anything Parker Possible.™

Air Conditioning & Refrigeration

Master Catalog

Catalog CIC-2003-1/USA
April 2003



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Climate & Industrial Controls Group
Cleveland, OH

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⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, OH

Parker, Your Preferred Supplier

For refrigeration and air conditioning OEMs, wholesalers and contractors, Parker Hannifin offers a complete value package that makes it the supplier of choice.

Product Breadth

Parker has assembled a formidable package of refrigeration and air conditioning products. As outlined in the pages of this catalog, it is clear that no other single manufacturer offers a more comprehensive selection. Customers seeking one stop shopping need look no further. And while the current portfolio is impressive, Parker continues to expand its offering via internal product development and strategic acquisition.

Value-Added Systems, Assemblies and Kits

Beyond components lie systems. To meet customers' overall application needs, Parker combines the best of its product line to deliver customized kits, subsystems, manifolds and leak-free value-added assemblies. The result is maximum performance and total value.

Parker can add value to your units by creating unique assemblies designed to your specifications. Our manufacturing and assembling processes create value-added assemblies that include components and custom-bent tubing to match the unique design of a unit. Components, such as valves, couplings, dryers, and distributors, can be connected together with complex custom-bent tubing providing a cost reduction.

Less inventory and fewer suppliers will be required within your facility by allowing Parker to manufacture your assemblies. Each assembly is leak tested to ensure performance and reduce warranty costs. Shippable directly to your assembly line, value-added assemblies can increase your line rates, maintain less scrap, and eliminate floor space and overhead. All assemblies are UL & CSA recognized.

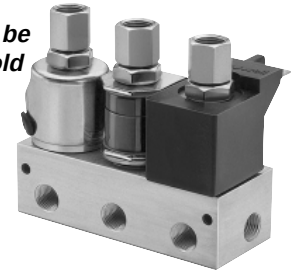
Parker Value-Added Systems – Case History

Parker recently engineered this subsystem for a maker of refrigerant recovery and reclaim units.

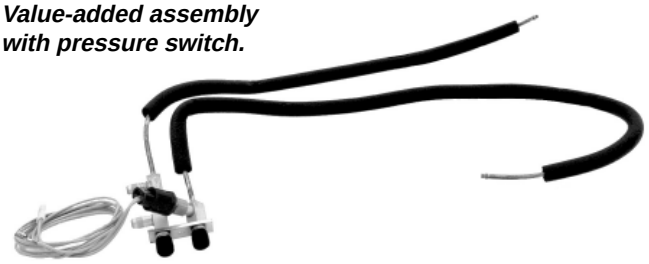
The results:

- 105 separate parts combined into 1 subsystem and supplied as 1 part number
- 82 potential leak points reduced to 27
- 50% less labor per finished unit
- $257,000 annual cost savings for the customer
- Many vendors to one

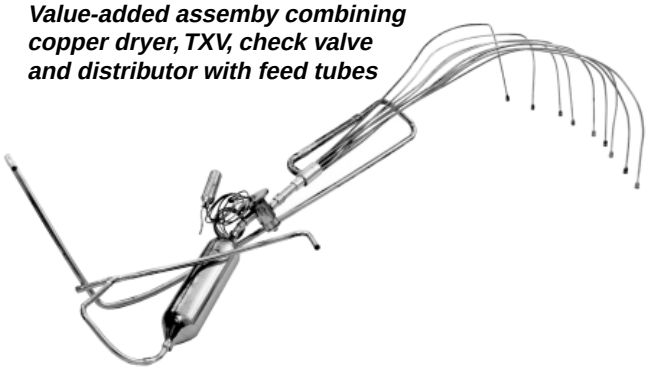
Solenoid valves can be mounted to a manifold in any combination.

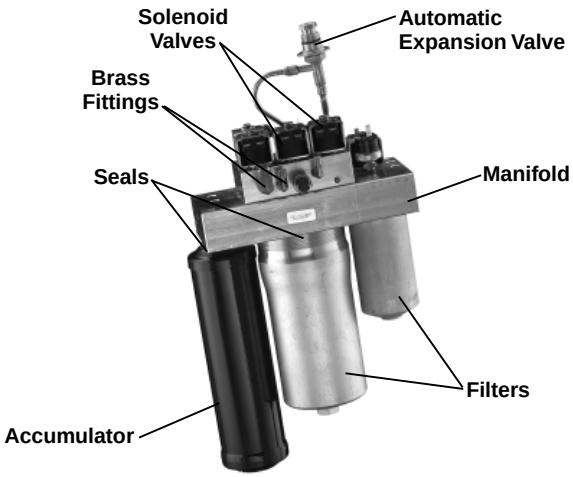


Value-added assembly with pressure switch.



Value-added assemby combining copper dryer, TXV, check valve and distributor with feed tubes





Globally Capable

In its quest to provide premier customer service, Parker is everywhere. More than 48,000 employees work in 200+ manufacturing locations and 150+ service centers. They work in 49 countries on 6 continents and speak close to 100 languages. Another 8,200 distributors and Parker Stores provide service and support. All Parker operating units connect globally via an enterprise gateway. This portal provides customers and suppliers alike a mechanism to deal with the company's many locations as though they were a single entity.

Lean Manufacturing Techniques and "Cost Outs"

Throughout its 200+ manufacturing operations, Parker employs "lean" –a systematic methodology for elimination of waste. Basic "lean rules" are present in all Parker factories, including value stream mapping, one-piece flow manufacturing, visual controls, kaizen events, internal kanban, and concurrent engineering. ISO, QS, and other certifications are also in place. Parker is pleased to work with its customers to identify possible wastes in their own manufacturing processes to generate "cost out" ideas.

Technology Leadership

Technology has long been at the heart of Parker's success. At a corporate level, Parker Central Engineering leads the way. Using computer simulation and other techniques, our army of engineers design peak performance into flow control, pneumatic, hydraulic, electromechanical, magnetic, thermal, and refrigeration systems.

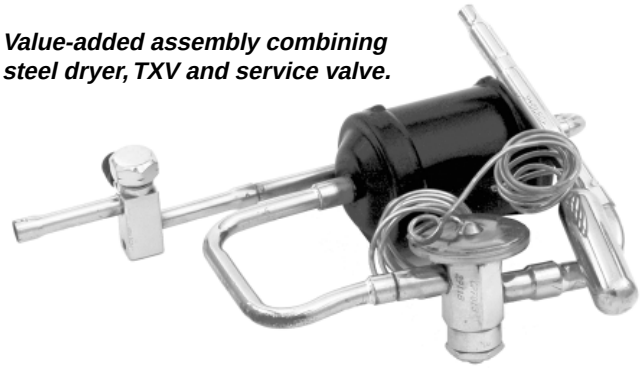
The Climate and Industrial Controls Group boasts its own array of technology resources: a dedicated Applied Technology Center; test ammonia rigs and supermarket racks; environmental chambers; vibration, burst, and impulse testing units; a fuel cell business unit; and design engineering staff at every division. The results are clear –more than 150 patents in climate and control technology over the past 40 years.

e-Business Capabilities

inPHorm product selection software, EDI (electronic data interchange), Par-Zap bar coding technology, PHconnect for secured internet business to business transactions, and www.parker.com, one of the most comprehensive sites on the web.



Pressure Regulator Mini Service Kit



Value-added assembly combining steel dryer, TXV and service valve.



Custom Kit featuring solenoid valves, copper dryers, expansion valves and distributors.

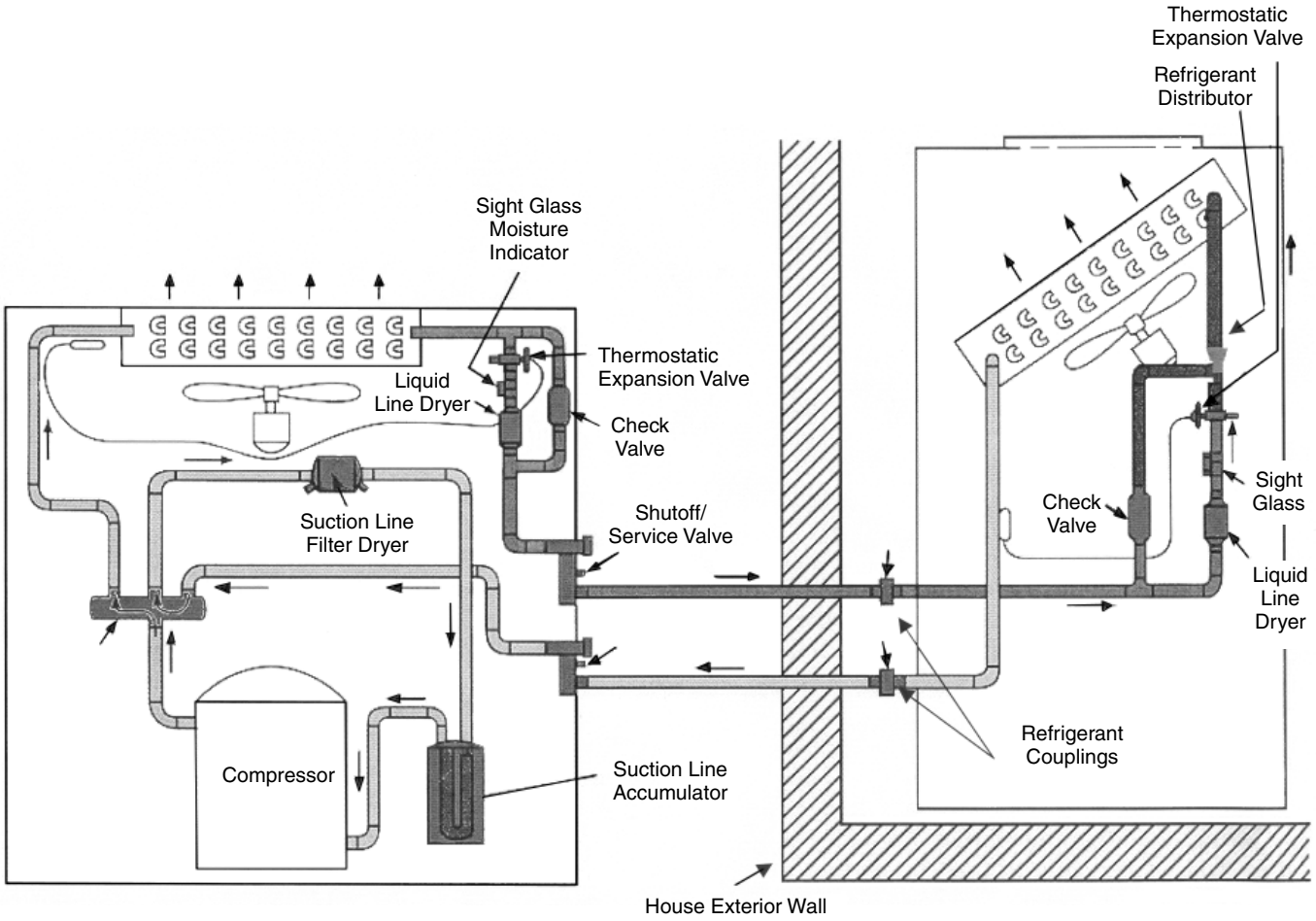


Value-added assembly combining copper dryer, TXV and service valve.

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Climate & Industrial Controls Group
Cleveland, OH

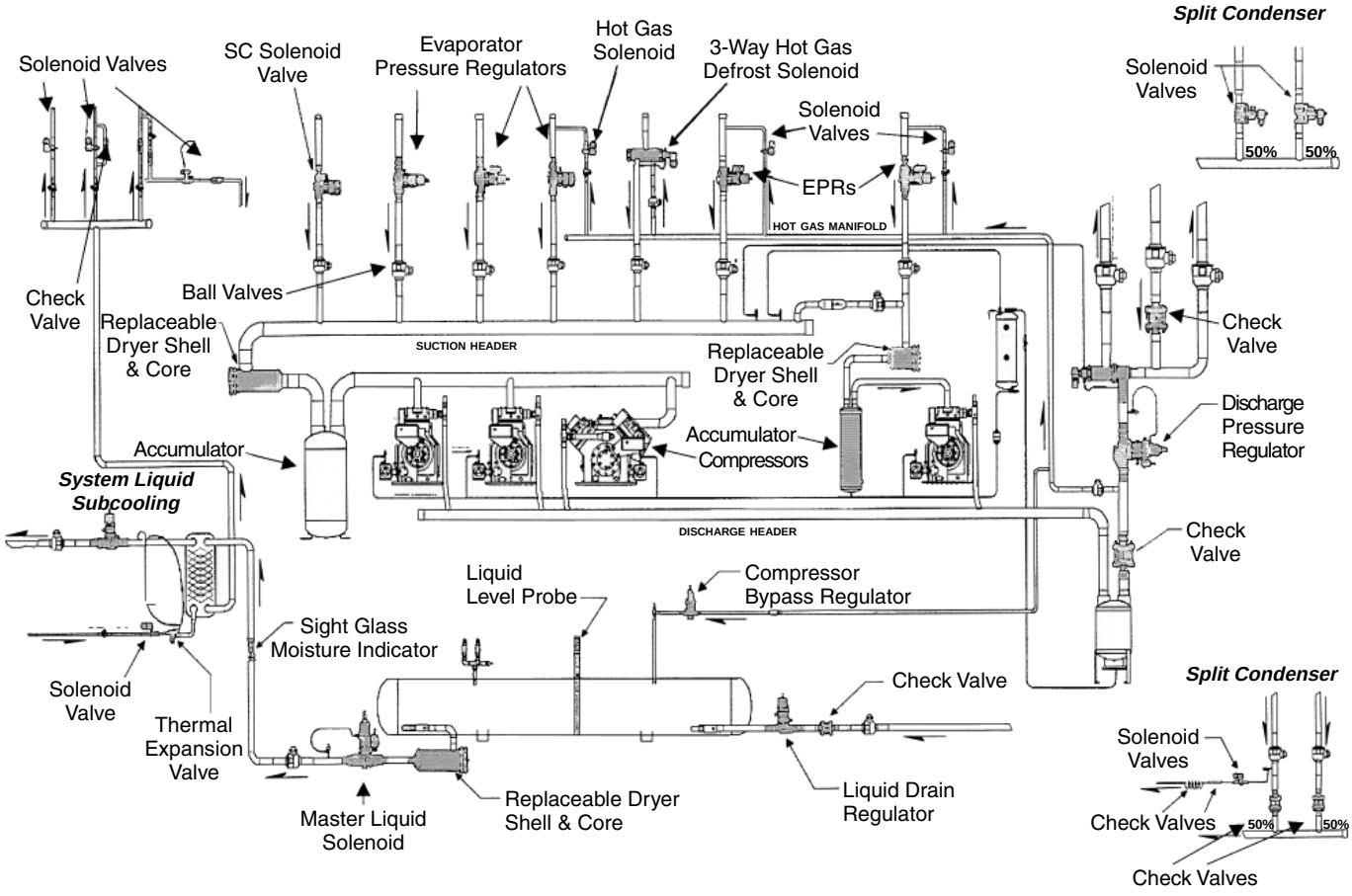
Parker knows that not all refrigeration and air conditioning applications are created equal. We have dedicated engineers and sales force with hundreds of years combined experience and knowledge in commercial, residential, industrial and supermarket systems.

Application Expertise:
Residential and Commercial Air Conditioning



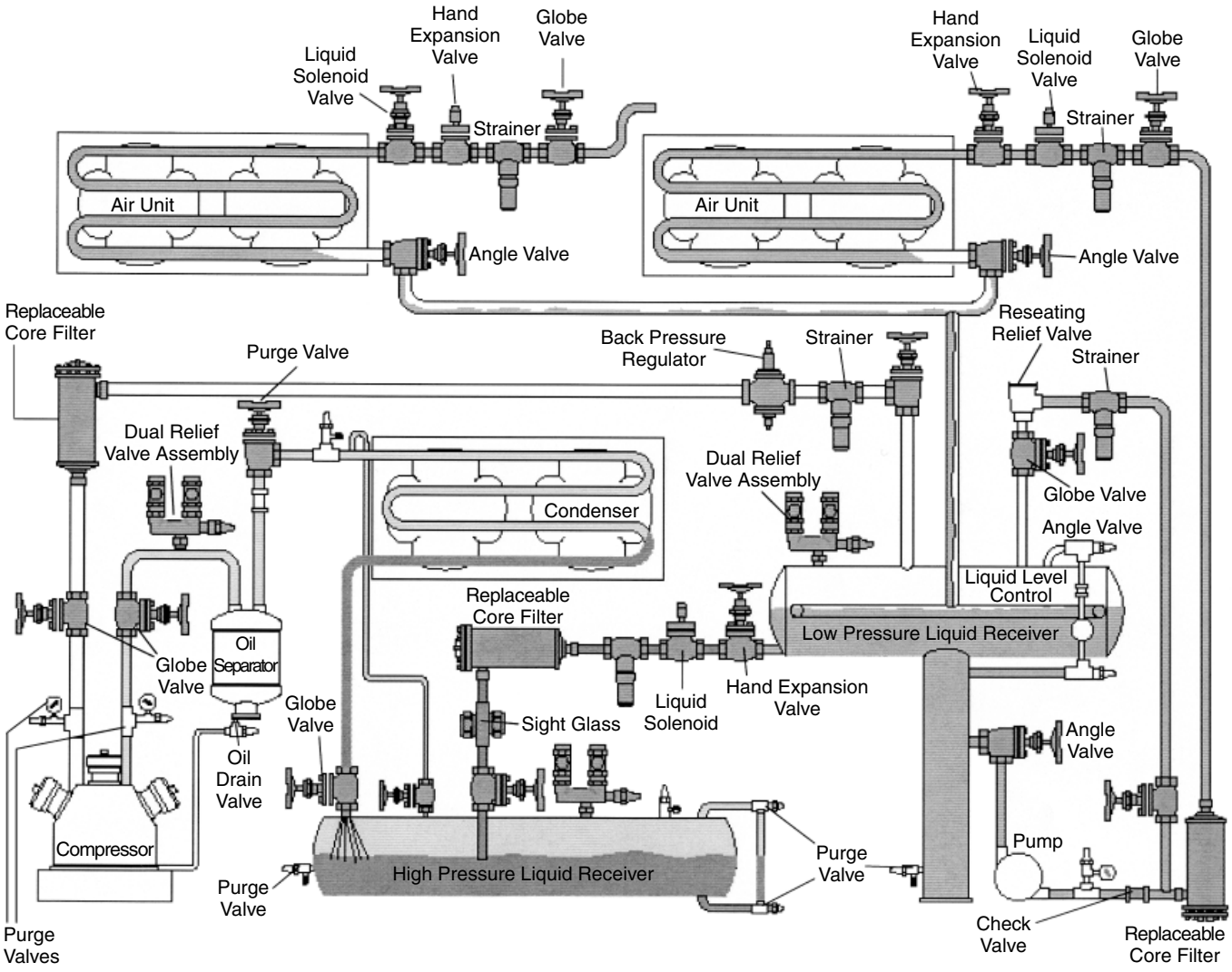
Parker knows "the guts" of air conditioning systems better than anyone. That's why global air conditioning equipment makers depend on Parker product breadth and engineering expertise. In return, these customers get customized, leak free subsystems that fit their applications perfectly.

Application Expertise:
Supermarket Refrigeration



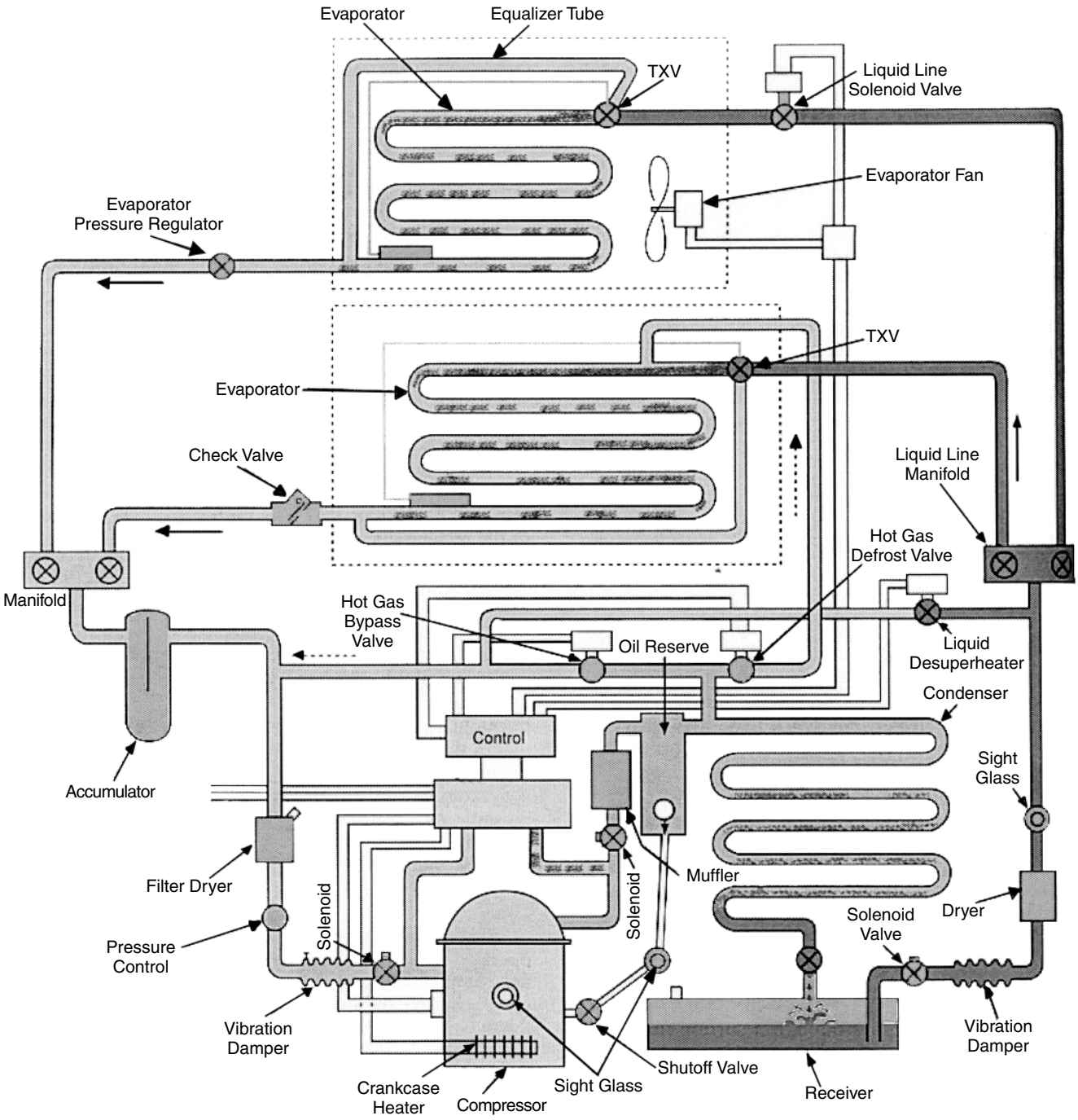
Parker prevents and solves problems for supermarket store owners. Our technology ensures that FDA and other food safety temperature guidelines are met; minimizes the “energy penalty” that improperly designed competitive products can cause; and reduces maintenance and inventory costs by offering standard products that meet different application needs with simple interchangeable cartridges, kits and adapters.

Application Expertise:
Industrial Refrigeration



Parker keeps the world's food supply safe. As the world's population grows, so does its need for large scale, refrigerated food preparation and storage facilities. Food warehouses, meat plants, fisheries, dairies, breweries and wineries all rely on Parker Refrigerating Specialties (RS) brand components and systems. The result: food of the highest freshness, quality and safety.

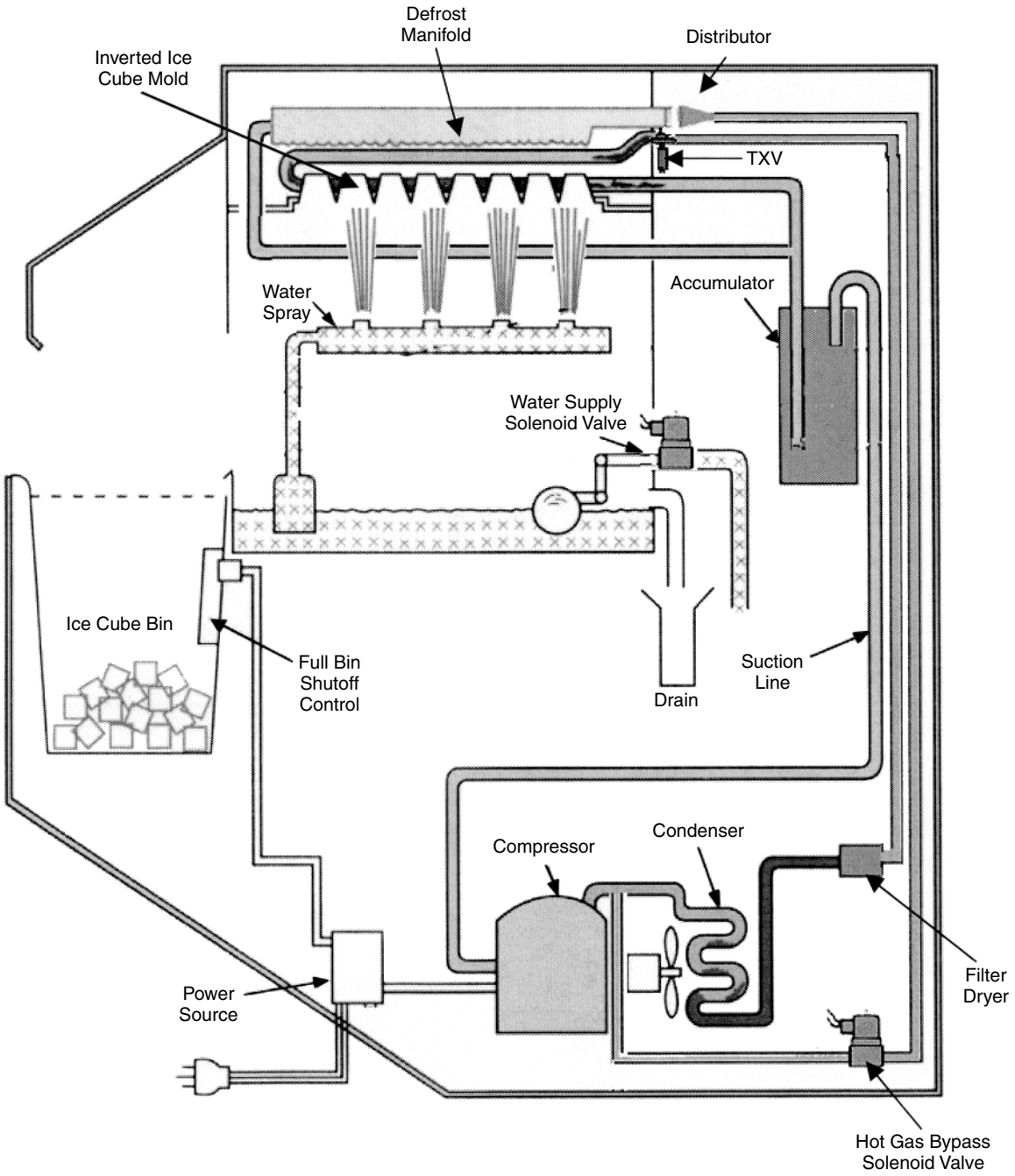
Application Expertise:
Commercial Refrigeration (Walk-In Cooler Application)



From the kitchen to the cooler, Parker knows commercial refrigeration. The list of applications is diverse...appliances, water fountains, ice machines, yogurt and ice cream machines, beverage dispensing, transport refrigeration, cryogenics, medicine, entertainment, specialty cooling...The common factor? Dependable, energy efficient performance powered by Parker.

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Cleveland, OH

Application Expertise:
Commercial Refrigeration (Ice Machine Application)



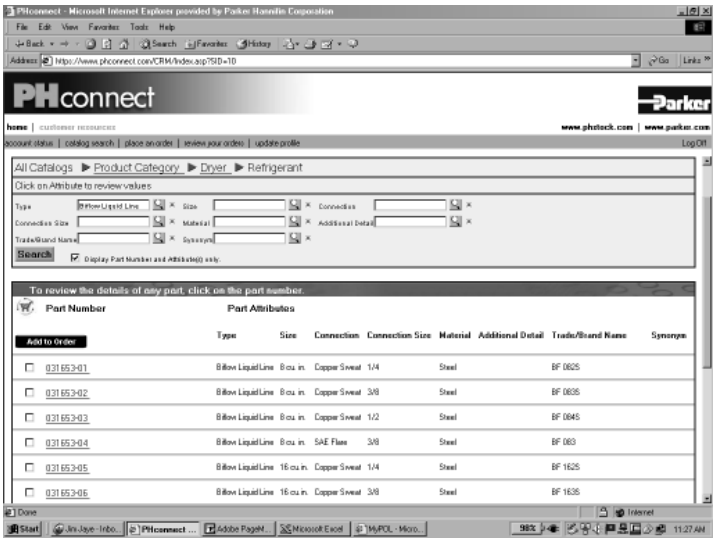
PHconnect - Internet Customer Resource

PHconnect, Parker's online resource, enables Parker customers to do the following via the internet:

- enter orders
- check product inventory and availability
- search product catalogs
- check order status
- track package shipment and delivery
- check account status with Parker

PHconnect is available 24/7. Requirements include an internet connection and an account with Parker Hannifin. PHconnect is a FREE service. *(Some capabilities not available to all customers — contact your Parker sales rep for more information.)*

To get started with PHconnect, copy the form below. Then complete and return it to the address below.



PHconnect Application

COMPANY NAME: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

PHONE NUMBER (including area code): _____

YOUR COMPANY'S BILL-TO AND SHIP-TO LOCATIONS (PARKER SIX-DIGIT CUSTOMER CODES) FOR WHICH YOU ARE REQUESTING PHCONNECT

BILL-TO: _____ SHIP-TO: _____

USER ADMINISTRATOR (should be main user at this location; can also grant access to PHconnect features to other users at this location)

NAME/TITLE: _____ E-MAIL ADDRESS: _____

REQUESTED USER ID (i.e. Bobby123, LisaXYZ, etc.): _____

ADDITIONAL USERS:

1) NAME/TITLE: _____ E-MAIL ADDRESS: _____

REQUESTED USER ID (i.e. Bobby123, LisaXYZ, etc.): _____

2) NAME/TITLE: _____ E-MAIL ADDRESS: _____

REQUESTED USER ID (i.e. Bobby123, LisaXYZ, etc.): _____

PERSON COMPLETING THIS FORM

By signing and completing this document, I agree to the standard terms and conditions of use listed on the back of this form.

YOUR NAME (please print): _____

TITLE: _____

SIGNATURE: _____ DATE: _____

PLEASE MAIL THIS FORM TO:

Parker Hannifin Corp.
Attention: PHconnect
Climate & Industrial Controls Group
6035 Parkland Blvd.
Cleveland, OH 44124

OR FAX IT TO:

Fax: 1-216-896-4008

EDI — Electronic Data Interchange

EDI (Electronic Data Interchange) is the computer application-to-computer application communication of a standard business transaction in a standard data format. EDI users eliminate unnecessary paperwork by exchanging information directly between computers and between applications instead of by telephone, facsimile, or mail.

Previously, corporations used different computers and systems, and the data communicated among these computers had to be manually reformatted. Today, EDI uses computer network technology to provide data storage, translation, and transmission among business partners. These services, which are not limited by hardware or software differences, convert a sender's speeds, codes, and document formats into forms compatible to the receiver.

EDI was first implemented in the transportation industry to help eliminate the large amounts of paperwork created to move products and manage inventories. Before EDI, the industry had to manually trace shipping requests and instructions from manufacturers, distributors, and customers. It has since been proven to be more efficient and less costly for both customers and suppliers to exchange such data electronically. Other industries followed, and today EDI has widespread application and is a key part of worldwide electronic commerce.

Although many of these trading partnerships have incompatible data formats, Parker is able to link with them because of the national EDI standards developed by the American National Standard Institute's Accredited Standards Committee X.12 (ANSI X.12). These standards provide a common language and format, and are supported by virtually all third-party networks and translation software distributors. Parker also belongs to the Automotive Industry Action Group (AIAG), the Aerospace Industries Association (AIA), and other trade associations that work to standardize and organize the collective efforts of various manufacturers and suppliers in the area of electronic data interchange.

Parker is especially well-poised to take advantage of EDI linkages because of its "Gateway Concept," in which Parker's internal communication network collects and distributes information to the customer from a single point. Conversely, customer transmitted information can be received at a single point and distributed to Parker divisions via the internal network. The Gateway provides a single highway among all Parker divisions and their customers, resulting in faster communication speed, added convenience to customers, and substantial cost savings for all parties involved.

Parker's information strategy has evolved into a comprehensive hardware and software resource. We will continue to use our EDI resource as an electronic commerce tool to enhance our customer service commitment.

Business Opportunities with EDI

With the increasing emphasis on customer service, EDI provides the following benefits:

- Allows users to transmit standard and paperless business transactions electronically.
- Increases accuracy and timeliness, resulting in faster and more efficient transaction processing.
- Reduces transaction costs.
- Reduces inventory and storage.
- Helps solve delivery problems.
- Adds a competitive advantage perspective, and may improve profits and market share by increased cash flow and enhanced planning.
- Offers potential cost savings due to high industry regard for EDI.

EDI is gaining as the preferred technology in receivables/invoicing and the totally paperless evaluated receipts settlement (ERS). The invoicing module is simply the creation of an electronic invoice following shipment of the goods, which streamlines paper saving and handling.

ERS goes even further in the payment of goods through electronic funds transfer. Upon recognizing the receipt of the material, the customer's computer recognizes the obligation, and subsequently initiates a payment funds transfer (EFT) from its bank to the vendor's bank for payment without involving an invoice.

Launching an electronic invoice at the same time as the product shipment creates an added benefit of advance shipment notification. The distribution customer has notice of in-transit material, and upon receipt may initiate normal invoice processing.

The future of EDI calls for more time-sensitive transactions, the elimination of edit problems or errors, and less human intervention in business processing functions.

Value-added Networks

Before information can be transmitted using EDI, data from the sender/user must first be translated into a standard format, and then communicated using the standard format to a receiver. This communication process takes place through either point-to-point

connection or through a third-party communications service. Point-to-point connection is only practical in businesses that do not deal with multiple trading partners.

Third-party communication networks or Value-Added Networks (VANS) eliminate the need for extra hardware, software, telephone connections, or manpower. Most trading partners find it convenient to use third-party networks. VANs are service bureau companies offering mailbox functions to trading partners, allowing them to receive and transmit their electronic transactions to multiple locations with minimal problems.

For instance, General Electric Information Services (GEIS) has a VAN called EDI*Express, which has a local access network to which a person can subscribe and receive a mailbox. Parker directly subscribes to several VANs, and all of these third-party service providers interconnect with virtually all other VANs.

The Role of Database Integration

Now that we have discussed many of the elements in the structure of EDI, it is important that you have an understanding of the content found within the EDI application structure. In other words, the ANSI standards alone will not fully ensure acceptance of an electronic document; the data itself must be recognized by the divisional application system and be efficiently applied within that system structure.

What this means is that if the data transmitted within the ANSI format does not conform to the divisional application database, then additional manual processing would be required. Since this would defeat the purpose of EDI, it is mandatory that trading partners use identical data (exact part numbers, prices, etc.) within their EDI processing.

For Original Equipment Manufacturers (OEMs), part numbers and prices agreed to by trading partner divisions must be precisely reflected in the OEM database. In this way, the customer's database and Parker's divisional EDI processing will be tied together with common data content.

Transactions that have been implemented within Parker divisions with various trading partners include those shown in the table at the right.

EDI Communication Guidelines

Communication

- Parker uses a dial out capability only. Trading partners do not have the ability to dial into Parker's mainframe computer.
- Therefore, Parker requires the use of a third-party network (VAN) service to provide store-and-forward capability and compliance checking (see page 9for more information). A listing of Value-Added Networks will be provided upon request.

Technical

- A micro, mini, or mainframe computer must be available to implement EDI.
- The computer must have communication capability; that is, you must have at least a business telephone line or the equivalent, as well as a modem.
- Parker communicates in a FTP protocol. The trading partners may use any protocol compatible with their selected third-party network.
- Each trading partner must have the ability to communicate data in the ANSI X.12 format. Internal use of the data is user-defined.
- Each trading partner should have sufficient error detection capability to ensure compliance within the ANSI X.12 format. Trading partners agree on specific field requirements within the ANSI format.

ANSITrans	EDIFACT Trans	Name		Send	Receive
152	*	Statistical Government Information	GR	X	
810	INVOIC	Invoice	IN	X	X
820	REMADV	Remittance Advice	RA		X
824	APERAK	Application Advice	AG	X	X
830	DELFOR	Material Release	PS	X	X
832	PRICAT	Price/Sales Catalog	SC	X	
836	*	Contract Award	RQ		X
838	PARTIN	Trading Partner Profile	TD		X
840	REQQTE	Request For Quote	RQ		X
841	QLSPEC	Tech Specifications	SP	X	X
842	NONCON	Non conformance Report	NC		X
843	QUOTES	Response to RFQ	RR	X	
846	INVINQ	Inventory Inquiry/Advice	IB	X	X
850	ORDERS	Purchase Order	PO	X	X
853	*	Carrier Routing	RI		X
855	ORDRSP	PO Acknowledgment	PR	X	X
856	DESADV or PRODEX	Advance Shipment Notification	SH	X	X
860	ORDCHG	PO Change	PC		X
861	RECADV	Receiving Advice	RC		X
862	DELJIT	Shipping Schedule	SS		X
863	QALITY	Quality Reporting	RT	X	
864	GENRAL	Text	TX		X
865	ORDRSP	PO Change Acknowledgment	CA	X	
867	PROTRA	Product Transfer and Resale Report	PT		X
869	OSTENQ	Order Status Inquiry	RS		X
870	OSTRPT	Order Status Report	RS	X	
997	CONTRL	Functional Acknowledgment	FA	X	X

NOTE: Not all transactions are applicable to all trading partnerships.

- Trading partners must also have problem resolution capability, including the ability to retransmit data if it is found to be erroneous or lost due to transmission problems.

Other Comments

Parker divisions use the EDI Gateway to manage hundreds of trading partnerships.Translation of ANSI X.12 formatted data by Parker Hannifin into and out of user-defined records is done by using Sterling Software Company's Gentran EDI translation software. The version used at Parker was developed specifically for a mainframe computer running in the MVS operating environment. The communications management software for Parker's computer system, which includes EDI communications activity, is Universal Link's U-LINK software package. Parker's EDI Gateway acts as a service bureau to individual divisions for EDI processing. In this way, we can offer expanded EDI expertise to our divisions and their trading partner suppliers.

The Parker Communication Network

Almost 10,000 terminals worldwide are linked within the Parker Communications Network to the various data centers. This network linkage allows enterprise-based systems like the EDI Gateway to reach all divisions. Another advantage is central control of VAN access and point-to-point communication management in one place for all divisions, regardless of location.

EDI Addressing

Transactions must be addressed within our EDI system in much the same way as when the transaction was manually executed.

Each division has its own unique DUN's number and use the standard ANSI “01” qualifier.

The following addressing information refers to the ISA and GS segments, and is offered as an example of Parker's preferred addressing structure:

- ISA 01 + divisional DUN's number
- GS divisional DUN's number

ISA05=Partner's qualifier (ANSI standard)
ISA06=Partner DUN's number ID
ISA07=01 qualifier
ISA08=Divisional DUN's number

GS02=Partner's DUN's number/ID
GS03=Parker's divisional DUN's number

Time-Sensitive EDI

Parker subscribes to the following public access VANs:

- GEIS (General Electric Co.)
- Advantis (IBM)

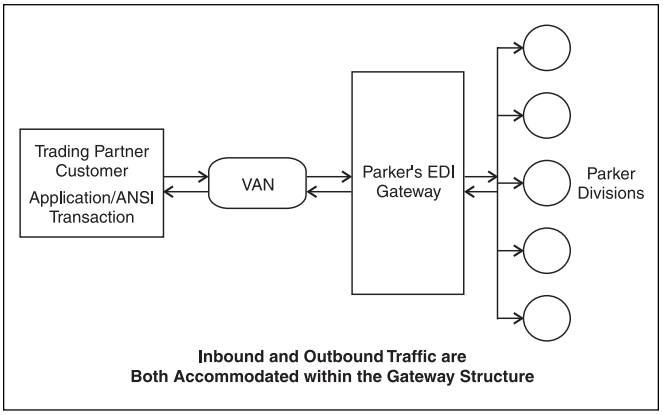
Numerous interconnections (to GEIS) are in use, including with Harbinger, AT&T's Easylink, Sterling, and industry specific networks.

Mailboxes on the VANs are accessed several times a day, seven days a week for inbound traffic. Outbound documents, especially shipment notices, are launched several times per hour to meet customer requirements.

Timing of EDI transaction traffic management is transparent to customers who rate our EDI performance using their own criteria.

The scope of Parker's EDI effort incorporates 50 separate trading partner divisions doing electronic business with our trading partner customers. There are over 1,400 trading partner linkages in place at Parker. Although one of our major information technology initiatives is to integrate EDI transaction activity into divisional operating systems, not all divisions are at the same level of development as others.

Management is fully committed to meeting our customers' EDI initiatives and strengthening the Parker-customer relationship. The EDI Gateway staff is dedicated to customer service, so do not hesitate to call on us.



Inbound and Outbound Traffic are Both Accommodated within the Gateway Structure

Getting Started With EDI

If you are new to EDI:

Although we cannot provide EDI advice and counsel that is specifically tailored to your company, we can offer you the following limited assistance in starting an EDI program:

1. An explanation of EDI
2. An explanation of the transactions
3. A discussion on choosing a third-party network
4. A discussion on quantifying objectives and determining what to expect from EDI

If you have an active program:

If you have an established EDI program, there is very little preparation needed to begin trading with us once you have completed the Trading Partnership Agreement.

1. Advise us of your interest in becoming a trading partner and tell us which Parker divisions you wish to exchange information with.
2. Work with us to develop an implementation schedule.
3. Mutually define the functional and technical parameters under which we will trade, including your third-party network subscription.
4. Participate in a pilot program, including testing in a parallel transaction trading environment.
5. Upon completion of the EDI implementation process, when both partners are confident in their transaction trading capability, shut off the paper process.

EDI Contacts

Business Contact:

EDI Technical Resources Manager
Corporate IT Dept. Parker Hannifin Corporation
6035 Parkland Blvd. Cleveland, Ohio 44124-4141
(216) 896-3000

Technical Contact:

EDI Senior Technical Analyst
Corporate IT Dept. Parker Hannifin Corporation
6035 Parkland Blvd. Cleveland, Ohio 44124-4141
(216) 896-3000

Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

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Parker Hannifin Corporation
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Notes

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Introduction to Dryers

A dryer in a refrigeration system has two functions; one, to adsorb system contaminants such as water and acid, and two, to provide physical filtration.

Selecting a filter dryer for a particular application requires various technical factors to be considered. These factors include the type of system, connecting line size, water capacity, flow capacity (size of system), filtration capability, material of construction (steel versus copper), and safe working pressures. Evaluation of each factor is necessary to ensure proper and economical dryer design.

Parker Hannifin has developed filter dryer recommendations based on current technical data, as well as many years of actual field experience. They have been tested for flow and water capacity using the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 63.1 and are rated for use based on the Air Conditioning and Refrigeration Institute's guideline ARI 710. Data obtained from this testing is shown in the Capacities "(Ratings at ARI Standard Conditions)" tables for liquid line filter dryers and can be used as a comparison for filter dryers. However, other factors must be considered for various types of equipment.

Adsorbing Moisture and Preventing Acids

The ability to remove moisture from a refrigeration system is the most important function of a dryer. Moisture can come from many sources such as trapped air from improper evacuation, system leaks, and motor windings to name a few. Another source is due to improper handling of polyolester (POE) lubricants, which are hygroscopic; that is, they readily absorb moisture. POEs can pick up more moisture from its surroundings and hold it much tighter than the previously used mineral oils. This moisture can cause freeze-ups and corrosion of metallic components. Moisture in the system can also cause a reaction with POEs called hydrolysis**,** forming organic acids.

To prevent the formation of these acids, the moisture within the system must be minimized. This is accomplished by the use of desiccants within the filter dryer. The three most commonly used desiccants are molecular sieve, activated alumina and silica gel.

Molecular sieves are crystalline sodium aluminosilicates (synthetic zeolites) having cubic crystals, which selectively adsorb molecules based on molecular size and polarity. The crystal structure is honeycombed with regularly spaced cavities or pores. Each of these cavities or pores are uniform in size. This uniformity eliminates the co-adsorption of molecules varying in size. This permits molecules, such as water, to be adsorbed, while allowing other larger molecules, such as the refrigerant, lubricant and acids, to pass by. The surface of this desiccant is charged positively with cations, which act as a magnet and will therefore adsorb polarized molecules, such as water, first and hold them tightly. The water molecules are physically separated from the lubricant, minimizing the potential for POE hydrolysis.

Activated alumina is formed from aluminum oxide (Al_2O_3) and is not a highly crystalline material. Both alumina and silica gel show a wide range of pore sizes and neither exhibit any selectivity based on molecular size. Due to the varying pore sizes, they can co-adsorb the much larger refrigerant, lubricant and acid molecules, eliminating the surface area available to adsorb water. Alumina can also aid in the hydrolysis of the POE lubricants creating organic acids since both water and lubricant are adsorbed into the pore openings of the alumina.

Silica gel is a non-crystalline material with a molecular structure formed by bundles of polymerized silica (SiO_2). Gel-type desiccants are indicative of the weaker bond formed between water and the desiccant. Silica gel is the old type of desiccant and is not widely used in today's filter dryers.

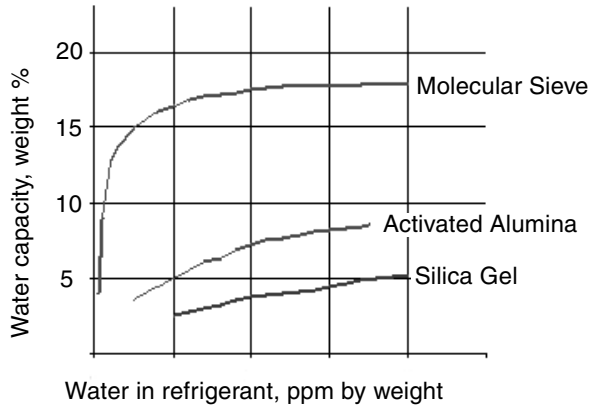
Selecting Desiccant Material

There are many factors involved when selecting which desiccant material is best for which application. Water capacity, refrigerant and lubricant compatibility, physical strength, and acid capacity are important characteristics of desiccants that should be considered.

Dryers are often placed on the liquid side of the system to remove moisture and some solids before the refrigerant travels through the expansion valve. Acid levels, both organic and inorganic, are not typically high on the liquid side, but some does exist and a dryer should be able to remove some of it. However, acid levels will remain low if the dryer can remove most of the moisture in the system. To accomplish this, the dryer must have an adequate water capacity level. Water capacity is the amount of water or moisture the desiccant can hold while maintaining low levels within the refrigeration system.

Figure 1 illustrates the water capacity of different desiccants as a percent of weight in an R-12 refrigerant system. It can be determined from this that the molecular sieve desiccant retains the highest amount of moisture. This type of isotherm represents unimolecular adsorption. This is due to the strong bond between the molecular sieve and water. The activated alumina desiccant retains a fair amount of moisture, as well. However, the retention isn't as great as the molecular sieve. This is indicative of co-adsorption of other materials and the weak hold activated alumina has on water.

FIGURE 1



In order to properly size a molecular sieve dryer, the maximum operating temperature should be known. The dryer should be located in the liquid line between the outlet of the condenser and the metering device. Typical water capacity is shown in drops of water per gram of molecular sieve, based on liquid line temperature, as shown in Table 1.

TABLE 1

Drops of Water							
R-12		R-22		R-502		R-134a	
75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F
3.72	3.52	3.40	3.24	3.40	3.24	3.40	3.20

Refrigerant and lubricant compatibility is essential when selecting the correct desiccant. Dryers are often used on the suction line side of a system to prevent foreign particles, acids, sludge and moisture from entering the compressor. Inorganic acid formation is predominantly found on the suction side and could cause corrosion and motor burnout. Inorganic acids (HCl and HF) form from the decomposition of the refrigerant. This may happen as a result of added heat and moisture in the system. Inorganic acids formed will attack the crystalline structure of the molecular sieve and break it down. Thus, it is important to keep the fluoride and chloride levels, found on the desiccant, low. Additionally, if the correct compatible desiccant is used, the measured levels of the F- and Cl- will remain low. Incompatible refrigerants and desiccants will promote decomposition and formation of these inorganic acids. Table 2 gives a summary of the compatible refrigerant and molecular sieve.

TABLE 2

Refrigerant	Dessicant
R-12	XH-6, XH-9, XH-11
R-22	XH-6, XH-9, XH-11
R-134a	XH-6, XH-9, XH-11
R-401A	XH-6, XH-9, XH-11
R-401B	XH-6, XH-9, XH-11
R-401C	XH-6, XH-9, XH-11
R-402A	XH-6, XH-9, XH-11
R-402B	XH-6, XH-9, XH-11
R-404A	XH-6, XH-9, XH-11
R-407A	*XH-6, XH-9*, XH-11
R-407B	*XH-6, XH-9*, XH-11
R-407C	*XH-6, XH-9*, XH-11
R-410A	*XH-6, XH-9*, XH-11
R-502	XH-6, XH-9, XH-11
R-507A	XH-6, XH-9, XH-11

* Note: Dessicant may adsorb R-32, causing the water capacity to be reduced. *(Courtesy UOP)*

Hydrolysis of the lubricant will form organic acids. Organic acids are the carboxylic acids that are the result of POE lubricants reacting with water in the system. The water attacks the POE lubricant and breaks it down into its original components (carboxylic acid and alcohol). This breakdown of the POE lubricant will not happen if minimal moisture is present in the system. The levels of these acids can be reduced by keeping the moisture level in the system low. Table 3 reveals the acid capacity of two types of desiccants.

TABLE 3

Dessicant	Inorganic Acid Capacity (% by wt)	Organic Acid Capacity (% by wt)
Molecular Sieve	approx 6%	0.80%
Activated Alumina	approx 6%	5.50%

The formation of these organic and inorganic acids will cause the water capacity of the desiccant to decrease. Therefore, it is important to know the compatibility of the components within a refrigerant system. Table 4 (on the following page) displays the various refrigerants and the compatible lubricant.

Desiccants should be strong enough mechanically to resist breaking up when subjected to system vibrations and surges. Incompatible combinations of refrigerant, lubricant and desiccant will have low crush strength and high attrition values. Crush strength can be defined as the force required to break the individual beads of desiccant. Attrition occurs when the desiccant is shaken or vibrated to yield fine particles.

TABLE 4

Refrigerant	Lubricant
R-12	Alkylbenzene and Mineral Oil
R-22	Alkylbenzene and Mineral Oil
R-134a	POE (Polyolester)
R-401A	Alkylbenzene/POE (Polyolester)
R-401B	Alkylbenzene/POE (Polyolester)
R-401C	POE (Polyolester)
R-402A	Alkylbenzene/POE (Polyolester)
R-402B	Alkylbenzene/POE (Polyolester)
R-404A	POE (Polyolester)
R-407A	POE (Polyolester)
R-407B	POE (Polyolester)
R-407C	POE (Polyolester)
R-410A	POE (Polyolester)
R-502	POE (Polyolester)
R-507A	POE (Polyolester)

Courtesy Allied Signal

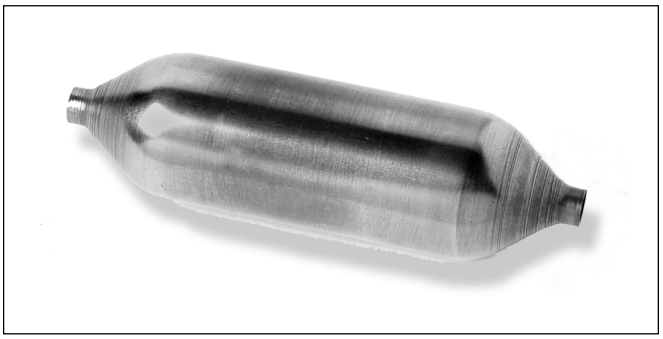
Steel vs. Copper

The major differences in using steel versus copper dryers are the system sizes and applications. Copper dryers are normally used in smaller systems, systems with less pressure fluctuations and lower vibration tendencies. Some smaller systems do not require high filtration capabilities; however, some of the smaller systems using the new refrigerants will require better filtration. In order to meet these requirements a core dryer and dryers with additional filter media, besides a screen, should be used. Also, copper is typically the most economical option for smaller systems. Because copper dryers are used for smaller applications, the refrigerant charge required will generally be smaller than in the steel dryer. In order to determine how much desiccant is required to properly remove the moisture in a system, information regarding the total amount of refrigerant charge is required. When used in conjunction with system horsepower, maximum operating temperature and maximum operating pressure, the total system moisture can be calculated. The total system moisture information is used to determine adequate dryer capacity.

Information regarding operating pressure is required to adequately size the wall thickness of the dryer to attain the ultimate burst pressure, for both copper and steel. In accordance with Underwriters Laboratories (UL) and the Canadian Standards Association (CSA), the burst pressure is rated as five times the design working pressure of the system, or as three times the design working pressure of the system along with a fatigue stress test, as per UL 1995. Typically, for copper dryers, the design working pressure value can be correlated to tube diameter and wall thickness in order to meet specific UL specifications.

Loose-Filled Copper Dryers

Parker's Loose-Filled Copper Dryers adsorb system contaminants and provide physical filtration to systems between 1/4 and 2 tons. Applications include refrigerators, freezers, ice makers, beverage dispensers, water coolers, cryogenics, and walk-in coolers.



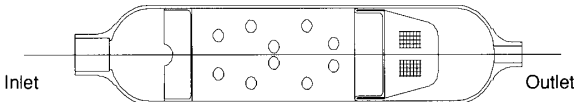
Application

- Refrigeration systems between 1/4 and 2 tons.

Features and Benefits

- One-piece copper shells in 3/4" to 1" O.D., along with spun sweat connections in a variety of sizes, provide easy installation, simplified brazing, and corrosion-resistance.
- Up to 30 grams of 100% molecular sieve provide maximum water adsorption.
- Dryers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit.

3/4" O.D. Copper Dryer Data



Recommended tonnages: 1/4 to 1/2 tons depending on application and system. Consult Parker.

Part No.	Design Working Pressure PSI	Inlet Inches	Outlet Inches	Overall Length Inches
032099-00	360	.164 .159/ .258 .253	.091 .086	4.63
032159-00	360	.164 .159	.091 .086	4.50
032200-00	500	.195 .190	.081 .076	4.37
032169-00	360	.197 .192	.092 .087	4.75

3/4" O.D. Copper Dryer Water Capacities

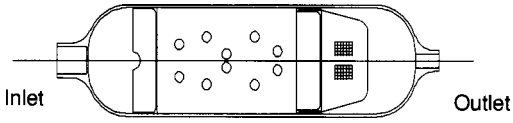
	Water Capacity in drops of water													
	R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032099-00	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.6
032159-00	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.6
032200-00	28.1	26.0	25.3	23.3	27.7	26.4	27.7	25.7	26.0	24.5	28.2	26.0	28.1	26.0
032169-00	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.6

	Water Capacity in drops of water													
	R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032099-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
032159-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
032200-00	27.9	26.0	20.6	18.9	20.6	18.9	22.3	20.1	16.8	14.8	25.8	24.3	27.9	26.2
032169-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8

One and two inlets are available as well as cap tube sizes on outlet from .081 to .125.

1" O.D. Copper Dryer Data

Part No.	Design Working Pressure PSI	Inlet Inches	Outlet Inches	Overall Length Inches
032083-00	500	.250 .244	.098 .093	4.00
058066-00	500	.380 .377/ .256 .253	.195 .190	4.19
057404-00	500	.320 .315	.320 .315	3.81



Recommended tonnages (part numbers 032083-00 and 058066-00): 1/4 to 1/2 tons depending on application and system. Consult Parker.

Recommended tonnages (part number 057404-00): R-12 = 1/2; R-22 = 2; R-134a = 2; R401A = 2; R-404A = 1.3; R410A = 2; R-502 = 1.3; R-507A = 1.3

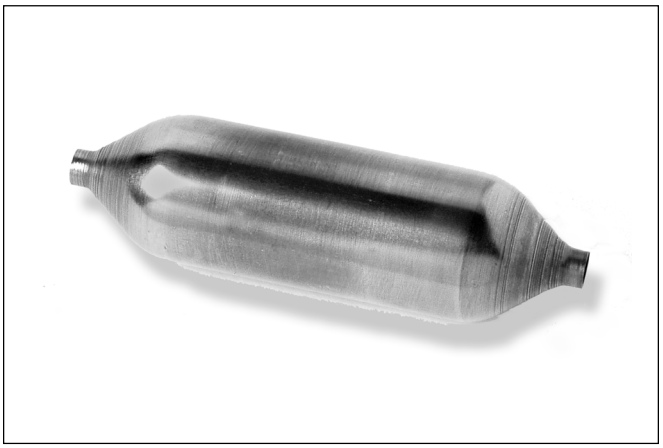
1" O.D. Copper Dryer Water Capacities

	Water Capacity in drops of water													
	R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032083-00	43.0	39.4	N/R	N/R	40.3	37.7	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
058066-00	49.5	45.9	44.7	41.1	48.9	46.5	48.9	45.3	45.9	43.2	49.8	45.9	49.5	45.6
057404-00	60.5	58.6	54.7	50.6	59.8	57.0	58.6	53.1	57.0	52.5	59.4	53.8	59.4	53.8

	Water Capacity in drops of water													
	R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032083-00	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
058066-00	49.2	45.9	36.3	33.3	36.3	33.3	39.3	35.4	29.7	26.1	45.6	42.9	49.2	46.2
057404-00	59.5	56.0	39.4	35.6	39.4	35.6	41.9	37.8	32.3	28.8	55.7	52.5	60.2	56.3

N/R = not recommended. Consult Parker for more information.

Loose-Filled Spring-Loaded Copper Dryers



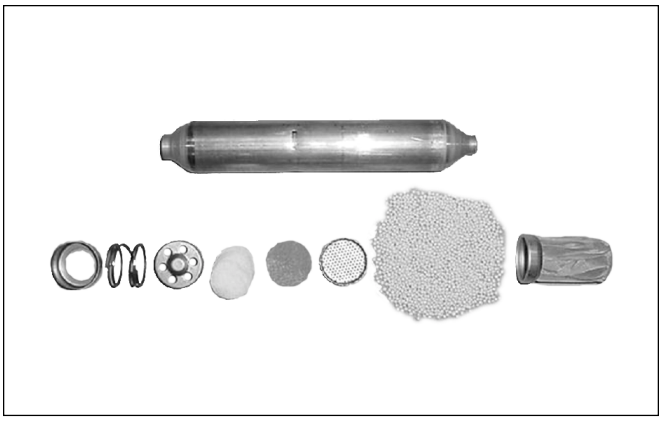
Parker's Loose-Filled Spring-Loaded Copper Dryers adsorb system contaminants and provide physical filtration to air conditioning and heat-pump systems between 1/4 and 5 tons. Dryers are spring-loaded to compact the sieve load, preventing attrition by movement of the sieve material.

Application

- Air conditioning and heat-pump systems between 1/4 and 5 tons.

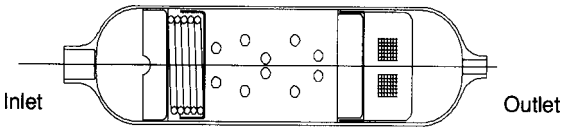
Features and Benefits

- One-piece copper shells in 1" to 1-5/8" O.D., along with spun sweat connections in a variety of sizes, provide easy installation, simplified brazing, and corrosion-resistance.
- Up to 90 grams of 100% molecular sieve provide maximum water adsorption. Specially formulated sieve, XH-11, is compatible with R-410a applications.
- Dryers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit.
- Dryers are also available with fiberglass padding for filtration up to 20-30 microns.



1" O.D. Spring-Loaded Copper Dryer Data

Part No.	Design Working Pressure PSIG	Inlet Inches	Outlet Inches	Overall Length Inches
032231-00	500	.202 .192 /.381 .378	.133 .128	4.25
054625-01	500	.256 .253	.256 .253	4.38
056242-03	500	.383 .378	.383 .378	4.38
053817-01	500	.378 .383	.378 .383	5.69



Part No.	Maximum flow rate at 1 psig in tons														
	R-12	R-22	R-134A	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
032231-00	Recommended Tonnages: 1/2 to 1 tons depending on application and system. Consult Parker.														
054625-01	1.5	1.5	1.6	1.8	1.5	1.4	1	1.2	1.2	1.3	1.1	1.4	1.7	1.2	1.2
056242-03	2.7	3.6	3.3	3.6	3.7	3.3	2.4	2.8	2.4	3.1	2.5	3.5	3.5	2.3	2.3
053817-01	2.3	3	2.7	3	3.1	2.7	2	2.4	2	2.6	2.1	2.9	2.9	1.9	2

1" O.D. Spring-Loaded Copper Dryer Water Capacities

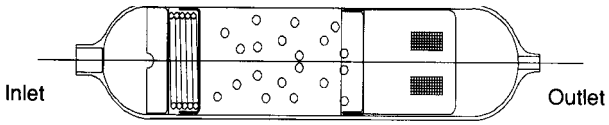
	Water Capacity in drops of water													
	R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032231-00	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	32.8	30.8	33.2	30.6	33.2	30.6
054625-01	51.0	49.4	46.2	42.7	50.5	48.1	49.4	44.8	49.4	44.8	49.4	44.8	49.4	44.8
056242-03	51.0	49.4	46.2	42.7	50.5	48.1	49.4	44.8	49.4	44.8	49.4	44.8	49.4	44.8
053817-01	94.5	91.5	85.5	79.0	93.5	89.0	91.5	83.0	91.5	83.0	91.5	83.0	91.5	83.0

	Water Capacity in drops of water													
	R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032231-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
054625-01	50.2	47.3	49.4	44.8	49.4	44.8	49.4	44.8	27.3	24.3	47.0	44.3	50.8	47.5
056242-03	50.2	47.3	49.4	44.8	49.4	44.8	49.4	44.8	27.3	24.3	47.0	44.3	50.8	47.5
053817-01	93.0	87.5	91.5	83.0	91.5	83.0	91.5	83.0	50.5	45.0	87.0	82.0	94.0	88.0

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50. All 1" dryers are U.L. recognized components, File #SA8570. Tonnage ratings will vary depending on the inlet and outlet requested.

1-3/16" O.D. Spring-Loaded Copper Dryer Data

Part No.	Design Working Pressure PSI	Inlet Inches	Outlet Inches	Overall Length Inches
056243-04	500	.508 .503	.508 .503	5.13
056243-03	500	.383 .378	.383 .378	5.13
053776-00	540	.384 .378	.384 .378	7.00



Part No.	Maximum flow rate at 1 psig in tons														
	R-12	R-22	R-134A	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
056243-04	3.6	4.8	4.4	4.7	5	4.4	3.2	3.8	3.1	4.2	3.4	4.6	4.7	3.1	3.1
056243-03	2.7	3.6	3.3	3.5	3.7	3.3	2.4	2.8	2.3	3.1	2.5	3.5	3.5	2.3	2.3
053776-00	2.8	3.7	3.4	3.7	3.8	3.4	2.5	2.9	2.4	3.2	2.6	3.6	3.6	2.4	2.4

1-3/16" O.D. Spring-Loaded Copper Dryer Water Capacities

	Water Capacity in drops of water													
	R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
056243-04	94.5	91.5	85.5	79.0	93.5	89.0	91.5	83.0	89.0	82.0	92.8	84.0	92.8	84.0
056243-03	94.5	91.5	85.5	79.0	93.5	89.0	91.5	83.0	89.0	82.0	92.8	84.0	92.8	84.0
053776-00	170.1	164.7	153.9	142.2	168.3	160.2	164.7	149.4	160.2	147.6	167.0	151.2	167.0	151.2

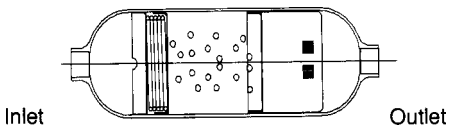
	Water Capacity in drops of water													
	R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
Part No.	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
056243-04	93.0	87.5	61.5	55.6	61.5	55.6	65.5	59.0	50.5	45.0	87.0	82.0	94.0	88.0
056243-03	93.0	87.5	61.5	55.6	61.5	55.6	65.5	59.0	50.5	45.0	87.0	82.0	94.0	88.0
053776-00	167.4	157.5	110.7	100.0	110.7	100.0	117.9	106.2	90.9	81.0	156.6	147.6	169.2	158.4

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50. All 1-3/16" dryers are U.L. recognized components, File #SA8570. Tonnage ratings will vary depending on the inlet and outlet requested.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

1-5/8" O.D. Spring-Loaded Copper Dryer Data

Part No.	Design Working Pressure PSI	Inlet Inches	Outlet Inches	Overall Length Inches
032040-00	500	.383 .378	.383 .378	6.00
032145-00	500	.383 .378	.383 .378	4.38
031805-03	500	.383 .378	.383 .378	5.50
056244-01	500	.383 .378	.383 .378	5.38
056156-01	500	.253 .256	.253 .256	7.00



Part No.	Maximum flow rate at 1 psig in tons														
	R-12	R-22	R-134A	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
032040-00	4.4	5.8	5.3	5.8	6	5.3	3.9	4.6	3.8	5.1	4.1	5.6	5.7	3.8	3.8
032145-00	3.5	4.7	4.3	4.6	4.8	4.3	3.2	3.7	3.1	4.1	3.3	4.5	4.6	3	3.1
031805-03	3.8	5.1	4.7	5	5.3	4.6	3.4	4	3.3	4.5	3.6	4.9	5	3.3	3.3
056244-01	3.7	5	4.5	4.9	5.2	4.6	3.4	3.9	3.2	4.4	3.5	4.8	4.8	3.2	3.2
056156-01	1.3	1.8	1.6	1.8	1.9	1.6	1.2	1.4	1.2	1.6	1.3	1.7	1.7	1.2	1.2

1-5/8" O.D. Spring-Loaded Copper Dryer Water Capacities

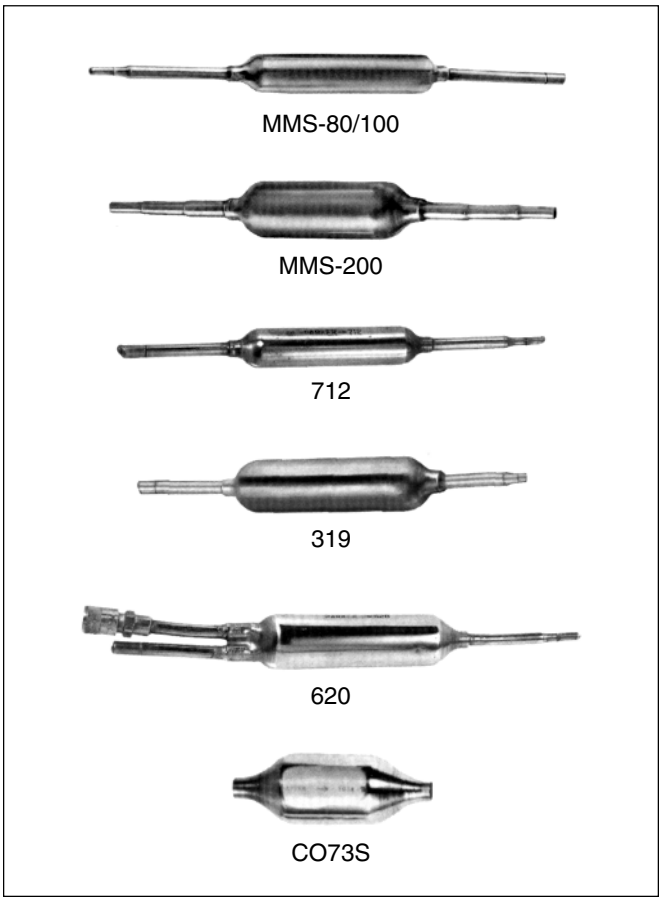
Part No.	Water Capacity in drops of water													
	R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032040-00	170.1	164.7	153.9	142.2	168.3	160.2	164.7	149.4	160.2	147.6	167.0	151.2	167.0	151.2
032145-00	92.4	85.7	83.4	76.7	91.3	86.8	91.3	84.6	85.7	80.6	93.0	85.7	92.4	85.7
031805-03	132.3	128.1	119.7	110.6	130.9	124.6	128.1	116.2	124.6	114.8	129.9	117.6	129.9	117.6
056244-01	170.1	164.7	153.9	142.2	168.3	160.2	164.7	149.4	160.2	147.6	167.0	151.2	167.0	151.2
056156-01	340.2	329.4	307.8	284.4	336.6	320.4	329.4	298.8	320.4	295.2	333.9	302.4	333.9	302.4

Part No.	Water Capacity in drops of water													
	R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
032040-00	167.4	157.5	110.7	100.0	110.7	100.0	117.9	106.2	90.9	81.0	156.6	147.6	169.2	158.4
032145-00	91.8	85.7	67.8	62.2	67.8	62.2	73.4	66.1	55.4	48.7	85.1	80.1	91.8	86.2
031805-03	130.2	122.5	86.1	77.8	86.1	77.8	91.7	82.6	70.7	63.0	121.8	114.8	131.6	123.2
056244-01	167.4	157.5	110.7	100.0	110.7	100.0	117.9	106.2	90.9	81.0	156.6	147.6	169.2	158.4
056156-01	334.8	315.0	221.4	200.0	221.4	200.0	235.8	212.4	181.8	162.0	313.2	295.2	338.4	316.8

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50. All 1-3/16" dryers are U.L. recognized components, File #SA8570. Tonnage ratings will vary depending on the inlet and outlet requested.

Service Copper Dryers

Parker's Service Copper Dryers adsorb system contaminants and provide physical filtration to systems. The service copper dryers provide replacement or additional dryers to systems as required.



Application

- Air conditioning, heat pump, and refrigeration systems as matched with the unique unit.

Features and Benefits

- Worldwide OEM usage and acceptance to add dryers or match replacements with a variety of units.
- All copper construction for corrosion resistance, simplified brazing, and easy installation.
- 100% XH-9 molecular sieve is specially formulated for refrigerants and blends, including 134a, 404A, and 507A for maximum water adsorption.
- Compatible with mineral oils and synthetics.
- UL recognized and CSA certified.

Copper Service Dryer Specifications

MRO Model No.	Part No.	Molecular Sieve	Description	Overall Length	Inlet Tube Size OD / ID	Outlet Tube Size OD / ID
MMS-80	058070-01	10g XH9	3/4" Non-directional	7 3/8"	1/4" / 3/16"	1/4" / 3/16"
MMS-100	058198-01	10g XH9	3/4" directional	7 3/8"	1/4" / 3/16"	1/4" / 3/16"
MMS-200	032134-01	20g XH9	1" directional step down	10 1/2"	1/4" / 3/16"	1/4" / 3/16"
					5/16" / 1/4"	5/16" / 1/4"
					3/8" / 5/16"	3/8" / 5/16"
712	032092-00	10g XH9	3/4" directional	8 1/2"	1/4" / 3/16"	.089 / .092 cap. tube
319	032144-00	30g XH9	1 3/16" directional	9 3/4"	5/16" OD	.127 / .130
619	032142-00	10g XH9	3/4" w/access valve	8 7/8"	1/4" / 3/16"	.089 / .092 cap. tube
620	032133-00	20g XH9	1" w/access valve	9 1/2"	5/16" / 1/4"	.127 / .130 cap. tube
621	032143-00	20g XH9	1" w/double inlet	9"	5/16" / 1/4"	.127 / .130 cap. tube
CO73S	032145-00	28g XH9	1 5/8" directional	4 3/8"	3/8" ID	3/8" ID

MRO Model No.	Recommended Tonnages: Part No.	R-22 R-402	R-134a	R-401A/B	R-404A R-502, R-507A	R-410A
MMS-80	058070-01	1/3 to 2 tons depending on application and system. Contact Parker for details.				
MMS-100	058198-01					
MMS-200	032134-01					
712	032092-00					
319	032144-00					
619	032142-00					
620	032133-00					
621	032143-00					
CO73S	032145-00	4	4	4 1/2	3	4 1/2

Copper Service Dryer Water Capacities

MRO Part No.	OEM Part No.	Water Capacity in drops of water													
		R-12		R-22		R-134a		R-401A / B		R-401C		R-402A		R-402B	
		75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
MMS-80	058070-01	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.4
MMS-100	058198-01	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.4
MMS-200	032134-01	66.0	61.2	59.6	54.8	65.2	62.0	65.2	60.4	61.2	57.6	66.4	61.2	66.0	60.8
712	032092-00	33.0	30.6	29.8	27.4	32.6	31.0	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.4
319	032144-00	99.0	91.8	89.4	82.2	97.8	93	97.8	90.6	91.8	86.4	99.6	91.8	99.0	91.2
619	032142-00	33.0	30.6	29.8	27.4	32.6	31	32.6	30.2	30.6	28.8	33.2	30.6	33.0	30.4
620	032133-00	66.0	61.2	59.6	54.8	65.2	62.0	65.2	60.4	61.2	57.6	66.4	61.2	66.0	60.8
621	032143-00	66.0	61.2	59.6	54.8	65.2	62	65.2	60.4	61.2	57.6	66.4	61.2	66.0	60.8
C073S	032145-00	92.4	85.68	83.44	76.72	91.28	86.8	91.28	84.56	85.68	80.64	92.96	85.68	92.4	85.12

Part No.	OEM Part No.	Water Capacity in drops of water													
		R-404A		R-407A		R-407B		R-407C		R-410A		R-502		R-507A	
		75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°	75°	125°
MMS-80	058070-01	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
MMS-100	058198-01	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
MMS-200	032134-01	65.6	61.2	48.4	44.4	48.4	44.4	52.4	47.2	39.6	34.8	60.8	57.2	65.6	61.6
712	032092-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
319	032144-00	98.4	91.8	72.6	66.6	72.6	66.6	78.6	70.8	59.4	52.2	91.2	85.8	98.4	92.4
619	032142-00	32.8	30.6	24.2	22.2	24.2	22.2	26.2	23.6	19.8	17.4	30.4	28.6	32.8	30.8
620	032133-00	65.6	61.2	48.4	44.4	48.4	44.4	52.4	47.2	39.6	34.8	60.8	57.2	65.6	61.6
621	032143-00	65.6	61.2	48.4	44.4	48.4	44.4	52.4	47.2	39.6	34.8	60.8	57.2	65.6	61.6
C073S	032145-00	91.84	85.68	67.76	62.16	67.76	62.16	73.36	66.08	55.44	48.72	85.12	80.08	91.84	86.24

Cu LLD® Series Solid-Core Copper Dryers



Parker's Solid-Core Copper Dryers adsorb system contaminants and provide physical filtration to systems between 1/2 and 5 tons. Applications include air conditioning, heat pumps, and ice makers.

Application

- Systems between 1/2 and 5 tons.

Base Product Part Number

Cu LLD

Features and Benefits

- One-piece copper shells in 1-3/16" to 2" O.D., along with spun sweat connections in a variety of sizes, provide easy installation, simplified brazing, and corrosion-resistance.
- Standard 1, 2, 3, 5, and 8 cubic inch cores available in 100% molecular sieve, 100% activated alumina, or blends to provide maximum water adsorption. Specially formulated cores in XH-11 are compatible with R-410a applications.
- Dryers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit.

Cu LLD® Series Solid-Core Copper Dryers — Water Drop Capacity at ARI Conditions

MRO Model No.	OEM Model No.	R-12 (15 ppm) 75°F/125°F	R-22 (60 ppm) 75°F/125°F	R-134a (50 ppm) 75°F/125°F	R-401A/B (50 ppm) 75°F/125°F	R-401C (50 ppm) 75°F/125°F	R-402A (50 ppm) 75°F/125°F	R-402B (50 ppm) 75°F/125°F
Cu LLD 2-3S	s13	31/28	28/24	31/27	30/26	29/25	30/26	30/26
Cu LLD 3-2S	s22	69/63	63/55	69/62	67/57	65/57	68/58	68/58
Cu LLD 3-3S	s23	69/63	63/55	69/62	67/57	65/57	68/58	68/58
Cu LLD 5-3S	s33	95/87	86/75	94/85	92/79	90/78	94/80	94/80
Cu LLD 8-3S	s53	166/152	150/131	165/147	161/137	157/136	163/139	163/139
Cu LLD 16-3S	s83	266/242	241/209	263/236	258.0	258/20	251/217	261/223

MRO Model No.	OEM Model No.	R-404A (50 ppm) 75°F/125°F	R-407A (50 ppm) 75°F/125°F	R-407B (50 ppm) 75°F/125°F	R-407C (50 ppm) 75°F/125°F	R-410A (50 ppm) 75°F/125°F	R-502 (50 ppm) 75°F/125°F	R-507A (50 ppm) 75°F/125°F
Cu LLD 2-3S	s13	30/27	20/17	20/17	21/18	17/14	28/25	31/27
Cu LLD 3-2S	s22	68/61	45/38	45/38	48/41	37/31	64/57	69/61
Cu LLD 3-3S	s23	68/61	45/38	45/38	48/41	37/31	64/57	69/61
Cu LLD 5-3S	s33	94/83	62/53	62/53	66/56	51/43	88/78	95/84
Cu LLD 8-3S	s53	164/145	108/92	33878	115/98	89/75	153/136	165/146
Cu LLD 16-3S	s83	261/223	262/232	173/147	173/147	142/119	245/217	265/233

Cu LLD® Series Solid-Core Copper Dryers — Installation Recommendations (Nominal Tons)

OEM Model No.	MRO Model No.	Selection Recommendations (Nominal Ratings - Tons)											
		Refrigeration Commercial Low Temp. Equipment						Air Conditioning OEM, Self-Contained/Field Replacement					
		12 134a 401A	22 402	404A 502 507A	407C 410A	407A	407B	134a 401A	22 402 410A	404A 502 507A	407A	407B	407C
s13	Cu LLD 2-3S	1	1	3/4	1 1/4	1	3/4	2	2	1 1/2	2	1 3/4	1 1/2
s22	Cu LLD 3-2S	3/4	3/4	1/2	3/4	1/2	3/4	1 1/2	1 1/2	1	1 3/4	1	1 1/2
s23	Cu LLD 3-3S	1 3/4	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	3 1/2	3	2 1/2	3 1/2	2 1/2	3 1/2
s33	Cu LLD 5-3S	1 3/4	1 1/2	1 3/4	1 3/4	1 1/2	1 3/4	3 1/2	3	2 1/2	3	2 1/2	3 1/2
s53	Cu LLD 8-3S	2	1 1/2	1 3/4	2	1 3/4	1 1/2	3 1/2	3	2 1/2	3 1/2	3	4
s83	Cu LLD 16-3S	2	1 1/2	1 3/4	2	1 3/4	1 1/2	4	3 1/2	2 1/2	3 1/2	3	4

Cu LLD® Series Solid-Core Copper Dryers — Tons of Refrigerant at Pressure Drop 1 psi

OEM Model No.	MRO Model No.	R-12	R-22	R-134a	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R410A	R-502	R-507A
s13	Cu LLD 2-3S	2.2	2.9	2.6	2.9	3.0	2.7	2.0	2.3	1.9	2.6	2.1	2.9	2.8	1.9	1.9
s22	Cu LLD 3-2S	1.4	1.9	1.7	1.8	1.9	1.7	1.3	1.5	1.2	1.6	1.3	1.8	1.8	1.2	1.2
s23	Cu LLD 3-3S	3.2	4.3	3.9	4.3	4.4	3.9	2.9	3.4	2.8	3.7	3.0	4.2	4.2	2.8	2.8
s33	Cu LLD 5-3S	3.1	4.2	3.8	4.1	4.3	3.8	2.8	3.3	2.7	3.6	2.9	4.1	4.1	2.7	2.7
s53	Cu LLD 8-3S	3.4	4.6	4.2	4.5	4.7	4.1	3.1	3.6	3.0	4.0	3.2	4.5	4.5	3.0	3.0
s83	Cu LLD 16-3S	3.6	4.8	4.4	4.7	5.0	4.4	3.2	3.8	3.1	4.2	3.4	4.7	4.6	3.1	3.1

Copper Filter Dryer with Activated Alumina Core

Activated alumina core provides excellent system filtration along with removal of sludge and acids.

Part No.	Design Working Pressure PSI	Filtration Capacity Microns	Inlet In.	Outlet In.	Screen Area Sq. In.	Overall Length In.
057945-00	450	30.0	1/4	5/16	0.94	3.69
057945-02	450	30.0	.383 / .378	.383 / .378	0.94	3.69

Copper Filter Dryer with Activated Alumina Core Water Capacities

Part No.	R-12		R-22		R-134a		R-401A/B		R-401C		R-402A/B	
	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F
057945-00	11.7	9.2	10.9	8.6	10.8	10.2	10.5	9.5	10.2	9.4	10.7	9.7
057945-02	11.7	9.2	10.9	8.6	10.8	10.2	10.5	9.5	10.2	9.4	10.7	9.7

Part No.	R-404A		R-407A/B		R-407C		R-104A		R-502		R-507A	
	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F	75°F	125°F
057945-00	10.7	10.1	7.1	6.4	7.5	6.8	5.8	5.2	10.0	7.7	10.8	10.1
057945-02	10.7	10.1	7.1	6.4	7.5	6.8	5.8	5.2	10.0	7.7	10.8	10.1

CBF Bi-Flow Copper Dryers

Parker's Bi-Flow Copper Dryers adsorb system contaminants and provide physical filtration to heat-pump systems between 1-1/2 and 4-1/2 tons.

Application

- Heat-pump systems between 1-1/2 and 4-1/2 tons.

Base Product Part Number

CBF

Features and Benefits

- One-piece copper shell with 2" O.D., along with spun sweat connections in a variety of sizes, provide easy installation, simplified brazing, and corrosion-resistance.
- Standard 3 and 5 cubic inch cores available in 100% molecular sieve to provide maximum water adsorption. Specially formulated cores in XH-11 are compatible with R-410a applications.
- Dryers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit.
- Larger dryer with 8 cubic inch core in development providing higher holding capacities.



Copper Bi-Flow Dryer Data

Part Number	Overall Length	Core	Inlet/Outlet
032284-052	7.04	3 cu in core	1/4" inlet and outlet
032284-053	7.04	3 cu in core	3/8" inlet and outlet
032284-082	7.98	5 cu in core	1/4" inlet and outlet
032284-083	7.98	5 cu in core	3/8" inlet and outlet
032284-084	7.98	5 cu in core	1/2" inlet and outlet
032284-085	7.98	5 cu in core	5/8" inlet and outlet

All of these dryers have a .01 - .02 tube stop in the inlet and outlet.

Refrigerant Internal Holding Capacities for Copper Bi-Flow Dryer

(refrigerant @ 100°F)

Part No. Series	R-12	R-22	R-134a	R-401A/B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
032284-050	7.16	6.47	6.55	6.37	5.60	5.90	6.02	5.55	6.11	6.20	6.12	5.64	6.54	5.56
032284-080	9.05	8.18	8.28	8.05	7.08	7.46	7.61	7.02	7.72	7.83	7.73	7.13	8.27	7.03

Copper Bi-Flow Dryer Water Drop Capacity at ARI Conditions

Part No. Series	R-12 (15 ppm) 75°F/125°F	R-22 (60 ppm) 75°F/125°F	R-134a (150 ppm) 75°F/125°F	R-401A (50 ppm) 75°F/125°F	R-402A/B (50 ppm) 75°F/125°F	R-404A (50 ppm) 75°F/125°F	R-407A (50 ppm) 75°F/125°F	R-407B (50 ppm) 75°F/125°F	R-407C (50 ppm) 75°F/125°F	R-410A (50 ppm) 75°F/125°F	R-502 (50 ppm) 75°F/125°F	R-507A (50 ppm) 75°F/125°F
032284-050	143/130	129/112	141/127	138/118	140/120	141/124	93/79	93/79	101/84	81/64	132/117	142/125
032284-080	229/209	207/180	226/202	221/189	224/191	225/199	149/126	149/126	161/134	129/102	210/187	227/200

Gold Label Steel Liquid Line Dryers (LLD Series)



Features and Benefits

- High moisture and acid capacity. Maximum filtration capacity.
- Exceptional compatibility with new polyolester oils.
- Compatible with all existing and new refrigerants and blends including 134a, 401A/B, 402A/B, 404A, 407A/B/C, 410A, 502, 507A.
- Spring loaded, molecular sieve and activated alumina.
- Solid copper sweat fittings.
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test and resists corrosion.
- Eliminates concern of additive stripping.
- 032 MF liquid line dryer features 1/4" SAE steel flare male inlet and 1/4" SAE steel female flare outlet. Consult Parker for other sizes.
- 500 psig design pressure (600 psig available on all models designed for R-410A applications with XH11 desiccant.
- Extended copper ends available (select models).
- Various inlet/outlet fitting combinations available.
- U.L. listed SA3441, CSA certified LR46423.

NOTE: ***For R-410A applications, Parker recommends XH11 desiccant. See pages 38-40 for R-410A dryer information.***

Gold Label Steel Liquid Line Dryers - Water Drop Capacity at ARI Conditions

Model Series	R-12 (15 ppm) 75°F/125°F	R-22 (60 ppm) 75°F/125°F	R-134a (150 ppm) 75°F/125°F	R-401A/B (60 ppm) 75°F/125°F	R-401C (60 ppm) 75°F/125°F	R-402A/B (60 ppm) 75°F/125°F	R-404A/ R-507 (50 ppm) 75°F/125°F	R-407A/B (50 ppm) 75°F/125°F	R-407C (50 ppm) 75°F/125°F	R-410A* (50 ppm) 75°F/125°F	R-502 (30 ppm) 75°F/125°F	R-507A (50 ppm) 75°F/125°F
030	79/76	71/66	78/74	76/69	74/68	77/70	78/73	51/46	55/49	42/37	73/68	78/73
050	198/191	177/160	196/185	157/142	153/141	159/144	194/182	105/95	127/115	87/78	181/169	161/151
080	280/270	250/230	277/262	237/215	231/213	241/218	273/257	159/144	180/162	124/111	255/238	244/228
160	401/386	358/325	395/375	461/418	448/413	467/423	389/367	309/280	258/232	178/159	365/341	473/443
300	835/808	755/698	826/786	808/733	786/724	819/742	822/773	543/491	579/521	446/397	769/724	830/777
410	1164/1127	1053/973	1151/1096	1127/1022	1096/1010	1142/1034	1145/1078	757/684	806/726	622/554	1071/1010	1158/1084
750	1776/1720	1607/1485	1757/1673	1720/1560	1673/1541	1743/1579	1748/1645	1156/1044	1231/1109	949/846	1635/1541	1767/1654

*See pages 40-42 for R-410A specific dryers and applications.

Refrigerant Holding Capacities for Gold Label Steel Liquid Line Dryers (in oz. of refrigerant @ 100° F)

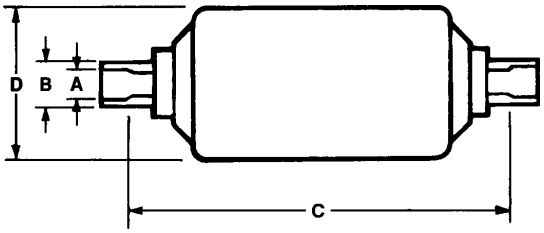
Model Series	R-12	R-22	R-134a	R-401A/B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A*	R-502	R-507A
030	1.92	1.74	1.76	1.71	1.51	1.59	1.42	1.49	1.64	1.46	1.45	1.52	1.76	1.50
050	3.30	3.00	3.00	4.99	4.39	4.62	4.31	2.60	4.78	4.44	2.80	2.60	2.90	2.60
080	6.10	5.50	5.60	7.10	6.24	6.58	6.10	4.80	6.81	6.27	5.30	4.80	5.40	4.80
160	9.10	8.20	8.40	7.89	6.94	7.31	6.28	7.10	7.57	6.46	7.80	7.20	8.00	7.10
300	26.73	24.17	24.47	23.79	20.92	22.04	20.43	20.73	22.82	21.01	20.75	21.07	24.42	20.77
410	37.33	33.75	34.17	33.22	29.21	30.78	28.53	28.95	31.86	29.34	28.98	29.42	34.10	29.00
750	71.32	64.48	65.29	63.47	55.81	58.81	55.62	55.31	60.88	57.20	56.49	56.21	65.15	55.41

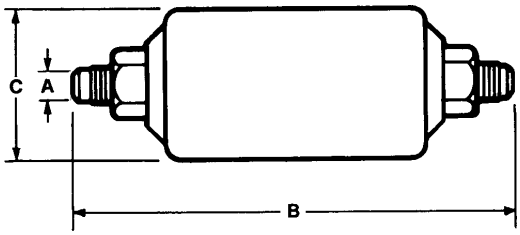
*See pages 40-42 for more dryers specifically recommended for R-410A.

Gold Label Steel Liquid Line Dryers

Steel Liquid Line Dryer Dimensions

Model No.	I.D.	System Cutout Length	Diameter in Inches	Overall Length Inches	Model No.	SAE Flare	System Cutout Length	Diameter in Inches
052S	1/4	3 7/8	2 3/8	4 3/8	052	1/4	4 7/8	2 3/8
0525S	5/16	3 3/4	2 3/8	4 3/8				
053S	3/8	3 11/16	2 3/8	4 3/8	053	3/8	5 1/4	2 3/8
082S	1/4	4 3/4	2 3/8	5 1/4	082	1/4	5 5/8	2 3/8
0825S	5/16	4 5/8	2 3/8	5 1/4				
083S	3/8	4 9/16	2 3/8	5 1/4	083	3/8	6	2 3/8
084S	1/2	4 1/2	2 3/8	5 3/8	084	1/2	6 3/8	2 3/8
162S	1/4	5 3/8	2 3/8	5 7/8	162	1/4	6 5/16	2 3/8
1625S	5/16	5 5/16	2 3/8	5 7/8				
163S	3/8	5 3/16	2 3/8	5 15/16	163	3/8	6 3/4	2 3/8
164S	1/2	5 1/8	2 3/8	6 1/16	164	1/2	7	2 3/8
165S	5/8	5 1/8	2 3/8	6 5/16	165	5/8	7 1/4	2 3/8





Gold Label Steel Liquid Line Dryers Flow Capacity (tons of refrigerant) at pressure drop 1 psi

Model No.	Filter Area	R-12	R-22	R-134a	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A*	R-502	R-507A
032		1.27	1.70	1.54	1.74	1.75	1.55	1.14	1.34	1.10	1.48	1.19	1.64	1.67	1.11	1.10
032S	10	1.41	1.84	1.72	1.93	1.95	1.72	1.27	1.48	1.22	1.65	1.32	1.82	1.86	1.23	1.23
032MF		1.27	1.70	1.54	1.74	1.75	1.55	1.14	1.34	1.10	1.48	1.19	1.64	1.67	1.11	1.10
052		1.41	1.84	1.72	1.93	1.95	1.72	1.27	1.48	1.22	1.65	1.32	1.82	1.86	1.23	1.23
052S		1.48	2.05	1.80	2.03	2.04	1.80	1.34	1.56	1.29	1.73	1.39	1.91	1.95	1.29	1.29
0525S	17	2.47	3.32	3.00	3.38	3.40	3.01	2.23	2.60	2.14	2.88	2.31	3.19	3.25	2.15	2.15
053		2.97	3.96	3.60	4.06	4.08	3.61	2.67	3.12	2.57	3.46	2.78	3.83	3.90	2.58	2.57
053S		3.54	4.74	4.29	4.83	4.86	4.30	3.18	3.71	3.06	4.12	3.31	4.56	4.64	3.07	3.06
082		1.41	1.84	1.72	1.93	1.95	1.72	1.27	1.48	1.22	1.65	1.32	1.82	1.86	1.23	1.23
082S		1.56	2.12	1.89	2.13	2.14	1.89	1.40	1.63	1.35	1.81	1.46	2.01	2.04	1.35	1.35
0825S		2.62	3.46	3.17	3.58	3.60	3.18	2.35	2.74	2.27	3.05	2.45	3.37	3.43	2.27	2.27
083	27	3.32	4.45	4.03	4.54	4.57	4.04	2.99	3.49	2.88	3.87	3.11	4.28	4.36	2.89	2.88
083S		3.75	5.02	4.54	5.12	5.15	4.55	3.37	3.93	3.25	4.37	3.51	4.83	4.92	3.26	3.25
084		5.30	7.14	6.43	7.25	7.29	6.44	4.77	5.56	4.59	6.18	4.96	6.84	6.96	4.61	4.60
084S		5.37	7.21	6.52	7.35	7.39	6.53	4.83	5.64	4.65	6.26	5.03	6.93	7.05	4.67	4.66
162		1.63	2.19	1.97	2.22	2.24	1.98	1.46	1.71	1.41	1.89	1.52	2.10	2.13	1.41	1.41
162S		1.77	2.40	2.14	2.42	2.43	2.15	1.59	1.85	1.53	2.06	1.65	2.28	2.32	1.54	1.53
1625S		3.04	4.03	3.69	4.16	4.18	3.69	2.74	3.19	2.63	3.54	2.84	3.92	3.99	2.64	2.64
163		3.96	5.30	4.80	5.41	5.45	4.81	3.56	4.15	3.43	4.61	3.70	5.10	5.20	3.44	3.43
163S	34	4.38	5.94	5.32	5.99	6.03	5.33	3.94	4.60	3.80	5.11	4.10	5.65	5.75	3.81	3.80
164		6.72	9.05	8.15	9.18	9.24	8.16	6.04	7.05	5.82	7.83	6.28	8.66	8.81	5.84	5.82
164S		7.28	9.83	8.83	9.96	10.02	8.85	6.55	7.64	6.31	8.49	6.81	9.39	9.56	6.33	6.31
165		9.40	12.58	11.40	12.86	12.94	11.43	8.46	9.87	8.15	10.96	8.80	12.12	12.34	8.17	8.15
165S		9.69	13.01	11.75	13.24	13.32	11.77	8.71	10.16	8.39	11.29	9.06	12.49	12.71	8.42	8.40
166		11.03	14.78	13.38	15.08	15.17	13.40	9.92	11.57	9.55	12.85	10.32	14.22	14.47	9.59	9.56
303		4.03	5.44	4.89	5.51	5.54	4.90	3.63	4.23	3.49	4.70	3.77	5.19	5.29	3.50	3.49
303S		4.60	6.15	5.57	6.28	6.32	5.59	4.13	4.82	3.98	5.35	4.30	5.92	6.03	3.99	3.98
304		7.99	10.75	9.69	10.92	10.99	9.71	7.19	8.38	6.92	9.31	7.47	10.30	10.48	6.94	6.93
304S	61	9.26	12.44	11.23	12.66	12.74	11.26	8.33	9.72	8.02	10.79	8.66	11.94	12.15	8.05	8.03
305		10.96	14.71	13.29	14.98	15.07	13.32	9.86	11.50	9.49	12.77	10.25	14.13	14.38	9.52	9.50
305S		12.09	16.26	14.66	16.53	16.63	14.69	10.88	12.69	10.47	14.09	11.31	15.58	15.86	10.51	10.48
306		12.30	16.47	14.92	16.82	16.92	14.95	11.07	12.91	10.66	14.33	11.51	15.86	16.14	10.69	10.67
307S		14.99	20.15	18.18	20.49	20.62	18.22	13.48	15.73	12.98	17.46	14.02	19.32	19.67	13.03	13.00
413		4.03	5.44	4.89	5.51	5.54	4.90	3.63	4.23	3.49	4.70	3.77	5.19	5.29	3.50	3.49
414		8.06	10.82	9.78	11.02	11.09	9.80	7.25	8.46	6.98	9.39	7.54	10.39	10.58	7.01	6.99
414S	80	9.26	12.44	11.23	12.66	12.74	11.26	8.33	9.72	8.02	10.79	8.66	11.94	12.15	8.05	8.03
415		10.96	14.71	13.29	14.98	15.07	13.32	9.86	11.50	9.49	12.77	10.25	14.13	14.38	9.52	9.50
415S		12.09	16.26	14.66	16.53	16.63	14.69	10.88	12.69	10.47	14.09	11.31	15.58	15.86	10.51	10.48
417S		17.18	23.12	20.84	23.49	23.63	20.88	15.46	18.03	14.88	20.02	16.07	22.15	22.54	14.93	14.90
756S		14.63	19.65	17.75	20.01	20.13	17.79	13.17	15.36	12.68	17.05	13.69	18.87	19.20	12.72	12.69
757S	131	18.17	24.32	22.04	24.84	24.99	22.08	16.35	19.07	15.74	21.17	17.00	23.42	23.84	15.79	15.75
759S		20.01	26.80	24.27	27.36	27.52	24.32	18.00	20.99	17.33	23.31	18.72	25.79	26.26	17.39	17.35

*Specific models have been designed for use with R-410A. See pages 20-21 for R-410A specific dryers and applications.

Gold Label Steel Liquid Line Dryers - Installation Recommendations (Nominal Tons)

Model No.	Selection Recommendations (Nominal Ratings - tons)											
	Refrigeration Commercial Low Temp. Equipment						Air Conditioning OEM, Self-Contained/Field Replacement					
	12 134a 401A	22 402	404A 502 507A	407C 410A	407A	407B	134a 401A	22 402 410A	404A 502 507A	407A	407B	407C
032	1/2	1/2	1/2	1/2	1/2	1/2	1	1 1/2	1	1	1	1 1/2
032S												
032MF												
052	1/3	1/3	1/3	1/3	1/3	1/3	3/4	1	3/4	3/4	3/4	1 1/2
052S												
0525S												
053	1 1/2	2	2	2	2	2	3	1	3	3	3	1 1/2
053S												
082	1/2	1/2	1/2	1/2	1/2	1/2	3/4	1 1/2	3/4	3/4	3/4	2
082S												
0825S	1	1	1	1	1	1	2	3	3	3	3	4
083												
083S												
084	1 1/2	2	1	2	2	2	3	5	4	3	3	7
084S												
162	1	1 1/2	3/4	1 1/2	1 1/2	3/4	1	2 1/2	1	2 1/2	1	2 1/2
162S												
1625S	2	2 1/2	2	2 1/2	2 1/2	2	3	4	3	3 1/2	3	5
163	2	4	2	4	4	4	4	6	4	6	4	7 1/2
163S												
164												
164S												
165	3	5	2 1/2	5	5	5	5	7 1/2	5	7 1/2	5	10
165S												
303	4	5	3	4	5	3	4	6	4	5	5	5
303S												
304	4	7 1/2	4	4	7 1/2	5	7 1/2	12	7 1/2	10	7 1/2	10
304S												
305	7 1/2	10	5	5	7 1/2	5	10	15	10	12 1/2	10	15
305S												
307S		15			10		18	24	12 1/2	15	12 1/2	20
413	4	5	4	5	5	4	5	7 1/2	5	5	5	5
414			5	5	5	5	7 1/2	12	7 1/2	10	7 1/2	10
414S												
415	10	7 1/2	7 1/2	7 1/2	7 1/2	10	12 1/2	18	10	15	12 1/2	18
415S												
417S		10			10		18	25	15	24	18	25
756S	15	20	15	15	20	12 1/2	15	25	15	20	15	25
757S	20	25	15	15	20	15	22	30	18	25	20	30
759S	22	30	20	18	25	20	25	34	20	28	22	32

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Sahara Series™ Liquid Line Dryers

Available only from your local Parker wholesaler, the Sahara Series is the right dryer at the right price. Its ideal moisture removal and contaminant filtration properties make it the perfect service replacement for +40°F to 55°F suction line temperature R-22 air conditioning systems.*

**(Also suitable for some refrigeration applications to +15°F. Consult Parker for details).*



Key Features & Benefits

- Excellent moisture and filtration capacity.
- Compatible with POE's, PAG's, PVE's, alkylbenzenes, and mineral oils.
- Compatible with all existing and new refrigerants and blends including R22, R134a, R401A/B, R402A/B, R404A, R502, R507A.
  (Also compatible with R410A. For maximum performance with R410A, see Parker's specific line of R410A dryers in Catalog RAC-1).
- High moisture capacity desiccant.
- Solid copper sweat fittings.
- SAE Flare fittings available.
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test and resists corrosion.
- Eliminates concern of additive stripping.
- 680 psig design pressure. U.L. File No. SA3441. CSA listed LR46423.
- Extended copper ends available (select models).
- Various inlet/outlet fitting combinations available.

Water Capacity in Drops (Ratings at ARI Standard Conditions)

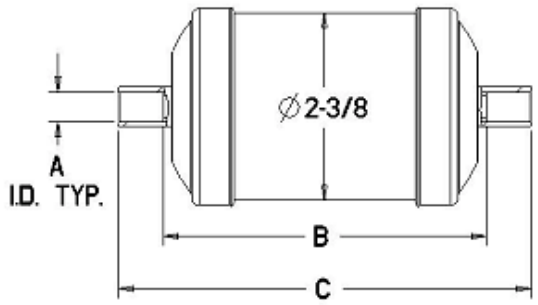
Model	R12 (15 ppm) 75°/125°	R22 (60 ppm) 75°/125°	R134a (150 ppm) 75°/125°	R401A (60 ppm) 75°/125°	R401B (60 ppm) 75°/125°	R402A (60 ppm) 75°/125°	R402B (60 ppm) 75°/125°	404A (50 ppm) 75°/125°	R-502 (30 ppm) 75°/125°	507A (50 ppm) 75°/125°
050	90/87	82/75	89/85	87/79	87/79	89/80	89/80	89/84	83/78	90/84
080	117/113	106/97	115/110	113/102	113/102	115/104	115/104	115/108	107/101	116/109
160	207/201	188/173	205/195	201/182	201/182	204/184	204/184	204/192	191/180	206/193

Refrigerant Holding Capacities (in oz. of refrigerant @ 100° F)

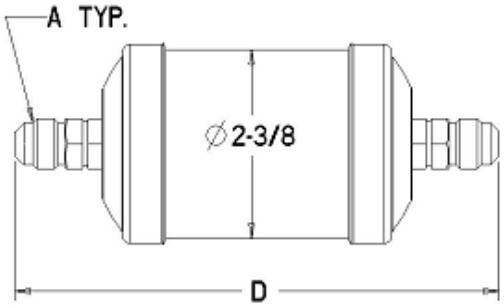
Model	Internal Volume (In^3)	R12	R22	R134a	R401A	R401B	R402A	R402B	R404A	R407A	R407B	R410A	R502	R507A
050	5.56	8.59	7.77	7.87	7.65	8.13	7.09	7.23	6.66	7.33	7.44	3.20	7.85	3.15
080	9.38	11.07	10.01	10.13	9.85	10.46	9.13	9.31	8.58	9.45	9.58	5.39	10.11	5.31
160	13.09	12.64	11.43	11.57	11.25	11.95	10.42	10.63	9.80	10.79	10.93	7.52	11.54	7.42

Dimensions

Model No. (Sweat Ftgs.)	Connection I.D. (A)	Cutout Length (B)	Overall Length (C)	Model No. (Flare Ftgs.)	SAE Flare Size (A)	Overall Length (D)
SS-052S	1/4	3 1/4	4.35	SS-052	1/4	4 3/4
SS-0525S	5/16		4.37			
SS-053S	3/8		4.39	SS-053	3/8	5 3/16
SS-082S	1/4	4 1/8	5.23	SS-082	1/4	5 5/8
SS-0825S	5/16		5.25			
SS-083S	3/8		5.27	SS-083	3/8	6 1/16
SS-084S	1/2		5.41	SS-084	1/2	6 5/16
SS-162S	1/4	4 3/4	5.88	SS-162	1/4	6 5/16
SS-1625S	5/16		5.90			
SS-163S	3/8		5.92	SS-163	3/8	6 3/4
SS-164S	1/2		6.06	SS-164	1/2	7
SS-165S	5/8		6.30	SS-165	5/8	7 1/4



Sweat Fittings



Flare Fittings

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Standard Products for R-410A

- 100% molecular seiv e XH11 dessicant.
- Ensures no degradation of the R032 within the make-up of R-410A.
- Parker has worked with the industry in establishing a pink colored label on all products for use with R-410A. Competitive products without pink lables should not be used and may cause system damage.
- See main liquid line and biflow dryer sections in this catalog for dimensional data.
- *Other sizes of R-410A specific dryers are available. Consult Parker.*



Model	ARI Flow Capacity @ 1 PSI	Recommended A/C Nominal Tons	Water Drop Capacity in R-410A (50 ppm) 75°F/125°F
Liquid Line Dryers			
053S-410A	4.64	4	86/77
083S-410A	4.92	5	131/117
163S-410A	5.75	5	254/226
303S-410A	6.03	6	446/397
Bi-Flow Dryers			
BF163S-XF	3.5	5	197/176

Guidelines for Parker Dryers and R-410A

Liquid line dryers are used in refrigeration systems to insure removal of contaminants and protect systems. The new refrigerant and lubricant combinations that have come in the wake of the regulation of CFCs and HCFCs have brought many changes to liquid line filter dryers. In particular, the introduction of Refrigerant 410A and Polyol Ester (POE lubricants) for the phase out of R-22 and mineral oil has created many design challenges as far as water and solid contaminant removal, refrigerant and lubricant compatibility and increased working pressures of the systems.

The basic job of a liquid line filter dryer is to remove water and solid contaminants from a refrigeration system. Water can get into systems from various sources. Some of these are leaks, improper cleaning and evacuation, polyolester (POE) lubricants and windings in electric motors. This water has to be removed to prevent freeze-ups, corrosion, and possible hydrolysis of the ester lubricant. Solid contaminants, like copper oxide, carbon, braze particles, etc., can clog metering devices or cause problems in the compressor. They are removed by filter media such as fiberglass pads, screens, and cores.

The new refrigerants and lubricants are excellent solvents. As a result, contaminants that R-22 and mineral oil left in place are now removed by HFC refrigerants such as R-410A/R-407C and POEs. Some of these common contaminants are residual detergents from cleaning, drawing compounds, rust preventatives, plasticizers and lubricant additives. These contaminants can deposit in capillary tubes, restrictor orifices or TXV seats.

Polyolester lubricants are made by reacting organic acids with alcohols to form the ester chains that make up the lubricant and water. This reaction is reversible, so under the right conditions, the lubricant can react with excess water to reverse the ester reaction and decompose into the original organic acid and alcohol. The organic acid can then deposit in the expansion device, restricting the flow. This was not an issue with the earlier HFC/CFC/mineral oil systems chemistry. In addition, polyolesters are hygroscopic so they can absorb a large amount of water. Studies have shown that activated alumina in the liquid line can play a role in the hydrolysis of the polyolester.

Refrigerant blends that have R-32 (a component of R-410A and R-407C) pose another issue for dryer manufacturers. R-32 is very close to water in terms of molecular size. This means that some desiccants can adsorb R-32 which lowers the water capacity of the desiccant. The more immediate effect is that the composition of the blend can change if there is enough R-32 adsorbed.

The Parker Solution

All of these factors have required changes in the internal components of liquid line dryers. From the outside, they remain the same but internally changes have been made to accommodate the new refrigerants and lubricants.

Filtration capacity in Parker liquid line dryers has been designed to insure that the dryer is able to handle the higher levels of contaminants. The filtration capacity of a Parker liquid line dryer and a comparably sized core liquid line dryer is shown in Figure 1. When tested per ASHRAE 63.1, allowing a maximum pressure drop of four psi, the core dryer reaches that level with the

addition of seven grams of contaminant, while the Parker dryer holds 23 grams before reaching the same pressure drop. At the same time, filtration capability, the ability to remove small particles, has not been compromised. In the same test, Parker dryers have filtration efficiencies up to 95%, which is a requirement for R-410A dryers.

The same filtration performance has been designed into bi-directional dryers for heat pumps. Figure 2 shows the results of testing of a standard bi-directional dryer and the Parker R-410A bi-directional dryer. The standard dryer holds 4 grams of contaminant while the R-410A specific dryer holds 36 grams of contaminant before reaching 4 psi pressure drop.

The desiccant (drying agent) used in the dryer had to be developed to be able to adsorb water and exclude R-32. This new desiccant is UOP's XH11. This is the desiccant that is used exclusively in Parker's R-410A liquid line dryers. The pore openings are specifically designed to adsorb moisture while excluding the R-32, lubricant and additives. This insures maximum water capacity in the dryer and allows the water to be physically separated from the POE lubricant to prevent hydrolysis. Activated alumina on the other hand has pore openings that will adsorb not only the water but the R-32, POE lubricant and it's additives, which lowers it's drying capabilities and removes essential additive's from the lubricant. It also gives the water and the lubricant a surface for the hydrolysis reaction since they can co-exist in the alumina's openings. The water is not physically separated from the lubricant.

Figure 3 displays the water capacity of different desiccants in R-22. It can be seen from this graph that molecular sieve 4A-XH-6 has approximately 3-4 times higher water capacity than activated alumina and silica gel.

Figure 4 shows the water capacity for different molecular sieve desiccants in R-410A. The steepness of the XH11 curve at low levels of water shows its high water capacity at low water levels. This means that it takes less XH11 than other sieve desiccants to dry refrigerants to low levels of water.

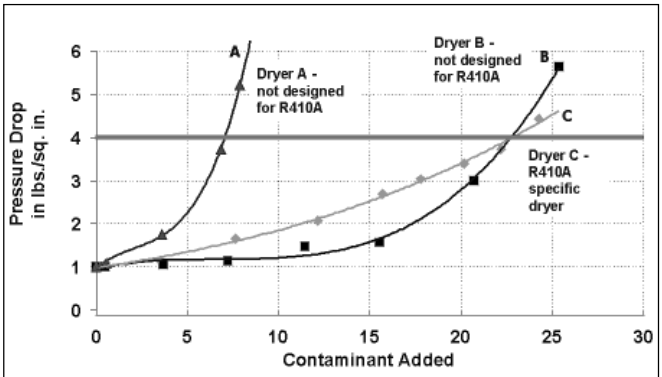


***FIGURE 1** - R410A Steel Liquid Line Dryer Filtration. (Note: 4 PSID is the baseline Parker uses when determining filtration capacity.)*

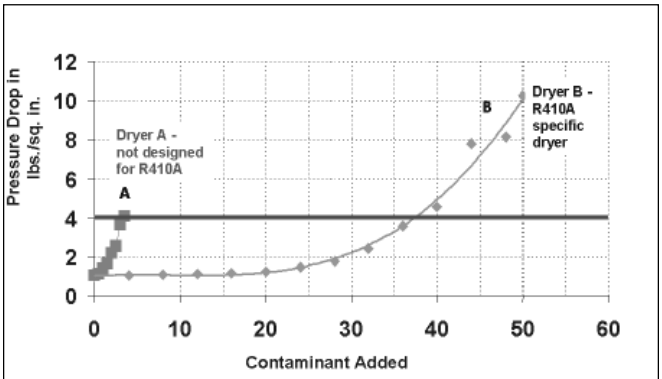


***FIGURE 2** - R410A Heat Pump Dryer Filtration. (Note: 4 PSID is the baseline Parker uses when determining filtration capacity.)*

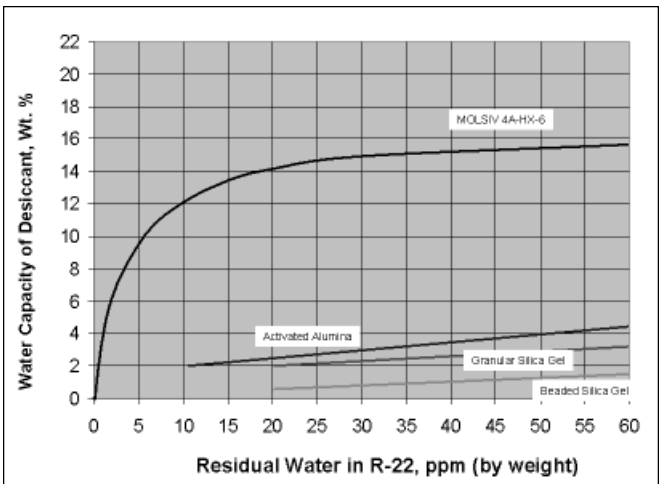


***FIGURE 3** - Water capacity of different desiccants in R-22 at 140°F. (Note: MOLSIV 4A-HX-6 is a trade name of UOP.)*

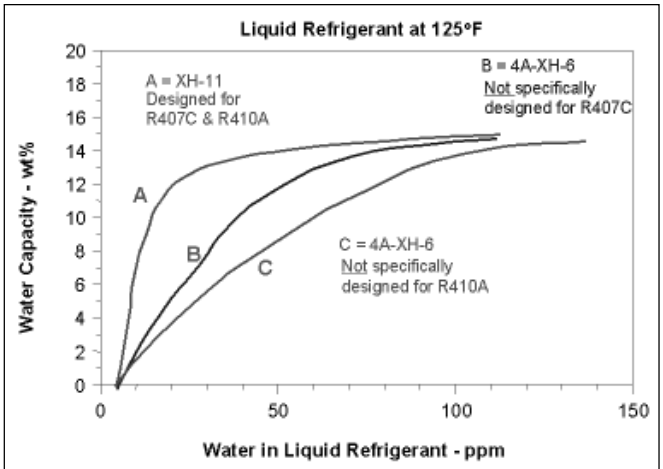


***FIGURE 4** - Water capacity of different desiccants in R-410A at 125°F. (Note: XH-11 and HX-6 are trade names of UOP.)*

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Figure 5 displays the reaction of molecular sieve and activated alumina with a POE lubricant and HFC refrigerant. After exposure of the desiccants to the POE and HFC refrigerant in a sealed glass tube for 14 days and 180°F, the activated alumina showed organic acid levels almost 40 times higher than that of molecular sieve. This is an indication of the breakdown of the lubricant. The fluoride levels were low indicating compatibility with the refrigerant.

Parker liquid line dryers have been designed specifically to meet the demands of the new HFC refrigerants. R-410A in particular, due to its higher pressures, required stronger construction to meet these working pressures. Parker liquid line dryers are UL listed for use with R-410A. This, in addition to increased filtration capacities, water capacity and compatibility insure that Parker liquid line dryers will provide R-410A systems maximum protection which leads to long reliable operation.

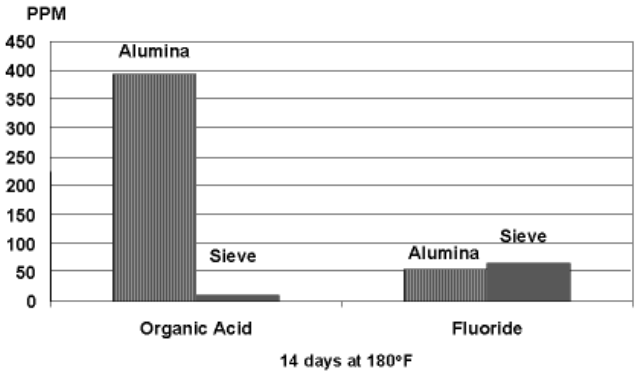


FIGURE 5 *- Sealed tube test results.*

Steel Bi-Flow Filter Dryers — BF Series

The "BF" Series bi-flow dryer is designed specifically for heat pump or reverse cyle application. External check valves are not required since they are incorporated within the filter dryer shell. The core design filters out contaminant particles down to 25 microns.

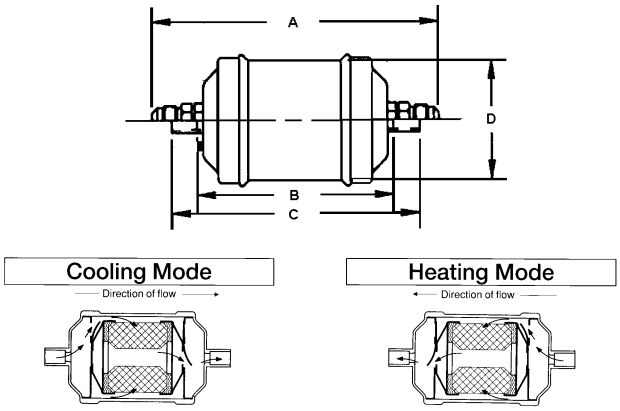


Features and Benefits

- 100% copper sweat or nickel plated flare fittings.
- Dessicant core provides reliable and effective removal of solid contaminants, acid and moisture.
- Model BF-163S-XF features XH11 desiccant design for R-410A applications. Provides three times the filtration as the standard bi-flow.
- Core is cushioned in fiber gaskets to protect core and to insure trouble-free performance.
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test and resists corrosion.
- U.L. listed file SA3441, CSA certified LR46423

Bi-flow Dryers — Dimensions

Model Number		Fitting Size	System Cutout Length	System Cutout Length	System Cutout Length	
Flare	Sweat	(Inches)	"A"	"B"	"C"	"D"
	BF082S	1/4		4.10	5.27	2.50
BF083	BF083S	3/8	6.09	4.10	5.27	2.50
BF084	BF084S	1/2	6.35	4.10	5.41	2.50
	BF162S	1/4		4.10	5.92	2.50
BF163	BF163S	3/8	6.75	4.75	5.92	2.50
	*BF163S-XF**	3/8	6.09	6.76	7.56	3.00
BF164	BF164S	1/2	7.00	4.75	6.06	2.50
	BF165S	5/8		4.75	6.30	2.50



Refrigerant Holding Capacities for Bi-Flow Dryers (in oz. of refrigerant @ 100° F)

Model Series	R-12	R-22	R-134a	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
BF080	8.17	7.39	7.48	7.27	7.27	6.39	6.74	6.87	6.34	6.97	7.07	6.98	6.44	7.46	6.34
BF160	9.54	8.63	8.74	8.49	8.49	7.47	7.87	8.03	7.40	8.14	8.26	8.16	7.52	8.72	7.41
*BF160-XF**	15.47	13.99	14.16	13.77	13.77	12.11	12.76	13.02	12.00	13.20	13.39	13.22	12.19	14.15	12.01

Bi-flow Dryer Water Drop Capacity at ARI Conditions

Model Series	R-12 (15 ppm) 75°F/125°F	R-22 (60 ppm) 75°F/125°F	R-134a (150 ppm) 75°F/125°F	R-401A/B (50 ppm) 75°F/125°F	R-401C (50 ppm) 75°F/125°F	R-402A (50 ppm) 75°F/125°F	R-402B (50 ppm) 75°F/125°F
BF080	105/102	95/88	104/99	102/92	99/91	103/93	103/93
BF160	148/144	134/124	147/140	144/130	140/129	146/132	146/132
*BF160-XF**	186/180	168/155	184/175	180/163	175/161	182/165	182/165

Model Series	R-404A (50 ppm) 75°F/125°F	R-407A (50 ppm) 75°F/125°F	R-407B (50 ppm) 75°F/125°F	R-407C (50 ppm) 75°F/125°F	R-410A (50 ppm) 75°F/125°F	R-502 (50 ppm) 75°F/125°F	R-507A (50 ppm) 75°F/125°F
BF080	103/97	68/62	68/62	73/65	56/50	97/91	104/98
BF160	146/137	97/87	97/87	103/93	79/71	137/129	148/138
*BF160-XF**	183/172	142/128	142/128	197/176	197/176*	171/161	185/173

*NOTE: Model Series BF160-XF is recommended for R-410A applications.

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Bi-Flow Dryer Flow Capacity — Tons of Refrigerant at Pressure Drop 1 PSI

Model No.	Filter Area cu inches	R-12	R-22	R-134a	R-401A	R-401B	R-401C	R-402A	R-402B	R-404A	R-407A	R-407B	R-407C	R-410A	R-502	R-507A
BF082S		1.6	2.1	1.9	2.2	2.2	1.9	1.4	1.7	1.4	1.9	1.5	2.0	2.1	1.4	1.4
BF083S		2.1	2.8	2.6	2.9	2.9	2.6	1.9	2.2	1.8	2.5	2.0	2.7	2.8	1.8	1.8
BF084S	10.4	2.7	3.5	3.2	3.6	3.6	3.2	2.4	2.8	2.3	3.1	2.5	3.4	3.5	2.3	2.3
BF083		2.1	2.8	2.6	2.9	2.9	2.6	1.9	2.2	1.8	2.5	2.0	2.7	2.8	1.8	1.8
BF084		2.7	3.5	3.2	3.6	3.6	3.2	2.4	2.8	2.3	3.1	2.5	3.4	3.5	2.3	2.3
BF162S		1.6	2.1	1.9	2.2	2.2	1.9	1.4	1.7	1.4	1.9	1.5	2.0	2.1	1.4	1.4
BF163S		2.2	2.9	2.6	3.0	3.0	2.6	2.0	2.3	1.9	2.5	2.0	2.8	2.9	1.9	1.9
BF164S		2.7	3.5	3.2	3.6	3.6	3.2	2.4	2.8	2.3	3.1	2.5	3.4	3.5	2.3	2.3
BF165S	14.4	3.7	4.9	4.5	5.1	5.1	4.5	3.3	3.9	3.2	4.3	3.5	4.8	4.9	3.2	3.2
BF163		2.1	2.8	2.6	2.9	2.9	2.6	1.9	2.2	1.8	2.5	2.0	2.7	2.8	1.8	1.8
BF164		2.7	3.5	3.2	3.6	3.6	3.2	2.4	2.8	2.3	3.1	2.5	3.4	3.5	2.3	2.3
BF163S-XF		2.7	3.6	3.3	3.7	3.7	3.3	2.4	2.8	2.3	3.1	2.5	3.5	3.5	2.3	2.3

Gold Label Steel Suction Line Filter Dryers "The Original SLD®"



Parker Hannifin developed and introduced the solid-core clean-up dryer for use in a system suction line. The compact design incorporates a large outside diameter shell, which results in a shorter lay-in length, and a larger core, which provides a greater filtration area for maximum operating efficiency.

The core material has controlled porosity which effectively removes and holds a maximum amount of contaminants with a minimum of pressure drop. In addition, the core material collects and holds inorganic acids and other harmful contaminants present after a motor burnout. The special binding process protects the core from acid decomposition.

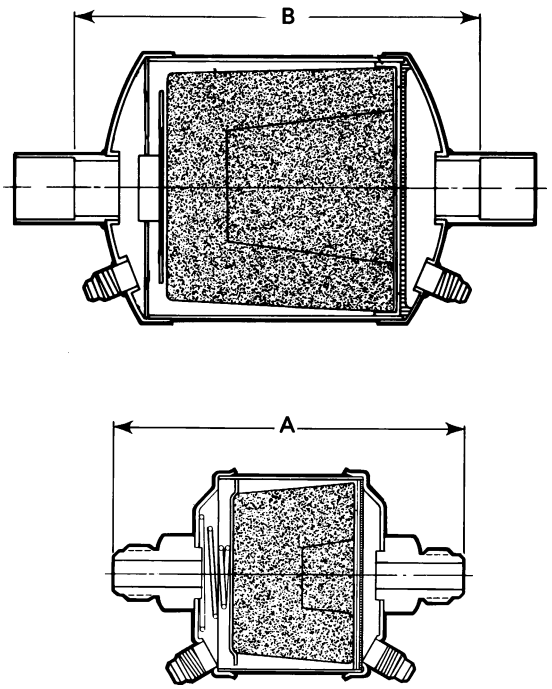
Access valves on both the inlet and outlet sides make it easy to measure pressure accurately. Occasionally, enough contaminant matter may collect in the filter core to cause a slight pressure drop. The access valves on the SLD make it easy to determine if a pressure drop exists and to measure the amount of the drop.

Features and Benefits

- The original SLD®, solid core, activated alumina suction line filter dryer.
- High acid capacity.
- Low pressure drop — exceptionally high flow rates.
- Designed for system clean-up.
- 500 hours salt spray protection.
- Shortest system cut-out lengths allow installation in tight areas.
- Two access valves simplify pressure drop measurement.
- Flare or solid copper sweat fittings.
- UL listed — File No. SA3441. CSA listed LR46423.

Steel Suction Line Dryer Dimensions

Model No.	A Overall Length Inches	B System Cutout Length - Inches	Shell Diameter Inches
SLD 8-3V-HH	5.13	-	3
SLD 8-3SV-HH	4.31	3.13	3
SLD 8-4V-HH	5.38	-	3
SLD 8-4SV-HH	4.44	3.13	3
SLD 8-5SV-HH	4.66	3.16	3
SLD 8-6SV-HH	4.72	3.16	3
SLD 13-5V-HH	5.82	-	4
SLD 13-5SV-HH	4.91	3.45	4
SLD 13-6SV-HH	4.97	3.45	4
SLD 13-7SV-HH	4.97	3.47	4
SLD 13-9SV-HH	5.72	3.47	4
SLD 27-7SV-HH	6.97	5.47	4
SLD 27-9SV-HH	7.72	5.36	4
SLD 54-11SV-HH	12	9.17	4
SLD 54-13SV-HH	12	9.17	4



Steel Suction Line Dryer Water Drop Capacities at 65°F

Model No.	Fitting	Desiccant (Cu. In.)	Filter Area (Sq. In.)	22 & 404A	134a & 407	401A & 410A	502 & 507A
SLD 8-3V-HH	3/8" SAE Flare	8	17.25	168	168	200	185
SLD 8-3SV-HH	3/8" Sweat	8	17.25	168	168	200	185
SLD 8-4V-HH	1/2" SAE Flare	8	17.25	168	168	200	185
SLD 8-4SV-HH	1/2" Sweat	8	17.25	168	168	200	185
SLD 8-5SV-HH	5/8" Sweat	8	17.25	168	168	200	185
SLD 8-6SV-HH	3/4" Sweat	8	17.25	168	168	200	185
SLD 13-5V-HH	5/8" SAE Flare	13 1/2	26	284	284	338	312
SLD 13-5SV-HH	5/8" Sweat	13 1/2	26	284	284	338	312
SLD 13-6SV-HH	3/4" Sweat	13 1/2	26	284	284	338	312
SLD 13-7SV-HH	7/8" Sweat	13 1/2	26	284	284	338	312
SLD 13-9SV-HH	1 1/8" Sweat	13 1/2	26	284	284	338	312
SLD 27-7SV-HH	7/8" Sweat	27	49	568	568	676	624
SLD 27-9SV-HH	1 1/8" Sweat	27	49	568	568	676	624
SLD 54-11SV-HH	1 3/8" Sweat	54	88	1136	1136	1352	1248
SLD 54-13SV-HH	1 5/8" Sweat	54	88	1136	1136	1352	1248

Steel Suction Line Filter Dryer Ratings and Capacities

Refrigerant	22					134a				R-404A					R-407A & R-407C				
Evaporator Temp	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**
Pressure Drop PSI	**3**	**2**	**1.5**	**1**	**0.5**	**2.0**	**1.5**	**1.0**	**0.5**	**3.0**	**2.0**	**1.5**	**1.0**	**0.5**	**3.0**	**2.0**	**1.5**	**1.0**	**0.5**
SLD 8-3V-HH	1.1	0.8	0.6	0.4	0.2	0.7	0.6	0.5	0.4	1.0	0.7	0.5	0.3	0.3	1.1	0.8	0.6	0.4	0.2
SLD 8-3SV-HH	1.2	0.9	0.7	0.5	0.3	0.8	0.7	0.6	0.5	1.0	0.8	0.6	0.4	0.5	1.2	0.9	0.7	0.5	0.3
SLD 8-4V-HH	2.3	1.6	1.1	0.7	0.4	1.5	1.2	0.9	0.7	2.0	1.4	0.9	0.6	0.6	2.2	1.6	1.1	0.7	0.4
SLD 8-4SV-HH	2.6	1.8	1.2	0.8	0.5	1.7	1.4	1.0	0.8	2.3	1.5	1.0	0.6	0.8	2.5	1.8	1.2	0.8	0.5
SLD 8-5SV-HH	3.9	2.6	1.8	1.2	0.6	2.5	2.0	1.5	1.1	3.4	2.2	1.5	1.0	1.0	3.8	2.6	1.8	1.2	0.6
SLD 8-6SV-HH	4.2	2.8	1.9	1.3	0.6	2.7	2.1	1.6	1.2	3.6	2.4	1.6	1.0	1.0	4.1	2.8	1.9	1.3	0.6
SLD 13-5V-HH	4.1	2.7	2.0	1.3	0.8	2.6	2.0	1.7	1.2	3.6	2.3	1.6	1.0	1.3	4.0	2.7	2.0	1.3	0.8
SLD 13-5SV-HH	5.0	3.0	2.5	1.5	1.0	3.2	2.3	2.1	1.4	4.3	2.5	2.1	1.2	1.6	4.9	3.0	2.5	1.5	1.0
SLD 13-6SV-HH	7.0	4.5	3.0	2.0	1.0	4.5	3.4	2.5	1.9	6.1	3.8	2.5	1.6	1.6	6.8	4.5	3.0	2.0	1.0
SLD 13-7SV-HH	7.0	4.5	3.0	2.0	1.0	4.5	3.4	2.5	1.9	6.1	3.8	2.5	1.6	1.6	6.8	4.5	3.0	2.0	1.0
SLD 13-9SV-HH	7.2	4.6	3.1	2.1	1.0	4.6	3.5	2.6	2.0	6.3	3.9	2.5	1.7	1.6	7.0	4.6	3.1	2.1	1.0
SLD 27-7SV-HH	10.0	8.0	5.0	3.0	2.0	6.4	6.0	4.2	2.9	8.7	6.8	4.1	2.4	3.2	9.7	7.9	5.0	3.1	2.1
SLD 27-9SV-HH	13.0	9.0	6.0	4.0	2.0	8.3	6.8	5.1	3.8	11.3	7.6	4.9	3.2	3.2	12.7	8.3	6.0	4.1	2.1
SLD 54-11SV-HH	20.0	13.5	9.5	6.5	3.5	12.8	10.2	8.0	6.2	17.4	11.4	7.8	5.2	5.7	19.5	13.4	9.5	6.6	3.6
SLD 54-13SV-HH	23.0	16.0	11.0	7.0	4.0	14.7	12.1	9.3	6.7	20.0	13.5	9.0	5.6	6.5	22.4	15.8	11.1	7.1	4.1

Refrigerant	407B					R-410A					502					507A				
Evaporator Temp	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**	**40°F**	**20°F**	**0°F**	**-20°F**	**-40°F**
Pressure Drop PSI	**3.0**	**2.0**	**1.5**	**1.0**	**0.5**	**3.0**	**2.0**	**1.5**	**1.0**	**0.5**	**3**	**2**	**1.5**	**1**	**0.5**	**3**	**2**	**1.5**	**1**	**0.5**
SLD 8-3V-HH	0.1	0.8	0.6	0.4	0.2	1.4	0.6	0.5	0.3	0.1	0.9	0.6	0.4	0.3	0.2	1.0	0.7	0.5	0.3	0.2
SLD 8-3SV-HH	1.1	0.8	0.7	0.5	0.3	1.5	0.7	0.5	0.4	0.2	1.0	0.7	0.5	0.4	0.2	1.1	0.8	0.6	0.4	0.2
SLD 8-4V-HH	2.1	1.5	1.0	0.7	0.4	2.9	1.2	0.8	0.5	0.3	1.8	1.2	0.9	0.6	0.3	2.1	1.4	0.9	0.6	0.3
SLD 8-4SV-HH	2.4	1.7	1.1	0.8	0.5	3.2	1.4	0.9	0.6	0.4	2.0	1.3	1.0	0.7	0.4	2.3	1.6	1.0	0.7	0.4
SLD 8-5SV-HH	3.6	2.4	1.7	1.2	0.6	4.8	2.0	1.4	0.9	0.4	3.1	2.1	1.5	1.0	0.5	3.5	2.3	1.5	1.0	0.5
SLD 8-6SV-HH	3.9	2.6	1.8	1.3	0.6	5.2	2.1	1.4	1.0	0.4	3.3	2.3	1.6	1.1	0.5	3.8	2.5	1.6	1.1	0.5
SLD 13-5V-HH	3.8	2.5	1.9	1.3	0.8	5.1	2.1	1.5	1.0	0.6	3.2	2.3	1.6	1.0	0.6	3.7	2.4	1.7	1.1	0.6
SLD 13-5SV-HH	4.6	2.8	2.4	1.4	1.0	6.2	2.3	1.9	1.1	0.7	4.0	2.5	2.0	1.0	0.6	4.5	2.7	2.1	1.2	0.8
SLD 13-6SV-HH	6.5	4.2	2.9	1.9	1.0	8.7	3.4	2.3	1.5	0.7	5.0	3.5	2.5	1.5	1.0	6.3	4.0	2.6	1.7	0.8
SLD 13-7SV-HH	6.5	4.2	2.9	1.9	1.0	8.7	3.4	2.3	1.5	0.7	5.0	3.5	2.5	1.5	1.0	6.3	4.0	2.6	1.7	0.8
SLD 13-9SV-HH	6.7	4.3	2.9	2.0	1.0	8.9	3.5	2.3	1.6	0.7	5.1	3.6	2.6	1.5	1.0	6.4	4.1	2.6	1.7	0.8
SLD 27-7SV-HH	9.3	7.5	4.8	2.9	1.9	12.4	6.1	3.8	2.2	1.5	8.0	5.0	4.0	2.5	1.5	8.9	7.2	4.3	2.5	1.6
SLD 27-9SV-HH	12.1	8.5	5.7	3.9	1.9	16.1	6.9	4.5	3.0	1.5	10.0	7.0	5.0	3.0	2.0	11.6	8.1	5.1	3.3	1.6
SLD 54-11SV-HH	18.6	12.7	9.0	6.3	3.4	24.8	10.3	7.2	4.8	2.6	15.0	10.5	7.5	5.0	3.0	17.9	12.1	8.1	5.4	2.8
SLD 54-13SV-HH	21.4	15.1	10.5	6.7	3.9	28.5	12.2	8.3	5.2	2.9	18.0	12.5	9.0	6.0	3.0	20.6	14.3	9.4	5.8	3.2

Sahara Series™ Suction Line Filter Dryers

Parker Hannifin has expanded its line of suction line dryers to give contractors unmatched versatility in servicing air conditioning and refrigeration systems. The new Sahara Series suction line dryers come in standard lay-in length sizes and join Parker's existing line of compact-size, Gold Label SLD suction line dryers. Contractors now have a full range of compact or standard size suction line dryers to choose from.

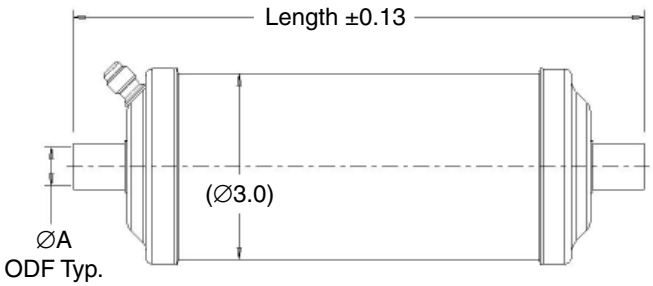
Features and Benefits

- Standard lay-in length is a direct replacement on OEM equipment where a compact size dryer is not installed.
- Desiccant is especially suited for acid and moisture removal in the system suction line.
- 30 cubic inch dryer.
- Copper fittings for easy installation are standard, as is an access port for checking system pressure drop.
- Finished in black powder coat paint that surpasses 500-hour ASTM salt spray test and resists corrosion.
- Compatible with most standard refrigerants.

Ratings and water drop capacities unavailable at press time. Contact Parker for details.



Sahara Series Suction Line Filter Dryer Dimensions



Model	Length	Connection
SS-SLD30-5SV	9.25"	5/8"
SS-SLD30-6SV	9.31"	3/4"
SS-SLD30-7SV	9.31"	7/8"

Replacement Dryer Shells and Filter Cores

Parker replacement filter cores and dryer shells are designed to provide flexibility over a widerange of applications. All models are designed for use in both the liquid *and* suction line of refrigeration or air conditioning systems. In single or multiple-core applications, cores may be loaded individually for ease of installation in tight spots. A wide range of fittings for suction-line applications and interchangeable laying-in dimensions with other manufactured models increase product versatility.

A new design of the internal assembly provides the advantage of using the Parker PFE-48BF filter element, which removes solid contaminants such as copper oxides, chips and other metal fines. The new design is also suited for using Parker dryer cores such as the Z-48 or the PCK-48HH, which provides removal of moisture, acid, wax and oil/flux paste.

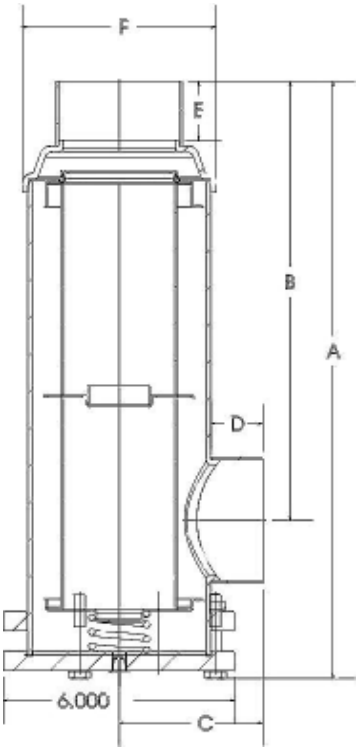


Features and Benefits

- Solid copper full flow fittings — 5/8" to 3 1/8".
- Powder paint exterior coating surpasses 500 hour ASTM salt spray tests and resists corrosion.
- Aluminum end plates and stainless steel bolts.

Replaceable Core Shell Dimensions

Shell	No. of Cores	Connection Size & Type	Dimensions (inches)					
			A	B	C	D	E	F
P485	1	5/8 ODF	9.14	5.52	3.18	0.63	0.63	4 3/4
P487	1	7/8 ODF	9.45	5.83	3.49	0.88	0.88	4 3/4
P489	1	1 1/8 ODF	9.45	5.83	3.49	1.00	1.00	4 3/4
P4811	1	1 3/8 ODF	9.66	6.04	3.70	1.00	1.00	4 3/4
P4813	1	1 5/8 ODF	9.65	6.03	3.69	1.00	1.00	4 3/4
P4817	1	2 1/8	10.16	6.54	3.97	1.34	1.34	4 3/4
P4821	1	2 5/8 ODF	10.34	6.22	4.16	1.50	1.50	4 3/4
P967	2	7/8 ODF	14.95	11.33	3.49	0.88	0.88	4 3/4
P969	2	1 1/8 ODF	14.95	11.33	3.49	1.00	1.00	4 3/4
P9611	2	1 3/8 ODF	15.16	11.54	3.70	1.00	1.00	4 3/4
P9613	2	1 5/8 ODF	15.15	11.53	3.69	1.00	1.00	4 3/4
P9617	2	2 1/8 ODF	15.56	11.94	3.97	1.34	1.34	4 3/4
P9621	2	2 5/8 ODF	15.75	11.63	4.16	1.50	1.50	4 3/4
P9625	2	3 1/8 ODF	15.93	10.57	4.37	1.75	1.75	4 3/4
P1449	3	1 1/8 ODF	20.51	16.89	3.49	1.00	1.00	4 3/4
P14411	3	1 3/8 ODF	20.72	17.10	3.70	1.00	1.00	4 3/4
P14413	3	1 5/8 ODF	20.71	17.09	3.69	1.00	1.00	4 3/4
P14417	3	2 1/8 ODF	21.56	17.63	3.97	1.34	1.34	4 3/4
P19211	4	1 3/8 ODF	26.28	22.66	3.70	1.00	1.00	4 3/4
P19213	4	1 5/8 ODF	26.27	22.65	3.69	1.00	1.00	4 3/4
P19217	4	2 1/8 ODF	27.12	23.12	3.97	1.34	1.34	4 3/4



Filter Elements and Cores

Z-48 Super High Capacity Core

Most highly recommended for use with POEs. Formulated for use with the new refrigerants, blends and synthetic polyolester oils. For hi-moisture, acid, sludge and particulate removal. The Z-48 has 3 times the moisture capacity of standard cores.



PCX-48 High Capacity Gold Label Core

For use in either liquid or suction line applications, the PCX-48 offers significantly higher moisture and acid capacity than standard cores. For systems with excessive moisture concerns and polyolester oils.



PCK-48 Burnout/Clean-up Core

For use in either liquid or suction line applications, the PCK-48 is formulated for burnouts where wax is not the issue. It also provides general clean-up of acids, varnishes, sludge and moisture.



PCK-48HH Charcoal Burnout Core

Formulated with charcoal to remove wax on low temperature systems even before problems occur. The PCK-48HH can be used in either liquid or suction line applications and also removes acids, water, solids and sludge. Recommended for refrigerant reclaim/recovery units.



PCK-100 High Capacity Core

For use in either liquid or suction line applications, the PCK-100 provides the lowest pressure drop possible while retaining high filter capacity. The PCK-100 offers high water and acid capacities to assure fast system clean-up. Ideal for corrective or preventative maintenance programs.



PFE-48BF Parker Filter Element

For use in filtering out solid contaminants. Suitable for bi-directional applications, this filter features low pressure drop and filtration capabilities down to 10 microns. It is also interchangeable with other manufacturers' filters.



Replacement Filter Core Dryer Water Drop Capacity at ARI Conditions

Core Model	R-12 (15 ppm) 75°F/125°F	R-22 (60 ppm) 75°F/125°F	R-134a (150 ppm) 75°F/125°F	R-401A/B (50 ppm) 75°F/125°F	R-401C (50 ppm) 75°F/125°F	R-402A (50 ppm) 75°F/125°F	R-402B (50 ppm) 75°F/125°F
PCX-48	770/607	697/524	762/591	746/551	725/544	756/558	756/558
PCK-48HH	524/374	474/322	518/363	507/339	493/335	512/343	512/343
PCK-48	607/447	549/386	600/435	587/406	571/401	596/411	596/411
Z-48	1833/1660	1659/1433	1814/1614	1775/1505	1726/1487	1799/1524	1799/1524
PCK-100	1572/1235	1422/1066	1556/1201	1522/1120	1481/1107	1543/1134	1543/1134

Core Model	R-404A (50 ppm) 75°F/125°F	R-407A (50 ppm) 75°F/125°F	R-407B (50 ppm) 75°F/125°F	R-407C (50 ppm) 75°F/125°F	R-502 (50 ppm) 75°F/125°F	R-507A (50 ppm) 75°F/125°F
PCX-48	758/581	501/369	501/369	534/392	709/544	766/584
PCK-48HH	515/357	341/227	341/227	363/241	482/335	521/359
PCK-48	597/428	395/272	395/272	420/288	559/401	604/430
Z-48	1804/1587	1193/1008	1193/1008	1270/1070	1688/1487	1823/1596
PCK-100	1547/1181	1023/750	1023/750	1090/796	1447/1107	1564/1188

Selection Recommendations for System Sizing

Shell	No. of Cores	Connection Size and Type	Refrigeration Low Temp. & Commercial Installations			Air Conditioning: Field Replacement & Field Installations			Air Conditioning: OEM / Self Contained Equipment		
			R-134a	R-22	R404A/R-507A	R-134a	R-22	R404A/R-507A	R-134a	R-22	R404A/R-507A
P485	1	5/8 ODF	8	10	8	8	10	8	12	15	10
P487	1	7/8 ODF	11	15	10	11	14	10	15	20	13
P489	1	1 1/8 ODF	11	15	10	13	17	10	20	25	15
P4811	1	1 3/8 ODF	13	20	13	13	20	13	20	25	15
P4813	1	1 5/8 ODF	15	20	15	15	20	15	22	27	20
P4817	1	2 1/8 ODF	20	25	20	20	25	20	25	30	22
P4821	1	2 5/8 ODF	20	25	20	20	25	20	25	30	22
P967	2	7/8 ODF	20	25	15	20	25	15	27	35	20
P969	2	1 1/8 ODF	25	33	20	25	33	20	33	40	25
P9611	2	1 3/8 ODF	30	35	25	30	35	25	35	45	30
P9613	2	1 5/8 ODF	35	40	30	35	40	30	40	50	35
P9617	2	2 1/8 ODF	40	45	35	40	45	35	45	55	40
P9621	2	2 5/8 ODF	40	45	35	40	45	35	45	55	40
P9625	2	3 1/8 ODF	45	50	40	45	50	40	50	60	45
P1449	3	1 1/8 ODF	30	40	30	30	40	30	40	55	35
P14411	3	1 3/8 ODF	40	50	35	40	50	35	50	65	40
P14413	3	1 5/8 ODF	50	50	40	45	55	40	55	70	45
P14417	3	2 1/8 ODF	60	50	45	50	60	45	60	80	50
P19211	4	1 3/8 ODF	50	70	45	50	70	45	60	80	50
P19213	4	1 5/8 ODF	60	80	55	60	80	55	77	100	60
P19217	4	2 1/8 ODF	65	85	60	65	85	60	80	105	65

PCK-100 Core Installation Recommendations - Nominal Tons

No. of Cores	Filter Area	Refrigeration Comm. and Low Temperature				Air Conditioning OEMs, Self-contained, Split & Field Replacement		
		R-134a R-401a	R-22 R-407a	R-407b R-404a R-507	R-407c R-410a	R-134a R-410a R-407b	R-22 R-407c R-410a	R-407a R-502 R-507A
3	294	75	100	60	65	100	125	80
3	294	80	110	65	70	105	130	85
4	392	110	130	100	125	130	150	125
4	392	115	135	105	130	135	165	125

Pre-Filters, Oil Devices and Strainers
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Notes

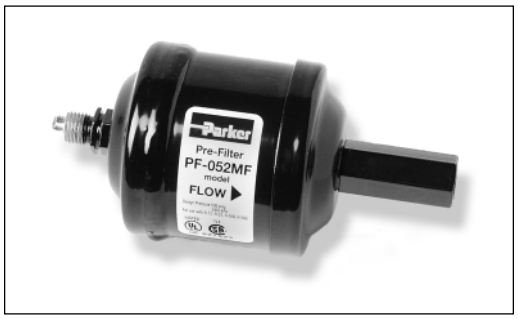
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Filters and Pre-Filters

Parker provides a large selection of components for recovery, recycle and reclaim machines, protecting them from the many types of contaminants that are encountered during the servicing of systems.

PF Series

The PF 052 & PF 052MF are designed to provide a filtration level of 15 microns. When installed on the inlet of your machine it can prevent costly damage by filtering solid contaminants out of the refrigerant before it enters your machine. The Parker pre-filter is for temporary use only and should be changed after servicing a maximum of six to eight systems. Change out may be needed sooner depending on actual system conditions. Various fitting combinations are available.



Features and Benefits

- Female outlet fitting allows direct mounting to the machine.
- Extended female end fitting provides valve handle clearance.
- Male-to-male fittings allow connection to or between hoses.
- Enlarged depth filtering area.
- UL listed / CSA certified.

Specifications

Model	Inlet	Outlet
PF 052	1/4" SAE male flare	1/4" SAE male flare
PF 052MF	1/4" SAE male flare	1/4" SAE female flare

SPD Series

The SPD series is an enlarged version of the PF Series with drying capabilities. This Super Pre-Filter-Dryer should be installed at the inlet of the machine and used where there are concentrations of contaminants in the refrigerant. Moisture capacity of this unit size exceeds anything else currently available in the market. The Super SPD series is the ideal solution when transferring large amounts of refrigerant for reclaim or recycle.



Features and Benefits

- Super high capacity for acid and moisture removal.
- Removes 504 drops of moisture vs. industry standard of 150 drops.
- Available with either 1/4" SAE or 3/8" SAE flare connections.
- Compatible with all HCFC, CFC and other refrigerants and blends.

Specifications

Model	Inlet	Outlet
SPD-162	1/4" SAE male flare	1/4" SAE male flare
SPD-162MF	1/4" SAE male flare	1/4" SAE female flare
SPD-163	3/8" SAE male flare	3/8" SAE male flare

LP Gas Filter

Additives to LP gas can cause scaling and flaking of copper and aluminum tubing over a period of time. The Parker LP Gas Filter effectively removes these contaminants

Features and Benefits

- Special paint meets U.L. requirements for gas appliances.

Specifications

For LP Gas Filter, consult factory for inlet/outlet data and part numbers.

PRD-3 Series

Specifically designed for OEM recovery units that require 3/8" flare connections and a larger cross sectional filter area. The PRD-3 filter dryer meets or exceeds OEM specifications providing both value and efficiency.



Features and Benefits

- High acid and high moisture capacity.
- Enlarged filtration area.
- 3/8" SAE male flare fittings on both ends.
- Drop in replacement for ASD-28F3 or KH45LD010.
- Compatible with all HCFC, CFC and other refrigerant blends.

Specifications

Model	Inlet	Outlet
PRD-3	3/8" SAE male flare	3/8" SAE male flare

Oil Vapor Dryer Separator

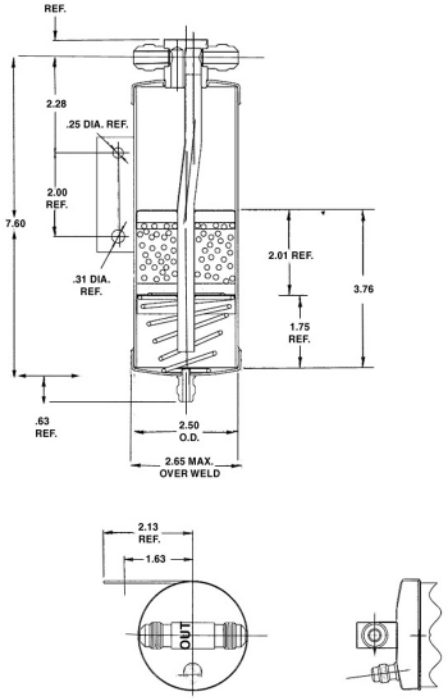
The Parker Vapor Dryer Separator (VDS Series) removes contaminated oil from a system in addition to solids, acid and moisture. A 1/4" SAE oil drain access fitting is located on the bottom to provide a continuous means of measuring the amount of oil removed from a system, thereby indicating the amount needed to be replaced. The VDS holds up to four ounces of oil and is reusable for up to 50 pounds of refrigerant, depending upon contamination levels. For rigid or secure mounting, a side bracket is welded to the body. The VDS can also be hung from a manifold gauge set with the wire strap provided. A model is available with coalescing element for improved oil separation.



Features and Benefits

- Oil removal drain fitting.
- Acid and moisture removal.
- 3/8" SAE male flare fittings.
- Inlet access valve fitting.
- Mounting bracket.

Dimensions



POS-321 Oil Separator



The Parker oil separator removes oil from system refrigerant by means of a highly efficient coalescing filter. The filter is 98.5% efficient, filtering oil and particles down to 1/10 of a micron while leaving a trace amount of oil necessary for adequate system lubrication. The separator is ideal for recovery and reclaim operations.

Features and Benefits

- 3.6 ounces/108 ml capacity.
- Standard 1/8" npt connection size.
- 1/4" or 3/8" flare or sweat connections optional.
- For use with all CFC, HCFC and HFC refrigerants.
- Design pressure of 500 psig / 3550 kPa / 35.5 bar.
- U.L. listed SA5915.

Oil Reservoirs



Parker oil reservoirs are holding vessels for stand-by oil necessary for the operation of a system.

Features and Benefits

- Two or three sight glass ports for oil level monitoring.
- 3/8" flare valve on the top and bottom shipped separately to be adjusted per customer requirements. Allows isolation of the reservoir for addition or removal of oil from the tank.
- Vent port for connection to the suction line to prevent pressure build up in the reservoir.
- Available with mounting studs and brackets.
- Other sizes available: 1/4 and 1/2 tons.

Specifications

Model No.	Parker Part No.	Total Capacity in Gallons	A Capacity Gallons	B Capacity Gallons	Length Inches
POR-2	089351-00	2	3/4	3/4	18
POR-3	089379-00	3	3/4	3/4	23
POR-4	089350-00	3	3/4	1 1/2	36

PS-033 Oil Strainer



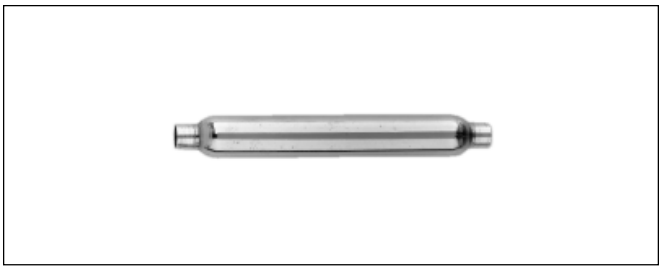
Parker oil strainers removes contaminant from the oil line by means of a 200 mesh filter screen.

Features and Benefits

- Filtration area = 7.0 square inches.
- 3/8" SAE steel male flare connections.
- U.L. listed.
- Design pressure of 500 psig (3550 kPa).

Copper Strainers

Parker's Copper Strainers are used in refrigeration and air conditioning systems to filter sediment, to protect refrigerant metering devices such as capillary tubing, and to protect other components such as valves and compressors. Screen sizes are selected to ensure that all targeted amounts and sizes of particles are trapped without causing substantial pressure drop.



Application

- Refrigeration and air conditioning systems.

Features and Benefits

- 1/2", 5/8", 3/4", 1", 1-3/16", 1-3/8" and 1-5/8" O.D. one-piece copper shells are available to match the system requirements of a unit.
- Bifurcated sweat connections in a variety of sizes provide easy installation.
- Standard 100 and 150 mesh stainless steel screens available that filter at 140 and 104 microns, respectively; standard 120 mesh brass screens that filter at 117 microns; other screens available upon request such as 20, 40 and 200 mesh.

Recommended Screen Area

Screen Area Sq. In.	Low Temp. R-12 & R-134a 0° F or below	Med. Temp. R-12 & R-134a 0° F or above	Low Temp. R-22	Air Cond. R-22
0.8	1/8 hp	1/4 hp	1/8 hp	1/3 hp
1.8	1/4 hp	1/3 hp	1/3 hp	1/2 hp
2.2	1/3 hp	1/2 hp	1/2 hp	3/4 hp
2.3	1/2 hp	3/4 hp	3/4 hp	1 hp
5.2	1 1/2 hp	2 hp	1 1/2 hp	3 hp
6	2 hp	3 hp	2 hp	5 hp

Strainer Screen Dimensions

Mesh	Diameter of Wire	Particle Size Maximum Diameter	Screen Material	Micron Size	% Open Area
100 x 90	0.0045	0.0055	s.s.	140	30%
120 x 108	0.0036	0.0046	brass	117	30%
150 x 140	0.0026	0.0041	s.s.	104	37%

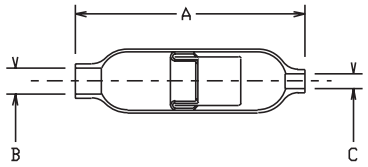
Strainer Dimensions

Model No.	Length (In.)	Area Sq. Inches	Inlet I.D.	Outlet I.D.	Screen
PS-2S	2.75	1	1/4	1/4	120 mesh brass
PS-3S	2.75	1	3/8	3/8	120 mesh brass
PS-4S	3	1	1/2	1/2	100 mesh stainless steel
PS-5S	5.13	8.37	5/8	5/8	100 mesh stainless steel
PS-7S	5.13	8.37	7/8	7/8	100 mesh stainless steel
PS-9S	5.44	10.62	1.125	1 1/8	100 mesh stainless steel
PS-11S	5.44	10.62	1.375	1 3/8	100 mesh stainless steel
PS-13S	6	10.62	1.625	1 5/8	40 mesh stainless steel

*Models in this chart are Standard Aftermarket Products

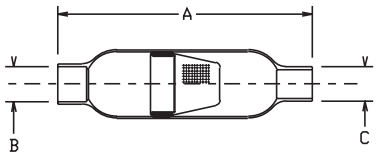
5/8" O.D. Copper Strainers – Standard Products

Parker Part No.	Design Working Pressure PSIG	Filtration Capacity Microns	Screen Area Sq. In.	Inlet Inches	Outlet Inches	Overall Length Inches
054139-00	500	140	0.75	1/4	.147-.152	2.25



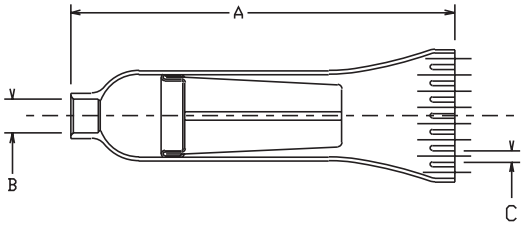
3/4" O.D. Copper Strainers

Part No.	Design Working Pressure PSIG	Filtration Capacity Microns	Screen Area Sq. In.	(B) Inlet Inch I.D.	(C) Outlet Inches I.D.	Overall Length In. (A)
054816-03	500	117	0.88	1/4	1/4	2.75
054816-06	500	117	0.88	3/8	5/16	2.75
054816-01	500	117	0.88	3/8	3/8 OD	2.75
054816-02	500	117	0.88	3/8	3/8	2.75
054816-10	500	117	0.88	1/2	1/2 OD	2.75
056822-00	500	140	0.88	1/2	1/2	3
051163-01	500	140	4.55	3/8	3/8	5.75



1" O.D. Copper Strainers

STANDARD PRODUCT						
Part No.	Design Working Pressure PSIG	Filtration Capacity Microns	Screen Area Sq. In.	(B) Inlet Inch I.D.	(C) Outlet Inches I.D.	Overall Length In. (A)
057073-01	500	140	1.96	3/8	8 @ 1/8	4.25
MODIFIED STANDARD						
441601	360-540	104	1.96	see chart below		3.8-4.3



Outlet Options

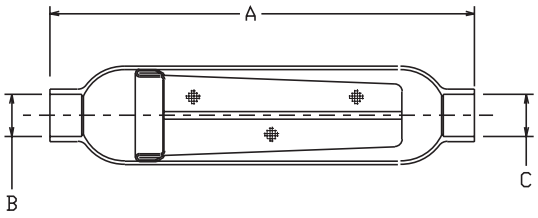
Outlet	No. of Holes	Outlet	No. of Holes
0.081	1	0.125	1, 2, 3, 4, 5, 6, 8
0.087	1	3/16	1
0.093	1	1/4	1
0.099	1	5/16	1
0.106	1, 2, 3, 4, 5, 6, 8	3/8	1
0.112	1	1/2	1

Inlet Options

Inlet	No. of Holes
3/16	1
1/4	1, 2
5/16	1, 2
3/8	1
1/2	1
5/8	1

All strainers are Underwriters Laboratories recognized file SA-8570, guide card SMGT-2 and Canadian Standards Association certified file No. LR-87950.

1-3/16" O.D. Copper Strainers



STANDARD PRODUCT						
Part No.	Design Working Pressure PSIG	Filtration Capacity Microns	Screen Area Sq. In.	(B) Inlet Inch I.D.	(C) Outlet Inches I.D.	Overall Length In. (A)
058307-00	500	140	8.37	1/2	1/2	5.13
MODIFIED STANDARD						
441901	500	104	2.32	see chart below		5.8-6.5

Outlet Options

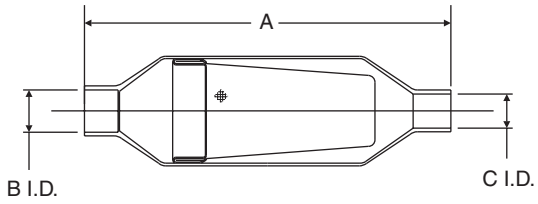
Outlet	No. of Holes	Outlet	No. of Holes
0.099	1, 2, 3, 4, 5, 6	1/4	1
0.106	1, 2, 4	5/16	1
0.112	1, 3, 4, 6	3/8	1, 2
0.125	1, 2	1/2	1

Inlet Options

Inlet	No. of Holes
1/4	1
5/16	1, 2
3/8	1, 2
1/2	1
5/8	1

All 1-3/16" O.D. strainers are Underwriters Laboratories recognized file SA-8570, guide card SMGT-2 and Canadian Standards Association certified file No. LR-87950 Model 319.

1-5/8" O.D. Copper Strainers



Part No.	Design Working Pressure PSIG	Filtration Capacity Microns	Screen Area Sq. In.	(B) Inlet Inches I.D.	(C) Outlet Inches I.D.	Overall Length In. (A)
053830-01	500	140	10.62	1/4	1/4	5.13
054745-01	500	140	10.62	5/8	.617-.622 O.D.	5.44

All 1-5/8" O.D. strainers are Underwriters Laboratories recognized file SA-8570, guide card SMGT-2 and Canadian Standards Association certified file No. LR-87950 Model 1638.

Accumulators, Receivers, Tanks and Mufflers
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Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Introduction to Accumulators

The prime function of a suction line accumulator in a heat pump or refrigeration system is to catch and hold any unused portion of the system charge. It must also prevent liquid slugging of the compressor and excessive refrigerant dilution of the compressor oil.

The accumulator must return refrigerant and oil to the compressor at a sufficient rate to maintain both system operating efficiency and proper crankcase oil level. To make sure these tasks are accomplished, system designers must consider the following items:

- The accumulator must have sufficient internal volume.
- A properly sized and protected oil return orifice is required to ensure positive oil (and refrigerant) return to the compressor.
- The pressure drop across the accumulator should be as low as possible for given inlet and outlet fitting sizes.

Oil return at minimum flow rate is controlled by the outlet U-tube size. Refrigerant and oil will be returned to the compressor by pressure drop across the orifice metering area and the liquid head above the orifice. Other design requirements include:

- Safe working and burst pressures.
- Agency approvals.
- Salt spray, moisture, and corrosion resistance.

Figure 1 shows a typical accumulator with an inlet deflector. The shape of the deflector directs the inlet flow in a slightly downward tangential direction.

The inlet to the U tube is located behind the inlet deflector to prevent liquid carry-over and is bell-shaped to reduce the sudden contraction loss of the high-velocity gas. The U-tube diameter is selected to minimize pressure drop at high flow rates yet provide adequate oil return at low flow rates.

A 50 x 60 mesh screen is installed to protect the small diameter oil return orifice.

An anti-siphon hole, provided near the outlet of the U tube, prevents liquid from siphoning into the outlet tubing and compressor during an off cycle.

A fusible alloy plug is generally a U.L. requirement. It is a safety device to protect against excessive pressures in the event of a fire.

Accumulator Fine Tuning

Accumulator selection can be fine tuned for best performance. This involves the sizing of the accumulator, and the sizing of the orifice. The controlling factor for both is the type of metering device used on the system, either a fixed orifice or a thermostatic expansion valve.

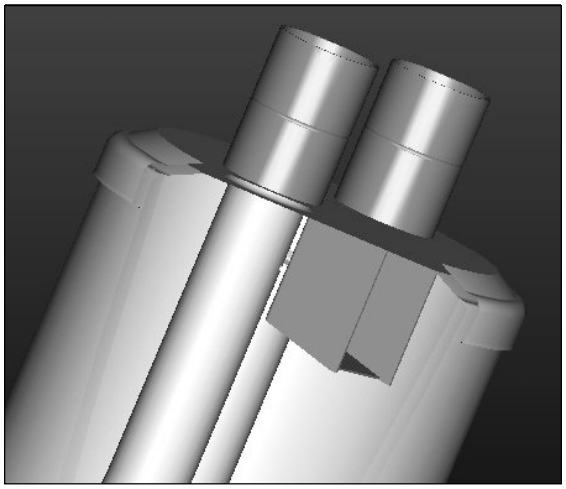


Figure 1 - Typical accumulator with inlet deflector baffle.

In systems using a fixed orifice in the heating mode, the accumulator holding capacity should be about 70% of the system charge. This should provide adequate holding capacity during operation with blocked or fouled heat exchanger coils. The resulting high discharge/ low suction pressure condition will push much of the system charge into the accumulator. The oil return orifice size should be small to prevent excess liquid refrigerant being returned to the compressor. This would excessively reduce the compressor discharge temperature, lowering heating performance. Parker recommends a 0.040 inch diameter orifice as a good starting point for these systems.

In systems using an expansion valve, the accumulator holding capacity should be about 50% of the system charge. At startup and after defrost, the bulb of the expansion valve is warm. This causes flooding of the evaporator and brings the accumulator into play until the valve regains control. The accumulator must also deal with off cycle refrigerant migration. At shut down, the accumulator is the coldest component in the system. This results in migration of liquid refrigerant to the lower temperature accumulator. This type of system needs to get the refrigerant returned to circulation more quickly than the fixed orifice system. Parker recommends a 0.055 inch diameter orifice to allow quick return of liquid refrigerant. The recommended sizes of the orifices can be further tested for optimum results. Parker has the ability to provide orifices in sizes smaller and larger to satisfy the characteristics required by the customer.

New Refrigerants

The introduction of new refrigerants and oils has created new problems in the design of all system components and suction accumulators are no exception. As mentioned earlier, the accumulator is the coldest component in the system. The new refrigerants and the oils they are used with may not be fully miscible in the temperature range the accumulator normally operates. The oil and refrigerant can separate into oil rich and refrigerant rich layers in the accumulator, with the refrigerant rich layer at the bottom. The oil return orifice is located in the now refrigerant rich layer.

Parker's solution to this problem is to provide active mixing of the layers in the accumulator. This is accomplished by the shape and positions of the inlet deflector and outlet U-tube. The inlet flow stream is directed tangentially into the liquid layers in the bottom of the accumulator. The resulting circulation of the liquid past the off center U-tube forces a mixing of the oil and refrigerant layers.

Field Replacement

Parker recommends that the accumulator should be changed when a compressor is replaced. The old accumulator may contain contaminants from the problem that caused the compressor failure. There may also be considerable oil remaining from the first compressor if a gradual loss of charge caused the failure. This amount coupled with the oil in the replacement compressor may create an oil over charge condition.

Steel Suction Line Accumulators

'U"Tube Style Accumulators

The Parker "U" tube accumulator design is a result of extensive laboratory testing plus detailed investigation of the various accumulators currently available. It takes into account all of the requirements essential for heat pump applications, including safe holding volume (relative to the system's total charge), protected flow control for positive refrigerant and oil return, and minimum pressure drop across the accumulator.

Parker offers standard accumulator models designed for application on heat pump and refrigeration systems from 1/4 through 12 tons. Liquid refrigerant holding requirements of suction accumulator may vary by application. Because of the diversity in heat pump systems, accumulator capacity selection should be determined by actual testing. Consult Parker for assistance if required.



Features & Benefits

- Solid copper connections.
- "U" tube design for maximum flow of refrigerant and minimum oil entrapment.
- Inlet flow deflector guides refrigerant toward wall for smooth tangential flow and gradual expansion.
- "U" tube entrance is positioned behind the inlet flow deflector to prevent unwanted liquid refrigerant from entering and damaging compressor.
- Metering orifice matched to system capacity assures optimum liquid refrigerant and oil flow back to compressor.
- Protective screen and orifice assembly on "U" tube protects against foreign particles and contaminants affecting metering function.
- Fittings and "U" tube are matched to accumulator holding capacity and total system charge for minimum pressure drop and maximum refrigerant flow.
- U.L. listed for 355 psig design pressure. File No. SA5172.
- Powder paint exterior coating surpasses 500 hour ASTM salt spray tests.
- Integral 430°F Fuse Plugs (U.L. File No. SA5441).

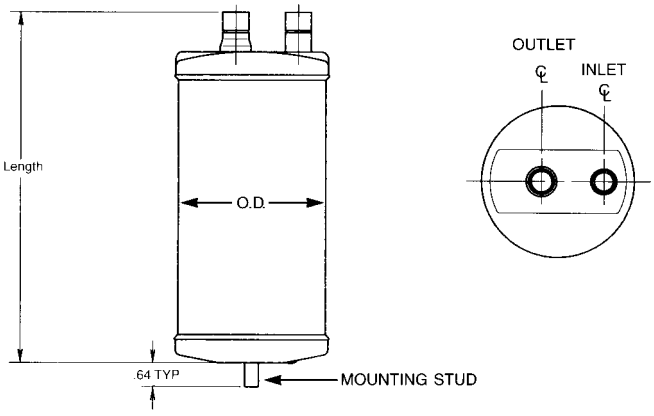
Also available:

Heat Exchanger Accumulator

- Can be made in all models of Parker's standard accumulators.
- Copper heat exchange coil for superior heat exchange.
- Liquid line connections available in 3/8" I.D.

Dimensions and Flow Data

Refer to the chart on the following page for dimension values and flow data.



Steel Suction Line Accumulator Dimensions and Flow Data

Model No.	Solder Fitting Size	Dimensions (Inches) Length	Dimensions (Inches) O.D.	Capacity[1] (oz.)	Evap. Temp. °F	Recommended capacity in tons of refrigeration: 22 & 404A Tons @ 1 psi	22 & 404A Min. Tons	134a Tons @ 1 psi	134a Min. Tons	401A Tons @ 1 psi	401A Min. Tons	402A Tons @ 1 pis	402A Min. Tons	407C Tons @ 1 pis	407C Min. Tons	410A Tons @ 1 pis	410A Min. Tons	502 & 507A Tons @ 1 pis	502 & 507A Min. Tons
PA3060-10-4	1/2"	10.35	3	35	40	2.00	0.35	1.67	0.30	1.42	0.25	1.97	1.01	1.97	0.46	1.93	1.44	1.48	0.27
PA3060-10-5	5/8"	10.35	3	35	0	1.54	0.25	0.98	0.16	1.06	0.18	1.53	0.41	1.53	0.18	1.50	0.65	1.10	0.20
					-20	1.33	0.21	0.69	0.11	0.90	0.15	1.32	0.25	1.32	0.11	1.30	0.42	0.93	0.16
PA3060-15-5	5/8"	15.05	3	55	40	2.10	0.35	1.75	0.30	1.49	0.25	2.07	1.01	2.07	0.46	2.02	1.44	1.55	0.27
					0	1.62	0.25	1.03	0.16	1.11	0.18	1.61	0.41	1.60	0.18	1.57	0.65	1.16	0.20
					-20	1.40	0.21	0.73	0.11	0.95	0.15	1.39	0.25	1.39	0.11	1.36	0.42	0.98	0.16
PA3060-15-6	3/4"	15.05	3	54	40	2.30	0.35	1.92	0.30	1.63	0.25	2.27	1.01	2.27	0.46	2.22	1.44	1.70	0.27
					0	1.77	0.25	1.12	0.16	1.22	0.18	1.76	0.41	1.75	0.18	1.72	0.65	1.27	0.20
					-20	1.53	0.21	0.80	0.11	1.04	0.15	1.52	0.25	1.52	0.11	1.49	0.42	1.07	0.16
PA4065-9-5C	5/8"	9.62	4	60	40	2.96	0.35	2.47	0.30	2.10	0.25	2.92	1.01	2.92	0.46	2.85	1.44	2.19	0.27
					0	2.28	0.25	1.44	0.16	1.57	0.18	2.27	0.41	2.26	0.18	2.21	0.65	1.63	0.20
					-20	1.98	0.21	1.03	0.11	1.34	0.15	1.97	0.25	1.96	0.11	1.93	0.42	1.39	0.16
PA4065-9-6C	3/4"	9 5/8"	4	58	40	3.00	0.35	2.53	0.30	2.10	0.25	2.96	1.01	2.96	0.46	2.89	1.44	2.20	0.28
					0	2.30	0.25	1.48	0.16	1.60	0.18	2.29	0.41	2.28	0.18	2.23	0.65	1.70	0.20
					-20	2.00	0.21	1.05	0.11	1.40	0.15	1.99	0.25	1.98	0.11	1.95	0.42	1.40	0.16
PA5083-9-6C	3/4"	9.62	5	89	40	3.82	0.57	3.19	0.49	2.71	0.41	3.76	1.51	3.77	0.69	3.68	2.16	2.82	0.46
					0	2.95	0.41	1.86	0.27	2.03	0.30	2.94	0.61	2.92	0.27	2.86	0.98	2.10	0.33
					-20	2.55	0.35	1.32	0.18	1.73	0.24	2.53	0.37	2.53	0.16	2.48	0.63	1.79	0.27
PA5083-9-7C	7/8"	9.63	5	86	40	3.90	0.57	3.21	0.49	2.70	0.41	3.84	1.51	3.85	0.69	3.76	2.16	2.80	0.46
					0	3.00	0.41	1.88	0.27	2.00	0.30	2.98	0.61	2.97	0.27	2.91	0.98	2.10	0.33
					-20	2.60	0.35	1.33	0.18	1.70	0.24	2.58	0.37	2.58	0.16	2.53	0.63	1.80	0.27
PA5083-12-7C	7/8"	12.88	5	125	40	5.41	0.88	4.51	0.75	3.83	0.64	5.33	2.12	5.34	0.96	5.21	3.03	4.00	0.70
					0	4.17	0.64	2.64	0.42	2.87	0.45	4.15	0.86	4.13	0.38	4.05	1.37	2.98	0.51
					-20	3.61	0.54	1.87	0.28	2.45	0.37	3.59	0.52	3.58	0.22	3.52	0.88	2.53	0.41
PA5083-11-7C	7/8"	11.33	5	108	40	4.38	0.57	3.21	0.43	3.10	0.41	4.32	1.51	4.32	0.69	4.22	2.16	3.23	0.46
					0	3.37	0.41	1.88	0.24	2.32	0.30	3.35	0.61	3.34	0.27	3.27	0.98	2.41	0.33
					-20	2.92	0.35	1.33	0.16	1.98	0.24	2.90	0.57	2.89	0.16	2.84	0.63	2.04	0.27
PA5083-11-6C	3/4"	11.33	5	111	40	3.85	0.57	3.21	0.49	2.72	0.41	3.79	1.51	3.80	0.69	3.71	2.16	2.84	0.46
					0	2.97	0.41	1.88	0.27	2.04	0.30	2.96	0.61	2.94	0.27	2.88	0.98	2.12	0.33
					-20	2.56	0.35	1.33	0.18	1.74	0.24	2.54	0.57	2.54	0.16	2.49	0.63	1.80	0.27
PA5083-15-7C	7/8"	15.34	5	156	40	6.20	0.88	5.17	0.75	4.39	0.64	6.11	2.12	6.12	0.96	5.97	3.03	4.58	0.70
					0	4.78	0.64	3.03	0.42	3.29	0.45	4.76	0.86	4.73	0.38	4.64	1.37	3.41	0.51
					-20	4.13	0.54	2.15	0.28	2.80	0.37	4.10	0.52	4.09	0.22	4.02	0.88	2.90	0.41
PA5083-17-7C	7/8"	17.25	5	179	40	6.20	0.88	5.17	0.75	4.39	0.64	6.11	2.12	6.12	0.96	5.97	3.03	4.58	0.70
					0	4.78	0.64	3.03	0.42	3.27	0.45	4.76	0.86	4.73	0.38	4.64	1.37	3.41	0.51
					-20	4.13	0.54	2.15	0.28	2.80	0.37	4.10	0.52	4.09	0.22	4.02	0.88	2.90	0.41
PA6125-15-9C	1 1/8"	15.00	6	211	40	9.00	3.00	8.83	1.97	6.10	1.90	8.87	3.45	8.88	1.57	8.67	4.93	7.30	3.00
					0	5.60	2.00	5.62	0.82	3.70	1.20	5.57	1.40	5.55	0.62	5.44	2.23	4.50	2.00
					-20	4.30	0.80	4.31	0.50	2.80	0.05	4.27	0.85	4.26	0.36	4.19	1.43	3.40	0.80
PA6125-15-11C	1 3/8"	15.25	6	214	40	12.00	3.00	12.05	1.97	6.20	1.90	11.82	3.45	11.85	1.57	11.56	4.93	9.80	3.00
					0	7.50	2.00	7.52	0.82	5.00	1.20	7.46	1.40	7.43	0.62	7.28	2.23	6.00	2.00
					-20	5.80	0.80	5.82	0.50	3.60	0.05	5.76	0.85	5.75	0.36	5.65	1.43	4.60	0.80
PA6125-18-9C	1 1/8"	18.00	6	264	40	8.80	3.00	8.84	1.97	6.00	1.90	8.67	3.45	8.69	1.57	8.48	4.93	7.20	3.00
					0	5.50	2.00	5.52	0.82	3.70	1.20	5.47	1.40	5.45	0.62	5.34	2.23	4.40	2.00
					-20	4.30	0.80	4.31	0.50	2.80	0.05	4.27	0.85	4.26	0.36	4.19	1.43	3.40	0.80
PA6125-18-11C	1 3/8	18.00	6	267	40	11.00	3.00	11.05	1.97	7.50	1.90	10.84	3.45	10.86	1.57	10.59	4.93	9.10	3.00
					0	7.00	2.00	7.02	0.82	4.60	1.20	6.96	1.40	6.93	0.62	6.80	2.23	5.50	2.00
					-20	5.40	0.80	5.42	0.50	3.50	0.05	5.37	0.85	5.35	0.36	5.26	1.43	4.20	0.80
PA6125-20-11C	1 3/8"	20.25	6	302	40	11.00	3.00	11.05	1.97	7.50	1.90	10.84	3.45	10.86	1.57	10.59	4.93	9.10	3.00
					0	7.00	2.00	7.02	0.82	4.60	1.20	6.96	1.40	6.93	0.62	6.80	2.23	5.50	2.00
					-20	5.40	0.80	5.42	0.50	3.50	0.05	5.37	0.85	5.35	0.36	5.26	1.43	4.20	0.80

[1] Holding capacity of R-22 at 40°F. Divide by .7 to obtain recommended maximum system charge on fixed orifice systems. Consult Parker for availability.

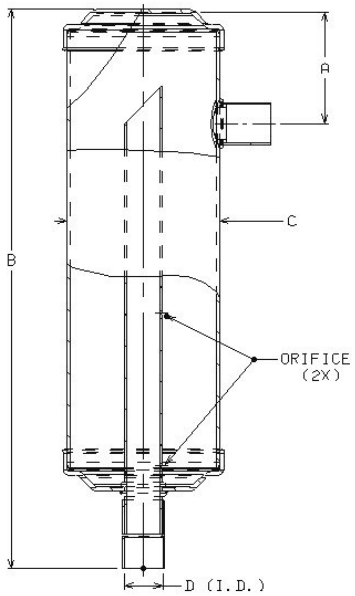
Stand Pipe Style Steel Accumulators



Features and Benefits

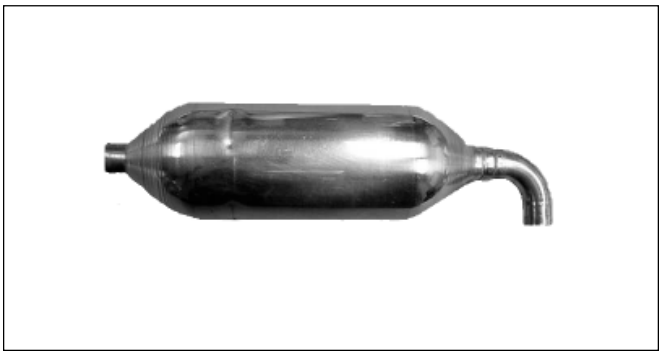
- Available in 2-1/2", 3" and 4" diameters.
- Copper and copper plated steel fittings
- Standard fitting sizes: 3/4" and 7/8". Other sizes available upon request.
- Dual, screened orifice design. Various orifice sizes available.
- U.L. listed file no. SA5172, CSA certified.

Dimensions



Part No.	Model No.	A	B	C	D I.D.		Orifice (2x's)	Volume
					Inlet	Outlet		
070332-00	P3060-11-6C	2.25	11.00	3.00	3/4	3/4	0.060 typ.	41.5 in^3
070333-00	P3060-13-7C	2.25	13.00	3.00	7/8	7/8	0.060 typ.	50.0 in^3
070342-00	P3060-13-7C	2.25	13.00	3.00	7/8	7/8	0.035 typ.	50.0 in^3

Vertical, Horizontal, and Stand-Pipe Copper Accumulators



Parker's Vertical, Horizontal, and Stand-Pipe Copper Accumulators hold unused system charge to prevent liquid slugging of the compressor and excessive refrigerant dilution of the compressor oil. Copper accumulators have extensive usage in low temperature refrigeration and heat-pump applications, along with some residential air conditioning systems.

Application

- Low temperature refrigeration and heat-pump applications.
- Some residential air conditioning systems.

Features and Benefits

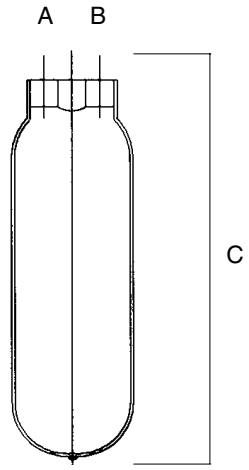
- Accumulators available in vertical (inlet and outlet on same end), horizontal (inlet and outlet on opposite ends), and stand-pipe designs.
- Stand-pipe design can be made with or without an orifice to meter oil return to the compressor.
- Systems using a rotary compressor should use a stand-pipe accumulator including a screened baffle and an oil-return orifice for maximum system performance.
- A wide variety of O.D. and volume sizes are designed to meet the unique requirements of a system.
- Bifurcated sweat connections in a variety of sizes provide for easy installation.

1-1/8" Copper Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches) Inlet (A)	Outlet (B)	Overall Length Inches (C)	Internal Volume (Cu. In.)
032185-00	500	3/8	1/4	8.25	1.97

1-3/16" Copper Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches) Inlet (A)	Outlet (B)	Overall Length Inches (C)	Internal Volume (Cu. In.)
056268-00	400	3/8	3/8	5	4.41
051639-03	400	3/8	3/8	6.5	5.88
056039-01	400	3/8	5/16	6.5	5.88
056039-02	400	5/16	5/16	6.5	5.88



1-3/8" Copper Accumulator

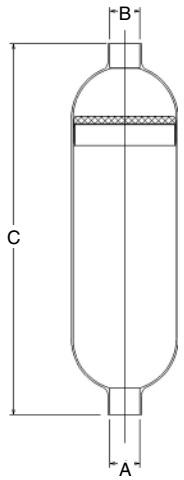
Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches) Inlet (A)	Outlet (B)	Overall Length Inches (C)	Internal Volume (Cu. In.)
057375-00	300	3/8	3/8	7.06	2.77
056380-01	300	3/8	3/8	6	6.86

1-5/8" Copper Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches) Inlet (A)	Outlet (B)	Overall Length Inches (C)	Internal Volume (Cu. In.)
056238-01	400	5/16	1/4	4	6.54
056689-02	400	3/8	3/8	4	6.54
057337-00	400	1/2	1/2	5	8.40
057302-00	400	5/16	5/16	5.13	8.65
057203-00	400	1/2	5/8	6	10.27
057995-00	500	3/8	3/8	5.5	2.61
056326-02	400	1/4	1/4	7	12.14
056472-01	400	3/8	3/8	8	14.00
056463-01	400	1/2	1/2	10	17.74
056463-02	400	3/8	3/8	10	17.74

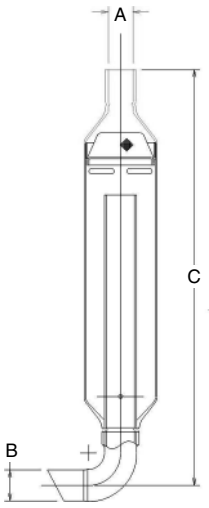
2-1/4" Copper Accumulator

Parker Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches) Inlet (A)	Outlet (B)	Overall Length Inches (C)	Internal Volume (Cu. In.)
032237-00	325	5/8	5/8	7.81	7.41



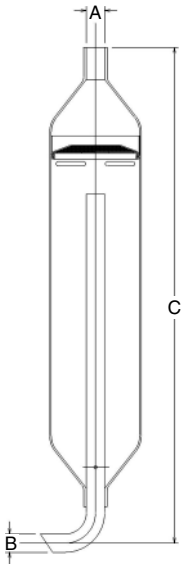
1-1/8" Copper Stand Pipe Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches)		Overall Length Inches (C)	Internal Volume (Cu. In.)
		Inlet (A)	Outlet (B)		
032014-00	325	3/8	0.477	6.44	2.48
071440-00	325	1/2	0.589	7.25	2.14



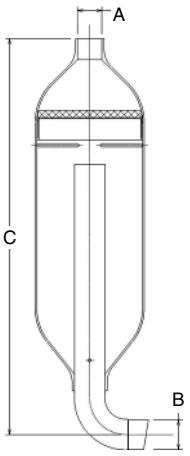
1-7/8" Copper Stand Pipe Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches)		Overall Length Inches (C)	Internal Volume (Cu. In.)
		Inlet (A)	Outlet (B)		
071442-00	325	3/8	3/8	10.2	14.98



2-1/4" Copper Stand Pipe Accumulator

Part No.	Design Working Pressure PSIG	Standard Nominal Sizes (Inches)		Overall Length Inches (C)	Internal Volume (Cu. In.)
		Inlet (A)	Outlet (B)		
032236-00	325	1/2	0.616	8.19	14.87



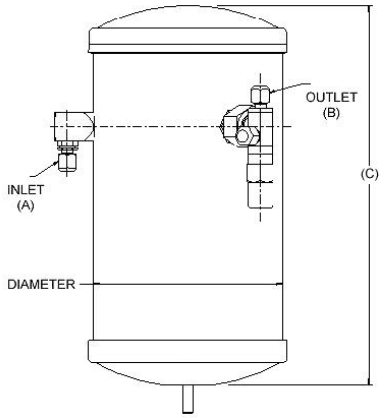
Steel Receivers



Features and Benefits

- Designed for refrigerant storage during normal operation and system pump down.
- Allows the system to adjust to varying system conditions and loads.
- Available in 4", 5" and 6" diameters (2 1/2" and 3" diameter vertical receivers and horizontal receiver models available. Consult Parker).
- Available up to 36" in length.
- Integral 430° F fuse plug.
- Available options: sight glasses, moisture indicators, float balls, valves, mounting brackets, belly bands, relief valve ports.
- Valve is shipped unassembled.
- PTFE gasket seal for valve.
- UL file number SA5195 and CSA file number LR46423.

Dimensions



Model Number	Diameter (Inches)	A Inlet	B Outlet	C Overall Length (Inches)	Holding Capacity
PR4095-10-2	4	1/4 SAE	1/4 SAE	10	4 LBS.
PR5109-10-2	5	1/4 SAE	1/4 SAE	10	6 LBS.
PR5109-10-3	5	3/8 SAE	3/8 SAE	10	6 LBS.
PR6125-12-3	6	3/8 SAE	3/8 SAE	12	10 LBS.
PR6125-18-4	6	1/2 SAE	1/2 SAE	18	16 LBS.

Holding Capacity calculated at 90% system charge at 90°F for R-22 & R134a. For R- 404A & R-507 multiply by 0.9.

Compensator Tanks

A compensator tank is a mode dependent receiver that can be used in a heat pump system. As the heating mode does not require as much refrigerant as the cooling mode, the compensator tank stores the excess refrigerant.



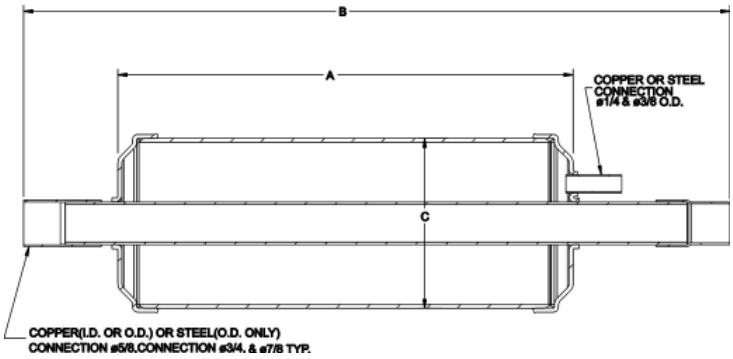
Features and Benefits

- Available with 5/8", 3/4" and 7/8" suction line connections — steel or copper sweat.
- Liquid connections - steel or copper sweat.
- Diameters of 3", 3 1/2" and 4" available.
- Various holding capacities available.
- Corrosion resistant paint gives 500 hour salt spray protection.
- U.L. listed SA5915.

Compensator Tank Refrigerant Holding Capacities

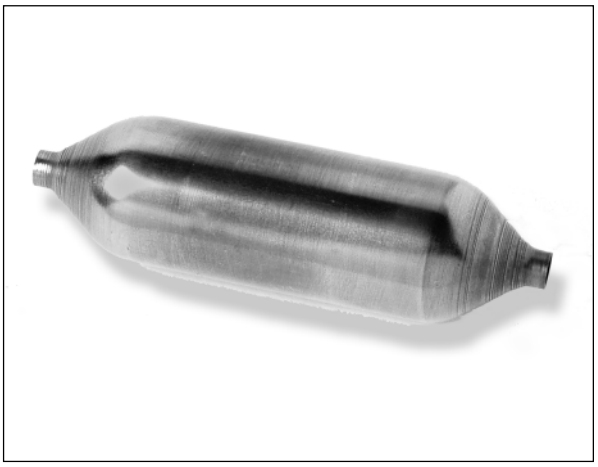
Model	Int. Volume In.^{3}	Holding Capacities (oz.)		
		22	134a	410A
PR3083-8-7C	45	29.60	30.06	26.35
PR3083-16-7C	89	58.55	59.46	52.12
PR3083-12-7C	66	43.42	44.09	38.65
PR35083-9-7C	72	47.37	48.10	42.17
PR35083-4-7C	31	20.39	20.71	18.16
Densities at 100°F in lb/ft^3	-	71.05	72.15	63.25

Dimensions



Model	A	B	C	Suction Connections	Liq. Line Fitting
PR-3083-8-7C	8.25	13.00	3.00	7/8 I.D. x 7/8 O.D.	1/4 O.D.
PR-3083-16-7C	16.00	21.25	3.00	7/8 I.D. x 7/8 O.D.	1/4 O.D.
PR3083-12-6C	12.00	16.00	3.00	3/4 I.D. typ.	1/4 I.D.
PR-35083-9-7C	9.38	14.55	3.50	7/8 I.D. x 7/8 O.D.	3/8 O.D.
PR-35083-4-7C	4.28	8.93	3.50	7/8 I.D. x 7/8 O.D.	3/8 O.D.

Copper Mufflers



Parker's Copper Mufflers are used in refrigeration and air conditioning systems to provide noise attentuation associated with pressure pulses from the compressor. The muffler is usually mounted vertically and flowing downward in the compressor discharge line for efficient oil movement. Internal baffles can be provided for additional dissipation of pressure pulsing.

Application

- Refrigeration and air conditioning systems.

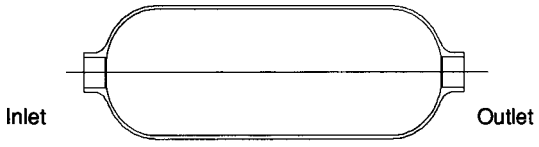
Features and Benefits

- One-piece copper shells are available in 3/4", 1-3/16", 1-5/8" and 2" O.D. sizes to match the system requirements of a unit.
- Sweat connections in a variety of sizes provide for easy installation.
- Internal steel baffles can be provided for additional dissipation of pressure pulsing with the 1-5/8" O.D. model. The number of baffles can be specified according to customer requirements.

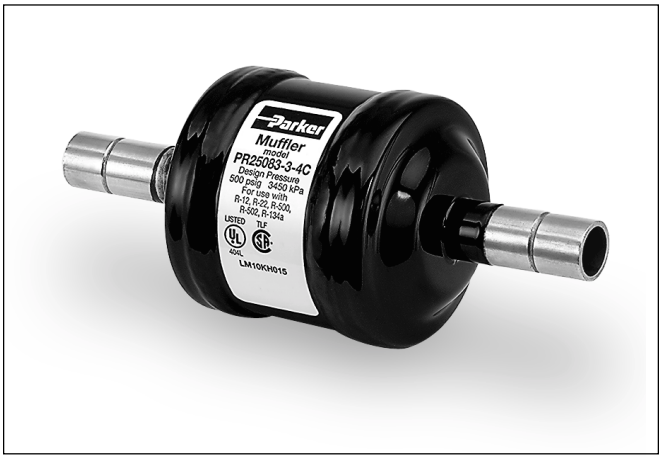
1-5/8" O.D. Copper Mufflers

Part No.	Design Working Pressure (PSIG)	Baffle Material	Inlet Inches	Outlet Inches	Overall Length
054801-01	500	2 C.R.S.	3/8	3/8	4.00
054801-02	500	2 C.R.S.	1/2	1/2	4.00
031798-00	500	None	3/8	3/8	4.38
031780-00	500	None	1/2	1/2	4.38
031686-01	500	None	3/8	3/8	8.00
422801*	500	None	various		4.3 - 5.3

*5/16", 1/4", 3/8", 1/2", and 5/8" outlet and inlet options with one hole are available.



Steel Mufflers

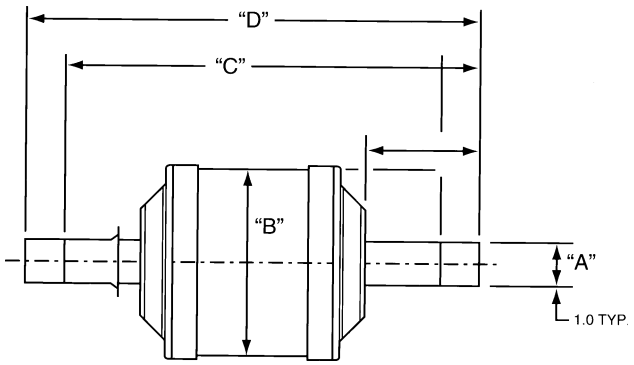


Parker steel mufflers are designed to assist with today's and future compressor related difficulties such as noise reduction due to compressor pulsation and/or turbulent gas flow or vibration through the discharge line.

Features and Benefits

- UL/CSA listed for 500 psig design pressure. (Selected models listed at 600 psig — consult Parker for details.)
- 100% pure copper sweat fitting.
- Extended end fittings available.
- Fully welded construction.
- Bi-directional flow.
- Powder coated paint gives maximum corrosion resistance of 500 hour salt spray protection.
- Various fitting combinations and lengths available upon request.
- U.L. listed SA5918.

Dimensions



Model Number	A Connections Inlet (in.)	A Connections Outlet (in.)	B Diameter (in.)	C System Cutout Length	D Overall Length (in.)
PM25049-3-3C	3/8	3/8	2 1/2	3.36	4.36
PM25049-3-4C	1/2	1/2	2 1/2	3.26	4.50
PM25049-3-4C	1/2	1/2	2 1/2	5.08	6.08
PR25083-X-YC	1/4	5/8	2 1/2	3.09 min - 11.0 max	3.09 min - 11.0 max
PR25083-2-3C	3/8	3/8	2 1/2	1.86	2.96
PR25083-3-2C	1/4	1/4	2 1/2	3.32	4.32
PR25083-3-3C	3/8	3/8	2 1/2	3.36	4.36
PR25083-2-4C	1/2	1/2	2 1/2	2.66	3.09
PR25083-3-4C	1/2	1/2	2 1/2	3.26	4.5
PR25083-3-4C	1/2	1/2	2 1/2	5.08	6.08
PR3083-X-YC	3/8	7/8	3	3.09 min - 11.0 max	3.09 min - 11.0 max
PR3083-4-3C	1/2	1/2	3	3.95	4.95
PR3083-5-4C	1/2	1/2	3	8.13	9.13
PM3083-5-4C	1/2	1/2	3	8.13	9.13
PR3083-8-6C	7/8	7/8	3	8.94	10.32
PR35083-5-7C	7/8	7/8	3 1/2	4.90	6.45
PR35083-8-9C	1 1/8	1 1/8	3 1/2	8.44	10.87

* B dimension does not include weld bead measurement, which is nominal.

