Operating Manual

Model: 116-5MR
Size:
Serial #:
Sales Order :

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OCV™ Control Valves LLC

Global performance. Personal touch.

pressure reducing and solenoid shutoff deluge valve with opening speed control and local manual reset

installation, operating, and maintenance instructions

model 116-5MR

BRK 330C solenoid valve
Ron 9-5-14

GENERAL DESCRIPTION

The OCV Model 116-5MR Pressure-Reducing/Solenoid Deluge Valve with manual reset is designed to perform the following functions:

1. Reduce a higher upstream pressure into a lower, constant downstream pressure.
2. Open or close in response to an electrical signal. Note: Valve will not close until manual reset is activated.
3. Open or close in response to the manual override feature.
4. Remains open after solenoid energization until the local manual reset is activated and the solenoid is de-energized to reclose the valve.

The 116-5MR consists of the following components:

1. Model **65 Basic Control Valve**, a hydraulically-operated, diaphragm-actuated globe or angle valve which closes with an elastomer-on-metal seal.
2. **Model 452 Solenoid Pilot**, a three-way, electrically-operated valve. Applying power to the solenoid coil causes the main valve to open.
3. **Model 3650S or A224 Accelerator Pilot**, a three-way hydraulically operated valve. De-pressurizing the bonnet of this valve allows the main valve to close. The accellerator has a supply side orifice which allows the 1340 pressure reducing pilot to control the outlet pressure.
4. **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.
5. **Model 141-3 Flow Control Valve**, provides opening speed control adjustment for the 116-5MR.
6. **Model 141-1 Check Valve**, along with item 8C ball valve provides the manual reset capability of the valve.
7. **Model 159 Y-Strainer**. The strainer protects the pilot system from solid contaminants in the line fluid.
8. **Four Model 141-4 Ball Valves**, useful for isolating the pilot system for maintenance or troubleshooting. One is used as a manual override. Other ball valves also may be included for pressure gauges and a pressure switch. See schematic diagram.
9. **Model 155 Visual Indicator**, useful for knowing the valves position at a glance.

At user option, the 116-5MR may also be equipped with the following:

1. Model 31 Limit Switch Assembly (includes visual indicator)
2. Pressure gauges with isolation ball valves.
3. Pressure switch with isolation ball valve.
4. Junction box field installed and mounted on the solenoid coil.

THEORY OF OPERATION (Refer to schematic diagram)

A. PRESSURE-REDUCINGACTION:

To understand how the 116-5MR operates, it is best to start with the Accelerator Pilot. Due to the orifice in its upstream port 2, the accelerator orifice creates a pressure drop proportional to the flow through it when the valve is open. The flow through the accelerator orifice is in turn controlled by the degree of opening of the PRESSURE REDUCING PILOT. The wider the pilot opens, the greater the flow through the accelerator orifice and the

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lower the pressure downstream of the orifice. Conversely, the more the pilot closes, the lower the flow through the accelerator orifice and the greater the pressure downstream of the orifice.

Now note that the diaphragm chamber of the MAIN VALVE is connected to port 1 of the accelerator 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 the downstream pressure to the set point. Conversely, as downstream pressure tends to decrease below the set point, the pilot moves further open. This results in a decrease in pressure in the diaphragm chamber of the main valve. The main valve then opens wider to bring the downstream pressure back up to the set point. The net result of all this is a constant modulating action by the pilot and main valve and a downstream pressure which remains constant despite fluctuations in demand or inlet pressure.

B. ELECTRICAL ON-OFF ACTION:

When the coil of the solenoid pilot is de-energized, it in turn de-pressurizes the bonnet of the accelerator pilot. This completely blocks the pilot system and allows full inlet pressure to build up in the diaphragm chamber of the main valve. Thus, the main valve remains tightly closed. However, if the coil is energized, the accelerator pilot shifts fully, which allows the main valve to open and come under control of the reducing pilot as described above. **NOTE: The valve will not close until the manual reset ball valve is activated along with de-energizing the solenoid valve. See schematic diagram under "MANUAL RESET" for simple reset instructions.**

C. MANUAL OVERRIDE ACTION:

When the manual override ball valve is opened, it in turn de-pressurizes the bonnet of the main valve. This allows the main valve to open fully.

INSTALLATION

The 116-5MR 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.

Once the main valve is installed, the solenoid pilot is wired into the control system. This is a simple three-wire hookup.

STARTUP AND ADJUSTMENT

The following procedures should be followed in the order presented in order to effect an initial startup of the 116-5MR:

1. Install pressure gauges of the proper range upstream and downstream of the 116-5MR.
2. Remove the plastic cap from the pressure-reducing pilot, and loosen the adjusting screw jam nut. Turn the adjusting screw **counterclockwise** until it is loose enough to be turned by hand.
3. Turn the adjusting screw of the flow control valve(s) (if optionally equipped) fully **clockwise**, then counterclockwise **three full turns**.
4. 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. If the valve opens, activate the manual reset ball valve to close the valve. See schematic diagram.
5. Energize the solenoid pilot. The main valve should remain closed or else 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. Check downstream pressure. It should be lower than desired at this point. If it is already too high, there is too much restriction downstream. Open further valves or otherwise increase demand until the pressure falls below the desired set point.
8. Slowly turn the adjusting screw of the pressure-reducing pilot **clockwise** until downstream pressure rises to the desired set point. Tighten the adjusting screw jam nut and replace the plastic cap.
9. If there are small-scale oscillations in the downstream pressure, slowly turn the adjusting screw of the flow control valve(s) (if optionally equipped) **clockwise** until the oscillations disappear. CAUTION: Never close the valve(s) fully. To do so will prevent the main valve from opening.
10. De-energize the solenoid pilot and observe that the valve closes. The manual reset will need to be activated to allow the valve to close. See schematic diagram for

simple instructions.

11. If pressure readjustment should ever be required, the pressure-reducing pilot is adjusted **clockwise** to **increase** pressure; **counterclockwise** to **decrease** pressure. Always adjust the discharge pressure while flowing. Never try to set the discharge pressure in a static condition.

MAINTENANCE

Due to the simplicity of design of the 116-5MR, 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. Check for frayed or loose electrical connections.
4. If the valve is equipped with a Y-strainer, check the screen for buildup 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 116-5MR, the following guide should enable the technician to isolate the specific cause of the problem.

A. MAIN VALVE FAILS TO OPEN:

1. Valve closed downstream of 116-5MR. Open as required.
2. Downstream pilot system ball valve closed. Open as required.
3. Solenoid not energized. Check electrical system.
4. Flow control valve fully closed (if equipped). See Adjustment instructions. Normally 2-3 turns open will give satisfactory performance.
5. Pressure-reducing pilot adjusted too far counterclockwise. See Adjustment instructions.
6. Solenoid pilot stuck closed or coil burned out. See Solenoid Valve section of this manual.
7. Stem of pressure-reducing pilot binding. See 1340 section of this manual.
8. Stem of main valve binding. See Basic Valve section of this manual.
9. Problem with accelerator pilot. See drawing A224 or 3650S to determine cause. The main valve is signaled to open when the solenoid valve is energized and pressure is applied from solenoid valve port A to the bonnet of the accelerator.

B. MAIN VALVE FAILS TO CLOSE:

IMPORTANT: This valve is equipped with a manual reset feature. Deenergizing the solenoid <u>will not reclose the valve</u> until item 8C ball valve is opened which allows the venting of the three-way auxiliary pilot diaphragm chamber. See schematic diagram.

1. Upstream pilot system ball valve closed. Open as required.
2. Solenoid not de-energized. Check electrical system. See manual reset instructions on schematic diagram.
3. Strainer clogged. Clean as required.
4. Pressure-reducing pilot adjusted too far clockwise. See Adjustment instructions.
5. 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.
6. Pressure-reducing pilot stem binding or seat badly deteriorated. Disassemble pilot and determine cause. See 1340 section of this manual.
7. Solenoid pilot stuck open. See Solenoid Valve section of this manual.
8. Close all pilot system ball valves, and loosen a pipe plug in the main valve bonnet. A continuous discharge of fluid from the loosened plug indicates that the main valve diaphragm is ruptured. See Basic Valve section of this manual.
9. Main valve stem binding or object in valve. Disassemble valve and determine cause. See Basic Valve section of this manual.
10. Accelerator pilot not shifting. See drawing A224 or 3650S of this manual to determine cause. The main valve is signaled to close when the solenoid valve is de-energized and the accelerator bonnet pressure is vented through solenoid port 3 (after manual reset activation.) This allows the accelerator pilot to shift, connecting ports 2 and 1 which in turn pressurizes the main valve bonnet and closes the valve.

