

# non-modulating float valve 1 1/4 thru 24"

## installation, operating, and maintenance instructions

### model 8000

#### GENERAL DESCRIPTION

The OCV Series 8000 liquid level control valves ( or float-controlled valves) are designed to maintain a desired level in a tank or reservoir by opening for refilling the tank when fluid is below the high level point and closing tightly when the desired level is reached.

The 8000 is a non-modulating valve; that is, it is either full open or full closed. It is available in two basic configurations:

1. **Model 8000**, with the float pilot provided separate from the main valve for remote mounting. This configuration is typically used when the fill line is located at the bottom of the tank.
2. **Model 8000VM**, with the float pilot mounted on the main valve. This configuration is typically used when the fill line is located at the top of the tank.

All Series 8000 valves include an OCV Model 65 Basic Valve assembly and a Model 814 three-way rotary float pilot. For faster operation, valves 8" and larger also include a Model 3600 three-way auxiliary pilot.

#### INSTALLATION

##### A. Model 8000

1. Install the main valve in the fill line per the instructions in the "Series 65 Basic Valve" section of this manual. Make sure the flow arrow points **toward** the tank.

2. Install the float pilot per the instructions in the "Model 814 Float Pilot" section of this manual.
3. Install two (2) sense lines between the main valve and float pilot. For proper operation, these lines should be at least 1/4" I.D. in size.
  - (a) The first line runs from the inlet (supply) side of the main valve to the **supply** port of the float pilot. This port is located 30° below the horizontal centerline of the float pilot body.
  - (b) The second line runs from the **common** port of the float pilot located directly on top of the float pilot body) to the bonnet of the main valve (6" and smaller) or to the bonnet of the three-way auxiliary pilot (8" and larger).
4. Adjust the counterbalance and float per the instructions in the "Model 814 Float Pilot" section of this manual.

##### B. MODEL 8000VM

Model 8000VM is installed as above, except that Step 3 can be deleted. The sense lines are factory-installed on this model.

#### THEORY OF OPERATION

##### A. VALVES WITHOUT AUXILIARY PILOT (6" and smaller):

When the float is in the "down" position, a connection is made in the pilot from **common** to **exhaust**. This vents the diaphragm chamber of the main valve, allow-

ing it to open. The tank fills through the valve until the desired high level is reached; i.e., the float reaches the "up" position. At this point, a connection is made in the pilot from **supply** to **common**. This applies inlet pressure to the diaphragm chamber of the main valve, causing it to go fully closed.

#### **B. VALVES WITH AUXILIARY PILOT (8" and larger):**

The above description applies except that the float pilot alternately vents or pressurizes the diaphragm chamber of the three-way auxiliary pilot. In relay fashion, the auxiliary pilot then vents or pressurizes the diaphragm chamber of the main valve.

#### **MAINTENANCE**

Because of the simplicity of design of the 8000, required maintenance is minimal. However, the following checks, periodically performed, will do much to keep the valve operating properly and efficiently.

1. Check for leaks at fittings and around flanges and connections. Tighten as required.
2. Check for chipped or peeling paint.
3. 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 8000, the following guide should enable the technician to isolate the specific cause of the problem.

##### **A. MAIN VALVE FAILS TO OPEN:**

1. Check pressure at the inlet of the main valve. In order for the valve to open fully, this pressure

must be at least 5 psi greater than tank head.

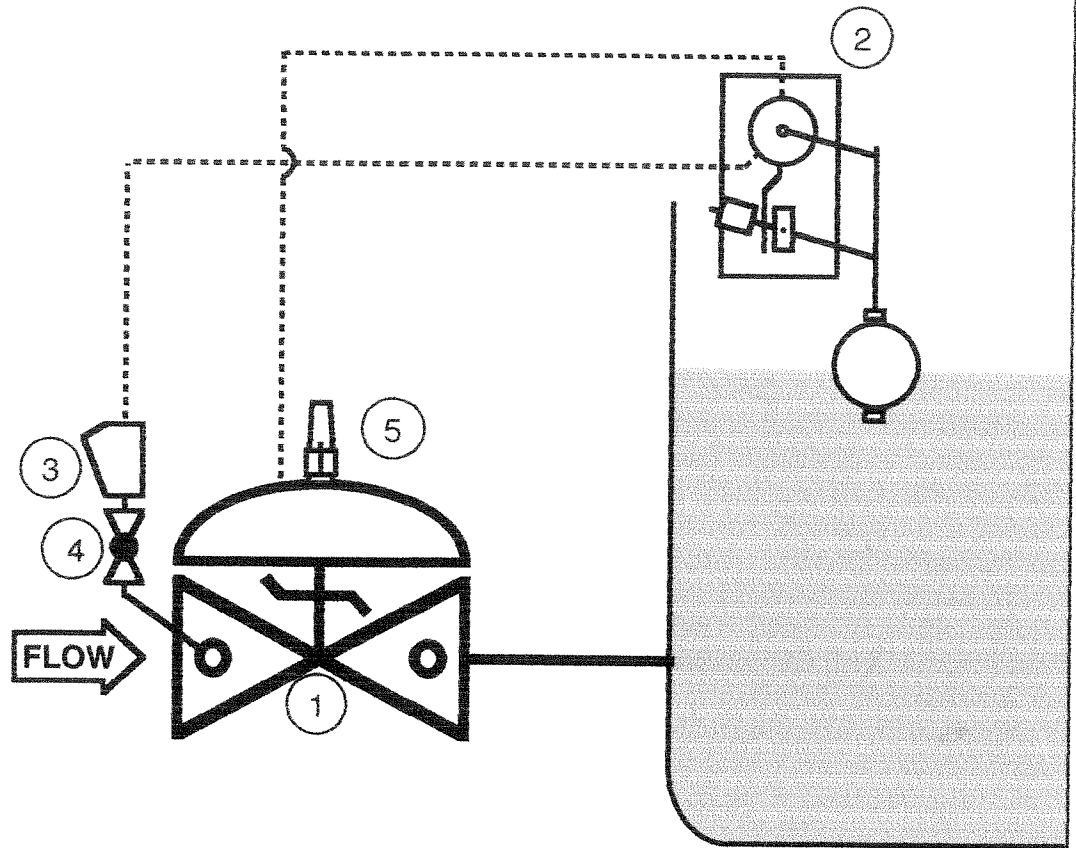
2. Check for closed isolation valve between main valve and tank - open as required.
3. Remove connection from float pilot at bonnet of main valve or auxiliary pilot, if so equipped.
  - a. If valve opens, the problem is in the float pilot - See 814 Float Pilot" section.
  - b. If valve remains closed, the problem is in main valve ( or auxiliary pilot). Proceed to Step 4.
4. If the valve is equipped with an auxiliary pilot, and there is a continuous discharge from its bonnet connection, the pilot diaphragm is ruptured - See 3600 Pilot section.
5. 3600 Pilot bound up - See 3600 Pilot section.
6. Main valve diaphragm ruptured (PETROLEUM SERVICE VALVES ONLY) - See Series 65 Basic Valve section.
7. Main valve stem restricted - See Series 65 Basic Valve section.

