure switch for automatically grounding primary side of magneto ignition circuit on gas engine operated pump or air compressor. Contacts open automatically at predetermined low setting to permit engine to be restarted manually. Also used to open circuit on falling pressure on electrically operated equipment.

240 V. 10 A.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	1 H.P.	1 H.P.	—
240	1 H.P.	1 H.P.	—
32	—	—	1/4 H.P.



P61AG-1

CAT. NO.	TYPE	Switch Action	Range Min. Cutout to Max. Cut-in kPa (psig)	Differential Adj.		Factory Setting		No. of Poles	Pressure Connect. FNPTF
				Min. kPa (PSI)	Max. kPa (PSI)	Open kPa (PSI)	Close kPa (PSI)		
5226	P61AG-1	Close High	69 to 517 (10 to 75)	69 (10)	241 (35)	138 (20)	241 (35)	2	1/4"

COMBINATION OPERATING AND LOSS OF PRIME PROTECTION

TWO POLE CONTACT UNIT

Model P61BB-1 replaces the standard pump operating switch to maintain supply pressure and also provides shut-down in event pressure falls approximately 10 psi below the switch cut-in setting.

Manual start lever provides "manually closed contact" for starting, permitting pressure build-up to maintain the run position.

240 V. 10 A.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	1 H.P.	1 H.P.	—
240	1 H.P.	1 H.P.	—
32	—	—	1/4 H.P.



P61BB-2

CAT. NO.	TYPE	RANGE kPa (PSIG)	FACTORY SETTINGS kPa (PSIG)			PRESSURE CONNECTOR FNPTF
			OPERATING CUTOUT	LOSS OF PRIME CUT-IN	LOSS OF PRIME PRIME	
5227	P61BB-2	124 to 469 (18 to 68)	276 (40)	138 (20)	69 (10)*	1/4"

*Loss of prime cutout will remain approx. 10 psi below the cut-in setting when switch settings are increased.

PENN PUMP
PRESSURE SWITCHES

Continued next page (522-a).

PENN PUMP PRESSURE SWITCHES

WEATHER-RESISTANT PRESSURE SWITCH

Two-pole pressure switches for mounting in locations subject to outdoor weather. The P61CA opens an electrical circuit on a rise in pressure. A typical application is for operation of irrigation pumps. The P61CG closes a circuit on a pressure rise. A typical application is a magneto grounding switch on stationary engines.

ELECTRICAL RATINGS

Volts	Single Phase A.C.	Polyphase A.C.	D.C.
120	2 H.P.	2 H.P.	—
240	2 H.P.	3 H.P.	—
32	—	—	1/4 H.P.



P61
Weather Tight Case

Series P10



ACTION ON INCREASE
OF PRESSURE



P10BC-28

With Bracket No. BKT16A-600



P10FC-16

P10 SERIES LOW PRESSURE CONTROL SINGLE STAGE

These SPDT pressure controls open or close an electrical circuit from a change in operating pressure.

Typical applications include: Pneumatic systems, control of pumps or small air compressors and pressure-electric interlock of fluid flow systems. R to Y terminals make (cut-in) on pressure rise.

Maximum Allowable Pressure: 150 psig.

Controls have a visible calibrated scale and adjustable range. A universal mounting bracket No. BKT16A-600 is supplied as standard. Model

ELECTRICAL RATINGS — (For each Pennswitch)

Motor Rating	120 V.	208 V.	240 V.	277 V.
A.C. Full Load Amps.	16.0	9.2	8.0	7.0
A.C. Locked Rotor Amps.	96.0	55.2	48.0	42.0
Non-inductive Amps.	16.0	9.2	8.0	7.2

Pilot Duty — 125 VA. at 24 to 277 V. A.C.

NOTE: On 2-stage models, the maximum connected load shall not exceed 2000 VA.

CAT. NO.	TYPE	NUMBER OF STAGES	CONTACT ACTION	RANGE kPa (PSIG)	FACTORY SETTING				PRESSURE CONN. FNPTF
					kPa (PSIG)	SWITCH DIFFERENT. kPa (PSI)			
82214	<u>P10BC-28</u>	1	SPDT	20 to 140 (3 to 20)	83 (12) R to Y Cut-In	2		14	1/8"
	<u>P10BC-20</u>					DETAILS ON APPLICATION			
	<u>P10BG-3</u>					DETAILS ON APPLICATION			
	<u>P10FC-16</u>	2	SPDT	20 to 140 (3 to 20)	55 (8) R - Y Cut-Out Low Stage	82 (12) R - Y Cut-In High Stage	14 (2) Low Stage	14 (2) High Stage	1/8"

Underlined Models have Metric Scales.

SUPPLEMENTARY LITERATURE

OUR CATALOGUE IS QUITE COMPREHENSIVE — EVEN SO WE CANNOT PRINT ALL THE INFORMATION IN THE VARIOUS MANUFACTURERS' LITERATURE — THESE ARE AVAILABLE ON REQUEST

PENN AIR VOLUME CONTROLS

FOR SHALLOW WELLS



F92B-2

Shallow Well Air Volume Control to prevent waterlogged or air bound tanks by maintaining proper air volume at all times. Float operation regulates opening and closing of the air valve on change in water level. The air valve opens on water level rise. It is connected to the snifter valve by means of copper tubing (tubing with flat flare fittings furnished on request — see Specification Table). All internal operating parts are constructed of brass to minimize corrosion.

CAT. NO.	TUBE KIT NO.
5244	190-820-30" tube
5245	190-821-36" tube
5246	190-822-48" tube
5247	190-823-60" tube

CAT. NO.	TYPE	GAUGE TAPPING	COPPER TUBING AND CONNECTORS		TANK CONN.	SUPPLY TANK
5242	F92B-2	1/4" Tap for Gauge	Flat flare fitting for 3/16" tubing all Air Volume Controls	Available with 3/16" O.D. Copper Tube with two flat flare fittings in optional tube lengths, as shown below: Kit No. 190-820-30" tube. Kit No. 190-821-36" tube. Kit No. 190-822-48" tube. Kit No. 190-823-60" tube.	1 1/4" Male National Pipe Thread	552 kPa (80 lbs.) Max. Pressure. Min. Diameter 9 inches
5243	F92B-1	1/4" Tap for Gauge .016 brass orifice				

FOR DEEP WELLS



F93B-1

F93H-1

Deep Well Air Volume Control to prevent air bound tanks by maintaining proper air volume at all times. Float operation opens the air valve on water level drop (increase in tank air), permitting air to bleed from tank to atmosphere. F93H-1 provided with minimum pressure release regulator (releases air to atmosphere only when

tank pressure is 172 kPa [25 lbs.] or higher). Recommended for installations where water must be drawn rapidly. Prevents the discharge of air when the tank pressure drops to the minimum required at the water taps.

All internal parts are constructed of brass to minimise corrosion.

CAT. NO.	TYPE	GAUGE TAPPING	MIN. PRESSURE RELEASE	TANK CONN.	SUPPLY TANK
5249	F93B-1	1/4" Tap for Gauge	Supplied on F93H-1 Only (Set at 172 kPa [25 lbs.]) Non-Adjustable	1 1/4" Male National Pipe Thread	552 kPa (80 lbs.) Max. Pressure Minimum Diam. 9 inches.
52410	F93H-1	1/4" Tap for Gauge			

AIR RELEASE VALVES FOR F90/F91 AIR VOLUME CONTROLS

F91 SERIES DEEP WELL CONTROLS



PART NO. KIT23A-601

CAT. NO.

F91 SERIES DEEP WELL CONTROLS FOR ATTACHING CAPILLARY TUBING FOR GASEOUS WELLS



PART NO. 191-811R

CAT. NO.

F90 SERIES SHALLOW WELL CONTROLS



PART NO. 192-802R

CAT. NO.

CLOSED TANK FITTING



Part No. F9013A-600R packing nut assembly. For application where the temperature does not fall below -35° F (-37° C) or exceed 250° F (121° C). Maximum liquid pressure limit is 150 psig (1034 kPa). Use with Style 1, 3/8" dia. bulb for direct immersion application. A19's require models with support tube; A70, A72's do not need support tube.

CAT. NO.

AIR RELEASE VALVE FOR F91H ONLY

Part Number 191-812R

CAT. NO.

PENN FLOW AND FLOAT SWITCHES

F61 SERIES FLOW SWITCH

STANDARD FLOW RATE — SPDT



F61KB-11



F61MB-1

The F61 flow switch is designed for use on liquid lines using water, ethylene glycol solutions, or other liquids not injurious to the brass and phosphor bronze parts that come in contact with the liquid. The SPDT contacts make or break an electrical circuit when flow starts or stops.

F61KB-11 : NEMA 1 type enclosure.

F61MB-1 : This flow switch meets NEMA type 4 requirements and is U.L. listed as raintight. Use on indoor or outdoor applications in high humidity atmospheres, on liquid lines handling fluids below dewpoint temperatures or below 0°C (32°F).

Use on lines carrying well water, swimming pool water, sea water, brine or ethylene glycol. Not for use with hazardous fluids or in hazardous atmospheres.

CAT. NO.	TYPE
5261	F61KB-11 Std. Enclosure
52623	F61MB-1 Vapour Proof Encl.

The paddle is of three segments for use in pipes from 1" to 3" in diameter. Paddle segments may be removed or trimmed as needed. Type No. F61KB-11 and F61MB-1 include a 6" paddle for pipes 4" to 6".

ELECTRICAL RATINGS

Motor Ratings	120 V.	208 V.	240 V.	277 V.
Horsepower	1	1	1	—
A.C. Full Load Amps.	16.0	8.8	8.0	—
A.C. Locked Rotor Amps.	96.0	52.8	48.0	—
Non-Inductive or Resistance Load Amps.	16	16	16	16
Pilot Duty — 125 VA. 24/277 V. A.C.				

Dimensions :

F61KB-11 : 8-3/8"H(3" paddle), 4"W, 2-13/16"D.
F61MB-1 : 8-11/16"H(3" paddle), 4-51/64"W, 2-13/16"D.

Pipe Connection : 1" MNPT.

Max. Liquid Pressure : 1034kPa (150psig).

Max. Liquid Temperature : 121°C (250°F).

Min. Liquid Temperature, F61KB-11 : 0°C(32°F);

F61MB-1 : -29°C (-20°F).

Ambient Temperatures : 0 to 82°C (32 to 180°F).

TYPICAL FLOW RATES — IMPERIAL GALLS/MIN. & LITRES/SEC.

TYPE	LINE PIPE SIZE		Imp.G.P.M. litre/sec.	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"
F61KB-11 or F61MB-1	Min. Adj.	Flow Increase R to Y Closes	Imp. GPM	3.5	4.8	6.3	11.4	15.0	22.9	54.2	104	158	313
			l/s	.26	.37	.47	.86	1.14	1.74	4.10	7.89	12.00	23.66
		Flow Decrease R to B Closes	Imp. GPM	2.1	3.1	4.2	7.9	10.4	15.8	41.7	84.2	132	267
			l/s	.16	.23	.32	.60	.79	1.20	3.15	6.37	10.00	20.19
	Max. Adj.	Flow Increase R to Y Closes	Imp. GPM	7.3	11.1	16.0	24.2	28.8	44.2	107	204	313	633
			l/s	.56	.84	1.21	1.83	2.18	3.34	8.08	15.45	23.66	47.95
		Flow Decrease R to B Closes	Imp. GPM	7.1	10.4	15.0	22.5	26.7	41.7	102	196	300	608
			l/s	.54	.79	1.14	1.70	2.02	3.15	63.3	92.5	113	333

* Flow rates for these sizes are calculated.

† These gpm figures are for switch with 6" paddle. For 4" and 5" line pipe the paddle is trimmed.

LOW FLOW RATE — SPDT

For use on liquid lines using water, ethylene glycol solutions, or other liquids not injurious to the brass and phosphor bronze parts. SPDT contact switch is activated by a low flow rate; however, it has a large flow capacity with minimum pressure drop. Typical applications include:

- Water purification and treatment systems.
- Booster pumps.
- Fast shut down on high input boilers to guard against circulation failure.
- Cooling systems for electronic tubes, bearings and compressors.

F61KD : NEMA 1 type enclosure.

Min. Liquid Temperature, F61KD : 0°C (32°F)

Ambient Temperature : 0 to 82°C (32 to 180°F).

Dimensions : 5-1/32"H, 4"W, 2-13/16"D.

Motor Ratings	120 V.	208 V.	240 V.	277 V.
Horsepower	1	1	1	—
A.C. Full Load Amps.	16.0	8.8	8.0	—
A.C. Locked Rotor Amps.	96.0	52.8	48.0	—
Non-Inductive or Resistance Load Amps.	16	16	16	16
Pilot Duty — 125 VA. 24/277 V. A.C.				



TYPE F61KD

CAT. NO.	TYPE	Inlet and Outlet Size Female NPT	Enclosure NEMA Type	Adjustment Range R to Y Closes Flow Increase	Adjustment Range R to Y Opens Flow Decrease	Maximum Liquid Temp.	Maximum Liquid Pressure
5262	F61KD-3	1/2" x 1/2"	1	Imp. GPM Min. 0.50 Max. 0.92	Imp. GPM Min. 0.25 Max. 0.75	121°C (250°F)	1034 kPa (150psig)
5263	F61KD-4	3/4" x 3/4"	1	l/s Min. 0.038 Max. 0.069	l/s Min. 0.019 Max. 0.057		

FLOW AND FLOAT SWITCHES

F60 SERIES FLOW INTERLOCK SWITCHES

PENN



F60

Food waste disposal units, commercial dishwasher and similar applications.

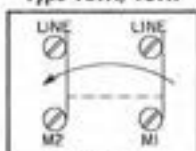
Designed to control an electrical circuit on applications requiring a predetermined amount of liquid. Control contacts will close when the required amount of liquid is flowing through the unit. Control contacts open when flow decreases to a preselected rate of flow.

ELECTRICAL RATINGS

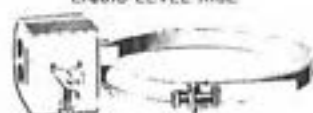
Motor Ratings	120 V. A.C.	208 V. A.C.	240 V. A.C.
Horsepower	1.0	1.0	1.0
Non-Ind. Amps.	15.0	9.2	8.0
Pilot Duty — 125 VA. 120 to 240 V. A.C.			

CAT. NO.	TYPE	SWITCH ACTION	FLOW RANGE	INLET AND OUTLET
5264	F60B-1	SPST — Close on Increase of Flow	Min. closing point 1.46 imp. GPM — 0.11 l/s. Max. closing point 2.08 " " — 0.16 " Opening point 0.42 " " — 0.03 "	1/2" Female NPT
5265	F60M-1	SPDT	below cut-in point, non-adjustable	1/2" Female NPT
5266	F60L-1	SPDT (Low Flow)	Min. closing point 0.42 imp. GPM — 0.03 l/s. Max. closing point 0.63 " " — 0.05 " Opening point 0.08 " " — 0.006 " below closing point, non-adjustable	1/2" Female NPT

Type F59A, F59H



ACTION ON LIQUID LEVEL RISE



F59A-2

Universal Replacement



F59D-5

F59 SERIES SUMP PUMP SWITCH

WEIGHT OPERATED

Switch to start electric motor on liquid level rise, stop motor on liquid level drop. Cuts in when upper weight is submerged approximately half-way. Cuts out when lower weight is approximately half-exposed. Each switch includes 1 m (36") of cable and 2 weights.

F59D5 is equipped with a switch power cord and a 3 prong male/female power plug. The male prongs plug into the wall outlet and the sump pump cord plugs into the female end of the plug.

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ELECTRICAL RATINGS

Volts	A.C.	D.C.
F59A, F59H		
120	1 H.P.	1/4 H.P.
240	1 H.P.	1/4 H.P.
F59D		
120	1/2 H.P.	1/4 H.P.

CAT. No.	TYPE	Contact Action	Mounting	Wiring
52612	F59A-1	DPST	External mounting bracket	Drop cord wiring
52613	F59A-2	DPST	External mounting — Includes universal mounting bracket & 24" strap for quick easy mounting on the motor, on the pedestal or on the discharge pipe.	Drop cord wiring
52614	F59D-5	SPST	External mounting — Includes clamp for mounting on pedestal or on the discharge pipe.	8' power cord with 3 prong dual plug
52614	F59H-1	DPST	External mounting bracket	Conduit Wiring — 7/8" conduit openings in case
52615	Part Number WGT11A-601R for weight and cable kit only.			

UNIVERSAL REPLACEMENT

KENRAHN BALL FLOAT SWITCH

2 1/2" DIA. PVC BALL FLOAT ANGULAR CHANGE PRODUCES SNAP ACTION OF MERCURY SWITCH.

TYPE CR — Contacts close on Rise of liquid. Used for emptying or high level Alarm circuits.

TYPE CF — Contacts close on Fall of liquid. Used for filling or low level Alarm circuits.

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ELECTRICAL RATING

1 AMP 240 VOLT AC.
1 AMP 6-24 VOLT DC.

STANDARD LENGTHS OF DOUBLE INSULATED CABLE 20' AND 40'.

CAT. NO.	TYPE	SWITCH ACTION	VOLTS	CABLE LENGTH
52616	R32-20	Close on Rise	32*	6.1 m (20 ft.)
52618	R230-20	Close on Rise	230	
52619	CF230-20	Close on Fall	230	
52620	R230-40	Close on Rise	230	12.2 m (40 ft.)
52621	F230-40	Close on Fall	230	

* 32 Volt Control Transformer supplied.

AVAILABLE ON APPLICATION: 32V units with 12.2 m (40 ft.) & 18.3 m (60 ft.) Cables
230V units with 18.3 m (60 ft.) Cables

PENN AIR FLOW SWITCHES

F62 SERIES AIR FLOW SWITCH

SPDT CONTACT UNIT



F62AA-8

This control detects air flow or the absence of air flow in ducts, responding only to velocity of air movement. One piece stainless steel paddle may be trimmed, if needed. Control supplied with mounting plate gasket.

Range adjusting screw permits field adjustment of flow rate setting.

Dimensions: 10 1/8" H (including paddle), 4" W, 2 1/8" D.

Paddle Width	Switch Action on Flow	* Minimum Air Velocity in FPM (in/sec.) Required to Activate Control			
		Horizontal Flow		Vertical Flow (Upward)	
		30 in. ² (243 cm ²) or larger Duct Area	Less Than 30 in. ² (243 cm ²) or larger Duct Area	30 in. ² (243 cm ²) or larger Duct Area	Less Than 30 in. ² (243 cm ²) or larger Duct Area
2 1/2"	Increase (R to Y Closed)	425 (3.2)	575 (3.9)	930 (4.8)	730 (3.8)
	Decrease (R to S Closed)	325 (1.7)	220 (1.3)	830 (4.3)	575 (2.9)
3 1/4"	Increase (R to Y Closed)	300 (2.3)	330 (1.8)	730 (3.8)	300 (2.3)
	Decrease (R to S Closed)	230 (1.3)	180 (.9)	630 (3.3)	330 (1.8)

* These are approximations only. Actual trip points are affected by air turbulence, humidity, air density, air temperature, etc.

ELECTRICAL RATING

Motor Ratings in Amps.	120 V.	208 V.	240 V.	277 V.
Nominal Horsepower	1	1	1	—
A.C. Full Load	16.0	8.8	8.0	—
A.C. Locked Rotor	96.0	52.8	48.0	—
Non-Inductive or Resistance Load	22.0*	22.0*	22.0*	22.0*

Pilot Duty — 125 VA, 120/277 V. A.C.

* SPST normally closed or normally open rating. SPDT rating is 16.0 Amps.

CAT. NO.	TYPE	PADDLE SIZE	MAX. AMBIENT TEMP.
5268	F62AA-8	2-1/8" x 6-7/8"	82°C (180°F)
5269	F62AA-9	3-1/8" x 6-7/8"	82°C (180°F)

PENN REPLACEMENT PADDLES FOR F61KB, F61MB & F62 FLOW SWITCHES

CAT. NO.	REPLACEMENT KIT NUMBER	DESCRIPTION
52647	KIT21A-600	3 in 1 paddle kit for Series F61
52648	KIT21A-601	6" paddle kit for Series F61
52649	KIT44A-600	2-1/8" wide paddle kit for Series F62
52650	KIT44A-601	3-1/8" wide paddle kit for Series F62
52652	PLT52A-600	3 in 1 Stainless Steel paddle kit for Series F61

NOTES

YOUR ONE STOP SOURCE FOR ACPAR PARTS

McDONNELL LIQUID FLOW SWITCHES

GENERAL PURPOSE MODELS

These flow switches are used primarily as automatic controls or safety devices in air conditioning, heating and water systems and also in processing work. They include the Model FS4-3 standard, and the Model FS8V in vapour-proof construction.

FEATURES

Easy Wiring—Cover completely removable. No cramped quarters, no danger of kinked wires interfering with operation.

Two Knockouts—Connect conduit at either side of housing.

Switch—Single-pole double-throw. Compact in size. Powerful snap action assures dependable operation.

Knife-Edged Bearings—Of hardened stainless steel to minimize friction.

Adjusting Screw—Provides simple way to adjust sensitivity to flow.

Packless—Heavy duty Monel syphon seals switch assembly from line.

3-in-1 Paddle—Segmented Monel paddle quickly adaptable for 1" to 3" pipe. Extended Monel paddle also included for larger pipe sizes.



McDONNELL No. FS4-3



The Model FS4-3 is a compact flow switch for service on water lines principally. It has a single-pole double-throw switch, can be wired to make one circuit, break a second circuit when flow starts or stops. All parts in contact with liquid in pipe are of brass or Monel. The FS4-3 is installed in tee or welded fitting in horizontal pipe.

Max. Pressure : 1034 kPa (150 psi)

Max. Temperature : 149°C (300°F)

CAT. NO. 52634

McDONNELL No. FS8V



The Model FS8V provides vapour-proof construction in a compact size flow switch. It is particularly suited for use in areas of high humidity and for out-of-doors installation. It has a single-pole double-throw switch, adjustment for sensitivity to flow, packless construction, wetted parts of brass and Monel. Like the FS4-3 it has segmented paddle as well as extended paddle, and it installs in tee or welded fitting in horizontal pipe.

Max. Pressure : 1034 kPa (150 psi)

Max. Temperature : 107°C (225°F)

CAT. NO. 52636

HEAVY DUTY MODELS

These flow switches are designed for heavier duty service or for use with process liquids. They include the FS7 standard Model and the FS7-4 Model for lower flow rates.

FEATURES

Switch—Dependable snap-action type, compact in size.

Footproof Wiring—Wiring completely shielded from switch action.

Magnetic Switching—Eliminates all mechanical connection between paddle arm and switching assembly.

Packless—Sealed tube of non-magnetic stainless steel isolates switch compartment from liquid and pressure in the pipe.

Easily Adjusted—for sensitivity to flow.

Convertible Paddles—Extended paddle, for pipe sizes over 1 1/4", quickly job-trimmed to precise size for optimum performance.

McDONNELL No. FS7



The Model FS7 Flow Switch can be used for a wide variety of applications in air-conditioning, heating and water systems, and in processing work. They have a single-pole double-throw switch, can be wired to make one circuit and break a second circuit when flow stops or starts. The standard Model is supplied with all wetted parts of brass.

Max. Pressure : 2069 kPa (300 psi)

Max. Temperature : 149°C (300°F)

CAT. NO. 52635

McDONNELL No. FS7-4



The Model FS7-4 Flow Switch incorporates the basic features and design of the Model FS7. They are modified by moving the fulcrum of the paddle lever arm so they will respond to lower flow rates. They have single-pole double-throw switches, and include an extended paddle for larger pipe sizes. All wetted parts are of brass.

Max. Pressure : 2069 kPa (300 psi)

Max. Temperature : 149°C (300°F)

CAT. NO. 52637

REFER NEXT PAGE FOR :
FLOW RATE TABLES
ELECTRICAL RATINGS
INSTALLATION DATA

McDONNELL LIQUID FLOW SWITCHES

CAPACITY — ELECTRICAL — INSTALLATION DATA

FLOW RATES REQUIRED TO ACTUATE FLOW SWITCHES

Flow rates in Imperial gallons per minute and litres per second.

MODEL	PIPE SIZE IN WHICH FLOW SWITCH INSTAL'D.			1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4" *	5" *	6" *
FS4-3	Factory or Minimum Adjustment	Flow	Imp.GPM	5.0	8.2	10.6	15.7	20.3	25.0	33.1	48.9	66.0
			l/s	.38	.62	.80	1.19	1.54	1.89	2.51	3.70	5.0
		No Flow	Imp.GPM	3.0	4.7	5.8	7.8	9.7	10.0	16.5	24.4	33.0
			l/s	.23	.36	.44	.59	.73	.76	1.25	1.85	2.5
	Maximum Adjustment	Flow	Imp.GPM	8.5	14.0	19.2	27.3	35.3	43.4	61.3	95.8	138.3
			l/s	.64	1.06	1.45	2.07	2.67	3.29	4.64	7.25	10.5
FS8V	Factory or Minimum Adjustment	Flow	Imp.GPM	4.1	6.3	7.8	11.4	14.9	20.2	29.4	40.5	50.3
			l/s	.31	.48	.59	.86	1.13	1.53	2.23	3.07	3.81
		No Flow	Imp.GPM	2.8	4.4	5.6	7.8	10.1	13.7	22.5	31.2	39.0
			l/s	.21	.33	.42	.59	.77	1.04	1.70	2.36	2.95
	Maximum Adjustment	Flow	Imp.GPM	14.7	24.2	31.5	47.0	59.4	74.2	98.3	148.3	204.2
			l/s	1.11	1.83	2.39	3.56	4.50	5.62	7.44	11.23	15.46
FS7-4	Factory or Minimum Adjustment	Flow	Imp.GPM		4.0	5.3	8.3	12.8	20.3	27.8	37.0	46.9
			l/s		.30	.40	.63	.97	1.54	2.11	2.80	3.55
		No Flow	Imp.GPM		2.5	3.0	4.9	7.9	12.8	17.6	25.8	40.6
			l/s		.19	.23	.37	.60	.97	1.33	1.95	3.07
	Maximum Adjustment	Flow	Imp.GPM		6.4	8.3	13.2	19.8	29.6	51.2	70.0	95.7
			l/s		.49	.63	1.00	1.50	2.24	3.88	5.30	7.25

FLOW RATES FOR FS7

PIPE SIZE IN WHICH FLOW SWITCH INSTAL'D.			1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8" **	10" **	12" **	14" **	16" **
Fact. or Min. Adjust.	Flow	Imp.GPM	7.0	9.0	14.8	22.3	38.4	44.7	59.8	78.8	169.2	328.3	587.5	716.7	950.0
		l/s	.53	.68	1.21	1.69	2.91	3.38	4.53	6.00	12.8	24.9	44.5	54.3	71.9
	No Flow	Imp.GPM	3.3	4.2	6.8	10.3	17.6	18.5	26.5	37.5	104.2	225.8	441.7	537.5	716.7
		l/s	.25	.32	.52	.78	1.35	1.40	2.01	2.84	7.9	17.1	33.4	40.7	54.3
Max. Adjust.	Flow	Imp.GPM	11.3	14.8	24.5	38.5	63.3	82.5	117.5	165.0	325.0	575.0	933.3	1150.0	1516.7
		l/s	.86	1.12	1.86	2.92	4.79	6.25	8.90	12.49	24.6	43.5	70.7	87.1	114.8
	No Flow	Imp.GPM	10.4	12.7	21.0	31.1	55.7	59.2	83.3	116.7	233.3	430.0	733.3	891.7	1183.3
		l/s	.79	.96	1.59	2.36	4.22	4.48	6.31	8.84	17.7	32.6	55.5	67.5	89.6

Flow rates are averages which may vary $\pm 10\%$ from tabulated values.

* Equipped with extended paddle trimmed to pipe size - Models FS4-3 and FS8V

** Model FS7 equipped with 6" paddle.

ELECTRICAL RATINGS

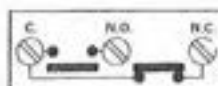
Ampere Ratings

Motor Duty	230 V.A.C.
Full Load	3.7 Amps.
Locked Rotor	22.2 Amps.
	230 V.D.C.
	0.15 Amps.
Pilot Duty: A.C., 125 V.A., 115-230 V.	

SWITCH OPERATION SCHEMATICS

In the Flow Rates given in the tables above for liquid flow switches the word "Flow" means that the switch will close one circuit, and open the other, when the flow rate is increased to the rate shown. (See schematic "Flow")

The words "No-Flow" mean the switch will reverse position - will open the first circuit and close the second - when the flow rate is decreased to the rate shown. (See schematic "No-Flow").

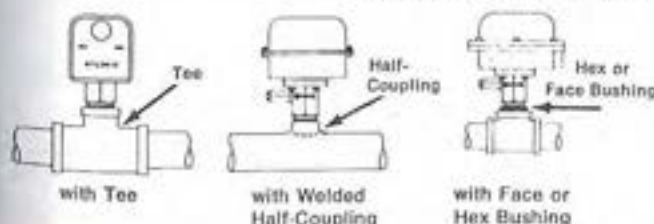


NO FLOW



FLOW

TYPICAL INSTALLATIONS



Installation

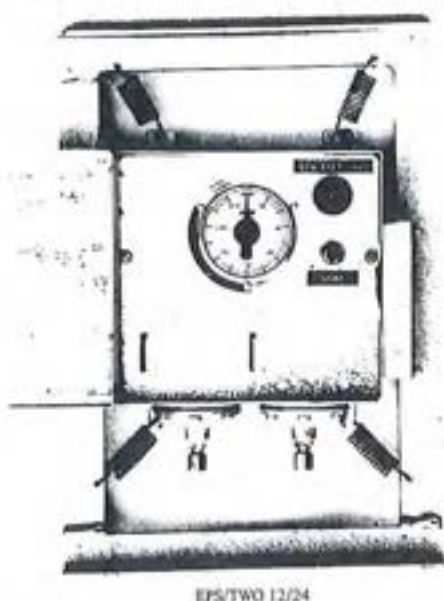
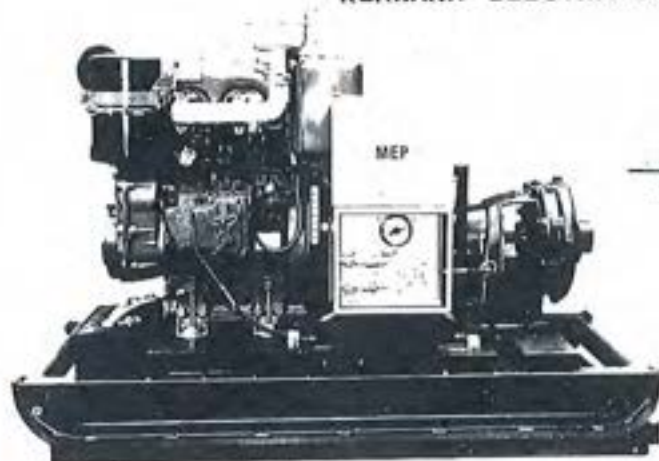
It is recommended that all models be installed upright in a horizontal run of pipe and that any valves, elbows, orifices or other restrictions be removed at least five pipe diameters from either side of the flow switch. Specific installation instructions are provided with each control.

ORDERING PROCEDURE : REFER TO PAGE 526-c AND QUOTE CAT. NO. OF ITEM REQUIRED.
SECTION 7

Tech. Page 526-d

ENGINE PROTECTION EQUIPMENT

"KENRAHN" ELECTRIC AND NON ELECTRIC TYPES



Engine Protection Control Units are designed to provide protection for petrol or diesel engines and pumping plants against damage caused by :-
 Low lubricating oil pressure High coolant temperatures
 Loss of prime or low pump pressures Fan belt breakage or generator failure
 Control Units are also available complete with a time switch to provide the convenience of shut down after the expiry of a preset time.

ELECTRICAL ENGINE PROTECTION UNITS EEP & EPS

Electrically Operated Protection Units 12/24 Volt DC

EEP/TWO - Suits Air Cooled Engine Driving a Pump.

EEP/TO or TW - Suits Air Cooled Engines.

XP/NO - Temp. Sensor for EEP Units (Water Cooled Engines).

Knock Offs for above Units to Operate Diesel Rack

A2 12/24V - 8 lb. Thrust 1" Stroke.

A4 12/24V - 36 lb. Max. Load with external spring, 2" Stroke.

A2 Bowden Cable and bracket.

Fail Safe Electrically Operated Protection Unit

EPS/TWO - Suits Air Cooled Engine Driving a Pump.

EPS/TO or TW - Suits Air Cooled Engines.

XP/NC - Temp. Sensor for EPS Units (Water Cooled Engines).

A2S 12 or 24V - 8 lb. Thrust 1" Stroke, State Voltage.

A4 12 or 24V - 36 lb. Max. Load with external spring, 2" stroke.

A2S Bowden Cable and Bracket.

Any of above supplied without Time Clock deduct.

SYMBOLS:

T - 24 hr. Timer stops engine at end of Pre-set time.

W - Loss of Pump Discharge Pressure.

O - Loss of Engine Oil Pressure.

XP - Engine Water Temperature Protection.

MECHANICAL ENGINE PROTECTION EQUIPMENT - MEP

Standard Stocked Units:

To Suit Air Cooled Engine Driving a Pump

To suit Water Cooled Engine Driving a Pump

Time Control Only - No Protection

MEP/TWO

MEP/TWOX

MEP/T

SYMBOLS:

T - 24 hr. Timer Stops Engine at end of Pre-set Time

MEP/TOX or TWX

W - Loss of Pump Discharge Pressure

MEP/OWX

O - Loss of Engine Oil Pressure

MEP/OX or WX

X - Engine Water Temperature Protection

MEP/TO or TW

Variations to any of above Models.

Standard:

12 - 12 hr. Timer to replace 24 hr. Timer

S - Micro switch to prevent battery drain and protect alternator

B - Black spring on pressure unit 30-100 psi shut down.

A - Air Cooled Engine Temperature Flat Bulb.

Special:

E - Excess water pressure. Stops on press. rise up to 100 psi.

V - Vacuum Sensor for Pump Suction Line.

F - Flood Irrigation Sensor stops on Low Pump Press. 1-6 psi

Brackets to suit most engines are available on request.

SINGLE & COMBINATIONS AVAILABLE

CAT. NO.	TYPE	CAT. NO.	TYPE
52827	EEP/TOX	52878	A2 12/24V (8 lb/1")
52828	EEP/TWOX	52888	A4 12/24V (36 lb/2")
52843	EEP/TWO	52879	A2 Bowden Cable
	EEP/TO		EPS/TWO
	EEP/TW		EPS/TO
52881	XP/NO		EPS/TW
52842	MPB 240V	52882	XP/NC
52844	EPS/OXP	52887	A2S 12/24V (8 lb/1")
52845	EPS/TWOXP		A2S Bowden Cable

SINGLE & COMBINATIONS AVAILABLE

CAT. NO.	TYPE	CAT. NO.	TYPE
52851	MEP/OX	52868	MEP-T/ITC
52852	MEP/TOX	52869	MEP/O
52853	MEP/TWOX	52870	MEP/W
52854	MEP/TWO	52871	MEP/X
52855	MEP/TW	52874	MEP/WX
52856	MEP/TO	52875	MEP/OWX
52857	MEP/TWX		MEP/T

SPARES AVAILABLE ON APPLICATION

ORDERING INFORMATION : QUOTE CAT. NO. REQUIRED - PLUS

Standard Models - Specify: Type Number / Engine Type / Pump Pressure Range / Shutdown Device Required / Voltage

Non-Standard Models - Specify Features Required

THERE'S JUST NOT ENOUGH SPACE TO LIST ALL OF THE EQUIPMENT AND SERVICES WE CAN OFFER YOU
 LET US KNOW ABOUT YOUR REQUIREMENTS

SOLENOID VALVES

FOR WATER, OIL, AIR AND GAS

531
Danfoss



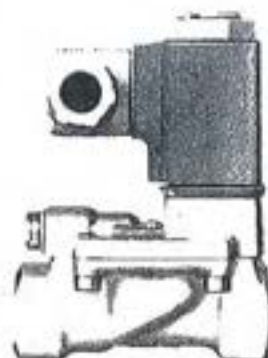
JUNCTION BOXES



TYPE EVI



VALVES



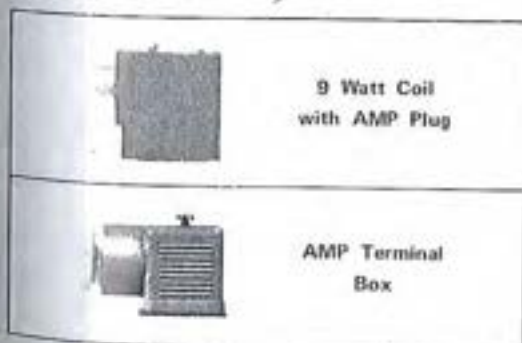
TYPE EVSI



CAT. NO.	TYPE	CODE No.	APPLIC.	* CONN.	DIFFERENTIAL PRESSURE kPa		TEMP. MEDIUM °C	TEST PRESS. kPa	Kv m ³ /h @ PD 100kPa
					MIN	MAX			
DIRECT CONTROLLED									
531110	EVI-1.5	32U1407	OLW	1/8" F.BSP	0	3000	-10 to +90	5000	0.05
531111		32U1417	OLW	1/4" F.BSP	0	3000		5000	0.05
531112	EVI-2	32U1437	OLW	1/4" F.BSP	0	2000		5000	0.15
531113	EVI-3	32U1467	OLW	1/4" F.BSP	0	1000		5000	0.3
SERVO - CONTROLLED									
	EVSI-6	32U1454	OL	3/8" F.BSP	10	3000†	Air -10/+60	5000	0.6
	EVSI-10	32U1514	OL	1/2" F.BSP	10	3000†	Oil -10/+90	5000	1.5
53141	EVSI-15	32U4507	WBD	1/2" F.BSP	30	1000	-30 to +100	2000	4.0
53142	EVSI-20	32U4527	WBD	3/4" F.BSP					8.0
53143	EVSI-25	32U4547	WBD	1" F.BSP					11.0
53144	EVSI-32	32U4567	WBD	1 1/4" F.BSP					16.0
53145	EVSI-40	32U4587	WBD	1 1/2" F.BSP					22.0
53146	EVSI-50	32U4607	WBD	2" F.BSP					40.0
	EVSI-65	16D4106	WBD	2 1/2" F.BSP	25	1000	-25 to +90	2000	50.0
	EVSI-80	16D4106	WBD	3" F.BSP					75.0
	EVSI-100	16D4107	WBD	4" F.BSP					130.0
53149	EVJHS-15	32U3033	Steam	1/2" F.BSP	10	1000	160 Max.	3000	4.8
53150	EVJHS-20	32U3053	Steam	1/2" F.BSP					6.0

† O = Oil L = Air W = Water WBD = Water and brine for refrigeration plant.
† EVSI-6 & 10 for Oil: Diff. Pressure 2000 kPa.

All valves supplied standard with Junction Box.



9 Watt Coil with AMP Plug

AMP Terminal Box

ELECTRICAL COIL DATA (Coils Without Junction Box)				
CAT. NO.	VOLTS/FREQUENCY	WATTS	CODE No.	SUITS VALVE
122289	240 / 50	9	42N7502	EVI / EVSI
122290	415 / 50	9	42N7505	EVI / EVSI
122291	12V, DC	9	42N7550	EVI / EVSI
122292	24V, DC	9	42N7551	EVI / EVSI
	240 / 50	8	32K7772	EVJHS
122296	Junction Box		42N0156	EVI / EVSI

TYPE EVSI SOLENOID VALVES AND CAPACITIES FOR WATER AND BRINE ARE ALSO LISTED IN REFRIG./AIR COND. SECTION 1, PAGE 122-b
For complete details refer Manufacturers Literature Available On Request

SOLENOID VALVES

Valve Type 56

AIR & GAS SERVICE

Basic Valve Number	Pipe connection BSP internal parallel in	Orifice diameter mm in	Operating pressure differential		Gas capacity SG 0.5	
			Maximum	Minimum	7.5 mm H ₂ O pressure drop, m ³ /hr	0.3 in H ₂ O pressure drop, ft ³ /hr
5675	1/2	7.9 0.312	16	0	1.6	55
5676	3/4	12.7 0.5	16	0	3.2	115
5677	1	12.7 0.5	16	0	3.7	130
5602	1 1/2	25.4 1.0	12	0	8.4	295
5603	2	25.4 1.0	12	0	11.3	400

The body is a high grade aluminium die casting and has pipe connections screwed 1/2 in—1 in BSP internal parallel (BS 21). The valve plunger is of heat treated nickel iron with a floating seat disc of synthetic rubber to ensure tight shut-off throughout the valve life. The plunger housing is of high quality brass, with adequate clearance to give high plunger acceleration.



Satchwell
BLACK
AUTOMATIC CONTROLS LTD

Valve Type 66

An electro-hydraulic actuator assembly self-contained in a rugged light alloy housing mounted directly to a cast spheroidal (nodular) graphite iron valve body via a mild steel adaptor collar.

The valve seat is of specially selected NITRILE rubber powerfully loaded in the closed position by two stainless steel springs.

When an electrical supply is established to the **PowerSeal** actuator, a relief valve closes and an electrically driven pump provides pressure to the underside of a piston lifting the main valve against the return springs. When the valve is fully open, the pump is switched off by a limit switch, the relief valve remaining closed.

When 'CLOSE' is signalled, or electrical power fails, the relief valve opens relieving the pressure under the piston, permitting the return springs to close the main valve.



Basic Valve Number	Pipe connection BSP in	Orifice diameter		Max. operating pressure differential		Flow capacity 7.5mm H ₂ O press. drop		Opening time seconds	Closing time seconds
		mm	in	kg/cm ²	lbf/in ²	7.5mm H ₂ O press. drop m ³ /hr	0.3in H ₂ O press. drop ft ³ /hr		
6601	1	25	1	0.84	12	10.5	375	2 to 5	Less than 1
6602	1 1/2	32	1.25	0.84	12	15.5	550		
6603	1 1/2	38	1.5	0.84	12	24	850		
6604	2	50	2	0.49	7	45	1600	2 to 5	Less than 1
6605	2 1/2	64	2.5	0.35	5	68	2400		
6606	3	76	3	0.35	5	83	2950		
6607	4	102	4	0.21	3	144	5100		

Media: Air or gas. **Media temperature:** 65°C (150°F) maximum. **Ambient temperature:** 55°C (130°F) maximum.
Maximum body pressure: 10.5 kg/cm² (150 lbf/in²). **Back pressure** (maximum reverse pressure): 0.15 kg/cm² (2 lbf/in²)
Pipe connections: screwed BSP internal parallel or flanged, drilled as required to Table D or Din 10—see options.
Mounting attitude: actuator vertical or horizontal as shown on valve nameplate.
Voltage: 240v 50Hz (suitable generally for 220v 50Hz).

OIL BURNER NOZZLES TECH. PAGE 536

STEINEN

SPECIFICATIONS

Steinen nozzles are available in five different types, each of which produces a different spray pattern. These nozzles are designed and engineered for top performance in the various types of furnace and boiler designs.

Nozzles are stamped with the capacity in G.P.H. (gallons per hour), the spray angle and even identifying the type of spray pattern.

DESIGN FEATURES

Steinen nozzles with the stainless steel highly finished, self-seating metering insert creates a perfect swirl chamber that produces a uniform spray pattern — no one-sided fires.

The exclusive polished "Mirror Finish" tip, made from high quality heat and wear resistant stainless steel allows maximum heat reflection minimizing internal gumming and coking. Stainless steel, being less of a heat conductor than most other materials, also maintains lower

internal nozzle temperatures, thereby keeping the accumulation of varnish and residue at a minimum.

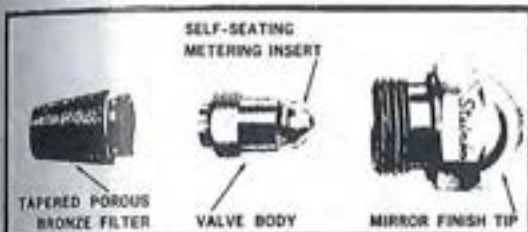
The unique Steinen porous bronze filter with its exclusive tapered design provides greater filtering area, an added advantage for longer and more efficient nozzle life. Porous bronze filters are standard on all nozzles .40 G.P.H. through 1.00 G.P.H. Above 1.00 G.P.H., 100 mesh monel strainers are furnished.

Every Steinen nozzle is individually tested and calibrated to high quality standards. Each nozzle is packed in an individual transparent, dustproof plastic container with a plastic cap clearly stamped showing capacity, spray angle and type of nozzle.

CAPACITIES AND SPRAY ANGLES

Steinen nozzles are available from .40 thru 50.00 G.P.H. in 30°, 45°, 60°, 70°, 80°, 90° spray angles. All nozzles are individually

tested for capacity, spray angle, spray pattern and atomization against a calibrated Master nozzle. The Master nozzles are calibrated with oil @ 35 SSU viscosity @ 100°F and 100 PSI. The tolerance of the spray angles are held to plus or minus 5° and capacity tolerance to plus 5% minus nothing. However, it is important to note that in conducting laboratory or field tests, different ratings may be obtained as capacity varies with viscosity. The capacity changes by approximately 1% for each SSU change in viscosity. When operating at higher pressures, the capacity increases and the spray angle may decrease. It is recommended that when operating at approximately 200 PSI, wider spray angles may be necessary. When using heavier oils, it may also be necessary to use wider spray angles depending upon the air handling equipment.



Porous Bronze Filters are standard on all nozzles .40 G.P.H. thru 1.00 G.P.H. Above 1.00 G.P.H. 100 mesh monel strainers are furnished.

INSTRUCTIONS

for Ordering Nozzles . . . Please Specify

1. Quantity wanted
2. Capacity rating
3. Angle of spray
4. Type of spray

All nozzles are packaged in dust-proof containers, with size and capacity clearly printed on top.

TYPE Q is a specially designed nozzle in the popular sizes .50 - 3.00 G. P. H. These nozzles have a distinctive spray pattern and are highly successful in solving critical combustion problems as it minimizes noisy fires and pulsation.

.40 TO 2.25 G.P.H.

TYPE H nozzles produce a very fine atomized hollow cone spray pattern.

.40 TO 4.00 G.P.H.

TYPE S solid cone nozzles produce a fine atomized uniform spray throughout the entire pattern.

2.50 TO 50.00 G.P.H.

TYPE PH nozzles are similar to the Type H except that they are relatively more hollow. Made in larger capacities for light and heavy oil applications where fine atomization is required.

4.50 TO 50.00 G.P.H.

TYPE SS is a general purpose nozzle in the larger sizes and delivers a semi-solid cone spray pattern.

4.50 TO 50.00 G.P.H.

SPRAY PATTERNS

S

H

B

ORDERING Specify

- Quantity Req'd.
- Capacity Rating
- Spray Pattern

Danfoss Oil Nozzle Type OD

Danfoss oil nozzles are a precision-made quality product, with a perfect spray pattern determined by the cone and the orifice tip as the important parts. The cone and the orifice tip are made with an instrument-mechanical precision, of a wear resistant and corrosion proof chrome-nickel steel. These features in combination with careful positioning of these parts in the nozzle housing result in an oil nozzle with a perfect spray pattern.

Danfoss oil nozzles in the capacity range of from (1.6 to 4.5 kg/h) (0.5 to 1.35 US gal/h) (1.89 to 5.11 l/h) are equipped with a nylon strainer designed especially for small oil nozzles with a low velocity of flow. Danfoss oil nozzles with a low capacity have a bore as fine as a hair in the orifice tip. It is, therefore, important that the strainer should be a tight fit on the nozzle housing so that small particles of foreign matter do not evade the strainer and reach the bore.

Danfoss oil nozzles have a treble capacity marking. On the flat sides of the oil nozzle its capacity is indicated in kg/h, USgal/h, and l/h respectively.

The kg/h rating can be used — with a good approximation — for a comparison between the oil nozzle capacity and the capacity stamped on the boiler, since 1 kg of oil per hour corresponds to approx. 10,000 kcal/h.

The USgal/h rating makes it easy to find a Danfoss oil nozzle to replace an oil nozzle marked in USgal/h only, since oil nozzles of American make and Danfoss oil nozzles are directly comparable.

The l/h rating can also be used with a good approximation for comparison between the oil nozzle capacity and the kW firing rate, since 1 litre of oil per hour corresponds to approx. 10 kW.

Danfoss oil nozzles have a marking which indicates the capacity, spray angle, and spray pattern of the oil nozzle. This marking is repeated on the cover of the oil nozzle container.

To make a further distinction between the different spray patterns of the oil nozzles, they are supplied in containers each with a different coloured cover.

Spray Pattern B — White, S — Red, H — Blue.

CAPACITY RANGE

SPRAY PATTERN	30° SPRAY ANGLE			45° SPRAY ANGLE			60° & 80° SPRAY ANGLE		
	kg/h	USgal/h	l/h	kg/h	USgal/h	l/h	kg/h	USgal/h	l/h
S	2.25 to 10.0	0.65 to 3.0	2.46 to 11.4	1.6 to 10.0	0.5 to 3.0	1.89 to 11.4	1.6 to 10.0	0.5 to 3.0	1.89 to 11.4
H	2.25 to 10.0	0.65 to 3.0	2.46 to 11.4	1.6 to 10.0	0.5 to 3.0	1.89 to 11.4	1.6 to 10.0	0.5 to 3.0	1.89 to 11.4
B	2.25 to 12.0	0.65 to 3.75	2.46 to 14.0	2.25 to 40.0	0.65 to 12.0	2.46 to 45.0	2.0 to 100	0.6 to 31.5	2.27 to 119

OIL BURNER PRIMARY CONTROLS



Danfoss OIL BURNER CONTROLS

APPLICATION

This series is designed for the full automatic control and protection of pressure jet oil burners and should be used in conjunction with one of the photo resistor units types FD or PCF. The oil burner controls attempt immediate re-ignition in the event of flame failure and are intended for use with both intermittent and continuous ignition. They are designed for oil burners having single or three-phase motors.

CAT. NO.	MODEL	CODE No.	APPLICATION	LOCK OUT TIME	PRE/POST PURGE	PHOTO RESISTOR UNIT	
						TYPE	APPLICATION
5381	57H1	57H0062	Single Phase Motor	10 to 25 sec.	20/15 sec.	LD	Sights — Side and End
5383	57L1	57L0001	Single or Three Phase Motors	15 sec.	20/20 sec.	FD or PCF	Blower tube side or end
5385	57L3	57L0003	Single or Three Phase Motors	15 sec.	Nil	PCF	1 1/2" Light Channel Tube

PHOTO RESISTOR UNITS

CAT. NO.	TYPE	CODE No.	APPLICATION
5387	FD	57L0031	For fitting in blower tube. Side or end light
53810	LD	57H0020	For fitting in burner tube. Side or end light
53812	LDC	57H0030	For fitting in 1 1/2" light channel tube

Danfoss INTERMITTENT DUTY ONLY

IGNITION TRANSFORMERS

CAT. NO.	CODE NO.	RATING	DESCRIPTION
53855	52L0001	10 KV	Bottom Connections
53856	52L0003	10 KV	Side Connections
53861	52L0030	8 KV	Side Connections for Gas

ALLANSON CONTINUOUSLY RATED

CAT. NO.	TYPE	RATING	DESCRIPTION
53878	911-389	10 KV Cont.	Two Pin — Enclosed Type
53879	911-360G	10 KV Cont.	Two Pin
53880	911-347	10 KV Cont.	Two Pin — Hinged Mounting
53882	911-406	10 KV Cont.	Two Pin with Junction Box



ACCESSORIES

CAT. NO.	TYPE	CODE NO.	SYMBOL	DESCRIPTION	
53872	IGNITION ELECTRODE TYPE 52	52-0006		Rajah-type terminal	Ø14 mm (9/16 in.) porcelain insulator
53873		52-0007			Ø16 mm (5/8 in.) porcelain insulator
53890	52D	52D0382		High Voltage Cable Adaptor	
53889				High Voltage Terminal Clips	

Danfoss

FUEL OIL PUMPS



TYPE RSA



TYPE MSLA

CAT. NO.	TYPE	CODE No.	DIRECTION OF ROTATION VIEWED FROM SHAFT END	DESCRIPTION
54022	MSLA 032	71B-0101	Clockwise	Oil Pump with built-in Solenoid Valve
54023	MSLA 032	71B-1101	Anti-Clockwise	
54024	MSLB 032	71B-2101	Clockwise	Oil Pump for Solenoid Valve in nozzle line
54025	MSLB 032	71B-3101	Anti-Clockwise	
54027	RSLB 050	70-4130	Clockwise	Oil Pump with hydraulic Cut-Off
	RSLB 050	70L-4140	Anti-Clockwise	
54013	RSL 028	70-4340	Clockwise	Oil Pump for
	RSL 028	70L-4330	Anti-Clockwise	
54014	RSL 028	70L-4340	Anti-Clockwise	One, Two or Multi - Stage Operation
54010	RSA 40	70-3240	Clockwise	
54029	RSA 40	70-3230	Anti-Clockwise	One, Two or Multi - Stage Operation
5409	RSA 40	70L-3240	Anti-Clockwise	
	RSA 40	70L-3230	Anti-Clockwise	One, Two or Multi - Stage Operation
54043	RSA 60	70-3350	Clockwise	
54011	RSA 60	70-3360	Clockwise	One, Two or Multi - Stage Operation
54044	RSA 60	70L-3350	Anti-Clockwise	
54012	RSA 60	70L-3360	Anti-Clockwise	One, Two or Multi - Stage Operation
54026	RSA 125	70-3400	Clockwise	
54045	RSA 125	70-3410	Clockwise	One, Two or Multi - Stage Operation
	RSA 125	70L-3400	Anti-Clockwise	
54028	RSA 125	70L-3410	Anti-Clockwise	One, Two or Multi - Stage Operation

CROSS REFERENCE CHART TYPES RSA / TYPES RS

As shown in the Cross Reference Chart below, Type RSA Pumps can be used to replace Type RS Pumps.

RS 28 070-5300	⇒	RSA 28 070-5370
RS 28 070-5302	⇒	RSA 28 070-5372
RS 28 070-5310	⇒	RSA 28 070-5380
RS 28 070-5312	⇒	RSA 28 070-5382
RS 28 070-5322	⇒	RSA 28 070-5332
RS 28 070L5300	⇒	RSA 28 070L5370
RS 28 070L5302	⇒	RSA 28 070L5372
RS 28 070L5310	⇒	RSA 28 070L5380
RS 28 070L5312	⇒	RSA 28 070L5382
RS 28 070L5322	⇒	RSA 28 070L5332
RS 40 070-3200	⇒	RSA 40 070-3230
RS 40 070-3202	⇒	RSA 40 070-3232
RS 40 070-3210	⇒	RSA 40 070-3240
RS 40 070-3212	⇒	RSA 40 070-3242
RS 40 070-3222	⇒	RSA 40 070-3249
RS 40 070L3200	⇒	RSA 40 070L3230
RS 40 070L3202	⇒	RSA 40 070L3232
RS 40 070L3210	⇒	RSA 40 070L3240
RS 40 070L3212	⇒	RSA 40 070L3242
RS 40 070L3222	⇒	RSA 40 070L3249
RS 60 070-3300	⇒	RSA 60 070-3350
RS 60 070-3302	⇒	RSA 60 070-3352
RS 60 070-3310	⇒	RSA 60 070-3360
RS 60 070-3312	⇒	RSA 60 070-3362
RS 60 070L3300	⇒	RSA 60 070L3350
RS 60 070L3302	⇒	RSA 60 070L3352
RS 60 070L3310	⇒	RSA 60 070L3360
RS 60 070L3312	⇒	RSA 60 070L3362

OIL STRAINERS

SPECIFICALLY DESIGNED FOR FITTING ON OIL BURNERS

DANFOSS TYPE "OF"



CAT. NO.	TYPE	CODE No.	CONNECTION
54063	OF	23N 0010	1/4" NPSF
54064	OF	23N 0011	3/8" BSP

NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

CHECK VALVES



If the oil tank is situated at a lower level than the oil pump, it is necessary to provide a check valve in the suction line to prevent the oil flowing back to the tank when the burner is standing.

The check valve may be mounted either at the end of the suction line at the bottom of the tank, or in the burner room at the point where the suction line is carried through the wall.

Furthermore, it is advisable to fit a check valve in the return line. As the oil flowing through the return line is strained, there is no risk of the check valve in the return line failing on account of dirt.

CAT. NO.	HELDON PART No.	CONN. Flare
54071	3365 / 5	5/16"
54072	3365 / 6	3/8"
54073	3365 / 8	1/2"

ACCESSORIES FOR HYDRONIC SYSTEMS

Onga twin tanks

All multi stage pressure systems are supplied with two or more twin tanks to give the correct water draw-off. This twin tank is compact and light in weight so installation and maintenance become simple. As the initial air charge is long lasting, the twin tank eliminates the greatest source of trouble experience with water pressure systems; the malfunctioning of the air volume control, which results in rapid cycling of the system and eventual motor troubles. The twin tank has an expandable liner that completely protects the tank from corrosion and the water from contamination and discoloration by rust. These tanks are pipe-mounted and can be installed anywhere in the delivery line; this allows the pump to be located more conveniently.



The Onga Twin Tanks are made of steel with a non-toxic, non-tasting, non-corrosive expandable liner. This liner completely separates the water from the tank so that no corrosion, contamination or discoloration can take place. Because initial air charge lasts a long time waterlogging and motor troubles do not occur.

Can be pipe mounted remotely from the pump so that pump can be installed under house or in confined space. Increased performance can be obtained in installations with high static heads.

Multiple standardized tanks are used to tailor the draw-off required to your exact application.

Replaceable liner — the liner can be replaced using the existing tank shell.

Versatility. Onga Twin Tank can be used with any make of water pressure system to add reliability to the system and give more water draw-off.

Compact. The tank is small in size and light in weight — one man can easily install the whole water pressure system. Because of size, the unit takes up less space and lends itself to installation in existing buildings.

Bad Water protection. No contamination or corrosion will result if very bad water is being pumped. For complete pressure switch protection against corrosion and blocking it can be mounted on air side of the tank.

Liner Protection. If the tank accidentally loses air charge, the liner will not be damaged.

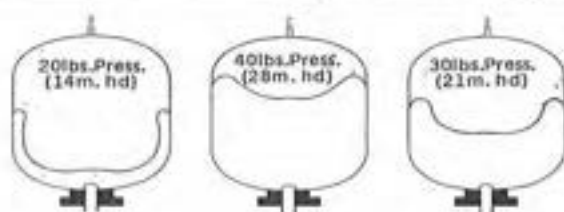
How to install an Onga twin tank

1. Tank should be pipe-mounted vertically.
2. Initial air charge should be 10% below pressure switch cut-in pressure (this should be checked every 12 months).
3. Tank is best mounted under cover in a cool situation.
4. Use recommended number of twin tanks.



Operation of tank

When the pump first starts no water will enter the tank until the pump pressure is greater than the air supercharge in the tank. As pump pressure increases, water enters the tank expanding the liner and further compressing the air until top pressure is reached and pump is shut off. When a tap is turned on fresh non-contaminated water flows out of the tank. The air expands, the pump turns on and the cycle is repeated.