C. MAIN VALVE OPENS AND CLOSES, BUT DOES NOT CONTROL DOWNSTREAM PRESSURE:

1. If 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(s) (if equipped) may help damp out the oscillations. In an extreme case, try adjusting the pressure slightly higher.

D. VALVE CLOSES WITHOUT MANUAL RESET:

1. Item 6 check valve leaking. Disassemble and determine cause. Replace if necessary.

MODEL 116-5MR

DELUGE VALVE
WITH PRESSURE REDUCING
HYDRAULICALLY OPERATED
(ELECTRICALLY ACTUATED)
WITH LOCAL MANUAL RESET
(Energize to Open)

SOLENOID	SOL PORTS	ACCEL PORTS	VALVE
ENERGIZE	P&A	1&3	OPEN
DEENERGIZE AFTER ENERG.	A&R	1&3	OPEN
DEENERGIZE AND MAN RESET	A&R	1&2	CLOSED

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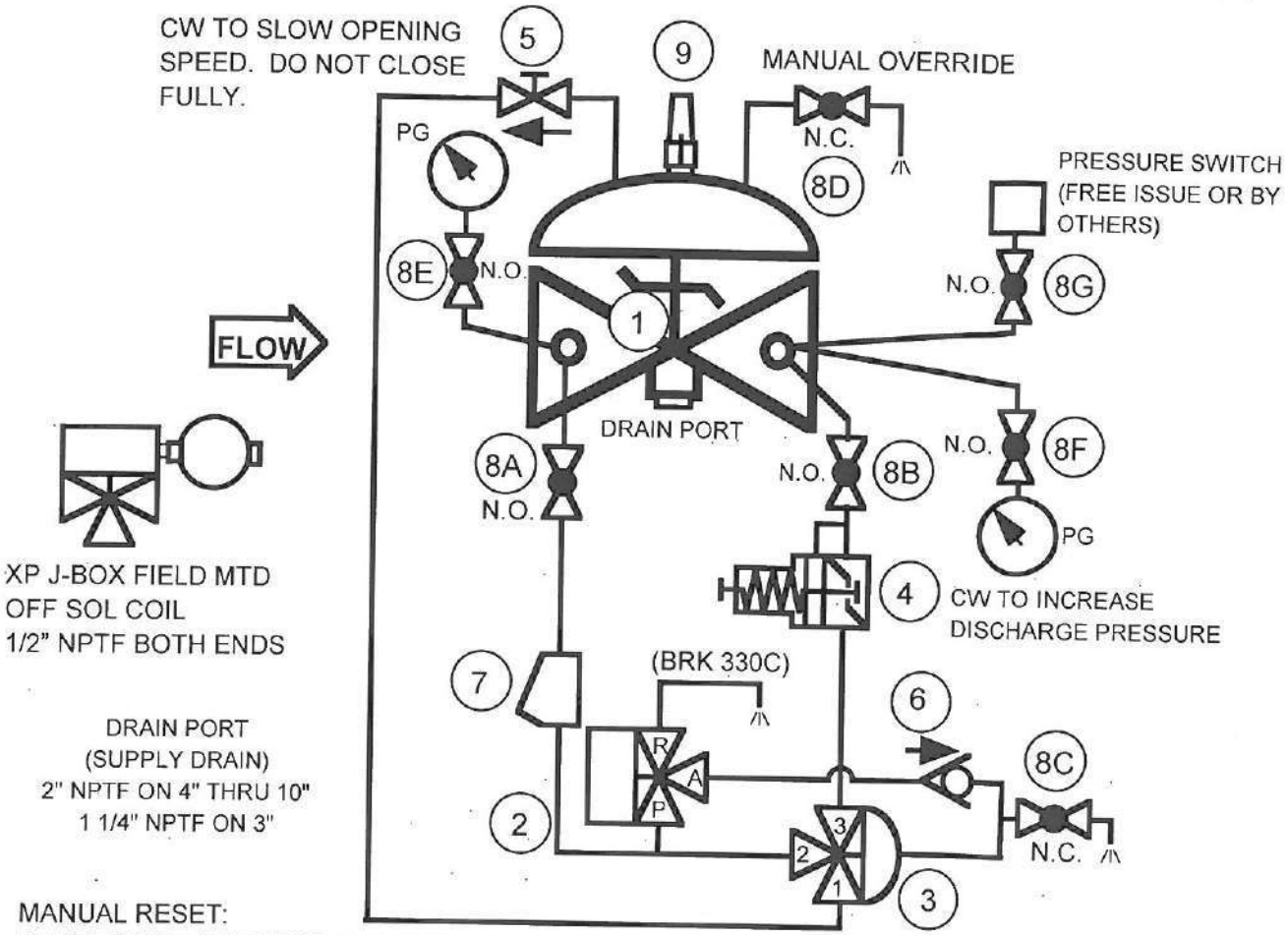

MANUAL RESET:
DEENERGIZE SOLENOID, OPEN 8C, ALLOW VALVE TO CLOSE, RECLOSE 8C.

ITEM	PART NO.	QTY	DESCRIPTION
1	65FC	1	BASIC VALVE ASSEMBLY (UL LISTED 3" THRU 10")
2	452	1	THREE-WAY SOLENOID PILOT
3	3650S or A224	1	ACCELERATOR PILOT
4	1340	1	PRESSURE REDUCING PILOT
5	141-3	1	FLOW CONTROL VALVE (OPENING SPEED CONTROL)
6	141-1	1	CHECK VALVE
7	159	1	Y-STRAINER
8	141-4	7	BALL VALVE
9	155	1	VISUAL INDICATOR

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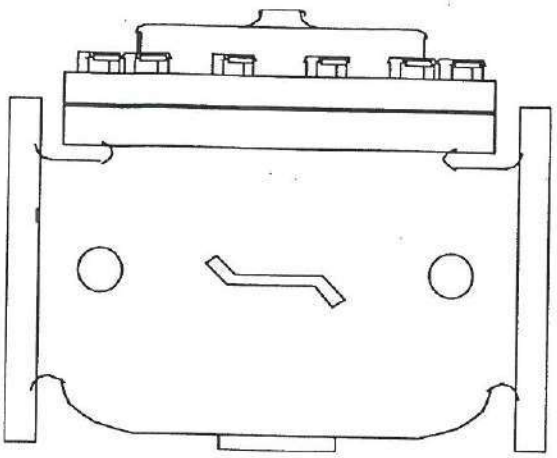

installation, operating, and maintenance instructions

series 65FC

basic *deluge* control valve

GENERAL DESCRIPTION

The OCV Series 65FC is a hydraulically-operated, diaphragm-actuated valve. It is available in the globe configuration and is **UL Listed** for **Deluge service** in sizes 3" thru 10". 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. A **1 1/4" NPTF** opening is provided for rapid drainage of the main water supply on the 3" valve. A **2" NPTF** opening is provided on the 4" thru 10" valves.

FUNCTIONAL DESCRIPTION

Because the Series 65FC 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. When allowed, isolation valves (eg., gate or butterfly) be installed on the inlet and discharge sides of

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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.

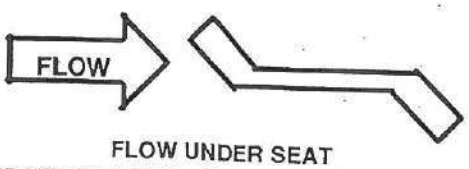
REPAIR PROCEDURES

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. **If difficulty in performance is experienced, contact the factory at 1-800-331-4113 or 1-888-OCV-VALV (1-888-628-8258) for a toll free discussion with an engineer, member of the sales staff, or for the name of the closest factory representative for your area.**

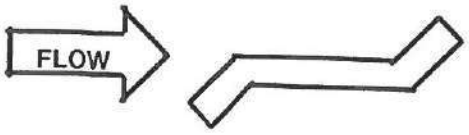
Problems with the main valve can be classed in three basic categories:

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.*



FLOW UNDER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE



FLOW OVER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO OPEN

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: 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 10" valves are threaded 3/8-16.*
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.