Sight Glass Moisture Indicators
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Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

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Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

PSG Sight Glasses and Moisture Indicators

Parker's PSG Sight Glass and Moisture Indicator provides a quick visual diagnosis of refrigerant and moisture levels within a system. The sight glass indicates if the system has the proper refrigerant level, a restricted dryer, or excessive pressure-drop. The moisture indicator recognizes moisture within the system. In conjunction, the sight glass & moisture indicator provide early warning that a potential failure exists resulting in corrosion, chemical damage, restricted flow, or even compressor failure.



Features and Benefits

- Etch-resistant glass with a simple color comparison provides easy viewing and quick diagnostics.
- Flare models feature forged brass body and fittings for corrosion resistance.
- Sweat models feature copper fittings to permit solder installation without disassembly.
- Leak-proof design is compact and short in length to easily fit within a unit and provide accuracy in performance.
- UL listed.

Dimensions

Model No.	Fitting Size	Fitting Type	Overall Length (in.)	Cut Out Length (in.)
PSG-2	1/4"	SAE Male Flare	3.42	—
PSG-3	3/8"	SAE Male Flare	3.56	—
PSG-4	1/2"	SAE Male Flare	3.82	—
PSG-5	5/8"	SAE Male Flare	4.06	—
PSG-2MF	1/4"	Female Flare	3.05	—
PSG-3MF	3/8"	Female Flare	3.17	—
PSG-4MF	1/2"	Female Flare	3.39	—
PSG-5MF	5/8"	Female Flare	3.69	—
PSG-10T	Replacement indicator element and o-ring.			
PSG-2S	1/4"	Sweat	4.88	4.19
PSG-3S	3/8"	Sweat	4.88	4.12
PSG-4S	1/2"	Sweat	4.88	3.87
PSG-5S	5/8"	Sweat	4.88	3.62
PSG-7S	7/8"	Sweat	6.25	4.73
PSG-9S	1 1/8"	Sweat	6.25	4.45
PSG-11S	1 3/8"	Sweat	7.97	6.03
PSG-13S	1 5/8"	Sweat	7.97	5.79
PSG-17S	2 1/8"	Sweat	7.97	5.47

Moisture Color Indications in PPM at Liquid Specific Temperatures

System Conditions	Indicator Color	System Refrigerant								
		12	22	134a	401A	401B/C	404A	410A	502	507A
		Liquid Line Temperature								
		75°F	75°F	75°F	75°F	75°F	75°F	75°F	75°F	75°F
Dry	Green	below 5	below 30	below 35	below 120	below 50	below 40	below 69	below 10	below 33
Caution	Yellow/Green	5 - 15	30-110	35-120	120-420	50-175	40-140	69-240	10-50	33-115
Wet	Yellow	above 15	above 110	above 120	above 420	above 175	above 140	above 240	above 50	above 115

Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Couplings
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Process Couplings

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Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Introduction to Parker Couplings

Parker Hannifin has the broadest Coupling Product offering in the market. Whether it's Quick Connect, Self-Sealing upon disconnection, Brass or Steel Material, Parker has what you need. With applications ranging from room air-conditioners to cryogenic pumps, Parker has the product you are looking for.

This complete line approach allows Parker to develop Value-Added Assemblies that will reduce SKUs and decrease overall tack time. Combine this with the outstanding services Parker offers and anything is possible.

The Parker Advantage

- Broadest product line
- Technology leader
- Value-Added Assembly
- E-Commerce
- Supply chain management



5500 Series Self-Sealing Brass Couplings



RC05 Series Multi-Purpose Process Couplings

5700 Series One-Shot™ Brass Coupling



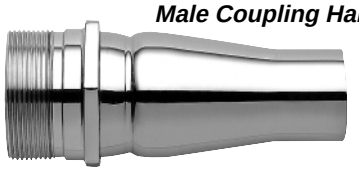


RC01C Series Automotive R134A Process Couplings

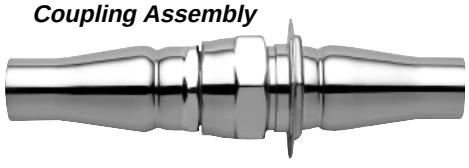
Female Coupling Half



Male Coupling Half

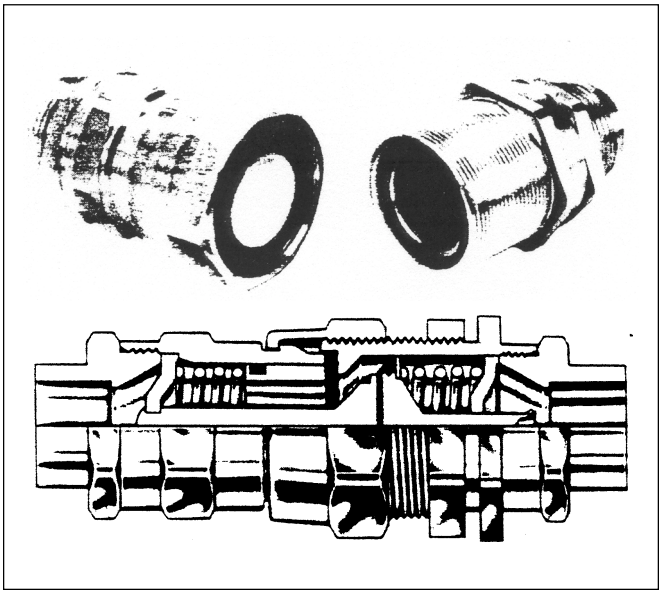


Coupling Assembly



5400 Series Self-Sealing Steel Couplings

Parker's 5400 Self-Sealing Steel Couplings are used in fluid-transfer applications for easy maintenance on refrigeration and air conditioning systems. Applications can also include marine refrigeration and air conditioning systems, along with cryogenic units.



Applications

- General fluid-transfer applications
- Marine refrigerant and air conditioning systems
- Cryogenic systems

Base Product Part Number

5400-S2 Male coupling half
5400-S5 Female coupling half

Features and Benefits

- Self-sealing upon disconnection maintains minimum inclusion of air and loss of fluid.
- Field repairable allowing an internal valve to be replaced, if needed.
- Steel coupling provides durability.
- A variety of mechanical end connections available, along with sweat connections, to provide options for installation.
- Multiple sizes available, along with bulkhead mounting options, to match a coupling to a unique application.

Agency Approvals

U.L. listed; File No: SA2709

Specifications

See Chart below.

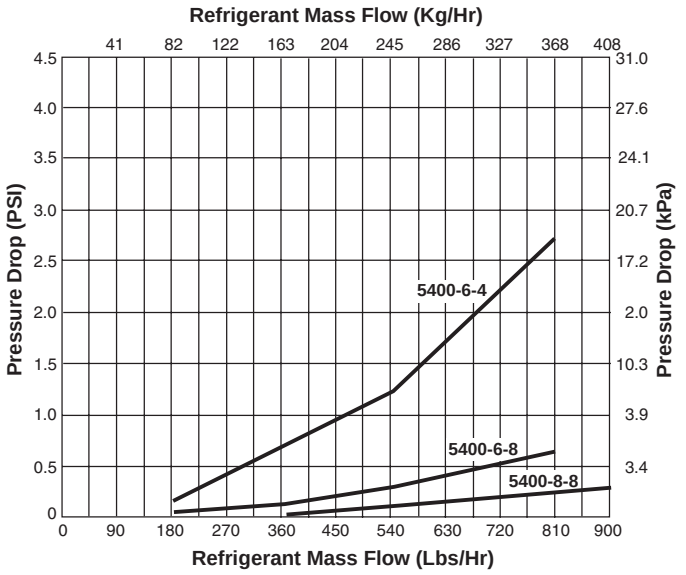
All sizes are field repairable.

Standard Material: Final seal – Neoprene™
Seal – Neoprene™
Body – Zinc-plated steel
Adapter – Steel or Brass

Specifications

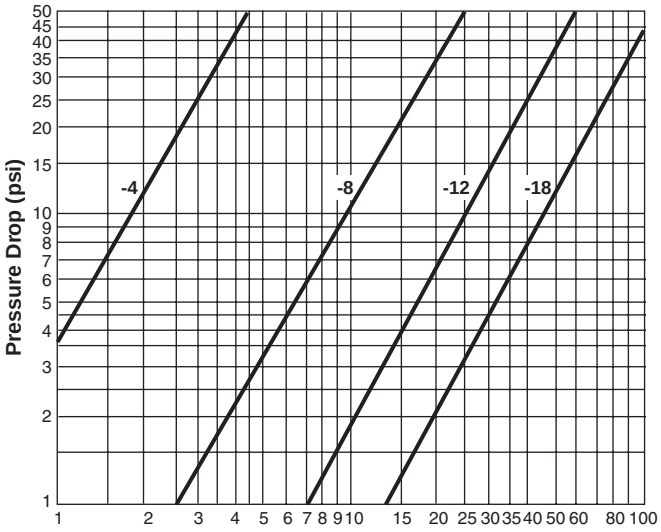
Dash Size	Part Description	Operating Pressure (psi)	Minimum Burst Pressure (psi)	Air Inclusion CC/Connect	Maximum Fluid Loss CC/Disconnect	Static Connect (psig)	Coupled (oz./yr)	Uncoupled Without Cap/Plug (oz./yr)	Uncoupled With Cap/Plug (oz./yr)	Vacuum (in. Hg.)	Rated Flow (gpm)
-4	Male half	2500	7500	0.1	0.05	150	< 0.25	< 0.5	< 0.25	-	-
-4	Female half	500	1500	0.1	0.05	150	< 0.25	< 0.5	< 0.25	-	-
-4	Whole coupling	3000	9000	0.1	0.05	150	< 0.25	< 0.5	< 0.25	28	14
-8	Male half	1750	5200	0.1	0.1	150	< 0.25	< 0.5	< 0.25	-	-
-8	Female half	400	1200	0.1	0.1	150	< 0.25	< 0.5	< 0.25	-	-
-8	Whole coupling	1750	5200	0.1	0.1	150	< 0.25	< 0.5	< 0.25	28	14
-12	Male half	800	2100	0.3	0.1	150	< 0.25	< 0.5	< 0.25	-	-
-12	Female half	400	1200	0.3	0.1	150	< 0.25	< 0.5	< 0.25	-	-
-12	Whole coupling	700	2100	0.3	0.1	150	< 0.25	< 0.5	< 0.25	28	35
-16	Male half	700	2100	0.05	0.2	150	< 0.25	< 0.5	< 0.25	-	-
-16	Female half	300	900	0.05	0.2	150	< 0.25	< 0.5	< 0.25	-	-
-16	Whole coupling	700	2100	0.05	0.2	150	< 0.25	< 0.5	< 0.25	28	75

Liquid Line
Pressure Drop vs. Mass Flow
Refrigerant R22



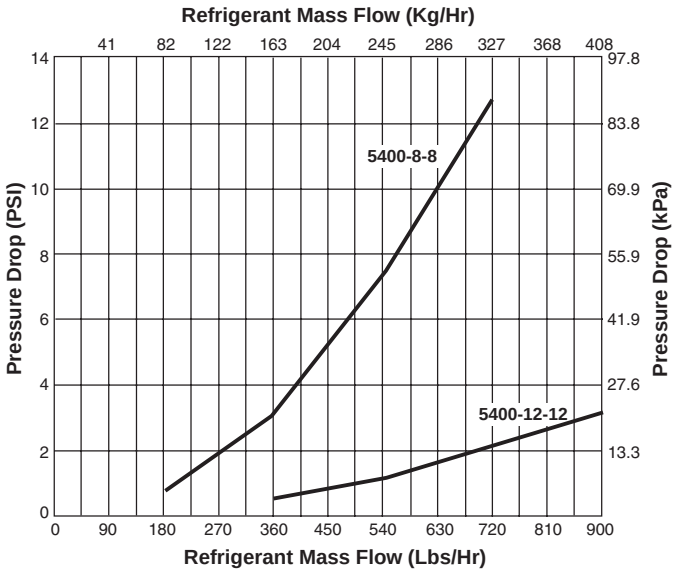
5400-6-4 — 3/8" Coupling Body (-06) with 1/4" (-04) Copper Connection, R22
5400-6-8 — 3/8" Coupling Body (-06) with 1/2" (-08) Copper Connection, R22
5400-8-8 — 1/2" Coupling Body (-08) with 1/2" (-08) Copper Connection, R22

Press Drop Versus Flow



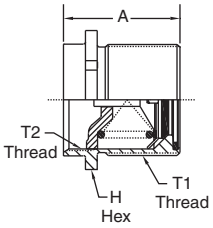
(Test Fluid MIL-H-5606 Hydraulic Oil at 100°F)

Suction Line
Pressure Drop vs. Mass Flow
Refrigerant R22



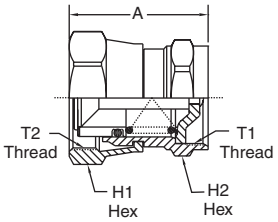
5400-8-8 — 1/2" Coupling Body (-08) with ½" (-08) Copper Connection, R22
5400-12-12 — 3/4" Coupling Body (-12) with 3/4" (-12 Copper Connection, R22

5400-S2
Male Half
No Adapter



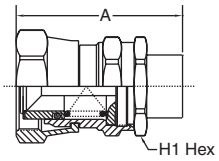
Part Number Neoprene	Coupling Size	T1 Thread	A	H1 Hex	T2 Thread
5400-S2-4	-4	5/8 - 18UNF	1.08	0.75	1/2 - 20
5400-S2-8	-8	1 - 20UNEF	1.37	1.13	7/8 - 20
5400-S2-12	-12	1-7/16 - 16UN	1.74	1.63	1-1/4 - 18
5400-S2-16	-16	1-3/4 - 16UN	1.83	1.88	1-19/32 - 20NS

5400-S5
Female Half
No Adapter



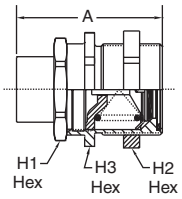
Coupling Size	T1 Thread	A	H1 Hex	H2 Hex	T2 Thread
-4	1/2 - 20	1.13	0.75	0.63	5/8 - 18
-8	7/8 - 20	1.63	1.19	1.00	1 - 20
-12	1-1/4 - 18	2.15	1.63	1.38	1-7/8 - 16
-16	1-19/32 - 20NS	2.37	2.00	1.75	1-3/4 - 16UN

5401-S14
Female Half
Braze Tubing Adapter



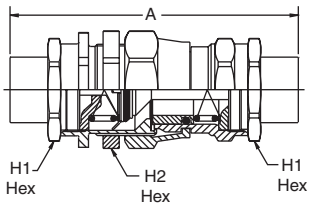
Part Number Neoprene	Coupling Size	Copper Size	A	H1 Hex
5401-S14-4-4	-4-4	1/4	1.57	0.63
5401-S14-6-4	-6-4	3/8	1.57	0.63
5401-S14-6-8	-6-8	3/8	2.00	1.00
5401-S14-8-8	-8-8	1/2	2.00	1.00
5401-S14-10-8	-10-8	5/8	2.00	1.00
5401-S14-10-12	-10-12	5/8	2.88	1.38
5401-S14-12-12	12-12	3/4	2.88	1.38
5401-S14-14-12	14-12	7/8	2.88	1.38
5401-S14-14-16	14-16	7/8	3.34	1.75
5401-S14-16-16	16-16	1	3.34	1.75
5401-S14-18-16	18-16	1-1/8	3.34	1.75

5401-S17
Male Half
Braze Tubing Adapter



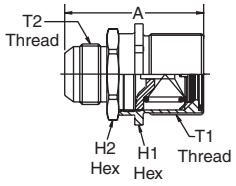
Part Number Neoprene	Coupling Size	Copper Size	A	H1 Hex	H2 Hex	H3 Hex
5401-S17-4-4	-4-4	1/4	1.52	0.63	0.75	0.75
5401-S17-6-4	-6-4	3/8	1.52	0.63	0.75	0.75
5401-S17-6-8	-6-8	3/8	1.75	1.00	1.19	1.19
5401-S17-8-8	-8-8	1/2	1.75	1.00	1.19	1.19
5401-S17-10-8	-10-8	5/8	1.75	1.00	1.19	1.12
5401-S17-10-12	-10-12	5/8	2.47	1.38	1.56	1.62
5401-S17-12-12	12-12	3/4	2.47	1.38	1.56	1.62
5401-S17-14-12	14-12	7/8	2.47	1.38	1.56	1.62
5401-S17-14-16	14-16	7/8	2.80	1.75	2.00	1.88
5401-S17-16-16	16-16	1	2.80	1.75	2.00	1.88
5401-S17-18-16	18-16	1-1/8	2.80	1.75	2.00	1.88

5401
Complete Coupling
Braze Tubing Adapter



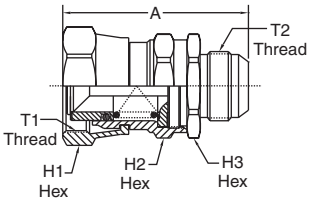
Part Number Neoprene	Coupling Size	Copper Size	A	H1 Hex	H2 Hex
5401-4-4	4-4	1/4	2.82	0.63	0.75
5401-6-4	6-4	3/8	2.82	0.63	0.75
5401-6-8	6-8	3/8	3.37	1.00	1.19
5401-8-8	8-8	1/2	3.37	1.00	1.19
5401-10-8	10-8	5/8	3.37	1.00	1.19
5401-10-12	10-12	5/8	4.76	1.38	1.62
5401-12-12	12-12	3/4	4.76	1.38	1.62
5401-14-12	14-12	7/8	4.76	1.38	1.62
5401-14-16	14-16	7/8	5.52	1.75	1.88
5401-16-16	16-16	1	5.52	1.75	1.88
5401-18-16	18-16	1-1/8	5.52	1.75	1.88
5401-22-16	22-16	1-3/8	5.52	1.75	1.88

5410-S17-No-No
Male Half
SAE 37° (JIC)



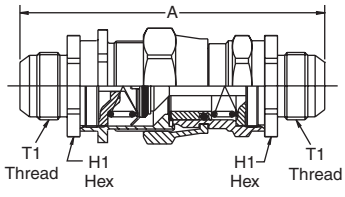
Part Number Neoprene	Coupling Size	T1 Thread	A	H1 Hex	H2 Hex	T2 Thread
5410-S17-4-4	4-4	5/8 - 18UNF	1.88	0.75	0.63	7/16 - 20UNF
5410-S17-6-4	6-4	5/8 - 18UNF	1.89	0.75	0.63	9/16 - 18UNF
5410-S17-6-8	6-8	1 - 20UNEF	2.18	1.13	1.00	9/16 - 18UNF
5410-S17-8-8	8-8	1 - 20UNEF	2.28	1.13	1.00	3/4 - 16UNF
5410-S17-10-12	10-12	1-7/16 - 16UN	2.75	1.63	1.38	7/8 - 14UNF
5410-S17-12-12	12-12	1-7/16 - 16UN	2.86	1.63	1.38	1-1/16 - 12UN
5410-S17-16-16	16-16	1-3/4 - 16UN	2.99	1.88	1.75	1-5/16 - 12UN

5410-S14-No-No
Female Half
SAE 37° (JIC)



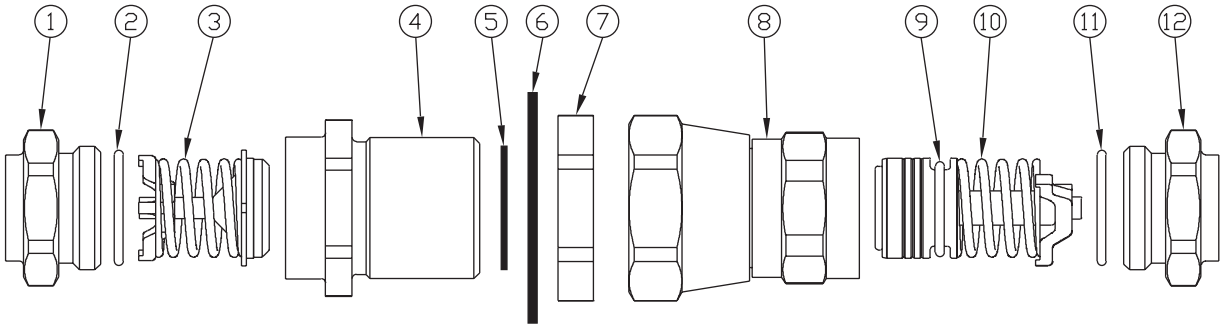
Part Number Neoprene	Coupling Size	T1 Thread	A	H1 Hex	H2 Hex	H3 Hex	T2 Thread
5410-S14-4-4	4-4	5/8 - 18UNF	1.13	0.75	0.63	0.63	7/16 - 20UNF
5410-S14-6-4	6-4	5/8 - 18UNF	1.13	0.75	0.63	0.63	9/16 - 18UNF
5410-S14-6-8	6-8	1 - 20UNEF	1.63	1.19	1.00	1.00	9/16 - 18UNF
5410-S14-8-8	8-8	1 - 20UNEF	1.63	1.19	1.00	1.00	3/4 - 16UNF
5410-S14-10-12	10-12	1-7/16 - 16UN	2.15	1.63	1.38	1.38	7/8 - 14UNF
5410-S14-12-12	12-12	1-7/16 - 16UN	2.15	1.63	1.38	1.38	1-1/16 - 12UN
5410-S14-16-16	16-16	1-3/4 - 16UN	2.37	2.00	1.75	1.75	1-5/16 - 12UN

5410-No-No (No “S”)
Complete Coupling
SAE 37° (JIC)



Part Number Neoprene	Coupling Size	T1 Thread	A	H1 Hex
5410-4-4	4-4	7/16 - 20UNF	3.54	0.63
5410-6-4	6-4	9/16 - 18UNF	3.56	0.63
5410-6-8	6-8	9/16 - 18UNF	4.23	1.00
5410-8-8	8-8	3/4 - 16UNF	4.44	1.00
5410-10-12	10-12	7/8 - 14UNF	5.33	1.38
5410-12-12	12-12	1-1/16 - 12UN	5.54	1.38
5410-16-16	16-16	1-5/16 - 12UN	5.89	1.75

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH



Typical Male Coupling Half (S2)

Typical Female Coupling Half (S5)

Item No.	Dash Size > Tube O.D. Size>	-4 1/4" - 3/8"	-8 1/4" - 5/8"	-12 5/8" - 7/8"	-16 7/8" - 1-3/8"
Typical Male Half					
1	Tubing Adapter	202208-*-4	202208-*-8	202208-*-12	202208-*-16
2	O-Ring	22546-12	22546-17	22546-23	22546-28
3	Assembly	5400-S20-4	5400-S20-8	5400-S20-12	5400-S20-16
4	Body	5400-17-4	5400-17-8	5400-17-12	5400-17-16
5	Gasket Seal	22008-4	22008-8	22008-12	22008-16
6	Lock Washer	5400-54-4	5400-54-8	5400-54-12	5400-54-16
7	Jam Nut	5400-53-4	5400-53-8	5400-53-12	5400-53-16
Typical Female Half					
8	Union Nut and Body Assembly	5400-S16-4	5400-S16-8	5400-S16-12	5400-S16-16
9	O-Ring	22546-10	22546-112	22546-116	22546-214
10	Valve and Sleeve Assembly	5400-S19-4	5400-S19-8	5400-S19-12	5400-S19-16
11	O-Ring	22546-12	22546-17	22546-23	22546-28
12	Tubing Adapter	202208-*-4	202208-*-8	202208-*-12	202208-*-16
13	Dust cap (S2 half)	5400-32-4	5400-32-8	5400-32-12	5400-32-16
14	Dust cap (S5 half)	5400-41-4	5400-41-8	5400-41-12	5400-41-16

*Specify O.D. Tubing size of adapter required in 16th of an inch.
Example: -4 coupling with 3/8" O.D. tubing = 6/16 or -6.
Part number is then 202208-6-4.



Maximum Bulkhead Thickness

Coupling Size	Lock Washer Installed	Lock Washer Not Used
-4	0.21	0.26
-8	0.14	0.20
-12	0.23	0.29
-16	0.10	0.16

Recommended Torque Values

Recommended torque values in ft. lbs., are listed below.

Dash Size	Adapter to Body		S2 Half to S5 Half
	Braze Type or Aluminum	Non-Braze Type Steel or Brass	
-4	5400-S6-8	5400-S12-15	10-12
-8	5400-S15-20	5400-S35-45	35-37
-12	5400-S35-40	5400-S45-55	45-47
-16	5400-S50-60	5400-S55-65	65-67

Assembly Instructions

Step 1 After tubing or hose has been connected to adapters (1) and (12), install adapter O-rings (2) and (11)* on adapters. Be sure O-rings are not twisted.

Step 2 Generously lubricate adapter O-rings (2) and (11) with the system lubricant to prevent them from scuffing and tearing when coupling body is threaded on adapter.

Step 3 Adapter to S2 male coupling half connection.

A. Lubricate poppet face with system lubricant. Insert poppet valve assembly (3) into body (4). Tighten body (4) on adapter (1).

B. After body and adapter make metal-to-metal contact, tighten by rotating body (4) 1/8" with respect to adapter (1) or torque to the value shown in the "Torque Values" table.

Step 4 Adapter to S5 female coupling half connection.

A. Lubricate O-ring (9) liberally with system lubricant. Insert valve and sleeve assembly (10) into body (8). Tighten body (8) on adapter (12).

B. After body and adapter make metal-to-metal contact, tighten by rotating body (8) 1/8" with respect to adapter (12) or torque to the value shown in the "Torque Values" table.

Step 5 Coupling connection.

A. Generously lubricate the gasket seal (5) on the 5400-S2 male coupling half with the system lubricant.

B. Thread the union nut (8) onto the S2 male coupling half. Tighten union nut to torque values shown in the "Torque Values" table.

IMPORTANT - DO NOT rotate the S5 female coupling half body during connection.

C. After the coupling halves are seated, keep the bodies of the S2 male coupling half (4) and that of the S5 female coupling half (8) from rotating and tighten the union nut to the torque values shown in the "Torque Values" table.

IMPORTANT - DO NOT rotate the S2 or S5 coupling half body during connection.

Bulkhead Mounting — S2 Half

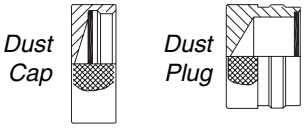
Step 1 Install lock washer (6) on S2 half, insert S2 male coupling half through bulkhead, and tighten jam-nut (7) so that lock-washer teeth are fully compressed.

Note: Lock washer (6) must be between hex of S2 male half and bulkhead.

***IMPORTANT:** Generous lubrication is required for all gaskets and O-rings. Lubrication should match system oil and be compatible with refrigerant system

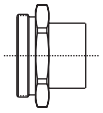
Accessories

Dust Cap and Dust Plug



Coupling Size	Part Numbers	
	Dust Cap with Gasket	Dust Plug with Gasket
-4	5400-S6-4	5400-S8-4
-8	5400-S6-8	5400-S8-8
-12	5400-S6-12	5400-S8-12
-16	5400-S6-16	5400-S8-16

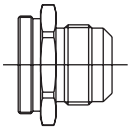
Adapter — Braze



O-Ring Required

Coupling Size	Part Numbers		Thread Size P	Tube O.D. Size
	O-Ring	Brass		
-4	22546-12	202208-4-4B	1/2-20	1/4
-8	22546-17	202208-8-8B	7/8-20	1/8
-12	22546-23	202208-10-12B	1-1/4 - 18	5/8
-16	22546-28	202208-14-16B	1-9/32 - 20	5/8

Adapter SAE 37° (JIC)



O-Ring Required

Coupling Size	Part Numbers			Thread Size P	Tube O.D. Size
	O-Ring	Brass	Steel		
-4	22546-12	202220-4-4B	202220-4-4S	7/16 - 20	1/4
-4	22546-12	202220-6-4B	202220-6-4S	9/16 - 18	3/8
-8	22546-17	202220-6-8B	202220-6-8S	9/16 - 18	3/8
-8	22546-17	202220-8-8B	202220-8-8S	3/4 -16	1/2
-12	22546-23	202220-10-12B	202220-10-12S	7/8 - 14	5/8
-12	22546-23	202220-10-12B	202220-10-12S	1-1/16 - 12	3/4
-16	22546-28	202220-16-16B	202220-16-16S	1-3/16 - 12	1

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

5500 Series Self-Sealing Brass Coupling

Parker's 5500 Self-Sealing Brass Couplings are used in fluid-transfer applications for easy maintenance on refrigeration and air conditioning systems. Applications can also include marine refrigeration and air conditioning systems, along with split refrigeration and split beverage systems.



Application

- Portable split-system air conditioners
- Split refrigeration systems
- Marine refrigeration systems
- Refrigerated dry cleaning systems
- Beverage systems

Base Product Part Number

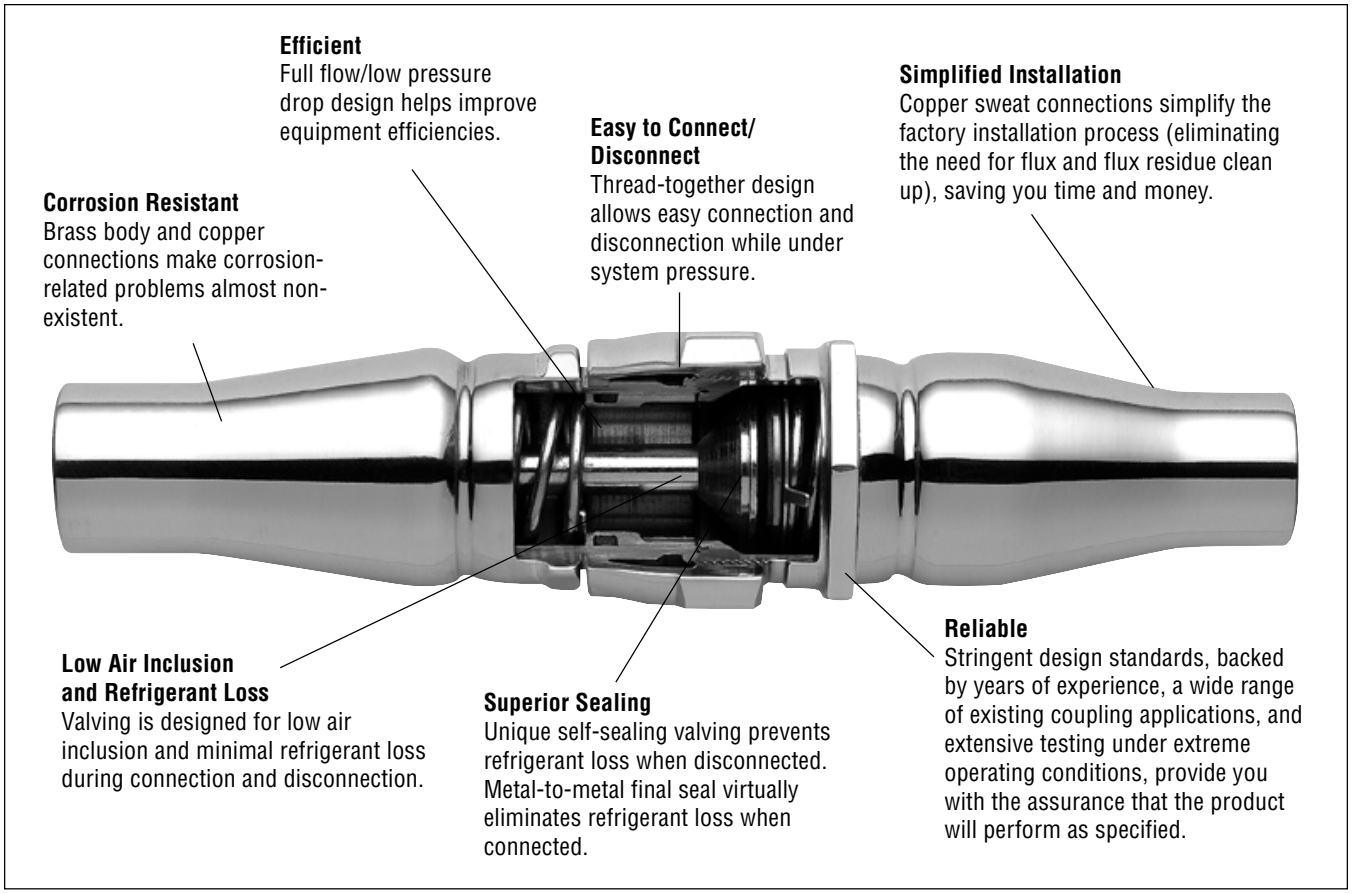
5502	Male coupling half
5505	Female coupling half

Features and Benefits

- Self-sealing upon disconnection maintains minimum inclusion of air and loss of fluid.
- Brass coupling provides corrosion resistance.
- Final metal-to-metal seal provides low leakage.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Panel mounting options are available for the unique needs of a unit.

Agency Approvals

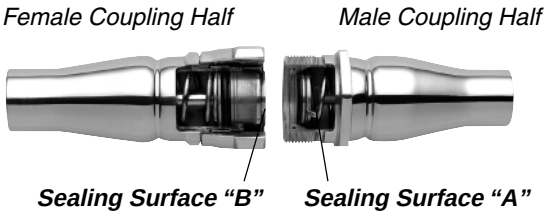
UL listed; File No: SA2709



How it Operates

Disconnected

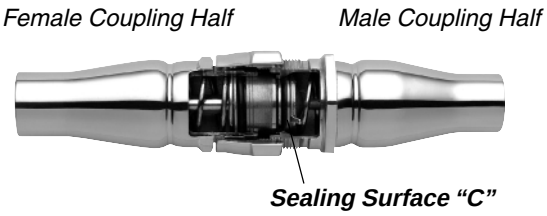
When disconnected, spring-loaded valve assemblies in the male and female coupling halves are sealed to prevent refrigerant loss and the inclusion of air or foreign materials. A spring in the male coupling half presses the bonded poppet against sealing surface “A” of the coupling body. Likewise, a spring in the female coupling half presses the sleeve against sealing surface “B” of the stem valve head. An O-ring on the female sleeve prevents leakage between the sleeve and coupling body.



Partially Connected

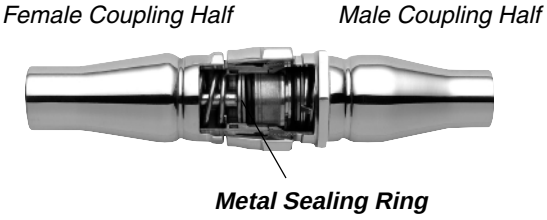
As the two coupling halves are threaded together, sealing surface “C” of the male coupling body contacts the bonded seal of the female coupling’s sleeve assembly.

At the same time, the stem valve head in the female coupling assembly contacts the male coupling’s bonded poppet, forcing air out of the coupling. During this stage, both coupling halves are sealed, preventing leakage of refrigerant.



Fully Connected

Continued tightening of the union nut (female coupling) draws the couplings together, and opens the fluid passage by forcing the male coupling’s poppet assembly and the female coupling’s sleeve assembly open. When fully coupled a metal ring located in the front of the male coupling, forms a leak-tight seal between the two coupling halves.



Specifications

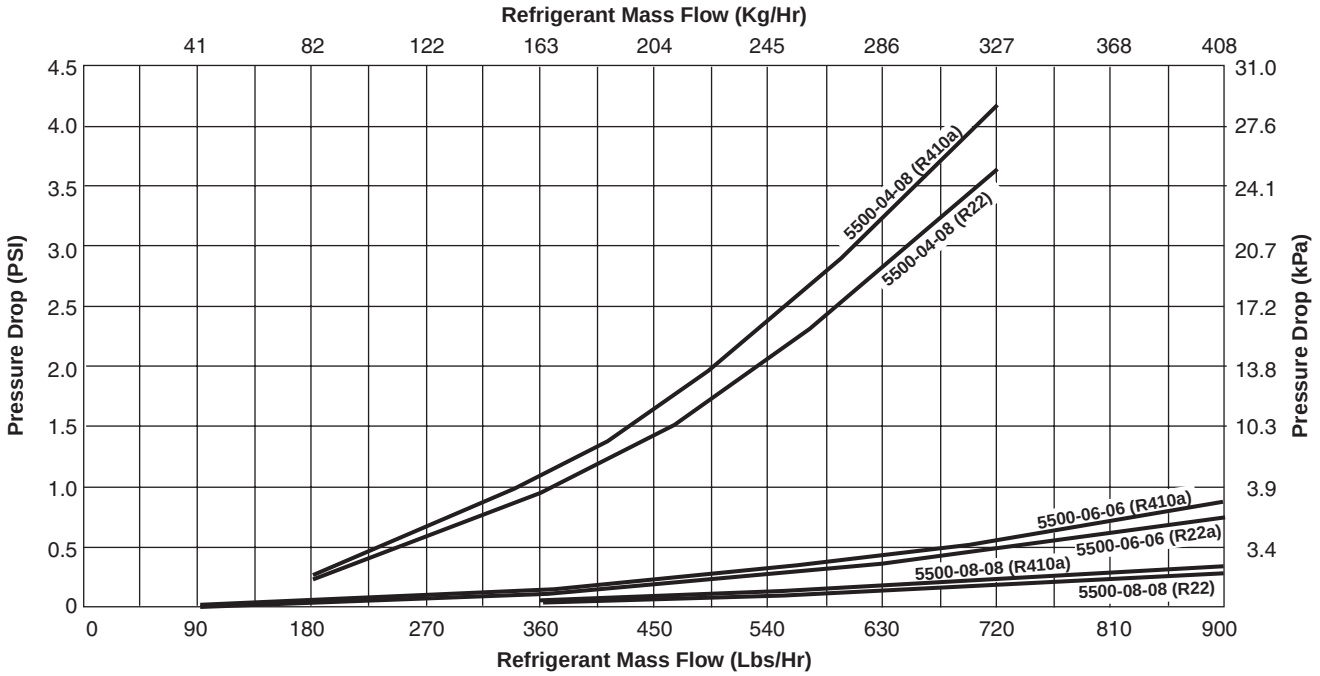
PRODUCT	**5500 Series Self-Sealing Brass Couplings**
Operating Temperature Range	-40°F to 250°F (-40°C to +121°C)
Operating Pressure Range, Connected	
Male & Female Coupling	
-06, -08, -12 & -16 Body Sizes	Vacuum to 750 psi (52 bar)
Operating Pressure Range, Disconnected	
Male Coupling Half	
-06, -08, -12 & -16 Body Sizes	Vacuum to 750 psi (52 bar)
Female Coupling Half	
-06 & -08 Body Sizes	Vacuum to 600 psi (41 bar)
-12 Body Size	Vacuum to 550 psi (40 bar)
-16 Body Size	Vacuum to 333 psi (23 bar)
Minimum Burst Pressure, Connected	
Male & Female Coupling	
-06, -08, -12 & -16 Body Sizes	2,700 psi (186 bar)
Minimum Burst Pressure, Disconnected	
Male Coupling Half	
-06, -08, -12 & -16 Body Sizes	2,700 psi (186 bar)
Female Coupling Half	
-06 & -08 Body Size	1,800 psi (124 bar)
-12 Body Size	1,650 psi (114 bar)
-16 Body Size	1,000 psi (70 bar)
Maximum Air Inclusion (During Connection)	
Male & Female Coupling Halves	
-06 Body Size	0.15 cc per connection
-08 Body Size	0.10 cc per connection
-12 Body Size	0.20 cc per connection
-16 Body Size	0.40 cc per connection
Maximum Fluid Loss (During Disconnection)	
Male & Female Coupling Halves	
-06 & -08 Body Sizes	0.10 cc per disconnection
-12 Body Size	0.30 cc per disconnection
-16 Body Size	0.20 cc per disconnection
MATERIALS	
Coupling Body	Brass Bar per ASTM-B16, Alloy C3600
Connections	Refrigeration Grade Copper, per ASTM-B75, Alloy C12200
Valve Stem Assembly (Female Coupling)	Chromate Plated Steel
Bonded Poppet (Male Coupling)	Neoprene™
Bonded Sleeve (Female Coupling)	Neoprene™
MATERIAL COMPATIBILITY+	
All components, bonded poppet and sleeve, and valve stem O-Ring seal are compatible with these refrigerants and refrigerant oils:	
R22 & mineral oil, alkylbenzene oil, or polyolester oil	
R134a, R404a, R407c, R410a, or R507 & polyolester oil	
Vibration Resistance	Complies with UL 109
External Leak Rate, Connected	< 0.1 ounce (2.96 ml) of R22 refrigerant per year at
-06, -08, -12 & -16 Body Sizes	Operating Pressure Range
External Leak Rate, Disconnected	
-06, -08, -12 & -16 Body Sizes	< 0.50 ounce (14.79 ml) of R22 refrigerant per year
Without Protective Metal Cap or Plug Installed	
-08, -12 & -16 Body Sizes	< 0.25 ounce (7.39 ml) of R22 refrigerant per year
With Protective Metal Cap or Plug Installed*	

* Protective metal cap/plug not available for -06 Coupling Body Size

\+ Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility cannot be guaranteed. Contact Parker for compatibility of refrigerant oils not listed.

Flow Data

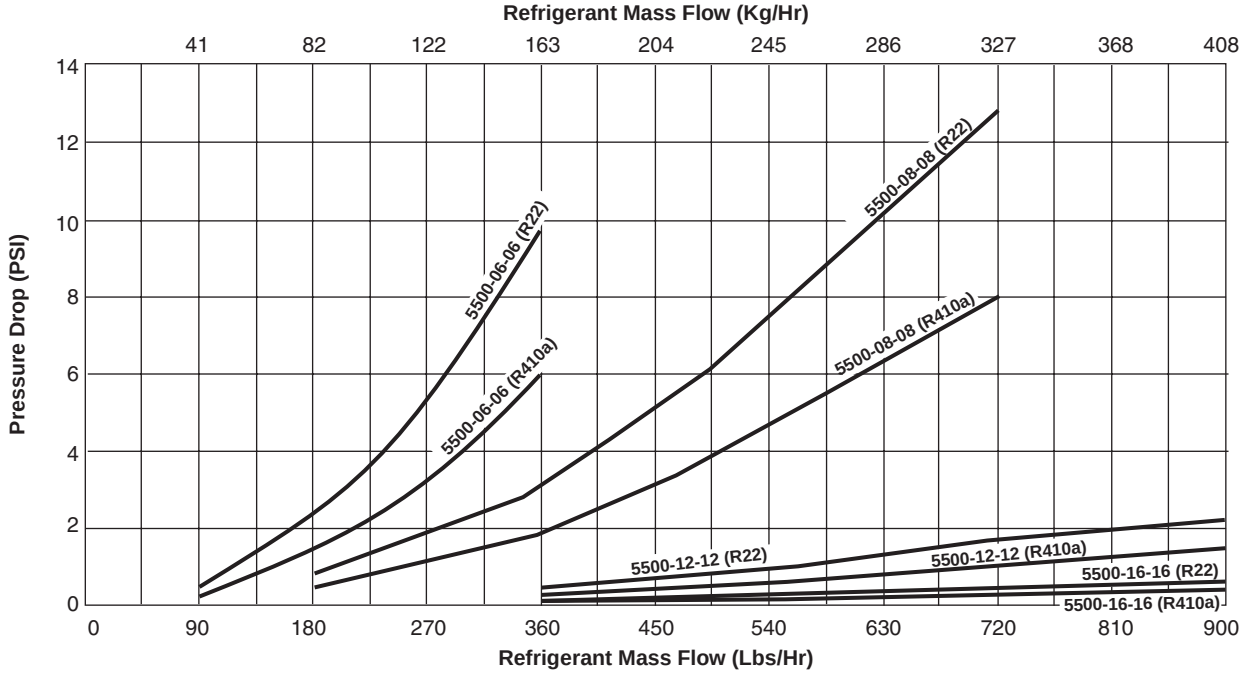
Liquid Line Pressure Drop vs. Mass Flow
Refrigerant R22 and R410a



5500-04-08 — 1/2" Coupling Body (-08) with 1/4" (-04) Copper Connection, R22
5500-06-06 — 3/8" Coupling Body (-06) with 3/8" (-06) Copper Connection, R22
5500-08-08 — 1/2" Coupling Body (-08) with 1/2" (-08) Copper Connection, R22

5500-04-08 — 1/2" Coupling Body (-08) with 1/4" (-04) Copper Connection, R410a
5500-06-06 — 3/8" Coupling Body (-06) with 3/8" (-06) Copper Connection, R410a
5500-08-08 — 1/2" Coupling Body (-08) with 1/2" (-08) Copper Connection, R410a

Suction Line Pressure Drop vs. Mass Flow
Refrigerant R22 and R410a

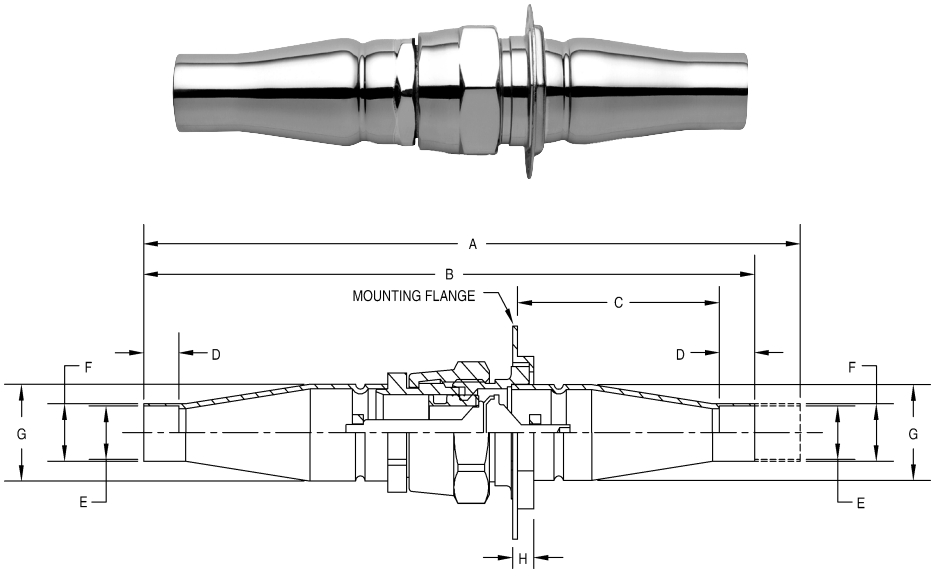


5500-06-06 — 3/8" Coupling Body (-06) with 3/8" (-06) Copper Connection, R22
5500-08-08 — 1/2" Coupling Body (-08) with 1/2" (-08) Copper Connection, R22
5500-12-12 — 3/4" Coupling Body (-12) with 3/4" (-12) Copper Connection, R22
5500-16-16 — 1" Coupling Body (-16) with 1" (16) Copper Connection, R22

5500-06-06 — 3/8" Coupling Body (-06) with 3/8" (-06) Copper Connection, R410a
5500-08-08 — 1/2" Coupling Body (-08) with 1/2" (-08) Copper Connection, R410a
5500-12-12 — 3/4" Coupling Body (-12) with 3/4" (-12) Copper Connection, R410a
5500-16-16 — 1" Coupling Body (-16) with 1" (16) Copper Connection, R410a

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Coupling Assembly

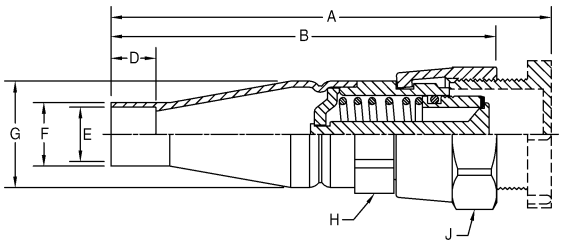


Copper Connection		Coupling Body		Dimensions								Weight	
Inch (Dash Size*)	mm	Inch (Dash Size*)	mm	Overall Disconnected Length A	Overall Connected Length B	Flange to Tube End C	Connection Depth D	Connection I.D. E	Connection O.D. F	Coupling Body O.D. G	Mounting Flange (Width) H	With Mounting Flange Ounces (Grams)	Without Mounting Flange Ounces (Grams)
1/4 ODS (-04)	6.4 ODS	3/8 (-06)	9.5	5.06 (128.5)	4.77 (121.2)	N/A	0.32 (8.1)	0.25 (6.4)	0.34 (8.6)	0.71 (18.0)	0.23 (5.8)	N/A	4.18 (118.45)
3/8 ODS (-06)	9.5 ODS	3/8 (-06)	9.5	5.06 (128.5)	4.77 (121.2)	N/A	0.32 (8.1)	0.38 (9.7)	0.46 (11.7)	0.71 (18.0)	0.23 (5.8)	N/A	4.18 (118.45)
1/4 ODS (-04)	6.4 ODS	1/2 (-08)	12.7	6.95 (176.5	6.56 (166.6)	2.64 (67.1)	0.31 (7.9)	0.25 (6.4)	0.38 (9.7)	0.92 (23.4)	0.23 (5.8)	8.44 (239.27)	7.96 (225.54)
3/8 ODS (-06)	9.5 ODS	1/2 (-08)	12.7	6.90 (174.2)	6.51 (165.4)	2.62 (66.5)	0.31 (7.9)	0.38 (9.7)	0.47 (12.0)	0.92 (23.4)	0.23 (5.8)	8.44 (239.27)	7.96 (225.54)
1/2 ODS (-08)	12.7 ODS	1/2 (-08)	12.7	6.86 (172.2)	6.47 (164.3)	2.58 (65.5)	0.38 (9.7)	0.50 (12.7)	0.59 (14.9)	0.92 (23.4)	0.23 (5.8)	8.44 (239.27)	7.96 (225.54)
5/8 ODS (-10)	15.9 ODS	1/2 (-08)	12.7	6.78 (172.2)	6.39 (162.3)	2.56 (65.0)	0.38 (9.7)	0.63 (16.0)	0.71 (17.9)	0.92 (23.4)	0.23 (5.8)	8.44 (239.27)	7.96 (225.54)
5/8 ODS (-10)	15.9 ODS	3/4 (-12)	19.1	7.79 (197.9)	7.24 (183.9)	2.71 (68.8)	0.50 (12.7)	0.63 (16.0)	0.75 (19.1)	1.32 (33.5)	0.23 (5.8)	18.60 (527.50)	17.90 (507.34)
3/4 ODS (-12)	19.1 ODS	3/4 (-12)	19.1	7.85 (199.4)	7.30 (185.4)	2.67 (67.8)	0.62 (15.7)	0.75 (19.1)	0.86 (21.7)	1.32 (33.5)	0.23 (5.8)	18.60 (527.50)	17.90 (507.34)
7/8 ODS (-14)	22.2 ODS	3/4 (-12)	19.1	7.85 (199.4)	7.30 (185.4)	2.67 (67.8)	0.75 (19.1)	0.88 (22.4)	0.97 (24.6)	1.32 (33.5)	0.23 (5.8)	18.60 (527.50)	17.90 (507.34)
7/8 ODS (-14)	22.2 ODS	1 (-16)	25.4	9.33 (237.0)	8.73 (221.7)	3.34 (84.8)	0.75 (19.1)	0.88 (22.4)	1.02 (25.8)	1.68 (42.7)	0.23 (5.8)	29.87 (846.72)	29.15 (826.35)
1 ODS (-16)	25.4 ODS	1 (-16)	25.4	9.46 (240.3)	8.86 (225.0)	3.42 (86.9)	0.88 (22.4)	1.00 (25.4)	1.12 (28.4)	1.68 (42.7)	0.23 (5.8)	29.87 (846.72)	29.15 (826.35)
1-1/8 ODS (-18)	28.6 ODS	1 (-16)	25.4	9.45 (240.0)	8.85 (224.8)	3.42 (86.9)	0.88 (22.4)	1.13 (28.7)	1.24 (31.4)	1.68 (42.7)	0.23 (5.8)	29.87 (846.72)	29.15 (826.35)

All dimensions in inches (mm)

* Dash size = copper connection size x 16

Female Coupling Half





Copper Connection		Coupling Body		Part Number		Dimensions								Weight Ounces (grams)
						Coupling Length		Connection			Coupling Body			
Inch (Dash Size*)	mm	Inch (Dash Size*)	mm	Less Plug	With Plug**	With Plug A	B	Depth D	I.D. E	O.D. F	O.D. G	Hex + H	Retaining Nut Hex + J	
1/4 ODS (-04)	6.4 ODS	3/8 (-06)	9.5	N/A	5505-04B-06	3.14 (79.8)	2.72 (69.1)	0.32 (8.1)	0.25 (6.4)	0.34 (8.6)	0.71 (18.0)	0.75 (19.1)	0.94 (23.9)	2.53 (71.73)
3/8 ODS (-06)	9.5 ODS	3/8 (-06)	9.5	N/A	5505-06B-06	3.14 (79.8)	2.72 (69.1)	0.32 (8.1)	0.38 (9.7)	0.46 (11.7)	0.71 (18.0)	0.75 (19.1)	0.94 (23.9)	2.53 (71.73)
1/4 ODS (-04)	6.4 ODS	1/2 (-08)	12.7	5505-04-08	5505-04B-08	3.88 (98.6)	3.69 (93.7)	0.31 (7.9)	0.25 (6.4)	0.38 (9.7)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
1/4 ODS (-04)	6.4 ODS	1/2 (-08)	12.7	5505-04-08	5505-04S-08	4.04 (102.86)	3.69 (93.7)	0.31 (7.9)	0.25 (6.4)	0.38 (9.7)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
3/8 ODS (-06)	9.5 ODS	1/2 (-08)	12.7	5505-06-08	5505-06B-08	3.85 (97.8)	3.66 (93.0)	0.31 (7.9)	0.38 (9.7)	0.47 (12.0)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
3/8 ODS (-06)	9.5 ODS	1/2 (-08)	12.7	5505-06-08	5505-06S-08	4.01 (101.9)	3.66 (93.0)	0.31 (7.9)	0.38 (9.7)	0.47 (12.0)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
12 ODS (-08)	12.7 ODS	1/2 (-08)	12.7	5505-08-08	5505-08B-08	3.85 (97.8)	3.66 (93.0)	0.38 (9.7)	0.50 (12.7)	0.59 (14.9)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
12 ODS (-08)	12.7 ODS	1/2 (-08)	12.7	5505-08-08	5505-08S-08	4.01 (101.9)	3.66 (93.0)	0.38 (9.7)	0.50 (12.7)	0.59 (14.9)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
5/8 ODS (-10)	15.9 ODS	1/2 (-08)	12.7	5505-10-08	5505-10B-08	3.79 (96.3)	3.60 (91.4)	0.50 (12.7)	0.63 (16.0)	0.71 (17.9)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
5/8 ODS (-10)	15.9 ODS	1/2 (-08)	12.7	5505-10-08	5505-10S-08	3.95 (100.3)	3.60 (91.4)	0.50 (12.7)	0.63 (16.0)	0.71 (17.9)	0.92 (23.4)	1.00 (25.4)	1.19 (30.2)	4.85 (137.46)
5/8 ODS (-10)	15.9 ODS	3/4 (-12)	19.1	5505-10-12	5505-10S-12	4.64 (117.9)	4.09 (103.9)	0.50 (12.7)	0.63 (16.0)	0.75 (19.1)	1.32 (33.5)	1.38 (35.1)	1.62 (30.2)	10.58 (299.98)
3/4 ODS (-12)	19.1 ODS	3/4 (-12)	19.1	5505-12-12	5505-12S-12	4.77 (121.2)	4.19 (106.4)	0.62 (15.7)	0.75 (19.1)	0.86 (21.7)	1.32 (33.5)	1.38 (35.1)	1.62 (41.4)	10.58 (299.98)
7/8 ODS (-14)	22.2 ODS	3/4 (-12)	19.1	5505-14-12	5505-14S-12	4.77 (121.2)	4.19 (106.4)	0.75 (19.1)	0.88 (22.4)	0.97 (24.6)	1.32 (33.5)	1.38 (35.1)	1.62 (41.4)	10.58 (299.98)
7/8 ODS (-14)	22.2 ODS	1 (-16)	25.4	5505-14-16	5505-14S-16	5.48 (139.2)	4.96 (126.0)	0.75 (19.1)	0.88 (22.4)	1.02 (25.8)	1.68 (42.7)	1.69 (42.9)	2.00 (50.8)	18.34 (519.91)
1 ODS (-16)	25.4 ODS	1 (-16)	25.4	5505-16-16	5505-16S-16	5.62 (142.7)	5.01 (127.3)	0.88 (22.4)	1.00 (25.4)	1.12 (28.4)	1.68 (42.7)	1.69 (42.9)	2.00 (50.8)	18.34 (519.91)
1-1/8 ODS (-18)	28.6 ODS	1 (-16)	25.4	5505-18-16	5505-18S-16	5.52 (140.2)	5.00 (127.0)	0.88 (22.4)	1.13 (28.7)	1.24 (31.4)	1.68 (42.7)	1.69 (42.9)	2.00 (50.8)	18.34 (519.91)

All dimensions in inches (mm)

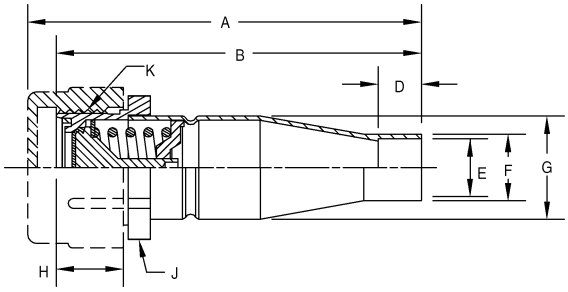
* Dash size = copper connection size x 16

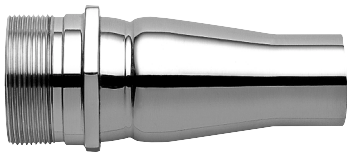
** "B" in the part number denotes a plastic plug. "S" in the part number denotes a steel plug.

+ Dimension is across hex flats.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Male Coupling Half





Copper Connection		Coupling Body		Part Number**		Dimensions									Weight Ounces (Grams)
						Coupling Length		Depth			Coupling Body				
Inch (Dash Size*)	mm	Inch (Dash Size*)	mm	Less Cap	With Cap**	(with cap) A	B	Depth D	I.D. E	O.D. F	O.D. G	Thread Length H	Hex Diameter + J	Thread Size K	
1/4 ODS (-04)	6.4 ODS	3/8 (-06)	9.5	N/A	5502-04B-06	2.58 (65.5)	2.40 (61.0)	0.32 (8.1)	0.25 (6.4)	0.34 (8.6)	0.71 (18.0)	0.49 (12.4)	0.83 (21.1)	M20-1.5	1.65 (6.72)
3/8 ODS (-06)	9.5 ODS	3/8 (-06)	9.5	N/A	5502-06B-06	2.58 (65.5)	2.40 (61.0)	0.32 (8.1)	0.38 (9.7)	0.46 (11.7)	0.71 (18.0)	0.49 (12.4)	0.83 (21.1)	M20-1.5	1.65 (6.72)
1/4 ODS (-04)	6.4 ODS	1/2 (-08)	12.7	5502-04-08	5502-04B-08	3.31 (84.1)	3.26 (82.8)	0.31 (7.9)	0.25 (6.4)	0.38 (9.7)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
1/4 ODS (-04)	6.4 ODS	1/2 (-08)	12.7	5502-04-08	5502-04S-08	3.47 (88.1)	3.26 (82.8)	0.31 (7.9)	0.25 (6.4)	0.38 (9.7)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
3/8 ODS (-06)	9.5 ODS	1/2 (-08)	12.7	5502-06-08	5502-06B-08	3.29 (83.6)	3.24 (82.3)	0.31 (7.9)	0.38 (9.7)	0.47 (12.0)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
3/8 ODS (-06)	9.5 ODS	1/2 (-08)	12.7	5502-06-08	5502-06S-08	3.45 (87.6)	3.24 (82.3)	0.31 (7.9)	0.38 (9.7)	0.47 (12.0)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
1/2 ODS (-08)	12.7 ODS	1/2 (-08)	12.7	5502-08-08	5502-08B-08	3.25 (82.6)	3.20 (81.3)	0.38 (9.7)	0.50 (12.7)	0.59 (14.9)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
1/2 ODS (-08)	12.7 ODS	1/2 (-08)	12.7	5502-08-08	5502-08S-08	3.41 (86.6)	3.20 (81.3)	0.38 (9.7)	0.50 (12.7)	0.59 (14.9)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
5/8 ODS (-10)	15.9 ODS	1/2 (-08)	12.7	5502-10-08	5502-10B-08	3.23 (82.0	3.18 (80.8)	0.50 (12.7)	0.63 (16.0)	0.71 (17.9)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
5/8 ODS (-10)	15.9 ODS	1/2 (-08)	12.7	5502-10-08	5502-10S-08	3.91 (99.3)	3.18 (80.8)	0.50 (12.7)	0.63 (16.0)	0.71 (17.9)	0.92 (23.4)	0.62 (15.7)	1.13 (28.7)	1-20	3.11 (88.08)
5/8 ODS (-10)	15.9 ODS	3/4 (-12)	19.1	5502-10-12	5502-10S-12	3.91 (117.9)	3.70 (103.9)	0.50 (12.7)	0.63 (16.0)	0.75 (19.1)	1.32 (33.5)	0.99 (25.1)	1.63 (41.4)	1-7/16-16	7.31 (207.36)
3/4 ODS (-12)	19.1 ODS	3/4 (-12)	19.1	5502-12-12	5502-12S-12	3.96 (100.6)	3.75 (95.3)	0.62 (15.7)	0.75 (19.1)	0.86 (21.7)	1.32 (33.5)	0.99 (25.1)	1.63 (41.4)	1-7/16-16	7.31 (207.36)
7/8 ODS (-14)	22.2 ODS	3/4 (-12)	19.1	5502-14-12	5502-14S-12	3.96 (100.6)	3.75 (95.3)	0.75 (19.1)	0.88 (22.4)	0.97 (24.6)	1.32 (33.5)	0.99 (25.1)	1.63 (41.4)	1-7/16-16	7.31 (207.36)
7/8 ODS (-14)	22.2 ODS	1 (-16)	25.4	5502-14-16	5502-14S-16	4.68 (118.9)	4.37 (111.0)	0.75 (19.1)	0.88 (22.4)	1.02 (25.8)	1.68 (42.7)	1.03 (26.2)	1.88 (47.8)	1-3/4-16	10.81 (306.44)
1 ODS (-16)	25.4 ODS	1 (-16)	25.4	5502-16-16	5502-16S-16	4.76 (120.9)	4.45 (113.0)	0.88 (22.4)	1.00 (25.4)	1.12 (28.4)	1.68 (42.7)	1.03 (26.2)	1.88 (47.8)	1-3/4-16	10.81 (306.44)
1-1/8 ODS (-18)	28.6 ODS	1 (-16)	25.4	5502-18-16	5502-18S-16	4.76 (120.9)	4.45 (113.0)	0.88 (22.4)	1.13 (28.7)	1.24 (31.4)	1.68 (42.7)	1.03 (26.2)	1.88 (47.8)	1-3/4-16	10.81 (306.44)

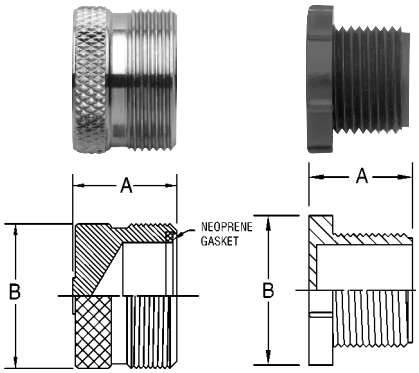
All dimensions in inches (mm)

* Dash size = copper connection size x 16

** "B" in the part number denotes a plastic plug. "S" in the part number denotes a steel plug.

+ Dimension is across hex flats.

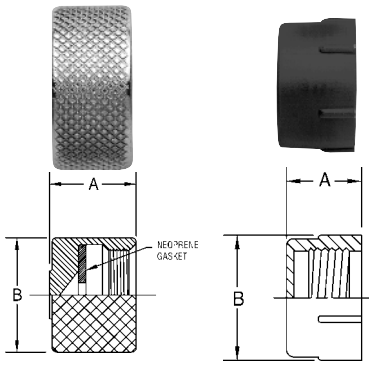
Protective Plugs
(Bulk package, 25/package)



Coupling Body Size (Dash Size*)	mm	Part Number	Dimensions Length A	Dimensions Diameter B	Weight Ounces (Grams)
Plastic					
3/8 (-06)	9.5	5410-06-BULK	0.72 (18.3)	1.04 (26.4)	0.09 (2.68)
1/2 (-08)	12.7	5410-08-BULK	0.04 (9.9)	1.20 (30.5)	0.07 (1.90)
Steel					
1/2 (-08)	12.7	5400-S8-08-BULK	0.72 (18.3)	1.00 (25.4)	1.48 (41.92)
3/4 (-12)	19.1	5400-S8-12-BULK	1.13 (28.7)	1.44 (36.6)	4.84 (137.34)
1 (-16)	25.4	5400-S8-16-BULK	1.25 (31.8)	1.75 (44.5)	7.93 (224.76)

All dimensions in inches (mm)
* Dash size = copper connection size x 16

Protective Caps
(Bulk package, 25/package)

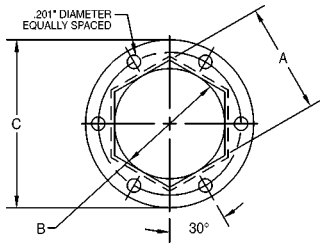


Coupling Body Size (Dash Size*)	mm	Part Number	Dimensions Length A	Dimensions Diameter B	Weight Ounces (Grams)
Plastic					
3/8 (-06)	9.5	5409-06-BULK	0.55 (14.0)	0.93 (23.6)	0.04 (1.12)
1/2 (-08)	12.7	5409-08-BULK	0.50 (12.7)	1.01 (25.7)	0.06 (1.70)
Steel					
1/2 (-08)	12.7	5400-S6-08-BULK	0.56 (14.2)	1.13 (28.7)	1.08 (30.58)
3/4 (-12)	19.1	5400-S6-12-BULK	0.56 (14.2)	1.63 (41.4)	2.38 (67.48)
1 (-16)	25.4	5400-S6-16-BULK	0.75 (19.1)	2.00 (50.8)	4.98 (141.20)

All dimensions in inches (mm)
* Dash size = copper connection size x 16

Mounting Flange (Steel)





Coupling Body Size (Dash Size*)	mm	Part Number	Dimensions Diameter A	Dimensions Circle Diameter	Dimensions Diameter C	Weight Ounces (Grams)
3/8 (-06)	9.5	N/A	N/A	N/A	N/A	N/A
1/2 (-08)	12.7	150-22-08	1.13 (28.7)	1.69 (42.9)	2.00 (50.8)	0.48 (13.73)
3/4 (-12)	19.1	150-22-12	1.63 (41.4)	2.12 (53.9)	2.50 (63.5)	0.71 (20.16)
1 (-16)	25.4	150-22-16	1.88 (47.8)	2.38 (60.5)	2.75 (69.9)	0.72 (20.37)

All dimensions in inches (mm)
* Dash size = copper connection size x 16

How to Order

5502
Coupling Type

Product Type
5502 = Male Coupling Half
5505 = Female Coupling Half

04
Copper Connection Size

Copper Connection (Denoted xx/16)	
-04 = 1/4"	(6.4 mm)
-06 = 3/8"	(9.5 mm)
-08 = 1/2"	(12.7 mm)
-10 = 5/8"	(15.9 mm)
-12 = 3/4"	(19.1 mm)
-14 = 7/8"	(22.2 mm)
-16 = 1"	(25.4 mm)
-18 = 1-1/8"	(28.6 mm)

B
Cap Requirements

Cap
0 = No Cap
B = Includes Plastic Protective Cap or Plug
S = Includes Steel Protective Cap or Plug

06
Coupling Body Size

Coupling Body Size (Denoted xx/16)	
-06 = 3/8"	(9.5 mm)
-08 = 1/2"	(12.7 mm)
-12 = 3/4"	(19.1 mm)
-16 = 1"	(25.4 mm)

5700 Series One-Shot™ Brass Couplings

Parker's 5700 One-Shot Brass Couplings are used in fluid-transfer applications for easy installation on refrigeration and air conditioning systems. Applications typically include split air conditioning systems, split heat pumps, and manufactured homes.



Specifications

PRODUCT: 5700 Series One Shot™ Brass Coupling	
Operating Temperature Range	-40°F to 250°F (-40°C to +121°C)
Operating Pressure Range, Connected Male & Female Coupling -06, -08, -12 & -16 Body Sizes	 Vacuum to 750 psi (52 bar)
Operating Pressure Range, Disconnected Male Coupling Half -06, -08, -12 & -16 Body Sizes Female Coupling Half -06 & -08 Body Sizes -12 Body Size -16 Body Size	 Vacuum to 750 psi (52 bar) Vacuum to 600 psi (41 bar) Vacuum to 550 psi (40 bar) Vacuum to 333 psi (23 bar)
Minimum Burst Pressure, Connected Male & Female Coupling -06, -08, -12 & -16 Body Sizes	 2,700 psi (186 bar)
Minimum Burst Pressure, Disconnected Male Coupling Half -06, -08, -12 & -16 Body Sizes Female Coupling Half -06 & -08 Body Size -12 Body Size -16 Body Size	 2,700 psi (186 bar) 1,800 psi (124 bar) 1,650 psi (114 bar) 1,000 psi (70 bar)
Maximum Air Inclusion (During Connection) Male & Female Coupling Halves -06 Body Size -08 Body Size -12 Body Size -16 Body Size	 0.15 cc per connection 0.10 cc per connection 0.20 cc per connection 0.40 cc per connection
Maximum Fluid Loss (During Disconnection) Male & Female Coupling Halves -06 & -08 Body Sizes -12 Body Size -16 Body Size	 0.10 cc per disconnection 0.30 cc per disconnection 0.20 cc per disconnection
MATERIALS	
Coupling Body	Brass Bar per ASTM-B16, Alloy C3600
Connections	Refrigeration Grade Copper, per ASTM-B75, Alloy C12200
Valve Stem Assembly (Female Coupling)	Chromate Plated Steel
Bonded Poppet (Male Coupling)	Neoprene™
Bonded Sleeve (Female Coupling)	Neoprene™
MATERIAL COMPATIBILITY [+] All components, bonded poppet and sleeve, and valve stem O-Ring seal are compatible with these refrigerants and refrigerant oils: R22 & mineral oil, alkylbenzene oil, or polyolester oil R134a, R404a, R407c, R410a, or R507 & polyolester oil	
Vibration Resistance	Complies with UL 109
External Leak Rate, Connected -06, -08, -12 & -16 Body Sizes	 < 0.1 ounce (2.96 ml) of R22 refrigerant per year at Operating Pressure Range
External Leak Rate, Disconnected -06, -08, -12 & -16 Body Sizes Without Protective Metal Cap or Plug Installed -08, -12 & -16 Body Sizes With Protective Metal Cap or Plug Installed*	 < 0.50 ounce (14.79 ml) of R22 refrigerant per year < 0.25 ounce (7.39 ml) of R22 refrigerant per year

Application

- Split air conditioning systems
- Split heat pumps
- Manufactured homes

Base Product Part Number

5780 Female coupling half without charge port
5781 Female coupling half with charge port
5782 Male coupling half without charge port
5783 Male coupling half with charge port

Features and Benefits

- Single-use coupling contains a diaphragm that is pierced upon connection and folded back into the coupling to provide a high flow path and low pressure drop.
- Final metal-to-metal seal keeps air inclusion to a minimum.
- Brass coupling provides corrosion resistance.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Brass sweat connections and panel-mounting options are available for the unique needs of a unit.
- Male/female charge ports can be included for easy system diagnostics.
- Stub kits (FD57) are also available with copper connections.

Agency Approvals

UL listed; File No: SA2709

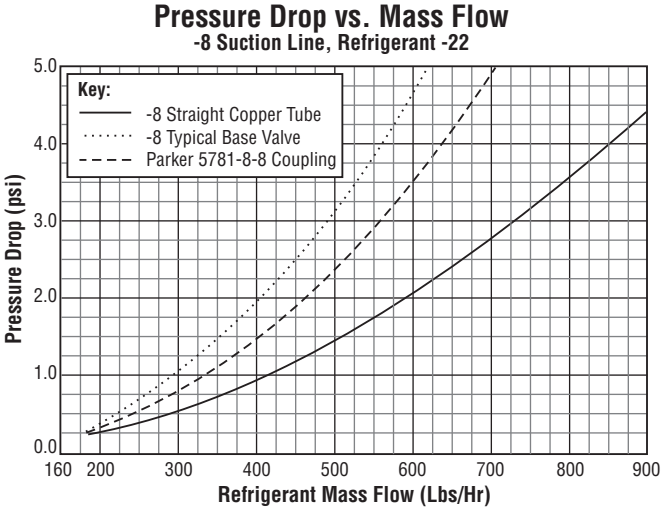
Specifications Notes:

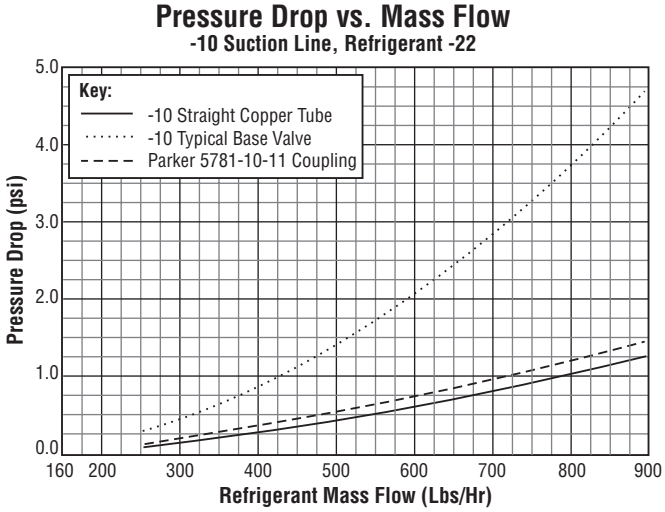
* Protective metal cap/plug not available for -06 Coupling Body Size

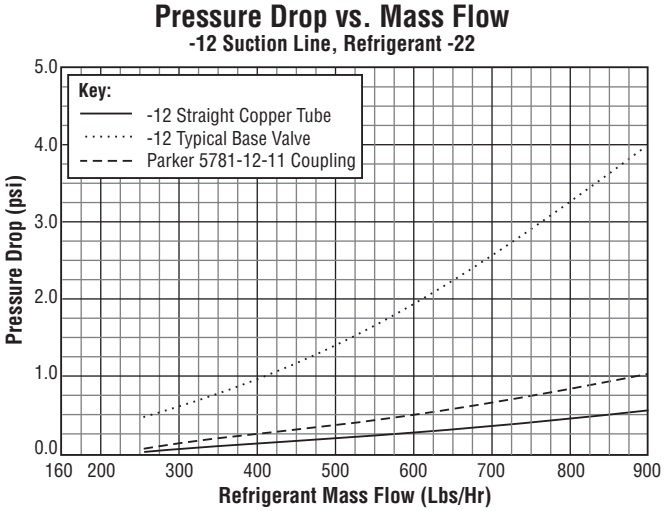
[+] Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility cannot be guaranteed. Contact Parker for compatibility of refrigerant oils not listed.

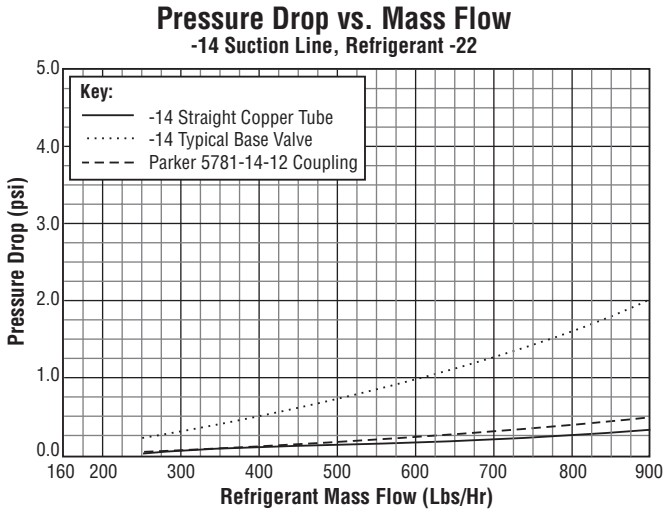
Pressure Drop Comparison

The graphs below show significant reduction in pressure drop and associated efficiency gains utilizing Parker 5700 Series Couplings vs. standard base valves.







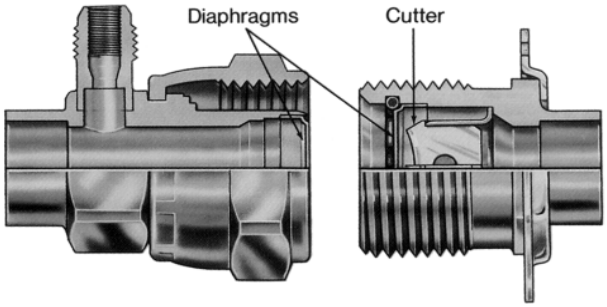


Design and Operation

A complete 5780 Series Coupling consists of the combination of male and female coupling halves. Either coupling half is available with or without a charging port, depending on the particular application.

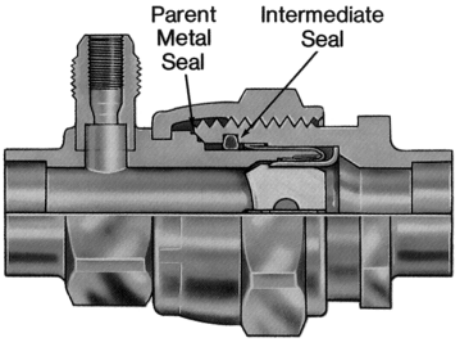
Coupling Halves Before Connection

Diaphragms in the coupling halves provide a seal that prevents refrigerant loss before connection. The male half (right unit) contains a cutter blade, the metal refrigerant sealing diaphragm and intermediate synthetic rubber seal which prevent loss of refrigerant while the coupling is being connected. The female half (left unit) contains a metal diaphragm which is a leak-proof metal closure.

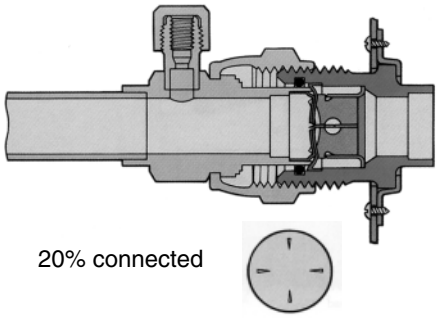


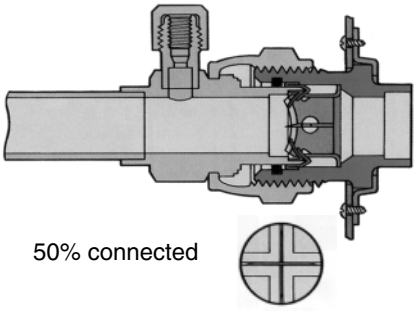
Coupling Halves Connected

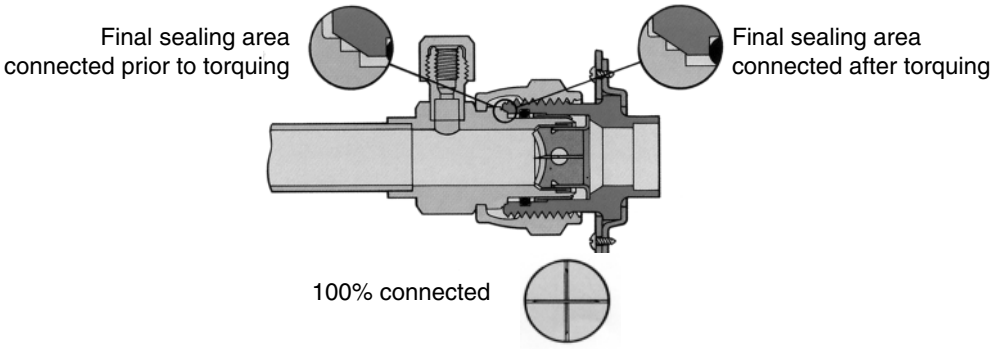
Tightening the union nut draws the coupling halves together, piercing and folding both metal diaphragms back and opening the fluid passage, thereby providing minimal restriction to flow. When fully coupled, a parent metal seal forms a permanent leakproof joint between the two coupling halves preventing the loss of refrigerant to the atmosphere.



The cutaway views below show male and female coupling halves joined at 20%, 50%, and 100% connection. Note the way the cutter blades pierce the diaphragms and fold them back out of the flow path. Also note the difference in the final sealing area before and after torquing.

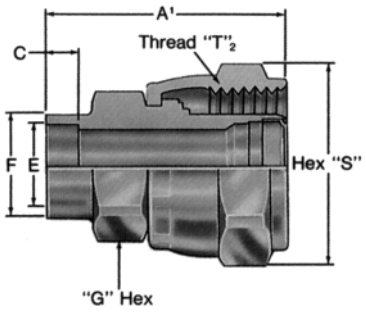




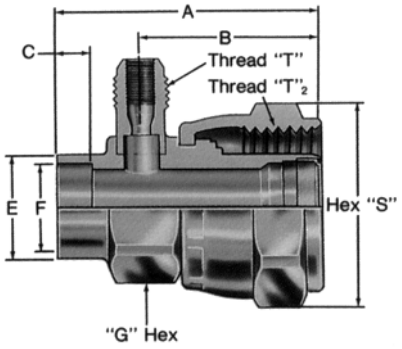


Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

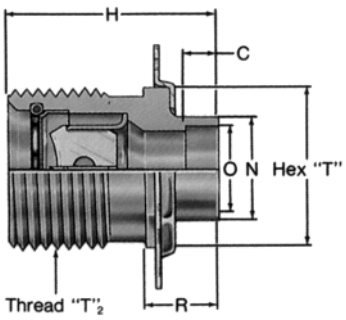
5780-Size Female Half without Charge Port



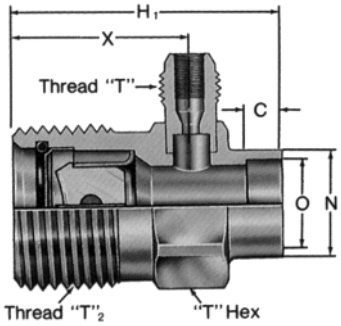
5781-Size Female Half with Charge Port



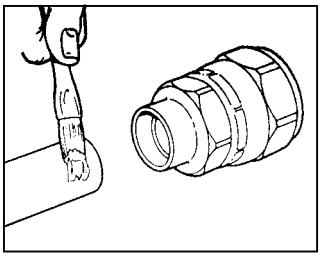
5782-Size Male Half without Charge Port



5783-Size Male Half with Charge Port

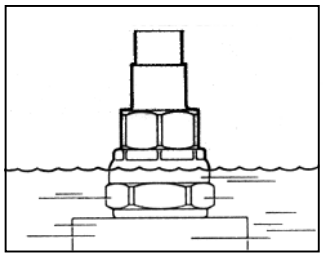


Factory Brazing Instructions



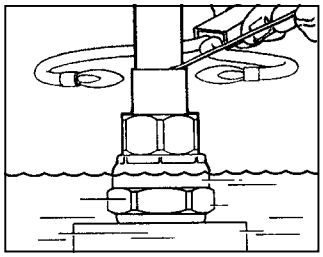
Step 1 Sparingly apply paste flux to the copper tube.

Note: Liquid flux or excessive flux can run inside the coupling and cause corrosion.

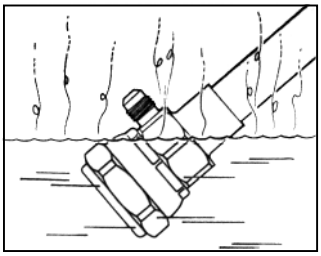


Step 2 Immerse the coupling (diaphragm end) into a flowing cool water bath.

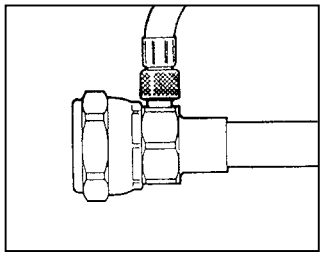
- 5780 and 57781 female halves: Water level should be halfway up the nut and the nut hex fully immersed.
- 5782 and 5783 male halves: Water level should fully cover the threads.



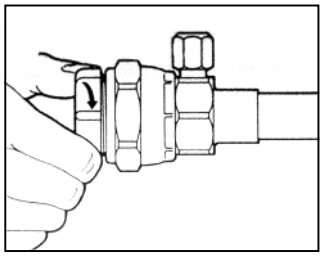
Step 3 Use a double tip torch to promote even heating and reduce braze time.



Step 4 After the alloy solidifies, quench the tubing and coupling to reduce the temperature below 400°F. Make sure the water does not enter the open charge port in the 5781 or 5783 half.



Step 5 The couplings can be subjected to unit test pressures up to 300 psig. If pressures in excess of 300 psig are used, the protector caps and plugs should be installed



Step 6 Protector caps and plugs should be installed finger tight. Over-tightening can damage the diaphragm. The diaphragm and O-ring can be lubricated with refrigerant oil prior to installing the protector caps or plugs as added assurance of proper lubrication when connected at unit installation.

Male-Half Installation Procedure

Male half (5782) should be mounted with the hex on the inside of the unit held in place with the appropriate mounting flange. Sheet metal opening, screw hole diameter, and mounting bolt circle dimensions are included in the chart below.

Coupling Part Number	Coupling Hex Size	Recommended Sheet Metal Opening	Flange Part Number	Mounting Bolt Circle	Screw Hole Diameter
5782-Size-6	3/4"	0.656	5700-22-6	1.44	0.201
5782-Size-6	3/4"	0.656	5700-22-6	1.44	0.153
5782-Size-8	15/16"	0.969	FD67-1008-10	1.69	0.153
5782-Size-10	1-1/16"	1.094	FD67-1110-10	1.69	0.201
5782-Size-10	1-1/16"	1.094	FD67-1008-12	1.69	0.153
5782-Size-11	1-1/8"	1.156	150-22-8	1.69	0.201
5782-Size-11	1-1/8"	1.156	5700-22-10	1.69	0.153
5782-Size-12	1-7/16"	1.469	FD57-1110-12	2.12	0.201
5782-Size-12	1-7/16"	1.469	FD57-1111-12	2.12	0.153

All dimensions in inches.

Installation Instructions

Step 1 Braze coupling to clean copper tubing.

Step 2 Install plastic dust plug.

Step 3 Apply refrigeration oil to the diaphragm and threads of the couplings on the indoor unit.

Step 4 Connect the line set couplings finger tight. **Do not use a wrench.** The O-ring will seal.

Step 5 Repeat steps 3 and 4 on the outdoor unit.

Step 6 Evacuate and charge the line set per the manufacturer's instructions. Retighten the charge port cap.

Step 7 Tighten all four coupling connections with a wrench until seated or a definite resistance is felt. Mark a line on the swivel nut and unit. Using the line as a guide, tighten an additional 1/4 turn.

Step 8 Leak check the braze and coupling joints. Follow the manufacturer's instructions for start up.

Reconnection Instructions

Note: The O-ring is only an intermediate seal during the initial connection of a precharged unit/line set combination. The O-ring is only used for sealing between the time the diaphragm is pierced and the final metal-to-metal seal is made.

The final leak-proof seal is a metal-to-metal connection made between the male and female coupling bodies.

Step 1 Upon disconnection, remove O-ring.

Step 2 If O-ring is missing from groove, insure O-ring is not lodged inside coupling halves and reconnect without O-ring.

Step 3 Route the suction line and liquid line between the indoor and outdoor unit.

Step 4 Remove protector caps and plugs.

Step 5 Carefully wipe coupling seats and threaded surfaces with a clean cloth, to prevent the inclusion of dirt or any foreign material in the system.

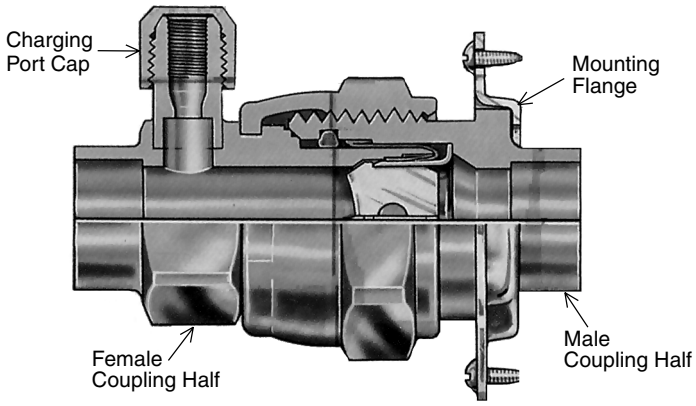
Step 6 Lubricate male half diaphragm and synthetic rubber seal with system-compatible refrigerant oil. Thread coupling halves together by hand to insure proper mating of threads. Use proper size wrenches (on coupling body hex and on union nut) and tighten until coupling bodies sea" or a definite resistance is felt.

Step 7 Using a marker, mark a line lengthwise from the coupling union nut to the bulkhead. Then tighten an additional 1/4 turn; the misalignment of the line will show the amount the coupling has been tightened. This final 1/4 turn is necessary to insure the formation of a leakproof joint.

If a torque wrench is used, the following torque values are recommended:

Coupling Size	Ft/Lbs
-6	10-12
-10	35-45
-11	35-45
-12	55-65

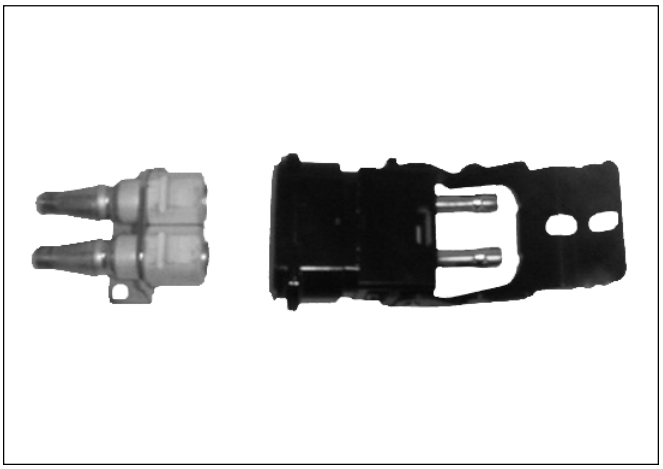
Order Options



Basic Coupling Size	O.D. Tube Size	Female Coupling Half without Charging Port (Includes Plug)	Female Coupling Half with Charging Valve Port less Cap and Core (Includes Plug)	Male Coupling Half with Protector Cap less Mounting Flange	Male Coupling Half with Charging Valve Port less Cap and Core (Includes Plug)	Mounting Flanges for 5782 Couplings Only		Charging Port Cap	Charging Valve Core
						Bolt Hole Dia. 0.15 (#10 Screw)	Bolt Hole Port (#14 Screw)		
-6	1/4	5780-4-6	5781-4-6	5782-4-6	5783-4-6	5706-22-6	5700-22-6	221014-4B	222034-4
-6	5/16	5780-5-6	5781-5-6	5782-5-6	5783-5-6	5706-22-6	5700-22-6	221014-4B	222034-4
-6	3/8	5780-6-6	5781-6-6	5782-6-6	5783-6-6	5706-22-6	5700-22-6	221014-4B	222034-4
-8	3/8	5780-6-8	5781-6-8	5782-6-8	–	FD67-1008-10	–	221014-4B	222034-4
-8	1/2	5780-8-8	5781-8-8	5782-8-8	–	FD67-1008-10	–	221014-4B	222034-4
-8	5/8	5780-10-8	5781-10-8	5782-10-8	–	FD67-1008-10	–	221014-4B	222034-4
-10	1/2	5780-8-10	5781-8-10	5782-8-10	5783-8-10	FD67-1008-12	FD57-1111-10	221014-4B	222034-4
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-11	5/8	5780-10-11	5781-10-11	5782-10-11	5783-10-11	5700-22-10	150-22-8	221014-4B	222034-4
-11	3/4	5780-12-11	5781-12-11	5782-12-11	5783-12-11	5700-22-10	150-22-8	221014-4B	222034-4
-11	7/8	5780-14-11	5781-14-11	5782-14-11	5783-14-11	5700-22-10	150-22-8	221014-4B	222034-4
-12	3/4	5780-12-12	5781-12-12	5782-12-12	–	FD57-1111-12	FD57-1110-12	221014-4B	222034-4
-12	7/8	5780-14-12	5781-14-12	5782-14-12	–	FD57-1111-12	FD57-1110-12	221014-4B	222034-4
-12	1-1/8	5780-18-12	5781-18-12	5782-18-12	–	FD57-1111-12	FD57-1110-12	221014-4B	222034-4

RC04 Series Dual-Line ConnectAire™ Couplings

Parker's RC04 Dual-Line ConnectAire™ Couplings are used in fluid-transfer applications for easy maintenance on refrigeration and air conditioning systems. Applications can also include portable air conditioners, split refrigeration systems, and mini-split air conditioning & heat pump systems up to 2-tons.



Application

- Split refrigeration systems
- Mini-split air conditioning and heat pump systems up to 2-tons
- Portable air conditioners

Base Product Part Number

RC04-A01-6666 & A02-6666	Male Coupling
RC04-B01-6666, B02-6666, B04-6666 & B06-6565	Female Coupling

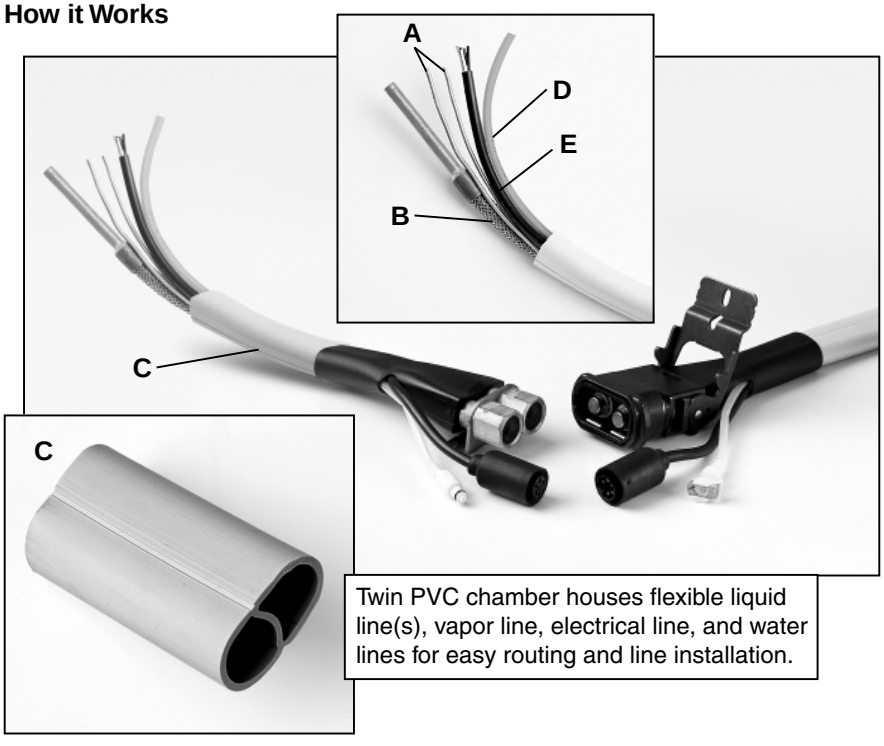
Features and Benefits

- Simultaneously and quickly connects both liquid and vapor lines without the use of tools.
- Self-sealing upon disconnection maintains minimum inclusion of air and loss of fluid.
- Brass coupling provides corrosion resistance.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Panel mounting options are available for the unique needs of a unit.

Specifications

Coupling Size	-6
Maximum Operating Pressure bar (psi)	27.6 (400)
Minimum Burst Pressure bar (psi)	137.9 (2000)
Vacuum Microns	50
Air Inclusion Per. Valve (cc. max.)	0.025
Operating Temperature Range °C (°F)	-40C to +121°C (-40°F to +250°F)
R22 Connected Leakage/Effusion Rating	<0.1 oz./yr.
Reusable Connections	>1000

How it Works



Twin PVC chamber houses flexible liquid line(s), vapor line, electrical line, and water lines for easy routing and line installation.

A – Liquid Line (High Pressure) — Liquid or capillary lines.

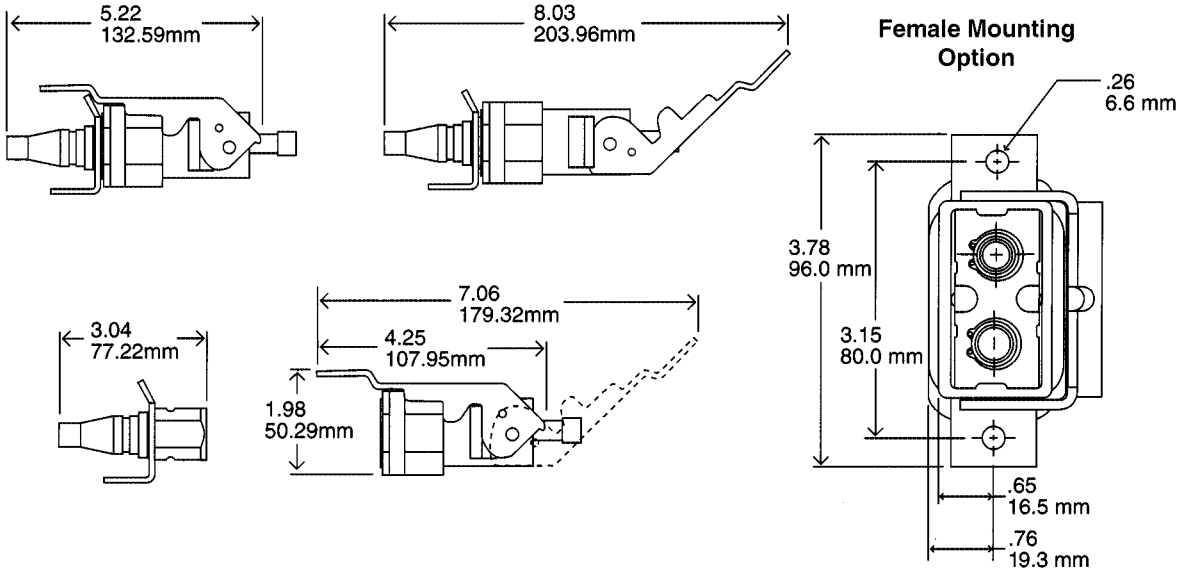
B – Vapor Line (Low Pressure) — Flexible, stainless steel line withcopper tube end for easy factory installation.

C – Cover — Flexible protective sleeve.

D – Condensate — Flexible condensate line for water drainage.

E – Electrical — Wiring harnesses custom-made to your exact specifications.

Dimension Data



Installation Instructions

To Connect:

Step 1 Ensure that the handle on the female coupling is in a reclined position away from the mating male coupling

Step 2 Retract the “Release Sleeve” on Female Coupling and insert the mating male coupling, located on the outside unit.

Step 3 Release the “Release Sleeve” to the lock the male coupling into places

Step 4 Fold the female coupling handle towards the male coupling half and push until the handle seals behind the “Release Sleeve” and flat against the entire coupling assembly.

Step 5 Connect the auxiliary electrical and condenser lines.

Step 6 Connect the electrical power cord from the A/C unit into the appropriate electrical wall outlet and start the A/C unit.

To Disconnect:

Step 1 Shut down the A/C unit and unplug the electrical power cord from the wall outlet.

Step 2 Wait five minutes for the line pressure between the indoor compressor unit and outdoor condensing unit to equalize.

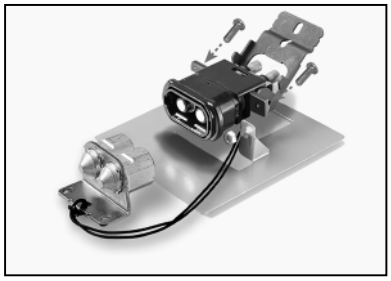
Step 3 Pull the female coupling handle up and toward the female coupling to the “full back” position.

Step 4 Retract the “Release Sleeve” on the Female Coupling to release the male coupling half from the female half.

Step 5 Disconnect the auxiliary electrical and condenser lines.

Step 6 The indoor compressor unit can now be moved to another location.

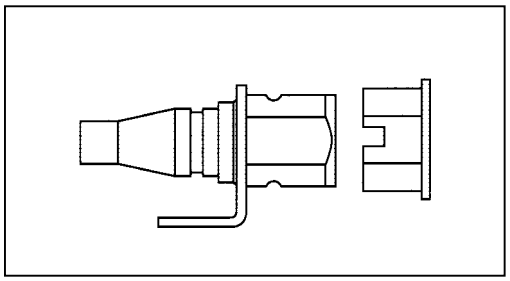
Female Mounting Option



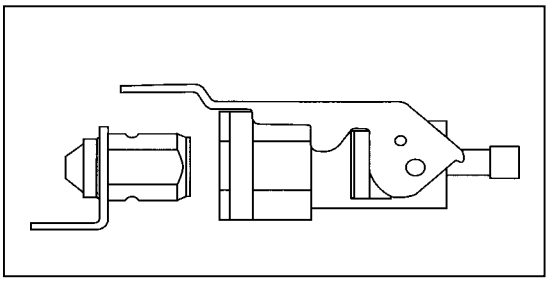
Protective Transition Boot



Male Half — Protective Cap for Male Half



Female Half — Protective Plug for Female Half



RC01C Series Automotive R134A Process Coupling

Parker's RC01C Automotive Process Coupling provides easy evacuating and charging of HFC-134a mobile air conditioning systems.



Application

- Evacuating and charging of HFC-134a air conditioning systems

Base Product Part Number

RC01C-002 Lowside field service coupling
RC01C-003 Highside field service coupling
*See the following page for brass and plated part numbers and configurations.

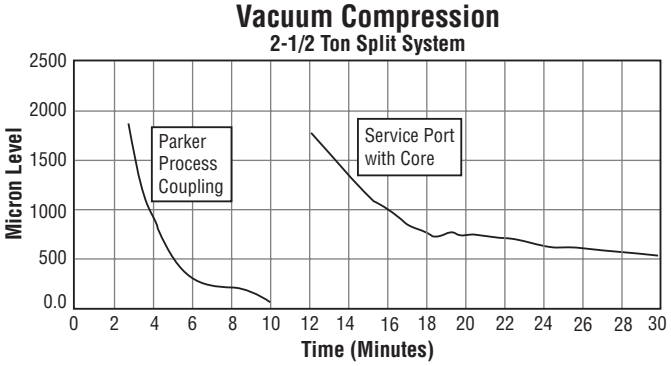
Features and Benefits

- Safety feature prevents coupling from flowing unless connected to service port.
- Brass coupling, with or without plating, provides corrosion resistance.
- Red anodized knob on the high side and blue anodized knob on the low side, along with distinct sizes, assist in preventing cross-contamination between sections of the system.

Agency Approvals

RC01C – UL recognized; File No. SA2709
U.S. Patent No. RE34,781

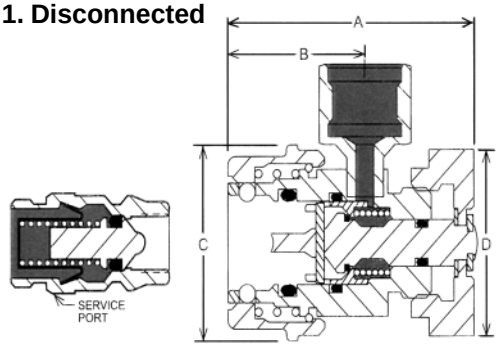
Vacuum Compression



With flow equal to a 3/8" tube, Parker process couplings evacuate refrigerant in one-sixth of the time of current service ports.

Connection and Actuation – RC01C002 & RC01C003

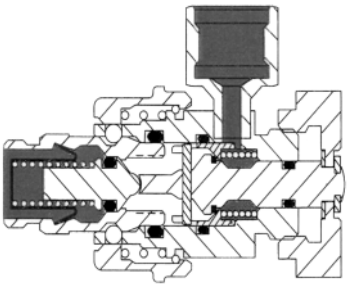
1. Disconnected



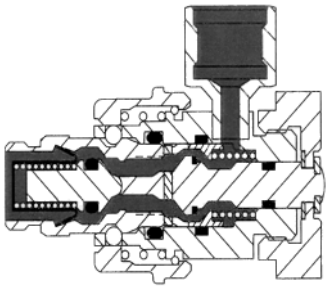
System Side	Part No.	A Ref.	B Ref.	C Ref.	D Ref.
Low Side	RC01C002	1.89	1.08	1.31	1.25
High Side	RC01C003	1.87	1.05	1.31	1.25

= Flow Path

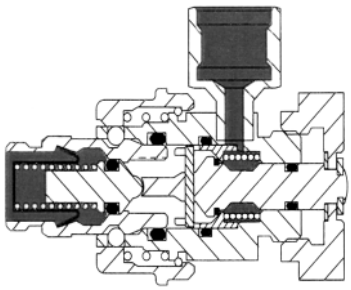
2. Connected



3. Service Port Open

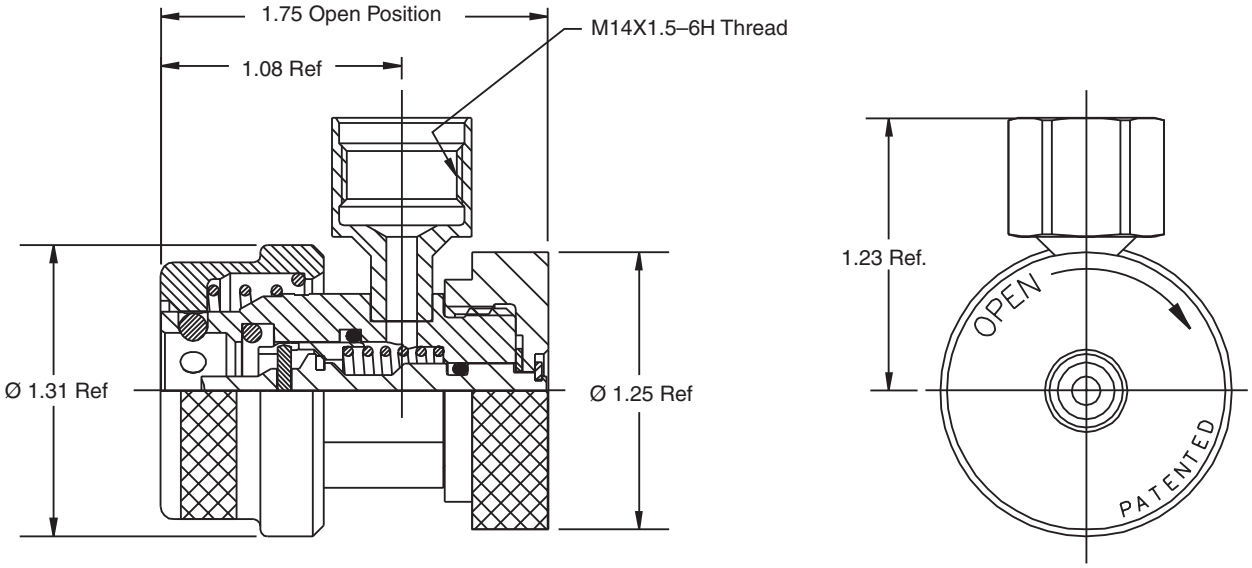


4. Service Port Closed

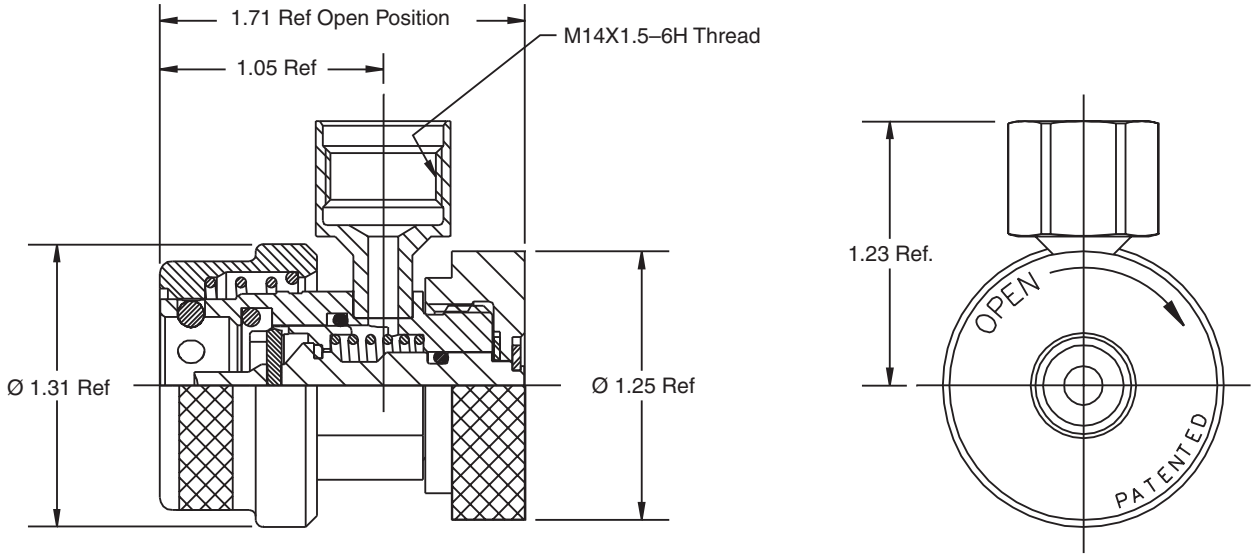


Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

RC01C-002 Service Coupling Assembly
Low Side, R134a



RC01C-003 Service Coupling Assembly
High Side, R134a

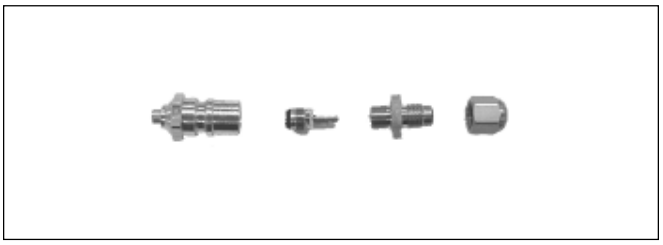


Finish	Side Port	System Side	Part Number
Plated	14 mm Female	Low Side	RC01C-002
Plated	14 mm Female	High Side	RC01C-003
Plated	5/8" - 18 Male	Low Side	RC01C-006
Plated	5/8" - 18 Male	High Side	RC01C-007
Plated	7/16" - 20 Male	Low Side	RC01C-011
Plated	7/16" - 20 Male	High Side	RC01C-012

Finish	Side Port	System Side	Part Number
Brass	14 mm Female	Low Side	RC01C-021
Brass	14 mm Female	High Side	RC01C-022
Brass	7/16" - 20 Male	Low Side	RC01C-023
Brass	7/16" - 20 Male	High Side	RC01C-024

RC05 Series Multi-Purpose Process Coupling

Parker's RC05 Multi-Purpose Process Coupling provides rapid in-plant processing of air conditioning and heat pump systems. A service adapter also provides evacuation and charging of units in the field.



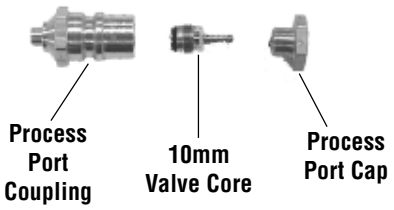
Application

- Residential split-system air conditioners and heat pumps.
- Packaged air conditioners and heat pumps.
- Ice making systems.

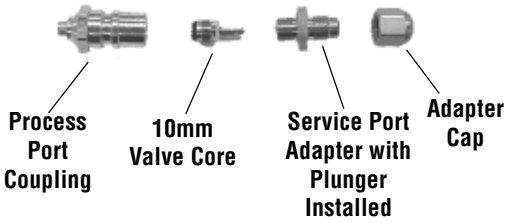
Base Product Part Number

RC05

RC05C-01-04-00A or B



RC05C-01-04-04A or B



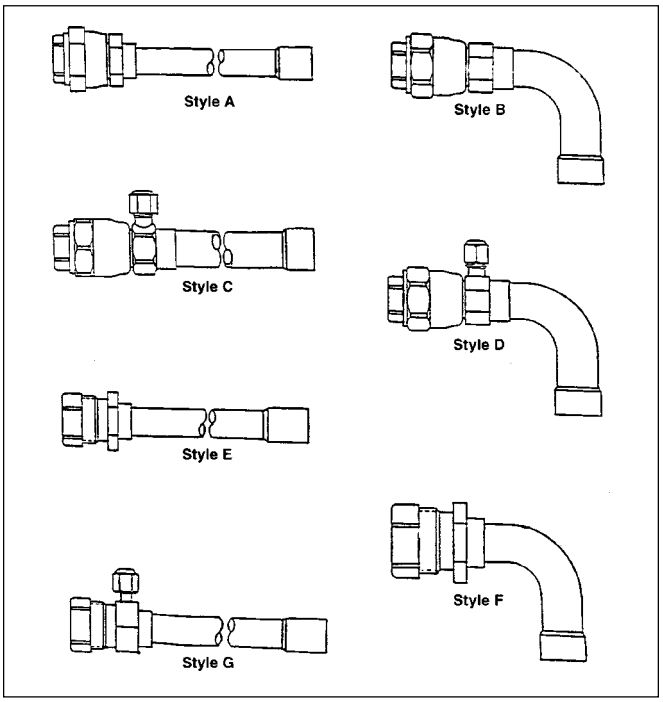
Features and Benefits

- Valve core is installed in the process port coupling to eliminate accidental removal in the field, reducing the potential for injury and refrigerant loss.
- Optional adapter converts process coupling to a standard field service port, eliminating the need for a separate service port and additional braze joints.
- Distinct coupling interfaces, one for R-22 and one for R-410a, prevent cross-contamination of refrigerant.
- Frontloaded valve core allows for easy brazing and high flow.
- Brass coupling provides corrosion resistance.
- Connects to a steel female coupling with a ball latch to provide consistent sealing and easy connection/disconnection force.
- Compact design provides mounting flexibility, along with minimum inclusion of air and loss of fluid.

Agency Approvals

Patent pending.

FD57 Series Stub Kit Couplings



Application

- Factory precharged heat pump and split-type air conditioning systems.

Base Product Part Number

FD57 - XXXX - Copper size - coupling size

Features and Benefits

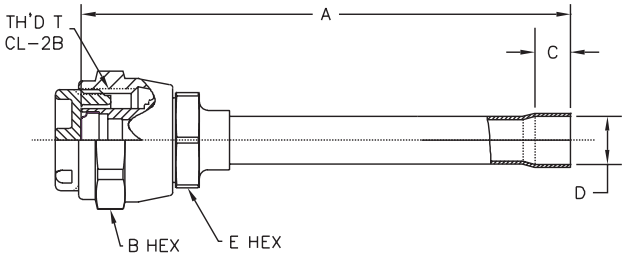
- Easy installation of replacement units.
- Direct copper braze capability.

Agency Approvals

UL Recognized; File No. SDTW 2.SA2709

FD57-1083

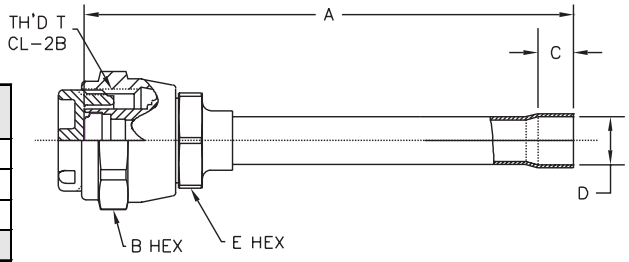
5700 Series Coupling to Copper Tube



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1083-05-06	5/8-18	7.17	0.81	0.75	0.32	0.62
FD57-1083-06-06	3/4-18	7.17	0.81	0.75	0.38	0.62
FD57-1083-10-10	1-1/16-12	7.61	1.31	0.75	0.63	1.00
FD57-1083-12-10	1-1/16-12	7.67	1.31	0.75	0.76	1.00
FD57-1083-14-12	1-7/16-16	8.05	1.69	0.75	0.88	1.38
FD57-1083-12-11	1-1/8-12	7.71	1.31	0.75	0.76	1.00

FD57-1127

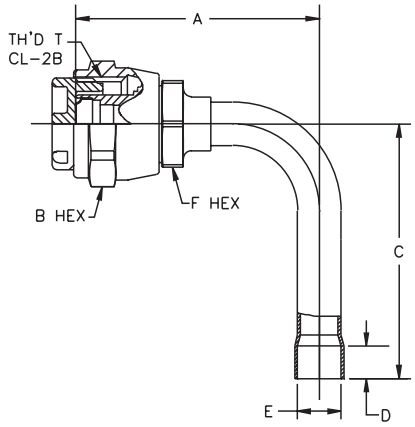
Commercial (Residential) Freon with Copper Tube Stub



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1127-04-06	5/8-18	4.09	0.81	0.31	0.25	0.62
FD57-1127-05-06	5/8-18	4.09	0.81	0.31	0.31	0.62
FD57-1127-06-06	5/8-18	4.09	0.81	0.31	0.38	0.62
FD57-1127-08-10	1-1/16-12	5.28	1.31	0.38	0.50	1.00
FD57-1127-08-11	1-1/8-12	5.32	1.31	0.38	0.50	1.00
FD57-1127-10-10	1-1/16-12	5.73	1.31	0.50	0.62	1.00
FD57-1127-10-11	1-1/8-12	5.77	1.31	0.50	0.62	1.00
FD57-1127-12-10	1-1/16-12	5.79	1.31	0.62	0.75	1.00
FD57-1127-12-11	1-1/8-12	5.83	1.31	0.62	0.75	1.00
FD57-1127-12-12	1-1/16-12	6.13	1.69	0.62	0.75	1.38

FD57-1128

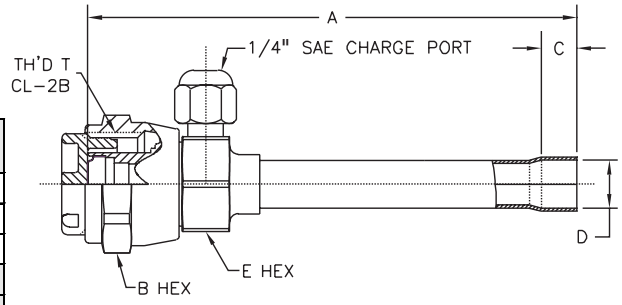
90° Commercial (Residential) Freon with Copper Tube Stub



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.	F Ref.
FD57-1128-04-06	5/8-18	1.92	0.81	2.37	0.31	0.25	0.62
FD57-1128-05-06	5/8-18	2.30	0.81	2.16	0.31	0.31	0.62
FD57-1128-06-06	5/8-18	2.30	0.81	2.16	0.31	0.38	0.62
FD57-1128-08-10	1-1/16-12	2.81	1.31	2.94	0.38	0.50	1.00
FD57-1128-08-11	1-1/8-12	2.85	1.31	2.94	0.38	0.50	1.00
FD57-1128-10-10	1-1/16-12	2.86	1.31	3.34	0.50	0.62	1.00
FD57-1128-10-11	1-1/8-12	2.90	1.31	3.34	0.50	0.62	1.00
FD57-1128-12-10	1-1/16-12	2.92	1.31	3.34	0.62	0.75	1.00
FD57-1128-12-11	1-1/8-12	2.96	1.31	3.34	0.62	0.75	1.00
FD57-1128-12-12	1-1/16-12	3.26	1.69	3.34	0.62	0.75	1.38
FD57-1128-14-11	1-1/8-12	3.56	1.31	2.97	0.75	0.88	1.00
FD57-1128-14-12	1-1/16-12	3.86	1.69	2.97	0.75	0.88	1.38

FD57-1084

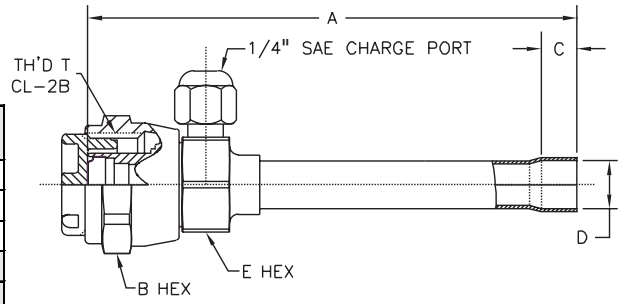
5700 Series Coupling Half with Charge Port to Copper Tube



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1084-05-06	5/8-18	7.42	0.81	0.75	0.312	0.62
FD57-1084-06-06	5/8-18	7.42	0.81	0.75	0.375	0.62
FD57-1084-10-10	1-1/16-12	7.86	1.31	0.75	0.625	1.00
FD57-1084-12-10	1-1/16-12	7.92	1.31	0.75	0.750	1.00
FD57-1084-14-12	1-7/16-16	8.30	1.69	0.75	0.875	1.38
FD57-1084-14-11	1-1/8-12	8.00	1.31	0.75	0.875	1.00
FD57-1084-12-11	1-1/8-12	7.96	1.31	0.75	0.750	1.00
FD57-1084-10-11	1-1/8-12	7.90	1.31	0.75	0.625	1.00

FD57-1129

Commercial (Residential) Freon with Charge Port and Copper Tube Stub



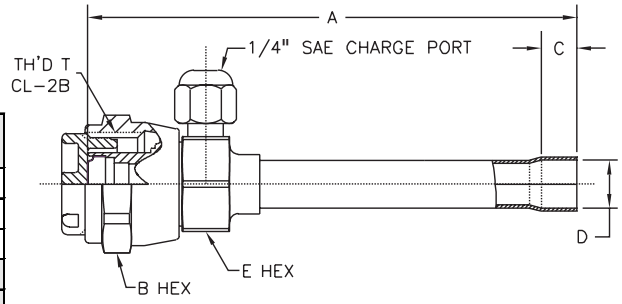
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1129-04-06	5/8-18	4.34	0.81	0.31	0.25	0.62
FD57-1129-05-06	5/8-18	4.34	0.81	0.31	0.31	0.62
FD57-1129-06-06	5/8-18	4.34	0.81	0.31	0.38	0.62
FD57-1129-08-10	1-1/16-12	5.53	1.31	0.38	0.50	1.00
FD57-1129-08-11	1-1/8-12	5.57	1.31	0.38	0.50	1.00
FD57-1129-10-10	1-1/16-12	5.98	1.31	0.50	0.62	1.00
FD57-1129-10-11	1-1/8-12	6.02	1.31	0.50	0.62	1.00
FD57-1129-12-10	1-1/16-12	6.04	1.31	0.62	0.75	1.00
FD57-1129-12-11	1-1/8-12	6.08	1.31	0.62	0.75	1.00
FD57-1129-12-12	1-1/16-12	6.38	1.69	0.62	0.75	1.38
FD57-1129-14-11	1-1/8-12	4.03	1.31	0.75	0.88	1.00
FD57-1129-14-12	1-1/16-12	4.03	1.69	0.75	0.88	1.38
FD57-1129-18-11	1-1/8-12	4.03	1.31	0.91	1.12	1.00

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

FD57-1147

Commercial (Residential) Freon with Charge Port and Copper Tube Stub

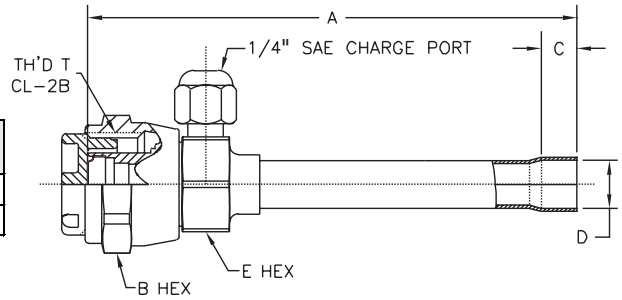
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1147-06-06	5/8-18	4.34	0.81	0.31	0.38	0.62
FD57-1147-06-11	1-1/8-12	4.50	1.31	0.31	0.38	1.00
FD57-1147-08-10	1-1/16-12	5.53	1.31	0.38	0.50	1.00
FD57-1147-08-12	1-7/16-12	5.89	1.69	0.38	0.50	1.38
FD57-1147-10-12	1-7/16-12	6.31	1.69	0.38	0.62	1.38



FD57-1157

Commercial (Residential) Freon with Charge Port and Copper Tube Stub

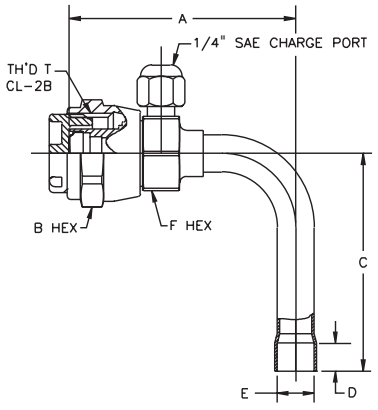
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1157-05-06	5/8-18	5.55	0.81	0.31	5/16	0.62
FD57-1157-06-06	5/8-18	5.55	0.81	0.31	3/8	0.62



FD57-1130

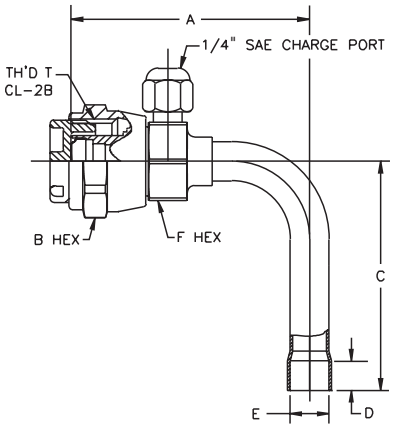
90° Commercial (Residential) Freon with Charge Port and Copper Tube Stub

Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.	F Ref.
FD57-1130-04-06	5/8-18	2.18	0.81	2.37	0.31	0.25	0.62
FD57-1130-05-06	5/8-18	2.55	0.81	2.16	0.31	0.31	0.62
FD57-1130-06-06	5/8-18	2.55	0.81	2.16	0.31	0.38	0.62
FD57-1130-08-10	1-1/16-12	3.06	1.31	2.94	0.38	0.50	1.00
FD57-1130-08-11	1-1/8-12	3.10	1.31	2.94	0.38	0.50	1.00
FD57-1130-10-10	1-1/16-12	3.11	1.31	3.34	0.50	0.62	1.00
FD57-1130-10-11	1-1/8-12	3.15	1.31	3.34	0.50	0.62	1.00
FD57-1130-12-10	1-1/16-12	3.17	1.31	3.34	0.62	0.75	1.00
FD57-1130-12-11	1-1/8-12	3.21	1.31	3.34	0.62	0.75	1.00
FD57-1130-12-12	1-1/16-12	3.51	1.69	3.34	0.62	0.75	1.38
FD57-1130-14-11	1-1/8-12	3.81	1.31	2.97	0.75	0.88	1.00
FD57-1130-14-12	1-1/16-12	4.11	1.69	2.97	0.75	0.88	1.38
FD57-1130-18-11	1-1/8-12	3.81	1.31	3.45	0.91	1.12	1.00



FD57-1148

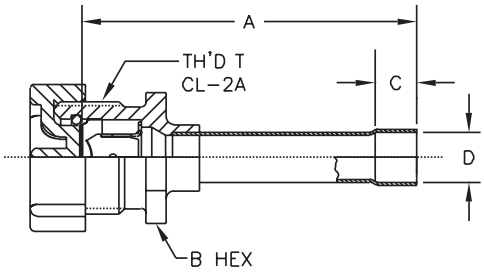
90° Commercial (Residential) Freon with Charge Port and Copper Tube Stub



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.	F Ref.
FD57-1148-06-06	3/4-18	2.55	0.81	2.16	0.31	0.38	0.62
FD57-1148-06-11	1-1/8-12	2.85	1.31	2.06	0.31	0.38	1.00
FD57-1148-08-10	1-1/16-12	3.06	1.31	2.94	0.38	0.50	1.00
FD57-1148-08-12	1-1/16-16	3.64	1.69	2.72	0.38	0.50	1.38
FD57-1148-10-12	1-1/16-16	3.51	1.69	3.32	0.50	0.62	1.38

FD57-1115

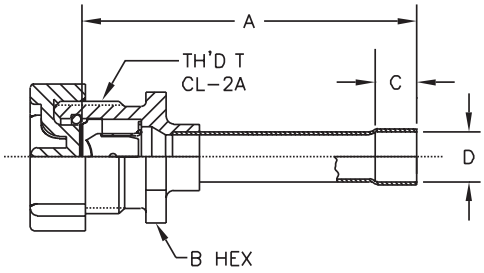
5700 Series Coupling Half to Copper Tube



Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1115-05-06	5/8-18	7.08	0.75	0.75	0.312
FD57-1115-06-06	5/8-18	7.08	0.75	0.75	0.375
FD57-1115-10-11	1-1/8-12	7.54	1.12	0.75	0.625
FD57-1115-12-11	1-1/8-12	7.63	1.12	0.75	0.750
FD57-1115-14-11	1-1/8-12	7.63	1.12	0.75	0.875
FD57-1115-14-12	1-1/16-16	7.80	1.44	0.75	0.875
FD57-1115-10-10	1-1/16-12	7.43	1.06	0.75	0.625

FD57-1131

5700 Series Coupling Half with Copper Tube Stub



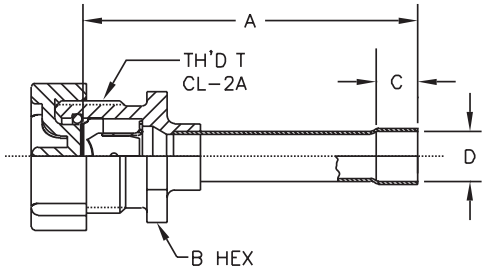
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1131-04-06	5/8-18	4.00	0.75	0.31	0.25
FD57-1131-05-06	5/8-18	4.00	0.75	0.31	0.31
FD57-1131-06-06	5/8-18	4.00	0.75	0.31	0.38
FD57-1131-08-10	1-1/16-12	5.09	1.06	0.38	0.50
FD57-1131-08-11	1-1/8-12	5.20	1.12	0.38	0.50
FD57-1131-10-10	1-1/16-12	5.55	1.06	0.50	0.62
FD57-1131-10-11	1-1/8-12	5.66	1.12	0.50	0.62
FD57-1131-12-10	1-1/16-12	5.64	1.06	0.62	0.75
FD57-1131-12-11	1-1/8-12	5.75	1.12	0.62	0.75
FD57-1131-12-12	1-1/16-12	5.90	1.44	0.62	0.75
FD57-1131-14-11	1-1/8-12	5.72	1.12	0.75	0.88
FD57-1131-14-12	1-1/16-12	5.89	1.44	0.75	0.88

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Cleveland, OH

FD57-1146

5700 Series Coupling Half with Copper Tube Stub

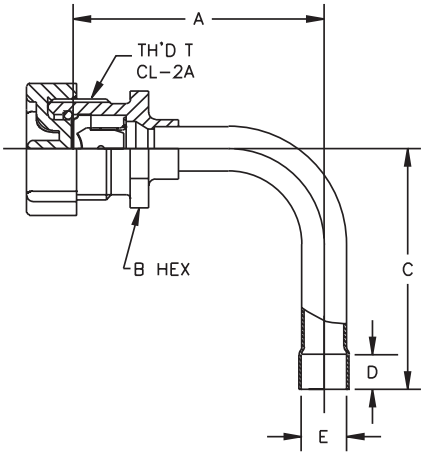
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1146-06-06	3/4-18	3.14	0.87	0.38	0.75
FD57-1146-06-11	1-1/8-12	3.30	1.30	0.38	1.12
FD57-1146-08-10	1-1/16-12	3.22	1.23	0.50	1.06
FD57-1146-08-12	1-1/16-16	3.53	1.66	0.50	1.44
FD57-1146-10-12	1-1/16-16	3.65	1.66	0.62	1.44



FD57-1132

90° 5700 Series Coupling Half with Copper Tube Stub

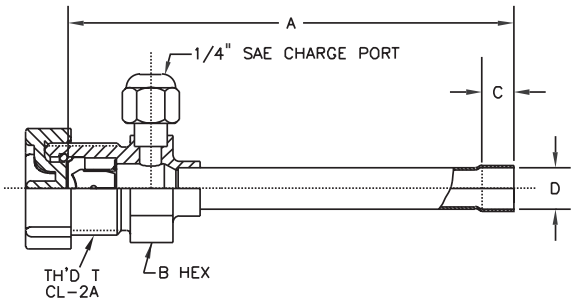
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1132-04-06	5/8-18	1.84	0.75	2.37	0.31	0.25
FD57-1132-05-06	5/8-18	2.21	0.75	2.16	0.31	0.31
FD57-1132-06-06	5/8-18	2.21	0.75	2.16	0.31	0.38
FD57-1132-08-10	1-1/16-12	2.62	1.06	2.94	0.38	0.50
FD57-1132-08-11	1-1/8-12	2.73	1.12	2.94	0.38	0.50
FD57-1132-10-10	1-1/16-12	2.68	1.06	3.34	0.50	0.62
FD57-1132-10-11	1-1/8-12	2.79	1.12	3.34	0.50	0.62
FD57-1132-12-10	1-1/16-12	2.77	1.06	3.34	0.62	0.75
FD57-1132-12-11	1-1/8-12	2.88	1.12	3.34	0.62	0.75
FD57-1132-12-12	1-1/16-12	3.03	1.44	3.34	0.62	0.75
FD57-1132-14-11	1-1/8-12	3.45	1.12	2.97	0.75	0.88
FD57-1132-14-12	1-1/16-12	3.62	1.44	2.97	0.75	0.88



FD57-1121

5700 Series Coupling Half with Charge Port to Copper Tube

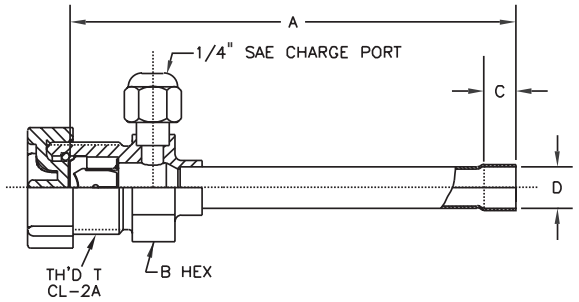
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1121-05-06	5/8-18	7.33	0.62	0.75	0.312
FD57-1121-06-06	5/8-18	7.33	0.62	0.75	0.375
FD57-1121-10-11	1-1/8-12	7.84	1.12	0.75	0.625
FD57-1121-12-11	1-1/8-12	7.84	1.12	0.75	0.750
FD57-1121-14-11	1-1/8-12	7.85	1.12	0.75	0.875



FD57-1133

5700 Series Coupling Half with Charge Port and Copper Tube Stub

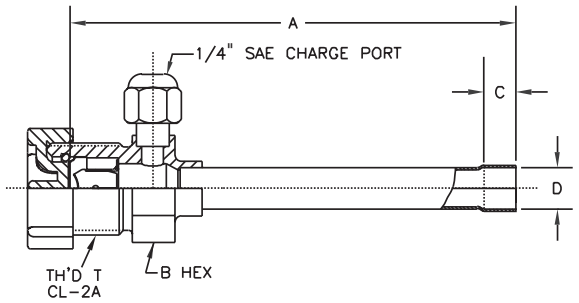
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1133-05-06	5/8-18	4.25	0.62	0.31	0.31
FD57-1133-06-06	5/8-18	4.25	0.62	0.31	0.38
FD57-1133-10-11	1-1/8-12	5.96	1.12	0.5	0.62
FD57-1133-12-11	1-1/8-12	5.96	1.12	0.62	0.75
FD57-1133-14-11	1-1/8-12	5.94	1.12	0.75	0.88



FD57-1158

5700 Series Coupling Half with Charge Port and Copper Tube Stub

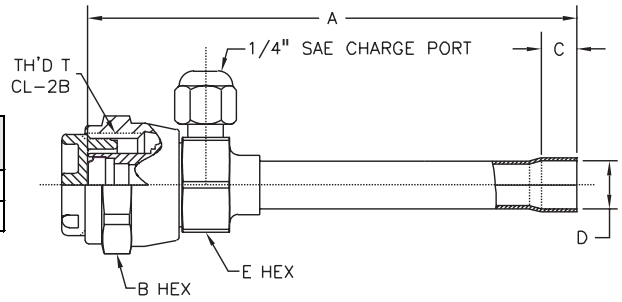
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.
FD57-1158-05-06	5/8-18	5.46	0.62	0.31	5/16
FD57-1158-06-06	5/8-18	5.46	0.62	0.31	3/8



FD57-1144

Commercial (Residential) Freon with Charge Port and Copper Tube Stub

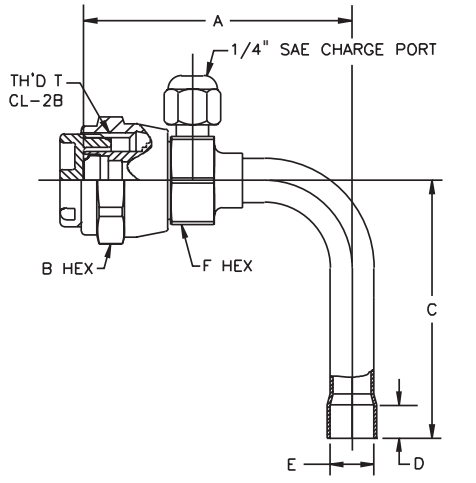
Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.
FD57-1144-05-06	5/8-18	4.34	0.81	0.31	0.31	0.62
FD57-1144-12-11	1-1/8-18	6.08	1.31	0.62	0.75	1.00



FD57-1145

90° Commercial (Residential) Freon with Charge Port and Copper Tube Stub

Part Number	Thread T	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.	F Ref.
FD57-1145-10-11	1-1/8-12	3.15	1.31	3.34	0.50	0.62	1.00
FD57-1145-12-11	1-1/8-12	4.71	1.31	4.50	0.62	0.75	1.00
FD57-1145-14-11	1-1/8-12	3.81	1.31	2.97	0.75	0.88	1.00
FD57-1145-18-11	1-1/8-12	3.81	1.31	3.45	0.91	1.12	1.00



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Cleveland, OH

Notes

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Cleveland, OH

Service and Check Valves
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Check Valves

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Soft-Seat Copper Check Valves ..... page 127

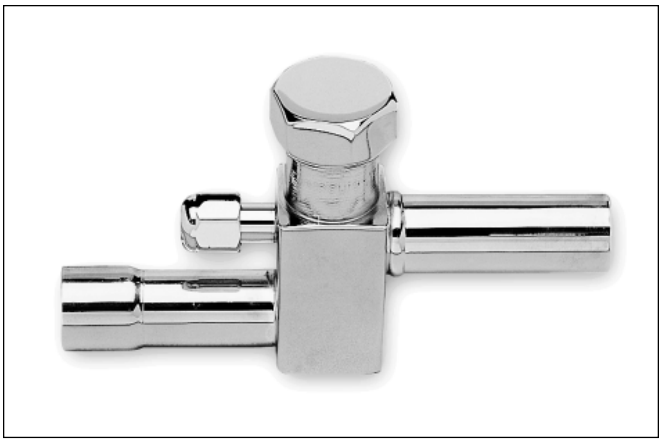
Brass Check Valves ..... page 128

Notes

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Cleveland, OH

Frontseating Valves

Parker's Frontseating Valves are used as service valves in split air-conditioning and heat-pump systems. The valves isolate sections of a system for servicing and provide a means for charging refrigerant into a unit.



Application

- Residential split-system air conditioners and heat pumps

Agency Approvals

U.L. recognized; File No: SA5188
CSA approval; File No. LR86182-2

Specifications

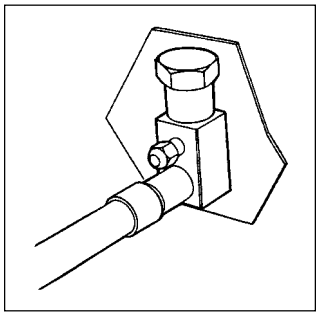
PRODUCT	Frontseating Valves
Operating Temperature Range+	-40°F to +250°F (-40°C to +121°C)
Operating Pressure Range	Vacuum to 750 psi
Minimum Burst Pressure	3,000 psi (207 bar)
MATERIALS	
Valve Body	Brass*
Valve Stem	Brass*
Valve Stem Cap	Brass*
Gauge Port Cap	Brass* or Plastic
CONNECTION TYPES AND MATERIALS	
Sweat	Wrought Copper per ASTM-B75, Alloy C12200
SAE 45°Flare	Brass*
MATERIAL COMPATIBILITY** All components, including valve stem seal packaging and O-Rings are compatible with these refrigerants and refrigerant oils: R22 & mineral oil, alkylbenzene oil or polyolester oil R134a, R404a, R407c, R-410a or R507 & polyolester oil	
Vibration Resistance	Complies with UL 109
Corrosion Resistance	Complies with ASTM B117
External Leak Rate	< 0.1 ounce of R22 refrigerant per year at Operating Pressure Range

* Brass Bar per ASTM-B16, Alloy C36000.
** Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility can not be guaranteed. Please contact Parker for compatibility of refrigerants and refrigerant oils not listed.

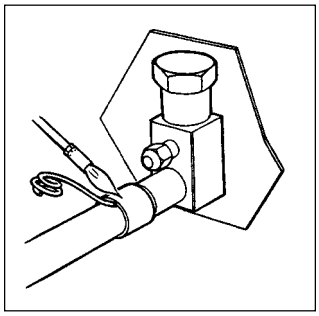
Features and Benefits

- The simplest of service valves providing basic shut-off, charging, and evacuating capabilities.
- Captivated stem-design eliminates the traditional retaining ring, reducing the potential for injury.
- Multiple end-configurations are available, along with assemblies, to meet the unique needs and flow patterns of a unit.
- Use of a standard Allen wrench provides actuation of the valve.
- Brass body and copper-connection tubes virtually eliminate corrosion-related problems.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Flare connections also available as an alternative to sweat connections.

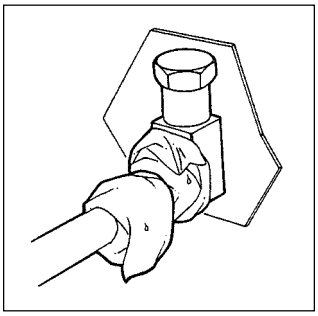
Factory Installation



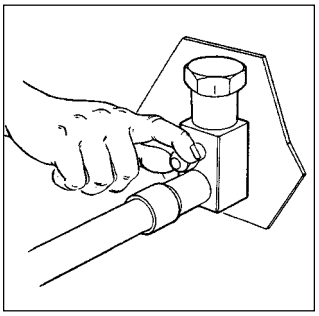
Step 1 Attach the valve using the mounting procedure that best suits the application. Clean the tubing to be brazed to the Parker frontseating valve.



Step 2 Flux the copper tubing and insert into the stub. Flux is not required if a low to zero-silver braze alloy is used. Braze the joint. Due to the extended copper stub the valve does not need to be immersed in water or otherwise cooled during brazing.



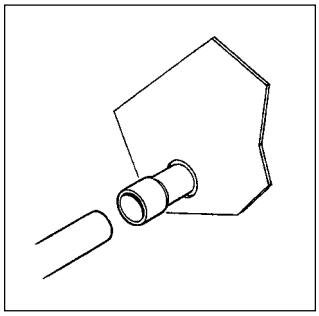
Step 3 After brazing, quench the joint with a wet rag to cool the joint and remove any flux residue.



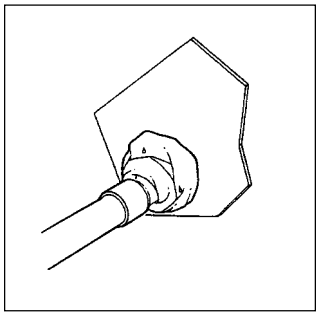
Step 4 Install a valve core (part #222034-4) and a valve cap (part #221014-4B) on the charge port.

Field Installation

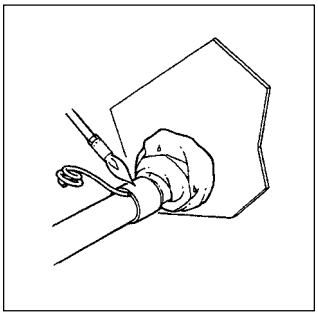
Install the outdoor and indoor units per the manufacturer's recommendations. Route the copper lines between the units.



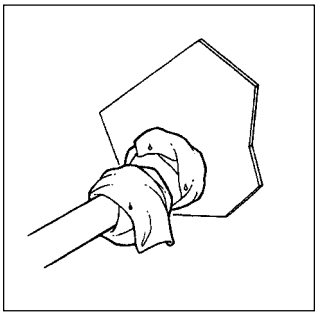
Step 1 The tubing should be cut square, so it is round and free of burrs at the connecting ends. Clean the tubing to prevent contaminants from entering the system.



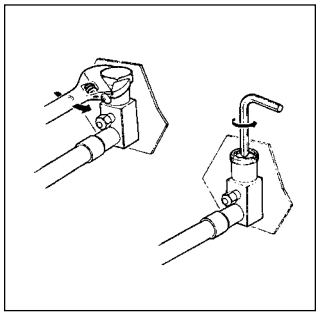
Step 2 Wrap a wet rag around the copper stub before brazing.



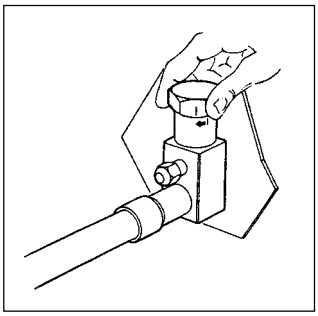
Step 3 Flux the copper tubing and insert into the stub. (Flux is not required if a low to zero-silver braze alloy is used.) Braze the joint.



Step 4 After brazing — quench the joint with a wet rag to cool the joint and remove any flux residue.



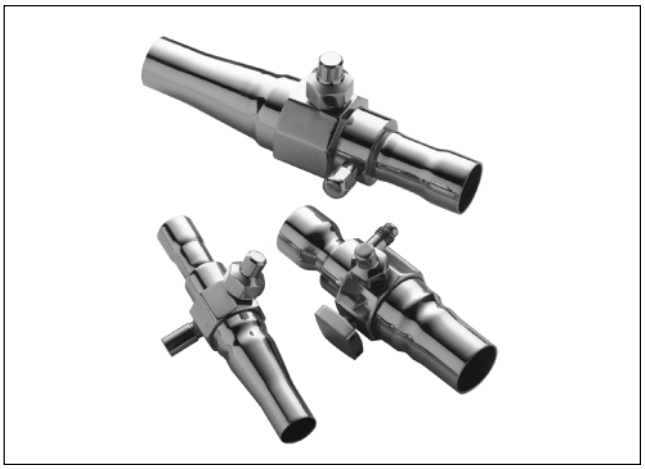
Step 5 This is not a backseating valve. To open the valve remove the valve cap with an adjustable wrench. Insert a 3/16" or 5/16" hex wrench into the stem. Back out counterclockwise until the valve stem incurs resistance.



Step 6 Replace the valve cap finger tight then tighten an additional 1/12 turn or 1/2 hex flat. A metal-to-metal seal is now complete. Complete normal factory recommended procedures.

RB01 Series Ball Valves

Parker's RB01 Ball Valves are used as service valves in split air conditioning and heat-pump systems or in commercial refrigeration applications. The valves isolate sections of a system for servicing and provide a means for charging refrigerant into a unit.



Application

- Residential and commercial air conditioning and heat pumps
- Commercial refrigeration

Base Product Part Number

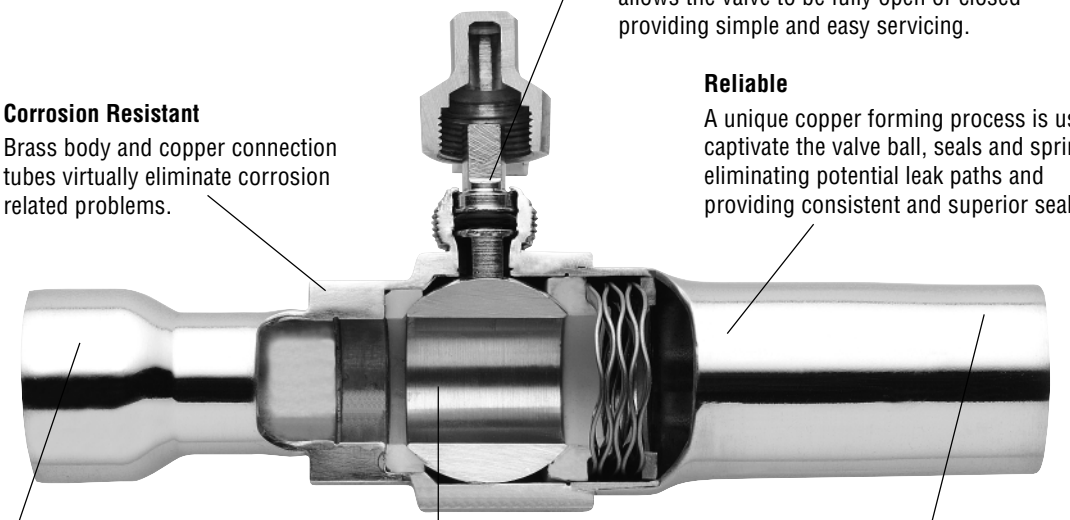
RB01

Features and Benefits

- Full-flow design provides low-pressure drop for maximum system performance.
- One quarter-turn, low-torque actuation allows the valve to be open or closed providing simple and easy servicing.
- Use of a standard crescent wrench provides simple quarter-turn actuation.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Brass body and copper-connection tubes virtually eliminate corrosion-related problems.
- A unique copper-forming process is used to captivate the valve ball, seals, and spring, eliminating potential leak paths and providing consistent and superior sealing.
- Pad and post-mounting are available to provide additional support to the valve, if necessary.
- Multiple end-configurations are available, along with assemblies, to meet the unique needs of a unit.

Agency Approvals

UL recognized; File No: SA5188

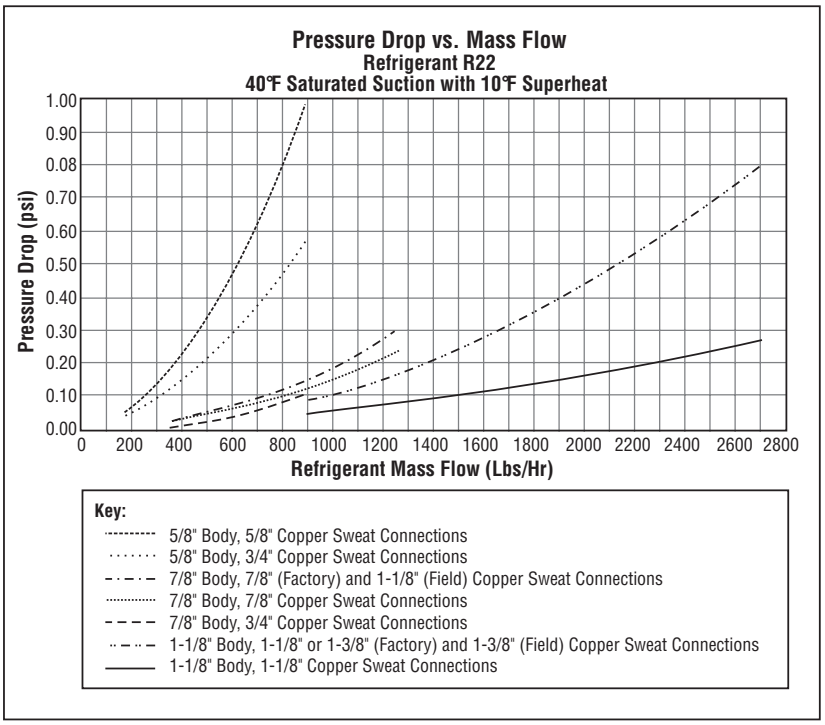


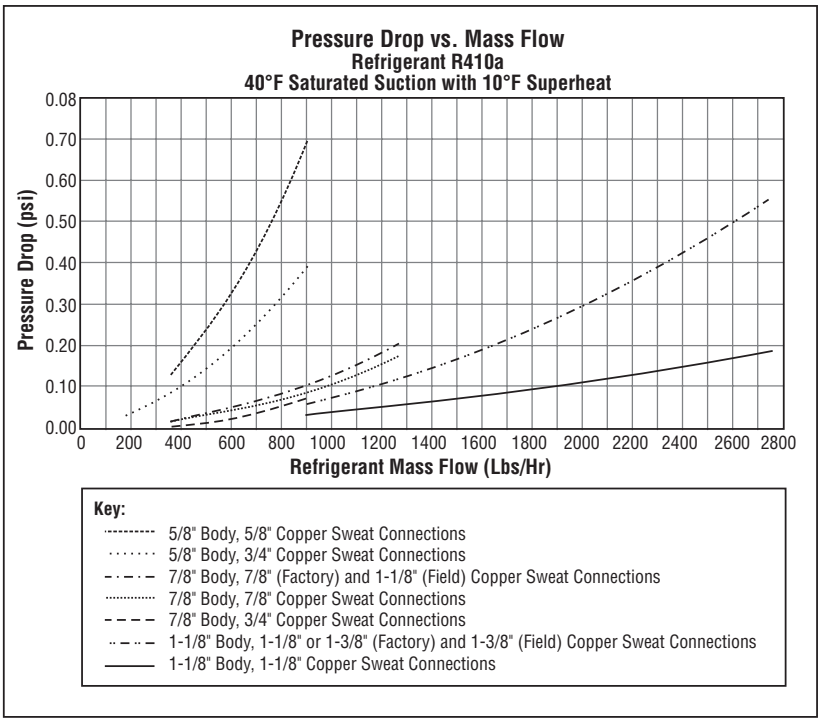
Specifications

PRODUCT	RB01 Series Ball Valves
Operating Temperature Range	-40°F to +250°F (-40°C to +121°C)
Operating Pressure Range	Vacuum to 750 psi
Minimum Burst Pressure	3,000 psi (207 bar)
MATERIALS	
Valve Body	Brass per ASTM B16, Alloy C36000
Ball	Brass per ASTM B16, Alloy C36000
Connections	Wrought Copper, per ASTM-B75, Alloy C12200
Valve Stem	Zinc Plated Steel
Valve Stem Seal	Neoprene™ "W" Type O-Ring
Ball Seat	Polyphenylene Sulphide
Ball Seal	PTFE or TFM
Valve Stem Cap	Brass per ASTM B16, Alloy C36000
Gauge Port Cap	Brass per ASTM B16, Alloy C36000
Gauge Port Valve Seals	PTFE and Neoprene™
Mounting Post or Pad	Brass per ASTM B16, Alloy C36000
MATERIAL COMPATIBILITY*	
All components, including valve stem O-Ring seal, ball seat and ball seal, are generally compatible with the following refrigerants and refrigerant oils: R22 & mineral oil, alkylbenzene oil, or polyolester oil R134a, R404a, R407c, R410a or R507 & polyolester oil	
Vibration Resistance	Complies with UL 109
Material Strength	Complies with UL207 (Moist Ammonia Test)
External Leak Rate	< 0.1 ounce of R22 refrigerant per year at 150 psi <0.25 ounce of R22 refrigerant per year at 600 psi with ball closed and valve stem cap removed

* Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility can not be guaranteed. Please contact Parker for compatibility of refrigerants and refrigerant oils not listed.

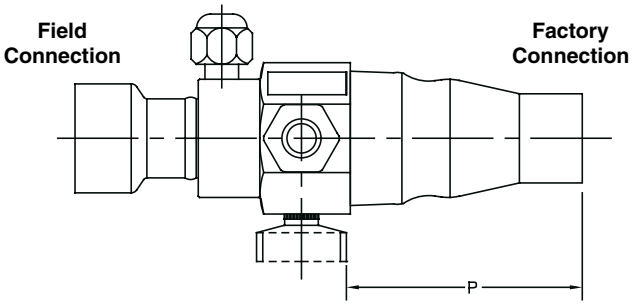
Flow Data

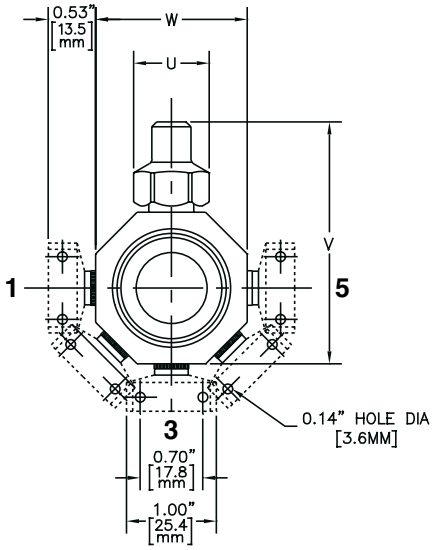


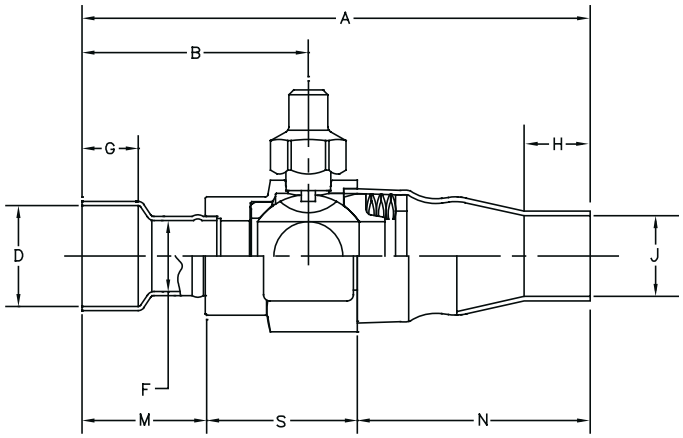


Pad Mount

RB01-031, RB01-032, RB01-033





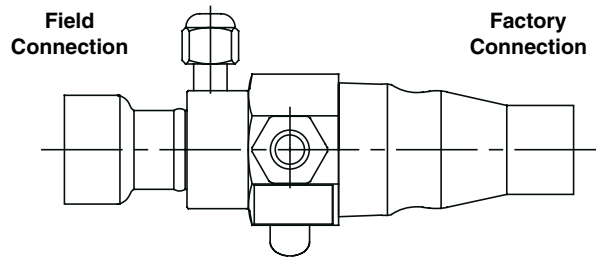


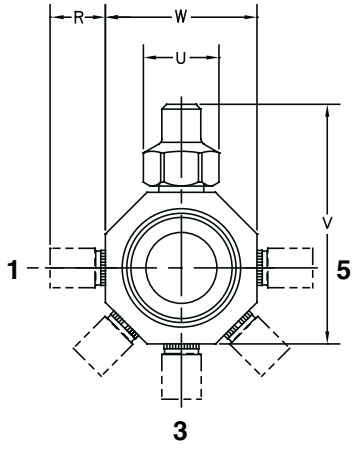
Connection		Part Numbers			Dimensions														
Factory	Field	No. 1 Mtg Position with Right-Hand Gauge Port	No. 3 Mtg Position with Left-Hand Gauge Port	No. 5 Mtg Position with Left-Hand Gauge Port	Nominal Body Size	A	B	D	F	G	H	J	M	N	P	S	U (Across Flats)	V	W (Across Flats)
3/4" ODS	3/4" ODS	RB01-031-121412	RB01-032-121412	RB01-033-121412	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.75 (19.0)	0.75 (19.0)	0.62 (15.7)	0.62 (15.7)	0.75 (19.0)	1.37 (34.8)	2.79 (70.9)	2.83 (71.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	7/8" ODS	RB01-031-141414	RB01-032-141414	RB01-033-141414	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.88 (22.4)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	2.83 (71.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	1-1/8" ODS	RB01-031-141418	RB01-032-141418	RB01-033-141418	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	2.83 (71.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
1-1/8" ODS	1-1/8" ODS	RB01-031-181418	RB01-032-181418	RB01-033-181418	7/8 (22.2)	5.40 (137.2)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.62 (15.7)	1.13 (28.7)	1.37 (34.8)	2.34 (59.4)	2.38 (60.4)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)

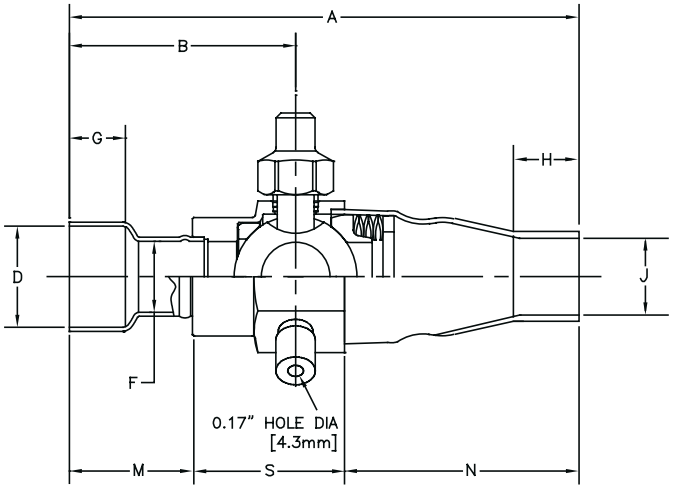
All dimensions in inches (mm)

Post Mount

RB01-034, RB01-035, RB01-036





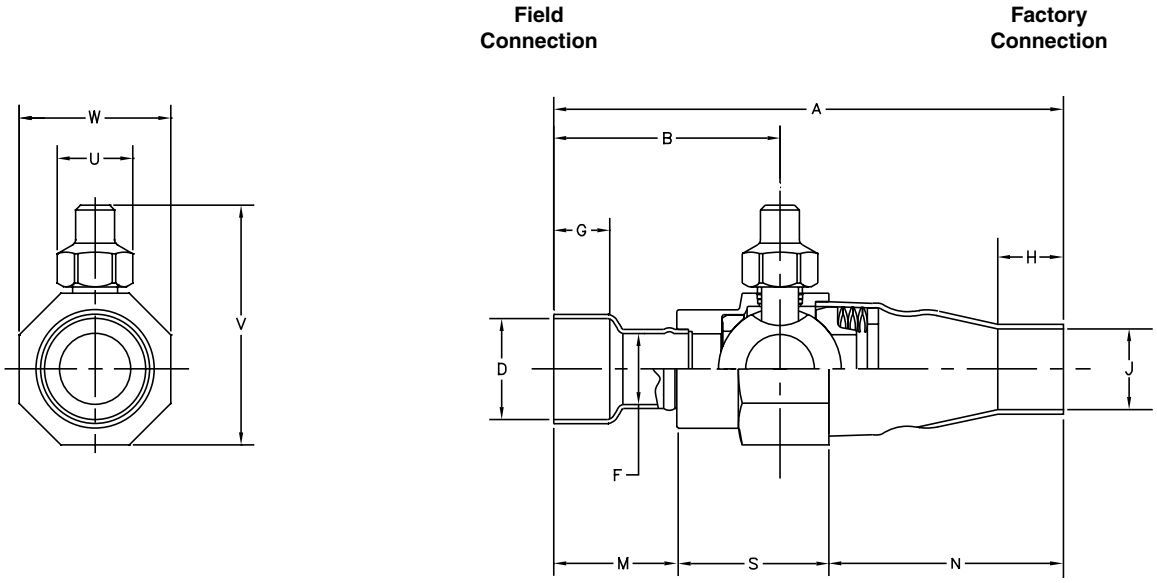


Connection		Part Numbers			Dimensions													
Factory	Field	No. 1 Mtg Position with Right-Hand Gauge Port	No. 3 Mtg Position with Left-Hand Gauge Port	No. 5 Mtg Position with Left-Hand Gauge Port	Nominal Body Size	A	B	D	F	G	H	J	M	N	R	S	U (Across Flats)	V	W (Across Flats)
5/8" ODS	5/8" ODS	RB01-034-101010	RB01-035-101010	RB01-036-101010	5/8 (15.9)	5.86 (148.8)	2.53 (64.3)	0.63 (16.0)	0.62 (15.7)	0.50 (12.7)	0.50 (12.7)	0.63 (16.0)	1.50 (38.1)	2.81 (71.4)	0.80 (20.3)	1.55 (39.4)	0.75 (19.0)	2.30 (58.4)	1.31 (33.3)
3/4" ODS	3/4" ODS	RB01-034-121012	RB01-035-121012	RB01-036-121012	5/8 (15.9)	5.86 (148.8)	2.53 (64.3)	0.75 (19.0)	0.75 (19.0)	0.62 (15.7)	0.62 (15.7)	0.75 (19.0)	1.50 (38.1)	2.81 (71.4)	0.80 (20.3)	1.55 (39.4)	0.75 (19.0)	2.30 (58.4)	1.31 (33.3)
3/4" ODS	3/4" ODS	RB01-034-121412	RB01-035-121412	RB01-036-121412	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.75 (19.0)	0.75 (19.0)	0.62 (15.7)	0.62 (15.7)	0.75 (19.0)	1.37 (34.8)	2.79 (70.9)	0.62 (15.7)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	7/8" ODS	RB01-034-141414	RB01-035-141414	RB01-036-141414	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.88 (22.4)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	0.62 (15.7)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	1-1/8" ODS	RB01-034-141418	RB01-035-141418	RB01-036-141418	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	0.62 (15.7)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
1-1/8" ODS	1-1/8" ODS	RB01-034-181418	RB01-035-181418	RB01-036-181418	7/8 (22.2)	5.40 (137.2)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.62 (15.7)	1.13 (28.7)	1.37 (34.8)	2.34 (59.4)	0.62 (15.7)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
1-1/8" ODS	1-1/8" ODS	RB01-034-181818	RB01-035-181818	RB01-036-181818	1-1/8 (28.6)	8.00 (203.2)	3.56 (90.4)	1.13 (28.7)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.13 (28.7)	2.19 (55.6)	3.60 (91.4)	0.62 (15.7)	2.21 (56.1)	0.94 (23.9)	3.17 (80.5)	2.00 (50.8)
1-1/8" ODS	1-3/8" ODS	RB01-034-181822	RB01-035-181822	RB01-036-181822	1-1/8 (28.6)	8.00 (203.2)	3.56 (90.4)	1.38 (35.1)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.13 (28.7)	2.19 (55.6)	3.60 (91.4)	0.62 (15.7)	2.21 (56.1)	0.94 (23.9)	3.17 (80.5)	2.00 (50.8)
1-3/8" ODS	1-3/8" ODS	RB01-034-221822	RB01-035-221822	RB01-036-221822	1-1/8 (28.6)	7.92 (201.2)	3.56 (90.4)	1.38 (35.1)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.38 (35.1)	2.19 (55.6)	3.52 (89.4)	0.62 (15.7)	2.21 (56.1)	0.94 (23.9)	3.17 (80.5)	2.00 (50.8)

All dimensions in inches (mm)

No Mount

RB01-019



Connection			Dimensions													
Factory	Field	Part Numbers	Nominal Body Size	A	B	D	F	G	H	J	M	N	S	U (Across Flats)	V	W (Across Flats)
5/8" ODS	5/8" ODS	RB01-019-101010	5/8 (15.9)	5.86 (148.8)	2.53 (64.3)	0.63 (16.0)	0.62 (15.7)	0.50 (12.7)	0.50 (12.7)	0.63 (16.0)	1.50 (38.1)	2.81 (71.4)	1.55 (39.4)	0.75 (19.0)	2.30 (58.4)	1.31 (33.3)
3/4" ODS	3/4" ODS	RB01-019-121012	5/8 (15.9)	5.86 (148.8)	2.53 (64.3)	0.75 (19.0)	0.75 (19.0)	0.62 (15.7)	0.62 (15.7)	0.75 (19.0)	1.50 (38.1)	2.81 (71.4)	1.55 (39.4)	0.75 (19.0)	2.30 (58.4)	1.31 (33.3)
3/4" ODS	3/4" ODS	RB01-019-121412	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.75 (19.0)	0.75 (19.0)	0.62 (15.7)	0.62 (15.7)	0.75 (19.0)	1.37 (34.8)	2.79 (70.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	7/8" ODS	RB01-019-141414	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	0.88 (22.4)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
7/8" ODS	1-1/8" ODS	RB01-019-141418	7/8 (22.2)	5.85 (148.6)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.75 (19.0)	0.88 (22.4)	1.37 (34.8)	2.79 (70.9)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
1-1/8" ODS	1-1/8" ODS	RB01-019-181418	7/8 (22.2)	5.40 (137.2)	2.52 (64.0)	1.13 (28.7)	0.88 (22.4)	0.62 (15.7)	0.62 (15.7)	1.13 (28.7)	1.37 (34.8)	2.34 (59.4)	1.69 (42.9)	0.75 (19.0)	2.67 (67.8)	1.68 (42.7)
1-1/8" ODS	1-1/8" ODS	RB01-019-181818	1-1/8 (28.6)	8.00 (203.2)	3.56 (90.4)	1.13 (28.7)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.13 (28.7)	2.19 (55.6)	3.60 (91.4)	2.21 (56.1)	0.94 (23.9)	3.17 -80.5	2.00 (50.8)
1-1/8" ODS	1-3/8" ODS	RB01-019-181822	1-1/8 (28.6)	8.00 (203.2)	3.56 (90.4)	1.38 (35.1)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.13 (28.7)	2.19 (55.6)	3.60 (91.4)	2.21 (56.1)	2.21 (23.9)	3.17 (80.5)	2.00 (50.8)
1-3/8" ODS	1-3/8" ODS	RB01-019-221822	1-1/8 (28.6)	7.92 (201.2)	3.56 (90.4)	1.38 (35.1)	1.12 (28.4)	0.75 (19.0)	0.75 (19.0)	1.38 (35.1)	2.19 (55.6)	3.52 (89.4)	2.21 (56.1)	2.21 (23.9)	3.17 (80.5)	2.00 (50.8)

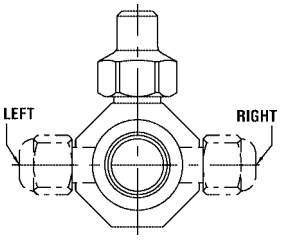
All dimensions in inches (mm)

Available Options

Available Options	
Mounting Type:	Pad Mount, Post-Stud Mount or No Mount
Gauge Port Location:	Left-Hand Gauge Port with Mounting Positions 2-5 Right-Hand Gauge Port with Mounting Positions 1-4
Ship Position:	Ball Open or Ball Closed*
Gauge Port Cap:	Brass* or Plastic

* Provided with standard product offering

Gauge Port Locations Viewed from the Field Connection



How to Order

RB01 — Product Series

019 — Unique Features

Customized to mounting and gauge-port specifications

12 — Factory Connection

Factory Connection (Denoted xx/16)
10 = 5/8"
12 = 3/4"
14 = 7/8"
18 = 1-1/8"
22 = 1-3/8"

10 — Body Size

Body Size (Denoted xx/16)
10 = 5/8"
14 = 7/8"
18 = 1-1/8"

12 — Field Connection

Field Connection (Denoted xx/16)
10 = 5/8"
12 = 3/4"
14 = 7/8"
18 = 1-1/8"
22 = 1-3/8"

Backseating Valves

Parker's Backseating Valves are used as service valves in air-conditioning and heat-pump systems. The valves isolate sections of a system for servicing and provide a means for charging refrigerant into a unit.

Application

- Residential split-system air conditioners and heat pumps

PRODUCT	Backseating Valves
Operating Temperature Range+	-40°F to +250°F (-40°C to +121°C)
Operating Pressure Range	Vacuum to 750 psi
Minimum Burst Pressure	3,000 psi (207 bar)
MATERIALS	
Valve Body	Machined Brass* or Forged
Valve Stem	Nickel-Plated Carbon Steel or 316L Stainless Steel
Valve Stem Cap	Valox® Cap with Neoprene™ "W" Gasket or Brass* Cap
Gauge Port Cap	Valox® Cap with Neoprene™ "W" Gasket or Brass* Cap
VALVE STEM SEAL MATERIALS	
Packing Nut	Brass*
Packing	Composite (Arimid, Neoprene™ and TFE)
O-Ring	Neoprene™ "W"
CONNECTION TYPES AND MATERIALS	
Sweat	Brass* or Wrought Copper per ASTM-B75, Alloy C12200
SAE 45° Flare	Brass*
RTS	Brass* or 316L Stainless Steel
MATERIAL COMPATIBILITY** All components, including valve stem seal packaging and o-rings are compatible with these refrigerants and refrigerant oils: R22 & mineral oil, alkylbenzene oil or polyolester oil R134a, R404a, R407c, R-410a or R507 & polyolester oil	
Vibration Resistance	Complies with UL 109
Corrosion Resistance	Complies with ASTM B117
External Leak Rate	< 0.1 ounce of R22 refrigerant per year at Operating Pressure Range

Valox® is a federally registered trademark of the General Electric Company.

+ Frontseat maximum operating temperature for 1-3/8" valve body is +210°F (+99C)

* Brass Bar per ASTM-B16, Alloy C36000.

** Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility can not be guaranteed. Please contact Parker for compatibility of refrigerants and refrigerant oils not listed.



Features and Benefits

- Precision machining of the stem and valve seats, as well as composite packing or o-ring stem seals, translates into reliable and repeatable sealing.
- Isolated chargeport minimizes refrigerant loss during servicing.
- Brass body and copper connection tubes virtually eliminate corrosion-related problems.
- Copper-sweat connections provide basic ends for brazing and eliminate the need for flux, simplifying the installation process.
- Multiple end configurations are available, along with assemblies, to meet the unique needs and flow patterns of a unit.

RB8 Series Multi-Function Cooling-Only Flare Valves

Parker's RB8 Multi-Function Flare Valves are used as service valves in mini-split air conditioners. The valves isolate sections of a system for servicing and provide a means for charging refrigerant into a unit. The valve also holds a restrictor and screen to meter refrigerant and filter debris, increasing system efficiency.

Application

- Mini-split air conditioners

Base Product Part Number

RB8

Features and Benefits

- Inclusion of a restrictor into the valve provides precise refrigerant metering to increase efficiency.
- Noise and vibration through the unit are reduced by inclusion of the restrictor into the valve.
- Inclusion of a screen into the valve filters dirt and debris prior to entering the restrictor, maintaining full flow and enhancing performance.
- Captivated stem-design holds the stem within the valve to prevent it from releasing when the cap is removed or the unit is serviced, reducing the potential for injury.
- Combined functionality of valve, restrictor, and screen reduces component inventory (shut-off valve, field-access gage port, expansion device, filter screen or strainer, line-set connector, check valve, by-pass circuit, and capillary tubes) leading to a reduction in overall installed cost.
- Combined functionality of valve, restrictor, and screen also reduces space requirements within a unit and eliminates braze joints to reduce potential leaks paths.
- Patent-pending.

Agency Approvals

Pending UL approval.

Flow Data

Available upon requested application.



Specifications

PRODUCT	RB8 Series Valves
Operating Temperature Range	-40°F to +250°F (-40°C to +121°C)
Ambient Operating Temperature	-40°F to +250°F (-40°C to +121°C)
Operating Pressure Range	Vacuum to 750 psi (52 bar)+
Minimum Burst Pressure	3,750 psi (259 bar)+
MATERIALS	
Valve Body	Brass*
Connections	Refrigeration Grade Copper, per ASTM-B75, Alloy C12200
Valve Stem	Brass*
Valve Stem Seal	Neoprene™ "W" or HNBR O-Ring
Valve Stem Cap	Brass*
Gauge Port Cap	Brass* or Plastic with Neoprene™ "W" or HNBR O-Ring Seal
Gauge Port Valve Seals	Neoprene™ & Teflon® or HNBR & Teflon® Seals
MATERIAL COMPATIBILITY**	
Neoprene™	– R22 & mineral oil, alkylbenzene oil or polyolester oil R134a, R404a, R407c, R-410a or R507 & polyolester oil
HNBR	– R-410a & polyvinylether oil or "Hard" Alkylbenzene oil
Vibration Resistance	Complies with UL 109
External Leak Rate	< 0.1 ounce of R410a refrigerant per year at Operating Pressure Range

Teflon® is a federally registered trademark of E.I. du Pont de Nemours and Company.

\+ Pending UL testing and approval. Tests performed by Parker indicate that operating and burst pressures can be achieved.

* Brass Bar per ASTM-B16, Alloy C36000.

** Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility cannot be guaranteed. Please contact Parker for compatibility of refrigerants and refrigerant oils not listed.

RB9 Series Multi-Function Heat-Pump Flare Valves

Parker's RB9 Multi-Function Flare Valves are used as service valves in mini-split heat pumps. The valves isolate sections of a system for servicing and provide a means for charging refrigerant into a unit. The valve also holds a restrictor and screen to meter refrigerant and filter debris, increasing system efficiency.

Application

- Mini-split heat pumps

Base Product Part Number

RB9

Features and Benefits

- Inclusion of a restrictor into the valve provides precise refrigerant metering to increase efficiency.
- Noise and vibration through the unit are reduced by inclusion of the restrictor into the valve.
- Inclusion of a screen into the valve filters dirt and debris prior to entering the restrictor, maintaining full flow and enhancing performance.
- Captivated stem-design holds the stem within the valve to prevent it from releasing when the cap is removed or the unit is serviced, reducing the potential for injury.
- Combined functionality of valve, restrictor, and screen reduces component inventory (shut-off valve, field-access gage port, expansion device, filter screen or strainer, line-set connector, check valve, by-pass circuit, and capillary tubes) leading to a reduction in overall installed cost.
- Combined functionality of valve, restrictor, and screen also reduces space requirements within a unit and eliminates braze joints to reduce potential leaks paths.
- Patent-pending.

Agency Approvals

Pending UL approval.

Flow Data

Available upon requested application.



Specifications

PRODUCT	RB9 Series Valves
Operating Temperature Range	-40°F to +250°F (-40°C to +121°C)
Ambient Operating Temperature	-40°F to +250°F (-40°C to +121°C)
Operating Pressure Range	Vacuum to 750 psi (52 bar)+
Minimum Burst Pressure	3,750 psi (259 bar)+
MATERIALS	
Valve Body	Brass*
Connections	Refrigeration Grade Copper, per ASTM-B75, Alloy C12200
Valve Stem	Brass*
Valve Stem Seal	Neoprene™ "W" or HNBR O-Ring
Valve Stem Cap	Brass*
Gauge Port Cap	Brass* or Plastic with Neoprene™ "W" or HNBR O-Ring Seal
Gauge Port Valve Seals	Neoprene™ & Teflon® or HNBR & Teflon® Seals
MATERIAL COMPATIBILITY**	
Neoprene™	– R22 & mineral oil, alkylbenzene oil or polyolester oil R134a, R404a, R407c, R-410a or R507 & polyolester oil
HNBR	– R-410a & polyvinylether oil or "Hard" Alkylbenzene oil
Vibration Resistance	Complies with UL 109
External Leak Rate	< 0.1 ounce of R410a refrigerant per year at Operating Pressure Range

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\+ Pending UL testing and approval. Tests performed by Parker indicate that operating and burst pressures can be achieved.

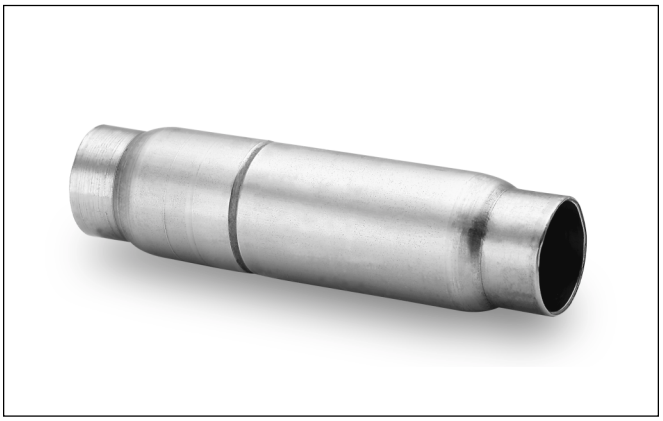
* Brass Bar per ASTM-B16, Alloy C36000.

** Due to the numerous manufacturers of refrigerant oils and continuous changes of additives, compatibility cannot be guaranteed. Please contact Parker for compatibility of refrigerants and refrigerant oils not listed.

Check Valves

Check valves are designed to allow flow in one direction only. They are used to prevent backwards flow through dryers and other devices that are designed for directional flow.

Copper Ball Check Valves



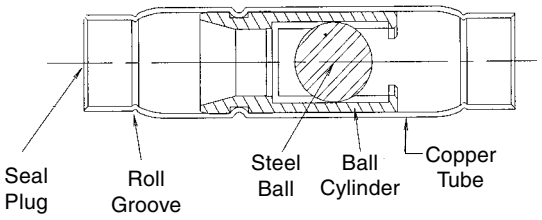
Parker's Copper Ball Check Valves are used in refrigeration and air conditioning systems to maintain flow in only one direction. Internal components seat or “check,” preventing flow back through the valve. These products are often used in conjunction with dryers or strainers to ensure unidirectional flow, with compressors to prevent liquid refrigerant from flooding back to the inlet, or in system lines to redirect flow to another circuit.

Application

- Refrigeration and air conditioning systems.

Features and Benefits

- Stainless steel ball is contained in a one-piece brass retainer within a copper tube to provide corrosion resistance and durability.
- Straight-flow design yields high flow for maximum system performance.
- Standard ball valves offer stainless steel-to-brass seating for low refrigerant leakage.
- Sweat connections in a variety of sizes provide for easy installation and simplified brazing.
- Spring-loaded designs are also available for near horizontal mounting applications.

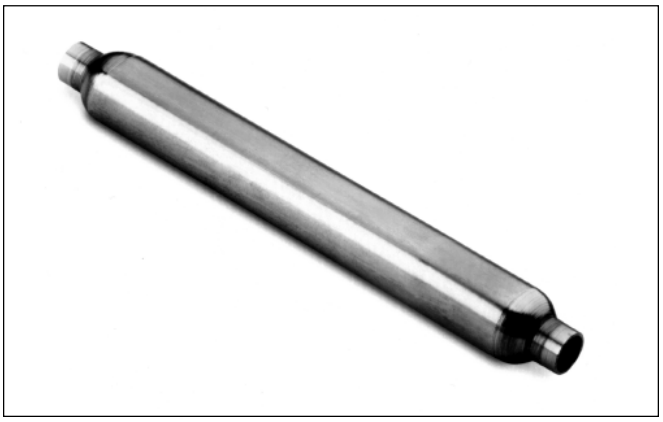


Dimensions

Model No.	UL Model	Female Sweat Connect in.	Overall Length in.	System Cutout Length in.	Body Dia. in.	Flow-tons* @ 1 psi pressure drop													
						12	22	134a	401A/B	401C	402A	402B	404A	407A	407B	407C	410A	502	507A
CV4-6FS-6FS	3/8F	3/8	3.75	3.00	1/2	2.6	3.5	3.2	3.6	3.2	2.4	2.8	2.3	3.1	2.5	3.4	3.4	2.3	2.3
CV5-8FS-8FS	1/2F	1/2	3.75	2.88	5/8	4.8	6.4	5.8	6.6	5.8	4.3	5.0	4.2	5.6	4.5	6.2	6.3	4.2	4.2
CV7-10FS-10FS	5/8F	5/8	4.5	3.50	7/8	9.0	12.0	10.9	12.3	11.0	8.1	9.5	7.8	10.5	8.4	11.6	11.8	7.8	7.8
CV9-14FS-14FS	7/8F	7/8	4.5	3.50	1.13	18.6	24.8	22.5	25.4	22.6	16.7	19.5	16.1	21.6	17.4	23.9	24.3	16.1	16.1
CV11-18FS-18FS	1 1/8F	1.125	5	4.00	1.38	48.8	65.0	59.1	66.7	59.3	43.9	51.2	42.2	56.8	45.6	62.9	64.0	42.4	42.3

* Rated at 86°F liquid/5°F evaporator

Soft-Seat Copper Check Valves



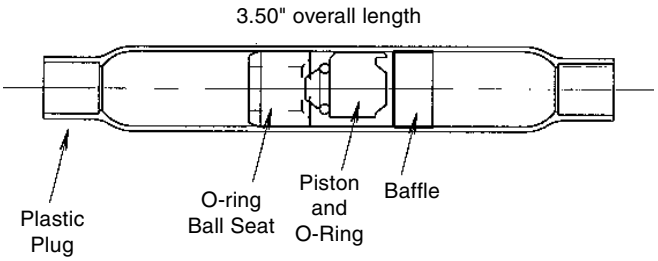
Parker's Soft-Seat Copper Check Valves are used in refrigeration and air conditioning systems to maintain flow in only one direction. Internal components seat or "check," preventing flow back through the valve. These products are often used in conjunction with dryers or strainers to ensure unidirectional flow, with compressors to prevent liquid refrigerant from flooding back to the inlet, or in system lines to redirect flow to another circuit.

Application

- Refrigeration and air conditioning systems.

Features and Benefits

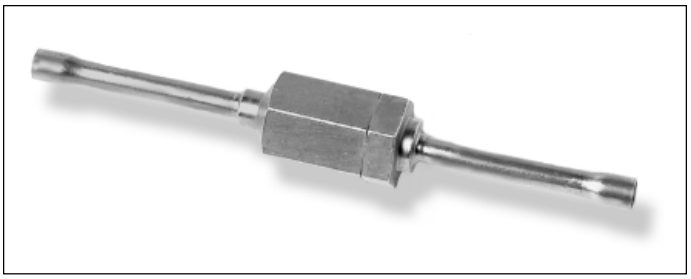
- Soft-seat valve features a Neoprene™ O-ring that seals to a metal seat for low refrigerant leakage (10cc/min. compared to traditional check valves with 750 cc/min.).
- Brass piston seat and steel piston provide corrosion resistance and durability.
- Sweat connections in a variety of sizes provide for easy installation and simplified brazing.



Dimensions

Part No.	UL Model	Female Sweat Connect in.	Overall Length in.	System Cutout Length in.	Body Dia. in.	Flow tons @ 1 psi pressure drop
274243-00	PCV525	5/16	3.5	2.81	0.525	TBD
274243-01	PCV525	3/8	3.5	2.81	0.525	
274243-03	PCV525	1/2	3.5	3.10	0.525	

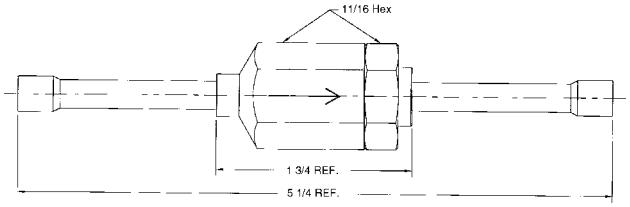
1/4" Brass Check Valve

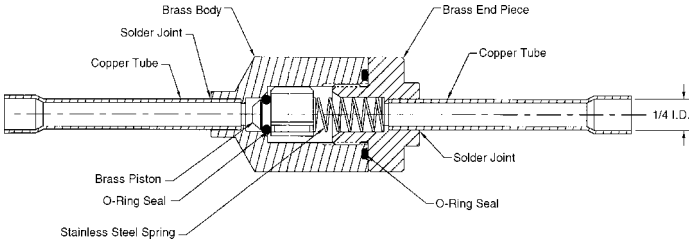


Features and Benefits

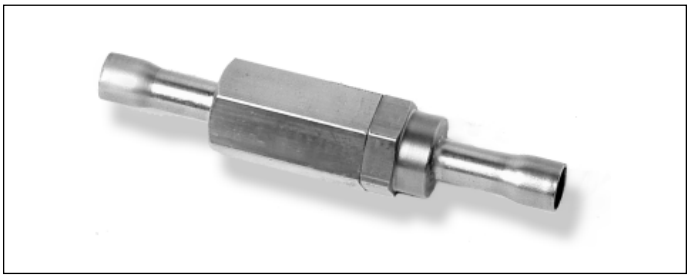
- Poppet style valve incorporates o-ring sealing surface.
- Brass body and piston resist corrosion.
- Stainless steel spring resists corrosion.
- Braze connections.

Dimensions





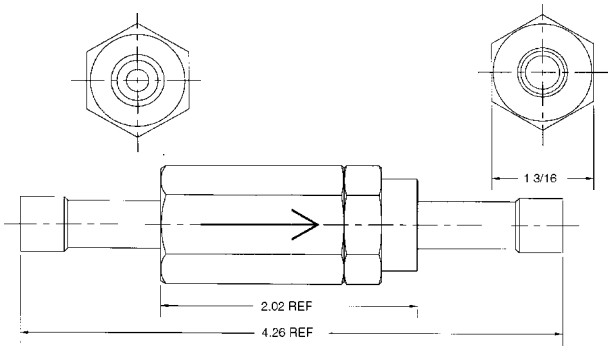
3/8" Brass Check Valve

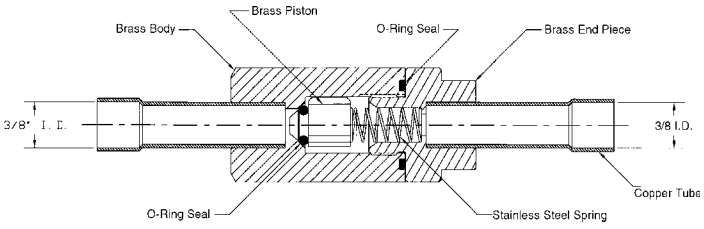


Features and Benefits

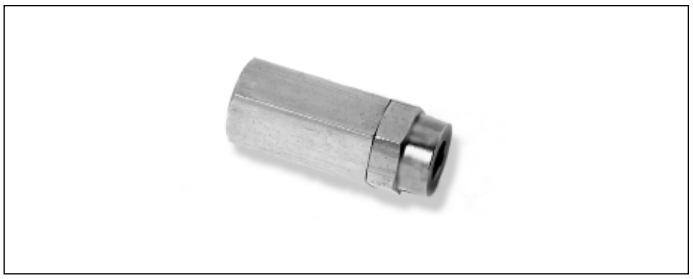
- Poppet style valve incorporates o-ring sealing surface.
- Brass body and piston resist corrosion.
- Stainless steel spring resists corrosion.
- Braze connections.

Dimensions





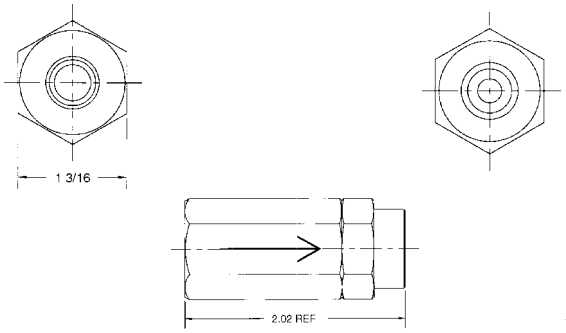
1/8" NPT Brass Check Valve

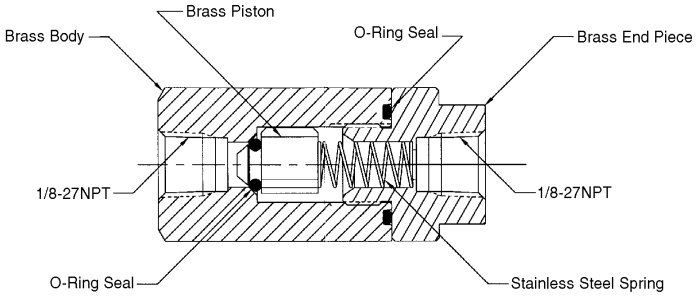


Features and Benefits

- Poppet style valve incorporates o-ring sealing surface.
- Brass body and piston resist corrosion.
- Stainless steel spring resists corrosion.
- Female NPT threaded connections.

Dimensions





Notes

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Cleveland, OH

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Applications: Slush Machines, Salad Bars, Vending Machines



EG Series TXV - (page 138)
Applications: Supermarket Cases, Walk-in Freezers, Ice Machines



EGC Series TXV - (page 139)
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RE Series TXV - (page 140)
Applications: Air Conditioning, Industrial Chillers, Commercial Refrigeration



H Series TXV - (page 142)
Applications: Air Conditioning, Heat Pumps, Bi-flow (Package Systems)



HC Series TXV - (page 142)
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EC Series TXV - (page 144)
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ECC Series TXV - (page 145)
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G Series TXV - (page 146)
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N Series TXV - (page 147)
Applications: Low Profile Coolers, Ice Machines, Beverage Dispensers



C Series TXV - (page 148)
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B5 Series TXV - (page 149)
Applications: Air Conditioning, Refrigeration



104A Series AXV - (page 170)
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104F Series AXV - (page 170)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, Vending, Ice Machines



139 Series EPR - (page 171)
Applications: Soft Serve Ice Cream Machines, Small Capacity Evaporator Pressure Control



AT Series AXV - (page 172)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, PTAC/PTHP, High Cycle



A7 Series AXV - (page 172)
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AS Series AXV - (page 172)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, Vending, Ice Machines



A1 Series AXV - (page 172)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, Vending, Ice Machines



A2 Series AXV - (page 173)
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A3 Series AXV - (page 173)
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AE3 Series AXV - (page 173)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, Vending, Ice Machines



A4 Series AXV - (page 173)
Applications: Ice Cream/Slush Machines, Hot Gas Bypass, Freeze Protection, Refrigerant Reclaim, Vending, Ice Machines



625 Series Electric Valve - (page 181)
Applications: Heat Pumps, Flooded Evaporator Systems, Multiple Evaporator Systems, Hot Gas, Temperature Regulators

TXV Model Number Selection Guide

S	(E)	5	V
MODEL	EXTERNAL EQUALIZER OPTIONAL	CAPACITY	REFRIGERANT



S



EG(C)
C = internal check valve

(E) for Externally Equalized
Evaporator pressure drop > 3 psi

BLANK for Internally Equalized
Evaporator pressure drop < 3 psi or smaller tonnage evaporators
See page 163



I



H(C)(A)
C = internal check valve
A = adjustable



RE



EC

Capacity
Parker's expansion valves offer a range of capacities from 1/8 ton to 70 tons depending on valve series.
See pages 152-157 for capacity tables.



G



N



C



B5

Rainbow Charge™ Refrigerant Designation

J	R-134a, R-401A (MP39), R-401B (MP66)
V	R-407C (AC9000), R-22
S	R-125, R-404A (HP62), R-402A (HP80), R402B (HP81), R-507 (AZ50)
Z	R-410A

Refrigerant Color Code

R-12 - (yellow)
R-22 - (green)
R-502 - (purple)
R-134a - (light blue)
R-404A - (orange)
R-407C - (brown)
R-410A - (rose)
HP80 - (canary)
HP81 - olive)

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X

CHARGE TYPE

Rainbow Charge™ Refrigerant Designation

JW, JX60
VX100, VW, VX35, VZ
SW, SX35, SX110, SZ
KX200

Charge Type

"W" (all-purpose) liquid charge maintains nearly "flat" superheat control over a -40F° to +60F° (-40C° to +15C°) evaporator temperature range.

