

INSTALLATION AND MAINTENANCE INSTRUCTIONS

3-WAY DIRECT ACTING SOLENOID VALVES NORMALLY CLOSED, NORMALLY OPEN AND UNIVERSAL OPERATION 1/8, 1/4, 3/8 and 1/2" NPT—RESILIENT SEATING

BULLETINS

8300

8302



FORM NO. V-5942

DESCRIPTION

Bulletin 8300's are 3-way, direct acting solenoid valves having only four moving parts—a core, a lever and two poppet type valve discs. Valves are supplied with resilient seats and plastic discs and valve bodies of brass, steel or stainless steel construction. Standard valves have a General Purpose, NEMA Type I Solenoid Enclosure.

Bulletin 8302's are the same as Bulletins 8300 except the solenoids are equipped 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. Installation and Maintenance Instructions for the Explosion-Proof/Watertight Solenoid Enclosure are shown on Form No. V5381.

OPERATION

Normally Closed (Suffix Letter "F")

Solenoid De-energized: Flow is from Cylinder Connection (1) to Exhaust Connection (3). Pressure Connection (2) is closed.

Solenoid Energized: Flow is from Pressure Connection (2) to Cylinder Connection (1). Exhaust Connection (3) is closed.

Normally Open (Suffix Letter "G")

Solenoid De-energized: Flow is from Pressure Connection (3) to Cylinder Connection (1). Exhaust Connection (2) is closed.

Solenoid Energized: Flow is from Cylinder Connection (1) to Exhaust Connection (2). Pressure Connection (3) is closed.

Universal (Suffix Letter "U")

Solenoid De-energized: Flow is from Connection (3) to Connection (1) or Connection (1) to Connection (3). Connection (2) is closed.

Solenoid Energized: Flow is from Connection (1) to Connection (2) or Connection (2) to Connection (1). Connection (3) is closed.

NOTE: Operation forms are identified by catalog suffix letters as follows:

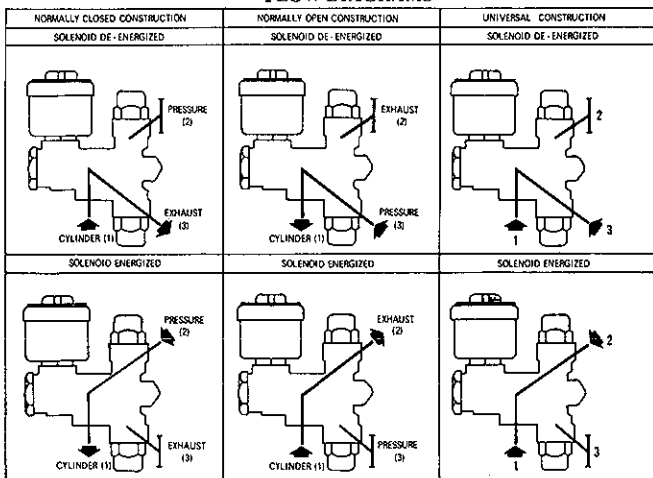
- Suffix Letter "F" Normally Closed Operation
- Suffix Letter "G" Normally Open Operation
- Suffix Letter "U" Universal Operation

CHANGING OPERATION FORMS

Universal valves (U) may be used for any operation form without internal changes. However, normally closed (F) and normally open (G) valves cannot be used for a different operation form unless internal parts (upper and lower springs) are changed. Consult factory for new internal parts and nameplate for proper valve identification. Refer to "NEW SPRING INSTALLATION" Section when changing operation forms.

IMPORTANT: No minimum operating pressure is required.

FLOW DIAGRAMS



NOTE: PORT MARKINGS 1, 2 AND 3 CORRESPOND DIRECTLY TO A, B, AND C.

