

Operating Manual

Model: 127-9S

Size:

Serial #:

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Installation, Operating and Maintenance Instructions

Model 127-9S

Two Stage Preset Valve

GENERAL DESCRIPTION

The OCV Model 127-9S is specifically designed for fuel loading systems and is used in conjunction with a two-stage preset meter (Mechanical or Electronic). It performs the following functions:

SINGLE-STAGE STARTUP WITH PRESSURE REDUCING:

When signaled by the preset, the 127-9S will open and maintain a constant downstream pressure.

TWO-STAGE SHUTDOWN: Working off electrical signals from the preset, the 127-9S will close to the low flow position near the end of the load for "topping off" flow. At the end of the load, the valve will go fully closed.

PRESET CONTROLLERS

Mechanical Preset Controllers, like the Veeder Root 7600 and the LC M500, incorporate two SPDT switches which are mechanically toggled inside the preset after a certain percent of the load is complete. Historically, OCV has utilized the previous version of this valve, the Model 127-9, to operate with these presets.

With the advent and growing popularity of **Electronic Preset Controllers**, like LCR2, EMR4, & Multiload, a different approach is needed. These presets have a much simpler switching arrangements, typically two outputs that operate only on-off. Depending on operating conditions, the 127-9 may not work properly with these presets.

The 127-9S has been designed to operate reliably with both electronic presets as well as the older mechanical types.

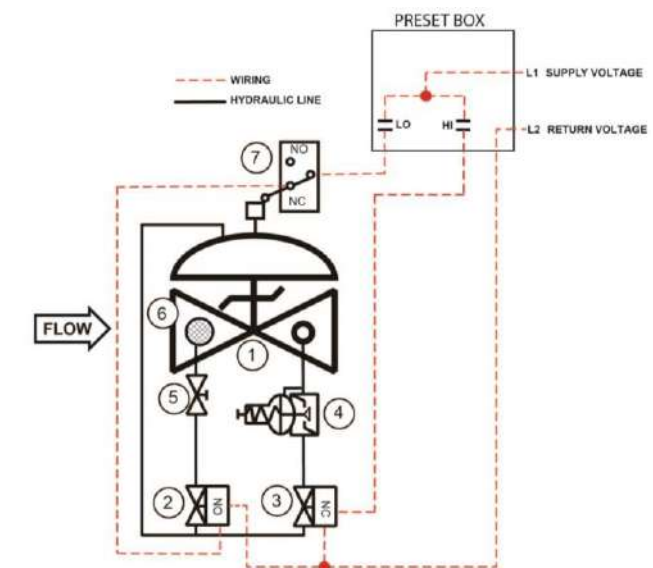
SCHEMATIC

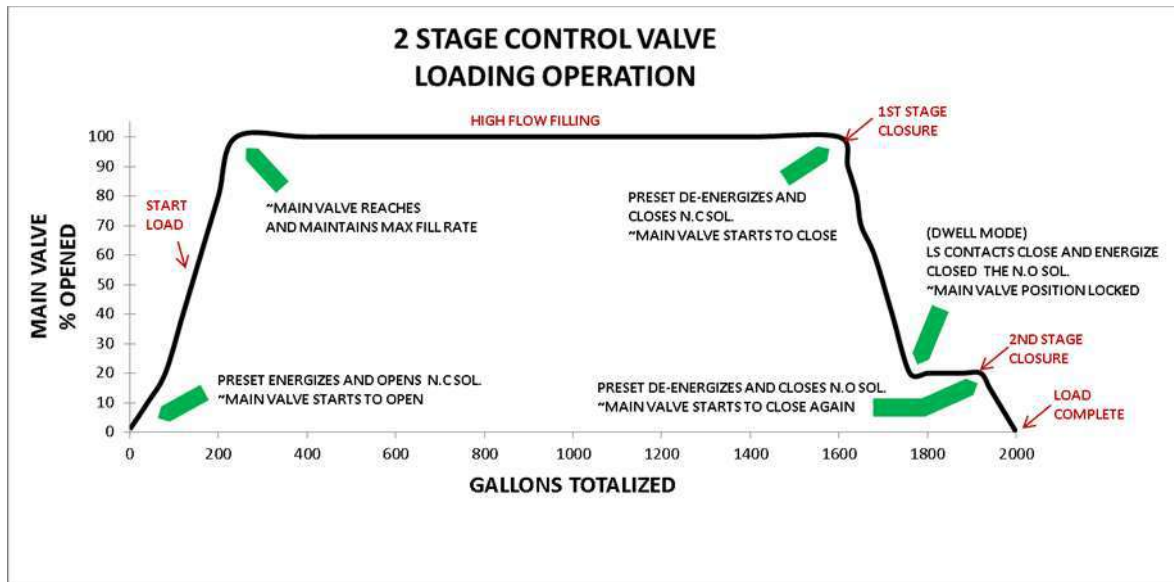
The 127-9S consists of the following components, arranged as shown on the schematic diagram:

1. **Model 65 Basic Valve Assembly**, a hydraulically operated, diaphragm actuated, pilot controlled, globe valve which closes with an elastomer-on-metal seal.
2. **Model 450 Two Way, Normally Open Solenoid Pilot**. This pilot is energized to its closed position by the control circuit

to enable the valve to hold its low flow position during the first stage of shutdown.

3. **Model 451 Two Way, Normally Closed Solenoid Pilot**. This pilot is the primary electrical control device on the valve. It is energized to its open position to enable the main valve to open, and deenergized to its closed position to make the main valve close.
4. **Model 1340 Pressure Reducing Pilot** that senses downstream pressure. Closes when downstream pressure is too high and opens when downstream pressure is too low.
5. **Model 141-2 Needle Valve** that is a fixed restriction device for the pressure reducing valve modulation. It also serves as the opening and closing speed for the main valve.
6. **Model 123 Inline Strainer** that protects the pilot system from solid contaminants in the line fluid.
7. **Model 150 Limit Switch Assembly**, a SPDT switch unit actuated by movement of the valve stem. It routes the electrical signals required for the two-stage closing function.





THEORY OF OPERATION

The 127-9S fill rate is controlled via OCV supplied solenoids & limit switch, as well as a customer supplied preset controller. The filling operations will be described in detail using given schematic, graph, and below table. Note that the actual preset controller output labels may vary. The schematic in this manual uses HI (high flow) and LO (low flow) for simplification.

