

# ELECTRIC ON-OFF VALVE

## INSTRUCTIONS

Installation - Operation - Inspection - Maintenance



2" - 36" ROSS MODEL - 42WR FIGURE 14  
ELECTRIC ON-OFF VALVE

Globe Flat Seat Style

**ROSS VALVE** Mfg. Co., Inc.

PO BOX 595, TROY, NY 12181 - PHONE 518/274-0961 - FAX 518/274-0210

## INSTALLATION / START-UP (ROSS PISTON VALVE – GLOBE OR ANGLE STYLE)

### Shipment:

Prior to shipment, each valve is thoroughly tested and pre-adjusted at the factory to the expected field conditions. Any visible damage to the crate or packaging should be immediately brought to the attention of the shipping company and documented with photographs.

Depending upon the valve size, external controls may be attached or in a separate box. The inlet of the main valve is identified with a metal tag. When controls are shipped separately, connections are tagged.

### Storage:

If it is necessary to store the valve before installation, it should be protected from the elements. Inside storage is recommended. If this is not possible, the valve should be protected from dirt, heat, freezing, and direct sunlight.

### Installation:

1. Carefully remove all shipping materials and check the valve for any other foreign objects.
2. If possible, flush the line before inserting the valve.
3. The valve is tagged with a model and serial number. It is recommended that the serial number be noted in your records as this will be requested by the factory when any technical support or parts replacement is required. **Valve serial number: L\_\_\_\_\_.**
4. Place the valve in line with the flange marked "INLET" facing the high pressure or supply line.  
CAUTION: Do not obstruct the vent hole in the center of the bottom cap (#16 for Globe Body valves) or in the differential cylinder bracket (#27 for Angle Body valves). Allow enough clearance above the valve for removal of the stem assembly.
5. If external piping and controls are not attached to the valve when shipped, connect couplings identified with tags that are numbered. The arrow on the pilot valve body points in the direction of flow through the pilot valve. Flow is always away from the top cap of the main valve. The indicator rod (#20) shows the position of the main stem.
6. Attach gauge cocks to the back side of the valve.
7. Complete any necessary wiring on solenoid valves (if applicable).

### Start-Up:

1. Close the isolation valves (#18) in the control piping.
2. Open the main line gate valve (if installed) on the discharge/downstream side of the valve.
3. *Slowly* open the main line gate valve (if installed) on the inlet/upstream side of the valve.
4. Open the isolation valves (#18) in the control piping.
5. Loosening the union of the control piping on the top cap side of the speed control valve will help bleed air and give a positive indication when the operating chamber is full. It may be necessary to apply pressure to the valve indicator rod (if provided) with a wrench handle or block of wood until the valve operating chamber is pressurized.
6. No lubrication or adjustment to the valve is required or recommended. The valve has been thoroughly tested at the factory and set to the expected field conditions.

# ON-OFF VALVE

**Purpose:** Stop/ start flow in a system

**Model Number:** 42WR

**Sizes:** 1" - 48"

**Type:** Nonthrottling

**Primarily Controlled By:** Electricity

**Located:** In line/In line near storage

**Purpose:** To stop and start water flow in a piping system

**Inlet Pressure:** Maximum: 300 psi

**Inlet Pressure:** Minimum: 5 psi

**Construction:** Body: 1" - 36" - Cast iron (semi-steel) with bronze trim  
40" - 48" - Ductile iron, with bronze/ stainless steel trim

**Voltages:** AC or DC

**Coil Housings:** Waterproofed or molded coil

**Manual Control:** To open or close valve in case of power failure

**Control Devices:**

**Strainer:** Model 5F-2

**Valves:**

Needle: Speed Control

Pilot: Solenoid: 3 Way: Model 42WR



Ross engineers customize the basic 42WR to accommodate individual needs.

## BASIC APPLICATIONS: FLOW CONTROL/LINE ISOLATION

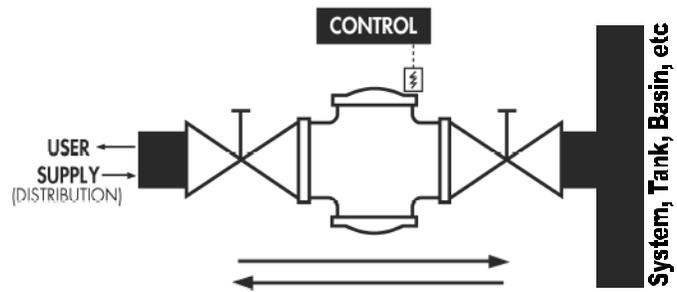
1. Isolate a system.
2. Control level in tanks, basins, reservoirs, etc.
3. Control flow when water is being metered.

**If:** Line needs to be isolation from the system

**Ross Main Valve will:** Full close to stop flow.

**If:** Line needs to be brought into the system

**Ross Main Valve will:** Full open to start flow.



## THE ROSS ADVANTAGE

1. Ross engineers provide in depth service based on
  - a. State of the art technology
  - b. The company's experience, which dates back to 1879.
2. Rugged construction materials provide a longer valve life and insure that the valve WILL NOT experience sudden breakdowns due to component failures.
3. Valve is completely pre-piped, tested and adjusted in the factory.
4. All parts are built and manufactured in the USA.

## Volume of Liquid Exhausted from Controls When Valve Opens

Valve Size	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"
Cubic Inches	34	82	188	314	565	923	1355	2200	2200	3620	6730	9160	23013	34743
Gallons	0.15	0.35	0.81	1.36	2.44	4.00	5.87	9.50	9.50	15.70	29.00	39.60	99.62	150.4

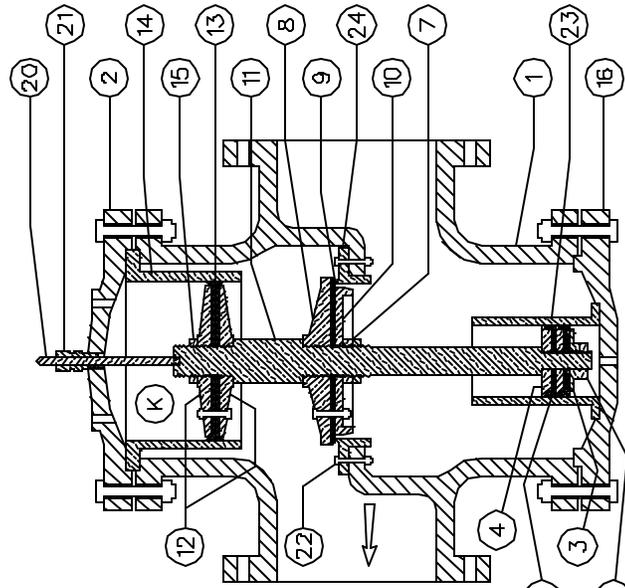
**Caution:** Provision should be made in the valve chamber to dispose of the waste water.

PART	DESCRIPTION	QTY.	MATERIAL
1	VALVE SHELL	1	CAST IRON
2	TOP CAP	1	CAST IRON
3	BOTTOM STEM GUIDE NUT	1	BRONZE
4	BOTTOM CUP FOLLOWERS (SET OF 2)	1	BRONZE
5	PISTON CUP PACKING	2	LEATHER
6	BOTTOM STEM LOCK NUT	1	BRONZE
7	STEM NUT	1	BRONZE
8	SEAT DISC	1	BRONZE
9	SEAT PACKING	1	POLYURETHANE
10	SEAT PACKING SUPPORT	1	BRONZE
11	STEM	1	BRONZE
12	MAIN CUP PLATES (SET OF 2)	1	BRONZE
13	MAIN CUP PACKING	2	LEATHER
14	MAIN BUSHING	1	BRONZE
15	TOP STEM NUT	1	BRONZE
16	BOTTOM CAP	1	CAST IRON
17	NEEDLE VALVE	1	BRONZE
18	ISOLATION VALVE	1	BRONZE
20	INDICATOR ROD	1	BRONZE
21	INDICATOR STUFFING BOX	1	BRONZE
22	BOLTS & NUTS (SEAT RING)	VARY	BRONZE
23	BOTTOM CAP CYLINDER	1	BRONZE
24	SEAT RING	1	BRONZE
25	STRAINER	1	BRONZE/STAINLESS
27	3 WAY SOLENOID	1	BRONZE/STAINLESS
	BOLTS & NUTS (TOP & BOTTOM CAP)	VARY	BRONZE
	BOLTS & NUTS (CUP PLATES)	VARY	BRONZE
	BOLTS (BOTTOM CAP CYLINDER)	1	TEFLON
	INDICATOR ROD PACKING (SET)	3	COMPOSITION
	COVER & MAIN BUSHING GASKETS	3	COMPOSITION
	STEM GASKETS	3	COMPOSITION

