# surge anticipation valve

## installation, operating, and maintenance instructions

# model 118

## GENERAL DESCRIPTION

The OCV Model 118 surge anticipation valve is designed to be installed in a bypass line and thereby act to relieve high pressure surges to a sump. The Series 118 includes three models differentiated by the opening signals to which each responds:

Model 118-1 - Opens on power failure.

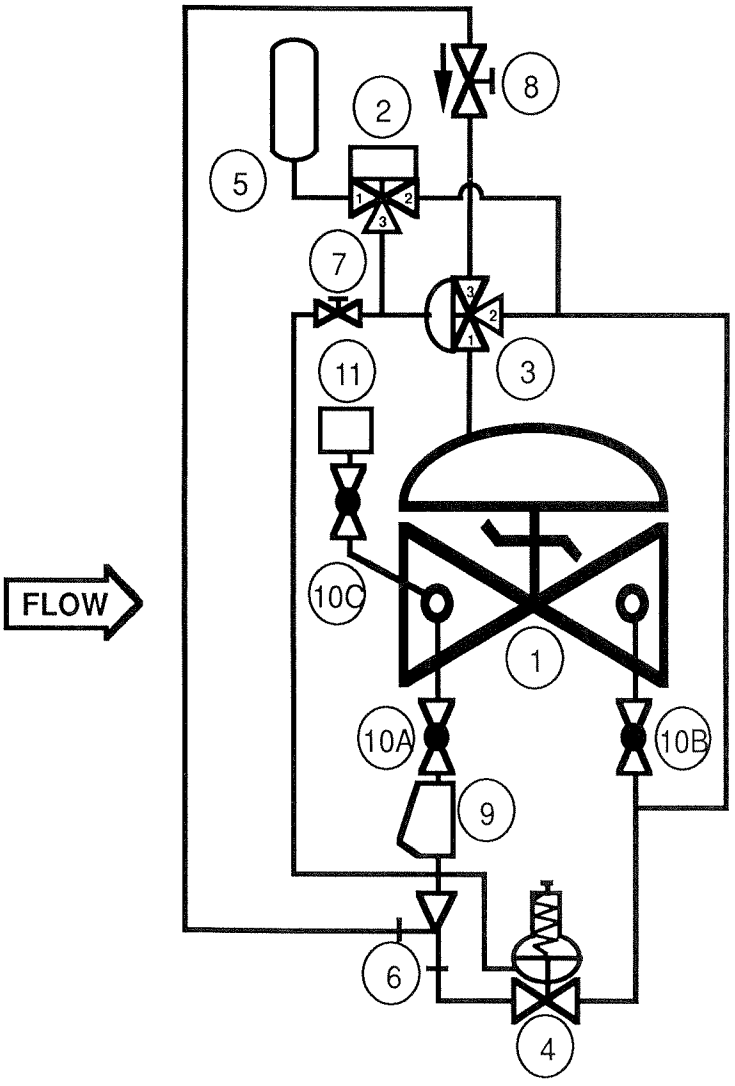
Model 118-2 - Opens on power failure or high pressure.

Model 118-3 - Opens on power failure, high pressure or low pressure.

The Model 118-3 acts to correct a common problem in pipeline systems: low and high pressure waves which propagate through the contained fluid. In a closed system, these waves will continue to travel from end-to-end of the line until their energy is dissipated by fluid friction. The Model 118-3 opens on a low-pressure signal and remains open during an adjustable delay interval to relieve the high pressure surges which will follow.

## THEORY OF OPERATION (Model 118-3) (Refer to the attached schematic for component identification)

To ensure quick response to pressure signals, the bonnet of the main valve (1) is loaded and relieved through the high-capacity three-way pilot (8). When the three-way pilot bonnet is pressurized, inlet pressure is routed to the main valve bonnet, closing the main valve. Depressurizing the three-way pilot bonnet connects the main valve bonnet to downstream and allows the main valve to open.

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The three-way pilot bonnet is constantly loaded through an adjustable restriction (5). Either a low pressure signal breaking the contacts in pressure switch (4) or a power failure will deenergize the coil of the solenoid valve (9) which relieves the three-way pilot bonnet to the accumulator (10). This will allow the main valve to open and remain open until the accumulator fills, thus pressurizing the three-way pilot bonnet and closing the main valve. Thus on a low-pressure-signal opening, the main valve will reclose after the delay interval, even if system pressure remains below the set point. Restoration of power or return to normal pressure will energize the solenoid coil, vent the accumulator to downstream and reset the valve for the next cycle. The time-delay during which the valve remains open can be adjusted by means of a strict relief mode. A high pressure signal opens the pressure relief pilot (11) venting the main valve bonnet through the ejector (6), allowing the valve to open. Upon return to normal pressure, the pilot closes, repressurizing the main valve bonnet, thus causing the valve to close.

## INSTALLATION

Refer to installation procedures in Model 65 section. Adjust the Pressure Relief Pilot, Model 1330, to the desired high pressure opening (Model 118-2, 118-3). Set the pressure switch (Model 118-3) to the desired low pressure opening. Adjust the time-delay control (close to increase delay) to the desired delay. Adjust the opening (if provided) and closing speed controls as necessary. Neither the speed controls nor the time delay control should be completely closed.

## WIRING

PARALLEL

The solenoid valve coil should be wired in ~~series~~ with INCOMING POWER TO THE PUMP (120 AC STD) ~~the pump run circuit~~ (all models) and the pressure switch using the common (white) and normally open (block) terminals (Model 118-3).

## TROUBLESHOOTING

Be sure that none of the speed controls (needle valves) are completely closed, that the main valve has inlet pressure, that flow is not blocked downstream and that the solenoid and/or pressure switch have electrical power.

### MAIN VALVE FAILS TO CLOSE:

Main valve diaphragm rupture or seat disc failure. Clogged strainer or control lines. Three-way pilot diaphragm or seat failure. Solenoid valve failure. Stem binding in main valve, relief pilot or three-way pilot.

## 118-3 ADJUSTMENT INSTRUCTIONS

### A. RELIEF PILOT

1. Turn 1330 fully **clockwise**.
2. Shut-in system to build pressure as high as possible.
3. If pressure is **above** desired relief point, adjust 1330 slowly **counterclockwise** until valve opens and pressure falls to desired set point.
4. If pressure is **below** desired set point, adjust 1330 slowly **counterclockwise** until valve just begins to open. Then adjust 1330 **clockwise** one full turn.

### B. PRESSURE SWITCH

**NOTE:** Make sure switch is wired **in series** with the solenoid across the incoming 120VAC line. Make sure the **white** and **black** terminals inside the pressure switch case are used (see diagram).

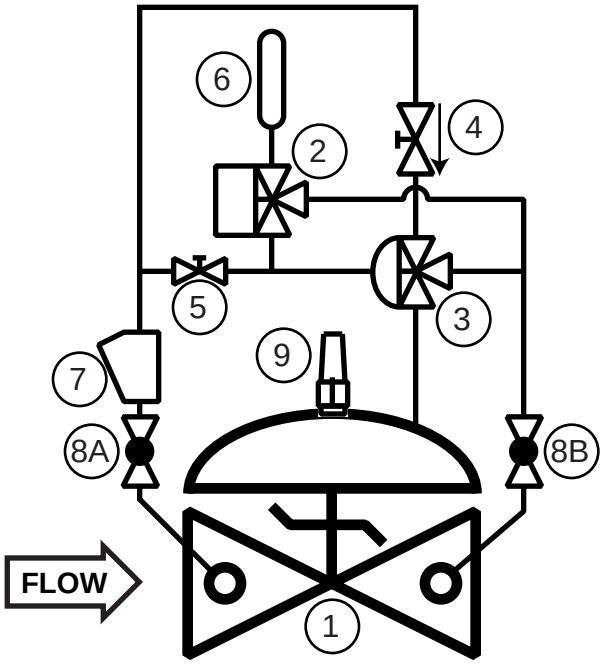
1. Turn **HI** contact on pressure switch fully **clockwise**.
2. Turn **LO** contact on pressure switch fully **counterclockwise**.
3. Make sure the pump is **off** and pressure switch is reading **normal static pressure**.
4. Turn HI contact **counterclockwise** until it contacts the gauge pointer, then 15-20 psi further **counterclockwise**.

**NOTE:** The maximum reading possible on the gauge will now be the low pressure set point.

### C. TIME DELAY CONTROL

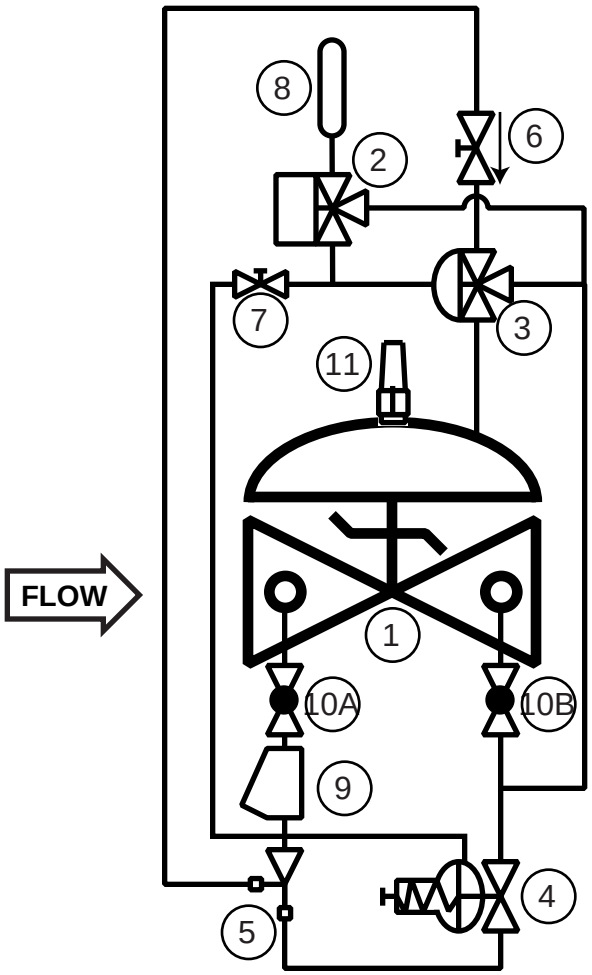
1. Make initial setting of metering valve at **3 turns open**.
2. Remove power from solenoid and let valve open.
3. Adjust metering valve as required to give desired time open. (Probably 15-30 seconds on a system like this.)

