Operating Manual

Model #: 127-5
Size: "
Serial #:
Sales Order :

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OCV™ Control Valves LLC

Global performance. Personal touch.

combination pressure reducing and surge control valve

installation, operating, and maintenance instructions

model 127-5

GENERAL DESCRIPTION

The OCV Model 127-5 Pressure Reducing/Surge Control Valve is designed to perform the following functions:

1. Reduce a higher upstream pressure into a lower, **constant** downstream pressure.
2. Close quickly in the event of rapid downstream pressure buildup. This feature makes the 127-5 particularly useful for **dead-end service.**

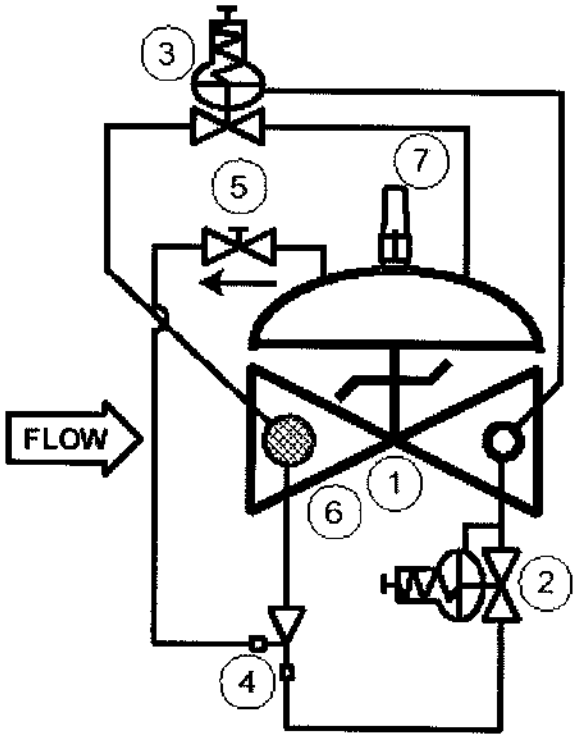
The 127-5 consists of the following components:

1. **Model 65 Basic Control Valve,** a hydraulically-operated, diaphragm-actuated globe or angle valve that closes with an elastomer-on-metal seal.
2. **Model 1340 Pressure Reducing Pilot,** a two-way, normally-open pilot valve which senses downstream pressure under its diaphragm and balances it against an adjustable spring load. An increase in downstream pressure tends to make the pilot close.
3. **Model 2470 Surge Control Pilot,** a two-way, normally-closed pilot valve which also senses downstream pressure under its diaphragm and balances it against an adjustable spring load. An increase in downstream pressure tends to make the pilot open.
4. **Model 126 Ejector,** a simple "tee" fitting with a fixed orifice in its upstream port. It provides the proper pressure to the diaphragm chamber of the main valve depending on the position of the pressure reducing pilot.
5. **Model 141-3 Flow Control Valve,** a needle-type valve which provides adjustable, restricted flow in one direction and free flow in the opposite direction. On the 127-5, the flow control valve is connected as an **opening speed control.**
6. **Model 123 Inline Strainer** that protects the pilot system from solid contaminants in the line fluid.
7. **Model 155L Visual Indicator,** that allows the user to determine the valve's operating postion at a glance.

THEORY OF OPERATION

(Refer to schematic diagram)

PRESSURE REDUCING ACTION: To understand how the 127-5 operates, it is best to start with the **Ejector (4).** Due to the orifice in its upstream port, the ejector creates a pressure drop proportional to the flow through it. The flow through the ejector is in turn controlled by the degree of opening of the



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Pressure Reducing Pilot (2). The wider the pilot opens, the greater the flow through the ejector and the lower the pressure downstream of the orifice. Conversely, the more the pilot closes, the lower the flow through the ejector and the greater the pressure downstream of the orifice.

Now note that the diaphragm chamber of the **Main Valve (1)** is connected to the branch port of the ejector and is thus downstream of the orifice. 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 downstream pressure to the set point. Conversely, as the 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.

SURGE CONTROL ACTION: The **Surge Control Pilot (3)** is typically set approximately 5-10 psi higher than the pressure reducing pilot. Therefore, under normal operation, the surge control pilot is closed and has no effect on valve operation. However, if downstream pressure should start to build rapidly, as would be caused by a sudden cessation or reduction in demand, the surge pilot will open wide and literally "dump" full inlet pressure into the main valve diaphragm chamber. The main valve therefore closes very quickly in order to hold the pressure buildup to a minimum.

INSTALLATION

The 127-5 is furnished fully factory-assembled and ready for installation at the appropriate point in the system. The user is referred to the Basic Valve section of this manual for full installation details.

STARTUP AND ADJUSTMENT

The following procedures should be followed in the order presented in order to effect an initial startup of the 127-5.

1. Install a pressure gauge of the proper range downstream of the 127-5.

2. Remove the plastic cap from the pressure reducing pilot (2) and loosen the adjusting screw jam nut. Turn the adjusting screw **counterclockwise** until it is loose enough to be turned by hand.

3. Remove the plastic cap from the surge control pilot (3) and loosen the adjusting screw jam nut. Turn the adjusting screw **clockwise** to a full stop.

4. Turn the adjusting screw of the flow control valve fully **clockwise,** then back it off **three full turns.**

5. Start the pump, or otherwise start the system flowing. The main valve will at this time be either fully closed or open only a very small amount.