Imperial Units

ONGA TWIN TANK DRAW-OFF TABLE

Metric Units

Imperial Units	Pressure Switch Setting	Draw-off Imperial gallons	Size of Conventional Tank for equivalent draw-off Imp gallons	Metric Units	Pressure Switch Setting Metres hd.	Draw-off litres	Size of Conventional Tank for equivalent draw-off litres
8 gallon twin tanks Max flow 20 g.p.m.	11/22	2.2	13.4	8 gallon twin tanks Max flow 90 litres p.m.	8/16	10.0	60.9
	15/30	2.4	15.3		11/22	10.9	69.5
	20/40	2.6	17.8		15/30	11.8	80.9
Standard tank	30/50	2.2	22.7	Standard tank	20/35	10.0	103.2
100 p.s.i. working pressure	40/65	2.2	27.6	70 metres hd. working pressure	28/45	10.0	125.4
	50/80	2.2	32.5		35/56	10.0	147.7
	60/90	2.0	37.4		42/63	9.1	170.0
	70/100	1.8	42.3		50/70	8.2	192.3
High pressure tank	90/120	1.5	52.1	High pressure tank	63/85	6.8	236.8
200 p.s.i. working pressure	110/150	1.6	61.9	140 metres hd. working pressure	77/106	7.3	281.3
	140/180	1.4	76.6		100/127	6.4	348.2
	160/200	1.3	86.3		113/140	5.9	392.2
2 gallon twin tank Max flow 10 g.p.m. Max pressure 60 lbs. p.s.i.	11/22	0.57	3.3	2 gallon twin tank Max flow 45 litres p.m. Max pressure 45 metres hd.	8/16	2.6	15.0
	15/30	0.62	3.7		11/22	2.8	16.8
	20/40	0.69	4.4		15/30	3.2	20.0
	30/50	0.58	5.6		20/35	2.6	25.5
	40/60	0.53	6.2		28/45	2.4	28.2

ACCESSORIES FOR HYDRONIC SYSTEMS

PRESSURE REDUCING AND RELIEF VALVES



CAT. NO.	TYPE	DESCRIPTION	SETTING
54416	A40C	PRESSURE REDUCING	83 - 97 kPa (12-14 PSI)
54419	M330	RELIEF VALVE	207 kPa (30 PSI)
54417	AC50	REDUCING VALVE	0-517 kPa(0-75PSI) Adjustable
54420	LV50	RELIEF VALVE	207 kPa (30 PSI)
54424	VR 2	VACUUM RELIEF	

AUTOMATIC AND MANUAL AIR VENTS



CAT. NO.	TYPE	DESCRIPTION
54411	67	AUTO AIR VENT 1/8 MALE CONNECTION
54413	17	MANUAL AIR VENT KEY OPERATION
54415	19	KEY TO OPERATE NO. 17 VENT

HYDRAULIC ENGINEERING—TECHNICAL DATA

METRIC — ENGLISH APPROXIMATIONS

100 p.s.i. =
 70 metres head of water (70.4)
 700 kilopascals (690)
 100 ft. head of water =
 30 metres head of water (30.48)
 300 kilopascals (298.9)
 100 kilopascals =
 14.5 p.s.i. (14.48)
 34 ft. head of water (33.456)
 10 metres head of water (10.197)
 1 atmosphere (1.013)
 30 inches head of mercury (30.397)
 100 metres head of water =
 330 ft. head of water (328.08)
 1000 kilopascals (980.6)
 100 imperial gallons =
 450 litres (454.6)
 1 cubic metre =
 1000 litres (exactly)
 220 gallons (219.96)
 1000 cubic metres =
 0.8 acre ft. (0.811)

Practical suction lift of water at 20°C

Elevation		Barometric reading		Suction lift			
Feet	Metres	p.s.i.	Milli-bars	Theoretical		Practical	
				Feet	Metres	Feet	Metres
Sea level		14.7	1013	34.0	10.36	22.0	6.71
1300	396	14.0	966	32.4	9.88	21.0	6.40
2600	792	13.3	918	30.8	9.39	20.0	6.01
2900	883	12.7	877	29.2	8.90	18.0	5.49
5200	1584	12.0	828	27.8	8.47	17.0	5.18

Practical suction lift of water in metres at elevated temperatures at sea level

Max. suction lift (←) → Min. positive head									
Temp.	50°C	55°C	60°C	65°C	70°C	75°C	80°C	85°C	90°C 95°C
Metres	2.6	1.9	1.2	0.7	0	0.7	1.2	1.9	2.6 3.3

VELOCITY OF WATER IN PIPES

(1) Feet per second

Galls. per minute	Pipe size				
	1"	1½"	1¾"	2"	2½"
5	2.45	1.57	1.09	0.61	0.39
10	4.90	3.14	2.18	1.23	0.78
15	7.35	4.71	3.27	1.84	1.18
20	9.81	6.28	4.36	2.46	1.57
30	14.71	9.41	6.54	3.68	2.35
40	19.61	12.56	8.72	4.90	3.14
50	24.52	15.69	10.90	6.13	3.92
60	29.42	18.83	13.08	7.35	4.71
70	34.32	21.97	15.26	8.58	5.49
90	44.13	28.24	19.62	11.03	7.06

(2) Metres per second

Litres per minute	Pipe size Millimetres				
	25	32	40	50	65
25	0.82	0.53	0.37	0.21	0.13
50	1.64	1.05	0.73	0.41	0.26
75	2.47	1.58	1.10	0.62	0.39
100	3.29	2.11	1.46	0.82	0.53
150	4.93	3.16	2.19	1.23	0.79
200	6.58	4.21	2.92	1.64	1.05
250	8.22	5.26	3.65	2.05	1.32
300	9.87	6.32	4.39	2.47	1.58
350	11.51	7.37	5.12	2.88	1.84
400	13.16	8.42	5.85	3.29	2.11

Values enclosed by shaded area are recommended suction velocities.

HYDRAULIC ENGINEERING

CONVERSION DATA

LITRES TO IMPERIAL GALLONS

Litres	0	1	2	3	4	5	6	7	8	9
	Gallons									
0		.22	.44	.66	.88	1.1	1.32	1.54	1.76	1.98
10	2.20	2.42	2.64	2.86	3.08	3.30	3.52	3.74	3.96	4.18
20	4.40	4.62	4.84	5.06	5.28	5.50	5.72	5.94	6.16	6.38
30	6.60	6.82	7.04	7.26	7.48	7.70	7.92	8.14	8.36	8.58
40	8.80	9.02	9.24	9.46	9.68	9.90	10.12	10.34	10.56	10.78
50	11.00	11.22	11.44	11.66	11.88	12.10	12.32	12.54	12.76	12.98
60	13.20	13.42	13.64	13.86	14.08	14.30	14.52	14.74	14.96	15.18
70	15.40	15.62	15.84	16.06	16.28	16.50	16.72	16.94	17.16	17.38
80	17.60	17.82	18.04	18.26	18.48	18.70	18.92	19.14	19.36	19.58
90	19.80	20.02	20.24	20.46	20.68	20.90	21.12	21.34	21.56	21.78
100	22.00	22.22	22.44	22.66	22.88	23.10	23.32	23.54	23.76	23.98
110	24.20	24.42	24.64	24.86	25.08	25.30	25.52	25.74	25.96	26.18
120	26.40	26.62	26.84	27.06	27.28	27.50	27.72	27.94	28.16	28.38
130	28.60	28.82	29.04	29.26	29.48	29.70	29.92	30.14	30.36	30.58
140	30.80	31.02	31.24	31.46	31.68	31.90	32.12	32.34	32.56	32.78
150	33.00	33.22	33.44	33.66	33.88	34.10	34.32	34.54	34.76	34.98
160	35.20	35.42	35.64	35.86	36.08	36.30	36.52	36.74	36.96	37.18
170	37.40	37.62	37.83	38.05	38.27	38.49	38.71	38.93	39.15	39.37
180	39.59	39.81	40.03	40.25	40.47	40.69	40.91	41.13	41.35	41.57
190	41.79	42.01	42.23	42.45	42.67	42.89	43.11	43.33	43.55	43.77
200	43.99	44.21	44.43	44.65	44.87	45.09	45.31	45.53	45.75	45.97
210	46.19	46.41	46.63	46.85	47.07	47.29	47.51	47.73	47.95	48.17
220	48.39	48.61	48.83	49.05	49.27	49.49	49.71	49.93	50.15	50.37
230	50.59	50.81	51.03	51.25	51.47	51.69	51.91	52.13	52.35	52.57
240	52.79	53.01	53.23	53.45	53.67	53.89	54.11	54.33	54.55	54.77
250	54.99	55.21	55.43	55.65	55.87	56.09	56.31	56.53	56.75	56.97
260	57.19	57.41	57.63	57.85	58.07	58.29	58.51	58.73	58.95	59.17
270	59.39	59.61	59.83	60.05	60.27	60.49	60.71	60.93	61.15	61.37
280	61.59	61.81	62.03	62.25	62.47	62.69	62.91	63.13	63.35	63.57
290	63.79	64.01	64.23	64.45	64.67	64.89	65.11	65.33	65.55	65.77
300	65.99	66.21	66.43	66.65	66.87	67.09	67.31	67.53	67.75	67.97

IMPERIAL GALLONS TO LITRES

Gallons	0	1	2	3	4	5	6	7	8	9
	Litres									
0		4.55	9.09	13.64	18.18	22.73	27.28	31.82	36.37	40.91
10	45.5	50.0	54.6	59.1	63.6	68.2	72.7	77.3	81.8	86.4
20	90.9	95.5	100	104.6	109.1	113.7	118.2	122.7	127.3	131.8
30	136.4	141.0	145.5	150	154.6	159.1	163.7	168.2	172.8	177.3
40	182	186	191	195	200	205	209	214	218	223
50	227	232	236	241	245	250	255	259	264	268
60	273	277	282	286	291	295	300	305	309	314
70	318	323	327	332	336	341	346	350	355	359
80	364	368	373	377	382	386	391	396	400	405
90	409	414	418	423	427	432	436	441	446	450
100	455	459	464	468	473	477	482	486	491	496
110	500	505	509	514	518	523	527	532	536	541
120	546	550	555	559	564	568	573	577	582	586
130	591	596	600	605	609	614	618	623	627	732
140	636	641	646	650	655	659	664	668	673	677
150	682	686	691	696	700	705	709	714	718	723

HYDRAULIC ENGINEERING DATA on Pages 544-a and 544-b reproduced from
Onga Pump Engineering Bulletin B2276

AIR MOVING PRODUCTS

"G" & "800" SERIES PERFORMANCE DATA

548

DELHI



G SERIES
Double Inlet
Blowers



800 SERIES
Double Inlet
Exhauster

- 12 STANDARD Models equipped with Bolted on Bases which give all 4 Discharge Positions.
- The ideal blower for new applications and replacements.
- Capacity Range 200 to 10,000 C.F.M.
- Shafts are extended on both ends for either rotation.
- Sleeve Bearings are standard — Ball Bearings are optional.
- Shipped as Bottom Horizontal Discharge (as illustrated) complete with two pulleys, belt and necessary hardware.

**DIRECT
DRIVE
BLOWERS**

Cat. No.	UNIT No.	C.F.M. Outlet Vel.	1/8" S.P. HP	1/4" S.P. HP	1/2" S.P. HP	3/4" S.P. HP	1" S.P. HP	1 1/4" S.P. HP
5481	TIP SPEED (FPM) 2.07 x R.P.M. G 7-5 MAX. R.P.M. 2800	200 510 300 764 400 1020 500 1274	550 .02 705 .04 846 .07 985 .12	710 .03 820 .05 945 .07 1100 .15	1100 .09 990 .08 1125 .13 1280 .21	1405 .14 1275 .14 1185 .16 1395 .30	1605 .20 1540 .22 1420 .22 1470 .28	1975 .24 1940 .29 1830 .44 1735 .40
5482	TIP SPEED (FPM) 2.07 x R.P.M. G 7 MAX. R.P.M. 2800	300 582 400 775 500 969 600 1163 700 1358	550 .02 549 .03 614 .05 680 .07 760 .09	720 .04 715 .05 740 .08 800 .09 860 .11	1035 .10 1015 .11 1000 .12 1015 .14 1045 .18	1250 .16 1270 .19 1250 .20 1235 .22 1260 .25	1420 .23 1455 .24 1440 .29 1435 .30 1420 .33	1710 .28 1755 .43 1700 .48 1790 .52 1740 .54
5483	TIP SPEED (FPM) 2.59 x R.P.M. G 9-7 MAX. R.P.M. 2250	400 612 400 918 800 1224 1000 1530	365 .02 385 .04 445 .07 540 .11	510 .03 505 .05 535 .09 600 .13	740 .08 720 .10 725 .14 740 .17	920 .12 890 .14 875 .18 885 .27	1040 .16 1040 .21 1025 .25 1020 .32	1285 .24 1300 .34 1255 .38 1245 .45
5484	TIP SPEED (FPM) 2.59 x R.P.M. G 9 & 809 MAX. R.P.M. 2250	400 714 800 952 1000 1190 1200 1428 1400 1666	355 .03 395 .05 455 .09 515 .14 580 .21	495 .05 495 .07 525 .11 575 .16 640 .24	745 .11 700 .13 700 .17 710 .22 745 .30	925 .19 905 .22 855 .24 855 .29 865 .37	1060 .24 1045 .30 1010 .33 995 .38 990 .46	1300 .40 1305 .48 1305 .57 1250 .61 1215 .67
5486	TIP SPEED (FPM) 2.83 x R.P.M. G 10-8 MAX. R.P.M. 2000	400 723 800 964 1000 1205 1200 1446 1400 1690	345 .02 375 .05 430 .09 490 .14 550 .21	470 .04 475 .07 500 .11 550 .16 600 .23	675 .10 645 .12 675 .17 670 .22 710 .29	850 .15 820 .18 825 .23 830 .29 840 .37	995 .21 960 .24 945 .29 950 .36 960 .45	1210 .33 1210 .40 1170 .45 1160 .52 1165 .62
5487	TIP SPEED (FPM) 2.95 x R.P.M. G 10 & 810 MAX. R.P.M. 2000	800 771 1000 965 1200 1155 1400 1350 1600 1542 1800 1735	320 .04 345 .06 395 .08 440 .13 485 .15 525 .20	445 .06 450 .08 480 .11 485 .15 505 .22 575 .30	635 .11 630 .14 630 .19 630 .23 645 .29 665 .37	790 .18 780 .21 775 .25 775 .31 770 .38 780 .46	915 .25 905 .29 905 .34 900 .40 900 .47 900 .57	1145 .42 1125 .47 1115 .53 1110 .60 1110 .69 1110 .78
5489	TIP SPEED (FPM) 3.06 x R.P.M. G 110 MAX. R.P.M. 1900	1000 937 1200 1125 1400 1310 1600 1500 1800 1685 2000 1875	340 .06 370 .08 400 .13 440 .17 470 .22 505 .29	440 .08 455 .11 480 .15 505 .21 535 .27 570 .34	605 .15 610 .18 615 .23 630 .28 650 .35 670 .43	745 .23 745 .26 750 .31 755 .37 770 .45 795 .53	860 .28 855 .35 855 .40 860 .47 870 .55 885 .64	1055 .49 1055 .55 1055 .63 1050 .69 1050 .78 1050 .88
54810	TIP SPEED (FPM) 3.37 x R.P.M. G 12-9 MAX. R.P.M. 1800	1200 1050 1400 1240 1600 1430 1800 1620 2000 1810	320 .04 375 .15 445 .28 520 .46 595 .70	420 .11 440 .19 490 .31 555 .49 620 .74	575 .20 585 .29 605 .42 640 .60 685 .84	710 .29 710 .41 715 .54 735 .74 765 .98	830 .40 815 .52 815 .67 830 .89 850 1.16	1040 .66 1010 .79 1000 .97 1000 1.21 1005 1.51
54811	TIP SPEED (FPM) 3.37 x R.P.M. G 12 & 812 MAX. R.P.M. 1800	1200 825 1400 962 1600 1100 1800 1236 2000 1372 2200 1512 2400 1648 2600 1784 2800 1920 3000 2056 3200 2192	300 .06 310 .08 340 .12 360 .15 420 .24 480 .40 540 .60 600 .84 660 .1.08 720 .1.32 780 .1.56	400 .11 400 .13 410 .16 425 .20 470 .31 525 .46 585 .66 645 .90 705 1.14 765 1.38 825 1.62	595 .23 570 .34 565 .37 545 .43 580 .43 605 .58 650 .78 705 1.08 765 1.32 825 1.56 885 1.80	765 .41 750 .43 710 .43 700 .46 700 .58 705 .74 725 .94 765 1.22 810 1.46 860 1.70 910 1.94 960 2.18	870 .57 895 .65 875 .67 820 .64 805 .75 805 .92 815 1.14 840 1.42 890 1.66 940 1.90 990 2.14	1050 .94 1045 1.02 1080 1.11 1090 1.20 1010 1.18 990 1.32 985 1.54 990 1.84
54813	TIP SPEED (FPM) 4.03 x R.P.M. G 15-12 MAX. R.P.M. 1450	1400 970 2000 1210 2400 1455 2800 1700 3200 1940 3600 2180	290 .10 325 .17 365 .27 400 .40 445 .55 495 .77	355 .15 380 .22 415 .32 455 .47 490 .64 530 .87	465 .25 485 .32 510 .45 545 .61 575 .80 610 1.05	575 .35 570 .42 590 .55 615 .72 645 .97 670 1.22	700 .50 660 .55 665 .67 680 .87 705 1.10 740 1.40	875 .92 840 .92 810 1.00 810 1.17 820 1.40 845 1.72
54814	TIP SPEED (FPM) 4.03 x R.P.M. G 15 & 815 MAX. R.P.M. 1450	2000 952 2400 1143 2800 1334 3200 1524 3600 1715 4000 1905 4400 2095 4800 2285	250 .10 280 .17 315 .27 350 .38 385 .53 420 .71 455 .92 490 1.18	325 .15 330 .21 350 .30 375 .41 410 .54 445 .75 480 .97 515 1.25	495 .32 465 .35 465 .43 470 .55 480 .68 495 .85 520 1.05 555 1.35	620 .54 610 .57 570 .61 570 .72 570 .84 575 1.03 585 1.21 605 1.48	715 .77 720 .85 700 .90 660 .92 660 1.07 660 1.24 660 1.45 670 1.70	885 1.15 880 1.33 880 1.50 880 1.64 830 1.62 810 1.74 805 1.98 805 2.22
54816	TIP SPEED (FPM) 4.89 x R.P.M. G 18, 818	3000 1065 4000 1420 5000 1775 6000 2130 7000 2485 8000 2840 9000 3195 10000 3550	220 .20 240 .35 280 .60 325 .90 365 1.40 405 2.00 450 2.80 495 3.80	295 .30 305 .50 330 .75 355 1.10 395 1.60 425 2.20 475 3.05 520 4.00	415 .50 410 .70 420 1.00 435 1.35 465 1.90 495 2.50 525 3.30 565 4.30	535 .80 510 .95 505 1.25 515 1.65 525 2.15 550 2.80 580 3.60 615 4.60	615 1.00 600 1.25 585 1.55 585 1.95 595 2.55 605 3.20 625 3.85 660 5.15	745 1.70 755 1.90 730 2.25 715 2.65 720 3.35 725 4.15 730 5.05 745 6.10

CAT. NO. 54818	CAT. NO. 54819	CAT. NO. 54820
G7-DD-10 1/10 H.P. Shaded Pole Motor	G9-7-DD-6 1/8 H.P. Shaded Pole Motor	G9-DD-6 1/8 H.P. Shaded Pole Motor
1/8" S.P. — 755 C.F.M.	1/8" S.P. — 1010 C.F.M.	1/8" S.P. — 1065 C.F.M.
1/4" S.P. — 725 C.F.M.	1/4" S.P. — 960 C.F.M.	3/8" S.P. — 990 C.F.M.

**Single Inlet
"400" and
"600"
SERIES**
DETAILS ON
APPLICATION.

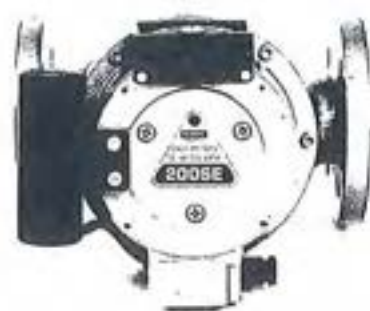
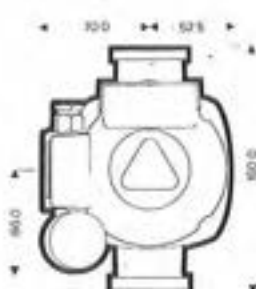
7

HOT WATER CIRCULATORS

SMC

COMMODORE BRONZE &
COMMODORE MINI BRONZE

ALL DIMENSIONS UNLESS OTHERWISE STATED ARE IN MILLIMETRES



SMC PUMPS are supplied in two main categories:

- 1. Cast Iron Pumps (Blue enamel finish)**
Suitable for circulating hot water in pressurised or open vented "indirect" heating system circuits or in the "indirect" circuits of hot water supply systems.
Max. Working Pressure 100 kPa
Max. Water Temp. 110°C
Max. ambient air Temp. 60°C (when water at 110°C)
Max. ambient air Temp. 70°C (when water at 90°C).

IMPORTANT: On no account should Cast Iron Pumps be used in a "direct" system application.

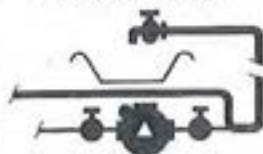
- 2. Bronze Pumps (Bronze enamel finish)**
Suitable for use in "direct" system application, such as circulating hot water in secondary circulations servicing draw-off water to taps and showers.

Pumps may be fitted in either flow or return position, though it is preferable to avoid the lowest point in the system where foreign matter or sediment could collect. All SMC domestic pumps are designed to operate at up to 60 starts per hour.

CAST IRON PUMPS ("Indirect Systems")



BRONZE PUMPS ("Direct" Systems)

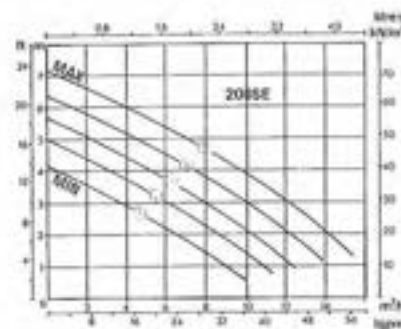
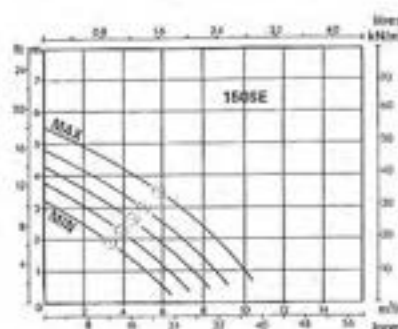
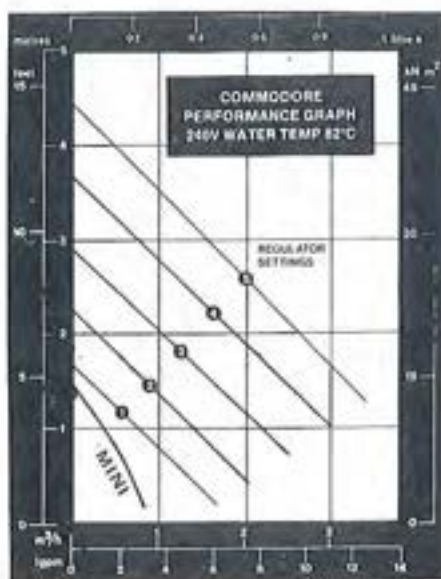


CONSTRUCTION: These pumps offer unique design features. The design is based upon the disc motor, with hydramatic float action, producing maximum torque at start-up. The use of ceramic double thrust bearings ensures smooth and quiet running, minimal wear and long maintenance free life.

LEAKPROOF: Having no gland or mechanical seal, periodic renewal or replacement is eliminated. The disc motor design permits the use of a positively located joint ring to seal the hydraulic section of the pump.

ELECTRICAL FEATURES: The disc motor provides both high starting torque and low starting current. With its new dry capacitor, reduces power consumption by approx. 10% whilst giving increased hydraulic performance.

ELECTRIC REGULATOR: The patented electric regulator, built integrally into the pump, offers a choice of 5 positions (Except for Mini-Bronze Model) enabling the circulation rate to be selected at will. This unique regulator is far simpler than the changing of impellers or pulleys as with other heating circulators. The regulator simplifies circuit balancing, can give increased output as building extensions are added and enables identical pumps to be used in multizone heating systems. Output charts indicate the regulator settings for each pump size.



CAT. NO.	MODEL	CODE No.	CONNECTIONS	CAPACITY*
CAST IRON PUMPS				
	Commodore 130	H1000130CI	1" BSP Female	5 IGPM @ 12' Head
5503	150SE	H1000150CI	1 1/2" BSP Flanges	18 IGPM @ 13' Head
5504	200SE	H1000200CI	2" BSP Flanges	25 IGPM @ 15' Head
BRONZE PUMPS				
5505	Commodore 160B Bronze	H1000160BR	1" BSP Female	5 IGPM @ 12' Head
5502	150SE Bronze	H1000150BR	1 1/2" BSP Flanges	20 IGPM @ 12' Head
	Commodore Bronze Solar Mini 130	H100000SMB	1" BSP Female	2 IGPM @ 2' Head

* Capacity is based on the highest setting. Refer Charts for full performance details.

HOT WATER CIRCULATORS

LOEWE-SILENTA

550-a

Circulating Pumps

glandless, for central heating systems

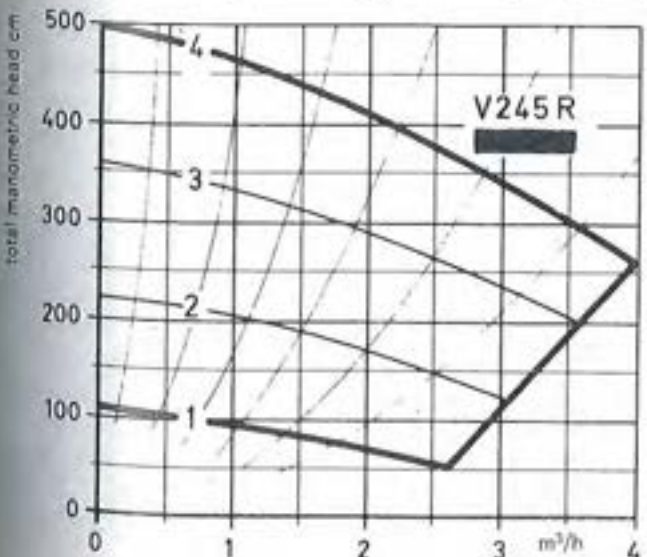
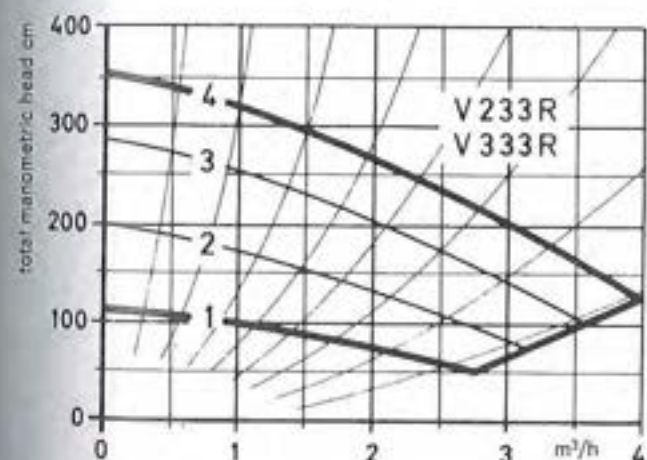
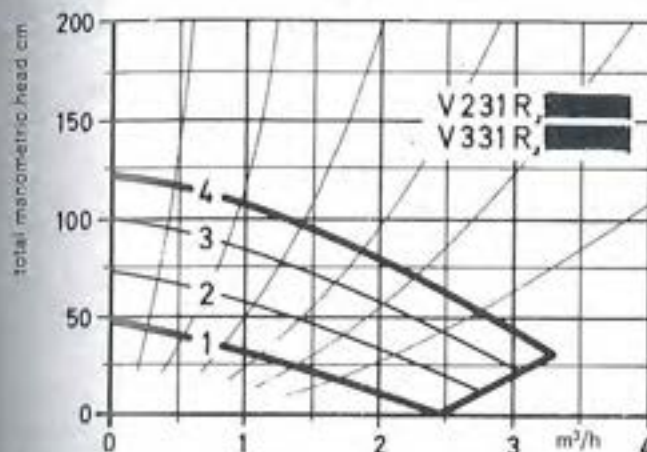


V 231 R



4 3 2 1: output control settings

Characteristic curves



CAT. NO.	MODEL
55011	V231R
55012	V331R
55013	V233R
55014	V333R
55015	V245R

APPLICATION

SILENTA Circulators have been designed for installation in hot-water central heating systems. They can be used in "gravity" circulation systems and in pumped systems. The circulators can be installed in the flow or return pipe.

DESIGN

The pump's volute casing of special cast iron is provided with screwed connections or flanges (larger models). Due to its glandless construction, the circulator does not require any maintenance.

Can and sealing:

The stator space is separated from the pumped liquid by means of a nonmagnetic can of nichrome steel. Two NU-LIP seals guarantee perfect tightness of the can between rotor and stator.

Checking the direction of rotation:

A mechanical device of simple and sturdy design allows quick checking of the direction of rotation.

Bearings:

At the bearing points, the shafts of the SILENTA are either protected by shaft sleeves of wear-resisting stainless casting alloy, or they are of massive hardened stainless steel. The bearing bush is of graphitic carbon (with metallic impregnation) which has specially been developed for hot-water lubrication. This combination of bearing material ensures, even after many years, service reliability and unchanged silent operation.

Corrosion protection:

Every SILENTA is provided with a high grade corrosion protection. Pump casing, motor casing and bearing flange are subjected to a special dipcoating process with subsequent oven-baking at a temperature of 150°C.

Deaeration:

Deaeration of the rotor space is effected automatically, which ensures proper lubrication of the bearings and smooth running of the pump.

Variable SILENTA-V:

The output of these circulators is adjustable by internal by-pass. The desired output and head are obtained by setting the output control device. The figures 1-4 on the output control device correspond to the figures identifying the characteristic curves of the respective pump model. Regulation is infinitely variable and, of course, intermediate values can be set, too.

Minimum static pressure:

In case of low intake or working pressures, especially in conjunction with high temperatures of the pumped liquid, it will be advisable to exactly determine the necessary intake pressure, in order to avoid cavitation noises. Net positive suction head H_{14} on request.

OPERATING DATA

Capacities up to 60 m³/h

Heads up to 1050 cm

Max. working pressure: 6 atm. gauge

special execution 10 atm. gauge (casing and flanges according to NP 10) on request.

Admissible water temperature +20°C up to 130°C.

All SILENTA Circulators have been constructed for silent operation. The output ranges or characteristic curves have been adapted to the requirements of the heating technique. If the working point of the SILENTA is within the output limits shown, there will be no cavitation noises, even in case of very low working pressure. The capacity limits shown are however not equivalent to the max. motor output.

7

SINGER PUMP UNITS

MAGNETIC COUPLED PUMP UNIT

The SINGER Magnetic Coupled Pump Unit (with plastic pump body) is different from other pumps in that it has neither seal nor glands. The impeller, on Acetal bearings, is driven by a magnet behind a membrane of polypropylene. The unit will therefore pump a large variety of different and difficult liquids. The pump is powered by a sub-fractional horsepower Ball Race Motor and has a capacity of 13.63 litres at 914mm (3 gals. at 3') (Nett head.)

DIRECT DRIVE PUMP UNITS

SINGER Direct Drive Pump units are precision engineered to meet the requirements of appliance manufacturers who specialise in the manufacture of washing machines, dish washers and allied products. They are also ideally suited for indoor garden fountains and landscape garden applications, waterfalls, etc. The units may also be used in home swimming pool filter systems



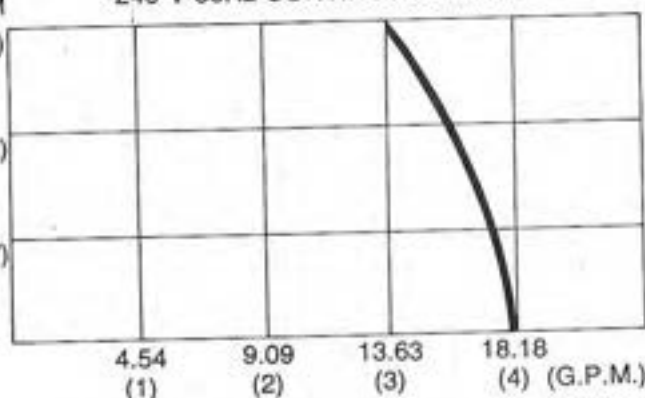
SPECIFICATIONS

MAGNETIC COUPLED PUMP UNIT	
SINGER PART NO.	17266
CAT. NO.	55018
VOLTAGE	240
FREQUENCY Hz	50
WATTS, FREE	40
WATTS, PUMPING	42
WATTS, LOCKED	52
AMPERES, FREE	.265
AMPERES, PUMPING	.3
AMPERES, LOCKED	.362
RATING	CONT.

HEAD IN MM

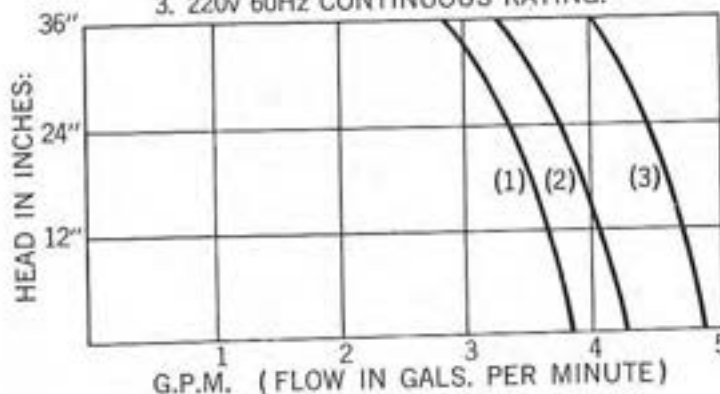
914 MM (36")
610 MM (24")
305 MM (12")

240 V 50Hz CONTINUOUS RATING

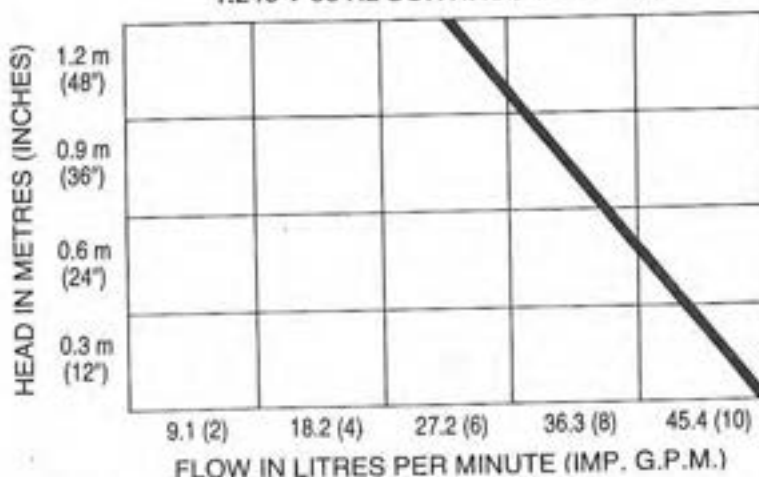


(FLOW IN LITRES PER MINUTE)

1. 240v 50Hz CONTINUOUS RATING.
2. 240v 50Hz INTERMITTENT RATING.
3. 220v 60Hz CONTINUOUS RATING.



1.240 V 50 Hz CONTINUOUS RATING

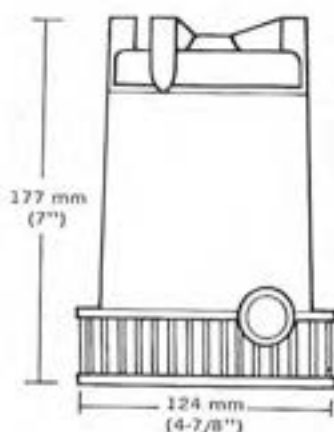


SINGER

Fully Submersible Bilge

PUMP

5500 LPH
12 - 24 - 32 VOLTS DC



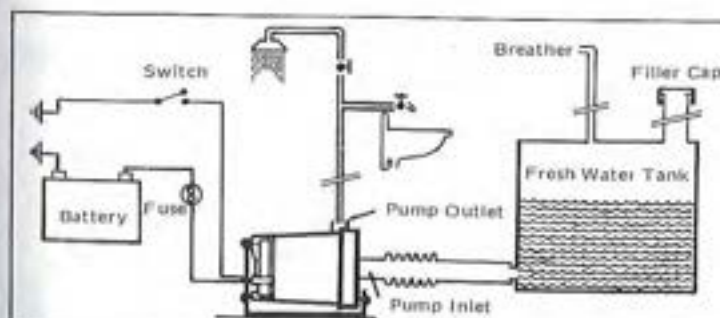
SUPER SEAL BILGE PUMPS are totally submersible. The one piece case is moulded in high-impact acetal material and incorporates Teflon seals (no unreliable gaskets). It can't be overwhelmed by water — once you switch it on, it works away swiftly until the water is back where it belongs. Over the side. Super Seal can be run continuously fully submerged or for 30 minutes half submerged.

5500 LITRES PER HOUR. At free discharge, Super Seal pumps 5500 litres per hour (1450 U.S. G.P.H.), drawing 7.0amps at 12 volts. There's no vibration, because shock-mounted internal parts ensure smooth, quiet running. Conversation doesn't stop when Super Seal starts.

ROUGH WEATHER RELIABILITY. When you're shipping it green, you need a pump you can trust. Super Seal is the one. A fail-safe back-up seal system means water can't get in, even if one seal should give way. All Super Seal parts are non-electrolytic and can't be harmed by petrol, diesel fuel, oil, salts, weak acid, or water. Open impeller design prevents clogging, pumps dirt and particles overboard. Stainless steel shaft and Teflon seals eliminate corrosion problems, and ensure a long, trouble-free life. Even if Super Seal runs dry, the self-lubricating properties of the Teflon will prevent severe seal damage.

EASY TO INSTALL. Super Seal is just 177mm (7") tall, ("Electronic" — 219mm or 8.5/8") including strainer, and 124mm (4.7/8") in diameter over the base. So it fits easily in the bilge, where it's completely out of sight and ready for work. And once the base is installed, the rest of the pump snaps on and off without tools, screws or bolts.

FULLY GUARANTEED. Super Seal is fully guaranteed. You can trust it for years of dependable service. Whether your boat is for fun or for work a Super Seal will make her safer, more comfortable and easier to handle.



General purpose pump kit

With the help of a simple adaptor kit Super Seal can be modified to serve as a general purpose pump to move all the fresh water you need from tank to tap. It can be operated from a convenient electrical footswitch, and doesn't need a pressure tank. It's ideal for your boat, regardless of size or age. It also has many other practical applications. Installation is quick and simple.

CAT. NO.	PART No.	CAPACITY	VOLTS DC	DESCRIPTION
55031	19375	5500	12	Standard Super Seal. Fully Submersible Bilge Pump
55032	19381	litres/hour	24	
	19385		32	
	18240			General Purpose Pump Kit — Mounting Bracket
	18241			General Purpose Pump Kit — Adaptor

SATCHWELL TEMPERATURE DETECTORS & CONTROLLERS

TEMPERATURE DETECTORS

TYPE DR ROOM AIR TEMPERATURE DETECTORS

Type DR Room Air Temperature Detectors

For use with Satchwell controllers to provide temperature control of heating and air conditioning plant. Thermistor detector circuit. Suitable for surface or conduit box mounting.

Approximate size:
86mm high x 86mm wide x 30mm deep.
For full specification see leaflet DS 1.1.



CAT. NO.	TYPE	SCALE	CONTROL RANGE	ADJUSTMENT
5601	DR2251	10° to 35°C	-5° to +40°C	Exposed
5602	DR2252	10° to 35°C	-5° to +40°C	Concealed
5603	DR2253	None	-5° to +40°C	None

TYPE DD AIR DUCT TEMPERATURE DETECTORS

Type DD Air Duct Temperature Detectors

For use with Satchwell controllers to provide temperature control of heating and air conditioning plant. Moisture proofed resin bonded stem. Thermistor detecting circuit.

Approximate head size:
85mm high x 63mm wide x 42mm deep.
For full specification see leaflet DS 1.1.



CAT. NO.	TYPE	STEM LENGTH	SCALE	CONTROL RANGE	ADJUSTMENT
5604	DD1204	300mm	5° to 50°C	-5° to +70°C	Concealed
5605	DD1401	300mm	None	-5° to +70°C	None
5606	DD1403	460mm	None	-5° to +70°C	None

CONTROLLERS

CLIMATRONIC TYPE CZT TEMPERATURE CONTROLLERS

CONTROLLERS

Climatronic Type CZT Temperature Controllers
Designed for use with Satchwell temperature detectors to provide proportional control for heating and air conditioning plant. Additional facilities include detector averaging, set-up and set-back, motor override, high temperature limit and deadzone.

Approximate size:
123mm high x 184mm wide x 103mm deep.
For full specification see leaflet DS 2.1.



CAT. NO.	TYPE	CONTROL RANGE	PROPORTIONAL BAND SCALE	CONTROL FACILITY
5607	CZT3301	-5° to +40°C	1° to 20°C	1 stage
5608	CZT3302	-5° to +40°C	1° to 10°C per stage	2 stage
5609	CZT3303	35° to 120°C	2° to 20°C	1 or 2 stage

THIS CATALOGUE INCLUDES ONLY A SMALL SELECTION OF AVAILABLE SATCHWELL EQUIPMENT
We will be pleased to supply additional information on the comprehensive range available, together with Technical literature

SATCHWELL

CONTROLLER ACTUATORS & ACTUATORS MODULATING CONTROLLER ACTUATORS

565

CLIMATRONIC TYPE AZT TEMPERATURE CONTROLLER-ACTUATOR



A compact unit combining a proportional controller with an actuator. It provides a simple means of operating valves, dampers and step controllers in heating and air conditioning systems.

Power supply: 210-240V 50-60 Hz.

Approximate size:
194mm high x 117mm wide x
80mm deep.
For full specification see leaflet
DS 3.20.

CAT. NO.	TYPE	CONTROL RANGE	PROPORTIONAL BAND SCALE	CONTROL FACILITY	OUTPUT SHAFT ROTATION	TORQUE
5651	AZT3302	10° to 35°C if used with DR detector or 5° to 50°C if used with DD detector	1° to 10°C per stage	1 or 2 stage	160° in 180 secs.	50 Nm
5652	AZT3304		1° to 10°C	1 stage with Heating-Cooling Switch	160° in 180 secs.	50 Nm
5653	AZT3352		1° to 10°C per stage	1 or 2 stage	90° in 100 secs.	50 Nm
5654	AZT3354		1° to 10°C	1 stage with Heating-Cooling Switch	90° in 100 secs.	50 Nm

ACTUATORS — MODULATING

TYPE XRM & ZRM MODULATING ACTUATORS FOR MB VALVES & STEP CONTROLLERS



Modulating light duty two position actuators designed primarily for use with Climatronic integral or proportional controllers and with Modular System 565 controllers.
Power supply: 24V 50 Hz.

Approximate size:
143mm high x 100mm wide x
117mm deep.
For full specification see leaflet
DS 3.1.

CAT. NO.	TYPE	STROKE	TORQUE	FEEDBACK POTENTIOMETER	AUXIL. SWITCH
5655	ZRM1201	90° in 4 minutes. Reversing.	2 Nm	One 135 Ohm	—
5656	ZRM1202	90° in 4 minutes. Reversing.	2 Nm	Two 135 Ohm	—
5657	ZRM1203	90° in 4 minutes. Reversing.	2 Nm	One 135 Ohm	2A 250V ac
5658	XRM1201	90° in 4 minutes. Reversing.	2 Nm	—	—

TYPE AXM & AZM MEDIUM DUTY MODULATING ACTUATORS



Designed to operate valves and dampers, the AXM is for use with integral controllers and AZM incorporates a feedback potentiometer for use with proportional controllers.
Power supply: 24V 50-60 Hz.

Approximate size:
194mm high x 117mm wide x
80mm deep.
For full specifications see leaflet
DS 3.2.

CAT. NO.	TYPE	APPLICATION	STROKE	TORQUE	FEEDBACK POTENTIOMETER	AUXILIARY SWITCH
5659	AXM1201	Integral control	160° in 3 minutes. (Reversing.)	5.6 Nm	—	—
5660	AXM1202	Integral control	160° in 3 minutes. (Reversing.)	5.6 Nm	—	2
5661	AXM1251 *	Integral control	90° in 2 minutes. (Reversing.)	5.6 Nm	—	—
5662	AZM1401	Proportional control	160° in 3 minutes. (Reversing.)	5.6 Nm	135 Ohm	—
5663	AZM1402	Proportional control	160° in 3 minutes. (Reversing.)	5.6 Nm	135 Ohm	2
5664	AZM1451 *	Proportional control	90° in 2 minutes. (Reversing.)	5.6 Nm	135 Ohm	—

* AXM1251 and AZM1451 are for operating type MB valves only.

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SATCHWELL

ACTUATORS, CONTROLLERS & VALVES

MODULATING ACTUATORS

TYPES XKM & ZKM HEAVY DUTY

Powerful modulating actuators designed to operate large valves and dampers. Type XKM is designed for integral controlled operation. Type ZKM for proportional controlled operation, using an appropriate Satchwell controller in each case. Power supply: 24V 50-60 Hz.

Stroke: 90° in 2 minutes. Reversing.

Torque: 16.8 Nm

Approximate size: 125mm high x 156mm wide x 222mm deep.

For full specifications, see leaflet DS 3.3.



CAT. NO.	TYPE	POTENTIOMETERS		AUXILIARY SWITCHES	TRANSFER SWITCHES	ACCESSORY KITS *
		INTERNAL	EXTERNAL			
5661	XKM2201	None	None	None*	Two	831-1-203 (2 auxiliary switches) or 831-1-204 (2 auxiliary switches & 145 Ohm potentiometer)
5662	XKM2301	None	None	Two	Two	
5663	ZKM2201	135 Ohm	None	None*	Two	
5664	ZKM2202	135 & 145 Ohm	None	None*	None	
5665	ZKM2301	135 Ohm	None	Two	Two	
5666	ZKM2302	135 & 145 Ohm	None	Two	None	
5667	ZKM2303	135 Ohm	145 Ohm	Two	Two	
5668	ZKM2304	135 & 145 Ohm	145 Ohm	Two	None	

STEP CONTROLLERS

TYPE MC AND MD

STEP CONTROLLERS

Step Controllers Type MC & MD

These controllers comprise a number of electrically separate switches operated in sequence by Satchwell 'R' type motors. For use with Satchwell modulating controllers, or suitable two-position switching device.

A 'recycling' switch used with appropriate relays returns the

controller to the 'start' position before the load is reconnected in the event of power failure.

Approximate size: 136mm high x 391mm wide x 102mm deep.

For full specification see leaflet DS 4.6.



CAT. NO.	CONTROLLER TYPE	NO. OF STEPS	SWITCH DIFFERENTIAL	CURRENT RATINGS	
				SEQUENCE SWITCHES	RECYCLING SWITCH
5669	MC1201	6	Adjustable 5% to 80% of full stroke	Single pole double-throw	Single pole double-throw 6A, 380V ac
56610	MC1202	9		6A, 380V ac	
56611	MC1203	12		Single pole single-throw 20A, 380V ac	
56612	MD3201	5	Fixed at approx. 5% of full stroke	15A, 440V ac	
56613	MD3226	10			

CONTROL VALVES

TYPE MB THREE-PORT ROTATING SHOE VALVES

The MB Types are 3-port valves for the mixing or diverting of hot or chilled water. They can be operated by the R and A series actuators and the Satchwell controller-actuators.

For full specification see leaflet DS 4.31.



CAT. NO.	FOR USE WITH ACTUATOR TYPES AXM, AZM & AZT					LINKAGE TYPE (90° ROTATION)	
	VALVE TYPE	SIZE	Cv or Kv VALUE	MAXIMUM DIFFERENTIAL PRESSURE			
56614	MB1402	1/2 in. BSP	1.8	0.7 bar (10 lbf/in ²)	826-1-652	RM	Hot water only
56615	MB1452	3/4 in. BSP	4.0	0.7 bar (10 lbf/in ²)	826-1-652	XRM	
56616	MB1502	1 in. BSP	8.0	0.7 bar (10 lbf/in ²)	826-1-652	ZRM	
56617	MB1552	1 1/4 in. BSP	12	0.35 bar (5 lbf/in ²)	826-1-652	and CD	
56618	MB1602	1 1/2 in. BSP	20	0.35 bar (5 lbf/in ²)	826-1-652	no linkage required	
56619	MB1652	2 in. BSP	32	0.35 bar (5 lbf/in ²)	826-1-652		

THIS CATALOGUE INCLUDES ONLY A SMALL SELECTION OF AVAILABLE SATCHWELL EQUIPMENT

We will be pleased to supply additional information on the comprehensive range available, together with Technical literature

HONEYWELL CONTROLS

MICRO SWITCH

NO TOUCH CONTROLS

THESE PHOTOELECTRIC AND PROXIMITY CONTROLS REQUIRE "NO TOUCH" (ARE ACTUATED WITHOUT PHYSICAL CONTACT) AND CAN OFTEN SATISFY SWITCHING NEEDS WHERE ELECTROMECHANICAL SWITCHES ARE DIFFICULT TO APPLY. Photoelectric controls respond to a change in light intensity at a photo-receiver, and will detect opaque or translucent materials at short or long range.

Proximity controls respond to the nearness of metal only, and will detect metallic objects a few inches or less from the sensor. They will detect through non-metallic materials.

(Ferromagnetic proximity controls will detect through non-ferrous metals also.)

No-touch controls perform as limit switches, positioning devices, speed controls, counters, inspection tools, and in many other functions. The static design of these controls prevents them from wearing out mechanically — either from constant use, or from detecting rough or abrasive parts or materials. No-touch controls can detect small, lightweight parts without detaching them; delicate, painted, or polished surfaces without marring them. They can detect irregularly shaped objects, and respond to objects regardless of their direction of entry into the sensing field. Controls can perform a variety of logic functions at electronic speeds.

MICRO SWITCH photoelectric and proximity devices offer you high quality and reliable performance.

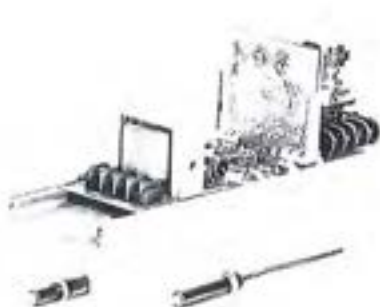
Contemporary... with a plug-in "brain"



Self-contained : light source, photo receiver, amplifier, plug-in LOG logic card and output relay in a sturdy NEMA rated housing.



Self-contained/modular hybrid : light source and photo receiver in one housing wired to a control base (NEMA rated housing) containing the amplifier, plug-in LOG logic card and output relay.



Modular : separate light source and photo receiver wired to individual rack mounted modular printed circuit boards containing the power supply, the plug-in LOG logic card base/amplifier, and the output relay.

Traditional... with TR logic modules



Self-contained: light source photo receiver predetermined logic amplifier and output relay in a common sealed housing.



Self-contained/modular hybrid : light source and photo receiver in a common housing, wired to an open control chassis containing the amplifier, plug-in TR logic module and output relay.



Modular : separate light source and photo receiver wired to an open control chassis with an amplifier, plug-in TR logic module and output relay.

THESE TWO PAGES OFFER ONLY A "GLIMPSE" OF THE VAST RANGE OF HONEYWELL MICRO SWITCH CONTROLS AVAILABLE

PLEASE CONTACT US FOR COMPREHENSIVE SPECIFICATIONS AND DETAILS TO SUIT YOUR REQUIREMENTS

MANUFACTURERS CATALOGUES ARE AVAILABLE ON REQUEST

ORDERING PROCEDURES

ORDER BY HONEYWELL CATALOGUE/PART NO. ONLY

REFER PAGES 476 & 477 FOR HONEYWELL RESIDENTIAL REFRIGERATION & AIR CONDITIONING CONTROLS

HONEYWELL CONTROLS RESIDENTIAL TRADELINE CONTROLS

A SUMMARY OF THE WIDE RANGE OF REFRIGERATION AND AIR CONDITIONING CONTROLS FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL APPLICATIONS

DAMPERS

ELECTRIC HEATING CONTROLS

ELECTRONIC AIR CLEANERS

FLAME SAFEGUARD CONTROLS

Primary Controls, Detectors, Flame Rods and Holders, Photocells, Rectifier Pilots.

FLAME SAFEGUARD COMMERCIAL/INDUSTRIAL AND PROCESS BURNER CONTROLS

GAS BURNER CONTROLS

Residential Gas Combination Controls and Components, Direct Spark Ignition System, Thermocouples, Pilot Burners, Pilot Generators, Recreational Vehicle Controls.

HUMIDITY CONTROLLERS

HYDRONIC CONTROLS

MOTORS AND VALVES

Motors: Damper Actuators, Valve Actuators, Linkages, Zone Motor, Proportional Motors, Potentiometer, Auxiliary Switches, Balancing Relays.

Valves: Gas, Motorized, Radiator, Steam.

OIL BURNER CONTROLS

Detectors, Cad Cell Controls, Stack Controls, Magnetic Valve, Time Delay Relay.

PRESSURE CONTROLLERS

Proportional, Controllers for oil, steam, water and air pressure, Pressure Switches.

REFRIGERATION AND AIR CONDITIONING CONTROLS

Contactors, Fan Centres, Relays, Temperature Controllers, Pressure-actuated Controllers.

SERVICE AIDS

STEP CONTROLLERS

STOKER CONTROLS

SWITCHES

SWITCHING RELAYS

General Purpose, Medium Duty, Heavy Duty.

TEMPERATURE CONTROLLERS

Agricultural, Changeover, Indoor-Outdoor, Outdoor Reset, Proportional, Multi-stage, Remote Bulb.

THERMOSTATS

Heating, Cooling, Heating-Cooling, Day-Nite, Heavy Duty, Light Duty, Fan-Coil, Clock, Proportional, Multi-stage, Subbases, Guards.

TRANSFORMERS

Clock, General Purpose, Heavy Duty, Plug-In Multi-mount.

WARM AIR LIMITS

Fan, Limit, Combination Fan-Limit.

ZONE CONTROL SYSTEMS

PARTS AND ACCESSORIES

SUPER TRADELINE CONTROLS

T872 MULTISTAGE THERMOSTATS



LOW VOLT THERMOSTATS FOR 1- OR 2-STAGE HEATING AND/OR COOLING SYSTEMS.

T282A, T882A, TS882A CHRONOTHERM CLOCK THERMOSTATS



FOR COMPLETELY AUTOMATIC NIGHT SETBACK — MORNING PICKUP TEMPERATURE CONTROL OF A HEATING SYSTEM OR AUTOMATIC DAY SETUP FOR COOLING SYSTEMS.

H600A HUMIDIFIER CONTROL



OPERATES HUMIDIFICATION EQUIPMENT ON RH FALL OR DEHUMIDIFICATION EQUIPMENT ON RH RISE.

S43A,B,D SAIL SWITCHES



SWITCH MAKES AN ELECTRICAL CIRCUIT ON AN INCREASE IN AIR VELOCITY.

M934A MODUTROL MOTOR



REVERSING, PROPORTIONAL, SHADED POLE MOTOR.

M945A-H,M MODUTROL MOTORS



MODULATING, SPRING-RETURN MOTORS USED TO OPERATE DAMPERS AND VALVES

V5011A,B,C SINGLE SEATED VALVES



USED FOR 2-POSITION AND MODULATING CONTROL OF STEAM AND WATER IN HEATING OR COOLING SYSTEMS.

S684D,F; S984D,E,F,J STEP CONTROLLERS



USED FOR SWITCHING MULTIPLE LOADS IN A PREDETERMINED SEQUENCE.

HONEYWELL CONTROLS RESIDENTIAL TRADELINE CONTROLS



**RA890G PROTECTORELAY
PRIMARY CONTROL**
NON PROGRAMMING.
SOLID STATE ELECTRONIC RELAY FOR
USE ON INDUSTRIAL
AND COMMERCIAL GAS
OIL, OR COMBINATION
GAS-OIL BURNERS.



C645A,B



C645C



C645D

**C645A,B GAS PRESSURE
SWITCHES**
**C645C,D AIR PRESSURE
SWITCHES**

SAFETY DEVICES, USED
IN POSITIVE-PRESSURE
OR DIFFERENTIAL-
PRESSURE SYSTEMS TO
SENSE GAS OR AIR
PRESSURE CHANGES.



R4140G,M

R4140L

**R4140G,L,M,
FSG PROGRAMMING
CONTROL**

Provides flameout protection
plus automatic sequencing of
burner motor, firing rate motor
(L and G only), ignition, pilot
valve, and main fuel valve(s).
Use with rectifying, infrared, or
ultraviolet flame detectors.



**C437D-H,J,K
GAS PRESSURE SWITCHES**

FOR SAFETY SHUTOFF, PRESSURE
CONTROL, AND DIFFERENTIAL
PRESSURE CONTROL IN INDUSTRIAL
GAS SYSTEMS. WITH DIRECT AND
REVERSE-ACTING SWITCHING (SPST).



**L91 PROPORTIONAL
PRESSURETROL CONTROLLER**

MODULATING PRESSURE OPERATED
CONTROL USED AS A HIGH LIMIT CON-
TROLLER OR, IN STEAM HEATING
SYSTEMS, AS A DIRECT CONTROLLER
FOR A PROPORTIONAL MOTOR OPER-
ATING AN AUTOMATIC BURNER.

L404A,B,C,D,F
L604A,L

L404L

**L404A,B,C,D,F,L; L604A,L
PRESSURETROL
CONTROLLERS**

PROVIDE OPERATING
CONTROL, AUTOMATIC
LIMIT OR MANUAL RE-
SET LIMIT PROTECT-
ION FOR PRESSURE
SYSTEMS UP TO 300 PSI

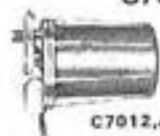
**V5055 INDUSTRIAL GAS VALVES WITH V4055,
V4062 OR V9055 FLUID POWER ACTUATORS**

V4055



V5055

PROVIDE LINE VOLT-
AGE CONTROL OF GAS
SUPPLY TO COMMERCIAL
AND INDUSTRIAL
BURNERS. COMBINA-
TIONS OF VALVES AND
ACTUATORS PROVIDE
ON-OFF, OFF-LO-HI,
AND MODULATING
CONTROL.



C7012A,C,E,F



C7020A

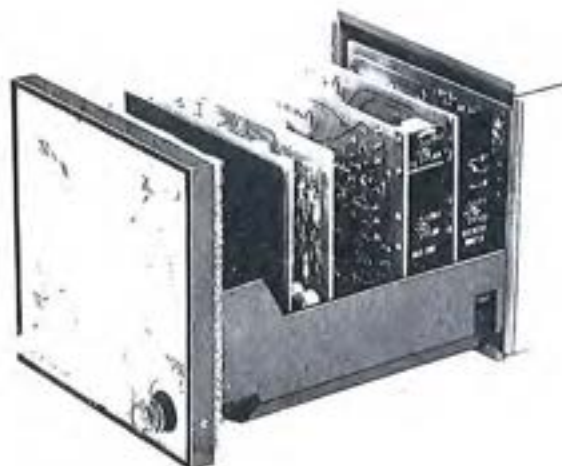
**C7012A,C,E,F (PURPLE PEEPER),
C7020A ULTRAVIOLET
FLAME DETECTORS**

ELECTRONIC FLAME
DETECTORS FOR
SENSING ULTRAVIO-
LET RADIATION OF
INDUSTRIAL GAS, OIL,
OR COMBINATION GAS-
OIL FLAMES.

VERSAPAK II CONTROLLERS

Product Description

The Versapak II features a family of electronic control instruments with a wide variety of input and output signals. Specifically designed to meet modern industry's requirements for flexibility, reliability, and low installation and maintenance costs, the Versapak II incorporates the latest electronic techniques for analog process instrumentation. Integrated circuitry and a minimum of moving parts ensure a high degree of reliability and virtually no maintenance. The compact DIN size case allows high density mounting in both the vertical and horizontal directions, thus minimizing panel space and cost.



REFER PAGES 573 & 574 FOR HONEYWELL MICRO SWITCH CONTROLS.
ORDERING PROCEDURE

ORDER BY HONEYWELL CATALOGUE/PART NO. USING HONEYWELL LITERATURE AVAILABLE ON REQUEST
577 Tech. Page SECTION 7

Danfoss

Thermostatic valves for terminal regulation

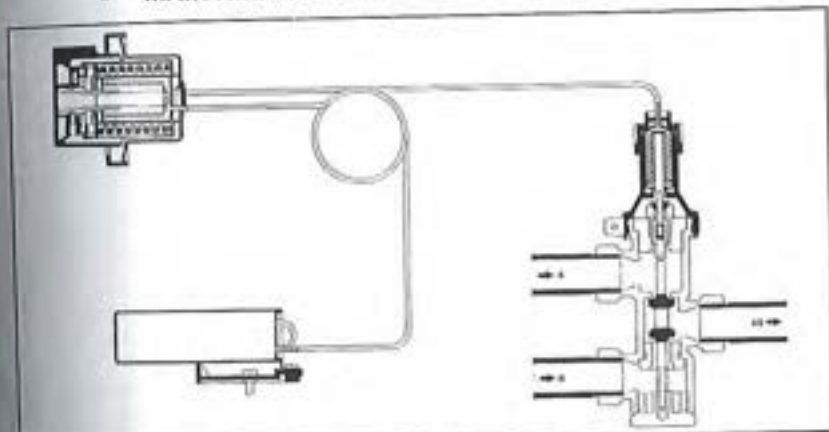
Danfoss automatic terminals controls for ventilation and air conditioning systems in offices, schools, hospitals, computer rooms, laboratories, hotels, etc.

Danfoss air conditioning valves consist of a series of thermostatic elements and valves which are combined to make up a range of proportional regulators. The proportional regulators automatically maintain stable room temperature, relative to the setting chosen.



ADVANTAGES

- SELF-ACTING SYSTEM
- MINIMUM MAINTENANCE
- SEATED VALVE
- SIMPLE INSTALLATION
- MAINTENANCE WITHOUT DRAINING DOWN
- SUITABLE FOR ALL WATER SYSTEMS
- 2 - PIPE SYSTEMS
- 4 - PIPE SYSTEMS
- WITH OR WITHOUT CHANGEOVER
- FAN-COIL AND INDUCTION UNITS



Thermostatic Elements

Control elements are based on the familiar Danfoss bellows system which guarantees excellent performance and long life.

Valves

The Danfoss program of air conditioning valves makes it possible to regulate all normal water systems incorporating terminals, for example, fan-coil units, induction units, etc.