MANUAL OPERATOR (Optional)

Valves with Suffix "MO" after catalog number are provided with a manual operator which allows operation when desired or during an interruption of electrical power. To actuate valve manually, push knob upward and rotate one half (1/2) turn. Valve will now be in same position as when solenoid is energized. To disengage manual operator, rotate manual operator approximately one half (1/2) turn until guide pin in manual operator stem engages slots in stuffing box bonnet and drops down. CAUTION: For valve to operate electrically, manual operator stem must be fully retracted.

INSTALLATION

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

POSITIONING

Valve must be mounted with the solenoid vertical and upright.

MOUNTING

For mounting bracket mounting dimensions, refer to Figure 3.

PIPING

Connect piping to valve according to markings on valve body. The form of flow is indicated by the Suffix Letters ("F," "G" or "U") following the valve catalog number on the nameplate. 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 pipe, do not use valve as a lever. Wrenches applied to valve body or piping are to be located as close as possible to connection point.

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. Housings for all solenoids are provided with connections or accommodations for 1/2 inch conduit. The general purpose solenoid enclosure may be rotated to facilitate wiring by removing the retaining cap or clip. CAUTION: When metal retaining clip disengages, it will spring upward. Rotate enclosure to desired position. Replace retaining cap or clip 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 including the solenoid base sub-assembly, core/spring sub-assembly or core.

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 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 depressurize valve before making repairs. It is necessary to remove valve from pipe line for repairs.

PREVENTIVE MAINTENANCE

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, operate the valve at least once a month to insure proper opening and closing.
- Periodic inspection (depending on medium 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.
- Inspect resilient-seated valves after the first three years of service or more frequently depending upon rate of valve cycling. Check seats and measure strokes to be certain they comply with the strokes given in Form No. V-5940. Based on initial inspection results, an Inspection/Maintenance program should be established.

IMPROPER OPERATION

- Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic click signifies 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.
- Burned-Out Coil:** Check for open-circuited coil. Replace coil if necessary.
- Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.
- Incorrect Pressure:** Check pressure at the solenoid valve. Pressure to the valve must not exceed that stamped on nameplate.
- Incorrect Pressure Connection:** Refer to valve catalog suffix letter on nameplate and flow diagrams.
- Excessive Leakage:** Disassemble valve and clean all parts and passageways. Leakage between the seats and discs is usually caused by lodgement of foreign material on the valve seating surfaces. The foreign material, though not present upon examination, may have damaged the seating surfaces enough to cause leakage. Leakage thru resilient seats can only be corrected by installing new seat assemblies. When new seats are installed, the strokes must be rechecked and adjusted where necessary. Refer to paragraphs on "NEW SEAT AND DISC INSTALLATION" under "INSTALLATION OF NEW SPARE PARTS KIT" Section.

COIL REPLACEMENT (Refer to Figure 4)

Turn off electrical power supply and disconnect coil lead wires.

- Remove retaining cap or clip, nameplate and solenoid cover. CAUTION: When metal retaining clip disengages, it will spring upward.
- Slip yoke containing coil, sleeves and insulating washers off the solenoid base sub-assembly. For D-C construction, a fluxplate over the coil replaces the yoke and sleeves. Insulating washers are omitted when a molded coil is used.
- Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.

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.

ASCO Valves



VALVE DISASSEMBLY FOR GENERAL CLEANING AND INSPECTION

(Refer to Figure 4)

Depressurize valve and turn off electrical power supply. It is strongly recommended that the valve be removed from the pipe line for ease of maintenance. If it is not practical to remove the valve from the pipe line and resetting of strokes is required or a new Spare Parts Kit is to be installed, consult factory for special bonnet tools which are available. When consulting the factory, be sure to include the valve catalog number and serial number from the nameplate on the valve.

