booster pump control valve

installation, operating, and maintenance instructions

model 125-27

GENERAL DESCRIPTION:

The OCV Model 125-27 is a "normally-closed" valve designed for installation in the discharge line of a booster pump. Interlocked with pump operation, the 125-27 acts to reduce start up and shutdown surges. It also includes a built-in check feature for power failure closing and to prevent back flow when the pump is off.

The Model 125-27 is recommended over the standard Model 125 under the following conditions:

1. Very tight linear control is necessary on opening and closing speed controls.
2. Absolutely no back flow can be tolerated.

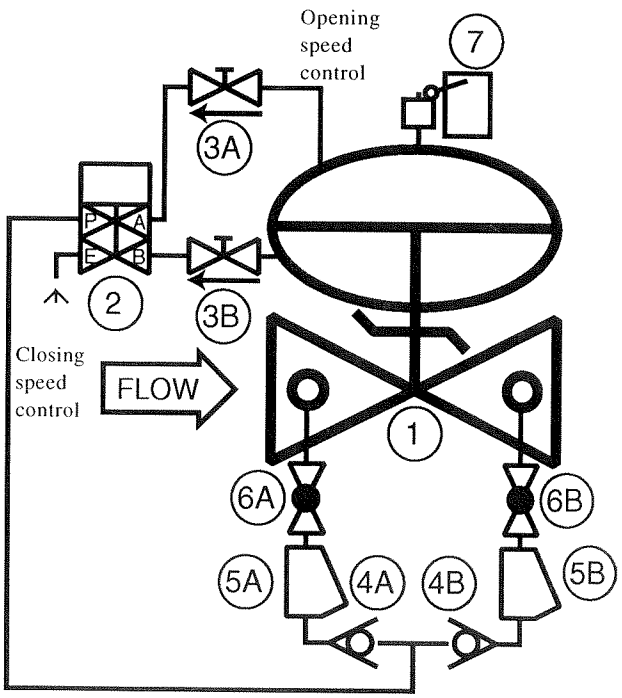
CONSTRUCTION:

The Model 125-27 is based on the Model 66SC, which is a dual-chamber, diaphragm-actuated globe or angle valve which closes with an elastomer-on-metal seal. It includes a built-in lift check feature. Control accessories include a single-pole, double-throw limit switch to interlock valve action with pump operation, a four-way solenoid pilot, flow control valves for adjusting opening and closing speeds, check valves and isolation cocks.

INSTALLATION

In order to ensure safe, accurate and efficient operation of the Model 125-27, the following list of check points and procedures should be following when installing the valve:

1. Make a careful visual inspection of the valve to ensure that there has been no damage to the external piping, fittings and controls. Check that all fittings are tight.
2. It is recommended that block valves (e.g., gate or butterfly) be installed on both sides of the valve to isolate the valve for maintenance.
3. It is recommended that pressure gauges be installed on both sides of the valve to provide monitoring during initial start up and during operation.
4. Prior to mounting the valve, thoroughly flush all interconnecting piping of chips, scale and foreign matter.
5. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.



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6. It is recommended that for maximum efficiency and serviceability, valves 6" and larger be installed with the bonnet up.

7. Allow sufficient room around the valve for ease of adjustment and maintenance service.

8. For the Model 125-27 to function properly, it must be electrically tied in with the pump. The wiring diagram included in this manual shows one way of accomplishing this. Certainly there are other wiring arrangements that will work equally well, as long as they function to **start** and **stop** the pump against a closed valve.

9. A quantity of water will be dumped to atmosphere each time the valve opens or closes. Drain provisions should be provided to carry off this water. The actual quantity is dependent on valve size, per the following:

1-1/4" & 1-1/2"	-	2.5 oz.
2"	-	4.0 oz.
3"	-	10.0 oz.
4"	-	1.2 pints
6"	-	2.0 quarts
8"	-	1 gal.
10"	-	2.2 gal.
12"	-	3.5 gal.
14"	-	6.5 gal.
16"	-	8.6 gal.

THEORY OF OPERATION

Hydraulic operation of the Model 125-27 is relatively simple and may be seen by referring to the schematic diagram. Energizing the coil of the solenoid pilot (2) connects Port "P" to "B" and Port "A" to "E". This routes valve inlet pressure (pump discharge pressure) to the lower diaphragm chamber and vents the upper diaphragm chamber to atmosphere. Thus, the main valve (1) opens at a rate governed by the setting of opening speed control (4B).

De-energizing the coil of the solenoid pilot (2) connects Port "P" to "A" and Port "B" to "E". This routes valve inlet pressure to the upper diaphragm chamber and vents the lower diaphragm chamber to atmosphere. The main valve (1) closes at a rate governed by the setting of closing speed control (4A).

To sum up, energizing the solenoid pilot causes the valve to open; de-energizing the solenoid pilot causes the valve to close.

Electrical operation may be seen by referring to the wiring diagram.

OPENING CYCLE

Starting the system, whether by closure of the Low Pressure Switch in Automatic, or by placing the HOA switch in HAND, immediately energizes the coils of Relay (R1), Time Delay Relay (TD1) and the Solenoid Pilot (SO1). The latter starts the valve open as described above. Meanwhile, power is available to the pump motor starter (M) through the now-closed contacts of R1 and the still-closed contacts of TD1. After a small degree of valve opening, the contacts of the limit switch (MS) close, energizing the coil of Time Delay Relay (TD2). The TD2 contacts immediately close, giving a second path for power to M. After the preset time interval, the TD1 contacts will open, leaving M powered solely through TD2. Note, however, that is for some reason the valve has not opened, MS will not close and TD2 will not be energized. Therefore, when TD1 times out, power will be removed from M, and the pump will stop. This is to protect the pump from having to continue working against a valve that will not open.

CLOSING CYCLE

The shutdown cycle begins when either the HPS contacts open or the HOA switch is placed in OFF. This immediately de-energizes the coils of R1, TD1 and SO1. The latter starts the valve closed as described above. The pump continues running. When the valve reaches the nearly-closed position, the MS contacts break, de-energizing the coil of TD2. The valve continues to the full closed position. After the preset time interval, the TD2 contacts break and the pump stops.

POWER FAILURE OPERATION

If electrical power is lost while the pump is running, the valve will quickly close by means of a built-in lift check device. Rather than being fixed, the seat assembly is allowed to slide on the stem independent of the diaphragm assembly. See the main valve assembly drawing for details.

Under normal conditions, with the pump running, the pump discharge pressure is sufficient to overcome the

spring and force the seat assembly up against the stop on the stem. Thus, the valve opens and closes normally, depending on the position of the diaphragm assembly.

On power failure, however, the forward pressure differential rapidly dissipates. This allows the spring to force the seat assembly away from the stem stop and onto the valve seat. Thus, the valve is already closed by the time the pressure reversal occurs. Meanwhile, the two check valves (items 5 on the schematic diagram) feed pressure to the upper diaphragm chamber, allowing the diaphragm assembly to slowly "follow" to the closed position, "resetting" the valve for the next startup cycle.

CAUTION: In most systems, a considerable surge will be developed when the fluid momentum reverses itself, then comes to a sudden stop against a closed check valve. Some sort of downstream surge protection is necessary in such system. OCV highly recommends the Series 118 Surge Anticipation Valve for this purpose.

CONTROLS ADJUSTMENT

Adjustable controls for the Model 125-27 are opening speed, closing speed, limit switch actuation point and the time-delay intervals.

Opening and closing speeds are adjusted by means of the two flow control valves. The control between the solenoid and **lower** diaphragm chamber is the **closing** speed control: the control between the solenoid and **upper** diaphragm chamber is the **opening** speed control. Both adjust in the same manner; **clockwise** to decrease response speed; **counterclockwise** to increase response speed. The proper set point for these controls is dependent on individual system characteristics. In general, they should be set to give positive valve response consistent with minimizing surges in the downstream piping. Also in general, the closing speed control will usually be set slower than the opening speed control.

Limit switch actuation point is set by adjusting the retainer on the valve indicator stem (see Drawing #150 for details). To do this, loosen the set screw in the side of the retainer. Raising the retainer will **decrease** the amount the valve is open when the limit switch actuates; **lowering** the retainer will **increase** the amount of opening. Usually, the set point should be at a very small amount of opening—approximately 1/8-1/4 inch. Remember to re-tighten the set screw after making adjustments.