The elements consist of a setting unit, a sensor and one, or two actuators. They operate by modulation.

A temperature rise at the sensor causes a pressure increase in the thermostatic system. This pressure is transferred to the actuator which opens/closes the air conditioning valve.

The elements operate without external power, i.e. no electrical leads or pneumatic lines.

CONTROL ELEMENTS

CAT. NO.	TYPE	CODE No.	Setting Range °C	Neutral Zone °C	Max. Sensor Temp. °C	Capillary tube lengths from setting unit to sensor/actuator metres
58051	CEV	13F3122	16-27		60	2 + 2
		13F3111				1 + 1
	CEK	13F3177	(1)		60	2 + 2
		13F3166				1 + 1
	CES	13F3022	18-25	2.0	60	2 + 2
		13F3011				1 + 1
	CED	13F3077	(2)	1.5	60	2 + 2
		13F3066				1 + 1

Note (1): The setting range of 11°C is factory set but can be changed by readjustment within the limits 10 - 35°C.

Note (2): The setting range of 7°C is factory set but can be changed by readjustment within the limits 15 - 30°C.

VALVES

CAT. NO.	TYPE	Designation	CODE No.	Valve Type	Conn.	Kv
58015	RAV15/8	Valve for hot water	13U0016	Angle	½" BSP	1.6
58016			13U0017	Straight		
58019	RAV20/8		13U0021	Angle	¾" BSP	2.3
58020			13U0022	Straight		
58022	RAV25/8		13U0027	Straight	1" BSP	2.6
58028	RAV15/2		13U0216	Angle	½" BSP	2.9
58029			13U0217	Straight		
58032	RAV20/2		13U0221	Angle	¾" BSP	4.2
58033			13U0222	Straight		
58035	RAV25/2		13U0227	Straight	1" BSP	5.8
58037	KOVM	Valve for cold or hot water	13U3015	—	½" BSP	1.5
58040	KOVC	Changeover Valve	13U3025	—	½" BSP	1.5
58039	KOVS	Sequence Valve	13U3035	—	½" BSP	0.63
58038	KOVD	Distributor Valve	13U3030	—	½" BSP	0.85

TYPE RAV PHIAL UNITS

CAT. NO.	CODE No.	DESCRIPTION	CAT. NO.	CODE No.	DESCRIPTION
	13U1100	Fixed		13U1105	Remote
	13U1110	Fixed - Series N		13U1115	Remote - Series N
	13U1102	Remote		13U1108	Remote
	13U1112	Remote - Series N		13U1118	Remote - Series N

IT IS RECOMMENDED THAT MANUFACTURERS LITERATURE (AVAILABLE ON REQUEST) BE CONSULTED FOR DETAILED INFORMATION AND APPLICATION OF THESE UNITS

HANSEN COUPLINGS

HANSEN COUPLINGS ARE AVAILABLE IN THREE TYPES
 2-WAY SHUT-OFF — 1-WAY SHUT-OFF — STRAIGHT THROUGH
 THIS CATALOGUE LISTS THE MORE COMMONLY USED TYPES AND SIZES. LITERATURE DETAILING THE
 FULL RANGE, INCLUDING DIMENSIONS AND ADDITIONAL TECHNICAL DATA IS AVAILABLE ON REQUEST

- 2-WAY SHUT-OFF COUPLINGS —** These have a valve in both Socket and Plug, which automatically closes when the coupling is disconnected.
- 1-WAY SHUT-OFF COUPLINGS —** This type has a valve in the Socket only, so that when the coupling is disconnected only the Socket closes off, preventing further flow.
- STRAIGHT THROUGH COUPLINGS —** These couplings do not have valves in either Socket or Plug, and provide a smooth bore for maximum unrestricted flow.



IDENTIFICATION & ORDERING

PROVIDED THE INFORMATION IN THIS CATALOGUE IDENTIFIES YOUR EXACT REQUIREMENTS, IT IS RECOMMENDED THAT YOU ORDER BY OUR CATALOGUE NO. IF UNSURE — ORDER AS FOLLOWS:

TYPICAL EXAMPLE — ORDER BY : 1. SOCKET NO. 2. PLUG NO. 3. SEAL NO.
 (Omit SEAL NO. if Standard Seal is desired)

E.G. "2-WAY" — 1. Socket No. B4-H26 2. Plug No. B4-K26 3. Standard Seal — Omit.
 COMBINATION SOCKET & PLUG = B4 - HK26

Note: Prefix "B" is for Brass, Nil for Steel, "LL" for Stainless Steel.

WHEN IN DOUBT — PROVIDE THE FOLLOWING INFORMATION

1. 2-WAY, 1-WAY OR STRAIGHT THROUGH
2. SIZE
3. MATERIAL
4. FLUID OR GAS HANDLED
5. TEMPERATURE (AMBIENT & FLUID OR GAS)
6. PRESSURE

TYPE	SERIES	APPLICATIONS
2-WAY	HK	Hydraulic Service, Vacuum (selected sizes) low micron range, Water, Compressed Air, Various Liquids and Gases, LP Gas, Anhydrous Ammonia, Fluorinated Refrigerants, Paint.
	HDK	Steam line connections for Tyre Retreading and other equipment.
	2-HKIG & 2-HKIL	Gas and Liquid lines, Compressed Air, Water — Provides foolproof Non-interchangeable feature for Unlike fluids and gases in parallel lines.
1-WAY	PUSH-TITE	
	3000	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	4000	
	5000	
	6000	
	100	Compressed Air, Gases, Grease/Oil, Liquids, Vacuum (limited)
	400	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	500	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	600	Oxygen Service, Gases, Nitrous Oxide, Vacuum (limited), Water
	700	Acetylene Service, Gases, Nitrous Oxide, Vacuum (limited), Water
	1000	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	2-RL	Compressed Air, Vacuum (limited)
	3-RL	
STRAIGHT THROUGH	ST	Compressed Air, Gases, Hydraulic Fluids, Liquids, Vacuum, Water
	GH	Water

ACCESSORIES

DUST CAPS : Dust Caps are available for most Couplings where protection is necessary against excessive flying grit or dust. The Socket Dust Cap is easily applied by pulling back sleeve of Socket and inserting Dust Cap. The Plug Dust Cap covers the entire machined surface of the Plug. It is applied and held in place by friction on locking portion of the Plug. Metal Dust Caps are supplied with chain and attachment ring. Plastic Dust Caps have integral plastic strap and attachment loop.



SPECIALS

Present us with your problem — We will endeavour to help you.
 REFER FOLLOWING PAGES FOR ADDITIONAL DETAILS
 SECTION 7

HANSEN COUPLINGS

ELASTOMER (SEAL MATERIAL) SELECTION GUIDE

O-RINGS, WASHERS, OTHER SEALS

Select seals that are compatible with the service you intend for your couplings. You must allow for the kind of fluid to be conveyed and its temperature. Chemically active fluids will destroy some seal materials. And certain seals withstand high temperatures, whereas others cannot. Use this Elastomer Selection Guide to find the seal you need.

NOTE: Elastomer, or seal material listed as "Standard" is supplied in most Hansen Couplings. Elastomers designated as "118", "123", "146" etc. are available as optional seal material for Series HK, Series 8000 and Series ST Couplings. Other seal materials available upon request (some ex USA) to suit specific requirements.

NOTE: The following information is accurate to the best of our knowledge; however since the conditions of use vary widely and are beyond our control, specific applications may result in shortened seal life or require other elastomeric compounds.

Fluid	TEMPERATURE RANGE		Hansen Elastomer
	°F	°C	
Air	-40 to +250	-40 to +121	Standard
Air (above 200°F)	-20 to +500	-29 to +260	-143
Acetylene Gas	-40 to +200	-40 to + 93	Standard
Acids (Mild)	-40 to +200	-40 to + 93	-123.
Alkalies	-40 to +160	-40 to + 71	Standard
Ammonia, Anhydrous	-40 to +120	-40 to + 49	-146
Ammonia, Anhydrous	-65 to +240	-54 to +116	-192*
Ammonia, Aqueous	-65 to +200	-54 to + 93	-192*
Brake Fluid (Non-Petroleum)	-65 to +250	-54 to +121	-192*
Brake Fluid (Petroleum)	-40 to +250	-40 to +121	-123
Butane	-40 to +200	-40 to + 93	-146
Carbon Dioxide (Max. Pressure 150 psi)	-65 to +200	-54 to + 93	-213
Carbon Tetrachloride	-20 to +250	-29 to +121	-143
Diesel Fuel	-40 to +250	-40 to +121	-146
Freon 11	-40 to +200	-40 to + 93	-146
12, 13, 14, 22, 113, 114, 114B2, 115, 218, C-316 & 502. With Oils of 200°F Aniline Point and Lower	-40 to +200	-40 to + 93	-118
Freon 12, 13, 14, 22, 113, 114, 114B2, 115, 218, C-316 and 502. With Oils of over 200°F Aniline Point	-40 to +200	-40 to + 93	Standard
Gasoline (Aromatic & Non Aromatic)	-40 to +160	-40 to + 71	-146

Fluid	TEMPERATURE RANGE		Hansen Elastomer
	°F	°C	
Helium Gas	-65 to +200	-54 to + 93	Standard
Hydraulic Fluid, Petroleum Base with Aniline Point above 160°F	-65 to +250	-54 to +121	Standard
Hydrogen Gas	-65 to +200	-54 to + 93	Standard
Kerosene	-40 to +120	-40 to + 49	-146
L.P. Gases	-40 to +120	-40 to + 49	-146
Methane	-40 to +120	-40 to + 49	-146
Mineral Spirits	-40 to +160	-40 to + 71	-146
Nitrogen Gas	-65 to +200	-54 to + 93	Standard
Oxygen	Service Conditions Dictate Elastomer Selection		
Oils			
Animal *	-40 to +160	-40 to + 71	Standard
Mineral Oil with Aniline Point Above 160°F	-40 to +250	-40 to +121	Standard
Vegetable-Non Food Service	-40 to +250	-40 to +121	Standard
Propane	-40 to +120	-40 to + 49	-146
Propylene	-40 to +250	-40 to +121	Standard
Steam, Saturated	Max. 338° (100 psig)	Max. 170° (690kPa)	-192*
Transmission Oil (Automotive)	-40 to +250	-40 to +121	Standard
Trichloroethylene	-20 to +200	-29 to + 93	-143
Turpentine	-40 to +200	-40 to + 93	Standard
Water to 180°F	To + 180	To +82	Standard

* -192 compound is not compatible with mineral base greases or oils.

Pressure Ratings & Flow Capacity for Two-Way Shut-Off Couplings

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

FAILURE: FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

CV FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{U.S. GPM}{C_v} \right]^2$$

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

*** SAFETY FACTORS:**

For Liquids: Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.

For Gases: Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

SERIES	STEEL (Standard)		STEEL (High Pressure)		BRASS		CV	Ac
	Service	Failure †	Service	Failure †	Service	Failure †		
1-HK	4000	16000	—	—	1000	12000	0.5	12
2-HK	3000	15000	7500	30000 (connected) 15000 (disconnected)	800	15000	1.1	28
3-HK	2000	16000	5000	16000	500	11000	1.0	48
4-HK	2000	15000	5000	20000	500	14000	3.2	80
4-HKA	500	800	psi disconnected (Failure † pressure 15000 when connected).				3.3	82
6-HK	1500	8000	3000	15000	500	9000	8.2	205
8-HK	1000	6000	2000	15000	500	6000	11.4	285
2-HKIG	—	—	—	—	—	—	1.1	28
2-HKIL	—	—	—	—	—	—	1.1	28
B3-HDK-Y	—	—	—	—	—	—	1.9	48
B4-HDK	—	—	—	—	—	—	3.2	80
B6-HDK	—	—	—	—	—	—	8.2	205
B8-HDK	—	—	—	—	—	—	11.4	285
B12-HDK	—	—	—	—	—	—	24.0	600

TWO-WAY SHUT-OFF COUPLINGS ARE DETAILED ON PAGE 586-b

1-Way Couplings — Refer Pages 586-c, 586-d and 586-e

Straight Through Couplings — Refer Page 586-f

586-b

HANSEN 2-WAY SHUT-OFF COUPLINGS

These Couplings provide positive shut-off of both ends of pressurized lines when disconnected. They put an end to the loss of gas or liquids. As soon as you release the locking sleeve, valves in both socket and plug close, shutting off flow.

When connecting, the Plug contacts an O-ring in the socket creating a positive seal. There is no chance of premature flow or waste due to a partial connection. The Plug must be fully sealed in the Socket before the valves will open.

Series 1-HK to 8-HK



SOCKETS with female pipe threads



PLUGS with female pipe threads

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

TYPE	SIZE FPT	SOCKET		PLUG		COMBINATION SOCKET & PLUG P/N
		CAT. NO.	PART NO.	CAT. NO.	PART NO.	
STEEL STANDARD SEAL	1/8"	5861	1-H11	586101	1-K11	1-HK11
	1/4"	5862	2-H16	586102	2-K16	2-HK16
	3/8"	5863	3-H21	586103	3-K21	3-HK21
	1/2"	5864	4-H26	586104	4-K26	4-HK26
	3/4"	5867	6-H31	586107	6-K31	6-HK31
	1"	5868	8-H36	586108	8-K36	8-HK36
	1.1/4"	58698	12-H41	586211	12-K41	12-HK41
BRASS STANDARD SEAL	1/8"	5869	B1-H11	586109	B1-K11	B1-HK11
	1/4"	58610	B2-H16	586110	B2-K16	B2-HK16
	3/8"	58611	B3-H21	586111	B3-K21	B3-HK21
	1/2"	58612	B4-H26	586112	B4-K26	B4-HK26
	3/4"	58613	B6-H31	586113	B6-K31	B6-HK31
	1"	58614	B8-H36	586114	B8-K36	B8-HK36
	1.1/4"	58699	B12-H41	586212	B12-K41	B12-HK41
STEEL HIGH PRESS SEAL	1/4"	58692	2-H16C	586205	2-K16C	2-HK16C
	3/8"	58693	3-H21C	586206	3-K21C	3-HK21C
	1/2"	5866	4-H26C	586106	4-K26C	4-HK26C
	3/4"	58694	6-H31C	586207	6-K31C	6-HK31C
Steel-Ammonia	1/2"	5865	4-H26A	586105	4-K26A	4-HK26A

Note: Larger sizes available on application (ex-USA).
Stainless Steel Couplings (Prefix "LL") also available ex-USA.

Series HDK steam

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.



Sockets BRASS Plugs
Female Connections Female Connections
DOUBLE O-RING SEALS
TWO-WAY SHUT-OFF

Provides quick, dependable connection and disconnection of steam lines. At instant of connection, double O-ring seals effect leak-proof Seal before valves in Socket and Plug release flow of steam. During instant of disconnection, Coupling remains sealed until valves effect complete shut-off of steam - on both sides of line.

SIZE FPT	SOCKET		PLUG	
	CAT. NO.	PART NO.	CAT. NO.	PART NO.
3/8"	58690	B3-HD21-Y *	586203	B3-K21-192
1/2"	58695	B4-HD26-192	586208	B4-K26-192
3/4"	58696	B6-HD31-192	586209	B6-K31-192
1"	58697	B8-HD36-192	586210	B8-K36-192
1.1/4"		B12-HD41-192		B12-K41-192
1.1/2"		B12-HD46-192		B12-K46-192

* Includes Easy-to-Grip sleeve flange.

STAINLESS STEEL

Series 2-HKIL & Series 2-HKIG

Non-interchangeable Couplings for liquids/gases



SOCKET - SERIES 2-HKIG - PLUG
With male end connections



SOCKET - SERIES 2-HKIL - PLUG
With male end connections

Series 2 - HKIG and 2 - HKIL with female end connections are included in Table but not illustrated.

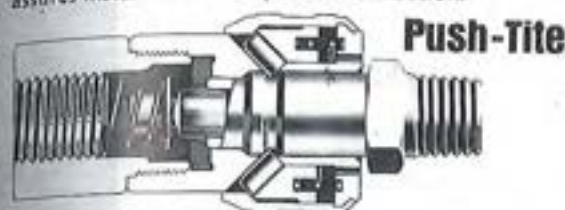
For Elastomer (Seal Material) Chart, Pressure Ratings and Flow Capacities - Refer Tech. Page 186-a.

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE - CATALOGUE SUPPLIED ON REQUEST.

SECTION 7

HANSEN 1-WAY SHUT-OFF COUPLINGS

Where only automatic shut-off of Socket end of line is required, use this type of Hansen Coupling. Spring actuated valve assures instant shut-off upon disconnection.



Push-Tite

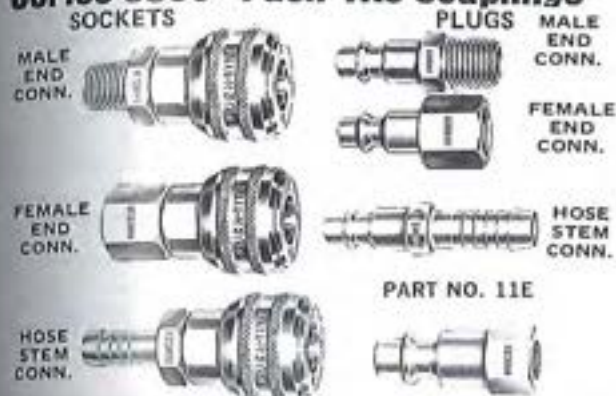
Series 3000, 4000, 5000, 6000

Instantaneous connection and disconnection of fluid lines with automatic shut-off of Socket end of line. When connected, Plug is free to swivel eliminating any kinks in the hose.

Socket is machined from solid brass bar stock. Steel Plug is fully hardened and rustproofed.

Locking pawls, sleeve spring and valve springs are of stainless steel.

Series 3000—Push-Tite Couplings



PART NO. 11E

END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male End	1/8" MPT		2900	Brass
	1/4" MPT	58624	3100	
	3/8" MPT	58626	3300	
Female End	1/4" FPT	58623	3000	Brass
	3/8" FPT	58625	3200	
Hose Stem	1/4" H.S.	586533	3600	Brass
	3/8" H.S.	586534	3700	

PLUGS				
Male End	1/4" MPT	586127	10	Steel
	1/4" MPT	586128	B-10	Brass
	1/8" MPT	586130	12	Steel
	3/8" MPT	586131	14	
Female End	1/4" FPT	586129	11	Steel
	1/8" FPT		13	
	3/8" FPT	586132	15	
Hose End	1/4" H.S.	586133	16	Steel
	3/8" H.S.	586134	17	
Special *	5/16"-32F.Thd.	586238	11E	

* Supplied with fibre washer — Fits tyre valve stem.

Series 6000—Push-Tite Couplings



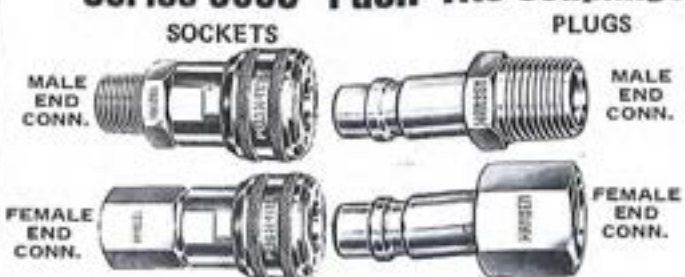
END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Female	3/4" FPT	58640	6400	Brass
P L U G S				
Male	1" MPT	586152	68	Steel
Female	1/2" FPT	586149	65	Steel
	3/4" FPT	586151	67	

Series 4000—Push-Tite Couplings



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male	1/2" MPT	58632	4500	Brass
Female	1/2" FPT	58631	4400	
PLUGS				
Male	1/4" MPT	586135	40	Steel
	3/8" MPT	586137	42	Brass
	3/8" MPT	586245	B-42	
	1/2" MPT	586139	44	Steel
Female	1/4" FPT	586136	41	Steel
	3/8" FPT	586138	43	
	1/2" FPT	586140	45	

Series 5000—Push-Tite Couplings



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Female	1/2" FPT	58635	5200	Brass
	3/4" FPT	58637	5400	
PLUGS				
Male	1/4" MPT	586141	50	Steel
	3/8" MPT	586142	52	
	1/2" MPT	586144	54	Brass
	1/2" MPT	586216	B54	
Female	3/8" FPT	586143	53	Steel
	1/2" FPT	586145	55	
	3/4" FPT	586147	57	

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

FOR ELASTOMER (SEAL MATERIAL) CHART

REFER Tech. Page 186-a

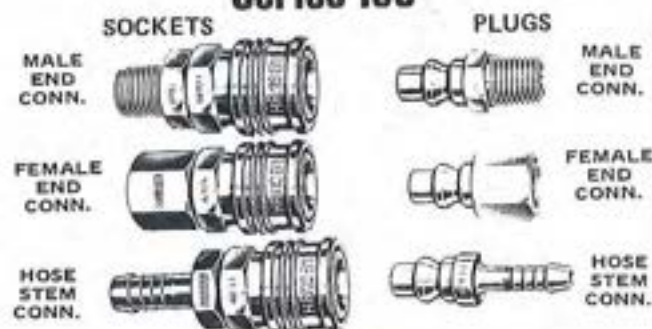
REFER PAGES 586-d and 586-e FOR ADDITIONAL 1-WAY COUPLINGS

NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

HANSEN 1-WAY SHUT-OFF COUPLINGS — Cont'd.

Series 100



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			

SOCKETS

Male	1/8" MPT	58658	101	Brass
	1/4" MPT	58660	103	
	3/8" MPT	58662	105	
Female	1/8" FPT	58657	100	Brass
	1/4" FPT	58659	102	
	3/8" FPT	58661	104	
Hose Stem	1/4" H.S.	58663	110	Brass
	3/8" H.S.		112	

PLUGS

Male	1/8" MPT	586184	1G1	Steel
	1/4" MPT	586186	1G3	
	3/8" MPT	586188	1G5	
Female	1/4" FPT	586185	1G2	Steel
	3/8" FPT	586187	1G4	
	1/4" H.S.	586189	1G10	
Hose Stem	3/8" H.S.	586190	1G12	Steel

Series 400



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			

SOCKETS

Male	1/4" MPT	58673	410	Brass
	1/4" FPT	58672	400	
Female	3/8" FPT	58674	420	Brass
	1/2" FPT	58676	440	

PLUGS

Male	1/4" MPT	586135	40	Steel
	3/8" MPT	586137	42	
	3/8" MPT	586245	B-42	
	1/2" MPT	586139	44	
Female	1/4" FPT	586136	41	Steel
	3/8" FPT	586138	43	
	1/2" FPT	586140	45	
	3/8" H.S.	586246	B406	
Hose Stem	1/2" H.S.	586247	408	Steel

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

Series 500



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			

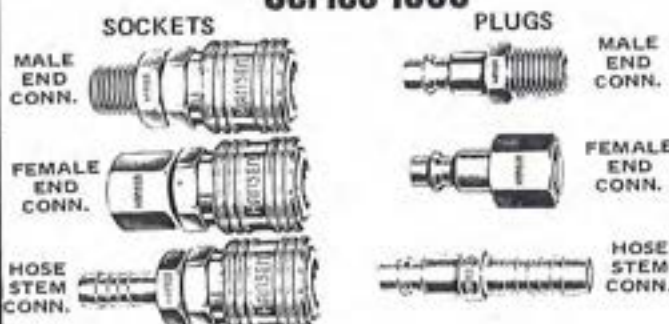
SOCKETS

Male	3/8" MPT	58679	510	Brass
	1/2" MPT	58681	530	
Female	3/8" FPT	58678	500	Brass
	1/2" FPT	58680	520	
	3/4" FPT	58682	540	

PLUGS

Male	1/4" MPT	586141	50	Steel
	3/8" MPT	586142	52	
	1/2" MPT	586144	54	
	1/2" MPT	586236	B-54	
Female	3/8" FPT	586143	53	Steel
	1/2" FPT	586145	55	
	3/4" FPT	586147	57	

Series 1000



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			

SOCKETS

Male	1/4" MPT	58669	1100	Brass
	3/8" MPT	58671	1300	
Female	1/4" FPT	58668	1000	Brass
	3/8" FPT	58670	1200	
Hose Stem	1/4" H.S.	586502	1600	Brass
	3/8" H.S.	586501	1700	

PLUGS

Male	1/4" MPT	586127	10	Steel
	1/4" MPT	586128	B-10	
	1/8" MPT	586130	12	
	3/8" MPT	586131	14	
Female	1/4" FPT	586129	11	Steel
	1/8" FPT		13	
	3/8" FPT	586132	15	
Hose Stem	1/4" H.S.	586133	16	Steel
	3/8" H.S.	586134	17	
	5/16" H.S.		18	
Special *	5/16" - 32 F.Th.	586238	11E	

*Supplied with fibre Washer — Fits tyre valve stem.

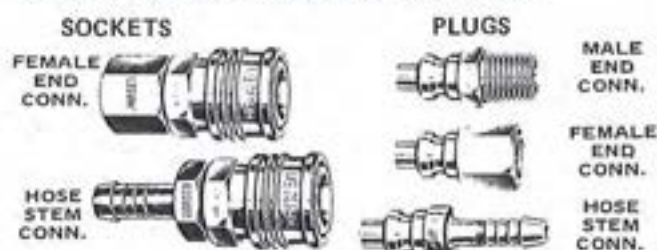
FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

REFER PAGES 586-c and 586-e FOR ADDITIONAL 1-WAY COUPLINGS

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

HANSEN 1-WAY SHUT-OFF COUPLINGS — Cont'd.

Series 600 Quick-Connective Couplings for Oxygen Service



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Female	1/4" FPT	58665	GR-602	Brass
Hose Stem	3/8" H.S.	586508	GR-608	
P L U G S				
Male	1/4" MPT	586233	03	Brass
Female	1/4" FPT	586191	02	
Hose Stem	3/8" H.S.	586214	09	

Series 2-RL—Ring-Lock Couplings



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/8" MPT	586540	2-R10	Steel
	1/4" MPT	586541	2-R15	
Female	3/8" FPT	586542	2-R21	Steel
P L U G S				
Male	1/8" MPT	586240	2-L10	Steel
	1/4" MPT	586241	2-L15	
	3/8" MPT	586242	2-L20	
Female	3/8" FPT	586243	2-L21	Steel

Pressure Ratings & Flow Capacities

Series	Connected - psi		Disconnected - psi		Cv	Ac
	Service	Failure †	Service	Failure †		
3000	1500	12000	900	8000	1.1	28
4000	1500	18000	700	4000	1.8	45
5000	1500	14000	500	2000	3.0	75
6000	1500	9000	400	9000	5.0	125
2-RL	300	15000	300	4000	1.9	48
3-RL	300	15000	300	2000	3.2	80
100	1000	10000	300	3000	0.8	20
400	700	18000	700	4000	1.8	45
500	500	14000	500	2000	2.9	72
600	500	10000	500	6000	0.8	20
700	500	10000	500	6000	0.8	20
1000	1500	12000	900	8000	1.1	28

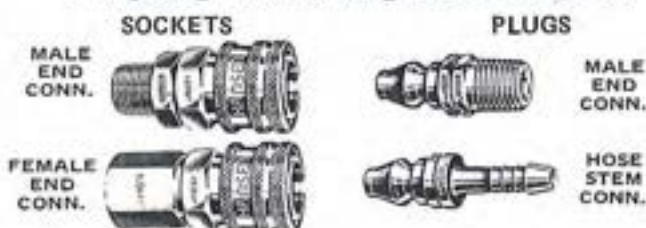
Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

REFER PAGES 586-c and 586-e FOR ADDITIONAL 1-WAY COUPLINGS

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

Series 700 Quick-Connective Couplings for Acetylene Service



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/4" MPT	58667	RD-703	Brass
Female	1/4" FPT	58666	RD-702	
P L U G S				
Male	1/4" MPT		A3P	Brass
Hose Stem	1/4" H.S.	586217	A7	
	3/8" H.S.	586219	A9	

Series 3-RL—Ring-Lock Couplings



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/2" MPT	586543	3-R25	Steel
P L U G S				
Male	1/2" MPT	586244	3-L25	Steel

Gas-Mate Couplings ONE-WAY SHUT-OFF

A.G.A. certified for Natural Gas,
Manufactured Gas, Mixed Gas, and for
Liquified Petroleum and LP Gas-Air Mixtures
AVAILABLE EX USA ON APPLICATION

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

† FAILURE: FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

Cv FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{U.S. GPM}{Cv} \right]^2$$

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

* SAFETY FACTORS

For Liquids: Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.

For Gases: Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

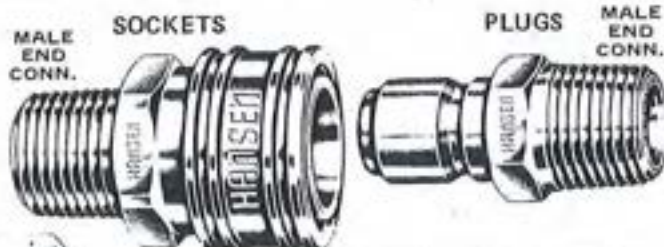
* NOTE: Cv FACTOR IS IN US gals/min.

HANSEN STRAIGHT THROUGH COUPLINGS

Hansen Straight Through Couplings are recommended for lines where quickly detachable Coupling without automatic shut-off valves are needed. Smooth unrestricted bore permits full flow of fluids. The Plug automatically locks in place when connected. An O-ring seal eliminates any possibility of fluid leak when connected.

Series ST

—without Shut-off Valves



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/4" MPT	58642	2-S15	Brass
	3/8" MPT	58645	3-S20	
	1/2" MPT	58648	4-S25	
	3/4" MPT	58651	6-S30	
	1" MPT	58654	8-S35	
Female	1/4" FPT	58643	2-S16	Brass
	3/8" FPT	58646	3-S21	
	1/2" FPT	58649	4-S26	
	3/4" FPT	58652	6-S31	
	1" FPT	58655	8-S36	
Hose Stem	1/4" H.S.	58644	2-S17	Brass
	3/8" H.S.	58647	3-S22	
	1/2" H.S.	58650	4-S27	
	3/4" H.S.	58653	6-S32	

PLUGS				
Male	1/4" MPT	586153	2-T15	Steel
	3/8" MPT	586159	3-T20	
	1/2" MPT	586165	4-T25	
	3/4" MPT	586171	6-T30	
	1" MPT	586177	8-T35	
Female	1/4" MPT	586156	B2-T15	Brass
	3/8" MPT	586162	B3-T20	
	1/2" MPT	586168	B4-T25	
	3/4" MPT	586174	B6-T30	
	1" MPT	586180	B8-T35	
Hose Stem	1/4" FPT	586154	2-T16	Steel
	3/8" FPT	586160	3-T21	
	1/2" FPT	586166	4-T26	
	3/4" FPT	586172	6-T31	
	1" FPT	586178	8-T36	
Female	1/4" FPT	586157	B2-T16	Brass
	3/8" FPT	586163	B3-T21	
	1/2" FPT	586169	B4-T26	
	3/4" FPT	586175	B6-T31	
	1" FPT	586181	B8-T36	
Hose Stem	1/4" H.S.	586155	2-T17	Steel
	3/8" H.S.	586164	B3-T22	
	1/2" H.S.	586170	B4-T27	
	3/4" H.S.	586173	6-T32	

pressure ratings & flow capacity

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

† FAILURE: FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

Cv FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{U.S. GPM}{Cv} \right]^2$$

NOTE: Cv is in
US gals/min.

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

Series GH

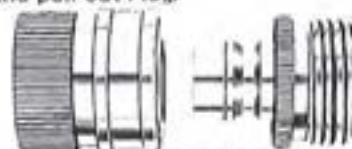
—provides quick, leakproof water service connections.

With Hansen Series GH Couplings, you avoid the squirting, spraying and leaking you often get with less dependable water service Couplings.

When Coupling is connected tight, seal of Plug to Socket is insured by a high grade O-Ring in Socket.

Both Socket and Plug are of Brass construction with stainless steel internal parts.

To connect the Hansen water service Couplings, you merely push back the Socket Sleeve and push in Plug. To disconnect, push back Socket Sleeve and pull out Plug.



END CONNECTION	CAT. NO.	PART NO.
SOCKET		
1.1/16" 11-1/2 Female Water Hose Thread		GHS-12
PLUG		
1.1/16" 11-1/2 Male Water Hose Thread		GHP-11



END CONNECTION	CAT. NO.	PART NO.
SOCKET		
3/4" — 14 FPT	586512	8-GHS-75FS
PLUG		
3/4" — 14 MPT	586213	8-GHP-75MS

Series	With Steel Plug-psi		With Brass Plug-psi		Cv	Ac
	Service	Failure †	Service	Failure †		
2-ST	1800	22000	1200	21000	2.5	62
3-ST	800	14000	800	11000	6.6	165
4-ST	500	11000	500	9000	9.7	242
6-ST	500	7000	500	7000	29.6	740
8-ST	300	8000	300	5000	62.7	1570
GH	—	—	200	—	10.2	255

* SAFETY FACTORS

For Liquids: Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.

For Gases: Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

VIBRA-CONTROL ANTI-VIBRATION EQUIPMENT

TYPE S & SL 1" Deflection SPRING MOUNTS

590

TYPE S — COMMON APPLICATIONS :

Fan Coil Units, both suspended and floor mounted, Fan assemblies, Hanger assemblies.

TYPE SL — COMMON APPLICATIONS :

Fan assemblies, Pumps, Refrigeration and Air Compressors, Reciprocating Chiller Sets, Stationary Engines.

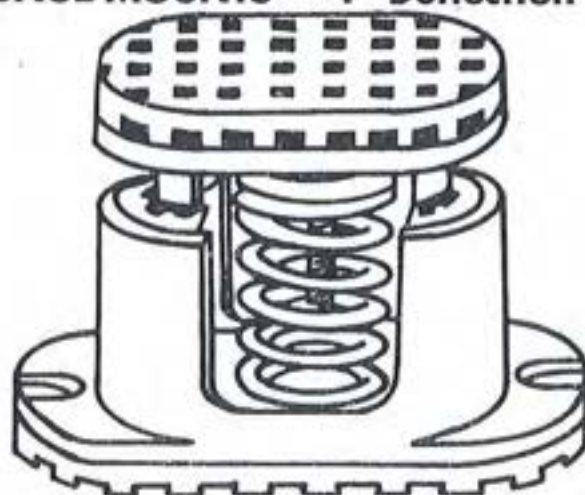


MODEL S		MODEL SL		LOAD		COLOUR CODE
WITHOUT LEVELLING ASSEMBLY		WITH LEVELLING ASSEMBLY		LBS.	kg.	
CAT. NO.	MODEL	CAT. NO.	MODEL			
5903	S-A- 10	59040	SL-A - 10	10	4.5	Brown and White
5904	- 20	59041	- 20	20	9.1	Silver and Yellow
5905	- 30	59042	- 30	30	13.6	White and Orange
5906	- 40	59043	- 40	40	18.2	Gray and Red
5907	- 60	59044	- 60	60	27.3	Black
5908	- 80	59045	- 80	80	36.4	Purple and White
5909	- 100	59046	- 100	100	45.5	Blue
59010	- 125	59047	- 125	125	56.8	Green
59011	- 150	59048	- 150	150	68.2	Yellow
59012	- 200	59049	- 200	200	90.9	Orange
59013	- 300	59050	- 300	300	136.4	Red
59014	S-B- 200	59051	SL-B - 200	200	90.9	Purple and White
59015	- 300	59052	- 300	300	136.4	Blue
59016	- 400	59053	- 400	400	181.8	Green
59017	- 500	59054	- 500	500	227.3	Yellow
59018	- 600	59055	- 600	600	272.7	Orange
59019	- 800	59056	- 800	800	363.6	Red
59026	S-C- 600	59057	SL-C - 600	600	272.7	Blue
59027	- 800	59058	- 800	800	363.6	Green
59028	-1000	59059	-1000	1000	454.5	Yellow
59029	-1250	59060	-1250	1250	568.2	Orange
59030	-1500	59061	-1500	1500	681.8	Red
59031	-1750	59062	-1750	1750	795.5	Red. Tan Inner Spring.
59032	-2000	59063	-2000	2000	909.0	Red. Silver Inner Spring.

NOTES : 1. Type SL Spring Mounts are also available as "SL-2" to 4000 lbs. and "SL-4" to 8000 lbs. Loading.
2. 2", 3" and 4" Deflection Spring Mounts with or without levelling assembly, available on application.
3. Loading and Colour Code applies to both "S" and "SL" Types.

SNUB MOUNTS — 1" Deflection

COMMON APPLICATIONS : This Type as the name indicates is a snubbed mount and is especially suitable for absorbing shock loads under such machines as heavy presses. It is also used for reciprocating and centrifugal chiller sets.



Adjustment is by means of internal screw.
Also available with loads up to 8000 lbs.

CAT. NO.	MODEL	COLOUR CODE	LOAD	
			LBS.	kg.
590133	SNUB-A - 80	Purple and White	80	36.4
590134	- 100	Blue	100	45.5
590135	- 125	Green	125	56.8
590136	- 150	Yellow	150	68.2
590137	- 200	Orange	200	90.9
590138	- 300	Red	300	136.4
590139	SNUB-B - 200	Purple and White	200	90.9
590140	- 300	Blue	300	136.4
590141	- 400	Green	400	181.8
590142	- 500	Yellow	500	227.3
590143	- 600	Orange	600	272.7
590144	- 800	Red	800	363.6
590145	SNUB-C - 600	Blue	600	272.7
590146	- 800	Green	800	363.6
590147	-1000	Yellow	1000	454.5
590148	-1250	Orange	1250	568.2
590149	-1500	Red	1500	681.8
590150	-1750	Red. Tan Inner Spring	1750	795.5
	-2000	Red. Silver Inner Spring	2000	909.0

TYPE NP NEOPRENE MOUNTING PADS

Type NP is a general purpose pad and is freely used in conjunction with spring housings both as a high frequency isolator and as a friction pad which obviates the need for holding down bolts. It may be laminated with other alternate layers of NP and metal to provide greater isolation. Applications : It is used for the isolation of high frequency vibration. It is good for non-critical isolation of pumps, fans, fan coil units etc. It is oil resistant and weatherproof.

CAT. NO.	MODEL	SIZE	LOAD PSI (kPa)
590212	NP	18" x 18"	30 to 80 [Optimum 60] [207 to 552 [Optimum 414]]

Smaller sizes available on request.

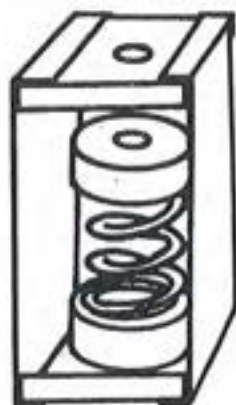
VIBRA - CONTROL EQUIPMENT — CONTINUED NEXT PAGE.

VIBRA-CONTROL ANTI-VIBRATION EQUIPMENT HANGERS



TYPE HN
DOUBLE
DEFLECTION
NEOPRENE
HANGER

APPLICATIONS : Pipework, fan assemblies fan coil units and ductwork, where low static deflection is acceptable.



TYPE HS
SPRING
HANGER

APPLICATIONS : As above, but where static deflection of approx. 1" is required.

Vibra-Control Hanger Boxes are of exceptionally robust design and will endure very high overloading without damage.

Spring Hangers are designed to prevent metallic contact between hanger rod and box.

CAT. NO.	MODEL	COLOUR CODE	LOAD	
			LBS.	kg.

TYPE HN DOUBLE DEFLECTION NEOPRENE HANGER

590226	HN-A	White	12 to 40	5 to 18
590227	"	Red	30 to 70	13 to 32
590228	"	Green	60 to 120	27 to 55
590230	HN-B	Red	70 to 140	32 to 64
590231	"	Green	100 to 220	45 to 100
590232	"	Blue	170 to 350	77 to 160
590234	HN-C	Green	200 to 400	90 to 180
590235	"	Blue	300 to 580	136 to 264
590236	"	Yellow	500 to 1000	227 to 455

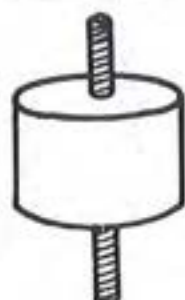
TYPE HS SPRING HANGER

590239	HS-A- 10	Brown and White	10	4.5
590240	- 20	Silver and Yellow	20	9.1
590241	- 30	White and Orange	30	13.6
590242	- 40	Gray and Red	40	18.2
590243	- 60	Black	60	27.3
590244	- 80	Purple and White	80	36.4
590245	- 100	Blue	100	45.5
590246	- 125	Green	125	56.8
590247	- 150	Yellow	150	68.2
590248	- 200	Orange	200	90.9
590249	- 300	Red	300	136.4
590251	HS-B- 200	Purple and White	200	90.9
590252	- 300	Blue	300	136.4
590253	- 400	Green	400	181.8
590254	- 500	Yellow	500	227.3
590255	- 600	Orange	600	272.7
590256	- 800	Red	800	363.6
590257	HS-C- 600	Blue	600	272.7
590258	- 800	Green	800	363.6
590259	-1000	Yellow	1000	454.5
590260	-1250	Orange	1250	568.2
590261	-1500	Red	1500	681.8
590262	-1750	Red, Tan Inner Spring	1750	795.5
590263	-2000	Red, Silver Inner Spring	2000	909.0

NOTES: 1. Combination Neoprene and Spring Hangers also available.

2. Other types of mountings also available on request — e.g. Type SR Restrained Mounts, Type SFM Spring Floor Mount and NFM Neoprene Floor Mount.

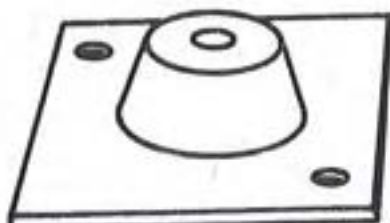
NEOPRENE MOUNTS



TYPE CN
CYLINDRICAL
MOTOR
MOUNTS

MATERIAL
50 DURO
NEOPRENE

APPLICATIONS : Electric Motors, Small Petrol Motors, Instruments (general), Compressors, Shaker Tables, Small fans etc.



TYPE SN
SINGLE DEFLECTION
&
TYPE N
DOUBLE DEFLECTION
MOUNTS

APPLICATIONS : Hangers, Fan Coil Units, Fans, Pumps.

CAT. NO.	MODEL	LOAD	
		LBS.	kg.
590275	CN-A	12	5.5
590276	CN-B	20	9.1
590277	CN-C	30	13.6
590278	CN-D	50	22.7
590279	CN-E	120	54.5
590282	CN-F	140	63.6

Loads shown are for Compression.

Deflections at rated load approx. 0.1".

TYPE SN SINGLE DEFLECTION		TYPE N DOUBLE DEFLECTION		COLOUR * CODE	LOAD *	
CAT. NO.	MODEL	CAT. NO.	MODEL		LBS.	kg.
590187	SN-A	590201	N-A	White	12 to 40	5 to 18
590188	"	590202	"	Red	30 to 70	13 to 32
590189	"	590203	"	Green	60 to 120	27 to 55
590191	SN-B	590205	N-B	Red	70 to 140	32 to 64
590192	"	590206	"	Green	100 to 220	45 to 100
590193	"	590207	"	Blue	170 to 350	77 to 159
		590209	N-C	Green	200 to 400	90 to 182
		590210	"	Blue	300 to 580	136 to 264
		590211	"	Yellow	500 to 1000	227 to 455

* Colour Code and Load applies to both Type SN and Type N Mounts.

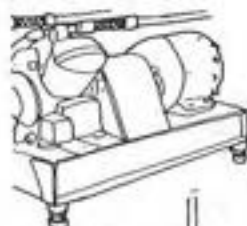
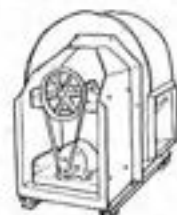
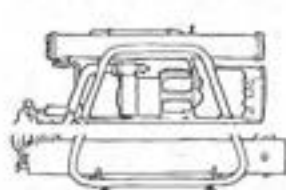
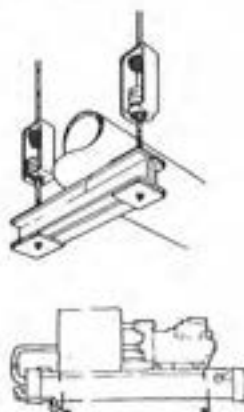
VIBRA-CONTROL ANTI-VIBRATION EQUIPMENT — REFER ALSO PREVIOUS PAGE.



MASON

NOISE AND VIBRATION CONTROL PRODUCTS

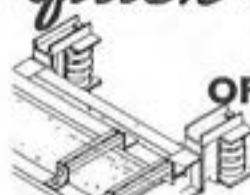
TECH. PAGE **591**



It's almost twenty years since Mason started with little more than the firm belief that you would support a company dedicated to the promotion of a better product. You have reaffirmed that belief and in this short outline about the things we produce we will try to tell of our innovations that were and are new and better.

A quick look at the Mason line

OF NOISE AND VIBRATION CONTROL PRODUCTS



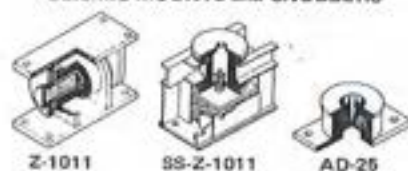
SPRING MOUNTS



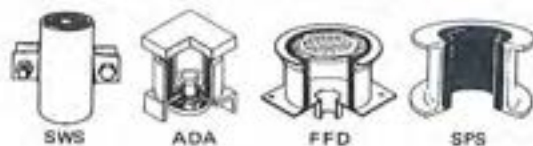
NEOPRENE MOUNTS and PADS



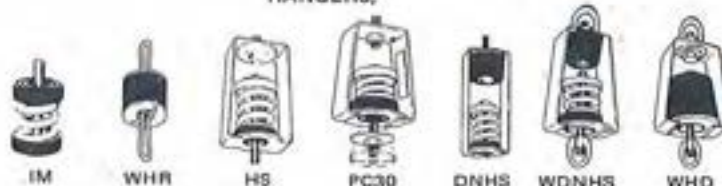
SEISMIC MOUNTS and SNUBBERS



PIPING SPECIALTIES



HANGERS,



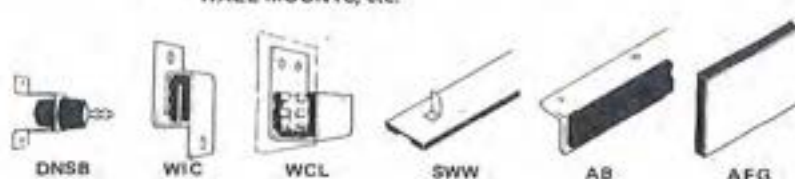
FAN BASES and RAILS,



FLOOR MOUNTS,



WALL MOUNTS, etc.



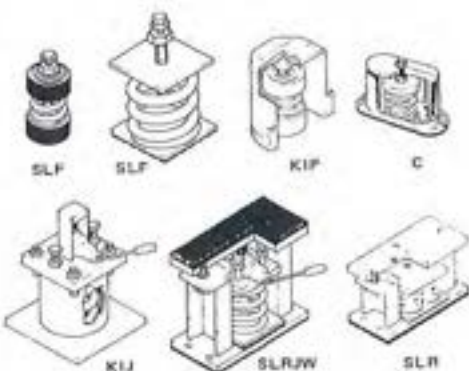
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NOISE AND VIBRATION CONTROL PRODUCTS

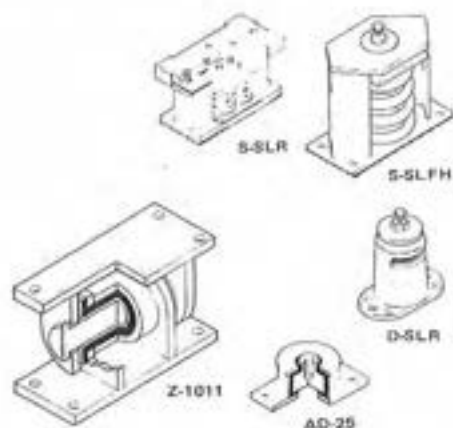
SPRING MOUNTS

Helical spring mounts have been with us for many years, but Mason pioneered the use of springs designed with diameters equal to or approaching their operating heights. The stable SLF configuration can be used without housings for maximum vibration attenuation. While the telescoping Type C casting does introduce some damping, all of the other special purpose housings encase the spring without interfering with its action. The Type KIP and KIJ housings can be cast into foundations poured in place. They provide a means of loading the springs and elevating the foundations. Types SLR or SLRJW are restrained spring mountings with operating height equal to installed height and special features for safety in wind loads. The inclusion of vertical limit stops prevent spring extension when weight is removed. Mountings carrying 6820 kg (15,000 pounds) or more are usually designed with a hydraulic jack to save time and effort. Another Mason contribution to the art.



SEISMIC SNUBBERS AND MOUNTS

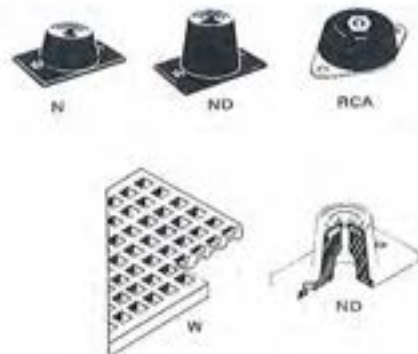
Most specifications for mountings used in seismic zones call for static g ratings in three planes. Simple welded designs such as the S-SLR and S-SLFH meet these requirements. The best snubbers are the all-directional Z-1011 series which have been tested and rated for stiffness and ultimate capacity. There are air gaps between the AASHO bridge-bearing neoprene bushings and the steel housings to prevent short circuiting of the isolation provided by the springs. The applications are normally backed up by a computer program developed for Mason by one of the seismologists at the University of California in Pasadena. The dynamic program accepts the earthquake input and predicts motions and accelerations at the bearings, mechanical service connections and structural attachments. This enables us to maintain specified motion and deceleration levels. Neoprene mountings such as the AD-25 are customized for 25 Hz, or other frequencies.



NEOPRENE MOUNTS AND PADS

Neoprene mounts and pads are such simple commodities that there really isn't a great deal to talk about. However, when the Type N and ND mountings were designed 19 years ago, they were the first to have all metal parts covered by neoprene to prevent corrosion and to provide a nonskid surface. A second taller mount was designed to gain added deflection rather than copying the old technique of bolting two mountings in series. Individual neoprene mountings are available in load ranges from 7 to 1955 kg (15 to 4300 pounds) per mounting. The RCA mounting is a captive design suitable for mobile installations.

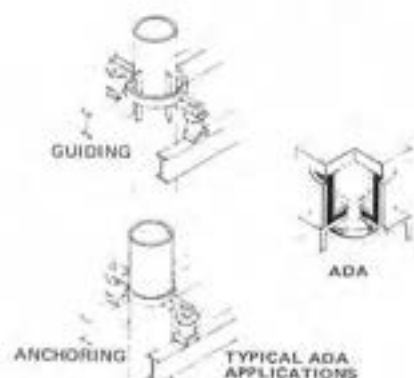
The Type W pad was one of the early waffle designs as compared to the more common ribbed variety. The advantage of the waffle is that it is self-sealing and the pads last longer. The continuous pattern on both sides normally provides for higher capacities in a given rubber hardness. Type W pads are available in cut sizes up to 18" x 36". Standard mounts and pads or custom products can be moulded in the Mason Plant in special materials such as natural rubber, hycar or bridge-bearing AASHO quality neoprene.



HANGERS

Neoprene hangers (HD), spring hangers (HS) and combination spring and neoprene hangers (DNHS) were in existence before the formation of Mason, but we did develop the first double-deflection design using a single taller rubber element. The most sophisticated design is the 30N using a spring series even larger in diameter than those used for the SLF mountings. This enables us to enlarge the hole in the bottom of the hanger box so the suspension rods can swing through a full 30° arc, virtually eliminating the age old problem of hanger rods rubbing against the holes in the hanger boxes and short-circuiting the system. We have also provided neoprene bottom cups for the springs moulded with rubber hole bushings as an added precaution. All spring hangers can be supplied precompressed with a loading scale for simplified adjustment and load verification in the field. Special hangers are also available for pipe expansion problems.

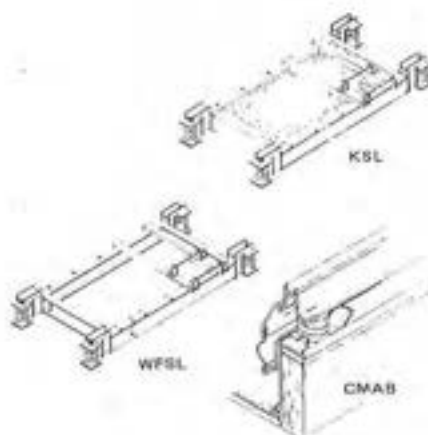




PIPING SPECIALTIES

Resilient guiding and anchoring of piping has always been something of a problem. Many designs place the resilient material in direct contact with the piping surface. Since the materials are normally rubber or rubberlike there had always been the problem of heat sensitivity, friction and wear as the piping slid against the resilient surface. In some cases there was an unpleasant odour as well, as these materials tend to smell when warm.

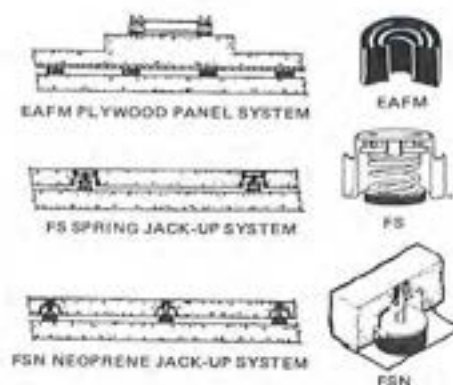
The ADA pipe hanger or guide is an all-directional device that may be bolted or welded in any position. It is remote from the piping itself as it is used under the ends of a rugged clamp or an oversized guide ring, depending on whether anchoring or guiding is required. ADA anchors and guides are manufactured for all sizes of pipe and may be used as seismic anchors as well.



BASES AND ROOF RAILS

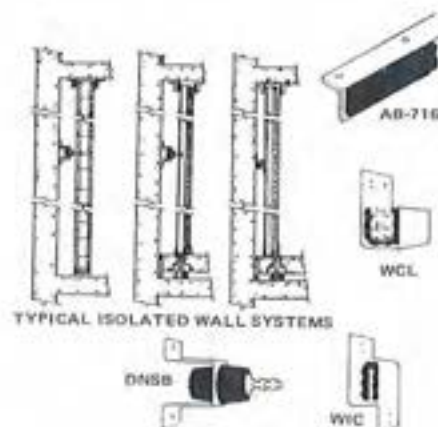
Type WFSL and KSL bases have become an industry standard because we have encouraged specifications calling for structural steel perimeters with a depth equal to 1/10th the length for WFSL frames and 1/12th the length for the concrete filled KSL designs. Height saving brackets are almost always used and bases are customized to fit 1 1/2 HP close coupled pumps all the way up to 8000 ton centrifugal machines, with a variety of fan, pump, compressor, chiller, etc., base designs in between.

A more recent product is the Type CMAB curb mounted aluminium base for rooftop equipment. The extruded overlapping design made with a flexible neoprene weather-seal around the perimeter provides 25 mm (1") of static deflection. This heliarc welded base is normally shipped in one piece. In the short period it has been marketed it has gained widespread engineering and contractor acceptance because it does not leak, and it does not blind.



FLOATING FLOOR MOUNTS

The idea of pouring a secondary floor on an elastic medium goes back as long as we can remember. Cork was the first material used, but because of its high frequency, the older floating floors were not too effective. The method of pouring concrete on plywood supported by fibreglass was improved upon by substituting EAFM-AASHO bridge-bearing neoprene mounts for the glass. Panels are not the best way to go, however, and we recommend the jack-up system, wherein you pour the secondary floor around FS or FSN mounts that have been placed on plastic sheeting spread over the sub floor. You lift the cured slab with the adjustment bolts in each mount. No plywood is left beneath the floors; there is no possibility of concrete breaking through the formwork to short-circuit the system, and larger more effective air gaps can be used at no increase in cost. Mountings are usually placed on 1200 mm (48") centres, with closer spacing in areas carrying heavier loads. The FS spring design is used for those applications where vibration rather than sound is the major problem. These jack-up systems were both developed and proven by Mason with acoustical and structural test data to back their recommendations.



WALL MOUNTS AND CEILING HANGERS

Floating walls and suspended ceilings complete the isolation. Walls should be resting on a continuous pad, Type SWW, if not on the floating floor, and sealed at the top with AB-716 angle brackets. Buckling is prevented by means of DNSB sway braces or the simpler WIC or WCL commonly used with fabricated walls. All of these devices use neoprene as the isolation media.

Ceilings are suspended using all of the hangers normally used for piping. They are modified by introducing eye bolts at each end for wiring or bolting to black iron runners. The spring ceiling hangers are precompressed to minimize downward travel as construction proceeds. The WHR is a simple inexpensive device to prevent high frequency transmission at low cost.





TYPE SLF & C — Nominal 1" Deflection SPRING MOUNTINGS



SINGLE SPRING
1" Deflection
SLF MOUNT



TYPE C

TYPE SLF MOUNTINGS : SLF mountings of the proper deflection are recommended for all vibration control applications where it is not necessary to cope with weight removal or wind load problems. Excessive discharge pressures can be dealt with by adding mass through the use of floating inertia bases or in extreme cases, by the addition of horizontal thrust restraints.

TYPE C SPRING MOUNTINGS : These mountings provide a packaged solution to troublesome vibration problems. Since the static deflection of the spring element is much greater than that provided by most rubber materials, these units will perform where it is necessary to establish low natural frequencies or to use a mounting that is more yielding than the supporting floor. Type "C" mountings are specifically designed for noise and vibration free application in critical areas on light concrete or wooden floors.

TYPE SLF		TYPE C		CAPACITY		RATED DEFLECTION INS.	COLOUR CODE
CAT. NO.	MODEL	CAT. NO.	MODEL	LBS.	kg.		
591101	SLF-A- 45	591126	C-A- 45	45	20.5	1.60	Blue
591102	- 75	591127	- 75	75	34.1	1.50	Orange
591103	- 125	591128	- 125	125	56.8	1.33	Brown
591104	- 200	591129	- 200	200	90.9	1.15	Black
591105	- 310	591130	- 310	310	140.9	1.00	Yellow
591106	SLF-B- 60	591131	C-B- 60	60	27.3	2.14	Brown
591107	- 140	591132	- 140	140	63.6	1.97	Orange
591108	- 280	591133	- 280	280	127.3	1.60	Green
591109	- 450	591134	- 450	450	204.5	1.31	Red
591110	- 750	591135	- 750	750	340.9	1.12	White
591111	-1000	591136	-1000	1000	454.5	1.00	Blue
591112	SLF-C- 110	591137	C-C- 110	110	50.0	2.07	Purple
591113	- 225	591138	- 225	225	102.3	1.84	Blue
591114	- 435	591139	- 435	435	197.7	1.55	Gray
591115	- 735	591140	- 735	735	334.1	1.24	White
591116	-1000	591141	-1000	1000	454.5	1.06	Black
591117	-1350	591142	-1350	1350	613.6	1.00	Yellow
591118	-1675	591143	-1675	1675	761.4	1.00	Note 1
591119	-2100	591144	-2100	2100	954.5	1.00	Note 2

- NOTES: 1. SLF-C-1675 and C-C-1675 Mountings have a GRAY spring inside a YELLOW spring.
2. SLF-C-2100 and C-C-2100 Mountings have a RED spring inside a YELLOW spring.
3. SLF Type Mountings are available in Capacities to 33600 lbs. (15273 kg.).
4. C " " " " " " " " 8400 lbs. (3818 kg.).
5. Capacities, Rated Deflection and Colour Codes apply to both SLF and C Types.

TYPE ND NEOPRENE MOUNTINGS — Double Deflection



Rubber is the most widely accepted vibration control material. It may be natural or synthetic and moulded in a wide variety of shapes and sizes with or without metallic inserts depending on the service. The materials popularity is based on low cost, effectiveness in a wide band of frequencies and ease of application.

Type "ND" Neoprene Mountings are designed for both high static deflections and simplified installation. The rubber is loaded in both shear and compression to provide the desirable straight line Rubber-in-Shear deflection curves as well as overload protection. They are one piece moulded assemblies with skid resistant rubber ridged baseplates and circular rubber ridged tops.

CAT. NO.	MODEL	COLOUR CODE	CAPACITY RANGE	
			LBS.	kg.
591176	ND-A	Black	15 to 45	7 to 20
591177	"	Green	30 to 75	14 to 34
591178	"	Red	60 to 125	27 to 57
591179	ND-B	Black	50 to 100	23 to 45
591180	"	Green	75 to 150	34 to 68
591181	"	Red	110 to 235	50 to 107
591182	"	White	180 to 380	82 to 173
591183	"	Yellow	300 to 600	136 to 273
591184	ND-C	Green	140 to 260	64 to 118
591185	"	Red	200 to 400	91 to 182
591186	"	White	310 to 600	141 to 273
591187	"	Yellow	520 to 1000	236 to 454
591188	ND-D	Yellow	1060 to 2100	482 to 955
591189	ND-E	Yellow	2200 to 4300	1000 to 1955

It is not necessary to bolt these mountings to the floor on most installations. They can be used under flat based machines that have no bolt holes in much the same manner as vibration pads. When the equipment has a flush drain pan or tank on the bottom, they may be inverted so that the rectangular rubber covered steel baseplate provides support over a large area.

