



# KEYSTONE SERIES V30 / V32 MARINE HP BUTTERFLY VALVES

## INSTALLATION AND OPERATION MANUAL

Before installation these instructions must be fully read and understood



## 1 GENERAL

Suggested installation orientation is with valve shaft horizontal or inclined from vertical. Unless otherwise recommended by Emerson, mount the valve in the preferred direction with the directional arrow pointing to the lower pressure side so that the front face of the disc will be upstream when the valve is in the closed position. Thermal insulation of the body is mandatory for operating temperatures above 200 °C (392 °F). The Keystone marine high performance butterfly valve offers the following body styles: Series V30 for wafer style and Series V32 for lug style.

## 2 INSPECTION

### 2.1

Carefully remove the valve from the shipping package (box or pallet) to avoid any damage to the valve and, in the case of automated valves, to the electric or pneumatic/hydraulic actuator or instrumentation.

### 2.2

Prior to installation, clean the inside of the valve. Insure that there are no solid objects such as pieces of wood, plastic or packing materials within the valve or on the valve seat.

### 2.3

Inspect the seat and disc edge to insure that

they were not damaged in handling. This is especially important in the case of valves with 'fail- open' actuators.

### 2.4

Confirm that the materials of construction listed on the valve body are appropriate for the service intended and are as specified.

### 2.5

Locate the directional arrow on the valve name plate that defines the preferred mounting orientation in respect to the pressure. In most cases, the valve is properly installed when the actual fluid flow or high pressure is acting on the front face of the disc when the valve is closed.

### 2.6

Ensure that the packing seal cover screws are tight.

### CAUTION

*The valve should be installed in the closed position to insure that the seat and disc are not damaged during installation. Particular care should be taken with valves equipped with 'fail open' actuators. Failure to insure proper handling may result in damage to the valve. If the pipe is lined, confirm that the disc rotation does not contact the lining during the opening stroke. Failure to confirm that the disc rotation does not contact the lining may result in damage to the valve.*

### IMPORTANT

*Whenever possible, install the valve with the shaft in the horizontal position and, if possible, with the cast-in disc stop located top-side of the pipe. If the shaft cannot be positioned horizontally, position the shaft so that it is not on the vertical centerline in a horizontal pipe run. This will minimize any depositing of solid particles present in the fluid into the lower bearing.*

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### 3 INSTALLATION

The valves are shipped with flange gasket surface protection. Before installing the valve, remove the protection and carefully clean and de-grease both surfaces with a solvent.

#### 3.1 SERIES V32 - LUG STYLE

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- 3.1.1 Orient the valve with the directional flow arrow (preferred direction) pointing in the proper direction.
- 3.1.2 Insert the valve between the flanges until the two bottom holes in the valve align with the two lower flange holes.
- 3.1.3 Insert a bolt or stud through the flange and thread it into the holes in the valve body. This will allow the valve to center itself properly for the installation of the flange gaskets.
- 3.1.4 Install the flange gaskets and the remaining flange bolting.
- 3.1.5 Use the crossover method to tighten all flange bolts.

#### 3.2 SERIES V30 - WAFER STYLE

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- 3.2.1 Orient the valve with the directional flow arrow (preferred direction) pointing in the proper direction.
- 3.2.2 Insert the valve between the flanges until the alignment holes at either side of the valve match the corresponding holes in the flanges.
- 3.2.3 Insert a long bolt or stud through the flange and thread it through the alignment hole. This will allow the valve to center itself properly for the installation of the flange gaskets.
- 3.2.4 Install the flange gaskets and the remaining flange bolting.
- 3.2.5 Remove the long bolts/studs from the lower alignment holes and replace with correctly-sized bolts.
- 3.2.6 Using the crossover method, tighten all flange bolts.

### 4 VALVE CHECKOUT

#### 4.1

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Tighten the packing seal screws just enough to prevent shaft leakage.

#### 4.2

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Check the operation of the valve by stroking it to 'full open' and 'full close'. To determine the valve orientation of the disc, keyways are aligned with the disc. The valve disc travels clockwise to close.