"Z" (low temperature) charge provides fast pulldown benefits like a gas charge with the non-migrating benefits of a liquid charge; usable over a -40F° to 0F° (-40C° to -20C°) evaporator temperature range.

"X" (damped response) gas charge provides a pressure limiting (MOP) charge with anti-hunt characteristics over a -40F° to +60F° (-40C° to +15C°) evaporator temperature range.

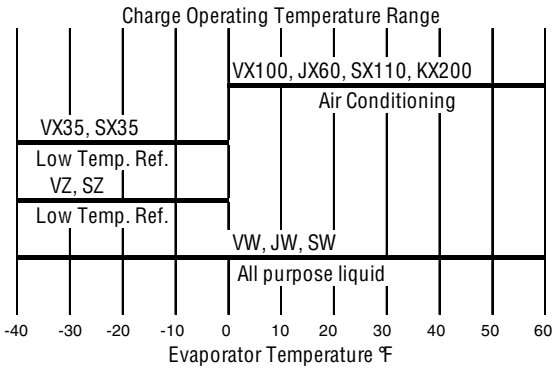
Notes: M.O.P. not available on "W" or "Z" charge.

*May not be used on systems in which bulb temperature will exceed 130° F (i.e. defrost). Contact Parker for pressure and temperature.

100

M.O.P.

M.O.P.
Maximum Operating Pressure



B

BLEED OPTIONAL

Bleed

Denoted by "B".

Not available on all TXVs.

See bleed capacity.

Used for equalizing system during off cycle (compressor unloading). Consult Parker.

See page 164.

20

BLEED CAPACITY

Bleed Capacity

Calculated based on nominal capacity of valve specified by manufacturer or Parker.

Typically 30% or less.

Calculated by:

$$\frac{\text{Desired Bypass Capacity}}{\text{Rated Valve Capacity}} \times 100\%$$

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S Series

Parker's S series is well suited for new or replacement installations on a variety of small to medium tonnage air-conditioning, heat pump, and refrigeration systems. A brass body with standard ODF solder connections and balanced port construction lends itself to installation on systems requiring stability and control under low load and other varying conditions.



Applications

- Air Conditioning
- Heat Pumps
- Commerical Refrigeration
- Transport Refrigeration
- Beverage Dispensers
- Dehumidifiers
- Ice Machines

Features and Benefits

- 60" capillary tube with shock loop
- Optional external equalizer
- Stainless steel power element
- Weight: .7 lbs. (.32 kg)
- Optional bleed
- Field adjustable superheat

Specifications

Refrigerant	Refrigerant Designation	Capacity Range Tons	Internally Equalized Models	Externally Equalized Models	Rainbow Charges™	Inlet Connection ODF (Optional)	Outlet Connection ODF (Optional)	Equalizer Connection (Optional)
R-12	J	1/8 - 1/2	S 1/2J	SE 1/2J	W, X60	1/4 (3/8)	1/2 (3/8)	1/4" ODF (1/4" SAE)
R-134a		1/4 - 1	S 1J	SE 1J		3/8 (1/4)	1/2 (3/8)	
R-401A		1 - 2	S 2J	SE 2J		1/2	5/8 (7/8)	
R-401B		1 1/2 - 3	S 3J	SE 3J		1/2	7/8 (5/8)	
		3 1/2 - 5	S 5J	SE 5J		5/8	7/8	
R- 402B	S	1/8 - 1/2	S 1/2S	SE 1/2S	W, Z, X110 X35	1/4 (3/8)	1/2 (3/8)	1/4" ODF (1/4" SAE)
R- 404A		1/4 - 1	S 1S	SE 1S		3/8 (1/4)	3/8	
R-402A		1 - 2	S 2S	SE 2S		1/2	5/8 (7/8)	
R- 502		1 1/2 - 4	S 4S	SE 4S		1/2	7/8 (5/8)	
R- 507		4 1/2 - 6	S 6S	SE 6S		5/8	7/8	
R-22 R-407C	V	1/5 - 3/4	S 3/4V	S 3/4V	W, Z, X100 X35	1/4 (3/8)	1/2 (3/8)	1/4" ODF (1/4" SAE)
		1/2 - 1 1/2	S 1-1/2V	SE 1-1/2V		3/8 (1/4)	1/2 (3/8)	
		1 1/2 - 3	S 3V	SE 3V		1/2	5/8 (7/8)	
		3 1/2- 5	S 5V	SE 5V		1/2	7/8 (5/8)	
		5 1/2 - 7 1/2	S 7 1/2	SE 7-1/2V		5/8	7/8	
		8 - 10	S 10	SE 10V		5/8	7/8	
R-410A	K	1/2 - 1 1/2	S 1 1/2K	SE 1 1/2K	KX200	3/8	1/2	1/4" ODF (1/4" SAE)
		1 1/2 - 3	S 3K	SE 3K		3/8	1/2	
		3 1/2 - 5	S 5K	SE 5K		1/2	5/8	
		5 1/2 - 7 1/2	S 7K	SE 7K		1/2	5/8	
		7 1/2 - 9	S 9K	SE 9K		5/8	7/8	

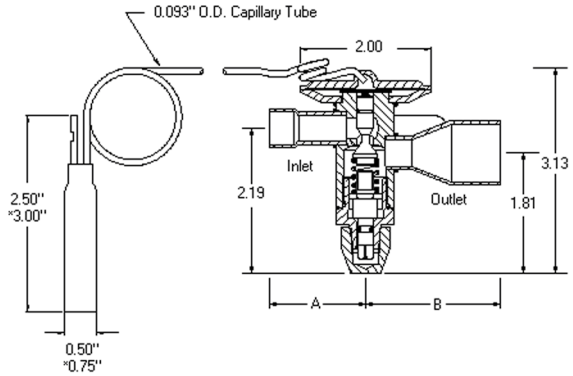
Notes:

1. U.L. recognized for maximum operational pressure of 650 psig (45 bars).
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type "X" MOP gas charge only.

Dimensions

Fitting	Inlet A	Outlet B
1/4 ODF	1.46	-
3/8 ODF	1.69	1.69
1/2 ODF	1.46	1.46
5/8 ODF	1.57	1.57
7/8 ODF	-	2.07

* VX100, KX200 only



I Series

The right angle I Series with pure copper connections is an ideal compact size brass valve where landscape and precise control is of greatest concern (as in fractional horsepower refrigeration systems). The superheat is factory set to optimize system performance for original equipment applications.



Applications

- Salad Bars
- Ice Machines
- Slush Machines
- Vending Machines
- Beverage Dispensers
- Back bar Reach-in Cases
- Mobile/Self-contained Cases

Features and Benefits

- Bottom Inlet
- Stainless steel power element
- 30" capillary tube
- Factory set superheat
- W, Z charges
- Weight: 3.5 oz / 0.1 k

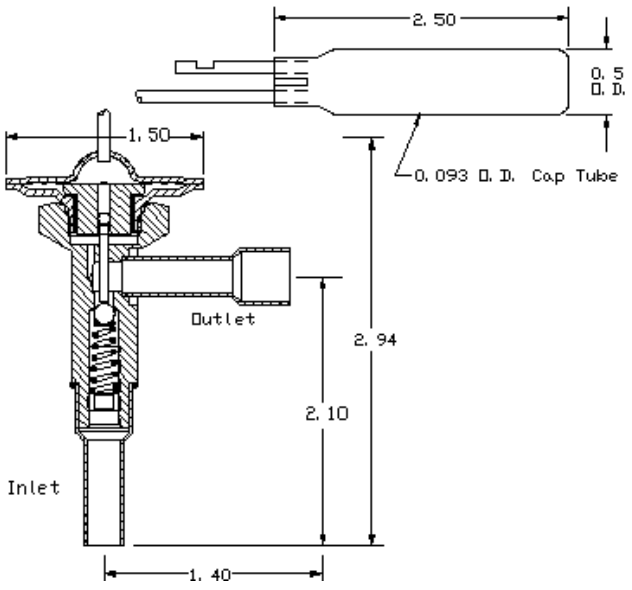
Specifications

Refrigerant	Refrigerant Designation	Nominal Capacity	Capacity Range	Model No. Internally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connection
R-12 R134a R-401A R-401B	J	1/2 1	1/4 - 1/2 3/4 - 1	I 1/2J I 1J	W W	1/4" ODF	3/8" ODF
R-402A R-402B R-404A R-502 R-507	S	1/2 1	1/4 - 1/2 3/4 - 1	I 1/2S I 1S	W, Z W, Z	1/4" ODF	3/8" ODF
R-22 R-407C	V	1 2	1/2 - 1 1 1/2 - 2	I 1V I 2V	W, Z W, Z	1/4" ODF	3/8" ODF

Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C).

Dimensions



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EG Series

The EG series refrigeration right angle brass body expansion valve incorporates a new shock loop, stainless steel power element, and a removable inlet strainer, making it an ideal choice for commerical refrigeration and supermarket applications. New Rainbow Charges™ are noted below for use on medium temperature ("W" charges), low temperature ("Z" charges) or MOP ("X" charges). See details on page 135.



Applications

- Supermarket Cases
- Self-contained Cases
- Walk-in Coolers/Freezers
- Ice Machines
- Salad Bars
- Transport Refrigeration

Features and Benefits

- Stainless steel power element
- 30" capillary tube with shock loop
- Removable inlet strainer
- Field adjustable superheat
- 1/4" ODF external equalizer
- W, Z or MOP (X) charges available
- Weight: 1.0 lbs / 0.45 kg

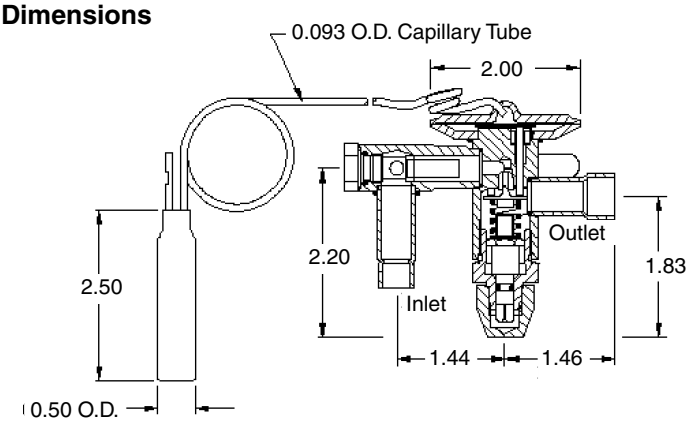
Specifications

Refrigerant	Refrigerant Designation	Nominal Capacity	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connection
R-12 R-134a R-401A R-401B	J	1/8 1/4 1/2 1 1 1/2 2	EG 1/8 J EG 1/4 J EG 1/2 J EG 1 J EG 1-1/2 J EG 2 J	EGE 1/8 J EGE 1/4 J EGE 1/2 J EGE 1 J EGE 1-1/2 J EGE 2 J	W, X60	3/8" ODF	1/2" ODF
R-402B R-404A R-402A R-502 R-507	S	1/8 1/4 1/2 1 1 1/2 2	EG 1/8 S EG 1/4 S EG 1/2 S EG 1 S EG 1-1/2 S EG 2 S	EGE 1/8 S EGE 1/4 S EGE 1/2 S EGE 1 S EGE 1-1/2 S EGE 2 S	W, Z, X35, X110	3/8" ODF	1/2" ODF
R-22 R-407C	V	1/4 1/2 1 1 1/2 2 2 1/2 3	EG 1/4 V EG 1/2 V EG 1 V EG 1-1/2 V EG 2 V EG 2 1/2V EG 3 V	EGE 1/4 V EGE 1/2 V EGE 1 V EGE 1-1/2 V EGE 2 V EGE 2 1/2 V EGE 3 V	W, Z, X35, X100	3/8" ODF	1/2" ODF

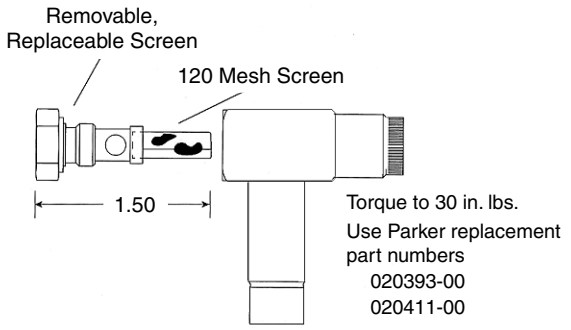
Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type "X" MOP gas charge only.

Dimensions



Serviceable Strainer for Sweat (ODF)



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

EGC Series

This valve is similar to the EG series except it incorporates an internal check valve, providing reverse flow up to 2 tons for hot or cool gas defrost applications. This eliminates the need for an external check valve and related bypass plumbing. A brass body, ODF solder connections, stainless steel power element and a removable inlet strainer make installations easier. New Rainbow Charges™ listed below cover medium "W" temperature charges, low "Z" temperature charges or MOP "X" charges.



Applications

- Hot Gas Defrost
- Cool Gas Defrost
- Supermarket Cases
- Back Shelf Storage Cases
- Walk-in Coolers/Freezers
- Salad Bars
- Transport Refrigeration

Features and Benefits

- Extended ODF connections
- Balanced port design
- 30" capillary tube with shock loop
- Stainless steel power element
- Field adjustable superheat
- 1/4" ODF external equalizer
- Rainbow charges available
- Weight: 1.0 lbs / 0.45 kg

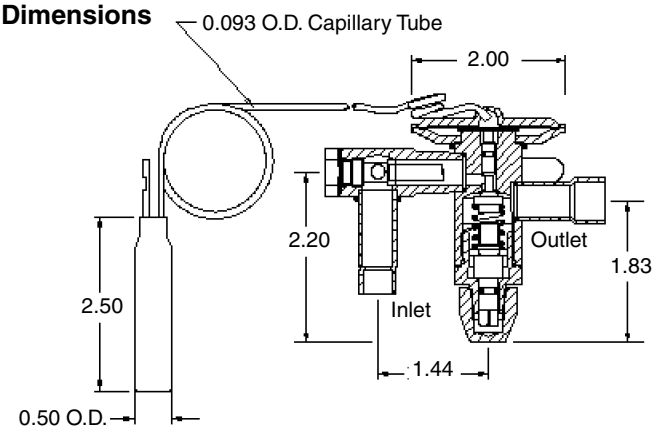
Specifications

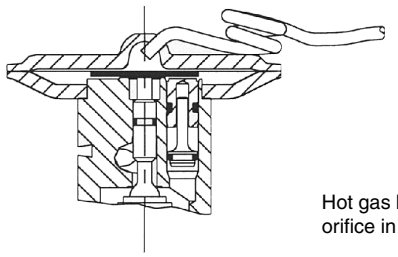
Refrigerant	Refrigerant Designation	Nominal Capacity	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connection
R-12 R-134a R-401A R-401B	J	1/8 1/4 1/2 1 1 1/2 2	EGC 1/8 J EGC 1/4 J EGC 1/2 J EGC 1 J EGC 1-1/2 J EGC 2 J	EGCE 1/8 J EGCE 1/4 J EGCE 1/2 J EGCE 1 J EGCE 1-1/2 J EGCE 2 J	W, X60	3/8" ODF	1/2" ODF
R-402B R-404A R-402A R-502 R-507	S	1/8 1/4 1/2 1 1 1/2 2	EGC 1/8 S EGC 1/4 S EGC 1/2 S EGC 1 S EGC 1-1/2 S EGC 2 S	EGCE 1/8 S EGCE 1/4 S EGCE 1/2 S EGCE 1 S EGCE 1-1/2 S EGCE 2 S	W, Z, X35, X110	3/8" ODF	1/2" ODF
R-22 R-407C	V	1/4 1/2 1 1 1/2 2	EGC 1/4 V EGC 1/2 V EGC 1 V EGC 1-1/2 V EGC 2 V	EGCE 1/4 V EGCE 1/2 V EGCE 1 V EGCE 1-1/2 V EGCE 2 V	W, Z, X35, X100	3/8" ODF	1/2" ODF

Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C)
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type "X" MOP gas charge only.

Dimensions





Hot gas bypasses txv orifice in defrost

CHECK VALVE SECTION

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

RE Series

The Parker RE series valve utilizes balanced port construction to provide optimum operation on medium to large tonnage air conditioning and refrigeration systems. Two brass body styles with copper ODF connections and a removable Rainbow Charged™ thermostatic power element provide the stability and control required in a variety of applications, especially where there are wide changes in load conditions. Body Style 1 has an R-22 nominal capacity up to 30 tons, while Body Style 2 extends the capacity range to 70 tons.



Applications

- Air Conditioning
- Process Chillers
- Industrial Refrigeration
- Transport Refrigeration

Features and Benefits

- Balanced port design
- Removable stainless steel power element
- Field adjustable superheat
- 1/4" sweat external equalizer
- Rainbow Charges™
- Weight: Body Style 1 - 1.7 lbs. / .77 kg
  Body Style 2 - 2.5 lbs. / 1.13 kg
- Forward or reverse flow
- 60" capillary tube (120" optional)

Specifications

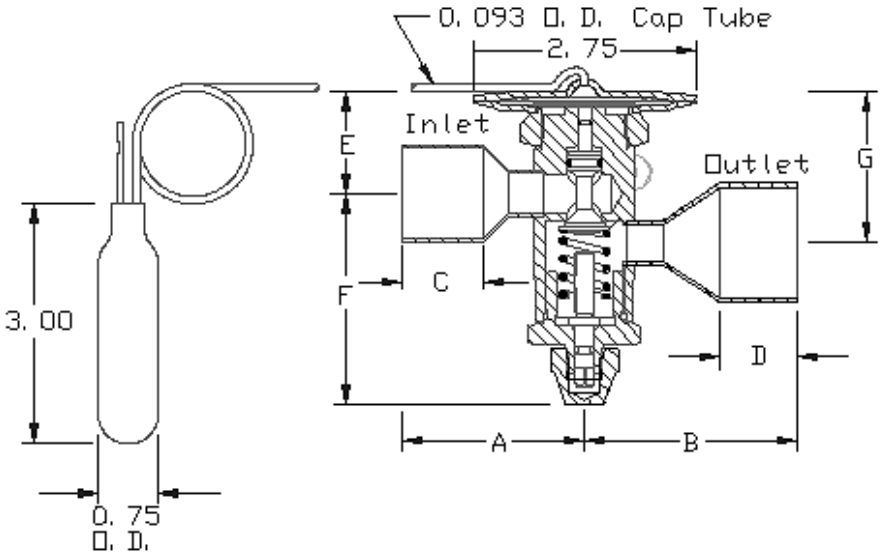
Refrigerant	Refrigerant Designation	Nominal Capacity	Body Style	Externally Equalized	Rainbow Charges™	Inlet Connection (Optional)	Outlet Connection
R-12 R-134a R-401A R-401B	J	6	1	RE 6 J	W, X60	5/8"	7/8"
		9	1	RE 9 J		7/8"	1-1/8"
		12	1	RE 12 J		7/8 (1-1/8")	1-3/8"
		16	1	RE 16 J		1-1/8"	1-3/8"
		23	2	RE 23 J		1-1/8"	1-3/8"
		40	2	RE 40 J		1-1/8"	1-5/8"
R-402B R-404A R-402A R-502 R-507	S	6	1	RE 6 S	W, Z, X110, X35	5/8"	7/8"
		9	1	RE 9 S		7/8"	1-1/8"
		12	1	RE 12 S		7/8 (1-1/8")	1-3/8"
		21	1	RE 21 S		1-1/8"	1-3/8"
		30	2	RE 30 S		1-1/8"	1-3/8"
		45	2	RE 45 S		1-1/8"	1-5/8"
R-22 R-407C	V	10	1	RE 10 V	W, Z, X100, X35	5/8"	7/8"
		15	1	RE 15 V		7/8"	1-1/8"
		20	1	RE 20 V		7/8 (1-1/8")	1-3/8"
		30	1	RE 30 V		1 -1/8"	1-3/8"
		40	2	RE 40 V		1-1/8"	1-3/8"
		70	2	RE 70 V		1-1/8"	1-5/8"

Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C)
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type “X” MOP gas charge only.

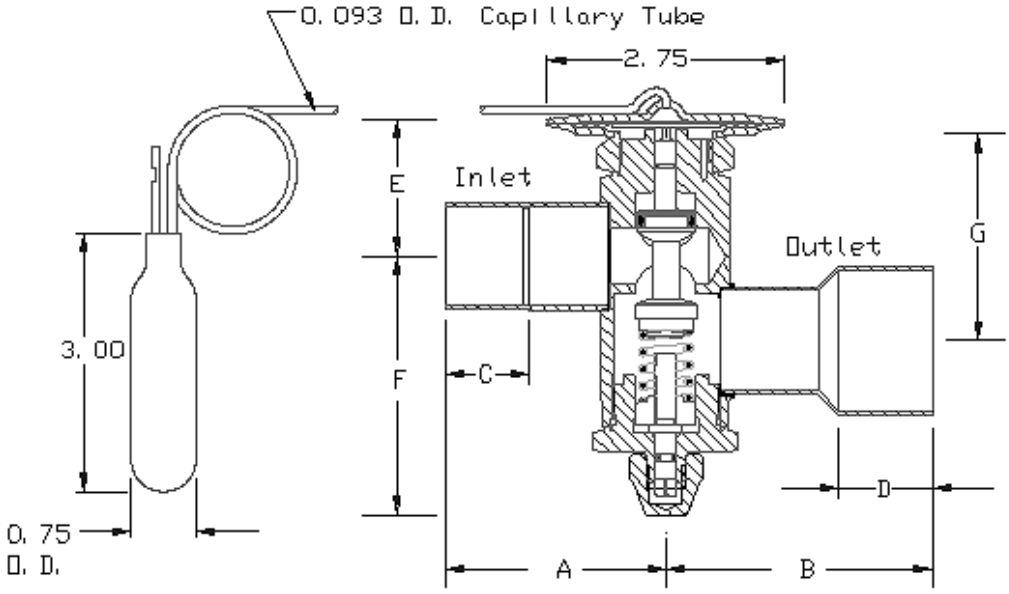
Dimensions

RE Body Size 1



Fitting Size	RE Body Size 1						
ODF	A	B	C	D	E	F	G
5/8	1.55	–	0.36 Min	–	1.45	2.56	2.06
7/8	2	2	.73 Min.	.73 Min.	1.45	2.56	2.06
1 1/8	2.3	2.3	.93 Min.	.93 Min.	1.45	2.56	2.06
1 3/8	–	2.68	–	.93 Min.	1.45	2.56	2.06

RE Body Size 2



Fitting Size	RE Body Size 2						
ODF	A	B	C	D	E	F	G
1 1/8	2.7	2.7	.91 Min.	.91 Min.	1.83	2.96	2.81
1 3/8	–	2.85	–	.97 Min.	1.83	2.96	2.81
1 5/8	–	3.13	–	1.09 Min.	1.83	2.96	2.81

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

H Series and HC Series

The H series balanced port valve is designed specifically for air conditioning and heat pumps used in both air or water source systems. It offers features such as select indoor and/or outdoor thermostatic Rainbow Charges™, bleeds, and a variety of connection styles for the inlet, outlet, and external equalizer.

The HC series adds a built-in 5 ton check valve for R-22, R-407C and R-410A heat pump applications with either factory set or field adjustable superheat.



Applications

- Air Conditioning Systems
- Heat Pump Systems
- Bi-flow (package) Systems

Features and Benefits

- Stainless steel power element
- Bypass bleeds available
- Bi-directional metering available
- Weight: 10.7 oz. (.30 kg)
- Factory set or field adjustable superheat
- Low pressure drop internal check valve

Specifications

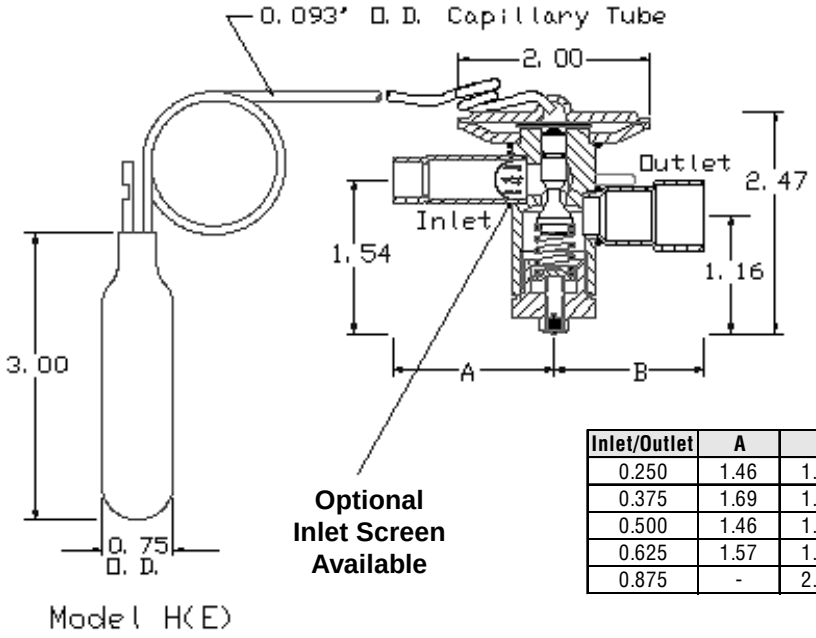
Refrigerant	Regfrigerant Designation	Capacity Range	Nominal Capacity	Internal Equalized	Exterior Equalized	Rainbow Charges	Bleed for Off Cycle Operation	Inlet Connections	Outlet Connections
R-407C	V	1/2 - 1 1/2	1 - 1/2	HA 1-1/2V	HAE 1 1/2V	X-100A, X100	B	1/4, 3/8, 1/2 & 5/8" ODF flo-rater	3/8,1/2,5/8 & 7/8" ODF flo-rater
		1 1/2 - 3	3	HA 3V	HAE 3V		B		
		3 1/2 - 5	5	HA 5V	HAE 5V		B		
		5 1/2 - 7 1/2	7 1/2	-	HAE 7 1/2V		B		
		8 - 10	10	-	HAE 10V		B		
		models with internal check valves - "C" designation							
		1/2 - 1 1/2	1 1/2V	HCA1-1/2V	HCAE 1 1/2V	X100A, X100	B	1/4, 3/8, 1/2 & 5/8" ODF flo-rater	3/8,1/2,5/8 & 7/8" ODF flo-rater
		1 1/2 - 3	3	HCA 3V	HCAE 3V		B		
		3 1/2 - 5	5	HCA 5V	HCAE 5V		B		
R-410A	K	1/2 - 1 1/2	1 1/2V	HA 1-1/2K	HAE 1 1/2K	X200	B	1/4, 3/8, 1/2 & 5/8" ODF flo-rater	3/8,1/2,5/8 & 7/8" ODF flo-rater
		1 1/2 - 3	3	HA 3K	HAE 3K		B		
		3 1/2 - 5	5	HA 5K	HAE 5K		B		
		5 1/2 - 7	7	-	HAE 7K		B		
		7 1/2 - 9	9	-	HAE 9K		B		
		specific models with internal check valves - "C" designation							
		1/2 - 1 1/2	1 1/2	HCA1-1/2K	HCAE 1 1/2K	X200	B	1/4, 3/8, 1/2 & 5/8" ODF flo-rater	3/8,1/2,5/8 & 7/8" ODF flo-rater
		1 - 2	2	HCA 2K	HCAE 2K		B		
		1 1/2 - 3	3	HCA 3K	HCAE 3K		B		
		3 1/2 - 5	5	HCA 5K	HCAE 5K		B		

Notes:

1. U.L. recognized for maximum operational pressure of 650 psig (45 bars).
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.

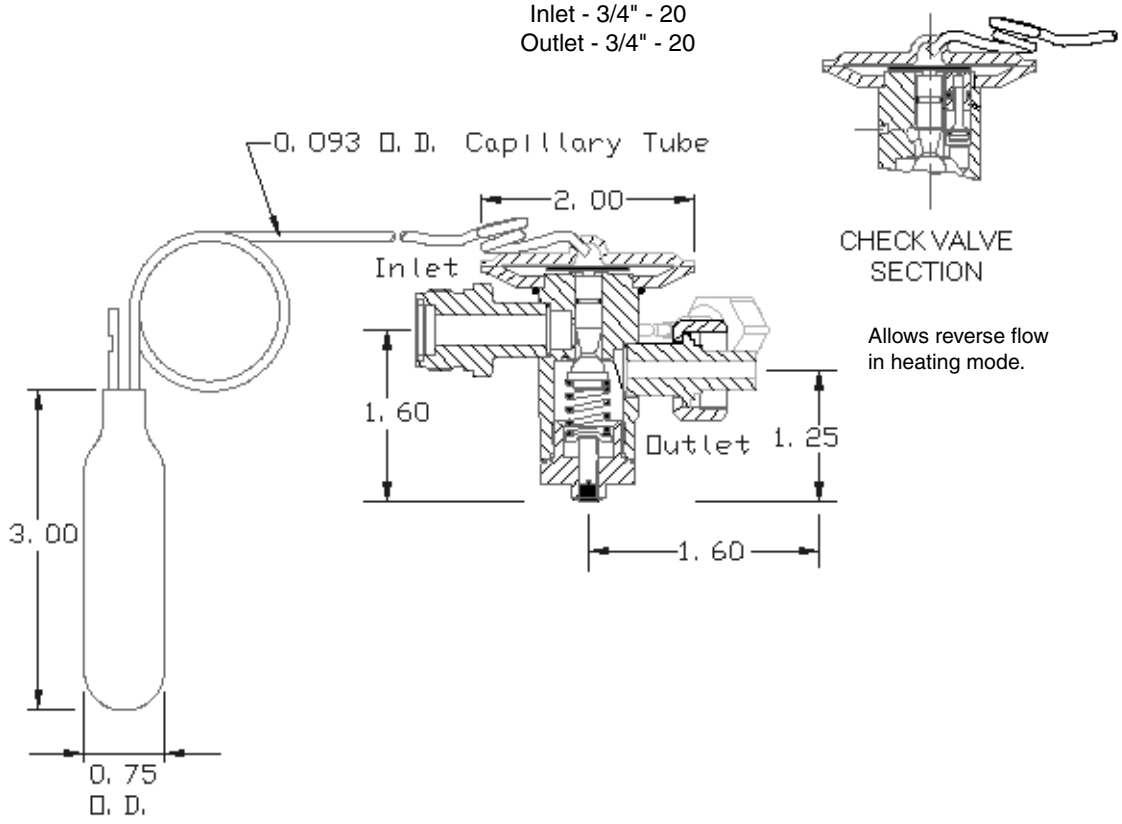
Dimensions

H and& HC Series
Dimensions (inches)
Connections (ODF)



Inlet/Outlet	A	B
0.250	1.46	1.46
0.375	1.69	1.69
0.500	1.46	1.46
0.625	1.57	1.57
0.875	-	2.07

H and HC Series
Connections - flo-rater
Inlet - 3/4" - 20
Outlet - 3/4" - 20



Allows reverse flow
in heating mode.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

EC Series

The EC series features extended ODF solder connections, brass body, and balanced port design. The new stainless steel power element makes it suited for both refrigeration and air conditioning applications. Rainbow Charges™ are indicated in the chart below for medium temperature “W” charges, low temperature “Z” charges or MOP “X” charge for those applications.



Applications

- Small Chillers
- Heat Pump Units
- Air Conditioning Units
- Freezers
- Walk-in Boxes
- Refrigerated Cases
- Mobile Refrigeration

Features and Benefits

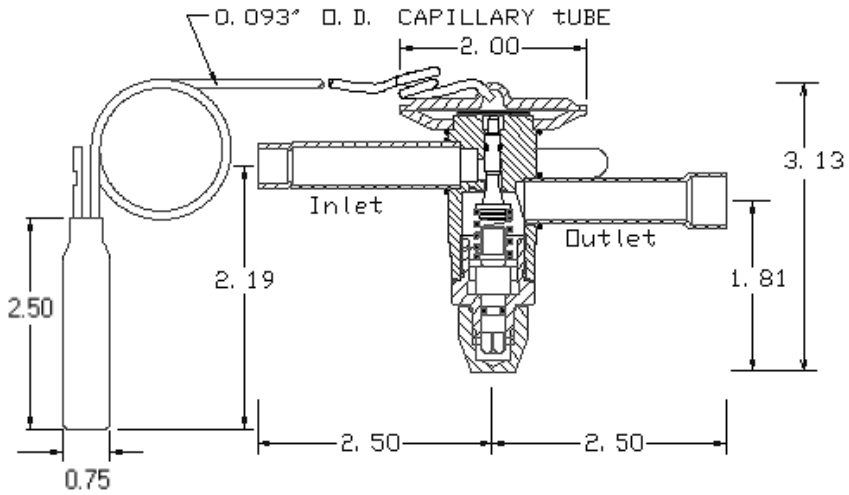
- Extended ODF connections
- Balanced port design
- 30" capillary tube with shock loop
- Stainless steel power element
- Field adjustable superheat
- 1/4" ODF external equalizer
- Rainbow charges available
- Weight: 1.0 lbs / 0.45 kg

Specifications

Refrigerant	Refrigerant Designation	Orifice Designation	Capacity Range	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connect (Optional)	Equalizer Connection
R-12 R-134a R-401A R-401B	J	AA A B C	1/8 - 1/2 1/4 - 1 1 - 2 1 1/2 - 3	EC-AA-J EC-A-J EC-B-J EC-C-J	ECE-AA-J ECE-A-J ECE-B-J ECE-C-J	W, X60	3/8" ODF	1/2" ODF (5/8" ODF)	1/4" ODF
R-402A R-402B R-404A R-502 R-507	S	AA A B C	1/8 - 1/2 1/4 - 1 1 - 2 1 1/2 - 4	EC-AA-S EC-A-S EC-B-S EC-C-S	ECE-AA-S ECE-A-S ECE-B-S ECE-C-S	W, Z, X110 X35	3/8" ODF	1/2" ODF (5/8" ODF)	1/4" ODF
R-22 R-407C	V	AA A B C	1/5 - 3/4 1/2 - 1 1/2 1 1/2 - 3 3 1/2 - 5	EC-AA-V EC-A-V EC-B-V EC-C-V	ECE-AA-V ECE-A-V ECE-B-V ECE-C-V	W, Z, X100 X35	3/8" ODF	1/2" ODF (5/8" ODF)	1/4" ODF

Notes:
1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C) .
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type “X” MOP gas charge only.

Dimensions



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

ECC Series

The ECC series is similar to the EC series except it incorporates an internal check valve, providing reverse flow of up to 2 tons for hot or cool gas defrost applications. This eliminates the need for an external check valve and related hot gas plumbing. A brass body, ODF solder connections, and a removable inlet strainer make installations easier. New Rainbow Charges™ are indicated in the chart below for medium temperature "W" charges, low temperature "Z" charges or MOP "X" charge for those applications.



Applications

- Heat Pump Units
- Air Conditioning Units
- Freezers
- Walk-in Boxes
- Refrigerated Cases

Features and Benefits

- Extended ODF connections
- Balanced port design
- 30" capillary tube with shock loop
- Stainless steel power element
- Field adjustable superheat
- 1/4" ODF external equalizer
- Rainbow charges available
- Weight: 1.0 lbs / 0.45 kg

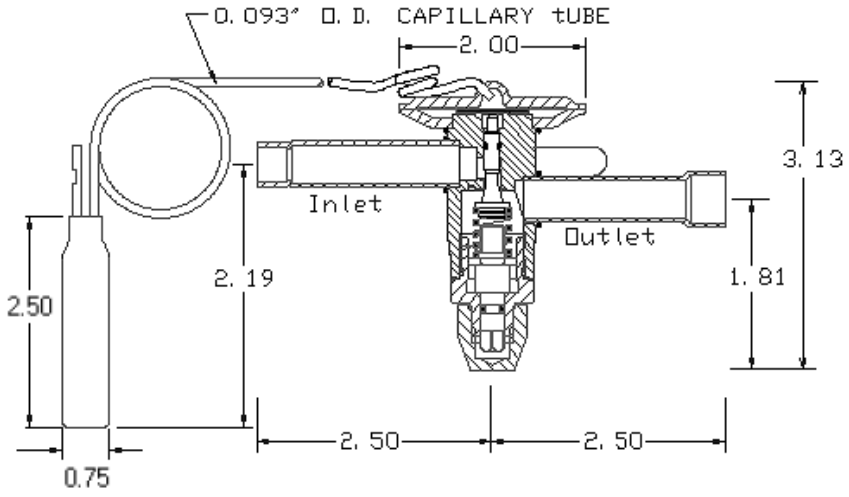
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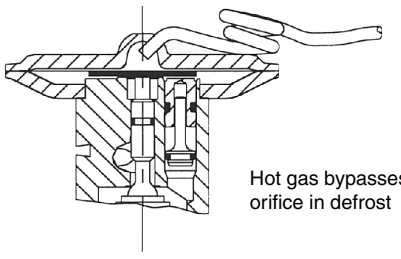
Refrigerant	Refrigerant Designation	Orifice Designation	Capacity Range	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connect (Optional)	Equalizer Connection
R-12 R-134a R-401A R-401B	J	AA A B C	1/8 - 1/2 1/4 - 1 1 - 2 1 1/2 - 3	ECC-AA-J ECC-A-J ECC-B-J ECC-C-J	ECCE-AA-J ECCE-A-J ECCE-B-J ECCE-C-J	W, X60	3/8" ODF	1/2" ODF (5/8" ODF optional)	1/4" ODF
R-402A R-402B R-404A R-502 R-507	S	AA A B C	1/8 - 1/2 1/4 - 1 1 - 2 1 1/2 - 4	ECC-AA-S ECC-A-S ECC-B-S ECC-C-S	ECCE-AA-S ECCE-A-S ECCE-B-S ECCE-C-S	W, Z, X110 X35	3/8" ODF	1/2" ODF (5/8" ODF optional)	1/4" ODF
R-22 R-407C	V	AA A B C	1/5 - 3/4 1/2 - 1 1/2 1 1/2 - 3 3 1/2 - 5	ECC-AA-V ECC-A-V ECC-B-V ECC-C-V	ECCE-AA-V ECCE-A-V ECCE-B-V ECCE-C-V	W, Z, X100 X35	3/8" ODF	1/2" ODF (5/8" ODF optional)	1/4" ODF

Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type "X" MOP gas charge only.

Dimensions





Hot gas bypasses txv orifice in defrost

CHECK VALVE SECTION

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

G Series

The G series features a brass body with SAE flare connections and is available internally or externally equalized through a 1/4" SAE male fitting. It provides accurate and stable control over changing loads, and is an ideal selection for refrigeration and air conditioning systems. An array of Rainbow Charges™ provide the necessary control and operation.



Applications

- Small Refrigeration Machines
- Slush Machines
- Air Conditioning Units
- Freezers
- Walk-in Boxes
- Refrigerated Cases

Features and Benefits

- 30" capillary tube with shock loop
- Stainless steel power element
- Field adjustable superheat
- 1/4" SAE external equalizer
- Inlet strainer
- Rainbow Charges™ available
- Weight: 1.0 lbs / 0.45 kg

Specifications

Refrigerant	Refrigerant Designation	Nominal Capacity	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection (Optional)	Outlet Connection (Optional)	Equalizer Connection
R-12 R-134a R-401A R-401B	J	1/8 1/4 1/2 1 1 1/2 2 2 1/2 3 5	G 1/8 J G 1/4 J G 1/2 J G 1 J G 1-1/2 J G 2 J G 2-1/2 J G 3 J G 5 J	GE 1/8 J GE 1/4 J GE 1/2 J GE 1 J GE 1-1/2 J GE 2 J GE 2-1/2 J GE 3 J GE 5 J	W, X60	1/4" SAE & (3/8") 3/8" SAE 3/8" SAE & (1/2") 1/2" SAE	1/2" SAE 1/2" SAE & (5/8") 5/8" SAE	1/4" SAE
R-402A R-402B R-404A R-502 R-507	S	1/8 1/4 1/2 1 1-1/2 2 2-1/2 3 4 6	G 1/8 S G 1/4 S G 1/2 S G 1 S G 1-1/2 S G 2 S G 2-1/2 S G 3 S G 4S G 6 S	GE 1/8 S GE 1/4 S GE 1/2 S GE 1 S GE 1-1/2 S GE 2 S GE 2-1/2 S GE 3 S GE 4 S GE 6 S	W, Z, X110 X35	1/4" SAE & (3/8") (1/4" SAE) 3/8" SAE 3/8" SAE 1/2" SAE	1/2" SAE 1/2" SAE 5/8" SAE	1/4" SAE
R-22 R-407C	V	1/4 1/2 1 1 1/2 2 1/2 2 3 4 5 8	G 1/4 V G 1/2 V G 1 V G 1-1/2 V G 2 1/2 V G 2 V G 3 V G 4 V G 5 V G 8 V	GE 1/4 V GE 1/2 V GE 1 V GE1-1/2 V GE 2 1/2V GE 2 V GE 3 V GE 4 V GE 5 V GE 8 V	W, Z, X100 X35	1/4" SAE & (3/8") 3/8" SAE & 1/4" SAE 3/8" SAE & 1/2" 1/2" SAE	1/2" SAE 3/8" SAE & (1/2") 1/2" SAE & (5/8") 5/8" SAE	1/4" SAE

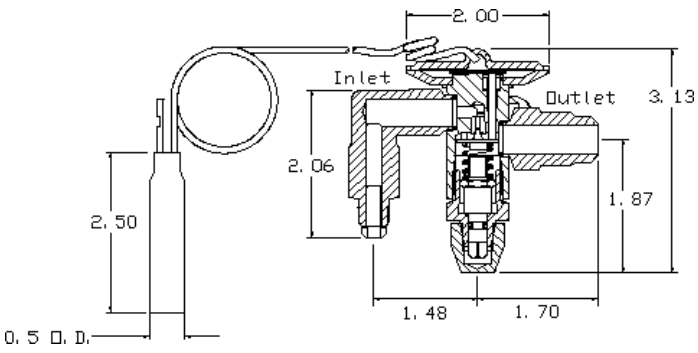
Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type “X” MOP gas charge only.

Optional inlet screen available.

Use Parker part numbers:
056813-00
056820-00

Dimensions



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

N Series

This small flare brass valve series is ideally suited where space is at a premium. Its stainless steel power element and compact body has always made it the first choice for installation in commercial refrigeration systems. External equalized models are provided with a 30" capillary and 1/4" SAE flare nut, eliminating the need to run a separate equalizer line. Medium, low & MOP (X) charges are available as noted below.



Applications

- Low Profile Coolers
- Beverage Dispensers
- Beverage Boxes
- Small Chillers
- Ice Machines
- Small Freezers

Features and Benefits

- Compact body
- Removable inlet screen
- Factory set superheat
- Accurate and stable control
- Right angle configuration
- 30" capillary tube
- Weight: 5.0 oz. / .14 kg

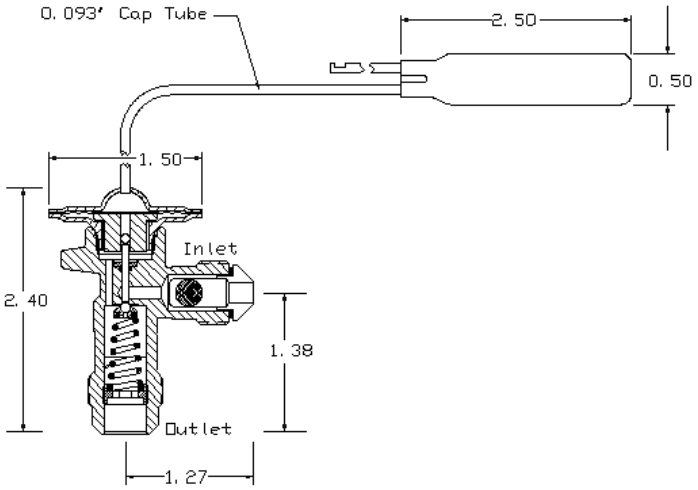
Specifications

Refrigerant	Refrigerant Designation	Nominal Capacity	Capacity Range	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connection
R-12 R-134a R-401A R-401B	J	1/4 1/2 2	1/4 - 1/2 1/4 - 3/4 1 - 2	N 1/4 J N 1/2 J N 2 J	NE 2 J	W, X60	1/4 SAE 1/4 SAE 3/8 SAE	1/2 SAE
R-402A R-402B R-404A R-502 R-507	S	1/4 1/2 2	1/4 - 1/2 1/4 - 3/4 1 - 2	N 1/4 S N 1/2 S N 2 S	NE 2 S	W, Z, X110 X35	1/4 SAE 1/4 & 3/8 SAE 3/8 SAE	1/2 SAE
R-22 R-407C	V	1/4 1/2 1 3	1/4 - 1/2 1/4 - 3/4 1/2 - 1 1 1/2 - 3	N 1/4 V N 1/2 V N 1 V N 3 V	NE 3 V	W, Z, X100 X35	1/4 SAE 1/4 or 3/8 SAE 3/8 SAE	1/2 SAE

Notes:

1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type “X” MOP gas charge only.

Dimensions



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

C Series



The C series incorporates a brass body with SAE flare fittings using balanced port construction, allowing operation over varying load conditions. Designed for use on small refrigeration and or air conditioning systems, the external equalized models are provided with a 1/4" SAE male connection. The new stainless steel power element element and shock loop provides added benefits to all installations. A variety of Rainbow Charges™ add further flexibility for operation and selection.

Applications

- Small Refrigeration Systems
- Slush Machines
- Air Conditioning Units
- Freezers
- Walk-in Coolers
- Refrigerated Cases
- Rail & Transport Refrigeration

Features and Benefits

- Balanced port
- Stainless steel power element
- Inlet strainer
- 30" capillary tube with shock loop
- Field adjustable superheat
- 1/4" SAE external equalizer
- Weight: 1.0 lbs / 0.45 kg

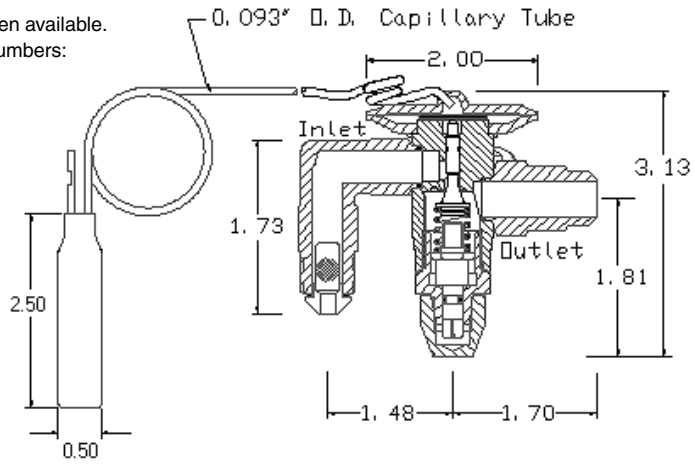
Specifications

Refrigerant	Refrigerant Designation	Orifice Designation	Capacity Range	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection	Outlet Connection	Equalizer Connection
R-12 R-134a R-401A R-401B	J	AA A B C	1/8 - 1/2 1/4 - 1 1 - 2 1 1/2 - 3	C-AA-J C-A-J C-B-J C-C-J	CE-AA-J CE-A-J CE-B-J CE-C-J	W, X60	1/4"SAE (3/8" optional) 3/8" SAE	1/2 SAE	1/4 SAE
R-402A R-402B R-404A R-502 R-507	S	AA A B C	1/8 -1/2 1/4 - 1 1 - 2 1 1/2 - 4	C-AA-S C-A-S C-B-S C-C-S	CE-AA-S CE-A-S CE-B-S CE-C-S	W, Z, X110 X-35	1/4 SAE (3/8" optional) 3/8" SAE	1/2 SAE	1/4 SAE
R-22 R-407C	V	AA A B C	1/5 - 3/4 1/2 - 1 1/2 1 1/2 - 3 3 1/2- 5	C-AA-V C-A-V C-B-V C-C-V	CE-AA-V CE-A-V CE-B-V CE-C-V	W, Z, X100 X-35	1/4 SAE (3/8" optional) 3/8 SAE	1/2 SAE	1/2 SAE

Notes:
1. Maximum operational pressure 500 psig (35 bars) high side and 275 psig (19 bars) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use “W” or “Z” liquid charges in applications where bulb temperatures can exceed 130°F (55°C). For these applications use type “X” MOP gas charge only.

Dimensions

Optional inlet screen available.
Use Parker part numbers:
056813-00
56820-00



B5 Series

The new Parker B5 series is designed to work with interchangeable orifice cartridges. This choice allows the highest accuracy and the easiest way to select the better flow into the system.

A special O-ring seal prevents leakage by the pin (saturated liquid from evaporator inlet) from spraying on the lower side of the power element and affecting valve operation. This also allows more versatility in bulb mounting location, as it is no longer a requirement to mount the bulb upstream of the external equalizer connection (it can be mounted either upstream or downstream) as there will be no flow of refrigerant.

Capillary tube on the top of the valve is brazed horizontally in order to avoid any braking during the installation.

Applications

- Air Conditioning Systems
- Refrigeration



Features and Benefits

- Works with interchangeable orifice cartridges.
- Versatility in bulb mounting location.
- Provides precise control for a variety of applications.
- Adjustable superheat is factory set at 5°C.
- Nominal capacities range is from 0.5 up to 17.5 kW (R22).

Specifications and Dimensions

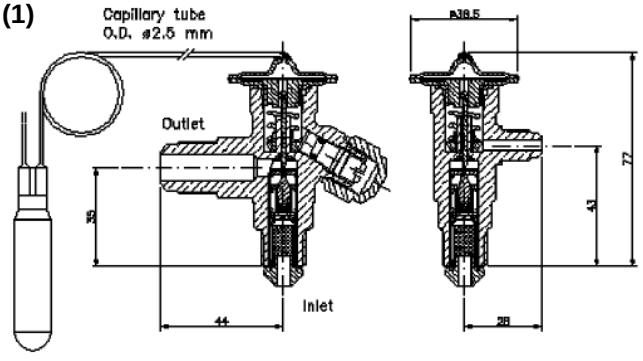
Model	Equalization	Inlet	Outlet	External Equalization	Dimensioned Drawing (Below)
B5	Internal	3/8" SAE	1/2" SAE	–	1
BE5	External	3/8" SAE	1/2" SAE	1/4" SAE	1
B5/S	Internal	3/8" SAE*	12 mm ODF	–	2
B5/SP	Internal	3/8" SAE*	1/2" ODF	–	2
BE5/S	External	3/8" SAE*	12 mm ODF	6 mm ODF	2
BE5/SP	External	3/8" SAE*	1/2" ODF	1/4" ODF	2

*See adaptors list at right.

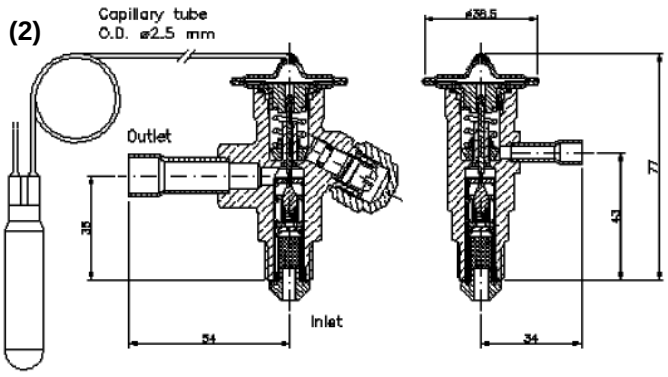
***Adapters for Brazing Models**

Model	Valve Body	Copper Tube
A2S	3/8" SAE	6 mm ODF
A2SP	3/8" SAE	1/4" ODF
A3S	3/8" SAE	10 mm ODF
A3SP	3/8" SAE	3/8" ODF

(1)



(2)



• Consult Parker for domestic availability.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Valves

Model	Refrigerant	May Be Used With	Mop	Capillary Tube
V-NX100	R407C	R22	100	1500 mm
V-NW	R407C	R22	–	1500 mm
JX60	R134a	R12, R401A, R401B	60	1500 mm
JW	R134a	R12, R401A, R401B	–	1500 mm
SX110	R404a	R125, R502, R402A, R402B, R507	110	1500 mm
SW	R404a	R125, R502, R402A, R402B, R507		1500 mm

Cartridges/Models and Nominal Capacities (kW)

Model	R22	R134a	R404A
Cx	0.5	0.4	0.38
C0	1.0	0.9	0.7
C1	2.5	1.8	1.6
C2	3.5	2.6	2.1
C3	5.2	4.6	4.2
C4	8.0	6.7	6.0
C5	10.5	8.6	7.7
C6	15.5	10.5	9.1

Capacity Tables

R22 (kW)

	Pressure Drop (bar)							
	2	4	6	8	10	12	14	16
	Evaporator Temperature +10°C							
CX	0.37	0.48	0.55	0.60	0.63	0.65	0.65	0.67
C0	0.87	1.1	1.2	1.30	1.4	1.4	1.4	1.5
C1	2.2	2.8	3.2	3.40	3.6	3.7	3.8	3.8
C2	3.0	4.0	4.7	5.10	5.4	5.6	5.8	5.8
C3	5.4	7.2	8.3	9.10	9.7	10.0	10.2	10.3
C4	8.1	10.8	12.5	13.80	14.5	15.0	15.4	15.5
C5	10.2	13.6	15.7	17.20	18.3	18.9	19.3	19.5
C6	12.6	16.7	19.3	21.00	22.3	23.1	23.5	23.7
	Evaporator Temperature 0°C							
CX	0.37	0.48	0.55	0.59	0.63	0.65	0.66	0.66
C0	0.84	1.0	1.2	1.30	1.3	1.4	1.4	1.4
C1	1.9	2.4	2.7	3.00	3.1	3.2	3.3	3.3
C2	2.6	3.4	4.0	4.30	4.6	4.8	4.9	5.0
C3	4.6	6.1	7.1	7.80	8.2	8.5	8.7	8.8
C4	6.9	9.1	10.5	11.50	12.2	12.7	13.0	13.2
C5	8.8	11.6	13.3	14.60	15.5	16.1	16.4	16.6
C6	10.8	14.2	16.3	17.80	18.9	19.6	20.0	20.2
	Evaporator Temperature -10°C							
CX	0.37	0.47	0.53	0.57	0.60	0.63	0.64	0.64
C0	0.79	0.96	1.1	1.20	1.2	1.3	1.3	1.3
C1	1.6	2.0	2.3	2.50	2.6	2.7	2.8	2.8
C2	2.2	2.9	3.3	3.60	3.8	4.0	4.1	4.1
C3	3.9	5.1	5.9	6.40	6.8	7.1	7.3	7.3
C4	5.8	7.6	8.7	9.50	10.1	10.5	10.8	10.9
C5	7.4	9.6	11.0	12.00	12.8	13.3	13.6	13.8
C6	9.1	11.8	13.5	14.70	15.6	16.2	16.6	16.8
	Evaporator Temperature -20°C							
CX	–	0.44	0.50	0.54	0.57	0.59	0.61	0.61
C0	–	0.88	1.00	1.10	1.1	1.2	1.2	1.2
C1	–	1.7	1.9	2.00	2.2	2.3	2.3	2.3
C2	–	2.4	2.7	2.90	3.1	3.2	3.3	3.3
C3	–	4.2	4.8	5.20	5.5	5.8	5.9	6.0
C4	–	6.2	7.1	7.70	8.2	8.5	8.7	8.8
C5	–	7.9	9.0	9.80	10.3	10.8	11.0	11.2
C6	–	9.6	11.0	11.90	12.6	13.1	13.5	13.7
	Evaporator Temperature -30°C							
CX	–	0.40	0.45	0.49	0.52	0.55	0.56	0.57
C0	–	0.79	0.90	0.96	1.0	1.1	1.1	1.1
C1	–	1.4	1.5	1.70	1.8	1.8	1.9	1.9
C2	–	1.9	2.2	2.70	2.5	2.6	2.6	2.7
C3	–	3.4	3.9	4.20	4.4	4.6	4.7	4.8
C4	–	5.0	5.7	6.20	6.5	6.8	7.0	7.1
C5	–	6.4	7.2	7.80	8.3	8.6	8.8	9.0
C6	–	7.8	8.8	9.60	10.1	10.5	10.8	11.0
	Evaporator Temperature -40°C							
CX	–	–	0.42	0.45	0.48	0.50	0.52	0.53
C0	–	–	0.80	0.86	0.92	0.95	0.98	0.99
C1	–	–	1.3	1.40	1.4	1.5	1.5	1.6
C2	–	–	1.7	1.90	2.0	2.0	2.1	2.1
C3	–	–	3.1	3.40	3.5	3.7	3.8	3.8
C4	–	–	4.6	4.90	5.2	5.4	5.6	5.7
C5	–	–	5.8	6.30	6.6	6.9	7.1	7.2
C6	–	–	7.1	7.70	8.1	8.4	8.7	8.8

R134a (kW)

	Pressure Drop (bar)				
	2	4	6	8	10
	Evaporator Temp. +10°C				
CX	0.34	0.43	0.47	0.50	0.51
C0	0.71	0.86	0.93	0.97	0.98
C1	1.50	1.86	2.05	2.15	2.19
C2	2.03	2.63	2.96	3.14	3.23
C3	3.64	4.71	5.29	5.61	5.77
C4	5.40	6.98	7.84	8.32	8.55
C5	6.86	8.85	9.93	10.8	10.9
C6	8.42	10.8	12.1	12.8	13.2
	Evaporator Temp. 0°C				
CX	0.33	0.42	0.46	0.47	0.49
C0	0.65	0.78	0.86	0.89	0.91
C1	1.25	1.55	1.71	1.80	1.83
C2	1.69	2.17	2.43	2.58	2.64
C3	3.04	3.89	4.36	4.61	4.73
C4	4.47	5.72	6.42	6.80	6.97
C5	5.69	7.27	8.14	8.62	8.83
C6	6.98	8.89	9.95	10.5	10.8
	Evaporator Temp. -10°C				
CX	0.30	0.38	0.43	0.44	0.44
C0	0.59	0.70	0.77	0.81	0.82
C1	1.01	1.25	1.39	1.46	1.49
C2	1.38	1.75	1.95	2.06	2.11
C3	2.48	3.13	3.49	3.69	3.77
C4	3.63	4.59	5.12	5.42	5.55
C5	4.62	5.83	6.51	6.88	7.05
C6	5.66	7.12	7.95	8.40	8.61
	Evaporator Temp. -20°C				
CX	0.28	0.35	0.39	0.41	0.42
C0	0.53	0.62	0.69	0.72	0.73
C1	0.81	1.00	1.11	1.17	1.19
C2	1.11	1.39	1.54	1.62	1.65
C3	2.00	2.48	2.75	2.90	2.96
C4	2.90	3.62	4.02	4.25	4.35
C5	3.70	4.60	5.11	5.40	5.53
C6	5.52	5.62	6.24	6.60	6.76
	Evaporator Temp. -30°C				
CX	0.25	0.32	0.35	0.37	0.38
C0	0.48	0.55	0.61	0.64	0.64
C1	0.66	0.80	0.88	0.93	0.95
C2	0.90	1.10	1.21	1.27	1.29
C3	1.60	1.97	2.17	2.28	2.32
C4	2.32	2.85	3.16	3.33	3.41
C5	2.95	3.63	4.02	4.24	4.34
C6	3.61	4.43	4.91	5.18	5.31
	Evaporator Temp. -40°C				
CX	0.23	0.28	0.32	0.33	0.34
C0	0.44	0.50	0.54	0.56	0.57
C1	0.54	0.65	0.72	0.76	0.77
C2	0.74	0.89	0.98	1.02	1.04
C3	1.32	1.60	1.75	1.84	1.86
C4	1.90	2.31	2.55	2.68	2.74
C5	2.42	2.94	3.24	3.42	3.49
C6	2.95	3.59	3.96	4.18	4.28

R404A (kW)

	Pressure Drop (bar)							
	2	4	6	8	10	12	14	16
	Evaporator Temperature +10°C							
CX	0.28	0.36	0.40	0.42	0.44	0.44	0.44	0.44
C0	0.63	0.76	0.83	0.87	0.89	0.90	0.92	0.92
C1	1.35	1.71	1.88	1.98	2.04	2.06	2.07	2.08
C2	1.84	2.42	2.74	2.92	3.03	3.06	3.08	3.08
C3	3.29	4.31	4.89	5.22	5.40	5.47	5.52	5.52
C4	4.88	6.40	7.25	7.73	8.01	8.12	8.19	8.20
C5	6.21	8.12	9.18	9.77	10.12	10.25	10.32	10.33
C6	7.61	9.93	11.21	11.92	12.33	12.49	12.58	12.60
	Evaporator Temperature 0°C							
CX	0.27	0.35	0.39	0.40	0.41	0.41	0.41	0.42
C0	0.58	0.71	0.78	0.81	0.83	0.83	0.83	0.84
C1	1.13	1.43	1.61	1.68	1.72	1.72	1.72	1.72
C2	1.53	2.00	2.28	2.42	2.50	2.52	2.52	2.51
C3	2.75	3.59	4.08	4.34	4.47	4.49	4.49	4.48
C4	4.05	5.30	6.00	6.4	6.59	6.65	6.66	6.65
C5	5.17	6.73	7.62	8.11	8.35	8.40	8.43	8.40
C6	6.33	8.23	9.31	9.9	10.19	10.26	10.28	10.26
	Evaporator Temperature -10°C							
CX	0.26	0.33	0.38	0.39	0.40	0.40	0.40	0.40
C0	0.53	0.66	0.73	0.76	0.78	0.78	0.78	0.78
C1	0.96	1.21	1.37	1.44	1.47	1.47	1.46	1.45
C2	1.31	1.68	1.91	2.03	2.09	2.08	2.07	2.06
C3	2.33	3.03	3.42	3.64	3.74	3.74	3.72	3.68
C4	3.42	4.42	5.02	5.35	5.50	5.51	5.49	5.46
C5	4.36	5.63	6.37	6.79	6.98	6.99	6.96	6.93
C6	5.34	6.89	7.79	8.30	8.53	8.54	8.51	8.46
	Evaporator Temperature -20°C							
CX	–	0.31	0.35	0.37	0.38	0.37	0.38	0.38
C0	–	0.59	0.67	0.70	0.71	0.71	0.71	0.71
C1	–	0.99	1.11	1.18	1.22	1.22	1.21	1.19
C2	–	1.36	1.54	1.64	1.68	1.70	1.67	1.65
C3	–	2.44	2.75	2.96	3.03	3.04	3.01	2.96
C4	–	3.55	4.02	4.34	4.45	4.48	4.45	4.40
C5	–	4.52	5.12	5.51	5.66	5.70	5.65	5.59
C6	–	5.53	6.26	6.73	6.91	6.97	6.91	6.84
	Evaporator Temperature -30°C							
CX	–	–	0.32	0.34	0.36	0.35	0.35	0.34
C0	–	–	0.60	0.63	0.64	0.64	0.64	0.64
C1	–	–	0.90	0.96	0.99	0.98	0.97	0.95
C2	–	–	1.23	1.30	1.34	1.34	1.32	1.28
C3	–	–	2.20	2.34	2.42	2.41	2.38	2.33
C4	–	–	3.20	3.43	3.55	3.56	3.53	3.48
C5	–	–	4.08	4.36	4.52	4.55	4.49	4.43
C6	–	–	4.99	5.34	5.53	5.57	5.50	5.42
	Evaporator Temperature -40°C							
CX	–	–	0.29	0.31	0.32	0.31	0.32	0.31
C0	–	–	0.53	0.55	0.56	0.56	0.56	0.54
C1	–	–	0.71	0.76	0.78	0.77	0.76	0.74
C2	–	–	0.96	1.01	1.04	1.04	1.02	0.99
C3	–	–	1.72	1.83	1.88	1.88	1.84	1.79
C4	–	–	2.50	2.68	2.77	2.78	2.75	2.70
C5	–	–	3.19	3.41	3.54	3.55	3.50	3.44
C6	–	–	3.90	4.18	4.33	4.36	4.30	4.22

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Pressure Temperature Chart

Temp		R-12	R-22	R-123	R-134a	R-502	AZ-50 R-507	R-717	MP 39 R-401A		HP 80 R-402A		HP 62 R-404A	FX 10 R-408A	FX 56 R-409A		AZ 20 R-410A
°F	°C								Liquid	Vapor	Liquid	Vapor	Liquid	Liquid	Liquid	Vapor	
-50	-45.6	*15.4*	*6.2*	*29.2*	*18.4*	*0.2*	1.0	*14.4*	-	-	-	-	0.6	1.6	12.4	17.2	5.0
-45	-42.8	*13.3*	*2.7*	*29.0*	*16.6*	1.9	3.0	*11.8*	-	-	-	-	2.7	1.1	9.7	15.2	7.0
-40	-40.0	*11.0*	0.5	*28.9*	*14.7*	4.1	5.5	*8.8*	*8.1*	*13.2*	6.8	6.3	5.0	3.3	6.8	13.1	11.6
-35	-37.2	*8.4*	2.6	*28.7*	*12.3*	6.5	8.2	*5.5*	*5.1*	*10.7*	9.6	9.1	7.6	5.6	3.5	10.7	14.9
-30	-34.4	*5.5*	4.9	*28.4*	*9.7*	9.2	11.1	*1.7*	*1.7*	*7.9*	12.6	12.1	10.4	8.2	0.0	8.1	18.5
-25	-31.7	*2.3*	7.4	*28.1*	*6.8*	12.1	14.3	1.2	1.0	*4.8*	16.0	15.4	13.4	11.0	2.0	5.1	22.5
-20	-28.9	0.6	10.1	*27.8*	*3.6*	15.3	17.8	3.5	3.0	*1.4*	19.6	18.9	16.8	14.1	4.1	1.9	26.9
-15	-26.1	2.4	13.2	*27.4*	*0.1*	18.8	21.7	6.2	5.2	1.2	23.6	22.9	20.5	17.5	6.5	0.8	31.6
-10	-23.3	4.5	16.4	*27.0*	2.0	22.6	25.8	9.0	7.7	3.3	27.9	27.1	24.5	21.2	9.0	2.8	36.8
-5	-20.6	6.7	20.0	*26.5*	4.1	26.6	30.3	12.3	10.3	5.5	32.6	31.7	28.8	25.2	11.8	4.9	42.5
0	-17.8	9.1	24.0	*25.9*	6.5	31.1	35.2	15.6	13.2	8.0	37.6	36.7	33.5	29.5	14.8	7.2	48.6
5	-15.0	11.8	28.2	*25.3*	9.1	35.9	40.5	19.5	16.3	10.7	43.1	42.1	38.6	34.2	18.1	9.7	55.2
10	-12.2	14.6	32.7	*24.6*	11.9	41.0	46.1	23.7	19.7	13.7	49.0	48.0	44.0	39.3	21.7	12.5	62.3
15	-9.4	17.7	37.7	*23.7*	15.1	46.5	52.2	28.3	23.4	16.9	55.3	54.2	49.9	44.8	25.5	15.4	70.0
20	-6.7	21.0	43.0	*22.8*	18.4	52.5	58.8	33.4	27.4	20.4	62.1	60.9	56.2	50.7	29.6	18.7	78.3
25	-3.9	24.6	48.7	*21.8*	22.1	58.8	65.8	38.8	31.7	24.2	69.3	68.1	63.0	57.0	34.0	22.2	87.2
30	-1.1	28.4	54.9	*20.7*	26.1	65.6	73.3	44.9	36.4	28.3	77.1	75.8	70.3	63.7	38.7	26.0	96.8
35	1.7	32.5	61.4	*19.5*	30.4	72.8	81.3	51.4	41.3	32.8	85.4	84.0	78.1	71.0	43.8	30.1	107.0
40	4.4	36.9	68.5	*18.1*	35.1	80.5	89.8	58.4	46.6	37.6	94.2	92.8	86.4	78.7	49.2	34.5	118.0
45	7.2	41.6	76.0	*16.6*	40.0	88.7	98.9	66.1	52.4	42.7	104.0	102.0	95.2	87.0	54.9	39.2	130.0
50	10.0	46.7	84.0	*15.0*	45.4	97.4	109.0	74.3	58.5	48.2	114.0	112.0	104.7	95.8	61.0	44.3	142.0
55	12.8	52.0	92.5	*13.1*	51.2	107.0	119.0	83.2	65.0	54.1	124.0	123.0	114.7	105.1	67.6	49.8	156.0
60	15.6	57.7	101.6	*11.2*	57.4	116.4	130.0	92.6	71.9	60.4	136.0	134.0	125.3	115.1	74.5	55.6	170.0
65	18.3	63.7	111.0	*9.0*	64.0	127.0	141.0	102.8	79.3	67.2	147.0	146.0	136.6	125.6	81.8	61.9	185.0
70	21.1	70.1	121.4	*6.6*	71.1	138.0	154.0	113.8	87.1	74.4	160.0	158.0	148.6	136.8	89.5	68.6	201.0
75	23.9	76.9	132.0	*4.0*	78.6	149.0	167.0	125.5	95.4	82.1	173.0	171.0	161.2	148.7	97.7	75.8	217.0
80	26.7	84.1	144.0	*1.2*	86.7	161.0	180.0	138.0	104.0	90.2	187.0	185.0	174.6	161.2	106.4	83.4	235.0
85	29.4	91.7	156.0	0.9	95.1	174.0	195.0	151.4	114.0	98.9	202.0	200.0	188.8	174.4	115.5	91.5	254.0
90	32.2	99.7	168.4	2.5	104.2	187.4	210.0	165.5	123.0	108.0	218.0	215.0	203.7	188.4	125.2	100.2	274.0
95	35.0	108.0	182.0	4.2	113.8	201.0	226.0	180.6	134.0	118.0	233.0	232.0	219.4	203.1	135.3	109.4	295.0
100	37.8	117.0	196.0	6.1	124.1	216.2	244.0	196.7	145.0	128.0	251.0	249.0	235.9	218.7	146.0	119.2	317.0
105	40.6	127.0	211.0	8.1	134.9	232.0	252.0	213.9	156.0	139.0	269.0	267.0	253.4	235.0	157.2	129.6	341.0
110	43.3	136.0	226.4	10.3	146.3	247.9	281.0	231.8	169.0	151.0	288.0	286.0	271.7	252.1	169.0	140.6	365.0
115	46.1	147.0	243.0	12.6	158.4	265.0	301.0	251.0	181.0	163.0	308.0	305.0	290.9	270.2	181.4	152.3	391.0
120	48.9	158.0	260.0	15.1	171.1	282.7	322.0	271.1	195.0	176.0	238.0	326.0	311.1	289.1	194.4	164.7	418.0
125	51.7	169.0	278.4	17.7	184.5	301.0	344.0	292.5	209.0	189.0	350.0	347.0	332.3	308.9	208.0	177.8	446.0
130	54.4	181.0	296.8	20.6	198.7	320.8	368.0	314.9	224.0	203.0	372.0	370.0	354.5	329.7	222.3	191.6	476.0
135	57.2	193.0	317.0	23.6	213.6	341.0	393.0	338.8	239.0	218.0	396.0	393.0	377.8	351.5	237.2	206.3	507.0
140	60.0	207.0	337.3	26.8	229.3	362.6	419.0	363.5	255.0	234.0	420.0	418.0	402.2	374.3	252.9	221.8	539.0
145	62.8	220.0	359.0	30.2	245.7	385.0	446.0	390.2	272.0	250.0	446.0	443.0	427.7	398.1	269.3	238.2	573.0
150	65.6	235.0	381.0	33.8	263.0	408.4	475.0	417.4	299.0	267.0	472.0	470.0	454.4	423.0	293.0	286.4	608.0

Black figures = psig
Figures in italics = inches Hg. Below 1 ATM

Quick Alternate Refrigerant Reference

ASHRAE #	*Replaces*	*Applications*	*Notes*
R-134a	R-12	New equip. & retrofits	Close match to CFC-12
R-401A	R-12	Retrofits	Close match to R-12
R-402A	R-502/R-12	Retrofits	Higher discharge pressure than R-502
R-404A	R-502/R-22	New equip. & retrofits	Close match to R-502 & R-22
R-407B	R-502	New equip. & retrofits	Close match to R-502
R-407C	R-22	New equipment	Close match to R-22
R-408A	R-502/R-22	Retrofits	Higher discharge pressure than R-502
R-409A	R-12	Retrofits	Higher discharge pressure than R-12
R-410A	R-22	New equipment	Extremely higher discharge pressures
R-507	R-502/R-22	New equip. & retrofits	Close match to R-502

CONVERSION REFERENCE

Temperature °F = ((°C X 9) / 5) + 32
Temperature °C = ((°F - 32) * 5) / 9

COP = KW Out/KW In
EER = BTUH Out/Watts In
BTU min = Kw X 56.92
BTU = KwH X 3,413
BTUs = HP hrs X 2547
BTU hour = Watts X 3.4129
HP = Kw X 1.34
1 Ton (Refrigeration) = 12,000 BTU hour
Watts = HP X 745.7

Meters = inches X 0.0254
Kilograms = lbs. X 0.4536

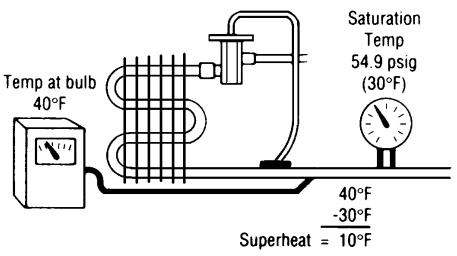
Cubic Feet = Gallons X 0.1337
Cubic Feet/Hr = GPM X 8.021
kPa = Inches Hg X 3.39
kPa = PSI X 6.89
Atmospheres = PSI X .06804
Inches of Mercury = PSI X 2.037
PSIA = PSIG + 14.7

Water Properties
Weight of One Gallon = 8.34 LB. @ 68°F
Specific Heat = 1 BTU/LB/F°
Qt = 500 X GPM X TD
1 ft. (head) = 0.433 PSI

Psychometrics
Qs = 1.10 X TD X CFM
Qt = 4.5 X HD X CFM

How to Determine Superheat

1. Determine suction pressure at the evaporator outlet with gauge. On close coupled installations, suction pressure may be read at compressor suction connection.
2. Use pressure temperature chart to determine saturation temperature at observed suction pressure.
3. Measure suction gas temperature on the line at the expansion valve bulb's remote location.
4. Subtract saturation temperature (from Step 2) from suction gas temperature (from Step 3). The difference is the superheat of the suction gas. (Example uses R-22).



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R134a/R401A*/R401B*/R12* U.S. Extended Capacities in Tons

EVAPORATOR TEMP. (°F)				40°F						20°F						0°F					
PRESSURE DROP (PSIG)				40	60	80	100	120	140	60	80	100	120	140	160	60	80	100	120	140	160
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
G(E), EG(E)		1/8		0.10	0.13	0.14	0.16	0.18	0.19	0.12	0.14	0.15	0.17	0.18	0.20	0.11	0.12	0.14	0.15	0.16	0.17
G(E), EG(E)		1/4		0.20	0.25	0.29	0.32	0.35	0.38	0.24	0.28	0.31	0.34	0.37	0.39	0.21	0.25	0.27	0.30	0.32	0.35
G(E), EG(E)		1/2		0.41	0.50	0.58	0.65	0.71	0.76	0.48	0.55	0.62	0.68	0.73	0.78	0.43	0.49	0.55	0.60	0.65	0.69
C(E), EC(E)	AA	1/2	1/8 - 1/2	0.41	0.50	0.58	0.65	0.71	0.76	0.48	0.55	0.62	0.68	0.73	0.78	0.43	0.49	0.55	0.60	0.65	0.69
S(E)		1/2	1/8 - 1/2	0.41	0.50	0.58	0.65	0.71	0.76	0.48	0.55	0.62	0.68	0.73	0.78	0.43	0.49	0.55	0.60	0.65	0.69
I		1/2	1/4 - 1/2	0.41	0.50	0.58	0.65	0.71	0.76	0.48	0.55	0.62	0.68	0.73	0.78	0.43	0.49	0.55	0.60	0.65	0.69
N		1/2	1/4 - 3/4	0.61	0.75	0.87	0.97	1.06	1.15	0.72	0.83	0.93	1.02	1.10	1.18	0.64	0.74	0.82	0.90	0.97	1.04
G(E), EG(E)		1		0.82	1.00	1.15	1.29	1.41	1.53	0.96	1.11	1.24	1.36	1.47	1.57	0.85	0.98	1.10	1.20	1.30	1.39
C(E), EC(E)	A	1	1/4 - 1	0.82	1.00	1.15	1.29	1.41	1.53	0.96	1.11	1.24	1.36	1.47	1.57	0.85	0.98	1.10	1.20	1.30	1.39
S(E)		1	1/4 - 1	0.82	1.00	1.15	1.29	1.41	1.53	0.96	1.11	1.24	1.36	1.47	1.57	0.85	0.98	1.10	1.20	1.30	1.39
I		1	3/4 - 1	0.82	1.00	1.15	1.29	1.41	1.53	0.96	1.11	1.24	1.36	1.47	1.57	0.85	0.98	1.10	1.20	1.30	1.39
G(E), EG(E)		1 1/2		1.22	1.50	1.73	1.94	2.12	2.29	1.44	1.66	1.86	2.04	2.20	2.35	1.28	1.47	1.65	1.80	1.95	2.08
G(E), EG(E)		2		1.63	2.00	2.31	2.58	2.83	3.06	1.92	2.22	2.48	2.72	2.93	3.14	1.70	1.96	2.19	2.40	2.60	2.78
C(E), EC(E)	B	2	1 - 2	1.63	2.00	2.31	2.58	2.83	3.06	1.92	2.22	2.48	2.72	2.93	3.14	1.70	1.96	2.19	2.40	2.60	2.78
S(E), N(E)		2	1-2	1.63	2.00	2.31	2.58	2.83	3.06	1.92	2.22	2.48	2.72	2.93	3.14	1.70	1.96	2.19	2.40	2.60	2.78
G(E)		2 1/2		2.04	2.50	2.89	3.23	3.54	3.82	2.40	2.77	3.10	3.39	3.67	3.92	2.13	2.45	2.74	3.01	3.25	3.47
G(E)		3		2.45	3.00	3.46	3.87	4.24	4.58	2.88	3.33	3.72	4.07	4.40	4.70	2.55	2.94	3.29	3.61	3.90	4.16
C(E), EC(E)	C	3	1 1/2 - 3	2.45	3.00	3.46	3.87	4.24	4.58	2.88	3.33	3.72	4.07	4.40	4.70	2.55	2.94	3.29	3.61	3.90	4.16
S(E)		3	1 1/2 - 3	2.45	3.00	3.46	3.87	4.24	4.58	2.88	3.33	3.72	4.07	4.40	4.70	2.55	2.94	3.29	3.61	3.90	4.16
G(E)		5		4.08	5.00	5.77	6.45	7.07	7.64	4.80	5.54	6.20	6.79	7.33	7.84	4.25	4.91	5.49	6.01	6.49	6.94
S(E)	D	5	3 1/2 - 5	4.08	5.00	5.77	6.45	7.07	7.64	4.80	5.54	6.20	6.79	7.33	7.84	4.25	4.91	5.49	6.01	6.49	6.94
RE		6		4.90	6.00	6.93	7.75	8.49	9.17	5.76	6.65	7.44	8.15	8.80	9.41	5.10	5.89	6.58	7.21	7.79	8.33
RE		9		7.35	9.00	10.40	11.60	12.70	13.70	8.64	9.98	11.20	12.20	13.20	14.10	7.65	8.83	9.88	10.80	11.70	12.50
RE		12		9.8	12.0	13.9	15.5	17.0	18.3	11.5	13.3	14.9	16.3	17.6	18.8	10.2	11.8	13.2	14.4	15.6	16.7
RE		16		13.1	16.0	18.5	20.7	22.6	24.4	15.4	17.7	19.8	21.7	23.5	25.1	13.6	15.7	17.6	19.2	20.8	22.2
RE		23		18.8	23.0	26.6	29.7	32.5	35.1	22.1	25.5	28.5	31.2	33.7	36.1	19.6	22.6	25.2	27.6	29.9	31.9
RE		40		32.7	40.0	46.2	51.6	56.6	61.1	38.4	44.3	49.6	54.3	58.7	62.7	34.0	39.3	43.9	48.1	51.9	55.5

*Balanced port valves are designed to cover an operating range from 50% of nominal capacity up to110% of nominal capacity.

R134a/R401A*/R401B*/R12* Metric Extended Capacities in Kilowatts

EVAPORATOR TEMP. (°C)				10°C						0°C						-10°C					
PRESSURE DROP (BAR)				3	4	6	7	8	10	4	6	7	8	10	11	4	6	7	8	10	11
Valve Type	Orifice	Nominal Capacity (kW)	Capacity Range* (kW)																		
G(E), EG(E)		1/2		0.39	0.45	0.55	0.59	0.63	0.71	0.43	0.53	0.58	0.62	0.69	0.72	0.41	0.51	0.55	0.58	0.65	0.68
G(E), EG(E)		1		0.78	0.90	1.10	1.19	1.27	1.42	0.87	1.07	1.15	1.23	1.38	1.44	0.83	1.01	1.09	1.17	1.30	1.37
G(E), EG(E)		2		1.55	1.79	2.20	2.37	2.54	2.84	1.74	2.13	2.30	2.46	2.75	2.89	1.65	2.02	2.18	2.33	2.61	2.74
C(E), EC(E)	AA	2	1/2-2	1.55	1.79	2.20	2.37	2.54	2.84	1.74	2.13	2.30	2.46	2.75	2.89	1.65	2.02	2.18	2.33	2.61	2.74
S(E)		2	1/2-2	1.55	1.79	2.20	2.37	2.54	2.84	1.74	2.13	2.30	2.46	2.75	2.89	1.65	2.02	2.18	2.33	2.61	2.74
I		2	1-2	1.55	1.79	2.20	2.37	2.54	2.84	1.74	2.13	2.30	2.46	2.75	2.89	1.65	2.02	2.18	2.33	2.61	2.74
N		3	1-3	2.33	2.69	3.30	3.56	3.80	4.25	2.61	3.20	3.45	3.69	4.13	4.33	2.48	3.03	3.27	3.50	3.91	4.10
G(E), EG(E)		4		3.11	3.59	4.39	4.75	5.07	5.67	3.48	4.26	4.60	4.92	5.50	5.77	3.30	4.04	4.37	4.67	5.22	5.47
C(E), EC(E)	A	4	1-4	3.11	3.59	4.39	4.75	5.07	5.67	3.48	4.26	4.60	4.92	5.50	5.77	3.30	4.04	4.37	4.67	5.22	5.47
S(E)		4	1-4	3.11	3.59	4.39	4.75	5.07	5.67	3.48	4.26	4.60	4.92	5.50	5.77	3.30	4.04	4.37	4.67	5.22	5.47
I		4	3-4	3.11	3.59	4.39	4.75	5.07	5.67	3.48	4.26	4.60	4.92	5.50	5.77	3.30	4.04	4.37	4.67	5.22	5.47
G(E), EG(E)		5		4.66	5.38	6.59	7.12	7.61	8.51	5.22	6.39	6.90	7.38	8.25	8.66	4.95	6.06	6.55	7.00	7.83	8.21
G(E), EG(E)		7		6.21	7.17	8.79	9.49	10.10	11.30	6.96	8.52	9.21	9.84	11.00	11.50	6.60	8.08	8.73	9.33	10.40	10.90
C(E), EC(E)	B	7	4-7	6.21	7.17	8.79	9.49	10.10	11.30	6.96	8.52	9.21	9.84	11.00	11.50	6.60	8.08	8.73	9.33	10.40	10.90
S(E), N(E)		7	4-7	6.21	7.17	8.79	9.49	10.10	11.30	6.96	8.52	9.21	9.84	11.00	11.50	6.60	8.08	8.73	9.33	10.40	10.90
G(E)		9		7.77	8.97	11.00	11.90	12.70	14.20	8.70	10.70	11.50	12.30	13.80	14.40	8.25	10.10	10.90	11.70	13.00	13.70
G(E)		11		9.32	10.80	13.20	14.20	15.20	17.00	10.40	12.80	13.80	14.80	16.50	17.30	9.90	12.10	13.10	14.00	15.70	16.40
C(E), EC(E)	C	11	5-11	9.32	10.80	13.20	14.20	15.20	17.00	10.40	12.80	13.80	14.80	16.50	17.30	9.90	12.10	13.10	14.00	15.70	16.40
S(E)		11	5-11	9.32	10.80	13.20	14.20	15.20	17.00	10.40	12.80	13.80	14.80	16.50	17.30	9.90	12.10	13.10	14.00	15.70	16.40
G(E)		18		15.5	17.9	22.0	23.7	25.4	28.4	17.4	21.3	23.0	24.6	27.5	28.9	16.5	20.2	21.8	23.3	26.1	27.4
S(E)	D	18	12-18	15.5	17.9	22.0	23.7	25.4	28.4	17.4	21.3	23.0	24.6	27.5	28.9	16.5	20.2	21.8	23.3	26.1	27.4
RE		21		18.6	21.5	26.4	28.5	30.4	34.0	20.9	25.6	27.6	29.5	33.0	34.6	19.8	24.3	26.2	28.0	31.3	32.8
RE		32		28.0	32.3	39.5	42.7	45.7	51.0	31.3	38.4	41.4	44.3	49.5	51.9	29.7	36.4	39.3	42.0	47.0	49.3
RE		42		37.3	43.0	52.7	56.9	60.9	68.1	41.8	51.1	55.2	59.1	66.0	69.2	39.6	48.5	52.4	56.0	62.6	65.7
RE		56		49.7	57.4	70.3	75.9	81.2	90.8	55.7	68.2	73.7	78.7	88.0	92.3	52.8	64.7	69.9	74.7	83.5	87.6
RE		81		72	83	101	109	117	130	80	98	106	113	127	133	76	93	100	107	120	126
RE		141		124	143	176	190	203	227	139	170	184	197	220	231	132	162	175	187	209	219

* See page 160.

Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor chart on the following page.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Multiplier R-134a	1.33	1.27	1.21	1.11	1.07	1.00	0.93	0.87	0.81	0.71

Liquid Line Temp.	0°C	20°C	30°C	40°C	50°C	60°C
Multiplier R-134a	1.33	1.21	1.09	1.00	0.85	0.71

These ratings are based on vapor free 100°F liquid refrigerant entering the expansion valve, and a maximum of 7°F change in superheat.

R410A U.S. Extended Capacities in Tons

EVAPORATOR TEMP. (°F)				40°F						20°F						0°F					
PRESSURE DROP (PSIG)				120	160	200	240	280	320	120	160	200	240	280	320	120	160	200	240	280	320
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
S(E) H(E)	AA	1 1/2	1/2 - 1 1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.22	1.41	1.58	1.73	1.87	1.99
S(E) H(E)	A	3	1 1/2 - 3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.44	2.82	3.15	3.45	3.73	3.99
S(E), H(E)	B	5	3 1/2 - 5	4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	4.07	4.70	5.25	5.76	6.22	6.65
S(E) H(E)	C	7	5 1/2 - 7	6.06	7.00	7.83	8.57	9.26	9.90	5.94	6.86	7.67	8.40	9.07	9.70	5.70	6.58	7.36	8.06	8.70	9.31
S(E) H(E)	D	9	7 1/2 - 9	7.79	9.00	10.06	11.02	11.91	12.73	7.64	8.82	9.86	10.80	11.67	12.47	7.33	8.46	9.46	10.36	11.19	11.96

*Balanced port valves are designed to cover an operating range from 50% of nominal capacity up to10% of nominal capacity.
Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Multiplier R-410A	1.09	1.06	1.03	1.00	0.97	0.93	0.89	0.84

R410A Metric Extended Capacities in Kilowatts

EVAPORATOR TEMP. (°C)				10°F						0°F						-10°F					
PRESSURE DROP (PSIG)				8	11	14	17	20	22	8	11	14	17	20	22	8	11	14	17	20	22
Valve Type	Orifice	Nominal Capacity kW)	Capacity Range* (kW)																		
S(E) H(E)	AA	6	2 - 6	5.12	6.00	6.77	7.46	8.09	8.49	5.01	5.88	6.63	7.31	7.93	8.32	4.91	5.76	6.50	7.16	7.77	8.15
S(E) H(E)	A	11	6 - 11	9.38	11.00	12.41	13.67	14.83	15.56	9.19	10.78	12.16	13.40	14.54	15.25	9.01	10.56	11.91	13.13	14.24	14.93
S(E), H(E)	B	18	12 - 18	15.35	18.00	20.31	22.38	24.27	25.46	15.04	17.64	19.90	21.93	23.79	24.95	14.74	17.28	19.49	21.48	23.30	24.44
S(E) H(E)	C	23	19 - 23	19.61	23.00	25.95	28.59	31.01	32.53	19.22	22.54	25.43	28.02	30.39	31.88	18.83	22.08	24.91	27.45	29.77	31.23
S(E) H(E)	D	31	24 - 31	26.44	31.00	34.97	38.54	41.80	43.84	25.91	30.38	34.27	37.77	40.96	42.96	25.38	29.76	33.57	37.00	40.13	42.09

* See page 160.
Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	20°C	30°C	40°C	50°C	60°C
Multiplier R-410A	1.18	1.12	1.06	1.00	0.94

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R22/R407C* U.S. Extended Capacities in Tons

EVAPORATOR TEMP. (°F)				40°F						20°F						0°F					
PRESSURE DROP (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
G(E), EG(E)		1/4		0.22	0.25	0.28	0.31	0.33	0.35	0.21	0.25	0.27	0.30	0.32	0.35	0.19	0.22	0.25	0.27	0.29	0.31
G(E), EG(E)		1/2		0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.49	0.55	0.60	0.65	0.69	0.38	0.44	0.49	0.54	0.58	0.62
C(E), EC(E)	AA	3/4	1/5-3/4	0.65	0.75	0.84	0.92	0.99	1.06	0.64	0.74	0.82	0.90	0.97	1.04	0.57	0.66	0.74	0.81	0.87	0.93
S(E)		3/4	1/5-3/4	0.65	0.75	0.84	0.92	0.99	1.06	0.64	0.74	0.82	0.90	0.97	1.04	0.57	0.66	0.74	0.81	0.87	0.93
G(E), EG(E)		1		0.87	1.00	1.12	1.22	1.32	1.41	0.85	0.98	1.10	1.20	1.30	1.39	0.76	0.88	0.98	1.08	1.16	1.24
I, N		1	1/2-1	0.87	1.00	1.12	1.22	1.32	1.41	0.85	0.98	1.10	1.20	1.30	1.39	0.76	0.88	0.98	1.08	1.16	1.24
G(E), EG(E)		1 1/2		1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
C(E), EC(E)	A	1 1/2	1/2-1 1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
S(E)		1 1/2	1/2-1 1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
G(E), EG(E)		2		1.73	2.00	2.24	2.45	2.65	2.83	1.70	1.96	2.19	2.40	2.59	2.77	1.52	1.76	1.97	2.16	2.33	2.49
I		2	1 1/2-2	1.73	2.00	2.24	2.45	2.65	2.83	1.70	1.96	2.19	2.40	2.59	2.77	1.52	1.76	1.97	2.16	2.33	2.49
G(E), EG(E)		2 1/2		2.17	2.50	2.80	3.06	3.31	3.54	2.12	2.45	2.74	3.00	3.24	3.46	1.91	2.20	2.46	2.69	2.91	3.11
G(E), EG(E)		3		2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.29	2.64	2.95	3.23	3.49	3.73
C(E), EC(E)	B	3	1 1/2-3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.29	2.64	2.95	3.23	3.49	3.73
S(E), N(E)		3	1 1/2-3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.29	2.64	2.95	3.23	3.49	3.73
G(E)		4		3.46	4.00	4.47	4.90	5.29	5.66	3.39	3.92	4.38	4.80	5.19	5.54	3.05	3.52	3.94	4.31	4.66	4.98
G(E)		5		4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	3.81	4.40	4.92	5.39	5.82	6.22
C(E), EC(E)	C	5	3 1/2-5	4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	3.81	4.40	4.92	5.39	5.82	6.22
S(E)		5	3 1/2-5	4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	3.81	4.40	4.92	5.39	5.82	6.22
S(E)	D	7 1/2	5 1/2-7 1/2	6.50	7.50	8.39	9.19	9.92	10.60	6.37	7.35	8.22	9.00	9.72	10.40	5.72	6.60	7.38	8.08	8.73	9.33
G(E)		8		6.93	8.00	8.94	9.80	10.60	11.30	6.79	7.84	8.77	9.60	10.40	11.10	6.10	7.04	7.87	8.62	9.31	9.96
S(E)		10	8-10	8.66	10.0	11.2	12.2	13.2	14.1	8.49	9.80	11.0	12.0	13.0	13.90	7.62	8.80	9.84	10.8	11.6	12.4
RE		10		8.66	10.0	11.2	12.2	13.2	14.1	8.49	9.80	11.0	12.0	13.0	13.90	7.62	8.80	9.84	10.8	11.6	12.4
RE		15		13.0	15.0	16.8	18.4	19.8	21.2	12.7	14.7	16.4	18.0	19.4	20.8	11.4	13.2	14.8	16.2	17.5	18.7
RE		20		17.3	20.0	22.4	24.5	26.5	28.3	17.0	19.6	21.9	24.0	25.9	27.7	15.2	17.6	19.7	21.6	23.3	24.9
RE		30		26.0	30.0	33.5	36.7	39.7	42.4	25.5	29.4	32.9	36.0	38.9	41.6	22.9	26.4	29.5	32.3	34.9	37.3
RE		40		34.6	40.0	44.7	49.0	52.9	56.6	33.9	39.2	43.8	48.0	51.9	55.4	30.5	35.2	39.4	43.1	46.6	49.8
RE		70		60.6	70.0	78.3	85.7	92.6	99.0	59.4	68.6	76.7	84.0	90.7	97.0	53.3	61.6	68.9	75.4	81.5	87.1

EVAPORATOR TEMP. (°F)				-10°F						-20°F						-40°F					
PRESSURE DROP (PSIG)				100	125	150	175	200	225	125	150	175	200	225	250	125	150	175	200	225	250
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
G(E), EG(E)		1/4		0.19	0.21	0.23	0.24	0.26	0.28	0.17	0.19	0.20	0.22	0.23	0.24	0.11	0.13	0.14	0.14	0.15	0.16
G(E), EG(E)		1/2		0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.23	0.25	0.27	0.29	0.31	0.32
C(E), EC(E)	AA	3/4	1/5-3/4	0.56	0.62	0.68	0.73	0.78	0.83	0.51	0.56	0.61	0.65	0.69	0.72	0.34	0.38	0.41	0.43	0.46	0.49
S(E)		3/4	1/5-3/4	0.56	0.62	0.68	0.73	0.78	0.83	0.51	0.56	0.61	0.65	0.69	0.72	0.34	0.38	0.41	0.43	0.46	0.49
G(E), EG(E)		1		0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.46	0.50	0.54	0.58	0.62	0.65
I, N		1	1/2-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.46	0.50	0.54	0.58	0.62	0.65
G(E), EG(E)		1 1/2		1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
C(E), EC(E)	A	1 1/2	1/2-1 1/2	1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
S(E)		1 1/2	1/2-1 1/2	1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
G(E), EG(E)		2		1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.92	1.00	1.08	1.16	1.23	1.30
I		2	1 1/2-2	1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.92	1.00	1.08	1.16	1.23	1.30
G(E), EG(E)		2 1/2		1.85	2.07	2.27	2.45	2.62	2.78	1.71	1.87	2.02	2.16	2.29	2.41	1.15	1.26	1.36	1.45	1.54	1.62
G(E), EG(E)		3		2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.38	1.51	1.63	1.74	1.85	1.94
C(E), EC(E)	B	3	1 1/2-3	2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.38	1.51	1.63	1.74	1.85	1.94
S(E), N(E)		3	1 1/2-3	2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.38	1.51	1.63	1.74	1.85	1.94
G(E)		4		2.96	3.31	3.63	3.92	4.19	4.44	2.73	2.99	3.23	3.45	3.66	3.86	1.83	2.01	2.17	2.32	2.46	2.59
G(E)		5		3.70	4.14	4.53	4.89	5.23	5.55	3.41	3.74	4.03	4.31	4.58	4.82	2.29	2.51	2.71	2.90	3.08	3.24
C(E), EC(E)	C	5	3 1/2-5	3.70	4.14	4.53	4.89	5.23	5.55	3.41	3.74	4.03	4.31	4.58	4.82	2.29	2.51	2.71	2.90	3.08	3.24
S(E)		5	3 1/2-5	3.70	4.14	4.53	4.89	5.23	5.55	3.41	3.74	4.03	4.31	4.58	4.82	2.29	2.51	2.71	2.90	3.08	3.24
S(E)	D	7 1/2	5 1/2-7 1/2	5.55	6.21	6.80	7.34	7.85	8.33	5.12	5.60	6.05	6.47	6.86	7.23	3.44	3.77	4.07	4.35	4.61	4.86
G(E)		8		5.92	6.62	7.25	7.83	8.37	8.88	5.46	5.98	6.46	6.90	7.32	7.72	3.67	4.02	4.34	4.64	4.92	5.19
S(E)		10	8-10	7.40	8.27	9.06	9.79	10.50	11.10	6.82	7.47	8.07	8.63	9.15	9.64	4.58	5.02	5.42	5.80	6.15	6.48
RE		10		7.40	8.27	9.06	9.79	10.50	11.10	6.82	7.47	8.07	8.63	9.15	9.64	4.58	5.02	5.42	5.80	6.15	6.48
RE		15		11.1	12.4	13.6	14.7	15.7	16.7	10.2	11.2	12.1	12.9	13.7	14.5	6.88	7.53	8.14	8.70	9.23	9.72
RE		20		14.8	16.5	18.1	19.6	20.9	22.2	13.6	14.9	16.1	17.3	18.3	19.3	9.2	10.0	10.8	11.6	12.3	13.0
RE		30		22.2	24.8	27.2	29.4	31.4	33.3	20.5	22.4	24.2	25.9	27.5	28.9	13.8	15.1	16.3	17.4	18.5	19.4
RE		40		29.6	33.1	36.3	39.2	41.9	44.4	27.3	29.9	32.3	34.5	36.6	38.6	18.3	20.1	21.7	23.2	24.6	25.9
RE		70		51.8	57.9	63.4	68.5	73.3	77.7	47.7	52.3	56.5	60.4	64.1	67.5	32.1	35.2	38.0	40.6	43.1	45.4

* See page 160.
Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Multiplier R-22	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.77

These ratings are based on vapor free 100°F liquid refrigerant entering the expansion valve, and a maximum of 7°F change in superheat.
*Balanced port valves are designed to cover an operating range from 50% of nominal capacity up to 110% of nominal capacity.

R22/R407C* Metric Extended Capacities in Kilowatts

EVAPORATOR TEMP. (°C)				10°C						0°C						-10°C					
PRESSURE DROP (BAR)				5	7	9	10	12	14	5	7	9	10	12	14	7	9	10	12	14	16
Valve Type	Orifice	Nominal Capacity (kW)	Capacity Range* (kW)																		
G(E), EG(E)		1		0.75	0.89	1.01	1.06	1.16	1.26	0.74	0.87	0.99	1.04	1.14	1.23	0.84	0.96	1.01	1.10	1.19	1.28
G(E), EG(E)		2		1.50	1.78	2.01	2.12	2.33	2.51	1.47	1.74	1.97	2.08	2.28	2.46	1.69	1.91	2.02	2.21	2.39	2.55
C(E), EC(E)	AA	3	3/4-3	2.25	2.66	3.02	3.18	3.49	3.77	2.21	2.61	2.96	3.12	3.42	3.69	2.53	2.87	3.03	3.31	3.58	3.83
S(E)		3	3/4-3	2.25	2.66	3.02	3.18	3.49	3.77	2.21	2.61	2.96	3.12	3.42	3.69	2.53	2.87	3.03	3.31	3.58	3.83
G(E), EG(E)		4		3.00	3.55	4.03	4.25	4.65	5.02	2.94	3.48	3.95	4.16	4.56	4.92	3.37	3.83	4.03	4.42	4.77	5.10
I, N		4	2-4	3.00	3.55	4.03	4.25	4.65	5.02	2.94	3.48	3.95	4.16	4.56	4.92	3.37	3.83	4.03	4.42	4.77	5.10
G(E), EG(E)		5		4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
C(E), EC(E)	A	5	2-5	4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
S(E)		5	2-5	4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
G(E), EG(E)		7		6.00	7.10	8.06	8.49	9.30	10.00	5.88	6.96	7.89	8.32	9.12	9.85	6.75	7.65	8.07	8.84	9.54	10.20
I		7	5-7	6.00	7.10	8.06	8.49	9.30	10.00	5.88	6.96	7.89	8.32	9.12	9.85	6.75	7.65	8.07	8.84	9.54	10.20
G(E), EG(E)		9		7.51	8.88	10.10	10.60	11.60	12.60	7.36	8.70	9.87	10.40	11.40	12.30	8.44	9.57	10.10	11.00	11.90	12.80
G(E), EG(E)		11		9.01	10.70	12.10	12.70	14.00	15.10	8.83	10.40	11.80	12.50	13.70	14.80	10.10	11.50	12.10	13.30	14.30	15.30
C(E), EC(E)	B	11	5-11	9.01	10.70	12.10	12.70	14.00	15.10	8.83	10.40	11.80	12.50	13.70	14.80	10.10	11.50	12.10	13.30	14.30	15.30
S(E), N(E)		11	5-11	9.01	10.70	12.10	12.70	14.00	15.10	8.83	10.40	11.80	12.50	13.70	14.80	10.10	11.50	12.10	13.30	14.30	15.30
G(E)		14		12.00	14.20	16.10	17.00	18.60	20.10	11.80	13.90	15.80	16.60	18.20	19.70	13.50	15.30	16.10	17.70	19.10	20.40
G(E)		18		15.00	17.80	20.10	21.20	23.30	25.10	14.70	17.40	19.70	20.80	22.80	24.60	16.90	19.10	20.20	22.10	23.90	25.50
C(E), EC(E)	C	18	12-18	15.00	17.80	20.10	21.20	23.30	25.10	14.70	17.40	19.70	20.80	22.80	24.60	16.90	19.10	20.20	22.10	23.90	25.50
S(E)		18	12-18	15.00	17.80	20.10	21.20	23.30	25.10	14.70	17.40	19.70	20.80	22.80	24.60	16.90	19.10	20.20	22.10	23.90	25.50
S(E)	D	26	19-26	22.50	26.60	30.20	31.80	34.90	37.70	22.10	26.10	29.60	31.20	34.20	36.90	25.30	28.70	30.30	33.10	35.80	38.30
G(E)		28		24.00	28.40	32.20	34.00	37.20	40.20	23.50	27.80	31.60	33.30	36.50	39.40	27.00	30.60	32.30	35.30	38.20	40.80
S(E)		35	28-35	30.00	35.50	40.30	42.50	46.50	50.20	29.40	34.80	39.50	41.60	45.60	49.20	33.70	38.30	40.30	44.20	47.70	51.00
RE		35		30.00	35.50	40.30	42.50	46.50	50.20	29.40	34.80	39.50	41.60	45.60	49.20	33.70	38.30	40.30	44.20	47.70	51.00
RE		53		45.00	53.30	60.40	63.70	69.80	75.00	44.10	52.20	59.20	62.40	68.40	73.80	50.60	57.40	60.50	66.30	71.60	76.50
RE		70		60.00	71.00	80.60	84.90	93.00	100.0	58.80	69.60	78.90	83.20	91.20	98.50	67.50	76.50	80.70	88.40	95.40	102.0
RE		106		90.1	107.0	121.0	127.0	140.0	151.0	88.3	104.0	118.0	125.0	137.0	148.0	101.0	115.0	121.0	133.0	143.0	153.0
RE		141		120.0	142.0	161.0	170.0	186.0	201.0	118.0	139.0	158.0	166.0	182.0	197.0	135.0	153.0	161.0	177.0	191.0	204.0
RE		246		210.0	249.0	282.0	297.0	326.0	352.0	206.0	244.0	276.0	291.0	319.0	345.0	236.0	268.0	282.0	309.0	334.0	357.0

EVAPORATOR TEMP. (°F)				-20°C						-30°C						-40°C					
PRESSURE DROP (BAR)				9	10	12	14	16	17	9	10	12	14	16	17	9	10	12	14	16	17
Valve Type	Orifice	Nominal Capacity (kW)	Capacity Range* (kW)																		
G(E), EG(E)		1		0.82	0.86	0.94	1.02	1.09	1.12	0.60	0.64	0.70	0.75	0.81	0.83	0.40	0.42	0.47	0.50	0.54	0.55
G(E), EG(E)		2		1.63	1.72	1.88	2.03	2.18	2.24	1.21	1.27	1.40	1.51	1.61	1.66	0.81	0.85	0.93	1.00	1.07	1.11
C(E), EC(E)	AA	3	3/4-3	2.45	2.58	2.83	3.05	3.26	3.36	1.81	1.91	2.09	2.26	2.42	2.49	1.21	1.27	1.40	1.51	1.61	1.66
S(E)		3	3/4-3	2.45	2.58	2.83	3.05	3.26	3.36	1.81	1.91	2.09	2.26	2.42	2.49	1.21	1.27	1.40	1.51	1.61	1.66
G(E), EG(E)		4		3.26	3.44	3.77	4.07	4.35	4.48	2.42	2.55	2.79	3.01	3.22	3.32	1.61	1.70	1.86	2.01	2.15	2.21
I, N		4	2-4	3.26	3.44	3.77	4.07	4.35	4.48	2.42	2.55	2.79	3.01	3.22	3.32	1.61	1.70	1.86	2.01	2.15	2.21
G(E), EG(E)		5		4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
C(E), EC(E)	A	5	2-5	4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
S(E)		5	2-5	4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
G(E), EG(E)		7		6.53	6.88	7.53	8.14	8.70	8.97	4.83	5.09	5.58	6.03	6.44	6.64	3.22	3.40	3.72	4.02	4.30	4.43
I		7	5-7	6.53	6.88	7.53	8.14	8.70	8.97	4.83	5.09	5.58	6.03	6.44	6.64	3.22	3.40	3.72	4.02	4.30	4.43
G(E), EG(E)		9		8.16	8.60	9.42	10.20	10.90	11.20	6.04	6.37	6.98	7.54	8.06	8.30	4.03	4.25	4.65	5.02	5.37	5.54
G(E), EG(E)		11		9.79	10.30	11.30	12.20	13.10	13.50	7.25	7.64	8.37	9.04	9.67	9.96	4.83	5.09	5.58	6.03	6.44	6.64
C(E), EC(E)	B	11	5-11	9.79	10.30	11.30	12.20	13.10	13.50	7.25	7.64	8.37	9.04	9.67	9.96	4.83	5.09	5.58	6.03	6.44	6.64
S(E), N(E)		11	5-11	9.79	10.30	11.30	12.20	13.10	13.50	7.25	7.64	8.37	9.04	9.67	9.96	4.83	5.09	5.58	6.03	6.44	6.64
G(E)		14		13.1	13.8	15.1	16.3	17.4	17.9	9.67	10.20	11.20	12.10	12.90	13.30	6.44	6.79	7.44	8.04	8.59	8.86
G(E)		18		16.3	17.2	18.8	20.3	21.8	22.4	12.1	12.7	14.0	15.1	16.1	16.6	8.06	8.49	9.30	10.0	10.7	11.1
C(E), EC(E)	C	18	12-18	16.3	17.2	18.8	20.3	21.8	22.4	12.1	12.7	14.0	15.1	16.1	16.6	8.06	8.49	9.30	10.0	10.7	11.1
S(E)		18	12-18	16.3	17.2	18.8	20.3	21.8	22.4	12.1	12.7	14.0	15.1	16.1	16.6	8.06	8.49	9.30	10.0	10.7	11.1
S(E)	D	26	19-26	24.5	25.8	28.3	30.5	32.6	33.6	18.1	19.1	20.9	22.6	24.2	24.9	12.1	12.7	14.0	15.1	16.1	16.6
G(E)		28		26.1	27.5	30.1	32.6	34.8	35.9	19.3	20.4	22.3	24.1	25.8	26.6	12.9	13.6	14.9	16.1	17.2	17.7
S(E)		35	28-35	32.6	34.4	37.7	40.7	43.5	44.8	24.2	25.5	27.9	30.1	32.2	33.2	16.1	17.0	18.6	20.1	21.5	22.1
RE		35		32.6	34.4	37.7	40.7	43.5	44.8	24.2	25.5	27.9	30.1	32.2	33.2	16.1	17.0	18.6	20.1	21.5	22.1
RE		53		48.9	51.6	56.5	61.0	65.3	67.3	36.3	38.2	41.9	45.2	48.3	49.8	24.2	25.5	27.9	30.1	32.2	33.2
RE		70		65.3	68.8	75.3	81.4	87.0	89.7	48.3	50.9	55.8	60.3	64.4	66.4	32.2	34.0	37.2	40.2	43.0	44.3
RE		106		97.9	103.0	113.0	122.0	131.0	135.0	72.5	76.4	83.7	90.4	96.7	99.6	48.3	50.9	55.8	60.3	64.4	66.4
RE		141		131	138	151	163	174	179	97	102	112	121	129	133	64.4	67.9	74.4	80.4	85.9	88.6
RE		246		228	241	264	285	305	314	169	178	195	211	226	232	113	119	130	141	150	155

* See page 160.
Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
Multiplier R-22	1.30	1.21	1.10	1.00	0.89	0.78

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R404A/R502*/R402A*, B*/R507* U.S. Extended Capacities in Tons

EVAPORATOR TEMP. (°F)				40°F						20°F						0°F					
PRESSURE DROP (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
G(E), EG(E)		1/8		0.11	0.13	0.14	0.15	0.17	0.18	0.10	0.12	0.13	0.15	0.16	0.17	0.09	0.11	0.12	0.13	0.14	0.15
G(E), EG(E)		1/4		0.22	0.25	0.28	0.31	0.33	0.35	0.21	0.24	0.27	0.29	0.32	0.34	0.19	0.22	0.24	0.27	0.29	0.31
G(E), EG(E)		1/2		0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.48	0.54	0.59	0.63	0.68	0.38	0.44	0.49	0.53	0.58	0.62
C(E), EC(E)	AA	1/2	1/8-1/2	0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.48	0.54	0.59	0.63	0.68	0.38	0.44	0.49	0.53	0.58	0.62
S(E)		1/2	1/8-1/2	0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.48	0.54	0.59	0.63	0.68	0.38	0.44	0.49	0.53	0.58	0.62
I		1/2	1/4-1/2	0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.48	0.54	0.59	0.63	0.68	0.38	0.44	0.49	0.53	0.58	0.62
N		1/2	1/4-3/4	0.65	0.75	0.84	0.92	0.99	1.06	0.62	0.72	0.80	0.88	0.95	1.02	0.57	0.65	0.73	0.80	0.86	0.92
G(E), EG(E)		1		0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
C(E), EC(E)	A	1	1/4-1	0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
S(E)		1	1/4 -1	0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
I		1	3/4-1	0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
G(E), EG(E)		1 1/2		1.30	1.50	1.68	1.84	1.98	2.12	1.25	1.44	1.61	1.76	1.90	2.04	1.13	1.31	1.46	1.60	1.73	1.85
G(E), EG(E)		2		1.73	2.00	2.24	2.45	2.65	2.83	1.66	1.92	2.15	2.35	2.54	2.72	1.51	1.74	1.95	2.13	2.30	2.46
C(E), EC(E)	B	2	1 - 2	1.73	2.00	2.24	2.45	2.65	2.83	1.66	1.92	2.15	2.35	2.54	2.72	1.51	1.74	1.95	2.13	2.30	2.46
S(E), N(E)		2		1.73	2.00	2.24	2.45	2.65	2.83	1.66	1.92	2.15	2.35	2.54	2.72	1.51	1.74	1.95	2.13	2.30	2.46
G(E)		3		2.60	3.00	3.35	3.67	3.97	4.24	2.49	2.88	3.22	3.53	3.81	4.07	2.26	2.61	2.92	3.20	3.45	3.69
G(E)		4		3.46	4.00	4.47	4.90	5.29	5.66	3.33	3.84	4.29	4.70	5.08	5.43	3.01	3.48	3.89	4.26	4.60	4.92
C(E), EC(E)	C	4	1 1/2-4	3.46	4.00	4.47	4.90	5.29	5.66	3.33	3.84	4.29	4.70	5.08	5.43	3.01	3.48	3.89	4.26	4.60	4.92
S(E)		4	1 1/2-4	3.46	4.00	4.47	4.90	5.29	5.66	3.33	3.84	4.29	4.70	5.08	5.43	3.01	3.48	3.89	4.26	4.60	4.92
G(E)		6		5.20	6.00	6.71	7.35	7.94	8.49	4.99	5.76	6.44	7.05	7.62	8.15	4.52	5.22	5.84	6.39	6.91	7.38
C(E)	D	6	4 1/2-6	5.20	6.00	6.71	7.35	7.94	8.49	4.99	5.76	6.44	7.05	7.62	8.15	4.52	5.22	5.84	6.39	6.91	7.38
RE		6		5.20	6.00	6.71	7.35	7.94	8.49	4.99	5.76	6.44	7.05	7.62	8.15	4.52	5.22	5.84	6.39	6.91	7.38
RE		9		7.79	9.00	10.10	11.00	11.90	12.70	7.48	8.64	9.66	10.60	11.40	12.20	6.78	7.83	8.75	9.59	10.40	11.10
RE		12		10.4	12.0	13.4	14.7	15.9	17.0	10.0	11.5	12.9	14.1	15.2	16.3	9.0	10.4	11.7	12.8	13.8	14.8
RE		21		18.2	21.0	23.5	25.7	27.8	29.7	17.5	20.2	22.5	24.7	26.7	28.5	15.8	18.3	20.4	22.4	24.2	25.8
RE		30		26.0	30.0	33.5	36.7	39.7	42.4	24.9	28.8	32.2	35.3	38.1	40.7	22.6	26.1	29.2	32.0	34.5	36.9
RE		45		39.0	45.0	50.3	55.1	59.5	63.6	37.4	43.2	48.3	52.9	57.1	61.1	33.9	39.2	43.8	47.9	51.8	55.4

EVAPORATOR TEMP. (°F)				-10°F						-20°F						-40°F					
PRESSURE DROP (PSIG)				100	125	150	175	200	225	125	150	175	200	225	250	125	150	175	200	225	250
Valve Type	Orifice	Nominal Capacity (tons)	Capacity Range* (tons)																		
G(E), EG(E)		1/8		0.09	0.10	0.11	0.12	0.13	0.14	0.09	0.09	0.10	0.11	0.11	0.12	0.05	0.06	0.06	0.07	0.07	0.08
G(E), EG(E)		1/4		0.19	0.21	0.23	0.24	0.26	0.28	0.17	0.19	0.20	0.22	0.23	0.24	0.11	0.12	0.13	0.14	0.15	0.15
G(E), EG(E)		1/2		0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.22	0.24	0.26	0.28	0.29	0.31
C(E), EC(E)	AA	1/2	1/8-1/2	0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.22	0.24	0.26	0.28	0.29	0.31
S(E)		1/2	1/8-1/2	0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.22	0.24	0.26	0.28	0.29	0.31
I		1/2	1/4-1/2	0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.22	0.24	0.26	0.28	0.29	0.31
N		1/2	1/4-3/4	0.56	0.62	0.68	0.73	0.78	0.83	0.51	0.56	0.61	0.65	0.69	0.72	0.33	0.36	0.39	0.41	0.44	0.46
G(E), EG(E)		1		0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
C(E), EC(E)	A	1	1/4-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
S(E)		1	1/4 -1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
I		1	3/4-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
G(E), EG(E)		1 1/2		1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.65	0.72	0.77	0.83	0.88	0.92
G(E), EG(E)		2		1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.87	0.96	1.03	1.10	1.17	1.23
C(E), EC(E)	B	2	1-2	1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.87	0.96	1.03	1.10	1.17	1.23
S(E), N(E)		2	1-2	1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.87	0.96	1.03	1.10	1.17	1.23
G(E)		3		2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.31	1.43	1.55	1.65	1.76	1.85
G(E)		4		2.96	3.31	3.63	3.92	4.19	4.44	2.73	2.99	3.23	3.45	3.66	3.86	1.74	1.91	2.06	2.21	2.34	2.47
C(E), EC(E)	C	4	1 1/2-4	2.96	3.31	3.63	3.92	4.19	4.44	2.73	2.99	3.23	3.45	3.66	3.86	1.74	1.91	2.06	2.21	2.34	2.47
S(E)		4	1 1/2-4	2.96	3.31	3.63	3.92	4.19	4.44	2.73	2.99	3.23	3.45	3.66	3.86	1.74	1.91	2.06	2.21	2.34	2.47
G(E)		6		4.44	4.96	5.44	5.87	6.28	6.66	4.09	4.48	4.84	5.18	5.49	5.79	2.62	2.87	3.10	3.31	3.51	3.70
C(E)	D	6	4 1/2-6	4.44	4.96	5.44	5.87	6.28	6.66	4.09	4.48	4.84	5.18	5.49	5.79	2.62	2.87	3.10	3.31	3.51	3.70
RE		6		4.44	4.96	5.44	5.87	6.28	6.66	4.09	4.48	4.84	5.18	5.49	5.79	2.62	2.87	3.10	3.31	3.51	3.70
RE		9		6.66	7.45	8.16	8.81	9.42	9.99	6.14	6.72	7.26	7.76	8.24	8.68	3.92	4.30	4.64	4.96	5.27	5.55
RE		12		8.88	9.93	10.9	11.7	12.6	13.3	8.18	8.97	9.68	10.40	11.00	11.60	5.23	5.73	6.19	6.62	7.02	7.40
RE		21		15.5	17.4	19.0	20.6	22.0	23.3	14.3	15.7	16.9	18.1	19.2	20.3	9.2	10.0	10.8	11.6	12.3	12.9
RE		30		22.2	24.8	27.2	29.4	31.4	33.3	20.5	22.4	24.2	25.9	27.5	28.9	13.1	14.3	15.5	16.5	17.6	18.5
RE		45		33.3	37.2	40.8	44.1	47.1	50.0	30.7	33.6	36.3	38.8	41.2	43.4	19.6	21.5	23.2	24.8	26.3	27.7

* See page 160.

Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Multiplier R-404	1.43	1.33	1.24	1.17	1.08	1.00	0.91	0.83	0.73	0.64

These ratings are based on vapor free 100°F liquid refrigerant entering the expansion valve, and a maximum of 7°F change in superheat.
*Balanced port valves are designed to cover an operating range from 50% of nominal capacity up to 110% of nominal capacity.

R404A/R502*/R402A*, B/R507* Metric Extended Capacities in Kilowatts

EVAPORATOR TEMP. (°C)				10°C						0°C						-10°C					
PRESSURE DROP (BAR)				5	7	9	10	12	14	5	7	9	10	12	14	5	7	9	10	12	14
Valve Type	Orifice	Nominal Capacity (kW)	Capacity Range*																		
G(E), EG(E)		1/2		0.38	0.45	0.51	0.54	0.59	0.64	0.36	0.43	0.49	0.51	0.56	0.61	0.34	0.41	0.46	0.49	0.53	0.58
G(E), EG(E)		1		0.77	0.91	1.03	1.08	1.19	1.28	0.73	0.86	0.98	1.03	1.13	1.22	0.69	0.82	0.92	0.97	1.07	1.15
G(E), EG(E)		2		1.53	1.81	2.05	2.16	2.37	2.56	1.45	1.72	1.95	2.06	2.25	2.43	1.38	1.63	1.85	1.95	2.13	2.31
C(E), EC(E)	AA	2 1/2-2		1.53	1.81	2.05	2.16	2.37	2.56	1.45	1.72	1.95	2.06	2.25	2.43	1.38	1.63	1.85	1.95	2.13	2.31
S(E)		2	1/2-2	1.53	1.81	2.05	2.16	2.37	2.56	1.45	1.72	1.95	2.06	2.25	2.43	1.38	1.63	1.85	1.95	2.13	2.31
I		2	1-2	1.53	1.81	2.05	2.16	2.37	2.56	1.45	1.72	1.95	2.06	2.25	2.43	1.38	1.63	1.85	1.95	2.13	2.31
N		3	1-3	2.30	2.72	3.08	3.25	3.56	3.84	2.18	2.58	2.93	3.08	3.38	3.65	2.07	2.45	2.77	2.92	3.20	3.46
G(E) ,EG(E)		4		3.06	3.62	4.11	4.33	4.74	5.12	2.91	3.44	3.90	4.11	4.51	4.87	2.76	3.26	3.70	3.90	4.27	4.61
C(E), EC(E)	A	4	1-4	3.06	3.62	4.11	4.33	4.74	5.12	2.91	3.44	3.90	4.11	4.51	4.87	2.76	3.26	3.70	3.90	4.27	4.61
S(E)		4	1-4	3.06	3.62	4.11	4.33	4.74	5.12	2.91	3.44	3.90	4.11	4.51	4.87	2.76	3.26	3.70	3.90	4.27	4.61
I		4	3-4	3.06	3.62	4.11	4.33	4.74	5.12	2.91	3.44	3.90	4.11	4.51	4.87	2.76	3.26	3.70	3.90	4.27	4.61
G(E), EG(E)		5		4.59	5.43	6.16	6.49	7.11	7.68	4.36	5.16	5.85	6.17	6.76	7.30	4.13	4.89	5.55	5.85	6.40	6.92
G(E), EG(E)		7		6.12	7.25	8.22	8.66	9.49	10.20	5.82	6.88	7.80	8.23	9.01	9.73	5.51	6.52	7.39	7.79	8.54	9.22
C(E), EC(E)	B	7	4-7	6.12	7.25	8.22	8.66	9.49	10.20	5.82	6.88	7.80	8.23	9.01	9.73	5.51	6.52	7.39	7.79	8.54	9.22
S(E), N(E)		7	4-7	6.12	7.25	8.22	8.66	9.49	10.20	5.82	6.88	7.80	8.23	9.01	9.73	5.51	6.52	7.39	7.79	8.54	9.22
G(E)		11		9.18	10.9	12.3	13.0	14.2	15.4	8.7	10.3	11.7	12.3	13.5	14.6	8.3	9.8	11.1	11.7	12.8	13.8
G(E)		14		12.2	14.5	16.4	17.3	19.0	20.5	11.6	13.8	15.6	16.5	18.0	19.5	11.0	13.0	14.8	15.6	17.1	18.4
C(E), EC(E)	C	14	5-14	12.2	14.5	16.4	17.3	19.0	20.5	11.6	13.8	15.6	16.5	18.0	19.5	11.0	13.0	14.8	15.6	17.1	18.4
S(E)		14	5-14	12.2	14.5	16.4	17.3	19.0	20.5	11.6	13.8	15.6	16.5	18.0	19.5	11.0	13.0	14.8	15.6	17.1	18.4
G(E)		21		18.4	21.7	24.6	26.0	28.5	30.7	17.5	20.6	23.4	24.7	27.0	29.2	16.5	19.6	22.2	23.4	25.6	27.7
C(E)	D	21	16-21	18.4	21.7	24.6	26.0	28.5	30.7	17.5	20.6	23.4	24.7	27.0	29.2	16.5	19.6	22.2	23.4	25.6	27.7
RE		21		18.4	21.7	24.6	26.0	28.5	30.7	17.5	20.6	23.4	24.7	27.0	29.2	16.5	19.6	22.2	23.4	25.6	27.7
RE		32		27.6	32.6	37.0	39.0	42.7	46.1	26.2	31.0	35.1	37.0	40.6	43.8	24.8	29.3	33.3	35.1	38.4	41.5
RE		42		36.7	43.5	49.3	52.0	56.9	61.5	34.9	41.3	46.8	49.4	54.1	58.4	33.1	39.1	44.4	46.8	51.2	55.3
RE		74		64.3	76.1	86.3	90.9	99.6	108.0	61.1	72.3	81.9	86.4	94.6	102.0	57.9	68.5	77.6	81.8	89.6	96.8
RE		106		91.8	109	123	130	142	154	87	103	117	123	135	146	83	98	111	117	128	138
RE		158		138	163	185	195	213	231	131	155	176	185	203	219	124	147	166	175	192	207

EVAPORATOR TEMP. (°C)				-20°C						-30°C						-40°C					
PRESSURE DROP (BAR)				7	9	10	12	14	16	9	10	12	14	16	17	9	10	12	14	16	17
Valve Type	Orifice	Nominal Capacity (kw)	Capacity Range* (kW)																		
G(E), EG(E)		1/2		0.35	0.40	0.42	0.46	0.50	0.53	0.29	0.30	0.33	0.36	0.38	0.40	0.19	0.20	0.22	0.24	0.25	0.26
G(E), EG(E)		1		0.71	0.80	0.84	0.92	1.00	1.07	0.58	0.61	0.66	0.72	0.77	0.79	0.38	0.40	0.44	0.47	0.51	0.52
G(E), EG(E)		2		1.41	1.60	1.69	1.85	2.00	2.14	1.15	1.21	1.33	1.43	1.53	1.58	0.76	0.80	0.88	0.95	1.01	1.04
C(E), EC(E)	AA	1/2-2		1.41	1.60	1.69	1.85	2.00	2.14	1.15	1.21	1.33	1.43	1.53	1.58	0.76	0.80	0.88	0.95	1.01	1.04
S(E)		2	1/2-2	1.41	1.60	1.69	1.85	2.00	2.14	1.15	1.21	1.33	1.43	1.53	1.58	0.76	0.80	0.88	0.95	1.01	1.04
I		2	1-2	1.41	1.60	1.69	1.85	2.00	2.14	1.15	1.21	1.33	1.43	1.53	1.58	0.76	0.80	0.88	0.95	1.01	1.04
N		3	1-3	2.12	2.40	2.53	2.77	3.00	3.20	1.73	1.82	1.99	2.15	2.30	2.37	1.14	1.20	1.32	1.42	1.52	1.57
G(E) ,EG(E)		4		2.83	3.20	3.38	3.70	4.00	4.27	2.30	2.42	2.66	2.87	3.07	3.16	1.52	1.60	1.75	1.90	2.03	2.09
C(E), EC(E)	A	4	1-4	2.83	3.20	3.38	3.70	4.00	4.27	2.30	2.42	2.66	2.87	3.07	3.16	1.52	1.60	1.75	1.90	2.03	2.09
S(E)		4	1-4	2.83	3.20	3.38	3.70	4.00	4.27	2.30	2.42	2.66	2.87	3.07	3.16	1.52	1.60	1.75	1.90	2.03	2.09
I		4	3-4	2.83	3.20	3.38	3.70	4.00	4.27	2.30	2.42	2.66	2.87	3.07	3.16	1.52	1.60	1.75	1.90	2.03	2.09
G(E), EG(E)		5		4.24	4.81	5.07	5.55	5.99	6.41	3.45	3.64	3.98	4.30	4.60	4.74	2.28	2.40	2.63	2.84	3.04	3.13
G(E), EG(E)		7		5.65	6.41	6.75	7.40	7.99	8.54	4.60	4.85	5.31	5.74	6.13	6.32	3.04	3.20	3.51	3.79	4.05	4.18
C(E), EC(E)	B	7	4-7	5.65	6.41	6.75	7.40	7.99	8.54	4.60	4.85	5.31	5.74	6.13	6.32	3.04	3.20	3.51	3.79	4.05	4.18
S(E), N(E)		7	4-7	5.65	6.41	6.75	7.40	7.99	8.54	4.60	4.85	5.31	5.74	6.13	6.32	3.04	3.20	3.51	3.79	4.05	4.18
G(E)		11		8.48	9.61	10.1	11.1	12.0	12.8	6.90	7.27	7.97	8.61	9.20	9.48	4.56	4.81	5.26	5.69	6.08	6.27
G(E)		14		11.3	12.8	13.5	14.8	16.0	17.1	9.2	9.7	10.6	11.5	12.3	12.6	6.08	6.41	7.02	7.58	8.11	8.36
C(E), EC(E)	C	14	5-14	11.3	12.8	13.5	14.8	16.0	17.1	9.2	9.7	10.6	11.5	12.3	12.6	6.08	6.41	7.02	7.58	8.11	8.36
S(E)		14	5-14	11.3	12.8	13.5	14.8	16.0	17.1	9.2	9.7	10.6	11.5	12.3	12.6	6.08	6.41	7.02	7.58	8.11	8.36
G(E)		21		17.0	19.2	20.3	22.2	24.0	25.6	13.8	14.5	15.9	17.2	18.4	19.0	9.12	9.61	10.5	11.4	12.2	12.5
C(E)	D	21	16-21	17.0	19.2	20.3	22.2	24.0	25.6	13.8	14.5	15.9	17.2	18.4	19.0	9.12	9.61	10.5	11.4	12.2	12.5
RE		21		17.0	19.2	20.3	22.2	24.0	25.6	13.8	14.5	15.9	17.2	18.4	19.0	9.12	9.61	10.5	11.4	12.2	12.5
RE		32		25.4	28.8	30.4	33.3	36.0	38.4	20.7	21.8	23.9	25.8	27.6	28.5	13.7	14.4	15.8	17.1	18.2	18.8
RE		42		33.9	38.4	40.5	44.4	48.0	51.3	27.6	29.1	31.9	34.4	36.8	37.9	18.2	19.2	21.1	22.7	24.3	25.1
RE		74		59.3	67.3	70.9	77.7	83.9	89.7	48.3	50.9	55.8	60.2	64.4	66.4	31.9	33.6	36.9	39.8	42.6	43.9
RE		106		84.8	96.1	101	111	120	128	69.0	72.7	79.7	86.1	92.0	94.8	45.6	48.1	52.6	56.9	60.8	62.7
RE		158		127	144	152	166	180	192	104	109	120	129	138	142	68	72	79	85	91	94

* See page 160.
Shaded areas are standard conditions.

Liquid Refrigerant Temperature Correction Factor

Liquid Line Temp.	10°C	20°C	30°C	40°C	50°C	60°C
Multiplier R404A	1.48	1.33	1.14	1.00	0.76	0.56

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Applications

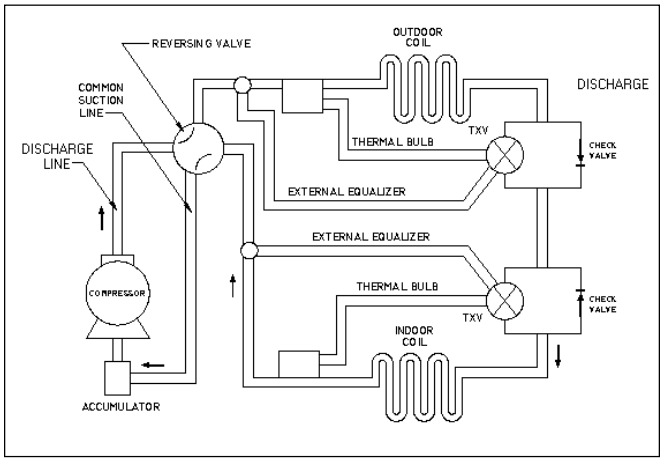
Bi-Directional Valves

The conventional means of applying thermostatic expansion valves to a split system heat pump is shown in the schematic below. This system employs two thermostatic expansion valves and two check valves and could be simplified by using a single thermostatic expansion valve as depicted in the schematic at the right labelled “Bi-directional TXV.”

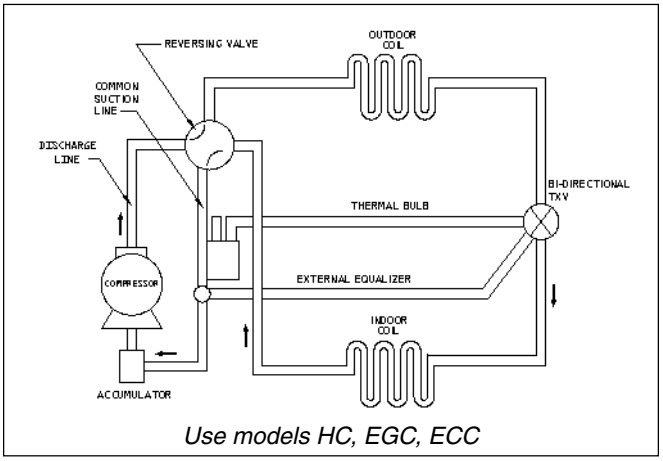
The drawing at the bottom right is a schematic of a heat pump employing a single externally equalized bi-directional thermostatic expansion valve controlling superheat in both the cooling and heating modes. The balanced port valve is ideally suited for this application since its internal construction prevents liquid by-pass through the external equalizer connection in both modes of operation. *Only externally equalized* valves can be used for this application.

When the bi-directional valve is used on a split system and installed on the condensing unit, it may be necessary to insulate the tubing between the expansion valve and the indoor heat exchanger. To decrease the pressure drop, it may also be necessary to increase the diameter of the insulated tubing. These system modifications are not necessary when the valve is applied to a single packaged heat pump.

Note: The schematics at the right show the air conditioning systems in the cooling mode. By switching the 4-way valve, flow from the compressor will be directed from the outdoor coil to the indoor coil changing the systems from cooling to heating.



Conventional TXV



Use models HC, EGC, ECC

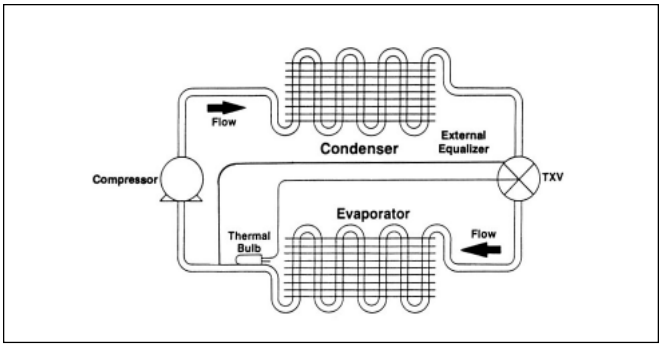
Bi-directional TXV

General Information

Operation

The thermostatic expansion valve is a metering device designed to regulate the flow of liquid to the vaporator, at a rate equal to the evaporation of the liquid in the evaporator. This is accomplished by maintaining a predetermined superheat at the evaporator outlet (suctionline) which ensures that all liquid refrigerant vaporizes in the evaporator with only refrigerant gas returning to thecompressor.

The thermostatic expansion valve (see the schematic at the right) is installed in the liquid line at the evaporator inlet separating the high and low pressure side of the system. The thermal bulb is connected to the outlet of the evaporator, sensing the evaporator outlet temperature. The expansion valve will remain in the closed position until the preset superheat setting is reached. Subsequently, refrigerant flow through the valve orifice will maintain a flow rate consistent with the heat load and the valve superheat setting. If the temperature sensed by the thermal bulb increases, the flow rate will increase, maintaining the proper evaporator outlet superheat. If the temperature decreases, the



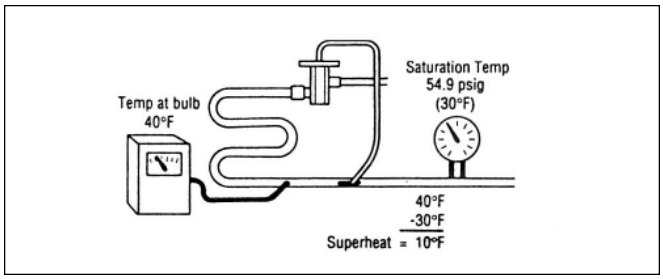
Thermostatic Expansion Valve

valve will stroke in the closing direction in response to the reduced heat load on the evaporator, again maintaining the proper evaporator outlet superheat.

The superheated suction gas flows to the compressor where its pressure and temperature are increased due to compression. The superheated discharge gas from the compressor then flows to the condenser where heat isrejected, changing the gas into a high pressure subcooled liquid. The liquid refrigerant then flows to the expansion valve inlet and is metered into the evaporator at a flow rate necessary to maintain proper evaporator superheat.

How To Determine Superheat

1. Determine suction pressure at evaporator outlet with gauge. On close coupled installations, suction pressure may be read at compressor suction connection.
2. Use Pressure-Temperature Chart to determine saturation temperature at observed suction pressure. For example, with an R-22 system: 54.9 psig = 30°F.
3. Measure temperature of suction gas at the expansion valve's remote bulb location. For example: 40°F.
4. Subtract saturation temperature of 30°F (Step 2) from suction gas temperature of 40°F (Step 3). The difference, 10°F, is the superheat of the suction gas.



Determining Superheat

Superheat

Superheat is the temperature of refrigerant gas above its saturated vapor (dewpoint) temperature. Superheat as it relates to thermostatic expansion valves, can be broken down into three categories:

- Static Superheat – The amount of superheat necessary to overcome the superheat spring force biased in a closed position. Any additional superheat (force) would open the valve.
- Opening Superheat – The amount of superheat necessary to open the valve to its rated capacity.
- Operating Superheat – The superheat at which the valve operates at normal running conditions or normal capacity. The operating superheat is the sum of the static and opening superheat. The figure at the right illustrates the three superheat categories. The reserve capacity, as shown in the graph, is important since it provides the ability to compensate for occasional substantial increases in evaporator load, intermittent flash gas, reduction in high side pressure due to low ambient conditions, shortage of refrigerant, etc.

Valve Setting

Parker "sets" the thermostatic expansion valve superheat at the static condition described above. Turning the adjusting screw clockwise will increase the static superheat. Conversely, turning the adjusting screw counterclockwise will decrease the superheat. Parker valves can also be adjusted at the operating point, indicated above. When a system is operating, any adjustments made will change the operating superheat. The static superheat range of adjustment is 3°F to 18°F. One full turn clockwise will typically increase superheat 2°F to 4°F.

NOTE: Refer to the valve's installation bulletin for specific directions on superheat adjustment.

Charges

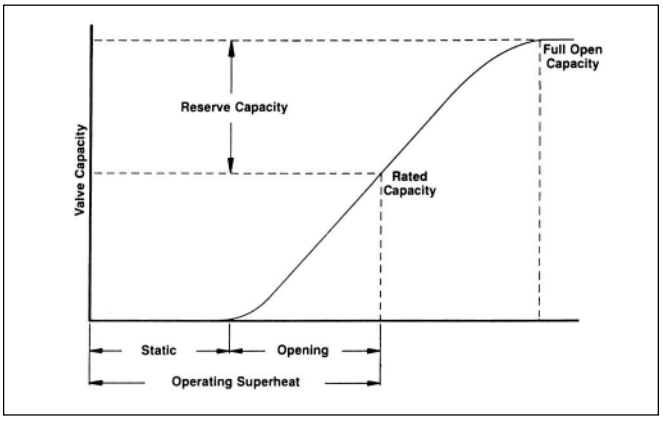
Power elements may be system charged (charged with the same refrigerant used in the system) or cross charged (refrigerant different from that used in the system).

"W" Charge

The Parker "W" liquid cross charge can be used with evaporator temperatures from -40°F to +60°F (-40°C to +15°C). Unlike conventional cross charges, the "W" charge maintains a nearly constant superheat throughout this range of evaporator temperatures. A liquid charged bulb maintains control even when the power element is colder than the bulb.

"Z" Charge

The Parker "Z" low temperature liquid cross charge can be used with evaporator temperatures from -40°F to 0°F (-40°C to -20°C). The "Z" cross charge is designed specifically for low temperature applications; therefore, it can control the system so that the desired

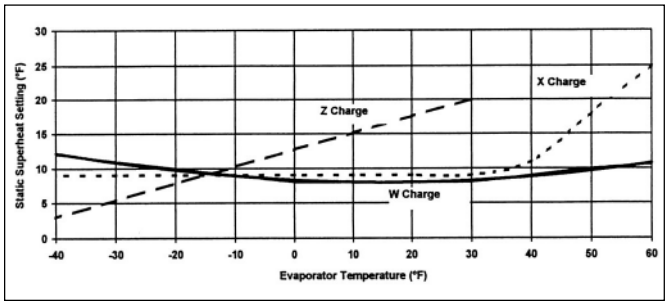


Superheat Capacities

evaporator conditions are achieved more rapidly than the all purpose “W” liquid charge. Additionally, the “Z” charge prevents the possibility for compressor floodback on startup due to higher operating superheats at higher evaporator temperatures. Like the “W” charge, the “Z” liquid charged bulb maintains control even when the valve power element is colder than the bulb.

Since the “Z” charge is designed specifically for low temperature applications, it does not exhibit “flat” superheat control over the entire operating range. This characteristic decrease in superheat as the evaporator temperature decreases allows the system to reach the desired operating conditions quickly. Due to this “slope” in superheat control (see graph at the right below), it is possible to optimize the operating superheat for any particular application by adjusting the valve after operating conditions are achieved.

The graph at the right illustrates the typical superheat control characteristics of Parker thermostatic valve bulb charges.



Parker Thermostatic Bulb Charges

X Charge

The Parker “X” anti-hunt gas cross charge can be used with evaporator temperatures from -40°F to +60°F (-40°C to +15°C). Every “X” charge is a pressure limiting, or MOP (Maximum Operating Pressure), type charge which limits flow on startup to prevent flooding and/or compressor overload. The approximate maximum evaporator operating pressure is designated in psig by the numbers which follow the “X”, e.g. “X60” has an approximate pressure limit of 60 psig. Due to the pressure limiting characteristics of these charges, each charge is usable over a specific evaporator temperature range which can be determined by referencing the MOP number and refrigerant type in the table below.

Valves with an “X” type charge should not be used where the power element could get colder than the thermal bulb. Migration of the bulb charge to the power element can occur causing a loss of valve control. The only exceptions to this are the R-22 type VX100 charge and R-410A type KX200 charge, which are non-migrating charges designed specifically for air-conditioning, heat pump and medium temperature applications.

Recommended thermostatic valve charges are listed in the table at the right. A “–” indicates that a charge is not available for an application.

Recommended Thermostatic Valve Charges

Application	Applicable Evaporator Temperature Range	R-22 R-407C	R-12 R-134a	R-502 R-404A	R-410A
Low Temp Refrigeration	-40°F to 0°F (-40°C to -20°C)	VZ	–	SZ	–
Commercial Refrigeration	-40°F to +60°F (-40°C to +15°C)	VW	JW	SW	–
Low Temp Pressure Limiting	-40°F to 0°F (-40°C to -20°C)	VX35	–	SX35	–
Commercial Pressure Limiting	-10°F to +60°F (-20°C to +15°C)	VX100	JX60	SX110	KX200
Air Conditioning	+30°F to +60°F (0°C to +15°C)	VX100 VX100A	JX60	SX110	KX200
Heat Pump	-15°F to +60°F (-30°C to +15°C)	VX100	–	–	KX200

The Parker Rainbow Charge™

Multiple Use Thermostatic Charges for Alternative Refrigerants

Parker Rainbow Charges™ are designed to provide precise control for a complex variety of old and new refrigerant applications. Rainbow Charge labeling visually indicates which refrigerants each valve is designed for to simplify selection and reduce inventory. Rainbow Charge colors are consistent with industry standard refrigerant identification, insuring that the right Rainbow Charges are chosen for the application See pages 134 and 160 for more information on bulb charges.

Charge	May also be used with
JW, JX60 (R-134a)	R-12, R-401A (MP39), R-401B (MP66)
VW, VX35, VX100, VZ (R22)	R-407C (AC9000)
SW, SX35, SX110, SZ (R404A)	R-125, R-502, R-402A (HP80), R-402B (HP81), R-507 (AZ50)

Use the following steps to determine the correct capacity valve for use with one of the alternative refrigerants listed above:

1. Choose an expansion valve, using the capacity tables, which meets the requirements of the application. For example, if applying an R-22 valve to an R-407C system, choose an appropriate R-22 valve using the conditions of the R-407C system (choose appropriate evaporator temperature and valve pressure drop from R-22 capacity table).
2. Multiply the capacity found in the table by the appropriate factor below to determine actual valve capacity with the new alternative.

From	To	Multiply by	Special Considerations
R-134a	R-12	0.80	Decrease superheat by approximately 5°
R-134a	R-401A (MP-39)	1.05	Adjust superheat only if necessary
R-134a	R-401B (MP-66)	1.05	Adjust superheat only if necessary
R-22	R-407C (AC9000)	1.01	Increase superheat by approximately 5°
R-404A	R-125	0.77	Decrease superheat by approximately 5° for -10°F evap or lower
R-404A	R-502	1.02	Adjust superheat only if necessary
R-404A	R-402A (HP-80)	1.00	Decrease superheat by approximately 5° for 20°F evap or lower
R-404A	R-402B (HP-80)	1.10	Adjust superheat only if necessary
R-404A	R-507 (AZ50)	0.98	Decrease superheat by approximately 5°

3. Correct the capacity determined in the previous step for liquid line temperature.

	Degrees F														
Refrigerant	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°
R-134a	1.66	1.60	1.54	1.47	1.40	1.33	1.27	1.21	1.11	1.07	1.00	0.93	0.87	0.81	0.71
R-401A (MP-39)	1.57	1.51	1.43	1.37	1.35	1.28	1.23	1.17	1.11	1.06	1.00	0.94	0.88	0.82	0.75
R-401B (MP-66)	1.58	1.52	1.47	1.41	1.37	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.81	0.75
R-407C (AC9000)	1.60	1.56	1.49	1.43	1.37	1.32	1.25	1.18	1.12	1.07	1.00	0.94	0.85	0.78	0.71
R-125	2.14	2.00	1.91	1.79	1.71	1.58	1.47	1.38	1.26	1.12	1.00	0.88	0.73	0.57	0.40
R-404A (HP62)	1.91	1.83	1.74	1.64	1.56	1.48	1.39	1.30	1.19	1.10	1.00	0.89	0.78	0.67	0.56
R-402A (HP-80)	1.92	1.84	1.75	1.65	1.59	1.49	1.39	1.29	1.19	1.10	1.00	0.90	0.79	0.69	0.58
R-402B (HP-81)	1.76	1.69	1.61	1.54	1.47	1.39	1.31	1.24	1.16	1.08	1.00	0.91	0.83	0.73	0.64
R-507 (AZ50)	1.96	1.86	1.77	1.68	1.58	1.48	1.39	1.29	1.19	1.10	1.00	0.90	0.80	0.67	0.54

Anti-Hunt Ballast Bulb ("X" Charge)

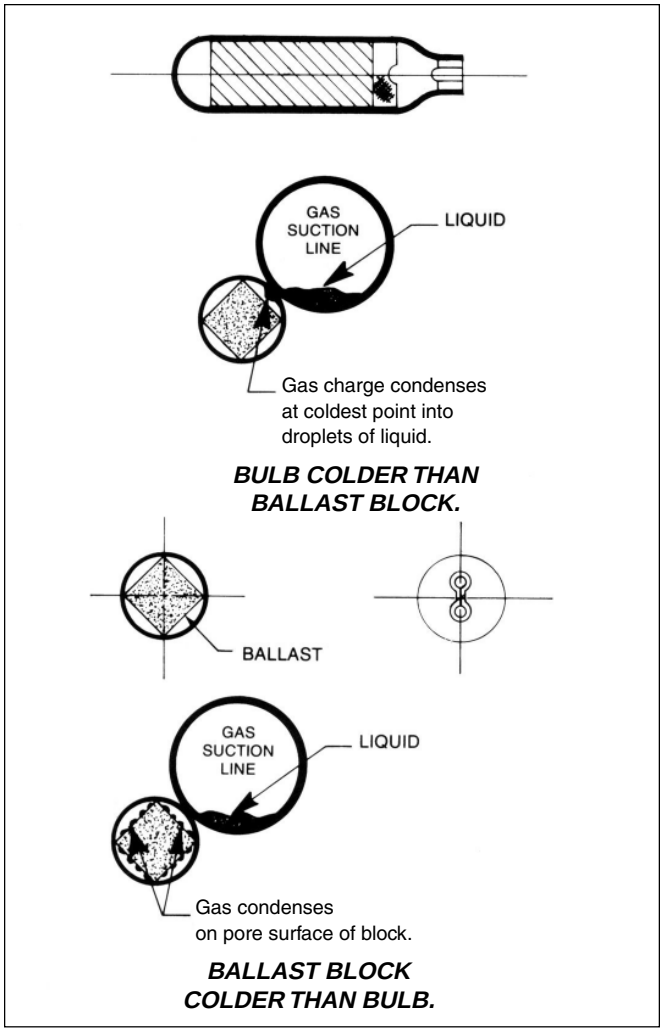
The power element sensing bulb for an "X" charge contains an internal ballast material and the entire assembly is gas cross charged.

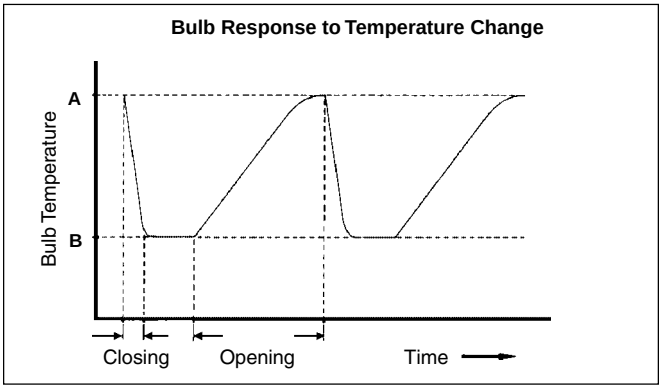
The combination of the cross charge and internal ballast results in a variable rate time constant dampening that reduces or entirely eliminates undesirable system hunt or instability caused by overfeeding or underfeeding the evaporator.

The top two graphs at the right illustrate the thermal ballast time delay characteristics. The top graph shows the bulb response to temperature change. The thermal bulb pressure will decrease rapidly when the temperature is decreased from point A to B causing the valve to modulate toward a lower flow position. As the temperature is increased back to point A, considerably more time is required to increase the thermal bulb pressure

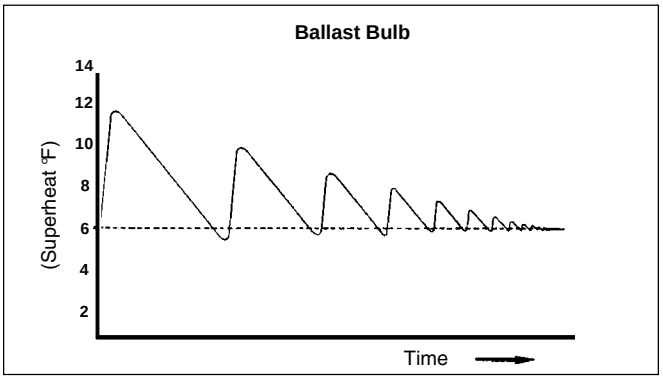
The second graph is an illustration characterizing the operating superheat variation of a typical refrigeration system. When the system load decreases, the suction line temperature and flow decrease and the operating superheat rises rapidly. As the suction line temperature increases, the bulb pressure will slowly increase and the operating superheat will decrease slowly to the predetermined level. This results in a sawtooth wave form which minimizes the system floodback. After several cycles of continuous dampened amplitude, the system will operate at the predetermined superheat with minimum suction line fluctuations (anti-hunt).

The bottom graph illustrates the operation of a non-ballast bulb charge. Since it will respond quickly in an opening and closing manner, the valve may overfeed and underfeed causing undesirable system fluctuation referred to as hunt.

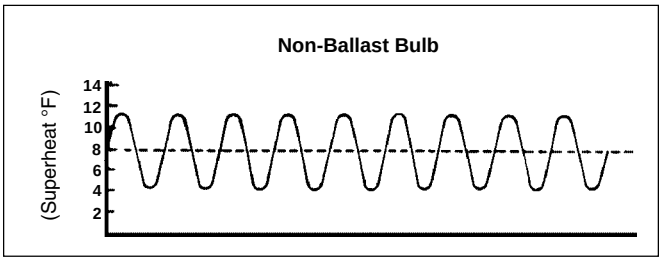




Bulb Response to Temperature Change



Operating Superheat Variation of a Typical Refrigeration System

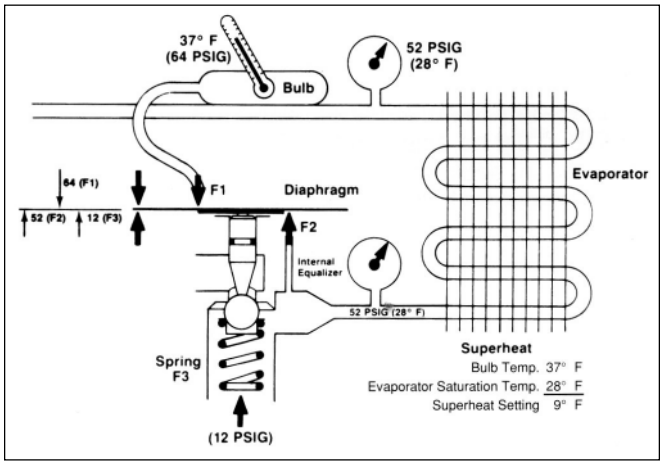


Operation of a Non-Ballast Bulb Charge

Internally Equalized Valves

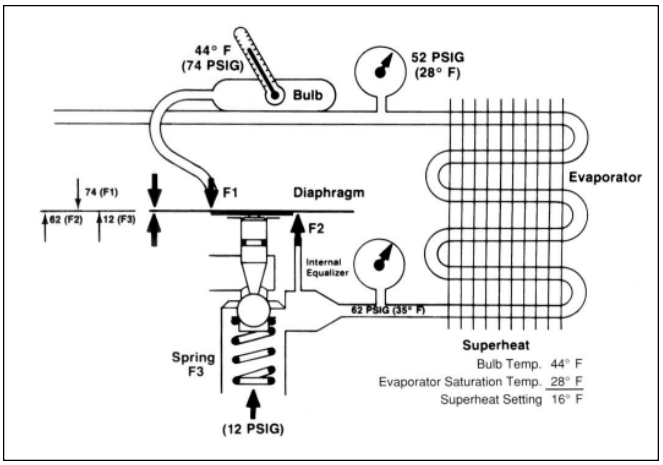
The outlet pressure of an internally equalized valve is transmitted to the underside of the diaphragm through an equalizer hole inside the valve body. Internally equalized valves are used with evaporators that have a pressure drop of less than 3 psi.

The equalizer passageway is the communication link from the evaporator to the underside of the diaphragm (F2). Internally equalized valves incorporate an internal communication passage from the outlet valve cavity to the underside of the diaphragm. In applications where the pressure drop between the valve outlet and the evaporator outlet is negligible, internal equalizers are effective to communicate the actual evaporator pressure to the underside of the diaphragm. In the schematic below, the F-1 force corresponding to refrigerant R-22 at 37°F is 64 psig. The evaporator pressure F-2 is 52 psig at 28°F and the superheat spring force F-3 is set for the balancing pressure of 12 psig. The valve is now in balance with 64 psig above and below the diaphragm and the superheat setting is 9°F.



Internally Equalized Valve with 0 PSI Drop in Evaporator

The following schematic shows the application of an internally equalized valve with a pressure drop of 10 psi across the evaporator. The evaporator saturated inlet pressure is 62 psig at 35°F. The superheat spring force (F-3) is set for an equivalent of 12 psig. The pressure under the diaphragm for an internally equalized valve would total 74 psig (12 + 62 psig). The remote thermal bulb force F-1 is 74 psig, for balanced conditions. This bulb pressure corresponds to a saturation temperature of 44°F. The pressure at the outlet of the evaporator is only 52 psig, 10 psig below the inlet pressure. The saturation temperature at 52 psig is 28°F. Use of an internally equalized valve will result in a superheat of 16°F (44°F- 28°F) at the evaporator outlet. Accordingly, the internally equalized valve used with a high pressure drop evaporator will cause excessive superheat and corresponding capacity loss.

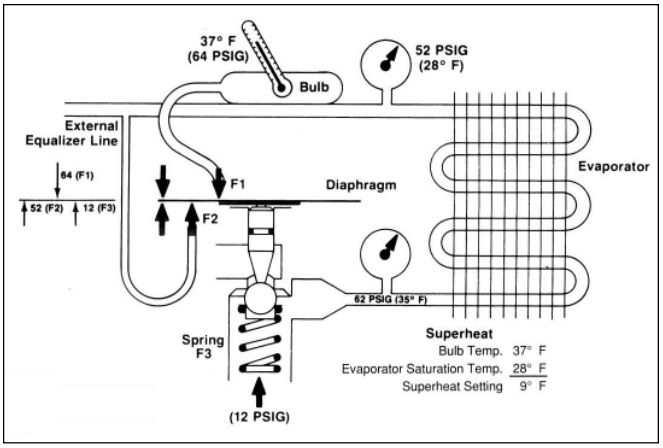


R-22 Internally Equalized Valve with 10 PSI Drop in Evaporator

Externally Equalized Valves

Employment of an externally equalized valve is required to control the evaporator at the proper superheat when the pressure drop of the evaporator is high, i.e. greater than 3 psig. The externally equalized valve will sense the pressure at the outlet of the evaporator. In the schematic below, the pressure under the diaphragm now totals 64 psig (12 plus 52 psig). The thermal bulb pressure above the diaphragm force, F-1, also equals 64 psig while the corresponding saturation temperature is 37°F.

The superheat at the outlet of the evaporator is 9°F (37°F-28°F). The use of a valve with an external equalizer has decreased the superheat from 16°F to 9°F and restored the superheat to the original value of 9°F with the same spring force of 12 psig.



Externally Equalized Valve with 10 PSI Drop in Evaporator

Note: Never cap an external equalizer service port.

Refer to the evaporator manufacturer's installation bulletin or look for a service port near the outlet of the evaporator for external equalizer installation.

Off Cycle Unloading (Bleed)

Internal bleed orifices are used to equalize the high and low side pressures during the off cycle so that low starting torque compressors can start. Systems such as air conditioners and heat pumps sometimes require a TXV with internal bleed due to the frequent cycling that occurs.

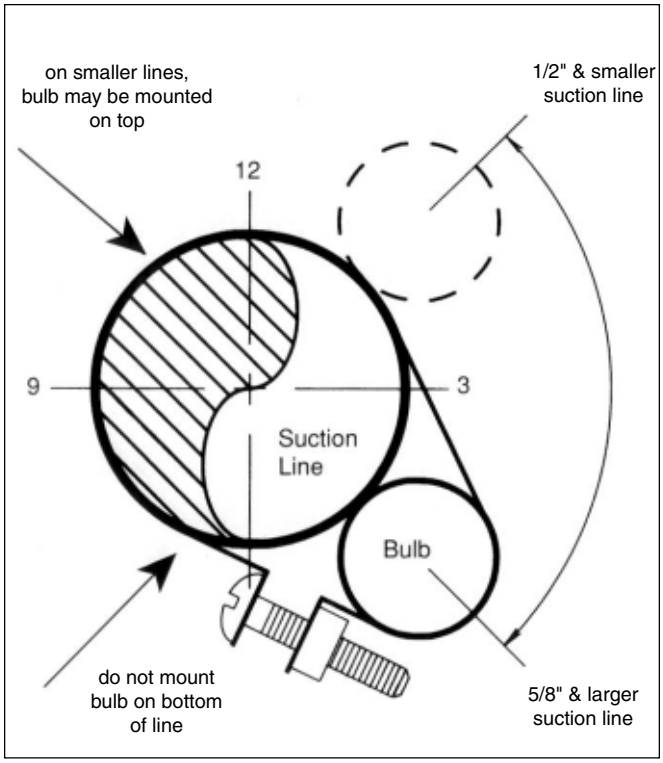
Consult the factory if a bypass bleed is required.

The required bleed size is a function of high and low side system volumes, refrigerant charge, and pressure difference across the valve prior to shutdown. These variables affect the equalization time required by a time delay device or thermostat reset. Bleed sizes are usually specified as a percentage of the nominal valve capacity and can range from 5% to 50%, although 15% to 30% is more commonly specified.

At the end of the valve model number, a letter “B” followed by digits indicates an internal bleed. These digits represent the bleed capacity as a percentage of the valve’s nominal capacity.

Example: SE5VX100B20 – Bleed orifice 20% of 5 tons, or 1 ton bypass bleed.

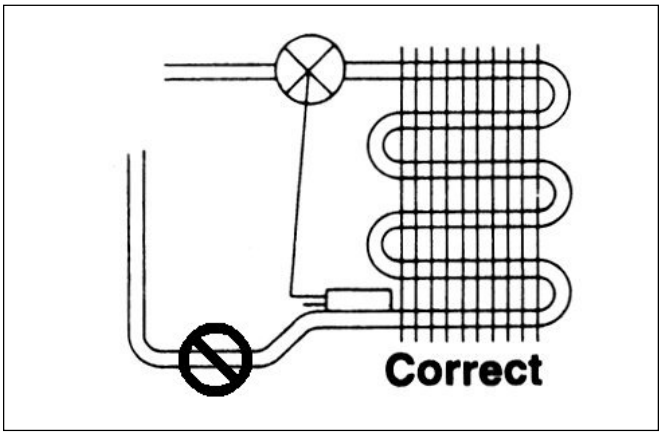
Because the internal bleed is an additional flow path in the valve, adding a bleed will increase the capacity of the valve. Thus, a 5 ton valve with a 20% bleed is actually capable of 6 tons. However, intentionally adding an internal bleed to increase the capacity of a valve is not recommended.



Bulb Location and Installation

Since the control response of the bulb is crucial for satisfactory operation, care should be taken in its mounting and positioning.

- Always make sure the suction line is cleaned before clamping the bulb in place.
- On lines that are 1/2" O.D. or smaller, the bulb may be installed on top of the line or side mounted (preferably at the 3 o’clock position).
- On lines that are 7/8" O.D. or larger, the remote bulb should be installed at 45° or at approximately the 4 or 8 o’clock position.
- Never mount a bulb on the bottom of suction lines because a mixture of refrigerant and oil may be present at that point, especially on smaller lines.
- It is good practice to insulate the bulb regardless of the refrigerant type. This ensures that the bulb will only respond to the suction gas temperature and will not be affected by condensation, ice formation or ambient temperatures.
- Avoid mounting the bulb on vertical lines or close to reversing valves.
- The bulb should always be mounted between the evaporator outlet and the external equalizer connection and should be as close to the evaporator outlet as possible (generally 3 to 6 inches).
- On systems that have multiple evaporators, the bulb must be mounted on the suction line of the evaporator which it controls. Do not mount the bulb on the common suction line.
- Install traps on vertical risers. (See the illustration below.)



Installation of Traps

Balanced Port Valves

Parker balanced port thermostatic expansion valves can be applied to a broad range of air conditioning and refrigeration systems. They exhibit exceptional performance over a wide variation in load on a specific system, or the same valve can be applied to a large range of application capacities.

Features of the balanced port valve include:

- Fully balanced port design incorporating a patented power piston.
- Compensates for wide variations in high to low side pressure.
- Has sufficient capacity to allow for intermittent flash gas.
- Compensates for wide variations in evaporator load.
- Compensates for changes in liquid line temperatures.
- Compensates for wide variations in pressure drop across the thermostatic expansion valve.

Operation

Conventional thermostatic expansion valves respond to four forces (See the illustration at the right):

Force 1 — Thermal bulb pressure times the diaphragm effective area. This force acts on the top of the diaphragm which tends to open the valve.

Force 2 — Evaporator pressure times the diaphragm effective area. This force acts on the underside of the diaphragm. It tends to close the valve. This force is transmitted to the diaphragm through the valve body with internally equalized valves and through the external connection on externally equalized valves.

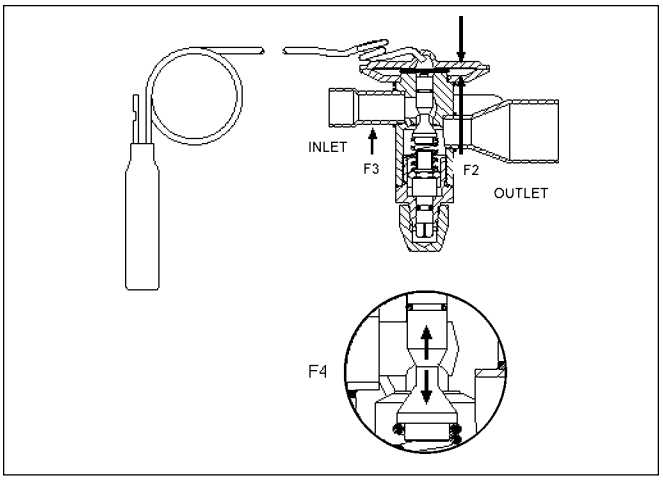
Force 3 — Superheat spring force which assists in closing the valve.

Force 4 — High and low side pressure differential times the port area. This differential pressure force tends to open the valve.

Balanced port valves respond to forces (F-1), (F-2) and (F-3) in a manner similar to conventional valves; however, they take a unique approach to the (F-4) force created by high and low side pressure differentials across the ball and valve orifice. (See figure A.) The area of the Parker Power Piston® is equal to the area of the port diameter. This force is cancelled out as the piston force and the force across the port are equal and opposite.

As inlet pressure changes, the (F-4) force changes but always remain equal and opposite and is cancelled out, therefore, variations in valve system pressures do not have any effect on the static superheat setting of the valve.

The change in operation superheat is only affected by operating changes in load requirements. In contrast, unbalanced (conventional) valves will also change



Forces that Cause Conventional Thermostatic Expansion Valves Responses

operating superheat due to the changes in inlet pressure (F-4). This additional superheat change increases considerably as the port diameter and valve capacity increase.

Assuming a port diameter of .250 inches and a high side pressure change of 100 psi, the change in force of an unbalanced valve would be (100 x .049) or 4.9 pounds. If the effective area of the diaphragm was 1.00 square inch, the change in evaporator pressure would be 4.0psig. If this example is applied to high side variations of 100 to 200 psi, and all common refrigerants are considered at evaporator temperatures from -20°F to +40°F, it is possible that the superheat change could vary 3.5°F to 22°F. This superheat change (not inherent in balanced valves) is in variations in load conditions.

Parker thermostatic expansion valves incorporate the power piston (balanced port), which has been used successfully for over 30 years. The balanced port power element assembly incorporates heavy duty diaphragm housings and a high strength stainless steel flat diaphragm to withstand severe high pressures. The assembly also includes a “buffer” ring for additional support and subsequent additional endurance. The flat steel diaphragm provides a smooth stroke without “snap.” The rugged stainless steel piston assembly uses a proven Parker “O” Ring packing compound for refrigerant use. The element is protected from any system contaminants by virtue of the piston seal on the Parker Power Piston. Additionally, this seal prevents any leakage from the high to low side of the valve.

In the manufacturing process, secondary operations are made on Parker valves that places the diaphragm at a specific position relative to neutral (weld point). This important manufacturing process insures uniform diaphragm sensitivity. Through this unique manufacturing process, Parker valves essentially minimize the variation in superheat change to attain a specific capacity.

Valve Selection Procedure

1. Determine application information.

It is important to obtain specific system information in order to choose the correct valve for a particular application. Listing this information will aid in making choices such as capacity, charge, and fitting configuration which will result in the best possible valve choice for the application.

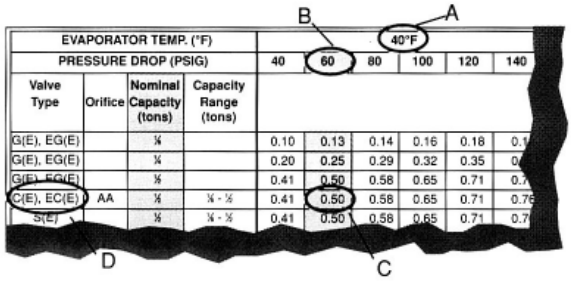
- **System refrigerant**. Determine what refrigerant will be used in the system.
- **Evaporator load or system capacity**. Determine the design system capacity.
- **Evaporator operating temperature/pressure**. Determine the design evaporator temperature and pressure. *Evaporator temperature* is usually specified, or can be calculated by subtracting the "TD" temperature from the desired environment control temperature. *Evaporator pressure* can be determined by looking up the associated saturation pressure for the known evaporator temperature in a refrigerant table.
- **Evaporator pressure drop, distributor pressure drop**. Determine any pressure drop which will occur after the refrigerant exits the valve, such as distributor pressure drop and evaporator pressure drop.
- **Condenser operating pressure/liquid temperature**. Determine the condenser pressure and liquid temperature. The liquid temperature can be determined directly or by subtracting a desired subcooling amount from the condenser design temperature. When determining the liquid pressure, consider any factors which may affect the pressure entering the valve; such as friction losses, vertical lift, and pressure drop across system components such as dryers, sight glasses, and other valves.

Refrigerant	Vertical Lift Pressure Drop					
	20 ft.	6 m	40 ft.	12 m	60 ft.	18 m
R-12	11	0.75	23	1.6	33	2.3
R-22	10	0.69	20	1.4	30	2.1
R-502	10	0.69	21	1.4	31	2.1
R-134a	10	0.69	20	1.4	30	2.1
R-404A	8.5	0.59	17	1.2	25	1.7

- **Connection configuration** (fitting types, sizes, orientations.) Determine what style connections are best suited for the application, SAE flare or ODF copper.
- **Valve adjustment requirements** (adjustable, non-adjustable.) Determine whether or not field adjustment is required.
- **Bypass bleed requirements**. Determine if the system requires equalization of high and low side pressures due to compressor starting limitations. Contact the factory if this is necessary.

2. Determine the required nominal capacity and charge for the valve.

Liquid Line Temp.	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Multiplier R-22	1.21	1.11	1.07	1.00	0.93	0.87	0.81	0.71



A.Evaporator temperature
B. Pressure Drop
C. Design System Tonnage
D. Valve Type

Selection of nominal capacity

- **Find the correct capacity table**. Refer to capacity table section and find the correct page for the system refrigerant in either English or metric units.
- **Find the correct evaporator temperature section for the application** based on the design evaporator temperature.
- **Determine the pressure drop available across the expansion valve**. Deduct the evaporator pressure from the condenser pressure, then deduct pressure losses due to distributors, vertical lift, strainers, other valves, dryers in liquid line, and any significant friction losses in the evaporator and condenser refrigerant lines.
- **Find correct pressure drop column.**
- **Find a capacity selection in that column** which most closely matches the desired system capacity. The usable capacity published in the table represents the valve's nominal capacity at a specific condition. The system design capacity at that same condition should be at least 50% of, but not more than 10% over the selected valve's capacity.
- **Determine the correct type and capacity valve**. Read across to the leftmost columns which describe the model(s) and nominal capacity which will be best for the application.
- **Correct table capacity for liquid line (subcooling) temperature.** Subcooling will normally increase both system and valve capacities. Subcooling will also increase the density of the liquid refrigerant, increase the enthalpy difference across the evaporator and prevent flash gas at the metering device. Flash gas severely reduces the refrigerant flow through the valve orifice, decreasing valve capacity and increasing operating superheat. Correct the system design capacity for liquid line temperature with the liquid temperature correction table located on that page.

Selection of charge

- **Refer to pages 159 and 160 for a full explanation of charge selection.**
- **Select a charge which is best suited for the application.** Type "W" charges are good all-purpose charges, "Z" charges are meant for low temperature applications, and "X" charges are for applications requiring a pressure limit.

3. Choose the valve configuration which best suits the application.

- Select a model which best suits the needs of the application based on fitting type, size, and orientation. Consider physical size and type of adjustment available for each model.
- **Determine whether an external equalizer is necessary.** Combined pressure drops of the distributor and evaporator which exceed 3 psi will require an externally equalized valve for proper operation.
- **Determine the full model number** by combining the information.

Nomenclature *(Example)*

G	E	3	V	X	100	3/8"r SAE	x	1/2" SAE	x	1/4" SAE/ODF
Valve Model	**External Equalizer** Omit for Internal Equalizer	**Nominal Capacity in Tons**	**Refrigerant** See pages 134 and 157.	**Valve Charge** See pages 134 and 157. W Z X	**Maximum Operating Pressure (MOP)**	**Inlet Fitting Size and Type**		**Outlet Fitting Size and Type**		**External Equalizer Size and Type**

Example of Valve Selection Procedure

1. Determine application information. The following information was obtained from system design constraints. The example application is an R-22 freezer which operates continuously at a temperature of 15°F. The evaporator is rated at a 10° TD, therefore the evaporator temperature is approximately 5°F. There are no special pressure constraints on the compressor.

• **System refrigerant**	R-22
• **System capacity**	13,600 BTU/hr (1.13 tons)
• **Evaporator temperature**	5°F
Evaporator pressure	28 psig
• **Evaporator pressure losses**	
Distributor pressure drop	15 psi (estimated)
Evaporator pressure drop	6 psi (estimated)
• **Condenser pressure**	225 psig
Liquid line pressure losses	4 psi (estimated)
Liquid temperature	90°F
• **Connections required**	3/8" SAE liquid line con. 1/2" SAE evaporator con.
• **Valve adjustment requirements**	Adjustable
• **Bypass bleed requirements**	None

2. Determine the required nominal capacity and charge for the valve.

Selection of nominal capacity

• **Find the correct capacity table**	Correct R-22 table on p. 154
• **Find the correct evaporator**	Refer to 0° evaporator section (closest to 5°F design temp.)
• **Determine available pressure drop**	Condenser pressure 225 psig Evaporator pressure - 28 psig Total pressure drop 197 psig Subtract losses Liquid line - 4 psi Distributor - 15 psi Evaporator - 6 psi Net pressure drop 172 psi
• **Find correct pressure drop column**	Refer to 175 psi pressure drop column
• **Find a capacity selection**	Find that there is a G(E)1 valve rated at 1.16 tons
• **Correct table capacity for liquid temperature correction**	Refer to the liquid temperature table for R-22 and find a factor of 1.08 1.16 tons x 1.08 = 1.23 tons This valve will be operating at 92% capacity

Selection of charge

• **Select appropriate charge**	From evaporator temperature range on page 135, choose VW charge

3. Choose the valve configuration that's best for the application

• **Select valve model**	Choose the G(E)1 for this example.
• **Determine if there is an external eqaulizer**	Pressure drop after the expansion valve is 11 psi (5 psi + 6 psi). It is necessary for the valve to be externally equalized, therefore the model number for the valve will include the "E".

- **Determine the full model number;** put the information together:
  GE 1 VW 3/8"R SAE X 1/2" SAE X 1/4" SAE

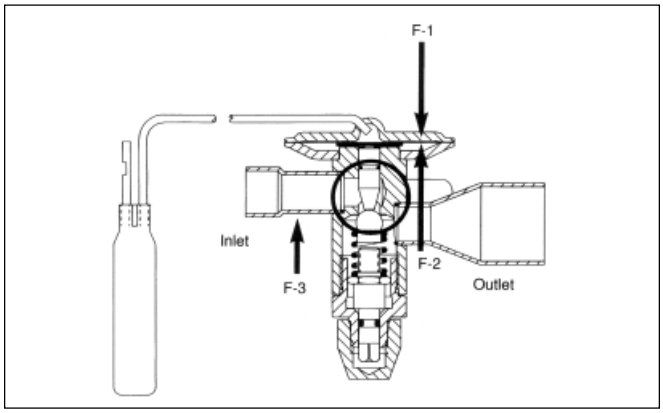
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Tips for Understanding and Preventing Superheat Hunting in TXVs

A common problem facing refrigeration and air conditioning service technicians and contractors is that of superheat hunting by thermostatic expansion valves (TXVs). Here is a better understanding of a commonly overlooked cause of superheat hunting and how the problem might be corrected.

Defining Superheat "Hunting"

Superheat hunting is a cyclical fluctuation in suction superheat due to varying refrigerant flow rate in the system. Superheat hunting is the result of the expansion valve (see the illustration below) excessively opening and closing in an attempt to maintain a constant operating condition. Hunting can be observed as regular fluctuations in suction temperature, and in extremes, suction pressure. Excessive hunting can reduce the capacity and efficiency of the system resulting in uncomfortable conditions, loss of product, and wasted energy.



A conventional balanced port thermostatic expansion valve and the three forces it responds to:
Force F1 – Thermal bulb pressure times the diaphragm effective area. This force acts on the top of the diaphragm which tends to open the valve.
Force F2 – Evaporator pressure times the diaphragm effective area. This force acts on the underside of the diaphragm. It tends to close the valve. This force is transmitted to the diaphragm through the valve body with internal equalized valves and through the external connection in external equalized valves.
Force F3 – Superheat spring force which assists in closing the valve.

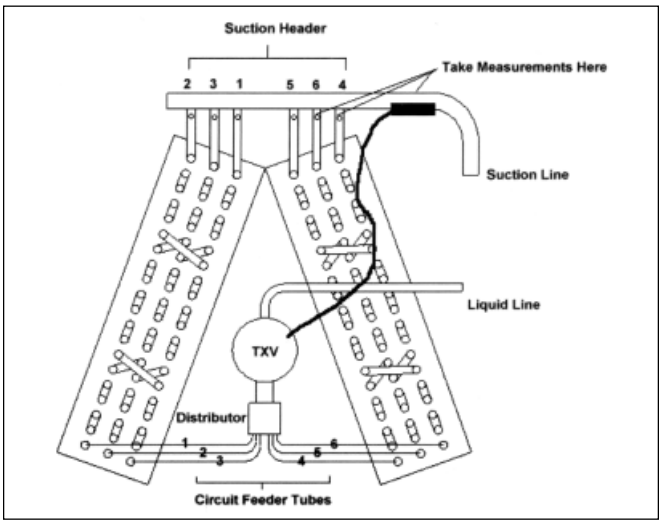
Common Reasons for TXV Hunting

- **Oversized valve –** The expansion valve may be oversized for the application or operating condition of the system. If the valve capacity significantly exceeds the requirements of the system, when the valve attempts to adjust to system load it overcompensates because it is oversized.
- **Incorrect charge selection –** The charge selected does not have the necessary control characteristics and / or dampening ability to stabilize operation.
- **Undercharged system –** Intermittent loss of subcooling is causing loss of expansion valve capacity and resulting intermittent high superheat.
- **Poor bulb contact –** Loss or delay of temperature signal to bulb causes erratic and unpredictable operation.
- **An imbalanced heat exchanger (multi-circuit coil) –** An imbalance in the heat load on each circuit creates a false temperature signal to the expansion valve bulb and results in erratic operation. Since this problem is commonly overlooked in the field, a closer examination and a possible solution are in order.

Balanced or Unbalanced Circuits? TXVs on Multi-Circuit Heat Exchangers

TXVs respond, in part, to the temperature of the suction line. At the expansion valve outlet, flow is divided into 2 or more paths (circuits) at the inlet of the evaporator by the distributor. These paths recombine as they exit the evaporator into the suction manifold. (See the illustration below.)

Ideally, each circuit is equally loaded and absorbs an equivalent amount of heat. If one assumes the refrigerant flow rate and heat load through each circuit is equal, then the superheat condition exiting each circuit will be equal and when all of the flow streams recombine, the result is a "true" average condition of the evaporator suction gas. When one or more circuits has a lighter heat load, some refrigerant from that circuit remains unevaporated when it exits the coil. When this unevaporated liquid refrigerant combines with the other superheated flow streams, the recombined suction flow



Expansion Valve Flow

no longer represents an average condition. The suction temperature where the bulb is mounted will be lower than the "true" average of the circuits if they were all properly superheated.

Sensing a "cold" suction condition will cause the valve to close down because it is sensing a condition which is not superheated enough; when the valve closes down, it restricts flow to all circuits and eventually "dries out" the circuits which are is flooding. By this time, the remaining circuits have become highly superheated due to the reduced flow rate. At the point the "flooding" circuit(s) begin to be superheated, the suction temperature rises rapidly because there is no more liquid present to falsely reduce the suction temperature.

Sensing a now "warm" suction condition, the valve opens to decrease superheat and the lightly loaded circuit begins to flood into the suction manifold again. Suction temperature drops rapidly again, the valve closes down again, the sequence repeating in a cyclical fashion.

Again, the ideal situation is to assume each circuit is equally loaded and absorbs an equivalent amount of heat; in reality, this situation does not always occur. There are several reasons why circuits can become unevenly loaded:

- **Poor heat exchanger design –** In this case, each circuit is not of equal length and loading.
- **Poor refrigerant distribution –** This problem occurs due to the wrong choice of distributor or feeder tubes, partially blocked passageways of feeder tubes, unequal feeder tube lengths, and/or kinked feeder tubes.
- **Uneven air flow –** Air flow across the evaporator is reduced in some areas while increased in other areas. Dirty coils or damaged coil fins can have a similar effect on air flow.

Diagnosing a Hunting Problem: Is It the Heat Exchanger?

Diagnosing a hunting problem due to an imbalanced heat exchanger requires measuring the exit temperature of each circuit upstream of the suction manifold. To perform this process, average the temperatures of all of the circuits upstream of the suction manifold and compare this average temperature to the actual temperature of the suction manifold close to where the bulb is mounted. If the average value of the circuit exit temperatures exceeds the actual suction temperature value by more than 2°F, then there is likely one or more circuit(s) which are not completely superheated (flooding). A closer examination of the individual circuit temperatures and the associated suction pressure should reveal which circuit(s) are causing the problem.

One simple rule to remember is that the valve's response will favor the circuit that is flooding. Because of this favorable response, a heat exchanger can be operating at a reasonable exit superheat but still have a significant loss in capacity because the expansion valve is responding to one or more flooding circuits while the other circuits remain highly superheated, and thus highly inefficient.

Correcting the Problem

Correcting the problem can be a difficult task. First, the service tech must recognize the cause of the problem. If not, the problem can only be compensated for and this could mean a reduction in system performance. Here are some tips for correcting or compensating for an imbalanced heat exchanger:

- If possible, examine and correct any problems with air flow, coil circuitry, and distribution such that the circuits are more evenly fed and loaded. The goal is a more consistent circuit exit temperature on all circuits. One lightly loaded circuit may be tolerable if there are, for example, eight circuits. However, this is probably not the case if there are only three.
- Adjust the superheat of the valve to a slightly higher value. Attempting to control an evaporator near to or lower than 5°F operating superheat can exceed the sensing capability of most expansion valves and result in hunting and subsequent intermittent flooding.
- If practical, move the bulb farther downstream on the suction line. Better mixing of the refrigerant prior to the bulb can "smooth" out the valve response although capacity and efficiency may not improve significantly.

Model 104A & 104F Constant Pressure Expansion Valves

Specifications

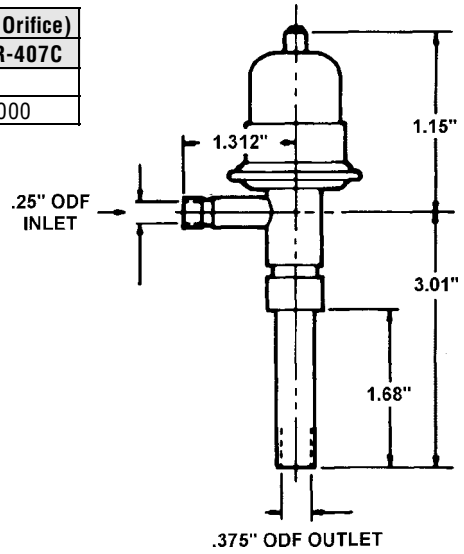
- **Hermetic construction.**
- **Solder connections:** High temperature type 1/4" O.D.F. inlet, 3/8" O.D.F. outlet (5/16" outlet available).
- **Valve opening point adjusting range:** 0 to 90 psig is standard for valves. A higher adjustment range is available.
- **Adjusting screw:** Set at a pre-determined pressure with sealant or lock nut.
- **With or without bleed** for offcycle unloading in all orifice sizes.
- **Orifice sizes:** .120" is standard; .093" and .140" orifices are available.
- **Bleed sizes:** B2 through B60 nicked seat type; B60 through B140 drilled by-pass type.
- **Maximum Operating Pressures**
  High Side: 500 psig (35 bars)
  Low Side: 300 psig (21 bars)
- **Construction:** Brass, copper and stainless steel.

104A

Capacities (BTU/hr) Model 104A

Model No.	Device No.	Nominal Capacity (.120" Orifice)	
		R-12 R-134a	R-22 R-407C
Model 104A			
104A	104-505	14,000	24,000

Dimensions



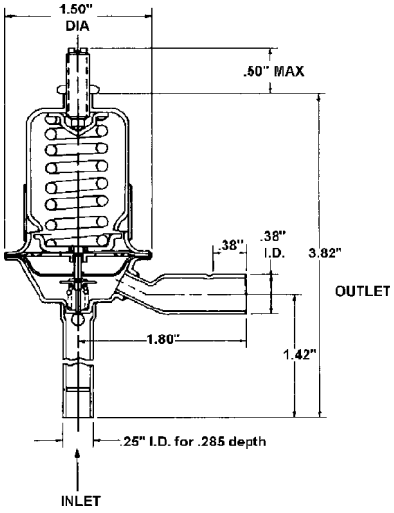


104F

Capacities (BTU/hr) Model 104A

Refrigerant	Orifice Size	
	.093"	.120"
R-12 R-134a	12,000	15,000
R-407C R-22	18,000	24,000

Dimensions





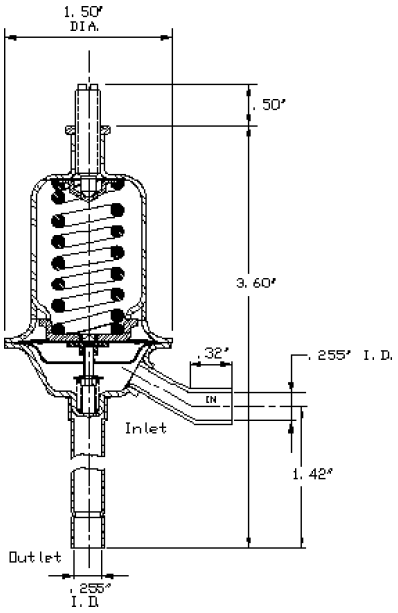
Model 139 Evaporator Pressure Regulator (EPR)



Specifications

- **Solder Connections –** 1/4" ODM inlet, 1/4" ODF outlet.
- **Adjustment Range –** Consult Parker.
- **Adjusting Screw –** Set at pre-determined pressure with sealant or locknut.
- **Nominal Capacities –** For fractional horsepower compressors. For more detail consult Parker.
- **Construction –** All brass, copper and stainless steel.
- **Maximum Operating Pressure –** Consult Parker.

Dimensions



A Series Constant Pressure Expansion Valves

Specifications

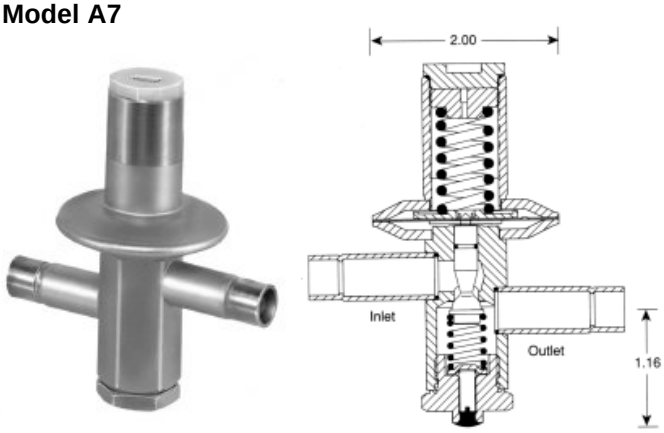
- 0-90 psig adjustment range.
- Bypass bleeds available.
- Construction: Brass, copper and stainless steel.
- Optional external equalizer.
- U.L. recognized for maximum operating pressure of 500 psig high side, 225 psig low side.

Model No.	Equalizer	Connections	
		Inlet	Outlet
A1	Internal	1/4" SAE	1/4" NPTF
A2*	Internal	1/4" SAE	1/2 SAE
A3	Internal	3/8" SAE	1/2" SAE
AE3**	External	3/8" SAE	1/2" SAE
A4	Internal	1/4" SAE	1/2" SAE
AS	Internal	1/4" ODF	3/8" ODF
A7	Internal	3/8" ODF	3/8" ODF
AT	Internal	1/4 SAE 1/4 ODF 8 mm ODF	1/4 NPTF 8 mm ODF

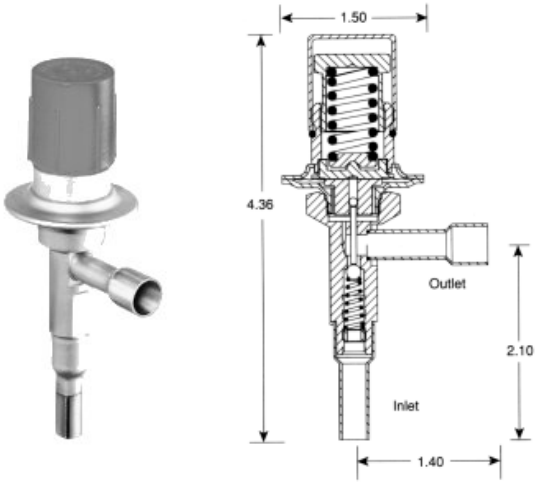
* 1/2" x 3/8" SAE flare adapter available.

** It is recommended that external equalizer type be used when pressure drop through the evaporator and/or distributor exceeds 5 psi.

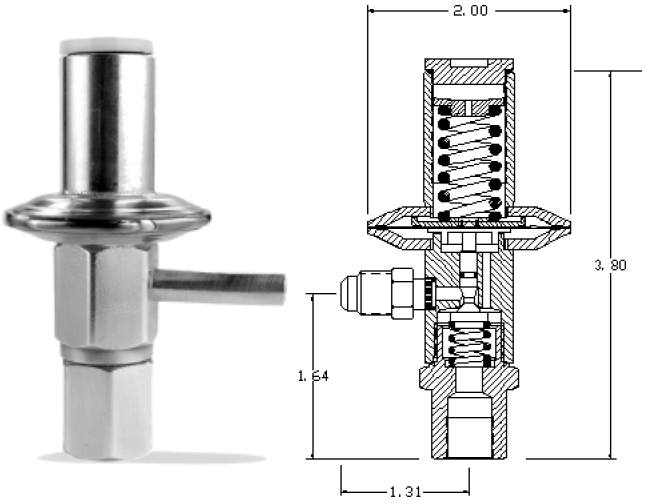
Model A7



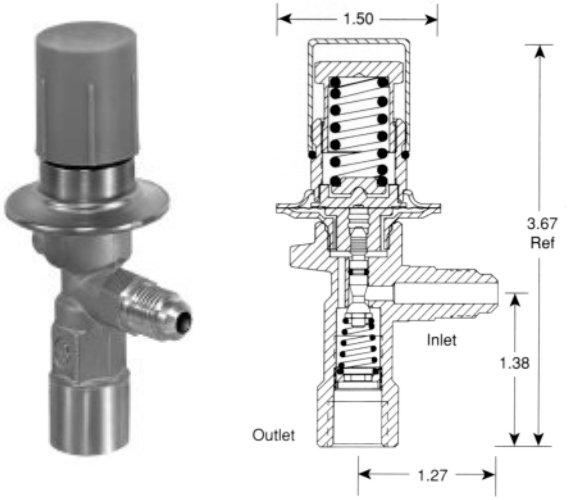
Model AS



Model AT

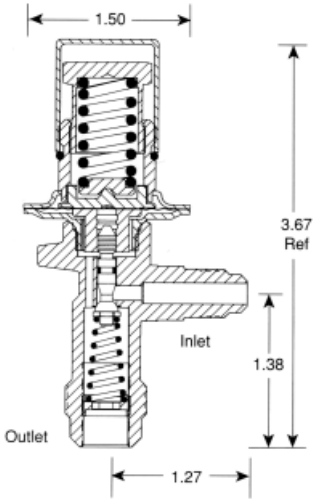


Model A1



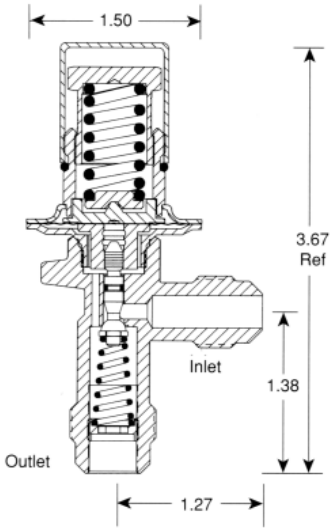
Model A2



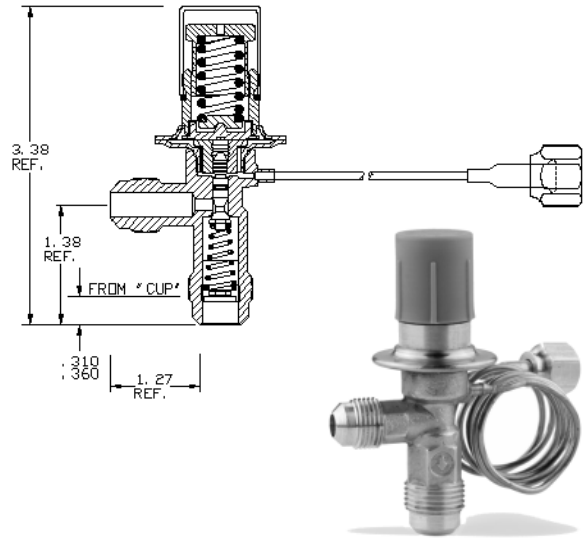


Model A3



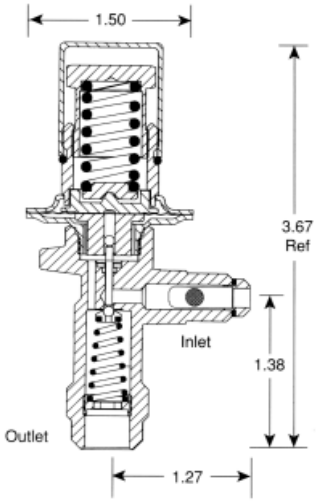


Model AE3



Model A4





Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R-134a/R-401A/R-401B/R-12 U.S. Extended Capacities in Tons

Evaporator Temp. (°F)				40°F						20°F						0°F					
Pressure Drop (PSIG)				40	60	80	100	120	140	60	80	100	120	140	160	60	80	100	120	140	160
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	2	1-2	1.63	2.00	2.31	2.58	2.83	3.06	1.90	2.19	2.45	2.69	2.90	3.10	1.70	1.96	2.19	2.40	2.60	2.78
A4		1/2	1/4-3/4	0.61	0.75	0.87	0.97	1.06	1.15	0.71	0.82	0.92	1.01	1.09	1.16	0.64	0.74	0.82	0.90	0.97	1.04
A7-AA	AA	1/2	1/8-1/2	0.41	0.50	0.58	0.65	0.71	0.76	0.48	0.55	0.61	0.67	0.73	0.78	0.43	0.49	0.55	0.60	0.65	0.69
A7-A	A	1	1/4-1	0.82	1.00	1.15	1.29	1.41	1.53	0.95	1.10	1.23	1.34	1.45	1.55	0.85	0.98	1.10	1.20	1.30	1.39
A7-B	B	2	1-2	1.63	2.00	2.31	2.58	2.83	3.06	1.90	2.19	2.45	2.69	2.90	3.10	1.70	1.96	2.19	2.40	2.60	2.78
A7-C	C	3	1 1/2 - 3	2.45	3.00	3.46	3.87	4.24	4.58	2.85	3.29	3.68	4.03	4.35	4.65	2.55	2.94	3.29	3.61	3.90	4.16
AS, ASB20		1	1/4-1	0.82	1.00	1.15	1.29	1.41	1.53	0.95	1.10	1.23	1.34	1.45	1.55	0.85	0.98	1.10	1.20	1.30	1.39
104A	.093	1		0.82	1.00	1.15	1.29	1.41	1.53	0.95	1.10	1.23	1.34	1.45	1.55	0.85	0.98	1.10	1.20	1.30	1.39
104A, 104F	.120	1 1/4		1.03	1.25	1.44	1.61	1.76	1.91	1.19	1.38	1.54	1.68	1.81	1.94	1.06	1.23	1.38	1.50	1.63	1.74
104A, 104F	.140	1 1/2		1.23	1.50	1.73	1.94	2.12	2.30	1.43	1.65	1.85	2.01	2.18	2.33	1.28	1.47	1.65	1.80	1.95	2.09
Evaporator Temp. (°F)				-10°F						-20°F						-40°F					
Pressure Drop (PSIG)				80	100	120	140	160	180	80	100	120	140	160	180	80	100	120	140	160	180
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	2	1-2	1.64	1.83	2.01	2.17	2.32	2.46	1.34	1.50	1.64	1.77	1.89	2.01	0.88	0.98	1.07	1.16	1.24	1.32
A4		1/2	1/4-3/4	0.61	0.69	0.75	0.81	0.87	0.92	0.50	0.56	0.62	0.66	0.71	0.75	0.33	0.37	0.40	0.44	0.47	0.49
A7-AA	AA	1/2	1/8-1/2	0.41	0.46	0.50	0.54	0.58	0.61	0.33	0.37	0.41	0.44	0.47	0.50	0.22	0.25	0.27	0.29	0.31	0.33
A7-A	A	1	1/4-1	0.82	0.92	1.00	1.08	1.16	1.23	0.67	0.75	0.82	0.89	0.95	1.00	0.44	0.49	0.54	0.58	0.62	0.66
A7-B	B	2	1-2	1.64	1.83	2.01	2.17	2.32	2.46	1.34	1.50	1.64	1.77	1.89	2.01	0.88	0.98	1.07	1.16	1.24	1.32
A7-C	C	3	1 1/2 - 3	2.46	2.75	3.01	3.25	3.48	3.69	2.01	2.25	2.46	2.66	2.84	3.01	1.32	1.47	1.61	1.74	1.86	1.97
AS, ASB20		1	1/4-1	0.82	0.92	1.00	1.08	1.16	1.23	0.67	0.75	0.82	0.89	0.95	1.00	0.44	0.49	0.54	0.58	0.62	0.66
Pressure Drop (PSIG)				40	60	80	100	120	140	60	80	100	120	140	160	60	80	100	120	140	160
104A	.093	1		0.82	0.92	1.00	1.08	1.16	1.23	0.67	0.75	0.82	0.89	0.95	1.00	0.44	0.49	0.54	0.58	0.62	0.66
104A, 104F	.120	1 1/4		1.03	1.15	1.25	1.35	1.45	1.54	0.84	0.94	1.03	1.11	1.19	1.25	0.55	0.61	0.60	0.73	0.78	0.83
104A, 104F	.140	1 1/2		1.23	1.38	1.50	1.62	1.74	1.85	1.01	1.13	1.23	1.34	1.43	1.50	0.66	0.74	0.81	0.87	0.93	0.99

Shaded areas are standard conditions.

