

Operating Manual

Model: 108-2SLF

Size: "

Serial #:

Sales Order:

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pressure relief valve with sense line flush

installation, operating,
and
maintenance instructions

model 108-2SLF

GENERAL DESCRIPTION

The OCV Model 108-2SLF may be generically described as a **back pressure control valve**, i.e., it controls the pressure at its inlet. As a **Pressure Relief Valve**, the 108-2SLF is installed on a bypass from a main line. It opens to relieve any pressure above its set point.

The Model 108-2SLF consists of the following components, arranged as shown on the schematic diagram:

1. **Model 65 Basic Control Valve**, a hydraulically-operated, diaphragm-actuated, globe or angle valve which closes with an elastomer-on-metal seal.
2. **Model 1330SLF Pressure Relief Pilot**, a two-way, normally-closed pilot valve which senses upstream pressure under its diaphragm and balances it against an adjustable spring load. An increase in upstream pressure tends to make the pilot open. The pilot is equipped with a sense line flush feature.
3. **Model 126 Ejector**, a simple "tee" fitting with a fixed orifice in its inlet port. It provides the proper pressure to the diaphragm chamber of the main valve depending on the position of the pressure relief pilot.
4. **Sense Line Drain Orifice**, allows the pilot sensing chamber to have a constant flushing action through it.

At user option, the 108-2SLF may also be equipped with the following:

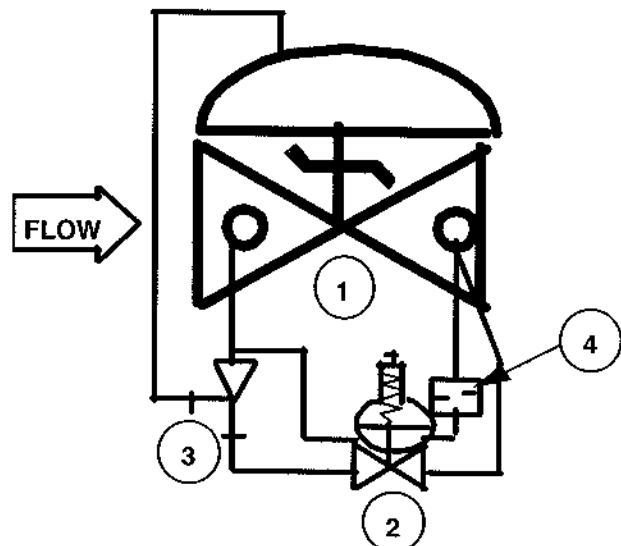
1. Model 155 Visual Indicator.

2. Model 150 Limit Switch Assembly (includes visual indicator).

THEORY OF OPERATION

To understand how the 108-2SLF operates, it is best to start with the **Ejector (3)**. Due to the orifice in its upstream port, the ejector creates a pressure drop proportional to the flow through it. The flow through the ejector is in turn controlled by the degree of opening of the **Pressure Relief Pilot (2)**. The **wider the pilot opens, the greater the flow** through the ejector and the **lower the pressure** downstream of the orifice. Conversely, the **more the pilot closes, the lower the flow** through the ejector and the **greater the pressure** downstream of the orifice.

Now note that the diaphragm chamber of the Main Valve (1) is connected to the branch port of the ejector and is thus downstream of the orifice. Therefore, the



pressure in the diaphragm chamber of the main valve is effectively controlled by the pressure relief pilot in the manner described above. As the pilot **opens**, the diaphragm pressure **decreases** and the main valve **opens**; as the pilot **closes**, the diaphragm pressure **increases** and the main valve **closes**.

If the 108-2SLF is installed as a **pressure relief valve**, the pressure upstream of the main valve is normally below the set point of the relief pilot. Therefore, the pilot is fully closed, and so is the main valve. However, if, for any reason, the pressure rises above the set point, the pilot will open, and the main valve will follow in turn. The net effect is that the main valve will open and control the pressure at the set point, not allowing it to rise any further. Once pressure returns to normal, the pilot and main valve will return to the closed position.

INSTALLATION

The 108-2SLF is furnished fully factory-assembled and ready for installation at the appropriate point in the system.

For full installation details, the user is referred to the Model 65 Basic Valve section of this manual.

START-UP AND ADJUSTMENTS

The following procedures should be followed in the order presented in order to affect an initial startup of the 108-2SLF.

