deep well pump control valve

installation, operating, and maintenance instructions

model 126

GENERAL DESCRIPTION:

The OCV Model 126 is a "normally-open" valve designed for installation in a bypass line of a deep well system in conjunction with a slow-opening check valve (e.g., OCV Model 94-2) in the main discharge line.

The functions of the Model 126 are to vent air and debris from the well column to atmosphere, to prevent start-up and shut-down pressure surges from reaching the main line, and to break the vacuum in the well column during shut down.

CONSTRUCTION

The Model 126 is based on a Model 66, which is a dual-chamber, diaphragm-actuated globe or angle valve which closes with an elastomer-on-metal seal and has dual diaphragm chambers completely isolated from the flow chamber. Pressure over the diaphragm acts to close the valve; pressure under the diaphragm acts to open it. Control accessories included are a single-pole, double-throw microswitch to interlock valve action with pump start up and shut down, a four-way solenoid pilot valve and two flow control valves which regulate the opening and closing rates of the main valve.

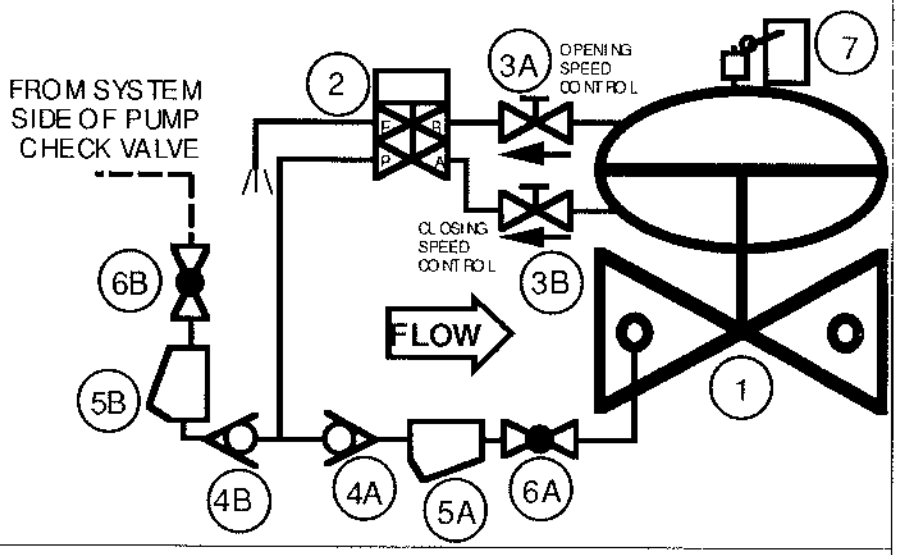
ELECTRICAL

OCV furnishes the microswitch and solenoid pilot factory-installed; other switches, relays and all wiring are customer provided. Consult the wiring diagram which follows for details.

The customer may use other wiring arrangements; however, the operating description below applies to the OCV-suggested system. Please note that in wiring the Model 126, the common and **normally-closed** terminals of the microswitch are used.

INSTALLATION

Other than electrical hook-up, installation of the Model 126 requires only flange bolt-up and connection of a sense line from the solenoid pilot to the main discharge line downstream of the check valve. This connection may be made conveniently to the downstream body tap of the OCV Model 94-2. The Model 126 discharges a small amount of fluid each time it opens or closes. Installation should include provision for this discharge. At system start up, adjust the pressure switches, time



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delay relays, opening and closing speed controls and microswitch actuating collar for desired operation.

TROUBLESHOOTING

Be sure that the valve has control pressure through the sense lines, the stop cocks and flow control valves are open, and the microswitch and solenoid coil are properly supplied with electrical power.

A. VALVE FAILS TO CLOSE:

Possible causes - Ruptured diaphragm, clogged control line or sense line, stem binding, solenoid valve failure.

B. VALVE FAILS TO OPEN:

Possible causes - Clogged control line or sense line, stem binding, solenoid valve failure.

STARTUP

With the pump off, main line pressure (from downstream of the check valve) acts under the diaphragm of the Model 126 holding it open. At start up, the solenoid coil is energized, routing main line pressure to the upper diaphragm chamber (bonnet) and exhausting the lower diaphragm chamber (intermediate plate). The valve closes slowly, venting air from the well column and gradually bringing main line pressure up to pump head. Start up also energizes the coils of the latching relay (R1) and the "on-delay" time delay relay (TD1). TD1 contacts remain closed until the delay interval ends. As the valve closes, the microswitch (MS) contacts make, energizing the coil of the "off delay" time-delay relay (TD2). Until TD1 times out, the pump motor is powered through both TD1 and TD2. Thus, if the valve fails to close and energize TD2 before TD1 times out, the pump motor is stopped automatically.

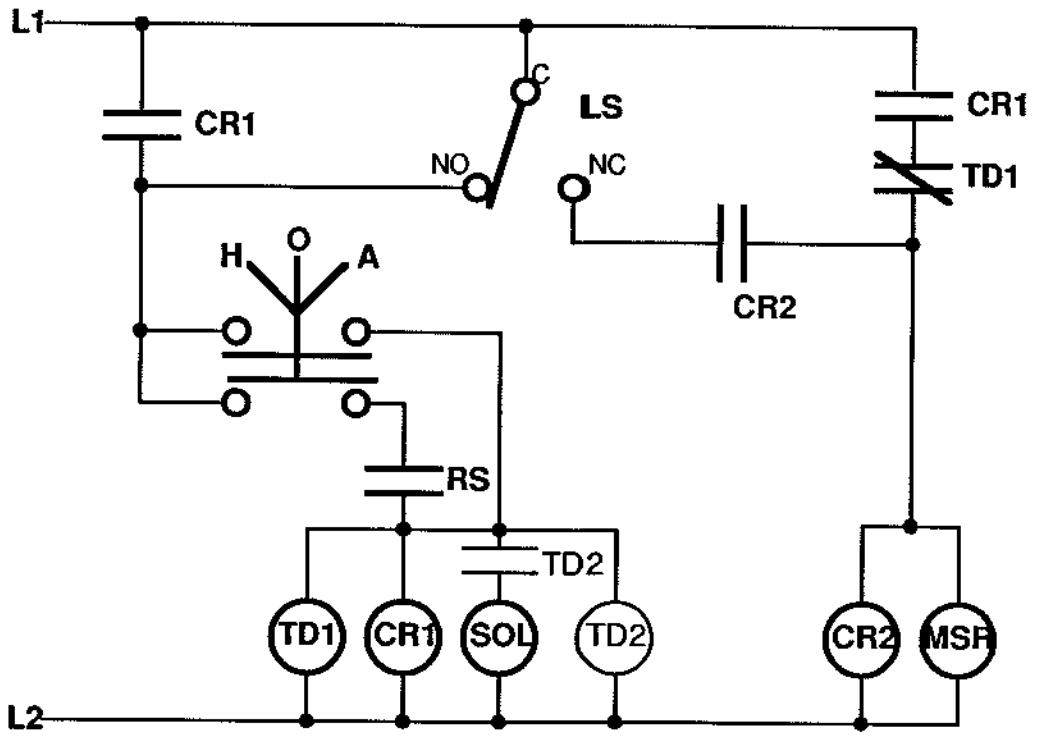
PUMP RUN

While the pump is running, the Model 126 remains closed. In case of power failure, the valve opens.