##### **B. MAIN VALVE FAILS TO CLOSE:**

1. Strainer clogged. Clean as required.
2. Remove connection from float pilot to bonnet of main valve or auxiliary pilot.
  - a. A weak or non-existent flow **from** the float pilot indicates a malfunction in the float pilot - See 814 Pilot section.
  - b. A **continuous** flow **from** the main valve bonnet indicates a ruptured diaphragm (WATER SERVICE VALVES ONLY).
  - c. If neither of the above applies, proceed to Step 3.
3. Auxiliary pilot (if so equipped) stem restricted or seat damaged - See 3600 Pilot section.
4. Main valve stem restricted or foreign object under main valve seat - See Series 65 Basic Valve section.

**MODEL 8000**  
**1 1/4-6"**

**LEVEL CONTROL VALVE**



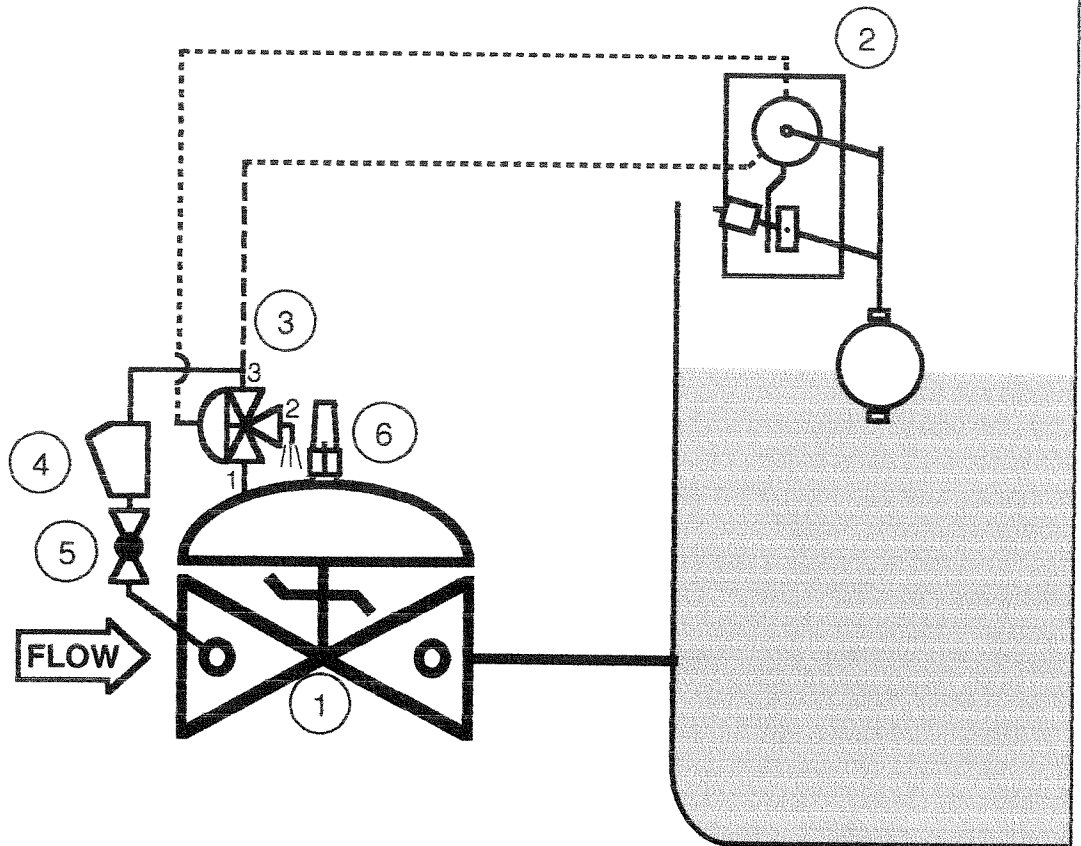
----- INDICATES FIELD-CONNECTED LINES

ITEM	PART NO.	QTY	DESCRIPTION
1	65	1	BASIC VALVE ASSEMBLY
2	814	1	THREE-WAY FLOAT PILOT
3	159	1	Y-STRAINER
4	141-4	1	ISOLATION BALL VALVE
5	155	1	VISUAL INDICATOR (OPTIONAL)

