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**SERIES GHP High Performance
Butterfly Valve
Installation and Maintenance
August 2003**

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Safety

1. Line media – Verify the line contents and verify compatibility prior to any service on the valve assembly. Ensure that the proper protective clothing and services are in place for worker safety. completely drain lines where required for safety reasons and use caution with media that will not fully drain from the system.
2. Line Pressure – Remove all line pressure prior to any service on the valve assembly. Verify that both sides of the valve are depressurized for worker safety. Ensure that any system blocking devices (valves, flanges, etc.) are secured and cannot be operated while this valve is being maintained and ensure conformance to applicable regulatory codes as a minimum.
3. Application limits – Ensure that a application conditions are within the performance capability of the product (pressure, temperature, material compatibility, etc) prior to placing the valve into operation.
4. Safety relief device – Ensure that a properly sized and installed safety relief valve is operational and in place at all times that the valve is in operation. Verify that the safety relief device cannot be isolated from the system thereby losing safety protection.
5. Moving component clearance -Ensure that workers take sufficient safety precautions to prevent personal injury from moving components, including rotating discs, actuation devices, linkages, etc. Install permanent field safety devices such as guards for exposed hazards at installation.
6. Component grounding - Ensure the valve is fully grounded when installed in systems with flammable line media or atmospheres. Ensure the disc is grounded via a grounding strap attached to the stem.



7 Pressurized component safety- Extreme caution should be exercised with any pressurized components, including the valve assembly. While the system is pressurized, care should be taken to prevent shock loads to the valve by impact, which could cause pressure boundary failure. At no time should any worker be in line with the valve shaft or disc while the system is pressurized. Extreme caution should be exercised when removing any valve actuation devices ensuring that the line is not pressurized.

8 Actuation device disablement - disable all automatic or remote actuation devices which might cause unexpected operation while being serviced, including power and signal sources. Lock out should, as a minimum, meet applicable regulatory codes.

Storage

The valves should be stored on a pallet or "skid" in a clean, dry warehouse. If the valves must be stored outside, the following applies:

1. Valves must be kept off the ground and high enough to avoid standing water.
2. Cover the valves with a water repellent cover (not supplied by Grinnell Flow Control).

Installation

- 1 The GHP butterfly valve is bi-directional and can be installed with flow in either direction.
- 2 The GHP butterfly valve is designed for installation with the shaft in any orientation. It is preferred that the valve be installed with the shaft horizontal to minimize the collection of solids, particles, etc. in the hub and bearing areas.

3 Consideration should be given to the location of the valves in the piping system. The valve should not be placed too close to other valves, elbows, etc. as its performance may be affected. It is recommended the valve have a minimum of six pipe diameters upstream and four pipe diameters downstream between it and other valves, elbows etc. in the piping system. System design is out of the scope of the valve manufacturer.

WARNING

- 4 Before proceeding, review all safety instructions and ensure conformance.
- 5 Verify that the flange or pipe ID is equal to or greater than the published "Q" dimension on the GHP assembly drawing to ensure proper opening clearance for the centered valve.
- 6 Spread the flanges a minimum of 5 mm (1.87 inch) wider than the body width. Ensure the disc is closed, or partially open but totally within the body width and at least 10 mm (.375 inch) from the valve body face. Insert the valve between the flanges & install as many bolts or studs as possible. Install flange gaskets appropriate for the intended service.
- 7 Center the valve body in the flanges.

WARNING

Failure to properly center the valve body may cause improper valve operation or disc edge damage

- 8 Slowly remove the flange spreaders and lightly tighten the bolting while centering the valve. Slowly open the valve in the clockwise direction to ensure disc clearance with the flanges and pipe. Install any remaining bolting and cross-tighten all flange bolting.

