

# Installation & Maintenance Instructions

## 3-WAY PISTON VALVE

BULLETIN

8321

Form No.V5417R2

### DESCRIPTION

Bulletin 8321 is an internal pilot operated 3-way solenoid valve. Standard valves have a General Purpose Nema Type 1 Solenoid Enclosure. Valves may also be equipped with an enclosure which is designed to meet Nema Type 4-Watertight, Nema Type 7 (C or D) Hazardous Locations - Class 1, Group 'C' or 'D' and Nema Type 9 ('E', 'F' or 'G') Hazardous Location - Class II, Group 'E', 'F' or 'G'.

#### MANUAL OPERATOR (Optional)

Valves with suffix "MO" or "MS" after catalog number are provided with a manual operator which allows manual operation when desired or during an interruption of electrical power.

### OPERATION

#### NORMALLY CLOSED (Refer to Figure 1)

Solenoid De-energized: Flow is from Cylinder 'A' to Exhaust. Pressure connection is closed.

Solenoid Energized: Flow is from Pressure to Cylinder 'A'. Exhaust connection is closed.

#### NORMALLY OPEN (Refer to Figure 1)

Solenoid De-energized: Flow is from Pressure to Cylinder 'A'. Exhaust-connection is closed.

Solenoid Energized: Flow is from Cylinder 'A' to Exhaust. Pressure connection is closed.

**NOTE:** To change from normally closed construction to normally open construction, the plastic pilot insert and lower disc spring have to be replaced. (Consult factory).

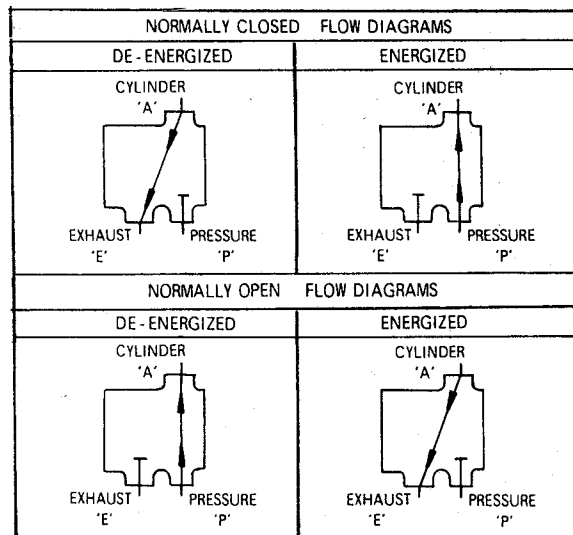


FIGURE 1

### INSTALLATION

Check nameplate for correct catalog number, pressure, voltage and service.

#### POSITIONING

valve may be mounted in any position.

#### PIPING

Connect piping to the Pressure (P), Exhaust (E), and Cylinder (A) Ports according to flow diagram. If a speed/flow control valve is used, it must be located in the piping between the solenoid valve and the cylinder.

For precision control of cylinder positions, there should be no leaks in piping between cylinder and valve. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of piping. When tightening pipe, do not use valve as a lever.

**CAUTION:** To insure operation of the valve, the pressure and exhaust lines must be full area without restriction, and a minimum differential pressure as stamped on the nameplate must be maintained between the pressure and exhaust. Do not install any restrictive devices in either the pressure (inlet) connection or the exhaust (outlet) connection of the valve. Restricting either of these lines may cause valve malfunction. Should metering or restrictive devices be required they must be installed in cylinder connection (between solenoid valve and cylinder).

**IMPORTANT:** For protection of the solenoid valve, install a strainer or filter suitable for the service involved in the inlet side as close to the valve as possible. Periodic cleaning is required, depending on the service conditions. See Bulletins 8600, 8601 and 8602 for strainers.

#### WIRING

Wiring must comply with Local and National Electrical Codes. For valves equipped with an explosion-proof, watertight enclosure (Nema 4, 7 & 9), the electrical fittings must be approved for use in the approved hazardous locations. Housings for all solenoids are made with connections for 1/2 inch conduit. The general purpose enclosure may be rotated to facilitate wiring by removing the retaining cap. After rotating to desired position, be certain to replace cap before operating.

**NOTE:** Alternating Current (A-C) and Direct Current (D-C) Solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid, not just the coil.

### SOLENOID TEMPERATURE

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched by hand for only an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

### MAINTENANCE

**WARNING:** Turn off electrical power and line pressure to valve before making repairs. It is not necessary to remove valve from pipe line for repairs.

#### CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary, depending on the media and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation or excessive leakage will indicate that cleaning is required.

#### PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. Operate the valve periodically to insure proper opening and closing.
3. Periodic inspection (depending on media and service conditions) of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

#### TEMPERATURE LIMITATIONS

For maximum valve ambient and fluid temperatures, refer to chart below. For higher ambient and fluid temperatures, consult factory. Check catalog number and watt rating on nameplate to determine the maximum temperatures.

WATTAGE	CATALOG NUMBER COIL PREFIX	COIL CLASS	MAXIMUM AMBIENT TEMP. °F	MAXIMUM FLUID TEMP. °F
6	none or S	A	77	180
6	FT or SF	F	122	200
6	HT	H	140	200
9.7	none, FT, HT S, or SF	A, F or H	77	120

#### IMPROPER OPERATION

1. **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown-out fuses, open-circuited or grounded coil, broken lead wires or splice connections.

2. **Burned-Out Coil:** Check for open-circuited coil. Replace coil if necessary.
3. **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.
4. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within the range specified on nameplate.
5. **Excessive Leakage (Improper Opening and Closing of Ports):** Disassemble valve (See Valve Disassembly Instructions) and clean all parts and passageways. Replace worn or damaged parts with a complete "Spare Parts Kit" for best results.

#### COIL REPLACEMENT (Refer to Figure 2)

Turn off electrical power, disconnect coil lead wires.

**CAUTION:** The solenoid must be fully reassembled as the housing is part of, and completes the magnetic circuit. Be careful to place insulating washers at each end of the coil if required.

1. Remove retaining cap, nameplate and solenoid cover.
2. Slip yoke containing coil, sleeves and insulating washers off the solenoid base sub-assembly. **NOTE:** Insulating washers are omitted when molded coil is used. In some D-C Constructions, a single flux plate over the coil replaces yoke, sleeves and insulating washers.
3. Reassemble in reverse order of disassembly.

#### VALVE DISASSEMBLY AND REASSEMBLY (Refer to Figure 2)

Depressurize valve and turn off electrical power.

1. Solenoid may be removed intact by loosening and removing solenoid base sub-assembly from body.
2. Remove core spring, core assembly and body gasket respectively.
3. A 4-36 Machine Screw (provided in "Spare Parts Kits") serves as a self-tapping screw to remove insert from body. Thread screw a few turns in thru hole located in the flat surface of insert. **CAUTION:** Do not damage center hole (Pilot Orifice) in raised surface of insert. Remove insert by using a pair of pliers on the head of the screw.
4. Remove three gaskets from insert. Tag each as they are removed so that they can be reassembled in the same locations. **NOTE:** Middle and lower gaskets have the same physical dimensions, however, the lower gasket is made of a softer material.
5. Remove lower disc holder assembly and lower disc spring. This completes pilot disassembly.
6. Remove end cap, end cap gasket and outer piston gasket.
7. Slide out piston assembly and inner piston gasket.
8. All parts and passageways are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete "Spare Parts Kit" for best results.
9. Reassemble valve in reverse order of disassembly. **NOTE:** Lubricate all rubber parts with Dow Corning's Valve Seal or equivalent silicone grease.

#### MANUAL OPERATOR DISASSEMBLY AND REASSEMBLY

(Refer to Figure 3)

Depressurize valve and turn off electrical power.

1. Remove two retaining screws.
2. Slide out manual operator stem/knob/retainer sub-assembly.
3. Remove stem O-ring.
4. Remove guide and gasket.
5. Manual operator parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete "Spare Parts Kit" for best results.
6. Reassemble manual operator in reverse order of disassembly. **NOTE:** Lubricate all rubber parts with Dow Corning's Valve Seal or equivalent silicone grease.