1. Disassemble valve in an orderly fashion paying careful attention to exploded view provided for identification 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. For Explosion-Proof/Watertight Enclosure, refer to Installation and Maintenance Instruction Sheet, Form No. V-5381.
3. Unscrew solenoid base sub-assembly and remove bonnet gasket. For Explosion-Proof/Watertight Solenoid Enclosure, a special bonnet adapter wrench is available, Order No. 102-649-1.
4. Unscrew disc guide caps (both ends) and remove disc guide cap gaskets, upper and lower springs, discs, and disc stems. CAUTION: Tag springs, discs and disc stems as they are not interchangeable and must be returned to the original location. Tag upper and lower for ease of identification.
5. Remove end cap, end cap gasket and slip core/spring sub-assembly (A-C Construction) or core (D-C Construction) off the end of the valve lever and lift it out through solenoid base sub-assembly opening.
6. Inspect upper and lower valve seats but do not remove from valve body unless installing a complete Spare Parts Kit.
7. Clean all parts thoroughly and replace worn or damaged parts with a complete Spare Parts Kit. If a Spare Parts Kit is required, refer to section on "INSTALLATION OF NEW SPARE PARTS KITS" for complete rebuild. IMPORTANT: Install all new parts. Do not retain any old parts when rebuilding valve. If only partial installation is made, valve malfunction may occur.

VALVE REASSEMBLY

1. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.
2. Lubricate all gaskets with Dow Corning's Valve Seal silicone lubricant or an equivalent high grade silicone grease.
3. Replace core/spring sub-assembly (A-C Construction) or core (D-C Construction) through solenoid base sub-assembly opening and engage with lever.
4. Install end cap gasket and end cap. Torque end cap to 55 ± 5 foot-pounds [74.6 ± 6.8 newton meters].
5. Replace bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to 175 ± 25 inch-pounds [19.8 ± 2.8 newton meters].
6. Replace solenoid enclosure and retaining cap or clip.
7. For stroke setting requirements (adjustment of valve disc stems), refer to "NEW SEAT AND DISC INSTALLATION" Paragraphs under "INSTALLATION OF NEW SPARE PARTS KIT" Section.
8. Install upper and lower springs. Refer to "NEW SPRING INSTALLATION" Section.
9. Replace disc guide cap gaskets and disc guide caps (both ends). Torque disc guide caps to 180 ± 15 inch-pounds [20.3 ± 1.7 newton meters].
10. After maintenance, operate the valve a few times to be sure of proper opening and closing. A metallic click signifies that the solenoid is operating.

NEW SPRING INSTALLATION (Refer to Figures 1 and 4)

When it is desired to change to a different form of flow or operating conditions, new upper and lower springs corresponding to the new requirements must be installed. Depressurize valve and turn off electrical supply. Remove the two disc guide caps and old springs. Install new springs in their proper location as indicated on the factory labeled tags. Replace disc guide caps and torque to 180 ± 15 inch-pounds [20.3 ± 1.7 newton meters]. The smaller diameter end of the Type "38" body springs faces the discs.

NOTE: The lower spring is always the weaker of the two and should always be located at the bottom. If the springs are installed in the wrong position, the valve will not function properly.

A method to determine which spring is the weaker is by placing the two springs on the shaft of a screwdriver or similar tool and compressing them. The spring which compresses to the "L" dimension (Figure 1) first is the weaker of the two springs and should be placed on the bottom.

MANUAL OPERATOR DISASSEMBLY AND REASSEMBLY (Refer to Figure 4)

1. Unscrew stuffing box bonnet from valve body. (Be certain manual operator stem is fully retracted). Remove the manual operator intact.
2. Remove gasket from stuffing box bonnet.
3. Press or drive out knob/stem pin from operating knob and stem. CAUTION: When removing knob/stem pin from knob/stem sub-assembly, do not let parts fly apart.
4. Remove spring and slide stem out of stuffing box bonnet. CAUTION: Before sliding stem thru stuffing box bonnet, be certain there are no burrs on stem from removing knob/stem pin. Do not damage captive gasket seat ("O"-ring) in stuffing box sub-assembly.
5. All parts are now accessible for cleaning.
6. Reassemble in reverse order of disassembly, paying careful attention to exploded view provided for identification and placement of parts.
7. Torque stuffing box bonnet to 16 ± 3 foot-pounds [22.7 ± 4.1 newton meters].