6. Carefully loosen one of the pipe plugs in the main valve bonnet until fluid appears around the threads. When only clear fluid (no air) is discharging, retighten the plug.

7. Slowly turn the adjusting screw of the pressure reducing pilot **clockwise** until the dowstream pressure rises to point approximately 10-15 psi **above** the desire set point. If necessary, restrict demand slightly in order to set the pressure this high.

8. Slowly turn the adjusting screw of the surge control pilot **counterclockwise** until downstream pressure decreases to a point 5-10 psi above the desired set point. Tighten the adjusting screw jam nut and replace the plastic cap.

9. Slowly turn the adjusting screw of the pressure reducing pilot **counterclockwise** until downstream pressure decreases to the desired set point. Tighten the adjusting screw jam nut and replace the plastic cap.

10. If there are small-scale oscillations in the downstream pressure, slowly turn the adjusting screw of the flow control valve clockwise until the oscillations disappear. CAUTION: Never close this valve fully. To do so will prevent the main valve from opening.

11. If pressure readjustment should ever be required, the pressure reducing pilot is adjusted **clockwise** to **increase** pressure; **counterclockwise** to **decrease** pressure. The same applies to the surge control pilot.

MAINTENANCE

Due to the simplicity of design of the 127-5, required maintenance is minimal. However, the following checks, periodically performed, will do much to keep the valve operating properly and efficiently.

1. Check for chipped or peeling paint.
2. Check for leaks at fittings and around flanges and connections. Tighten as required.
3. If the valve is equipped with a Y-strainer, check the screen for build-up of solid material. Clean as required. This point is most important, as a clogged strainer can keep the valve from operating properly. On new installations, it is recommended that the strainer be checked every day or two until experience dictates a greater or lesser interval.

TROUBLESHOOTING

In the event of malfunction of the 127-5, the following guide should enable the technician to isolate the specific cause of the problem.

MAIN VALVE FAILS TO OPEN

1. Valve closed downstream of 127-5 — Open as required.
2. Flow control valve fully closed — See Adjustment instructions.
3. Pressure reducing pilot adjusted too far counterclockwise — See Adjustment instructions.
4. Surge control pilot adjusted too far counterclockwise — See Adjustment instructions.
5. Stem of pressure reducing pilot binding — See 1340 section of this manual.
6. Seat of surge pilot deteriorated — Disassemble pilot and replace seat. See 1330 section of this manual.
8. Stem of main valve binding or diaphragm ruptured — See Basic Valve section of this manual.

MAIN VALVE FAILS TO CLOSE

1. Strainer clogged. Clean as required.
2. Pressure reducing pilot adjusted too far clockwise. See Adjustment instructions.
3. Diaphragm of pressure reducing pilot ruptured. This will be evidenced by a discharge of fluid from the vent port in the pilot bonnet. Disassemble pilot and replace diaphragm.
4. Pressure reducing pilot stem binding or seat badly deteriorated. Disassemble pilot and determine cause. See 1340FC section of this manual.
5. Main valve stem binding or object in valve. Disassemble valve and determine cause. See Basic Valve section of this manual.

MAIN VALVE OPENS AND CLOSES, BUT DOES NOT CONTROL PRESSURE

1. If the pressure remains **too high** despite adjustment of the pressure reducing pilot, refer to Main Valve Fails to Close, above.
2. If pressure remains too low despite adjustment of the pressure reducing pilot, refer to Main Valve Fails to Open, above.
3. If pressure oscillates, you may likely be in a period of very low demand. Frequently this problem will disappear as demand increases. In the meantime, further closing of the flow control valve may help damp out the oscillations. In an extreme case, try adjusting the pressure slightly higher.

MAIN VALVE FUNCTIONS NORMALLY, BUT NO SURGE CONTROL ACTION

1. Ball Valve in series with surge pilot or on surge pilot sense line closed. Open as required.
2. Surge pilot set too far clockwise. See Adjustment instructions.
3. Diaphragm of surge pilot ruptured. This will be evidenced by a discharge of fluid from the vent hole in the pilot bonnet. Disassemble pilot and replace diaphragm.
4. Stem of surge pilot binding. disassemble pilot and determine cause. See 1330 section of this manual.

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

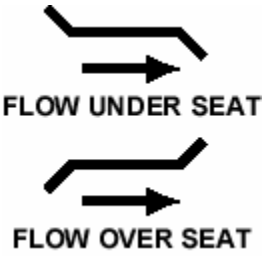
2. VALVE FAILS TO CLOSE

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

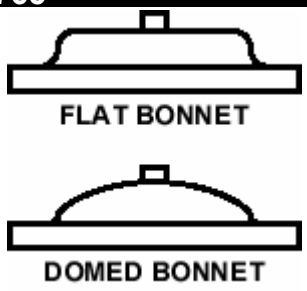
3. VALVE OPENS AND CLOSES BUT LEAKS WHEN CLOSED

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)

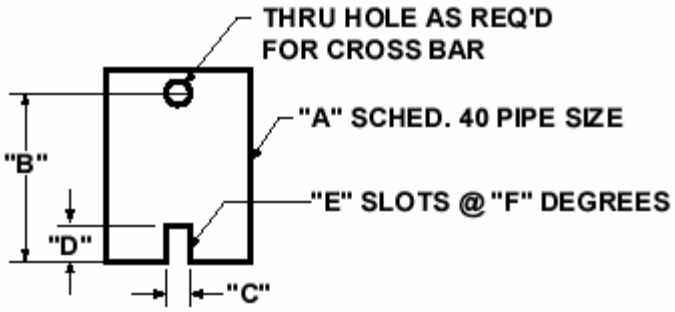
VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 A	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
4" (100)	6	1/4-20 A	6.3 (8.6)	16" (250)	12	1/2-13 H	43 (58)
6" (150)	6	3/8-16 H	19.7 (27)	18" (300)	12	1/2-13 H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