The proper time intervals on the time delay relays, TD1 and TD2 are again dependent on individual system characteristics. Recall that TD1 functions to shut down the pump should the valve fail to open. Normally a setting of 90 seconds to 2 minutes will suffice here. TD2 functions on valve closing—it takes the time between breaking of the limit switch contacts and final pump shutdown. Optimally, the valve should be **fully** closed before the pump stops. A TD2 setting of 30-60 seconds will usually ensure this.

MAINTENANCE

Visual inspection at periodic intervals is required to determine the general physical condition of the equipment. This inspection should be conducted at least every 30 days. The following is a list of "check points" to assist maintenance personnel in this inspection task:

1. Check for chipped or peeling paint.
2. Check that all tube fittings are secure.
3. Check for damaged tubing.
4. Check for loose electrical connections or frayed wiring.
5. Check for leaks at fittings and around bonnet and flanges.
6. Check for loose bolts on bonnet and flanges.
7. Remove and clean strainer screen.

TROUBLESHOOTING

The following outline provides troubleshooting data for the Model 125-27. The information presented should enable you to isolate a specific malfunction and enable you to take the appropriate corrective action.

A. VALVE FAILS TO OPEN:

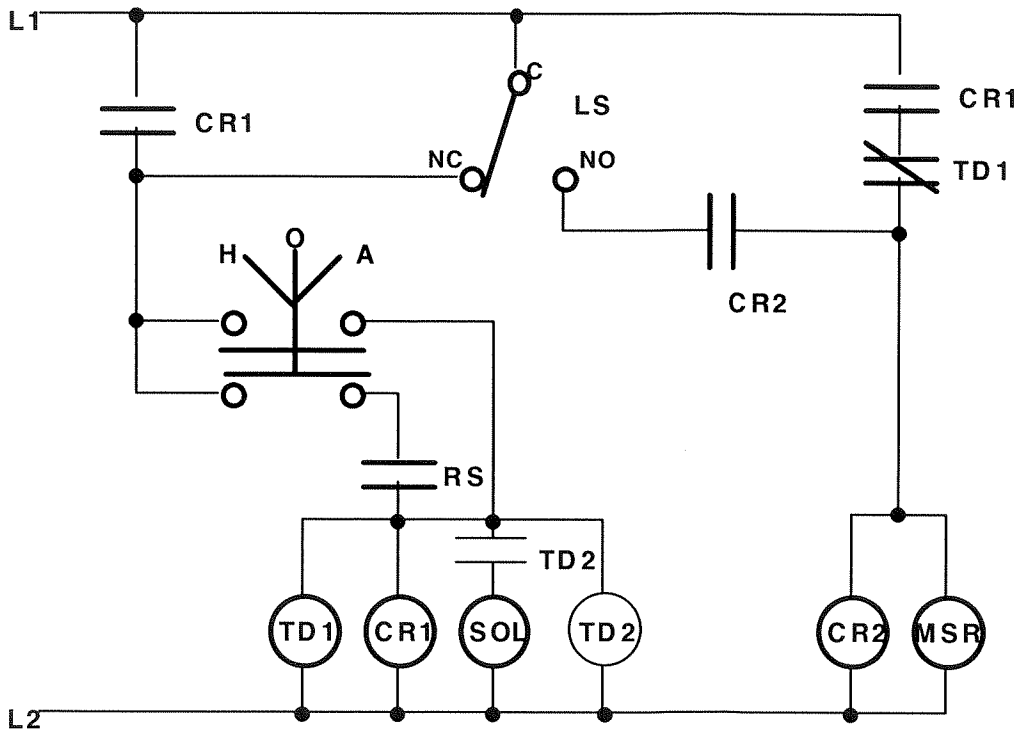
1. Stop cock closed - open as required.
2. Strainer clogged - remove screen and clean.
3. Solenoid pilot not energized - check electrical system.
4. Opening speed control too far closed - open as required.

5. Faulty solenoid pilot - see solenoid instructions.
6. Clogged tubing feeding solenoid pilot - remove and clear.
7. Main valve stem binding - disassemble main valve and determine cause of bind. Polish stem if necessary.

B. VALVE FAILS TO CLOSE:

1. Stop cock closed - open as required.
2. Strainer clogged - remove screen and clean.
3. Solenoid pilot not de-energized - check electrical system.
4. Closing speed control too far closed - open as required.
5. Faulty solenoid pilot - see solenoid instructions.
6. Clogged tubing feeding solenoid pilot - remove and clear.
7. Main valve diaphragm ruptured - replace diaphragm.
8. Obstruction in main valve - disassemble valve and determine cause of obstruction.

SK1134
RECOMMENDED WIRING DIAGRAM
SERIES 125 BOOSTER PUMP CONTROL VALVES

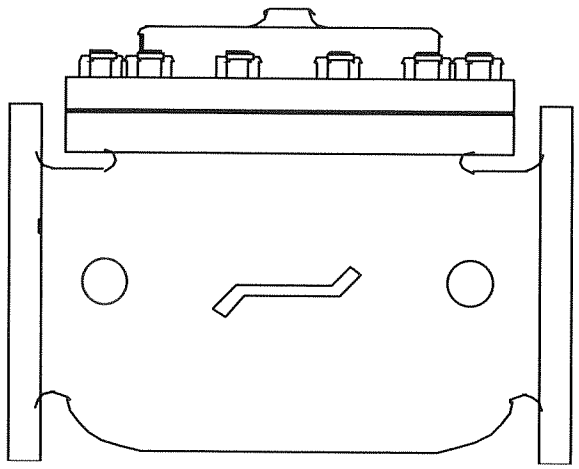


_FURNISHED BY OCV:

SOL = Solenoid Pilot Valve
LS = Limit Switch, SPDT

_FURNISHED BY CUSTOMER:

HOA = Hand-Off-Auto Switch
RS = Remote Start Switch (for Automatic Operation)
CR1 = Control Relay, DPST, N.O. or better
CR2 = Control Relay, SPST, N.O. or better
TD1 = Time Delay Relay, On-Delay Type, SPST, N.C. or better
(Shuts down pump if vlave does not open)
0-180 secs. recommended
TD2 = Time Delay Relay, On-Delay Type, SPST, N.O. or better
(OPTIONAL: Delays valve opening after pump start.)
MSR = Pump Motor Starter Relay



installation, operating, and maintenance instructions

series 66

basic control valve

GENERAL DESCRIPTION

The OCV Series 66 Power-Actuated Valve is a hydraulically-operated, diaphragm type valve. The diaphragm is a nylon fabric bonded with an elastomer. An elastomeric seat disc forms a tight seal with the valve seat when the valve is closed. The valve contains upper and lower diaphragm chambers, separated and sealed from each other by the diaphragm itself. The lower chamber is sealed from the flow passage by means of a stem seal.

Because of the twin-chamber design, the Series 66 valve requires no line pressure differential to operate. Thus, it is particularly useful where line pressure is extremely low, pressure loss is critical or where line fluid is too dirty or otherwise unsuitable for operating the valve.

The Series 66 valve is designed to operate in a temperature range from -40 degrees F to +180 degrees F, depending upon the type of fluid being transported. It is available in either globe or angle configuration in ductile iron (150 lb. or 300 lb.) or in cast steel (150 lb. or 300 lb.) construction.

FUNCTIONAL DESCRIPTION

The Series 66 valve may be operated by line pressure or by an independent pressure source (equal to or greater than line pressure). Applying that pressure to the lower diaphragm chamber and simultaneously venting the upper diaphragm chamber causes the valve to move to its full open position. Conversely, applying pressure to the upper diaphragm chamber and simultaneously venting the lower chamber causes the valve to go fully closed.

INSTALLATION

In order to insure safe, accurate and efficient operation of the Series 66 valve, the following list of checkpoints and procedures should be followed when installing the valve.

1. Make a careful visual inspection of the valve to insure that there has been no damage to the external piping, fittings or controls. Check that all fittings are tight.
2. It is recommended that either gate or block valves be installed on the inlet and discharge sides of the valve to facilitate isolating the valve for preventive or corrective maintenance.
3. It is recommended that pressure gauges be installed at the inlet and discharge ports to provide monitoring of the valve during initial start-up and during operation.
4. Prior to mounting the valve, all interconnecting piping should be thoroughly flushed of chips, scale and foreign matter.
5. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.

