

Jamesbury™ Wafer-Sphere™ butterfly valve series K815W, K815L, K830W, K830L, K860W, & K860L class 150, 300 and 600

Installation, maintenance and
operating instructions

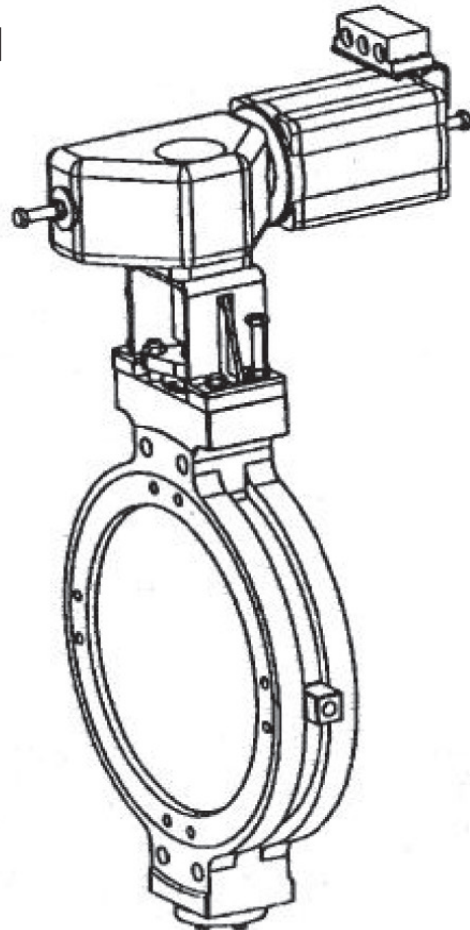


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READ THESE INSTRUCTIONS FIRST!

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.

INTRODUCTION

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.valmet.com/flowcontrol/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Valmet has highly skilled personnel available for startup, maintenance and repair of our valves and component parts. Arrangements for this service can be made through your local Valmet representative or sales department. When performing maintenance use only Valmet replacement parts. Parts are obtainable through your local representative or spare parts department.

When ordering parts, always include Model and Serial Number of the unit being repaired.

1. GENERAL

These installation and maintenance instructions apply to 14"-30" (DN350-750), pressure class 150 cryogenic Wafer, 14"-48" (DN350-1200), pressure class 150 cryogenic Lug, 14"-24" (DN350-600), pressure class 300 cryogenic Wafer, 14"-36" (DN350-900), pressure class 300 cryogenic Lug, and 3"-24" (DN80-600), pressure class 600 cryogenic Wafer & Lug series regardless of the type of material used. The 800 series valves are designed with built in versatility making them well-suited to handle a wide variety of process applications.

Recommended spare parts required for maintenance refer to section 7. The model number, size, rating and serial number of the valve are shown on the identification tag located on the valve.

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the installation, operation, and troubleshooting of the Jamesbury™ 14"– 30"(DN 350-750) K815W, 14"– 48"(DN 350-1200) K815L, 14"– 24"(DN 350-600) K830W, 14"– 36"(DN 350-900) K830L, 3"– 24"(DN 80-600) K860W and K860L *Wafer-Sphere* Butterfly Valves. Please read these instructions carefully and save them for further reference.

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 OFFSET SHAFT IN THE *WAFER-SPHERE* VALVE 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. THIS WILL PREVENT MECHANICAL DAMAGE TO THE DISC SEALING EDGE.

WARNING: AT ALL TIMES KEEP HANDS OUT OF THE WATERWAY OF THE VALVE. A VALVE WITH AN ACTUATOR COULD CLOSE UNEXPECTEDLY AT ANY TIME AND RESULT IN SERIOUS INJURY.

1.2 DESCRIPTION

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

1.3 ECCENTRIC SHAFT DESIGN

One *Wafer-Sphere* valve design feature that is responsible for its superior performance is the valve's eccentric shaft design. As shown by **Figure 3**, the shaft is offset in two planes: (1) away from the valve disc center line; and (2) behind the disc sealing plane. The offset shaft design makes the disc lift completely off the seat as the valve starts to open, eliminating wear points at the top and bottom of the seat. Because the disc rotates in an ec-centric arc, it operates in one quadrant only.

