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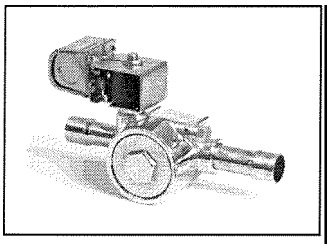

INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS REFRIGERATION SOLENOID VALVE 2-WAY NORMALLY CLOSED AND 2-WAY NORMALLY OPEN PILOT OPERATED PISTON VALVES R40 AND R45 SERIES

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GENERAL SAFETY INSTRUCTIONS BEFORE INSTALLATION

Carefully read installation, operation and maintenance procedures prior to installing or servicing valve.
Valves for use with common refrigerants. Do not use with ammonia or corrosive fluids.
Do not use solenoid as a safety shut-off valve when making repairs.
Do not install a valve before depressurizing system down to atmospheric pressure.
Follow brazing instructions to prevent valve damage.
Remove coil, if assembled, prior to brazing.

DESCRIPTION

These valves are 2-way pilot operated valves. The refrigeration valve product line contains both normally closed (N.C.) and normally open (N.O.) valves in a brass construction. The pilot operated models require a minimum operating pressure differential to ensure valve operation.

Valves may be ordered with either NEMA 2, 4, 4X integrated coils for ordinary locations or NEMA 4, 4X, 7, and 9 for hazardous locations: Divisions I and II; Class I, Groups A, B, C, and D; Class II, Groups E, F, and G. Additional solenoid coils and enclosures are offered as described in our catalog.

PRINCIPLES OF OPERATION

R40 SERIES - NORMALLY CLOSED

The valve utilizes a plunger to open and close a pilot orifice. Opening the pilot orifice causes a pressure differential and subsequent piston assembly shift to open and close the valve's main orifice.

Solenoid De-energized: Pressure is connected to inlet port and is blocked by the plunger on the pilot orifice and by the piston on the main valve orifice.

Solenoid Energized: The plunger is lifted off the pilot orifice venting the pressure behind the piston. The venting of pressure enables the piston to open the main orifice, allowing flow though the valve.

R45 SERIES - NORMALLY OPEN

The valve utilizes a push operator to open and close the pilot orifice. Closing the pilot orifice causes a pressure differential and subsequent piston assembly shift to close the valve's main orifice.

Solenoid De-energized: Pressure is connected to inlet port and fluid is free to flow to the outlet port.

Solenoid Energized: The plunger shifts to close the pilot orifice causing pressure to build up behind the piston which shifts the piston to close the main valve orifice. Flow between the inlet and outlet ports is then stopped.

CAUTION: A minimum operating pressure differential of 1 psi is required for proper valve operation.

FLUID CODES

Listed below are the codes utilized by Underwriters Laboratories (UL) and the Canadian Standards Association (CSA) for various common fluids. The codes for those fluids that are approved or certified by the agencies for use with each valve are printed on the outside of the individual packaging.

CODE	FLUID
F21	- Air, water & light oils
F22	- Common refrigerants except ammonia

For the maximum fluid temperatures, as well as valve ambient limitations, check the valve part number on the nameplate and refer to the catalog.

MANUAL BYPASS

Note: The manual bypass described below is optional. The description and operation instructions apply to valves that have been equipped with the appropriate manual bypass stem.

The manual bypass operator allows manual operation when desired or during an electrical power outage. The stem contains a 1/8" square drive for ease of operation with a standard refrigeration or open end wrench.

General: The manual bypass stem is a 1/2 turn clockwise override. The first 1/4 turn opens the solenoid operated pilot. The second 1/4 turn opens the main piston. The valve is supplied with the bypass stem in the off position (all counterclockwise) against a mechanical stop.

To open the pilot section: Turn the bypass stem 1/4 turn clockwise. If there is at least a 2 psi pressure drop, the main piston will shift thus opening the main orifice. To close the valve, turn the stem counterclockwise to the off position.

To block the main piston open: If it is necessary to open the main orifice below 2 psi or to block it open after opening the pilot, continue to turn the stem clockwise another 1/4 turn or to the mechanical stop. This will keep the valve open when charging the system. To close the valve, turn the stem counterclockwise 180 degrees or 1/2 turn to the off position or mechanical stop.

WARNING: For valve to operate electrically, the manual bypass stem must be fully disengaged in the off position.

INSTALLATION INSTRUCTIONS

Mounting position and pressure limits: Valves can be mounted directly on piping and are designed to operate in any position. The valves may be installed in any line regardless of the direction in which the line runs. However, for optimum life and performance the valves should be mounted vertically upright so as to minimize wear and reduce the possibility of foreign matter accumulating inside the sleeve area.

Line pressure, voltage and frequency must conform to nameplate rating. Allow adequate clearance above valve for removal of coil.