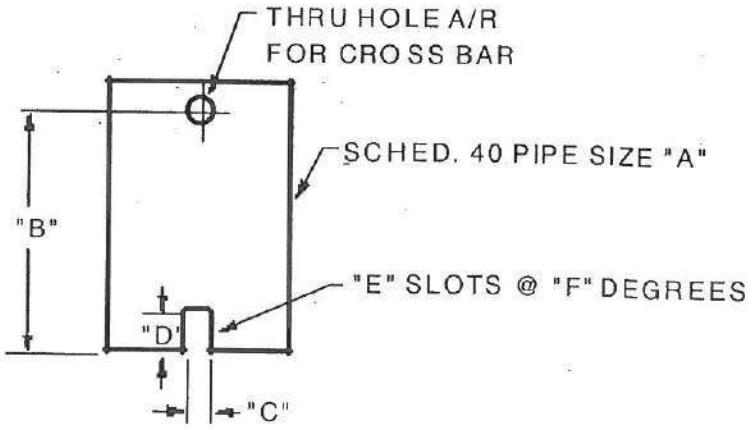
PROCEDURE C: SEAT DISC REPLACEMENT

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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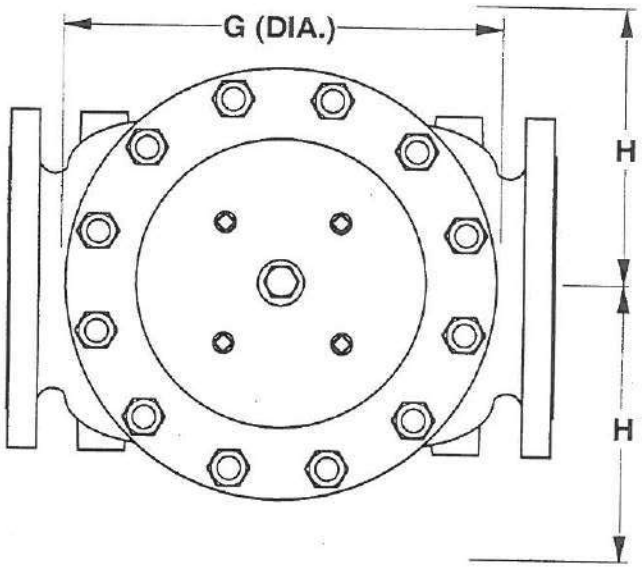
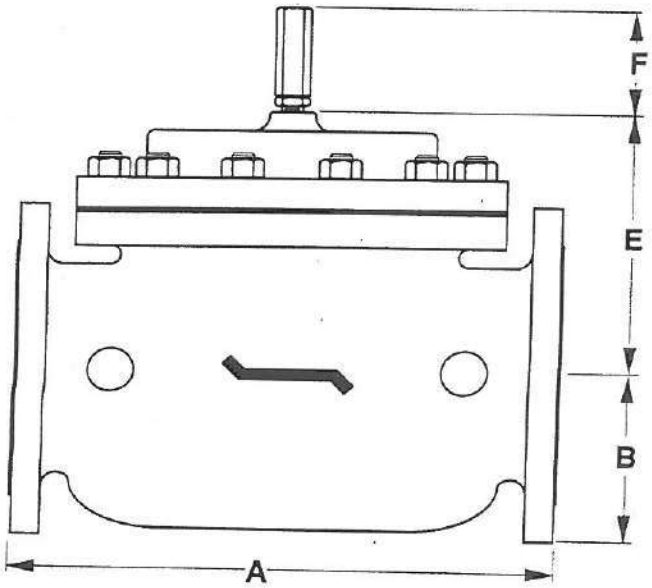
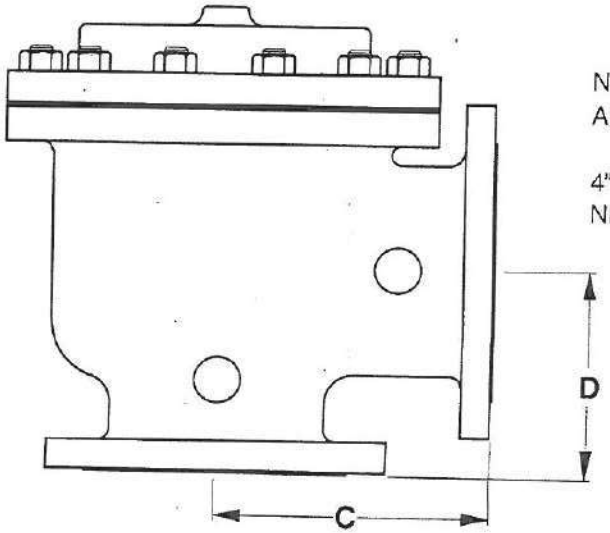


DIM	ANSI CLASS	VALVE SIZE 1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	24
A	S.E	8.75	8.75	9.88	10.50	13.00	–	–	–	–	–	–	–	–
	150	8.50	8.50	9.38	10.50	12.00	15.00	17.75	25.38	29.75	34.00	39.00	40.38	62.00
	300	8.75	8.75	9.88	11.12	12.75	15.62	18.62	26.38	31.12	35.50	40.50	42.00	63.75
B	SE	1.44	1.44	1.69	1.88	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

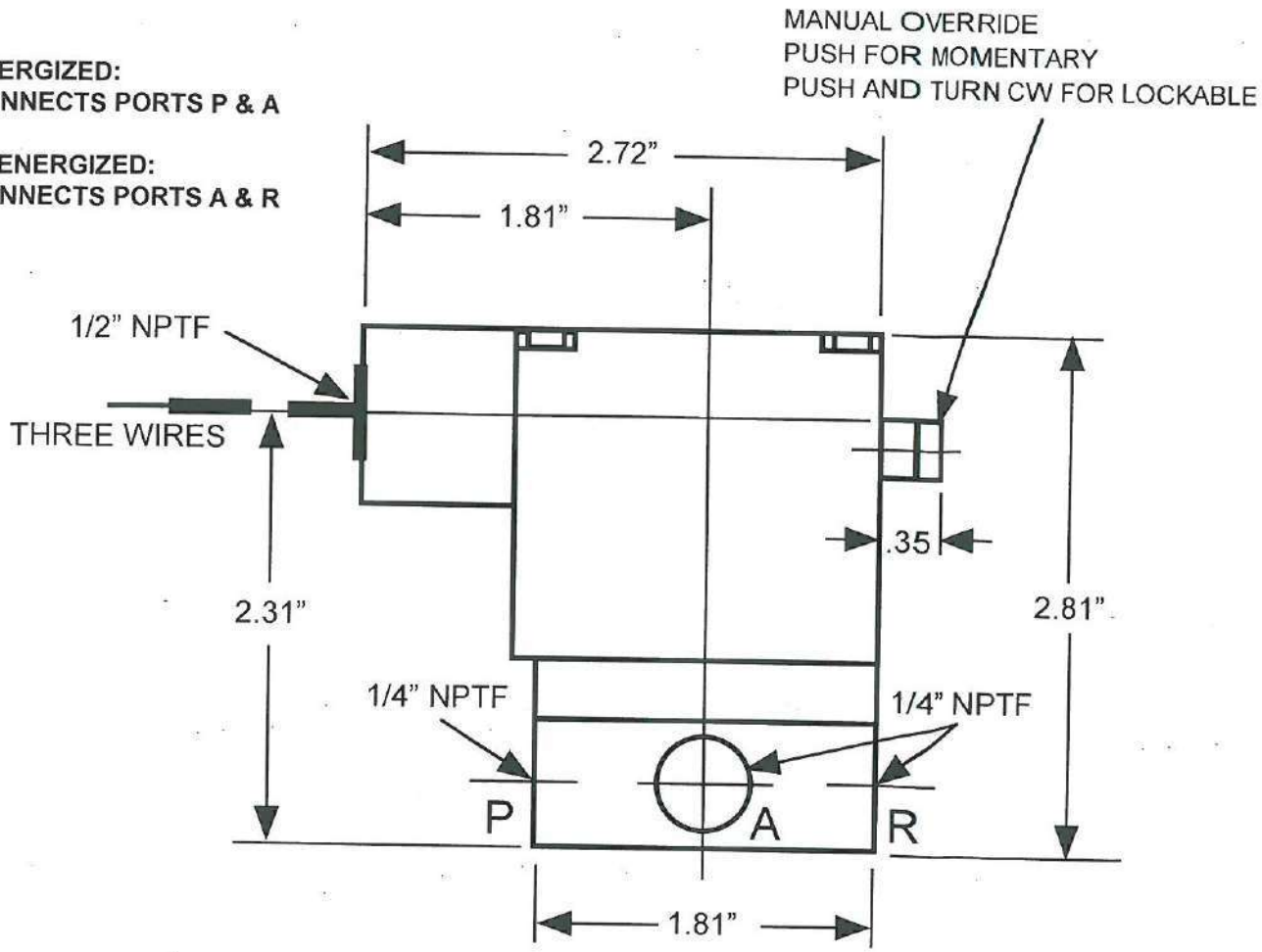
4" VALVE DIMENSIONS ARE FOR NEW MODEL 4400

