Operating Manual

Model: 115-5S
Size:
Serial #:
Sales Order :

7400 East 42nd
Place Tulsa,
Oklahoma
74145-4744 USA

phone: 918-627-1942
888-628-8258

fax: 918-622-8916

email: sales@controlvalves.com

website: www.controlvalves.com

OCV® FLUID SOLUTIONS LLC

OCV® Dorot

matholding group

Two Stage Preset Valve

Installation, Operating and Maintenance Instructions

Model 115-5S

GENERAL DESCRIPTION

The OCV Model 115-5S 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: When signaled by the preset, the 115-5S will open fully.

TWO-STAGE SHUTDOWN: Working off electrical signals from the preset, the 115-5S 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 115-5, to operate with these presets.

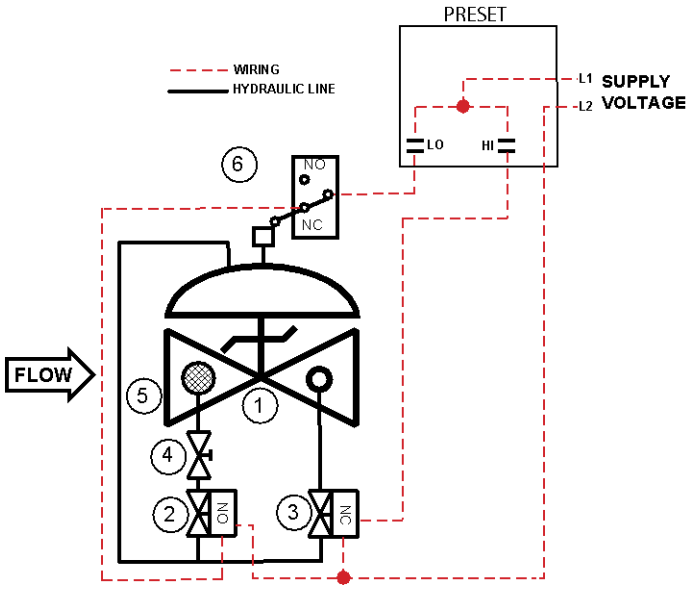
With the advent and growing popularity of **Electronic Preset Controllers,** like LCR2, EMR4, & Multiload, a different approach is needed. These presets have a much simpler switching arrangements, typically two outputs that operate only on-off. Depending on operating conditions, the 115-5 may not work properly with these presets.

The 115-5S has been designed to operate reliably with both electronic presets as well as the older mechanical types.

SCHEMATIC

The 115-5S 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 141-2 Needle Valve** that controls the closing speed of the main valve.
5. **Model 123 Inline Strainer** that protects the pilot system from solid contaminants in the line fluid.
6. **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 following discussion refers to the preset outputs as HI and LO. The actual designations in the preset may be different, for example, SW1 and SW2, or S1 and S2. The important thing to note is that:

- The HI output is ON (closed) at the start of the run, and turns OFF (opens) to initiate closing.
- The LO output is ON (closed) at the start of the run and turns OFF (opens) at the very end of the run.

OPENING: A loading run is initiated via preset device electronic outputs. The **HI** output directly energizes the normally closed (NC) solenoid (3), opening it, and routing fluid from the main valve diaphragm chamber to downstream. Since the capacity of

