

Jamesbury™ Wafer-Sphere™ butterfly valves series 8000 and 8200, 24" - 48"

Installation, maintenance and
operating instructions

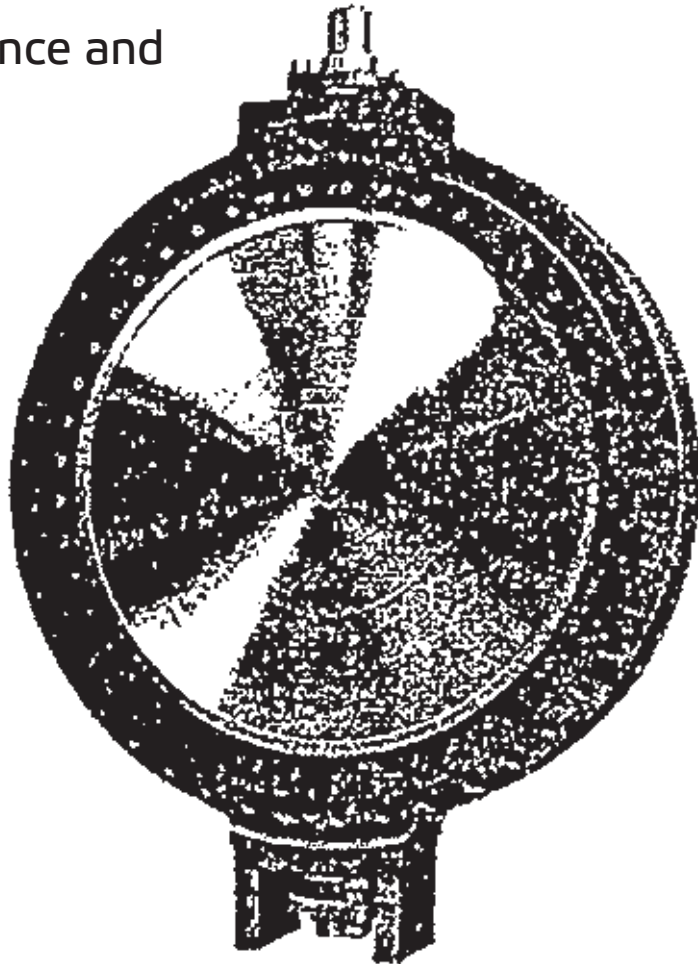


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READ THESE INSTRUCTIONS FIRST!

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.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. DESCRIPTION

The Jamesbury™ *Wafer-Sphere* valve is a high performance butterfly valve with a one-piece body and a resilient, positive-sealing seat. In 24" - 48" sizes, it is available in two standard series:

8000 Series – Wafer design for ANSI Class 150 piping systems.

8200 Series – Single flange (lugged) design for ANSI Class 150 piping systems.

IMPORTANT NOTE: Maximum shut-off pressure rating depends on the materials chosen. Refer to the tag attached to each valve for this rating.

1.1 OFFSET 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. 4**). Offset shaft design makes the rotating disc cam back and away from the seat, 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. 4**)

1.2 POSITIVE STOP FEATURE

To prevent seat damage from over-travel of the disc beyond the closed position (primarily during field mounting of an 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 stops in-line. The location of the feature on the body is shown in the drawing, Figure 3.

1.3 WARNING

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

ARE YOU PROTECTED?

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

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 AN ACTUATOR ON THE VALVE.

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

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 OR DAMAGE TO THE WAFER WILL RESULT.

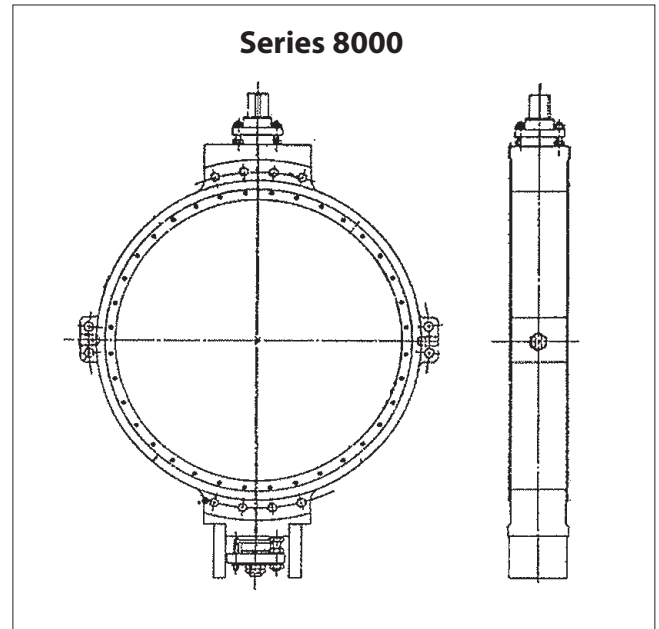


Figure 1.

