

Specifications

Sizes: 2", 3", 4" and 6"

Connections: Female NPT (2" only), Flanged

Body Type: Globe

Temperature Range: -50° F to 300° F

Trim Characteristic: Modified % (Throttling)

Stem Travel: 2" CV30- 1.00in, 3" CV30-1.42in,
4" CV30-1.76in, 6" CV30-2.5

Pressure Rating: 3900 psi (-50° F to 200° F), 3755
psi at 400° F

Shutoff: ANSI Class IV Metal Seat,
Class VI Soft Seat.

Actuator Sizes: No. 70 (70 in² area),
No. 120 (120 in² area)

Input Signal Ranges: 3-15 psi, 6-30 psi

Application

The CV30 is a reliable, full port control valve in a compact package featuring balanced plug control trim for excellent throttling or on/off control of fluids. The adjustable top works are designed to save space while leaving enough room to mount a controller. The soft seat design achieves repeatable bubble tight shut-off while remaining out of the flow path. The CV30 is ideally suited for a wide range of applications such as pressure control, level control, or flow control.

The CV30 can be equipped with an unbalanced metal to metal seat option for operation in sandy service, as well.



Figure 1.

CV30 Reverse



Figure 2.

Model CV30 Installation

Installation

When installing the CV30, make sure to follow best piping practices. The CV30 is designed to be installed with flow under the seat. Be sure to have the valve oriented accordingly. Thread in a 1/4" NPT fitting into the spring/diaphragm actuator (Upper housing for direct, lower housing for reverse). Connect an instrument that provides a pneumatic signal to the CV30. If installing a CV30 with an electric actuator, wire the actuator according to valve operation needs.

Actuator Action

When connecting a pneumatic signal it is important to understand the differences between a reverse and direct acting actuator. If it's reverse acting (fail close) the signal needs to be connected to the port in the lower housing. For a direct acting (fail open) the signal needs to be connected to the port in the upper housing. See figure 4.

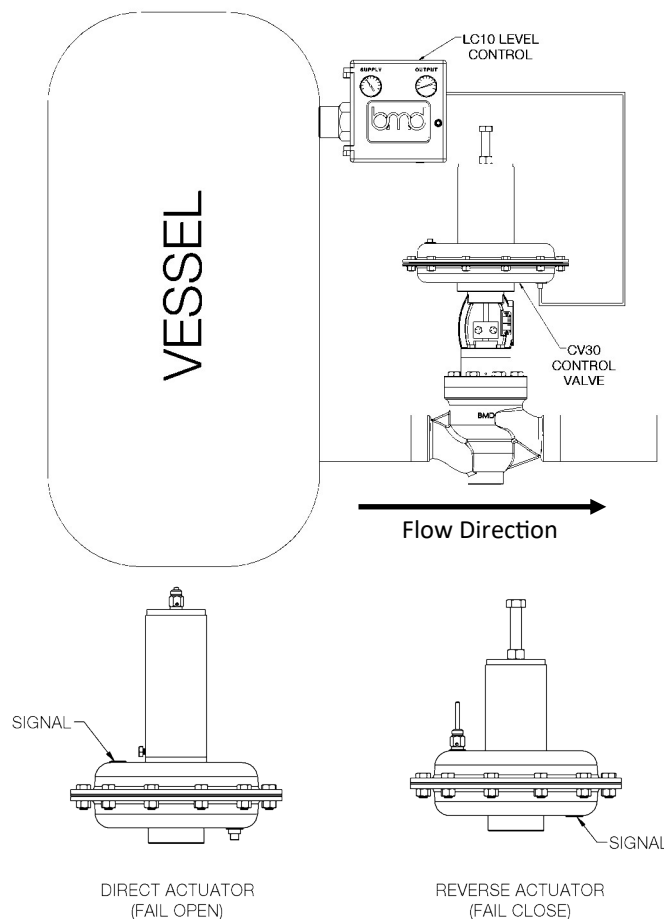


Figure 4.

Model CV30 Operation

Operation

The CV30 operates by receiving a pneumatic signal that, depending on the action of the actuator, will open or close the valve. For Reverse acting as shown in figure 4 the pneumatic signal enters in the lower housing. The pressure builds and overcomes the spring force allowing the plug to lift off the seat. For Direct acting as shown in figure 4 the pneumatic signal enters into the upper housing. The pressure builds and overcomes the spring force causing the plug to lower onto the seat.