**MODEL 8000**  
**8-24"**

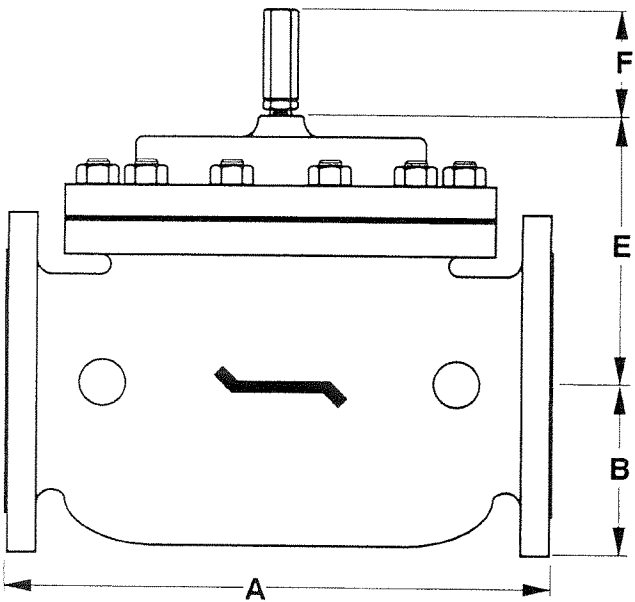
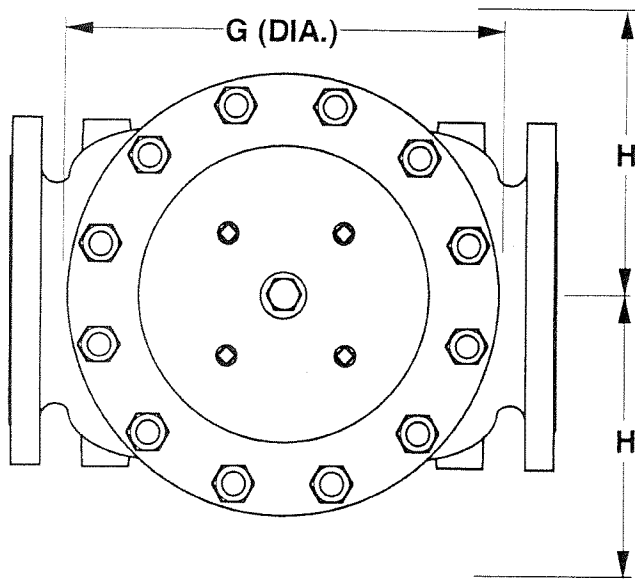
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**LEVEL CONTROL VALVE**

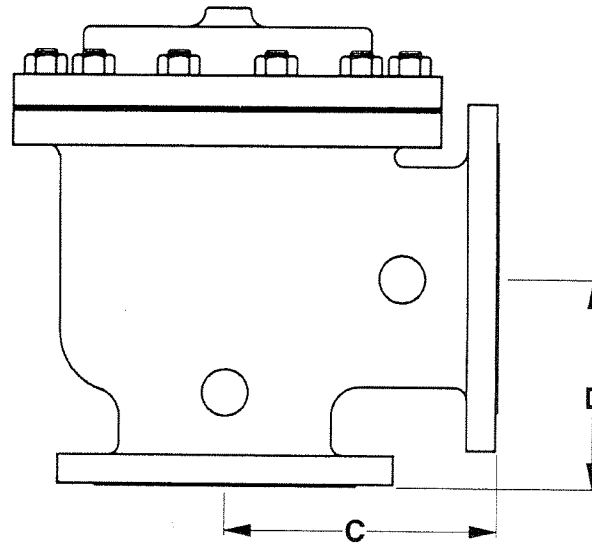


----- INDICATES FIELD-CONNECTED LINES

ITEM	PART NO.	QTY	DESCRIPTION
1	65	1	BASIC VALVE ASSEMBLY
2	814	1	THREE-WAY FLOAT PILOT
3	3600	1	THREE-WAY AUXILIARY PILOT
4	159	1	Y-STRAINER
5	141-4	1	ISOLATION BALL VALVE
6	155	1	VISUAL INDICATOR (OPTIONAL)



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	SE	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	

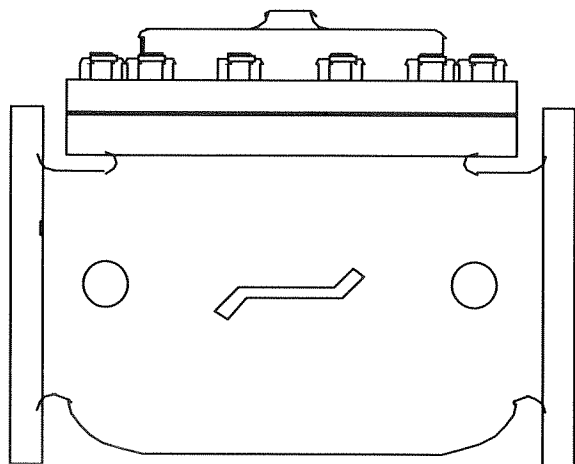


NOTE: 3" VALVE DIMENSIONS ARE FOR NEW MODEL 3100

4" VALVE DIMENSIONS ARE FOR NEW MODEL 4400

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

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



# 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-

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.

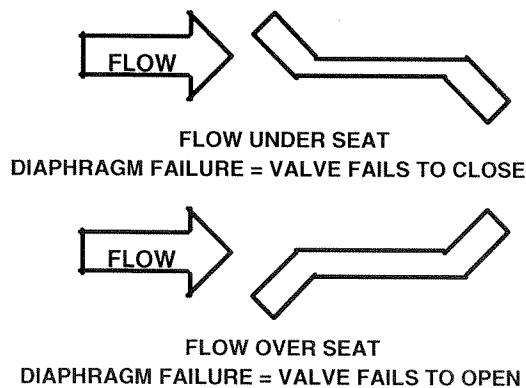
#### PROCEDURE A : DIAPHRAGM REPLACEMENT

1. Isolate the valve from the system by closing upstream and 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 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**