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6. It is recommended that for maximum efficiency and serviceability, valves 6" and larger be installed in a horizontal position.

7. Allow sufficient room around the valve for ease of adjustment and maintenance service.

8. Because of the venting action, a quantity of fluid will be exhausted each time the valve opens or closes. Provisions should be made to drain or dispose of this vented fluid.

Valve Size	Discharge Capacity (gallons)
1.25-1.5"	.02
2"	.05
2.5"	.06
3"	.1
4"	.2
6"	.6
8"	1.3
10"	2.5
12"	4.0
14"	6.5
16"	9.6

MAINTENANCE

The OCV control valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection should be established to determine how the fluid being handled is affecting the efficiency of the valve. In a water system, for example, the fluid velocity as well as the substances occurring in natural waters, such as dissolved minerals, colloidal and suspended particles vary in every installation. The effect of these actions or substances must be determined by inspection. It is recommended that an annual inspection, which includes examination of the valve interior, be conducted. Particular attention should be paid to the elastomeric parts, i.e., the diaphragm and seat disc. Any obviously worn parts should be replaced.

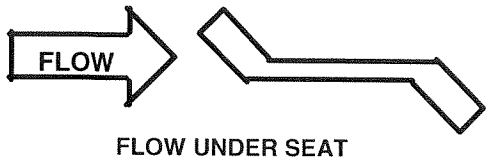
TROUBLESHOOTING

In the event of malfunction of the OCV control valve, troubleshooting should be conducted according to the procedures outlined for the specific model of valve. Then, if those steps indicate a problem with the main valve, this section will outline the procedures necessary to correct the problem.

Problems with the main valve can be classed in three basic categories:

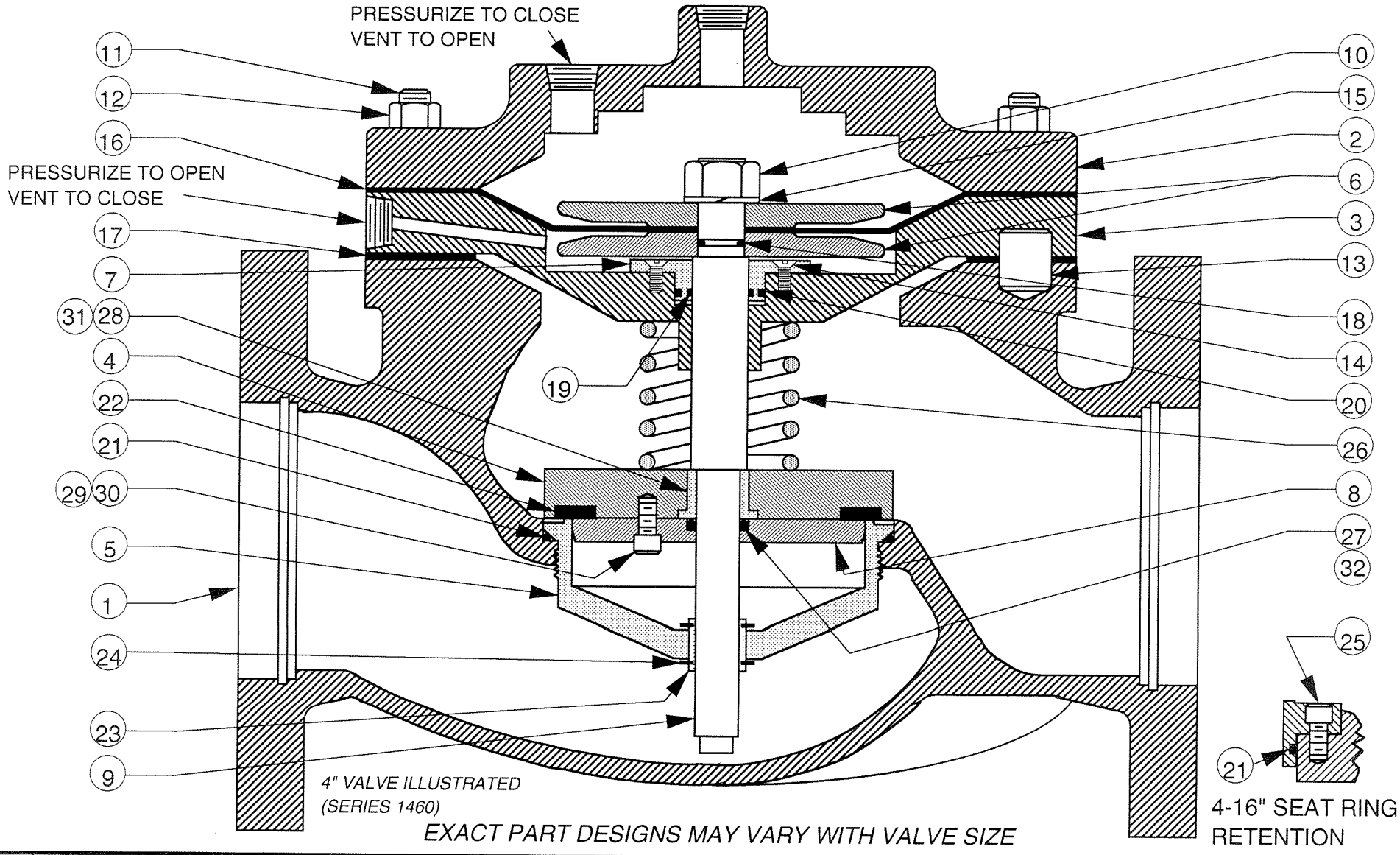
1. MAIN VALVE FAILS TO OPEN
   a. Closed isolation valves or cocks in pilot system or in main line—*Open valves or cocks.*
   b. Insufficient operating pressure—*Check pressure.*
2. MAIN VALVE FAILS TO CLOSE
   a. Closed cocks in control system or in main line—*Open cocks.*
   b. Lack of cover chamber pressure—*Check upstream pressure strainer, tubing, cocks, needle valves for restriction.*
   c. Diaphragm damaged (see note)—*Replace diaphragm.*
   d. Diaphragm assembly inoperative. Corrosion or excessive scale buildup on valve stem—*Clean and polish stem. Replace any defective, damaged or badly eroded parts.*
   e. Mechanical obstruction. Object lodged in valve—*Remove obstruction.*
   f. Worn seat disc—*Replace seat disc.*
   g. Badly scored seat—*Replace seat.*

NOTE: Assuming control system is functioning properly.



FLOW UNDER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE

FLOW OVER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO OPEN



EXACT PART DESIGNS MAY VARY WITH VALVE SIZE

CHG	E.C. NO.	DATE	BY

REVISIONS | **REF DWG NO'S**

MATERIAL	TOLERANCES
	UNLESS NOTED FRACTIONAL ±1/64 DECIMAL ±.005 MACH. FINISH 125 √ ANGULAR ±1/2°

NO. REQ'D	DRAWN BY	DATE
	RON	3-11-97
SCALE NONE	CHKD. BY	DATE

OCV Control Valves TULSA, OKLAHOMA U.S.A.

POWER-ACTUATED VALVE with LIFT CHECK ASSY
2-16" VALVES

SIZE	DRAWING NUMBER	REV.
A	SK-1084	A

INSTALLATION AND MAINTENANCE INSTRUCTIONS

4-WAY VALVES – SINGLE SOLENOID

1/4" - 3/8" - 1/2" - 3/4" - 1" N.P.T. – 1/4" - 3/8" - 3/4" ORIFICE

BULLETIN **8344**

ASCO

Form No. V-5770

DESCRIPTION

Bulletin 8344 valves are packless, solenoid pilot controlled, heavy duty, 4-way valves with forged brass valve bodies and poppet type main discs. The main discs are power driven in both directions by line pressure. No return springs are required.

The standard valves have a General Purpose, NEMA Type 1 Solenoid Enclosure. Valves may also be equipped with an enclosure which is designed to meet NEMA Type 4-Watertight, NEMA Type 7 (C or D) Hazardous Locations-Class I, Group C or D and NEMA Type 9 (E, F or G) Hazardous Locations-Class II, Group E, F or G and are shown on a separate sheet of Installation and Maintenance Instructions, Form Nos. V-5381 and V-5391.