Valve Adjustment

To adjust a valve with a reverse acting actuator loosen the adjusting screw nut and turn the adjusting screw CW to increase the seat load and CCW to decrease the seat load. Once the valve seals off, the balanced seat design allows for it to continue to seal off at higher pressures without turning the adjustment screw, instead, the turning the adjustment screw CW will move the span range. For a #70 actuator size use a 5/16" wrench. For the #120 actuator size use a 1-1/8" wrench. For a direct acting actuator the seat load will be increased by increasing the signal pressure to the valve actuator.

Model CV30 Maintenance

Maintenance:

Trim Replacement

Before changing the trim, make sure the CV30 is closed off from service and depressurized completely. Loosen the Nut on the Adjusting Screw. Back off Adjusting Screw to relieve spring pressure on the valve. Remove the Stem Block and the Yoke Bolts. Remove the Actuator/Yoke assembly. Remove the Packing Plug from the Bonnet. Remove the Bonnet Bolts and Remove the Bonnet as well as the top Cage O-ring on the Trim Assembly. Use the cage removal tool, see Table 1, to remove the Trim Assembly from the body. Use an O-ring pick to remove the Body O-ring. Grease the new Body O-ring before fitting into the O-ring groove in the valve body. Grease the new Cage O-rings from the trim repair kit and install them on the new Trim Assembly. Install the new trim assembly into the valve body. Bolt the Bonnet to the Valve Body. Replace the O-ring on the Packing Plug and install into the Bonnet. Install the Actuator/Yoke onto the Bonnet and Bolt back into place.

Trim Repair

Optionally, individual parts could be changed without using the Trim Replacement Kit. Before replacing any trim parts, follow the previous procedure until the Trim Assembly has been removed from the Body, see Figure 6 for a Trim Breakdown, Figure 7 for the Metal Seat Option. Use the Seat Removal Tool, See Table 1, and remove the seat from the cage and inspect for damages. Remove the Plug/Stem Assembly from the Cage and inspect the Plug Ring for damage. For the Metal Seat option, the Plug and Seat Ring must be replaced as a pair as the two parts are lapped against one another.

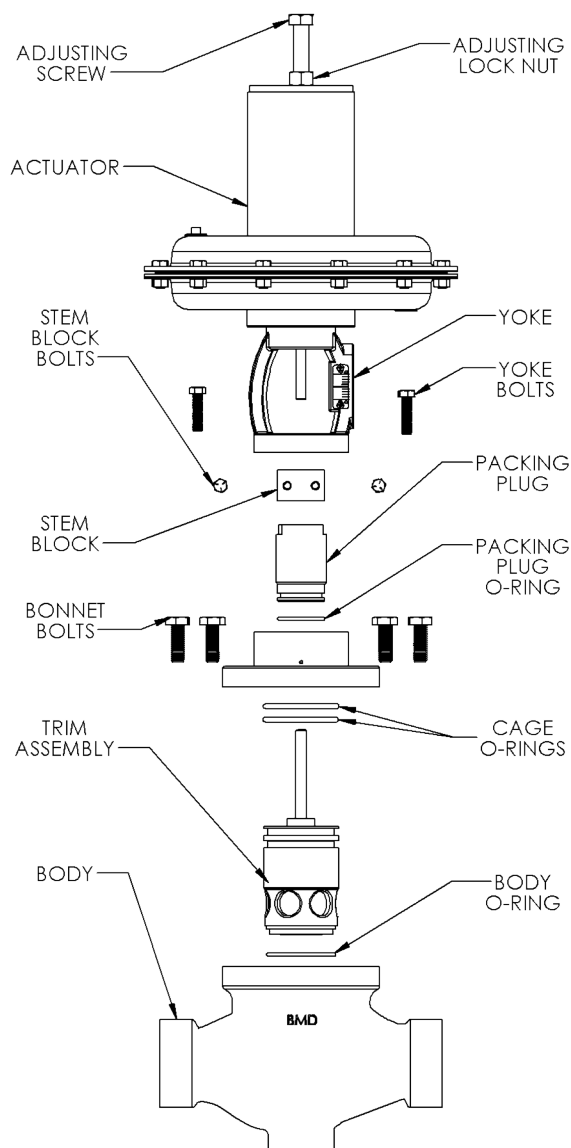


Figure 5.