WARNING:

IF THE VALVE DOES NOT HAVE EITHER A FULLY OPERATIONAL ACTUATOR OR A HANDLE, **DO NOT PRESSURIZE THE VALVE.** UNRESTRAINED DISC MAY OPEN OR CLOSE DUE TO PIPELINE PRESSURE.

SERIES K815W 14"– 30"(DN 350-750) VALVES
ANSI CLASS 150 WAFER DESIGN
SERIES K830W 14"– 24"(DN 350-600) VALVES
ANSI CLASS 300 WAFER DESIGN
SERIES K860W 3"– 24"(DN 80-600) VALVES

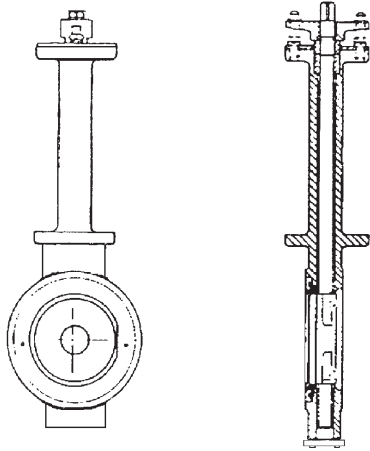


Figure 1.

SERIES K815L 14"– 48"(DN 350-1200) VALVES
ANSI CLASS 150 SINGLE FLANGE LUGGED DESIGN
SERIES K830L 14"– 36"(DN 350-900) VALVES
ANSI CLASS 300 SINGLE LUGGED DESIGN
SERIES K860L 3"– 24"(DN 80-600) VALVES

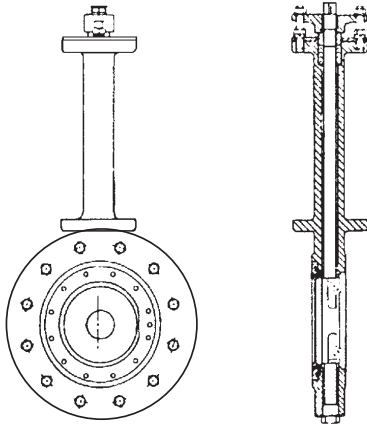


Figure 2.

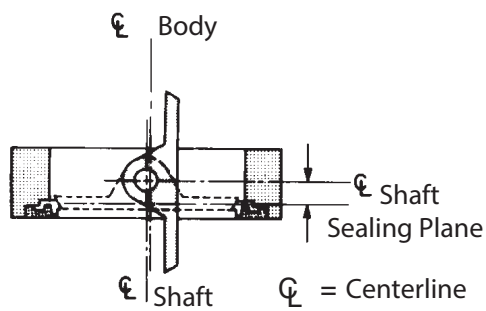


Figure 3.

1.4 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 in the body.

1.5 WAFER BODY DESIGN

Some Wafer designs contain flange bolt holes or slots in the body to hold the valve and assist with correct alignment during installation in the line. The centering holes or slots in wafer bodies alone are not suitable or intended for containing line pressure, and are only for use in conjunction with a fully bolted pipeline flange.

1.6 SAFETY PRECAUTIONS

WARNING:

DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

Exceeding the pressure or temperature limitations marked on the valve identification plate may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

WARNING:

SEAT AND BODY RATINGS!

The practical and safe use of this product is determined by both the seat and body ratings. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some of the seat materials have pressure ratings that are less than the body ratings. All of the body and seat ratings are dependent on valve type and size, seat material, and temperature. Do not exceed these ratings!

WARNING:

DO NOT DISMANTLE THE VALVE OR REMOVE IT FROM THE PIPELINE WHILE THE VALVE IS PRESSURIZED!

Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve.

Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance. Failure to do this may result in damage or personal injury.

WARNING:**BEWARE OF DISC MOVEMENT!**

Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline. When the valve is actuated, the disc functions as a cutting device. Disconnect any pneumatic supply lines, any electrical power sources and make sure springs in spring-return actuators are in the full extended/relaxed state before performing any valve maintenance. Failure to do this may result in damage or personal injury!

WARNING:**WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!**

Never lift the valve or valve/actuator assembly by the actuator, positioner, limit switch or their piping. Place lifting devices securely around the valve body. Failure to follow these instructions may result in damage or personal injury from falling parts.