OPERATION (Refer to Figure 1)

Solenoid de-energized flow is from Pressure Connection to Cylinder 'A'; Cylinder 'B' is open to Exhaust.
Solenoid energized flow is from Pressure Connection to Cylinder 'B'; Cylinder 'A' is open to Exhaust.
Minimum on time for valves is 0.3 second on air service and 1.0 second on liquids.
NOTE: Minimum operating pressure differential is 10 P.S.I. on air, gas or water and 25 P.S.I. on hydraulic oil (300 S.S.U.).

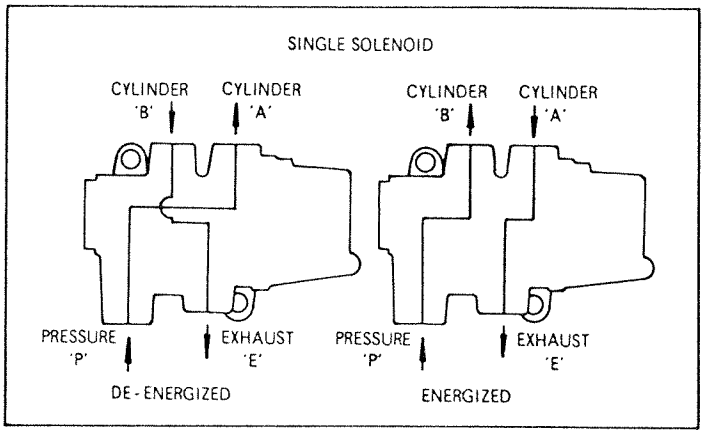


Figure 1.

MANUAL OPERATOR (Optional) (Refer to Figures 6, 7 and 8)

DESCRIPTION

Valves with Suffix "MO" after catalog number are provided with a manual operator which allows manual operation when desired or during an interruption of electrical power.

OPERATION:

To actuate valve manually, turn manual operator clockwise to stop. Valve will now be in same position as when solenoid is energized.

For valve to operate electrically manual operator must be turned counterclockwise to stop.

SPEED/FLOW CONTROL – METERING DEVICES

(Refer to Figure 2)

Speed/flow control valves (2) may be added to allow full unrestricted flow in one direction and controlled flow in the opposite direction. These valves must be located in the 'A' and/or 'B' cylinder piping, between the solenoid valve and the cylinder.

IMPORTANT:

NOTE: Do not install the speed control or any other restrictive devices in either the pressure (inlet) connection or the exhaust (outlet) connection of the valve. Restricting either of these lines may cause valve malfunction.

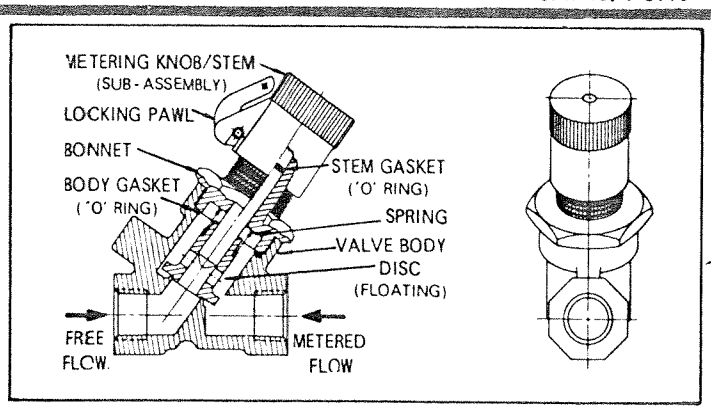


Figure 2.

INSTALLATION

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

POSITIONING

Valve may be mounted in any position.

PIPING (Refer to Figure 3)

Connect piping to the pressure, exhaust and cylinder ports according to flow diagram. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter 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 to connection point as possible.

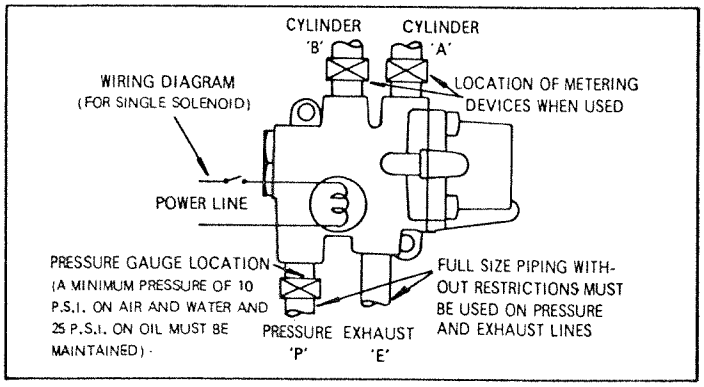


Figure 3.

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.

To insure 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 must be maintained between the pressure and exhaust at the moment of changeover. Hydraulic pumps or air reservoirs must have adequate capacity to maintain the minimum pressure during changeover. To check pressure during changeover, install a gage in the pressure connection, close to the valve as shown.

WIRING

Wiring must comply with Local and National Electrical Codes. For valves equipped with an explosion-proof, watertight enclosure (NEMA 4, 7 & 9) the electrical fittings must be approved for use in the approved hazardous locations. Housings for all solenoids are made with connections for 1/2 inch conduit. The general purpose enclosure (NEMA 1) may be rotated to facilitate wiring by removing the retaining cap. After rotating to desired position, be certain to replace retaining cap 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, not just the coil.

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 and line pressure to valve before making repairs. It is not necessary to remove valve from pipe line for repairs.

CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary, depending on the media and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive heating or noise will indicate that cleaning is required.

PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate valve at least once a month to insure proper opening and closing.
3. Periodic inspection (depending on media 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 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 at the solenoid valve. Pressure to the valve must be within the range indicated on the nameplate. Flow must be adequate to maintain a minimum differential to allow valve to transfer (see pressure limitation on nameplate).
5. **Excessive Leakage:** Disassemble valve and clean all parts and passageways. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

A-C / D-C COIL REPLACEMENT (Refer to Figure 5)

Turn off electrical power and disconnect coil lead wires.

1. Remove retaining cap or clip, nameplate and solenoid housing/cover. CAUTION: When metal retaining clip disengages it will spring upward.
2. Lift off spring washer, upper insulating washer and coil. NOTE: Insulating washers are omitted when molded coil is used.
3. Reassemble parts in reverse order of disassembly.

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

D-C COIL REPLACEMENT – ALTERNATE CONSTRUCTION

(Refer to Figure 4)

Turn off electrical power 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. Lift off fluxplate and coil.
3. Coil is now accessible for replacement. Reassemble in reverse order of disassembly.

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit.

VALVE DISASSEMBLY (Refer to Figure 5)

Depressurize valve and turn off electrical power. Disconnect coil lead wires.

1. Solenoid may be removed intact by loosening and removing solenoid base sub-assembly from body.
2. A-C / D-C Construction:
   Remove core/core spring/disc sub-assembly and body gasket ('O' ring) respectively.
   Alternate D-C Construction:
   Remove core spring, core assembly and body gasket respectively.
3. A 4-40 machine screw (provided in Spare Parts Kit) serves as a self-tapping screw to remove insert from body. Thread screw a few turns in hole located in the flat surface of insert. CAUTION: Do not damage center hole (pilot orifice) in raised surface of insert. Remove insert by using a pair of pliers on the head of the screw.
4. Remove three gaskets from insert. Tag each as they are removed so that they can be reassembled in the same location. NOTE: Middle and lower gaskets have the same physical dimensions, however, the lower gasket is made of a softer material.
5. Remove four (4) body screws and slip piston end body from piston.
6. Slide piston/shaft assembly out of body.
7. 1/4 - 3/8 - 1/2 N.P.T. Construction:
   Remove four (4) 'O' ring gaskets, two (2) from piston end body counter bores and two (2) from body insert - one (1) from each end.
   3/4 - 1 N.P.T. Construction:
   Remove five (5) 'O' ring gaskets, two (2) from piston end body, counter bores and three (3) from body insert (two from large end, one from small end).
8. To disassemble piston/shaft assembly, insert brass rod in cross hole of shaft. (NOTE: Rod must be brass or other soft material so as not to burr edges of hole.) Unscrew and remove shaft nut. Remove shaft washer, piston, shaft/piston gasket, body insert and lift out main disc.
9. Remove two (2) 'U' shaped lip seals from piston, one from each end.
10. 1/4 - 3/8 - 1/2 N.P.T. Construction:
    Unscrew end cap/seat from main body. Remove two (2) 'O'-ring gaskets from end cap/seat and lift out main disc.
    3/4 - 1 N.P.T. Construction:
    Remove four (4) end cap/seat screws and slide out end cap/seat from main body. Remove two (2) 'O'-ring gaskets from end cap/seat and lift out main disc.
11. All parts and passageways are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

