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INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS

3-WAY N.C., N.O. and D.C. SOLENOID VALVE
3/8", 1/2", 3/4" NPT
VALVE TYPES: 73312, 73322, 73382

This document is intended for use as a complementary resource to the User Safety Responsibility Statements located in product literature and posted to www.parker.com/safety.

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS ("Products") COULD CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

Possible consequences of failure or improper selection, or improper use of these Products include, but are not limited to:

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- Work piece or component parts being thrown off at high speeds
- Failure of a device to function properly, for example, failure to clamp or unclamp an associated item or device
- Explosion
- Sudden moving or falling objects
- Release of toxic or otherwise injurious liquids or gases
- Electrical shorts or burn out of equipment

Before selecting or using any of these Products, it is important that you read and follow the subsequent instructions.

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 the application, follow applicable industry standards, and follow the information concerning the Product in the current Product literature and in any other materials provided from Parker or its subsidiaries or authorized distributors. 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 system and components and assuring that all performance, endurance, maintenance, safety, and warning requirements of the application are met.

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DESCRIPTION

These valves are 3-way, pilot operated diaphragm models requiring a minimum operating pressure differential of 10 PSI to insure valve operation. They are available in normally closed (N.C.), normally open (N.O.) and directional control (D.C.) versions. The 73312, 73322 and 73382 are offered in a combination of brass and stainless steel construction. 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

Normally closed type: 73312

De-energized: Pressure is connected to the inlet port 1 and is directed to the cavity behind the spindle assembly. The diaphragm cavity is open to the sleeve pilot exhaust and the fluid pressure is unbalanced across the diaphragm. The fluid pressure behind the spindle assembly in conjunction with the spindle assembly spring will shift the spool so that the spindle seal prevents flow thru the valve. Cylinder port 2 is open to exhaust port 3.

Energized: The plunger moves upwards and closes the sleeve pilot exhaust. This action causes the pressure to increase behind the diaphragm. Once this pressure exceeds the fluid pressure behind the spindle and spindle assembly spring the spindle assembly will shift, opening the inlet orifice and sealing the exhaust orifice. Flow is now from inlet port 1 to cylinder port 2. The exhaust port 3 is now sealed.

Normally open type: 73322

De-energized: Pressure is connected to the inlet port 3 and is directed to the cavity in front of the diaphragm. Fluid behind the diaphragm will vent thru the sleeve. Fluid pressure is unbalanced across the diaphragm. As a result, the fluid pressure in front of the diaphragm will shift the spindle assembly opening the inlet orifice and sealing the exhaust orifice. Flow is from the inlet port 3 to cylinder port 2. The exhaust port 1 is sealed.

Energized: The plunger moves upwards and closes the sleeve pilot exhaust. As a result, the pressure behind the diaphragm in combination with the diaphragm spring causes the spindle assembly to shift, opening the exhaust orifice and closing the inlet orifice. Flow is now from the cylinder port 2 to the exhaust port 1. The inlet port 3 is sealed.

Directional control type 73382:

De-energized: Pressure is connected to the in port 2 and directed to the pilot orifice. The pilot orifice is sealed by the plunger. The diaphragm cavity is open to the sleeve pilot exhaust. The inlet pressure in conjunction with the spindle spring is sufficient to shift the spindle assembly opening the normally open port 3 and sealing the normally closed port 1.

Energized: The plunger moves upward sealing the sleeve pilot exhaust and opening the pilot orifice allowing the pressure to increase behind the diaphragm assembly. The force behind the diaphragm assembly is now sufficient to overcome the inlet pressure and spindle spring force shifting the spindle in the other direction. This action opens the normally closed port 1 and seals the normally open port 3.

Note: A minimum operating pressure differential of 10 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
A	-	Air or nontoxic, nonflammable gases
AC	-	Acetylene
F	-	Common refrigerants except ammonia
G	-	City gas supplied by public utilities
GA	-	Gasoline
HO	-	Petroleum based hydraulic oils having viscosities of up from 125 to 400 SSU at 38°C
02		Nos. 1 and 2 fuel oils, oils having viscosities not more than 40 SSU at 38°C
02 - 06	-	No. 2 through No. 6 oil
OX	-	Oxygen
S	-	Steam
W	-	Water or other aqueous nonflammable liquids

For the maximum fluid temperatures, as well as valve ambient temperature limitations, check the valve part number on the nameplate and refer to the catalog or the outside of the shipping package.

INSTALLATION INSTRUCTIONS

Mounting position and pressure limits: Valves can be mounted directly on piping. The 73312, 73322 and 73382 valves are designed to be multi-poised and will perform properly when mounted in any position. However, for optimum life and performance the valves should be mounted vertically upright to minimize wear and reduce the possibility of foreign matter accumulating inside the sleeve area.