SYSTEM	STATUS	HI FLOW FILLING		DWEEL FLOW FILLING		END LOAD
	% GALLONS TOTALIZED	1%	90%	91%	91-99%	100% GPM
PRESET OUTPUTS	HI, SW1, S1 MECH / EL.	ON (CLOSED)		OFF (OPENED)		
	LO, SW2, S2 ELECT. PRESET	ON (CLOSED)				OFF (OPENED)
	LO, SW2, S2 MECH. PRESETS	OFF (OPENED)		ON (CLOSED)		OFF (OPENED)
MAIN VALVE	N.C SOLENOID	ENERG.		DE-ENERG		
	N.O SOLENOID	DE-ENERG.		ENERG.	DE-ENERG	
	LIMIT SWITCH	CLOSED	OPENED	OPENED	CLOSED	CLOSED
	65 MAIN VALVE	OPENING	OPENED	CLOSING	LOCKED	CLOSED

OPENING: A loading run is initiated via preset controller electronic outputs. The **HI** output directly energizes the normally closed solenoid (3), opening it. Also upon startup, the **LO** output, wired to the normally open solenoid through the limit switch, may or may not supply power to the normally open solenoid. Neither operation mode of the N.O Solenoid will affect opening of the main valve. After the main valve has opened far enough to increase outlet pressure to the setpoint of the pressure reducing pilot, the main valve will stop opening to prevent downstream pressure from rising too high.

NOTE: If the valve opening is not adequate (i.e., the flow rate is too low), needle valve (4) adjusting knob should be carefully turned clockwise as described in "Startup and Adjustments" section.

PRESSURE REDUCING FUNCTION: To understand how the 127-9 pressure reducing function works, it is best to start with the 141-2 needle valve (5) and 1340 pressure reducing pilot (4). The 141-2, locked in at a position, can be looked at as a fixed restriction device, whereas, the 1340 pilot is a variable restriction

constantly modulating open and closed as it is responding to changes in downstream pressure. The 141-2 creates a pressure drop proportional to the flow through it and the flow through the 141-2 is controlled by the degree of opening of the 1340 pilot. Next, we will look at two scenarios, Open 1340 & Closed 1340

****Open 1340****When the 1340 opens, there is a higher flow and proportionally higher pressure drop at the 141-2 needle. With this large flow and pressure drop at the 141-2, the pressure on the downstream of the 141-2 is decreased.

****Closed 1340****When the 1340 closes, the flow and pressure drop at the 141-2 decreases which then causes the 141-2 outlet pressure to increase.

Now note that the diaphragm chamber of the main valve (1) is connected downstream of the needle valve. In this manner, the pressure in the diaphragm chamber of the main valve is in fact controlled by the pressure-reducing pilot. As the diaphragm pressure decreases, the main valve opens; as the diaphragm pressure increases, the main valve closes.

Putting it all together, as downstream pressure tends to increase above the set point of the pressure-reducing pilot, the pilot moves further closed. This results in an increase in pressure in the diaphragm chamber of the main valve. The main valve then closes slightly to restore the downstream pressure to the set point. Conversely, as downstream pressure tends to decrease below the set point, the pilot moves further open. This results in a decrease in pressure in the diaphragm chamber of the main valve. The main valve then opens wider to bring the downstream pressure back up to the set point. The net result of all this is a constant modulating action by the pilot and main valve and a downstream pressure which remains constant despite fluctuations in demand or inlet pressure. Simply stated, the main valve copy's the 1340 operation. The 1340 pressure reducing pilot is the primary PRV control and the 65 is the secondary control.

Note: The pressure reducing function is active only when both solenoids are in the "opened" position.



TWO-STAGE CLOSING: Shutdown is initiated by the preset counter a certain number of gallons before the end of the load. This number is adjustable in the preset. When the counter reaches this trip point, the **HI** output turns off which de-energizes the NC solenoid (3), closing it. Now full inlet pressure is directed to the diaphragm chamber of the main valve through the NO solenoid (2) and needle valve (5). The valve starts closed.

When the valve is nearly closed, the limit switch (7) contacts toggle from the "NO" position to the "NC" position. The preset control **LO** output will supply power through the now closed limit switch and will energize the NO solenoid, closing it. Now there is no flow either to or from the diaphragm chamber, and the valve is "hydraulically locked" in the low flow position. This is sometimes referred to as "dwell" flow.

When the preset counter reaches the end of the load, the **LO** output turns off, the NO solenoid is deenergized open, and the valve travels the short distance to full closed.

INSTALLATION

- The 127-9S is furnished fully factory-assembled including all control line tubing.
- Install the 127-9S on the discharge of the meter, observing the following:
 - Before installing the valve, make sure there is no foreign material inside the valve.
 - Make sure all tubing connections are secure.
 - For ease of maintenance service of the valve and meter, it is recommended that an isolation valve be installed upstream of the meter.
- Make sure the voltage of the solenoids matches that of the preset outputs.
- Complete all wiring between the preset and valve as shown on the wiring diagram. Make sure that the wiring and conduit is appropriate for hazardous locations.

STARTUP AND ADJUSTMENTS

The following procedures should be followed for startup of the 127-9S. Pressure reducing pilots will be factory set using standard setpoint as shown in below table, unless a specific setpoint has been provided with customer order.

Part Number	Color	Spring Range	Standard Pressure Setting
651701	Green	5-30 PSI	20 PSI
651703	Red (Rnd Wire)	20-80 PSI	60 PSI
651000	Red (Square Wire)	20-200 PSI	60 PSI
651704	Yellow	65-180 PSI	80 PSI
651702	Blue	100-300 PSI	175 PSI

If pressure reducing pilot is factory set and does not require adjustment, skip steps 2, 3, 8, 9, & 10. Note that if field adjustments are made to needle valve (5), all Startup and Adjustment steps should be performed to assure correct pressure setting and valve opening and closing speeds.

- Install a pressure gauge of the proper range downstream of the 127-9S. The unused downstream side port on the main valve body may be used for this purpose if there is no convenient location in the downstream piping.

- Remove the plastic cap from the pressure-reducing pilot, and loosen the adjusting screw jam nut. Turn the adjusting screw counterclockwise until it is loose enough to be turned by hand.
- From the factory the needle should be set and locked at 4 turns opened. Do not make any adjustments unless required in step 12.
Caution: Adjustment of the needle valve will affect the 1340 pressure setpoint. Also, adjusting the needle valve will affect both the opening and closing speed. Opening speed may not be affected if a large enough N.C solenoid orifice has been selected.
- Perform limit switch adjustments as shown in the "Summary of Adjustments" section.
- Connect the loading arm to a truck or other appropriate receiving vessel. *****If the pressure reducing pilot is factory set**, throttle an isolation valve downstream of the 127-9S near closed. If isolation valves are not available, limit supply flow to control valve inlet via some other means. This is meant to prevent possible erratic operation due to compressible air inside main valve bonnet chamber.
- Start the system by dialing in the number of gallons to be loaded and actuating the lever on the preset counter. The valve should open slightly.
- Carefully loosen a pipe plug on the main valve bonnet until fluid appears around the threads. When only clear fluid (no air) is discharging, retighten the plug.
- Reopen system isolation valve or resupply full system pressure as previously performed in step 5.
- Slowly turn the adjusting screw of the pressure reducing pilot (4) clockwise until downstream pressure increases to the setpoint.
- Allow the load to complete and run several more loads to check for proper two stage closing operation and proper 127-9S opening and closing speeds.
- If the load overshoots, closing speed adjustments can be made via the needle valve per step 12 or in some preset controller's per step 13.
- Needle valve speed adjustments:
 - To increase closing and slow opening speed, turn the needle valve (5) knob counter-clockwise ¼ turn and reset 1340 pilot.
Caution: Too much adjustment will prevent opening of main valve. Adjust needle valve knob in ¼ turn increments and reset 1340 pilot as adjustments are made.
 - To slow closing and increase opening speed, turn the needle valve knob clockwise ¼ turn and reset 1340 pilot. Do not close completely. Adjustment will increase the opening speed.
- Note:** After any adjustments are made to the needle valve, a test load should be performed to validate proper opening/closing speeds & pressure setting.
- The HI output OFF setting in a preset can sometimes be adjusted to prevent overshooting the load run. This is the preferred method of closing speed adjustment. Follow preset controller instructions for more details.
- After the 127-9S operation is verified through several filling cycles, tighten the adjusting screw jam nut on the 1340 and replace plastic cap.