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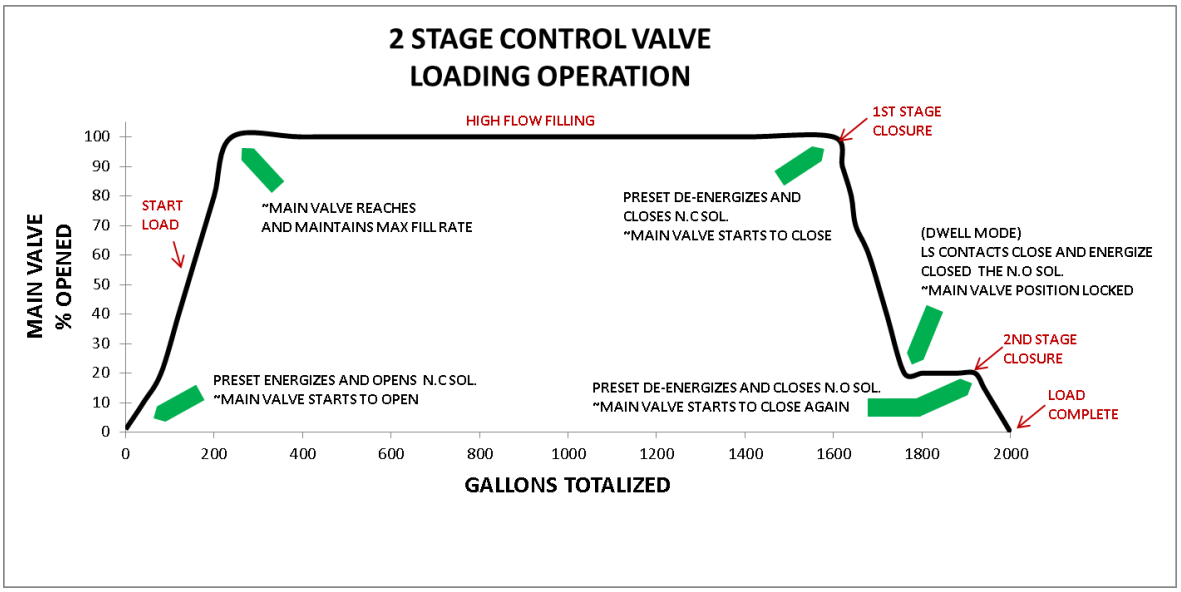


the NC solenoid is greater than that of the normally open (NO) solenoid (2) and the needle valve (4), the main valve will open fully. Meanwhile, the **LO** output, wired to the NO solenoid through the limit switch, will momentarily energize the NO solenoid to the closed position. This is of no consequence, and once the valve is open far enough to open the limit switch, the NO solenoid will reopen. The valve will remain in the full open position until closure is initiated.

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 inlet pressure is directed to the diaphragm chamber of the main valve through the NO solenoid (2) and needle valve (4). The valve starts closed.

When the valve is nearly closed, the limit switch (6) contacts toggle from the "NO" position to the "NC" position. The preset control **LO** output will supply power through the 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.

The graphic above summarizes the operation of the 115-5S.

INSTALLATION

1. The 115-5S is furnished fully factory-assembled including all control line tubing.
2. Install the 115-5S on the discharge of the meter, observing the following:
   a. Before installing the valve, make sure there is no foreign material inside the valve.
   b. Make sure all tubing connections are secure.
   c. For ease of maintenance service of the valve and meter, it is recommended that an isolation valve be installed upstream of the meter.
3. Make sure the voltage of the solenoids matches that of the preset outputs.
4. 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.

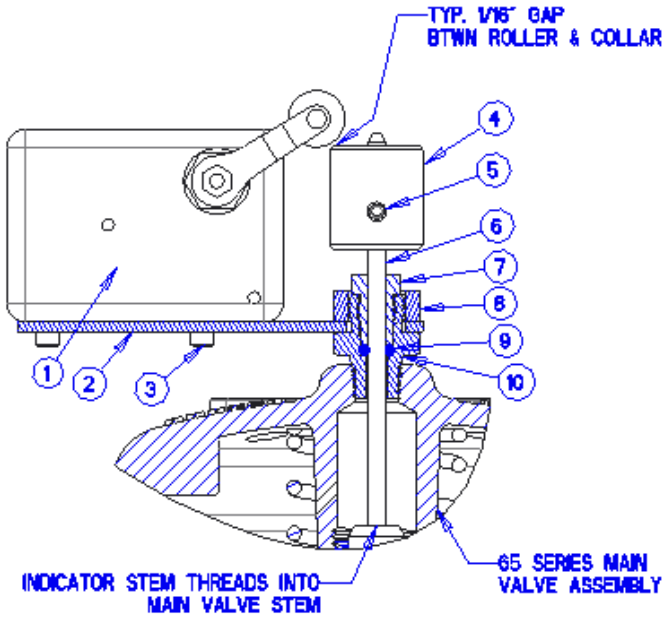
STARTUP AND ADJUSTMENTS

The following procedures should be followed in the order presented in order to affect an initial startup of the 115-5S.