Minimum and maximum line pressure must conform to the nameplate rating.

Piping: Connect line pressure to the inlet port. Use of Teflon tape, thread compound or sealants is permissible, but should be applied sparingly to male pipe threads only. Valves with 'J0" in position 11 & 12 of the part number include a pilot exhaust pipe return. Valves with 'J1 " In the position 11 & 12 do not include a pilot exhaust pipe return. **In the case of "J1", the exhaust adapter should be connected to an exhaust line if the medium is a liquid or air polluting gas.** When threading pipe fittings into sleeve port use an open end wrench on the flats of the adapter to prevent the hex adapter from turning.

CAUTION: Do not allow foreign particles, Teflon tape, or thread compound to enter valve. Tightening torque should not exceed the following values at the stated port sizes: 3/8" NPT - 225 in-lbs., 1/2" NPT - 300 in-lbs., 3/4" NPT - 450 in-lbs. When provided, wrench flats on the body should be used when applying torque. **Do not use sleeve or enclosure as a lever.**

Media filtration: Filtration of 100 microns or better is recommended. Install the filter on the inlet side as close to the valve possible. Dirt or foreign material in the media may cause leakage, excessive wear, or in exceptional cases, malfunction. Clean periodically depending on service conditions.

Lubrication: Lubrication is not required although air 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.

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.

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

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.

DIN Coil and Terminal Box Assembly (Coil Code D100, D200, D300; Option Code TB): Loosen cover screws and swing cover 90°C toward the conduit hub in order to access the interior space. Separate the plastic block containing the screw terminals from the metal enclosure using a small flat head screwdriver. Feed the lead wires through the conduit hub and attach them to the appropriate screw terminal. For electrical connection within the terminal box, use field wire that is rated 90°C greater. Snap the plastic block back into place inside the metal enclosure. Replace the cover and hand-tighten the cover Screws. Place the gasket over the DIN spades on the coil and press the terminal box and coil together. Secure the terminal box to the coil using the mounting screw provided. Apply 20 to 30 in-lbs. torque to the mounting screw.

Screw Terminal Coil and Terminal Box Assembly (Coil Code, S100, S200 or S300; Option Code TB): Loosen cover screws and swing cover 90°C toward the conduit boss in order to access interior space. Feed the lead wires through the conduit hub and attach them to the appropriate screw terminal. For electrical connection within the terminal box, use field wire that is rated 90°C or greater. Replace the cover and hand- tighten the cover screws. Press the terminal box and coil together. Secure the terminal box to the coil using the mounting screw provided. Apply 20 to 30 in-lbs. torque to the mounting screw.

CAUTION: When the DIN or Screw Terminal coils are used with the Terminal Box Assembly, be sure to apply wrench to the wrench flats on the conduit hub when installing electrical conduit.

Coil/enclosure temperature: Standard 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. Any excessive heating will be indicated by smoking and/or odor of burning coil insulation.

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 tun off electrical power to the valve before attempting repair.*

The valves need not be removed from the main line.

To remove the coil assembly: For valves with the exhaust pipe return tube, remove the nuts on the tube. Do not remove the fitting in the adapter or body. For valves without the pipe return, remove the adapter and seal from sleeve. Remove the nut on the top of the coil assembly followed by the wave washer and coil assembly.

To disassemble the pressure vessel: Slide the Skinner U99-011 wrench nut over the sleeve tube. Mate the wrench nut to the sleeve flange and tum the wrench nut. The plunger, return spring, and flange seal may now be removed.

CAUTION; *Do not use a pipe wrench directly on the sleeve. Instead, use a Skinner U99-011 wrench nut to remove and install the sleeve assembly.*

Remove the cover screws holding the large and small covers from the valve body. Remove the small and large covers and O-ring from the small cover. In the case of the 73312 & 73382 valves, remove the spindle spring from the small cover side and for the 73322 type remove the spindle spring from the large cover end.

Remove the spindle assembly by holding one spindle nut with a box or socket wrench and unscrewing the spindle nut on the opposite end. Depending upon which spindle nut was removed, disassemble the parts from the spindle and remove. Pull the spindle and remaining parts from the opposite side. Remove the remaining spindle nut and disassemble parts.

Replacement Parts: When ordering replacement parts kits, specify valve number and voltage from nameplate. Parts kits are available for each valve. Parts included in each kit are marked with an asterisk (*). See exploded views.

REASSEMBLY INSTRUCTIONS

WARNING: *When replacing coils, valves equipped with Hazardous Location coils must use Hazardous Location*

replacement coils only. Verify nameplate data and coil part number before installing the replacement coll.

To reassemble the pressure vessel: Assemble the diaphragm side of the spindle assembly first. Note the orientation of spindle. The larger threaded hub is for the diaphragm assembly.