R-22/R-407C* U.S. Extended Capacities in Tons

Evaporator Temp. (°F)				40°F						20°F						0°F					
Pressure Drop (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	3	1 1/2-3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.29	2.64	2.95	3.23	3.49	3.73
A4		1	1/2-1	0.87	1.00	1.12	1.22	1.32	1.41	0.85	0.98	1.10	1.20	1.30	1.39	0.76	0.88	0.98	1.08	1.16	1.24
A7-AA	AA	3/4	1/5-3/4	0.65	0.75	0.84	0.92	0.99	1.06	0.64	0.74	0.82	0.90	0.97	1.04	0.57	0.66	0.74	0.81	0.87	0.93
A7-A	A	11/2	1/2-1 1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
A7-B	B	3	11/2-3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.29	2.64	2.95	3.23	3.49	3.73
A7-C	C	5	3 1/2-5	4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	3.81	4.40	4.92	5.39	5.82	6.22
AS, ASB20		11/2	1/2-1 1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
104A	.093	1.5		1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.14	1.32	1.48	1.62	1.75	1.87
104A, 104F	.120	2.0		1.63	2.00	2.10	2.30	2.48	2.65	1.59	1.84	2.05	2.25	2.43	2.60	1.43	1.65	1.85	2.03	2.19	2.34
104A, 104F	.140	2.5		1.95	2.50	2.52	2.76	2.97	3.18	1.91	2.21	2.46	2.70	2.91	3.12	1.71	1.98	2.22	2.43	2.63	2.81
Evaporator Temp. (°F)				-10°F						-20°F						-40°F					
Pressure Drop (PSIG)				100	125	150	175	200	225	125	150	175	200	225	250	125	150	175	200	225	250
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	3	1 1/2-3	2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.38	1.51	1.63	1.74	1.85	1.94
A4		1	1/2-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.46	0.50	0.54	0.58	0.62	0.65
A7-AA	AA	3/4	1/5-3/4	0.56	0.62	0.68	0.73	0.78	0.83	0.51	0.56	0.61	0.65	0.69	0.72	0.34	0.38	0.41	0.43	0.46	0.49
A7-A	A	11/2	1/2-1 1/2	1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
A7-B	B	3	1 1/2-3	2.22	2.48	2.72	2.94	3.14	3.33	2.05	2.24	2.42	2.59	2.75	2.89	1.38	1.51	1.63	1.74	1.85	1.94
A7-C	C	5	3 1/2-5	3.70	4.14	4.53	4.89	5.23	5.55	3.41	3.74	4.03	4.31	4.58	4.82	2.29	2.51	2.71	2.90	3.08	3.24
AS, ASB20		11/2	1/2-1 1/2	1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
Pressure Drop (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
104A	.093	1.5		1.11	1.24	1.36	1.47	1.57	1.67	1.02	1.12	1.21	1.29	1.37	1.45	0.69	0.75	0.81	0.87	0.92	0.97
104A, 104F	.120	2.0		1.39	1.55	1.70	1.84	1.96	2.09	1.28	1.40	1.51	1.61	1.71	1.81	0.86	0.94	1.01	1.09	1.15	1.21
104A, 104F	.140	2.5		1.67	1.86	2.04	2.21	2.36	2.51	1.53	1.68	1.82	1.94	2.06	2.18	1.04	1.13	1.22	1.31	1.38	1.46

* See page 160.

Shaded areas are standard conditions.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R-404A/R-502*/R-402A*, B*/R-507* U.S. Extended Capacities in Tons

Evaporator Temp. (°F)				40°F						20°F						0°F					
Pressure Drop (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	2	1-2	1.73	2.00	2.24	2.45	2.65	2.83	1.66	1.92	2.15	2.35	2.54	2.72	1.51	1.74	1.95	2.13	2.30	2.46
A4		1/2	1/4-3/4	0.65	0.75	0.84	0.92	0.99	1.06	0.62	0.72	0.80	0.88	0.95	1.02	0.57	0.65	0.73	0.80	0.86	0.92
A7-AA	AA	1/2	1/8-1/2	0.43	0.50	0.56	0.61	0.66	0.71	0.42	0.48	0.54	0.59	0.63	0.68	0.38	0.44	0.49	0.53	0.58	0.62
A7-A	A	1	1/4-1	0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
A7-B	B	2	1-2	1.73	2.00	2.24	2.45	2.65	2.83	1.66	1.92	2.15	2.35	2.54	2.72	1.51	1.74	1.95	2.13	2.30	2.46
A7-C	C	4	1 1/2 - 4	3.46	4.00	4.47	4.90	5.29	5.66	3.33	3.84	4.29	4.70	5.08	5.43	3.01	3.48	3.89	4.26	4.60	4.92
AS, ASB20		1	1/4-1	0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
104A	.093	1.5		0.87	1.00	1.12	1.22	1.32	1.41	0.83	0.96	1.07	1.18	1.27	1.36	0.75	0.87	0.97	1.07	1.15	1.23
104A, 104F	.120	2.0		1.09	1.25	1.40	1.53	1.65	1.76	1.04	1.20	1.34	1.48	1.59	1.70	0.94	1.09	1.21	1.34	1.44	1.54
104A, 104F	.140	2.5		1.31	1.50	1.68	1.83	1.98	2.12	1.25	1.44	1.61	1.77	1.91	2.04	1.13	1.31	1.46	1.61	1.73	1.85
Evaporator Temp. (°F)				-10°F						-20°F						-40°F					
Pressure Drop (PSIG)				100	125	150	175	200	225	125	150	175	200	225	250	125	150	175	200	225	250
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	2	1-2	1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.87	0.96	1.03	1.10	1.17	1.23
A4		1/2	1/4-3/4	0.56	0.62	0.68	0.73	0.78	0.83	0.51	0.56	0.61	0.65	0.69	0.72	0.33	0.36	0.39	0.41	0.44	0.46
A7-AA	AA	1/2	1/8-1/2	0.37	0.41	0.45	0.49	0.52	0.56	0.34	0.37	0.40	0.43	0.46	0.48	0.22	0.24	0.26	0.28	0.29	0.31
A7-A	A	1	1/4-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
A7-B	B	2	1-2	1.48	1.65	1.81	1.96	2.09	2.22	1.36	1.49	1.61	1.73	1.83	1.93	0.87	0.96	1.03	1.10	1.17	1.23
A7-C	C	4	1 1/2 - 4	2.96	3.31	3.63	3.92	4.19	4.44	2.73	2.99	3.23	3.45	3.66	3.86	1.74	1.91	2.06	2.21	2.34	2.47
AS, ASB20		1	1/4-1	0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
Pressure Drop (PSIG)				75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200
104A	.093	1.5		0.74	0.83	0.91	0.98	1.05	1.11	0.68	0.75	0.81	0.86	0.92	0.96	0.44	0.48	0.52	0.55	0.59	0.62
104A, 104F	.120	2.0		0.93	1.04	1.14	1.23	1.31	1.39	0.85	0.94	1.01	1.08	1.15	1.20	0.55	0.60	0.65	0.69	0.74	0.78
104A, 104F	.140	2.5		1.11	1.25	1.37	1.47	1.58	1.67	1.02	1.13	1.22	1.29	1.38	1.44	0.66	0.72	0.78	0.83	0.89	0.93

* See page 160.
Shaded areas are standard conditions.

Liquid Refrigerant Correction Factors

R-12	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-12 Multiplier	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-404A	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-404A Multiplier	1.48	1.39	1.30	1.19	1.10	1.00	0.89	0.78	0.67	0.56
R-134a	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-134a Multiplier	1.33	1.27	1.21	1.11	1.07	1.00	0.93	0.87	0.81	0.71
R-22	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-22 Multiplier	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.77
R-502	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-502 Multiplier	1.43	1.33	1.24	1.17	1.08	1.00	0.91	0.83	0.73	0.64

R-12	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-12	1.30	1.21	1.10	1.00	0.89	0.77
R-22	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-22	1.30	1.21	1.10	1.00	0.89	0.78
R-404A	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-404A	1.48	1.33	1.14	1.00	0.76	0.56
R-134a	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-134a	1.33	1.21	1.09	1.00	0.85	0.71
R-502	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-502	1.43	1.31	1.17	1.00	0.84	0.67

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R-134a/R-401A/R-401B/R-12 U.S. Extended Capacities in Kilowatts

Evaporator Temp. (°C)				10°C						0°C						-10°C					
Pressure Drop (BAR)				3	4	6	7	8	10	4	6	7	8	10	11	4	6	7	8	10	11
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	7	4-7	6.21	7.17	8.79	9.49	10.10	11.30	6.89	8.44	9.11	9.74	10.90	11.40	6.46	7.91	8.54	9.13	10.20	10.70
A4		3	1-3	2.33	2.69	3.30	3.56	3.80	4.25	2.58	3.16	3.42	3.65	4.08	4.28	2.42	2.97	3.20	3.42	3.83	4.02
A7-AA	AA	2	1/2-2	1.55	1.79	2.20	2.37	2.54	2.84	1.72	2.11	2.28	2.44	2.72	2.86	1.61	1.98	2.14	2.28	2.55	2.68
A7-A	A	4	1-4	3.11	3.59	4.39	4.75	5.07	5.67	3.44	4.22	4.56	4.87	5.45	5.71	3.23	3.95	4.27	4.57	5.10	5.35
A7-B	B	7	4-7	6.21	7.17	8.79	9.49	10.10	11.30	6.89	8.44	9.11	9.74	10.90	11.40	6.46	7.91	8.54	9.13	10.20	10.70
A7-C	C	11	5-11	9.32	10.80	13.20	14.20	15.20	17.00	10.30	12.70	13.70	14.60	16.30	17.10	9.69	11.90	12.80	13.70	15.30	16.10
AS, ASB20		4	1-4	3.11	3.59	4.39	4.75	5.07	5.67	3.44	4.22	4.56	4.87	5.45	5.71	3.23	3.95	4.27	4.57	5.10	5.35
104A	.093	1	1-4	3.11	3.59	4.39	4.75	5.07	5.67	3.44	4.22	4.56	4.87	5.45	5.71	3.23	3.95	4.27	4.57	5.10	5.35
104A, 104F	.120	1 1/4	2-5	3.89	4.49	5.49	5.94	6.34	7.09	4.30	5.28	5.70	6.09	6.81	7.14	4.04	4.94	5.34	5.71	6.38	6.69
104A, 104F	.140	1 1/2	3-6	4.67	5.39	6.59	7.13	7.61	8.51	5.16	6.33	6.84	7.31	8.18	8.57	4.85	5.93	6.41	6.86	7.65	8.03
Evaporator Temp. (°C)				-20°C						-30°C						-40°C					
Pressure Drop (BAR)				6	7	8	10	11	12	6	7	8	10	11	12	6	7	8	10	11	12
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	7	4-7	6.77	7.31	7.81	8.74	9.16	9.57	5.01	5.41	5.78	6.47	6.78	7.08	3.25	3.51	3.75	4.20	4.40	4.60
A4		3	1-3	2.54	2.74	2.93	3.28	3.44	3.59	1.88	2.03	2.17	2.42	2.54	2.66	1.22	1.32	1.41	1.57	1.65	1.72
A7-AA	AA	2	1/2-2	1.69	1.83	1.95	2.18	2.29	2.39	1.25	1.35	1.45	1.62	1.70	1.77	0.81	0.88	0.94	1.05	1.10	1.15
A7-A	A	4	1-4	3.38	3.65	3.91	4.37	4.58	4.78	2.50	2.70	2.89	3.23	3.39	3.54	1.63	1.76	1.88	2.10	2.20	2.30
A7-B	B	7	4-7	6.77	7.31	7.81	8.74	9.16	9.57	5.01	5.41	5.78	6.47	6.78	7.08	3.25	3.51	3.75	4.20	4.40	4.60
A7-C	C	11	5-11	10.10	11.00	11.70	13.10	13.70	14.40	7.51	8.11	8.68	9.70	10.20	10.60	4.88	5.27	5.63	6.30	6.60	6.90
AS, ASB20		4	1-4	3.38	3.65	3.91	4.37	4.58	4.78	2.50	2.70	2.89	3.23	3.39	3.54	1.63	1.76	1.88	2.10	2.20	2.30
104A	.093	1	1-4	3.38	3.65	3.91	4.37	4.58	4.78	2.50	2.70	2.89	3.23	3.39	3.54	1.63	1.76	1.88	2.10	2.20	2.30
104A, 104F	.120	1 1/4	2-5	4.23	4.56	4.89	5.46	5.73	5.98	3.13	3.38	3.61	4.04	4.24	4.43	2.04	2.20	2.35	2.63	2.75	2.88
104A, 104F	.140	1 1/2	3-6	5.07	5.48	5.87	6.56	6.87	7.17	3.75	4.05	4.34	4.85	5.09	5.31	2.45	2.64	2.82	3.15	3.30	3.45

Shaded areas are standard conditions.

R-22/R-407C U.S. Extended Capacities in Kilowatts

Evaporator Temp. (°C)				10°C						0°C						-10°C					
Pressure Drop (BAR)				5	7	9	10	12	14	5	7	9	10	12	14	7	9	10	12	14	16
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	11	5-11	9.01	10.70	12.10	12.70	14.00	15.10	8.83	10.40	11.80	12.50	13.70	14.80	10.10	11.50	12.10	13.30	14.30	15.30
A4		4	2-4	3.00	3.55	4.03	4.25	4.65	5.02	2.94	3.48	3.95	4.16	4.56	4.92	3.37	3.83	4.03	4.42	4.77	5.10
A7-AA	AA	3	3/4-3	2.25	2.66	3.02	3.18	3.49	3.77	2.21	2.61	2.96	3.12	3.42	3.69	2.53	2.87	3.03	3.31	3.58	3.83
A7-A	A	5	2-5	4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
A7-B	B	11	5-11	9.01	10.70	12.10	12.70	14.00	15.10	8.83	10.40	11.80	12.50	13.70	14.80	10.10	11.50	12.10	13.30	14.30	15.30
A7-C	C	18	12-18	15.00	17.80	20.10	21.20	23.30	25.10	14.70	17.40	19.70	20.80	22.80	24.60	16.90	19.10	20.20	22.10	23.90	25.50
AS, ASB20		5	2-5	4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
104A	.093	5	2 - 5	4.50	5.33	6.04	6.37	6.98	7.54	4.41	5.22	5.92	6.24	6.84	7.38	5.06	5.74	6.05	6.63	7.16	7.65
104A, 104F	.120	6 1/2	3 - 6 1/2	5.63	6.66	7.55	7.96	8.73	9.43	5.51	6.53	7.40	7.80	8.55	9.23	6.33	7.18	7.56	8.29	8.95	9.56
104A, 104F	.140	8	4 - 8	6.75	7.99	9.06	9.56	10.50	11.30	6.62	7.83	8.88	9.36	10.30	11.10	7.59	8.61	9.08	9.95	10.70	11.50
Evaporator Temp. (°C)				-20°C						-30°C						-40°C					
Pressure Drop (BAR)				9	10	12	14	16	17	9	10	12	14	16	17	9	10	12	14	16	17
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	11	5-11	9.79	10.30	11.30	12.20	13.10	13.50	7.25	7.64	8.37	9.04	9.67	9.96	4.83	5.09	5.58	6.03	6.44	6.64
A4		4	2-4	3.26	3.44	3.77	4.07	4.35	4.48	2.42	2.55	2.79	3.01	3.22	3.32	1.61	1.70	1.86	2.01	2.15	2.21
A7-AA	AA	3	3/4-3	2.45	2.58	2.83	3.05	3.26	3.36	1.81	1.91	2.09	2.26	2.42	2.49	1.21	1.27	1.40	1.51	1.61	1.66
A7-A	A	5	2-5	4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
A7-B	B	11	5-11	9.79	10.30	11.30	12.20	13.10	13.50	7.25	7.64	8.37	9.04	9.67	9.96	4.83	5.09	5.58	6.03	6.44	6.64
A7-C	C	18	12-18	16.30	17.20	18.80	20.30	21.80	22.40	12.10	12.70	14.00	15.10	16.10	16.60	8.06	8.49	9.30	10.00	10.70	11.10
AS, ASB20		5	2-5	4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
104A	.093	5	2 - 5	4.89	5.16	5.65	6.10	6.53	6.73	3.63	3.82	4.19	4.52	4.83	4.98	2.42	2.55	2.79	3.01	3.22	3.32
104A, 104F	.120	6 1/2	3 - 6 1/2	6.11	6.45	7.06	7.63	8.16	8.41	4.54	4.78	5.24	5.65	6.04	6.23	3.03	3.19	3.49	3.76	4.03	4.15
104A, 104F	.140	8	4 - 8	7.34	7.74	8.48	9.15	9.80	10.10	5.45	5.73	6.29	6.78	7.25	7.47	3.63	3.83	4.19	4.52	4.83	4.98

Shaded areas are standard conditions.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R-404A/R-502/R-402A, B/R-507 U.S. Extended Capacities in Kilowatts

Evaporator Temp. (°C)				10°C						0°C						-10°C					
Pressure Drop (BAR)				5	7	9	10	12	14	5	7	9	10	12	14	5	7	9	10	12	14
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	7	4-7	6.06	7.17	8.14	8.58	9.39	10.10	5.88	6.96	7.89	8.32	9.11	9.84	5.58	6.60	7.48	7.89	8.64	9.33
A4		3	1-3	2.27	2.69	3.05	3.22	3.52	3.80	2.21	2.61	2.96	3.12	3.42	3.69	2.09	2.48	2.81	2.96	3.24	3.50
A7-AA	AA	2	1/2-2	1.52	1.79	2.03	2.14	2.35	2.54	1.47	1.74	1.97	2.08	2.28	2.46	1.39	1.65	1.87	1.97	2.16	2.33
A7-A	A	4	1-4	3.03	3.59	4.07	4.29	4.70	5.07	2.94	3.48	3.95	4.16	4.56	4.92	2.79	3.30	3.74	3.94	4.32	4.67
A7-B	B	7	4-7	6.06	7.17	8.14	8.58	9.39	10.10	5.88	6.96	7.89	8.32	9.11	9.84	5.58	6.60	7.48	7.89	8.64	9.33
A7-C	C	14	5-14	12.1	14.3	16.3	17.2	18.8	20.3	11.8	13.9	15.8	16.6	18.2	19.7	11.2	13.2	15.0	15.8	17.3	18.7
AS, ASB20		4	1-4	3.03	3.59	4.07	4.29	4.70	5.07	2.94	3.48	3.95	4.16	4.56	4.92	2.79	3.30	3.74	3.94	4.32	4.67
104A	.093	1	1-4	3.03	3.59	4.07	4.29	4.70	5.07	2.94	3.48	3.95	4.16	4.56	4.92	2.79	3.30	3.74	3.94	4.32	4.67
104A, 104F	.120	1 1/4	2-5	3.79	4.49	5.09	5.36	5.88	6.34	3.68	4.35	4.94	5.20	5.70	6.15	3.49	4.13	4.68	4.93	5.40	5.84
104A, 104F	.140	1 1/2	3-6	4.55	5.39	6.11	6.44	7.05	7.61	4.41	5.22	5.93	6.24	6.84	7.38	4.19	4.95	5.61	5.91	6.48	7.01
Evaporator Temp. (°C)				-20°C						-30°C						-40°C					
Pressure Drop (BAR)				7	9	10	12	14	16	9	10	12	14	16	17	9	10	12	14	16	17
Valve Type	Orifice	Nominal Capacity	Capacity Range																		
A1, A2, A(E)3, AT	B	7	4-7	5.67	6.43	6.77	7.42	8.02	8.57	4.80	5.06	5.54	5.99	6.40	6.60	3.09	3.26	3.57	3.86	4.12	4.25
A4		3	1-3	2.13	2.41	2.54	2.78	3.01	3.21	1.80	1.90	2.08	2.24	2.40	2.47	1.16	1.22	1.34	1.45	1.55	1.59
A7-AA	AA	2	1/2-2	1.42	1.61	1.69	1.86	2.00	2.14	1.20	1.26	1.39	1.50	1.60	1.65	0.77	0.81	0.89	0.96	1.03	1.06
A7-A	A	4	1-4	2.83	3.21	3.39	3.71	4.01	4.28	2.40	2.53	2.77	2.99	3.20	3.30	1.55	1.63	1.78	1.93	2.06	2.12
A7-B	B	7	4-7	5.67	6.43	6.77	7.42	8.02	8.57	4.80	5.06	5.54	5.99	6.40	6.60	3.09	3.26	3.57	3.86	4.12	4.25
A7-C	C	14	5-14	11.3	12.9	13.5	14.8	16.0	17.1	9.60	10.1	11.1	12.0	12.8	13.2	6.18	6.52	7.14	7.71	8.24	8.50
AS, ASB20		4	1-4	2.83	3.21	3.39	3.71	4.01	4.28	2.40	2.53	2.77	2.99	3.20	3.30	1.55	1.63	1.78	1.93	2.06	2.12
104A	.093	1	1-4	2.83	3.21	3.39	3.71	4.01	4.28	2.40	2.53	2.77	2.99	3.20	3.30	1.55	1.63	1.78	1.93	2.06	2.12
104A, 104F	.120	1 1/4	2-5	3.54	4.01	4.24	4.64	5.01	5.35	3.00	3.16	3.46	3.74	4.00	4.13	1.94	2.04	2.23	2.41	2.58	2.65
104A, 104F	.140	1 1/2	3-6	4.25	4.82	5.09	5.57	6.02	6.42	3.60	3.80	4.16	4.49	4.80	4.95	2.33	2.45	2.67	2.90	3.09	3.18

Shaded areas are standard conditions.

Liquid Refrigerant Correction Factors

R-12	Liquid Line Temp	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
	R-12 Multiplier	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-404A	**Liquid Line Temp**	**50°F**	**60°F**	**70°F**	**80°F**	**90°F**	**100°F**	**110°F**	**120°F**	**130°F**	**140°F**
	R-404A Multiplier	1.48	1.39	1.30	1.19	1.10	1.00	0.89	0.78	0.67	0.56
R-134a	**Liquid Line Temp**	**50°F**	**60°F**	**70°F**	**80°F**	**90°F**	**100°F**	**110°F**	**120°F**	**130°F**	**140°F**
	R-134a Multiplier	1.33	1.27	1.21	1.11	1.07	1.00	0.93	0.87	0.81	0.71
R-22	**Liquid Line Temp**	**50°F**	**60°F**	**70°F**	**80°F**	**90°F**	**100°F**	**110°F**	**120°F**	**130°F**	**140°F**
	R-22 Multiplier	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.77
R-502	**Liquid Line Temp**	**50°F**	**60°F**	**70°F**	**80°F**	**90°F**	**100°F**	**110°F**	**120°F**	**130°F**	**140°F**
	R-502 Multiplier	1.43	1.33	1.24	1.17	1.08	1.00	0.91	0.83	0.73	0.64

R-12	Liquid Line Temp	10°C	20°C	30°C	40°C	50°C	60°C
	Multiplier R-12	1.30	1.21	1.10	1.00	0.89	0.77
R-22	**Liquid Line Temp**	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**
	Multiplier R-22	1.30	1.21	1.10	1.00	0.89	0.78
R-404A	**Liquid Line Temp**	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**
	Multiplier R-404A	1.48	1.33	1.14	1.00	0.76	0.56
R-134a	**Liquid Line Temp**	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**
	Multiplier R-134a	1.33	1.21	1.09	1.00	0.85	0.71
R-502	**Liquid Line Temp**	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**
	Multiplier R-502	1.43	1.31	1.17	1.00	0.84	0.67

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Climate & Industrial Controls Group
Cleveland, OH

Understanding the Constant Pressure Valve

The constant pressure valve is a vital component of many refrigeration and A/C systems. It automatically meters refrigerant to the evaporator at a rate equal to compressor pumping capacity.

The constant pressure valve contains a diaphragm, control spring (FS1), seat and valve needle or ball. The control spring, above the diaphragm, moves the diaphragm down. This moves the valve open.

The opposing force is provided by low side evaporator pressure (FE) and a constant body spring force (FS2). This moves the valve closed. During the off cycle, evaporator pressure builds and overcomes spring pressure. This keeps the valve closed until the next on cycle. At the start of the on cycle, the compressor quickly reduces evaporator pressure. When this pressure equals the control spring pressure, the valve begins to open.

The valve opens when evaporator pressure is just below the control spring pressure setting. This is the valve's opening point, or setting.

Bleeds

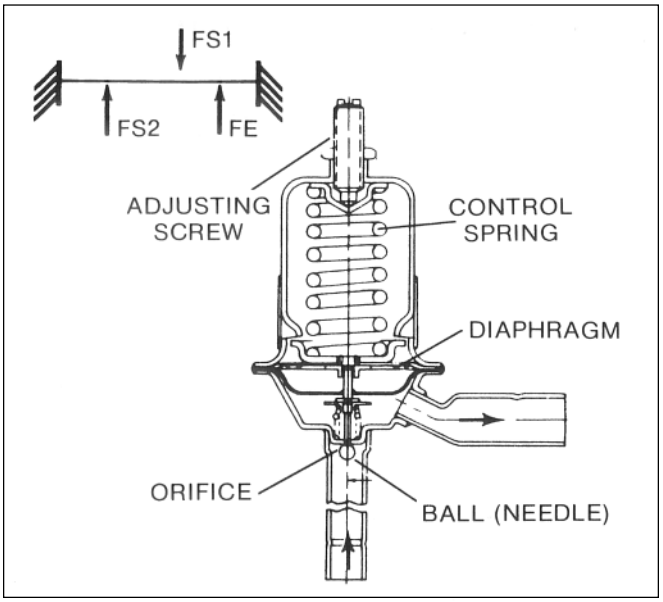
Bleed type valves permit pressures in the system to reach a balance point during the off cycle. At the next running cycle, the motor starts under practically no load. This allows the use of low starting torque compressor motors.

The bleed type (or slotted orifice) valve has a small slot in the valve seat. This prevents complete close off at the end of the machine's-on cycle, permitting refrigerant flow at a reduced rate.

Proper selection should result in a bleed and orifice which will always have control over the refrigerant flow at all standard operating conditions. Application of a larger bleed will speed equalization time, but may cause the valve to lose control at high head pressure operating conditions. Loss of control means all the flow will be through the bleed and the valve will be closed because the bleed capacity matches the compressor capacity.

How to Select Constant Pressure Expansion Valves

1. Load on the system in Btu's per hour or in tons (12,000 Btu per hour equals 1 ton)
2. System refrigerant
3. Evaporator temperature or pressure
4. Condensing temperature or pressure
5. Pressure drop across the valve
6. Off-cycle unloading, if required



Elevation Change and Valve Setting

The control spring in a constant pressure valve works with atmospheric pressure to move the valve in an opening direction. Any substantial change in altitude after a valve has been adjusted will alter the low side flow rate maintained by the valve.

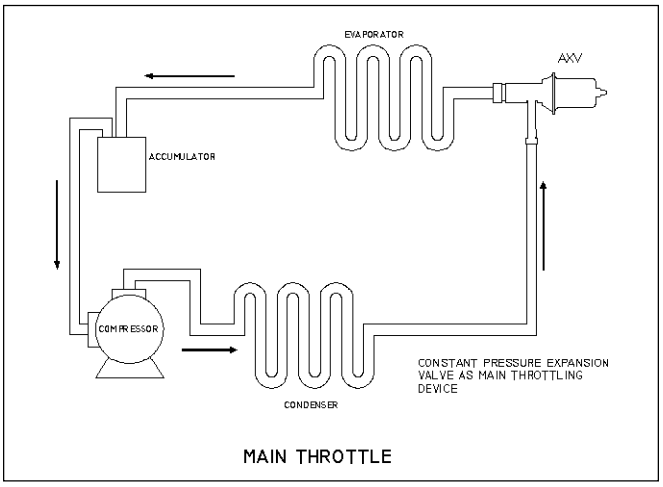
If a low side gauge is available, adjust the valve to increase the system pressure above the sea level reading by the amount shown in the gauge pressure correction column of the table below.

Altitutde	Barametric Pressure		Gage Pressure
Feet	Inches Hg.	psia	correction (psia)
0	29.92	14.70	-
500	29.38	14.70	-0.30
1000	28.86	14.19	-0.51
1500	28.33	13.91	-0.79
2000	27.82	13.58	-1.12
2500	27.32	13.41	-1.29
3000	26.82	13.20	-1.50
3500	26.33	12.92	-1.78
4000	25.84	12.70	-2.00
4500	25.37	12.44	-2.26
5000	24.90	12.23	-2.57
5500	24.43	12.01	-2.69
6000	23.98	11.78	-2.92
6500	23.53	11.55	-3.15
7000	23.09	11.33	-3.37
7500	22.65	11.10	-3.60
8000	22.22	10.92	-3.78
8500	21.80	10.70	-4.00
9000	21.39	10.50	-4.20
9500	20.98	10.30	-4.40
10000	120.58	10.10	-4.60

Constant Pressure and EPR Valve Applications

Constant Evaporator Pressure

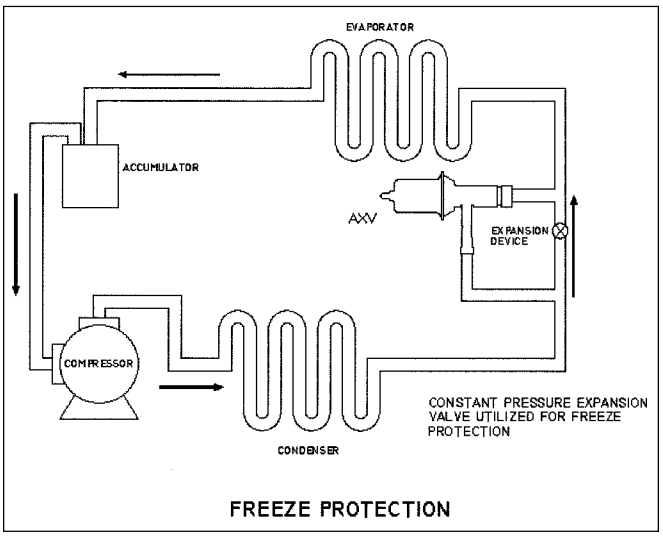
Parker constant pressure expansion valves maintain a constant evaporator pressure for applications when close control of evaporator pressure and temperature are required.



MAIN THROTTLE

Freeze Protection

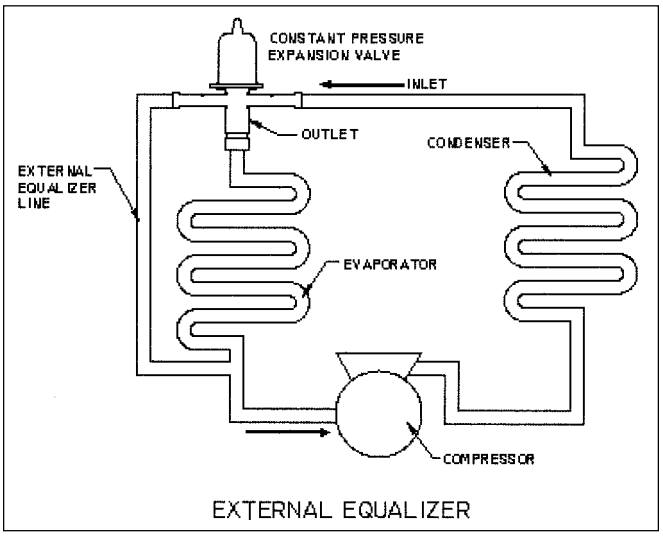
Parker constant pressure expansion valves can be used to prevent evaporator freezing, which may occur at low loads on small air conditioning applications. The valve is installed in parallel with the system expansion device to maintain a minimum evaporator pressure when flow through the main expansion device is insufficient. An accumulator to protect the compressor from liquid is recommended.



FREEZE PROTECTION

External Equalizer

The Parker Model AE3 is available with an external equalizer. External equalizer models are recommended in applications where the pressure drop through the distributor and/or evaporator exceeds 5 psi. The outlet pressure of the evaporator is communicated to the underside of the diaphragm through the external equalizer line.

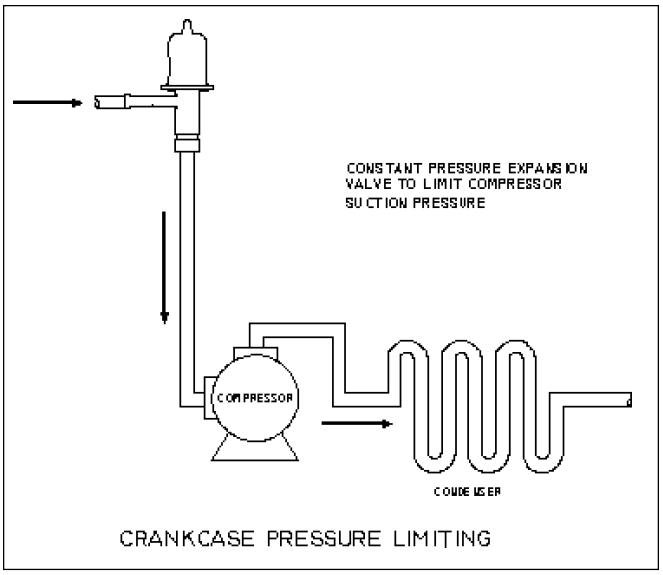


EXTERNAL EQUALIZER

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Cleveland, OH

Crankcase Pressure Limiting

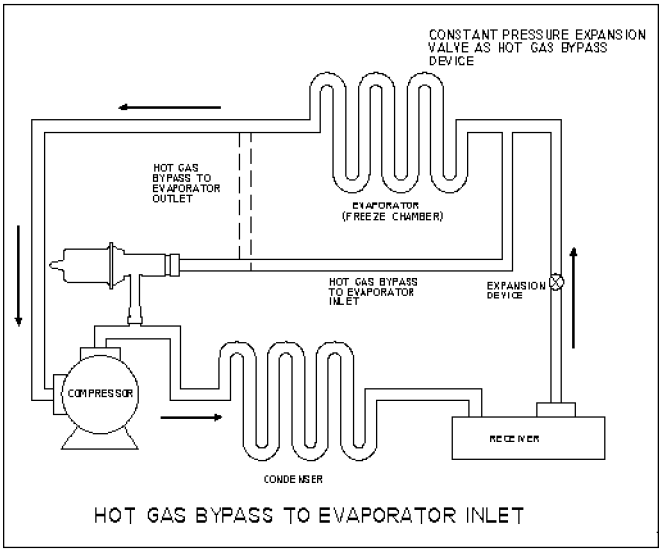
Parker constant pressure expansion valves can be used to limit the maximum operating suction pressure to the compressor. The valve is adjusted to open at a predetermined outlet pressure while restricting flow at higher system inlet pressures in order to protect the compressor. Non-bleed type valves are recommended for this type application.



CRANKCASE PRESSURE LIMITING

Hot Gas Bypass to Evaporator Inlet

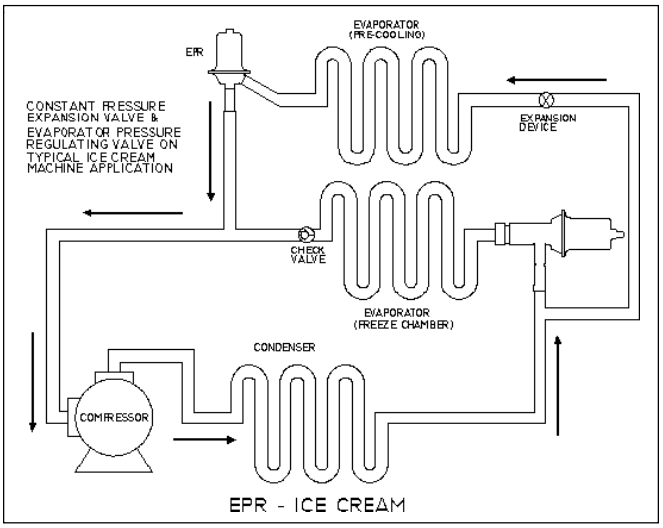
Constant pressure expansion valves control hot gas bypass in systems where temperature is extremely critical and load conditions vary widely – particularly low loads. Installed between the discharge line and the evaporator, the valve controls pressure precisely. As the load drops, evaporator pressure decreases. It throttles open to maintain outlet pressure. This action maintains the temperature of the evaporator. This application may also be used as freeze protection.



HOT GAS BYPASS TO EVAPORATOR INLET

EPR - Ice Cream Machine

Parker Model 139 EPRs are specifically designed for fractional horsepower evaporator applications where precise control of evaportor pressure is required when using a primary expansion device. A typical application is in a multiple evaporator system where different evaporator pressures and temperatures are desired. The 139 EPR may be used to control at a higher evaporator pressure then is present at the compressor suction.



EPR - ICE CREAM

Model 625 — Thermal Electric Valve



Specifications

- **Refrigerant –** Can be used with most refrigerants except ammonia.
- **Voltage –** 24 volts AC or DC (in accordance with U.L. low voltage class 2 specifications).
- **Power –** 4.13 watts at capacity rating.
- **Dielectric Strength –** 500 RMS volts minimum (1 lead to ground).
- **Resistance –** 70 ohms.
- **Electrical Leads –** 1/4" spade connectors.
- **Valve Construction** – Brass, copper, and stainless steel.
- **Net Weight** – 5 3/4 ounces.
- **Connections –** 3/8" ODM x 5/8" ODF

Nominal Capacities

R-22 - 1/2 through 10 tons
R-134a - 1/3 through 7 tons
R-404a - 1/3 through 7 tons

Standard Valves

Orifice Size	Part Number
0.040	040925-023
0.047	040925-014
0.062	040925-013
0.070	040925-025
0.078	040925-002
0.093	040925-003
0.109	040925-004
0.125	040925-001
0.140	040925-005
0.187	040925-028

Model 625 — Liquid Sensing Thermistor

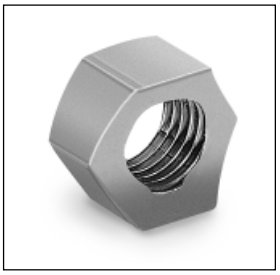


Specifications

- **Refrigerant –** Can be used with all refrigerants except ammonia.
- **Max. power rating –** 800 milliwatts in still air.
- **Max. temperature rating –** 302°F (150°C).
- **Dielectric Strength –** 500 RMS volts minimum (1 lead to ground).
- **Resistance –**See device chart.
- **Leads –** 22 gauge, 221°F (105°C) appliance wire pigtails.
- **Fitting material** – Brass.
- **Net weight** – 3/4 ounce.

Typical Applications	Thermistor Resistance (77° F)	Size	Bonnet color and length	Part Number
Air Conditioners Heat Pumps Meat Cases Chillers Ice Makers Low Temp Display Cases Ice Cream Freezers Cascade Systems Low Temp Blower Coils	50 ohms	1/4 mpt	Green 6" Leads	040930-150
Special applications with extremely high load changes	100 ohms	1/4 mpt	Red 6" Leads	040930-519

Model 625 - Thermistor Suction Line Adapter



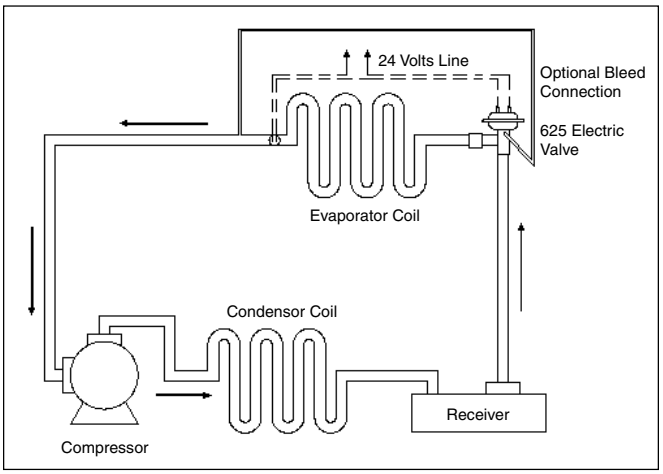
Suction line or refrigerant tubing O.D.	Part Number	Suction line or refrigerant tubing O.D.	Part Number
1/2"	040935-01	1 1/8"	040935-06
5/8"	040935-02	1 1/4"	040935-07
3/4"	040935-03	1 3/8"	040935-08
7/8"	040935-04	1 1/2"	040935-09
1 1/8"	040935-05	1 5/8"	040935-10

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Thermal Electric Valve Model 625 — Applications

Parker's thermal electric valve can be used for a variety of applications demanding control functions that are difficult to accomplish with thermostatic expansion valves. When considering this valve for an application, consider that the thermal electric valve inherently provides the following benefits:

- Approximately 10 percent additional coil capacity.
- Rapid system unloading.
- Controlled suction refrigerant quality or superheat.
- Cool suction gas.
- Similar capacity stroke from –20°F (-29°C) through + 40°F (+4°C).
- Reduction in valve inventory (no special bulb charges, no external equalizers, no superheat settings).



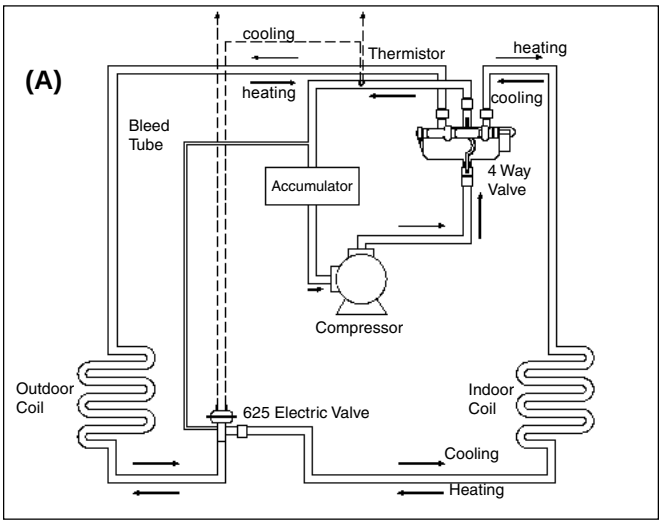
Eliminating Super Heat in Evaporators

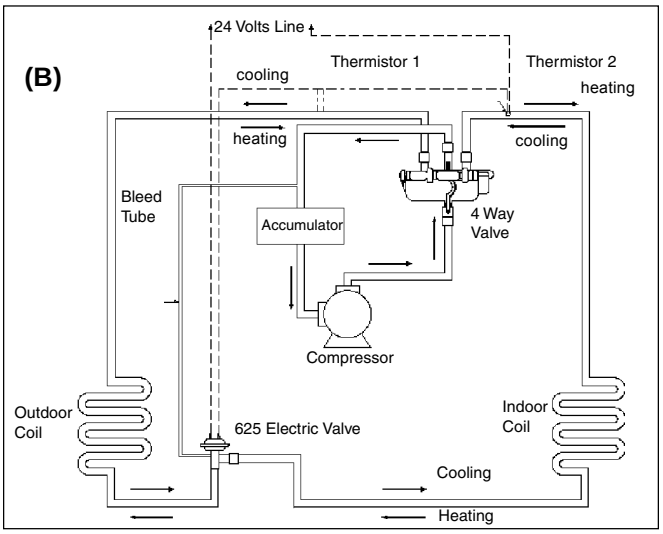
The thermal electric valve maintains zero degrees superheat in the evaporator at all loads. This means that 10-15% more evaporator coil surface is available for added cooling capacity.

Improving the Operating Performance and Cost of Heat Pumps

Bi-directional operation makes the electric valve a popular heat pump control. One electric valve and one or two thermistors reduce the number of components normally used: two thermostatic types, two check valves and their connections.

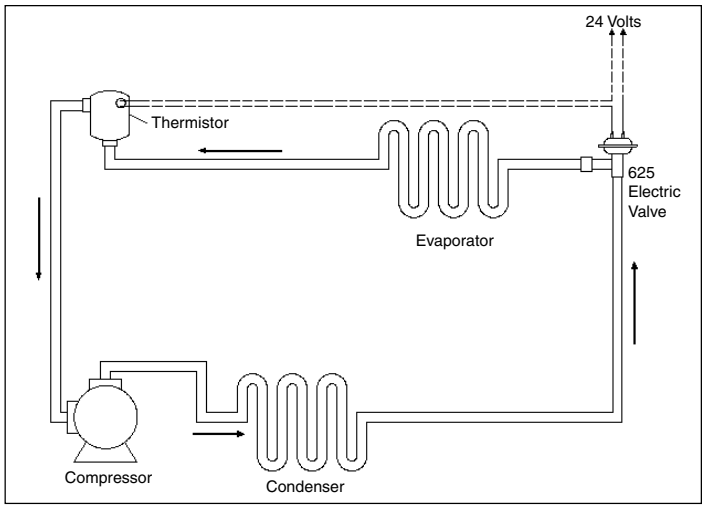
- **Application A**: The first heat pump uses only one thermistor in the common suction line between the reversing valve and the compressor. This produces a saturated vapor entering the compressor.
- **Application B**: Two thermistors, wired in series with the electric valve, are used in the second schematic. With this arrangement, suction gas entering the compressor is slightly superheated due to heat transfer in the reversing valve.
  1. During cooling, thermistor #2 controls the electric valve. Thermistor #1 is in the compressor discharge line. Thermistor #1 has no effect on valve operation because it is sensing hot gas and self-heating to low resistance (full open).
  2. In the heating cycle, thermistor #1 controls the valve and thermistor #2 is located in the compressor discharge line. Compressor protection during defrost cycles is another advantage of the system.





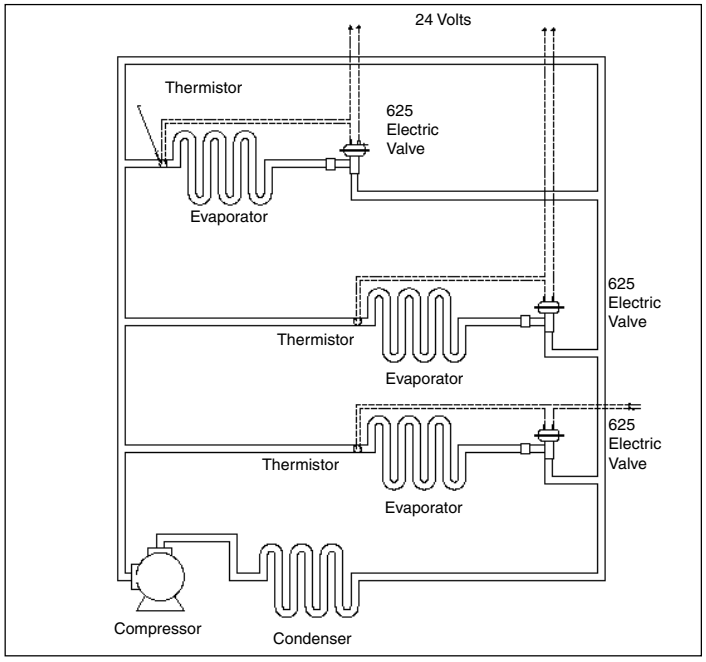
Maintaining a Flooded Evaporator

Place the thermistor in an accumulator to control the level of liquid refrigerant.



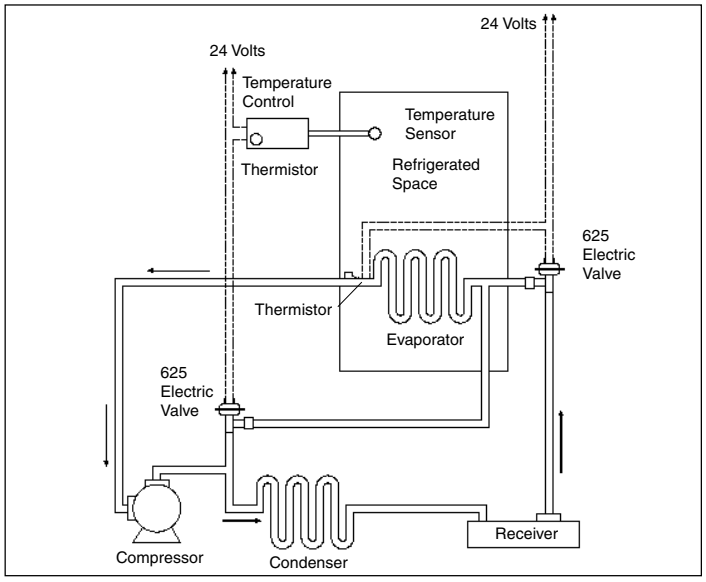
Multiple Evaporator Systems

The electric valve can increase the efficiency and reduce the number of controls required. Put a 625 valve and thermistor on each evaporator. Thermostats can be used to maintain different temperatures, reducing requirements for pressure regulators and solenoids.



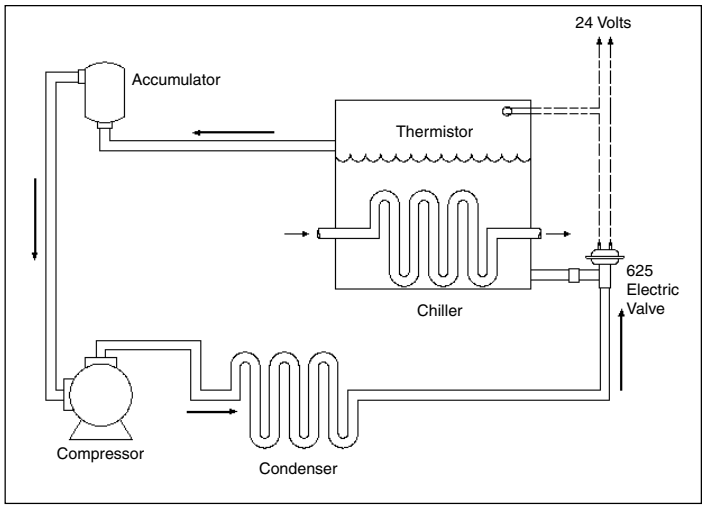
Hot Gas and/or Evaporator Temperature Regulator

A special temperature sensing probe is mounted inside the refrigerated space. A solid state temperature control amplifies the electrical signal of the probe and controls the modulation of the electric valve. As the temperature in the refrigerated space drops, voltage to the valve increases and the valve admits hot refrigerant gas directly into the evaporator.



Chillers

This chiller design uses the thermistor as a liquid level control and the electric valve as a normal expansion device.

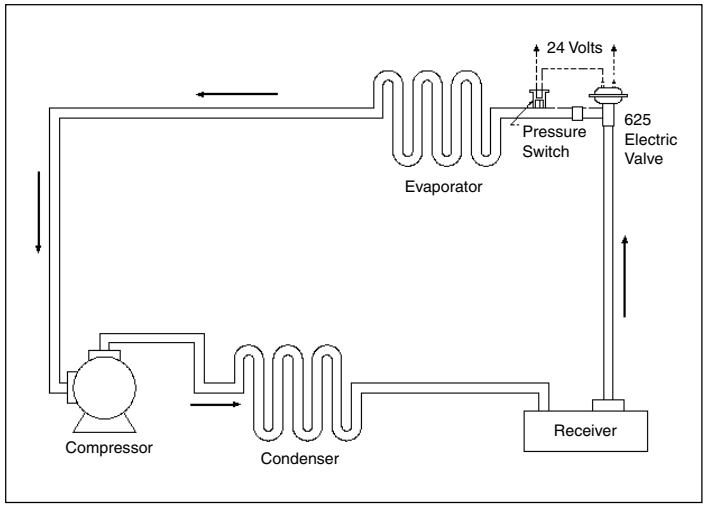


Constant Pressure Control

When combined with a pressure or temperature switch, the electric valve can be used to control evaporator pressure. The switch, which senses evaporator pressure or temperature, closes when the evaporator drops below the set point. The closing of the switch energizes the electric valve. The resulting increase in refrigerant flow raises evaporator pressure. The pressure switch then opens and the valve modulates, maintaining the set point.

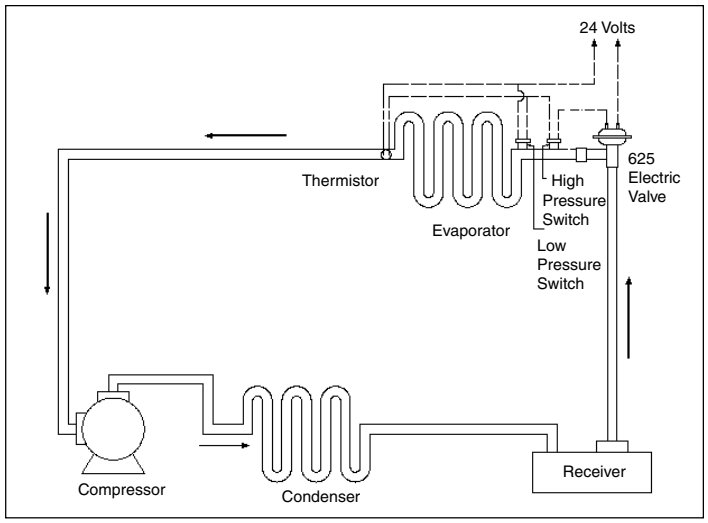
Pressure switches can be used to limit both maximum and minimum system pressure. These switches can be placed anywhere in the system to close the electric valve or limit its capacity when desired levels of pressure or temperature are reached.

Pressure transducers and certain proportional controllers can also be used to provide closer pressure control.



High and Low Pressure Limit

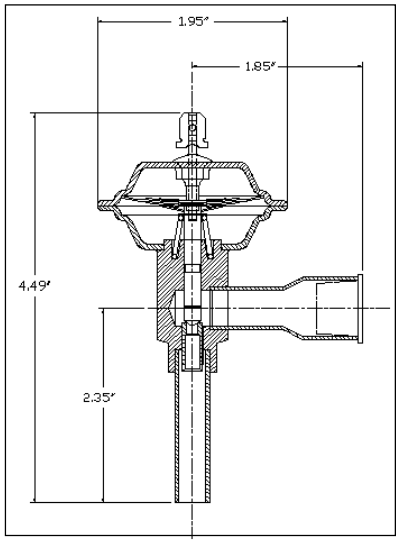
Combine the thermistor with a pressure switch to automatically convert the electric valve to a pressure limiting control. A high pressure limit switch prevents further increase when its pressure setting is reached. A low pressure limit switch prevents further decrease when its pressure setting is reached. A low pressure limit switch is wired in parallel with the thermistor. This arrangement provides zero degree superheat between high and low pressure limits. Note that the compressor suction line is still allowed to superheat.



Thermal Electric Valve Model 625 Operation

The thermal electric valve is operated by, and responds to, low voltage electricity. The valve's operation is simple and easy to understand.

The operating parts of the valve are shown in the figure at the right. They are: a wire-bound bimetal heater and a spring-loaded needle.

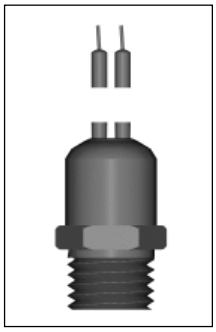


Model 625 Thermal Electric Valve

The amount of voltage applied to the heater controls the degree of the valve opening. At zero voltage, the valve is closed. As voltage is applied, the heater deflects the bimetal upward. The stainless steel needle follows the bimetal deflection and opens the valve. The more voltage applied to the valve, the greater the valve opening.

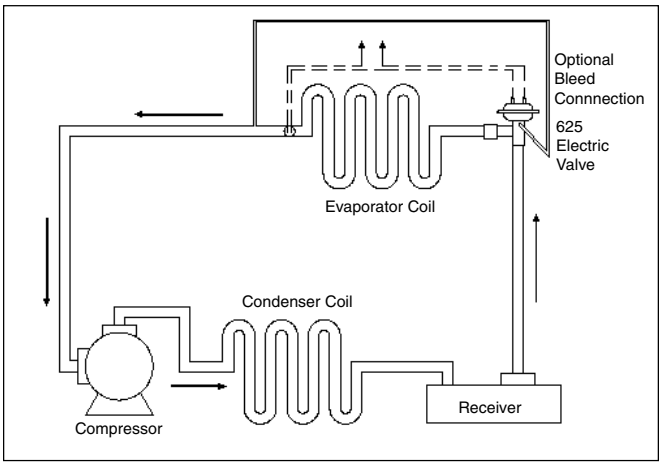
Because system pressure or temperature doesn't affect it, one valve will work for all applications from low temperature freezers to unitary air conditioners.

A special device, called a liquid sensing thermistor (shown here), regulates voltage to the electric valve. The thermistor is installed in the suction line at the exact point where complete change of refrigerant from liquid to gas is desired. Here, the thermistor reacts to the amount of liquid present in the refrigerant as it leaves the evaporator.



Liquid Sensing Thermistor

The schematic at the top of the right column illustrates the operation of the thermistor and the electric valve when they are wired in series. When voltage is applied, the thermistor acts like a small heater. An increase in evaporator load causes superheat to increase. This means the refrigerant changes to superheated gas at the thermistor location. Because the gas is superheated, there is no liquid present and the thermistor has nothing to cool it. When exposed to dry refrigerant gas in this manner, the thermistor is heated to a high temperature by the voltage applied to it and the resistance drops. This causes an increase in voltage across



Operation of the Thermistor and the Electric Valve when They are Wired in Series

the bimetal heater inside the valve head and the bimetal deflects upward. This deflection opens the valve more.

The valve stays open until enough liquid refrigerant is fed into the evaporator to reduce superheat. Once superheat is eliminated, wet refrigerant gas again contacts the thermistor. The wet gas cools the thermistor. The thermistor's resistance increases and less voltage is sent to the valve. The valve moves toward closing.

Ambient Effect

The electric valve is calibrated to close in a 70°F (21°C) ambient when no voltage is applied. Above 70°F (21°C) the valve opens and bleeds off refrigerant. The valve has a normal tendency to lose capacity at a lower ambient temperature. The thermistor, however, compensates for these changes automatically.

Bleed Connections

In many cases, the electric valve is manufactured with a third connection that bleeds off small quantities of liquid refrigerant that may collect in the head of the valve where the bimetal heater is located, which limits capacity. With the bleed connection, full capacity of the valve is available at all conditions. The bleed tube is always connected to the system suction line.

Easy Servicing

The electric valve makes system analysis trouble shooting fast and easy. Service personnel need only attach a voltmeter to the electric valve and thermistor. The readings obtained from the voltmeter will tell how the valve is operating at a glance. A simple check of system conditions will indicate thermistor function and identify problems elsewhere in the system.

Thermal Electric Valve Model 625 Installation

Mounting Position – The valve should be installed such that the thermal head is within 30° of an upright position to insure maximum capacity.

Sweat Soldering – The same precautions should be used when sweating this valve into a system that would normally be used with conventional valves to prevent excessive temperature build up (damp cloth – chill block – and so on).

Thermistor Suction Line Adapter – The thermistor should be located flush, or slightly less, with the inside wall of the suction line. The 5/16" dimension shown in the second illustration at the right will correctly locate the thermistor assembly with the inside wall of the suction line. Projection of the female adapter fittings, as well as the thermistor assembly, into the suction line should be avoided (see the illustration at the right).

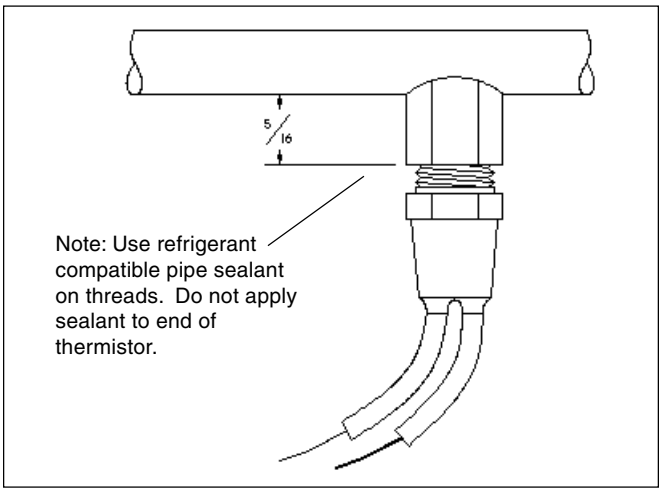
Thermistor Location & Sensing Positions – The liquid sensing thermistor assembly can be used in any suction line with a diameter of 1/2" or larger. It will work on both vertical and horizontal suction lines, but should never be located where liquid refrigerant is likely to accumulate or trap off. For instance; in a bottom U-Bend connecting two vertical risers (see the bottom graphic at the right).

Since suction refrigerant flow depends upon many factors including suction line size, suction gas velocity, elbows, reducers, etc.; it is important to establish firm rules regarding the best location of the liquid sensing thermistor.

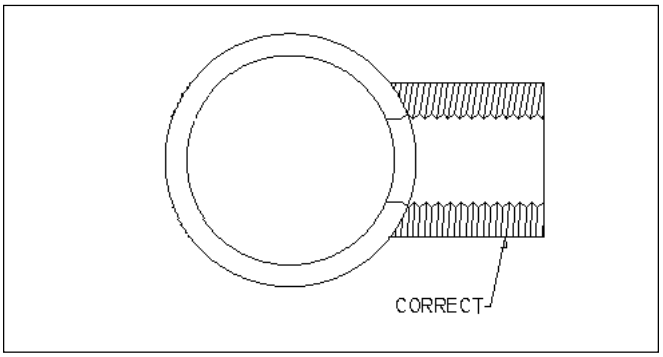
The following observations have been made on a wide variety of applications and have proven to be useful guidelines for locating thermistor assemblies in suction lines.

1. High velocity suction locations are preferable over low velocity locations.
2. Smaller diameter suction locations are preferable over larger diameter locations.
3. Unless the flow pattern around an elbow or reducer is well known or specifically designed for the liquid sensing thermistor assembly, it is best to stay at least 6 inches away when locating downstream of them.
4. Vertical suction lines make excellent locations, but trapping should be avoided as mentioned earlier (see the bottom graphic at the right).

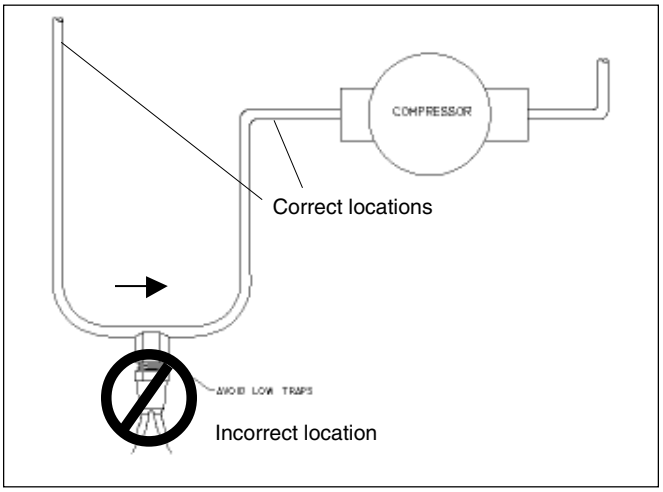
(Continued on the following page.)



Suction Line Identifying Location of Thermistor Assembly



Correct Placement of Thermistor Assembly into Suction Line



Correct and Incorrect Locations for Thermistor Assembly

If the line is at some angle other than vertical, the lower or gravity side is preferable (see the illustration at the right).

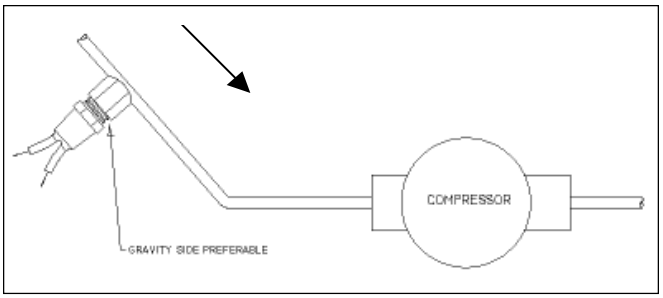
5. Thermistor location on horizontal suction lines is more common and in some cases (large diameter low velocity suction lines) permits adjustments to be made in suction gas saturation (see illustration in the right column). The best thermistor sensing positions in horizontal suction lines are generally between 4 o'clock and 8 o'clock in the lower half of the suction line, although successful applications have been made with the thermistor in all axial locations. **As a rule, the thermistor should be located as high axially in the 4 to 8 o'clock range as possible on horizontal suction lines using tolerable suction gas wetness as the limiting factor.**
6. The most important rule regarding the location of the liquid sensing thermistor on any applications is simply this; make sure that liquid or wet refrigerant gas can come into good contact with the thermistor at all loads. Once a location has been established on a given application, subsequent units will show excellent repeatability.

Effects of Ambients and Blowers During Running Periods – Exposure to fan or blower air movement has almost no effect on the valve. It will operate properly in all ambients from -40°F (-40°C) to +150°F (+66°C). The valve has a normal tendency to lose capacity at lower ambients and gain capacity at high ambients. The thermistor, however, generally compensates for these changes automatically.

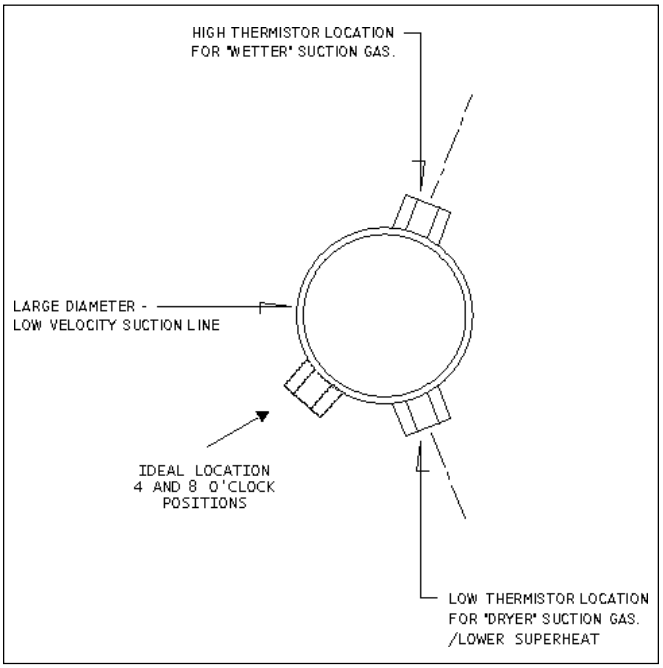
Effect of Ambient During Off-Cycle Periods – During off-cycle periods, the valve will bleed off refrigerant if exposed to ambients above 70°F (21°C) and will close off relatively tight if exposed to ambients of less than 70°F. In short, the valve is simply calibrated to close at 70°F with no electrical energy applied.

Off-Cycle System Unloading – The valve can be left energized 100% of the time, in which case it will completely and rapidly unload the system during off-cycle periods.

The valve can be de-energized during off-cycle periods with the compressor, in which case it will partially unload the system, depending upon the amount of charge and the ambient. (See Effect of Ambient During Off-Cycle Periods above).



Preferable Location for Thermistor Assembly on Angled Line



Best Thermistor Sensing Positions on Horizontal Suction Lines

Note: Do not install in vertical lines.

Troubleshooting

Testing For Proper Operation

The valve and thermistor should be wired in series as shown in the illustration below. All wiring should be made in accordance with U.L. low voltage class 2 codes.

Some Precautions

1. Never apply more than the output of a 24 volt transformer to the valve circuit.
2. Don't apply 24 volts directly across the thermistor leads. It will short out the valve and damage the thermistor if both terminals of the electric valve are touched with one volt-ohmmeter lead.

Initial Electrical Checkout

If the electric valve and/or thermistor are suspected to be inoperative, check the following:

1. Are the electrical connections to the valve and thermistor tight and correctly wired?

   If the connections are okay, continue to step 2.
2. With the transformer disconnected, make a simple electrical continuity check of the valve and thermistor using the volt-ohmmeter.

Service Gauge Manifold Tests

If no problem is found during the volt-ohmmeter tests, reconnect the power supply and connect a service gauge manifold to the system. Then observe high and low side pressures during the following tests:

1. **To see if the valve is closing:**

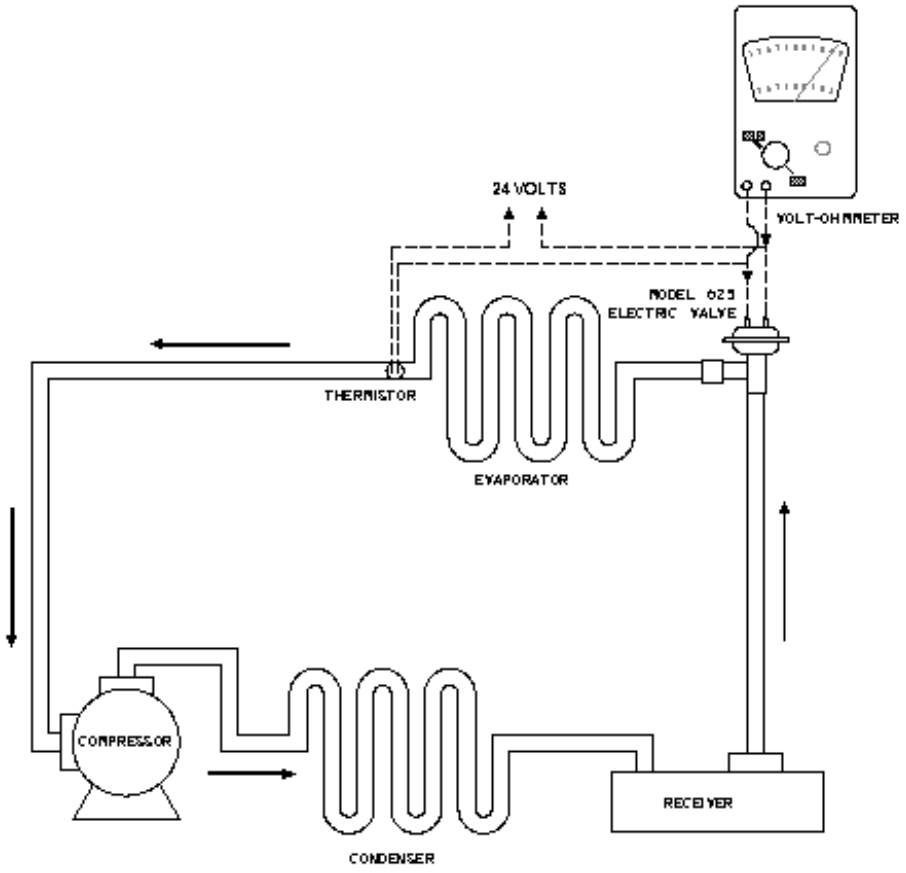
   Remove voltage to the valve by disconnecting any wire in the circuit.

   With the circuit open, low side pressure should begin to drop. Wait three or four minutes, if the pressure does drop the valve is closing freely and is not clogged or sticking.
2. **To see if the valve is opening:**

   Remove the thermistor from the circuit by placing a jumper wire across the two thermistor leads. This will send 24 volts directly to the valve.

   With 24 volts at the valve as the valve opens, low side pressure should begin to increase. If low side pressure does increase, the valve is opening properly and is okay. Note that this kind of testing cannot be done with a capillary tube system.

   With a thermostatic expansion valve system, the thermal bulb has to be removed from the suction line and heated to see if the valve is opening properly.



Proper Wiring of Valve and Thermistor

Problem: Voltage to the valve is low, liquid is in the suction line.
Probable cause: *Solder or other electrically conductive material has clogged the thermistor.*

Problem: Voltage to the valve is high, superheated condition at the thermistor location.
Probable cause: *Some contaminant is shorting the thermistor out of the circuit.*

Problem: Voltage will not drop below 17 volts and goes as high as 26 volts.
Probable cause: *Transformer output too high.*

Valve Replacement

Always replace a defective electric valve with an exact duplicate.

Mounting

If possible, install the valve with the head within 30 degrees of upright. This prevents any liquid from migrating to the bimetal chamber where it could affect valve operation.

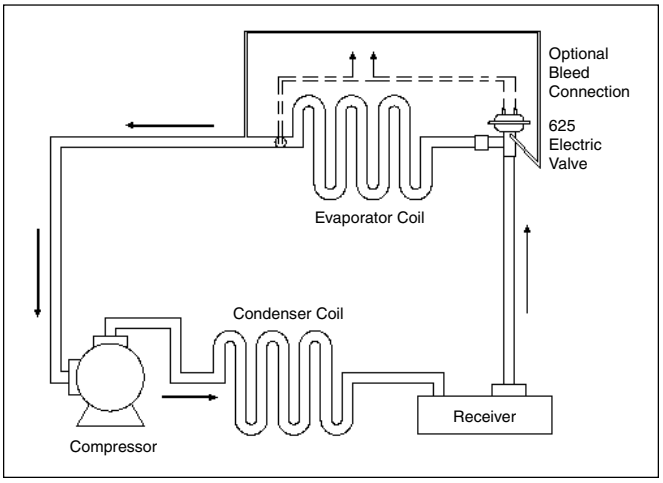
If the valve is mounted with the head down, an electric valve with a bleed tube connection must be used.

Bleed Connection

The third solder connection on solder-type electric valves is the bleed connection. It prevents migration of liquid refrigerant to the bimetal chamber. A valve with a bleed tube must always be used on heat pumps.

Connect the bleed tube downstream of the thermistor in the system suction line as shown in the illustration below. On heat pumps, connect the bleed tube to the common suction line.

Remember to use a chill block or wet cloths to protect the valve body when soldering.



Valve Ratings

The following ratings are based on 100°F (38°C) vapor-free liquid refrigerant entering the valve.

Refrigerant R-134a/R-12/R-401A, B
Tons of Refrigeration — Evaporator Temperatures °F/C

Part Number	Orifice Size	+40°F (+4°C)					+20°F (-7°C)					-10°F (-23°C)					-40°F (-40°C)				
		PRESSURE DROP ACROSS VALVE (PSIG)																			
		40	60	80	100	120	60	80	100	120	140	80	100	120	140	160	100	120	140	160	180
040925-023	.040	.274	.335	.387	.433	.476	.318	.368	.411	.450	.486	.335	.374	.410	.442	.473	.332	.364	.393	.420	.446
040925-014	.047	.530	.650	.750	.840	.923	.618	.715	.798	.875	.945	.648	.725	.794	.857	.917	.642	.703	.760	.812	.862
040925-013	.062	.735	.900	1.04	1.07	1.28	.860	.995	1.11	1.22	1.31	.905	1.01	1.11	1.20	1.28	.895	.980	1.06	1.13	1.20
040925-025	.070	.875	1.07	1.24	1.39	1.52	1.00	1.16	1.30	1.42	1.53	1.04	1.16	1.27	1.37	1.46	1.00	1.09	1.18	1.26	1.34
040925-002	.078	1.36	1.66	1.92	2.15	2.36	1.58	1.82	2.04	2.23	2.41	1.65	1.85	2.02	2.19	2.34	1.64	1.79	1.94	2.07	2.20
040925-003	.093	1.87	2.29	2.65	2.96	3.26	2.15	2.49	2.78	3.04	3.29	2.26	2.53	2.77	2.99	3.20	2.21	2.42	2.61	2.79	2.96
040925-004	.109	2.29	2.80	3.24	3.63	3.98	2.64	3.05	3.41	3.73	4.04	2.74	3.07	3.36	3.63	3.88	2.65	2.90	3.14	3.35	3.55
040925-001	.125	2.65	3.25	3.75	4.20	4.61	3.05	3.53	3.94	4.31	4.66	3.14	3.51	3.84	4.15	4.44	3.03	3.32	3.58	3.83	4.06
040925-005	.140	3.01	3.68	4.25	4.75	5.23	3.42	3.78	4.42	4.84	5.23	3.52	3.93	4.30	4.65	4.96	3.40	3.72	4.03	4.30	4.56
040925-028	.187	4.42	5.41	6.25	7.00	7.68	5.04	5.83	6.51	7.13	7.70	5.17	5.78	6.33	6.84	7.32	5.00	5.47	5.92	6.32	6.71

Liquid Refrigerant Temp Entering Valve	Multiplier Factor	Liquid Refrigerant Temp Entering Valve	Multiplier Factor
80°F (27°C)	1.11	110°F (43°C)	0.93
90°F (32°C)	1.07	120°F (49°C)	0.87
100°F (38°C)	1.00	130°F (54°C)	0.81
		140°F (60°C)	0.71

To determine valve ratings for other liquid refrigerant temperatures entering the valve, multiply the capacities listed above by the proper multiplier factor listed.

Refrigerant R-404a/R-502/R-507C/R-402A,B/R-125
Tons of Refrigeration — Evaporator Temperatures °F/C

Part Number	Orifice Size	+40°F (+4°C)					+20°F (+4°C)					-10°F (-23°C)					-40°F (-40°C)				
		PRESSURE DROP ACROSS VALVE (PSIG)																			
		75	100	125	150	175	100	125	150	175	200	125	150	175	200	225	150	175	200	225	250
040925-023	.040	.325	.374	.419	.461	.494	.355	.395	.435	.470	.502	.352	.386	.417	.446	.473	.334	.360	.386	.409	.431
040925-014	.047	.629	.725	.811	.892	.956	.685	.765	.840	.907	.970	.681	.747	.807	.864	9.15	.647	.699	.747	.793	.836
040925-013	.062	.876	1.01	1.13	1.24	1.33	.955	1.07	1.17	1.26	1.35	.948	1.04	1.12	1.20	1.27	.900	.973	1.04	1.10	1.16
040925-025	.070	1.04	1.20	1.34	1.47	1.58	1.12	1.25	1.38	1.49	1.59	1.12	1.23	1.32	1.41	1.50	1.06	1.14	1.22	1.29	1.37
040925-002	.078	1.61	1.86	2.08	2.29	2.45	1.75	1.96	2.15	2.32	2.48	1.75	1.92	2.07	2.22	2.35	1.66	1.79	1.92	2.03	2.14
040925-003	.093	2.22	2.56	2.87	3.16	3.38	2.40	2.69	2.95	3.18	3.40	2.39	2.62	2.83	3.03	3.20	2.24	2.42	2.59	2.74	2.89
040925-004	.109	2.71	3.13	3.50	3.85	4.13	2.93	3.27	3.59	3.87	4.14	2.88	3.16	3.41	3.65	3.86	2.67	2.88	3.08	3.27	3.45
040925-001	.125	3.16	3.64	4.07	4.48	4.80	3.41	3.81	4.18	4.52	4.83	3.32	3.64	3.93	4.20	4.45	3.07	3.31	3.54	3.76	3.96
040925-005	.140	3.56	4.11	4.60	5.06	5.42	3.81	4.26	4.67	5.05	5.39	3.70	4.06	4.38	4.69	4.96	3.43	3.70	3.96	4.20	4.42
040925-028	.187	5.23	6.04	6.75	7.43	7.47	5.60	6.26	6.86	7.40	7.93	5.44	5.97	6.45	6.90	7.30	5.05	5.45	5.83	6.17	6.52

Liquid Refrigerant Temperature Entering Valve	Multiplier Factor	Liquid Refrigerant Temperature Entering Valve	Multiplier Factor
80°F (27°C)	1.17	110°F (43°C)	0.91
90°F (32°C)	1.08	120°F (49°C)	0.88
100°F (38°C)	1.00	130°F (54°C)	0.82
		140°F (60°C)	0.77

Refrigerant R-22/R-407C
Tons of Refrigeration — Evaporator Temperatures °F/C

Part Number	Orifice Size	+40°F (+4°C)					+20°F (-7°C)					-10° F (-23° C)					-40°F (-40°C)				
		PRESSURE DROP ACROSS VALVE (PSIG)																			
		75	100	125	150	175	100	125	150	175	200	125	150	175	200	225	150	175	200	225	250
040925-023	.040	.486	.560	.626	.689	.740	.540	.604	.662	.715	.765	.556	.610	.659	.704	.746	.554	.598	.640	.678	.715
040925-014	.047	.938	1.08	1.21	1.33	1.43	1.04	1.17	1.28	1.38	1.48	1.08	1.18	1.28	1.36	1.45	1.07	1.16	1.24	1.31	1.38
040925-013	.062	1.31	1.51	1.69	1.86	2.00	1.46	1.63	1.79	1.93	2.07	1.50	1.65	1.78	1.91	2.02	1.50	1.62	1.73	1.84	1.94
040925-025	.070	1.56	1.79	2.01	2.21	2.37	1.69	1.88	2.07	2.23	2.38	1.68	1.84	1.99	2.12	2.24	1.60	1.73	1.84	1.95	2.06
040925-002	.078	2.39	2.75	3.08	3.39	3.63	2.66	2.97	3.26	3.52	3.76	2.73	3.00	3.24	3.46	3.67	2.72	2.94	3.14	3.33	3.51
040925-003	.093	3.29	3.80	4.25	4.67	5.02	3.63	4.06	4.45	4.81	5.14	3.73	4.09	4.42	4.72	5.01	3.66	3.95	4.23	4.48	4.73
040925-004	.109	4.05	4.67	5.23	5.76	6.17	4.47	5.00	5.48	5.93	6.34	4.55	5.00	5.40	5.77	6.12	4.42	4.77	5.11	5.41	5.71
040925-001	.125	4.70	5.42	6.06	6.66	7.15	5.16	5.77	6.33	6.83	7.32	5.22	5.72	6.18	6.61	7.00	5.06	5.46	5.84	6.19	6.53
040925-005	.140	5.34	6.16	6.89	7.58	8.12	5.82	6.51	7.14	7.71	8.25	5.87	6.44	6.95	7.44	7.88	5.69	6.15	6.57	6.97	7.34
040925-028	.187	7.84	9.04	10.1	11.1	11.9	8.50	9.49	10.4	11.2	12.0	8.62	9.43	10.2	10.9	11.5	8.34	9.00	9.63	10.2	10.7

Liquid Refrigerant Temp Entering Valve	Multiplier Factor	Liquid Refrigerant Temp Entering Valve	Multiplier Factor
80°F (27°C)	1.12	110°F (43°C)	0.94
90°F (32°C)	1.06	120°F (49°C)	0.88
100°F (38°C)	1.00	130°F (54°C)	0.82
		140°F (60°C)	0.77

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Climate & Industrial Controls Group
Cleveland, OH

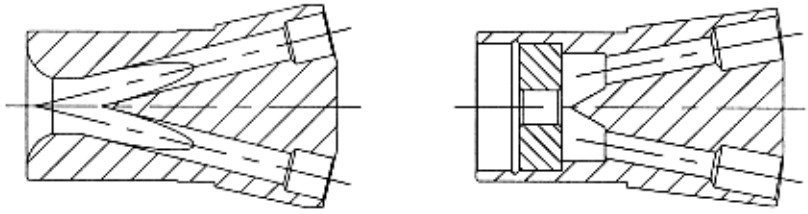
Refrigerant Distributors

Refrigerant distributors are of two basic designs, each having certain merits that the design engineer may regard as best for the application. Parker produces both basic types with the largest range of sizes, variations and specials of any manufacturer. (Distributors are made of brass unless aluminum is specified.)

The **nozzle type distributor** has a permanent or replaceable sharp-edged orifice to mix the two-phase fluid before it enters the coil circuit passageways. By changing nozzles with different orifice sizes, one body type may be used for various refrigerants, loads, and also for different numbers of circuit sizes.

The **Venturi (low pressure drop) distributor** has a machined, contoured throat on the approach side with diverging circuit holes beyond the smallest section of the throat. There is no separate nozzle; therefore the pressure drop is less than the sharp-edged orifice distributor. The throat size is determined by the number and size of the circuits and cannot be altered.

Nozzles for orifice type distributors for various suction temperatures in °F and refrigerants are listed in the tables starting on page 195. These numbers determine the hole size.



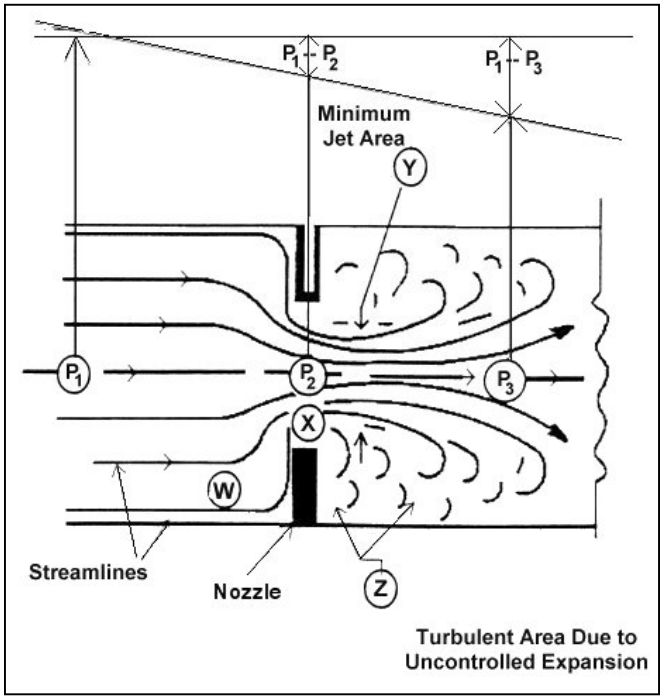
Venturi Nozzle Type



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Nozzle Type Distributors

Parker nozzle type distributors depend on the high pressure drop through the orifice and the resulting turbulence to provide equal distribution to all circuits. The illustration below shows that the approaching refrigerant streamlines nearest the pipe wall (W), then it turns radial at the face of the nozzle towards the orifice. This radial flow continues past the edge of the orifice (X) and is moved through the orifice by the center mass of the refrigerant. The refrigerant flow continues through the orifice with a minimum jet area (Y) forming past the nozzle. The uncontrolled expansion in the area just past the nozzle causes a turbulent pattern (Z) to be set-up between the jet area (Y) and the walls, which dissipates the velocity energy. UL Listing 11550.



Flow through a nozzle device.
No pressure recovery, high pressure drop.

Sizing Guidelines

Calculating the Orifice Size Needed

To calculate the correct orifice size needed the **refrigerant** that is being used, the **temperature** of the evaporator coil, and the **capacity** of the coil will need to be known.

Look at the nozzle sizing table on page 196. Locate the **refrigerant** that is being used across the top of the table. Locate the **temperature** of the evaporator coil under the desired refrigerant and go down the column to the **capacity** of the coil. The required nozzle size is in the first column of the table to the left of the coil capacity.

Specifying the Distributor Body

To calculate the correct orifice size the following information is needed:

1) the **refrigerant** type being used
2) **number of circuits** in the evaporator coil
3) the **temperature** of the evaporator coil
4) the **capacity** of the evaporator coil



Calculating the Circuit Size Tube

After gathering the above information, first calculate the circuit capacity by dividing the evaporator coil **capacity** by the **number of circuits** in the evaporator coil.

Next calculate the circuit tube size by using the Distributor Tube Circuit Capacities Table on page 195. Find the columns that are headed by the **refrigerant** that is being used. Under the correct refrigerant header are columns of evaporator column **temperatures**. Go down the correct temperature column to the circuit capacity previously calculated then go the last column on the left to find the circuit tube size.

Calculating the Body Type

Using the charts on pages 197-199 locate the column titled "Maximum No. of Circuits" and go down the column until the required circuit diameter and the required number of circuits are found. The body number is in the first column. Look across the row to find the largest "Nozzle" orifice for that body to ensure that the body can support the required orifice. There may be a variety of combinations that will work depending on the inlet O.D. required. There is also a variety of inlet adapters available such as added copper tubes with 1/2" or 5/8" 45 degree flare nuts, expanded ends, or straight ends depending on the body selected.

Distributor Tube Circuit Capacities Table

Tube Size inches O.D.	Evaporating Temperature °F														
	Refrigerant														
	R-12 / R-134a					R-22					R-404A / R-502 / R-507				
	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
5/32	0.19	0.14	0.11	0.08	0.06	0.26	0.21	0.16	0.12	0.09	0.18	0.13	0.10	0.07	0.05
3/16	0.40	0.30	0.23	0.17	0.13	0.53	0.44	0.33	0.24	0.20	0.37	0.28	0.22	0.15	0.12
1/4	0.80	0.60	0.45	0.33	0.25	1.10	0.89	0.67	0.49	0.39	0.73	0.58	0.43	0.31	0.23
5/16	1.60	1.20	0.90	0.66	0.50	2.20	1.70	1.30	0.98	0.79	1.50	1.10	0.83	0.62	0.46
3/8	2.80	2.10	1.60	1.20	0.88	3.70	2.90	2.20	1.70	1.40	2.50	2.00	1.50	1.10	0.80

Refrigerants at various evaporator temperatures - Tons of Refrigeration
Capacity per circuit at 10 psi pressure drop. See *Distributor Loading vs. Pressure Drop* table below for pressure drop at 50% to 200% of this rating.

*Correction Factors for Other Liquid Temperatures for Nozzle and Tubes								
Liquid Temperature °F	50°	60°	70°	80°	90°	100°	110°	120°
Correction factor	2.10	1.83	1.59	1.37	1.17	1.00	0.85	0.72

**Correction factors for Other Distributor Tube Lengths											
Tube Length - Inches	12	18	24	30	36	42	48	54	60	66	72
Correction Factor	1.36	1.16	1.07	1.00	0.95	0.90	0.86	0.82	0.79	0.76	0.73

*100° liquid entering thermostatic expansion valve.
**For tubing length of 30"

Distributor Loading vs. Pressure Drop

Actual Load as a Percent of Published Rating (corrected for Liquid Temperature	R-12 / R-134a		R-22 & R-502	
	Δ P Nozzle psi	Δ P Tubes and Passages	Δ P Nozzle psi	Δ P Tubes and Passages psi
50	4	3	7	3
60	6	4	10	4
70	8	5	13	5
80	10	6	16	6
90	12	8	20	8
100	15	10	25	10
110	18	12	30	12
120	20	14	35	14
130	22	16	38	16
140	24	18	40	18
150	27	21	43	21
160	29	23	46	24
170	31	25	49	27
180	33	27	52	30
190	36	29	54	32
200	38	31	57	34

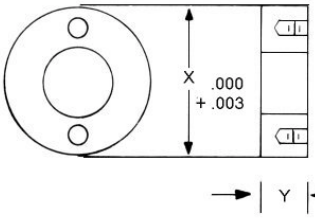
Nozzle Sizing Table (Evaporator Temperature, °F)

Nozzle Number Size	Evaporating Temperature °F														
	Refrigerant														
	R-12 / R-134a					R-22					R-404A / R-502 / R-507				
	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
1/2	.35	.28	.22	.18	.16	.62	.48	.37	.28	.25	.40	.31	.22	.17	.13
3/4	.53	.44	.34	.27	.23	.92	.75	.61	.50	.37	.59	.47	.39	.30	.20
1	.72	.56	.47	.36	.30	1.3	1.06	.79	.63	.51	.83	.68	.50	.36	.26
1 1/2	1.1	.80	.70	.56	.46	1.9	1.6	1.3	1.0	.85	1.4	.95	.72	.53	.39
2	1.5	1.2	.96	.74	.61	2.5	2.1	1.7	1.3	1.1	1.8	1.5	.99	.76	.58
2 1/2	1.9	1.5	1.16	.92	.81	3.1	2.5	2.0	1.6	1.3	2.2	1.8	1.3	.94	.71
3	2.2	1.8	1.5	1.2	1.05	3.7	3.1	2.4	1.9	1.6	2.6	2.2	1.5	1.2	.84
4	2.9	2.3	1.9	1.5	1.3	5.0	4.1	3.2	2.6	2.1	3.4	2.8	2.1	1.6	1.2
5	3.7	2.9	2.3	1.9	1.7	6.2	4.9	4.0	3.1	2.6	4.2	3.4	2.5	1.9	1.4
6	4.4	3.5	2.8	2.3	2.0	7.3	5.7	4.7	3.7	3.0	5.2	4.0	2.9	2.3	1.7
8	5.9	4.6	3.6	3.0	2.5	9.7	7.4	6.1	4.7	3.8	6.5	5.4	3.9	3.1	2.3
10	7.3	5.8	4.5	3.6	3.1	11.6	9.3	7.4	5.3	4.4	8.3	6.6	4.5	3.6	2.6
12	8.7	6.9	5.4	4.2	3.4	14.3	11.2	8.8	6.7	5.6	10.1	8.0	5.6	4.2	3.2
15	10.8	8.2	6.6	5.2	4.5	17.7	13.7	10.8	8.2	6.6	12.2	9.8	7.3	5.3	4.5
17	12.3	9.4	7.5	6.1	5.1	20.0	15.9	12.2	9.2	7.9	13.9	11.4	7.8	6.6	5.2
20	14.5	11.0	8.8	6.9	5.7	23.8	18.5	14.5	11.1	9.2	17.0	13.5	9.5	7.7	5.9
25	18.0	13.8	11.0	8.7	7.5	30.6	23.7	18.3	14.0	11.3	22.0	17.0	12.2	9.5	7.8
30	21.5	16.2	12.1	11.0	9.0	35.2	28.0	21.0	16.0	13.4	26.0	19.0	13.8	10.6	9.6
35	25.8	19.5	15.3	12.8	12.0	42.0	33.0	25.5	21.0	16.0	21.0	23.0	16.8	13.4	10.7
40	29.4	22.6	19.2	15.6	12.8	46.7	37.7	31.7	23.0	19.0	34.0	25.5	19.6	14.9	11.8
50	37.0	28.2	23.2	18.4	16.0	62.3	48.0	37.0	29.0	24.0	45.0	34.0	25.0	19.0	15.9

Nozzles & Retainer Rings

Nozzles and rings may be ordered separately. Information required for nozzles is the outside size of the nozzle, which is designated by a letter, and a number which determines the orifice size. Nozzles are interchangeable with several bodies. Rings may be ordered with letter corresponding to the nozzle, i.e., “G” ring would go with a distributor body that takes a “G” nozzle as listed.

NOTE: Nozzle size is approximately equal to the system compressor horsepower (i.e., nozzle 8 equals approximately 8 HP compressor).

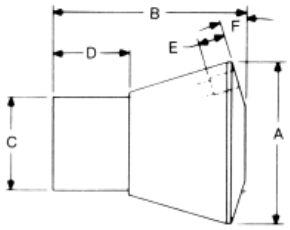


Tapped holes available on request. These holes do not alter the function of the nozzle and are seldom used.

Nozzle Dimensions		
	X	Y
L	0.401	0.187
J	0.498	0.250
G	0.735	0.250
E	1.000	0.250
C	1.120	0.250
A	1.375	0.250

Chart A





TYPE 120

Nomenclature

120	–	6	–	1/4		5
Body Style		Number of Holes		Size of Holes		Nozzle Size

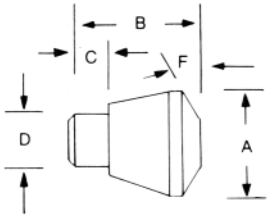
Chart A

Maximum No. of Circuits			Nozzle	A	B	C	D	E	F
TYPE 117 1112	5/32 3/16 1/4 5/16 3/8	8 7 6 4 2	G Largest 50	.906	1.718	.872 .875	1.000	.375 +/- .015	–
TYPE 120 1113	5/32 3/16 1/4 5/16 3/8	14 12 8 6 4	G Largest 50	1.156	1.781	.873 .875	.88	.375 +/- .015	8°
TYPE 130 1115	5/32 3/16 1/4 5/16	19 15 10 8	E Largest 50	1.500	2.437	1.123 1.125	1.125	.375 +/- .015	15°
TYPE 150 1116	5/32 3/16 1/4 5/16 3/8	20 18 14 9 7	E Largest 50	1.750	2.437	1.123 1.125	1.125	.375 +/- .015	17°
TYPE 140 1117	3/16 1/4 5/16 3/8	18 14 9 7	C Largest 50	1.750	2.562	1.373 1.375	1.250	.375 +/- .015	11°
TYPE 160 1126	3/16 1/4 5/16 3/8	24 18 15 12	C Largest 50	2.313	2.812	1.373 1.375	1.125	.375 +/- .015	17°
TYPE 175 1125	3/16 1/4 5/16 3/8	28 24 20 16	A Largest 50	3.000	3.062	1.623 1.625	1.375	.375 +/- .015	25°
TYPE 170 1128	SAME AS 175		C Largest 50	3.000	3.062	1.373 1.375	1.375	.375 +/- .015	25°
TYPE 180 1127	3/16 1/4 5/16 3/8	37 30 26 20	A Largest 50	3.500	3.312	1.623 1.625	1.281	.375 +/- .015	35°
TYPE 190 1143	3/16 1/4 5/16 3/8	40 34 30 24	A Largest 50	4.000	3.670	1.623 1.625	1.438	.375 +/- .015	35°
TYPE 209 D-209	3/16 1/4 5/16	15 10 8	J Largest 10	1.500	2.000	.623 .625	.625	.187 .250	35°
TYPE 23	5/32 3/16 1/4	7 6 4	L 8	.812	1.187	.625 .623	.625	.125 .187 .187	14°
TYPE 24	5/32 3/16 1/4 5/16	10 8 6 4	L 8	1.000	1.625	.625 .623	.625	.125 .187 .187 .275	14°
TYPE 25	5/32 3/16 1/4 5/16 3/8	14 12 8 6 4	L 8	1.156	1.753	.625 .623	.625	.125 .187 .187 .275 .312	14°
TYPE 60 D-147	3/16 1/4 5/16	16 12 9	G Largest 50	1.625	2.125	.872	.906	.187	23°
TYPE 21 1620	5/32 3/16 1/4	7 6 4	J Largest 10	.812	1.187	.623 .625	.625	.125 .187 .187	14°
TYPE 22 1622	5/32 3/16 1/4 5/16	10 8 6 4	J Largest 10	1.000	1.625	.623 .625	.625	.125 .187 .187 .275	14°
TYPE 105 1613	5/32 3/16 1/4	6 4 4	PERMANENT 6 #	.812	1.175	.498 .500	.500	.125 .187 .187	15°
TYPE 20 1616	5/32 3/16 1/4	10 8 6	PERMANENT 6 #	1.000	1.550	.498 .500	.500	.125 .187 .187	14°

Chart B

Maximum No. of Circuits			Nozzle	A	B	C	D	E	F
TYPE 107 1604	5/32 3/16 1/4	7 6 4	Largest 6	.812	1.000	.328	.430 .428	.125 .187 .187	15°
TYPE 251 1607	5/32 3/16 1/4 5/16	10 8 6 4	6	1.000	1.375	.330	.430 .428	.125 .187 .187 .275	15°

Chart B

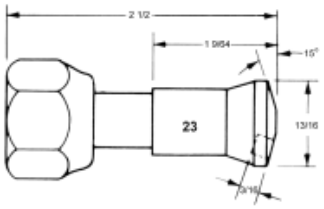


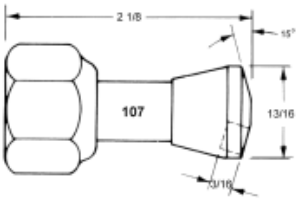
TYPE 107

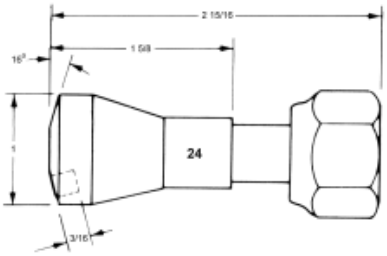
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

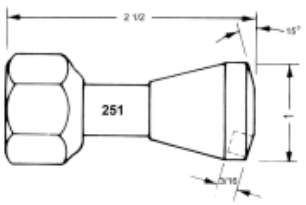
Flare-Type Distributors with Nozzles

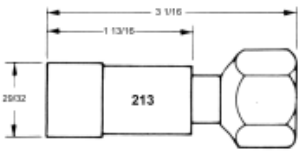
(Regular or Frost Free Nut)

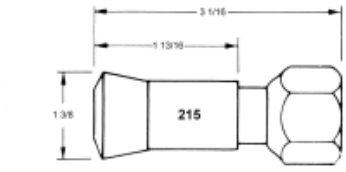












Type	Maximum No. of Circuits & Tube Size		Largest Orifice	Nozzle & Retainer Ring Size	Expansion Valve Outlet Connection
23-X-X-X-E60 *1605*	7 6 4	5/32 3/16 1/4	8	L	1/2 SAE MALE FLARE
107-X-X-X-E60 *1603*	7 6 4	5/32 3/16 1/4	4	Permanent Nozzle Not Replaceable	1/2 SAE MALE FLARE
24-X-X-X-E28 *1608*	10 8 6 4	5/32 3/16 1/4 5/16	8	L	1/2 SAE MALE FLARE
251-X-X-X-E60 *1606*	10 8 6 4	5/32 3/16 1/4 5/16	6	Permanent Nozzle Not Replaceable	1/2 SAE MALE FLARE
213-X-X-X-E19 5/8 Flare *1104*	9 6 6	5/32 3/16 1/4	10	Nozzle J	5/8 SAE Male Flare
215-X-X-X-E19 5/8 Flare *1147*	10 8 6	5/32 3/16 1/4	10	Nozzle J	5/8 SAE Male Flare

Nomenclature

120	–	X	–	X	–	X	–	E-60
Body Style		Number of Circuits		Size of Circuits		Nozzle Size		Various Inlet Adapter



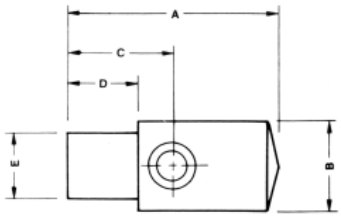
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Heat Pump & Hot Gas Defrost Distributors

When ordering heat pump and hot gas distributors, specify number and size of side connections.



Type 100 - 5 - 3/16 - 1/2



Side Connections Circuits Available

Type	Max. Number Circuits Avail.	Nozzle & Retainer Ring	Side Connections Number	Side Connections Size	A	B	C	D	E
100-X-X-X-X	5/32-8 3/16-8 1/4-4	J	1 or 2	3/8 1/2	2 1/64	7/8	63/64	21/32	.623 .625
1651		Largest 10							
30-X-X-X-X	5/32-14 3/16-12 1/4-8 5/16-5 3/8-4	G	1 or 2	3/8 1/2	2 35/64	1 1/4	1 7/32	29/32	.873 .875
1653		Largest 50							
40-X-X-X-X	5/32-20 3/16-18 1/4-12 5/16-9 3/8-7	E	1 or 2	3/8 1/2 5/8	3 1/4	1 5/8	1 15/32	1 1/6	1.123 1.125
1655		Largest 50							
55-X-X-X-X	5/32-30 3/16-26 1/4-18 5/16-14 3/8-11	C	1 or 2	1/2 5/8 7/8	4 1/4	2 1/4	1 7/8	1 5/16	1.373 1.375
1657		Largest 50							
57-X-X-X-X	1/4-15 5/16-18 3/8-14	A	1 or 2	7/8 1 1/8	4 7/8	2 3/4	2 5/16	1 5/8	1.623 1.626
1659		Largest 50							

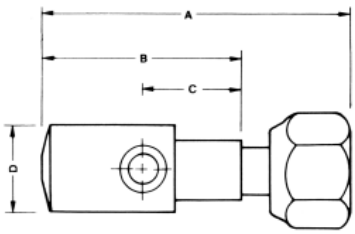
Nomenclature

100	–	5	–	3/16	–	1/2	–	4
Body Style		Number of Circuits		Size of Circuits		Side Outlet Size		Nozzle Size

Flare-Type



Type 100 - 6 - 3/16 - 1/2



NOTE: ***Nomenclatue*** *is same as above with addition of inlet adaptors (as customer requires). Standard inlet adaptors shown.*

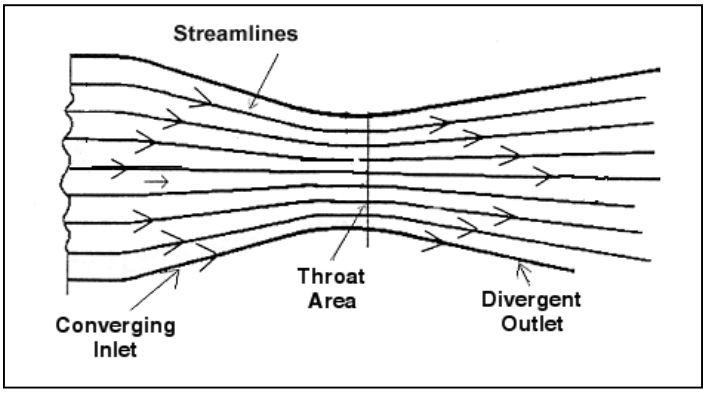
Type	Max. Number Circuits Avail.	Nozzle & Retainer Ring	Side Connections Number	Side Connections Size	A	B	C	D	Flare Nut
100-X-X-X-X-E43	5/32-8 3/16-8 1/4-4	Permanent	1 or 2	3/8 1/2	3 1/2	2 1/64	63/64	7/8	1/2
1650		Largest 10							
100-X-X-X-X-E70	5/32-14 3/16-10 1/4-8 5/16-5 3/8-4	Permanent	1 or 2	3/8 1/2	3 7/8	2 33/64	1 7/32	1 1/4	5/8
1652		Largest 10							
30-X-X-X-X-E41	5/32-14 3/16-12 1/4-8 5/16-5 3/8-4	Permanent	1 or 2	3/8 1/2	3 7/8	2 33/64	1 7/32	1 1/4	5/8
1654		Largest 50							
40-X-X-X-X-E42	5/32-20 3/16-18 3/8-12 5/16-9 3/8-7	Permanent	1 or 2	1/2 5/8	5 3/16	3 1/4	1 15/32	1 5/8	5/8
1656		Largest 50							

Venturi Low Pressure Drop Distributors

This style of distributor is designed on the venturi orifice concept. The venturi orifice has basically three sections:

(1) the converging inlet
(2) the throat area
(3) diverging outlet.

Based on the continuity equation and Bernoulli equation, as the liquid refrigerant enters section (1) the velocity of the refrigerant begins to increase and the pressure begins to decrease. This continues until a maximum velocity and a minimum pressure is reached in the throat area, section (2). After the refrigerant leaves section (2) and begins to enter section (3), the diverging outlet, the velocity begins to decrease and the pressure increases. The venturi orifice creates a smooth transition from section (1) through section (2) and then back to section (3) resulting in little turbulence. The pressure of the refrigerant after leaving section (3) is only slightly less than the inlet pressure. The pressure loss is caused by frictional losses between the distributor wall and the fluid boundary layer, and some turbulence. Due to the low pressure loss and smooth refrigerant flow pattern, the venturi distributor provides a low pressure loss refrigerant disturbing device. UL Listing 115500.



Flow through a Venturi low pressure drop distributor.

Capacities

Venturi type distributor capacities are supplied in tons of refrigerant. The capacity is based on the following conditions:

- a total distributor pressure drop of 15 psi
- liquid refrigerant subcooled 1°F at the expansion device
- a refrigerant tube length of 36" or . 91 meters.

Note: Standard operating range is from 1/2 to twice the capacity.



Sizing Suggestions

Required system information:

1) system design capacity in tons of refrigerant
2) system design refrigerant
3) total number of circuits required
4) system design temperature
5) inlet tube size

Step A: Select the chart on the following pages that matches the inlet tube size required.

Step B: Select the column that matches the total number of circuits required.

Step C: Using the system capacity, select a distributor that matches both the system refrigerant and design temperature.

Step D: Determine if the system design capacity meets the 1/2 to twice the standard operating capacity requirements.

Step E: If the standard operating capacity requirement is not met, repeat the selection process utilizing either the next size smaller or larger inlet tube size.

% Nominal Load	Pressure Drop psi
250	40
150	25
125	20
100	15
75	10
50	7.5

5/32" ODF Distributors

Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
*4-2.5-2 *5-2.5-2	2	0.6	0.41	0.26	0.17	0.12	0.88	0.6	0.4	0.26	0.18	0.45	0.31	0.19	0.12	0.09
*4-2.5-3 *5-2.5-3	3	0.9	0.6	0.4	0.25	0.18	1.32	0.9	0.6	0.39	0.27	0.68	0.46	0.29	0.18	0.13
*4-2.5-4 *5-2.5-4	4	1.2	0.82	0.53	0.34	0.24	1.76	1.2	0.8	0.52	0.36	0.9	0.61	0.39	0.25	0.18
*4-2.5-5 *5-2.5-5	5	1.5	1	0.66	0.42	0.3	2.2	1.5	1	0.65	0.45	1.13	0.77	0.49	0.31	0.22
*4-2.5-6 *5-2.5-6	6	1.8	1.2	0.79	0.5	0.36	2.64	1.8	1.2	0.78	0.54	1.35	0.92	0.59	0.37	0.27
*4-2.5-7 *5-2.5-7	7	2.1	1.4	0.92	0.59	0.42	3.08	2.1	1.4	0.91	0.63	1.57	1.07	0.69	0.43	0.31
*4-2.5-8 *5-2.5-8	8	2.4	1.6	1.1	0.67	0.48	3.52	2.4	1.6	1.04	0.72	1.8	1.22	0.79	0.5	0.36
*4-2.5-9 *5-2.5-9	9	2.7	1.8	1.2	0.76	0.54	3.96	2.7	1.8	1.17	0.81	2.03	1.38	0.89	0.56	0.4
*4-2.5-10 *5-2.5-10 7-2.5-10	10	3.0	2.0	1.3	.84	.60	4.40	3.00	2.00	1.30	.90	2.25	1.53	.99	.63	.45
7-2.5-11	11	3.3	2.3	1.5	.92	.66	4.84	3.30	2.20	1.43	.99	2.47	1.68	1.08	.69	.49
F5-2.5-12 7-2.5-12	12	3.6	2.4	1.6	1	0.72	5.28	3.6	2.4	1.56	1.08	2.7	1.84	1.18	0.75	0.54
F5-2.5-13 7-2.5-13	13	3.9	2.7	1.7	1.1	0.78	5.72	3.9	2.6	1.69	1.17	2.93	1.99	1.28	0.81	0.58
F5-2.5-14 7-2.5-14	14	4.2	2.9	1.8	1.2	0.84	6.16	4.2	2.8	1.82	1.26	3.15	2.24	1.38	0.88	0.63
F5-2.5-15 7-2.5-15	15	4.5	3.1	2	1.3	0.9	6.6	4.5	3	1.95	1.35	3.37	2.36	1.48	0.94	0.67
7-2.5-16	16	4.8	3.3	2.1	1.3	.96	7.04	4.80	3.20	2.08	1.44	3.60	2.49	1.58	1.00	.72
7-2.5-17	17	5.1	3.5	2.2	1.4	1.0	7.48	5.10	3.50	2.21	1.54	3.82	2.61	1.68	1.06	.76
7-2.5-18	18	5.4	3.7	2.4	1.5	1.1	7.92	5.40	3.60	2.34	1.62	4.05	2.75	1.78	1.13	.81
7-2.5-19	19	5.7	3.9	2.5	1.6	1.1	8.36	5.70	3.80	2.47	1.71	4.27	2.90	1.83	1.19	.85
7-2.5-20	20	6.0	4.1	2.6	1.7	1.2	8.80	6.00	4.00	2.60	1.80	4.50	3.06	1.98	1.26	.90
7-2.5-21	21	6.3	4.3	2.8	1.8	1.3	9.25	6.30	4.20	2.73	1.89	4.72	3.21	2.07	1.32	.94
7-2.5-22	22	6.6	4.5	2.9	1.9	1.3	9.70	6.60	4.40	2.86	1.98	4.95	3.36	2.17	1.38	.99
7-2.5-23	23	6.9	4.7	3.0	1.9	1.4	10.15	6.90	4.60	2.99	2.07	5.17	3.51	2.27	1.44	1.03
7-2.5-24	24	7.2	4.9	3.2	2.0	1.4	10.6	7.20	4.80	3.12	2.16	5.40	3.67	2.37	1.51	1.08

*Available with flare nut or ODM inlet connections.
**For R-500 capacities, multiply R-12 capacities by 1.2.
“F” available with flare nut only.

3/16" ODF Distributors

Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
3-3-2 *4-3-2 *5-3-2	2	1.20	.82	.54	.36	.25	1.80	1.20	.79	.53	.37	.90	.61	.40	.27	.18
3-3-3 *4-3-3 *5-3-3	3	1.80	1.20	.82	.54	.38	2.60	1.80	1.20	.79	.55	1.40	.90	.61	.40	.28
3-3-4 *4-3-4 *5-3-4	4	2.40	1.70	1.10	.72	.50	3.50	2.40	1.60	1.10	.76	1.80	1.30	.81	.54	.37
3-3-5 *4-3-5 *5-3-5 7-3-5	5	3.0	2.0	1.3	.90	.64	4.40	3.00	2.00	1.30	.92	2.30	1.50	.99	.67	.47
3-3-6 *4-3-6 *5-3-6 7-3-6	6	3.6	2.40	1.70	1.10	0.76	5.30	3.60	2.40	1.60	1.10	2.70	1.80	1.30	0.81	0.56
3-3-7 *4-3-7 *5-3-7 7-3-7	7	4.20	2.90	1.90	1.30	.89	6.10	4.20	2.80	1.80	1.30	3.10	2.20	1.40	.99	.66
*4-3-8 *5-3-8 7-3-8 9-3-8	8	4.80	3.20	2.20	1.40	1.00	7.00	4.80	3.20	2.10	1.50	3.60	2.40	1.60	1.10	.75
4-3-9 *5-3-9 7-3-9 9-3-9	9	5.40	3.70	2.40	1.70	1.10	7.90	5.40	3.60	2.40	1.70	4.10	2.80	1.80	1.30	.85
*5-3-10 7-3-10 9-3-10	10.00	6.00	4.10	2.80	1.80	1.30	8.80	6.00	3.90	2.60	1.80	4.50	3.10	2.10	1.40	0.99
7-3-11 9-3-11	11	6.60	4.40	3.00	2.00	1.40	9.60	6.50	4.30	2.90	2.00	5.00	3.30	2.30	1.50	1.10
*5-3-12 7-3-12 9-3-12	12	7.20	4.90	3.20	2.20	1.60	10.50	7.10	4.70	3.20	2.20	5.40	3.70	2.40	1.60	1.20
F5-3-13 7-3-13 9-3-13	13	7.80	5.30	3.50	2.40	1.70	11.40	7.70	5.10	3.40	2.40	5.90	4.00	2.60	1.80	1.30
7-3-14 9-3-14	14	8.40	5.80	3.80	2.50	1.80	12.30	8.30	5.50	3.70	2.60	6.30	4.30	2.90	1.90	1.40
7-3-15 9-3-15	15	9.00	6.10	4.10	2.80	1.90	13.10	8.90	5.90	4.00	2.80	6.80	4.60	3.10	2.10	1.50
7-3-16 9-3-16	16	9.60	6.50	4.30	2.90	2.00	14.00	9.50	6.30	4.20	2.90	7.20	4.90	3.20	2.20	1.50
7-3-17 9-3-17	17	10.20	7.00	4.60	3.10	2.20	14.90	10.10	6.70	4.50	3.10	7.70	5.20	3.40	2.30	1.60
7-3-18 9-3-18	18	10.80	7.30	4.90	3.20	2.30	15.80	10.70	7.10	4.70	3.30	8.10	5.50	3.70	2.40	1.70
7-3-19 9-3-19	19	11.40	7.80	5.20	3.50	2.40	16.60	11.30	7.50	5.00	3.50	8.60	5.90	3.90	2.60	1.80
7-3-20 9-3-20	20	12.00	8.20	5.40	3.60	2.50	17.50	11.90	7.90	5.30	3.70	9.00	6.10	4.10	2.70	1.90
7-3-21 9-3-21	21	12.60	8.50	5.60	3.70	2.60	18.40	12.50	8.30	5.50	3.90	9.40	6.40	4.30	2.80	2.00
7-3-22 9-3-22	22	13.20	9.00	5.90	4.00	2.80	19.20	13.10	8.70	5.80	4.00	9.90	6.70	4.50	2.90	2.10
7-3-23 9-3-23	23	13.80	9.40	6.10	4.10	2.90	20.10	13.70	9.10	6.00	4.20	10.30	7.00	4.70	3.00	2.20
7-3-24 9-3-24	24	14.40	9.80	6.50	4.30	3.00	21.00	14.30	9.50	6.30	4.40	10.80	7.40	4.90	3.20	2.30

*Available with flare nut or ODM inlet connections.
**For R-500 capacities, multiply R-12 capacities by 1.2.
"F" available with flare nut only.

1/4" ODF Distributors

Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
*4-4-2 *5-4-2 7-4-2	2	2.4	1.7	1.1	.70	.50	3.5	2.4	1.6	1.1	.76	1.8	1.3	.81	.54	.37
*4-4-3 *5-4-3 7-4-3	3	3.6	2.4	1.7	1.1	.76	5.3	3.6	2.4	1.6	1.1	2.7	1.8	1.3	.81	.56
*4-4-4 *5-4-4 7-4-4	4	4.8	3.2	2.2	1.4	1.0	7.0	4.8	3.2	2.1	1.5	3.6	2.4	1.6	1.1	.75
*4-4-5 *5-4-5 7-4-5	5	6.0	4.1	2.8	1.8	1.3	8.8	6.0	3.9	2.6	1.8	4.5	3.1	2.1	1.4	.99
*4-4-6 *5-4-6 7-4-6 9-4-6	6	7.2	4.9	3.2	2.2	1.6	10.5	7.1	4.7	3.2	2.2	5.4	3.7	2.4	1.6	1.2
7-4-7 9-4-7	7	8.4	5.8	3.8	2.5	1.8	10.5	7.1	4.7	3.2	2.2	5.4	3.7	2.4	1.6	1.2
5-4-8 7-4-8 9-4-8	8	9.6	6.5	4.3	2.9	2.0	14.0	9.5	6.3	4.2	2.9	7.2	4.9	3.2	2.2	1.5
5-4-9 7-4-9 9-4-9 11-4-9	9	10.8	7.3	4.9	3.2	2.3	15.8	10.7	7.1	4.7	3.3	8.1	5.5	3.7	2.4	1.7
7-4-10 9-4-10 11-4-10	10	12.0	8.2	5.4	3.6	2.5	17.5	11.9	7.9	5.3	3.7	9.0	6.1	4.1	2.7	1.9
7-4-11 11-4-11	11	13.2	9.0	6.0	4.0	2.8	19.3	13.1	8.7	5.8	4.1	9.9	6.8	4.5	3.0	2.1
7-4-12 9-4-12 11-4-12	12	14.4	9.8	6.5	4.3	3.0	21.0	14.3	9.5	6.3	4.4	10.8	7.4	4.9	3.2	2.3
7-4-13 9-4-13 11-4-13	13	15.6	10.6	7.1	4.7	3.2	22.8	15.5	10.2	6.8	4.8	11.7	7.9	5.3	3.5	2.4
7-4-14 9-4-14 11-4-14	14	16.8	11.4	7.6	5.0	3.5	24.5	16.7	11.0	7.4	5.2	12.6	8.6	5.7	3.8	2.6
7-4-15 9-4-15 11-4-15	15	18.0	12.2	8.0	5.4	3.8	26.3	17.9	11.8	7.9	5.5	13.5	9.2	6.0	4.1	2.9
7-4-16 9-4-16 11-4-16	16	19.2	13.1	8.7	5.8	4.1	28.0	19.0	12.6	8.4	5.9	14.4	9.8	6.5	4.3	3.1
7-4-17 11-4-17	17	20.4	13.9	9.2	6.1	4.3	29.8	20.2	13.4	8.9	6.3	15.3	10.4	6.9	4.6	3.2
7-4-18 11-4-18	18	21.6	14.6	9.7	6.5	4.6	31.5	21.4	14.2	9.5	6.6	16.2	11.0	7.3	4.9	3.4
7-4-19 11-4-19	19	22.8	15.5	10.3	6.8	4.8	33.3	22.6	15.0	10.0	7.0	17.1	11.6	7.7	5.1	3.6
7-4-20 11-4-20	20	24.0	16.3	10.8	7.2	5.0	35.0	23.8	15.8	10.5	7.4	18.0	12.2	8.1	5.4	3.8
7-4-21 11-4-21	21	25.2	17.2	11.4	7.6	5.3	36.8	25.0	16.6	11.1	7.7	18.9	12.9	8.6	5.7	4.0
7-4-22 11-4-22	22	26.4	18.0	11.9	7.9	5.5	38.5	26.2	17.3	11.6	8.1	19.8	13.5	8.9	5.9	4.1
7-4-23 11-4-23	23	27.6	18.7	12.5	8.3	5.8	40.3	27.4	18.1	12.1	8.5	20.7	14.0	9.4	6.2	4.3
7-4-24 11-4-24	24	28.8	19.6	13.0	8.6	6.0	42.0	28.6	18.9	12.6	8.8	21.6	14.7	9.7	6.5	4.5

*Available with flare nut or ODM inlet connections.
**For R-500 capacities, multiply R-12 capacities by 1.2.
"F" available with flare nut only.

5/16" ODF Distributors

Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
*4-5-2 *5-5-2 7-5-2	2	4.8	3.2	2.2	1.4	1.0	7.0	4.8	3.2	2.1	1.5	3.6	2.4	1.6	1.1	.75
F4-5-3 *5-5-3 7-5-3	3	7.2	4.9	3.2	2.2	1.6	10.5	7.1	4.7	3.2	2.2	5.4	3.7	2.4	1.6	1.2
F4-5-4 *5-5-4 7-5-4	4	9.6	6.5	4.3	2.9	2.0	14.0	9.5	6.3	4.2	2.9	7.2	4.9	3.2	2.2	1.5
7-5-5 9-5-5	5	12.0	8.2	5.4	3.6	2.5	17.5	11.9	7.9	5.3	3.7	9	6.1	4.1	2.7	1.9
7-5-6 9-5-6	6	14.4	9.8	6.5	4.3	3	21	14.3	9.5	6.3	4.4	10.8	7.4	4.9	3.2	2.3
9-5-7 11-5-7	7	16.8	11.4	7.6	5	3.5	34.5	16.7	11	7.4	5.2	12.6	8.6	5.7	3.8	2.6
9-5-8 11-5-8	8	19.2	13.1	8.6	5.8	4.1	28	19	12.6	8.4	5.9	14.4	9.8	6.5	4.3	3.1
11-5-9	9	21.6	14.6	9.7	6.5	4.6	31.5	21.4	14.2	9.5	6.6	16.2	11.0	7.3	4.9	3.4
11-5-10	10	24.0	16.3	10.8	7.2	5.0	35.0	23.8	15.8	10.5	7.4	18.0	12.2	8.1	5.4	3.8
11-5-11	11	26.4	18.0	11.9	7.9	5.5	38.5	26.2	17.3	11.6	8.1	19.8	13.5	8.9	5.9	4.1
11-5-12	12	28.8	19.6	13.0	8.6	6.0	42.0	28.6	18.9	12.6	8.8	21.6	14.7	9.7	6.5	4.5
11-5-13	13	31.2	21.2	14.0	9.4	6.6	45.5	30.9	20.5	13.7	9.6	23.4	15.9	10.5	7.0	5.0
11-5-14	14	33.6	22.8	15.1	10.1	7.1	49.0	33.3	22.1	14.7	10.3	25.2	17.1	11.3	7.6	5.3
11-5-15	15	36.0	24.5	16.2	10.8	7.6	52.5	35.7	23.6	15.8	11.0	27.0	18.4	12.2	8.1	5.7
13-5-16	16	38.4	26.2	17.3	11.5	8.0	56.0	38.1	25.2	16.8	11.8	28.8	19.6	13.0	8.6	6.0
13-5-17	17	40.8	27.7	18.4	12.2	8.5	59.5	40.4	26.8	17.8	12.5	30.6	20.8	13.8	9.1	6.4
13-5-18	18	43.2	29.4	19.4	13.0	9.1	63.0	42.8	28.4	18.9	13.2	32.4	22.1	14.6	9.7	6.8
13-5-19	19	45.6	31.0	20.5	13.7	9.6	66.5	45.2	29.9	20.0	14.0	34.2	23.2	15.4	10.3	7.2
13-5-20	20	48.0	32.6	21.6	14.4	10.1	70.0	47.6	31.4	21.0	14.7	36.0	24.5	16.2	10.8	7.7
13-5-21	21	50.4	34.3	22.7	15.1	10.6	73.5	50.0	32.9	22.0	15.4	37.8	25.7	17.0	11.3	7.9
13-5-22	22	52.8	36.0	23.8	15.8	11.0	77.0	52.5	34.4	23.1	16.1	39.6	27.0	17.8	11.9	8.3

*Available with flare nut or ODM inlet connections.
“F” available with flare nut only.

3/8" ODF Distributors

Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
F4-6-2 7-6-2	2	8.4	5.8	3.8	2.5	1.8	12.3	8.3	5.5	3.7	2.6	6.3	4.3	2.9	1.9	1.4
F5-6-3 7-6-3	3	12.6	8.5	5.6	3.8	2.6	18.4	12.5	8.3	5.5	3.9	9.5	6.4	4.2	2.9	2.0
F5-6-4 7-6-4	4	16.8	11.4	7.6	5.0	3.5	24.5	16.7	11.1	7.4	5.1	12.6	8.6	5.7	3.8	2.6
9-6-5 11-6-5	5	21.0	14.3	9.5	6.4	4.4	30.6	20.8	13.9	9.2	6.4	15.8	10.7	7.1	4.8	3.3
9-6-6 11-6-6	6	25.2	17.2	11.4	7.6	5.3	36.8	25.0	16.6	11.1	7.7	18.9	12.9	8.6	5.7	4.0
11-6-7	7	29.4	20.0	13.2	8.9	6.1	42.9	29.2	19.4	12.9	9.0	22.0	15.0	9.9	6.7	4.6
11-6-8	8	33.6	22.8	15.1	10.1	7.1	49.0	33.3	22.2	14.7	10.3	25.2	17.1	11.3	7.6	5.3
11-6-9	9	37.8	25.7	17.0	11.3	7.9	55.1	37.5	25.0	16.5	11.6	28.3	19.2	12.7	8.5	6.0
11-6-10	10	42.0	28.6	19.0	12.6	8.9	61.3	41.7	27.7	18.4	12.9	31.5	21.4	14.2	9.5	6.7
11-6-11	11	46.2	31.4	20.8	13.8	9.7	67.4	45.8	30.4	20.2	14.2	34.3	23.5	15.6	10.4	7.2
11-6-12	12	50.4	34.3	22.7	15.1	10.6	73.5	50.0	33.2	22.1	15.5	37.8	25.7	17.0	11.3	7.9
13-6-17	17	68.2	46.3	30.7	20.5	14.4	99.4	67.6	44.8	29.9	21.0	51.1	34.7	23.0	15.4	10.8
13-6-18	18	74.4	50.6	33.6	22.4	14.9	108.5	73.9	49.0	32.7	21.7	55.8	37.9	25.2	16.8	11.2

*Available with flare nut or ODM inlet connections.
"F" available with flare nut only.

1/2" ODF Distributors

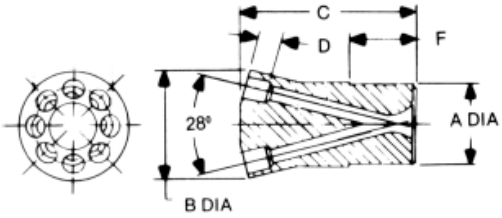
Part Number	# of Outlets	Tons - R134a					Tons - R22					Tons - R404A/R507				
		40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°	40°	20°	0°	-20°	-40°
11-8-2	2	12.0	8.2	5.4	3.6	2.5	17.5	11.9	7.9	5.3	3.8	9.0	6.1	4.1	2.7	1.9
11-8-3	3	18.0	12.2	8.2	5.4	4.2	26.3	17.9	11.8	7.9	5.5	13.5	9.2	6.1	4.1	3.2
11-8-4	4	24.0	16.3	10.8	7.2	5.0	35.0	23.8	15.8	10.5	7.6	18.0	12.2	8.1	5.4	3.8
11-8-5	5	30.0	20.4	13.6	9.0	6.4	43.8	29.8	19.7	13.2	9.2	22.5	15.3	10.2	6.8	4.8
11-8-6	6	36.0	24.5	16.2	10.8	7.6	52.5	35.7	23.6	15.8	11.0	27.0	18.4	12.2	8.1	5.7
11-8-7	7	42.0	28.6	19.0	12.6	8.9	61.3	41.7	27.6	18.4	12.9	31.5	21.4	14.2	9.5	6.7
13-8-8	8	48.0	32.6	21.7	14.4	10.2	70.0	47.7	31.5	21.1	14.7	36.0	24.5	16.3	10.8	7.7
13-8-9	9	54.0	36.7	24.4	16.2	11.4	78.7	53.7	31.9	23.7	16.5	40.5	27.5	18.3	12.1	8.6
13-8-10	10	60.0	40.8	27.1	18.0	12.7	87.5	59.6	39.4	26.3	18.4	45.0	30.6	20.3	13.5	9.5
13-8-11	11	66.0	44.9	30.0	19.8	14.0	96.3	65.6	43.3	28.9	20.3	49.5	33.7	22.4	14.8	10.5
13-8-12	12	72.0	49.0	32.6	21.6	15.4	105.2	71.5	47.2	31.5	22.1	54.0	36.8	24.5	16.2	11.4
13-8-13	13	78.0	53.0	35.3	23.4	16.6	113.8	77.5	51.2	34.2	24.0	58.5	39.8	26.5	17.6	12.4

*Available with flare nut or ODM inlet connections.
"F" available with flare nut only.

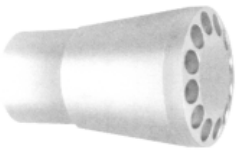
NOTE: Capacity shown is the total distributor capacity for the indicated number of outlets with 36" tubes. Ratings are based on average condensing temperature, 15 psi drop across the distributor, and 1 degree F subcooled liquid entering the expansion valve.

Type	A Dia.	B Dia.	C	D +/-.015	F
3-3-2	.375 .373	.812	1.236	.171	.393
3-3-3					
3-3-4					
3-3-5					
3-3-6					
3-3-8		1.000	1.380	.171	.375
3-4-2		.812	1.236	.234	.393
3-4-3					
3-4-4					
3-4-6					
4-2-5-2	.500 .498	–	.708	.125	–
4-2.5-3					
4-2.5-4		.625	.909		.500
4-2.5-5					
4-2.5-6		.688	1.022		.505
4-2.5-8		.793	1.263		
4-2.5-9		.970	1.530		
4-3-2		.625	.812		
4-3-3					
4-3-4		.656	.906		
4-3-5		.750	1.050	.171	
4-3-6		.812	1.195		
4-3-7		.875	1.359		
4-3-8		.970	1.530		
4-3-9		1.000	1.625		
4-3-10		1.095	1.562		.500
4-3-12		1.250	2.031		
4-4-2		.830	1.110	.234	.405
4-4-3					
4-4-4					
4-4-5		1.000	1.561		.440
4-4-6					
4-4-7		1.250	1.775		.500
4-4-8					
5-2.5-2	.625 .623	–	.960	.125	–
5-2.5-3					
5-2.5-4					
5-2.5-5		.688	1.093		.630
5-2.5-6					
5-2.5-7		.837	1.406		
5-2.5-8					
5-2.5-9					
5-2.5-10		.899	1.496		
5-3-2		–	.887	.171	–
5-3-3					
5-3-4		.812	1.236		.630
5-3-5					
5-3-6					
5-3-7		.937	1.433		
5-3-8					
5-3-9					
5-3-10		1.250	2.031		
5-3-11					
5-3-12					

Example of Type Number				
3	–	3	–	4
Size of Inlet in 1/8ths		Size of Outlets in 1/16ths		Number of Outlets



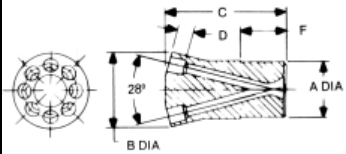
Type	A Dia.	B Dia.	C	D +/-.015	F
5-4-2	.625 .623	.812	1.205	.234	.630
5-4-3					
5-4-4					
5-4-5		1.000	1.498		
5-4-6					
5-4-8		1.250	1.875		
5-4-9		1.280	2.030		
5-4-10		1.416	2.518		
5-5-2		.875	1.165	.297	.567
5-5-3		1.000	1.495		.630
5-5-4					
5-6-2		1.125	1.738	.312	.625
7-2.5-10	.815	1.125	1.812	.125	.875
7-2.5-11					
7-2.5-12					
7-2.5-13		1.265	2.219		
7-2.5-14					
7-2.5-15					
7-2.5-16					
7-2.5-18		1.156	2.562		
7-2.5-20					
7-2.5-24					
7-3-5	.875 .873	.890	1.492	.171	.880
7-3-6					
7-3-7		1.000	1.659		
7-3-8					
7-3-9					
7-3-10		1.240	2.101		
7-3-11					
7-3-12					
7-3-13		1.625	2.722		
7-3-14					
7-3-15					
7-3-16		1.609	2.718		
7-3-17					
7-3-18		2.109	3.650		
7-3-19					
7-3-20					
7-3-24					
7-4-2		.890	1.331	.234	
7-4-3					
7-4-4					
7-4-5		1.041	1.581		
7-4-6					
7-4-7		1.187	1.812		
7-4-8					

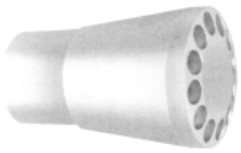


Type	A Dia.	B Dia.	C	D +/-.015	F
7-4-9	.875 .873	1.416	2.247	.234	.880
7-4-10					
7-4-11		1.701	2.698		
7-4-12					
7-4-13					
7-4-14		1.800	2.698		
7-4-15		2.188	3.550		
7-4-16					
7-4-17					
7-4-18					
7-4-19		2.313	3.378		
7-4-20					
7-4-21		2.705	3.813		
7-4-22					
7-4-23					
7-4-24					
7-5-2		.894	1.290	.297	.875
7-5-3		1.063	1.543		.880
7-5-4					
7-5-5		1.250	1.930		
7-5-6					
7-6-2		1.250	1.930	.312	
7-6-3					
7-6-4					
9-3-8	1.125 1.123	1.188	2.050	1.71	1.036
9-3-9					
9-3-10		1.240	2.101		
9-3-11					
9-3-12					
9-3-13		1.680	2.875		
9-3-14					
9-3-15					
9-3-16					
9-3-17					
9-3-18					
9-3-19		2.115	3.684		
9-3-20					
9-3-21					
9-3-22					
9-3-23					
9-3-24					
9-4-6		–	1.878	.234	–
9-4-7		1.285	1.935		1.036
9-4-8					
9-4-9		1.285	2.075		
9-4-10		1.375	2.206		
9-4-11		1.567	2.505		
9-4-12					
9-4-13		2.000	3.210		1.031
9-4-14		1.980			1.036
9-4-15					
9-4-16					
9-5-5		1.250	1.777	.297	
9-5-6					

Type	A Dia.	B Dia.	C	D +/-.015	F
9-5-7	1.125 1.123	1.438	2.105	.297	1.036
9-5-8					
9-6-5		1.453	2.109	.312	1.031
9-6-6					
11-4-8	1.375 1.373	1.415	2.328	.234	1.156
11-4-9					
11-4-10					
11-4-11		1.500	2.458		1.161
11-4-12		1.688	2.779		
11-4-13					
11-4-14		1.183	2.995		
11-4-15		1.875	3.119		
11-4-16		1.988	3.296		
11-4-17		2.180	3.582		1.156
11-4-18					
11-4-19		2.313	4.015		1.161
11-4-20					
11-4-21		2.705	4.138		
11-4-22					
11-4-23					
11-4-24					
11-5-6		1.484	2.218	.247	1.156
11-5-7					
11-5-8					
11-5-9		1.938	3.033		1.161
11-5-10					
11-5-11					
11-5-12					
11-5-13		2.313	3.649		1.156
11-5-14					
11-5-15					
11-6-6	1.375	1.484	2.239	.359	
11-6-7		1.890	2.671		
11-6-8					
11-6-10		2.296	3.239		
11-6-12					
11-8-3		1.468	2.156	.484	
11-8-4		1.062	2.687		
11-8-5					
11-8-6		2.0625	2.705		
11-8-7					
13-5-16	1.625 1.623	2.750	4.500	.297	
13-5-17					
13-5-18		2.835	4.859		
13-5-19					
13-5-20					
13-5-21		3.000	4.281		
13-5-22					
13-6-13		2.046	5.781	.359	1.280
13-8-8		2.250	3.140	.359	
13-8-10		2.593	3.765	.484	
13-8-13		3.125	4.750	.484	

Example of Type Number				
3	–	3	–	4
Size of Inlet in 1/8ths		Size of Outlets in 1/16ths		Number of Outlets

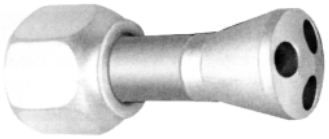


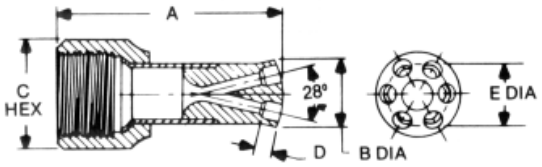


Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Flare Type Venturi Distributors

Regular or Frost Free Nut





Outlet Size	Number of Outlets	Type Number	A	B Dia.	C Hex	D	E Dia.
3/16	3	F3-3-3	1 1/16	5/8	7/8	3/16	1/2
	4	F3-3-4					1/2
	5	F3-3-5	2 3/16	13/16			17/32
	6	F3-3-6					17/32
5/32	2	F4-2.5-2	1 7/8	1/2		1/8	9/32
	4	F4-2.5-4	2 13/64	43/64			7/16
	5	F4-2.5-5	2 5/64	39/64			25/64
	6	F4-2.5-6	2 13/16	43/64			7/16
	8	F4-2.5-8	2 17/32	55/64			5/8
3/16	2	F4-3-2	1 29/32	35/64		11/64	5/16
	3	F4-3-3	1 63/64	19/32			11/32
	4	F4-3-4	2 3/8	25/32			17/32
	5	F4-3-5			1		
	6	F4-3-6					
	8	F4-3-8	2 45/64	59/64			21/32
1/4	2	F4-4-2	2 7/64	25/32		15/64	13/32
	3	F4-4-3	2 23/64	27/32			33/64
	4	F4-4-4					
	5	F4-4-5	2 47/64	1			11/16
	6	F4-4-6					
5/16	2	F4-5-2	2 27/64	7/8			31/64
	3	F4-5-3	2 23/32	1 1/64		19/64	41/64
3/8	2	F4-6-2	2 5/8	1 1/16		23/64	19/32

Outlet Size	Number of Outlets	Type Number	A	B Dia	C Hex	D	E Dia
5/32	4	F5-2.5-4	2 23/64	21/32	1 1/8	1/8	7/16
	6	F5-2.5-6					
	8	F5-2.5-8	2 17/32	25/32			35/64
	9	F5-2.5-9	2 43/64	27/32			39/64
	12	F5-2.5-12	3 5/16	1 7/32			31/32
	13	F5-2.5-13					
	14	F5-2.5-14	3 7/64	1 9/64			29/32
	6	F5-3-6	2 29/64	51/64		11/64	17/32
	8	F5-3-8	2 21/32	59/64			21/32
3/16	9	F5-3-9	2 27/32	1			47/64
	10	F5-3-10	3 7/64	1 15/64			15/16
	12	F5-3-12					
1/4	2	F5-4-2				15/64	33/64
	3	F5-4-3	2 27/64	53/64			
	4	F5-4-4					
	5	F5-4-5	2 23/32	1 1/64			11/16
	6	F5-4-6					
5/16	2	F5-5-2	2 25/32	7/8		19/64	31/64
	3	F5-5-3	2 23/32	1 1/64			41/64

NOTE: To order distributor only drop prefix “F” and substitute inlet size. For example a distributor head to go into 1/2" O.D. copper would be .430 plus size of outlets in 1/16" and number of circuits. 430-3-4 would go into 1/2" tubing and have four 3/16" feeder tube sockets.

Example of Type Number				
3	**–**	**3**	**–**	**4**
Size of Inlet in 1/8ths		Size of Outlets in 1/16ths		Number of Outlets

Parker Plus: Value-Added Components & Custom Brazing

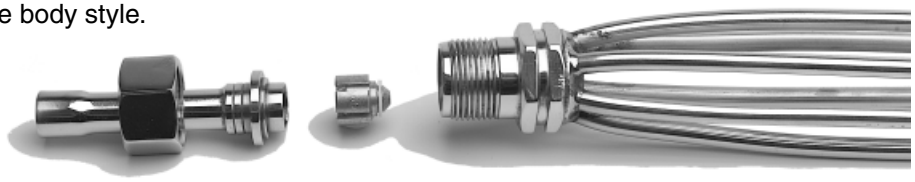
Parker Climate Controls Division produces up to 20 million trouble-free braze joints a year for HVAC/R companies worldwide. Our customers have discovered that Parker brazed products offer greater integrity which results in lower on-line leaks and fewer field problems. In addition, most cost evaluations prove Parker is extremely cost effective when compared with in-house methods. Contact Parker for an on-site evaluation.



Flo-Rater Designs

Style F Flo-Raters

- Most versatile and cost effective body style.
- Accepts 5 fluted, 3 fluted and double-headed piston styles.
- Accepts TVXs — no brazing needed.
- 3 Sub-models for full range of circuit quantities.
- Flange mount available.
- Full range of circuit sizes and quantities.
- Easy field repliceable restrictor — no brazing required.
- Full line of inlet styles.
- ***See page 210.***



Style A Flo-Raters

- Cost effective.
- 3 sub-models for full range of circuit quantities and sizes.
- PTFE seal on body.
- PTFE or neoprene seal on piston.
- ***See page 211.***

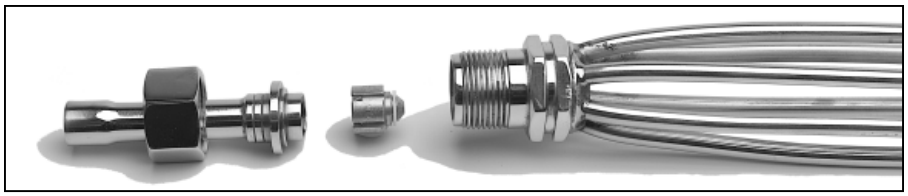


Style M Flo-Raters

- Heavy duty quality.
- Preferred by OEM users.
- PTFE or neoprene seal on piston.
- ***See page 213.***



Flo-Rater Style F



Application
Meter refrigerant and distribute two-phase refrigerant to a coil. Replaces capillary tubes, TXVs and check valves as a means of metering refrigerant flow through air conditioning and heat pump systems.

Agency Approvals
UL Recognized; File No: 7511
US Patent No. 5,894,741

Features and Benefits
- Most versatile and cost effective body style.
- Accepts 5 fluted, 3 fluted and double-headed piston styles.
- Accepts TVXs — no brazing required.
- Flange mount available.
- Full range of circuit sizes and quantities.
- Easy field replaceable restrictor — no brazing required.
- Full line of inlet styles.

Nomenclature

No. 8713602-17-1080 *(Example)*

87F	–	1	–	3	–	6	–	02	17	1	80
Body Style 75 = 3/4" hex 87 = 7/8" hex 100 = 1" hex		**Screen** 0 = no screen 1 = with screen		**Size of Circuits Dia. in 1/16ths**		**Number of Circuits**		**Inlet Style** See inlet style chart.	**Length of Circuit Tubes in Inches**	**Piston Style** See piston style chart.	**Piston Size in Thousandths** See piston size chart.

Circuit Capacity List
75 = 0-1/4, 5-3/16, 7-1/8
87 = 5-1/4, 7-3/16, 8-1/8
100 = 6-1/4, 9-3/16, 12-1/8

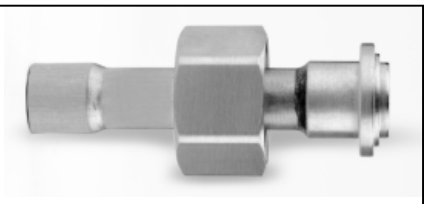
Orifice Sizing
See graphs on page 218.


75F Body


87F Body


100F Body

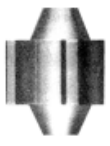
Most Common Inlet Types (Custom Designs Available)
00 = No inlet piece included.
26 = Flange with 3/8" O.D. x .028 wall x 2" long. With one end expanded to 3/8" I.D.
35 = Flange with 3/8" O.D. x .028 wall with 90° bend and one end expanded to 3/8" I.D.


End Piece No. 26 Shown
Custom Engineered Models Available

Piston Types Available
1 = 3 fluted, stepped hole, PTFE gasket
5 = 5 fluted, straight hole with no chamfer, PTFE gasket
6 = 5 fluted, straight hole with 45 x .010 chamfer, neoprene gasket
9 = Doubleheaded piston


3 Flute

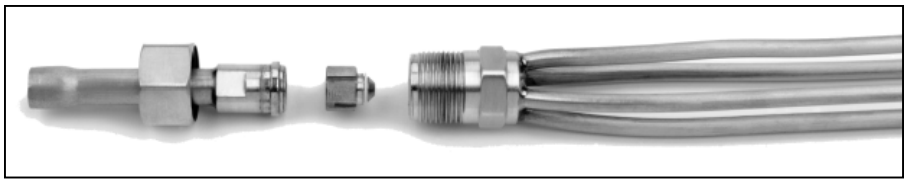

5 Flute


Doubleheaded

Pistons Available

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Flo-Rater Style A



Application
Meter refrigerant and distribute two-phase refrigerant to a coil. Replaces capillary tubes, TXVs and check valves as a means of metering refrigerant flow through air conditioning and heat pump systems.

Agency Approvals
UL Recognized; File No: 7511

Features and Benefits
- Cost effective.
- Full range of circuit sizes and quantities.
- Easy field replaceable restrictor — no brazing required.
- Accepts TXVs — no brazing required.
- Accepts 5 and 3 fluted piston styles.
- Flange mount available.
- Full line of inlet styles.

Nomenclature

No. 8713602-17-1080 *(Example)*

87	–	1	–	3	–	6	–	02	17	1	80
Body Style 75 = 3/4" hex 87 = 7/8" hex 100 = 1" hex		**Screen** 0 = no screen 1 = with screen		**Size of Circuits Dia. in 1/16ths**		**Number of Circuits**		**Inlet Style** See inlet style chart.	**Length of Circuit Tubes in Inches**	**Piston Style** See piston style chart.	**Piston Size in Thousandths** See piston size chart.

Circuit Capacity List
75 = 0-1/4, 5-3/16, 7-1/8
87 = 5-1/4, 7-3/16, 8-1/8
100 = 6-1/4, 9-3/16, 12-1/8

Orifice Sizing
See graphs on page 218.



75 Body

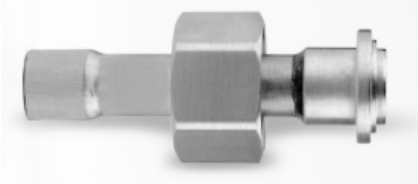


87 Body



100 Body

Most Common Inlet Types (Custom Designs Available)
00 = No inlet piece included.
01 = Flange with 3/8" O.D. x .028 wall x 2" long. With one end expanded to 3/8" I.D.
02 = Flange with 3/8" O.D. x .028 wall x 9" long. Straight.
03 = Flange with 3/8" O.D. x .028 wall x 3.5" long. Straight.
04 = Flange with 3/8" O.D. x .028 wall x 2.6" long. With one end expanded to 3/8" I.D.
27 = Flange with 3/8" O.D. x .028 wall with 90° bend and one end expanded to 3/8" I.D.
11 = Flange with 3/8" O.D. x .018 wall x 6.250" long. Straight.
18 = Flange with 3/8" O.D. x .028 wall x with 90° bend. Straight.



End Piece No. 01 Shown
Custom Engineered Models Available

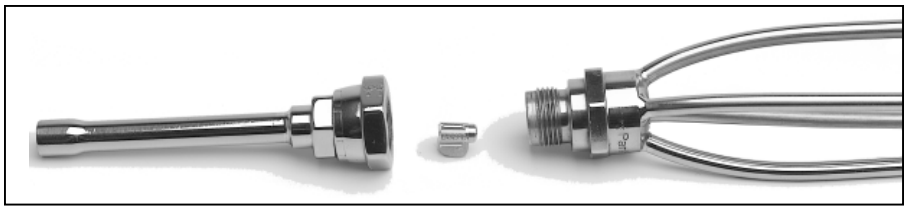
Piston Types Available
1 = 3 fluted, stepped hole, PTFE gasket
5 = 5 fluted, straight hole with no chamfer, PTFE gasket
6 = 5 fluted, straight hole with 45 x .010 chamfer, neoprene gasket



Pistons Available
3 Flute (left)
5 Flute (right)

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Flo-Rater Style FD20



Application
Meter refrigerant and distribute two-phase refrigerant to a coil. Replaces capillary tubes, TXVs and check valves as a means of metering refrigerant flow through air conditioning and heat pump systems.

Agency Approvals
UL Recognized; File No: 2709

Features and Benefits
- Cost effective.
- Full range of circuit sizes and quantities.
- Easy field replaceable restrictor — no brazing required.
- Accepts TXVs — no brazing required.
- Metal to metal seals (body and piston).
- Flange mount available.
- Full line of inlet styles.
- Requires bullet nose piston FF1913-10-XXX

Nomenclature

No. FD20G001B04065 *(Style B Example)*

FD20G	–	001	–	B	–	04	–	065
FD20 Flow Control, Fully Assembled		Basic Configuration		"B" Style Piston FF1913-10-XXX		Number of Outlets		Orifice Size

Circuit Capacity
- 2-10 circuits

Orifice Sizing
See graphs on page 218.



75B Body (Style B)



87B Body (Style B)



100B Body (Style B)

Most Common Inlet Types (Custom Designs Available)
- Flange with 3/8" O.D. x .028 wall x 1" long.
- Flange with 3/8" O.D. x .028 wall x 4.5" long. With one end expanded to 3/8" I.D.
- Flange with 3/8" O.D. x .028 wall x 1" long. With 90° bend and one end expanded to 3/8" I.D.



FD20 Inlet
Custom Engineered
Models Available

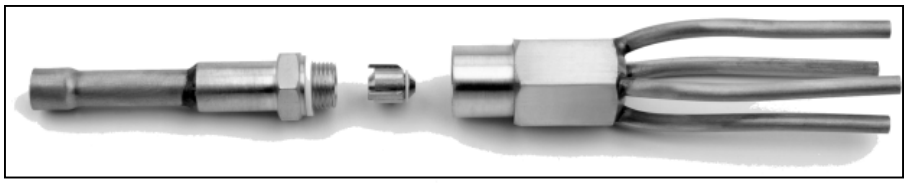
Piston Type
- "B" style bullet nose



Pistons Available
Chamfered

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Flo-Rater Style M



Application
Meter refrigerant and distribute two-phase refrigerant to a coil. Replaces capillary tubes, TXVs and check valves as a means of metering refrigerant flow through air conditioning and heat pump systems.

Agency Approvals
UL Recognized; File No: 115500

Features and Benefits
- Heavy duty design.
- Full range of circuit sizes and quantities.
- Easy field replaceable restrictor.
- Accepts 5 and 3 fluted piston styles.
- Full line of inlet styles.

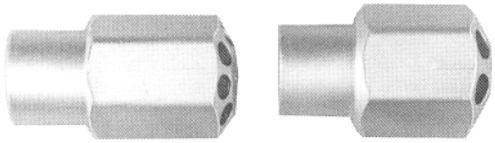
Nomenclature

No. 43412-17-3080 *(Style M Example)*

4	–	3	–	4	–	12	–	17	–	3	–	080
Body Style		**Size of Circuits Dia. in 1/16ths**		**Number of Circuits**		**End Piece Style**		**Length of Circuit Tubes in Inches**		**Piston Style**		**Piston Size in Thousandths**
4L = 7/8" hex body w/ 1/2-20-2B thds 4 = 7/8" hex body w/1/2-24-2B thds 5 = 15/16" hex body 6 = 15/16" hex body (short) 7 = 1-1/4" hex body										See piston style chart.		See piston size chart.

Circuit Capacity List
4MDB = 6-1/4, 8-3/16, 10-1/8
7MDB = 11-3/16

Orifice Sizing
See graphs on page 218.



4 MDB Body *7 MDB Body*

Most Common Inlet Types (Custom Designs Available)
00 = no inlet piece
10 = 3/8" sweat
12 = 3/8" sweat with tube brazed in
25 = 1/4" flare
38 = 3/8" flare
50 = 1/2" flare
70 = 3/8" flare with 90 degree 3/8" elbow



End Piece No. 12 Shown
Custom Engineered Models Available

Piston Types Available
1 = 3 fluted, stepped hole, PTFE gasket
5 = 5 fluted, straight hole with no chamfer, PTFE gasket
6 = 5 fluted, straight hole wiyh 45 x .010 chamfer, neoprene gasket



3 Flute *5 Flute*
Pistons Available

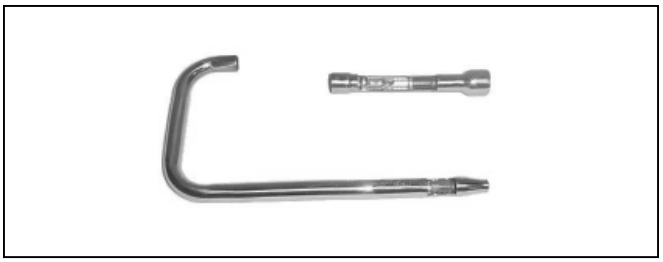
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Flo-Rater Style FD20D

Application
Designed to replace hard-to-handle and easily damaged capillary tubing giving a more predictable pressure drop.

Agency Approvals
UL Recognized; File No: 2709

Features and Benefits
- Cost effective alternative to capillary tubes.
- One piece design.
- Versatility in length, end configuration, orifice size and copper tube bend configuration.
- Easy to handle and install.
- Complete range of orifice sizes.

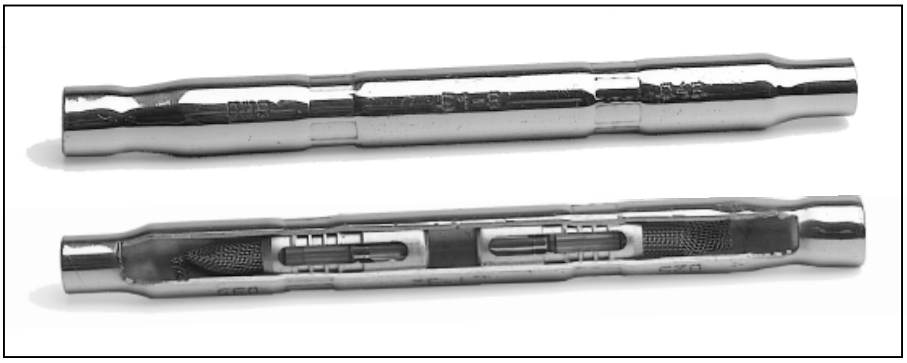


Performance Specifications
- Pressure up to 750 psi operating
- Minimum burst pressure: 3750 psi
- Mass flow rates from 50 lb./hr. to 1200 lb./hr.
- Restrictor sized from .030" to .105" (in .001" increments)

Orifice Sizing
See graphs on page 218.

Flo-Rater Style FD20E

Application
Developed to solve space limitation problems on Packaged Terminal Heat Pumps and mini-split systems. The FD20E utilizes two floating orifices to replace two check valves and two cap tubes along with up to eight braze joints with one easy to install self-contained unit requiring only two braze joints.



Agency Approvals
UL Recognized; File No: 2709
US Patent No. 5,265,438

Features and Benefits
- Cost effective alternative to capillary tubes, check valves and strainers.
- One piece design.
- Bi-directional flow control/filter screen combination.
- Custom end configurations.
- Complete range of orifice sizes.

Performance Specifications
- Pressure up to 750 psi operating
- Minimum burst pressure: 3750 psi
- Operating temperature: +140°F to +250°F (-40°C to +121°C)
- Mass flow rates from 50 lb./hr. to 1200 lb./hr.
- Restrictor sized from .020" to .105" (in .001" increments)
- End configurations: Male 1/4", 5/16", 3/8", 1/2" Female 1/4", 5/16", 3/8", 1/2"

Orifice Sizing
See graphs on page 218.

Flo-Rater Style FD20F



Application

Utilizing a floating orifice the FD20F is designed for use on PTAC systems. This eliminates hard-to-handle and easily damaged capillary tubing and check valves giving a more predictable pressure drop.

Agency Approvals

UL Recognized; File No: 2709
US Patent No. 5,265,438

Features and Benefits

- Cost effective alternative to capillary tubes.
- One piece design.
- Bi-directional flow with filter screen combination.
- Custom end configurations.
- Complete range of orifice sizes.

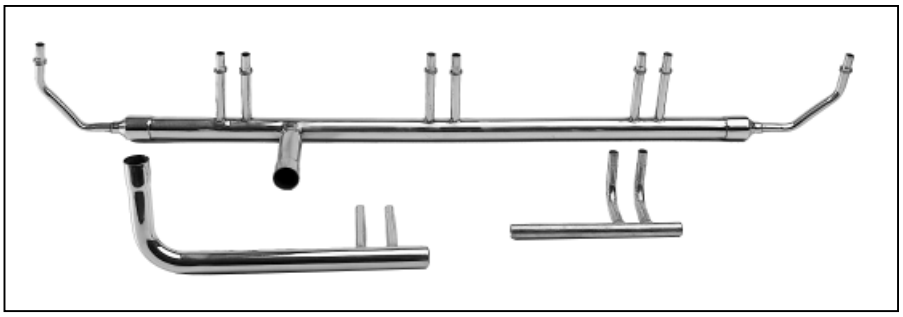
Performance Specifications

- Pressure up to 750 psi operating
- Minimum burst pressure: 3750 psi
- Operating temperature: +140°F to +250°F (-40°C to +121°C)
- Mass flow rates from 50 lb./hr. to 1200 lb./hr.
- Restrictor sized from .020" to .105" (in .001" increments)

Orifice Sizing

See graphs on page 218.

Manifolds



Application

Meter refrigerant and distribute two-phase refrigerant to a coil. Replaces capillary tubes, TXVs and check valves as a means of metering refrigerant flow through air conditioning and heat pump systems.

Features and Benefits

- Custom manifolds are available for optimizing evaporator and condensor coil performance. Individual feeder legs can be equipped with fixed restrictors for air conditioning only or floating restrictors for heat pump applications.

Flo-Rater and Manifold Pistons

Orifice Sizing
See graphs on page 218.

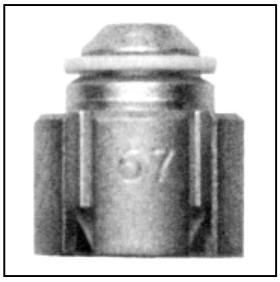
Piston Style: 5 Fluted (5)

Nomenclature

No. 5OPXXX0 *(Example)*

5OP	–	059	–	0
		Orifice Diameter in Thousandths		

Applications
Use in body style F, A and M



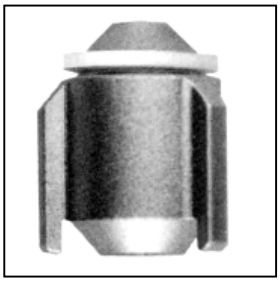
Piston Style: 3 Fluted (3)

Nomenclature

No. OPXXX0 *(Example)*

OP	–	059	–	0
		Orifice Diameter in Thousandths		

Applications
Use in body style F, A and M



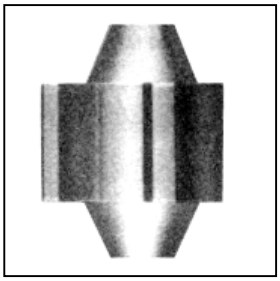
Piston Style: Doubleheaded (9)

Nomenclature

No. 99OPXXX0 *(Example)*

99OP	–	059	–	0
		Orifice Diameter in Thousandths		

Applications
Use in body style F



Piston Style: Blunt Nose (10)

Nomenclature

No. FF1913-09-XXX *(Example)*

FF1913	–	09	–	059
				Orifice Diameter in Thousandths

Applications
Use in body style FD20

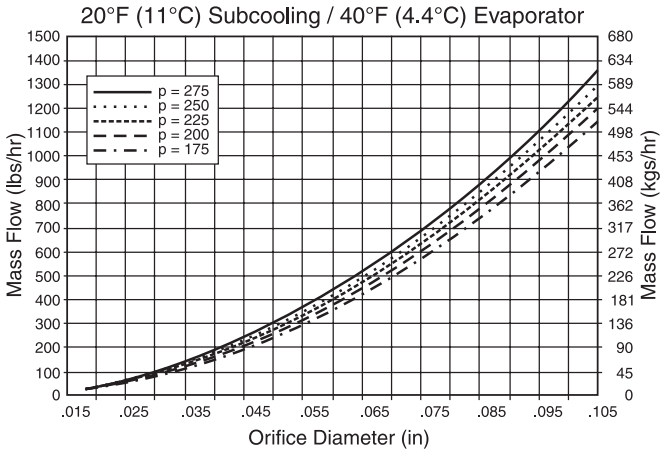


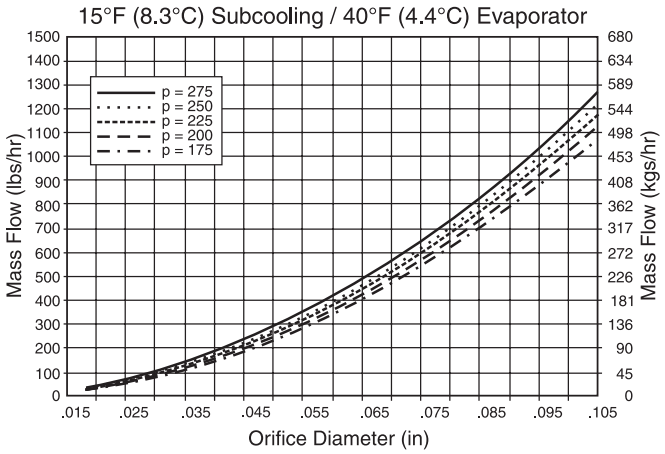
Pistons Available Chamfered

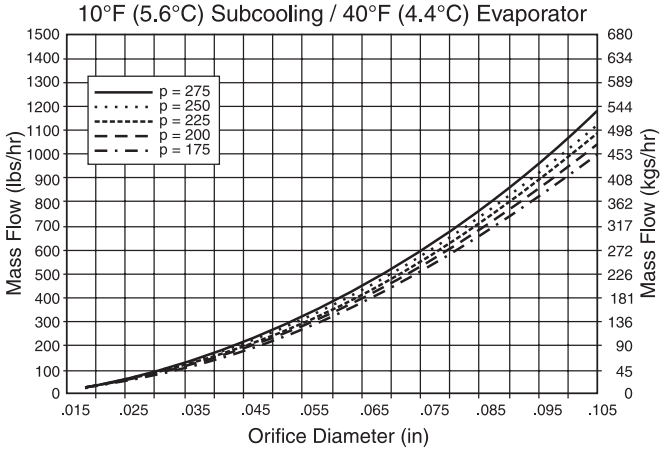
Selecting the Right Orifice for Your Flow Control

You can use the following graphs to select the correct flow control for your applications:

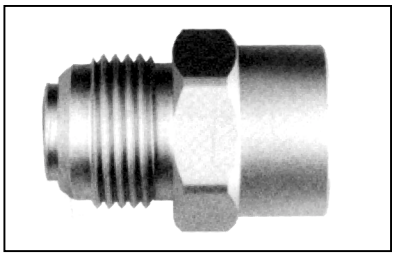
1) Determine the amount of subcooling desired.
2) Select the graph closest to desired subcooling.
3) Determine design inlet pressure = p.
4) From the selected graph, choose the line with the appropriate pressure.
5) Determine the required mass flow.
6) Draw an imaginary straight line from the desired mass flow to the pressure line chosen, then drop the imaginary line down to the orifice diameter axis.
7) The orifice diameter can be read directly to the nearest thousandth (for example: 0.075 inch).







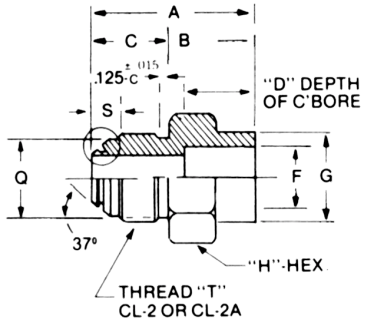
O-Ring Adapter Fittings

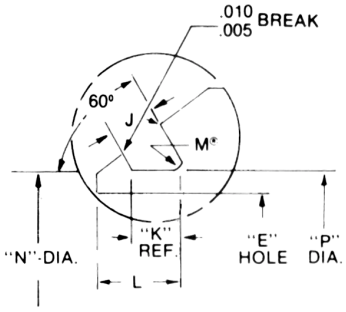


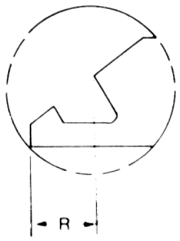
Features and Benefits

- Variations of length and tube connetions available.

Dimensions







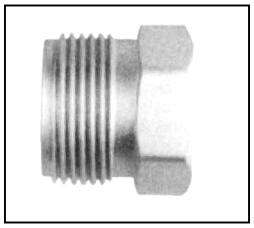
Part No.	Dash Size	Size Brazed End	O.D. Tube Size	A ±.010	B ±.010	C ±.015	D ±.010	E ±.005	F ±.003	G ±.010	H ±.010	J ±.003	K ±.005	L ±.003	M ±.005	N ±.003	P ±.003	Q ±.005	R ±.005	S ±.015	O-Ring Dash Size	T Thread
BJ-1	8-10	.500	.625	1.59	.375	.758	.688	.446	.506	1.09	1.13	.089	.103	.122	.020	.539	.522	.767	.082	.266	14	7/8 - 14
BJ-2	10-10	.625	.625	1.59	.375	.758	.688	.446	.632	1.09	1.13	.089	.103	.122	.020	.539	.522	.767	.082	.266	14	7/8 - 14
BJ-3	12-10	.750	.625	1.59	.375	.758	.688	.446	.757	1.09	1.13	.089	.103	.132	.020	.539	.522	.767	.089	.266	14	7/8 - 14
BJ-4	14-10	.875	.625	1.59	.375	.758	.688	.446	.882	1.09	1.13	.089	.103	.132	.020	.539	.522	.767	.089	.266	14	7/8 - 14
BJ-5	10-12	.625	.750	1.10	.438	.864	.812	.575	.632	1.19	1.250	.089	.103	.134	.020	.664	.664	.930	.094	.315	16	1-1/16-12
BJ-6	14-12	.875	.750	1.10	.438	.864	.812	.609	.882	1.19	1.250	.089	.103	.134	.020	.664	.664	.930	.094	.315	16	1-1/16-12
BJ-7	12-16	.750	1.000	2.03	.500	.911	.875	.695	.757	1.34	1.375	.089	.103	.134	.020	.913	.913	1.19	.094	.315	20	1-5/16-12
BJ-8	16-14	.875	1.000	2.03	.500	.911	.875	.745	.882	1.34	1.375	.089	.103	.134	.020	.913	.913	1.19	.094	.315	20	1-5/16-12
BJ-9	16-16	1.000	1.000	2.03	.500	.911	.875	.745	1.01	1.34	1.375	.089	.103	.134	.020	.913	.913	1.19	.094	.315	20	1-5/16-12
BJ-10	18-16	1.125	1.000	2.03	.500	.911	.875	.745	1.13	1.34	1.375	.089	.103	.134	.020	.913	.913	1.19	.094	.315	20	1-5/16-12
BJ-11	18-20	1.125	1.250	2.20	.562	.958	1.000	.955	1.13	1.63	1.750	.089	.103	.159	.020	1.15	1.18	1.50	.118	.367	25	1-5/8-12
BJ-20		1.375	1.375	2.19	.562	1.08	7/8	1.25	1.38	1.88	2.0	.111	.128	.181	.030	1.38	1.35	1.76	.121	.378		1-7/8-12
BJ-12	22-20	1.375	1.250	2.20	.562	.958	1.000	.955	1.38	1.63	1.750	.089	.103	.159	.020	1.15	1.18	1.50	.118	.367	25	1-5/8-12

Type-O Fittings

Features and Benefits

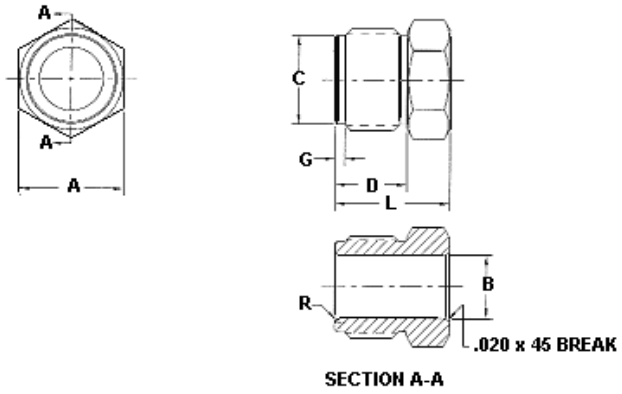
- Modifications of these fittings are available upon request.
- Add suffix “A” for aluminum, “S” for steel.

Male Inverted Swivel Nut Tube (O-Type)



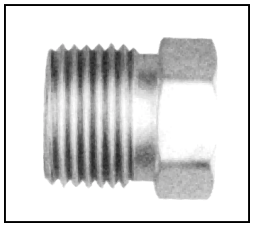
Material: Brass

Dimensions



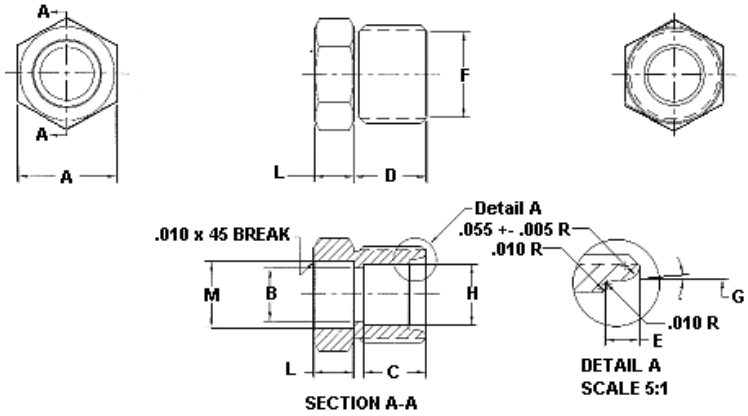
Part No.	Thread Size	Min. Full Thread	Tube O.D.	A Hex.	B Dia. Max.	B Dia. Min.	C Dia. Max.	C Dia. Min.	D	G	L	R
4053	7/16-24 NS-2A	.286	.250	.44	.258	.255	.378	.363	.34	.03	.54	.032
4075	5/8-18 UNF-2A	.356	.375	.62	.383	.380	.548	.533	.44	.06	.70	.032
4056	3/4-18 NS-2A	.413	.500	.75	.508	.505	.673	.658	.51	.06	1.05	.046
4080	7/8-18 NS-2A	.429	.625	.88	.633	.630	.798	.783	.53	.06	.85	.046
4076	1-1/16-16 UN-2A	.500	.750	1.06	.761	.758	.976	.961	.60	.08	.94	.046

Male Swivel Nut Tube (O-Type)



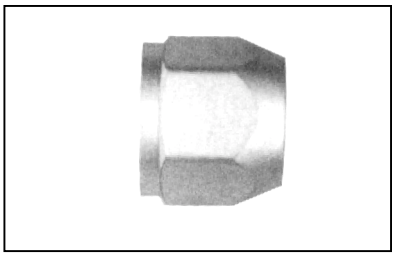
Material: Brass

Dimensions



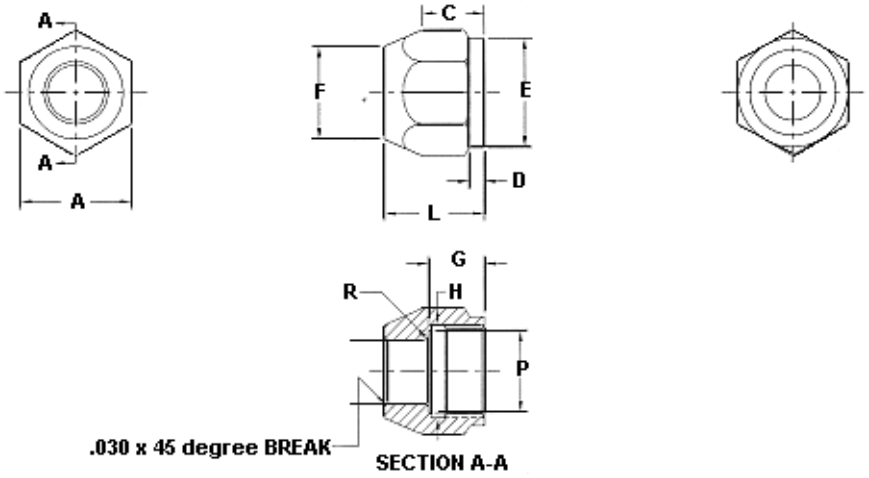
Part No.	Thread Size	Min. Full Thread	Tube O.D.	Hex.	B	C	D	E	F Dia. Max.	F Dia. Min.	G Dia. Max.	G Dia. Min.	H	L	M
B115	7/16-20 UNF-2A	.34	.250	.44	.189	.26	.44	.121	.370	.360	.271	.265	.198	.19	.254
B116	5/8-18 UNF-2A	.39	.375	.62	.281	.37	.48	.131	.550	.540	.439	.433	.338	.25	.379
B117	3/4-16 UNF-2A	.48	.500	.75	.406	.48	.56	.131	.666	.656	.563	.557	.462	.31	.504
B118	7/8-14 UNF-2A	.58	.625	.88	.500	.48	.70	.131	.780	.770	.672	.666	.571	.38	.629
B119	1-1/16-14 UNF-2A	.70	.750	1.06	.625	.48	.83	.131	.970	.960	.797	.791	.696	.44	.754

Female Fitting Tube (O-Type)



Material: Brass

Dimensions



Part No.	Thread Size	Min. Full Thread	Tube O.D.	A Hex.	FDIA Max.	FDIA Min.	C	D	E Dia.	F Dia.	G	L	M Dia.	N	P Dia.	R
B046	7/16-20 UNF-2B	.22	.250	.56	.260	.255	.38	.12	.56	.46	.31	.59	.437	.156	.383	.032
B079	5/8-18 UNF-2B	.26	.375	.75	.385	.380	.44	.12	.75	.59	.36	.69	.625	.156	.565	.032
B045	3/4-16 UNF-2B	.32	.500	.88	.510	.505	.50	.12	.88	.75	.45	.81	.750	.187	.682	.046
B052	7/8-14 UNF-2B	.42	.625	1.06	.635	.630	.68	.12	1.00	.93	.54	.94	.875	.187	.798	.046
B047	1-1/16-14 UNF-2B	.54	.750	1.25	.760	.755	.81	.12	1.25	1.12	.67	1.12	1.062	.187	.986	.046

Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Value-Added Products and Services
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Also see pages 4 and 5 for value-added products and services.

Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Value-Added Assemblies

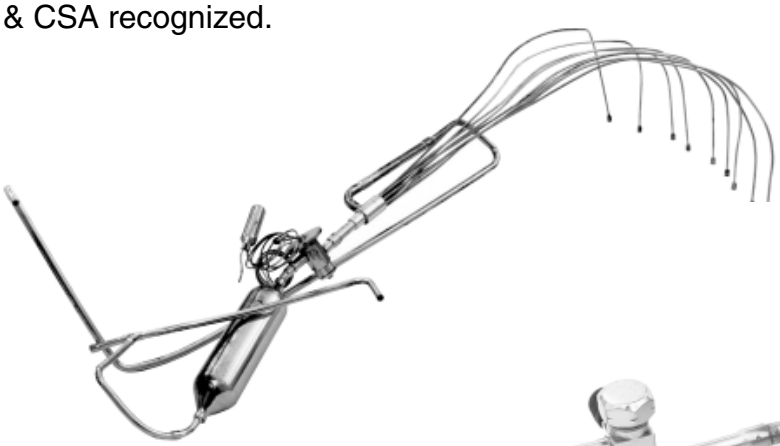
Parker can add value to your units by creating unique assemblies designed to your specifications. Our manufacturing and assembling processes create value-added assemblies that include components and custom-bent tubing to match the unique design of a unit.



Features and Benefits

- Components, such as valves, couplings, dryers, and distributors, can be connected together with complex custom-bent tubing providing a cost reduction.
- Less inventory and fewer suppliers will be required within your facility by allowing Parker to manufacture your assemblies.
- Each assembly is leak tested to ensure performance and reduce warranty costs.
- Shippable directly to your assembly line, value-added assemblies can increase your line rates, maintain less scrap, and eliminate floor space and overhead.
- UL & CSA recognized.







Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Refrigeration Solenoid Valves
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Notes

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Introduction

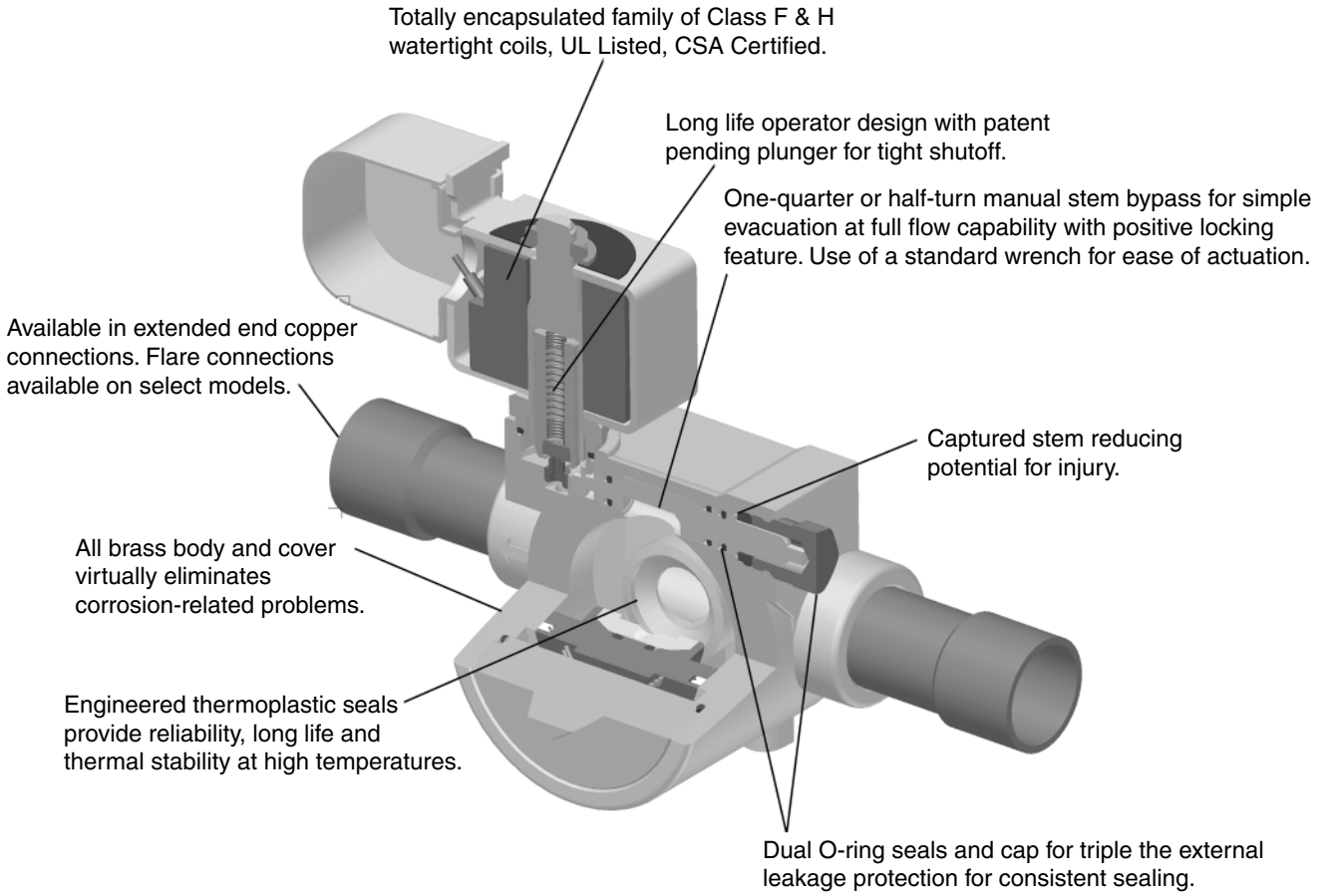
The Parker Refrigeration Valves consist of a family of direct and pilot operated solenoid valves for liquid, suction and hot gas defrost application requirements. The valves are compatible with virtually all of today's commercially available CFC, HCFC and HFC refrigerants and blends. The Parker refrigeration valves meet a broad range of system needs including refrigeration, air conditioning and freezing applications. From small fractional tonnage to large systems.

The portfolio is endowed with numerous benefits including:

- A full-line of normally closed and normally open valves.
- State of the art operator performance for long life, ease of service and tighter system integrity.
- Patent pending manual stem functionality.
- High pressure ratings to comply with newer refrigerants.
- Extended end sweat connections enable brazing installation without disassembly.
- Complete line of high temperature watertight coil designs suitable for all valves.
- AC & DC coils are interchangeable on all valve body versions.

The Parker Refrigeration Valves are constructed of the highest quality materials available for exceptional quality, long life and reliability. All components have been rigorously qualified based on the international standard ISO9001 / 2000 certification processes providing rigorous standards for design, development, manufacturing and testing. High quality you've come to expect from Parker.

Compatible with virtually all CVC, HFC and HCFC refrigerants and oils



Specifically designed family of valves to meet the higher pressure of today's earth friendly refrigerants.

Solenoid Valve Nomenclature

The numbering system allows every user an easy method to identify, select and understand the valve being purchased. The following table describes the numbering system

Nomenclature for Complete Valve Assemblies:

Valve Assemblies						Electrical Enclosures		
Type	Family Configuration	Connection	Port Size	Connection Size	Optional Manual Stem	Coil Type	Coil Watts	Voltage Codes
R Refrigeration	10 20 30 40 50	E – Ext End F – Flare	Port sizes are measured in 1/32nds of an inch	Connection sizes are measured in 1/8ths of an inch	M	D – Din J – Leaded K – Junction Box T – Spade C – Conduit Hub (Reference electrical enclosure catalog page for a detailed description of each coil type)	1-10 3-22	C1 12VDC C2 24VDC B2 24/60 2K 208/60 P3 120/60 Q3 240/60 U3 208-240/60 (Reference standard voltages for a detailed description of each code)

For combined Valve and Coil Assemblies:

Step 1: Select the Valve catalog number based on the application requirements as specified in the individual catalog section based on the connection type, port size, connection size and rating.

Step 2: Add the optional Manual Stem, if required.

Step 3: Select the appropriate coil type and wattage per the valve specification chart based on the system pressures. Either 10 watt or 22 watt coil.

Step 4: Use the Voltage Code to specify the correct voltage.

Example:

Step 1 & 2: To order a 2-way normally closed valve, 1/2 ODF connection, manual bypass option, R22, 5 ton liquid line rating, reference R20 valve catalog page. Select R20E84M.

Step 3 & 4: To order a junction box coil assembly, 10W, 208-240VAC rating, reference coil assembly catalog page. Select K1U3.

To order fully assembled valve with coil, simply add the 2 part numbers together.

Example: R20E84M + K1U3 = R20E84MK1U3

For Valves Only:

Valve assemblies can be ordered as separate items. Simply select the catalog valve number in steps 1 & 2 above.

For Coil Assemblies:

Coil Assemblies can be ordered as separate items. Simply begin the coil assembly part number using an "R" and follow steps 3 & 4 above.

Example: To select a junction box coil assembly, 10W, 208-240VAC rating, reference coil assembly catalog page. Specify RK1U3.

Standard Voltages

Voltage Code	DC Voltage
C1	12 VDC
C2	24 VDC

Voltage Code	AC Voltage
B2	24/60
P3	120/60; 110/50
2K	208/60
Q3	240/60; 220/50
U3	208-240/60

Consult Parker for additional voltages that can be satisfied with a new coil of a specific voltage.

General Specifications

Refrigerants ..... R-22, R-134a, R-404a, R-507, etc.
Maximum Safe Working Pressure 650psi
Operating Temperature Range
Fluid ..... -20°F to 250°F (-30°C to 121°C) (10w ac)
Ambient for AC voltages ..... -20°F to 120°F (-30°C to 49°C)
Ambient for DC voltages ..... -20°F to 120°F (-30°C to 49°C)
(Valves not suitable for ammonia service)

UL Listed & CSA Certified with Standard Voltages:

AC Voltages	DC Voltages
24/60	12 VDC
110/50, 120/60	24VDC
	208-240/60
	220/50, 240/60

Coil Enclosures: Reference Coil Enclosure page 249 for Electrical Specifications

Normally Closed Valve Specifications

Valve Series	Port Size	CV	AC Operating Pressure Differential (psi)					DC Operating Pressure Differential (psi)				
			Min	Maximum AC Ratings		Ambient Temp. °F	Fluid Temp °F	Min	Maximum DC Ratings		Ambient Temp. °F	Fluid Temp °F
				10w	22w		10w/22w		10w	22w		10w/22w
R10 E2 & F2	5/64	0.13	0	450		120	250	0	200	395	120	250/240
R10 E3 & F3	3/32	0.21	0	300	450	120	250/240	0		365	120	240
R20 E4 & F4	1/8	0.40	1	450		120	250	1		250	120	240
R20 E6 & F6	3/16	0.75	1	450		120	250	1		250	120	240
R20 E8 & F8	1/4	1.09	1	450		120	250	1		250	120	240
R30 E10	5/16	1.77	1	450		120	250	1	270	425	120	250/240
R30 E12	3/8	1.86	1	450		120	250	1	270	425	120	250/240
R30 E15	15/32	2.86	1	450		120	250	1	270	425	120	250/240
R40 E18	9/16	4.40	1	450		120	250	1	270	425	120	250/240
R40 E28	7/8	7.90	1	450		120	250	1	270	425	120	250/240
R50 E32	1	12.30	1	280	400	120	250/240	1		160	120	240
R50 E40	1-1/4	21.40	1	280	400	120	250/240	1		160	120	240

Reference individual catalog pages for specific valve numbers and connection sizes.

Normally Open Valve Specifications

Valve Series	Port Size	CV	AC Operating Pressure Differential (psi)					DC Operating Pressure Differential (psi)				
			Min	Maximum AC Ratings		Ambient Temp. °F	Fluid Temp °F	Min	Maximum DC Ratings		Ambient Temp. °F	Fluid Temp °F
				10w	22w		22w		10w	22w		22w
R15 E2 & F2	5/64	0.13	0		450	120	240	0		450	120	240
R15 E3 & F3	3/32	0.21	0		450	120	240	0		450	120	240
R25 E4 & F4	1/8	0.40	1		450	120	240	1		450	120	240
R25 E6 & F6	3/16	0.75	1		450	120	240	1		450	120	240
R25 E8 & F8	1/4	1.09	1		450	120	240	1		450	120	240
R35 E10	5/16	1.77	1		450	120	240	1		450	120	240
R35 E12	3/8	1.86	1		450	120	240	1		450	120	240
R35 E15	15/32	2.86	1		450	120	240	1		450	120	240
R45 E18	9/16	4.40	1		450	120	240	1		450	120	240
R45 E28	7/8	7.90	1		450	120	240	1		450	120	240
R55 E32	1	12.30	1		350	120	240	1		350	120	240
R55 E40	1-1/4	21.40	1		350	120	240	1		350	120	240

Reference individual catalog pages for specific valve numbers and connection sizes.

Parker Hannifin Corporation
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Cleveland, OH

Ratings Summary

Valve Series*	Nominal Capacity (Tons)[1, 2]											
	Liquid				Suction				Hot Gas			
	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
R10/15 E2 &	0.73	0.56	0.49	0.87	0.08	0.06	0.08	0.1	0.14	0.12	0.13	0.16
R10/15 E3 &	1.18	0.91	0.79	1.4	0.12	0.09	0.11	0.15	0.2	0.17	0.19	0.24
R20/25 E4 &	2.09	1.62	1.41	2.49	0.21	0.16	0.2	0.26	0.36	0.31	0.34	0.43
R20/25 E6 &	3.8	2.95	2.56	4.53	0.4	0.31	0.37	0.5	0.67	0.57	0.64	0.8
R20/25 E8 &	5.53	4.29	3.73	6.61	0.59	0.45	0.54	0.73	0.98	0.84	0.93	1.18
R30/35 E10	8.42	6.53	5.67	10.1	0.95	0.72	0.87	1.17	1.58	1.35	1.5	1.9
R30/35 E12	10.8	8.38	7.27	12.9	1.15	0.88	1.05	1.42	1.92	1.64	1.82	2.3
R30/35 E15	16.2	12.5	10.9	19.3	1.46	1.11	1.34	1.8	2.43	2.08	2.31	2.92
R40/45 E18	24.9	19.3	16.7	29.7	2.72	2.08	2.49	3.36	4.53	3.88	4.31	5.45
R40/45 E28	44.0	34.1	29.6	52.5	4.64	3.56	4.26	5.74	7.75	6.64	7.38	9.31
R50/55 E32	69.2	53.7	46.6	82.6	5.33	4.08	4.89	8.79	11.9	10.2	11.3	14.3
R50/55 E40	120.7	93.6	81.3	144.1	8.06	6.17	7.4	15.3	17.9	15.4	17.1	24.9

* Reference individual catalog pages for specific valve numbers and connection sizes.

1 Nominal capacities are based on ARI Standard 760 under the following system conditions:
Liquid line capacities are based on 40°F evaporator, 10°F superheat and 101°F condenser temperatures and pressure drop p across valve:
p = 2 psi for R134a
p = 3 psi for R-22, R-404a, R-507
p = 5 psi for R410a
Suction vapor capacities of 40°F evaporator temperature plus 25°F superheat, 101°F condenser and 1 psi drop across valve.
Rated hot gas capacities based on 40°F evaporator temperature plus 25°F superheat and 101°F condenser temperature and 2 psi drop.

2 For capacities at other ratings, refer to Extended Capacity tables.

Series R10 — 2-Way Direct Acting Normally Closed Valves
Series R15 — 2-Way Direct Acting Normally Open Valves

Materials of Construction

Body ..... Brass
Seals ..... Rulon®
Plunger ..... 430 Stainless
Sleeve Tube ..... 305 Stainless
Stop ..... 430 Stainless
Springs ..... Stainless
Shading Ring ..... Copper
Connections ..... Extended Ends - Copper
SAE Flare Ends Available
Manual Stem ..... 430 Stainless (available)



Specifications

R10 Valve — Normally Closed

Valve Number*	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R10E22M	1/4 ODF	5/64	0.13	0.73	0.56	0.49	0.87	0.08	0.06	0.08	0.10	0.14	0.12	0.13	0.16
R10E23M	3/8 ODF														
R10E32M	1/4 ODF	3/32	0.21	1.18	0.91	0.79	1.40	0.12	0.09	0.11	0.15	0.20	0.17	0.19	0.24
R10E33M	3/8 ODF														
Flare Ends															
R10F32M	1/4 SAE	3/32	0.21	1.18	0.91	0.79	1.40	0.12	0.09	0.11	0.15	0.20	0.17	0.19	0.24
R10F33M	3/8 SAE														

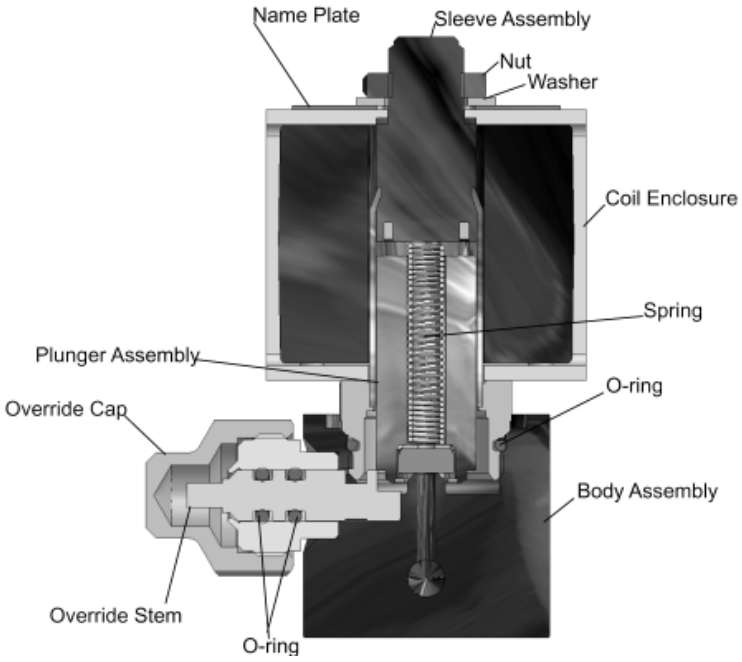
* Without Manual Bypass – Omit suffix “M” for the valve number.

