

## FLUID CONTROL DIVISION

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### INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS 2-WAY N.C. AND N.O. PILOT OPERATED VALVES 3/8", 1/2", 3/4" and 1" NPT 1-1/4", 1-1/2" and 2" NPT WATER VALVE TYPES: 7321B



#### DESCRIPTION

The 7321B valves are 2-way, pilot operated diaphragm valves requiring a minimum operating pressure differential to insure valve operation. Valves are available in normally closed (N.C.) and normally open versions of brass 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

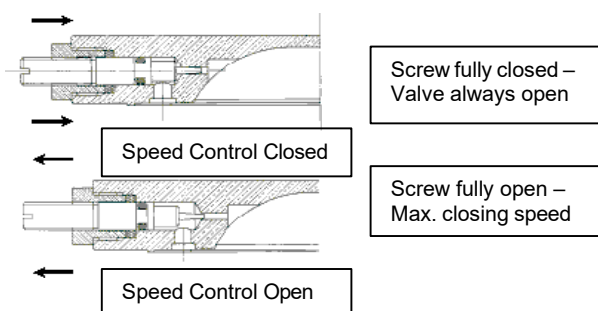
##### Normally Closed type: 7321B

**De-energized:** A flow arrow on the body indicates flow direction. Ports are not marked. Pressure is connected to the inlet 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 very low differential pressure, energizing the coil creates a magnetic force sufficient to lift the plunger off the pilot orifice and vents the pressure above the diaphragm. The venting creates a pressure imbalance across the diaphragm, which causes the diaphragm to open the valve main orifice allowing flow through the valve. The valve will remain open as long as the coil is energized.

##### Metering Valves (Closing Speed):

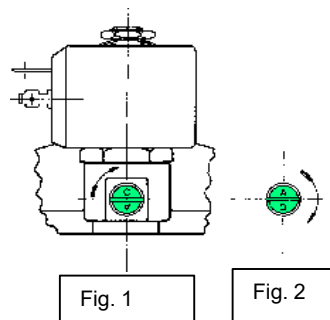
*Metering described is optional – these descriptions and operating instructions apply only to valves that have been equipped with the appropriate metering.*



Valves with the metering screw feature located in the cover 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 metering stem.

##### Manual Overrides Valves:

*Manual overrides described are optional – these descriptions and operating instructions apply only to valves that have been equipped with the appropriate manual override.*



The unit is shipped with a manual override feature. The manual control is used to operate the valve without connecting the coil. The slotted control screw has two positions:

**Closed:** To function, turn the slotted screw component located in the cover below the sleeve tube so the letter "C" is in the upper position of the screw head (Fig. 1).

**Open:** To function, turn the slotted screw head so the letter "A" is in the upper position of the screw head (Fig. 2).

##### Normally Open type: 7322B

**De-energized:** A flow arrow on the body indicates flow direction. Ports are not marked. Pressure is connected to the inlet port. The fluid enters the valve below the diaphragm assembly lifting the diaphragm open allowing flow through the valve. The valve will remain open as long as the coil is de-energized.

**Energized:** The plunger moves, closing the pilot orifice, which causes the pressure to build up above the diaphragm. The increased pressure and the diaphragm spring cause the diaphragm to close the main orifice,

stopping flow through the valve. The valve will remain closed as long as the coil is energized.

**NOTE:** When the valve is removed from the box, the diaphragm will be closed. Line pressure will open the valve.

**CAUTION:** A minimum operating pressure differential is required for proper valve operation. Consult nameplate rating.

### **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.

<b><u>CODE</u></b>	<b><u>FLUID</u></b>
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 possibly resulting in valve failure

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 are 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 – 250 in-lbs.      1/2" NPT - 350 in-lbs.  
3/4" NPT – 450 in-lbs.      1" NPT - 600 in-lbs.  
1-1/4" NPT – 700 in-lbs.    1-1/2" NPT – 750 in-lbs.  
2" NPT – 950 in-lbs.

**Do not use sleeve or enclosure as a lever when applying torque. Connect outlet line to opposite port. Only use wrench flats provided on the body when applying torque.**

**Media filtration:** For protection of the valve, install a suitable strainer or filter in the inlet side as close to the valve as possible. Recommended strainer of 100 microns or better. 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 10th position of part number have parts made from ethylene propylene rubber and must not be exposed to petroleum based lubricants or other hydrocarbons.

**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 screw have been installed to prevent possible coil damage from overheating.

**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, and then retighten the nut with an input torque of 43-53 in-lbs.

**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.

**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.

Use a 7/8" (22mm) wrench or an adjustable wrench to remove the sleeve tube. The plunger, return spring and flange seal may be removed.

Unscrew the four (4) or (6) cover screws. The diaphragm assembly, return spring, and O-ring can now be removed. On metering valves, the speed control feature can also be removed at this time. If the cover cannot be easily lifted off the body, laterally tap the cover or gently pry the cover from the body. Care must be taken not to damage the diaphragm, cover or body.

**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 section drawing and component tabulation.

## **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 metering feature, replace the O-rings and reassemble the speed control device at this time. Install the diaphragm assembly into the body. Making sure the diaphragm tab is located over the outlet port of the body. Line up the diaphragm bolt holes with the appropriate bolt and flow holes in the body. Install the screws and tighten screw with a torque of 70-80 in-lbs for the 3/8" and 1/2" sizes and 125-150 in-lbs for the larger port size valves. Avoid damaging the main orifice when placing the diaphragm assembly in the valve.

Install the manual override (where applicable) into the cover prior to sleeve assembly. Insert the manual override into the valve cover. Rotate the override until the large flat surface of the override is facing out of the cover. This orientation is required for proper sleeve assembly.

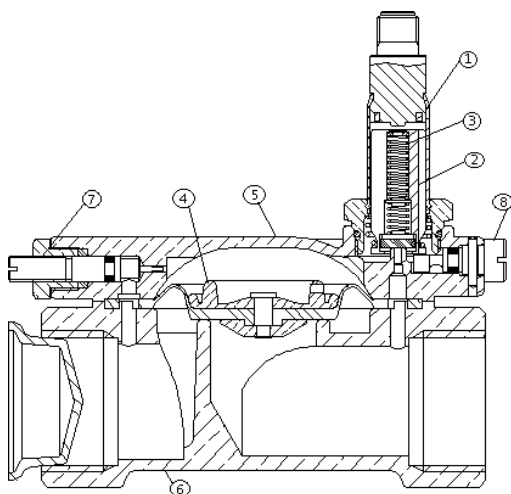
If the sleeve was removed from the cover, install the plunger and spring into the sleeve. Tighten the sleeve assembly with an input torque of 230-250 in-lbs.

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.

After re-assembly, it is advisable to thoroughly check for leakage and for correct operation of the valve.

Refer to the Installation Instructions for remaining installation procedures.

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



Normally Closed Valve (typical)

Part	Description
* 1	Sleeve Assembly
* 2	Plunger Assembly
* 3	Plunger Spring
* 4	Diaphragm Assembly
5	Cover
6	Body
7	Metering Stem (optional)
8	Manual Override Stem (optional)

\* Parts included in repair kit. Contact Parker Fluid Control for repair kit number based on selected valve.

#### DECLARATION

Parker's Fluid Control Division certifies its valve appliance products comply 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 Fluid Control 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.