two-way altitude valve with solenoid override

(energize-to-close)

(sizes 10" - 16")

installation, operating and maintenance instructions

model 3333-2

GENERAL DESCRIPTION

The OCV Model 3333-2 is designed to control the level in a storage tank or reservoir without the use of floats or other devices within the tank itself. It is an on-off valve that remains fully opened until the high level shutoff point is reached.

The 3333-2 is a two-way design. It not only feeds the tank, but also allows the tank to feed they system when system pressure falls below tank head.

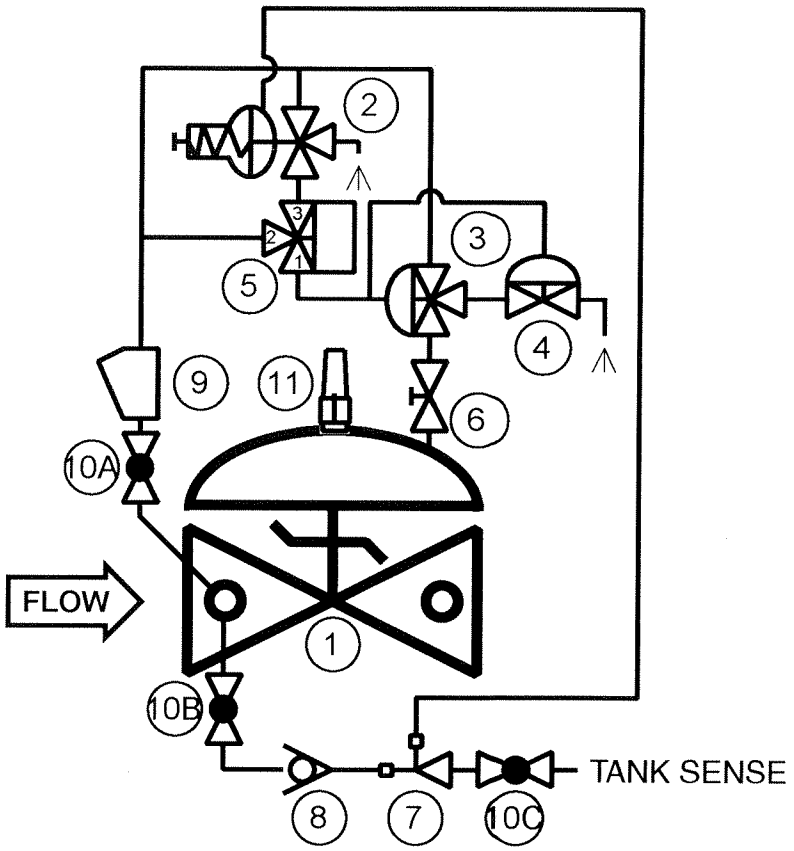
The 3333-2 consists of the following components, arranged as shown on the schematic diagram:

1. **Model 65 Basic Valve Assembly,** a hydraulically operated, diaphragm actuated, pilot controlled globe valve that closes with an elastomer-on-metal seal.
2. **Model 3300 Altitude Pilot,** a three-way control pilot that senses the tank head under its diaphragm and balances it against an adjustable spring load. Based on the actual tank head as compared to the set point, the pilot shifts to either vent or pressurize the auxiliary pilots in order to open and close the main valve.
3. **Model 3600 Three-Way Auxiliary Pilot,** that shifts to open the main valve when its diaphragm is chamber is vented by the altitude pilot, and shifts to close the main valve when its diaphragm chamber is pressurized by the altitude pilot.
4. **Model 6401 Two-Way Auxiliary Pilot,** a two way, normally pilot valve that opens when its diaphragm chamber is vented by the altitude pilot, which, in turn, allows the main valve to open.
5. **Model 452 Three-Way Solenoid Pilot.** When energized, the solenoid pilot will override the altitude pilot and close the valve, regardless of tank level.
6. **Model 141-2 Needle Valve** that controls the opening and closing speed of the main valve.
7. **Model 126 Ejector,** a simple tee fitting with a small orifice installed in its inlet port. Together with the check valve (7), the ejector allows the altitude pilot to sense either tank head or system pressure, whichever is lowest.
8. **Model 141-1 Check Valve,** that allows flow from tank to system to initiate return flow.
9. **Model 159 Y-Strainer** that protects the pilot system from solid contaminants in the line fluid.
10. Three **Model 141-4 Ball Valves,** useful for isolating various parts of the pilot system for troubleshooting or repair.
11. **Model 155 Visual Indicator** that enables the user to determine the valve's operating position at a glance.

THEORY OF OPERATION

Operation of the 3333-2 is quite simple and can be readily understood by referring to the schematic diagram.

NORMAL ACTION (SOLENOID DEENERGIZED): The diaphragm chamber of the altitude pilot (2) is connected to sense at the branch of the ejector (7). This is on the system side of the orifice in the ejector, which is represented by the



triangular part of the symbol. When tank head is higher than system pressure, check valve (8) opens, allowing flow through the ejector. The orifice creates a pressure drop, allowing the altitude pilot to sense system pressure. When the system pressure falls below the set point, the altitude pilot shifts to vent the diaphragm chambers of the two auxiliary pilots (2 and 3) to atmosphere. The three-way auxiliary pilot (2) shifts to connect port 1 to port 2 and block port 3. The two-way auxiliary pilot (3) opens. Now the diaphragm chamber of the main valve (1) is allowed to vent to atmosphere and line pressure forces the main valve to the full open position. The tank feeds the system.

When system pressure rises above tank head (e.g., a pump is started), check valve (8) closes. Now there is no flow through the ejector, and the altitude pilot senses tank head. When the tank level rises to the high level shutoff point (set point), the altitude pilot shifts to connect inlet pressure to the diaphragm chambers of the auxiliary pilots. Pilot (3) closes, and pilot (2) shifts to connects port 3 and port 1, which, in turn, connects full inlet pressure to the main valve diaphragm chamber, forcing the valve fully and tightly closed.

ELECTRICAL ACTION: When the coil of the solenoid pilot (5) is deenergized Port 1 is connected to Port 3 and Port 2 is blocked. The valve operates under control of the altitude pilot, as explained above. If the solenoid is energized, Port 2 is connected to Port 1 and Port 3 is blocked. If this occurs while the tank is filling, full inlet pressure is directed to the diaphragm chambers of the auxiliary pilots. This results in valve closure.

To summarize, the valve will close during a tank fill if the altitude pilot sense high level or the solenid is energized. The valve can still open for return flow regardless of the electrical state of the solenoid.

INSTALLATION

The 3333-2 valve is furnished fully factory assembled except for the tank sense line. In areas where freezing temperatures are possible, the valve should be located in a vault below the frost line. The flow arrow on the name tag (located on the valve flange) should point *toward* the tank. As a further check, the

spring barrel and adjusting screw of the altitude pilot will point *away from* the tank. See the Model 65 Basic Valve section of this manual for full details of valve installation.

Once the main valve is installed, the tank sense line must be connected at ball valve (10C). The proper installation of this sense line is critical to the efficient operation of the altitude valve. The following guidelines apply.

1. It is essential that the sense line be connected as close to the tank as possible in order to accurately sense the tank head. In most cases, the best location is the riser of an elevated tank or the wall of a ground storage tank. If this is not practical, connect the sense line to the fill pipe as close to the tank as possible. In extreme cases, the sense line may be connected at the discharge body side port of the main valve, but this should only be done if the valve itself is extremely close to the tank.
2. Minimum recommended size for the sense line is ½" OD tubing or 3/8" pipe.
3. In order to prevent air accumulation, the sense line should slope slightly upwards from the valve to the tank.
4. The 3333-2 vents its diaphragm chamber to atmosphere each time it opens. The volume varies according to valve size, as shown below. Provision should be made to drain off or otherwise dispose of this water.

10" - 3.0 gal..	14" - 6.5 gal..
12" - 4.0 gal.	16" - 9.6 gal.

Finally, the solenoid pilot must be wired into the control system. This is a simple two wire (plus ground) connection.

STARTUP AND ADJUSTMENT

The following details the full startup procedures for the Model 3333-2. Certain adjustments may not be necessary if the valve was preset at the factory. Nevertheless, the valve's operation should be closely monitored until the shutoff level is verified.

