

# Operating Manual

**Model: 115-26TR (115-26T)**

**Size: "**

**Serial #:**

**Sales Order :**

7400 East 42nd Place  
Tulsa, Oklahoma  
74145-4744 USA

**phone:** 918-627-1942  
888-628-8258

**fax:** 918-622-8916

**email:** [sales@controlvalves.com](mailto:sales@controlvalves.com)

**website:** [www.controlvalves.com](http://www.controlvalves.com)



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# solenoid control and check valve with thermal relief

(energize-to-open)

installation, operating  
and  
maintenance instructions

**model 115-26TR**

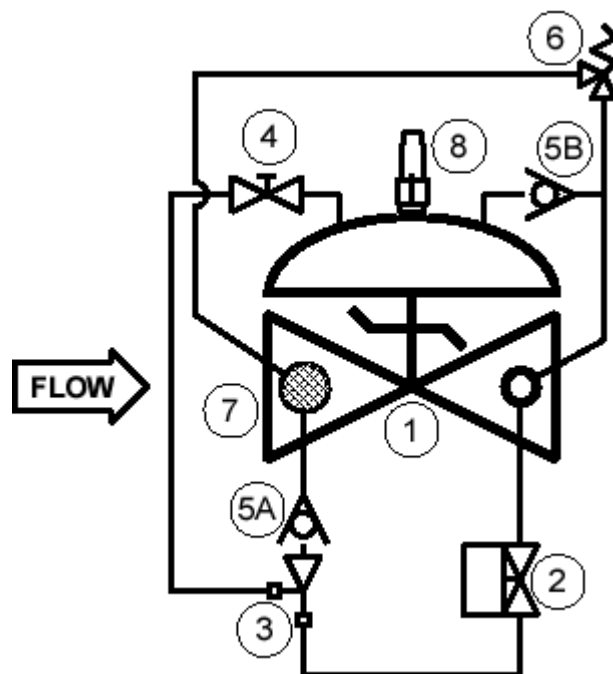
## GENERAL DESCRIPTION

The OCV Model 115-26TR solenoid control valve is designed to open or close in response to an electrical signal. It will also close in the event of a pressure reversal, but will relieve thermal buildup from downstream to upstream. It consists of the following components:

1. **Model 65 Basic Valve**, a hydraulically-operated, diaphragm-actuated, valve that closes with an elastomer-on-metal seal.
2. **Model 451 Solenoid Pilot** a two-way, normally-closed, electrically-operated valve. Applying power to the solenoid coil causes the valve to open.
3. **Model 126 Ejector**, a simple “tee” fitting with a fixed orifice in its upstream port. It provides the proper pressure to the diaphragm chamber of the main valve depending on the position of the solenoid pilot.
4. **Model 141-2 Needle Valve** that controls the opening and closing speed of the main valve under electrical control.
5. Two **Model 141-1 Check Valves** that enable the 115-26TR to operate as a check valve.
6. **Model 684703 Thermal Relief Valve**, an adjustable two-way valve that will relieve thermal buildup from downstream to upstream.
7. **Model 123 Inline Strainer** that protects the pilot system from solid contaminants in the line fluid.
8. **Model 155L Visual Indicator (optional)** that allows the user to determine the valve's operating position at a glance.

## THEORY OF OPERATION

**ELECTRICAL ACTION:** To understand how the 115-26TR operates, it is best to begin with the EJECTOR. 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 position of the SOLENOID PILOT. If its coil is energized, the solenoid pilot is full open and full flow is allowed through the ejector. The pressure drop through the orifice is at its greatest, which means the **minimum** pressure exists downstream of the orifice.



Now note that the main valve diaphragm chamber is connected at the branch port of the ejector, which is downstream of the orifice. Thus the diaphragm chamber “sees” this low pressure and the main valve opens wide.

When its coil is deenergized, the solenoid pilot goes fully closed. This blocks flow through the ejector which allows full inlet pressure to be applied to the main valve diaphragm chamber. The main valve thus goes fully and tightly closed.

**CHECK FEATURE:** In the event of pressure reversal, check valve (5B) opens to admit the higher downstream pressure to the diaphragm chamber, forcing the valve to the fully closed position. At the same time, check valve (5A) closes to prevent any back flow through the pilot system. However, should downstream pressure increase to the set point of the thermal relief valve (6), this valve will open to relieve the buildup to the upstream side of the valve.

## INSTALLATION

The 115-26TR is furnished fully factory-assembled and ready for installation at the appropriate point in the system. The user is referred to the Basic Valve section of this manual for full installation details.

Once the main valve is installed, the solenoid pilot is wired into the control system. This is a simple two-wire (plus ground) hookup. Make sure the applied voltage is the same as that stamped on the solenoid nameplate.

## STARTUP AND ADJUSTMENT

The following procedures should be followed in the order presented in order to effect an initial startup of the 115-26TR.

1. Make sure the solenoid (2) is deenergized.
2. Turn the adjusting screw of the needle valve (4) fully **clockwise**, then back it off **three full turns**.
3. Start the pump, or otherwise start the system flowing. The main valve will at this time be fully closed.
4. Carefully loosen one of the pipe plugs in the main valve bonnet until fluid appears around the threads. When only clear fluid (no air) is discharging, retighten the plug.

5. Energize the solenoid pilot. Observe that the main valve opens.
6. Deenergize the solenoid pilot and observe that the valve closes.
7. Open and close the valve several times electrically as required to set needle valve for proper opening and closing speed. *CAUTION: Do not close the needle valve fully. To do so can prevent the valve from operating.*

## MAINTENANCE

Because of the simplicity of design of the 115-26TR, 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.
3. Check for frayed or loose electrical connections.

## TROUBLESHOOTING

In the event of malfunction of the 115-26TR, the following guide should enable the technician to isolate the specific cause of the problem and take the appropriate corrective action.

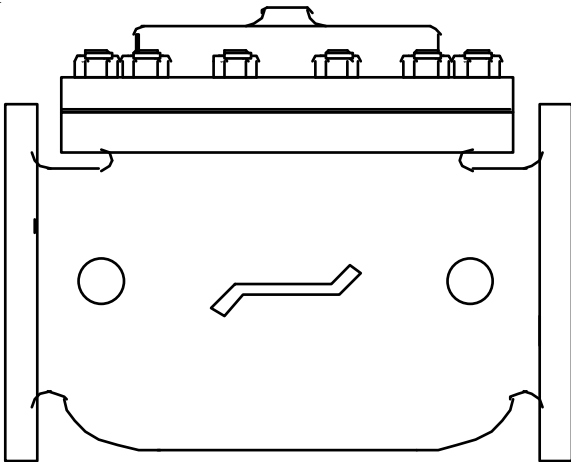
### MAIN VALVE FAILS TO OPEN:

1. Valve closed upstream or downstream of the 115-26TR. Open as required.
2. Solenoid not energized. Check electrical system.
3. Needle valve fully closed. See Adjustment instructions.
4. Solenoid pilot stuck closed. See Solenoid Valve section of this manual.
5. Stem of main valve binding or diaphragm ruptured. Disassemble valve and determine cause. See the Model 65 Basic Valve section of this manual.

**MAIN VALVE FAILS TO CLOSE:**

1. Solenoid not deenergized. Check electrical system.
2. Strainer clogged. Clean as required.
3. Solenoid pilot stuck open or coil burned out. See Solenoid Valve section of this manual.
4. Check valve (5B) leaking. Repair or replace as necessary.
5. Check valve (5A) stuck closed. Repair or replace as necessary.
6. Main valve stem binding, seat damaged, or object in main valve. Disassemble valve and determine cause. See Basic Valve section of this manual.





