

# Installation & Maintenance Instructions

## 2-POSITION, 4-WAY SOLENOID VALVES

1/4", 3/8", 1/2", 3/4", OR 1" NPT – 1/4", 3/8", OR 3/4" ORIFICE  
SINGLE SOLENOID – AIR OR INERT GAS SERVICE

SERIES

8344

Form No. V6861R1

**IMPORTANT:** See Installation and Maintenance Instructions, Form No. V6862 for exploded isometric views.

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

### DESCRIPTION

Series 8344 valves are heavy duty, 2-position, 4-way valves with poppet type seats and discs to provide tight seating. The main valve discs are power driven in both directions by line pressure. No return springs are required. The valves are made of forged brass with stainless steel, brass, and copper internal parts; elastomers are Buna N. The valves may be provided with a low power or intrinsically safe solenoid.

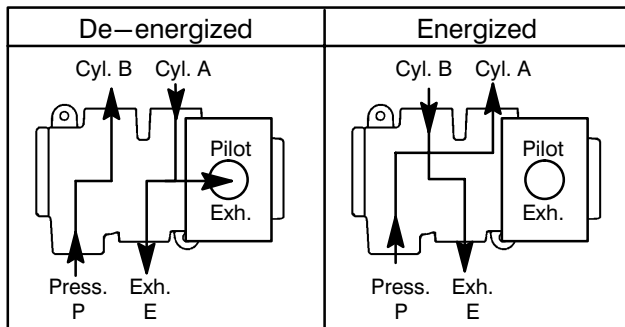
### OPERATION

**Solenoid De-energized:** Flow is from Pressure P to Cylinder B and from Cylinder A to Exhaust E. Slight pilot exhaust is also apparent.

**Solenoid Energized:** Flow is from Pressure P to Cylinder A and from Cylinder B to Exhaust E.

**IMPORTANT:** Minimum operating pressure differential is 10 psi.

### Flow Diagrams



### INSTALLATION

Check nameplate 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.

#### Temperature Limitation

Fluid and ambient temperature range: -4°F to +140°F.

#### 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.

### Positioning

Valve may be mounted in any position.

### Mounting

For mounting valve refer to Figure 1.

Pipe Size	Length "L"*		Width "W" *		Holes "D"* Dia. Ø	
	Inches	mm	Inches	mm	Inches	mm
1/4"	1 7/8	47,6	2 13/32	61,1	9/32	7,1
3/8"	2 5/8	66,6	3 1/8	79,3	11/32	8,7
1/2"						
3/4"	3 7/8	98,4	3 13/16	96,8	11/32	8,7
1"						

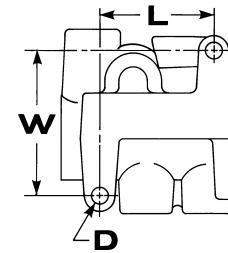


Figure 1. Series 8344 valve body mounting dimensions.

### Piping

There is pilot exhaust from the top of the solenoid when the valve is in the de-energized mode. The pilot exhaust may be connected to the main exhaust if the air or inert gas cannot be exhausted directly to the atmosphere. Connect piping or tubing to valve according to markings on valve body. Refer to flow diagrams in **OPERATION** section.

**CAUTION:** To avoid damage or accidental disengagement of cartridge assembly from valve body, hold cartridge assembly securely by wrenching flats when installing or removing piping at top of solenoid.

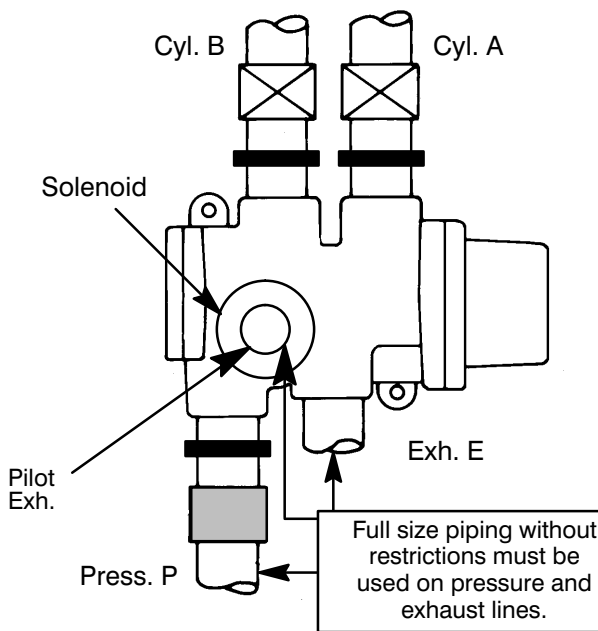
Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close 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 (10 psi), as stamped on the nameplate must be maintained between pressure and exhaust at the moment of 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:** These solenoid valves are intended for use on clean dry air or inert gas, filtered to 50 micrometres or better. The dew point of the media should be at least 10° C (18° F) below the minimum temperature to which any portion of the clean air/inert gas system could be exposed to prevent freezing. If lubricated air is used, the lubricants must be compatible with Buna N elastomers. Diester oils may cause operational problems. Instrument air in compliance with ANSI/ISA Standard S7.3–1975 (R1981) exceeds the above requirements and is, therefore, an acceptable media for these valves.