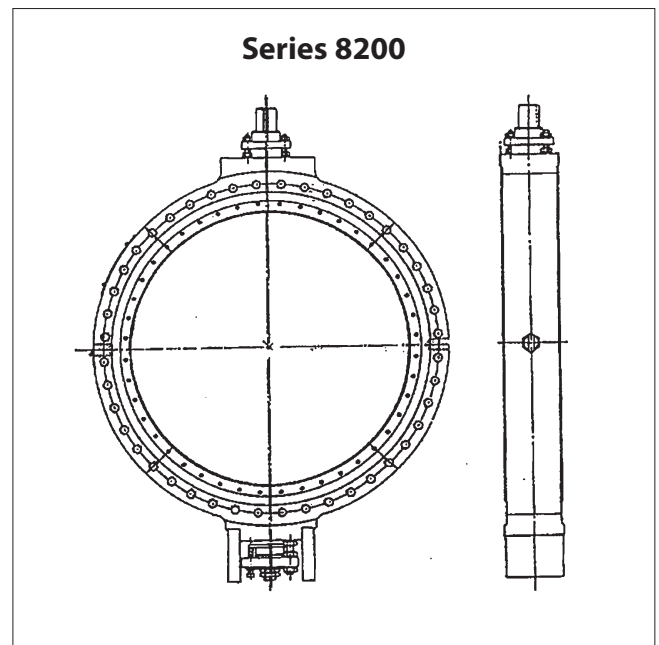


Figure 2.

NOTE REGARDING FLANGE BOLT HOLE THREAD

In order to accommodate normal alloy steel bolting, flange bolt holes larger than 1" are being standardized with a UN-8 thread. Inspect the valve body to determine whether it has previous UNC-7 or new UN-8 tapped holes.

2. INSTALLATION

- I. FULL PRESSURE RATING - POLYMERIC-SEATED *WAFER-SPHERE* VALVES (Refer to the catalog for allowable pressures and temperatures.) In general, for full pressure rating, all polymeric-seated *Wafer-Sphere* butterfly valves should be installed with the disc face toward the higher pressure (shaft downstream.)
- II. METAL-SEATED *WAFER-SPHERE* VALVE

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

- III. GENERAL INFORMATION

1. Read the **GENERAL WARNING** Section carefully.
2. **IMPORTANT: ONLY** actuator stop set screws should be used to stop the disc in position. **DO NOT** use the "positive stop" feature by itself to limit actuator travel.
3. Before installing the closed valve in the line, be sure that the actuator is attached so that a counterclockwise rotation, viewed from above, opens the valve (see **Fig. 4**). Again, fully close the valve before installing it in the line.
4. 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.