# installation, operating, and maintenance instructions

## series 65 basic control valve

### GENERAL DESCRIPTION

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

### FUNCTIONAL DESCRIPTION

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

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

### INSTALLATION

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

valve.

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

In addition, it is highly recommended that:

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

### MAINTENANCE

The OCV control valve requires no lubrication and a minimum of maintenance. However, a periodic inspection should be established to determine how the fluid being handled is affecting the efficiency of the valve. In a water system, for example, the fluid velocity as well as the substances occurring in natural waters, such as dissolved minerals and suspended particles, vary in every installation. The effect of these actions or substances must be determined by inspection. It is recommended that an annual inspection, which includes 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

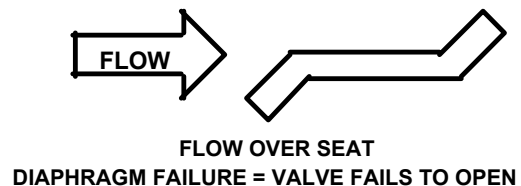
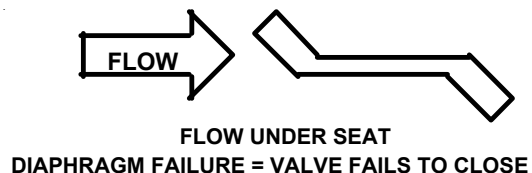
1. Isolate the valve from the system by closing upstream and downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in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

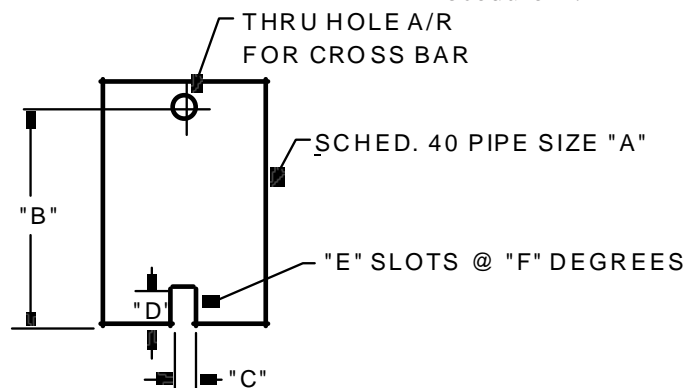
1. Perform Steps 1 and 2 of Procedure B, above.
2. With the spool assembly removed from the body, remove the seat retainer screws.
3. Slide the seat retainer off the lower end of the stem.
4. Remove the seat disc from its groove in the spool.  
*NOTE: The seat disc may fit quite tightly in the groove.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

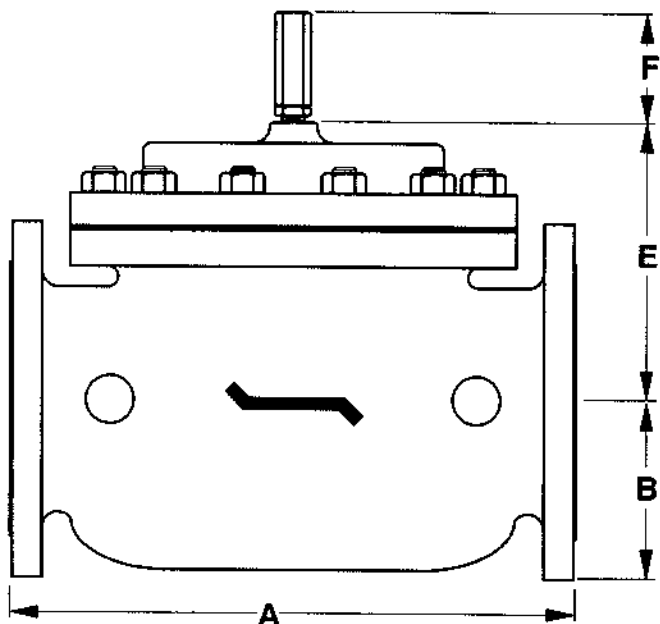
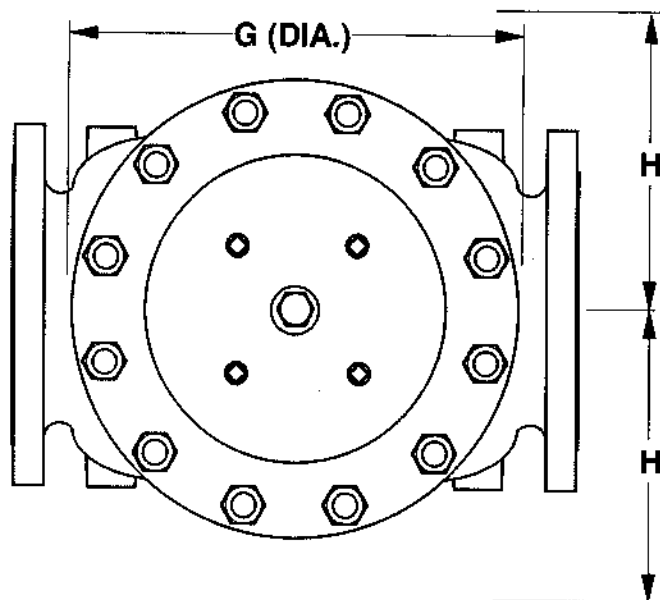
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.

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.

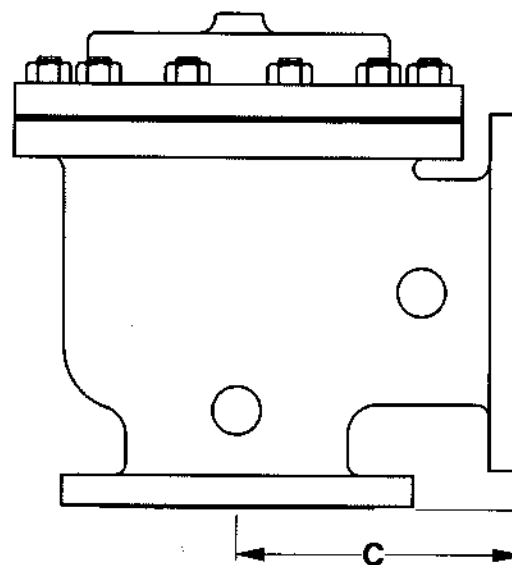


VALVE SIZE	"A" PIPE SIZE	"B" MIN. LENGTH	"C" SLOT WIDTH	"D" SLOT DEPTH	"E" NO. OF SLOTS	"F" SLOT SPACING
1-1/4"	3/4"	6"	3/8"	3/8"	2	180°
1-1/2"	3/4"	6"	3/8"	3/8"	2	180°
2"	1-1/2"	7"	3/8"	3/8"	2	180°
2-1/2"	2"	8"	1/2"	1/2"	3	120°
3"	2-1/2"	9"	5/8"	5/8"	2	180°
4"	3"	10"	5/8"	5/8"	2	180°

REVISED 3-17-97




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

<b>TOLERANCES</b>		 <b>OCV Control Valves</b> TULSA, OKLAHOMA U.S.A.		
UNLESS NOTED				
FRACTIONAL $\pm 1/64$				
DECIMAL $\pm .005$				
MACH. FINISH 125/ ANGULAR $\pm 1/2^\circ$				
		<b>GENERAL VALVE DIMENSIONS</b>		
DRAWN BY SDJ	DATE 10-6-97	SIZE	DRAWING NUMBER	REV.
CHKD. BY	DATE	<b>A</b>	<b>65D</b>	<b>B</b>



# Installation & Maintenance Instructions

2-WAY DIRECT-ACTING SOLENOID VALVES  
NORMALLY OPEN OR NORMALLY CLOSED OPERATION  
BRASS OR STAINLESS STEEL CONSTRUCTION - 1/8", 1/4", OR 3/8" NPT

SERIES

8262  
8263

Form No. V5256R8

**IMPORTANT:** See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil or Solenoid Replacement.

## DESCRIPTION

Series 8262 and 8263 valves are 2-way direct-acting general service solenoid valves. Valves bodies are of rugged brass or stainless steel. Series 8262 or 8263 valves may be provided with a general purpose or explosionproof solenoid enclosure. Series 8262 and 8263 valves with suffix "P" in the catalog number are designed for dry inert gas and non-lubricated air service.