#### 4.3

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For automated valves, set the air pressure/ electrical voltage for at least the minimum given to operate the actuator. For pneumatic actuators, do not apply more than 1.25 times the pressure for which the actuator was designed.

#### NOTE

For spring return actuators with positioners, overpressure will cause excessive time delay in the spring movement for the valve disc to travel out of the seat.

### 5 OPERATION

The Series V30/V32 has been designed to require a minimum of maintenance. Generally, only maintenance on the packing seal box is required.

### 6 MAINTENANCE

If shaft leakage is observed through the packing box, replace the packing seal O-rings.

### 7 DISASSEMBLY

To begin disassembly, refer to the part lists and proceed as follows:

#### WARNING

*Depressurize the valve and associated piping before disassembly. Failure to do so may cause serious personal injury and/or equipment damage.*

1. Remove the valve from the line. Clean the valve according to proper cleaning procedures as outlined by the plant or according to a prescribed procedure.
2. Remove the actuator and relevant connecting key. Note the actuator position relative to the valve.

#### CAUTION

*Throughout disassembly and assembly, always use cardboard or brass shims to protect the valve body, disc, flange and sealing surfaces from damage. Failure to do so may result in serious damage to the valve.*

#### 7.1 REMOVING THE DISC-TO-SHAFT TAPERED PIN CONNECTIONS

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- 7.1.1 Open the valve disc to its full open position.

#### NOTE

On valve sizes DN 250 (NPS 10) and larger, it is recommended that two workers perform the disc tapered pin removal process.

- 7.1.2 Place the disc in a vise
- 7.1.3 Using a tool steel punch, locate the punch on the small end of the disc taper pin and then strike the punch with a heavy hammer.

#### NOTE

Some of the weld on the taper pins may need to be removed by grinding.

#### WARNING

*When placing the valve into the bench vise, make sure the small end of the disc taper pin faces the assembler. Hold the punch with a punch holder or a pair of vise grips. Otherwise, serious injury may occur.*

#### 7.2 REMOVING THE BOTTOM COVER ASSEMBLY (APPLICABLE ABOVE DN 300 (NPS 12))

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To disassemble the bottom cover assembly, remove the following bottom cover assembly components:

- bottom cover plate
- washer
- bolts

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## INSTALLATION AND OPERATION MANUAL

### 7.3 REMOVING THE PACKING SEAL COVER ASSEMBLY

- 7.3.1 Untighten the packing seal screws.
- 7.3.2 Remove the packing seal cover.

### 7.4 REMOVING THE SHAFT AND DISC

- 7.4.1 When removing the shaft from the disc, clamp the vise jaws on to the shaft area above the valve body top plate.
- 7.4.2 Once the vise jaws are secure against the shaft, drive the wedge-shaped chisel/punch between the valve body top plate and the bench vise.
- 7.4.3 As the valve body moves away from the bench vise, the shaft is removed from the disc hubs.
- 7.4.4 Continue to reposition the valve body with the bench vise so as to allow removal of shaft.

#### CAUTION

Physically hold the disc to prevent from falling and becoming damaged during removal. When shaft is removed from the disc, the disc is unsupported.

#### WARNING

Smaller discs may be removed by hand DN 50 to DN 200 (NPS 2 to NPS 8). Remove larger discs with proper hoisting equipment. Failure to do so may result in personal injury or damage to equipment.

### 7.5 REMOVING THE SEAT RETAINER RING

Remove the seat retainer ring by removing the hex socket screws from the seat retaining ring inserted into the body.

### 7.6 REMOVING THE SEAT ASSEMBLY

To remove the seat assembly.

### 7.7 REMOVING THE PACKING SEAL ASSEMBLY FOR PACKING SEAL REPLACEMENT WITH SHAFT IN BODY

- 7.7.1 Using the screws, grab and remove each packing seal.

#### NOTE

To remove the packing seal with the shaft still in the valve body, two long, slender screws are required. must be at least eighty millimeter long. The most commonly used screws are 'drywall screws'.

### 7.8 REMOVING THE SHAFT BEARINGS (ABOVE DN 300 (NPS 12))

#### NOTE

A special bearing removal/installation tool is required to remove or install the shaft bearings (5). The tool O.D. dimension should be as near in size as the valve shaft bore I.D. dimension and have a Class 3 fit. Any Machinist Handbook can provide Class 3 tolerances.

