Operating Manual

Model #: 114-1
Size: "
Serial #:
Sales Order:

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OCV Control Valves™ LLC

Global performance. Personal touch.

refueling control valve

installation, operating and maintenance instructions

model 114-1

GENERAL DESCRIPTION

The OCV Model 114-1 is a control valve specifically designed for aircraft refueling service. Referred to as either a refueling control valve or hydrant control valve, it performs the following functions:

1. Opens and closes pneumatically from a deadman control handle.
2. While open, modulates to control downstream pressure at a predetermined set point.
3. Closes rapidly to prevent undue pressure buildup due to a rapid reduction in demand.
4. While closed, will relieve downstream thermal buildup.

The 114-1 consists of the following components, arranged as shown on the schematic diagram.

1. **Model 65 Basic Valve Assembly,** a hydraulically operated, diaphragm actuated globe valve that closes with an elastomer-on-metal seal.
2. **Model 1330 Deadman Pilot,** a two-way normally closed pilot that is the interface with the pneumatic deadman handle. Pressurizing the diaphragm of the pilot allows the main valve to open. Venting the diaphragm of the pilot causes the main valve to close.
3. **Model 1340 Pressure Reducing Pilot,** a two-way, normally-open control pilot that senses downstream (venturi) pressure under its diaphragm and balances it against an adjustable spring load. An increase in pressure above the set point tends to make the pilot close.
4. **Model 2470 Surge Control Pilot,** a two-way, normally-closed control pilot that senses downstream (venturi) pressure under its diaphragm and balances it against an adjustable spring load. An increase in pressure above the set point tends to make the pilot open.
5. **Model 126 Ejector,** a simple tee fitting with a small orifice installed in its inlet port. The ejector works with the pressure reducing pilot to enable the valve to modulate.
6. **Model 141-3 Flow Control Valve,** a needle-type valve that provides adjustable, restricted flow in one direction, and free flow in the opposite direction. On the 114-1, the flow control valve is connected as an **opening speed control**.
7. Two **Model 141-1 Check Valves** that give the 114-1 its thermal relief and defueling capability.
8. **Model 123 Inline Strainer** that protects the pilot system from solid contaminants in the line fluid.
9. **Model 155L Visual Indicator** that enables the user to determine the valve's position at a glance.
10. **No. 550500 Hydrant Hose Adapter** that provides an API-type hose connection on the discharge side of the valve.

THEORY OF OPERATION

DEADMAN CONTROL ACTION: Squeezing the trigger of the deadman handle applies air pressure to the diaphragm of the **deadman pilot (2)**, shifting it

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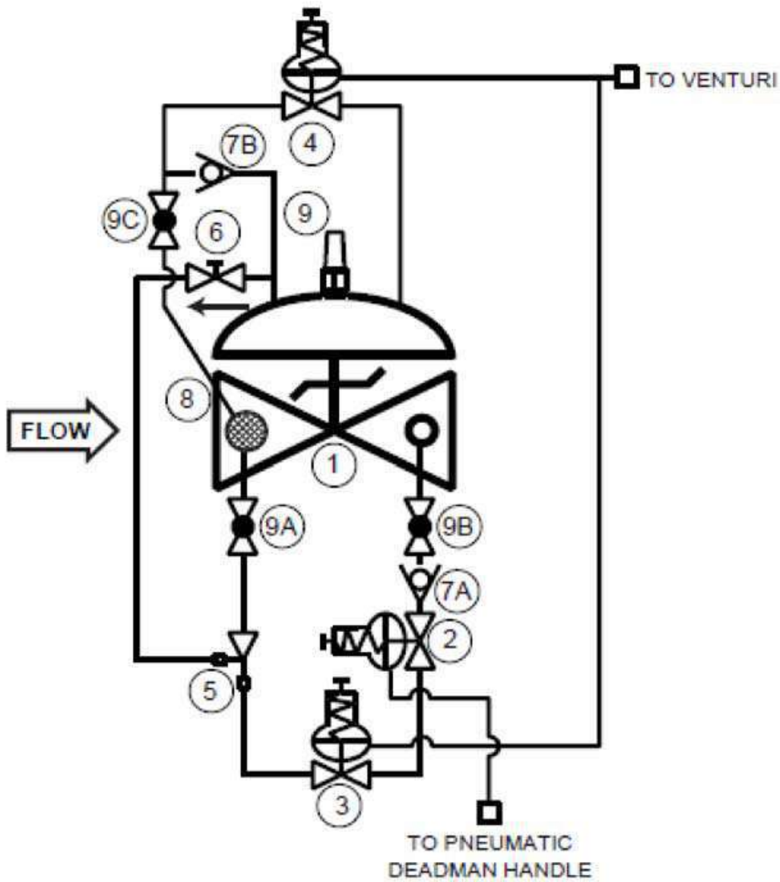


to connect the main valve diaphragm chamber to downstream, via the pressure reducing pilot. This allows the valve to open.

Releasing the trigger vents pressure from the diaphragm of the deadman pilot, directing all inlet pressure to the main valve diaphragm chamber, driving the valve quickly and tightly closed.

PRESSURE REDUCING ACTION: The **pressure reducing pilot (3)** senses the pressure at the venturi. As the pressure tends to increase above the set point, the pilot moves further closed. This results in an increase in pressure in the diaphragm chamber of the main valve through the orifice in the **ejector (5)**. The valve then closes slightly to restore the downstream pressure to the set point. Conversely, as the 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 inlet pressure or demand.

SURGE CONTROL ACTION: As explained above, the main valve tends to close as downstream pressure rises above the set point. However, the speed of this closure is limited by the size of the orifice in the ejector. In the event of a rapid reduction in demand, such as might be caused by the closure of an aircraft tank valve, the valve may not be able to close fast enough to prevent the pressure from rising beyond established limits. For this reason, the 114-1 is equipped with a **surge control pilot (4).** This normally-closed pilot valve is connected directly between the inlet of the valve and the diaphragm chamber, and, like the pressure reducing pilot, senses venturi pressure. It is normally set 5-10 psi higher than the reducing pilot; therefore under normal conditions it is closed and has no effect on valve operation. However, if pressure does rise to its set point, the surge control pilot opens and sends a large volume of fluid to the main valve diaphragm chamber, causing the valve to close at a rate much greater than that which can be obtained through the ejector. Therefore downstream pressure build up is held to a minimum.

DEFUEL/THERMAL RELIEF ACTION: If, for any reason, downstream pressure becomes higher than upstream pressure, **check valve (7B)** opens and relieves pressure form the main valve diaphragm, allowing the valve to open. At the same time, **check valve (7A)** closes to prevent reverse flow through the pilot system that would otherwise build up against the ejector orifice and impede the opening of the valve.