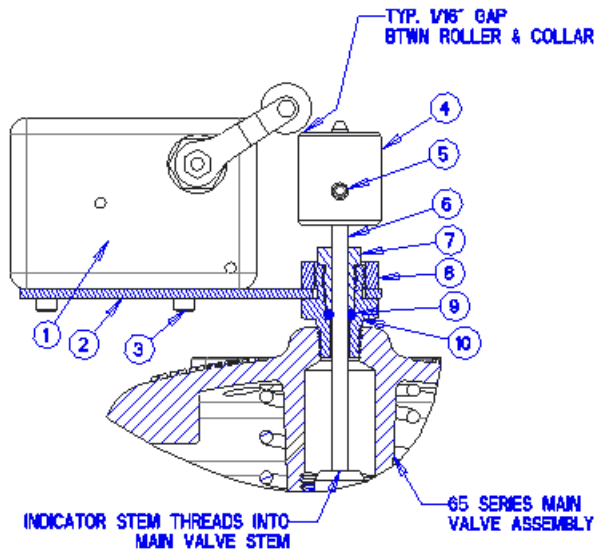


SUMMARY OF ADJUSTMENTS

1. Pressure reducing pilot (4):
 - a. Clockwise to increase downstream pressure.
 - b. Counter-clockwise to decrease downstream pressure.
2. Needle valve (5):
 - a. Clockwise – closing fully will prevent the main valve from closing at end of load.
 - Decreases valve closing speed & Increases the valve opening speed.
 - b. Counter-clockwise – opening fully will prevent main valve from opening at beginning of load.
 - Increases valve closing speed.
 - May slow or prevent valve opening speed if turned too far Counter-clockwise: Needle valve is supplying more fluid to main valve bonnet than the N.C solenoid can exhaust to downstream. This will be seen as a lower than expected flow during HI flow filling because the main valve is not allowed to opened fully.

Caution: Any adjustment of needle valve will cause the downstream pressure setpoint to drift slightly.

3. Low flow position: Refer to diaphragm below. The valve's low flow position may be adjusted by loosening the 1/8" allen set screw (item 5) in the collar (item 4) on the indicator stem (item 6). From the factory, the limit switch roller arm is placed approximately 1/8" above the collar as a starting point.
 - a. Lower the collar to increase the low flow rate
 - b. Raise the collar to decrease the low flow rate.



MAINTENANCE

Required maintenance of the 127-9S is minimal. However, the following steps, periodically performed, will do much to keep the valve operating efficiently and properly.

1. Check for leaks at fittings and around flanges. Tighten as required.
2. Check for chipped or peeling paint. Touch up as required.
3. Check that all electrical wiring is secure.

TROUBLESHOOTING

In the event of malfunction of the 127-9S, the following outline should enable the technician to isolate the cause of the problem and to take the appropriate corrective action.

MAIN VALVE FAILS TO OPEN OR PRESSURE TOO LOW

1. N.C. solenoid (3) not energized — Check control signals from preset.
2. N.C. solenoid (3) stuck closed or coil burned out — Replace coil. See the Solenoid Valve section of this manual.
3. Diaphragm of main valve (1) ruptured or stem binding — See Model 65 Basic Valve section of this manual.
4. Needle Valve (5) adjusted too far counter-clockwise — See Adjustment Instructions.
5. Pressure reducing pilot (4) adjusted too far counterclockwise — See Adjustment Instructions.
6. Stem of pressure reducing pilot binding — Disassemble pilot and determine cause. See the 1340 Pilot section of this manual

MAIN VALVE FAILS TO CLOSE OR PRESSURE TOO HIGH

1. N.C. solenoid (3) not deenergized — Check control signals from preset.
2. N.O. solenoid (2) energized — Check control signals from preset.
3. N.C. solenoid (3) stuck open — Disassemble and determine cause. See the Solenoid Valve section of this manual.
4. N.O. solenoid (2) stuck closed — Disassemble and determine cause. See the Solenoid Valve section of this manual.
5. Stem of main valve (1) binding — See the Model 65 Basic Valve section of this manual.
6. Pressure reducing pilot (4) diaphragm ruptured - This will be evidenced by a leakage of fuel from the vent hole in the pilot bonnet — Replace diaphragm. See the 1340 Pilot section of this manual.
7. Pressure reducing pilots (4) stem binding or seat deteriorated — Disassemble pilot and determine cause. See the 1340 Pilot section of this manual.
8. Needle Valve closed all the way – re-adjust per “startup and adjustments” section.
9. Inline strainer dirty – remove strainer and clean or replace. Located in upstream side port of main valve.

VALVE SKIPS LOW FLOW POSITION ON SHUTDOWN

1. N.O. solenoid (2) not being energized. — Check signals from preset.
2. Coil of N.O. solenoid (2) burned out — Replace coil. See the Solenoid Valve section of this manual.
3. N.O. solenoid (2) stuck open — Disassemble and determine cause. See the Solenoid Valve section of this manual.

VALVE DOES NOT GO TO FULL SHUT-OFF

1. N.O. solenoid (2) not being deenergized — Check signals from preset.
2. N.O. solenoid (2) stuck closed — Disassemble and determine cause. See the Solenoid Valve section of this manual.
3. Seat of main valve (1) damaged. — See the Model 65 Basic Valve section of this manual.



Model 65/765

basic control valve

GENERAL DESCRIPTION

The OCV Series 65 is a hydraulically operated, diaphragm-actuated valve, *full port* valve. The globe configuration (Model 65) is available in sizes 1 1/4" thru 16" and 24". The angle configuration (Model 65A) is available in sizes 1 1/4" thru 12" and 16".