## OPERATION

**Normally Open:** Valve is open when solenoid is de-energized; closed when is energized.

**Normally Closed:** Valve is closed when solenoid is de-energized; open when energized.

**IMPORTANT:** No minimum operating pressure required.

### Manual Operation

Manual operator allows manual operation when desired or during an electrical power outage. Depending upon basic valve construction, three types of manual operators are available:

#### Push Type Manual Operator

To engage push type manual operator, push stem at base of valve body upward as far as possible. Valve will now be in the same position as when the solenoid is energized. To disengage manual operator, release stem. Manual operator will return to original position.

#### Screw Type Manual Operator

To engage screw type manual operator, rotate stem at base of the valve body clockwise until it hits a stop. Valve will now be in the same position as when the solenoid is energized. To disengage, rotate stem counterclockwise until it hits a stop.

**CAUTION:** For valve to operate electrically, manual operator stem must be fully rotated counterclockwise.

#### Stem/Lever Type Manual Operator

To engage manual operator, turn stem/lever clockwise until it hits a stop. Valve will now be in the same position as when the solenoid is energized. To disengage manual operator, turn stem/lever counterclockwise until it hits a stop.

**CAUTION:** For valve to operate electrically, manual operator stem/lever must be fully rotated counterclockwise.

### Flow Metering Devices

Valves with suffix "M" in catalog number are provided with a metering device for flow control. Turn stem to right to reduce flow; left to increase flow.

## INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Note: Inlet port will either be marked "I" or "IN". Outlet port will be marked "O" or "OUT".

### Future Service Considerations.

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid after disassembly and reassembly.

### Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to charts below. Check catalog number, coil prefix, suffix, and watt rating on nameplate to determine the maximum temperatures.

Wattage	Catalog Number Coil Prefix	Coil Class	Max. Ambient Temp. °F	Max. Fluid Temp. °F
6, 10.5, 12.4	none, DA or S	A	77	180
6, 10.5 12.4	DF, FT or SF	F	125	180
6, 10.5, 12.4	HT	H	140	180
9, 10.7	none, DP or SP	F	77	180
9.7	none, FT or HT	A, F or H	77	120
11.2	none, FT or HT	A, F or H	77	150
16.7	none, DP or SP	F	77	200
17.1	none, KP SP or SD	F	125	180
17.1	HB, KB SS or SV	H	140	180

Catalog Nos. 8262B200 and 8262 C200 AC construction only and Catalog Nos. 8262B214 and 8262 D200 AC and DC construction are limited to 140°F fluid temperature.

Valves with Suffix V or W that are designed for AC service and normally closed operation are for use with No. 2 and 4 fuel oil service. These valves have the same maximum temperatures per the above table except Suffix W valves are limited to a maximum fluid temperature of 140°F.

Listed below are valves with Suffix V in the catalog number that are acceptable for higher temperatures.

Catalog Number Coil Prefix	Max. Ambient Temp. °F	Max. Fluid Temp. °F
FT8262, HB8262 FT8263, HB8263 8262G, 8263G	125	250*
HT or HB 8262G HT or HB 8263G	140	250

\*The only exception is the 8262G and 8263G series (Class F coil) at 50 Hertz rated 11.1 and 17.1 watts are limited to 210°F fluid temperature.

### Positioning

This valve is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Valves with suffix "P" in the catalog number must be mounted with the solenoid vertical and upright.

### Mounting

Refer to Figure 2 for mounting dimensions.

### Piping

Connect piping or tubing to valve according to markings on valve body. Inlet port will either be marked "I" or "IN". Outlet port will be marked "O" or "OUT". Wipe the pipe threads clean of cutting oils. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

**IMPORTANT:** To protect the solenoid valve, install a strainer or filter suitable for the service involved, in the inlet side as close to the valve as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

## MAINTENANCE

**⚠ WARNING:** To prevent the possibility of personal injury or property damage, turn off electrical power, depressurize valve, and vent fluid to a safe area before servicing the valve.

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

### Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the 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. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

### Preventive Maintenance

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, the valve should be operated at least once a month to insure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

### Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve (see Maintenance) and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

### Valve Disassembly

1. Disassemble valve using exploded views for identification of parts.
2. Remove solenoid, see separate instructions.
3. Unscrew solenoid base sub-assembly or valve bonnet with special wrench adapter supplied in ASCO Rebuild Kit. For wrench adapter only, order No. K218948. Remove core assembly, core spring, and solenoid base gasket from valve body. For normal maintenance on Series 8263 valves it is not necessary to remove valve seat. See Figure 1 for metering or manual operator constructions.
4. For normally open construction (Figure 3) remove end cap, or manual operator, (not shown) end cap gasket, disc holder spring, and disc holder assembly.
5. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

### Valve Reassembly

1. Use exploded views for identification, orientation and placement of parts.
2. Lubricate all gaskets with DOW CORNING® 111 Compound lubricant or an equivalent high-grade silicone grease.
3. For normally open construction (Figure 3), install disc holder assembly, disc holder spring, end cap gasket and end cap or manual operator. For valves with 1/8" NPT, torque end cap or manual operator to  $90 \pm 10$  in-lbs [ $10.2 \pm 1.1$  Nm]. For all other valves torque end cap or manual operator to  $175 \pm 25$  in-lbs [ $19.8 \pm 2.8$  Nm].
4. For Series 8263 apply a small amount of LOCITITE® PST® pipe sealant to threads of valve seat (if removed). Follow manufacturers instructions for application of pipe sealant. Then install valve seat and torque to  $75 \pm 10$  in-lbs [ $8.5 \pm 1.1$  Nm].
5. Replace solenoid base gasket, core assembly with core spring and solenoid base sub-assembly or plugnut/core tube sub-assembly and valve bonnet. Note: For core assemblies with internal type core springs, install wide end of core spring in core assembly first, closed end of core spring protrudes from top of core assembly.
6. For 1/8" NPT valve constructions, Torque valve bonnet to  $90 \pm 10$  in-lbs [ $10.2 \pm 1.1$  Nm]. Torque solenoid base sub-assembly to  $175 \pm 25$  in-lbs [ $19.8 \pm 2.8$  Nm].
7. Install solenoid, see separate solenoid instructions. Then make electrical hookup to solenoid.

**⚠ WARNING:** To prevent the possibility of personal injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

8. Restore line pressure and electrical power supply to valve.
9. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic click signifies the solenoid is operating.

## ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (\*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

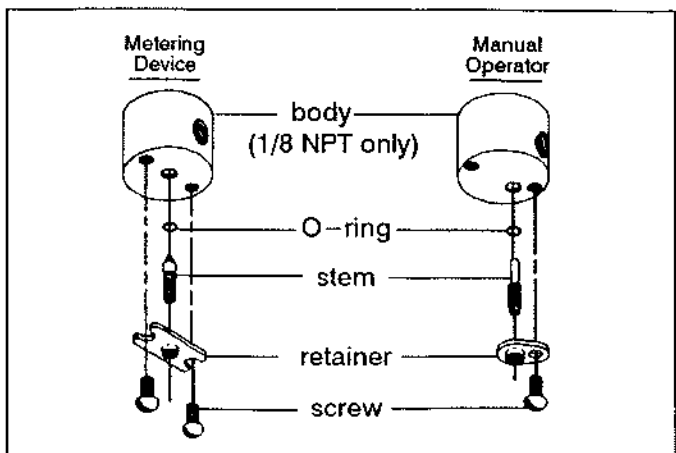
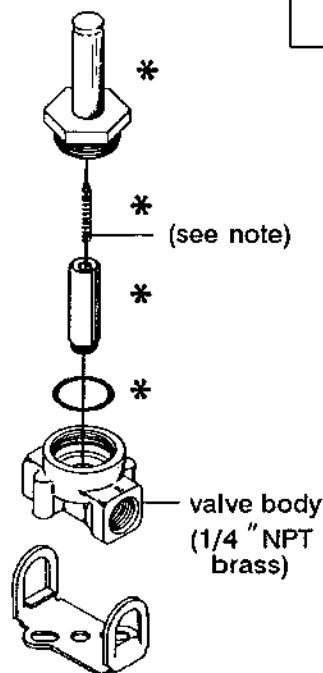
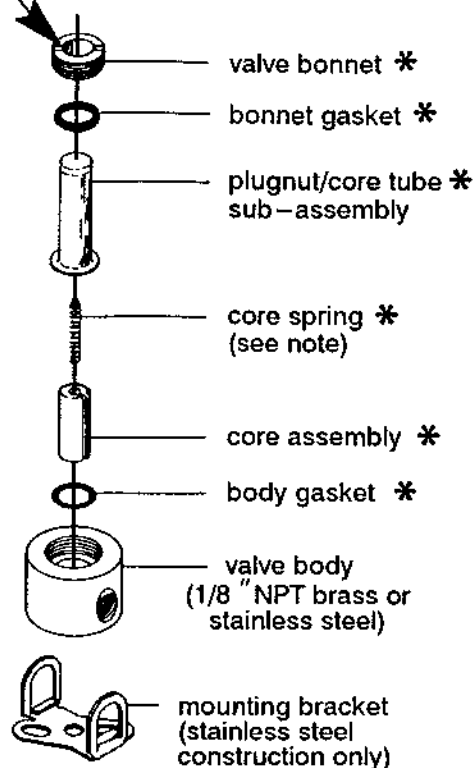
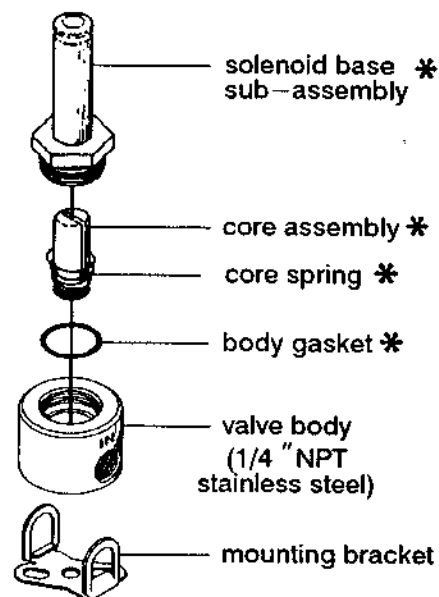


Figure 1. Metering and manual operator constructions.

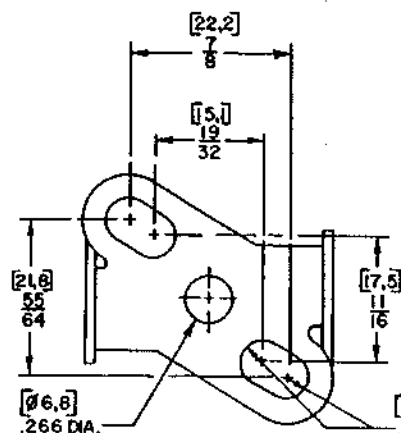
\* Bonnet wrench supplied in ASCO Rebuild Kits.  
For bonnet wrench only order No. K218948.



Torque Chart		
Part Name	Torque value Inch-Pounds	Torque value Newton-Meters
solenoid base sub-assembly	175±25	19,8±2,8
valve bonnet	90±10	10,2±1,1
valve seat	75±10	8,5±1,1

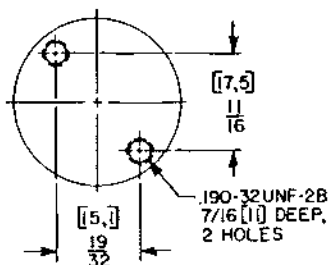


### Series 8262

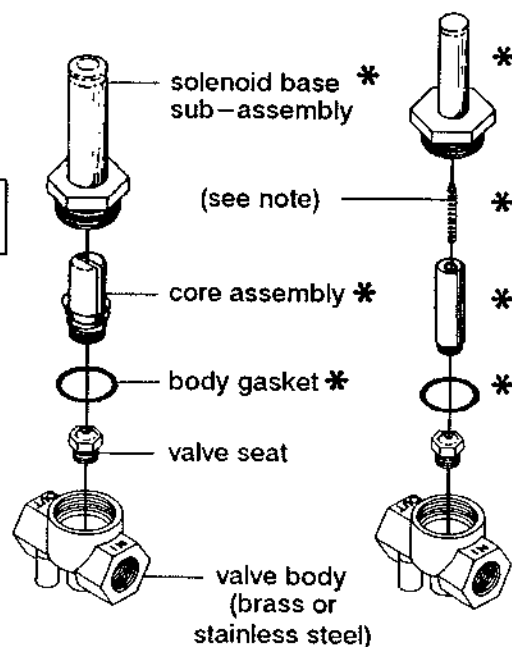
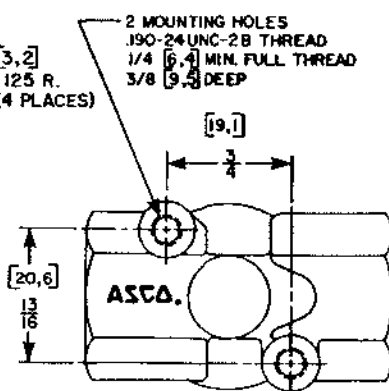


\* Indicates Parts Supplied  
in ASCO Rebuild Kits.

[m m]  
— INCHES —



(1/8" NPT brass)



### Series 8263

Note:  
Wide end of core spring in core first,  
closed end protrudes from top of core.

Figure 2. Series 8262 and 8263, normally closed construction.

## Disassembly and Reassembly of Stem /Lever Type Manual Operator (Refer to Figure 3)

**NOTE:** There are two stem/lever manual operator constructions. They are identified by the location of the core spring as *internal* or *external* spring construction.

1. Unscrew solenoid base sub-assembly from manual operator body.
2. Unscrew manual operator body from valve body. Then remove body gasket and stem retainer.
3. Slip stem/spacer sub-assembly with stem gasket from manual operator body. Remove core assembly with core spring from center of manual operator body.
4. All parts are now accessible for cleaning or replacement. Lubricate gaskets per *Valve Reassembly* step 2.

5. Position core assembly with core spring into base of manual operator body. Then install stem/spacer sub-assembly into manual operator body to engage with core assembly.
6. Reinstall stem retainer on body and stem/spacer sub-assembly.

**IMPORTANT:** The spacer on the stem/spacer sub-assembly must be *inside* of the stem retainer for *internal* spring construction and *outside* the stem retainer for *external* spring construction.

7. Replace body gasket and install manual operator assembly in valve body. Torque manual operator body to  $175 \pm 25$  in-lbs [ $19.8 \pm 2.8$  Nm].
8. Replace solenoid base gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to  $175 \pm 25$  in-lbs [ $19.8 \pm 2.8$  Nm].
9. Check manual operator for proper operation. Turn stem clockwise and counterclockwise; stem should turn freely without binding.