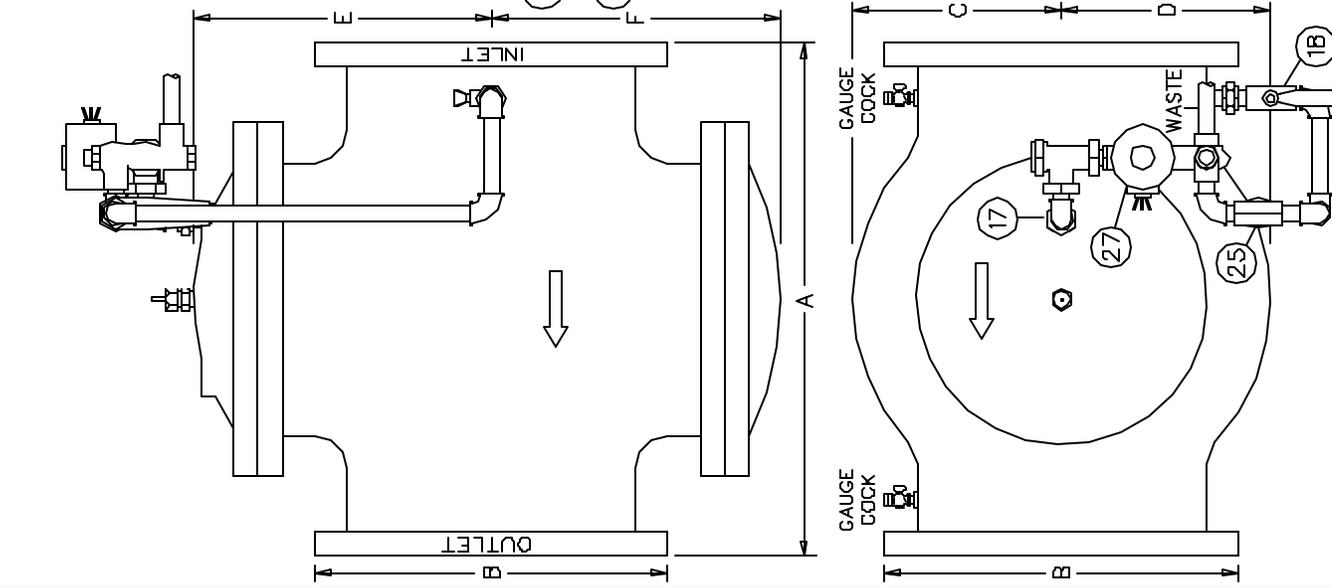
**ROSS VALVE Mfg. Co., Inc.**  
 6 OAKWOOD AVENUE - TROY, NEW YORK, 12180 - TEL. (518) 274-0961  
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 WEBSITE: www.rossvalve.com - E-MAIL: sales@rossvalve.com

DRAWING 42WR GLOBE BODY 2" - 36" NO SCALE DATE 5-15-03 TJS  
 FIGURE 14

MODEL 42WR  
 ELECTRICALLY OPERATED ON/OFF VALVE



VALVE SIZE (IN)	ASME B.1B.1 CLASS	SHIPPING WEIGHT (LBS)	DIMENSIONS (INCHES)					
			A	B	D&D	E	F	
2	125	230	14	6	4-3/4	7	7	
2.5	250	275	14-5/8	8-1/2	4-3/4	7	7	
3	125	230	14	7-1/2	4-3/4	7	7	
4	250	275	14-5/8	8-1/4	4-3/4	7	7	
6	125	230	14	9	4-3/4	7	7	
8	250	275	14-5/8	10	4-3/4	7	7	
10	125	230	17-3/4	11	6-5/8	9	9	
12	250	275	17-3/4	12-1/2	6-5/8	9	9	
14	125	230	24	13-1/2	8-3/4	12-1/2	12-1/2	
16	250	275	24-13/16	15	8-3/4	12-1/2	12-1/2	
18	125	230	24	16	10	14-1/4	14-1/4	
20	250	275	24-7/8	17-1/2	10	14-1/4	14-1/4	
24	125	230	30	19	12	15-1/2	15-1/2	
25	250	275	31-1/2	20-1/2	12	15-1/2	15-1/2	
30	125	230	34-1/4	21	14	18	18	
36	250	275	35-3/4	23	14	18	18	
42	125	230	37-7/8	23-1/2	15	21-1/2	21-1/2	
48	250	275	38-1/4	25-1/2	15	21-1/2	21-1/2	
60	125	230	41-7/8	25	18-3/8	24	24	
72	250	275	41-7/8	28	18-3/8	24	24	
90	125	230	42-3/8	27-1/2	18-3/8	24	24	
108	250	275	42-3/8	30-1/2	18-3/8	24	24	
120	125	230	47	32	20	25	25	
144	250	275	47	35	20	25	25	
180	125	230	63-3/4	38-3/4	26-1/4	34	34	
216	250	275	65-1/16	43	26-1/4	34	34	
270	125	230	85	48	28-1/4	34	34	
324	250	275	85	50	28-1/4	34	34	

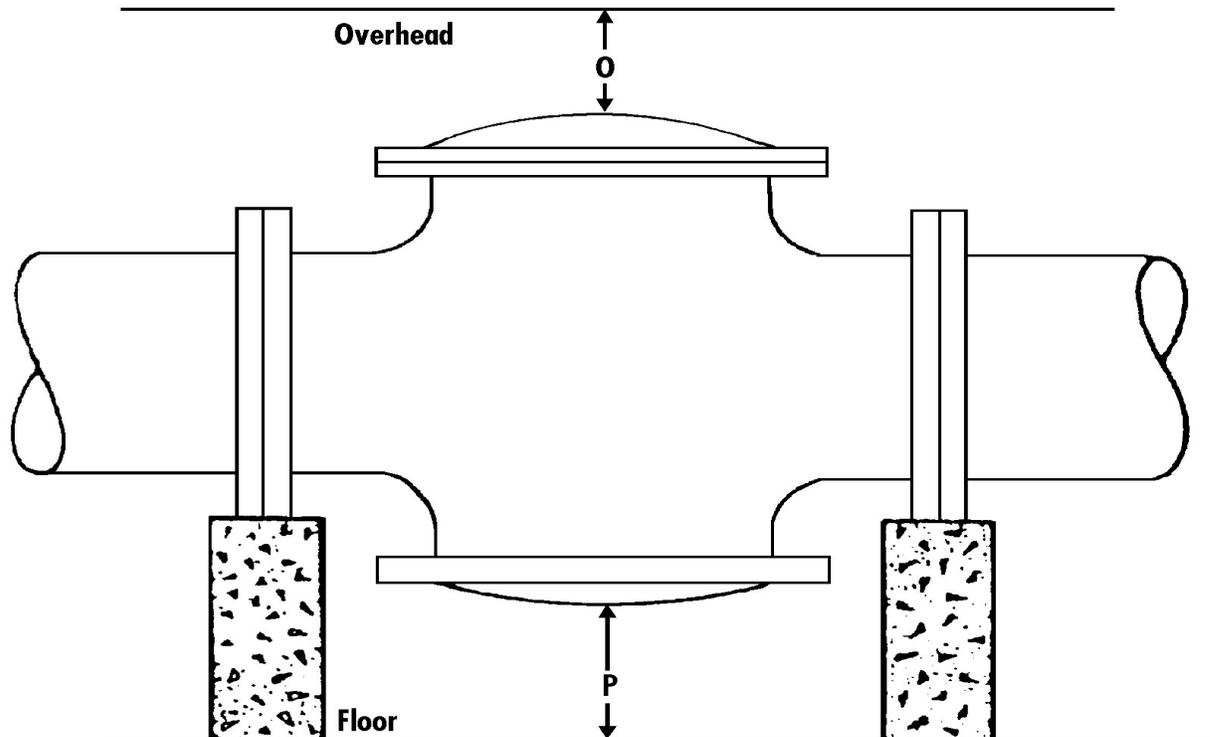


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 NOTE: The Ross Valve Mfg. Co., Inc., reserves the right to modify valve construction which will result in equal or superior performance to existing designs. These modifications may be made at any time and at the sole discretion of the manufacturer.

# DIMENSIONS

## Globe Body Minimum Clearances

## Piston Valve Sizes: 4" - 48"



Size (Inches)	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"
<b>O</b>	14	16	18	21	23	28	28	33	33	36	43	46	54	60
<b>P</b>	4 1/2	5 1/2	6 1/2	1	1	1	1	1	1	1	1	1	1	1

### Note

1. Dimension "O" is clearance for removal of the top cap and piston for repacking the main valve. Additional working space for the convenience of the service man should be considered above as well as around the valve.
2. Dimension "P" as listed is the desirable clearance under the valve for removal of the STANDARD bottom cap. This dimension may be reduced to 1 inch for all valves on special applications.

### Note

- A. **Do not obstruct vent hole located at the center of the bottom cap.**
- B. Consideration should be given for installation of valves 14" or larger under manhole in the roof of the valve vault or for additional clearance above the valve since a mechanical hoist will probably be required for removal of the piston. An eye bolt or hook cast in the cover slab over the center of the valve is useful.
- C. If clearance under the valve is limited, dimensions "O" and "P" can be modified. Consult the factory concerning special applications.

## Features

- Designed for high flow and high pressure service.
- Direct acting, requires no minimum operating pressure.
- Choice of metal seating materials to handle aggressive fluids, or resilient seating for airtight shutoff.
- Ideal for power plants and similar applications.

## Construction

Valve Parts in Contact with Fluids		
Body	Brass	304 Stainless Steel
Disc	303 Stainless Steel (Metal), PA or Brass (Resilient)	
Seats	NBR, Phosphor Bronze	303 Stainless Steel
Core Tube	305 Stainless Steel	
Core and Plugnut	430 F Stainless Steel	
Springs	302 Stainless Steel, 17-7PH or Inconel	
Shading Coil	Copper	Silver
Gaskets	NBR	PTFE

## Electrical

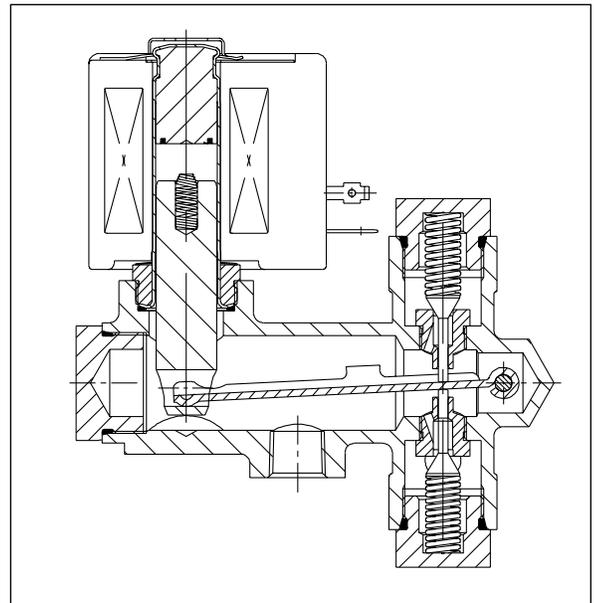
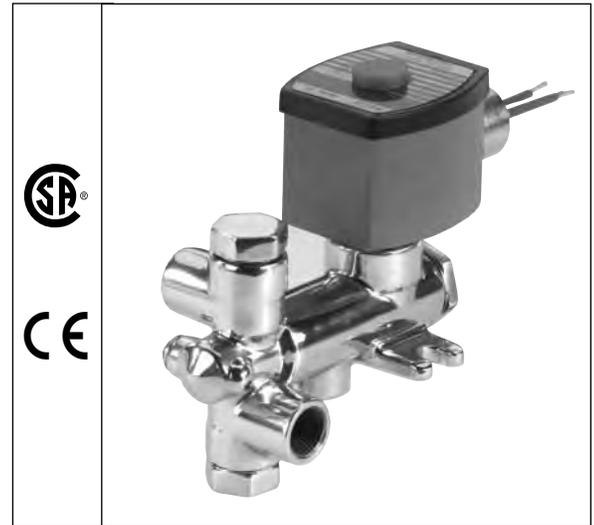
Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part Number			
	DC Watts	AC			General Purpose		Explosionproof	
		Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	-	20.1	43	240	272610	-	272614	-
H	36.2	28	60	330	222345	222184	222345	222184
H	-	16.1	35	180	272810	-	272814	-
H	-	28.2	50	385	224195	-	224195	-

**Standard Voltages:** 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz). 6, 12, 24, 120, 240 volts DC. Must be specified when ordering.