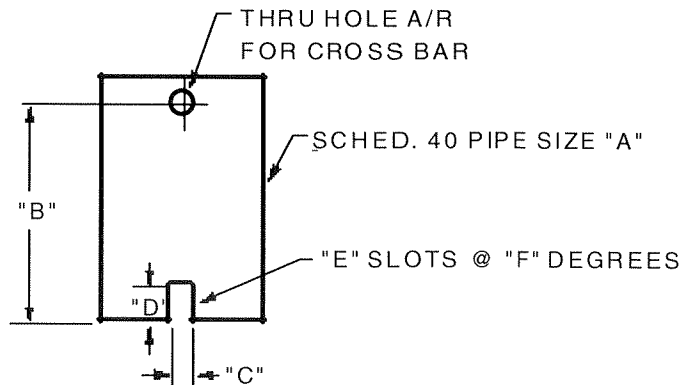
- 1. Perform Steps 1 and 2 of Procedure B, above.
- 2. With the spool assembly removed from the body, remove the seat retainer screws.
- 3. Slide the seat retainer off the lower end of the stem.
- 4. Remove the seat disc from its groove in the spool.  
*NOTE: The seat disc may fit quite tightly in the 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



# three-way rotary float pilot

## installation, operating, and maintenance instructions

# model 814

### GENERAL DESCRIPTION

The OCV Model 814 Rotary Float Pilot is a float-actuated, three-port pilot valve designed to provide on-off action to an OCV Model 65 main valve. It features the following:

- (1) Integral mounting plate to facilitate installation within the tank.
- (2) Designed for mounting above the fluid level to prevent a cross-connection.
- (3) Separate adjustment of closing and opening points.

### INSTALLATION

- A. The 814 is installed in the tank as shown on the assembly drawing. Mounting means can vary widely, as long as sufficient clearance is provided between the moving parts and the tank wall.
- B. Vertical location above the fluid level is not critical. However, the 814 comes standard with 3 feet of float rod, which places the following "limits" on location:
  - (1) The pilot can be **no closer** to the high level point than 9 1/4", as shown.
  - (2) The pilot can be **no further** from the low level point than 38", as shown.
- C. For best results, it is highly recommended that the float itself be installed in a stilling well. This is particularly true if the fill line exits into the top of the tank.
- D. If the 814 is to be mounted remote from the main valve it is controlling, two connections must be made from the pilot to the valve:
  - (1) Pilot "supply" connection—located 30° below the horizontal centerline of the pilot body—connect to the inlet side of the main valve.
  - (2) Pilot "common" connection—located directly on top of the pilot body—connect to the bonnet of the main valve, or to the bonnet of the auxiliary pilot, if so equipped.
- E. Next, the pilot is balanced for the amount of float rod used:
  - (1) Thread the upper float rod (item 14) into the float rod connector (item 13).
  - (2) Slide a stop collar (item 18) over the upper float rod and temporarily tighten the set screw (item 19).
  - (3) Install a stud (item 17) in the lower end of the upper float rod.
  - (4) Thread the float rod extension (item 15) onto the stud.
  - (5) Install the second stud in the lower end of the float rod extension.
  - (6) Slip the second stop collar onto the lower float rod (item 16).
  - (7) Thread the lower float rod onto the float rod extension. (NOTE: The float should **not** yet be on the rod!)
  - (8) Loosen the set screw (item 21) in the side of the counterweight (item 29).
  - (9) Adjust the counterweight so that the entire linkage, when rotated to any position between full up and full down, tends to stay wherever it is placed.
  - (10) When the linkage is balanced, re-tighten the set screw (item 21).
  - (11) Remove the lower float rod (item 16).
  - (12) Slip the float (item 31) on to the lower float rod.
  - (13) Reinstall the lower float rod.

- F. Finally, the float itself is adjusted, as follows:
- (1) Rotate the linkage to the full "down" position.
  - (2) Hold the float at the desired **low** level point (i.e., the point at which you want the main valve to **open**).
  - (3) Move the lower float collar (item 18) up to the bottom of the float and tighten its set screw (item 19).
  - (4) Rotate the linkage to the full "up" position.
  - (5) Hold the float at the desired **high** level point (i.e., the point at which you want the main valve to **close**.)
  - (6) Loosen the set screw in the upper float collar and slide the collar down to the top of the float. Re-tighten the set screw.

## THEORY OF OPERATION

The basic principle of operation of the 814 pilot is quite simple and straightforward. There are three sets of flow passages in the pilot body, and matching sets in the lapped rotary disc. The passages are arranged so that:

- (A) With the float "down", the "supply" port is blocked, and the "common" port is connected to "exhaust". This allows the pilot to vent the diaphragm chamber of a main valve or auxiliary pilot, thus opening the main valve.
- (B) With the float "up", the "exhaust" port is blocked, and "supply" is connected to "common". This allows the pilot to pressurize the diaphragm chamber of the main valve or auxiliary pilot, thus closing the main valve.

## MAINTENANCE

Because of the simplicity of design of the 814 pilot, as well as its general inaccessibility in the tank, required maintenance is minimal. Most malfunctions of the pilot are caused by grit and particulate matter in the flow stream, therefore the best preventive maintenance for the pilot is a clean and full-functioning strainer on the supply line.

