

INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS
2-WAY N.C. DIRECT LIFT DIAPHRAGM VALVE
3/8", 1/2", 3/4" AND 1" NPT
VALVE TYPES: 7221G



DESCRIPTION

The 7221G valves are 2-way, direct lift diaphragm valves. Valves are normally closed (N.C.) and are offered in a combination of brass and stainless steel construction. The direct lift feature is achieved by a mechanical link between the diaphragm assembly and the plunger assembly. 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: 7221G

De-energized: A flow arrow on the body indicates flow direction. Ports are not marked. Pressure is connected to the upstream port. The fluid enters the valve below the diaphragm assembly, flows through the diaphragm bleed hole and fills the cavity above the diaphragm. The diaphragm is pressed against the main orifice by the force of the plunger spring and the fluid pressure sealing the main orifice. The plunger seals the diaphragm pilot orifice and there is no flow through the valve.

Energized: Low differential pressure operation: With near zero or very low differential pressure, energizing the coil creates a magnetic force sufficient to lift the plunger and the diaphragm assembly, opening the valve main orifice.

Higher differential pressure operation: With a higher differential pressure the magnetic force is not strong enough to lift the diaphragm assembly off the main orifice. The plunger upward motion opens the pilot orifice. The pilot orifice is larger than the diaphragm bleed hole draining the upper valve cavity and lifting the diaphragm off the main orifice. Valve will remain open as long as the coil is energized.

Anti-Water Hammer Valves:

Valves with the anti-water hammer feature function the same as the above valves except during de-energizing, the closing of the diaphragm assembly is slowed by adjustment of a speed control feature. The 4-position speed control selector is located on the valve cover. Position 1 allows fast closing, position 4 causes the slowest closing.

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.

<u>CODE</u>	<u>FLUID</u>
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 425 to 400 SSU at 38°C
O2	- Nos. 1 and 2 fuel oils, oils having viscosities not more than 40 SSU at 38°C
O2 - O6	- 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 limitations, check the valve part number on the nameplate and refer to the catalog.

INSTALLATION INSTRUCTIONS

Mounting position and pressure limits: Valves can be mounted directly on piping and are designed to operate in any position. 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 must conform to nameplate rating.

Piping: Remove protective closures from the ports. Connect line pressure to the upstream port. An arrow on the body indicates direction of flow. Use of Teflon tape, thread compound or sealants is permissible, but should be applied sparingly to male pipe threads only.

CAUTION: Do not allow foreign particles, Teflon tape, or thread compound to enter valve. Only the wrench flats provided on the body ports should be used in applying the torque. Tightening torque should not exceed the following values for each port size:

3/8" NPT - 225 in-lbs., 1/2" NPT - 300 in-lbs., 3/4" NPT - 450 in-lbs., 1" NPT - 600 in-lbs. **Do not use sleeve or enclosure as a lever when applying torque. Connect outlet line to opposite port.**

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 air line lubrication will substantially increase valve life.

CAUTION: Valve types with an "E" in the 10 th position of part number have parts made from ethylene propylene rubber and must not be exposed to petroleum based lubricants or other hydrocarbons.

Anti-water Hammer Valves: Valves with the speed control feature should be checked to verify position location. Position 1 causes the fastest closing time and position 4 causes the slowest closing time. The position required in each application will depend on closing time required and pressure differential through the valve.

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 / Option Codes D1DB, D2DB, D3DB): Loosen cover screws and swing cover 90° 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 Flathead 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 for 90° C or 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 / Option Codes S1TB, S2TB, S3TB): Loosen cover screws and swing cover 90° toward the conduit hub in order to access the 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 for 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 a 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 turn off electrical power to the valve before attempting repair.

The valve body need not be removed from the line.

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.

To disassemble the pressure vessel:

CAUTION: Do not use a pipe wrench directly on the sleeve tube.

For general cleaning and internal component replacement, there is no reason to remove the sleeve from the valve cover. Unscrew the four (4) cover screws. The diaphragm retainer/plunger assembly, return spring, diaphragm and O-ring can now be removed. On anti water hammer valves the speed control feature can also be removed at this time.

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: Valves equipped with **Hazardous Location** coils must use **Hazardous Location** replacement coils only. Verify nameplate data and coil part number before installing the replacement coil.

To reassemble the pressure vessel:

Refer to exploded view drawings. Assemble the O-ring into the body groove. For valves with the anti - water hammer feature, replace the O-rings and reassemble the speed control device at this time. Place return spring over plunger and install plunger diaphragm with the diaphragm installed into sleeve cover assembly. Parts must be replaced in the

order shown. Tighten screw with a torque of 70-80 in-lbs. Avoid damaging the main orifice when placing the diaphragm assembly in the valve.

If the sleeve was removed from the cover, tighten the sleeve assembly with an input torque of 260-270 in-lbs.

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

Refer to the Installation Instructions for remaining installation procedures.

TROUBLE SHOOTING	
PROBLEM	PROCEDURE
Valve fails to operate.	<ol style="list-style-type: none">1. Check electrical supply with voltmeter. Voltage must agree with nameplate rating.2. Check coil with ohmmeter for shorted or open coil.3. Make sure that pressure complied with nameplate rating.
Valve is sluggish or inoperative - electrical supply and pressure check out.	<ol style="list-style-type: none">1. Disassemble valve as per the Disassembly Instructions. Clean out extraneous matter. The plunger must be free to move without binding.2. Check the diaphragm for tears and for clogged or obstructed bleed hole or pilot orifice. Torn diaphragm must be replaced.3. Check all springs, if broken, replace.4. Check that the plunger is attached to the diaphragm assembly.
External leakage at sleeve flange to cover joint.	<ol style="list-style-type: none">1. Check that sleeve is torqued to 260-270 in-lbs.
External leakage at flange joint between body and cover.	<ol style="list-style-type: none">1. Check that cover screws are torqued with an input torque of 70-80 in-lbs. If leakage persists replacement of diaphragm assembly or flange O-ring may be required and/or bodies or covers with damaged sealing surfaces may have to be replaced.
External leakage at speed control device.	<ol style="list-style-type: none">1. Check O-rings for damage. Replace if necessary.
Internal Leakage	<ol style="list-style-type: none">1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in a mild soap and water solution.2. Examine diaphragm sealing surface for dirt. Remove all foreign particles. Examine orifice for nicks. Damaged parts must be repaired or replaced.3. Check plunger return spring. Replace if broken.

DECLARATION

Parker's Skinner Valve 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 Skinner 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 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.