## SURGE ANTICIPATION VALVE
## (Power Failure Opening Only)



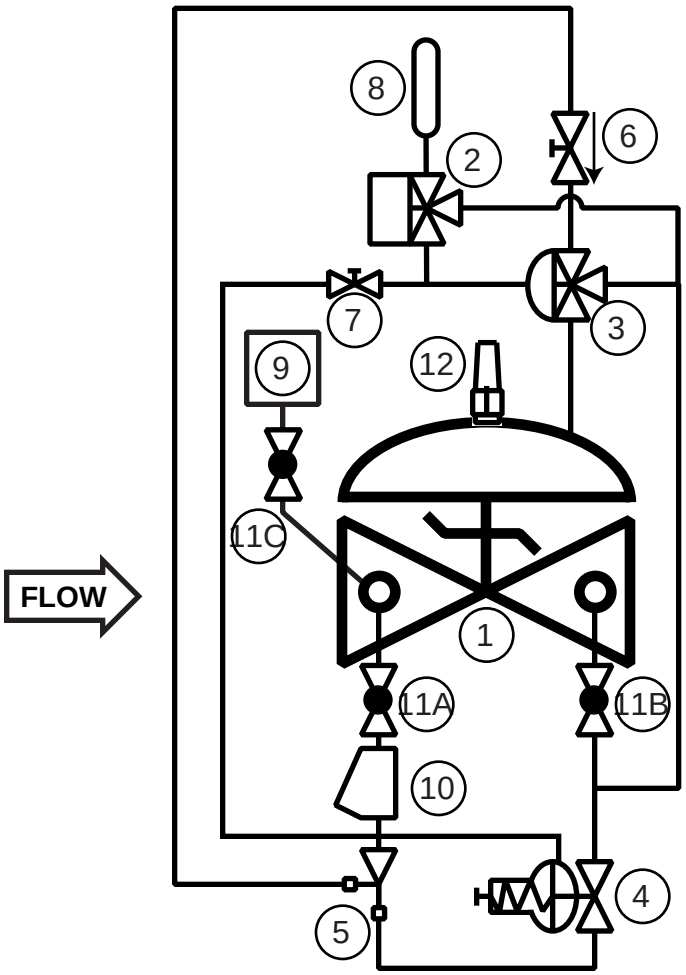

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 65 | 1 | BASIC VALVE ASSEMBLY |
| 2 | 452 | 1 | THREE-WAY SOLENOID PILOT |
| 3 | 3600 | 1 | THREE-WAY AUXILIARY PILOT |
| 4 | 141-3 | 1 | FLOW CONTROL VALVE (Closing Speed Control) |
| 5 | 141-2FM | 1 | METERING VALVE |
| 6 | -- | 1 | ACCUMULATOR |
| 7 | 159 | 1 | Y-STRAINER |
| 8 | 141-4 | 2 | ISOLATION BALL VALVE |
| 9 | 155 | 1 | VISUAL INDICATOR (Optional) |

## SURGE ANTICIPATION VALVE
## (Power Failure & High Pressure Opening)

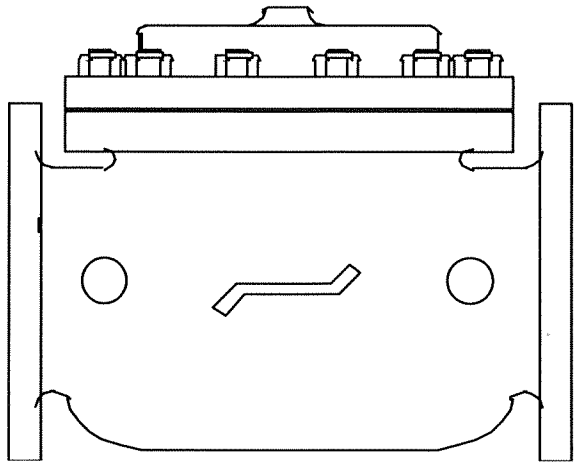



| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 65 | 1 | BASIC VALVE ASSEMBLY |
| 2 | 452 | 1 | THREE-WAY SOLENOID PILOT |
| 3 | 3600 | 1 | THREE-WAY AUXILIARY PILOT |
| 4 | 1330 | 1 | PRESSURE RELIEF PILOT |
| 5 | 126 | 1 | EJECTOR |
| 6 | 141-3 | 1 | FLOW CONTROL VALVE (Closing Speed Control) |
| 7 | 141-2FM | 1 | METERING VALVE |
| 8 | -- | 1 | ACCUMULATOR |
| 9 | 159 | 1 | Y-STRAINER |
| 10 | 141-4 | 2 | ISOLATION BALL VALVE |
| 11 | 155 | 1 | VISUAL INDICATOR (Optional) |

## SURGE ANTICIPATION VALVE
## (Power Failure, High Pressure and Low Pressure Opening)




| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 65 | 1 | BASIC VALVE ASSEMBLY |
| 2 | 452 | 1 | THREE-WAY SOLENOID PILOT |
| 3 | 3600 | 1 | THREE-WAY AUXILIARY PILOT |
| 4 | 1330 | 1 | PRESSURE RELIEF PILOT |
| 5 | 126 | 1 | EJECTOR |
| 6 | 141-3 | 1 | FLOW CONTROL VALVE (Closing Speed Control) |
| 7 | 141-2FM | 1 | METERING VALVE |
| 8 | -- | 1 | ACCUMULATOR |
| 9 | 589080 | 1 | PRESSURE SWITCH |
| 10 | 159 | 1 | Y-STRAINER |
| 11 | 141-4 | 3 | ISOLATION BALL VALVE |
| 12 | 155 | 1 | VISUAL INDICATOR (Optional) |



# installation, operating, and maintenance instructions

# series 65

# basic control valve

## GENERAL DESCRIPTION

The OCV Series 65 is a hydraulically-operated, diaphragm-actuated valve. It is available in either a globe (Model 65) or angle (Model 65A) configuration. The diaphragm is nylon-fabric bonded with synthetic rubber and forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. An elastomeric seat disc forms a tight seal with the valve seat when pressure is applied above the diaphragm.

## FUNCTIONAL DESCRIPTION

Because the Series 65 is a hydraulically operated valve, it requires a minimum line pressure of approximately 5 psig in order to function. The valve functions on a simple principle of pressure differential. The line pressure at the inlet of the valve is bypassed through the pilot control piping to the diaphragm chamber of the valve. This pressure, together with the valve spring, works against the pressure under the valve seat. Because the effective area of the diaphragm is greater than that of the seat, the valve is held tightly closed. As the controlling pilot(s) allow the pressure to bleed off the diaphragm chamber, the two opposing pressures begin to balance and the valve will begin to open. The valve can be used to perform a simple on-off function, or with the proper pilot system, a modulating, or regulating function.

In cases where the line fluid is unusually dirty, or is otherwise unsuitable for operating the valve, an independent operating pressure source may be employed. The pressure available from such a source must be equal to, or greater than, line pressure.

## INSTALLATION

In order to insure safe, accurate and efficient operation of the OCV control 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. Thoroughly flush all interconnecting piping of chips, scale and foreign matter prior to mounting the valve.
3. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.
4. Allow sufficient room around the valve for ease of adjustment and maintenance service.

In addition, it is highly recommended that:

1. Isolation valves (eg., gate or butterfly) be installed on the inlet and discharge sides of the valve to facilitate isolating the valve for maintenance.
2. Pressure gauges be installed at the inlet and outlet sides of the valve to provide monitoring of the valve during initial start-up and during operation. The body side ports, if unused by the pilot system, provide a convenient connection for the gauges.
3. All valves larger than 6" be installed horizontally, i.e., with the bonnet pointed up, for ease of adjustment and maintenance servicing.

## MAINTENANCE

The OCV control valve requires no lubrication 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 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 ex-

amination 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.

## REPAIR PROCEDURES

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. VALVE FAILS TO OPEN
   a. Diaphragm damaged* - See Procedure A
   b. Stem binding - See Procedure B
2. VALVE FAILS TO CLOSE
   a. Diaphragm damaged* - See Procedure A
   b. Stem binding - See Procedure B
   c. Object lodged in valve - See Procedure B
3. VALVE OPENS AND CLOSES BUT LEAKS WHEN CLOSED
   a. Seat disc damaged - See Procedure C
   b. Seat ring damaged - See Procedure D

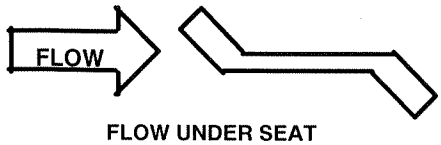
**A diaphragm failure can prevent the valve from either opening or closing, depending on the flow direction. Most water service valves flow "under the seat", in which case a diaphragm failure will keep the valve from closing. On the other hand, most fuel service valves flow "over the seat", in which case a diaphragm failure will keep the valve from opening. To determine which you have, examine the bridge mark cast into the side of the valve body, then compare it with the figures below.*

### *PROCEDURE A : DIAPHRAGM REPLACEMENT*

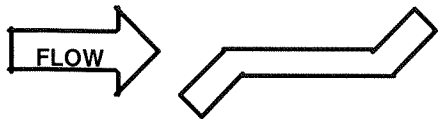
1. Isolate the valve from the system by closing upstream amd downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in place, it may be loosened by rapping sharply around its edge with a *rubber-headed* mallet. *NOTE: 8" and larger valves are equipped with eye bolts through which a chain can be fastened to aid in lifting the bonnet.*
6. Remove the spring.
7. Remove the diaphragm plate capscrews and the diaphragm plate.
8. Remove the old diaphragm.
9. Making sure the dowel pin holes are in the proper location, place the new diaphragm over the studs and press down until it is flat against the body and spool.
10. Replace the diaphragm plate and the diaphragm plate capscrews.
11. Tighten all diaphragm plate capscrews snugly.
12. Replace the spring.
13. Replace the bonnet and reinstall the bonnet nuts.
14. Tighten the bonnet nuts snugly using a criss-cross tightening pattern.
15. Reinstall the control tubing.
16. Reopen the upstream and downstream block valves.
17. Before placing the valve back in service, perform the air bleed procedure described in the first section of this manual.

### *PROCEDURE B: CORRECTION OF BINDING STEM*

1. Perform Steps 1 thru 6 of Procedure A, above.
2. Remove the spool assembly from the valve. *NOTE:*




**FLOW UNDER SEAT**
**DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE**




**FLOW OVER SEAT**
**DIAPHRAGM FAILURE = VALVE FAILS TO OPEN**

*On smaller valves, this can be accomplished simply by grasping the stem and pulling upward. Valves 6" and larger have the top of the stem threaded to accept an eyebolt to aid in lifting the spool out of the body. 6" thru 12" valves are threaded 3/8-16. 14" and 16" valves are threaded 5/8-11.*

3. Carefully examine both ends of the stem for deep scratches, scoring or buildup of mineral deposits.

Polish the stem if necessary using a fine grade of emery cloth.

4. Similarly, examine and polish the upper bushing (in the bonnet) and the lower guide (in the seat ring).
5. Reinstall the spool assembly.
6. Reassemble the valve, following Steps 12 thru 17 in Procedure A.

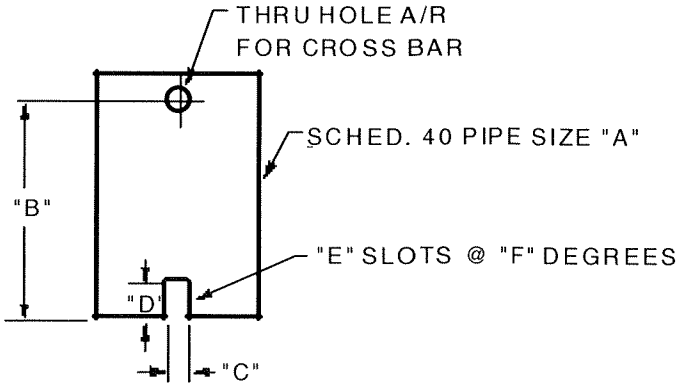
*PROCEDURE C: SEAT DISC REPLACEMENT*

1. Perform Steps 1 and 2 of Procedure B, above.
2. With the spool assembly removed from the body, remove the seat retainer screws.
3. Slide the seat retainer off the lower end of the stem.
4. Remove the seat disc from its groove in the spool. *NOTE: The seat disc may fit quite tightly in the groove. If necessary, it may be pried out using a thin-bladed screwdriver or similar tool.*
5. Install the new seat disc in the groove.
6. Reinstall the seat retainer and tighten the seat retainer screws.
7. Reassemble the valve, following Steps 5 and 6 of Procedure B.