## TROUBLESHOOTING

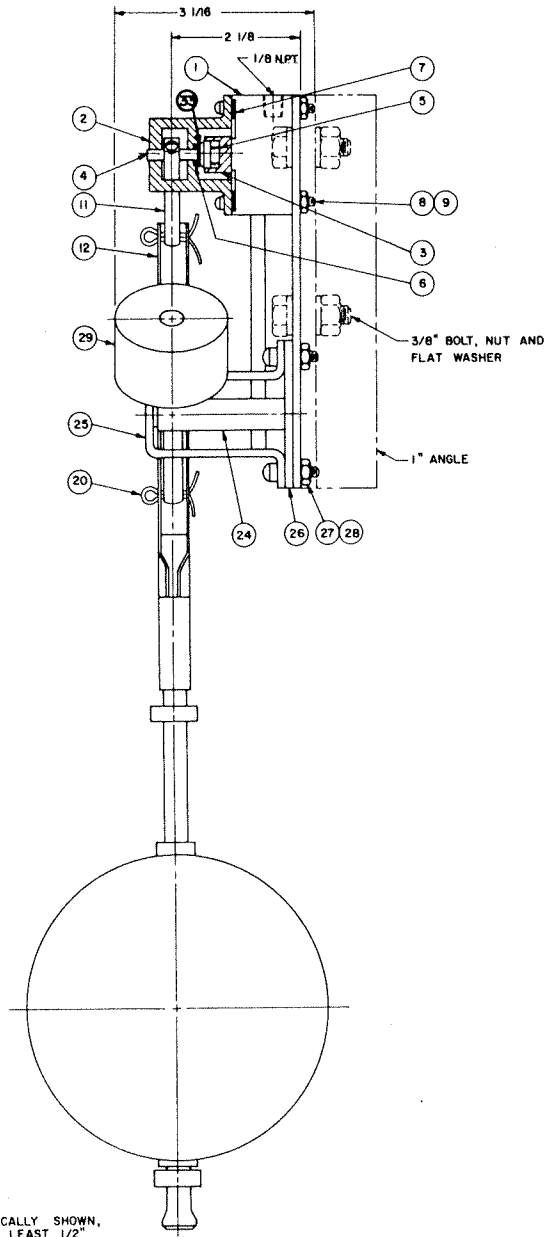
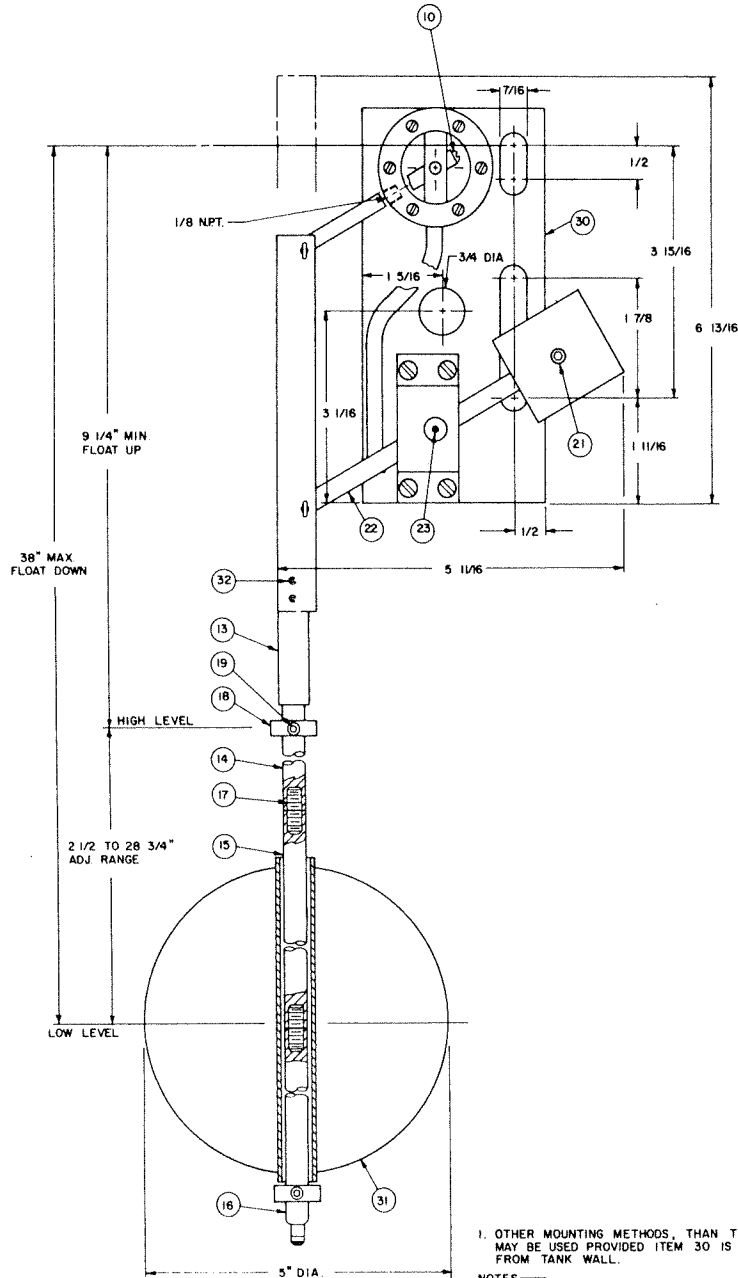
There are basically only two ways the 814 pilot can malfunction:

1. Clogged flow passages which restrict flow through the pilot. This will be evident in failure to either open or close the main valve, depending on which passages are clogged.
  - (a) If the main valve won't close, remove the "common" connection and rotate the linkage to the "up" position. A weak or non-existent flow indicates clogging. Remove the "supply" connection and blow through it with compressed air. This is often sufficient to clear the clog. If not, the pilot must be disassembled.
  - (b) If the main valve won't open, rotate the linkage to the "down" position. A weak or nonexistent exhaust indicates clogging. Remove the "common" connection and blow through it with compressed air, as above.
2. Inability of the pilot to shut off properly due to foreign matter trapped between the disc and body or scoring of the mating surfaces of the disc and body. This will be evident in a **continuous** flow from the "exhaust" post and may result in failure to close the main valve. Here the pilot must be disassembled in order to clear the malfunction.

If the pilot must be disassembled, it is important that the following steps be rigidly followed.

1. As the pilot is disassembled, mark the following sets of parts so that proper orientation can be maintained on reassembly.
  - (a) Disc (item 3) in relation to body (item 1)
  - (b) Arbor (item 4) in relation to disc (item 3)
2. Take care not to lose the small spring (item 5) located between the disc and arbor.
3. Carefully separate the disc and body and examine the mating surfaces. Any buildup of foreign material should be carefully removed using a clean, soft cloth. If excessive scoring of the mating surfaces is evident, the body and/or disc should be replaced.
4. Apply a light coating of Dow Corning Valve Seal\* to the mating surfaces of disc and body. Place the disc against the body using the orientation marks applied in Step 1.
5. Reassemble the pilot, taking special care to observe proper orientation of parts.