The Series 765 is the same as the Series 65, except that it is a *reduced port* valve. It is available only in the globe configuration in sizes 3" thru 24".

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. A synthetic rubber seat disc forms a tight seal with the valve seat when pressure is applied above the diaphragm.

FUNCTIONAL DESCRIPTION

Because the Series 65/765 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.

CAUTION: Take appropriate care to protect personnel and equipment when lifting the valve for uncrating and for installation. Use appropriate lifting equipment. Lifting eyes are provided on 8" and larger valves to facilitate this task.

3. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.
4. When installing flanged-end valves, use the proper number and size of flange bolts when installing the valve (see Tables 1 & 2). Make sure flange gaskets are of the proper material for the service. To ensure a tight seal, flange bolts should be tightened evenly in a criss-cross pattern. Tables 1 & 2 also shows the proper final torque values for the flange bolts.



5. Allow sufficient room around the valve for ease of adjustment and maintenance service.
6. After the lines are filled with liquid, bleed all air from the diaphragm chamber. This can be done by carefully loosening a pipe plug in the bonnet until fluid begins to appear around the threads. When only clear liquid (no air) is flowing, retighten the plug.

In addition, it is highly recommended that:

1. Isolation valves (e.g., 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 examination of the valve interior, be conducted. Particular attention should be paid to the rubber 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

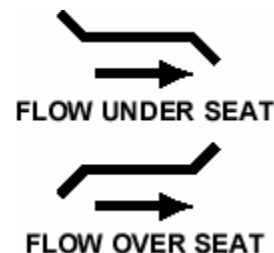
2. VALVE FAILS TO CLOSE

- a. Diaphragm damaged* - See Procedure A
- b. Stem binding - See Procedure B
- c. Object lodged in valve - See Procedure B

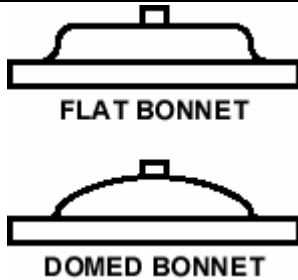
3. VALVE OPENS AND CLOSSES BUT LEAKS WHEN CLOSED

- 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, and then compare it with the figures below.*



IMPORTANT: Over the years, OCV has made significant design changes to the 3", 4", 8", 10" and 12" valves. Therefore, before ordering rubber kits or other parts, you will need to determine which style valve you have (old or new). This can be easily determined by looking at the valve *bonnet*. As shown below, old-style valves have flat bonnets; new-style valves (except for the 3" full port and 4" reduced port valves) have domed bonnets.



For 3" valves, simply measure the *diameter* of the bonnet. Old-style bonnets have a 7-11/16" (195 mm) diameter; new style bonnets have an 8-3/4" (222 mm) diameter. That same 8-3/4" diameter flat bonnet is also used on the 4" reduced port valve.

PROCEDURE A: DIAPHRAGM REPLACEMENT

1. Wear appropriate clothing and equipment to protect the skin and eyes from exposure to the line fluid.
2. Isolate the valve from the system by closing upstream and downstream block valves.
3. Bleed all pressure from the valve.

WARNING! IT IS EXTREMELY IMPORTANT THAT ALL PRESSURE BE REMOVED FROM THE VALVE BEFORE DOING EVEN PARTIAL DISASSEMBLY.

4. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
5. To minimize any possible fluid spillage, drain the upstream and downstream sides of the valve as much as possible. Unused side ports in the main valve body can be used for this purpose. They will bring the fluid level down to approximately the centerline of the piping.
6. Remove all tubing connected at the bonnet.
7. Remove the bonnet nuts.
8. 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.
9. Remove the spring.
10. Remove the diaphragm plate capscrews and the diaphragm plate.
11. Remove the old diaphragm.

12. 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.
13. Replace the diaphragm plate and the diaphragm plate capscrews.
14. Tighten all diaphragm plate capscrews snugly. See Table 4 for proper torque values.
15. Replace the spring.
16. Replace the bonnet and reinstall the bonnet nuts.
17. Tighten the bonnet nuts snugly using a criss-cross tightening pattern. See Table 3 for torque requirements.
18. Reinstall the control tubing.
19. Reopen the upstream and downstream block valves.
20. Before placing the valve back in service, perform the air bleed procedure described in the Installation section of this manual.

PROCEDURE B: CORRECTION OF BINDING STEM

1. Perform Steps 1 thru 9 of Procedure A, above.
2. Remove the spool assembly from the valve. NOTE: 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. The 24" valve is threaded 3/4-10.
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 15 thru 20 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.
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.



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 3" or smaller valve, or a 4" old-style valve, follow Steps 4 thru 9, below.
3. If you are working on a new-style 4" valve, or any valve 6" or larger, follow Steps 10 thru 16, below.
4. Seat rings in the smaller valves are threaded into the valve body. To remove, you will need a special seat ring tool. One may be purchased from OCV, or one may be fabricated. (See Table 5 for details.)
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 on larger valves 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.



TABLE 1
FLANGE BOLTING REQUIREMENTS – CLASS 150 FLANGES

VALVE SIZE (DN)	NO. OF BOLTS	BOLT SIZE	RECOMMENDED TORQUE (FT-LB)	RECOMMENDED TORQUE (N-M)
1 ¼" (32)	4	1/2-13 X 2.50" LONG	75	102
1 ½" (40)	4	1/2-13 X 2.50" LONG	75	102
2" (50)	4	1/2-13 X 2.50" LONG	75	102
2 ½" (65)	4	5/8-11 X 3.00" LONG	150	204
3" (80)	4	5/8-11 X 3.25" LONG	150	204
4" (100)	8	5/8-11 X 3.25" LONG	150	204
6" (150)	8	3/4-10 X 3.50" LONG	250	339
8" (200)	8	3/4-10 X 3.75" LONG	250	339
10" (250)	12	7/8-9 X 4.00" LONG	378	513
12" (300)	12	7/8-9 X 4.25" LONG	378	513
14" (350)	12	1-8 X 4.50" LONG	583	791
16" (400)	16	1-8 X 4.75" LONG	583	791
18" (450)	16	1 1/8" X 5.00" LONG	782	1061
20" (500)	20	1 1/8" X 5.50" LONG	782	1061
24" (600)	20	1 1/4"-7 X 6.00" LONG	1097	1488