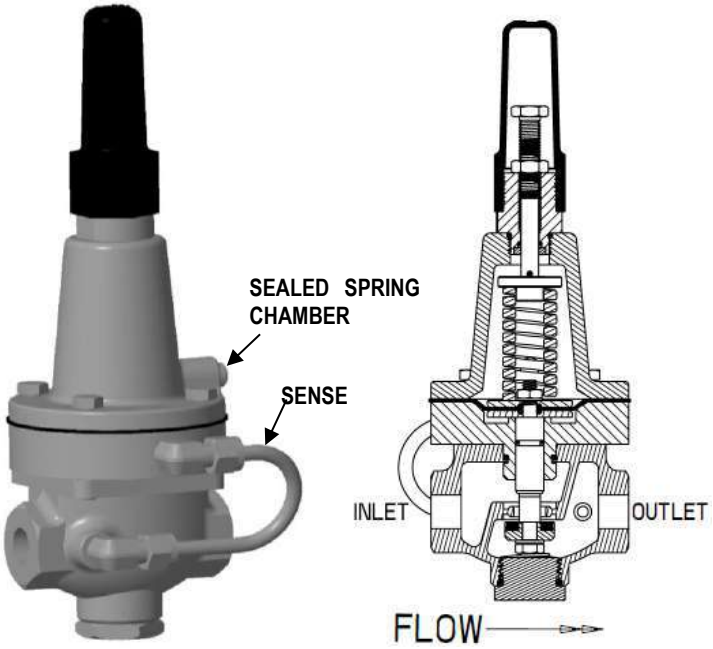
VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)	VALVE SIZE (DN)	NO. OF SCREWS	SCREW SIZE	REC. TORQUE FT-LB (N-M)
3" (80)	4	1/4-20 H	6.3 (8.6)	10" (250)	12	3/8-16 H	19.7 (27)
4" (100)	6	1/4-20 H	6.3 (8.6)	12" (300)	12	1/2-13 H	43 (58)
8" (200)	8	3/8-16 H	19.7 (27)				

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°



Installation, Operating, Maintenance Instructions

Pressure Reducing Pilot

For Petroleum Service

Model 1340P

GENERAL DESCRIPTION

The Model 1340P Pressure Reducing Pilot is a normally open, direct-acting, spring-loaded, diaphragm-type control pilot with remote or local downstream sense capabilities. The 1340p can serve many functions depending on its installation location:

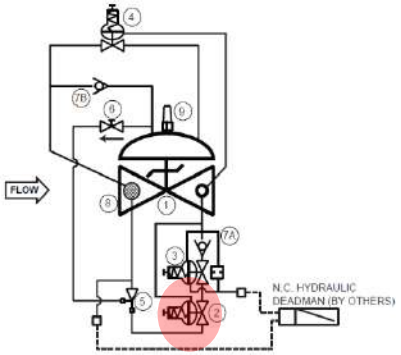
1. As the primary control pilot for the OCV 127/114 pressure reducing control valves sold into the petroleum fluids market, it is designed to hold a constant preset discharge pressure from the main valve.
2. The 1340p may also be used by as a standalone direct acting pressure reducing regulator for small systems, but system requirements must accept a CV of less than 1.5.

The 1340p is sold standard in stainless steel construction and with 3/8 NPT or 1/2 NPT end connections. The 1340p has a sealed top spring chamber to prevent petroleum product from leaking if the diaphragm should ever fail. It is available with four different adjustment ranges:

5-30 psi (green)	20-200 psi (Red/square)
20-80 psi (red/round)	100-300 psi (Blue)

FUNCTIONAL DESCRIPTION

When installed on OCV 127 or 114 control valve exterior pilot systems, the 1340p 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.



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7400 East 42nd Place / Tulsa, Oklahoma 74145 USA / 918-627-1942 / 888-628-8258 / Fax 918-622-8916
e-mail: sales@controlvalves.com / website: www.controlvalves.com

INSTALLATION AND ADJUSTMENT

The 1340p 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 1340p 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 1340p 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 plugged vent hole in the pilot bonnet. Removal of the 1/8" NPT plug will be required to inspect diaphragm condition.
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 1340P assembly drawing for parts identification. It is recommended to replace all rubber elastomers when repairing pilot.

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.