*PROCEDURE D: SEAT RING REPLACEMENT*

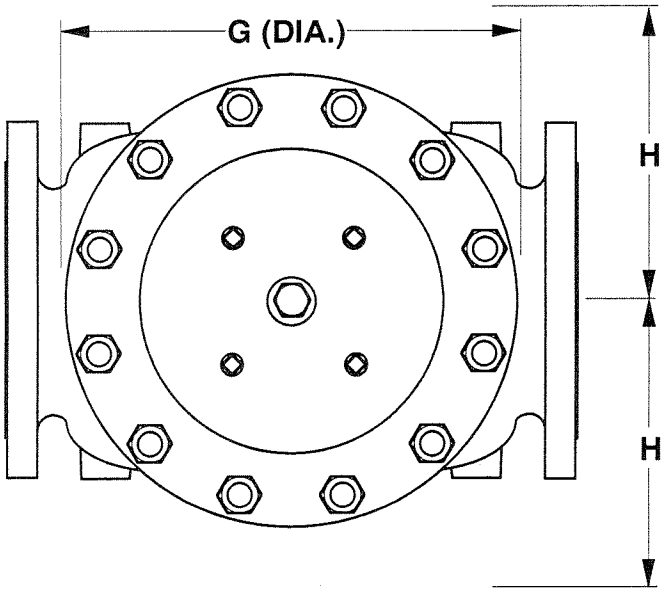
*NOTE: It is rare for a seat ring to require replacement. Minor nicks and scratches in the seating surface can usually be smoothed out with emery cloth.*

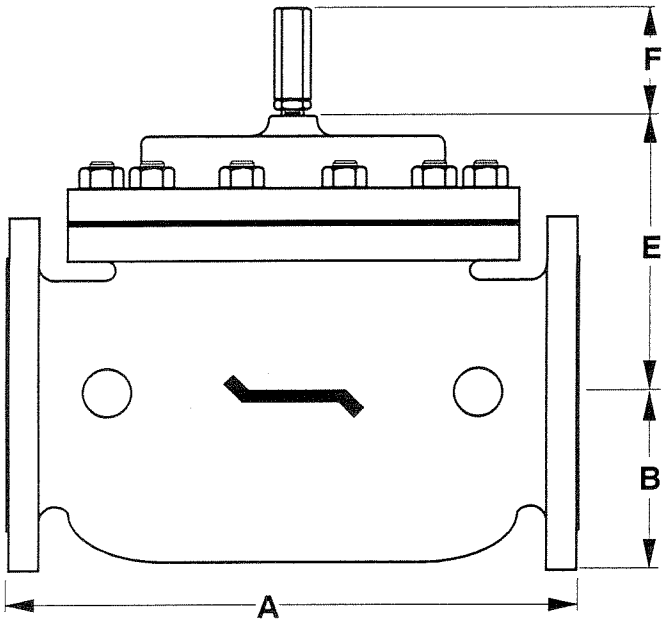
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.
4. Seat rings in valves 4" and smaller are threaded into the valve body. To remove, you will need a special seat ring tool. You may fabricate one using standard pipe as shown in the sketch below, or one may be purchased from OCV.
5. Using the seat ring tool, unthread the seat ring from the body.
6. Remove the old o-ring from the counterbore in the body.
7. Install the new o-ring in the counterbore.
8. Using the seat ring tool, install the new seat ring.
9. Reassemble the valve, following Steps 5 & 6 of Procedure B.
10. Seat rings in valves 6" and larger are bolted into the body with socket head capscrews. In addition you will note that the seat ring is equipped with additional threaded holes that may be used for "jacking" the seat ring out of the body.
11. Remove the socket head capscrews.
12. Remove the old seat ring from the body by temporarily installing two or more of the capscrews in the "jacking" holes.
13. Install a new o-ring in the groove of the new seat ring. Lubricate the o-ring and outer seat ring wall with Vaseline® or similar lubricant.
14. Install the new seat ring in the body, making sure that the capscrew holes line up.
15. Replace and tighten all the capscrews.
16. Reassemble the valve, following Steps 5 and 6 of Procedure B.



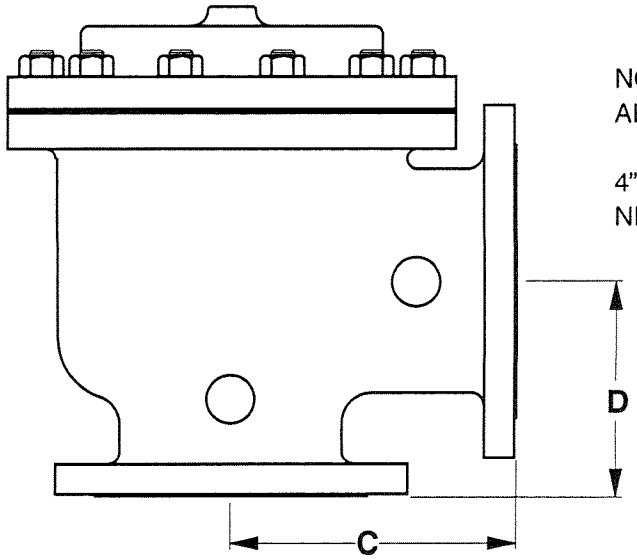

| VALVE SIZE | "A" PIPE SIZE | "B" MIN. LENGTH | "C" SLOT WIDTH | "D" SLOT DEPTH | "E" NO. OF SLOTS | "F" SLOT SPACING |
|---|---|---|---|---|---|---|
| 1-1/4" | 3/4" | 6" | 3/8" | 3/8" | 2 | 180° |
| 1-1/2" | 3/4" | 6" | 3/8" | 3/8" | 2 | 180° |
| 2" | 1-1/2" | 7" | 3/8" | 3/8" | 2 | 180° |
| 2-1/2" | 2" | 8" | 1/2" | 1/2" | 3 | 120° |
| 3" | 2-1/2" | 9" | 5/8" | 5/8" | 2 | 180° |
| 4" | 3" | 10" | 5/8" | 5/8" | 2 | 180° |

REVISED 3-17-97




| DIM | ANSI CLASS | VALVE SIZE | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 24 |
| A | S.E | 8.75 | 8.75 | 9.88 | 10.50 | 13.00 | – | – | – | – | – | – | – | – |
| | 150 | 8.50 | 8.50 | 9.38 | 10.50 | 12.00 | 15.00 | 17.75 | 25.38 | 29.75 | 34.00 | 39.00 | 40.38 | 62.00 |
| | 300 | 8.75 | 8.75 | 9.88 | 11.12 | 12.75 | 15.62 | 18.62 | 26.38 | 31.12 | 35.50 | 40.50 | 42.00 | 63.75 |
| B | SE | 1.44 | 1.44 | 1.69 | 1.88 | 2.25 | – | – | – | – | – | – | – | – |
| | 150 | 2.31 | 2.50 | 3.00 | 3.50 | 3.75 | 4.50 | 5.50 | 6.75 | 8.00 | 9.50 | 10.62 | 11.75 | 16.00 |
| | 300 | 2.62 | 3.06 | 3.25 | 3.75 | 4.12 | 5.00 | 6.25 | 7.50 | 8.75 | 10.25 | 11.50 | 12.75 | 18.00 |
| C | SE | 4.38 | 4.38 | 4.75 | 6.00 | 6.50 | – | – | – | – | – | – | – | – |
| | 150 | 4.25 | 4.25 | 4.75 | 6.00 | 6.00 | 7.50 | 10.00 | 12.69 | 14.88 | 17.00 | – | 20.81 | – |
| | 300 | 4 3/8 | 4.38 | 5.00 | 6.38 | 6.38 | 7.81 | 10.50 | 13.19 | 15.56 | 17.75 | – | 21.62 | – |
| D | SE | 3.12 | 3.12 | 3.88 | 4.00 | 4.50 | – | – | – | – | – | – | – | – |
| | 150 | 3.00 | 3.00 | 3.88 | 4.00 | 4.00 | 5.50 | 6.00 | 8.00 | 11.38 | 11.00 | – | 15.69 | – |
| | 300 | 3.25 | 3.25 | 4.12 | 4.38 | 4.38 | 5.81 | 6.50 | 8.50 | 12.06 | 11.75 | – | 16.50 | – |
| E | ALL | 6.00 | 6.00 | 6.00 | 7.00 | 6.50 | 7.92 | 10.00 | 11.88 | 15.38 | 17.00 | 18.00 | 19.00 | 27.00 |
| F | ALL | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 6.38 | 6.38 | 6.38 | 6.38 | 6.38 | 8.00 |
| G | ALL | 6.00 | 6.00 | 6.75 | 7.69 | 8.75 | 11.75 | 14.00 | 21.00 | 24.50 | 28.00 | 31.25 | 34.50 | 52.00 |
| H | ALL | 10.00 | 10.00 | 11.00 | 11.00 | 11.00 | 12.00 | 13.00 | 14.00 | 17.00 | 18.00 | 20.00 | 20.00 | 28.50 |




NOTE: 3" VALVE DIMENSIONS ARE FOR NEW MODEL 3100

4" VALVE DIMENSIONS ARE FOR NEW MODEL 4400

REV. A SDJ 6-6-02
REV. B SDJ 2-3-03

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

| DRAWN BY | DATE |
|---|---|
| SDJ | 10-6-97 |
| CHKD. BY | DATE |

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

# GENERAL VALVE DIMENSIONS

| SIZE | DRAWING NUMBER | REV. |
|---|---|---|
| A | 65D | B |

# INSTALLATION & MAINTENANCE INSTRUCTIONS

ASCO.
BULLETIN
8320

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

Form No V5688R2

## 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)

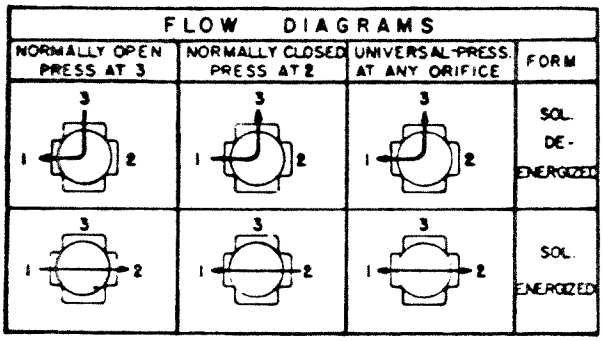
Applies pressure when solenoid is de-energized; exhausts pressure when solenoid is energized. When solenoid is de-energized, flow is from Port "3" to Port "1." Port "2" is closed. When solenoid is energized, flow is from Port "1" to "2." Port "3" is closed.

**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 |
| | None, DP, or SP | 16.7* | 77 | 200 |
| DC | None, FT, or HT | 11.2* | 77 | 150 |

* Catalog Nos. 8320A170, 8320A180, and 8320A190 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 N. 'onal Electrical Code. Solenoid housings are provided with a 7/8" diamete 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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ASCO Valves
Automatic Switch Co. 50-60 Hanover Road, Florham Park, New Jersey 07932

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.

end cap (or manual operator assembly). For brass construction, torque end cap to 175 ± 25 inch-pounds (19,8 ± 2,8 newton-meters). For stainless steel, torque end cap to 90 ± 10 inch-pounds (10,2 ± 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 ± 25 inch-pounds (19,8 ± 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.

