

Jamesbury™ Wafer-Sphere™ butterfly valve 14" – 20"

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.

THIS NOTE ALSO APPLIES TO DIMENSION L IN FIGURE 2 ON PAGE 4.

The valve has a 150# ANSI body pressure rating and is designed to be used in 150# ANSI piping systems. The maximum seat pressure rating depends upon the material chosen. It is important to refer to the tag fastened on each valve for the material descriptions and their rating.

1.1 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. 7**).

1.2 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 latest model *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 on the body insert is shown in **Fig. 4**.

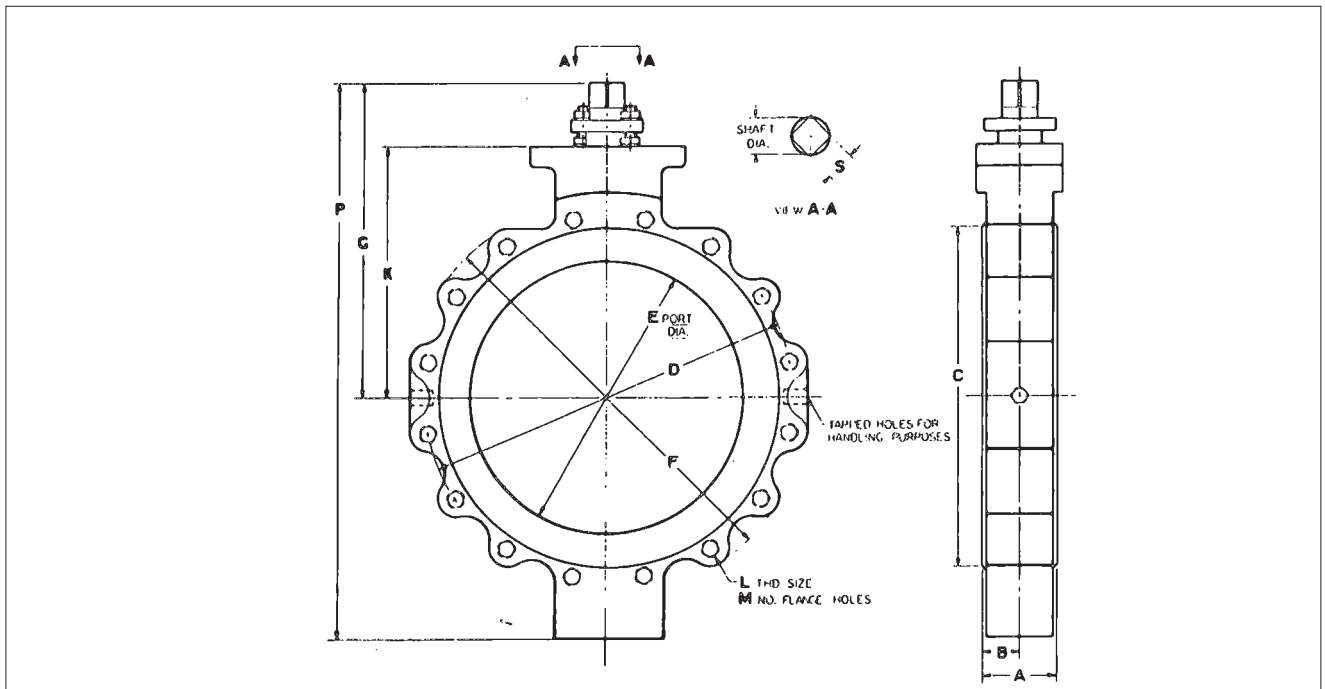


Figure 1.

Approximate Dimensions (Inches)													
Valve Size	A	B	C	D	E	F	G	K	L	M	P	S	Shaft Diam
14	3-1/4	1-15/16	16-1/4	18-3/4	12-1/2	21	16-3/16	12-7/16	1 – 8	12	28-1/4	1-1/8	1-5/8
16	3-3/4	2-1/16	18-1/2	21-1/4	14-3/8	23-1/2	18-5/8	14-5/8	1 – 8	16	31-7/8	1-5/8	1-7/8
18	4-5/8	2-5/16	21	22-3/4	16-9/16	25	19-3/4	15-3/4	1-1/8 – 7	16	34-3/4	1-5/8	2-1/8
20	4-1/2	2-9/16	23	25	18-5/8	27-1/2	20-3/4	16-3/4	1-1/8 – 7	20	36-3/4	1-5/8	2-3/8

2. 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 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.
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 or damage to the wafer will result.