BONNET CHAMBER SEAL REPLACEMENT

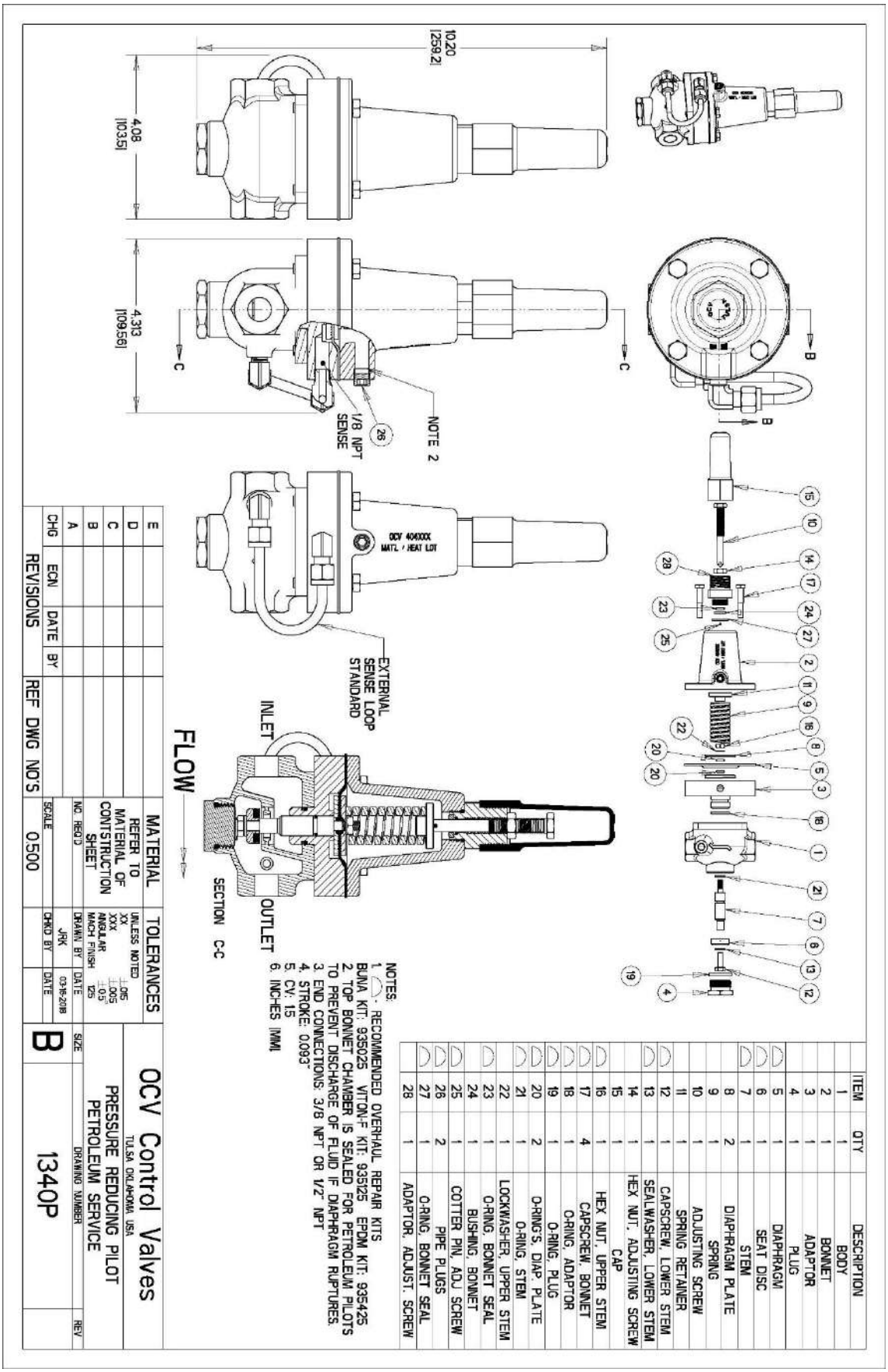
4. Remove adapter (28) assembly from bonnet (2).
5. Remove old o-ring (25).
6. Remove cotter key (25) from adjusting screw (10)
7. Remove adjusting screw. Check that adjusting screw lower polished seal surface is clean.
8. Remove and install new o-ring (23) in adapter (28).
9. Re-install adjusting screw (10) and cotter key (25).
10. Re-install adapter assembly (28) and new o-ring (25) back onto bonnet (2). Set aside.

11. Remove the plug (4) from the bottom of the pilot.

DIAPHRAGM / SEAT DISC / STEM REPLACEMENT

12. 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) & old diaphragm (5).
13. Remove adapter (3) from body (1), install new o-ring (18), and reinstall adapter (3).
14. Remove Stem (7) and seat disc assembly through bottom of pilot (1).
15. Remove capscrew (12), seal washer (13), and old seat disc (6).
16. Inspect stem and o'ring (21) carefully.

17. Remove any foreign material or light scratches from the stem with a fine grade of emery cloth. A badly scored stem should be replaced.
18. Replace o'ring (21).
19. Lubricate the o'ring and stem liberally with Vaseline® or similar lubricant.
20. Place a new seat disc, new seal washer (13), and capscrew (12) on the stem. Tighten Securely.
21. Install Stem (7) and seat disc(6) assembly through bottom of pilot body (1).
22. Install lower diaphragm plate (8), o'ring (20),
23. Install new diaphragm (5).
24. Replace upper diaphragm plate (8), o'ring (20), lock washer (22) and hex nut (16). Tighten securely.
25. Hold spring (9) and spring retainers (11) together in the proper orientation and insert them into the bonnet (2).
26. Place the bonnet assembly over the adapter (3) and insert the bonnet capscrews (17). Tighten securely.
27. Place valve back in service, following the startup and adjustment procedures given in the main portion of this manual.