Please consult separate document: instructions for lifting Valmet products. (See Valmet document id: 10LIFT70EN.PDF).

CAUTION:**BEWARE OF NOISE EMISSIONS!**

The valve may produce noise in the pipeline. The noise level depends on the application. Observe the relevant work environment regulations on noise emission. This can be measured or calculated using Neles Nelprof software.

CAUTION:**BEWARE OF A VERY COLD OR HOT VALVE!**

The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

NOTE:

Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

ATEX/EX SAFETY

CAUTION!

Potential electrostatic hazard, ensure the protection (grounding, etc.) in the process.

1.7 WELDING NOTES

WARNING:

Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

NOTE:

A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX or other applicable regulation.

CAUTION:

To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 °C (200 °F).

It is recommended that thermal chinks be used to check the temperature in these areas during welding.

CAUTION:

Ensure that any weld splatter does not fall onto the valve closing members eg. trim or seats. This may damage critical seating surfaces and cause leaks.

2. TRANSPORTATION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

Store the valve carefully. Storage indoors in a dry place is recommended.

Do not remove the flow port protectors until installing the valve.

Move the valve to its intended location just before installation.

The valve is usually delivered in the closed position.

If the valve(s) are to be stored for a long duration, follow the recommendations of IMO-S1.

3. INSTALLATION

3.1 CRYOGENIC WAFER-SPHERE VALVES

1. For lowest torque requirements, *Wafer-Sphere* butterfly valves should be installed with the insert toward the higher pressure (shaft downstream).
2. To ensure optimum packing performance, cryogenic *Wafer-Sphere* butterfly valves should be installed with the shaft extension no greater than 45° from vertical. Under the operating limits on the valve name-plate, the shaft extension is structurally capable of supporting the weight of the actuator in all possible in-stallation orientations.

WARNING: Do not connect structural supports or attachments to the shaft extension or actuator. Do not use the shaft extension for climbing or lifting.

3.2 GENERAL

Remove the flow port protectors and check that the valve is clean inside. Clean valve if necessary.

Flush the pipeline carefully before installing the valve. Foreign objects, such as sand or pieces of welding electrodes, will damage the disc and seats.

3.3 GENERAL INFORMATION

WARNING:

THE VALVE SHOULD BE TIGHTENED BETWEEN FLANGES USING APPROPRIATE GASKETS AND FASTENERS COMPATIBLE WITH THE APPLICATION, AND IN COMPLIANCE WITH APPLICABLE PIPING CODES AND STANDARDS. CENTER THE FLANGE GASKETS CAREFULLY WHEN FITTING THE VALVE BETWEEN FLANGES. DO NOT ATTEMPT TO CORRECT PIPELINE MISALIGNMENT BY MEANS OF FLANGE BOLTING! RECOMMENDED FASTENER LENGTHS ARE LISTED IN BULLETIN T104-1.

1. Read the **WARNING** section carefully.
2. **IMPORTANT:** Use ONLY the operating actuator stop set screws to stop the disc in position. **DO NOT** use the “positive stop” 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 0.010”(0.254mm) to 0.040”(1.02mm) clearance between the disc and the “positive stop” in the body.
4. 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 Figure 3**). Again, fully close the valve before in-stalling it in the line.
5. **CAUTION:** The *Wafer-Sphere* butterfly valve should be centered between flanges to prevent any damage to the disc or shaft which will be caused by the disc striking the pipe wall.
6. Secure the valve between flanges using appropriate gaskets, fasteners, and tightening torque for the service, in compliance with applicable piping codes and standards. To compress the flange gaskets evenly, tighten the flange bolts in an alternating sequence.
7. On some valves, there is insufficient space for all the flange bolt holes to pass through the valve body. For this reason, threaded holes have been made in the body. It is recommended that a commercially available anti-seize lubricant be used in the threaded holes.
8. If there is weepage past the shaft seal upon installation, it means the valve may have been subject to wide temperature variations in shipment. Leak tight performance will be restored by a simple packing adjustment described in the **MAINTENANCE** section.

4. MAINTENANCE

WARNING:

Observe the safety precautions mentioned in Section 1.8 before maintenance!