CAUTION

- 9 If loose flanges are being used as part of a new installation, tack weld the flanges to the pipe and remove the valve prior to final welding. Failure to do so may result in serious heat damage to the Teflon seat and elastomer seal assembly.
- 10 Install the actuation device, if not already in place. The valve should rotate clockwise to close and counter clockwise to open. The shaft indicates the disc position. The disc is parallel to the flats on a Double-D connection and in line with the keyways on a keyed stem. Please note that the disc travel stop is an over-travel stop and does not represent the closed position of the valve. Set any actuator travel limits to stop the valve with the disc face parallel to the front face of the valve.
- 11 Ensure the disc is in the customer preferred direction for system startup. After system pressurization, ensure that there are no leaks and the valve is functioning properly.

Removal

WARNING

- 1 Before proceeding, review all safety instructions and ensure conformance. Relieve all system pressure, drain lines if required, disconnect power from automatic actuation device, ensure worker safety, etc.
- 2 Ensure the disc is in the closed position. The disc is parallel to the flats on a Double-D connection and in line with the keyway on a keyed stem.
- 3 Loosen and remove studs or bolting. Using spreaders, spread the flanges a minimum of 5mm (.187) wider than the body width.
- 4 Carefully remove the valve from the line.

Valve Disassembly

CAUTION

Never attempt to remove or perform maintenance on a valve that is pressurized. Removal of pressure from the pipeline is essential prior to performing maintenance.

- 1 Seat & Retainer Removal (Figures 5, 6A and 6B)
 - a Use a screwdriver to pry up the free end of retainer key (15) from the groove, through the installation window in the seat retainer (14).
 - b Using a spanner type tool or punch and hammer, rotate the seat retainer 360 degrees clockwise until the retainer key is fully disengaged
 - c Remove the seat retainer (14) from the body.
 - d Remove the seat from the body.
 - e Inspect the valve body and retaining ring for any excessive wear or damage prior to replacing the seat.
 - f For reassembly, refer to Seat & Retainer Installation provided under valve assembly.
- 2 Bottom Cover Removal (Figure 4)
 - a Remove the cover, gasket, washers and screws from the bottom surface of the lower neck.
 - b Remove the four washers (24) and four cover screws (21) from the bottom cover (10).
 - c Remove the cover gasket (16).
 - d For reassembly, refer to Bottom Cover Installation provided under valve assembly.
- 3 Packing Removal: Adjustable Packing (Figure 3)
 - a Remove the bridge (8) and gland from the stem.
 - b Remove anti-blowout ring (17) from the stem by prying with a screwdriver.

Illustration 1

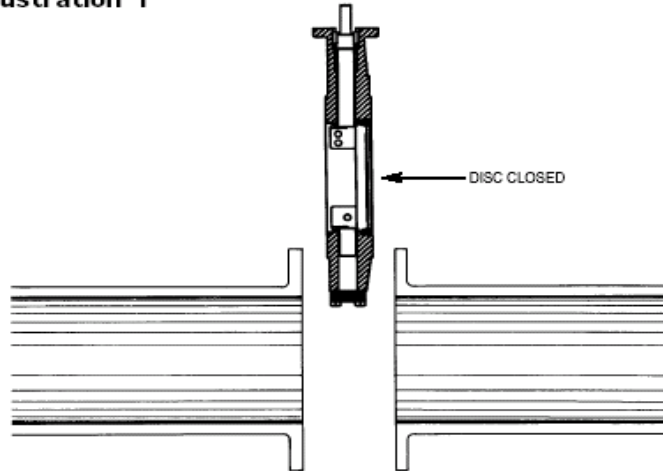
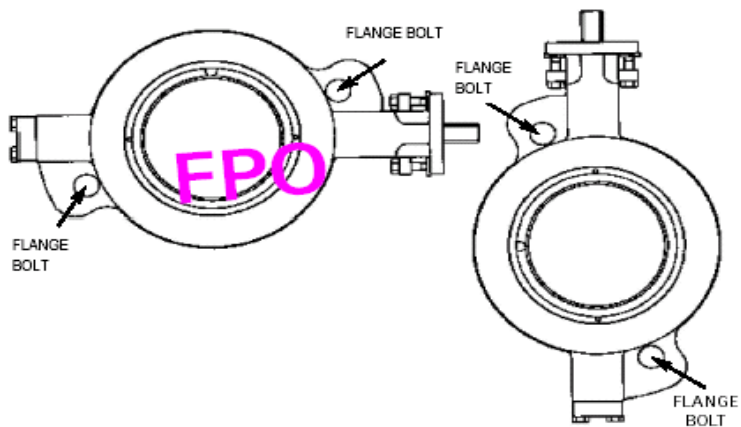


Illustration 2



NOTE: Take care not to over stretch the ring while removing.