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	DRAWING NUMBER	REV.
CHKD. BY	DATE	A	65D	B

ENERGIZED:
CONNECTS PORTS P & A

DEENERGIZED:
CONNECTS PORTS A & R



SUITABLE FOR SEAWATER APPLICATIONS
FLOW MEDIUM IS SEPARATED FROM THE MAGNETIC SYSTEM BY A HERMETICALLY SEALING DIAPHRAGM.

OCV MODEL 452 SOLENOID VALVE
DIRECT ACTING NORMALLY CLOSED
3 WAY SOLENOID VALVE
BODY - 316 SS
SEALS - EPDM
MEDIA TEMP -40 DEG F +194 DEG F
MAX AMBIENT TEMP 130 DEG F
VOLTAGE TOLERANCE + - 10%
CONTINUOUS DUTY COIL
MTG POSITION - ANY (PREFER UPRIGHT)
MOMENTARY OR LOCKABLE MAN OVERRIDE

PRESSURE RANGE = (5/64" ORIF 0-230 PSI) (1/8" ORIF 0-140 PSI)
Cv FACTOR = (5/64" ORIF .13) (1/8" ORIF .27)
PIPE SIZE = 1/4"
VOLTAGE RANGES = 24/60, 120/60, 240/60 VAC/HZ
12, **24** VDC
POWER CONSUMPTION = 8 WATTS, AC & DC, CLASS H COIL
ELECTRICAL CONN = 1/2" CONDUIT
FM APPROVED FOR HAZARDOUS LOCATIONS
CLASS 1 DIVISION 1 GROUP A, B, C, D
LEAKAGE - BUBBLETIGHT

BRK 330C

CHG	E.C. NO.	DATE	BY

REVISIONS

MATERIAL	TOLERANCES
	N/A

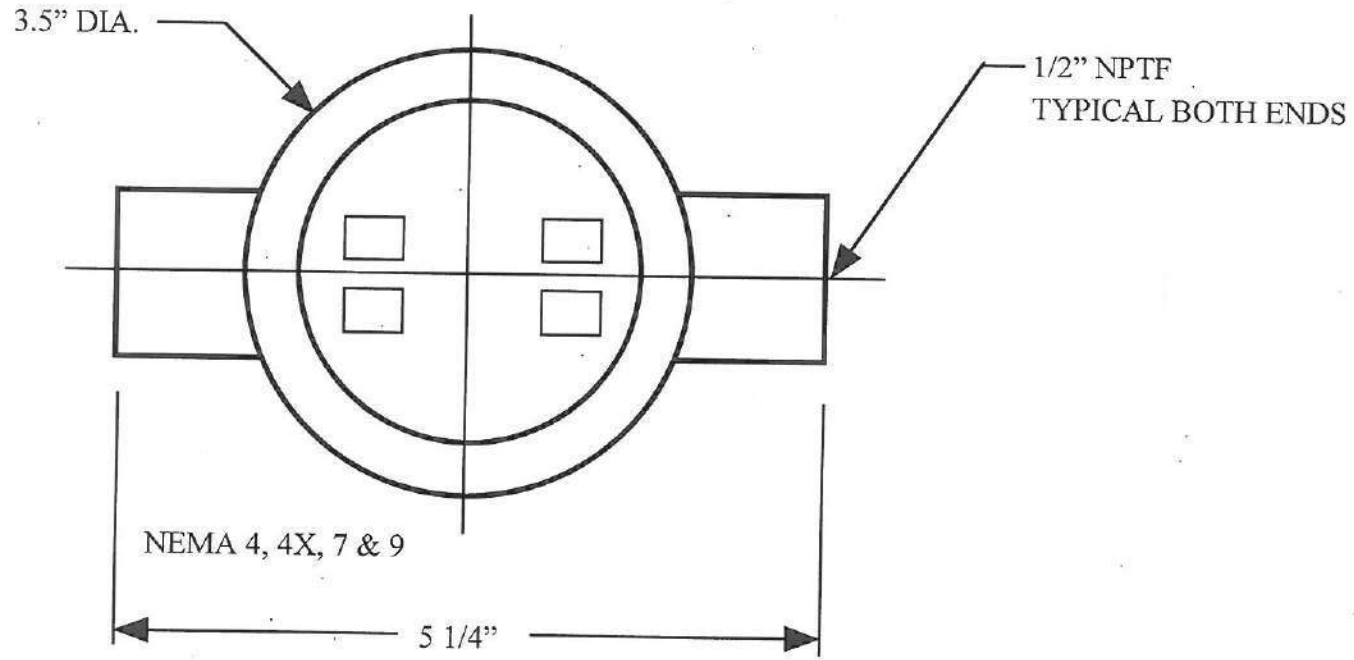
NO. REQ'D	DRAWN BY	DATE
	RON	9-18-00

SCALE	CHKD. BY	DATE
NONE		

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

3 WAY SOLENOID VALVE
MODEL 452 (NORM CLOSED)

SIZE	DRAWING NUMBER	REV.
A	452	



NOTES:

1. BOX IS APPROX 2" DEEP.
2. BOX HAS A SIX CONNECTOR, DOUBLE ROW TERMINAL BLOCK INSIDE.

CHG	E.C. NO.	DATE	BY

REVISIONS

REF DWG NO'S

MATERIAL	TOLERANCES
ALUMINUM	GENERAL ENVELOPE

NO. REQ'D	DRAWN BY	DATE
	RON	1-12-99
SCALE	CHKD. BY	DATE

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

ADALET J-BOX 1/2" NPTF ON EA END
WITH 6 CONNECTOR TERM STRIP

SIZE	DRAWING NUMBER	REV.
A	315046	

accelerator pilot

installation, operating, and maintenance instructions

model A224

GENERAL DESCRIPTION

The OCV Model A224 Accelerator Pilot is a hydraulically-operated, diaphragm-type three-way valve. It has two operating positions, one which provides full flow between two of its ports. It is normally used on a main valve subject to the following conditions: (1) A modulating-type pilot, such as rate of flow, is also used on the valve; (2) Faster-than-normal closing speed is required; and (3) An independent means, such as a solenoid pilot or float valve, is used to place the valve in or out of operation.

INSTALLATION

Referring to the attached assembly drawing for port identification, the A224 is installed on the main valve as follows: Port A is connected to the control pilot. Port B is connected to the bonnet of the main valve. Port D is connected to the energizing source (solenoid or float pilot).

THEORY OF OPERATION

Pressurizing the bonnet of the A224 pilot through Port D moves the stem assembly to its downward position. Orificed flow is now available from Port C (main valve inlet) to both Port A (Control pilot) and Port B (Main valve bonnet). In this position, the A224 acts as an ejector. Flow through it is modulated by the control pilot, which in turn modulates the main valve to maintain a constant flow rate or pressure.