\*NOTE: Dow Corning Valve Seal is the **only** lubricant approved for use in this pilot.



1. OTHER MOUNTING METHODS, THAN TYPICALLY SHOWN, MAY BE USED PROVIDED ITEM 30 IS AT LEAST 1/2" FROM TANK WALL.

NOTES —

33	685719	1	WASHER, FLAT	STN STL AISI 304
32	620702	2	PIN, SPRING	STN STL AISI 302
31	520705	1	FLOAT	STN STL AISI 304
30	300433	1	PLATE, MOUNTING	STEEL AISI 1020
29	300813	1	COUNTERWEIGHT	STN STL AISI 303
28	590718	4	NUT, HX. HD.	STN STL AISI 304
27	532701	4	SCREW, FIL. HD.	STN STL AISI 304
26	300107	1	BASE, BRACKET	BRASS ASTM B16
25	300106	1	BRACKET	BRASS ASTM B16
24	300126	1	STEM, C'WT PIVOT	BRASS ASTM B16
23	620707	1	PIN, SPRING	STN STL AISI 302
22	300125	1	ARM, C'WT	BRASS ASTM B16
21	530708	1	SCREW, SET	STN STL AISI 304
20	620006	2	PIN, COTTER	STN STL AISI 302
19	530714	2	SCREW, SET	STN STL AISI 304
18	300788	2	COLLAR, STOP	STN STL AISI 303
17	510407	2	STUD	STN STL AISI 303
16	300738	1	ROD, FLOAT LWR.	STN STL AISI 304
15	300789	1	ROD, FLOAT EXT.	STN STL AISI 304
14	300730	1	ROD, FLOAT UPR.	STN STL AISI 304
13	300120	1	CONN., FLT. ROD	BRASS ASTM B16
12	300122	1	ARM, LINKAGE	BRASS ASTM B16
11	300808	1	ARM, ACTUATOR	STN STL AISI 303
10	532703	1	SCREW, RD. HD.	STN STL AISI 304
9	532712	6	SCREW, FIL. HD.	STN STL AISI 304
8	590722	6	NUT, HX. HD.	STN STL AISI 304
7	693013	1	GASKET	BUNA-N COMM'L
6	611008	1	O-RING	PARKER V747-75
5	651711	1	SPRING	STN STL AISI 302
4	300726	1	ARBOR	STN STL AISI 303
3	300735	1	DISC	STN STL AISI 300
2	304112	1	BONNET	BNZ ASTM B62
1	302712	1	BODY	STN STL AISI 302

ITEM	PART NO	QTY	DESCRIPTION	MATERIAL																																																																											
<table border="1"> <tr> <td>E</td><td></td><td></td><td>MATERIAL</td><td>TOLERANCES</td></tr> <tr> <td>D</td><td></td><td></td><td></td><td>UNLESS NOTED</td></tr> <tr> <td>C</td><td></td><td></td><td></td><td>FRACTIONAL 1/16"</td></tr> <tr> <td>B</td><td></td><td></td><td></td><td>DECIMAL .005</td></tr> <tr> <td>A</td><td></td><td></td><td></td><td>AND .001 ANGLE 1/16"</td></tr> <tr> <td></td><td></td><td></td><td></td><td>BLACK FINISH 1/16"</td></tr> <tr> <td>CHG</td><td>E</td><td>C</td><td>NO</td><td>NO</td></tr> <tr> <td></td><td></td><td></td><td>DATE</td><td>DATE</td></tr> <tr> <td></td><td></td><td></td><td>BY</td><td>BY</td></tr> <tr> <td></td><td></td><td></td><td>CHKD</td><td>CHKD</td></tr> <tr> <td></td><td></td><td></td><td>BY</td><td>BY</td></tr> <tr> <td></td><td></td><td></td><td>DATE</td><td>DATE</td></tr> <tr> <td></td><td></td><td></td><td>SCALE</td><td>SCALE</td></tr> <tr> <td></td><td></td><td></td><td>REF. DWG. NO'S</td><td>REF. DWG. NO'S</td></tr> <tr> <td></td><td></td><td></td><td>FULL (APPROX)</td><td>FULL (APPROX)</td></tr> </table>					E			MATERIAL	TOLERANCES	D				UNLESS NOTED	C				FRACTIONAL 1/16"	B				DECIMAL .005	A				AND .001 ANGLE 1/16"					BLACK FINISH 1/16"	CHG	E	C	NO	NO				DATE	DATE				BY	BY				CHKD	CHKD				BY	BY				DATE	DATE				SCALE	SCALE				REF. DWG. NO'S	REF. DWG. NO'S				FULL (APPROX)	FULL (APPROX)
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# 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