1. Install a pressure gauge of proper range on the inlet (system) side of the valve.
2. Loosen the jam nut on needle valve (6) and turn the adjusting screw fully **counterclockwise**.
3. Make sure all three ball valves (10A thru 10C) are open.
4. Make sure the solenoid (5) is deenergized.
5. Open main line isolation valves as necessary to put the valve "on line."
6. Allow system pressure to fall below tank head.
7. If the main valve does not open, turn the adjusting screw of the altitude pilot (2) **clockwise** until it does.
8. Now start the fill pump(s) as necessary to raise system pressure above tank head.
9. Let the tank fill. If the valve closes before the desired shutoff level is reached, repeat Step 7.
10. When the desired shutoff level is reached, turn the adjusting screw of the altitude pilot **counterclockwise** until the valve begins to close.
11. Observe that the valve closes fully. If the valve closes too quickly, slowly turn the adjusting screw of the needle valve (5) **clockwise** until the desired speed is attained. *CAUTION: Do NOT close the needle valve completely. To do so can prevent the valve from operating at all.*
12. Tighten the adjusting screw jam nuts on altitude pilot (2) and needle valve (6).

MAINTENANCE

Required maintenance of the 3333-2 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. Make sure that electrical connections are dry and secure.
4. Check the screen of the Y-strainer 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 in-

stallations, it is recommended that the strainer be checked every day or two until experience dictates a greater or lesser interval.

TROUBLESHOOTING

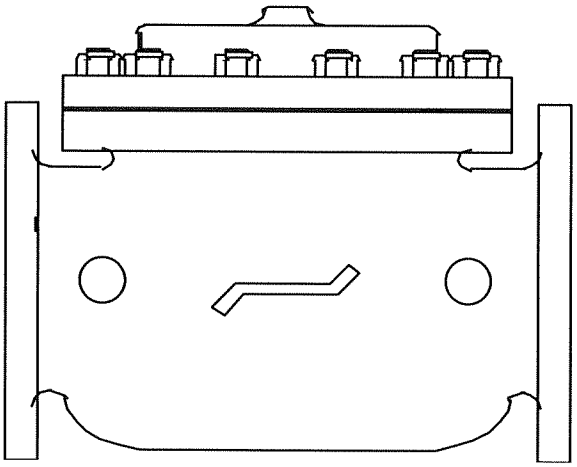
In the event of malfunction of the 3333-2, the following guide should enable the technician to isolate the cause of the problem and take appropriate corrective action.

MAIN VALVE FAILS TO OPEN

1. Make sure system pressure is low enough to call for valve opening. The opening point, relative to full tank head, is dependent on the spring used in the altitude pilot, hence on the tank height itself. This varies from approximately 2 feet on the lowest tanks, to approximately 6 feet on the highest.
2. Ball valve (10B) closed — Open as required.
3. Needle valve (6) fully closed — Open as required. See Adjustment instructions.
4. Altitude pilot (2) adjusted too far counterclockwise — See Adjustment Instructions.
5. Carefully disconnect the tubing at the bonnet of the three-way auxiliary pilot (3). There should be no pressure on this line.
   a) If there is pressure coming through the tubing, proceed to Step 6.
   b) If there is pressure coming from the bonnet of the three-way auxiliary pilot, its diaphragm may be ruptured. Disassemble pilot and determine cause. See the 3600 Pilot section of this manual.
   c) If there is no pressure, proceed to Step 7.
6. Altitude pilot leaking or mechanism binding — Disassemble pilot and determine cause. See the 3300 Pilot section of this manual.
7. Check valve (8) stuck closed — Repair or replace as necessary.
8. Two-way auxiliary pilot (4) stuck closed — Disassemble pilot and determine cause. See the 6401 section of this manual.
9. Main valve (1) stem binding — Disassemble valve and determine cause. See the Model 65 section of this manual.

MAIN VALVE FAILS TO CLOSE

1. Make sure that high level has been reached.
2. Ball valve (10A) closed — Open as required.
3. Ball valve (10C) closed — Open as required.
4. Check valve (8) stuck open or leaking badly — Repair or replace as necessary.
5. Strainer (9) clogged — Clean as required.
6. Needle valve (6) closed fully — Open as required. See Adjustment instructions.
7. Altitude pilot (2) adjusted too far clockwise — See Adjustment instructions.
8. Carefully disconnect the tubing at the bonnet of the three-way auxiliary pilot (3). The tubing should be pressurized.
   a) If there is no pressure coming through the tubing, the problem is in the altitude pilot (2). Disassemble pilot and determine cause. See the 3300 pilot section of this manual.
   b) If there is pressure coming through the tubing, proceed to Step 9.
9. Stem of three-way auxiliary pilot (3) binding — Disassemble pilot and determine cause. See the 3600 pilot section of this manual.
10. Stem of main valve (1) binding, diaphragm ruptured, or object caught in valve — Disassemble valve and determine cause. See the Model 65 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 ex-

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amination 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

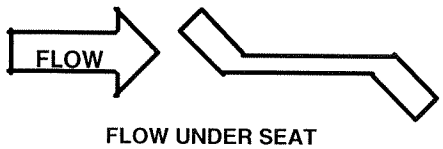
**A diaphragm failure can prevent the valve from either opening or closing, depending on the flow direction. Most water service valves flow "under the seat", in which case a diaphragm failure will keep the valve from closing. On the other hand, most fuel service valves flow "over the seat", in which 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

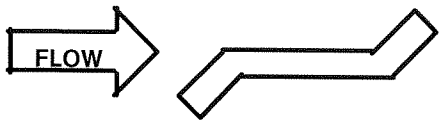
1. Isolate the valve from the system by closing upstream amd downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in 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.

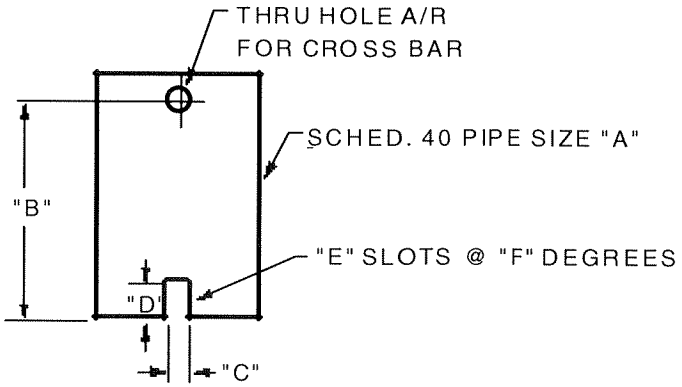
PROCEDURE C: SEAT DISC REPLACEMENT

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

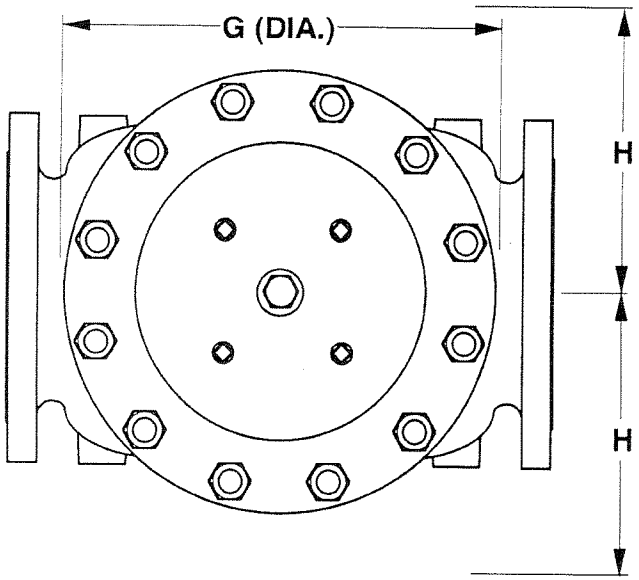
NOTE: It is rare for a seat ring to require replacement. Minor nicks and scratches in the seating surface can usually be smoothed out with emery cloth.

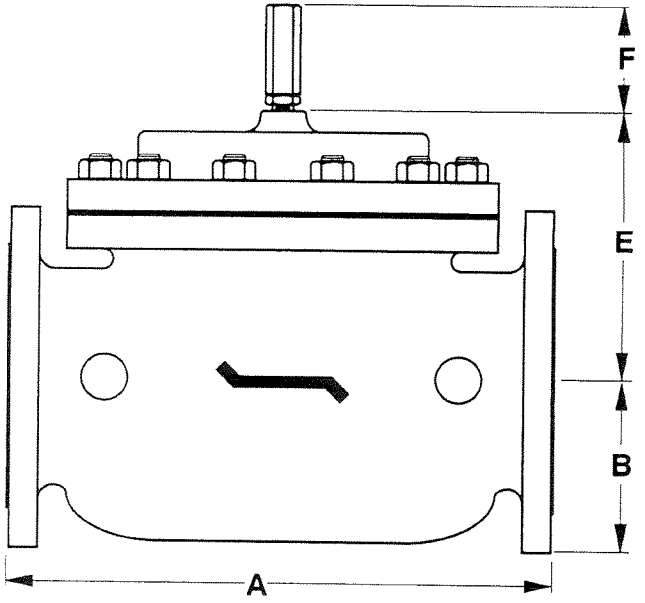
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.
4. Seat rings in valves 4" and smaller are threaded into the valve body. To remove, you will need 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.