VALVE REASSEMBLY (Refer to Figure 5)

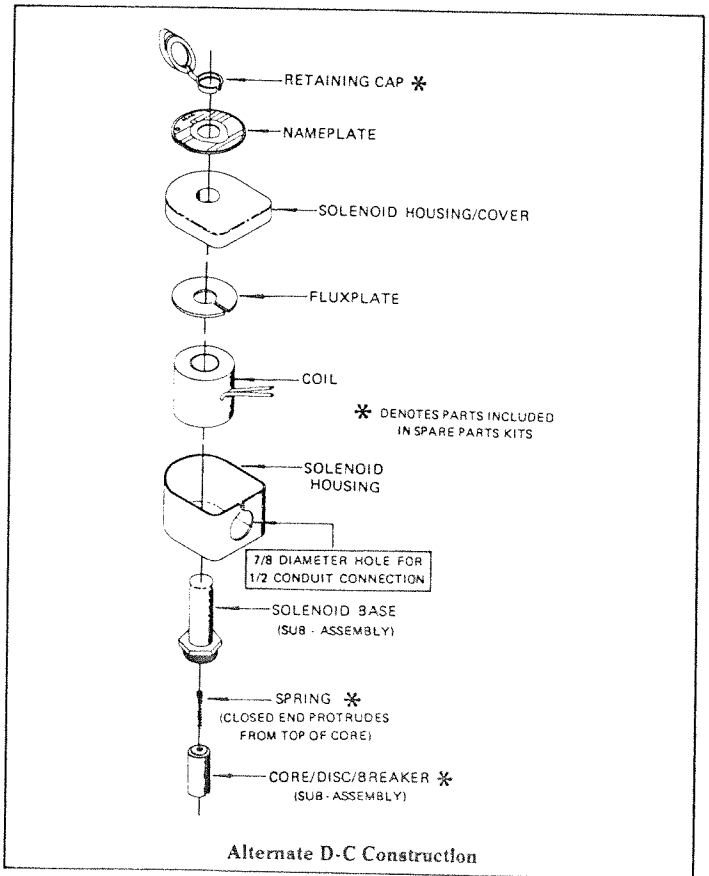
1. Clean all parts and passageways thoroughly.
2. Reassemble parts in reverse order of disassembly. Parts should be installed in the same cavity that they were removed from.
3. Lubricate all rubber parts with Dow Corning's Valve Seal or equivalent silicone grease.

NOTE: Main discs must be assembled with 'U' cup lip seals facing out (flat brass surface facing in). 'U' cup shaped lip seals on piston must face out at each end.

SPARE PARTS KITS

Spare Parts Kits and Coils are available for ASCO valves.
Parts marked with an asterisk (*) are supplied in Spare Parts Kits.

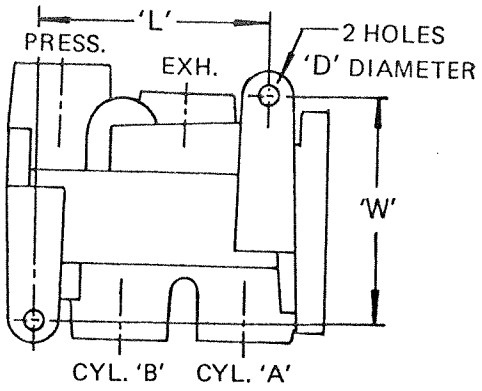
ORDERING INFORMATION FOR SPARE PARTS KITS
When Ordering Spare Parts Kits or Coils Specify Valve Catalog Number, Serial Number and Voltage.



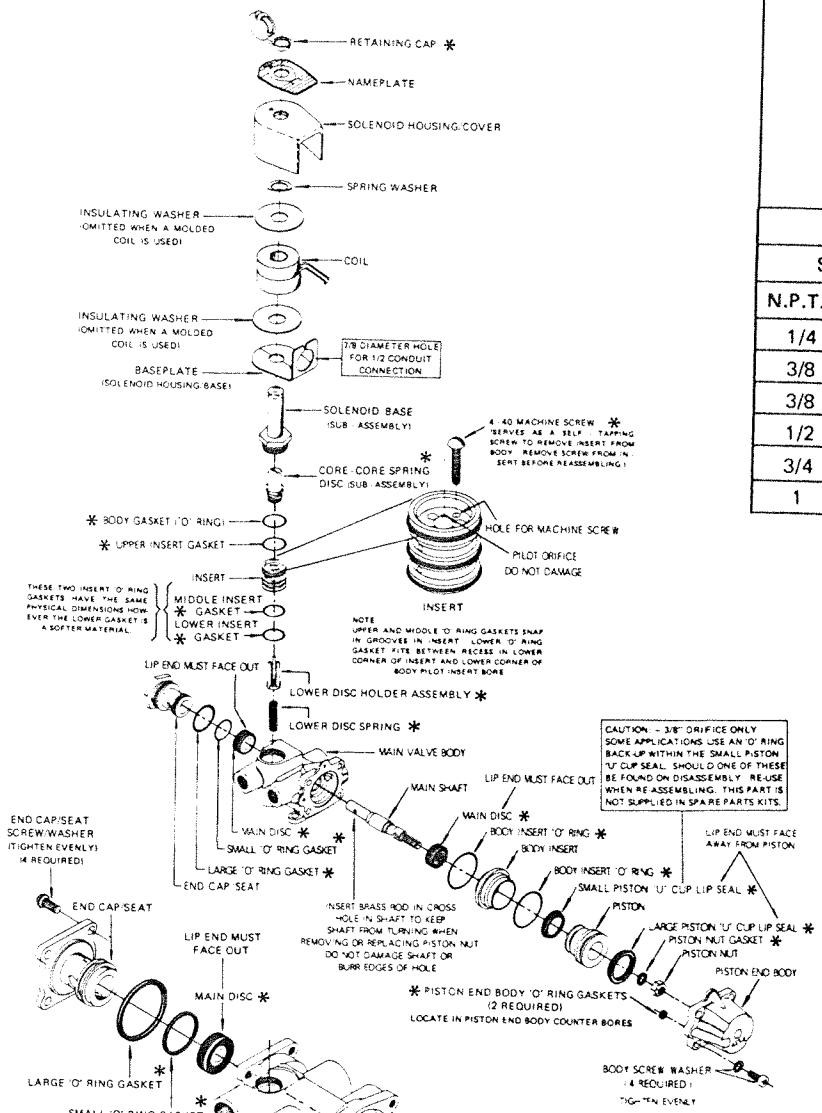
Alternate D-C Construction

Figure 4.

MOUNTING DIMENSIONS



MOUNTING DIMENSIONS							
Size		Length 'L'		Width 'W'		Holes 'D' Dia.	
N.P.T.	Orifice	Inches	MM	Inches	MM	Inches	MM
1/4	1/4	1 7/8	47.6	2 13/32	61.1	9/32	7.1
3/8	1/4	1 7/8	47.6	2 13/32	61.1	9/32	7.1
3/8	3/8	2 5/8	66.7	3 1/8	79.4	11/32	8.7
1/2	3/8	2 5/8	66.7	3 1/8	79.4	11/32	8.7
3/4	3/4	3 7/8	98.6	3 13/16	96.8	11/32	8.7
1	3/4	3 7/8	98.6	3 13/16	96.8	11/32	8.7



1/4 - 3/8 - 1/2 N.P.T. CONSTRUCTION

3/4 - 1 N.P.T. CONSTRUCTION

BULLETIN NO. 8344
Single Solenoid A-C / D-C Construction
1/4 - 3/8 - 1/2 - 3/4 - 1 N.P.T.

Figure 5.

MANUAL OPERATOR

To actuate valve manually, turn manual operator clockwise to stop. Valve will now be in same position as when solenoid is energized.

For valve to operate electrically, manual operator must be turned counter-clockwise to stop.

MANUAL OPERATOR DISASSEMBLY

(Refer to Figures 6, 7 and 8)

Depressurize valve and turn off electrical power. Disconnect coil lead wires.