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.

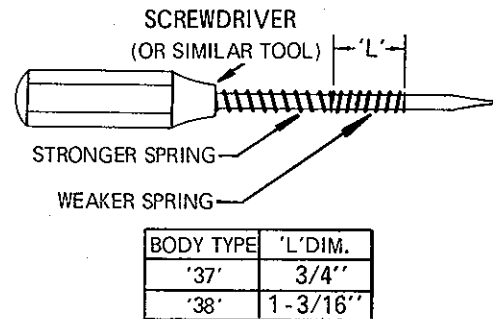


Figure 1. Method to Determine Weaker Spring

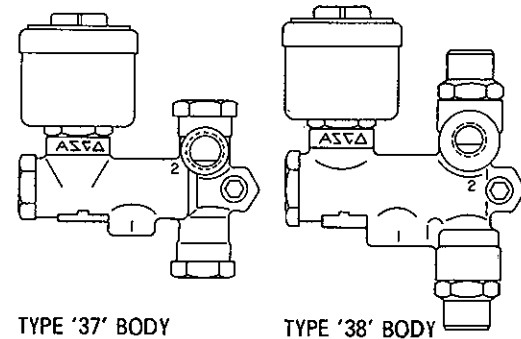


Figure 2. Identification of Body Type

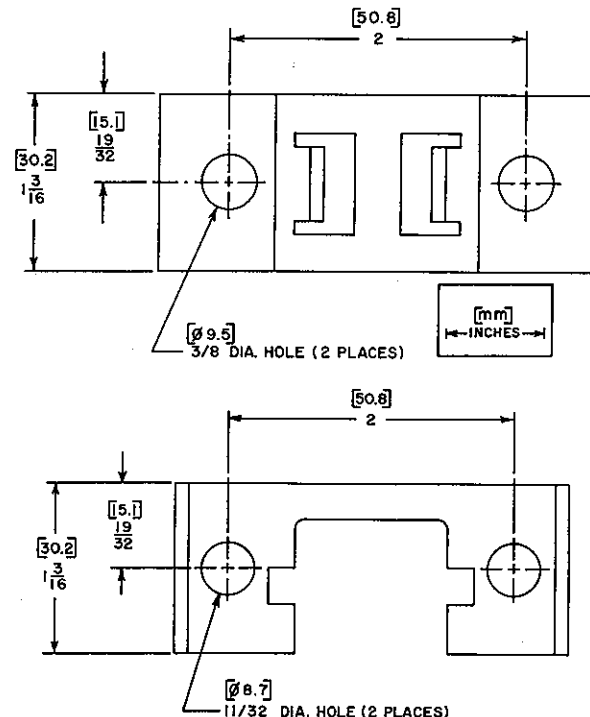
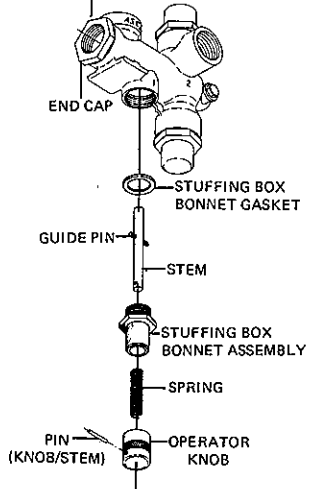