EXTENDED END TUBE SOLDER CONNECTIONS

Refrigeration solenoid valves with solder type connections may be installed without disassembly. Any of the commonly used types of solder are satisfactory with the brass or copper tubes.

CAUTION: - Do not over-heat the valve due to prolonged heating as internal component damage may occur. It is recommended that the flame be directed away from the valve body. Place a wet rag or heat sink on the extensions at the body to prevent overheating.

CAUTION: ***Do not* use *sleeve or enclosure as a lever when applying torque. Connect refrigerant Jines to the inlet and outlet ports.***

Media filtration: For protection of the valve install a suitable strainer or filter in the inlet side as close to the valve as possible. Dirt or foreign material in the media may cause excessive leakage, wear, or in exceptional cases, malfunction. Clean periodically depending on service conditions.

Lubrication: Lubrication is not required although line lubrication will substantially increase valve life.

Electrical connection: Electrical supply must conform to nameplate rating. Connect coil leads or terminals to the electrical circuit using standard electrical practices in compliance with local authorities and the National Electrical Code.

Do not power coil until it has been fitted and the retaining washer and nut have been installed to prevent possible coil damage from overheating.

WARNING: *Turn off electrical power before connecting the valve to the power source.*

WARNING: *Valves to be installed in **Hazardous Locations,** must be outfitted with Hazardous Location coils only. Verify nameplate data and coil part number before installing the valve.*

If the coil assembly is located in an inconvenient orientation, it may be reoriented to facilitate installation. Loosen coil assembly nut, rotate coil assembly to desired position, then retighten the nut with an input torque of 43- 53 in-lbs.

COIL ASSEMBLY

ASSEMBLY INSTRUCTIONS FOR ALL COIL TYPES

Position coil (as described below) on the sleeve, install valve identification plate on top of coil, slide the wave washer over the sleeve and tighten coil assembly nut with an input torque of 43-53 in-lbs.

Junction Box Coil Assembly: Loosen and remove junction box cover from frame. Remove knock out tabs by pushing and twisting until tab separates from frame. Install wiring cable. Feed the power lead wires into the junction box and attach the power lead wires to the coil wires using wire twist nuts. Attach the ground wire to the junction box frame as necessary. Carefully fold the wires and replace the junction box cover to the frame ensuring that the tabs are contained within the cover.

CAUTION: Failure to attach ground wire to ground screw may violate certain electrical codes and create a hazard.

DIN Coil and various cable option terminations: Loosen cable screw and remove plastic housing from DIN coil. Do not remove the gasket from the DIN spades on the coil. Separate the plastic block from the housing with a small screwdriver to expose the electrical terminations. Feed the lead wires through the DIN connector housing and attach them to the appropriate screw terminal. Snap the plastic block back into place. Replace the plastic housing onto the DIN spades and tighten the screws. To secure the housing and coil together, apply 20 to 30 in- lbs. torque to the mounting screw.

Conduit Coil with 1/2" NPT connection: Conduit coils are available with either NEMA 2, 4, 4X integrated coils for ordinary locations or NEMA 4, 4X, 7, and 9 for hazardous locations: Divisions I and II; Class I, Groups A, B, C, and D; Class II, Groups E, F, and G.

Use suitable electrical cabling and conduit materials and components meeting applicable NEMA recommendations.

Spade Coil with ¼" tabs: Slide coil assembly over sleeve. Connect spade termination connector to spade tabs on coil.

Coil/enclosure temperature: Refrigeration valves are supplied with coils designed for continuous duty service. Normal free space must be provided for proper ventilation. When the coil is energized continuously for long periods of time, the coil assembly will become hot. The coil is designed to operate permanently under these conditions.

Smoking and/or odor of burning coil insulation will indicate any excessive heating.

For the maximum valve ambient conditions, as well as the fluid temperatures, check the valve part number on the nameplate and refer to the catalog to determine the maximum temperatures.

MAINTENANCE

Note: Depending on service conditions, fluid being used, filtration, and lubrication, it may be required to periodically clean and/or replace worn components. See Disassembly Instructions.

CAUTION: Do not expose plastic or elastomeric materials to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.

DISASSEMBLY INSTRUCTIONS

WARNING: Depressurize system and turn off electrical power to the valve before attempting repair. The coil must not be energized unless it is installed on the valve. Otherwise, the coil will overheat and burn out.

The valve body need not be removed from the line.

CAUTION: When removing or replacing the sleeve assembly, it may be necessary to provide proper support to prevent the valve from rotating thereby causing damage to piping.

To remove the coil assembly:

For both ordinary and hazardous location constructions, unscrew the nut on the top of the coil assembly. The wave washer and coil assembly can now be removed. The coil assembly can be lifted off the sleeve tube.