1. Loosen the jam nut on the adjusting screw of the needle valve (4). Turn the adjusting screw fully clockwise, then counterclockwise four full turns.
2. Connect the loading arm to a truck or other appropriate receiving vessel.
3. 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.
4. Carefully loosen a pipe plug in the main valve bonnet until fluid appears around the threads. When only clear fluid (no air) is discharging, retighten the plug.
5. If the valve opening is not adequate (i.e., the flow rate is too low), slowly turn the adjusting screw of the needle valve (4) clockwise until the flow rate is adequate. ****CAUTION**** Do not close the needle valve fully. To do so will prevent the valve from closing.
6. Allow the load to continue to its end, observing that the valve closes in two stages.
7. If closing is too slow, particularly the first stage, slowly turn the adjusting screw of the needle valve counter-clockwise to increase the closing speed.

SUMMARY OF ADJUSTMENTS

1. Needle valve (4): Clockwise to decrease valve closing speed; counterclockwise to increase valve closing speed.
2. 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. .
    - Lower the collar to increase the low flow rate
    - Raise the collar to decrease the low flow rate.



MAINTENANCE

Required maintenance of the 115-5S 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 115-5S, 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

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.

MAIN VALVE FAILS TO CLOSE

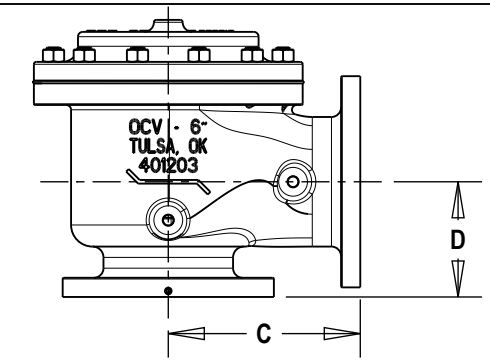
1. N.C. solenoid (3) not deenergized — Check control signals from preset.
2. N.O. solenoid (2) energized — Check control signals from meter.
3. N.C. solenoid (3) stuck open — Disassemble and determine cause. See the Solenoid Valve section of this manual.
4. N.O. solenoid (2) stuck closed — Disassemble 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.

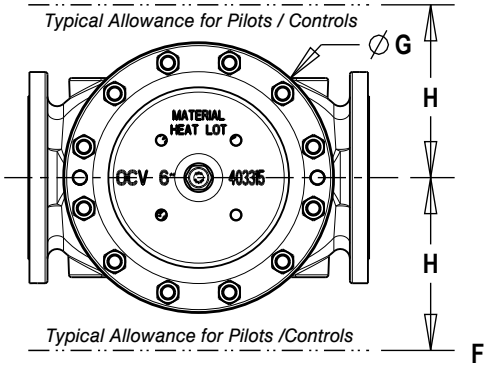
VALVE SKIPS LOW FLOW POSITION ON SHUTDOWN

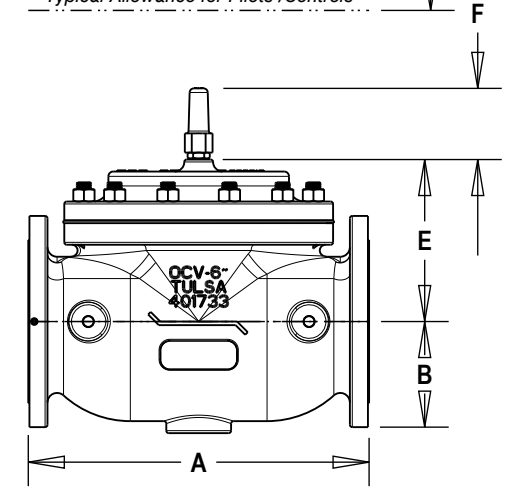
1. N.O. solenoid (2) not being energized. — Check signals from preset.
2. Coil of N.O. solenoid (2) burned out — Replace coil. See the Solenoid Valve section of this manual.
3. N.O. solenoid (2) stuck open — Disassemble and determine cause. See the Solenoid Valve section of this manual.

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.