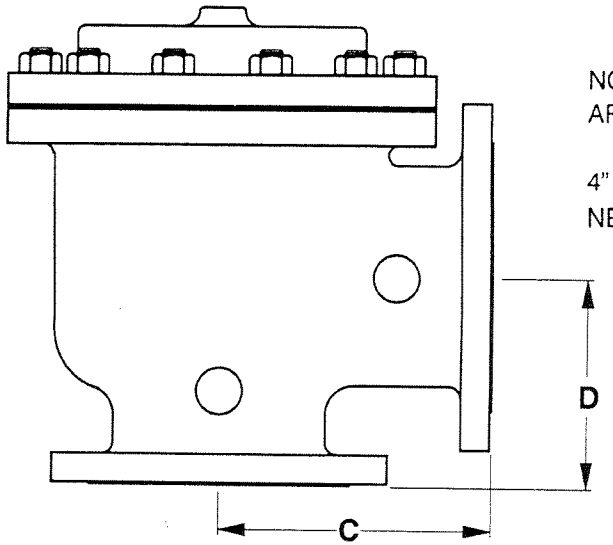
VALVE SIZE	"A" PIPE SIZE	"B" MIN. LENGTH	"C" SLOT WIDTH	"D" SLOT DEPTH	"E" NO. OF SLOTS	"F" SLOT SPACING
1-1/4"	3/4"	6"	3/8"	3/8"	2	180°
1-1/2"	3/4"	6"	3/8"	3/8"	2	180°
2"	1-1/2"	7"	3/8"	3/8"	2	180°
2-1/2"	2"	8"	1/2"	1/2"	3	120°
3"	2-1/2"	9"	5/8"	5/8"	2	180°
4"	3"	10"	5/8"	5/8"	2	180°

REVISED 3-17-97





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

DRAWN BY	DATE
SDJ	10-6-97
CHKD. BY	DATE

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

GENERAL VALVE DIMENSIONS

SIZE	DRAWING NUMBER	REV.
A	65D	B

altitude pilot

installation, operating, and maintenance instructions

model 3300

GENERAL DESCRIPTION

The OCV Model 3300 Altitude Pilot is a hydraulically-operated, diaphragm-actuated, three-way pilot valve. Used on a Model 65 Basic Valve, the 3300 is designed to control the level in an elevated tank or reservoir without the use of floats or electrical probes. The use of a large diaphragm area, a long spring and a hydraulically-balanced internal arrangement give this pilot the high sensitivity necessary for this application.

INSTALLATION

The 3300 is normally furnished factory-installed on the main valve; however, it can be field-mounted, either on the valve or remotely, if desired.

These are four connections on the pilot, as shown on the assembly drawing:

1. 3/8" NPT SENSING CONNECTION: This connection provides the tank head sense to the diaphragm. It is extremely important that this connection be made so as to accurately sense the tank head at all times. The best possible location is the base of the riser itself. For maintenance and troubleshooting purposes, it is advisable that this line contain an isolation cock.

2. 3/8" SUPPLY CONNECTION: This connection senses inlet (system) pressure to the main valve. Normally it is connected to the inlet side port of the main valve. It should also contain an isolation cock and should be protected by a strainer.

3. 1/2" CONNECTION TO BONNET: This connection is made directly to the main valve bonnet of 8" and smaller valves. On 10" and larger valves, it is connected to the bonnet of a three-way auxiliary pilot.

4. 3/8" NPT VENT TO ATMOSPHERE: This is exactly what the name applies—a **free** vent to atmosphere. Depending on the valve size, a certain amount of water will be discharged each time the valve opens, either from this vent or from the auxiliary pilot. Drain provisions should be provided for this water.

VALVE SIZE	AMT. VENTED
1-1/4 & 1-1/2"	2.5 oz.
2"	4.0 oz.
3"	10.0 oz.
4"	1.2 pints
6"	2.0 quarts
8"	1.0 gal.
10"	2.2 gal.
12"	3.5 gal.
14"	6.5 gal.
16"	8.6 gal.

THEORY OF OPERATION

Understanding of the operation of the 3300 will be aided by referring to the assembly drawing. For convenience, the left end of the pilot will be referred to as "up," and the right end as "down."

The pilot is operated by tank head pressure, acting through the sensing connection to the lower side of the

OCV Control Valves
7400 East 42nd Place / Tulsa, Oklahoma 74145 -4744 USA / (918) 627-1942 / 888-OCV-VALV / FAX 918-622-8916
e-mail: sales@controlvalves.com / website: www/controlvalves.com

diaphragm (12). There it is balanced by an adjustable spring force acting on the diaphragm assembly. As the tank level falls, the sensed head lessens, allowing the spring (13) to predominate, forcing the diaphragm assembly downwards. On the other hand, as tank level increases, the tank head gradually overcomes the spring, forcing the diaphragm assembly upwards.

Within the valve, there are three "chambers" to consider.

1. The drilled chamber inside the stem (8). This chamber is ported to the supply connection. Note that the stem can form a seal against the seat disc (32). This is referred to as the "inner seal."
2. The annular chamber between the stem (8) and the seat (7). This chamber is ported to the bonnet connection. Note that the lower end of the seat can also form a seal against the seat disc (32). This is referred to as the "outer seal."
3. The chamber below the stem and seat. This chamber is ported to the vent.

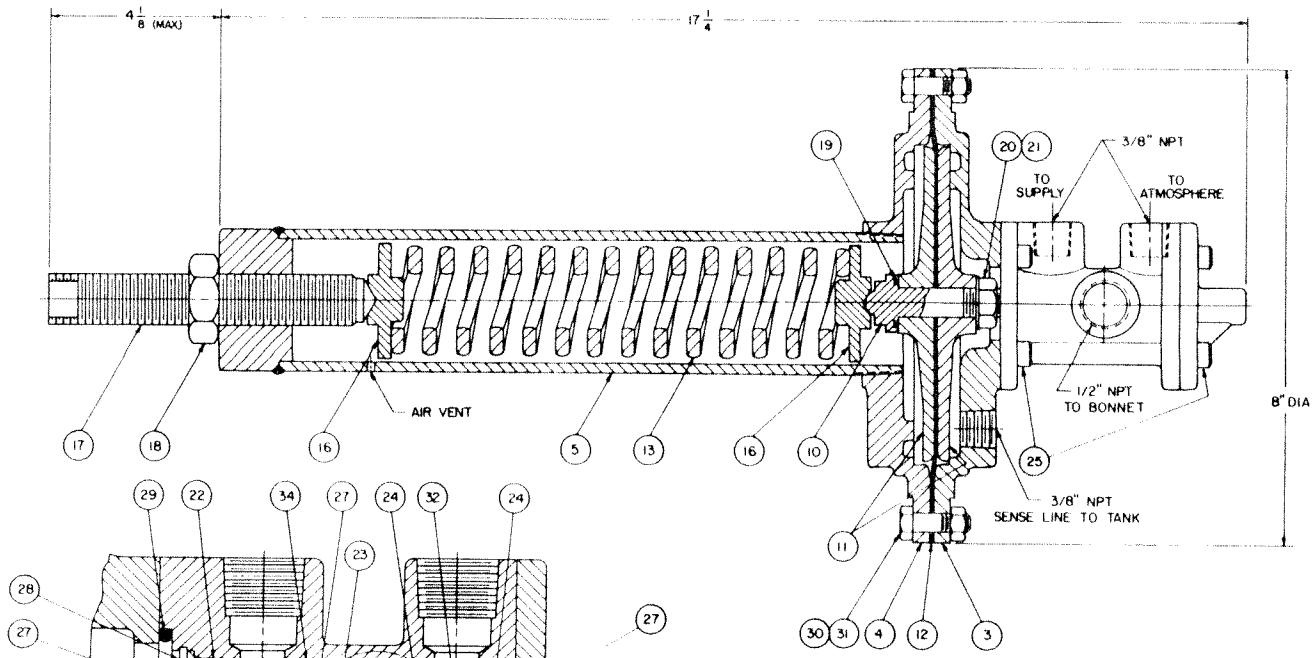
Now, as the diaphragm assembly moves downward, indicative of a falling tank head, the stem (8) is forced downwards, which first "makes" the inner seal between stem and seat disc (32), then "breaks" the outer seal between seat (7) and seat disc (32). Thus the bonnet chamber is connected to the vent chamber, and the main valve opens.