CAUTION:

When handling the valve or the valve package as a whole, be mindful of the weight of the valve or the entire package.

WARNING:

For safety reasons the retaining plates **MUST** always be installed according to Section 5.3.

Numbers in () refer to items shown in Figures 4, 8, & 9.

4.1 GENERAL

Although Jamesbury valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting valves at least every five (5) years. The inspection and maintenance frequency depends on the actual application and process condition.

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.

WARNING:

FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:

1. Wear any protective clothing or equipment normally required when working with the fluid involved.
2. Depressurize the pipeline by placing the valve in the open position and draining the pipeline.

After removal and before any disassembly, cycle the valve again several times.

NOTE:

When sending goods to the manufacturer for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety datasheets (MSDS)).

NOTE:

In order to ensure safe and effective operation, always use original spare parts to make sure that the valve functions as intended.

NOTE:

For safety reasons, replace pressure retaining bolting if the threads are damaged, have been heated, stretched or corroded.

4.2 VALVE REMOVAL

WARNING:

Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

1. Read the **WARNING** Section carefully.
2. Valve must be fully closed before sliding it out of the pipeline.
3. **CAUTION:** Valves equipped with fail-open (air-to-close) spring-return actuators must be disconnected from the actuators and then closed, 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.

Ensure that the valve is not pressurized and the pipeline is empty. Ensure that the medium cannot flow into the section where servicing is to take place. Support the valve carefully with a hoist. Place ropes carefully and unscrew the pipe flange bolts. Ensure that the ropes are positioned correctly.

Valve Size ANSI Class 150/300/600	Screw Size (Inch)	Torque Stainless
14 (DN 350)	3/8	15/22 FT.-LB. (20/30Nm)
16 (DN 400)(150,300)	3/8	15/22 FT.-LB. (20/30Nm)
16 (DN 400)(600)	1/2	30/44 FT.-LB. (41/60 Nm)
18 (DN 450)	1/2	30/44 FT.-LB. (41/60 Nm)
20 (DN 500)	1/2	30/44 FT.-LB. (41/60 Nm)
24 (DN 600)	1/2	30/44 FT.-LB. (41/60 Nm)
30 (DN 750)	1/2	30/44 FT.-LB. (41/60 Nm)
36 (DN 900)	1/2	30/44 FT.-LB. (41/60 Nm)
42 (DN 1050)	1/2	30/44 FT.-LB. (41/60 Nm)
48 (DN 1200)	1/2	30/44 FT.-LB. (41/60 Nm)

Torque values shown are lower/upper limits.

4.3 CTFE SEAT REPLACEMENT

WARNING:

Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

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 (5) 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 Valmet for service.
7. Cycle the valve closed.
8. Install the seat into the insert.
9. Replace the insert and seat together using the insert screws. Tighten the screws uniformly, torque values are given in **Table 1**. Lubricate stainless steel screws when assembled in stainless steel bodies. Lubricant must be compatible with media in the pipeline. Open valve and re-torque the insert screws per **Table 1**. Take care not to damage the sealing edge of the disc. Close the valve.
10. Set the actuator stops as described in the appropriate actuator IMO listed on page 8.

NOTE: After the installation of a new seat, the torque will be higher for a few cycles. Valve Testing Procedures are outlined in Section 4.

4.4 COMPOSITE SEAT REPLACEMENT

WARNING:

Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

1. After removing the valve from the pipeline, place it on a bench and cycle it open. Take care not to damage the sealing edge of the valve disc.
2. Remove insert screws (21). Using a wooden or plastic rod and hammer, drive the insert out of the body from the shaft side. Do not strike the valve directly with a hammer.
3. Remove the seat (5) and discard. Remove the body seals (40) from the insert and body.
4. Carefully clean the gasketing surfaces with a solvent. They should be free of all grooves and scratches. If deep scratches are present, polish or repair as required.
5. Clean the valve and deburr the insert.
6. Carefully clean and polish the disc. 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 Valmet for service.
8. Cycle the valve closed.
9. Two graphite gasket style body seals (40) are required. One is between the body and the seat tail, the other is between the insert and the seat tail, as shown in **Figure 4**, p.5. These should be installed in accordance with the following step.