MASON VIBRATION CONTROL PRODUCTS — CONTINUED NEXT PAGE.

NOISE AND VIBRATION CONTROL PRODUCTS



591-d MASON



HD
NEOPRENE HANGER

TYPE HD NEOPRENE HANGERS TYPE HS SPRING HANGERS

Resilient hangers are used primarily to prevent vibration and noise transmission from suspended piping and equipment, or to keep building vibrations and noises out of suspended ceilings. They may also be used for expansion problems such as those encountered with pipe line rises. Hangers are most commonly located in the suspension rods, straps or wires, although they may be attached directly to the structural or acoustical ceilings.

It is always best to locate hangers closest to the construction that is being protected. When piping or equipment is being isolated the best hanger location is close to the structural ceiling or suspension steel. Acoustical ceiling hangers should be down close to the floating ceiling.

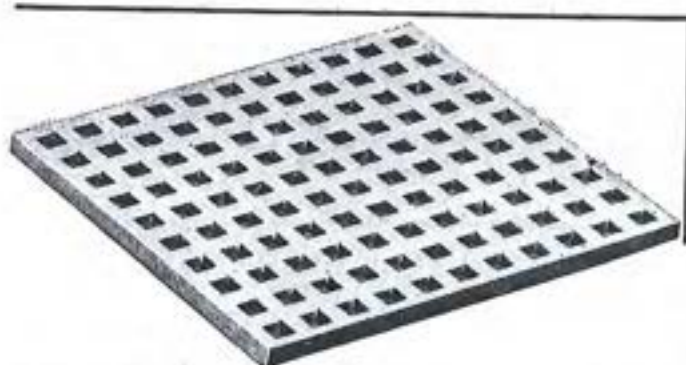


HS
SPRING HANGER

HD hangers are double deflection neoprene units with average static deflections of 0.4". Up until 1965 a single deflection hanger was manufactured with an average deflection of 0.2", but their performance was found to be so limited that they were dropped from the range. HD hangers are minimal devices that should be used for the isolation of very small equipment, or high frequencies only. They should not be considered at all for equipment running below 800 rpm if you wish to isolate vibration occurring at the operating speed. They are primarily noise isolators, and neoprene is used because of its excellent aging characteristics.

HS hangers are made with a steel spring centered within a neoprene cup. The neoprene cup provides some sound isolation but more importantly the projecting neoprene bushing prevents steel to steel contact between the hanger rod and the hanger box when the rods are off centre. While some of the lighter capacities in each size provide rather large deflections the HS-A, HS-B and HS-C are generally considered a 1" deflection series. Spring hangers provide good isolation where there is a very small high frequency component and so they are generally recommended for applications like duct work suspension.

- NOTES: 1. HS Type Hangers are available in capacities up to 8400 lbs.
2. 30° Angularity Hangers and Combination Spring and Neoprene Hangers are available on request.



TYPE HD NEOPRENE HANGERS

CAT. NO.	MODEL	COLOUR CODE	LOAD	
			LBS.	kg.
591226	HD-A	Black	Up to 45	Up to 20
591227	"	Green	30 to 75	14 to 34
591228	"	Red	60 to 125	27 to 57
591229	HD-B	Red	Up to 235	Up to 107
591230	"	White	180 to 380	82 to 173
591231	"	Yellow	320 to 650	145 to 295
591232	HD-C	White	Up to 600	Up to 273
591233	"	Yellow	520 to 1000	236 to 455

TYPE HS SPRING HANGERS

591251	HS-A- 45	Blue	45	20
591252	- 75	Orange	75	34
591253	- 125	Brown	125	57
591254	- 200	Black	200	91
591255	- 310	Yellow	310	141
591256	HS-B- 60	Brown	60	27
591257	- 140	Orange	140	64
591258	- 280	Green	280	127
591259	- 450	Red	450	205
591260	- 750	White	750	341
591261	-1000	Blue	1000	455
591262	HS-C- 110	Purple	110	50
591263	- 225	Blue	225	102
591264	- 435	Gray	435	198
591265	- 735	White	735	334
591266	-1000	Black	1000	455
591267	-1350	Yellow	1350	614
591268	-1675	Yell. & Gray	1675	761
591269	-2100	Yell. & Red	2100	955

TYPE W VIBRATION PADS

Vibration Pads are used to reduce noise and vibration and to eliminate the need for bolting down. The flat configuration hardly elevates the machine to be isolated and in many cases this low cost method conveniently solves or prevents a problem that does not warrant the use of either rubber or spring mountings. As a general rule, pads are recommended to eliminate bolting, for minor vibration problems in upper stories or for ground floor and non critical applications.

THE TYPE "W" Neoprene Waffle has greater carrying capacity per square inch, increased holding power and a built in contamination seal. Identical rubber grids are moulded back to back for maximum rubber contact area and resistance to rib collapse or hinging. The interconnections form suction pockets for gripping smooth steel as well as rough surfaces and also act as dirt and oil dams at the perimeter regardless of how the pad is cut. The square waffle pattern is laid out on 1/2" centers to facilitate cutting pads to size in the field without the need for measuring.

While there is no need for bolting or cementing on most installations, Type "W" Adhesive may be used for securing machines that have exceptionally large horizontal forces. The adhesive is also useful when the pad is made part of an assembly or shipped cemented to machinery legs.

CAT. NO.	MODEL	SIZE	RECOMMENDED LOADING
591205	W	18" x 36"	60 lbs./sq. in. (4.2 kg/sq. cm.)
591206	W	18" x 18"	
591207	W	12" x 12"	
591208	W	6" x 6"	
591209	W	4" x 4"	
591210	W	3" x 3"	
591211	W	2" x 2"	

TYPE RCA RESTRAINED RUBBER MOUNTS



NON-OIL RESISTANT

* Max. load on 60 Duro is the same as the 40 Duro when used in Shear or Tension i.e. 700 lbs.

CAT. NO.	MODEL	DURO.	COMPRESSION	
			LBS.	kg.
591201	RCA-40	40	700	318
591202	RCA-60	60	1000 *	455



FLEXIBLE CONNECTORS AND EXPANSION JOINTS

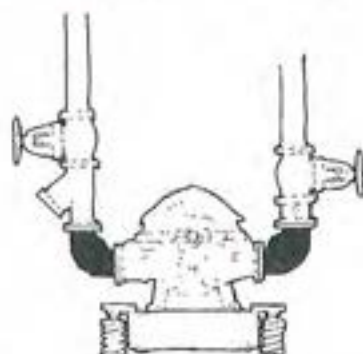
MASON



We offer the conventional stainless steel connectors and bronze freeon connectors to meet demand. Quality is good and pricing competitive, but there's little that can be done to improve these commodities. When you swing over to rubber connectors, we still supply rubber flanged hose BRFH and the conventional rubber expansion joint EJH. These have been around for quite awhile as has the MFNC single sphere connector.

We don't stop there however, and the more interesting designs are the threaded and double sphered MFTFU up to 2" in diameter, the double sphered flanged MFTNC up to 12" diameter, and the most unique of all the MFNEC elbow design. These last four connectors are not wire reinforced and they are constructed of multiple plies of nylon tire cord and neoprene in a manufacturing process very similar to the manufacture of automotive tires. This construction enables these connectors to breath volumetrically and to be rated for maximum elongation so control rods are not necessary. We have been involved in intensive testing of these connectors through various acoustical firms such as Cerami & Assoc., Bolt Beranek & Newman, Newcomb & Boyd and Robin Towne & Assoc., to verify the fact that they are extremely effective in reducing both noise and vibration at pump impeller frequency (rpm times number of blades).

We believe that we are the only firm that has developed this sort of acoustical data and after all we should all know a little about the acoustics as well as the fact that they don't leak.



TYPE MFTFU CONNECTORS
DOUBLE SPHERE - THREADED UNIONS (GALV.)

CAT. NO.	SIZE	CONNECTIONS	
		Female BSP	Nom. Metric
5921	MFTFU-0.75	3/4"	19 mm
5922	MFTFU-1	1"	25 mm
5923	MFTFU-1.25	1 1/4"	32 mm
5924	MFTFU-1.5	1 1/2"	40 mm
5925	MFTFU-2	2"	50 mm

TYPE MFNC CONNECTORS
SINGLE SPHERE - TABLE 'E' FLOATING FLANGES

CAT. NO.	SIZE	CONNECTIONS	
		Table 'E' Flg.	Nom. Metric
59212	MFNC- 2	2"	50 mm
59213	MFNC- 2.5	2 1/2"	65 mm
59214	MFNC- 3	3"	80 mm
59215	MFNC- 4	4"	100 mm
59216	MFNC- 5	5"	125 mm
59217	MFNC- 6	6"	150 mm
59218	MFNC- 8	8"	200 mm
59219	MFNC-10	10"	250 mm
59220	MFNC-12	12"	300 mm
59221	MFNC-14	14"	350 mm
59222	MFNC-16	16"	400 mm
59223	MFNC-18	18"	450 mm
59224	MFNC-20	20"	500 mm
59225	MFNC-24	24"	600 mm

TYPE MFTNC CONNECTORS
DOUBLE SPHERE - TABLE 'E' FLOATING FLANGES

CAT. NO.	SIZE	CONNECTIONS	
		Table 'E' Flg.	Nom. Metric
59226	MFTNC- 1.5	1 1/2"	40 mm
59227	MFTNC- 2	2"	50 mm
59228	MFTNC- 2.5	2 1/2"	65 mm
59229	MFTNC- 3	3"	80 mm
59230	MFTNC- 4	4"	100 mm
59231	MFTNC- 5	5"	125 mm
59232	MFTNC- 6	6"	150 mm
59233	MFTNC- 8	8"	200 mm
59234	MFTNC-10	10"	250 mm
59235	MFTNC-12	12"	300 mm

TYPE MFNEC ELBOW CONNECTORS
TABLE 'E' FLOATING FLANGES

CAT. NO.	SIZE	CONNECTIONS	
		Table 'E' Flg.	Nom. Metric
59251	MFNEC- 2.5	2 1/2"	65 mm
59252	MFNEC- 3	3"	80 mm
59253	MFNEC- 4	4"	100 mm
59254	MFNEC- 5	5"	125 mm
59255	MFNEC- 6	6"	150 mm
59256	MFNEC- 8	8"	200 mm
59257	MFNEC-10	10"	250 mm
59258	MFNEC-12	12"	300 mm

FLANGES - TABLE 'F' - (MATCHES TABLE 'H')
SUITS TYPES MFNC - MFTNC - MFNEC

CAT. NO.	TYPE	SIZE		CAT. NO.	TYPE	SIZE	
		Ins.	Nom. Metric			Ins.	Nom. Metric
59275	F2.5	2 1/2"	65 mm	59280	F 8	8"	200 mm
59278	F5	5"	125 mm	59281	F10	10"	250 mm
59279	F6	6"	150 mm	59282	F12	12"	300 mm

WATER SERVICES by uop

CHEMICATOR[®] brand WATER TREATMENT PRODUCTS

A RANGE OF WATER TREATMENTS, CORROSION PREVENTIVES AND ALLIED PRODUCTS ARE AVAILABLE FOR THE PROTECTION OF THE WATER SIDE OF HEAT TRANSFER EQUIPMENT AND OTHER UNITS WHICH HANDLE WATER FOR VARIOUS PURPOSES



Boiler Water Treatment

While there are differences, boilers — as well as hot water and process heating systems — are exposed to many of the same types of water-related problems as are air conditioning systems. To assure their effective operation, chemical treatments are required to prevent corrosion and scale resulting from dissolved gases and minerals.

Other Products

These include descalers for removing scale in cooling water systems and boilers, cleaners for removing rust in chilled water systems or hot water systems, a number of special purpose cleaners and a special biocide for algae and slime control. These products are listed below and on the following page.

Why Water Treatment for Air Conditioning Systems?

Heat picked up by an air conditioning system is rejected at the cooling tower. This tower, if water-saving installation, requires only enough water to compensate for evaporation and blow-down. This blow-down limits the build-up of dissolved solids, which otherwise can form scale in the system. Condenser scale rapidly increases power consumption, decreases the system's capacity and contributes to wear and strain on system equipment.

While the amount of water used during evaporation is a function of the system's design, the amount of blow-down is determined by the chemical composition of the make-up water and type of chemical water treatment.

Over the years it has been found that certain chemicals have the ability to prevent the formation of scale, allowing more dissolved solids to circulate throughout the system. Thus, the proper usage of the right water treatment chemicals can assure more efficient air conditioning systems over a long period of operation.

Proper Water Treatment Helps Reduce Electric Power Usage

Clean, water-cooled equipment offers the most efficient air conditioning method available today. Should it be dirty (scale encrusted), efficiency decreases and power consumption increases. Normally, for each degree Celsius that the condensing temperature rises, the wattage input will increase about one percent and the system's capacity will decrease at least one percent.

The alternatives for scale control — heavy bleed-off, or minimal bleed-off and regular acid cleaning — are expensive . . . more expensive than a properly designed and properly implemented water treatment program when all factors are considered.

Blow-down . . . Important Facts You Should Know

Only pure water is evaporated from an open recirculating cooling tower. Impurities, inherent in the make-up water, must be controlled by blow-down and/or chemical water treatment. A large volume blow-down lowers the concentration of solids (impurities) in the tower water, while a reduced blow-down raises them. When blow-down, alone, is used to control scale, it is usually set "heavy" and results in "cycles of concentration" (COC) of 1.5 or less. (COC defines the level of solids present and is the ratio between total solids in the tower water and total solids in the make-up water). When treatment chemicals as listed below are used, not only can the blow-down be reduced, but the COC is significantly increased.

COOLING WATER TREATMENT PACK No. 1	
For control of scale, corrosion and biological fouling in cooling systems 10 to 30 tons.	
CAT. NO.	DESCRIPTION
59325	1 - Chemicator Model E Briquette Feeder
—	M-40 Algicide:
59355	1 Gall. Bottle
59385	5 Gall. Pail
59359	1 Box Deep Purple Algicide (12 briquettes/box)
59367	1 - Cooling Water Test Kit
—	Choice of Chemicator Refills:
59328	P & O Wide range. Can be used in all systems where make-up water total hardness does not exceed 200 ppm
59332	1 - Refill Tube No. 101/50 — if make-up water total alkalinity is between 50 - 100 ppm
59330	1 - Refill Tube No. J-2 — if make-up water total alkalinity is greater than 100 ppm

COOLING WATER TREATMENT PACK No. 2	
For control of scale, corrosion and biological fouling in cooling systems 40 to 200 tons.	
CAT. NO.	DESCRIPTION
59326	1 - Chemicator Model L - 1 Liquid Feeder (2 units for every 40 tons of cooling capacity)
59339	1 Gall. Bottle Formula No. 870 Scale and Corrosion Control
—	M55 Microbiocide:
59381	1 Gall. Bottle
59386	5 Gall. Pail
59359	1 Box Deep Purple Algicide (12 briquettes/box) 1 box req'd for every 40 tons of cooling capacity
59367	1 - Cooling Water Test Kit

NOTE: For Cooling Water Treatment Pack Nos. 1 and 2 — Refer available literature for recommended bleed rates.

CONTINUED NEXT PAGE

CHEMICATOR[®] brand WATER TREATMENT PRODUCTSA RANGE OF WATER TREATMENTS, CORROSION PREVENTIVES AND ALLIED PRODUCTS
Continued from previous page

CAT. NO.	DESCRIPTION
CLOSED SYSTEM TREATMENT PACK No. 1	
For control of corrosion in chilled water systems and hot closed water systems	
—	Formula No. 890 Closed System Control
—	1 Gall. for every 100 galls. water in recirculating system or for approx. every 5 tons of cooling capacity
59383	5 Gall. Pail
59387	30 Gall. Drum
59388	55 Gall. Drum
59389	1 - Unit Model 5-HD By-Pass Feeder
59390	1 - PNI Test Kit

BOILER WATER TREATMENT PACK No. 1	
For control of scale and corrosion in steam boilers under 25HP and under 90 psig operating pressure	
59391	B-86 Boiler Briquettes (1 brig./600 galls. feed water)
59392	5 Gall. Pail Formula No. 885 Steam Line Control Feed continuously to maintain pH 8.0 to 8.5 in condensate
59389	1 - Unit Model 5-HD By-Pass Feeder
59393	Boiler Water Test Kit No. 1

BOILER WATER TREATMENT PACK No. 2	
For control of scale and corrosion in steam boilers up to 300 psig operating pressure	
—	Formula No. 883 (1 gal./4500-5000 galls. feed water)
59394	5 Gall. Pail
59395	30 Gall. Drum
59396	55 Gall. Drum
59392	5 Gall. Pail Formula No. 885 Steam Line Control Feed continuously to maintain pH 8.0 to 8.5 in condensate

DESCALING PACK FOR COOLING WATER SYSTEMS & BOILERS	
For removing scale in cooling water systems and boilers	
—	All-Met Descaler (4lbs/10 US galls. recirculating water)
59340	25 lb Pail
59397	50 lb Pail
59341	100 lb Pail
59382	8 oz. Bottle S.E. Defoamer
—	N-30 Acid Neutralizer (1lb/20 US galls. of spent acid solution)
59343	9 lb Case
59398	25 lb Pail
Note: Quantities of All-Met Descaler and N-30 Acid Neutralizer depend on the amount of scale actually in the system and extent of acidity of spent acid solution. Above figures are estimates.	
To prevent scale, see Cooling Water Treatment Pack No. 1 or No. 2.	

CLEAN-UP PACK FOR CLOSED WATER SYSTEMS	
For removing rust in chilled water systems or hot water systems	
—	Formula No. 899 System Cleaner (1-2 galls./100 galls. system water)
59384	1 Gall. Bottle
59399	Case of 4 Galls.
593100	5 Gall. Pail
593101	30 Gall. Drum
593102	55 Gall. Drum
Note: To prevent corrosion in closed water systems, see Closed System Treatment Pack No. 1	

CLEAN-UP PACK FOR NEW COOLING WATER SYSTEMS AND BOILERS	
For removing mill scale, weld scale, grease, dirt from new cooling water systems and boilers	
—	Formula No. 899 System Cleaner:—For Cooling Towers — 1-2 galls./100 galls. of system water. For Boilers — 2-4 galls./100 galls. of boiler water
59384	1 Gall. Bottle
59399	Case of 4 Galls.
593100	5 Gall. Pail
593101	30 Gall. Drum
593102	55 Gall. Drum

CAT. NO.	DESCRIPTION
ICE MACHINE CLEANER	
For removing deposits in ice machines	
—	Ice Machine Cleaner: 8 ozs/3 galls. of water in the system. Food Grade Acid. Contains special indicator dye.
593103	1 Gall. Bottle
59349	8 fl. oz. Bottle

KLEEN KOIL	
For removing grease and oil dirt on refrigeration equipment	
Can be diluted for most cleaning jobs.	
59344	1 Gall. Bottle
59345	5 Gall. Pail
593104	30 Gall. Drum
593105	55 Gall. Drum

KLEEN KOIL II	
A MORE CONCENTRATED CLEANER	
For removing grease and oil dirt on refrigeration equipment	
593106	1 Gall. Bottle
593107	5 Gall. Pail
593108	30 Gall. Drum
593109	55 Gall. Drum

ALU-KLEEN ALUMINIUM CLEANER	
For removing dirt and grease from aluminium and copper-finned tubes — for difficult jobs use full strength	
59351	1 Gall. Bottle
593112	5 Gall. Pail
593113	30 Gall. Drum

NEUTRA-SOLV	
For removing grease, oil and dirt from engine parts, machinery, tools, exhaust fans, ventilation hoods etc.	
(Dilute 1 part in 5 parts water for most applications)	
59347	1 Gall. Bottle
59348	5 Gall. Pail
593110	30 Gall. Drum
593111	55 Gall. Drum

KOOLER KARE	
For removing scale from evaporative coolers	
(Use 2 briquettes for every 5 galls. of water in the system)	
59353	1 — Box 12 briquettes

2-CH ALGAECIDE	
59358	25 lbs.

FORMULA No. 875	
Scale and Corrosion Inhibitor for Cooling Systems over 200 galls. Use if total hardness of make-up water is 50 ppm or over.	
593114	30 Gall. Drum
593115	55 Gall. Drum

FORMULA No. 877	
Scale and Corrosion Inhibitor for Cooling Systems over 200 tons. Use if total hardness of make-up water is under 50 ppm.	
593116	30 Gall. Drum
593117	55 Gall. Drum

K-25 PHOSPHATE PEARLS	
Scale and Corrosion Inhibitor for once-through cooling systems or potable water systems	
593118	6/10 lb. Case
593119	25 lbs.
593120	50 lbs.

TRACELEAK	
Liquid Leak Tracer for locating gas line leaks	
593121	8 oz. Bottle
593122	1 Gall. Bottle

M100 DOUBLE SHEAR MOUNTING:

This mounting is a particularly versatile isolator which is suitable for ALL types of light and heavy machinery and structures.

The M100 is well suited to installations that require the mounting to resist the sideways pull with both driven loads and to maintain the centre distance for gears, without a loss of isolation efficiency in the vertical direction.

The mounting consists of three steel members which are securely bonded to two sections of rubber in its most effective manner, i.e., in shear with progressively increasing compression.

The M100 mounting is available in two rubber hardnesses, the M100-50 being the softer and the most effective isolator while the M100-60, being harder, provides increased stability in areas of application where this advantage is the important requirement. The mounting holes can be drilled to suit your own individual requirements. The mounting can be bolted or welded to a separate retention plate if preferred, but SECURE fixing is generally recommended.

IMPORTANT: The M100 mountings should be securely fixed to the foundations before the load is applied to prevent the mount spreading and therefore, not allowing it to obtain the correct deflection.

The standard sizes available of the M100 mounting are 150 mm and 300 mm, but if you require a load rating that calls for smaller lengths it is an easy matter for you to cut to the required size.

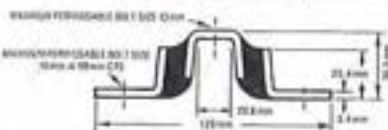


The M100 mountings provide excellent resistance stability with a good vertical isolation efficiency and are therefore suitable for all drives, etc., but the mount should be installed with the tension as follows:-

LOAD RATING CHART:

Part No.	25 mm	38 mm	51 mm	76 mm	102 mm	127 mm
M100-50	18 kg	26 kg	40 kg	58 kg	75 kg	100 kg
M100-60	22 kg	32 kg	47 kg	70 kg	90 kg	120 kg

As measured at 1 mm deflection.



CUSHION CONNECTORS:

Mackay Cushion Connectors are available in a wide range of load capacities and are particularly versatile mountings, suitable for all types of heavy and medium machinery and structures. Each Mackay Cushion Connector consists of a pair of round metal plates, between which is bonded a cylindrical shaped cushion of high tensile rubber.

This rubber to metal bonding offers the simplest form of vibration control for use in shear and/or compression loading, but is not recommended for use under permanent tension loading. Mackay Cushion Connectors are compact, lightweight, easy to install and combine excellent vibration and shock control characteristics.

High load carrying capacity and long service life permit the use of lighter, less expensive fabricating materials in the manufacture of equipment.

Because of simplicity of design and ease of installation, these mountings are both practical and economical. Mackay Cushion Connectors are used effectively to isolate vibration and shock in machinery of all types. The application of these mountings in either shear or compression or a combination of both, will solve the majority of your vibration problems providing a mounting system compatible with many types of equipment and machinery operating in diverse environments. Mackay Cushion Connectors are used extensively to provide the best combination of performance and economy for a wide range of commercial and industrial machinery and equipment, consumer products, vehicles, electronic equipment, etc.

If unable to find a cushion connector in our range to meet your specific requirement, please refer your problem to us, as special sizes can be manufactured in quantity to suit.



PART NO.	MM A	MM B	MM C	MM D	Thread Size E	COMPRESSION LOAD KG	TENSION LOAD KG	SHEAR LOAD KG	DEFLECTION MM
M100	12.7	12.7	12.7	12.7	3/16 wht	5.68	3.443	1.13	1.5
M145	19	12.7	19	15.9	1/4 wht	5.63	4.55	8.17	1.5
M163	25.2	19	22.2	19	1/4 wht	7.9	5.7	15.13	1.5
M141-35	22.2	19	22.2	25.4	5/16 wht	12.16	9.12	3.347	1.5
M141-40	22.2	19	22.2	25.4	5/16 wht	18.22	12.16	4.557	1.5
M141-50	22.2	19	22.2	25.4	5/16 wht	22.29	18.22	5.65	1.5
M141-60	22.2	19	22.2	25.4	5/16 wht	30.42	24.25	8.565	1.5
M142-35	25.4	25.4	25.4	34.9	3/8 wht	12.16	9.12	3.4	1.5
M142-40	25.4	25.4	25.4	34.9	3/8 wht	17.21	13.18	4.55	1.5
M142-50	25.4	25.4	25.4	34.9	3/8 wht	20.40	20.30	6.0	1.5
M142-60	25.4	25.4	25.4	34.9	3/8 wht	48.65	36.50	10.16	1.5
M146-40	31.7	31.7	31.7	50.5	3/8 wht	43.58	34.45	9.11	3
M146-50	31.7	31.7	31.7	50.5	3/8 wht	62.64	48.60	12.16	3
M146-60	31.7	31.7	31.7	50.5	3/8 wht	87.117	64.87	18.24	3
M195-40	19	44.4	19	66.7	M10	66.68	58.78	13.16	3
M195-50	19	44.4	19	66.7	M10	80.120	59.104	18.22	3
M195-60	19	44.4	19	66.7	M10	159-210	120-165	30.47	3



CAT. NO.	Part No.	CAT. NO.	Part No.
59434	M160	59442	M142-40
59435	M145	59443	M142-50
59436	M163	59444	M142-60
59437	M141-35	59445	M146-40
59438	M141-40	59446	M146-50
59439	M141-50	59447	M146-60
59440	M141-60	59448	M195-40
59441	M142-35	59449	M195-50
59450	M195-60		

On Application

General MACHINERY VIBRATION ISOLATORS:

Mackay general machinery VIBRATION ISOLATORS are manufactured from metal and a special resilient rubber, bonded together to provide flexible isolators that are used to eliminate vibration and noise in installations such as:

• MOTOR DRIVEN FANS • AIR CONDITIONING EQUIPMENT

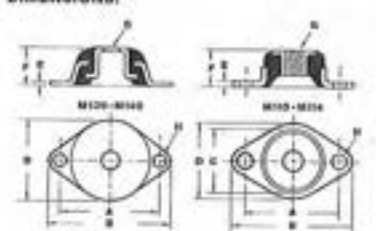
• MOTOR GENERATOR SETS • ELECTRICAL TRANSFORMERS

• MARINE ENGINES and all types of industrial and electrical machinery

A resilient type isolator can only be effective if the base of the machine to be isolated is itself firmer than the mounting. It may be necessary to strengthen the base of the machine to ensure that these isolators perform effectively.

These special mountings were developed to meet almost every type of machinery installation within the loading range, with telescopic metal inserts providing considerable stability in all directions. The two light duty mountings, M110 and M114 are equipped with upper metal inserts, tapped to receive standard bolts or set screws. The mounting can be bolted to the floor or other base, with bolts through the two lugs of the lower metal stamping. When using the heavy duty mountings M139 and M145, loads can be suspended as well as supported. Interlocking Ranges Incorporated in M139 and M145 isolators ensure suspension even if the rubber is completely destroyed by fire, etc.

DIMENSIONS:



LOAD RATING CHART:

Mounting	Maximal Diameter	Load in Kgf Compression	Load in Kgf Shear
M110	40	35-40	30-35
M114	50	45-55	35-50
M114	40	45-60	25-40
M114	50	55-65	40-60
M114	60	60-120	60-80
M140	40	200-250	150-140
M140	50	250-300	170-160
M140	60	300-350	180-200
M140	80	600-800	200-280
M139	40	450-550	150-250
M139	50	550-725	250-400
M139	60	725-900	400-550

Part No.	A	B	C	D	E	F	G	H
M110	40.22 mm	76 mm	41 mm	48 mm	3 mm	39 mm	21/16" SAE	8.7 mm
M114	76.16 mm	82 mm	57 mm	60 mm	3 mm	39 mm	13/16" SAE	8.7 mm
M140	110 mm	141 mm	—	63 mm	3 mm	41 mm	17/32"	13.5 mm
M139	127 mm	157 mm	—	102 mm	3 mm	48 mm	13/16"	14.2 mm

Dimensions in mm (inches) unless otherwise stated.

CAT. NO.	P/N & Duro	CAT. NO.	P/N & Duro	CAT. NO.	P/N & Duro
59420	M110-40	59425	M114-60	59429	M140-80
59421	M110-50	59426	M140-40	59430	M139-40
59423	M114-40	59427	M140-50	59431	M139-50
59424	M114-50	59428	M140-60	59432	M139-60

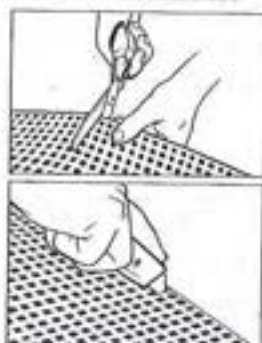
M164 MACHINERY MOUNTING PAD:

The inexpensive material for effective control of machinery vibration, shock and acoustic noise.

OIL-RESISTANT NEOPRENE



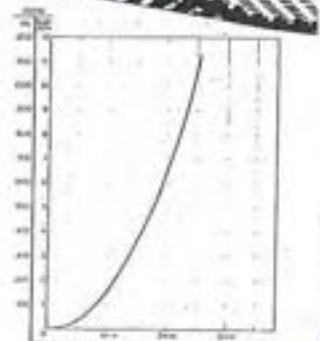
When installing a M164 Pad, an overlap of 25 mm around the feet of the machine should be allowed.



The Mackay M164 Mounting Pad is only available in a standard size of 457 mm x 457 mm. Using economy or a little, the pad can be easily cut to any required size.

MULTIPLE LAYERS:

Where it is required to obtain increased deflection at the same loading rate, the M164 Pad can be stacked in layers. Each layer should have a metal insert, spaced each layer with a metal sheet plate of 1.5 to 2 mm thickness. If several layers are required, the top of the stack should be less than the length or width.



DEFLECTION GRAPH:

For optimum operation, the M164 Pad should be loaded at 2.5 kg/cm², but it is suitable for a load rating from 7 to 4.2 kg/cm².

When used with impact type machinery such as punch presses, the pad should be loaded at 1.5 kg/cm².



CAT. No. 59451

Size 457 x 457 mm (18" x 18")

594-a

MACKAY SILENTRUBA PRODUCTS



INSTRUMENT ISOLATORS:

The Mackay range of PANEL MOUNTINGS are widely used to efficiently isolate steady static vibration and the control of occasional shock.

These mountings are easy to install and are in configurations to suit a variety of design requirements. It is generally recommended that snubbing washers be used to provide an interlocking system of metal parts which act to prevent damage from overload or excessive shock impact.

The snubbing washers act to restrict axial movement when space limitations must be considered, but they have no effect upon the action or efficiency of the mounting.

This type of isolator is particularly suitable for the isolation of noise transmission and similar high frequency vibration.

SUGGESTED METHOD OF MOUNTING:

STANDARD METHOD OF MOUNTING:

METHOD OF MOUNTING FOR MODULAR EQUIPMENT:

METHOD OF MOUNTING FOR MODULAR EQUIPMENT:

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METHOD OF MOUNTING FOR MODULAR EQUIPMENT:

M101



M110



M110



LOAD RATING:

Part No.	Load	Deflection
M110-2	0.9kg	1.5mm
M110-4	1.8kg	1.5mm
M110-6	2.7kg	1.5mm
M110-8	3.6kg	1.5mm
M110-10	4.5kg	1.5mm
M110-12	5.4kg	1.5mm
M110-17	9.8kg	1.5mm
M110-25	2.5kg	1.5mm
M110-30	4.5kg	1.5mm
M101-10	4.5kg	1.5mm
M101-15	6.8kg	1.5mm
M101-20	9.1kg	1.5mm
M101-25	11.4kg	1.5mm

DIMENSIONS:

	M110	M110	M101
A	5mm	8mm	10mm
B	20mm	40mm	51mm
C	1.2mm	10mm	16mm
D	16mm	64mm	76mm
E	25mm	15mm	21mm
F	44mm	5mm	1.20mm
G	4mm DIA.	25mm	38mm
H	—	3.5mm DIA.	7mm DIA.
J	—	—	6mm

Combination MOBILE and MACHINERY ISOLATORS:

The combination ISOLATORS provide the excellent shock absorbing properties of rubber in shear and compression with good dynamic cushioning under rugged operating conditions.

These ISOLATORS are designed to be used as an assembly. The rebound unit limits the free movement of the equipment to some extent, but this restriction is very desirable in mobile installations. Care must be taken when installing to ensure that the nut is not drawn too tightly so as to avoid any excessive preloading of the ISOLATOR and rebound unit.

M107



M104 and M204



M104

M204

M107

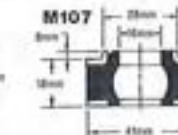
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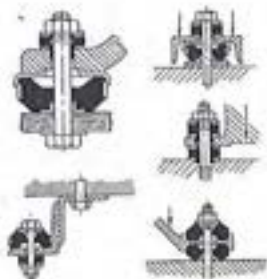
M107

M107

M107



Part No.	Load (kg)	DEFLECTION (mm)
M104-4	3.7	4
M104-50	90	4
M104-60	125	4
M104-70	160	4
M204	270	4
M107-40	110	4
M107-50	170	4
M107-60	250	4
M107-70	280	4



TYPICAL WORKING SYSTEMS

Cat. No.	Part No.	Cat. No.	Part No.	Cat. No.	Part No.
59411	M104-4	59414	M104-70	59416	M107-50
59412	M104-50		M204	59417	M107-60
59413	M104-60	59415	M107-40	59418	M107-70

MOBILE DUAL COMPRESSION ISOLATORS:

The Mackay dual compression mobile ISOLATORS have been engineered especially for controlling vibration, shock and noise in vehicular equipment which results in improved comfort and increased equipment life. They perform the primary function of isolating vibration in all directions.

M169 and M187



METHOD OF MOUNTING:

SUPPORTED MEMBER

SUPPORTED MEMBER

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BONDED BUFFERS:

For inexpensive and effective control of machinery vibration, shock and acoustic noise.

These buffers are equally adaptable when controlling impact or when used as machine feet. They also may be used as rubbing rubbers when excessive shock loads are encountered in resiliently mounted equipment.

Features:

Designed specifically to control impact and torque reaction loads. Built to last movement and stabilize equipment at critical frequencies.

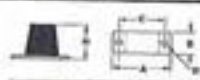
A rugged rubber bonded to metal unit ensures simplicity of application and ease of installation.



PART No.	MM A	MM B	C	MM D	STATIC LOAD KG	Deflection mm	BUFFING LOAD KG	Deflection mm
M171	21	21	114.95	14	17	3	40	8
M172	22	25	128.16	28	64	3	190	8
M173	36	42	162.90	33	115	3	400	12
M174	58	50	219.06	16	170	8	800	20



PART No.	MM A	MM B	C	MM D	STATIC LOAD KG	Deflection mm	BUFFING LOAD KG	Deflection mm
M172	50	42	348.06	18	42	8	175	20
M173	65	51	348.06	18	75	8	250	20



PART No.	MM A	MM B	MM C	MM D	STATIC LOAD KG	Deflection mm	BUFFING LOAD KG	Deflection mm
M176	73	127	44	102	10	87	10	200



PART NO.	MM N	MM N	STATIC LOAD KG	Deflection mm	BUFFING LOAD KG	Deflection mm
M180	103	79	20	150	25	450

CAT. NO.	PART No.	CAT. NO.	PART No.
59456	M171	59454	M172
59460	M170	59455	M173
59459	M175	59457	M176
59458	M174	59461	M180

SUSPENSION MOUNTINGS:

The Mackay SUSPENSION ISOLATING have been designed for use in the building and construction industry. Use of these mounts will give satisfactory isolation of vibration and structural noise transmitted in piping and ductwork.

The MOUNTINGS work equally well when used in heavy pipe installations, air conditioning, ducting, suspended fan units or acoustical ceilings. Supplied in two parts, the mountings are easily installed. The frame is fixed to the building structure by chain bolts, welding, or other suitable means. The rubber flexible element is then installed in the frame and the hanger rod passed through the base of the assembled mount and fastened in position. Height adjustment can be made to ensure correct location of the suspended unit if threaded hanger rods are used. The smaller unit (M193) allows for pre-assembly of the hanger rod into the rubber element prior to raising into position.

The assembled unit provides a strong, compact fastener. The mounting for the suspension of all types of equipment. The components form an interlocking lock, thus preventing failure in the event of destruction or damage to the rubber flexible element. All steel surfaces are treated to prevent corrosion. The smaller mountings (M193) are packaged in labelled boxes showing load ratings of the mounts. The rubber flexible element is also colour coded as shown in the load rating chart.

M197



M193

DIMENSIONS:

	M193	M197
A	73mm	128mm
B	51mm	102mm
C	51mm	79mm
D	25mm	64mm
E	25mm	79mm
F	37mm	102mm
G	10mm	19mm
H	25mm	32mm



LOAD RATING:

PART No.	Load	Deflection at rated load	Color Coding
M193-45	30kg	11mm	Green
M193-58	30kg	11mm	Red
M193-55	45kg	11mm	Yellow
M193-60	60kg	11mm	White
M197	91kg	19mm	Plain
M197	272kg	37mm	Plain
M197	450kg	45mm	Plain

Deflection is typically 1mm.

CAT. NO.	PART No.	CAT. NO.	PART No./Load
	M193-45		M197 - 91 kg
	M193-58		M197 - 272 kg
	M193-55		M197 - 450 kg
	M193-60		

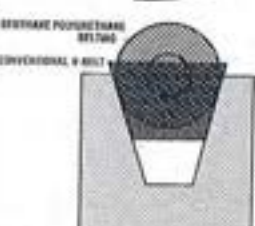
REDTHANE VEE BELTING:

Because of major advances in extrusion technology, Redthane Vee Belting has proved itself to be an exciting new development in the field of mechanical power transmission, both in terms of reliability and cost saving.

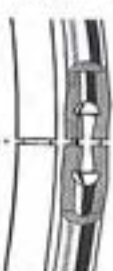
Something completely different from Mackay Polyurethane Vee Belting — it's so different it really does save money!

FEATURES:

- Replaces almost all types of conventional belting in A, B & C section vee belts, link belting and all round section belts.
- Proven extrusion technology in the form of a Polyurethane based belt offering unique qualities of strength, durability, resistance to oils and abrasion, moisture, radiation and chemicals.
- Supplied in a continuous length. Required length is simply cut off, and tensioned correctly (as illustrated) to give smooth, trouble-free running. No inter-pulley adjustments are necessary before or after fitting.
- Reduces belt life dramatically up to 20 times. Crucial savings in terms of machine down time, direct labour, production losses etc.
- Cuts belt weight to a minimum. When just one portion of the belt is damaged, that portion can be cut and replaced with a new section. No question of scrapping the whole belt.
- Provides the complete answer where stocks are concerned. Instead of having to stock up with countless different vee belt sizes, just one or two Redthane belts will supply all your needs with the minimum of time and space taken up.



SIMPLY CUT and FASTEN...



SPECIFICATIONS:

Summit	Approx. Max. Pulley Dia. in Gears	Supplied in Coils	Sections Available
12.7mm	150mm	25 metres	'W' section
19.0mm	100mm	50 metres	'K' and some 'W' sections
25.4mm	75mm	50 metres	Most 'W' sections
31.8mm	60mm	50 metres	Low power drives
38.1mm	25mm	100 metres	Low power drives

The maximum operating temperature of Redthane is 80°C.

Foot per Minute	A Section Minimum Pulley Dia.	B.P. Rating	B Section Minimum Pulley Dia.	B.P. Rating
1000	4.0"	0.60	5.0"	1.00
1200	4.0"	0.65	5.0"	1.25
1400	4.0"	0.95	5.0"	1.60
1600	4.0"	1.05	5.0"	1.80
1800	4.0"	1.28	5.0"	2.00
2000	4.5"	1.25	6.0"	2.20
2200	4.5"	1.35	6.0"	2.45
2400	4.5"	1.45	6.0"	2.70
2600	4.5"	1.55	6.0"	2.90
2800	4.5"	1.68	6.0"	3.00
3000	4.5"	1.65	6.0"	3.15
3200	5.0"	1.70	7.0"	3.25
3400	5.0"	1.75	7.0"	3.35
3600	5.0"	1.80	7.0"	3.40
3800	5.0"	1.82	7.0"	3.45
4000	5.0"	1.85	7.0"	3.50

NOTE: B.P. RATING BASED ON 7% INITIAL TENSION		
STATIC TENSILE LOADS, POUNDS		
3%	92	104
4%	85	130
6%	79	160
7%	97	186

CAT. NO. (per coil)	DIAM. mm	COIL SIZE	CAT. NO. (per metre)	Fasteners CAT. NO.
594160	12.7	25 m	594161	594170
594162	10.2	50 m	594163	594171
594164	7.9	50 m	594165	594172
594166	6.4	50 m	594167	594173
594168	4.8	100 m	594169	594174

compothane hammers



Cost "Savings"

- No lost work time due to broken hammers.
- Extended tool life.
- Reduced injuries — reducing costly medical and compensation claims.

Safety

- Uniquely unbreakable handle due to unique patented construction.
- Eliminates flying heads — Compothane® hammers are cast in one piece — unbreakable.
- Wrap-around grip and flanged butt provides better tool control and prevents tool slipping.

MODELS:

REGULAR MODELS

Basic industrial shapes in 5 sizes — dual blow heads in hard and medium hardness.

SLIMLINE MODELS

Deep threaded for many wrench applications where space is confined. Dual blow heads, hard or medium hardness, 6 sizes.

SLUDGE MODELS

Suitable for wide range of industrial and construction needs. Performs maximum hard tool tasks from end use to full size design applications — in hardness only 3 sizes.

The technical story...

DEAD BLOW HEADS

The shock loaded dead blow head is featured on all of Compothane hammers in use. The dead blow head provides maximum striking force with minimum effort and eliminates rebound and vibration.

TEMPERATURE RANGE

Compothane hammers can be used effectively in a temperature range of 0°C (32°F) to 94°C (200°F). Special formulated Compothane hammers can be supplied that retain their flexibility to -40°C (-40°F).

FEATURES:

- Compothane® hammers replace lead, mauls, leather, brass, copper and plastic mallets, and last 10 times longer than these materials.
- Compothane® hammers do not expose metal on the head or handle.
- This means no sparking.
- Compothane® hammers can be struck under the most favorable conditions.
- Compothane® hammers will not support flame.
- Compothane® hammers will not work or dent sensitive steel metal or pre-painted parts.
- Compothane® hammers play an important role in plant noise abatement programs.

IMPORTANT

A Compothane® soft faced hammer is not a carpenter's tool. Exposed blows on soft faces will splinter the face and expose the metal underneath. If any metal is exposed on the face or handle, the hammer must be replaced with a new one.

COMPLETE DETAILS & AVAILABLE RANGE SUPPLIED ON APPLICATION

594-c MACKAY SILENTRUBA PRODUCTS



Flexi-PLY

90° UNIVERSAL HOSE BENDS:

Mackay 90 degree HOSE BENDS consist of a tough nylon reinforcing "knitted" into the rubber to ensure a good quality, durable hose for industrial applications. A versatile range is manufactured with sizes available from 13mm I.D. to 57mm I.D. with a universal angle of 90°.

Sizes: 13mm I.D. to 57mm I.D.



flex-i-cast

URETHANE HOSE PROTECTORS:

Designed and modelled to eliminate the damage and potential dangers resulting from abrasion on oil hydraulic and mechanical hoses used in hard rock mining, the Flexi-cast Polyurethane Hose Protector is proven to be the effective and economical answer to costly downtime, replacement expense and production delays.

The Flexi-cast Hose Protector is particularly valuable to and has wide applications in the mining, forest products, quarrying and cement industries where abrasion and pressure hose failure results in high maintenance costs. Hydraulic fluid losses are reduced in virtually any hose failure on an air line, electrical cable, welding, battery charging cable and water lines are less, even under the severest operating conditions. The Polyurethane Hydraulic Hose Protector is available in five sizes. Each size will fit a range of ports for hydraulic and other hoses and cables. The protector is self-gripping and comes in the standard lengths shown in the specification table. The protector is required only on those portions of the hose that are exposed or vulnerable to abrasive conditions.

The Flexi-cast Protector can be installed on existing systems without dismantling the hose assembly. This eliminates the risk of contamination and simplifies field installation.

The protector can also be used again in the event of a non-leakage hose failure. Unlike metal protectors, there are no sharp edges to injure operators and the resilience of Flexi-cast urethane means no "locks" leading to premature hose failure.



Tough,
easy-to-install,
abrasion resistant,
reduced
down-time.

Part No.	Internal Diameter	A	Length	B
UH8 13	13mm	105mm	50mm	
UH8 16	16mm	105mm	50mm	
UH8 19	19mm	105mm	50mm	
UH8 25	25mm	105mm	50mm	
UH8 31	31mm	129mm	60mm	
UH8 38	38mm	129mm	60mm	
UH8 44	44mm	140mm	70mm	
UH8 50	50mm	140mm	70mm	
UH8 57	57mm	170mm	85mm	
UH8 100	100mm-105mm	870mm x 50mm	90mm	

SPECIFICATIONS:

Part No.	Standard Length Metres	Feet	Hydraulic Hoses I.D.	To and From Motor or Pump, Electrical Cable I.D.
UH 8 13	0.51	3	10mm-20mm	10mm-20mm
UH 8 16	0.51	3	20mm-30mm	20mm-30mm
UH 8 19	1.22	4	30mm-40mm	30mm-40mm
UH 8 25	1.22	4	40mm-50mm	40mm-50mm
UH 8 31	1.22	4	50mm-60mm	50mm-60mm
UH 8 38	1.22	4	60mm-70mm	60mm-70mm

FULL DETAILS AND AVAILABILITY SUPPLIED ON REQUEST

Flexi-Strap

RUBBER STRAPS and FASTENERS

AVAILABLE IN 230mm, 380mm, 610mm and 785mm LENGTHS



- REINFORCED ENDS — hooks will not pull out
- QUICK ON/OFF HOOKS eliminate rope-tying.
- PLASTIC COATED HOOKS — will not chip or scratch paintwork.
- NON-STAINING, LONG-LIFE RUBBER — weather resistant compound.

For your protection, Mackay recommends that the use of "Flexi-Straps" DOES NOT EXCEED the specified stretch as listed:

Part No.	Length	Recommended Maximum Stretch
FHS9	230mm	285mm
FHS15	380mm	475mm
FHS24	610mm	765mm
FHS31	785mm	980mm



TYPICAL APPLICATIONS



SAILBOARD EQUIPMENT



GAS BOTTLES



ACTROL RECOMMENDATION — From Staff and Customer Experience

The Flexi-Strap is the answer to carrying Large items in the boot of your sedan car, for situations where you cannot close the boot lid.

What do you normally do? — Protect the equipment being carried as best you can with cushions, blankets etc. and use a piece of rope to tie down the boot lid.

What happens? — As you go along the road, the boot lid inevitably starts "flapping" and the protective material becomes loose necessitating frequent and frustrating stops to check and readjust the ropes to prevent possible damage to your boot lid and the equipment being carried.

NO MORE — Use a Flexi-Strap — it overcomes all these problems as well as having many other useful purposes as illustrated above.

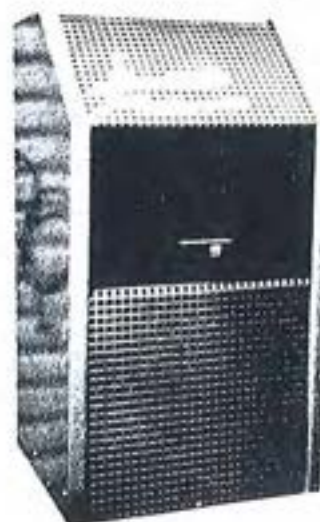
CAT. NO.	PART No.	LENGTH
594220	FHS9	230
594221	FHS15	380
	FHS24	610
594222	FHS31	785

Note: Above Flexi-Straps are supplied singly (carded). For bulk supply contact Actrol for special bulk pricing.

ALSO AVAILABLE

"TY-DOWNS" TORCORDER — Reels of 152 metres Part No. 507	CAT. NO. 594250	FELK SAFETY TIE DOWN STRAPS Part No. 487475	CAT. NO. 594291
"TY-DOWNS" TORCORDER HOOKS Part No. 508	CAT. NO. 594251		

REFRIGERATED AIR DRIERS

Frigematic

CONSTRUCTION. All Series R.A.D. dryers incorporate a hermetically sealed, air cooled refrigeration unit; electrically wired to starting and protecting devices, ON/OFF switch, POWER ON light, terminal box and connecting cable with 3 pin plug.

The refrigerated condenser, heat exchanger and connecting tubes are of copper construction with brass fittings for air inlet, air outlet and condensate drain connections. Components liable to sweat are fully insulated.

The complete assembly is contained in a welded and rust-protected steel frame and covered by easy removable heavy gauge ZINCSEAL panels which are finished on the outside in hammertone enamel. Ventilation covers are of chrome plated perforated sheet. Left and right hand cable outlets are provided.

INSTALLATION AND MAINTENANCE. All Series R.A.D. dryers are provided with mounting lugs for above floor installation, away from dust and fluff concentration which could clog the condenser. This reduces maintenance to an occasional dusting of the unit and an occasional cleaning of the externally mounted condensate discharge trap.

All units are fully factory tested and ready for plug in operation after airlines are connected and the condensate discharge trap has been screwed on to the drain fitting.

SPECIFICATIONS FRIGEMATIC SERIES R A D refrigerated, non-cycling air dryers

DATA	MODEL						
	UNIT	RAD 10	RAD 20	RAD 30	RAD 40	RAD 60	RAD 80
CAT. NO.		5951	5952	5956	5953	5954	5955
CAPACITY AT 43.3°C (110°F) AMBIENT 690 kPa (100 PSi)/37.8°C (100°F)	litre/sec.	4.7	9.4	14.2	18.9	28.3	37.8
	SCFM	10	20	30	40	60	80
PRESSURE DEW POINT	°C	1.7	1.7	1.7	1.7	1.7	1.7
	°F	35	35	35	35	35	35
MAXIMUM OPERATING PRESSURE	kPa	2069	2069	2069	2069	2069	2069
	PSIG	300	300	300	300	300	300
ELECTRICAL REQUIREMENTS	240 Volt. Single Phase. 50 Hz.						
AIR CONNECTIONS	BSP-F	1/2"	1/2"	3/4"	3/4"	1"	1 1/4"
DRAIN CONNECTION	BSP-M	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
HEIGHT	Cm	58.4	66	86.3	86.3	101.5	116.8
	INCHES	23	26	34	34	40	46
WIDTH	Cm	40.6	35.5	40.6	40.6	40.6	48.2
	INCHES	16	14	16	16	16	19
DEPTH	Cm	33	33	38.1	38.1	40.6	45.7
	INCHES	13	13	15	15	16	18
WEIGHT	kg	30	38.2	54.5	60.9	75	94.1
	LBS	66	84	120	134	165	207

CAPACITY RATINGS for all Series R.A.D. dryers are based on the following operating conditions.

AIRFLOW CAPACITY — litre/sec. (SCFM) (Refer Note 1.)

OPERATING AIR PRESSURE — 690kPa (100psig) (Refer Note 2.)

INLET AIR TEMPERATURE — 37.8°C (100°F) (Refer Note 3.)

PRESSURE DEW POINT — 1.7°C (35°F) (Refer Note 3.)

AMBIENT TEMPERATURE — 43.3°C (110°F) (Refer Note 4.)

MAXIMUM OPERATING PRESSURE — 2069kPa (300psig) (Refer Note 2.)

NOTES :

- (1) SCFM = Standard Cubic Feet/Minute = Cubic Feet of Free Air/Minute. For airflow capacity refer to Series R.A.D. Model Specification Table above.
- (2) OPERATING AIR PRESSURE may be increased to maximum operating pressure with a suitable condensate discharge trap. Higher operating pressure will result in a lower atmospheric dew point which at 690kPa/1.7°C (100 psig/35°F) PDP = -23.3°C (-10°F) 1379kPa/1.7°C (200psig/35°F) PDP = -28.9°C (-20°F), 2069kPa/1.7°C (300psig/35°F) PDP = -34.4°C (-30°F).
- (3) INLET AIR TEMPERATURE and PRESSURE DEW POINT (PDP). Due to the high efficiency of the Frigematic heat exchanger the inlet air temperature can safely be exceeded by 50% without any ill effect to the unit. The pressure dew point however will raise slightly.
- (4) AMBIENT TEMPERATURE = temperature surrounding the R.A.D. unit. A lower ambient temperature permits an increase in airflow of 10% for each 8.3°C (15°F) reduction below 43.3°C (110°F).

GUARANTEE : The manufacturer warrants the complete unit against all defects in material and workmanship for a period of 12 months from date of delivery. Any part found defective will be replaced or repaired free of charge on delivery to our store.

SELF ADHESIVE IDENTIFICATION PRODUCTS

BRADY®

PIPE MARKERS

What's the difference in **BRADY** Pipe Markers?

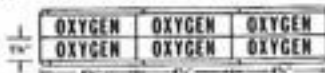
Brady offers a complete system of standardized pipe identification. There are seven styles of pressure-sensitive pipe markers that combine colors and legends for all sizes of pipe; two types of marker materials and adhesives for various pipe and insulation textures and environments: (1) Brady B-500 Vinyl Cloth General Purpose Pipe Markers and (2) Brady B-350 Perma-Code Thin Film Pipe Markers. In addition, there are *Directional Arrows* for showing line flow and valve locations; *Color-Coded Pipe Banding Tapes* for all-around-the-pipe identification; *Special* pipe markers and sizes with any colors or legends you need, plus *Blank Markers* with colored backgrounds you can write on.



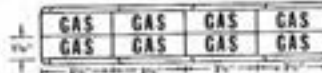
SMALL LEGENDS (3/4" high) — for pipes under 3" diameter



Style 4 — FOUR identical Markers, each 1 1/2" x 7", per dispenser card.



Style 6 — SIX identical Markers, each 1 1/2" x 4 3/8", per dispenser card.



Style 8 — EIGHT identical Markers, each 1 1/2" x 3 1/2", per dispenser card.

LARGE LEGENDS (2" high) — for pipes over 3" diameter



Style 1 — ONE 2 1/4" x 14" Marker per dispenser card.



Style 2 — TWO identical Markers, each 2 1/4" x 7", per dispenser card.



Style 3 — THREE identical Markers, each 2 1/4" x 4 3/8", per dispenser card.

NUMBERS AND LETTERS

FOR FAST GENERAL PURPOSE MARKING, B-500 VINYL-CLOTH NUMBERS AND LETTERS ON DISPENSER CARDS



Printing on Marker	Y5 Series 1 1/2" x 5" Size	Y35 Series 1 1/2" x 3 1/2" Size	Y225 Series 3/4" x 2 1/4" Size	Y15 Series 1 1/2" x 1 1/2" Size	Y75 Series 9/16" x 3/4" Size	Y05 Series 11/32" x 1/2" Size	Y03 Series 1/4" x 3/8" Size
0	Y5-0	Y35-0	Y225-0	Y15-0	Y75-0	Y05-0	Y03-0
1	Y5-1	Y35-1	Y225-1	Y15-1	Y75-1	Y05-1	Y03-1
2	Y5-2	Y35-2	Y225-2	Y15-2	Y75-2	Y05-2	Y03-2
9	and so on through Y5-9	Y35-9	Y225-9	Y15-9	Y75-9	Y05-9	Y03-9
A	Y5-A	Y35-A	Y225-A	Y15-A	Y75-A	Y05-A	Y03-A
B	Y5-B	Y35-B	Y225-B	Y15-B	Y75-B	Y05-B	Y03-B
C	Y5-C	Y35-C	Y225-C	Y15-C	Y75-C	Y05-C	Y03-C
Z	and so on through Y5-Z	Y35-Z	Y225-Z	Y15-Z	Y75-Z	Y05-Z	Y03-Z
—(Dash)	Y5-DSH	Y35-DSH	Y225-DSH	Y15-DSH	Y75-DSH	Y05-DSH	Y03-DSH
Fractions (1/4 to 3/4)	—	—	—	Y15-FRC	Y75-FRC	Y05-FRC	—
All fractions mounted on same card: 1/4, 1/4, 3/8, 1/2, 3/4, 3/4, 3/4.							
Combination Paces Letters* Numbers*	* Also available Y5-LC Y5-NC	Y35-LC Y35-NC	Y225-LC Y225-NC	Y15-LC Y15-NC	Y75-LC Y75-NC	Y05-LC Y05-NC	Y03-LC Y03-NC

ORDER BY DESCRIPTION AND BRADY NO.

REFER ALSO TO TECH. PAGE 596-a FOR ADDITIONAL BRADY PRODUCTS

SELF ADHESIVE IDENTIFICATION PRODUCTS

BRADY**WIRE MARKERS**

Standardized Wire Identification Tells Which Wire Goes Where
 ... Eliminates Guesswork ... Speeds Installation ...
 Saves Maintenance Time for Machine, Equipment Lighting
 and Motor Wiring

Brady Self-Sticking Wire Markers provide permanent, standardized around-the-wire identification for existing wiring ... new wiring. Markers are mounted on 2" x 9" quick-release convertible dispenser cards with double Zip-Strip feature to facilitate use of 1½" length or ¾" length. Markers peel off easily one at a time as needed. Application is quick—wrap marker completely around the wire, permanently, or "flag" for temporary identification.

MARKERS FOR EVERY NEED

Over 5,000 different wire marker legends are stocked, ready for immediate delivery. Choose from: cards of solid numbers or letters (all markers on each card are identical), consecutive numbers and letters or symbols repeated. See stock lists.

B-500 Vinyl Cloth for general wire marking needs. Sturdy, tough, dirt-resistant—adaptable to many conditions.
 Temperature range: —40° F. to 250° F.

B-600 Polyester Film. Legends are sub-surface printed on Mylar for permanent protection against abrasion and solvents.
 Temperature range: —20° F. to 250° F.

B-700 Vinyl Film constructed from flexible vinyl backing and special oil-resistant adhesive. Exceptional conformability to small diameter wire. May be removed and reapplied.
 Temperature range: —20° F. to 300° F.

B-184 Aluminum Foil for applications where constant high temperature is a determining factor. Good resistance to solvents, oil and abrasion.
 Temperature range: —40° F. to 300° F.

Brady offers wire markers in three additional stock materials:

B-191 Clear Vinyl Self-Laminating
B-400 Vinyl-with-Polyester Film

B-12 Acetate Cloth

Solid Number Cards

Legend
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Consecutive Number Cards

Legend
1-33
34-66
67-99
100-124
250-274
275-299
475-499
500-524
975-999
1975-1999

Consecutive Numbers Repeated

Legend
1-3
1-4
1-5
1-6
1-7
1-8
1-9
0-9
1-10
0-10
1-12
0-12
1-15
0-15
1-18
0-18
1-36

Solid Letter Cards

Legend
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z
and so on

Consecutive Letter Cards

Legend
A thru Z (Capital Letters)
a thru z (Small Letters)
A thru Z Plus A thru J
A thru Z Plus O thru 9

Other **BRADY** Quality Self-Sticking Products for Industry

AISLE MARKERS**WARNING STRIPES****SAFETY SIGNS****NO SMOKING****WRITE-ON LABELS****PROPERTY TAG**

ASSET
NO.

CABLE MARKERS

ORDER BY DESCRIPTION AND BRADY NO.

REFER ALSO TO TECH. PAGE 596 FOR ADDITIONAL BRADY PRODUCTS

MODERNOTECNICA

Cingo Wire Markers



They are made of self-adhesive cloth — size mm. 7.5 x 42. They come on a stiff support and are detached from it when applied. (see illustration).

They are arranged in packs, each composed of 20 wire markers and all have same marking repeated 6 times. It is recommended to apply the wire marker without touching the adhesive.

CINGO Packs (twenty markings). **CAT. NO. 6001**



Box 50 Packs — See illustration.

CAT. NO. 6002

On request : Numbers over 1000, Special markings, Larger print size.

CINGO BOOK - They accommodate the packs with the desired marking in the necessary order so they are ready at hand and there is no waste. Packs can be interchanged. Book Cingo Model 20 (size cm. 10x15x3) containing 20 packs.

CAT. NO. 6003

Book Cingo Model 40 (size cm. 10x30x3) containing 40 packs.

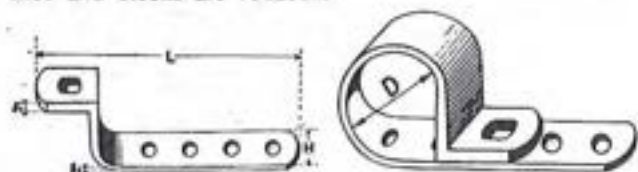
CAT. NO. 6004

CINGO CASE - made of fire-painted steel sheets, size 39x50x21, suitable for containing 100 boxes of Cingo wiremarker each box holding 50 packs.