- c With a packing puller, remove the upper anti-extrusion ring (11) from the top of the packing set.
- d With a packing puller, remove the packing set (12) from the packing bore.
- e Also with the packing puller, remove the lower anti-extrusion washer (11) from the stem.

4 **Packing Removal: Non-Adjustable Packing (Figure 3)**

- a Remove the bridge (8) and gland (27) from the stem.
- b Remove anti-blowout ring (17) from the stem by prying with a screwdriver.

NOTE: Take care not to over stretch the ring while removing

Remove O-rings (28 and 29) from the packing gland (27).

5 **Disc-Stem Removal (Figure 2)**

- a Drive the upper stem wedge (s) (5) pin out of the disc.

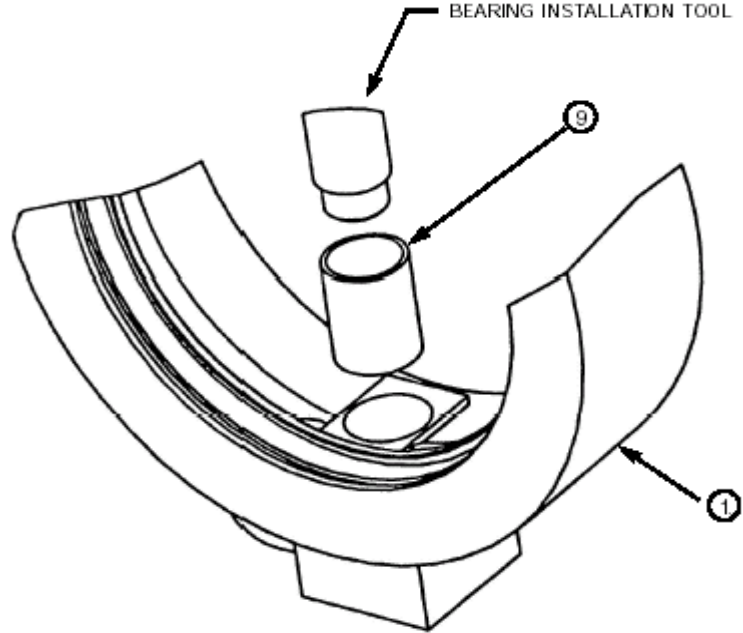
NOTE: the pins are tack welded in place. The tack weld may need to be ground off prior to driving the pins out

- b Remove the upper stem (3).
- c Drive the roll pin (6) out of the lower stem and disc hub.
- d Remove the lower stem (4).
- e Remove the disc centering bearings (18) from the upper and lower hub counterbores of the disc (2).
- f For reassembly, refer to Disc-stem installation provided under valve assembly.

6 **Stem Bearing Removal (Figure 1 and 2)**

- a Remove the two stem bearings (9) using a close fitting tool as shown. A wrench socket or similar device may be used.

Figure 1



NOTE: If it is intended to reuse these bearings, apply only sufficient force to remove the bearings. Excessive force could damage them.