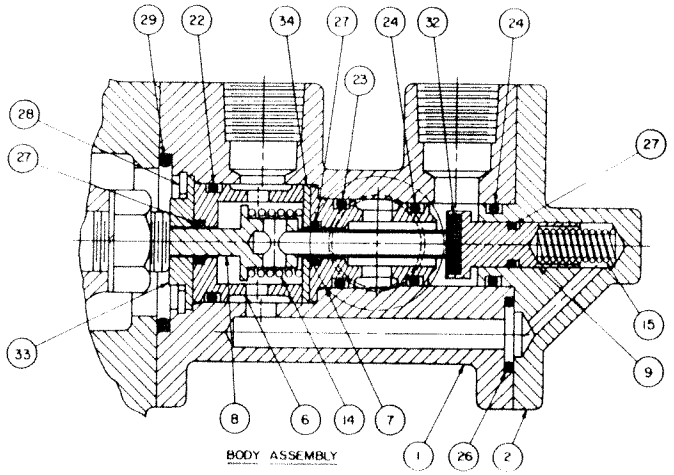
Conversely, as the diaphragm assembly moves upward, indicative of an increasing tank head, the stem (8) is forced upwards by spring (14) and spring (15). This first "makes" the outer seal between seat (7) and seat disc (32), then "breaks" the inner seal between stem (8) and seat disc (32). Thus the supply chamber is connected to the bonnet chamber, and the main valve closes.

ADJUSTMENT

Initial adjustment of the 3300 is **always** a two-step process:

1. Turn the adjustment screw (17) clockwise until the valve opens. This is indicated by a sudden discharge of water from the vent line. Allow the tank to fill. If the valve should close prematurely before the tank is full, turn the adjustment screw further clockwise until the valve reopens.
2. When the tank reaches the desired high level, turn the adjustment screw slowly counterclockwise until the valve starts closed. This is best determined by watching for a downward movement of the valve indicator stem.





NOTES

1 ▲ = RECOMMENDED SPARE PARTS

2 WHEN ORDERING PILOTS OR PARTS PLEASE SPECIFY:
- (A) MODEL NUMBER
- (B) WORKING PRESSURE AND TEMPERATURE
- (C) HEIGHT OF TOWER OR TANK FROM CENTER LINE OF BASIC VALVE
- (D) PART NUMBER
- (E) QUANTITY
- (F) DESCRIPTION
- (G) MATERIAL

ITEM	PART NO.	DESCRIPTION	QTY.	MATERIAL
34	300212	SEAL RETAINER, SEAT	1	BRASS
33	300213	SEAL RETAINER, BUSHING	1	BRASS
▲ 32	694500	SEAT DISC	1	BUNA-N
31	531725	CAPSCREW	12	STN. STL.
30	590725	HEX NUT	12	STN. STL.
▲ 29	610218	O-RING	1	BUNA-N
28	630708	SNAP RING	1	STN. STL.
▲ 27	611010	O-RING	3	VITON
▲ 26	611111	O-RING	1	VITON
25	530701	CAPSCREW	8	STN. STL.
▲ 24	611112	O-RING	2	VITON
▲ 23	611113	O-RING	1	VITON
▲ 22	610117	O-RING	1	BUNA-N
21	590711	HEX NUT	1	STN. STL.
20	685703	LOCKWASHER	1	STN. STL.
▲ 19	610017	O-RING	1	BUNA-N
18	590037	JAM NUT	1	CAD. PL. STL.
17	300048	ADJUSTING SCREW	1	CAD. PL. STL.
16	300049	SPRING RETAINER	2	CAD. PL. STL.
15	651706	SPRING	1	STN. STL.
14	651705	SPRING	1	STN. STL.
13	—	SPRING (SEE DATA)	1	STEEL
▲ 12	694001	DIAPHRAGM	1	BUNA-N, NYLON
11	308101	DIAPHRAGM PLATE	2	BRONZE
10	300704	SCREW, DIAPH. PLATE	1	STN. STL.
9	310702	SEAT RETAINER	1	STN. STL.
8	314701	STEM	1	STN. STL.
7	310724	SEAT	1	STN. STL.
6	300211	BUSHING, STEM	1	BRASS
5	300450	SPRING BARREL	1	STEEL
4	304101	BONNET, TOP	1	BRONZE
3	304121	BONNET, BOTTOM	1	BRONZE
2	300155	CAP, BOTTOM	1	BRONZE
1	302101	BODY	1	BRONZE

SPRING DATA		
PART NO.	TANK HEIGHTS	COLOR CODE
651404	5 TO 30 FEET	BLUE/GOLD
651405	20 TO 50 FEET	GOLD
651406	40 TO 80 FEET	BLUE
651407	70 TO 140 FEET	ORANGE
651410	130 TO 230 FEET	YELLOW

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

MATERIAL

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ±1/64 · ANGULAR ±0.5° · MACH. FINISH 125

DRAWN BY RON DATE 6/84

CHKD BY DATE

SCALE FULL

Fisher Control Valves

ALTITUDE PILOT

SIZE D

DRAWING NUMBER 3300

REV B

SUPERSEDES 3300, 12-82, REV A

three-way pilot

installation, operating, and maintenance instructions

model 3600

GENERAL DESCRIPTION

The OCV Model 3600 is a hydraulically-operated, diaphragm-actuated, three-way valve. It is normally used on a main valve when faster-than-normal closing speed is required or when another pilot (e.g., float pilot or solenoid valve) is used to actuate the main valve.

FUNCTIONAL DESCRIPTION

Pressurizing the bonnet of the three-way pilot moves its stem to the "down" position connecting Ports 1 and 3. Depressurizing the bonnet of the OCV Model 3600 allows its stem to return to the "up position," connecting Ports 1 and 2.

Pressurize the bonnet of the 3600 to open the main valve on Model 115-4's, 125's and 119's. De-pressurize the bonnet of the 3600 to open the main valve on Model 3333's and 118's.

TROUBLESHOOTING

A major malfunction in the three-way 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 3600 is suspected, proceed as follows:

1. FAILURE OF PILOT TO CLOSE MAIN VALVE
   A. Ruptured diaphragm
      (1) Detach sense line from the bonnet of the pilot and remove the bonnet. Inspect the diaphragm carefully for holes or cracks.
      (2) If damaged, replace with new diaphragm.
   B. Pilot stem binding
      (1) With bonnet removed, inspect the stem journal in the bonnet for buildup of foreign material.
      (2) Clean as necessary and reassemble pilot.
   C. Obstruction in seat area
      (1) Disassemble pilot and remove obstruction.
   D. Rubber seat damaged
      (1) Disassemble pilot and examine seats for excessive wear or damage.
      (2) Replace if necessary and reassemble pilot.
2. FAILURE OF PILOT TO OPEN MAIN VALVE
   A. Pilot stem binding
      (1) Proceed as in 1B above.
   B. Obstruction in seat area
      (1) Proceed as in 1C above.
   C. Rubber seat damaged
      (1) Proceed as in 1D above.

MAINTENANCE

Because of the simplicity of design of the 3600 pilot, required maintenance is minimal. Check fittings and bolts periodically for tightness, and inspect the body for damage or excessive buildup of foreign material.