INSTALLATION

1. The 114-1 is furnished fully factory-assembled and ready for installation at the appropriate point in the system. The user is referred to the Model 65 Basic Valve section of this manual for full installation details.
2. After the valve is installed, the pneumatic deadman handle can be connected to the deadman pilot via the quick-disconnect provided.
3. Finally, a common sense line from the pressure reducing pilot and surge control pilot must be installed to the pressure compensating venturi. A quick-disconnect is provided for this purpose.

STARTUP AND ADJUSTMENTS

The following procedures should be followed in the order presented in order to effect an initial startup of the 114-1. NOTE: All valves were factory-preset at 50 psi for the pressure reducing pilot and 55 psi on the surge control pilot. If these settings are satisfactory, those steps indicated with an asterisk (*) can normally be deleted from the initial startup procedure.

1. Remove the dust cover from the hydrant hose adapter (9), and connect the hose from the hydrant hose truck.

2. Connect the sense line from the venturi to the **female** quick-disconnect on the 114-1.

3. Connect the hose from the deadman handle to the **male** quick-disconnect installed in the deadman pilot (2).

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

5* Remove the plastic cap from the surge control pilot (4) and loosen the adjusting screw jam nut. Turn the adjusting screw **clockwise** to a full stop.

6*. Loosen the adjusting screw jam nut on the opening speed control valve (6). Turn the adjusting screw **fully clockwise**, then **counter-clockwise** three full turns.

7. Start the pump or otherwise pressurize the system. The valve should remain closed.

8. 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.

9. Squeeze and hold the trigger of the deadman handle. The valve should open. If it does not, slowly turn the adjusting screw of the deadman pilot (2) **counter-clockwise** until the valve opens.

10* Slowly turn the adjusting screw of the pressure reducing pilot (2) **counter-clockwise** until the venturi pressure decreases to the desired set point **plus 10 psi**.

11* Slowly turn the adjusting screw of the surge control pilot (3) **counter-clockwise** until the pressure falls to the set point **plus 5 psi.** Tighten the adjusting screw jam nut and replace the plastic cap.

12* Slowly turn the adjusting screw of the pressure reducing pilot (2) **counter-clockwise** until the pressure falls to the set point. Tighten the adjusting screw jam nut and replace the plastic cap.

13. Release the trigger of the deadman handle and observe that the valve closes. If it does not close, slowly turn the adjusting screw of the deadman pilot (2) clockwise until the valve closes fully.

14. Shut down the system.

15. In case readjustment of the 114-1 should be required, the following summarizes the adjustment of the four adjustable controls.
    (a) Deadman pilot (2): Clockwise to allow valve to close when deadman handle is released.
    (b) Pressure Reducing Pilot (3): Clockwise to **increase** venturi pressure.
    (c) Surge Control Pilot (4): Clockwise to **increase** venturi pressure.
    (d) Flow Control Valve (6): Clockwise to **decrease** valve opening speed. *CAUTION: Never close this valve fully. To do so will prevent the valve from opening at all.*

MAINTENANCE

Because of the simplicity of design of the 114-1, required maintenance is minimal. However, the following checks, periodically performed, can do much to keep the valve operating properly and efficiently.

1. Check for chipped or peeling paint. Touch up as required.
2. Check for leaks at fittings and around flanges and connections. Tighten as required.

TROUBLESHOOTING

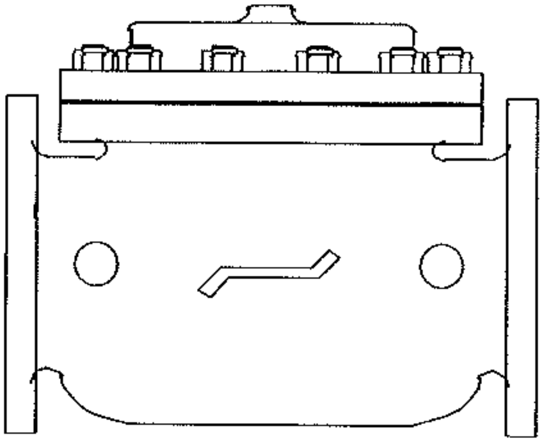
In the event of malfunction of the 114-1, the following guide should enable the technician to isolate the cause of the problem and take the appropriate corrective action.

MAIN VALVE FAILS TO OPEN/PRESSURE TOO LOW

1. Valve closed upstream or downstream of 114-1 — Open as required.
2. Trigger of deadman handle not depressed — Depress as required.
3. Deadman pilot adjusted too far clockwise — See adjustment instructions.
4. Flow control valve (6) fully closed — Open as required. See Adjustment Instructions.
5. Pressure reducing pilot (3) adjusted too far counter-clockwise — See Adjustment Instructions.
6. Surge control pilot (4) adjusted too far counter-clockwise — See Adjustment Instructions.
7. Deadman pilot (2) stem binding or diaphragm ruptured — Disassemble pilot and determine cause. See the 1330 Pilot section of this manual.
8. Stem of pressure reducing pilot (3) binding — Disassemble pilot and determine cause. See the 1340 Pilot section of this manual.
9. Stem of surge control pilot (4) binding or seat deteriorated — Disassemble pilot and determine cause. See the 1330 Pilot section of this manual.
10. Check valve (7A) stuck closed — Repair or replace as necessary.
11. Check valve (7B) stuck open — Repair or replace as necessary.
12. Stem of main valve (1) binding or diaphragm ruptured — Disassemble valve and determine cause. See the Model 65 Basic Valve section of this manual.

MAIN VALVE FAILS TO CLOSE/PRESSURE TOO HIGH

1. Defective deadman handle — Repair or replace as necessary.
2. Deadman pilot (2) adjusted too far counter-clockwise — See Adjustment Instructions.
3. Pressure reducing pilot (3) adjusted too far clockwise — See Adjustment Instructions.
4. Deadman pilot (2) stem binding or seat deteriorated — Disassemble pilot and determine cause. See the 1330 Pilot section of this manual.
5. Stem of pressure reducing pilot (3) binding or seat deteriorated — Disassemble pilot and determine cause. See the 1340 Pilot section of this manual.
6. Strainer (7) clogged — Clean as required.
7. Stem of main valve (1) binding or object caught in valve — Disassemble valve and determine cause. See the Model 65 Basic Valve section of this manual.



installation, operating, and maintenance instructions

series 65

basic control valve

GENERAL DESCRIPTION

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

FUNCTIONAL DESCRIPTION

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

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

INSTALLATION

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

1. Make a careful visual inspection of the valve to insure that there has been no damage to the external piping, fittings or controls. Check that all fittings are tight.
2. Thoroughly flush all interconnecting piping of chips, scale and foreign matter prior to mounting the valve.
3. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.
4. Allow sufficient room around the valve for ease of adjustment and maintenance service.