- 7.8.1 Insert the removal tool in the valve body top plate area and down the shaft journal until the tool contacts the upper bearings.
- 7.8.2 Remove the upper bearings by striking the tool with a hammer.
- 7.8.3 Insert the removal tool in the valve body bottom plate area and down the shaft journal until the tool contacts the lower bearing.
- 7.8.4 Strike the tool until the lower bearing (5) is clear of the lower body shaft journal.

### 7.9 INSPECTING THE VALVE COMPONENTS

- 7.9.1 After disassembly, visually inspect the seat retainer ring and the bottom cover plate.
- 7.9.2 Make sure all body sealing surfaces:
  - are flat
  - are free of corrosion damage
  - have a smooth surface
  - are free of burrs.Remove any burrs with fine grit sandpaper.
- 7.9.3 Inspect for scratches around disc edges:
  - If scratched, smooth the edge with fine grit sandpaper (220/400 wet/dry sandpaper)
  - Remove the scratch by using a blending motion and extend the smoothed area at least two inches above, below and around the original scratch
  - To polish the disc edge, use a powered wire brush
  - Finish sand or polish the edge on a lathe, as required.
- 7.9.4 Check to see that the shaft-to-bearing contact locations are free of galling.
- 7.9.5 Check to see that the shaft-to-packing seal contact area is free of scratches.

#### NOTE

If scratched or galled, these surfaces should be polished or replaced.

FIGURE 1



FIGURE 2



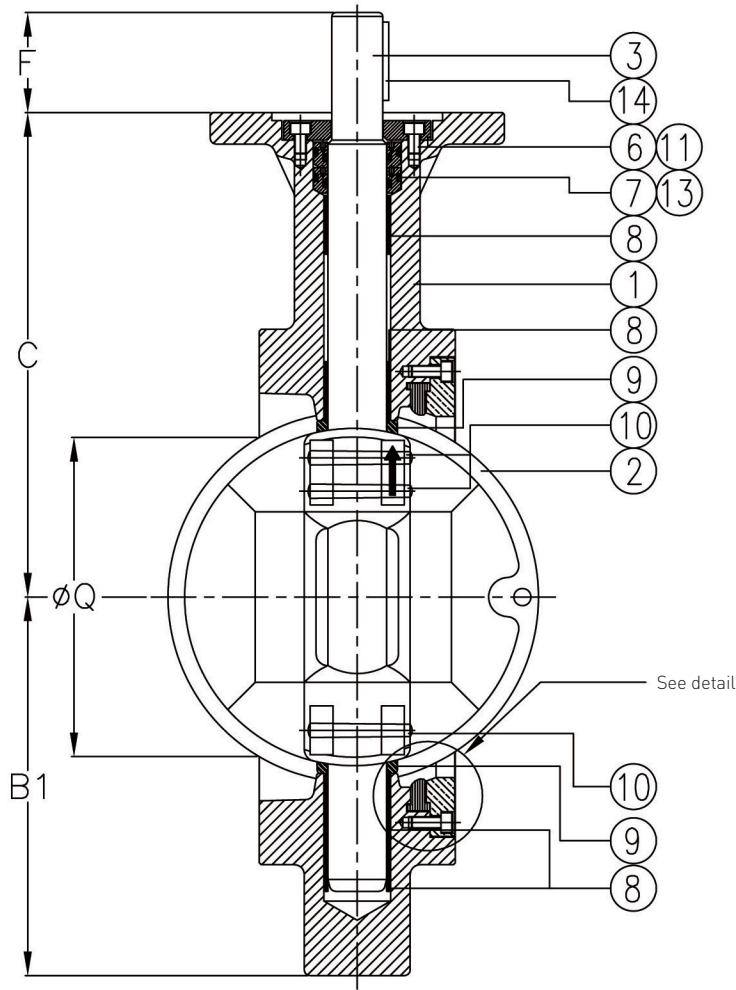
FIGURE 3  
Seat retainer ring and screws