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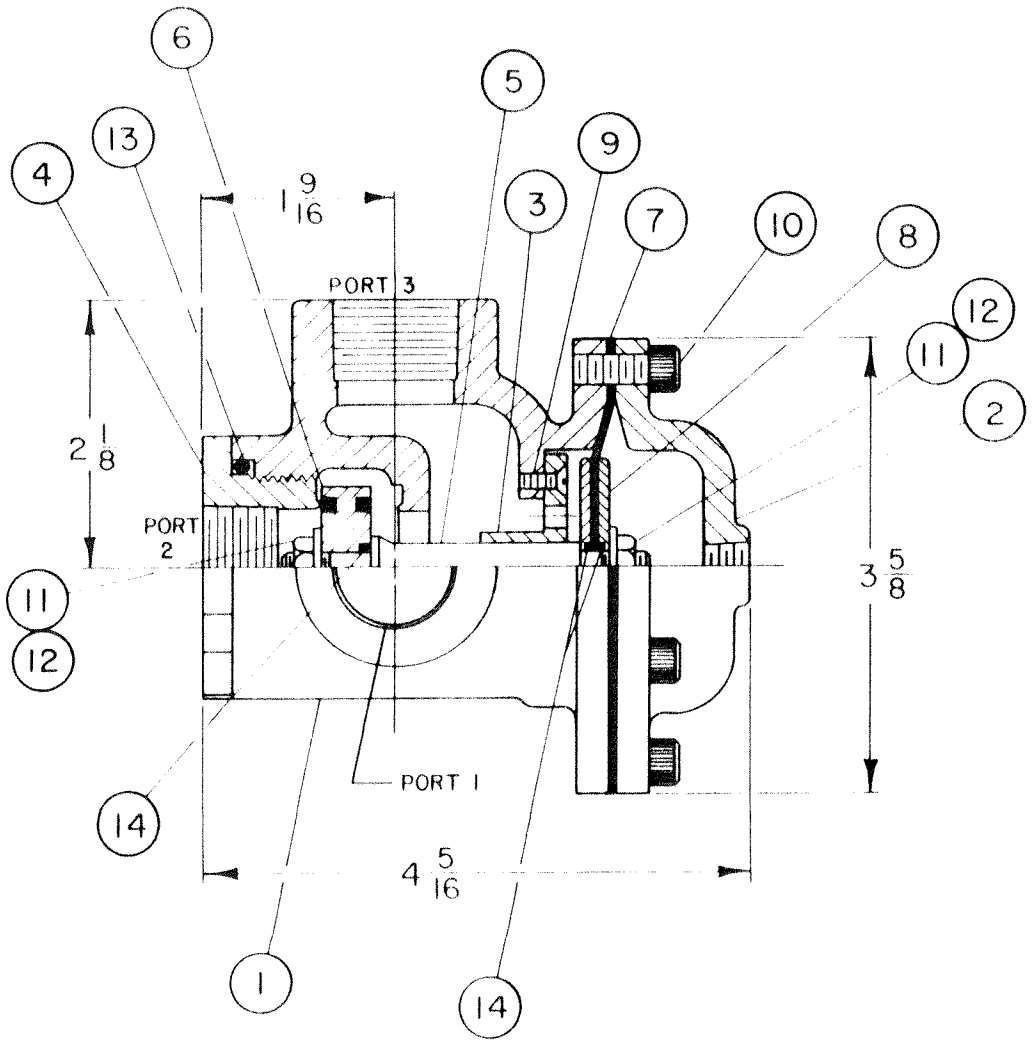
e-mail: sales@controlvalves.com / website: www/controlvalves.com



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	300171	1	ADAPTER	BRASS
		300771	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
E			
D			
C			
B			
A			

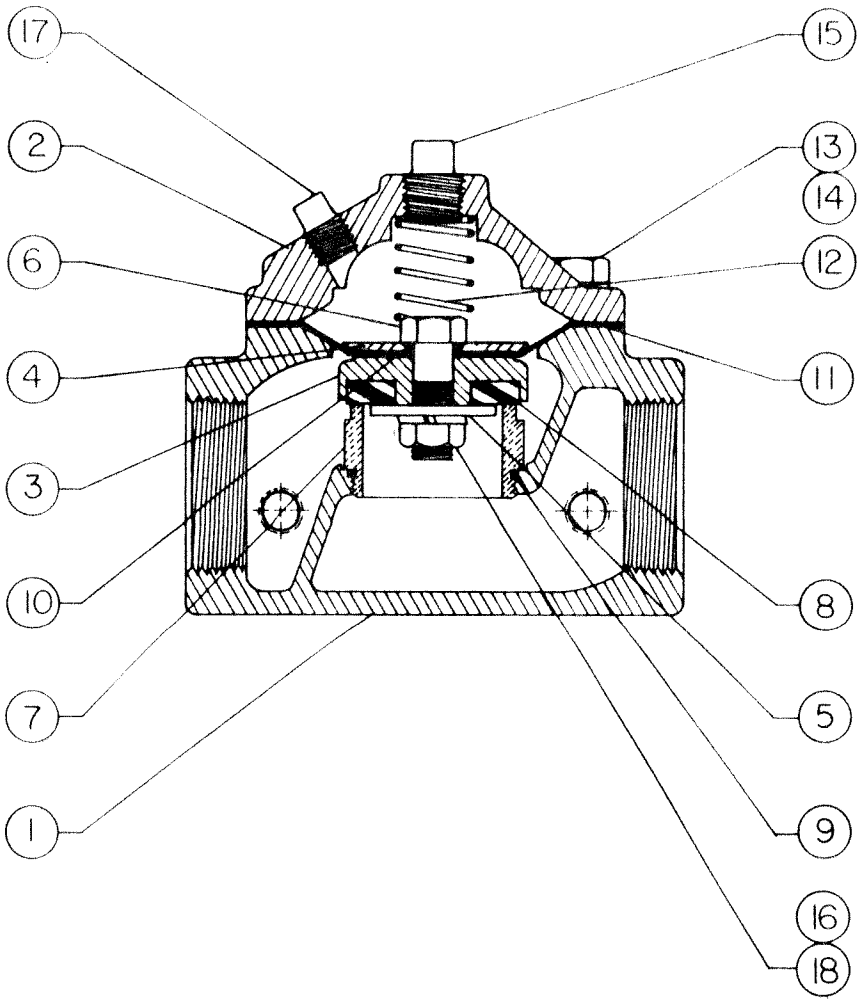
REVISIONS

REF DWG NO'S

MATERIAL	TOLERANCES UNLESS NOTED FRACTIONAL ± 1/64 DECIMAL ± .005 MACH. FINISH 125 ANGULAR ± 1°	OCV Control Valves TULSA, OKLAHOMA U.S.A.
		THREE-WAY PILOT
NO. REQ'D	DRAWN BY BRW DATE 7/18/83	SIZE B — DRAWING NUMBER 3600 — REV
SCALE	CHKD. BY DATE	

NOTE

1. WHEN ORDERING PARTS PLEASE SPECIFY SERIES NUMBER, PART NUMBER AND MATERIAL.
2. ▲ RECOMMENDED SPARE PARTS.
3. ● FURNISHED ASSEMBLED IN OVERHAUL KIT.



	ITEM	O.C.V. NO.	QTY.	DESCRIPTION	MATERIAL
		1"		NOMINAL SIZE	
		4⅛"		LENGTH, FACE-TO-FACE	
●	18	6475	1	STEM NUT	STN.STEEL
	17	6469	A/R	PIPE PLUG 1/4"	STEEL
●	16	1551	1	LOCK WASHER	STN STEEL
	15	6471	A/R	PIPE PLUG 3/8"	STEEL
	14	6457	4	BOLT, CAD. PLATED	STEEL
	13	6461	4	LOCK WASHER, CAD.PLTD.	STEEL
	12	6445	1	SPRING	STN. STEEL
▲	11	6441	1	DIAPHRAGM	NYLON, BUNA-N
●▲	10	616	1	"O"-RING, STEM	BUNA-N
▲	9	6449	1	"O"-RING, SEAT RING	BUNA-N
●▲	8	6437	1	SEAT DISC	BUNA-N
	7	6417	1	SEAT RING	RED BRASS
●	6	6433	1	STEM	BRASS
●	5	6425	1	SEAT RETAINER	STN.STEEL
●	4	6421	1	DIAPHRAGM PLATE	BRASS
●	3	6429	1	SEAT CUP	DELRIN
	2	6413	1	BONNET	DUCT. IRON
	1	6407	1	BODY	DUCT. IRON

OCV OIL CAPITAL VALVE CO.

MODEL 64 BASIC VALVE ASSEMBLY, 1"

ENGINEERING DATA 6401

INSTALLATION AND MAINTENANCE INSTRUCTIONS

3-WAY MINIATURE SIZE SOLENOID VALVES
NORMALLY CLOSED, NORMALLY OPEN AND UNIVERSAL OPERATION
1/8 NPT – 3/64, 1/16, 3/32 AND 1/8 ORIFICE
BRASS AND STAINLESS STEEL CONSTRUCTION

BULLETIN 8320

ASCO

FORM NO. V6055

DESCRIPTION

Bulletin 8320 valves are 3-way, direct-acting, miniature size solenoid valves with all three pipe connections located in the valve body. Valves are of rugged brass or stainless steel construction. Standard valves have a General Purpose NEMA Type 1 Solenoid Enclosure. Valves may also be equipped with a solenoid enclosure which is designed to meet NEMA Type 4 — Watertight, NEMA Type 7 (C or D) Hazardous Locations — Class I, Groups C or D and NEMA Type 9 (E, F or G) Hazardous Locations — Class II, Groups E, F or G. Installation and Maintenance Instructions for the Explosion-Proof/Watertight Solenoid Enclosure are shown on Form No. V5391.