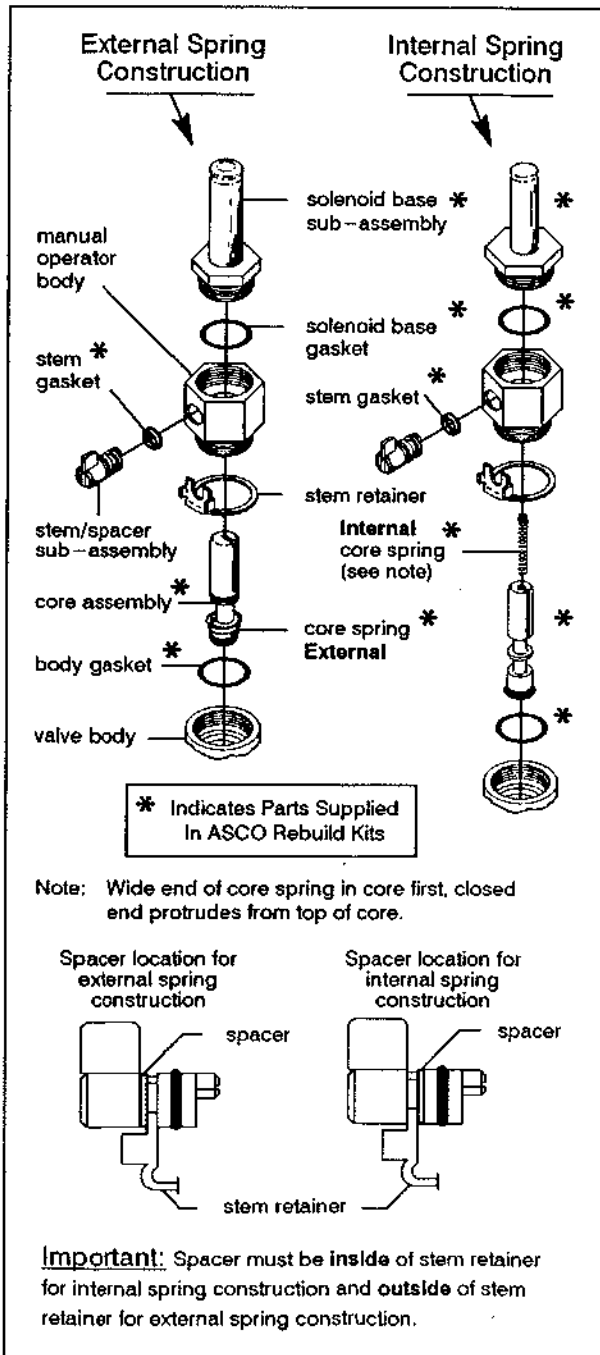


Figure 3. Stem/lever type manual operators

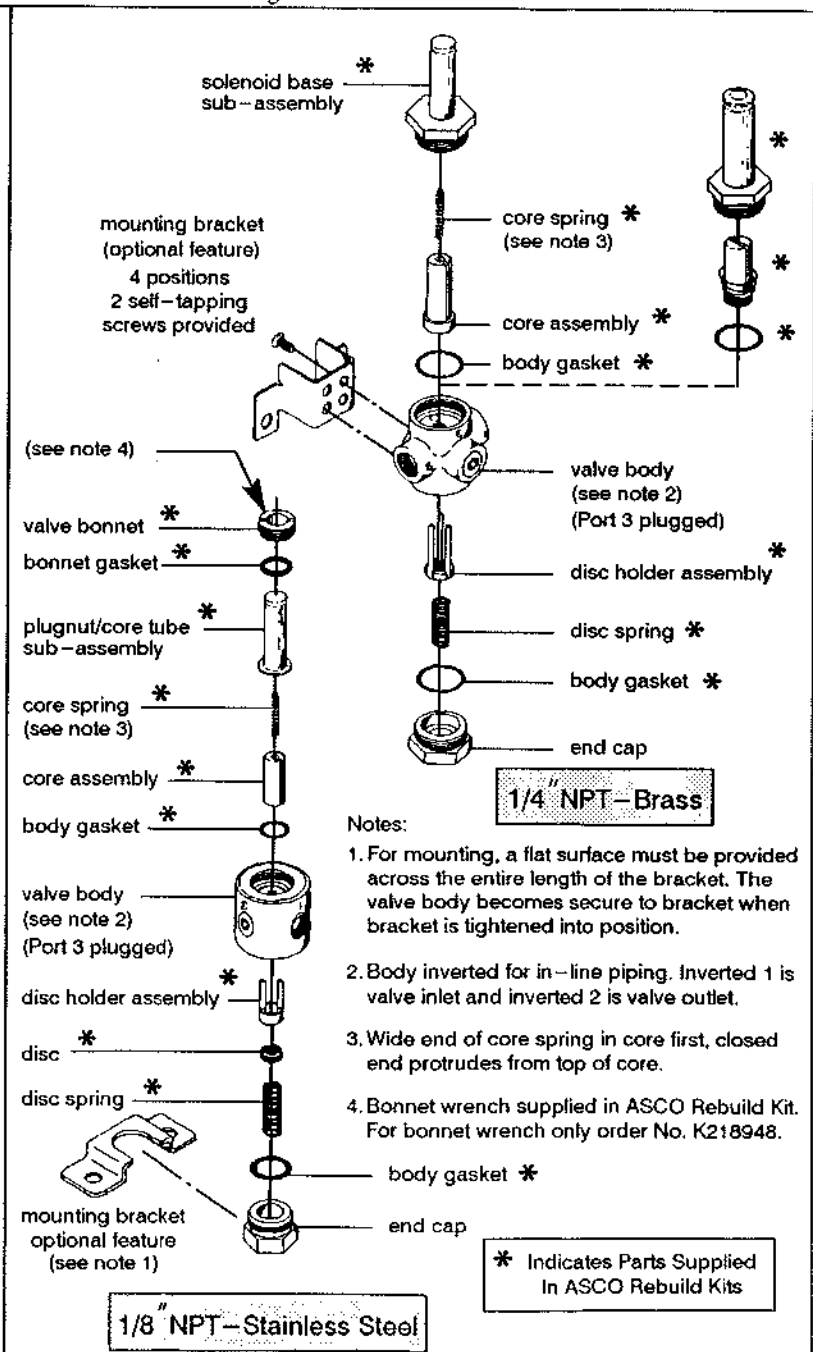


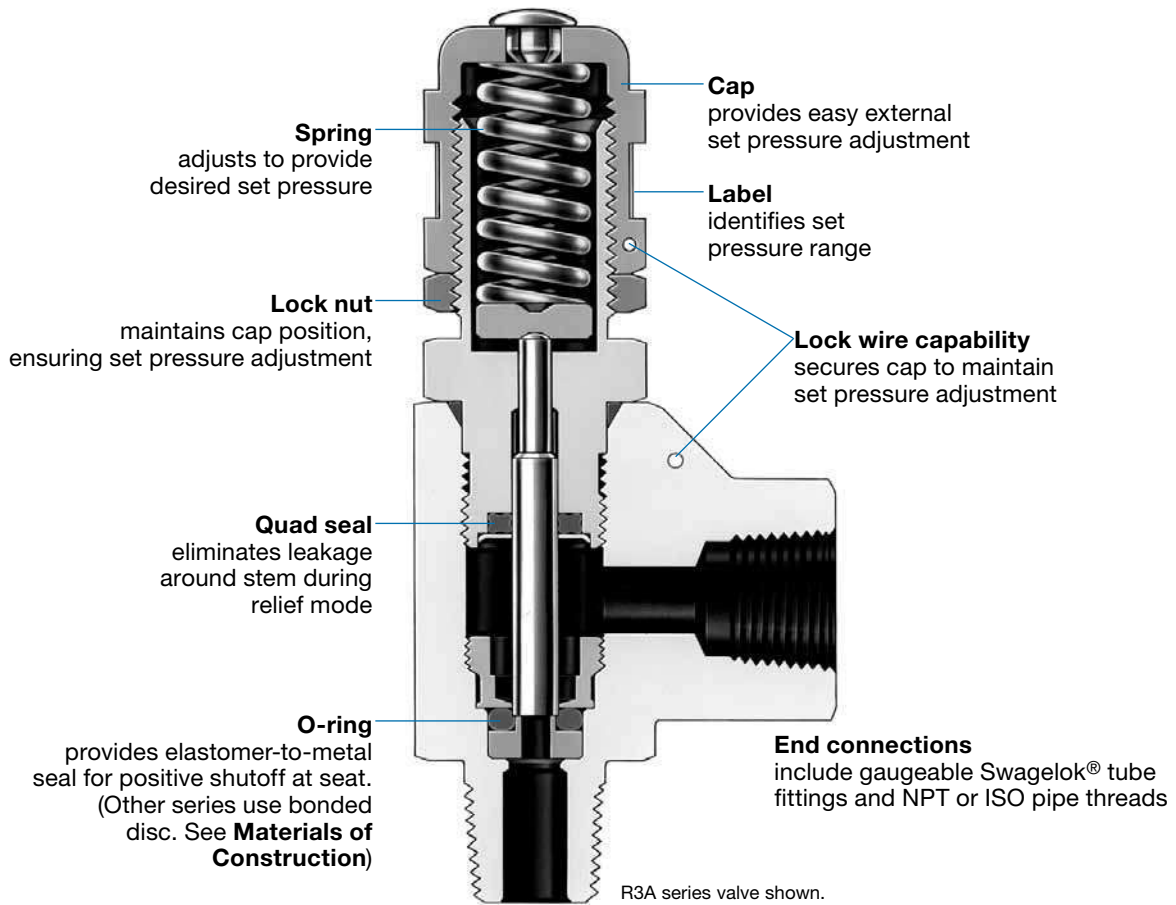
Figure 4. Series 8262, normally open construction.

# Proportional Relief Valves



## R Series

- Liquid or gas service
- Set pressures from 10 to 6000 psig (0.68 to 413 bar)
- 1/4 and 1/2 in. and 6 to 12 mm end connections



## Features

### High-Pressure Valves

- Service up to 6000 psig (413 bar)
- Multiple springs for a selection of set pressure ranges
- Valves available factory-set to a specified set pressure
- 1/4 in. and 6 and 8 mm end connections—R3A series
- 1/2 in. and 12 mm end connections—R4 series

### Low-Pressure Valves

- Service up to 300 psig (20.6 bar)
- One spring for the full set pressure range
- Valves available factory-set to a specified set pressure
- 1/4 in. and 6 and 8 mm end connections—RL3 series
- 1/2 in. and 12 mm end connections—RL4 series

