

# Installation & Maintenance Instructions

BULLETIN

8345

2 POSITION – 4–WAY FUNCTION VALVES

MIDGET SIZE – 1/4 NPT

I&M V6161R3

## DESCRIPTION

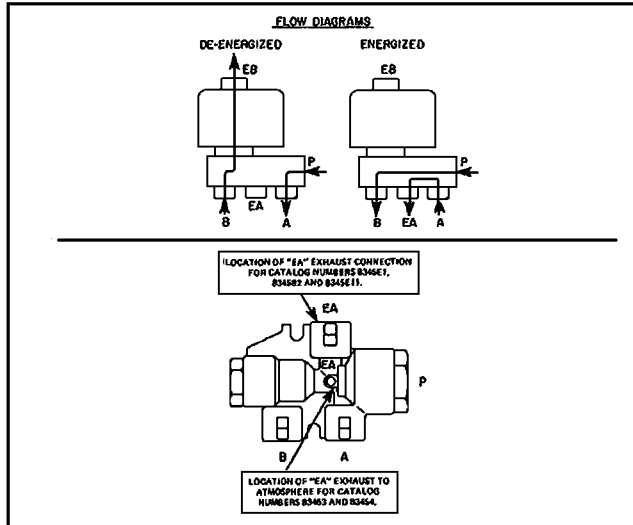
Bulletin 8345 valves are 2-position, 4-way midget size solenoid valves with rugged forged brass bodies. These valves are extremely compact to meet the requirements where space and weight are important and are primarily used to control small double acting cylinders, not larger than 4 inches in diameter. Standard valves have a General Purpose, NEMA Type 1 Solenoid Enclosure. Valves may also be supplied with an enclosure which is designed to meet NEMA Type 4 – Watertight, NEMA Type 7 (C or D) Hazardous Locations – Class I, Groups C or D and NEMA Type 9 (E, F or G) Hazardous Locations – Class II, Groups E, F or G.

## OPERATION

Solenoid De-Energized: Flow is from Pressure "P" to Cylinder "A" and from Cylinder "B" to Exhaust "EB." Exhaust "EA" is closed.

Solenoid Energized: Flow is from Pressure "P" to Cylinder "B" and from Cylinder "A" to Exhaust "EA." Exhaust "EB" is closed.

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



## MANUAL OPERATOR (Optional)

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

## INSTALLATION

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

### TEMPERATURE LIMITATIONS

For maximum valve ambient and fluid temperatures, refer to chart below. Check catalog number on nameplate to determine temperature limitations.

Construction Watt Rating	Coil Class	Catalog Number Prefix	Max. Ambient Temp. °F	Max. Fluid Temp. °F	
A-C Construction (Alternating Current)	A	None or DA	77	200	
	11	F	DF or FT	104	200
		H	HT	140	200
D-C Construction (Direct-Current)	A, F or H	None, FT or HT	104	104	

**NOTE:** For higher ambient and fluid temperature limitations, consult factory.

### POSITIONING

This valve is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertical and upright so as to reduce the possibility of foreign matter accumulating in the core tube area.

### MOUNTING

For mounting dimensions, refer to Figure 1.

### PIPING

Connect piping according to markings on valve body. Refer to flow diagrams provided. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of

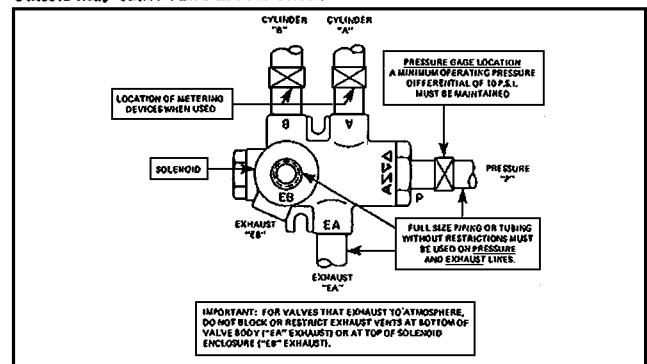
piping. When tightening the pipe, do not use valve or solenoid as a lever. Wrenches applied to valve body or piping are to be located as close as possible to the connection point.