Figure 3. Mounting Bracket Dimensions

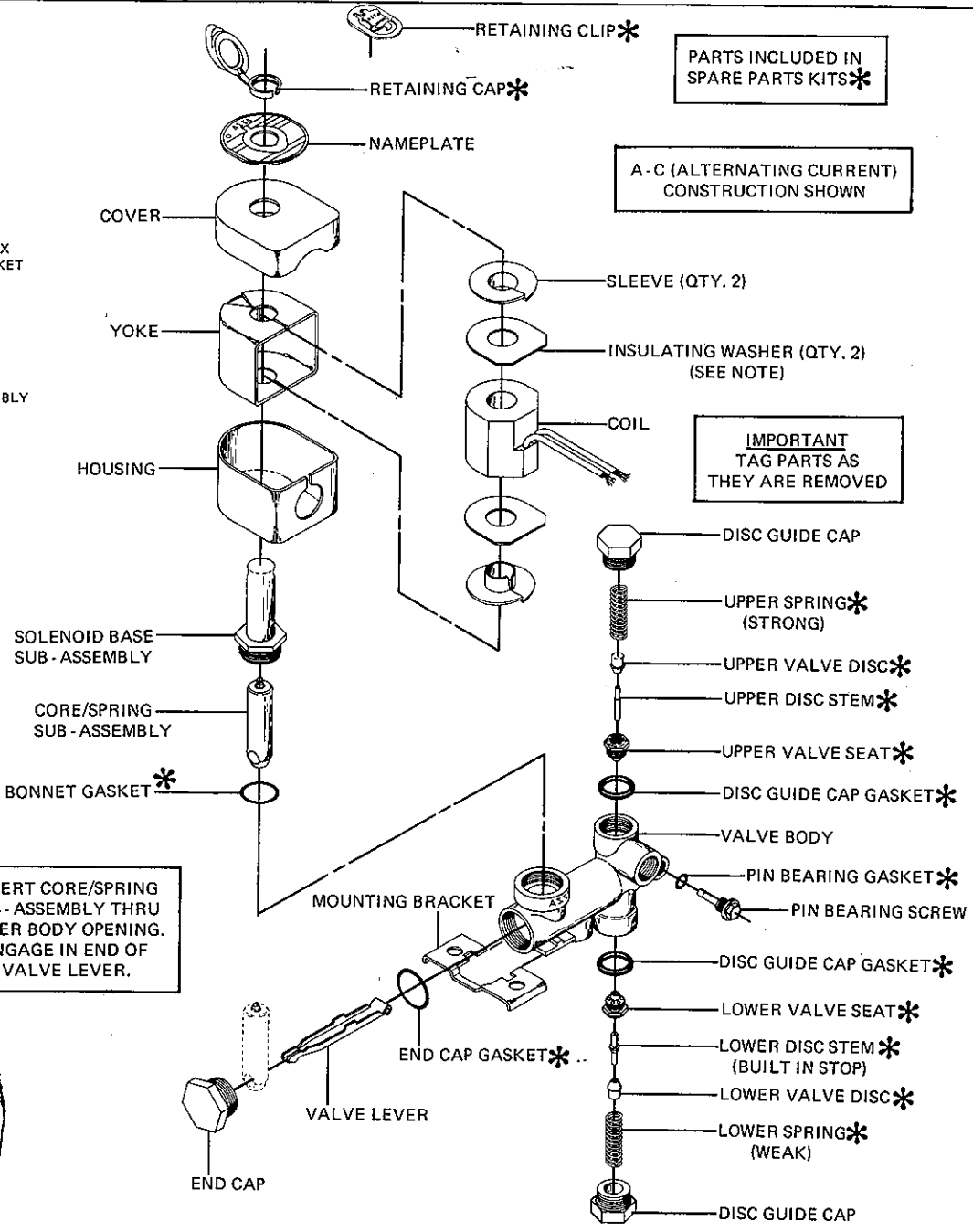
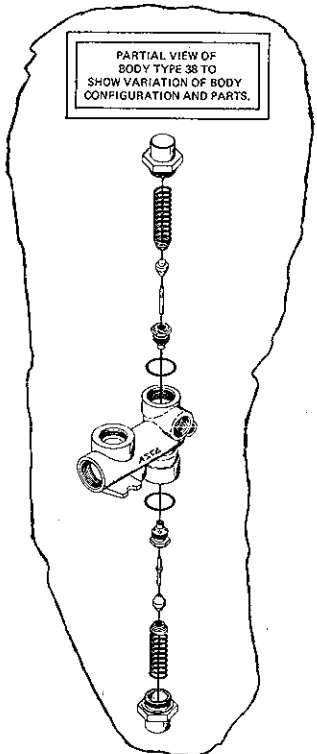
CONNECTION '1' MACHINED INTO END CAP (WHEN MANUAL OPERATOR IS USED)