ITEM	QTY	DESCRIPTION
1	1	BODY
2	1	BONNET
3	1	ADAPTOR
4	1	PLUG
5	1	DIAPHRAGM
6	1	SEAT DISC
7	1	STEM
8	2	DIAPHRAGM PLATE
9	1	SPRING
10	1	ADJUSTING SCREW
11	1	SPRING RETAINER
12	1	CAPSCREW, LOWER STEM
13	1	SEALWASHER, LOWER STEM
14	1	HEX NUT, ADJUSTING SCREW
15	1	CAP
16	1	HEX NUT, UPPER STEM
17	4	CAPSCREW, BONNET
18	1	O-RING, ADAPTOR
19	1	O-RING, PLUG
20	2	O-RING'S, DIAP. PLATE
21	1	O-RING, STEM
22	1	LOCKWASHER, UPPER STEM
23	1	O-RING, BONNET SEAL
24	1	BUSHING, BONNET
25	1	COTTER PIN, ADJ SCREW
26	2	PIPE PLUGS
27	1	O-RING, BONNET SEAL
28	1	ADAPTOR, ADJUST. SCREW

NOTES:
1. ◯ - RECOMMENDED OVERHAUL REPAIR KITS
BUNA KIT: 935025 VITON-F KIT: 935125 EPDM KIT: 935425
2. TOP BONNET CHAMBER IS SEALED FOR PETROLEUM PILOTS TO PREVENT DISCHARGE OF FLUID IF DIAPHRAGM RUPTURES.
3. END CONNECTIONS: 3/8 NPT OR 1/2" NPT
4. STROKE: 0.093"
5. CV: 1.5
6. INCHES [MM]

REVISIONS				
	ECN	DATE	BY	
E				
D				
C				
B				
A				
CHG				

REF DWG NO'S	

MATERIAL
REFER TO MATERIAL OF CONTSTRUCTION SHEET
NO. REQ'D

TOLERANCES
UNLESS NOTED
.XX ±.05
.XXX ±.005
ANGULAR ±.5°
MACH. FINISH 125
DRAWN BY JRK DATE 03-16-2018
CHKD BY DATE

SCALE 0.500

SIZE B

DRAWING NUMBER 1340P

REV

OCV Control Valves
TULSA, OKLAHOMA, USA
PRESSURE REDUCING PILOT
PETROLEUM SERVICE

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7400 East 42nd Place / Tulsa, Oklahoma 74145 USA / 918-627-1942 / 888-628-8258 / Fax 918-622-8916
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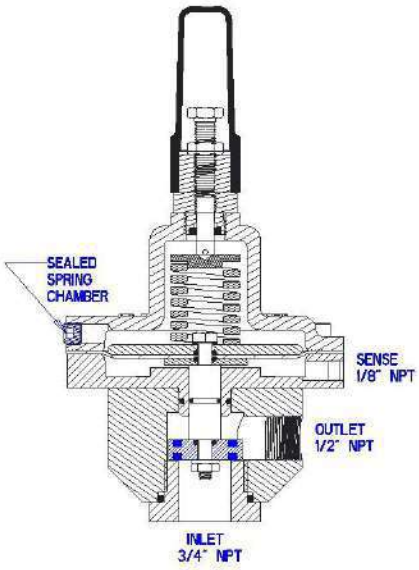


Installation, Operating, Maintenance Instructions

Pressure Surge Pilot

For petroleum Service

Model 2470

GENERAL DESCRIPTION

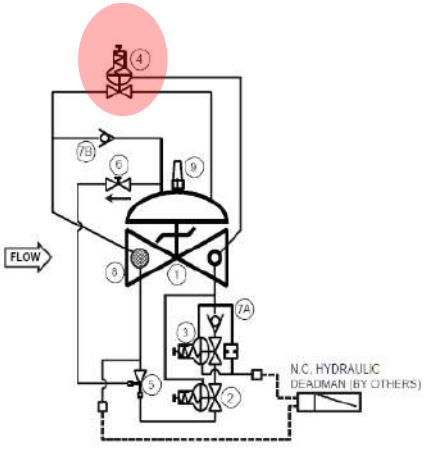
The Model 2470 Surge Pilot is a normally closed, direct-acting, spring-loaded, diaphragm-type control pilot with remote or local downstream sense capabilities. The 2470 was specifically designed to limit pressure surges downstream of OCV model 127/114 pressure reducing valves in aviation fuel loading systems. The 2470 is very similar to the OCV 1330p relief pilot, but it has a large port capacity which allows for faster response on larger OCV main valves. It is used on pressure reducing valves 4inch and larger when loading fuel directly into airplanes. It is used on pressure reducing valves 6in and larger for fueling valves loading into other critical devices in aviation systems.

The 2470 is sold standard in stainless steel construction and with 3/8 NPT or 1/2 NPT end connections. The 2470 has a sealed top spring chamber to prevent petroleum product from leaking externally if the diaphragm should ever fail. The 2470 is only available with a 20-80psi spring range which is typically seen in aircraft loading.

FUNCTIONAL DESCRIPTION

The 2470 is installed on a 127-5 or 114 pressure reducing control valve external pilot systems as a surge pilot sensing outlet pressure. The pilot provides additional closing speed for the main valve when outlet pressure surges too fast. The downstream pressure is sensed under the diaphragm of the pilot and is balanced against an adjustable spring load.

- As the downstream pressure increases above the set point, the pilot opens wider, increasing the pressure in the diaphragm chamber of the main valve, closing the main valve. Since the 2470 pilot has oversized ports, it can close the OCV main valve very rapidly to prevent over pressurization downstream at the airplane wing.
- Conversely, as downstream pressure decreases below the set point, the 2470 pilot closes further. When the 2470 surge pilot closes fully, it has no effect on the 114/127 pressure reducing valve and the primary pressure control function takes full control.