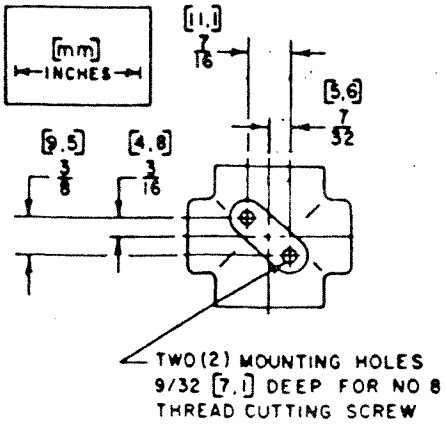



Figure 1. Brass Valve Body Mounting

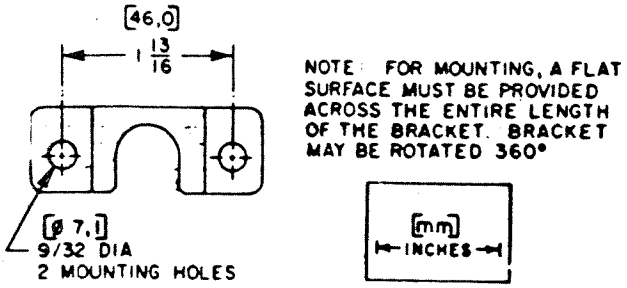



Figure 2. Mounting Bracket for Stainless Steel

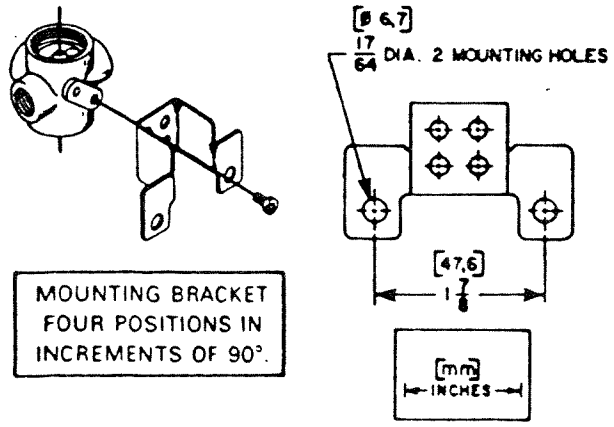



Figure 3. Optional Mounting Bracket for Brass

## 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.

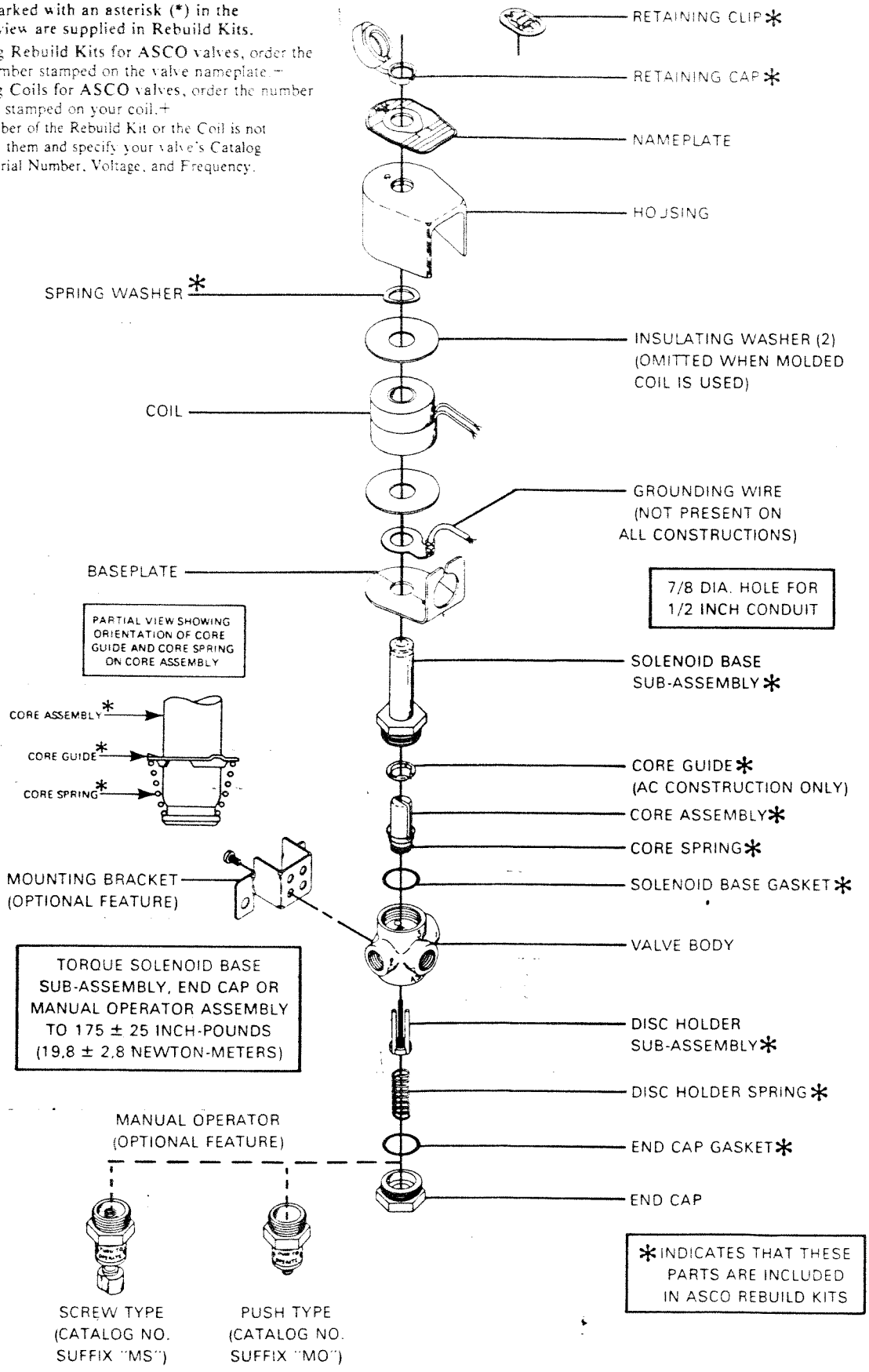



Figure 4. Bulletin 8320, Brass Construction
With General Purpose Solenoid Enclosure Shown
For Explosion-Proof Solenoid Enclosure, See Form No.V5380.

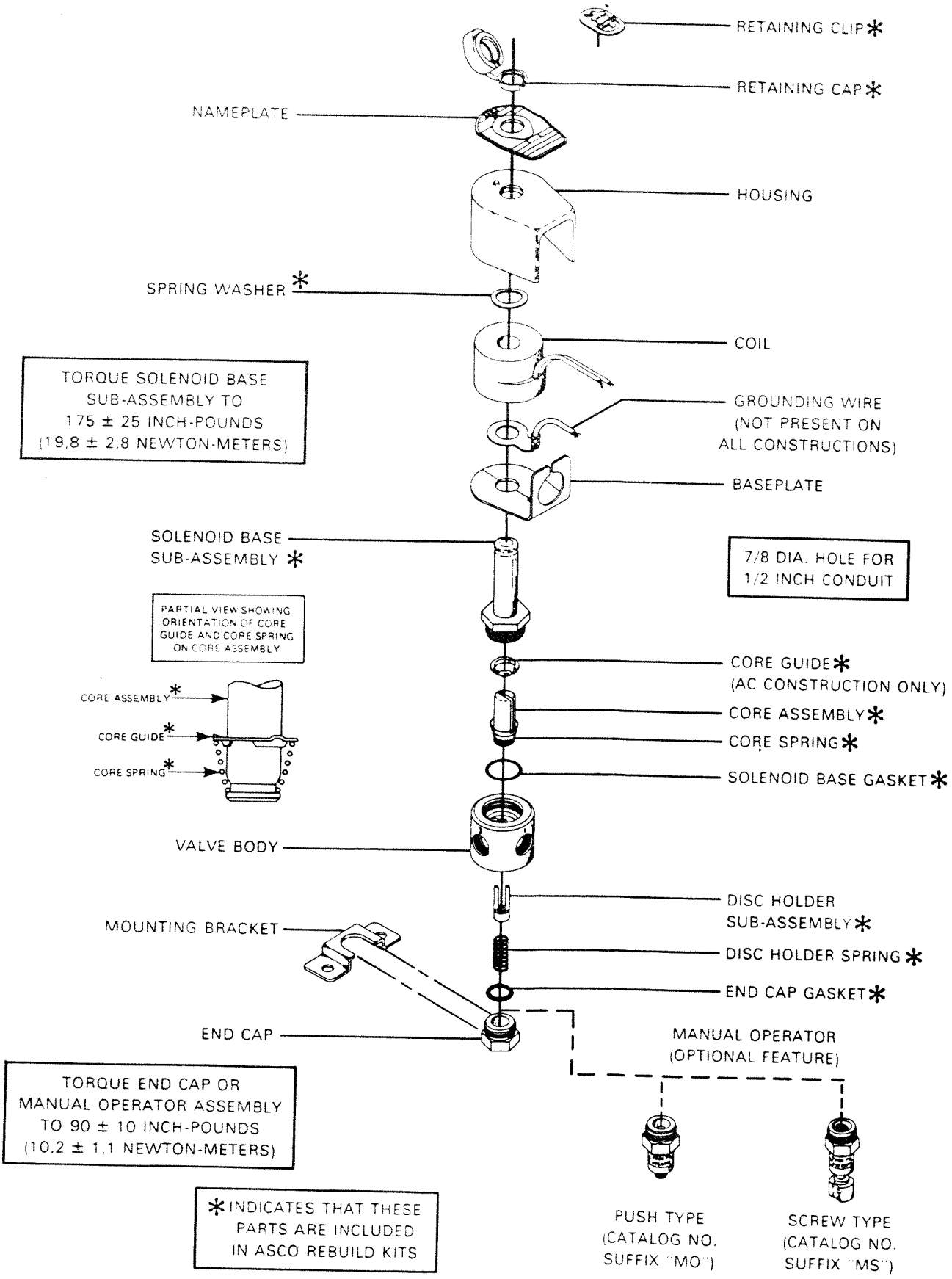



Figure 5. Bulletin 8320, Stainless Steel Construction
With General Purpose Solenoid Enclosure Shown.
For Explosion- Proof Solenoid Enclosure, See Form No.V5380.

# three-way pilot

## installation, operating, and maintenance instructions

# model 330

## GENERAL DESCRIPTION

The OCV Model 330 is a hydraulically-operated, diaphragm-actuated, three-way valve. It is normally used on a main valve when faster-than-normal closing speed is required or when another pilot (e.g., float pilot or solenoid valve) is used to actuate the main valve.

## FUNCTIONAL DESCRIPTION

The ports of the OCV Model 330 are connected as follows (refer to attached drawing for identification):

Port A - To inlet side of main valve
Port B - To bonnet of main valve
Port C - To discharge side of main valve
Port D - To actuating pilot

Pressurizing the bonnet of the three-way pilot moves its stem to the "down" position connecting Ports A and B, thus routing inlet pressure to the main valve bonnet and closing it. Depressurizing the bonnet of the OCV Model 330 allows its stem to return to the "up" position, connecting Ports A and C, relieving the pressure on the main valve bonnet to downstream and opening the main valve.

## TROUBLESHOOTING

A major malfunction in the three-way pilot would generally be evident in a failure of the main valve to open or close. However, keep in mind that such symptoms can also be caused by a malfunction in the main valve itself or in the control pilot(s). If the 330 is suspected, proceed as follows:

### A. FAILURE OF PILOT TO CLOSE MAIN VALVE

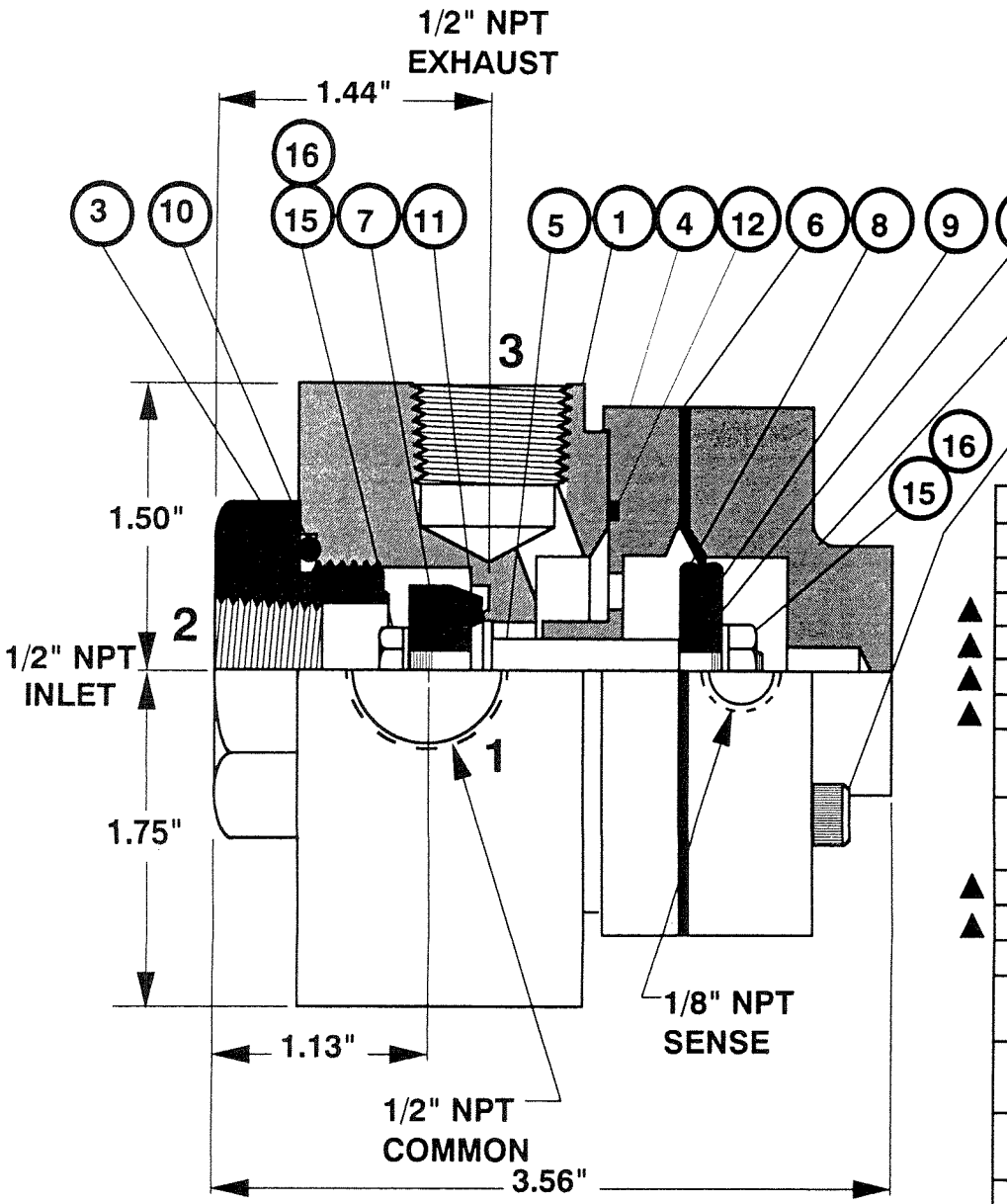
1. Ruptured diaphragm:
   (a) Detach sense line from the bonnet of the pilot and remove the bonnet. Inspect the diaphragm carefully for holes or cracks.
   (b) If damaged, replace with new diaphragm.
2. Pilot stem binding:
   (a) With bonnet removed, inspect the stem journal in the bonnet for buildup of foreign material.
   (b) Clean as necessary and reassemble pilot.
3. Obstruction in seat area:
   (a) Disassemble pilot and remove obstruction.
4. Rubber seat damaged:
   (a) Disassemble pilot and examine seats for excessive wear or damage.
   (b) Replace if necessary and reassemble pilot.

### B. FAILURE OF PILOT TO OPEN MAIN VALVE

1. Pilot stem binding: Proceed as in A2, above.
2. Obstruction in seat area: Proceed as in A3, above.
3. Rubber seat damaged: Proceed as in A4, above.

## MAINTENANCE

Because of the simplicity of design of the 330 pilot, required maintenance is minimal. Check fittings and bolts periodically for tightness, and inspect the body for damage or excessive buildup of foreign material.




▲ = RECOMMENDED SPARE PARTS

| | ITEM | PART NO | QTY | DESCRIPTION | MATERIAL |
|---|---|---|---|---|---|
| | 16 | 685711 | 2 | LOCKWASHER | STN. STEEL |
| | 15 | 590718 | 2 | HEX NUT | STN. STEEL |
| | 14 | 530713 | 4 | SKT. HD. CAPSCREW | STN. STEEL |
| ▲ | 13 | 611008 | 1 | O-RING (610008 BUNA-N) | VITON |
| ▲ | 12 | 610030 | 1 | O-RING (611030 VITON) | BUNA-N |
| ▲ | 11 | 611111 | 1 | O-RING (610111 BUNA-N) | VITON |
| ▲ | 10 | 610216 | 1 | O-RING (611216 VITON) | BUNA-N |
| | 9 | 308706<br>308106 | 1 | UPPER DIAPH. PLATE | STN. STEEL<br>BRASS |
| | 8 | 308704<br>308104 | 1 | LOWER DIAPH. PLATE | STN. STEEL<br>BRASS |
| ▲ | 7 | 310716 | 1 | SEAT PLUG (310727 SS/VT) | SS/BUNA-N |
| ▲ | 6 | 694015 | 1 | DIAPHRAGM (694115 VIT) | BUNA-N |
| | 5 | 314718 | 1 | STEM | STN. STEEL |
| | 4 | 306776<br>306129 | 1 | GUIDE PLATE | STN. STEEL<br>BRASS |
| | 3 | 300782<br>300130 | 1 | ADAPTER | STN. STEEL<br>BRASS |
| | 2 | 304704<br>304104 | 1 | BONNET | STN. STEEL<br>BRONZE |
| | 1 | 302700<br>302100 | 1 | BODY | STN. STEEL<br>BRONZE |

| CHG | E.C. NO. | DATE | BY |
|---|---|---|---|
| | | | |

REVISIONS

REF DWG NO'S

MATERIAL

NO. REQ'D

SCALE FULL

TOLERANCES

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

DRAWN BY RON DATE 12-17-98

CHKD. BY DATE

OCV Control Valves

THREE-WAY PILOT

| SIZE | DRAWING NUMBER | REV. |
|---|---|---|
| A | 330P | |

# three-way pilot

## installation, operating, and maintenance instructions

# model 3600

## GENERAL DESCRIPTION

The OCV Model 3600 is a hydraulically-operated, diaphragm-actuated, three-way valve. It is normally used on a main valve when faster-than-normal closing speed is required or when another pilot (e.g., float pilot or solenoid valve) is used to actuate the main valve.

## FUNCTIONAL DESCRIPTION

Pressurizing the bonnet of the three-way pilot moves its stem to the "down" position connecting Ports 1 and 3. Depressurizing the bonnet of the OCV Model 3600 allows its stem to return to the "up position," connecting Ports 1 and 2.

Pressurize the bonnet of the 3600 to open the main valve on Model 115-4's, 125's and 119's. De-pressurize the bonnet of the 3600 to open the main valve on Model 3333's and 118's.

## TROUBLESHOOTING

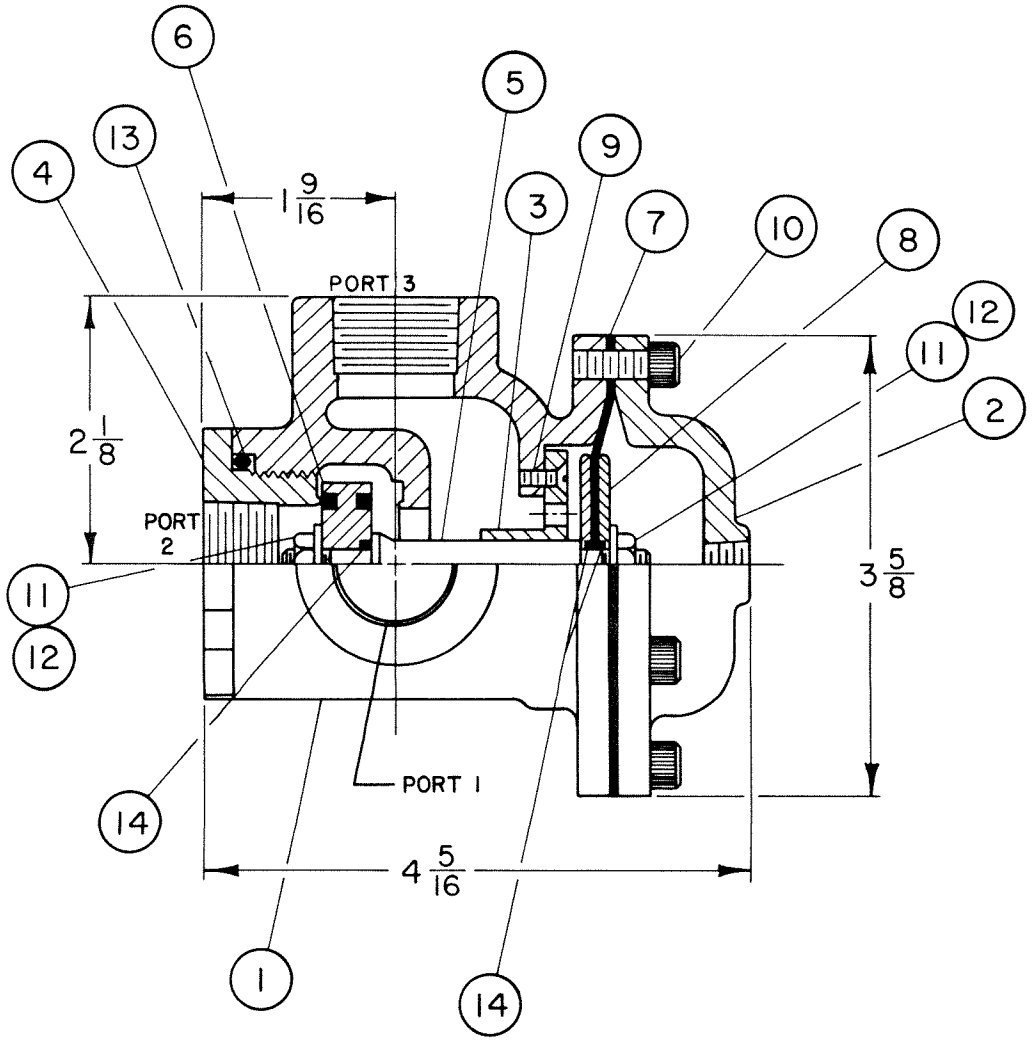
A major malfunction in the three-way pilot would generally be evident in a failure of the main valve to open or close. However, keep in mind that such symptoms can also be caused by a malfunction in the main valve itself or in the control pilot(s). If the 3600 is suspected, proceed as follows:

1. FAILURE OF PILOT TO CLOSE MAIN VALVE
   - A. Ruptured diaphragm
     - (1) Detach sense line from the bonnet of the pilot and remove the bonnet. Inspect the diaphragm carefully for holes or cracks.
     - (2) If damaged, replace with new diaphragm.
   - B. Pilot stem binding
     - (1) With bonnet removed, inspect the stem journal in the bonnet for buildup of foreign material.
     - (2) Clean as necessary and reassemble pilot.
   - C. Obstruction in seat area
     - (1) Disassemble pilot and remove obstruction.
   - D. Rubber seat damaged
     - (1) Disassemble pilot and examine seats for excessive wear or damage.
     - (2) Replace if necessary and reassemble pilot.
2. FAILURE OF PILOT TO OPEN MAIN VALVE
   - A. Pilot stem binding
     - (1) Proceed as in 1B above.
   - B. Obstruction in seat area
     - (1) Proceed as in 1C above.
   - C. Rubber seat damaged
     - (1) Proceed as in 1D above.

## MAINTENANCE

Because of the simplicity of design of the 3600 pilot, required maintenance is minimal. Check fittings and bolts periodically for tightness, and inspect the body for damage or excessive buildup of foreign material.