In addition, it is highly recommended that:

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

MAINTENANCE

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

REPAIR PROCEDURES

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

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

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

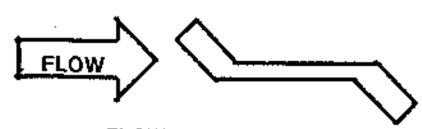
**A diaphragm failure can prevent the valve from either opening or closing, depending on the flow direction. Most water service valves flow "under the seat", in which case a diaphragm failure will keep the valve from closing. On the other hand, most fuel service valves flow "over the seat", in which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

PROCEDURE A : DIAPHRAGM REPLACEMENT

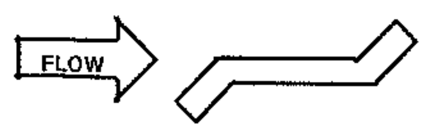
1. Isolate the valve from the system by closing upstream amd downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in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

PROCEDURE B: CORRECTION OF BINDING STEM

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



FLOW UNDER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE



FLOW OVER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO OPEN

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

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

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

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

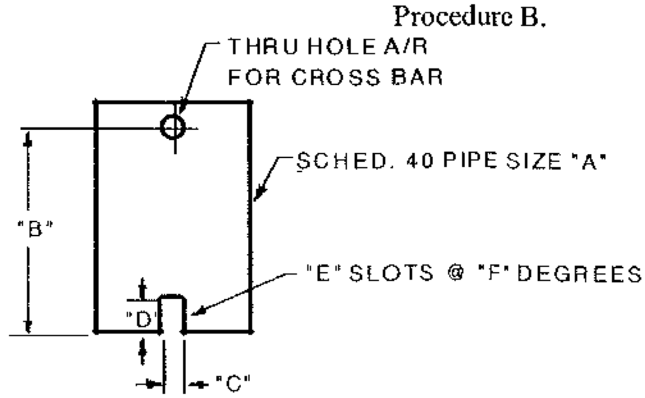
PROCEDURE C: SEAT DISC REPLACEMENT

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

PROCEDURE D: SEAT RING REPLACEMENT

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

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



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

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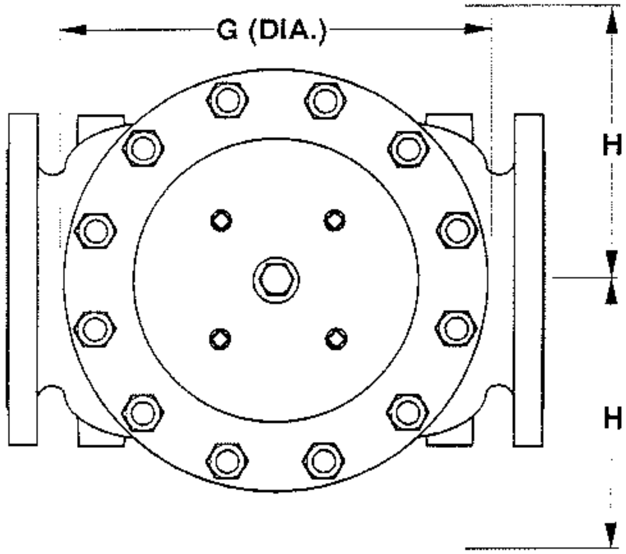
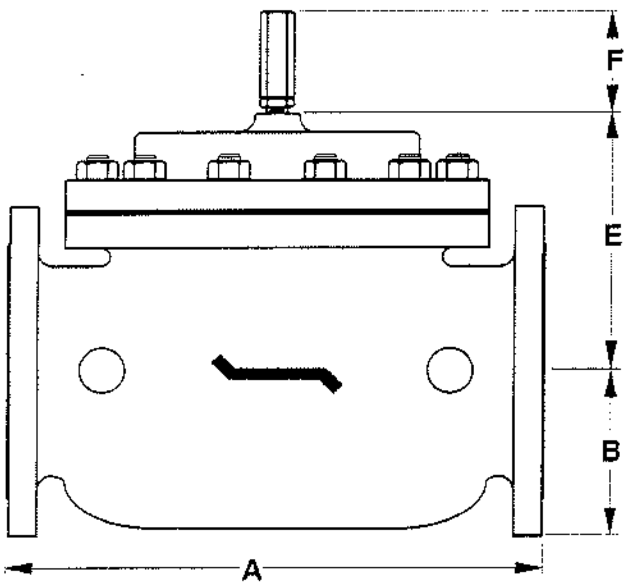
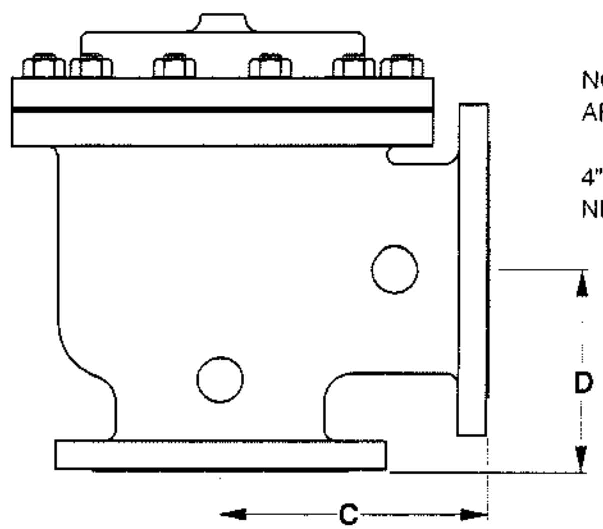




DIM	ANSI CLASS	VALVE SIZE 1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	24
A	S.E	8.75	8.75	9.88	10.50	13.00	–	–	–	–	–	–	–	–
	150	8.50	8.50	9.38	10.50	12.00	15.00	17.75	25.38	29.75	34.00	39.00	40.38	62.00
	300	8.75	8.75	9.88	11.12	12.75	15.62	18.62	26.38	31.12	35.50	40.50	42.00	63.75
B	SE	1.44	1.44	1.69	1.88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

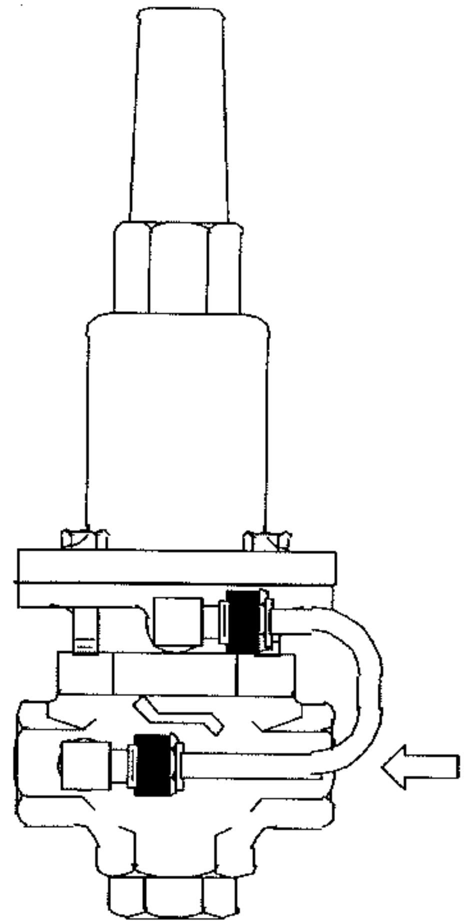


NOTE: 3" VALVE DIMENSIONS ARE FOR NEW MODEL 3100

4" VALVE DIMENSIONS ARE FOR NEW MODEL 4400

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

TOLERANCES	**OCV Control Valves** TULSA, OKLAHOMA U.S.A.
UNLESS NOTED FRACTIONAL ±1/64 DECIMAL ±.005 MACH. FINISH 125√ ANGULAR ±1/2°	**GENERAL VALVE DIMENSIONS**
DRAWN BY SDJ / DATE 10-6-97	SIZE A / DRAWING NUMBER 65D / REV. B
CHKD. BY / DATE	