CAT. NO. 5006

Looping Wire-Clamp

Made of flexible nylon, in natural color; are adjustable do not damage the cables, do not get old. Processing times and stocks are reduced.



Cat.No.	Model	H	L	S1	S2	D adjustable
60016	1	9	53	2	0.8	from 5 to 12 mm
60017	2	12	103	2.5	1	from 7 to 26 mm
60018	3	15	153	3	1.5	from 24 to 45 mm

TriK Strings



Particolare

To make bundles of cables; self-adjustable for diameter from 5mm to 33mm. No tool is necessary for applying them and application is rapid. Made of nylon, in natural colour or black.

Length 130 mm. — width 3 mm. Packaging : Boxes with 1000 pieces. **CAT. NO. 6009**

Index Rings



INDEX RINGS - can be combined; absolutely indelible, do not get dirty, do not move or detach, do not rotate round the cable.

Material: they are made of PVC.

White with black markings : numbered from 0 to 9 — block letters — small letters — conventional markings.

Colored : white, red, green, yellow, black, ash, bleu, rose, brown.

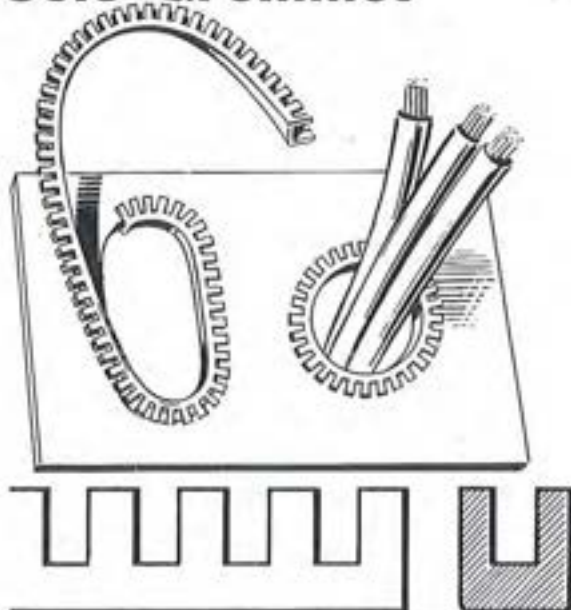
Packaging : boxes with extendable cover for easy and quick disposal.

Cat. No.	Inner Diameter mm	Width mm	Pieces in each Box
60010	1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 4.5	4	1000
60011	5 - 5.5	4	500
60012	6 - 7	6	500
60013	8 - 9 - 10 - 11	6	250
60014	12 - 13 - 14 - 15	6	125

CONTAINERS: made of oven painted steel sheets — suitable to contain 10 boxes (size cm. 33x11.5x20). Each container can easily be joined by means of a special plate.

CAT. NO. 60015

Sole Grommet



Suitable for steel sheet thickness from 0.5 to 1.5 mm. It is of pleasant appearance and can be used to insulate holes of very limited dimensions.

Material: polyethylene B.P.; color : natural or black. It comes in bars length 12 cm. or 25 cm.

Special nylon type - natural color.

It comes in bars from 12 cm. or 25 cm.

Packaging : in bags containing 100 pieces each bag.

Cat.No.	Bar Length	Colour	Description
6007	12 cm	Natural	Polyethylene BP.
6008	25 cm	Natural	Polyethylene BP.
	12 cm	Black	Polyethylene BP.
	25 cm	Black	Polyethylene BP.
	12 cm	Natural	Nylon Type
	25 cm	Natural	Nylon Type

PORTABLE INSTRUMENTS

rustrak miniature chart recorders

Dependable miniature instruments for permanently recording power, temperature, pressure, strain, events or virtually any parameter that can be converted into an electrical signal. • Inkless, dry writing, rectilinear recording with wide range of sensitivities, writing and chart speeds. • Operate as chart tearoff or reroll. Quick, easy chart review and rewind. Sliding access window. • Most units about 5 1/2" H, 3 1/2" W, 4 1/2" D. Weight about 3 1/2 lbs. • Rugged die-cast aluminum case in epoxy suede-like charcoal gray finish. • Accuracy $\pm 2\%$ of full scale. Response time 0.8 sec. to 1.0 sec. Usable chart widths: single channel — 2-5/16", dual channel — 1" each.



288

Single Channel DC Recorder.

Basic recorder in the Rustrak line. Ranges from 0-10 microamperes to 0-5 amperes DC; 0-10 millivolts to 0-500VDC. Multipliers and shunts available. Chart speeds 1/2" to 480" per hour. Many available options, features and accessories. AC models also available.

CAT. NO. 6031



2122

Temperature Recorders.

Wide variety of temperature recorders using thermocouples, thermistors or nickel wire sensors. Ranges from -100°F. to +2400°F. and custom spans as narrow as 25°F. Also available in °C. and in single or dual channels.

CAT. NO. 6035



292-4

Event Recorders, Models 292-4

Four or eight channels. Records worktime, productivity of machines and personnel; provides data for time study, cost analysis, security control. Chart speeds to 50 inches per minute with definition of up to 16 events per second.

CAT. NO. 6037



291

Dual Channel DC Recorder.

Same as basic Model 288 except dual channel with two galvanometers. Available in combinations of current and voltage or different ranges each channel. Usable chart width, 1" per channel. AC models also available.

CAT. NO. 6032

Let Rustrak engineering "knowhow" develop an instrument for your particular application.

TRANSPORTATION
OCEANOGRAPHY
MILITARY
COMMUNICATIONS
ATOMIC ENERGY
MEDICAL
CHEMICAL
PROCESSING
RESEARCH
ELECTRONIC



2133/F204AB

Recording-Controller Feature.

ON-OFF solid state controller feature available as option on most Rustrak recorders. Controls up to 5 amps resistive load at 30 VDC or 115 VAC. Set points continuously adjustable over entire chart range. Option price added to cost of companion recorder. Not available separately.

CAT. NO. 6038



2194

One Microampere DC Recorder.

Solid state with full-scale sensitivity of 1 microampere, range of 0 to 10 millivolts DC and input impedance of 10,000 ohms. For use as temperature bridge and strain gauge read-out or as a recorder accessory for laboratory and process instruments.

CAT. NO. 6033



191

Multipurpose Recorder.

Two recording channels, one analog, one event. Twenty-one ranges up to 1000 millivolts, microamperes or milliamperes on analog channel. Displays 7 1/2 inches of chart. On-off event marker has 10 millisecond response time. Carrying handle doubles as tilting support.

CAT. NO. 6039



2162

Pressure Recorder.

Single channel pressure recording of most liquids and gases using a C-type Bourdon tube. Standard ranges 0-15, 0-30, 0-50, 0-100, 0-200, 0-300 and 0-500 psi. Many special offset ranges available.

CAT. NO. 6034



2195

Strain Gage Recorder.

Records resistance change of gages used for measuring strain, stress, displacement, load, torque, or any transducer using strain gage sensing elements for static display. Maximum sensitivity: 500 micro-inches/inch. Self-contained instrument with regulated supply.

CAT. NO. 6036



192

Dissolved Oxygen/Temperature Recorder.

Simultaneously records dissolved oxygen and temperature. Temp. range, 0 to 40°C. Operates unattended for about four weeks from two inexpensive batteries. Chart speed regulation, $\pm 0.5\%$. For surveys in water pollution control programs.

CAT. NO. 60310

WE CAN HANDLE YOUR ORDERS AS FAST AND AS CAREFULLY AS WE CAN
WE TRY TO GIVE YOU THE VERY BEST SERVICE

TEST EQUIPMENT

BACHARACH OIL BURNER COMBUSTION TESTING KITS

UTILITY KIT

UTILITY KIT	Code No. 10 - 5022	CAT. NO. 6061
UTILITY KIT (METRIC)	Code No. 10 - 5037	CAT. NO. 60616

Designed with the specific needs of the serviceman in mind, the Utility Kit contains the four basic instruments for checking CO₂, Draft, Smoke and Stack Temperature. These instruments are ruggedly built, accurate, easy to use. Illustrations at right show the application of the Utility Kit Instruments in testing combustion efficiency. The Kit contains the FYRITE CO₂ Indicator with sampling hose assembly, TRUE-SPOT Smoke Tester with smoke scale and 40 filter strips, Model MZF Draft Gauge, TEMPOINT Dial Thermometer and Fire Efficiency Finder Slide Rule. The steel carrying case is sturdily constructed, with carrying handle and two snap-catch locks.



KIT COMPONENTS MAY BE PURCHASED SEPARATELY AS UNDER

Cat. No.	Bacharach Code No.	Description
6062	10 - 5000	Fyrite Gas Analyser CO ₂ 0 - 20%
6063	21 - 7008	True - Spot Smoke Tester.
6064	21 - 0019	True - Spot Filter Tips (40)
6065	13 - 7019	MZF Draft Gauge +0.05 to 0 to 0.25"W.

Cat. No.	Bacharach Code No.	Description
6066	12 - 7018	Tempoint Thermometer 12" (500°C)
6067	10 - 5084	Fire Efficiency Slide Rule.
6068	10 - 0100	Carrying Case (Large).

FOR BACHARACH FLORITE AIR VELOCITY METERS AND INDICATORS

Refer Refrig./Air Cond. Section Page 335-c.



Magnehelic® Pressure Gages are offered in 30 ranges from 0 to .5" WC to 0-150" WC and 5 psi. Zero center ranges to 15-0-15" WC. Special ranges or requirements on order.

Air Velocity Instruments



Series

2000 MAGNEHELIC® Differential Pressure Gages

2000 Series Dwyer Magnehelic Gages feature the exclusive "Magnetic Linkage." The "magnetic link" eliminates mechanical friction between the flexible diaphragm and the indicating pointer and permits over pressures to 25 psi without damage.

Designed for accurate, sensitive measurement of pressure, pressure differentials, or vacuum to 2% of full scale. The 2000 Series Magnehelic features a universal single case style for both surface and flush mounting with both side and back connections. A convenient zero-

Complete kits include inclined-vertical manometer, stainless steel pitot tube and all necessary instructions. Manometers read directly in feet per minute velocity and inches of water static.

Kits available:

- No. 400-5, 0-5" W.C. and 400-9000 fpm.
- No. 400-10, 0-10" W.C. and 400-12,600 fpm
- No. 400-23, 0-23" W.C. and 600-19,200 fpm
- No. 115-AV, 0-0.25" W.C. and 500-2000 fpm
- No. 102-AV, 0-2" W.C. and 1500-5500 fpm

adjust screw is located on the exterior of the cover. Measure air velocity, furnace draft, filter resistance, fan and blower output, gas pressure and static pressures. Provide check on control equipment, automatic valves, gas-air ratio controls, and similar devices.

Special Options:

- High pressure model for 100 psi total pressure.
- Adjustable signal flag.
- Portable kits.
- Air Filter accessories.

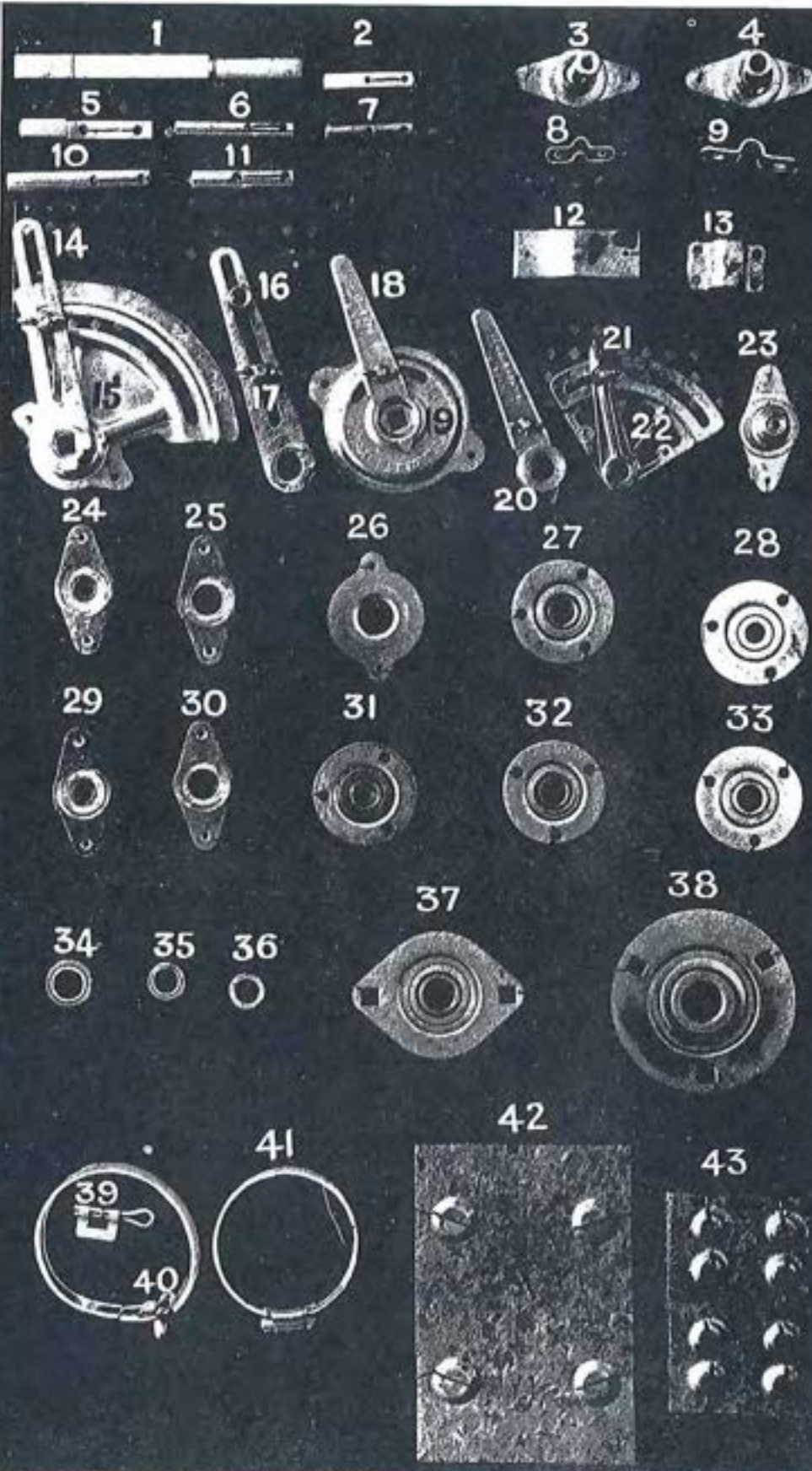
Other instruments available:

- Flex-Tube Molded Plastic (requires pitot tube)
- No. 27, 0-7000 fpm
- No. 28, 0-10,500 fpm
- No. 460 Air Meter (hand held), 260-4000 fpm

Pitot Tubes

Stainless steel construction suitable for temperatures to 800°F. The stem is graduated in inches to show the depth of insertion. Design is approved by ASHRAE and AMCA.
 1/8" diameter in insertion lengths of 12", 18", 24", 36", 48" and 60".
 1/16" diameter in insertion lengths of 6" and 12", regular tip or short tip.

Cat. No.	Legend No.	Description
6121	1.	FS(X) 1/2" Stub Shaft.
6122	2.	EM 5/16" Stub Shaft.
6123	3.	S.U.D. 3/16" Push Pull Kit.
6124	4.	S.U.D. 5/16" Push Pull Kit.
6125	5.	EM 3/8" Drive Shaft.
6126	6.	FS(L) 3/8" Stub Shaft.
6127	7.	FS(S) 3/8" Stub Shaft.
6128	8.	HP 3/16" Saddle
6129	9.	HP 5/16" Saddle
61210	10.	FS(L) 1/2" Stub Shaft.
61211	11.	FS(S) 1/2" Stub Shaft.
61212	12.	HV 1/2" Saddle
61213	13.	H 1/2" Saddle
61214	14.	A1(L) 3/8" Sq. Indicator Arm.
61215	15.	B(L) Quadrant Face.
61216	16.	QSW Swivel Joint
61217	17.	A1(L) 1/2" Rd. Indicator Arm.
61218	18.	A(S) 3/8" Sq. Indicator Arm.
61219	19.	B(S) Quadrant Face.
61220	20.	A1(S) 1/2" Rd. Indicator Arm.
61221	21.	A1(S) 3/8" Rd. Indicator Arm.
61222	22.	B1(S) 3/8" Quad-rant Face.
61223	23.	KM Control Kit.
61224	24.	CT 3/8" Thru Bearing.
61225	25.	CT 1/2" Thru Bearing.
61226	26.	CT(P) 1/2" Thru Bearing.
61227	27.	PT(N) 1/2" Thru Ball Race.
61228	28.	PT 3/8" Thru Ball Race.
61229	29.	CB 3/8" Blind Bearing.
61230	30.	CB 1/2" Blind Bearing.
61231	31.	PB 1/2" Blind Ball Race.
61232	32.	PT(K) 1/2" Thru Ball Race.
61233	33.	PT 1/2" Thru Ball Race.
61234	34.	5/8" Bush.
61235	35.	1/2" Bush.
61236	36.	3/4" O/D., 1/2" I/D. Bush.
61237	37.	PT 3/4" Thru Ball Race.
61238	38.	PT(K) 3/4" Thru Ball Race.
61239	39.	JNC Nip Clip.
61240	40.	JNC-T Nip Clip with Tape.
61241	41.	Worm Drive Clip.
61242	42.	TV125 Vane Runner.
61243	43.	TV325 Vane Runner.



NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

MAKE IT AN ACTROL PART — YOU'LL APPRECIATE THE SERVICE AND BACKING

DUCT HARDWARE

Cat. No.	Legend No.	Description
61244	44.	Linkage Set
61245	45.	G250 Gear Wheel.
61246	46.	G600 Gear Wheel.
61247	47.	I.M.G. Modular Grille.
61248	48.	RV150 Vinyl Fabric.
61249	49.	Wavebar 120 Glass Fabric.
61250	50.	Damper Spring.
61251	51.	LT Kit.
61252	52.	M.C. Non Return Catch.
61253	53.	L160 Fusible Link.
61254	54.	Quartzoid Link.
61255	55.	"1706" Silver-mastic.
61256	56.	Mastic Gun.
61257	57.	Door Gasket.
61258	58.	Access Door Handle Set.
61259	59.	Type "A" Hinges.

REFER TO THE
FOLLOWING PAGES
FOR

FLEXIBLE DUCTING
Page 238

RETURN AIR GRILLES
WOODEN
Pages 620 and 620-a

CEILING DIFFUSERS
Pages 621 and 621-a

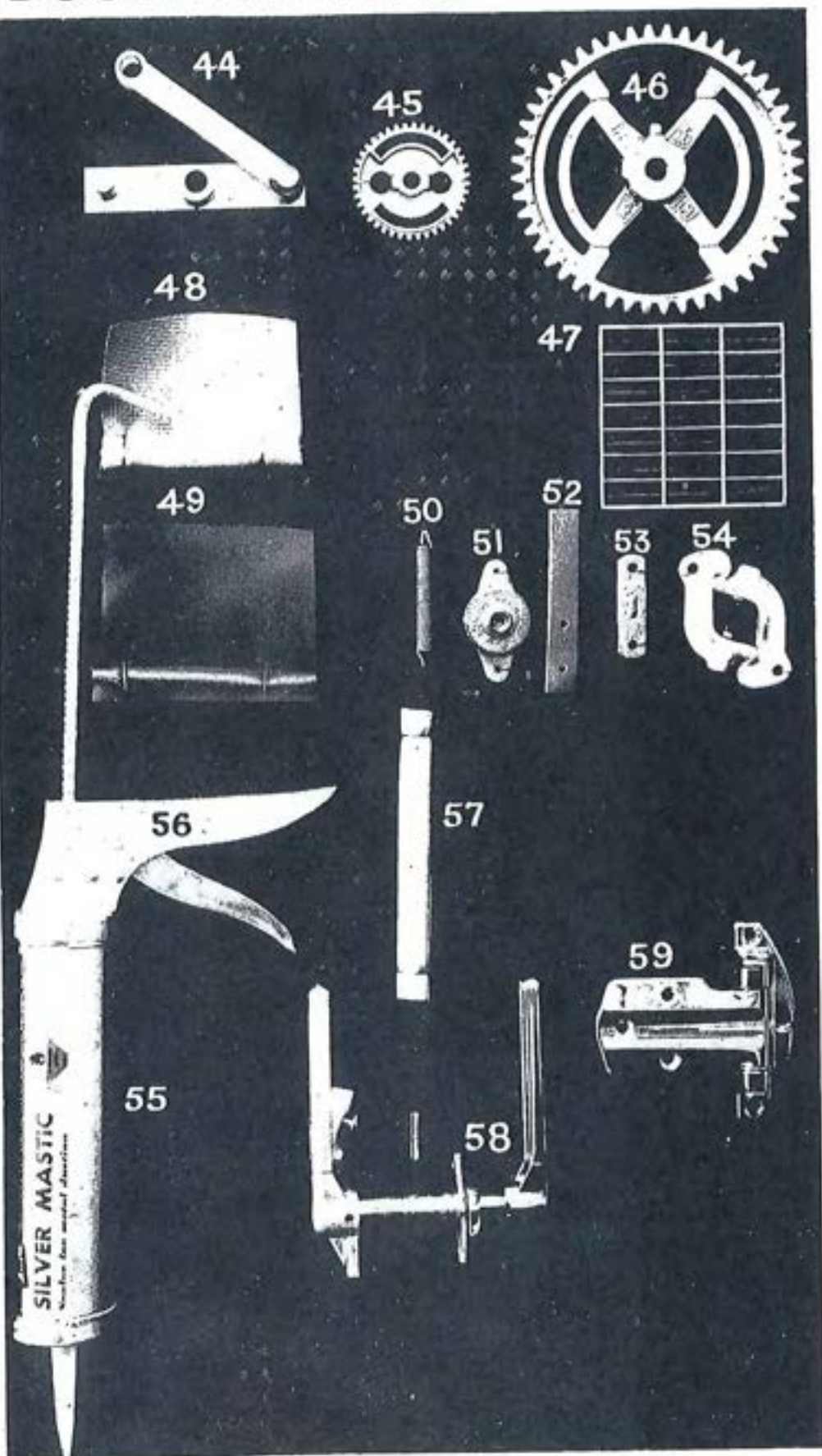
CEILING RETURN AND
EXHAUST GRILLES
Pages 622 and 622-a

WALL SUPPLY GRILLES
Pages 623/623-a, b, c, d

OPPOSED BLADE DAMPERS &
STREAM SPLITTER DAMPERS
Page 624

WALL RETURN GRILLES
Page 625

DOOR RELIEF GRILLES
Page 626



ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

YOU CAN PURCHASE ALL KINDS OF COMPONENTS AND EQUIPMENT FROM US AT A SAVING IN PRICE
ASK US FOR A QUOTATION

AVDEL FASTENING SYSTEMS

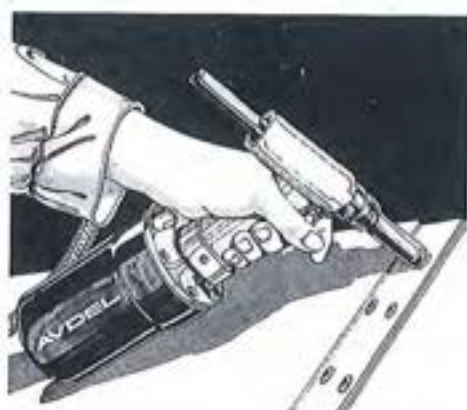
The Avdel range of fastening systems has been designed to replace conventional fasteners in nearly all modern applications.

Where nuts and bolts, solid rivets, self-tapping screws or welding are currently used to assemble components, an Avdel system can invariably give a better, quicker, permanent fastening at a lower overall installed cost.

With conventional fastening methods, about 80% of the cost of joining two components together is accounted for

by the labour. Avdel systems enable an unskilled operator to give you a high-quality, high-strength fastening in a fraction of the time — which means a fraction of the cost. Obviously, different applications require different fastenings. But, whatever your application, it is probable that one of the Avdel systems will give you an improved fastening at less cost.

Some of the more common and mostly used systems are detailed on this and the following pages.



MONOBOLT

The Avdel Monobolt is a unique structural fastener which requires access from one side of the workpiece only.

It is ideal for original assembly, or for replacing conventional 'two-sided' fasteners where access is difficult.

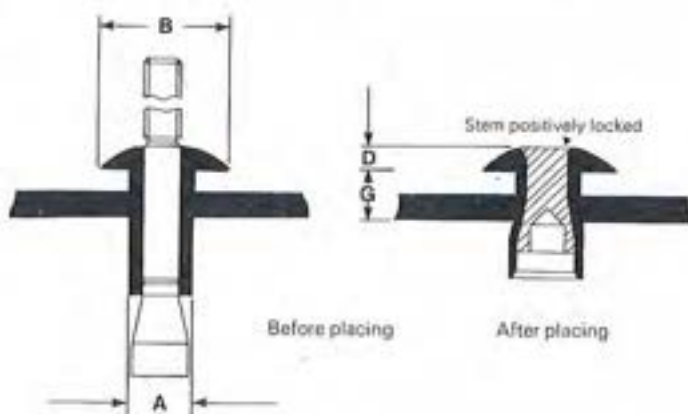
Major features include:

- High-shear, high-tension and high clamp-up.
- Can be placed in seconds by an unskilled operator.
- Very wide grip range.
- Vibration-resistant fastening.
- Reduced installed costs.



How the Avdel Monobolt system works

- The Monobolt is loaded into the nose of the tool and then inserted into the prepared hole in the workpiece.
- The tool grips the Monobolt stem and exerts an axial pull. This pull draws the stem through the bolt to give a high-clench joint and complete hole fill.
- The placing tool automatically shears the stem flush with the head profile and mechanically locks the stem into the recess in the Monobolt shell.



TECHNICAL DATA

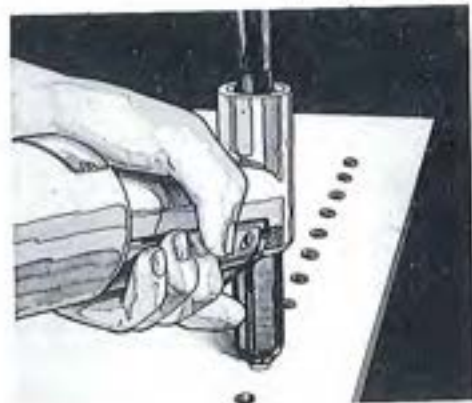
Notes: Monobolts are supplied lubricated and should NOT be degreased.

CAT. NO.	Part Number	Material	Finish	Head Form	Nominal Diameter	Grip Range G	Head Diameter B	Shank Diameter A	Minimum Clearance Behind Sheet	Head Height Maximum D	Recommended Hole Size
61573	2771-0613	Steel	Zinc Plated	Protruding Head	3/16 (4.8)	.064 (1.63) .270 (6.86)	.395 (10.03) .375 (9.53)	.191 (4.85) .187 (4.75)	.410 (10.41)	.073 (1.85)	.201 (5.11) .191 (4.85)
61574	2771-0617	Steel	Zinc Plated	Protruding Head	3/16 (4.8)	.214 (5.44) .420 (10.67)	.395 (10.03) .375 (9.53)	.191 (4.85) .187 (4.75)	.410 (10.41)	.073 (1.85)	.191 (4.85) .195 (4.95)
61575	2771-0817	Steel	Zinc Plated	Protruding Head	1/4 (6.4)	.080 (2.03) .375 (9.53)	.525 (13.34) .505 (12.83)	.257 (6.53) .254 (6.45)	.480 (12.19)	.104 (2.64)	.260 (6.6) .276 (7.0)
61576	2771-0824	Steel	Zinc Plated	Protruding Head	1/4 (6.4)	.350 (8.89) .625 (15.88)	.525 (13.34) .505 (12.83)	.257 (6.53) .254 (6.45)	.480 (12.19)	.104 (2.64)	.260 (6.6) .264 (6.7)
61577	2774-0613	Al Alloy	Plain	Protruding Head	3/16 (4.8)	.064 (1.63) .270 (6.86)	.395 (10.03) .375 (9.53)	.190 (4.83) .187 (4.75)	.410 (10.41)	.073 (1.85)	.191 (4.85) .201 (5.11)
61578	2774-0617	Al Alloy	Plain	Protruding Head	3/16 (4.8)	.214 (5.44) .420 (10.67)	.395 (10.03) .375 (9.53)	.190 (4.83) .187 (4.75)	.410 (10.41)	.073 (1.85)	.191 (4.85) .195 (4.95)
61579	2774-0817	Al Alloy	Plain	Protruding Head	1/4 (6.4)	.080 (2.03) .375 (9.53)	.525 (13.34) .505 (12.83)	.256 (6.50) .254 (6.45)	.510 (12.95)	.104 (2.64)	.261 (6.6) in Steel 269 (6.8) in Al Alloy
61581	7498-0031	MONOBOLT PNEUMATIC PLACING TOOL (Less Nose Assembly)									

Imperial Dimensions are in inches (unless otherwise stated).

Metric Dimensions (in brackets) are in millimetres (unless otherwise stated) and are for reference only.

AVDEL FASTENING SYSTEMS



AVEX

The Avex multi-grip breakstem rivet is designed to join varying material thicknesses with just one length of rivet.

Major features include:

- Complete hole-fill, even in oversize or irregular holes.
- Positive stem retention.
- Weather-resistant fastening.
- No problems with hole line-up.
- Simplicity of operation.
- Reduced in-place costs.



COMMERCIAL SERIES 1661 — SNAP HEAD TYPE

CAT. NO.	Material	Rivet Stem	Rivet Diameter	Recommended Hole Size	Grip Range	Dimensions			
						A	B Max	C Max	M Max
6151	1661-010	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6152	1661-014	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6154	1661-012	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61510	1661-016	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6156	1661-015	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6158	1661-018	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)

COMMERCIAL SERIES 1660 — 120° COUNTERSUNK HEAD TYPE

CAT. NO.	Material	Rivet Stem	Rivet Diameter	Recommended Hole Size	Grip Range	Dimensions			
						A	B Max	C Max	M Max
6157	1660-012	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6155	1660-014	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6157	1660-015	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
6159	1660-018	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)

COMMERCIAL SERIES 1624 — SNAP HEAD STEEL

CAT. NO.	Material	Rivet Stem	Rivet Diameter	Recommended Hole Size	Grip Range	Dimensions			
						A	B Max	C Max	M Max
61512	1624-011	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61513	1624-014	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61514	1624-012	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61515	1624-015	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)

The Large Flange Avex Rivet — a rivet which has all the benefits of the standard Avex rivet but one which has been designed specifically to provide strong secure joints in wide tolerance hole applications. It also has a new style low profile head configuration which gives it greater bearing surface and makes it ideal for use on soft materials such as wood, plastic and fiberglass. Available in just 3 grip lengths this rivet will cover a range of material thicknesses from 0.062" to 0.781".

COMMERCIAL SERIES 1641 — LARGE FLANGE AVEX RIVETS

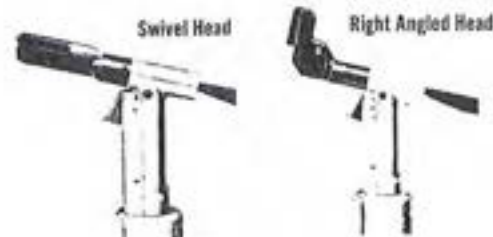
CAT. NO.	Material	Rivet Stem	Rivet Diameter	Recommended Hole Size	Grip Range	Dimensions			
						A	B Max	C Max	M Max
61516	1641-001	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61517	1641-002	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)
61518	1641-003	1/4 (3.2)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)	125 (5.1)	200 (8.0)	240 (9.5)	247 (9.8)

CAT. NO.	PART NO.	DESCRIPTION
61516	734	Basic Power Tool
61517	7340-9604	1/8" Nose Assembly for 734 Tool
61518	7340-9605	5/32" Nose Assembly for 734 Tool
61519	7340-9606	3/16" Nose Assembly for 734 Tool
61520	7340-9609	3/16" Steel Nose Assembly for 734 Tool
61521	7345-0004	Swivel Head Tool — for 1/8" Rivets
61522	7345-0005	Swivel Head Tool — for 5/32" Rivets
61523	7345-0006	Swivel Head Tool — for 3/16" Rivets
61524	7596	Hand Tool for 1/8" and 5/32" Rivets
61525	762	Workshop Kit
61526	7605	Extension Type Hand Tool — all sizes of Rivets
61527	7540	Long Arm Tool — for 5/32" and 3/8" Rivets



How the Avex system works

1. The rivet stem is placed into the hole of the placing tool, the rivet is then inserted into prepared holes.
2. The tool is pulled back, creating an enlarged head that fills the hole and clamps the sheets tightly together.
3. On completion of the cycle, the stem breaks at the break notch and is discarded.



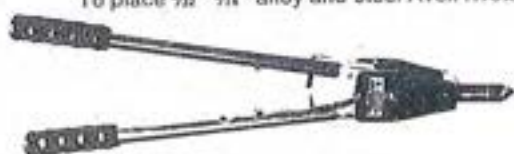
7596 Hand Tool

Heavy duty tradesman's tool to place 1/8" and 5/32" diameter Avex rivets.



7540 Long Arm Tool — heavy duty

To place 5/32" 1/4" alloy and steel Avex rivets.



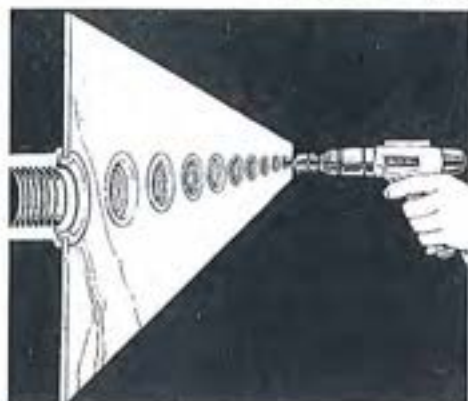
7605 Hand Tool

Heavy duty tool to place all sizes of Avex rivets.



AVDEL FASTENING SYSTEMS

NUTSERT



The Avdel Nutsert enables a high-strength threaded steel insert or anchor nut to be placed in thin sheet metals down to thicknesses of 0.02 ins.

MAJOR FEATURES INCLUDE:

Access required to one side of the workpiece only. Can be placed after painting or plating. Takes only 4 seconds to place. Reduced installation costs.



How the Avdel Nutsert system works

1. Nutsert is placed in pre-drilled hole.
2. On activation the threaded shank of the placing tool puts up the threaded section of the Nutsert until the threaded wall collapses radially outward, clenching it tight against the sheet.
3. The tool is withdrawn at a press of the trigger, leaving the Nutsert ready to receive a screw or bolt.

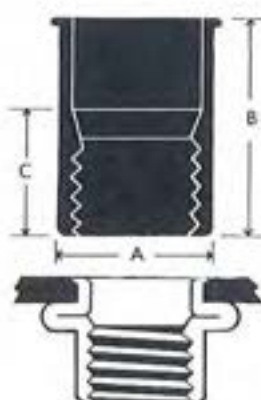


THIN SHEET NUTSERT — COMMERCIAL SERIES 9550 — THREAD FORMS: B.S.W. and METRIC COARSE (I.S.O.)**

NOTE: Thin Sheet Nutserts (with the exception of those marked thus *) can be used in thicker material providing installation and functional term prove suitable.

CAT. NO.	Part No.	Material	Finish	Thread Form	Thread Size	Dimensions									Suggested Hole Size	
						Material Thickness In. mm.		A Max. In. mm.		B Max. In. mm.		C Max. In. mm.		In.	mm.	
61552 61553	9551-0514 9551-0515 *	Steel	Zinc Plated	B.S.W.	3/16 1/8	.020/.050 .020/.120	5/16 27 8.76/3.25	289 374	7.11 9.5	465 610	11.81 15.5	240 325	6.1 8.51	9/32 3/8	7.2 8.6	
61556	9558-0413	Steel	Zinc Plated	M4x0.7	M4	.020 .050	0.51 1.27	245	6.32	410	10.41	250	6.35	1/4	6.4	
61556	9558-0514	Steel	Zinc Plated	M5x0.8	M5	.020 .050	0.51 1.27	280	7.11	465	11.81	240	6.10	9/32	7.2	
61557	9558-0610	Steel	Zinc Plated	M6x1.0	M6	.020 .120	0.76 3.25	374	9.5	610	15.5	325	8.51	3/8	8.6	
61558	9558-0871	Steel	Zinc Plated	M8x1.25	M8	.020 .120	0.91 3.25	416	10.57	630	16.00	305	9.27	4/16	10.6	

** Thread Form: B.A., B.S.F., U.N.F., and U.N.C. also available on application.



NUTSERT — COMMERCIAL SERIES 9500 — THREAD FORMS: B.S.W., B.S.F., U.N.C., U.N.F. and B.A.

NOTE: Hole sizes given in these tables are for guidance only and they will vary dependent upon the material thickness, hardness and brittleness.

CAT. NO.	Part Number	Material	Finish	Thread Form	Thread Size	Dimensions [in.]			Suggested hole size	
						A MAX	L MAX	M MAX		
61529	9501-0612	Steel	Zinc Plated	B.S.W.	3/16	280	193	380	9/32	7.2
61530	9501-0816				1/4	374	263	520	3/8	9.6
61531	9501-1020				5/16	465	313	620	1/2	12.7
61532	9501-1224				3/8	567	373	740	9/16	14.3
	9503-0412	Steel	Zinc Plated	B.A.	4	218	193	380	7/32	5.6
	9503-0512				5	243	193	380	9/32	7.2
	9503-0616				6	268	193	380	1/4	6.4
	9503-0816				8	374	263	520	3/8	9.6
61533	9504-0816	Steel	Zinc Plated	U.N.C. Fract.	1/4	374	263	520	3/8	9.6
61534	9504-1020				5/16	465	313	620	1/2	12.7
	9504-1224				3/8	567	373	740	9/16	14.3
	9505-0412				4	1865	193	380	3/16	4.8
61535	9505-0512	Steel	Zinc Plated	U.N.C. Number	5	218	193	380	7/32	5.6
61536	9505-0812				8	243	193	380	1/4	6.4
61537	9505-1012				10	268	193	380	9/32	7.2
61538	9506-0816	Steel	Zinc Plated	U.N.F. Fract.	1/4	374	263	520	3/8	9.6
61539	9506-1020				5/16	465	313	620	1/2	12.7
61540	9506-1224				3/8	567	373	740	9/16	14.3
	9507-0612 *				6	218	193	380	7/32	5.6
61541	9507-0812 *	Steel	Zinc Plated	U.N.F. Number	8	243	193	380	1/4	6.4
61542	9507-1012				10	268	193	380	9/32	7.2



NUTSERT — COMMERCIAL SERIES 9500 — THREAD FORM: METRIC COARSE (I.S.O.)

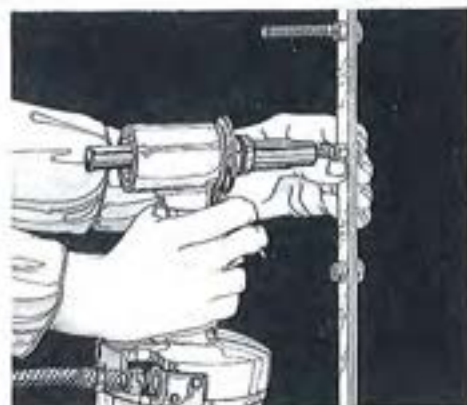
CAT. NO.	Part No.	Material	Finish	Thread Form	Thread Size	Dimensions [mm.]			Suggested hole size	
						A MAX	L MAX	M MAX		
61548	9508-0312	Steel	Zinc Plated		M3x0.5	183	4.74	4.91	9.65	3/16 4.8
61547	9508-0412				M4x0.7	243	6.33	4.91	9.65	1/4 6.4
61548	9508-0512				M5x0.8	305	7.12	4.91	9.65	9/32 7.2
61549	9508-0616				M6x1	374	8.50	5.99	13.21	3/8 9.6
61550	9508-0816				M8x1.25	465	10.68	7.96	15.25	1/2 12.7
61551	9508-1024				M10x1.5	567	14.27	9.48	18.88	9/16 14.3

* Items marked thus are normally not stocked and therefore are subject to special quotation and may be subject to delivery delay.

NUTSERT POWER TOOLS		
Cat. No.	Part No.	Description
61559	7441	Straight Pneumatic Tool
61560	7444	Straight Pneumatic Tool
61561	7524	Pistol Grip Pneumatic Tool
61562	7525	Pistol Grip Pneumatic Tool
61563	7526	Pistol Grip Pneumatic Tool
61564	7527	Pistol Grip Pneumatic Tool
61568	7484	Manual Tool (SN)
61571	7486	Manual Tool (TSN)
KITS		
61572	750	Kit (SN)
615102	770	Kit (TSN) Imperial Sizes
615103	780	Kit (TSN) Metric Sizes

7

AVDEL FASTENING SYSTEMS



How the Avdelok system works

1. The Avdelok pin is inserted through the prepared holes, and the collar slipped over the pin tail. The tool is placed over the pin tail, and the trigger pressed.
2. The tool grips the annular grooves of the pin tail and clenches the work tight, seating the collar into the locking grooves.
3. The tail of the pin breaks flush with the collar and is ejected. If necessary, the Avdelok can be removed later with simple collar cutters.

AVDELOK

The Avdelok is a two-piece, high-strength structural fastener which can be placed three times as fast as a conventional nut and bolt. In addition, the Avdelok gives the same strength with a smaller size: for instance, a 3/8 in. Avdelok can replace a 1/2 in. nut and bolt.

MAJOR FEATURES INCLUDE:

Can be placed by unskilled operator. High-strength, high-clench, vibration-proof fastening. Replaces nuts and bolts, solid rivets or welding. Completed fastening requires visual inspection only. Reduced installed costs.



AVDELOK PRODUCT CODES

Example: 2611 - 06 03

First four Numerals (2611) = Product Code.

Next two (06) = Diameter Code:

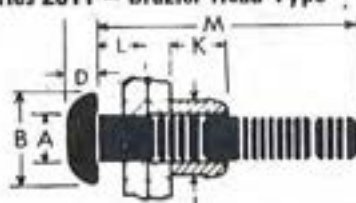
i.e. Shank Diam. in 32nd. inches.

Last two (03) = Grip Length in 16th. ins.

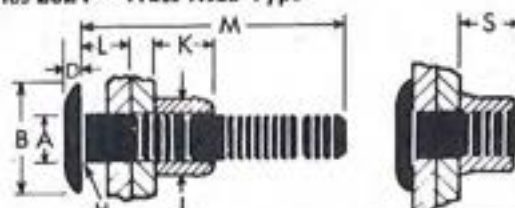
(Collar - Zeros only to complete Code).

Note: All grip ranges are shown with a full collar. If a half collar is used then the grip range is increased to that of the next largest pin and the dimension 'S' reduced accordingly.

Series 2611 - Brazier Head Type



Series 2624 - Truss Head Type



GENERAL DIMENSIONS - DRILL SIZES

TYPE	NOM. DIAM.	DIMENSIONS - INS.					DRILL SIZES	
		A	B	D (Nom)	J (Max)	H Rad. (Max)	INS.	mm
SERIES 2611 - BRAZIER HEAD	3/16	.195 / .191	.385 / .365	.131	.309	—	9 (.196)	5
	1/4	.259 / .254	.525 / .475	.152	.406	—	G (.261)	6.6
	5/16	.322 / .317	.656 / .594	.201	.492	—	P (.323)	8.2
	3/8	.385 / .380	.787 / .713	.248	.598	—	W (.386)	9.8
SERIES 2624 - TRUSS HEAD	5/16	.322 / .317	.781 / .719	.140	.492	.025	P (.323)	8.2

AVDELOK PINS

CAT. NO.	PART No.	Nom. Dia. Ins.	DIMENSIONS - INS.			CAT. NO.	PART No.	Nom. Dia. Ins.	DIMENSIONS - INS.		
			Grip Range	L	M				Grip Range	L	M
6161	2611-0603	3/16	.344 - .406	.390	1.55	61615	2611-0813	1/4	.781 - .843	.831	2.12
6162	2611-0604	3/16	.219 - .281	.265	1.42	61616	2611-0814	1/4	.843 - .906	.894	2.18
6163	2611-0608	3/16	.469 - .531	.515	1.67	61617	2611-0816	1/4	.969 - 1.031	1.019	2.31
6164	2611-0802	1/4	.094 - .156	.144	1.43	61618	2611-0820	1/4	1.219 - 1.281	1.269	2.56
6165	2611-0803	1/4	.156 - .219	.206	1.50	61619	2611-1004	5/16	.234 - .328	.300	1.80
6166	2611-0804	1/4	.219 - .281	.269	1.56	61620	2611-1006	5/16	.328 - .422	.394	1.90
6167	2611-0805	1/4	.281 - .344	.331	1.62	61621	2611-1007	5/16	.422 - .516	.487	1.98
6168	2611-0806	1/4	.344 - .406	.394	1.68	61622	2611-1009	5/16	.516 - .609	.581	2.08
6169	2611-0807	1/4	.406 - .469	.456	1.75	61623	2611-1204	3/8	.187 - .312	.268	2.02
61610	2611-0808	1/4	.469 - .531	.519	1.81	61624	2611-1206	3/8	.312 - .437	.393	2.15
61611	2611-0809	1/4	.531 - .594	.581	1.87	61625	2611-1208	3/8	.437 - .562	.518	2.27
61612	2611-0810	1/4	.594 - .656	.644	1.93	61626	2611-1210	5/16	.562 - .687	.643	2.40
61613	2611-0811	1/4	.656 - .718	.706	2.00	61627	2611-1212	5/16	.687 - .812	.768	2.52
61614	2611-0812	1/4	.718 - .781	.769	2.06	61628	2624-1222	5/16	1.250 - 1.500	1.336	3.21

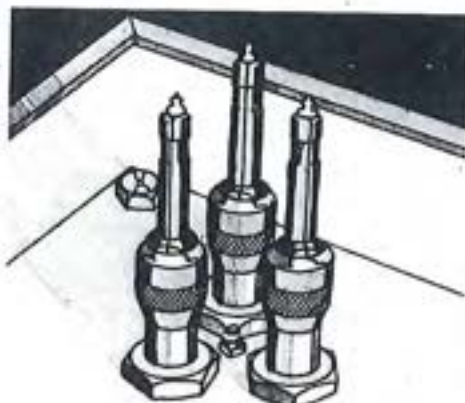
AVDELOK COLLARS

AVDLEUR COLLARS									
CAT. NO.	PART No.	To Suit 2611 Pins	DIMENSIONS — INS.		CAT. NO.	PART No.	To Suit 2611 Pins	DIMENSIONS — INS.	
			S (Max)	K (Max)				S (Max)	K (Max)
FULL COLLARS					HALF COLLARS				
61629	2662-0600	3/16"	.31	.25	61633	2682-0600	3/16"	.25	.15
61630	2662-0800	1/4"	.42	.32	61634	2682-0800	1/4"	.36	.23
61631	2662-1000	5/16"	.48	.38	61635	2682-1000	5/16"	.39	.24
61632	2662-1200	3/8"	.58	.46	61636	2682-1200	3/8"	.45	.31

TOOLS

61637	720	Power Tool - for 3/16" & 1/4" Sizes (Adaptors & Nose Assemblies Available)	61639	722	Power Tool - up to 3/8" Size (Red. Adaptors req'd for 3/16 & 1/4)
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AVDEL FASTENING SYSTEMS



REPETITION RIVETING

Briv, Chobert

Avdel high-speed repetition riveting systems include a wide range of equipment and fasteners designed to cover all types of assembly applications. To satisfy the needs of high-volume production, multi-head set-ups are available.

Major features include:

High-strength, vibration-proof fastening.
Rivets placed from one-side of the workpiece.
A single tool can place up to 1500 rivets per hour.
Operator fatigue reduced to a minimum.
Reduced in-place costs.



How the Avdel Briv system works

1. Magazine-loaded rivet is placed into pre-drilled holes; operator presses trigger to withdraw mandrel.
2. Mandrel expands rivet to fill hole and draw components together.
3. Components clenched tightly together; placing tool automatically ready for next operation.



BRIV RIVETS PRODUCT CODES

EXAMPLE: 1801 - 04 06

First four Numerals (1801) = Product Code (Fastener type, material and finish)
Next two Numerals (04) = Diameter Code (i.e. Shank Diameter in 32nd. inches)
Last two Numerals (06) = Length Code (i.e. Rivet Length)

BRIV RIVETS - Aluminium Alloy - Plain Finish

CAT. NO.	PART No.	Nom. Dia. INS.	DIMENSIONS — INS.					HOLE SIZE INS.
			Grip Range	L (Max)	A (Max)	B (Max)	D (Max)	
61722	1801 - 0404	1/8	.045 - .095	.170	.124	.265	.038	.1285 / .1315
61723	1801 - 0406	1/8	.085 - .135	.210				
61724	1801 - 0408	1/8	.125 - .175	.250				
61725	1801 - 0410	1/8	.165 - .215	.290				
61726	1801 - 0412	1/8	.205 - .265	.330				
61727	1801 - 0505	5/32	.026 - .115	.188	.153	.320	.038	.1562 / .1592
61728	1801 - 0507	5/32	.080 - .155	.235				
61729	1801 - 0509	5/32	.145 - .205	.285				
61730	1801 - 0511	5/32	.195 - .255	.335				
61731	1801 - 0513	5/32	.225 - .275	.348				
61732	1801 - 0607	3/16	.105 - .155	.228	.188	.380	.045	.191 / .194
61733	1801 - 0609	3/16	.145 - .205	.285				
61734	1801 - 0611	3/16	.195 - .255	.335				
61735	1801 - 0613	3/16	.245 - .305	.385				
61736	1801 - 0615	3/16	.295 - .355	.435				
TOOLS								
61738	7271	Repetition Riveting Pneumatic Tool — Hand Held — Automatic — Air Operated Jaws						
	7273	Repetition Riveting Pneumatic Tool — Remote Control — Bench Mounted						
Jaws and Accessories to suit available on application								

NOTES:

Product Code 1821 Briv, Rivets (Steel - Zinc Plated) available on application.
Above data relates to Briv rivets which are installed with Standard Front Jaws.
Information for the Avlug, Chobert and Grovit Range of Rivets available on application.



ELECTRONIC COMPONENTS

Illustrated and listed on this and the following pages are only a FEW of the wide and comprehensive range of ACME ELECTRONIC COMPONENTS — Coaxial Cable and Coaxial Cable Connectors. If it is not listed — Please Ask — We can probably help you.

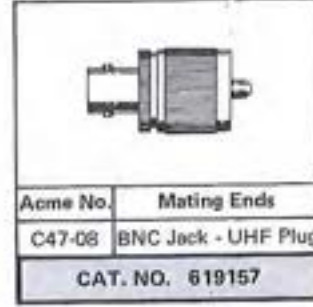
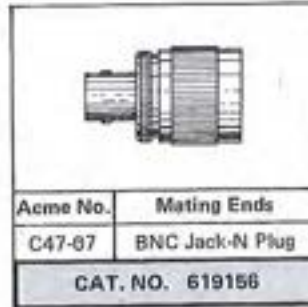
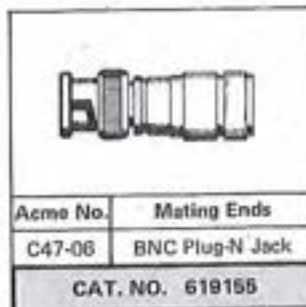
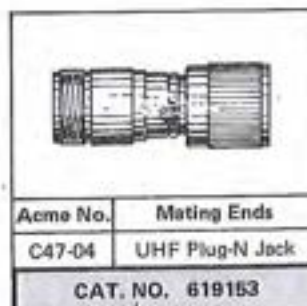
COAXIAL CABLE

CAT. NO.	Military Number RG/U	Jacket O.D.	Shields		Dielectric O.D. & Type	Centre Conductor	V.P. %	Cap. Mmfd/ ft.	Max. Operat. Volts Rms.	Nom. Imp. Ohms	lbs./ 1000 ft.	Connector Series
			Outer	Inner								
RG COAXIAL CABLE												
619364	11A											
	11A	.405	—	C	.285P	7/26TC	65.9	20.5	5000	75	90	N, C, HN, UHF
619365	58A											
	58A	.195	—	TC	.116P	19/.0071TC	65.9	30	1900	50	27	TNC, BNC, BN, C, UHF, N, Plug-in
619366	58C											
	58C	.195	—	TC	.116P	19/.0071TC	65.9	30	1900	50	27	TNC, BNC, BN, C, UHF, N, Plug-in
619367	59B											
	59B	.242	—	C	.146P	.023CW	65.9	21	2300	75	35	TNC, BNC, BN, C, UHF, N, Plug-in
619368	62A											
	62A	.242	—	C	.146SSP	22CW	84	13.5	750	93	35	TCN, BCN, BN, C, UHF, N, Plug-in
619373	213											
	213	.405	—	C	.285P	7/.0296P	65.9	29.5	5000	50	103	N, C, HN, UHF
SUB-MINIATURE RG CABLE												
Teflon dielectric sub-miniature cable is able to withstand continuous operating temperatures up to 250°C. Teflon jacket is weatherproof, chemically inert, insoluble in liquids and gases — provides the greatest flexibility and lowest attenuation. The polyethylene dielectric miniature coaxial cable is intended for use in any miniaturized electronic application where extremely high temperature is not a consideration.												
619369	174											
	174	.100	—	TC	.060P	7/34CW	65.9	30	1500	50	7.5	
619370	178B											
	178B	.075 Max.	—	S	.034T	7/38SCW	69.5	28.5	1000	50	6	
619371	179B											
	179B	.105 Max.	—	S	.063T	7/38SCW	69.5	19.5	1200	75	11	

NOTES: ALL CABLE SOLD PER 30 metres (100 ft.)

C = Copper. S = Silvered Copper. CW = Copperweld. TC = Tinned Copper. P = Polyethylene.
CCP = Conductive Coated Polyethylene. T = Teflon. TT = Teflon Tape. SCW = Silvered Copperweld.
SST = Semi-Solid Teflon. SSP = Semi-Solid Polyethylene.

ADAPTERS BETWEEN SERIES



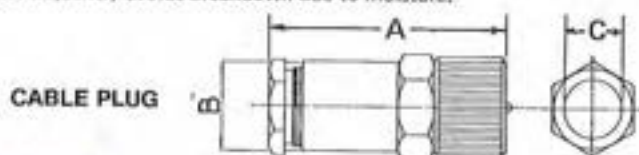
ELECTRONIC COMPONENTS

COAXIAL CABLE CONNECTORS

UHF Series

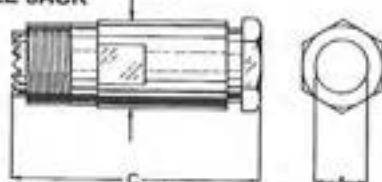
619-a
ACME

The UHF Series are general purpose connectors of non-constant impedance. They are satisfactory up to 500 Mega Hertz and are rated at a peak voltage of 500 v.r.m.s. Where impedance matching is necessary the 'N' series, or the 'BNC' series connectors should be used. The connectors have either machined brass or die-cast zinc bodies. All metal parts are either silver plated or plated with non-tarnish finish, ensuring maximum conductivity and low contact resistance. Teflon and Polystyrene are the dielectrics principally used. Cable plugs and cable jacks are available in weatherproof form, which ensures complete sealing of the cable-end of the connector and consequently avoids breakdown due to moisture.



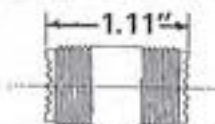
CAT. NO.	Acme No.	Cable	DIMENSIONS			Eng. Data
			A	B	C	
61953	C32-4	RG-8U, UR-57, 67	1.86	.69	.420	Teflon Insul.
61957	C32-10	RG-59U, UR-70	1.86	.69	.245	Teflon Insul.
61965	C32-21	RG-58U, UR-43	1.59	.50	.220	Teflon Insul.

CABLE JACK



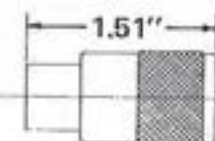
CAT. NO.	Acme No.	Cable	Dimensions			Eng. Data
			A	B	C	
61976	C32-36	RG-8U, UR-57, UR-67	.420	.69	1.92	Teflon Insul.
61980	C32-42	RG-58/U	.220	.69	1.92	Teflon Insul.

ADAPTER STRAIGHT JACK TO JACK



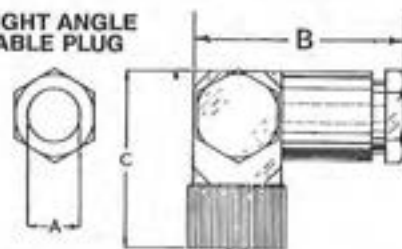
CAT. NO.	Acme No.	Mil. Equiv.	Insulation
61960	C32-14	PL-258	Polystyrene Teflon

CABLE PLUG



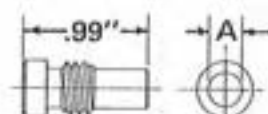
Cat. No.	Acme No.	Mil. Equiv.	Cable	Eng. Data
61969	C32-27		UR-4, 57, 67, RG-213	Teflon
61981	C32-43	PL-259	RG-8, 11, 213, 214	Teflon N.T.

RIGHT ANGLE CABLE PLUG



CAT. NO.	Acme No.	Cable	Dimensions			Eng. Data
			A	B	C	
	C32-65	RG-8U, UR-57, UR-67	.420	1.61	1.36	Teflon Insul.
61994	C32-66	RG-58U, UR-43	.220	1.40	1.36	Teflon Insul.

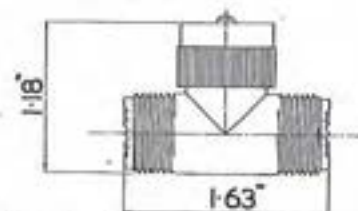
REDUCING ADAPTER



Cat. No.	Acme No.	Mil. Equiv.	Cable	Dimens. A
61967	C32-24	UG-175/U	RG-58U, UR-43	.220 (3/16)
61968	C32-25	UG-176/U	RG-59U, UR-70	.250 (1/4)

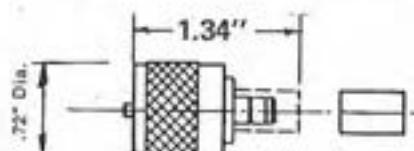
The Reducing Adapters are for use with C32-27 Plugs.

ADAPTER TEE



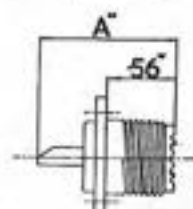
CAT. NO.	Acme No.	Mil. Equiv.	Insulation
61973	C32-32	49199	Polycarbonate Teflon

SHORT TAIL CRIMP PLUGS



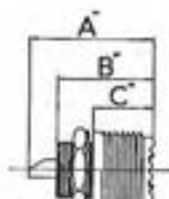
CAT. NO.	Acme No.	Cable	Trim Jig
61982	C32-44	RG-58	C70-09
61983	C32-45	RG-59	C70-10
61984	C32-46	RG-8	C70-08

FLANGE MOUNT JACK RECEPTACLE



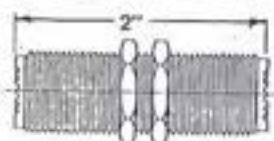
CAT. NO.	Acme No.	Mil. Equiv.	Dim. A	Body Matl.	Insulation	Eng. Data
61986	C32-49	—	1.07	Zinc Die Cast	Teflon	N.T.
61991	C32-60	50-239	1.07			

SINGLE HOLE MOUNT JACK RECEPTACLE



CAT. NO.	Acme No.	Dimensions			Insulation	Hole No.	Eng. Data
		A	B	C			
61955	C32-8	1.04	.83	.50	Polycarbonate	6	N.T.
61970	C32-28	1.04	.83	.50	and Teflon	4	N.T.

ADAPTER STRAIGHT JACK TO JACK (Single Hole Bulkhead Feed Thru)



Cat. No.	Acme No.	Mil. Equiv.	Insulation	Hole No.
61971	C32-30	UG-363/U	Polycarbonate Teflon	26



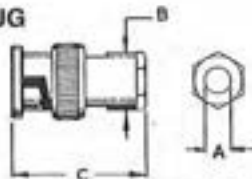
ELECTRONIC COMPONENTS COAXIAL CABLE CONNECTORS

BNC Series

The B.N.C. connectors feature a quick disconnect, bayonet lock coupling. They are a small, lightweight connector suitable for use with the smaller R.F. coaxial cables. They will operate to a peak voltage of 500 volts and are weatherproof.

The Improved B.N.C. connectors feature better weatherproofing and cable clamping. They have good electrical performance to 10,000 Mega Hertz and high temperature operation up to 250°C.