## Applications

R series relief valves are proportional relief valves that open gradually as the pressure increases. Consequently, they do not have a capacity rating at a given pressure rise (accumulation), and they are not certified to ASME or any other codes.

⚠ **Some system applications require relief valves to meet specific safety codes. The system designer and user must determine when such codes apply and whether these relief valves conform to them.**

⚠ **Swagelok proportional relief valves should never be used as ASME Boiler and Pressure Vessel Code safety relief devices.**

⚠ **Swagelok proportional relief valves are not “Safety Accessories” as defined in the Pressure Equipment Directive 97/23/EC.**

## Operation

R series relief valves OPEN when system pressure reaches the set pressure and CLOSE when system pressure falls below the set pressure.

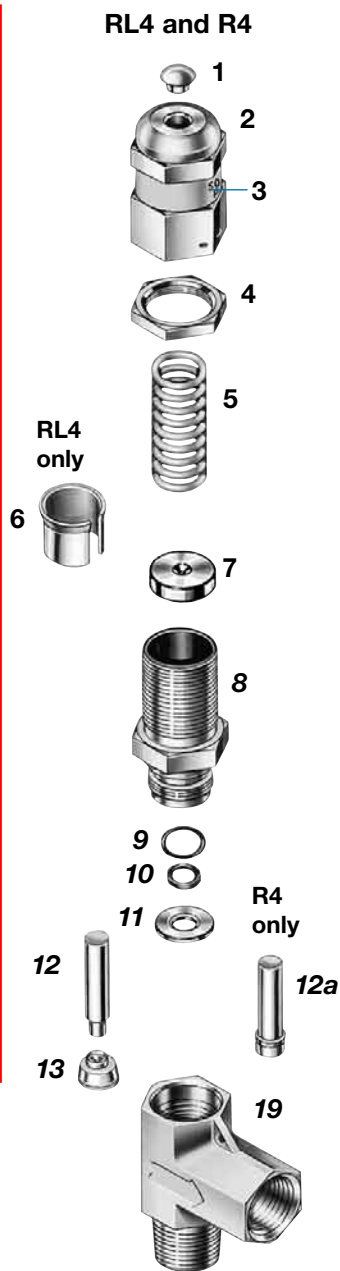
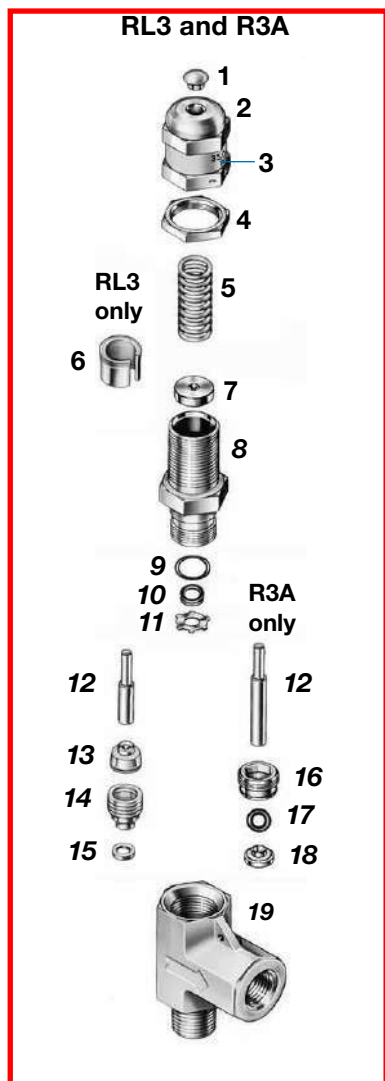
■ High-pressure R3A and R4 series—select and install the spring that covers the required set pressure; apply the matching label to the cap.

■ Low-pressure RL3 and RL4 series—the spring is already installed.