3. INSTALLATION

I. FULL PRESSURE RATING – ELASTOMER-SEATED WAFER-SPHERE VALVES In general, for full pressure rating, all elastomer-seated *Wafer-Sphere* butterfly valves should be installed with the disc face toward the higher pressure (shaft down-stream). Butt weld piping flanges are recommended for high pressure valves.

II. METAL-SEATED WAFER-SPHERE VALVES 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 PRECAUTIONS** section carefully.
2. **IMPORTANT: ONLY** actuator stop set screws must be used to stop the disc in position. **DO NOT** use the "positive stop" insert (2) 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 a slight gap (approximately 1/64") between the disc and the "positive stop" insert.

3.1 SERVICE KITS

Two types of service kits are available. Kit A consists of a filled TFE (M) seat (5) and two sets of TFE shaft seals (8) (four sets in 24" and 30" kits). Kit B contains the same parts as Kit A plus a pair of shaft bearings (6) , and one set each of standard and oversize taper pins (13).

Valve Size	Kit A Seat and Shaft Seal Only	Kit B Seat, Seal, Bearings, 17-4 PH Pins	Kit B Seat Seal, Bearings, 316 SS Pins
14"	RKWBMT	RKW1BMT	RKW43MT
16"	RKW9MT	RKW19MT	RKW44MT
18"	RKW21MT	RKW31MT	RKW45MT
20"	RKW24MT	RKW34MT	RKW46MT

4. Before installing the closed valve in the line, be sure that handle or actuator is attached so that a counterclockwise rotation, viewed from above, opens the valve (See **Fig. 7**). Again, fully close the valve before installing it in the line.

CAUTION:

UNLESS THE VALVE IS IN THE FULLY CLOSED POSITION, COMPRESSING THE SEAT MAY DAMAGE IT.

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.

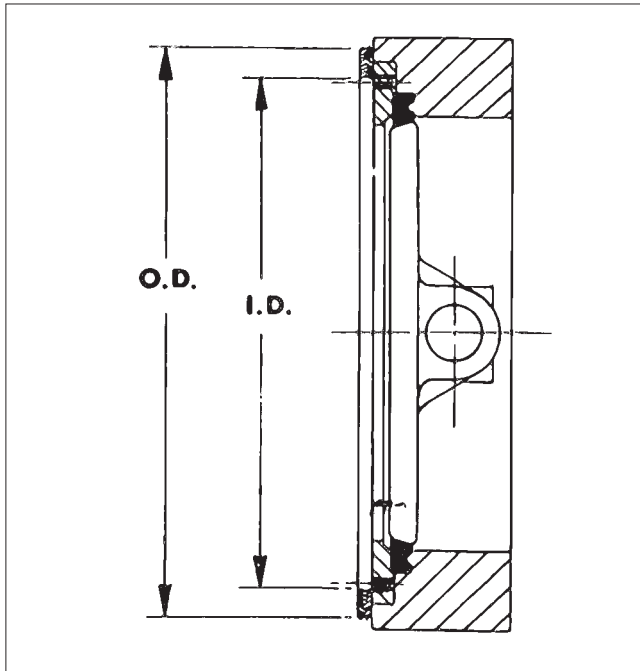


Figure 3

4. MAINTENANCE

4.1 ROUTINE 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. Overhauling the valve consists of seat, seals, and bearing replacement.

Follow the disassembly and assembly instructions when overhauling the valve. All precautions should be taken as specified. **NOTE:** After installation of a new seat, torque will be higher for a few cycles.