1. Install a pressure gauge of the proper range upstream of the 108-2SLF. The unused **inlet** side port in the main valve body may be used for this purpose if there is no convenient location in the upstream piping.
2. Remove the plastic cap from the pressure relief pilot (2) and loosen the adjusting screw jam nut. Turn the adjusting screw **clockwise** to a full stop.
3. Start the pump or otherwise start the system flowing. The main valve at this time should be fully closed.
4. Carefully loosen a pipe plug in the main valve bonnet until fluid begins to discharge around the threads. When only clear fluid (no air) is discharging, retighten the plug.
5. While observing the inlet pressure gauge, retard flow in the system by closing valves or otherwise reducing demand until the pressure increases to

approximately 5 psi **above** the desired set point.

6. Slowly turn the adjusting screw of the pressure relief pilot (2) **counterclockwise** until the valve opens and the pressure falls **to the set point**. Tighten the adjusting screw jam nut and replace the plastic cap.
7. Shut down the pump.

MAINTENANCE

Because of the simplicity of design of the 108-2SLF, required maintenance is minimal. However, the following checks, periodically performed, can do much to keep the valve operating properly and efficiently.

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

TROUBLESHOOTING

In the event of malfunction of the 108-2SLF, the following guide should enable the technician to isolate the specific cause of the problem and take the appropriate corrective action.

A. MAIN VALVE FAILS TO OPEN:

1. Valve closed upstream or downstream of the 108-2SLF. Open as required.
2. Pressure relief pilot (2) adjusted too far clockwise. See Adjustment instructions.
3. Diaphragm of pressure relief pilot (2) ruptured. This will be evidenced by a discharge of fluid from the vent hole in the pilot bonnet. Replace diaphragm. See the 1330SLF Pilot section of this manual.
4. Stem of pressure relief pilot (2) binding. Disassemble pilot and determine cause. See the 1330SLF Pilot section of this manual.
5. Stem of main valve binding. Disassemble valve and determine cause. See the Model 65 Basic Valve section of this manual.
6. Fire Foam Service-Check line to assure it is not clogged.

B. MAIN VALVE FAILS TO CLOSE:

1. Pressure relief pilot (2) adjusted too far counter-

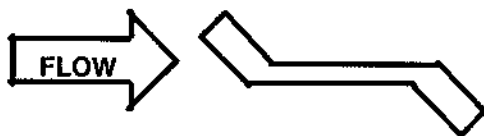
clockwise. See Adjustment instructions.

2. Pressure relief pilot (2) stem binding or seat badly deteriorated. Disassemble pilot and determine cause. See the 1330SLF Pilot section of this manual.

NOTE: Certain valves, predominantly those in fuel service, are assembled "fail closed." In this case, a ruptured diaphragm would keep the valve from opening, rather than keep it from closing. To determine which type you have, examine the "bridge mark" cast into the side of the main valve body and compare it with the diagram below.

3. Main valve stem binding or object caught in valve. Disassemble valve and determine cause. See the Model 65 Basic Valve section of this manual.

C. MAIN VALVE OPENS AND CLOSES, BUT



**FLOW UNDER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE**

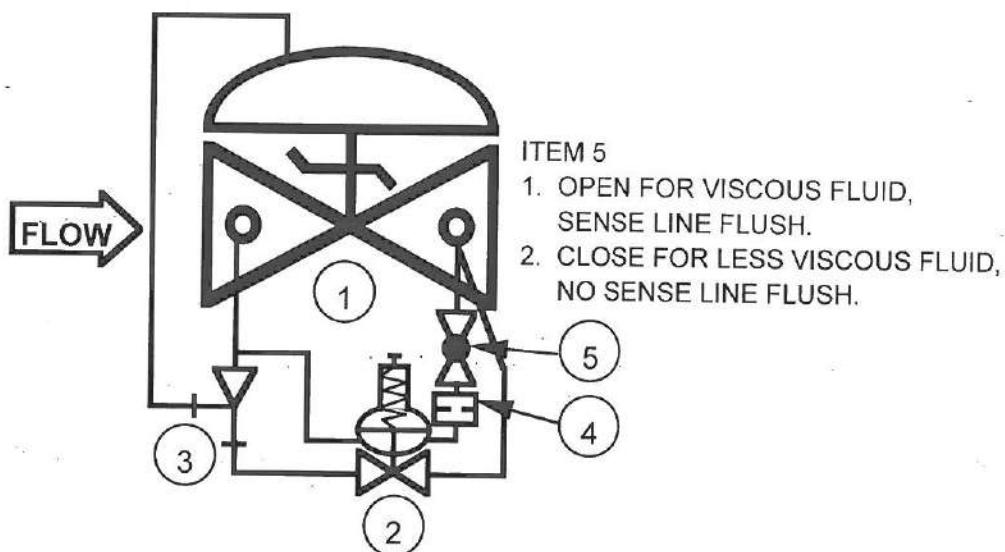
LEAKS WHEN CLOSED.