VIEW SHOWING MANUAL OPERATOR THREADED INTO CONNECTION '1' ON UNDERSIDE OF VALVE BODY

TORQUE STUFFING BOX BONNET TO 16 ± 3 FOOT-POUNDS (22.7 ± 4.1 NEWTON METERS)

PARTIAL VIEW OF BODY TYPE 38 TO SHOW VARIATION OF BODY CONFIGURATION AND PARTS.



PARTS INCLUDED IN SPARE PARTS KITS*

A-C (ALTERNATING CURRENT) CONSTRUCTION SHOWN

IMPORTANT TAG PARTS AS THEY ARE REMOVED

INSERT CORE/SPRING SUB-ASSEMBLY THRU UPPER BODY OPENING. ENGAGE IN END OF VALVE LEVER.

NOTE: INSULATING WASHERS (2) ARE OMITTED WHEN A MOLDED COIL IS USED.

PART NAME	TORQUE VALUE INCH-POUNDS	TORQUE VALUE NEWTON METERS
PIN BEARING SCREW	55 ± 5	6.2 ± .6
SOLENOID BASE SUB-ASSEMBLY	175 ± 25	19.8 ± 2.8
VALVE SEATS (UPPER & LOWER)	80 ± 8	9.0 ± .9
DISC GUIDE CAPS (UPPER & LOWER)	180 ± 15	20.3 ± 1.7
END CAP	FOOT-POUNDS 55 ± 5	74.6 ± 6.8

Figure 4.

Bulletin 8300
Body Type 37 - Resilient Seating
General Purpose Solenoid Enclosure Shown.
For Explosion-Proof/Watertight Solenoid Enclosure Used on Bulletin 8302, See Form No. V-5381.

INSTALLATION OF NEW SPARE PARTS KITS

Depressurize valve and turn off electrical power supply. Disassemble valve in an orderly fashion paying careful attention to exploded views provided for identification of parts. For ease of maintenance, valve should be removed from the pipe line. Spare Parts Kits include springs for all three forms of flow (F, G and U). Check the catalog number suffix on the nameplate to determine which form of flow you have. For example, a Form "F" valve is normally closed operation. When the correct springs have been chosen, immediately discard remaining two (2) sets of springs to avoid any difficulty.

- 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. For Explosion-Proof/Watertight Solenoid Enclosure, refer to Form V-5381 for disassembly.
- Unscrew solenoid base sub-assembly and remove bonnet gasket. For explosion-Proof/Watertight Solenoid Enclosure, a special wrench is required to remove the solenoid base sub-assembly. Wrench adapter Order No. 102-649-1.
- Unscrew disc guide cap (both ends) and remove disc guide cap gaskets, upper and lower springs, discs and disc stems.
- Remove upper and lower valve seats using a 1/2 inch thin wall socket wrench.
- Remove end cap and end cap gasket. Slip core/spring sub-assembly (A-C Construction) or core (D-C Construction) off the end of the valve lever and lift out through the solenoid base sub-assembly opening.
- Remove pin bearing screw and pin bearing gasket.
- Slide valve lever out through the end cap opening of the valve body.
- All parts are now accessible for replacement. Clean all internal passageways. Install a complete Spare Parts Kit. IMPORTANT: Install all new parts. Do not retain any old parts when rebuilding valve.
- Reassemble in reverse order of disassembly paying careful attention to exploded views provided for identification and placement of parts.
- Lubricate all gaskets with Dow Corning's Valve Seal silicone lubricant or an equivalent high grade silicone grease.
- Insert valve lever and replace pin bearing gasket and pin bearing screw through the valve lever. Torque pin bearing screw to 55 ± 5 inch-pounds [$6.2 \pm .6$ newton meters].
- Position core/spring sub-assembly (A-C Construction) or core (D-C Construction) thru solenoid base sub-assembly opening and engage with valve lever. Install end cap gasket and end cap. Torque end cap to 55 ± 5 foot-pounds [74.6 ± 6.8 newton meters].
- Replace bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to 175 ± 25 inch-pounds [19.8 ± 2.8 newton meters].
- Install upper and lower valve seats using a small amount of pipe compound on the seat threads to avoid possible leakage. Torque upper and lower valve seats to 80 ± 8 inch-pounds [$9.0 \pm .9$ newton meters].
- Replace solenoid enclosure and retaining cap or clip. For Explosion-Proof/Watertight Solenoid Enclosures, refer to Form No. V-5381.