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INSTALLATION AND ADJUSTMENT

For 114 models with downstream surge control, the 2470 is installed in the main valve control piping between the upstream body tap and the top bonnet tap. Flow must be in the direction indicated. The pilot typically senses outlet pressure further downstream at a venturi, as is common in direct fueling to aircraft.

Surge pilot pressure setting is normally 5-10psi higher than the primary pressure reducing pilot. Be sure to review instructions in the 127/114 control valve manual for more specific instructions. Adjustment is made by means of a single adjusting screw

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

MAINTENANCE

Required maintenance of the 2470 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 2470 pilot. These, and the symptoms they can cause, are as follows:

PILOT DIAPHRAGM RUPTURED: - Results in the main valve closing too slowly. Downstream pressure may rise too high during sudden reductions in flow. A ruptured pilot diaphragm will be evidenced by leakage through the plugged vent hole in the pilot bonnet. Removal of the 1/8" NPT plug will be required to inspect diaphragm condition.

PILOT SEAT DISC DETERIORATED: Outlet pressure may be unstable or too low under flowing conditions.

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 2470 assembly drawing for parts identification. It is recommended to replace all rubber elastomers when repairing pilot. To replace seat disc and stem, lower adapter (11) must be removed. For overhaul of the pilot, please remove pilot from 114/127 pilot system.

1. Prior to disassembling the pilot, turn the adjusting screw (12) fully counterclockwise until it is loose enough to be turned with the fingers.
2. Remove the eight bonnet capscrews (18).
3. Remove the bonnet (2). Set the spring (9) and spring retainers (10) aside in a safe place.

BONNET CHAMBER SEAL REPLACEMENT

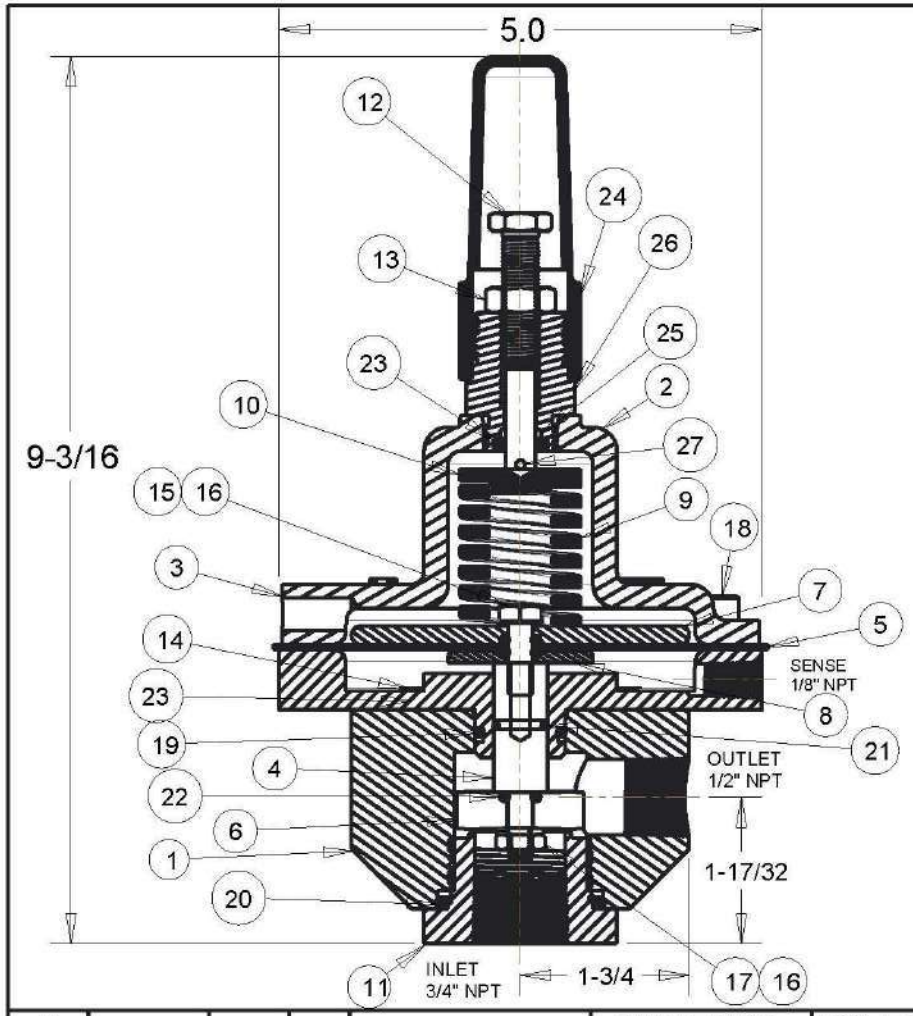
4. Remove guide (26) assembly from bonnet (2).
5. Remove old o-ring.
6. Remove cotter key (27) from adjusting screw (12)
7. Remove adjusting screw. Check that adjusting screw lower polished seal surface is clean.
8. Remove and install new o-ring (23) in guide (26).
9. Re-install adjusting screw (12) and cotter key (27).
10. Re-install guide assembly (26) and new o-ring back onto bonnet (2). Set aside.

DIAPHRAGM / SEAT DISC / STEM REPLACEMENT

11. Remove lower adapter (11).
12. Removed four countersink screws(14) and o'ring (23).
13. Using a 7/16" socket as a backup on hex nut (17), Remove hex nut (16), lock washer (15), diaphragm plates (7&8) and o'rings & old diaphragm (5).
14. Remove Stem (4) and seat disc(6) assembly through bottom of pilot body (1).
15. Remove hex nut (17), seal washer (16), o'ring (22), and old seat disc (6).