4.2 VALVE REMOVAL AND BENCH MAINTENANCE

- I. Read the **GENERAL PRECAUTIONS** 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 be disconnected from the actuators or there must be sufficient air pressure supplied to the actuator to close the valve. After valve removal, slowly relieve the pressure in the actuator.
- IV. **Seat Replacement** (Refer to Fig. 4)
 1. After removing the valve from the line, place it on a bench in a vise and cycle the valve open.
 2. With the disc in the open position, remove the insert (2). Using a nylon rod or a rod of other soft material, with a hammer tap from the back, or shaft, side of the valve.

3. Remove the seat, and discard it.
4. Clean the valve.
5. Carefully clean and polish the disc. 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.
9. The insert should be installed per Figure 4.
10. Cycle the valve fully closed, and compress the seat. 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.

V. Shaft Packing Replacement

1. Remove the actuator.
2. 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 packing (8) with a packing tool.
5. Replace the old packing with new packing. **NOTE:** Keep the packing rings stacked in the same order as removed from kit.
6. Remove the spacer (7), only if complete disassembly is necessary.

VI. Bearing Replacement

1. Remove the wafer pin welds by grinding or machining off the weld. Drive out the taper pins in the direction shown in diagram (Fig. 4).
2. Remove the pressure plug (11).
3. 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.
4. Remove the top bearing (6) by pushing it up from the bottom (waterway).
5. 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 bearings by pushing them toward the center of the valve.
6. To reassemble the valve, follow the instructions in the **ASSEMBLY** section.