When pressure is removed from the bonnet of the A224, pressure at Port C forces the stem assembly to its upward position. Now Port A (Control pilot) is blocked, and full flow is available from Port C (main valve inlet) to Port B (main valve bonnet). The main valve thus goes quickly closed.

MAINTENANCE

Because of the simplicity of design of the A224 pilot, required maintenance is minimal. Check fittings and bolts periodically for tightness, and inspect the body for damage or excessive buildup of foreign material.

TROUBLESHOOTING

A major malfunction in the A224 pilot would generally be evident in a failure of the main valve to open or close. However, keep in mind that such symptoms can be also caused by a malfunction in the main valve itself or in the control pilot(s). If the A224 is suspected, proceed as follows:

A. FAILURE OF PILOT TO OPEN MAIN VALVE

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

B. FAILURE OF PILOT TO CLOSE MAIN VALVE

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

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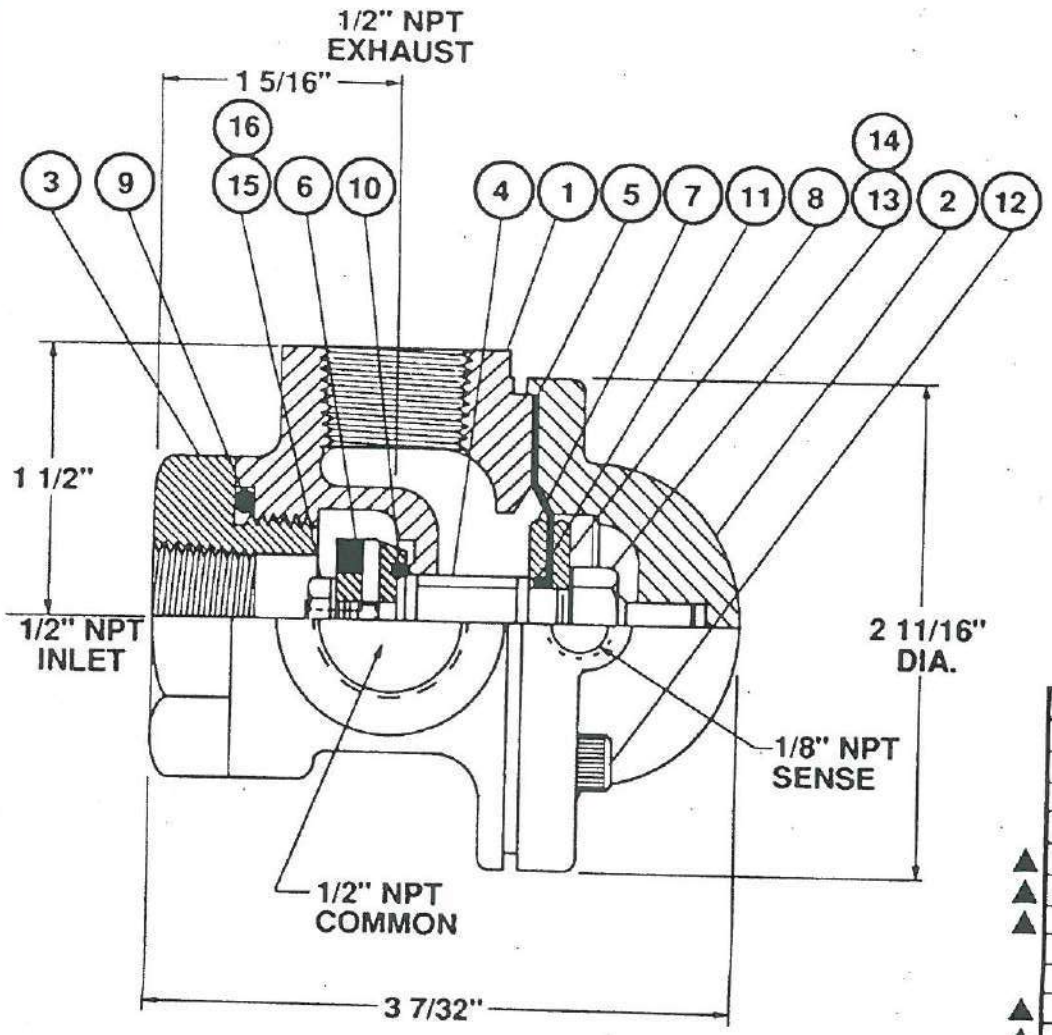

▲ = RECOMMENDED SPARE PARTS

	ITEM	PART NO	QTY	DESCRIPTION	MATERIAL
	16	685720	1	LOCKWASHER	STN. STEEL
	15	590718	1	HEX NUT	STN. STEEL
	14	685702	1	LOCKWASHER	STN. STEEL
	13	590717	1	HEX NUT	STN. STEEL
	12	530708	4	SKT. HD. CAPSCREW	STN. STEEL
▲	11	611012	1	O-RING	VITON
▲	10	611111	1	O-RING	VITON
▲	9	610216	1	O-RING	BUNA-N
	8	308110	1	UPPER DIAPH. PLATE	BRASS
	7	308109	1	LOWER DIAPH. PLATE	BRASS
▲	6	310708	1	SEAT PLUG	SS/BUNA-N
▲	5	694000	1	DIAPHRAGM	BUNA-N
	4	314732	1	STEM	STN. STEEL
	3	300782	1	ADAPTER	STN. STEEL
	2	304100	1	BONNET	BRONZE
	1	302100	1	BODY	BRONZE

CHG	E.C. NO.	DATE	BY	REVISIONS

REF DWG NO'S

MATERIAL

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

NO. REQ'D

DRAWN BY SDJ DATE 2-2-93

SCALE FULL

CHKD BY DATE

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

ACCELERATOR PILOT

SIZE	DRAWING NUMBER	REV.
A	A224	

accelerator pilot

installation, operating and maintenance instructions

model 3650

GENERAL DESCRIPTION

The OCV Model 3650 Accelerator Pilot is a hydraulically operated, diaphragm type, three-way valve. It has two operating positions, one of which provides full flow between two of its ports. It is normally used on a main valve subject to the following conditions: (1) a modulating pilot, such as rate of flow, is used on the valve; (2) faster then normal closing speed is required; and (3) an independent means, such as solenoid pilot or float valve, is used to place the valve in or out of operation.

INSTALLATION

Refer to the assembly drawing for port identification. The 3650 is installed on the main valve as follows: The 3/4" INLET port is connected to the inlet side port of the main valve. The 3/4" OUTLET port is connected to the inlet of the control pilot (rate of flow, pressure reducing, etc.). The 3/4" COMMON port is connected to the main valve bonnet via any speed controls. Finally, the 1/8" port in the center of the pilot bonnet is connected to the energizing source (solenoid or float pilot).

THEORY OF OPERATION

Pressurizing the bonnet of the 3650 moves the stem assembly to its downward position. Orificed flow is now available from the INLET port to both the COMMON port and the OUTLET port. In this position, the 3650 acts as a restricted supply. Flow through the orifice is modulated by the control pilot, which in turn modulates the main valve to maintain a constant flow rate or pressure.

When pressure is removed from the bonnet, inlet pressure at the INLET port forces the stem assembly to its upward position. Now the OUTLET port is blocked, and full flow is available from the INLET port to the COMMON port. The main valve thus goes quickly closed.

MAINTENANCE

Because of the simplicity of design of the 3650, required maintenance is minimal. Check fittings and bolts periodically for tightness, and inspect the body for damage or excessive buildup of foreign material.

TROUBLESHOOTING

A major malfunction in the 3650 pilot would generally be evident in a failure of the main valve to open or close. However, keep in mind that such symptoms can also be caused by a malfunction in the main valve itself or in the control pilot(s). If the 3650 is suspected, proceed as follows:

A. FAILURE OF PILOT TO OPEN MAIN VALVE

1. Ruptured diaphragm:.
   a) Detach sense line from bonnet of the pilot, and remove the bonnet. Inspect the diaphragm carefully for holes or cracks.
   b) If damaged, replace with new diaphragm.
2. Pilot stem binding:
   a) With bonnet removed, inspect the stem journal in the guide plate for buildup of foreign material.
   b) Clean as necessary and reassemble pilot.