U.S. DIMENSIONS (INCHES)

DIM	END CONN.	1 1/4	1 1/2	2	2 1/2	3	4	6 STD	6 EXT	8	10	12	14	16	24
A	SCREWED	8 3/4	8 3/4	9 7/8	10 1/2	13	--	--	--	--	--	--	--	--	--
	GROOVED	8 3/4	8 3/4	9 7/8	10 1/2	13	15 1/4	20	--	--	--	--	--	--	--
	150# FLGD	8 1/2	8 1/2	9 3/8	10 1/2	12	15	17 3/4	20	25 3/8	29 3/4	34	39	40 3/8	62
	300# FLGD	8 3/4	8 3/4	9 7/8	11 1/8	12 3/4	15 5/8	18 5/8	21	26 3/8	31 1/8	35 1/2	40 1/2	42	63 3/4
B	SCREWED	1 7/16	1 7/16	1 11/16	1 7/8	2 1/4	--	--	--	--	--	--	--	--	--
	GROOVED	--	1	1 3/16	1 7/16	1 3/4	2 1/4	3 5/16	--	--	--	--	--	--	--
	150# FLGD	2 5/16	2 1/2	3	3 1/2	3 3/4	4 1/2	5 1/2	5 1/2	6 3/4	8	9 1/2	10 5/8	11 3/4	16
	300# FLGD	2 5/8	3 1/16	3 1/4	3 3/4	4 1/8	5	6 1/4	--	7 1/2	8 3/4	10 1/4	11 1/2	12 3/4	18
C ANGLE	SCREWED	4 3/8	4 3/8	4 3/4	6	6 1/2	--	--	--	--	--	--	--	--	--
	GROOVED	4 3/8	4 3/8	4 3/4	6	6 1/2	7 5/8	--	--	--	--	--	--	--	--
	150# FLGD	4 1/4	4 1/4	4 3/4	6	6	7 1/2	10	--	12 11/16	14 7/8	17	--	20 13/16	--
	300# FLGD	4 3/8	4 3/8	5	6 3/8	6 3/8	7 13/16	10 1/2	--	13 3/16	15 9/16	17 3/4	--	21 5/8	--
D ANGLE	SCREWED	3 1/8	3 1/8	3 7/8	4	4 1/2	--	--	--	--	--	--	--	--	--
	GROOVED	3 1/8	3 1/8	3 7/8	4	4 1/2	5 5/8	--	--	--	--	--	--	--	--
	150# FLGD	3	3	3 7/8	4	4	5 1/2	6	--	8	11 3/8	11	--	15 11/16	--
	300# FLGD	3 1/8	3 1/8	4 1/8	4 3/8	4 3/8	5 13/16	6 1/2	--	8 1/2	12 1/16	11 3/4	--	16 1/2	--
E	ALL	6	6	6	7	6 1/2	8	10	10	11 7/8	15 3/8	17	18	19	27
F	ALL	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	8
G	ALL	6	6	6 3/4	7 11/16	8 3/4	11 3/4	14	14	21	24 1/2	28	31 1/4	34 1/2	52
H	ALL	10	10	11	11	11	12	13	13	14	17	18	20	20	28 1/2

METRIC DIMENSIONS (MILLIMETERS)

DIM	END CONN.	DN32	DN40	DN50	DN65	DN80	DN100	DN150 STD	DN150 EXT	DN200	DN250	DN300	DN350	DN400	DN600
A	SCREWED	222	222	251	267	330	--	--	--	--	--	--	--	--	--
	GROOVED	222	222	251	267	330	387	508	--	--	--	--	--	--	--
	150# FLGD	216	216	238	267	305	381	451	508	645	756	864	991	1026	1575
	300# FLGD	222	222	251	283	324	397	473	533	670	791	902	1029	1067	1619
B	SCREWED	37	37	43	48	57	--	--	--	--	--	--	--	--	--
	GROOVED	--	25	30	37	44	57	84	--	--	--	--	--	--	--
	150# FLGD	59	64	76	89	95	114	140	140	171	203	241	270	298	406
	300# FLGD	67	78	83	95	105	127	159	--	191	222	260	292	324	457
C ANGLE	SCREWED	111	111	121	152	165	--	--	--	--	--	--	--	--	--
	GROOVED	111	111	121	152	165	194	--	--	--	--	--	--	--	--
	150# FLGD	108	108	121	152	152	191	254	--	322	378	432	--	529	--
	300# FLGD	111	111	127	162	162	198	267	--	335	395	451	--	549	--
D ANGLE	SCREWED	79	79	98	102	114	--	--	--	--	--	--	--	--	--
	GROOVED	79	79	98	102	114	143	--	--	--	--	--	--	--	--
	150# FLGD	76	76	98	102	102	140	152	--	203	289	279	--	398	--
	300# FLGD	79	79	105	111	111	148	165	--	216	306	298	--	419	--
E	ALL	152	152	152	178	165	203	254	254	302	391	432	457	483	686
F	ALL	98	98	98	98	98	98	98	98	162	162	162	162	162	203
G	ALL	152	152	171	195	222	298	356	356	533	622	711	794	876	1321
H	ALL	254	254	279	279	279	305	330	330	356	432	457	508	508	724