NEW SEAT AND DISC INSTALLATION

- New upper and lower seats and discs cannot be installed without making some minor adjustments. It is important that the stroke of the valve discs be set carefully in order to obtain the proper orifice opening and reliable operation of the valve. Check valve nameplate for the catalog number and refer to "Stroke Chart", Form No. V5940 for stroke setting requirements. Refer to Figure 5 for the method of measuring the stroke and Figure 6 for stroke setting (grinding). Spaces are provided on this sheet for your calculations.
- Place the valve in a vertical and upright position. NOTE: Solenoid and core/spring sub-assembly or core must be assembled in the valve when strokes are measured. Install upper disc stem (large diameter first and valve disc). Use a depth gauge to measure the distances. NOTE: Upper disc stem is a straight stem while the lower disc stem has a built-in stop. Refer to Figure 6.
- With valve de-energized, measure Dimension "A." Dimension "A" is from the top of the valve body to the top of the upper disc as illustrated in Figure 5.
- With valve energized, measure Dimension "B." Dimension "B" is from the top of the valve body to the top of the upper disc as illustrated in Figure 5.
- Dimension "A" - "B" = upper disc stroke.

The differences between the two distances "A" minus "B" is the upper disc stroke. If the stroke is more than can be allowed in the "Stroke Chart" Form No. V-5940 (according to catalog number and body type), the end of the upper disc stem (small diameter end) which contacts the upper valve disc, (see Figure 6) must be ground off until the proper stroke is obtained. After grinding, the end of the disc stem must be chamfered slightly.

- Replace upper valve spring (strong spring), disc guide cap with disc guide cap gasket attached. Torque disc guide cap to 180 ± 15 inch-pounds [20.3 ± 1.7 newton meters].
- Turn valve upside-down to install lower disc stem (without lower valve disc). The lower disc stem stroke is to be $.010 \pm .002$ less than the upper disc stroke.
- Upper disc stroke minus $.010$ equals $\pm .002$ the correct lower stem stroke.
- With valve energized, measure Dimension "C."
- With valve de-energized, measure Dimension "D."
- Dimension "C" - "D" = lower stem stroke.

The difference between the two distances "C" - "D" is the lower stem stroke. If the stroke is more than that calculated in Paragraph No. 23, the end of the disc stem which contacts the valve lever must be ground off until the proper stroke is obtained. After grinding, the end of the disc stem must be crowned slightly and polished smooth.

- Install lower valve disc on disc stem.

- With valve energized, measure Dimension "E."
- With valve de-energized, measure Dimension "F."
- Dimension "E" - "F" = lower disc stroke.

The difference between the two distances "E" minus "F" is the lower disc stroke. If the stroke is more than that allowed in the "Stroke Chart," Form No. V-5940 (according to catalog number and body type) the end of the lower disc stem (small diameter end) which contacts the lower valve disc (see Figure 6) must be ground off until the proper stroke is obtained. After grinding, the end of the disc stem must be chamfered slightly.