SHUT DOWN

Opening the pump circuit switch does not immediately shut down the pump. Instead, the solenoid pilot coil is de-energized, thus opening the main valve. As the valve opens, the microswitch contacts break, de-energizing the coil of TD2. When TD2 times out, its contacts break and shut down the pump. Thus the valve opens slowly with the pump running, gradually reducing the pressure at the inlet side of the check valve. When the pump stops, the Model 126 remains open. Thus no vacuum forms in the well column, and the valve is reset for the next start up.

SK1233
RECOMMENDED WIRING DIAGRAM
SERIES 126 DEEP WELL PUMP CONTROL VALVES

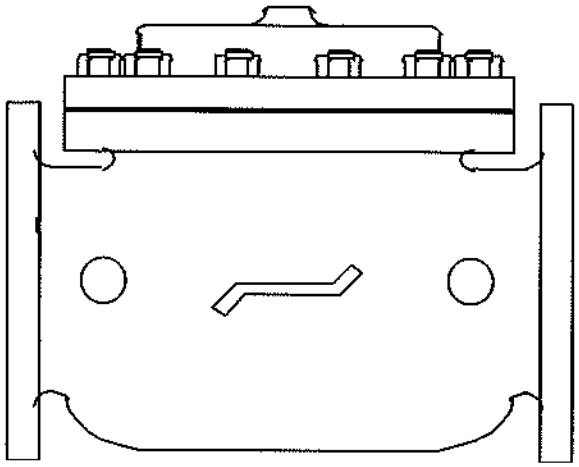


FURNISHED BY OCV :

SOL = Solenoid Pilot Valve
LS = Limit Switch, SPDT

FURNISHED BY CUSTOMER :

HOA = Hand-Off-Auto Switch
RS = Remote Start Switch (for Automatic Operation)
CR1 = Control Relay, DPST, N.O. or better
CR2 = Control Relay, SPST, N.O. or better
TD1 = Time Delay Relay, On-Delay Type, SPST, N.C. or better
(Shuts down pump if valve does not close)
0-180 secs. recommended
TD2 = Time Delay Relay, On-Delay Type, SPST, N.O. or better
(OPTIONAL: Delays valve closing after pump start.)
MSR = Pump Motor Starter Relay



installation, operating, and maintenance instructions

series 66

basic control valve

GENERAL DESCRIPTION

The OCV Series 66 Power-Actuated Valve is a hydraulically-operated, diaphragm type valve. The diaphragm is a nylon fabric bonded with an elastomer. An elastomeric seat disc forms a tight seal with the valve seat when the valve is closed. The valve contains upper and lower diaphragm chambers, separated and sealed from each other by the diaphragm itself. The lower chamber is sealed from the flow passage by means of a stem seal.

Because of the twin-chamber design, the Series 66 valve requires no line pressure differential to operate. Thus, it is particularly useful where line pressure is extremely low, pressure loss is critical or where line fluid is too dirty or otherwise unsuitable for operating the valve.

The Series 66 valve is designed to operate in a temperature range from -40 degrees F to +180 degrees F, depending upon the type of fluid being transported. It is available in either globe or angle configuration in ductile iron (150 lb. or 300 lb.) or in cast steel (150 lb. or 300 lb.) construction.

FUNCTIONAL DESCRIPTION

The Series 66 valve may be operated by line pressure or by an independent pressure source (equal to or greater than line pressure). Applying that pressure to the lower diaphragm chamber and simultaneously venting the upper diaphragm chamber causes the valve to move to its full open position. Conversely, applying pressure to the upper diaphragm chamber and simultaneously venting the lower chamber causes the valve to go fully closed.

INSTALLATION

In order to insure safe, accurate and efficient operation of the Series 66 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. It is recommended that either gate or block valves be installed on the inlet and discharge sides of the valve to facilitate isolating the valve for preventive or corrective maintenance.
3. It is recommended that pressure gauges be installed at the inlet and discharge ports to provide monitoring of the valve during initial start-up and during operation.
4. Prior to mounting the valve, all interconnecting piping should be thoroughly flushed of chips, scale and foreign matter.
5. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.

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6. It is recommended that for maximum efficiency and serviceability, valves 6" and larger be installed in a horizontal position.

7. Allow sufficient room around the valve for ease of adjustment and maintenance service.

8. Because of the venting action, a quantity of fluid will be exhausted each time the valve opens or closes. Provisions should be made to drain or dispose of this vented fluid.

Valve Size	Discharge Capacity (gallons)
1.25-1.5"	.02
2"	.05
2.5"	.06
3"	.1
4"	.2
6"	.6
8"	1.3
10"	2.5
12"	4.0
14"	6.5
16"	9.6

MAINTENANCE

The OCV control valve requires no lubrication or packing 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, colloidal and suspended particles vary in every installation. The effect of these actions or substances must be determined by inspection. It is recommended that an annual inspection, which includes examination of the valve interior, be conducted. Particular attention should be paid to the elastomeric parts, i.e., the diaphragm and seat disc. Any obviously worn parts should be replaced.

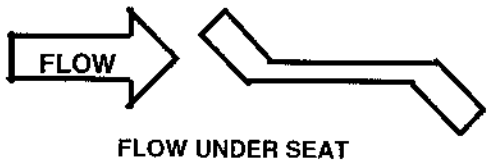
TROUBLESHOOTING

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.

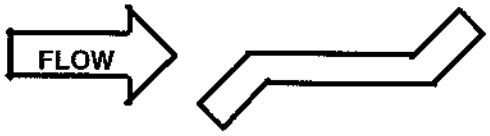
Problems with the main valve can be classed in three basic categories:

1. MAIN VALVE FAILS TO OPEN
   a. Closed isolation valves or cocks in pilot system or in main line—*Open valves or cocks.*
   b. Insufficient operating pressure—*Check pressure.*
2. MAIN VALVE FAILS TO CLOSE
   a. Closed cocks in control system or in main line—*Open cocks.*
   b. Lack of cover chamber pressure—*Check upstream pressure strainer, tubing, cocks, needle valves for restriction.*
   c. Diaphragm damaged (see note)—*Replace diaphragm.*
   d. Diaphragm assembly inoperative. Corrosion or excessive scale buildup on valve stem—*Clean and polish stem. Replace any defective, damaged or badly eroded parts.*
   e. Mechanical obstruction. Object lodged in valve—*Remove obstruction.*
   f. Worn seat disc—*Replace seat disc.*
   g. Badly scored seat—*Replace seat.*

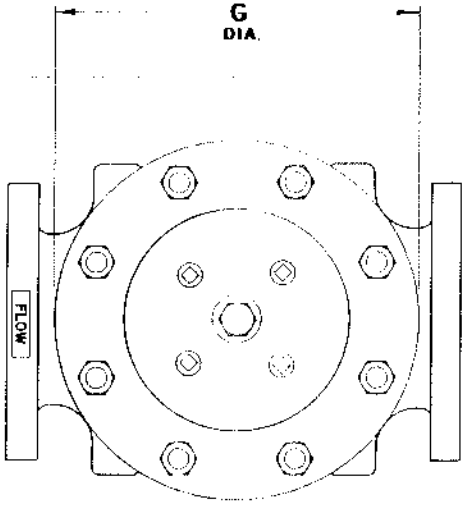
NOTE: Assuming control system is functioning properly.