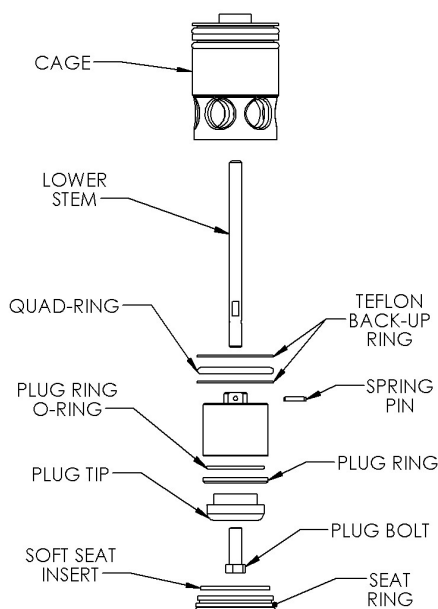


Figure 6.

Soft Seat Trim Assembly

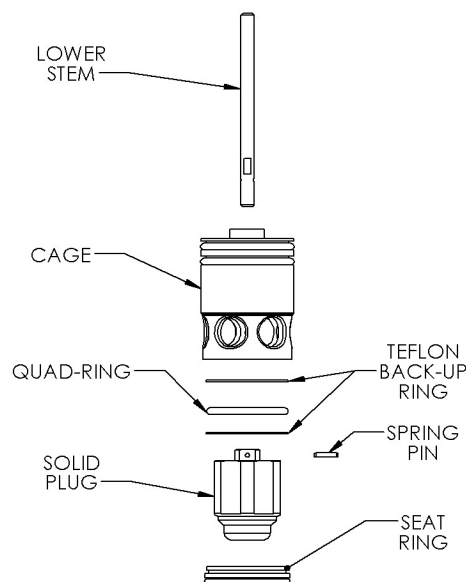


Figure 7.

Metal Seat Trim Assembly

Packing Replacement

Before replacing the packing, refer to the Trim Replacement section and follow the instructions until the Packing Plug is removed. See Figure 8 for a parts breakdown. Pull out the Packing Spring. The Packing can either be pushed out from the top of the Packing Plug or pulled out with a pick tool. Be careful not to scratch the bore of the Packing Plug as this can cause the valve to leak. Inspect the Stem for any damage as well. Use retaining ring pliers to remove the Retaining Ring at the top of the Packing Plug. Use a pick tool to remove the Felt Ring and the Felt Retaining Washer. Insert the new Felt Ring and place the new Felt Retaining Washer over it. Use the retainer ring pliers to install the new Retaining Ring. Install the new Stem Packing, Stem Packing Retainer, and Spring.

NOTE: BMD recommends greasing the packing set well with a PTFE based grease to enhance service life.

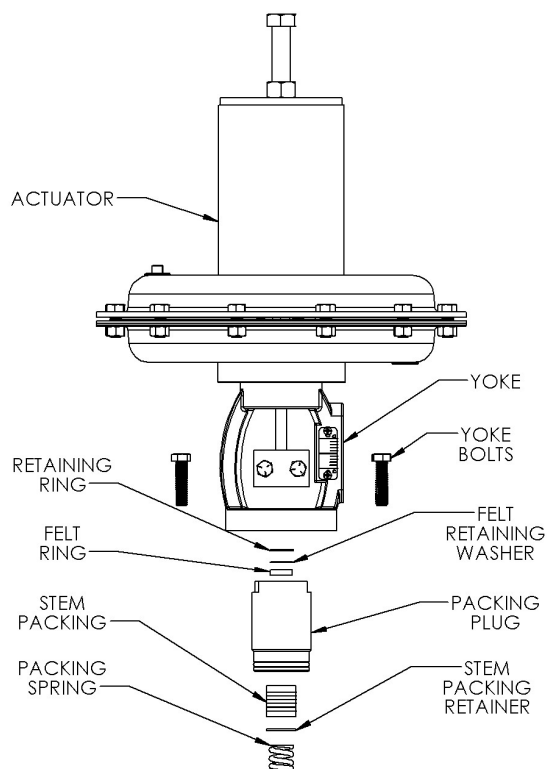


Figure 8.