installation, operating, and maintenance instructions

pressure reducing pilot

model 1340

GENERAL DESCRIPTION

The Model 1340 Pressure Reducing Pilot is a normally-open, direct-acting, spring-loaded, diaphragm-type control pilot. As the primary control pilot for the OCV Series 127 control valves, it is designed to maintain a constant preset discharge pressure from the main valve. It is a constant throttling device, maintaining precise, positive control of the main valve.

The 1340 may also be used by itself as a downstream pressure regulator.

The 1340 is available in bronze or stainless steel construction and with 3/8 NPT or 1/2 NPT end connections.

The 1340 is available with four different adjustment ranges:

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

FUNCTIONAL DESCRIPTION

The 1340 controls the pressure in the diaphragm chamber of the main valve, hence the degree of opening or closing of the valve. The downstream pressure is sensed under the diaphragm of the pilot and is balanced against an adjustable spring load. As the downstream pressure decreases below the set point, the pilot opens wider, decreasing the pressure in the diaphragm chamber of the main valve, opening the valve a proportionate amount. Conversely, as downstream pressure increases above the set point, the pilot closes further, increasing the pressure in the diaphragm chamber of the main valve, closing the valve a proportionate amount. The net result is a constant modulating action of the pilot and main valve, keeping the downstream pressure at the set point within very close limits.

INSTALLATION AND ADJUSTMENT

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

OCV Control Valves

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e-mail: sales@controlvalves.com / website: www/controlvalves.com

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

Clockwise adjustment **increases** downstream pressure.

Counterclockwise adjustment **decreases** downstream pressure.

MAINTENANCE

Required maintenance of the 1340 is minimal. Fittings and bolts should be periodically checked, and the body should be inspected for damage or excessive buildup of foreign material.

TROUBLESHOOTING

Other than improper adjustment, there are basically only three malfunctions which can occur with the 1340 pilot. These, and the symptoms they can cause, are as follows:

1. PILOT DIAPHRAGM RUPTURED: Results in failure of the main valve to close and/or downstream pressure that is too high. A ruptured pilot diaphragm will be evidenced by leakage through the vent hole in the pilot bonnet.
2. PILOT SEAT DISC DETERIORATED: Results in a downstream pressure that drifts too high under dead-end (zero flow) conditions.
3. PILOT STEM BINDING: Typically results in poor pressure control, though in extreme cases, it can result in failure of the main valve to open or close.

REPAIR PROCEDURES

Refer to the 1340 assembly drawing for parts identification.

A. DIAPHRAGM REPLACEMENT

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

B. SEAT DISC REPLACEMENT

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

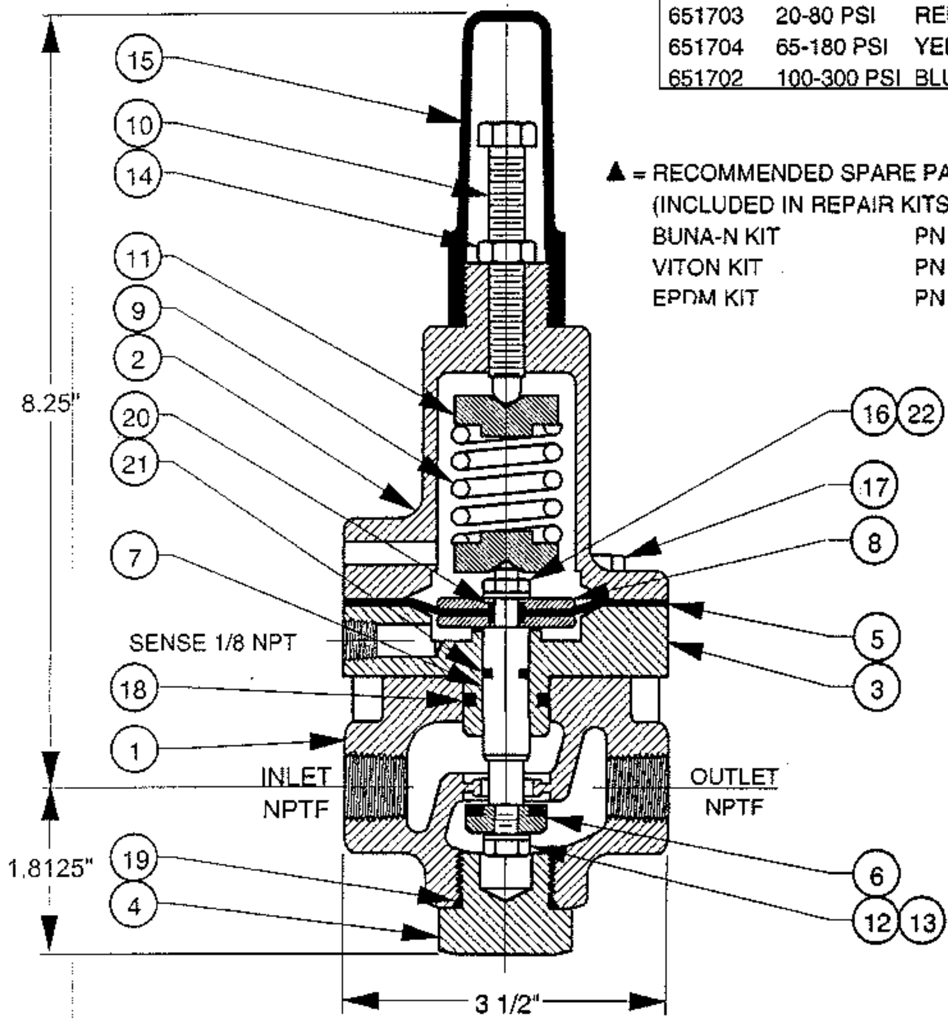
C. STEM REPAIR

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

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

▲ = RECOMMENDED SPARE PARTS
(INCLUDED IN REPAIR KITS)