TABLE 2
FLANGE BOLTING REQUIREMENTS – CLASS 300 FLANGES

VALVE SIZE (DN)	NO. OF BOLTS	BOLT SIZE	RECOMMENDED TORQUE (FT-LB)	RECOMMENDED TORQUE (N-M)
1 ¼" (32)	4	5/8-11 X 2.75" LONG	150	204
1 ½" (40)	4	3/4-10 X 3.00" LONG	250	339
2" (50)*	6	5/8-11 X 3.00" LONG	150	204
	2	5/8-11 X 2.25" LONG	150	204
2 ½" (65)	8	3/4-10 X 3.25" LONG	250	339
3" (80)	8	3/4-10 X 3.50" LONG	250	339
4" (100)	8	3/4-10 X 3.75" LONG	250	339
6" (150)	12	3/4-10 X 4.25" LONG	250	339
8" (200)	12	7/8-9 X 4.75" LONG	378	513
10" (250)	16	1-8 X 5.50" LONG	583	791
12" (300)	16	1 1/8-7 X 5.75" LONG	782	1061
14" (350)	20	1 1/8-7 X 6.25" LONG	782	1061
16" (400)*	18	1 1/4-7 X 6.50" LONG	1097	1488
	2	1 1/4-7 X 5.50" LONG	1097	1488
18" (450)	24	1 1/4-7 X 6.75" LONG	1097	1488
20" (500)	24	1 1/4-7 X 7.25" LONG	1097	1488
24" (600)	24	1 1/2-6 X 8.00" LONG	1750	2375

* TOP TWO HOLES ON VALVE FLANGES ARE DRILLED & TAPPED. USE THE SHORTER BOLTS LISTED IN THESE HOLES.



TABLE 3
BONNET BOLTING TORQUE SPECIFICATIONS
NEW-STYLE FULL PORT VALVES (SERIES 65)

VALVE SIZE (DN)	NO. OF STUDS	STUD SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
1 ¼" (32)	8	3/8-16	31 (42)	8" (200)	12	7/8-9	378 (513)
1 ½" (40)	8	3/8-16	31 (42)	10" (250)	16	7/8-9	378 (513)
2" (50)	8	3/8-16	31 (42)	12" (300)	20	1 1/8-7	782 (1061)
2 ½" (65)	8	1/2-13	75 (102)	14" (350)	20	1 1/8-7	782 (1061)
3" (80)	8	1/2-13	75 (102)	16" (400)	20	1 1/4-7	1097 (1488)
4" (100)	8	3/4-10	250 (339)	24" (400)	28	1 1/2-6	1750 (2375)
6" (150)	12	3/4-10	250 (339)				

NEW-STYLE REDUCED PORT VALVES (SERIES 765)

VALVE SIZE (DN)	NO. OF STUDS	STUD SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	8	3/8-16	31 (42)	12" (300)	16	7/8-9	378 (513)
4" (100)	8	1/2-13	75 (102)	16" (250)	20	1 1/8-7	782 (1061)
6" (150)	8	3/4-10	250 (339)	18" (300)	20	1 1/4-7	1097 (1488)
8" (200)	12	3/4-10	250 (339)	20" (350)	20	1 1/4-7	1097 (1488)
10" (250)	12	7/8-9	378 (513)	24" (400)	20	1 1/4-7	1097 (1488)

OLD-STYLE FULL PORT VALVES (SERIES 65)

VALVE SIZE (DN)	NO. OF SCREWS	STUD SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	8	3/8-16	31 (42)	10" (250)	16	3/4-10	250 (339)
4" (100)	8	7/16-20	50 (68)	12" (300)	20	1 1/8-7	782 (1061)
8" (200)	12	3/4-10	250 (339)				



TABLE 4
DIAPHRAGM PLATE CAPSCREW TORQUE SPECIFICATIONS
NEW-STYLE FULL PORT VALVES (SERIES 65)

VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
1 1/4" (32)	1	3/8-24 N	21.5 (29)	8" (200)	8	1/2-13 H	43 (58)
1 1/2" (40)	1	3/8-24 N	21.5 (29)	10" (250)	12	1/2-13 H	43 (58)
2" (50)	4	1/4-20 A	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
2 1/2" (65)	6	10-32 A	2.7 (3.7)	14" (350)	16	3/8-16 H	19.7 (27)
3" (80)	6	1/4-20 A	6.3 (8.6)	16" (400)	16	1/2-13 H	43 (58)
4" (100)	6	3/8-16 H	19.7 (27)	24" (400)	16	1-8 H	286 (383)
6" (150)	8	3/8-16 H	19.7 (27)				

NEW-STYLE REDUCED PORT VALVES (SERIES 765)

VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 A	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
4" (100)	6	1/4-20 A	6.3 (8.6)	16" (250)	12	1/2-13 H	43 (58)
6" (150)	6	3/8-16 H	19.7 (27)	18" (300)	12	1/2-13 H	43 (58)
8" (200)	8	3/8-16 H	19.7 (27)	20" (350)	12	1/2-13 H	43 (58)
10" (250)	8	1/2-13 H	43 (58)	24" (400)	12	1/2-13 H	43 (58)

OLD-STYLE FULL PORT VALVES (SERIES 65)

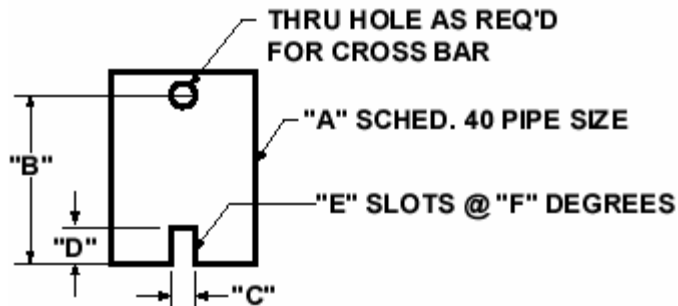
VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 H	6.3 (8.6)	10" (250)	12	3/8-16 H	19.7 (27)
4" (100)	6	1/4-20 H	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
8" (200)	8	3/8-16 H	19.7 (27)				

N = SINGLE HEX NUT ON VALVE STEM

A = ALLEN-HEAD CAPSCREWS

H = HEX-HEAD CAPSCREWS

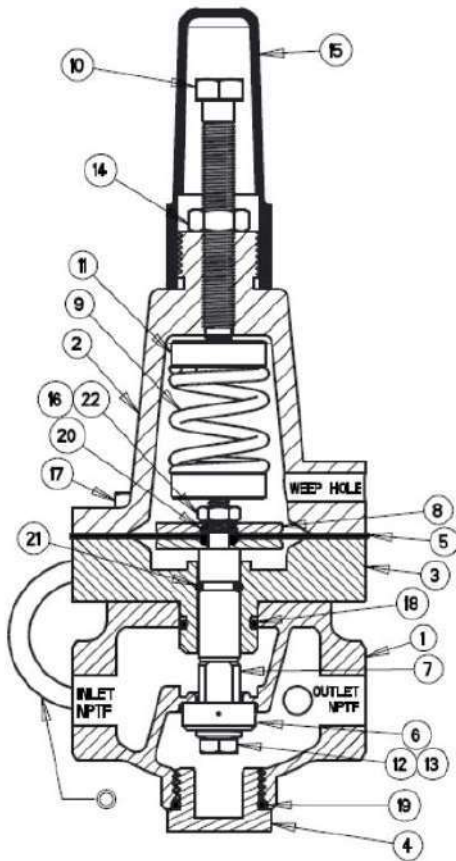
TABLE 5
SEAT RING TOOL DETAILS



VALVE SIZE FULL PORT	VALVE SIZE RED. PORT	"A" PIPE SIZE	"B" MIN. LENGTH	"C" SLOT WIDTH	"D" SLOT DEPTH	"E" # SLOTS	"F" 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"	3"	1 1/2	7"	3/8"	3/8"	2	180°
2 1/2"	--	2	8"	1/2"	1/2"	3	120°
3" NEW	4"	2 1/2	9"	1/4"	3/8"	3	120°
3" OLD	--	2 1/2	9"	5/8"	5/8"	2	180°
4" OLD	--	3	10"	5/8"	5/8"	2	180°