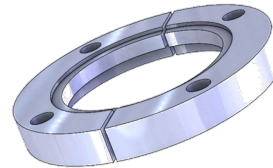
Diaphragm Replacement

In order to replace the diaphragm the topworks must first be removed from the valve. This can be done by removing the Stem Block to disconnect the Upper and Lower Stems and removing the Yoke Bolts. For a reverse acting actuator loosen and remove the Adjusting Screw. For a direct acting actuator remove the Spring Cover, and loosen the Hex Nut that is on top of the Upper Spring Retainer. Unscrew and remove all the bolts holding the Upper and Lower Housings together. While holding the Hex Nut below the diaphragm, remove the Jam Nut and Hex Nut above the Diaphragm. (On a Direct Acting Actuator, the Top Stem will be removed instead of the Upper Jam Nut and Hex Nut.) Remove the Lock Washer, Diaphragm O-ring, Diaphragm Plate, and Diaphragm. Install a new Diaphragm and Diaphragm O-ring and reassemble the Housing.

Table 1.

TOOLS		
SIZE	CAGE PULLER	SEAT TOOL
2 INCH	T174	T089
3 INCH	T175	
4 INCH	T176	
6 INCH	T177	

Cage Tool



Seat Tool

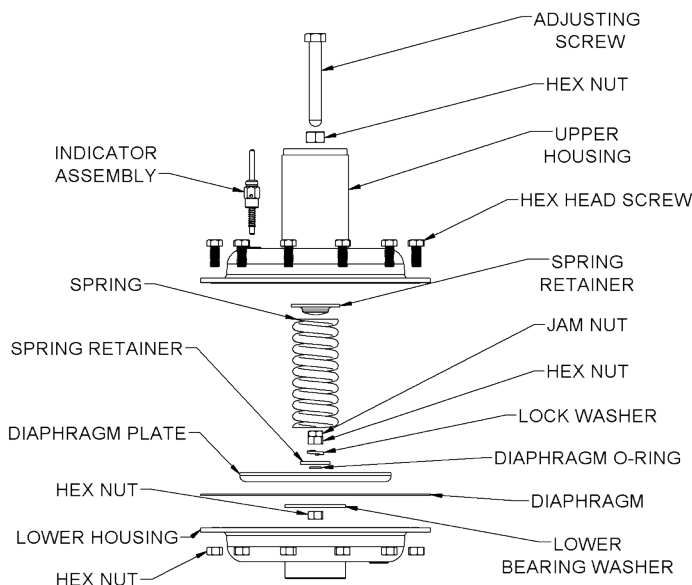


Figure 8.

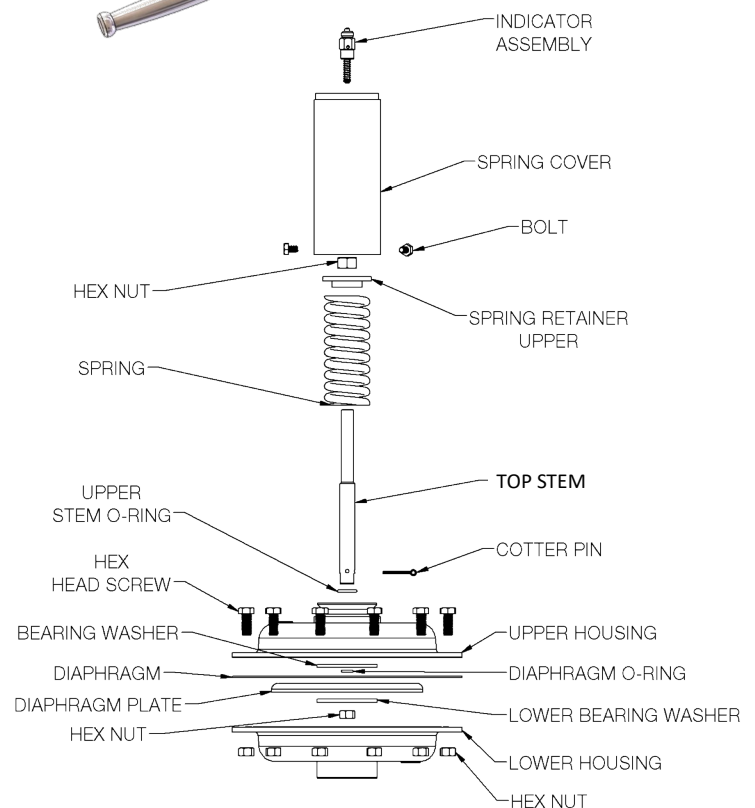


Figure 7.

Model CV30 Maintenance Cont.