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



	ITEM	PART NO	QTY	DESCRIPTION		MATERIAL
	1	302102	1	BODY	3/8" NPTF	BRONZE
		302104			1/2" NPTF	
		302702			3/8" NPTF	STN STEEL
		302704			1/2" NPTF	
	2	304102	1	BONNET		BRONZE
		304702				STN STEEL
	3	300129	1	ADAPTOR		BRONZE
		300719				STN STEEL
	4	692502	1	PLUG		ZINC PLTD STL
		310730				STN STEEL
▲	5	694002	1	DIAPHRAGM		BUNA-N / NYLON
		694102				VITON / NYLON
		694016				EPDM / NYLON
▲	6	310703	1	SEAT DISC		BUNA-N / SS
		310709				VITON / SS
		310707				EPDM / SS
	7	314704	1	STEM		STN STEEL
		314004				MONEL
	8	308102	2	DIAPHRAGM PLATE		BRASS
		308702				STN STEEL
	9	CHART	1	SPRING		STN STEEL
	10	300700	1	ADJUSTING SCREW		STN STEEL
	11	300134	2	SPRING RETAINER		BRASS
		300729				STN STEEL
	12	531700	1	HEX HEAD CAPSCREW		STN STEEL
▲	13	685760	1	LOCKWASHER		STN STEEL
	14	590717	1	HEX NUT		STN STEEL
	15	692002	1	CAP		PVC
	16	590712	1	HEX NUT		STN STEEL
	17	531701	4	HEX HEAD CAPSCREW		STN STEEL
▲	18	611116	1	O-RING		VITON
		614116				EPDM
▲	19	610912	1	O-RING		BUNA-N
		611912				VITON
		914912				EPDM
▲	20	611010	2	O-RING		VITON
		614010				EPDM
▲	21	611012	1	O-RING		VITON
		614012				EPDM
	22	685700	1	LOCKWASHER		STN STEEL

CHG	E.C. NO.	DATE	BY

REVISIONS

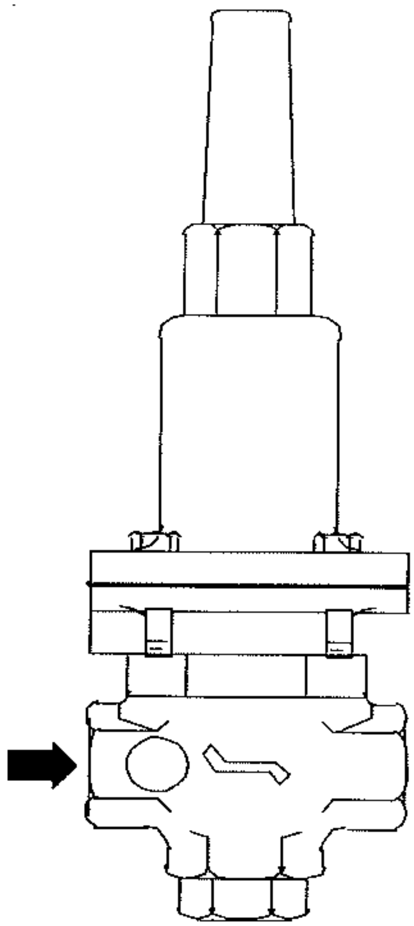
REF DWG NO'S

MATERIAL	TOLERANCES	
NOTED	UNLESS NOTED FRACTIONAL ±1/64 DECIMAL ±.005 MACH. FINISH 125 √ ANGULAR ±1/2°	
NO. REQ'D	DRAWN BY RON	DATE 2-15-96
SCALE 1/2	CHKD. BY	DATE

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

MODEL 1340 PILOT 3/8"-1/2" NPTF
PRESSURE REDUCING

SIZE	DRAWING NUMBER	REV.
A	1340	



installation, operating, and maintenance instructions

pressure sustaining/ pressure relief pilot

model 1330

GENERAL DESCRIPTION

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

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

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

The 1330 is available with four different adjustment ranges:

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

FUNCTIONAL DESCRIPTION

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

INSTALLATION AND ADJUSTMENT

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

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e-mail: sales@controlvalves.com / website: www/controlvalves.com

control piping ahead of the ejector.

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

Clockwise adjustment **increases** upstream pressure.

Counterclockwise adjustment **decreases** upstream pressure.

MAINTENANCE

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

TROUBLESHOOTING

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

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

REPAIR PROCEDURES

Refer to the 1330 assembly drawing for parts identification.

A. DIAPHRAGM REPLACEMENT

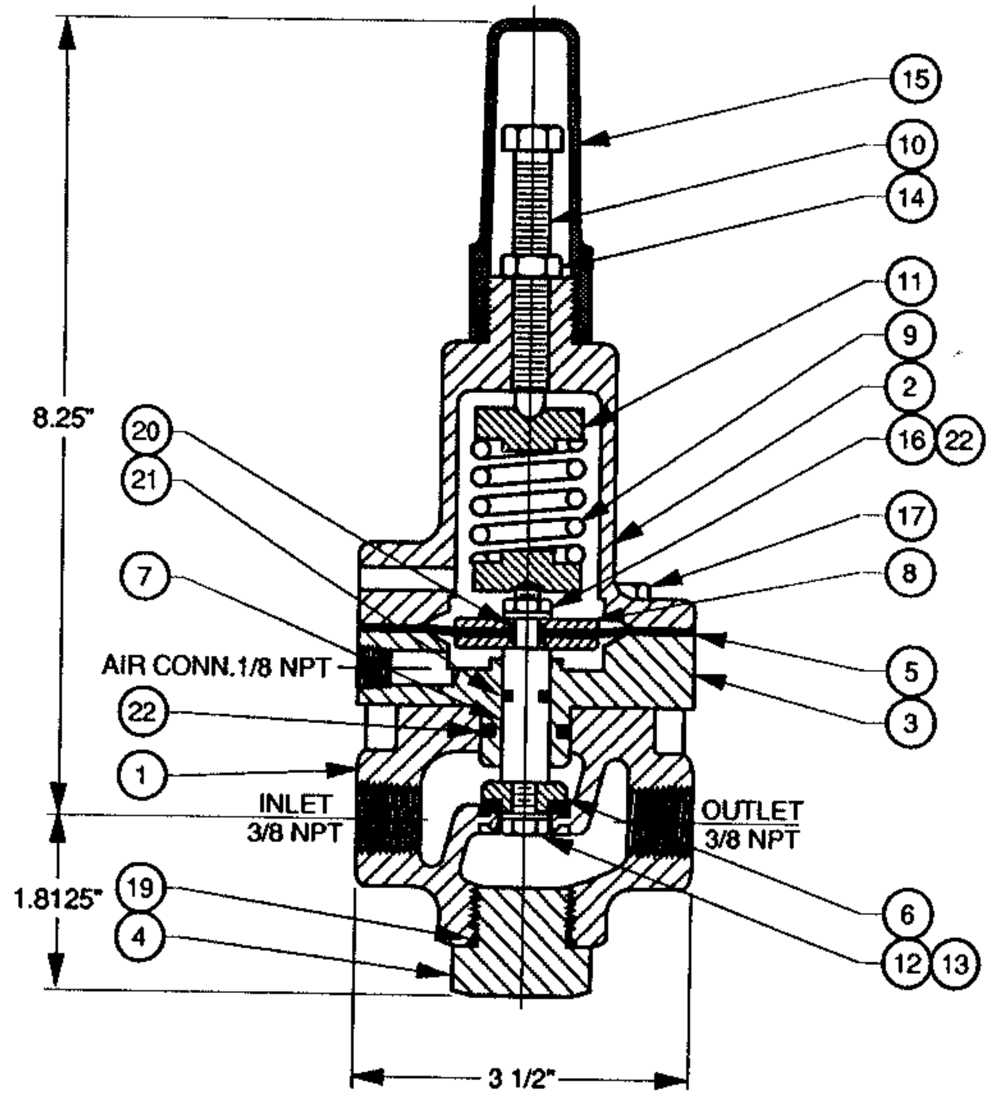
1. Prior to disassembling the pilot, turn the adjusting screw (10) fully counterclockwise until it is loose enough to be turned with the fingers.
2. Remove the four bonnet capscrews (17).
3. Remove the bonnet (2). Set the spring (9) and spring retainers (11) aside in a safe place.
4. Pull the adapter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