**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 and/or B piping between the solenoid valve and the cylinders.

**IMPORTANT:** Do not install flow controls (speed or metering devices) or any type of restrictive device in either the Pressure P (inlet) or Exhaust E (outlet) ports of the valve. Restricting either of these lines may cause valve malfunction.



— Indicates location of pressure gauge

— Indicates location of filter

— Indicates location of metering device

**IMPORTANT**  
A minimum operating pressure differential of 10 PSI must be maintained during shifting.

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

NOTE: It is not necessary to remove the valve body from the pipeline for repairs. However, piping or tubing must be removed from pilot exhaust on top of solenoid.

**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 shift. Clean filter when cleaning the valve.

**Preventive Maintenance**

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, the valve should be operated at least once a month to insure proper opening and closing.
- Depending on the medium and service condition, 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 and install a complete ASCO Rebuild Kit.

**Service Note**

**Determine pipe size (NPT) from nameplate and follow the appropriate disassembly and reassembly instructions.**

**Valve Disassembly for 1/4", 3/8" or 1/2" NPT Valves**

1. Disassemble valve in an orderly fashion using exploded views for identification and placement of parts. See Figure 4 for 1/4" NPT and Figure 5 for 3/8" or 1/2" NPT valve sizes on Form No. V6862.
2. Remove piping from pilot exhaust on top of solenoid.
3. Remove solenoid, see separate instructions.
4. Unscrew cartridge assembly from valve body. Then remove cartridge gasket and orifice gasket.
5. A 4–40 machine screw provided in ASCO Rebuild Kit serves as a self-tapping screw to remove insert from body. Thread 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.

6. Remove insert by using a pair of pliers to grip the head of the screw. Then pull insert with gaskets from body insert cavity.
7. 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 are the same size, however, the lower gaskets is a softer material. Then remove disc holder sub-assembly, disc spring, and shim.

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Figure 2. Series 8344 piping diagram.  
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8. The solenoid pilot is now completely disassembled.
9. Remove body screws (4) and lockwashers (4) from piston end body. Slip piston end body off piston/shaft sub-assembly.
10. Remove small body gaskets (2) from counterbores in piston end body.
11. Slide piston/shaft sub-assembly from main valve body. The piston/shaft sub-assembly is comprised of the main shaft, locknut, shaft gasket, piston, body u-cup, guide u-cup, u-cup o-ring (only present in 3/8" or 1/2" NPT constructions), piston end guide, guide gaskets (2) and resilient disc.
12. Remove guide gaskets (2), one from either side of piston end guide.
13. Disassemble piston/shaft sub-assembly by inserting a brass rod (of suitable size) in cross hole in shaft. Rod must be brass or other soft material so as not to burr the edges of hole. Hold piston shaft firmly (with rod) and unscrew locknut. Disassemble piston/shaft sub-assembly in an orderly fashion. Do not damage or mar any of the parts.
14. Remove locknut, shaft gasket, piston with body and guide u-cups (2) attached. Slide piston end guide and resilient main disc off main shaft.
15. Remove body u-cups and guide u-cup from piston. For 3/8" or 1/2" NPT valves, remove u-cup o-ring from guide u-cup.
16. Unscrew seat from opposite end of main body. Remove large and small seat gaskets (2) from seat. Then remove resilient main disc from body bore.
17. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

#### Valve Reassembly for 1/4", 3/8" or 1/2" NPT Valves

**IMPORTANT: Install all parts supplied in ASCO Rebuild Kit. Do not mix old and new parts.**

1. Lubricate cartridge gasket, orifice gasket, large and small seat gaskets, upper, middle, and lower insert gaskets with DOW CORNING® 200 Fluid lubricant or an equivalent high-grade silicone fluid lubricant.
2. Lubricate all remaining gaskets, u-cups, bores of piston, piston end body, and the main disc sliding area on the main shaft with a light coat with DOW CORNING® 111 Compound lubricant. For valves with Suffix **MF** in the catalog number, lubricate main disc slide area with William F. Nye, Inc. Fluorocarbon Gel 852B.