**Note:** 125 and 250 volts DC are battery voltages applied in power plants. Special AC and DC constructions are available to pilot power plant control valves. Consult your local ASCO sales office for details.

## Solenoid Enclosures

**Standard:** Red-Hat II - Watertight, Types 1, 2, 3, 3S, 4, and 4X; Red-Hat - Type 1.  
**Optional:** Red-Hat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; Red-Hat - Explosionproof and Watertight, Types 3, 4, 4X, 7, and 9. See footnote on next page.  
(To order, add prefix "EF" to catalog number.)  
See *Optional Features Section* for other available options.



## Nominal Ambient Temperature Ranges:

Class F Coils AC: 32°F to 125°F (0°C to 52°C)

Class H Coils AC: 32°F to 140°F (0°C to 59°C)

Class H Coils DC: 32°F to 77°F (0°C to 25°C)  
(104°F/40°C occasionally)

Refer to *Engineering Section* for details.

## Approvals:

CSA certified. Meets applicable CE directives.

Refer to *Engineering Section* for details.

# 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 — METAL TO METAL SEATING

BULLETINS  
8300  
8302  
8315

**ASCO**

FORM NO. V-5941

#### 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 stainless steel seats and discs and valve bodies of brass, steel or stainless steel construction. Standard valves have a General Purpose, NEMA Type 1 Solenoid Enclosure. Bulletin 8315 valves are identical to Bulletin 8300 valves except they are designed for higher temperature service.

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. V-5381.

#### 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:

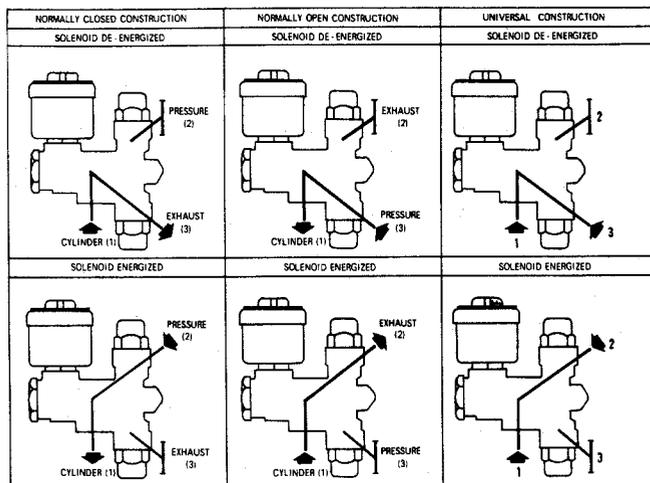
Suffix Letter "F" Normally Closed Operation  
Suffix Letter "G" Normally Open Operation  
Suffix Letter "U" Universal Operation

#### 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 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 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

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate the valve at least once a month to insure proper opening and closing.
3. 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.

#### IMPROPER OPERATION

1. **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.
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 pressure at the solenoid valve. Pressure to the valve must not exceed that stamped on nameplate.
5. **Incorrect Pressure Connection:** Refer to valve catalog suffix letter on nameplate and flow diagrams.
6. **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 the stainless steel (metal to metal) seats can usually be corrected by regrinding and lapping (see section on grinding and lapping). If leakage should still exist, the seating surfaces may be worn more than grinding and/or lapping can correct. In that case, replace both seats and discs. NOTE: New seats and discs must be checked and adjusted for proper stroke 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.

1. Remove retaining cap or clip, nameplate and solenoid cover. CAUTION: When metal retaining clip disengages, it will spring upward.
2. 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.
3. 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**

**ASCO**

## 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 Instructions Sheet, Form No. V-5381.
3. Unscrew solenoid base sub-assembly and remove bonnet gasket. For Explosion-Proof/Watertight 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 and discs. CAUTION: Tag springs and discs 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 KIT" 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  $55 \pm 5$  foot-pounds [ $74.6 \pm 6.8$  newton meters].
5. Replace bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds [ $19.8 \pm 2.8$  newton meters].
6. Replace solenoid enclosure and retaining cap or clip.
7. Install valve discs. If lapping is required, refer to "LAPPING SEATS AND DISCS" Section.
8. For stroke setting requirements (adjustment of valve discs) refer to "NEW SEAT AND DISC INSTALLATION" Paragraphs under "INSTALLATION OF NEW SPARE PARTS KIT" Section.
9. Install upper and lower springs. Refer to "NEW SPRING INSTALLATION" Section.
10. Replace disc guide cap gaskets and disc guide caps (both ends). Torque disc guide caps to  $180 \pm 15$  inch-pounds [ $20.3 \pm 1.7$  newton meters].
11. 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  $180 \pm 15$  inch-pounds [ $20.3 \pm 1.7$  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  $16 \pm 3$  foot-pounds [ $22.7 \pm 4.1$  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.