R15 Valve — Normally Open

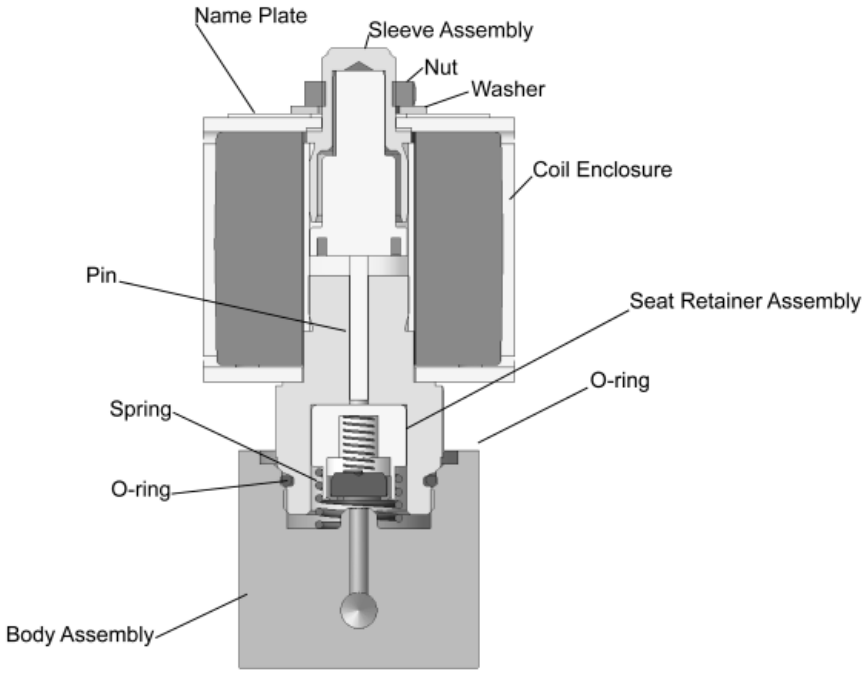
Valve Number	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R15E22	1/4 ODF	5/64	0.13	0.73	0.56	0.49	0.87	0.08	0.06	0.08	0.10	0.14	0.12	0.13	0.16
R15E23	3/8 ODF														
R15E32	1/4 ODF	3/32	0.21	1.18	0.91	0.79	1.40	0.12	0.09	0.11	0.15	0.20	0.17	0.19	0.24
R15E33	3/8 ODF														
Flare Ends															
R15F32	1/4 SAE	3/32	0.21	1.18	0.91	0.79	1.40	0.12	0.09	0.11	0.15	0.20	0.17	0.19	0.24
R15F33	3/8 SAE														

1 Reference Ratings Summary for nominal capacity system conditions.
2 For capacities at other ratings, refer to Extended Capacity tables.
Coils available separately. Use Coil “R” with “R” Series valves. Reference coil enclosure page 249 for electrical coil enclosure options.

Call-Outs

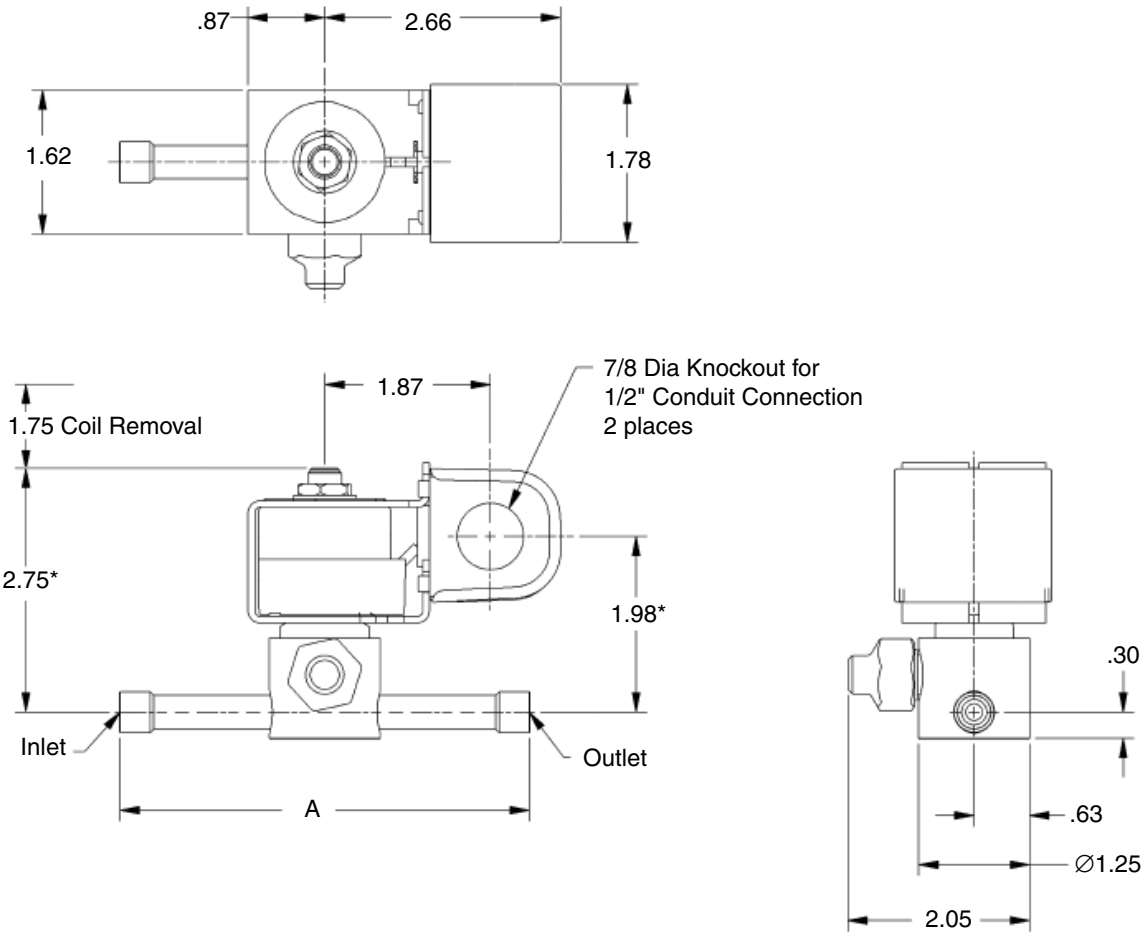


R10M



R15

Dimensions



Connection	Dimension "A"± .125
1/4 ODF	4.62
3/8 ODF	5.00

Manual override components and body features are shown for manual override valve option only.

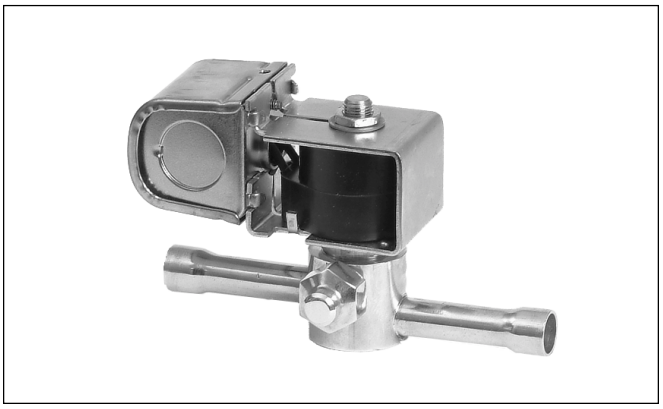
*Add 0.19 for normally open R15 valve.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Series R20 — 2-Way Pilot-Operated Normally Closed Valves
Series R25 — 2-Way Pilot-Operated Normally Open Valves

Materials of Construction

Body ..... Brass
Seals ..... Rulon®
Plunger ..... 430 Stainless
Sleeve Tube ..... 305 Stainless
Stop ..... 430 Stainless
Piston ..... Brass
Springs ..... Stainless
Shading Ring ..... Copper
Connections ..... Extended Ends – Copper
SAE Flare Available
Manual Stem ..... 430 Stainless (available)



Specifications

R20 Valve — Normally Closed

Valve Number*	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R20E42M	1/4 ODF	1/8	0.40	2.09	1.62	1.41	2.49	0.21	0.16	0.20	0.26	0.36	0.31	0.34	0.43
R20E43M	3/8 ODF														
R20E62M	1/4 ODF	3/16	0.75	3.80	2.95	2.56	4.53	0.40	0.31	0.37	0.50	0.67	0.57	0.64	0.80
R20E63M	3/8 ODF														
R20E83M	3/8 ODF	1/4	1.09	5.53	4.29	3.73	6.61	0.59	0.45	0.54	0.73	0.98	0.84	0.93	1.18
R20E84M	1/2 ODF														
Flare Fitting															
R20F42M	1/4 SAE	1/8	0.40	2.09	1.62	1.41	2.49	0.21	0.16	0.20	0.26	0.36	0.31	0.34	0.43
R20F43M	3/8 SAE														
R20F63M	3/8 SAE	3/16	0.75	3.80	2.95	2.56	4.53	0.40	0.31	0.37	0.50	0.67	0.57	0.64	0.80
R20F83M	3/8 SAE	1/4	1.09	5.53	4.29	3.73	6.61	0.59	0.45	0.54	0.73	0.98	0.84	0.93	1.18
R20F84M	1/2 SAE														

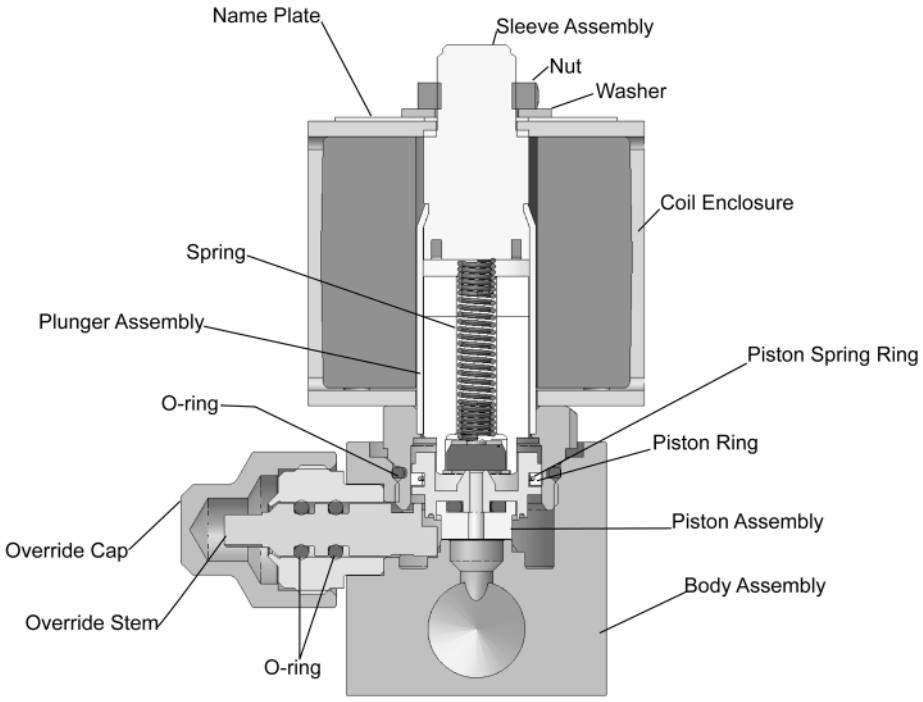
* Without Manual Bypass – Omit suffix “M” for the valve number.

R25 Valve — Normally Open

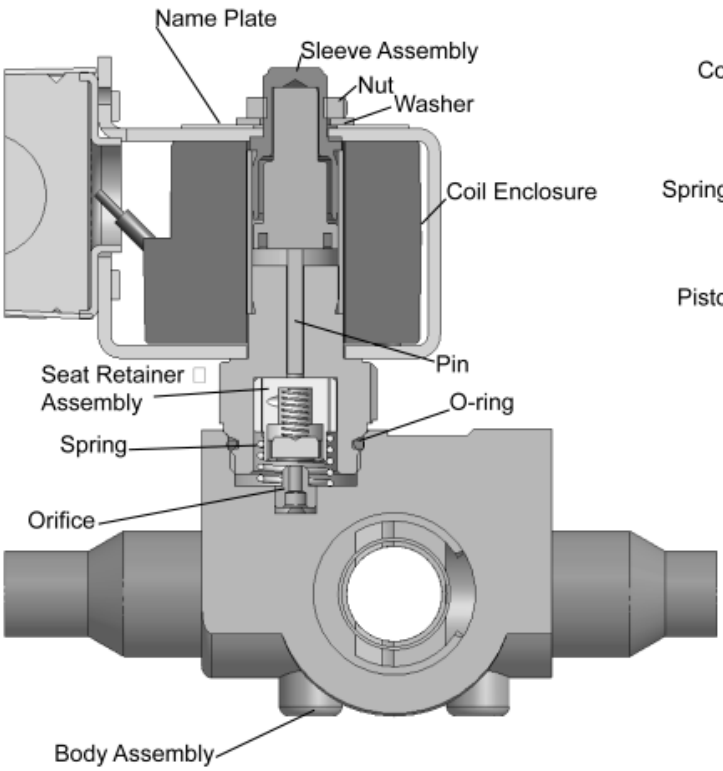
Valve Number	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R25E42	1/4 ODF	1/8	0.40	2.09	1.62	1.41	2.49	0.21	0.16	0.20	0.26	0.36	0.31	0.34	0.43
R25E43	3/8 ODF														
R25E62	1/4 ODF	3/16	0.75	3.80	2.95	2.56	4.53	0.40	0.31	0.37	0.50	0.67	0.57	0.64	0.80
R25E63	3/8 ODF														
R25E83	3/8 ODF	1/4	1.09	5.53	4.29	3.73	6.61	0.59	0.45	0.54	0.73	0.98	0.84	0.93	1.18
R25E84	1/2 ODF														
Flare Fitting															
R25F42	1/4 SAE	1/8	0.40	2.09	1.62	1.41	2.49	0.21	0.16	0.20	0.26	0.36	0.31	0.34	0.43
R25F43	3/8 SAE														
R25F63	3/8 SAE	3/16	0.75	3.80	2.95	2.56	4.53	0.40	0.31	0.37	0.50	0.67	0.57	0.64	0.80
R25F83	3/8 SAE	1/4	1.09	5.53	4.29	3.73	6.61	0.59	0.45	0.54	0.73	0.98	0.84	0.93	1.18
R25F84	1/2 SAE														

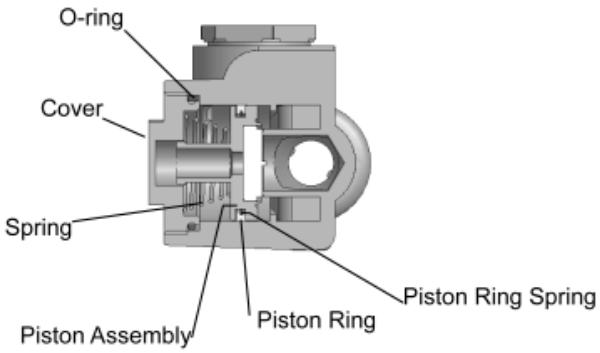
1 Reference Ratings Summary for nominal capacity system conditions.
2 For capacities at other ratings, refer to Extended Capacity tables.
Coils available separately. Use Coil “R” with “R” Series valves. Reference coil enclosure page 249 for electrical coil enclosure options.

Call-Outs



R20M

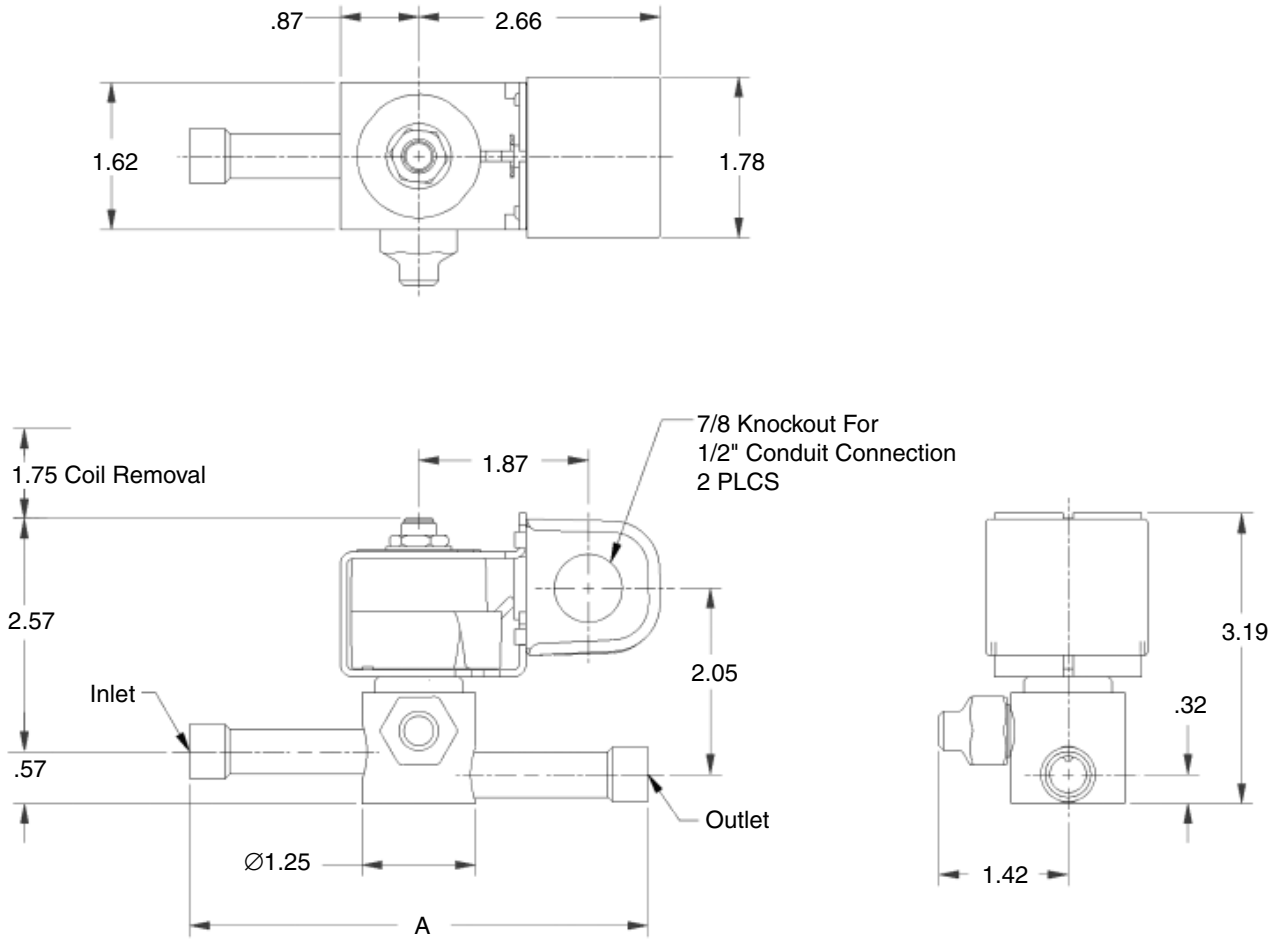




R25

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Dimensions



R20 Valve Shown

Connection	Dimension "A" ± .125
1/4 ODF	4.62
3/8 ODF	5.00
1/2 ODF	5.00

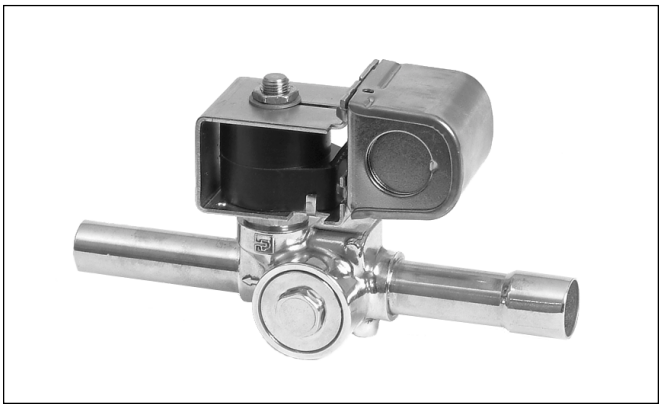
Manual override components and body features are shown for manual override valve option only.

For R25 valve dimensions, refer to R35 valve dimensions on page 241.

Series R30 — 2-Way Pilot-Operated Normally Closed Valves
Series R35 — 2-Way Pilot-Operated Normally Open Valves

Materials of Construction

Body ..... Brass
Seals ..... Rulon®
Plunger ..... 430 Stainless
Sleeve Tube ..... 305 Stainless
Stop ..... 430 Stainless
Piston ..... Brass
Springs ..... Stainless
Shading Ring ..... Copper
Connections ..... Extended Ends - Copper
Manual Stem ..... 430 Stainless (available)



Specifications

R30 Valve — Normally Closed

Valve Number*	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R30E103M	3/8 ODF	5/16	1.77	8.42	6.53	5.67	10.1	0.95	0.72	0.87	1.17	1.58	1.35	1.5	1.9
R30E104M	1/2 ODF														
R30E105M	5/8 ODF														
R30E124M	1/2 ODF	3/8	1.86	10.8	8.38	7.27	12.9	1.15	0.88	1.05	1.42	1.92	1.64	1.82	2.3
R30E125M	5/8 ODF														
R30E127M	7/8 ODF														
R30E154M	1/2 ODF	15/32	2.86	16.2	12.5	10.9	19.3	1.46	1.11	1.34	1.8	2.43	2.08	2.31	2.92
R30E155M	5/8 ODF														
R30E157M	7/8 ODF														

* Without Manual Bypass – Omit suffix “M” for the valve number.

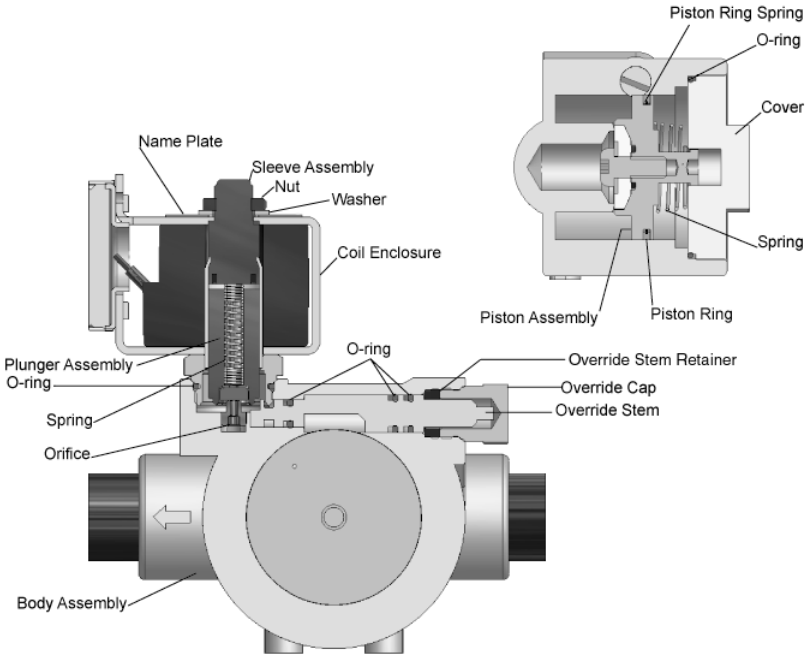
R35 Valve — Normally Open

Valve Number	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R35E103	3/8 ODF	5/16	1.77	8.42	6.53	5.67	10.1	0.95	0.72	0.87	1.17	1.58	1.35	1.5	1.9
R35E104	1/2 ODF														
R35E105	5/8 ODF														
R35E124	1/2 ODF	3/8	1.86	10.8	8.38	7.27	12.9	1.15	0.88	1.05	1.42	1.92	1.64	1.82	2.3
R35E125	5/8 ODF														
R35E127	7/8 ODF														
R35E154	1/2 ODF	15/32	2.86	16.2	12.5	10.9	19.3	1.46	1.11	1.34	1.8	2.43	2.08	2.31	2.92
R35E155	5/8 ODF														
R35E157	7/8 ODF														

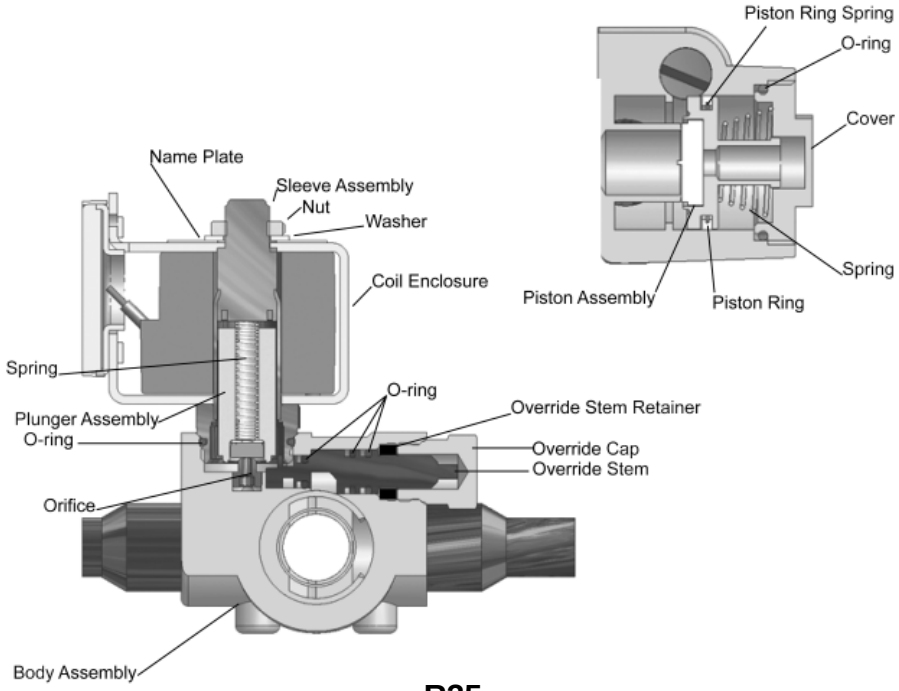
1 Reference Ratings Summary for nominal capacity system conditions.
2 For capacities at other ratings, refer to Extended Capacity tables.
Coils available separately. Use Coil “R” with “R” Series valves. Reference coil enclosure page 249 for electrical coil enclosure options.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Call-Outs

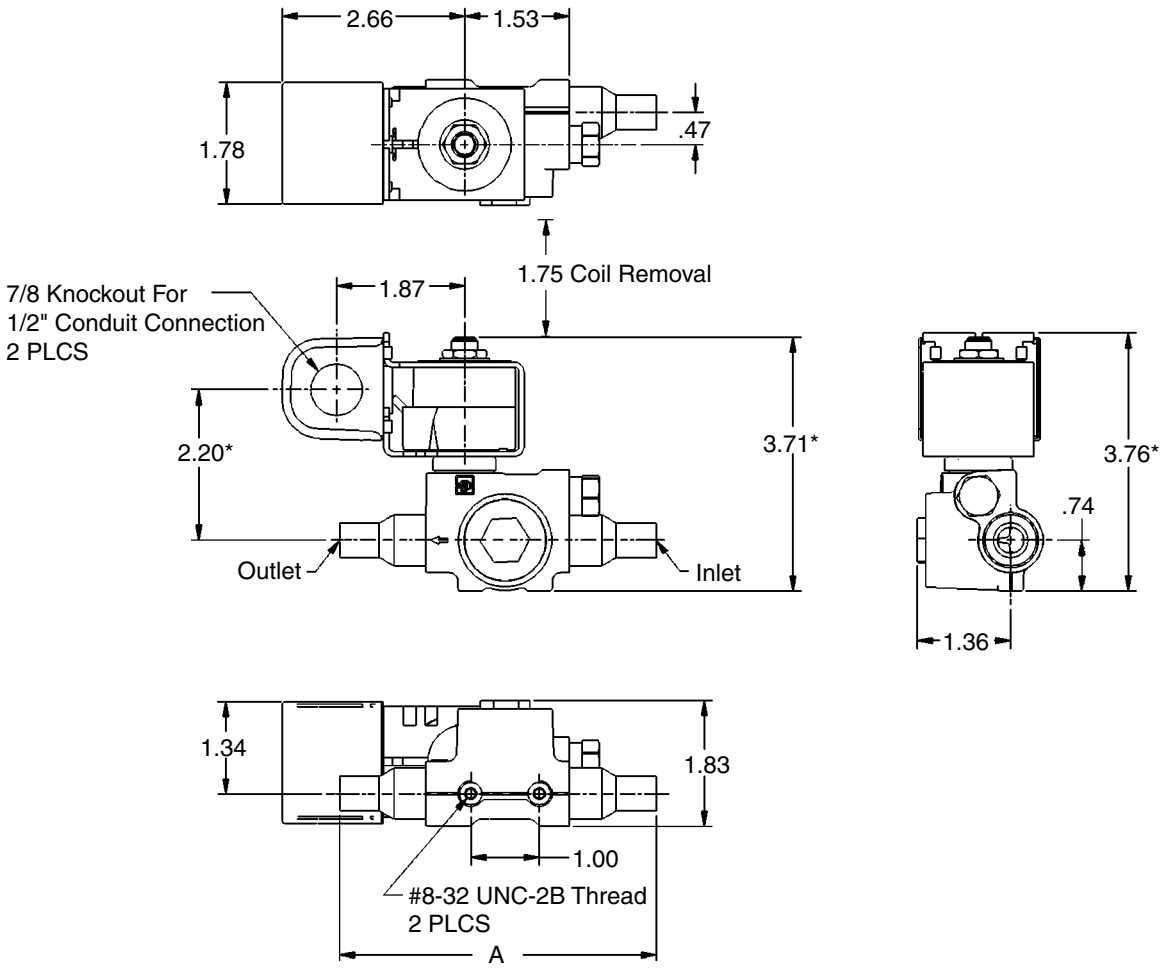


R30M



R35

Dimensions



R30 Valve Shown

Connection	Dimension "A"± .125
3/8 ODF	4.62
1/2 ODF	5.00
5/8 ODF	5.50
7/8 ODF	7.12

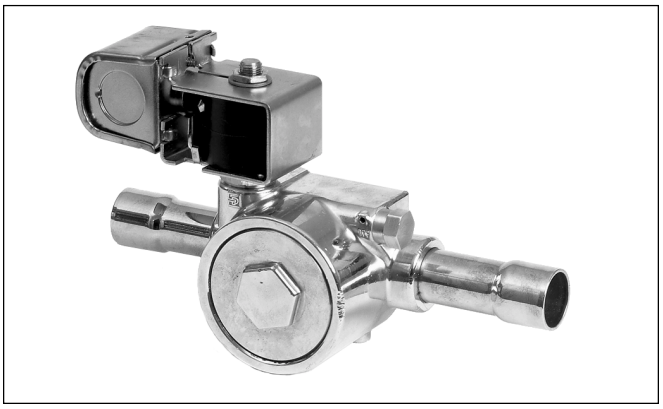
Manual override components and body features are shown for manual override valve option only.

* Add 0.19 for normally open R35 valve.

Series R40 — 2-Way Pilot-Operated Normally Closed Valves
Series R45 — 2-Way Pilot-Operated Normally Open Valves

Materials of Construction

Body ..... Brass
Seals ..... Rulon®
Plunger ..... 430 Stainless
Sleeve Tube ..... 305 Stainless
Stop ..... 430 Stainless
Piston ..... Brass
Springs ..... Stainless
Shading Ring ..... Copper
Connections ..... Extended Ends – Copper
Manual Stem ..... 430 Stainless (available)



Specifications

R40 Valve — Normally Closed

Valve Number*	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R40E185M	5/8 ODF	9/16	4.4	24.9	19.3	16.7	29.7	2.72	2.08	2.49	3.36	4.53	3.88	4.31	5.45
R40E187M	7/8 ODF														
R40E189M	1-1/8 ODF														
R40E287M	7/8 ODF	7/8	7.9	44.0	34.1	29.6	52.5	4.64	3.56	4.26	5.74	7.75	6.64	7.38	9.31
R40E289M	1-1/8 ODF														
R40E2811M	1-3/8 ODF														

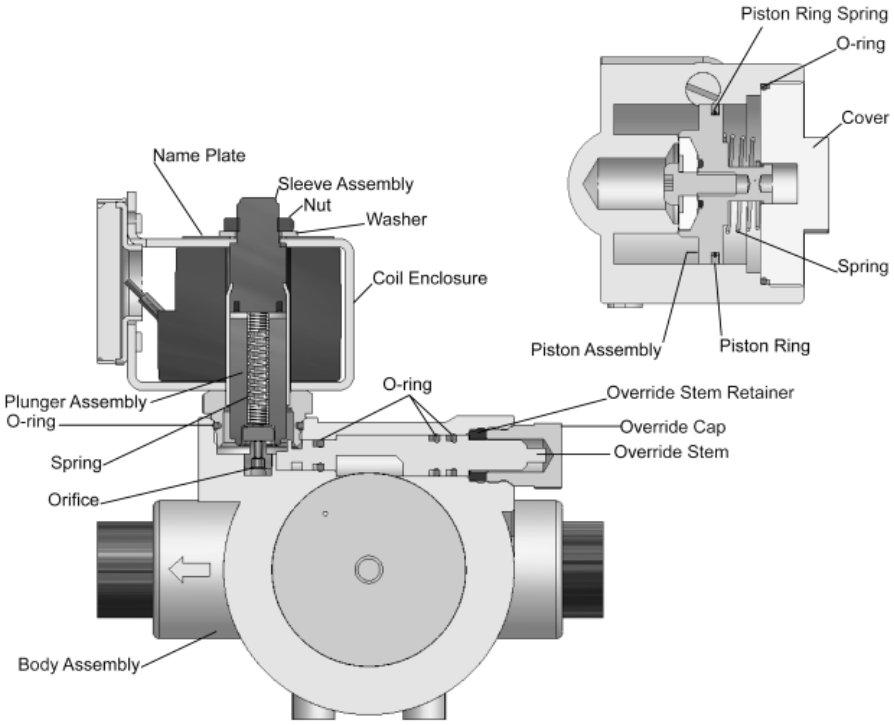
* Without Manual Bypass – Omit suffix “M” for the valve number.

R45 Valve — Normally Open

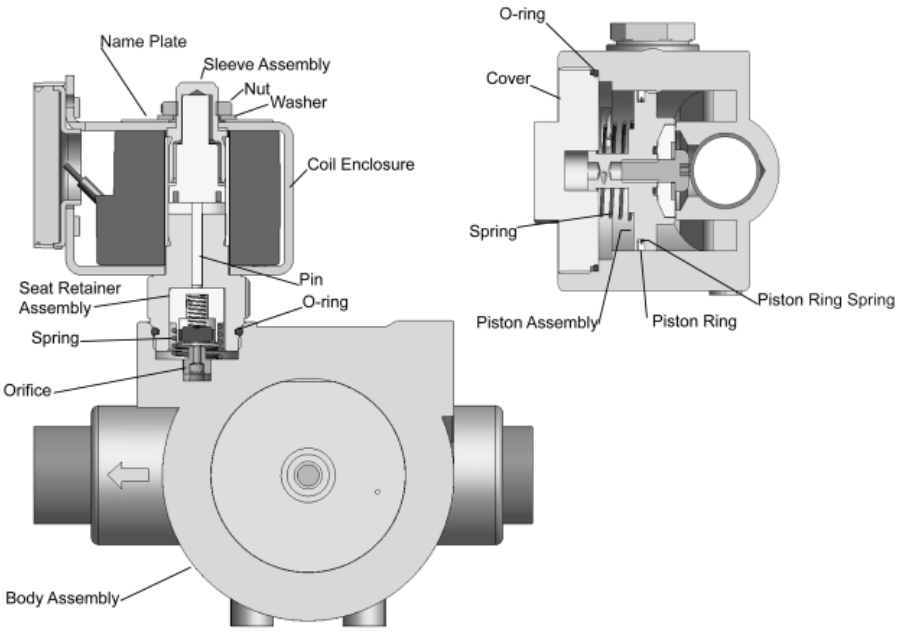
Valve Number	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R45E185	5/8 ODF	9/16	4.4	24.9	19.3	16.7	29.7	2.72	2.08	2.49	3.36	4.53	3.88	4.31	5.45
R45E187	7/8 ODF														
R45E189	1-1/8 ODF														
R45E287	7/8 ODF	7/8	7.9	44.0	34.1	29.6	52.5	4.64	3.56	4.26	5.74	7.75	6.64	7.38	9.31
R45E289	1-1/8 ODF														
R45E2811	1-3/8 ODF														

1 Reference Ratings Summary for nominal capacity system conditions.
2 For capacities at other ratings, refer to Extended Capacity tables.
Coils available separately. Use Coil “R” with “R” Series valves. Reference coil enclosure page 249 for electrical coil enclosure options.

Call-Outs

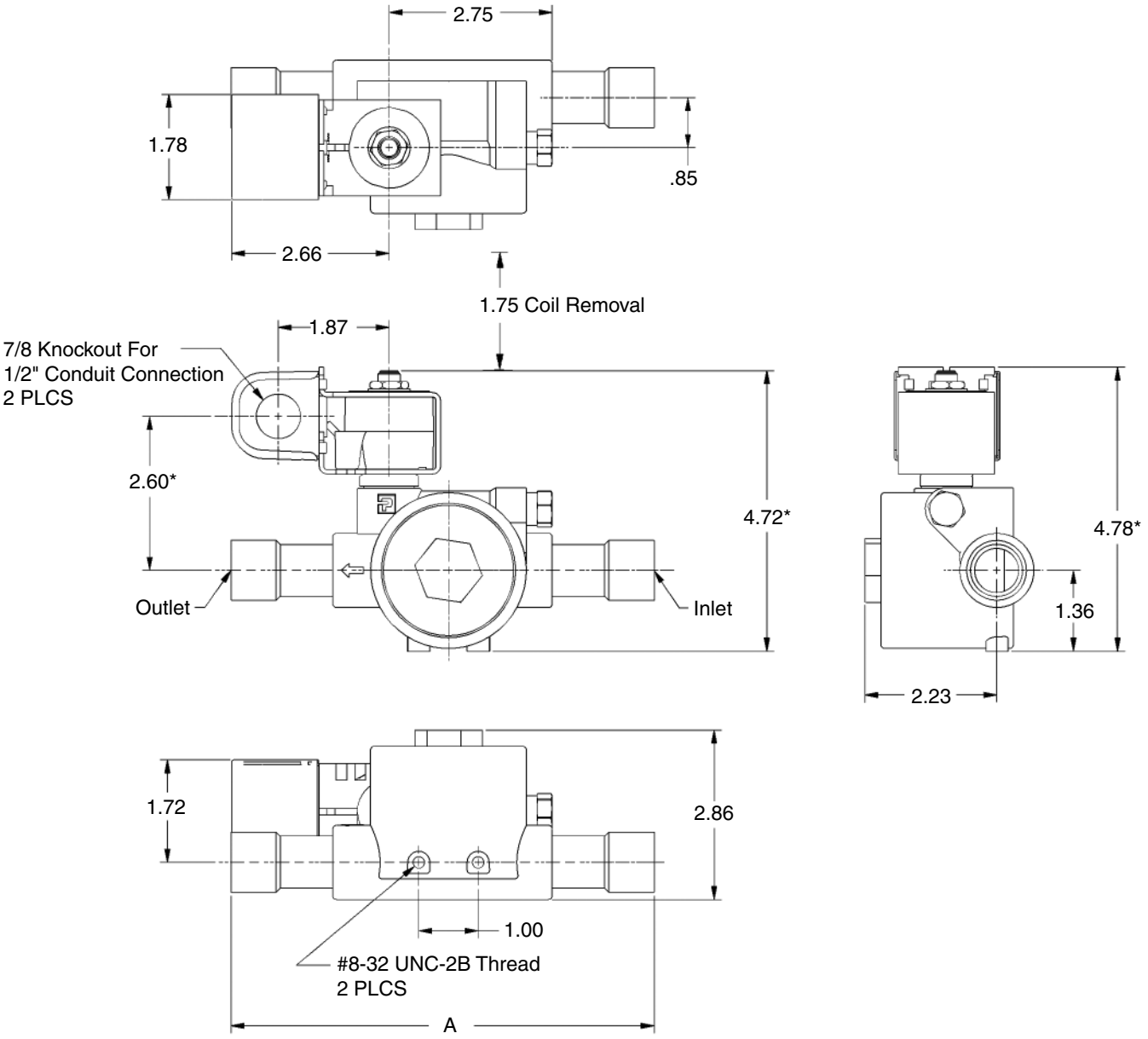


R40M



R45

Dimensions



Connection	Dimension "A"± .125
5/8 ODF	7.12
7/8 ODF	7.12
1-1/8 ODF	8.50
1-3/8 ODF	11.06

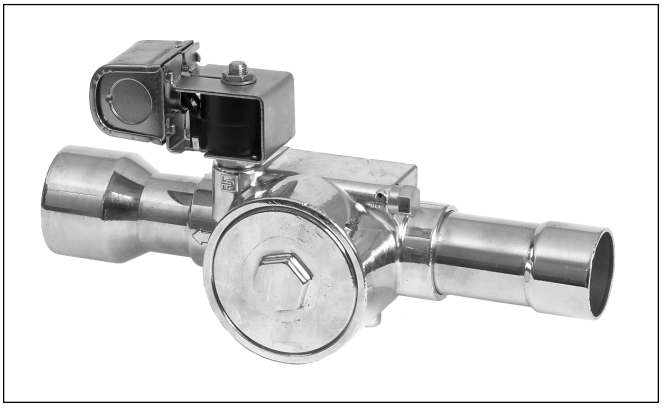
Manual override components and body features are shown for manual override valve option only.

* Add 0.19 for normally open R45 valve.

Series R50 — 2-Way Pilot-Operated Normally Closed Valves
Series R55 — 2-Way Pilot-Operated Normally Open Valves

Materials of Construction

Body ..... Brass
Seals ..... Rulon®
Plunger ..... 430 Stainless
Sleeve Tube ..... 305 Stainless
Stop ..... 430 Stainless
Piston ..... Brass
Springs ..... Stainless
Shading Ring ..... Copper
Connections ..... Extended Ends - Copper
Manual Stem ..... 430 Stainless (available)



Specifications

R50 Valve — Normally Closed

Valve Number*	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R50E329M	1-1/8 ODF	1	12.3	69.2	53.7	46.6	82.6	5.33	4.08	4.89	8.79	11.9	10.2	11.3	14.3
R50E3211M	1-3/8 ODF														
R50E4013M	1-5/8 ODF	1-1/4	21.4	120.7	93.6	81.3	144.1	8.06	6.17	7.4	15.3	17.9	15.4	17.1	24.9
R50E4017M	2-1/8 ODF														
R50E4021M	2-5/8 ODF														

* Without Manual Bypass – Omit suffix “M” for the valve number.

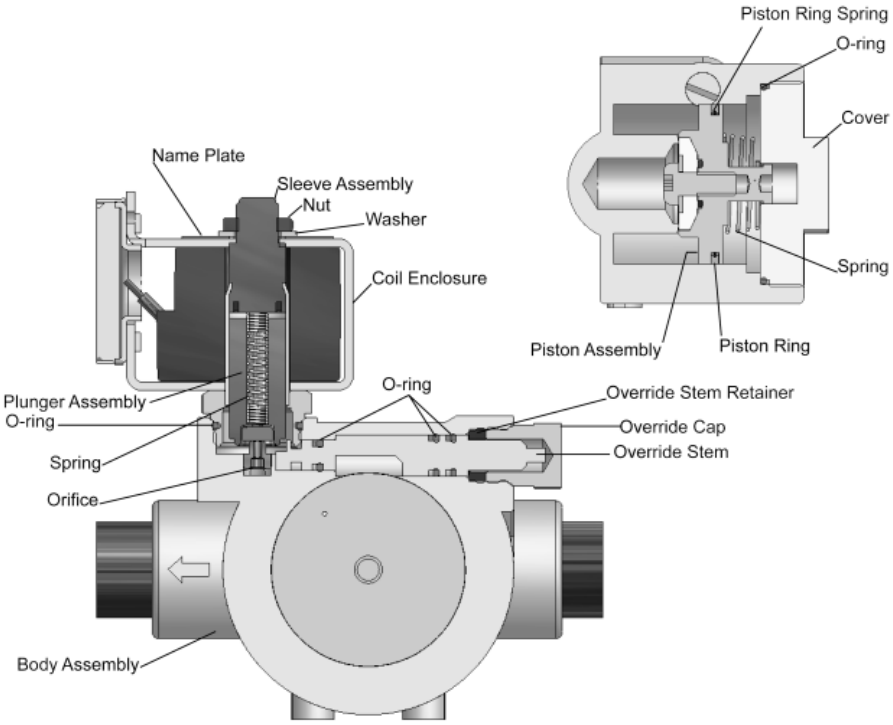
R55 Valve — Normally Open

Valve Number	Connection (Inches)	Port (Orifice) (Inches)	Cv	Nominal Capacity (Tons)[1, 2]											
				Nominal Liquid				Suction Vapor				Hot Gas			
				R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a	R22	R134a	R404a R507	R410a
Extended Ends															
R55E329	1-1/8 ODF	1	12.3	69.2	53.7	46.6	82.6	5.33	4.08	4.89	8.79	11.9	10.2	11.3	14.3
R55E3211	1-3/8 ODF														
R55E4013	1-5/8 ODF	1-1/4	21.4	120.7	93.6	81.3	144.1	8.06	6.17	7.4	15.3	17.9	15.4	17.1	24.9
R55E4017	2-1/8 ODF														
R55E4021	2-5/8 ODF														

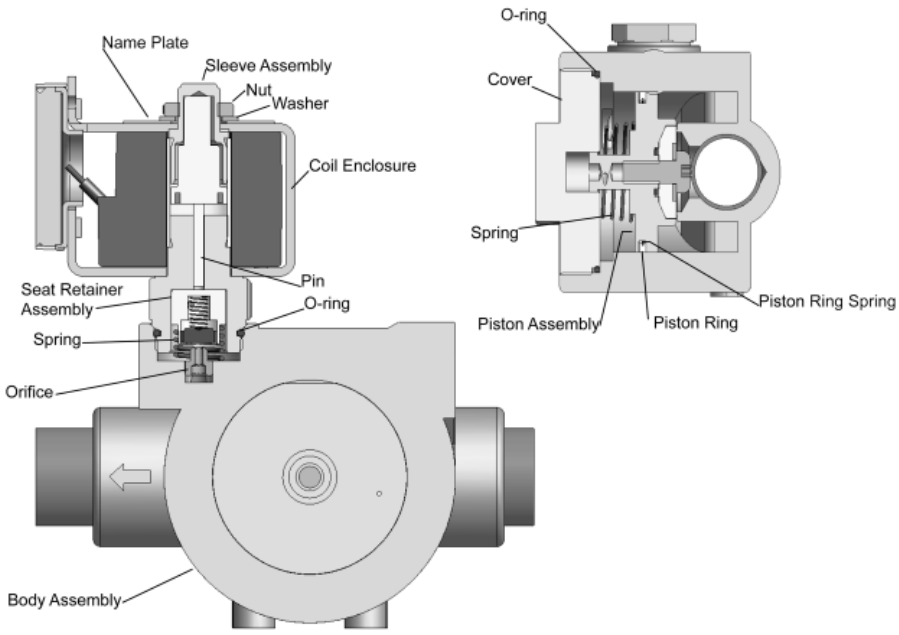
1 Reference Ratings Summary for nominal capacity system conditions.
2 For capacities at other ratings, refer to Extended Capacity tables.
Coils available separately. Use Coil “R” with “R” Series valves. Reference coil enclosure page 249 for electrical coil enclosure options.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Call-Outs

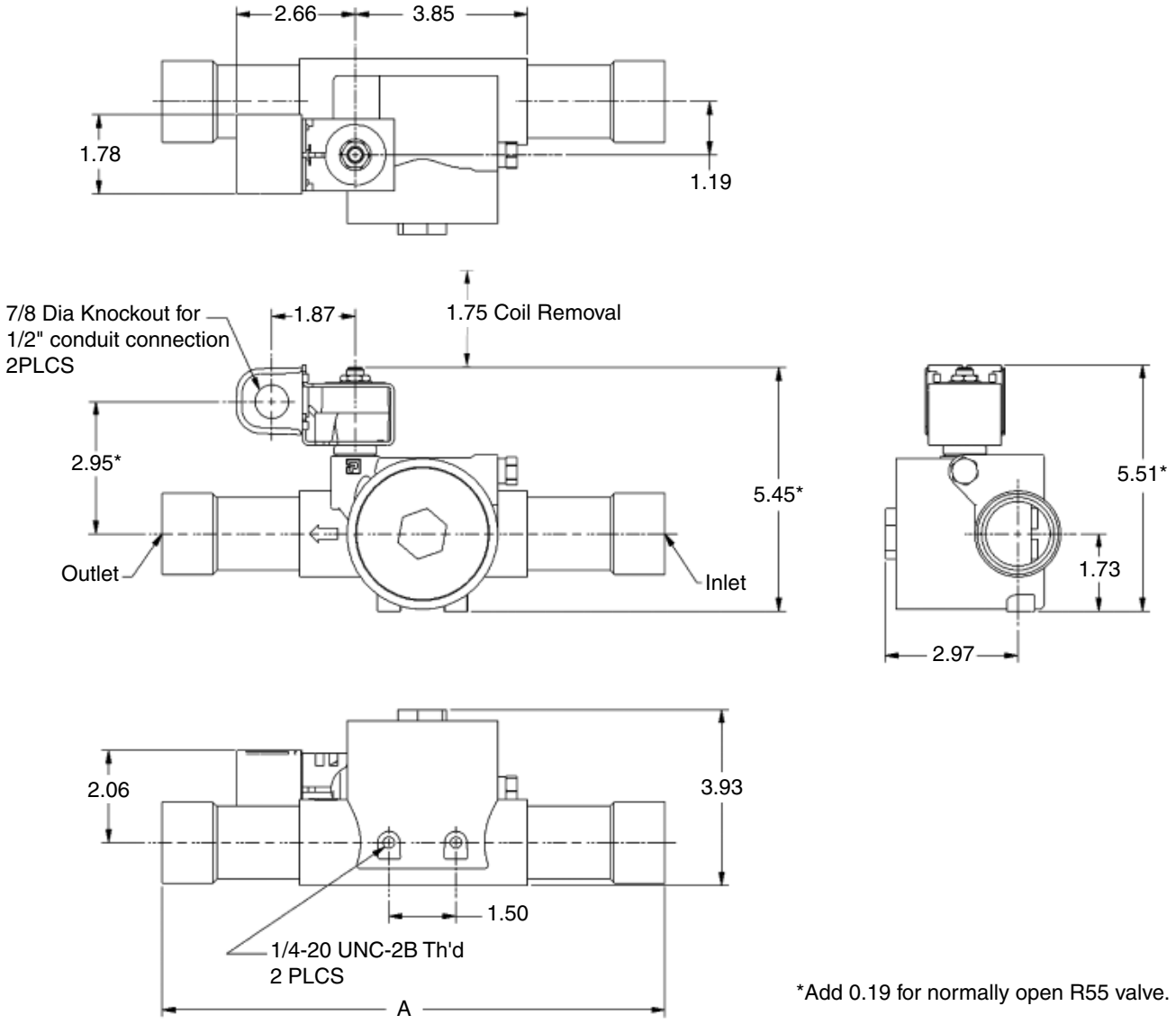


R50M



R55

Dimensions



*Add 0.19 for normally open R55 valve.

Connection	Dimension "A" ± .125
1-1/8 ODF	8.50
1-3/8 ODF	11.06
1-5/8 ODF	11.06
2-1/8 ODF	11.06
2-5/8 ODF	11.06

Manual override components and body features are shown for manual override valve option only.

Electrical Specifications

All Parker Refrigeration solenoid valves use standard coil designs that are interchangeable on all valve bodies. They are available in a wide variety of standard voltages and frequencies. Coils are labeled with electrical data providing easy identification.

Construction

Numerous construction options are available including junction box housing, DIN terminals, conduit hub housing and spade termination coils.

Encapsulated waterproof coils are standard on all valves listed in the catalog. The special compound is absolutely waterproof and impervious to oil, dust and most corrosive fumes and vapors.

All coils are Class "F" or "H" rated for high temperature application requirements. The coils are molded in accordance with UL, NEMA, and other accepted standards.

Standard Coil Options

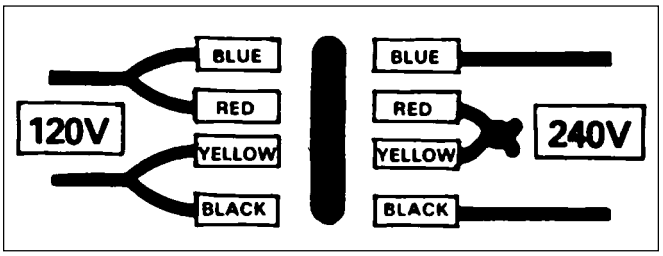
Coil Type	Standard Termination	Protection
Junction Box	6" lead length	Junction box equipped with grounding screw provision
Conduit Hub	18" lead length 2-wires	Type 1,2,3,3S,4,4X
DIN	DIN (terminations per DIN 43650/ISO 4400 requirements)	Cable glad or 1/2" NPT connectors available for IP65 protection
Leaded	18" Lead length 2-wires	Open frame enclosure where suitable
Spade	1/4" Male	Open frame enclosure where suitable

Electrical Supply Requirements

The solenoid coil must be connected to electrical lines of correct voltage and frequency as indicated on the coil label. The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The molded coil is designed to operate with line voltage from 85% to 110% of the coil rated voltage. Operating with a line voltage above or below these limits may result in reduced coil life or coil burn out. Also, operating with line voltage below the limit will result in lowering the maximum operating pressure differential (MOPD).

Wiring

Check the electrical specifications of the coil to make sure they correspond to the available electrical service. Valves with four-wire dual voltage option have a wiring diagram shown in the following figure. The figure illustrates which wires to connect to each other for 120 or 240 volt operation. Wiring and fusing must comply with prevailing local and national wiring codes and ordinances.



Wiring for Dual-Voltage Coil

Conversion from AC to DC Coils

The same valve assembly can be used for both AC and DC service requirements. AC and DC coils are interchangeable. To convert a valve assembly from AC to DC service, select the appropriate DC coil wattage and voltage per the valve specification chart based on the system pressure requirements.

Electrical Data

To determine the approximate Holding or Inrush Current for AC voltages including 24/60, 120/60, 208/60 and 240/60 in amperes, divide the voltage into the VA rating indicated in the AC Power Consumption tables. DC valves have no inrush current. The current rating in amperes are shown in the DC table. Figures are based on nominal values and will vary slightly depending on operating voltage and coil tolerances.

	AC Power Consumption Ratings			
	10 watt Coils		22 watt Coils	
Valve Series	VA Holding	VA Inrush	VA Holding	VA Inrush
Normally Closed Valves				
R10 Series	18	37	38	68
R20 Series	19	43	40	78
R30 Series	19	32	42	59
R40 Series	19	32	42	59
R50 Series	18	37	38	68
Normally Open Valves				
R15 Series	17	33	42	63
R25 Series	16	33	42	63
R35 Series	16	33	42	63
R45 Series	16	33	42	63
R55 Series	17	33	42	63

DC Current Comsumption Ratings (Amperes)		
Coil Type	12 VDC	24 VDC
R25 Series	16	33
R35 Series	16	33
R45 Series	16	33
R55 Series	17	33

Coil Enclosures

Standard Features

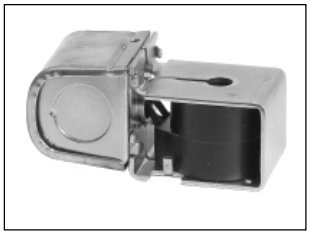
- Suitable for all Parker Refrigeration Solenoid Valves.
- Encapsulated Waterproof designs.
- Meets UL, CSA, NEMA & other acceptable standards.
- Dual Frequency coil for AC voltages.
- Dual Voltage coils available.
- Easy installation with nut and washer.
- **UL** and **CSA** approvals on “R” Series valves with applicable “R” coil/enclosure combinations.

Junction Box Electrical Characteristics

Materials of Construction

Encapsulant.....Molded Thermoplastic
Metal Enclosure.....Plated Carbon Steel
Conduit Cable..... 1/2" NPT with 6" leads

Coil Code	Wattage	Class
K1	10	F
K3	22	H



Conduit Coil Electrical Characteristics

Materials of Construction

Encapsulant.....Molded Thermoplastic
Conduit & Yoke .....Plated Carbon Steel
Conduit Cable..... 1/2" NPT with 18" leads
Safety Code.....NEMA Type 4X

Coil Code	Wattage	Class
C1	10	F
C3	22	H



DIN Coil Electrical Characteristics

Materials of Construction

Encapsulant.....Molded Thermoplastic
Yoke.....Plated Carbon Steel

Coil Code	Wattage	Class
D1	10	F
D3	22	H

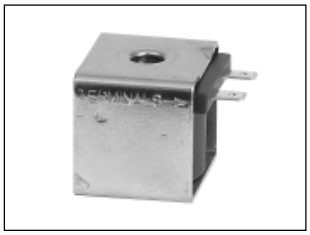


Spade Coil Electrical Characteristics

Materials of Construction

Encapsulant.....Molded Thermoplastic
Yoke.....Plated Carbon Steel
Conduit Cable..... 1/2" NPT with 6" leads

Coil Code	Wattage	Class
T1	10	F
T3	22	H



Leaded Coil Electrical Characteristics

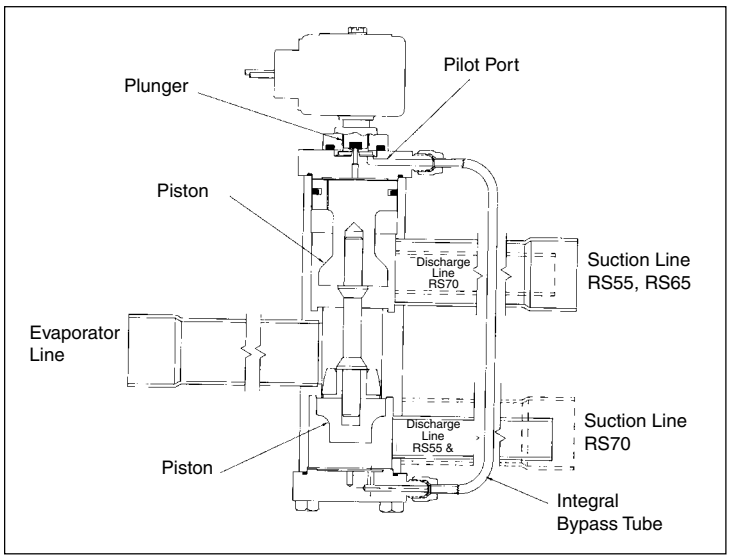
Materials of Construction

Encapsulant.....Molded Thermoplastic
Leaded Cable ..... 18" leads
Yoke.....Plated Carbon Steel

Coil Code	Wattage	Class
J1	10	F
J3	22	H



3-Way Hot Gas Defrost Valves



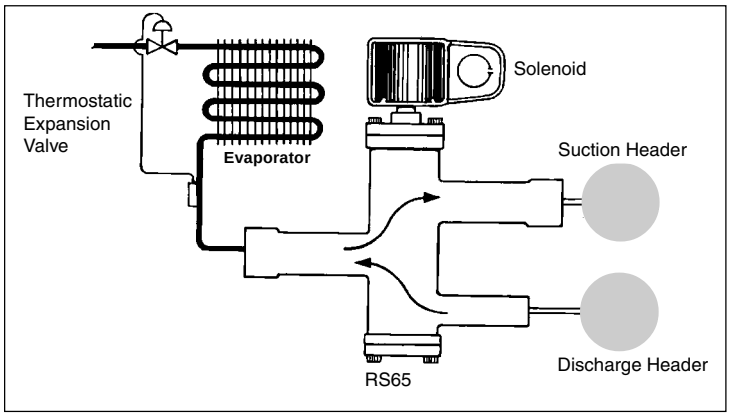


Application

Designed for hot gas defrost from the suction side of the evaporator coil, these valves are commonly used with modern multiplex systems.

Operation

When de-energized, the plunger closes the pilot port, allowing pressures to equalize across the piston. Discharge pressure holds the lower port seat closed. Flow is from the evaporator to the suction line. (See illustration below.)



Flow

When energized, discharge pressure flows to the top of the piston, creating a pressure imbalance sufficient to move the piston, closing the suction line to the evaporator and opening the discharge line to the evaporator. High pressure gas then flows from the discharge line to the evaporator, raising the pressure and temperature in the evaporator and defrosting the coil.

Note: When energized, there is a constant flow of discharge gas into the suction line through the equalizer port to permit flow from discharge line to evaporator.

Note: Valves are not intended to be used in conjunction with a stop valve directly in front of the defrost valve. To ensure proper performance, you must maintain a constant pressure supply to the discharge port on the defrost valve.

Connections

Valve Type	Evaporator Line	Suction Line	Discharge Line
RS-55	1-1/8" ODF	1-1/8" ODF	7/8" ODF
RS-65 RS-70	1-3/8" ODF	1-3/8" ODF	7/8" ODF

General Specifications for Refrigerant Solenoid Valves

Minimum Operating
Pressure Differential ..... 10 psi (.7 bars)
Maximum Opening
Pressure Differential ..... 300 psi (21 bars)
(Discharge to Evaporator)
Design Pressure (SWP) ..... 500 psig
Operating Temperatures
Fluid ..... -20°F to +240°F
(-30°C to +115°C)
Ambient ..... -20°F to +120°F
(-30°C to +50°C)
U.L. Listed and CSA certified on standard AC voltages.
Coils: See page 249.

RS55 Suction Line Capacities - Tons

Capacities Tons @ 1 psi Pressure Drop	Evaporator Temperatures in °F					
	20°	10°	0°	-10°	-20°	-40°
R-12	2.9	2.6	2.3	2.0	1.7	1.3
R-22	4.4	4.0	3.5	3.1	2.7	2.0
R-502	3.5	3.1	2.8	2.4	2.1	1.6
R-134a	4.2	3.7	3.2	2.8	2.4	1.7
R-404a (HP-62)*	3.9	3.5	3.1	2.8	2.4	1.8
R-507 (AZ-50)*	3.9	3.5	3.1	2.8	2.4	1.8

*AZ-50 & HP-62 are products of Allied Signal & DuPont respectively.

RS65, RS70 Suction Line Capacities - Tons

Capacities Tons @ 1 psi Pressure Drop	Evaporator Temperatures in °F					
	20°	10°	0°	-10°	-20°	-40°
R-12	6.9	6.1	5.4	4.7	4.0	3.0
R-22	10.5	9.4	8.4	7.4	6.5	4.9
R-502	8.4	7.4	6.6	5.8	5.0	3.7
R-134a	10.0	8.8	7.6	6.6	5.6	4.0
R-404a (HP-62)*	9.4	8.4	7.4	6.6	5.8	4.3
R-507 (AZ-50)*	9.4	8.4	7.4	6.6	5.8	4.3

*AZ-50 & HP-62 are products of Allied Signal & DuPont respectively.

Extended Capacity Tables

R22

	Liquid Capacitities					Suction Line Capacities					Discharge Line Capacities					
	Tons at Pressure Drop Across Valve in psi					Tons at 1 psi Pressure Drop and Evaporating Temperature of:					Pressure Drop Across Valve					
Valve Series	1 psi	2 psi	3 psi	4 psi	5 psi	40°F	20°F	0°F	20°F	40°F	2 psi	5 psi	10 psi	25 psi	50 psi	100 psi
R10/15 E2	0.42	0.59	0.73	0.83	0.94	0.08	0.07	0.05	0.04	0.03	0.14	0.23	0.34	0.50	0.77	1.25
R10/15 E3 & F3	0.68	0.96	1.18	1.35	1.52	0.12	0.10	0.07	0.06	0.04	0.20	0.34	0.51	0.73	1.12	1.84
R20/25 E4 & F4	1.21	1.71	2.09	2.40	2.70	0.21	0.17	0.13	0.10	0.08	0.36	0.60	0.90	1.30	2.00	3.27
R20/25 E6 & F6	2.19	3.10	3.80	4.35	4.90	0.40	0.32	0.25	0.19	0.14	0.67	1.13	1.68	2.44	3.74	6.12
R20/25 E8 & F8	3.19	4.52	5.53	6.33	7.14	0.59	0.47	0.36	0.28	0.21	0.98	1.66	2.46	3.58	5.49	8.98
R30/35 E10	4.86	6.88	8.42	9.64	10.87	0.95	0.75	0.59	0.45	0.33	1.58	2.67	3.97	5.77	8.85	14.47
R30/35 E12	6.23	8.82	10.80	12.70	13.94	1.15	0.91	0.71	0.54	0.40	1.92	3.24	4.82	7.00	10.74	17.56
R30/35 E15	9.33	13.20	16.20	18.50	20.90	1.46	1.16	0.90	69.00	0.51	2.43	4.11	6.11	8.88	13.60	22.30
R40/45 E18	14.40	20.30	24.90	28.50	32.10	2.72	2.16	1.69	1.29	0.95	4.53	7.66	11.40	16.60	25.40	41.50
R40/45 E28	25.40	35.90	44.00	50.40	56.80	4.64	3.70	2.89	2.20	1.63	7.75	13.10	19.50	28.30	43.40	71.00
R50/55 E32	39.90	56.50	69.20	79.20	89.30	5.33	4.24	3.31	2.52	1.87	11.90	20.00	29.80	36.80	56.50	92.40
R50/55 E40	69.70	98.50	120.70	138.20	155.80	8.06	6.41	5.01	3.81	2.83	17.90	30.30	45.10	49.10	75.30	123.20

Liquid Capacity based on 40°F evaporator temperature, 10°F superheat temperature and 100°F condenser temperature.
Suction line capacity based on 100° condenser temperature, 25°F superheat temperature.
Hot Gas bypass capacity based on isentropic compression from 40°F evaporator plus 25°F superheat to 100°F condenser plus 50°F superheat.

R134

	Liquid Capacitities					Suction Line Capacities					Discharge Line Capacities					
	Tons at Pressure Drop Across Valve in psi					Tons at 1 psi Pressure Drop and Evaporating Temperature of:					Pressure Drop Across Valve					
Valve Series	1 psi	2 psi	3 psi	4 psi	5 psi	40°F	20°F	0°F	20°F	40°F	2 psi	5 psi	10 psi	25 psi	50 psi	100 psi
R10/15 E2	0.40	0.56	0.69	0.79	0.89	0.06	0.05	0.04	0.03	0.02	0.12	0.20	0.29	0.46	0.74	1.31
R10/15 E3 & F3	0.65	0.91	1.12	1.28	1.44	0.09	0.07	0.05	0.04	0.03	0.17	0.29	0.43	0.68	1.09	1.92
R20/25 E4 & F4	1.15	1.62	1.99	2.27	2.56	0.16	0.13	0.09	0.07	0.05	0.31	0.52	0.77	1.21	1.94	3.42
R20/25 E6 & F6	2.08	2.95	3.61	4.13	4.66	0.31	0.23	0.18	0.13	0.09	0.57	0.97	1.44	2.26	3.64	6.39
R20/25 E8 & F8	3.04	4.29	5.26	6.02	6.79	0.45	0.34	0.26	0.19	0.14	0.84	1.42	2.11	3.31	5.33	9.37
R30/35 E10	4.62	6.53	8.00	9.16	10.33	0.72	0.56	0.42	0.30	0.22	1.35	2.29	3.40	5.34	8.59	15.10
R30/35 E12	5.92	8.38	10.26	11.75	13.25	0.88	0.67	0.50	0.37	0.26	1.64	2.78	4.13	6.47	10.40	18.30
R30/35 E15	8.86	12.50	15.40	17.30	19.80	1.11	0.85	0.64	0.46	0.34	2.08	3.52	5.23	8.21	13.20	23.20
R40/45 E18	13.60	19.30	23.60	27.00	30.50	2.08	1.59	1.19	0.87	0.63	3.88	6.56	9.76	15.30	24.70	43.30
R40/45 E28	24.10	34.10	41.80	47.90	54.00	3.56	2.72	2.04	1.48	1.07	6.64	11.20	16.70	26.20	42.20	74.10
R50/55 E32	37.90	53.70	65.70	75.20	84.80	4.08	3.13	2.34	1.70	1.64	10.20	17.20	25.60	34.10	54.80	96.40
R50/55 E40	66.20	93.60	114.70	131.30	148.00	6.17	4.73	3.53	2.57	1.86	15.40	26.00	38.60	45.40	73.10	128.60

Liquid Capacity based on 40°F evaporator temperature, 10°F superheat temperature and 100°F condenser temperature.
Suction line capacity based on 100° condenser temperature, 25°F superheat temperature.
Hot Gas bypass capacity based on isentropic compression from 40°F evaporator plus 25°F superheat to 100°F condenser plus 50°F superheat.

Temperature Correction Factors

Evaporator Temperature°F	40	30	20	10	0	-10	-20	-30	-40	Liquid Temperature °F	90	100	110	120	130
Correction Factor	1.00	0.96	0.92	0.88	0.84	0.80	0.77	0.74	0.71	Correction Factor	1.05	1.00	0.95	0.90	0.86

Extended Capacity Tables (Continued)

R404a and R507

	Liquid Capacitities					Suction Line Capacities					Discharge Line Capacities					
	Tons at Pressure Drop Across Valve in psi					Tons at 1 psi Pressure Drop and Evaporating Temperature of:					Pressure Drop Across Valve					
Valve Series	1 psi	2 psi	3 psi	4 psi	5 psi	40°F	20°F	0°F	20°F	40°F	2 psi	5 psi	10 psi	25 psi	50 psi	100 psi
R10/15 E2	0.28	0.40	0.49	0.56	0.63	0.08	0.06	0.04	0.03	0.02	0.13	0.22	0.33	0.49	0.78	1.36
R10/15 E3 & F3	0.46	0.65	0.79	0.90	1.02	0.11	0.09	0.07	0.05	0.03	0.19	0.32	0.48	0.71	1.15	2.00
R20/25 E4 & F4	0.81	1.15	1.41	1.61	1.82	0.20	0.15	0.12	0.09	0.06	0.34	0.57	0.85	1.27	2.04	3.56
R20/25 E6 & F6	1.48	2.09	2.56	2.93	3.30	0.37	0.29	0.22	0.16	0.12	0.64	1.08	1.60	2.38	3.81	6.66
R20/25 E8 & F8	2.15	3.04	3.73	4.27	4.81	0.54	0.42	0.32	0.24	0.17	0.93	1.58	2.34	3.49	5.59	9.77
R30/35 E10	3.27	4.63	5.67	6.49	7.32	0.87	0.68	0.51	0.38	0.27	1.50	2.54	3.78	5.62	9.01	15.80
R30/35 E12	4.20	5.94	7.27	8.33	9.39	1.05	0.82	0.62	0.46	0.33	1.82	3.08	4.59	6.82	10.90	19.10
R30/35 E15	6.28	8.88	10.90	12.50	14.10	1.34	1.04	0.79	0.58	0.42	2.31	3.91	5.82	8.65	13.80	24.20
R40/45 E18	9.66	13.70	16.70	19.20	21.60	2.49	1.94	1.47	1.09	0.79	4.31	7.29	10.80	16.10	25.90	45.20
R40/45 E28	17.10	24.20	29.60	33.90	38.20	4.26	3.31	2.52	1.86	1.34	7.38	12.50	18.60	27.60	44.20	77.30
R50/55 E32	26.90	38.00	46.60	53.40	60.10	4.89	3.80	2.89	2.14	1.54	11.30	19.10	28.40	35.90	57.50	100.50
R50/55 E40	46.90	66.40	81.30	93.10	104.90	7.40	5.75	4.36	3.23	2.33	17.10	28.80	42.90	47.90	76.70	134.00

Liquid Capacity based on 40°F evaporator temperature, 10°F superheat temperature and 100°F condenser temperature.
Suction line capacity based on 100° condenser temperature, 25°F superheat temperature.
Hot Gas bypass capacity based on isentropic compression from 40°F evaporator plus 25°F superheat to 100°F condenser plus 50°F superheat.

R410a

	Liquid Capacitities					Suction Line Capacities					Discharge Line Capacities					
	Tons at Pressure Drop Across Valve in psi					Tons at 1 psi Pressure Drop and Evaporating Temperature of:					Pressure Drop Across Valve					
Valve Series	1 psi	2 psi	3 psi	4 psi	5 psi	40°F	20°F	0°F	20°F	40°F	2 psi	5 psi	10 psi	25 psi	50 psi	100 psi
R10/15 E2	0.39	0.55	0.67	0.77	0.87	0.10	0.08	0.06	0.05	0.04	0.16	0.28	0.41	0.70	0.84	1.31
R10/15 E3 & F3	0.63	0.89	1.09	1.25	1.40	0.15	0.12	0.09	0.07	0.05	0.24	0.41	0.61	1.03	1.24	1.93
R20/25 E4 & F4	1.12	1.58	1.93	2.21	2.49	0.26	0.21	0.16	0.13	0.09	0.43	0.73	1.08	1.82	2.20	3.43
R20/25 E6 & F6	2.03	2.87	3.51	4.02	4.53	0.50	0.39	0.31	0.24	0.17	0.80	1.36	2.02	3.41	4.12	6.42
R20/25 E8 & F8	2.95	4.18	5.12	5.86	6.61	0.73	0.58	0.45	0.34	0.26	1.18	1.99	2.96	5.00	6.04	9.41
R30/35 E10	4.49	6.35	7.78	8.94	10.10	1.17	0.93	0.72	0.56	0.41	1.90	3.21	4.77	8.07	9.75	15.20
R30/35 E12	5.77	8.16	9.99	11.50	12.90	1.42	1.13	0.88	0.67	0.50	2.30	3.89	5.79	9.79	11.80	18.40
R30/35 E15	8.63	12.20	14.90	17.10	19.30	1.80	1.43	1.11	0.86	0.64	2.92	4.94	7.34	12.40	15.00	23.30
R40/45 E18	13.30	18.80	23.00	26.50	29.70	3.36	2.67	2.07	1.59	1.18	5.45	9.20	13.70	23.10	28.00	43.50
R40/45 E28	23.50	33.20	40.70	46.60	52.50	5.74	4.57	3.55	2.73	2.03	9.31	15.70	23.40	39.60	47.80	74.40
R50/55 E32	37.00	52.20	64.00	73.30	82.60	8.79	6.99	5.43	4.17	3.10	14.30	24.10	35.80	60.60	73.20	113.90
R50/55 E40	64.40	91.10	111.60	127.90	144.10	15.30	12.20	9.47	7.28	5.41	24.90	42.00	62.50	105.70	127.60	198.60

Liquid Capacity based on 40°F evaporator temperature, 10°F superheat temperature and 100°F condenser temperature.
Suction line capacity based on 100° condenser temperature, 25°F superheat temperature.
Hot Gas bypass capacity based on isentropic compression from 40°F evaporator plus 25°F superheat to 100°F condenser plus 50°F superheat.

Temperature Correction Factors

Evaporator Temperature°F	40	30	20	10	0	-10	-20	-30	-40	Liquid Temperature °F	90	100	110	120	130
Correction Factor	1.00	0.96	0.92	0.88	0.84	0.80	0.77	0.74	0.71	Correction Factor	1.05	1.00	0.95	0.90	0.86

Operating Principles

Introduction

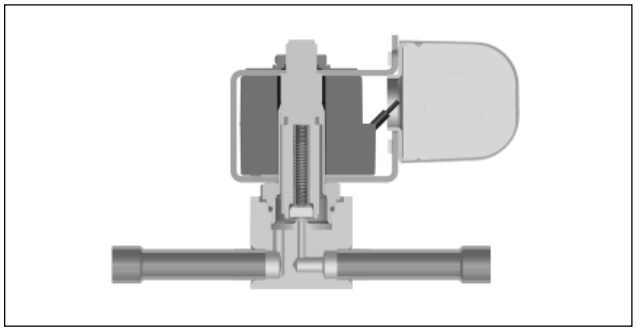
Solenoid valves are highly engineered products which can be used in many diverse and unique system applications. This section provides a brief overview of the components and functional varieties of solenoid valves.

General Information

Valve Construction and Basic Operation

A solenoid valve is an electronically operated device. It is used to control the flow of liquids or gases in a positive, fully-closed or fully-open mode. The valve is commonly used to replace a manual valve or where remote control is desirable. A solenoid is operated by opening and closing an orifice in a valve body which permits or prevents flow through the valve. The orifice is opened or closed through the use of a plunger that is raised or lowered within a sleeve tube by energizing the coil. The bottom of the plunger contains a compatible sealing material, which closes off the orifice in the body, stopping flow through the valve.

The solenoid assembly consists of a coil, plunger and sleeve assembly. In a normally closed valve, a plunger return spring holds the plunger against the orifice, preventing flow through the valve. When the coil is energized, a magnetic field is produced raising the plunger allowing flow through the valve. In a normally open valve, when the coil is energized, the plunger seals off the orifice stopping flow through the valve.

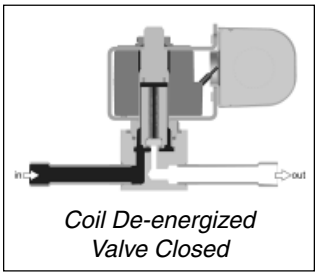


Two-Way Solenoid Valves

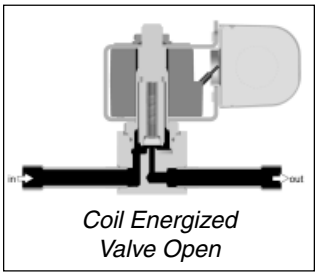
Two way valves control flow in one direction. They may be direct operated or pilot operated.

Direct Operated Solenoid Valves

Direct operated solenoid valves function to directly open or close the main valve orifice, which is the only flow path in the valve. Direct operated valves are used in systems requiring low flow capacities or in applications with low pressure differential across the valve orifice. The sealing surface that opens and closes the main valve orifice is connected to the solenoid plunger. The valve operates from zero pressure differential to maximum rated pressure differential (MOPD) regardless of line pressure. Pressure drop across the valve is not required to hold the valve open.



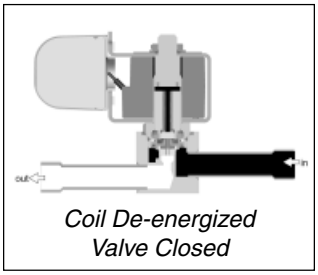
Coil De-energized
Valve Closed



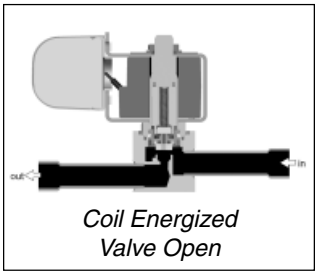
Coil Energized
Valve Open

Pilot Operated Valves

Pilot operated valves are the most widely used solenoid valves. Pilot operated valves utilize system line pressure to open and close the main orifice in the valve body. In a piston style valve, the main orifice is held closed with a piston seal pressed against the main orifice by the combined fluid pressure and spring pressure. In a normally closed valve, the piston is shifted or opened when the pilot operator is energized. This allows process fluid behind the piston to evacuate through the valve outlet. At this point, the system line pressure moves the piston opening the main orifice of the valve allowing high capacity flow through the valve. When energizing the coil of a normally open valve, fluid pressure builds up behind the piston forcing the piston to seal the main orifice of the valve.



Coil De-energized
Valve Closed



Coil Energized
Valve Open

Design Terminology

Continuous Duty – A rating given to a valve that can be energized continuously without overheating.

Correction Factor – A mathematical relationship related to a fluids specific gravity used to convert specific flows from a standard media to the media in question.

Current drain – The amount of current (expressed in amperes) that flows through the coil of a solenoid valve when it is energized.

Cv Factor – A mathematical factor that represents the quantity of water, in gallons per minute, that will pass through a valve with a 1 psi pressure drop across the valve.

Flow – Movement of fluid created by a pressure differential.

Flow Capacity – the quantity of fluid that will pass through a valve under a given set of temperature and pressure conditions.

Manual Stem – A mechanical device that permits the manual opening or closing of a valve in the case of emergency or power failure. A manual stem is available on all normally closed valves.

Maximum Operating Pressure Differential (MOPD) – The maximum pressure difference between the inlet and outlet pressures of the valve must not be exceeded, allowing the solenoid to operate in both the energized and de-energized positions.

Minimum Operating Pressure Differential – The minimum pressure difference between the inlet and outlet pressures required for proper operation. This minimum operating pressure differential must be maintained throughout the operating cycle of pilot operated valves to assure proper shifting from the closed position to the open position and visa versa. In the absence of the minimum operating pressure, the valve may close or will not fully open.

Orifice – The main opening through which fluid flows.

Safe Working Pressure – The maximum pressure a valve may be exposed to without experiencing any damage. The valve does not have to be operable at this pressure, but merely withstand the pressure without damage.

Identification

Valve Identification

All Parker valves are identified with a valve nameplate. The nameplate indicates the valve type and size, maximum operating pressure differential (MOPD) and safe working pressure (SWP). In addition, the nameplate also specifies the appropriate electrical specifications for agency compliance.

Example (shown at right):

R20E84 ..... Valve Number
MOPD ..... Maximum Operating Pressure Differential (psi)
SWP ..... Safe Working Pressure (psi)
Agency Requirement ..... Assembly consists of "R" body and "R" Coil

Coil Identification

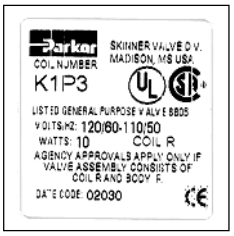
All Parker coil enclosures are identified with a label. The label indicates the coil part number, voltage and frequency.

Example (shown below):

RK1U3 ..... Coil Enclosure Part Number
208 / 60 ..... Voltage & Frequency
UL and CSA ..... Agency Approved



Valve Identification



Coil Identification

Agency Approvals

The Parker Refrigeration Valves are approved by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). Agency approval is specified based on assembly of an approved valve and coil enclosure assembly.

UL File Number: MH15507
CSA File Number: LR64702 legacy file

R Series Seal Material Designations

ASTM Designation	Commercial Designations and/or Trade Names
PTFE	Rulon®AR

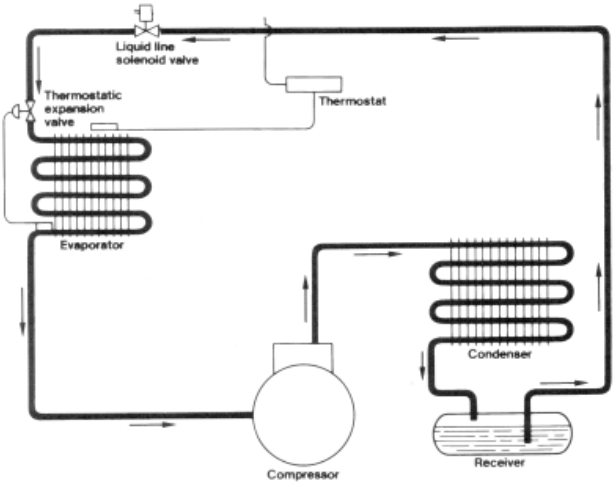
Rulon® AR is a Furon-Advanced Polymers Division trademark.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

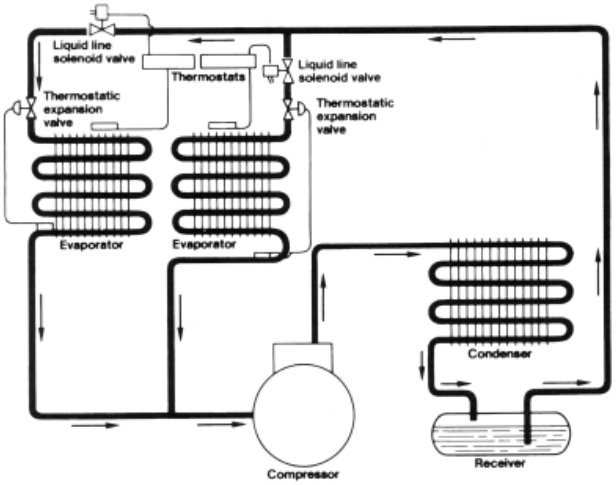
Typical Applications

Evaporator Temperature Control

A solenoid valve installed in the liquid line as close to the evaporator as possible, in conjunction with a narrow differential thermostat, is an excellent temperature control. By mounting the thermostat bulb in the supply or discharge air across the evaporator, the temperature swing is limited only by the differential of the thermostat.



Thermostatic Control of Evaporator Temperature

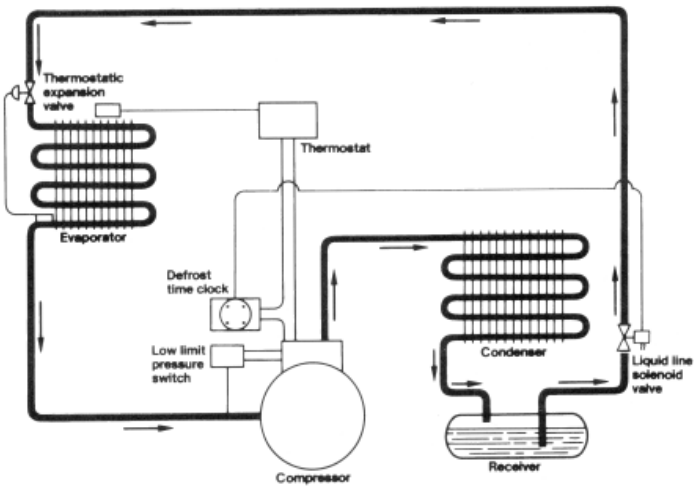


Thermostatic Control of Two Separate Evaporators

This type of temperature control can be used on a single or multiple evaporator system and is particularly useful on multiplexed systems with evaporators at different temperatures.

Defrost Pump Down

In situations where the condensing unit is installed in a low ambient, such as on a rooftop in northern climates, and the evaporator is operating at a temperature above the ambient, a pump down solenoid valve should be used. This allows the pressure control to be set at a cut out of 1 to 2 psi and the cut in to be set at a pressure below the pressure corresponding to the ambient temperature. This will insure that the condensing unit will start after cooling down during the defrost.



Pump Down Defrost with Low Ambient Conditions

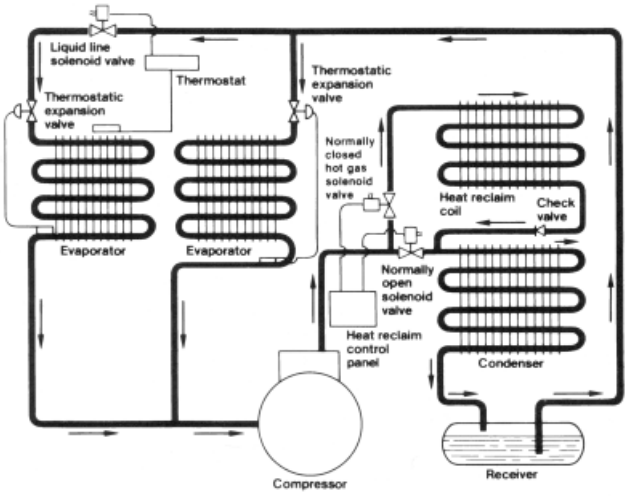
When a system has a defrost pump down solenoid valve, a thermostat should be used in series with the time clock defrost to control the temperature of the space or fixture. An alternative to the thermostat would be an evaporator pressure regulator.

Note: System diagrams are for illustrative purposes and are intended to show application of solenoid valves only.

Heat Reclaim Systems

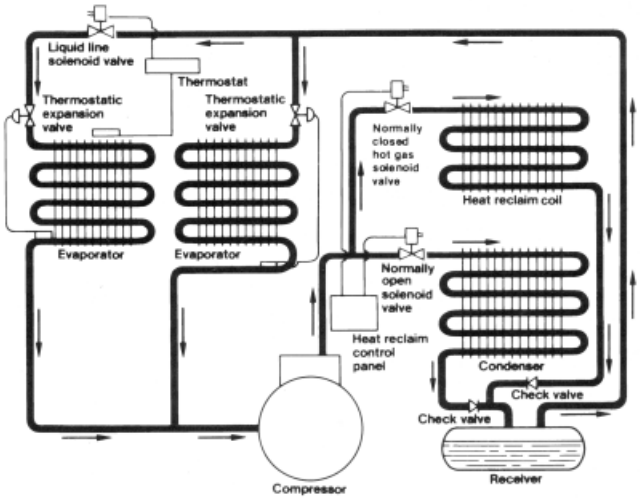
There are basically 2 types of heat reclaim systems: The series system and the parallel system.

In the series system, during normal operation, the discharge gas is condensed completely in the condenser. During the heating mode, the normally opened solenoid valve closes off the condenser and the normally closed solenoid opens to allow the discharge gas to flow into the heat reclaim coil. Complete condensation can occur in the heat reclaim coil if so designed, but manufacturers often prefer to take advantage of all the sensible heat available but only part of the latent heat, depending on the condenser for complete condensation.



Heat Reclaim System (Series)

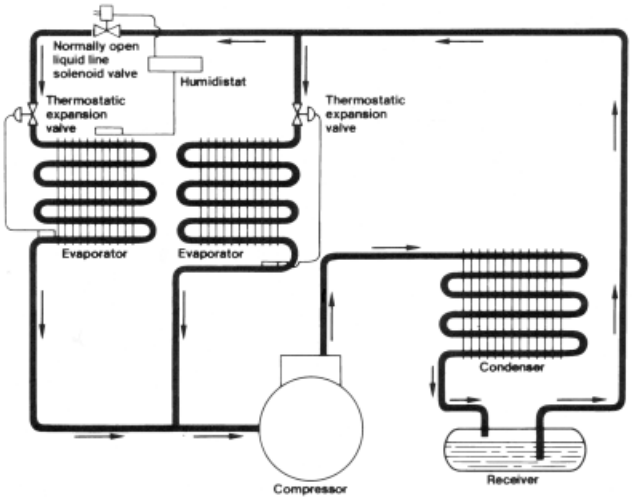
In the parallel systems there are, in effect, two separate condensers. During normal operation, the condenser is used for complete condensation of the discharge gas. In the heat reclaim mode the discharge gas is completely condensed in the heat reclaim coil thus maximizing the use of both sensible and latent heat. Some manufacturers recommend installing a 1/4" line from the heat reclaim coil, at its lowest point, back to the receiver to insure the proper drainage of oil and liquid refrigerant during the off cycle. Other manufacturers suggest the installation of a pressure control, to insure that the system will switch from the heat reclaim mode to the condenser in the event of fan stoppage or clogged filters.



Heat Reclaim System (Parallel)

Split Evaporator – Humidity Control

There are often times when the air temperature is satisfactory but the humidity level is too high. This can be remedied by using only half the evaporator to dehumidify the air without excessive cooling and the addition of auxiliary heat. This can best be accomplisehd by using a normally open solenoid valve on one half of the evaporator controlled by a humidistat.

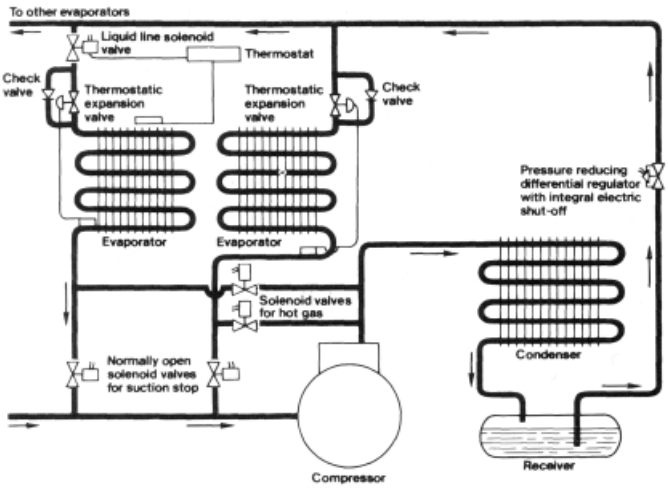


Split Coil Air Conditioning Dehumidification System

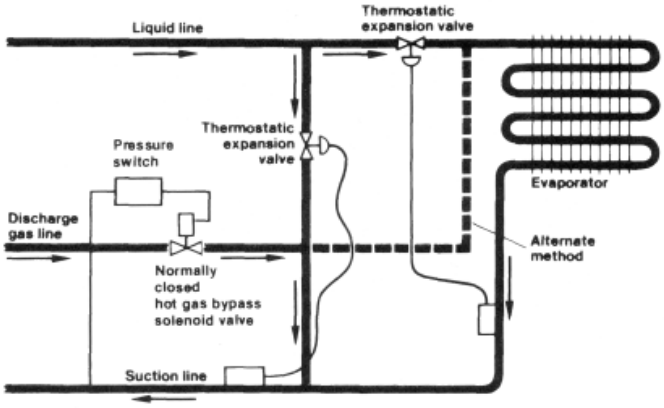
Hot Gas Defrost System

Hot gas defrost offers an excellent alternative to electric or air defrost. In this system the hot compressor discharge gas is routed to the outlet of the evaporator. This hot gas warms the evaporator, thaws any frost that has accumulated, condenses into a liquid and flows into the common liquid line to feed the other evaporators.

In order for this system to work properly, check valves must be installed to allow flow around the expansion valves. A pressure reducing valve should be used in the liquid line to provide a pressure differential between the condensed refrigerant leaving the defrosting evaporator and the common liquid line.



Hot Gas Defrost System



Capacity Control System

This system is drawn with only two evaporators but it is recommended that only twenty-five percent of any multiplexed system be hot gas defrosted at any given time.

An alternative to the hot gas defrost system is the cool gas defrost which uses the gas from the top of the receiver to defrost the evaporators. Because the cool gas defrost operates at a lower temperature, the thermal expansion of the refrigeration lines is reduced. This often eliminates the need for special piping techniques and leaks caused at line connections by excessive thermal flexing.

Capacity Control System

A simple method of providing compressor unloading is to use a solenoid valve connecting the discharge and suction lines of the compressor. The solenoid valve is controlled by a pressure control which responds to suction pressure. When the switch closes, it opens the normally closed solenoid valve and discharge gas is short circuited back to the suction side of the compressor.

In order to prevent overheating of the compressor, a thermostatic expansion valve should be installed to provide cooling to the compressor suction gas. An alternative method consists of injecting hot gas into the evaporator inlet. This prevents overheating of the compressor and increases the velocity of the gas through the evaporator.

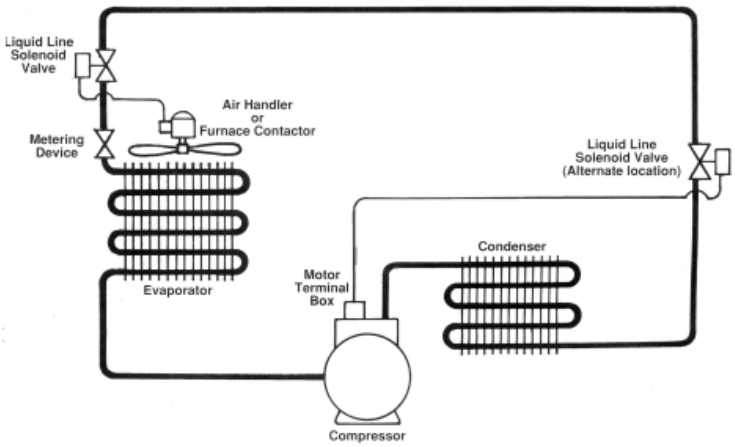
This type of unloading should not be attempted without thorough analysis of solenoid valve and expansion valve sizing.

Liquid Line Shut-Off

In an effort to obtain a higher efficiency rating on residential and commercial air conditioning systems, a normally closed solenoid valve typically is installed in the liquid line located near the air handler or furnace. In this case, the solenoid valve is wired in parallel with the contactor circuit (24 VAC) and may require a larger transformer to accommodate the valve.

As an alternative method, a normally closed solenoid valve may be located in the liquid line near the condensing unit and wired directly to the compressor motor terminal box. This solution improves system efficiency and maintains the refrigerant charge in the condenser coil during the off-cycle of the compressor which prevents refrigerant migration when long piping runs are used.

If the application requires a fail-safe or open mode, a normally open solenoid valve may be used. In this instance, the valve may also be located in the condensing unit and wired in series with the compressor crankcase heater.



Liquid Line Shut-Off

Pulse Width Modulating Valves

Parker's pulse width solenoid valves are designed to meter the refrigerant flow of mechanical refrigeration systems.

The pulse width solenoid valve, (PWM) when interfaced with microcomputers and appropriate sensors, precisely meters the refrigerant flow to control superheat evaporator pressure and other system parameters including the implementation of diagnostic functions (i.e.-charge level, crankcase temperature, oil pressure, current draw, values of high and low side pressures and temperatures).

Using a modified solenoid valve construction coupled with technology developed within Parker Hannifin, life cycles in excess of 100 million cycles are attainable. The PVM valve is well suited for systems employing variable speed compressor technology where pulse frequencies as low as 5 HZ may be used.

Unlike conventional thermostatic expansion valves, the PWM valve does not depend on refrigerant, system pressures or temperatures. In addition, the valve does not require a charged power element, capillary lines or external equalizer. Compared to conventional thermostatic expansion valves, the PWM valves do not require superheat change with load variations. The Parker PWM valve provides stable system control and constant superheat throughout load variations and discharge pressures. The system superheat can be held constant or changed to meet varying operational parameters such as compressor overload. Additionally, various methods of anticipating error through superheat change can be used to eliminate the refrigerant flow from over and under feed which causes hunting.



Model HP *Model CS & DS*

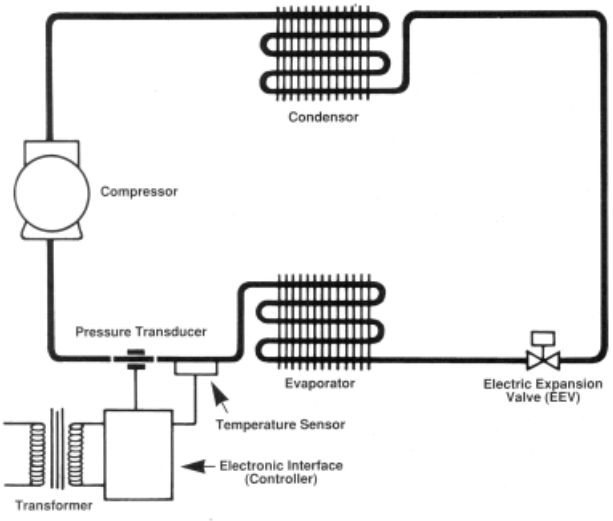
Features

- Long Life (100 million cycles).
- Suitable for all common refrigerants except ammonia.
- Maximum use of entire evaporator surface with minimum superheat result in increased efficiency (SEER).
- No superheat adjustment necessary.
- Wide range capacity results in reduced inventory.
- Fast, precise response to load changes.
- Readily adaptable to providing functions related to Maximum Operating Pressure (M.O.P.).
- Remote system control.
- Readily interfaces with a microcomputer and variable speed capacity compressor technology.
- Standard angle pattern solder connections–
  3/8 ODM x 3/8 ODM (Model HP)
  3/8 ODM x 1/2 ODF (Models CS/DS)
  (Consult Parker for different connections.)
- U.L. Recognized–File MH5567.

Typical Applications

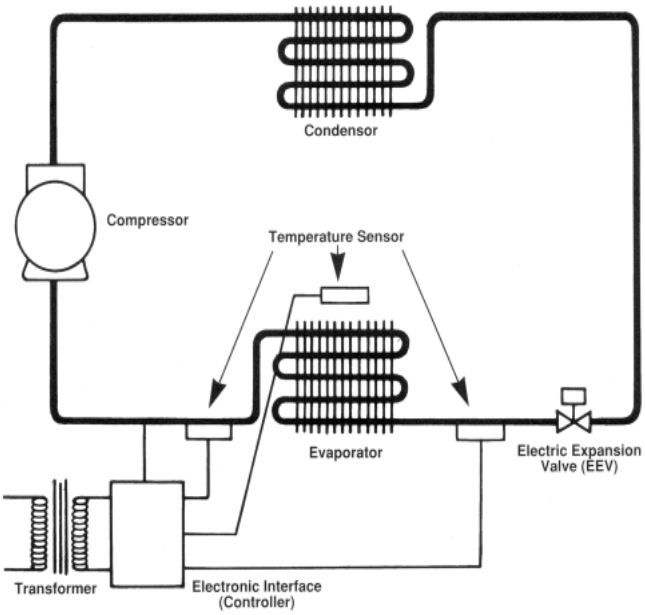
Superheat Control

Using appropriate temperature sensors, the temperature difference between the inlet and outlet of the evaporator will define a temperature which is related directly to superheat. Flooding is present if the temperature difference is zero. Adjustments to actual superheat must be made when the system has large evaporator pressure drops.



Superheat Control Using the Temperature & Pressure of Evaporator Outlet

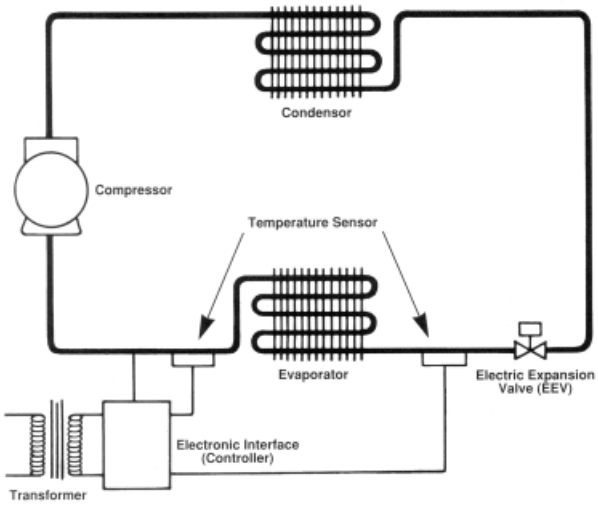
Superheat can also be measured directly by sensing the temperature and pressure at the evaporator outlet. In this case the pressure sensor could be a pressure transducer.



Superheat & Evaporator Temperature Control Using Three Temperature Sensors

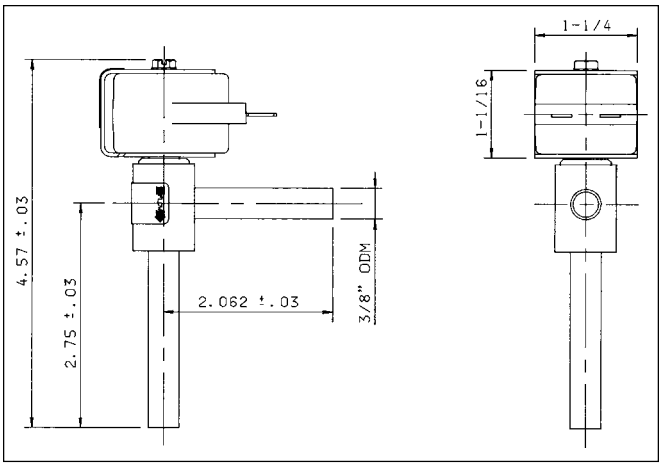
Evaporator Temperature Control

In addition to the superheat control, the microcomputers could include a sensor to control the evaporator temperature or pressure.



Superheat Control Using Two Temperature Sensors

HP Series



Model HP Mechanical Specifications

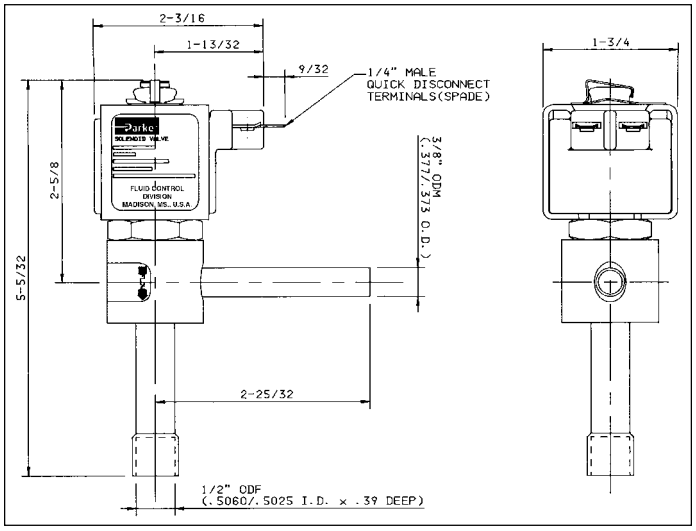
Safe Working Pressure ..... 500 PSIG
Burst Pressure ..... 2500 PSIG
Operating Pressure Differential ..... See table below
Operating Temperature ..... -20°F to +240°F
Storage Temperature ..... +180°F
Capacities ..... See capacity tables on page 262

Electrical Specifications

Operating Voltages ..... See table at right
Insulation System ..... Class F
Terminals ..... Spade, 18" Leads, D.I.N.
Enclosures ..... Open frame, Conduit hub

Model	MOPD	Orifice (IN)	Expansion Capacity Tons (R22)	Electrical Characteristics
HP120	300	1/64	1/4	AC Rectified Coils:
HP130	300	1/32	1/2	H-23R (9.5w) 24V/60Hz, 24V/50Hz, 110-120V/50-60Hz 220-240V/50-60Hz
HP145	300	3/64	3/4	DC Coils: H-23 (8.5w) 24V, 12V
HP160	300	1/16	1	

CS/DS Series



Model CS & DS Mechanical Specifications

Safe Working Pressure ..... 500 PSIG
Burst Pressure ..... 2500 PSIG
Operating Pressure Differential ..... See table below
Operating Temperature ..... -20°F to +240°F
Storage Temperature ..... +180°F
Capacities ..... See capacity tables on page 262

Electrical Specifications

Operating Voltages ..... See table at right
Insulation System ..... Class F
Terminals ..... Spade, 18" Leads
Enclosures ..... Open frame, Conduit hub, Junction Box

Model	MOPD	Orifice (IN)	Expansion Capacity Tons (R22)	Electrical Characteristics
CS1073	300	5/64	1-1/2	AC Rectified Coils:
CS1085	300	3/32	2	C-23R (11.2w) 24V/60Hz, 24V/50Hz, 110-120V/50-60Hz 220-240V/50-60Hz
DS1100	300	7/64	3	D-23R (16.0W) 24V/60Hz, 24V/50Hz, 110-120V/50-60Hz 220-240V/50-60Hz
DS1120	300	1/8	5	

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

R-12 US Extended Capacities in MBTU/H

Valve Type	Evaporator Temp. °F	40°						0°						-40°					
	Pressure Drop (PSIG)	40	60	80	100	120	140	60	80	100	120	140	160	80	100	120	140	160	180
	Orifice																		
HP120	1/64	0.68	0.84	0.97	1.08	1.18	1.28	0.71	0.82	0.92	1.01	1.09	1.16	0.37	0.41	0.45	0.49	0.52	0.55
HP130	1/32	1.20	1.47	1.70	1.90	2.08	2.25	1.25	1.44	1.61	1.77	1.91	2.04	0.65	0.72	0.79	0.85	0.91	0.97
HP145	3/64	2.47	3.02	3.49	3.90	4.27	4.61	2.57	2.97	3.32	3.63	3.92	4.19	1.33	1.48	1.62	1.75	1.87	1.33
HP160	1/16	4.14	5.06	5.85	6.54	7.16	7.74	4.31	4.97	5.56	6.09	6.58	7.03	2.22	2.48	2.72	2.94	3.14	3.33
CS1073	5/64	7.23	8.86	10.23	11.43	12.52	13.53	7.53	8.69	9.72	10.65	11.50	12.29	3.89	4.34	4.76	5.14	5.50	5.83
CS1085	3/32	9.40	11.51	13.29	14.86	16.28	17.59	9.79	11.30	12.63	13.84	14.95	15.98	5.05	5.65	6.19	6.68	7.14	7.58
DS1100	7/64	11.57	14.16	16.36	18.29	20.03	21.64	12.04	13.90	15.54	17.03	18.39	19.66	6.22	6.95	7.81	8.22	8.79	9.32
DS1120	1/8	13.13	16.08	18.57	20.76	22.74	24.56	13.67	15.78	17.64	19.33	20.88	22.32	7.05	7.89	8.64	9.33	9.98	10.58

R-22 US Extended Capacities in MBTU/H

Valve Type	Evaporator Temp. °F	40°						0°						-40°					
	Pressure Drop (PSIG)	40	60	80	100	120	140	60	80	100	120	140	160	80	100	120	140	160	180
	Orifice																		
HP120	1/64	1.39	1.61	1.80	1.97	2.13	2.28	1.23	1.42	1.58	1.74	1.87	2.00	0.74	0.81	0.87	0.93	0.99	1.04
HP130	1/32	2.45	2.83	3.16	3.47	3.74	4.00	2.16	2.49	2.78	3.05	3.29	3.52	1.30	1.42	1.53	1.64	1.74	1.83
HP145	3/64	5.03	5.81	6.50	7.12	7.69	8.22	4.43	5.11	5.72	6.26	6.76	7.23	2.66	2.92	3.15	3.37	3.57	3.77
HP160	1/16	8.44	9.74	10.89	11.93	12.88	13.77	7.42	8.57	9.58	10.50	11.34	12.12	4.46	4.89	5.28	5.65	5.99	6.31
CS1073	5/64	14.75	17.03	19.04	20.86	22.53	24.08	12.98	14.99	16.76	18.35	19.83	21.19	7.81	8.55	9.24	9.87	10.47	11.04
CS1085	3/32	19.17	22.14	24.75	27.12	29.29	31.31	16.87	19.48	21.78	23.86	25.77	27.55	10.15	11.12	12.01	12.84	13.62	14.35
DS1100	7/64	23.59	27.24	30.56	33.36	36.04	38.52	20.76	23.97	26.80	29.36	31.71	33.90	12.49	13.68	14.77	15.79	16.75	17.66
DS1120	1/8	26.78	30.92	34.57	37.87	40.90	43.73	23.56	27.21	30.42	33.32	35.99	38.48	14.17	15.53	16.77	17.93	19.02	20.04

R-404a US Extended Capacities in MBTU/H

Valve Type	Evaporator Temp. °F	40°						0°						-40°					
	Pressure Drop (PSIG)	40	60	80	100	120	140	60	80	100	120	140	160	80	100	120	140	160	180
	Orifice																		
HP120	1/64	0.92	1.06	1.19	1.30	1.41	1.50	0.78	0.90	1.01	1.11	1.19	1.28	1.00	0.49	0.53	0.57	0.61	0.64
HP130	1/32	1.62	1.87	2.09	2.29	2.47	2.64	1.37	1.59	1.78	1.94	2.10	2.25	0.79	0.87	0.94	1.00	1.06	1.12
HP145	3/64	3.32	3.83	4.29	4.70	5.07	5.42	2.82	3.26	3.64	3.99	4.31	4.61	1.63	1.78	1.93	2.06	2.19	2.30
HP160	1/16	5.57	6.43	7.19	7.87	8.50	9.09	4.73	5.46	6.11	6.69	7.23	7.73	2.73	2.99	3.23	3.45	3.66	3.86
CS1073	5/64	9.73	11.24	12.57	13.77	14.87	15.90	8.27	9.55	10.68	11.70	12.64	13.51	1.00	5.23	5.65	6.04	6.41	6.75
CS1085	3/32	12.65	14.61	16.34	17.90	19.33	20.67	10.76	12.42	13.89	15.21	16.43	17.57	6.21	6.80	7.35	7.85	8.33	8.78
DS1100	7/64	15.57	17.98	20.10	22.02	23.78	25.43	13.23	15.28	17.09	18.72	20.22	21.61	7.64	8.37	9.04	9.66	10.25	10.80
DS1120	1/8	17.67	20.41	22.82	24.99	27.00	28.86	15.02	17.35	19.39	21.24	22.95	24.53	8.67	9.50	10.26	10.97	11.63	12.26

Liquid Refrigerant Temperature Correction Factor

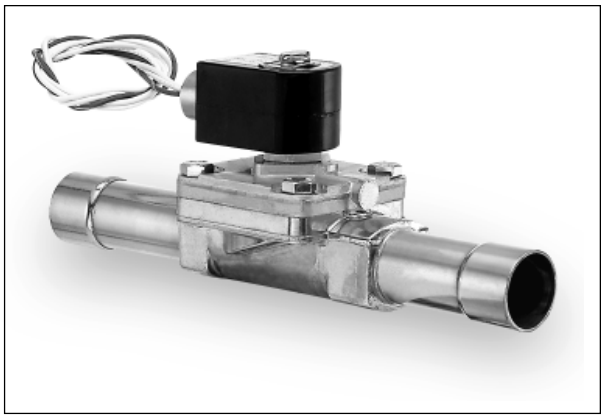
Liquid Line Temp. °F	50	60	70	80	90	100	110	120	130	140
Multiplier R-12	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.81	0.75
Multiplier R-22	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.76
Multiplier R-404a	1.56	1.45	1.34	1.23	1.12	1.00	0.88	0.75	0.62	0.48
Multiplier R-134a	1.35	1.28	1.21	1.14	1.07	1.00	0.93	0.86	0.78	0.71

Note: All capacities shown are based on 100°F liquid entering the valve, 40°F saturated evaporator temperature and 50% duty cycle during steady-state operation. Nominal capacities are shaded.

Duty Cycle Correction Factor

Duty Cycle	Correction Factor
30%	0.70
40%	0.8
50%	1
60%	1.1
70%	1.2
80%	1.4
90%	1.5
100%	1.7

Solenoid Valves for Secondary Coolants
For Supermarket Refrigeration



Description
Parker Hannifin, a pioneer in supermarket refrigeration control, introduces a new line of solenoid valves to control secondary coolants. These fluids include propylene glycol, ethylene glycol, Pecasol 50, Dynalene HC-40, and others. Parker's valve is the only valve designed to meet the requirements of both medium and low temperature applications encountered in supermarket applications.

What is Secondary Cooling?
In a secondary coolant, or secondary loop system, a chilled solution, such as propylene glycol, is circulated throughout the system rather than liquid refrigerant. Secondary coolant systems are advantageous because they can eliminate liquid refrigerant and suction gas lines running through a store. This reduces installation costs and labor, and eliminates costly refrigerant leaks.

Also, PVC tubing can be used, rather than the heavier, more expensive copper tubing normally used in traditional systems. Again, this reduces installation costs and labor, and eliminates costly refrigerant leaks.

Another benefit is more efficient defrost cycles with less potential product damage.

Minimum Pressure Drop
In order to achieve good heat transfer through a coil surface, minimizing pressure drops throughout the system is critical. Parker secondary coolant valves do not require a minimum pressure to operate.* This is because of the valve's unique “hung diaphragm” design. Other pilot operated valves require some minimum pressure drop to open the diaphragm or piston. This minimum pressure drop is a pressure loss, and means less pressure available at the coil. When using Parker’s secondary coolant valves, valve size can be maximized, minimizing the pressure drop.

*The 34E24C2-R1021E requires a minimum of 5 psi.

Features
- Suitable for both medium and low temperature systems — ethylene propylene diaphragm and seals are compatible with secondary fluids.
- Less maintenance and more dependability result from the NEMA 4 coils that protect against water, icing and vibration.
- Pressure drop (loss) is minimized by the unique hung diaphragm construction, eliminating the need for a minimum pressure differential.
- Quantity and quality of fluid flow is ensured by the large Cv rating that accurately matches fluid to flow characteristics.
- Easily matches up to system piping. Valves are available in sizes 5/8" to 2-1/8" ODF, ensuring that a valve is available for every common line size.
- Easy brazing and faster installation possible with the copper sweat connections which eliminate the need for pipe threaded connections and associated leaks.

General Specifications

Valve Description: 2 way hung diaphragm normally closed valve with brass forged body and EPDM trim material

Valve

Maximum Fluid Temperature ..... -40°F to +180°F (-40°C to +82°C)
Valve Body ..... Forged brass
Connections ..... ODF Copper
Plunger and Pole Piece ..... Stainless Steel
Enclosure Tube ..... Stainless Steel
Springs ..... Stainless Steel
Diaphragm ..... EPDM
Seals ..... EPDM
Safe Working Pressure:
10-26 Series ..... 250 psig
34 Series ..... 225 psig

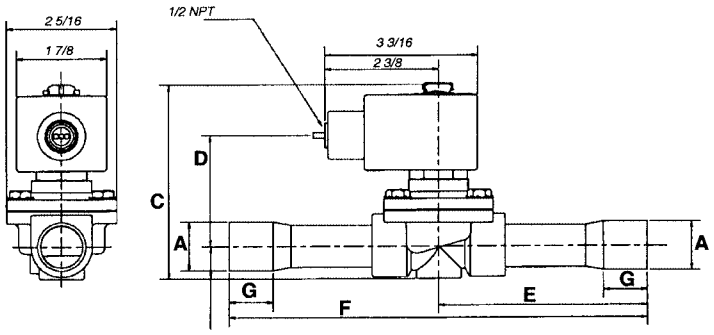
Coil

Type ..... NEMA 4, 4X (3 wire leads)
Power ..... 11 watts
Current
Inrush ..... 53 va
Holding ..... 20 va

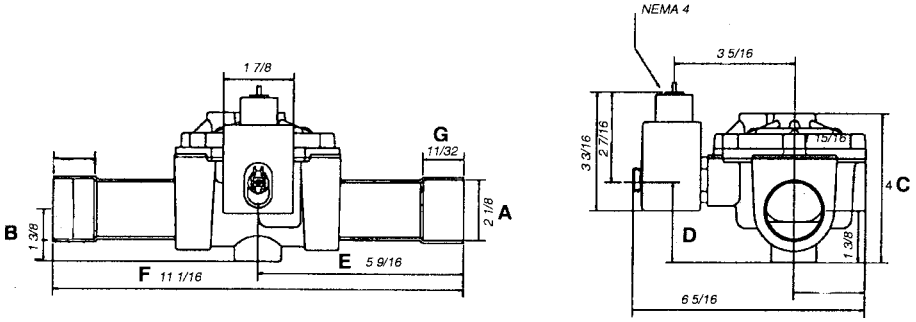
Voltage	Wire Length (inches)	Coil Part No.
24 VAC	18	CF4C01-R1021
120 VAC	18	CF4C05-R1021
208 VAC	18	CF4C10-R1021
240 VAC	18	CF4C15-R1021
120 VAC	36	CF4E05-R1021
208 VAC	36	CF4E10-R1021

Dimensions

Models 10E to 26E



Model 34E



Normally Closed Part No.	Cv	MOPD	Orifice Size	A	B	C	D	E	F	G
10E23C2-R1021E	4	0-150 psi	5/8"	5/8"	11/16"	4-1/16"	2-5/16"	3-1/4"	6-1/2"	1/2"
14E23C2-R1021E	5	0-150 psi	3/4"	7/8"	11/16"	4-1/16"	2-5/16"	3-5/8"	8-3/4"	3/4"
18E23C2-R1021E	5	0-150 psi	3/4"	1-1/8"	11/16"	4-1/16"	2-5/16"	4-1/4"	10-5/16"	15/16"
22EH5C2-R1021E	12.2	0-50 psi	1"	1-3/8"	13/16"	4-1/2"	3-1/8"	4-11/16"	9-3/8"	15/16"
26EH5C2-R1021E	12.2	0-50 psi	1"	1-5/8"	13/16"	4-1/2"	3-1/8"	4-11/16"	9-3/8"	15/16"
34E24C2-R1021E	22.5	5-125 psi	1-1/4"	2-1/8"	1-3/8"	4"	2-3/16"	5-9/16"	11-1/16"	11/32"

*Manual lift stems are available **only** on normally closed valves. Add suffix "M" to end of part no. to specify (example: 14E23C2-R1021EM).*

Normally Open Part No.	Cv	MOPD	Orifice Size	A	B	C	D	E	F	G
10E23O2-R1021E	4	0-150 psi	5/8"	5/8"	11/16"	4-1/16"	2-5/16"	3-1/4"	6-1/2"	1/2"
14E23O2-R1021E	5	0-150 psi	3/4"	7/8"	11/16"	4-1/16"	2-5/16"	3-5/8"	8-3/4"	3/4"
18E23O2-R1021E	5	0-150 psi	3/4"	1-1/8"	11/16"	4-1/16"	2-5/16"	4-1/4"	10-5/16"	15/16"
34E24O2-R1021E	22.5	5-125 psi	1-1/2"	2-1/8"	1-3/8"	4"	2-3/16"	5-9/16"	11-1/16"	11/32"

Jackes-Evans Refrigeration Solenoid Valves (RB/ORB Series)

Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/ Jackes-Evans Cross Reference chart.

Operating Principles

What is a Solenoid Valve?

The solenoid valve is an electronically operated device. It is used to control the flow of liquids or gases in a positive, fully-closed or fully-open mode. The valve is commonly used to replace a manual valve or where remote control is desirable. Solenoid valves are operated by a variety of electrical switches. Among them are automatic temperature, pressure and time switches or manual switches.

When energized, the solenoid coil provides a strong magnetic force which pulls a steel plunger up into the plunger tube. This opens the valve orifice in a normally closed valve, permitting the flow of liquids or gases.

Two-Way Solenoid Valves

Two way valves control flow in one direction. They may be direct operated or pilot operated, normally closed or normally open.

Direct Operated Solenoid Valves

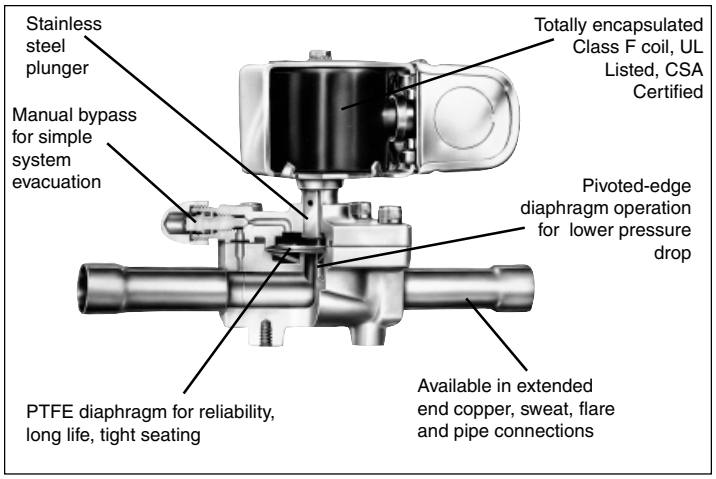
(See illustration at the right.)

Are used in systems requiring low flow capacities or in applications with low pressure differential across the valve orifice. The sealing surface that opens and closes the main valve orifice is connected to the solenoid plunger. The valve operates from zero pressure differential to maximum rated pressure differential (MOPD) regardless of line pressure. Pressure drop across the valve is not required to hold the valve open.

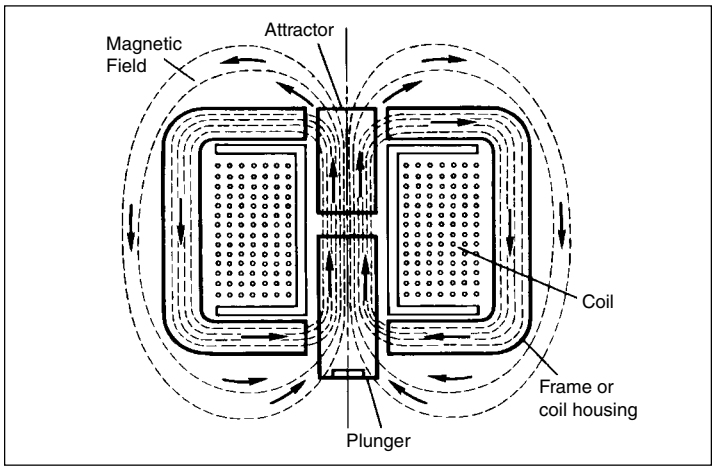
Pilot Operated Valves

(See illustration at the right.)

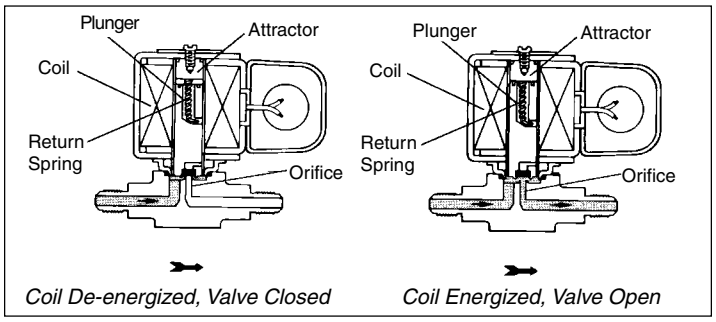
Pilot operated valves are the most widely used solenoid valves. The pilot orifice is much larger than the equalizer orifice. When the coil is energized, the plunger lifts off the pilot orifice. The pressure above the diaphragm is reduced to the outlet pressure of the valve. The resulting pressure differential across the diaphragm creates a force which lifts the diaphragm off the main port, opening the valve.



Refrigerant Solenoid Valve Features

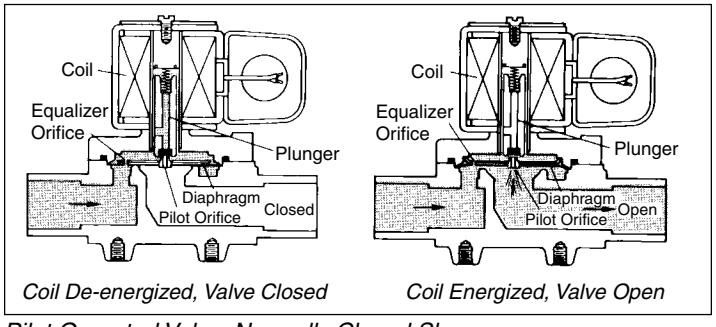


Solenoid Coil Operation



Coil De-energized, Valve Closed *Coil Energized, Valve Open*

Direct Operated Solenoid Valve, Normall Closed Shown



Coil De-energized, Valve Closed *Coil Energized, Valve Open*

Pilot Operated Valve, Normally Closed Shown

When the coil is de-energized, the pilot orifice is closed. The inlet pressure through the equalizer orifice equalizes the pressure above and below the diaphragm. The diaphragm resets, closing the valve.

MOPD (Maximum Opening Pressure Differential)
The MOPD between the inlet and outlet pressure of the valve must not be exceeded or the valve will not open. Conversely, if the valve is applied to a system when minimum operating pressure differential is not achieved, the valve will not open fully. These values are listed in the specifications for each type of valve.

Nomenclature

Example: RB21ME7.R23-120/60

R*	B	21	M	E	7	R23-120/60
Type R - Refrigeration (normally closed) *An O prefix ("OR") denotes normally open	**Body Material** B - Brass	**Nominal Capacity** Tonnage (R-12) 1 = 1 Ton 3 = 3 Ton 6 = 6 Ton 9 = 9 Ton 15 = 15 Ton 21 = 21 Ton 41 = 41 Ton 81 = 81 Ton	**Bypass** M - Manual Bypass (not applicable to normally open valves)	**Connection** E - Ext. End F - Flare	**Connection Size** Size of End Connection in eighths (inches) Example: 3 = 3/8" 13 = 1-5/8"	**Coil Nomenclature** R-23= Normally Closed Valves OR-23= Normally Open Valves

Ordering Information

Valve Assembly
To order a solenoid valve assembly **less the coil**, specify valve model number as defined above.

Examples: RB21ME7 (normally closed)
ORB21E7 (normally open)

The valve body assembly, identification plate and coil retainer are all included.

Coil Assemblies
To order coil assembly **only**, specify the coil type, voltage and frequency.

Examples: R-23, 120V-60Hz (normally closed)
OR-23, 120V-60Hz (normally open)

Valve Component Data
Unless otherwise stated, the components used in Jackes-Evans Solenoid Valves are as follows:

Body: Forged or Bar Stock Brass
Internal Parts: Stainless Steel
Springs: Stainless Steel
Pilot Seats: Neoprene
Diaphragms: PTFE

Applications/Compatibility
Jackes-Evans Refrigeration Solenoid Valves are designed for typical liquid line, suction line, discharge line and hot gas valve applications and are compatible with virtually all of today's CFC, HFC, and HCFC refrigerants and blends.*These valves are **not** designed for ammonia applications.

*For R-123 applications, different seals must be used – Please consult Parker.

Valve & Coil (Factory Assembled)
To order a complete valve coil assembly specify the valve model number with the coil type, voltage and frequency.

Example: RB21ME7 with R-23-120V-60Hz

Parts Kits
All currently manufactured Jackes-Evans valves are completely serviceable. If it is necessary to replace one internal part, all internal parts should also be replaced at that time. Therefore, standard service kits include the plunger assembly, diaphragm assembly and bonnet seal. Bonnet assemblies are also available but seldom need replacement.

Packaging
When placing your order, specify individual or bulk packaging. If this information is not specified, it becomes Parker's option.

Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.

R Series Refrigeration Valves
Cross Reference Chart
(to former Jackes-Evans RB Series Valves)

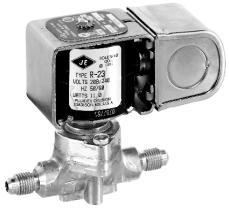
Port / Orifice Size	Normally Closed Valves: Existing Parker / Jackes-Evans Model	Normally Closed Valves: NEW Parker Part Number	Connections	Normally Open Valves: Existing Parker / Jackes-Evans Model	Normally Open Valves: NEW Parker Part Number
0.078	**NEW**	**R10E22**	**1/4 ODF**	**NEW**	**R15E22**
		R10E23	**3/8 ODF**		**R15E23**
3/32	RB1E2	**R10E32**	**1/4 ODF**	ORB1E2	**R15E32**
	RB1E3	**R10E33**	**3/8 ODF**	ORB1E3	**R15E33**
1/8	**NEW**	**R20E42**	**1/4 ODF**	**NEW**	**R25E42**
		R20E43	**3/8 ODF**		**R25E43**
3/16	**NEW**	**R20E62**	**1/4 ODF**	**NEW**	**R25E62**
		R20E63	**3/8 ODF**		**R20E63**
1/4	RB3E2		**1/4 ODF**	ORB3E2	
	RB3E3	**R20E83**	**3/8 ODF**	ORB3E3	**R25E83**
	RB3E4	**R20E84**	**1/2 ODF**	ORB3E4	**R25E84**
0.315	**NEW**	**R30E103**	**3/8 ODF**	**NEW**	**R35E103**
		R30E104	**1/2 ODF**		**R35E104**
		R30E105	**5/8 ODF**		**R35E105**
0.375	RB6E4	**R30E124**	**1/2 ODF**	ORB6E4	**R35E124**
	RB6E5	**R30E125**	**5/8 ODF**	ORB6E5	**R35E125**
		R30E127	**7/8 ODF**		**R35E127**
0.468	RB9E4	**R30E154**	**1/2 ODF**	ORB9E4	**R35E154**
	RB9E5	**R30E155**	**5/8 ODF**	ORB9E5	**R35E155**
	RB9E7	**R30E157**	**7/8 ODF**	ORB9E7	**R35E157**
0.562	RB15E5	**R40E185**	**5/8 ODF**	ORB15E5	**R45E185**
	RB15E7	**R40E187**	**7/8 ODF**	ORB15E7	**R45E187**
	RB15E9	**R40E189**	**1-1/8 ODF**	ORB15E9	**R45E189**
0.875	RB21E7	**R40E287**	**7/8 ODF**	ORB21E7	**R45E287**
	RB21E9	**R40E289**	**1-1/8 ODF**	ORB21E9	**R45E289**
		R40E2811	**1-3/8 ODF**		**R45E2811**
1	RB41E9	**R50E329**	**1-1/8 ODF**	ORB41E9	**R55E329**
	RB41E11	**R50E3211**	**1-3/8 ODF**	ORB41E11	**R55E3211**
1-1/4		**R50E4011**	**1-3/8 ODF**		**R55E4011**
	RB81E13	**R50E4013**	**1-5/8 ODF**	ORB81E13	**R55E4013**
	RB81E17	**R50E4017**	**2-1/8 ODF**	ORB81E17	**R55E4017**
		R50E4021	**2-5/8 ODF**		**R55E4021**

Table shown with extended end part numbers. Consult Parker for flare versions.

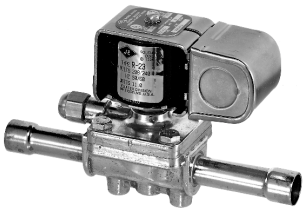
Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.

1 to 9 Tons (Normally Closed)


RB1E3


RB3F2


RB6E4


RB9ME5

Valve Series	Nominal Capacity (Tons)*					Model Number	Port Size	Connection Size
	R-12	R-22	R-502	R-134a	R-507/R-404a**			
RB1	1.0	1.0	1.0	1.0	1.0	RB1F2	7/64"	1/4" SAE
						RB1E2		1/4" ODF
						RB1E3		3/8" ODF
RB3	3.5	4.5	3.0	4.0	2.8	RB3F2	1/4"	1/4" SAE
						RB3E2		1/4" ODF
						RBF3F		3/8" SAE
						RB3E3		3/8" ODF
						RB3ME3		3/8" ODF
						RB3E4		1/2" ODF
						RB3ME4		1/2" ODF
RB6	6.0	7.5	5.8	8.1	5.6	RB6F4	3/8"	1/2" SAE
						RB6E4		1/2" ODF
						RB6ME4		1/2" ODF
						RB6E5		5/8" ODF
						RB6ME5		5/8" ODF
RB9	9.3	12.0	8.5	11.3	7.8	RB9F4	15/32"	1/2" SAE
						RB9E4		1/2" ODF
						RB9ME4		1/2" ODF
						RB9F5		5/8" SAE
						RB9E5		5/8" ODF
						RB9ME5		5/8" ODF

*Nominal capacity R12 @ 2 psi liquid pressure drop.

UPDATED
SEE PAGES 229-262

General Specifications

Design Pressure (SWP) ..... 500 psig (34 bars)

Maximum Opening
Pressure Differential
Normally Closed ..... 300 psig (21 bars)

Minimum Opening
Pressure Differential
Valve Type RB1 ..... zero psi
Valve Types RB3, RB6 & RB9 ..... 1 psi

Coil ..... All Jackes-Evans RB Series Solenoid Valves use the same size coil regardless of the valve type or style. For further information, refer to page 271.

Operating Temperatures
Fluid ..... -20°F to +240°F (-30°C to +115°C)
Ambient ..... -20°F to +120°F (-30°C to +50°C)

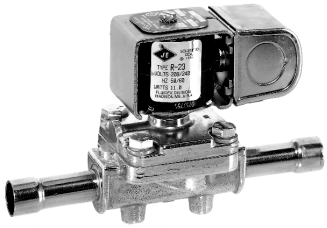
U.L. Listed with standard AC and DC voltages

CSA Certified on standard AC and DC voltages

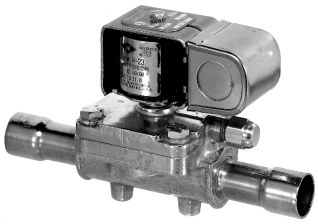
Dimensions ..... See page 273

Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.

10 to 83 Tons (Normally Closed)



RB15E5



RB21ME7



RB81ME13

Valve Series	Nominal Capacity (Tons)*					Model Number	Port Size	Connection Size
	R-12	R-22	R-502	R-134a	R-507/R-404a**			
RB15	14	19	13	17	12	RB15E5	9/16"	5/8" ODF
						RB15ME5		5/8" ODF
						RB15E7		7/8" ODF
						RB15ME7		7/8" ODF
						RB15E9		11/8" ODF
RB21	23	30	20	26	18	RB21E7	7/8"	7/8" ODF
						RB21ME7		7/8" ODF
						RB21E9		11/8" ODF
						RB21ME9		11/8" ODF
RB41	37	48	33	42	29	RB41E9	1"	11/8" ODF
						RB41ME9		11/8" ODF
						RB41E11		13/8" ODF
						RB41ME11		13/8" ODF
RB81	83	107	72	101	70	RB81E13	1 1/4"	15/8" ODF
						RB81ME13		15/8" ODF
						RB81E17		21/8" ODF
						RB81ME17		21/8" ODF

UPDATED
SEE PAGES 229-262

*Nominal capacity R12 @ 2 psi liquid pressure drop.

General Specifications

Design Pressure (SWP) ..... 500 psig (34 bars)

Maximum Opening
Pressure Differential
Normally Closed ..... 300 psig (21 bars)

Minimum Opening
Pressure Differential
Valve Types RB15, RB21 & RB41 ..... 1 psi
Valve Types RB81 ..... 2 psi

Coil ..... All Jackes-Evans RB Series Solenoid Valves use the same size coil regardless of the valve type or style. For further information, refer to page 271.

Operating Temperatures
Fluid ..... -20°F to +240°F (-30°C to +115°C)
Ambient ..... -20°F to +120°F (-30°C to +50°C)

U.L. Listed with standard AC and DC voltages

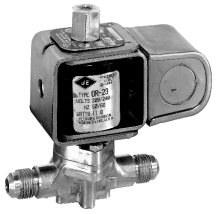
CSA Certified on standard AC and DC voltages

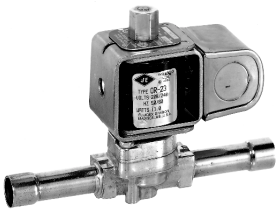
Dimensions ..... See page 273

Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.

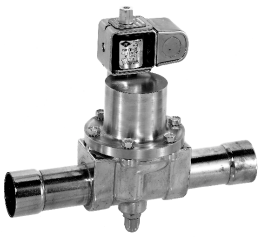
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

1 to 83 Tons (Normally Open)


ORB3F3


ORB6E5


ORB41E9


ORB81E13

Valve Series	Nominal Capacity (Tons)*					Model Number	Port Size	Connection Size
	R-12	R-22	R-502	R-134a	R-507/R-404a**			
ORB1	1.0	1.0	1.0	1.0	1.0	ORB1F2	7/64"	1/4" SAE
						ORB1E2		1/4" ODF
						ORB1E3		3/8" ODF
ORB3	3.5	4.5	3.0	4.0	2.8	ORB3F2	1/4"	1/4" SAE
						ORB3F3		3/8" SAE
						ORB3E3		3/8" ODF
						ORB3E4		1/2" ODF
ORB6	6.0	7.5	5.8	8.1	5.6	ORB6F4	3/8"	1/2" SAE
						ORB6E4		1/2" ODF
						ORB6E5		5/8" ODF
ORB9	9.3	12.0	8.5	11.3	7.3	ORB9E4	15/32"	1/2" ODF
						ORB9F5		5/8" SAE
						ORB9E5		5/8" ODF
ORB15	14.0	19.0	13.0	17.0	12.0	ORB15E5	9/16"	5/8" ODF
						ORB15E7		7/8" ODF
ORB21	23.0	30.0	20.0	26.0	18.0	ORB21E7	7/8"	7/8" ODF
ORB41	37.0	48.0	33.0	42.0	29.0	ORB41E9	1"	11/8" ODF
						ORB41E11		13/8" ODF
ORB81	83.0	107.0	72.0	101.0	70.0	ORB81E13	1 1/4"	15/8" ODF
						ORB81E17		21/8" ODF

UPDATED
SEE PAGES 229-262

*Nominal capacity R12 @ 2 psi liquid pressure drop.

General Specifications

Design Pressure (SWP) ..... 500 psig (4 bars)

Maximum Opening
Pressure Differential
Normally Open ..... 250 psig (17 bars)

Minimum Opening
Pressure Differential
Valve Type ORB1 ..... zero psi
Valve Types ORB3, ORB21
& ORB9, ORB15, ORB21 & ORB41 ..... 1 psi
Valve Type ORB81 ..... 2 psi

Coil ..... All Jackes-Evans ORB Series Solenoid Valves use the same size coil regardless of the valve type or style. For further information, refer to page 271.

Operating Temperatures
Fluid ..... -20°F to +240°F (-30°C to +115°C)
Ambient ..... -20°F to +120°F (-30°C to +50°C)

U.L. Listed with standard AC and DC voltages

CSA Certified on standard AC and DC voltages

Dimensions .....See page 273

Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.


Junction Box


Conduit Boss


Spade


DIN

All Jackes-Evans RB Series Solenoid Valves use the same size coil regardless of the valve type or style. They are available in a wide variety of voltages and frequencies in addition to the standard coils, listed in the table below. Coils are labeled with electrical data providing easy identification.

Construction
All solenoid coils are supplied with junction box housing as standard. Also available from the factory are conduit boss housings, spade terminal coils and DIN terminal coils. For specific coil options consult the factory.

Encapsulated for Long Life
Encapsulated waterproof coils are standard on all valves listed in this catalog. The special compound is absolutely waterproof, and impervious to oil, dust and most corrosive fumes and vapors.

All coils used in Parker Jackes-Evans solenoid valves are Class “F” molded and are constructed in accordance with UL, IEEE, NEMA and other accepted standards.

Electrical components of AC and DC coils are tested in accordance with ASTM D2307-78 and become a recognized component under U.L. 1446. The procedure produces data which concludes that a coil with 20,000 hours continuous operation will perform within the same specifications as a new coil.

Electrical Supply Requirements
The solenoid coil must be connected to electrical lines of correct voltage and frequency as indicated on the coil label. The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The molded coil is designed to operate with line voltage from 85% to 100% of coil rated voltage. Operating with a line voltage above or below these limits may result in coil burn-out. Also operating with line voltage below the limit will definitely result in lowering the valve maximum operating pressure differential (MOPD).

Fuse Capacities
Where electrical codes require individual fusing of each valve, fuse capacities should not exceed 3 amperes for voltages below 50 volts, and 2 amperes for voltages above 50 volts.

Electrical Data

Coil Types R-23/OR-23				
Volts/ Frequency (Hz)		Watts	VA Holding	VA Inrush
24/50-60		11	15	36
110-120/50-60		11		
208-240/50-60		11		
DUAL	120-240-/50-60	11		
DUAL	240-480/50-60			
6 VDC		16	2.67	N/A
12 VDC		16	1.33	
24VDC		16	0.67	

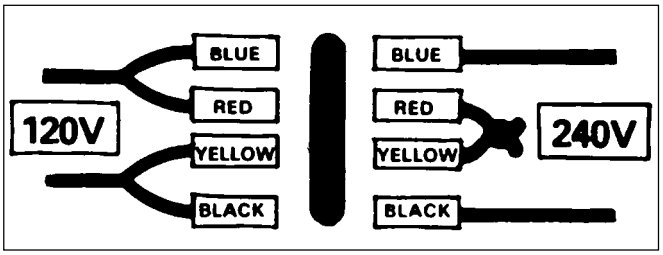
D.C. Coils have no inrush current.
For other voltages and frequencies contact the factory.

Standard Coil Options (R-23/OR-23)

Type	Standard Termination
Junction Box	6" Length, 2/64" Thick Insulated Wire
Conduit Boss	24" Length, 2/64" Thick Insulated Wire
Spade	1/4" Male
DIN	DIN

For other coil options contact the factory.

Wiring for Dual-Voltage Coil



Note: Parker Jackes-Evans refrigeration solenoid valves are being discontinued. For all new applications, see pages 229-262 of this catalog for new and improved R Series refrigeration solenoid valves. See page 267 for the R Series/Jackes-Evans Cross Reference chart.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

	Model	Liquid Line Capacities[1]				Suction Line Capacities[2]					Discharge Line Capacities[3]					
	Number	1 psi	2 psi	3 psi	5 psi	40°	20°	0°	-20°	-40°	2 psi	5 psi	25 psi	10 psi	50 psi	100 psi
R-12	RB1	0.53	0.76	0.95	1.20	0.08	0.07	0.05	0.05	0.04	0.14	0.22	0.31	0.47	0.63	0.70
	RB3	2.40	3.50	4.40	5.80	0.33	0.26	0.21	0.18	0.14	0.63	0.99	1.40	2.10	2.80	3.10
	RB6	4.30	6.00	7.40	9.80	0.58	0.45	0.37	0.31	0.24	1.10	1.80	2.50	3.80	5.00	5.50
	RB9	6.60	9.30	11.00	15.00	0.94	0.76	0.60	0.53	0.41	1.80	2.80	3.90	5.90	7.90	8.70
	RB15	10.00	14.00	17.00	22.00	1.40	1.10	0.91	0.81	0.63	2.70	4.20	5.90	9.00	12.00	13.00
	RB21	16.00	23.00	28.00	36.00	2.20	1.80	1.40	1.20	0.94	4.10	6.50	9.10	14.00	19.00	20.00
	RB41	26.00	37.00	45.00	58.00	3.20	2.60	2.00	1.80	1.40	6.80	11.00	15.00	23.00	31.00	34.00
	RB81	59.00	83.00	102.00	132.00	7.60	6.00	4.70	3.50	2.60	17.00	27.00	38.00	58.00	77.00	96.00
R-22	RB1	0.69	0.98	1.20	1.60	0.12	0.10	0.08	0.06	0.05	0.20	0.32	0.45	0.70	0.96	1.30
	RB3	3.00	4.50	5.70	7.50	0.48	0.39	0.31	0.25	0.20	0.92	1.40	2.00	3.10	4.30	5.70
	RB6	5.10	7.50	9.50	12.60	0.81	0.65	0.54	0.43	0.34	1.50	2.40	3.40	5.40	7.30	9.60
	RB9	8.60	12.00	15.00	20.00	1.40	1.10	0.90	0.71	0.55	2.60	4.00	5.70	8.80	12.00	16.00
	RB15	13.00	19.00	24.00	32.00	2.10	1.70	1.40	1.10	0.86	3.90	6.10	8.60	13.00	18.00	24.00
	RB21	20.00	30.00	36.00	48.00	3.30	2.70	2.20	1.70	1.30	6.00	9.50	13.00	21.00	28.00	37.00
	RB41	33.00	48.00	60.00	79.00	4.70	3.80	3.10	2.40	1.90	9.90	16.00	22.00	34.00	47.00	61.00
	RB81	76.00	107.00	131.00	169.00	11.40	9.30	7.30	5.70	4.30	26.00	40.00	57.00	88.00	121.00	159.00
R-502	RB1	0.47	0.67	0.83	1.10	0.10	0.08	0.06	0.05	0.03	0.16	0.26	0.36	0.56	0.77	1.00
	RB3	2.10	3.00	3.80	5.10	0.39	0.31	0.24	0.19	0.15	0.73	1.10	1.60	2.50	3.50	4.60
	RB6	4.10	5.80	7.10	9.20	0.61	0.49	0.38	0.30	0.23	1.10	1.80	2.60	4.00	5.60	7.30
	RB9	5.80	8.50	10.00	14.00	1.10	0.88	0.71	0.54	0.42	2.00	3.20	4.50	7.10	9.70	13.00
	RB15	8.90	13.00	16.00	21.00	1.70	1.30	1.10	0.83	0.65	3.10	4.90	6.90	11.00	15.00	19.00
	RB21	14.00	20.00	24.00	32.00	2.60	2.10	1.70	1.30	1.00	4.80	7.60	11.00	16.00	23.00	30.00
	RB41	22.00	33.00	41.00	54.00	3.80	3.00	2.40	1.80	1.40	7.90	12.00	17.00	27.00	37.00	50.00
	RB81	51.00	72.00	89.00	115.00	9.10	7.30	5.70	4.30	3.20	20.00	32.00	44.00	69.00	95.00	126.00
R-134a	RB1	0.63	0.89	1.10	1.40	0.10	0.09	0.07	0.07	—	0.18	0.30	0.41	0.62	0.82	0.92
	RB3	2.80	4.00	4.90	6.30	0.43	0.34	0.29	0.25	—	0.82	1.30	1.80	2.80	3.70	4.00
	RB6	5.70	8.10	9.90	12.80	0.76	0.59	0.49	0.41	—	1.50	2.40	3.30	5.00	6.60	7.20
	RB9	8.00	11.30	13.90	17.90	1.20	1.00	0.80	0.70	—	2.40	3.70	5.10	7.70	7.90	11.40
	RB15	12.00	17.00	21.00	27.00	1.80	1.40	1.20	1.10	—	2.50	5.50	7.70	12.00	16.00	17.00
	RB21	19.00	26.00	32.00	42.00	2.90	2.40	1.80	1.60	—	5.40	8.50	12.00	18.00	25.00	26.00
	RB41	29.00	42.00	51.00	66.00	4.20	3.40	2.60	2.40	—	8.90	14.00	20.00	30.00	41.00	45.00
	RB81	71.00	101.00	124.00	160.00	11.30	8.80	6.60	4.90	—	27.00	42.00	59.00	90.00	121.00	151.00
R-507 & R-404a	RB1	0.43	0.61	0.75	0.97	0.11	0.09	0.07	0.05	0.04	0.18	0.28	0.40	0.62	0.85	1.20
	RB3	2.00	2.80	3.40	4.40	0.43	0.35	0.28	0.22	0.18	0.82	1.20	1.80	2.80	3.80	5.10
	RB6	3.90	5.60	6.80	8.80	0.72	0.58	0.48	0.38	0.30	1.30	2.10	3.00	4.80	6.50	8.50
	RB9	5.50	7.80	9.50	12.30	1.20	0.98	0.80	0.63	0.49	2.30	3.60	5.10	7.80	10.70	14.20
	RB15	8.30	11.70	14.30	18.50	1.90	1.50	1.20	0.98	0.77	3.50	5.40	7.70	11.60	16.00	21.00
	RB21	12.80	18.00	22.00	29.00	2.90	2.40	2.00	1.50	1.20	5.30	8.50	11.60	18.70	25.00	33.00
	RB41	20.00	29.00	35.00	45.00	4.20	3.40	2.80	2.10	1.70	8.80	14.00	20.00	30.00	42.00	54.00
	RB81	49.00	70.00	85.00	110.00	10.10	8.30	6.50	5.00	3.80	23.00	36.00	51.00	78.00	108.00	142.00

Notes:

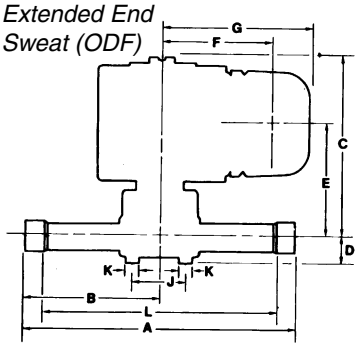
1. Liquid capacity based on 40°F evaporator 10°F superheat, 101°F condenser.
2. Suction line capacity for specified evaporator temperature plus 25°F superheat, 101°F condenser and 1 psi pressure drop across valve.
3. Hot gas bypass capacity based on isometric compression from 40°F evaporator plus 25°F superheat to 101°F condenser plus 50°F superheat.
4. For information on other alternative refrigerants, contact the factory.

Temperature Correction Factors

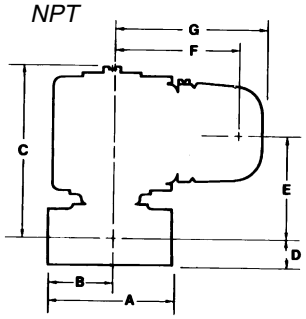
Evaporator Temperature °F	40	30	20	10	0	-10	-20	-30	-40	Liquid Temperature °F	90	100	110	120	130
Correction Factor	1.00	0.96	0.92	0.88	0.84	0.80	0.77	0.74	0.71	Correction Factor	1.05	1.00	0.95	0.90	0.86

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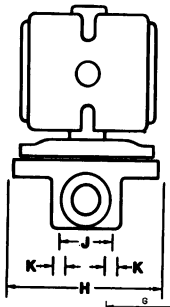
Extended End Sweat (ODF)



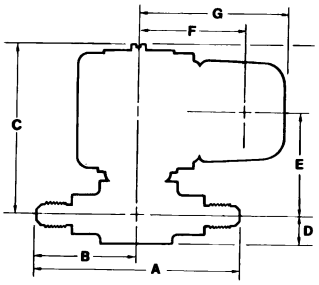
NPT

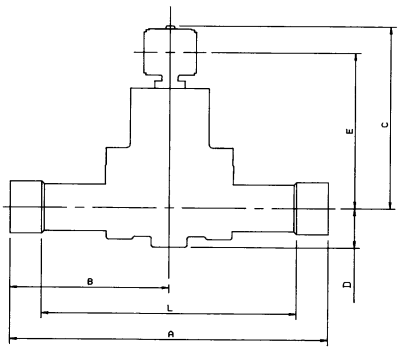


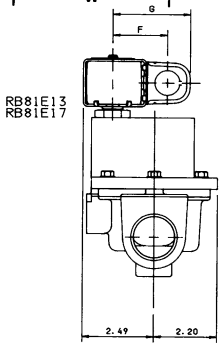
Typical End View



SAE Flare







All Dimensions in Inches

Valve Type	Connection Sizes in Inches	Overall Length A	Inlet to Centerline B	Centerline to Top C	Centerline to Bottom D	Centerline to Centerline of Junction Box E	Centerline to Centerline of Junction Box F	Centerline to end of Junction Box G	Maximum Width H	Mounting Hole Centerline J	Mounting Hole Thread Dimensions K	Inside Lay-in Length L
RB1P2	1/4 NPT	2.12	1.06	2.97	0.50	1.88	1.84	2.59	1.88	0.75	8-32	N.A.
RB1P3	3/8 NPT	2.12	1.06	2.97	0.50	1.88	1.84	2.59	1.88	0.75	8-32	N.A.
RB1E2	1/4 ODF	4.62	2.31	2.97	0.50	1.88	1.84	2.59	1.88	0.75	8-32	3.94
RB1E3	3/8 ODF	4.62	2.31	2.97	0.5	1.88	1.84	2.59	1.88	0.75	8-32	3.94
RB1F2	1/4 SAE	3.50	1.75	2.97	0.50	1.88	1.84	2.59	1.88	0.75	8-32	N.A.
RB3P2	1/4 NPT	2.12	1.06	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	N.A.
RB3P3	3/8 NPT	2.12	1.06	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	N.A.
RB3E3	3/8 ODF	4.62	2.31	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	3.94
RB3E4	1/2 ODF	5.00	2.50	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	4.22
RB3F2	1/4 SAE	3.50	1.75	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	N.A.
RB3F3	3/8 SAE	3.50	1.75	3.28	0.50	2.17	1.84	2.59	1.88	0.75	8-32	N.A.
RB6E4	1/2 ODF	5.00	2.50	3.34	0.50	2.23	1.84	2.59	1.88	0.75	8-32	4.22
RB6E5	5/8 ODF	6.50	3.25	3.34	0.50	2.23	1.84	2.59	1.88	0.75	8-32	5.50
RB6F4	1/2 SAE	3.94	1.97	3.34	0.50	2.23	1.84	2.59	1.88	0.75	8-32	N.A.
RB9P3	3/8 NPT	2.94	1.28	3.31	0.84	2.09	1.84	2.59	2.19	1.50	10-24	N.A.
RB9P4	1/2 NPT	2.94	1.28	3.31	0.84	2.09	1.84	2.59	2.19	1.50	10-24	N.A.
RB9E4	1/2 ODF	5.66	2.83	3.31	0.84	2.22	1.84	2.59	2.19	1.50	10-24	4.88
RB9E5	5/8 ODF	6.87	3.44	3.31	0.84	2.22	1.84	2.59	2.19	1.50	10-24	5.88
RB9F5	5/8 SAE	3.94	1.97	3.31	0.84	2.09	1.84	2.59	2.19	1.50	10-24	N.A.
RB15P4	1/2 NPT	3.44	1.45	3.34	0.56	2.25	1.84	2.59	2.44	N.A.	N.A.	N.A.
RB15E5	5/8 ODF	6.87	3.44	3.34	0.84	2.25	1.84	2.59	2.44	1.50	10-24	5.88
RB21P6	3/4 NPT	3.84	1.66	3.45	0.69	2.41	1.84	2.59	2.84	N.A.	N.A.	N.A.
RB21E7	7/8 ODF	7.50	3.67	3.45	1.00	2.41	1.84	2.59	2.84	1.75	1/4-20	5.97
RB41P8	1 NPT	4.44	1.95	4.62	0.84	3.55	1.84	2.59	3.19	N.A.	N.A.	N.A.
RB41E9	1-1/8 ODF	10.06	5.03	3.93	1.16	2.84	1.84	2.59	3.19	1.75	1/4-20	8.22
RB81E13	1-5/8 ODF	11.06	5.53	6.32	1.10	5.39	1.84	2.59	N.A.	N.A.	N.A.	8.87
RB81E17	2-1/8 ODF	11.06	5.53	6.32	1.10	5.39	1.84	2.59	N.A.	N.A.	N.A.	8.87

Notes: Normally open valve: Add 1/2 inch to overall height of valve.
Allow 2 inches above valve to remove coil assembly.

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Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

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Cleveland, OH

General Purpose Solenoid Valves
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Two-Way Solenoid Valves

Series 20: 1/8" –3/8" NPT connections, 3/64" –9/32" orifice

- Pressures from 0-2200 psi depending on orifice size and operation
- UL Listed and CSA Certified
- Normally open or normally closed, direct acting
- Brass or stainless steel (303ss for 1/8" and 1/4" NPT, 316ss for 3/8" NPT)
- Buna-N, Viton®, Neoprene, Ethylene propylene or Teflon® seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



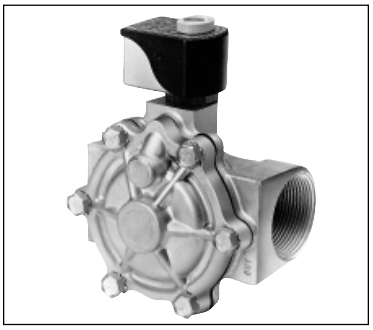
Series 20: 3/8" –3/4" NPT connections, 5/16" –3/4" orifice

- For low pressure applications, 0-20 psi, depending on orifice size
- UL Listed and CSA Certified
- Normally open or normally closed, direct acting
- Brass or 316 stainless steel
- Buna-N, Viton®, Neoprene or Ethylene propylene seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Series 22, 23, 24 and 26: 3/8" –3" NPT connections, 5/8" –3" orifice

- Pressures from 0-300 psi depending on construction
- Internally piloted diaphragm or piston depending on size
- UL Listed and CSA Certified (through 1-1/2")
- Normally open or normally closed construction
- Brass or 316 stainless steel (to 1-1/2" NPT)
- Buna-N, Viton®, Neoprene or Ethylene propylene seals (to 1-1/2")
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



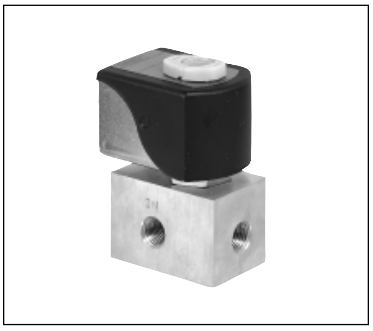
Series H5, S5 and 25: 1/4" –1" NPT connections, 1-1/32" –1" orifice

- Pressures from 0-300 psi depending on operation
- S5 series for steam service 125 psi saturated steam
- Normally open or normally closed construction
- Internally piloted floating diaphragm
- Brass with optional integral stainless steel seat
- Teflon®, Buna-N, or Ethylene propylene seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Series 28: 1/4" –3/4" NPT connections, 5/16" –3/4" orifice

- High pressure applications to 1500 psi
- Normally open or normally closed, internally piloted piston
- Brass bodies
- For air, inert gasses, water or light oil control
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Three-Way Solenoid Valves

Series 30: 1/8" –1/4" NPT connections, 3/64" –11/64" orifice

- Pressures from 0-250 psi depending on orifice size and operation
- UL Listed and CSA Certified
- Normally open, normally closed, or universal construction
- Direct acting
- Brass or 303 stainless steel
- Buna-N, Viton®, Neoprene, Ethylene propylene or Teflon® seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



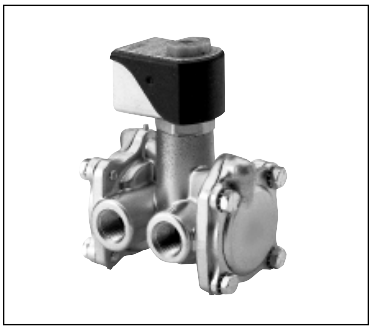
Series 35 and 38: 1/4" –3/8" NPT connections, 3/32" –9/32" pressure orifice, 1/4" –11/32" exhaust orifice

- Quick exhaust
- Pressures from 5-200 psi depending on construction
- Normally open, normally closed, or universal construction
- Internally pilot operated
- Brass bodies, 303 stainless steel available (series 35)
- Buna-N or Viton® seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Series 34: 3/8" –3/4" NPT connections, 5/8" pressure & exhaust orifices

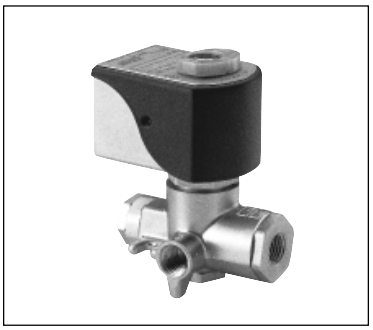
- Pressures from 10-250 psi depending on construction
- Normally open or normally closed construction
- Internally pilot operated diaphragms
- Brass bodies
- Buna-N, Viton®, Neoprene or Ethylene propylene seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Four-Way Solenoid Valves

Series 48: 1/4" NPT connections, 1/16" pressure orifices, 3/32" exhaust orifices

- Pressures from 10-150 psi
- Internally pilot operated
- UL Approved
- Brass bodies, Buna-N seals
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, and 9 enclosures are available



Special Purpose Valves Designed for Specific Applications

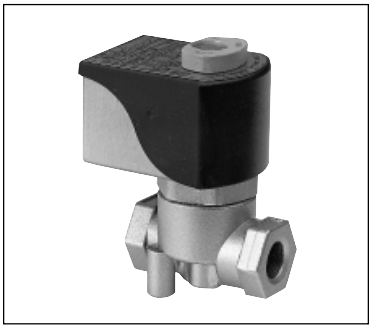
Cryogenic Valves: 1/8" –1" NPT connections, 3/64" –1" orifice

- Pressures from 0-500 psi depending on construction
- 2-way, normally closed or normally open
- Brass or 303 stainless steel depending on construction
- For liquid CO_2 and other cryogenic fluids to -320°F (-196°C)
- Teflon® or urethane standard seals; Kel-F seal for bubbletight shutoff
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7 and 9 enclosures are available



Vacuum Service Valves: 1/4" –1" NPT connections, 9/32" –1" orifice

- Suitable for vacuum service to 10^{-6} torrs
- Brass with degassed Buna-N or Viton seals
- Normally open or normally closed construction
- AC or DC voltage
- NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7 and 9 enclosures are available



Long Life –Quiet Operating Valves 1/4" –1-1/2" NPT connections, 1/8" –1-1/4" orifice

- Pressures from 0-175 psi depending on construction
- Brass with Buna-N, Viton®, Neoprene or Ethylene propylene seals
- Design life of 5 million cycles for diaphragm valves and 20 million cycles for direct acting valves
- Normally open or normally closed construction
- AC or DC voltage



Enclosure/Coil Terminal Combinations

Enclosures	Coil Termination						
	Screw (K)	Spade (S)	D.I.N. (H)	6" Leads	18" Leads	24" Leads	36" Leads
Strain Relief (C)					X	X	X
Explosion Proof (E)					X	X	X
General Purpose (G)					X	X	X
316 SS Explosion Proof (M)					X	X	X
Open Frame (O)	X	X			X	X	X
Encapsulated D.I.N. (P)			X				
Splice Box (S)				X			
316 SS Submersible (U)					X	X	X
Submersible Splice Box (W)	X	X		X			
Explosion Proof W/Ground Lead (Y)					X	X	X
316 SS Explosion Proof W/Ground Wire (Z)					X	X	X
Gold Ring II™ (4)					X		

Condensed listing of NEMA Enclosures

NEMA Type	Gold Ring™ Enclosure Code
1	C, G, P, S, GP
1	4
3	4
3R	4
3S	4
4	P,* 4
4X	4
6	W
7	E, M, Y, Z
9	E, M, Y, Z

*With Suitable Connector

Industrial Valve Seal Material Designations

ASTM Designation	Commercial Designations and/or Trade Names
NBR	Buna-N, Nitrile
FKM	Fluorinated Hydrocarbon, Viton®
EPDM	Ethylene Propylene
PTFE	Teflon®, Rulon® AR
CR	Neoprene

Viton® and Teflon® are Dupont Co. trademarks.
Rulon® AR is a Furon-Advanced Polymers Division trademark.

Gold Ring™ General Purpose Industrial Solenoid Valves



Applications

Parker's Gold Ring™ line of brass body general purpose solenoid valves include the two, three and four-way products for use in a variety of applications. The valves are used in situations where the need exists to electrically control the flow of a fluid or gas.

Functions

- Normally Closed — energize to open pressure port. De-energized, closed.
- Normally Open — energize to close pressure port. De-energized, open.
- Universal three-way valves — Can be installed for either normally closed, or normally open operation. Universal mode of operation is also suitable for flow selection (pressure at port 2 and 3) or diversion (pressure at port 1).

Standard Materials of Construction

- Body-Brass; Seals-NBR, EPDM or PTFE as noted
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies)
- Disc Holder-Celcon

Electrical Characteristics

- AC- 110/120-50/60, 220/240-50/60 (other voltages available on request)
- UL Listed and CSA Certified.

Temperature Ratings

(media as listed)

- AC Voltages: 200°F max.
- DC Voltages: 150°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult Parker.

How to Order

Select valve part number and coil (wattage must match).

Example: 04F48S2106ACFAF4C05

(For complete information on Gold Ring Valves, see Parker Catalog 7300A.)

Two-Way Solenoid Valves

NPT	Orifice	Cv	Operating Pressure Differential Min. PSI	Max. (MOPD) PSI Air Inert Gas	Water	Light Oil 300 SSU	Max. Temp °F	AC Watt	Valve Part Number
Operation: Two-Way Normally Closed (Energize to Open) *(valve is standard w/ urethane disc.)*									
1/8	1/8	0.34	0	155	180	140	180	6.0	02F20C1108AAF
1/4	1/8	0.35	0	300	300	200	180	11.0	04F20C1108ACF
1/4	5/32	0.50	0	150	150	145	180	11.0	04F20C2110ACF
Operation: Two-Way Normally Closed (Energize to Open)									
3/8	5/8	3.00	5	200	135	135	180	6.0	06F22C2140AAF
1/2	5/8	4.00	0	150	150	150	180	11.0	08F23C2140ACF
1/2	5/8	4.00	5	200	135	135	180	6.0	08F22C2140AAF
3/4	3/4	5.00	0	150	150	150	180	11.0	12F23C2148ACF
3/4	3/4	5.00	5	200	135	135	180	6.0	12F22C2148AAF
3/4	3/4	6.50	5	250	150	100	180	6.0	12F24C2148AAF
1	1	13.00	5	150	150	100	180	6.0	16F24C2164AAF
1 1/4	1 1/8	15.00	5	150	125	100	180	6.0	20F24C2172AAF
1 1/2	1 1/4	22.50	5	150	125	100	180	6.0	24F24C2180AAF
2	2	43.00	5	145	145	145	180	11.0	32F24C2199ACF
Operation: Two-Way Normally Open (Energize to Close)									
1/4	1/8	0.35	0	130	110	100	180	11	04F20O1108ACF
3/8	5/8	3.00	0	150	150	150	180	11.0	06F23O2140ACF
1/2	5/8	4.00	0	150	150	150	180	11.0	08F23O2140ACF
3/4	3/4	5.50	0	150	150	150	180	11.0	12F23O2148ACF

Two-Way Steam & Hot Water Solenoid Valves

NPT	Orifice	Cv	Operating Pressure Differential				Max. Temp °F	AC Watt	Valve Part Number
			Min. PSI	Max. (MOPD) PSI		Notes			
				Air Inert Gas	Water				
Operation: Steam & Hot Water Two-Way Normally Closed (Energize to Open)									
3/8	1/2	3.00	1	50	-	2,4	300	11.0	06FS5C2332ACF
1/2	1/2	3.6	1	50	-	2,4	300	11.0	08FS5C2332ACF
1/2	1/2	3.6	1	125	-	3	353	11.0	08FS5C2432ACH
1/2	5/8	4.00	0	50	150	4	300	11.0	08FS3C2340ACF
3/4	3/4	7.4	1	50	-	2,4	300	11.0	12FS5C2348ACF
3/4	3/4	7.4	1	125	-	3	353	11.0	12FS5C2448ACH
3/4	3/4	5.00	0	50	150	4	300	11.0	12FS3C2348ACF

Notes:

1) Valve contains stainless steel valve body.
2) Valve contains stainless steel seat and ethylene propylene elastomers.
3) Valve contains stainless steel seat and Teflon elastomers.
4) Valves with ethylene propylene elastomers are limited to 50 psi and 300°F. Do not use a higher pressure steam with pressure reducing valve since this may result in super heated steam.

Three-Way Solenoid Valves

NPT	Orifice	Cv	Operating Pressure Differential				Max. Temp °F	AC Watt	Valve Part Number
			Min. PSI	Max. (MOPD) PSI					
				Air Inert Gas	Water	Light Oil 300 SSU			
Operation: Three-Way Normally Closed (Pressure at 2, Energize to Open)									
1/4	3/32	0.12	0	150	150	150	200	11.0	04F30C2106ACF
Operation: Three-Way Universal (Pressure at any port)									
1/4	1/16	0.09	0	125	130	130	200	11.0	04F30U2104ACF
Operation: Three-Way Normally Open (Pressure at 3, Energize to Close)									
1/4	3/32	0.12	0	140	140	140	200	11.0	04F30O2106ACF

Four-Way Solenoid Valves

NPT	Orifice Pilot/Exhaust	Cv	Operating Pressure Differential				Max. Temp °F	AC Watt	Valve Part Number
			Min. PSI	Max. (MOPD) PSI					
				Air Inert Gas	Water	Light Oil 300 SSU			
Operation: Four-Way Universal (Pressure at P)									
1/4	1/16 I 3/32	0.09	10	150	150	150	180	11.0	04F48S2106ACF

Coil Availability

Coil Number	Description
AF4C05	6 Watt, Class 155, Type 4, 4X, 18 inch leads, 110/50 120/60 AC
AF4C15	6 Watt, Class 155, Type 4, 4X, 18 inch leads, 220/50 240/60 AC
CF4C05	11 Watt, Class 155, Type 4, 4X, 18 inch leads, 110/50 120/60 AC
CF4C15	11 Watt, Class 155, Type 4, 4X, 18 inch leads, 220/50 240/60 AC
CH4C05	11 Watt, Class 180, Type 4, 4X, 18 inch leads, 110/50 120/60 AC
CH4C15	11 Watt, Class 180, Type 4, 4X, 18 inch leads, 220/50 240/60 AC

Water Regulating Valves

Features

- Compact size simplifies installation.
- Self-cleaning – sliding block wipes orifice clean every cycle.
- Easy to adjust – Simple screw type pressure adjustment. Adjusting stem is easily accessible.
- Diaphragm type nitrile seals keep water in main valve body. Water does not come in contact with either spring or bellows. Elastomer seals are nylon reinforced.
- Extra large bellows is built for extra long life.
- Choice of capillary lengths – 32" and 48" are standard.
- Choice for capillary terminals – 1/4" flare nut, 1/4" refrigerant access valve or ODM solder.
- Non-corrosive materials used throughout – stainless steel orifice, Teflon® reinforced slide, forged brass body.
- No chatter, because operation is not affected by inlet pressure.
- Wide operating range – 65 to 300 psig. One valve for all common refrigerants.
- Manual flushing capability – all 3 valve sizes.



Model 65A *Pressure Actuated Water Regulating Valve*

General Specifications

Operating Head Pressure Range ..... 65 psig to 300 psig (Model 65A) Bellows Stop is standard in all devices.

Maximum Water Pressure ..... 150 psi

Head Pressure Connection ..... 32" capillary with 1/4" flare nut is standard. Other lengths and terminals available.

N.P.T. Water Connection ..... 3/8" – 1/2" – 3/4"

Materials

Main Valve ..... Sliding Rulon® Block

Main Valve Seat ..... Stainless Steel

Internal Parts ..... Brass and Stainless Steel

Springs ..... Plated Spring Steel

Valve Body ..... Forged Brass

Valve Bellows ..... Heavy-duty phosphor bronze and brass

Water Seals ..... Double Diaphragm Type

Ordering Information

Model No.	Device No.	Female NPT
65A	65-101	3/8"
65A	65-501	1/2"
65A	65-502	3/4"

Dual Acting Water Valve

Features

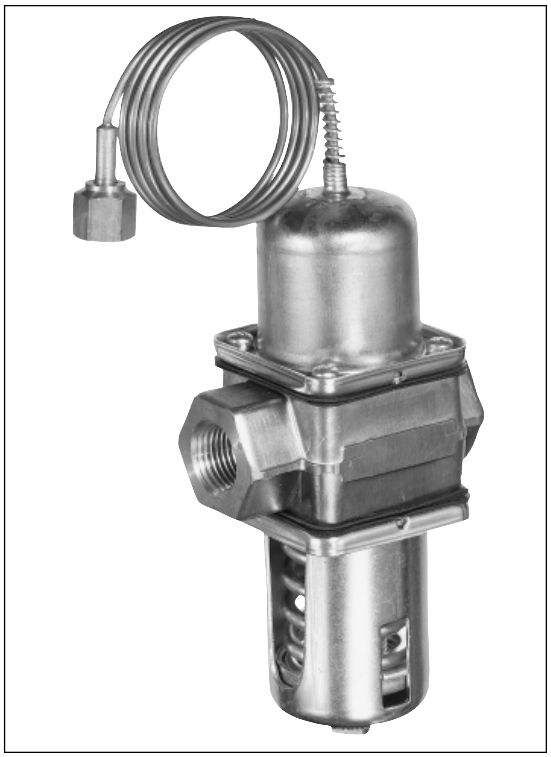
- **Does the Work of Two Valves** — The Model 265 handles both the heating and cooling cycles of water source heat pumps so that a separate valve for each cycle is unnecessary. As a result, cost is reduced, efficiency increased, and maintenance simplified.
- **Easy to adjust** The conveniently located outer stem adjusts for heating, and an inner screw adjusts for cooling to set valve opening points.
- **Self-Cleaning**
  The Model 265 works well even in dirty water. The sliding valve block wipes the orifice clean after every cycle. Therefore, dirt can't accumulate.
- **Fights Corrosion** Every part of the Model 265 that is touched by water is stainless steel or brass. The sliding block is Rulon®.
- **Non-Chattering** Operation is not affected by inlet pressure, so there are no disturbing chattering sounds.
- **Leak-Resistant** The valve diaphragm has double seals to prevent leakage.

General Specifications

Sensing Pressure Range ..... 0 to 300 PSI
Closed Plateau ..... 50-214 PSIG, Adjustable
Maximum Water Pressure ..... 150 PSIG
Sensing Pressure Connection ..... 32" Capillary; solder, flare or refrigerant access valve.

Materials

Valve Body ..... Forged Brass
Valve Gate ..... Sliding Rulon® Block
Valve Seat ..... Stainless Steel Orifice Plate
Diaphragm Seals ..... Nitrile
Other Internal Parts ..... Stainless Steel
Pressure Bellows ..... Heavy Duty Two-Ply Brass
Adjusting Springs ..... Plated Stainless Steel



Model 265 *For Water Source Heat Pumps*

Ordering Information

Use the chart below to choose the Parker Dual Acting Water Valve device number that fits your application.

Inlet and Outlet	Model No.	Device No.
1/2" NPT	265	265-002
		*265-009
3/4" NPT	265	265-102
		*265-109

*Models with mounting bracket
Shaded models available special order

Flo-Con Pressure Regulators and Valves
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Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Product Overview

With more than 30 years of commercial refrigeration control valve design and manufacturing experience, the Parker Refrigerating Specialties product line has evolved to include a wide variety of regulators, solenoid valves, and in-line check valves designed for precise and reliable control in both supermarket and field built halocarbon systems. Included in this expanded family of refrigeration components are high capacity pilot operated regulators and solenoid valves in extended port and connection size combinations. The highest capacity non-flanged regulators and solenoid valves available in the industry are included in this unique combination of control valves. Considering their application in larger systems, one control valve may be used in place of a competitor's parallel valve combination in some instances.

Parker Refrigerating Specialties commercial pilot operated regulators are modular by design, and are superior to direct operated valves in their ability to maintain a precise control of set point, despite changes in load. With a parabolic plug design as a standard feature throughout this line of regulators, a linear relationship exists between the main valve opening and the valve's capacity. The result is a steady set point and precise control, even at varying or low flow conditions.

As an added benefit, Parker Refrigerating Specialties pilot operated solenoid valves in the SC and S8 series utilize the same bodies, cartridges, and solenoid coil assemblies as their (S)PORT and A8 regulator counterparts. In many instances, capacities can be changed by simply changing cartridges, a feature common throughout both lines of regulators and solenoid valves.

Parker Refrigerating Specialties product bulletins are also available for all valve types covered throughout this section . Product bulletins cover a variety of details such as dimensions, cutaway views, and specific information related to valve operation, which is not included within the context of this catalog. Product bulletin numbers are referenced in the selection guide matrix on page 284 and are readily available upon request.

A8 Pressure Regulators



Initially introduced as the A7, the current A8 pressure regulator is designed with flexibility in mind, covering both high and low side applications in commercial refrigeration systems. A dual range spring, standard in all A8 regulators (with the exception of the differential version), allows the valve to control at any set point within a 10" Hg to 400 psi (250mm Hg to 27.6 bar) pressure range. Three body sizes define the A8 line. The A8A is the smallest of the three, the A81 covers the mid-range applications, and the A82 is the largest. Along with the standard A8 inlet pressure regulator, optional variations include inlet regulators with electric shut off features (A8AS, A81S, A82S) and wide opening or bypass features (A8_B). In addition, outlet pressure regulators (A8_OE), outlet regulators with electric shut-off features (A8_OES), differential pressure regulators (A8_L), and differential regulators with wide opening features (A8_BL) round out the product line. Eight different “port” sizes (or capacity cartridges) are available in the A8 family of regulators with connection sizes ranging from 7/8" (22mm) up to 2-5/8" (66mm). All A8 regulators are ductile iron bodied valves with brazed copper couplings. Valve cartridges are also made of ductile iron. A water resistant class “H” coil enclosed in a general purpose coil housing is supplied as standard with any A8 regulator version. Solenoid coils can be supplied either with twin leads or with DIN connectors.

(S)PORT / (S)PORT II Pressure Regulators



The (S)PORT and (S)PORT-II pressure regulators are a unique line of valves designed specifically for evaporator pressure control in commercial supermarket applications. All (S)PORT regulators are designed to control in a pressure range of 10" Hg to 120 psig (250mm Hg to 8.3 bar). The original (S)PORT, introduced several years ago, continues to be manufactured with a ductile iron body and cartridge assembly. The (S)PORT-II, a more recent addition to the line, is made of completely corrosion resistant materials including aluminum bronze bodies and cartridge assemblies, and stainless steel bolts and adjusting stems. (S)PORT regulators are available in three common versions typically applied on low side applications: A standard upstream pressure regulator, or PORT, a

regulator combined with an electric shut-off feature, or (S)PORT, and a unique combination of electric shut and bypass feature, the (S)PORT-B. The (S)PORT version is typically applied on a refrigeration circuit utilizing hot gas for defrosting purposes, while the (S)PORT-B offers the same capability in addition to a wide opening, or bypass feature, for quick pull down during start up or after a circuit's hot gas defrost period has been terminated. A water resistant class F coil and open frame coil housing is standard on the (S)PORT regulator line. Solenoid coils with DIN connectors can also be supplied.

S8 Solenoid Valves



S8 solenoid valves are flexible by design, suitable for discharge gas applications or as a liquid feed valve. S8 solenoid valves can also be applied on a low side (suction line) application. If (S)PORT pressure regulators are being considered, however, on a super-market rack system for example, the Refrigerating Specialties “SC” solenoid valve would be a better option (see description below) as suction shut-off devices. Overall, the design of the S8 solenoid valve with regards to its major components, complements that of the A8 regulator. That is, the valve bodies, cartridge assemblies, solenoid operators, and solenoid coils are identical to those used on the A8 regulator line. The same class “H” coil and general purpose coil housing which are standard throughout the A8 regulator line are supplied with the S8 solenoid. Along with the A8 line of regulators, solenoid coils with DIN connectors are also available.

SC Solenoid Valves



The "SC" line of solenoid valves were designed to complement (S)PORT pressure regulators in both appearance and construction. Components such as valve bodies, cartridges, solenoid operators, and solenoid coils are interchangeable between the SC solenoid and (S)PORT regulator lines of valves. Like the (S)PORT regulator, the SC solenoid is available with either ductile iron materials (both body and cartridge) or corrosion resistant aluminum bronze materials. With the (S)PORT regulator and SC solenoid combination, any suction line control requirement can be satisfied while maintaining reliable performance and common appearance. The SC line of solenoids utilizes the same water resistant class F coil and open frame coil housing which is standard with the (S)PORT line of regulators.

A9 Pressure Regulators



A9 outlet pressure regulators utilize a compact design unique to the Refrigerating Specialties line of regulators, and are applied most typically as hot gas bypass or receiver pressure control valves. Four port sizes ranging from 3/8" (9mm) through 1-1/8" (28mm) are available. Utilizing a pilot operated design for stable control of set point, the A9E is typically used as a hot gas bypass regulator. The A9E regulator, when used in a hot gas bypass application, is externally equalized to suction pressure, or the pressure being controlled. Through years of reliable performance, it has become a standard on a variety of OEM equipment where precise suction pressure control is required for stable system operation. The A9, an internally equalized regulator which senses and controls immediate downstream pressure, is typically applied as a receiver pressure control valve for those systems using regulators for condenser pressure control on air cooled condensers.

CK4A In Line Check Valves



CK4A in line check valves are versatile spring closing disc check valves, used for most hot gas and liquid line applications. The CK4 series of check valves are a flanged family of check valves, utilizing a gasketed refrigeration style tongue-and-groove ODS flange for commercial applications. Eight port sizes are available ranging from 1/2" (13mm) through 4" (100mm). Up through and including the 2" port size valve, three different ODS connection sizes are available for each port size valve to accommodate a reduced capacity valve in larger lines. All valves are made to tight seat leakage specifications, utilizing a lapped metal-to-metal seat design. The pressure drop required to open the valve fully is about .75 psi. Because of it's spring closing design, CK4 check valves can be intalled in both vertical and horizontal pipe lines.

(S)PORT and (S)PORT-II Evaporator Pressure Regulators

Features and Benefits

- Highest capacity commercial regulator in the industry.
- Sweat-in-place without disassembly.
- Interchangeable capacity cartridges.
- Low pressure drop.
- Manual opening stem.
- Variations include electric shut-off along with bypass and shut-off feature.
- (S)PORT-II with corrosion resistant aluminum bronze construction.
- All stainless steel bolts, stem, locking nut, piston and plug.
- Dual voltage 208/240/60 Hz coil.



Specifications

- Design pressure (M.R.P.): 450 psig (31.0 bar)
- Minimum fluid temperature -40°F (-40°C)
- Operating range: 10" Hg to 120 psig (250 mm Hg to 8.3 bar)
- UL listed (except 50 Hz versions), file SA5473
- CSA certified, file LR20991-14

Standard Voltages

- 120V/60Hz, 110V/50Hz
- 208V/240V/60Hz, 220V/50Hz
- 240V/50Hz
- 240V/60Hz, 220V/50Hz (DIN)
- 240V/50Hz (DIN)

Valve Nomenclature

S	P	OR	T	II	B	7	11
Electric Shut-Off	Parker	Open on Rise of Inlet Pressure	Inlet Pressure "Tap" or Fitting	Aluminum Bronze Version	Bypass Feature	Port Size in Eighths of an Inch	Connection Size in Eighths of an Inch

(S)PORT Port/Connection Size Combinations

Type	Port Size	Connection Sizes Available
(S)PORT or (S)PORT-II	03 (3/8", 9mm)	07, 09, 11, 13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5/8"/42mm, 2-1/8"/54mm)
	05 (5/8" 15mm)	07, 09, 11, 13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5/8"/42mm, 2-1/8"/54mm)
	07 (7/8", 22mm)	07, 09, 11, 13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5/8"/42mm, 2-1/8"/54mm)
	09 (1-1/8", 28mm)	07, 09, 11, 13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5/8"/42mm, 2-1/8"/54mm)
	11 (1-3/8", 35mm)	09, 11, 13, 17 (1-1/8"/28mm, 1-3/8"/35mm, 1-5/8"/42mm, 2-1/8"/54mm)
(S)PORT	13 (1-5/8", 42mm)	13, 17, 21 (1-5/8"/42mm, 2-1/8"/54mm, 2-5/8"/66mm)
	17 (2-1/8", 54mm)	17, 21 (2-1/8"/54mm, 2-5/8"/66mm)
	21 (2-5/8", 66mm)	21 (2-5/8", 66mm)

NOTE: (S)PORT-II regulators have same port/ connection combinations as standard (S)PORT regulators but are not available in the 13, 17, or 21 port size versions.

Description: Unlike other Parker Refrigerating Specialties regulators, (S)PORT regulators utilize a unique numbering system identifying port & connection size values in eighths of an inch (see previous page). For example, a 7/8" port size by 1-1/8" connection size valve would be identified as a (S)PORT 07-09, with the valves port size being the first numerical value in the description (in eighths of an inch), and the connection size being the second value. All (S)PORT cartridges are externally stamped with the plug or port size using this same numbering system for field identification purposes. (S)PORT evaporator pressure regulators are available in two versions, each with their own distinct material characteristics; the original (S)PORT, and the (S)PORT-II. The original (S)PORT utilizes a ductile iron body with brazed copper couplings along with a ductile iron cartridge assembly. The original (S)PORT is available in eight port sizes ranging from a 3/8" (03) to 2-5/8" (21) and with connection sizes up to 2-5/8" (21). A 1/4" SAE flare access fitting is standard on the upsteam side of the valve's cartridge assembly. An open frame, class F leaded coil is provided as standard with all (S)PORT regulators. A class H coil with DIN connector is also available with certain voltages.

The (S)PORT-II, a more recent introduction, is made completely with corrosion resistant materials. Both the body and cartridge are an aluminum-bronze material, with the adapter and bonnet being aluminum. In addition, stainless steel bonnet bolts and adjusting stems are standard on all (S)PORT-II regulators. In contrast to the original (S)PORT, five port sizes are offered with the (S)PORT-II style of regulator, ranging from 3/8" (03) to 1-3/8" (11). The same open-frame coil housing which is standard on the (S)PORT is supplied with the (S)PORT-II. The access fitting on the (S)PORT-II is located on the upstream side of the valve body, and positioned to easily connect a gauge fitting for servicing. The (S)PORT-II design specifically targets the rigorous application of a commercial evaporator pressure regulator –particularly those applications with hot gas defrost circuits. The corrosion resistant design of the (S)PORT-II is capable of withstanding the cooling and heating cycles to which these types of regulators are continually exposed.

All (S)PORT regulators are designed to be applied as a low side (evaporator) pressure regulator only. They are capable of being set to control pressures within a 10" to 120 psig (250mm Hg through 8.3 bar) range. For high side regulator applications, the Refrigerating Specialties A8 regulator should be considered.

Variations: PORT or PORT-II: Standard Inlet pressure regulator. (S)PORT or (S)PORT-II: Inlet pressure regulator with an electric shut-off feature. (S)PORT-B or (S)PORT-II-B. Inlet pressure regulator with an electric shut-off and electric wide opening, (or bypass) feature.

Installation: (S)PORT regulators use a spring loaded solenoid plunger design which assists the plunger in closing off tightly against the solenoid pilot seat regardless of position or orientation. The regulator can therefore be installed in either a horizontal or vertical pipe line regardless of the type of (S)PORT valve being installed (i.e. with or without a pilot solenoid).

When brazing in line, typically a wet cloth wrapped around the valve body is recommended to dissipate heat. **If a valve is disassembled prior to installation, always have the correct gasket/ O-ring kit available for reassembly.** The internal cartridge-to-body O-ring will need to be replaced prior to reassembly.

Adjustment: Adjustment of a regulators set point requires that the pressure being controlled be monitored by an accurate pressure gauge. Turning the valves adjusting screw clockwise (into the bonnet) compresses the range spring and subsequently raises the valves set point. Conversely, turning the adjusting stem counterclockwise will decrease the valves set point. Adjusting the set point of a (S)PORT regulator must be made with the solenoid energized, and the manual opening stem turned in. The inlet side solenoid only is required to be energized to adjust the set point on a (S)PORT-B. Depending on system design and system conditions, the pressure gauge may reflect some delay before a change in a regulator's set point actually results in a change in the pressure being maintained.

Electrical: All (S)PORT regulator versions utilize a molded water resistant class "F" solenoid coil with open frame housing as standard. A class "H" DIN coil is also available with certain voltages. Coils are designed to operate with line voltage from 85% to 110% of rated coil voltage. Operating with a coil voltage above or below these limits may result in coil burnout. Also, operating with a coil voltage below this limit will result in lowering the valves maximum opening pressure differential, or MOPD. Power consumption during normal operation will be 10 watts or less. The 208/240/60 Hz wide voltage range coil used on all (S)PORT regulators is rated at 280 MOPD. All other coils are rated at 300 MOPD.

Ordering Guide: Specify valve type (PORT, (S)PORT, (S)PORT-II, etc.), port and connection size in eighths of an inch (port size indicated first), and voltage, if applicable.

