

Installation & Maintenance Instructions

SERIES

8316

I&M No.V7534



3-WAY SOLENOID VALVES
NORMALLY CLOSED AND NORMALLY OPEN OPERATION
3/8", 1/2" AND 3/4" NPT

IMPORTANT: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil or Solenoid Replacement.

DESCRIPTION

Series 8316's are 3-way solenoid pilot operated, diaphragm controlled valves. Valves are made of brass with only four moving parts: a core assembly, two diaphragm assemblies, and a disc holder sub-assembly. Valves may be provided with a general purpose/watertight, open frame, or watertight/explosionproof solenoids.

OPERATION

Normally Open:

Solenoid De-energized: Flow is from Pressure "P" to Cylinder "A", Exhaust "E" connection is closed.

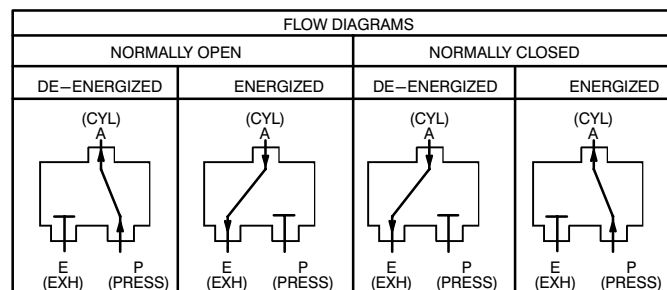
Solenoid Energized: Flow is from Cylinder "A" to Exhaust "E", Pressure "P" connection is closed.

Normally Closed:

Solenoid De-energized: Flow is from Cylinder "A" to Exhaust "E", Pressure "P" connection is closed.

Solenoid Energized: Flow is from Pressure "P" to Cylinder "A", Exhaust "E" connection is closed.

NOTE: To change from normally closed operation to normally open operation, consult ASCO.



IMPORTANT: A minimum operating pressure differential of 10 psi is required. Valve vents to "0" psi.

Manual Operation

Manual operator allows manual operation when desired or during an electrical power outage. To operate valve manually, rotate manual operator stem clockwise 180°. Valve will now be in the same position as when the solenoid is energized. Rotate manual operator stem counterclockwise 180° before operating valve electrically.

CAUTION: For valve to operate electrically, manual operator stem/lever must be fully rotated counterclockwise.

INSTALLATION

Check nameplate and solenoid marking for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Future Service Considerations.

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid after disassembly and reassembly.

Temperature Limitations

Valves with design change letter "K" or "P" within the catalog number (example: 8316K054) have a maximum fluid temperature of 180°F. Refer to separate solenoid Installation and Maintenance Instructions for maximum ambient temperature.

Positioning

This valve is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Mounting

For mounting bracket dimensions, (optional feature), refer to Figure 1.

Piping

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

To insure proper operation of the valve, the pressure and exhaust lines must be full area without restriction. A minimum differential pressure as stamped on the nameplate must be maintained between pressure and exhaust during shifting. Air reservoirs must have adequate capacity to maintain this minimum pressure during shifting. To check pressure during shifting, install a pressure gauge in the pressure piping as close to the valve as possible.

IMPORTANT: To protect the solenoid valve, install a strainer or filter suitable for the service involved, in the inlet side as close to the valve as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

Flow Controls (Speed or Metering Devices)

Flow control valves may be added to control cylinder speed. If used, these flow control valves must be located in Cylinder "A" piping between the solenoid valve and the cylinder. **IMPORTANT:** Do not install flow controls (Speed or Metering Devices) or any type of restrictive device in either the Pressure "P" (inlet) or the Exhaust "E" (outlet) port of the valve. Restricting either of these lines may cause valve malfunction.

MAINTENANCE

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator and/or valve, and vent fluid to a safe area before servicing.

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

Keep the medium flowing through the valve as free from dirt and foreign material as possible.

Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up or other conditions that could impede solenoid valve shifting are possible. In many cases, solenoid valves are periodically exercised during normal system use or as part of routine maintenance or surveillance activities and no additional exercise is necessary. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.

Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Causes of Improper Operation

Incorrect Pressure: Check valve pressure. Pressure to valve must be within range specified on nameplate.

Excessive Leakage: Disassemble valve (see Maintenance) and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

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

Burned-Out Solenoid: Check for open-circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.