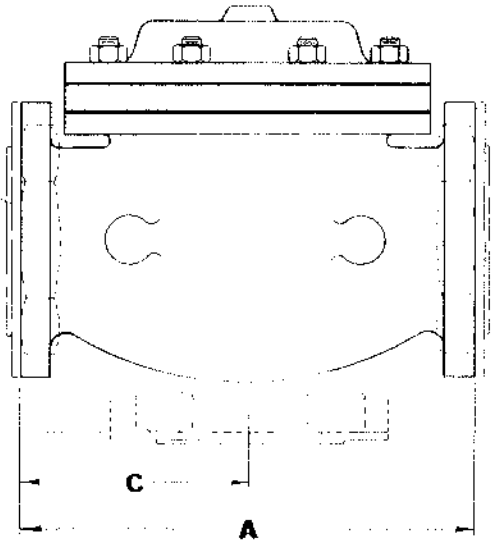
FLOW UNDER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO CLOSE

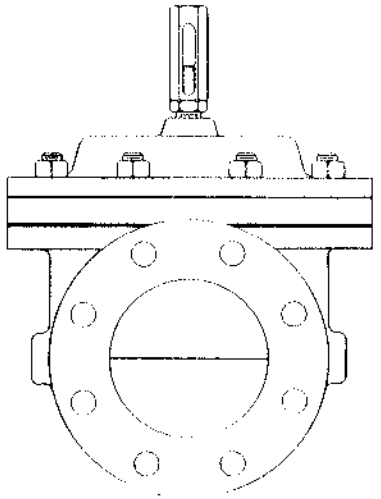


FLOW OVER SEAT
DIAPHRAGM FAILURE = VALVE FAILS TO OPEN



DIM.	ANSI PSI	VALVE SIZE 1½, 1¼	2	2½, 3	4	6	8	10	12	14	16
A	SCREWED	8 3/4	9 3/8	10 1/2	—	—	—	—	—	—	—
	125-150	8 1/2	9 3/8	10 1/2	13 1/2	17 3/4	21 3/8	26 3/4	34	39	40 3/8
	250-300	8 3/4	9 7/8	11 1/4	14 1/8	18 5/8	22 3/8	28 1/8	35 1/2	40 1/2	42
B	SCREWED	1 7/16	3	1 7/8, 2 1/4	—	—	—	—	—	—	—
	125-150	2 5/16, 2 1/2	3	3 1/2, 3 3/4	4 1/2	5 1/2	6 3/4	8	9 1/2	10 5/8	11 3/4
	250-300	2 5/8, 3 1/16	3 1/4	3 3/4, 4 1/8	5	6 1/4	7 1/2	8 3/4	10 1/4	11 1/2	12 3/4
C	SCREWED	4 3/8	4 3/4	6 1/4	—	—	—	—	—	—	—
	125-150	4 1/4	4 3/4	6	7 5/8	10	12 3/4	—	17	—	—
	250-300	4 3/8	5	6 3/8	7 15/16	10 1/2	13 1/4	—	17 3/4	—	—
D	SCREWED	3 1/8	3 7/8	4 1/2	—	—	—	—	—	—	—
	125-150	3	3 7/8	4	5 1/16	6	8	—	11	—	—
	250-300	3 1/8	4	4 3/8	5 3/8	6 1/2	8 1/2	—	11 3/4	—	—
E	SCREWED	6 3/4	6 3/4	7 7/8	—	—	—	—	—	—	—
	125-150	6 3/4	6 3/4	7 7/8	8 7/8	11 1/2	12 7/16	15 3/8	18 7/8	23	24 3/8
	250-300	6 3/4	6 3/4	7 7/8	8 7/8	11 1/2	12 7/16	15 3/8	18 7/8	23	24 3/8
F	SCREWED	3 7/8	3 7/8	3 7/8	—	—	—	—	—	—	—
	125-150	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	6 3/8	6 3/8	6 3/8	6 3/8
	250-300	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	6 3/8	6 3/8	6 3/8	6 3/8
G DIA.	SCREWED	6	6 3/4	7 11/16	—	—	—	—	—	—	—
	125-150	6	6 3/4	7 11/16	10	14	17 3/4	21 5/8	28	31 1/4	34 1/2
	250-300	6	6 3/4	7 11/16	10	14	17 3/4	21 5/8	28	31 1/4	34 1/2
H	SCREWED	10	11	11	—	—	—	—	—	—	—
	125-150	10	11	11	12	13	14	17	18	20	20
	250-300	10	11	11	12	13	14	17	18	20	20





NOTES:

1. WHEN ORDERING VALVES PLEASE SPECIFY
   - (A) QUANTITY
   - (B) VALVE SIZE
   - (C) VALVE MATERIAL
   - (D) TYPE OF SERVICE
   - (E) MAX. AND MIN. WORKING PRESSURE
   - (F) MAX AND MIN. WORKING TEMPERATURE
   - (G) FLANGED OR SCREWED ENDS

REVISIONS	REF DWG NO'S	MATERIAL	TOLERANCES	DCV Control Valves
				VALVE INSTALLATION DRAWING
		NO REQ'D	DRAWN BY BRW DATE 3-6-03	SIZE D — DRAWING NUMBER 66D — REV.
			CHKD BY DATE	

INSTALLATION AND MAINTENANCE INSTRUCTIONS

4-WAY VALVES — SINGLE SOLENOID

1/4" - 3/8" - 1/2" - 3/4" - 1" N.P.T. — 1/4" - 3/8" - 3/4" ORIFICE

BULLETIN **8344**

ASCO

Form No. V-5770

DESCRIPTION

Bulletin 8344 valves are packless, solenoid pilot controlled, heavy duty, 4-way valves with forged brass valve bodies and poppet type main discs. The main discs are power driven in both directions by line pressure. No return springs are required.

The standard valves have a General Purpose, NEMA Type 1 Solenoid Enclosure. Valves may also be equipped with an enclosure which is designed to meet NEMA Type 4-Watertight, NEMA Type 7 (C or D) Hazardous Locations-Class I, Group C or D and NEMA Type 9 (E, F or G) Hazardous Locations-Class II, Group E, F or G and are shown on a separate sheet of Installation and Maintenance Instructions, Form Nos. V-5381 and V-5391.