Pressure Reducing Pilot

Model 1340



GENERAL DESCRIPTION

The Model 1340 Pressure Reducing Pilot is a normally-open, direct-acting, spring-loaded, diaphragm-type control pilot. As the primary control pilot for the OCV Series 127 control valves, it is designed to maintain a constant preset discharge pressure from the main valve. It is a constant throttling device, maintaining precise, positive control of the main valve. The 1340 may also be used by itself as a downstream pressure regulator. The 1340 is available in bronze or stainless steel construction and with 3/8 NPT or 1/2 NPT end connections. The 1340 is available with four different adjustment ranges:

5-30 psi	20-200 psi
20-80 psi	100-300 psi

FUNCTIONAL DESCRIPTION

The 1340 controls the pressure in the diaphragm chamber of the main valve, hence the degree of opening or closing of the valve. The downstream pressure is sensed under the diaphragm of the pilot and is balanced against an adjustable spring load. As the downstream pressure decreases below 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 downstream

pressure increases above 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 downstream pressure at the set point within very close limits.

INSTALLATION AND ADJUSTMENT

The 1340 is normally installed in the main valve control piping between the ejector and the downstream body tap. Flow must be in the direction indicated. In most cases, a sense line is factory installed between the diaphragm sense port and the downstream pilot body side port, as shown in the drawing. The pilot can also be remote sensed by running a line (typically 1/4" O.D. tubing) from the 1/8 NPT connection under the pilot diaphragm to the desired downstream point where the pressure control is desired.

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

- **Clockwise** adjustment **increases** downstream pressure.
- **Counterclockwise** adjustment **decreases** downstream pressure.

MAINTENANCE

Required maintenance of the 1340 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 1340 pilot. These, and the symptoms they can cause, are as follows:

1. **PILOT DIAPHRAGM RUPTURED:** Results in failure of the main valve to close and/or downstream pressure that is too high. A ruptured pilot diaphragm will be evidenced by leakage through the vent hole in the pilot bonnet.
2. **PILOT SEAT DISC DETERIORATED:** Results in a downstream pressure that drifts too high under dead-end (zero flow) conditions.
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 1340 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. Remove the plug (4) from the bottom of the pilot.
5. Using a 7/16" socket as a backup on capscrew (12), remove hex nut (16), lock washer (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), lock washer (22) and hex nut (16). Tighten securely.
10. Reinstall plug (4).

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.