1. Pressure relief pilot (2) adjusted slightly too low. See adjustment instructions.
2. Check for deteriorated seat in the pressure relief pilot (2). See 1330SLF pilot section of this manual.
3. Check for deteriorated seat in the basic valve (1). See the Model 65 Basic Valve section of this manual

MODEL 108-2SLF

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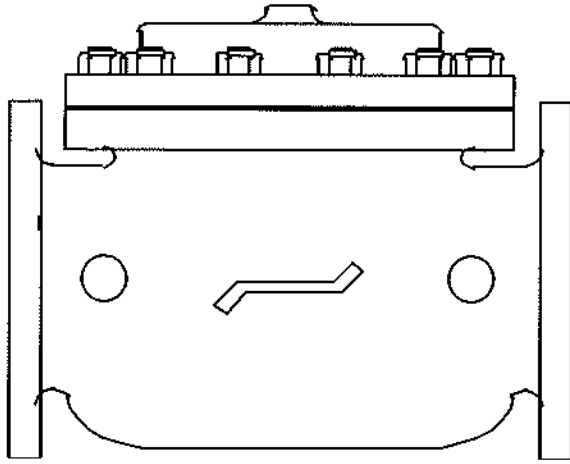
PRESSURE RELIEF / PRESSURE SUSTAINING VALVE with MANUALLY SELECTED SENSE LINE FLUSH



| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 65 | 1 | BASIC VALVE ASSEMBLY |
| 2 | 1330SLF | 1 | PRESSURE RELIEF PILOT |
| 3 | 126 | 1 | EJECTOR |
| 4 | 300777 | 1 | ORIFICE FITTING |
| 5 | 141-4 | 1 | BALL VALVE (Sense Line Flush Manual Select) |

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 CLOSSES 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

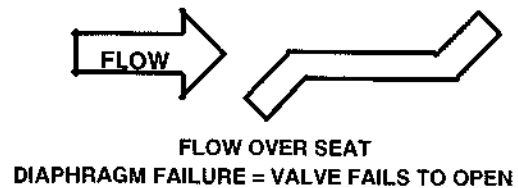
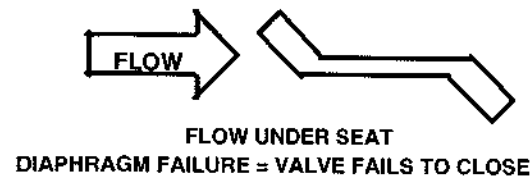
1. Isolate the valve from the system by closing upstream and downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in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

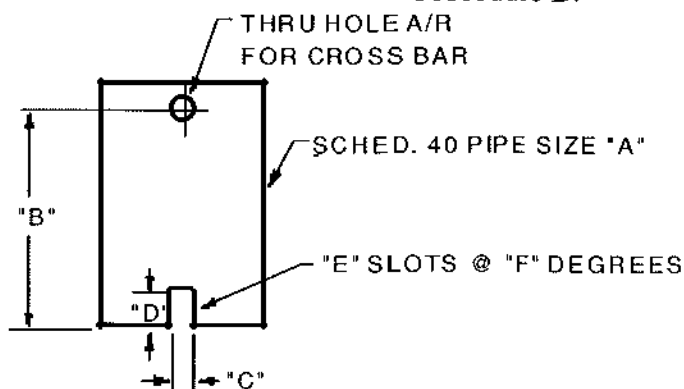
1. Perform Steps 1 and 2 of Procedure B, above.
2. With the spool assembly removed from the body, remove the seat retainer screws.
3. Slide the seat retainer off the lower end of the stem.
4. Remove the seat disc from its groove in the spool.
NOTE: The seat disc may fit quite tightly in the groove. If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