2 **DISC-STEM Installation (Figure 2)**

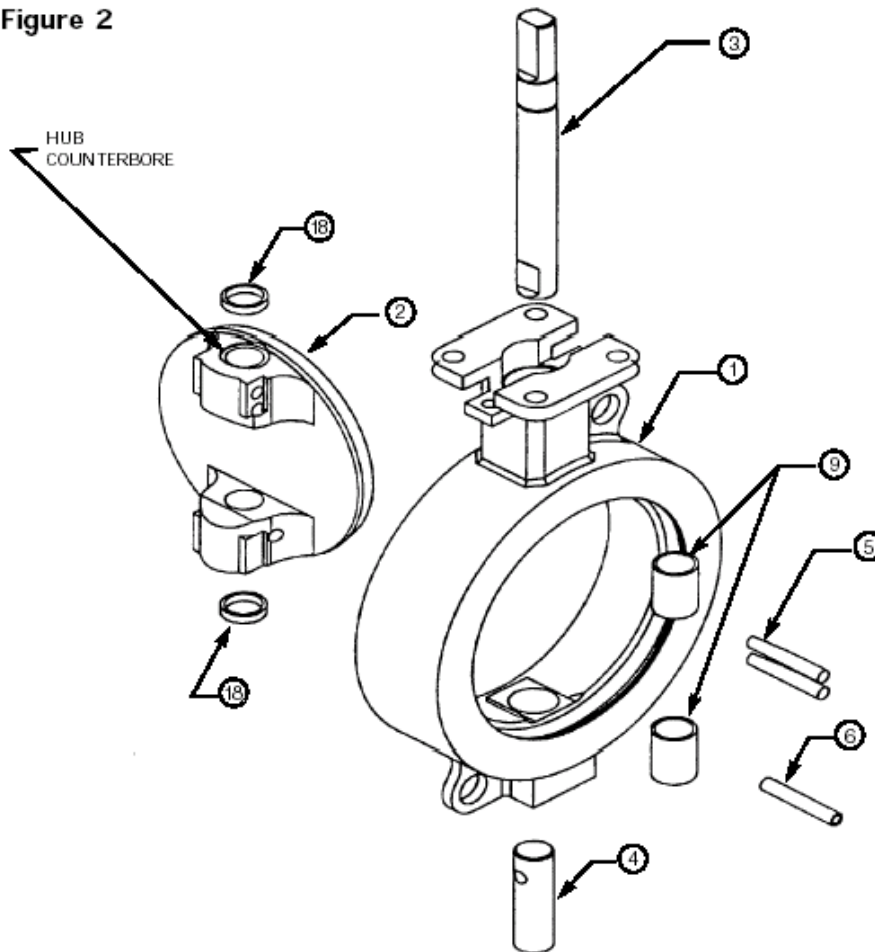
- a Place the disc centering bearings (18) into position on the upper and lower hub counterbores of the disc (2) and hold in place. With the disc stem holes held horizontally, insert the disc into the body between the body ID flats. Ensure that the topside of the disc, indicated with an arrow, is toward the top of the valve. Once the disc and spacers have started into the body, the flats will hold the spacers in place and the disc can be positioned in line with the stem bores.
- b Install the upper stem (3) through the upper neck and bearing, into the stem hole in the disc. The disc position may need to be adjusted slightly to line up the stem with the hole in the disc hub.
- c Rotate the stem until the wedge pin flats line up with the pinholes in the disc. Hold the disc in the open position with one hand while rotating the stem to prevent it moving while lining up the wedge pin flat and holes.

1 **STEM BEARING Installation (Figure 1 and 2)**

- a Mount the valve body (1) horizontally in a bench vise with the seat pocket side facing you.
- b Using a tool as described in the previous section, item 1, install the two stem bearings (9). Apply only sufficient force to install the bearing. excessive force could be a sign of a problem and could damage the bearing. The ends of the bearings should be flush with the body ID flats after installation.

Valve Reassembly

Figure 2



- d Insert the upper pin (5): Small end first into the pinhole from the seat pocket side making certain that the flant on the pin engages the flat on the stem. Push the pin snugly all the way in with finger force until it stops. While holding the upper pin in place, push the stem all the way in until it stops. This ensures that the stem is correctly positioned. Tap the pin lightly into place with a hammer and punch. Do not drive the pin fully home at this time.
 - e For assemblies with only a single wedge pin; omit steps 7 and 8.
 - f Confirm that the upper stem is correctly positioned by looking through the lower pinhole in the upper hub. The stem flat should be visible, but the lead in chamfer, or corner radius, on the flat should not be visible. If the chamfer, or corner radius, is visible, loosen the pin and repeat step 5.
 - g Insert the lower of the upper two pins, small end first and from the seat side as before, into the pinhole and tap lightly into place.
 - h Insert the lower stem (4) through the lower neck and bearing into the lower stem hole in the disc hub. Align the roll pinhole in the stem with the pinhole in the hub and install the roll pin (6), from either side, fully into the disc hub.
 - i Drive the upper stem wedge pins (2) fully home. The small end(s) of the pin(s) should always be within +/- 5mm (.2 in) of the surface of the disc hub.
- Installation of the disc and stems is now complete.