⚠ **For valves not actuated for a period of time, initial relief pressure may be higher than the set pressure.**



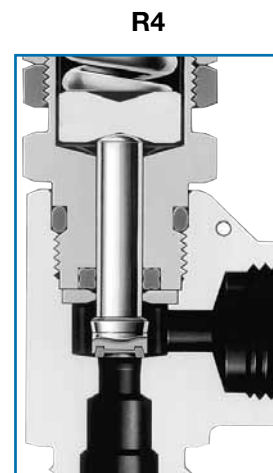
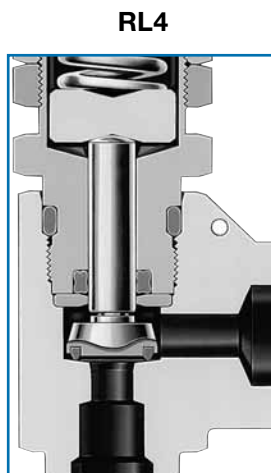
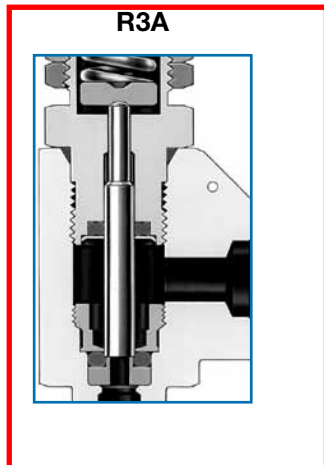
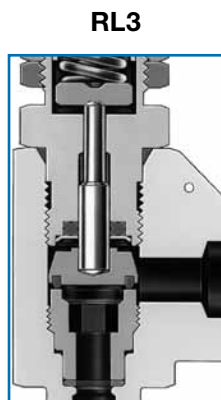
## Materials of Construction



Component	Material Grade/ASTM Specification
1 Plug	302 SS/ASTM 240
2 Cap	316 SS/A479
3 Label	Polyester
4 Lock nut	RL3, R3A—powdered metal 300 series SS/B783; RL4, R4—316 SS/A276
5 Spring	S17700 SS/AMS 5678
6 Sleeve	304 SS/A240
7 Spring support	RL3, R3A—powdered metal 300 series SS/B783; RL4, R4—316 SS/A276
8 Bonnet	316 SS/A479
9 O-ring	Fluorocarbon FKM
10 Quad seal	PTFE-coated fluorocarbon FKM
11 Retainer	RL3, R3A—316 SS/A666; RL4, R4—316 SS/A479
12 Stem	316 SS/A479
12a Bonded stem	Fluorocarbon FKM-bonded <sup>①</sup>
13 Bonded disc	316 SS/A479
14 Seat	316 SS/A479
15 Gasket	PTFE-coated 316 SS/A240
16 Seat retainer	316 SS/A479
17 O-ring	Fluorocarbon FKM
18 Insert	316 SS/A479
19 Body	316 SS/A182
Lubricants	Molybdenum disulfide-based dry film and paste; silicone-based

Wetted components listed in *italics*.

① Material Safety Data Sheet for bonding agents available on request.



## Ordering Information

### Low-Pressure Valves (RL3 and RL4 Series)

Valve contains spring; set pressure must be adjusted. Select a valve ordering number.

#### Factory-Set Valves

RL3 and RL4 series valves are available with springs factory-set to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure; certificates of test are included.

To order, add **-SET** to the valve ordering number and specify the desired set pressure.

Example: SS-RL3S4-**SET**

#### Replacement Spring Kits

Spring kits include spring and installation instructions. Select a spring kit ordering number.

Series	Spring Kit Ordering Number	Set Pressure Range psig (bar)
RL3	177-13K-RL3	10 to 225 (0.68 to 15.5)
RL4	177-13K-RL4	

### High-Pressure Valves (R3A and R4 Series)

Valve does not contain spring. Select a valve ordering number and a spring kit ordering number.

#### Spring Kits

Spring kits include spring, label, 302 SS lock wire with seal, spring support, and installation instructions.

Select a spring kit basic ordering number and add the spring designator for the desired set pressure range.

Examples: **177-R3A-K1-F**  
**177-13K-R4-C**

Set Pressure Range psig (bar)	Spring Designator	Spring Color
<b>R3A series spring kit: basic ordering number 177-R3A-K1-</b>		
50 to 350 (3.4 to 24.1)	A	Blue
350 to 750 (24.1 to 51.7)	B	Yellow
750 to 1500 (51.7 to 103)	C	Purple
1500 to 2250 (103 to 155)	D	Orange
2250 to 3000 (155 to 206)	E	Brown
3000 to 4000 (206 to 275)	F	White
4000 to 5000 (275 to 344)	G	Red
5000 to 6000 (340 to 413)	H	Green
<b>R4 series spring kit: basic ordering number 177-13K-R4-</b>		
50 to 350 (3.4 to 24.1)	A	Blue
350 to 750 (24.1 to 51.7)	B	Yellow
750 to 1500 (51.7 to 103)	C	Purple

#### Factory-Set Valves

R3A and R4 series valves are available with springs factory-set to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure; certificates of test are included.

To order, add **-SET** and a spring designator whose range includes the desired set pressure to the valve ordering number; specify the desired set pressure.

Example: SS-4R3A-**SETB**

## Options and Accessories

### Seal Materials

Fluorocarbon FKM is the standard seal material. Buna N, ethylene propylene, and neoprene are available.

To order a valve with an optional seal material, add a valve seal material designator to the valve ordering number.

Examples: SS-4R3A-**BU**  
SS-RL3S4-**BU**

To order a *replacement seal kit*, insert a seal kit material designator as a prefix (R3A series) or suffix (all others) to the seal kit basic ordering number.

Examples: **BU**-R3A-K2  
SS-3K-RL3-**BN**

Seal Material	Designator	
	Valves	Seal Kits
Buna N	-BU	BN <sup>①</sup>
Ethylene propylene	-EP	EP
Neoprene	-NE	NE
Fluorocarbon FKM	—	VI

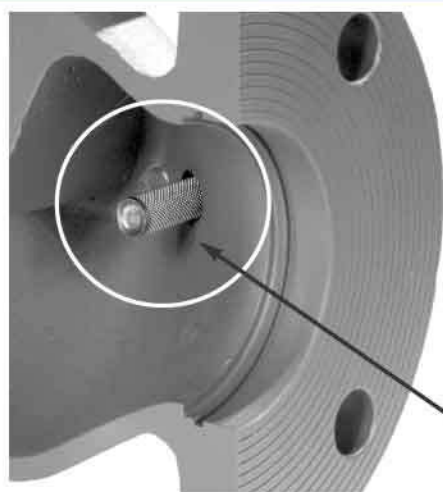
<sup>①</sup> Use **BU** for R3A series seal kits.

RL3 Series	R3A Series	RL4 Series	R4 Series
<b>Seal kit basic ordering number</b>			
SS-3K-RL3-	-R3A-K2	SS-3K-RL4-	SS-3K-R4-
<b>Seal kit contents</b>			
O-ring, quad seal, bonded disc, retainer, instructions	O-rings (2), quad seal, retainer, instructions	O-ring, quad seal, bonded disc, retainer, instructions	O-ring, quad seal, bonded stem, instructions

### Special Cleaning and Packaging (SC-11)

To order R series relief valves processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)*, MS-06-63, to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C, add **-SC11** to the valve ordering number.

Example: SS-RL3S4-**SC11**



Strainer Shown Installed

## DESCRIPTION

The 123 Inline Strainer installs in the inlet side port of the main valve, and protects the pilot system from solid contaminants in the line fluid. The screen prevents the entrance of particles into the pilot system piping while flow through the main valve washes the screen clean. Recommended use on petroleum valve applications where flushing or removal of the screen for cleaning is not practical or may be considered hazardous.

## DIMENSIONS

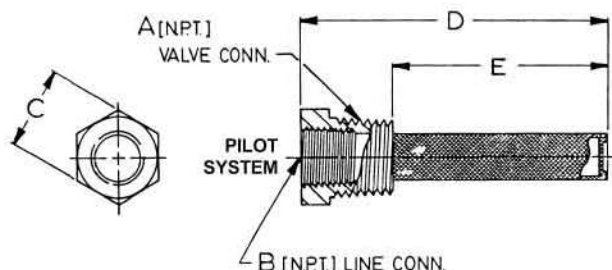
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

## MATERIALS

Inline strainers are all-stainless steel construction.