To insure proper 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 (10 psi) must be maintained between pressure and exhaust at the moment of changeover. Air reservoirs must have adequate capacity to maintain the minimum pressure during changeover. To check pressure during changeover, install a pressure gage in the pressure connection as close to the valve as possible.

**IMPORTANT:** For the 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 service conditions. See Bulletins 8600, 8601 and 8602 for strainers.

### FLOW CONTROLS (Speed or Metering Devices)

Flow control valves (speed or metering devices) may be added to allow full unrestricted flow in one direction and control flow in the opposite direction. These flow control valves must be located in Cylinders "A" and/or "B" piping between the solenoid valve and the cylinders. **IMPORTANT:** Do not install flow control speed and/or metering devices or any type of restrictive device in either the Pressure "P" (inlet) connection or in the Exhaust "EA" or "EB" (outlet) connections of the valve. Restricting these lines or outlets may cause valve malfunction.



### WIRING

Wiring must comply with Local and National Electrical Codes. For valves equipped with an Explosion-Proof/Watertight Solenoid Enclosure, the electrical fittings must be approved for use in the approved hazardous locations. Housings for all solenoids are provided with accommodations or connections for 1/2 inch conduit. To facilitate wiring, the solenoid enclosure may be rotated 360°. The general purpose solenoid enclosure may be rotated by loosening the pipe adapter or removing the retaining cap or clip. **CAUTION:** When metal retaining clip disengages, it will spring upward. Rotate solenoid enclosure to desired position. Tighten pipe adapter to a maximum torque of 80 inch-pounds [10.2 newton meters] or replace retaining cap or clip. To rotate the Explosion-Proof/Watertight Solenoid Enclosure, loosen cover. Rotate the solenoid enclosure to desired position and tighten cover. Torque cover to 135 ± 10 inch-pounds [15.3 ± 1.1 newton meters].

### 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 with the hand only for 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 supply and depressurize valve before making repairs. It is not necessary to remove the valve from the pipe line for repairs. However, piping or tubing must be removed from Pressure "P" connection and Exhaust "EB" connection on air and liquid constructions.

### CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary depending on 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. Clean valve strainer or filter when cleaning solenoid valve.

### PREVENTIVE MAINTENANCE

- Keep 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. The actual frequency of exercise 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 rebuild kit.

ASCO Valves ®

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## 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 range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve and clean all parts. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

## COIL REPLACEMENT

Turn off electrical power supply and disconnect coil lead wires. Determine solenoid construction, General Purpose or Explosion-Proof/Watertight. Proceed in the following manner:

### General Purpose (Refer to Figures 2 and 3.)

1. Disconnect tubing connection at top of solenoid enclosure. Unscrew pipe adapter and remove spring washer. For air only construction, remove retaining cap or clip. CAUTION: When metal retaining clip disengages, it will spring upward.
2. Slip nameplate, cover, spring washer, insulating washer, coil and insulating washer off the solenoid base sub-assembly. Insulating washers (2) are omitted when a molded coil is used.
3. Reassemble in reverse order of disassembly paying careful attention to exploded views provided for identification and placement of parts.
4. Maximum torque for the pipe adapter is 90 inch-pounds [10.2 newton meters].

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit. Place an insulating washer at each end of coil, if required.

### Explosion-Proof/Watertight (Refer to Figure 1.)

1. Disconnect tubing connection at top of solenoid enclosure and unscrew pipe adapter.
2. Unscrew cover with nameplate and retaining ring attached. Two wrenching flats are provided on the housing to hold it securely in place while the housing cover is being removed or replaced.
3. Remove flux washer, insulating washer, coil and insulating washer. Insulating washers (2) are omitted when a molded coil is used.
4. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.
5. Before reassembly, refer to note below for proper greasing requirements of explosion-proof/watertight solenoid enclosure.
6. Torque solenoid cover to  $135 \pm 10$  inch-pounds [ $15.3 \pm 1.1$  newton meters]. Maximum torque for pipe adapter is 90 inch-pounds [10.2 newton meters].