A8, (S)PORT & SC Suction Capacities (Tons) R22

Evap Temp °F Evap Pres. psig	Pres Drop psi	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
50° F	1	0.74	1.88	2.65	3.37	5.97	8.90	15.66	20.06
84 psig	3	1.26	3.20	4.53	5.77	10.20	15.22	26.77	34.25
	5	1.59	4.08	5.77	7.36	12.99	19.41	34.09	43.60
	10	2.15	5.55	7.91	10.11	17.75	26.58	46.55	59.45
40° F	1	0.67	1.70	2.40	3.06	5.42	8.08	14.22	18.20
68.5 psig	3	1.14	2.90	4.10	5.23	9.24	13.79	24.24	31.01
	5	1.44	3.68	5.22	6.66	11.73	17.53	30.79	39.36
	10	1.92	4.98	7.11	9.09	15.92	23.87	41.76	53.30
30° F	1	0.61	1.54	2.17	2.77	4.90	7.31	12.86	16.46
54.9 psig	3	1.02	2.61	3.70	4.72	8.33	12.43	21.85	27.95
	5	1.29	3.31	4.69	5.99	10.55	15.77	27.67	35.36
	10	1.70	4.43	6.34	8.12	14.19	21.30	37.21	47.46
20° F	1	0.55	1.39	1.96	2.49	4.41	6.58	11.57	14.82
43.0 psig	3	0.92	2.34	3.32	4.23	7.47	11.16	19.59	25.06
	5	1.15	2.95	4.19	5.36	9.42	14.10	24.71	31.57
	10	1.49	3.91	5.62	7.20	12.54	18.85	32.88	41.89
10° F	1	0.49	1.24	1.75	2.23	3.95	5.89	10.37	13.27
32.7 psig	3	0.81	2.09	2.96	3.78	6.66	9.95	17.46	22.33
	5	1.01	2.61	3.72	4.76	8.35	12.51	21.91	27.98
	10	1.29	3.41	4.92	6.33	10.96	16.51	28.74	36.57
0° F	1	0.43	1.11	1.56	1.99	3.52	5.25	9.24	11.82
23.9 psig	3	0.72	1.85	2.62	3.35	5.89	8.81	15.46	19.76
	5	0.88	2.30	3.28	4.20	7.35	11.01	19.27	24.58
	10	1.09	2.93	4.27	5.49	9.46	14.29	24.79	31.50
-10° F	1	0.38	0.98	1.38	1.76	3.12	4.65	8.18	10.47
16.4 psig	3	0.63	1.62	2.31	2.95	5.18	7.75	13.58	17.34
	5	0.76	1.99	2.86	3.67	6.39	9.60	16.77	21.38
	10	0.91	2.47	3.64	4.70	8.02	12.17	21.02	26.64
-20° F	1	0.34	0.86	1.22	1.55	2.74	4.09	7.19	9.20
10.1 psig	3	0.54	1.41	2.01	2.57	4.50	6.75	11.81	15.08
	5	0.65	1.71	2.47	3.17	5.50	8.27	14.41	18.34
	10	0.73	2.04	3.04	3.94	6.65	10.14	17.41	21.98
-30° F	1	0.29	0.75	1.06	1.36	2.39	3.57	6.28	8.03
4.8 psig	3	0.46	1.21	1.73	2.22	3.87	5.81	10.15	12.95
	5	0.54	1.44	2.09	2.70	4.65	7.02	12.18	15.47
	10	0.56	1.61	2.46	3.22	5.32	8.19	13.93	17.49
-40° F	1	0.25	0.65	0.92	1.18	2.07	3.10	5.43	6.95
0.5 psig	3	0.39	1.02	1.47	1.89	3.28	4.94	8.60	10.95
	5	0.43	1.18	1.74	2.25	3.84	5.83	10.07	12.75
	10	0.43	1.23	1.90	2.52	4.06	6.31	10.63	13.34

Capacities are based on 100°F liquid, 10°F superheat at valve inlet, and are maximum for the conditions listed. For each 10°F liquid is below 100°F, INCREASE capacity values by 4%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of 3 psi should be used in the regulator selection process. If a pressure drop of more than 3 psi is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a 3 psi pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Kilowatts) R22

Evap Temp °C Evap Pres. Bar	Pres Drop bar	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
10° C	0.07	2.57	6.53	9.20	11.71	20.76	30.95	54.47	69.74
5.8 bar	0.2	4.27	10.88	15.37	19.59	34.65	51.70	90.91	116.34
	0.4	5.88	15.07	21.35	27.25	48.04	71.78	126.04	161.16
	0.8	7.86	20.39	29.11	37.24	65.23	97.77	171.09	218.37
5° C	0.07	2.36	5.98	8.43	10.74	19.03	28.37	49.93	63.93
4.8 bar	0.2	3.90	9.95	14.07	17.93	31.70	47.30	83.16	106.41
	0.4	5.35	13.73	19.48	24.87	43.80	65.49	114.92	146.90
	0.8	7.08	18.44	26.39	33.79	59.07	88.62	154.91	197.59
0° C	0.07	2.15	5.46	7.70	9.81	17.38	25.91	45.59	58.37
4 bar	0.2	3.55	9.06	12.82	16.34	28.87	43.10	75.74	96.90
	0.4	4.84	12.45	17.69	22.59	39.74	59.44	104.25	133.21
	0.8	6.32	16.56	23.78	30.48	53.13	79.80	139.31	177.56
-5° C	0.07	1.96	4.97	7.01	8.93	15.82	23.59	41.51	53.14
3.2 bar	0.2	3.22	8.22	11.64	14.84	26.20	39.13	68.74	87.93
	0.4	4.35	11.23	15.99	20.43	35.89	53.72	94.14	120.25
	0.8	5.60	14.77	21.29	27.32	47.46	71.41	124.44	158.45
-10° C	0.07	1.77	4.51	6.36	8.11	14.35	21.41	37.66	48.21
2.6 bar	0.2	2.90	7.43	10.53	13.43	23.68	35.38	62.14	79.46
	0.4	3.89	10.08	14.38	18.39	32.24	48.30	84.56	107.96
	0.8	4.90	13.05	18.91	24.31	42.05	63.40	110.23	140.19
-15° C	0.07	1.60	4.07	5.75	7.32	12.96	19.33	34.01	43.53
1.98 bar	0.2	2.60	6.67	9.47	12.08	21.29	31.82	55.84	71.39
	0.4	3.45	8.98	12.84	16.44	28.75	43.12	75.40	96.19
	0.8	4.23	11.40	16.62	21.42	36.83	55.68	96.53	122.56
-20° C	0.07	1.44	3.66	5.17	6.59	11.65	17.38	30.57	39.12
1.46 bar	0.2	2.32	5.96	8.46	10.81	19.02	28.45	49.89	63.75
	0.4	3.03	7.93	11.38	14.59	25.43	38.20	66.68	84.99
	0.8	3.58	9.80	14.43	18.65	31.81	48.27	83.35	105.59
-25° C	0.07	1.28	3.27	4.62	5.89	10.42	15.55	27.34	34.98
1.0 bar	0.2	2.05	5.28	7.52	9.61	16.88	25.27	44.27	56.54
	0.4	2.62	6.93	9.99	12.83	22.27	33.52	58.39	74.34
	0.8	2.95	8.27	12.32	15.98	26.98	41.15	70.66	89.23
-30° C	0.07	1.14	2.91	4.11	5.24	9.26	13.83	24.30	31.09
0.63 bar	0.2	1.79	4.64	6.63	8.48	14.86	22.27	38.96	49.73
	0.4	2.24	5.97	8.67	11.16	19.26	29.07	50.49	64.18
	0.8	2.35	6.78	10.28	13.42	22.31	34.27	58.37	73.39
-40° C	0.07	0.88	2.25	3.19	4.07	7.18	10.73	18.83	24.07
0.04 bar	0.2	1.32	3.47	5.00	6.42	11.16	16.78	29.26	37.26
	0.4	1.51	4.19	6.22	8.07	13.66	20.80	35.78	45.23
	0.8	1.49	4.24	6.50	8.56	13.99	21.61	36.59	45.92

Capacities are based on 40°C liquid, 5°C superheat at valve inlet, and are maximum for the conditions listed. For each 5°C liquid is below 40°C, INCREASE capacity values by 7%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of .20 bar should be used in the regulator selection process. If a pressure drop of more than .20 bar is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a .20 bar pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Tons) R134a

Evap Temp °F Evap Pres. psig	Pres Drop psi	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
50° F	1	0.58	1.47	2.07	2.64	4.67	6.96	12.25	15.68
45.4 psig	3	0.97	2.48	3.51	4.48	7.90	11.80	20.73	26.51
	5	1.21	3.12	4.44	5.67	9.96	14.91	26.14	33.39
	10	1.57	4.13	5.94	7.61	13.25	19.92	34.74	44.25
40° F	1	0.51	1.31	1.84	2.35	4.16	6.20	10.91	13.97
35.1 psig	3	0.86	2.20	3.11	3.97	7.00	10.47	18.38	23.49
	5	1.06	2.75	3.92	5.01	8.79	13.16	23.05	29.43
	10	1.35	3.58	5.18	6.65	11.52	17.36	30.20	38.43
30° F	1	0.46	1.16	1.64	2.08	3.69	5.50	9.67	12.38
26.1 psig	3	0.75	1.93	2.75	3.51	6.17	9.23	16.18	20.68
	5	0.92	2.40	3.43	4.39	7.69	11.53	20.16	25.72
	10	1.14	3.06	4.46	5.74	9.89	14.95	25.93	32.93
20° F	1	0.40	1.02	1.44	1.84	3.25	4.85	8.52	10.90
18.4 psig	3	0.65	1.69	2.40	3.07	5.39	8.07	14.14	18.07
	5	0.79	2.08	2.98	3.82	6.66	10.00	17.47	22.27
	10	0.94	2.58	3.79	4.89	8.36	12.68	21.90	27.75
10° F	1	0.35	0.89	1.26	1.61	2.84	4.25	7.46	9.55
11.9 psig	3	0.56	1.46	2.08	2.67	4.67	7.00	12.25	15.64
	5	0.67	1.77	2.56	3.29	5.70	8.58	14.95	19.04
	10	0.75	2.12	3.15	4.09	6.91	10.54	18.09	22.85
0° F	1	0.30	0.78	1.10	1.40	2.47	3.69	6.49	8.30
6.5 psig	3	0.48	1.25	1.79	2.29	4.00	6.01	10.50	13.39
	5	0.56	1.49	2.17	2.79	4.81	7.26	12.61	16.02
	10	0.57	1.68	2.55	3.34	5.53	8.51	14.48	18.19
-10° F	1	0.26	0.67	0.95	1.21	2.13	3.19	5.59	7.15
2.0 psig	3	0.40	1.05	1.52	1.95	3.39	5.09	8.88	11.30
	5	0.45	1.23	1.80	2.33	3.98	6.03	10.41	13.20
	10	0.46	1.27	1.98	2.62	4.22	6.58	11.03	13.74

Capacities are based on 100°F liquid, 10°F superheat at valve inlet, and are maximum for the conditions listed. For each 10°F liquid is below 100°F, INCREASE capacity values by 4%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of 3 psi should be used in the regulator selection process. If a pressure drop of more than 3 psi is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a 3 psi pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Kilowatts) R134a

Evap Temp °C Evap Pres. Bar	Pres Drop bar	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
10° C	0.07	2.05	5.03	7.25	9.30	16.50	24.60	43.20	55.20
3.13 bar	0.2	3.38	8.73	12.10	15.60	27.60	41.30	72.50	92.60
	0.35	4.31	10.90	15.70	20.20	35.80	53.50	93.80	119.90
	0.7	5.54	14.50	20.90	26.90	47.50	71.00	124.60	159.20
5° C	0.07	1.85	4.54	6.54	8.42	14.90	22.20	39.00	49.90
2.48 bar	0.2	3.02	7.56	10.90	14.00	24.80	37.10	65.10	83.10
	0.35	3.82	9.73	14.00	18.10	31.90	47.70	83.70	106.90
	0.7	4.82	12.80	18.40	23.70	41.80	62.50	109.70	140.20
0° C	0.07	1.65	4.07	5.87	7.56	13.40	20.00	35.00	44.80
1.92 bar	0.2	2.68	6.75	9.73	12.50	22.10	33.10	58.00	74.20
	0.35	3.36	8.62	12.40	16.00	28.30	42.20	74.10	94.70
	0.7	4.13	11.10	16.00	20.60	36.40	54.40	95.50	122.00
-5° C	0.07	1.47	3.64	5.24	6.75	11.90	17.80	31.30	40.00
1.42 bar	0.2	2.36	5.98	8.61	11.10	19.60	29.30	51.40	65.70
	0.35	2.92	7.56	10.90	14.00	24.80	37.10	65.00	83.10
	0.7	3.49	9.54	13.80	17.70	31.30	46.80	82.10	104.90
-10° C	0.07	1.30	3.23	4.65	5.99	10.60	15.80	27.80	35.50
.993 bar	0.2	2.06	5.25	7.57	9.75	17.20	25.80	45.20	57.70
	0.35	2.50	6.57	9.47	12.20	21.50	32.20	56.50	72.20
	0.7	2.88	8.08	11.60	15.00	26.50	39.60	69.50	88.80
-15° C	0.07	1.15	2.85	4.10	5.28	9.34	14.00	24.50	31.30
.625 bar	0.2	1.78	4.57	6.59	8.49	15.00	22.40	39.30	50.30
	0.35	2.12	5.64	8.12	10.50	18.50	27.60	48.50	61.90
	0.7	2.32	6.71	9.68	12.50	22.00	32.90	57.70	73.80
-20° C	0.07	1.00	2.50	3.60	4.63	8.19	12.20	21.50	27.40
.3149 bar	0.2	1.52	3.94	5.68	7.31	12.90	19.30	33.90	43.30
	0.35	1.76	4.77	6.87	8.85	15.60	23.40	41.00	52.40
	0.7	1.87	5.46	7.88	10.10	17.90	26.80	47.00	60.00

Capacities are based on 40°C liquid, 5°C superheat at valve inlet, and are maximum for the conditions listed. For each 5°C liquid is below 40°C, INCREASE capacity values by 7%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of .20 bar should be used in the regulator selection process. If a pressure drop of more than .20 bar is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a .20 bar pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Tons) R404a

Evap Temp °F Evap Pres. psig	Pres Drop psi	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
50° F	1	0.63	1.60	2.26	2.87	5.09	7.59	13.36	17.10
104.7 psig	3	1.08	2.74	3.87	4.93	8.71	13.00	22.87	29.26
	5	1.37	3.49	4.94	6.30	11.12	16.60	29.17	37.32
	10	1.85	4.78	6.80	8.68	15.26	22.84	40.03	51.14
40° F	1	0.56	1.43	2.02	2.57	4.55	6.79	11.95	15.30
86.4 psig	3	0.96	2.44	3.45	4.40	7.78	11.61	20.42	26.13
	5	1.22	3.11	4.40	5.62	9.91	14.80	25.99	33.24
	10	1.64	4.23	6.03	7.71	13.52	20.25	35.47	45.29
30° F	1	0.50	1.27	1.80	2.29	4.05	6.04	10.64	13.62
70.3 psig	3	0.85	2.17	3.07	3.91	6.91	10.31	18.13	23.19
	5	1.07	2.75	3.90	4.98	8.77	13.11	23.02	29.43
	10	1.43	3.72	5.31	6.79	11.89	17.83	31.19	39.80
20° F	1	0.45	1.13	1.59	2.03	3.59	5.36	9.43	12.07
56.2 psig	3	0.75	1.92	2.71	3.46	6.10	9.11	16.01	20.48
	5	0.94	2.42	3.44	4.39	7.72	11.55	20.26	25.90
	10	1.24	3.24	4.64	5.94	10.38	15.58	27.21	34.70
10° F	1	0.39	0.99	1.40	1.79	3.16	4.72	8.30	10.63
44.0 psig	3	0.66	1.68	2.38	3.03	5.35	8.00	14.04	17.96
	5	0.82	2.11	3.00	3.84	6.75	10.09	17.69	22.61
	10	1.06	2.79	4.01	5.15	8.96	13.47	23.49	29.92
0° F	1	0.34	0.87	1.23	1.57	2.78	4.14	7.28	9.32
33.5 psig	3	0.57	1.46	2.08	2.65	4.67	6.98	12.25	15.66
	5	0.71	1.83	2.61	3.34	5.85	8.77	15.35	19.60
	10	0.90	2.38	3.44	4.42	7.66	11.54	20.07	25.53
-10° F	1	0.30	0.76	1.07	1.37	2.42	3.61	6.34	8.11
24.5 psig	3	0.49	1.27	1.80	2.30	4.04	6.04	10.60	13.54
	5	0.60	1.57	2.25	2.87	5.03	7.54	13.18	16.81
	10	0.74	1.99	2.91	3.74	6.44	9.73	16.87	21.42
-20° F	1	0.26	0.66	0.93	1.18	2.09	3.12	5.48	7.01
16.8 psig	3	0.42	1.08	1.54	1.97	3.46	5.18	9.08	11.59
	5	0.51	1.33	1.91	2.45	4.26	6.41	11.18	14.25
	10	0.60	1.64	2.41	3.12	5.31	8.06	13.91	17.61
-30° F	1	0.22	0.56	0.80	1.01	1.79	2.67	4.70	6.01
10.4 psig	3	0.35	0.92	1.31	1.67	2.93	4.39	7.68	9.81
	5	0.42	1.11	1.60	2.06	3.56	5.37	9.34	11.88
	10	0.46	1.30	1.95	2.53	4.26	6.51	11.15	14.06
-40° F	1	0.19	0.48	0.68	0.86	1.52	2.27	3.99	5.10
5.0 psig	3	0.29	0.76	1.09	1.40	2.45	3.67	6.41	8.17
	5	0.34	0.90	1.32	1.70	2.92	4.41	7.64	9.70
	10	0.34	0.99	1.52	1.99	3.27	5.06	8.56	10.73

Capacities are based on 100°F liquid, 10°F superheat at valve inlet, and are maximum for the conditions listed. For each 10°F liquid is below 100°F, INCREASE capacity values by 4%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of 3 psi should be used in the regulator selection process. If a pressure drop of more than 3 psi is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a 3 psi pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Kilowatts) R404a

Evap Temp °C Evap Pres. Bar	Pres Drop bar	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
10° C	0.07	2.15	5.46	7.70	9.80	17.37	25.90	45.59	58.37
8.1 bar	0.2	3.59	9.13	12.88	16.42	29.05	43.33	76.22	97.55
	0.4	4.95	12.67	17.94	22.89	40.38	60.32	105.95	135.51
	0.8	6.67	17.25	24.58	31.43	55.15	82.59	144.66	184.72
5° C	0.07	1.94	4.93	6.96	8.86	15.69	23.40	41.18	52.73
7.0 bar	0.2	3.23	8.23	11.62	14.81	26.19	39.08	68.73	87.95
	0.4	4.44	11.39	16.14	20.60	36.32	54.27	95.28	121.83
	0.8	5.94	15.41	22.00	28.15	49.31	73.90	129.32	165.06
0° C	0.07	1.75	4.44	6.27	7.98	14.14	21.08	37.10	47.50
6.0 bar	0.2	2.90	7.39	10.45	13.32	23.55	35.14	61.78	79.05
	0.4	3.97	10.20	14.47	18.47	32.54	48.64	85.35	109.11
	0.8	5.25	13.69	19.60	25.09	43.86	65.80	115.01	146.70
-5° C	0.07	1.57	3.99	5.62	7.16	12.68	18.91	33.28	42.60
5.1 bar	0.2	2.59	6.61	9.35	11.92	21.07	31.45	55.27	70.71
	0.4	3.53	9.08	12.90	16.48	28.99	43.36	76.05	97.17
	0.8	4.61	12.07	17.34	22.22	38.73	58.18	101.55	129.43
-10° C	0.07	1.40	3.56	5.02	6.39	11.32	16.88	29.70	38.03
4.3 bar	0.2	2.30	5.88	8.33	10.62	18.75	27.99	49.18	62.90
	0.4	3.11	8.03	11.43	14.61	25.66	38.42	67.32	85.98
	0.8	3.99	10.55	15.21	19.52	33.90	51.01	88.88	113.16
-15° C	0.07	1.24	3.16	4.46	5.68	10.06	15.00	26.40	33.79
3.6 bar	0.2	2.03	5.20	7.37	9.41	16.59	24.79	43.53	55.66
	0.4	2.72	7.06	10.07	12.88	22.57	33.82	59.20	75.57
	0.8	3.42	9.12	13.22	17.00	29.39	44.32	77.03	97.95
-20° C	0.07	1.10	2.80	3.95	5.03	8.91	13.29	23.38	29.92
3.0 bar	0.2	1.79	4.58	6.50	8.30	14.62	21.86	38.36	49.03
	0.4	2.36	6.16	8.81	11.28	19.72	29.59	51.73	65.99
	0.8	2.89	7.80	11.38	14.67	25.20	38.12	66.04	83.84
-25° C	0.07	0.97	2.46	3.48	4.43	7.84	11.69	20.56	26.31
2.5 bar	0.2	1.56	4.00	5.69	7.27	12.78	19.12	33.52	42.83
	0.4	2.03	5.32	7.64	9.79	17.06	25.63	44.73	57.00
	0.8	2.38	6.55	9.65	12.47	21.25	32.27	55.68	70.51
-30° C	0.07	0.84	2.15	3.04	3.88	6.85	10.22	17.97	22.99
2.0 bar	0.2	1.34	3.47	4.94	6.31	11.08	16.59	29.06	37.11
	0.4	1.71	4.54	6.55	8.41	14.58	21.96	38.24	48.67
	0.8	1.91	5.37	8.03	10.42	17.56	26.81	45.98	58.03
-40° C	0.07	0.63	1.60	2.27	2.90	5.11	7.64	13.42	17.16
1.3 bar	0.2	0.96	2.52	3.61	4.62	8.07	12.11	21.16	26.97
	0.4	1.15	3.13	4.60	5.94	10.15	15.39	26.60	33.72
	0.8	1.14	3.24	5.07	6.70	10.81	16.85	28.25	35.19

Capacities are based on 40°C liquid, 5°C superheat at valve inlet, and are maximum for the conditions listed. For each 5°C liquid is below 40°C, INCREASE capacity values by 7%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of .20 bar should be used in the regulator selection process. If a pressure drop of more than .20 bar is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a .20 bar pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Tons) R507

Evap Temp °F Evap Pres. psig	Pres Drop psi	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
50° F	1	0.66	1.66	2.34	2.98	5.29	7.88	13.88	17.77
109 psig	3	1.12	2.85	4.02	5.12	9.06	13.51	23.77	30.42
	5	1.42	3.63	5.13	6.55	11.56	17.26	30.34	38.81
	10	1.93	4.97	7.07	9.04	15.89	23.77	41.67	53.24
40° F	1	0.59	1.49	2.10	2.68	4.74	7.07	12.44	15.93
89.8 psig	3	1.00	2.55	3.60	4.58	8.11	12.09	21.27	27.22
	5	1.27	3.24	4.59	5.85	10.33	15.42	27.09	34.65
	10	1.71	4.41	6.29	8.04	14.11	21.13	37.01	47.26
30° F	1	0.52	1.33	1.88	2.39	4.23	6.31	11.11	14.23
73.3 psig	3	0.89	2.27	3.21	4.09	7.22	10.78	18.94	24.24
	5	1.12	2.88	4.08	5.20	9.17	13.71	24.07	30.77
	10	1.50	3.89	5.56	7.11	12.45	18.67	32.66	41.69
20° F	1	0.47	1.18	1.67	2.13	3.76	5.61	9.88	12.64
58.8 psig	3	0.79	2.01	2.84	3.62	6.40	9.55	16.79	21.47
	5	0.99	2.54	3.60	4.60	8.10	12.11	21.26	27.17
	10	1.31	3.40	4.88	6.24	10.91	16.37	28.60	36.48
10° F	1	0.41	1.05	1.48	1.88	3.33	4.96	8.73	11.18
46.1 psig	3	0.69	1.77	2.50	3.19	5.64	8.42	14.78	18.91
	5	0.86	2.23	3.17	4.04	7.11	10.63	18.65	23.82
	10	1.12	2.95	4.24	5.44	9.46	14.22	24.81	31.62
0° F	1	0.36	0.92	1.30	1.65	2.93	4.36	7.68	9.83
35.2 psig	3	0.60	1.55	2.19	2.80	4.93	7.37	12.93	16.54
	5	0.75	1.94	2.76	3.53	6.19	9.26	16.23	20.72
	10	0.95	2.52	3.65	4.68	8.12	12.23	21.28	27.08
-10° F	1	0.32	0.80	1.13	1.44	2.56	3.81	6.71	8.58
25.8 psig	3	0.52	1.34	1.90	2.43	4.28	6.40	11.22	14.34
	5	0.64	1.67	2.38	3.05	5.33	7.99	13.98	17.84
	10	0.79	2.13	3.09	3.98	6.86	10.37	17.98	22.84
-20° F	1	0.27	0.70	0.98	1.25	2.22	3.31	5.81	7.44
17.8 psig	3	0.45	1.15	1.64	2.09	3.68	5.51	9.65	12.32
	5	0.54	1.42	2.03	2.60	4.54	6.82	11.91	15.18
	10	0.64	1.75	2.58	3.33	5.69	8.63	14.91	18.89
-30° F	1	0.23	0.60	0.85	1.08	1.91	2.85	5.00	6.40
11.1 psig	3	0.38	0.98	1.40	1.79	3.13	4.69	8.20	10.47
	5	0.45	1.19	1.71	2.20	3.81	5.74	9.99	12.72
	10	0.50	1.41	2.10	2.73	4.60	7.01	12.03	15.19
-40° F	1	0.20	0.51	0.72	0.92	1.62	2.43	4.26	5.45
5.5 psig	3	0.31	0.82	1.17	1.50	2.62	3.94	6.88	8.77
	5	0.36	0.97	1.42	1.82	3.14	4.74	8.23	10.45
	10	0.37	1.08	1.65	2.16	3.57	5.50	9.34	11.72

Capacities are based on 100°F liquid, 10°F superheat at valve inlet, and are maximum for the conditions listed. For each 10°F liquid is below 100°F, INCREASE capacity values by 4%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of 3 psi should be used in the regulator selection process. If a pressure drop of more than 3 psi is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a 3 psi pressure drop, and should not be considered for these types of systems.*

A8, (S)PORT & SC Suction Capacities (Kilowatts) R507

Evap Temp °C Evap Pres. Bar	Pres Drop bar	03 3/8" 9 mm	05 5/8" 15 mm	07 7/8" 22 mm	09 1-1/8" 28 mm	11 1-3/8" 35 mm	13 1-5/8" 42 mm	17 2-1/8" 54 mm	21 2-5/8" 66 mm
10° C	0.07	2.25	5.70	8.03	10.23	18.13	27.03	47.58	60.92
7.5 bar	0.2	3.74	9.53	13.45	17.14	30.32	45.24	79.57	101.83
	0.4	5.18	13.24	18.74	23.90	42.18	63.00	110.67	141.55
	0.8	6.98	18.04	25.70	32.85	57.67	86.35	151.27	193.19
5° C	0.07	2.03	5.16	7.28	9.27	16.42	24.48	43.09	55.17
6.3 bar	0.2	3.38	8.61	12.16	15.50	27.42	40.91	71.94	92.07
	0.4	4.66	11.93	16.91	21.57	38.04	56.84	99.80	127.62
	0.8	6.24	16.17	23.07	29.51	51.72	77.50	135.65	173.16
0° C	0.07	1.84	4.66	6.57	8.37	14.83	22.11	38.91	49.82
5.26 bar	0.2	3.04	7.76	10.97	13.98	24.71	36.88	64.83	82.96
	0.4	4.17	10.71	15.20	19.40	34.17	51.08	89.65	114.60
	0.8	5.53	14.41	20.61	26.39	46.14	69.21	121.01	154.38
-5° C	0.07	1.65	4.19	5.91	7.53	13.34	19.89	35.00	44.81
4.3 bar	0.2	2.73	6.96	9.84	12.55	22.17	33.10	58.18	74.43
	0.4	3.72	9.57	13.59	17.36	30.54	45.68	80.13	102.40
	0.8	4.87	12.75	18.30	23.45	40.89	61.42	107.24	136.70
-10° C	0.07	1.48	3.76	5.30	6.75	11.95	17.82	31.36	40.14
3.5 bar	0.2	2.43	6.22	8.80	11.22	19.80	29.57	51.96	66.46
	0.4	3.29	8.50	12.09	15.45	27.15	40.63	71.21	90.97
	0.8	4.25	11.19	16.12	20.69	35.96	54.09	94.28	120.08
-15° C	0.07	1.32	3.35	4.73	6.02	10.66	15.89	27.96	35.80
2.8 bar	0.2	2.16	5.52	7.82	9.97	17.59	26.28	46.16	59.03
	0.4	2.89	7.50	10.69	13.67	23.97	35.91	62.87	80.27
	0.8	3.66	9.73	14.08	18.10	31.32	47.21	82.10	104.44
-20° C	0.07	1.17	2.97	4.20	5.34	9.46	14.11	24.82	31.77
2.1 bar	0.2	1.90	4.87	6.91	8.82	15.54	23.23	40.77	52.12
	0.4	2.52	6.56	9.38	12.01	21.01	31.51	55.10	70.30
	0.8	3.10	8.35	12.17	15.67	26.97	40.76	70.68	89.75
-25° C	0.07	1.03	2.62	3.70	4.72	8.35	12.45	21.90	28.03
1.6 bar	0.2	1.66	4.27	6.07	7.75	13.63	20.39	35.76	45.70
	0.4	2.17	5.69	8.16	10.46	18.24	27.40	47.84	60.98
	0.8	2.58	7.05	10.37	13.40	22.87	34.69	59.92	75.92
-30° C	0.07	0.90	2.30	3.25	4.14	7.32	10.92	19.20	24.56
2.1 bar	0.2	1.44	3.71	5.28	6.75	11.86	17.75	31.10	39.72
	0.4	1.84	4.87	7.02	9.02	15.66	23.56	41.05	52.27
	0.8	2.08	5.82	8.67	11.25	19.00	28.97	49.76	62.86
-40° C	0.07	0.68	1.73	2.45	3.12	5.51	8.22	14.44	18.47
0.38 bar	0.2	1.04	2.72	3.90	4.99	8.71	13.08	22.85	29.13
	0.4	1.25	3.41	4.99	6.44	11.03	16.70	28.89	36.65
	0.8	1.25	3.58	5.58	7.36	11.94	18.55	31.20	38.95

Capacities are based on 40°C liquid, 5°C superheat at valve inlet, and are maximum for the conditions listed. For each 5°C liquid is below 40°C, INCREASE capacity values by 7%. (*Sizing charts are also for Crankcase Pressure Regulators in sizes to 2 1/8 port only.)

NOTE: *Due to conditions encountered with refrigeration circuits utilizing hot gas for defrosting purposes, a maximum pressure drop of .20 bar should be used in the regulator selection process. If a pressure drop of more than .20 bar is considered, the regulator could become restrictive after the termination of a defrost cycle, thereby requiring an extended pull down period. The shaded areas of the suction tables designate regulator capacities above a .20 bar pressure drop, and should not be considered for these types of systems.*

A8 Pressure Regulators



Features and Benefits

- Dual range spring for flexibility in application.
- Highest capacity commercial regulator in the industry.
- Molded Class H coil construction.
- Internally pilot operated.
- Manual opening stem.
- Interchangeable capacity cartridges.
- Inlet, outlet, or differential control capability.
- Sweat-in place without disassembly.
- Inlet access fitting as standard.
- Electric shut-off and electric wide open variations.
- Excellent regulation at light loads.
- DIN coil assemblies available.

Specifications

- Control range: 10" Hg to 400 psig (250mm Hg to 27.6 bar).
- Minimum fluid temperature: -40°F (-40°C).
- Design Pressure (M.R.P.): 450 psig (31.0 bar).
- UL listed (except 50 Hz version), file # SA5473.
- CSA certified, file LR20991-14.

Standard Voltages

- 120V/60Hz, 110V/50Hz
- 240V/60Hz, 220V/50Hz
- 208V/60Hz
- 240V/60Hz, 220V/50Hz (DIN)
- 240V/50Hz (DIN)

A8 Valve Nomenclature

A8	A	BL	7/8"	1 1/8"
Valve Family	Body Size	Optional Variation (see chart)	Port Size in Inches	Connection Size in Inches

Valve Types: A8A, A81, A82. All are inlet pressure regulators.
Optional adapter functions are as follows:

"S" Suffix	Inlet Regulator with Electric Shut-Off
"B" Suffix	Inlet Regulator with Electric Bypass Feature
"L" Suffix	Differential Pressure Regulator
"BL" Suffix	Differential Regulator with Electric Bypass Feature
"OE" Suffix	Outlet Pressure Regulator
"OES" Suffix	Outlet Pressure Regulator with Electric Shut-Off

A8 Port/Connection Size Combinations

Valve Type	Port Size	Available Connection Sizes
A8A	3/8" (9mm)	5/8", 7/8", 1-1/8" (15mm, 22mm, 28mm)
A8A	5/8" (15mm)	5/8", 7/8", 1-1/8" (15mm, 22mm, 28mm)
A8A	7/8" (22mm)	7/8", 1-1/8" (22mm, 28mm)
A81	5/8" (15mm)	1-1/8", 1-3/8" (28mm, 35mm)
A81	7/8" (22mm)	1-1/8", 1-3/8", 1-5/8", 2-1/8" (28mm, 35mm, 42mm, 54mm)
A81	1-1/8" (28mm)	1-1/8", 1-3/8", 1-5/8", 2-1/8" (28mm, 35mm, 42mm, 54mm)
A81	1-3/8" (35mm)	1-1/8", 1-3/8", 1-5/8", 2-1/8" (28mm, 35mm, 42mm, 54mm)
A82	1-5/8" (42mm)	1-5/8", 2-1/8", 2-5/8" (42mm, 54mm, 66mm)
A82	2-1/8" (54mm)	1-5/8", 2-1/8", 2-5/8" (42mm, 54mm, 66mm)
A82	2-5/8" (66mm)	1-5/8", 2-1/8", 2-5/8" (42mm, 54mm, 66mm)

Description/Variations: A8 Pressure regulators can conveniently be identified by three primary types: inlet, outlet, and differential regulator versions. Inlet pressure regulators open on a rise in inlet pressure above the valves set point, and close when the inlet pressure drops below the valve's set point.

Outlet pressure regulators maintain a constant outlet or downstream pressure. Outlet regulators will open when outlet pressure falls below the valves set point and close when the outlet pressure is above it's set point.

Differential pressure regulators will open when the pressure difference across the regulator is greater than the valves set point. Conversely, they will close when the pressure difference across the valve is below the valve's set point.

In addition, these three categories of valves, inlet, outlet, and differential, can also have optional variations added to the basic regulator, such as an electric shut-off feature, or bypass (electric wide opening) feature. Please refer to the inside front cover of this condensed catalog for a complete listing of all A8 regulator variations and their typical applications.

Pressure Ranges: All A8 series inlet and outlet pressure regulators feature a wide pressure range, 10" Hg to 400 psig (250mm Hg to 27.6 bar), thus allowing flexibility in application. Differential pressure regulators offer a single range spring capable of being set within a range of 0 to 120 psig (0 to 8.3 bar). Since it is the pressure difference across the valve which is being controlled with any differential regulator version (not inlet pressure), this range is appropriate for any application, whether applied on the low side or high side of the system. For example, discharge regulators will certainly be exposed to pressures exceeding 120 psig under normal operation. However, they are most typically set to control at about a 25 psi differential for hot gas supply purposes for defrost. Since this 25 psi set point easily falls within the range of this regulator, it is an appropriate pressure range for the application.

Installation: For those A8 regulators having an intregal pilot solenoid feature, the solenoid operators utilize a spring loaded solenoid plunger design, which assists the plunger in closing off tightly against the solenoid pilot seat regardless of position or orientation. The regulator can therefore be installed in either a horizontal or vertical pipe line regardless of valve variation. Those A8 regulators that have no pilot solenoid can also be installed in a similar manner.

When brazing in line, typically a wet cloth wrapped around the valve body is recommended to dissipate heat. **If a valve is disassembled prior to installation, always have the correct gasket/ O-ring kit available for reassembly.** The internal cartridge-to-body O-ring will need to be replaced prior to reassembly.

Adjustment: Adjustment of a regulator's set point requires that the pressure being controlled be monitored by an accurate pressure gauge. Turning the valve's adjusting screw clockwise (into the bonnet) compresses the range spring and subsequently raises the valves set point. Conversely, turning the adjusting stem counter-clockwise will decrease the valve's set point. Adjusting the set point of an A8AS, A81S, or A82S regulator must be made with the solenoid energized, and the manual opening stem turned in . The adjustment of an A8AB, A81B, or A82B must be made with the solenoid de-energized, and the manual opening stem turned in.

Electrical: All A8 regulator versions utilize a molded water resistant class “H” solenoid coil with a “general purpose” coil housing as standard. A class “H” DIN coil is also available with certain voltages. Coils are designed to operate with line voltage from 85% to 110% of rated coil voltage. Operating with a coil voltage above or below these limits may result in coil burnout. Also, operating with a coil voltage below this limit will result in lowering the valves' maximum opening pressure differential, or MOPD.

Ordering Guide: Specify valve type, port and connection size, and voltage, if applicable.

NOTE: For A8 valve suction capacity tables, please reference pages 290-297 of this catalog.

A9 Pressure Regulators

Features and Benefits

- Pilot operated for precise control of set point.
- External or internal equalizer.
- Available with integral electric shut-off.
- Sweat-in place without disassembly.
- Molded class H coil construction.
- DIN coil assemblies available.

Specifications

- Two pressure ranges:
  Range A = 10" Hg vacuum to 120 psig
  (250 mm hg to 8.3 bar) *(hot gas bypass range).*
  Range B = 80 psig to 220 psig (5.6 to 15.2 bar)
  (typical application - receiver pressure regulator).
- Minimum fluid temperature: -40° F (-40° C).
- Design pressure (M.R.P.): 450 psig (31.0 bar)
- All models UL listed, file # SA5473.
- CSA certified A9S & A9SE, file # LR20991-14.

A9 Valve Nomenclature

A9	S	E	5/8"	7/8"
Valve Family	Integral Solenoid/ Electric Shut-Off	Externally Equalized	Port Size in Inches	Connection Size in Inches

A9	Outlet Pressure Regulator
A9S	Outlet Pressure Regulator with Electric Shut-Off Feature
A9E	Externally Equalized Outlet Pressure Regulator
A9SE	Externally Equalized Outlet Pressure Regulator with Electric Shut-Off Feature

A9 Port/Connection Size Combinations

Port Size	Available Connection Sizes
3/8" (9mm)	5/8", 7/8", 1-1/8" (15mm, 22mm, 28mm)
5/8" (15mm)	5/8", 7/8", 1-1/8" (15mm, 22mm, 28mm)
7/8" (22mm)	5/8", 7/8", 1-1/8" (15mm, 22mm, 28mm)
1-1/8" (28mm)	1-1/8" (28mm)

Description: The A9 family of pilot operated outlet pressure regulators are ductile iron bodied valves with brazed copper couplings. The A9 is "internally equalized" to outlet pressure by means of a small channel or passage drilled through the outlet of the adapter which effectively communicates downstream pressure to the pilot section of the valve. The regulator therefore reacts to and controls the immediate outlet pressure of the control valve. When used as a receiver pressure regulator, range "B" should be designated when ordering.

The A9E is an "externally equalized" outlet pressure regulator and is usually applied as a hot gas bypass regulator. For those applications where the discharge gas is introduced into the inlet of the evaporator, an A9E is typically used with a small pilot line connected from the compressor suction to the external fitting on the regulator. Installed in this manner the valve senses and responds to compressor suction pressure while piped to feed discharge gas to the inlet of the evaporator. Since it is the suction pressure that the regulator is responding to and ultimately controlling, a range "A" regulator should be designated when ordering an A9E or A9SE for this application.

Standard Voltages

- 120V/60Hz, 110V/50Hz
- 240V/60Hz, 220V/50Hz
- 208V/60Hz
- 240V/60Hz, 220V/50Hz (DIN)
- 240V/50Hz (DIN)



Installation: A9 regulators can be mounted either in a vertical or horizontal line with the refrigerant flow in the direction of the arrow on the body. These regulators may be soldered into the line without disassembly. A wet cloth should be wrapped around the valve and the soldering flame should be directed away from the valve body.

Adjustment: Loosen the adjusting stem seal nut and turn the adjusting stem clockwise to raise the set point of the regulator. Turn the adjusting stem counter clockwise (into the bonnet) compresses the range spring and subsequently raises the valve's set point. Conversely, turning the adjusting stem counterclockwise will decrease the valve's set point. For a range "A" valve, one complete turn of the adjusting stem will result in a change in set point of about 16 psi (1.1 bar). One complete turn of the adjusting stem on a range "B" regulator will change the set point approximately 25psi (1.7 bar). The set point adjustment of an A9S or A9SE must be made with the pilot solenoid energized.

Electrical: A9S and A9SE regulators utilize a molded water resistant Class "H" solenoid coil with a general purpose coil housing which meets NEMA 3R and 4 requirements. A class "H" DIN coil is also available with certain voltages. Power consumption during normal operation will be 11 watts or less. The coils are designed to operate with a line voltage from 85% to 110% of rated coil voltage. Operating with a line voltage above or below these limits may result in coil burn out.

Ordering Guide: Specify valve type, range, port and connection size. If shut off ("S") variation is included, specify voltage and frequency.

CK4 Check Valve

Features and Benefits

- Spring-loaded, in-line check valve.
- Compact size, mounts in any position.
- A minimum pressure difference of .75 psi (.05 bar) required to fully open valve.
- Several ODS connection sizes available for most port size valves.
- Positive spring closing action.
- Lapped, metal to metal stainless steel or chrome plated seat.
- Various flanged connections available.

Specifications

- Design pressure (MRP): 500 psig, (32 bar).
- Minimum fluid temperature: -40°F (-40°C).
- UL listed, file # SA5473.
- CSA certified, file # LR20991-14.

CK4 Valve Nomenclature

CK	4A	4
Check Valve	Flanged Body Style	Port Size

CK4 Port/Connection Size Combinations

Valve Type	Port Size	Available ODS Flange Connection Sizes
CK4A-2	1/2" (13mm)	1/2", 5/8", 7/8" (13mm, 15mm, 22mm)
CK4A-3	3/4" (20mm)	7/8", 1-1/8", 1-3/8" (22mm, 28mm, 35mm)
CK4A-4	1" (25mm)	1-1/8", 1-3/8", 1-5/8" (28mm, 35mm, 42mm)
CK4A-6	1-1/4" (32mm)	1-3/8", 1-5/8", 2-1/8" (35mm, 42mm, 54mm)
CK4A-8	2" (50mm)	1-5/8", 2-1/8", 2-5/8" (42mm, 54mm, 66mm)
CK4A-9	2-1/2" (65mm)	2-5/8", 3-1/8" (66mm, 78mm)
CK4A-0	3" (75mm)	3-1/8", 3-5/8" (78mm, 91mm)
CK4A-16	4" (100mm)	4-1/8" (103mm)



Description: CK4A check valves allow flow in one direction only, and will prevent backward flow of refrigerant should the outlet pressure increase even slightly above the valve's inlet pressure. The CK4A check valve is a flanged spring closing valve which utilizes a corrosion resistant, stainless steel or chrome plated lapped seat. This material and type of construction ensures reliable closing action and minimum seat leakage.

Typical applications for large commercial refrigeration systems include condenser liquid drain check valves, and condenser bypass lines. As a bypass check valve, it is usually installed downstream of a receiver pressure regulator. In this application, the CK4A check valve prevents back-flow through the receiver pressure regulator and into the discharge line in the event of a system shut-down.

CK4A check valves utilize mating flanges. In most instances, ODS flanges with copper couplings provide various connection sizes to match the valve to the line. The flanges used are two bolt refrigeration style (tongue and groove) on all valves up to and including 1" (25mm) port size, and four bolt on 1-1/4" (32mm) through 4" (100mm) port size.

Installation: Because of their spring closing construction, CK4A check valves can be mounted in any position in either a vertical or horizontal line. The valve must be installed with the arrow pointing in the direction of flow. After installing the CK4A between it's flanges, tighten the flange bolts evenly.

Ordering Guide: Specify the CK4A port size and the connection size of the ODS flange.

CK4A Liquid Drain Capacities (Tons) R22

Cond Temp Sat pres (psig)	Evap Temp	Pres Drop psi	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
75° F (132)	-40° F	0.75	9.9	20.7	37.9	55.3	134.0	203.8	326.2	611.5
		3	19.8	41.4	75.7	110.7	267.9	407.7	652.3	1223.1
	0° F	0.75	10.5	21.9	40.1	58.6	141.9	216.0	345.6	648.0
		3	21.0	43.8	80.2	117.3	283.9	432.0	691.2	1295.9
	40° F	0.75	11.0	23.0	42.1	61.6	149.0	226.8	362.8	680.3
		3	22.0	46.0	84.2	123.1	298.0	453.6	725.7	1360.7
95° F (182)	-40° F	0.75	8.9	18.6	34.1	49.9	120.7	183.7	294.0	551.2
		3	17.8	37.3	68.2	99.7	241.5	367.5	587.9	1102.4
	0° F	0.75	9.5	19.8	36.3	53.1	128.6	195.7	313.0	587.0
		3	19.0	39.7	72.7	106.2	257.1	391.3	626.1	1173.9
	40° F	0.75	10.0	20.9	38.3	56.0	135.5	206.2	330.0	618.7
		3	20.0	41.8	76.6	112.0	271.1	412.5	660.0	1237.5
115° F (243)	-40° F	0.75	7.9	16.6	30.3	44.3	107.3	163.2	261.2	489.7
		3	15.9	33.1	60.6	88.6	214.5	326.5	522.4	979.4
	0° F	0.75	8.5	17.7	32.5	47.5	115.0	174.9	279.9	524.8
		3	17.0	35.5	65.0	95.0	229.9	349.9	559.8	1049.6
	40° F	0.75	9.0	18.8	34.4	50.3	121.8	185.3	296.5	555.9
		3	18.0	37.6	68.8	100.6	243.5	370.6	593.0	1111.8

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Tons) R134a

Cond Temp (Sat pres) psig	Evap Temp	Pres Drop psi	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
75° F (78.6)	-40° F	0.75	8.9	18.6	34.1	49.8	120.6	183.5	293.6	550.5
		3	17.8	37.2	68.2	99.6	241.2	367.0	587.2	1101.0
	0° F	0.75	9.7	20.4	37.3	54.5	131.9	200.7	321.1	602.0
		3	19.5	40.7	74.5	108.9	263.7	401.3	642.1	1204.0
	40° F	0.75	10.5	22.0	40.3	58.9	142.7	217.2	347.5	651.5
		3	21.1	44.1	80.7	117.9	285.4	434.3	695.0	1303.0
95° F (113.8)	-40° F	0.75	7.9	16.4	30.0	43.9	106.2	161.7	258.6	485.0
		3	15.7	32.8	60.0	87.8	212.5	323.3	517.3	969.9
	0° F	0.75	8.7	18.1	33.2	48.5	117.3	178.5	285.6	535.6
		3	17.3	36.2	66.3	96.9	234.6	357.0	571.3	1071.1
	40° F	0.75	9.5	19.8	36.2	52.9	128.0	194.8	311.6	584.2
		3	18.9	39.5	72.3	105.7	256.0	389.5	623.2	1168.5
115° F (158.4)	-40° F	0.75	6.8	14.2	25.9	37.9	91.7	139.5	223.2	418.6
		3	13.6	28.3	51.8	75.7	183.4	279.0	446.5	837.1
	0° F	0.75	7.6	15.8	29.0	42.4	102.6	156.1	249.7	468.2
		3	15.2	31.7	58.0	84.7	205.1	312.1	499.4	936.4
	40° F	0.75	8.4	17.4	31.9	46.7	113.0	172.0	275.2	516.0
		3	16.7	34.9	63.9	93.4	226.0	344.0	550.4	1031.9

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Kilowatts) R22

Cond Temp (Sat pres) bar	Evap Temp	Pres Drop bar	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
25° C (9.2)	-40° C	0.05	33.7	70.3	128.8	188.2	455.6	693.3	1109.2	2079.8
		0.21	69.0	144.1	263.9	385.6	933.7	1420.8	2273.3	4262.4
	-20° C	0.05	35.5	74.1	135.8	198.4	480.4	731.0	1169.7	2193.1
		0.21	72.8	152.0	278.2	406.7	984.5	1498.2	2397.1	4494.6
	0° C	0.05	37.2	77.6	142.1	207.7	502.8	765.1	1224.2	2295.4
		0.21	76.2	159.0	291.2	425.6	1030.4	1568.0	2508.8	4704.1
30° C (10.9)	-40° C	0.05	32.2	67.2	123.0	179.7	435.1	662.1	1059.3	1986.2
		0.21	65.9	137.6	252.0	368.3	891.6	1356.8	2170.9	4070.4
	-20° C	0.05	34.0	71.0	129.9	189.9	459.7	699.5	1119.2	2098.5
		0.21	69.6	145.4	266.2	389.1	942.1	1433.6	2293.7	4300.7
	0° C	0.05	35.6	74.4	136.2	199.0	481.9	733.3	1173.3	2199.9
		0.21	73.0	152.4	279.1	407.9	987.6	1502.8	2404.6	4508.5
35° C (12.6)	-40° C	0.05	30.6	64.0	117.1	171.2	414.4	630.6	1009.0	1891.8
		0.21	62.8	131.1	240.0	350.8	849.3	1292.3	2067.7	3877.0
	-20° C	0.05	32.4	67.7	124.0	181.2	438.8	667.7	1068.4	2003.2
		0.21	66.5	138.8	254.1	371.4	899.3	1368.5	2189.5	4105.4
	0° C	0.05	34.1	71.1	130.2	190.3	460.8	701.3	1122.0	2103.8
		0.21	69.8	145.8	266.9	390.1	944.4	1437.2	2299.4	4311.5

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Kilowatts) R134a

Cond Temp (Sat pres) bar	Evap Temp	Pres Drop bar	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
25° C (5.5)	-40° C	0.05	30.2	63.1	115.4	168.7	408.5	621.6	994.6	1864.9
		0.21	61.9	129.2	236.6	345.8	837.2	1273.9	2038.3	3821.8
	-20° C	0.05	32.8	68.4	125.3	183.2	443.5	674.8	1079.7	2024.5
		0.21	67.2	140.3	256.8	375.4	908.8	1383.0	2212.8	4149.0
	0° C	0.05	35.3	73.7	134.9	197.1	477.3	726.3	1162.0	2178.8
		0.21	72.3	151.0	276.4	404.0	978.1	1488.4	2381.5	4465.3
30° C (6.7)	-40° C	0.05	28.5	59.6	109.1	159.5	386.2	587.7	940.3	1763.1
		0.21	58.5	122.2	223.7	326.9	791.5	1204.4	1927.0	3613.2
	-20° C	0.05	31.1	65.0	118.9	173.8	420.9	640.5	1024.8	1921.5
		0.21	63.8	133.1	243.8	356.3	862.6	1312.6	2100.2	3937.9
	0° C	0.05	33.6	70.1	128.4	187.7	454.4	691.5	1106.5	2074.6
		0.21	68.8	143.8	263.2	384.7	931.3	1417.3	2267.6	4251.8
35° C (7.8)	-40° C	0.05	26.9	56.1	102.8	150.3	363.8	553.6	885.7	1660.7
		0.21	55.1	115.1	210.7	307.9	745.5	1134.5	1815.2	3403.4
	-20° C	0.05	29.4	61.5	112.5	164.5	398.2	606.0	969.5	1817.9
		0.21	60.3	126.0	230.6	337.1	816.1	1241.8	1986.9	3725.5
	0° C	0.05	31.9	66.6	121.9	178.2	431.5	656.6	1050.6	1969.8
		0.21	65.4	136.5	249.9	365.2	884.3	1345.6	2153.0	4036.9

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Tons) R404a

Cond Temp (Sat pres) psig	Evap Temp	Pres Drop psi	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
75° F (161.2)	-40° F	0.75	6.6	13.8	25.3	37.0	89.6	136.3	218.0	408.8
		3	13.2	27.6	50.6	74.0	179.1	272.6	436.1	817.7
	0° F	0.75	7.4	15.5	28.3	41.4	100.3	152.6	244.1	457.7
		3	14.8	31.0	56.7	82.8	200.5	305.2	488.2	915.5
	40° F	0.75	8.1	17.0	31.1	45.5	110.1	167.6	268.1	502.7
		3	16.3	34.0	62.2	91.0	220.2	335.2	536.2	1005.5
95° F (219.4)	-40° F	0.75	5.5	11.5	21.0	30.7	74.3	113.0	180.8	339.1
		3	11.0	22.9	42.0	61.4	148.6	226.1	361.7	678.2
	0° F	0.75	6.3	13.1	23.9	35.0	84.7	128.9	206.3	386.8
		3	12.5	26.2	47.9	70.0	169.4	257.8	412.6	773.5
	40° F	0.75	7.0	14.6	26.7	39.0	94.3	143.5	229.7	430.6
		3	13.9	29.1	53.3	77.9	188.7	287.1	459.3	861.3
115° F (290.9)	-40° F	0.75	4.3	9.0	16.4	24.0	58.2	88.5	141.7	265.6
		3	8.6	18.0	32.9	48.1	116.4	177.1	283.3	531.2
	0° F	0.75	5.0	10.5	19.3	28.2	68.3	103.9	166.3	311.8
		3	10.1	21.1	38.6	56.4	136.6	207.8	332.6	623.5
	40° F	0.75	5.7	12.0	21.9	32.1	77.6	118.1	188.9	354.3
		3	11.5	24.0	43.9	64.1	155.2	236.2	377.9	708.5

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Tons) R507

Cond Temp (Sat pres) psig	Evap Temp	Pres Drop psi	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
75° F (167.0)	-40° F	0.75	6.6	13.7	25.1	36.6	88.7	134.9	215.9	404.8
		3	13.1	27.4	50.1	73.2	177.3	269.8	431.7	809.5
	0° F	0.75	7.3	15.2	27.9	40.7	98.6	150.1	240.2	450.3
		3	14.6	30.5	55.8	81.5	197.3	300.2	480.4	900.7
	40° F	0.75	8.0	16.7	30.5	44.6	108.1	164.5	263.1	493.4
		3	16.0	33.4	61.1	89.3	216.1	328.9	526.2	986.7
95° F (226.0)	-40° F	0.75	5.5	11.6	21.2	30.9	74.9	114.0	182.3	341.9
		3	11.1	23.1	42.3	61.9	149.8	227.9	364.7	683.8
	0° F	0.75	6.3	13.1	23.9	35.0	84.6	128.8	206.0	386.3
		3	12.5	26.1	47.8	69.9	169.3	257.6	412.1	772.7
	40° F	0.75	6.9	14.5	26.5	38.7	93.8	142.8	228.4	428.3
		3	13.9	29.0	53.0	77.5	187.6	285.5	456.8	856.5
115° F (301.0)	-40° F	0.75	4.5	9.3	17.1	25.0	60.5	92.1	147.3	276.2
		3	8.9	18.7	34.2	50.0	121.0	184.2	294.7	552.5
	0° F	0.75	5.2	10.8	19.8	28.9	69.9	106.4	170.3	319.3
		3	10.3	21.6	39.5	57.8	139.9	212.9	340.6	638.7
	40° F	0.75	5.8	12.2	22.3	32.6	78.9	120.0	192.0	360.0
		3	11.7	24.3	44.6	65.1	157.7	240.0	384.0	719.9

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Kilowatts) R404a

Cond Temp (Sat pres) bar	Evap Temp	Pres Drop bar	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
25° C (11.2)	-40° C	0.05	22.2	46.4	85.0	124.3	300.9	457.9	732.6	1373.6
		0.21	45.6	95.2	174.3	254.7	616.6	938.4	1501.4	2815.1
	-20° C	0.05	24.7	51.6	94.4	138.0	334.1	508.5	813.6	1525.4
		0.21	50.6	105.7	193.5	282.8	684.8	1042.1	1667.3	3126.2
	0° C	0.05	27.0	56.4	103.2	150.8	365.1	555.6	889.0	1666.9
		0.21	55.3	115.5	211.5	309.1	748.3	1138.7	1822.0	3416.2
30° C (13.1)	-40° C	0.05	20.5	42.8	78.4	114.5	277.3	421.9	675.1	1265.8
		0.21	42.0	87.7	160.6	234.7	568.2	864.7	1383.5	2594.1
	-20° C	0.05	22.9	47.9	87.7	128.1	310.2	472.0	755.2	1415.9
		0.21	47.0	98.1	179.6	262.5	635.6	967.3	1547.6	2901.8
	0° C	0.05	25.2	52.6	96.3	140.8	340.8	518.6	829.8	1555.9
		0.21	51.6	107.8	197.4	288.5	698.5	1062.9	1700.6	3188.6
35° C (15.1)	-40° C	0.05	18.7	39.1	71.5	104.6	253.2	385.2	616.4	1155.7
		0.21	38.3	80.1	146.6	214.3	518.8	789.5	1263.2	2368.6
	-20° C	0.05	21.1	44.1	80.7	118.0	285.6	434.7	695.5	1304.0
		0.21	43.3	90.4	165.4	241.8	585.4	890.8	1425.3	2672.5
	0° C	0.05	23.4	48.8	89.3	130.5	315.9	480.8	769.2	1442.3
		0.21	47.9	99.9	183.0	267.4	647.5	985.3	1576.5	2955.9

NOTE: Shading is for readability purposes only.

CK4A Liquid Drain Capacities (Kilowatts) R507

Cond Temp (Sat pres) bar	Evap Temp	Pres Drop bar	CK4A2 1/2" 13 mm	CK4A3 3/4" 20 mm	Ck4A4 1" 25 mm	CK4A6 1-1/4" 32 mm	CK4A8 2" 50 mm	CK4A9 2-1/2" 65 mm	CK4A0 3" 75 mm	CK4A16 4" 100 mm
25° C (11.6)	-40° C	0.05	22.1	46.1	84.3	123.3	298.5	454.2	726.7	1362.5
		0.21	45.2	94.4	172.9	252.6	611.6	930.8	1489.2	2792.3
	-20° C	0.05	24.3	50.8	93.1	136.0	329.4	501.2	802.0	1503.7
		0.21	49.9	104.2	190.8	278.8	675.0	1027.2	1643.5	3081.7
	0° C	0.05	26.5	55.4	101.4	148.2	358.8	546.0	873.6	1637.9
		0.21	54.3	113.5	207.8	303.7	735.3	1118.9	1790.3	3356.8
30° C (13.5)	-40° C	0.05	20.5	42.8	78.3	114.5	277.1	421.7	674.7	1265.1
		0.21	42.0	87.7	160.5	234.6	567.9	864.2	1382.8	2592.7
	-20° C	0.05	22.7	47.5	87.0	127.1	307.7	468.2	749.2	1404.7
		0.21	46.6	97.3	178.2	260.5	630.6	959.6	1535.4	2878.8
	0° C	0.05	24.9	52.0	95.2	139.1	336.8	512.5	820.0	1537.5
		0.21	51.0	106.5	195.1	285.1	690.2	1050.3	1680.5	3150.9
35° C (15.6)	-40° C	0.05	18.9	39.4	72.2	105.5	255.5	388.8	622.1	1166.5
		0.21	38.7	80.8	148.0	216.3	523.7	796.9	1275.0	2390.6
	-20° C	0.05	21.1	44.1	80.8	118.0	285.7	434.8	695.7	1304.5
		0.21	43.3	90.4	165.5	241.9	585.6	891.1	1425.8	2673.4
	0° C	0.05	23.2	48.5	88.9	129.9	314.5	478.5	765.7	1435.6
		0.21	47.6	99.5	182.1	266.2	644.5	980.7	1569.2	2942.2

NOTE: Shading is for readability purposes only.

Condenser Pressure Control

For Air Cooled Condensers

Parker Refrigerating Specialties and Flo-Con regulators provide the wide range of adjustment of condenser and receiver pressures required for the most efficient operation of large air-cooled condenser systems. The regulators are an integral part of the refrigeration system and provide direct control of condenser and receiver pressures to achieve satisfactory system operation with minimum energy consumption.

Condenser pressure control is needed for one or more of the following reasons:

1. To maintain sufficient receiver pressure to insure flow of an adequate amount of liquid to the evaporator for proper temperature control and adequate refrigeration capacity.
2. To permit start up during cold weather conditions by quickly developing adequate receiver pressure.
3. To provide an ample supply of hot gas for defrosts, reheat or heat reclamation systems.
4. To prevent flash gas in the liquid lines. With no pressure control, at very low ambient temperatures the cold liquid may be at almost saturated conditions because of the low condensing pressure. The lack of sub-cooling may cause the liquid to evaporate when the liquid lines pass through warm areas or where pressure drops take place (filters, valves, etc.). The presence of flash vapor would affect the performance of expansion valves, eroding seats, causing irregular flow, and reducing capacity.

Types of systems

Two systems of variable condenser pressure control are shown on the opposite page. Figure 1 shows a Liquid Drain Control Method using a regulator in the liquid line to provide the desired condenser pressure. This method is ideal for large capacity systems since a smaller regulator is required for liquid line than for discharge line.

Figure 2 shows a Discharge Gas Control Method using a regulator in the discharge line. In both cases a bypass regulator is used to control the receiver pressure by feeding it with high-pressure gas as necessary.

This method is particularly suitable for systems requiring hot gas defrost, heat reclaim, and for ease of start up of systems with a cold receiver.

Valve Functions

Valve A in Figure 1 is an Inlet Pressure Regulator in the liquid drain line from the condenser, and senses the condenser pressure. The regulator closes as the condenser pressure drops below the set point, thus back flooding the condenser and reducing the inside surface area available for condensing.

Valve B in Figures 1 and 2 is an Outlet Pressure Regulator in the bypass line from compressor discharge to the condenser liquid drain line. This valve senses the receiver pressure and opens when the pressure drops below the set point, thus maintaining the receiver pressure.

Valve C in Figures 1 and 2 is an In-line Check valve in the liquid drain line to prevent higher pressure from backing up into the condenser during low ambient conditions when the compressor is idle.

Valve D in Figure 2 is an Inlet Pressure Regulator in the compressor discharge line. This regulator senses the discharge pressure and closes as the pressure drops below the set point, thus maintaining the discharge pressure at the desired level.

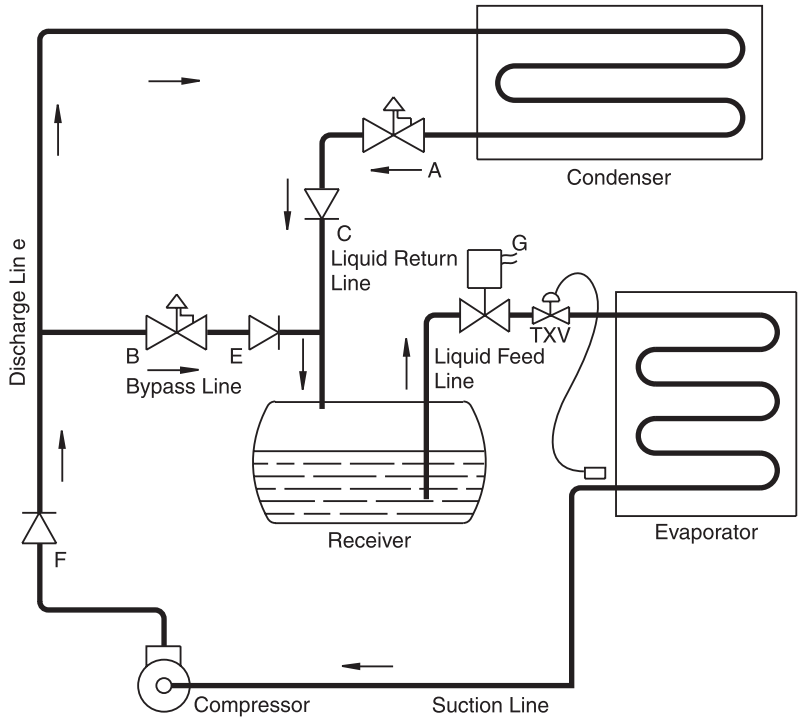


Figure 1 *— Liquid drain method, condenser pressure control. (See page 346 for symbol legend.)*

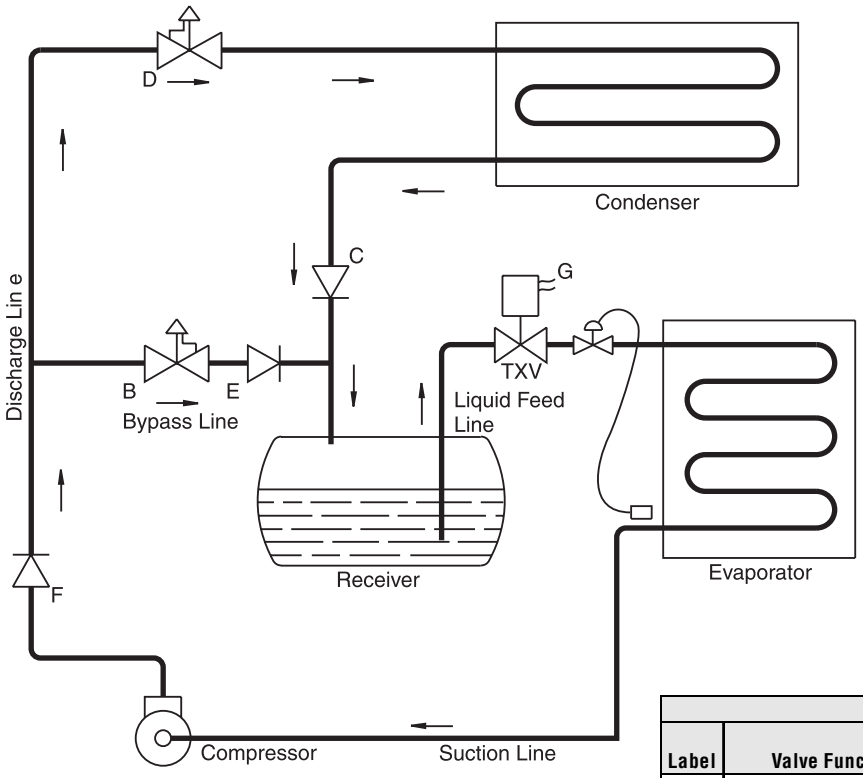


Figure 2 *— Discharge gas control method, condenser pressure control. (See page 346 for symbol legend.)*

Valve Legend				
Label	Valve Function	Application	Design	Selection Page
A	Inlet Pressure Regulator	Liquid Drain	A8	308-311
B	Outlet Pressure Regulator	Condenser Bypass	A9 or A8_OE	328-335
C	Check Valve	Liquid Drain	CK4A	320-327
D	Inlet Pressure Regulator	Discharge Pressure	A8	312-319
E	Check Valve	Condenser Bypass	CK4A	320-327
F	Check Valve	Compressor Discharge	CK4A	320-327
G	Solenoid Valve	Liquid Feed	SC	343

A8 Liquid Drain Capacities (Tons) R22

Cond Temp (Sat pres) psig	Evap Temp (Sat Pres) psig	Pres Drop psi	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	3	8.7	22.1	31.2	39.7	70.4	104.8	184.6	236.5
(132)	(0.5)	6	12.4	31.3	44.1	56.1	99.5	148.3	261.1	334.4
	0° F	3	9.3	23.5	33.0	42.0	74.5	111.1	195.6	250.5
	(24.0)	6	13.1	33.2	46.7	59.4	105.4	157.1	276.7	354.3
	40° F	3	9.7	24.6	34.7	44.1	78.3	116.6	205.4	263.1
	(68.5)	6	13.7	34.8	49.0	62.4	110.7	164.9	290.5	372.0
95° F	-40° F	3	7.9	19.9	28.1	35.7	63.4	94.5	166.4	213.1
(182)	(0.5)	6	11.1	28.2	39.7	50.6	89.7	133.6	235.3	301.4
	0° F	3	8.4	21.2	29.9	38.1	67.5	100.6	177.2	227.0
	(24.0)	6	11.9	30.0	42.3	53.8	95.5	142.3	250.6	321.0
	40° F	3	8.8	22.4	31.5	40.1	71.2	106.1	186.8	239.2
	(68.5)	6	12.5	31.7	44.6	56.8	100.7	150.0	264.2	338.3
115° F	-40° F	3	7.0	17.7	25.0	31.8	56.3	84.0	147.9	189.4
(243)	(0.5)	6	9.9	25.1	35.3	44.9	79.7	118.7	209.1	267.8
	0° F	3	7.5	19.0	26.7	34.0	60.4	90.0	158.4	202.9
	(24.0)	6	10.6	26.9	37.8	48.1	85.4	127.2	224.1	287.0
	40° F	3	7.9	20.1	28.3	36.1	64.0	95.3	167.8	215.0
	(68.5)	6	11.2	28.5	40.1	51.0	90.4	134.8	237.4	304.0

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Tons) R134a

Cond Temp (Sat pres) psig	Evap Temp (Sat Pres) psig	Pres Drop psi	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	3	7.9	19.9	28.0	35.7	63.3	94.4	166.2	212.9
(78.6)	(14.7 in. hg)	6	11.1	28.2	39.7	50.5	89.6	133.5	235.0	301.0
	0° F	3	8.6	21.8	30.7	39.0	69.3	103.2	181.7	232.8
	(6.5)	6	12.2	30.8	43.4	55.2	97.9	145.9	257.0	329.2
	40° F	3	9.3	23.6	33.2	42.3	75.0	111.7	196.7	251.9
	(35.1)	6	13.2	33.3	46.9	59.8	106.0	158.0	278.2	356.3
95° F	-40° F	3	6.9	17.6	24.7	31.5	55.8	83.1	146.4	187.5
(113.8)	(14.7 in. hg)	6	9.8	24.8	34.9	44.5	78.9	117.6	207.1	265.2
	0° F	3	7.7	19.4	27.3	34.7	61.6	91.8	161.7	207.1
	(6.5)	6	10.8	27.4	38.6	49.1	87.1	129.8	228.7	292.9
	40° F	3	8.3	21.1	29.8	37.9	67.2	100.2	176.4	225.9
	(35.1)	6	11.8	29.9	42.1	53.6	95.1	141.6	249.5	319.5
115° F	-40° F	3	6.0	15.1	21.3	27.1	48.2	71.8	126.4	161.8
(158.4)	(14.7 in. hg)	6	8.5	21.4	30.2	38.4	68.1	101.5	178.7	228.9
	0° F	3	6.7	16.9	23.9	30.4	53.9	80.3	141.4	181.0
	(6.5)	6	9.5	24.0	33.7	42.9	76.2	113.5	199.9	256.0
	40° F	3	7.4	18.7	26.3	33.5	59.4	88.5	155.8	199.5
	(35.1)	6	10.4	26.4	37.2	47.3	83.9	125.1	220.3	282.1

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Kilowatts) R22

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Pres Drop bar	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	0.2	29.7	75.3	106.0	134.9	239.3	356.5	627.9	804.2
(9.2)	(0.0)	0.4	42.0	106.4	149.9	190.8	338.4	504.2	888.0	1137.3
	-20° C	0.2	31.3	79.4	111.7	142.2	252.3	376.0	662.1	848.0
	(1.4)	0.4	44.3	112.2	158.0	201.2	356.8	531.7	936.4	1199.3
	0° C	0.2	32.8	83.1	117.0	148.9	264.1	393.5	693.0	887.5
	(4.0)	0.4	46.4	117.5	165.4	210.5	373.5	556.5	980.0	1255.2
30° C	-40° C	0.2	28.4	71.9	101.2	128.8	228.5	340.5	599.6	768.0
(10.9)	(0.0)	0.4	40.1	101.7	143.1	182.2	323.2	481.5	848.0	1086.1
	-20° C	0.2	30.0	75.9	106.9	136.1	241.4	359.8	633.6	811.4
	(1.4)	0.4	42.4	107.4	151.2	192.5	341.4	508.8	896.0	1147.5
	0° C	0.2	31.4	79.6	112.1	142.7	253.1	377.1	664.2	850.6
	(4.0)	0.4	44.4	112.6	158.5	201.8	357.9	533.3	939.3	1203.0
35° C	-40° C	0.2	27.0	68.5	96.4	122.7	217.6	324.3	571.1	731.5
(12.6)	(0.0)	0.4	38.2	96.8	136.3	173.5	307.8	458.6	807.7	1034.5
	-20° C	0.2	28.6	72.5	102.1	129.9	230.5	343.4	604.8	774.6
	(1.4)	0.4	40.5	102.5	144.3	183.7	325.9	485.7	855.3	1095.4
	0° C	0.2	30.1	76.1	107.2	136.4	242.0	360.6	635.1	813.5
	(4.0)	0.4	42.5	107.7	151.6	193.0	342.3	510.0	898.2	1150.4

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Kilowatts) R134a

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Pres Drop bar	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	0.2	26.6	67.5	95.0	120.9	214.5	319.7	563.0	721.1
(5.5)	(373 mm hg)	0.4	37.7	95.4	134.4	171.0	303.4	452.1	796.2	1019.8
	-20° C	0.2	28.9	73.3	103.2	131.3	232.9	347.1	611.2	782.8
	(91.4 mm hg)	0.4	40.9	103.6	145.9	185.7	329.4	490.8	864.4	1107.1
	0° C	0.2	31.1	78.9	111.0	141.3	250.7	373.5	657.8	842.5
	(1.9)	0.4	44.0	111.5	157.0	199.8	354.5	528.2	930.3	1191.5
30° C	-40° C	0.2	25.2	63.8	89.8	114.3	202.8	302.2	532.3	681.7
(6.7)	(373 mm hg)	0.4	35.6	90.2	127.0	161.7	286.9	427.4	752.7	964.1
	-20° C	0.2	27.5	69.5	97.9	124.6	221.1	329.4	580.1	743.0
	(91.4 mm hg)	0.4	38.8	98.3	138.5	176.2	312.6	465.8	820.4	1050.7
	0° C	0.2	29.6	75.1	105.7	134.6	238.7	355.7	626.3	802.2
	(1.9)	0.4	41.9	106.2	149.5	190.3	337.5	503.0	885.8	1134.5
35° C	-40° C	0.2	23.7	60.1	84.6	107.7	191.1	284.7	501.4	642.1
(7.8)	(373 mm hg)	0.4	33.6	85.0	119.7	152.3	270.2	402.6	709.1	908.1
	-20° C	0.2	26.0	65.8	92.6	117.9	209.1	311.6	548.8	702.9
	(91.4 mm hg)	0.4	36.7	93.0	131.0	166.7	295.8	440.7	776.2	994.1
	0° C	0.2	28.1	71.3	100.4	127.8	226.6	337.7	594.7	761.7
	(1.9)	0.4	39.8	100.8	141.9	180.7	320.5	477.6	841.0	1077.2

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Tons) R404a

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Pres Drop psi	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	3	5.8	14.8	20.8	26.5	47.0	70.1	123.4	158.1
(161.2)	(2.7)	6	8.3	20.9	29.5	37.5	66.5	99.1	174.6	223.6
	0° F	3	6.5	16.6	23.3	29.7	52.7	78.5	138.2	177.0
	(33.5)	6	9.2	23.4	33.0	42.0	74.5	111.0	195.4	250.3
	40° F	3	7.2	18.2	25.6	32.6	57.8	86.2	151.8	194.4
	(86.4)	6	10.2	25.7	36.2	46.1	81.8	121.9	214.6	274.9
95° F	-40° F	3	4.8	12.3	17.3	22.0	39.0	58.1	102.4	131.1
(219.4)	(2.7)	6	6.9	17.4	24.4	31.1	55.2	82.2	144.8	185.4
	0° F	3	5.5	14.0	19.7	25.1	44.5	66.3	116.8	149.5
	(33.5)	6	7.8	19.8	27.9	35.5	62.9	93.8	165.1	211.5
	40° F	3	6.2	15.6	21.9	27.9	49.5	73.8	130.0	166.5
	(86.4)	6	8.7	22.0	31.0	39.5	70.1	104.4	183.9	235.5
115° F	-40° F	3	3.8	9.6	13.5	17.2	30.6	45.5	80.2	102.7
(290.9)	(2.7)	6	5.4	13.6	19.1	24.4	43.2	64.4	113.4	145.2
	0° F	3	4.5	11.3	15.9	20.2	35.9	53.4	94.1	120.6
	(33.5)	6	6.3	16.0	22.5	28.6	50.7	75.6	133.1	170.5
	40° F	3	5.1	12.8	18.1	23.0	40.8	60.7	107.0	137.0
	(86.4)	6	7.2	18.1	25.5	32.5	57.6	85.9	151.3	193.7

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Tons) R507

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Pres Drop psi	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	3	5.8	14.6	20.6	26.3	46.6	69.4	122.2	156.5
(167.0)	(5.5)	6	8.2	20.7	29.2	37.1	65.9	98.1	172.8	221.3
	0° F	3	6.4	16.3	22.9	29.2	51.8	77.2	136.0	174.1
	(35.2)	6	9.1	23.0	32.5	41.3	73.3	109.2	192.3	246.3
	40° F	3	7.0	17.9	25.1	32.0	56.8	84.6	148.9	190.8
	(89.8)	6	10.0	25.3	35.6	45.3	80.3	119.6	210.6	269.8
95° F	-40° F	3	4.9	12.4	17.4	22.2	39.3	58.6	103.2	132.2
(226.0)	(5.5)	6	6.9	17.5	24.6	31.4	55.6	82.9	146.0	187.0
	0° F	3	5.5	14.0	19.7	25.1	44.4	66.2	116.6	149.4
	(35.2)	6	7.8	19.8	27.8	35.4	62.9	93.7	164.9	211.3
	40° F	3	6.1	15.5	21.8	27.8	49.3	73.4	129.3	165.6
	(89.8)	6	8.7	21.9	30.9	39.3	69.7	103.8	182.8	234.2
115° F	-40° F	3	3.9	10.0	14.1	17.9	31.8	47.4	83.4	106.8
(301.0)	(5.5)	6	5.6	14.1	19.9	25.3	44.9	67.0	117.9	151.1
	0° F	3	4.6	11.6	16.3	20.7	36.7	54.7	96.4	123.5
	(35.2)	6	6.5	16.3	23.0	29.3	52.0	77.4	136.3	174.6
	40° F	3	5.1	13.0	18.3	23.3	41.4	61.7	108.7	139.2
	(89.8)	6	7.3	18.4	25.9	33.0	58.6	87.3	153.7	196.8

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Kilowatts) R404a

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Pres Drop bar	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	0.2	19.6	49.7	70.0	89.1	158.0	235.5	414.7	531.1
(11.2)	(0.3)	0.4	27.8	70.3	99.0	126.0	223.5	333.0	586.5	751.1
	-20° C	0.2	21.8	55.2	77.7	98.9	175.5	261.5	460.5	589.8
	(2.0)	0.4	30.8	78.1	109.9	139.9	248.2	369.8	651.3	834.1
	0° C	0.2	23.8	60.3	84.9	108.1	191.8	285.8	503.3	644.6
	(4.9)	0.4	33.7	85.3	120.1	152.9	271.2	404.1	711.7	911.5
30° C	-40° C	0.2	18.1	45.8	64.5	82.1	145.6	217.0	382.2	489.4
(13.1)	(0.3)	0.4	25.6	64.8	91.2	116.1	205.9	306.9	540.4	692.2
	-20° C	0.2	20.2	51.2	72.1	91.8	162.9	242.7	427.5	547.5
	(2.0)	0.4	28.6	72.5	102.0	129.9	230.4	343.3	604.5	774.3
	0° C	0.2	22.2	56.3	79.3	100.9	179.0	266.7	469.7	601.6
	(4.9)	0.4	31.4	79.6	112.1	142.7	253.1	377.2	664.3	850.8
35° C	-40° C	0.2	16.5	41.8	58.9	75.0	133.0	198.1	348.9	446.9
(15.1)	(0.3)	0.4	23.3	59.2	83.3	106.0	188.0	280.2	493.5	632.0
	-20° C	0.2	18.6	47.2	66.4	84.6	150.0	223.6	393.7	504.2
	(2.0)	0.4	26.3	66.7	94.0	119.6	212.2	316.1	556.8	713.1
	0° C	0.2	20.6	52.2	73.5	93.5	165.9	247.3	435.4	557.7
	(4.9)	0.4	29.1	73.8	103.9	132.3	234.7	349.7	615.8	788.7

NOTE: Shading is for readability purposes only.

A8 Liquid Drain Capacities (Kilowatts) R507

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Pres Drop bar	A8 3/8" 9 mm	A8 5/8" 15 mm	A8 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	0.2	19.5	49.3	69.4	88.4	156.8	233.6	411.3	526.8
(11.6)	(0.4)	0.4	27.5	69.7	98.2	125.0	221.7	330.3	581.7	745.1
	-20° C	0.2	21.5	54.4	76.6	97.5	173.0	257.8	454.0	581.4
	(2.1)	0.4	30.4	77.0	108.4	137.9	244.7	364.6	642.0	822.3
	0° C	0.2	23.4	59.3	83.5	106.2	188.4	280.8	494.5	633.3
	(5.2)	0.4	33.1	83.8	118.0	150.2	266.5	397.1	699.3	895.7
30° C	-40° C	0.2	18.1	45.8	64.5	82.1	145.5	216.9	381.9	489.2
(13.5)	(0.4)	0.4	25.6	64.7	91.2	116.0	205.8	306.7	540.1	691.8
	-20° C	0.2	20.1	50.8	71.6	91.1	161.6	240.8	424.1	543.2
	(2.1)	0.4	28.4	71.9	101.2	128.8	228.6	340.6	599.8	768.1
	0° C	0.2	22.0	55.6	78.3	99.7	176.9	263.6	464.2	594.5
	(5.2)	0.4	31.1	78.7	110.8	141.0	250.2	372.7	656.4	840.7
35° C	-40° C	0.2	16.7	42.2	59.4	75.7	134.2	200.0	352.2	451.1
(15.6)	(0.4)	0.4	23.6	59.7	84.1	107.0	189.8	282.8	498.1	637.9
	-20° C	0.2	18.6	47.2	66.5	84.6	150.1	223.6	393.8	504.4
	(2.1)	0.4	26.4	66.8	94.0	119.6	212.2	316.3	557.0	713.3
	0° C	0.2	20.5	52.0	73.1	93.1	165.2	246.1	433.4	555.1
	(5.2)	0.4	29.0	73.5	103.4	131.7	233.6	348.0	613.0	785.0

NOTE: Shading is for readability purposes only.

A8 Discharge Capacities (Tons) R22

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	140°	3	1.5	3.8	5.3	6.8	12.0	17.9	31.4	40.2
(132)	(0.5)	180°		1.4	3.6	5.1	6.5	11.4	17.1	30.0	38.4
		220°		1.4	3.5	4.9	6.2	11.0	16.4	28.8	36.9
		140°	6	2.1	5.3	7.5	9.6	16.9	25.2	44.3	56.7
		180°		2.0	5.1	7.2	9.1	16.1	24.1	42.3	54.2
		220°		1.9	4.9	6.9	8.8	15.5	23.1	40.7	52.0
75° F	0° F	140°	3	1.6	4.0	5.6	7.2	12.7	18.9	33.3	42.6
(132)	(24.0)	180°		1.5	3.8	5.4	6.8	12.1	18.1	31.8	40.7
		220°		1.4	3.7	5.2	6.6	11.6	17.4	30.6	39.1
		140°	6	2.2	5.6	7.9	10.1	17.9	26.7	47.0	60.1
		180°		2.1	5.4	7.6	9.7	17.1	25.5	44.9	57.4
		220°		2.0	5.2	7.3	9.3	16.4	24.5	43.1	55.1
75° F	40° F	140°	3	1.6	4.2	5.9	7.5	13.3	19.9	34.9	44.7
(132)	(68.5)	180°		1.6	4.0	5.6	7.2	12.7	19.0	33.4	42.7
		220°		1.5	3.8	5.4	6.9	12.2	18.2	32.1	41.1
		140°	6	2.3	5.9	8.3	10.6	18.8	28.1	49.3	63.1
		180°		2.2	5.6	8.0	10.2	18.0	26.8	47.1	60.3
		220°		2.1	5.4	7.7	9.8	17.2	25.7	45.3	57.9
95° F	-40° F	140°	3	1.6	4.1	5.8	7.4	13.0	19.4	34.2	43.8
(182)	(0.5)	180°		1.5	3.9	5.5	7.0	12.4	18.4	32.4	41.5
		220°		1.5	3.7	5.2	6.7	11.8	17.6	31.0	39.7
		140°	6	2.3	5.8	8.2	10.4	18.4	27.5	48.3	61.8
		180°		2.2	5.5	7.7	9.9	17.5	26.1	45.8	58.6
		220°		2.1	5.2	7.4	9.4	16.7	24.9	43.8	56.1
95° F	0° F	140°	3	1.7	4.4	6.1	7.8	13.9	20.7	36.4	46.6
(182)	(24.0)	180°		1.6	4.1	5.8	7.4	13.2	19.6	34.5	44.2
		220°		1.6	4.0	5.6	7.1	12.6	18.8	33.1	42.3
		140°	6	2.4	6.2	8.7	11.1	19.6	29.2	51.4	65.8
		180°		2.3	5.8	8.2	10.5	18.6	27.7	48.8	62.4
		220°		2.2	5.6	7.9	10.1	17.8	26.5	46.7	59.7
95° F	40° F	140°	3	1.8	4.6	6.5	8.3	14.6	21.8	38.4	49.1
(182)	(68.5)	180°		1.7	4.4	6.2	7.8	13.9	20.7	36.4	46.6
		220°		1.6	4.2	5.9	7.5	13.3	19.8	34.8	44.6
		140°	6	2.5	6.5	9.2	11.7	20.7	30.8	54.2	69.4
		180°		2.4	6.2	8.7	11.1	19.6	29.2	51.4	65.8
		220°		2.3	5.9	8.3	10.6	18.8	28.0	49.2	63.0
115° F	-40° F	140°	3	1.7	4.4	6.2	7.9	14.0	20.9	36.8	47.1
(243)	(0.5)	180°		1.6	4.1	5.8	7.4	13.2	19.6	34.5	44.2
		220°		1.5	3.9	5.5	7.1	12.5	18.6	32.8	42.0
		140°	6	2.4	6.2	8.8	11.2	19.8	29.6	52.0	66.5
		180°		2.3	5.8	8.2	10.5	18.6	27.7	48.8	62.4
		220°		2.2	5.6	7.8	10.0	17.7	26.4	46.4	59.3
115° F	0° F	140°	3	1.9	4.7	6.7	8.5	15.0	22.4	39.4	50.5
(243)	(24.0)	180°		1.7	4.4	6.2	8.0	14.1	21.0	37.0	47.3
		220°		1.7	4.2	5.9	7.6	13.4	20.0	35.2	45.0
		140°	6	2.6	6.7	9.4	12.0	21.2	31.7	55.7	71.3
		180°		2.5	6.3	8.8	11.3	19.9	29.7	52.3	66.9
		220°		2.3	5.9	8.4	10.7	18.9	28.2	49.7	63.6
115° F	40° F	140°	3	2.0	5.0	7.1	9.0	15.9	23.7	41.7	53.4
(243)	(68.5)	180°		1.8	4.7	6.6	8.4	14.9	22.3	39.2	50.2
		220°		1.8	4.5	6.3	8.0	14.2	21.2	37.3	47.7
		140°	6	2.8	7.1	10.0	12.7	22.5	33.6	59.0	75.5
		180°		2.6	6.6	9.4	11.9	21.1	31.5	55.4	70.9
		220°		2.5	6.3	8.9	11.3	20.1	29.9	52.6	67.4

A8 Discharge Capacities (Kilowatts) R22

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	60°	0.2	5.1	13.0	18.4	23.4	41.5	61.9	108.9	139.4
(9.2)	(0.0)	80°		4.9	12.5	17.6	22.5	39.8	59.4	104.4	133.7
		100°		4.7	12.1	17.0	21.7	38.4	57.2	100.7	128.9
		60°	0.4	7.2	18.4	26.0	33.2	58.6	87.5	153.8	196.8
		80°		6.9	17.6	24.9	31.8	56.2	83.9	147.5	188.7
		100°		6.7	17.0	24.0	30.6	54.2	80.8	142.1	181.8
25° C	-20° C	60°	0.2	5.4	13.8	19.4	24.7	43.8	65.3	114.8	147.0
(9.2)	(1.4)	80°		5.2	13.2	18.6	23.7	42.0	62.6	110.1	141.0
		100°		5.0	12.7	17.9	22.9	40.5	60.3	106.2	135.9
		60°	0.4	7.6	19.4	27.4	35.0	61.8	92.3	162.2	207.5
		80°		7.3	18.6	26.3	33.5	59.3	88.5	155.5	198.9
		100°		7.0	17.9	25.4	32.3	57.1	85.2	149.8	191.7
25° C	0° C	60°	0.2	5.7	14.4	20.3	25.9	45.8	68.3	120.2	153.9
(9.2)	(4.0)	80°		5.4	13.8	19.5	24.8	43.9	65.5	115.3	147.6
		100°		5.2	13.3	18.8	23.9	42.3	63.1	111.1	142.2
		60°	0.4	8.0	20.3	28.7	36.6	64.7	96.6	169.7	217.2
		80°		7.6	19.5	27.5	35.1	62.0	92.6	162.7	208.2
		100°		7.4	18.8	26.5	33.8	59.8	89.2	156.8	200.7
30° C	-40° C	60°	0.2	5.3	13.6	19.1	24.4	43.2	64.3	113.2	145.0
(10.9)	(0.0)	80°		5.1	13.0	18.3	23.3	41.3	61.6	108.3	138.7
		100°		4.9	12.5	17.6	22.4	39.7	59.2	104.2	133.4
		60°	0.4	7.5	19.1	27.1	34.5	61.0	91.0	160.0	204.7
		80°		7.2	18.3	25.9	33.0	58.3	87.0	153.0	195.8
		100°		6.9	17.6	24.9	31.7	56.1	83.7	147.2	188.3
30° C	-20° C	60°	0.2	5.6	14.3	20.2	25.7	45.6	68.0	119.6	153.2
(10.9)	(1.4)	80°		5.4	13.7	19.3	24.6	43.6	65.0	114.4	146.5
		100°		5.2	13.2	18.6	23.7	42.0	62.6	110.1	141.0
		60°	0.4	7.9	20.2	28.6	36.4	64.4	96.1	169.0	216.3
		80°		7.6	19.3	27.3	34.8	61.6	91.9	161.6	206.8
		100°		7.3	18.6	26.3	33.5	59.3	88.5	155.5	199.0
30° C	0° C	60°	0.2	5.9	15.0	21.2	27.0	47.8	71.3	125.4	160.6
(10.9)	(4.0)	80°		5.7	14.4	20.3	25.8	45.7	68.2	120.0	153.6
		100°		5.4	13.8	19.5	24.8	44.0	65.6	115.4	147.8
		60°	0.4	8.3	21.2	30.0	38.2	67.5	100.8	177.2	226.7
		80°		8.0	20.3	28.7	36.5	64.6	96.4	169.5	216.8
		100°		7.7	19.5	27.6	35.1	62.1	92.7	163.0	208.6
35° C	-40° C	60°	0.2	5.5	14.1	19.8	25.3	44.8	66.7	117.4	150.3
(12.6)	(0.0)	80°		5.3	13.4	18.9	24.1	42.7	63.6	112.0	143.4
		100°		5.1	12.9	18.2	23.1	41.0	61.1	107.5	137.7
		60°	0.4	7.8	19.9	28.1	35.8	63.2	94.3	165.9	212.3
		80°		7.4	18.9	26.7	34.1	60.3	89.9	158.2	202.4
		100°		7.1	18.2	25.7	32.7	57.9	86.4	151.8	194.3
35° C	-20° C	60°	0.2	5.9	14.9	21.0	26.8	47.4	70.7	124.4	159.2
(12.6)	(1.4)	80°		5.6	14.2	20.0	25.5	45.2	67.4	118.6	151.8
		100°		5.4	13.6	19.2	24.5	43.4	64.7	113.9	145.8
		60°	0.4	8.3	21.0	29.7	37.9	67.0	99.9	175.7	224.8
		80°		7.9	20.0	28.3	36.1	63.8	95.2	167.5	214.3
		100°		7.6	19.2	27.2	34.6	61.3	91.4	160.8	205.8
35° C	0° C	60°	0.2	6.2	15.6	22.1	28.1	49.8	74.2	130.6	167.2
(12.6)	(4.0)	80°		5.9	14.9	21.0	26.8	47.5	70.8	124.5	159.4
		100°		5.6	14.3	20.2	25.7	45.6	68.0	119.6	153.1
		60°	0.4	8.7	22.1	31.2	39.8	70.3	104.9	184.5	236.1
		80°		8.3	21.1	29.7	37.9	67.0	100.0	175.9	225.1
		100°		7.9	20.2	28.6	36.4	64.4	96.0	168.9	216.1

A8 Discharge Capacities (Tons) R134a

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	140°	3	1.1	2.9	4.1	5.2	9.2	13.7	24.1	30.8
(78.6)	(14.7 in. hg)	180°		1.1	2.8	3.9	5.0	8.8	13.1	23.0	29.5
		220°		1.0	2.7	3.7	4.8	8.4	12.6	22.2	28.4
		140°	6	1.6	4.1	5.8	7.3	12.9	19.3	33.9	43.4
		180°		1.5	3.9	5.5	7.0	12.4	18.5	32.5	41.5
		220°		1.5	3.7	5.3	6.8	11.9	17.8	31.2	39.9
75° F	0° F	140°	3	1.2	3.2	4.5	5.7	10.0	15.0	26.3	33.7
(78.6)	(6.5)	180°		1.2	3.0	4.3	5.4	9.6	14.3	25.2	32.2
		220°		1.1	2.9	4.1	5.2	9.2	13.8	24.2	31.0
		140°	6	1.7	4.4	6.3	8.0	14.2	21.2	37.1	47.5
		180°		1.7	4.2	6.0	7.7	13.5	20.2	35.5	45.4
		220°		1.6	4.1	5.8	7.4	13.0	19.4	34.1	43.6
75° F	40° F	140°	3	1.3	3.4	4.8	6.1	10.9	16.2	28.5	36.5
(78.6)	(35.1)	180°		1.3	3.3	4.6	5.9	10.4	15.5	27.3	34.9
		220°		1.2	3.1	4.4	5.7	10.0	14.9	26.2	33.6
		140°	6	1.9	4.8	6.8	8.7	15.3	22.9	40.2	51.4
		180°		1.8	4.6	6.5	8.3	14.6	21.9	38.4	49.1
		220°		1.7	4.4	6.3	8.0	14.1	21.0	36.9	47.2
95° F	-40° F	140°	3	1.2	3.1	4.4	5.6	9.9	14.8	26.0	33.2
(113.8)	(14.7 in. hg)	180°		1.2	3.0	4.2	5.3	9.4	14.0	24.7	31.6
		220°		1.1	2.8	4.0	5.1	9.0	13.4	23.6	30.3
		140°	6	1.7	4.4	6.2	7.9	14.0	20.8	36.6	46.8
		180°		1.6	4.2	5.9	7.5	13.3	19.8	34.8	44.5
		220°		1.6	4.0	5.6	7.2	12.7	19.0	33.3	42.6
95° F	0° F	140°	3	1.3	3.4	4.8	6.2	10.9	16.3	28.7	36.7
(113.8)	(6.5)	180°		1.3	3.3	4.6	5.9	10.4	15.5	27.2	34.9
		220°		1.2	3.1	4.4	5.6	9.9	14.8	26.1	33.4
		140°	6	1.9	4.8	6.8	8.7	15.4	23.0	40.4	51.7
		180°		1.8	4.6	6.5	8.3	14.6	21.9	38.4	49.1
		220°		1.7	4.4	6.2	7.9	14.0	20.9	36.8	47.1
95° F	40° F	140°	3	1.5	3.7	5.3	6.7	11.9	17.8	31.3	40.0
(113.8)	(35.1)	180°		1.4	3.6	5.0	6.4	11.3	16.9	29.7	38.0
		220°		1.3	3.4	4.8	6.1	10.9	16.2	28.5	36.4
		140°	6	2.1	5.3	7.5	9.5	16.8	25.1	44.1	56.4
		180°		2.0	5.0	7.1	9.0	16.0	23.8	41.9	53.6
		220°		1.9	4.8	6.8	8.7	15.3	22.8	40.1	51.3
115° F	-40° F	140°	3	1.3	3.3	4.6	5.9	10.4	15.6	27.4	35.1
(158.4)	(14.7 in. hg)	180°		1.2	3.1	4.4	5.5	9.8	14.6	25.8	33.0
		220°		1.2	2.9	4.1	5.3	9.4	14.0	24.5	31.4
		140°	6	1.8	4.6	6.6	8.4	14.8	22.0	38.7	49.6
		180°		1.7	4.4	6.2	7.9	13.9	20.7	36.4	46.6
		220°		1.6	4.1	5.9	7.5	13.2	19.7	34.7	44.3
115° F	0° F	140°	3	1.4	3.7	5.2	6.6	11.7	17.4	30.7	39.3
(158.4)	(6.5)	180°		1.4	3.5	4.9	6.2	11.0	16.4	28.8	36.9
		220°		1.3	3.3	4.6	5.9	10.5	15.6	27.5	35.2
		140°	6	2.0	5.2	7.3	9.3	16.5	24.7	43.3	55.5
		180°		1.9	4.9	6.9	8.8	15.5	23.2	40.7	52.1
		220°		1.8	4.6	6.6	8.4	14.8	22.1	38.8	49.6
115° F	40° F	140°	3	1.6	4.0	5.7	7.3	12.9	19.2	33.8	43.3
(158.4)	(6.5)	180°		1.5	3.8	5.4	6.8	12.1	18.1	31.8	40.7
		220°		1.4	3.6	5.1	6.5	11.5	17.2	30.3	38.7
		140°	6	2.2	5.7	8.1	10.3	18.2	27.2	47.8	61.1
		180°		2.1	5.4	7.6	9.7	17.1	25.5	44.9	57.4
		220°		2.0	5.1	7.2	9.2	16.3	24.3	42.7	54.7

A8 Discharge Capacities (Kilowatts) R134a

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	60°	0.2	3.9	10.0	14.1	18.0	31.8	47.4	83.4	106.7
(5.5)	(373 mm hg)	80°		3.8	9.6	13.5	17.2	30.5	45.5	80.0	102.4
		100°		3.6	9.2	13.1	16.6	29.4	43.9	77.2	98.8
		60°	0.4	5.5	14.0	19.9	25.4	44.8	66.9	117.4	150.1
		80°		5.3	13.5	19.1	24.4	43.0	64.2	112.7	144.1
		100°		5.1	13.0	18.4	23.5	41.4	61.9	108.7	139.0
25° C	-20° C	60°	0.2	4.3	10.8	15.3	19.5	34.5	51.5	90.5	115.8
(5.5)	(91.4 mm hg)	80°		4.1	10.4	14.7	18.7	33.1	49.4	86.9	111.2
		100°		3.9	10.0	14.2	18.1	31.9	47.7	83.8	107.3
		60°	0.4	5.9	15.2	21.6	27.6	48.6	72.6	127.5	163.0
		80°		5.7	14.6	20.7	26.4	46.6	69.7	122.3	156.4
		100°		5.5	14.1	20.0	25.5	45.0	67.2	118.0	150.9
25° C	0° C	60°	0.2	4.6	11.7	16.5	21.0	37.1	55.4	97.4	124.6
(5.5)	(1.9)	80°		4.4	11.2	15.8	20.2	35.6	53.2	93.5	119.7
		100°		4.2	10.8	15.3	19.4	34.4	51.3	90.2	115.5
		60°	0.4	6.4	16.4	23.2	29.7	52.3	78.1	137.2	175.4
		80°		6.1	15.7	22.3	28.5	50.2	75.0	131.7	168.3
		100°		5.9	15.2	21.5	27.5	48.4	72.3	127.0	162.4
30° C	-40° C	60°	0.2	4.1	10.3	14.6	18.6	32.9	49.0	86.2	110.4
(6.7)	(373 mm hg)	80°		3.9	9.9	14.0	17.8	31.5	47.0	82.6	105.7
		100°		3.7	9.5	13.5	17.1	30.3	45.2	79.6	101.8
		60°	0.4	5.7	14.5	20.6	26.3	46.4	69.3	121.7	155.6
		80°		5.4	13.9	19.7	25.2	44.4	66.3	116.5	149.0
		100°		5.2	13.4	19.0	24.2	42.8	63.9	112.2	143.4
30° C	-20° C	60°	0.2	4.4	11.3	15.9	20.2	35.8	53.4	94.0	120.3
(6.7)	(91.4 mm hg)	80°		4.2	10.8	15.2	19.4	34.3	51.2	90.0	115.2
		100°		4.1	10.4	14.7	18.7	33.0	49.3	86.7	111.0
		60°	0.4	6.2	15.9	22.5	28.6	50.5	75.5	132.6	169.6
		80°		5.9	15.2	21.5	27.4	48.4	72.3	126.9	162.3
		100°		5.7	14.6	20.7	26.4	46.6	69.6	122.2	156.3
30° C	0° C	60°	0.2	4.8	12.2	17.2	21.9	38.7	57.7	101.5	129.9
(6.7)	(1.9)	80°		4.6	11.6	16.4	20.9	37.0	55.3	97.2	124.4
		100°		4.4	11.2	15.8	20.2	35.7	53.2	93.6	119.8
		60°	0.4	6.7	17.1	24.2	30.9	54.6	81.5	143.2	183.1
		80°		6.4	16.4	23.2	29.6	52.2	78.0	137.1	175.3
		100°		6.2	15.8	22.4	28.5	50.3	75.1	132.0	168.8
35° C	-40° C	60°	0.2	4.2	10.7	15.0	19.2	33.9	50.6	89.0	113.9
(7.8)	(373 mm hg)	80°		4.0	10.2	14.4	18.3	32.4	48.3	85.0	108.7
		100°		3.8	9.8	13.8	17.6	31.1	46.4	81.7	104.5
		60°	0.4	5.9	15.0	21.2	27.1	47.8	71.4	125.5	160.6
		80°		5.6	14.3	20.3	25.9	45.7	68.2	119.8	153.2
		100°		5.4	13.8	19.5	24.9	43.9	65.5	115.1	147.3
35° C	-20° C	60°	0.2	4.6	11.7	16.5	21.0	37.1	55.4	97.4	124.7
(7.8)	(91.4 mm hg)	80°		4.4	11.1	15.7	20.0	35.4	52.9	93.0	119.0
		100°		4.2	10.7	15.1	19.3	34.1	50.8	89.4	114.4
		60°	0.4	6.4	16.4	23.3	29.7	52.4	78.2	137.4	175.8
		80°		6.1	15.7	22.2	28.3	50.0	74.6	131.1	167.7
		100°		5.9	15.1	21.3	27.2	48.0	71.7	126.0	161.2
35° C	0° C	60°	0.2	5.0	12.6	17.8	22.7	40.2	60.0	105.5	135.1
(7.8)	(1.9)	80°		4.7	12.1	17.0	21.7	38.4	57.3	100.8	129.0
		100°		4.6	11.6	16.4	20.9	36.9	55.1	96.9	124.0
		60°	0.4	7.0	17.8	25.2	32.1	56.7	84.7	148.9	190.4
		80°		6.7	17.0	24.1	30.7	54.2	80.9	142.1	181.8
		100°		6.4	16.3	23.1	29.5	52.1	77.7	136.6	174.7

A8 Discharge Capacities (Tons) R404

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	140°	3	1.2	3.2	4.5	5.7	10.1	15.1	26.5	33.9
(161.2)	(2.7)	180°		1.2	3.0	4.3	5.4	9.6	14.3	25.2	32.3
		220°		1.1	2.9	4.1	5.2	9.2	13.7	24.1	30.9
		140°	6	1.8	4.5	6.3	8.1	14.3	21.3	37.5	47.9
		180°		1.7	4.3	6.0	7.7	13.6	20.2	35.6	45.5
		220°		1.6	4.1	5.8	7.3	13.0	19.4	34.1	43.6
75° F	0° F	140°	3	1.4	3.6	5.0	6.4	11.3	16.9	29.7	38.0
(161.2)	(33.5)	180°		1.3	3.4	4.8	6.1	10.8	16.0	28.2	36.1
		220°		1.3	3.2	4.6	5.8	10.3	15.4	27.0	34.6
		140°	6	2.0	5.0	7.1	9.0	16.0	23.9	41.9	53.7
		180°		1.9	4.8	6.7	8.6	15.2	22.7	39.8	51.0
		220°		1.8	4.6	6.4	8.2	14.5	21.7	38.1	48.8
75° F	40° F	140°	3	1.5	3.9	5.5	7.0	12.4	18.5	32.6	41.7
(161.2)	(86.4)	180°		1.5	3.7	5.2	6.7	11.8	17.6	31.0	39.7
		220°		1.4	3.6	5.0	6.4	11.3	16.9	29.7	38.0
		140°	6	2.2	5.5	7.8	9.9	17.6	26.2	46.1	58.9
		180°		2.1	5.2	7.4	9.4	16.7	24.9	43.8	56.0
		220°		2.0	5.0	7.1	9.0	16.0	23.8	41.9	53.6
95° F	-40° F	140°	3	1.3	3.2	4.6	5.8	10.3	15.3	27.0	34.5
(219.4)	(2.7)	180°		1.2	3.0	4.3	5.5	9.7	14.4	25.4	32.5
		220°		1.1	2.9	4.1	5.2	9.2	13.7	24.1	30.9
		140°	6	1.8	4.6	6.5	8.2	14.5	21.7	38.2	48.8
		180°		1.7	4.3	6.1	7.7	13.7	20.4	35.9	45.9
		220°		1.6	4.1	5.8	7.3	13.0	19.4	34.1	43.6
95° F	0° F	140°	3	1.5	3.7	5.2	6.6	11.7	17.5	30.8	39.4
(219.4)	(33.5)	180°		1.4	3.5	4.9	6.2	11.0	16.4	28.9	37.1
		220°		1.3	3.3	4.7	5.9	10.5	15.6	27.5	35.2
		140°	6	2.0	5.2	7.4	9.4	16.6	24.7	43.5	55.7
		180°		1.9	4.9	6.9	8.8	15.6	23.3	40.9	52.4
		220°		1.8	4.7	6.6	8.4	14.8	22.1	38.9	49.8
95° F	40° F	140°	3	1.6	4.1	5.8	7.4	13.1	19.5	34.3	43.9
(219.4)	(86.4)	180°		1.5	3.9	5.4	6.9	12.3	18.3	32.2	41.3
		220°		1.4	3.7	5.2	6.6	11.7	17.4	30.7	39.2
		140°	6	2.3	5.8	8.2	10.4	18.5	27.6	48.5	62.0
		180°		2.1	5.5	7.7	9.8	17.4	25.9	45.6	58.3
		220°		2.0	5.2	7.3	9.3	16.5	24.6	43.3	55.4
115° F	-40° F	140°	3	1.2	3.2	4.5	5.7	10.0	15.0	26.4	33.7
(290.4)	(2.7)	180°		1.1	2.9	4.1	5.2	9.3	13.8	24.3	31.1
		220°		1.1	2.7	3.9	4.9	8.7	13.0	22.9	29.3
		140°	6	1.8	4.5	6.3	8.0	14.2	21.2	37.3	47.7
		180°		1.6	4.1	5.8	7.4	13.1	19.5	34.4	44.0
		220°		1.5	3.9	5.5	7.0	12.3	18.4	32.3	41.4
115° F	0° F	140°	3	1.5	3.7	5.2	6.7	11.8	17.6	30.9	39.6
(290.4)	(33.5)	180°		1.3	3.4	4.8	6.1	10.9	16.2	28.5	36.5
		220°		1.3	3.2	4.5	5.8	10.2	15.3	26.9	34.4
		140°	6	2.1	5.2	7.4	9.4	16.7	24.9	43.8	56.0
		180°		1.9	4.8	6.8	8.7	15.4	22.9	40.3	51.6
		220°		1.8	4.5	6.4	8.2	14.5	21.6	38.0	48.6
115° F	40° F	140°	3	1.7	4.2	5.9	7.6	13.4	20.0	35.1	45.0
(290.4)	(86.4)	180°		1.5	3.9	5.5	7.0	12.4	18.4	32.4	41.5
		220°		1.4	3.7	5.2	6.6	11.6	17.3	30.5	39.1
		140°	6	2.3	6.0	8.4	10.7	19.0	28.3	49.7	63.7
		180°		2.2	5.5	7.7	9.9	17.5	26.1	45.8	58.7
		220°		2.0	5.2	7.3	9.3	16.4	24.5	43.1	55.2

A8 Discharge Capacities (Kilowatts) R404

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	60°	0.2	4.3	10.9	15.4	19.6	34.7	51.7	91.0	116.5
(11.2)	(0.3)	80°		4.1	10.4	14.7	18.7	33.1	49.4	86.8	111.2
		100°		3.9	10.0	14.1	17.9	31.8	47.4	83.4	106.8
		60°	0.4	6.0	15.4	21.7	27.7	49.0	73.1	128.5	164.5
		80°		5.8	14.7	20.7	26.4	46.7	69.7	122.6	156.9
		100°		5.5	14.1	19.9	25.4	44.9	66.9	117.7	150.6
25° C	-20° C	60°	0.2	4.8	12.1	17.1	21.7	38.5	57.4	101.1	129.4
(11.2)	(2.0)	80°		4.5	11.6	16.3	20.8	36.8	54.8	96.4	123.5
		100°		4.4	11.1	15.6	19.9	35.3	52.6	92.6	118.5
		60°	0.4	6.7	17.1	24.1	30.8	54.4	81.2	142.7	182.7
		80°		6.4	16.3	23.0	29.4	51.9	77.4	136.2	174.2
		100°		6.1	15.6	22.1	28.2	49.8	74.3	130.7	167.3
25° C	0° C	60°	0.2	5.2	13.2	18.7	23.8	42.1	62.8	110.4	141.4
(11.2)	(4.9)	80°		5.0	12.6	17.8	22.7	40.2	59.9	105.4	134.9
		100°		4.8	12.1	17.1	21.8	38.6	57.5	101.2	129.5
		60°	0.4	7.3	18.7	26.4	33.6	59.5	88.7	156.0	199.6
		80°		7.0	17.8	25.2	32.1	56.7	84.6	148.8	190.4
		100°		6.7	17.1	24.2	30.8	54.4	81.2	142.8	182.8
30° C	-40° C	60°	0.2	4.3	11.0	15.5	19.8	35.0	52.2	91.8	117.5
(13.1)	(0.3)	80°		4.1	10.5	14.7	18.8	33.3	49.6	87.3	111.7
		100°		3.9	10.0	14.1	18.0	31.9	47.5	83.6	107.0
		60°	0.4	6.1	15.5	21.9	28.0	49.4	73.8	129.7	166.0
		80°		5.8	14.8	20.8	26.6	47.0	70.1	123.3	157.8
		100°		5.5	14.1	20.0	25.4	45.0	67.1	118.0	151.1
30° C	-20° C	60°	0.2	4.8	12.3	17.3	22.1	39.1	58.4	102.7	131.5
(13.1)	(2.0)	80°		4.6	11.7	16.5	21.0	37.2	55.5	97.6	125.0
		100°		4.4	11.2	15.8	20.1	35.6	53.1	93.5	119.7
		60°	0.4	6.8	17.4	24.5	31.3	55.3	82.5	145.1	185.7
		80°		6.5	16.5	23.3	29.7	52.6	78.4	137.9	176.5
		100°		6.2	15.8	22.3	28.5	50.3	75.1	132.0	169.0
30° C	0° C	60°	0.2	5.3	13.5	19.1	24.3	43.0	64.1	112.9	144.5
(13.1)	(4.9)	80°		5.1	12.9	18.1	23.1	40.9	61.0	107.3	137.4
		100°		4.8	12.3	17.4	22.1	39.2	58.4	102.8	131.5
		60°	0.4	7.5	19.1	27.0	34.4	60.8	90.7	159.5	204.1
		80°		7.1	18.1	25.6	32.7	57.8	86.2	151.5	193.9
		100°		6.8	17.4	24.5	31.3	55.3	82.5	145.1	185.7
35° C	-40° C	60°	0.2	4.3	11.0	15.6	19.8	35.1	52.3	92.1	117.9
(15.1)	(0.3)	80°		4.1	10.4	14.7	18.7	33.2	49.5	87.1	111.5
		100°		3.9	10.0	14.0	17.9	31.7	47.3	83.2	106.5
		60°	0.4	6.1	15.6	22.0	28.1	49.6	74.0	130.2	166.7
		80°		5.8	14.7	20.8	26.5	46.9	70.0	123.1	157.6
		100°		5.5	14.1	19.9	25.3	44.8	66.8	117.5	150.4
35° C	-20° C	60°	0.2	4.9	12.4	17.5	22.3	39.6	59.0	103.9	133.0
(15.1)	(2.0)	80°		4.6	11.8	16.6	21.1	37.5	55.8	98.3	125.8
		100°		4.4	11.2	15.8	20.2	35.8	53.3	93.8	120.1
		60°	0.4	6.9	17.6	24.8	31.7	56.0	83.5	146.9	188.1
		80°		6.5	16.6	23.5	29.9	52.9	79.0	138.9	177.8
		100°		6.2	15.9	22.4	28.6	50.5	75.4	132.6	169.7
35° C	0° C	60°	0.2	5.4	13.8	19.4	24.7	43.8	65.3	114.9	147.1
(15.1)	(4.9)	80°		5.1	13.0	18.4	23.4	41.4	61.8	108.7	139.2
		100°		4.9	12.4	17.5	22.3	39.6	59.0	103.8	132.9
		60°	0.4	7.6	19.5	27.5	35.0	61.9	92.4	162.5	208.0
		80°		7.2	18.4	26.0	33.1	58.6	87.4	153.7	196.7
		100°		6.9	17.6	24.8	31.6	55.9	83.4	146.7	187.7

A8 Discharge Capacities (Tons) R507

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
75° F	-40° F	140°	3	1.3	3.2	4.5	5.8	10.2	15.2	26.8	34.3
(167.0)	(5.5)	180°		1.2	3.1	4.3	5.5	9.7	14.5	25.5	32.6
		220°		1.2	2.9	4.1	5.3	9.3	13.9	24.4	31.2
		140°	6	1.8	4.5	6.4	8.2	14.4	21.5	37.8	48.4
		180°		1.7	4.3	6.1	7.8	13.7	20.5	36.0	46.0
		220°		1.6	4.1	5.8	7.4	13.1	19.6	34.4	44.1
75° F	0° F	140°	3	1.4	3.6	5.0	6.4	11.4	16.9	29.8	38.2
(167.0)	(35.2)	180°		1.3	3.4	4.8	6.1	10.8	16.1	28.3	36.3
		220°		1.3	3.3	4.6	5.8	10.3	15.4	27.1	34.8
		140°	6	2.0	5.0	7.1	9.1	16.0	23.9	42.1	53.9
		180°		1.9	4.8	6.8	8.6	15.2	22.8	40.0	51.2
		220°		1.8	4.6	6.5	8.3	14.6	21.8	38.3	49.0
75° F	40° F	140°	3	1.5	3.9	5.5	7.0	12.4	18.6	32.7	41.8
(167.0)	(89.8)	180°		1.5	3.7	5.2	6.7	11.8	17.6	31.0	39.7
		220°		1.4	3.6	5.0	6.4	11.3	16.9	29.7	38.1
		140°	6	2.2	5.5	7.8	9.9	17.6	26.2	46.1	59.0
		180°		2.1	5.2	7.4	9.4	16.7	24.9	43.8	56.1
		220°		2.0	5.0	7.1	9.0	16.0	23.9	42.0	53.7
95° F	-40° F	140°	3	1.3	3.3	4.7	6.0	10.6	15.7	27.7	35.5
(226.0)	(5.5)	180°		1.2	3.1	4.4	5.6	9.9	14.8	26.1	33.4
		220°		1.2	3.0	4.2	5.3	9.5	14.1	24.8	31.8
		140°	6	1.8	4.7	6.6	8.4	14.9	22.2	39.1	50.1
		180°		1.7	4.4	6.2	7.9	14.0	20.9	36.8	47.1
		220°		1.6	4.2	5.9	7.6	13.4	19.9	35.1	44.9
95° F	0° F	140°	3	1.5	3.7	5.3	6.7	11.9	17.8	31.3	40.1
(226.0)	(35.2)	180°		1.4	3.5	5.0	6.3	11.2	16.7	29.5	37.7
		220°		1.3	3.4	4.7	6.0	10.7	15.9	28.1	35.9
		140°	6	2.1	5.3	7.5	9.5	16.9	25.1	44.2	56.6
		180°		2.0	5.0	7.0	9.0	15.9	23.7	41.6	53.3
		220°		1.9	4.7	6.7	8.5	15.1	22.5	39.6	50.7
95° F	40° F	140°	3	1.6	4.2	5.9	7.5	13.2	19.7	34.7	44.4
(226.0)	(89.8)	180°		1.5	3.9	5.5	7.0	12.4	18.6	32.7	41.8
		220°		1.5	3.7	5.3	6.7	11.9	17.7	31.1	39.8
		140°	6	2.3	5.9	8.3	10.6	18.7	27.9	49.0	62.7
		180°		2.2	5.5	7.8	9.9	17.6	26.2	46.1	59.0
		220°		2.1	5.3	7.4	9.5	16.7	25.0	43.9	56.2
115° F	-40° F	140°	3	1.3	3.3	4.7	6.0	10.6	15.8	27.8	35.7
(301.0)	(5.5)	180°		1.2	3.1	4.4	5.5	9.8	14.6	25.8	33.0
		220°		1.1	2.9	4.1	5.2	9.3	13.8	24.3	31.1
		140°	6	1.9	4.7	6.7	8.5	15.0	22.4	39.4	50.4
		180°		1.7	4.4	6.2	7.8	13.9	20.7	36.4	46.6
		220°		1.6	4.1	5.8	7.4	13.1	19.5	34.4	44.0
115° F	0° F	140°	3	1.5	3.9	5.4	6.9	12.3	18.3	32.2	41.2
(301.0)	(35.2)	180°		1.4	3.6	5.0	6.4	11.3	16.9	29.8	38.1
		220°		1.3	3.4	4.7	6.0	10.7	16.0	28.1	36.0
		140°	6	2.1	5.5	7.7	9.8	17.4	25.9	45.6	58.3
		180°		2.0	5.0	7.1	9.1	16.0	23.9	42.1	53.9
		220°		1.9	4.8	6.7	8.5	15.1	22.6	39.7	50.8
115° F	40° F	140°	3	1.7	4.3	6.1	7.8	13.8	20.6	36.3	46.5
(301.0)	(89.8)	180°		1.6	4.0	5.7	7.2	12.8	19.1	33.6	43.0
		220°		1.5	3.8	5.3	6.8	12.1	18.0	31.7	40.6
		140°	6	2.4	6.1	8.7	11.1	19.6	29.2	51.3	65.7
		180°		2.2	5.7	8.0	10.2	18.1	27.0	47.5	60.7
		220°		2.1	5.4	7.6	9.6	17.1	25.4	44.8	57.3

A8 Discharge Capacities (Kilowatts) R507

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	A8A 3/8" 9 mm	A8A 5/8" 15 mm	A8A 7/8" 22 mm	A81 1-1/8" 28 mm	A81 1-3/8" 35 mm	A82 1-5/8" 42 mm	A82 2-1/8" 54 mm	A82 2-5/8" 66 mm
25° C	-40° C	60°	0.2	4.3	11.0	15.6	19.8	35.1	52.3	92.1	117.9
(11.6)	(0.4)	80°		4.1	10.5	14.9	18.9	33.5	50.0	87.9	112.6
		100°		4.0	10.1	14.3	18.2	32.2	48.0	84.5	108.1
		60°	0.4	6.1	15.6	22.0	28.0	49.6	74.0	130.1	166.5
		80°		5.8	14.9	21.0	26.8	47.3	70.6	124.1	158.8
		100°		5.6	14.3	20.2	25.7	45.4	67.8	119.3	152.6
25° C	-20° C	60°	0.2	4.8	12.2	17.2	21.9	38.7	57.8	101.6	130.1
(11.6)	(2.1)	80°		4.6	11.6	16.4	20.9	37.0	55.1	97.0	124.2
		100°		4.4	11.2	15.8	20.1	35.5	53.0	93.2	119.4
		60°	0.4	6.7	17.2	24.3	30.9	54.7	81.7	143.6	183.7
		80°		6.4	16.4	23.2	29.5	52.2	77.9	137.0	175.3
		100°		6.2	15.8	22.3	28.4	50.2	74.9	131.6	168.4
25° C	0° C	60°	0.2	5.2	13.3	18.7	23.8	42.2	62.9	110.7	141.7
(11.6)	(5.2)	80°		5.0	12.7	17.9	22.7	40.3	60.1	105.7	135.3
		100°		4.8	12.2	17.2	21.9	38.7	57.7	101.6	130.0
		60°	0.4	7.3	18.7	26.4	33.7	59.6	88.9	156.4	200.1
		80°		7.0	17.9	25.2	32.2	56.9	84.9	149.2	191.0
		100°		6.7	17.2	24.2	30.9	54.6	81.5	143.4	183.4
30° C	-40° C	60°	0.2	4.4	11.2	15.8	20.1	35.7	53.2	93.6	119.8
(13.5)	(0.4)	80°		4.2	10.7	15.0	19.2	33.9	50.6	89.0	114.0
		100°		4.0	10.2	14.4	18.4	32.5	48.5	85.3	109.3
		60°	0.4	6.2	15.8	22.4	28.5	50.4	75.2	132.3	169.3
		80°		5.9	15.1	21.3	27.1	47.9	71.5	125.7	160.9
		100°		5.7	14.4	20.4	26.0	45.9	68.5	120.5	154.2
30° C	-20° C	60°	0.2	4.9	12.4	17.6	22.4	39.6	59.1	103.9	133.0
(13.5)	(2.1)	80°		4.7	11.8	16.7	21.3	37.7	56.2	98.8	126.5
		100°		4.5	11.4	16.0	20.4	36.1	53.8	94.8	121.3
		60°	0.4	6.9	17.6	24.8	31.6	56.0	83.5	146.9	187.9
		80°		6.6	16.7	23.6	30.1	53.2	79.4	139.6	178.7
		100°		6.3	16.0	22.6	28.8	51.0	76.1	133.8	171.3
30° C	0° C	60°	0.2	5.4	13.6	19.2	24.5	43.3	64.6	113.7	145.6
(13.5)	(5.2)	80°		5.1	13.0	18.3	23.3	41.2	61.5	108.2	138.5
		100°		4.9	12.4	17.5	22.3	39.5	58.9	103.7	132.8
		60°	0.4	7.6	19.2	27.2	34.6	61.3	91.4	160.7	205.7
		80°		7.2	18.3	25.8	32.9	58.2	86.9	152.8	195.6
		100°		6.9	17.5	24.8	31.6	55.8	83.3	146.5	187.4
35° C	-40° C	60°	0.2	4.5	11.3	16.0	20.4	36.1	53.8	94.6	121.1
(15.6)	(0.4)	80°		4.2	10.7	15.1	19.3	34.1	50.9	89.6	114.7
		100°		4.0	10.3	14.5	18.4	32.6	48.7	85.6	109.6
		60°	0.4	6.3	16.0	22.6	28.8	51.0	76.0	133.7	171.1
		80°		6.0	15.1	21.4	27.3	48.2	71.9	126.5	161.9
		100°		5.7	14.5	20.4	26.0	46.1	68.7	120.9	154.8
35° C	-20° C	60°	0.2	5.0	12.7	17.9	22.8	40.3	60.1	105.8	135.5
(15.6)	(2.1)	80°		4.7	12.0	16.9	21.5	38.2	56.9	100.2	128.2
		100°		4.5	11.5	16.2	20.6	36.5	54.4	95.8	122.6
		60°	0.4	7.0	17.9	25.3	32.2	57.0	85.0	149.5	191.4
		80°		6.7	16.9	23.9	30.5	53.9	80.4	141.5	181.1
		100°		6.4	16.2	22.9	29.1	51.5	76.9	135.2	173.1
35° C	0° C	60°	0.2	5.5	13.9	19.7	25.0	44.4	66.2	116.4	149.1
(15.6)	(5.2)	80°		5.2	13.2	18.6	23.7	42.0	62.6	110.2	141.1
		100°		5.0	12.6	17.8	22.7	40.2	59.9	105.4	134.9
		60°	0.4	7.7	19.7	27.8	35.4	62.7	93.5	164.5	210.6
		80°		7.3	18.6	26.3	33.5	59.3	88.5	155.7	199.3
		100°		7.0	17.8	25.2	32.1	56.7	84.6	148.8	190.5

CK4A Hot Gas Discharge Capacities (Tons) R22

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
75° F	-40° F	140°	0.75	1.7	3.5	6.4	9.4	22.8	34.7	55.5	104.0
(132)	(0.5)	180°		1.6	3.4	6.2	9.0	21.8	33.1	53.0	99.4
		220°		1.5	3.2	5.9	8.6	20.9	31.9	51.0	95.6
		140°	3	3.4	7.0	12.8	18.8	45.4	69.1	110.6	207.4
		180°		3.2	6.7	12.3	17.9	43.4	66.0	105.7	198.1
		220°		3.1	6.4	11.8	17.2	41.7	63.5	101.5	190.4
75° F	0° F	140°	0.75	1.8	3.7	6.8	10.0	24.1	36.7	58.8	110.2
(132)	(24.0)	180°		1.7	3.6	6.5	9.5	23.1	35.1	56.2	105.3
		220°		1.6	3.4	6.3	9.2	22.2	33.8	54.0	101.3
		140°	3	3.6	7.4	13.6	19.9	48.1	73.2	117.2	219.7
		180°		3.4	7.1	13.0	19.0	46.0	70.0	111.9	209.9
		220°		3.3	6.8	12.5	18.3	44.2	67.2	107.6	201.7
75° F	40° F	140°	0.75	1.9	3.9	7.2	10.5	25.4	38.6	61.7	115.7
(132)	(68.5)	180°		1.8	3.7	6.8	10.0	24.2	36.9	59.0	110.6
		220°		1.7	3.6	6.6	9.6	23.3	35.4	56.7	106.3
		140°	3	3.7	7.8	14.3	20.9	50.5	76.9	123.0	230.7
		180°		3.6	7.5	13.6	19.9	48.3	73.5	117.5	220.4
		220°		3.4	7.2	13.1	19.2	46.4	70.6	113.0	211.8
95° F	-40° F	140°	0.75	1.8	3.8	7.0	10.2	24.8	37.7	60.4	113.2
(182)	(0.5)	180°		1.7	3.6	6.7	9.7	23.5	35.8	57.3	107.5
		220°		1.7	3.5	6.4	9.3	22.5	34.3	54.9	102.9
		140°	3	3.7	7.6	14.0	20.4	49.5	75.3	120.4	225.8
		180°		3.5	7.2	13.3	19.4	46.9	71.4	114.3	214.3
		220°		3.3	6.9	12.7	18.6	44.9	68.4	109.4	205.1
95° F	0° F	140°	0.75	2.0	4.1	7.5	10.9	26.4	40.2	64.3	120.5
(182)	(24.0)	180°		1.9	3.9	7.1	10.4	25.1	38.1	61.0	114.4
		220°		1.8	3.7	6.8	9.9	24.0	36.5	58.4	109.5
		140°	3	3.9	8.1	14.9	21.8	52.7	80.2	128.3	240.5
		180°		3.7	7.7	14.1	20.7	50.0	76.1	121.7	228.2
		220°		3.5	7.4	13.5	19.8	47.8	72.8	116.5	218.4
95° F	40° F	140°	0.75	2.1	4.3	7.9	11.5	27.8	42.4	67.8	127.1
(182)	(68.5)	180°		2.0	4.1	7.5	10.9	26.4	40.2	64.3	120.6
		220°		1.9	3.9	7.1	10.4	25.3	38.5	61.6	115.5
		140°	3	4.1	8.6	15.7	22.9	55.5	84.5	135.2	253.5
		180°		3.9	8.1	14.9	21.8	52.7	80.2	128.3	240.6
		220°		3.7	7.8	14.3	20.8	50.4	76.7	122.8	230.2
115° F	-40° F	140°	0.75	2.0	4.1	7.5	11.0	26.7	40.6	64.9	121.7
(243)	(0.5)	180°		1.9	3.9	7.1	10.3	25.0	38.1	61.0	114.3
		220°		1.8	3.7	6.7	9.8	23.8	36.2	58.0	108.7
		140°	3	3.9	8.2	15.0	22.0	53.3	81.0	129.7	243.1
		180°		3.7	7.7	14.1	20.6	50.0	76.1	121.7	228.2
		220°		3.5	7.3	13.4	19.6	47.5	72.3	115.7	216.9
115° F	0° F	140°	0.75	2.1	4.4	8.1	11.8	28.6	43.5	69.6	130.5
(243)	(24.0)	180°		2.0	4.1	7.6	11.1	26.8	40.8	65.3	122.5
		220°		1.9	3.9	7.2	10.5	25.5	38.8	62.1	116.5
		140°	3	4.2	8.8	16.1	23.6	57.1	86.8	138.9	260.5
		180°		4.0	8.3	15.1	22.1	53.6	81.5	130.4	244.5
		220°		3.8	7.9	14.4	21.0	50.9	77.5	124.0	232.5
115° F	40° F	140°	0.75	2.2	4.7	8.6	12.5	30.3	46.1	73.7	138.2
(243)	(68.5)	180°		2.1	4.4	8.0	11.7	28.4	43.2	69.2	129.7
		220°		2.0	4.2	7.6	11.2	27.0	41.1	65.8	123.4
		140°	3	4.5	9.3	17.1	25.0	60.4	92.0	147.2	276.0
		180°		4.2	8.8	16.0	23.4	56.7	86.3	138.1	259.0
		220°		4.0	8.3	15.2	22.3	53.9	82.1	131.3	246.3

CK4A Hot Gas Discharge Capacities (Kilowatts) R22

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
25° C	-40° C	60°	0.05	5.8	12.2	22.3	32.7	79.1	120.3	192.5	360.9
(9.2)	(0.0)	80°		5.6	11.7	21.4	31.3	75.8	115.4	184.7	346.2
		100°		5.4	11.3	20.7	30.2	73.1	111.3	178.0	333.8
		60°	0.21	11.9	24.9	45.6	66.7	161.4	245.6	392.9	736.7
		80°		11.4	23.9	43.7	63.9	154.8	235.5	376.8	706.5
		100°		11.0	23.0	42.2	61.6	149.2	227.0	363.2	681.0
25° C	-20° C	60°	0.05	6.2	12.9	23.6	34.4	83.4	126.9	203.0	380.6
(9.2)	(1.4)	80°		5.9	12.3	22.6	33.0	80.0	121.7	194.7	365.1
		100°		5.7	11.9	21.8	31.8	77.1	117.3	187.7	351.9
		60°	0.21	12.6	26.3	48.1	70.3	170.2	258.9	414.3	776.8
		80°		12.1	25.2	46.1	67.4	163.2	248.3	397.3	745.0
		100°		11.6	24.3	44.5	65.0	157.3	239.3	383.0	718.0
25° C	0° C	60°	0.05	6.4	13.5	24.7	36.0	87.3	132.8	212.5	398.3
(9.2)	(4.0)	80°		6.2	12.9	23.7	34.6	83.7	127.4	203.8	382.1
		100°		6.0	12.5	22.8	33.3	80.7	122.8	196.5	368.4
		60°	0.21	13.2	27.5	50.3	73.6	178.1	271.0	433.6	813.0
		80°		12.6	26.4	48.3	70.5	170.8	259.9	415.8	779.7
		100°		12.2	25.4	46.5	68.0	164.6	250.5	400.8	751.5
30° C	-40° C	60°	0.05	6.1	12.7	23.2	33.9	82.2	125.0	200.1	375.1
(10.9)	(0.0)	80°		5.8	12.1	22.2	32.5	78.6	119.6	191.4	358.9
		100°		5.6	11.7	21.4	31.3	75.7	115.1	184.2	345.4
		60°	0.21	12.4	25.9	47.4	69.3	167.8	255.4	408.7	766.2
		80°		11.9	24.8	45.4	66.3	160.6	244.3	390.9	733.0
		100°		11.4	23.8	43.7	63.8	154.5	235.1	376.2	705.3
30° C	-20° C	60°	0.05	6.4	13.4	24.5	35.9	86.8	132.1	211.4	396.4
(10.9)	(1.4)	80°		6.1	12.8	23.5	34.3	83.1	126.4	202.3	379.2
		100°		5.9	12.3	22.6	33.0	80.0	121.7	194.7	365.0
		60°	0.21	13.1	27.4	50.1	73.2	177.3	269.9	431.8	809.6
		80°		12.5	26.2	47.9	70.1	169.6	258.1	413.0	774.4
		100°		12.1	25.2	46.1	67.4	163.2	248.4	397.4	745.2
30° C	0° C	60°	0.05	6.7	14.0	25.7	37.6	91.0	138.5	221.6	415.5
(10.9)	(4.0)	80°		6.4	13.4	24.6	36.0	87.1	132.5	212.0	397.6
		100°		6.2	12.9	23.7	34.6	83.8	127.5	204.1	382.6
		60°	0.21	13.7	28.7	52.5	76.8	185.9	282.9	452.6	848.7
		80°		13.1	27.4	50.3	73.5	177.8	270.6	433.0	811.9
		100°		12.6	26.4	48.4	70.7	171.1	260.4	416.6	781.2
35° C	-40° C	60°	0.05	6.3	13.1	24.1	35.2	85.2	129.6	207.4	388.9
(12.6)	(0.0)	80°		6.0	12.5	23.0	33.6	81.3	123.7	197.8	371.0
		100°		5.8	12.0	22.1	32.2	78.0	118.8	190.0	356.3
		60°	0.21	12.9	26.9	49.2	71.9	174.1	265.0	424.0	795.0
		80°		12.3	25.6	46.9	68.6	166.1	252.7	404.3	758.1
		100°		11.8	24.6	45.1	65.9	159.5	242.7	388.3	728.0
35° C	-20° C	60°	0.05	6.7	13.9	25.5	37.3	90.2	137.3	219.6	411.8
(12.6)	(1.4)	80°		6.4	13.3	24.3	35.5	86.0	130.9	209.5	392.8
		100°		6.1	12.8	23.4	34.1	82.6	125.8	201.2	377.3
		60°	0.21	13.6	28.5	52.1	76.2	184.4	280.6	449.0	841.8
		80°		13.0	27.1	49.7	72.6	175.8	267.6	428.1	802.8
		100°		12.5	26.1	47.7	69.7	168.9	257.0	411.1	770.9
35° C	0° C	60°	0.05	7.0	14.6	26.8	39.1	94.7	144.2	230.7	432.5
(12.6)	(4.0)	80°		6.7	13.9	25.5	37.3	90.4	137.5	220.0	412.5
		100°		6.4	13.4	24.5	35.8	86.8	132.1	211.3	396.2
		60°	0.21	14.3	29.9	54.7	80.0	193.7	294.7	471.5	884.1
		80°		13.6	28.5	52.2	76.3	184.7	281.0	449.6	843.1
		100°		13.1	27.4	50.1	73.2	177.3	269.9	431.8	809.6

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

CK4A Hot Gas Discharge Capacities (Tons) R134a

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
75° F	-40° F	140°	0.75	1.3	2.7	4.9	7.2	17.5	26.6	42.6	79.9
(78.6)	(14.7 in hg)	180°		1.2	2.6	4.7	6.9	16.7	25.5	40.8	76.5
		220°		1.2	2.5	4.6	6.7	16.1	24.5	39.2	73.6
		140°	3	2.6	5.4	9.8	14.4	34.8	52.9	84.6	158.7
		180°		2.5	5.1	9.4	13.7	33.2	50.6	80.9	151.8
		220°		2.4	4.9	9.0	13.2	32.0	48.7	77.9	146.0
75° F	0° F	140°	0.75	1.4	3.0	5.4	7.9	19.1	29.1	46.6	87.4
(78.6)	(6.5)	180°		1.4	2.8	5.2	7.6	18.3	27.9	44.6	83.6
		220°		1.3	2.7	5.0	7.3	17.6	26.8	42.9	80.5
		140°	3	2.8	5.9	10.7	15.7	38.0	57.8	92.5	173.5
		180°		2.7	5.6	10.3	15.0	36.4	55.3	88.5	165.9
		220°		2.6	5.4	9.9	14.4	35.0	53.2	85.1	159.6
75° F	40° F	140°	0.75	1.5	3.2	5.9	8.6	20.7	31.5	50.4	94.6
(78.6)	(35.1)	180°		1.5	3.1	5.6	8.2	19.8	30.2	48.3	90.5
		220°		1.4	2.9	5.4	7.9	19.1	29.0	46.4	87.1
		140°	3	3.0	6.3	11.6	17.0	41.1	62.6	100.1	187.8
		180°		2.9	6.1	11.1	16.2	39.3	59.9	95.8	179.6
		220°		2.8	5.8	10.7	15.6	37.8	57.6	92.1	172.8
95° F	-40° F	140°	0.75	1.4	2.9	5.3	7.8	18.8	28.7	45.9	86.0
(113.8)	(14.7 in hg)	180°		1.3	2.8	5.1	7.4	17.9	27.3	43.6	81.8
		220°		1.3	2.7	4.9	7.1	17.2	26.1	41.8	78.4
		140°	3	2.8	5.8	10.6	15.5	37.5	57.1	91.3	171.2
		180°		2.6	5.5	10.1	14.7	35.6	54.2	86.8	162.7
		220°		2.5	5.3	9.7	14.1	34.2	52.0	83.2	155.9
95° F	0° F	140°	0.75	1.5	3.2	5.9	8.6	20.8	31.7	50.7	95.0
(113.8)	(6.5)	180°		1.5	3.1	5.6	8.2	19.8	30.1	48.2	90.3
		220°		1.4	2.9	5.4	7.8	19.0	28.9	46.2	86.6
		140°	3	3.1	6.4	11.7	17.1	41.4	63.0	100.8	189.1
		180°		2.9	6.1	11.1	16.3	39.4	59.9	95.8	179.7
		220°		2.8	5.8	10.7	15.6	37.7	57.4	91.8	172.2
95° F	40° F	140°	0.75	1.7	3.5	6.4	9.4	22.7	34.6	55.3	103.7
(113.8)	(35.1)	180°		1.6	3.3	6.1	8.9	21.6	32.9	52.6	98.6
		220°		1.5	3.2	5.8	8.5	20.7	31.5	50.4	94.5
		140°	3	3.3	7.0	12.8	18.7	45.2	68.8	110.0	206.3
		180°		3.2	6.6	12.1	17.7	42.9	65.3	104.6	196.0
		220°		3.0	6.4	11.6	17.0	41.1	62.6	100.2	187.8
115° F	-40° F	140°	0.75	1.5	3.1	5.6	8.2	19.9	30.3	48.4	90.8
(158.4)	(14.7 in hg)	180°		1.4	2.9	5.3	7.7	18.7	28.5	45.6	85.4
		220°		1.3	2.8	5.0	7.4	17.8	27.1	43.4	81.4
		140°	3	2.9	6.1	11.2	16.4	39.7	60.3	96.5	181.0
		180°		2.8	5.8	10.5	15.4	37.3	56.7	90.8	170.2
		220°		2.6	5.5	10.0	14.7	35.5	54.0	86.5	162.1
115° F	0° F	140°	0.75	1.6	3.4	6.3	9.2	22.2	33.9	54.2	101.6
(158.4)	(6.5)	180°		1.5	3.2	5.9	8.6	20.9	31.8	51.0	95.5
		220°		1.5	3.1	5.6	8.2	19.9	30.3	48.5	91.0
		140°	3	3.3	6.8	12.5	18.3	44.4	67.5	108.0	202.5
		180°		3.1	6.4	11.8	17.2	41.7	63.5	101.5	190.4
		220°		2.9	6.1	11.2	16.4	39.7	60.4	96.7	181.3
115° F	40° F	140°	0.75	1.8	3.8	6.9	10.1	24.5	37.3	59.7	111.9
(158.4)	(35.1)	180°		1.7	3.6	6.5	9.5	23.1	35.1	56.2	105.3
		220°		1.6	3.4	6.2	9.1	22.0	33.4	53.5	100.3
		140°	3	3.6	7.5	13.8	20.2	48.9	74.4	119.0	223.1
		180°		3.4	7.1	13.0	19.0	46.0	69.9	111.9	209.8
		220°		3.2	6.8	12.4	18.1	43.8	66.6	106.6	199.8

CK4A Hot Gas Discharge Capacities (Kilowatts) R134a

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
25° C	-40° C	60°	0.05	4.5	9.3	17.1	25.0	60.6	92.2	147.4	276.5
(5.5)	(373 mm hg)	80°		4.3	9.0	16.4	24.0	58.2	88.5	141.6	265.5
		100°		4.1	8.7	15.9	23.2	56.1	85.4	136.6	256.2
		60°	0.21	9.1	19.0	34.8	50.9	123.2	187.5	300.1	562.6
		80°		8.7	18.3	33.4	48.9	118.3	180.0	288.1	540.1
		100°		8.4	17.6	32.3	47.1	114.1	173.7	277.9	521.1
25° C	-20° C	60°	0.05	4.9	10.1	18.6	27.2	65.7	100.0	160.1	300.1
(5.5)	(91.4 mm hg)	80°		4.7	9.7	17.8	26.1	63.1	96.1	153.7	288.2
		100°		4.5	9.4	17.2	25.2	60.9	92.7	148.3	278.1
		60°	0.21	9.9	20.7	37.8	55.3	133.8	203.6	325.8	610.8
		80°		9.5	19.8	36.3	53.1	128.4	195.5	312.7	586.4
		100°		9.2	19.1	35.0	51.2	123.9	188.6	301.7	565.7
25° C	0° C	60°	0.05	5.2	10.9	20.0	29.2	70.8	107.7	172.3	323.0
(5.5)	(1.9)	80°		5.0	10.5	19.2	28.1	67.9	103.4	165.4	310.2
		100°		4.8	10.1	18.5	27.1	65.6	99.8	159.6	299.3
		60°	0.21	10.6	22.2	40.7	59.5	144.0	219.1	350.6	657.4
		80°		10.2	21.3	39.1	57.1	138.2	210.4	336.6	631.1
		100°		9.9	20.6	37.7	55.1	133.4	203.0	324.7	608.9
30° C	-40° C	60°	0.05	4.6	9.7	17.7	25.9	62.7	95.3	152.5	286.0
(6.7)	(373 mm hg)	80°		4.4	9.3	17.0	24.8	60.0	91.3	146.1	274.0
		100°		4.3	8.9	16.3	23.9	57.8	88.0	140.8	264.0
		60°	0.21	9.4	19.7	36.1	52.7	127.6	194.2	310.7	582.5
		80°		9.0	18.9	34.5	50.5	122.2	185.9	297.5	557.8
		100°		8.7	18.2	33.3	48.6	117.7	179.1	286.6	537.3
30° C	-20° C	60°	0.05	5.0	10.5	19.3	28.2	68.3	103.9	166.3	311.7
(6.7)	(91.4 mm hg)	80°		4.8	10.1	18.5	27.0	65.4	99.5	159.3	298.6
		100°		4.7	9.7	17.8	26.0	63.0	95.9	153.5	287.7
		60°	0.21	10.3	21.5	39.3	57.4	139.1	211.6	338.6	634.8
		80°		9.8	20.6	37.6	55.0	133.2	202.7	324.2	608.0
		100°		9.5	19.8	36.3	53.0	128.3	195.2	312.3	585.6
30° C	0° C	60°	0.05	5.4	11.4	20.8	30.5	73.7	112.2	179.5	336.6
(6.7)	(1.9)	80°		5.2	10.9	20.0	29.2	70.6	107.5	172.0	322.4
		100°		5.0	10.5	19.2	28.1	68.1	103.6	165.7	310.7
		60°	0.21	11.1	23.2	42.4	62.0	150.1	228.5	365.6	685.4
		80°		10.6	22.2	40.6	59.4	143.8	218.8	350.1	656.4
		100°		10.2	21.4	39.1	57.2	138.5	210.8	337.2	632.3
35° C	-40° C	60°	0.05	4.8	10.0	18.3	26.7	64.6	98.3	157.3	294.9
(7.8)	(373 mm hg)	80°		4.6	9.5	17.4	25.5	61.7	93.9	150.3	281.7
		100°		4.4	9.2	16.8	24.5	59.3	90.3	144.5	270.9
		60°	0.21	9.7	20.3	37.2	54.4	131.7	200.4	320.7	601.3
		80°		9.3	19.4	35.5	51.9	125.8	191.4	306.2	574.1
		100°		8.9	18.7	34.2	49.9	120.9	184.0	294.4	552.0
35° C	-20° C	60°	0.05	5.2	10.9	20.0	29.2	70.7	107.6	172.2	322.9
(7.8)	(91.4 mm hg)	80°		5.0	10.4	19.1	27.9	67.6	102.8	164.5	308.4
		100°		4.8	10.0	18.4	26.8	65.0	98.9	158.2	296.6
		60°	0.21	10.7	22.3	40.7	59.6	144.2	219.4	351.0	658.2
		80°		10.2	21.2	38.9	56.9	137.7	209.5	335.2	628.5
		100°		9.8	20.4	37.4	54.7	132.4	201.4	322.3	604.2
35° C	0° C	60°	0.05	5.7	11.8	21.7	31.7	76.6	116.6	186.6	349.8
(7.8)	(1.9)	80°		5.4	11.3	20.7	30.2	73.2	111.4	178.2	334.2
		100°		5.2	10.9	19.9	29.1	70.4	107.1	171.4	321.3
		60°	0.21	11.5	24.1	44.2	64.5	156.2	237.7	380.4	713.2
		80°		11.0	23.0	42.2	61.6	149.2	227.0	363.2	681.0
		100°		10.6	22.1	40.5	59.2	143.4	218.2	349.2	654.7

CK4A Hot Gas Discharge Capacities (Tons) R404a

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
75° F	-40° F	140°	0.75	1.4	3.0	5.4	7.9	19.2	29.3	46.8	87.8
(161.2)	(2.7)	180°		1.4	2.8	5.2	7.6	18.3	27.8	44.5	83.5
		220°		1.3	2.7	5.0	7.2	17.5	26.7	42.6	80.0
		140°	3	2.8	5.9	10.8	15.8	38.4	58.4	93.4	175.1
		180°		2.7	5.6	10.3	15.1	36.5	55.5	88.8	166.4
		220°		2.6	5.4	9.9	14.4	34.9	53.1	85.0	159.3
75° F	0° F	140°	0.75	1.6	3.3	6.1	8.9	21.5	32.8	52.5	98.3
(161.2)	(33.5)	180°		1.5	3.2	5.8	8.5	20.5	31.2	49.9	93.5
		220°		1.4	3.0	5.5	8.1	19.6	29.8	47.7	89.5
		140°	3	3.2	6.6	12.1	17.7	42.9	65.4	104.6	196.1
		180°		3.0	6.3	11.5	16.9	40.8	62.1	99.4	186.3
		220°		2.9	6.0	11.0	16.1	39.1	59.5	95.1	178.4
75° F	40° F	140°	0.75	1.7	3.7	6.7	9.8	23.7	36.0	57.6	108.0
(161.2)	(86.4)	180°		1.7	3.5	6.4	9.3	22.5	34.2	54.8	102.7
		220°		1.6	3.3	6.1	8.9	21.5	32.8	52.4	98.3
		140°	3	3.5	7.3	13.3	19.5	47.2	71.8	114.8	215.3
		180°		3.3	6.9	12.7	18.5	44.8	68.2	109.2	204.7
		220°		3.2	6.6	12.1	17.7	42.9	65.3	104.5	195.9
95° F	-40° F	140°	0.75	1.4	3.0	5.5	8.1	19.6	29.8	47.6	89.3
(219.4)	(2.7)	180°		1.4	2.8	5.2	7.6	18.4	28.0	44.8	84.1
		220°		1.3	2.7	5.0	7.2	17.5	26.7	42.6	80.0
		140°	3	2.9	6.0	11.0	16.1	39.1	59.4	95.1	178.3
		180°		2.7	5.7	10.4	15.2	36.7	55.9	89.5	167.7
		220°		2.6	5.4	9.9	14.4	34.9	53.2	85.1	159.5
95° F	0° F	140°	0.75	1.6	3.4	6.3	9.2	22.3	34.0	54.3	101.9
(219.4)	(33.5)	180°		1.6	3.2	5.9	8.7	21.0	32.0	51.1	95.9
		220°		1.5	3.1	5.6	8.3	20.0	30.4	48.6	91.2
		140°	3	3.3	6.9	12.6	18.4	44.5	67.8	108.5	203.4
		180°		3.1	6.5	11.8	17.3	41.9	63.8	102.0	191.3
		220°		2.9	6.2	11.3	16.5	39.9	60.7	97.0	182.0
95° F	40° F	140°	0.75	1.8	3.8	7.0	10.3	24.8	37.8	60.5	113.4
(219.4)	(86.4)	180°		1.7	3.6	6.6	9.7	23.4	35.6	56.9	106.7
		220°		1.6	3.4	6.3	9.2	22.2	33.9	54.2	101.6
		140°	3	3.7	7.7	14.0	20.5	49.6	75.5	120.8	226.4
		180°		3.4	7.2	13.2	19.3	46.7	71.0	113.6	213.0
		220°		3.3	6.8	12.5	18.3	44.4	67.5	108.0	202.6
115° F	-40° F	140°	0.75	1.4	2.9	5.4	7.9	19.1	29.1	46.5	87.2
(290.4)	(2.7)	180°		1.3	2.7	5.0	7.3	17.6	26.8	42.9	80.5
		220°		1.2	2.6	4.7	6.9	16.6	25.3	40.4	75.8
		140°	3	2.8	5.9	10.8	15.8	38.2	58.1	92.9	174.2
		180°		2.6	5.4	10.0	14.5	35.2	53.6	85.7	160.8
		220°		2.5	5.1	9.4	13.7	33.2	50.5	80.7	151.4
115° F	0° F	140°	0.75	1.7	3.5	6.3	9.3	22.4	34.1	54.6	102.4
(290.4)	(33.5)	180°		1.5	3.2	5.9	8.6	20.7	31.5	50.4	94.5
		220°		1.4	3.0	5.5	8.1	19.5	29.7	47.5	89.0
		140°	3	3.3	6.9	12.7	18.5	44.8	68.2	109.1	204.5
		180°		3.1	6.4	11.7	17.1	41.3	62.9	100.6	188.7
		220°		2.9	6.0	11.0	16.1	38.9	59.2	94.8	177.7
115° F	40° F	140°	0.75	1.9	3.9	7.2	10.5	25.5	38.8	62.0	116.3
(290.4)	(86.4)	180°		1.7	3.6	6.6	9.7	23.5	35.8	57.3	107.4
		220°		1.6	3.4	6.3	9.2	22.2	33.7	53.9	101.2
		140°	3	3.8	7.9	14.4	21.0	50.9	77.5	123.9	232.4
		180°		3.5	7.3	13.3	19.4	47.0	71.5	114.4	214.4
		220°		3.3	6.8	12.5	18.3	44.2	67.3	107.7	201.9

CK4A Hot Gas Discharge Capacities (Kilowatts) R404a

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
25° C	-40° C	60°	0.05	4.9	10.2	18.7	27.3	66.1	100.5	160.9	301.6
(11.2)	(0.3)	80°		4.7	9.7	17.8	26.0	63.1	96.0	153.5	287.9
		100°		4.5	9.3	17.1	25.0	60.6	92.2	147.5	276.5
		60°	0.21	10.0	20.8	38.1	55.7	134.9	205.3	328.5	615.9
		80°		9.5	19.9	36.4	53.2	128.7	195.9	313.4	587.7
		100°		9.1	19.1	34.9	51.1	123.6	188.1	300.9	564.3
25° C	-20° C	60°	0.05	5.4	11.3	20.7	30.3	73.4	111.6	178.6	334.9
(11.2)	(2.0)	80°		5.2	10.8	19.8	28.9	70.0	106.6	170.5	319.7
		100°		5.0	10.4	19.0	27.8	67.3	102.3	163.7	307.0
		60°	0.21	11.1	23.1	42.3	61.9	149.8	228.0	364.8	683.9
		80°		10.6	22.1	40.4	59.0	143.0	217.5	348.1	652.6
		100°		10.1	21.2	38.8	56.7	137.3	208.9	334.2	626.6
25° C	0° C	60°	0.05	5.9	12.4	22.7	33.1	80.2	122.0	195.2	366.0
(11.2)	(4.9)	80°		5.7	11.8	21.6	31.6	76.5	116.5	186.3	349.4
		100°		5.4	11.3	20.8	30.4	73.5	111.8	178.9	335.5
		60°	0.21	12.1	25.3	46.3	67.6	163.7	249.1	398.6	747.4
		80°		11.5	24.1	44.2	64.5	156.2	237.7	380.4	713.2
		100°		11.1	23.2	42.4	62.0	150.0	228.3	365.2	684.8
30° C	-40° C	60°	0.05	4.9	10.3	18.8	27.5	66.6	101.4	162.2	304.2
(13.1)	(0.3)	80°		4.7	9.8	17.9	26.2	63.4	96.4	154.3	289.3
		100°		4.5	9.4	17.2	25.1	60.7	92.4	147.8	277.1
		60°	0.21	10.1	21.0	38.5	56.2	136.1	207.2	331.5	621.5
		80°		9.6	20.0	36.6	53.5	129.4	197.0	315.1	590.9
		100°		9.2	19.1	35.0	51.2	124.0	188.6	301.8	565.9
30° C	-20° C	60°	0.05	5.5	11.5	21.1	30.8	74.5	113.4	181.5	340.2
(13.1)	(2.0)	80°		5.2	10.9	20.0	29.3	70.9	107.9	172.6	323.6
		100°		5.0	10.5	19.2	28.0	67.9	103.3	165.3	310.0
		60°	0.21	11.3	23.5	43.0	62.9	152.3	231.7	370.8	695.2
		80°		10.7	22.3	40.9	59.8	144.8	220.3	352.5	660.9
		100°		10.2	21.4	39.2	57.3	138.7	211.0	337.6	633.0
30° C	0° C	60°	0.05	6.1	12.6	23.1	33.8	81.9	124.6	199.4	373.9
(13.1)	(4.9)	80°		5.8	12.0	22.0	32.2	77.9	118.5	189.6	355.5
		100°		5.5	11.5	21.1	30.8	74.6	113.5	181.7	340.6
		60°	0.21	12.4	25.8	47.3	69.1	167.3	254.7	407.5	764.0
		80°		11.8	24.6	45.0	65.7	159.1	242.1	387.3	726.3
		100°		11.3	23.5	43.1	62.9	152.4	231.9	371.0	695.6
35° C	-40° C	60°	0.05	4.9	10.3	18.9	27.6	66.8	101.6	162.6	304.8
(15.1)	(0.3)	80°		4.7	9.8	17.9	26.1	63.2	96.2	153.9	288.5
		100°		4.5	9.3	17.1	24.9	60.3	91.8	146.9	275.5
		60°	0.21	10.1	21.1	38.6	56.4	136.6	207.8	332.5	623.5
		80°		9.6	19.9	36.5	53.4	129.2	196.6	314.6	589.8
		100°		9.1	19.0	34.9	51.0	123.4	187.7	300.4	563.2
35° C	-20° C	60°	0.05	5.6	11.6	21.3	31.1	75.3	114.6	183.4	343.9
(15.1)	(2.0)	80°		5.3	11.0	20.2	29.5	71.3	108.5	173.6	325.5
		100°		5.0	10.5	19.2	28.1	68.1	103.6	165.8	310.9
		60°	0.21	11.4	23.8	43.6	63.7	154.1	234.5	375.2	703.5
		80°		10.8	22.5	41.2	60.2	145.8	221.8	354.9	665.5
		100°		10.3	21.5	39.3	57.5	139.2	211.8	338.9	635.4
35° C	0° C	60°	0.05	6.2	12.9	23.6	34.4	83.3	126.8	202.9	380.4
(15.1)	(4.9)	80°		5.8	12.2	22.3	32.6	78.9	120.0	192.0	360.0
		100°		5.6	11.6	21.3	31.1	75.3	114.6	183.4	343.8
		60°	0.21	12.6	26.3	48.2	70.4	170.5	259.4	415.0	778.2
		80°		11.9	24.9	45.6	66.6	161.2	245.4	392.6	736.1
		100°		11.4	23.8	43.5	63.6	153.9	234.3	374.8	702.8

CK4A Hot Gas Discharge Capacities (Tons) R507

Cond Temp (Sat Pres) psig	Evap Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
75° F	-40° F	140°	0.75	1.4	3.0	5.5	8.0	19.4	29.6	47.3	88.8
(167)	(5.5)	180°		1.4	2.9	5.2	7.6	18.5	28.1	45.0	84.4
		220°		1.3	2.7	5.0	7.3	17.7	27.0	43.1	80.9
		140°	3	2.9	6.0	11.0	16.0	38.8	59.0	94.4	176.9
		180°		2.7	5.7	10.4	15.2	36.8	56.1	89.7	168.2
		220°		2.6	5.4	10.0	14.6	35.3	53.7	86.0	161.2
75° F	0° F	140°	0.75	1.6	3.3	6.1	8.9	21.6	32.9	52.7	98.8
(167)	(35.2)	180°		1.5	3.2	5.8	8.5	20.6	31.3	50.1	93.9
		220°		1.5	3.0	5.6	8.1	19.7	30.0	48.0	90.0
		140°	3	3.2	6.7	12.2	17.8	43.1	65.6	105.0	196.9
		180°		3.0	6.3	11.6	16.9	41.0	62.4	99.8	187.2
		220°		2.9	6.1	11.1	16.2	39.3	59.8	95.6	179.3
75° F	40° F	140°	0.75	1.8	3.7	6.7	9.8	23.7	36.1	57.7	108.2
(167)	(87.8)	180°		1.7	3.5	6.4	9.3	22.5	34.3	54.9	102.9
		220°		1.6	3.3	6.1	8.9	21.6	32.9	52.6	98.6
		140°	3	3.5	7.3	13.4	19.5	47.2	71.9	115.0	215.7
		180°		3.3	6.9	12.7	18.6	44.9	68.3	109.4	205.0
		220°		3.2	6.6	12.2	17.8	43.0	65.5	104.8	196.4
95° F	-40° F	140°	0.75	1.5	3.1	5.7	8.3	20.1	30.6	48.9	91.7
(226)	(5.5)	180°		1.4	2.9	5.3	7.8	18.9	28.8	46.1	86.4
		220°		1.3	2.8	5.1	7.4	18.0	27.4	43.9	82.3
		140°	3	3.0	6.2	11.3	16.6	40.1	61.0	97.6	183.0
		180°		2.8	5.8	10.7	15.6	37.7	57.4	91.9	172.3
		220°		2.7	5.5	10.2	14.9	36.0	54.7	87.5	164.1
95° F	0° F	140°	0.75	1.7	3.5	6.4	9.4	22.7	34.6	55.3	103.7
(226)	(35.2)	180°		1.6	3.3	6.0	8.8	21.4	32.5	52.1	97.6
		220°		1.5	3.1	5.8	8.4	20.4	31.0	49.6	93.0
		140°	3	3.3	7.0	12.8	18.7	45.3	68.9	110.3	206.8
		180°		3.2	6.6	12.1	17.6	42.7	64.9	103.9	194.7
		220°		3.0	6.3	11.5	16.8	40.6	61.8	98.9	185.5
95° F	40° F	140°	0.75	1.9	3.9	7.1	10.4	25.2	38.3	61.3	114.9
(226)	(87.8)	180°		1.8	3.7	6.7	9.8	23.7	36.1	57.7	108.2
		220°		1.7	3.5	6.4	9.3	22.6	34.4	55.0	103.1
		140°	3	3.7	7.8	14.2	20.7	50.2	76.4	122.3	229.2
		180°		3.5	7.3	13.4	19.5	47.3	72.0	115.1	215.9
		220°		3.3	7.0	12.7	18.6	45.0	68.5	109.7	205.6
115° F	-40° F	140°	0.75	1.5	3.1	5.7	8.3	20.2	30.7	49.1	92.1
(301)	(5.5)	180°		1.4	2.9	5.3	7.7	18.7	28.4	45.5	85.3
		220°		1.3	2.7	5.0	7.3	17.6	26.8	42.9	80.5
		140°	3	3.0	6.2	11.4	16.7	40.3	61.4	98.2	184.1
		180°		2.8	5.8	10.5	15.4	37.3	56.8	90.9	170.3
		220°		2.6	5.4	10.0	14.5	35.2	53.6	85.7	160.7
115° F	0° F	140°	0.75	1.7	3.6	6.6	9.6	23.3	35.5	56.8	106.5
(301)	(35.2)	180°		1.6	3.3	6.1	8.9	21.6	32.9	52.6	98.6
		220°		1.5	3.1	5.8	8.4	20.4	31.0	49.6	93.1
		140°	3	3.4	7.2	13.2	19.3	46.6	71.0	113.5	212.9
		180°		3.2	6.7	12.2	17.8	43.1	65.6	105.0	196.9
		220°		3.0	6.3	11.5	16.8	40.7	61.9	99.1	185.8
115° F	40° F	140°	0.75	1.9	4.1	7.4	10.9	26.3	40.0	64.0	120.1
(301)	(89.8)	180°		1.8	3.8	6.9	10.1	24.3	37.0	59.3	111.1
		220°		1.7	3.5	6.5	9.5	23.0	35.0	55.9	104.9
		140°	3	3.9	8.1	14.9	21.7	52.6	80.0	128.0	240.0
		180°		3.6	7.5	13.7	20.1	48.6	74.0	118.4	222.0
		220°		3.4	7.1	13.0	19.0	45.9	69.8	111.7	209.4

CK4A Hot Gas Discharge Capacities (Kilowatts) R507

Cond Temp (Sat Pres) bar	Evap Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop bar	1/2" 13 mm	3/4' 20 mm	1" 25 mm	1-1/4" 32 mm	2" 50 mm	2-1/2" 65 mm	3" 75 mm	4" 100 mm
25° C	-40° C	60°	0.05	4.9	10.3	18.9	27.6	66.8	101.7	162.8	305.2
(11.6)	(0.4)	80°		4.7	9.9	18.0	26.4	63.8	97.1	155.4	291.4
		100°		4.5	9.5	17.3	25.3	61.3	93.3	149.4	280.0
		60°	0.21	10.1	21.1	38.6	56.4	136.5	207.8	332.4	623.3
		80°		9.6	20.1	36.8	53.8	130.3	198.3	317.3	595.0
		100°		9.3	19.3	35.4	51.7	125.2	190.6	304.9	571.7
25° C	-20° C	60°	0.05	5.5	11.4	20.8	30.5	73.8	112.3	179.6	336.8
(11.6)	(2.1)	80°		5.2	10.9	19.9	29.1	70.4	107.2	171.5	321.6
		100°		5.0	10.4	19.1	28.0	67.7	103.0	164.8	309.1
		60°	0.21	11.1	23.3	42.6	62.2	150.7	229.3	366.9	687.9
		80°		10.6	22.2	40.6	59.4	143.8	218.9	350.2	656.6
		100°		10.2	21.3	39.1	57.1	138.2	210.3	336.5	631.0
25° C	0° C	60°	0.05	5.9	12.4	22.7	33.2	80.4	122.3	195.7	366.9
(11.6)	(5.2)	80°		5.7	11.8	21.7	31.7	76.7	116.8	186.8	350.3
		100°		5.5	11.4	20.8	30.5	73.7	112.2	179.5	336.6
		60°	0.21	12.1	25.3	46.4	67.8	164.1	249.8	399.6	749.3
		80°		11.6	24.2	44.3	64.7	156.7	238.4	381.5	715.3
		100°		11.1	23.2	42.5	62.2	150.5	229.1	366.5	687.3
30° C	-40° C	60°	0.05	5.0	10.5	19.2	28.1	67.9	103.3	165.4	310.0
(13.5)	(0.4)	80°		4.8	10.0	18.3	26.7	64.6	98.3	157.3	295.0
		100°		4.6	9.6	17.5	25.6	62.0	94.3	150.8	282.8
		60°	0.21	10.3	21.4	39.2	57.3	138.8	211.2	337.9	633.6
		80°		9.8	20.4	37.3	54.5	132.0	200.9	321.4	602.6
		100°		9.4	19.5	35.8	52.3	126.5	192.6	308.1	577.7
30° C	-20° C	60°	0.05	5.6	11.6	21.3	31.1	75.4	114.8	183.6	344.3
(13.5)	(2.1)	80°		5.3	11.1	20.3	29.6	71.7	109.2	174.7	327.5
		100°		5.1	10.6	19.4	28.4	68.8	104.7	167.5	314.0
		60°	0.21	11.4	23.8	43.6	63.7	154.1	234.5	375.2	703.6
		80°		10.8	22.6	41.4	60.5	146.6	223.1	356.9	669.2
		100°		10.4	21.7	39.7	58.0	140.5	213.8	342.1	641.5
30° C	0° C	60°	0.05	6.1	12.7	23.3	34.1	82.5	125.6	201.0	376.8
(13.5)	(5.2)	80°		5.8	12.1	22.2	32.4	78.5	119.5	191.2	358.5
		100°		5.6	11.6	21.3	31.1	75.3	114.6	183.3	343.7
		60°	0.21	12.5	26.0	47.7	69.7	168.7	256.7	410.7	770.0
		80°		11.9	24.8	45.3	66.3	160.4	244.1	390.6	732.4
		100°		11.4	23.7	43.5	63.5	153.8	234.0	374.5	702.1
35° C	-40° C	60°	0.05	5.1	10.6	19.4	28.4	68.7	104.5	167.2	313.4
(15.6)	(0.4)	80°		4.8	10.0	18.4	26.9	65.0	98.9	158.3	296.8
		100°		4.6	9.6	17.6	25.7	62.2	94.6	151.4	283.8
		60°	0.21	10.4	21.7	39.7	58.0	140.3	213.6	341.7	640.7
		80°		9.8	20.5	37.6	54.9	132.9	202.2	323.5	606.6
		100°		9.4	19.6	35.9	52.5	127.0	193.3	309.3	579.9
35° C	-20° C	60°	0.05	5.7	11.9	21.7	31.7	76.8	116.8	186.9	350.5
(15.6)	(2.1)	80°		5.4	11.2	20.5	30.0	72.7	110.6	177.0	331.9
		100°		5.1	10.7	19.6	28.7	69.5	105.8	169.3	317.4
		60°	0.21	11.6	24.2	44.4	64.8	156.9	238.8	382.1	716.5
		80°		11.0	22.9	42.0	61.4	148.6	226.1	361.8	678.3
		100°		10.5	21.9	40.1	58.7	142.0	216.1	345.8	648.4
35° C	0° C	60°	0.05	6.2	13.0	23.9	34.9	84.5	128.6	205.7	385.7
(15.6)	(5.2)	80°		5.9	12.4	22.6	33.1	80.0	121.8	194.8	365.3
		100°		5.7	11.8	21.6	31.6	76.5	116.4	186.3	349.3
		60°	0.21	12.8	26.7	48.8	71.3	172.7	262.8	420.5	788.5
		80°		12.1	25.2	46.2	67.5	163.5	248.8	398.2	746.5
		100°		11.6	24.1	44.2	64.6	156.3	237.9	380.6	713.6

A9 and A8_0 Condenser Bypass Capacities (Tons) R22

Cond Temp (Sat pres) psig	Ev. Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
75° F	-40° F	140°	10	3.5	9.9	28.1	39.8	14.4	36.9	52.4	66.9	117.8	176.0	308.9
(132)	(5.5)	180°		3.6	10.1	28.7	40.6	14.8	38.0	54.0	68.9	121.4	181.4	318.4
		220°		3.7	10.3	29.3	41.5	15.1	38.9	55.2	70.4	124.1	185.5	325.5
		140°	15	4.3	12.3	35.0	49.9	17.9	46.2	65.8	84.1	147.6	221.1	387.3
		180°		4.4	12.5	35.7	50.9	18.4	47.6	67.8	86.7	152.2	227.9	399.2
		220°		4.5	12.8	36.5	52.0	18.8	48.7	69.3	88.7	155.6	233.0	408.1
75° F	0° F	140°	10	3.7	10.5	29.8	42.2	15.3	39.2	55.6	70.9	124.9	186.8	327.7
(132)	(35.2)	180°		3.8	10.7	30.4	43.1	15.7	40.4	57.3	73.1	128.7	192.5	337.8
		220°		3.9	10.9	31.1	44.0	16.1	41.3	58.5	74.7	131.6	196.8	345.3
		140°	15	4.6	13.0	37.1	53.0	18.9	49.0	69.8	89.2	156.5	234.4	410.6
		180°		4.7	13.3	37.8	54.0	19.5	50.5	71.9	91.9	161.3	241.6	423.2
		220°		4.8	13.6	38.7	55.2	20.0	51.6	73.5	94.0	164.9	247.0	432.6
75° F	40° F	140°	10	3.9	11.0	31.4	44.4	16.0	41.1	58.4	74.5	131.3	196.3	344.4
(132)	(87.8)	180°		4.0	11.2	32.0	45.3	16.5	42.4	60.2	76.8	135.3	202.3	355.0
		220°		4.1	11.5	32.7	46.2	16.9	43.4	61.5	78.5	138.3	206.8	362.9
		140°	15	4.8	13.7	39.0	55.6	19.9	51.4	73.3	93.7	164.4	246.3	431.3
		180°		4.9	13.9	39.8	56.7	20.5	53.0	75.6	96.6	169.5	253.8	444.6
		220°		5.0	14.2	40.6	58.0	21.0	54.2	77.2	98.7	173.3	259.5	454.5
95° F	-40° F	140°	10	2.9	8.1	23.0	32.4	11.7	30.0	42.5	54.3	95.8	143.0	251.2
(182)	(5.5)	180°		2.9	8.2	23.4	32.9	12.1	30.9	43.7	55.8	98.5	147.1	258.3
		220°		3.0	8.4	23.9	33.6	12.3	31.5	44.7	57.0	100.6	150.2	263.8
		140°	15	3.5	9.9	28.4	40.2	14.5	37.3	53.0	67.6	119.0	178.0	312.1
		180°		3.6	10.1	28.9	41.0	14.9	38.3	54.4	69.5	122.4	183.0	321.0
		220°		3.7	10.3	29.5	41.8	15.2	39.2	55.6	71.0	125.0	186.9	327.9
95° F	0° F	140°	10	3.1	8.6	24.5	34.5	12.5	32.0	45.4	57.9	102.2	152.6	268.0
(182)	(35.2)	180°		3.1	8.8	24.9	35.1	12.9	32.9	46.7	59.5	105.0	156.9	275.5
		220°		3.2	8.9	25.5	35.9	13.2	33.7	47.7	60.8	107.3	160.2	281.5
		140°	15	3.8	10.6	30.2	42.9	15.4	39.7	56.5	72.1	126.9	189.7	332.8
		180°		3.8	10.8	30.8	43.7	15.9	40.9	58.1	74.1	130.4	195.1	342.2
		220°		3.9	11.0	31.4	44.6	16.2	41.7	59.3	75.7	133.3	199.3	349.6
95° F	40° F	140°	10	3.2	9.1	25.9	36.4	13.2	33.8	47.9	61.1	107.8	161.1	282.9
(182)	(87.8)	180°		3.3	9.2	26.3	37.1	13.6	34.8	49.3	62.8	110.9	165.6	290.9
		220°		3.4	9.4	26.9	37.9	13.9	35.5	50.3	64.2	113.2	169.1	297.1
		140°	15	4.0	11.2	31.9	45.3	16.3	41.9	59.6	76.1	133.8	200.2	351.1
		180°		4.1	11.4	32.5	46.1	16.8	43.1	61.3	78.2	137.6	205.9	361.1
		220°		4.1	11.6	33.2	47.0	17.1	44.0	62.6	79.9	140.6	210.3	368.8
115° F	-40° F	140°	10	2.4	6.8	19.3	27.1	9.9	25.2	35.7	45.5	80.3	119.9	210.7
(243)	(5.5)	180°		2.5	6.9	19.6	27.5	10.1	25.8	36.5	46.5	82.2	122.7	215.7
		220°		2.5	7.0	20.0	28.1	10.3	26.3	37.2	47.5	83.9	125.2	220.0
		140°	15	3.0	8.4	23.8	33.6	12.2	31.2	44.2	56.4	99.4	148.5	260.8
		180°		3.0	8.5	24.1	34.1	12.5	31.9	45.2	57.7	101.8	152.1	267.0
		220°		3.1	8.6	24.6	34.7	12.7	32.6	46.2	58.9	103.8	155.1	272.4
115° F	0° F	140°	10	2.6	7.3	20.7	29.2	10.6	27.1	38.3	48.8	86.3	128.8	226.3
(243)	(35.2)	180°		2.6	7.4	21.0	29.6	10.9	27.7	39.2	50.0	88.3	131.8	231.7
		220°		2.7	7.5	21.4	30.1	11.1	28.3	40.0	51.0	90.1	134.5	236.3
		140°	15	3.2	9.0	25.5	36.1	13.1	33.5	47.4	60.5	106.7	159.5	279.9
		180°		3.2	9.1	25.9	36.6	13.4	34.3	48.6	62.0	109.3	163.3	286.6
		220°		3.3	9.3	26.4	37.3	13.6	35.0	49.5	63.2	111.5	166.6	292.4
115° F	40° F	140°	10	2.8	7.7	22.0	30.9	11.3	28.7	40.6	51.8	91.6	136.7	240.2
(243)	(87.8)	180°		2.8	7.8	22.3	31.4	11.5	29.4	41.6	53.0	93.7	139.9	245.9
		220°		2.9	8.0	22.8	32.0	11.8	30.0	42.4	54.1	95.6	142.7	250.8
		140°	15	3.4	9.5	27.1	38.3	13.8	35.5	50.3	64.2	113.2	169.2	297.0
		180°		3.4	9.7	27.5	38.8	14.2	36.3	51.5	65.7	115.9	173.2	304.1
		220°		3.5	9.8	28.0	39.6	14.5	37.1	52.6	67.1	118.2	176.7	310.2

A9 and A8_0 Condenser Bypass Capacities (Kilowatts) R22

Cond Temp (Sat Pres) bar	Ev. Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
25° C	-40° C	60°	0.7	12.9	36.1	103.0	145.7	52.6	135.1	191.7	244.7	431.1	644.4	1130.8
(9.2)	(0.4)	80°		13.1	36.8	104.9	148.4	53.6	137.6	195.2	249.2	438.9	656.2	1151.5
		100°		13.4	37.5	107.0	151.3	54.7	140.3	199.1	254.1	447.6	669.1	1174.3
		60°	1	15.5	43.8	124.9	178.0	63.8	164.7	234.5	299.8	526.4	788.0	1380.7
		80°		15.8	44.6	127.2	181.3	65.0	167.7	238.9	305.3	536.0	802.5	1406.1
		100°		16.1	45.5	129.8	184.9	66.2	171.1	243.6	311.3	546.7	818.4	1434.0
25° C	-20° C	60°	0.7	13.6	38.1	108.7	153.8	55.6	142.6	202.3	258.3	455.0	680.1	1193.5
(9.2)	(2.1)	80°		13.8	38.8	110.7	156.6	56.6	145.2	206.0	263.0	463.3	692.5	1215.4
		100°		14.1	39.6	112.9	159.7	57.7	148.1	210.1	268.2	472.4	706.2	1239.4
		60°	1	16.4	46.2	131.8	187.8	67.3	173.8	247.4	316.2	555.3	831.3	1456.6
		80°		16.7	47.1	134.2	191.3	68.5	177.0	252.0	322.0	565.5	846.6	1483.4
		100°		17.0	48.0	136.9	195.1	69.9	180.5	257.0	328.4	576.7	863.4	1512.8
25° C	0° C	60°	0.7	14.2	40.0	113.9	161.1	58.2	149.4	211.9	270.5	476.5	712.3	1250.1
(9.2)	(5.2)	80°		14.5	40.7	116.0	164.0	59.3	152.1	215.8	275.5	485.2	725.4	1273.0
		100°		14.8	41.5	118.3	167.3	60.4	155.1	220.1	280.9	494.8	739.7	1298.2
		60°	1	17.2	48.4	138.0	196.7	70.4	181.9	259.1	331.1	581.4	870.4	1525.1
		80°		17.5	49.3	140.6	200.3	71.7	185.3	263.8	337.2	592.1	886.4	1553.1
		100°		17.8	50.2	143.3	204.2	73.2	189.0	269.1	343.9	603.8	904.0	1583.9
30° C	-40° C	60°	0.7	11.6	32.6	92.9	131.1	47.5	121.6	172.4	220.0	387.9	579.7	1017.7
(10.9)	(0.4)	80°		11.8	33.2	94.5	133.4	48.3	123.8	175.5	223.9	394.8	589.9	1035.7
		100°		12.1	33.8	96.4	136.0	49.2	126.2	178.9	228.2	402.4	601.3	1055.8
		60°	1	14.0	39.4	112.2	159.4	57.3	147.6	209.9	268.2	471.5	705.4	1236.8
		80°		14.2	40.1	114.2	162.3	58.3	150.3	213.6	272.9	479.9	717.9	1258.8
		100°		14.5	40.8	116.5	165.4	59.5	153.2	217.8	278.2	489.2	731.9	1283.2
30° C	-20° C	60°	0.7	12.3	34.5	98.2	138.7	50.2	128.7	182.4	232.7	410.3	613.1	1076.5
(10.9)	(2.1)	80°		12.5	35.1	100.0	141.2	51.1	130.9	185.6	236.8	417.6	623.9	1095.5
		100°		12.8	35.8	101.9	143.9	52.1	133.5	189.2	241.4	425.7	636.1	1116.7
		60°	1	14.8	41.6	118.7	168.6	60.6	156.1	222.0	283.5	498.5	745.9	1307.7
		80°		15.1	42.3	120.8	171.6	61.7	158.9	225.9	288.5	507.3	759.1	1330.9
		100°		15.3	43.2	123.1	174.9	62.9	162.0	230.3	294.1	517.2	773.8	1356.8
30° C	0° C	60°	0.7	12.9	36.2	103.1	145.5	52.7	135.0	191.4	244.2	430.5	643.3	1129.5
(10.9)	(5.2)	80°		13.1	36.8	104.9	148.1	53.6	137.4	194.8	248.5	438.1	654.7	1149.5
		100°		13.4	37.5	107.0	151.0	54.7	140.1	198.5	253.3	446.6	667.4	1171.8
		60°	1	15.5	43.6	124.5	176.8	63.6	163.7	232.8	297.4	522.9	782.3	1371.6
		80°		15.8	44.4	126.7	180.0	64.7	166.6	236.9	302.6	532.2	796.2	1395.9
		100°		16.1	45.3	129.1	183.5	66.0	169.9	241.5	308.5	542.5	811.7	1423.1
35° C	-40° C	60°	0.7	10.6	29.7	84.6	119.3	43.3	110.7	156.8	200.0	352.9	527.2	925.9
(12.6)	(0.4)	80°		10.8	30.2	86.1	121.3	44.0	112.6	159.4	203.4	358.9	536.0	941.5
		100°		11.0	30.8	87.7	123.6	44.8	114.7	162.5	207.2	365.6	546.2	959.3
		60°	1	12.7	35.8	102.0	144.6	52.1	134.0	190.3	243.0	427.6	639.5	1121.8
		80°		13.0	36.4	103.8	147.0	53.0	136.2	193.5	247.1	434.9	650.3	1140.8
		100°		13.2	37.1	105.7	149.8	54.0	138.8	197.2	251.7	443.1	662.6	1162.4
35° C	-20° C	60°	0.7	11.2	31.5	89.7	126.5	45.9	117.4	166.3	212.1	374.2	559.0	981.8
(12.6)	(2.1)	80°		11.4	32.0	91.3	128.6	46.6	119.4	169.1	215.7	380.5	568.4	998.3
		100°		11.7	32.6	93.0	131.0	47.5	121.6	172.3	219.7	387.7	579.1	1017.1
		60°	1	13.5	37.9	108.1	153.2	55.2	142.0	201.7	257.5	453.2	677.8	1188.9
		80°		13.7	38.6	110.0	155.8	56.2	144.4	205.1	261.8	460.9	689.2	1209.0
		100°		14.0	39.3	112.1	158.8	57.2	147.1	209.0	266.8	469.6	702.3	1232.0
35° C	0° C	60°	0.7	11.8	33.1	94.3	133.0	48.2	123.4	174.8	223.0	393.4	587.7	1032.2
(12.6)	(5.2)	80°		12.0	33.7	95.9	135.2	49.0	125.5	177.7	226.7	400.0	597.5	1049.5
		100°		12.2	34.3	97.8	137.8	50.0	127.9	181.1	231.0	407.6	608.8	1069.3
		60°	1	14.2	39.9	113.6	161.1	58.0	149.2	211.9	270.6	476.3	712.3	1249.5
		80°		14.4	40.5	115.6	163.8	59.0	151.8	215.5	275.2	484.4	724.3	1270.6
		100°		14.7	41.3	117.8	166.9	60.2	154.6	219.6	280.4	493.5	738.0	1294.7

A9 and A8_0 Condenser Bypass Capacities (Tons) R134a

Cond Temp (Sat pres) psig	Ev. Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
75° F	-40° F	140°	10	2.4	6.9	19.6	28.0	10.0	25.9	36.9	47.2	82.8	124.0	217.1
(78.6)	(5.5)	180°		2.5	7.1	20.3	29.1	10.6	27.4	39.0	49.9	87.5	131.1	229.5
		220°		2.6	7.4	21.1	30.2	11.0	28.4	40.5	51.8	90.8	136.1	238.3
		140°	15	3.0	8.6	24.5	35.6	12.5	32.7	47.0	60.3	105.1	157.9	275.5
		180°		3.1	8.9	25.4	36.9	13.2	34.6	49.7	63.8	111.1	166.9	291.2
		220°		3.2	9.2	26.4	38.3	13.7	35.9	51.6	66.2	115.3	173.2	302.3
75° F	0° F	140°	10	2.7	7.5	21.4	30.7	10.9	28.3	40.4	51.7	90.7	135.8	237.8
(78.6)	(35.2)	180°		2.8	7.8	22.2	31.8	11.6	30.0	42.7	54.7	95.8	143.6	251.4
		220°		2.9	8.1	23.1	33.0	12.0	31.1	44.4	56.8	99.5	149.1	260.9
		140°	15	3.3	9.4	26.8	38.9	13.6	35.8	51.4	66.0	114.9	172.6	301.2
		180°		3.4	9.7	27.8	40.4	14.4	37.8	54.4	69.7	121.4	182.5	318.4
		220°		3.5	10.1	28.8	41.9	15.0	39.3	56.4	72.4	126.0	189.4	330.5
75° F	40° F	140°	10	2.9	8.1	23.2	33.2	11.9	30.7	43.8	56.0	98.2	147.2	257.7
(78.6)	(87.8)	180°		3.0	8.4	24.1	34.5	12.5	32.5	46.3	59.2	103.8	155.6	272.4
		220°		3.1	8.8	25.0	35.8	13.0	33.7	48.1	61.5	107.8	161.5	282.7
		140°	15	3.6	10.1	29.0	42.1	14.7	38.7	55.7	71.4	124.3	186.8	325.9
		180°		3.7	10.5	30.1	43.7	15.6	40.9	58.8	75.5	131.4	197.5	344.5
		220°		3.8	10.9	31.2	45.3	16.2	42.5	61.1	78.3	136.4	205.0	357.6
95° F	-40° F	140°	10	2.0	5.5	15.8	22.4	8.0	20.7	29.5	37.6	66.2	99.0	173.6
(113.8)	(5.5)	180°		2.0	5.7	16.3	23.2	8.5	21.9	31.1	39.7	69.8	104.4	183.1
		220°		2.1	5.9	16.9	24.0	8.8	22.7	32.2	41.2	72.4	108.3	189.9
		140°	15	2.4	6.8	19.5	28.0	10.0	25.9	36.9	47.3	82.8	124.1	217.1
		180°		2.5	7.1	20.2	29.0	10.5	27.3	39.0	49.9	87.3	130.9	229.0
		220°		2.6	7.3	21.0	30.1	10.9	28.3	40.4	51.7	90.6	135.8	237.5
95° F	0° F	140°	10	2.2	6.1	17.5	24.8	8.9	22.9	32.6	41.7	73.3	109.6	192.2
(113.8)	(35.2)	180°		2.3	6.3	18.1	25.7	9.4	24.2	34.4	43.9	77.3	115.6	202.7
		220°		2.3	6.6	18.7	26.6	9.8	25.1	35.7	45.6	80.2	119.9	210.3
		140°	15	2.7	7.6	21.6	31.0	11.0	28.6	40.8	52.3	91.5	137.2	240.0
		180°		2.8	7.8	22.4	32.1	11.6	30.2	43.1	55.1	96.5	144.7	253.2
		220°		2.9	8.1	23.2	33.3	12.0	31.3	44.7	57.2	100.1	150.1	262.6
95° F	40° F	140°	10	2.4	6.7	19.1	27.1	9.7	25.1	35.7	45.5	80.1	119.8	210.1
(113.8)	(87.8)	180°		2.5	6.9	19.8	28.1	10.3	26.5	37.6	48.0	84.5	126.4	221.6
		220°		2.6	7.2	20.5	29.1	10.7	27.4	39.0	49.8	87.6	131.1	229.9
		140°	15	2.9	8.3	23.6	33.8	12.0	31.2	44.6	57.1	99.9	149.8	262.0
		180°		3.0	8.5	24.4	35.0	12.7	32.9	47.1	60.2	105.4	158.0	276.4
		220°		3.1	8.9	25.3	36.3	13.2	34.2	48.8	62.4	109.3	163.9	286.7
115° F	-40° F	140°	10	1.6	4.6	13.0	18.4	6.6	17.0	24.2	30.8	54.3	81.2	142.6
(158.4)	(5.5)	180°		1.7	4.7	13.4	19.0	7.0	17.9	25.4	32.4	57.1	85.3	149.8
		220°		1.7	4.9	13.9	19.6	7.2	18.5	26.3	33.5	59.1	88.4	155.1
		140°	15	2.0	5.6	16.1	22.9	8.2	21.2	30.1	38.5	67.6	101.2	177.4
		180°		2.1	5.8	16.6	23.6	8.6	22.2	31.7	40.4	71.1	106.4	186.4
		220°		2.1	6.0	17.2	24.5	8.9	23.0	32.8	41.9	73.6	110.2	193.1
115° F	0° F	140°	10	1.8	5.1	14.6	20.6	7.5	19.1	27.1	34.6	61.1	91.2	160.2
(158.4)	(35.2)	180°		1.9	5.3	15.1	21.3	7.8	20.1	28.5	36.4	64.1	95.8	168.3
		220°		2.0	5.5	15.6	22.1	8.1	20.8	29.5	37.7	66.4	99.3	174.3
		140°	15	2.2	6.3	18.0	25.7	9.2	23.7	33.8	43.2	75.9	113.5	199.0
		180°		2.3	6.5	18.6	26.5	9.7	24.9	35.5	45.4	79.7	119.3	209.1
		220°		2.4	6.8	19.3	27.4	10.0	25.8	36.8	47.0	82.6	123.6	216.6
115° F	40° F	140°	10	2.0	5.7	16.2	22.8	8.3	21.2	30.0	38.3	67.5	100.9	177.1
(158.4)	(87.8)	180°		2.1	5.9	16.7	23.6	8.7	22.2	31.5	40.2	70.9	106.0	186.1
		220°		2.2	6.1	17.3	24.4	9.0	23.0	32.7	41.7	73.5	109.8	192.7
		140°	15	2.5	7.0	19.9	28.3	10.2	26.2	37.3	47.7	83.8	125.4	219.7
		180°		2.6	7.2	20.6	29.3	10.7	27.6	39.2	50.1	88.0	131.7	230.9
		220°		2.7	7.5	21.3	30.3	11.1	28.5	40.6	51.9	91.2	136.5	239.2

A9 and A8_0 Condenser Bypass Capacities (Kilowatts) R134a

Cond Temp (Sat Pres) bar	Ev. Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
25° C	-40° C	60°	0.7	8.9	25.1	71.6	102.3	36.5	94.6	134.9	172.5	302.5	453.1	793.3
(5.5)	(0.4)	80°		9.2	25.9	74.0	105.9	37.8	97.8	139.6	178.5	312.9	468.8	820.7
		100°		9.5	26.8	76.6	109.6	39.1	101.3	144.4	184.7	323.8	485.1	849.4
		60°	1	10.7	30.5	87.3	126.4	44.5	116.4	167.1	214.1	373.4	560.8	979.1
		80°		11.1	31.6	90.3	130.8	46.0	120.4	172.9	221.6	386.3	580.2	1013.0
		100°		11.5	32.7	93.4	135.4	47.6	124.6	178.9	229.3	399.8	600.5	1048.4
25° C	-20° C	60°	0.7	9.6	27.2	77.8	111.2	39.7	102.8	146.6	187.5	328.7	492.4	862.0
(5.5)	(2.1)	80°		10.0	28.2	80.4	115.0	41.0	106.3	151.7	193.9	340.0	509.4	891.9
		100°		10.3	29.2	83.3	119.0	42.5	110.0	156.9	200.7	351.9	527.2	923.0
		60°	1	11.6	33.1	94.7	137.2	48.2	126.3	181.3	232.4	405.2	608.6	1062.6
		80°		12.1	34.3	98.0	142.0	49.9	130.7	187.6	240.4	419.3	629.7	1099.4
		100°		12.5	35.5	101.4	146.9	51.7	135.3	194.2	248.8	433.9	651.7	1137.8
25° C	0° C	60°	0.7	10.4	29.3	83.7	119.8	42.7	110.7	157.9	201.9	354.0	530.3	928.5
(5.5)	(5.2)	80°		10.8	30.4	86.6	123.9	44.2	114.5	163.3	208.9	366.2	548.7	960.6
		100°		11.1	31.4	89.7	128.2	45.8	118.5	169.0	216.2	379.0	567.8	994.1
		60°	1	12.5	35.6	101.9	147.6	51.9	135.9	195.1	250.1	436.0	654.9	1143.3
		80°		13.0	36.9	105.4	152.7	53.7	140.6	201.9	258.7	451.1	677.5	1182.9
		100°		13.4	38.2	109.1	158.1	55.6	145.6	208.9	267.7	466.9	701.2	1224.2
30° C	-40° C	60°	0.7	8.0	22.5	64.1	91.3	32.7	84.4	120.2	153.7	269.8	404.0	707.8
(6.7)	(0.4)	80°		8.2	23.2	66.2	94.4	33.8	87.3	124.3	158.9	279.0	417.7	731.9
		100°		8.5	24.0	68.5	97.6	35.0	90.3	128.6	164.4	288.7	432.1	757.2
		60°	1	9.6	27.2	77.7	111.9	39.6	103.2	147.7	189.2	330.6	496.0	867.1
		80°		9.9	28.1	80.4	115.7	41.0	106.7	152.8	195.6	341.9	512.9	896.7
		100°		10.3	29.1	83.1	119.7	42.4	110.4	158.1	202.4	353.7	530.7	927.7
30° C	-20° C	60°	0.7	8.7	24.5	69.9	99.6	35.7	92.2	131.2	167.7	294.5	440.9	772.5
(6.7)	(2.1)	80°		9.0	25.3	72.3	103.0	36.9	95.3	135.7	173.4	304.5	455.9	798.8
		100°		9.3	26.2	74.8	106.6	38.2	98.6	140.4	179.4	315.0	471.6	826.4
		60°	1	10.5	29.6	84.7	122.0	43.2	112.5	161.0	206.2	360.4	540.7	945.2
		80°		10.8	30.7	87.6	126.1	44.7	116.3	166.5	213.2	372.7	559.1	977.4
		100°		11.2	31.7	90.6	130.5	46.2	120.4	172.3	220.6	385.6	578.4	1011.2
30° C	0° C	60°	0.7	9.4	26.5	75.6	107.7	38.6	99.6	141.8	181.3	318.3	476.6	835.0
(6.7)	(5.2)	80°		9.7	27.4	78.2	111.3	39.9	103.0	146.7	187.4	329.2	492.8	863.4
		100°		10.1	28.3	80.9	115.2	41.3	106.6	151.7	193.9	340.5	509.8	893.3
		60°	1	11.3	32.0	91.5	131.7	46.6	121.5	173.9	222.6	389.2	583.9	1020.7
		80°		11.7	33.1	94.6	136.2	48.2	125.6	179.8	230.2	402.4	603.8	1055.4
		100°		12.1	34.3	97.9	140.9	49.9	130.0	186.0	238.2	416.4	624.6	1091.9
35° C	-40° C	60°	0.7	7.2	20.3	58.0	82.4	29.6	76.3	108.4	138.5	243.5	364.3	638.8
(7.8)	(0.4)	80°		7.5	21.0	59.9	85.1	30.6	78.8	112.0	143.1	251.6	376.4	660.1
		100°		7.7	21.7	62.0	88.0	31.6	81.5	115.8	148.0	260.2	389.3	682.6
		60°	1	8.7	24.6	70.1	100.5	35.8	92.8	132.5	169.6	297.0	445.1	778.9
		80°		9.0	25.4	72.4	103.8	37.0	95.9	137.0	175.2	306.9	460.0	804.9
		100°		9.3	26.2	74.9	107.4	38.2	99.2	141.6	181.2	317.3	475.6	832.3
35° C	-20° C	60°	0.7	7.9	22.3	63.6	90.3	32.5	83.6	118.9	151.9	267.1	399.6	700.6
(7.8)	(2.1)	80°		8.2	23.0	65.7	93.3	33.6	86.4	122.9	156.9	276.0	412.8	723.9
		100°		8.5	23.8	68.0	96.5	34.7	89.4	127.0	162.3	285.4	426.9	748.6
		60°	1	9.5	26.9	76.8	110.1	39.2	101.7	145.2	185.7	325.3	487.6	853.2
		80°		9.8	27.8	79.4	113.7	40.5	105.1	150.0	191.9	336.1	503.8	881.6
		100°		10.2	28.7	82.1	117.6	41.9	108.6	155.1	198.4	347.6	521.0	911.7
35° C	0° C	60°	0.7	8.6	24.2	69.0	98.0	35.2	90.8	129.0	164.8	289.9	433.6	760.3
(7.8)	(5.2)	80°		8.9	25.0	71.3	101.3	36.4	93.8	133.3	170.3	299.5	448.0	785.6
		100°		9.2	25.9	73.7	104.7	37.7	97.0	137.9	176.1	309.7	463.3	812.4
		60°	1	10.3	29.2	83.3	119.3	42.5	110.2	157.4	201.3	352.7	528.6	925.0
		80°		10.7	30.1	86.0	123.3	43.9	113.9	162.6	208.0	364.4	546.2	955.8
		100°		11.0	31.2	89.0	127.5	45.4	117.8	168.2	215.1	376.8	564.8	988.4

A9 and A8_0 Condenser Bypass Capacities (Tons) R404a

Cond Temp (Sat pres) psig	Ev. Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
75° F	-40° F	140°	10	2.2	6.2	17.7	25.0	9.1	23.2	32.9	42.0	74.0	110.6	194.2
(161.2)	(5.5)	180°		2.3	6.5	18.5	26.1	9.6	24.7	35.0	44.7	78.7	117.6	206.5
		220°		2.4	6.8	19.2	27.2	10.0	25.7	36.5	46.6	82.1	122.7	215.3
		140°	15	2.8	7.8	22.2	31.5	11.3	29.2	41.5	53.0	93.2	139.5	244.5
		180°		2.9	8.1	23.1	32.8	12.0	31.0	44.2	56.4	99.1	148.4	260.1
		220°		3.0	8.4	24.1	34.2	12.5	32.4	46.0	58.8	103.4	154.7	271.2
75° F	0° F	140°	10	2.5	7.0	19.9	28.1	10.2	26.1	37.0	47.2	83.2	124.4	218.3
(161.2)	(35.2)	180°		2.6	7.3	20.8	29.3	10.8	27.8	39.3	50.2	88.5	132.2	232.2
		220°		2.7	7.6	21.6	30.5	11.3	28.9	41.0	52.3	92.3	137.9	242.1
		140°	15	3.1	8.7	24.9	35.4	12.7	32.8	46.6	59.5	104.6	156.6	274.4
		180°		3.2	9.1	25.9	36.9	13.5	34.8	49.6	63.3	111.3	166.5	291.9
		220°		3.4	9.5	27.0	38.4	14.1	36.3	51.7	66.0	116.0	173.6	304.3
75° F	40° F	140°	10	2.7	7.7	21.9	31.0	11.2	28.7	40.8	52.0	91.7	137.0	240.5
(161.2)	(87.8)	180°		2.9	8.0	22.9	32.3	11.9	30.6	43.3	55.3	97.5	145.7	255.8
		220°		3.0	8.4	23.8	33.7	12.4	31.9	45.2	57.7	101.7	151.9	266.7
		140°	15	3.4	9.6	27.4	38.9	14.0	36.0	51.3	65.5	115.1	172.3	302.0
		180°		3.6	10.0	28.5	40.6	14.9	38.3	54.5	69.7	122.4	183.2	321.1
		220°		3.7	10.4	29.7	42.3	15.5	40.0	56.9	72.6	127.7	191.0	334.9
95° F	-40° F	140°	10	1.6	4.6	13.0	18.4	6.7	17.0	24.1	30.8	54.3	81.1	142.5
(219.4)	(5.5)	180°		1.7	4.8	13.5	19.0	7.1	18.0	25.5	32.5	57.4	85.8	150.7
		220°		1.8	4.9	14.1	19.8	7.3	18.8	26.6	33.9	59.8	89.3	156.9
		140°	15	2.0	5.7	16.2	23.0	8.3	21.3	30.2	38.6	68.0	101.6	178.3
		180°		2.1	5.9	16.9	23.8	8.8	22.5	32.0	40.8	71.9	107.5	188.6
		220°		2.2	6.2	17.5	24.8	9.1	23.5	33.3	42.5	74.8	111.9	196.3
95° F	0° F	140°	10	1.9	5.3	15.0	21.1	7.7	19.6	27.7	35.3	62.4	93.2	163.7
(219.4)	(35.2)	180°		2.0	5.5	15.5	21.9	8.1	20.7	29.3	37.4	66.0	98.5	173.2
		220°		2.0	5.7	16.2	22.8	8.4	21.6	30.5	38.9	68.7	102.6	180.2
		140°	15	2.3	6.5	18.6	26.3	9.5	24.4	34.7	44.2	77.9	116.5	204.4
		180°		2.4	6.8	19.3	27.3	10.1	25.8	36.7	46.8	82.4	123.2	216.3
		220°		2.5	7.1	20.1	28.4	10.5	26.9	38.2	48.7	85.8	128.3	225.1
95° F	40° F	140°	10	2.1	5.9	16.8	23.6	8.6	21.9	31.0	39.5	69.8	104.3	183.2
(219.4)	(87.8)	180°		2.2	6.1	17.4	24.5	9.1	23.2	32.8	41.8	73.9	110.3	193.8
		220°		2.3	6.4	18.1	25.5	9.4	24.1	34.1	43.5	76.9	114.8	201.7
		140°	15	2.6	7.3	20.8	29.4	10.6	27.3	38.7	49.4	87.1	130.2	228.5
		180°		2.7	7.6	21.6	30.5	11.2	28.9	41.0	52.3	92.1	137.7	241.7
		220°		2.8	7.9	22.5	31.8	11.7	30.1	42.6	54.4	95.9	143.3	251.6
115° F	-40° F	140°	10	1.2	3.3	9.4	13.2	4.8	12.3	17.4	22.1	39.1	58.4	102.7
(290.4)	(5.5)	180°		1.2	3.4	9.7	13.6	5.0	12.9	18.2	23.2	41.0	61.1	107.5
		220°		1.3	3.5	10.0	14.1	5.2	13.4	18.9	24.1	42.5	63.5	111.6
		140°	15	1.5	4.1	11.7	16.5	6.0	15.4	21.8	27.7	49.0	73.1	128.4
		180°		1.5	4.2	12.1	17.0	6.3	16.1	22.8	29.1	51.3	76.6	134.5
		220°		1.6	4.4	12.5	17.6	6.5	16.7	23.6	30.2	53.2	79.5	139.6
115° F	0° F	140°	10	1.4	3.9	11.2	15.7	5.7	14.6	20.7	26.3	46.5	69.5	122.1
(290.4)	(35.2)	180°		1.4	4.1	11.5	16.2	6.0	15.3	21.6	27.6	48.7	72.7	127.9
		220°		1.5	4.2	12.0	16.8	6.2	15.9	22.4	28.6	50.6	75.5	132.7
		140°	15	1.7	4.9	13.9	19.6	7.1	18.2	25.8	32.9	58.1	86.8	152.4
		180°		1.8	5.0	14.3	20.2	7.5	19.1	27.0	34.5	60.8	90.8	159.6
		220°		1.9	5.2	14.9	20.9	7.7	19.8	28.0	35.8	63.1	94.3	165.6
115° F	40° F	140°	10	1.6	4.5	12.9	18.0	6.6	16.8	23.7	30.2	53.4	79.7	140.1
(290.4)	(87.8)	180°		1.7	4.6	13.2	18.6	6.9	17.5	24.8	31.6	55.9	83.4	146.6
		220°		1.7	4.8	13.7	19.2	7.1	18.2	25.7	32.8	58.0	86.6	152.2
		140°	15	2.0	5.6	15.9	22.5	8.1	20.9	29.5	37.7	66.5	99.3	174.4
		180°		2.1	5.8	16.4	23.1	8.5	21.8	30.9	39.4	69.6	104.0	182.6
		220°		2.1	6.0	17.0	24.0	8.9	22.7	32.1	40.9	72.2	107.9	189.5

A9 and A8_0 Condenser Bypass Capacities (Kilowatts) R404a

Cond Temp (Sat Pres) bar	Ev. Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
25° C	-40° C	60°	0.7	8.0	22.4	63.9	90.1	32.6	83.6	118.5	151.2	266.7	398.5	699.6
(11.2)	(0.4)	80°		8.3	23.3	66.3	93.6	33.9	86.8	123.1	157.0	276.9	413.7	726.4
		100°		8.6	24.2	68.9	97.3	35.2	90.2	127.9	163.2	287.7	429.9	754.8
		60°	1	9.7	27.3	77.8	110.5	39.7	102.4	145.5	185.9	326.9	489.1	857.5
		80°		10.1	28.3	80.8	114.8	41.3	106.3	151.1	193.0	339.4	507.8	890.4
		100°		10.5	29.4	84.0	119.3	42.9	110.4	157.0	200.6	352.7	527.7	925.2
25° C	-20° C	60°	0.7	8.9	25.0	71.1	100.4	36.4	93.2	132.1	168.5	297.1	443.9	779.4
(11.2)	(2.1)	80°		9.2	25.9	73.9	104.3	37.8	96.7	137.1	175.0	308.5	460.9	809.3
		100°		9.6	26.9	76.8	108.4	39.2	100.5	142.5	181.8	320.5	479.0	840.9
		60°	1	10.8	30.4	86.6	123.0	44.2	113.9	161.9	206.8	363.7	544.1	954.0
		80°		11.2	31.5	89.9	127.7	45.9	118.3	168.1	214.8	377.6	565.0	990.6
		100°		11.6	32.8	93.4	132.7	47.7	122.9	174.7	223.2	392.4	587.1	1029.3
25° C	0° C	60°	0.7	9.8	27.3	77.9	110.0	39.8	102.1	144.7	184.6	325.5	486.3	853.9
(11.2)	(5.2)	80°		10.1	28.4	80.9	114.2	41.4	106.0	150.2	191.7	337.9	505.0	886.6
		100°		10.5	29.5	84.1	118.7	43.0	110.1	156.1	199.2	351.1	524.7	921.2
		60°	1	11.8	33.2	94.7	134.6	48.4	124.6	177.2	226.4	398.0	595.5	1044.0
		80°		12.3	34.5	98.4	139.8	50.2	129.4	184.0	235.0	413.3	618.3	1084.1
		100°		12.7	35.8	102.2	145.2	52.2	134.5	191.2	244.2	429.4	642.5	1126.4
30° C	-40° C	60°	0.7	6.9	19.3	55.1	77.6	28.1	72.0	102.0	130.1	229.6	342.9	602.3
(13.1)	(0.4)	80°		7.2	20.0	57.1	80.5	29.2	74.7	105.8	134.9	238.0	355.6	624.5
		100°		7.4	20.8	59.3	83.5	30.3	77.5	109.8	140.1	247.1	369.1	648.4
		60°	1	8.4	23.5	66.9	94.8	34.2	87.9	124.8	159.3	280.5	419.4	735.8
		80°		8.7	24.3	69.4	98.3	35.4	91.1	129.4	165.2	290.8	434.9	762.9
		100°		9.0	25.3	72.0	102.1	36.8	94.6	134.3	171.5	301.9	451.5	792.0
30° C	-20° C	60°	0.7	7.8	21.7	61.9	87.2	31.6	80.9	114.6	146.2	257.9	385.2	676.6
(13.1)	(2.1)	80°		8.0	22.5	64.1	90.4	32.8	83.9	118.8	151.5	267.4	399.4	701.5
		100°		8.3	23.4	66.6	93.8	34.0	87.1	123.3	157.3	277.6	414.7	728.3
		60°	1	9.4	26.3	75.1	106.4	38.3	98.6	140.0	178.7	314.6	470.4	825.3
		80°		9.7	27.3	77.8	110.3	39.8	102.2	145.1	185.3	326.2	487.8	855.7
		100°		10.1	28.3	80.8	114.5	41.3	106.1	150.7	192.4	338.6	506.4	888.4
30° C	0° C	60°	0.7	8.5	23.9	68.2	96.1	34.9	89.2	126.3	161.1	284.3	424.7	745.9
(13.1)	(5.2)	80°		8.9	24.8	70.7	99.6	36.1	92.5	131.0	167.1	294.8	440.3	773.4
		100°		9.2	25.8	73.4	103.4	37.5	96.0	136.0	173.4	306.0	457.1	802.9
		60°	1	10.3	29.0	82.7	117.1	42.2	108.5	154.1	196.8	346.4	518.0	908.7
		80°		10.7	30.1	85.7	121.4	43.8	112.5	159.8	204.0	359.2	537.1	942.2
		100°		11.1	31.2	89.0	126.1	45.5	116.8	165.9	211.8	372.9	557.6	978.2
35° C	-40° C	60°	0.7	6.0	16.7	47.7	67.1	24.4	62.3	88.2	112.4	198.5	296.5	520.9
(15.1)	(0.4)	80°		6.2	17.3	49.3	69.4	25.2	64.5	91.2	116.4	205.5	306.8	539.0
		100°		6.4	18.0	51.2	72.0	26.2	66.9	94.6	120.7	213.1	318.2	559.0
		60°	1	7.2	20.3	57.9	81.8	29.6	75.9	107.6	137.4	242.1	361.8	635.0
		80°		7.5	21.0	59.9	84.7	30.6	78.5	111.4	142.2	250.5	374.4	657.2
		100°		7.8	21.8	62.1	87.8	31.7	81.4	115.5	147.4	259.8	388.3	681.5
35° C	-20° C	60°	0.7	6.8	19.0	54.1	76.1	27.7	70.7	100.0	127.6	225.2	336.3	590.9
(15.1)	(2.1)	80°		7.0	19.7	56.0	78.8	28.6	73.1	103.5	132.0	233.1	348.1	611.6
		100°		7.3	20.4	58.1	81.7	29.7	75.9	107.4	136.9	241.7	361.0	634.2
		60°	1	8.2	23.0	65.5	92.7	33.5	85.9	121.9	155.6	274.2	409.8	719.3
		80°		8.5	23.8	67.8	95.9	34.7	88.9	126.2	161.0	283.7	424.1	744.4
		100°		8.8	24.7	70.4	99.5	35.9	92.2	130.8	167.0	294.3	439.8	772.0
35° C	0° C	60°	0.7	7.5	21.1	60.1	84.5	30.7	78.5	111.1	141.7	250.1	373.5	656.3
(15.1)	(5.2)	80°		7.8	21.8	62.2	87.5	31.8	81.2	115.0	146.6	258.9	386.6	679.2
		100°		8.1	22.6	64.5	90.7	33.0	84.2	119.2	152.0	268.5	400.9	704.3
		60°	1	9.1	25.5	72.7	102.8	37.2	95.3	135.2	172.6	304.1	454.6	797.8
		80°		9.4	26.4	75.3	106.4	38.5	98.7	140.0	178.6	314.7	470.4	825.7
		100°		9.8	27.4	78.0	110.3	39.9	102.3	145.1	185.2	326.4	487.9	856.3

A9 and A8_0 Condenser Bypass Capacities (Tons) R507

Cond Temp (Sat pres) psig	Ev. Temp (Sat Pres) psig	Discharge Temp °F	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
75° F	-40° F	140°	10	2.3	6.4	18.4	25.9	9.4	24.0	34.1	43.5	76.6	114.5	201.0
(167)	(5.5)	180°		2.4	6.7	19.2	27.1	10.0	25.7	36.4	46.4	81.9	122.4	214.9
		220°		2.5	7.0	20.1	28.3	10.5	26.8	38.0	48.5	85.6	127.8	224.5
		140°	15	2.8	8.0	22.8	32.5	11.7	30.1	42.8	54.6	96.0	143.7	251.9
		180°		3.0	8.4	23.9	34.0	12.5	32.1	45.7	58.4	102.7	153.6	269.3
		220°		3.1	8.8	25.0	35.5	13.0	33.6	47.8	61.0	107.2	160.5	281.3
75° F	0° F	140°	10	2.6	7.2	20.5	28.9	10.5	26.8	38.0	48.5	85.6	127.9	224.6
(167)	(35.2)	180°		2.7	7.5	21.4	30.3	11.2	28.7	40.7	51.9	91.5	136.7	240.1
		220°		2.8	7.9	22.4	31.6	11.7	30.0	42.5	54.2	95.6	142.8	250.8
		140°	15	3.2	8.9	25.5	36.2	13.0	33.5	47.7	60.9	107.1	160.3	281.0
		180°		3.3	9.3	26.7	37.9	13.9	35.9	51.0	65.2	114.5	171.4	300.4
		220°		3.5	9.8	27.9	39.6	14.5	37.5	53.3	68.1	119.6	179.0	313.9
75° F	40° F	140°	10	2.8	7.9	22.5	31.8	11.5	29.5	41.8	53.3	94.1	140.6	246.8
(167)	(87.8)	180°		2.9	8.3	23.6	33.2	12.3	31.5	44.7	57.0	100.6	150.2	263.8
		220°		3.1	8.6	24.6	34.7	12.9	32.9	46.7	59.6	105.1	157.0	275.6
		140°	15	3.5	9.8	28.0	39.8	14.3	36.8	52.4	66.9	117.6	176.0	308.5
		180°		3.6	10.3	29.3	41.6	15.3	39.4	56.0	71.5	125.7	188.1	329.8
		220°		3.8	10.7	30.6	43.5	16.0	41.1	58.5	74.7	131.3	196.5	344.5
95° F	-40° F	140°	10	1.8	5.0	14.1	19.8	7.2	18.4	26.1	33.2	58.7	87.6	154.0
(226)	(5.5)	180°		1.8	5.2	14.7	20.7	7.7	19.6	27.8	35.4	62.5	93.3	164.0
		220°		1.9	5.4	15.3	21.6	8.0	20.5	29.0	36.9	65.2	97.4	171.1
		140°	15	2.2	6.1	17.5	24.7	8.9	22.9	32.5	41.5	73.1	109.3	191.8
		180°		2.3	6.4	18.2	25.8	9.5	24.4	34.7	44.2	77.9	116.5	204.4
		220°		2.4	6.7	19.0	26.9	9.9	25.5	36.2	46.1	81.3	121.5	213.3
95° F	0° F	140°	10	2.0	5.6	16.0	22.6	8.2	20.9	29.6	37.8	66.7	99.7	175.1
(226)	(35.2)	180°		2.1	5.9	16.7	23.5	8.7	22.3	31.6	40.3	71.1	106.2	186.6
		220°		2.2	6.1	17.5	24.5	9.1	23.3	32.9	42.0	74.2	110.8	194.7
		140°	15	2.5	7.0	19.9	28.1	10.1	26.0	36.9	47.1	83.0	124.1	217.9
		180°		2.6	7.3	20.7	29.3	10.8	27.7	39.3	50.2	88.5	132.3	232.1
		220°		2.7	7.6	21.6	30.6	11.3	28.9	41.1	52.4	92.3	138.0	242.2
95° F	40° F	140°	10	2.2	6.3	17.9	25.1	9.1	23.3	33.0	42.1	74.3	111.0	195.1
(226)	(87.8)	180°		2.3	6.5	18.6	26.2	9.7	24.9	35.2	44.9	79.2	118.3	207.8
		220°		2.4	6.8	19.4	27.3	10.2	25.9	36.7	46.8	82.6	123.4	216.8
		140°	15	2.8	7.8	22.1	31.2	11.3	29.0	41.1	52.4	92.4	138.1	242.4
		180°		2.9	8.1	23.0	32.6	12.0	30.9	43.8	55.9	98.4	147.2	258.3
		220°		3.0	8.4	24.0	34.0	12.6	32.2	45.7	58.3	102.7	153.5	269.5
115° F	-40° F	140°	10	1.3	3.7	10.7	15.0	5.5	13.9	19.7	25.1	44.3	66.1	116.3
(301)	(5.5)	180°		1.4	3.9	11.1	15.5	5.8	14.7	20.8	26.5	46.9	70.0	123.0
		220°		1.4	4.0	11.5	16.2	6.0	15.3	21.7	27.6	48.8	72.8	128.1
		140°	15	1.7	4.7	13.2	18.7	6.8	17.3	24.5	31.3	55.2	82.5	144.9
		180°		1.7	4.8	13.7	19.4	7.2	18.3	26.0	33.1	58.4	87.3	153.3
		220°		1.8	5.0	14.3	20.1	7.5	19.1	27.0	34.5	60.8	90.9	159.6
115° F	0° F	140°	10	1.6	4.4	12.5	17.5	6.4	16.3	23.0	29.3	51.8	77.3	136.0
(301)	(35.2)	180°		1.6	4.5	12.9	18.2	6.8	17.2	24.3	31.0	54.8	81.8	143.8
		220°		1.7	4.7	13.5	18.9	7.0	17.9	25.3	32.3	57.1	85.2	149.7
		140°	15	1.9	5.4	15.5	21.8	7.9	20.2	28.6	36.5	64.4	96.2	169.0
		180°		2.0	5.6	16.0	22.6	8.4	21.4	30.3	38.6	68.2	101.8	178.8
		220°		2.1	5.9	16.7	23.5	8.7	22.3	31.5	40.2	71.0	106.0	186.2
115° F	40° F	140°	10	1.8	5.0	14.2	19.9	7.3	18.5	26.1	33.3	58.9	87.9	154.5
(301)	(87.8)	180°		1.8	5.2	14.7	20.6	7.7	19.6	27.6	35.2	62.3	93.0	163.5
		220°		1.9	5.4	15.3	21.5	8.0	20.4	28.8	36.7	64.9	96.8	170.2
		140°	15	2.2	6.2	17.5	24.7	9.0	22.9	32.5	41.4	73.1	109.2	191.8
		180°		2.3	6.4	18.2	25.6	9.5	24.3	34.4	43.8	77.4	115.5	203.0
		220°		2.4	6.6	18.9	26.7	9.9	25.3	35.8	45.6	80.5	120.3	211.3

A9 and A8_0 Condenser Bypass Capacities (Kilowatts) R507

Cond Temp (Sat Pres) bar	Ev. Temp (Sat Pres) bar	Discharge Temp °C	Pres Drop psi	A9 3/8" 9 mm	A9 5/8" 15 mm	A9 7/8" 22 mm	A9 1-1/8" 28 mm	A8AOE 3/8" 9 mm	A8AOE 5/8" 15 mm	A8AOE 7/8" 22 mm	A81OE 1-1/8" 28 mm	A81OE 1-3/8" 35 mm	A82OE 1-5/8" 42 mm	A82OE 2-1/8" 54 mm
25° C	-40° C	60°	0.7	8.3	23.4	66.6	94.0	34.0	87.2	123.6	157.7	278.1	415.5	729.6
(11.6)	(0.4)	80°		8.7	24.4	69.4	98.0	35.5	90.9	128.8	164.3	289.8	433.0	760.3
		100°		9.1	25.4	72.3	102.0	37.0	94.7	134.2	171.2	301.9	451.0	792.0
		60°	1	10.1	28.4	80.9	114.8	41.3	106.3	151.1	193.0	339.5	507.8	890.5
		80°		10.5	29.6	84.3	119.6	43.0	110.8	157.5	201.2	353.8	529.3	928.1
		100°		10.9	30.8	87.8	124.6	44.8	115.4	164.1	209.5	368.5	551.3	966.8
25° C	-20° C	60°	0.7	9.2	25.9	73.8	104.1	37.7	96.6	136.9	174.6	307.9	460.1	807.9
(11.6)	(2.1)	80°		9.6	27.0	76.9	108.5	39.3	100.6	142.6	182.0	320.9	479.5	841.9
		100°		10.0	28.1	80.1	113.0	40.9	104.8	148.6	189.5	334.3	499.4	877.0
		60°	1	11.2	31.4	89.4	127.0	45.7	117.6	167.1	213.5	375.5	561.7	985.0
		80°		11.6	32.7	93.2	132.3	47.6	122.6	174.2	222.5	391.3	585.4	1026.5
		100°		12.1	34.1	97.1	137.8	49.6	127.7	181.4	231.7	407.6	609.8	1069.3
25° C	0° C	60°	0.7	10.1	28.3	80.6	113.7	41.2	105.5	149.5	190.7	336.3	502.4	882.3
(11.6)	(5.2)	80°		10.5	29.5	84.0	118.5	42.9	109.9	155.8	198.7	350.5	523.6	919.4
		100°		10.9	30.7	87.5	123.4	44.7	114.5	162.2	207.0	365.0	545.4	957.7
		60°	1	12.2	34.2	97.6	138.5	49.8	128.3	182.4	232.9	409.7	612.9	1074.7
		80°		12.7	35.7	101.7	144.4	51.9	133.7	190.1	242.8	427.0	638.7	1120.0
		100°		13.2	37.2	105.9	150.4	54.1	139.3	198.0	252.9	444.8	665.3	1166.7
30° C	-40° C	60°	0.7	7.3	20.6	58.6	82.5	29.9	76.6	108.5	138.4	244.2	364.7	640.7
(13.5)	(0.4)	80°		7.6	21.4	61.0	85.9	31.2	79.8	113.0	144.1	254.3	379.8	667.1
		100°		8.0	22.3	63.5	89.5	32.5	83.1	117.6	150.0	264.7	395.4	694.5
		60°	1	8.9	24.9	70.9	100.5	36.2	93.1	132.2	168.8	297.1	444.3	779.5
		80°		9.2	25.9	73.9	104.6	37.7	97.0	137.7	175.7	309.4	462.6	811.7
		100°		9.6	27.0	76.9	108.9	39.3	101.0	143.3	183.0	322.1	481.7	845.1
30° C	-20° C	60°	0.7	8.2	22.9	65.3	92.0	33.4	85.4	120.9	154.3	272.2	406.6	714.3
(13.5)	(2.1)	80°		8.5	23.9	68.0	95.8	34.8	88.9	125.9	160.6	283.5	423.4	743.7
		100°		8.9	24.9	70.8	99.8	36.2	92.6	131.1	167.2	295.1	440.8	774.3
		60°	1	9.9	27.7	79.0	111.9	40.4	103.7	147.2	187.9	330.9	494.8	868.0
		80°		10.3	28.9	82.3	116.5	42.0	108.0	153.3	195.7	344.6	515.2	903.9
		100°		10.7	30.0	85.7	121.3	43.8	112.4	159.6	203.7	358.7	536.4	941.1
30° C	0° C	60°	0.7	9.0	25.2	71.7	101.0	36.7	93.8	132.8	169.4	298.9	446.5	784.3
(13.5)	(5.2)	80°		9.4	26.2	74.7	105.2	38.2	97.7	138.3	176.4	311.3	464.9	816.6
		100°		9.7	27.3	77.8	109.5	39.7	101.7	144.0	183.6	324.0	484.0	850.2
		60°	1	10.8	30.4	86.7	122.7	44.3	113.7	161.5	206.2	363.0	542.7	952.2
		80°		11.3	31.7	90.2	127.8	46.1	118.4	168.2	214.7	378.0	565.2	991.6
		100°		11.7	33.0	94.0	133.1	48.0	123.3	175.1	223.5	393.5	588.4	1032.3
35° C	-40° C	60°	0.7	6.5	18.2	51.7	72.8	26.5	67.6	95.6	122.0	215.4	321.6	565.0
(15.6)	(0.4)	80°		6.8	18.9	53.8	75.7	27.5	70.3	99.5	126.8	224.0	334.4	587.7
		100°		7.0	19.7	56.0	78.8	28.6	73.1	103.5	132.0	233.0	347.9	611.4
		60°	1	7.8	22.0	62.6	88.4	32.0	82.0	116.3	148.4	261.6	391.0	686.3
		80°		8.1	22.8	65.1	92.0	33.3	85.3	121.0	154.4	272.1	406.7	713.8
		100°		8.5	23.8	67.7	95.7	34.6	88.7	125.9	160.6	283.1	423.1	742.6
35° C	-20° C	60°	0.7	7.3	20.4	58.1	81.8	29.7	76.0	107.5	137.1	242.1	361.4	635.1
(15.6)	(2.1)	80°		7.6	21.2	60.5	85.1	30.9	79.0	111.8	142.6	251.8	375.9	660.5
		100°		7.9	22.1	62.9	88.5	32.2	82.2	116.3	148.3	261.9	391.1	687.1
		60°	1	8.8	24.6	70.2	99.3	35.9	92.1	130.6	166.6	293.6	438.9	770.4
		80°		9.1	25.6	73.1	103.3	37.3	95.8	135.8	173.3	305.4	456.5	801.3
		100°		9.5	26.7	76.0	107.4	38.8	99.6	141.3	180.3	317.8	474.9	833.6
35° C	0° C	60°	0.7	8.1	22.6	64.2	90.4	32.8	83.9	118.8	151.5	267.4	399.3	701.7
(15.6)	(5.2)	80°		8.4	23.5	66.8	94.0	34.2	87.3	123.5	157.5	278.2	415.3	729.8
		100°		8.7	24.4	69.5	97.8	35.5	90.8	128.5	163.9	289.4	432.1	759.2
		60°	1	9.7	27.2	77.5	109.6	39.6	101.6	144.1	183.9	324.1	484.4	850.3
		80°		10.1	28.3	80.6	114.0	41.2	105.7	149.9	191.3	337.1	503.9	884.4
		100°		10.5	29.4	83.9	118.6	42.9	110.0	155.9	199.0	350.7	524.2	920.1

Hot Gas Bypass

Hot gas bypass is a method of compressor capacity control that has been utilized in the refrigeration and air conditioning industry for many years. A significant number of refrigeration and air conditioning systems operate at full capacity no more than 20% of their running time. As a result, many compressors operating above fifteen horsepower are equipped with cylinder unloading devices whereby the capacity of the compressor can effectively be reduced. The need for automatic hot gas bypass becomes evident, however, for those systems having compressors that do not possess cylinder unloading, or for those systems with unloading capability, but without or lacking suction pressure control between the last stage of unloading and 0% capacity.