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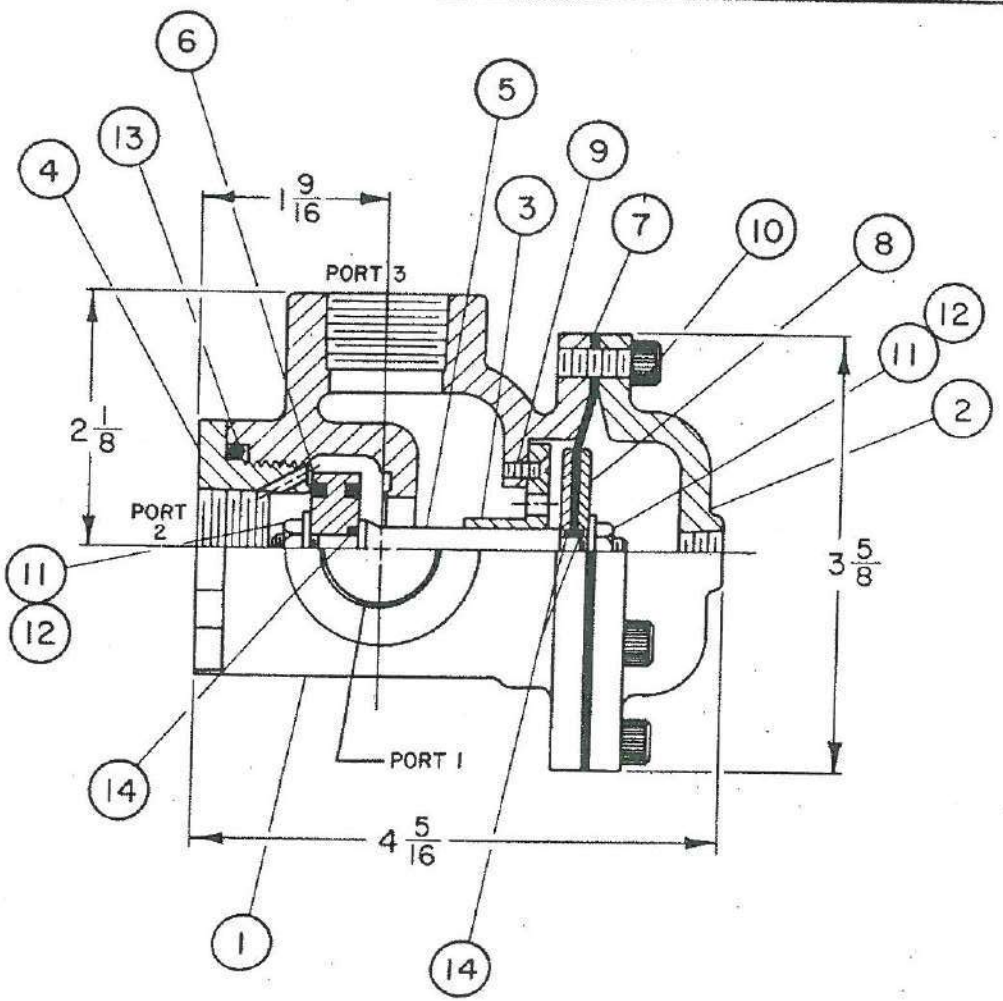
e-mail: sales@controlvalves.com / website: www.controlvalves.com

3. Rubber seat damaged:
   a) Disassemble pilot and examine seats for wear or damage.
   b) Replace if necessary and reassemble pilot.

B. FAILURE OF PILOT TO CLOSE MAIN VALVE

1. Pilot stem binding:
   a) With bonnet removed, inspect the stem journal in the guide plate for buildup of foreign material.
   b) Clean as necessary and reassemble pilot.
2. Rubber seat damaged:
   a) Disassemble pilot and examine seats for wear or damage.
   b) Replace if necessary and reassemble pilot.



NOTE:

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

	ITEM	PART NO.	QTY.	DESCRIPTION	MATERIAL
▲	14	611010	3	O-RING	VITON
▲	13	610222	1	O-RING	BUNA-N
	12	685763	2	LOCKWASHER	STAINLESS STEEL
	11	590712	2	HEX HEAD JAM NUT	STAINLESS STEEL
	10	530701	6	SOCKET HD. CAPSCREW	STAINLESS STEEL
	9	532735	2	FLAT HEAD SCREW	STAINLESS STEEL
	8	308135	2	DIAPHRAGM PLATE	BRASS
		308735	2	DIAPHRAGM PLATE	STAINLESS STEEL
▲	7	694035	1	DIAPHRAGM	BUNA-N
		694135	1	DIAPHRAGM	VITON
▲	6	310736	1	SEAT DISC	STN. STL./BUNA-N
		310737	1	SEAT DISC	STN. STL./VITON
	5	314735	1	STEM	STAINLESS STEEL
	4	300183	1	ADAPTER	BRASS
		300783	1	ADAPTER	STAINLESS STEEL
	3	300164	1	GUIDE PLATE	BRASS
		300764	1	GUIDE PLATE	STAINLESS STEEL
	2	304135	1	BONNET	BRONZE
		304735	1	BONNET	STAINLESS STEEL
	1	302135	1	BODY	BRONZE
		302735	1	BODY	STAINLESS STEEL

PARTS LIST

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

MATERIAL

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

NO. REQ'D

SCALE

DRAWN BY: B.R.W. DATE: 7-28-83

CHKD BY DATE

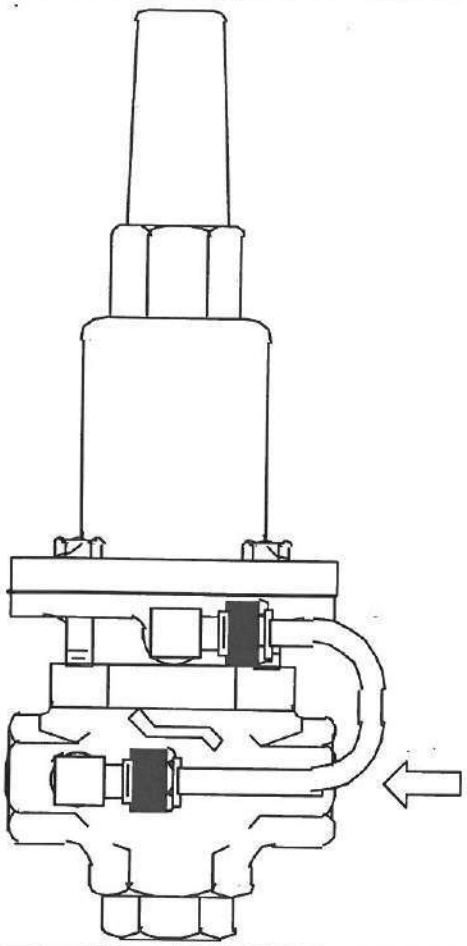
OCV Control Valves TULSA, OKLAHOMA U.S.A.

ACCELERATOR PILOT

SIZE: B

DRAWING NUMBER: 3650

REV



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.

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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.