3. MAINTENANCE

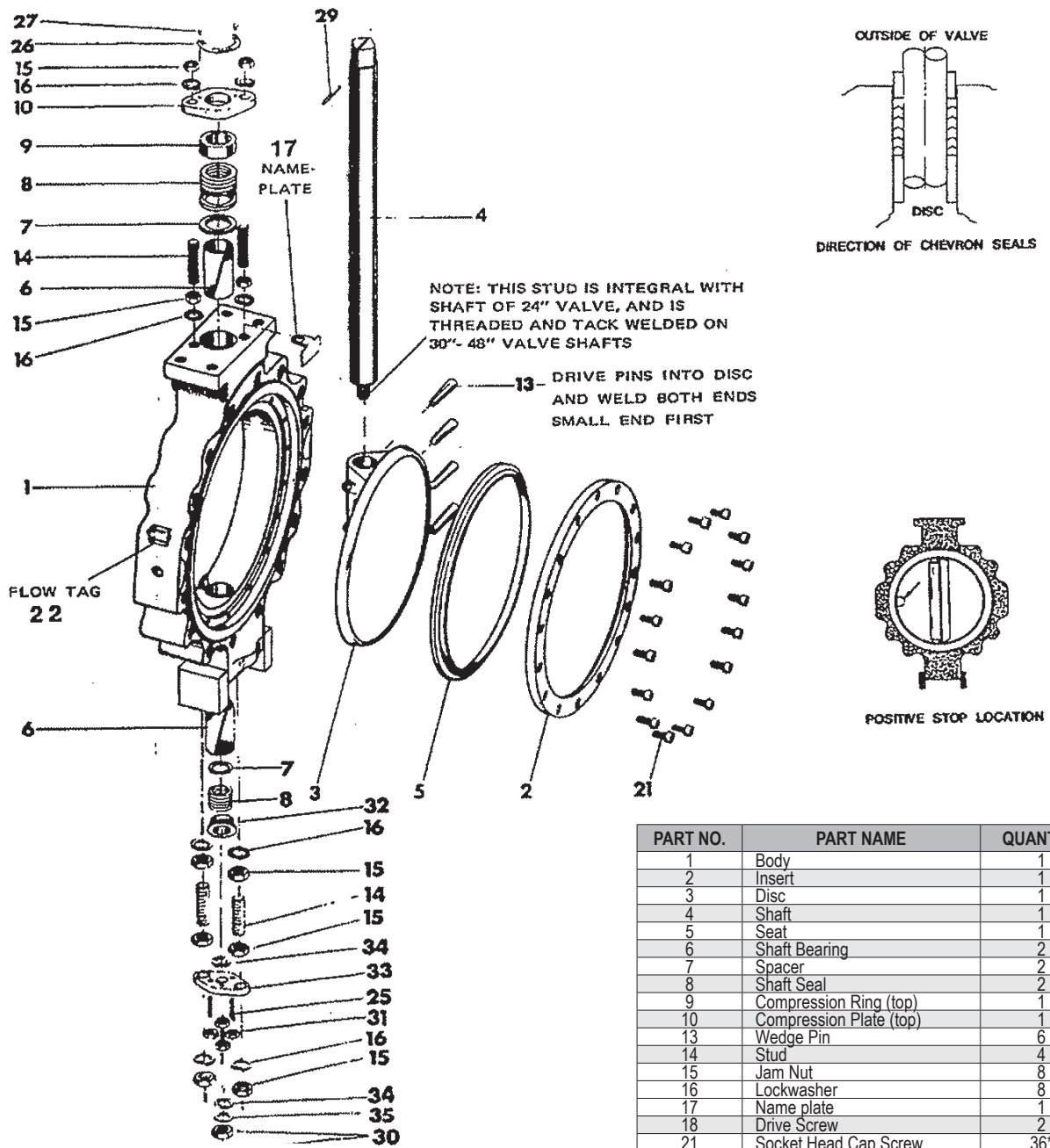
Routine maintenance consists of tightening down the compression plate periodically to compensate for seal wear. The valve should be closed during tightening. The compression plate, however, should not be tightened down too severely, since this will shorten the life of the seals. More extensive maintenance such as seat, seal and bearing replacement is described in the following sections. Numbers in () refer to items shown in Fig. 3.

3.1 VALVE REMOVAL AND SHOP MAINTENANCE

- I. Read the **WARNING** Section carefully.
- II. Valve must be fully closed before sliding it out of the pipeline.
- III. **CAUTION:** Valves equipped with fail-open spring return actuators must have sufficient air pressure applied to the actuator to close the valve. After valve removal, slowly relieve the pressure in the actuator. Take care to protect the exposed sealing edge of the disc.
- IV. Seat Replacement (**Refer to Fig. 3**)
 1. After removing the valve from the line, cycle the valve open. Take care not to damage the edge of the disc while it is open.
 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 hammer. Do not strike the valve directly with the hammer.
 3. Remove the seat, and discard it.
 4. Clean the valve.
 5. Carefully clean and polish the disc sealing surface. It should be free of all grooves and scratches.
 6. 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.
 7. Cycle the valve closed.
 8. Place the new seat in the valve. Make sure the angle on the inside diameter of the seat corresponds to the angle of the outer edge of the disc.
 9. The insert should be installed per Figure 3.
 10. Install the socket head cap screws (21) and tighten as shown in the sequential diagram (**Fig. 9**) and torque chart (**Table I**).
 11. Seat compression is accomplished when the valve is installed between flanges and the flange bolts are tightened.