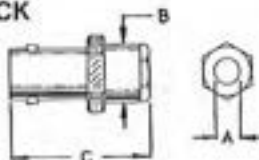
CABLE PLUG



CAT. NO.	Acme No.	Mil. Equiv.	Cable	Dimensions		
				A	B	C
619201	C53-04	UG-88 C/U	RG-58U, UR-43	.217	.50	1.00
619202	C53-07	UG-260 B/U	RG-59U, UR-70	.252	.50	1.00
619204	C53-09	UG-959-A/U	RG-8U, UR-57* UR-67	.438	.75	1.50
619260	C54-01*		RG-58U	.205	.50	1.00
619262	C54-03*		RG-59U	.252	.50	1.00
619266	C54-07*		RG-174U	.110	.50	1.00

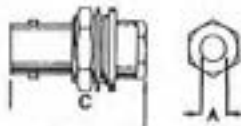
* Sq. Cut Non Tarnish Finish

CABLE JACK



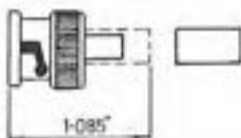
CAT. NO.	Acme No.	Mil. Equiv.	Cable	Dimensions		
				A	B	C
619206	C53-14	UG-89 C/U	RG-58U, UR-43	.217	.50	1.00
619207	C53-17	UG-261 C/U	RG-59U, UR-70	.252	.50	1.00

SINGLE HOLE MOUNT CABLE JACK



CAT. NO.	Acme No.	Mil. Equiv.	Cable	Dimension		Hole No.
				A	C	
619211	C53-23	UG-910 A/U	RG-59U, UR-70	.252	1.16	4
619239	C53-63	UG-909 B/U	RG-58U, UR-43	.217	1.16	4

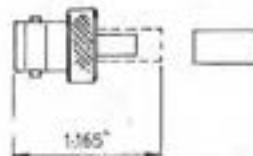
CABLE PLUG CRIMP TERMINATION



CAT. NO.	Acme No.	Cable	Trim Jigs		Eng. Data
			Jacket	Dielectric	
619243	C53-81	RG-58	KTJ 57	KTD 25	N.T.*
619244	C53-82	RG-59	KTJ 57	KTD 26	N.T.*

* Crimp Contact, N.T., Non Tarnish Finish.

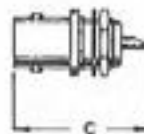
CABLE JACK CRIMP TERMINATION



CAT. NO.	Acme No.	Cable	Trim Jigs		Eng. Data
			Jacket	Dielectric	
619246	C53-86	RG-58	KTJ 57	KTD 25	N.T.
619247	C53-87	RG-59, 62	KTJ 57	KTD 26	NT.CC

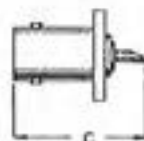
N.T., Non Tarnish Finish CC Crimp Contact.

SINGLE HOLE MOUNT JACK RECEPTACLE



Cat. No.	Acme No.	Mil. Equiv.	Dim. C	Hole No.
619217	C53-33	UG-1094/U	1.06	6

FLANGE MOUNT JACK RECEPTACLE



Cat. No.	Acme No.	Mil. Equiv.	Dim. C	Plate No.
619213	C53-27	UG-290 A/U	1.06	2

ADAPTER STRAIGHT PLUG TO PLUG



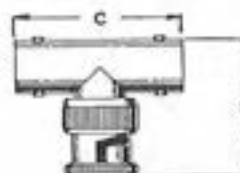
Cat. No.	Acme No.	Mil. Equiv.	Dim. C
619231	C53-52	UG-491 B/U	1.22

ADAPTER STRAIGHT JACK TO JACK



Cat. No.	Acme No.	Mil. Equiv.	Dim. C	Eng. Data
619223	C53-41	UG-914/U	1.28	Mates Plug to Plug

ADAPTER TEE



CAT. NO.	Acme No.	Mil. Equiv.	Dimensions		Eng. Data
			B	C	
619232	C53-54	UG-274 A/U	1.06	1.28	2 Jacks, 1 Plug

ELECTRONIC COMPONENTS COAXIAL CABLE CONNECTORS

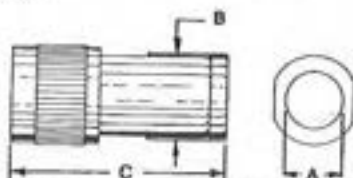
619-c
ACME

The N-Series are a line of low voltage, constant impedance connectors designed for use with small and medium size R.F. cable. They are weatherproof connectors rated at 1,000 volt peak. They are suitable for use with frequencies up to 10,000 Mega Hertz and their impedance rating is 50 ohms.

The connectors have machined brass bodies. All metal parts are silver plated. Teflon insulators are used throughout. Contacts are made from brass or beryllium copper. The improved type N connectors feature better weatherproofing and a positive metal to metal cable clamping mechanism.

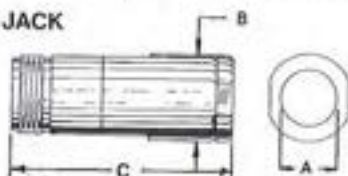
N - Series

CABLE PLUG



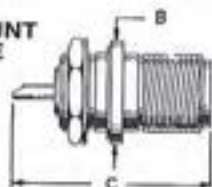
CAT. NO.	Acme No.	Mil. Equiv.	Cable	Dimensions		
				A	B	C
619103	C39-07		RG-8U, UR-57, UR-67	.420	.69	1.75
619110	C39-15	UG-536 A/U	RG-55U, 58U, UR-43	.217	.50	1.50
619111	C39-18	UG-21 B/U	RG-8U, 9U	.435	.69	1.75

CABLE JACK



CAT. NO.	Acme No.	Mil. Equiv.	Cable	Dimensions		
				A	B	C
619109	C39-14		RG-8U, UR-57, UR-67	.420	.69	1.75
619118	C39-27	UG-23 B/U	RG-8U, 9U	.435	.69	1.75
619120	C39-30		RG-55, 58	.210		1.56

SINGLE HOLE MOUNT JACK RECEPTACLE



CAT. NO.	Acme No.	Dimens.		Hole No.	Eng. Data
		B	C		
619107	C39-12	.81	1.44	4	Herm. Seal Teflon Insul. Screw Mount

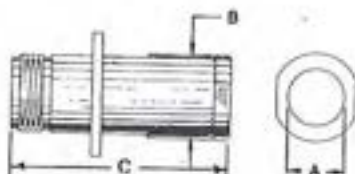
CABLE PLUG CRIMP TERMINATION



CAT. NO.	Acme No.	Cable	Trim Jigs		Trim Code	Dim. A	Eng. Data
			Jacket	Dielectric			
619141	C39-83	RG-8, 11, 213	KTJ-60	KTD-28	402	1.32	CC.NT
619142	C39-88	RG-58	KTJ-65	KTD-38	415*	1.44	N.T.

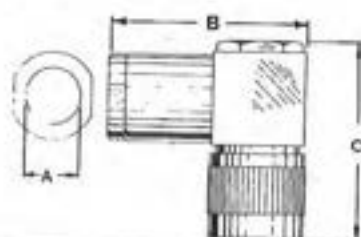
CC Crimp Contact N.T. Non Tarnish Finish
* Contact positioning jig KTP-5 required for cabling.

FLANGE MOUNT CABLE JACK



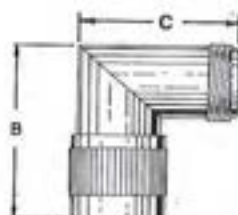
CAT. NO.	Acme No.	Cable	Dimensions		
			A	B	C
619108	C39-13	RG-8U, UR-57, UR-67	.420	.69	1.75

RIGHT ANGLE CABLE PLUG



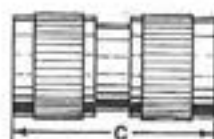
CAT. NO.	Acme No.	Cable	Dimensions		
			A	B	C
619128	C39-41	RG-8U, 9U	.437	1.69	1.63

ADAPTER RIGHT ANGLE JACK TO PLUG



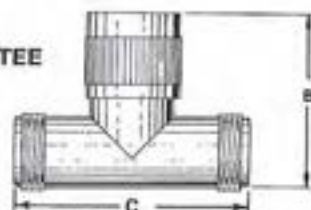
CAT. NO.	Acme No.	Mil. Equiv.	Dimensions	
			B	C
619131	C39-45	UG-27 C/U	1.38	1.25

ADAPTER STRAIGHT PLUG TO PLUG



CAT. NO.	Acme No.	Mil. Equiv.	Dim. C
619130	C39-43	UG-57 B/U	1.59

ADAPTER TEE



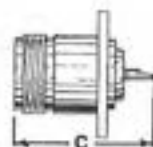
CAT. NO.	Acme No.	Mil. Equiv.	Dimensions		Eng. Data
			B	C	
619134	C39-48	UG-28 A/U	1.22	1.75	3 Jacks

ADAPTER STRAIGHT JACK TO JACK



CAT. NO.	Acme No.	Mil. Equiv.	Dimensions	
			B	C
619105	C39-10	UG-29 B/U	.63	1.75

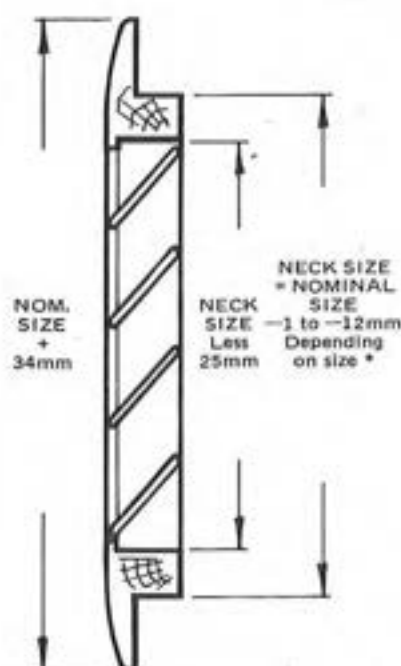
FLANGE MOUNT JACK RECEPTACLE



CAT. NO.	Acme No.	Mil. Equiv.	Dim. C
619109	C39-09	UG-58 A/U	1.11

AIR DIFFUSION EQUIPMENT

WOODFLO RETURN AIR GRILLES



CONSTRUCTION

TIMBER

COLOUR

STAINED -
Standard (HDO)

Available on

Application

Satin White

Unstained (Raw).



NOMINAL SIZE Width & Height mm	APPROX. IMPERIAL EQUIVALENT INS.	GRILLE ONLY	BACK FLANGE (1)	GRILLE AND (2) MOUNTING BOX	FILTER
		CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
350 x 350	14 x 14	620307	620331	620351	620376
350 x 400	14 x 16	620308	620332	620352	620377
375 x 375	15 x 15	620310	620334	620354	620379
375 x 600	15 x 24				
400 x 350	16 x 14	620311	620335	620355	620380
400 x 400	16 x 16	620312	620336	620356	620381
400 x 500	16 x 20	620313	620337	620357	620382
400 x 600	16 x 24	620314	620338	620358	620383
400 x 750	16 x 30	620315	620339	620359	620384
450 x 150	18 x 6	620302	620326		
450 x 200	18 x 8	620303	620327		
450 x 300	18 x 12				
450 x 450	18 x 18	620316	620340	620360	620385
450 x 500	18 x 20				
450 x 600	18 x 24				
450 x 750	18 x 30				
500 x 350	20 x 14				
500 x 400	20 x 16	620317	620341	620361	620386
500 x 450	20 x 18				
500 x 500	20 x 20	620318	620342	620362	620387
500 x 600	20 x 24				
550 x 550	22 x 22	620319	620343	620363	620388
600 x 150	24 x 6	620304	620328		
600 x 200	24 x 8	620305	620329		
600 x 250	24 x 10	620306	620330		
600 x 300	24 x 12				
600 x 400	24 x 16				
600 x 450	24 x 18				
600 x 500	24 x 20	620320	620344	620364	620389
600 x 600	24 x 24	620321	620345	620365	620390
750 x 600	30 x 24	620322		620366	620391
900 x 600	36 x 24	620324		620368	620393
900 x 900	36 x 36				
900 x 1200	36 x 48				
1200 x 1200	48 x 48				

- Notes : 1. 4 - 2" Dowels supplied with each Back Flange for fitting to Grille.
 2. Mounting Box acts as mounting for Grille and also holds filter.
 3. Door Grilles may be coupled together with 4 - 2" Dowels using predrilled holes. Specify when ordering.
 4. Other sizes available on request.

REFER NEXT PAGE FOR PERFORMANCE AND SELECTION DATA

AIR DIFFUSION EQUIPMENT

WOODFLO RETURN AIR GRILLES

PERFORMANCE DATA

VELOCITY		FREE AREA m ²	1.0 m/sec	1.5 m/sec	2.0 m/sec	2.5 m/sec	3.0 m/sec
NOMINAL SIZE Width x Height mm	APPROX. IMPERIAL EQUIVALENT INS.		PRESSURE DROP — Pascals				
			3.9	7.9	12.8	18.6	25.5
			FLOW — litre/sec				
350 x 350	14 x 14	0.079	79	119	158	198	237
350 x 400	14 x 16	0.092	92	138	184	230	276
375 x 375	15 x 15	0.092	92	138	184	230	276
375 x 450 *	15 x 18 *	0.112	112	168	224	280	336
375 x 600	15 x 24	0.155	155	233	310	388	465
400 x 350	16 x 14	0.091	91	137	182	228	273
400 x 400	16 x 16	0.106	106	159	212	265	318
400 x 500	16 x 20	0.134	134	201	268	335	402
400 x 600	16 x 24	0.166	166	249	332	415	498
400 x 750	16 x 30	0.209	209	314	418	523	627
400 x 900 *	16 x 36 *	0.255	255	383	510	638	765
450 x 150	18 x 6	0.035	35	53	70	88	105
450 x 200	18 x 8	0.053	53	80	106	133	159
450 x 300	18 x 12	0.087	87	131	174	218	261
450 x 375 *	18 x 15 *	0.112	112	168	224	280	336
450 x 400 *	18 x 16 *	0.120	120	180	240	300	360
450 x 450	18 x 18	0.136	136	204	272	340	408
450 x 500	18 x 20	0.152	152	228	304	380	456
450 x 600	18 x 24	0.188	188	282	376	470	564
450 x 700 *	18 x 28 *	0.221	221	332	442	553	663
450 x 750	18 x 30	0.237	237	356	474	593	711
500 x 350	20 x 14	0.116	116	174	232	290	348
500 x 400	20 x 16	0.135	135	203	270	338	405
500 x 450	20 x 18	0.152	152	228	304	380	456
500 x 500	20 x 20	0.170	170	255	340	425	510
500 x 600	20 x 24	0.210	210	315	420	525	630
550 x 550	22 x 22	0.207	207	311	414	518	621
600 x 150	24 x 6	0.048	48	72	96	120	144
600 x 200	24 x 8	0.071	71	107	142	178	213
600 x 250	24 x 10	0.094	94	141	188	235	282
600 x 300	24 x 12	0.118	118	177	236	295	354
600 x 400	24 x 16	0.163	163	245	326	408	489
600 x 450	24 x 18	0.185	185	278	370	463	555
600 x 500	24 x 20	0.206	206	309	412	515	618
600 x 600	24 x 24	0.255	255	383	510	638	765
750 x 600	30 x 24	0.322	322	483	644	805	966
900 x 600	36 x 24	0.388	388	582	776	970	1164
900 x 900	36 x 36	0.597	597	896	1194	1493	1791
900 x 1200	36 x 48	0.806	806	1209	1612	2015	2418
1200 x 1200	48 x 48	1.084	1084	1626	2168	2710	3252

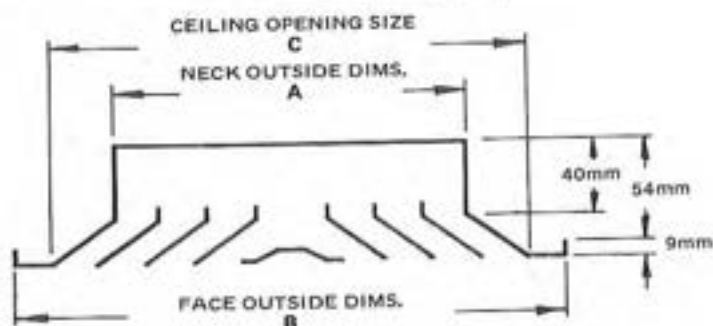
* Non-Standard Sizes - available on application.

Note : During the Metric change over period both S.I. Metric and Imperial sizes can be manufactured without difficulty.

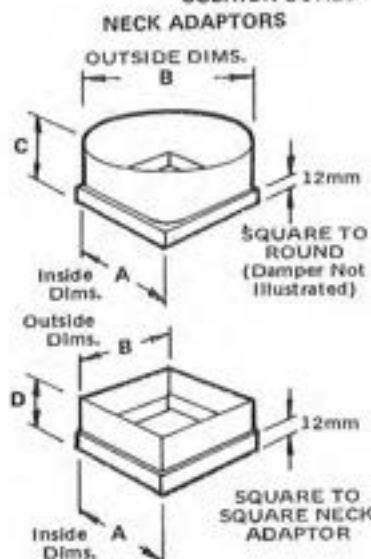
ORDERING PROCEDURE : REFER TO PAGE 620 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED.

ACPAR AIR DIFFUSION EQUIPMENT

CEILING DIFFUSERS — MODEL CS



AVAILABLE WITH : NECK ADAPTORS
Square to Round
Square to Square
O.B. DAMPERS
CUSHION BOXES



DIMENSIONS

CEILING DIFFUSER — MODEL CS			
MODEL SIZE	A mm	B mm	C mm
1525s	145	250	186
2030s	195	300	236
2535s	245	350	286
3040s	295	400	336
3545s	345	450	386
5060s	495	600	536
6030s	195	300	236
	x	x	x
	495	600	536

NECK ADAPTORS				
NOMINAL SIZE	A (1) mm	B (2) mm	C (3) Round Neck mm	D Square Neck mm
15s15R	145	145	75	37
20s20R	195	195	100	37
25s25R	245	245	125	37
30s30R	295	295	150	37
35s35R	345	345	175	37
50s50R	495	495	250	37
Other Sizes as Required	Nominal —5mm	Nominal —5mm	Half O.D. of Neck	37

(1) Fits over diffuser neck
(2) Adapted neck size
(3) Available without damper

CATALOGUE NOS. AND ORDERING DETAILS

DIFFUSER — MODEL CS		OB DAMPER — MODEL D		SQUARE TO ROUND ADAPTOR		CUSHION BOX — MODEL CB	
CAT. NO.	MODEL SIZE	CAT. NO.	MODEL SIZE	CAT. NO.	MODEL SIZE	CAT. NO.	MODEL SIZE
6211	1525s	6212	D150	6213	15s15R	6214	CB150
6217	2030s	6218	D200	6219	20s20R	62110	CB200
62113	2535s	62114	D250	62115	25s25R	62116	CB250
62119	3040s	62120	D300	62121	30s30R	62122	CB300
62126	3545s	62127	D350	62128	35s35R	62129	CB350
62132	5060s	62133	D500			62134	CB500
62138	6030s	62139	D5020				

NOTES : Round Adaptors and Cushion Boxes are fitted with a two piece wing damper in the round neck, as standard.
Adaptors or Cushion Boxes other than standard sizes as listed above, with either round or square necks are available on application.

PERFORMANCE DATA — REFER NEXT PAGE

ACPAR AIR DIFFUSION EQUIPMENT

PERFORMANCE DATA

CEILING DIFFUSERS — MODEL CS

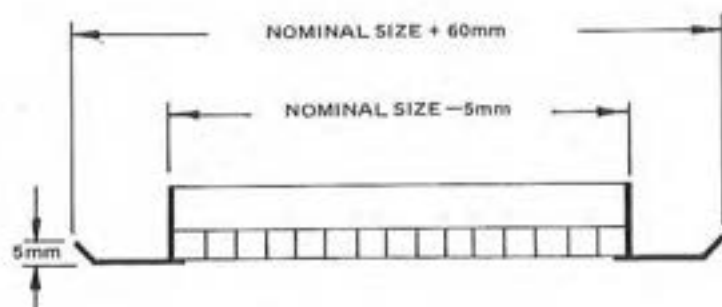
FLOW l/sec	DIFFUSER SIZE	NECK VELOC. m/sec	PRESS. DROP Pascals	THROW m	SOUND RATING NC
25	1525s *	1.10	2.5	1.5	—
	1525R *	1.39	2.5	1.7	—
45	1525s	2.24	5.0	1.8	—
	1525R	2.84	5.0	1.9	—
	2030s	1.24	4.9	1.5	—
	2030R	1.57	4.9	1.5	—
70	1525s	3.33	9.9	1.8	18
	1525R	4.23	10.0	2.0	20
	2030s	1.84	9.9	1.8	—
	2030R	2.34	9.9	1.9	—
95	1525s	4.43	14.9	2.4	23
	1525R	5.62	16.0	2.6	25
	2030s	2.45	5.0	1.8	20
	2030R	3.11	6.4	2.0	22
	2535s	1.55	3.5	1.5	—
	2535R	1.97	4.2	1.8	—
	6030s	0.53	2.5	0.9	—
120	1525s	5.62	24.9	3.2	31
	1525R	7.14	24.9	3.3	33
	2030s	3.11	19.9	2.7	25
	2030R	3.94	20.9	2.8	27
	2535s	1.97	7.5	2.0	17
	2535R	2.50	9.2	2.1	18
	3040s	1.36	2.5	1.6	—
	3040R	1.72	2.5	1.6	—
	6030s	0.67	4.9	1.1	—
140	2030s	3.68	34.8	3.1	29
	2030R	4.68	35.6	3.3	31
	2535s	2.33	9.9	2.5	17
	2535R	2.96	10.5	2.7	19
	3040s	1.61	4.9	1.8	—
	3040R	2.04	4.9	1.8	—
	6030s	0.80	7.5	1.2	—
165	2030s	4.34	37.3	3.7	33
	2030R	5.51	39.0	4.0	34
	2535s	2.75	12.4	3.2	18
	2535R	3.49	14.9	3.3	20
	3040s	1.89	4.9	2.0	—
	3040R	2.41	5.0	2.0	—
	6030s	0.94	8.0	1.7	—
190	2030s	4.95	49.8	4.2	36
	2030R	5.28	52.3	4.5	39
	2535s	3.13	14.9	3.7	19
	2535R	3.98	16.0	3.9	21
	3040s	2.16	7.4	2.7	—
	3040R	2.74	9.0	2.9	17
	3545s	1.58	4.9	2.4	—
	3545R	2.01	5.0	2.4	—
	6030s	1.07	9.9	1.9	20
	2535s	3.53	14.9	4.0	23
210	2535R	4.49	18.9	4.1	26
	3040s	2.44	9.9	3.0	20
	3040R	3.09	10.2	3.1	23
	3545s	1.78	4.9	2.9	—
	3545R	2.26	5.2	2.9	18
	6030s	1.20	12.4	2.3	23

FLOW	DIFFUSER	NECK	PRESS.	THROW	SOUND
l/sec	SIZE	VELOC.	DROP	m	RATING
		m/sec	Pascals		NC
235	2535s	3.92	19.9	5.0	24
	2535R	4.97	24.9	5.1	26
	3040s	2.70	12.4	3.9	18
	3040R	3.43	14.9	4.0	20
	3545s	1.97	9.9	3.6	18
	3545R	2.51	10.1	3.6	20
	6030s	1.34	14.9	2.4	25
280	2535s	4.70	20.0	5.5	30
	2535R	5.97	24.9	5.7	32
	3040s	3.24	12.5	4.4	25
	3040R	4.12	14.9	4.5	27
	3545s	2.40	12.4	4.2	20
	3545R	3.01	12.4	4.2	22
	5060s	1.15	5.0	2.4	17
330	6030s	1.60	22.4	3.0	30
	2535s	5.50	29.8	6.3	33
	2535R	6.98	34.8	6.5	35
	3040s	3.80	22.4	5.1	27
	3040R	4.82	24.9	5.2	29
	3545s	2.81	17.4	4.6	24
	3545R	3.52	17.6	4.6	26
375	5060s	1.35	4.9	2.6	18
	6030s	1.88	29.9	3.7	32
	3040s	4.32	27.4	5.1	31
	3040R	5.50	29.9	5.2	33
	3545s	3.15	22.4	5.0	27
	3545R	4.01	23.5	5.0	29
	5060s	1.53	7.5	3.0	19
425	6030s	2.14	34.9	4.4	33
	3040s	4.87	29.9	5.7	34
	3040R	5.20	32.4	5.8	36
	3545s	3.56	24.9	5.6	31
	3545R	4.53	26.0	5.7	33
	5060s	1.73	7.8	3.3	19
	6030s	2.41	42.3	5.0	36
470	3040s	5.40	34.8	6.1	35
	3040R	5.86	39.8	6.2	37
	3545s	3.95	29.8	5.2	33
	3545R	5.02	34.8	5.3	35
	5060s	1.92	9.9	3.6	24
	6030s	2.67	54.8	5.5	38
	3545s	4.75	44.8	6.7	38
565	3545R	6.03	47.3	6.9	40
	5060s	2.31	14.9	3.9	28
	660	5060s	2.69	19.9	5.1	31
755	5060s	3.08	24.9	5.7	35
850	5060s	3.46	29.9	6.1	37
940	5060s	3.84	37.4	6.8	39
1040	5060s	4.23	44.8	7.0	43
1130	5060s	4.61	54.8	7.5	45
1225	5060s	5.00	62.3	8.0	48

Note: * "s" suffix = Square Neck
"R" suffix = Round Neck

ORDERING PROCEDURE : REFER TO PAGE 621 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

ACPAR AIR DIFFUSION EQUIPMENT CEILING RETURN AND EXHAUST GRILLES MODEL CR



LEGEND

TYPE	CRP	:	Plastic Egg-Crate — Fixed Core.
TYPE	CRPH	:	Plastic Egg-Crate — Hinged Core with Filter Slides.
TYPE	CRA	:	Aluminium Egg-Crate — Fixed Core.
TYPE	CRAH	:	Aluminium Egg-Crate — Hinged Core with Filter Slides.

CAT. NO.	SIZE mm		APPROX. IMPERIAL EQUIVALENT SIZE — INS.
	WIDTH	HEIGHT	

TYPE CRP

62220	150	150	6 x 6
62221	200	200	8 x 8
62222	250	250	10 x 10
62223	300	300	12 x 12
62224	450	450	18 x 18
62225	500	400	20 x 16
62226	500	500	20 x 20
62227	600	400	24 x 16
62228	600	500	24 x 20
62229	600	600	24 x 24

TYPE CRPH

62226	450	450	18 x 18
62231	500	400	20 x 16
62228	500	500	20 x 20
62227	600	400	24 x 16
62229	600	500	24 x 20
62230	600	600	24 x 24

CAT. NO.	SIZE mm		APPROX. IMPERIAL EQUIVALENT SIZE — INS.
	WIDTH	HEIGHT	

TYPE CRA

62270	150	150	6 x 6
62271	200	200	8 x 8
62272	250	250	10 x 10
62273	300	300	12 x 12
62252	450	450	18 x 18
62251	500	400	20 x 16
62254	500	500	20 x 20
62253	600	400	24 x 16
62255	600	500	24 x 20
62256	600	600	24 x 24

TYPE CRAH

62277	450	450	18 x 18
62276	500	400	20 x 16
62279	500	500	20 x 20
62278	600	400	24 x 16
62280	600	500	24 x 20
62281	600	600	24 x 24

OTHER SIZES AVAILABLE ON REQUEST
REFER NEXT PAGE FOR PERFORMANCE DATA

QUICK AS A FLASH

AND VERY CAREFUL. THAT'S OUR ORDER DEPARTMENT. WHETHER YOUR ORDER IS LARGE OR SMALL, IT WILL RECEIVE PROMPT AND EXACTING ATTENTION. WE DESPATCH OVER 90% OF ALL ORDERS ON THE SAME DAY THEY ARE RECEIVED.

ACPAR AIR DIFFUSION EQUIPMENT

PERFORMANCE DATA

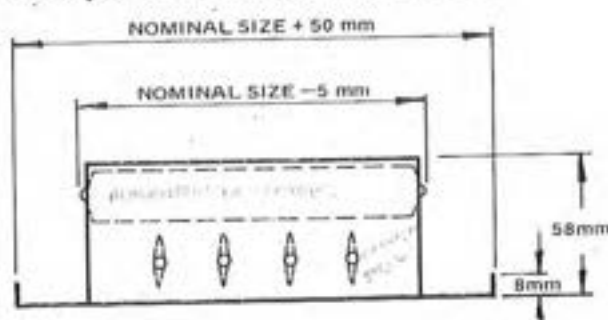
CEILING RETURN AIR GRILLES — MODEL CRA

VELOCITY m/sec GRILLE SIZE mm	1.0 PRESS. DROP 2.5 Pascals		1.5 PRESS. DROP 4.0 Pascals		2.0 PRESS. DROP 7.0 Pascals		2.5 PRESS. DROP 11.0 Pascals		3.0 PRESS. DROP 16.0 Pascals		4.0 PRESS. DROP 28.0 Pascals		5.0 PRESS. DROP 45.0 Pascals	
	I/s	NC	I/s	NC	I/s	NC	I/s	NC	I/s	NC	I/s	NC	I/s	NC
150 x 150	18	—	27	—	36	—	45	—	54	23	72	25	90	33
200 x 200	32	—	50	—	66	—	82	—	99	16	132	26	165	34
300 x 300	76	—	116	—	154	—	192	14	231	20	308	30	385	39
400 x 400	136	—	210	—	280	—	350	16	420	22	560	32	700	40
400 x 500	176	—	264	—	352	—	440	16	528	23	704	33	880	40
400 x 600	212	—	318	—	424	—	530	18	636	24	848	34	1060	42
450 x 750	265	—	398	—	530	—	662	19	795	25	1060	35	1325	43
450 x 500	198	—	298	—	396	—	495	16	594	24	792	34	990	42
450 x 600	259	—	388	—	518	—	647	19	777	25	1036	35	1295	43
450 x 750	299	—	448	—	598	—	747	19	897	26	1196	35	1495	43
450 x 450	194	—	291	—	388	—	485	17	582	24	776	34	970	42
500 x 500	240	—	360	—	480	—	600	19	720	25	960	35	1200	43
500 x 600	289	—	433	—	578	—	722	20	867	26	1156	35	1445	44
600 x 600	348	—	522	—	696	—	870	21	1044	27	1392	36	1740	44
600 x 900	525	—	787	—	1050	14	1312	23	1575	29	2100	38	2625	47
600 x 1200	702	—	1053	—	1404	16	1755	24	2106	30	2808	39	3510	48
750 x 750	503	—	755	—	1006	14	1258	23	1509	29	2012	38	2515	47
750 x 900	659	—	988	—	1318	15	1648	24	1977	30	2636	39	3295	48
750 x 1200	881	—	1322	—	1762	17	2200	25	2643	31	3524	41	4405	49
900 x 900	792	—	1188	—	1584	16	1980	25	2376	31	3168	40	3960	49
900 x 1200	1059	—	1588	—	2118	18	2648	26	3177	32	4236	42	5295	50
1200 x 1200	1416	—	2124	—	2832	19	3540	27	4248	33	5664	43	7080	52

ACPAR AIR DIFFUSION EQUIPMENT

WALL SUPPLY GRILLES — MODEL WS

DOUBLE DEFLECTOR (UNIVERSAL) TYPE



CAT. NO.	SIZE mm		APPROX. IMPERIAL EQUIVALENT INS.
	LENGTH	HEIGHT	
6231	300	100	12 x 4
6232	350	100	14 x 4
6233	400	100	16 x 4
6234	450	100	18 x 4
62313	300	150	12 x 6
62314	350	150	14 x 6
62315	400	150	16 x 6
62316	450	150	18 x 6
62317	500	150	20 x 6
62318	600	150	24 x 6
62326	400	200	16 x 8
62327	450	200	18 x 8
62328	500	200	20 x 8
62329	600	200	24 x 8
62330	750	200	30 x 8
62331	900	200	36 x 8
62338	400	250	16 x 10
62339	450	250	18 x 10
62340	500	250	20 x 10
62341	600	250	24 x 10
62342	750	250	30 x 10
62343	900	250	36 x 10
62351	500	300	20 x 12
62352	600	300	24 x 12
62353	750	300	30 x 12
62354	900	300	36 x 12
62363	350	350	14 x 14
62364	400	400	16 x 16
62365	500	500	20 x 20
62366	600	600	24 x 24
62367	750	750	30 x 30

REFER FOLLOWING PAGES FOR PERFORMANCE DATA.

ONE STOP BUYING

NOW-A-DAYS, THE RELATIVELY HIGH PAY RATES OF MECHANICS AND SERVICEMEN MAKES IT UNECONOMIC TO RUN AROUND TO DIFFERENT SUPPLY HOUSES FOR ODD BALL ITEMS. YOU CAN FIND MOST ANYTHING FOR REPAIR OR INSTALLATION OF REFRIGERATION, AIR CONDITIONING AND HEATING AT YOUR ACPAR CENTRE.

ACPAR AIR DIFFUSION EQUIPMENT

PERFORMANCE DATA

WALL SUPPLY GRILLES — MODEL WS — DOUBLE DEFLECTION

FLOW l/sec.	NOM. SIZE mm	200 x 100			250 x 100			300 x 100 200 x 150			350 x 100 250 x 150			300 x 150 450 x 100			350 x 150 250 x 200			
		DEFLECTION	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°
23	Throw	1.2	3	1.8	3	2.7	1.8	2.4	2.1	1.5	3	2.7	1.8	2.4	2.1	1.2				
	Drop	1.1	1	0.5	1.1	1	0.5	1.1	1	0.5	1.3	1.2	0.6	1.2	1.1	0.6				
	Velocity	1.8	1.91	2.29	1.37	1.49	1.77	1.08	1.18	1.35	0.95	1.04	1.23	0.89	0.75	0.89				
	Static Pressure	1.49	1.99	2.74	1.0	1.25	1.74	0.25	0.5	0.75	0.25	0.5	0.75	0.5	0.75	1.0				
35	Throw	4.8	4.2	2.7	4.2	3.6	2.4	3.6	3	2.1	3.9	3.6	2.1	3	2.7	1.8				
	Drop	1.3	1.2	0.6	1.3	1.2	0.6	1.3	1.2	0.6	1.4	1.3	0.7	1.4	1.3	0.5				
	Velocity	2.65	2.89	3.42	2.06	2.24	2.66	1.63	1.78	2.11	1.44	1.57	1.86	1.04	1.14	1.35				
	Static Pressure	2.99	3.74	5.98	1.99	2.49	3.99	1.0	1.25	1.99	1.0	1.25	1.99	0.75	1.0	1.49				
45	Throw	6.4	5.7	3.6	5.4	4.8	3	4.8	4.2	2.7	4.5	3.9	2.7	3.6	3.3	2.1	3.3	3	1.8	
	Drop	1.4	1.4	0.6	1.5	1.4	0.7	1.5	1.4	0.7	1.5	1.4	0.7	1.4	1.4	0.7	1.6	1.5	0.5	
	Velocity	3.95	3.85	4.58	2.75	3	3.56	2.18	2.38	2.83	1.92	2.1	2.5	1.4	1.52	1.81	1.18	1.29	1.54	
	Static Pressure	5.23	6.73	10.46	3.24	4.24	6.98	1.74	2.24	3.74	1.74	2.24	3.49	1.0	1.25	1.99	0.75	1.0	1.49	
60	Throw	7.3	6.4	4.2	6.7	5.7	3.6	5.7	5.1	3.3	5.4	4.8	3	4.5	3.9	2.4	3.9	3.6	2.1	
	Drop	1.5	1.4	0.7	1.6	1.4	0.8	1.6	1.4	0.8	1.6	1.5	0.8	1.6	1.4	0.8	1.7	1.6	0.8	
	Velocity	4.42	4.82	5.71	3.45	3.76	4.45	2.73	2.98	3.54	2.41	2.62	3.11	1.75	1.91	2.27	1.48	1.62	1.92	
	Static Pressure	7.97	10.46	16.19	4.98	6.48	10.21	2.49	3.24	5.23	2.49	3.24	4.98	1.25	1.74	2.49	1.0	1.25	1.99	
70	Throw	8.5	7.6	4.8	7.9	7	4.5	7	6	3.9	6.4	5.7	3.6	6.4	4.8	3	4.8	4.2	2.7	
	Drop	1.5	1.4	0.7	1.6	1.5	0.8	1.7	1.6	0.8	1.8	1.6	0.9	1.6	1.6	0.8	1.8	1.7	0.9	
	Velocity	5.31	5.79	6.85	4.14	4.51	5.34	3.29	3.58	4.24	2.9	3.15	3.74	2.11	2.3	2.73	1.79	1.95	2.31	
	Static Pressure	11.71	14.89	22.91	6.98	9.22	14.69	3.49	4.74	7.47	3.24	4.24	6.73	1.74	2.24	3.74	1.25	1.74	2.49	
80	Throw	9.7	8.5	5.4	8.8	7.9	4.8	7.9	7	4.5	7.3	6.4	4.2	6	5.4	3.3	5.7	5.1	3.3	
	Drop	1.6	1.5	0.8	1.7	1.6	0.8	1.7	1.6	0.9	1.8	1.7	0.9	1.8	1.7	0.9	1.9	1.8	0.9	
	Velocity	6.2	6.76	8.01	4.83	5.26	6.24	3.84	4.18	4.96	3.38	3.69	4.36	2.46	2.68	3.19	2.09	2.28	2.7	
	Static Pressure	15.19	19.92	31.13	9.22	12.2	19.43	4.74	6.23	10.46	4.49	5.98	9.47	2.24	2.99	4.98	1.49	1.99	3.24	
95	Throw	11.2	10	6.4	9.7	8.5	5.4	8.8	7.9	4.8	8.2	7.3	4.5	7	6	3.9	6.4	5.7	3.6	
	Drop	1.7	1.6	0.8	1.8	1.7	0.9	1.8	1.7	0.9	1.9	1.8	0.9	1.9	1.8	0.9	2	1.8	1	
	Velocity	7.12	7.73	9.19	5.53	6.02	7.13	4.39	4.78	5.17	3.87	4.21	4.99	2.82	3.07	3.65	2.39	2.6	3.09	
	Static Pressure	19.67	25.65	40.34	12.2	16.19	26.15	6.23	8.47	13.95	5.73	7.47	12.2	2.74	3.74	5.98	1.99	2.74	4.24	
105	Throw	12.1	10.6	7	10.6	9.4	6	10	8.8	5.7	8.8	7.9	4.8	7.6	6.7	4.2	7.3	6.4	4.2	
	Drop	1.8	1.7	0.9	1.8	1.7	0.9	1.9	1.7	0.9	2	1.9	0.9	2	1.9	1	2.1	1.9	1	
	Velocity	7.98	8.69	10.3	6.22	6.78	8.02	4.94	5.38	6.38	4.35	4.74	5.62	3.17	3.46	4.1	2.69	2.93	3.48	
	Static Pressure	24.9	32.62	51.05	15.15	20.17	32.13	7.72	10.46	17.19	7.23	9.47	15.19	3.49	4.74	7.72	2.74	3.74	5.98	
120	Throw	13.4	11.8	7.6	11.8	10.6	6.7	10.6	9.4	6	9.7	8.5	5.4	8.5	7.6	4.8	8.2	7.3	4.5	
	Drop	1.8	1.7	0.9	1.9	1.8	0.9	1.9	1.8	0.9	2.1	2.0	1	2.1	2.0	1	2.2	2.1	1	
	Velocity	8.47	9.66	11.45	6.92	7.54	8.93	5.49	5.98	6.45	4.84	5.28	6.24	3.53	3.84	4.56	2.99	3.26	3.87	
	Static Pressure	30.63	40.09	63.0	18.68	24.66	38.1	9.47	12.7	21.17	8.97	11.96	19.38	4.24	5.73	9.47	3.24	4.49	7.23	
130	Throw				12.8	11.2	7.3	11.2	10	6.4	10.6	9.4	6	9.1	8.2	5.1	8.8	7.9	4.8	
	Drop				2	1.8	0.9	2	1.9	0.9	2.1	2	1	2.2	2	1	2.2	2.1	1	
	Velocity				7.61	8.29	9.8	6.04	6.58	7.78	5.33	5.8	6.88	3.88	4.23	5.02	3.29	3.58	4.26	
	Static Pressure				22.66	29.88	46.31	11.46	15.44	25.65	10.71	14.2	22.91	4.98	6.73	11.21	3.74	4.98	8.47	
140	Throw				13.7	12.1	7.9	12.1	10.6	7	11.5	10.3	6.7	9.7	8.5	5.4	9.4	8.2	5.4	
	Drop				2	1.9	1	2	1.9	1	2.2	2	1	2.3	2.2	1.1	2.3	2.2	1.1	
	Velocity				8.31	9.04	10.73	6.59	7.28	8.51	5.81	6.33	7.51	4.24	4.62	5.48	3.59	3.91	4.63	
	Static Pressure				26.9	35.61	56.78	13.45	18.18	30.13	12.7	16.94	27.15	6.23	8.47	14.2	4.49	5.98	10.21	
155	Throw							13.1	11.5	7.3	12.1	10.6	7	10.3	9.1	5.7	10	8.8	5.7	
	Drop							2.1	2	1	2.2	2	1	2.3	2.2	1.1	2.3	2.2	1.1	
	Velocity							7.14	7.78	9.2	6.3	6.86	8.11	4.99	5.49	6.53	3.89	4.24	5.03	
	Static Pressure							15.49	21.17	35.36	14.7	19.43	31.13	7.23	9.96	16.44	5.23	7.23	11.96	
165	Throw							14.6	12.8	8.2	13.1	11.5	7.3	10.9	9.7	6	10.6	9.4	6	
	Drop							2.1	2	1	2.2	2.1	1	2.3	2.2	1.1	2.3	2.2	1.1	
	Velocity							7.7	8.38	9.68	6.79	7.39	8.77	4.95	5.39	6.4	4.2	4.57	5.42	
	Static Pressure							18.18	24.66	40.84	17.19	22.91	36.85	8.22	11.21	18.68	5.98	8.22	13.7	
175	Throw							15.5	13.7	8.8	13.7	12	7.6	11.4	10	6.6	11.1	10	6.3	
	Drop							2.2	2	1	2.2	2.1	1	2.4	2.3	1.1	2.4	2.3	1.1	
	Velocity							8.25	8.98	10.66	7.27	7.92	9.36	5.3	5.78	6.84	4.5	4.9	5.8	
	Static Pressure							20.92	28.39	47.07	16.68	22.35	36.13	9.47	12.95	21.67	6.73	9.22	15.44	
190	Throw							16.6	14.8	9.4	14.2	12.8	8.2	12	10.5	7	12	10.5	7	
	Drop							2.2	2.1	1	2.3	2.2	1.1	2.4	2.3	1.2	2.5	2.4	1.2	
	Velocity							8.8	9.58	11.35	7.76	8.45	9.82	5.66	6.16	7.31	4.8	5.23	6.19	
	Static Pressure							23.66	32.13	53.04	22.17	29.39	47.56	10.71	14.7	24.41	7.72	10.46	17.68	
210	Throw																13.3	11.7	7.6	13
	Drop																2.5	2.4	1.2	2.6
	Velocity																6.37	6.94	8.21	5.4
	Static Pressure																13.45	18.43	30.88	9.47
235	Throw																14.5	12.7	8.2	14
	Drop																2.6	2.4	1.2	2.6
	Velocity																7.08	7.71	9.13	6
	Static Pressure																16.69	22.91	38.6	11.71
260	Throw																			

ACPAR AIR DIFFUSION EQUIPMENT

PERFORMANCE DATA

WALL SUPPLY GRILLES — MODEL WS — DOUBLE DEFLECTION

FLOW l/sec.	NOM. SIZE mm	400 x 150 300 x 200 600 x 100			450 x 150 350 x 200			500 x 150 750 x 100			400 x 200 550 x 150			600 x 150 450 x 200			500 x 200 650 x 150		
		0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°
	Throw																		
	Drop																		
	Velocity																		
	Static Pressure																		
45																			
60																			
70		4.2	3.6	2.4	4.2	3.6	2.4												
		1.7	1.6	0.8	2.0	1.8	0.9												
		1.92	1.66	1.07	1.37	1.49	1.77												
		1.0	1.35	1.99	0.75	1.0	1.25												
80		4.8	4.2	2.7	4.8	4.2	2.7	4.5	3.9	2.4	4.2	3.6	2.4						
		1.8	1.7	0.9	2.0	1.9	1.0	2.2	2.1	1.0	1.8	1.7	0.9						
		1.78	1.94	2.3	1.61	1.75	2.02	1.0	1.08	1.28	1.31	1.43	1.09						
		1.25	1.74	2.74	1.0	1.25	1.99	0.75	1.0	1.49	1.0	1.25	1.99						
95		5.6	4.8	3.0	5.5	4.8	3.3	5.1	4.5	3.0	4.5	3.9	2.4	4.2	3.6	2.4	3.6	3.3	2.1
		1.9	1.8	0.9	2.1	2.0	1.0	2.2	2.1	1.0	2.0	1.8	0.9	3.0	2.7	1.4	2.1	1.9	1.0
		2.04	2.22	2.64	1.83	2.0	2.37	1.14	1.24	1.47	1.5	1.63	1.94	1.35	1.47	1.74	1.18	1.28	1.53
		1.49	1.99	3.24	1.25	1.74	2.49	1.0	1.25	1.99	1.0	1.25	1.99	0.75	1.0	1.49	0.75	1.0	1.49
105		6.0	5.4	3.3	6.0	5.4	3.3	5.4	5.1	3.0	4.8	4.2	2.7	4.5	3.9	2.4	3.9	3.6	2.1
		2.0	1.9	1.0	2.2	2.0	1.0	2.3	2.1	1.0	2.1	1.9	1.0	2.91	2.7	1.4	2.1	2.0	1.0
		2.3	2.5	2.97	2.06	2.25	2.66	1.35	2.01	2.39	1.69	1.84	2.18	1.52	1.65	1.97	1.33	1.45	1.72
		1.99	2.74	4.49	1.74	2.24	3.74	1.25	1.74	2.74	1.0	1.25	1.99	1.0	1.25	1.99	0.75	1.0	1.49
120		6.7	5.7	3.6	6.7	5.7	3.6	6.0	5.4	3.3	5.4	4.8	3.0	5.1	4.5	3.0	4.5	3.9	2.4
		2.2	2.1	1.0	2.2	2.0	1.0	2.3	2.1	1.1	2.1	2.0	1.0	3.0	2.5	1.4	2.2	2.1	1.0
		2.55	2.78	3.3	2.3	2.5	2.97	2.05	2.24	2.65	1.88	2.05	2.43	1.69	1.85	2.19	1.48	1.61	1.91
		2.24	2.99	4.98	1.99	2.74	4.49	1.49	1.99	3.24	1.25	1.74	2.74	1.25	1.74	2.74	1.0	1.25	2.24
130		7.3	6.4	4.2	7.0	6.0	3.9	6.4	5.7	3.6	6.0	5.1	3.3	5.4	4.8	3.0	5.1	4.5	3.0
		2.2	2.1	1.0	2.3	2.2	1.1	2.3	2.2	1.1	2.2	2.1	1.0	3.0	2.7	1.4	2.2	2.1	1.0
		2.81	3.06	3.63	2.53	2.75	3.26	2.26	2.47	2.93	2.07	2.25	2.67	1.86	2.03	2.41	1.63	1.78	2.11
		2.74	3.74	6.23	2.49	3.49	5.48	1.74	2.24	3.99	1.49	1.99	3.24	1.25	1.74	2.49	1.0	1.25	2.24
140		8.2	7.3	4.5	7.6	6.7	4.2	7.0	6.0	3.9	6.7	5.7	3.6	6.0	5.4	3.3	5.4	4.8	3.0
		2.3	2.2	1.1	2.4	2.2	1.1	2.4	2.2	1.1	2.3	2.2	1.1	3.0	2.7	1.4	2.3	2.1	1.1
		3.07	3.34	3.96	2.75	3.01	3.57	2.47	2.69	3.19	2.26	2.46	2.92	2.03	2.22	2.63	1.78	1.94	2.3
		3.24	4.49	7.23	2.74	3.74	6.23	2.24	2.99	4.98	1.74	2.49	3.99	1.49	1.99	3.24	1.24	1.49	2.49
155		8.8	7.9	4.8	8.2	7.3	4.5	7.6	6.7	4.2	7.0	6.4	3.9	6.7	5.7	3.6	5.7	5.1	3.3
		2.4	2.3	1.1	2.4	2.3	1.1	2.4	2.3	1.1	2.4	2.3	1.1	3.0	2.7	1.4	2.4	2.2	1.1
		3.33	3.63	4.3	2.99	3.26	3.87	2.68	2.92	3.46	2.45	2.67	3.17	2.2	2.4	2.85	1.93	2.1	2.49
		3.74	4.98	8.47	3.24	4.49	7.47	2.49	3.49	5.73	1.99	2.74	4.49	1.74	2.24	3.99	1.25	1.49	2.74
165		9.4	8.2	5.1	8.8	7.6	4.8	8.2	7.3	4.5	7.6	6.7	4.2	7.0	6.0	3.9	6.4	5.7	3.6
		2.5	2.3	1.2	2.4	2.3	1.2	2.5	2.3	1.2	2.5	2.3	1.2	3.0	2.8	1.4	2.5	2.3	1.2
		3.58	3.9	4.63	3.22	3.51	4.16	2.88	3.14	3.73	2.64	2.87	3.41	2.38	2.59	3.07	2.08	2.25	2.69
		4.24	5.73	9.72	3.49	4.74	7.97	2.74	3.74	6.48	1.99	2.99	5.23	1.99	2.74	4.49	1.49	1.99	3.24
175		9.7	8.5	5.4	9.4	8.2	5.4	8.5	7.6	4.8	8.2	7.0	4.5	7.3	6.4	4.2	6.7	6.0	3.6
		2.5	2.4	1.2	2.5	2.3	1.2	2.6	2.4	1.2	2.6	2.4	1.2	3.0	2.8	1.4	2.6	2.4	1.2
		3.84	4.19	4.96	3.46	3.76	4.47	3.09	3.37	3.99	2.83	3.08	3.65	2.55	2.78	3.28	2.23	2.43	2.88
		4.98	6.73	11.46	3.99	5.48	9.22	3.24	4.49	7.47	2.49	3.49	5.73	2.24	2.99	4.98	1.49	1.99	3.24
190		10.3	9.1	5.7	9.7	8.5	5.4	9.1	8.2	5.1	8.5	7.6	4.8	7.9	7.0	4.5	7.3	6.4	4.2
		2.6	2.4	1.2	2.6	2.4	1.2	2.6	2.4	1.2	2.6	2.4	1.2	3.0	2.8	1.4	2.6	2.4	1.2
		4.1	4.46	5.29	3.69	4.02	4.53	3.3	3.99	4.25	3.02	3.29	3.9	2.72	2.95	3.52	2.38	2.59	3.07
		5.48	7.47	12.7	4.49	6.23	10.41	3.74	5.23	8.72	2.99	4.24	6.98	2.49	3.49	5.73	1.74	2.49	3.99
210		11.5	10.3	6.7	10.9	9.7	6.0	10.3	9.8	5.7	9.4	8.2	5.4	8.8	7.9	4.8	7.9	7.0	4.5
		2.6	2.4	1.3	2.7	2.5	1.3	2.8	2.5	1.3	2.7	2.6	1.3	3.0	2.8	1.4	2.7	2.5	1.3
		4.61	5.03	5.95	4.15	4.52	5.35	3.71	4.04	4.79	3.4	3.7	4.39	3.06	3.34	3.96	2.68	2.92	3.46
		6.73	9.22	15.44	5.73	7.97	13.2	4.49	6.23	10.71	3.74	5.23	8.97	3.24	4.49	7.23	1.74	2.49	3.99
235		12.5	10.9	7.0	12.1	10.9	7.0	10.9	9.7	6.0	10.3	9.1	5.7	9.7	8.5	5.4	8.8	7.9	4.8
		2.7	2.5	1.3	2.8	2.6	1.4	2.8	2.6	1.4	2.8	2.6	1.4	3.0	2.8	1.4	2.8	2.6	1.4
		5.13	5.59	6.63	4.62	5.03	5.95	4.13	4.5	5.33	3.78	4.12	9.75	3.4	3.71	4.39	2.98	3.24	3.85
		8.22	11.21	19.17	6.98	9.72	16.19	5.48	7.47	13.2	4.49	6.23	10.71	3.74	5.23	8.72	2.74	3.49	6.48
260		13.4	11.8	7.6	13.1	11.5	7.3	11.8	10.6	6.7	11.2	10.0	6.4	10.6	9.4	6.0	9.7	8.5	5.4
		2.8	2.6	1.3	2.9	2.7	1.4	2.9	2.7	1.4	2.9	2.7	1.4	3.0	2.8	1.4	3.0	2.7	1.4
		5.66	6.15	7.29	5.08	5.53	6.55	4.54	4.95	5.87	4.16	4.53	5.37	3.75	4.08	4.84	3.28	3.57	4.23
		9.96	13.7	23.16	8.22	11.71	19.17	6.73	9.22	16.19	5.23	7.23	12.7	4.49	6.23	10.71	3.24	4.49	7.72
280		14.6	12.8	8.2	14.0	12.1	7.9	12.8	11.2	7.3	11.8	10.6	6.7	11.5	10.3	6.7	10.6	9.4	6.0
		2.9	2.7	1.4	3.0	2.7	1.4	3.0	2.8	1.4	2.9	2.7	1.4	3.0	2.8	1.4	3.1	2.9	1.5
		6.16	6.71	7.95	5.54	6.04	7.14	4.96	5.4	6.4	4.54	4.94	5.87	4.09	4.45	5.28	3.58	3.9	4.62
		11.71	16.19	27.39	9.96	13.7	23.41	7.97	10.96	19.17	6.23	8.72	15.19	5.73	7.47	12.95	3.99	5.23	9.72
305		15.5	13.7	8.8	14.6	12.8	8.2	13.7	12.0	7.8	13.0	11.5	7.2	12.5	10.8	7.3	11.5	10.0	6.7
		3.0	2.8	1.4	3.0	2.8	1.4	3.1	2.8	1.4	3.0	2.8	1.4	3.1	2.9	1.4	3.2	3.0	1.5
		6.67	7.27	8.63	6.01	6.54	7.75	5.37	5.95	6.93	4.92	5.35	6.35	4.43	4.83	5.72	3.88	4.22	5.01
		13.94	19.17	32.62	11.46	15.94	26.89	9.22	12.7	22.16	7.47	10.46	18.18	8.23	11.72	14.69	4.49	6.23	10.96

ORDERING PROCEDURE : REFER TO PAGE 623 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

ACPAR AIR DIFFUSION EQUIPMENT

PERFORMANCE DATA

WALL SUPPLY GRILLES — MODEL WS — DOUBLE DEFLECTION

FLOW l/sec.	NOM. SIZE mm	750 x 150 450 x 250			600 x 200 500 x 250			900 x 150 450 x 300			750 x 200 600 x 250			900 x 200 700 x 250			750 x 250 600 x 300		
		0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°
330	Throw	11.2	10.6	6.4	10.9	9.76	6.1	10.3	9.1	5.7	9.4	8.2	5.4	8.23	7.3	4.5	7.9	7.0	4.5
	Drop	3.20	3.0	1.6	3.3	3.0	1.6	3.7	3.5	1.8	3.3	3.1	1.6	4.4	4.1	2.2	3.3	3.1	1.6
	Velocity	3.79	4.13	4.9	3.47	3.77	4.47	3.15	3.63	4.06	2.75	3.01	3.58	2.27	2.48	3.01	2.17	2.37	2.80
	Static Pressure	4.49	6.24	10.71	3.49	4.99	8.47	3.24	4.48	8.22	2.49	3.49	6.23	1.74	2.49	4.23	1.25	1.74	3.24
355	Throw	12.2	10.6	7.0	11.5	10.3	6.7	11.2	10.0	6.4	10.6	8.8	5.7	8.8	7.9	4.8	8.2	7.3	4.5
	Drop	3.3	3.1	1.6	3.3	3.1	1.6	3.7	3.5	1.9	3.3	3.1	1.6	4.4	4.2	2.2	3.4	3.2	1.7
	Velocity	4.06	4.42	5.23	3.71	4.04	4.79	3.38	3.9	4.35	2.95	3.23	3.83	2.44	2.66	3.15	2.33	2.53	3.0
	Static Pressure	5.23	7.22	12.7	4.0	5.74	9.72	3.74	5.23	9.22	2.74	3.74	6.73	1.99	2.74	4.73	1.49	2.24	3.58
375	Throw	13.1	11.5	7.6	12.5	10.9	7.3	11.8	10.6	7.0	10.6	9.4	6.1	9.4	8.2	5.4	8.8	7.9	4.8
	Drop	3.3	3.1	1.7	3.4	3.2	1.7	3.7	3.5	1.9	3.4	3.2	1.7	4.4	4.2	2.2	3.5	3.3	1.7
	Velocity	4.33	4.7	5.59	3.95	4.31	5.1	3.63	4.15	4.66	3.15	3.45	4.1	2.6	2.85	3.37	2.48	2.7	3.21
	Static Pressure	5.73	7.98	13.45	4.48	6.23	10.95	4.23	5.98	10.46	2.99	4.23	7.22	2.24	3.24	5.48	1.49	2.24	3.58
400	Throw	13.7	12.2	7.9	13.1	11.5	7.6	12.5	10.9	7.3	11.2	10.0	6.4	9.7	8.5	5.4	9.4	8.2	5.4
	Drop	3.4	3.2	1.7	3.5	3.3	1.7	3.8	3.5	1.9	3.5	3.2	1.7	4.4	4.1	2.2	3.5	3.3	1.7
	Velocity	4.62	5.02	5.97	4.21	4.59	5.43	3.89	4.51	5.02	3.41	3.71	4.41	2.81	3.06	3.63	2.68	2.93	3.45
	Static Pressure	6.47	8.96	16.93	5.23	7.47	12.95	4.73	6.72	11.7	3.24	4.48	7.97	2.49	3.49	5.98	1.74	2.49	4.23
425	Throw	14.0	12.5	7.9	13.4	11.89	7.6	13.1	11.5	7.6	11.5	10.3	6.7	10.3	9.1	5.7	10.0	8.8	5.7
	Drop	3.5	3.3	1.7	3.6	3.5	1.8	3.8	3.6	1.9	3.6	3.4	1.7	4.4	4.1	2.2	3.6	3.3	1.7
	Velocity	4.96	5.38	6.38	4.53	4.94	5.85	4.12	4.75	5.32	3.62	3.94	4.68	2.98	3.24	3.86	2.84	3.1	3.66
	Static Pressure	7.22	9.95	17.18	5.73	8.22	14.19	5.23	7.47	12.95	3.74	5.23	9.21	2.74	3.98	6.72	1.99	2.99	5.23
470	Throw	15.5	13.7	8.8	14.9	13.1	8.5	14.3	12.8	8.2	12.8	11.2	7.3	11.5	10.3	6.7	10.3	9.1	5.7
	Drop	3.6	3.4	1.8	3.7	3.5	1.8	3.8	3.6	1.9	3.7	3.5	1.8	4.4	4.1	2.2	3.7	3.4	1.8
	Velocity	5.5	5.98	7.1	5.03	5.49	6.5	4.58	5.28	5.92	4.02	4.38	5.18	3.3	3.6	4.28	3.15	3.44	4.06
	Static Pressure	8.96	12.7	21.91	6.97	10.21	17.43	6.23	8.96	15.44	4.48	6.47	11.21	3.24	4.48	7.97	2.49	3.49	6.97
520	Throw	16.7	14.9	9.7	16.1	14.3	9.1	15.5	13.7	8.8	13.4	11.8	7.6	12.5	10.9	7.3	11.2	10.0	6.4
	Drop	3.7	3.5	1.8	3.8	3.6	1.9	3.9	3.7	1.9	3.9	3.7	1.9	4.5	4.2	2.2	3.8	3.5	1.9
	Velocity	6.06	6.6	7.82	5.54	6.02	7.15	5.04	5.64	6.5	4.42	4.82	5.72	3.64	3.98	4.7	3.46	3.78	4.46
	Static Pressure	10.71	14.94	25.9	8.47	11.96	21.18	7.47	10.71	18.68	5.48	7.72	13.7	3.98	5.73	9.96	2.99	4.48	8.22
565	Throw	17.9	16.8	10.3	17.3	15.2	10.0	16.7	14.9	9.7	15.2	13.4	8.5	13.4	11.8	7.6	11.8	10.6	7.0
	Drop	3.8	3.6	1.9	3.9	3.7	1.9	4.0	3.8	1.9	4.0	3.8	2.0	4.5	4.1	2.2	3.9	3.6	1.9
	Velocity	6.62	7.2	8.54	6.06	6.58	7.8	5.5	6.36	7.1	4.84	5.26	6.22	3.98	4.32	5.14	3.76	4.11	4.88
	Static Pressure	12.95	18.18	31.13	9.97	14.19	25.16	8.96	12.95	22.66	6.23	8.96	15.69	4.48	6.47	11.21	3.49	5.23	9.46
610	Throw	19.2	17.0	10.8	18.6	16.4	10.5	17.9	15.8	10.3	16.4	14.6	9.4	14.3	12.7	8.2	13.1	11.4	7.6
	Drop	3.9	3.7	1.9	4.0	3.8	1.9	4.1	3.9	2.0	4.1	3.9	2.0	4.5	4.1	2.2	4.0	3.7	1.9
	Velocity	7.16	7.8	9.22	6.56	7.14	8.46	5.99	6.88	7.72	5.24	5.70	6.74	4.3	4.7	5.56	4.1	4.46	5.28
	Static Pressure	15.29	21.17	36.85	11.7	16.88	29.38	10.46	15.79	26.39	7.47	10.71	18.92	5.23	7.47	12.7	4.23	6.23	11.45
660	Throw	20.2	17.8	11.5	19.7	17.6	11.2	18.9	16.7	10.5	17.6	15.5	10.0	15.4	13.7	8.8	14.3	12.8	8.2
	Drop	4.0	3.8	1.9	4.0	3.8	2.0	4.1	3.9	2.0	4.2	4.0	2.1	4.5	4.1	2.2	4.1	3.9	2.0
	Velocity	7.7	8.42	9.96	7.06	7.68	9.11	6.41	7.42	8.29	5.64	6.12	7.28	4.64	5.06	6.0	4.42	4.8	5.7
	Static Pressure	17.68	24.4	42.08	13.45	19.17	33.62	12.2	17.68	30.89	8.72	12.45	22.16	6.23	8.96	15.94	5.23	7.47	13.45
705	Throw	21.2	18.8	12.0	20.6	18.2	11.5	20.0	17.6	11.2	18.6	16.4	10.6	16.4	14.6	9.4	15.5	13.7	8.8
	Drop	4.1	3.9	2.0	4.1	3.9	2.0	4.2	4.0	2.1	4.3	4.0	2.1	4.5	4.1	2.2	4.3	4.0	2.1
	Velocity	8.27	9.0	10.66	7.55	8.23	9.76	6.88	7.95	8.9	6.02	6.56	7.78	4.98	5.42	6.42	4.72	5.18	6.1
	Static Pressure	20.17	28.64	48.56	15.44	21.91	38.84	13.94	20.17	35.36	9.96	14.19	25.4	6.97	9.96	17.68	5.73	8.72	15.44
755	Throw	22.4	19.8	12.8	21.8	19.5	12.5	21.0	18.6	11.7	19.5	17.3	10.9	17.3	15.2	10.0	16.6	14.9	9.7
	Drop	4.1	3.9	2.0	4.2	4.0	2.0	4.3	4.1	2.1	4.4	4.1	2.2	4.5	4.2	2.2	4.4	4.1	2.2
	Velocity	8.82	9.6	11.37	8.05	8.79	10.41	7.35	8.47	9.49	6.43	7.02	8.32	5.3	5.78	6.86	5.04	5.5	6.5
	Static Pressure	22.91	31.62	55.03	17.43	25.15	43.82	15.69	22.66	39.84	11.45	16.43	29.13	7.97	11.45	20.17	6.47	9.71	17.43
800	Throw	23.6	21.0	13.4	23.0	20.3	13.1	22.2	19.7	12.8	20.4	17.9	11.4	18.2	16.1	10.3	17.6	15.5	10.0
	Drop	4.2	4.0	2.1	4.3	4.0	2.1	4.4	4.1	2.2	4.5	4.2	2.2	4.5	4.2	2.2	4.5	4.2	2.2
	Velocity	9.38	10.22	12.12	8.56	9.36	11.06	7.8	9.02	10.00	6.84	7.45	8.84	5.64	6.16	7.27	5.36	5.84	6.92
	Static Pressure	25.65	35.86	62.0	19.67	28.14	49.3	17.68	25.4	44.32	12.7	18.18	32.37	8.96	12.95	23.16	7.47	10.96	18.68
850	Throw	25.3	22.4	14.2	24.3	21.5	13.7	23.1	20.4	13.1	21.6	19.2	12.5	19.5	17.3	10.9	18.6	16.4	10.6
	Drop	4.3	4.0	2.1	4.3	4.0	2.1	4.4	4.1	2.2	4.5	4.2	2.2	4.6	4.3	2.3	4.6	4.3	2.3
	Velocity	9.92	10.8	12.8	9.08	9.88	11.72	8.26	9.53	10.66	7.24	7.9	9.36	5.98	6.5	7.72	5.68	6.18	7.32
	Static Pressure	28.64	39.84	69.47	21.91	31.37	55.28	19.92	28.64	49.88	14.19	20.42	36.11	9.96	14.44	25.65	8.72	11.95	21.41
895	Throw																		
	Drop																		
	Velocity																		
	Static Pressure																		
940	Throw																		
	Drop																		
	Velocity																		
	Static Pressure																		