OPERATION (Refer to Figure 1)

Solenoid de-energized flow is from Pressure Connection to Cylinder 'A'; Cylinder 'B' is open to Exhaust.
Solenoid energized flow is from Pressure Connection to Cylinder 'B'; Cylinder 'A' is open to Exhaust.
Minimum on time for valves is 0.3 second on air service and 1.0 second on liquids.
NOTE: Minimum operating pressure differential is 10 P.S.I. on air, gas or water and 25 P.S.I. on hydraulic oil (300 S.S.U.).

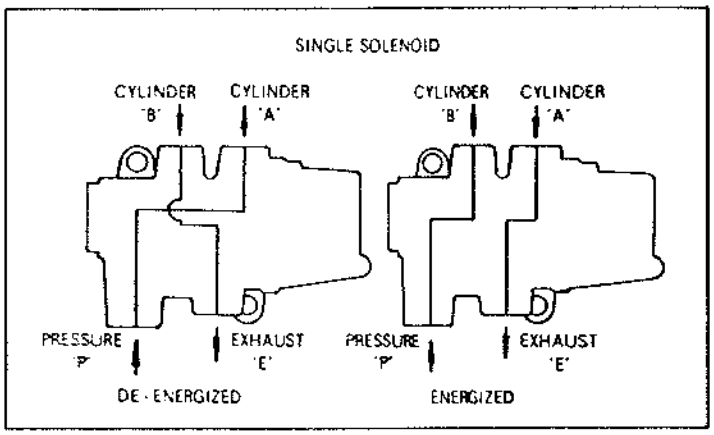


Figure 1.

MANUAL OPERATOR (Optional) (Refer to Figures 6, 7 and 8)

DESCRIPTION

Valves with Suffix "MO" after catalog number are provided with a manual operator which allows manual operation when desired or during an interruption of electrical power.

OPERATION:

To actuate valve manually, turn manual operator clockwise to stop. Valve will now be in same position as when solenoid is energized.

For valve to operate electrically manual operator must be turned counterclockwise to stop.

SPEED/FLOW CONTROL — METERING DEVICES

(Refer to Figure 2)

Speed flow control valves (2) may be added to allow full unrestricted flow in one direction and controlled flow in the opposite direction. These valves must be located in the 'A' and/or 'B' cylinder piping, between the solenoid valve and the cylinder.

IMPORTANT:

NOTE: Do not install the speed control or any other restrictive devices in either the pressure (inlet) connection or the exhaust (outlet) connection of the valve. Restricting either of these lines may cause valve malfunction.

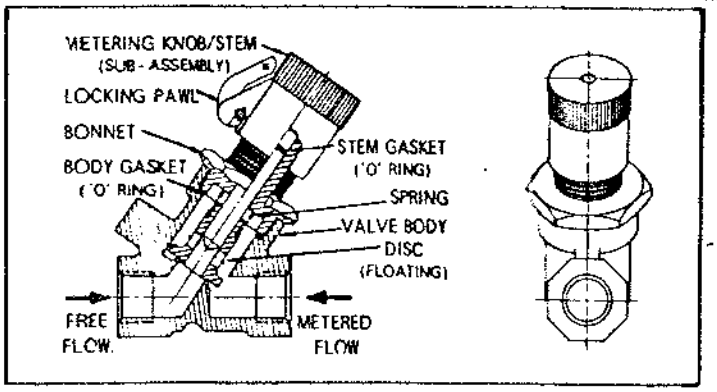


Figure 2.

INSTALLATION

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

POSITIONING

Valve may be mounted in any position.

PIPING (Refer to Figure 3)

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

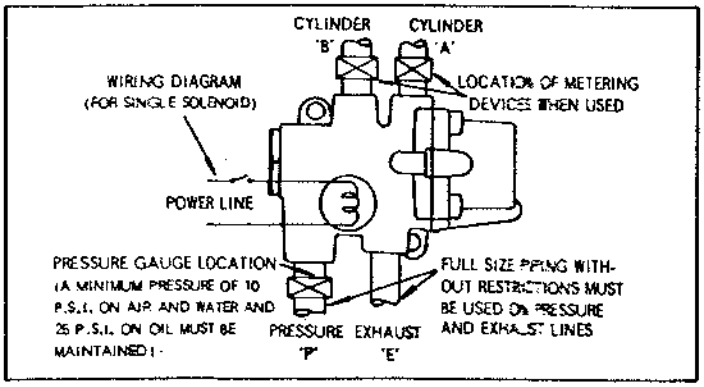


Figure 3.

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

To insure operation of the valve, the pressure and exhaust lines must be full area without restriction and a minimum differential pressure as stamped on the nameplate must be maintained between the pressure and exhaust at the moment of changeover. Hydraulic pumps or air reservoirs must have adequate capacity to maintain the minimum pressure during changeover. To check pressure during changeover, install a gage in the pressure connection, close to the valve as shown.

WIRING

Wiring must comply with Local and National Electrical Codes. For valves equipped with an explosion-proof, watertight enclosure (NEMA 4, 7 & 9) the electrical fittings must be approved for use in the approved hazardous locations. Housings for all solenoids are made with connections for 1/2 inch conduit. The general purpose enclosure (NEMA 1) may be rotated to facilitate wiring by removing the retaining cap. After rotating to desired position, be certain to replace retaining cap before operating.

NOTE: Alternating Current (A-C) and Direct Current (D-C) Solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid, not just the coil.

SOLENOID TEMPERATURE

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

MAINTENANCE

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

CLEANING

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

PREVENTIVE MAINTENANCE

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

IMPROPER OPERATION

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

A-C / D-C COIL REPLACEMENT (Refer to Figure 5)

Turn off electrical power and disconnect coil lead wires.

1. Remove retaining cap or clip, nameplate and solenoid housing/cover. CAUTION: When metal retaining clip disengages it will spring upward.
2. Lift off spring washer, upper insulating washer and coil. NOTE: Insulating washers are omitted when molded coil is used.
3. Reassemble parts in reverse order of disassembly.

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

D-C COIL REPLACEMENT — ALTERNATE CONSTRUCTION

(Refer to Figure 4)

Turn off electrical power and disconnect coil lead wires.

1. Remove retaining cap or clip, nameplate and solenoid cover. CAUTION: When metal retaining clip disengages it will spring upward.
2. Lift off fluxplate and coil.
3. Coil is now accessible for replacement. Reassemble in reverse order of disassembly.

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit.

VALVE DISASSEMBLY (Refer to Figure 5)

Depressurize valve and turn off electrical power. Disconnect coil lead wires.