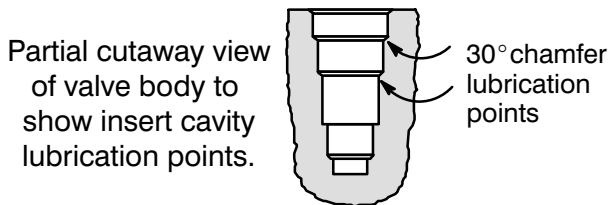


Figure 3. Lubrication of body insert cavity.

3. Preassemble piston/shaft sub-assembly as follows:
  - A. Position resilient main disc on main shaft so that resilient side of main disc is facing the piston end guide.
  - B. Position piston end guide on main shaft.
  - C. Install body u-cup and guide u-cup onto piston. Open end of guide u-cup faces the main valve body, while open end of body u-cup faces the piston end

- body. For 3/8" or 1/2" NPT valves, install a u-cup o-ring inside the guide u-cup.
- D. Position piston assembly on main shaft.
- E. Replace shaft gasket and locknut. Tighten locknut while holding the main shaft as described in **Valve Disassembly** section step 13. For 3/8" and 1/2" NPT valve constructions, torque locknut to  $125 \pm 10$  in-lbs [ $14,1 \pm 1,1$  Nm]. For 1/4" NPT valve construction, torque locknut to  $50 \pm 5$  in-lbs [ $5,7 \pm 0,6$  Nm].
- F. Position guide gaskets (2) one on guide facing piston end body, the other in counterbore of main valve body.
4. Install piston/shaft sub-assembly into main valve body.
5. Install small body gaskets (2) into counterbores in piston end body.
6. Slip piston end body over piston/shaft sub-assembly and replace lockwashers and body screws (4). Torque screws in a crisscross manner to  $40 \pm 5$  in-lbs [ $4,5 \pm 0,6$  Nm].
7. Install resilient main disc at opposite end of main shaft; be sure resilient side is facing seat.
8. Install seat with large and small seat gaskets attached. Torque seat to  $40 \pm 5$  ft-lbs [ $54,2 \pm 6,8$  Nm].
9. Position shim, lower insert gasket, and disc holder spring in body insert cavity.
10. 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.
11. Place disc holder sub-assembly into insert. Install insert (with gaskets and disc holder assembly) into body insert cavity, making certain that the disc holder spring is centered. Rotate this assembly slightly while pushing downward to aid installation.
12. Position cartridge gasket on insert in valve body.
13. Install orifice gasket in recess in base of cartridge assembly.
14. Thread cartridge assembly with orifice gasket into valve body. Then torque cartridge assembly to  $175 \pm 25$  in-lbs [ $19,8 \pm 2,8$  Nm].
15. Install solenoid, see separate instructions. Then make up piping to pilot exhaust on top of solenoid and electrical connection to solenoid.

**▲ WARNING: To prevent the possibility of personal 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.**

16. Restore line pressure and electrical power supply to valve.

#### Valve Disassembly for 3/4" or 1" NPT Valves

1. Disassemble valve in an orderly fashion using exploded view for identification and placement of parts. See Figure 6 on Form No. V6862.
2. Remove piping from pilot exhaust on top of solenoid.
3. Remove solenoid, see separate instructions.
4. Unscrew cartridge assembly from valve body. Then remove cartridge gasket and orifice gasket.