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit. Place an insulating washer at each end of coil, if required.

NOTE: Installation and maintenance of explosion-proof equipment requires more than ordinary care to insure safe performance. All finished surfaces of the solenoid are constructed to provide a flameproof seal. Be sure that the surfaces are wiped clean before replacing. If watertight, as well as explosion-proof is a requirement, grease the joints including the under side of the solenoid base sub-assembly flange and internal threads of the housing cover with DOW CORNING® 111 compound or an equivalent high grade silicone grease.

## VALVE DISASSEMBLY AND REASSEMBLY

Turn off electrical power supply and disconnect coil lead wires. Remove piping or tubing from Pressure "P" connection and Exhaust "EB" connection on some air or liquid valve constructions. If rigid conduit is used, it may be necessary to disassemble the conduit from the solenoid enclosure. Determine valve construction, that is, "Air Only with General Purpose Solenoid Enclosure," "Air or Liquid Construction with General Purpose Solenoid Enclosure" or "Air or Liquid Construction with Explosion-Proof/Watertight Solenoid Enclosure" and refer to the appropriate instructions below.

## AIR ONLY CONSTRUCTION WITH GENERAL PURPOSE SOLENOID ENCLOSURE. (Refer to Figure 2.)

1. Disassemble and reassemble valve in an orderly fashion paying careful attention to exploded view provided for identification and placement of parts.
2. Remove retaining cap or clip and slip the entire solenoid enclosure off the solenoid base sub-assembly. CAUTION: When metal retaining clip disengages, it will spring upward.
3. Unscrew solenoid base sub-assembly and remove core assembly, core spring and solenoid base gasket.
4. For normal maintenance, (cleaning) it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. If disassembly is required, remove stem pin and slip stem with stem spring and stem gasket from valve body.
5. Unscrew end cap and remove end cap gasket, body gasket and disc.
6. Unscrew end plug and remove end plug gasket, piston and piston "U" cup.
7. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.
8. Lubricate piston "U" cup and all gaskets with DOW CORNING® 111 compound or an equivalent high grade silicone grease.
9. Position piston "U" cup on piston with mouth or open end facing in the direction of the end plug.
10. Install piston into valve body. Position end plug gasket on end plug and install into valve body. Torque end plug to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
11. Position body gasket and end cap gasket on end cap. Install disc and end cap into valve body. Torque end cap to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
12. If removed, assemble and replace manual operator stem gasket, stem, stem spring and stem pin.
13. Position solenoid base gasket in valve body.
14. Install core assembly and core spring into solenoid base sub-assembly. Thread solenoid base sub-assembly by hand into valve body. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds [ $19.8 \pm 2.8$  newton meters].
15. Install solenoid enclosure and the retaining cap or clip.
16. Make-up pipe or tubing connections to valve body.
17. After maintenance, operate the valve a few times to be sure of proper operation.

## AIR OR LIQUID CONSTRUCTION WITH GENERAL PURPOSE SOLENOID ENCLOSURE. (Refer to Figure 3.)

1. Disassemble and reassemble valve in an orderly fashion paying careful attention to exploded view provided for identification and placement of parts.
2. Unscrew pipe adapter and remove spring washer.
3. Slip the entire solenoid enclosure off the solenoid base sub-assembly.
4. Remove plugnut gasket from solenoid base sub-assembly.
5. Unscrew solenoid base sub-assembly and remove core assembly, core spring and solenoid base gasket.
6. For normal maintenance, (cleaning) it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. If disassembly is required, remove stem pin and slip stem with stem spring and stem gasket from valve body.
7. Unscrew end cap and remove end cap gasket, body gasket and disc.
8. Unscrew end plug and remove end plug gasket, piston and piston "U" cup.
9. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.
10. Lubricate piston "U" cup and all gaskets with DOW CORNING® 111 compound or an equivalent high grade silicone grease.
11. Position piston "U" cup on piston with mouth or open end facing in the direction of the end plug.
12. Install piston into valve body. Position end plug gasket on end plug and install into valve body. Torque end plug to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
13. Position body gasket and end cap gasket on end cap. Install disc and end cap into valve body. Torque end cap to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
14. If removed, assemble and replace manual operator stem gasket, stem, stem spring and stem pin.
15. Position solenoid base gasket in valve body.
16. Install core assembly in core spring into solenoid base sub-assembly. Thread solenoid base sub-assembly into valve body. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds [ $19.8 \pm 2.8$  newton meters].
17. Replace plugnut gasket and install solenoid enclosure over solenoid base sub-assembly.
18. Replace spring washer and pipe adapter. Maximum torque for pipe adapter is 90 inch-pounds [10.2 newton meters].
19. Make-up piping or tubing connections to valve body.
20. After maintenance, operate the valve a few times to be sure of proper operation.