1. Remove the solenoid intact by loosening and removing the solenoid base sub-assembly from the manual operator body.
2. Remove core spring on Alternate D-C Construction and solenoid base to manual operator body gasket ('O' ring) from manual operator body.
3. Unscrew manual operator body from main valve body.
4. Slip retainer from lower manual operator body threads. Then slide manual operator stem/lever assembly from manual operator body.
5. Remove core sub-assembly from manual operator body.
6. Remove 'O' ring from manual operator stem/lever sub-assembly.
7. All parts are now accessible for cleaning and/or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

MANUAL OPERATOR REASSEMBLY (Refer to Figures 6, 7 and 8)

1. Reassemble manual operator in reverse order of disassembly. Note that the body gasket must be installed in the pilot body cavity before installing the manual operator body sub-assembly.
2. Preassemble the following manual operator body parts in the following order to make up the manual operator body sub-assembly. Slip core sub-assembly thru the manual operator body. (NOTE: On cores with double recesses, line up manual operator stem with the lower groove.) There is a captive spacing washer on the manual operator stem lever sub-assembly. Locate this stem/lever spacer on the inside or outside of the retaining fork as follows:
   A. All cores with an outside diameter up to 13/32" (.406 dia.), the spacer must be located inside the retainer fork.
   B. All cores with an outside diameter greater than 13/32" (.406 dia.), the spacer must be located outside the retainer fork.
3. Having installed the stem gasket on the stem and correctly determined the proper location of the spacer, slip the stem assembly into the manual operator body and slide the retainer up over the lower threads engaging the stem/lever sub-assembly.
4. Screw manual operator body sub-assembly into main body.
5. Turn manual operator lever to the 9 o'clock position, i.e., this is the same position that the operator would be in if the valve were to be operated electrically.
6. Install the solenoid base to manual operator body gasket. Install core spring on Alternate D-C Construction.
7. Reinstall solenoid base sub-assembly complete with solenoid.

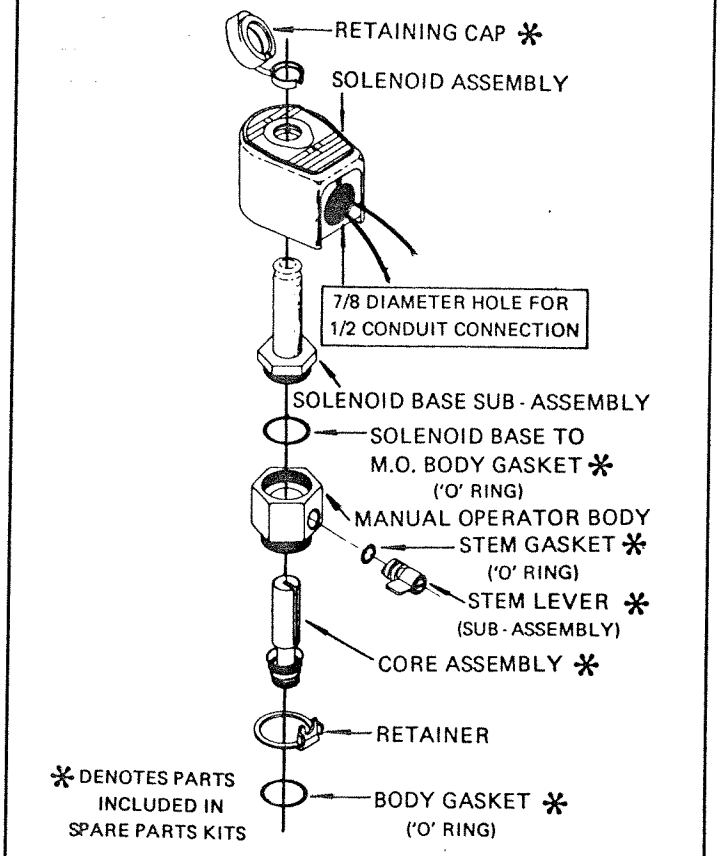


Figure 6. Manual Operator — A-C / D-C Construction

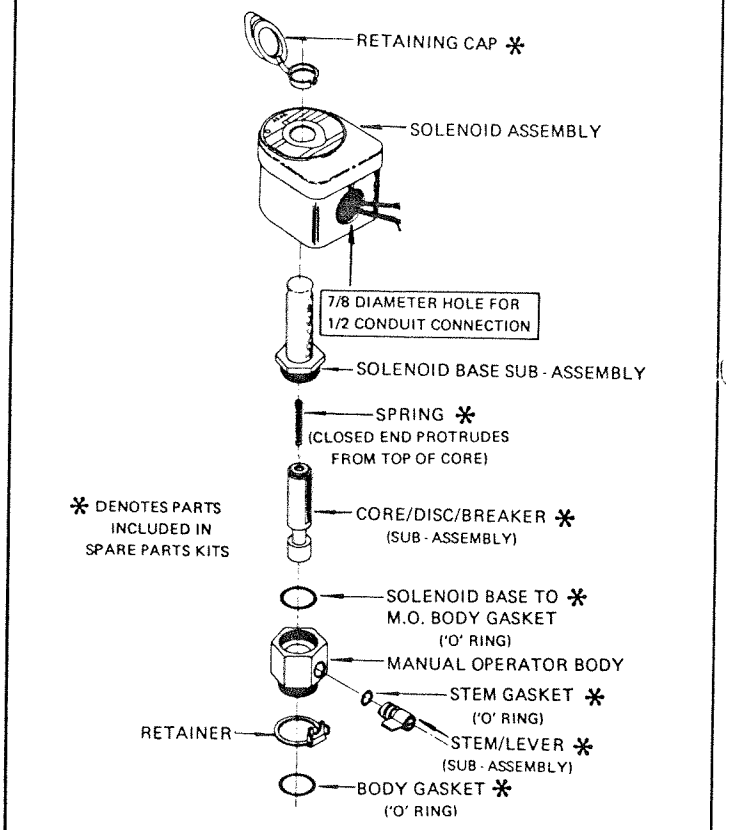
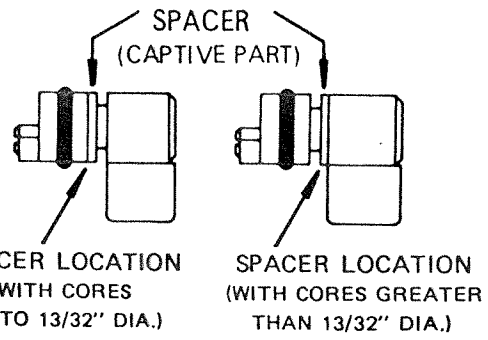


Figure 7. Manual Operator — Alternate D-C Construction



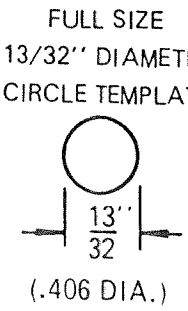
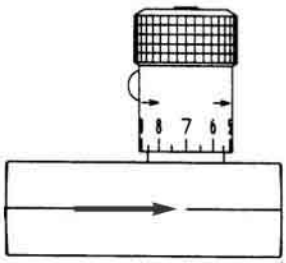


Figure 8.

DESCRIPTION

The Model 141-3 Flow Control Valve is an adjustable restriction device, installed in the control circuit tubing. The flow control valve differs from a standard needle valve in that it includes an internal check valve. Thus it allows free flow in one direction (through the check) and restricted flow in the other direction (through the needle). The setting of the flow control valve meters the flow into or out of the main valve diaphragm chamber, thus controlling either the opening or closing speed of the main valve. These can be installed in series for separate opening and closing speed control. Restricted flow is in the direction of the flow arrow on the body.

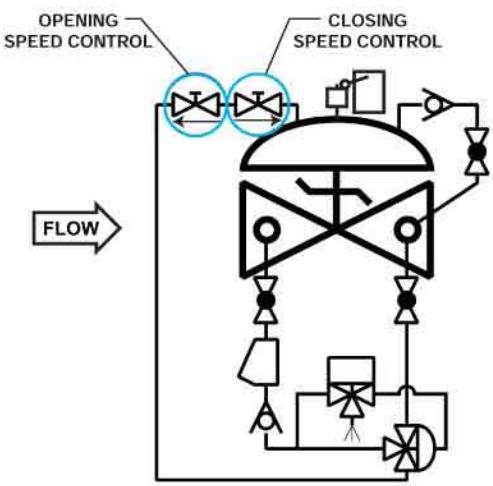


MODEL 141-3 MATRIX

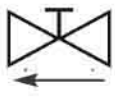
MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	682100	1/4	2 3/8	1 ¼"-2"
Brass	682101	3/8	2 3/4	2 ½"-6"
Brass	682102	1/2	3 1/4	8"-10"
Brass	682103	3/4	3 7/8	12"-16"
Stn. Steel	682700	1/4	2 3/8	1 ¼"-2" Stn.
Stn. Steel	682701	3/8	2 3/4	2 ½"-6"
Stn. Steel	682702	1/2	3 1/4	8"-10"
Stn. Steel	682703	3/4	3 5/8	12"-16"

Note: Flow control valve use and size may vary on valve application. Consult factory.