1. Solenoid may be removed intact by loosening and removing solenoid base sub-assembly from body.
2. A-C / D-C Construction:
   Remove core/core spring/disc sub-assembly and body gasket ('O' ring) respectively.
   Alternate D-C Construction:
   Remove core spring, core assembly and body gasket respectively.
3. A 4-40 machine screw (provided in Spare Parts Kit) serves as a self-tapping screw to remove insert from body. Thread screw a few turns in hole located in the flat surface of insert. CAUTION: Do not damage center hole (pilot orifice) in raised surface of insert. Remove insert by using a pair of pliers on the head of the screw.
4. Remove three gaskets from insert. Tag each as they are removed so that they can be reassembled in the same location. NOTE: Middle and lower gaskets have the same physical dimensions, however, the lower gasket is made of a softer material.
5. Remove four (4) body screws and slip piston end body from piston.
6. Slide piston/shaft assembly out of body.
7. 1/4 - 3/8 - 1/2 N.P.T. Construction:
   Remove four (4) 'O' ring gaskets, two (2) from piston end body counter bores and two (2) from body insert - one (1) from each end.
   3/4 - 1 N.P.T. Construction:
   Remove five (5) 'O' ring gaskets, two (2) from piston end body, counter bores and three (3) from body insert (two from large end, one from small end).
8. To disassemble piston/shaft assembly, insert brass rod in cross hole of shaft. (NOTE: Rod must be brass or other soft material so as not to burr edges of hole.) Unscrew and remove shaft nut. Remove shaft washer, piston, shaft/piston gasket, body insert and lift out main disc.
9. Remove two (2) 'U' shaped lip seals from piston, one from each end.
10. 1/4 - 3/8 - 1/2 N.P.T. Construction:
    Unscrew end cap/seat from main body. Remove two (2) 'O'-ring gaskets from end cap/seat and lift out main disc.
    3/4 - 1 N.P.T. Construction:
    Remove four (4) end cap/seat screws and slide out end cap/seat from main body. Remove two (2) 'O'-ring gaskets from end cap/seat and lift out main disc.
11. All parts and passageways are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

VALVE REASSEMBLY (Refer to Figure 5)

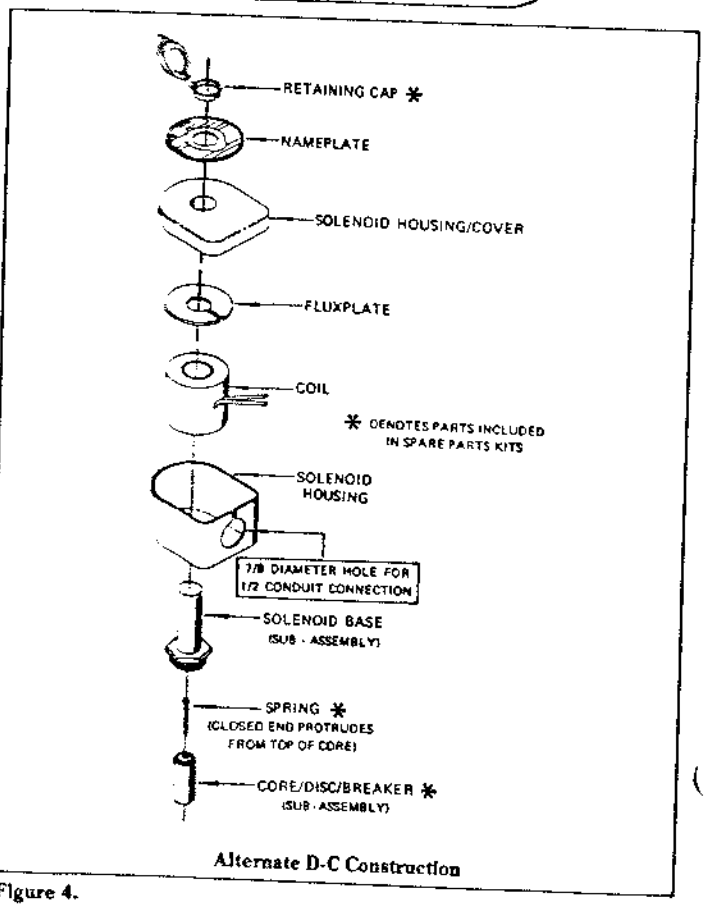
1. Clean all parts and passageways thoroughly.
2. Reassemble parts in reverse order of disassembly. Parts should be installed in the same cavity that they were removed from.
3. Lubricate all rubber parts with Dow Corning's Valve Seal or equivalent silicone grease.

NOTE: Main discs must be assembled with 'U' cup lip seals facing out (flat brass surface facing in). 'U' cup shaped lip seals on piston must face out at each end.

SPARE PARTS KITS

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

ORDERING INFORMATION FOR SPARE PARTS KITS
When Ordering Spare Parts Kits or Coils Specify Valve Catalog Number, Serial Number and Voltage.