CHG	ECN	DATE	BY	
E				
D				
C				
B				
A				

REVISIONS | **REF DWG NO'S**

MATERIAL

TOLERANCES

UNLESS NOTED
.XX ±.015
.XXX ±.005
ANGULAR ±0.5°
MACH. FINISH 125

OCV Control Valves

TULSA OKLAHOMA USA

65D GENERAL VALVE DIMENSIONS

NO. REQ'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER	REV
	RLA	3/8/16	A	65D_DIM_DWG	C
SCALE	CHKD BY	DATE			
NOT TO SCALE					

Installation, Operating, and Maintenance Instructions

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 ¼" thru 16" and 24". The angle configuration (Model 65A) is available in sizes 1 ¼" 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.

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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

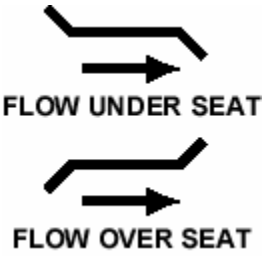
2. VALVE FAILS TO CLOSE

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

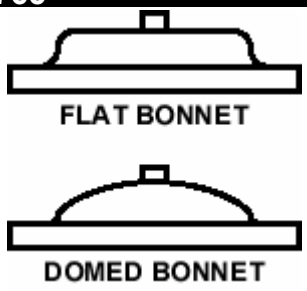
3. VALVE OPENS AND CLOSES BUT LEAKS WHEN CLOSED

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, 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.

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.
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.

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 2	5/8-11 X 3.00" LONG 5/8-11 X 2.25" LONG	150 150	204 204
2 ½" (65)	8	3/4-10X 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 2	1 1/4-7 X 6.50" LONG 1 1/4-7 X 5.50" LONG	1097 1097	1488 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 ¼" (32)	1	3/8-24 N	21.5 (29)	8" (200)	8	1/2-13 H	43 (58)
1 ½" (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 ½" (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)

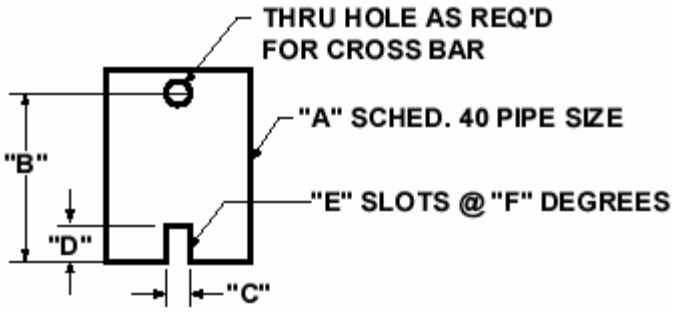
VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 A	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
4" (100)	6	1/4-20 A	6.3 (8.6)	16" (250)	12	1/2-13 H	43 (58)
6" (150)	6	3/8-16 H	19.7 (27)	18" (300)	12	1/2-13 H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

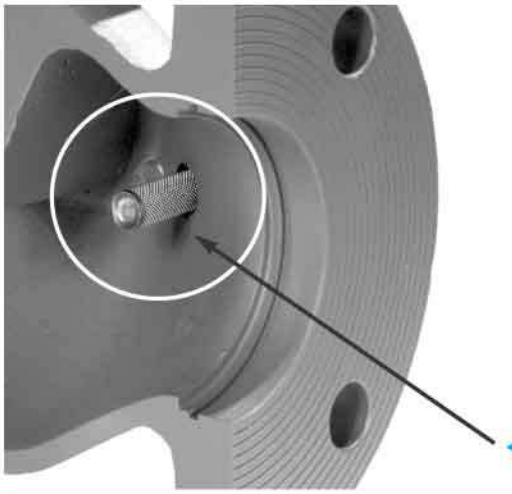
VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 H	6.3 (8.6)	10" (250)	12	3/8-16 H	19.7 (27)
4" (100)	6	1/4-20 H	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
8" (200)	8	3/8-16 H	19.7 (27)				

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°



DESCRIPTION

The 123 Inline Strainer installs in the inlet side port of the main valve, and protects the pilot system from solid contaminates 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.