3 PACKING Installation (Figure 3)

a Assemblies with adjustable packing:

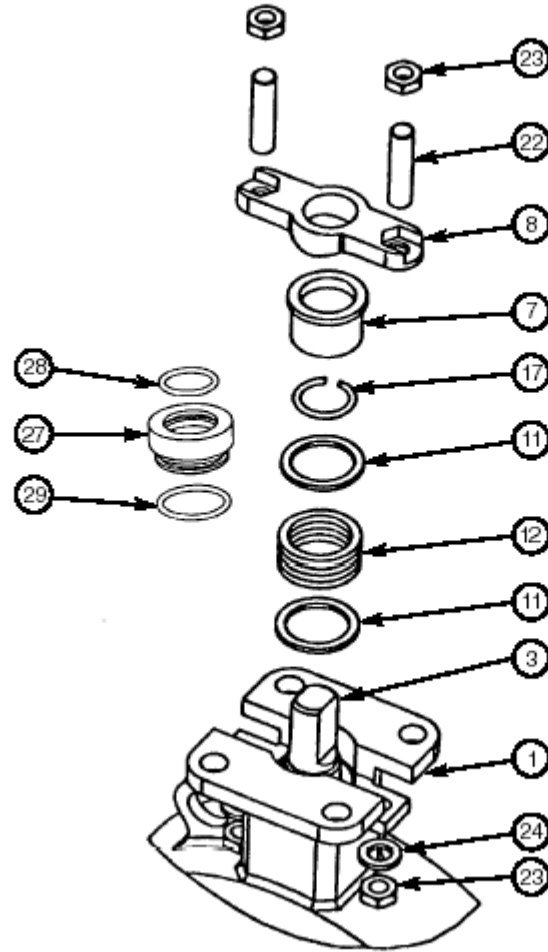
- 1 Install the lower anti-extrusion washer (11) over the stem and into the packing bore. the washer should fit freely into the packing bore without cocking, binding or excessive Force.
- 2 Install the packing set (12) into the packing bore with the tool provided. Note: When Installing vee-cup style packing, take care not to cock or damage the packing as it passes over the anti-blowout ring groove on the stem and into the packing bore.
- 3 Install the upper anti-extrusion ring (11) on top of the packing set.
- 4 Install anti-blowout ring (17) onto the stem. Take care not to over stretch the ring while installing. The ring should fit snugly in the groove provided in the stem (3).
- 5 Install the gland (7) over the stem as shown.

b Assemblies with non-adjustable packing.

- 1 Install O-rings (28 & 29) onto gland (27). A light film of silicone grease should be applied to each O-ring as it is installed.
- 2 Apply a light film of silicone grease to the packing bore prior to installing the gland.
- 3 While rotating, install the gland into the packing bore. Do not pound into place. Doing so will almost certainly damage the O-ring seal.

c Begin installing the gland bridge by installing a hex nut (23) onto the long threaded end of each packing stud (22). The end of the stud should be flush with the face of the nut.

Figure 3



- d Insert the short threaded end of each stud, nut on opposite end, into the stud holes of the packing bridge (8). The nuts on the ends of the studs fit into pockets cast into the bridge.
- e Place the bridge over the stem and lower it into contact with the gland while guiding the studs into holes provided in ears cast onto the body (1) as shown. Install washers (24) and nuts (23) onto the short threaded end of each stud sticking below the cast ears.

- f Refer to Table 1 for the proper packing stud torques.
- g The top of the bridge should be below the actuator mounting surface at least 1mm(.04 in) after the bridge studs are tightened.
- h For adjustable packing, the remaining gland travel should not be less than 4mm (.16) in before bottoming out. Non-adjustable packing should be fully bottomed out.