A hot gas bypass system is designed to **artificially** load the compressor upon a decrease in evaporator load for one or more of the following reasons:

- To prevent the operation of the compressor at unacceptably low suction pressures, which could result in oil pumping, compressor cycling, temperature variation, and eventual compressor or motor failure.
- To prevent a significant drop in evaporator temperature where constant conditions are required.
- To prevent the frosting of the evaporator coil, which can cause a loss of capacity due to the restricted air flow.

Basic hot gas bypass systems are illustrated in Figures 3 and 4.

A portion of the refrigerant discharge gas is bypassed around the condenser and thermostatic expansion valve, effectively reducing the flow of refrigerant available for cooling. In addition to the reduction in refrigeration effect due to the reduced liquid refrigerant flow through the condenser and expansion valve, the heat content of the hot gas bypassed compared to the suction gas will add load, further reducing the refrigeration effect of the evaporator.

Compressor suction pressure is the principal condition being controlled with any hot gas bypass system. Therefore, whenever discharge gas is introduced into the inlet of the evaporator by means of a hot gas bypass regulator, the regulator must be used with an external equalizer connected to the compressor suction main, and at a point downstream of any evaporator pressure regulator which may be used. In this manner, any pressure drop conditions due to distributors, evaporator circuiting, or valves will not affect the operation of the hot gas bypass regulator.

The two commercial regulators recommended for hot gas bypass applications are the Refrigerating Specialties A9E, and A8_OE series. The A9E is physically the smaller of the two valve types, covering port sizes of

3/8" through 1-1/8", and was originally designed specifically for hot gas bypass applications. The A8 series covers three different body sizes, the A8AOE, A81OE, and A82OE, and cover a much larger capacity range, with port sizes as large as 2 1/8".

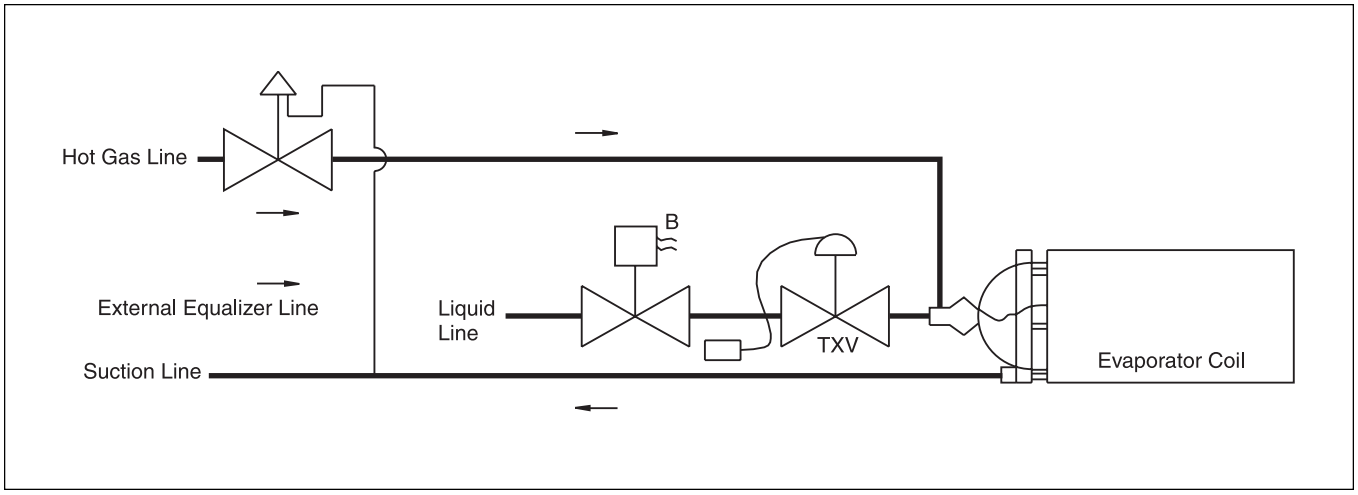


Figure 3 *- Hot gas bypass to entrance of evaporator. (See page 346 for symbols legend).*

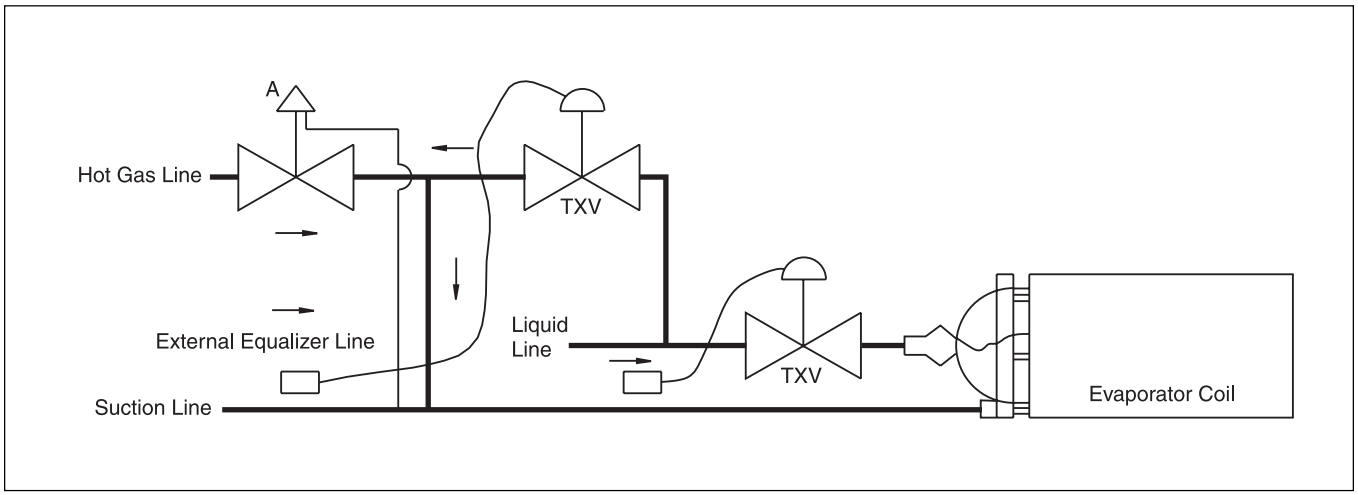


Figure 4 *- Hot gas bypass to suction with liquid injection. (See page 346 for symbols legend).*

Valve Legend				
Label	**Valve Function**	**Application**	**Design**	**Selection Page**
A	Outlet Pressure Regulator	Hot Gas Bypass	A9 or A8_OE	338-339
B	Solenoid Valve	Liquid Feed	SC	343

Hot Gas Bypass Capacities (Tons) R22

Cond. Temp.	Discharge Temp	A9 3/8	A9 5/8	A9 7/8	A9 1-1/8	A8AOE 3/8	A8AOE 5/8	A8AOE 7/8	A81OE 1-1/8	A81OE 1-3/8	A82OE 1-5/8	A82OE 2-1/8
86° F	140° F	1.4	4.1	12.0	19.1	6.0	17.1	25.8	33.6	56.2	86.0	147.0
	180° F	1.5	4.3	12.4	19.9	6.3	17.8	26.8	34.9	58.4	89.4	152.8
	220° F	1.5	4.5	12.9	20.6	6.5	18.5	27.8	36.2	60.6	92.7	158.6
100° F	140° F	1.6	4.8	13.8	22.3	7.0	19.8	30.3	39.8	65.3	100.9	170.9
	180° F	1.7	5.0	14.4	23.3	7.3	20.7	31.7	41.6	68.3	105.5	178.7
	220° F	1.8	5.2	15.0	24.3	7.6	21.6	33.1	43.4	71.2	110.0	186.3
110° F	140° F	1.8	5.2	15.1	24.4	7.6	21.7	33.2	43.8	71.5	110.5	187.0
	180° F	1.9	5.5	15.9	25.7	8.0	22.8	34.9	46.0	75.1	116.1	196.5
	220° F	1.9	5.7	16.6	26.9	8.4	23.8	36.5	48.1	78.7	121.5	205.8
120° F	140° F	1.9	5.7	16.4	26.5	8.2	23.5	36.0	47.5	77.5	119.8	202.8
	180° F	2.0	6.0	17.3	28.0	8.7	24.8	38.1	50.2	81.9	126.6	214.4
	220° F	2.1	6.3	18.2	29.4	9.2	26.1	40.0	52.8	86.2	133.2	225.5

Hot Gas Bypass Capacities (Tons) R134a

Cond Temp'	Discharge Temp	A9 3/8	A9 5/8	A9 7/8	A9 1-1/8	A8AOE 3/8	A8AOE 5/8	A8AOE 7/8	A81OE 1-1/8	A81OE 1-3/8	A82OE 1-5/8	A82OE 2-1/8
86° F	140° F	1.0	2.8	8.2	13.2	4.1	11.8	17.9	23.4	38.8	59.7	101.5
	180° F	1.0	3.0	8.7	14.1	4.4	12.5	19.0	24.9	41.3	63.5	108.0
	220° F	1.1	3.2	9.2	14.9	4.7	13.3	20.2	26.4	43.7	67.3	114.4
100° F	140° F	1.1	3.3	9.6	15.5	4.8	13.8	21.1	27.9	45.5	70.3	119.1
	180° F	1.2	3.6	10.3	16.6	5.2	14.8	22.7	29.8	48.8	75.3	127.6
	220° F	1.3	3.8	11.0	17.7	5.5	15.7	24.1	31.8	52.0	80.3	135.9
110° F	140° F	1.2	3.7	10.6	17.2	5.4	15.3	23.4	30.8	50.4	77.8	131.7
	180° F	1.3	4.0	11.5	18.5	5.8	16.5	25.2	33.2	54.3	83.9	142.0
	220° F	1.4	4.2	12.3	19.8	6.2	17.6	27.0	35.6	58.1	89.8	152.1
120° F	140° F	1.4	4.0	11.6	18.8	5.9	16.7	25.6	33.7	55.1	85.2	144.2
	180° F	1.5	4.4	12.6	20.5	6.4	18.2	27.8	36.7	59.9	92.6	156.7
	220° F	1.6	4.7	13.6	22.0	6.9	19.5	30.0	39.5	64.5	99.7	168.7

Hot Gas Bypass Capacities (Tons) R404a

Cond Temp'	Discharge Temp	A9 3/8	A9 5/8	A9 7/8	A9 1-1/8	A8AOE 3/8	A8AOE 5/8	A8AOE 7/8	A81OE 1-1/8	A81OE 1-3/8	A82OE 1-5/8	A82OE 2-1/8
86° F	140° F	1.5	4.4	12.6	20.2	6.3	18.0	27.2	35.5	59.2	90.8	155.0
	180° F	1.6	4.7	13.6	21.8	6.9	19.5	29.4	38.3	63.9	98.0	167.3
	220° F	1.7	5.1	14.6	23.4	7.4	20.9	31.5	41.1	68.6	105.2	179.6
100° F	140° F	1.6	4.9	14.0	22.7	7.1	20.1	30.8	40.5	66.4	102.6	173.6
	180° F	1.8	5.3	15.3	24.8	7.7	22.0	33.7	44.3	72.5	112.1	189.7
	220° F	1.9	5.7	16.6	26.8	8.4	23.8	36.5	48.0	78.6	121.4	205.5
110° F	140° F	1.7	5.1	14.9	24.0	7.5	21.3	32.7	43.1	70.3	108.7	184.0
	180° F	1.9	5.7	16.4	26.5	8.3	23.6	36.1	47.6	77.8	120.1	203.4
	220° F	2.1	6.2	17.9	29.0	9.0	25.7	39.5	52.0	85.0	131.3	222.2
120° F	140° F	1.8	5.3	15.4	24.9	7.8	22.1	33.9	44.6	72.9	112.7	190.7
	180° F	2.0	6.0	17.3	28.0	8.7	24.9	38.1	50.2	82.0	126.8	214.6
	220° F	2.2	6.6	19.1	31.0	9.6	27.5	42.1	55.5	90.7	140.1	237.2

Hot Gas Bypass Capacities (Tons) R507

Cond Temp'	Discharge Temp	A9 3/8	A9 5/8	A9 7/8	A9 1-1/8	A8_OE 3/8	A8_OE 5/8	A8_OE 7/8	A8_OE 1-1/8	A8_OE 1-3/8	A8_OE 1-5/8	A8_OE 2-1/8
86° F	140° F	1.5	4.6	13.2	21.1	6.6	18.9	28.5	37.1	62.0	95.0	162.3
	180° F	1.7	4.9	14.3	22.9	7.2	20.5	30.8	40.2	67.2	102.9	175.8
	220° F	1.8	5.3	15.4	24.6	7.7	22.0	33.2	43.2	72.2	110.6	189.0
100° F	140° F	1.7	5.1	14.8	24.0	7.5	21.3	32.6	42.9	70.3	108.6	183.8
	180° F	1.9	5.6	16.3	26.3	8.2	23.3	35.8	47.0	77.0	119.1	201.6
	220° F	2.1	6.1	17.6	28.5	8.9	25.3	38.8	51.0	83.5	129.1	218.5
110° F	140° F	1.9	5.5	15.9	25.7	8.0	22.8	35.0	46.1	75.3	116.3	196.9
	180° F	2.1	6.1	17.6	28.5	8.9	25.3	38.8	51.1	83.5	129.0	218.4
	220° F	2.3	6.7	19.3	31.1	9.7	27.6	42.4	55.8	91.2	141.0	238.6
120° F	140° F	2.0	5.8	16.7	27.0	8.4	24.0	36.8	48.5	79.2	122.3	207.1
	180° F	2.2	6.5	18.8	30.5	9.5	27.0	41.5	54.6	89.3	137.9	233.5
	220° F	2.4	7.2	20.8	33.6	10.5	29.8	45.8	60.3	98.5	152.2	257.7

Hot Gas Bypass Capacities (Kilowatts) R22

Cond. Temp.	Discharge Temp	A9 9 mm	A9 15 mm	A9 22 mm	A9 28 mm	A8AOE 9 mm	A8AOE 15 mm	A8AOE 22 mm	A81OE 28 mm	A81OE 35 mm	A82OE 42 mm	A82OE 54 mm
30° C	60° C	4.9	14.6	42.1	67.3	21.2	60.2	90.6	118.0	197.5	302.5	517.1
	80° C	5.1	15.1	43.6	69.7	22.0	62.4	93.8	122.1	204.5	313.1	535.4
	100° C	5.3	15.6	45.1	72.0	22.7	64.5	97.0	126.3	211.5	323.8	553.7
40° C	60° C	5.9	17.4	50.3	81.4	25.4	72.2	110.8	145.8	238.4	368.4	623.7
	80° C	6.1	18.2	52.5	84.9	26.5	75.3	115.5	152.0	248.6	384.2	650.4
	100° C	6.4	18.9	54.6	88.3	27.5	78.4	120.2	158.1	258.7	399.7	676.6
45° C	60° C	6.4	18.8	54.5	88.1	27.4	78.1	119.8	157.9	257.9	398.6	674.7
	80° C	6.7	19.7	57.0	92.2	28.7	81.8	125.5	165.4	270.1	417.4	706.7
	100° C	7.0	20.6	59.5	96.3	30.0	85.4	131.0	172.6	282.0	435.7	737.6
50° C	60° C	6.8	20.2	58.4	94.5	29.4	83.8	128.6	169.4	276.7	427.6	723.9
	80° C	7.2	21.3	61.5	99.5	31.0	88.3	135.4	178.4	291.4	450.3	762.2
	100° C	7.5	22.3	64.5	104.3	32.5	92.5	141.9	187.0	305.4	471.9	798.9

Hot Gas Bypass Capacities (Kilowatts) R134a

Cond Temp.	Discharge Temp	A9 9 mm	A9 15 mm	A9 22 mm	A9 28 mm	A8AOE 9 mm	A8AOE 15 mm	A8AOE 22 mm	A81OE 28 mm	A81OE 35 mm	A82OE 42 mm	A82OE 54 mm
30° C	60° C	3.4	10.0	28.9	46.6	14.5	41.4	63.0	82.3	136.5	210.0	357.1
	80° C	3.6	10.6	30.5	49.2	15.4	43.8	66.6	87.0	144.3	222.0	377.6
	100° C	3.8	11.1	32.2	51.9	16.2	46.1	70.2	91.7	152.1	233.9	398.0
40° C	60° C	4.1	12.2	35.2	57.0	17.8	50.5	77.5	102.1	166.8	257.8	436.4
	80° C	4.4	13.0	37.6	60.8	18.9	53.9	82.7	108.9	178.0	275.0	465.5
	100° C	4.7	13.8	39.9	64.5	20.1	57.2	87.7	115.6	188.9	291.8	494.0
45° C	60° C	4.5	13.3	38.5	62.2	19.4	55.2	84.6	111.5	182.2	281.5	476.6
	80° C	4.8	14.3	41.3	66.7	20.8	59.2	90.8	119.6	195.4	302.0	511.2
	100° C	5.1	15.2	44.0	71.1	22.2	63.1	96.8	127.5	208.3	321.8	544.8
50° C	60° C	4.9	14.4	41.6	67.3	21.0	59.7	91.6	120.7	197.2	304.7	515.8
	80° C	5.3	15.6	45.0	72.7	22.7	64.5	99.0	130.4	213.0	329.1	557.2
	100° C	5.6	16.7	48.2	77.9	24.3	69.1	106.0	139.6	228.1	352.5	596.7

Hot Gas Bypass Capacities (Kilowatts) R404a

Cond Temp'	Discharge Temp	A9 9 mm	A9 15 mm	A9 22 mm	A9 28 mm	A8AOE 9 mm	A8AOE 15 mm	A8AOE 22 mm	A81OE 28 mm	A81OE 35 mm	A82OE 42 mm	A82OE 54 mm
30° C	60° C	5.2	15.3	44.3	71.0	22.3	63.4	95.7	124.7	208.3	319.3	545.3
	80° C	5.5	16.4	47.5	76.0	23.9	68.0	102.5	133.6	223.2	342.1	584.2
	100° C	5.9	17.5	50.6	81.1	25.5	72.5	109.3	142.5	238.1	364.8	623.1
40° C	60° C	5.9	17.5	50.6	81.8	25.5	72.6	111.3	146.6	239.5	370.1	626.6
	80° C	6.4	19.0	55.0	88.9	27.7	78.9	121.0	159.4	260.5	402.5	681.4
	100° C	6.9	20.5	59.3	96.0	29.9	85.1	130.6	171.9	281.0	434.3	735.1
45° C	60° C	6.2	18.3	52.9	85.6	26.7	76.0	116.5	153.5	250.7	387.4	655.9
	80° C	6.8	20.1	58.2	94.1	29.3	83.5	128.1	168.8	275.7	426.1	721.2
	100° C	7.4	21.9	63.3	102.4	31.9	90.9	139.3	183.6	299.9	463.4	784.4
50° C	60° C	6.4	18.8	54.3	87.9	27.4	78.0	119.5	157.5	257.3	397.6	673.1
	80° C	7.1	21.0	60.7	98.2	30.6	87.1	133.6	176.1	287.6	444.4	752.4
	100° C	7.8	23.1	66.8	108.0	33.6	95.8	146.9	193.6	316.2	488.6	827.1

Hot Gas Bypass Capacities (Kilowatts) R507

Cond. Temp.	Discharge Temp	A9 9 mm	A9 15 mm	A9 22 mm	A9 28 mm	A8AOE 9 mm	A8AOE 15 mm	A8AOE 22 mm	A81OE 28 mm	A81OE 35 mm	A82OE 42 mm	A82OE 54 mm
30° C	60° C	5.4	16.0	46.4	74.3	23.4	66.4	100.1	130.5	218.0	334.1	570.7
	80° C	5.8	17.3	49.9	79.9	25.1	71.4	107.7	140.3	234.4	359.2	613.6
	100° C	6.2	18.4	53.3	85.3	26.9	76.3	115.0	149.8	250.4	383.7	655.5
40° C	60° C	6.3	18.6	53.7	86.8	27.1	77.1	118.2	155.6	254.3	393.0	665.3
	80° C	6.9	20.3	58.6	94.8	29.5	84.1	129.0	169.8	277.6	428.9	726.1
	100° C	7.4	21.9	63.3	102.3	31.9	90.8	139.3	183.4	299.7	463.1	784.0
45° C	60° C	6.6	19.7	56.9	91.9	28.7	81.6	125.1	164.8	269.3	416.1	704.4
	80° C	7.3	21.7	62.7	101.4	31.6	90.0	138.0	181.8	297.0	458.9	776.9
	100° C	8.0	23.6	68.2	110.3	34.4	97.9	150.1	197.7	323.0	499.1	844.9
50° C	60° C	6.9	20.5	59.2	95.8	29.8	85.0	130.3	171.7	280.4	433.4	733.6
	80° C	7.7	22.9	66.3	107.2	33.4	95.1	145.9	192.2	313.9	485.1	821.2
	100° C	8.5	25.2	72.8	117.7	36.7	104.4	160.1	211.0	344.6	532.5	901.5

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Discharge Regulators for Supermarket Applications

The Parker Refrigerating Specialties Division has built a reputation as a principal supplier of reliable, high side control valves to the supermarket industry. One of the more critical applications on a commercial refrigeration system where hot gas is utilized for defrosting purposes is the use of a regulator in the discharge line. Refrigerating Specialties types A81BL or A82BL have become a standard for many supermarket rack manufacturers specifically for this application.

The "BL" version of an A8 regulator in a discharge application serves two functions. The valve is either in a wide open (or bypassed) position with it's solenoid energized to facilitate a minimum pressure drop through the valve when no refrigeration circuits are calling for defrost. In this mode, the valve essentially is acting as a low pressure drop solenoid in an opened position. When a refrigeration circuit begins a defrost sequence however, the solenoid on the discharge A8_BL regulator is de-energized (via the defrost program), thereby converting the valve into a differential pressure regulator.

A differential regulator communicates outlet pressure into the valve's bonnet in order to compensate range spring pressure with downstream pressure. The set point of the valve thus becomes the sum of spring pressure plus outlet pressure. Whatever the range spring pressure is set for effectively becomes the pressure difference the valve will maintain from its inlet to outlet. If, for example, the regulator was set to maintain a 25 psi set point, the valve will regulate and maintain an upstream pressure 25 psi higher than it's downstream pressure, regardless of fluctuations in downstream pressure. In this application, the regulator ensures that the hot gas pressure supplied to a circuit for defrost purposes will be high enough to overcome the pressure drop through the supply line, the losses through valves and fittings, and through the evaporator coil. The defrost condensate exits the evaporator and is then introduced, at an elevated pressure, back into the liquid line.

Because each system may vary due to any number of design considerations, the A81BL and A82BL regulators are field adjustable. The regulator can therefore be adjusted to determine the most efficient set point while ensuring that each evaporator defrosts in a timely and thorough manner.

For larger systems that exceed the capacity of the A8 regulator line, Refrigerating Specialties offers a higher capacity flanged valve for discharge applications, the A4AB or A4ABL.

For sizing, please see "Discharge Capacities" on pages 312 – 319.

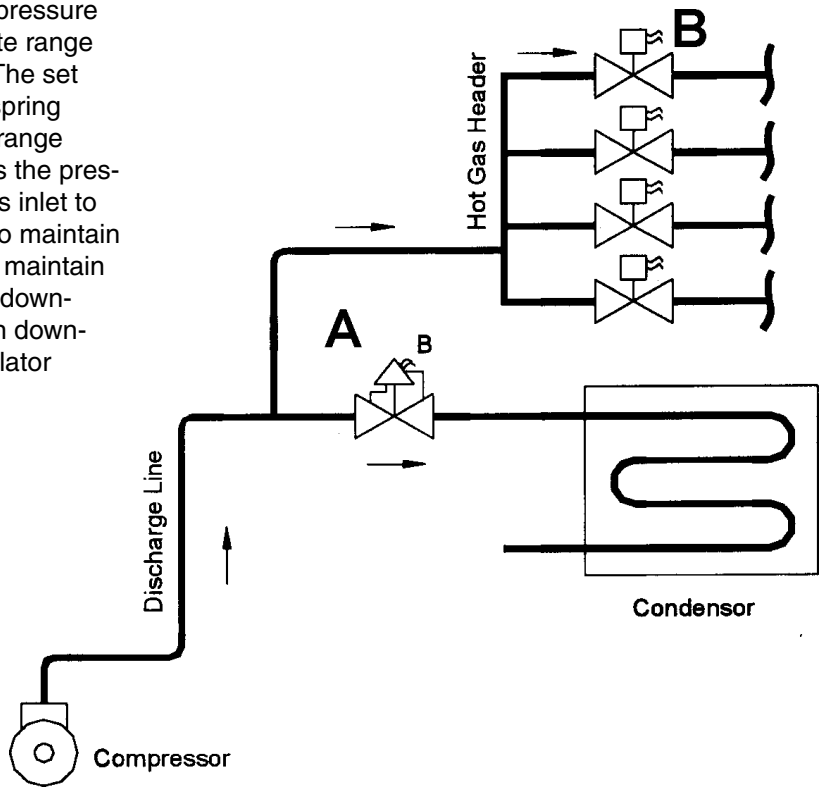


Figure 5 *- Discharge regulator for supermarket applications. (See page 346 for symbols legend.)*

Valve Legend				
Label	Valve Function	Application	Design	Selection Page
A	Inlet Pressure Regulator	Discharge Pressure	A8	312-319
B	Solenoid Valve	Liquid Feed	SC	343

Crankcase Pressure Regulators

Crankcase pressure regulators, also known as “CPRs” or “holdback” regulators, are outlet pressure regulators installed in the suction line which prevent an excessive downstream pressure regardless of fluctuations in load or inlet conditions. R/S types A8AOE, A810E, and A82OE comprise the line of commercial outlet pressure regulators that can be applied as crankcase pressure regulators.

When system conditions occur that allow suction pressures to increase appreciably above normal operating levels, a crankcase regulator should be applied. Without a downstream regulator, which effectively throttles down the suction pressure to the compressor, a compressor motor overload condition can occur. Such conditions are likely during pull down after a hot gas defrost period, or during system start-up. An A8-OE outlet regulator will gradually close when the downstream pressure begins to rise above the valve’s set point, and will gradually open when the outlet pressure falls below its set point, effectively preventing the compressor suction pressure from exceeding the regulator’s set point.

No crankcase regulator can maintain its set for pressure if branch lines feed into the main suction line downstream of the regulator. For that reason, it is important that no lines feed into the suction line between the regulator and the compressor.

(For sizing, please reference suction capacity charts for A8 regulators on pages 290 through 297.)

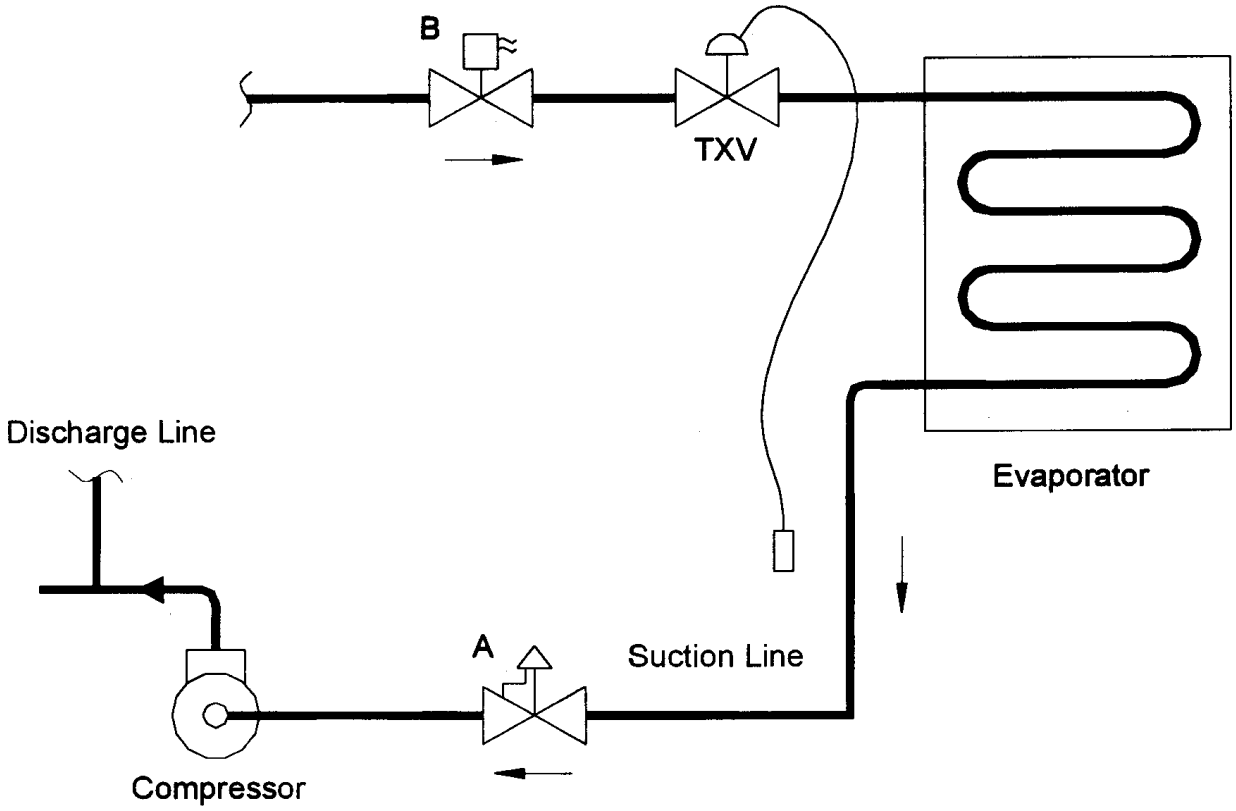


Figure 6 *- Crankcase pressure regulator application. (See page 346 for symbol legend)*

Valve Legend				
Label	**Valve Function**	**Application**	**Design**	**Selection Page**
A	Outlet Pressure Regulator	Crankcase Pressure	A8_OE	290-297
B	Solenoid Valve	Liquid Feed	SC	342

SC Suction Solenoid Valves



Key Features and Benefits

- Highest capacity non-flanged valve in the industry.
- Available with 208V/240V/60Hz wide range voltage coil.
- Low pressure drop, internally pilot operated.
- All stainless steel bolts, stem, piston and plug.
- Manual opening stem.
- Sweat in place without disassembly.
- Molded class “F” coil construction.
- DIN coil assemblies available.
- Interchangeable capacity cartridges. Same as those used on (S)PORT EPRs.

Specifications

- Design pressure (M.R.P.): 450 psig (31.0 bar).
- Maximum opening pressure differential (MOPD): 300 psig (20.7 bar). (Except 208/240V/60Hz wide voltage range coil).
- Minimal fluid temperature: -40°F (-40°C).
- UL listed (except 50Hz), file SA5473.
- CSA certified, file LR20991-14.

Standard Voltages

- 120V/60Hz, 110V/50Hz
- 208V/240V/60Hz, 220V/50Hz
- 240V/50Hz
- 240V/60Hz, 220V/50Hz (DIN)
- 240V/50Hz (DIN)

Valve Nomenclature

SC	1 or 2	11	11
Suction Solenoid	Body Size	Port Size in Eighths of an Inch	Connection Size in Eighths of an Inch

SC Port/Connection Size Combinations*

Type	Port Size	Connection Sizes Available
SC1 or SC-II	03 (3/8", 9mm)	07, 09, 11,13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5-8"/42mm, 2-1/8"/54mm)
	05 (5/8" 15mm)	07, 09, 11,13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5-8"/42mm, 2-1/8"/54mm)
	07 (7/8", 22mm)	07, 09, 11,13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5-8"/42mm, 2-1/8"/54mm)
	09 (1-1/8", 28mm)	07, 09, 11,13, 17 (7/8"/22mm, 1-1/8"/28mm, 1-3/8"/35mm, 1-5-8"/42mm, 2-1/8"/54mm)
	11 (1-3/8", 35mm)	09, 11,13, 17 (1-1/8"/28mm, 1-3/8"/35mm, 1-5-8"/42mm, 2-1/8"/54mm)
SC2	13 (1-5/8", 42mm)	13, 17, 21 (1-5/8" /42mm, 2-1/8" /54mm, 2-5/8" /66mm)
	17 (2-1/8", 54mm)	17, 21 (2-1/8" /54mm, 2-5/8" /66mm)
	21 (2-5/8", 66mm)	21 (2-5/8", 66mm)

*__NOTE:__ Completely corrosion resistant SC-II solenoids with aluminum bronze bodies and cartridge assemblies have same port/connection combinations as standard SC solenoids, but are not available in the 13, 17, or 21 port size versions.

Description: The SC series of commercial solenoids was developed as a flexible, low pressure drop, suction line solenoid valve, in a wide range of port and connection sizes. With cartridge (port) sizes available up to 2-5/8" (66mm) in size, SC solenoids offer the greatest capacity of any non-flanged commercial solenoid in the industry. The unique design of the SC solenoid is a mirror image of the (S)PORT regulator line, utilizing the same cartridges, solenoid coil assemblies, bodies, and internal parts as those used in the construction of the (S)PORT regulators. With this flexible line of suction line solenoids complementing the complete line of (S)PORT regulators, a wide range of high capacity, suction line refrigeration control valves are now available from a single source.

Along with (S)PORT regulators, SC solenoids are manufactured with ductile iron bodied valves with brazed copper couplings, and are suitable for most

common commercial refrigerants along with certain oils. The SC solenoid may be opened by means of a manual opening stem for servicing or in case of an electrical power failure.

The SC-II series of valves are manufactured with completely corrosion resistant materials including aluminum bronze bodies and cartridge assemblies, and stainless steel adapter bolts. Cartridges, and solenoids are interchangeable with the (S)PORT-II regulator line.

Variations: SC1/ SC-II Solenoids: Five port sizes, from 3/8" (9mm) through 1-3/8" (35mm). SC2 Solenoid: three port sizes, from 1-5/8" (42mm) through 2-5/8" (66mm).

Installation: SC solenoid valves can be mounted either in a vertical or horizontal line with the refrigerant flow in the direction of the arrow on the body. These valves may be soldered into the line without disassembly. When brazing in line, typically a wet cloth wrapped around the valve body is recommended to dissipate heat. **If a valve is disassembled prior to installation, always have the correct gasket/ O-ring kit available for reassembly.** The internal cartridge-to-body O-ring will need to be replaced prior to reassembly.

Electrical: SC commercial solenoid valves utilize a molded water resistant Class “F” solenoid coil with an open frame coil housing that meets NEMA 3R and 4 requirements. A class “H” DIN coil is also available with certain voltages. Power consumption during normal operation will be 10.2 watts or less.

All coils except for the 208/240V/60Hz version operate with a 300 psi (20.7 bar) maximum opening pressure differential (MOPD). The 208/240V/60Hz coil operates with a 280 psi (19.3 bar) MOPD.

All coils are designed to operate with a line voltage from 85% to 110% of rated coil voltage. Operating with a line voltage above or below these limits may result in coil burn out.

Ordering Guide: Specify valve type (SC1, SC-II or SC2), port and connection size, coil voltage, and frequency.

NOTE: For SC valve suction capacity tables, please reference pages 290-297 of this catalog.

SC1/SC2 Liquid Capacities in Evaporator Tons

Based on 100°F Condensing, 40°F Evaporator and no flashing through the valve for the pressure drop listed.

Port Size	R22 2 psi pr drop	R22 4 psi pr drop	R134a 2 psi pr drop	R134a 4 psi pr drop	R404A 2 psi pr drop	R404A 4 psi pr drop	R507 2 psi pr drop	R507 4 psi pr drop
03 (3/8")	6	9	6	9	4	6	4	6
05 (5/8")	14	20	13	19	9	12	9	13
07 (7/8")	22	31	21	29	14	19	14	20
09 (1-1/8")	35	50	33	47	22	31	23	32
11 (1-3/8")	49	69	46	65	30	43	32	45
13 (1-5/8")	78	110	73	104	48	68	50	71
17 (2-1/8")	117	165	110	156	72	102	76	107
21 (2-5/8")	156	220	147	207	96	136	101	143

SC1/SC2 Liquid Capacities in Evaporator Kilowatts

Based on 37.7°C Condensing, 4.4°C Evaporator and no flashing through the valve for the pressure drop listed.

Port Size	R22 0.14 bar pr drop	R22 0.27 bar pr drop	R134a 0.14 bar pr drop	R134a 0.27 bar pr drop	R404A 0.14 bar pr drop	R404A 0.27 bar pr drop	R507 0.14 bar pr drop	R507 0.27 bar pr drop
03 (9mm)	23	32	21	30	14	20	15	21
05 (15mm)	50	71	47	67	31	44	32	46
07 (22mm)	78	110	73	103	48	68	50	71
09 (28mm)	123	174	116	164	76	107	80	113
11 (35mm)	172	243	162	229	106	150	111	157
13 (42mm)	274	387	258	365	169	239	177	251
17 (54mm)	411	581	387	547	253	358	266	376
21 (66mm)	548	775	516	729	338	477	354	501

S81/S82 Solenoid Valves



Features

- Highest capacity non-flanged solenoid valve in the industry.
- Low pressure drop.
- Manual opening stem.
- Sweat in place without disassembly.
- Molded class “H” coil construction.
- DIN coil assemblies available.
- Inlet pressure access fitting.
- Interchangeable capacity cartridges.

Specifications

- Maximum opening pressure differential (MOPD): 300 psig (20.7 bar).
- Minimum fluid temperature: -40°F (-40°C).
- Design pressure (M.R.P.): 450 psig (31.0 bar).
- UL listed, file SA5473.
- CSA certified, file LR20991-14.

Standard Voltages

- 120V/60Hz, 110V/50Hz
- 240V/60Hz, 220V/50Hz
- 208V/60Hz
- 240V/60Hz, 220V/50Hz (DIN)
- 240V/50Hz (DIN)

Valve Nomenclature

S8	1 or 2	7/8"	1 1/8"
Solenoid	Body Size	Port Size in Inches	Connection Size in Inches

S8 Port/Connection Size Combinations

Valve Type	Port Size	Available Connection Sizes
S81	3/8" (9mm)	7/8", 1-1/8",1-3/8" (22mm, 28mm,35mm)
S81	5/8" (15mm)	7/8", 1-1/8",1-3/8" (22mm, 28mm,35mm)
S81	7/8" (22mm)	7/8", 1-1/8",1-3/8" (22mm, 28mm,35mm)
S81	1-1/8" (28mm)	1-1/8", 1-3/8", 1-5/8" (28mm, 35mm, 42mm)
S81	1-3/8" (35mm)	1-3/8", 1-5/8", 2-1/8" (35mm, 42mm, 54mm)
S82	1-5/8" (42mm)	1-5/8", 2-1/8", 2-5/8" (42mm, 54mm, 66mm)
S82	2-1/8" (54mm)	2-1/8", 2-5/8" (54mm, 66mm)
S82	2-5/8" (66mm)	2-5/8" (66mm)

Description: The S8 series of commercial solenoids was developed as a versatile, general purpose, commercial refrigeration valve, capable of being applied in most liquid, hot gas, or suction applications. With cartridge (port) sizes available up to 2-5/8" (66mm) in size, S8 solenoids offer the greatest capacity of any non-flanged commercial solenoid in the industry. The unique design of the S8 solenoid is a mirror image of the A8 regulator line, utilizing the same cartridges, solenoid coil assemblies, bodies, and internal parts as those used in the construction of the A8's. With this flexible line of commercial solenoids complementing the complete line of commercial A8 regulators, a wide offering of high capacity commercial refrigeration control valves are now available from a single source.

Similar to the A8 regulators, S8 solenoids are manufactured with ductile iron bodies with brazed copper couplings, and are suitable for most common commercial refrigerants along with certain oils. The S8 solenoid may be opened by means of a manual opening stem for servicing or in case of an electrical power failure.

Variations: S81 Solenoid: Five port sizes, from 3/8" (9mm) through 1-3/8". S82 Solenoid: Three port sizes, from 1-5/8" through 2-5/8".

Installation: S8 solenoid valves can be mounted either in a vertical or horizontal line with the refrigerant flow in the direction of the arrow on the body. These valves may be soldered into the line without disassembly. A wet cloth should be wrapped around the valve and the soldering flame should be directed away from the valve body.

If a valve is disassembled prior to installation, always have the correct gasket/O-ring kit available for reassembly. The internal cartridge-to-body O-ring will need to be replaced prior to reassembly

Electrical: S8 commercial solenoid valves utilize a molded water resistant Class "H" solenoid coil with a general purpose coil housing which meets NEMA 3R and 4 requirements. A class "H" DIN coil is also available with certain voltages. Power consumption during normal operation will be 10.2 watts or less. The coils are designed to operate with a line voltage from 85% to 110% of rated coil voltage. Operating with a line voltage above or below these limits may result in coil burn out.

Ordering Guide: Specify valve type (S81 or S82), port and connection size, and coil voltage and frequency.

NOTE: For S81 / S82 valve suction capacity tables, please reference pages 290-297 of this catalog.

S81/S82 Liquid Capacities in Evaporator Tons

Based on 100°F Condensing, 40°F Evaporator and no flashing through the valve for the pressure drop listed.

Port Size	R22 2 psi pr drop	R22 4 psi pr drop	R134a 2 psi pr drop	R134a 4 psi pr drop	R404a 2 psi pr drop	R404a 4 psi pr drop	R507 2 psi pr drop	R507 4 psi pr drop
3/8"	6	9	6	9	4	6	4	6
5/8"	14	20	13	19	9	12	9	13
7/8"	22	31	21	29	14	19	14	20
1-1/8"	35	50	33	47	22	31	23	32
1-3/8"	49	69	46	65	30	43	32	45
1-5/8"	78	110	73	104	48	68	50	71
2-1/8"	117	165	110	156	72	102	76	107
2-5/8"	156	220	147	207	96	136	101	143

S81/S82 Liquid Capacities in Evaporator Kilowatts

Based on 37.7°C Condensing, 4.4°C Evaporator and no flashing through the valve for the pressure drop listed.

Port Size	R22 0.14 bar pr drop	R22 0.27 bar pr drop	R134a 0.14 bar pr drop	R134a 0.27 bar pr drop	R404a 0.14 bar pr drop	R404a 0.27 bar pr drop	R507 0.14 bar pr drop	R507 0.27 bar pr drop
9mm	23	32	21	30	14	20	15	21
15mm	50	71	47	67	31	44	32	46
22mm	78	110	73	103	48	68	50	71
28mm	123	174	116	164	76	107	80	113
35mm	172	243	162	229	106	150	111	157
42mm	274	387	258	365	169	239	177	251
54mm	411	581	387	547	253	358	266	376
66mm	548	775	516	729	338	477	354	501

Abbreviations and Terminology

Abbreviations

A (Amp)	Ampere
BTU/hr	British Thermal Units per Hour
BTU/min.	British Thermal Units per Minute
°C	Degrees Celsius or Centigrade
cm^2 (sq. cm)	Square centimeters
CPR	Crankcase Pressure Regulator
CSA	Canadian Standards Association
°F	Degrees Fahrenheit
EPR	Evaporator Pressure regulator
ft (')	Feet
in (")	Inches
hg	Mercury
Hz	Hertz (frequency, cycles per second)
ID	Inside diameter
kcal/h	Kilocalories per hour
kg	Kilogram
kg/cm^2	Kilogram per square centimeter
kw	Kilowatts
lbs	Pounds
lbs/min	Pounds per minute
m	Meter
m^3/h	Cubic meters per hour
mm	Millimeter
mm hg	Millimeters mercury equivalent vacuum
MOPD	Maximum Opening Pressure Differential
NEMA	National Electrical Manufacturers Association
NPT	National Pipe Thread
OD	Outside Diameter
ODS	Outside Diameter Sweat or tubing O.D., which can be soldered into fitting
psi	Pounds per square inch
psig	Pounds per square inch gauge
sq. cm (cm^2)	Square centimeters
SWP	Safe Working Pressure
TXV	Thermostatic Expansion Valve
UL	Underwriters Laboratories, Inc.
V	Volts

Explanation of Terminology

Design pressure (SWP): The maximum allowable working pressure for which a valve or regulator is designed.

Evaporator temperature: Saturated temperature in the evaporator.

Maximum fluid temperature: The highest normally allowable internal temperature for a particular valve.

Maximum Opening Pressure Differential: The maximum difference between the pressure at the valve inlet and the pressure at the valve outlet at which a solenoid will open consistently (MOPD).

Minimum fluid temperature: The lowest normally allowable internal temperature for a particular valve assuming a clean, oil-free fluid and the absence of thermal or pressure shock.

Net weight: The weight of a particular valve. Does not include shipping cartons.

Pressure drop: The pressure difference between the pressure at the valve inlet and the pressure at the valve outlet.

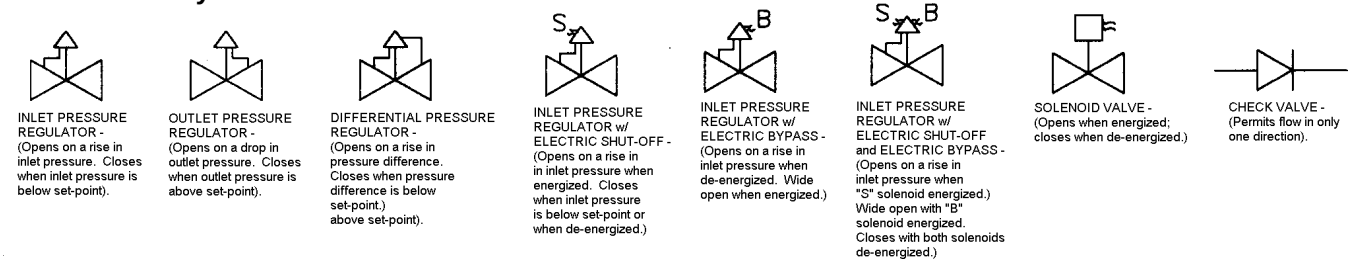
Shock: A sudden, violent increase in pressure; can be caused by a rapid change in temperature, pressure, velocity, or direction.

Valve or regulator capacity: All capacities are maximum for the conditions listed at each table. No “reserve capacity” is included in this catalog.

Conversions to metric:

1 ton = 200 BTU/min
1 ton = 3024kcal/hr
1 kw = .2844 ton
1 kw = 56.89 BTU/min
1 kw = 860 kcal/hr
1 bar = 1.0197 kg/cm^2
1 bar = 14.5 psi
1 ATM = .98 bar = 14.7 psi

Control Valve Symbols and Functions



INLET PRESSURE REGULATOR - (Opens on a rise in inlet pressure. Closes when inlet pressure is below set-point).

OUTLET PRESSURE REGULATOR - (Opens on a drop in outlet pressure. Closes when outlet pressure is above set-point).

DIFFERENTIAL PRESSURE REGULATOR - (Opens on a rise in pressure difference. Closes when pressure difference is below set-point.) above set-point).

INLET PRESSURE REGULATOR w/ ELECTRIC SHUT-OFF - (Opens on a rise in in inlet pressure when energized. Closes when inlet pressure is below set-point or when de-energized.)

INLET PRESSURE REGULATOR w/ ELECTRIC BYPASS - (Opens on a rise in inlet pressure when de-energized. Wide open when energized.)

INLET PRESSURE REGULATOR w/ ELECTRIC SHUT-OFF and ELECTRIC BYPASS - (Opens on a rise in inlet pressure when "S" solenoid energized.) Wide open with "B" solenoid energized. Closes with both solenoids de-energized.)

SOLENOID VALVE - (Opens when energized; closes when de-energized.)

CHECK VALVE - (Permits flow in only one direction).

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How to Use this Section

This section is organized by product group. For most sections, the first page is an overview. Specifications and selection guides given in table form provide comparison of the different valves and aid in selecting a specific product. Each type is then presented individually, giving additional information such as description, flows, materials of construction, dimensions and ordering information.

In order to bring Refrigerating Specialties model numbers into a format that will enable product ordering from the Parker online system, model coding has been developed for use with all of our product series.

Each character of a model number has significance. A model number can be built by selecting an option for each category in the model code and inserting the code given for that option into the model number. An example is shown at the top of every model code. With only a few exceptions, you must always enter something for each category, even if it only indicates that you do not want that option.

It is now possible to order flanges, coils, strainers, check valves, etc. with the valve within one model number. ***Be aware that you could build a model number that is not valid*** by selecting flange connections that do not apply to that size valve or voltages that cannot be provided on that style of coil, etc. Please use the reference tables to view the option limitations.

Our most commonly ordered options are offered in the catalog. However, there are many other possibilities. If you require something not shown in the catalog, please call us or send an e-mail to RSD_info@parker.com.

New Products

Products appearing in our catalog for the first time are:

- A2CK reseating relief regulator
- CK5 gas powered suction stop valves
- Hand valves with extended bonnets
- PLLC programmable controller and *DepthTracker* transducer probes
- Rapid purgers
- Gauge valves
- Liquid drain ball valves
- Compact class "H" coils
- Female flanges
- SR/SRH safety relief valve
- Open and hermatic liquid pumps

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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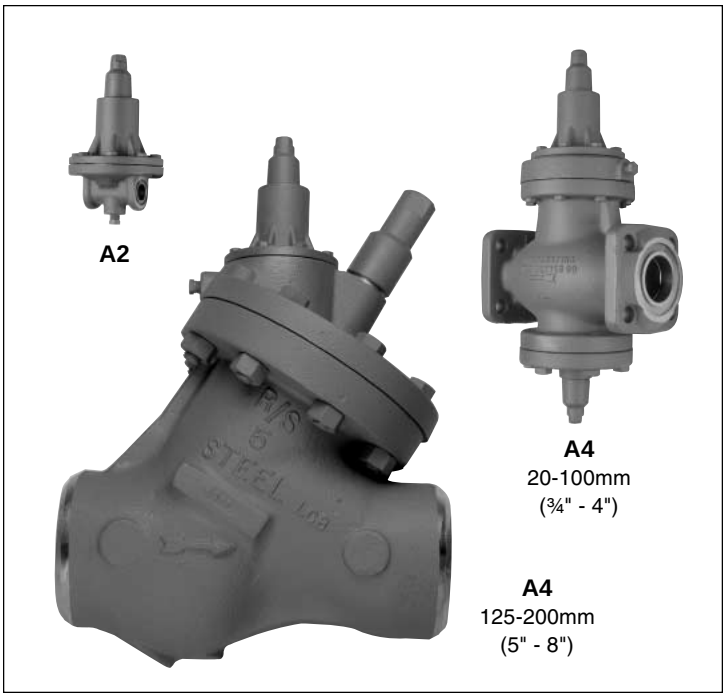
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Pressure Regulators

The Refrigerating Specialties family of pressure regulators includes valves that 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 Type A2 are compact, small capacity regulators. The Type A4 are heavy-duty, high-flow regulators available in flanged body style in sizes 20-100mm (¾" - 4") and weld end body style in sizes 125-200mm (5" - 8"). The Adaptomode® system makes it possible to order the regulator and modules separately for stock or field conversion.

Gauge valves and gauges may be purchased with the regulator or separately (see pages 440-441).



Specifications

Type		A2A	A2B	A2CK	A4	A4	A4
Port Size	mm				20-32	40-100	125-200
	inch				¾" - 1¼"	1⅝" - 4"	5" - 8"
Seat					Metal-to-Metal (PTFE on A4K)	Lapped Metal-to-Metal	Lapped Metal-to-Metal
Pilot Seat		Chrome Plated Lapped Metal-to-Metal	Chrome Plated Lapped Metal-to-Metal	Chrome Plated Lapped Metal-to-Metal	Chrome Plated Lapped Metal-to-Metal	Chrome Plated Lapped Metal-to-Metal	Chrome Plated Lapped Metal-to-Metal
Body Material		Gray Iron	Gray Iron	Gray Iron	Gray Iron	Gray Iron	Cast Steel
Body Connection		Flanged	Flanged	Flanged	Flanged	Flanged	Weld End
Flow	Kv	1.28	0.43 (Inlet)		6.2 - 15	28.6 - 116	171 - 471
	Cv	1.5	0.5		7.2 - 17.5	33.4 - 135	200 - 550
Fluid Temperature	°C	-45° to 105°	-45° to 105°	-45° to 105°	-45° to 105°	-50° to 105°	-50° to 105°
	°F	-50° to 220	-50° to 220°	-50° to 220°	-50° to 220°	-60° to 220°	-60° to 220°
Operation		Direct Diaphragm	Direct Diaphragm	Direct Diaphragm	Pilot	Pilot	Pilot
Bulletin for Reference		21-02	21-02	21-03	See Page 356	See Page 356	23-20

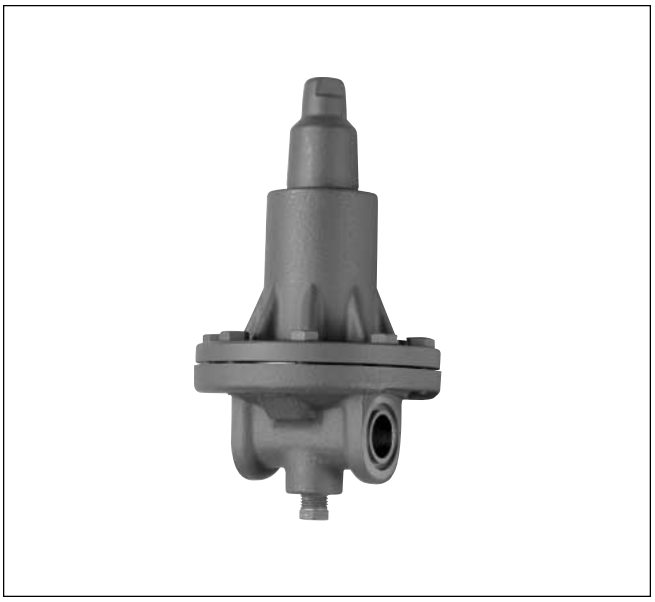
Pressure Setting Ranges

Code	Set Point Range	Approx. Pressure Change per Turn of Adjusting Screw	Factory Set Point (unless otherwise specified)
A	0 - 10.3 bar (0 - 150 PSIG)	1.7 bar (25 PSI)	2.8 bar (40 PSIG)
V	500mm Hg to 8.3 bar (20" Hg to 120 PSIG)	1.7 bar (25 PSI)	1.0 bar (15 PSIG)
D	5.2 to 19.3 bar (75 to 280 PSIG)	3.7 bar (53 PSI)	9.7 bar (140 PSIG)

*For variations "K" and "BK", the set point is factory set and **sealed**. Standard set point for each range is shown in the table to the left. A custom setting may be specified by adding the set point in PSIG preceded by a "-" at the end of the model number, i.e. -90. Set point must be valid for the range selected.*

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Compact, direct diaphragm operated
- Maximum rated pressure (MRP): 27.6 bar (400 PSIG)
- Flanged connections: FPT, SW, WN, ODS
- Available with close coupled strainer
- Stainless steel diaphragm



Description

The A2 type pressure regulators are compact, direct diaphragm operated, for use with refrigerant liquid or vapor. The regulators can be used with ammonia, R-22, R-134a, R-404A, R-507, certain other refrigerants, oil and other approved fluids with similar pressure, temperature and corrosion characteristics. The regulators are for use in systems where a small inlet or outlet pressure regulator is needed.

Materials

Body ..... Gray iron
Seat ..... Chrome plated
Diaphragm ..... Stainless steel preformed

Specifications

Maximum Fluid Temperature ..... 105°C (220°F)
Minimum Fluid Temperature ..... -45°C (-50°F)
Design Pressure (MRP) ..... 27.6 bar (400 PSIG)

⚠ **WARNING!**
ODS flanges not suitable for use with ammonia.

Application Guide

Type	Function	Operation	Typical Applications
A2B	Control inlet pressure	Regulate at preset inlet pressure Field adjustable Open on rise in inlet pressure	1. Small capacity back pressure regulator 2. Small capacity defrost relief regulator
A2A	Inlet regulator, greater capacity		
A2BO	Control outlet pressure	Regulate at preset outlet pressure Field adjustable Open on drop in outlet pressure	1. Gas pressure reducing regulator 2. Liquid or oil pressure reducing regulator

Selection Guide

Type	Description	Ranges Available (Std. is Bold)	Connections Available Style: FPT, SW, WN	Flow Coefficient③	
				Kv	Cv
A2B	Small Capacity Back Pressure Regulator	V, **A,** D	¼", ⅜", ½", ¾"	0.43	0.5
A2BK①	Relief, Give pressure setting	**A,** D		0.34	0.4
A2BP	Differential Regulator for ext. connection	**A,** D		0.43	0.5
A2BM	Electrically Compensated	V, **A**, D			
A2BT	Temperature Operated Regulator	1, 2	¼", ⅜", ½", ¾"		
A2A	Small Capacity Back Pressure Regulator	**A,** D	¼", ⅜", ½", ¾"	1.28	1.5
A2BO1②	Small Capacity Outlet Pressure Regulator	**V,** D	¼", ⅜", ½", ¾"	0.09	0.1
A2BO2②				0.17	0.2
A2BO4②				0.43	0.5

① The A2BK Reseating Relief Regulator can be used for various relief to low side applications including cold liquid line sections where buildup of dangerous hydrostatic pressure is possible. See "Safe Operation".

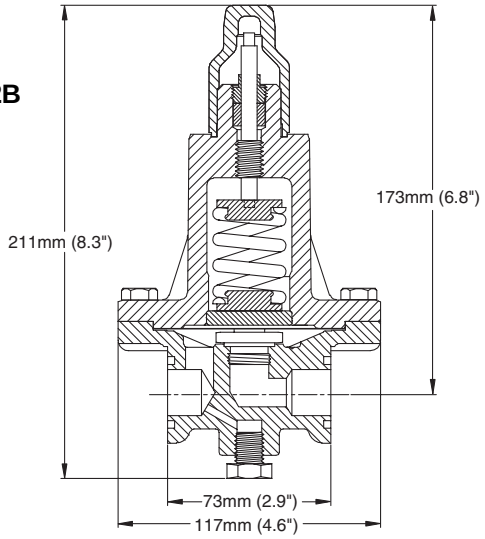
② For external pressure connection, specify A2BO1E, A2BO2E or A2BO4E.

③ Flow coefficients are for standard range.

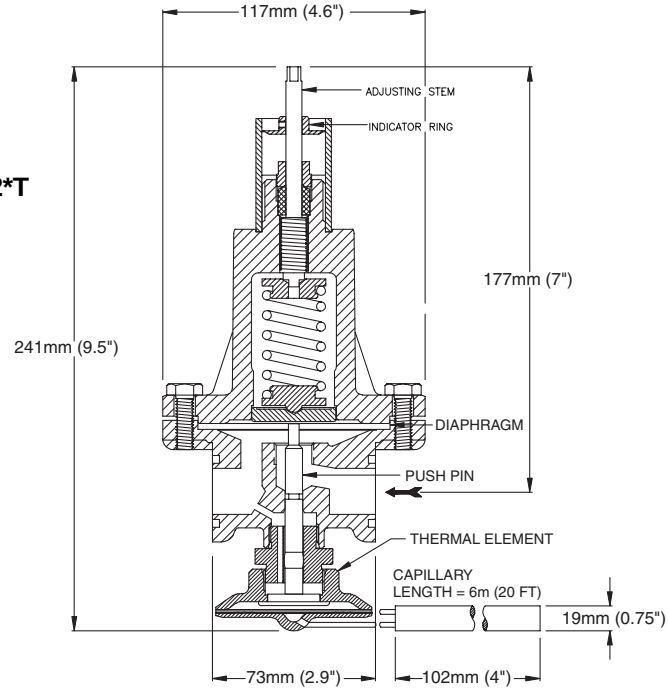
⚠ **CAUTION:**
When ordering a Type A2 regulator to be used as a pilot regulator for an A4R, the size of the A4R main regulator must be considered. For 20-50mm (¾" - 2") A4R, order an A2B2 or A2BO2E. For 65-200mm (2½" - 8") A4R, order an A2B or A2BO4E.

Dimensions

A2A, A2B



A2*T



How to Order Type A2 Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Variation	Range	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Strainer		Set Point
A2B	T	1	F03	F03	A2	A	S	–	

Type

A2A	Inlet, 1.28 Kv
A2B	Inlet, 0.43 Kv

Variations (see Note)

Blank	Inlet Regulator, No Variation
2	A2B Inlet Regulator, 0.17 Kv
E	External Pressure Connection
K	Reseating Relief
M*	Electrically Compensated (Select Motor)
P	1:1 Pneumatically (Pressure) Compensated
3P	3:1 Pneumatically (Pressure) Compensated
T	Temperature Operated
H	Inlet Regulator w/Handwheel
O1	Outlet, 0.09 Kv
O2	Outlet, 0.17 Kv
O4	Outlet, 0.43 Kv
O1E	Outlet External, 0.09 Kv
O2E	Outlet External, 0.17 Kv
O4E	Outlet External, 0.43 Kv

Note: Only "T" variation is available with A2A.

Flange Type / Size

Flange Type		Size	
X	No Flange	**00**	None
F	FPT (IPS)	**02***	¼"
S	SW (IPS)	**03**	⅜"
W	WN (IPS)	**04**	½"
		06	¾"
K	ODS	**04**	½"
		05	⅝"
		07	⅞"
D	DIN Weld Neck	**10**	10mm
		15	15mm
		20	20mm

* FPT only.

Body

N	No Valve
A	1/4" Angle

Strainer

N	No Strainer
S	w/Strainer

Custom Set Point (Var. "K" Only)

Setting in PSIG within the values for the range selected

Pressure Range*

A	0 to 10.3 Bar (0 to 150 PSIG)
D	5.2 to 19.3 Bar (75 to 280 PSIG)
V	500mm Hg to 8.3 Bar (20" Hg to 120 PSIG)

Temperature Range ("T" Variation only)

1	-30° to +30°C (-20° to +80°F)
2	+20° to +60°C (60° to 140°F)

* See Selection Guide table for pressure range availability. Not available with "T" variation.

Gauge Size, Range, Type

N	No Gauge
A	2½" English, Low Pressure
B	3½" English, Low Pressure
C	2½" English, High Pressure
D	3½" English, High Pressure
E	2½" Metric, Low Pressure
F	3½" Metric, Low Pressure
G	2½" Metric, High Pressure
H	3½" Metric, High Pressure

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404A
5	R-507

***Motor Style ("M" Variation Only)**

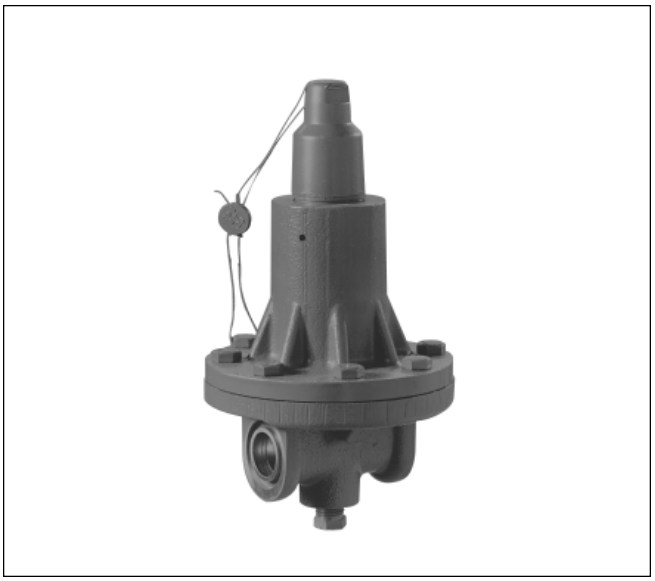
H	Motor Hardware Only
	Honeywell Motors
1	24V 50/60Hz Std. Cam w/120V transformer
A	24V 50/60Hz Std, Cam w/240V transformer
2	24V 50/60Hz Low Rise Cam w/120V transformer
B	24V 50/60Hz Low Rise Cam w/240V transformer
3	4-20 mA, 120V 50/60Hz, Standard Cam
4	4-20 mA, 120V 50/60Hz, Low Rise Cam
5	4-20 mA, 240V 50/60Hz, Standard Cam
6	220V 50Hz Std. Cam
7	220V 50Hz Low Rise Cam

***Motor Style, Continued ("M" Variation only)**

	Penn Motors
8	24V 50/60Hz Std. Cam w/120V transformer
C	24V 50/60Hz Std. Cam w/240V transformer
9	24V 50/60Hz Low Rise Cam w/120V transformer
D	24V 50/60Hz Low Rise Camw/240V transformer

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Compact, direct diaphragm operated
- Maximum rated pressure (MRP): 27.6 bar (400 PSIG)
- Flanged connections: FPT, SW, WN, ODS
- Available with close coupled strainer



Description

The A2CK pressure relief regulator is direct diaphragm operated, for use with refrigerant liquid or vapor. The regulators can be used with ammonia, R-22, R-134a, R-507 and other common refrigerants. This regulator is used in systems where a small direct operated valve is required as a safety device to relieve “trapped” liquid lines in the event that a hydrostatic pressure condition develops. *The A2CK should not be piped or applied as ASME certified safety relief valve for use on pressure vessels.*

The A2CK utilizes a special pilot seat designed to provide for a higher flow rate (Cv) than the A2BK relief regulator. Additionally, with a relatively small ratio of diaphragm to pilot seat area, it is designed to open and regulate refrigerant flow quickly through the pilot seat once its set point has been reached. The design of the valve allows for this “quick release” feature. However, it does not offer the same type of controlled response which may be required for a standard regulator application. For those applications where a small regulator is needed for accurate upstream pressure control, an A2A or A2B direct operated regulator should be considered.

The A2CK is factory set and sealed with a lead seal prior to shipment. Since the valve should be used exclusively as a small internal relief valve, it is designed with the “D” range adjusting spring only. Set points must fall in the 75 to 280 PSIG (5 to 19 bar) range.

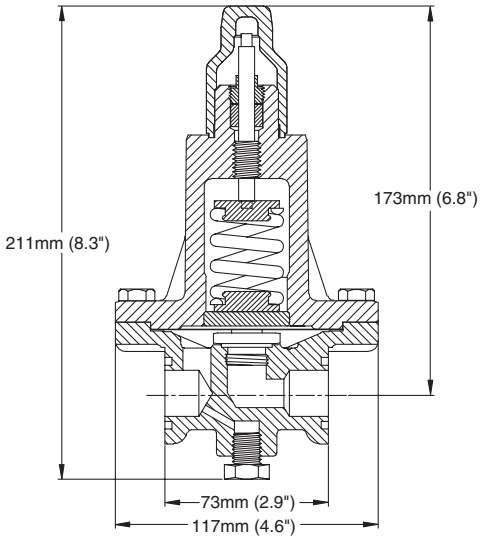
Materials

Body Material	Gray iron
Seat Material	Chrome plated
Diaphragm Material	Stainless steel

Specifications

Maximum Fluid Temperature	105°C (220°F)
Minimum Fluid Temperature	-45°C (-50°F)
Design Pressure (MRP)	27.6 bar (400 PSIG)
Flow Coefficient	1.14 Cv

Dimensions



How to Order A2CK Compact Relief Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Variation	Range	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Strainer		Set Point
A2C	K	D	F03	F03	C1	A	S	–	125

Variation

K	Reseating Relief Regulator

Range

D	5.2-19.3 Bar (75-280 PSIG)

Flange Type / Size

Flange Type		Size	
X	No Flange	**00**	None
F	FPT (IPS)	**02***	¼"
S	SW (IPS)	**03**	⅜"
W	WN (IPS)	**04**	½"
		06	¾"
K	ODS	**04**	½"
		05	⅝"
		07	⅞"
D	DIN Weld Neck	**10**	10mm
		15	15mm
		20	20mm

* FPT only.

Gauge Size, Range, Type

N	No Gauge
A	2½" English, Low Pressure
B	3½" English, Low Pressure
C	2½" English, High Pressure
D	3½" English, High Pressure
E	2½" Metric, Low Pressure
F	3½" Metric, Low Pressure
G	2½" Metric, High Pressure
H	3½" Metric, High Prsesure

Refrigerant

0	None
7	R-717
1	R-134a
2	R-22
4	R-404A
5	R-507

Body

N	No Valve
A	1/4" Angle

Strainer

N	No Strainer
S	w/Strainer

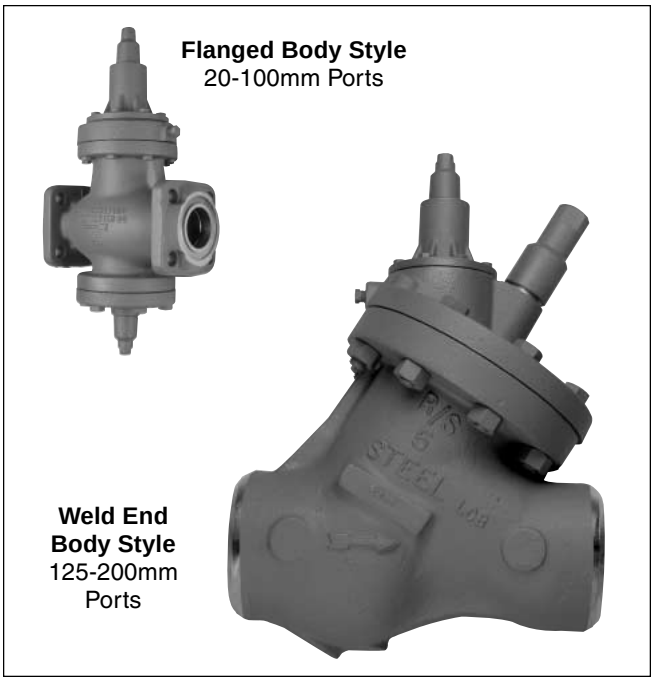
Custom Set Point

xxx	Setting in PSIG between 75 and 280. Standard factory setting is 140.

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Pilot operated for precise control
- Characterized modulating plug for stable control under low flow conditions
- Many control variations are possible
- Convertible to other variations
- Optional close coupled strainers up to 100mm (4")
- Manual opening stem
- Easy to service



Description

These compact, heavy-duty, pilot-operated regulators are suitable for use with Ammonia, R-22, R-134a, R-404A, R-507 and other common refrigerants and fluids approved for use in refrigeration systems.

The A4 family of regulators includes valves that 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 shown on pages 354-358.

Port sizes 20-100mm (3/4" to 4") are flanged body valves. Port sizes 125 -200mm (5" - 8") are weld end body valves.

Ordering Tips

A4 regulators with variations are normally ordered factory assembled and tested. However, the A4Z regulators and the Adaptomode® modules shown on pages 372-374 are available separately for stock or field conversions.

Flanges are generally ordered with the regulator and are specified as part of the model number. Male flanges are provided for both inlet and outlet. Flanges may also be ordered separately from pages 433-435.

The A4R regulators are available for remote pilot operation. The pilot regulator (A2B) and pilot solenoid must be ordered separately.

Variations B, S and D, alone or in combination with other variations, require a selection of voltage, coil and pilot light. For variations with two solenoids, each selection applies to both. Not all voltages are available for each type of coil and/or pilot light. Refer to the table on page 376 for availability. For other variations, enter “0” into those fields of the model code.

A4 regulators are generally ordered with an upstream strainer to prevent entrance of foreign materials into the valve and the rest of the system.

Back flow through these regulators will occur when outlet pressure exceeds inlet pressure by several PSI. To avoid backflow under these conditions, order the check valve option to install downstream of the regulator.

Regulators will be set to standard set points for the selected range (see page 349). For variations “K” and “BK”, a custom setting can be indicated at the end of the model number by adding the value in PSI preceded by a “-”, i.e. -100. For Range V, indicate PSI as above, or inches Hg by adding the setting in inches preceded by “-Hg”, i.e. -Hg10.

Materials

Body:

20-100mm ..... Gray Iron (ASTM A126 Class B)
125-100mm ..... Cast Steel (A-352 GR, LCB)

Seat ..... Lapped Metal to Metal
except A4K 20-32mm (¾" to 1¼") ..... PTFE

Pilot Seat ..... Chrome Plated Steel

Diaphragm ..... Stainless Steel, Preformed

Specifications

Maximum Fluid Temperature ..... 105°C (220°F)

Minimum Fluid Temperature:
20-32mm (¾" to 1¼") ..... -45°C (-50°F)
40-200mm (1⅝" to 8") ..... -50°C (-60°F)

Design Pressure (MRP) ..... 27.6 bar (400 psig)

Flow Coefficients

Port Size	Flow Coefficient Kv (Cv)	Reduced Capacity Plugs		
		50% Kv (Cv)	35% Kv (Cv)	17% Kv (Cv)
20	6.2 (7.2)	3.1 (3.6)		1.0 (1.2)
25	8.6 (10.0)			
32	15.0 (17.5)		5.2 (6.1)	
40	28.6 (33.4)		10.0 (11.7)	
50	42.4 (49.5)			
65	60.0 (70.0)		21.0 (24.5)	
75	86.0 (100.0)		30.0 (35.0)	
100	116.0 (135.0)		41.0 (48.0)	
125	171.0 (200.0)			
150	308.0 (360.0)			
200	471.0 (550.0)			

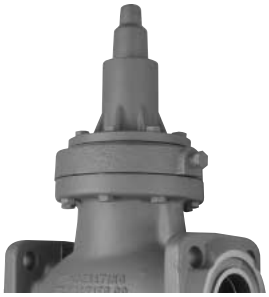
Application Guide

There are many possible combinations of A4 regulator variations. The electric shut-off (S), electric wide-opening (B) and dual pressure (D) variations are often combined with each other. Or they may be used in combination with the compensated (M, P, 3P and T), outlet pressure (O) or differential pressure (L) regulators. Remote configurations of most variations are available using the A4R regulator separate from pilot controls.

Variation	Type Suffix	Type	Function	Operation	Typical Applications
Basic regulator	—	A4	Control inlet pressure	Operates at present inlet pressure. Can be field adjusted. Opens on rising inlet pressure.	1. Evaporator pressure control 2. Condenser pressure control 3. Any inlet pressure control
Electric shut-off	S	A4S	Control inlet pressure or shut off regulator	Regulates when electrically energized; closed when not energized.	1. Open for temperature control 2. Closed for defrosting
Electric wide opening	B	A4B	Control inlet pressure or wide open regulator	Regulates when not electrically energized; wide open when energized.	1. Wide open for maximum cooling 2. Regulating for defrost 3. Regulating for temperature control.
Dual Pressure	D	A4D	Dual pressure control	Regulates 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.
Reseating relief	K	A4K	Reseating relief regulator	Open wide above set point. Repeatedly reseats after operation.	1. Defrost relief 2. Non-atmospheric relief 3. High to low relief
Outlet pressure regulator	O	A4O A4OE	Control outlet pressure	Regulates 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. Receiver pressure control
Differential pressure regulator	L	A4L	Control pressure difference across regulator	Regulates pressure difference at or below a pre-set amount.	1. Liquid pump relief regulator 2. Reduce liquid or vapor line pressure
Electrically compensated	M	A4M	Motor changes pressure set-point	Potentiometer or solid state type thermostat readjusts set-point to match evaporator temperature to a varying load.	1. Precise control of process cooling 2. Liquid chillers 3. For load change compensation
Pneumatically compensated	P, 3P	A4P A43P	Air pressure changes set-point (1:1 ratio); A4A3P for 3:1 ratio	Pneumatic thermostat readjusts set-point to match evaporator temperature to a varying load.	1. Precise control of process cooling 2. Liquid chillers 3. For load change compensation
Temperature operated	T	A4T A4OT A4OTE	Temperature bulb controls regulator opening	Increase in temperature opens regulator; decrease in temperature closes regulator. Also reverse acting with “O” variation.	1. Process cooling systems 2. Liquid chillers 3. Systems with load change 4. Heat reclaim
Electronic pilot operated	J	A4J	Electronic signal controls regulator opening	Pilot position is proportional to electronic signal.	1. Precise control 2. Liquid chiller 3. System with load change
Externally equalized	E	A4E A4OE etc.	Control at external pressure sensed remote from valve	Same as standard regulator except controlled pressure is sensed away from regulator.	1. Low Pressure drop (A4AE) 2. Hot gas bypass (A4AOE)
Main regulator for remote pilot	R	A4R	Main regulator is controlled by separate pilots	Main regulator modulates, closes or opens in response to remote pilots.	1. Simple inventory of regulator and pilots 2. Convenient placement of pilots 3. Unusual pilots or circuits
Basic regulator assembly	Z	A4Z	Complete regulator assembly to which modules can be added.	Can be built into most of the A4A variation regulators. Has a Modudapter® and two Moduplates®.	Versatile unit for inventory along with Modules on pages 372-374.

The most common variations of the Type A4 regulator appear on the following pages. For other combinations, please consult Parker.

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Cleveland, OH



A4
Basic Inlet



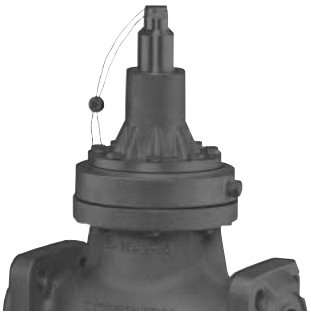
A4O
Basic Outlet



A4L
Differential Pressure



A4Z
Inlet with Modudapter®



A4K
Relief



A4P
Pressure Compensated



A4B
Electric Wide Opening



A4S
Electric Shut-Off



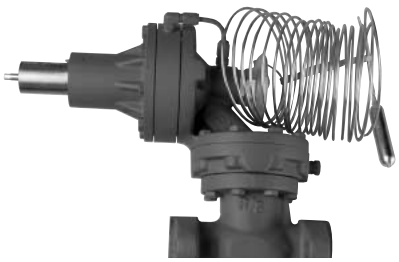
A4D
Dual Pressure



A4JS
Electronic Pilot Operated



A4M
Electrically Compensated



A4OT
Temperature Operated

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Regulator Variations

Added Variation	Code	Catalog Pages*	Ordering Information Required						Bulletin Number
			Pressure Range(s)	Voltage, Coil	Pilot Light	Motor	Set Point	Temp. Range	
Electric Shut-Off	S	356-357	●	★	★				23-06
Electric Wide Opening	B	356-357	●	★	★				23-06
Dual Pressure Regulator	D	356-357	●●	★	★				23-06
Reseating Relief Regulator	K[1]	356-357	●				●		23-05
Outlet Pressure Regulator	O	358-359	●						23-07
Differential Pressure Regulator	L[2]	360-361	●						23-10
Electrically Compensated	M[3]	364-365	●			●			23-11
1:1 Pneumatically Compensated	P	360-361	●						23-08
3:1 Pneumatically Compensated	3P	360-361	●						23-08
Temperature Operated	T	362-363						●	23-09
Electronic Pilot Operated	J[4]	366-367	●						23-12
Externally Equalized	E	356-357	●						23-05
Main Regulator for Remote Pilot	R	356-357							23-05
Complete Regulator Assembly w/ Modudapter® & 2 Moduplates®	Z[5]	12-13	●						23-06

* Page numbers reference information for flanged body regulators, 20-100mm (¾" to 4"). For weld end bodies, 125-200mm (5" - 8"), see pages 370-371.

★ See Table on Page 376 for available voltages for coils and pilot lights.

NOTES:

1 Factory set and tagged. Standard 4.9 bar (70 PSIG)

2 Determine range from pressure **difference** required

3 Thermostats available to order separately

4 Includes a Landis & Staefa M2FP03GX direct operated proportional solenoid as pilot valve. Order I/O module and controller within model number. Transformer may be ordered separately.

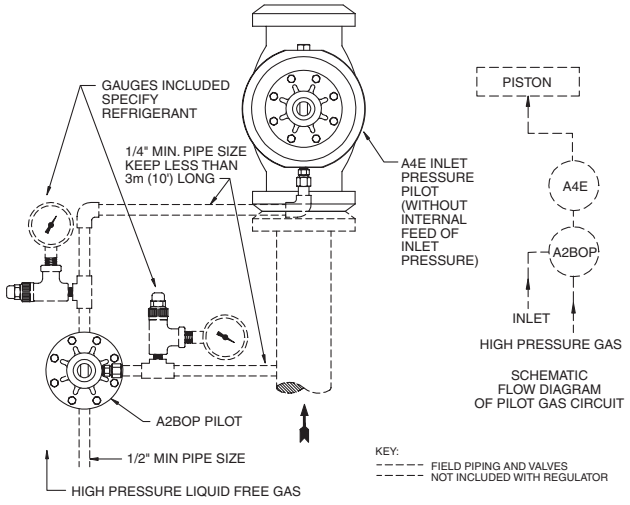
5 See pages 372-374 for Adaptomode modules sold separately.

Low Pressure Drop Option (LPD)

With the conventional evaporator regulator, a minimum of 2 PSI pressure across the main valve is required for the valve to be fully open. The Low Pressure Drop feature added to a Type A4 inlet or outlet pressure regulator permits full flow modulation with prsesure drops down to 1/2 PSI.

The principle of operation for the LPD is to provide high pressure refrigerant to the A2BOP pilot inlet line. Reduce this high pressure to a lower pressure and control it to follow the main regulator upstream pressure always at a fixed differential (approximately 5 PSI). Use this controlled following pressure through the pilot circuit and to the top of the piston, where it will operate the main valve independently of the main line pressure drop. The controlled following pressure from the A2BOP must be enough higher than the upstream pressure to provide reliable operation at all times, but not so high at any time as to cause excessive leakage, which would reduce evaporator capacity.

All Type A4 Regulating Valves arranged for LPD operation must also be sized for LPD operation. The capacity of a regulator at 1/2 PSI pressure drop will be 50% of the capacity at 2 PSI pressure drop for the same inlet conditions.



The basic LPD assembly includes:

- Compensated pressure regulator (A2BOP)
- Gauge valves:
  2 with inlet regulator, 3 with outlet regulator
- 760mm Hg to 10.5 bar (30" Hg to 150 lb.) gauges:
  2 with inlet regulator, 3 with outlet regulator

NOTE: Not available with Variations E, L, K or R.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Basic Inlet Regulators, 20-100mm (¾" - 4")

A4 inlet regulators open on a rise in inlet pressure above the set point and close on a drop in inlet pressure below the set point. The inlet pressure set point is not appreciably affected by variations in outlet pressure.

Regulators are pilot operated using upstream pressure for the opening force and requires a minimum 0.14 bar (2 psig) pressure drop to fully open. They modulate the flow of refrigerant gas or liquid to maintain constant upstream (or inlet) pressure as set-for, despite load fluctuations.

The **A4D dual pressure regulator** is capable of regulating at two different set points using a pair of pilot regulators controlled by a solenoid valve. A4DD regulates three set points (low/mid range/high).

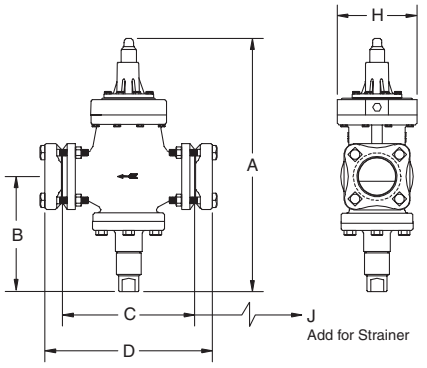
The **A4K reseating relief regulator** is factory set and sealed at a specified set-point.

The **A4AR** is a main valve only and will control pressures as determined by the remote pilot(s) piped to it.

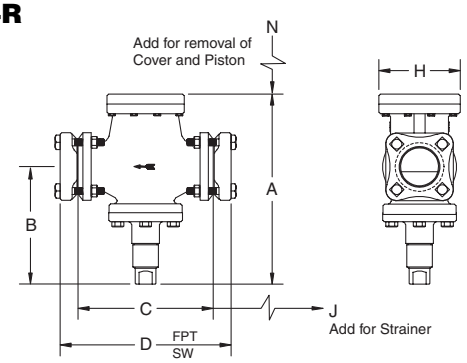
See Pages 370-371 for weld end body regulators.

Dimensions

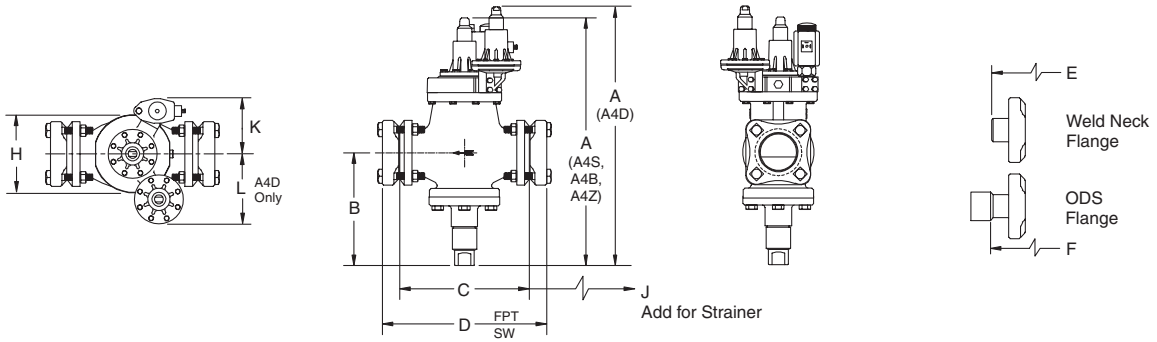
A4
A4E
A4K



A4R



A4B
A4S
A4Z
A4D



OVERALL VALVE DIMENSIONS																				
Port Size		20mm & 25mm (3/4" & 1")			32mm (1-1/4")			40mm & 50mm (1-5/8" & 2")			65mm (2-1/2")			75mm (3")			100mm (4")		
DIMENSION			mm	inches		mm	inches		mm	inches		mm	inches		mm	inches		mm	inches
A	A4 Basic		392	15.4		410	16.1		464	18.2		483	19.0		597	23.5		653	25.7
	A4R		241	9.5		254	10.0		307	12.1		325	12.8		432	17.0		478	18.8
	A4S, B, Z		392	15.4		410	16.6		484	16.2		483	19.0		597	23.5		653	25.7
	A4D		429	16.9		447	17.6		500	19.7		513	20.2		632	24.9		685	27.0
B			148	5.8		162	6.3		177	6.9		181	7.1		273	10.7		292	11.5
C			164	6.2		203	8.0		251	9.9		252	9.9		311	12.2		359	14.1
H			117	4.6		117	4.6		140	5.5		159	6.2		176	7.0		222	8.8
J			98	3.9		178	7.0		251	9.9		314	12.4		314	12.4		363	14.3
K			112	4.4		112	4.4		117	4.6		124	4.9		142	5.6		157	6.2
L			122	4.8		122	4.8		135	5.3		133	5.2		122	4.8		152	6.0
M			138	5.4		138	5.4		140	5.5		150	5.9		170	6.6		190	7.7
OVERALL LENGTH DIMENSIONS WITH FLANGE																				
D*	FPT & SW FOR PIPE SIZES	3/4"	216	8.5	1-1/4"	256	10.1	1-1/2"	307	12.1	2-1/2"	331	13.0	3"	389	15.3	4"	450	17.7
		1"	216	8.5	1-1/2"	256	10.1	2"	307	12.1									
		1-1/4"	216	8.5															
E*	WN FOR FLANGE PIPE SIZES	3/4"	254	10.0	1-1/4"	300	11.8	1-1/2"	364	14.3	2-1/2"	401	15.8	3"	478	18.8	4"	571	22.5
		1"	261	10.3	1-1/2"	304	12.0	2"	371	14.6									
		1-1/4"	261	10.3															
F*	ODS FOR TUBE SIZES	7/8"	239	9.4	1-3/8"	269	10.6	1-5/8"	358	14.1	2-5/8"	348	13.7	3-1/8"	414	16.3	4-1/8"	503	19.8
		1-1/8"	239	9.4	1-5/8"	279	11.0	2-1/8"	338	13.3									
		1-3/8"	231	9.1	2-1/8"	305	12.0	2-5/8"	358	14.1	3-1/8"	389	15.3	3-5/8"	432	17.0			
		1-5/8"	239	9.4															

How to Order Basic Inlet Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Press. Drop	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	E	V	0	F08	F08	A2	A	0	12	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Function

Blank	Basic Inlet Regulator
S	Electric Shut-Off
B	Electric Wide Opening
BS	Electric Wide Opening & Shut-Off
D	Dual Pressure (Low/High)
DD	Dual Pressure (Low/Mid/High)
DS	Dual Pressure & Electric Shut-Off
DB	Dual Pressure & Electric Wide Opening
E	Externally Equalized
ES	Externally Equalized & Electric Shut-Off
K	Reseating Relief
BK	Electric Wide Opening & Reseating Relief
R	Main Regulator only (Order Remote Pilot Separately)
Z	Basic Regulator with Modudapter® & 2 Moduplates®

Pressure Range*

A	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)
X	No Range (A4R only)

* For dual pressure variations (D, DS, DB), specify a pressure range for each pilot regulator (low/high), i.e. AD. For A4DD, specify low/mid/high, i.e., VAD.

See Availability Table!

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	06 ¾" 08 1" 10 1¼" 12 1½" 16 2" 20 2½" 24 3" 32 4"
K ODS (US) *Not suitable for use with ammonia.*	07 7/8" 09 1 1/8" 11 1 3/8" 13 1 5/8" 17 2 1/8" 21 2 5/8" 25 3 1/8" 29 3 5/8" 33 4 1/8"
D DIN Weld Neck M Insert Metric C EC-Br Copper	Enter size from table below.

Reduced Capacity Plugs (See page 8)

0	Full Capacity
1	17%
3	35%
5	50%

Gauge Size, Range, Type

N	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Gauge Valve

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404A
5	R-507

LPD?

0	No
1	Yes

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Pilot Light

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Lens Color

0	None
G	Green (std)
R	Red
A	Amber
W	White

Strainer?

N	No
S	Yes

Check Valve

0	None
1	w/CK-1
4	w/CK-4

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.
* Integral pilot light. Lens color designated separately

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	A0			72	159	80	177	132	291

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Basic Outlet Regulators, 20-100mm (¾" - 4")

Outlet regulators modulate flow of refrigerant gas or liquid to maintain a constant downstream pressure as set-for, despite fluctuations in load. The regulator will gradually close when downstream pressure begins to rise above the setting and will gradually open when pressure begins to fall below the setting.

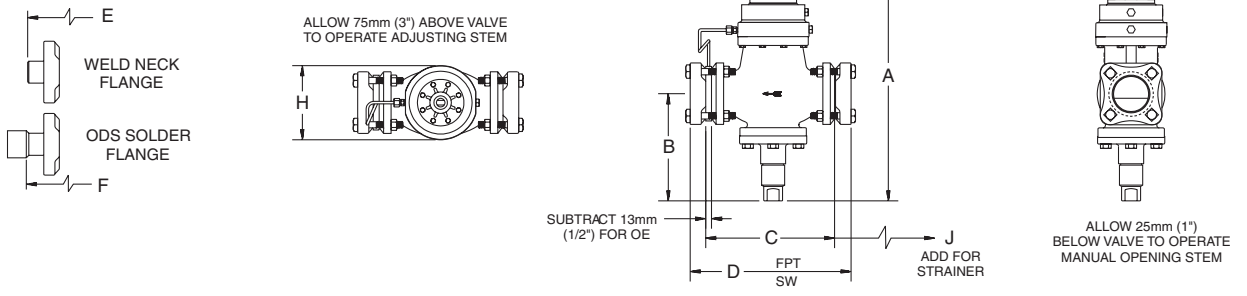
A4 Regulators are pilot operated using upstream pressure for the opening force and requires a minimum 0.14 bar (2 psig) pressure drop to fully open.

The regulator cannot maintain set-for pressure if uncontrolled branch pipe lines feed into the main pipeline downstream of the A4AO Regulator.

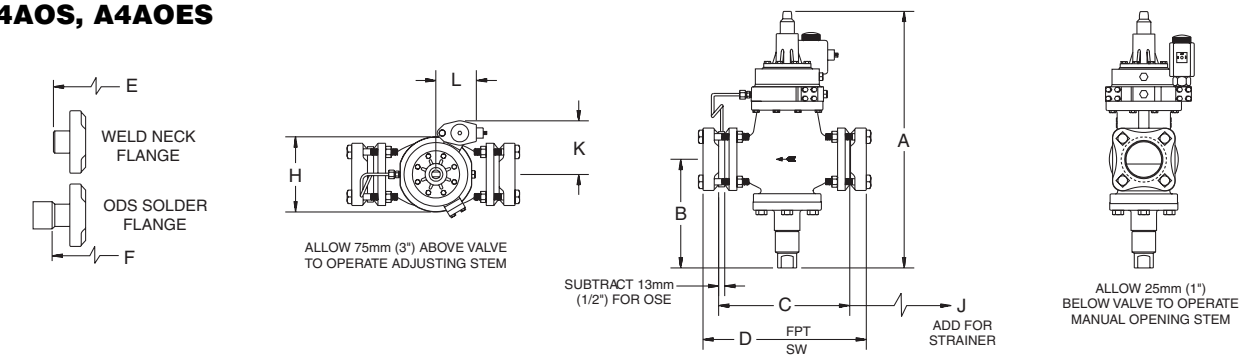
These valves are generally ordered with close coupled strainer to prevent entrance of foreign material into the valve and the rest of the system.

See Pages 370-371 for weld end body regulators.

A4AO, A4AOE



A4AOS, A4AOES



OVERALL VALVE DIMENSIONS

Port Size		20mm & 25mm (3/4" & 1")			32mm (1-1/4")			40mm & 50mm (1-5/8" & 2")			65mm (2-1/2")			75mm (3")			100mm (4")		
DIMENSION			mm	inches		mm	inches		mm	inches		mm	inches		mm	inches		mm	inches
A			454	17.9		472	18.6		525	20.7		538	21.2		657	25.9		710	28.4
B			148	5.8		162	6.3		177	6.9		181	7.1		273	10.7		292	11.5
C*			177	6.7		216	8.5		264	10.4		264	10.4		324	12.7		352	14.6
H			117	4.6		117	4.6		140	5.5		159	6.2		178	7.0		222	8.8
J			98	3.9		178	7.0		251	9.9		314	12.4		314	12.4		363	14.3
K			112	4.4		112	4.4		117	4.6		124	4.9		142	5.6		157	6.2
L			122	4.8		122	4.8		135	5.3		133	5.2		122	4.8		152	6.0
OVERALL LENGTH DIMENSIONS WITH FLANGES ***Subtract 13mm (0.5") from C, D, E & F Dimensions for E Variation**																			
D*	FPT & SW FOR PIPE SIZES	3/4"	229	9.0	1-1/4"	269	10.6	1-1/2"	320	12.6	2-1/2"	344	13.5	3"	402	15.8	4"	463	18.2
		1"	229	9.0	1-1/2"	269	10.6	2"	320	12.6									
		1-1/4"	229	9.0															
E*	WN FOR FOR PIPE SIZES	3/4"	267	10.5	1-1/4"	313	12.3	1-1/2"	377	14.8	2-1/2"	414	16.1	3"	491	19.3	4"	584	23.0
		1"	274	10.8	1-1/2"	317	12.5	2"	384	15.1									
		1-1/4"	274	10.8															
F*	ODS FOR TUBE SIZES	7/8"	252	9.9	1-3/8"	282	11.1	1-5/8"	371	14.6	2-5/8"	361	14.2	3-1/8"	427	16.8	4-1/8"	516	20.3
		1-1/8"	252	9.9	1-5/8"	292	11.5	2-1/8"	351	13.8									
		1-3/8"	244	9.6	2-1/8"	318	12.5	2-5/8"	371	14.6	3-1/8"	402	15.8	3-5/8"	445	17.5			
		1-5/8"	252	9.9															

How to Order Outlet Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Press. Drop	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	OE	V	0	F08	F08	A2	A	0	21	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Variation

O	Basic Outlet Regulator
OS	w/ Electric Shut-Off
OB	w/ Electric Wide Opening
OBS	w/ Electric Wide Opening & Shut-Off
OD	w/ Dual Pressure
OE	Externally Equalized
OES	Externally Equalized & Electric Shut-Off

Pressure Range*

D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)

*For dual pressure variation (OD), enter pressure range for each pilot regulator, i.e. VD (low/high).

Reduced Capacity Plugs (see page 8)

0	Full Capacity
1	17%
3	35%
5	50%

See Availability Table!

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	06	¾"
S	SW (IPS)	08	1"
W	Weld Neck (IPS)	10	1¼"
		12	1½"
		16	2"
		20	2½"
		24	3"
		32	4"
K	ODS (US) *Not suitable for use with ammonia.*	07	7/8"
		09	1 1/8"
		11	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Enter size from table below.	
M	Insert Metric		
C	EC-Br Copper		

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Body

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404a
5	R-507

LPD?

0	No
1	Yes

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.

Pilot Light

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer?

N	No
S	Yes

Check Valve

0	None
1	w/CK-1
4	w/CK-4

* Integral pilot light. Lens color designated separately

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	A0			72	159	80	177	132	291

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Differential & Pressure Compensated, 20-100mm (¾" - 4")

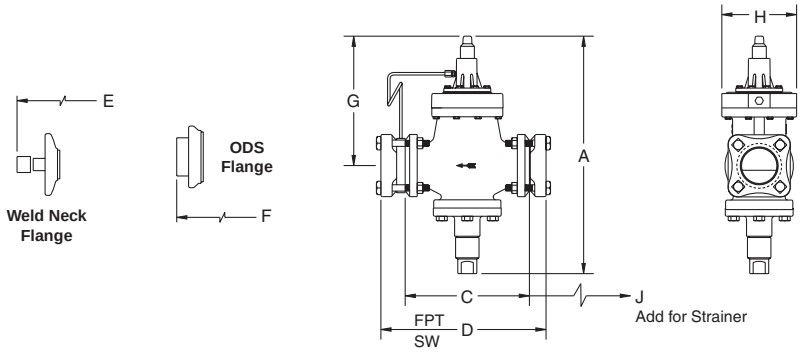
Differential regulators (A4L) modulate flow of refrigerant liquid or gas to maintain a constant set-for pressure *differential* between regulator inlet and regulator outlet.

Pneumatically compensated inlet regulators modulate the flow of refrigerant gas or liquid to maintain a varying inlet pressure (A4P) or outlet pressure (A4OP) in response to a pneumatic signal received from a pneumatic controller. The regulator *set-point will be directly varied* on a 1:1 basis with value of the air pressure supplied to the bonnet. A 3:1 set-point variation is also available for inlet pressure regulators (A3P). Generally the pneumatic controller modulates the air pressure from 3 to 15 PSIG throughout its control range.

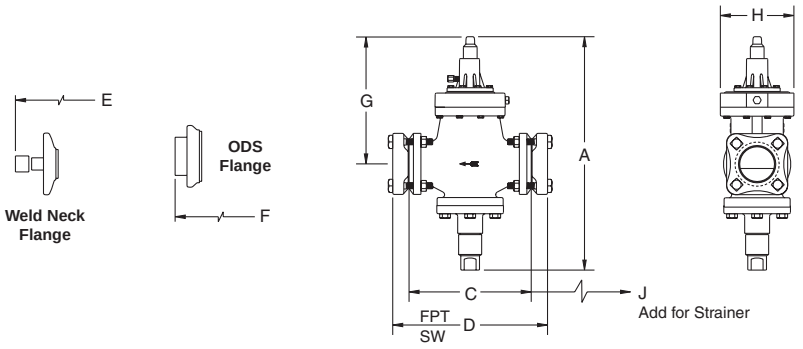
See Pages 370-371 for weld end body regulators.

Dimensions

A4L



A4P
A43P



OVERALL VALVE DIMENSIONS

Port Size		20mm & 25mm (3/4 & 1")			32mm (1-1/4")			40mm & 50mm (1-5/8 & 2")			65mm (2-1/2")			75mm (3")			100mm (4")		
DIMENSION			mm	inches		mm	inches		mm	inches		mm	inches		mm	inches		mm	inches
A	A4P, A4L		392	15.4		410	15.6		464	16.2		483	19.0		597	23.5		653	25.7
	A43P		414	16.3		432	17.0		485	19.1		505	19.9		620	24.4		676	26.6
C			164	6.2		203	8.0		251	9.9		252	9.9		311	12.2		359	14.1
G	A4P, A4L		244	9.6		248	9.8		287	11.3		302	11.9		324	12.8		361	14.2
	A43P		266	10.5		270	10.7		308	12.2		324	12.8		347	13.7		384	15.1
H			117	4.6		117	4.6		140	5.5		159	6.2		176	7.0		222	8.8
J			98	3.9		178	7.0		251	9.9		314	12.4		314	12.4		363	14.3
OVERALL LENGTH DIMENSIONS WITH FLANGES *Add 13mm (0.5") to D, E & F Dimensions for A4L Variation																			
D*	FPT & SW	3/4"	216	8.5	1-1/4"	256	10.1	1-1/2"	307	12.1									
	FOR PIPE	1"	216	8.5	1-1/2"	256	10.1	2"	307	12.1	2-1/2"	331	13.0	3"	389	15.3	4"	450	17.7
	SIZES	1-1/4"	216	8.5															
E*	WN FOR	3/4"	254	10.0	1-1/4"	300	11.8	1-1/2"	364	14.3									
	FOR PIPE	1"	261	10.3	1-1/2"	304	12.0	2"	371	14.6	2-1/2"	401	15.8	3"	478	18.8	4"	571	22.5
	SIZES	1-1/4"	261	10.3															
F*	ODS FOR	7/8"	239	9.4	1-3/8"	269	10.6	1-5/8"	358	14.1	2-5/8"	348	13.7	3-1/8"	414	16.3			
	TUBE	1-1/8"	239	9.4	1-5/8"	279	11.0	2-1/8"	338	13.3									
	SIZES	1-3/8"	231	9.1	2-1/8"	305	12.0	2-5/8"	358	14.1	3-1/8"	389	15.3	3-5/8"	432	17.0	4-1/8"	503	19.8
		1-5/8"	239	9.4															

How to Order Differential & Pressure Compensated Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Press. Drop	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	BL	VA	0	F08	F08	2A	A1	0	21	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Variation

L	Differential
BL	Differential & Electrical Wide Opening
P	Inlet Reg., 1:1 Pneumatic Compensation
PB	Inlet Reg., Wide Opening & 1:1 Pneumatic Comp.
PS	Inlet Reg., Electric Shut-Off & 1:1 Pneumatic Comp.
PE	Inlet Reg., Externally Equalized & 1:1 Pneumatic Comp.
3P	Inlet Reg., 3:1 Pneumatic Compensation
3PS	Inlet Reg., Electric Shut-Off & 3:1 Pneumatic Comp.
OP	Outlet Reg., 1:1 Pneumatic Compensation
OPS	Outlet Reg., Electric Shut-Off & 1:1 Pneumatic Comp.

Pressure Range

A*	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)

* Not available on outlet regulators (OP, OPS).

Reduced Capacity Plugs (see page 8)

0	Full Capacity
1	17%
3	35%
5	50%

See Availability Table!

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	06	¾"
S	SW (IPS)	08	1"
W	Weld Neck (IPS)	10	1¼"
		12	1½"
		16	2"
		20	2½"
		24	3"
		32	4"
K	ODS (US)	07	7/8"
	Not suitable for use with ammonia.	09	1 1/8"
		11	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Enter size from table below.	
M	Insert Metric		
C	EC-Br Copper		

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Gauge Valve

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404A
5	R-507

LPD?

0	No
1*	Yes

* N/A with "L" variation.

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.
* Integral pilot light. Lens color designated separately

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer?

N	No
S	Yes

Check Valve

0	None
1	w/CK-1
4	w/CK-4

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

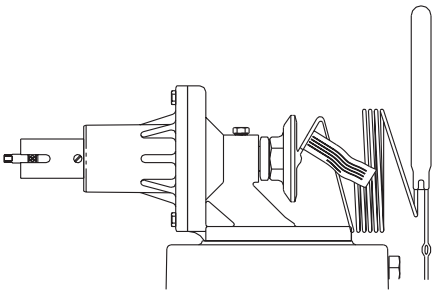
Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	A0			72	159	80	177	132	291

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Cleveland, OH

Temperature Operated Regulators (20-100mm)

The temperature compensated pressure regulator differs from the conventional pressure regulator in that rather than maintaining a previously set constant pressure, this regulator modulates pressure in accordance with the demands of the load. The regulator will vary its pressure set point as load demand varies as sensed by the thermal bulb. This valve responds to temperature changes only.

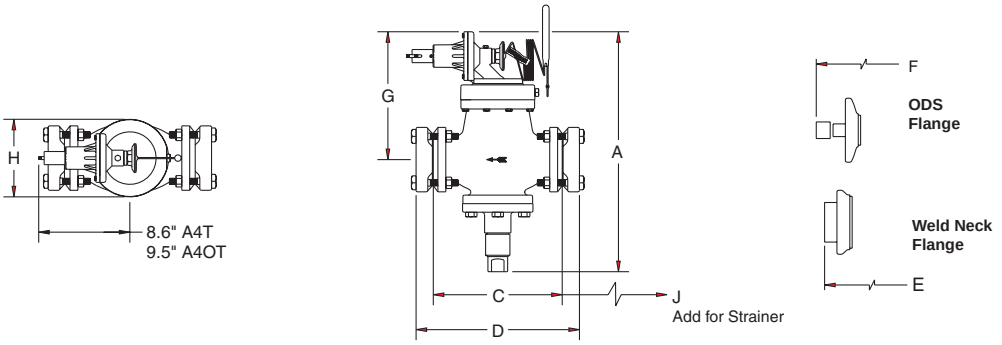
See Pages 370-371 for weld end body regulators.



Temperature Module

Dimensions

A4T, A4OT



OVERALL VALVE DIMENSIONS																				
Port Size		**20mm & 25mm (3/4" & 1")**			**32mm (1-1/4")**			**40mm & 50mm (1-5/8" & 2")**			**65mm (2-1/2")**			**75mm (3")**			**100mm (4")**		
DIMENSION			**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**
A			378	14.9		396	15.6		450	17.7		470	18.5		582	23.0		665	26.2
C			164	6.2		203	8.0		251	9.9		252	9.9		311	12.2		359	14.1
G			244	9.6		248	9.8		287	11.3		302	11.9		324	12.8		361	14.2
H			117	4.6		117	4.6		140	5.5		159	6.2		176	7.0		222	8.8
J			98	3.9		178	7.0		251	9.9		314	12.4		314	12.4		363	14.3
OVERALL LENGTH DIMENSIONS WITH FLANGES *Add 13mm (0.5") to D, E & F Dimensions for A4OT Variation**																				
D*	FPT & SW FOR PIPE SIZES	3/4"	216	8.5	1-1/4"	256	10.1	1-1/2"	307	12.1	2-1/2"	331	13.0	3"	389	15.3	4"	450	17.7
		1"	216	8.5	1-1/2"	256	10.1	2"	307	12.1									
		1-1/4"	216	8.5															
E*	WN FOR FOR PIPE SIZES	3/4"	254	10.0	1-1/4"	300	11.8	1-1/2"	364	14.3	2-1/2"	401	15.8	3"	478	18.8	4"	571	22.5
		1"	261	10.3	1-1/2"	304	12.0	2"	371	14.6									
		1-1/4"	261	10.3															
F*	ODS FOR TUBE SIZES	7/8"	239	9.4	1-3/8"	269	10.6	1-5/8"	358	14.1	2-5/8"	348	13.7	3-1/8"	414	16.3	4-1/8"	503	19.8
		1-1/8"	239	9.4	1-5/8"	279	11.0	2-1/8"	338	13.3									
		1-3/8"	231	9.1	2-1/8"	305	12.0	2-5/8"	358	14.1	3-1/8"	389	15.3	3-5/8"	432	17.0			
		1-5/8"	239	9.4															

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How to Order Temperature Operated Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Limit Reg.	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	OTS	1	0	F08	F08	A2	A	0	21	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Function

Direct: Opens on Rise in Temp.	
T	Temperature Operated
TS	Shut-Off & Temperature Operated
TB	Wide Opening & Temperature Operated
DT	Dual Pressure & Temperature Operated
DTB	Wide Opening, Dual Pressure & Temp. Op.
DTS	Shut-Off, Dual Pressure & Temperature Operated
Inverse: Closes on Rise in Temp.	
OT	Temperature Operated
OET	Temperature Operated, Externally Equalized
OTS	Temperature Operated & Electric Shut-Off

Range

1	Low Temperature: -30° to +30°C (-20° to +80°F)
2	High Temperature: +20° to +60°C (+60° to +140°F)
For "D" Variations (Temp + Pressure)	
3	Low Temperature + Range A
4	Low Temperature + Range D
5	Low Temperature + Range V
6	High Temperature + Range D

Reduced Capacity Plugs (see page 8)

0	Full Capacity
1	17%
3	35%
5	50%

See Availability Table!

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	06 ¾" 08 1" 10 1¼" 12 1½" 16 2" 20 2½" 24 3" 32 4"
K ODS (US) *Not suitable for use with ammonia.*	07 7/8" 09 1 1/8" 11 1 3/8" 13 1 5/8" 17 2 1/8" 21 2 5/8" 25 3 1/8" 29 3 5/8" 33 4 1/8"
D DIN Weld Neck M Insert Metric C EC-Br Copper	Enter size from table below.

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Gauge Valve

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404a
5	R-507

Low Limit Regulator

0	No
1	Yes

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.

Pilot Light

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer?

N	No
S	Yes

Check Valve

0	None
1	w/CK-1
4	w/CK-4

* Integral pilot light. Lens color designated separately

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	100			72	159	80	177	132	291

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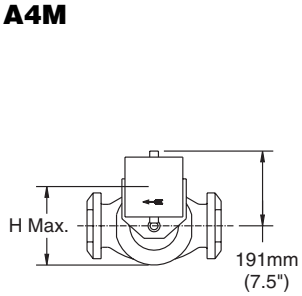
Electrically Compensated Regulators, 20-100mm (¾" - 4")

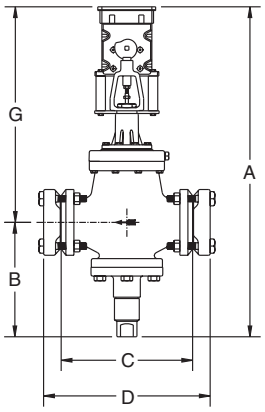
Type A4M electrically compensated inlet pressure regulators modulate the flow of refrigerant gas or liquid to maintain a varying upstream (Inlet) pressure in response to an electrical signal applied to a low-voltage motor mounted on a regulator pilot. A4OM regulators modulate outlet pressure.

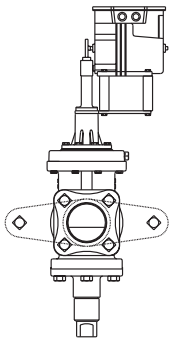
See pages 370-371 for weld end body regulators.

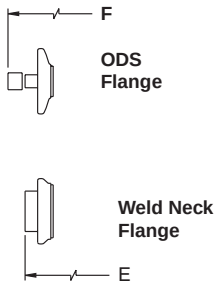
Dimensions

A4M









OVERALL VALVE DIMENSIONS																				
Port Size		20mm & 25mm (3/4" & 1")			32mm (1-1/4")			40mm & 50mm (1-5/8" & 2")			65mm (2-1/2")			75mm (3")			100mm (4")		
DIMENSION			mm	inches		mm	inches		mm	inches		mm	inches		mm	inches		mm	inches
A	A4M		597	23.5		615	24.2		668	26.3		688	27.1		803	31.6		859	33.8
	A4OM		620	22.4		638	23.1		691	25.2		711	26.0		826	32.5		882	34.7
B			148	5.8		162	6.3		177	6.9		181	7.1		273	10.7		292	11.5
C			164	6.2		203	8.0		251	9.9		252	9.9		311	12.2		359	14.1
G	A4M		449	17.7		453	17.9		491	19.4		507	20.0		530	20.9		566	22.3
	A4OM		472	18.6		476	18.8		514	20.3		530	20.9		553	21.8		589	23.2
H			117	4.6		117	4.6		140	5.5		159	6.2		176	7.0		222	8.8
OVERALL LENGTH DIMENSIONS WITH FLANGES *Add 13mm (0.5") to D, E & F Dimensions for A4OM Variation																				
D*	FPT & SW	3/4"	216	8.5	1-1/4"	256	10.1	1-1/2"	307	12.1										
	FOR PIPE	1"	216	8.5	1-1/2"	256	10.1	2"	307	12.1	2-1/2"	331	13.0	3"	389	15.3	4"	450	17.7
	SIZES	1-1/4"	216	8.5															
E*	WN FOR	3/4"	254	10.0	1-1/4"	300	11.8	1-1/2"	364	14.3										
	FOR PIPE	1"	261	10.3	1-1/2"	304	12.0	2"	371	14.6	2-1/2"	401	15.8	3"	478	18.8	4"	571	22.5
	SIZES	1-1/4"	261	10.3															
F*	ODS FOR	7/8"	239	9.4	1-3/8"	269	10.6	1-5/8"	358	14.1	2-5/8"	348	13.7	3-1/8"	414	16.3	4-1/8"	503	19.8
	TUBE	1-1/8"	239	9.4	1-5/8"	279	11.0	2-1/8"	338	13.3									
	SIZES	1-3/8"	231	9.1	2-1/8"	305	12.0	2-5/8"	358	14.1	3-1/8"	389	15.3	3-5/8"	432	17.0			
		1-5/8"	239	9.4															

How to Order Electrically Compensated Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Press. Drop	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	OMS1	D	0	F08	F08	A2	A	0	21	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Variation

M	Inlet Regulator
MS	With Electric Shut-Off
BM	WithElectric Wide Opening
DM	With Dual Pressure
OM	Electrically Compensated Outlet Regulator
OMS	Outlet Regulator with Electric Shut-Off

Motor Style

H	Motor Hardware Only
	Honeywell Motors
1	24V 50/60Hz Std. Cam, 120V Transformer
A	Option 1 with 240V Transformer
2	24V 50/60Hz Low Rise Cam, 120V Transformer
B	Option 2 with 240V Transformer
3	4-20 mA, 120V 50/60Hz Standard Cam
4	4-20 mA, 120V 50/60Hz Low Rise Cam
5	4-20 mA, 240V 50/60Hz Standard Cam
6	220V 50Hz Std. Cam
7	220V 50Hz Low Rise Cam
	Penn Motors
8	24V 50/60Hz Std. Cam, 120V Transformer
C	Option 8 with 240V Transformer
9	24V 50/60Hz Low Rise Cam, 120 V Transformer
D	Option 9 with 240V Transformer

Pressure Range*

A**	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)

See Availability Table!

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	06 ¾" 08 1" 10 1¼" 12 1½" 16 2" 20 2½" 24 3" 32 4"
K ODS (US) *Not suitable for use with ammonia.*	07 7/8" 09 1 1/8" 11 1 3/8" 13 1 5/8" 17 2 1/8" 21 2 5/8" 25 3 1/8" 29 3 5/8" 33 4 1/8"
D DIN Weld Neck M Insert Metric C EC-Br Copper	Enter size from table below.

Reduced Capacity Plug (see page 8)

0	Full Capacity
1	17%
3	35%
5	50%

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

*For DM variation, indicate range for each pilot, i.e. AD (low/high).
** Not available with OM or OMS variation.

Body

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404a
5	R-507

LPD

0	N/A

Coil Voltage

0	No Coil
	Standard
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
	Non-Standard
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.
* Integral pilot light. Lens color designated separately

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer?

N	No
S	Yes

Check Valve

0	None
1	w/CK-1
4	w/CK-4

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	A0			72	159	80	177	132	291

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

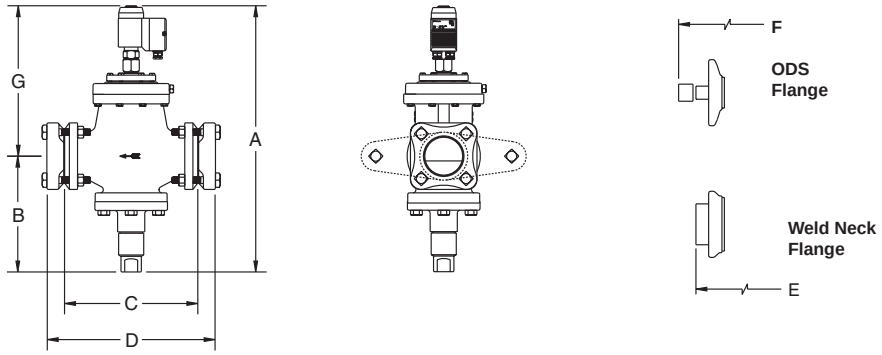
Electronic Pilot Operated Regulators, 20-100mm (¾" - 4")

Type A4J electronic pilot operated regulators utilize a Landis & Staefa M2FP03GX direct operated proportional solenoid as a pilot valve to modulate the flow of pilot pressure to the top of the regulator's piston. The positioning of the electronic pilot actuator is proportional to the input signal supplied to the electronic valve. Two separate control modules are available which respond to the supply signal from an external controller which senses the medium being cooled.

Type A4J is not available in 125-200mm (5" - 8") sizes.

Dimensions

A4J



OVERALL VALVE DIMENSIONS																				
Port Size		**20mm & 25mm (3/4" & 1")**			**32mm (1-1/4")**			**40mm & 50mm (1-5/8" & 2")**			**65mm (2-1/2")**			**75mm (3")**			**100mm (4")**		
DIMENSION			**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**		**mm**	**inches**
A			432	17.0		450	17.7		503	19.8		523	20.6		635	25.0		693	27.3
B			148	5.8		162	6.3		177	6.9		181	7.1		273	10.7		292	11.5
C			164	6.2		203	8.0		251	9.9		252	9.9		311	12.2		359	14.1
G			259	10.2		284	1132		325	12.8		343	13.5		366	14.4		401	15.6
H			117	4.6		117	4.6		140	5.5		159	6.2		176	7.0		222	8.8
OVERALL LENGTH DIMENSIONS WITH FLANGES																				
D*	FPT & SW FOR PIPE SIZES	3/4"	216	8.5	1-1/4"	256	10.1	1-1/2"	307	12.1										
		1"	216	8.5	1-1/2"	256	10.1	2"	307	12.1	2-1/2"	331	13.0	3"	389	15.3	4"	450	17.7
		1-1/4"	216	8.5															
E*	WN FOR FOR PIPE SIZES	3/4"	254	10.0	1-1/4"	300	11.8	1-1/2"	364	14.3										
		1"	261	10.3	1-1/2"	304	12.0	2"	371	14.6	2-1/2"	401	15.8	3"	478	18.8	4"	571	22.5
		1-1/4"	261	10.3															
F*	ODS FOR TUBE SIZES	7/8"	239	9.4	1-3/8"	269	10.6	1-5/8"	358	14.1	2-5/8"	348	13.7	3-1/8"	414	16.3			
		1-1/8"	239	9.4	1-5/8"	279	11.0	2-1/8"	338	13.3									
		1-3/8"	231	9.1	2-1/8"	305	12.0	2-5/8"	358	14.1	3-1/8"	389	15.3	3-5/8"	432	17.0	4-1/8"	503	19.8
		1-5/8"	239	9.4															

Electronic Accessories

For use with "J" variation regulators

Controllers	**Part #**
4-20 mA	105624
0-18 VDC	105625

Transformer	**Part #**
240/24	301787
120/24	301788

How to Order Electronic Pilot Operated Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Reduced Capacity	Inlet Flange	Outlet Flange	Gauge	Gauge Valve	Low Press. Drop	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	A4	J1	A	0	F08	F08	A2	A	0	21	0	0	S	4

Port Size

020	20mm (3/4")
025	25mm (1")
032	32mm (1-1/4")
040	40mm (1-1/2")
050	50mm (2")
065	65mm (2-1/2")
075	75mm (3")
100	100mm (4")

Function

J	Electronic Pilot Operated
JS	Electronic Pilot Operated with Electric Shut-Off
DJ	Electronic Pilot Operated with Dual Pressure

I/O Control Module

1	4-20 mA I/O Module
2	4-20 mA with Controller
3	4-20 mA with Controller and 120/24 Transformer
4	4-20 mA with Controller and 240/24 Transformer
5	0-10 VDC I/O Module
6	0-10 VDC with Controller
7	0-10 VDC with Controller and 120/24 Transformer
8	0-10 VDC with Controller and 240/24 Transformer

Pressure Range*

A	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)

*For dual pressure variation (DJ), enter pressure range for each pilot regulator, i.e. VA (low/high).

See Availability Table!

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	06	¾"
S	SW (IPS)	08	1"
W	Weld Neck (IPS)	10	1¼"
		12	1½"
		16	2"
		20	2½"
		24	3"
		32	4"
K	ODS (US)	07	7/8"
		09	1 1/8"
		11	1 3/8"
	Not suitable for use with ammonia.	13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Enter size from table below.	
M	Insert Metric		
C	EC-Br Copper		

Reduced Capacity Plugs (see page 8)

0	Full Capacity
1	17%
3	35%
5	50%

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Gauge Valve

N	No Valve
A	1/4" Angle Body

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404a
5	R-507

LPD

0	No

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48 VDC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Check Valve

0	None
1	w/CK-1
4	w/CK-4

Strainer

N	No
S	Yes

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.
* Integral pilot light. Lens color designated separately

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Regulator		w/Flanges		w/Str. & Flg.	
							kg	lb	kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	9.1	20	10	22	14	29
032	10 12	10 12	11 13 17	32 40 50		30 36 42	13	28	14	31	21	46
040	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
050	12 16	12 16	13 17 21	40 50			28	62	31	68	45	100
065		20	21 25	65 75			34	75	39	85	65	144
075		24	25 29	75			47	104	54	120	81	179
100		32	33	A0			72	159	80	177	132	291

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Weld End Regulators, 125-200mm (5" - 8")

These heavy duty, cast steel bodied pressure regulators weld directly in the line and do not require flanges. As with the flanged body regulators, they are pilot operated and use the same modules to configure many variations.

These valves can be ordered with the R/S strainer to be welded directly to the inlet of any regulator.

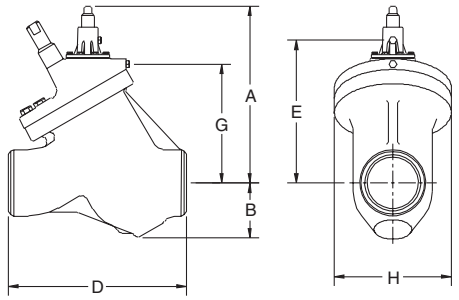
Dimensions

NOTE:

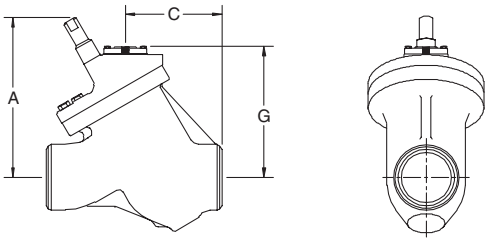
Allow 75mm (3") overhead clearance for access to adjusting stem.

Allow 100mm (4") overhead clearance for coil or seal cap removal.

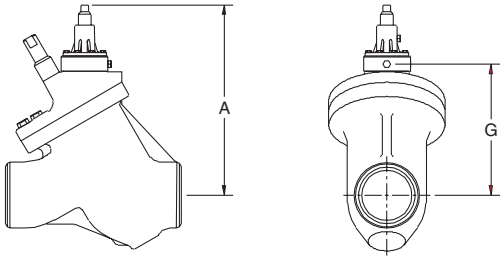
A4
A4E
A4P



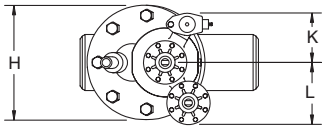
A4R



A4OE



A4B
A4S
A4D



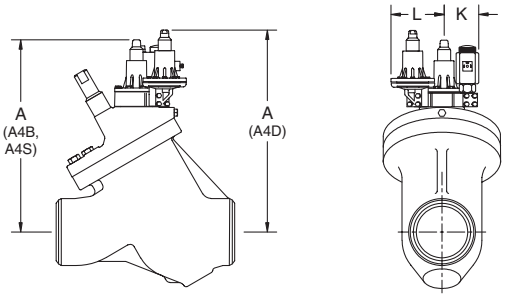


TABLE OF DIMENSIONS							
		125 (5")		150 (6")		200 (8")	
DIMENSIONS	TYPE	mm	inches	mm	inches	mm	inches
A	A4, A4E, A4P	438	17.25	514	20.25	572	22.50
	A4R	414	16.25	489	19.25	546	21.50
	A4S, A4B	476	18.75	552	21.75	610	24.00
	A4D	502	19.75	578	22.75	635	25.00
	A4OE	463	18.25	539	21.25	597	23.50
B		114	4.50	152	6.00	197	7.750
C		190	7.50	254	10.00	356	14.00
D		381	15.00	483	19.00	622	24.50
E		318	12.50	394	15.50	451	17.75
F		273	10.75	349	13.75	406	16.00
G		305	12.00	381	15.00	438	17.25
H		267	10.50	318	12.50	381	15.00
K		100	4.00	100	4.00	100	4.00
L		140	5.50	140	5.50	140	5.50

How to Order Weld End Regulators

Regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Range	Gauge	Gauge Valve	LPD/ Low Limit Regulator	Coil Voltage, Style	Pilot Light	Lens Color	Strainer
150	A4	BS	A	A2	A	0	21	0	0	S

Port Size

125	125mm (5")
150	150mm (6")
200	200mm (8")

Body

N	No Valve
A	1/4" Angle Body

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
K	48V DC
W	120V DC
J	230V DC
P	115/6/50
Q	440/6/60

Strainer?

N	No
S	Yes

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See table on page 376 for voltages.

Variation (For a differential regulator, use variation "P")

Blank	Basic Inlet Regulator
B	Electric Wide Opening
S	Electric Shut-Off
BS	Electric Wide Opening & Shut-Off
D	Dual Pressure
E	Externally Equalized
K	Reseating Relief
BK	Electric Wide Opening & Reseating Relief
M	Electrically Compensated
MS	Electrically Compensated with Electric Shut-Off
BM	Electrically Compensated with Electric Wide Open
DM	Dual Pressure, Electrically Compensated
P	1:1 Pressure Compensated
PB	1:1 Compensation and Electric Wide Opening
PS	1:1 Compensation and Electric Shut-Off
3P	3:1 Pressure Compensated
R	Main Regulator only (Order Remote Pilot Separately)
T	Temperature Compensated
Z	Basic Inlet Regulator with Modudapter® and Two Moduplates®
OE	Basic Outlet Regulator
OES	Outlet Regulator with Electric Shut-Off

Gauge Size, Range, Type

0	No Gauge
A	2½" Low Pressure, English
B	3½" Low Pressure, English
C	2½" High Pressure, English
D	3½" High Pressure, English
E	2½" Low Pressure, Metric
F	3½" Low Pressure, Metric
G	2½" High Pressure, Metric
H	3½" High Pressure, Metric

Refrigerant

0	No Gauge
7	R-717
1	R-134a
2	R-22
4	R-404A
5	R-507

Low Pressure Drop (Variations B, S, BS, D, P, 3P, PB, PS, OE, OES only)

0	No LPD
1	With LPD

Low Limit Regulator (Variation T only)

0	No Low Limit Reg.
1	With Low Limit Reg.

Motor Style (for M, MS, BM and DM only)

H	Motor Hardware Only
	Honeywell Motors
1	24V 50/60Hz Std. Cam, 120V Transformer
A	Option 1 with 240V Transformer
2	24V 50/60Hz Low Rise Cam, 120V Transformer
B	Option 2 with 240V Transformer
3	4-20 mA, 120V 50/60Hz Standard Cam
4	4-20 mA, 120V 50/60Hz Low Rise Cam
5	4-20 mA, 240V 50/60Hz Standard Cam
6	220V 50Hz Std. Cam
7	220V 50Hz Low Rise Cam
	Penn Motors
8	24V 50/60Hz Std. Cam, 120V Transformer
C	Option 8 with 240V Transformer
9	24V 50/60Hz Low Rise Cam, 120V Transformer
D	Option 9 with 240V Transformer

Pressure Range*

A**	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)
0	No Range (A4R only)

Temperature Range ("T" Variation only)

1	Low Temperature: -30° to +30°C (-20° to +80°F)
2	High Temperature: +20° to +60°C (+60° to +140°F)

* Dual pressure regulators ("D"variations) require a range for each pilot regulator, i.e. AD (low/high).

** Not available for outlet regulators.

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads
5	Explosion Proof
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

★ See page 376 for available coils by voltage.

* Integral pilot light. Lens color designated separately

Weights

Port Code	Less Strainer		w/Strainer	
	kg	lb	kg	lb
125	54	120	99	220
150	98	215	176	390
200	159	350	294	650

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

A2D Modular Pressure Pilot



Adds dual (D) variation when combined with Modular Solenoid Pilot (below). Provides a second higher control pressure.

Furnished with bolts and O-rings.

Mounts to Modudapter®. Same for all regulator sizes.

Type

A2D

Type	
A2D2	Use with 20-50mm (¾" to 2") Size A4
A2D	Use with 65-200mm (2½" to 8") Size A4

Range

A

Range	
A	0-10.3 Bar (0-150 PSIG)
D	5.2-19.3 Bar (75-280 PSIG)
V	500mm Hg to 8.3 Bar (20 in Hg to 120 PSIG)

S6A Modular Solenoid Pilot



Adds electric shut-off (S) or electric wide opening (B) and is used with Modular Pressure Pilot A2D for dual (D) variations. Uses Class "B" coil.

Furnished with bolts and O-rings.

Mounts to Modudapter®. Same for all regulator sizes.

Type

S6A

Volts/Frequency, Coil Style

1L

Volts/Frequency★			
0	No Coil		
	Standard		**Non-Standard**
1	120/60	**A**	24/60
R	120/6/60	**B**	288/60
2	208/60	**C**	480/60
S	208/6/60	**D**	24/50
3	240/60	**E**	42/50
T	240/6/60	**F**	48/50
4	440/60	**G**	12V DC
6	115/50	**H**	24V DC
7	230/50	**K**	48V DC
U	230/6/50	**W**	120V DC
8	240/50	**J**	230V DC
		P	115/6/50
		Q	440/6/60

★ See page 376 for available coil/voltage combinations.

Coil Style	
0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Order lens color separately

Remote Pilot Light

0

Remote Pilot Light▲	
0	None
1	PLT-1 (NEMA1)
2	PLT-2 (NEMA4)
5	PLT-5

Lens Color

G

Lens Color	
0	No Pilot Light
G	Green
R	Red
A	Amber
W	White

▲ With coils 1 & 3 only. See page 376 for voltages.

S6B Compact Modular Solenoid Pilot



Adds electric shut-off (S) or electric wide opening (B) and is used with Modular Pressure Pilot A2D for dual (D) variations. Uses Class "H" coil.

Furnished with bolts and O-rings.

Mounts to Modudapter®. Same for all regulator sizes.

Type

S6B

Coil Style, Volts/Frequency

81

Volts/Frequency	
0	No Coil
	Standard
1	120/60
2	208/60
3	240/60
6	115/50
7	230/50
8	240/50

Coil Style	
0	No Coil or Housing
8	Compact C,D Operator w/18" Leads
9	Compact C,D Operator w/DIN Connector

Remote Pilot Light

0

Remote Pilot Light▲	
0	None
5	PLT-5

▲ With coil 8 only. See page 376 for voltages.

Lens Color

0

Lens Color	
0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Modudapter® (MD, SMD)



The special adapter to which the modular solenoid pilot, modular pressure pilot and Moduplate are bolted.

The **Series Modudapter (SMD)** is used with special regulators such as A4DS, A4BDS, etc.

Furnished with bolts and gaskets. (Standard part of regulators with S, B, D and Z variations)

NOTE:
Use SMD65 for all 125-200mm (5" - 8") A4 regulators.

Type	Use with Regulator Size	Part Number
MD25	20-25mm (¾"-1")	200591
MD32	32mm (1¼")	200593
MD50	40-50mm (1⅝"-2")	200595
MD65	65mm (2½")	200597
MD75	75mm (3")	200599
MD100	100mm (4")	200606
Series Modudapter®		
SMD65	20-65mm (¾"-2½") 125-200mm (5" - 8")	200564
SMD100	75-100mm (3"-4")	200566

Moduplate® (MP)



Provides blankoff or cross-over of pilot circuit on Type A4S or Type A4B.

Attaches to Modudapter. Same for all regulator sizes.

Furnished with bolts and three O-rings.

To order, specify Part # 200518.

Vacuum Cartridge (VC)



A pilot seat with vacuum range cartridge. Will change A range A4, A2B or A2D to vacuum range: 500mm Hg to 8.3 bar (20 in Hg to 120 PSIG).

Same for all regulator sizes.

Furnished with diaphragm and necessary gasket.

To order, specify Part # 202004.

Outlet Regulator Kit (OR)



An auxiliary adapter which converts A4 inlet regulators to outlet regulators with OE variation.

Furnished with all internal parts, bolts and gaskets.

Use with Port Sizes	Part Number
20-50mm (¾"- 2")	200516
65-200mm (2½"- 8")	200517

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Pressure Bonnet Kit (PK)



Converts any A4, A4O or A2 Series regulator to 1:1 Pressure Compensation (P) variation . Standard in A range. Use with Type VC vacuum cartridge for V range.

Also available 3:1 pressure compensation (3P) variation.

Furnished with ¼" FPT bonnet connection for air or refrigerant pressure, bolts and gaskets. 3:1 kit includes above plus auxiliary adapter.

Same for all port sizes.

Type	Part Number
PK1 (1:1)	200520
PK3 (3:1)	200519

Temperature Bonnet Kit (TB)



Converts to temperature operated (T and OT) variation any A4 regulator.

Low range: -30° to 30°C (-20° to 80°F)
High range: 20° to 60°C (60° to 140°F)

Furnished as complete bonnet assembly including 15.9 x 133.4mm (5/8" x 3¼") bulb, 6m (20 ft.) capillary, bolts, gaskets and O-rings. Consult factory for 33' capillary.

Kit for A4OT (¾" to 4" only) includes tubing assembly for downstream connection.

Direct Acting (Cooling)

Use with Port Sizes	Part # Low Range	Part # High Range
20-50mm (¾"-2")	200622	202098
65-200mm (2½"-8")	200624	202097

Reverse Acting (Heating)

Use with Port Sizes	Part # Low Range	Part # High Range
20-200mm (¾"-8")	202096	202099

Motor Bonnet Kit (MB)



Converts to electric compensation (M) variation any A4 Series regulator. Standard in A range. Combine with VC vacuum cartridge for V range.

Furnished with bonnet, all internal parts, cam, bolts, gaskets, motor and transformer with 24 Volt secondary to operate motor.

Same for all ports.

Type **Motor Style**

MB **3**

Motor Style	
H	Motor Hardware Only
	Honeywell Motors
1	24V 50/60Hz Std. Cam with 120V Transformer
A	24V 50/60Hz Std. Cam with 240V Transformer
2	24V 50/60Hz Low Rise Cam with 120V Transformer
B	24V 50/60Hz Low Rise Cam with 240V Transformer
3	4-20 mA, 120V 50/60Hz Standard Cam
4	4-20 mA, 120V 50/60Hz Low Rise Cam
5	4-20 mA, 240V 50/60Hz Standard Cam
6	220V 50Hz Standard Cam
7	220V 50Hz Low Rise Cam
	Penn Motors
8	24V 50/60Hz Std. Cam with 120V Transformer
C	24V 50/60Hz Std. Cam with 240V Transformer
9	24V 50/60Hz Low Rise Cam with 120V Transformer
D	24V 50/60Hz Low Rise Cam with 240V Transformer

Electric Proportioning Thermostat (T27)

Use with "M" variation regulators.

Specifications:

Range ..... -34° to 21°C (-30° to 70°F)
Capillary ..... 1.5m (5') standard
Bulb ..... 12.7mm dia. x 106mm long (½" dia. x 4 3/16" long)
Sensitivity adjustable ..... 1.7° to 16.7°C (3° to 30°F)
Various electronic controllers available



To order, specify Part # 301808.

Well, Separable

For use with T27 Thermostat
Stainless steel, 3/8" x 5"

For use with temperature operated valves (A4T)
Stainless steel, 5/8" x 3"

Type	Part Number
For T27	301800
For Temperature Operated Valves	203237

Defrost Timer (T31)

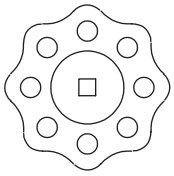
- U.L. listed
- Adjustable for defrost in 3-hour multiples
- Separate adjustable pump down cycle
- Separate adjustable fan delay cycle
- Contact ratings 10 amps
- Standard NEMA-3 housing



Type	Part Number
115V 60Hz	301805
208-240V 60Hz (Paragon #632)	301806

Handwheel

2½" diameter zinc stem handle. For regulator adjusting stem operation.



To order, specify Part # 302111.

Flange Ring-Tube Kits (FRT)

Use with "L" and "O" variation regulators

Close couples to the valve outlet. Eliminates the need for field piping.



Body Size	Part # Straight (A4O/A4L)	Part # Elbow (A4OT)
20-25mm (¾" - 1")	200439	200451
32mm (1¼")	200441	200453
40-50mm (1⅝" - 2")	200443	200455
65mm (2½")	200445	200457
75mm (3")	200447	200459
100mm (4")	200449	200461

Class "B" Coil (S6A)



The molded water resistant Class "B" solenoid coil, available on most Refrigerating Specialties solenoid valves, is designed for long life and powerful opening force. The standard coil housing meets NEMA 3R and 4 requirements. This sealed construction can withstand direct contact with moisture and ice. The coil housing far exceeds the requirements of NEMA Standard ICS.1-110.57 salt spray test for rust resistance.

By definition, Class "B" coil construction will permit coil temperatures, as measured by resistance method, as high as 130°C (266°F). Final coil temperatures are a function of both fluid and ambient temperatures. The higher fluid temperatures require lower ambient temperatures so the maximum coil temperature is not exceeded. Conversely, low fluid temperatures permit higher ambient temperatures.

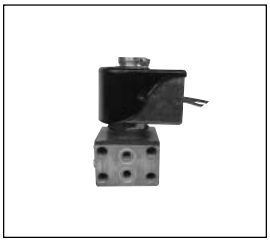
The supply circuits must be properly sized to give adequate voltage at the coil even when other electrical equipment is operating. The coil is designed to operate with line voltage from 85% to 110% of rated coil voltage. Power consumption during normal operation will be 33 watts or less.

Standard Encapsulated Coils

Volts/Hertz	Leads	Inrush Current (Amps)	Holding Current (Amps)	Fuse Size (Amps)
120/60	Blue	1.18	0.46	1
208/60	Blue and Red	0.63	0.26	1
240/60	Red	0.60	0.23	1
115/50	Yellow and Blue	1.22	0.21	1
230/50	Yellow	0.65	0.26	1

For other voltages, contact factory. On transformer coil, the 6 volt leads are always black.

Class "H" Coil (S6B)



The Refrigerating Specialties Division molded water resistant Class "H" coil is designed for long life and powerful opening force. The Class "H" coil construction will permit coil temperatures, as measured by resistance method, as high as 180°C (365°F).

The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The coil is designed to operate at 15% under voltage. Operating with line voltage below the limit will result in lowering the valve opening pressure differential.

Currents

Coil Type	Watt Rating	Volt Amperage	
		Holding	Inrush
Standard AC Class "H"	10.5	23	37
Standard AC Coil with 6v Secondary Pilot Light	11.0	26	38

Voltages

Coils are available from stock with most standard voltages (see table below). Non-standard voltages (shown in the shaded area of table) are available as special order. Coils are also available with 6V secondary voltage for use with remote pilot lights PLT-1 and PLT-2. Consult factory for other voltages.

NOTE: Pilot lights cannot be used with explosion proof or unleaded coils.

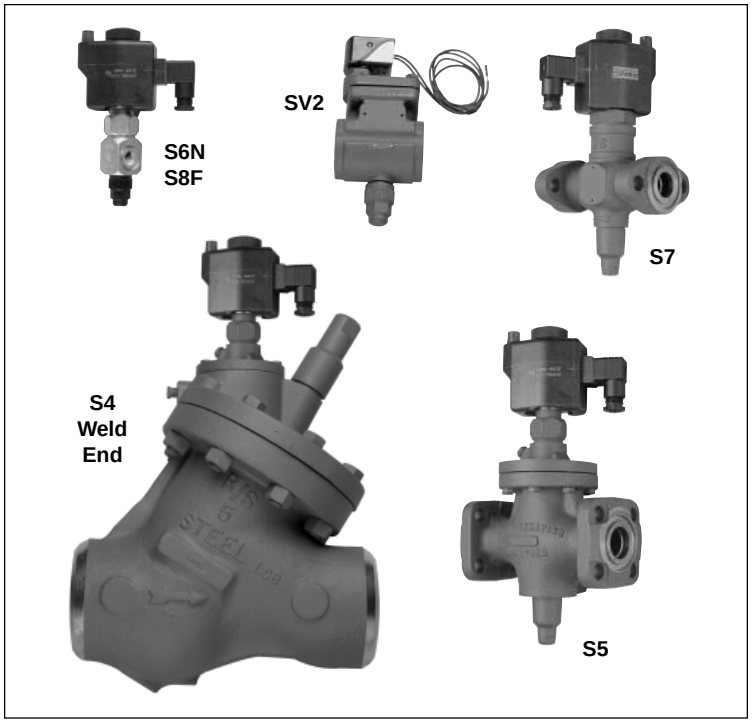
Available Voltages for Coils and Pilot Lights	Code	Class	120/60	120/6/60	208/60	208/6/60	240/60	240/6/60	440/60	115/50	230/50	230/6/50	240/50	24/60	288/60	480/60	24/50	42/50	48/50	12VDC	24VDC	48VDC	120VDC	230VDC	115/6/50	440/6/60
Encapsulated w/Leads	1	B	●	●	●	●	●	●		●	●		●	●			●		●							
Encapsulated w/Leads & Integral Pilot Light	L	B	●		●		●				●															
Encapsulated w/DIN Connector	2	B	●				●			●	●		●									●				
Encapsulated w/DIN & Integral Pilot Light	D	B	●				●			●	●		●													
Industrial Open Frame w/Leads	3	B	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●
Explosion Proof	5	—	●		●		●			●	●			●		●					●		●			
Compact C,D Operator w/Leads	8	H	●		●		●			●	●		●													
Compact C,D Operator w/DIN Connector	9	H	●		●		●			●	●		●													
PLT-1 (NEMA 1)				●		●		●				●													●	●
PLT-2 (NEMA 4)				●		●		●				●													●	●
PLT-5 (NEMA 4)			●		●		●																			

Solenoid Valves

The Refrigerating Specialties family of solenoid valves includes direct operated and pilot operated valves. Selections for most refrigeration applications are available – liquid, suction, hot gas and compressor unloading. Low or no pressure differential, equalizing and vent solenoid in sizes up to 50mm (2").

Explosion proof SV2X and S4X hazardous environment type solenoids carry NEMA Type 4 and 7 classification.

Coils are stocked in standard voltages. Non-standard voltages may be special ordered. See table on page 394 or consult factory.



Common Specifications

Design Pressure (MRP) ..... 27.6 Bar (400 psig)
SV2 only ..... 31.0 Bar (450 psig)
Maximum Fluid Temperature ..... 105°C (220°F)
Standard Coil Housing ..... NEMA 3R and 4
Explosion Proof Housing ..... NEMA Type 4 and 7

Specifications

Type		S6N	S8F	S7	SV2	S5	S5	S4	S4	S4
Port Size	mm	5	13	20-25	13-32	32	40-75	20-32	40-100	125-200
	inch	3⁄16"	½"	¾" - 1"	½" - 1¼"	1¼"	1⅝" - 3"	¾" - 1¼"	1⅝" - 4"	5" - 8"
Seat Material		PTFE	PTFE	PTFE	PTFE	PTFE	Metal	PTFE	Metal	Metal
Body Material		Ductile Iron	Ductile Iron	Gray Iron	Ductile Iron	Gray Iron	Gray Iron	Gray Iron	Gray Iron	Cast Steel
Minimum Pressure Drop to Open Wide	bar	0	0.7	0	.24	0.07	0.07	0.14	0.28	0.14
	psi	0	1	0	3.5	1	1	4	2	2
Minimum Fluid Temperature	°C	-50°	-50°	-30°	-45°	-30°	-30°	-45°	-50°	-50°
	°F	-60°	-60°	-25°	-50°	-25°	-25°	-50°	-60°	-60°
Operation		Direct Operated	Spring Closing	Electrically Held Open	Spring Closing	Gravity Closing	Gravity Closing	Spring Closing	Spring Closing	Spring Closing
Bulletin for Reference		30-90	30-91	30-92	30-06	30-93	30-93	30-94	30-94	30-05

Selection Guide

Valve Type	Refrigerant Application	Refrigerant Temperature Range	VALVE MOST RECOMMENDED – Listed by Port Size										
			5mm	13mm	20mm	25mm	32mm	40mm	50mm	65mm	75mm	100mm	125-200mm
			3⁄16"	½"	¾"	1"	1¼"	1⅝"	2"	2½"	3"	4"	5"- 8"
Solenoid	Liquid	Conventional warm high pressure	S6N	S8F SV2	S4 SV2	S4 SV2	S4 SV2	S4	S4	S4	S4	S4	S4
		Above -50°C (-60°F)	S6N	S8F	—	—	—	S4	S4	S4	S4	S4	S4
		Above -45°C (-50°F)	S6N	S8F SV2	S4 SV2	S4 SV2	S4 SV2	S4	S4	S4	S4	S4	S4
	Suction*	Above -30°C (-25°F)	S6N	S8F	S7	S7	S5	S5	S5	S5	S5	S4	S4
Solenoid	Hot Gas Defrost	Below 105°C (220°F)	S6N	S8F SV2	S4 SV2	S4 SV2	S4 SV2	S4	S4	S4	S4	S4	S4
	Bypass Compressor Unloading	Below 105°C (220°F)	S6N	S8F	S7	S7	S4E	S4E	S4E	S4E	S4E	S4E	—

*Also see Gas Powered Suction Valves.

- Coil Housing Surpasses NEMA Salt Spray Test
- Accepts Either Open Frame or Totally Encapsulated Coils
- Direct Acting, Normally Closed Operation
- Replaceable Teflon Seat
- Manual Opening Stem
- Stainless Steel Needle
- Pilot Light Available
- Maximum Opening Pressure Difference (MOPD) is 20.7 Bar (300 psi)



Description

This compact, heavy duty, direct-acting solenoid valve is suitable for industrial refrigerants for liquid lines, refrigerant oil lines, and as a pilot valve to actuate remote gas powered valves and other pilot actuated devices. The plunger-needle assembly is also used with most other Refrigerating Specialties industrial solenoid valves. This valve is usually ordered with a close-coupled stainless steel screen strainer. (See page 436 for strainer information).

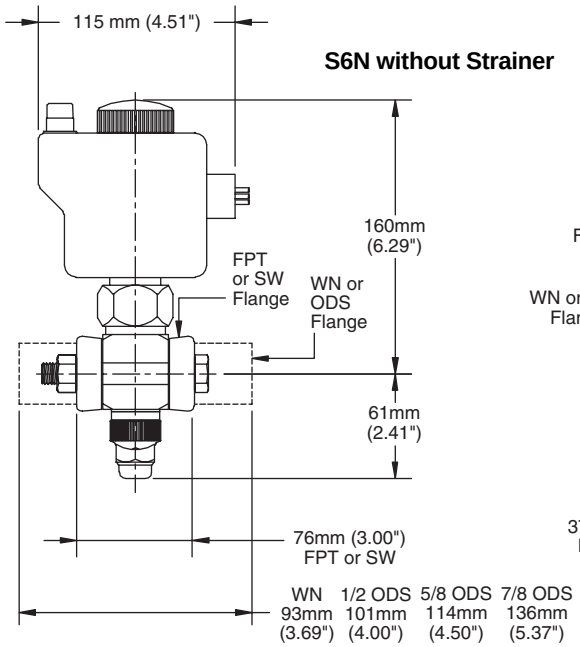
Materials

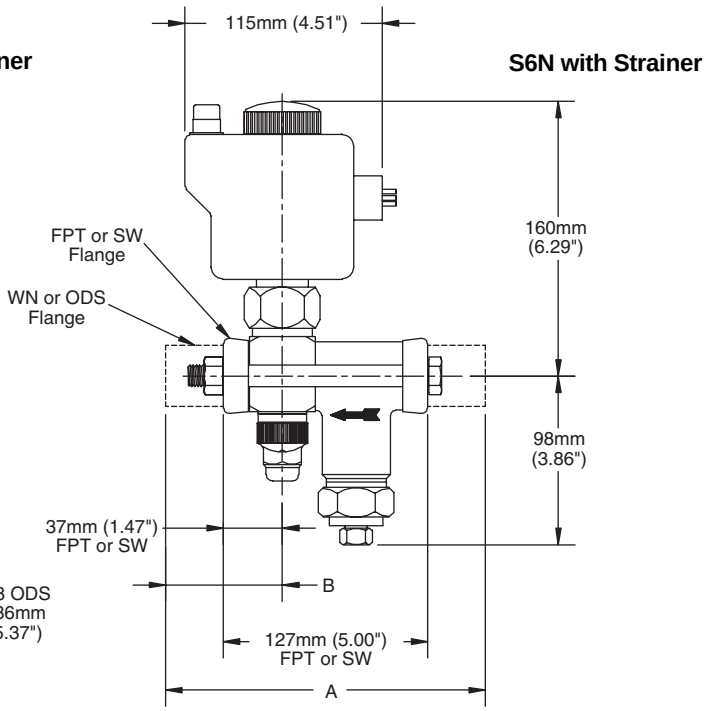
Body ..... Plated Ductile Iron
Seat ..... PTFE
Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop
to Open Wide ..... 0 bar (0 PSI)
Minimum Fluid Temperature ..... -50°C (-60°F)
Coil (See page 394) ..... Class “B” Housing
Flow Coefficient ..... 0.5 Kv (0.6 Cv)

Dimensions





	Flange	1/2 ODS	5/8 ODS	7/8 ODS
A	144mm (5.69")	152mm (6.00")	165mm (6.50")	187mm (7.37")
B	46mm (1.81")	50mm (1.97")	56mm (2.22")	67mm (2.66")

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

How to Order

Type S6N solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
005	S6N	F04	F04	12	0	0	S	4

Port Size

005	5mm (3/16")

Flange Type / Connection

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	02▲	1/4"
S	SW (IPS)	03	3/8"
W	WN (IPS)	04	1/2"
		06	3/4"
K	ODS (US)	04	1/2"
		05	5/8"
		07	7/8"

▲ FPT only

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48 V DC
P	115/6/50
Q	440/6/60

Coil Style ★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads

★ See page 394 for available coil style/voltage combinations.

* Integral pilot light. Lens color designated separately

Remote Pilot Light ◆

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

◆ With coils 1 & 3 only. See page 394 for voltages.

Lens Color

0	No Remote Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Check Valve

0	None
4	w/CK4

Weight:
Less Strainer ..... 2.5 kg (5 lbs)
With Strainer ..... 3.3 kg (7 lbs)

- Coil Housing Surpasses NEMA Salt Spray Test
- Accepts Either Open Frame or Totally Encapsulated Coils
- Replaceable Piston Plug Assembly
- Stainless Steel Needle
- Pilot Light Available
- Manual Opening Stem
- Maximum Opening Pressure Difference (MOPD) is 20.7 Bar (300 psi)



Description

This compact, heavy duty, pilot-operated solenoid valve is suitable for industrial refrigeration for liquid, suction and hot gas lines, and refrigerant oil lines. The plunger-needle assembly is also used with most other Refrigerating Specialties industrial solenoid valves. This valve is usually ordered with a close-coupled stainless steel screen strainer. (See page 436 for strainer information).

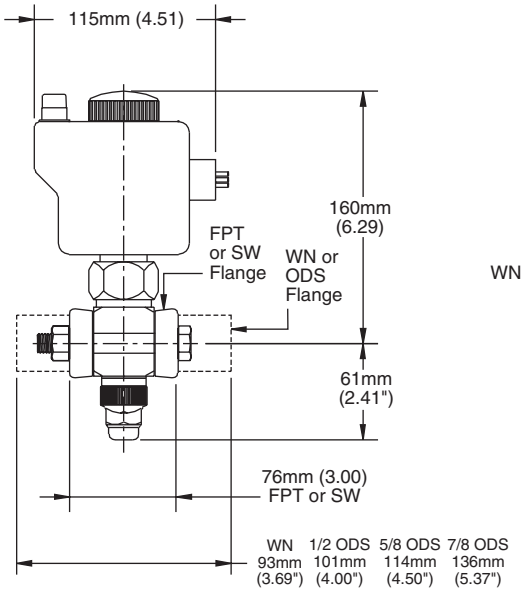
Materials

Body ..... Plated Ductile Iron
Seat ..... PTFE
Needle ..... Stainless Steel

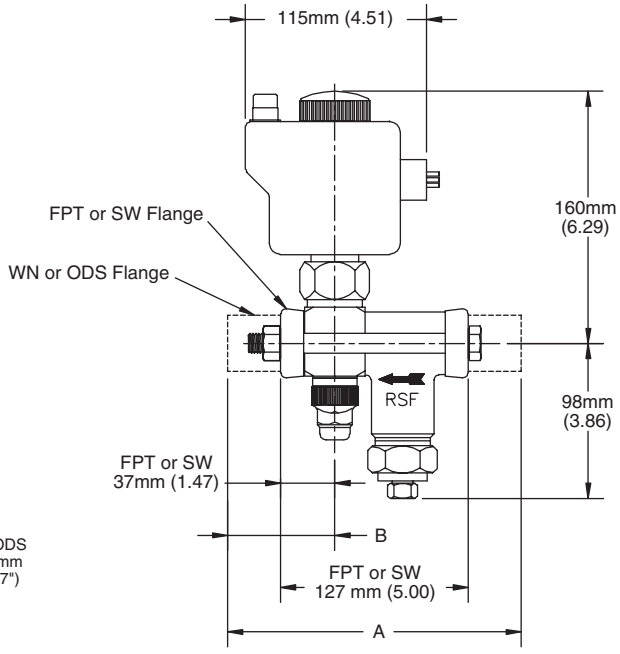
Specifications

Minimum Pressure Drop
to Open Wide ..... 0.7 bar (1 PSI)
Minimum Fluid Temperature ..... -50°C (-60°F)
Coil (see page 394) ..... Class “B” Housing
Flow Coefficient ..... 2.3 Kv (2.7 Cv)

Dimensions



S8F without Strainer



S8F with Strainer

	Flange	1/2 ODS	5/8 ODS	7/8 ODS
A	144mm (5.69")	152mm (6.00")	165mm (6.50")	187mm (7.37")
B	46mm (1.81")	50mm (1.97")	56mm (2.22")	67mm (2.66")

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

How to Order

Type S8F solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
013	S8F	F04	F04	R1	2	G	S	0

Port Size

013	13mm (½")

Flange Type / Connection

Flange Type		Connection	
X	Less Flanges	**00**	None
F	FPT (IPS)	**02▲**	1/4"
S	SW (IPS)	**03**	3/8"
W	Weld Neck (IPS)	**04**	1/2"
		06	3/4"
K	ODS (US)	**04**	1/2"
		05	5/8"
		07	7/8"
D	DIN Weld Neck	**10**	10mm
		15	15mm
		20	20mm

▲ FPT only.

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Coil Voltage★

0	No Coil
	Standard
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
	Non-Standard
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

★ See table on page 394 for available coil style/ voltage combinations.

Coil Style

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Lens color designated separately

Remote Pilot Light◆

0	None
1	PLT-1 (NEMA 1)
2	PLT-2(NEMA 4)
5	PLT-5

◆ With coils 1 & 3 only. See page 394 for voltages.

Lens Color

0	No Remote Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Check Valve

0	None
4	w/CK4

Weight:
Less Strainer .....2.5 kg (5 lbs)
With Strainer .....3.3 kg (7 lbs)

- Pilot Operated
- Molded Class “H” Coil Construction
- Pilot Light Available
- Manual Opening Stem
- MOPD 20.7 bar (300 PSIG); MRP 31.0 bar (450 PSIG)
- All Service from the Top



Description

This compact, heavy duty, pilot-operated solenoid valve is suitable for ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration. This valve may be opened by means of a manual opening stem for servicing or in case of electrical power failure. The valve can be ordered with a close-coupled stainless steel screen strainer (see page 436).

The Type SV2 valve is available with an optional extension tube to raise the solenoid operator and coil housing assembly 50mm (2") above the valve body to accommodate insulation. When the option is desired, the Type SV2A solenoid valve should be specified.

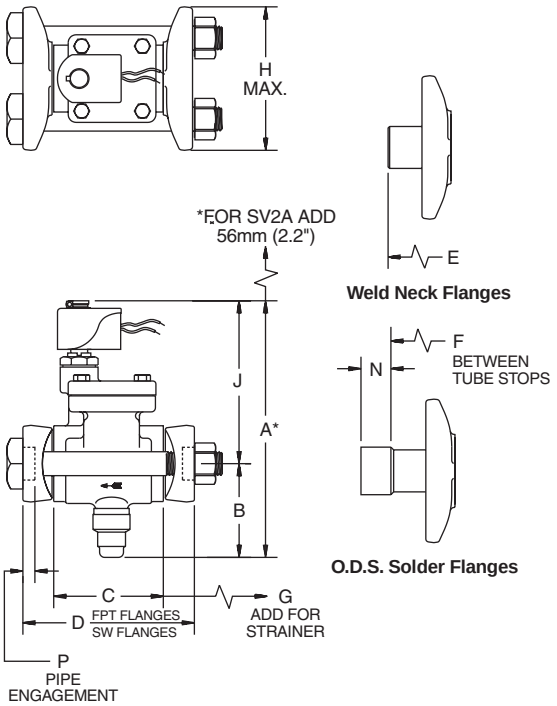
Materials

Body ..... Ductile Iron
Seat ..... PTFE
Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop to Open Wide ... .24 bar (3.5 PSI)
Minimum Fluid Temperature ..... -45°C (-50°F)
Coil (see page 394) ..... Class “H” Housing
Flow Coefficients
13 mm (½") ..... 2.6 Kv (3.0 Cv)
20 mm (¾") ..... 6.0 Kv (7.0 Cv)
25 mm (1") ..... 10.3 Kv (12.0 Cv)
32 mm (1¼") ..... 16.3 Kv (19.0 Cv)

Dimensions



Allow 38mm (1.5”) above valve for removal of coil housing assembly.
Allow 25mm (1”) below valve to operate manual opening stem.

Dimension		PORT SIZE								
		13mm (1/2")			20mm & 25mm (3/4"& 1")			32mm (1-1/4")		
A*	mm	166			203			219		
	inch	6.56			8.00			8.62		
B	mm	59			79			89		
	inch	2.31			3.12			3.50		
C	mm	57			87			149		
	inch	2.25			3.43			5.87		
D (FPT,SW)	mm	95			146			203		
	inch	3.75			5.73			7.97		
								1-1/4		1-1/2
E (WN)	mm	113			192			246		251
	inch	4.44			7.53			9.67		9.87
		1/2	5/8	7/8	7/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8
F (ODS)	mm	121	134	156	168			215	225	251
	inch	4.75	5.25	6.12	6.63			8.47	8.87	9.87
G	mm	50			99			178		
	inch	2.00			3.90			7.00		
H	mm	76			117			95		
	inch	3.00			4.60			3.75		
J*	mm	98			124			130		
	inch	3.87			4.87			5.12		
		1/2	5/8	7/8	7/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8
N (ODS)	mm	10	13	20	20	24	25	25	28	34
	inch	0.37	0.50	0.75	0.75	0.93	1.00	1.00	1.09	1.34
P (SW)	mm	13			13			15		
	inch	0.50			0.50			0.60		

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Cleveland, OH

How to Order

Type SV2 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	SV2	A	F08	F08	12	1	G	S	1

Port Size

013	13mm (½")
020	20mm (¾")
025	25mm (1")
032	32mm (1¼")

Variation

Blank	Standard Valve
A	w/Extension Tube

Not all flange sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type	Connection
X Less Flanges	**00** None
F FPT (IPS) **S** SW (IPS) **W** Weld Neck (IPS)	**02** ¼" **03** 3/8" **04** ½" **06** ¾" **08** 1" **10** 1¼" **12** 1½"
K ODS (US)	**04** ½" **05** 5/8" **07** 7/8" **09** 1 1/8" **11** 1 3/8" **13** 1 5/8" **17** 2 1/8"
D DIN Weld Neck **M** Insert Metric **C** EC-Br Copper	Enter size from table below.

*See table below for availability

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Coil Voltage

0	No Coil
	Standard
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
6	115/50
7	230/50
8	240/50
	Non-Standard
A	24/60
C	480/60
D	24/50
H	24V DC
W	120V DC

Coil Style★

0	No Coil
5	Explosion Proof
6	Compact A,B Operator w/18" Leads
7	Compact A,B Operator w/DIN Connector

★ See table on page 394 for available coil style/voltage combinations.

Remote Pilot Light

0	None
1	PLT-1(NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

◆ With coil 6 only. See page 394 for voltages.

Lens Color

0	No Remote Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Check Valve

0	None
1*	w/CK1
4	w/CK4

* N/A on Size 013

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Strainer		With Strainer	
							kg	lb	kg	lb
013	02 03 04 06	03 04 06	04 05 07	10 15 20			1.8	4	2.7	6
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	4.0	9	7.2	16
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	4.0	9	7.2	16
032	10 12	10 12	11 13 17	32 40 50		30 36 42	6.8	15	13.5	30

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Positive Lift, Held Open Electrically
- Standard Coil Housing Meets NEMA 3R and NEMA 4 – Rain Tight
- Coil Housing Surpasses NEMA Salt Spray Test
- Gray Iron Body, PTFE Seat
- Molded Class “B” Coil Construction
- Pilot Light Available
- Stainless Steel Needle
- Manual Opening Stem
- MRP 27.6 bar (400 PSIG)



Description

This heavy duty solenoid valve is suitable for ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration. The S7 is a pilot operated, positive lift valve. The valve may be opened by means of a manual opening stem for servicing or in case of electrical power failure.

It is advisable to install a strainer upstream of each valve to prevent entrance of foreign material into the valves and the rest of the system. Refrigerating Specialties strainers are available to close-couple to valve inlets (see page 436).

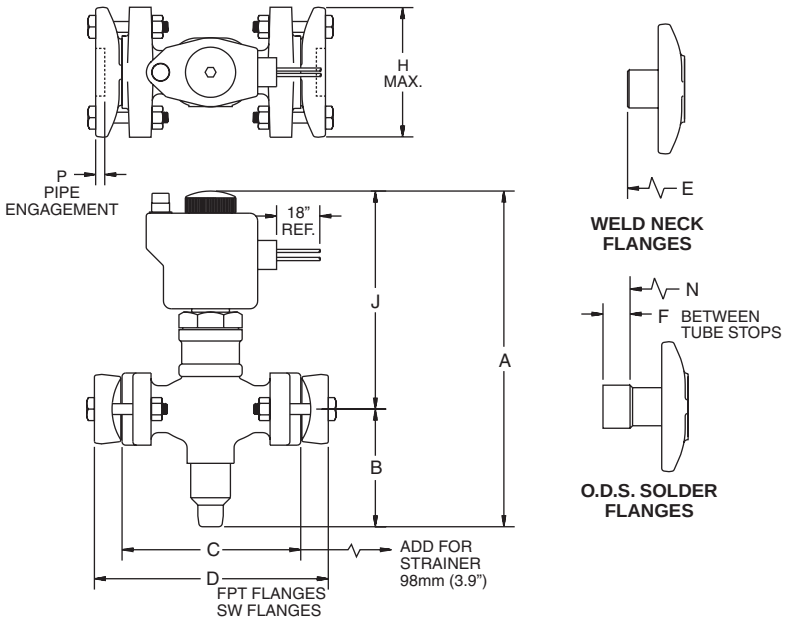
Materials

Body ..... Gray Iron
Seat ..... PTFE
Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop
to Open Wide ..... 0 bar (0 PSI)
Minimum Fluid Temperature ..... -30°C (-25°F)
Coil (See page 394) ..... Class “B” Housing
Flow Coefficients
20 mm (¾") ..... 6.8 Kv (8.0 Cv)
25 mm (1") ..... 8.6 Kv (10.0 Cv)

Dimensions



A		B		C		D (FPT, SW)		E (WN)		F (ODS)		H		J		N (ODS)		P (SW)	
MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH
282	11.1	102	4.0	157	6.2	216	8.5	261	10.3	239	9.4	117	4.6	180	7.1	25	1.0	13	0.5

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Cleveland, OH

How to Order

Type S7 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	S7	F08	F08	11	0	0	S	0

Port Size*

020	20mm (¾")
025	25mm (1")
050	50mm (2")

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	06 ¾" 08 1" 10 1¼" 12 1½" 16 2"
K ODS (US)	07 7/8" 09 1 1/8" 11 1 3/8" 13 1 5/8" 17 2 1/8" 21 2 5/8"
D DIN Weld Neck M Insert Metric C EC-Br Copper	Enter size from table below.

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

Coil Style★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads

★ See page 394 for available coil style/voltage combinations.
* Integral pilot light. Lens color designated separately.

Remote Pilot Light◆

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

◆ With coils 1 & 3 only. See page 394 for voltages.

Check Valve

0	None
1	w/CK1
4	w/CK4

Strainer

N	No Strainer
S	w/Strainer

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Strainer		With Strainer	
							kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	5.8	12	9	19
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	5.8	12	9	19
050	12 16	12 16	13 17 21	40 50			29	63	43	95

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Cleveland, OH

- Standard Coil Housing Meets NEMA 3R and NEMA 4 – Rain Tight
- Coil Housing Surpasses NEMA Salt Spray Test
- Replaceable Piston Plug Assembly
- Molded Class “B” Coil Construction
- Pilot Light Available
- Stainless Steel Needle
- Manual Opening Stem
- MOPD is 20.7 bar (300 PSIG); MRP is 27.6 bar (400 PSIG)



Description

This heavy duty, pilot-operated, gravity closing solenoid valve is suitable for ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration. The valve may be opened by means of a manual opening stem for servicing or in case of electrical power failure. The valve can be ordered with a close-coupled stainless steel screen strainer (see page 436).

Materials

Body ..... Gray Iron

Seat
- 32mm (1¼") ..... PTFE
- 40-75mm (1⅝" - 3") ..... Metal

Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop
to Open Wide ..... 0.07 bar (1 PSI)

Minimum Fluid Temperature ..... -30°C (-25°F)

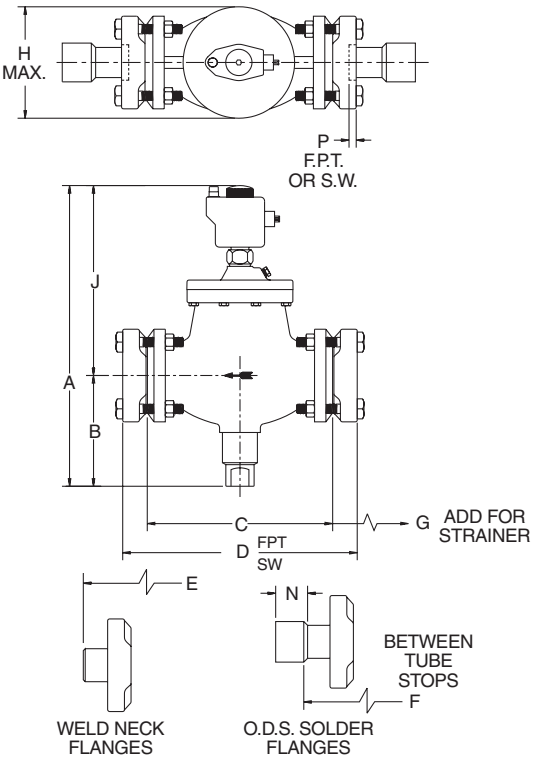
Coil (see page 394) ..... Class “B” Housing

External Connection
for Outlet Pressure (S5E) ..... ¼" FPT

Flow Coefficients
- 32mm (1¼") ..... 16.3 Kv (19.0 Cv)
- 40 mm (1⅝") ..... 31.7 Kv (37.0 Cv)
- 50 mm (2") ..... 43.7 Kv (51.0 Cv)
- 65mm (2½") ..... 70.7 Kv (82.0 Cv)
- 75mm (3") ..... 98.0 Kv (115 Cv)

Dimensions

Dimension		PORT SIZE									
		32mm (1-1/4")			40 & 50mm (1-5/8" & 2")			65mm (2-1/2")		75mm (3")	
A	mm	348			411			437		511	
	inch	13.7			16.2			17.2		20.1	
B	mm	117			127			137		198	
	inch	4.6			5.0			5.4		7.8	
C	mm	203			251			251		311	
	inch	8.0			9.9			9.9		12.2	
D (FPT,SW)	mm	256			307			331		289	
	inch	10.1			12.1			13.0		15.3	
		1-1/4		1-1/2	1-1/2		2				
E (WN)	mm	300		304	364		371	401		478	
	inch	11.8		12.0	14.3		14.6	15.8		18.8	
		1-3/8	1-5/8	2-1/8	1-5/8	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	3-5/8
F (ODS)	mm	269	279	304	358	338	358	348	389	414	432
	inch	10.6	11.0	12.0	14.1	13.3	14.1	13.7	15.3	16.3	17.0
G	mm	178			251			314		314	
	inch	7.0			9.9			12.4		12.4	
H	mm	117			140			159		176	
	inch	4.6			5.5			6.2		7.0	
J	mm	231			284			300		312	
	inch	9.1			11.2			11.8		12.3	
		1-3/8	1-5/8	2-1/8	1-5/8	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	3-5/8
N (ODS)	mm	25	28	33	28	33	38	38	43	43	48
	inch	1.0	1.1	1.3	1.1	1.3	1.5	1.5	1.7	1.7	1.9
		1-1/4		1-1/2	1-1/2		2				
P (SW)	mm	15		15	15		15	25		29	
	inch	0.6		0.6	0.6		0.6	1.0		1.1	



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How to Order

Type S5 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
050	S5		F12	F12	11	0	0	S	0

Port Size

032	32mm (1¼")
040	40mm (1⅝")
050	50mm (2")
065	65mm (2½")
075	75mm (3")

Variation

Blank	Standard
E	External Actuating Pressure Supply

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	10	1¼"
S	SW (IPS)	12	1½"
W	Weld Neck (IPS)	16	2"
		20	2½"
		24	3"
K	ODS (US)	11	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
D	DIN Weld Neck	Enter size from table below.	
M	Insert Metric		
C	EC-Br Copper		

WARNING!
ODS flanges not suitable for use with ammonia.

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

Coil Style★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads

★ See page 394 for available coil style/voltage combinations.
* Integral pilot light. Lens color designated separately

Remote Pilot Light◆

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

◆ With coils 1 & 3 only. See page 394 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Check Valve

0	None
1	w/CK1
4	w/CK4

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Strainer		With Strainer	
							kg	lb	kg	lb
032	10 12	10 12	11 13 17	32 40 50		30 36 42	14	30	21	46
040	12 16	12 16	13 17 21	40 50			29	63	43	95
050	12 16	12 16	13 17 21	40 50			29	63	43	95
065		20	21 25	65 75			37	81	64	140
075		24	25 29	75			53	116	80	175

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Cleveland, OH

- Standard Coil Housing Meets NEMA 3R and NEMA 4 – Rain Tight
- Coil Housing Surpasses NEMA Salt Spray Test
- Molded Class “B” Coil Construction
- Pilot Light Available
- Stainless Steel Needle
- Manual Opening Stem
- MOPD is 20.7 bar (300 PSIG); MRP is 27.6 bar (400 PSIG)



Description

This heavy duty solenoid valve is suitable for ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration. The S4 is a pilot operated valve that may be opened by means of the manual opening stem for servicing or in case of electrical power failure.