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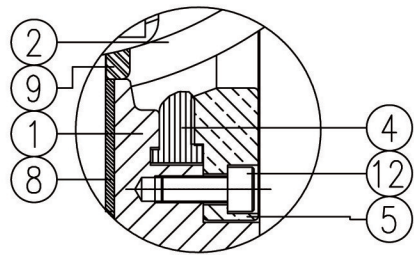
## INSTALLATION AND OPERATION MANUAL

**SERIES V30 / V32 WAFER AND LUG**  
**DN 50 (NPS 2) - DN 300 (NPS 12)**



**PARTS LIST**

| Item | Description           |
|------|-----------------------|
| 1    | Body                  |
| 2    | Disc                  |
| 3    | Shaft                 |
| 4    | Seat                  |
| 5    | Seat retaining ring   |
| 6    | Packing seal cover    |
| 7    | Packing seal          |
| 8    | Bearing               |
| 9    | Spacer                |
| 10   | Disc taper pin        |
| 11   | Hex socket screw      |
| 12   | Hex socket screw      |
| 13   | O-ring (packing seal) |
| 14   | Key                   |



Detail

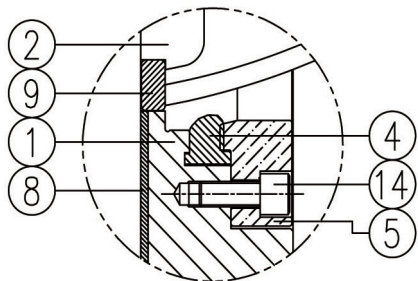
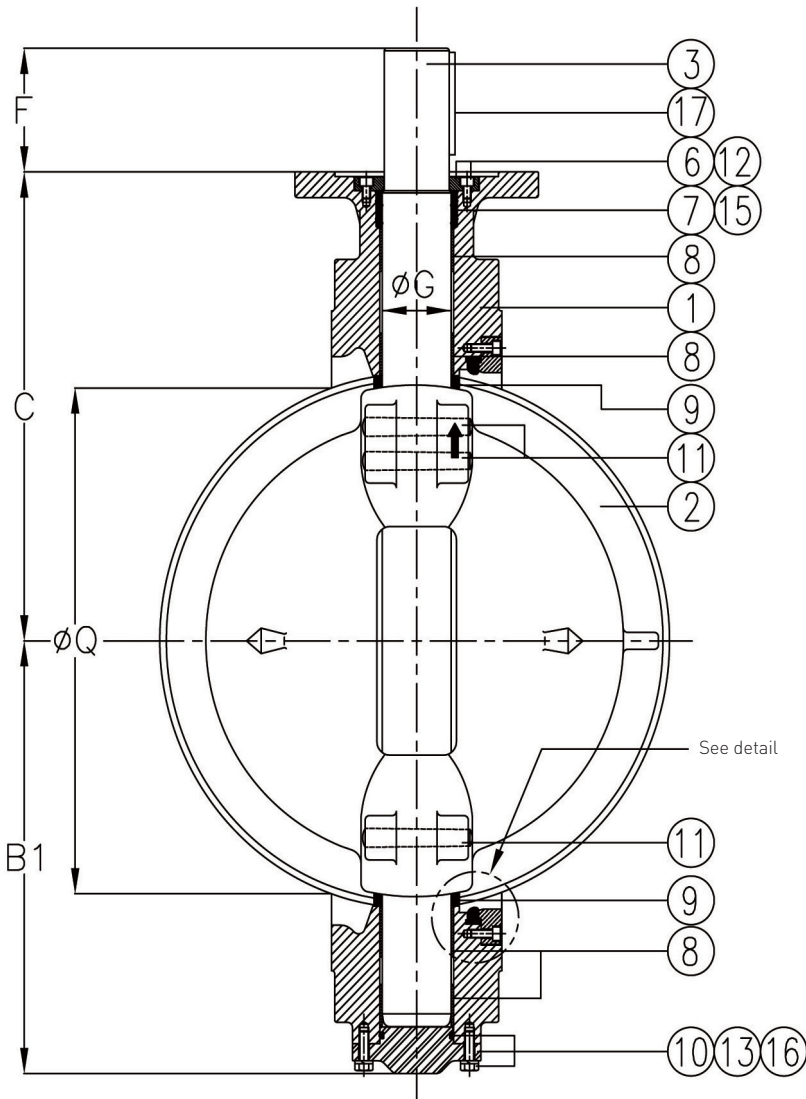
# KEYSTONE SERIES V30 / V32 MARINE HP BUTTERFLY VALVES