Low Voltage: Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Valve Disassembly

1. Disassemble valve using exploded views for identification of parts.
2. Remove solenoid, see separate instructions.
3. If the valve has a manual operator, refer to section on "**Manual Operator Disassembly**".
4. Unscrew solenoid base sub-assembly. Remove solenoid base gasket, core assembly with core spring and core guide, if present.
5. A 4-40 machine screw provided in ASCO Rebuild Kit serves as a self-tapping screw to remove insert from body. Turn screw a few turns into through hole located in flat surface of the insert. **CAUTION: Do not damage center hole (pilot orifice) in raised surface of insert.** Remove insert by using a pair of pliers to grip the head of the screw.
6. Remove three gaskets from insert. Tag each as they are removed so that they can be reassembled in the same location. Middle and lower gaskets have the same physical dimensions, however, the lower gasket is a softer material. Remove disc holder sub-assembly, spring cup, and disc spring. NOTE: Spring cup is not present on all valve constructions.
7. The solenoid pilot is now completely disassembled.
8. Remove bonnet screws and lockwashers (4) from each end of valve body. Remove valve bonnets, body passage gaskets, retaining rings, diaphragm assemblies, and body gaskets from each end of the valve body. These parts are identical.
9. All parts are now accessible for cleaning or replacement. Clean all parts and passageways thoroughly before valve reassembly. Replace worn or damaged parts with a complete ASCO Rebuild Kit for best results.

Valve Reassembly

1. Reassemble parts in reverse order of disassembly. Use exploded views for identification and placement of parts.
2. Lubricate all gaskets with DOW CORNING® 111 Compound lubricant or an equivalent high-grade silicone grease.
3. At each end of valve body, install body gasket, diaphragm assembly, retaining ring, body passage gasket, valve bonnet, and bonnet screws.
4. Torque bonnet screws in a crisscross manner to 95 ± 10 in-lbs. ($10,7 \pm 1,1$ Nm).
5. Position lower insert gasket and disc holder spring with spring cup (if present) in body insert cavity. Note: Use spring cup only when it has been previously used.
6. Snap upper and middle insert gaskets into grooves of insert. Lower insert gasket fits into the recess between the lower corner of the insert and the lower corner of the body insert cavity. Middle and lower insert gaskets are the same size. However, the lower gasket is made of a softer material.
7. Place disc holder assembly into insert. Install insert (with gaskets and disc holder assembly) into body cavity, making certain that the disc holder spring is centered.
8. If the valve being rebuilt has a manual operator, refer to section on "**Manual Operator Reassembly**".
9. Replace the solenoid base gasket, core assembly with core spring, and core guide, if present.
10. Replace solenoid base sub-assembly and torque to 175 ± 25 in-lbs ($19,8 \pm 2,8$ Nm).
11. Install solenoid, see separate instructions, and make electrical hookup.
12. Restore line pressure and electrical power supply to valve.
13. After maintenance is completed, operate the valve a few times to be sure of proper operation.
14. See **Additional Precautionary Instructions**.

Manual Operator Disassembly

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator and/or valve, and vent fluid to a safe area before servicing.

1. To remove valve solenoid, see separate solenoid instructions.
2. Unscrew solenoid base sub-assembly.
3. Unscrew manual operator body from main valve body and remove body gasket.
4. Remove stem retainer and slip the stem/lever sub-assembly from the manual operator body. Then remove stem gasket from stem/lever sub-assembly.
5. Remove core assembly, core spring, core guide and rider ring (if present).
6. Refer to "Valve Disassembly" step 5, for further disassembly.

Manual Operator Reassembly

1. Reassemble in reverse order of disassembly. Use exploded views for identification and placement of parts. See instructions provided in Figure 1 & Figure 2. Check watt rating on nameplate to determine construction.
2. Replace body gasket in valve body.
3. Replace stem gasket on stem/lever sub-assembly.
4. Preassemble manual operator parts, consisting of stem/lever sub-assembly with stem gasket and stem retainer.
5. Install core assembly with core spring, core guide and rider ring (if present) into base of manual operator body.
6. Install stem/lever sub-assembly in manual operator body.

IMPORTANT: Flat portion of stem must face upwards when reinstalled into body and retainer must be installed with flat side down to engage the groove in stem. See Figure 1.

7. Screw manual operator body sub-assembly into main valve body. Torque manual operator body to 175 ± 25 in-lbs ($19,8 \pm 2,8$ Nm).

8. Turn the manual operator lever to the 9 o'clock position. This is the position that the operator would be in if the valve was to be operated electrically.
9. Install the solenoid base sub-assembly. Torque solenoid base sub-assembly to 175 ± 25 in-lbs ($19,8 \pm 2,8$ Nm).
10. Replace solenoid and make electrical hookup.
11. Restore line pressure and electrical power supply.
12. After maintenance is completed, operate the valve electrically and manually a few times to be sure of proper operation.