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ORDERING PROCEDURE : REFER TO PAGE 623 AND QUOTE CATALOGUE NO. OF ITEM REQUIRED

ACPAR AIR DIFFUSION EQUIPMENT

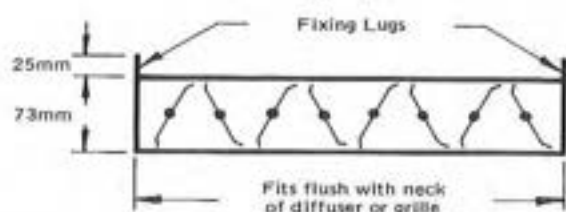
PERFORMANCE DATA

WALL SUPPLY GRILLES — MODEL WS — DOUBLE DEFLECTION

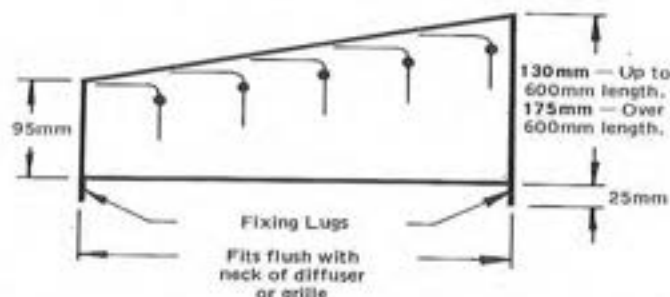
FLOW	NOM.SIZE mm	750 x 300			900 x 300			1000 x 300			1200 x 300			900 x 450			1000 x 450		
		0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°	0°	22½°	45°
330	Throw	7.0	6.1	4.0															
	Drop	3.3	3.1	1.6															
	Velocity	1.78	1.95	2.32															
	Static Pressure	1.0	1.25	2.24															
355	Throw	7.3	6.4	4.2															
	Drop	3.3	3.1	1.6															
	Velocity	1.93	2.1	2.49															
	Static Pressure	1.25	1.74	2.99															
375	Throw	7.9	7.0	4.5	6.7	5.7	3.6	6.1	5.5	3.3									
	Drop	3.4	3.2	1.6	3.7	3.5	1.8	3.7	3.5	1.8									
	Velocity	2.06	2.24	2.67	1.7	1.85	2.21	1.51	1.67	1.97									
	Static Pressure	1.25	1.74	3.0	1.0	1.50	2.24	0.75	1.0	1.74									
400	Throw	8.2	7.3	4.5	7.3	6.4	4.2	6.4	5.8	3.6									
	Drop	3.4	3.2	1.7	3.7	3.5	1.8	3.7	3.5	1.8									
	Velocity	2.18	2.38	2.83	1.8	1.97	2.34	1.61	1.76	2.1									
	Static Pressure	1.49	1.99	3.74	1.0	1.49	2.24	0.75	1.0	1.74									
425	Throw	8.8	7.9	4.9	7.6	6.7	4.2	7.0	6.1	3.9									
	Drop	3.5	3.3	1.7	3.8	3.5	1.8	3.7	3.5	1.8									
	Velocity	2.31	2.52	2.96	1.91	2.08	2.48	1.71	1.87	2.23									
	Static Pressure	1.49	1.99	3.74	1.0	1.49	2.24	1.0	1.49	2.24									
470	Throw	10.0	8.8	5.8	8.5	7.5	4.9	7.9	7.0	4.5	7.0	6.1	3.9						
	Drop	3.6	3.4	1.8	3.9	3.6	1.9	3.8	3.6	1.8	5.1	4.5	2.4						
	Velocity	2.57	2.8	3.33	2.12	2.32	2.76	1.91	2.08	2.47	1.58	1.73	2.06						
	Static Pressure	1.74	2.49	4.48	1.24	1.74	2.99	1.0	1.49	2.24	1.0	1.49	2.24						
520	Throw	10.9	9.7	6.1	9.4	8.2	5.5	8.8	7.9	4.8	7.6	6.7	4.3						
	Drop	3.8	3.6	1.9	4.0	3.7	1.9	3.8	3.6	1.9	5.1	4.9	2.5						
	Velocity	2.83	3.1	3.66	2.34	2.55	3.03	2.1	2.3	2.72	1.74	1.93	2.3						
	Static Pressure	2.24	3.24	5.73	1.49	2.24	3.74	1.24	1.74	2.99	1.0	1.24	2.24						
565	Throw	11.8	10.6	7.0	10.3	9.1	5.8	9.4	8.2	5.4	8.2	7.3	4.5	7.3	6.4	4.2	5.8	5.1	3.3
	Drop	3.9	3.7	1.9	4.1	3.8	2.0	3.9	3.7	1.9	5.1	4.8	2.5	4.5	4.4	2.2	3.4	3.2	1.6
	Velocity	3.1	3.37	4.0	2.85	3.6	3.3	2.3	2.51	2.97	1.9	2.08	2.47	1.66	1.81	2.16	1.5	1.64	1.95
	Static Pressure	2.49	3.49	6.47	1.74	2.49	4.48	1.49	2.24	3.49	1.34	1.74	2.99	1.99	2.99	5.23	1.49	2.24	3.74
610	Throw	12.5	10.9	7.3	10.9	9.7	6.1	10.0	8.8	5.8	9.1	8.2	5.1	8.2	7.3	4.5	6.7	5.8	3.6
	Drop	4.0	3.8	1.9	4.2	3.9	2.0	4.0	3.8	2.0	5.2	5.0	2.5	4.7	4.4	2.3	3.4	3.2	1.6
	Velocity	3.35	3.65	4.33	2.77	3.02	3.6	2.48	2.71	3.23	2.06	2.25	2.68	1.8	1.97	2.35	1.63	1.77	2.1
	Static Pressure	2.99	4.23	7.72	1.99	2.99	4.98	1.74	2.49	4.48	1.34	1.74	2.99	2.24	3.24	5.98	1.74	2.49	4.48
660	Throw	13.4	11.9	7.6	11.8	10.6	7.0	10.9	9.7	6.1	9.7	8.5	5.5	8.8	7.9	4.8	7.3	6.4	4.2
	Drop	4.2	4.0	2.0	4.3	4.0	2.1	4.2	4.0	2.0	5.3	4.9	2.5	4.8	4.5	2.3	3.6	3.4	1.7
	Velocity	3.61	3.93	4.66	3.0	3.26	3.86	2.68	2.92	3.47	2.22	2.43	2.89	1.94	2.12	2.52	1.75	1.91	2.28
	Static Pressure	3.49	4.98	9.21	2.25	3.24	5.73	1.99	2.74	4.98	1.49	2.49	3.74	2.49	3.74	6.72	1.99	2.99	5.23
705	Throw	14.3	12.8	8.23	12.5	10.9	10.3	11.9	10.6	7.0	10.3	9.1	5.8	9.4	8.5	5.4	7.5	7.0	4.5
	Drop	4.4	4.1	2.1	4.5	4.2	2.2	4.4	4.1	2.2	5.4	5.1	2.6	4.9	4.5	2.3	3.7	3.5	1.8
	Velocity	3.87	4.21	5.0	3.2	3.5	4.14	2.87	3.14	3.72	2.4	2.62	3.1	2.08	2.27	2.7	1.9	2.05	2.42
	Static Pressure	3.74	5.48	9.96	2.74	3.98	7.22	2.38	3.24	5.73	1.74	2.49	4.48	2.99	4.48	8.22	2.24	3.24	5.98
755	Throw	15.2	13.4	8.5	13.1	11.6	7.6	12.5	10.9	7.3	10.9	9.7	6.1	10.1	8.8	5.8	8.5	7.6	4.9
	Drop	4.5	4.2	2.2	4.6	4.3	2.3	4.5	4.2	2.2	5.5	5.1	2.7	4.9	4.6	2.4	3.7	3.5	1.8
	Velocity	4.12	4.5	5.32	3.4	3.71	4.4	3.06	3.33	3.96	2.55	2.78	3.3	2.24	2.44	2.9	2.02	2.18	2.6
	Static Pressure	4.23	6.23	11.21	2.99	4.48	7.97	2.49	3.74	6.47	1.74	2.49	4.48	3.24	4.98	8.96	2.74	3.98	7.47
800	Throw	15.8	14.0	8.8	14.0	12.5	7.9	13.1	11.6	7.6	11.6	10.3	6.7	10.6	9.4	6.1	9.1	8.2	5.1
	Drop	4.6	4.3	2.3	4.7	4.4	2.3	4.6	4.3	2.3	5.5	5.1	2.7	4.9	4.6	2.4	3.8	3.6	1.8
	Velocity	4.38	4.78	5.67	3.62	3.96	4.7	3.26	3.56	4.22	2.7	2.95	3.52	2.36	2.58	3.00	2.14	2.32	2.76
	Static Pressure	4.73	6.97	12.7	3.24	4.73	8.47	2.74	3.98	7.72	1.99	2.99	5.23	3.74	5.73	10.46	2.99	4.48	8.22
850	Throw	16.4	14.6	9.4	14.9	13.1	8.5	13.7	12.2	7.9	12.2	10.7	7.0	11.3	10.0	6.4	9.76	8.5	5.5
	Drop	4.7	4.3	2.3	4.8	4.5	2.3	4.7	4.4	2.3	5.5	5.2	2.7	5.0	4.7	2.4	3.8	3.6	1.8
	Velocity	4.65	5.06	6.0	3.8	4.19	4.97	3.44	3.76	4.46	2.87	3.12	3.72	2.52	2.74	3.26	2.26	2.45	2.92
	Static Pressure	5.48	7.97	14.69	3.74	5.48	9.96	2.99	4.48	7.97	2.24	3.24	5.73	3.98	6.23	11.21	3.24	4.98	8.96
895	Throw	17.4	15.2	10.0	15.5	13.7	8.8	14.3	12.8	8.2	12.8	11.3	7.32	11.9	10.6	7.0	10.3	9.1	5.8
	Drop	4.8	4.5	2.3	4.9	4.6	2.4	4.8	4.5	2.3	5.5	5.2	2.7	5.0	4.7	2.4	3.8	3.6	1.8
	Velocity	4.9	5.34	6.34	4.06	4.42	5.24	3.64	3.96	4.72	3.02	3.3	3.92	2.64	2.84	3.42	2.4	2.6	3.08
	Static Pressure	5.98	8.72	15.94	3.98	5.98	10.71	3.49	5.23	9.21	2.49	3.98	6.47	4.48	6.72	12.7	3.74	5.73	10.71
940	Throw				15.1	14.3	9.1	15.2	13.4	8.5	13.4	11.9	7.6	12.5	10.9	7.3	10.9	9.7	6.1
	Drop				5.1	4.8	2.4	5.0	4.7	2.4	5.6	5.3	2.7	5.0	4.7	2.4	3.8	3.6	1.8
	Velocity				4.28	4.66	5.54	3.84	4.2	4.96	3.18	3.47	4.12	2.8	3.06	3.62	2.62	2.74	3.24
	Static Pressure				4.48	6.72	11.95	3.74	5.48	9.96	2.74	4.23	7.22	4.98	7.47	14.19	3.98	5.98	10.96
1130	Throw				19.2	17.0	11.6	18.3	16.1	10.3	16.4	14.63	9.4	15.5	13.7	8.8	13.4	11.8	7.6
	Drop				5.3	5.0	2.6	5.2	4.9	2.5	5.7	5.3	2.8	5.1	4.8	2.5	3.8	3.6	1.9
	Velocity				5.14	5.6	6.62	4.62	5.02	5.96	3.82	4.18	4.96	3.36	3.66	4.34	3.02	3.28	3.9
	Static Pressure				6.23	9.21	16.93	5.24	7.72	14.2	3.74	5.48	9.96	6.98	10.72	20.18	5.73	8.47	16.19
1320	Throw				21.65	19.2	12.5	20.7	18.3	11.6	17.0	15.2	9.7	16.1	14.3	9.1	14.6	12.8	8.7
	Drop				5.7	5.4	2.7	5.3	5.0	2.6	5.8	5.5	2.8	5.2	4.9	2.5	3.8	3.5	1.9
	Velocity				5.98	6.45	7.72	5.38	5.86	6.94	4.46	4.88	5.78	3.92	4.28	5.06	3.		

ACPAR AIR DIFFUSION EQUIPMENT

OPPOSED BLADE (OB) DAMPERS — MODEL D



STREAM SPLITTER (SS) DAMPERS — MODEL V



CAT. NO.	SIZE mm		APPROX. IMPERIAL EQUIVALENT SIZE — INS.
	WIDTH	HEIGHT	

6241	300	100	12 x 4
6242	350	100	14 x 4
6243	400	100	16 x 4
6244	450	100	18 x 4

62413	300	150	12 x 6
62414	350	150	14 x 6
62415	400	150	16 x 6
62416	450	150	18 x 6
62417	500	150	20 x 6
62418	600	150	24 x 6

62426	400	200	16 x 8
62427	450	200	18 x 8
62428	500	200	20 x 8
62429	600	200	24 x 8
62430	750	200	30 x 8
62431	900	200	36 x 8

62438	400	250	16 x 10
62439	450	250	18 x 10
62440	500	250	20 x 10
62441	600	250	24 x 10
62442	750	250	30 x 10
62443	900	250	36 x 10

62451	500	300	20 x 12
62452	600	300	24 x 12
62453	750	300	30 x 12
62454	900	300	36 x 12

62463	350	350	14 x 14
62464	400	400	16 x 16
62465	500	500	20 x 20
62466	600	600	24 x 24
62467	750	750	30 x 30

CAT. NO.	SIZE mm		APPROX. IMPERIAL EQUIVALENT SIZE — INS.
	WIDTH	HEIGHT	

62476	300	100	12 x 4
62477	350	100	14 x 4
62478	400	100	16 x 4
62479	450	100	18 x 4

62488	300	150	12 x 6
62489	350	150	14 x 6
62490	400	150	16 x 6
62491	450	150	18 x 6
62492	500	150	20 x 6
62493	600	150	24 x 6

624101	400	200	16 x 8
624102	450	200	18 x 8
624103	500	200	20 x 8
624104	600	200	24 x 8
624105	750	200	30 x 8
624106	900	200	36 x 8

624113	400	250	16 x 10
624114	450	250	18 x 10
624115	500	250	20 x 10
624116	600	250	24 x 10
624117	750	250	30 x 10
624118	900	250	36 x 10

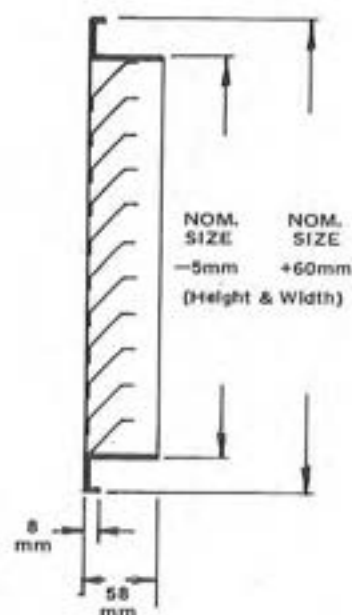
624126	500	300	20 x 12
624127	600	300	24 x 12
624128	750	300	30 x 12
624129	900	300	36 x 12

624138	350	350	14 x 14
624139	400	400	16 x 16
624140	500	500	20 x 20
624141	600	600	24 x 24
624142	750	750	30 x 30

NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

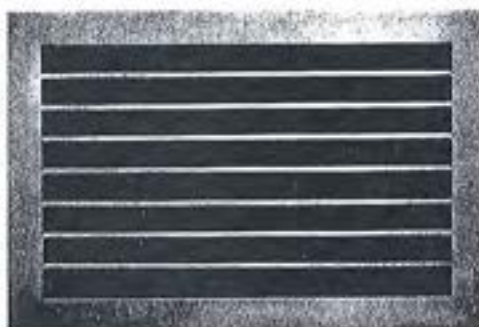
USE OUR TELEX SERVICE FOR YOUR ORDER

ACPAR AIR DIFFUSION EQUIPMENT WALL RETURN GRILLE — MODEL WR & WRH



MODEL WR : FIXED CORE

MODEL WRH : HINGED CORE WITH FILTER SLIDES



MODEL WR
FIXED CORE

MODEL WRH
HINGED CORE WITH FILTER SLIDES

CAT. NO.	SIZE		APPROX. IMPERIAL EQUIVALENT INS.
	HEIGHT	WIDTH	
6251	400	500	16 x 20
6252	400	600	16 x 24
6253	400	750	16 x 30
6254	450	450	18 x 18
6255	450	600	18 x 24
6256	450	750	18 x 30

CAT. NO.	SIZE		APPROX. IMPERIAL EQUIVALENT INS.
	HEIGHT	WIDTH	
62526	400	500	16 x 20
62527	400	600	16 x 24
62528	400	750	16 x 30
62529	450	450	18 x 18
62530	450	600	18 x 24
62531	450	750	18 x 30

PERFORMANCE DATA

VELOCITY →		1.0 m/sec		1.5 m/sec		2.0 m/sec		2.5 m/sec		3.0 m/sec	
GRILLE SIZE	FREE AREA m ²	PRESSURE DROP — PASCALS									
		5		10		17.5		27.5		40	
		l/sec	NC	l/sec	NC	l/sec	NC	l/sec	NC	l/sec	NC
300 x 300	0.053	53	—	80	—	106	—	133	20	159	27
350 x 350	0.076	76	—	114	—	152	—	190	21	228	30
400 x 400	0.103	103	—	155	—	206	14	258	22	309	31
400 x 500	0.135	135	—	203	—	270	15	338	23	405	31
400 x 600	0.167	167	—	250	—	334	16	418	24	501	32
400 x 750	0.215	215	—	322	—	430	16	538	26	645	34
400 x 900	0.324	324	—	486	—	648	18	810	28	972	35
450 x 450	0.134	134	—	201	—	268	15	335	24	402	31
450 x 500	0.152	152	—	228	—	304	16	380	24	456	32
450 x 600	0.188	188	—	282	—	376	16	470	25	564	33
450 x 750	0.242	242	—	363	—	484	18	605	26	726	34
450 x 900	0.296	296	—	444	—	592	19	740	27	888	35
500 x 400	0.129	129	—	194	—	258	15	323	23	387	31
500 x 500	0.169	169	—	254	—	338	16	423	24	507	32
500 x 600	0.209	209	—	314	—	418	16	523	26	627	33
600 x 600	0.251	251	—	377	—	502	16	628	28	753	34
600 x 800	0.396	396	—	594	—	792	20	990	28	1188	36
600 x 1200	0.541	541	—	812	—	1082	21	1353	30	1623	38
750 x 750	0.406	406	—	609	—	812	20	1015	29	1218	36
750 x 900	0.496	496	—	744	—	992	21	1240	30	1488	37
750 x 1200	0.678	678	—	1017	—	1356	22	1695	31	2034	38
900 x 900	0.596	596	—	894	—	1192	21	1490	31	1788	38
900 x 1200	0.814	814	—	1221	—	1628	24	2035	33	2442	39
1200 x 1200	1.087	1087	—	1630	—	2174	24	2718	34	3261	40

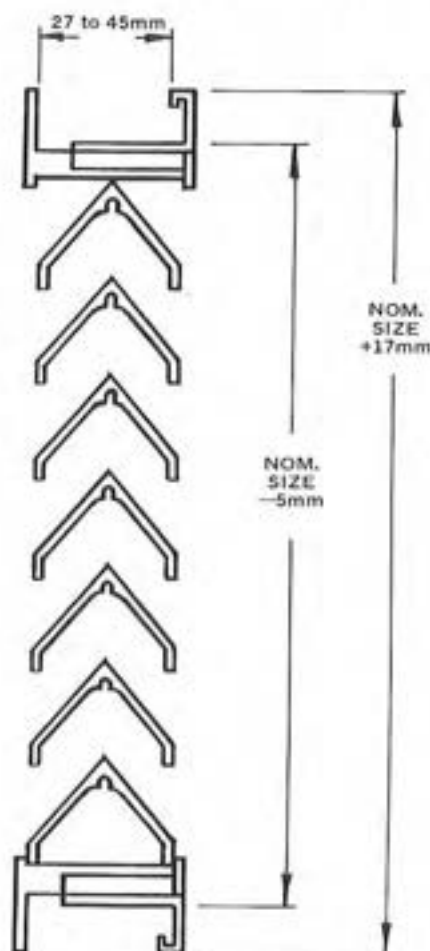
REFER ALSO TO TECH. PAGE 596-a FOR ADDITIONAL BRADY PRODUCTS.

SECTION 7

ACPAR AIR DIFFUSION EQUIPMENT

DOOR RELIEF GRILLE MODEL DT

ALUMINIUM ENAMEL FINISH



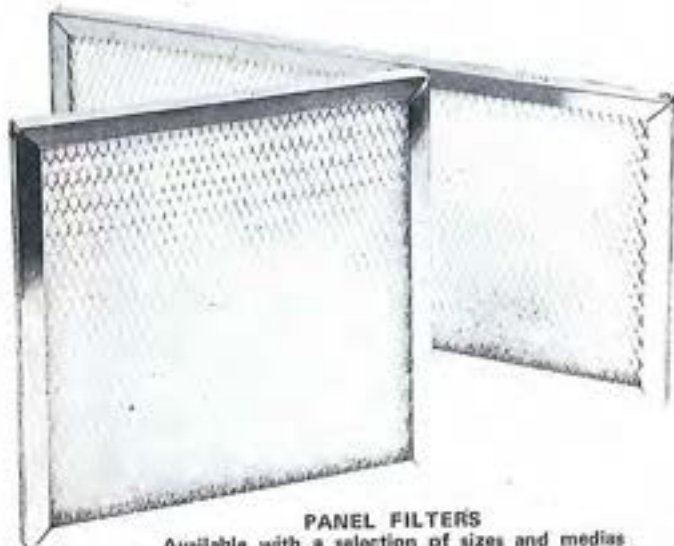
CAT. NO.	SIZE mm	FREE AREA m ³	FACE VELOCITY — m/s			
			0.5	1.0	1.5	2.0
			PRESSURE — Pascal			
			1.7	9	19	38
			CAPACITY — litre/sec.			
6267	450 x 150	0.035	18	35	53	70
6268	450 x 200	0.050	25	50	75	100
6269	450 x 300	0.083	42	83	125	166
6261	600 x 150	0.047	24	47	71	94
6262	600 x 200	0.069	35	69	104	138
6263	600 x 250	0.090	45	90	135	180
6264	600 x 300	0.112	56	112	168	224
6265	600 x 450	0.176	88	176	264	352
6266	600 x 600	0.240	120	240	360	480

TELEPHONE YOUR ORDER

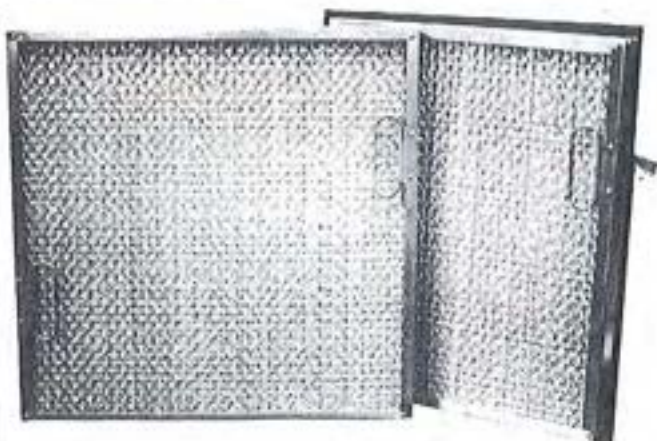
air filtration

ALFCO & ACTROL — TWO NAMES TO ASSOCIATE WITH AIR FILTRATION

Illustrated and briefly described is a wide range of filter types to suit most applications. Many of these filters are now being manufactured in Australia by Actrol. They vary from low to high (Absolute) air filtration, grease removal, frames, media and special application filters such as instrument fan filters and computer disc drive replacement filters. Comprehensive literature and technical advice is now available.



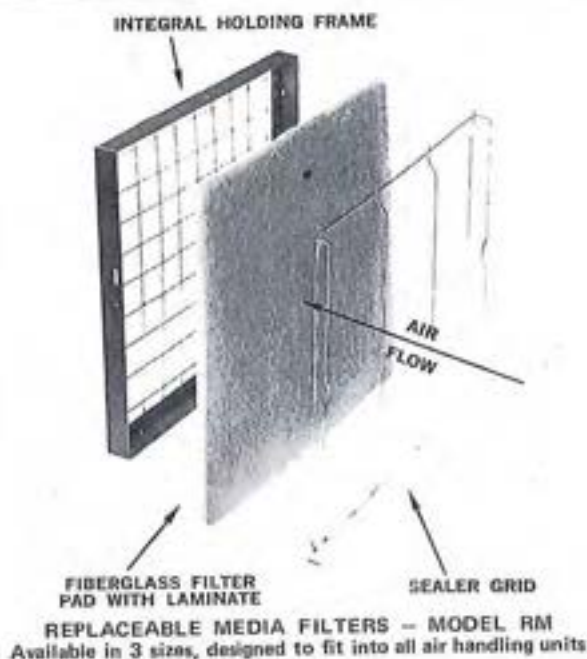
PANEL FILTERS
 Available with a selection of sizes and medias



ALL ALUMINIUM GREASE FILTERS — MODEL GF-50
 Sturdy aluminium frame construction with multiple layers of expanded aluminium media. Four basic sizes plus specials on application. Easily washable with mild detergent and hot water.



**HOLDING FRAMES
 MODEL HF**
 Wide range of sizes with depths of 25 and 50 mm. For use with all ALFCO/ACTROL washable air filters as well as standard disposable pleated filters and headed high efficiency bag filters.



REPLACEABLE MEDIA FILTERS — MODEL RM
 Available in 3 sizes, designed to fit into all air handling units

FILTER MEDIA



Synthetic washable filter media in several efficiency grades. Low air flow resistance and high dirt, dust and lint retaining ability. For heating systems, air conditioners etc.

Available in cut pads or bulk roll form.

ALFCO

Aluminum Filter Company

air filtration



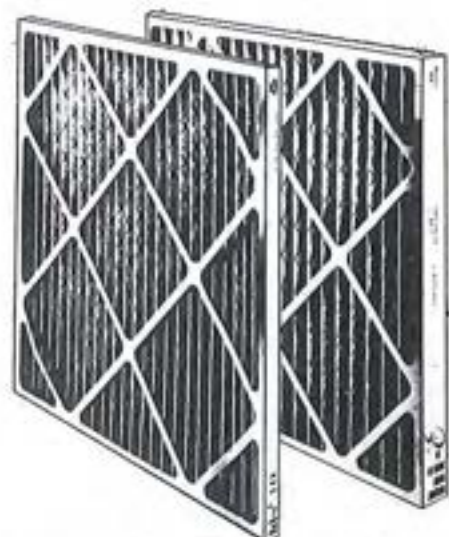
HEPA / ABSOLUTE FILTERS — MODEL 9F
High Efficiency Particulate Air filter designed for areas where maximum degree of cleanliness is required. Range of sizes and depths.



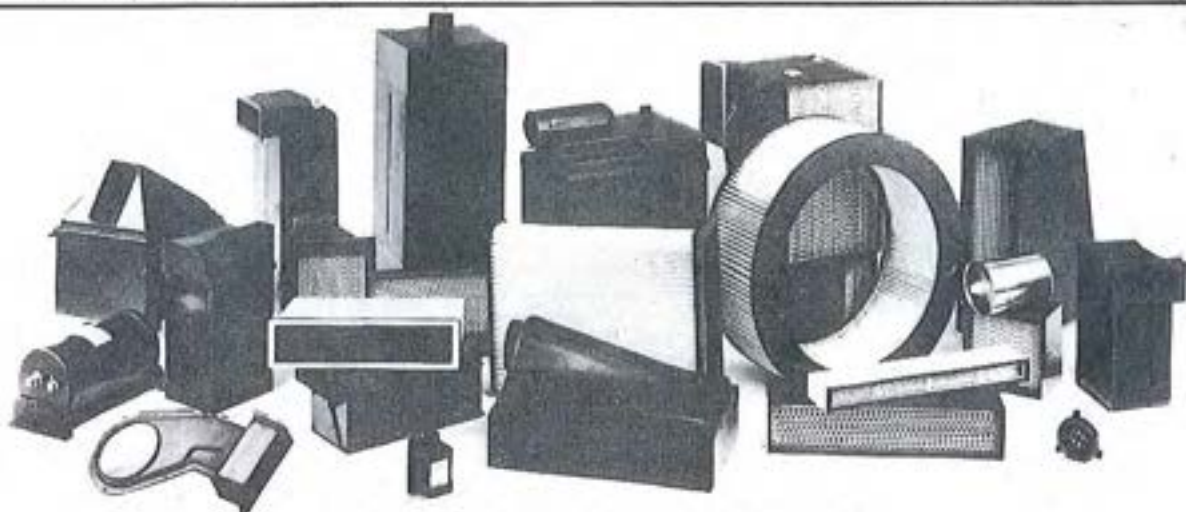
EXTENDED AREA (BAG TYPE) FILTERS
Extended area sewn type construction permits operating capacities from 470 to 1180 L/s (1000 to 2500 CFM).



INSTRUMENT FAN FILTERS
Injection moulded filter casing using a variety of filter media for use on miniature instrumentation cooling fans.



DISPOSABLE PLEATED MEDIA FILTERS
Medium and high efficiency types. Wide range of sizes in 50 and 100 mm depth.



COMPUTER DISC DRIVE REPLACEMENT FILTERS
A wide variety of types, sizes and shapes to suit every application

FOR ALL YOUR FILTER REQUIREMENTS — CONTACT ACTROL

Whatever your application, we can supply a filter to suit your specifications. Our manufacturing facilities are both modern and flexible. We invite your enquiries for any type of filter. Literature on all above types is available on application.



Electronic Air Cleaners

EMERSON

Clean air through . . . Electro-air.



At one time or another . . . Offices, bowling centres, bars, cocktail lounges, conference rooms and numerous other facilities have one thing in common: a mixture of smoke filled, stale air that causes people to become ill, their eyes to tear and induces a general feeling of discomfort.

The answer to this problem . . . An Electronic Air Cleaner manufactured by the Electro-Air Division of Emerson Electric, who, since 1954, have been refining the art of cleaning the air for offices, homes and factories.

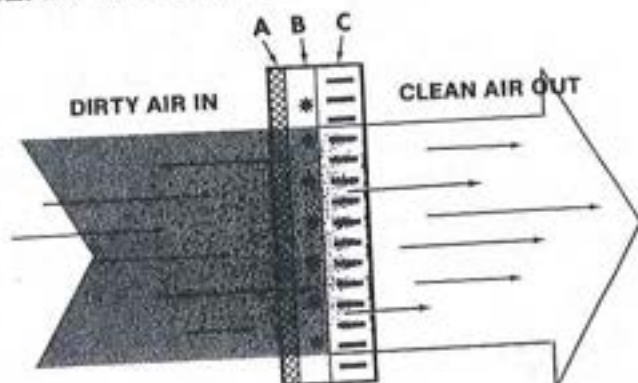
Electronic Air Cleaning is not a trick or gadget, but a time proven method of reducing the quantity of air-borne pollutants suspended in the air. Electronic Air Cleaners have been proven (by use of the U.S. National Bureau of Standards' Dust Spot Test) to be up to 9 times more efficient than standard air conditioning and heating filters.

HOW AN AIR CLEANER WORKS

Dirt laden air flowing first enters the pre-filter (A) where large particles (hair, lint, etc.) are trapped. Smaller particles (smoke, dust, pollen, etc.) pass through the pre-filter and enter the ionizing section (B). Here each tiny particle receives a positive electrical charge. These charged particles then enter the collecting section (C). This section consists of a series of aluminum plates. Alternate plates are positively charged.

The positive charge of the particles causes them to be repelled by the positive plates and attracted to the negative plates where they are collected . . . just as a magnet attracts iron filings.

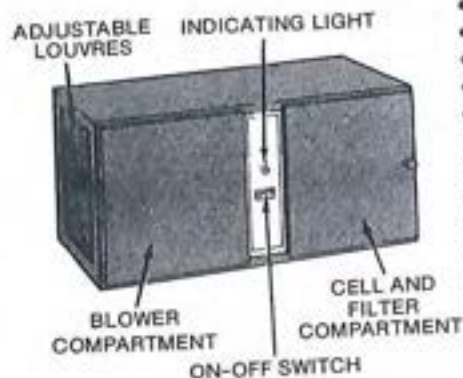
Thus, only cleaned-filtered air is exhausted from the Air Cleaner.



FOR COMFORT . . . HEALTH . . . AND PROFIT

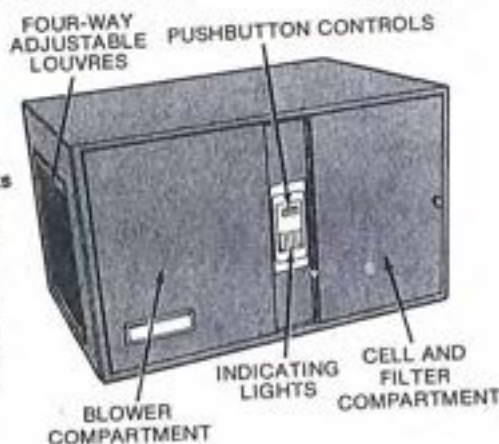
SC-1000

SC-500



- Offices and Shops
- Cocktail Lounges
- Meeting Rooms
- Restaurants
- Other Commercial Establishments

The SC-500 and SC-1000 Electronic Air Cleaners pictured in this literature have been designed for use in the applications listed above. Keep your employees happy and keep the customers coming back by establishing a better atmosphere in which they can work or relax.



MODEL SC - 500	MODEL SC - 1000
CAT. NO.	CAT. NO.

SECTION 8 — "GOLD"



AUTOMOTIVE AIR CONDITIONING INDEX



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(Complete Systems) 819/819-a

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 - Swaging 826
- Tube:
 - Benders/Cutters 826

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AUTOMOTIVE AIR CONDITIONING

SECTION 8 INDEX

ON REVERSE SIDE





INTRODUCTION

AUTOMOTIVE AIR CONDITIONING

PARTS — TOOLS — EQUIPMENT



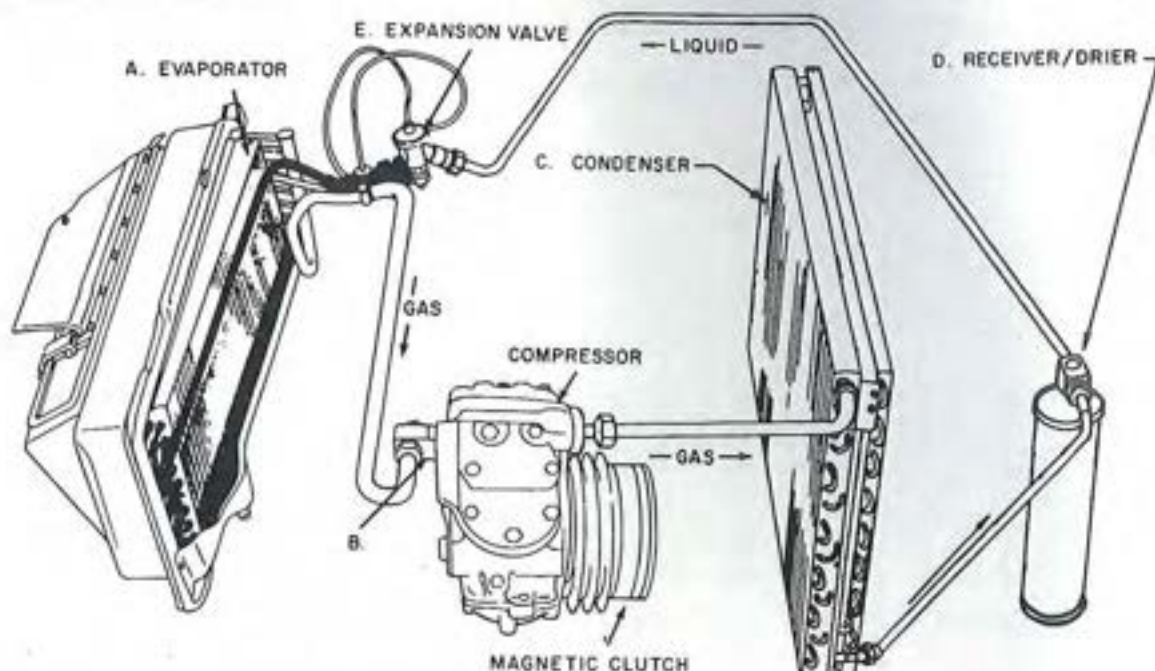
SYSTEM COMPONENTS

Automotive air conditioning system components are normally located under the hood (i.e. in the engine compartment) and in the passenger compartment under the dash board.

Most prominent of those in the engine compartment are the air conditioning refrigeration compressor, condenser coil, receiver-drier and related piping. An integral part of the compressor installation is the magnetic clutch which is driven by belt from the engine crankshaft pulley, and transmits power to the compressor whenever the air conditioning system is operated in the cooling cycle.

The condenser coil is located in front of the vehicle's radiator and because of the added cooling load the condenser coil imposes on the engine cooling system, it is normal and highly desirable to fit a larger or higher capacity radiator fan.

Inside the passenger compartment, generally mounted in a convenient position underneath the dash panel, is the evaporator unit which contains an air distribution fan (blower), evaporator coil, thermal expansion (TX) valve, air distribution ducts or grilles and related thermostat and controls. The evaporator unit also contains a condensate drain pan and tubing to carry away the moisture that condenses on the evaporator coil as the warm, moist air from inside (and/or outside) the vehicle passes through it during operation.



REFRIGERATION SYSTEM COMPONENTS (TYPICAL)

Note the schematic diagram of refrigeration components. The compressor (B) pumps heat-laden refrigerant from the evaporator (A). It compresses the refrigerant and sends it, under high pressure, to the condenser (C) as a superheated vapour. Since the high pressure vapour delivered to the condenser is much hotter than the surrounding air, it gives up its heat to the outside air flowing through the condenser fins.

As the refrigerant vapour gives up its heat, it changes to a liquid. The condensed liquid refrigerant is filtered, dried and temporarily stored, under pressure, in the receiver/drier (D) until it is needed by the evaporator.

Liquid refrigerant is metered from the receiver/drier into the evaporator by the thermostatic expansion valve (E), which controls the flow of refrigerant in this part of the system. The pressure of the refrigerant is lowered by the expansion valve and begins to boil, or change to a vapour. In so doing it must pick up heat from the warm air passing through the fins of the evaporator coil. This heat will be transmitted, via the compressor, to the condenser for dissipation and the complete cycle as described continues over and over whenever the unit is put into operation.

THE FOLLOWING PAGES DETAIL THE COMPONENTS, TOOLS AND EQUIPMENT REQUIRED FOR AUTOMOTIVE AIR CONDITIONING SYSTEMS

It is also recommended, that for a complete understanding on all aspects of automotive air conditioning, you should obtain a copy of the Imperial-Eastman "AUTOMOTIVE AIR CONDITIONING — SERVICE MANUAL", copies of which are available from all our Branches throughout Australia.

This Manual includes comprehensive Sections on :

- Basic Theory
- Description of Systems Components
- Testing Equipment
- Testing and Troubleshooting the Systems
- Performance Testing and Specifications
- Testing the System
- Compressor and Clutch Servicing
- Temperature Control Systems, etc.

CAT. NO. 327279



AUTOMOTIVE AIR CONDITIONING



Cool-Drive

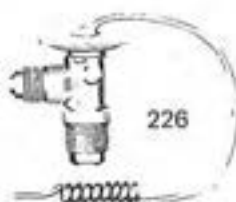
SINGER THERMOSTATIC EXPANSION VALVES



329
Block
Valve



126/226



226



Expansion Valve

002-0330 1 tonne
002-0730 1½ tonne

MAKE	CAT. NO.	Manuf. P/N	Device No.	Capacity Tons	Super-heat Setting °F	Inlet Conn. Ins.	Outlet Conn. Ins.	Press. Limit psig	Capillary Length Ins.	External Equaliser Connection Ins.	Ext. Equal. Lgth. Ins.
INTERNALLY EQUALISED											
SINGER	8001	18077	126-195	1½	9	3/8 M. Fl.	½ M. Fl.	50	12"- 3/8 Coil		
	8002	18188	226-027	2	6	3/8 M. Fl.	½ M. Fl.	52	12"- 3/8 Coil		
	8003	18394	126-108	1½	7½	3/8 M. Fl.	½ M. Fl.	45	12"- 3/8 Coil		
		18607	126-261	1½	5	3/8 O-Ring	½ O-Ring	55	8"- 3/8 Coil		
	BLOCK VALVES										
	80010	18131	329-001	1½	8	3/8 O-Ring	½ O-Ring	50			
	8009	18619	329-002	1½	5	3/8 O-Ring	½ O-Ring	50			
	8008	18620	329-003	2	8	3/8 O-Ring	½ O-Ring	50			
		18621	329-005	2	8	3/8 O-Ring	½ O-Ring	50			
		18618	329-701	1½	8	3/8 O-Ring	½ O-Ring	50			
	EXTERNALLY EQUALISED										
		18487	126-163	2	7	3/8 M. Fl.	½ M. Fl.	45	12"- 3/8 Coil	¼ Fl. Nut	16"
		18685	126-172	2	6	3/8 M.O-Ring	½ M.O-Ring	50	8"- ½ Tube	¼ O-Ring Nut F.	
		18688	126-124	1½	7	3/8 M. Fl.	½ M. Fl.	55	18"- 3/8 Coil	¼ Fl. Nut	
		18558	126-218	2	7	3/8 M.O-Ring	½ M.O-Ring	45	12"- 3/8 Coil	¼ O-Ring Nut	
	8004	18262	226-205	1½	10	3/8 M. Fl.	½ M. Fl.	60	7"- 3/8 Coil	¼ Fl. Nut	8.4"
		18524	226-210	1½	8	¼ M. Fl.	½ M. Fl.	45	12"- 3/8 Coil	¼ Fl. Nut	24"
		18558	226-218	1½	8	3/8 M. Fl.	½ M. Fl.	—	12"- 3/8 Tube	¼ Fl. Nut	12"
			226-271	1½	7	3/8 M. Fl.	½ M. Fl.	50	8"- 3/8 Coil	¼ Fl. Nut	8"
	8007	18135	226-288	1½	7	3/8 M.O-Ring	½ M.O-Ring	55	13"- 3/8 Coil	¼ O-Ring Nut	13"
	8005	18132	226-290	1½	5	3/8 M.O-Ring	½ M.O-Ring	65	15.5"	¼ O-Rg. Nut F.	9.5"
		18485	226-351 Tin Pitt.	2	13.6	3/8 M.O-Ring	½ M.O-Ring	65	11.75" Flat Tube	¼ O-Rg. Nut M.	14.36"
		18522	226-365	2	7.5	3/8 M.O-Ring	½ M.O-Ring	65	"	¼ O-Rg. Nut M.	14.36"
	80015		540	2		Suction Throttling Valve — Ext. Equal. — Setting Range 28 - 32 psig.					
COOL-DRIVE	80013	002-0330		1		Internally Equalised					
	80014	002-0730		1½		Internally Equalised					
		18499				OE Block Valve — Ford					

Cool-Drive

HI-LINE THERMOSTATS



HI-LINE PRESSURE SWITCHES



CAT. NO.	MFG. P/N	DESCRIPTION
THERMOSTATS		
	003-0180	COOL-DRIVE. 12" Cool-Drive III — Supreme — GX2
	003-0280	COOL-DRIVE. Cabmaster Old Type (Air Flow)
	003-0404	COOL-DRIVE. Cabmaster New Type (In Coil)
	003-0401	COOL-DRIVE. Ford OE and Repco
8028	13-2201	Temperature Setting: —3.3°C (26°F) Cut-Out, 1.7°C (35°F) Cut-In, 18" Capillary
8029	13-2205	Temperature Setting: —3.3°C (26°F) Cut-Out, 1.7°C (35°F) Cut-In, 42" Capillary
PRESSURE SWITCHES		
8021	12-2120	COMPRESSOR HIGH PRESSURE CUT-OUT SWITCH, with 36" long capillary tube, ¼" female flare connection mounting bracket. Disengages clutch at 300 psi and engages clutch at 265 psi.
8022	12-2155	COMPRESSOR HIGH PRESSURE CUT-OUT SWITCH, ¼" female flare connection, mounts on compressor. Disengages clutch at 300 psi and engages clutch at 265 psi.



AUTOMOTIVE AIR CONDITIONING



Cool-Drive SINGER RECEIVER-DRIERS



CAT. NO.	Part No.	Device No.	Outside Diameter ins.	Height ins.	Inlet ins.	Outlet ins.	Capacity cu. ins.	COMMENTS
8036	18261	412-012	2.75	10	3/8 M. O-Ring	3/8 M. O-Ring	7	HPRV (Chrysler Replac.)
8037	18263	412-013	2.75	10	3/8 M. FI.	3/8 M. FI.	4	Fuse Plug, Bracket
8038	18265	412-014	2.75	7	3/8 Barb	3/8 F. O-Ring	3	Bracket (GMH Replac.)
	18247	412-023	2.75	10.11	3/8 M. FI.	3/8 Barb	4	Fuse Plug
8034	18366	412-024	2.75	7	3/8 M. FI.	3/8 M. FI.	2	HPRV
	18463	412-043	2.75	10.5	3/8 M. O-Ring	3/8 M. O-Ring	3.5	HPRV, LPCO
8035	18374	412-054	2.75	9.875	3/8 M. FI.	3/8 M. FI.	4	
80326	18460	412-082	2.75	9.86	3/8 M. O-Ring	3/8 M. O-Ring	4	Bracket (Replac. XC Ford)
	18462	412-084	3.0	6.14	3/8 M. FI.	3/8 M. FI.	2	Fuse Plug
	18468	412-085	3.0	5.74	3/8 M. O-Ring	3/8 M. O-Ring	6	Fuse Plug
	18623	412-088	2.75	10.3	3/8 M. O-Ring	3/8 M. O-Ring	2.8	HPRV, Plug on top, Sight Glass on side
80327	18458	412-104	3.0	6.31	3/8 M. FI.	3/8 M. FI.	2	With LPCO, LH Inlet on Outlet side
80328	18504	412-106	2.75	9.86	3/8 M. O-Ring	3/8 M. O-Ring	4	Bracket, Fuse Plug (Replac. XD Ford)
	18597	412-138	2.75	9.86	3/8 M. O-Ring	3/8 M. O-Ring	4	Bracket, Fuse Plug
	18656	412-116	3.0	6.14	3/8 M. O-Ring	3/8 M. O-Ring	4	Dill valve, LH Inlet, Fuse Plug
	18675	412-097	3.0	6.0	3/8 M. O-Ring	3/8 M. O-Ring	2	Fuse Plug
80329	51110		2.5	7.6	3/8 Barb	3/8 Barb		Universal Barb x Barb
80330	51210		2.5	7.6	3/8 M. FI.	3/8 Barb		Universal FI. x Barb
80331	52210		3.0	6.0	3/8 M. FI.	3/8 Barb		Heavy Duty Universal
80332	51220		2.5	7.6	3/8 Barb	3/8 Barb		
80328	18504		2.75	10.5	3/8 M. O-Ring	3/8 M. O-Ring		Bracket, Replac. XD Ford
	18638	460-077	2.5	7.6	3/8 M. O-Ring	3/8 M. O-Ring	2	Dill valve, Fuse Plug
	18639	460-098	2.5	7.6	3/8 M. O-Ring	3/8 M. O-Ring	2	2 Dill Valves
80325	18500	460-020	2.5	7.6	3/8 M. O-Ring	3/8 M. O-Ring	2	(Replac. P & A Commodore)
	18505	460-047	2.5	7.6	3/8 M. FI.	3/8 M. FI.	2	With 1/2 SAE Pipe Connection LH Inlet Fuse Plug RH Inlet
	18523	460-061	2.5	7.6	3/8 M. FI.	3/8 M. FI.	2	HPCO (285-215 psi) LH Inlet, Fuse Plug RH Inlet
	18535	460-066	2.5	7.6	3/8 M. FI.	3/8 M. FI.	2	Dill Valve LH Inlet
	18540	460-069	2.5	7.6	3/8 M. FI.	3/8 M. FI.	2	2 Dill Valves
	18604	460-089	2.5	7.6	3/8 M. O-Ring	3/8 M. O-Ring	6	Fuse Plug plus Female Screw Take Off
	18624	460-092	2.5	7.6	3/8 M. O-Ring	3/8 M. O-Ring	2	HPRV (Left side of Inlet)
8032	18351	460-501	2.5	7.6	3/8 M. FI.	3/8 M. FI.	2	
8033	18354	460-502	2.5	7.6	3/8 Barb	3/8 Barb	2	
	18402	460-505	2.5	7.6	3/8 M. FI.	3/8 Barb	4	Fuse Plug
	18402	460-516	2.5	7.6	3/8 M. FI.	3/8 Barb	2	Fuse Plug
8031	18401	460-517	2.5	7.6	3/8 M. FI.	3/8 Barb	2	
	18601	460-546	2.5	6.1	3/8 M. FI.	3/8 M. FI.	2	Fuse Plug
	18631	401-003	4.0	6.18	3/8 F. O-Ring	3/8 M. O-Ring	9	Fuse Plug
	18610	401-011	4.0	7.88	3/8 F. O-Ring	3/8 M. O-Ring	10	2 Sight Glasses on side

All Filter Receiver-Driers contain Molecular Sieve Desiccant

LPCO = Low Pressure Cut-Out

HPCO = High Pressure Cut-Out

HPRV = High Pressure Relief Valve



AUTOMOTIVE AIR CONDITIONING



Cool-Drive CONDENSERS



23137



AC5022



AX5014

CAT. NO.	Cool-Drive P/N	Condenser Type	DIMENSIONS	
			mm	ins.
80550	SM1021	Modine	308 x 581 x 19	12-1/8 x 22-7/8 x 3/4
80551	SM1022	Modine	356 x 460 x 19	14 x 18-1/8 x 3/4
80553	SM1023C	Modine	356 x 581 x 19	14 x 22-7/8 x 3/4
80554	SM1024	Modine	260 x 451 x 19	10-1/4 x 17-3/4 x 3/4
80555	SM1025	Modine	260 x 431 x 19	10-1/4 x 17 x 3/4
80558	23135	Modine	241 x 460 x 25	9-1/2 x 18-1/8 x 1
80559	23136	Modine	289 x 460 x 25	11-3/8 x 18-1/8 x 1
80560	23137	Modine	289 x 489 x 22	11-3/8 x 19-1/4 x 7/8
80561	23138	Modine	308 x 581 x 19	12-1/8 x 22-7/8 x 3/4
	043-0624	Cabmaster	596 x 190 x 51	23-5/8 x 7-5/8 x 2
	23139	Modine	335 x 489 x 22	13-1/4 x 19-1/4 x 7/8
	AC5014	Modine	737 x 330 x 22 XD - XE Falcon	29 x 13 x 7/8
	AC5022	XD - XE Ford Factory "O" Ring Tube and Fin		

Cool-Drive

CONDENSER FAN ASSEMBLIES



ES1612 12V

CAT. NO.	COOL-DRIVE PART No.	DESCRIPTION
	ES1612 12V	Universal Side Condenser c/w hardware 12 Volt
	ES1724 24V	Universal Side Condenser c/w hardware 24 Volt

Cool-Drive

ELECTRIC FANS



ES0912

CAT. NO.	COOL-DRIVE PART No.	DESCRIPTION
	ES0912	Universal 12V c/w wiring, brackets and hardware - Shroud
	ES0912A	As above less wiring, brackets and hardware
	ES0912 12"	5 Blade 12" Motor & Fan only less Shroud, wiring & hardware

HI-LINE BLOWER WHEELS



CAT. NO.	MFG. P/N	DESCRIPTION
80518	16-2505	ABS plastic, RIGHT HAND. 3-3/16" Diam. x 3-3/8" long, Double Inlet, 5/16" shaft size
80519	16-2505	DITTO - LEFT HAND
80520	16-2506	ABS plastic, UNIVERSAL. 3-3/16" Diam. x 3-3/4" long, Double Inlet, 5/16" shaft size
80521	16-2520	ABS plastic. 4-1/2" Diam. x 3-1/4" long, Double Inlet, 5/16" shaft size
80522	16-2521	ABS plastic. 5" Diam. x 2-1/2" long, Double Inlet, 5/16" shaft size
80523	16-2552	For Holden HX/Torana plus distance plate. Use with Motor 15-2434



AUTOMOTIVE AIR CONDITIONING

Cool-Drive CLUTCHES

806



CAT. NO.	PART No.	DESCRIPTION
80637	MA6A 12V	Twin Groove 6" 2A Section 12 Volt
80638	MA6A 24V	Twin Groove 6" 2A Section 24 Volt
80639	MA6AM 12V	Twin Groove 6" 2A Sect. 12 Volt suit TM101R and RS
80640	MA6AM 24V	Twin Groove 6" 2A Sect. 24 Volt suit TM101R and RS
80642	MA6B 12V	Single Groove 6" 1B Section 12 Volt
80643	MA6B 24V	Single Groove 6" 1B Section 24 Volt
80644	MA6BM 12V	Single Groove 6" 1B Sect. 12 Volt suit TM101R and RS
80645	MA6BM 24V	Single Groove 6" 1B Sect. 24 Volt suit TM101R and RS
80647	MA7A 12V	Twin Groove 7" 2A Section 12 Volt
80648	MA7A 24V	Twin Groove 7" 2A Section 24 Volt
80649	MA7B 12V	Twin Groove 7" 2B Section 12 Volt
80650	MA7B 24V	Twin Groove 7" 2B Section 24 Volt
	IMRCP5-3-SA161AX)	Replacement Clutch CPR100
	MS5-1-4A2G	Replacement Clutch Sanyko 5X" 12 Volt
	AXC5-1-4 12V	Replacement Clutch FS507 - 508 5X" A Section 12 Volt
	AXC6A 12V	Replacement Clutch FS507 6" A Section 12 Volt
	AXC6B	Replacement Clutch FS507 6" B Section 12 Volt



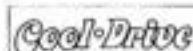
MA6A 12V



MA6BM 12V



AXC5-1-4 12V



SWITCHES, EVAPORATORS AND MISCELLANEOUS PARTS

CAT. NO.	PART No.	DESCRIPTION
	018-0880	Three Speed Fan Switch Cool-Drive III - GX2
	011-1180	Blower Switch Supreme II
	011-2180	A/C Switch Ford OE and Repco
	018-1980	Blower Switch Old Supreme
	018-1880	Thermostat Switch Old Supreme
	018-3780	Resistor 12V Cool-Drive - Supreme - GX2 - Cabmaster - Repco Commodore
	001-1220	Evaporator Coil Cool-Drive III
	001-1320	Evaporator Coil Supreme - GX2
	001-1719	Cabmaster Coil Old (Straight Suction Pipes)
	001-1720	Cabmaster Coil New (Bent Suction Pipe)
	001-2408	Evaporator Coil suit most Integrated Evaporators
	002-0145	Knob Cool-Drive - Cabmaster
	005-3914	Blower Motor 24V (Underdash) and Cabmaster
	005-2680	Condenser Motor Cabmaster 12V
	005-2480	Blower Motor 12V (Underdash) and Cabmaster
	005-3908	Blower Motor Commodore (Repco)
	005-3915	Condenser Motor Cabmaster 24V
	16012LA	Complete Front Cool-Drive III
	18012LA	Complete Front Supreme II
	20012LA	Complete Front GX2
	042-3109	Relay Control suit New Cabmaster CM1
	042-1780	Relay Integrated Evaporator where black box not used
	042-2980	Relay Control Box Integrated (Black Box) (Small)
	042-1080	Relay Control Box Integrated Old Type (Large)
	8595-61-200B	829L Factory A/C - Fan Switch
	10800K	Universal Sack Kit
	AC5013	Universal Sack Kit
	AC5021	Commodore Custom Sack Kit
	AC5028	XE - XD Custom Sack Kit
	AC5029	Sigma Custom Sack Kit
	80101	Palcon Relay Universal Idle Cut-Out
	CET12	Console Edge Trim
	SAC-33C	Idle Cut-Out suit Repco Integrated Evaporators - Plug in to existing Relay Box
	B100K	Idler Pulley Kit
	PC77420	Plastic A Sect. 90 mm Diam.
	PC77420D	Plastic A Sect. 90 mm Diam. c/w Centre Bolt and Adj. Bolt
	PC77120	Steel A Sect. 100 mm Diam.
	PC77121	Steel A Sect. 87 mm Diam.
	AC5016	XD Ford Rear Eyeball Kits
	AC5011	XD - XE Condenser Stays suit AC5014 Condenser

SPARE PARTS



AC5016

AC5011

10800K



AUTOMOTIVE AIR CONDITIONING PULLEYS — ECCENTRICS — FAN SPACERS



HI-LINE IDLER PULLEY

CAT. NO.	MFG. PART NO.	DESCRIPTION
8071	25-5301	IDLER PULLEY with bearing
8072	25-5302	BEARING
8073	25-5303	SNAP RING
8074	25-5304	IDLER PULLEY BOLT



HI-LINE ECCENTRIC (ALUMINIUM)

CAT. NO.	MFG. PART NO.	DESCRIPTION
80713	26-5408	ECCENTRIC 7/8"
80714	26-5410	ECCENTRIC 1"
80715	26-5412	ECCENTRIC 1.1/8"
80716	26-5414	ECCENTRIC 1.1/4"
80717	26-5416	ECCENTRIC 1.3/8"
80718	26-5418	ECCENTRIC 1.1/2"
80719	26-5420	ECCENTRIC 1.5/8"
80720	26-5422	ECCENTRIC 1.3/4"
80721	26-5424	ECCENTRIC 1.7/8"
80722	26-5426	ECCENTRIC 2"
80723	26-5428	ECCENTRIC 2.1/8"



SMITHS ALUMINIUM FAN SPACERS

CAT. NO.	MFG. PART NO.	DESCRIPTION
80726	27-5501	1/8" No Pilot
80727	27-5502	3/16" No Pilot
80728	27-5504	1/4" With Pilot
80729	27-5505	5/16" With Pilot
80730	27-5507	3/8" With Pilot
80731	27-5509	7/16" With Pilot
80732	27-5510	1/2" With Pilot
80733	27-5512	5/8" With Pilot
80734	27-5514	3/4" With Pilot
80735	27-5516	7/8" With Pilot
80736	27-5518	1" With Pilot
80737	27-5522	1.1/4" With Pilot
80738	27-5526	1.1/2" With Pilot
80739	27-5528	1.5/8" With Pilot
80740	27-5529	1.3/4" With Pilot
80741	27-5530	2" With Pilot
80742	27-5532	2.1/4" With Pilot





AUTOMOTIVE AIR CONDITIONING



Cool-Drive

ENGINE FAN BLADES



PC57110D



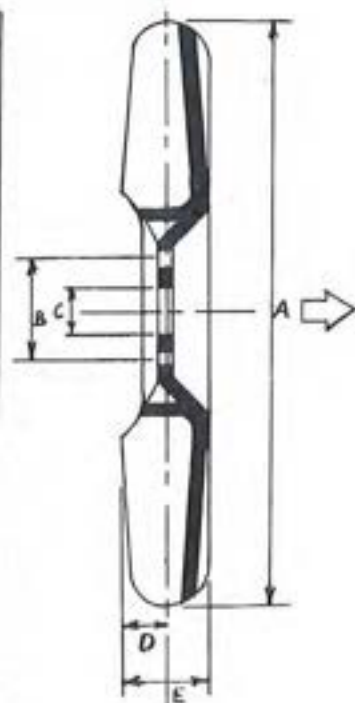
PC57110R



672100

ENGINE FAN SPECIFICATIONS AND DIMENSIONS (mm)

CAT. NO.	PART No.	Diameter A	Hole Pitch Circle B	Boss Hole Size C	Circle Line Clearance D	Full Blade Width E	Number Blades
	PC57110 A	360	40	16	23	45	6
	PC57110 C	360	60	32	23	45	6
	PC57110 D	340	50	24	31	46.5	5
	PC57110 E	360	44	16	22.5	39.5	6
	PC57110 F	340	60.3	26	18.9	43.4	6
	PC57110 G	340	45	16	20	44.5	5
	PC57110 L	380	128	90	30	50	6
	PC57110 M	270	44	16	15.5	40.5	4
	PC57110 N	340	44	16	20	44.5	5
	PC57110 P	360	60.5	16	24	45	6
	PC57110 R	450	49	16	33.1	55.1	8
	Holden-Ford						
	PC57110 T	340	50	24	31	46.5	5
	PC57110 V	340	56	24	20	46.5	6
	PC57110 W	380	50	32	23	45	6
	4200016						
	Commodore	360	44	16	22.5	39.5	6
METAL							
	651000 Fixed	385	49	16		38	6
	652000 Fixed	385	49	16		50	6
	671000 Fixed	430	49	16		38	6
	672000 Fixed	430	49	16		50	6
	672100 Fixed	440	49	16		45	6
	682000 Fixed	460	49	16		58	6



SPACER KITS

CAT. NO.	KIT No.	Spacer mm	Thread	Bolt Diam. mm	Length mm
	NC 63-00	12.7	NC	0.8	63
	NC 76-00	12.7	NC	0.8	76
	NF 32-00	12.7	NF	0.8	32
	NF 50-00	12.7	NF	0.8	50
	NF 63-00	12.7	NF	0.8	63
	NF 70-00	12.7	NF	0.8	70
	NF 82-95	12.7	NF	0.8	83
	NF 90-63	12.7	NF	0.8	90
	NF 95-00	12.7	NF	0.8	95
	NF 108-00	12.7	NF	0.8	108
	NF 114-70	12.7	NF	0.8	115





AUTOMOTIVE AIR CONDITIONING ENGINE FAN BLADES — FAN CLUTCHES



HI-LINE ENGINE FANS



CAT. NO.	MFG. PART NO.	SIZE	NO. BLADES	TYPE
8081	28-5720	15" x 2"	6	6-15 Heavy Duty
8082	28-5701	18" x 2"	6	6-18 Heavy Duty
8083	28-5704	17" x 2"		Clip Blade
8084	28-5705	17" x 2"	6	6-17 Heavy Duty
8085	28-5706	17" x 1"	6	6-17 Thin Line
8086	28-5738	14" Flex	6	6-14 Thin Line
8087	28-5725	15" Flex	6	6-15 Thin Line
8088	28-5739	13" Flex		
8089	28-5740	16"		Plastic Montchal



SMITHS FAN CLUTCHES

Two basic types of Silicone Fluid Controlled Fan Clutches are available
Thermostatic and Non-Thermostatic

Both types perform the same function - to control fan speed in relation to engine cooling demands. These Fan Clutches provide maximum cooling effect at low engine speeds - without over-cooling, excessive noise or power loss and motor drag at high speeds.