R40 SERIES - NORMALLY CLOSED VALVES

To disassemble the pressure vessel:

For the pilot section, use a 7/8" (22mm) wrench or an adjustable wrench to remove the sleeve tube. The plunger assembly, return spring and O-ring seal can be removed.

Manual bypass stem removal (where applicable) - Remove manual stem cap by turning counterclockwise. Use retainer tool to remove serviceable manual stem retainer. Rotate and pull the manual bypass stem until it is free to remove. Withdraw bypass stem.

For the piston section, to remove the piston, use a 1" wrench or an adjustable wrench to remove the piston plug in the bottom of the body. The piston, spring, and seal can be removed.

R45 SERIES- NORMALLY OPEN VALVES

For the pilot section, use a 7/8" (22mm) wrench or an adjustable wrench to remove the sleeve tube. The seat retainer assembly, pin, spring and O-ring can be removed.

For the piston section, to remove the piston, use a 1" wrench or an adjustable wrench to remove the piston plug in the bottom of the body. The piston, spring, and seal can be removed.

Parts kits are available for each valve. Parts included in each kit are marked with an **asterisk** (*). See exploded views.

REASSEMBLY INSTRUCTIONS

R40 SERIES - NORMALLY CLOSED VALVES

To reassemble the pressure vessel, refer to exploded view drawings. Parts must be replaced in the order shown. For the pilot section, assemble the (3) a-rings on manual bypass stem (where applicable) prior to assembly of sleeve to the body. Insert manual stem into the body. Replace the manual stem retainer and torque to 40 - 50 in-lbs. Reference Figure 1 tor manual stem positioning allowing assembly of the sleeve into the valve body.

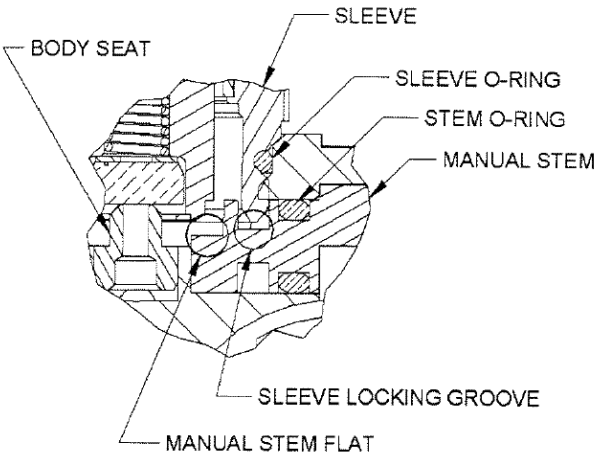
Replace the o-ring on the sleeve located just under the hex flange. Install the plunger and spring into the sleeve. Carefully align threads while installing the sleeve into the valve body. Tighten the sleeve assembly in the body with an input torque of 260-270 in-lbs.

For the piston section, insert piston / piston ring assembly into body, insert spring over stem of piston. Place seal into body. Carefully install the plug into the bottom of the body. Tighten the plug in the body with an input torque of 80 ft-lbs.

CAUTION: Visually check that the stem touches the valve orifice and the manual stem flat is in the horizontal position and the sleeve locking groove on the manual stem is visible Oust below the threads) when looking into the valve. Failure to properly replace the manual stem retainer and cap onto the valve body could allow the manual stem to blow out when the valve is pressurized and cause damage.

Replacement Parts: When ordering replacement parts kits, specify valve number and voltage from nameplate.

Figure 1 – Stem Position Diagram for Reassembly



R45 SERIES - NORMALLY OPEN VALVES

To reassemble the pressure vessel, refer to exploded view drawings. Parts must be replaced in the order shown.
For the pilot section, replace the O-ring on the sleeve located just under the hex flange. Hold the sleeve in the upside down position with the open end up. Insert the pin in the hole in the center of the sleeve. Place the spring onto the small end of the guide assembly and insert into the sleeve, guide end first. Place finger on the components to hold in place, if necessary, while carefully aligning threads while installing the sleeve into the valve body.

Tighten the sleeve assembly in the body with an input torque of 260-270 in-lbs.

For the piston section, insert piston / piston ring assembly into body, insert spring over stem of piston. Place seal into body. Carefully install the plug into the bottom of the body. Tighten the plug in the body with an input torque of 80 ft-lbs.

COIL REASSEMBLY INSTRUCTIONS

With coil assembly repositioned on the sleeve, reinstall data identification plate in place, slide the wave washer over the sleeve and tighten coil assembly nut with an input torque of 43-53 in-lbs.