The packing set is now installed.

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4 BOTTOM COVER Installation

- a Refer to Figure 4.
- b Install 4 washers (24) and 4 cover screws (21) in the bottom cover (10) as shown and place on a work surface with the screw heads down.
- c Install the cover gasket (16) over the cover screws.
- d Install the cover gasket, washers and screws onto the bottom surface of the lower neck as shown. Tighten the cover screws using the torque values given in Table 2

Installation of the bottom cover is complete

Figure 4

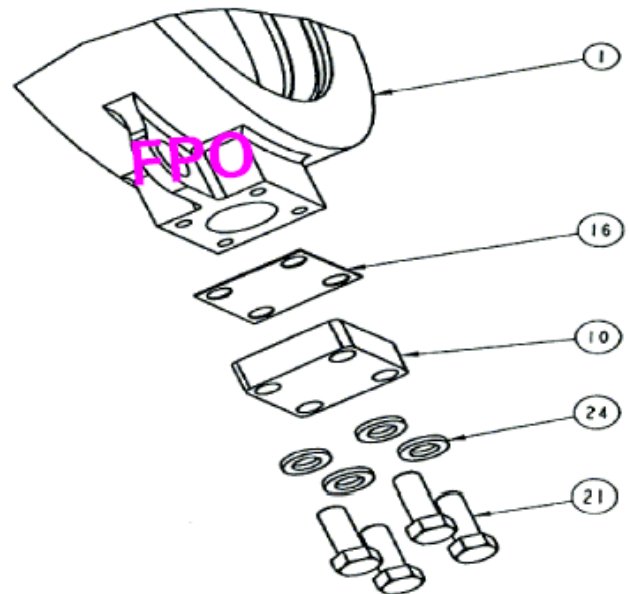


TABLE 1 RECOMMENDED PACKING STUD TORQUES

Valve size	Teflon Packing	Non-Adjustable	Vee-Cup Packing
50mm	3.5 (31)	3.5 (31)	.3 (2.6)
65mm	4.0 (35)	4.0 (35)	.4 (3.5)
80mm	4.0 (35)	4.0 (35)	.4 (3.5)
100mm	4.0 (35)	4.0 (35)	.4 (3.5)
125mm	6.0 (53)	6.0 (53)	.6 (5.3)
150mm	6.0 (53)	6.0 (53)	.6 (5.3)
200mm	7.5 (66)	7.5 (66)	.8 (7.1)
250mm	9.0 (80)	9.0 (80)	.9 (8.0)
300mm	9.0 (80)	9.0 (80)	.9 (8.0)

All dimensions in mm.

Torque units in Nm (lb. in) tolerance +/- 10%

TABLE 2 BOTTOM COVER SCREW TORQUES

Valve Size	Cover Screw Torque +/- 5%
50mm	6.4 (57)
65mm	6.4 (57)
80mm	6.4 (57)
100mm	16 (140)
125mm	16 (140)
150mm	16 (140)
200mm	16 (140)
250mm	16 (140)
300mm	33 (290)

All dimensions in mm.

Torque units in Nm (lb. in) tolerance +/- 10%

5 SEAT & RETAINER Installation

(Figures 5, 6A and 6B)

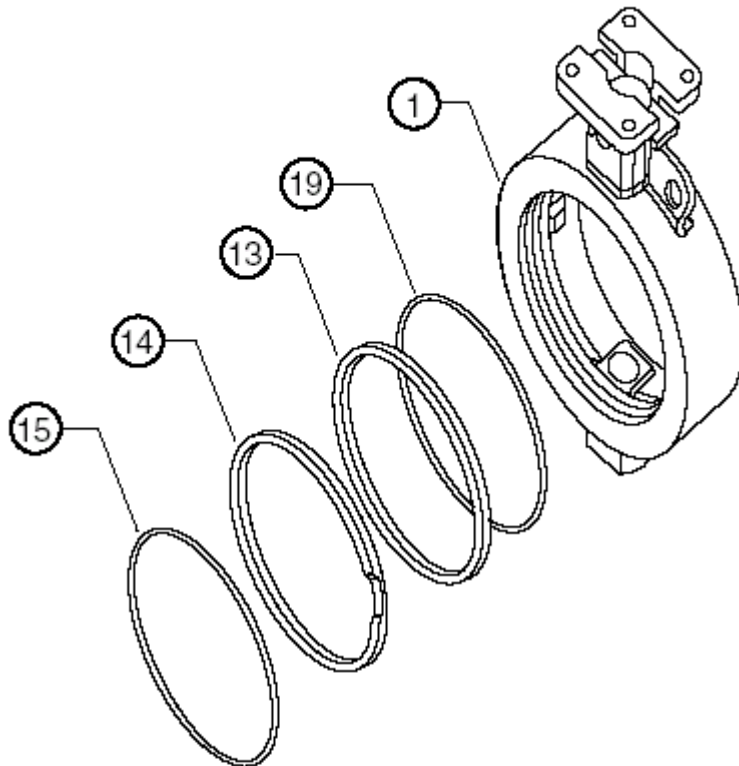
- a Swing the disc past full open until it is 180 degrees from the closed position.
- b Apply a light film of silicone grease to the seat backup O-Ring (19) and install in the groove on the OD of the seat (13).
- c Insert the seat into the valve body (1), small side first, as shown in Figure 6B.

NOTE: Seat retainer will not align
With retainer key slot in the body
If the seat is upside down.

- d Place the seat retainer (14) into the body, lip side first, as shown in Figure 6B.
- e Align the installation window in the retainer with the small hole drilled in the body, as shown in Figure 6A
- f Insert the hooked end of the retainer key (15) through the installation window in the retainer and into the drilled hole in the body as shown in Figure 6A
- g Rotate the retainer clockwise by hand until the groove in the OD of the retainer captures the retainer key as shown.
- h Using a pin type spanner tool, rotate the seat retainer 360 degrees counterclockwise until the retainer key is fully captured. The hooked end of the retainer key should remain visible in the installation window. Do not rotate the retainer where the hooked end is captured in the retainer groove

The seat and retainer are now installed.

Figure 5



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Figure 6A

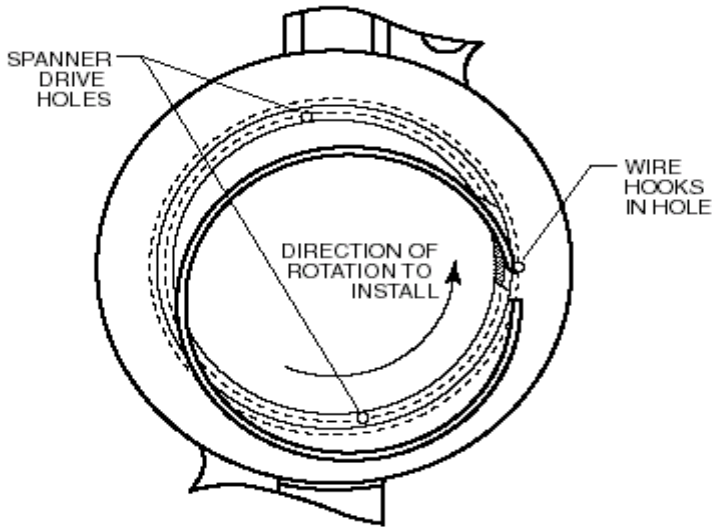
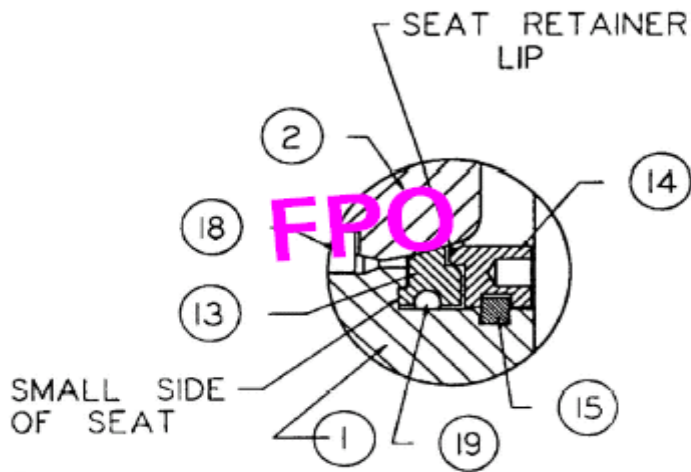