DIMENSIONS

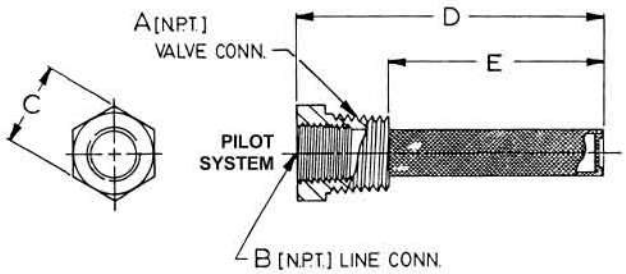
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

MATERIALS

Inline strainers are all-stainless steel construction.

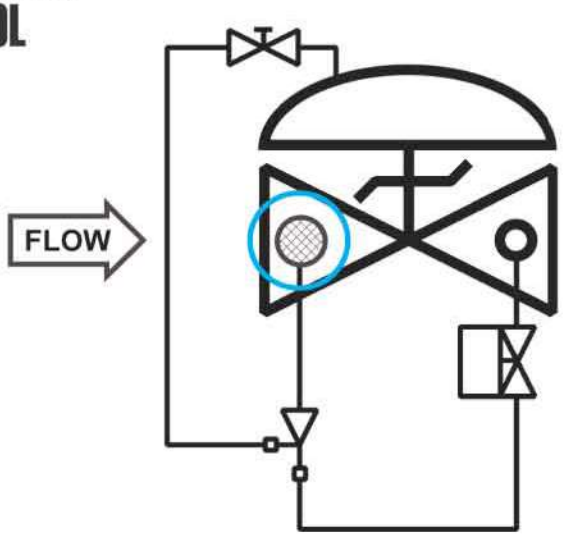
SCREEN SIZE

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.

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

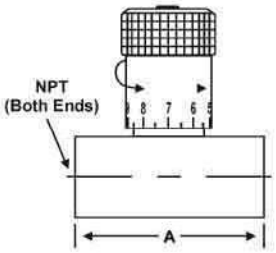
Inline Strainer 123

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

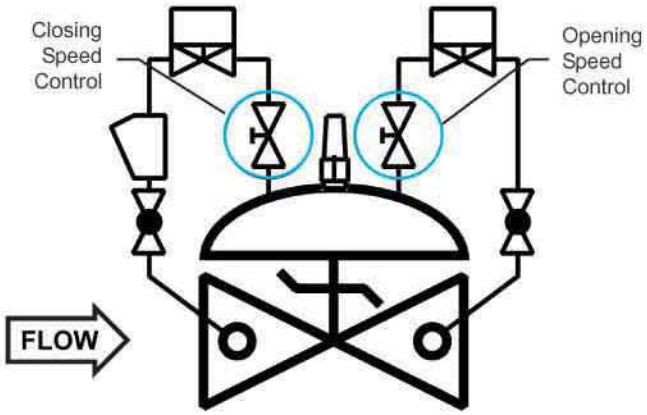


MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	683100	1/4	2	1 ¼"-2"
Brass	683101	3/8	2 1/4	2 ½"-6"
Brass	683102	1/2	2 5/8	8"-10"
Brass	683103	3/4	3 1/4	12"-16"
Stn. Steel	683700	1/4	2	1 ¼"-2"
Stn. Steel	683702	3/8	2 1/4	2 ½"-6"
Stn. Steel	682704	1/2	2 5/8	8"-10"
Stn. Steel	683703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

Needle Valve 141-2

DESCRIPTION

MODEL SHOWN:
ASCO 8210G6

MODEL SHOWN:
ASCO EF8262G148V

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.