SCHEMATIC SYMBOL



The Model 141-3 Flow Control Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 125 Pump Control Valve as separate opening and closing speeds.

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DESCRIPTION

The Model 141-1 Check Valve uses a spring-loaded poppet that will allow flow in one direction only. It is the primary component used on valves with a reverse flow check function. Flow is in the direction of the arrow on the check valve body.

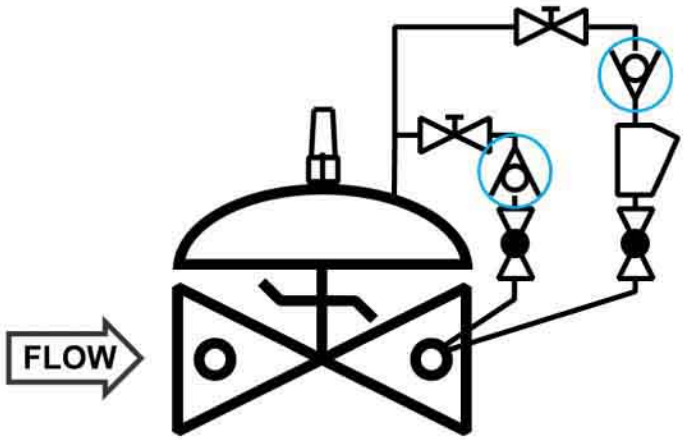
◀Check Valves shown
Stainless Steel & Brass

MODEL 141-1 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	LENGTH	USED ON VALVE SIZE
Bronze	681100	3/8	2	1 ¼"-6"
Bronze	681101	1/2	2 1/8	8"-10"
Bronze	681102	3/4	2 1/4	12"-16"
Stn. Steel	681700	3/8	2 5/16	1 ¼"-6"
Stn. Steel	681701	1/2	2 5/16	8"-10"
Stn. Steel	681702	3/4	2 7/8	12"-16"

SCHEMATIC SYMBOL

The Model 141-1 Check Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 94-3 Check Valve.

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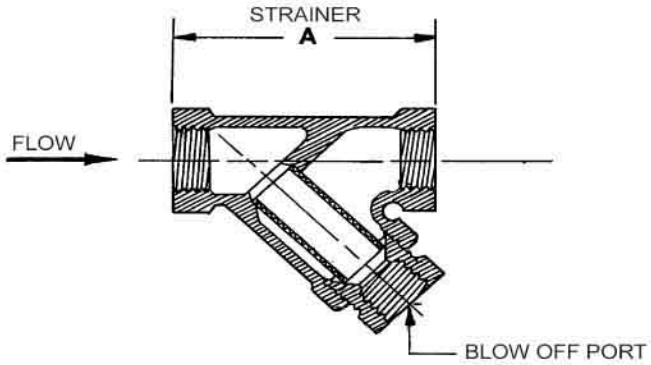
Check Valve 141-1

DESCRIPTION

MODEL 159 Y-STRAINER
The 159 Y-Strainer installs in the inlet piping of the pilot system and protects the pilot system from solid contaminants in the line fluid. It is the standard strainer for water service valves.

MODEL 159 Y-STRAINER MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	BLOW OFF PORT (NP)	A	STD. MESH	USED ON VALVE SIZE
Bronze	660100	3/8	3/8	2 11/16	24	1 ¼"-6"
Bronze	660101	1/2	3/8	2 5/8	24	8"-10"
Bronze	660102	3/4	3/8	3 5/16	24	12"-16"
Stn. Steel	660700	3/8	1/4	2 1/2	20	1 ¼"-6"
Stn. Steel	660701	1/2	1/4	2 1/2	20	8"-10"
Stn. Steel	660702	3/4	1/4	3 1/8	20	12"-16"



MATERIALS

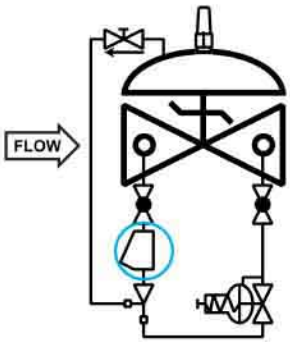
Bronze, ASTM B62
Optional mesh sizes: 50,100

Stainless Steel, CF8-M (316)
Optional mesh sizes: 60, 80, 100

Screens are stainless steel

SCHEMATIC SYMBOL

The Model 159 Y-Strainer is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 127-3 Pressure Reducing Valve

MAINTENANCE

Routine cleaning and checking of the Y-Strainer will aid in keeping the control valve functioning properly. Pilot system isolation ball valves are supplied on valves equipped with the Model 159 Y-Strainer. These allow flushing of the screen through the blow off port, or removal of the screen itself for manual cleaning.

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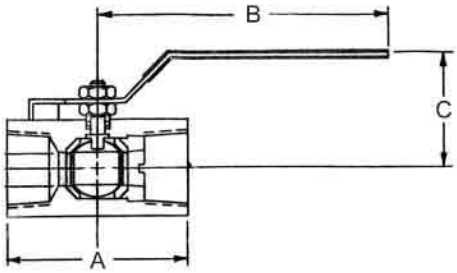
DESCRIPTION

The Model 141-4 Ball Valve is a ¼-turn shutoff device used for isolating the pilot system from the main valve. They are extremely useful for performing routine maintenance and troubleshooting.

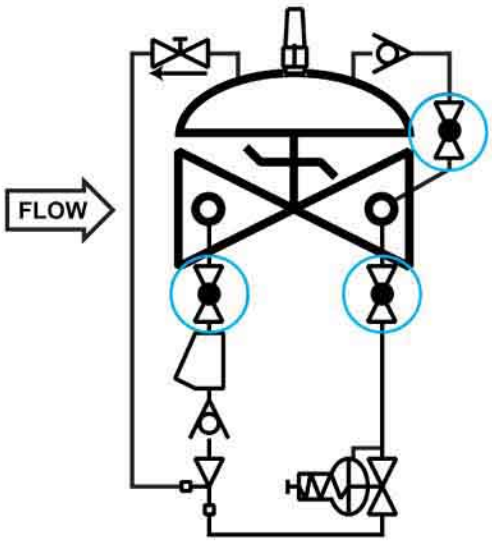
Ball valves are standard on water service valves; optional on fuel service valves.



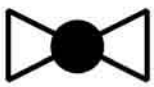
MODEL 141-4 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	B	C	USED ON VALVE SIZE*
Bronze	680100	3/8	1 3/4	3 1/2	1 7/8	1 ¼"-6"
Bronze	680101	1/2	2	3 1/2	2 1/4	8"-10"
Bronze	680102	3/4	3	4 3/4	2 1/4	12"-16"
Stn. Steel	680700	3/8	2	3 3/4	2 1/8	1 ¼"-6"
Stn. Steel	680701	1/2	2 1/4	3 3/4	2 1/2	8"-10"
Stn. Steel	680702	3/4	3	4 3/4	2 1/4	12"-16"

SCHEMATIC SYMBOL



The Model 141-4 Ball Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 127-4 Pressure Reducing / Check Valve.