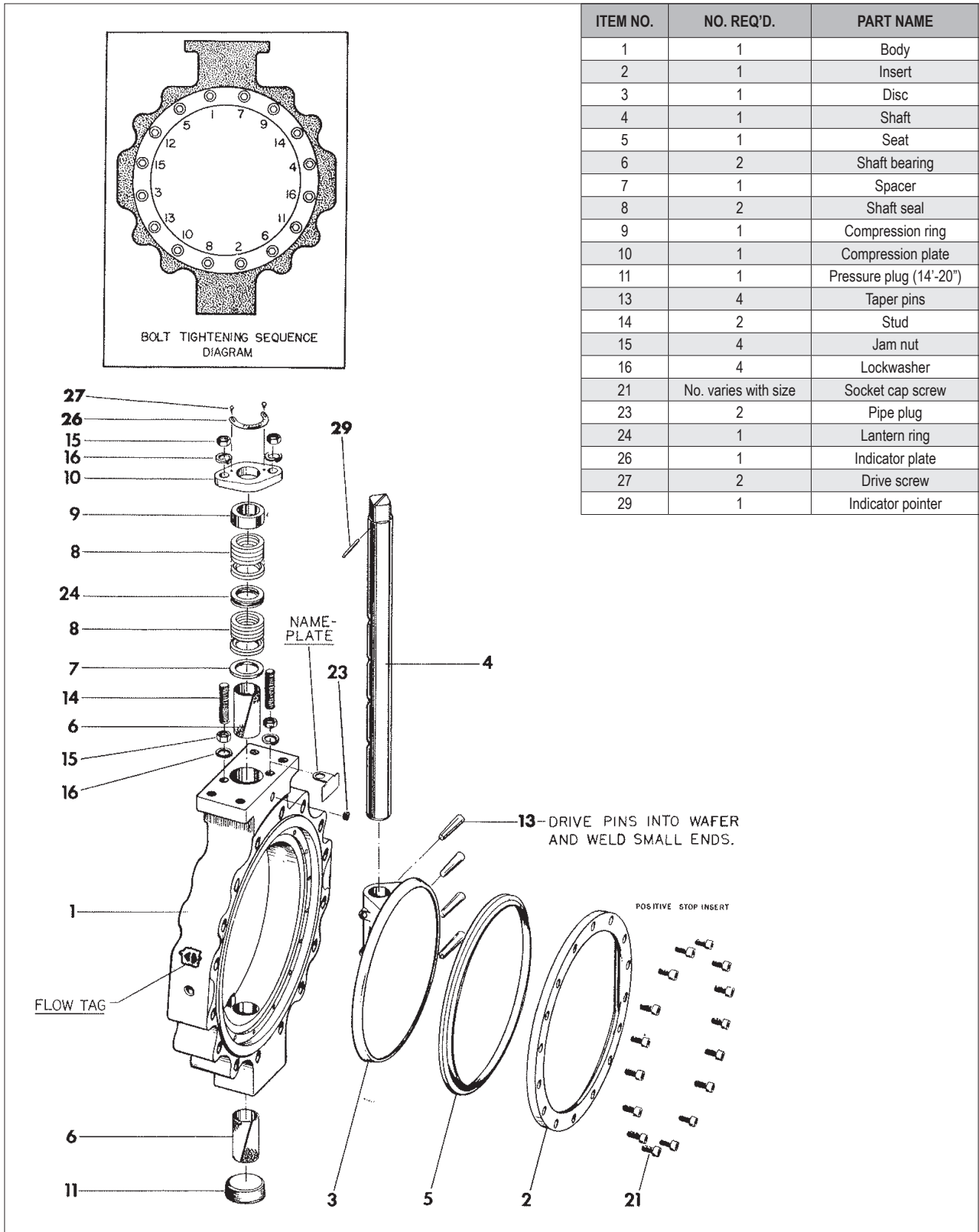


Figure 4 – Parts

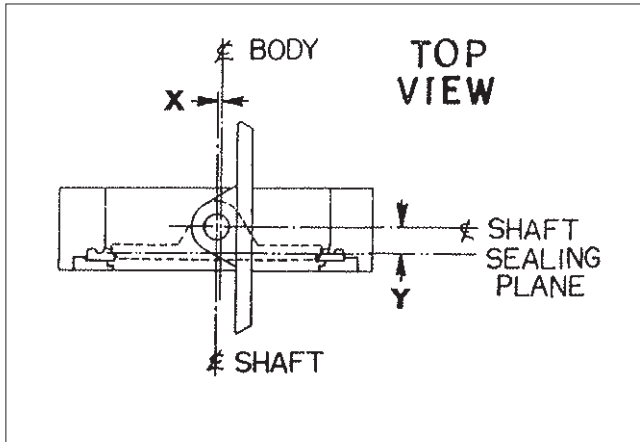


Figure 5. VIII Actuator Mounting

SEE THE APPLICABLE ACTUATOR MOUNTING INSTRUCTIONS (AMI) FOR THE PARTICULAR ACTUATOR THAT IS BEING MOUNTED ON THE VALVE.

IX. Actuator/Valve Adjustments

1. Type ST and Type ST-MS pneumatic actuators: **CAUTION:** While actuator stops are being set, there must be no pressure across the valve. Reread the General Precautions section on pg. 4.
 - (a) Disc travel on a *Wafer-Sphere* valve with a Type ST or ST-MS pneumatic actuator is controlled by a closed ("shut") travel stop set screw (20A) and by an open travel stop set screw (20B) in the actuator. See Fig. 6.
 - (b) Remove acorn nuts (19) protecting the closed ("shut") and open stop set screws (20A) and (20B), respectively. **NOTE:** Be sure O-rings remain in the acorn nuts.
 - (c) Partially open valve using air pressure on the actuator driver.
 - (d) Unscrew closed (shut) stop set screw (20A) far enough to accomplish step (e).
 - (e) Close the valve. With ST-MS actuators, allow spring to overclose the valve. (Now the disc should be resting on the insert stop.)
 - (f) Carefully turn the closed (shut) stop set screw (**20A in Fig. 6**) in, or clockwise, until increased resistance to further motion is felt. Turn the screw in an additional 1/8 turn. At this point, there will be a slight movement of the driver (2), and the pointer (24) will just begin to move, and the disc will come off the insert stop.
 - (g) Cycle the valve open and back to closed several times. The pointer (24) should return to the same position each time.
 - (h) Cycle the valve to the open position. If necessary, adjust the open stop set screw (20B) until the pointer (24) is approximately 90° from the closed (shut) position. This is full open.