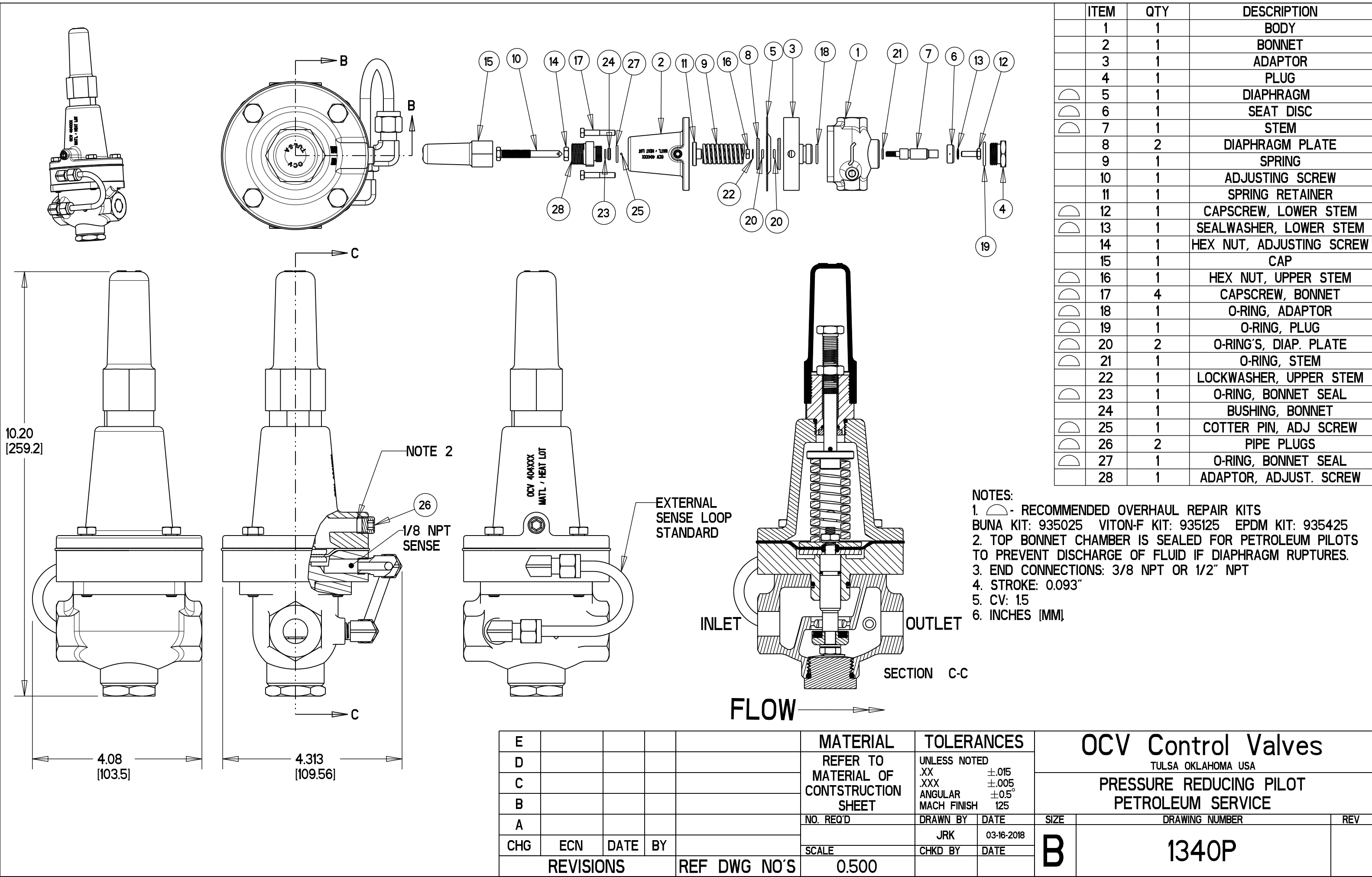
B. SEAT DISC REPLACEMENT

1. Follow Steps 1 through 4 under DIAPHRAGM REPLACEMENT, above.
2. Using a 7/16" socket as a backup on capscrew (12), remove hex nut (16), lock washer (22), diaphragm plates (8) and o'rings (20).
3. Remove stem (7) and seat disc (12) through bottom of pilot.
4. Remove capscrew (12), seal washer (13) and old seat disc (6).
5. Place new seat disc, new seal washer and capscrew (12) on stem. Tighten securely.
6. Reinsert stem through bottom of pilot.
7. Reinstall diaphragm plates (8), o'rings (20), diaphragm (5), lock washer (22) and hex nut (16). Tighten securely.
8. Reassemble pilot following Steps 10 through 13 under DIAPHRAGM REPLACEMENT, above.

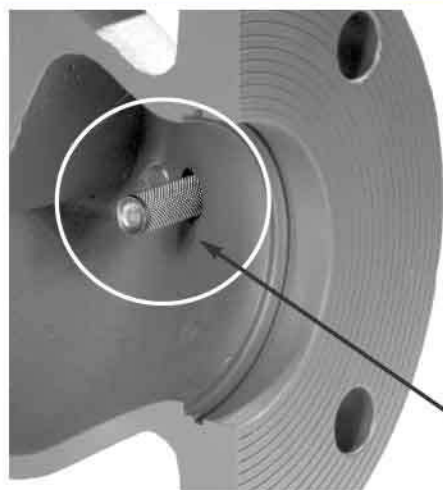
C. STEM REPAIR

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





E					MATERIAL	TOLERANCES	OCV Control Valves TULSA OKLAHOMA USA		
D					REFER TO MATERIAL OF CONSTRUCTION SHEET	UNLESS NOTED XX ±.015 .XXX ±.005 ANGULAR ±.05° MACH FINISH 125			
C							PRESSURE REDUCING PILOT PETROLEUM SERVICE		
B									
A					NO. REQ'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER
CHG	ECN	DATE	BY		SCALE	JRK	03-16-2018	B	1340P
REVISIONS				REF DWG NO'S	0.500	CHKD BY	DATE		



DESCRIPTION

The 123 Inline Strainer installs in the inlet side port of the main valve, and protects the pilot system from solid contaminants in the line fluid. The screen prevents the entrance of particles into the pilot system piping while flow through the main valve washes the screen clean. Recommended use on petroleum valve applications where flushing or removal of the screen for cleaning is not practical or may be considered hazardous.

Strainer Shown Installed

DIMENSIONS

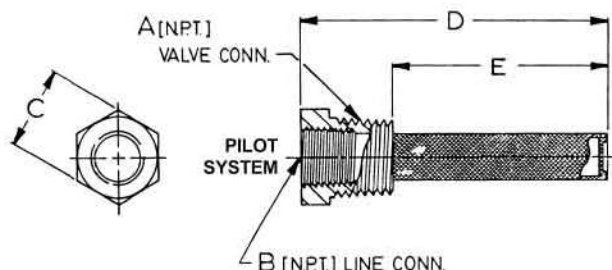
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

MATERIALS

Inline strainers are all-stainless steel construction.

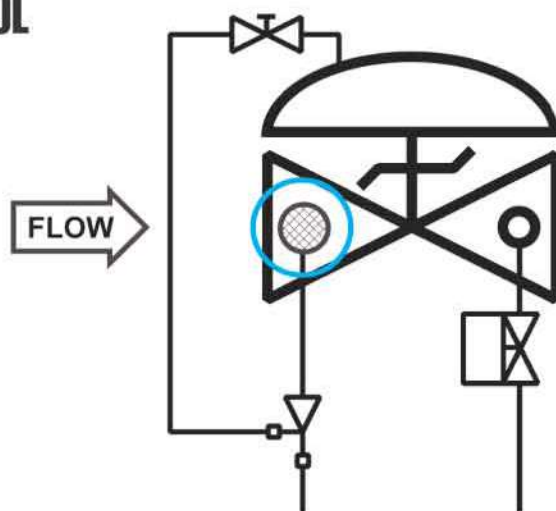
SCREEN SIZE

Standard screen is 40 mesh. Other mesh sizes are available.



SCHEMATIC SYMBOL

The Model 123 Inline Strainer is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-2 Solenoid Valve.

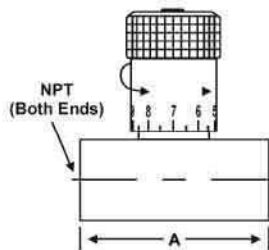
DESCRIPTION

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

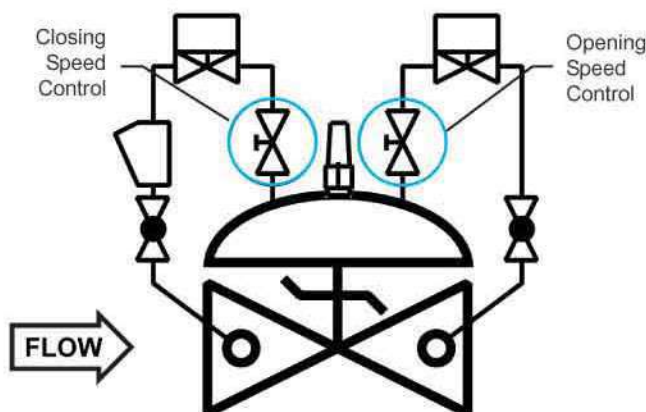
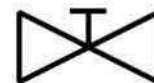


MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	683100	1/4	2	1 1/4"-2"
Brass	683101	3/8	2 1/4	2 1/2"-6"
Brass	683102	1/2	2 5/8	8"-10"
Brass	683103	3/4	3 1/4	12"-16"
Stn. Steel	683700	1/4	2	1 1/4"-2"
Stn. Steel	683702	3/8	2 1/4	2 1/2"-6"
Stn. Steel	682704	1/2	2 5/8	8"-10"
Stn. Steel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

DESCRIPTION

MODEL TWO-WAY SOLENOID

- Provides On/Off (Open/Close) control of main valve.
- Interfaces valve operation with timer, relays, probes, etc.
- Manual Override operation available.
- Available in weatherproof or explosion-proof enclosures.
- Wide range of voltages in AC / DC.
- Available energize to open or energize to close.
- Brass or stainless steel bodies available.