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

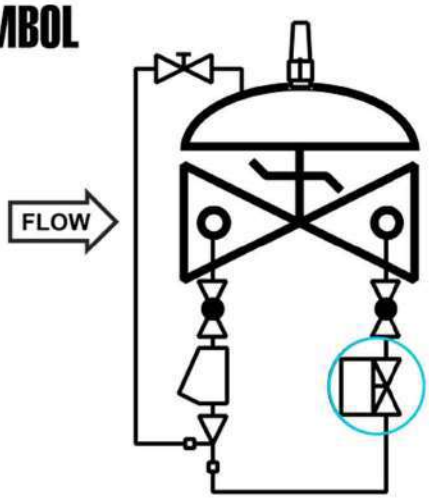
ENCLOSURES

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

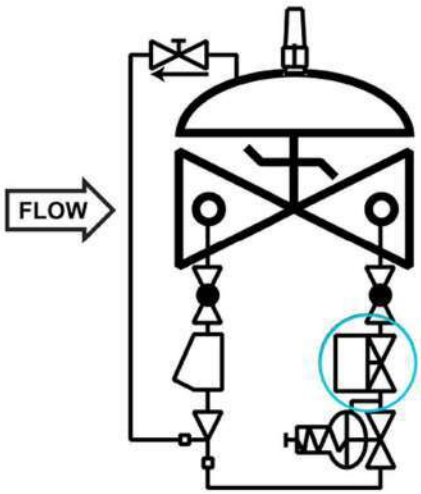
Note:
Specifications stated subject to change depending on solenoid selected per application. Consult factory.
Information Required: Voltage, actuation (energize to open or close), enclosure, working pressure, control fluid, valve function and size.

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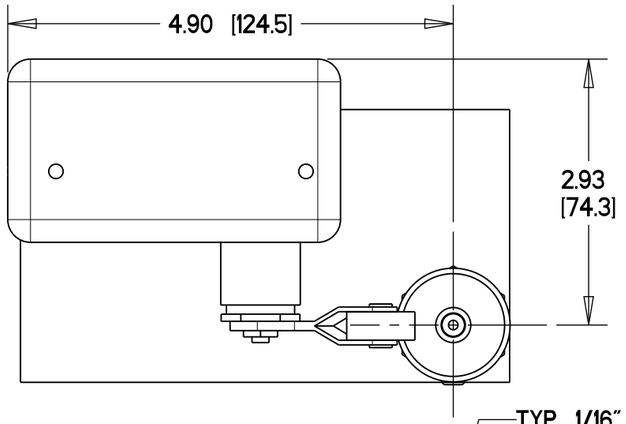
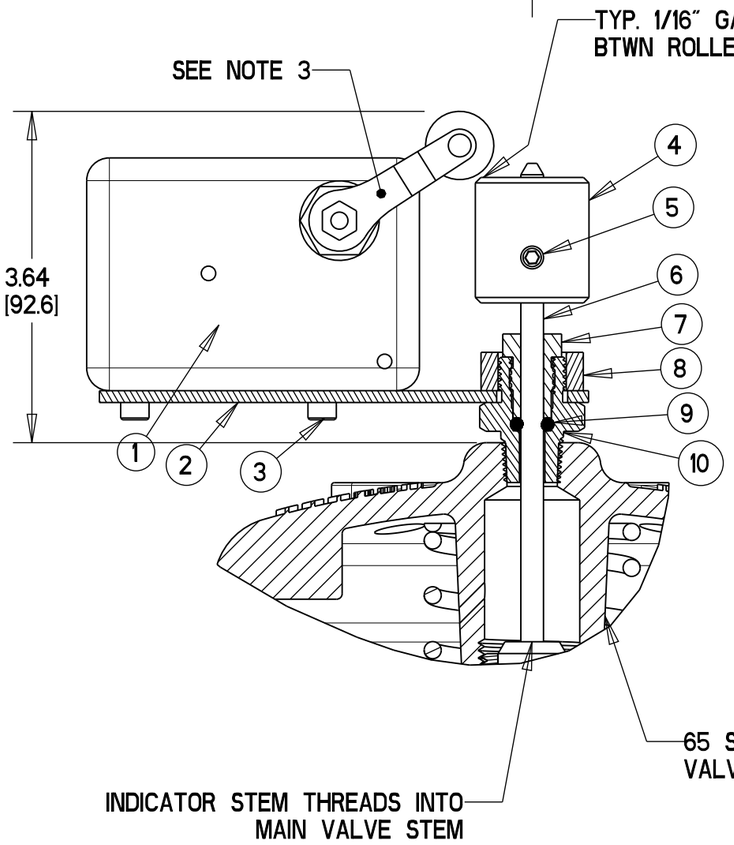
email: sales@controlvalves.com • **website:** www.controlvalves.com