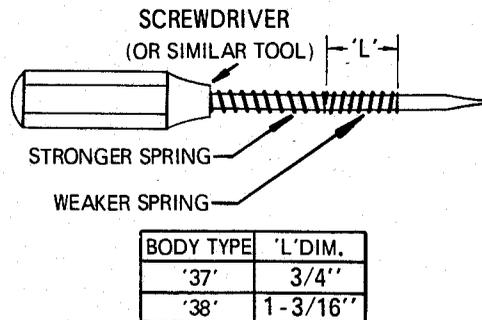


Figure 1. Method to Determine Weaker Spring

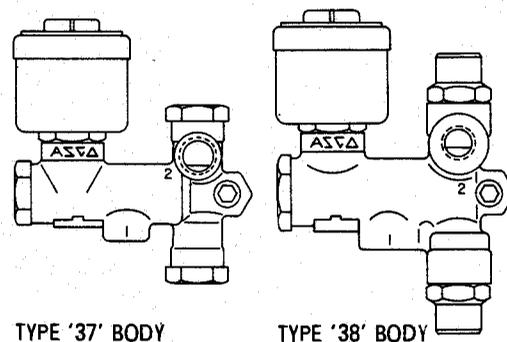


Figure 2. Identification of Body Type

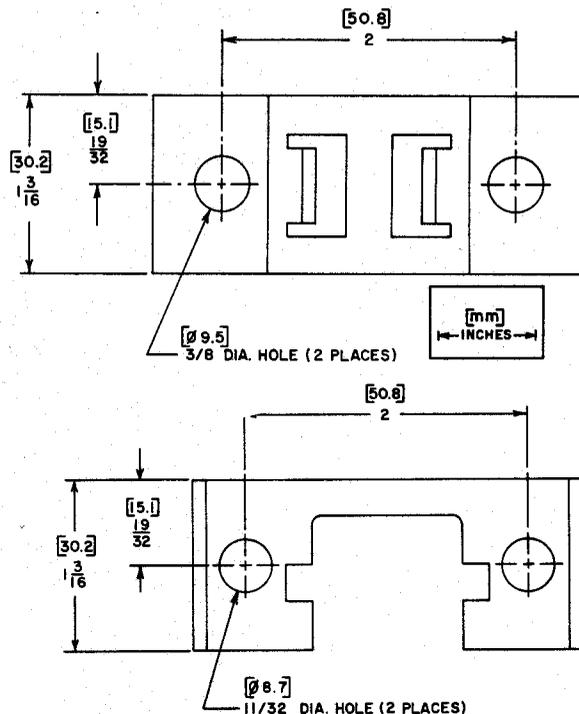


Figure 3. Mounting Bracket Dimensions

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

PARTS INCLUDED IN SPARE PARTS KITS\*

A - C (ALTERNATING CURRENT) CONSTRUCTION SHOWN

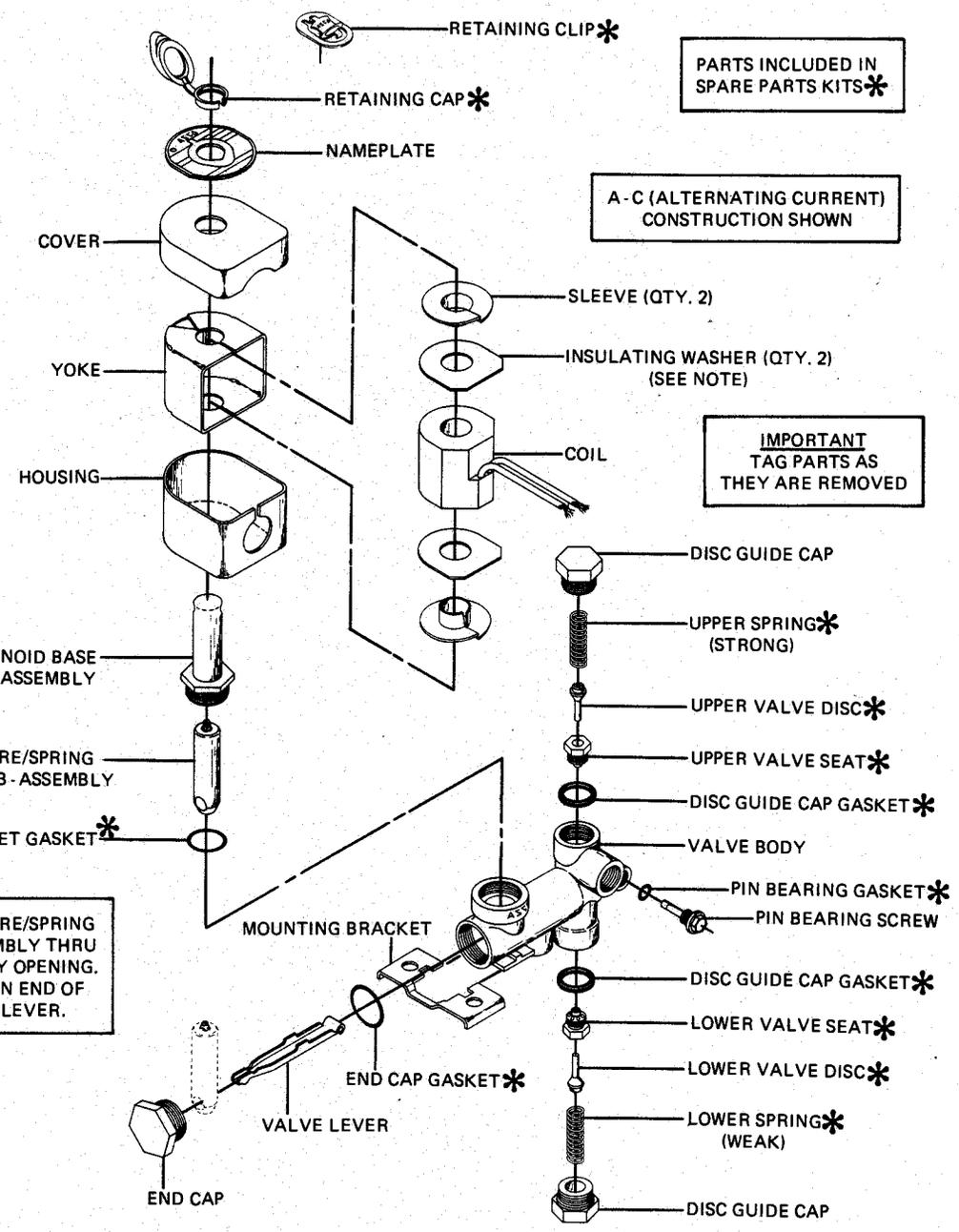
IMPORTANT TAG PARTS AS THEY ARE REMOVED

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

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

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

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



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 - Metal to Metal Seating  
 General Purpose Solenoid Enclosure Shown.  
 For Explosion-Proof/Watertight Solenoid Enclosure Used on Bulletin 8302 etc., See Form No. V-5381

**LAPPING SEATS AND DISCS**

Depressurize valve and proceed in the following manner:

**CAUTION: Tag upper and lower springs and upper and lower discs as they are not interchangeable and must be returned to original locations.**

1. Apply a small amount of fine grinding compound to the beveled seating surface of the disc and insert the disc in the proper valve seat (do not remove seat from body). A fine grade of grinding compound Grit Size 900 is recommended. NOTE: If new seats and discs are being installed, lap them before installation in the valve. Be sure to install seats and discs in mated sets.
2. Use a screwdriver in the slot provided in the disc and grind by rotating the disc back and forth using light pressure. After an evenly lapped surface has been obtained, repeat the grinding operation on the other disc.
3. Wipe all parts clean of grinding compound.
4. Reassemble parts in reverse order of disassembly replacing discs and springs in original positions. Be sure the weaker spring is located at the bottom and stronger spring at the top. If discs or springs are incorrectly reassembled, the valve will not function properly. To determine the weaker spring, refer to "NEW SPRING INSTALLATION" Section.

**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.

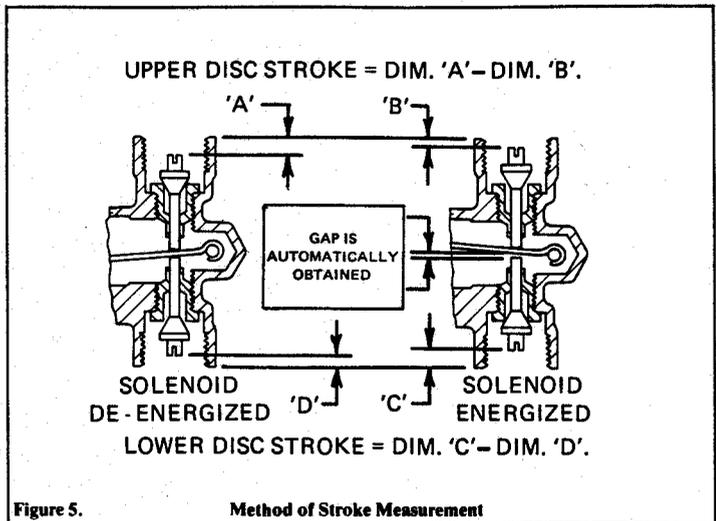
1. Remove retaining cap or clip and slip the entire solenoid enclosure off the solenoid base sub-assembly. CAUTION: When metal retaining clip disengages, it will spring upward. For Explosion-Proof/Watertight Solenoid Enclosure, refer to Form V-5381 for disassembly.
2. Unscrew solenoid base sub-assembly 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.
3. Unscrew disc guide cap (both ends) and remove disc guide cap gaskets, upper and lower springs and discs.
4. Remove upper and lower valve seats using a 1/2 inch thin wall socket wrench.
5. 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.
6. Remove pin bearing screw and pin bearing gasket.
7. Slide valve lever out through the end cap opening of the valve body.
8. 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.**
9. Reassemble in reverse order of disassembly paying careful attention to exploded views provided for identification and placement of parts.
10. Lubricate all gaskets with Dow Corning's Valve Seal silicone lubricant or an equivalent high grade silicone grease.
11. Insert valve lever and replace pin bearing gasket and pin bearing screw through the valve lever. Torque pin bearing screw to  $55 \pm 5$  inch-pounds [ $6.2 \pm .6$  newton meters].
12. 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  $55 \pm 5$  foot-pounds [ $74.6 \pm 6.8$  newton meters].
13. Replace bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds [ $19.8 \pm 2.8$  newton meters].
14. The stainless steel seats and discs (metal to metal seating) provided in the Spare Parts Kit have already been coined, however, lapping of the seats and discs is required. Refer to "LAPPING SEATS AND DISCS" Section. When lapping is complete, be sure to install seats and discs in mated sets.
15. 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  $80 \pm 8$  inch-pounds [ $9.0 \pm .9$  newton meters].
16. 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**

17. 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. V-5940 for stroke setting requirements. Refer to Figure 5 for the method of measuring the stroke. Spaces are provided on this sheet for your calculations.
18. Place the valve in a vertical and upright position. Install new upper disc and use a depth gauge to measure distances. NOTE: Solenoid and core/spring sub-assembly or core must be assembled in valve when strokes are measured.
19. 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.
20. 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.
21. 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 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.

22. Replace upper valve spring (strong spring), disc guide cap with disc guide cap gasket attached. Torque disc guide cap to  $180 \pm 15$  inch-pounds [ $20.3 \pm 1.7$  newton meters].
23. Turn valve upside-down to install lower disc and follow the same procedure used in setting the upper disc stroke to set the lower disc stroke. In general, more adjustment grinding of disc stem is required to set lower disc stroke.
24. With valve energized, measure Dimension "C."
25. With valve de-energized, measure Dimension "D."
26. Dimension "C" - "D" = lower stem stroke.
27. 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.
28. Replace lower valve spring (weak spring), disc guide cap with disc guide cap gasket attached. Torque disc guide cap to  $180 \pm 15$  inch-pounds [ $20.3 \pm 1.7$  newton meters].
29. 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.



### Features

- All NPT connections are in the valve body to allow in-line piping
- No Minimum Operating Pressure Differential required
- Broadest range of applications
- Mountable in any position

### Construction

Valve Parts in Contact with Fluids		
Body	Brass	303 Stainless Steel
Seals and Disc	NBR or Cast UR, as Listed	
Core Tube	305 Stainless Steel	
Core and Plugnut	430F Stainless Steel	
Core Springs	302 Stainless Steel	
Shading Coil	Copper	Silver
Disc-Holder	CA	
Core Guide	CA (10.1 and 17.1 Watt only)	

### Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part Number			
	DC Watts	AC			General Purpose		Explosionproof	
		Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	10.6	6.1	16	30	238210	238310	238214	238314
F	-	9.1	25	40	238210	-	238214	-
F	11.6	10.1	25	50	238610	238710	238614	238714
F	-	17.1	40	70	238610	-	238614	-

**Standard Voltages:** 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz).  
 6, 12, 24, 120, 240 volts DC. Must be specified when ordering. Other voltages are available when required.

### Solenoid Enclosures

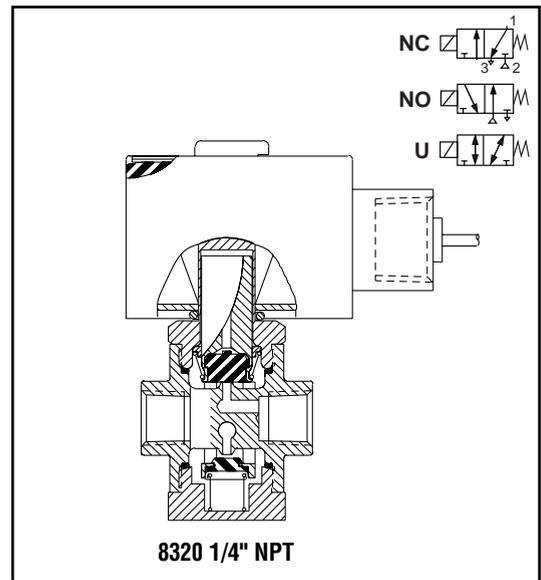
**Standard:** Watertight, Types 1, 2, 3, 3S, 4, and 4X.