Repair Kit Part Numbers

TRIM REPAIR KIT							
SIZE	SEAT/PLUG RING/ INSERT	FULL PORT			REDUCED PORT		
		BUNA	VITON	HNBR	BUNA	VITON	HNBR
2 INCH	D2/D2/POLY	58-00-0207	58-00-0208	-	58-00-0243	58-00-0244	-
	D2/CARBIDE/POLY	58-00-0245	58-00-0246	-	58-00-0247	58-00-0248	-
	D2/D2/HNBR	-	-	58-00-0249	-	-	58-00-0250
	D2/CARBIDE/HNBR	-	-	58-00-0251	-	-	58-00-0252
	316/316/HNBR	-	-	58-00-0253	-	-	58-00-0254
	316/CARBIDE/HNBR	-	-	58-00-0255	-	-	58-00-0256
	316 METAL TO METAL	58-00-0471	58-00-0473	58-00-0475	58-00-0472	58-00-0474	58-00-0475
3 INCH	D2/D2/POLY	58-00-0268	58-00-0269	-	58-00-0270	58-00-0271	-
	D2/CARBIDE/POLY	58-00-0272	58-00-0273	-	58-00-0274	58-00-0275	-
	D2/D2/HNBR	-	-	58-00-0276	-	-	58-00-0277
	D2/CARBIDE/HNBR	-	-	58-00-0278	-	-	58-00-0279
	316/316/HNBR	-	-	58-00-0280	-	-	58-00-0281
	316/CARBIDE/HNBR	-	-	58-00-0282	-	-	58-00-0283
	316 METAL TO METAL	58-00-0467	58-00-0457	58-00-0459	58-00-0468	58-00-0458	58-00-0460
4 INCH	D2/D2/POLY	58-00-0288	58-00-0289	-	58-00-0290	58-00-0291	-
	D2/CARBIDE/POLY	58-00-0292	58-00-0293	-	58-00-0294	58-00-0295	-
	D2/D2/HNBR	-	-	58-00-0296	-	-	58-00-0297
	D2/CARBIDE/HNBR	-	-	58-00-0298	-	-	58-00-0299
	316/316/HNBR	-	-	58-00-0300	-	-	58-00-0301
	316/CARBIDE/HNBR	-	-	58-00-0302	-	-	58-00-0303
	316 METAL TO METAL	58-00-0461	58-00-0463	58-00-0469	58-00-0462	58-00-0464	58-00-0470
6 INCH	D2/D2/POLY	58-00-0336	58-00-0337	-	58-00-0338	58-00-0339	-
	D2/CARBIDE/POLY	58-00-0340	58-00-0341	-	58-00-0342	58-00-0343	-
	D2/D2/HNBR	-	-	58-00-0344	-	-	58-00-0345
	D2/CARBIDE/HNBR	-	-	58-00-0346	-	-	58-00-0347
	316/316/HNBR	-	-	58-00-0348	-	-	58-00-0349
	316/CARBIDE/HNBR	-	-	58-00-0350	-	-	58-00-0351
	316 METAL TO METAL	58-00-0477	58-00-0479	58-00-0481	58-00-0478	58-00-0480	58-00-0482

Includes Trim Assembly* (Figure 6.), Cage O-rings, Body O-ring, Packing Plug O-ring.

*Metal to Metal Trim Assembly (Figure 7.)

ACTUATOR REPAIR KIT		
ACTUATOR	BUNA	VITON
#70	58-00-0205	58-00-0206
#120	58-00-0286	58-00-0287

Includes Diaphragm and O-rings for: Actuator O-ring, Stem O-ring, Diaphragm O-ring, Upper Stem O-ring and Cotter Pin

PACKING KIT		
SIZE	STD	NACE
2 INCH	58-00-0200	58-00-0242
3, 4, 6 INCH	58-00-0284	58-00-0285

Includes Packing, Packing Spring, Packing Retainer, Felt Washer and Retainers

Model CV30 Maintenance Cont.