5. A 4–40 machine screw provided in ASCO Rebuild Kit serves as a self–tapping screw to remove insert from body. Thread 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.**

6. Remove insert by using a pair of pliers to grip the head of the screw. Then pull insert with gaskets from body insert cavity.
7. 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 are the same size, however, the lower gaskets is a softer material. Then remove disc holder sub–assembly, disc spring, and shim.
8. The solenoid pilot is now completely disassembled.
9. Remove long body screws (4) and lockwashers (4) from piston end body. Slip piston end body off piston/shaft sub–assembly.
10. Remove small body gaskets (2) from counterbores in piston end body.
11. Slide piston/shaft sub–assembly from main valve body. The piston/shaft sub–assembly is comprised of the main shaft, shaft nut, shaft washer, piston, body u–cup, guide u–cup, shaft gasket, piston guide, seat gasket, guide gaskets (2) and a resilient main disc.
12. Disassemble piston/shaft assembly by inserting a brass rod (of suitable size) into cross hole in shaft. Rod must be brass or made of another soft material, so as not to burr edges of hole. Hold piston shaft firmly (with rod) and unscrew shaft nut.
13. Disassemble piston/shaft sub–assembly in an orderly fashion. Be careful not to damage or mar any of the parts.
14. Remove shaft nut, shaft washer, piston with body and guide–u–cups (2) attached from shaft. Then remove body u–cup and guide u–cup from piston.
15. Remove shaft gasket, piston guide, guide gaskets (2) seat gasket, and resilient main disc.
16. Remove short body screws (4) and lockwashers (4) from opposite end of main valve body. Remove body/seat gasket and seat gasket from seat. Then remove the other resilient main disc from bore of main valve body.
17. All parts are now accessible to clean or replace. If parts are worn or damaged install a complete ASCO Rebuild Kit.

**Valve Reassembly for 3/4", or 1" NPT Valves**

**IMPORTANT: Install all parts supplied in ASCO Rebuild Kit. Do not mix old and new parts.**

1. Lubricate cartridge gaskets, orifice gasket, body/seat gasket, seat gasket, upper, middle and lower insert gaskets with DOW CORNING® 200 fluid lubricant or an equivalent high–grade silicone fluid lubricant.
2. Lubricate all remaining gaskets, u–cups, bores of piston, piston end body, and the main disc sliding area on the main shaft with a light coat with DOW CORNING® 111 Compound lubricant. For valves with Suffix *MF* in the catalog number, lubricate main disc slide area with William F. Nye, Inc. Fluorocarbon Gel 852B.
3. Preassemble piston/shaft sub–assembly as follows:
  - A. Position resilient main disc on shaft so that resilient lip side of disc is facing the piston guide.
  - B. Install seat gasket and guide gaskets (2) on piston guide.

- C. Slip piston guide with gaskets onto shaft.
  - D. Position shaft gasket on shaft.
  - E. Install guide u–cup and body u–cup on piston. Make certain that open end of guide u–cup faces, the main valve body, while open end of body u–cup faces the piston end body. Position the piston with u–cups on shaft.
  - F. Replace shaft washer and shaft nut. Torque the shaft nut to  $125 \pm 10$  in–lbs [ $14,1 \pm 1,1$  Nm] while holding the shaft as described in *Valve Disassembly* for 3/4" or 1" NPT valves section step 12.
4. Install piston/shaft sub–assembly in main valve body.
  5. Position small body gaskets (2) in counterbores in piston end body.
  6. Slip piston end body over the piston/shaft sub–assembly. Then install four long body screws with lockwashers. Torque the long body screws (4) in a crisscross manner to  $40 \pm 5$  in–lbs [ $4,5 \pm 0,6$  Nm].
  7. Install resilient main disc at opposite end of main shaft. Be sure resilient side of disc is facing seat.
  8. Position seat gasket and body/seat gasket on seat.
  9. Install seat with gaskets into main valve body. Replace lockwashers (4) and short body screws (4). Torque body screws in a crisscross manner to  $40 \pm 5$  in–lbs [ $4,5 \pm 0,6$  Nm].
  10. Position shim, lower insert gasket, and disc holder spring in body insert cavity.
  11. 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.
  12. Place disc holder sub–assembly into insert. Install insert (with gaskets and disc holder assembly) into body insert cavity, making certain that the disc holder spring is centered. Rotate this assembly slightly while pushing downward to aid installation.
  13. Position cartridge gasket on insert in valve body.
  14. Install orifice gasket in recess in base of cartridge assembly.
  15. Thread cartridge assembly with orifice gasket into valve body. Then torque cartridge assembly to  $175 \pm 25$  in–lbs [ $19,8 \pm 2,8$  Nm].
  16. Install solenoid, see separate instructions. Then make up piping to pilot exhaust on top of solenoid and electrical connection to solenoid.

**▲ WARNING: To prevent the possibility of personal 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.**

17. Restore line pressure and electrical power supply to valve.

**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.