Non-Thermostatic Clutches are designed to fit all Rebuilt Water Pumps as well as the New Units.

CAT. NO.	TYPE
80824	THERMOSTATIC
80825	NON-THERMOSTATIC

SMITHS FAN CLUTCH BLADES

Designed to produce increased cooling output when mated with Fan Clutches. Used with either Thermostatic or Non-Thermostatic Clutch.

CAT. NO.	DIAMETER	SHAFT SIZE	BOLT DIAMETER	PITCH WIDTH
80814	18.1/4	2.5/8	3.1/4	2.3/8
80815	18.1/4	2.3/8	3	2
80816	17.1/4	2.5/8	3.1/4	2.3/8
80817	17.1/4	2.3/8	3	2

SMITHS FLEX FAN BLADES

Two sizes fit all Fan Clutches. Unique flexing action of light, non-rusting aluminium blades flattens fan pitch as RPM increases; thereby lessening noise, power loss and excessive drag to give increased engine mileage.

CAT. NO.	DIAMETER	SHAFT SIZE	BOLT DIAMETER	PITCH WIDTH
80820	17.1/4	5/8	5/16	Variable
80821	15.1/4	5/8	5/16	Variable



AUTOMOTIVE AIR CONDITIONING MOTORS AND SWITCHES

811

HI-LINE MOTORS

CAT. NO.	MFG. PART NO.	DESCRIPTION
8111	15-2411	12 volt, three speed, 5/16" double shaft length 3.3/8"
8112	15-2430	12 volt, single speed, 5/16" single shaft.
8113	15-2434	Torana/Holden High Speed.



HI-LINE SWITCHES

CAT. NO.	MFG. PART NO.	DESCRIPTION
81126	12-2101	FOUR POSITION SWITCH, 12 volt with resistors, off-low-medium-high, for use with single speed motors.
81127	12-2102	FOUR POSITION SWITCH, 12 or 24 volt without resistors, for use with three speed motors.
81128	12-2156	FAN SWITCH, 12 volt, closes contacts at 230°, opens contacts at 180°, used to operate condenser fans.
81129	12-2160	CIRCUIT BREAKER, 12 volt, 30 amp D.C. rating, automatic reset. Spade terminals.
81130	12-2160	CIRCUIT BREAKER, 12 volt, 30 amp 25168. Threaded.
81131	21-1210	AUTO RELAY (Car 121B)



IF IT IS NOT LISTED IN THIS CATALOGUE — ASK US ANYWAY
WE HAVE MANY ITEMS AND ACCESSORIES TOO NUMEROUS TO LIST
WE CAN PROBABLY HELP YOU

8



AUTOMOTIVE AIR CONDITIONING **SERVICE VALVES — BRACKETS — ADAPTOR KITS**



HI-LINE COMPRESSOR SERVICE VALVES



21-4620



21-4630



21-4670

CAT. NO.	MFG. P/N	DESCRIPTION
8131	21-4620	SERVICE VALVE, Pad type, Dill/Schrader, 5/8" barb.
8132	21-4621	SERVICE VALVE, Pad type, Dill/Schrader, 1/2" barb.
8133	21-4630	SERVICE VALVE, Pad type, Dill/Schrader, 5/8" flare.
8134	21-4631	SERVICE VALVE, Pad type, Dill/Schrader, 1/2" flare.
8135	21-4660	SERVICE VALVE, Rotolock, Dill/Schrader, 5/8" barb.
8136	21-4661	SERVICE VALVE, Rotolock, Dill/Schrader, 1/2" barb.
8137	21-4670	SERVICE VALVE, Rotolock, Dill/Schrader, 5/8" flare.
8138	21-4671	SERVICE VALVE, Rotolock, Dill/Schrader, 1/2" flare.

MOUNTING BRACKETS — ADAPTOR KITS



DUE TO THE WIDE VARIETY OF MAKES, MODELS AND TYPES OF VEHICLES, PLUS THE INTRODUCTION OF NEW MODELS FROM TIME TO TIME IT IS NECESSARY TO PROVIDE US WITH EXACT SPECIFICATIONS SO THAT THE CORRECT MOUNTING BRACKETS AND ADAPTOR KITS CAN BE SUPPLIED.

WHEN ORDERING

MAKE
MODEL
YEAR
ENGINE 4/6/8/V8 and Size.
STEERING Std/Power.
MODIFICATIONS to Standard.

PLEASE SPECIFY

Example

Holden
Gemini
1977
4 Cyl.
Std.
None





AUTOMOTIVE AIR CONDITIONING HOSE — HOSE FITTINGS — COUPLINGS



IMPERIAL AIR CONDITIONING HOSE — STYLE Y4

CAT. NO.	IMPERIAL P/N	HOSE I.D. INS	HOSE O.D. INS	MAX. OPERAT. PRESS.	MIN. BURST. PRESS.	MIN. BEND. RADIUS
8161	Y406	5/16	.72	400 psi	1750 psi	4"
8162	Y408	13/32	.87	400 psi	1750 psi	5"
8163	Y410	1/2	.97	400 psi	1600 psi	5"
8164	Y412	5/8	1.09	400 psi	1600 psi	6"

Y4
AIR CONDITIONING
REFRIGERANT-12



IMPERIAL CRIMP TYPE HOSE COUPLINGS FOR STYLE Y4 HOSE

CAT. NO.	IMPERIAL PART NO.	HOSE I.D.	TUBE O.D.	THREAD SIZE	DIMENSIONS — INS				
					A	B	C	E	F

MALE STRAIGHT COUPLING — 45° SAE FLARE

	FD06-06MS	5/16"	3/8"	5/8"-18	2.64	1.55	.23	.62	
	FD08-08MS	13/32"	1/2"	3/4"-16	2.81	1.72	.33	.75	
	FD10-10MS	1/2"	5/8"	7/8"-14	3.17	1.98	.42	.87	
	FD12-12MS	5/8"	3/4"	1 1/16"-14	3.37	2.22	.51	1.06	

FEMALE STRAIGHT COUPLING — 45° SAE FLARE SWIVEL

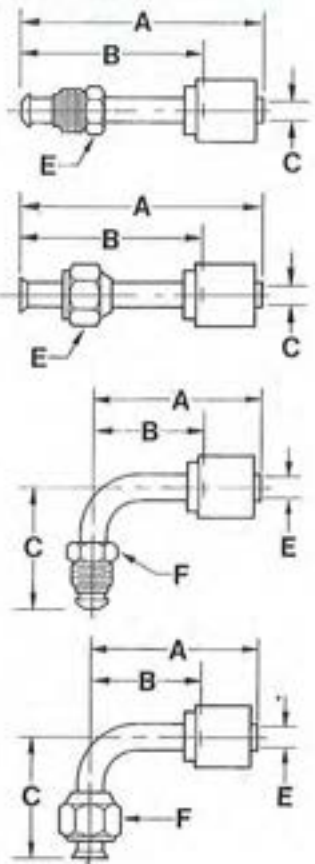
8166	FD06-06NS	5/16"	3/8"	5/8"-18	2.06	.97	.23	.81	
8167	FD08-08NS	13/16"	1/2"	3/4"-16	2.19	1.09	.33	.94	
8168	FD10-10NS	1/2"	5/8"	7/8"-14	2.42	1.23	.42	1.06	
	FD12-12NS	5/8"	3/4"	1 1/16"-14	2.56	1.41	.51	1.25	

BENT TUBE (90°) — MALE 45° SAE FLARE

	FD06-06MS90T	5/16"	3/8"	5/8"-18	2.19	1.09	1.83	.23	.62
	FD08-08MS90T	13/16"	1/2"	3/4"-16	2.44	1.34	2.12	.33	.75
	FD10-10MS90T	1/2"	5/8"	7/8"-14	2.78	1.59	2.58	.42	.87
	FD12-12MS90T	5/8"	3/4"	1 1/16"-14	2.81	1.66	2.62	.51	1.06

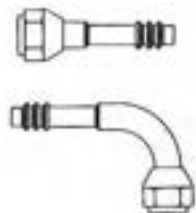
BENT TUBE (90°) — FEMALE 45° SAE FLARE SWIVEL

81610	FD06-06NS90T	5/16"	3/8"	5/8"-18	2.19	1.09	1.22	.23	.81
81611	FD08-08NS90T	13/16"	1/2"	3/4"-16	2.44	1.34	1.50	.33	.94
81612	FD10-10NS90T	1/2"	5/8"	7/8"-14	2.78	1.59	1.83	.42	1.06
	FD12-12NS90T	5/8"	3/4"	1 1/16"-14	2.81	1.66	1.81	.51	1.25



PUSH-ON HOSE/S.A.E. 45° FLARE FITTINGS

CAT. NO.	TYPE	APPLICATION	THREAD SIZE	HOSE I.D.	HOSE NO.
81616	STRAIGHT	Liquid Line	5/8 - 18	5/16	6
81617	FEMALE	Discharge Line	3/4 - 16	13/32	8
81618	FLARE	Suction Line	7/8 - 14	1/2	10
81619	90° ELBOW	Liquid Line	5/8 - 18	5/16	6
81620	FEMALE	Discharge Line	3/4 - 16	13/32	8
81621	FLARE	Suction Line	7/8 - 14	1/2	10



NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

ACPAR PARTS — TO HELP YOU BUILD REFRIGERATION SYSTEM RELIABILITY



AUTOMOTIVE AIR CONDITIONING IMPERIAL KWIKRIMP® SYSTEM



WE HAVE THIS MACHINE
AND CAN MAKE UP
PERFECT HOSE ASSEMBLIES
WHILE YOU WAIT

2" I.D. Assembly
2,500 psi working pressure



1/4" I.D. Assembly
5,000 psi working pressure
or anything in between

HERE IS WHAT WE DO

K-601 Kwikrimp Super 2 (3/16" to 2" hose sizes)

The most versatile Kwikrimp made. Enables you to combine the reliability of factory engineered hose assemblies with the convenience of on-the-spot production. Handles all Kwikrimp hose and couplings through 2" size. Extra large bowl opening and split rams permit attachment of bent stem couplings through the 2" size. System includes a heavy duty K-601 machine, rugged two stage power unit with connecting hose, six sets of dies with storage cabinet. Size of crimping unit: 18½" wide x 12½" deep x 22½" high. Weight 370 lbs. Pat. No. 3,805,580.

1

Select the desired coupling style and size. Insert into hose end.



2

Set gauge and position hose and coupling in top of machine. Operate pump until pin is flush with top of gauge.



3

Crimping gauge indicates when crimp is completed. Presto! A perfect assembly.



WE WILL BE GLAD TO QUOTE ON LARGE QUANTITIES



AUTOMOTIVE AIR CONDITIONING SERVICE KITS



IMPERIAL

Here's all you need to handle air conditioning service jobs. Imperial's master service kit includes a professional charging manifold, complete with gauges and charging lines, Tap-A-Can dispensing valve for tapping refrigerant cans, 4-way ratchet wrench, goggles, thermometer and a 90° swivel adaptor. A complete Auto Air Conditioning Service Manual covering service and repair techniques is included.

490-F Air Conditioning Service Kit

CAT. NO. 8181

Contents of Kit:

- 10-C 90° swivel adaptor
- 124-C 4-way ratchet wrench
- 336-FTB 3' blue charging hose
- 336-FTR 3' red charging hose
- 338-C Universal Tap-A-Can dispensing valve
- 360-FTY 5' yellow charging hose
- 380-G One pair safety goggles
- 495-C Brass charging manifold with pressure and compound gauges
- 602-T Dial thermometer — 1-3/8" face
- 5100 Complete service manual for air conditioning systems in cars and light trucks.

All items in kit available separately.



GM-6 CYLINDER COMPRESSOR TOOL KIT

The three popular types of compressors currently used on U.S. auto air conditioning systems are:

1. G.M. Frigidaire/Delco air conditioning — 10500
2. York Models A-206, 209 and 210 — 10550
3. Tecumseh HG850 and HG1000 — 10550

See Below

Two economical tool sets have been developed for field servicing of shaft bearings and seals for the above models — 10500 and 10550. Each tool is a necessity, and a definite time saver.



YORK AND TECUMSEH COMPRESSOR TOOL KIT

10549 Compressor seal puller



40748 Pkg. of 4 replacement fingers.



10546 Clutch spanner wrench



Also services Eaton, Pitts and Warner clutches.



10547 Seal installer and Seal plate aligner



10548 Clutch removing bolts



10545 Oil dip stick



CAT. NO. 81815*

G.M. FRIGIDAIRE/DELCO KIT

Part No. 10500

CAT. NO. 81816*

YORK/TECUMSEH KIT

Part No. 10550

* Also Cat. Nos. 35059 and 35836 Refrig/Air Cond. Section 6

818-a



AUTOMOTIVE AIR CONDITIONING SERVICE KITS TOOLS AND EQUIPMENT



ROBINAIR® AIR CONDITIONER TOOL CABINET KIT

Part No. 10475

CAT. NO. 81817



Includes convenient metal storage cabinet and air conditioner service tool package. Cabinet has moulded plastic tool organizer, metal pockets, and hangers for easy tool accessibility. Cabinet locks to protect tools from pilferage. Cabinet may be hung on wall near service area or placed on work bench. Kit contains all the tools necessary to perform air conditioning service when used with an appropriate vacuum pump. System testing, leak detection, compressor repair and system charging can be performed with these tools. Also includes service manual and system diagnosis chart. Dimensions of cabinet: 229 mm Deep x 508 mm High x 762 mm Wide (9" x 20" x 30")

KIT 10475 Consists of:

- 40155 Manifold
- 10501 Pulley Puller
- 10502 Pulley Installer/Bearing Remover and Installer
- 10503 Seal Assembly Remover and Installer
- 10504 Hub Drive Plate Remover Kit
- 40687 Clutch Assembly Remover
- 10505 Hub & Drive Plate Assembly Installer
- 40689 Clutch Plate and Pulley Installer
- 10507 Seal Seat Remover and Installer
- 10508 O-Ring Remover
- 10509 O-Ring Installer
- 10510 Snap Ring Installer

- 10513 Ceramic Seal Remover & Installer
- 10514 Shaft Seal Protector
- 10515 Evacuating and Charging Valve
- 10517 Compressor Test Plate
- 10538 Propane Leak Detector
- 10540 Pocket Thermometer
- 10545 Oil Dip Stick
- 10546 Clutch Spanner Wrench
- 10547 Seal Installer & Seal Plate Aligner
- 10548 Clutch Removing Bolts
- 10549 Shaft Seal Puller
- 10551 EPR Valve Remover & Installer
- 10559 4-Way Ratchet Wrench
- 10561 Service and Training Manual

- 10569 Dial Thermometer
- 10576 Oil Injector
- 10598 V.I.R. Service Tool Set
- 10678 Refrigerant Check Valve
- 10683 Internal Snap Ring Pliers
- 11001 "Taps-All" Can Valve
- 11004 Multi-Can Dispensing Valve
- 12008 Goggles
- 14161 Snap Ring Pliers No. 21
- 14162 Snap Ring Pliers No. 22
- 14163 Snap Ring Pliers No. 23
- 14166 Snap Ring Pliers No. 26
- 14401 Multi-Head Fin Straightener
- 40661 Tool Cabinet

MULTI-HEAD FIN STRAIGHTENER

14401

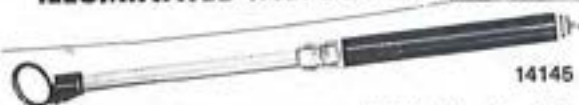


Six fin straighteners in one—6 in 1—will clean and straighten

condensor and evaporator coil fins having spacings of 8, 9, 10, 12, 14, 15 fins per inch. Small, compact, easy to use in confined spaces. The need to keep condensor and evaporator fins free of debris makes this tool a must for auto air conditioning servicemen.

CAT. NO. 81811

ILLUMINATED INSPECTION MIRROR



14145

Powered by standard "pen-lite" batteries this inspection mirror is intended primarily to inspect installation of the "O" ring seal in the shaft housing while compressor is still mounted on the car. Batteries not included.

CAT. NO. 81813*

*Also Cat. No. 35063 Refrig/Air Cond. Section 6

COMPRESSOR OIL INJECTOR

10576



Adding oil to air conditioning compressors is at best a slow process without this tool on cars without shut-off valves. The refrigerant charge is wasted and some disassembly required. 10576 is used in conjunction with a gauge manifold assembly. It utilizes the pressure differential from the high to the low side of the system to inject 2 oz. of oil into the unit.

CAT. NO. 8189

GOGGLES



12008

Essential safety equipment for all mechanics servicing air conditioners. Liquid refrigerant escaping from a loose or broken fitting will freeze any object and can cause permanent injury to the eyes. Built for protection from liquid.

CAT. NO. 81810



AUTOMOTIVE AIR CONDITIONING

EVAPORATORS - EVAPORATOR & COMPLETE SYSTEMS

Cool-Drive

EVAPORATOR SELECTION :

May be Integrated, Universal Underdash or Commercial.

- Integrated** — Designed to suit specific vehicles and includes all following components: Evaporator, Custom Hose Set, Receiver-Drier, Condenser and Bracket, Small Parts Kit, Heavy Duty Fan (where applicable)
Note: Although an Integrated system may be recommended, it may be substituted by a Universal Underdash Kit.
- Universal Underdash Kits** contain the following components: Condenser (Large or Small), Universal Hose Kit, Receiver-Drier, Small Parts Kit, Evaporator (Various types).
- Commercial** — Refer Repco Cool-Drive Catalogue for complete details.

COMPLETE SYSTEMS — See below.

CAT. NO.	PART No.	DESCRIPTION
EVAPORATORS ONLY		
	16012	Cool-Drive III, 3 speed fan, automatic thermostat, 24 pass, 3-way evaporator inlet and exhaust manifold, 360 x 140 x 310 mm evaporator size, 340 cu. metre per hour dry blower air volume (12,200 cu. ft.), 13,000 B.T.U. rating.
	18012	Supreme II has all the features of the Cool-Drive III plus: Larger 32 pass, 4-way evaporator inlet and exhaust manifold, 400 x 137 x 349 mm evaporator size, 400 cu. metre per hr. dry blower air volume (14,100 cu. ft.), 17,000 BTU rating.
	20012	12 Volt Galaxy 32 has same large capacity as the Supreme. It features a directional eye ball for personalised air flow and a remote control, finger tip fan speed switch which makes it ideal for larger vehicles and commercial applications.
	20024	24 Volt Galaxy has same large capacity as the Supreme. It features a directional eye ball for personalised air flow and a remote control, finger tip fan speed switch which makes it ideal for larger vehicles and commercial applications.



16012



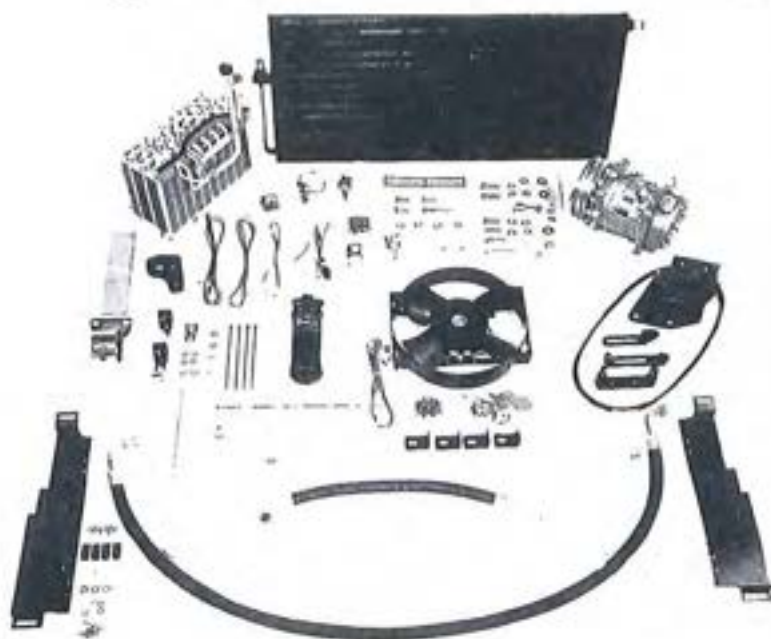
18012



20012-20024

Cool-Drive

COMPLETE SYSTEMS



EXAMPLE FORD FALCON COMPLETE SYSTEM.
AC603-1206CE.

Complete systems are available for several popular makes :

e.g. Ford Falcon, Holden Commodore and Camira, Mazda and Mitsubishi Sigma.

When ordering it is essential that correct identification of the vehicle is supplied:

Make
Model
Year
Engine 4/6/8/V8 and Size
Steering — Std. or Power
Modifications to standard

Remember: A complete system comes as two packages unless specified otherwise:

1. Mount Compressor Kit.
2. Evaporator Kit.

Details available on application

819-a



AUTOMOTIVE AIR CONDITIONING

EVAPORATOR SYSTEMS - COMPLETE SYSTEMS



Cool-Drive



6A



GX2ASC



CM1 CABMASTER



CM2 CABMASTER



CABMASTER INTERIOR FACIA

CAT. NO.	PART No.	DESCRIPTION
EVAPORATOR SYSTEMS		
81968	6A	Cool-Drive III Evaporator — 19 x 12 x 3/4 Condenser
81965	9A	Cool-Drive III Evaporator — 23 x 14 x 3/4 Condenser
81967	909A	Supreme Evaporator — 23 x 14 x 3/4 Condenser
	GX2C	12V GX2 Remote Fan Switch Evaporator — 19 x 12 x 3/4 Condenser
81966	GX2 12V	12V GX2 Remote Fan Switch Evaporator — 23 x 14 x 3/4 Condenser
	GX2 24V	24V GX2 Remote Fan Switch Evaporator — 23 x 14 x 3/4 Condenser
	GX2A	12V GX2 23 x 14 x 3/4 — 4 metre Bulk Hose Liquid
	GX2B	Same as above in 24 Volt
	GX2ASC	12V Same as above with 12V Side Condenser
	GX2BSC	24V Same as above with 24V Side Condenser
	6AT	Cool-Drive III — 19 x 12 x 3/4 — Bulk Hose Suction—Liquid — 48" Discharge Hose
	9AT	Same as above with 23 x 14 x 3/4 Condenser
	9ATC	Same as above c/w Tecumseh Compressor — Maga Clutch
	9ATSC	Cool-Drive III — Side Condenser 12V — Bulk Hose Liquid—Suction — 48" Discharge Hose
81969	CM1	Cabmaster Roof Top c/w Hoses — Fittings 12V
	CM1 24V	Cabmaster Roof Top c/w Hoses — Fittings 24V
	CM2	Cabmaster II Floor Mounted Evaporator only 12V
	CM2 24V	Cabmaster II Floor Mounted Evaporator only 24V
	CM3	Cabmaster III Interior Roof Mounted Evaporator only 12V
	CM3 24V	Cabmaster III Interior Roof Mounted Evaporator only 24V

Note: All above Evaporator Systems are packed in one box complete with Universal Hose Kit, Flare/Barb Drier, Fittings and Sack Kits, unless specified otherwise.



AUTOMOTIVE AIR CONDITIONING COMPRESSORS



Cool-Drive

CAT. NO.	PART No.	DESCRIPTION
	CPR100	4 Vane Rotary 7.5 cu. in. 12V
	CPR120	4 Vane Rotary 9.5 cu. in. Sankyo Mounting 12 Volt
	SS808	5 Vane Rotary 8.4 cu. in. Sankyo Mounting Twin Groove A Sect. 12 Volt
	SS809	5 Vane Rotary 9.5 cu. in. Sankyo Mounting Twin Groove A Sect. 12 Volt
	SS809-24V	5 Vane Rotary 8.4 cu. in. Sankyo Mounting 118 mm Twin Groove A Sect. Clutch 24 V
	SS809-B	5 Vane Rotary 8.4 cu. in. Sankyo Mounting 135 mm Single Groove B Sect. Clutch 12 V
	SS809-B24V	5 Vane Rotary 8.4 cu. in. Sankyo Mounting 135 mm Single Groove B Sect. Clutch 24 V
82030	F5507-5-25A	Centrot 7.5 cu. in. 5/8" Twin Groove A Sect Clutch 12 Volt
82032	F5507-6A	Centrot 7.5 cu. in. 6" Twin Groove A Sect Clutch 12 Volt
82035	F5507-6B	Centrot 7.5 cu. in. 6" Single Groove B Sect Clutch 12 Volt
82038	F5508-5-25A	Centrot 8.3 cu. in. 5/8" Twin Groove A Sect Clutch 12 Volt
	YM101	6 cu. in. Reciprocating York Mounting Less Clutch
	YM101R	6 cu. in. Reciprocating Special 3 Bolt Clutch Mounting
	YM10RS	6 cu. in. Reciprocating Special 3 Bolt Clutch Mounting
	YM123	9 cu. in. Reciprocating York Mounting Subs for F209 York
82040	F206	6 cu. in. York
82044	F210	10 cu. in. York
	SD5 12V	Sankyo 8.3 cu. in. 5/8" Twin Groove A Sect Clutch 12 Volt
	SD5 24V	Sankyo 8.3 cu. in. 5/8" Twin Groove A Sect Clutch 24 Volt
	SD5-B	Sankyo 8.3 cu. in. 6" Single Groove B Sect Clutch 12 Volt
	SD5-6B 24V	Sankyo 8.3 cu. in. 6" Single Groove B Sect Clutch 24 Volt
82017	HG1000	10 cu. in. Tecumseh (Cast Iron) Heavy Duty
	HG1000	Remanufactured Tecumseh 10 cu. in.
82041	F206EX	Remanufactured York 206 Exchange
82043	F209EX	Remanufactured York 209 Exchange
82045	F210EX	Remanufactured York 210 Exchange
	F210FEX	Remanufactured York Ford Factory Exchange
82031	F5507-5-25AEX	Remanufactured Centrot 507 5/8A Sect.
82033	F5507-6AEX	Remanufactured Centrot 507 6A Sect.
	F5507-6BEX	Remanufactured Centrot 507 6B Sect.
82037	F5508-5-25EX	Remanufactured Centrot 508 5/8A Sect.

FORD FACTORY
REMANU.

TM123

CPR100

F5508-5/A

ABACUS — SANKYO



CAT. NO.	MODEL	Displac. cu. ins.	DESCRIPTION
81010	SD508	8	12V — 5/8" Clutch
81011	SD507	7	12V — 5/8" Clutch
81012	SD506	6	12V — 5/8" Clutch

KIRBY — TECUMSEH



MODEL
HG 1000

REFER
Cool-Drive
Table Above
AND
PAGE 260
FOR FULL
DETAILS

KIRBY CAR AIR HR980 Automotive Compressor



FEATURES

- Reduced Package Size • Lower Weight • Maximum Application Flexibility • Contemporary Round Configuration • Minimum Refrigerant Leak Potential • Improved Efficiency • Advantageous NVH Characteristics (noise — vibration — harshness) • High Quality and Reliability • Cost Effective

PHYSICAL CHARACTERISTICS

- | | | | |
|----------------------|-------------------|------------------------|----------------|
| • Basic Design | Radial | • Weight - Less Clutch | 4 kg (8.9 lb.) |
| • Crankcase Assembly | Diecast Aluminium | • Number of Cylinders | 4 |
| • Crankshaft | Forged Steel | • Cubic in. Disp./rev | 9.8 |
| • Housing | Drawn Steel | • Factory Oil Charge | 8.0 oz. |
| | | • Refrigerant | R12 |

CAT. NO. 82050

An innovative adaption of proven mechanism has made it possible to assemble 4 cylinders in a radial design within an extremely small package. This package is easily contained within a nearly hermetic, drawn steel, welded housing, eliminating refrigerant leak potentials commonly associated with bolts and gaskets.

The resulting configuration permits use of a zero bearing load, nose mounted clutch, and a field proven shaft seal uniquely cooled by a combination of refrigerant gas and oil mist.

While this shaft seal design and performance will undoubtedly surpass the outstanding reliability record of present designs, the seal can be replaced easily with existing tools and fixtures now utilized by most facilities.

In terms of power savings, the HR980 gains from strong reductions in pressure drop contributed by the uni-directional refrigerant gas flow and the relatively large bore, large valve area, short stroke design. In terms of Noise, Vibration and Harshness, the radial arrangement of the cylinders, the short stroke, the advantages of 4 smaller pulses, all contribute to reduced pressure spikes.



AUTOMOTIVE AIR CONDITIONING SERVICE AIDS



DISPOSABLE REFRIGERANT CYLINDERS



FREON® - A Du Pont TM.

CAT. NO.	REFRIGERANT	CYLINDER SIZE	PART No.
185103	R12	15 lb.	G12/15
185104	R12	30 lb.	G12/30
185105	R12	50 lb.	G12/50
185106	R22	15 lb.	G22/15
185107	R22	30 lb.	G22/30
185108	R22	50 lb.	G22/50

VIRGINIA CAN-O-GAS®



R 12



R 22

FREON® - A Du Pont TM.

- The handy refrigerant in the throwaway container
- Easy, reliable way to add refrigerant to:
 - Automotive air conditioners
 - Window air conditioners
 - Freezers
 - Refrigerators
 - Water coolers
 - Vending machines
 - Ice cream cabinets

			CAT. NO.
R12	14 oz. Can No. CF121FT	(Flat Top)	18584
R22	1 lb. Can No. CF221ST	(Screw Top)	18564
R22	2 lb. Can No. CF222ST	(Screw Top)	18561
R114	1 lb. Can		18562
R502	1 lb. Can		18563
DYTEL * CONCENTRATE	14 oz. Can		

- * **DYTEL CONCENTRATE** — **DYTEL®** is a bright red dye used for detecting leaks in air conditioning and refrigeration systems
- Easy to use — has good solubility and stability with the refrigerants and oils — at low and high temperatures.
 - It pinpoints the leaks — the red colour appears at the location of the leak, sometimes in a matter of minutes. Locates both large and also multiple leaks close together.
 - It is a liquid — no solid residues to cause plugging of expansion devices, strainers, or filter-driers.
 - It is non-inflammable — can be used in areas where a flammable atmosphere may present a hazard as with some types of leak detectors.
 - It is non-reactive — has no effect on metals, oils, or insulation materials in refrigeration systems. Does not affect performance of liquid line moisture indicators.
 - Especially useful for automotive air conditioning.



VIRGINIA CAN-O-GAS® SAFETY RELIEF TOP CAN

Refrigerant 12, 14 oz. Can with Safety Relief Tapping Ring Top to prevent accidental bursting of can due to excessive internal pressure during charging. Pierce tapping of can through plastic ring.

14 oz. Can	CAT. NO. 18584
Plastic Safety Tapping Ring	CAT. NO. 18585



IMPERIAL TAP-A-CAN VALVES

No. 338-C Universal Tap-a-Can Valve fits all refrigerant cans. Has both plain and threaded spud top. 1/4" flare connection fits standard charging lines.

CAT. NO.
18568

ROBINAIR CAN TAPPING VALVES

Fits all flat top or threaded cans. Installed in a second by simply pressing the cam type locking device. Positive cam action insures against accidental blow off.

CAT. NO.
18575



REFER REFRIG. & AIR CONDITIONING SECTION 2 Pages 185, 185-a and 185-b
FOR COMPLETE DETAILS ON REFRIGERANTS AND DISPENSING EQUIPMENT



AUTOMOTIVE AIR CONDITIONING IMPERIAL SERVICE AIDS



SERVICE MANIFOLDS

Deep Vacuum Valve Design

Diaphragm valve design operates with fingertip precision. One turn to full open.

T-Grip Controls

Non-slip even with oily fingers.

Built-in Hose Closures

Hose ends screw into special body fittings.

4-Port Connections

Permit connecting vacuum, low side, high side and refrigerant lines at the same time. 4th port with depressor valve provides vacuum connection. Connections are 1/4" flare.

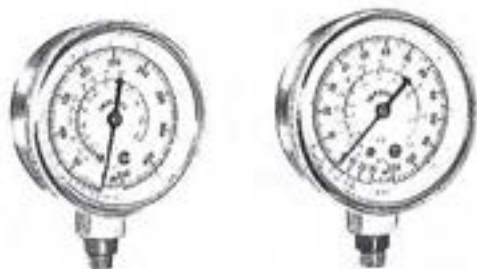
Tough Gauge Crystals

Impact resistant Lexan.
Front recalibration.

MODEL 453 - CB

CAT. NO. 34960

2 1/2" ADJUSTABLE PRESSURE AND COMPOUND GAUGES



CAT. NO.	MODEL	SIZE	TYPE	RANGE kPa	TEMP. °C REFRIG.	FINISH
33034	423-CK	2 1/2"	Pressure	0 - 3400	R12,22,502	Red Paint
33035	425-CK	2 1/2"	Compound	-100 - 0 - 1700	R12,22,502	Blue Paint

DUAL SCALE (kPa/PSI) GAUGES ALSO AVAILABLE — Refer Pages 330-a & 330-b

RATCHET WRENCHES

Covers 4 Sizes

Steel forged wrench has reversible ratchets. 7/16", 1/2" hex, 1/4" and 3/16" square ratchet.

124-C Ratchet Wrench.

CAT. NO. 35427



Covers 4 Sizes

Compact chrome plated wrench specially designed for use in hard to reach places. 1/4", 3/8", 7/16" and 1/8" square ratchets.

127-C Ratchet Wrench.

CAT. NO. 35429



REFER ALSO REFRIG./AIR CONDITIONING SECTIONS FOR:

Service Manifolds
Gauges
Wrenches

— Pages 349-b and 349-c.
— Pages 330-a, 330-b and 349.
— Pages 354 and 354-a.



AUTOMOTIVE AIR CONDITIONING SERVICE AIDS



ROBINAIR®

Dial-a-charge® charging cylinders

Duplicate factory accuracy when recharging systems in the field
Accuracy $\pm 1/4$ oz.

Dial-A-Charge Charging Cylinders permit the serviceman to easily compensate for volume fluctuations resulting from temperature variations. They allow the serviceman to buy refrigerant in economical drums and provide accuracy in recharging, eliminating over and under charging which might require call backs.

These cylinders are provided with heating elements. The use of the cylinders with the heating element allows the serviceman to overcome equalization of pressure between the system and the charging cylinder and reduce time required to recharge.

Cylinders with heating elements eliminate the need to warm with a heating blanket, or immerse the cylinder in a container of hot water or heat the base with a torch.

Simply "dial" the calibrated plastic shroud so the pressure heading at the top of the shroud corresponds to the gauge reading and the cylinder is ready to charge. Cylinders have shut-off valves with Teflon seats for finger tip control in charging systems to factory specifications, and are accurate to $\frac{1}{4}$ oz. of refrigerant when charging system.

WARNING

Due to the chemical nature of most refrigerants, high ambient and working temperatures will cause high pressures within the cylinder. To eliminate this potentially dangerous condition all Robinair Charging Cylinders are equipped with automatic pressure relief valves for your safety.

CAT. NO.	PART No.	CAPACITY GRAMS	GAUGE	GRADUATION INCREMENTS
34916	20310	1100	kPa/PSI	25 g
34912	20311	2200	kPa/PSI	25 g
34913	20312	4400	kPa/PSI	50 g

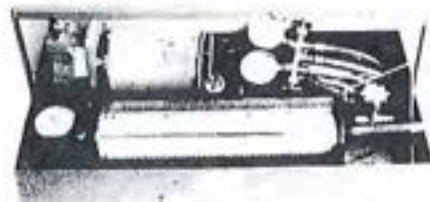
REPLACEMENT PARTS

	14764	Cylinder Pressure Gauge kPa/PSI
	14322	Replacement Heating Element
34951	43291	Sight Glass
34952	10746	1100
34953	10747	2200
34954	10748	4400
		Gasket Kits:
		Sight Glass and
		Inner Cylinder

ROBINAIR®

CHARGING STATIONS

TAKE YOUR SERVICE SHOP TO THE JOB

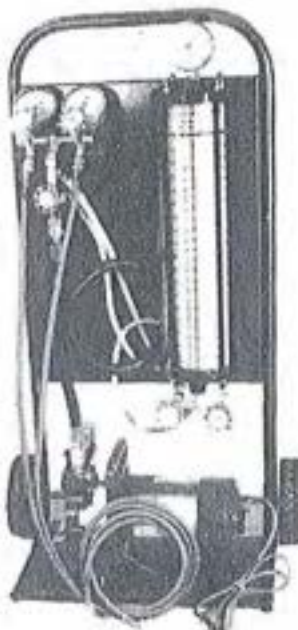


ROBI-PAK P/N 49001

These portable charging kits are designed as the ideal service aid for appliance and automotive repair shops. Consists of:
15096 High Vacuum Pump
43769 5 lb. Charging Cylinder
40153 Gauge Manifold Set

These portable charging stations are designed as the ideal service aid for appliance and automotive repair shops. They are also used by some servicemen to make home repair calls. Utilizing the 15096 Vacuum Pump and one of the heated Dial-A-Charge Charging Cylinders along with the necessary manifold, gauges, lines, etc., these units require only one hook-up to dehydrate and recharge a refrigerant system. For appliance repair, they are ideal for window air conditioners, freezers, refrigerators, etc. since they are mobile and can be taken to the job. This same feature makes them the only practical piece of equipment available for garage mechanics working on automotive air conditioners.

The carts are constructed with 5/8" square steel handles, framing rigid sheet metal support plates and mounted on 1" x 8" wheels.



13105

CAT. NO.	PART No.	CYLINDER CAPACITY lbs.	PUMP CAPACITY CFM	DESCRIPTION
349125	13105	5	1	PORTABLE CHARGING STATION
349126	13106	10	1	
349133	49001	5	1	ROBI-PAK CHARGING KIT

ACTROL KEEPS YOU UP-TO-DATE

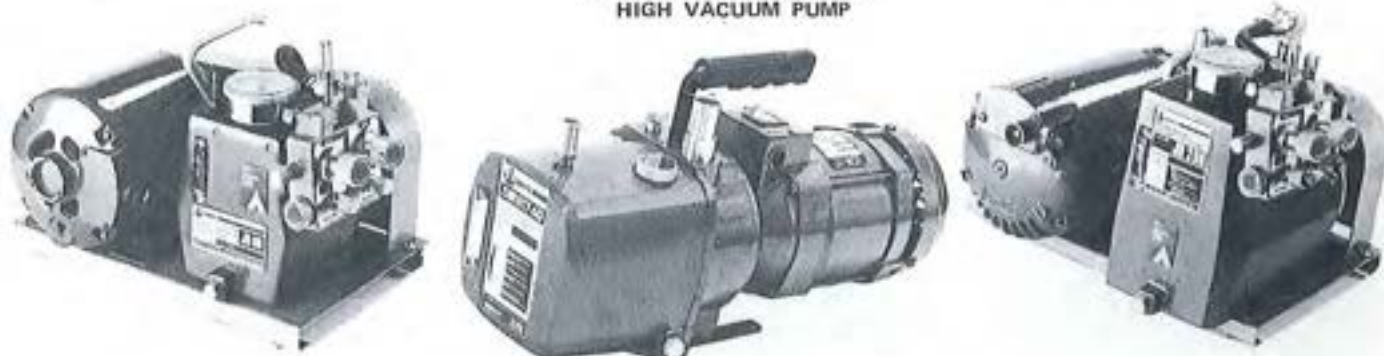
WE ARE CONTINUALLY STUDYING THE LOCAL AND INTERNATIONAL MARKETS
TO MAKE AVAILABLE THE MOST MODERN TYPE OF EQUIPMENT



AUTOMOTIVE AIR CONDITIONING SERVICE AIDS

JAVAC JIGTOOL HIGH VACUUM PUMPS

AND INTRODUCING THE
NEW JAVAC "DIRECT 60"
HIGH VACUUM PUMP



The New "J" Series of Vacuum pumps are fully described on Page 362 — Technical Specifications are shown in the table below
In addition, Javac have now developed a completely new high vacuum pump — the "DIRECT 60" — Details as follows:

This new style High Vacuum Pump has been developed for the scientific, industrial and general market. The new Javac DIRECT 60 High Vacuum Pump is a single stage in-line configured pump, which has been designed using some advantages of a belt-driven system employed to the direct drive principle. Previously, direct drives were complex/difficult to repair and suffered from excessive bearing wear — not so with the Javac DIRECT 60. The well known VACPAK® system employed in the Jigtool "J" range has been adapted into the Javac Direct 60 and now features quick removal without the need to disconnect or break the vacuum system. Further to this, a positive displacement oil pump feeds a monitored quantity of oil to the bearing and seal face to ensure long bearing life and high ultimate vacuums. It also completely eliminates oil suck-back, common to most direct drive vacuum pumps.

Cosmetically, the Javac DIRECT 60 is low profile and light weight with all the important components in easy reach.

Additional features include gas ballast, on/off switch, fan cooled continuously rated alloy motor, low noise, vibration and operation temperature serve to make the Javac DIRECT 60 ideal for all applications.

Precise machining and repeatability ensure all parts are of the highest possible quality. This is maintained by computer controlled machining centres and strict quality control, thus all components are fully interchangeable and easily replaced.

The Javac DIRECT 60 is priced below any competitive high vacuum pump, having superior performance and quality and coupled to the Jigtool "know how" to ensure it of world wide success.

JAVAC "DIRECT 60" FEATURES

- Single stage high vacuum pump.
- Direct drive.
- Low weight — alloy fan cooled motor.
- On/Off switch.
- Convenient carry handle.
- Sturdy base — can be bolted down.
- Full gas ballast.
- Large throughput suction fitting (Others available).
- Quiet vibration free operation.
- Positively no oil suck-back (built-in oil pump).
- Fully "O" ring sealed — no glues.
- Replaceable VACPAK® cartridge.
- Easy to dismantle and service modular form.
- Oil level not critical — will operate over a wide range, hence low maintenance.
- High vacuum capability better than 50×10^{-3} torr (50 microns).
- High flow rate of 60 litres/min.
- Net weight 12.5 kg.
- Australian designed and manufactured.
- All components interchangeable as built on computer controlled machinery.
- Fully guaranteed for 12 months.

CAT. NO.	MODEL	CAPACITY L/min.	PUMP RPM	OIL CHARGE Litre	MOTOR HP	SUCTION FITTING OD mm	WEIGHT kg	ACCESS'Y FITTING	REPLAC. VACPAK® CARTRIDGE CAT. NO.
SINGLE STAGE — Vacuum — Better than 50×10^{-3} torr (6.5 Pa) (50 microns)									
36210	Direct 60	60	1440	0.5/0.7	1/3	20	12.5	Optional	
SINGLE STAGE — Ultimate Vacuum 20×10^{-3} torr (2.64 Pa) (20 microns)									
36213	JS60	60	800	0.9	1/3	20	19	—	36282
	JSR60*	60	800	0.9	1/3	20	21	Manifold	
	JS120	120	800	0.7	1/3	20	21	—	36285
	JSR120*	120	800	0.7	1/3	20	23	Manifold	
	JS200	215	660	1.3	1/3	25	24	—	
36221	JSR200*	215	660	1.3	1/3	25	26	Manifold	
DOUBLE STAGE — Ultimate Vacuum 1×10^{-3} torr (.13 Pa) (1 micron)									
36214	JD60	60	800	0.7	1/3	20	21	—	36283
36215	JDR60*	60	800	0.7	1/3	20	23	Manifold	
36218	JD120	120	800	1.3	1/3	20	24	—	36286
36219	JDR120*	120	800	1.3	1/3	20	26	Manifold	
36220	JD200	215	660	1.7	1/2	25	34	—	36288
36222	JDR200*	215	660	1.7	1/2	25	36	Manifold	

NOTES: * All "R" (Refrigeration Series) units are fitted with a scale trap incorporating charging/nitrogen sweep valve, pump isolation valve, leak detector, compound/vacuum gauge and system connection hoses.
All units feature replaceable VACPAK® Cartridge. All motors 240 Volt 50 Hz. with 1.8 m (6 ft.) lead.
RECOMMENDED OIL — SUNISO 3GS — Refer Page 184.

REFER PAGE 362 FOR SERVICE ON VACPAK® CARTRIDGES AND VACUUM PUMPS

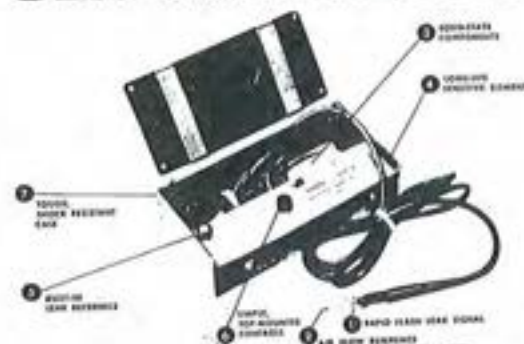


AUTOMOTIVE AIR CONDITIONING SERVICE AIDS



LEAK DETECTORS

GENERAL ELECTRIC "H-10A" -ELECTRONIC TYPE - 240V. A.C.



The G.E. H-10A Leak Detector draws in sample air through the probe tip. There is an instantaneous signal flash when you are near a leak. The faster the light flashes, the closer you are to the leak. An easy-to-see ball float built into the probe gives you a constant check on airflow through the probe. Solid state components add long life and minimize maintenance. The sensitive platinum element seldom requires replacement. When it does, a replacement simply plugs in. Has handy top-mounted controls for quick settings and adjustments. The H-10A's sensitivity is easily regulated with the Hi-Low switch. Hi can be used for most jobs; Low is for auto. air conditioner leaks.

SPECIFICATIONS

Power Supply: 240 volts, 50 cycles, 12 watts.
Sensitivity: 0.5 oz/year of R12 on Hi. 1.0 oz/year of R12 on Low.
Response Time: Approx. 1 second.
Reference Leak: R11 (refillable) Approx. life, 1 year.
Warm-up Time: Approx. 1 minute.
Dimensions: 114 x 66 x 216 mm (4.5 x 2.6 x 8.5 inches). Weight: 1 kg (2.2 lb).

CAT. NO. 3512

MODEL H-10A G.E. ELECTRONIC LEAK DETECTOR

New Leak Detector for Refrigeration Engineers

HALOTECK

- Rapid Response • Audio Output
- No Warm-up Time • Only one control
- Sensitive to less than 1/10th. oz. per year
- Battery Operated • Lightweight • Built-in Test Leak
- Completely new design sensor tip insensitive to draughts

SPECIFICATIONS

Sensitivity: Better than 1/10th oz/yr. R12. Response Time: 0.1 sec. to 1 oz/yr. leak R12
Battery: 9 volt alkaline (PP3 size) Battery Life: 30 hours normal use
Duty Cycle: Continuous Operating Temperature: 0°C to 40°C
Check Leak: Nominally 1/2 oz/yr (14 g/yr) Probe Length: 240 mm (9.5")
Weight: 305 g (10.7 oz) with batteries and spares
Spares Supplied: 1 spare sensor, 1 pack filters, 1 check leak

CAT. NO.	TYPE NO.	DESCRIPTION
35146	78.000	Halotek Leak Detector

watco

SEARCH®

THE HIGH VISCOSITY
LEAK DETECTOR
FOR REFRIGERANT
AIR AND GAS SYSTEMS

Search is packaged in an unbreakable squeeze type bottle with self-applicator.

Search is clean, non toxic and easy to apply. Simply apply Search to the suspicious area and watch for the bubbles to appear.

CAT. NO. 3502



Search is a special formula developed to pin-point the slightest leak, by applying it to the suspicious area. It's important to note that Search will not run off freely like a soap and water type solution. Its high viscosity enables Search to cling and wrap itself around the tube or fitting... As a result all possible leakage points, including normally hard to reach areas are covered, without causing unnecessary mess.
NOTE: Search is a safety must for auto. air-conditioner servicing, since it incorporates no open flame.

ROBINAIR® TEST INSTRUMENTS

THERMISTOR VACUUM GAUGE



CAT. NO. 36116

14010 Battery Operated. Range: 25,000-0 microns
Accuracy: 10 microns ± 2.5 microns
50 microns ± 7.5 microns
500 & up $\pm 10\%$
Battery Operated: 6 Alkaline "D" Cells
Battery Life: 250-300 hours
Compensated for Ambient Temp. : From 30°F to 120°F
Has a unique type bridge circuit which compensates for changes in ambient temperature and variance in battery voltage. Provides a means of monitoring the pull down of the vacuum pump on a system. Indicates leaks in a system if instrument shows increasing pressure reading. Two types of operation are provided - the null method providing greatest accuracy, and a direct meter reading which gives a continuous monitoring of evacuation progress in the system.

TEMPERATURE TESTER

(Four Jack - Dual Range - 14845)

Range: -45.6°C to 37.8°C Low

37.8°C to 148.9°C High

Accuracy: -17°C to +93°C $\pm 1^\circ\text{C}$

Balance of scale $\pm 2^\circ\text{C}$

Display: Large 4-1/4" x 3-3/16" meter

Size: 10" x 7-1/2" x 3-3/8"

Leads: Has 4 jacks for detachable leads.

Unit is supplied with two 43913 15 ft.

general purpose leads. Additional leads

available - P/N's 43913 thru 43918.

Refer Page 339-a.

Operates on 1 "D" cell battery (not

included). Unit is self-contained in

portable carrying case.

CAT. NO. 3399



14845

THESE ITEMS ARE COMMON TO THOSE DETAILED IN THE REFRIGERATION AND AIR CONDITIONING SECTION OF THIS CATALOGUE. FOR FULL DETAILS AND ADDITIONAL EQUIPMENT RANGES - REFER MAIN INDEX



AUTOMOTIVE AIR CONDITIONING TOOLS AND ACCESSORIES



VIRGINIA PT1 PRESSTITE INSULATION TAPE

Used to wrap expansion valve, thermal sensing bulb, suction lines or other parts to protect from engine heat. Insulates and seals. Stops water drip. Sticks to all metal and rubber parts. Self-adhering.

CAT. NO. 21087

FIN COMBS



For Straightening and Cleaning Evaporator and Condenser Fins

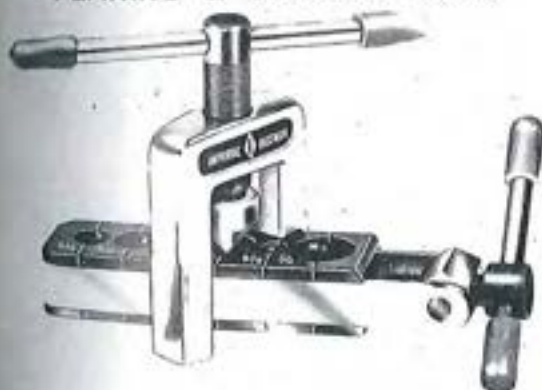
REFER REFRIG./AIR COND. SECTION 6
PAGE 347

TUBE CUTTERS



REFER REFRIG./AIR COND. SECTION 6
PAGES 356, 356-a, 356-b, 356-c

FLARING & SWAGING TOOLS



REFER REFRIG./AIR COND. SECTION 6
PAGES 348, 348-a, 348-b, 348-c, 348-d



OILS

REFER
REFRIG./AIR COND.
SECTION 2

PAGES
184 & 184-a

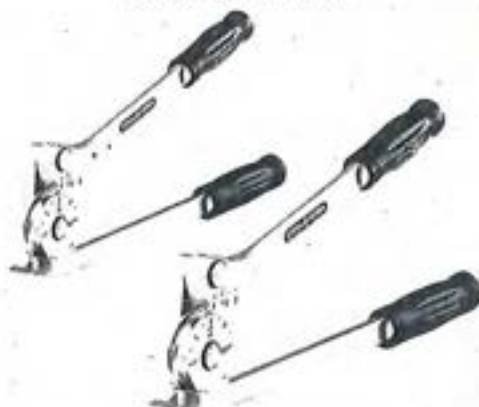
CHARGING LINES



REFER
REFRIG./AIR COND.
SECTION 6

PAGES
349-a, 349-c

TUBE BENDERS



REFER REFRIG./AIR COND. SECTION 6
PAGES 355, 355-a

SPRING TYPE TUBE BENDERS



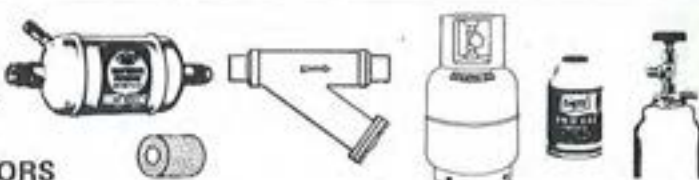
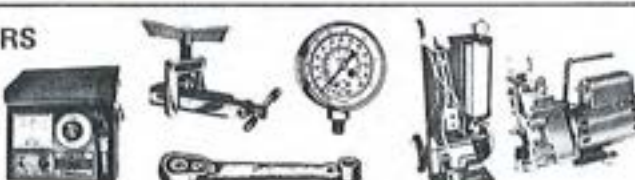
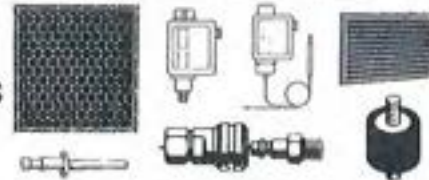
REFER REFRIG./AIR COND. SECTION 6
PAGE 355.

PICK-UP COUNTERS EVERYWHERE

AS WE GO TO PRESS THERE ARE 30 LARGE WAREHOUSES THROUGHOUT AUSTRALIA WITH STOCK FOR IMMEDIATE PICK-UP INCLUDING FAST COUNTER SERVICE. THE COMPLETE LISTING IS AT THE FRONT OF THIS CATALOGUE. IN MOST CASES THESE BRANCHES ARE IN LOCATIONS WITH FREE PARKING.

ACTROL PARTS CATALOGUE & TECHNICAL MANUAL NO. 4
COMPILED, TYPESET AND PRODUCED BY:-
TECHNICAL MARKETING RESOURCES PTY. LTD., MELB.
PRINTED BY:- RAMSAY WARE STOCKLAND PTY. LTD., MELB.

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2 Purple	FILTERS, DRIERS, STRAINERS DRYING AGENTS, DESICCANTS REFRIGERANTS, OILS, TEST KITS REFRIGERANT SERVICE AIDS CLEANERS, SOLVENTS, PROTECTORS 
3 Yellow	LINE FITTINGS & TUBING PIPE INSULATION & ADHESIVES VALVES – CHECK, RELIEF, AMMONIA LIQUID/MOISTURE INDICATORS SIGHT GLASSES, VIBRATION ELIMINATORS 
4 Orange	CABINET ACCESSORIES – HARDWARE COMPRESSORS & COND. UNITS – PARTS ADHESIVES, SEALANTS, MASTICS, TAPES INSULATION, COOL ROOM EQUIP. – FDC's SYSTEM COMPONENTS – AIR CURTAINS 
5 Pink	FAN BLADES & MOTORS, EXHAUST FANS MOTORS & STARTERS TERMINALS, BATTERIES RELAYS, OVERLOADS, CAPACITORS BOOKS, ELECTRICAL APPLIANCES 
6 Red	INSTRUMENTS, TOOLS, THERMOMETERS PRESSURE GAUGES, ELECT. METERS SOLDERS, BRAZING ALLOYS, FLUXES LEAK DETECTORS, VACUUM PUMPS SERVICING & CHARGING EQUIPMENT 
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9 Gold	AUTOMOTIVE AIR CONDITIONING COMPRESSORS, CONDENSERS, EVAPORATORS VALVES, SWITCHES, RECEIVER-DRIERS CLUTCHES, FAN BLADES, ADAPTOR KITS TOOLS, EQUIPMENT & ACCESSORIES 