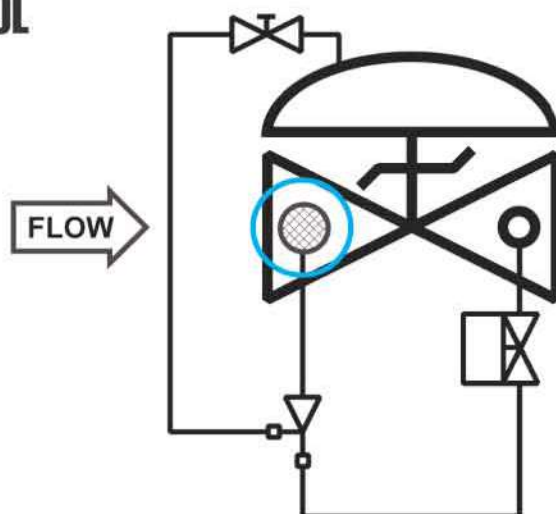
## SCREEN SIZE

Standard screen is 40 mesh. Other mesh sizes are available.



## SCHEMATIC SYMBOL

The Model 123 Inline Strainer is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-2 Solenoid Valve.

## 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.

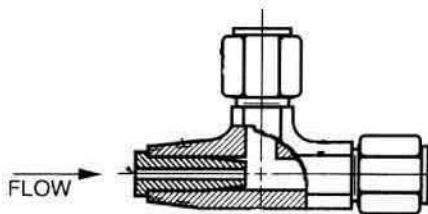
## MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

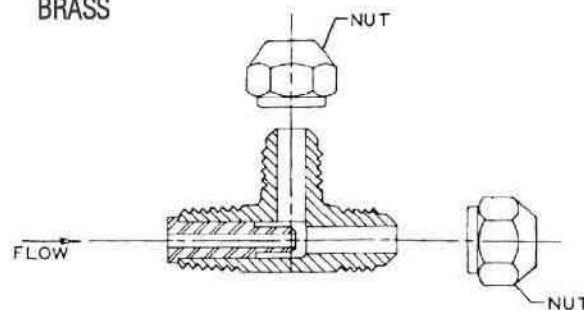
MATERIAL	PART NUMBER	P (NPT)	T-TUBE O.D.	STD. ORIFICE	USED ON VALVE SIZES
Brass	213100	3/8"	3/8"	.125"	1 1/4"-6"
Brass	214100	1/2"	1/2"	.188"	8"-10"
Brass	215100	3/4"	3/4"	.188"	12"-16"
316 Stn. Steel	213700	1/4"	3/8"	.090"	1 1/4"-6"
316 Stn. Steel	214700	3/8"	1/2"	.125"	8"-10"
316 Stn. Steel	215700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

Orifice bushings are stainless steel.

STAINLESS

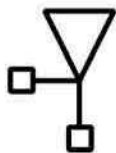


BRASS

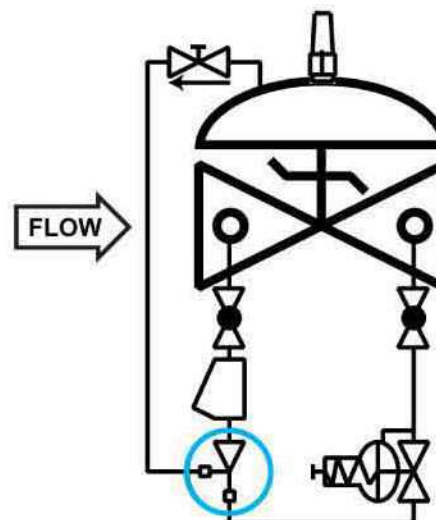


## SCHEMATIC SYMBOL

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



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





## 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.



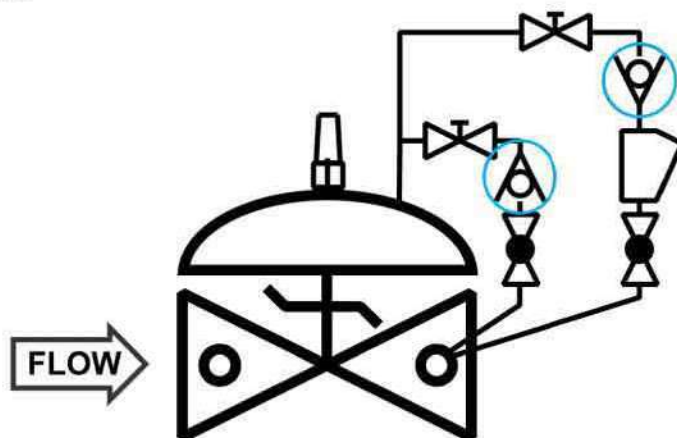
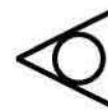
Check Valves shown  
Stainless Steel & Brass

## MODEL 141-1 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	LENGTH	USED ON VALVE SIZE
Bronze	681100	3/8	2	1 1/4"-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 1/4"-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.

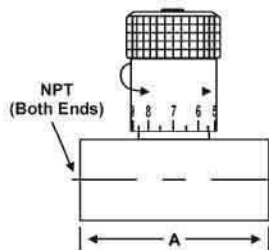
## DESCRIPTION

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

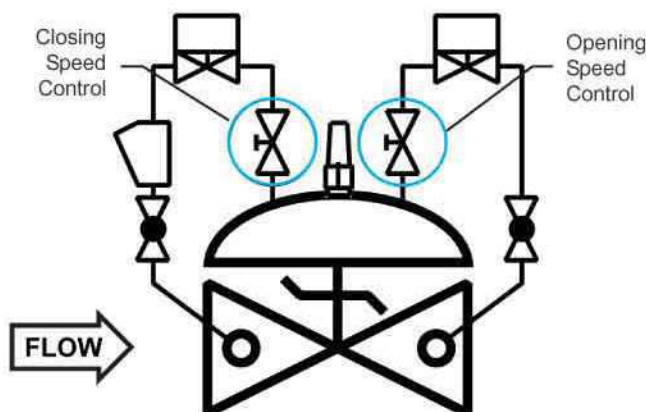
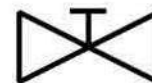


MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	683100	1/4	2	1 1/4"-2"
Brass	683101	3/8	2 1/4	2 1/2"-6"
Brass	683102	1/2	2 5/8	8"-10"
Brass	683103	3/4	3 1/4	12"-16"
Stn. Steel	683700	1/4	2	1 1/4"-2"
Stn. Steel	683702	3/8	2 1/4	2 1/2"-6"
Stn. Steel	682704	1/2	2 5/8	8"-10"
Stn. Steel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

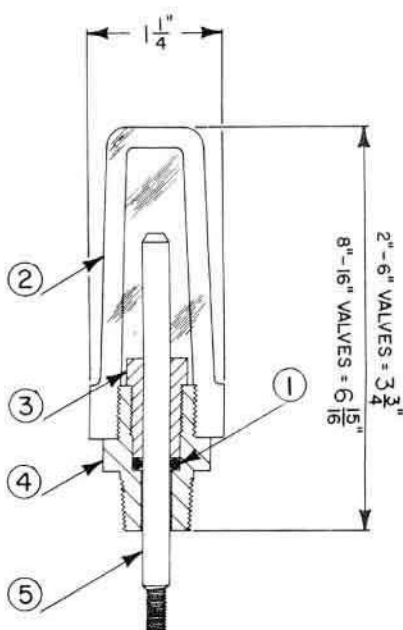


## DESCRIPTION

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

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

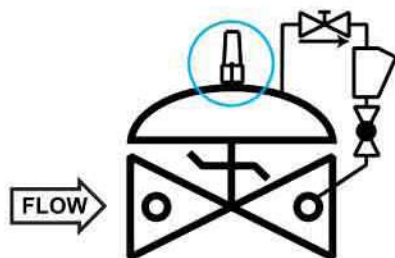
## MODEL 155 MATRIX



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

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

## SCHEMATIC SYMBOL



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

The Model 155 is shown on OCV Valve Schematic as:



## MATERIALS

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



**Global** performance. **Personal** touch.