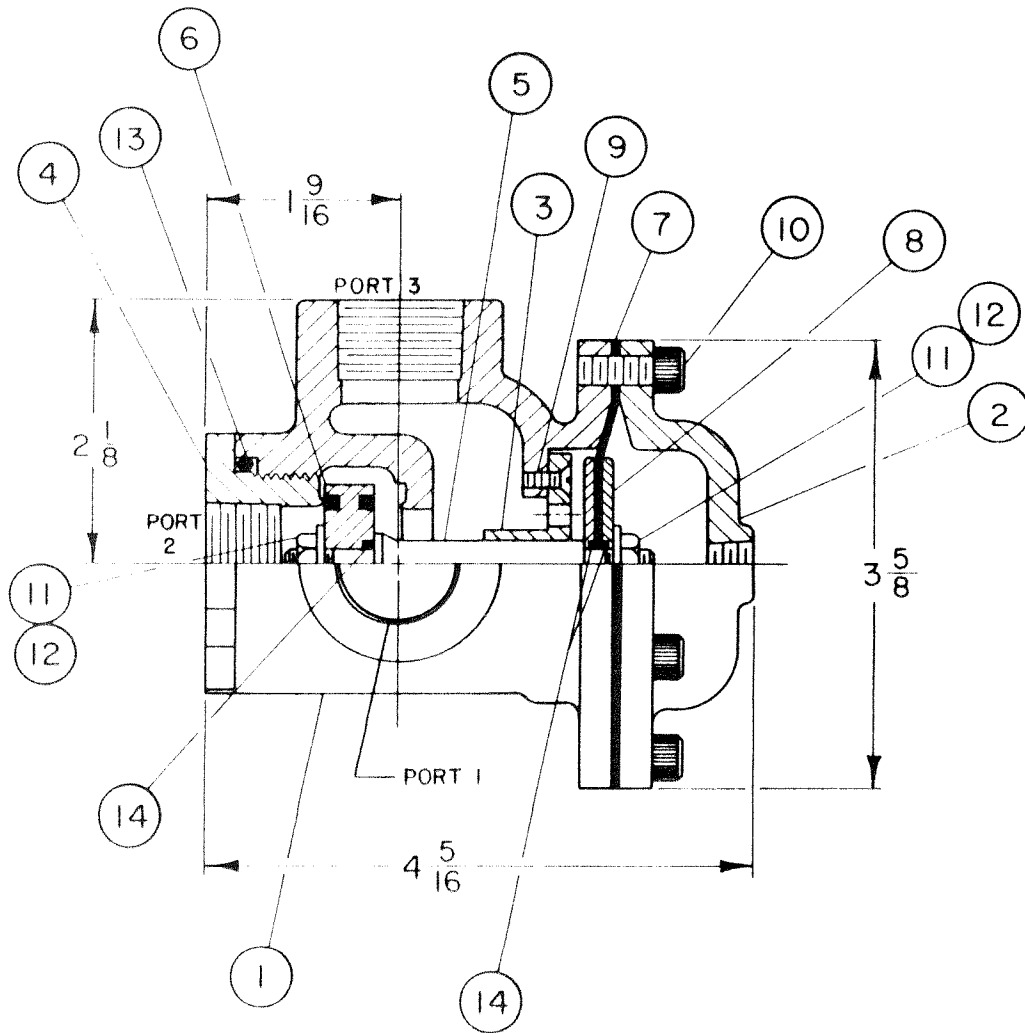
- (1) Proceed as in 1C above.

##### 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.



**NOTE:**

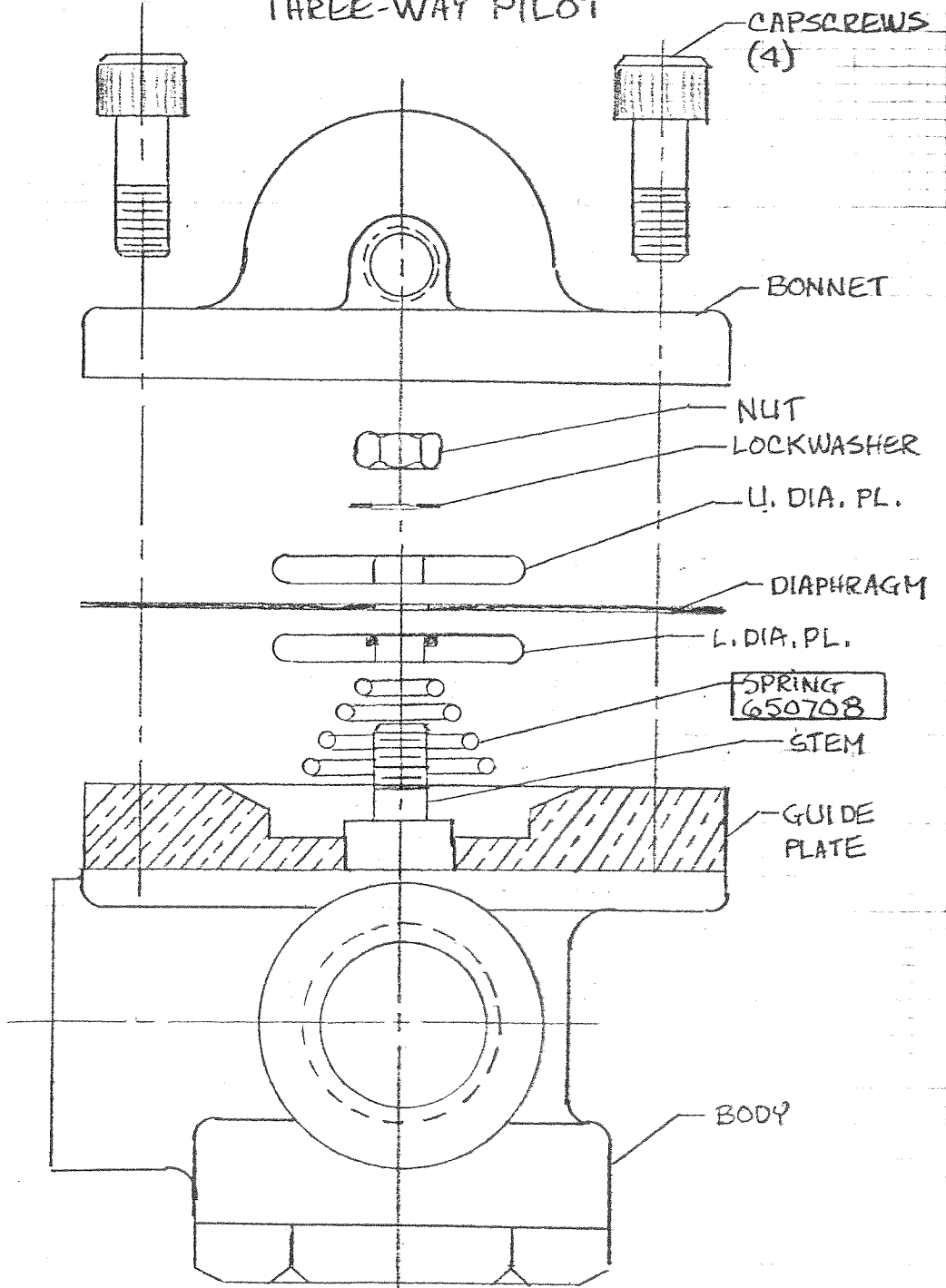
1. WHEN ORDERING PARTS, PLEASE SPECIFY; ITEM NO., PART NO. AND MATERIAL.
2. ▲ RECOMMENDED SPARE PARTS.