## AIR OR LIQUID CONSTRUCTION WITH EXPLOSION-PROOF/WATERTIGHT SOLENOID ENCLOSURE. (Refer to Figures 1 and 3.)

1. Disassemble and reassemble valve in an orderly fashion paying careful attention to exploded views provided for identification and placement of parts.
2. Remove pipe adapter and spring washer.
3. Unscrew housing cover with retaining ring and nameplate. Two wrenching flats are provided on the housing to hold it securely in place while the housing cover is being loosened or tightened.
4. Slip flux washer, spring washer, insulating washer, coil and insulating washer off the solenoid base sub-assembly. Insulating washers (2) are omitted when a molded coil is used.
5. Remove plugnut gasket from top of solenoid base sub-assembly.
6. Unscrew solenoid base sub-assembly with a special wrench adapter provided. Wrench adapter Order No. 170-022-1.
7. Remove solenoid base sub-assembly, housing, core assembly, core spring and solenoid base gasket.
8. For normal maintenance, (cleaning) it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. If disassembly is required, remove stem pin and slip stem with stem spring and stem gasket from valve body.
9. Unscrew end cap and remove end cap gasket, body gasket and disc.
10. Unscrew end plug and remove end plug gasket, piston and piston "U" cup.
11. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.
12. Lubricate piston "U" cup and all gaskets with DOW CORNING® 111 compound or an equivalent high grade silicone grease.
13. Position piston "U" cup on piston with mouth or open end facing in the direction of the end plug.
14. Install piston into valve body. Position the end plug gasket on end plug and install into valve body. Torque end plug to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
15. Position body gasket and end cap gasket on end cap. Install disc and end cap into valve body. Torque end cap to  $200 \pm 10$  inch-pounds [ $22.6 \pm 1.1$  newton meters].
16. If removed, assemble and replace manual operator stem gasket, stem, stem spring and stem pin.
17. Position solenoid base gasket in valve body.
18. Before proceeding refer to greasing instructions for explosion-proof/watertight solenoid enclosures under "Coil Replacement."
19. Position core assembly and core spring into solenoid base sub-assembly. Position solenoid base sub-assembly inside of solenoid housing and thread solenoid base sub-assembly into valve body. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds [ $19.8 \pm 2.8$  newton meters].
20. Replace insulating washer, coil, insulating washer, flux washer and spring washer. Insulating washers (2) are omitted when a molded coil is used. Replace housing cover with nameplate and retaining ring attached. Torque housing cover to  $135 \pm 10$  inch-pounds [ $15.3 \pm 1.1$  newton meters].
21. Replace spring washer and pipe adapter. Maximum torque for pipe adapter is 90 inch-pounds [10.2 newton meters].
22. Make-up pipe or tubing connections to valve body.
23. After maintenance, operate the valve a few times to be sure of proper operation.