For 3/4"size, place the O-ring and seal in the seal retainer and place on spindle, seal side in. Note: an additional snubber is required to be assembled to the seal. Add the diaphragm, spacer, diaphragm, diaphragm retainer, nut and lock washer. Hold the spindle and torque to 20-22 in-lbs for the 10-32 nut or 45-50 in-lbs for the 1/4-28 nut. Locating pin holes in diaphragms must line up. Place the assembly in the body through the large cover end. Place the snubber on the side of the spindle opposite the diaphragm with the large diameter next to the spindle hub. Next place the seal and O-ring into the seal retainer on the spindle seal side facing the hub. Add the spindle nut. Hand tighten spindle nut to hold the assembly.

For 3/8 and 1/2" orifice valves, it will be necessary to press the diaphragm and spacer firmly over the shoulder diameter of the seal retainer. The inner diaphragm area should be pushed into undercut of retainer. This alignment position must be maintained during the tightening procedure for the spindle nut in order to assure metal to metal contact between diaphragm retainer and shoulder of seal retainer. Add the spindle nut. Hand tighten spindle nut to hold the assembly.
Place the diaphragm over the locating pin. Special care should be taken so that the spindle assembly is not bent or distorted during this step. A bent or distorted spindle could cause leakage. Holding one spindle nut with a socket wrench tighten both nuts. 3/8" & 1/2' valves (#10 thread} 20-22 in-lbs of torque; 3/4" valves (1/4" thread} 45-50 in-lbs of torque.

Hold the spindle assembly from the small cover end of the valve. Keep the diaphragms smooth and free from wrinkles while the large cover is assembled. For the 73322 version the spindle spring fits into the recess of the larger cover (diaphragm end}. Place the spring in the recess before assembling the cover. Tighten the cover screws with 22-25 in-lbs of torque for the 3/8 and 1/2' versions and 51-57 in-lbs for the 3/4" version.

For the 73312 & 73382 versions the spindle spring fits into the recess of the smaller cover. Place the spindle spring in the small cover cavity. Place the O-ring on the small cover and place on the body. Add and tighten screws with 22-25 in-lbs of torque for the 3/8" & 1/2" version and 51-57 in-lbs of torque for the 3/4" version.

Place the flange seal in the top cover recess. Inert the spring and plunger assembly in the sleeve. Assemble the sleeve into body and with a U99-011 wrench nut, tighten the sleeve to 90- 180 in-lbs. With the coil assembly repositioned on the sleeve, slide the wave washer over the sleeve and tighten the coil assembly nut with an input torque of 43-53 in-lbs.

For valves with : " J1 "in the 11 & 12 position of the part number add the adapter to the sleeve assembly and tighten to 30-43 in-lbs of torque. For valves with "J0" In the 11 & 12 position of the part number, orient the adapter and fittings so that the tube wilt line up. Tighten nuts with 178-198 in-lbs of torque. Refer to the Installation Instructions for remaining installation procedures.

TROUBLE SHOOTING

PROBLEM	PROCEDURE
Valve Fails to operate	1. Check electrical supply with the voltmeter. Voltage must agree with nameplate rating. 2. Check coil with ohmmeter for shorted or open coil. Replace if defective. 3. Make sure that pressure complies with nameplate rating. Note: 10 psi minimum.
Valve is sluggish or inoperative - electrical supply and pressure check-out	1. Disassemble valve per instructions. Caution, do not damage diaphragm assembly. 2. Replace diaphragms if torn or damaged. 3. Clear clogged bleed paths in the diaphragm and body. Do not push wire into paths. 4. Replace plunger spring if broken or damaged. 5. Check spindle spring. If broken replace.
External leakage at covers	1. Tighten per instructions. If leakage continues replace cover O-rings.
External leakage at sleeve flange to body joint.	1. Check that sleeve is torqued with 130 - 150 in-lbs. If leakage continues replace flange seal.
Valve leaks at cylinder or exhaust body port	1. Check inlet 10 psi minimum pressure. 2. Disassemble valve per instructions. Do not damage diaphragm assembly. 3. Replace main orifice seals if worn. 4. Replace diaphragms if torn 5. Check retaining nut at both sides of spindle. Tighten per instructions. 6. Check spindle spring. If broken replace. 7. Inspect body orifices for nicks or dirt. Damage may require a new valve.
Internal leakage at pilot	1. Disassemble valve per instructions. Remove extraneous matter. Clean parts in a mild soap and water solution. 2. Replace worn/damaged plunger. 3. Check plunger spring. If broken, replace. 4. Inspect pilot orifice in the body for nicks or dirt. Damage may require a new valve.

DECLARATION

Parker's Fluid Control Division certifies have 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 valve 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 Honeywell 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.

OPTION " J "