CAUTION: Unless the valve is in the fully closed position, compressing the seat may damage it.

Exploded View



* Item #21 Qty. varies with size:

- 24" - Qty. 20
- 30" - Qty. 24
- 36" - Qty. 32
- 42" - Qty. 36
- 48" - Qty. 44

PART NO.	PART NAME	QUANTITY
1	Body	1
2	Insert	1
3	Disc	1
4	Shaft	1
5	Seat	1
6	Shaft Bearing	2
7	Spacer	2
8	Shaft Seal	2
9	Compression Ring (top)	1
10	Compression Plate (top)	1
13	Wedge Pin	6
14	Stud	4
15	Jam Nut	8
16	Lockwasher	8
17	Name plate	1
18	Drive Screw	2
21	Socket Head Cap Screw	36*
22	Flow Direction Tag	1
25	Set Screw	4
26	Indicator plate	1
27	Drive Screw	2
29	Indicator	1
30	Nut	3
31	Check Nut	4
32	Compression Ring (bottom)	1
33	Compression Plate (bottom)	1
34	Washer	2
35	Washer	1
36	Nut	0

Figure 3.

NOTE: After installation of a new seat, torque will be higher for a few cycles. Whenever a seat is replaced or an actuator is removed and reinstalled on a valve, the actuator travel stops will in all likelihood have to be readjusted. ACTUATOR/VALVE ADJUSTMENTS for instructions.

V. Upper Shaft Seal Replacement

1. Remove the actuator.
2. Remove the indicator (29). Take off the compression plate (10) by removing the stud nuts (15) and lockwashers (16). The studs (14) do not have to be removed.
3. Remove the compression ring (9).
4. Remove the old shaft seals (8) with a packing tool.
5. Do not remove the spacer (7), unless complete disassembly is necessary.
6. Replace the old seals with new seals. **NOTE:** If the seals are of the chevron type, keep the seal rings stacked in the same order as removed from the kit, and install them in the direction shown in Fig. 3.
7. Reinstall the compression ring (9), the compression plate (10), the lock washers (16) and nuts (15). Replace the indicator (29). Be sure that the hard-ware has been installed so that the indicator plate is under the pointer.
8. Close the valve (the seat and insert should be installed in the valve at this point).
9. 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.
10. VI. Lower Shaft Seal Replacement (See stud note Fig. 3)
11. Remove the two locknuts (30) on the wafer shaft.
12. Remove the two outer stud nuts (15) and lock-washers (16). The studs do not have to be removed. Do not adjust the stud nuts between the body and the compression plate.
13. Remove the compression plate washers (34 and 35) and the compression plate (33).
14. Remove the bottom compression ring (32).
15. Remove the old shaft seals (8) with a packing tool.
16. Replace the old seals with new seals. **NOTE:** If the seals are of the chevron type, keep the seal rings stacked in the same order as removed from the kit, and install them in the direction shown in Fig. 3.
17. Do not remove the spacer (7), unless complete disassembly is necessary.
18. Reassemble according to assembly instructions #6 through #12.

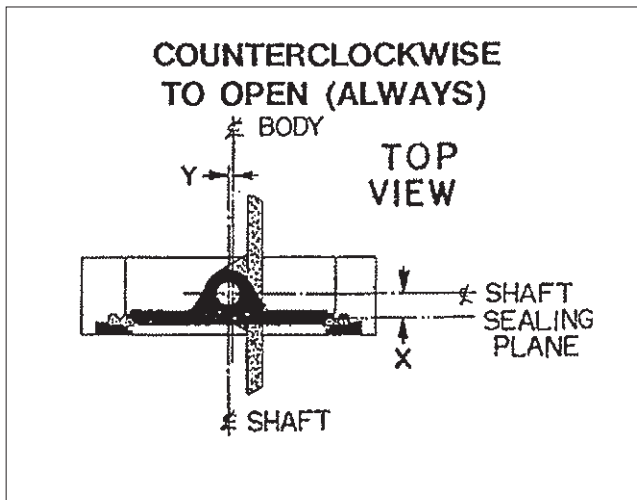


Figure 4.