## 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.

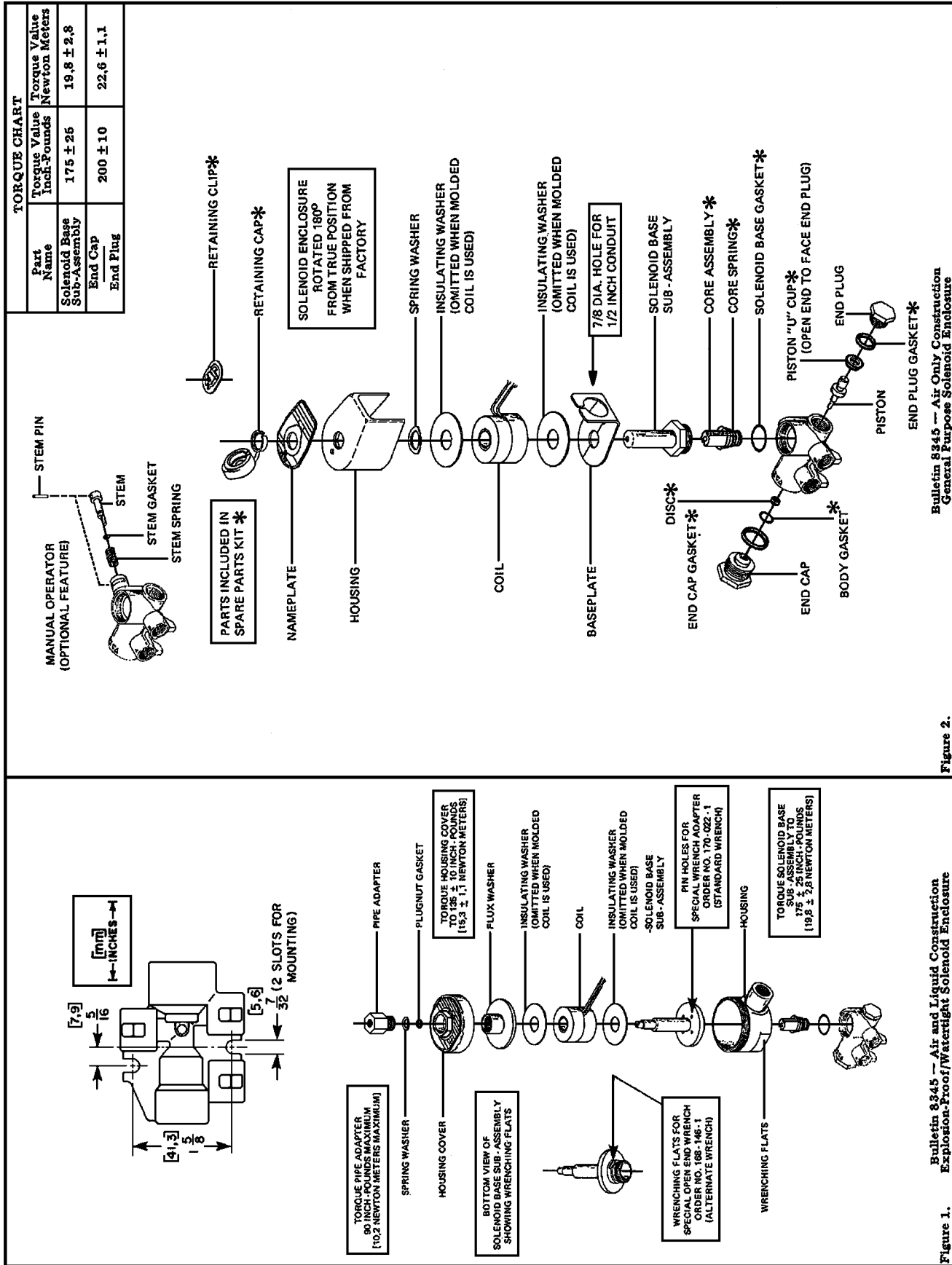


Figure 1. Bulletin 8345 -- Air and Liquid Construction Explosion-Proof/Watertight Solenoid Enclosure

Figure 2. Bulletin 8345 -- Air Only Construction General Purpose Solenoid Enclosure

TORQUE CHART		
Part Name	Torque Value Inch-Pounds	Torque Value Newton Meters
Pipe Adapter	90 (Maximum)	10,2 (Maximum)
Solenoid Base Sub-Assembly	175 ± 26	19,8 ± 2,8
End Cap End Plug	200 ± 10	22,6 ± 1,1