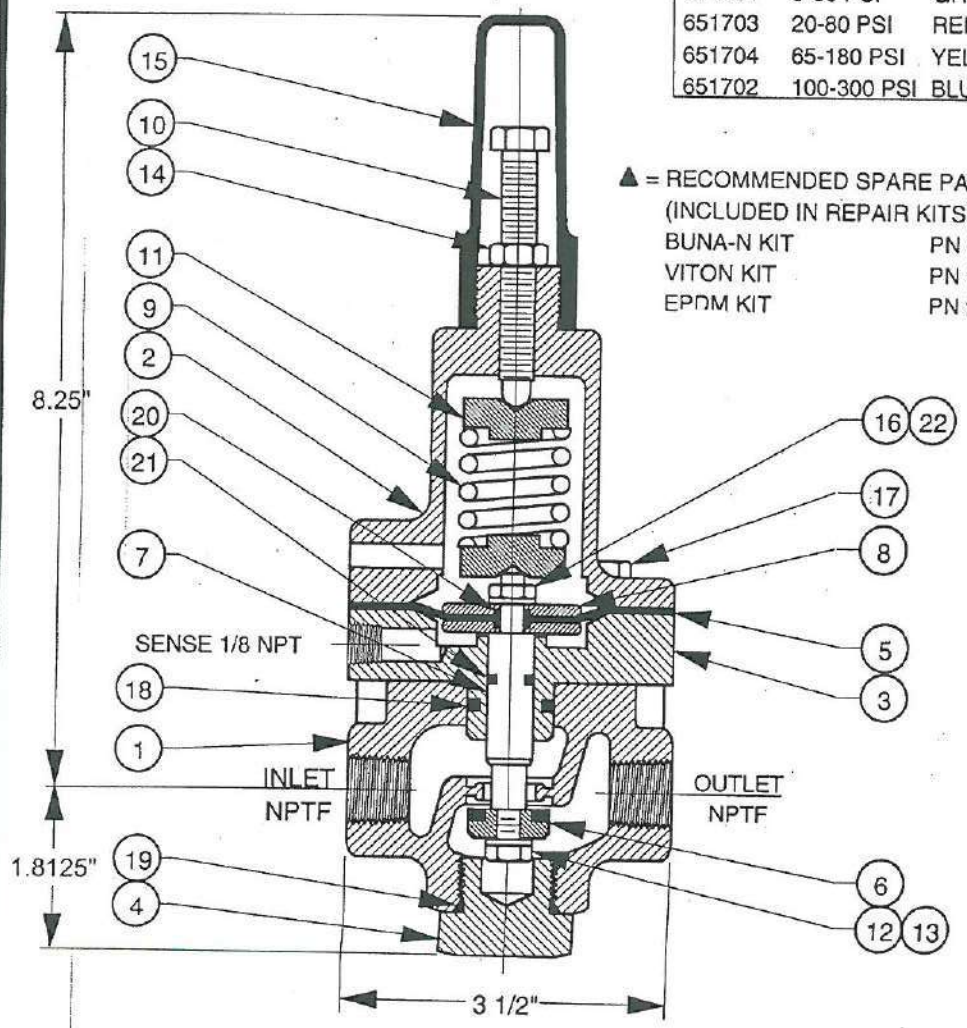
C. STEM REPAIR

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	DATE
	RON	2-15-96
SCALE 1/2	CHKD. BY	DATE

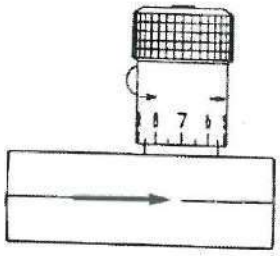
OCV Control Valves TULSA, OKLAHOMA U.S.A.

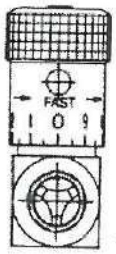
MODEL 1340 PILOT 3/8"-1/2" NPTF PRESSURE REDUCING

SIZE	DRAWING NUMBER	REV.
A	1340	

DESCRIPTION

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



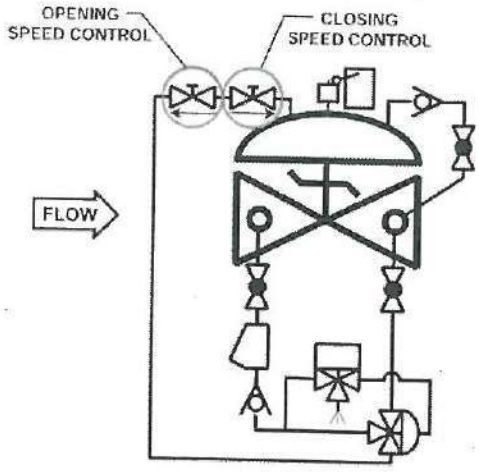


MODEL 141-3 MATRIX

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

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

SCHEMATIC SYMBOL



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

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

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

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.

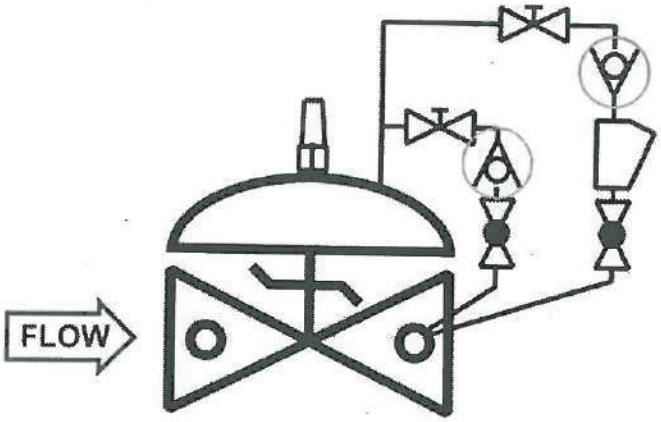
◀Check Valves shown
Stainless Steel & Brass

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.

Check Valve 141-1

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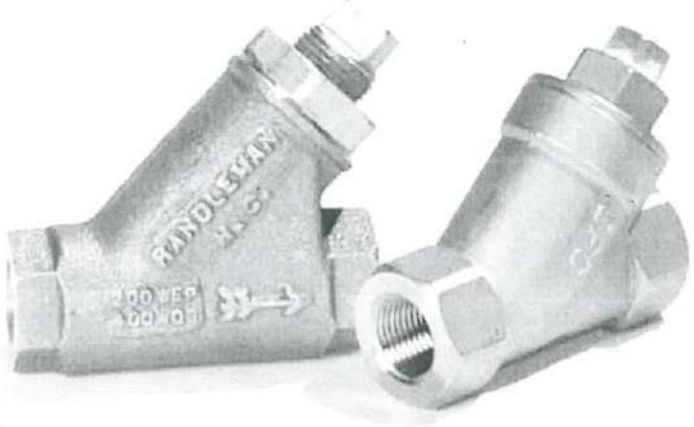
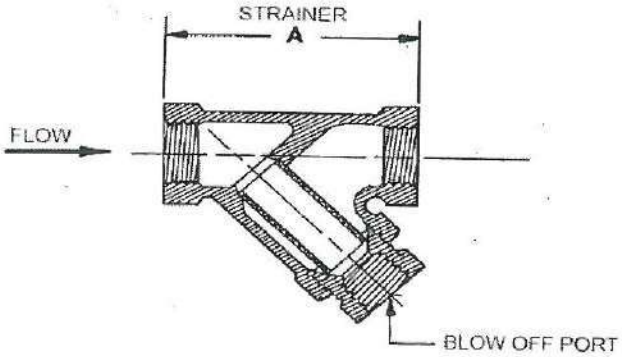


DESCRIPTION

MODEL 159 Y-STRAINER
The 159 Y-Strainer installs in the inlet piping of the pilot system and protects the pilot system from solid contaminants in the line fluid. It is the standard strainer for water service valves.

MODEL 159 Y-STRAINER MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	BLOW OFF PORT (NP)	A	STD. MESH	USED ON VALVE SIZE
Bronze	660100	3/8	3/8	2 11/16	24	1 ¼"-6"
Bronze	660101	1/2	3/8	2 5/8	24	8"-10"
Bronze	660102	3/4	3/8	3 5/16	24	12"-16"
Stn. Steel	660700	3/8	1/4	2 1/2	20	1 ¼"-6"
Stn. Steel	660701	1/2	1/4	2 1/2	20	8"-10"
Stn. Steel	660702	3/4	1/4	3 1/8	20	12"-16"



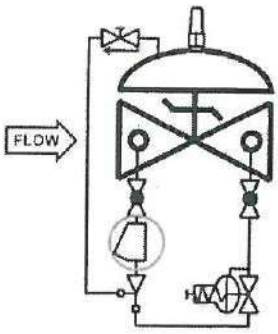
MATERIALS

Bronze, ASTM B62
Optional mesh sizes: 50,100

Stainless Steel, CF8-M (316)
Optional mesh sizes: 60, 80, 100

Screens are stainless steel

SCHEMATIC SYMBOL



The Model 159 Y-Strainer is shown on OCV Valve Schematics as:

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

MAINTENANCE

Routine cleaning and checking of the Y-Strainer will aid in keeping the control valve functioning properly. Pilot system isolation ball valves are supplied on valves equipped with the Model 159 Y-Strainer. These allow flushing of the screen through the blow off port, or removal of the screen itself for manual cleaning.