Table 1. Trouble Diagnosis

Symptom	Probable Cause(s)	Corrective Action(s)
In the closed position, process fluid leaks from inlet to outlet port	Insufficient spring tension for reverse-acting (fail close) actuator	Increase spring tension and watch for the leak to stop
	Excessive spring tension on direct-acting (fail open) actuator	Reduce spring tension and watch for leak to stop
	Insufficient supply pressure to a direct acting actuator (fail open)	Increase signal pressure
	Direct-acting (fail open) actuator thrust output diminished due to either a failed o-ring around the upper stem or a punctured actuator diaphragm	Apply supply pressure to actuator then remove the spring cover. Check for leakage around the o-ring where the upper stem enters the upper diaphragm house and the diaphragm from the opening of the vent plug installed in the lower diaphragm housing. Apply soapy water to inspect for leaks if necessary. Disassemble actuator, inspect and replace seal component as necessary.
	Trim is worn or damaged or failed seat/cage-to-body o-ring	Inspect the valve trim and o-ring seal components. Restore trim and/or replace components as necessary.
In Reverse-acting (fail close) actuators only: Supply pressure leaks from around the actuator stem at the top of the yoke window opening or from the bonnet weep hole	The actuator stem-to-yoke o-ring failed or the Housing to Yoke O-ring failed.	Disassemble the actuator and inspect the o-ring, yoke and actuator stem sealing surfaces. Replace any worn components.
Direct-acting (fail-open) actuator only: Supply pressure leaks from around the base of the spring cover on top of the upper diaphragm housing	The actuator stem-to-upper diaphragm housing o-ring failed	Disassemble the actuator and inspect the o-ring, back-up ring and sealing surfaces of the stem and housing bore. Replace the worn components as necessary

Model CV30 Maintenance Cont.

Table 1. Trouble Diagnosis Cont.

Symptom	Probable Cause(s)	Corrective Action(s)
Supply pressure is leaking from the diaphragm housing vent plug when the valve is not moving	The actuator diaphragm is punctured	Disassemble the actuator and replace the diaphragm and diaphragm-to-diaphragm plate o-ring
The valve will not open completely OR the valve will not close completely	The actuator spring has excessive tension or the supply pressure is too weak to override the spring (or both)	Decrease spring tension until the flow is achieved; increase the actuator supply pressure if required
The valve will not close. It is stuck fully open.	In a reverse-acting (fail close) actuator, the supply pressure cannot be vented due to a non-relieving pressure source device	Replace the supply pressure source device with one that is able to relieve pressure, or install a 3-way vent valve at the actuator supply connection
	The supply pressure line is connected to the wrong side of the actuator. If it's a direct-acting (fail open) actuator, the spring may be fully compressed and unable to create valve plug movement	Make sure that the actuator supply pressure source line is connected to the upper diaphragm housing. Decrease the spring tension to the minimum necessary to achieve full opening at the operating conditions
The valve is fully closed and will not open	The supply pressure line is connected to the wrong side of the actuator or the reverse-acting (fail close) actuator spring is completely compressed resulting in the inability to lift the valve plug	Make sure the actuator's supply pressure source line is connected to the lower diaphragm housing. Then decrease the spring tension until valve is open far enough to allow full travel

Model CV30 Maintenance Cont.

Table 1. Trouble Diagnosis Cont.

Symptom	Probable Cause(s)	Corrective Action(s)
The valve is fully closed and will not open. (Continued)	The direct-acting (fail open) actuator cannot vent supply pressure due to a non-relieving pressure source device	Replace the supply pressure source device with one that relieves pressure or install a 3-way vent valve at the actuator supply connection
	In a reverse-acting (fail close) actuator, the supply pressure may be the problem and in a direct-acting (fail open) actuator, the spring tension may be insufficient to open the valve plug	If you have a reverse-acting (fail close) actuator, increase the supply pressure. If you have a direct-acting (fail open) actuator, increase the spring tension. For both, an increase in supply pressure may be required to re-close the valve
	The static differential pressure combined with the trim size and the direction of the inlet "flow-over" may exceed the available thrust of the actuator opening	Record the valve's serial number, model number, current trim size and services conditions. Contact your BMD representative to verify actuator sizing and shut-off capability
The valve movement is sluggish or unusually slow.	There may be actuator seal leakage	Perform the correlating corrective action suggested
	The opening of the diaphragm housing vent plug is partially blocked	Remove the vent plug and unclog the opening
	If the valve has just been installed, the actuator supply pressure volume may be too low. If the valve has been in use for a while, the volume has diminished over time due to clogged openings and/or filters in control	Increase the supply pressure line size and/or install a volume booster. Clean the openings and clean/ replace the filters of the control devices according to the manufacturer's recommendations

Model CV30 Maintenance Cont.

Table 1. Trouble Diagnosis Cont.

Symptom	Probable Cause(s)	Corrective Action(s)
The Valve leaks between the Stem and the Packing Plug.	The Packing is work or damaged.	Replace the Packing.
The Valve leaks between bonnet and the Packing Plug.	The Packing Plug O-ring has failed.	Replace the O-ring.
Valve leaks between the Body and the Bonnet.	The Cage O-ring has failed.	Replace the O-ring.