    CAUTION: Take care not to damage stem (4) surface while removing hex nut (17). The stem doesn't incorporate flats for holding the stem. Please use a soft jaw wrench to hold the stem from turning.

16. Inspect stem (4) and o'ring (21) carefully.
17. Remove any foreign material or light scratches from the stem with a fine grade of emery cloth. A badly scored stem should be replaced.
18. Replace o'ring (21)
19. Lubricate the o'ring and stem liberally with Vaseline® or similar lubricant.
20. Place a new seat disc, new seal washer (16), o'ring (22), and hex nut (17) on the stem. Tighten Securely.
21. Remove adapter (3) from body (1), install new o-ring (19).
22. Re-install adapter (3), install four new o-ring (23), install four screws (14).
23. Install Stem (4) and seat disc(6) assembly through bottom of pilot body (1).
24. Install lower diaphragm plate (8), o'ring,
25. Install new diaphragm (5).
26. Replace upper diaphragm plate (7), o'ring, lock washer (16) and hex nut (15). Tighten securely.
27. Install o'ring (20) on lower adapter (11)
28. Install lower adapter (11) on body (1).
29. Hold spring (9) and spring retainers (10) together in the proper orientation and set them on top of the diaphragm plate (7)
30. Place the bonnet assembly over the adapter plate (3) and insert the bonnet capscrews (18). Tighten securely.
31. Place valve back in service, following the startup and adjustment procedures given in the main portion of this manual.



▲ = RECOMMENDED SPARE PARTS

ITEM	PART NO.	QTY	DESCRIPTION	MATERIAL
27	620712	1	COTTERKEY (NOT SHOWN)	STN. STEEL
26	320816	1	GUIDE, ADJ. SCREW	STN. STEEL
25	320718	1	BUSHING, ADJUSTING SCREW	STN. STEEL
24	692002	1	CAP	BUTYRATE
▲ 23	611011	4	O-RING	VITON
▲ 22	611010	2	O-RING	VITON
▲ 21	611013	1	O-RING	VITON
▲ 20	610222	1	O-RING	BUNA-N
▲ 19	611116	1	O-RING	VITON
18	530701	8	SKT. HD. CAPSCREW	STN. STEEL
17	590712	1	HEX NUT	STN. STEEL
16	685763	2	LOCKWASHER	STN. STEEL
15	531700	1	HEX. HD. CAPSCREW	STN. STEEL
14	532702	4	FLAT HD. CAPSCREW	STN. STEEL
13	590717	1	JAM NUT	STN. STEEL
12	320724	1	ADJUSTING SCREW	STN. STEEL
11	300771	1	ADAPTOR	STN. STEEL
10	300710	1	SPRING RETAINER	STN. STEEL
9	651414	1	SPRING , 20-80 PSI	STN. STEEL
8	308702	1	LOWER DIAPHRAGM PLATE	STN. STEEL
7	308720	1	UPPER DIAPHRAGM PLATE	STN. STEEL
▲ 6	310736	1	SEAT DISC	SS/BUNA-N
▲ 5	694004	1	DIAPHRAGM	BUNA-N
4	314744	1	STEM	STN. STEEL
3	300771	1	ADAPTOR PLATE	STN. STEEL
2	304730	1	BONNET	STN. STEEL
1	302721	1	BODY	STN. STEEL

CHG	ECN	DATE	BY	REF DWG NO'S
E				
D				
C				
B				
A				

REVISIONS

MATERIAL: STN STL/ BUNA

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

NO. REQ'D

DRAWN BY: JRK — DATE: 4-13-2015

SCALE: 60% — CHKD BY — DATE

OCV Control Valves
TULSA OKLAHOMA USA

2470
HIGH CAPACITY SURGE CONTROL PILOT

SIZE	DRAWING NUMBER	REV
A	230758	

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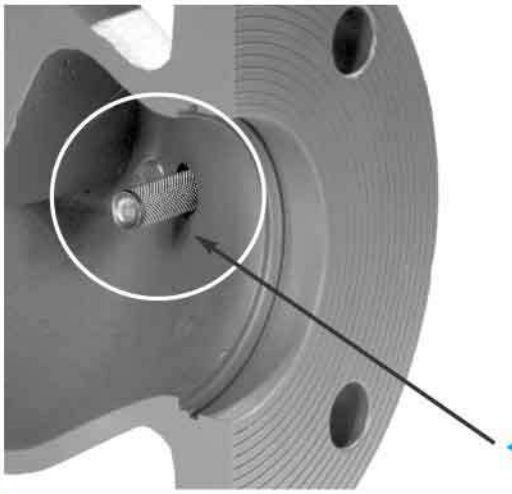


DESCRIPTION

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

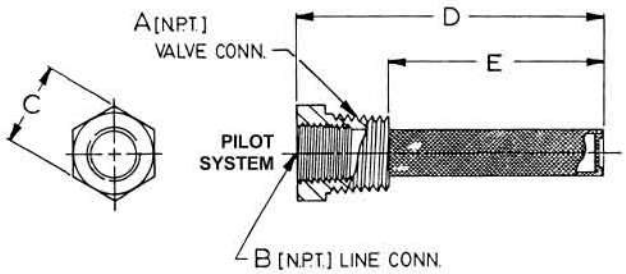
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

MATERIALS

Inline strainers are all-stainless steel construction.