OPERATION

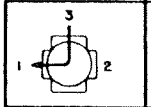
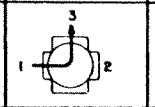
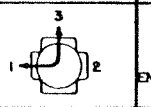
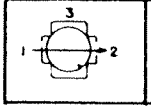
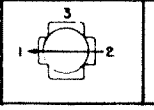
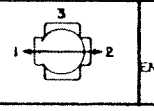
Normally Closed: Applies pressure when solenoid is energized; exhausts pressure when solenoid is de-energized. When solenoid is energized, flow is from Connection "2" to Connection "1." Connection "3" is closed. When solenoid is de-energized, flow is from Connection "1" to Connection "3." Connection "2" is closed.

Normally Open: Applies pressure when solenoid is de-energized; exhausts pressure when solenoid is energized. When solenoid is energized, flow is from Connection "1" to Connection "2." Connection "3" is closed. When solenoid is de-energized, flow is from Connection "3" to Connection "1." Connection "2" is closed.

Universal: For normally closed or normally open operation, selection or diversion of pressure can be applied to Connection "1," "2" or "3."

NOTE: To change from normally closed to normally open or universal operation, consult factory.

FLOW DIAGRAMS

NORMALLY OPEN PRESS. AT 3	NORMALLY CLOSED PRESS. AT 2	UNIVERSAL-PRESS. AT ANY ORIFICE	FORM
			SOL. DE-ENERGIZED
			SOL. ENERGIZED

MANUAL OPERATOR (Optional)

Manual operator allows manual operation during an interruption of electrical power or when otherwise desired. Two types of manual operators are available — push type (Suffix MO) and screw type (Suffix MS). To operate valve manually with push type operator, push stem at base of valve body as far upward as possible. Valve will now be in the same position as when the solenoid is energized. Removing pressure from stem will release manual operator to original position. To operate valve with a screw type manual operator, rotate manual operator stem at base of valve body clockwise until it hits a stop. Valve will now be in the same position as when the solenoid is energized. Rotate manual operator stem fully counterclockwise before operating valve electrically.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage and service.

TEMPERATURE LIMITATIONS

For maximum valve ambient and fluid temperatures, refer to chart below. For higher ambient and fluid temperatures, consult factory. Check catalog number prefix and watt rating on nameplate to determine the maximum temperatures.

Construction	Watt Rating	Catalog Number Prefix	Coil Class	Maximum Ambient Temp.°F	Maximum Fluid Temp.°F
A-C Construction (Alternating Current)	6	None, DA or S	A	77	180
		DB, LB, SB DF, FT or SF	H or F	122	200
		HT	H	140	200
	9*	None, DP or SP	F	77	180
D-C Construction (Direct Current)	9.7	None, FT HT, LB, S or SF	A, F or H	77	120

*Catalog Nos. 8320B130, 8320B131, 8320B134, 8320B135, 8320B138, 8320B139, 8320A140, 8320A141, 8320A144, 8320A145, 8320A148 and 8320A149 are limited to a fluid temperature of 140°F.

POSITIONING

This valve is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertical and upright so as to reduce the possibility of foreign matter accumulating in the core tube area.

MOUNTING

For mounting dimensions of mounting bracket, refer to Figure 1.

PIPING

Connect piping or tubing to valve according to markings on valve body. Refer to flow diagrams provided. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Pipe strain should be avoided by the proper support and alignment of piping. When tightening the connections, do not use the valve body or solenoid as a lever. Wrenches applied to valve body or piping are to be located as close as possible to connection point.

IMPORTANT: For the protection of the solenoid valve, install a strainer or filter suitable for the service involved in the inlet side as close to the valve as possible. Periodic cleaning is required depending on service conditions. See Bulletins 8600, 8601 and 8602 for strainers.

WIRING

Wiring must comply with Local and National Electrical Codes. Housings for all solenoids are provided with accommodations or connections for 1/2 inch conduit. The general purpose solenoid enclosure may be rotated to facilitate wiring by removing the retaining cap or clip. CAUTION: When metal retaining clip disengages, it will spring upward. Rotate solenoid enclosure to desired position. Replace retaining cap or clip before operating.

NOTE: Alternating current (A-C) and direct current (D-C) solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid, including the plugnut/core tube sub-assembly and core assembly.

SOLENOID TEMPERATURE

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched with the hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

WARNING: Turn off electrical power supply and depressurize valve before making repairs. It is not necessary to remove the valve from the pipe line for repairs.

CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary depending on medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. Clean valve strainer or filter when cleaning solenoid valve.

PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate the valve at least once a month to insure proper opening and closing.
3. Periodic inspection (depending on medium and service conditions) of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

IMPROPER OPERATION

1. **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown-out fuses, open-circuited or grounded coil, broken lead wires or splice connections.
2. **Burned-Out Coil:** Check for open-circuited coil. Replace coil, if necessary.
3. **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.
4. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve and clean all parts. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

COIL REPLACEMENT (Refer to Figure 1)

Turn off electrical power supply and disconnect coil lead wires. Proceed in the following manner:

1. Remove retaining cap or clip, nameplate and cover. CAUTION: When metal retaining clip disengages, it will spring upward.
2. Slip the yoke containing the coil, sleeves and insulating washers off the plugnut/core tube sub-assembly. Insulating washers (2) are omitted when a molded coil is used.
3. Slip coil, sleeves and insulating washers from yoke.
4. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit. Place an insulating washer at each end of coil, if required.

VALVE DISASSEMBLY

Depressurize valve and turn off electrical power supply. Proceed in the following manner:

1. Remove retaining cap or clip and slip the entire solenoid enclosure off the plugnut/core tube sub-assembly. CAUTION: When metal retaining clip disengages, it will spring upward. NOTE: For valve with an Explosion-Proof/Watertight Solenoid Enclosure, the solenoid may be removed as a complete unit by unscrewing the solenoid base sub-assembly.
2. Unscrew valve bonnet with special wrench adapter provided in the Spare Parts Kit (special wrench adapter Order No. 158-477-1).
3. Remove plugnut/core tube sub-assembly with valve bonnet and bonnet gasket attached.
4. Remove core spring, core assembly and body gasket.
5. Unscrew end cap or manual operator assembly and remove disc spring, disc, disc holder and body gasket.
6. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

Form No. V6055 PRINTED IN U.S.A. 1979 Automatic Switch Co. FLORHAM PARK, NEW JERSEY 07932