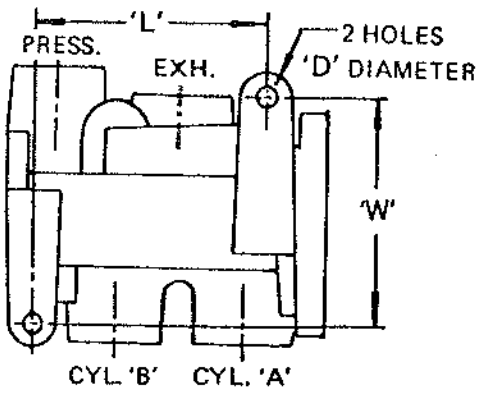


Alternate D-C Construction

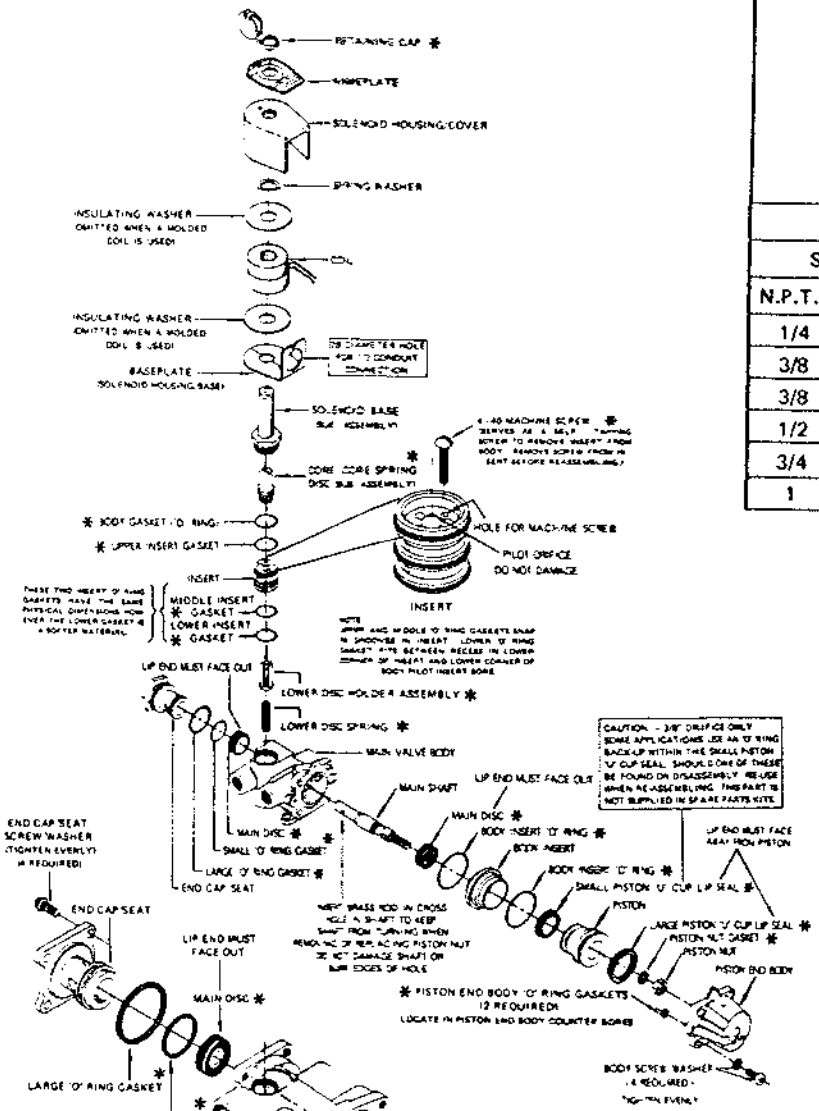
Figure 4.

ASCO Valves
Automatic Switch Co. FLORHAM PARK, NEW JERSEY 07932 Form No. V-E770 PRINTED IN U.S.A. 1974

MOUNTING DIMENSIONS



MOUNTING DIMENSIONS							
Size		Length 'L'		Width 'W'		Holes 'D' Dia.	
N.P.T.	Orifice	Inches	MM	Inches	MM	Inches	MM
1/4	1/4	1 7/8	47.6	2 13/32	61.1	9/32	7.1
3/8	1/4	1 7/8	47.6	2 13/32	61.1	9/32	7.1
3/8	3/8	2 5/8	66.7	3 1/8	79.4	11/32	8.7
1/2	3/8	2 5/8	66.7	3 1/8	79.4	11/32	8.7
3/4	3/4	3 7/8	98.6	3 13/16	96.8	11/32	8.7
1	3/4	3 7/8	98.6	3 13/16	96.8	11/32	8.7



1/4 - 3/8 - 1/2 N.P.T. CONSTRUCTION

3/4 - 1 N.P.T. CONSTRUCTION

BULLETIN NO. 8344
Single Solenoid A-C / D-C Construction
1/4 - 3/8 - 1/2 - 3/4 - 1 N.P.T.

Figure 5.

MANUAL OPERATOR

To actuate valve manually, turn manual operator clockwise to stop. Valve will now be in same position as when solenoid is energized.

For valve to operate electrically, manual operator must be turned counter-clockwise to stop.

MANUAL OPERATOR DISASSEMBLY

(Refer to Figures 6, 7 and 8)

Depressurize valve and turn off electrical power. Disconnect coil lead wires.

1. Remove the solenoid intact by loosening and removing the solenoid base sub-assembly from the manual operator body.
2. Remove core spring on Alternate D-C Construction and solenoid base to manual operator body gasket ('O' ring) from manual operator body.
3. Unscrew manual operator body from main valve body.
4. Slip retainer from lower manual operator body threads. Then slide manual operator stem/lever assembly from manual operator body.
5. Remove core sub-assembly from manual operator body.
6. Remove 'O' ring from manual operator stem/lever sub-assembly.
7. All parts are now accessible for cleaning and/or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

MANUAL OPERATOR REASSEMBLY (Refer to Figures 6, 7 and 8)

1. Reassemble manual operator in reverse order of disassembly. Note that the body gasket must be installed in the pilot body cavity before installing the manual operator body sub-assembly.
2. Preassemble the following manual operator body parts in the following order to make up the manual operator body sub-assembly. Slip core sub-assembly thru the manual operator body. (NOTE: On cores with double recesses, line up manual operator stem with the lower groove.) There is a captive spacing washer on the manual operator stem lever sub-assembly. Locate this stem/lever spacer on the inside or outside of the retaining fork as follows:
   A. All cores with an outside diameter up to 13/32" (.406 dia.), the spacer must be located inside the retainer fork.
   B. All cores with an outside diameter greater than 13/32" (.406 dia.), the spacer must be located outside the retainer fork.
3. Having installed the stem gasket on the stem and correctly determined the proper location of the spacer, slip the stem assembly into the manual operator body and slide the retainer up over the lower threads engaging the stem/lever sub-assembly.
4. Screw manual operator body sub-assembly into main body.
5. Turn manual operator lever to the 9 o'clock position, i.e., this is the same position that the operator would be in if the valve were to be operated electrically.
6. Install the solenoid base to manual operator body gasket. Install core spring on Alternate D-C Construction.
7. Reinstall solenoid base sub-assembly complete with solenoid.