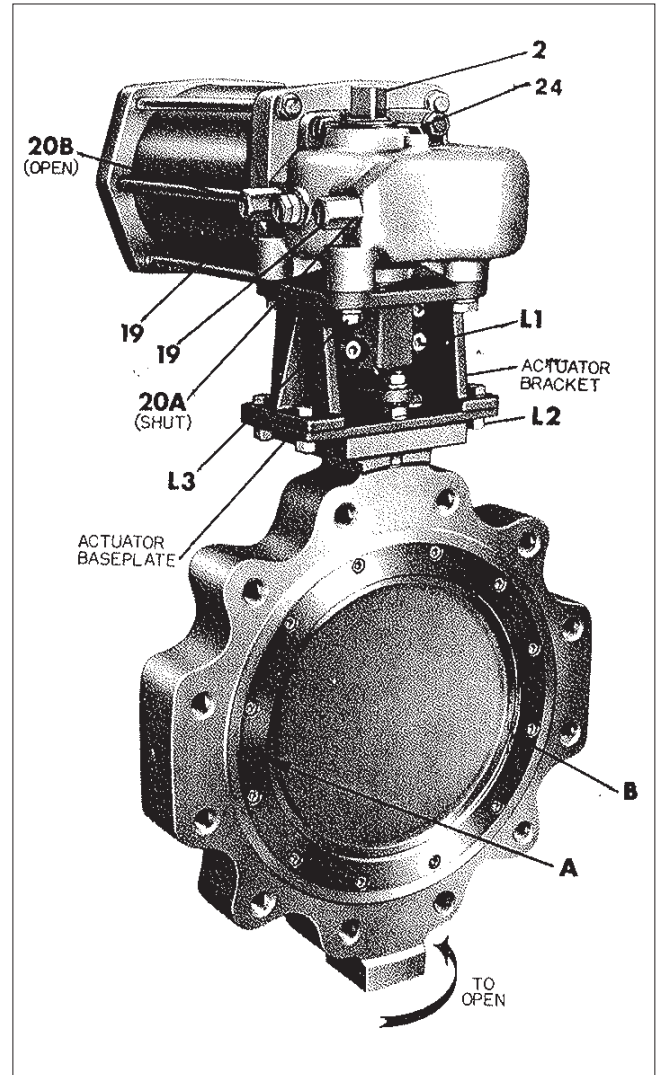


Figure 6

- (i) 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 (20B) with an acorn nut. Tighten the open stop set screw acorn nut.
- (j) Now close the valve. With the valve in the closed position, and air applied, cover the closed stop set screw acorn nut (19) and tighten it.
- (k) Cycle the valve open and closed, with full air pressure, three times. The disc must not touch the insert stop. The pointer should return to the same position each time. Visually check to see that the disc is not touching the insert stop in the closed setting.
- (l) Check all linkages and coupling bolts for tightness. Recommended torque values are as follows:
NOTE: Type ST-MS safety return actuators can only operate in the fail-close direction.

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

2. Quadra-Powr® Spring-Diaphragm Actuators:

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

- The *Quadra-Powr* has no acorn nuts on the stop screws.
- Because the stop screws can be held in position while tightening the jam nuts, there is no need to apply a load to the ends of the screws during this operation (steps (i) and (j) of Section IX #1).

NOTE: The *Quadra-Powr* spring-diaphragm can be set up to operate in either the fail-open or fail-close position.

3. Type MA Manual Gear Actuators:

Disc travel on a *Wafer-Sphere* valve with a Type MA manual gear actuator is also controlled by a closed (shut) travel stop set screw and an open travel stop set screw.

- Adjust actuator travel stops by following essentially the same procedure as described in #1 above for Type ST pneumatic actuators; set the two stop set screws of the actuator so as to prevent disc over-travel.
- Turn the handwheel so that it closes the valve.
- Turn the closed (shut) stop set screw in, or clockwise, until it stops. This will provide the proper closed setting.
- Tighten the jam nuts on the stop set screws. Maintain force on the stop set screws while tightening the nuts by applying torque to the actuator handle.

4. Type EJ, ERC, and ERCX Electric Actuators:

CAUTION: If an electric actuator's closed (shut) position switch adjustable cam (9) is not properly adjusted, the valve disc may contact the travel stop before the switch has been tripped. In this case, the actuator motor will continue to run, with possible damage resulting.

- Disc travel on a *Wafer-Sphere* valve with Type EJ, ERC, or ERCX electric actuators is controlled by a closed (shut) travel switch cam and by an open travel switch cam.
- Proper settings are obtained by adjusting the appropriate switch cams within the actuator housing to position the valve disc in the proper open and closed positions. **NOTE:** Refer to the applicable Valmet Installation, Maintenance, and Operating instruction (IMO) for identification of switches, cams and for the correct method of adjustment.

X. In-Line Actuator/Valve Adjustments

- CAUTION: THERE MUST BE NO PRESSURE ACROSS THE VALVE WHILE ACTUATOR STOPS ARE SET. RE-READ THE GENERAL PRECAUTIONS ON PAGE 4.**
- The same procedure (with the exception of vise checking) as in Bench Procedures for Actuator/Valve Adjustments should be followed. See IX 1, 2, 3, and 4.
- To properly set the disc in the closed position so that it just clears the insert stop, tighten the closed stop (**20A in Fig. 6**) approximately 1/2 turn beyond the point load on the screw is first felt.

5. ASSEMBLY

(Refer to Figure 4)

- Comply with the instructions in the Precautions section.
- Place the body (1) on a flat surface with the insert facing the assembler.
- Insert the TFE 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 to prevent movement during assembly and service.
- 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 wafer disc indicates which end of the disc should be located on the bonnet side.
- Insert the taper pins (13) and drive them into place. Weld the small end of the pin. After the disc cools, clean the welds with a wire brush. **CAUTION:** Use extreme care to keep contaminants out of the valve.
- For 14"-20" valves, assemble the spacer (7), shaft seals (8), lantern ring (24), and compression ring (9) in the valve.
- Screw the studs (14) into the body (1) and lock into place with the lock washers (16) and nuts (15).
- Slide the compression plate (10) over the shaft (4) and studs (14). Hold in place with the other two lock washers and nuts. Do not tighten down at this time.
- Using TFE tape to provide tight sealing, install the pipe plug (11).
- Install the seat and insert. Bolt the insert in place using proper sequence to tighten cap screws. See the diagram.
- Tighten the compression plate (10) by tightening the nuts until they touch the plate, then tighten each another 3/4 of a turn.

12. Install pipe plugs (23) in the leak-off holes, using TFE tape.

To Change Actuator Quadrant or Linkage Installation (See **Fig. 6**).

If it is necessary to orient the actuator in a different quadrant:

1. Loosen the valve/actuator coupling by loosening the coupling bolts.
2. Remove the four bolts holding the actuator bracket to the actuator baseplate.
3. After removing the actuator and bracket from the valve, remove the four bolts holding the actuator bracket to the actuator.
4. Reposition the actuator in the desired quadrant.
5. Retighten the four bolts which hold the actuator bracket to the actuator.
6. Reinstall the bracket on the baseplate, holding the two together with the four bolts and nuts. **CAUTION:** When installing the bracket and actuator, match its position to the valve position, i.e., valve open/actuator open and vice versa. The fit 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 wafer to move downward away from optimum seat contact when final tightening is accomplished.)
7. Tighten the coupling bolts. Be sure the actuator drive shaft and valve stem are rigidly held together and properly aligned.
8. Now fully tighten the four bolts holding the bracket to the baseplate. **CAUTION: WHEN REINSTALLING THE ACTUATOR, MATCH ITS POSITION TO THE VALVE POSITION – VALVE OPEN/ACTUATOR OPEN.** This ensures opening of the valve in a counterclockwise direction, as shown in the illustrations. **NOTE:** Type ST-MS safety-return actuators can fail-close only. They cannot be reoriented for fail-open. Fail-open actuators are available only in the *Quadra-Powr* series of actuators.

NOTE: For further information on mounting of actuators onto valves, refer to the appropriate Actuator Mounting Instructions (AMI).

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