OCV Control Valves 7400 East 42nd Place / Tulsa, Oklahoma 74145 / (918) 627-1942 / 800-331-4113/ FAX 918-622-8916




NOTE:

1. WHEN ORDERING PARTS, PLEASE SPECIFY; ITEM NO., PART NO. AND MATERIAL.
2. ▲ RECOMMENDED SPARE PARTS.

| | ITEM | PART NO. | QTY. | DESCRIPTION | MATERIAL |
|---|---|---|---|---|---|
| ▲ | 14 | 611010 | 3 | O-RING | VITON |
| ▲ | 13 | 610222 | 1 | O-RING | BUNA-N |
| | 12 | 685763 | 2 | LOCKWASHER | STAINLESS STEEL |
| | 11 | 590712 | 2 | HEX HEAD JAM NUT | STAINLESS STEEL |
| | 10 | 530701 | 6 | SOCKET HD. CAPSCREW | STAINLESS STEEL |
| | 9 | 532735 | 2 | FLAT HEAD SCREW | STAINLESS STEEL |
| | 8 | 308135 | 2 | DIAPHRAGM PLATE | BRASS |
| | | 308735 | 2 | DIAPHRAGM PLATE | STAINLESS STEEL |
| ▲ | 7 | 694035 | 1 | DIAPHRAGM | BUNA-N |
| | | 694135 | 1 | DIAPHRAGM | VITON |
| ▲ | 6 | 310736 | 1 | SEAT DISC | STN. STL./BUNA-N |
| | | 310737 | 1 | SEAT DISC | STN. STL./VITON |
| | 5 | 314735 | 1 | STEM | STAINLESS STEEL |
| | 4 | 300171 | 1 | ADAPTER | BRASS |
| | | 300771 | 1 | ADAPTER | STAINLESS STEEL |
| | 3 | 300164 | 1 | GUIDE PLATE | BRASS |
| | | 300764 | 1 | GUIDE PLATE | STAINLESS STEEL |
| | 2 | 304135 | 1 | BONNET | BRONZE |
| | | 304735 | 1 | BONNET | STAINLESS STEEL |
| | 1 | 302135 | 1 | BODY | BRONZE |
| | | 302735 | 1 | BODY | STAINLESS STEEL |

PARTS LIST

| CHG | E. C. NO | DATE | BY |
|---|---|---|---|
| E | | | |
| D | | | |
| C | | | |
| B | | | |
| A | | | |

REVISIONS

REF DWG NO'S

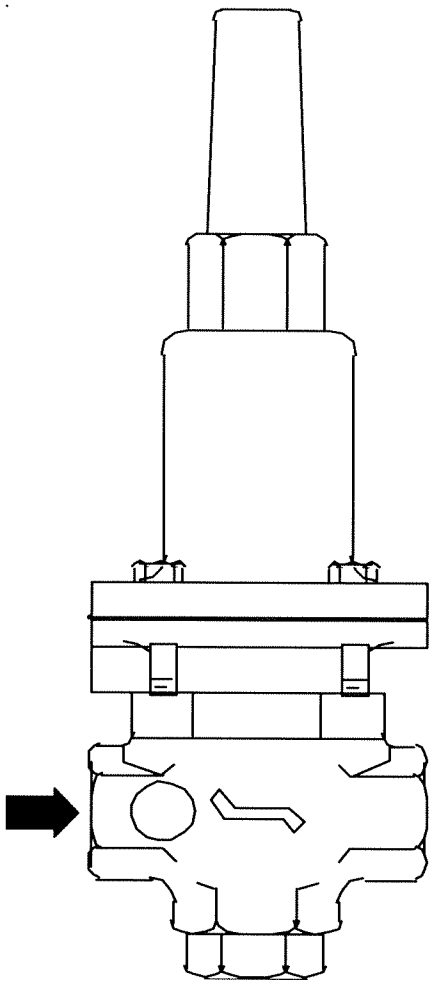
| MATERIAL | TOLERANCES |
|---|---|
| | UNLESS NOTED<br>FRACTIONAL ± 1/64<br>DECIMAL ± .005<br>MACH. FINISH 125<br>ANGULAR ± 1/2° |

| NO REQ'D | DRAWN BY | DATE |
|---|---|---|
| | B.R.W. | 7-28-83 |
| SCALE | CHKD BY | DATE |

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

THREE-WAY PILOT

| SIZE | DRAWING NUMBER | REV |
|---|---|---|
| B | 3600 | |



# installation, operating, and maintenance instructions

# pressure sustaining/ pressure relief pilot

# model 1330

## GENERAL DESCRIPTION

The Model 1330 Pressure Sustaining/Pressure Relief Pilot is a normally-closed, direct-acting, spring-loaded, diaphragm-type control pilot. As the primary control pilot for the OCV Series 108 control valves, it is designed to maintain a constant preset inlet pressure on the main valve. It is a constant throttling device, maintaining precise, positive control of the main valve.

The 1330 may also be used by itself as a back pressure regulator.

The 1330 is available in bronze or stainless steel construction and with 3/8 NPT or 1/2 NPT end connections.

The 1330 is available with four different adjustment ranges:

| | |
|---|---|
| 5-30 psi | 65-180 psi |
| 20-80 psi | 100-300 psi |

## FUNCTIONAL DESCRIPTION

The 1330 controls the pressure in the diaphragm chamber of the main valve, hence the degree of opening or closing of the valve. The upstream pressure is sensed under the diaphragm of the pilot and is balanced against an adjustable spring load. As the upstream pressure increases above the set point, the pilot opens wider, decreasing the pressure in the diaphragm chamber of the main valve, opening the valve a proportionate amount. Conversely, as upstream pressure decreases below the set point, the pilot closes further, increasing the pressure in the diaphragm chamber of the main valve, closing the valve a proportionate amount. The net result is a constant modulating action of the pilot and main valve, keeping the upstream pressure at the set point within very close limits.

## INSTALLATION AND ADJUSTMENT

The 1330 is normally installed in the main valve control piping between the ejector and the downstream body tap. Flow must be in the direction indicated. A sensing line, typically 1/4" O.D. tubing, must be installed between the pilot sense port and the upstream

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7400 East 42nd Place / Tulsa, Oklahoma 74145 -4744 USA / (918) 627-1942 / 888-OCV-VALV / FAX 918-622-8916
e-mail: sales@controlvalves.com / website: www/controlvalves.com

control piping ahead of the ejector.

Pressure adjustment is made by means of the single adjusting screw:

**Clockwise** adjustment **increases** upstream pressure.

**Counterclockwise** adjustment **decreases** upstream pressure.

## MAINTENANCE

Required maintenance of the 1330 is minimal. Fittings and bolts should be periodically checked, and the body should be inspected for damage or excessive buildup of foreign material.

## TROUBLESHOOTING

Other than improper adjustment, there are basically only three malfunctions which can occur with the 1330 pilot. These, and the symptoms they can cause, are as follows:

1. PILOT DIAPHRAGM RUPTURED: Results in failure of the main valve to open. A ruptured pilot diaphragm will be evidenced by leakage through the vent hole in the pilot bonnet.
2. PILOT SEAT DISC DETERIORATED: Results in failure of the valve to seal off completely (pressure relief service). Can also cause poor pressure control.
3. PILOT STEM BINDING: Typically results in poor pressure control, though in extreme cases, it can result in failure of the main valve to open or close.

## REPAIR PROCEDURES

Refer to the 1330 assembly drawing for parts identification.

### A. DIAPHRAGM REPLACEMENT

1. Prior to disassembling the pilot, turn the adjusting screw (10) fully counterclockwise until it is loose enough to be turned with the fingers.
2. Remove the four bonnet capscrews (17).
3. Remove the bonnet (2). Set the spring (9) and spring retainers (11) aside in a safe place.
4. Pull the adapter (3) out of the pilot body (1).
5. Remove hex nut (16), lockwasher (22), upper diaphragm plate (8) and o'ring (20).
6. Remove old diaphragm (5).
7. Inspect both diaphragm plate o'rings (20). Replace if necessary.
8. Place new diaphragm on stem (7).
9. Replace upper diaphragm plate (8), o'ring (20), lockwasher (22) and hex nut (16). Tighten securely.
10. Insert adapter (2) back into pilot body (1).
11. Hold spring (9) and spring retainers (11) together in the proper orientation and insert them into the bonnet (2).
12. Place the bonnet over the adapter and insert the bonnet capscrews (17). Tighten securely.
13. Place valve back in service, following the startup and adjustment procedures given in the main portion of this manual.

### B. SEAT DISC REPLACEMENT

1. Follow Steps 1 through 4 under DIAPHRAGM REPLACEMENT, above.
2. Remove capscrew (12), seal washer (13) and old seat disc (6).
3. Place new seat disc, new seal washer and capscrew (12) on stem. Tighten securely.
4. Reassemble pilot following Steps 10 through 13 under DIAPHRAGM REPLACEMENT, above.

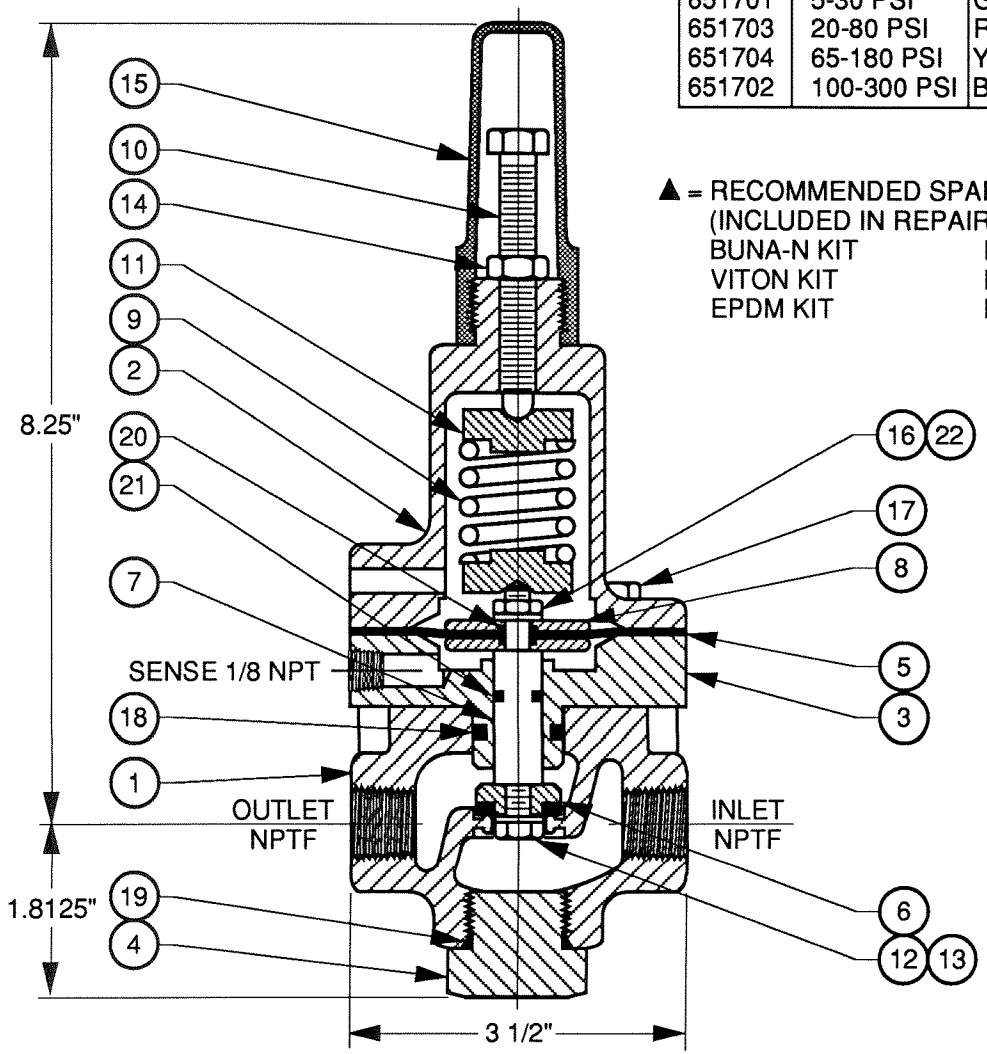
### C. STEM REPAIR

1. Follow Steps 1 and 2 under SEAT DISC REPLACEMENT, above.
2. Remove stem (7) from adapter (3).
3. Inspect stem and o'ring (21) carefully.
4. Remove any foreign material or light scratches from the stem with a fine grade of emery cloth. A badly scored stem should be replaced.
5. Replace o'ring (21).
6. Lubricate the o'ring and stem liberally with Vaseline® or similar lubricant.
7. Place stem in adapter (3). Make sure it moves freely.
8. Reassemble pilot following Steps 3 and 4 under SEAT DISC REPLACEMENT, above.