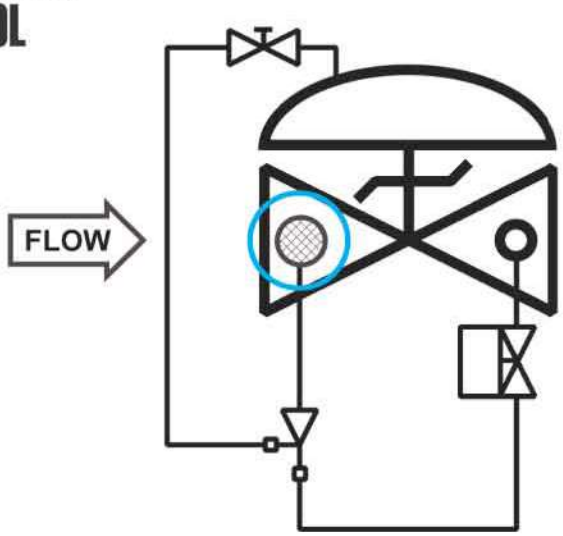
SCREEN SIZE

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.

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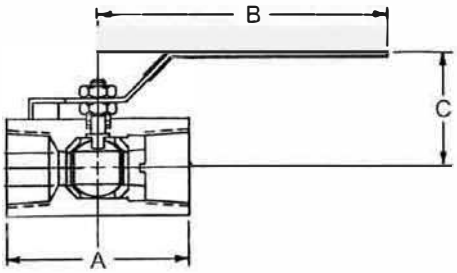
Inline Strainer 123

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.

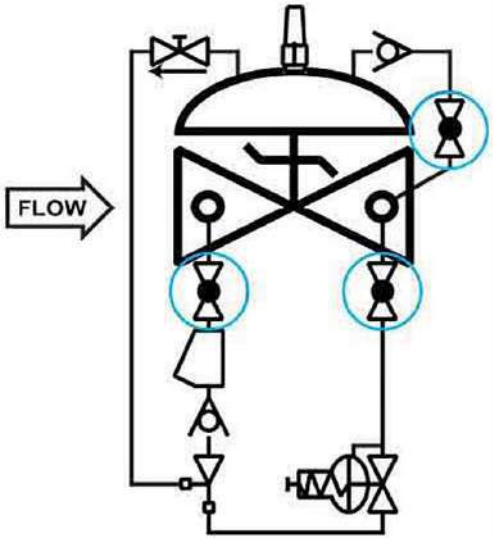
Ball valves are standard on water service valves; optional on fuel service valves.



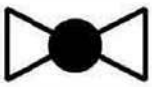
MODEL 141-4 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	B	C	USED ON VALVE SIZE*
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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email: sales@controlvalves.com • **website:** www.controlvalves.com

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.

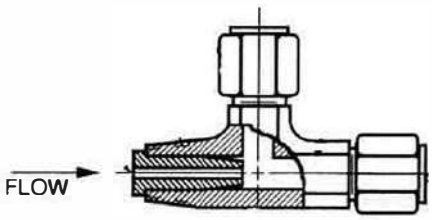
MODEL 126 EJECTOR DIAGRAM

Stainless Steel Construction

MATERIAL	PART NUMBER	P (NPT)	T-TUBE O.D.	STD. ORIFICE	USED ON VALVE SIZES
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"

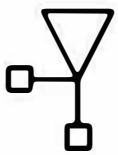
Orifice bushings are stainless steel.

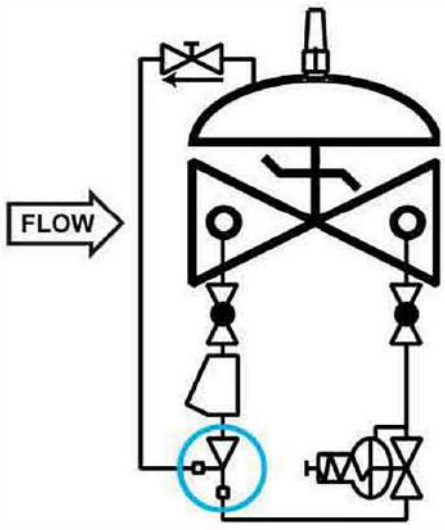
STAINLESS



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
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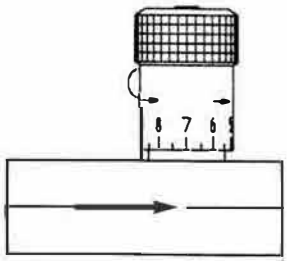
DESCRIPTION

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.

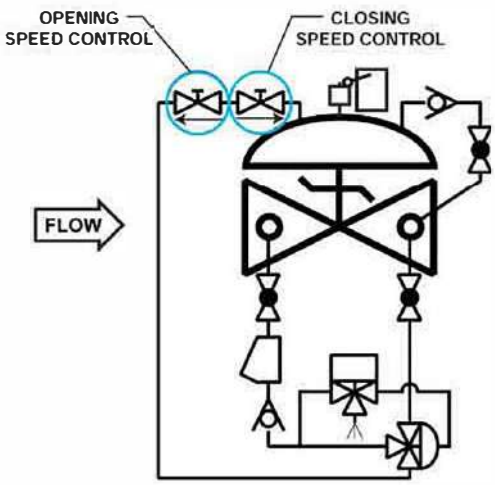


MODEL 141-3 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
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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