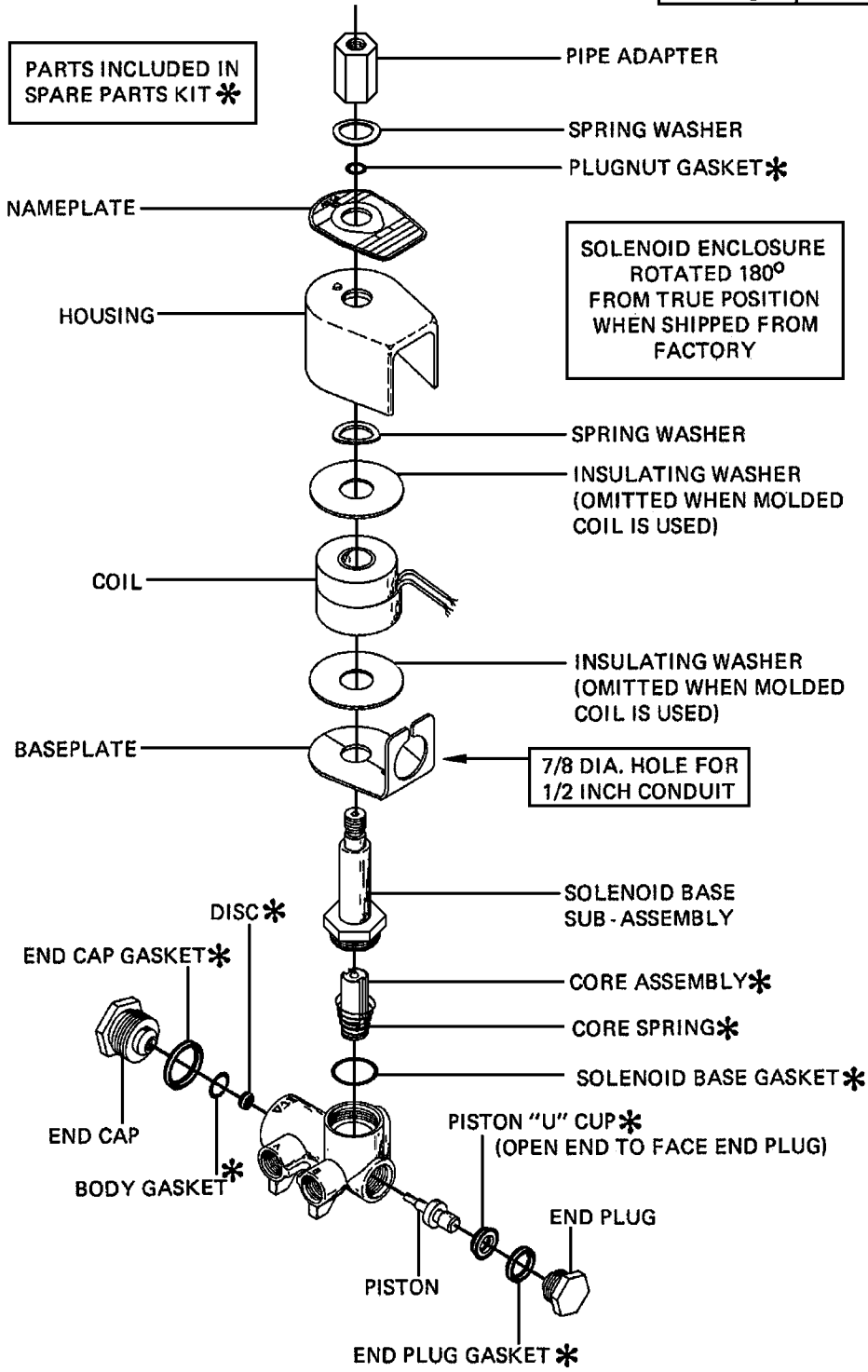


Figure 3.

Bulletin 8345 - Air and Liquid Construction  
General Purpose Solenoid Enclosure