MODEL SHOWN:
ASCO 8210G6



MODEL SHOWN:
ASCO EF8262G148V

The two-way solenoid is a valve that opens and closes flow depending upon the electrical state of the coil. Installed in the valve pilot circuit, it controls the valve to open or close. The solenoid can be installed in series with a hydraulic control pilot to override the pilot and close the valve (e.g., OCV Model 127-80, 108-4), or by itself to make a simple on/off valve, e.g. OCV Model 115-2.

AVAILABLE VOLTAGES

AC, 60Hz.:	24, 120, 240, 480 Volts
AC, 50Hz.:	110, 220, 440, Volts
DC:	6, 12, 24, 125, 240 Volts

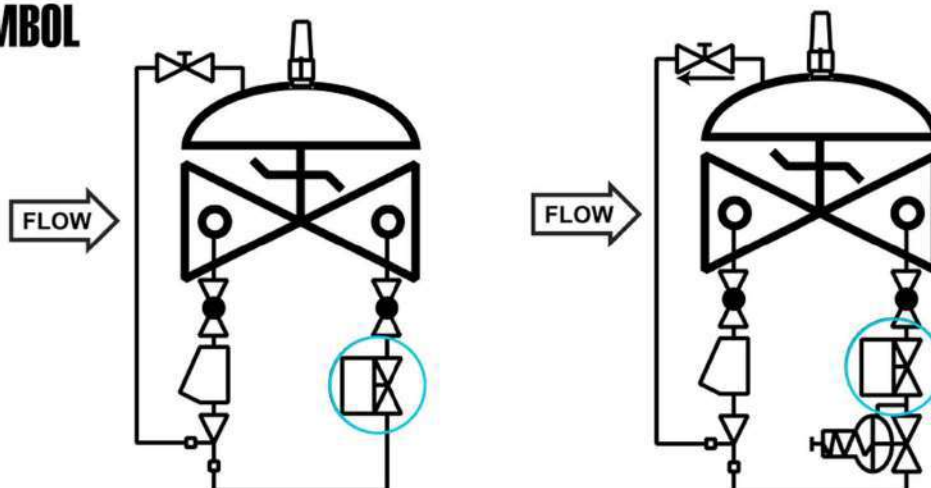
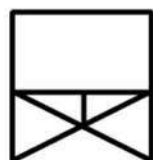
ENCLOSURES

General Purpose NEMA 1, 2, 3, 3S, 4, 4X
Explosion Proof NEMA 1, 2, 3, 3S, 4, 4X, 6, 6P, 7, 9

Note:
Specifications stated subject to change depending on solenoid selected per application. Consult factory.
Information Required: Voltage, actuation (energize to open or close), enclosure, working pressure, control fluid, valve function and size.

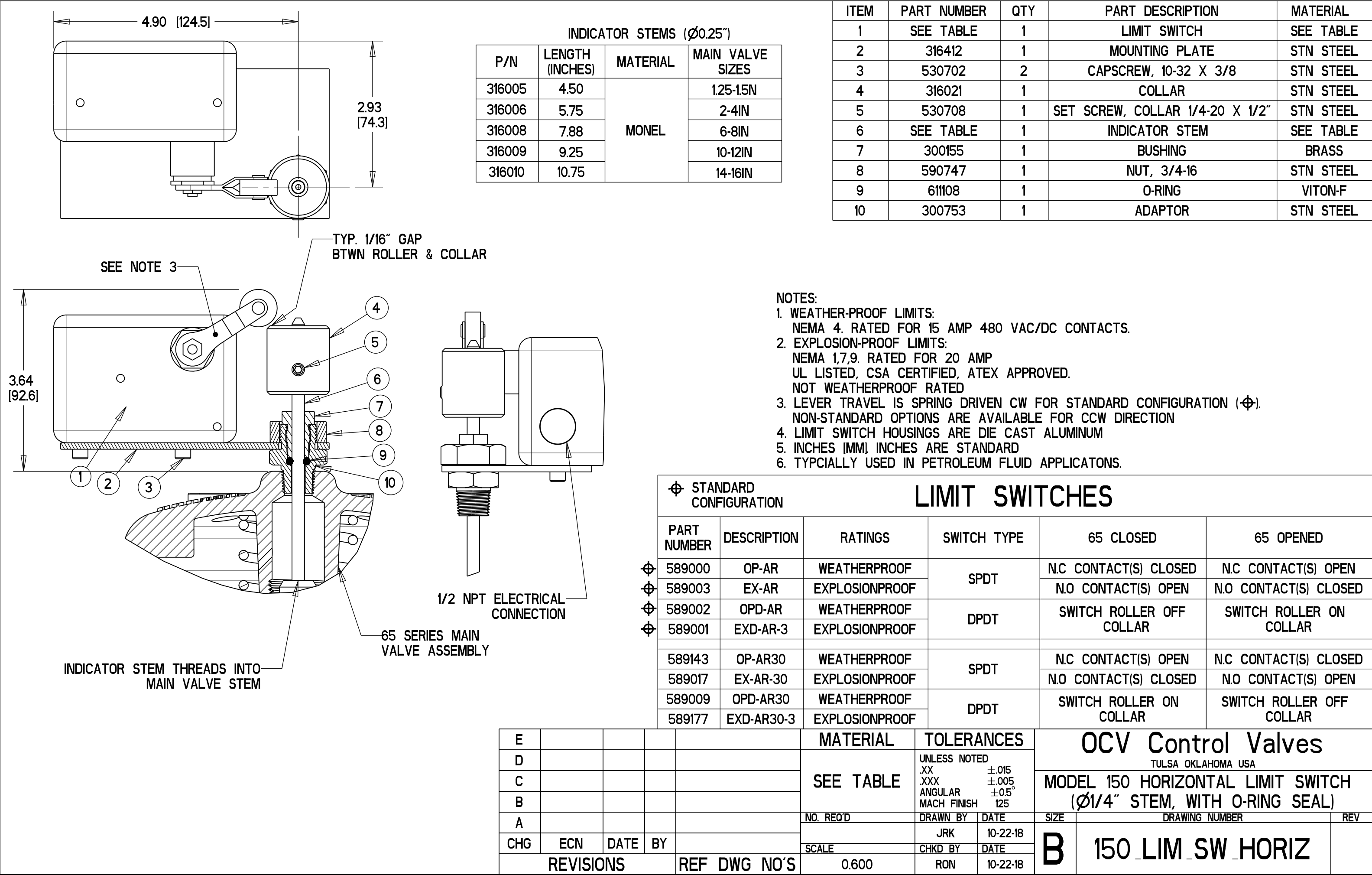
SCHEMATIC SYMBOL

The two-way solenoid is shown on OCV Valve Schematic as:



EXAMPLE: Shown here on a: Model 115-2 Solenoid Valve. Model 127-80 Pressure Reducing/Solenoid Valve

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