Additional Precautionary Instructions

1. Before returning valve back in service, do the following.

▲ WARNING: To prevent the possibility of death, serious injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

2. Restore line pressure and electrical power supply to valve.
3. After maintenance is completed, operate valve a few times to be sure of proper operation. A metallic *click* signifies the solenoid is operating.

ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

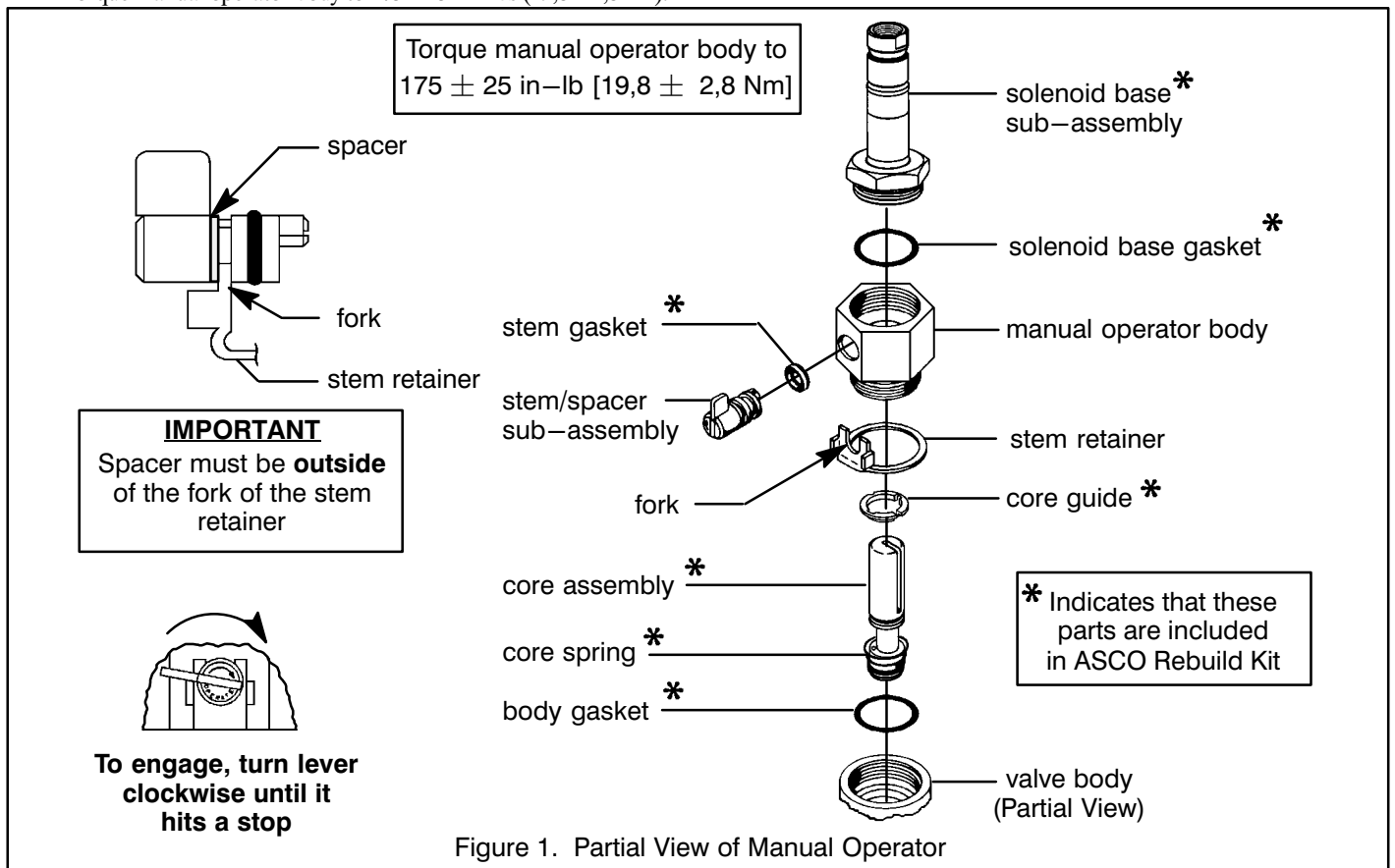
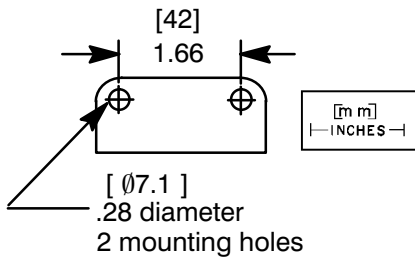
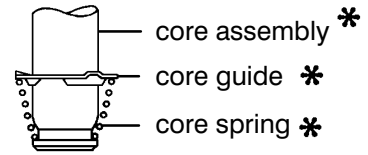