▲	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
	ITEM	PART NO.	QTY.	DESCRIPTION	MATERIAL

**PARTS LIST**

E										
D										
C										
B										
A										
CHG	E	C	NO	DATE	BY					
REVISIONS					REF DWG NO'S					
MATERIAL		TOLERANCES								
		UNLESS NOTED		THREE-WAY PILOT						
		FRACTIONAL ± 1/64		TULSA, OKLAHOMA, U.S.A.						
		DECIMAL ± .005								
		MACH FINISH 125								
		ANGULAR ± 1/2								
NO REQD		DRAWN BY		DATE		SIZE		DRAWING NUMBER		
		BRW		7-28-83		B		3600		
SCALE		CHKD BY		DATE		REV				

SK1217  
INSTALLATION OF SPRING  
IN MODEL 330P  
THREE-WAY PILOT



*SDJ*  
12-15-87



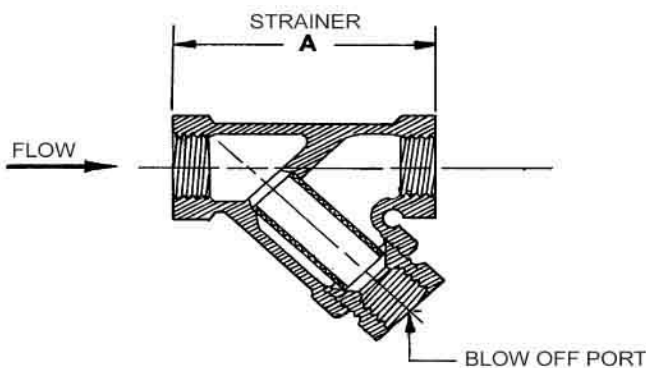
**DESCRIPTION**

**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 1/4"-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 1/4"-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**

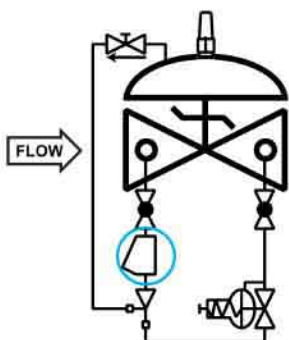
Bronze, ASTM B62  
Optional mesh sizes: 50, 100

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

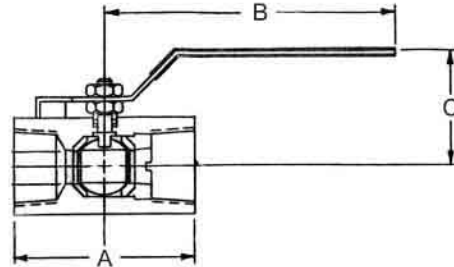
**MAINTENANCE**

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.

**DESCRIPTION**

The Model 141-4 Ball Valve is a 1/4-turn shutoff device used for isolating the pilot system from the main valve. They are extremely useful for performing routine maintenance and troubleshooting.

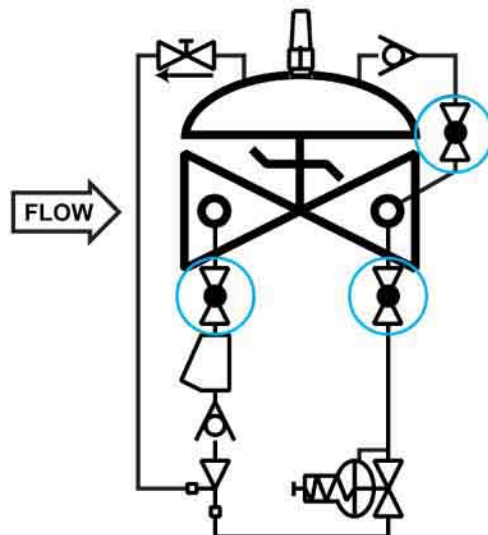
Ball valves are standard on water service valves; optional on fuel service valves.



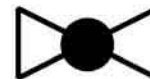
**MODEL 141-4 MATRIX**

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 1/4"-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 1/4"-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.



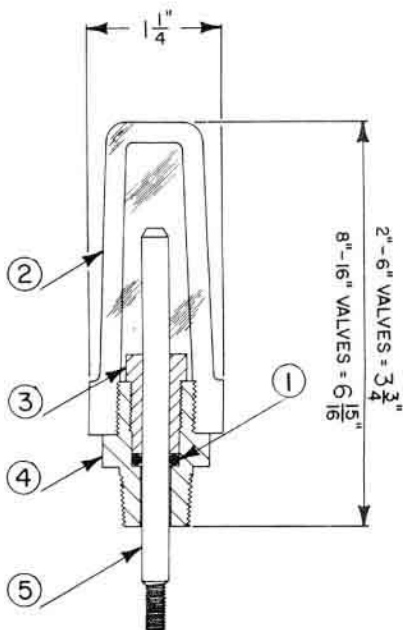
**DESCRIPTION**

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.



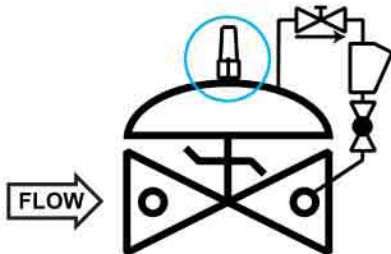
**MODEL 155 MATRIX**



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**



The Model 155 is shown on OCV Valve Schematic as:



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

**MATERIALS**

- Indicator Rod: Monel
- Adapter: Brass (std.), Stainless Steel (optional)
- Housing: Butyrate (1 1/4" - 6") Acrylic (8" and larger)
- O-Ring: Viton® (std.) Buna-N, EPDM (optional)

**Valve Position Indicator 155**