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Ball Valve 141-4

DESCRIPTION

MODEL 31 LIMIT SWITCH ASSEMBLY

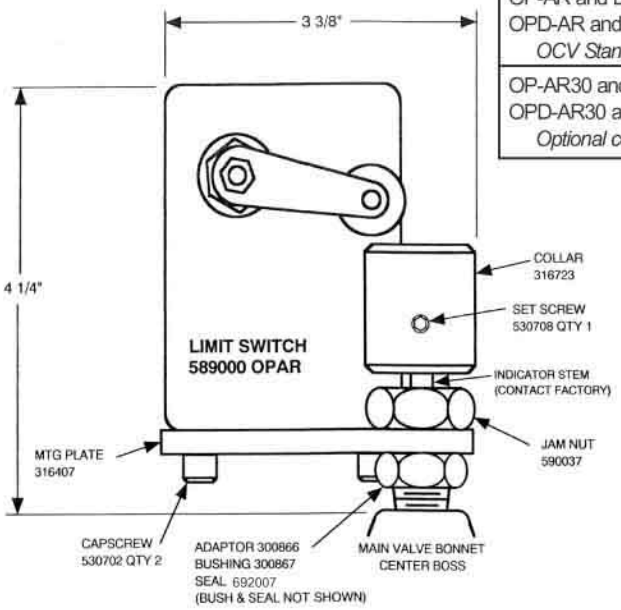
- Provides electrical indication of valve position.
- Adjustable to any point of valve travel.
- Heavy-duty stem seal.
- Installed without disassembly of valve.
- Available in weatherproof or explosion-proof enclosures.
- SPDT contacts (standard) DPDT (optional)

The Model 31 Limit Switch Assembly is a device that uses movement of the valve stem to make or break electrical contacts at designated points in the valve travel. It consists of an adaptor threaded into the center port of the valve bonnet, a rod threaded into the main valve stem, a heavy-duty stem seal, an actuating collar, and the switch unit. It may be installed on virtually any OCV control valve, and can be done so without any disassembly of the valve itself.

WHERE USED - Standard on Series 125/126 Pump Control Valves. Optional on all other series control valves.

MODEL 31 ASSY MATRIX

SWITCH TYPE	VALVE CLOSED	VALVE OPEN
OP-AR and EX-AR (SPDT) OPD-AR and EXD-AR-3 (DPDT) *OCV Standard Configuration*	N.C. contact(s) closed N.O. contact(s) open Switch roller OFF collar	N.C. contact(s) open N.O. contact(s) closed Switch roller ON collar
OP-AR30 and EX-AR30 (SPDT) OPD-AR30 and EXD-AR30-3 (DPDT) *Optional configuration*	N.C. contact(s) open N.O. contact(s) closed Switch roller ON collar	N.C. contact(s) closed N.O. contact(s) open Switch roller OFF collar



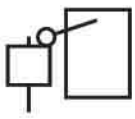
VALVE SIZE	PART NUMBER OP-AR (SPDT) Weatherproof	PART NUMBER EX-AR (SPDT) Explosion proof
1 1/4" - 1 1/2"	Consult factory	Consult factory
2" - 4"	252710	252413
6" - 8"	252720	252423
10 - 12"	252730	Consult factory
14" - 16"	252740	Consult factory

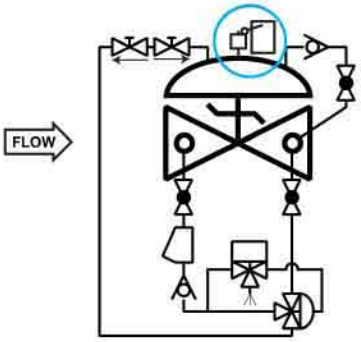
These part numbers include Buna-N stem seal. Consult Factory for part numbers on DPDT, other stem seals, and all model 31 switches shown in the Actuation matrix.

NOTE: Factory recommended valve installation should allow for indicator rod to be in the vertical position.

SCHEMATIC SYMBOL

The Model 31 is shown on OCV Valve Schematic as:





EXAMPLE: Shown here on a Model 125 Pump Control Valve

ELECTRICAL RATING

SPDT: 15 amps @ 125-480 VAC
1/2 amp @ 125 VDC, 1/4 amp @ 250 VDC
DPDT: 10 amps @ 125-250 VAC
0.3 amp @125 VDC, 0.15 amp @ 250 VDC

ENCLOSURES

OP Switches Weatherproof NEMA 4
EX Switches Explosion Proof NEMA 7, 9

MATERIALS

Indicator Rod: Stainless Steel
Adapter: Stainless Steel
Collars Stainless Steel

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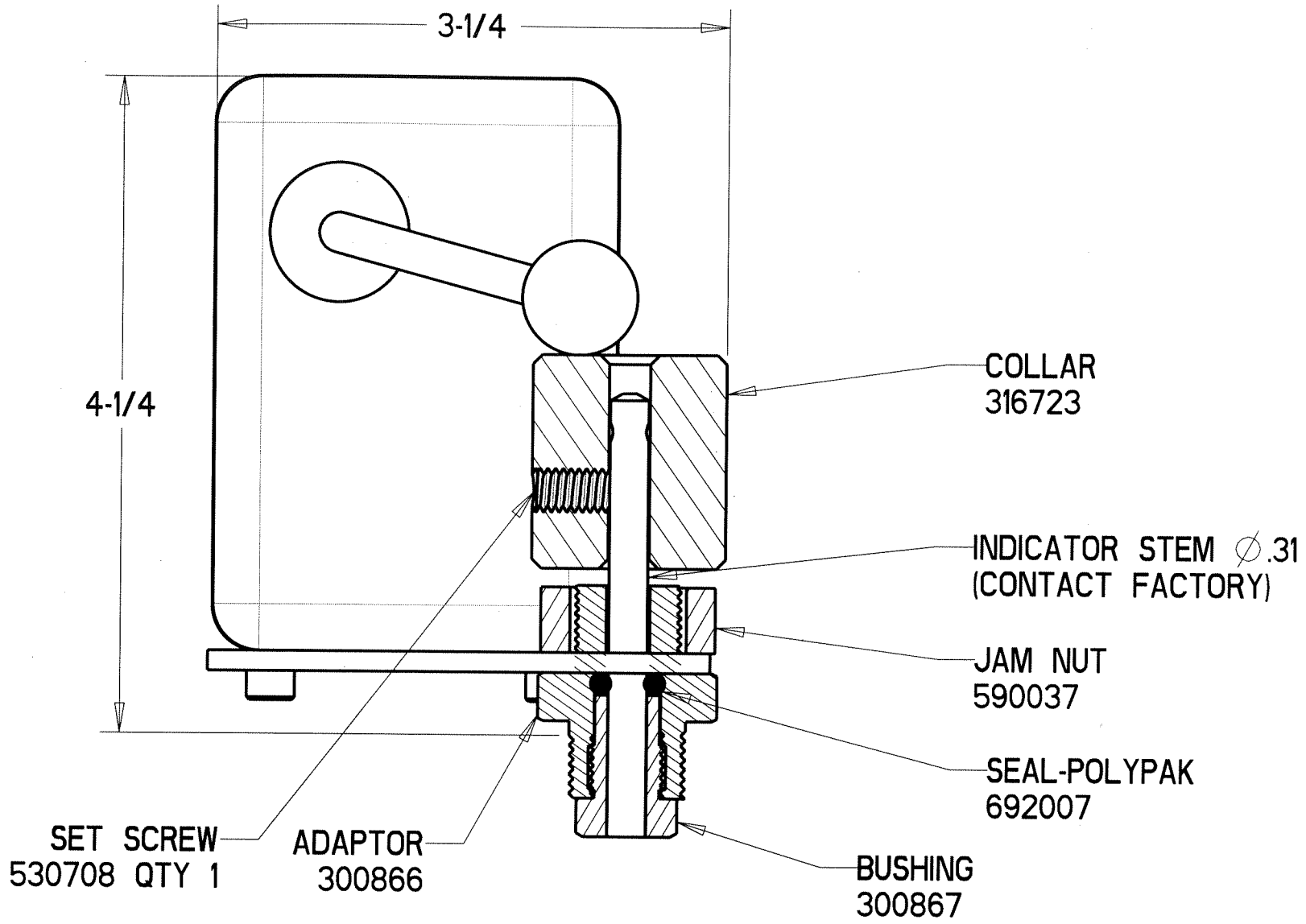

E					MATERIAL	TOLERANCES	OCV Control Valves	
D						UNLESS NOTED .XX ±.015 .XXX ±.005 ANGULAR ±0.5° MACH. FINISH 125	TULSA OKLAHOMA USA	
C							LIMIT SWITCH ASSEMBLY	
B								
A					NO. REQ'D	DRAWN BY / DATE	SIZE / DRAWING NUMBER	REV
CHG	ECN	DATE	BY			B.K. / 2-13-08		
REVISIONS				REF DWG NO'S	SCALE	CHKD BY / DATE	A / MODEL 31	
					FULL			