B. SEAT DISC REPLACEMENT

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

C. STEM REPAIR

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



ITEM	PART NO.	QTY	DESCRIPTION	MATERIAL
22	685700	1	LOCKWASHER	STN, STEEL
21	611012	1	O-RING	VITON
20	611010	2	O-RING	VITON
19	610119	1	O-RING	BUNA-N
18	611118	1	O-RING	VITON
17	531701	4	HEX HD CAPSCREW	STN. STEEL
16	590712	1	HEX NUT	STN. STEEL
15	692002	1	CAP	PVC
14	590717	1	HEX NUT	STN. STEEL
13	685760	1	LOCKWASHER	STN. STEEL
12	531700	1	HEX HD CAPSCREW	STN. STEEL
11	300729	2	SPRING RETAINER	STN. STEEL
10	300700	1	ADJUSTING SCREW	STN. STEEL
9	651703	1	SPRING	STN. STEEL
8	308702	2	DIAPHRAGM PLATE	STN. STEEL
7	314702	1	STEM	STN. STEEL
6	310718	1	SEAT DISC	SS/BUNA-N
5	694002	1	DIAPHRAGM	NYLON/BUNA-N
4	692502	1	PLUG	STN. STEEL
3	304702	1	ADAPTER	STN. STEEL
2	300719	1	BONNET	STN. STEEL
1	302702	1	BODY	STN. STEEL

CHG	E.C. NO.	DATE	BY

REVISIONS

REF DWG NO'S

MATERIAL

NO. REQ'D

SCALE 1/2

TOLERANCES

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

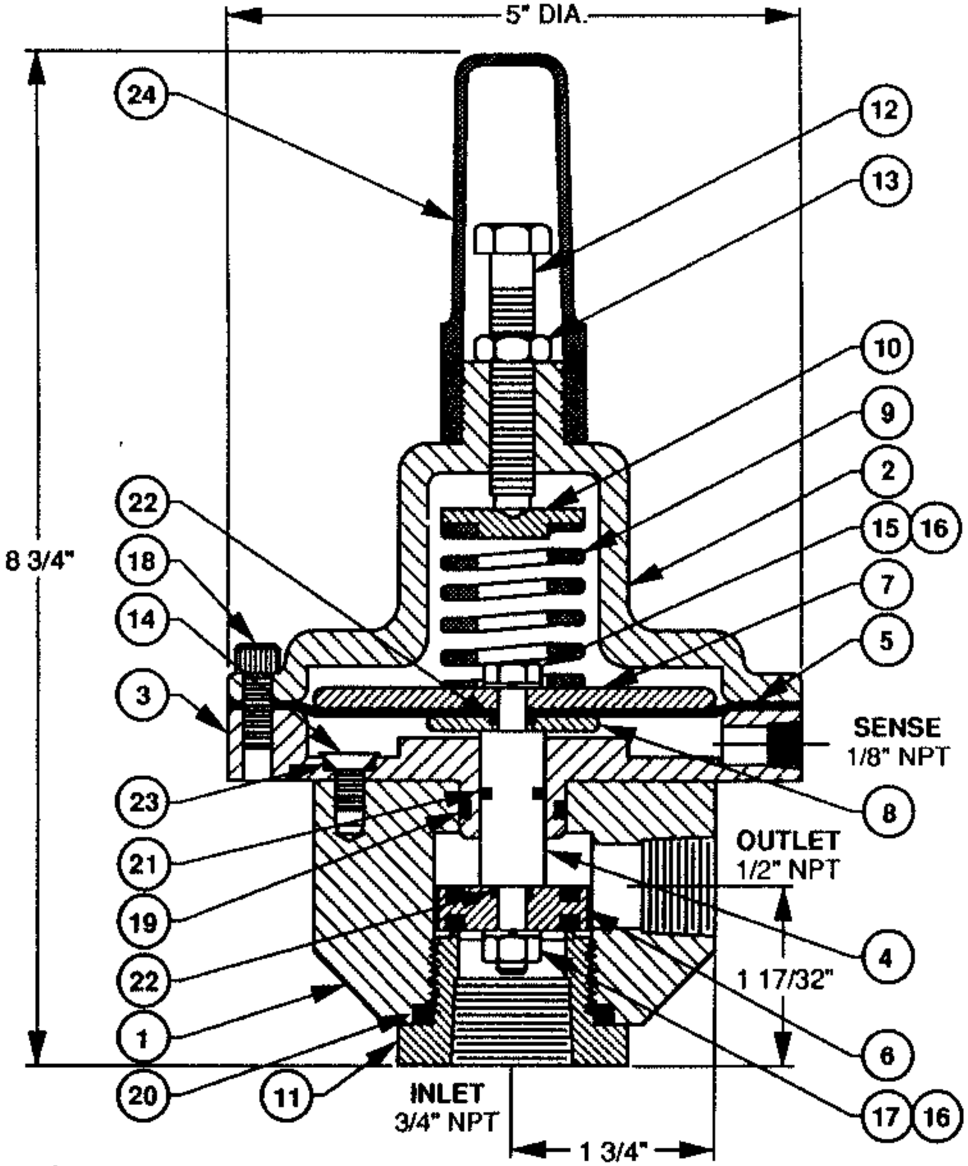
DRAWN BY SDJ | DATE 12-13-94

CHKD. BY | DATE

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

PNEUMATIC DEADMAN PILOT

SIZE A | DRAWING NUMBER 1330 | REV.