ASCO Valves

VALVE REASSEMBLY

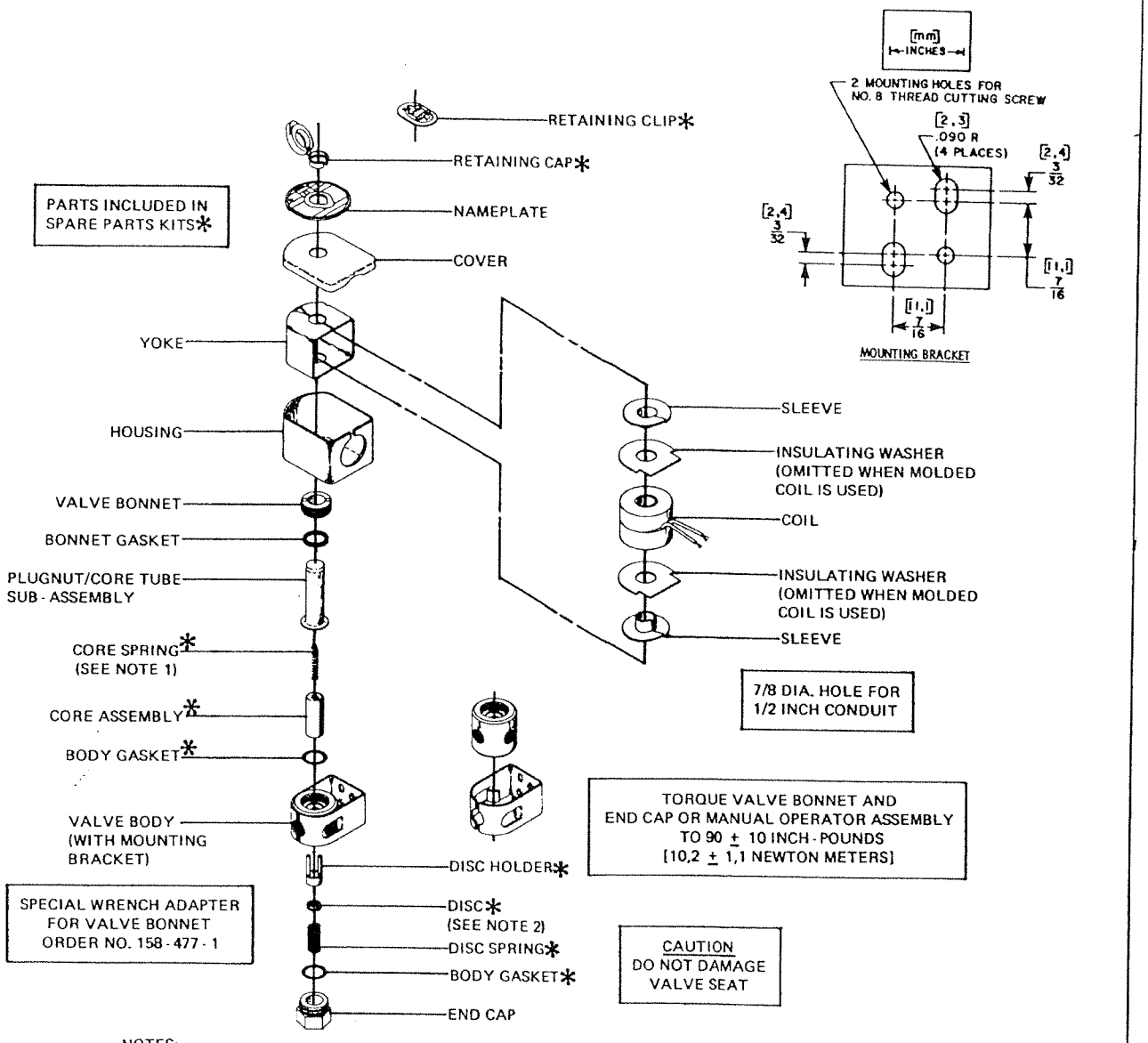
1. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.
2. Lubricate all gaskets with Dow Corning Corporation's MOLYKOTE® 111 compound or an equivalent high grade silicone grease.
3. Replace disc holder, disc, disc spring, body gasket and end cap. IMPORTANT: Some valves have a disc with a conical point on one side. Be sure conical point on disc faces orifice in valve body. Torque end cap (or manual operator assembly) to 90 ± 10 inch-pounds [10,2 ± 1,1 newton meters].
4. Replace body gasket and install core spring into core assembly. Install wide end of core spring into core assembly first, closed end protrudes from top of core assembly.
5. Position core assembly and core spring into plugnut/core tube sub-assembly. Install plugnut/core tube sub-assembly with core assembly and core spring in valve body. Torque valve bonnet to 90 ± 10 inch-pounds [10,2 ± 1,1 newton meters].
6. Replace solenoid enclosure and retaining cap or clip. NOTE: For valves with an Explosion-Proof/Watertight Solenoid Enclosure, the solenoid may be assembled as a complete unit.
7. After maintenance, operate the valve a few times to be sure of proper operation.

SPARE PARTS KITS

Spare Parts Kits and Coils are available for ASCO valves. Parts marked with an asterisk (*) are supplied in Spare Parts Kits.

ORDERING INFORMATION FOR SPARE PARTS KITS

When Ordering Spare Parts Kits or Coils, Specify Valve Catalog Number, Serial Number and Voltage.

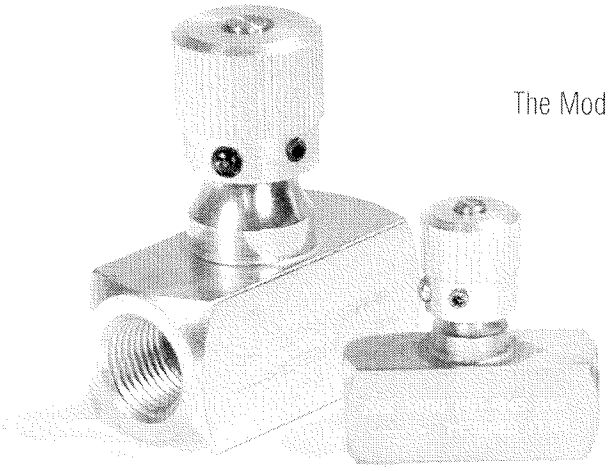


NOTES:
1. INSTALL WIDE END OF CORE SPRING IN CORE ASSEMBLY FIRST. CLOSED END OF CORE SPRING PROTRUDES FROM TOP OF CORE ASSEMBLY.
2. IF DISC HAS A CONICAL POINT ON ONE SIDE, BE SURE CONICAL POINT ON DISC FACES ORIFICE IN VALVE BODY.

Bulletin 8320
General Purpose Solenoid Enclosure Shown.
For Explosion-Proof Solenoid Enclosure, See Form No. V-5391.

Figure 1.

ASCO Valves
Automatic Switch Co. FLORHAM PARK, NEW JERSEY 07932 Form No. V6055 PRINTED IN U.S.A. 1979

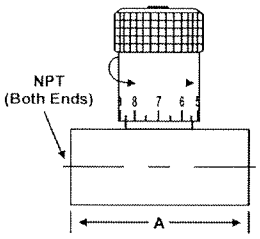


DESCRIPTION

The Model 141-2 Needle Valve is an adjustable restriction device installed in the control circuit tubing. The setting of the needle valve meters the flow into and out of the main valve diaphragm chamber, thus controlling the response speed of the main valve. Depending on the application, the needle valve may be used as a closing speed control, opening speed control, or both simultaneously.

Needle Valves shown
Sizes: 3/4" & 1/4"

MODEL 141-2 MATRIX

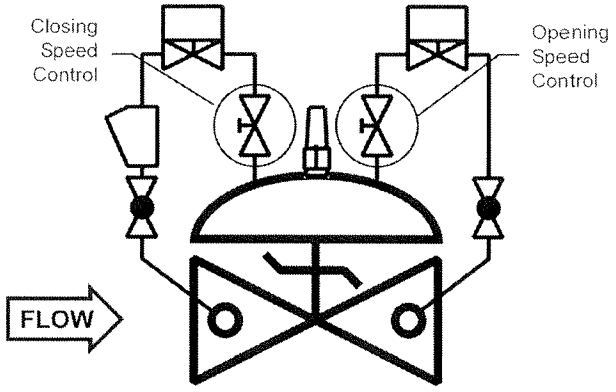


MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	683100	1/4	2	1 ¼"-2"
Brass	683101	3/8	2 1/4	2 ½"-6"
Brass	683102	1/2	2 5/8	8"-10"
Brass	683103	3/4	3 1/4	12"-16"
Stn. Steel	683700	1/4	2	1 ¼"-2"
Stn. Steel	683702	3/8	2 1/4	2 ½"-6"
Stn. Steel	682704	1/2	2 5/8	8"-10"
Stn. Steel	683703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

Note: Needle valve size may vary on valve application. Consult factory.

SCHEMATIC SYMBOL

The Model 141-2 Needle Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-3 DIGITAL VALVE as separate opening and closing speed controls.

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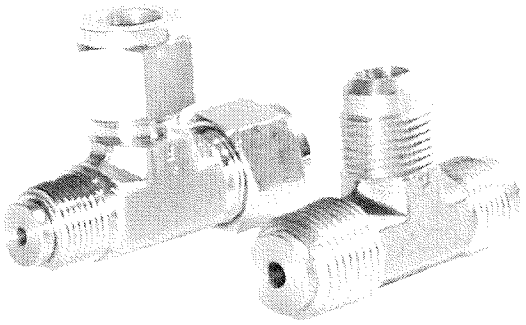
Needle Valve 141-2



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.

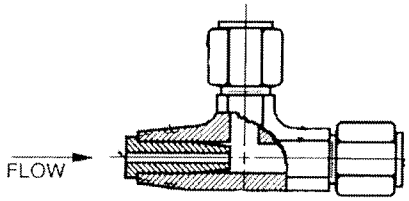
MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

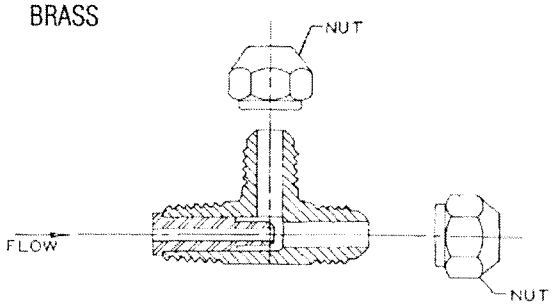
MATERIAL	PART NUMBER	P (NPT)	T-TUBE O.D.	STD. ORIFICE	USED ON VALVE SIZES
Brass	213100	3/8"	3/8"	.125"	1 ¼"-6"
Brass	214100	1/2"	1/2"	.188"	8"-10"
Brass	215100	3/4"	3/4"	.188"	12"-16"
316 Stn. Steel	213700	1/4"	3/8"	.090"	1 ¼"-6"
316 Stn. Steel	214700	3/8"	1/2"	.125"	8"-10"
316 Stn. Steel	215700	1/2"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

Orifice bushings are stainless steel.