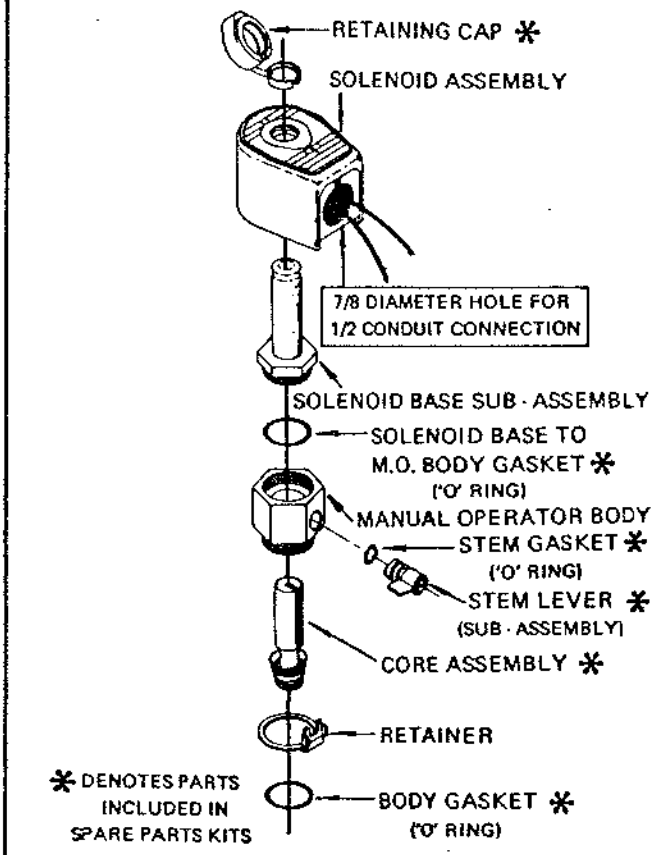


Figure 6. Manual Operator — A-C / D-C Construction

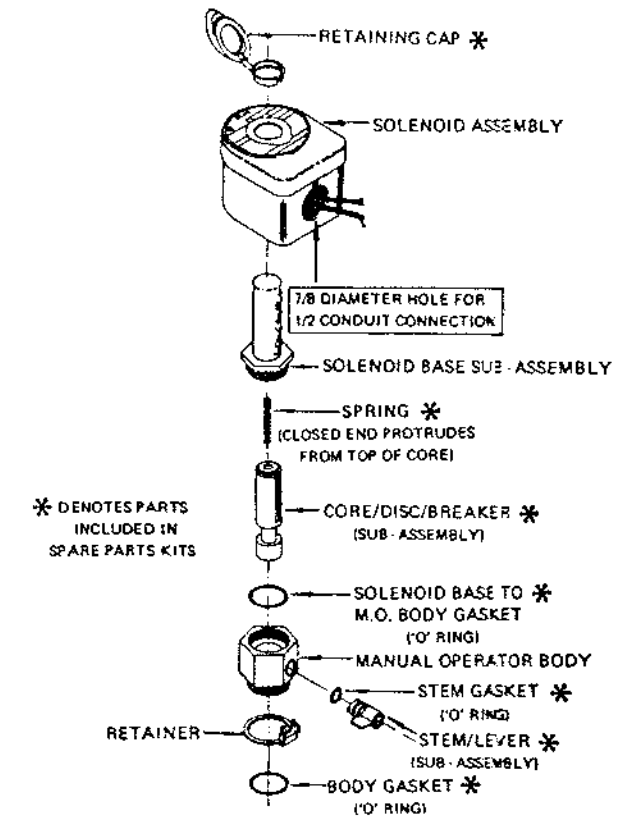
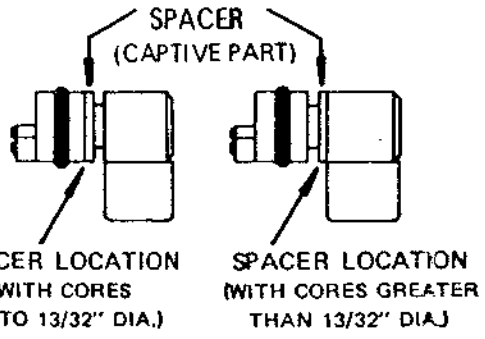


Figure 7. Manual Operator — Alternate D-C Construction



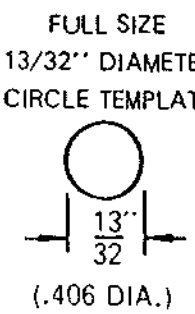
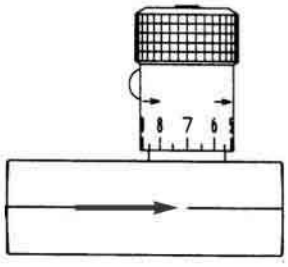


Figure 8.

DESCRIPTION

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

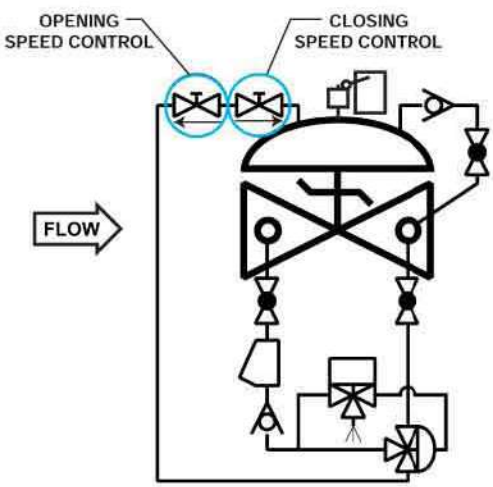


MODEL 141-3 MATRIX

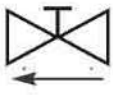
MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	682100	1/4	2 3/8	1 ¼"-2"
Brass	682101	3/8	2 3/4	2 ½"-6"
Brass	682102	1/2	3 1/4	8"-10"
Brass	682103	3/4	3 7/8	12"-16"
Stn. Steel	682700	1/4	2 3/8	1 ¼"-2" Stn.
Stn. Steel	682701	3/8	2 3/4	2 ½"-6"
Stn. Steel	682702	1/2	3 1/4	8"-10"
Stn.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

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

SCHEMATIC SYMBOL



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



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

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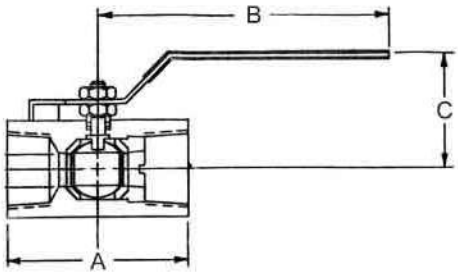
DESCRIPTION

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

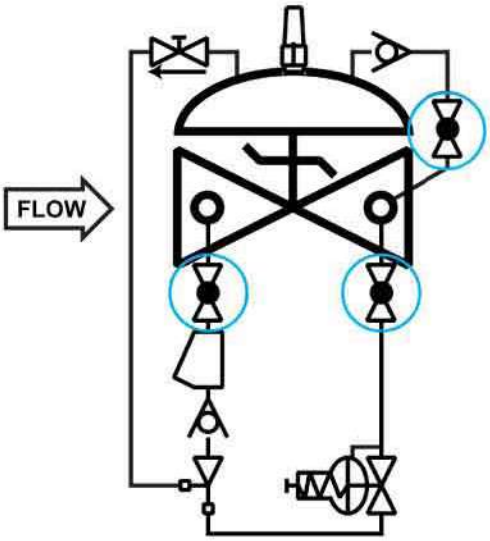
Ball valves are standard on water service valves; optional on fuel service valves.



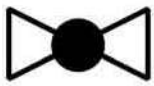
MODEL 141-4 MATRIX

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

SCHEMATIC SYMBOL



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



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

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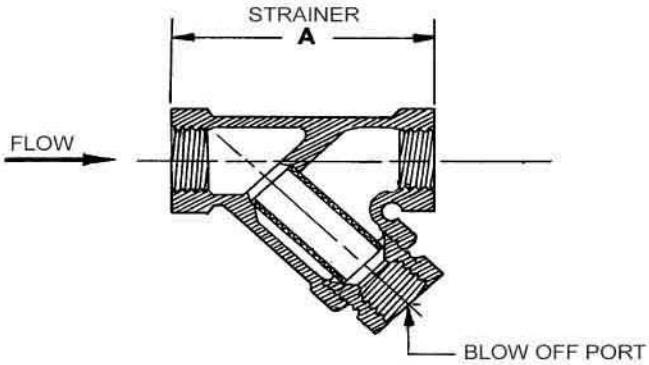
Ball Valve 141-4