## INSTALLATION AND OPERATION MANUAL

**SERIES V30 / V32 WAFER AND LUG**  
**DN 350 (NPS 14) - DN 900 (NPS 36)**

**PARTS LIST**

| Item | Description           |
|------|-----------------------|
| 1    | Body                  |
| 2    | Disc                  |
| 3    | Shaft                 |
| 4    | Seat                  |
| 5    | Seat retaining ring   |
| 6    | Packing seal cover    |
| 7    | Packing seal          |
| 8    | Bearing               |
| 9    | Spacer                |
| 10   | Bottom cover          |
| 11   | Disc taper pin        |
| 12   | Hex socket screw      |
| 13   | Hex bolt and washer   |
| 14   | Hex socket screw      |
| 15   | O-ring (packing seal) |
| 16   | O-ring (bottom cover) |
| 17   | Key                   |



Detail

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### 8 ASSEMBLY

#### 8.1 INSTALLING SHAFT BEARING

- 8.1.1 Insert the body into a vice as shown below. Protect the body flange surfaces from the vise clamping surfaces with cardboard or brass shims.
- 8.1.2 To avoid damaging the shaft bearing, gently press the bearing into the shaft body journal by lightly striking the bearing with a rubber mallet.
- 8.1.3 Once the shaft bearing has been partially inserted into the valve body journal, insert the installation/removal tool against the upper bearing.
- 8.1.4 Strike the tool with a hammer to continue inserting the shaft bearing until it is flush with the body flowpath surface.

#### 8.2 INSTALLING THE DISC/SHAFT ASSEMBLY

##### CAUTION

To prevent damage to the disc, do not allow the disc edges to contact the body flowpath surface.

- 8.2.1 Install the shaft into the valve body shaft journals with the pinning grooves position on top of the shaft side view.
- 8.2.2 Insert the disc locating spacers into the grooves on both sides of the disc. Align the spacer flat surface with the body flat surface on the shaft journals.
- 8.2.3 While holding the disc with the backside of the disc facing up and the double pin hub facing toward the body shaft journal, position the disc in the body.
- 8.2.4 Push the shaft through the spacers and into the disc hub shaft holes.
- 8.2.5 If required, rotate the shafts until the shaft tapered pin holes are in alignment with the disc hub tapered pin holes.
- 8.2.6 Manually push the disc tapered pins to install them through the disc hub tapered pin holes.
- 8.2.7 Install the packing seal (see 'Installing the packing seal').
- 8.2.8 Carefully drive the tapered pins firmly into the connection with a punch and hammer.

#### 8.3 INSTALLING THE PACKING SEAL

- 8.3.1 Install the packing seal with O-rings, and packing seal cover into the upper journal of the valve body.
- 8.3.2 Keeping the disc assembly in the closed position, tighten the packing seal cover screws have been correctly tightened when the packing seal cover is contacted enough to the surface of valves body.

#### 8.4 INSTALLING THE BOTTOM COVER ASSEMBLY (APPLICABLE ABOVE DN 300 (NPS 12))

- 8.4.1 Set O-ring in the bottom cover.
- 8.4.2 Align the bottom cover plate with the body bottom surface.
- 8.4.3 Tighten the bolts and washers.

#### 8.5 INSTALLING NBR, EPDM AND FLUOROELASTOMER (FKM) SEATS

- 8.5.1 Place the upper marking (size and material and 'FRONT' letter) of the seat seen into the body seat pocket.
- 8.5.2 Install the seat with the smallest inside diameter down. If the seat is incorrectly installed, it will ride higher on the disc than if installed correctly.

#### 8.6 INSTALLING THE SEAT RETAINER RING

- 8.6.1 Check to make sure the disc is in the closed position against the body disc stop.
- 8.6.2 Place the seat retainer ring on the seat pocket. Align the holes in the seat retainer ring with the holes in the body.
- 8.6.3 Install and tighten screws according to cross tightening.