- When the strokes have been set in accordance with Figure 5 and the "Stroke Chart," Form No. V-5940 a gap will automatically be obtained between the lower disc stem and the lever when the solenoid is energized. This gap will assure proper operation of the valve.
- Replace lower valve spring (weak spring), disc guide cap with disc guide cap gasket attached. Torque disc guide cap to 180 ± 15 inch-pounds [20.3 ± 1.7 newton meters].
- After maintenance, operate the valve a few times to be sure of proper opening and closing. A metallic click signifies that the solenoid is operating.

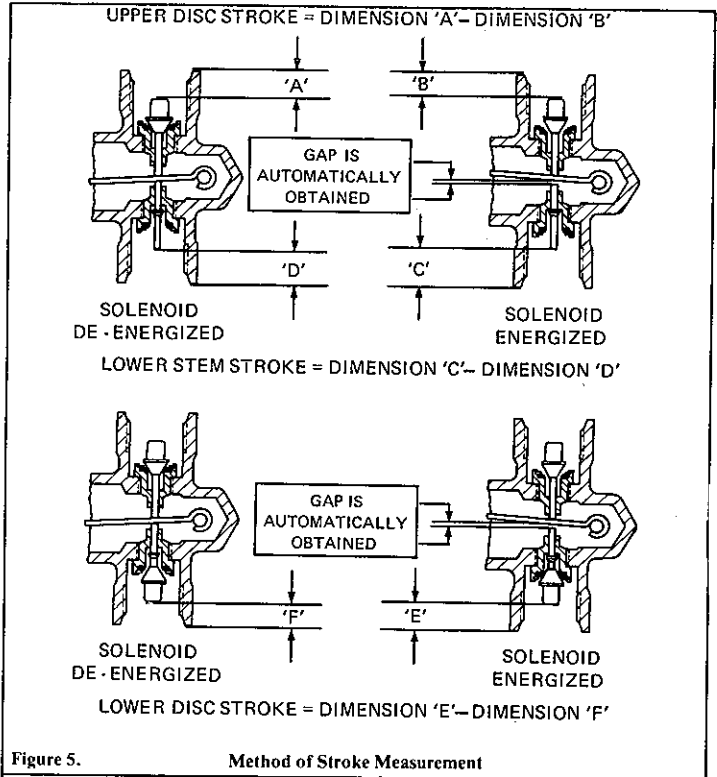


Figure 5. Method of Stroke Measurement

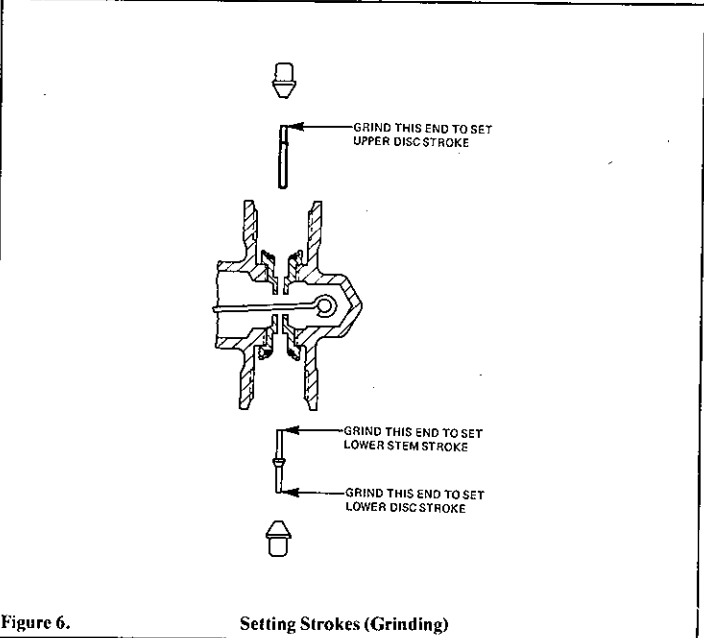


Figure 6. Setting Strokes (Grinding)