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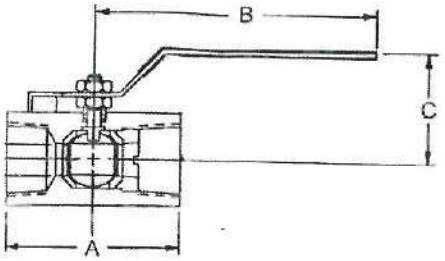
DESCRIPTION

The Model 141-4 Ball Valve is a ¼-turn shutoff device used for isolating the pilot system from the main valve. They are extremely useful for performing routine maintenance and troubleshooting.

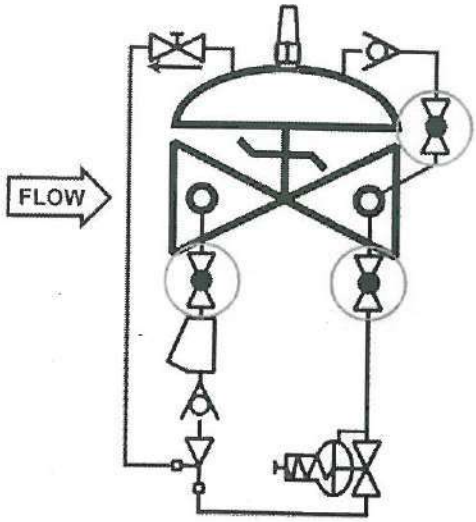
Ball valves are standard on water service valves; optional on fuel service valves.



MODEL 141-4 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	B	C	USED ON VALVE SIZE*
Bronze	680100	3/8	1 3/4	3 1/2	1 7/8	1 ¼"-6"
Bronze	680101	1/2	2	3 1/2	2 1/4	8"-10"
Bronze	680102	3/4	3	4 3/4	2 1/4	12"-16"
Stn. Steel	680700	3/8	2	3 3/4	2 1/8	1 ¼"-6"
Stn. Steel	680701	1/2	2 1/4	3 3/4	2 1/2	8"-10"
Stn. Steel	680702	3/4	3	4 3/4	2 1/4	12"-16"

SCHEMATIC SYMBOL



The Model 141-4 Ball Valve is shown on OCV Valve Schematics as:

EXAMPLE: Shown here on a MODEL 127-4 Pressure Reducing / Check Valve.

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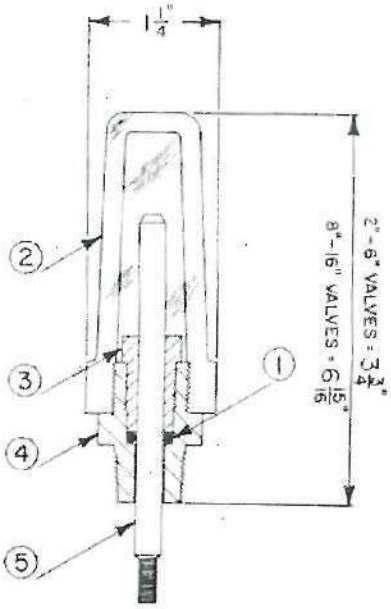
DESCRIPTION

The Model 155 Visual Indicator is a device that enables the user to determine the extent of opening of a control valve. It consists of an adaptor threaded into the center port of the valve bonnet, a rod threaded into the main valve stem, a sealing O-ring, and a protective clear plastic housing. The indicator rod moves as the valve opens and closes. It may be installed on virtually any OCV control valve, and can be done so without any disassembly of the valve itself.

WHERE USED - Standard on Series 94 Check Valves, Series 3330 Altitude Valves, and Series 22 Digital Control Valves. Optional on any other valve not employing a limit switch or position transmitter.

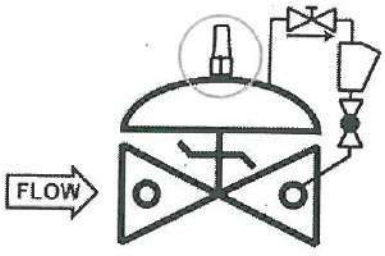
MODEL 155 MATRIX



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

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

SCHEMATIC SYMBOL



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

The Model 155 is shown on OCV Valve Schematic as:

MATERIALS

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

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Valve Position Indicator 155

PRECISION INSTRUMENT COMPANY

MODEL '301L', LIQUID FILLED GAUGES

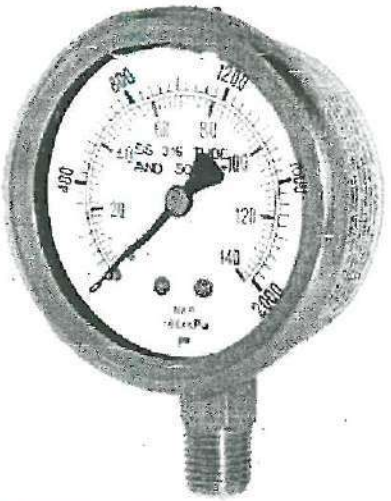
Our '300' Series Gauge Line Is A High Quality Line Of Liquid Filled Gauges. The Glycerine Filling Helps Dampen The Effects Of Pulsation And Vibration, While Also Perpetually Lubricating The Movement (And Keeping Contaminates Such As Dirt Away From All Moving Parts) Which Will Extend The Life Of The Gauge.

This Gauge Has Been Specifically Designed With The Original Equipment Manufacturers In Mind And Are Typically Used On Hydraulic & Pneumatic Systems As Well As Any Commercial Or Industrial Application Not Corrosive To 316LSS Wetted Parts Where Glycerine Filling Is Suitable For Use.

SPECIFICATIONS:

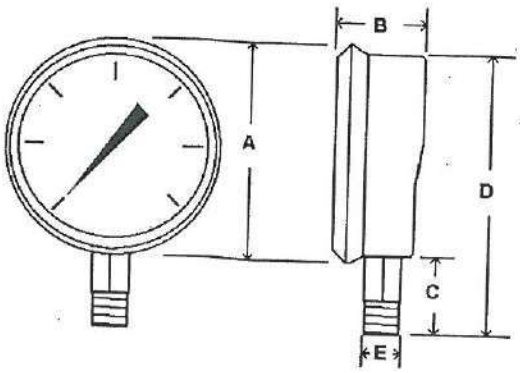
OCV
PN
589700

- **Available Dial Sizes:** 2 ½, 4", 6"
- **Available Connection Sizes:**
  1/4"MNPT on 2", 2 ½ and 4"
  1/2"MNPT on 4" and 6"
- **Stainless Steel Case And Bezel**
- **SS Internals**
- **316 SS Bourdon Tube & Connection**
- **Liquid Filled (Dry Available)**
- **Accuracy :** 2 ½ Dial Size = 1.5 %
  4" and 6" Dial Size = 1 %
- **Dual Scale: PSI & Bar (x100=kPa)**
  (Single Scale available)
- **Ambient temperature:** FILLED: 30'F to 160'F
  DRY: -30'F to 180'F



RANGE	CODE	Major In	Minor In
30/0"VAC	A	5	0.5
30/0/15	CB	5	0.5
30/0/30	CC	10	1
30/0/60	CD	10	1
30/0/100	CE	20	2
30/0/150	CF	20	2
30/0/300	CH	50	10
0/15	B	2	0.2
0/30	C	5	0.5
0/60	D	10	1
0/100	E	20	2
0/160	F	20	2
0/200	G	40	4
0/300	H	50	5
0/400	I	50	5
0/500	J	100	10
0/600	K	100	10
0/800	L	100	10
0/1000	M	200	20
0/1500	N	200	20
0/2000	O	400	50
0/3000	P	500	50
0/4000	Q	500	50
0/5000	R	1000	100
0/6000	S	2000	200
0/10,000	U	2000	200
0/15,000	V	2000	200

Some rangs nor available in all dial sizes, please call with your particular application



		A	B	C	D	E
2 ½ Dial	In	2.80	1.28	1.07	3.55	1/4" Npt
	MM	71	33	27	90	
4" Dial	In	4.32	1.63	1.25	5.57	1/4" or ½npt
	MM	110	42	32	141	
6" Dial	In	6.54	1.70	1.68	8.22	1/4" or ½npt
	MM	166	43	43	210	

Global performance. **Personal** touch.