STAINLESS

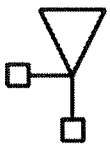


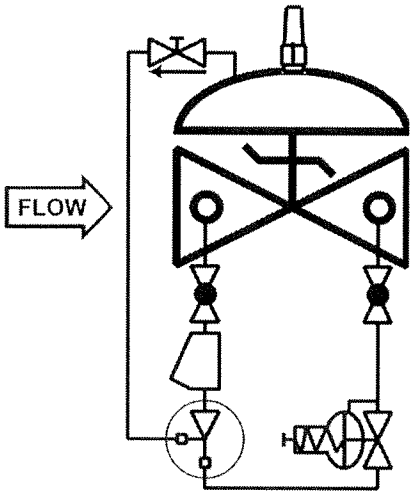
BRASS



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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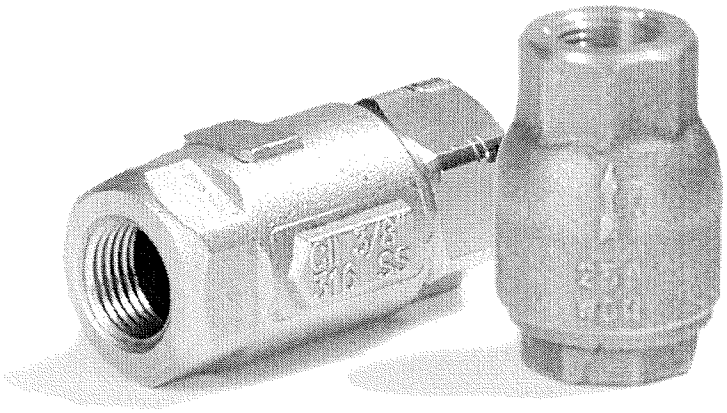
DESCRIPTION



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.

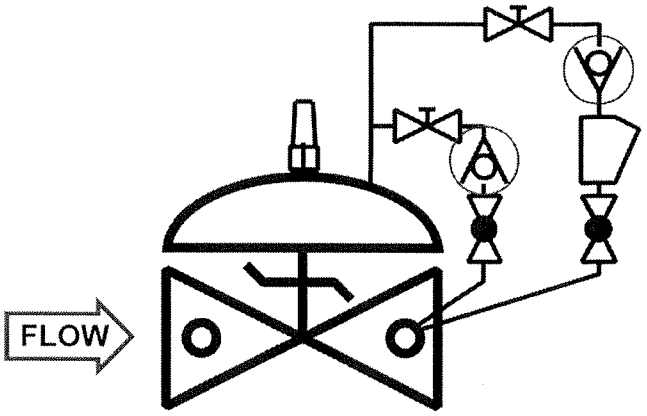
Check Valves shown Stainless Steel & Brass

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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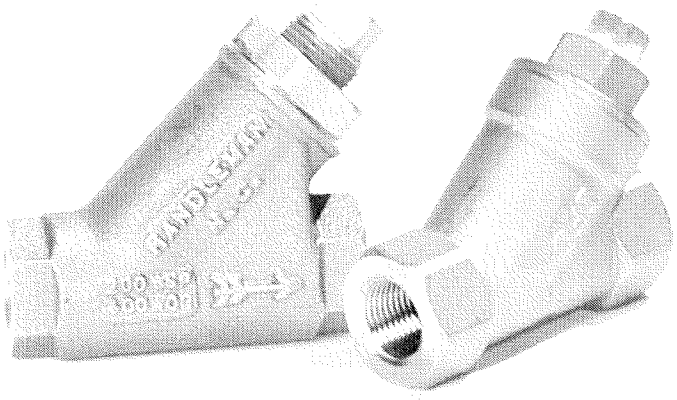
Check Valve 141-1

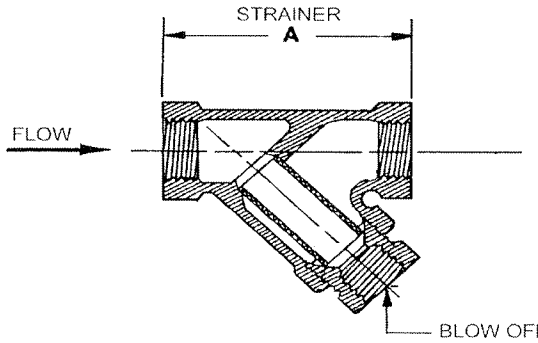


DESCRIPTION

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"



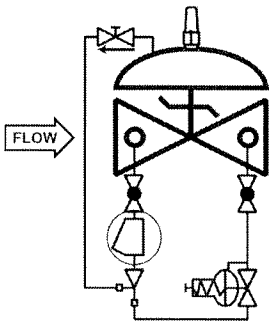
MATERIALS

Bronze, ASTM B62
Optional mesh sizes: 50,100

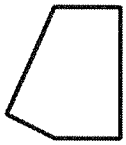
Stainless Steel, CF8-M (316)
Optional mesh sizes: 60, 80, 100

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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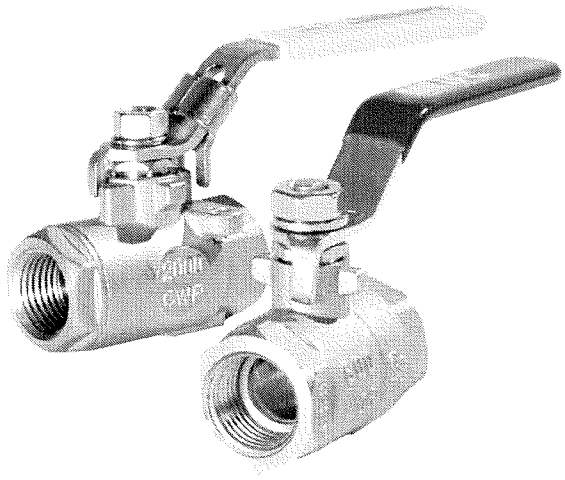
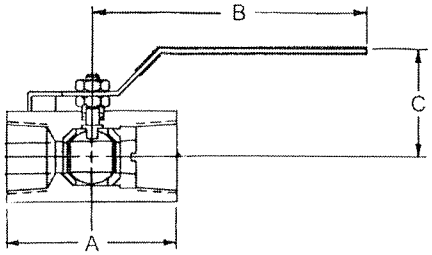
DESCRIPTION



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.

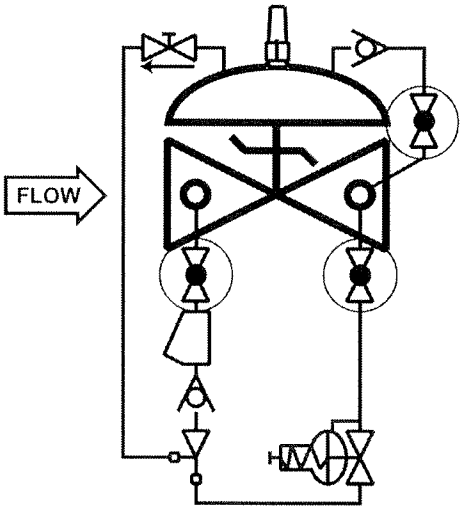
Ball valves are standard on water service valves; optional on fuel service valves.



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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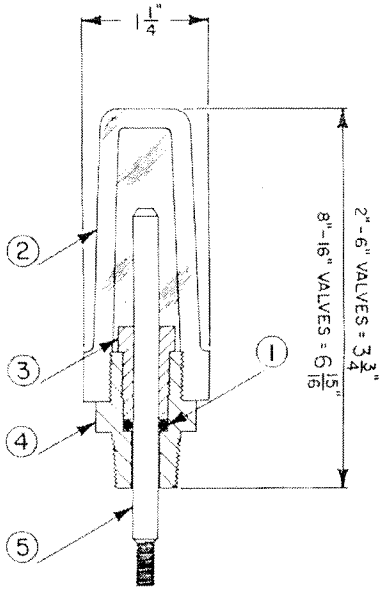
DESCRIPTION

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.

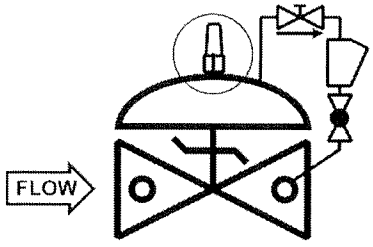
MODEL 155 MATRIX



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"	255106	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