4. VALVE DISASSEMBLY

1. Place the valve on a bench or other suitable working space.
2. If the seat is to be replaced, follow steps 2, 3, and 4 in the SEAT REPLACEMENT Section. **NOTE:** It is a good idea to replace the seat any time a valve is rebuilt.
3. Remove the shaft packing compression hardware as detailed in Steps 2-5 in the Upper Shaft Seal Replacement section. The packing material itself can be more easily removed after the shaft has been removed from the valve.
4. Remove the disc pins by grinding or machining off the welds. Drive out the pins in the direction shown in diagram (Fig. 3).
5. Disassemble the lower seal assembly as detailed in Steps 2-7 in the Lower Shaft Seal Replacement section.
6. Support the disc so that it will not drop upon removal of shaft. Remove the shaft through the top of the valve. Use a hammer or press to drive the shaft. Protect the threads and the bearing surface at the end of the shaft from damage during this operation. Do not hammer on the end of the threaded center stud. **NOTE:** In removing the shaft and freeing the disc, be careful not to scratch the sealing surface of the disc.
7. Remove the top bearing (6) by pushing it up from the bottom (waterway).
8. Remove the bottom bearing (6) by pushing it down from the top (waterway). **NOTE:** To keep bearings in place, the valve body is staked on the I.D. **DO NOT** try to remove the bearing by pushing them toward the center of the valve.

5. 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. Place the body (1) on a flat surface with the insert facing the assembler. Remove the seat (5) if not already removed.
6. Insert the bearings (6), lubricating the inside diameter with silicone grease or other lubricant compatible with the fluid to be handled. Using a center punch, stake the inboard end of the bearing bores to prevent movement during assembly and service. On 24"-48" valves, stake the outboard end of the lower bearing bores. **NOTE:** this staking will not be required if the original factory staking has not been damaged.
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 on the disc indicates which end of the disc should be located on the bonnet side.
8. Insert the pins (13) and drive them into place according to sequence in Fig. 7. The sequence and direction is very important to avoid alignment error between shaft and disc and be sure that all the pins can be installed. Weld both ends of the pins, small end first. After the disc cools, clean the welds with a wire brush. Welding may be left for the last operation if desired.
9. Slide the spacer (7), shaft seals (B), and compression ring (9) over the shaft (4) at the top of the valve. Slide the compression plate (10) over the shaft and studs (14), then place the two lockwashers (16) and nuts (15) on the studs (14). Do not tighten these nuts down onto the compression plate at this time.
10. Slide the spacer (7), shaft seals (8), and compression ring (32) onto the shaft (4) at the bottom of the valve.
11. Slide one thrust washer (34) onto the threaded stud at the bottom of the shaft. Slide the compression plate (33) over this shaft stud and the two studs (14), making sure that there are two nuts (15) on each stud between the compression plate and the valve body, one with lockwasher (16) to secure the stud to the body, and the other for adjusting the compression plate. Back the seat screws (25) out far enough to prevent them from contacting the compression ring (32).
12. Place the second thrust washer (35) and the two nuts (30) on the shaft stud, tightening the first nut only enough to take up all slack. Tighten the second (jam) nut securely against the first. The compression plate should be free to rotate but must not have any axial freedom on the shaft stud. Check for this.
13. Place the two lockwashers (16) and nuts (15) on the studs (14). Use these two nuts with the two nuts on the other side of the compression plate to adjust the disc upward or downward so that it is centrally spaced in the waterway. Measurements taken from the disc to the valve body at the top and bottom must be identical with one another within .015". Make sure all four nuts are tight.
14. Cycle the valve and recheck this measurement.
15. Install the seat according to maintenance instructions IV-7 through 10.
16. Tighten the set screws (25) at the bottom of the valve and nuts (15) at the top of the valve adequately to prevent shaft seal leakage. They should not be tightened too severely, since this will shorten the life of the seals.