TROUBLE SHOOTING	
PROBLEM	**PROCEDURE**
Valve fails to operate.	1. Check electrical supply with voltmeter. Voltage must agree with nameplate rating. 2. If supply voltage is too low, locate and correct cause of low voltage. Should exceed 85% of rated voltage. 3. Check coil with ohmmeter for shorted or open coil. 4. Make sure that pressure complies with nameplate rating. 5. Valve oversized for application. Reference catalog to determine proper valve to meet system capacity.
Valve coil burn-out	1. Continuous high voltage greater than 10% of rated voltage could result in coil failure. Locate and correct cause of high voltage. 2. Disassemble valve as per the Disassembly Instructions. Check for foreign material lodged in valve. Clean out extraneous matter. The plunger must be free to move without binding. 3. Check electrical wiring installation. 4. Valve located in high ambient temperature. Ventilate or isolate area 5. from high temperatures. May require valve relocation to lower temperature area.
Valve is sluggish or inoperative - electrical supply and pressure check out.	1. Disassemble valve as per the Disassembly Instructions. Clean out extraneous matter. The plunger must be free to move without binding. 2. The plunger / piston must be free to move without binding. Check for clogged or obstructed bleed hole in piston. 3. Check all springs, if broken, replace.
Valve fails to close (normally closed valve).	1. Disassemble valve as per the Disassembly Instructions. Clean out extraneous matter. The plunger must be free to move without binding. 2. Make sure manual bypass stem is not engaged by turning in counterclockwise direction until valve closes. 3. With coil de-energized, check power at coil wires. Power should be off. If power is present, correct faulty contacts or wiring.
Valve fails to close (normally open valve).	1. Disassemble valve as per the Disassembly Instructions. Clean out extraneous matter. The plunger must be free to move without binding. 2. The pin and spring must be properly inserted in the sleeve assembly. 3. With coil energized, check power at coil wires. Power should be on. If power is present, correct faulty contacts or wiring.
External leakage at sleeve flange.	1. Check that sleeve is torqued to 260-270 in-lbs. 2. If leakage persists, remove sleeve and check O-ring seal for damage. Replace if defective.
External leakage at manual bypass stem (where available).	1. Disassemble manual stem in valve per the Disassembly Instructions.
Internal Leakage	1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in a mild soap and water solution. 2. Examine surface of the piston. If damaged or worn, replace piston. 3. Examine orifice in body for nicks. Damage may require a new replacement valve. 4. Inspect the piston seat for nicks or scratches. Replace if damaged. 5. Inspect the piston seat for foreign matter or dirt accumulation. Also inspect the seat for wire drawing. Worn or dirty seat may require replacement of the valve.

DECLARATION

Parker's Fluid Control Division certifies its valve appliance products complies with the essential requirements of the applicable European Community Directives. We hereby confirm that the appliance has been manufactured in compliance with the applicable standards and is intended for installation in a machine or application where commissioning is prohibited until evidence has been provided that the machine or application is also in compliance with EC directives.

The data supplied in the Parker catalogs and general Installation, Operating & Maintenance Instructions are to be consulted and pertinent accident prevention regulations followed during product installation and use. Any unauthorized work performed on the product by the purchaser or by third parties can impair its function and relieves Parker Hannifin of all warranty claims and liability for any misuse and resulting damage.

A separate Declaration of Conformity or Manufacturer's declaration is available upon request. Please provide valve identification numbers and order serial numbers of products concerned.

R40 - R45 PARTS LIST				
ITEM	QTY	DESCRIPTION	N.C. REPAIR	N.O. REPAIR
1	1	BODY ASSEMBLY		
2	1	O-RING	X	
3	2	O-RING	X	
4	1	OVERRIDE STEM	X	
5	1	OVERRIDE STEM RETAINER		
6	1	OVERRIDE CAP		
7	1	PISTON RING SPRING	X	X
8	1	PISTON RING	X	X
9	1	PISTON ASSEMBLY	X	X
10	1	SPRING	X	X
11	1	SEAL	X	X
12	1	COVER		
13	1	ORIFICE		
14	1	N.C. PLUNGER ASSEMBLY	X	
15	1	N.C. SPRING	X	
16	1	O-RING	X	X
17	1	N.C. SLEEVE ASSEMBLY		
18	1	N.O. SPRING		X
19	1	SEAT RETAINER ASSEMBLY		X
20	1	PIN		X
21	1	N.O. SLEEVE ASSEMBLY		
22	1	JUNCTION BOX ENCLOSURE		
23	1	SPADE COIL ENCLOSURE		
24	1	DIN COIL ENCLOSURE		
25	1	NAMEPLATE		
26	1	WASHER		
27	1	NUT		

"X" - PARTS CONTAINED IN VALVE REPAIR KIT

FOR VALVES WITHOUT MANUAL OVERRIDE
STEM ITEMS 2, 3, &, 4 CAN BE DISCARDED