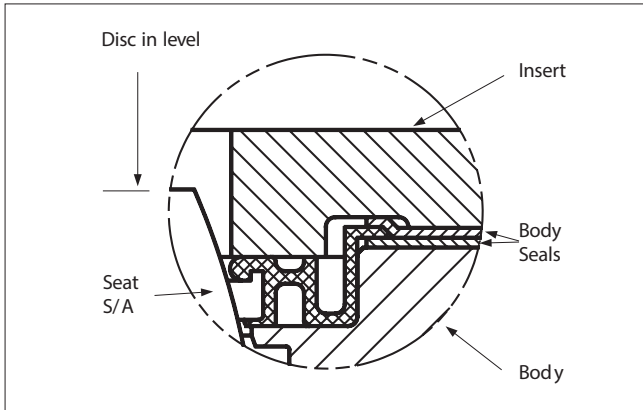


Figure 4.

- a. **IMPORTANT:** Exercise care at all times not to damage these gaskets. A break in the gasket will cause leakage and should not be used.
 - b. The bottom surface of the insert must be free of all foreign particles. Clean thoroughly with suitable solvent.
 - c. Apply the gasket to the body taking care to align the holes in the gasket with the insert screw holes, for lug style valves.
 - d. The top body seal must also be aligned with care to insure the seat tail is covered
10. Verify that the disc is in the level position. Install new seat, second gasket, and insert. See **Figure 4**. Install the insert screws. Lubricate stainless steel insert screws when assembled in stainless steel bodies. Lubricant must be compatible with media in the pipeline. Tighten screws uniformly to the torque values in **Table 1**.
 11. Set the actuator stops as described in Section 5 of these instructions. Do not install and tighten flanges on a newly re-seated valve until the 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.

4.5 SHAFT SEAL (PACKING) REPLACEMENT

WARNING:

Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

1. Remove the actuator.
2. Remove the indicator pointer (29) from the shaft. Pull it straight out with a pair of pliers to avoid breaking it off.
3. 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.
4. Remove the compression ring (9) (30"– 48") DN 750- 1200) Type 815, 14"– 36" (DN 350-900) Type 830, 14"– 24" (DN 350-600) Type 860 only).
5. Remove the old shaft packing (8) with a packing tool.

6. The spacer (7) need not be removed for shaft packing replacement.
7. Replace the old packing with new packing. **NOTE:** If the packing is of the PTFE chevron type, keep the packing rings stacked in the same order as removed from the kit. Note orientation shown in **Figure 9**.
8. Reinstall the compression ring (9) 30"– 48" (DN 750- 1200) Type K815, 14"– 16" (DN 350-400) Type K830, 14"– 24" (DN 350-600) Type K860 only), the compression plate (10), the lockwashers (16), nuts (15) and the indicator pointer (29). Be sure that the indicator plate is under the pointer.
9. Close the valve (the seat and insert should be installed in the valve at this point).
10. 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.

4.6 VALVE DISASSEMBLY

WARNING:

Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

1. Place the valve on a bench or other suitable working space.
2. If the seat is to be replaced, follow steps 2 and 3 in the **SEAT REPLACEMENT** section. **NOTE:** Replacement of the seat, shaft packing, body seal, body gasket, and shaft bearings is recommended whenever the valve is completely disassembled.
3. Remove the shaft packing compression hardware as detailed in steps 1 through 4 in the **SHAFT SEAL REPLACEMENT** section. The packing material itself can be removed more easily after the shaft has been removed from the valve.
4. Remove the wedge pin welds by grinding or machining off the weld. Drive out the pins in the opposite di-rection shown in **Figures 8 or 9**. Remove the cap screws (55) and lockwashers (56). Remove the cover plate (53) and gasket (54). Grind or file off the tack weld locking the pressure plug. Remove the weld and seals.
5. 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.
6. Remove the packing (8) and the spacer (7).
7. Remove the top bearing (6) through the waterway.
8. Remove the bottom bearing (6) either from the bottom of the valve or the waterway (also the spacer (43) in 14"– 48" (DN 350-1200) K830W and K830L valves).

4.7 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.
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 between the thrust bearings (64) 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.
8. Insert the wedge pins (13) and drive them into place. The pins must be driven so that all pins are the same depth within 1/16" (1.6mm). