

Wafer-Sphere® Butterfly Valves

3"-12" Series 8000, 8100, 8200 & 8300

Installation, Maintenance and
Operating Instructions

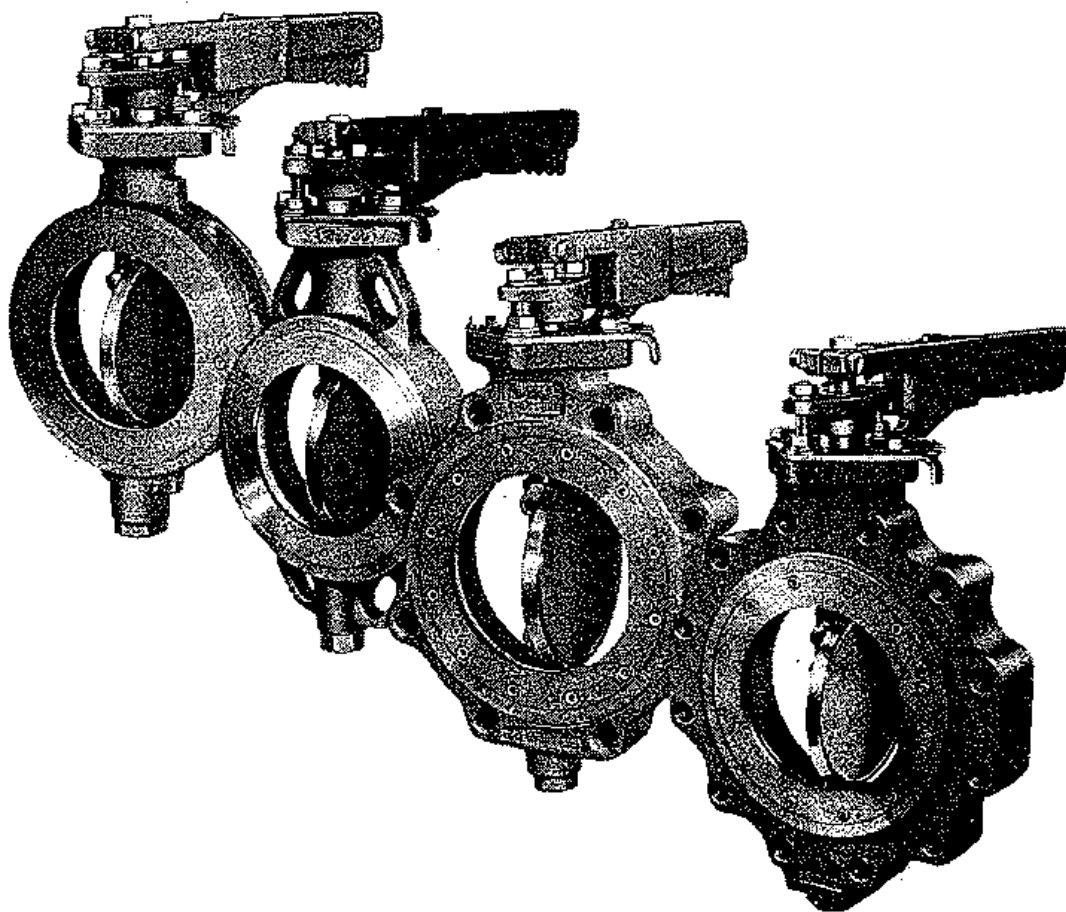


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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.
 If you require additional assistance, please contact the manufacturer or manufacturer's representative.
 Addresses and phone numbers are printed on the back cover.
 See also www.metso.com/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

DESCRIPTION

The Jamesbury® *Wafer-Sphere* valve is a butterfly valve of high performance design. **IMPORTANT NOTE:** Maximum shut-off pressure rating depends on the materials chosen. Refer to the tag attached to each valve for this rating. Do not use a valve at service conditions that exceed the rating of the tag.

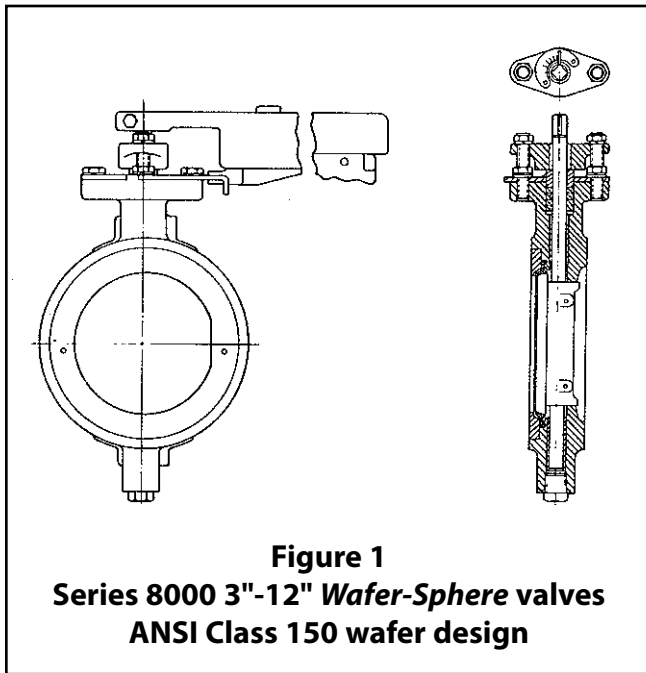


Figure 1
Series 8000 3"-12" *Wafer-Sphere* valves
ANSI Class 150 wafer design

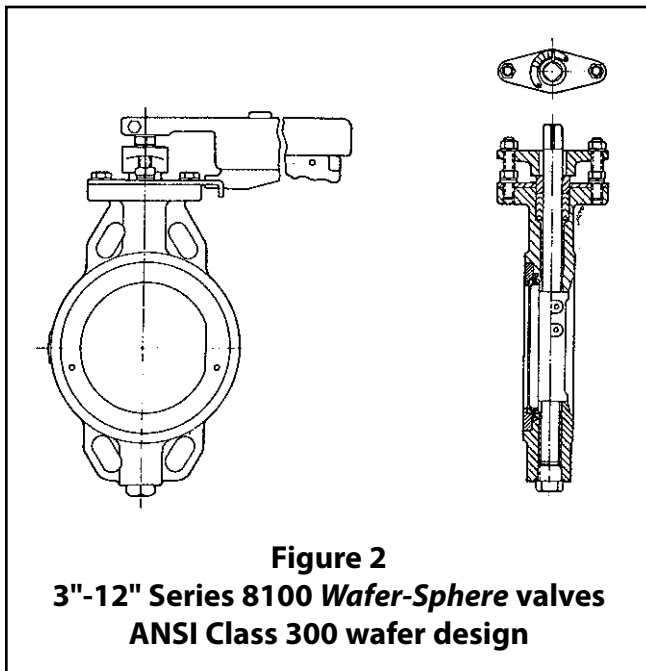


Figure 2
3"-12" Series 8100 *Wafer-Sphere* valves
ANSI Class 300 wafer design

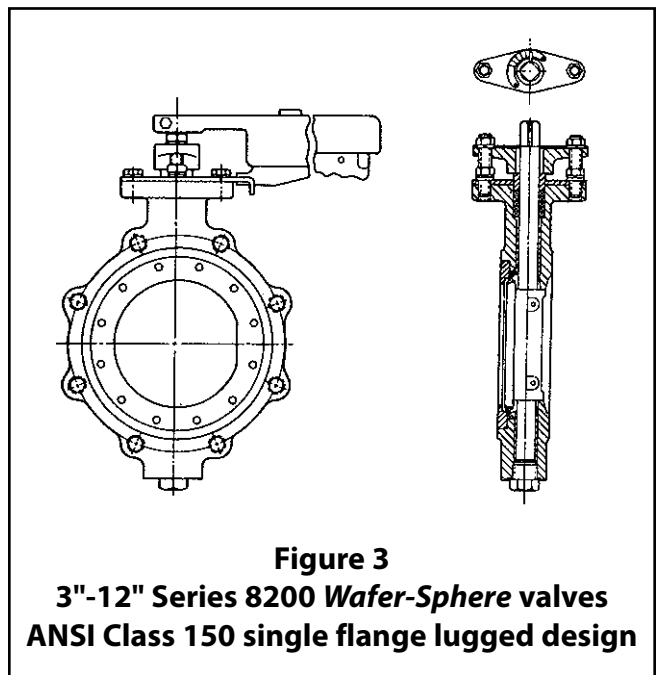


Figure 3
3"-12" Series 8200 *Wafer-Sphere* valves
ANSI Class 150 single flange lugged design

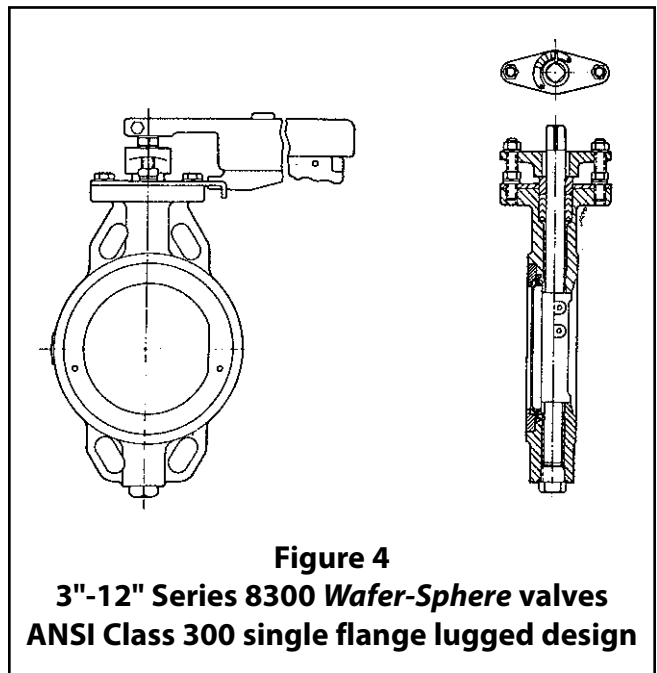


Figure 4
3"-12" Series 8300 *Wafer-Sphere* valves
ANSI Class 300 single flange lugged design

Eccentric Shaft Design

One of the design features of the *Wafer-Sphere* valve that is responsible for its superior performance is the valve's eccentric shaft design. The shaft is offset in two planes: (1) away from the valve disc centerline; and (2) behind the disc sealing plane (See Fig. 5). Offset shaft design makes the rotating disc cam back and away from the seat, completely eliminating the usual wear points at the top and bottom of the seat. Because the disc rotates off the seat in an eccentric arc, it operates in one quadrant only (See Fig. 5).

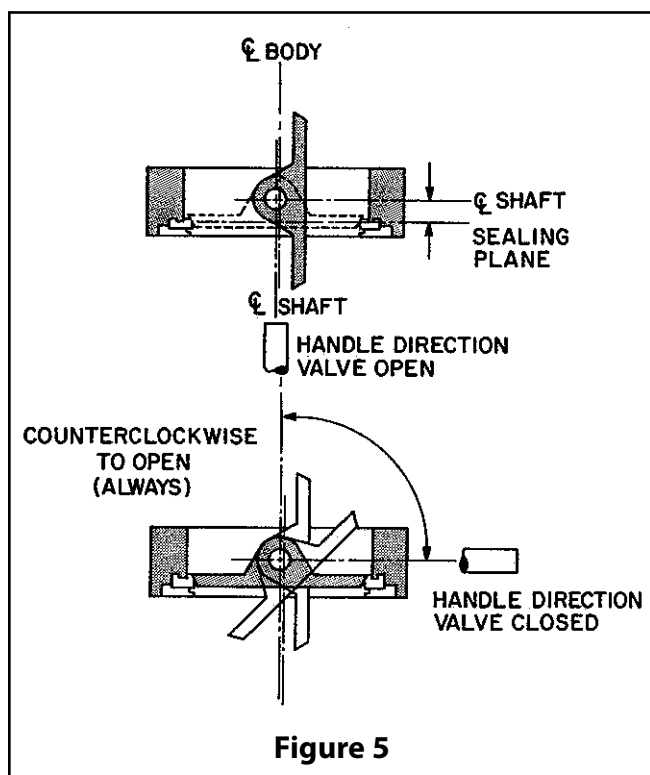


Figure 5

Positive Stop Feature

To prevent seat damage from over-travel of the disc beyond the closed position (primarily during field mounting of a handle or actuator), a "positive stop" feature has been designed into the *Wafer-Sphere* butterfly valve. The "positive stop" feature also makes it possible to adjust the actuator travel stops in-line. The location of this feature is on the body insert shown in Fig. 6.

Actuation

High line pressure may create high enough forces to pull the handle out of an operator's hand. Either a manual gear operator, or pneumatic or electric actuator should be used in place of a detent handle on 3" to 8" valves when differential pressure exceeds 150 psi, and on 10" and 12" valves when differential pressure exceeds 100 psi.

Fire-Tite (Fire Tested) Design

Supplementary details on disassembling, assembling and maintaining *Fire-Tite Wafer-Sphere* valves are contained at the end of these instructions under *FIRE-TITE WAFER-SPHERE VALVES*.

PRECAUTIONS

SAFETY FIRST! FOR YOUR SAFETY, TAKE THE FOLLOWING PRECAUTIONS BEFORE REMOVING THE VALVE FROM THE LINE, OR BEFORE ANY DISASSEMBLY:

1. WHAT'S IN THE LINE?

BE SURE YOU KNOW WHAT FLUID IS IN THE LINE. IF THERE IS ANY DOUBT, DOUBLE-CHECK WITH THE PROPER SUPERVISOR.

2. ARE YOU PROTECTED?

WEAR ANY PROTECTIVE CLOTHING AND EQUIPMENT NORMALLY REQUIRED TO AVOID INJURY FROM THE PARTICULAR FLUID IN THE LINE.

3. IS THE LINE DEPRESSURIZED?

DEPRESSURIZE THE LINE AND DRAIN THE SYSTEM FLUID. THE *WAFER-SPHERE* VALVE'S OFFSET SHAFT CREATES GREATER DISC AREA ON ONE SIDE OF THE SHAFT. THIS MEANS THAT A *WAFER-SPHERE* VALVE TENDS TO OPEN WHEN PRESSURIZED ON THE INSERT SIDE WITHOUT A HANDLE OR AN ACTUATOR ON THE VALVE.

NOTE; DO NOT PRESSURIZE THE VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT. DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM A VALVE UNDER PRESSURE

4. IS THE VALVE CLOSED?

BEFORE YOU INSTALL A *WAFER-SPHERE* VALVE IN, OR REMOVE IT FROM THE LINE, CYCLE THE VALVE FULLY CLOSED. THE *WAFER-SPHERE* VALVE MUST BE REMOVED FROM THE LINE IN THE CLOSED POSITION. THIS WILL PREVENT MECHANICAL DAMAGE TO THE DISC SEALING EDGE.

INSTALLATION

I. WAFER-SPHERE VALVES with TFE or other POLYMERIC SEAT

In general, for full pressure rating, all polymeric seated *Wafer-Sphere* butterfly valves including *Fire-Tite* valves should be installed with the insert toward the higher pressure (shaft downstream).

II. METAL-SEATED WAFER-SPHERE VALVES

Metal-seated *Wafer-Sphere* butterfly valves are single-directional. They must be installed ONLY with the insert toward the higher pressure (shaft downstream) •

III. GENERAL INFORMATION

1. Read the PRECAUTIONS Section carefully.
2. IMPORTANT: Only operating handle stops or actuator stop set screws must be used to stop the disc in position. DO NOT use the "positive stop" insert by itself to limit actuator travel.
3. Visually check the position of the disc when the valve is in the closed position and the insert is fully compressed. There should be less than 1/64" between the disc and the "positive stop" on the insert.
4. Before installing the closed valve in the line, be sure that the handle or actuator is attached so that a counterclockwise rotation, viewed from above, opens the valve (See Fig. 5). Again, fully close the valve before installing it in the line. If the valve is not in the fully closed position when the flange bolts are tightened, the seat may be damaged.
5. The *Wafer-Sphere* butterfly valve must be centered between flanges to avoid disc-pipe contact which could damage the disc and shaft. Any flange or pipeline welding should be done prior to installing of the valves. If this is impossible, protective covering or shields must be placed in the pipeline between the valve and the area being welded prior to welding. Not only must the valve be protected against weld slag, but also against any excessive heat, which could cause seat damage. It is essential that all weld slag, rods, debris, tools, etc., be removed from the pipeline before valves are installed or cycled.
6. Secure the valve between flanges. Compress the flange gasket EVENLY by tightening the fasteners in an alternating sequence.

IMPORTANT: The valve should be tightened between flanges using appropriate gaskets and fasteners for the service, in compliance with applicable piping codes and standards. Recommended fastener lengths are listed in Bulletin T104-1.

MAINTENANCE

General

Routine maintenance consists of tightening down the compression plate periodically to compensate for seal wear. The valve should be closed during tightening. The compression plate, however, should not be tightened down too severely, since this will shorten the life of the seals. More extensive maintenance such as seat, seal and bearing replacement is described below. Numbers in () refer to items shown in Fig. 6.

Valve Removal

1. Read the PRECAUTIONS carefully.
2. Valve must be fully closed before sliding it out of the pipeline.
3. CAUTION: Valves equipped with fail-open (air-to-close) return actuators must be disconnected from the actuators or there must be sufficient air pressure supplied to the actuator to close the valve while removing it from the pipeline. After valve removal, slowly relieve the pressure in the actuator.

SEAT REPLACEMENT

(except for *Fire-Tite* design. For these valves, refer to P. 12)

1. After removing the valve from the line, place it on a bench and cycle it open. Take care not to damage the sealing edge of the valve disc.
2. Remove the insert screws (21) and the insert (2). If the insert does not lift out easily, tap it out from the shaft side using a wooden or plastic rod and a hammer. Don't strike the valve directly with the hammer.
3. Remove the seat and discard it.
4. Remove the body seal (40) where applicable, (3" and 4" series 8200 and 8300 valves).
5. Clean the valve.
6. Carefully clean and polish the disc sealing surface. It should be free of all grooves and scratches.
7. If the disc is slightly damaged it may be possible to smooth the sealing surface with crocus cloth, a fine stone, or the equivalent. If deep scratches are present replace the disc or return the valve to the factory for service.
8. Cycle the valve closed.
9. Place the new seat in the valve.
10. Place the new body seal (40) in the groove in the body (when applicable).
11. Replace the insert and insert screws when applicable. Tighten the screws uniformly.

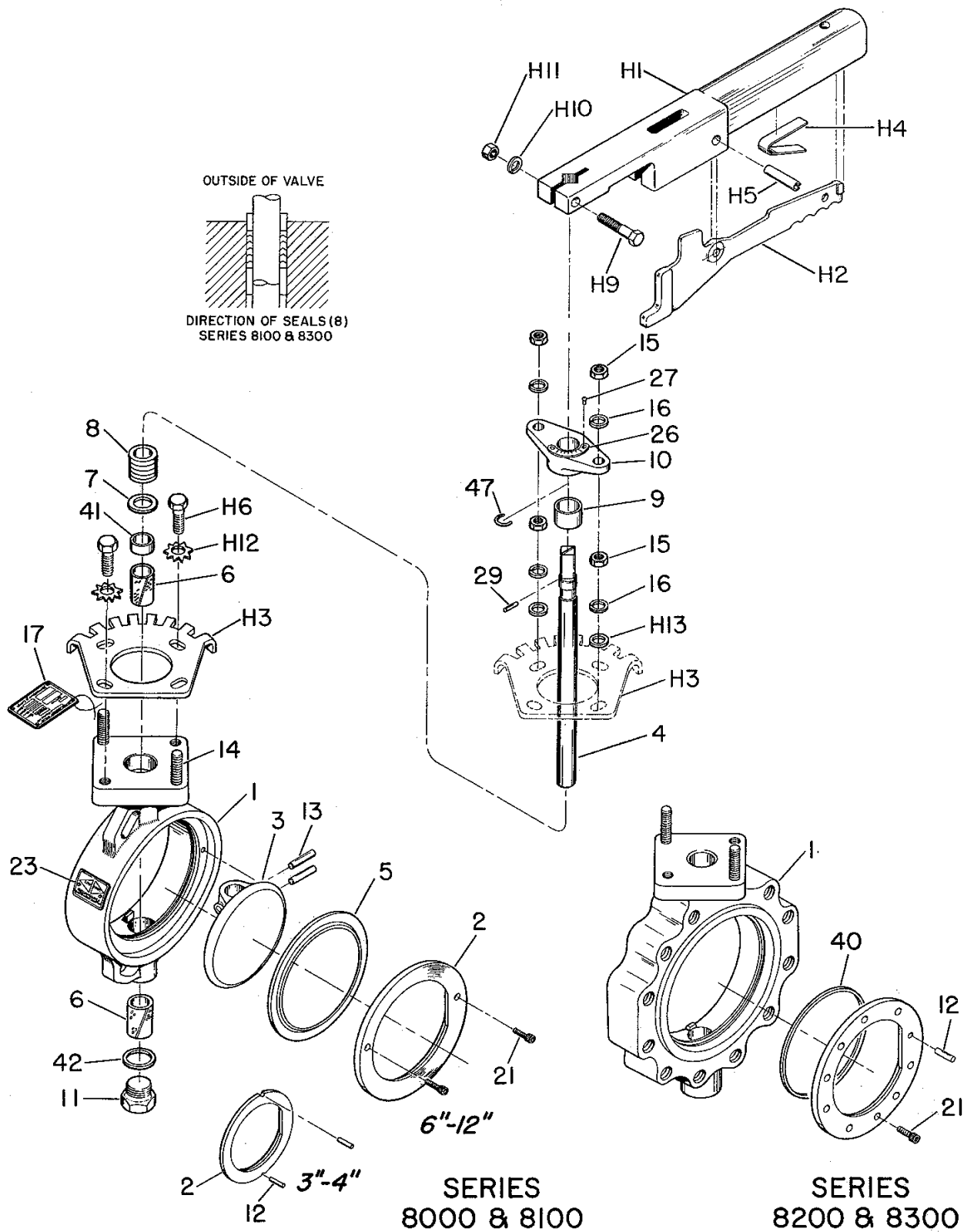


Figure 6
Exploded View

Valve Parts		
ITEM NO.	NO. REQ'D.	PART NAME
1	1	BODY
2	1	INSERT
3	1	DISC
4	1	SHAFT
5	1	SEAT
6	2	SHAFT BEARING
7	1	SPACER
8	1	SHAFT PACKING
9	1	COMPRESSION RING
10	1	COMPRESSION PLATE
11	1	PRESSURE PLUG
12	2	INSERT ROLL PIN (3"-4")
13	2	DISC PINS
14	2	STUD
15	4	JAM NUT
16	4	LOCKWASHER
17	1	NAMEPLATE
18	2	DRIVE SCREW
21	+	CAP SCREW (all valves except 3" & 4" Series 8000 and 8100)
23	1	FLOW DIRECTION TAG
26	1	INDICATOR PLATE
27	2	DRIVE SCREW
29	1	INDICATOR POINTER
40	1	INSERT SEAL (3"-4" 8200 & 8300)
41	1	TOP BEARING SPACER
42	1	PLUG SEAL
47	1	RETAINER RING
60*	1	SEALING RING
61*	1	SEALING TAPE (12" ONLY)
* Fire-Tite valves only + 8000 & 8100 6"-12" - 2 8200 & 8300 3"-8" - 12 10"-12" - 16		

Handle Parts		
ITEM NO.	DESCRIPTION	NO. REQ'D.
H1	Handle	1
H2	Lever	1
H3	Ratchet Plate	1
H4	Spring	1
H5	Spirol Pin	1
H6	Hex Head Cap Screw	2
H9	Hex Head Cap Screw	1
H10	Lockwasher	1
H11	Nut	1
H12	Star Washer	2
H13	Washer	2

- Set the handle or actuator stops as described in the SETTING ADJUSTMENTS Section. Do not install and tighten flanges on a newly reseated valve until the handle or actuator stops are properly set. Incorrect disc positioning may cause damage to a new seat when the valve is compressed between flanges for the first time; NOTE: After installation of a new seat, torque will be higher for a few cycles.

SHAFT PACKING REPLACEMENT

- Remove the handle or actuator.
- Remove the indicator pointer (29) from the shaft. Pull it straight out with a pair of pliers to avoid breaking it off.
- Remove the nuts (15) and washers (16) from above the compression plate (10). Remove the compression plate. The studs (14) do not have to be removed.
- Slide the retainer ring (47) off the shaft where applicable.
- Remove the compression ring (9).
- Remove the old shaft packing (8) with a packing tool.
- The spacer (7) need not be removed for shaft packing replacement.
- Replace the old packing with new packing. NOTE: If the packing is of the TFE chevron type, keep the packing rings stacked in the same order as from kit.
- Reinstall the compression ring (9), the retainer ring (47) where applicable, the compression plate (10), the lock washers (16) and nuts (15) and the indicator pointer (29). Be sure that the hardware has been installed so that the indicator plate is under the pointer.

* If the compression ring initially sits too high to install the retainer ring it may be necessary to precompress the packing somewhat. In that case, install the compression plate and tighten the nuts enough to accomplish the precompression. Remove the compression plate to install the retainer ring and then complete the reassembly.

- Close the valve (the seat and insert should be installed in the valve at this point).
- Tighten the nuts (15) evenly until the packing is adequately compressed to prevent leakage. This should require tightening the nuts approximately 1 1/2 to 2 full turns past the "finger-tight" position.

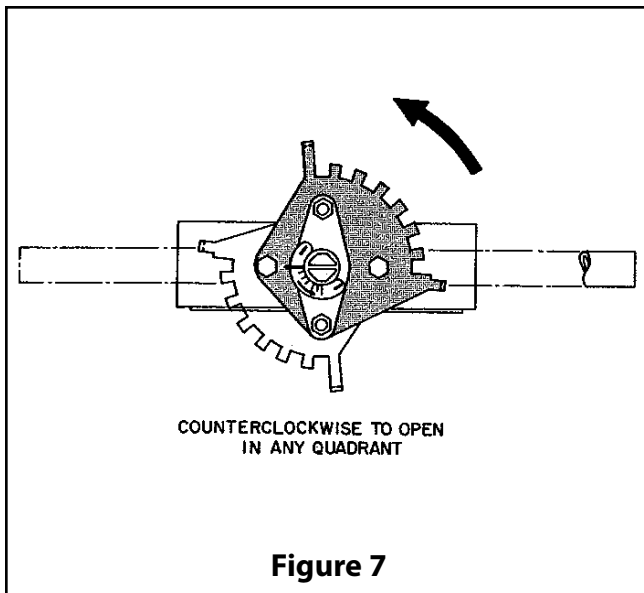
VALVE DISASSEMBLY

- Place the valve on a bench or other suitable working space.
- If the seat is to be replaced, follow Steps 2, 3, & 4 in the SEAT REPLACEMENT Section. NOTE: It is a good idea to replace the seat (and body seal in 3" and 4" valves) any time a valve is rebuilt. For *Fire-Tite* Valves, refer to P. 12.

3. Remove the shaft packing compression hardware as detailed in Steps 1-5 in the SHAFT PACKING REPLACEMENT section. The packing material itself can be more easily removed after the shaft has been removed from the valve.
4. Remove the disc pin welds by grinding or machining off the weld. Drive out the pins in the direction shown in Fig. 6.
5. Grind or file off the tack weld locking the pressure plug (11). Remove the plug and its seal (42).
6. Use a soft rod and hammer to tap the bottom of the shaft (4). Remove it through the top of the valve. NOTE: In doing so, and freeing the disc, be careful not to scratch the sealing surface of the disc.
7. Remove the packing (8) and the spacers (7) and (41).
8. Remove the top bearing (6) by pushing it up from the bottom (waterway).
9. Remove the bottom bearing (6) by pushing it down from the top (waterway).

VALVE ASSEMBLY

1. Clean all valve components.
2. Inspect all components for damage before starting to assemble the valve. Look especially for damage to sealing areas on the disc, shaft, and body and for wear in the bearing areas of the shaft and body.
3. Carefully clean and polish the disc sealing surface. It should be free of all grooves and scratches.
4. If the disc is slightly damaged it may be possible to smooth the sealing surface with crocus cloth, a fine stone, or the equivalent. If deep scratches are present replace the disc or return the valve to the factory for service.
5. Install the bearings (6) into the body bores from the ends of the valve.
6. Coat the shaft and the disc bore lightly with a lubricant compatible with the fluid to be handled by the valve.
7. Position the disc (3) in the body and slide the shaft (4) through the body and disc. Use caution to prevent damage to the bearings. An arrow and the word "bonnet" on the disc indicates correct orientation with the compression plate (10).
8. Insert the disc pins (13) and drive them into place. The wedge pins used in the design of the 8000 and 8200 series valves must be driven so that both pins are the same depth within 1/16". This requirement is not relevant to the taper pin design in the 8100 and 8300 series. Be certain that the pins are installed from the direction shown in Fig. 6. When they are correct, the indicator pointer (29) will point exactly parallel with the face of the disc. Weld both ends of the pins, small end first. After the disc cools, clean the welds with a wire brush. CAUTION: use care to keep contamination out of the valve.
9. Install the upper bearing spacer (41) (on all valves except 8" 8100 and 8300 series valves), the spacer (7), the packing (8), the compression ring (9) and the retainer ring (47) where applicable. If the packing is of the TFE chevron type, be certain that it is installed in the orientation shown in Fig. 6.
10. If the studs (14) have been removed from the valve, reinstall them in the holes shown in Fig. 6.
11. If the handle ratchet plate or the actuator base plate has been removed from the valve, reinstall it in the orientation shown in Fig. 6 or Fig. 9. Install lockwashers and screws in the two bonnet holes not used by the studs and install the lower lockwashers (16) and nuts (15) on the studs. Do not tighten the screws and nuts until the stops are set, (see SETTING ADJUSTMENTS Section).
12. Place the compression plate (10) over the shaft (4) and studs (14). Orient the plate so that the indicator pointer will be over the indicator plate. Install the lockwashers (16) and nuts (15), but do not tighten. Install the indicator pointer in the shaft.
13. Place the plug seal (42) in the recess at the bottom of the valve and install the plug (11). Torque the plug until it is flush with the body. A small (1/16") tack weld on the corner of the plug is recommended. CAUTION: A larger tack weld is apt to have enough heat to damage the seal.
14. Cycle the valve fully closed. If the seat and body seal are to be replaced as recommended, do so at this point. See the SEAT REPLACEMENT Section for details.
15. Install the insert and insert screws as shown in Fig. 6. The 3" and 4" 8000 and 8100 series valves do not have insert screws, They use two pins (12) to locate and hold the insert. Tighten the screws uniformly.
16. With the valve still closed, tighten the nuts (15) on the compression plate evenly until the packing is adequately compressed to prevent leakage. This should require tightening the nuts approximately 1 1/2 to 2 full turns past the "finger-tight" position.
17. Set the handle or actuator stops as described in the SETTING ADJUSTMENTS Section. Tighten the screws and nuts holding the ratchet plate or actuator base-plate. Do not install and tighten flanges on a newly reseated valve until the handle or actuator stops are properly set and the valve is fully closed. Incorrect disc positioning may cause damage to a new seat when the valve is compressed between flanges for the first time.



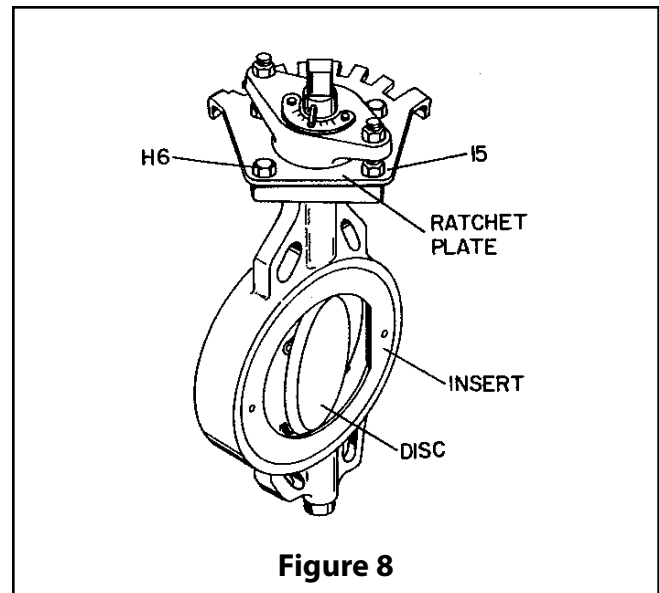
ACTUATOR MOUNTING

Original mounting of actuators is not covered in this document because of the wide variety of possible actuators. If an actuator is to be added to the valve, see the Actuator Mounting Instructions (AMI) accompanying the linkage kit for the actuator being mounted. Adjust the actuator stops as described below in the stop setting section for the appropriate actuator.

Change of Handle Quadrant

If it is necessary to remount the handle 180° from its standard direction (Fig. 7):

1. Remove the handle, indicator pointer (29), nuts (15), lockwashers (16), flatwashers (H13), compression plate (10), hex head cap screws (H6) and lockwashers (H12). Do not remove the studs (14).
2. Lift the ratchet plate up off the studs and rotate it 180° around the shaft. Do not turn it upside down. Drop it back over the studs.
3. Reinstall all the components which were just removed. Be certain that the indicator plate (26) is correctly oriented with respect to the indicator pointer (29) during the reassembly. Do not tighten the ratchet plate fasteners until the plate has been properly adjusted as described below in the SETTING HANDLE STOP Section. If the valve is not installed in the line, do not install it until the ratchet plate is properly adjusted.



Change of Actuator Quadrant

If it is necessary to orient the actuator in a different quadrant (Figures 9 and 10):

1. Loosen the valve/actuator coupling by loosening the coupling screws.
2. Mark the actuator bracket and baseplate to identify their orientation to each other. The bolt holes on many linkages are not symmetrical, so the identical holes must be aligned with each other before and after the actuator rotation. CAUTION: If the bracket is rotated with respect to the baseplate, the shaft will not be aligned with the actuator driver square, the coupling will not stay tight on the valve and damage may be done to the shaft and packing.
3. Remove the four bolts holding the actuator bracket to the actuator baseplate.
4. After removing the actuator and bracket from the valve, remove the four screws holding the actuator bracket to the actuator.
5. Reposition the actuator in the desired quadrant.
6. Reinstall and retighten the four screws which hold the actuator bracket to the actuator.
7. Verify that the actuator and valve positions match, i.e., valve closed and actuator at the "closed" end of stroke. This ensures opening of the valve in a counterclockwise direction, as shown in the illustrations. NOTE: Type ST-MS safety return actuators can spring-to-close only. They cannot be reoriented for spring-to-open. Spring-to-open actuators are available only in the *Quadra-Powr* series of actuators.
8. Reinstall the bracket on the baseplate, holding the two together with the four bolts and nuts. The bracket and baseplate should touch each other at all four bolt holes but the nuts should be only "finger tight". (Excessive tightening will prevent proper alignment of the actua-

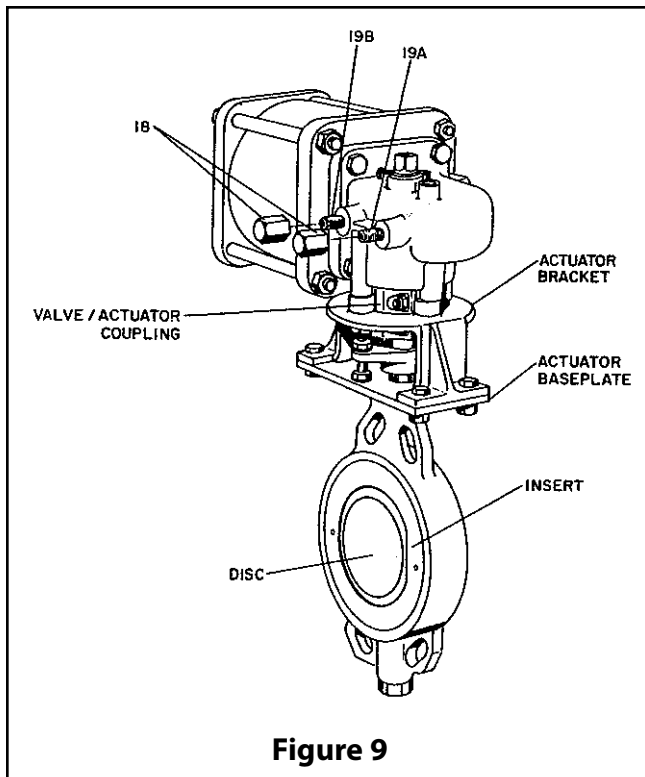


Figure 9

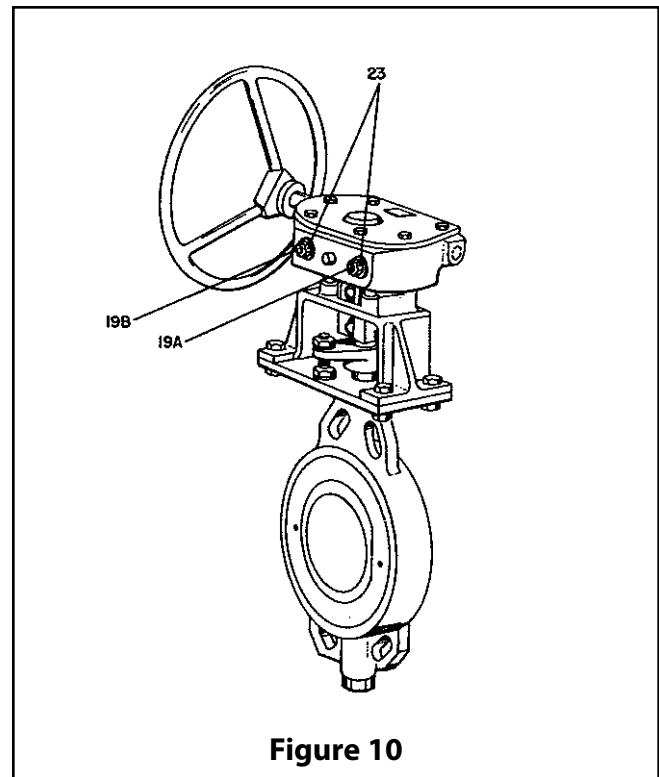


Figure 10

tor drive shaft and valve stem. Failure to tighten snugly will cause the shaft and disc to be pushed downward away from optimum seat contact when final tightening is accomplished.

9. Install the coupling and tighten the coupling bolts. Be sure the actuator drive shaft and valve stem are rigidly held together and properly aligned.
10. Loosen slightly the four nuts and bolts joining the bracket and baseplate so that the coupling can better align the actuator drive shaft and valve stem. Then fully tighten the nuts and bolts.
11. Set the actuator stops as described below in the SETTING ADJUSTMENTS section for the appropriate actuator. If the valve is not installed in the line, do not install it until the actuator stops are properly adjusted.

SETTING ADJUSTMENTS

Setting Stops (valve in the line)

It is preferable to adjust the stops on the handle or actuator before the valve is installed in the line because of the ability to check disc position visually. If this is not possible, and the valve is installed in the line, use the procedures which follow, ignoring any reference to measured clearance to the disc. CAUTION: There must be no pressure across the valve while the stops are being set. Following adjustments, check all linkage and coupling bolts for tightness.

Setting Stops (valve out of the line)

The following steps rely upon the insert (2) being clamped in the position it will take when installed in the line. The insert must be flush with the face of the body (1) within 1/64" maximum. The installed seat tends to lift the insert unless it is completely clamped or screwed in place. It may be most convenient to adjust the stops with the seat removed from the valve. Following the setting of the stops, the seat and insert must be reinstalled as described in the SEAT REPLACEMENT section.

Following adjustments, check all linkage and coupling bolts for tightness.

Setting Handle Stop (Fig. 8)

1. Loosen the two hex head cap screws (H6) and the two nuts (15) clamping the ratchet plate to the valve.
2. Close the valve until the disc touches the insert. Do not overclose the valve so that the insert is lifted by the disc.
3. If the handle (H1 in Fig. 6) has been removed from the valve, reinstall it on the shaft drive square and tighten the nut (H11). The handle should be installed so that it is parallel with the disc (3) in order to provide visual indication of disc position when viewed from a distance. With the handle locking tab in the last (closed) notch of the ratchet plate, rotate the ratchet plate clockwise (when viewed from above the handle) until it is stopped by the locking tab. The disc/handle assembly is now lightly trapped between the insert and the ratchet plate.
4. Tighten the two nuts (15) and two screws (H6) holding the ratchet plate.

Setting stops on ST and ST-MS Pneumatic Actuators (Fig. 9)

1. Disc travel on a *Wafer-Sphere* valve with a Type ST or ST-MS pneumatic actuator is controlled with a closed ("shut") travel stop set screw (19A) and by an open travel stop set screw (19B) in the actuator.
2. Remove acorn nuts (18) protecting the stop set screws. NOTE: Be sure O-rings remain in the acorn nuts.
3. Adjust the closed ("shut") stop set screw (19A) until the disc just touches the insert when the actuator is at the end of its stroke. Air pressure may have to be applied to ST-MS actuators to relieve the load on the closed (shut) stop set screw during the adjustment. CAUTION: If pressure is supplied to the actuator while the valve is exposed keep hands and tools away from the disc.
4. From the position which allows the disc to just touch the insert, turn the stop set screw in about 1/8 turn to get the disc 1/64" off the insert.
5. Cycle the actuator open and back to closed several times and verify that the disc returns to the same position each time. Keep hands and tools away from the disc and do not allow the disc to drag across surfaces which can scratch the sealing edge.
6. Cycle the valve to the open position. If necessary, adjust the open stop set screw (19B) until the pointer (24) is approximately 90° from the closed (shut) position. This is full open.
7. With the valve in the full open position, and with air applied so that load is applied to the open stop set screw to prevent it from moving, cover the open stop set screw with an acorn nut. Tighten the open stop set screw acorn nut.
8. Now close the valve. With the valve in the closed position, and air (or spring) load applied to the stop set

screw, tighten the closed (shut) stop set screw acorn nut.

9. Cycle the valve open and closed, with full air pressure, three times. The disc must return to the same position each time. Visually check to see that the disc is within 1/64" of the insert stop but is not lifting the insert from its proper position.

Setting Stops on Quadra-Powr Actuators

Follow the instructions for adjustment of ST-MS actuators with the following exceptions:

- (a) The *Quadra-Powr* has no acorn nuts on the stop screws.
- (b) Because the stop screws can be held in position with a screwdriver while tightening the jam nuts, there is no need to apply a load to the ends of the screws during this operation.

Setting Stops on Manual Gear Actuator (Fig. 10)

1. Loosen the jam nuts (23) locking the stop set screws (19). Back out the closed (shut) stop set screw (19A) far enough to allow the actuator to move the disc until it is just touches the insert.
2. Screw in the closed (shut) stop set screw until it stops against the gear face inside the actuator.
3. Taking care not to move the set screw, use the handwheel to open the disc slightly. Turn the closed (shut) stop set screw in about 1/8 turn. Check to see that the disc is 1/64" off the insert.
4. Lock the stop set screw with the jam nut at this point. The screw must be kept from moving while the nut is being tightened. This may be done either by holding the screw with a wrench, or by using the handwheel to drive the gear firmly against the end of the screw.
5. Open the valve so that the pointer is approximately 90° from the closed (shut) position using the handwheel. Adjust the open stop set screw (19B) to stop the gear at this position. Hold the stop set screw and tighten the jam nut.

Setting Stops on Electric Actuators

Electric actuator stops are controlled by adjustable cams and switches. Follow basically the same procedure for these actuators as for ST actuators. The closed (shut) switch should stop the disc within 1/64" of the insert. Do not set the stop so that the disc touches the insert before the switch turns the actuator off.

FIRE-TITE WAFER-SPHERE VALVES

Seat Replacement

1. After removing the valve from the line, place it on a bench and cycle it open. Take care not to damage the sealing edge of the valve disc.
2. Remove the insert screws (21) and the insert (2), see (Fig. 11). If the insert does not lift out easily, tap it out from the shaft side using a wooden or plastic rod and a hammer. Don't strike the valve directly with a hammer.
3. Remove the metal sealing ring (60) and the soft seat (5). Discard the soft seat.
4. Remove the gasket from between the insert and body on 3", 4" and 12" valve.
5. Carefully clean the sealing ring. Polish the I.D. It should be free of all grooves and scratches. If deep scratches are present, replace the sealing ring.
6. Clean the valve.
7. Carefully clean and polish the disc. It should be free of all grooves and scratches.
8. If the disc is slightly damaged, it may be possible to smooth the sealing surface with crocus cloth, a fine stone, or the equivalent. If deep scratches are present, replace the disc or return the valve to the factory for service.
9. Cycle the valve closed.
10. Verify that the disc is in the level position. Install new soft seat, sealing ring, and insert. See (Fig. 11). Note: A gasket is also required on 3", 4", and 12" sizes, see step #11). Install the insert screws, and tighten them uniformly. Check the gap between sealing ring and disc using feeler gages. The gap must not vary more than .008 when checked at six spots equally spaced on disc.

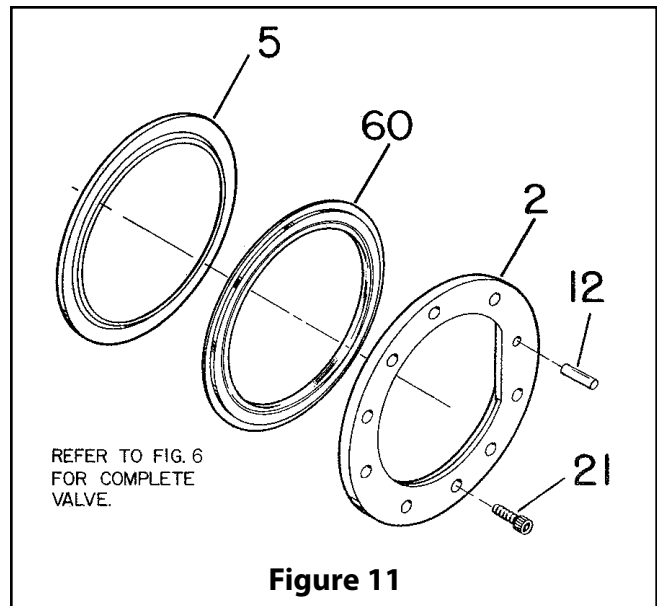


Figure 11

11. For 3", 4" and 12" sizes, a gasket is required between the insert and body as shown in (Fig. 12). On 3" and 4" valves, the precut gasket must be placed so that the holes line up with the insert screw holes. The 12" valve uses a graphite tape gasket. This tape is installed in accordance with the following steps:

- a. Important: Exercise care at all times not to damage the tape. A break in the tape will cause leakage and hence cannot be allowed.
- b. The bottom surface of the insert is to be free of all foreign particles. Clean thoroughly with a suitable solvent.
- c. Peel off 3 to 6 inches of, backing paper from the graphite tape.
- d. Apply the tape on the insert, adhesive side to insert bottom, overlapping on the I.D. approximately 1/32" (Fig. 13). Do not peel backing more than 3 to

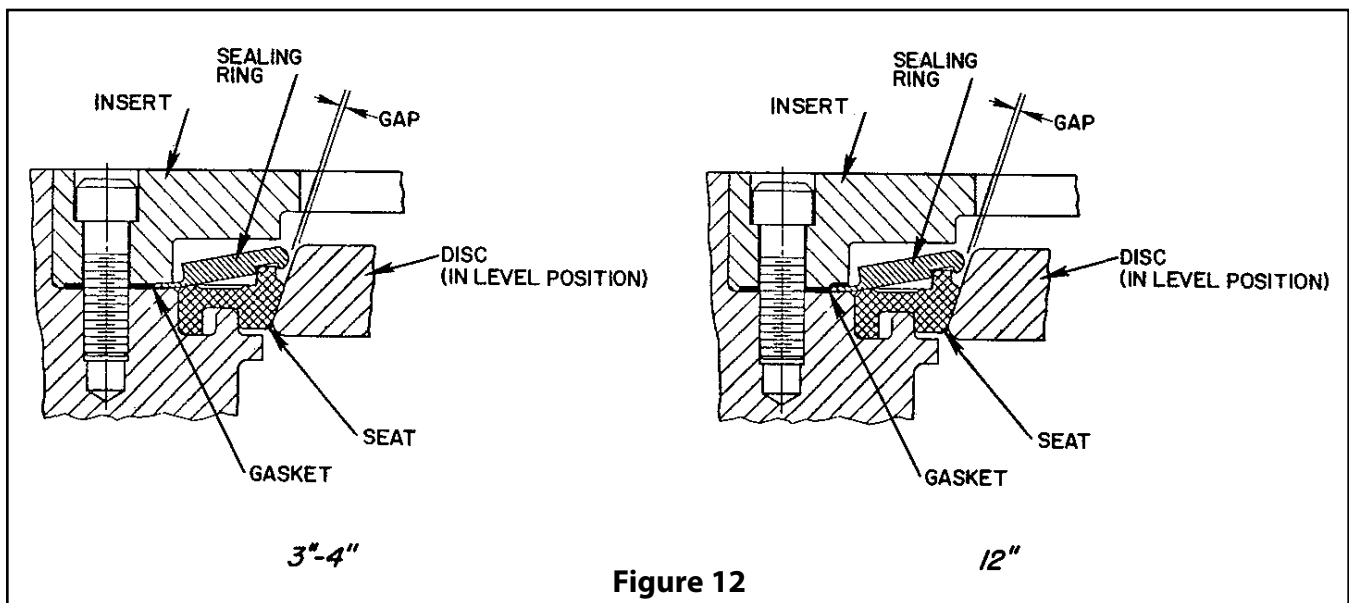


Figure 12

6 inches (handling will be difficult). Do not start tape over an insert screw hole.

- e. Upon reaching the starting point, lap tape not more than 1/8" and cut lapping tape with a sharp blade.
- f. Compress the tape on the insert by rolling (use cylinder, Fig. 14A) to assure total contact with insert. Compress the tape in the seal ring groove by carefully centering the sealing ring (60) in the insert and rolling (Fig. 14B). Remove the sealing ring from the insert.

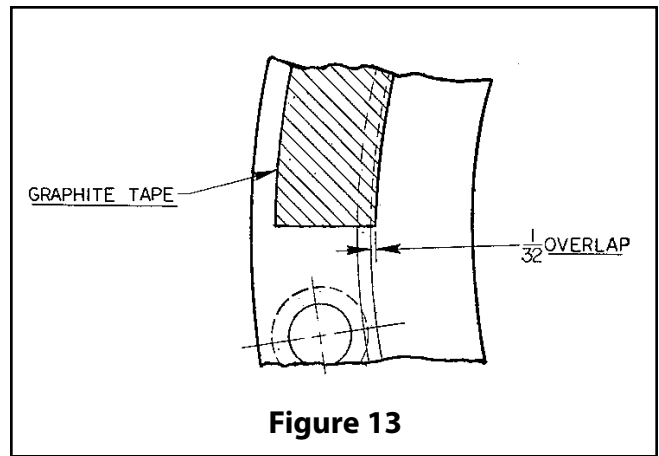


Figure 13

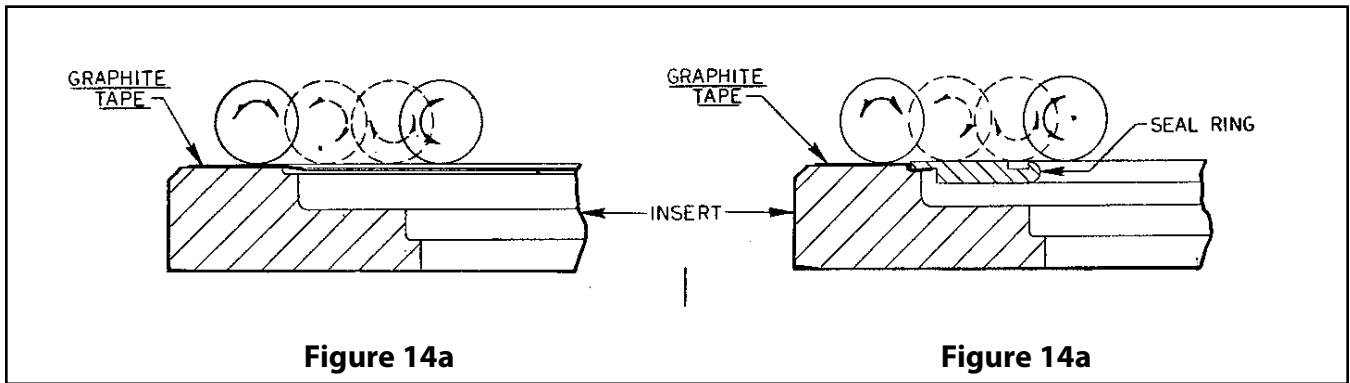


Figure 14a

Figure 14a

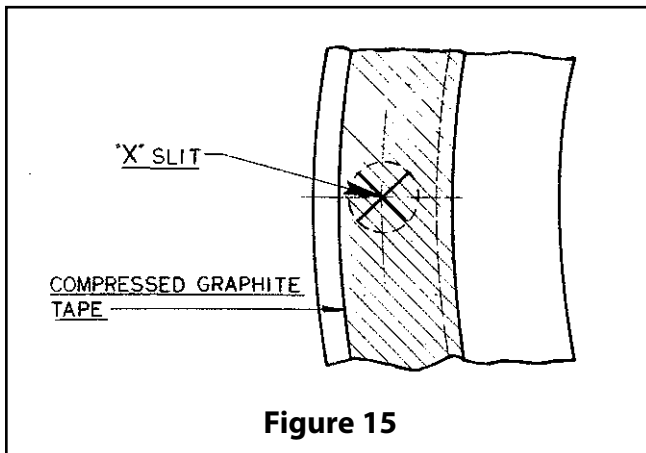


Figure 15

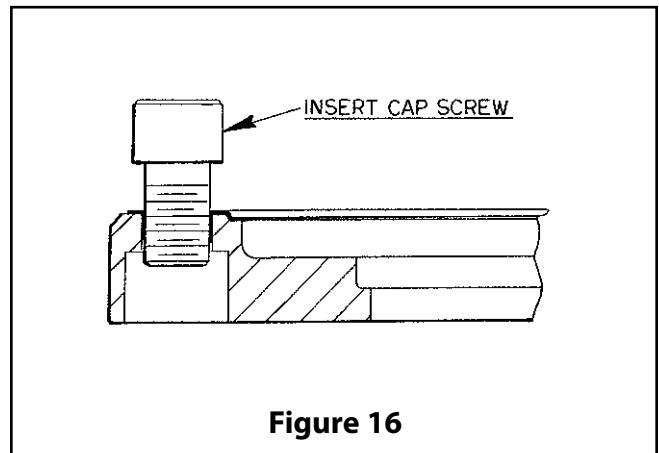


Figure 16

- g. Clear the tape from insert screw holes by cutting "X" (Fig. 15) with a sharp blade and inserting an insert cap screw from the bottom (Fig. 16), to open all holes to the correct diameter.
- h. A break in the tape may be mended by removing the damaged portion, replacing it with a new section of comparable dimensions, overlapping each end not more than 1/8". Repeat steps (f) & (g).
- i. Take care in handling the sub-assembly. Do not stack or handle it in any manner that may cause damage to the taped surface.

12. Set the handle or actuator stops as described in the SETTING ADJUSTMENTS Section. Do not install and tighten flanges on a newly reseated valve until the handle or actuator stops are properly set and the valve is fully closed. Incorrect disc positioning may cause damage to a new seat when the valve is compressed between flanges for the first time. NOTE: After installation of a new seat, torque will be higher for a few cycles.

Subject to change without prior notice.

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