**Optional:** Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9. (To order, add prefix "EF" to the catalog number.)

See *Optional Features Section* for other available options.



3-WAY



### Nominal Ambient Temp. Ranges

AC: 32°F to 125°F (0°C to 52°C)

DC: 32°F to 104°F (0°C to 40°C)

Refer to *Engineering Section* for details.

### Approvals

CSA certified. UL listed General Purpose Valves.

Meets applicable CE directives.

Refer to *Engineering Section* for details.

# Installation & Maintenance Instructions

**3-WAY SOLENOID VALVES — NORMALLY OPEN,  
NORMALLY CLOSED AND UNIVERSAL OPERATION  
1/4 NPT — BRASS AND STAINLESS STEEL CONSTRUCTION**

BULLETIN

**8320**

Form No.V5688R3

## DESCRIPTION

Bulletin 8320 valves are small 3-way solenoid valves with all three connections located in the body. Valve bodies are made of brass or stainless steel.

Standard valves have a Type 1, General Purpose Solenoid Enclosure. Valves may also be provided with an explosion-proof solenoid enclosure designed to meet Enclosure Type 3-Raintight, Type 7 (C & D)-Explosion-Proof Class I, Groups C & D and Type 9 (E, F, & G)-Dust Ignition-Proof Class II, Groups E, F, & G, and have a temperature range code of TC3. Installation and maintenance instructions for the explosion-proof solenoid enclosure are on Form No.V5380.

## OPERATION

### Normally Open (Pressure at 3)

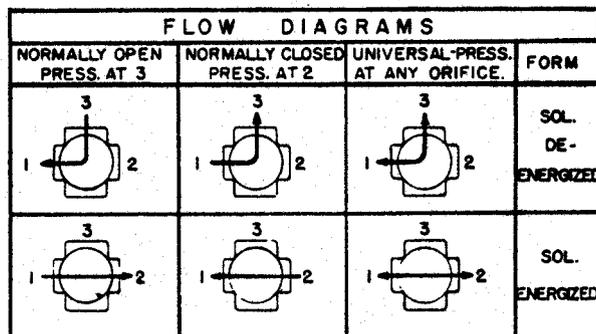
Applies pressure when solenoid is de-energized; exhausts pressure when solenoid is energized. When solenoid is de-energized, flow is from Port "3" to Port "1." Port "2" is closed. When solenoid is energized, flow is from Port "1" to "2." Port "3" is closed.

### Normally Closed (Pressure at 2)

Applies pressure when solenoid is energized; exhausts pressure when solenoid is de-energized. When solenoid is de-energized, flow is from Port "1" to Port "3." Port "2" is closed. When solenoid is energized, flow is from Port "2" to Port "1." Port "3" is closed.

### Universal (Pressure at 1, 2, or 3)

For normally closed or normally open operation, selection or diversion of pressure can be applied to Ports "1", "2", or "3."



### Manual Operator (Optional)

Manual operator allows manual operation when desired or during an electrical power outage. Two types of manual operators are available - push type (Suffix MO) and screw type (Suffix MS). To operate valve manually with push type operator, push stem at base of valve body as far upward as possible. Valve will now be in the same position as when the solenoid is energized. Removing pressure from stem will release manual operator to original position. To operate valve with a screw type manual operator, rotate manual operator stem at base of valve body clockwise until it hits a stop. Valve will now be in the same position as when the solenoid is energized. Rotate manual operator stem fully counterclockwise before operating valve electrically.

## INSTALLATION

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

## Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to chart below. Check catalog number prefix and watt rating on nameplate to determine the maximum temperatures. See example below chart.

Construction AC or DC	Catalog Number Prefix	Watts	Maximum Ambient Temp. °F	Maximum Fluid Temp. °F
AC	None, DA, or S	10.5	77	200
	DF, FT, or SF	10.5	122	200
	HT	10.5	140	200
DC	None, DP, or SP	16.7*	77	200
	None, FT, or HT	11.2*	77	150

\* Catalog Nos. 8320A 170, 8320A 180, and 8320A 190 are limited to 140 °F fluid temperature.

EXAMPLES: For Catalog No. HT8320A201, AC construction with a watt rating of 10.5, the maximum ambient temperature is 140°F with a maximum fluid temperature of 200°F. For Catalog No. 8320A204, AC construction with a watt rating of 10.5, the maximum ambient temperature is 77°F with a maximum fluid temperature of 200°F.

## 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 dimensions of body boss (brass) or mounting brackets (optional on brass construction), refer to Figures 1, 2, and 3.

## Piping

Connect piping to valve 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, 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.

**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 Bulletins 8600, 8601, and 8602 for strainers.

## Wiring

Wiring must comply with local codes and the National Electrical Code. Solenoid housings are provided with a 7/8" diameter hole to accommodate 1/2" conduit. On some constructions, a green grounding wire is provided. Use rigid metallic conduit to ground all enclosures not provided with a green grounding wire. To facilitate wiring, the enclosure may be rotated 360° by removing the retaining cap or clip. **WARNING:** When metal retaining clip disengages, it will spring upward. Rotate enclosure to desired position. Then replace retaining cap or clip before operating.

**NOTE:** Alternating current (AC) and direct current (DC) 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 and core assembly.

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### 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 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

**NOTE:** It is not necessary to remove the valve from the pipeline for repairs. **WARNING:** Turn off electrical power supply and depressurize valve before making 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. Clean valve strainer or filter when cleaning the valve.

### Preventive Maintenance

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, the valve should be operated at least once a month to insure proper opening and closing.
3. Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace worn or damaged parts. However, for best results, replace all parts as supplied with an ASCO Rebuild Kit.

### Causes Of Improper Operation

1. **Faulty Control Circuits:** 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 coil, broken lead wires or splice connections.
2. **Burned-Out Coil:** Check for open-circuited coil. Replace coil as necessary. Check supply voltage; it must be the same as specified on nameplate.
3. **Low Voltage:** Check voltage across the coil lead. Voltage must be at least 85% of nameplate rating.
6. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve (see Maintenance) and clean all parts. Replace worn or damaged parts. However, for best results, replace all parts as supplied with an ASCO Rebuild Kit.

### Coil Replacement (Refer to Figures 4 and 5)

**WARNING:** Turn off electrical power supply.

1. Disconnect coil lead wires.
2. Remove retaining cap or clip, nameplate and housing. **WARNING:** When metal retaining clip disengages, it will spring upward.
3. Remove spring washer, insulating washer, coil, insulating washer, ground wire terminal (if present) from solenoid base sub-assembly. Insulating washers are omitted when a molded coil is used.
4. Reassemble in reverse order of disassembly. Use exploded view provided for identification and placement of parts.

**CAUTION:** The solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Be sure to replace insulating washer at each end of the non-molded coil.

### Valve Disassembly (Refer to Figures 4 and 5)

**WARNING:** Depressurize valve and turn off electrical power supply.

1. Disassemble valve in an orderly fashion. Use exploded views for identification and placement of parts.
2. If necessary, disconnect coil lead wires, grounding wire (if present), and rigid conduit from solenoid housing.
3. Remove retaining cap or clip and slip the entire solenoid enclosure off the solenoid base sub-assembly. **WARNING:** When metal retaining clip disengages, it will spring upward.
4. Unscrew solenoid base sub-assembly from valve body.
5. Remove core assembly, core spring, core guide (AC construction only), and solenoid base gasket.
6. Unscrew end cap (or manual operator assembly) and remove end cap gasket, disc holder spring, and disc holder sub-assembly.
7. All parts are now accessible to clean or replace. Replace worn or damaged parts. However, for best results, replace all parts as supplied with an ASCO Rebuild kit.

### Valve Reassembly

1. Reassemble 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. For stainless steel valve constructions, apply a small amount of LOCTITE® PST® pipe sealant (ASCO No. 208-832-11) to male threads of end cap (or manual operator assembly). Pipe sealant supplied in ASCO Rebuild Kits.

3. Replace disc holder sub-assembly, disc holder spring, end cap gasket, and end cap (or manual operator assembly). For brass construction, torque end cap to  $175 \pm 25$  inch-pounds ( $19,8 \pm 2,8$  newton-meters). For stainless steel, torque end cap to  $90 \pm 10$  inch-pounds ( $10,2 \pm 1,1$  newton-meters).
4. Replace solenoid base gasket, core assembly, core spring, core guide (on AC construction only), and solenoid base sub-assembly. Torque solenoid base sub-assembly to  $175 \pm 25$  inch-pounds ( $19,8 \pm 2,8$  newton-meters).
5. Replace solenoid enclosure and retaining cap or clip.
6. Restore line pressure and electrical power supply to valve.
7. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic "click" signifies the solenoid is operating.

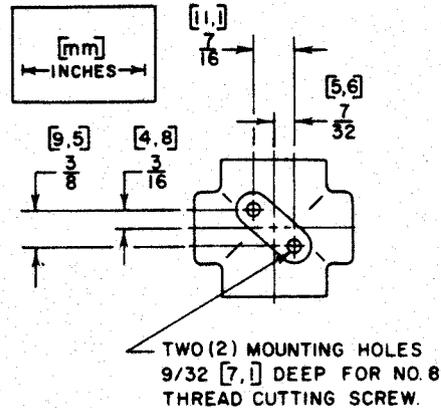


Figure 1. Brass Valve Body Mounting

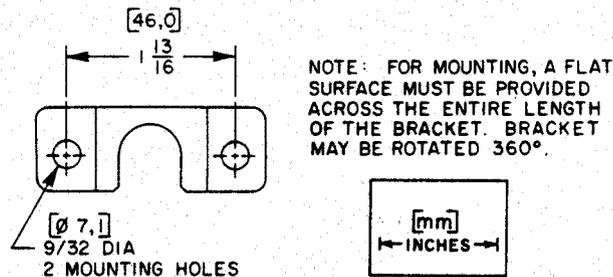


Figure 2. Mounting Bracket for Stainless Steel

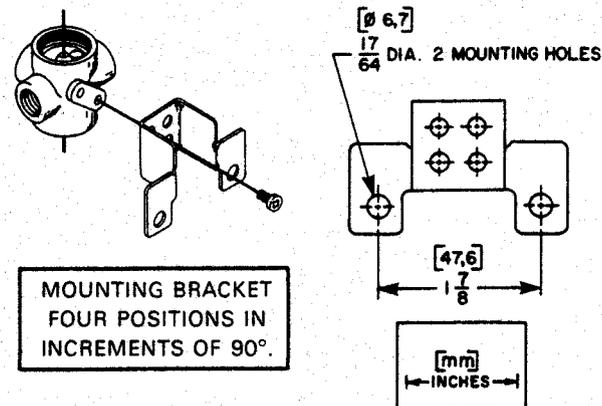


Figure 3. Optional Mounting Bracket for Brass

**ORDERING INFORMATION  
FOR ASCO REBUILD KITS AND COILS**

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.+
- When Ordering Coils for ASCO valves, order the number stamped on your coil.+

+ If the number of the Rebuild Kit or the Coil is not visible, order them and specify your valve's Catalog Number, Serial Number, Voltage, and Frequency.