▲ - RECOMMENDED SPARE PARTS
VITON ELASTOMERS AVAILABLE

	ITEM	PART NO.	QTY	DESCRIPTION	MATERIAL
	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	LOCK WASHER	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	300700	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	CR-V 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	300706	1	ADAPTOR	STN. STEEL
	2	304714	1	BONNET	STN. STEEL
	1	302721	1	BODY	STN. STEEL

CHG	E.C. NO.	DATE	BY

REVISIONS

REF DWG NO'S

MATERIAL

STN STL / BUNA-N

NO. REQ'D

SCALE 60%

TOLERANCES

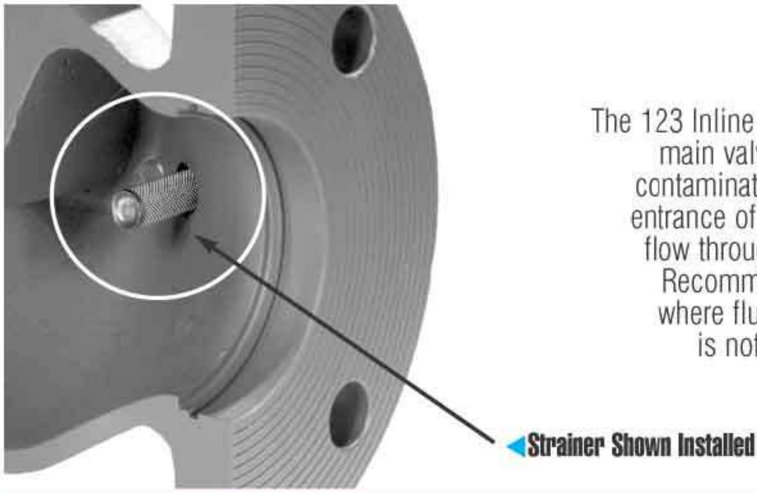
UNLESS NOTED
FRACTIONAL ±1/64
DECIMAL ±.005
MACH. FINISH 125 √
ANGULAR ±1/2°

DRAWN BY	DATE
SDJ	1-24-94
CHKD. BY	DATE

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

HIGH CAPACITY SURGE CONTROL PILOT

SIZE	DRAWING NUMBER	REV.
A	2470	



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

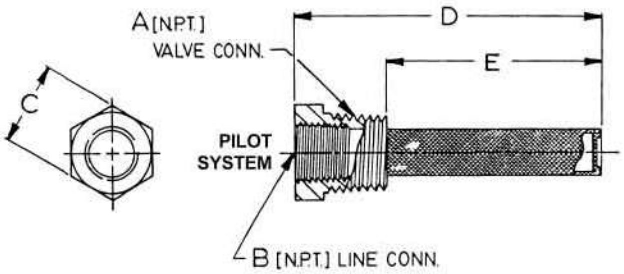
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

MATERIALS

Inline strainers are all-stainless steel construction.

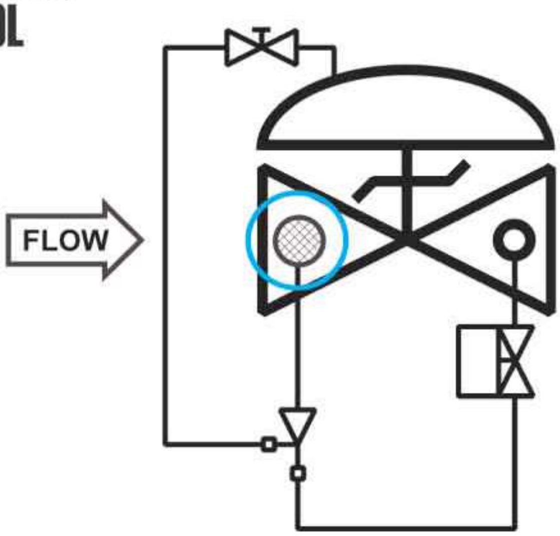
SCREEN SIZE

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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DESCRIPTION

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

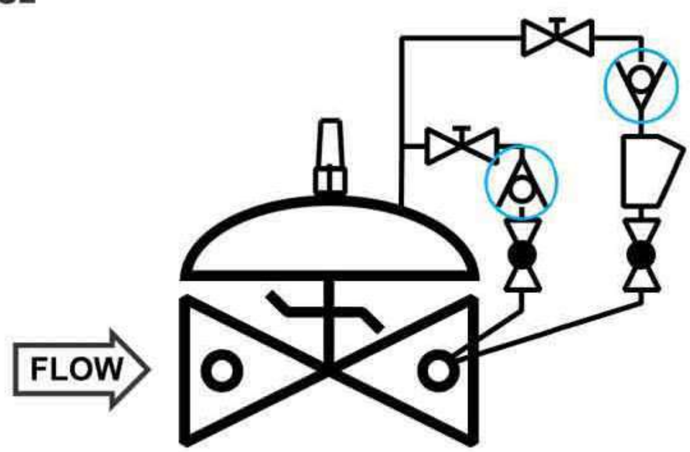
Check Valves shown Stainless Steel & Brass

MODEL 141-1 MATRIX

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

SCHEMATIC SYMBOL

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



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

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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.

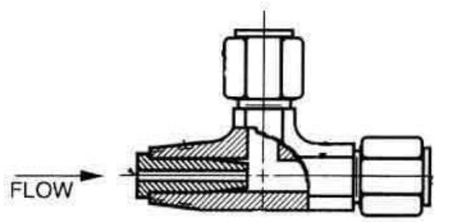
MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

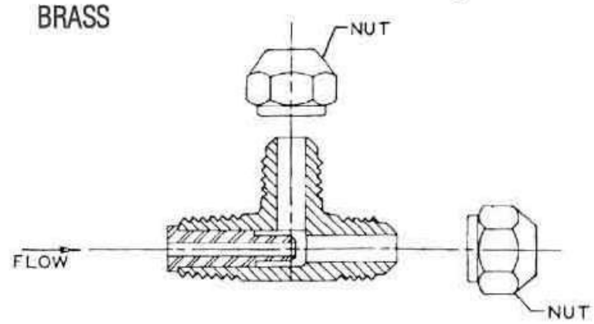
MATERIAL	PART NUMBER	P (NPT)	T-TUBE O.D.	STD. ORIFICE	USED ON VALVE SIZES
Brass	213100	3/8"	3/8"	.125"	1 ¼"-6"
Brass	214100	1/2"	1/2"	.188"	8"-10"
Brass	215100	3/4"	3/4"	.188"	12"-16"
316 Stn. Steel	213700	1/4"	3/8"	.090"	1 ¼"-6"
316 Stn. Steel	214700	3/8"	1/2"	.125"	8"-10"
316 Stn. Steel	215700	1/2"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

Orifice bushings are stainless steel.