6. ACTUATOR MOUNTING

1. Install the actuator on the valve in accordance with the applicable Actuator Mounting Instructions (AMI). If no AMI is available, install the actuator in accordance with the following general procedure.
2. Reinstall the actuator bracket on the valve, holding the two together with four bolts. The actuator should be securely bolted to the bracket at this point. Note that the bracket/valve bolt pattern is not symmetrical with respect to the valve shaft. Check to be certain that the actuator/bracket/valve orientation is such that the actuator is correctly oriented on the valve and that the actuator drive shaft and valve shaft are exactly aligned. The bolts between the valve and bracket should be snug but not too tight. (excessive tightening will prevent proper alignment of the actuator drive shaft and valve stem. Failure to tighten snugly will cause the shaft and disc to be driven downward away from optimum seat contact when final tightening is accomplished).
3. Match the actuator position to the valve position, i.e. valve open/actuator open and vice versa. Install the coupling and tighten the coupling bolts. Be sure the actuator drive shaft and valve stem are properly aligned and the coupling bolts are tight.
4. Now fully tighten the four bolts holding the bracket to the valve.

TABLE I										
Standard Torque Tables										
Bolt Size (inches)	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Torque (Ft. Lbs.)	9	18	30	50	75	110	150	250	375	580

7. SETTING STOPS

7.1 SETTING STOPS (VALVE IN THE LINE)

It is preferable to adjust the stops on the 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. Recommended torque values for fasteners are shown in Table I.

7.2 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. Recommended torque values for fasteners are shown in Table I.

7.3 SETTING STOPS ON ST AND ST-MS PNEUMATIC ACTUATORS (FIG. 5)

1. Disc travel on a *Wafer-Sphere* valve with 2 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 the acorn nuts (19) protecting the stop set screws.
NOTE: Be sure the O-rings remain in the acorn nuts.
3. Adjust the closed ("shut") stop set screws (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, an air (or spring) load applied to the stop set screw, tighten the closed ("shut") stop set 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.

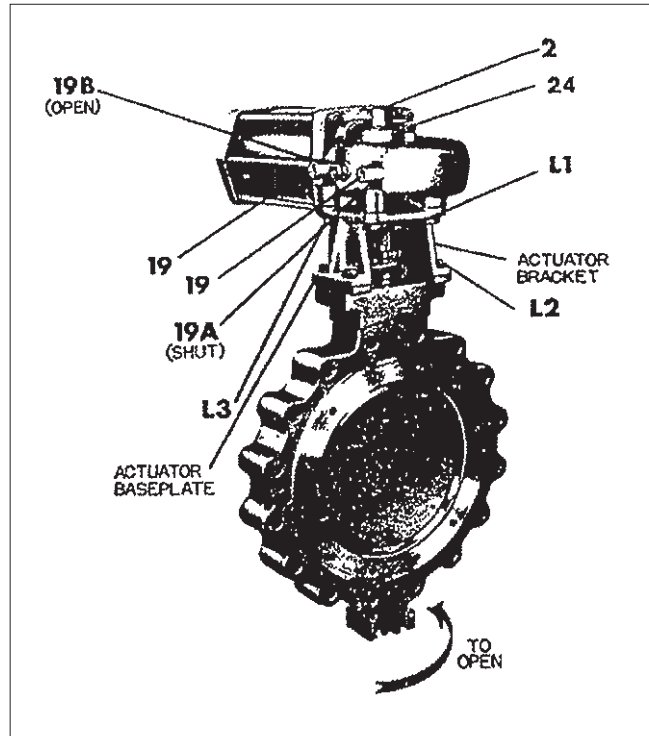


Figure 5.

7.4 SETTING STOPS ON QUADRA-POWER® 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.
- a. Because the stop screws can be held in position with a screwdriver while tightening the jam nuts, there is not need to apply a load to the ends of the screws during this operation.

7.5 SETTING STOPS ON MA MANUAL GEAR ACTUATOR (FIG. 6)

1. Loosen the jam nuts (32) 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 just touches the positive stop.
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 hand-wheel 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 positive stop.
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 hand-wheel. Adjust the open stop set screw (19B) to stop the gear at this position. Hold the stop set screw and tighten the jam nut.

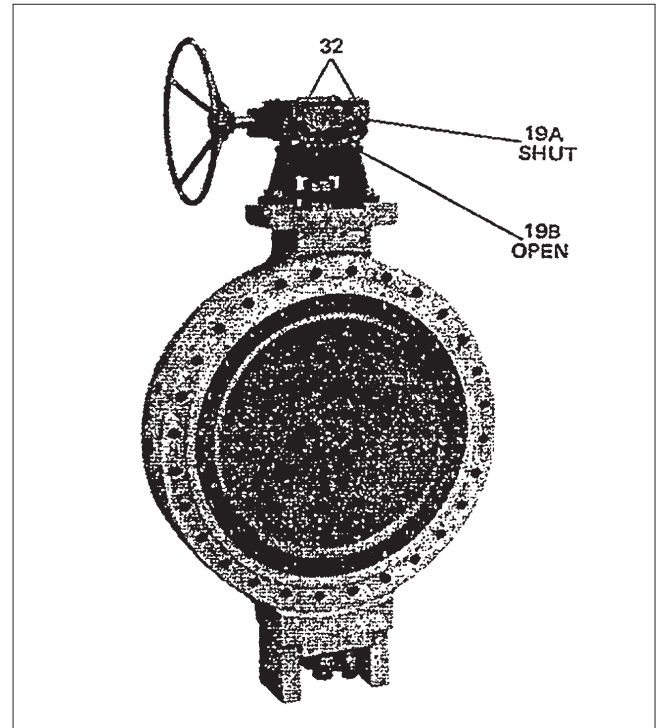


Figure 6.

7.6 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 the 1/64" of the insert. Do not set the stop so that the disc touches the insert before the switch turns the actuator off.

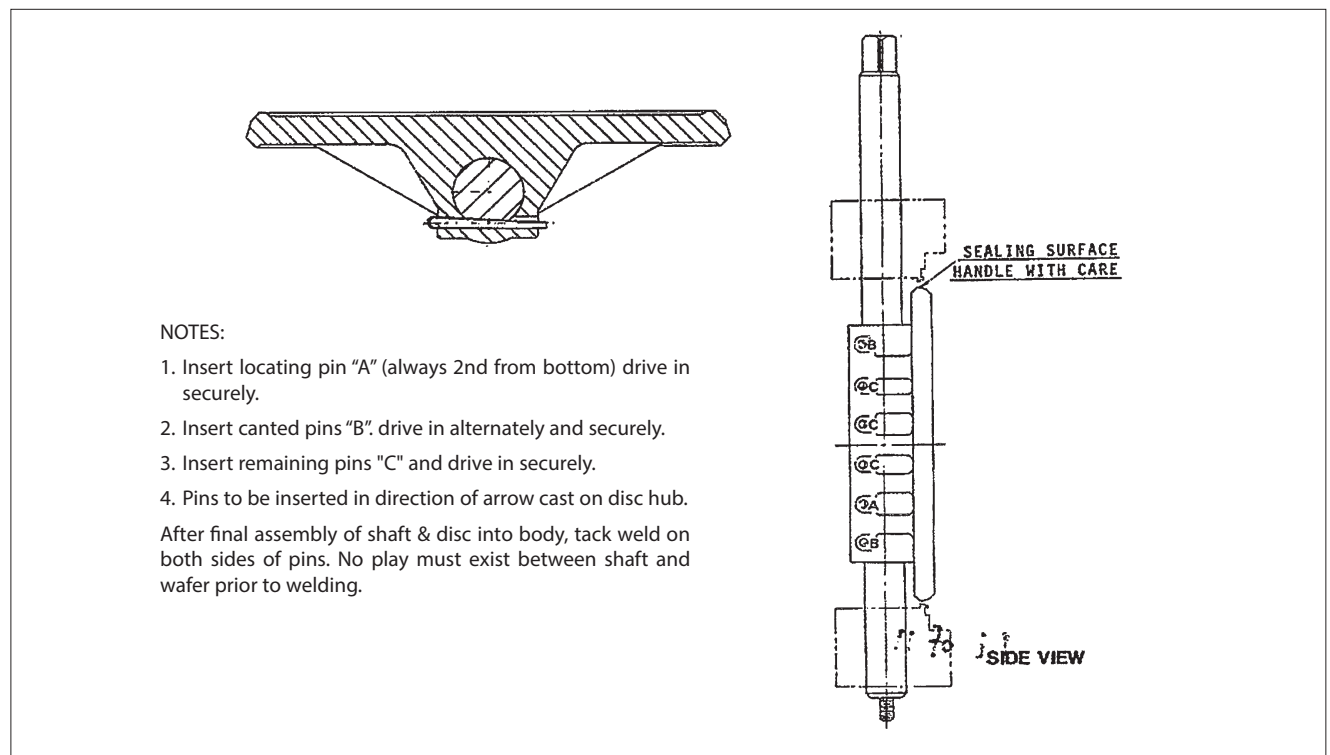


Figure 7.