#### SPARE PARTS KITS

Spare Parts Kits and Coils are available for ASCO valves. Parts marked with an asterisk (\*) are supplied in Spare Parts Kits.

#### ORDERING INFORMATION FOR SPARE PARTS KITS

When Ordering Spare Parts Kits or Coils  
Specify Valve Catalog Number,  
Serial Number and Voltage.

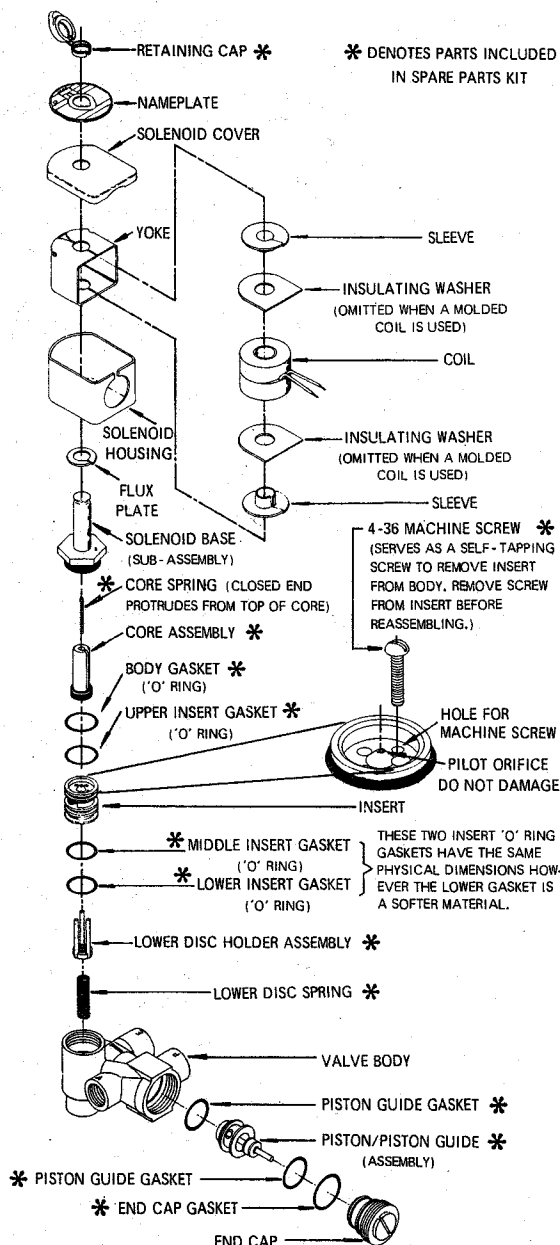


FIGURE 2

BULLETIN 8321

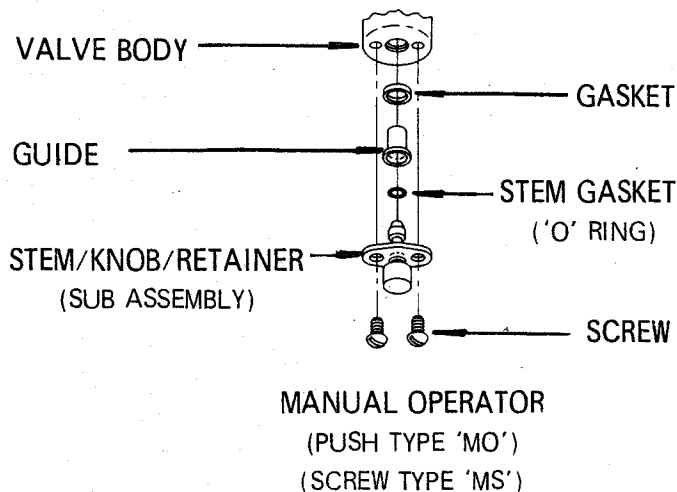


FIGURE 3