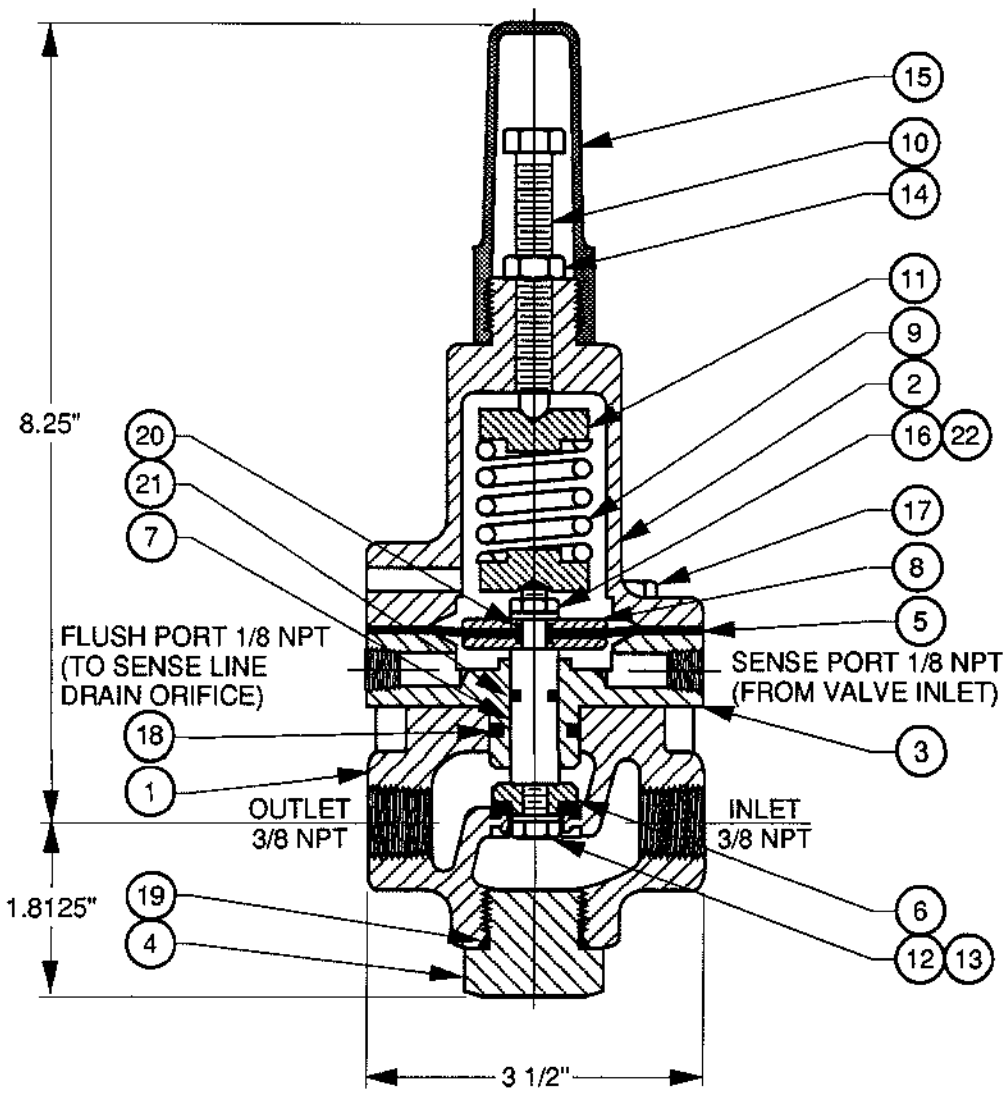
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.

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




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

▲ - RECOMMENDED SPARE PARTS
 (INCLUDED IN REPAIR KIT PN 930100)
 BUNA-N OR EPDM ELASTOMERS AVAILABLE
 1/2" NPT AVAILABLE
 BRONZE CONSTRUCTION AVAILABLE