Materials

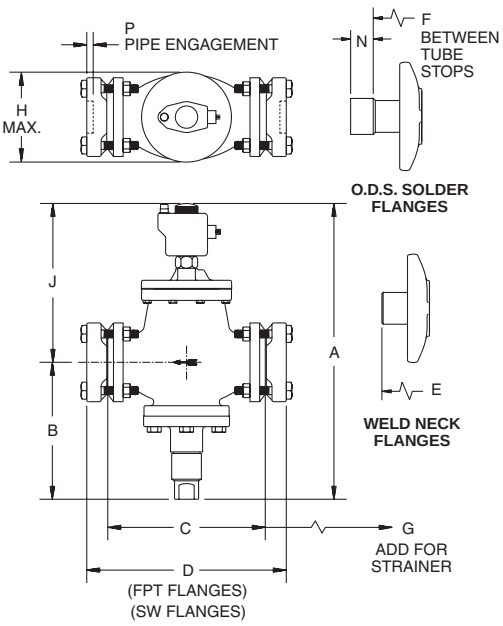
Body ..... Gray Iron
Seat ..... PTFE (13-32mm), Metal (40-100mm)
Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop to Open Wide
20-32mm (¾" - 1¼") ..... 0.14 bar (2 PSI)
40-100mm (1⅝" - 4") ..... 0.28 bar (4 PSI)
Minimum Fluid Temperature
20-32mm (¾" - 1¼") ..... -45°C (-50°F)
40-100mm (1⅝" - 4") ..... -50°C (-60°F)
Coil (See page 394) ..... Class “B” Housing

Flow Coefficients
20 mm (¾") ..... 6.2 Kv (7.2 Cv)
25 mm (1") ..... 8.6 Kv (10.0 Cv)
32mm (1¼") ..... 15.0 Kv (17.5 Cv)
40 mm (1⅝") ..... 28.6 Kv (33.4 Cv)
50 mm (2") ..... 42.4 Kv (49.5 Cv)
65 mm (2½") ..... 59.9 Kv (70.0 Cv)
75 mm (3") ..... 86.0 Kv (100 Cv)
100 mm (4") ..... 139 Kv (162 Cv)

Dimensions



Note: Allow 100mm (4") above valve for removal of coil housing and coil.

Dimension		PORT SIZE												
		20mm (3/4") & 25mm (1")	32mm (1-1/4")			40 & 50mm (1-5/8" & 2")			65mm (2-1/2")		75mm (3")		100mm (4")
A	mm	376	394			442			467		579		645
	inch	14.8	15.5			17.4			18.4		22.8		25.4
B	mm	148	162			177			181		273		292
	inch	5.8	6.3			6.9			7.1		10.7		11.5
C	mm	164	203			251			251		311		339
	inch	6.2	8.0			9.9			9.9		12.2		14.1
D	mm	216	256			307			331		389		450
(FPT,SW)	inch	8.5	10.1			12.1			13.0		15.3		17.7
			1¼		1½	1½		2					
E	mm	261	300		304	364		371	401		478		571
(WN)	inch	10.3	11.8		12.0	14.3		14.6	15.8		18.8		22.5
			1⅜	1⅝	2⅛	1⅝	2⅛	2⅝	2⅝	3⅛	3⅛	3⅝	
F	mm	239	269	279	304	358	338	358	348	389	414	432	303
(ODS)	inch	9.4	10.6	11.0	12.0	14.1	13.3	14.1	13.7	15.3	16.3	17.0	19.8
G	mm	98	178			251			314		314		363
	inch	3.9	7.0			9.9			12.4		12.4		14.3
H	mm	117	117			140			159		176		222
	inch	4.6	4.6			5.5			6.2		7.0		8.8
J	mm	224	231			284			300		312		353
	inch	8.8	9.1			11.2			11.8		12.3		13.9
			1⅜	1⅝	2⅛	1⅝	2⅛	2⅝	2⅝	3⅛	3⅛	3⅝	4⅛
N	mm	25	25	28	33	28	33	38	38	43	43	48	55
(ODS)	inch	1.0	1.0	1.1	1.3	1.1	1.3	1.5	1.5	1.7	1.7	1.9	2.2
			1-1/4		1-1/2	1-1/2		2					
P	mm	13	15		15	15		15	25		29		32
(SW)	inch	0.5	0.6		0.6	0.6		0.6	1.0		1.1		1.3

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How to Order

Type S4 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Inlet Flange	Outlet Flange	Coil Voltage, Style	Pilot Light	Lens Color	Strainer	Check Valve
020	S4	X	F08	F08	15	0	0	S	0

Port Size

020	20mm (¾")
025	25mm (1")
032	32mm (1¼")
040	40mm (1⅝")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")

Variation

Blank	Standard
E	External Actuating Pressure Supply
SC	Slow Closing

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	06 ¾" 08 1" 10 1¼" 12 1½" 16 2" 20 2½" 24 3" 32 4"
K ODS (US)	07 ⅞" 09 1⅛" 11 1⅜" 13 1⅝" 17 2⅛" 21 2⅝" 25 3⅛" 29 3⅝" 33 4⅛"
D DIN Weld Neck M Insert Metric C EC-Br Copper	Enter size from table below.

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Volts/Frequency★

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

★ See page 394 for coil availability.

Coil Style

0	No Coil
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads
5	Explosion Proof

* Integral pilot light. Lens color designated separately

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coil styles 1 and 3 only. See page 394 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Check Valve

0	None
1	w/CK1
4	w/CK4

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Strainer		With Strainer	
							kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	10	21	13	28
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	10	21	13	28
032	10 12	10 12	11 13 17	32 40 50		30 36 42	15	33	22	48
040	12 16	12 16	13 17 21	40 50			31	67	45	99
050	12 16	12 16	13 17 21	40 50			31	67	45	99
065		20	21 25	65 75			38	75	66	144
075		24	25 29	75			55	121	82	180
100		32	33	A0			75	164	127	278

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Pilot Operated
- Welds directly in the Line – No Flanges
- Removable Seat is Serviceable from Top Side
- Streamlined Fluid Flow Pattern
- Cast Steel Body, ASTM No. A352 Grade LCB
- PTFE Pilot Seat
- Molded Class “B” Coil Construction
- Manual Opening Stem
- MOPD 20.7 bar (300 PSIG); MRP 27.6 bar (400 PSIG)



Description

These heavy duty, spring closing solenoid valves are suitable for control of ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration valves. They weld directly in the line and do not require flanges. The Type S4W are pilot operated valves using upstream pressure for the moving force, and require a minimum of 0.21 bar (3 psi) pressure drop to fully open. The valves are normally closed.

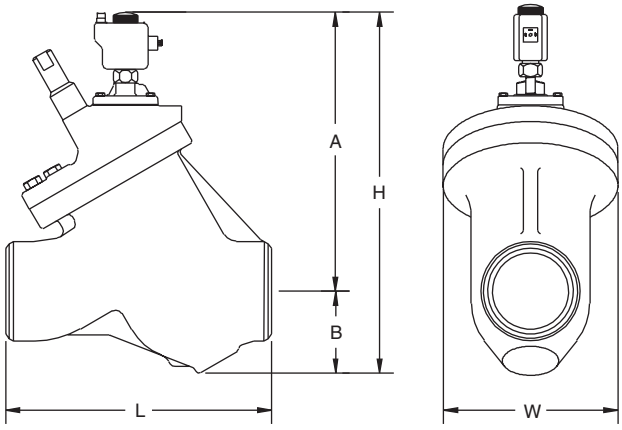
Materials

Body ..... Cast Steel (ASTM A352 Grade LCB)
Seat ..... Metal
Needle ..... Stainless Steel

Specifications

Minimum Pressure Drop
to Open Wide ..... 0.21 bar (3 PSI)
Temperature Range ..... -45° to 105°C (-50° to 220°F)
Coil (see page 394) ..... Class “B” Housing
Flow Coefficients
125 mm (5") ..... 171 Kv (200 Cv)
150 mm (6") ..... 308 Kv (360 Cv)
200 mm (8") ..... 471 Kv (550 Cv)

Dimensions



Dimension		125mm (5")	150mm (6")	200mm (8")
A	mm	451	527	584
	inch	17.75	20.75	23.00
B	mm	114	152	197
	inch	4.50	6.00	7.75
H	mm	565	679	781
	inch	22.25	26.75	30.75
L	mm	381	483	622
	inch	15.00	19.00	24.50
W	mm	267	318	381
	inch	10.50	12.50	15.00

How to Order

Type S4 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Variation	Coil Voltage, Style	Pilot Light	Lens Color	Strainer
150	S4		1R	2	G	S

Port Size

125	125mm (5")
150	150mm (6")
200	200mm (8")

Variation

Blank	Standard
E	External Actuating Pressure Supply

Coil Voltage★

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

★ See page 394 for available voltage/coil combinations.

Coil Style

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads
5	Explosion Proof

* Integral pilot light. Lens color designated separately.

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coil styles 1 and 3 only. See page 394 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

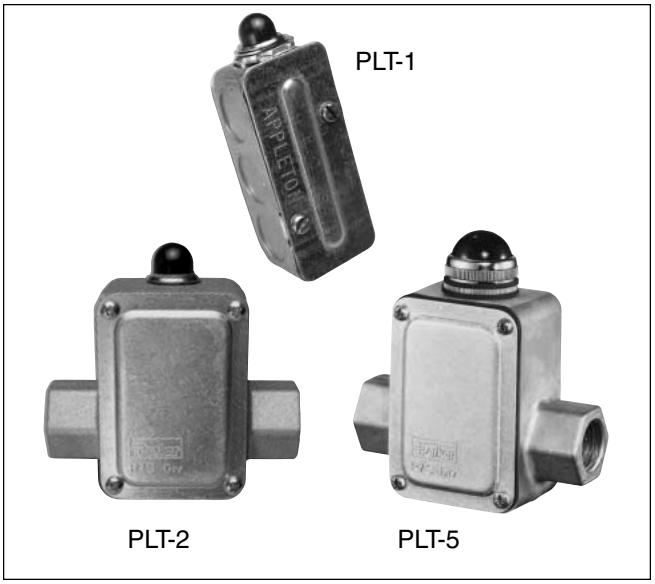
N	No Strainer
S	w/Strainer

Connections & Weights

Port Code	Connections Available	Weight			
	Weld End	Less Strainer		With Strainer	
		kg	lb	kg	lb
125	5"	54	120	99	218
150	6"	98	215	177	380
200	8"	159	350	295	650

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Pilot Light Assembly is Completely Self-Contained
- Gives Visual Observation of Solenoid Valve Operation
- Standard Conduit Box or Weatherproof Design



Description

The **PLT-1** assembly is completely self-contained, consisting of a standard conduit box with multiple knockouts for connecting to the R/S coil housing cover. The pilot light is a standard 6-volt bulb.

The **PLT-2** pilot light assembly is completely self-contained, consisting of a cast aluminum conduit box with 1/2" FPT connections, a gasket sealed cover and a moisture sealed pilot light. The light is a standard 6-volt bulb.

Transformer coils can be furnished for 120, 208, 240 volts 60 Hertz and 115 and 230 volts 50 Hertz – all with a 6-volt secondary winding.

The **PLT-5** pilot lights wire directly to line voltage. The bulb is 6 Watts for 120V applications and 10 Watts for 208/240V applications. The large base uses an S6 double contact bayonet bulb. No special transformer coil is required. The PLT-5 weatherproof unit has a cast aluminum box with stamped aluminum cover and rubber gasket. The assembly uses rubber washers to maintain weatherproof condition and is designed for outdoor use.

Ordering Information

Type	Voltage	Lens Color
PLT-2	1	G

Type

PLT-1	Transformer Style, NEMA1
PLT-2	Transformer Style, NEMA 4
PLT-5	Direct Wired, Weatherproof

Voltage

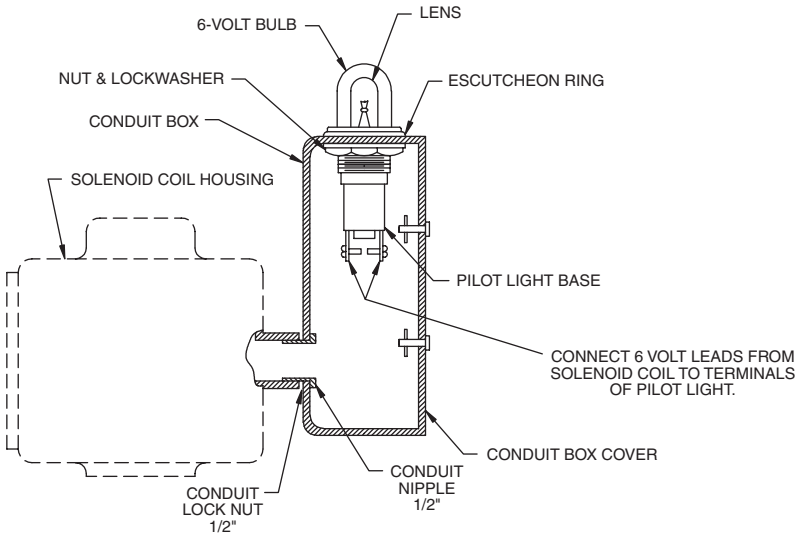
1★	6V Secondary
2◆	120/60
3◆	208/60 or 240/60

★ PLT-1 & PLT-2 only
◆ PLT-5 only

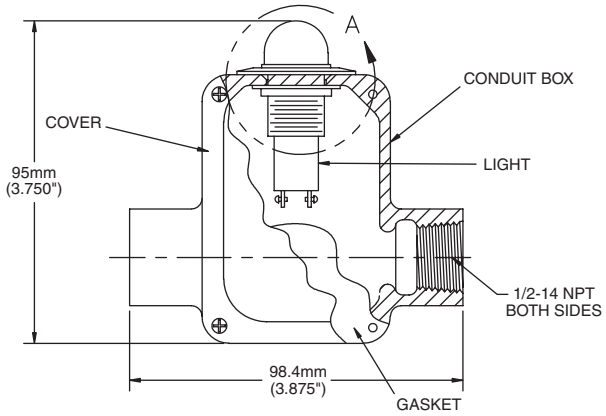
Lens Color

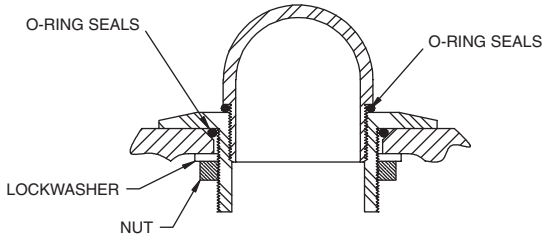
G	Green (std)
R	Red
A	Amber
W	White

PLT-1



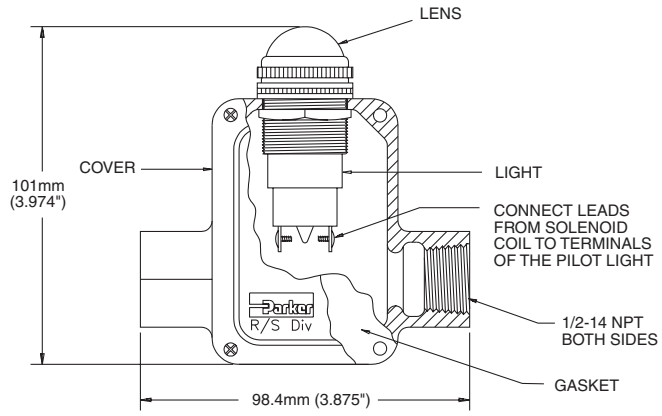
PLT-2

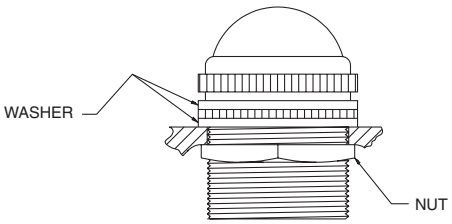




VIEW A ENLARGED

PLT-5





ENLARGED VIEW

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Cleveland, OH

Class "B" Coil

The molded water resistant Class "B" solenoid coil, available on most Refrigerating Specialties solenoid valves, is designed for long life and powerful opening force. The standard coil housing meets NEMA 3R and 4 requirements. This sealed construction can withstand direct contact with moisture and ice. The coil housing far exceeds the requirements of NEMA Standard ICS.1-110.57 salt spray test for rust resistance.

By definition, Class "B" coil construction will permit coil temperatures, as measured by resistance method, as high as 130°C (266°F). Final coil temperatures are a function of both fluid and ambient temperatures. The higher fluid temperatures require lower ambient temperatures so the maximum coil temperature is not exceeded. Conversely, low fluid temperatures permit higher ambient temperatures.

The supply circuits must be properly sized to give adequate voltage at the coil even when other electrical equipment is operating. The coil is designed to operate with line voltage from 85% to 110% of rated coil voltage. Power consumption during normal operation will be 33 watts or less.

Standard Encapsulated Coils

Volts/Hertz	Leads	Inrush Current (Amps)	Holding Current (Amps)	Fuse Size (Amps)
120/60	Blue	1.18	0.46	1
208/60	Blue and Red	0.63	0.26	1
240/60	Red	0.60	0.23	1
115/50	Yellow and Blue	1.22	0.21	1
230/50	Yellow	0.65	0.26	1

For other voltages, contact factory. On transformer coil, the 6 volt leads are always black.

Class "H" Coil (SV2 only)

The Refrigerating Specialties Division molded water resistant Class "H" coil is designed for long life and powerful opening force. The Class "H" coil construction will permit coil temperatures, as measured by resistance method, as high as 180°C (365°F).

The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The coil is designed to operate at 15% under voltage. Operating with line voltage below the limit will result in lowering the valve opening pressure differential.

Currents

Coil Type	Watt Rating	Volt Amperage	
		Holding	Inrush
Standard AC Class "H"	10.5	23	37
Standard AC Coil with 6v Secondary Pilot Light	11.0	26	38

Voltages

Coils are available from stock with most standard voltages (see table below). Non-standard voltages (shown in shaded area of table) can be special ordered. Coils are also available with 6V secondary voltage for use with remote pilot lights PLT-1 and PLT-2.

NOTE: Pilot lights cannot be used with explosion proof or unleaded (DIN connector) coils.

■ These voltages for the Class "H" coils are 120/60-110/50, 240/60-220/50, 480/60-440/50.

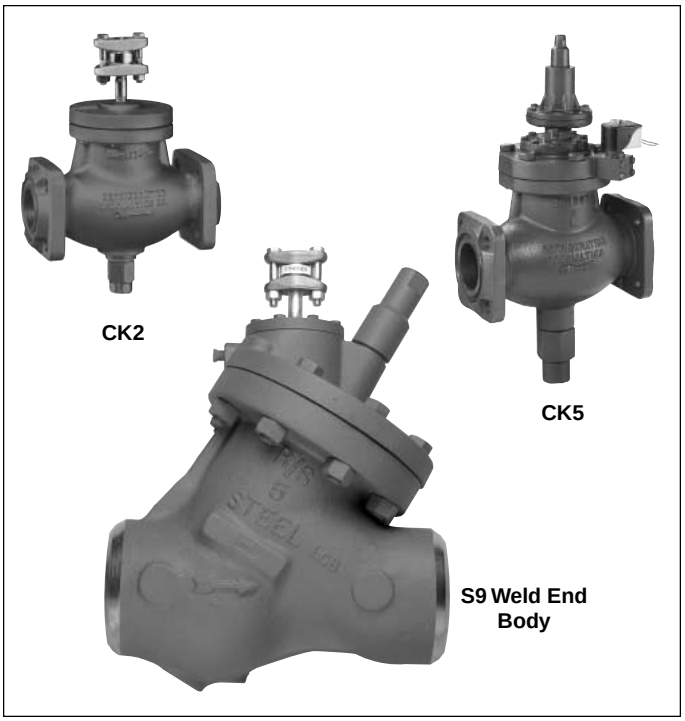
Available Voltages for Coils and Pilot Lights	Code	Class	120/60	120/6/60	208/60	208/6/60	240/60	240/6/60	440/60	115/50	230/50	230/6/50	240/50	24/60	288/60	480/60	24/50	42/50	48/50	12VDC	24VDC	120VDC	230VDC	48VDC	115/6/50	440/6/60
Encapsulated w/Leads	1	B	●	●	●	●	●	●		●	●		●	●			●		●							
Encapsulated w/Leads & Integral Pilot Light	L	B	●		●		●				●															
Encapsulated w/DIN Connector	2	B	●				●			●	●		●											●		
Encapsulated w/DIN & Integral Pilot Light	D	B	●							●	●		●													
Industrial Open Frame w/Leads	3	B	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●	●
Explosion Proof	5	–	●		●		●			●	●			●		●					●	●				
Compact A,B Operator w/Leads	6	H	■	■	●	●	■	■		●	●		●	●		■	●				●					
Compact A,B Operator w/DIN	7	H	■		●		■			●	●		●	●		■	●									
PLT-1 (NEMA 1)				●		●		●				●													●	●
PLT-2 (NEMA 4)				●		●		●				●													●	●
PLT-5 (NEMA 4)			●		●		●																			

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Climate & Industrial Controls Group
Cleveland, OH

Overview

Gas Powered Suction Stop Valves

- Very low pressure drop for low temperatures
- Ideal for overfeed or flooded systems
- Use in Vertical or Horizontal Line
- Pilot Connection Contains Disc Strainer between a Pair of Flanges
- Suitable to -50°C (-60°F)
- Main valve can lie on its side for minimum pressure drop with two-phase flow
- Manual opening stem
- Condenser gas powered piston and heavy return spring on Type S9 overcome viscous oil conditions



Common Specifications

Max. Opening Pressure Difference ..... 20.7 bar (300 psig)
Design Pressure (MRP) ..... 27.6 Bar (400 psig)
Maximum Fluid Temperature ..... 105°C (220°F)
Coil Insulation ..... Molded Waterproof Class B
Standard Coil Housing ..... NEMA 3R and 4

Specifications

Type		CK2	CK2	CK5	CK5	S9	S9
Port Size	mm	32	40-150	32	40-150	50-100	125-200
	inch	1¼"	1⅝" - 6"	1¼"	1⅝" - 6"	2" - 4"	5" - 8"
Seat Material		PTFE	Metal	PTFE	Metal	Metal	Metal
Body Material		Gray Iron	Gray Iron	Gray Iron	Gray Iron	Gray Iron	Cast Steel
Minimum Pressure Drop to Open Wide	bar	0	0	0	0	0	0
	psi	0	0	0	0	0	0
Minimum Fluid Temperature	°C	-50°	-50°	-50°	-50°	-50°	-50°
	°F	-60°	-60°	-60°	-60°	-60°	-60°
Operation		Normally Open	Normally Open	Normally Open	Normally Open	Normally Closed	Normally Closed
Bulletin for Reference		50-12	50-12	50-23	50-23	31-90	30-05

Selection Guide

Refrigerant Application	Refrigerant Temperature Range	VALVE MOST RECOMMENDED – Listed by Port Size											
		15mm	20mm	25mm	32mm	40mm	50mm	65mm	75mm	100mm	125mm	150mm	200mm
		½"	¾"	1"	1¼"	1⅝"	2"	2½"	3"	4"	5"	6"	8"
Suction	Above -50°C (-60°F) Normally Open*	Use larger size →			CK2 CK5	CK2A CK5	CK2 CK5	CK2 CK5	CK2 CK5	CK2 CK5	CK2 CK5	CK2 CK5	— —
	Above -50°C (-60°F) Normally Closed*	Use larger size → → → → →					S9	S9	S9	S9	S9	S9	S9

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

* Use CK2 only above -30°C (-25°F) if not powered by near oil free hot gas, such as in rotary screw compressor systems.

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- Normally Open
- Low Pressure Drop
- Heavy Return Spring
- Manual Opening Stem
- Use in Vertical or Horizontal Line
- Main Valve Can be Installed on Side
- Maximum Rated Pressure (MRP): 27.6 bar (400 psig)



Description

These piston type, pressure powered, normally open, heavy duty valves are built with control valve precision. All are equipped with flanges and manual lift stem. The 32mm (1¼") port size has a PTFE main seat; 40 mm (1 5/8") port and larger have a metal to metal seat.

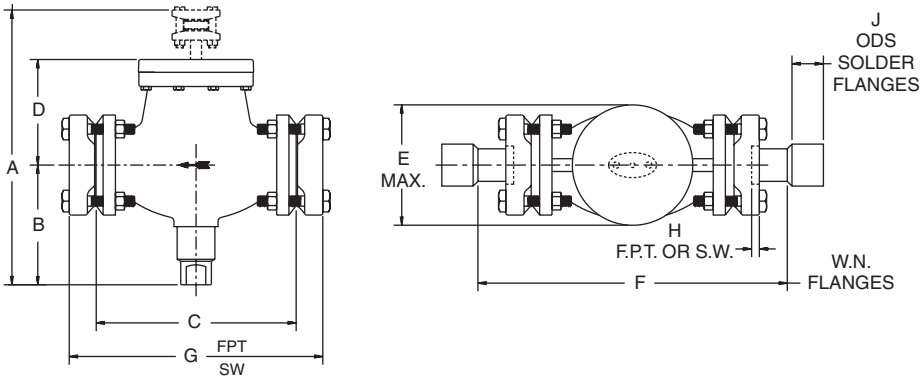
Specifications

Minimum Pressure Drop
to Open Wide ..... 0 bar (0 PSI)
Minimum Fluid Temperature ..... -50°C (-60°F)
Coil (See page 376) ..... Class "B" Housing
Flow Coefficient
32mm (1¼") ..... 16.3 Kv (19.0 Cv)
40mm (1 5/8") ..... 31.7 Kv (37.0 Cv)
50mm (2") ..... 43.7 Kv (51.0 Cv)
65mm (2½") ..... 70.2 Kv (82.0 Cv)
75mm (3") ..... 103 Kv (120 Cv)
100mm (4") ..... 171 Kv (200 Cv)
125mm (5") ..... 244 Kv (285 Cv)
150mm (6") ..... 342 Kv (400 Cv)

Materials

Body ..... Gray Iron
Seat
32mm (1¼") ..... PTFE
40-150mm (1 5/8"-6") ..... Metal
Needle ..... Stainless Steel

Dimensions



DIMENSIONAL DATA																			
PORT SIZE		A		B		C		D		E		F		G		H		J	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
32	1¼	312.7	12.31	122	4.8	203	8.0	96.5	3.8	86.4	3.4	304	12.0	256	10.1	15	0.6	33	1.3
40	1 5/8	359.9	14.17	139.7	5.5	251	9.9	129.5	5.1	129.5	5.1	371	14.6	307	12.1	15	0.6	38	1.5
50	2	359.9	14.17	139.7	5.5	251	9.9	129.5	5.1	129.5	5.1	371	14.6	307	12.1	15	0.6	38	1.5
65	2½	396.5	15.6	142.2	5.6	251	9.9	160	6.3	147.3	5.8	401	15.8	331	13.0	25	1.0	43	1.7
75	3	475.0	18.7	216	8.5	311	12.2	167.6	6.6	167.6	6.6	478	18.8	389	15.3	29	1.1	48	1.9
100	4	518.2	20.4	217	8.6	359	14.1	208.3	8.2	190.5	7.5	571	22.5	450	17.7	32	1.3	55	2.2
125	5	586.7	23.15	298.4	11.7	381	15.0	198.1	7.8	228.6	9.0	576.6	22.7	485	19.1	30.5	1.2	—	—
150	6	628.6	24.7	355.6	14.0	514.3	20.2	180.3	7.1	294.6	11.6	706.1	27.8	617	24.3	35.6	1.4	—	—

How to Order

Type CK2 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Pilot Connection	Pilot Option	Coil Voltage Coil Style	Pilot Light	Lens Color	Strainer
050	CK2	F12	F12	F03	1	12	0	0	S

Port Size

032	32mm (1¼")
040	40mm (1⅝")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")
125	125mm (5")
150	150mm (6")

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type	Connection
X Less Flanges	00 None
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	10 1¼" 12 1½" 16 2" 20 2½" 24 3" 32 4" 40 5" 48 6"
K ODS (US)	11 1⅜" 13 1⅝" 17 2⅛" 21 2⅝" 25 3⅛" 29 3⅝" 33 4⅛"
D DIN Weld Neck C EC-Br Copper	Enter size from table below.

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

NOTE: Where pilot solenoid valve is designated in this model code, its companion flanges will be supplied to correspond to pilot connection as selected within this model number. Customer may designate pilot style "0" and order pilot solenoid valve separately.

Pilot Option

0	No Pilot Solenoid
1	Pilot Solenoid only
2	Pilot Solenoid w/Strainer

Pilot Strainer Connection*

Flange Type	Connection
F FPT (IPS) S SW (IPS) W Weld Neck (IPS)	02★ ¼" 03 ⅜" 04 ½" 06 ¾"
K ODS (US)	04 ½" 05 ⅝" 07 ⅞"

Must be specified even if pilot solenoid is not ordered. See note below.
★FPT only.

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
P	115/6/50
Q	440/6/60

Coil Style★

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads

★ See table on page 376 for coil style/voltage combinations.
* Integral pilot light. Lens color designated separately

Pilot Light

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ Available with coils 1 & 3 only. See table on page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available					Weight			
						Less Flanges		With Flanges	
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	EC-Br Copper	kg	lb	kg	lb
032	10 12	10 12	11 13 17	32 40 50	30 36 42	13	28	15	33
040	12 16	12 16	13 17 21	40 50		25	55	28	60
050	12 16	12 16	13 17 21	40 50		25	55	28	60
065		20	21 25	65 75		34	74	36	79
075		24	25 29	75		47	104	50	109
100		32	33	A0		71	157	74	162
125		40				128	282	131	287
150		48				204	450	207	455

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Cleveland, OH

- Normally Open
- Low Pressure Drop
- Manual Opening Stem
- Integrated Pilot Solenoid on 32mm to 100mm (1 -1/4" to 4") Sizes
- Use in Vertical or Horizontal Line
- Can be Installed on Side
- Maximum Rated Pressure (MRP): 27.6 bar (400 psig)



Description

These piston-type, discharge gas powered, normally open, heavy duty valves are built with control precision. The 32mm through 100mm (1¼" through 4") port size valves are equipped with an attached modular pilot solenoid, A2D pilot regulator, and manual lift stem. The 125mm and 150mm (5" and 6") port size versions of this unique suction stop valve utilize a larger capacity, remotely piped pilot operated solenoid, the R/S type S8F. In addition, the pilot regulator for these two larger sized valves is mounted on top of valve with the strainer disc assembly piped into the side of the adapter.

Materials

Body ..... Gray Iron

Seat

32mm (1¼") ..... PTFE

40-150mm (1⅝"-6") ..... Metal

Needle ..... Stainless Steel

Specifications

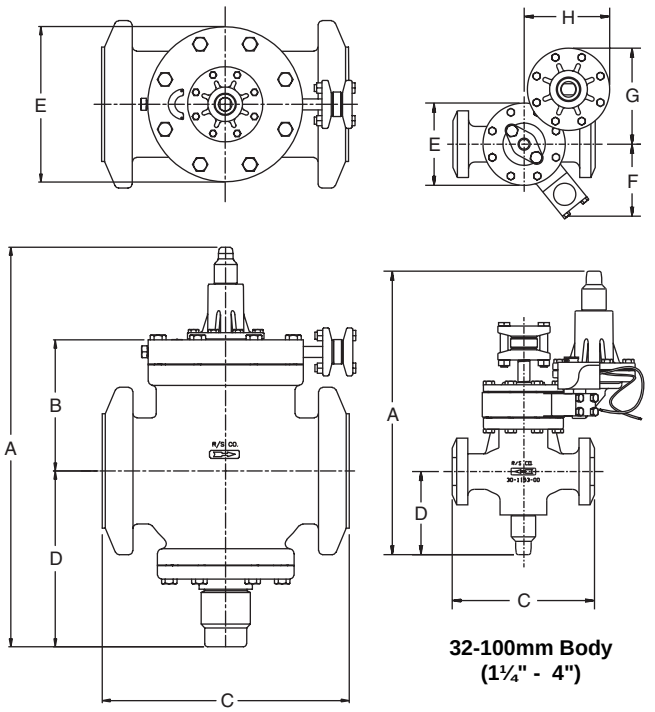
Minimum Pressure Drop
to Open Wide ..... 0 bar (0 PSI)

Minimum Fluid Temperature ..... -50°C (-60°F)

Coil (See page 376) ..... Class “H” Housing

Flow Coefficient

32mm (1¼") ..... 16.3 Kv (19.0 Cv)
40mm (1⅝") ..... 31.7 Kv (37.0 Cv)
50mm (2") ..... 43.7 Kv (51.0 Cv)
65mm (2½") ..... 70.2 Kv (82.0 Cv)
75mm (3") ..... 103 Kv (120 Cv)
100mm (4") ..... 171 Kv (200 Cv)
125mm (5") ..... 244 Kv (285 Cv)
150mm (6") ..... 342 Kv (400 Cv)



125-150mm Body (5" - 6")

32-100mm Body (1¼" - 4")

Dimensions

Dimension	1-1/4"	1-5/8"	2"	2-1/2"	3"	4"	5"	6"
A	17.6	19.7	19.7	20.2	24.9	27	23.2	26.8
B							8.4	7.7
C	8	9.9	9.9	9.9	12.1	14.1	15	20.2
D	6.3	6.9	6.9	7.1	10.7	11.5	11.7	14
E	4.6	5.5	5.5	6.2	7	8.8	9	11.6
F	4.4	4.6	4.6	4.9	5.6	6.2		
G	5.4	5.5	5.5	5.9	6.6	7.7		
H	4.8	5.3	5.3	5.2	4.8	5.5		

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Climate & Industrial Controls Group
Cleveland, OH

How to Order

Type CK5 valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Pilot Connection	Pilot Option	Coil Voltage, Coil Style	Pilot Light	Lens Color	Strainer
050	CK5	F16	F16	F03	1	12	0	0	S

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Port Size

032	32mm (1¼")
040	40mm (1⅝")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")
125	125mm (5")
150	150mm (6")

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	10	1¼"
S	SW (IPS)	12	1½"
W	Weld Neck (IPS)	16	2"
		20	2½"
		24	3"
		32	4"
		40	5"
		48	6"
K	ODS (US)	11	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Enter size from table below.	
C	EC-Br Copper		

WARNING!
ODS flanges not suitable for use with ammonia.

Pilot Option

0*	No Pilot Solenoid
1	With Pilot Solenoid
2*	With Pilot Solenoid and Strainer

* Available with 5" and 6" valves only. See note below.

Pilot Strainer Connection*

Flange Type		Connection	
F	FPT (IPS)	02★	¼"
S	SW (IPS)	03	3/8"
W	Weld Neck (IPS)	04	½"
		06	¾"
K	ODS (US)	04	½"
		05	5/8"
		07	7/8"

Must be specified even if pilot solenoid is not ordered.
★FPT only.

Strainer

N	No Strainer
S	w/Strainer

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1, 3 & 8 only. See page 376 for voltages.

Coil Voltage★

0	No Coil		
Standard		**Non-Standard**	
1	120/60	A	24/60
R	120/6/60	B	288/60
2	208/60	C	480/60
S	208/6/60	D	24/50
3	240/60	E	42/50
T	240/6/60	F	48/50
4	440/60	G	12V DC
6	115/50	H	24V DC
7	230/50	J	230V DC
U	230/6/50	P	115/6/50
8	240/50	Q	440/6/60

★ See table on page 376 for coil style/voltage combinations.

Coil Style (32-100mm)

0	No Coil or Housing
8	Compact C, D Operator w/18" Leads
9	Compact C, D Operator w/DIN Connector

Coil Style (125-150mm)

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Lens color designated separately

NOTE: For sizes 125 and 150 only: Where pilot solenoid valve is designated by this model code, its companion flanges will be supplied to correspond to pilot connection as selected within this model number. Customer may designate pilot style "0" and order S8F pilot solenoid valve separately.

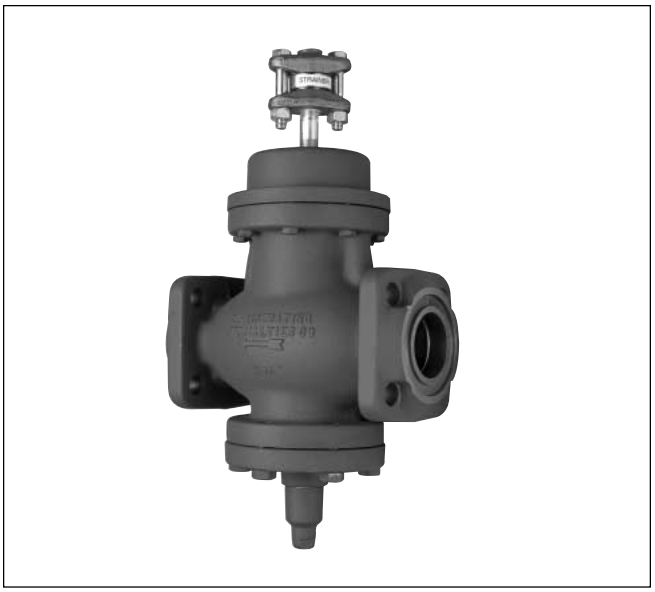
Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available					Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	EC-Br Copper	Less Flanges		With Flanges	
						kg	lb	kg	lb
032	10 12	10 12	11 13 17	32 40 50	30 36 42	13	28	15	33
040	12 16	12 16	13 17 21	40 50		25	55	28	60
050	12 16	12 16	13 17 21	40 50		25	55	28	60
065		20	21 25	65 75		34	74	36	79
075		24	25 29	75		47	104	50	109
100		32	33	A0		71	157	74	162
125		40				128	282	131	287
150		48				204	450	207	455

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Climate & Industrial Controls Group
Cleveland, OH

- Port Sizes 50-100mm (2" - 4")
- Low Pressure Drop for Low Temperature Operation
- Suitable to -50°C (-60°F)
- Can Be Installed in Vertical or Horizontal Position
- Manual Opening Feature
- Maximum Rated Pressure (MRP): 27.6 bar (400 PSIG)



Description

This heavy duty gas powered valve is suitable for Ammonia, R-22, R404a, and R507, other refrigerants, certain oils and other fluids approved for use in refrigeration. They are pilot operated semi-steel bodied valves. The valves may be opened by means of the manual opening stem for servicing or in case of electrical power failure.

The Type S9 is a pilot operated valve but uses an external source of higher pressure gas to operate the valve, and, therefore requires no minimum pressure drop to open. The external gas pressure must be at least 0.69 bar (10 psi) above valve internal upstream pressure for positive opening. This valve is normally closed.

Specifications

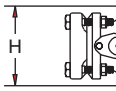
Minimum Pressure Drop
to Open Wide ..... 0 bar (0 PSI)
Minimum Fluid Temperature ..... -50°C (-60°F)
Coil (See page 376) ..... Class “B” Housing
Flow Coefficient
50mm (2") ..... 38.5 Kv (45.0 Cv)
65mm (2½") ..... 55.6 Kv (65.0 Cv)
75mm (3") ..... 85.6 Kv (100 Cv)
100mm (4") ..... 154 Kv (180 Cv)

Materials

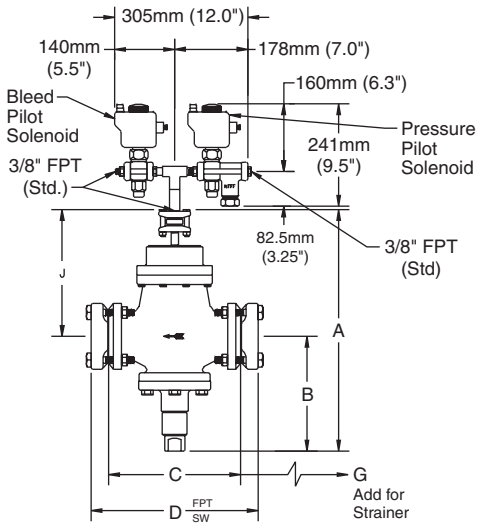
Body ..... Gray Iron
Seat ..... Metal

Dimensions

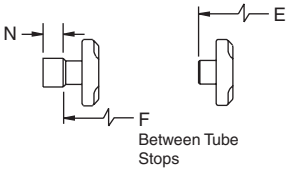
Dimension		50mm (2")			65mm (2-1/2")		75mm (3")		100mm (4")
A	MM	429			455		570		615
	INCH	16.9			17.9		22.4		24.2
B	MM	175			180		269		292
	INCH	6.9			7.1		10.6		11.5
C	MM	251			251		311		366
	INCH	9.9			9.9		12.2		14.4
D	MM	307			331		389		450
(FPT,SW)	INCH	12.1			13.0		15.3		17.7
	CONN.	**1-1/2**		**2**	**2-1/2**		**3**		**4**
E	MM	364		371	401		478		571
(WN)	INCH	14.3		14.6	15.8		18.8		22.5
	CONN.	**1-5/8**	**2-1/8**	**2-5/8**	**2-5/8**	**3-1/8**	**3-1/8**	**3-5/8**	**4-1/8**
F	MM	358	338	358	348	389	414	432	503
(ODS)	INCH	14.1	13.3	14.1	13.7	15.3	16.3	17	19.8
G	MM	251			314		314		363
	INCH	9.9			12.4		12.4		14.3
H	MM	140			159		176		222
	INCH	5.5			6.2		7.0		8.8
J	MM	254			274		300		323
	INCH	10.0			10.8		11.8		12.7
	CONN.	**1-5/8**	**2-1/8**	**2-5/8**	**2-5/8**	**3-1/8**	**3-1/8**	**3-5/8**	**4-1/8**
N	MM	28	33	38	38	43	43	48	55
(ODS)	INCH	1.1	1.3	1.5	1.5	1.7	1.7	1.9	2.2



Allow 100mm (4.0") above valve
for removal of coil knob & coil.



Allow 25mm (1.0") below valve
to operate manual opening stem



Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

How to Order

Type S9 flanged body valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Pilot Connection	Pilot Option	Volts/Frequency, Coil Style	Pilot Light	Lens Color	Strainer
050	S9	F12	F12	F03	1	21	0	0	S

Port Size

050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")

Not all flange types and sizes are available for each port size. See Flange Availability table for allowable combinations.

Flange Type	Connection
X Less Flanges	**00** None
F FPT (IPS) **S** SW (IPS) **W** Weld Neck (IPS)	**12** 1½" **16** 2" **20** 2½" **24** 3" **32** 4"
K ODS (US)	**13** 1 5/8" **17** 2 1/8" **21** 2 5/8" **25** 3 1/8" **29** 3 5/8" **33** 4 1/8"
D DIN Weld Neck	Enter size from table below.

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Pilot Option

0	No Pilot Assembly
1	With Pilot Assembly

Pilot Strainer Connection*

Flange Type	Connection
F FPT (IPS) **S** SW (IPS) **W** Weld Neck (IPS)	**02**★ ¼" **03** 3/8" **04** ½" **06** ¾"
K ODS (US)	**04** ½" **05** 5/8" **07** 7/8"

Must be specified even if pilot solenoid is not ordered. See note below.
★FPT only.

Volts/Frequency

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	48V DC
P	115/6/50
Q	440/6/60

★ See page 376 for coil style/voltage combinations.

Coil Style

0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Lens color designated separately

Pilot Light

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1 & 3 only. See page 376 for voltages.

Lens Color

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

NOTE:

Where pilot solenoid assembly is designated by this model code, its companion flanges will be supplied to correspond to pilot connection as selected within this designation. Coil and remote pilot light selections will apply to both solenoids. Customer may designate pilot style "0" and order pilot assembly separately (see page 392).

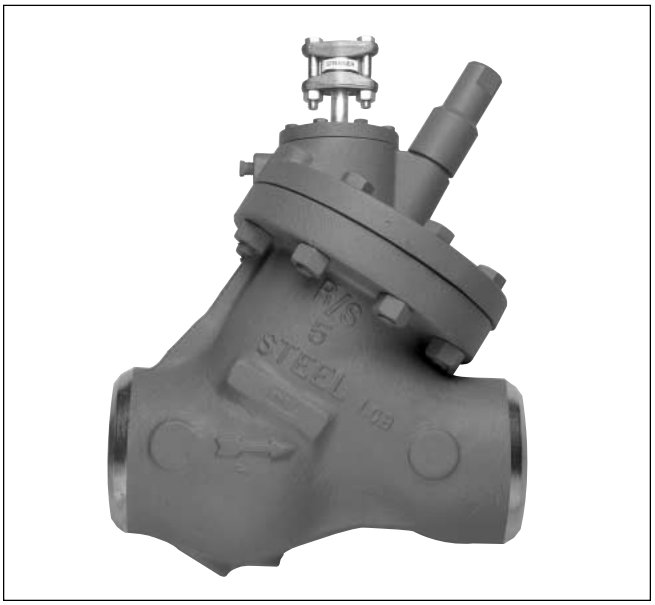
Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available				Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	With Flanges		With Pilots & Flanges	
					kg	lb	kg	lb
050	12 16	12 16	13 17 21	40 50	30	66	37	80
065		20	21 25	65 75	39	94	45	102
075		24	25 29	75	54	10	61	133
100		32	33	A0	74	173	81	177

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Port Sizes 125-200mm (5" - 8")
- Pilot Operated
- Welds directly in the Line – No Flanges
- Removable Seat is Serviceable from Top Side
- Coil Size Same as Most Other R/S Valves
- Streamlined Fluid Flow Pattern
- Cast Steel Body, ASTM No. A352 Grade LCB
- PTFE Pilot Seat
- Molded Class “B” Coil Construction
- Manual Opening Stem
- Maximum Rated Pressure (MRP): 27.6 bar (400 PSIG)



Description

These heavy duty, normally closed, gas powered valves are suitable for control of ammonia and other common refrigerants, certain oils and other fluids approved for use in refrigeration.

The Type S9 are pilot operated but use an external source of higher pressure gas to operate the valve and, therefore, require no minimum pressure drop to open. The external gas pressure must be at least 0.71 bar (10 psi) above valve internal upstream pressure for positive opening.

The S9 valve can be ordered without a pilot assembly and the pilot assembly ordered separately (see page 392).

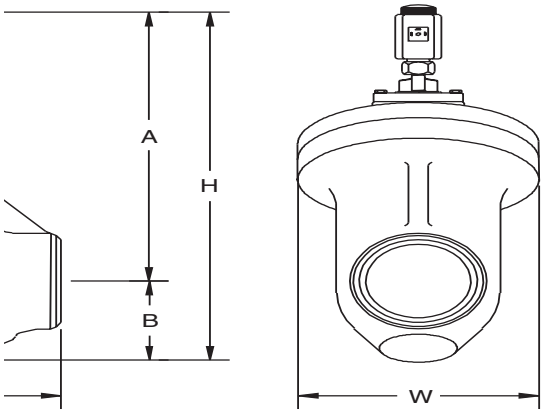
Materials

Body ..... Cast Steel
Seat ..... Metal

Specifications

Minimum Pressure
to Open Wide ..... 0.71 bar (10 PSI)
Fluid Temperature Range .... -45° to 100°C (-50° to 220°F)
Coil (See page 376) ..... Class “B” Housing
Flow Coefficients
125 mm (5") ..... 171 Kv (200 Cv)
150 mm (6") ..... 308 Kv (360 Cv)
200 mm (8") ..... 471 Kv (550 Cv)

Dimensions



Dimension		125mm (5")	150mm (6")	200mm (8")
B	mm	114	152	197
	inch	4.50	6.00	7.75
C	mm	597	673	730
	inch	23.50	26.50	28.75
K	mm	711	825	927
	inch	28.00	32.50	36.50
L	mm	381	483	622
	inch	15.00	19.00	24.50
W	mm	267	318	381
	inch	10.50	12.50	15.00

How to Order

Type S9 weld end body valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Pilot Connection	Pilot Assembly	Coil Voltage, Coil Style	Pilot Light	Lens Color	Strainer
150	S9	F03	1	12	0	0	S

Port Size

125	125mm (5")
150	150mm (6")
200	200mm (8")

Pilot Strainer Connection*

Flange Type		Connection	
F	FPT (IPS)	**02★**	¼"
S	SW (IPS)	**03**	⅜"
W	Weld Neck (IPS)	**04**	½"
		06	¾"
K	ODS (US)	**04**	½"
		05	⅝"
		07	⅞"

Must be specified even if pilot solenoid is not ordered. See note below.

★FPT only.

Pilot Assembly

0	No Pilot Assembly
1	With Pilot Assembly

Coil Voltage

0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	24V DC
P	115/6/50
Q	440/6/60

★ See page 376 for coil style/voltage combinations.

Coil Style

0	No Coil or Housing
1	Encapsulated w/36" Leads
L	Encapsulated w/36" Leads & Pilot Light*
2	Encapsulated w/DIN Connector
D	Encapsulated w/DIN Connector & Pilot Light*
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Lens color selected separately

Remote Pilot Light▲

0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1 & 3 only. See page 376 for voltages.

***Lens Color**

0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

Strainer

N	No Strainer
S	w/Strainer

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

NOTE:

Where pilot solenoid assembly is designated by this model code, its companion flanges will be supplied to correspond to pilot connection as selected within this designation. Coil and remote pilot light selections will apply to both solenoids. Customer may designate pilot style "0" and order pilot assembly separately (see page 392).

Weights

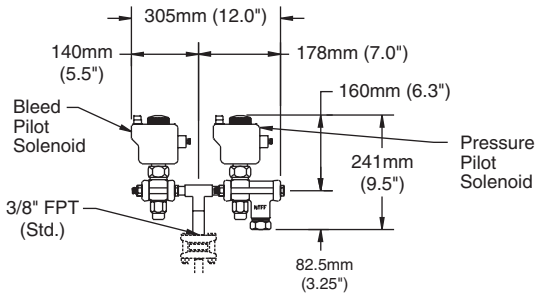
Port Code	Weight			
	Less Pilots		With Pilots	
	kg	lb	kg	lb
125	60	134	150	234
150	103	229	182	404
200	163	372	304	672

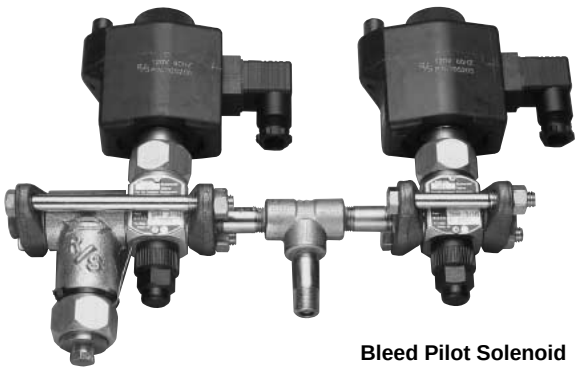
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Description

The S9 Pilot Assembly can be ordered separately from the valve for stock or field assembly. Assembly includes a S6N pressure pilot solenoid with close coupled strainer, a S6N bleed pilot solenoid, required piping and flange connections. See Note below.

The 50mm (2") S9 valve uses a 050 size assembly. Valves 65mm (2½") and larger use the 065 size assembly.





Bleed Pilot Solenoid

Pressure Pilot Solenoid with Strainer

How to Order

Type S9 pilot assembly can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Size	Type	Flanges	Coil Voltage, Coil Style	Pilot Light	Lens Color
065	PS9	F03	12	0	0

Size

050	Use with 50mm (2") S9 valve
065	Use with 65 - 200mm (2½"- 8") S9 valves

Flanges

Flange Type		Connection	
F	FPT (IPS)	**02★**	¼"
S	SW (IPS)	**03**	3/8"
W	Weld Neck (IPS)	**04**	½"
		06	¾"
K	ODS (US)	**04**	½"
		05	5/8"
		07	7/8"

★FPT only.

Coil Voltage, Coil Style

Coil Voltage★	
0	No Coil
Standard	
1	120/60
R	120/6/60
2	208/60
S	208/6/60
3	240/60
T	240/6/60
4	440/60
6	115/50
7	230/50
U	230/6/50
8	240/50
Non-Standard	
A	24/60
B	288/60
C	480/60
D	24/50
E	42/50
F	48/50
G	12V DC
H	24V DC
J	230V DC
K	24V DC
P	115/6/50
Q	440/6/60

★ See page 376 for coil style/voltage combinations.

Coil Style	
0	No Coil or Housing
1	Encapsulated w/36" Leads
L*	Encapsulated w/36" Leads & Pilot Light
2	Encapsulated w/DIN Connector
D*	Encapsulated w/DIN Connector & Pilot Light
3	Ind. Open Frame w/18" Leads

* Integral pilot light. Lens color selected separately

Pilot Light

Remote Pilot Lights▲	
0	None
1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)
5	PLT-5

▲ With coils 1 & 3 only. See page 376 for voltages.

Lens Color

Lens Color	
0	No Pilot Light
G	Green (std)
R	Red
A	Amber
W	White

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

NOTES:

1. Flanges connected to the piping supplied are standard 3/8" FPT. Flanges selected within the model number will be supplied for both inlet and outlet of the assembly.
2. Coil and remote pilot light selections will be provided for both pilot solenoids.

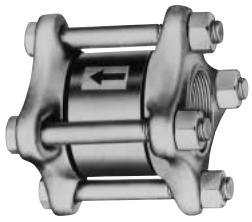
Weights

Size	kg	lb
050	60	134
065	103	229

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CK4
13-100mm
(½" - 4")



CK4
125-200mm
(5" - 8")

Specifications

Type		CK4A	CK4A	CK4A	CK1	CK1	CK3
Port Size	mm	13	20-100	125-200	20-32	40-150	—
	inch	½"	¾" - 4"	5" - 8"	¾"- 1¼"	1⅝" - 6"	½ - 1 FPT
Seat Material		Stainless Steel	Stainless Steel	Stainless Steel	PTFE	Metal to Metal	PTFE
Body Material		Steel	Ductile Iron	Ductile Iron	Gray Iron	Gray Iron	Steel
Design Pressure (MRP)	bar	34.5	34.5	34.5	20.7	20.7	20.7
	psi	500	500	500	300	300	300
Fluid Temperature Limits	°C	-55° to 105°	-55° to 105°	-55° to 105°	-30° to 105°	-30° to 105°	-30° to 105°
	°F	-60° to 220°	-60° to 220°	-60° to 220°	-25° to 220°	-25° to 220°	-25° to 220°
Close Coupling to Valve*		Yes	Yes	No	Yes	Up to 100mm	No
Close Coupled Inlet Strainer		Yes	Yes	No	Yes	Up to 100mm	No
Minimum Pressure Drop to Open Wide	bar	0.05	0.05	0.05	0.03	0.03	0.34
	psi	0.75	0.75	0.75	0.5	0.5	5
Bulletin for Reference		50-16	50-16	50-20	50-10	50-10	50-13

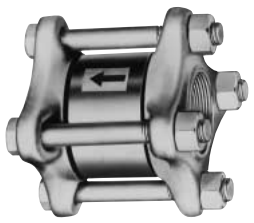
*Close coupling using male adapter ring to outlet of R/S control valves.

Selection Guide

Type	Port Sizes	Typical Applications	Mounting
CK4	13-200mm (½" - 8")	1. Liquid lines 2. High speed compressor discharge lines (Not recommended for slow speed compressor discharge lines) 3. Pump discharge lines 4. Suction lines down to -55°C (-60°F) 5. Hot gas lines from pan to evaporator 6. Defrost relief regulator venting to an imtermediate pressure 7. Prevent receiver pressure from backing up into a cold condenser 8. Prevent liquid returning to compressor during shutdown 9. Prevent liquid from flowing down into drain pan 10. Prevent reverse flow in suction line due to unusual load conditions	Any position **NOTE: Not** recommended for side port applications on screw compressors
CK1	20-150mm (¾" - 6")	1. Slow speed compressor discharge lines 2. Liquid lines 3. Suction lines down to -30°C (-25°F) 4. Side port applications on screw compressors	Horizontal lines with opening stem in the vertical position
CK3	1/2 to 1 FPT	1. Hot gas lines from pan to evaporator 2. Liquid lines	Any position

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- UL Listed (Thru 3" Size)
- Installs in any position
- Compact and lightweight
- In-Line flanged valves
- Design Pressure (MRP): 34.5 bar (500 psi)



13-100mm (1/2" - 4")



125-200mm (5" - 8")

Description

These compact valves are spring closing with a lapped, stainless steel or chrome plated seat for positive closing action and low leakage. A minimum pressure difference of 0.05 bar (0.75 psi) is required to hold the valve in the open position. Removable seat plate with combination O-ring and metal-to-metal knife edge seal allows the valve to be disassembled for maintenance. They may be ordered with a male adapter ring for close-coupling to other Refrigerating Specialties valves and may be installed in any position.

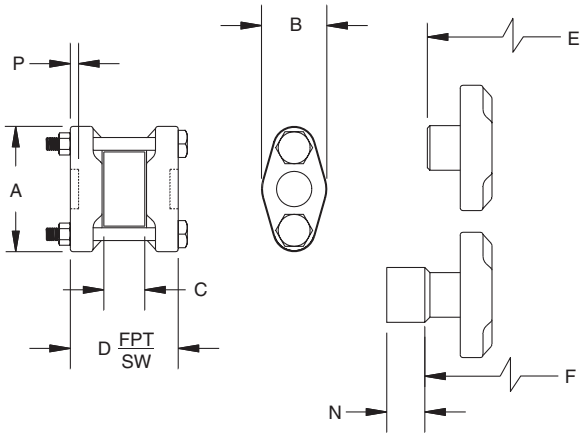
Materials

Body ..... Steel (15mm), Ductile Iron (20-200mm)
Seat ..... Stainless steel

Specifications

Design Pressure (MRP) ..... 34.5 bar (500 PSI)
Fluid Temperature Range .... -55° to 105°C (-60° to 220°F)
Flow Coefficients

13 mm (½") ..... 2.9 Kv (3.4 Cv)
20 mm (¾") ..... 6.1 Kv (7.1 Cv)
25 mm (1") ..... 11 Kv (13 Cv)
32 mm (1¼") ..... 16 Kv (19 Cv)
50mm (2") ..... 40 Kv (46 Cv)
65mm (2½") ..... 60 Kv (70 Cv)
75mm (3") ..... 96 Kv(112 Cv)
100mm (4") ..... 180 Kv(210 Cv)
125mm (5") ..... 240 Kv(280 Cv)
150mm (6") ..... 389 Kv(455 Cv)
200mm (8") ..... 670 Kv(783 Cv)



13 - 100mm Size

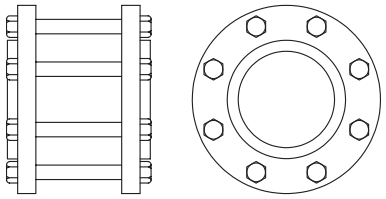
Dimensions

Dimension		PORT SIZE																	
		13mm (1/2")			20-25mm (3/4 - 1")			32mm (1-1/4")			50mm (2")			65mm (2-1/2")		75mm (3")		100m (4")
A	mm	75			113			95			114			148		148		179
	inch	29.3			4.43			3.75			4.50			5.81		5.81		7.06
B	mm	38			62			95			114			148		148		179
	inch	1.50			2.43			3.75			4.50			5.81		5.81		7.06
C	mm	27			32			50			60			70		81		89
	inch	1.06			1.25			2			2.37			2.75		3.19		3.50
D	mm	63			59			79			114			145		157		177
(FPT, SW)	inch	2.47			2.32			3.10			4.47			5.72		6.16		6.97
Conn. Size		**3/8, 1/2, 3/4**			**3/4"**	**1"**	**1-1/4"**	**1-1/4"**		**1-1/2"**	**1-1/2"**		**2"**	**2-1/2"**		**3"**		**4"**	
E	mm	82			97	117	117	126		136	171		177	215		245		298	
	inch	3.22			3.82	4.61	4.61	4.97		5.35	6.72		6.97	8.47		9.66		11.72	
Conn. Size		**1/2**	**5/8**	**7/8**	**7/8**	**1-1/8**	**1-3/8**	**1-5/8**	**1-3/8**	**1-5/8**	**2-1/8**	**1-5/8**	**2-1/8**	**2-5/8**	**2-5/8**	**3-1/8**	**3-1/8**	**3-5/8**	**4-1/8**
F	mm	76	82	98	99	193	99.5	111	119	130	159	193	177	205	203	250	228	248	285
	inch	2.98	3.22	3.85	3.88	4.07	3.91	4.36	4.69	5.12	6.26	7.57	6.95	8.08	7.98	9.82	8.95	9.76	11.2
N	mm	9	13	29	20	24	25	28	25	28	34	28	34	37	37	42	42	48	55
	inch	.37	.50	.75	.75	.93	.96	1.09	.96	1.09	1.34	1.09	1.34	1.46	1.46	1.65	1.65	1.90	2.15
P	mm	13			13			15			15			25		29		32	
	inch	.50			.50			.60			.60			1.0		1.1		1.3	

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Cleveland, OH

Dimensions

Nominal Pipe Size	Valve Length		Valve Diameter		Flange Outside Diameter		Diameter of Bolt Circle		# of Bolts
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	
125 mm (5")	4.125	104.8	8.375	212.7	11	279	9.25	235	8
150 mm (6")	4.625	117.5	9.750	247.7	12.5	318	10.62	270	12
200 mm (8")	5.625	142.9	12.000	304.8	15	381	13.00	330	12



125 - 200mm Size

How to Order

Type CK4 solenoid valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange
050	CK4	F12	F12

Not all flange types and connections are available for each port size. See Flange Availability table for allowable combinations.

Port Size	
013	13mm (½")
020	20mm (¾")
025	25mm (1")
032	32mm (1¼")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")
125	125mm (5")
150	150mm (6")
200	200mm (8")

Flange Type	Connection
X Less Flanges **R** Less Flanges, w/Male Adapter Ring	**00** None
F FPT (IPS) **S** SW (IPS) **W** Weld Neck (IPS)	**02**★ ¼" **03** ⅜" **04** ½" **06** ¾" **08** 1" **10** 1¼" **12** 1½" **16** 2" **20** 2½" **24** 3" **32** 4"
★ FPT only.	

Flange Type	Connection
K ODS (US) *Not suitable for use with ammonia.*	**04** ½" **05** 5/8" **07** 7/8" **09** 1 1/8" **11** 1 3/8" **13** 1 5/8" **17** 2 1/8" **21** 2 5/8" **25** 3 1/8" **29** 3 5/8" **33** 4 1/8"
D DIN Weld Neck **M** Insert Metric **C** EC-Br Copper	Enter size in mm from table below.
Y ANSI Slip-On (IPS) **Z** ANSI Weld Neck (IPS)	**40** 5" **48** 6" **64** 8"

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Flanges		With Flanges	
							kg	lb	kg	lb
013	02 03 04 06	03 04 06	04 05 07	10 15 20			0.5	1	0.9	2
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	0.9	2	2.3	5
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	0.9	2	2.3	5
032	10 12	10 12	11 13 17	32 40 50		30 36 42	2.5	5	3	8
050	12 16	12 16	13 17 21	40 50			3.2	7	5.9	13
065		20	21 25	65 75			5.4	12	10	22
075		24	25 29	75			7.3	16	12	26
100		32	33	A0			15	34	24	53

Port Code		300# ANSI Flange Connections Available (150# available for certain applications. Consult factory.)		Weight			
				Less Flanges		With ANSI Flanges	
mm	inch	Slip-on (IPS)	Weld Neck (IPS)	kg	lbs	kg	lbs
125	5"	40	40	20	45	50	110
150	6"	48	48	28	62	67	147
200	8"	64	64	44	96	105	231

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Rugged, Heavy Duty
- Low Pressure Drop
- Piston Type Gravity Closing
- Flanged, horizontal mounting
- Design Pressure(MRP): 27.6 bar (400 psig)
- Manual Opening Stem



Description

These piston type, gravity closing, heavy duty check valves are suitable for Ammonia, R-22, R-134a, R-404A, R-507, other refrigerants, certain oils and other fluids approved for use in refrigeration. All CK1 check valves are flanged and are suitable for mounting only in horizontal lines with opening stem in the vertical position. They have a manual opening stem for manual operation. They may be ordered with a male adapter ring (through 4" size) for close coupling. A minimum pressure difference of .03 bar (0.5 psi) is required to open the valve.

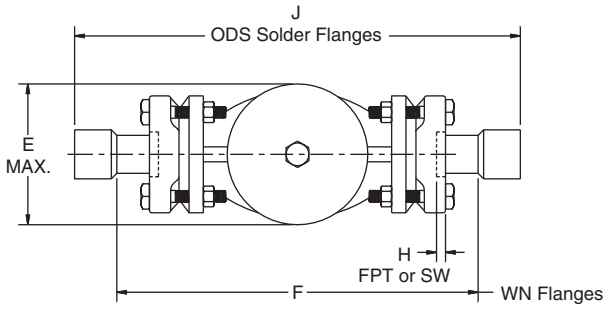
Materials

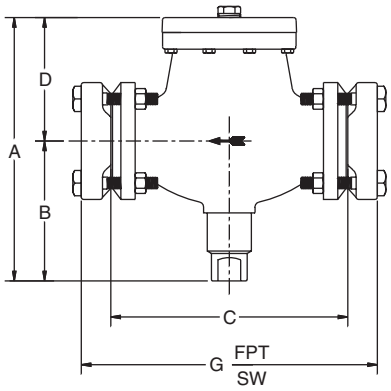
Body ..... Gray Iron
Seat ..... PTFE (20-32mm), Metal (40-150mm)

Specifications

Design Pressure (MRP) ..... 27.6 bar (400 PSI)
Fluid Temperature Range .... -30° to 105°C (-25° to 220°F)
Flow Coefficients

20 mm (¾")	8.1 Kv (9.5 Cv)
25 mm (1")	8.6 Kv (10 Cv)
32 mm (1¼")	16 Kv (19 Cv)
40mm (1 5/8")	32 Kv (37 Cv)
50mm (2")	44 Kv (51 Cv)
65mm (2½")	70 Kv (82 Cv)
75mm (3")	103 Kv(120 Cv)
100mm (4")	171 Kv(200 Cv)
125mm (5")	244 Kv(285 Cv)
150mm (6")	342 Kv(400 Cv)





Dimensions

DIMENSIONAL DATA																			
PORT SIZE		A		B		C		D		E		F		G		H		J	
mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
20, 25	¾, 1	191	7.5	102	4.0	158	6.2	89	3.5	117	4.6	239	9.4	216	8.5	13	.5	265	10.4
32	1¼	219	8.6	122	4.8	203	8.0	96.5	3.8	117	4.6	305	12.0	256	10.1	15	.6	320	12.6
40, 50	1 5/8, 2	270	10.6	139.7	5.5	251	9.9	129.5	5.1	129.5	5.1	371	14.6	307	12.1	15	.6	414	16.3
65	2½	303	11.9	142.2	5.6	251	9.9	160	6.3	147.3	5.8	401	15.8	331	13.0	25	1.0	424	16.7
75	3	384	15.1	216	8.5	311	12.2	167.6	6.6	167.6	6.6	478	18.8	389	15.3	29	1.1	500	19.7
100	4	427	16.8	217	8.6	366	14.1	208.3	8.2	190.5	7.5	571	22.5	450	17.7	32	1.3	615	24.2
125	5	496	19.5	298.4	11.7	381	15.0	198.1	7.8	228.6	9.0	576.6	22.7	485	19.1	30.5	1.2	—	—
150	6	537	21.1	355.6	14.0	514.3	20.2	180	7.1	294.6	11.6	706.1	27.8	617	24.3	35.6	1.4	—	—

How to Order

Type CK1 check valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Inlet Flange	Outlet Flange	Strainer
050	CK1	F12	F12	S

Not all flange sizes are available for each port size. See Flange Availability table for allowable combinations.

Port Size

020	20mm (¾")
025	25mm (1")
032	32mm (1¼")
040	40mm (1⅝")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")
125	125mm (5")
150	150mm (6")

Flange Type		Connection	
X	Less Flanges	**00**	None
R	Less Flanges, w/Male Adapter Ring		
F	FPT (IPS)	**06**	¾"
S	SW (IPS)	**08**	1"
W	Weld Neck (IPS)	**10**	1¼"
		12	1½"
		16	2"
		20	2½"
		24	3"
		32	4"
		40	5"
		48	6"
K	ODS (US)	**07**	7/8"
		09	1 1/8"
		11	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Enter size from table below.	
M	Insert Metric		
C	EC-Br Copper		

Strainer

N	No Strainer
S	w/Strainer

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Flange Availability & Weights

Table shows flange size codes available by flange type for each port size code

Port Code	Flange Connections Available						Weight			
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	Insert Metric	EC-Br Copper	Less Flanges		With Flanges	
							kg	lb	kg	lb
020	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	4.5	10	5.9	13
025	06 08 10	06 08 10	07 09 11	20 25 32	20 25 32	18 20 26 30	5.0	11	6.4	14
032	10 12	10 12	11 13 17	32 40 50		30 36 42	10	22	12	26
040	12 16	12 16	13 17 21	40 50			21	47	24	53
050	12 16	12 16	13 17 21	40 50			21	47	24	53
065		20	21 25	65 75			28	62	33	72
075		24	25 29	75			42	92	45	102
100		32	33	A0			62	136	70	154
125		40					109	239	137	279
150		48					182	400	200	440

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Small, Compact, Heavy Duty
- Heavy Spring Closing
- Installs in any position
- PTFE Seat
- Threaded Ends
- Maximum Rated Pressure (MRP): 27.6 bar (400 psig)



Description:

This compact, heavy duty, threaded in-line check valve is suitable for Ammonia, R-22, R-134a, R-404A, R-507 and other refrigerants, certain oils and other fluids approved for use in refrigeration.

The CK3 is spring closing and can be installed in any position. The CK3 is available with 1/2", 3/4", and 1" FPT connections.

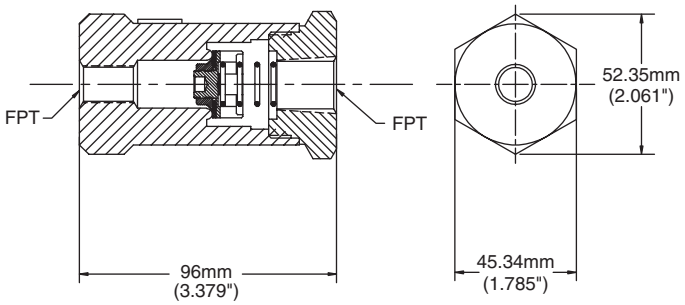
Materials

Body ..... Zinc-plated Steel
Seat ..... PTFE

Specifications

Design Pressure (MRP) ..... 27.6 bar (400 PSI)
Fluid Temperature Range .... -30° to 105°C (-25° to 220°F)
Flow Coefficients:
½" ..... 8.1 Kv (9.5 Cv)
¾" ..... 9.0 Kv (10.5 Cv)
1" ..... 9.8 Kv (11.5 Cv)

Dimensions



How to Order

Type CK3 check valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type
06	CK3

Port Size	
04	½" Female NPT
06	¾" Female NPT
08	1" Female NPT

- For use with R-22, R-717 and other common refrigerants
- High Capacity
- Excellent Repeatability
- Unaffected by Vibration
- Drain Plug Standard

Description

The **Type H** High Capacity Safety Relief Valves are designed and constructed to meet the requirements of ASME Boiler and Pressure Vessel Code and ANSI/ASHRAE 15-78 Code requirements and bear the ASME Code Symbol (UV) indicating compliance with these codes. Employing proven principles of design, these Safety Relief Valves are highly reliable and dependable. Precision machined moving parts of stainless steel, a PTFE disc and a cadmium-plated spring prevent sticking due to corrosion or cold welding, to assure valve opening at the set pressure long after installation. They are not suitable for corrosive ambient atmospheres such as chlorine, etc. The two-bolt flanged bottom inlet affords simple removal and replacement.

Two relief valves can be mounted on a **Type M** Dual Stop Valve Manifold. This arrangement permits either valve to be shut off individually and removed for repairs or inspection. Thus, one valve is always in service as required by most codes.

The high capacity of the Type H valve permits the use of a small size valve which results in space saving. The valves are very sturdy and compact, requiring small headroom. The dual valve manifold assembly is especially compact and easily assembled.

Materials

Body ..... Gray Iron
Internal Parts ..... Stainless Steel
Seat ..... PTFE

Specifications

Maximum Temperature ..... 150°C (300°F)
See page 413 for capacities.

Application

Used with ammonia and halocarbon refrigerants in noncorrosive environments, Relief Valves protect each refrigeration system pressure vessel that can be isolated by valves. Municipal codes may govern selection and installation. They may be patterned after the ASME boiler and pressure vessel code and the ANSI/ASHRAE 15-78 safety code for mechanical refrigeration. ANSI/ASHRAE 15-78 is highly recommended if there is no compulsory code.

The Type H safety relief valve is intended to prevent the pressure of the vessel from rising more than 10% above:
(1) the design working pressure (DWP) of the vessel or
(2) the pressure setting of the relief device.

Whenever conditions permit, it is advisable to have the relief valve pressure setting at least 25% higher than the normal operating pressure for the system. ***The relief valve pressure setting must not exceed the design working pressure of the vessel.***



Type H Valves on Type M Manifold

Selection Data

On positive displacement compressor systems, pressure limiting devices – such as high presure cutouts – must stop the action of the pressure imposing element at no higher than 90% of the pressure setting of the pressure relief device.

On non-positive displacement compressors, pressure limiting devices – such as high pressure cutout – may be set at the design working pressure (DWP) of the high side, provided:

1. The low side is protected bya properly sized pressure at the low side DWP and
2. There are not stop valves in the system that isolate the high side from the low side.

Discharge piping from relief devices must not exceed lengths specified in ANSI/ASHRAE 15-78 with discharge to atmosphere.

Per ANSI/ASHRAE 15-78, the formula for determining the minimum required discharge capacity of a relief device for each pressure vessel where the vessel is valved off from the refrigerating systems is: **C = FDL**, where:

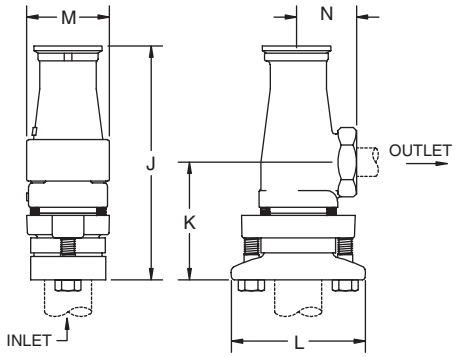
C = capacity, lb/min air
F = a factor from the table below
D = outside diameter of the vessel in feet
L = length of vessel in feet

Refrigerant	Factor (F)
R-717	0.5
R-22	1.6
Consult factory for other refrigerants.	

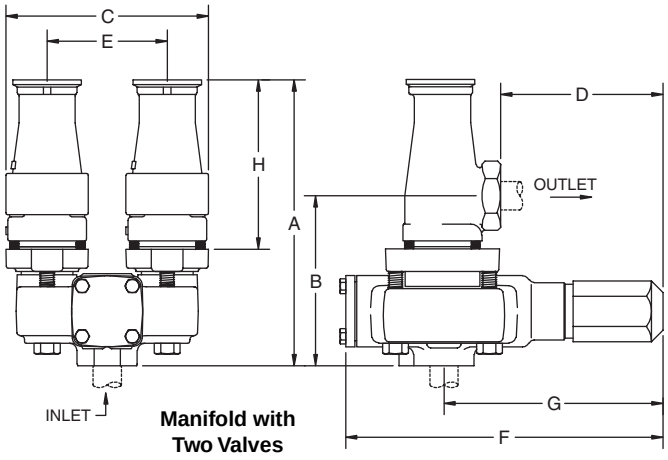
Refer to Bulletin 70-01.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Dimensions



Single Valve



Manifold with Two Valves

Dimension	H2		H3		H4		H5	
	mm	inch	mm	inch	mm	inch	mm	inch
A	251	9.87	295	11.62	340	13.37	371	14.62
B	152	6.00	187	7.37	211	8.31	224	8.81
C	171	6.75	219	8.62	273	10.75	318	12.50
D	137	5.37	127	5.00	117	4.62	111	4.37
E	102	4.00	127	5.00	165	6.50	165	6.50
F	273	10.75	283	11.12	298	11.75	298	11.75
G	187	7.37	188	7.41	192	7.56	192	7.56
H	166	6.53	202	7.97	237	9.34	266	10.46
I	193	7.59	229	9.03	267	10.53	296	11.65
K	96	3.77	120	4.72	137	5.40	151	5.93
L	102	4.00	102	4.00	122	4.81	122	4.81
M	70	2.75	92	3.62	108	4.25	152	6.00
N	49	1.94	62	2.43	75	2.94	81	3.19
Inlet	20	¾	25	1	32	1¼	32	1¼
Outlet	25	1	32	1¼	40	1½	50	2

Companion Mounting Flange (Male)

Size Oval Flange Tongue Pattern	Inlet Connection	Type Valve Applicable
½"	¾" FPT	H2
¾"	1" FPT	H3
1¼"	1¼" FPT	H4, H5
1¼"	1½" FPT	H4, H5

Note: Flange with bolts only. Gaskets supplied with Relief Valve.

Companion Mounting Flange (Female)

Size Oval Flange Tongue Pattern	Inlet Connection	Type Valve Applicable
½"	¾" FPT	H2
¾"	1" FPT	H3
1¼"	1¼" FPT	H4, H5
1¼"	1½" FPT	H4, H5

Note: Flange with bolts only. Gaskets supplied with Relief Valve.

Dual Stop Valve Manifold



Type	Bottom Inlet Connection Size
M2	¾" FPT
M3	1" FPT
M4	1½" FPT

Note: Bolts supplied with manifold.

Specifications

Note:
Pressure settings and capacities apply only when the valve is discharging to atmospheric pressure.

SINGLE VALVE ONLY						MANIFOLD FOR TWO VALVES	
Connections				Capacity		Connections	
Valve Type	Companion Mounting Flange (Inlet)	Relief Valve Outlet FPT	Pressure Setting (psig)	Lbs. Per Min Air	SCFM Air	Manifold Inlet Bottom	Relief Valve Outlet
H2	**½" Port** Provides ¾" FPT	1" FPT	50 75 100 125 150 175 200 225 250 275 300	23 32 41 50 60 69 78 87 96 105 114	302 422 541 661 780 899 1019 1138 1257 1377 1496	**Type M2** Manifold Provides ¾" FPT	1" FPT
H3	**¾" Port** Provides 1" FPT	1¼" FPT	50 75 100 125 150 175 200 225 250 275 300	38 53 68 83 98 113 128 143 158 173 188	498 694 890 1087 1283 1479 1676 1872 2068 2265 2461	**Type M3** Manifold Provides 1" FPT	1¼" FPT
H4	**1" Port** Provides 1¼" FPT	1½" FPT	50 75 100 125 150 175 200 225 250 275 300	57 79 101 124 146 169 191 213 236 258 281	744 1037 1330 1624 1917 2211 2504 2798 3091 3385 3678	**Type M4** Manifold Provides 1½" FPT	1½" FPT
H5	**1¼" Port** Provides 1¼" FPT	2"	50 75 100 125 150 175 200 225 250 275 300	95 132 170 207 244 282 319 357 394 431 469	1242 1732 2222 2712 3202 3692 4182 4672 5162 5653 6143	**Type M4** Manifold Provides 1½" FPT	2" FPT

How to Order

Safety relief valves and manifolds can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Inlet Flange	Connection Size		Pressure Setting
H2	1	1	–	100

Type (See Table Above)

H2	H2 Valve
H3	H3 Valve
H4	H4 Valve
H5	H5 Valve
M2	M2 Manifold
M3	M3 Manifold
M4▲	M4 Manifold

▲ Fits H4 & H5 Valves

Inlet Flange

X	Less Flange
1★	Male Companion Flange
2▲	Female Companion Flange
3▲	Male plus Female Companion Flanges

★ For Single Valves only.
▲ For Mainfolds only.

Connection Size

0	Less Flange
2	3/4" FPT (H2 only)
3	1" FPT (H3 only)
4	1¼" FPT (H4 & H5 only)
5	1½" FPT (H4 & H5 only)

◆ Standard settings shown. Other settings between 50 and 300 PSI are available at additional cost.

Pressure Setting◆

Blank	Manifold	
50	50 PSI	3.5 Bar
75	75 PSI	5.2 Bar
100	100 PSI	6.9 Bar
125	125 PSI	8.6 Bar
150	150 PSI	10.3 Bar
175	175 PSI	12.1 Bar
200	200 PSI	13.8 Bar
225	225 PSI	15.5 Bar
250	250 PSI	17.2 Bar
275	275 PSI	19.0 Bar
300	300 PSI	20.7 Bar

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- SR Series designed to meet ASHRAE 15 2001 requirements for new system installations
- SRH Series designed to meet ASHRAE 15 1994 (or earlier) system requirements
- Certified by the National Board of Boilers and Pressure Vessel Inspectors
- All stainless steel internal parts
- PTFE seat
- Accurate and dependable
- Pressure relief settings from 10.3 - 27.6 bar (150 - 400 psig)



Description

The type SR and SRH Safety Relief Valves are designed and constructed in strict accordance to the requirements of ASME Boiler and Pressure Vessel Code and certified by the National Board of Boiler and Pressure Vessel Inspectors. Each valve is accurately set and sealed at the factory and bear the UV and NB symbols. Employing proven principles of design, these safety relief valves are highly reliable and dependable. Precision machined stainless steel internal parts and a PTFE seat disk help prevent sticking due to corrosion and assure valve opening at the set pressure long after installation.

SR Connection sizes are ½" FPT inlet with ¾" or 1" FPT outlet or a ¾" inlet with 1 ¼" or 1 ½" outlet.

SRH series valves are available with a ½" inlet and ¾" or 1" outlet or a ¾" inlet and 1" outlet.

Type SR Safety Relief Valves

Valve Type	Relief Valve Inlet	Relief Valve Outlet
SR1	1/2" FPT	3/4" FPT
SR2	1/2" FPT	1" FPT
SR3	3/4" FPT	1-1/4" FPT
SR4	3/4" FPT	1-1/2" FPT

Type SRH Safety Relief Valves

Valve Type	Relief Valve Inlet	Relief Valve Outlet
SRH1	1/2" FPT	3/4" FPT
SRH2	1/2" FPT	1" FPT
SRH3	3/4" FPT	1" FPT

- Suitable for fluorocarbon refrigerants (R-22, R-134a, R-404A, R-507 and others), ammonia (R-717), nitrogen and carbon dioxide.
- Excellent flow coefficient – low pressure drop
- Handwheel and seal cap interchangeable on all valves
- Available as hand expansion valve in sizes up to 2" for socket weld and 1½" for threaded connection
- Same price for hand wheel or seal cap, globe or angle type, hand expansion or standard valve
- Save insulation cost



Operating Specifications

Design Pressure (MRP) ..... 27.6 Bar (400 psig)
Fluid Temperature Range ..... -45°C to +204°C (-50°F to +400°F)

For Hand Shut-Off Valves, refer to Bulletin 80-01.

For Hand Expansion Valves, refer to Bulletin 82-00.

General Specifications

Size	¼", ⅜", ½"	¾", 1", 1¼", 1½"	2", 2½", 3", 4", 5", 6", 8"	10", 12"
Body Type	Angle and Globe	Angle and Globe	Angle and Globe	Angle and Globe
Connections	Threaded and Socket Weld	Threaded and Socket Weld	Socket Weld and Butt Weld	Butt Weld
Body Material	Cast Steel	Cast Steel	Cast Steel	Cast Steel
Bonnet Material	Forged Steel	Forged Steel	Ductile Iron	Fabricated Steel
Packing Material	Non-Asbestos Graphite	Non-Asbestos Graphite	Non-Asbestos Graphite	Non-Asbestos Graphite
Seat Material	25% CarbonFilled PTFE	25% CarbonFilled PTFE	25% CarbonFilled PTFE	25% CarbonFilled PTFE

Flow Coefficients and Weights

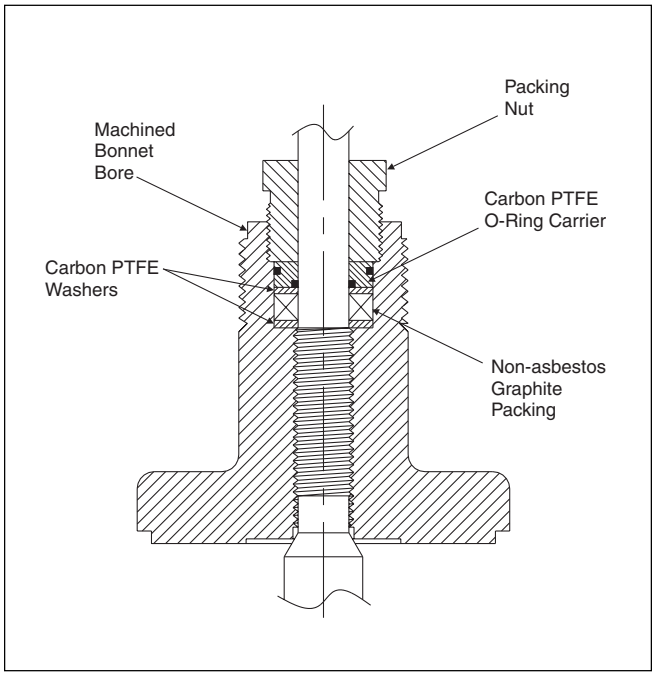
		Flow Coefficients						**Weights**					
Valve Size		**Globe "T"**		**Globe "Y"**		**Angle**		**Globe "T"**		**Globe "Y"**		**Angle**	
mm	**inches**	**Kv**	**Cv**	**Kv**	**Cv**	**Kv**	**Cv**	**kg**	**lb**	**kg**	**lb**	**kg**	**lb**
6	¼	2.2	2.6	—	—	3.1	3.6	1	2.2	—	—	1	2.2
10	⅜"	3.5	4.1	—	—	4.7	5.5	1	2.2	—	—	1	2.2
13	½"	6.2	7.2	—	—	6.9	8.0	1.1	2.4	—	—	1.1	2.4
20	¾"	12	14	—	—	14.6	17	1.8	4.0	—	—	1.8	4.0
25	1"	18.9	22	—	—	23.2	27	1.8	4.0	—	—	1.8	4.0
32	1¼"	25.8	30	40.5	53	30.1	35	4.2	9.2	4.2	9.2	4.2	9.2
38	1½"	35	43	45.6	53	40	46	4.5	10	4.5	10	4.5	10
50	2"	52	61	80	92.6	73	85	6.5	14.4	6.5	14.4	6.5	14.4
65	2½"	89	103	131	153	128	149	9.5	21	9.5	21	9.5	21
75	3"	98	114	179	208	180	208	20	45	15	33	15	33
100	4"	173	202	292	340	292	340	34	74	22	47	18	40
125	5"	—	—	716	718	716	718	—	—	45	98	34	75
150	6"	—	—	788	916	788	916	—	—	80	132	45	99
200	8"	—	—	1244	1446	1244	1446	—	—	116	255	87	192
254	10"	—	—	2133	2480	2133	2480	—	—	199	417	142	313
305	12"	—	—					—	—	204	450	153	337

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- ASTM 352 LCB Cast Steel Body (1/4" thru 12")
- Stainless Steel Stem
- Optional Stainless Steel Trim
- Reliable Back Seating
- Bolted Bonnets (1/4" thru 12")
- 25% Carbon Filled PTFE Seat Material
- Linear Flow “Y” Pattern Globe Body (1-1/4" thru 12") for Low Pressure Drop
- Extended Bonnets for Thicker Insulation
- Handwheel and Seal Cap Interchangeable on Same Valve

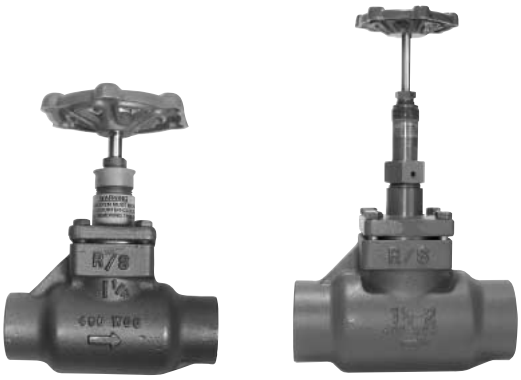
Description

This complete line of steel bodied valves with bolt-on bonnets is designed and built to maintain reliability both in the seating and back seating functions. This entire line is supplied with stainless steel stems and backseating capability. Corrosion resistant, high-grade stainless steel trim is available upon request. A unique carbon filled PTFE seat is standard throughout the line, lending durability to the seating surface. In addition a dual O-ring stem packing design along with a stem packing seal is standard on all valves from 1/4" thru 12". This innovative design seals both the valve stem and bonnet bore with independent O-rings, which are captured in a carbon PTFE carrier. The addition of the packing provides for backup sealing capability in the unlikely event of an O-ring failure.



Trim Options

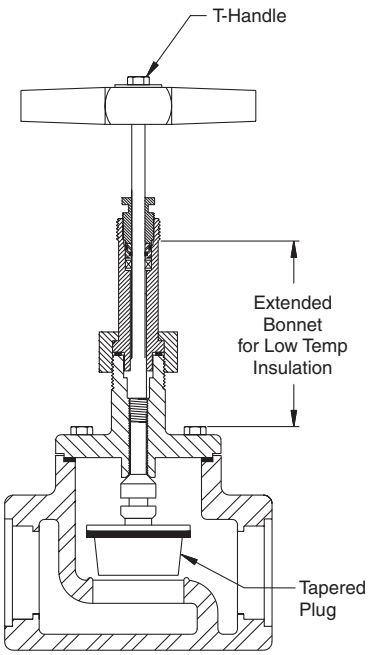
Standard mild steel trim includes Grade 5 Steel bonnet bolts, mild steel packing nut and Type 304 Stainless stem. The stainless steel trim option utilizes 316 Stainless Steel bonnet bolts, packing nut and stem to provide corrosion resistance for selected exposed parts.



Standard Bonnet **Extended Bonnet**

Extended Bonnet

An extended bonnet is available for selected sizes and styles of hand valves (see Availability Table). This design supports 3" thick insulation above bonnet bolts for valves through 3" size and 4" thick insulation for 4" size valves. All extended bonnet valves incorporate 316 Stainless Steel bonnet bolts, stem, packing nut, extension boss and boss retainer.



Hand Expansion Valve

Hand Expansion Valves

Hand expansion valves are the same as shut-off valves except they feature a tapered plug for throttling action. Handle options are a T-handle or seal cap.

How to Order

Hand valves can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Port Size	Type	Connection Style	Body Style	Trim Option	Operator Option
050	HS	F	T	T	S

Note: *Port sizes are not available in every body style. Refer to chart below for available combinations.*

Port Size

006	6mm (¼")
010	10mm (⅜")
013	13mm (½")
020	20mm (¾")
025	25mm (1")
032	32mm (1¼")
038	38mm (1½")
050	50mm (2")
065	65mm (2½")
075	75mm (3")
100	100mm (4")
125	125mm (5")
150	150mm (6")
200	200mm (8")
254	250mm (10")
305	304mm (12")

Valve Type

HE*	Hand Expansion
HS	Hand Shut-Off

* Available in port sizes 006 to 050 only.

Connection

F	FPT
B	Butt Weld
S	Socket Weld

Body Style

A	Angle
T	Globe "T"
Y	Globe "Y"

Trim Options

N	None
T	Stainless Steel Trim (Standard Bonnet)
E*	Extended Bonnet and Stainless Steel Trim

* Not available with Globe "Y" body and selected sizes in other body styles. Refer to chart below.

Handle Options

H	Handwheel (Type HS only)
S	Seal Cap
T	T-Handle (Type HE only)
C	Handwheel with Chain

Body and Connection Availability

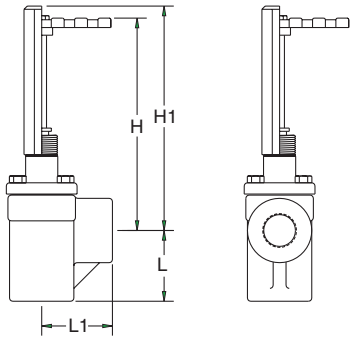
Table shows body and connection styles available for each port size code.
Hand expansion valves are not available in sizes within the shaded area.

Port Code	FPT		Socket Weld			Butt Weld		
	Angle	Globe "T"	Angle	Globe "T"	Globe "Y"	Angle	Globe "T"	Globe "Y"
006	★	★	★	★				
010	★	★	★	★				
013	●	●	●	●				
020	●	●	●	●				
025	●	●	●	●				
032	●	●	●	●	★	●		★
038	●	●	●	●	★	●		★
050			●	●	★	●		★
065			●	●	★	●		★
075			●		★	●	●	★
100			●		★	●	●	★
125						★		★
150						★		★
200						★		★
254						★		★
305						★		★

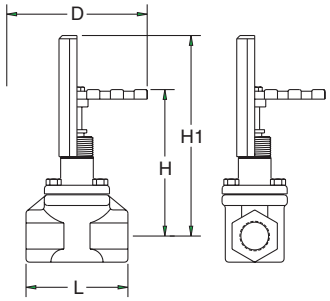
★ Not available with extended bonnet.

Dimensions on next pages.

Threaded Connection (FPT), Standard Bonnet



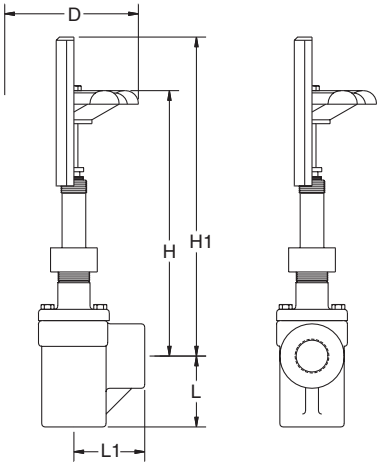
Angle



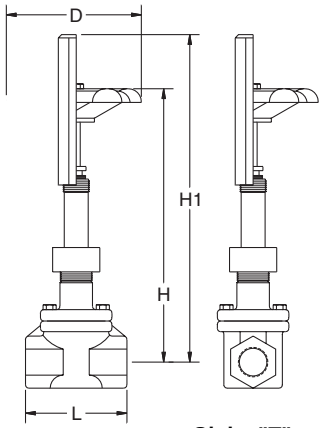
Globe "T"

Valve Size	Angle					Globe			
	L	L1	H	H1	D	L	H	H1	D
1/4", 3/8", 1/2"	1.75	1.75	4.50	6.00	2.50	3.75	5.75	6.88	2.50
3/4", 1"	1.50	2.00	5.75	6.50	4.00	3.88	5.75	6.50	4.00
1¼", 1½"	1.63	2.50	8.00	8.50	5.40	5.00	8.00	8.50	5.40

Threaded Connection (FPT), Extended Bonnet



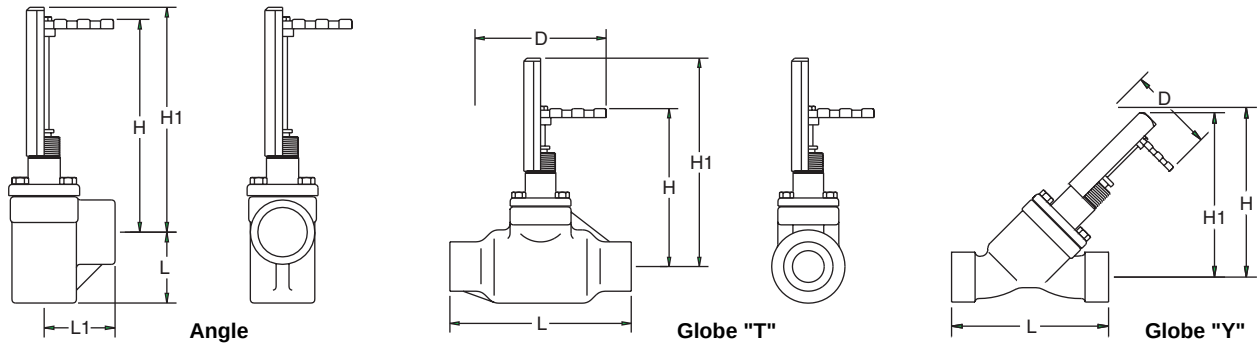
Angle



Globe "T"

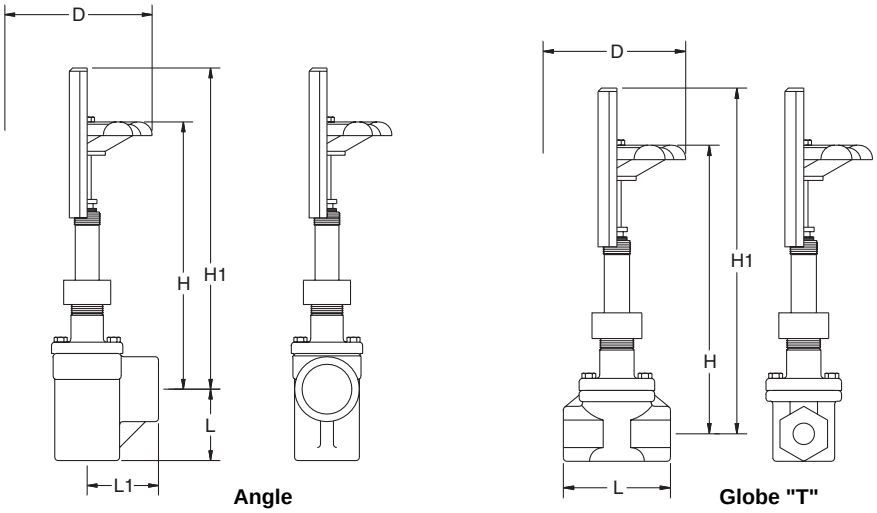
Valve Size	Angle					Globe			
	L	L1	H	H1	D	L	H	H1	D
1/2"	1.75	1.75	7.25	8.75	2.50	3.75	7.25	8.75	2.50
3/4", 1"	1.50	2.00	8.50	9.50	4.00	3.88	8.50	9.50	4.00
1¼"	2.75	2.75	9.25	10.75	5.40	7.00	9.25	10.75	5.40
1½"	2.75	2.75	9.25	10.75	5.40	8.25	9.25	10.75	5.40

Socket Weld Connection, Standard Bonnet



Valve Size	Angle					Globe "T"				Globe "Y"			
	L	L1	H	H1	D	L	H	H1	D	L	H	H1	D
1/4", 3/8", 1/2"	1.75	4.75	4.50	6.00	2.50	3.75	5.75	6.88	2.50	N/A			
¾", 1"	1.50	2.00	5.75	6.50	4.00	3.88	5.75	6.50	4.00	N/A			
1¼"	2.75	2.75	7.88	8.25	5.40	7.00	8.88	11.00	5.50	6.38	8.25	7.88	5.40
1½"	2.75	2.75	7.88	8.25	5.40	8.25	10.00	12.25	5.40	6.38	8.25	7.88	5.40
2"	3.12	3.12	8.38	8.63	5.40	8.25	10.00	12.25	5.40	8.00	9.50	8.63	5.40
2½"	3.75	3.75	9.00	9.25	5.40	9.75	13.75	14.25	5.40	9.25	10.50	9.50	5.40
3"	3.88	3.88	10.75	11.38	6.70	N/A				11.50	12.38	11.63	6.75
4"	4.50	4.50	11.63	12.00	6.75	N/A				13.88	13.75	12.63	6.75

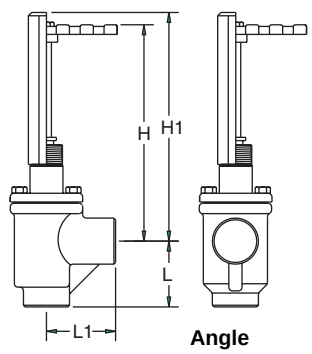
Socket Weld Connection, Extended Bonnet



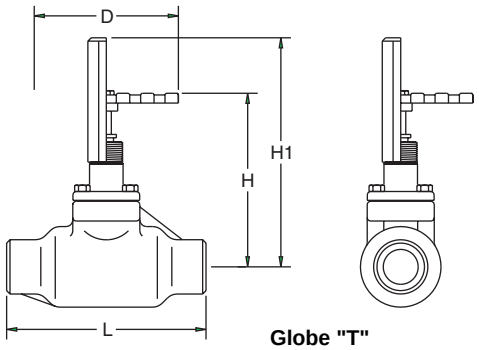
Valve Size	Angle					Globe			
	L	L1	H	H1	D	L	H	H1	D
1/2"	1.75	1.75	7.25	8.75	2.50	3.75	7.25	8.75	2.50
3/4", 1"	1.50	2.00	8.50	9.50	4.00	3.88	8.50	9.50	4.00
1¼"	2.75	2.75	9.00	10.50	5.40	7.00	9.00	10.50	5.40
1½"	2.75	2.75	9.00	10.50	5.40	8.25	9.00	10.50	5.40
2"	3.12	3.12	10.25	11.25	5.40	8.25	10.25	11.25	5.40
2½"	3.75	3.75	10.50	11.50	5.40	9.75	10.50	11.50	5.40
3"	3.88	3.88	11.00	12.50	6.75	N/A			
4"	4.50	4.50	12.75	14.25	6.75	N/A			

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

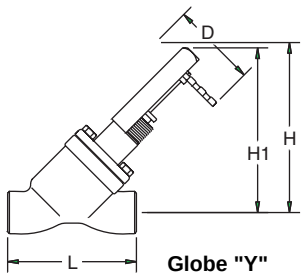
Butt Weld Connection, Standard Bonnet



Angle



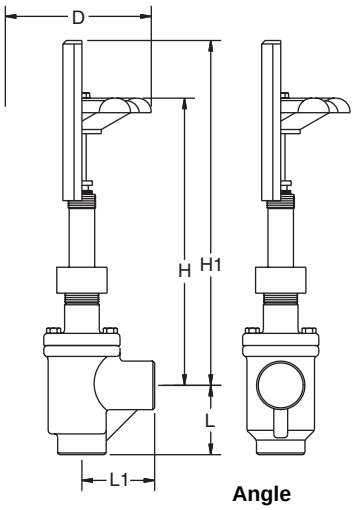
Globe "T"



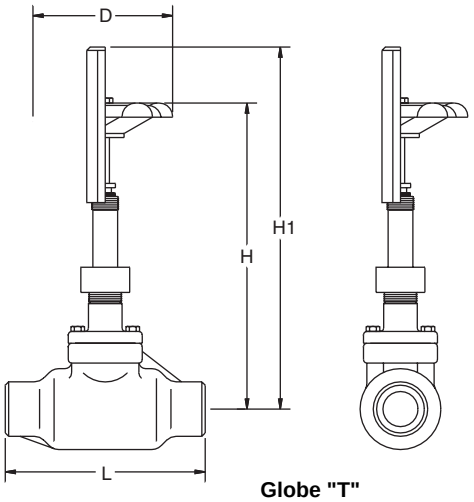
Globe "Y"

Valve Size	Angle					Globe "T"				Globe "Y"			
	L	L1	H	H1	D	L	H	H1	D	L	H	H1	D
1¼"	2.75	2.75	7.75	8.25	5.40	N/A				7.25	8.25	8.12	5.40
1½"	2.63	2.63	8.12	9.12	5.40	N/A				7.63	8.25	8.12	5.40
2"	3.00	3.00	8.50	8.75	5.40	N/A				8.12	9.75	8.75	5.40
2½"	3.63	3.88	11.12	11.75	6.75	N/A				9.63	10.75	9.50	5.40
3"	3.63	3.88	11.12	11.75	6.75	11.00	12.50	14.00	6.75	11.25	12.88	11.88	6.75
4"	4.62	5.00	11.38	12.00	6.75	12.50	14.00	15.50	6.75	12.25	13.25	12.25	6.75
5"	6.00	6.00	13.00	15.00	12.00	N/A				19.00	20.25	18.00	12.00
6"	6.38	6.38	14.50	15.50	12.00	N/A				22.00	21.68	18.68	12.00
8"	7.88	7.88	17.00	18.00	12.00	N/A				28.25	25.00	23.00	12.00
10"	9.75	9.75	25.75	27.25	16.50	N/A				35.00	35.00	32.00	16.50
12"	10.50	10.50	25.50	28.75	16.50	N/A				41.00	35.62	33.62	16.50

Butt Weld Connection, Extended Bonnet



Angle



Globe "T"

Valve Size	Angle					Globe			
	L	L1	H	H1	D	L	H	H1	D
1¼"	2.75	2.75	9.00	10.50	5.40	N/A			
1½"	2.63	2.63	9.00	10.50	5.40	N/A			
2"	3.00	3.00	10.00	11.00	5.40	N/A			
2½"	3.63	3.63	10.50	11.50	5.40	N/A			
3"	3.88	3.88	11.25	12.75	6.75	11.50	13.00	14.50	6.75
4"	4.50	4.50	12.75	14.25	6.75	13.00	15.25	16.75	6.75

- External Adjustment
- Easy Setting Scale
- Eliminates System Balancing
- Integral Check Valve
- "Frost Free" Neck

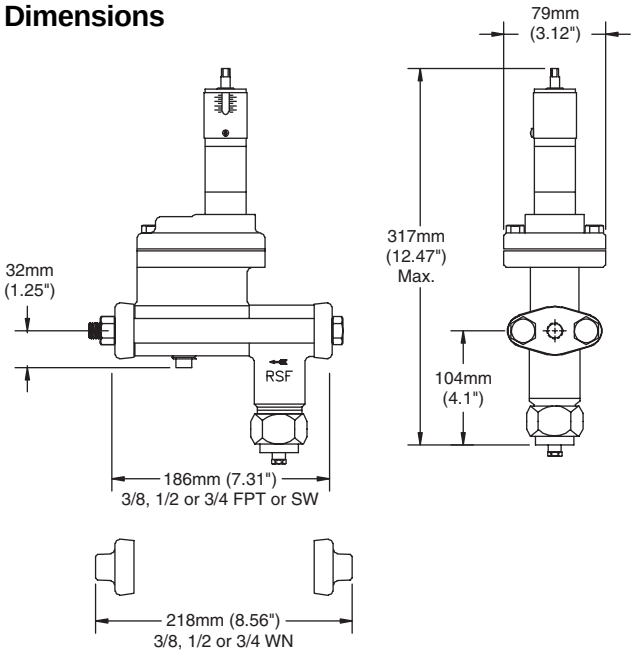
Description

This precision built, heavy duty, self-contained, iron bodied Automatic Flow Regulator is used as a liquid control device for Ammonia Overfeed Systems. This adjustable flow regulator, once set, maintains a constant 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.

Refer to Bulletin 41-10.



Dimensions



Specifications

Maximum Rated Pressure (MRP) ..... 27.6 bar (400 psi)
Pressure drop range ..... 0.35 to 3.5 bar (5 to 50 psi)
Operating temperature ..... - 40° to 38°C (- 40° to 100°F)

Application Note

An AFR flow regulator is designed to maintain an approximately constant liquid refrigerant delivery rate into the evaporator. However, it is not an expansion device capable of controlling vapor or two-phase flow. Design conditions, which allow for the formation of flash gas as liquid flows through the regulator, can cause the AFR to chatter and result in irregular liquid delivery.

This feed device should be applied only where sufficient liquid subcooling exists to ensure that its outlet pressure will never be reduced to less than the liquid's saturation vapor pressure. AFR's are not recommended for application in gas displacement systems or where controlled pressure receivers deliver liquid to the evaporators.

How to Order

Type AFR automatic flow regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Inlet Flange	Outlet Flange	Strainer
AFR	F04	F04	S

Flange Type		Connection	
X	Less Flanges	00	None
F	FPT (IPS)	03	3/8"
S	SW (IPS)	04	1/2"
W	Weld Neck (IPS)	06	3/4"
D	DIN Weld Neck	10	10mm
		15	15mm
		20	20mm

Strainer	
N	No Strainer
S	w/Strainer

Weights

Less flanges ..... 3.6 kg (8 lb)
With flanges ..... 4.1 kg (9 lb)
With strainer & flanges ..... 5.0 kg (11 lb)

Industrial Refrigeration Products

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Eliminates System Balancing
- Overcomes Flow Fluctuations
- Permits evaporator optimization

Description

The Fixed Flow Regulator is used as a liquid flow control device for Liquid Recirculation Systems and is suitable for use with R-22 and Ammonia. The regulator establishes and maintains a constant flow rate determined only by the selected orifice number and independent of initial pressure drop or changes in the inlet or outlet pressure.

Materials

Body ..... ASTM 126 Class B cast iron

Piston ..... Stainless steel

Flow Orifice and Valve Body Cap ..... Steel

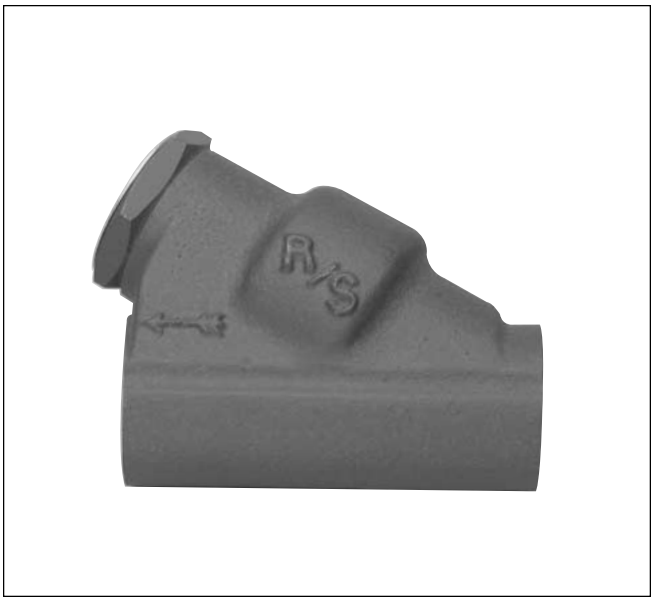
Specifications

Maximum Rated Pressure (MRP) ..... 27.6 bar (400 psi)

Pressure drop range ..... 0.35 to 3.5 bar (5 to 50 psi) Higher pressure drops up to 300 psi will not harm the regulator but can cause poor flow control.

Operating temperature .....- 40° to 38°C (- 40° to 100°F)

Refer to Bulletin 41-15.



Application Note

The FFR does not provide a check valve feature and will permit flow in the opposite direction; therefore, for hot gas defrost applications, or any other application where the pressure in the evaporator may occasionally exceed the pressure in the low pressure liquid line, a check valve must be installed *upstream.*

How to Order

Type FFR fixed flow regulators can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Orifice Number	Inlet Flange	Outlet Flange	Strainer
FFR	10	K05	K05	S

Orifice Number*	
04	4
06	6
10	10
15	15
20	20
30	30
40	40
60	60
80	80

* Orifice number indicates nominal tons ammonia.

Flange Type		Connection	
X	Less Flanges	**00**	None
R	Less Flanges, w/Male Adapter Ring		
F	FPT (IPS)	**03**	3/8"
S	SW (IPS)	**04**	1/2"
W	Weld Neck (IPS)	**06**	3/4"
K	ODS (US)	**04**	1/2"
		05	5/8"
		07	7/8"
D	DIN Weld Neck	**10**	10mm
		15	15mm
		20	20mm

Strainer	
N	No Strainer
S	w/Strainer

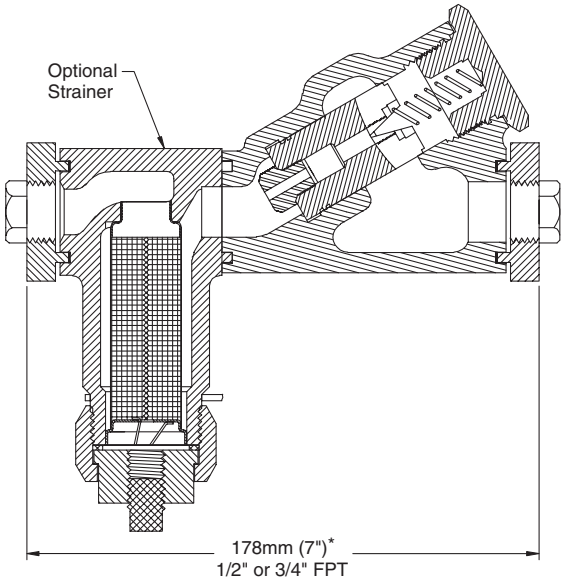
⚠ WARNING!
ODS flanges not suitable for use with ammonia.

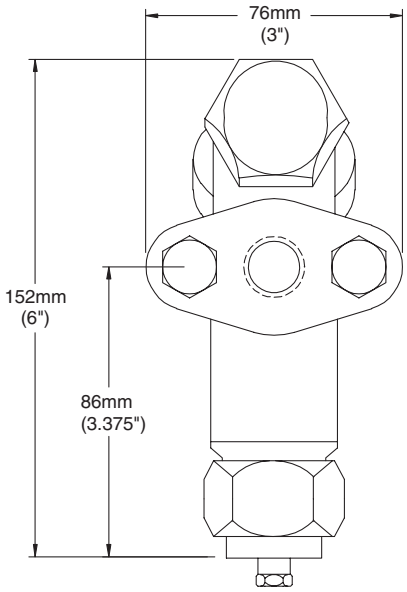
Weights

Less flanges ..... 1.4 kg (3 lb)
With flanges ..... 1.8 kg (4 lb)
With strainer & flanges ..... 2.7 kg (6 lb)

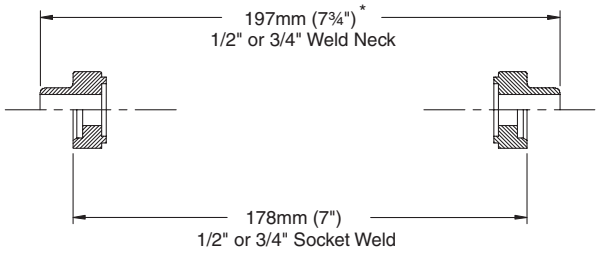
Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

Dimensions





** For FFR-2 without strainer, deduct 51mm (2").*



Notes

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Oversized keypad on front panel for programming
- Easy to read enlarged LED digital display
- 5 programmable 6 amp fused relays
- Level simulation mode facilitates control wiring check and test
- Large enclosure with separable terminal blocks accommodate up to 14 gage wire
- Plug-in style terminal blocks with recessed screws
- Conventional intstrument wiring from controller to probe
- 120/240 V 60 Hz or 110/220 V, 50 Hz Power
- 4-20 mA Output Signal

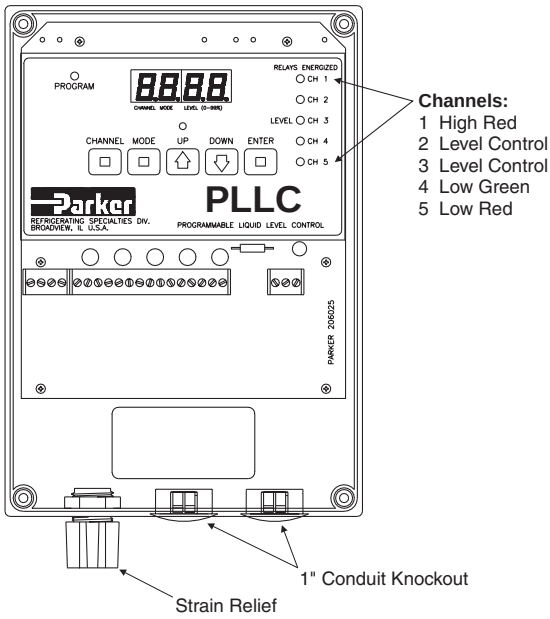


Purpose

The Programmable Liquid Level Control provides remote liquid level management for industrial refrigeration. The PLLC is designed for use specifically with Parker's *Depth Tracker* transducer liquid level probe. The PLLC provides the power source for the current loop of the probe. The transducer probe is used to provide a current signal proportional to the vertical liquid level in a standpipe or vessel. The PLLC serving as a switching mechanism also converts the return signal and performs up to 5 programmable relay functions.

Dimensions

Unit is 9½" high by 6¾" wide by 2" deep.

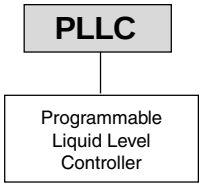


Wiring

The separable terminal blocks on the PLLC will accommodate up to 14 gage wire. The Line Voltage Input can be either 120/240V 60Hz or 110/220V 50Hz. The PLLC provides the power source for the current loop of the transducer probe. The programmable relays are individually 5 amp fused. Relays are equipped with normally open and closed terminals and can be wired as either. The maximum recommended distance between PLLC and probe is 5000 ft.

Refer to Bulletin 61-50.

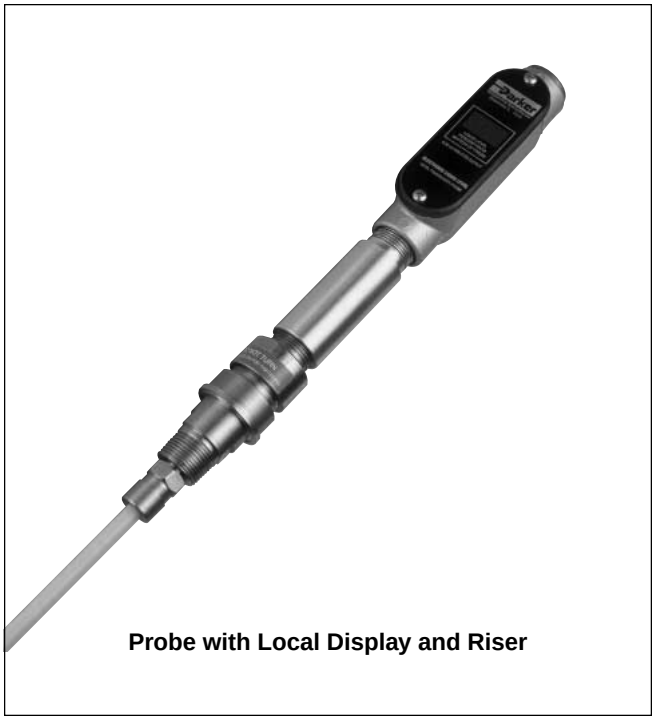
How to Order



Weight

1.8 kg (4 lb)

- Probe lengths: 2, 3, 4, 5, 6, 7, 8, 10 & 12 feet
- Integrated construction achieved by molding the PTFE sleeve directly to the center rod
- Electrical connection via 3/4" conduit boss or jacketed communications cable of suitable temperature/moisture protection
- Fully potted circuit board
- Local or remote digital read-out options
- Optional display riser accommodates column insulation
- Unique probelok connection option
- Factory pre-calibrated for ammonia for 0-100% level output in 4" IPS Standpipe. The electronics may be re-calibrated in the field to permit viewing of liquid level over any segment representing more than 40% of the probe's overall length.
- All wetted parts are stainless steel construction to prevent corrosion



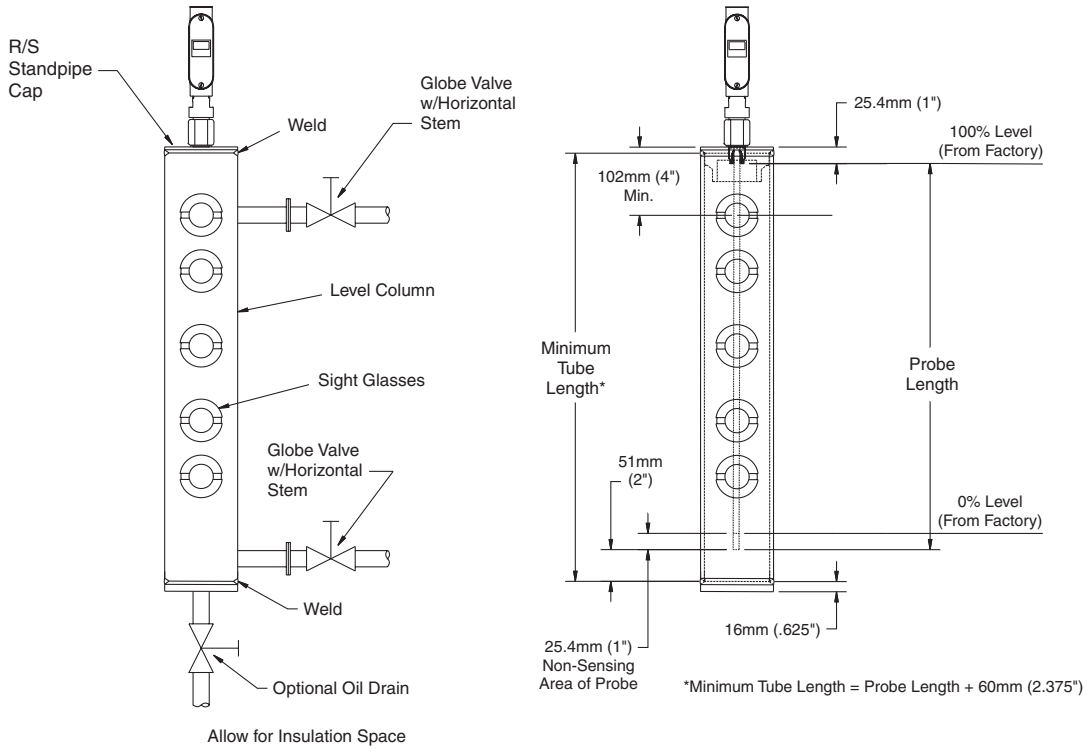
Probe with Local Display and Riser

Description

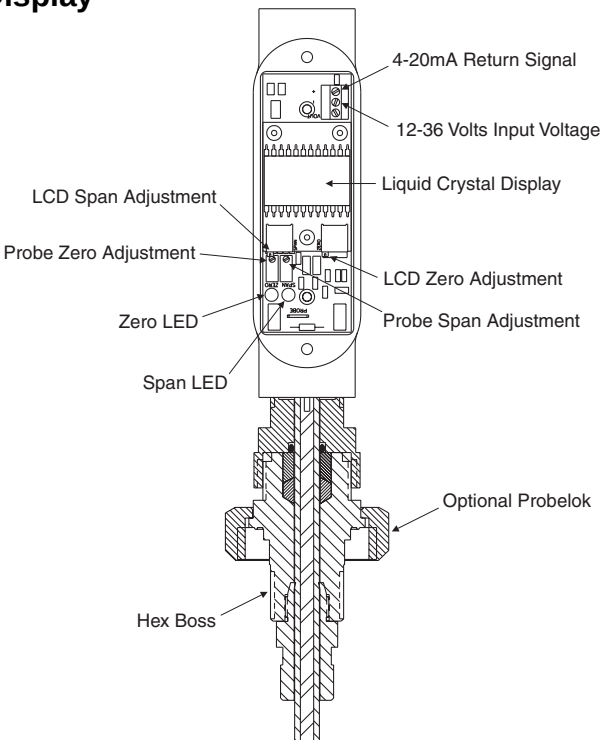
The Depth Tracker Liquid Level Industrial Transducer Probe (ITP) is used to provide a current signal proportional to the vertical liquid level. A remote programmable controller (PLLC) or microprocessor functioning as a switching mechanism can convert the signal transmitted.

This device is for use with refrigerant R-717 (ammonia) only. It may be used with liquid temperatures in a range of -77° to 57°C (-107° to 135°F). The minimum ambient for circuit board enclosure is -29°C (-20°F).

Dimensions

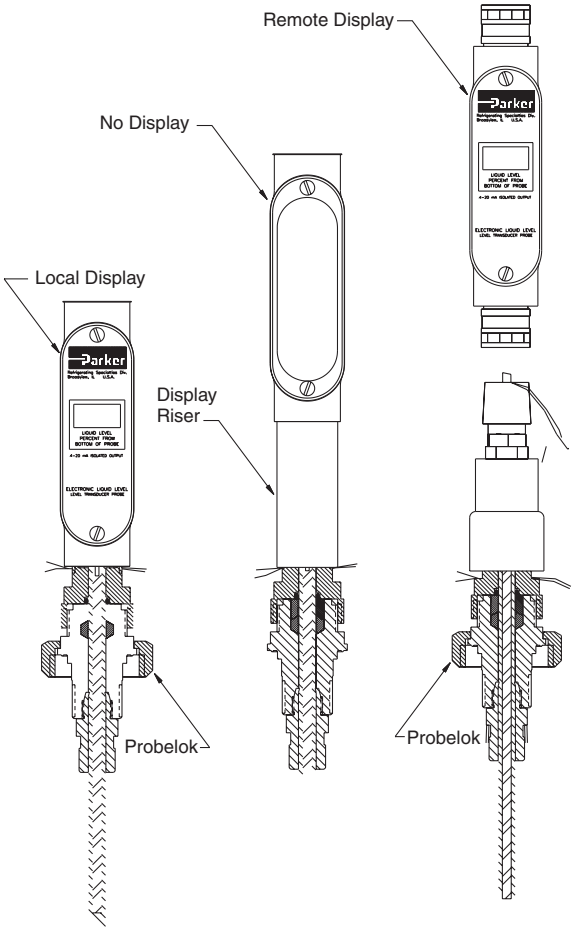


Display



Refer to Bulletin 61-30 for details on installation and settings.

Options



How to Order

Probes can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Length	Type	Display	Sleeve	Connection	Riser
05	ITP	D	C	N	X

Probe Length	
02	2 feet
03	3 feet
04	4 feet
05	5 feet
06	6 feet
07	7 feet
08	8 feet
10	10 feet
12	12 feet

Display	
N	No Display
D	Local Display
R	Remote Display

Sleeve	
C	No Sleeve
S*	Sleeve

* Not available on 10-12 ft.

Connection	
N	NPT (Standard)
P	Probelok

Riser	
X	No Riser
R	Riser

Weights

Length	Less Display		With Local Display		With Remote Display	
	kg	lb	kg	lb	kg	lb
2 ft	2.7	6	1.9	4.2	2.1	4.7
3 ft	3.2	7	2.3	5.0	2.5	5.5
4 ft	4.1	9	3.1	6.8	3.3	7.3
5 ft	5.2	11.5	4.4	9.6	4.6	10.1
6 ft	5.7	12.5	4.7	10.5	4.9	11.0
7 ft	6.4	14	5.5	12	5.7	12.5
8 ft	6.8	15	5.9	13	6.1	13.5
10 ft	7.7	17	6.8	15	6.8	15.5
12 ft	8.6	19	7.7	17	7.9	17.5

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Hermetically Sealed, Fused Switch Assembly
- Transparent Switch Housing for Visual Observation
- Magnetically Actuated, Mechanically Operated
- Single Stage, Single Pole, Double Throw Switch
- Float Controlled
- Rugged Construction
- Switch Assembly Fully Rotatable to Suit Installation
- Large Available Differential Minimizes Short Cycling or Actuation of Switch by Liquid Surges
- Types LL, LLC, LLS, LLSC, LLA, LLAC are U.L. Listed and CSA Certified
- DIN Connector Standard except on Explosion Proof Versions

Description

Refrigerant float switches are suitable for use with Ammonia, R22, R134a, R404a, R507 and other common refrigerants. This float controlled, magnetically actuated, mechanically operated 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, which is fused, and the 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.

Types LLC, LLSC, LLAC are U.L. listed for outdoor service. Types LLX, LLXS and LLAX are not fused.

Applications

To control liquid level in:

- liquid overfeed accumulators
- flooded surge drums
- flooded shell & tube chillers
- high and low pressure receivers
- intercoolers
- transfer vessels
- low or high level monitor



LL **LLS**

Materials

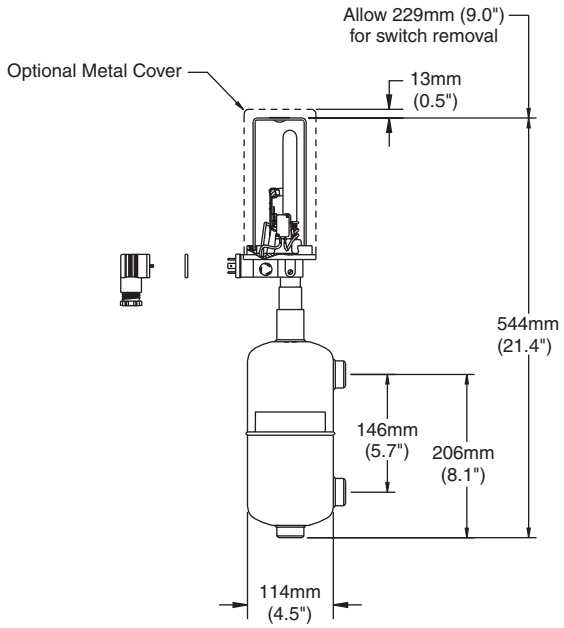
Standard Chamber ..... Steel
Float Ball ..... Stainless Steel

Specifications

Design Pressure (MRP) ..... 27.6 bar (400 PSI)
Fluid Temperature Range ..... -45° to 65°C (-50° to 150°F)
Ambient Temperature ..... -45° to 50°C (-50° to 120°F)
Switch ..... SPDT, Snap-acting, non-mercury
Rating ..... 120/240VAC, 10 Amp, 240 VA Pilot Duty
Fluid Specific Gravity Range ..... 0.57 to 1.70
Differential ..... Adjustable 13-50 mm (½"-2")
Factory set at 50mm (2")
Chamber Connections ..... ¾" FPTor 1" Butt Weld
Replaceable Fuse Style Bag ..... 7 Amp, 240 VAC

Refer to Bulletin 61-10.

Dimensions



How to Order

Refrigerant Float Switches can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Variations
LL	S

Type	
Blank	Standard model
C	With Metal Cover
S	With side, side and bottom connections
SC	With side, side and bottom connections and Metal Cover
X	Explosion Proof▲
XS	Explosion Proof with side, side and bottom connections▲
A	Low Temperature★
AC	Low Temperature with Metal Cover★
AX	Low Temperature, Explosion Proof▲★

▲ Not UL approved
★ Stainleess steel, temperature to -75°C (-100°F)

Standard model:

Hermetically sealed, clear plastic switch enclosure; tank connections combination fitting 3/4" FPT or 1" butt weld; mounted side and bottom; mild steel.

Weight

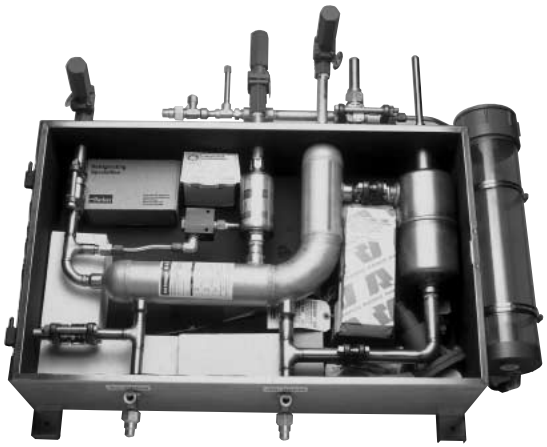
Type	kg	lbs
LL, LLS	5.9	13
LLA	5.9	13
LLAC, LLAX	6.4	14
LLC, LLSC	6.4	14
LLX, LLXS	6.4	14

Accessories

Item		Part Number
Permanent Magnet for external operation of switch assembly		201513
Replacement Top Switch Assembly	Conduit Boss	050100
	Quick Disconnect	050421
	Expl. Proof, Conduit	050101

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- High Capacity
- 4 to 32 purge points
- Stainless steel insulated enclosure (32" L x 20" H x 8" D)
- 316 –L stainless steel shell and tube heat exchanger.
- All stainless steel interior flange and pipe connections.



(Shown with side of enclosure removed)

Description

Rapid Purgers remove incondensibles from refrigeration systems. Included as standard on the purger:

Check valves
Gauge valves
Isolation valves
Liquid level switch
Vapor vent float
Water bubbler
Temperature controller
Liquid drainer
Pressure regulator

Controllers are available with 4 and 8 purge points (mini-micro) or 8, 16, 24 or 32 purge points (microprocessor) and can be easily adapted to any ammonia refrigeration plant. Five unique modes of operation allow maximum efficiency with minimal operator adjustments: automatic mode, automatic detection mode, scheduled purging mode, manual mode and remote mode.

Refer to Bulletin 75-00.

How to Order

Rapid purgers can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Type	Pressure Range	Refrigerant	Voltage (Control Panel & Coils)	Control Enclosure	Purge Points
RP	H	7	1	S	08

Pressure Range

L	Low Range: System suction inches Hg to 14 PSI
H	High Range: System suction 15-30 PSI

Refrigerant

7	Ammonia

Voltage

0	Manual or Explosion Proof
1	120V 60Hz
2	240V 60Hz
3	240V 50Hz

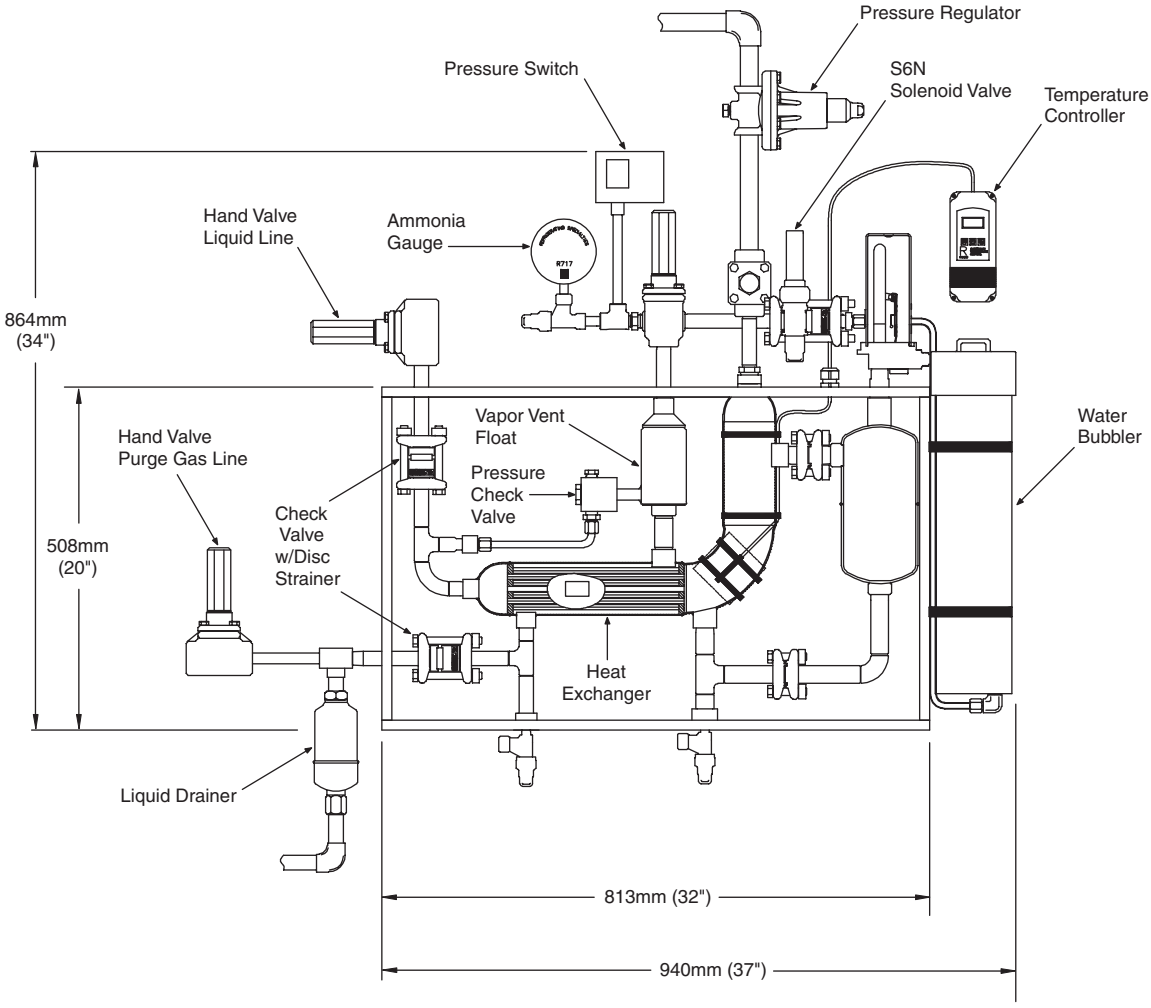
Control/Enclosure

E	Mini-Micro for 4 to 8 Purge Points (Requires Field Wiring)
S	Microprocessor Control for 8 or more Purge Points (Separate Mounting, Requires Field Wiring)
C	Remote Central Plant Control. Includes Insulated Stainless Enclosure and Local Electrical Controls

Purge Points

00	None – Corresponds to Manual or Central Plant Controlled
04	Four, Mini-Micro Control only
08	Eight, Either Mini-Micro or Microprocessor Control
16	Sixteen, Microprocessor Control only
24	Twenty-four, Microprocessor Control only
32	Thirty-two, Microprocessor Control only

Dimensions



Notes:

Purger styles that could encounter standby or power failure conditions such that vessel pressure could go high, should always be equipped with relief valves.

In the case of the Mini-Micro or the Microprocessor Controller, the control panel is always shipped separately and is mounted in close proximity of the Rapid Purger or at a remote location such as a refrigeration control room. Refer to Purger Bulletin 75-00 for additional information.

Refer to Rapid Purger Controller system information manual for specific operating and programming information. The Mini-Micro and Microprocessor are different manuals.

When ordering a purger with a microprocessor controller with option of condenser fan control and pump cycling, consult factory for additional information.

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- Drains Liquid Only
- Stops Flow of Vapor
- Prevents Vapor Lockup
- Built-in Strainer
- No Small Orifices
- Resists Wire Drawing
- Includes Pilot Light
- Manual Opening Stem



Description

Used to drain liquid from defrosting evaporators or heat recovery condensors into a lower pressure portion of the system. Permits flow of liquid refrigerant only. Prevents flow of vapor refrigerant.

All are heavy duty devices intended for use with Ammonia, R-22, R-134a, R-404A, R-507 and other common refrigerants.

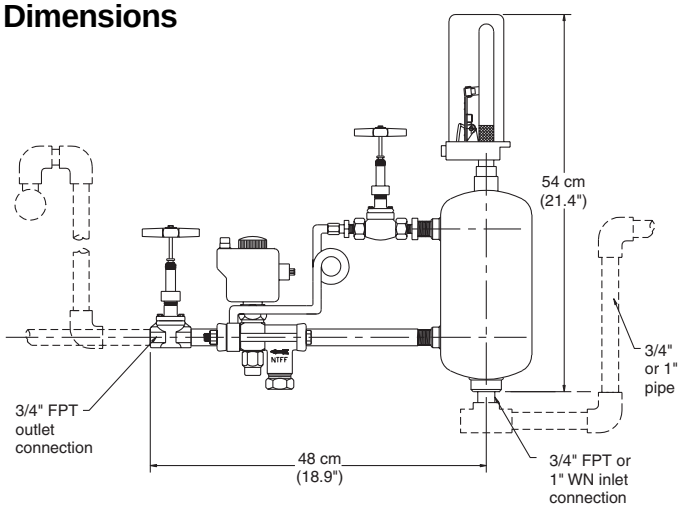
The Type ALD is a combination of a Type LLS Float Switch, a Type S8F Solenoid Valve with Strainer and Pilot Light Assembly, a 3/4" Hand Expansion Valve, and a 1/4" FPT Hand Expansion Bleed Valve as well as necessary pipe and fittings, complete for field assembly. Inlet is combination ¾" FPT or 1" butt weld. Outlet is ¾" FPT.

The rate of flow of refrigerant vapor (or liquid) through the vent valve is dependent upon the pressure difference between the float chamber and the Type ALD outlet pressure. It is also possible for the ALD to maintain a constant flow if the rate of liquid flow into the float chamber is equal to that leaving it.

The ALD can be manually drained by using the manual opening stem on the Type S8F solenoid valve.

Refer to Bulletin 62-01.

Dimensions



Ordering Information

Type	Coil Voltage	Coil Style	Pilot Light	Lens Color
ALD	R	1	2	G

Coil Voltage

Standard		Non-Standard	
R	120/6/60	P*	115/6/50
S	208/6/60	Q*	440/6/60
T	240/6/60		
U*	230/6/50		

* Available with industrial open frame coil only.

Coil Style

1	Encapsulated w/36" Leads
3	Industrial Open Frame w/18" Leads

Lens Color

G	Green (std)
R	Red
A	Amber
W	White

Remote Pilot Light

1	PLT-1 (NEMA 1)
2	PLT-2 (NEMA 4)

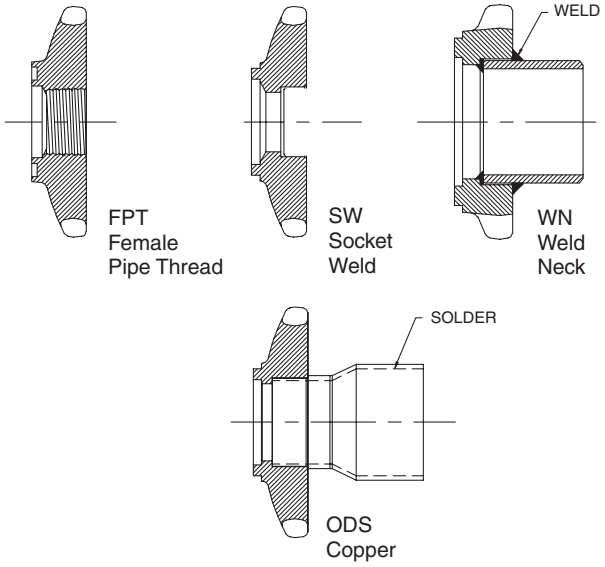
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Cleveland, OH

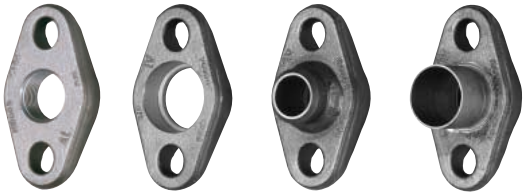
Flange Types

Flanges are sold individually and are available in male tongue type to fit sizes 5-150mm (1/2" to 6") and female groove type to fit sizes 5-100mm (1/2" to 4").

The following connection styles are available:

- Female Pipe Thread (FPT)
- Socket Weld (SW)
- Weld Neck (WN). Metric WN flanges also available in connection sizes ranging from 15 to 100mm. Consult factory for details.
- Outside Diameter Sweat (ODS) steel flanges with integral copper couplings to fit and solder over copper tubing. ***ODS flanges are not suitable for use with R-717 (ammonia).***
- ANSI flat face flanges are available from 125-200mm (5" - 8") for use with the CK4 check valve.
- Slip-On Socket I.D. ANSI Flat Face
- Weld Neck ANSI Flat Face



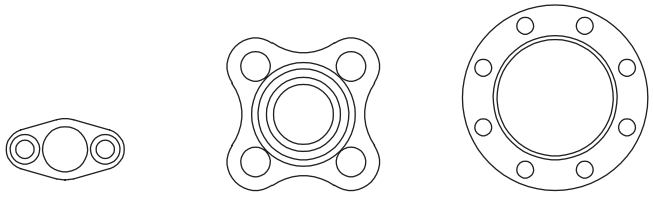


2-Bolt Flanges (FPT, SW, WN, ODS)



4-Bolt Flanges (SW, WN, ODS)
Also available in FPT

Flanges for sizes 5-25mm (3⁄16" to 1") are a 2-bolt oval style. Flanges for sizes 32-100mm (1¼" - 4") are a 4-bolt square style. Flanges for sizes 125-150mm (5" - 6") are an 8-bolt round style and are available as male type only.



5-25mm
(3/16" to 1")
Oval

32-100mm
(1¼" to 4")
Square

125-150mm
(5" to 6")
Round

Flange Union Kits

Flange union kits are available to join male and female flanges of the same size (see page 435).

Flange and Pipe Dimensions

US Pipe Sizes			Equivalent Metric Steel Tubing		Socket Weld Flange I.D.		Weld Neck Flange O.D.		ANSI Slip-On Socket I.D.		ANSI Weld Neck Neck O.D.	
Nominal Inch	Actual O.D. mm	Actual O.D. inch	NW	OD mm	mm	Inch	mm	inch	mm	inch	mm	inch
1/4"	13.72	0.540	8	13.5	14.22	0.560	13.72	0.540	—	—	—	—
3/8"	17.14	0.675	10	17.2	17.65	0.695	17.14	0.675	—	—	—	—
1/2"	21.34	0.840	15	21.3	21.84	0.860	21.34	0.840	—	—	—	—
3/4"	26.67	1.050	20	26.9	27.81	1.090	26.67	1.050	—	—	—	—
1"	33.40	1.315	25	33.7	34.67	1.365	33.40	1.315	—	—	—	—
1¼"	42.16	1.660	32	42.4	43.31	1.705	42.16	1.660	—	—	—	—
1½"	48.26	1.900	50	48.3	59.02	1.930	48.25	1.900	—	—	—	—
2"	60.32	2.375	50	60.3	62.10	2.445	60.3	2.375	—	—	—	—
2½"	73.02	2.875	65	76.1	74.80	2.945	73.03	2.875	—	—	—	—
3"	88.90	3.500	80	88.9	90.81	3.575	88.90	3.500	—	—	—	—
4"	114.30	4.500	100	114.3	116.20	4.575	114.30	4.500	—	—	—	—
5"	141.30	5.563	125	139.7	144.00	5.670	141.30	5.563	144.14	5.675	141.30	5.563
6"	168.28	6.625	150	165.1	170.90	6.730	168.28	6.625	171.07	6.735	168.28	6l625
8"	—	—	—	—	—	—	—		221.87	8.735	219.08	8.625

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Cleveland, OH

How to Order Flanges

Flanges can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Flange Size	Type	Connection Style	Connection Type	Connection Size
025	FL	M	F	08

Check table for available style/type/size combinations!

Flange Size

013	Fits Port Sizes 5 & 13mm (3/16" & 1/2")
025	Fits Port Sizes 20 & 25mm (3/4" & 1")
032	Fits Port Size 32mm (1¼")
050	Fits Port Sizes 40 & 50mm (1⅝" & 2")
065	Fits Port Size 65mm (2½")
075	Fits Port Size 75mm (3")
100	Fits Port Size 100mm (4")
125*	Fits Port Size 125mm (5"
150*	Fits Port Size 150mm (6")
200	Fits Port Size 200mm (8")

Connection Style

M	Male Tongue	
F	Female Groove	
N	ANSI Flat Face	

Connection Type

F	FPT (Female Pipe Thread)
S	SW (Socket Weld)
W	WN (Weld Neck)
K	ODS (Outside Diameter Sweat)
D	DIN Weld Neck
Y	SO (Slip On)
Z	WN (Weld Neck)

Connection Size

FPT, SW, WN, ANSI		ODS	
02	¼"	**04**	½"
03	⅜"	**05**	⅝"
04	½"	**07**	⅞"
06	¾"	**09**	1⅛"
08	1"	**11**	1⅜"
10	1¼"	**13**	1⅝"
12	1½"	**17**	2⅛"
16	2"	**21**	2⅝"
20	2½"	**25**	3⅛"
24	3"	**29**	3⅝"
32	4"	**33**	4⅛"
40	5"	**DIN Weld Neck** Select size in mm from table below.	
48	6"		
64	8"		

⚠ WARNING!
ODS flanges not suitable for use with ammonia.

Connection Size Availability

Flange Size	Connection Sizes Available					
	FPT (IPS)	Socket Weld (IPS) Weld Neck (IPS)	ODS (US)	DIN Weld Neck	ANSI Flat Face**	
					Weld Neck	Slip-on
013	02 03 04 06	02 03 04 06	04 05 07	10 15 20		
025	06 08 10	06 08 10	07 09 11	20 25 32		
032	10 12	10 12	11 13 17	32 40 50		
050	12 16	12 16	13 17 21	40 50		
065		20	21 25	65 75		
075		24	25 29	75		
100		32	33	A0		
125*		40			40	40
150*		48			48	48
200*					64	64

*Female flange not available ** For CK4 only

Weights

Flange Number Size	Used on R/S Port Sizes		Net Weight for Each Flange							
			FPT, SW		WN		ODS		ANSI	
	mm	inch	kg	lbs	kg	lbs	kg	lbs	kg	lbs
013	5 & 13	3/16" & 1/2"	0.14	0.3	0.23	0.5	0.14	0.3	—	—
025	20 & 25	3/4" & 1"	0.68	1.5	0.77	1.7	0.73	1.6	—	—
032	32	1-1/4"	0.68	1.5	0.91	2.0	0.73	1.6	—	—
050	40 & 50	1-5/8" & 1"	1.4	3.0	1.4	3.0	1.5	3.3	—	—
065	65	2-1/2"	2.3	5.0	3.0	6.5	2.5	5.5	—	—
075	75	3"	2.3	5.0	3.0	6.5	2.5	5.5	—	—
100	100	4"	4.1	9.0	6.8	15.0	4.5	9.9	—	—
125	125	5"	9.1	20.0	11.4	25.0	—	—	29.5	65
150	150	6"	9.1	20.0	11.4	25.0	—	—	38.6	85
200	200	8"	—	—	—	—	—		61.4	135

Flange Union Kits

Flange Union Kits are used to combine a male and a female flange within the same flange size code. Union Kits are available for flange sizes up to 100.

The kit consists of a flange gasket and the appropriate bolts for the flange size.

Order flanges separately.

Union Kits

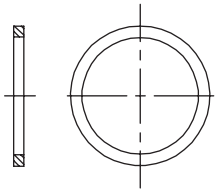
Flange Size	Union Kit Part Number
013	206213
025	206214
032	206215
050	206216
065	206217
075	206218
100	206219

Adapter Rings

Adapter rings are furnished with two matching flange gaskets.

Male Adapter Rings

Are used to close couple CK-4A or CK-1 Check Valves to the outlet of R/S Control Valves.



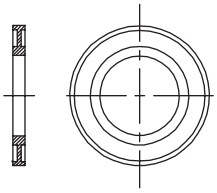
MALE ADAPTER RING

How to Order

Type	Part Number
MAR-13	200095
MAR-25	200089
MAR-32	200090
MAR-50	200091
MAR-65	200092
MAR-75	200093
MAR-100	200094

Female Adapter Rings

Are used in unions of two Male Flanges.

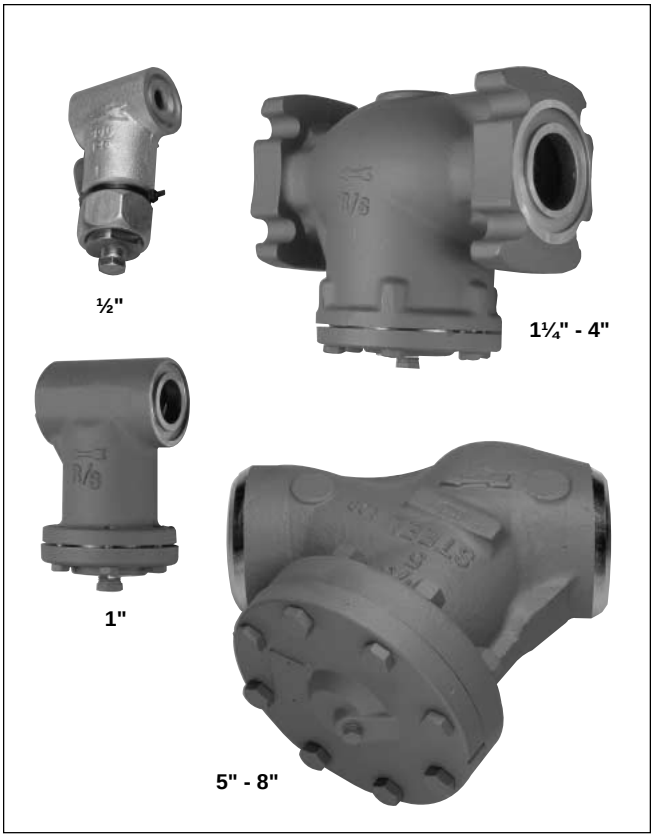


FEMALE ADAPTER RING

How to Order

Type	Part Number
FAR-13	200111
FAR-25	200112
FAR-32	200113
FAR-50	200114
FAR-65	200115
FAR-75	200116
FAR-100	200117

- Stainless Steel (60 Mesh) Screen
- 3/8" FPT Drain Connection 20-100mm (3/4" to 8") for Safe Cleaning in Line; 1/4" FPT for 13mm (1/2")
- Ample Screen Area
- Low Pressure Drop
- Can Be Close Coupled to Inlet of any R/S Valve with Same Port Size
- Durable Filter Bags available 20-100mm (3/4" thru 4") to Aid System Clean-Up
- Design Pressure (MRP): 27.6 Bar (400 PSIG)



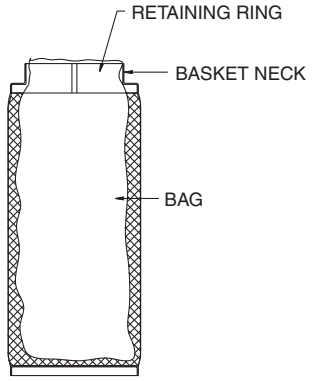
Description

Strainers are suitable for use with Ammonia, R-22, R-134a, R404A, R-507 and other common refrigerants

These industrial type Refrigerant Strainers with stainless steel screen are designed especially for the protection of R/S control valves from foreign materials present in refrigeration systems. The fine stainless screen mesh will collect particles as small as .006" in diameter. Generous available screen area allows maximum dirt capacity at minimum pressure drop.

The use of a strainer is extremely important upon start-up of a new refrigeration system where dirt, scale and weld particles may be present in the system and are disturbed and circulated when air testing or upon system start-up. Also when an existing system is revised, any settled dirt or foreign matter may be disturbed and circulated throughout the system. *It is not safe to omit strainers ahead of the control valves unless there is a certainty that the system will always be clean.*

If particles are too small to be removed by the strainer, it is suggested that a R/S filter bag be installed where applicable, periodically cleaned and removed when necessary.



Filter Bag

When used with R/S control valves, the strainer may be bolted directly to the inlet side of the valve to be protected. Standard R/S flange nuts and bolts are used to connect the strainer male outlet flange to the valve female inlet flange. Consequently, only one pair of R/S standard male companion flanges is needed for a close coupled strainer and valve combination.

Specifications

Size	Body Material	Screen Area		Screen Material
		Sq. cm	Sq. in.	
013	Gray Iron	39	6	Stainless Steel with Openings 0.23 x 0.23mm (0.009" x 0.009") 0.2mm (0.0075") Wire (60 Mesh)
025	Gray Iron	116	18	
032	Gray Iron	230	36	
050	Gray Iron	500	78	
065, 075	Gray Iron	570	88	
100	Gray Iron	794	123	
125	Cast Steel	790	123	
150	Cast Steel	1410	218	
200	Cast Steel	1750	272	

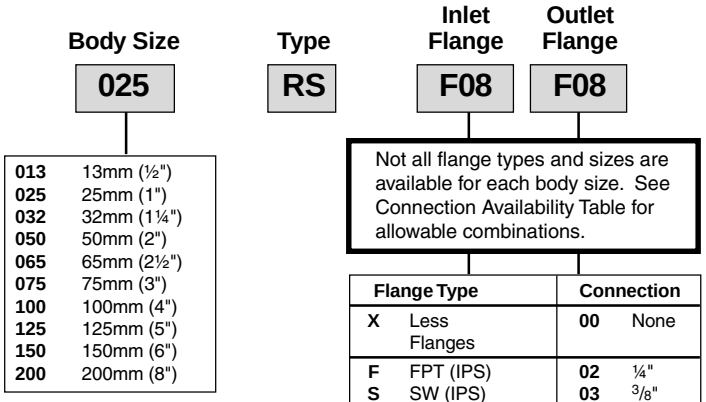
Flow Coefficients

13mm (½")	3.0 Kv	2.6 Cv
25mm (1")	9.4 Kv	8.1 Cv
32mm (1¼")	16.3 Kv	14.0 Cv
50mm (2")	67.7 Kv	58.2 Cv
65mm (2½")	112 Kv	96 Cv
75mm (3")	112 Kv	96 Cv
100mm (4")	170 Kv	146 Cv
125mm (5")	216 Kv	185 Cv
150mm (6")	362 Kv	311 Cv
200mm (8")	710 Kv	610 Cv

Refer to Bulletin 00-10.

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Cleveland, OH

How to Order



Flange Type		Connection	
X	Less Flanges	**00**	None
F	FPT (IPS)	**02**	¼"
S	SW (IPS)	**03**	3/8"
W	Weld Neck (IPS)	**04**	½"
		06	¾"
		08	1"
		10	1¼"
		12	1½"
		16	2"
		20	2½"
		24	3"
		32	4"
K	ODS (US)	**04**	½"
		05	5/8"
		07	7/8"
		09	1 1/8"
	Not suitable for use with ammonia.	**11**	1 3/8"
		13	1 5/8"
		17	2 1/8"
		21	2 5/8"
		25	3 1/8"
		29	3 5/8"
		33	4 1/8"
D	DIN Weld Neck	Size in mm. See table below.	

Note:

When flanges are specified in the model number, a **male** flange is provided for the inlet and a **female** flange for the outlet. If flanges are ordered separately (Code X - Less Flanges), a male and female should be ordered. See page 434.

Connection Availability

Size	Used with Port Size		Available Connection Codes (Bold Type Indicates Standard Size)			Weight			
						Less Flanges		With Flanges	
	mm	inch	ODS	FPT, SW, WN	DIN Weld Neck	kg	lbs	kg	lb
013	5 & 13	C\zn & ½	04, **05**, 07	02*, 03, **04**, 06	10, **15**, 20	0.9	2	1.4	3
025	20 & 25	¾ & 1	07, **09**, 11	06, **08**, 10	20, **25**, 32	3.2	7	4.5	10
032	32	1¼	11, **13**, 17	**10**, 12	**32**, 40, 50	6.8	15	8.2	18
050	40 & 50	1B\,, 2	13, **17**, 21	12, **16**	40, **50**	15	32	17	38
065	65	2½	**21**, 25	**20** (no FPT)	**65**, 75	24	53	29	63
075	75	3	**25**, 29	**24** (no FPT)	**75**	24	53	29	63
100	100	4	**33**	**32** (no FPT)	**A0**	52	114	60	132
125	125	5	N/A	N/A	N/A	45	100	—	—
150	150	6	N/A	N/A	N/A	79	175	—	—
200	200	8	N/A	N/A	N/A	136	300	—	—

* FPT only

Filter Bag Kits

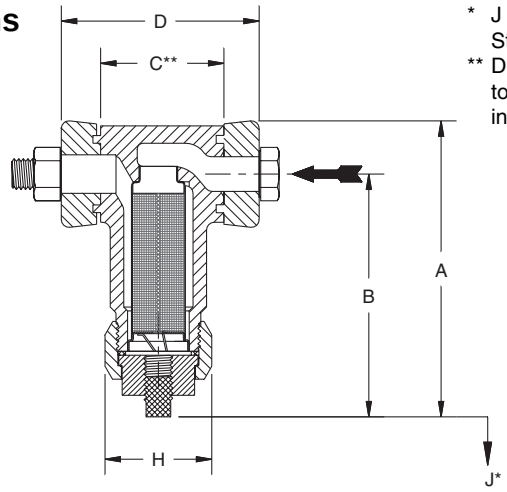
Body Size	Kit Number
013	Not Available
025	201701
032	201702
050	201703
065, 075	202513
100	202514

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Cleveland, OH

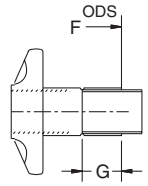
Dimensions

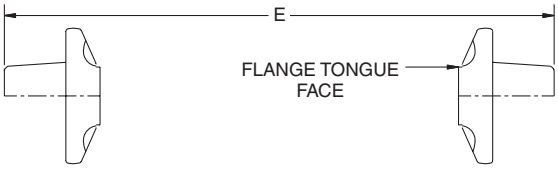
* J dimension is space required for removal of the Strainer Screen Assembly

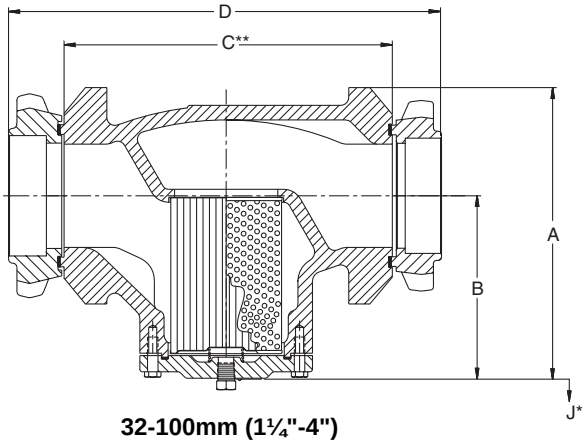
** Dimension C is the distance from one flange face to another. This is the space between the flanges in the line to allow the installation of the strainer.



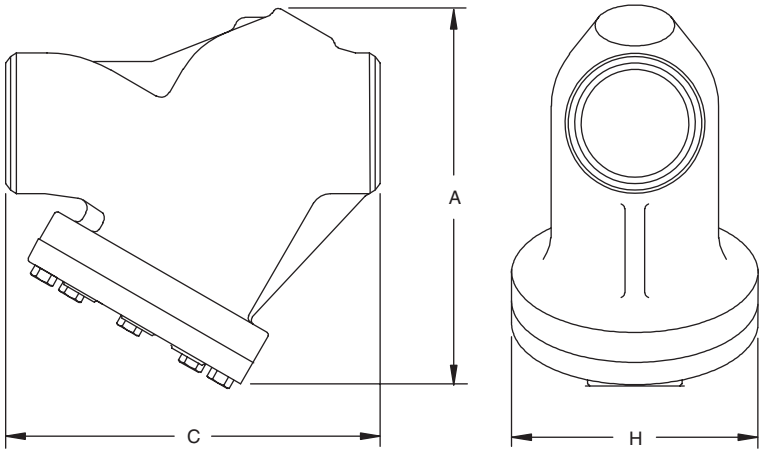
13-25mm (½"-1")







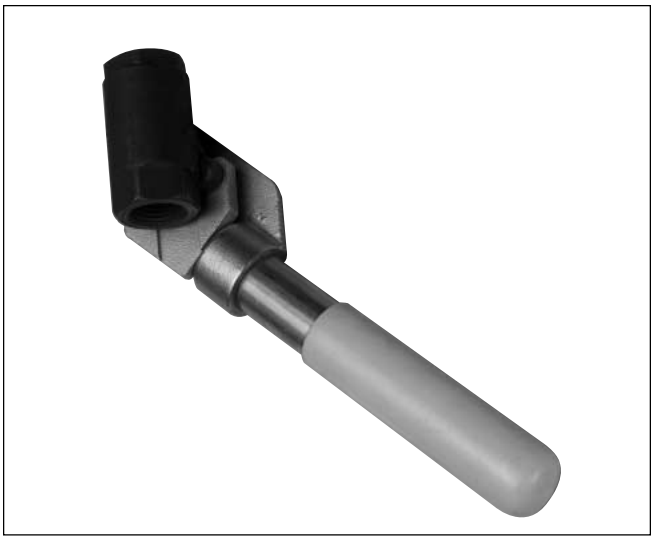
32-100mm (1¼"-4")



125-200mm (5"-8")

Strainer Size		Valve Port Size		A		B		C**		D (FPT,SW)		E (WN)		ODS SIZE	F (ODS)		G (ODS)		H		J	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	in	mm	in	mm	in	mm	in	mm	in
13	½	5 or 13	3/16 or 1/2	107	4.96	86	4.10	54	2.13	93	3.63	119	5.44	1/2 5/8 7/8	138 145 170	5.44 5.69 6.69	8.6 13 19	0.37 0.5 0.75	38	1.7	76	3.0
25	1	20 or 25	3/4 or 1	141	5.56	111	4.37	95	3.75	149	5.8	138	7.63	7/8 1-1/8 1-3/8 1-5/8	213 219 219 229	8.38 8.63 8.63 9.03	19 23 24 29	0.75 0.9 0.96 1.15	95	3.75	127	5.0
32	1¼	32	1¼	181	7.12	127	5.0	175	6.8	227	8.9	283	11.16	1-3/8 1-5/8 2-1/8	295 310 340	11.63 12.2 13.4	23 29 34	0.96 1.15 1.34	95	3.75	127	5.0
50	2	40 or 50	15/8 or 2	195	7.68	124	4.87	248	9.75	305	12	380	14.5	1-5/8 2-1/8 2-5/8	403 403 418	15.9 15.9 16.4	29 34 37	1.15 1.34 1.47	133	5.25	127	5.0
65	2½	65	2½	229	9.0	145	5.69	311	12.25	378	14.8	448	17.6	2-5/8 3-1/8	492 530	19.0 20.9	37 42	1.47 1.65	170	6.69	127	5.0
75	3	75	3	229	9.0	145	5.69	311	12.25	378	14.8	448	17.6	3-1/8 3-5/8	530 537	20.9 21.1	42 48	1.65 1.9	170	6.69	127	5.0
100	4	100	4	291	11.45	178	7.0	330	13	401	15.8	523	20.6	4-1/8	571	22.5	55	2.16	173	6.8	165	6.5
125	5	125	5	406	16			381	15										267	10.5		
150	6	150	6	483	19			483	19										318	12.5		
200	8	200	8	635	25			622	24.5										381	15		

- Spring Return to Close
- RPTFE Stuffing Box Ring
- All Components of Lever are Stainless Steel
- Nitride Corrosion Protection
- Blow-out Proof Stem Design
- Adjustable Packing Gland
- Investment Cast Components
- Multifill Seats



Description

These carbon steel ball valves have a “deadman” spring return handle. Operating torque is approximately three times standard valve torque. Connections are threaded NPT.

Materials

Body A216-WCB
“Deadman” Handle ..... Stainless Steel
Ball ..... A108-CS Chrome Plated
Stem Packing and Seat ..... Multifill PTFE
Body Seal ..... PTFE
Retainer, Gland Nut and Stem A108-CS

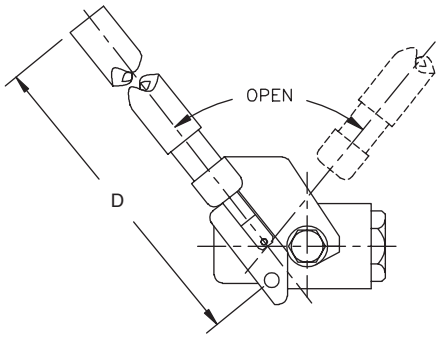
Specifications

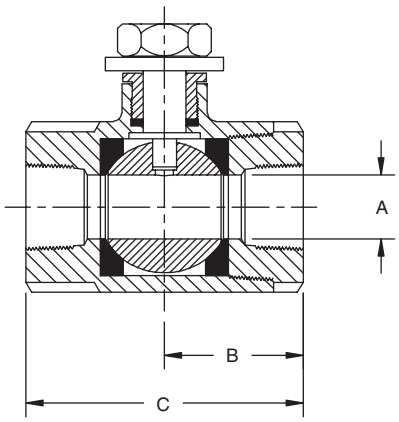
WOG ..... 138 bar (2000 psig)
Cold Non-Shock ..... 10.3 bar (150 psig) Saturated Steam, to 737mm (29 inches) Hg vacuum service
Federal Specifications ..... WW-V-35C, Type II

Ordering Information

Size	Part # Carbon Steel	Part # Stainless Steel	Weight
1/2"	206548	206551	0.6 kg (1.31 lb)
3/4"	206549	206552	0.9 kg (1.98 lb)
1"	206550	206553	1.1 kg (2.35 lb)

Dimensions





Size	A		B		C		D	
	mm	inch	mm	inch	mm	inch	mm	inch
1/2"	12.7	.50	28	1.12	57	2.25	178	7.00
3/4"	17	.68	38	1.50	76	3.00	178	7.00
1"	22	.87	43	1.68	86	3.37	178	7.00

- ASTM Forged Steel Body
- Stainless Steel Stem
- Angle or Globe Body
- Extended length available on inlet

Description

This line of rugged all steel bodied tiny hand valves are designed to seat tight and permit isolation of small system components. The stainless steel stem has the safety feature of being non-removable. The angle bodied valve and the globe body employ the same features. The optional MPT or FPT inlet connection and variable extended lengths are provided on both body sizes.

These multiple use small hand valves are normally mounted to pipe line components and lead to a gauge or instrument line. Flow rate are not generally of consideration except where valve is employed as a drain device or on remote piloted control valves

The valve is manually closed to prevent venting or to permit downstream component servicing. When manually opened, the inlet pressure source is equalized to the downstream side. This supports draining, venting, purging or component isolation.

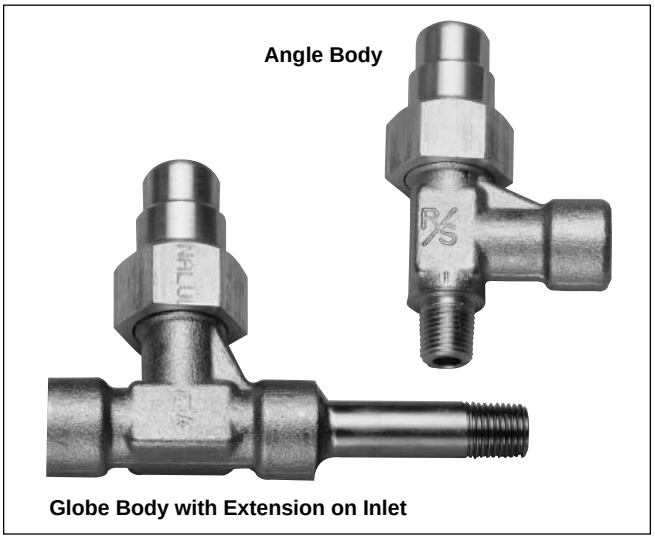
Materials

Body ..... Forged steel, zinc plated
Packing Nut ..... Steel
Stem ..... Stainless steel, 1/4" square flats
Stem Packing ..... Graphite base
Seal Cap ..... Aluminum
Seal Cap O-ring ..... Neoprene

Specifications

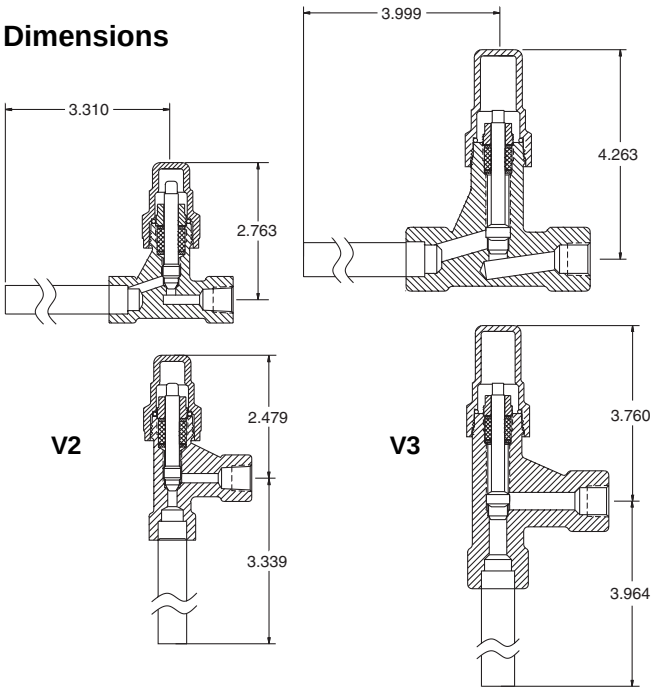
Maximum Rated Pressure (MRP) ..... 450 PSIG
Fluid Temperature Range ..... -40° to 115°C (-40° to 240°F)
Gauge Port ..... 1/4" FPT

Refer to Bulletin 84-00.



Globe Body with Extension on Inlet

Dimensions



How to Order Unibody Gauge Valves

Gauge valves can be ordered separately by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Unibody Valve Size	Body Style	Inlet Connection	Extension on Inlet	Connection Style	Seal Cap
V2	**A**	**M**	**00**	**N**	**A**

Valve Size

V2	1/4" Body
V3	3/8" Body

Style

A	Angle
G	Globe

Inlet

M	MPT*
F	FPT

*Globe body with MPT inlet must have extension.

Extension on Inlet*

00	None or Female		
V2		**V3**	
10	2.50"	**13**	3.25"
13	3.25"	**16**	4.00"
15	3.75"	**20**	5.00"
21	5.25"	**24**	6.00"
26	6.50"	**28**	7.00"
30	7.50"	**32**	8.00"
34	8.50"		

* Available on MPT inlet only.

Connection

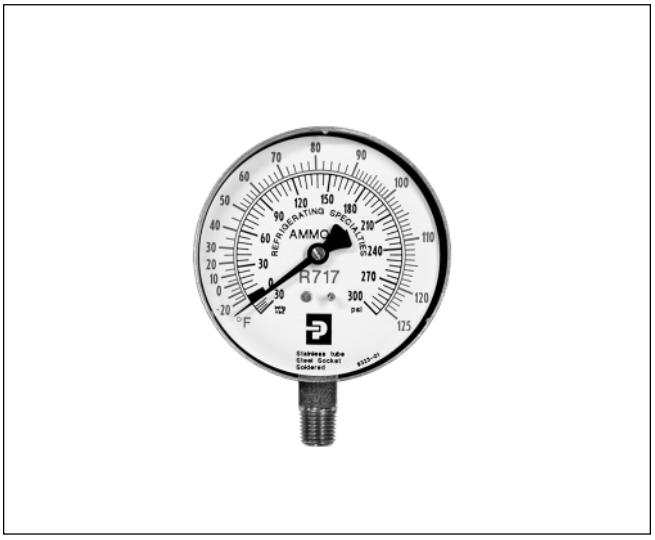
N	NPT

Seal Cap

A	Aluminum (V3 only)
P	Plastic (V2 only)

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

- All gauges have adjustable pointer
- All gauges utilize stainless steel housing and polycarbonate window over face
- 2½" and 3½" gauges incorporate flutter prevention mechanism
- 2½" and 3½" gauges are ASME Grade B 3%/2%/3% Max. Error
- 6" gauges are ASME Grade A 1% Max. Error



Description

All refrigerant gauges are combination pressure/saturation temperature gauges with pressure range appropriate to high side or low side duty for the refrigerants listed.

The 2½" and 3½" gauges are bottom connected 1/4" MPT. The 6" gauges are panel mount, back connected, 1/4" MPT.

Materials

Socket and Bourdon:
Gauges for Halocarbon Duty ..... Bronze & Brass
Gauges for Ammonia Duty ..... Stainless Steel

How to Order Refrigerant Gauges

Gauges can be specified by using the symbols in the chart below to develop a model number. Select only those symbols that represent the features desired, and place them in the sequence indicated by the example at the top of the chart.

Refrigerant Gauge	Face Diameter	Refrigerant	Pressure Range	Unit System
RG	25	2	L	B

Face Diameter

25	2.5 inches
35	3.5 inches
60	6.0 inches

Refrigerant

7	Ammonia (R-717)
1	R-134a
2	R-22
4	R-404A or R-507

Pressure Range

L	Low Pressure Range
H	High Pressure Range

Unit System

M	Metric
B	Imperial

Refrigerant	Pressure Ranges			
	Imperial Units (Temp in °F)		Metric Units (Temp in °C)	
	High Side Pressure Range	Low Side Pressure Range	High Side Pressure Range	Low Side Pressure Range
R717 (Ammonia)	30" Vac - 300 PSIG	30" Vac - 150 PSIG	760mm - 25 Bar	760mm - 10.5 Bar
R134a	30" Vac - 300 PSIG	30" Vac - 300 PSIG	760mm - 21.5 Bar	760mm - 21.5 Bar
R22	30" Vac - 500 PSIG	30" Vac - 150 PSIG	760mm - 35 Bar	760mm - 10.5 Bar
R-404A or R-507	30" Vac - 500 PSIG	30" Vac - 150 PSIG	760mm - 35 Bar	760mm - 10.5 Bar

GP Pump Advantages

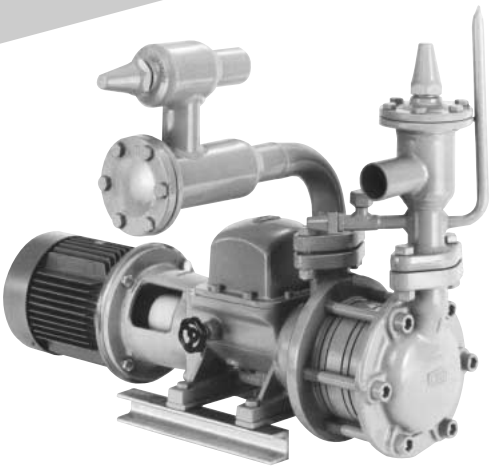
- Proven over decades of use
- Designed exclusively for the delivery of primary or secondary refrigerants
- Driven by standard electric motor
- Ability to handle liquid/vapor mixture
- High pressure increase, low flow rate
- Strong construction
- Low maintenance

The Pump Design

- Open impellers
- Lateral channels
- Wide channels
- Twin axial face seals

Consult Parker for ordering information.

New Products





Motors and valves shown are not included.

Advantages of HRP pumps

1. Unrivalled Safety

In contrast to most common hermetic pumps the stator housing of HRP pumps is designed to withstand high nominal pressure. If the motor “stator can” leaks in the event of an accident, no refrigerant will escape.

2. Good quality liquid delivery

The advanced design of the impeller-guide ring construction enables the pump to deliver a relatively high amount of vapor with the liquid flow. This is achieved without interrupting the constant delivery of the liquid. (The liquid volume flow will of course decrease with the increase of vapor volume.) In contrast to most other hermetic pumps the vapor that is generated while cooling the motor is vented to the discharge side without reducing the pump capacity.

3. Covering a wide range

All HRP pump models are suitable for the common refrigerants. The HRP 3232 is also especially designed to be used with CO_2 as a primary or secondary refrigerant. Due to the pump performance characteristic curve, each pump covers a wide range of applications.

4. Simple protection

The built-in temperature cut-out protects the pump against overheating and must be connected into the control system with the standard overload protection equipment. It is recommended to install a pressure differential switch or a flow switch on the discharge side of the pump.

5. No orifices or degassing lines required

The HRP pumps do not require any Q-max or Q-min orifices. The internal design of the pump incorporates an internal pressure equalization that enables the pump to depressurize quickly to the suction side during standstill, therefore eliminating the need for additional degassing lines.

6. Strong construction

The open execution of the impellers applies only small axial forces. The transformer oil protects the motor against moisture and provides good thermal conductivity.

7. Proven bearing design

With our extensive experience we have developed an improved low-wear bearing design. By monitoring the electrical resistance at the sensor contact, it is possible to detect for bearing wear while pump is at standstill.



8. Low maintenance

When the correct installation instructions are observed and carried out the pump will run for many trouble-free years without requiring maintenance. The strong conical filter in the pump suction inlet should be checked after commissioning. Note no other filters in the suction pipework are required. In the event of the pump filling with oil, it can be drained through screw plugs.

9. Suspended installation

Due to formation of ice around the pump, the suspended installation is preferred to foot mounting. This also allows for easy access to service the conical filter and to installing a condensate drip tray.

Consult Parker for ordering information.

Same blue paint pigment to match Refrigerating Specialties Division's new factory enhanced, corrosion resistant paint.

- Meets Auto Industry Salt Spray Test Standards
- Water Based Low VOL
- EHS Compliant
- Quick Drying



Note: For overseas shipments, consult factory.

11 oz. Can ..... ***Order Part Number 309210***

Warranties

All Refrigerating Specialties products are warranted against defect in workmanship and materials for a period of one year from date of shipment from originating factory. This warranty is in force only when products are properly installed, field assembled, maintained and operated in use and service, as specifically stated in Refrigerating Specialties Catalogs or Bulletins for normal refrigeration applications, unless otherwise approved in writing by Refrigerating Specialties Division. Defective products, or parts thereof, returned to the factory with transportation charges prepaid, and found to be defective by factory inspection, will be replaced or repaired at Refrigerating Specialties option, free of charge, F.O.B. factory. Warranty does not cover products which have been altered, repaired in the field, damaged in transit or have suffered accidents, misuse or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

THE EXPRESS WARRANTY SET FORTH ABOVE CONSTITUTES THE ONLY WARRANTY APPLICABLE TO REFRIGERATING SPECIALTIES PRODUCTS, AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, WRITTEN OR ORAL, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND IN NO EVENT IS REFRIGERATING SPECIALTIES RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Refrigerating Specialties, nor to assume, for Refrigerating Specialties, any other liability in connection with any of its products.

For More Information

Consult our web site **www.parker.com/refspec** for the most current bulletins and catalog information on all our products.

Safe Operation

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

Where cold refrigerant liquid lines are used, it is necessary that certain precautions by 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. (Tags are available for this purpose from the factory.) 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 or 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.

Flanges with ODS connections are not suitable for ammonia service.

Factory Repair and Rebuilding

For the convenience of our customers, we have a standard factory repair and rebuilding service. Repairable returned regulators are disassembled, cleaned, sandblasted, worn parts replaced, reassembled and repainted. For quickest service, it is advisable that this be done during the off peak season.

Pressure in PSIG

Temp.		MP39 R-401A		HP80 R-402A		HP62 R-404A	FX10 R-408A	FX56 R409A		AZ20 R-410A	R-22	R-123	R-134a	R-502	AZ-50 R-507	R-717
°F	°C	Liquid	Vapor	Liquid	Vapor	Liquid	Liquid	Liquid	Vapor							
-50	-45.6	—	—	—	—	0.6	1.6	***12.4***	***17.2***	5.0	***6.2***	***29.2***	***18.4***	***0.2***	1.0	***14.4***
-45	-42.8	—	—	—	—	2.7	1.1	***9.7***	***15.2***	7.0	***2.7***	***29.0***	***16.6***	1.9	3.0	***11.8***
-40	-40.0	***8.1***	***13.2***	6.8	6.3	5.0	3.3	***6.8***	***13.1***	11.6	0.5	***28.9***	***14.7***	4.1	5.5	***8.8***
-35	-37.2	***5.1***	***10.7***	9.6	9.1	7.6	5.6	***3.5***	***10.7***	14.9	2.6	***28.7***	***12.3***	6.5	8.2	***5.5***
-30	-34.4	***1.7***	***7.9***	12.6	12.1	10.4	8.2	0.0	***8.1***	18.5	4.9	***28.4***	***9.7***	9.2	11.1	***1.7***
-25	-31.7	1.0	***4.8***	16.0	15.4	13.4	11.0	2.0	***5.1***	22.5	7.4	***28.1***	***6.8***	12.1	14.3	1.2
-20	-28.9	3.0	***1.4***	19.6	18.9	16.8	14.1	4.1	***1.9***	26.9	10.1	***27.8***	***3.6***	15.3	17.8	3.5
-15	-26.1	5.2	1.2	23.6	22.9	20.5	17.5	6.5	0.8	31.6	13.2	***27.4***	***0.1***	18.8	21.7	6.2
-10	-23.3	7.7	3.3	27.9	27.1	24.5	21.2	9.0	2.8	36.8	16.4	***27.0***	2.0	22.6	25.8	9.0
-5	-20.6	10.3	5.5	32.6	31.7	28.8	25.2	11.8	4.9	42.5	20.0	***26.5***	4.1	26.6	30.3	12.3
0	-17.8	13.2	8.0	37.6	36.7	33.5	29.5	14.8	7.2	48.6	24.0	***25.9***	6.5	31.1	35.2	15.6
5	-15.0	16.3	10.7	43.1	42.1	38.6	34.2	18.1	9.7	55.2	28.2	***25.3***	9.1	35.9	40.5	19.5
10	-12.2	19.7	13.7	49.0	48.0	44.0	39.3	21.7	12.5	62.3	32.7	***24.6***	11.9	41.0	46.1	23.7
15	-9.4	23.4	16.9	55.3	54.2	49.9	44.8	25.5	15.4	70.0	37.7	***23.7***	15.1	46.5	52.2	28.3
20	-6.7	27.4	20.4	62.1	60.9	56.2	50.7	29.6	18.7	78.3	43.0	***22.8***	18.4	52.5	58.8	33.4
25	-3.9	31.7	24.2	69.3	68.1	63.0	57.0	34.0	22.2	87.2	48.7	***21.8***	22.1	58.8	65.8	38.8
30	-1.1	36.4	28.3	77.1	75.8	70.3	63.7	38.7	26.0	96.8	54.9	***20.7***	26.1	65.6	73.3	44.9
35	1.7	41.3	32.8	85.4	84.0	78.1	71.0	43.8	30.1	107.0	61.4	***19.5***	30.4	72.8	81.3	51.4
40	4.4	46.6	37.6	94.2	92.8	86.4	78.7	49.2	34.5	118.0	68.5	***18.1***	35.1	80.5	89.8	58.4
45	7.2	52.4	42.7	104.0	102.0	95.4	87.0	54.9	39.2	130.0	76.0	***16.6***	40.0	88.7	98.9	66.1
50	10.0	58.5	48.2	114.0	112.0	104.7	95.8	61.0	44.3	142.0	84.0	***15.0***	45.4	97.4	109.0	74.3
55	12.8	65.0	54.1	124.0	123.0	114.7	105.1	67.6	49.8	156.0	92.5	***13.1***	51.2	107.0	119.0	83.2
60	15.6	71.9	60.4	136.0	134.0	125.3	115.1	74.5	55.6	170.0	101.6	***11.2***	57.4	116.4	130.0	92.6
65	18.3	79.3	67.2	147.0	146.0	136.6	125.6	81.8	61.9	185.0	111.0	***9.0***	64.0	127.0	141.0	102.8
70	21.1	87.1	74.4	160.0	158.0	148.6	136.8	89.5	68.6	201.0	121.4	***6.6***	71.1	138.0	154.0	113.8
75	23.9	95.4	82.1	173.0	171.0	161.2	148.7	97.7	75.8	217.0	132.0	***4.0***	78.6	149.0	167.0	125.5
80	26.7	104.0	90.2	187.0	185.0	174.6	161.2	106.4	83.4	235.0	144.0	***1.2***	86.7	161.0	180.0	138.0
85	29.4	114.0	98.9	202.0	200.0	188.8	174.4	115.5	91.5	254.0	156.0	0.9	95.1	174.0	195.0	151.4
90	32.2	123.0	108.0	218.0	215.0	203.7	188.4	125.2	100.2	274.0	168.4	2.5	104.2	187.4	210.0	165.5
95	35.0	134.0	118.0	233.0	232.0	219.4	203.1	135.3	109.4	295.0	182.0	4.2	113.8	201.0	226.0	180.6
100	37.8	145.0	128.0	251.0	249.0	235.9	218.7	146.0	119.2	317.0	196.0	6.1	124.1	216.2	244.0	196.7
105	40.6	156.0	139.0	269.0	267.0	253.4	235.0	157.2	129.6	341.0	211.0	8.1	134.9	232.0	252.0	213.9
110	43.3	169.0	151.0	288.0	286.0	271.7	252.1	169.0	140.6	365.0	226.4	10.3	146.3	247.9	281.0	231.8
115	46.1	181.0	163.0	308.0	305.0	290.9	270.2	181.4	152.3	391.0	243.0	12.6	158.4	265.0	301.0	251.0
120	48.9	195.0	176.0	238.0	326.0	311.1	289.1	194.4	164.7	418.0	260.0	15.1	171.1	282.7	322.0	271.1
125	51.7	209.0	189.0	350.0	347.0	332.3	308.9	208.0	177.8	446.0	278.4	17.7	184.5	301.0	344.0	292.5
130	54.4	224.0	203.0	372.0	370.0	354.5	329.7	222.3	191.6	476.0	296.8	20.6	198.7	320.8	368.0	314.9
135	57.2	239.0	218.0	396.0	393.0	377.8	351.5	237.2	206.3	507.0	317.0	23.6	213.6	341.0	393.0	338.8
140	60.0	255.0	234.0	420.0	418.0	402.2	374.3	252.9	221.8	539.0	337.3	26.8	229.3	362.6	419.0	363.5
145	62.8	272.0	250.0	446.0	443.0	427.7	398.1	269.3	238.2	573.0	359.0	30.2	245.7	385.0	446.0	390.2
150	65.6	299.0	267.0	472.0	470.0	454.4	423.0	293.0	286.4	608.0	381.0	33.8	263.0	408.4	475.0	417.4

Italics = inches Hg. Below 1 ATM

Pressure in Bar

Temp.		MP39 R-401A		HP80 R-402A		HP62 R-404A	FX10 R-408A	FX56 R409A		AZ20 R-410A	R-22	R-123	R-134a	R-502	AZ-50 R-507	R-717
°F	°C	Liquid	Vapor	Liquid	Vapor	Liquid	Liquid	Liquid	Vapor							
-50	-45.6	—	—	—	—	0.0	0.1	***315.0***	***436.9***	0.3	***157.5***	***741.7***	***467.4***	***5.1***	0.1	***365.8***
-45	-42.8	—	—	—	—	0.2	0.1	***246.4***	***386.1***	0.5	***68.6***	***736.6***	***421.6***	0.1	0.2	***299.7***
-40	-40.0	***205.7***	***335.3***	0.5	0.4	0.3	0.2	***172.7***	***332.7***	0.8	0.0	***734.1***	***373.4***	0.3	0.4	***223.5***
-35	-37.2	***129.5***	***271.8***	0.7	0.6	0.5	0.4	***88.9***	***271.8***	1.0	0.2	***729.0***	***312.4***	0.4	0.6	***139.7***
-30	-34.4	***43.2***	***200.7***	0.9	0.8	0.7	0.6	0.0	***205.7***	1.3	0.3	***721.4***	***246.4***	0.6	0.8	***43.2***
-25	-31.7	0.1	***121.9***	1.1	1.1	0.9	0.8	0.1	***129.5***	1.6	0.5	***713.7***	***172.7***	0.8	1.0	0.1
-20	-28.9	0.2	***35.6***	1.4	1.3	1.2	1.0	0.3	***48.3***	1.9	0.7	***706.1***	***91.4***	1.1	1.2	0.2
-15	-26.1	0.4	0.1	1.6	1.6	1.4	1.2	0.4	0.1	2.2	0.9	***696.0***	***2.5***	1.3	1.5	0.4
-10	-23.3	0.5	0.2	1.9	1.9	1.7	1.5	0.6	0.2	2.5	1.1	***685.8***	0.1	1.6	1.8	0.6
-5	-20.6	0.7	0.4	2.2	2.2	2.0	1.7	0.8	0.3	2.9	1.4	***673.1***	0.3	1.8	2.1	0.8
0	-17.8	0.9	0.6	2.6	2.5	2.3	2.0	1.0	0.5	3.4	1.7	***657.9***	0.4	2.1	2.4	1.1
5	-15.0	1.1	0.7	3.0	2.9	2.7	2.4	1.2	0.7	3.8	1.9	***642.6***	0.6	2.5	2.8	1.3
10	-12.2	1.4	0.9	3.4	3.3	3.0	2.7	1.5	0.9	4.3	2.3	***624.8***	0.8	2.8	3.2	1.6
15	-9.4	1.6	1.2	3.8	3.7	3.4	3.1	1.8	1.1	4.8	2.6	***602.0***	1.0	3.2	3.6	2.0
20	-6.7	1.9	1.4	4.3	4.2	3.9	3.5	2.0	1.3	5.4	3.0	***579.1***	1.3	3.6	4.1	2.3
25	-3.9	2.2	1.7	4.8	4.7	4.3	3.9	2.3	1.5	6.0	3.4	***553.7***	1.5	4.1	4.5	2.7
30	-1.1	2.5	2.0	5.3	5.2	4.8	4.4	2.7	1.8	6.7	3.8	***525.8***	1.8	4.5	5.1	3.1
35	1.7	2.8	2.3	5.9	5.8	5.4	4.9	3.0	2.1	7.4	4.2	***495.3***	2.1	5.0	5.6	3.5
40	4.4	3.2	2.6	6.5	6.4	6.0	5.4	3.4	2.4	8.1	4.7	***459.7***	2.4	5.6	6.2	4.0
45	7.2	3.6	2.9	7.2	7.0	6.6	6.0	3.8	2.7	9.0	5.2	***421.6***	2.8	6.1	6.8	4.6
50	10.0	4.0	3.3	7.9	7.7	7.2	6.6	4.2	3.1	9.8	5.8	***381.0***	3.1	6.7	7.5	5.1
55	12.8	4.5	3.7	8.6	8.5	7.9	7.2	4.7	3.4	10.8	6.4	***332.7***	3.5	7.4	8.2	5.7
60	15.6	5.0	4.2	9.4	9.2	8.6	7.9	5.1	3.8	11.7	7.0	***284.5***	4.0	8.0	9.0	6.4
65	18.3	5.5	4.6	10.1	10.1	9.4	8.7	5.6	4.3	12.8	7.7	***228.6***	4.4	8.8	9.7	7.1
70	21.1	6.0	5.1	11.0	10.9	10.2	9.4	6.2	4.7	13.9	8.4	***167.6***	4.9	9.5	10.6	7.8
75	23.9	6.6	5.7	11.9	11.8	11.1	10.3	6.7	5.2	15.0	9.1	***101.6***	5.4	10.3	11.5	8.7
80	26.7	7.2	6.2	12.9	12.8	12.0	11.1	7.3	5.8	16.2	9.9	***30.5***	6.0	11.1	12.4	9.5
85	29.4	7.9	6.8	13.9	13.8	13.0	12.0	8.0	6.3	17.5	10.8	0.1	6.6	12.0	13.4	10.4
90	32.2	8.5	7.4	15.0	14.8	14.0	13.0	8.6	6.9	18.9	11.6	0.2	7.2	12.9	14.5	11.4
95	35.0	9.2	8.1	16.1	16.0	15.1	14.0	9.3	7.5	20.3	12.6	0.3	7.8	13.9	15.6	12.5
100	37.8	10.0	8.8	17.3	17.2	16.3	15.1	10.1	8.2	21.9	13.5	0.4	8.6	14.9	16.8	13.6
105	40.6	10.8	9.6	18.6	18.4	17.5	16.2	10.8	8.9	23.5	14.6	0.6	9.3	16.0	17.4	14.8
110	43.3	11.7	10.4	19.9	19.7	18.7	17.4	11.7	9.7	25.2	15.6	0.7	10.1	17.1	19.4	16.0
115	46.1	12.5	11.2	21.2	21.0	20.1	18.6	12.5	10.5	27.0	16.8	0.9	10.9	18.3	20.8	17.3
120	48.9	13.4	12.1	16.4	22.5	21.5	19.9	13.4	11.4	28.8	17.9	1.0	11.8	19.5	22.2	18.7
125	51.7	14.4	13.0	24.1	23.9	22.9	21.3	14.3	12.3	30.8	19.2	1.2	12.7	20.8	23.7	20.2
130	54.4	15.4	14.0	25.7	25.5	24.4	22.7	15.3	13.2	32.8	20.5	1.4	13.7	22.1	25.4	21.7
135	57.2	16.5	15.0	27.3	27.1	26.1	24.2	16.4	14.2	35.0	21.9	1.6	14.7	23.5	27.1	23.4
140	60.0	17.6	16.1	29.0	28.8	27.7	25.8	17.4	15.3	37.2	23.3	1.8	15.8	25.0	28.9	25.1
145	62.8	18.8	17.2	30.8	30.6	29.5	27.5	18.6	16.4	39.5	24.8	2.1	16.9	26.6	30.8	26.9
150	65.6	20.6	18.4	32.6	32.4	31.3	29.2	20.2	19.8	41.9	26.3	2.3	18.1	28.2	32.8	28.8

Italics = mm Hg. Below 1 ATM

Parker Hannifin Corporation
Climate & Industrial Controls Group
Cleveland, OH

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9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

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12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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Parker Hannifin Corporation

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving more than 400,000 customers worldwide.

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To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

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North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Center at our toll-free number: 1-800-C-PARKER (1-800-272-7537). In the UK, a similar service is available by calling 0500-103-203.

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Instrumentation

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