Figure 1. Partial View of Manual Operator

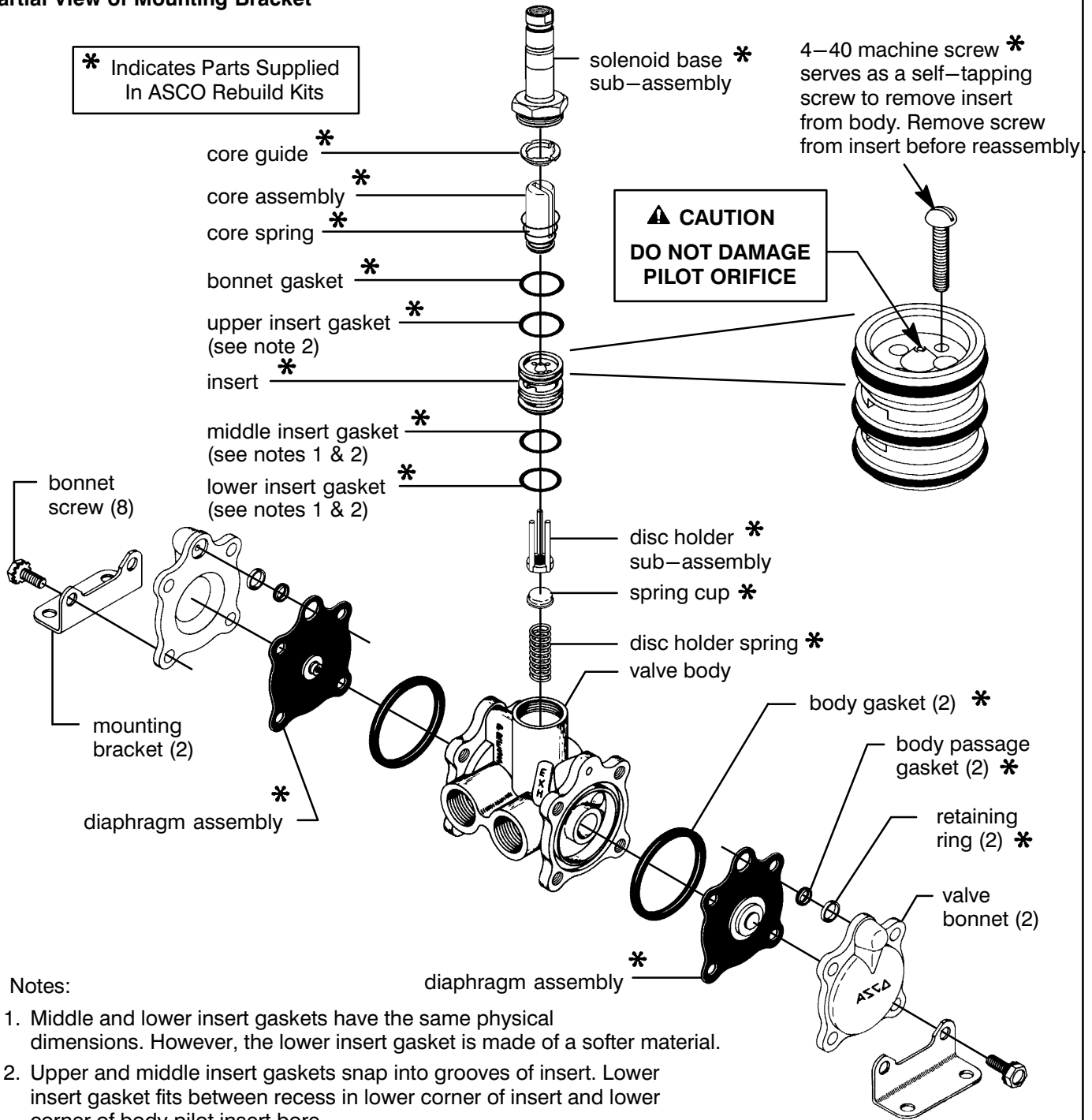


IMPORTANT
Partial cutaway view to show proper position of core guide and core spring on core assembly



Partial View of Mounting Bracket

* Indicates Parts Supplied In ASCO Rebuild Kits



Notes:

1. Middle and lower insert gaskets have the same physical dimensions. However, the lower insert gasket is made of a softer material.
2. Upper and middle insert gaskets snap into grooves of insert. Lower insert gasket fits between recess in lower corner of insert and lower corner of body pilot insert bore.

Figure 2. Series 8316