| ITEM | PART NO. | QTY | DESCRIPTION | MATERIAL |
|------|----------|--------|-------------------|------------|
| ▲ | 22 | 685700 | 1 LOCKWASHER | STN. STEEL |
| ▲ | 21 | 611012 | 1 O-RING | VITON |
| ▲ | 20 | 611010 | 2 O-RING | VITON |
| ▲ | 19 | 611912 | 1 O-RING | VITON |
| ▲ | 18 | 611116 | 1 O-RING | VITON |
| | 17 | 531701 | 4 HEX HD CAPSCREW | STN. STEEL |
| | 16 | 590712 | 1 HEX NUT | STN. STEEL |
| | 15 | 692002 | 1 CAP | PVC |
| | 14 | 590717 | 1 HEX NUT | STN. STEEL |
| ▲ | 13 | 685760 | 1 LOCKWASHER | STN. STEEL |
| | 12 | 531700 | 1 HEX HD CAPSCREW | STN. STEEL |
| | 11 | 300729 | 2 SPRING RETAINER | STN. STEEL |
| | 10 | 300700 | 1 ADJUSTING SCREW | STN. STEEL |
| | 9 | CHART | 1 SPRING | STN. STEEL |
| | 8 | 308702 | 2 DIAPHRAGM PLATE | STN. STEEL |
| | 7 | 314702 | 1 STEM | STN. STEEL |
| ▲ | 6 | 310709 | 1 SEAT DISC | VITON/SS |
| ▲ | 5 | 694102 | 1 DIAPHRAGM | VITON |
| | 4 | 310730 | 1 PLUG | STN. STEEL |
| | 3 | 300719 | 1 ADAPTER | STN. STEEL |
| | 2 | 304702 | 1 BONNET | STN. STEEL |
| | 1 | 302702 | 1 BODY | STN. STEEL |
| ITEM | PART NO. | QTY | DESCRIPTION | MATERIAL |

| CHG | E.C. NO. | DATE | BY | REVISIONS | REF DWG NO'S |
|-----|----------|------|----|-----------|--------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| MATERIAL | TOLERANCES |
|-----------------|--|
| STN STL / VITON | UNLESS NOTED FRACTIONAL ±1/64 DECIMAL ±.005 MACH. FINISH 125 ANGULAR ±1/2° ✓ |
| NO. REQ'D | DRAWN BY RON |
| SCALE 1/2 | DATE 1-9-96 |
| | CHKD. BY DATE |


Control Valves TULSA, OKLAHOMA U.S.A.

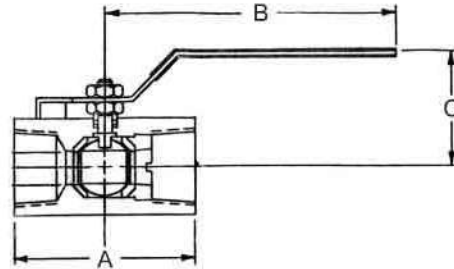
MODEL 1330SLF PRESSURE RELIEF PILOT

| | | |
|----------|----------------|------|
| SIZE | DRAWING NUMBER | REV. |
| A | 1330SLF | |

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.

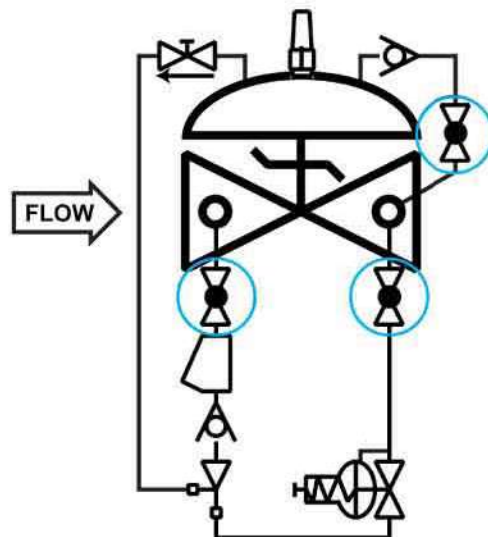
Ball valves are standard on water service valves; optional on fuel service valves.



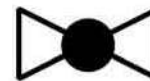
MODEL 141-4 MATRIX

| 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



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.