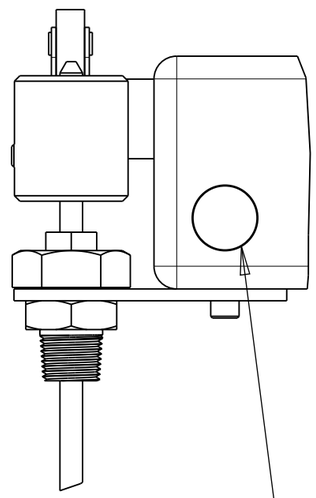


INDICATOR STEMS (Ø0.25")

P/N	LENGTH (INCHES)	MATERIAL	MAIN VALVE SIZES
316005	4.50	MONEL	1.25-1.5N
316006	5.75		2-4IN
316008	7.88		6-8IN
316009	9.25		10-12IN
316010	10.75		14-16IN

ITEM	PART NUMBER	QTY	PART DESCRIPTION	MATERIAL
1	SEE TABLE	1	LIMIT SWITCH	SEE TABLE
2	316412	1	MOUNTING PLATE	STN STEEL
3	530702	2	CAPSCREW, 10-32 X 3/8	STN STEEL
4	316021	1	COLLAR	STN STEEL
5	530708	1	SET SCREW, COLLAR 1/4-20 X 1/2"	STN STEEL
6	SEE TABLE	1	INDICATOR STEM	SEE TABLE
7	300155	1	BUSHING	BRASS
8	590747	1	NUT, 3/4-16	STN STEEL
9	611108	1	O-RING	VITON-F
10	300753	1	ADAPTOR	STN STEEL





NOTES:
1. WEATHER-PROOF LIMITS:
   NEMA 4. RATED FOR 15 AMP 480 VAC/DC CONTACTS.
2. EXPLOSION-PROOF LIMITS:
   NEMA 1,7,9. RATED FOR 20 AMP
   UL LISTED, CSA CERTIFIED, ATEX APPROVED.
   NOT WEATHERPROOF RATED
3. LEVER TRAVEL IS SPRING DRIVEN CW FOR STANDARD CONFIGURATION (⌖).
   NON-STANDARD OPTIONS ARE AVAILABLE FOR CCW DIRECTION
4. LIMIT SWITCH HOUSINGS ARE DIE CAST ALUMINUM
5. INCHES [MM]. INCHES ARE STANDARD
6. TYPCIALLY USED IN PETROLEUM FLUID APPLICATONS.

⌖ STANDARD CONFIGURATION

LIMIT SWITCHES

PART NUMBER	DESCRIPTION	RATINGS	SWITCH TYPE	65 CLOSED	65 OPENED
⌖ 589000	OP-AR	WEATHERPROOF	SPDT	N.C CONTACT(S) CLOSED	N.C CONTACT(S) OPEN
⌖ 589003	EX-AR	EXPLOSIONPROOF		N.O CONTACT(S) OPEN	N.O CONTACT(S) CLOSED
⌖ 589002	OPD-AR	WEATHERPROOF	DPDT	SWITCH ROLLER OFF COLLAR	SWITCH ROLLER ON COLLAR
⌖ 589001	EXD-AR-3	EXPLOSIONPROOF			
589143	OP-AR30	WEATHERPROOF	SPDT	N.C CONTACT(S) OPEN	N.C CONTACT(S) CLOSED
589017	EX-AR-30	EXPLOSIONPROOF		N.O CONTACT(S) CLOSED	N.O CONTACT(S) OPEN
589009	OPD-AR30	WEATHERPROOF	DPDT	SWITCH ROLLER ON COLLAR	SWITCH ROLLER OFF COLLAR
589177	EXD-AR30-3	EXPLOSIONPROOF			

CHG	ECN	DATE	BY
E			
D			
C			
B			
A			

REVISIONS

REF DWG NO'S

MATERIAL: SEE TABLE

TOLERANCES: UNLESS NOTED
.XX ±.015
.XXX ±.005
ANGULAR ±0.5°
MACH FINISH 125

NO. REQ'D

SCALE 0.600

DRAWN BY JRK DATE 10-22-18

CHKD BY RON DATE 10-22-18

OCV Control Valves

TULSA OKLAHOMA USA

MODEL 150 HORIZONTAL LIMIT SWITCH (Ø1/4" STEM, WITH O-RING SEAL)

SIZE B

DRAWING NUMBER 150_LIM_SW_HORIZ

REV


OCV® FLUID SOLUTIONS LLC
OCV®
Dorot
matholding group