| SPRING CHART | | |
|---|---|---|
| 651701 | 5-30 PSI | GREEN |
| 651703 | 20-80 PSI | RED |
| 651704 | 65-180 PSI | YELLOW |
| 651702 | 100-300 PSI | BLUE |

▲ = RECOMMENDED SPARE PARTS (INCLUDED IN REPAIR KITS)

| | |
|---|---|
| BUNA-N KIT | PN 930000 |
| VITON KIT | PN 930100 |
| EPDM KIT | PN 930400 |




| | ITEM | PART NO | QTY | DESCRIPTION | | MATERIAL |
|---|---|---|---|---|---|---|
| | 1 | 302102 | 1 | BODY | 3/8" NPTF | BRONZE |
| | | 302104 | | | 1/2" NPTF | |
| | | 302702 | | | 3/8" NPTF | STN STEEL |
| | | 302704 | | | 1/2" NPTF | |
| | 2 | 304102 | 1 | BONNET | | BRONZE |
| | | 304702 | | | | STN STEEL |
| | 3 | 300129 | 1 | ADAPTOR | | BRONZE |
| | | 300719 | | | | STN STEEL |
| | 4 | 692502 | 1 | PLUG | | ZINC PLTD STL |
| | | 310730 | | | | STN STEEL |
| | 5 | 694002 | 1 | DIAPHRAGM | | BUNA-N / NYLON |
| ▲ | | 694102 | | | | VITON / NYLON |
| | | 694016 | | | | EPDM / NYLON |
| | 6 | 310703 | 1 | SEAT DISC | | BUNA-N / SS |
| ▲ | | 310709 | | | | VITON / SS |
| | | 310707 | | | | EPDM / SS |
| | 7 | 314702 | 1 | STEM | | STN STEEL |
| | | 314002 | | | | MONEL |
| | 8 | 308102 | 2 | DIAPHRAGM PLATE | | BRASS |
| | | 308702 | | | | STN STEEL |
| | 9 | CHART | 1 | SPRING | | STN STEEL |
| | 10 | 300700 | 1 | ADJUSTING SCREW | | STN STEEL |
| | 11 | 300134 | 2 | SPRING RETAINER | | BRASS |
| | | 300729 | | | | STN STEEL |
| | 12 | 531700 | 1 | HEX HEAD CAPSCREW | | STN STEEL |
| ▲ | 13 | 685760 | 1 | LOCKWASHER | | STN STEEL |
| | 14 | 590717 | 1 | HEX NUT | | STN STEEL |
| | 15 | 692002 | 1 | CAP | | PVC |
| | 16 | 590712 | 1 | HEX NUT | | STN STEEL |
| | 17 | 531701 | 4 | HEX HEAD CAPSCREW | | STN STEEL |
| ▲ | 18 | 611116 | 1 | O-RING | | VITON |
| | | 614116 | | | | EPDM |
| | 19 | 610912 | 1 | O-RING | | BUNA-N |
| ▲ | | 611912 | | | | VITON |
| | | 914912 | | | | EPDM |
| ▲ | 20 | 611010 | 2 | O-RING | | VITON |
| | | 614010 | | | | EPDM |
| ▲ | 21 | 611012 | 1 | O-RING | | VITON |
| | | 614012 | | | | EPDM |
| | 22 | 685700 | 1 | LOCKWASHER | | STN STEEL |

| CHG | E.C. NO. | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**REVISIONS**

**REF DWG NO'S**

| MATERIAL | TOLERANCES |
|---|---|
| NOTED | **UNLESS NOTED**<br>FRACTIONAL ±1/64<br>DECIMAL ±.005<br>MACH. FINISH 125√<br>ANGULAR ±1/2° |
| NO. REQ'D | DRAWN BY: RON — DATE: 2-14-96 |
| SCALE: 1/2 | CHKD. BY — DATE |

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

# MODEL 1330 PILOT 3/8"-1/2" NPTF PRESSURE RELIEF / SUSTAINING / SURGE

| SIZE | DRAWING NUMBER | REV. |
|---|---|---|
| A | 1330 | |

## DESCRIPTION

MODEL 126 EJECTOR
The Model 126 ejector is a simple tee fitting with a fixed orifice in its inlet port. It provides the proper supply pressure to the main valve diaphragm chamber, allowing various two-way control pilots to control the valve position.

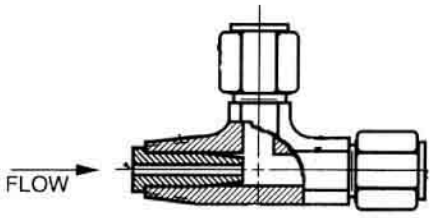
## MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

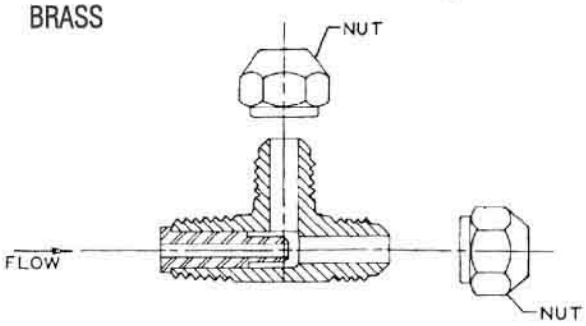
| MATERIAL | PART NUMBER | P (NPT) | T-TUBE O.D. | STD. ORIFICE | USED ON VALVE SIZES |
|---|---|---|---|---|---|
| Brass | 213100 | 3/8" | 3/8" | .125" | 1 ¼"-6" |
| Brass | 214100 | 1/2" | 1/2" | .188" | 8"-10" |
| Brass | 215100 | 3/4" | 3/4" | .188" | 12"-16" |
| 316 Stn. Steel | 213700 | 1/4" | 3/8" | .090" | 1 ¼"-6" |
| 316 Stn. Steel | 214700 | 3/8" | 1/2" | .125" | 8"-10" |
| 316 Stn. Steel | 215700 | 1/2" | 3/4" | .188" | 12"-16" |

Orifice bushings are stainless steel.

STAINLESS

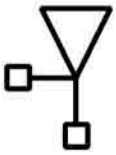


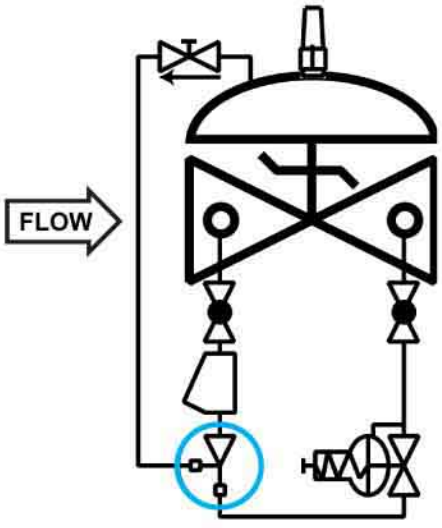

BRASS




## SCHEMATIC SYMBOL

The Model 126 Ejector is shown on OCV Valve Schematics as:



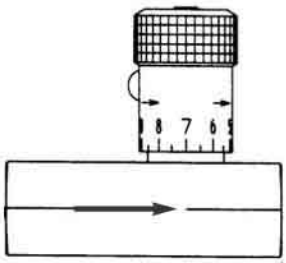



EXAMPLE: Shown here on a MODEL 127-3 Pressure Reducing Valve

**TOLL FREE 1.888.628.8258** • **phone:** (918)627.1942 • **fax:** (918)622.8916 • 7400 East 42nd Place, Tulsa, OK 74145
**email:** sales@controlvalves.com • **website:** www.controlvalves.com

## 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.

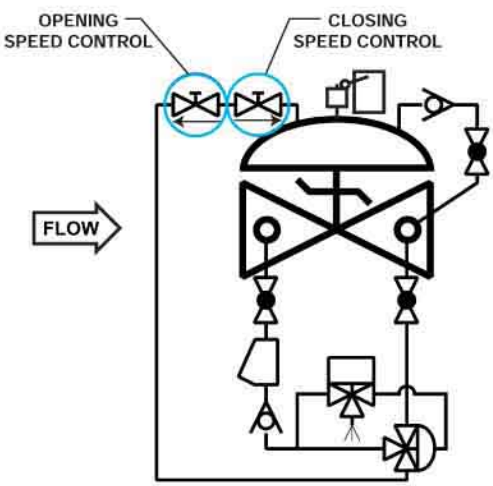



## MODEL 141-3 MATRIX

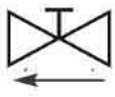
| MATERIAL | PART NUMBER | INLET/OUTLET (NPT) | A | USED ON VALVE SIZE* |
|---|---|---|---|---|
| Brass | 682100 | 1/4 | 2 3/8 | 1 ¼"-2" |
| Brass | 682101 | 3/8 | 2 3/4 | 2 ½"-6" |
| Brass | 682102 | 1/2 | 3 1/4 | 8"-10" |
| Brass | 682103 | 3/4 | 3 7/8 | 12"-16" |
| Stn. Steel | 682700 | 1/4 | 2 3/8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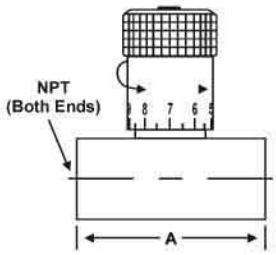
## DESCRIPTION

The Model 141-2 Needle Valve is an adjustable restriction device installed in the control circuit tubing. The setting of the needle valve meters the flow into and out of the main valve diaphragm chamber, thus controlling the response speed of the main valve. Depending on the application, the needle valve may be used as a closing speed control, opening speed control, or both simultaneously.

◀**Needle Valves shown**
**Sizes: 3/4" & 1/4"**

## MODEL 141-2 MATRIX

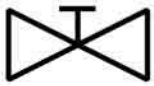


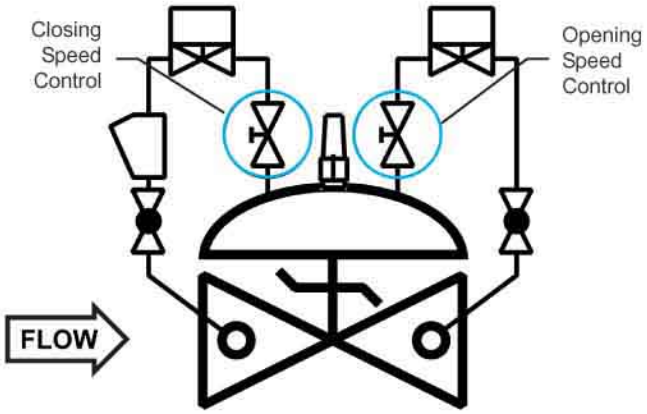

| MATERIAL | PART NUMBER | INLET/OUTLET (NPT) | A | USED ON VALVE SIZE* |
|---|---|---|---|---|
| Brass | 683100 | 1/4 | 2 | 1 ¼"-2" |
| Brass | 683101 | 3/8 | 2 1/4 | 2 ½"-6" |
| Brass | 683102 | 1/2 | 2 5/8 | 8"-10" |
| Brass | 683103 | 3/4 | 3 1/4 | 12"-16" |
| Stn. Steel | 683700 | 1/4 | 2 | 1 ¼"-2" |
| Stn. Steel | 683702 | 3/8 | 2 1/4 | 2 ½"-6" |
| Stn. Steel | 682704 | 1/2 | 2 5/8 | 8"-10" |
| Stn. Steel | 683703 | 3/4 | 3 5/8 | 12"-16" |

Note: Needle valve size may vary on valve application. Consult factory.

## SCHEMATIC SYMBOL

The Model 141-2 Needle Valve is shown on OCV Valve Schematics as:






EXAMPLE: Shown here on a MODEL 115-3 DIGITAL VALVE as separate opening and closing speed controls.