STAINLESS

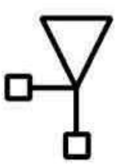


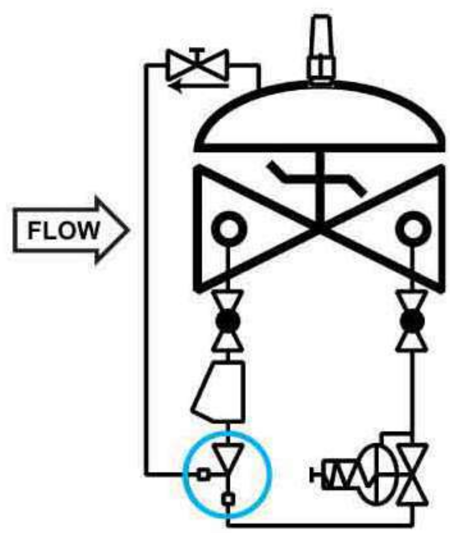
BRASS



SCHEMATIC SYMBOL

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





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

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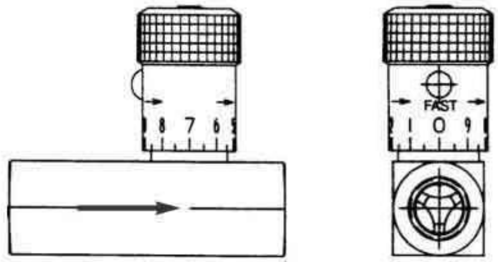
email: sales@controlvalves.com • **website:** www.controlvalves.com

DESCRIPTION

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

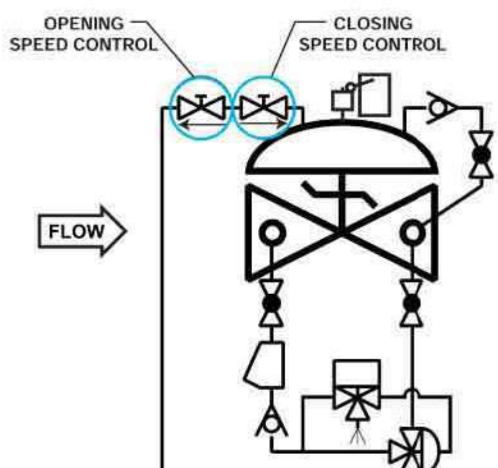


MODEL 141-3 MATRIX

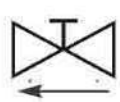
MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	682100	1/4	2 3/8	1 ¼"-2"
Brass	682101	3/8	2 3/4	2 ½"-6"
Brass	682102	1/2	3 1/4	8"-10"
Brass	682103	3/4	3 7/8	12"-16"
Stn. Steel	682700	1/4	2 3/8	1 ¼"-2" Stn.
Stn. Steel	682701	3/8	2 3/4	2 ½"-6"
Stn. Steel	682702	1/2	3 1/4	8"-10"
Stn.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

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

SCHEMATIC SYMBOL



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



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

DESCRIPTION

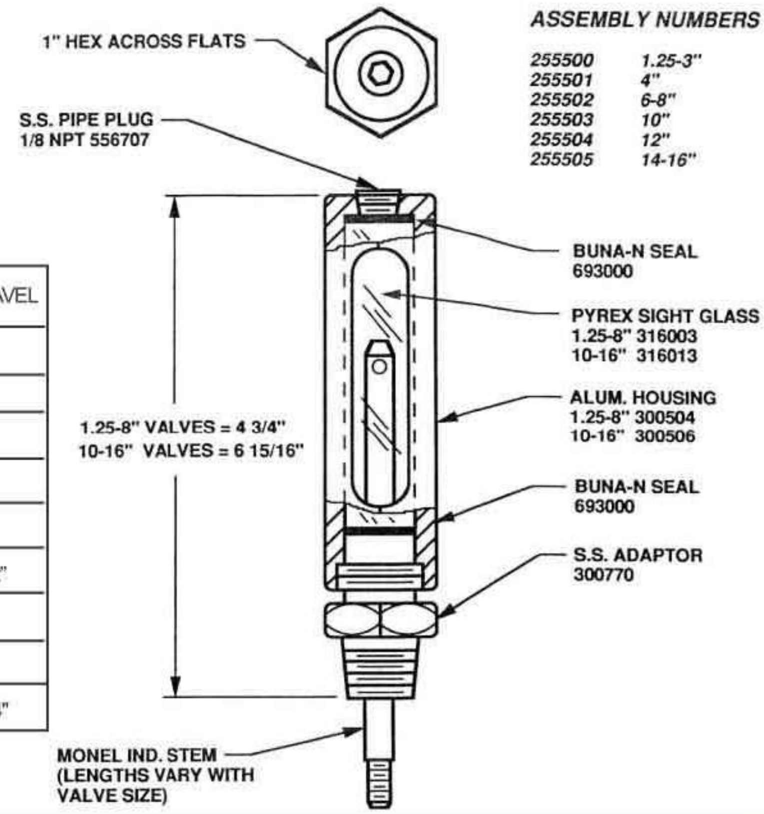
The Model 155L Visual Indicator is a device that enables the user to determine the extent of opening of a control valve. It consists of an adaptor threaded into the valve bonnet, a rod threaded into the main valve stem, a sealed Pyrex sight glass, and a protective aluminum housing. The indicator rod moves as the valve opens and closes. The 155L may be installed on virtually any OCV control valve, and can be done so without any disassembly of the valve itself. Since the assembly is not sealed from the diaphragm chamber of the main valve, it provides a convenient point for bleeding air via the 1/8" NPT port located at the top of the sight glass.

WHERE USED - The 155L is the standard visual indicator on fuel service valves. Optional on virtually any control valve not already employing a limit switch or position transmitter.

MODEL 155L MATRIX

MATERIAL	PART NO.	VALVE TRAVEL
1 1/4" - 1 1/2"	255500	3/8"
2"	255500	1/2"
2 1/2"	255500	3/4"
3"	255500	1"
4"	255501	1 3/8"
6" - 8"	255502	1 1/2" - 2"
10"	255503	2 1/2"
12"	255504	3"
14" - 16"	255505	3 1/2", 4"

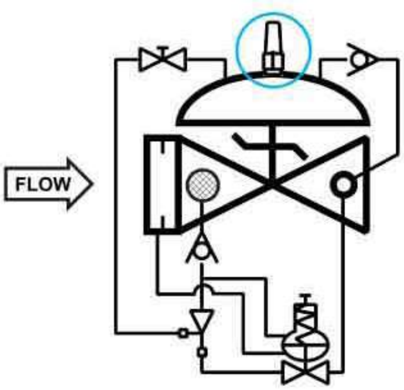
MAX WORKING PRESSURE: 300 PSI



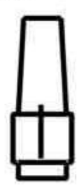
ASSEMBLY NUMBERS

255500	*1.25-3"*
255501	*4"*
255502	*6-8"*
255503	*10"*
255504	*12"*
255505	*14-16"*

SCHEMATIC SYMBOL



The Model 155L is shown on OCV Valve schematics as:



EXAMPLE: Shown here on a Model 120-6 Rate of Flow / Check Valve

MATERIALS

Indicator Rod:	Monel
Adapter:	Stainless Steel
Housing:	Aluminum
Sight Glass:	Pyrex
Sight Glass Seals:	Buna-N

OCV

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Global performance. **Personal** touch.