Figure 6B



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TROUBLESHOOTING GUIDE

SYMPTOM	PROBABLE CAUSE	SOLUTION
Valve opens only a few degrees and stops (it will not open to the full angle desired)	1 Improper installation, The valve is improperly aligned or the actuator is improperly installed. Incompatible pipe size.	1 Loosen the flange bolts, realign the valve with flanges, and retighten the flange bolts to correct torque per ANSI requirements. Check actuator. obtain valve to match pipe size used.
Leakage past the flange face.	1 Flange bolts are not evenly tightened. 2 Improper flanges.	1 Tighten flange bolts using recommended tightening sequence and torques.. 2 Refer to “flange requirements” on page 1.
Leakage in the closed position (leakage in the pipeline)	The disc is not closing fully 1 Actuator is not properly adjusted. 2 Damaged seat 3 Line pressure exceeds valves working pressure. 4 Damaged valve disc. 5 Leakage past seat.	1 Refer to actuator adjustment procedures. 2 Replace seat. 3 Obtain valve suitable for intended service pressure. 4 Replace disc. 5 Inspect seat and O-ring for damage or dirty seating surfaces.
Leakage at the valve stem	1 Packing seal improperly adjusted or failure.	1 Refer to “valve disassembly” procedures.
Water hammer	1 The valve is closing too quickly.	1 Adjust the actuator.
Excessively high torque	1 Obstruction in the pipeline. 2 Valve damaged. 3 Scale buildup on stem or seat.	1 Remove valve from pipeline and remove obstruction. 2 Return valve to factory for disc/stem replacement (check for water hammer or freezing of the material). 3 Open and close the valve several times. Operate the valve at least once a month. Check the valve seat for deterioration.

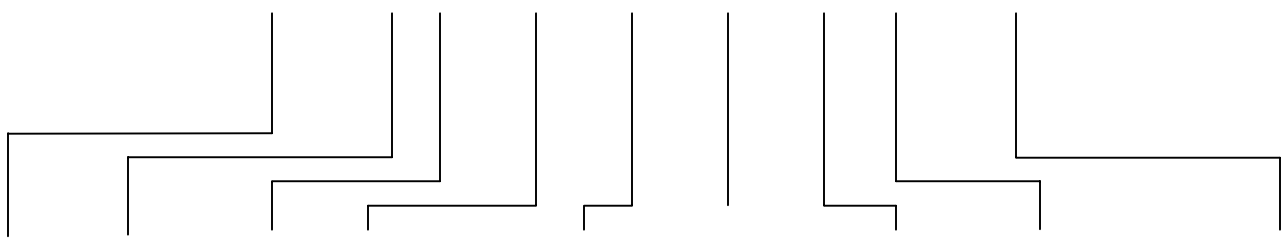
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HOW TO ORDER

Size 2" – 12"

Order by Figure Number

8" GHP - 1 W CS - SS - R - P - 2 - X



<u>SIZE</u>	<u>SERIES</u>	<u>ANSI RATING</u>	<u>BODY STYLE</u>	<u>BODY MATERIAL</u>	<u>DISC/SHAFT MATERIAL</u>	<u>SEAT MATERIAL</u>	<u>PACKING MATERIAL</u>	<u>OPERATOR</u>	<u>OPTIONS</u>
	GHP	150	W – Wafer L – Lug	CS – Carbon Steel SS – 316 Stainless Steel	SS – 316 S.S. Disc/ 17-4 S.S. Shaft	R - RTFE	P – PTFE	0 – Bare Shaft 1 – 10Pos. L /Lock Handle 2 – Gear Operator 4 – Pneumatic Actuator(<i>Specify</i>) 5 – Electric Actuator	X - Special (<i>Specify</i>)



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