##### NOTE

The two tapped holes allow the use of eye bolts so the seat retaining ring can be lifted to and from the body.

FIGURE 4



FIGURE 5

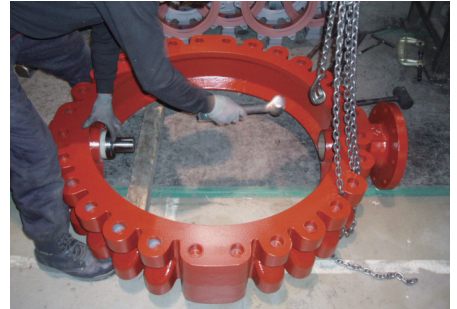


FIGURE 6



FIGURE 7



FIGURE 8



# KEYSTONE SERIES V30 / V32 MARINE HP BUTTERFLY VALVES

## INSTALLATION AND OPERATION MANUAL

### CAUTION

The standard seat retainer screws provide enough force to press the seat retainer ring for shipment and installation.

### 8.7 TIG WELDING OF THE DISC TAPER PINS

- 8.7.1 After assembling and testing the valve, lock the disc/shaft taper pins by forcefully driving the tapered pins in place with a hammer and steel punch.
- 8.7.2 TIG weld the disc taper pins. Weld using filler rod referenced in table 1.

FIGURE 9

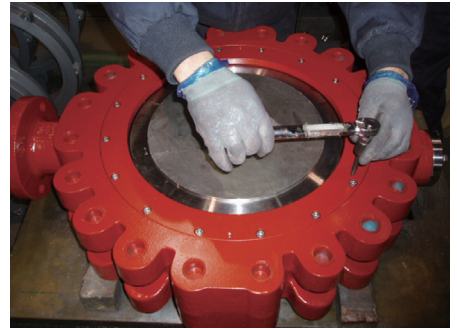


TABLE 1

| Shaft and pin material | Filler rod          |
|------------------------|---------------------|
| 431 stainless steel    | 316 stainless steel |
| K Monel 500®           | Monel®              |
| Inconel®               | Monel®              |

| Symptom                    | Possible cause   | Resolution  |
|----------------------------|--|---|
| Valve won't rotate         | <ol style="list-style-type: none"> <li>1. Actuator has failed</li> <li>2. Valve packed with debris</li> <li>3. Shaft key has sheared</li> </ol>  | <ol style="list-style-type: none"> <li>1. Repair or replace</li> <li>2. Flush or clean valve to remove debris</li> <li>3. Determine cause of shearing and correct, replace</li> </ol>   |
| Shaft packing seal leaking | <ol style="list-style-type: none"> <li>1. Packing seal O-ring damaged</li> </ol>   | <ol style="list-style-type: none"> <li>1. Depressurize valve and replace packing seal O-rings smooth the contact surface of O-rings</li> </ol>  |
| Bottom cover leaking       | <ol style="list-style-type: none"> <li>1. O-ring damage</li> </ol>   | <ol style="list-style-type: none"> <li>1. Remove valve from service and replace O-rings smooth the contact surface of O-rings</li> </ol>  |
| Valve leaking              | <ol style="list-style-type: none"> <li>1. Valve not fully closed</li> <li>2. Debris trapped in valve</li> <li>3. Seat or disc edge damaged</li> <li>4. Actuator mechanical closure stop incorrect</li> </ol> | <ol style="list-style-type: none"> <li>1. Close valve</li> <li>2. Cycle and flush to remove debris</li> <li>3. Remove valve from service and replace seat and/or repair or replace disc</li> <li>4. Adjust the stop to allow further closure</li> </ol> |
| Jerky operation            | <ol style="list-style-type: none"> <li>1. Shaft/bearing damaged</li> <li>2. Actuator/shaft adapter misaligned</li> <li>3. Air supply inadequate</li> </ol>   | <ol style="list-style-type: none"> <li>1. Disassemble valve and inspect for damage, repair or replacedamaged parts, reassemble</li> <li>2. Remove actuator mounting and realign</li> <li>3. Increase air supply pressure</li> </ol>                     |

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