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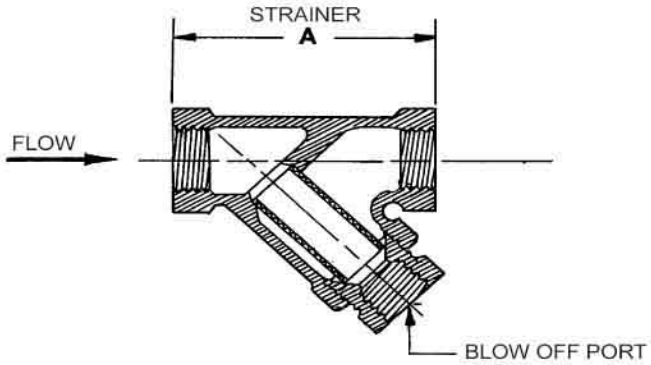
Needle Valve 141-2

## 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

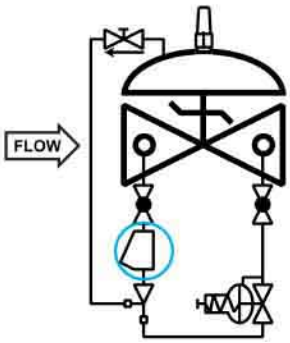
Bronze, ASTM B62
Optional mesh sizes: 50,100

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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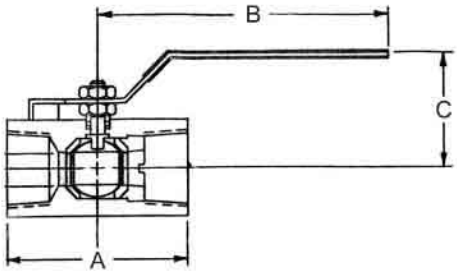
## DESCRIPTION

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.

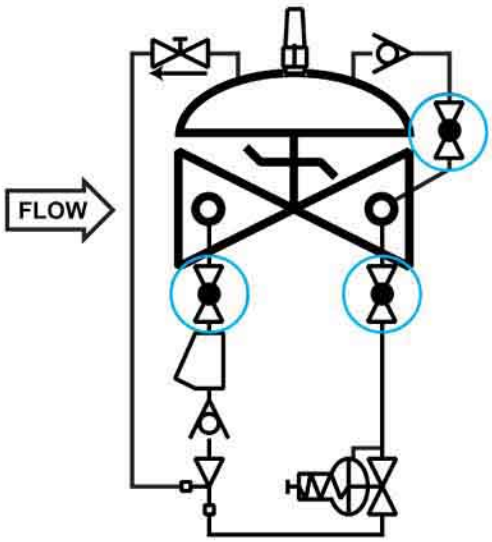
Ball valves are standard on water service valves; optional on fuel service valves.



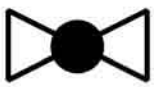

## MODEL 141-4 MATRIX

| 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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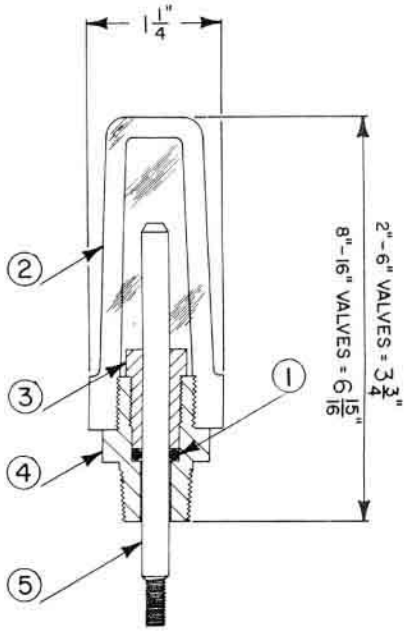
Ball Valve 141-4

## DESCRIPTION

The Model 155 Visual Indicator is a device that enables the user to determine the extent of opening of a control valve. It consists of an adaptor threaded into the center port of the valve bonnet, a rod threaded into the main valve stem, a sealing O-ring, and a protective clear plastic housing. The indicator rod moves as the valve opens and closes. 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 94 Check Valves, Series 3330 Altitude Valves, and Series 22 Digital Control Valves. Optional on any other valve not employing a limit switch or position transmitter.

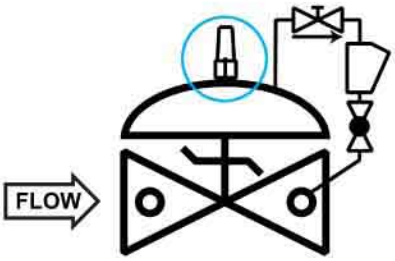
## MODEL 155 MATRIX




| MATERIAL | PART NO. (BRASS\ ADAPTOR) | PART NO. (STAINLESS ADAPTOR) | VALVE TRAVEL (FULL STROKE) |
|---|---|---|---|
| 1 1/4" - 1 1/2" | 255100 | 255700 | 3/8" |
| 2" | 255100 | 255700 | 1/2" |
| 2 1/2" | 255100 | 255700 | 3/4" |
| 3" | 255100 | 255700 | 1" |
| 4" | 255101 | 255701 | 1 3/8" |
| 6" | 255102 | 255702 | 1 1/2" |
| 8" - 10" | 255103 | 255703 | 2 1/2" |
| 12" | 255104 | 255704 | 3" |
| 14" - 16" | 255105 | 255705 | 3 1/2", 4" |
| 24" | 255109 | 255709 | 6" |

| ITEM | DESCRIPTION |
|---|---|
| 1 | O-Ring |
| 2 | Housing |
| 3 | Bushing |
| 4 | Adaptor |
| 5 | Stem |

## SCHEMATIC SYMBOL




EXAMPLE: Shown here on a Model 94-1 Check Valve

The Model 155 is shown on OCV Valve Schematic as:

## MATERIALS

| | |
|---|---|
| Indicator Rod: | Monel |
| Adapter: | Brass (std.), Stainless Steel (optional) |
| Housing: | Butyrate (1 ¼" - 6") Acrylic (8" and larger) |
| O-Ring: | Viton® (std.) Buna-N, EPDM (optional) |

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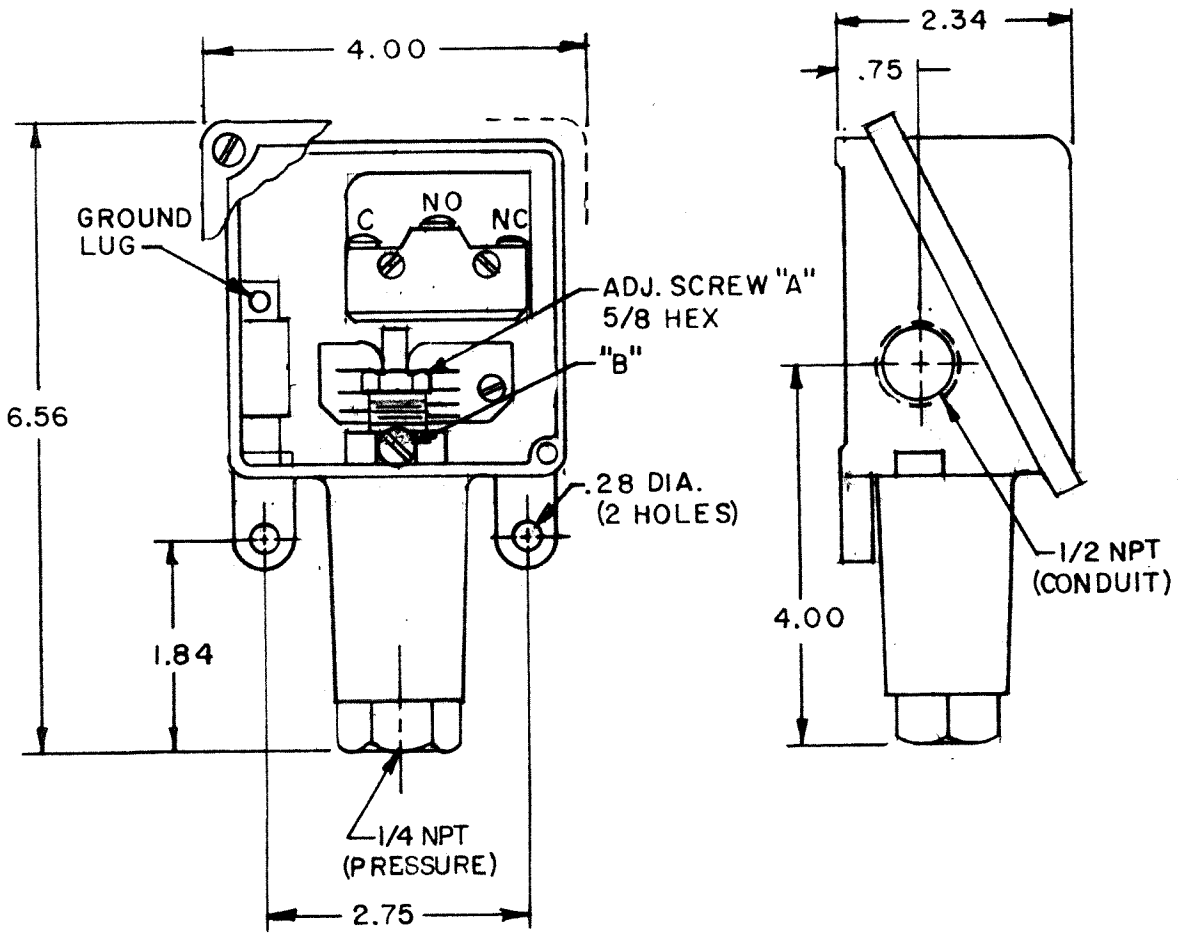
**email:** sales@controlvalves.com • **website:** www.controlvalves.com



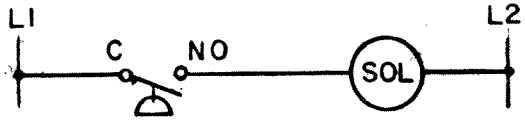

## 589080 PRESSURE SWITCH

ADJUSTMENT RANGE = 30-300 PSIG
PROOF PRESSURE = 600 PSIG
OPERATING TEMP = -40 TO +160°F
SWITCH TYPE: SPDT
SWITCH RATING: L96
15 AMPS, 125/250/480 VAC
ENCLOSURE: NEMA 4
WIRE SIZE: 14 AWG MAX.

ADJUSTMENT PROCEDURE:

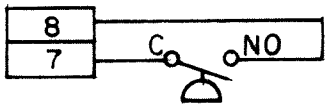
1. LOOSEN SCREW "B"
2. ADJUST 5/8 HEX "A" UNTIL TOP OF HEX ALIGNS WITH DESIRED SET POINT.
3. RETIGHTEN SCREW "B"

### WIRING DIAGRAMS




FOR MODEL 118-3

ADJUST 15-20 PSI BELOW SYSTEM STATIC PRESSURE




FOR PUMP COMMANDER II

ADJUST TO MINIMUM ALLOWABLE PUMP DISCHARGE PRESSURE

| CHG | E. C. NO | DATE | BY | REVISIONS |
|---|---|---|---|---|
| E | | | | |
| D | | | | |
| C | | | | |
| B | | | | |
| A | | | | |

REF DWG NO'S

| MATERIAL | TOLERANCES | | |
|---|---|---|---|
| | UNLESS NOTED<br>FRACTIONAL ± 1/64<br>DECIMAL ± .005<br>MACH. FINISH 125/<br>ANGULAR ± 1/2° | | |
| NO REQ'D | DRAWN BY | DATE | |
| | | 7-25-88 | |
| SCALE | CHKD. BY | DATE | |

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

PRESSURE SWITCH
30-300 PSI

| SIZE | DRAWING NUMBER | REV. |
|---|---|---|
| A | 589080 | |