DESCRIPTION

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

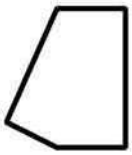
MODEL 159 Y-STRAINER MATRIX

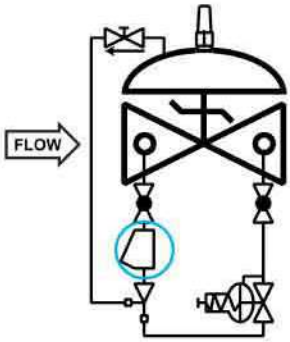
MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	BLOW OFF PORT (NP)	A	STD. MESH	USED ON VALVE SIZE
Bronze	660100	3/8	3/8	2 11/16	24	1 ¼"-6"
Bronze	660101	1/2	3/8	2 5/8	24	8"-10"
Bronze	660102	3/4	3/8	3 5/16	24	12"-16"
Stn. Steel	660700	3/8	1/4	2 1/2	20	1 ¼"-6"
Stn. Steel	660701	1/2	1/4	2 1/2	20	8"-10"
Stn. Steel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



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

MATERIALS

Bronze, ASTM B62
Optional mesh sizes: 50,100

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

Screens are stainless steel

MAINTENANCE

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

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DESCRIPTION

The Model 141-1 Check Valve uses a spring-loaded poppet that will allow flow in one direction only. It is the primary component used on valves with a reverse flow check function. Flow is in the direction of the arrow on the check valve body.

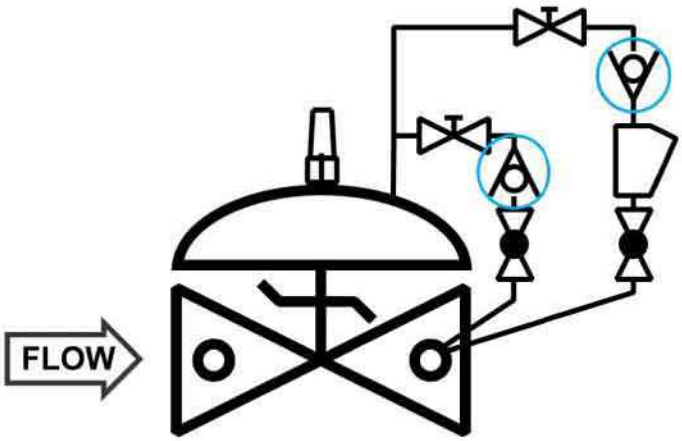
◀Check Valves shown
Stainless Steel & Brass

MODEL 141-1 MATRIX

MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	LENGTH	USED ON VALVE SIZE
Bronze	681100	3/8	2	1 ¼"-6"
Bronze	681101	1/2	2 1/8	8"-10"
Bronze	681102	3/4	2 1/4	12"-16"
Stn. Steel	681700	3/8	2 5/16	1 ¼"-6"
Stn. Steel	681701	1/2	2 5/16	8"-10"
Stn. Steel	681702	3/4	2 7/8	12"-16"

SCHEMATIC SYMBOL

The Model 141-1 Check Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 94-3 Check Valve.

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Check Valve 141-1

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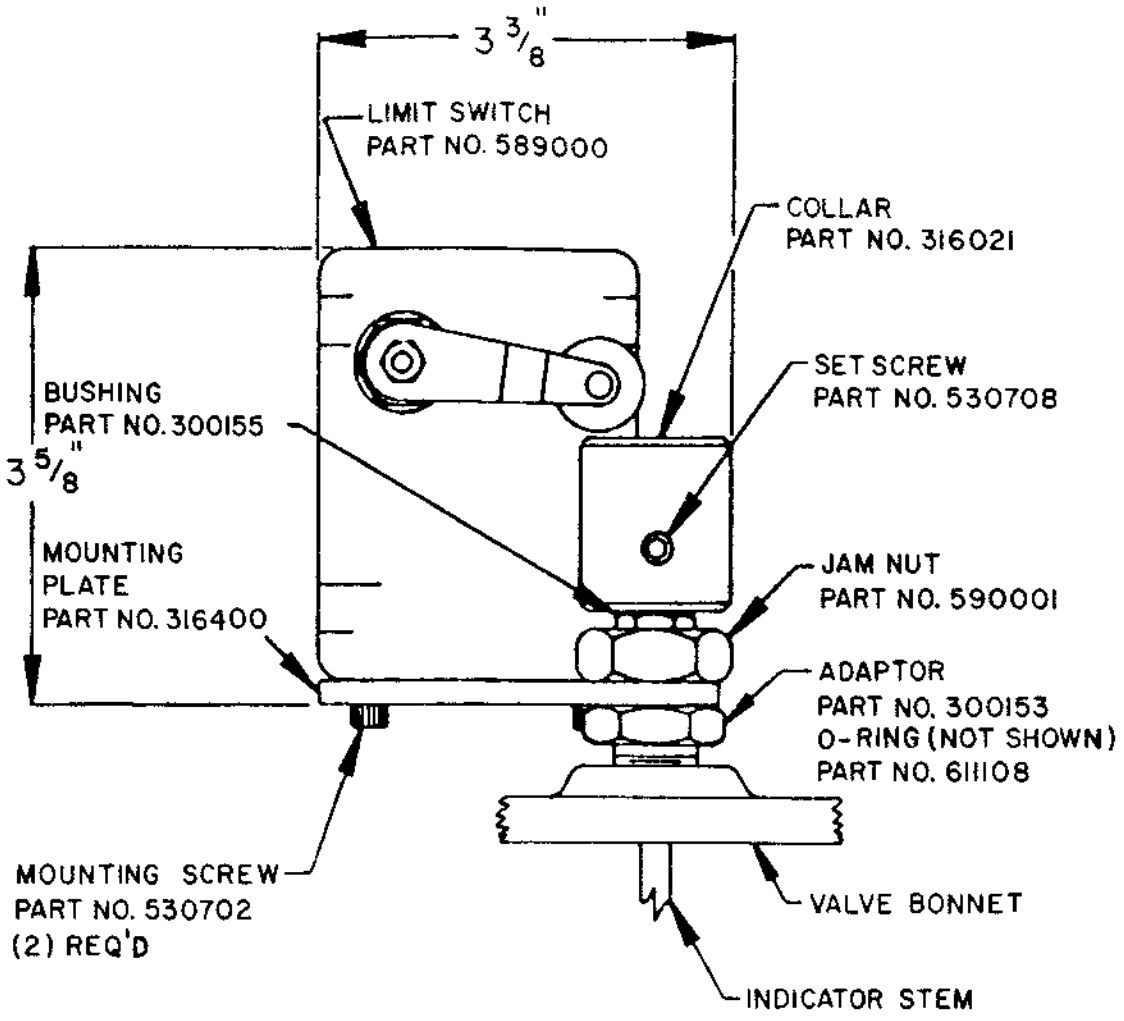

MODEL 150
LIMIT SWITCH ASSEMBLY