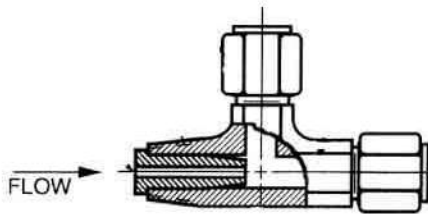
MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

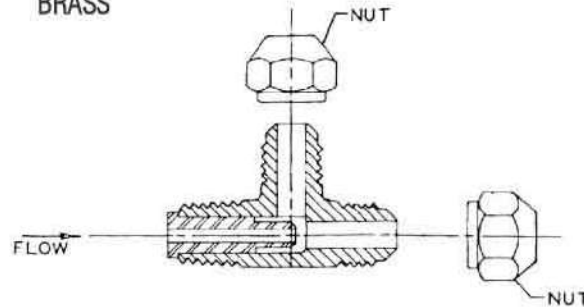
| MATERIAL | PART NUMBER | P (NPT) | T-TUBE O.D. | STD. ORIFICE | USED ON VALVE SIZES |
|----------------|-------------|---------|-------------|--------------|---------------------|
| Brass | 213100 | 3/8" | 3/8" | .125" | 1 1/4"-6" |
| Brass | 214100 | 1/2" | 1/2" | .188" | 8"-10" |
| Brass | 215100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

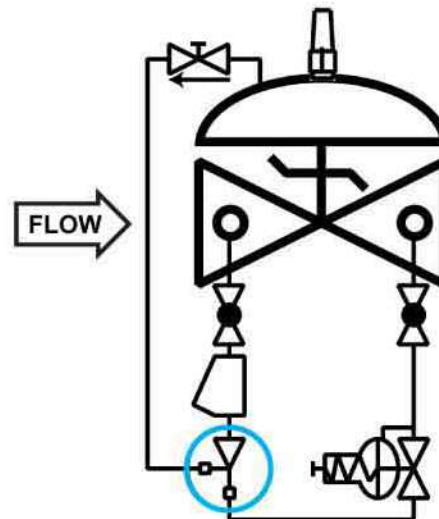
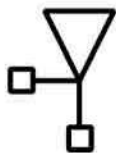


BRASS



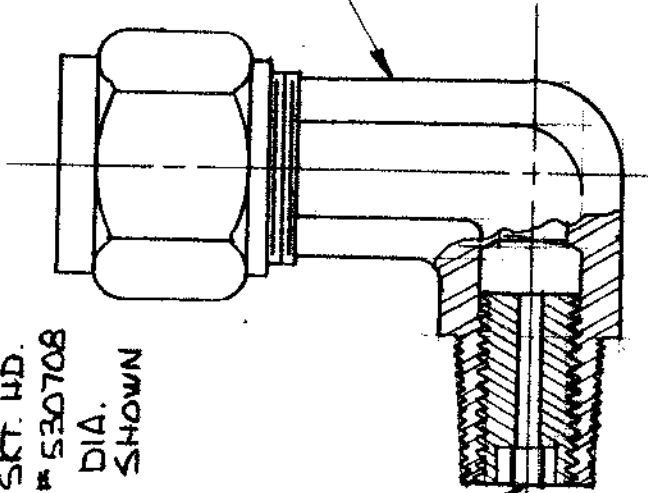
SCHEMATIC SYMBOL

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



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

DRILL FITTING #7 x $\frac{3}{4}$ DEEP
 TAP $\frac{1}{4}$ -20 x $\frac{5}{8}$ DEEP
 INSERT $\frac{1}{4}$ -20 SKT. HD.
 SET SCREW # 530708
 DRILL .062 DIA.
 THRU AS SHOWN



$\frac{1}{4}$ " TUBE x $\frac{1}{8}$ " NPT MALE
 COMPRESSION ELBOW
 (OCV P/N 552712)

SK-250

| | | | |
|---|----------------|-------------------------|----------|
| OCV Control Valves TULSA, OKLAHOMA, U.S.A. | | ORIFICED ELBOW FITTING | |
| SIZE | DRAWING NUMBER | REV. | |
| A | 300777 | | |
| E | | | |
| D | | | |
| C | | | |
| B | | | |
| A | 2430 | DATE | 10/31/83 |
| CHG | E. C. NO | DATE | BY |
| | | | |
| REVISIONS | | REF DWG NO'S | |
| | | 2430 | |
| | | 1330DMC | |
| | | SCALE | 2X |
| | | NO REQ'D | |
| | | DRAWN BY | DATE |
| | | CHKD. BY | DATE |
| | | TOLERANCES | |
| | | UNLESS NOTED | |
| | | FRACTIONAL $\pm 1/64$ | |
| | | DECIMAL $\pm .005$ | |
| | | MACH. FINISH 125/ | |
| | | ANGULAR $\pm 1/2^\circ$ | |

OCV[®] FLUID SOLUTIONS^{LLC}



matholding group