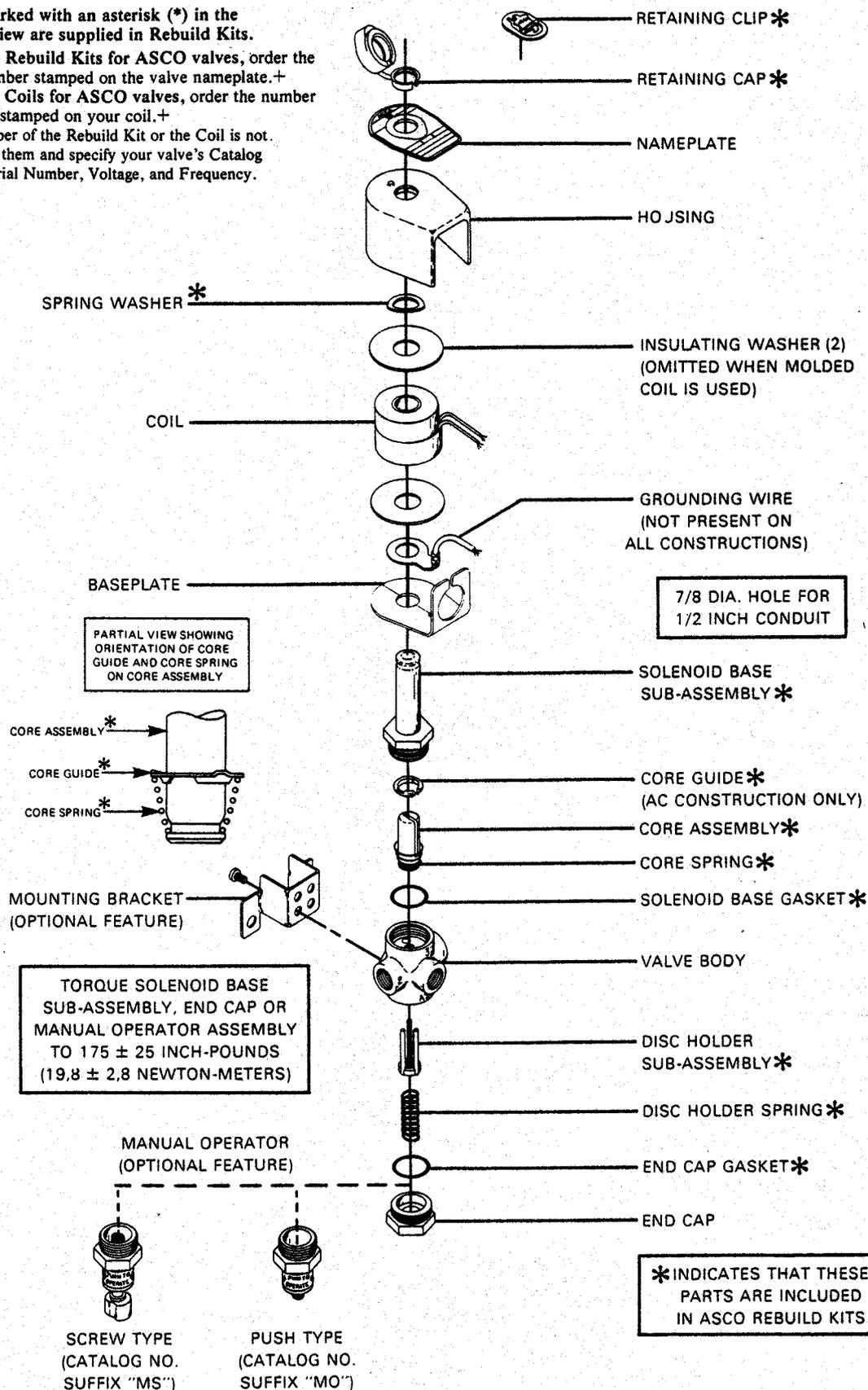


Figure 4. Bulletin 8320, Brass Construction  
With General Purpose Solenoid Enclosure Shown  
For Explosion-Proof Solenoid Enclosure, See Form No.V5380.

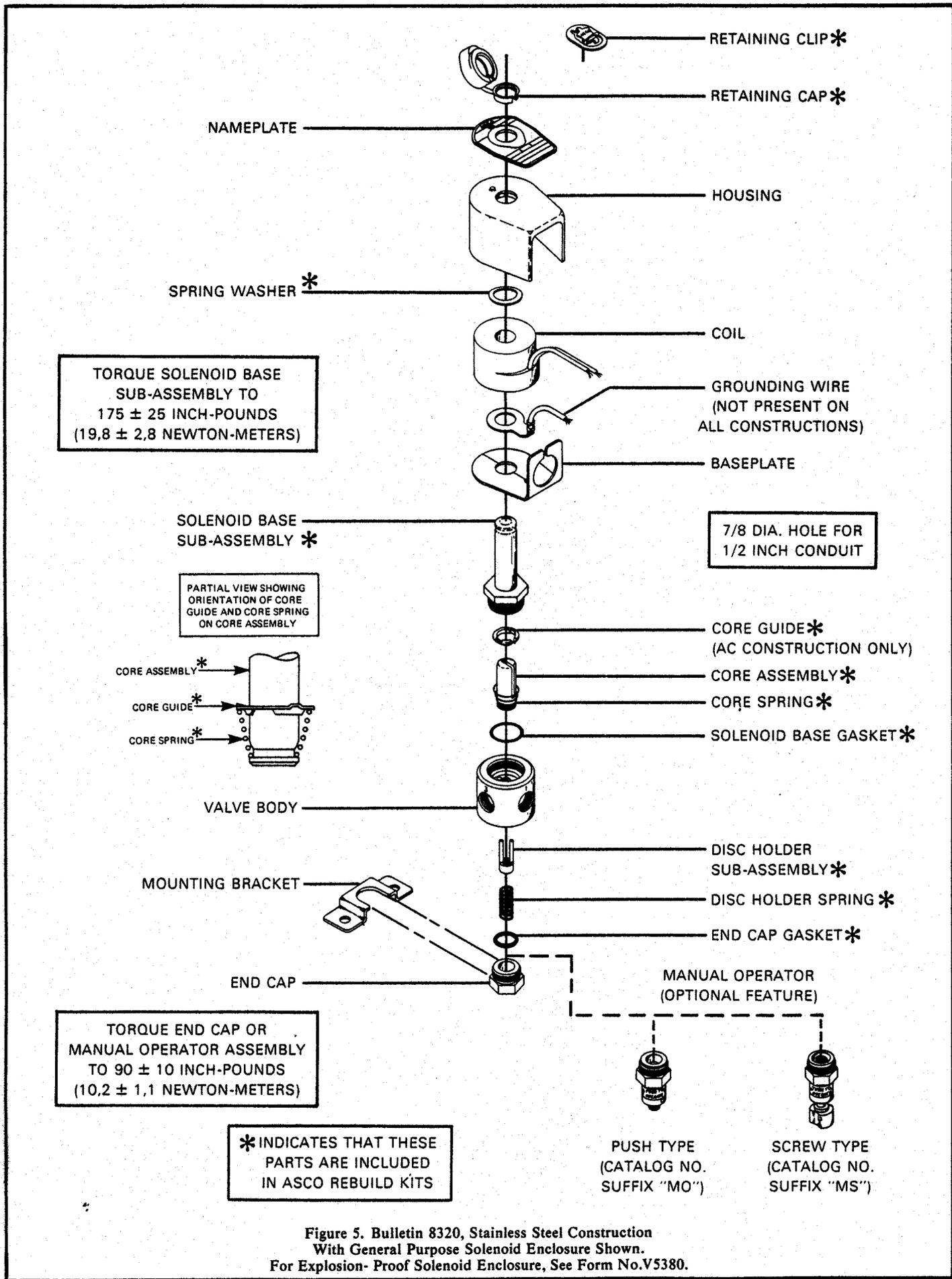


Figure 5. Bulletin 8320, Stainless Steel Construction With General Purpose Solenoid Enclosure Shown. For Explosion- Proof Solenoid Enclosure, See Form No.V5380.

# STRAINER

Model Number: 5F-2

**Sizes:** ½" – 1"

**Located:** On any external piping

**Purpose:** To protect external piping and control devices from fouling or damage from foreign particles

**Screen:** Cylindrical Dutch weave stainless steel wire mesh

**Piping Connection:** Standard pipe thread

## Operation

1. Water enters the cylindrical screen (#2) from the top and passes out through the sides of the cylinder.
2. Any particle too large to pass through .012 inch openings gets trapped in the cylinder, where, unless there is unusual turbulence, they settle at the bottom.

## Recommendation

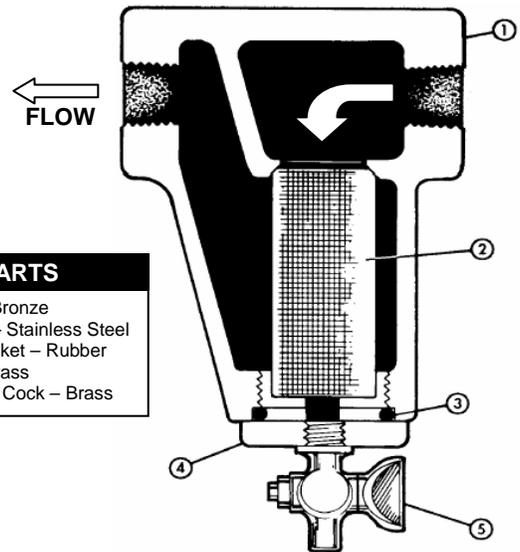
1. Strainer should be "blown down" frequently to remove collected foreign material from the sediment chamber.
2. Strainer screen should be removed occasionally for inspection and thorough cleaning.

## Note

1. To clean without shutting down the line, open the flush cock (#5) in the bottom cap (#4) for several seconds.
2. To remove the screen (#2), which requires shutting down the line, unscrew the bottom cap assembly (#5).

## Option

Two strainers installed in parallel (with the appropriate isolation valves) to permit uninterrupted service while cleaning.



### PARTS

1. Body – Bronze
2. Screen – Stainless Steel
3. Cap Gasket – Rubber
4. Cap – Brass
5. Flushing Cock – Brass

# NEEDLE VALVE

**Sizes:** One size fits all piston valves

**Primarily Controlled By:** Manually Adjusted

**Located:** On external control circuit of the main valve

**Purpose:** To limit flow in and out of the operating chamber

**Standard Shipped Adjustment:**

**Course Needle:** 5/6 to 2 turns off the seat

**Fine Needle:** Based on individual specifications

## Operation

The simple construction reliably limits maximum flow through the external piping, depending on the position of the adjustable stem/needle (#4) relative to the seat.

1. When the needle (#4) is adjusted counter-clockwise to a raised position,
  - a. More water can pass through the needle valve.
  - b. Water enters (leaves) the operating chamber more quickly.
  - c. The main valve piston moves up and down more quickly.
2. When the needle (#4) is adjusted clockwise to a lowered position,
  - a. Less water can pass through the needle valve.
  - b. Water enters (leaves) the operating chamber more slowly.
  - c. The main valve piston moves up and down more slowly.

## Adjustment

To adjust needle valve, which can be done without shutting down the main valve:

1. Remove the hex cap (#2) and lock (#1).
2. With a screw driver;
  - a. Turn the needle (#4) counter-clockwise to raise it
  - b. Turn the needle (#4) clockwise to lower it
3. Once the optimum position is determined, no further adjustment of the needle should be required.

## Note

It is advisable to occasionally remove the cap (#2) and lock (#1) and change the position of the needle (#4) momentarily to insure against gradual plugging.

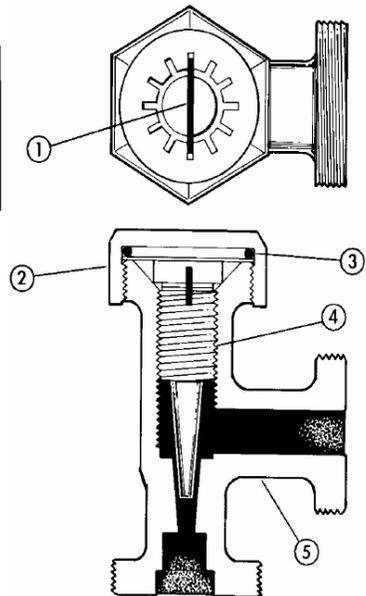
## Option

Two separate needle valves on one main valve – Provides independent control of opening and closing speeds.



### PARTS

1. Lock – Brass
2. Cap – Bronze
3. Cap Gasket – Rubber
4. Needle – Brass
5. Body – Bronze



## ROSS GLOBE VALVE

### PREVENTIVE MAINTENANCE

Intervals of inspection vary from valve to valve. Type of valve, quality of water being handled, rates of flow, operating pressures, and past maintenance practices all have a bearing on the length of service between overhauls.

So some recommendation may guide the operator, we suggest periodic inspections in order to check for proper valve operating pressures, as well as any visual leaks. Should the operator encounter any external leakage, or find any abnormalities in the operating pressures resulting from the operation of the valve, the valve should be scheduled for service.

#### **EVERY TWO (2) MONTHS:**

1. Flush the strainer via the flushing cock.
2. Flush the needle valve by turning then needle *clockwise* ½ turn, *counter-clockwise* 2 turns, then *clockwise* 1-1/2 turns to original setting.
3. Visually inspect for leaks around the indicator rod, bottom cap/differential vent hole, or pilot valves (hydraulic & /or solenoid).
4. Inspect drain line connection.

#### **EVERY FOUR (4) MONTHS:**

1. Remove and inspect strainer screen.
2. Remove and inspect needle valve, being sure to take note of the needle position away from the seat (number of turns).
3. Same visual inspection as above.

**Important:** Condition of the main valve packing can be accurately gauged by observing the leakage through the bottom vent hole "C". Negligible leakage usually indicates serviceable packing.

**Lubrication:** None Required.

**Spare Parts:** None required, recommended, or supplied unless specified. Under normal operating conditions, no spare parts would be necessary within five (5) years of service. The standard repair kit for Ross valves are in stock at the factory, and available for immediate shipment upon receipt of order with valve serial number (located on metal tag pinned to the top cap of the main valve).

**ROSS GLOBE VALVE**  
**INSPECTION - SERVICE RECORD**

VALVE LOCATION/I.D. \_\_\_\_\_

SIZE \_\_\_\_\_ MODEL \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

VALVE - OPEN ~ CLOSED ~ INDICATOR ROD EXPOSED \_\_\_ INCHES ABOVE STUFFING BOX CAP

MAIN VALVE OPERATED MANUALLY YES ~ ... NO ~

OPERATING PRESSURES - INLET (SUPPLY) \_\_\_\_\_ OUTLET (DOWNSTREAM) \_\_\_\_\_

EXTERNAL LEAKS ..... NONE ..... SLIGHT ..... MAJOR

..... INDICATOR STUFFING BOX ..... ~ ..... ~ ..... ~

..... BOTTOM CAP VENT HOLE ..... ~ ..... ~ ..... ~

..... DIAPHRAGM VENT-HYDRAULIC PILOT ..... ~ ..... ~ ..... ~

..... SOLENOID PILOT EXHAUST PORT ..... ~ ..... ~ ..... ~

OTHER CONDITIONS \_\_\_\_\_

STRAINER FLUSHED ..... YES ~ ..... NO ~

..... SCREEN EXAMINED . YES ~ ..... NO ~ ..... CLEANED ONLY ~

..... SCREEN CONDITION GOOD ~ ..... POOR ~ ..... INSTALLED NEW SCREEN ~

NEEDLE VALVE(S) (EXAMINE NEEDLE & SEAT FOR WEAR)

..... OPENING CONTROL . CLEANED ~ ..... ADJUSTED ~ ..... SET POINT \_\_\_\_\_

..... CLOSING CONTROL ..... CLEANED ~ ..... ADJUSTED ~ ..... SET POINT \_\_\_\_\_

HYDRAULIC PILOT ADJUSTED ..... NO ~ ..... YES ~ ..... \_\_\_\_\_ TURNS

..... CLOCKWISE ~ .. COUNTER-CLOCKWISE ~ ..... SET POINT \_\_\_\_\_

..... REBUILT ..... AT FACTORY DATE \_\_\_\_\_ . IN FIELD DATE \_\_\_\_\_

..... NEW HYDRAULIC PILOT REPLACEMENT ..... DATE \_\_\_\_\_

SOLENOID - COIL TESTED ..... NO ~ ..... YES ~ ..... REPLACED ~

..... SEATS - INSPECT & CLEAN \_\_\_\_\_

..... REBUILT ..... AT FACTORY DATE \_\_\_\_\_ . IN FIELD DATE \_\_\_\_\_

..... NEW SOLENOID REPLACEMENT ..... DATE \_\_\_\_\_

MAIN VALVE INTERNAL CONDITION -

..... MAIN CYLINDER (14) \_\_\_\_\_

..... BOTTOM CAP CYLINDER (23) \_\_\_\_\_

..... SEAT DISC/SUPPORT/RING \_\_\_\_\_

..... BODY TAP CONNECTIONS \_\_\_\_\_

..... MAIN VALVE REPACKED \_\_\_\_\_ DATE \_\_\_\_\_

ACTION RECOMMENDED \_\_\_\_\_

REPORT BY \_\_\_\_\_ DATE \_\_\_\_\_

**ANALYSIS FOR DETERMINING CONDITION RESPONSIBLE  
FOR AND CORRECTION OF FAULTY OPERATION**

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**No. 1 - WHEN VALVE DOES NOT CLOSE**

**Cause (a):** Solenoid Pilot (normally closed) failure – seats fouled.

**Correction:** Inspect, clean and regrind seats.

**Cause (b):** Solenoid Pilot (normally open) failure may be result of fouled seats or burned out coil.

**Correction:** Inspect, clean and regrind seats or replace coil.

**Cause (c):** Fouled Needle Valve.

**Correction:** Flush Needle Valve, remove Needle Valve cap and locking device; and with screw drive, turn need *counter-clockwise* 3 full turns. After 2 to 3 minutes of flushing, restore needle to its original position. This correction should be made while water passes through valve.

**Cause (d):** Sticks or stones lodged under or on seat of Main Valve.

**Correction:** Dismantle main valve and remove.

**Cause (e):** Worn leathers - Main Valve.

**Correction:** Replace leathers.

**Cause (f):** Isolation valve (18) is closed.

**Correction:** Open isolation valve.

**No. 2 - WHEN VALVE WILL NOT OPEN**

**Cause (a):** Normally Closed Solenoid Pilot may have seats fouled or coil burned out, while Normally Open Solenoid Pilot may have fouled seats.

**Correction:** Inspect, clean, regrind seats, or replace coil.

**Cause (b):** Leakage by main cup leathers (13).

**Correction:** Replace worn leather cups.

**Cause (c):** Main stem binding due to dirt or sediment lodging behind cup leathers.

**Correction:** Clean main stem and valve thoroughly.

## REPAIR INSTRUCTIONS - GLOBE BODY VALVES

When entering a valve pit to inspect a valve, all regulations regarding Confined Space Entry should be observed.

So some recommendation may guide the operator, we suggest periodic inspections in order to check for proper valve operating pressures as well as any visual leaks. Should the operator encounter any external leakage or find any abnormalities in the operating pressures which appear to be caused by the valve, the valve should be scheduled for service.

A reliable indication of internal packing condition can be obtained by observing any leakage from the vent hole in the center of the bottom cap. When leakage becomes significant, packing replacement should be made. As a general statement, the overall average life of a set of packings is 7 to 10 years. This may vary considerably because of specific operating conditions.

After observing pressures and inspecting for external leakage, the flush cock on the strainer should be opened momentarily to remove accumulated material. The needle valve cap should be removed and the needle closed 1/2 turn, opened 1 full turn, and then closed 1/2 turn to its original position.

### STEPS FOR INTERNAL REPAIRS:

All repairs and parts replacement may be made without removing the valve from the line. Internal repairs are made by removing the top cap of the valve. All internals are accessible through the top.

Shut inlet main line isolation valve, then shut outlet main line isolation valve. Open gauge cocks to de-pressurize the valve.

Remove indicator rod by inserting a nail through hole and unscrewing. Do not pull through stuffing box. Then remove top cap bolts and top cap. Be careful not to bend indicator rod.

In 8" and larger valves, withdraw piston by either removing two 3/8" bronze bolts in top stem nut and installing lifting device (horseshoe shaped piece of steel with two holes) over nut; or by looping a cable or nylon rope around these bolts. **Be sure lifting device is secure before removing piston.** In 4" and 6" valves, a threaded eyebolt should be screwed in the indicator rod hole.

Inspect both main bushing (Part No. 14) and bottom cylinder (Part No. 23) for mineral build-up or scoring. Smooth with emery or replace if necessary. Inspect seat ring for damage. Repair as necessary.

Secure main piston on a pipe threading stand (or lay piston on floor on rags or a similar cushioning material). Loosen top stem nut (Part No. 15) which holds the cup plate assembly. Remove cup plate bolts, nuts and copper washers on 8" cups and larger. Replace the leather cups (one faces up, one faces down). Re-install with new packings in the reverse order as outlined above.

**Caution** - The clamping bolts should be tight so that the packings are held securely and no leak occurs. Do not over-tighten so that the packing is deformed, however. All cup packings are impregnated with lubricants so that no external lubrication is necessary or desirable.

To replace the seat packing, it is necessary to determine if the valve is constructed with a "sliding" or a "flat" type seat. The sliding type seat has the seal or seat packing clamped in the valve body underneath the iron wall that separates the inlet and outlet valve chambers. It consists of a flanged packing held in place by a split bronze seat support ring. The lip of the packing "looks down" and care should be taken that the packing is concentric with the valve bore before the clamping bolts are tightened. In the "flat" type seat, the seat packing is located on the valve piston, where it is clamped between two plates and held by a stem nut (Part No. 7). Removal of this nut allows the plates to be separated and the packing replaced.

Replacement of the bottom cups (Part No. 5) is accomplished by removing the bottom stem lock nut (Part No. 6) and the flanged bottom guide nut (Part No. 3). Install the seals with the lip of both cups "looking up". Again, when re-assembling, be careful not to over tighten so that the cups are deformed.

Re-insert the piston being careful not to crimp the lower main cup when it enters the main bushing. The piston should move freely and drop of its own weight.

Replace the top cap and control piping (being sure to thread in the indicator rod), then restore water pressure. Be sure to open the discharge isolation valve first so that high inlet pressure is not trapped against a closed outlet valve.

All replaceable packings and gaskets are stock items and may be ordered as a repair kit for valve serial number \_\_\_\_\_. They are available for regular UPS delivery or next day service.

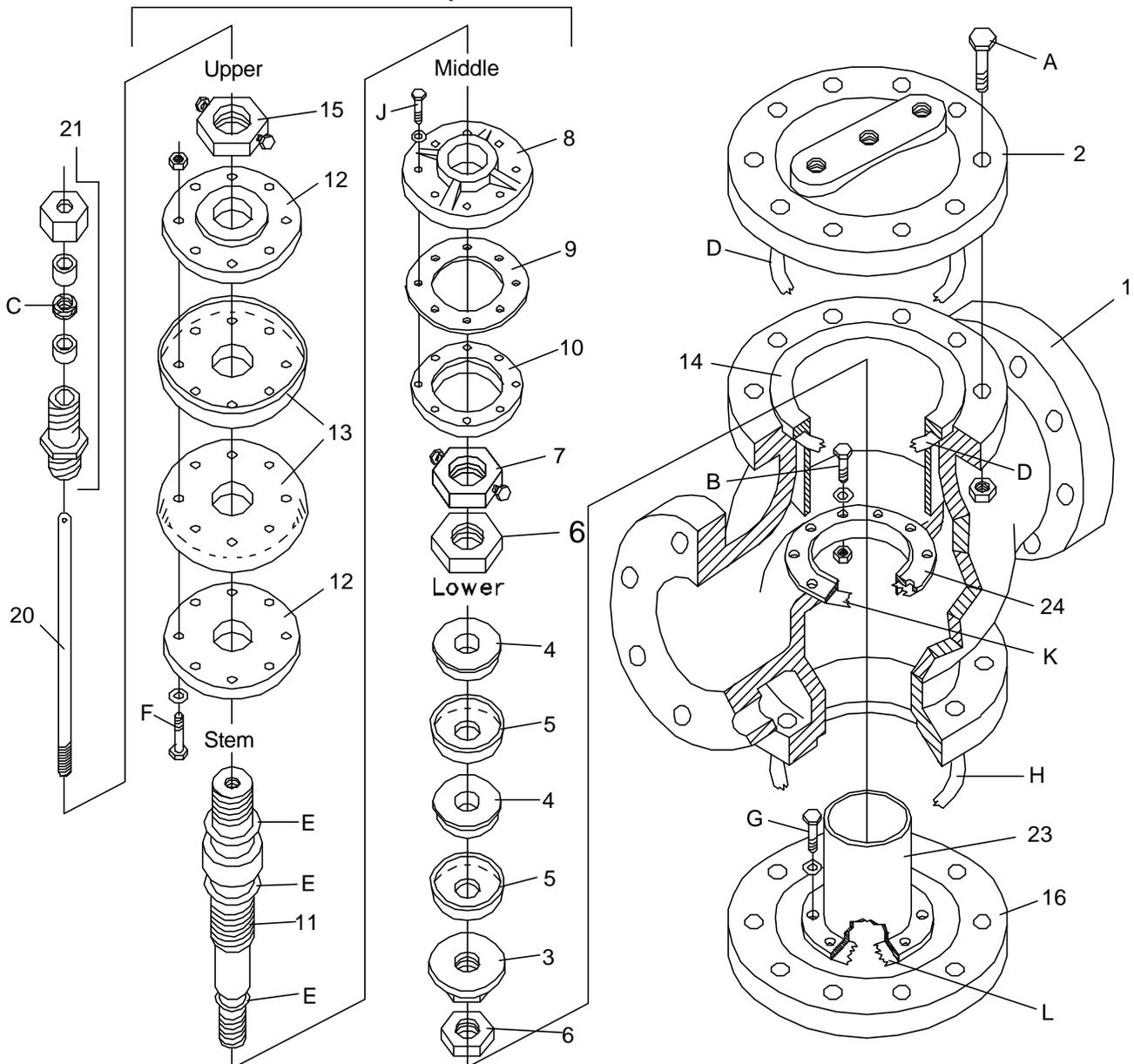
All spare parts are available from: Ross Valve Mfg. Co., Inc., 6 Oakwood Avenue, Troy, New York, 12180  
Phone: (518) 274-0961, Fax: (518) 274-0210

# ROSS VALVE Mfg. Co., Inc.

6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961

## GLOBE VALVE & PISTON ASSEMBLY WITH FLAT SEAT & PLAIN PACKING SUPPORT

### Piston Assembly



PART	DESCRIPTION	QUANTITY
1	SHELL	1
2	TOP CAP	1
3	BOTTOM STEM GUIDE NUT	1
4	PISTON CUP FOLLOWERS (SET OF 2)	1
*5	PISTON CUP PACKING	2
6	BOTTOM STEM LOCK NUT	2
7	STEM NUT W/ SET SCREWS	1
8	SEAT DISC	1
*9	SEAT PACKING	1
10	SEAT PACKING SUPPORT	1
11	STEM	1
12	MAIN CUP PLATES (SET OF 2)	1
*13	MAIN CUP PACKING	2
14	MAIN BUSHING	1
15	UPPER STEM NUT W/ SET SCREWS	1
16	BOTTOM CAP	1

PART	DESCRIPTION	QUANTITY
*20	INDICATOR ROD	1
21	INDICATOR STUFFING BOX	1
23	BOTTOM CAP CYLINDER	1
24	SEAT RING	1
A	BOLT & NUT - TOP & BOTTOM CAP	VARY
B	BOLT, NUT & WASHER - SEAT RING	VARY
*C	PACKING - INDICATOR STUFFING BOX	1 SET
*D	GASKET - TOP CAP & MAIN BUSHING	2
*E	GASKET - STEM	3
F	BOLT, NUT & WASHER - CUP PLATES	VARY
G	BOLT & WASHER - BOTTOM CAP CYLINDER	VARY
H	GASKET - BOTTOM CAP	1
J	BOLT, NUT & WASHER - SEAT DISC	VARY
K	GASKET - SEAT RING	1
L	GASKET - BOTTOM CAP CYLINDER	1

\* INDICATES WHICH ITEMS COME IN THE STANDARD VALVE REPAIR KIT.