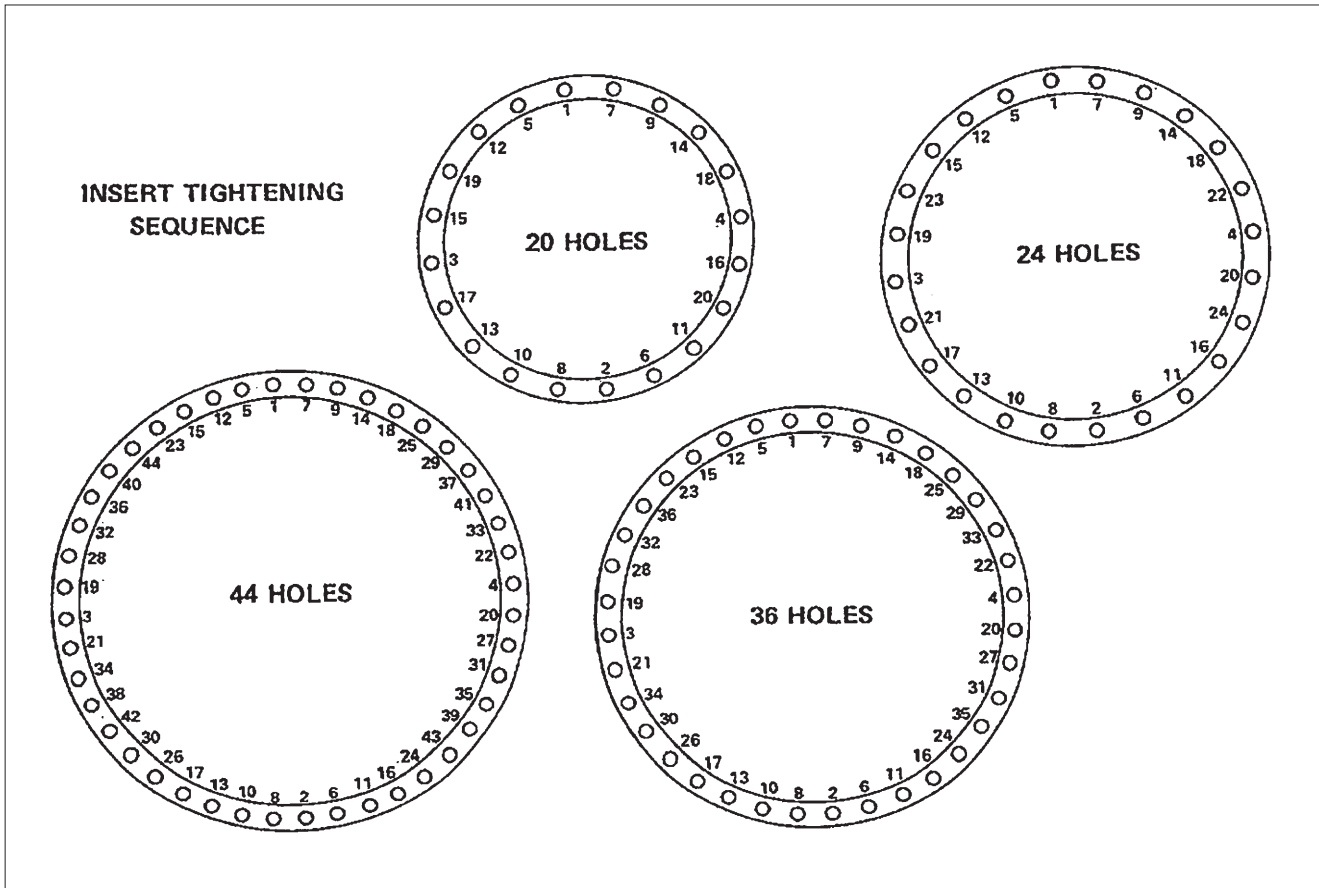


Figure 8.

Valmet Flow Control Oy

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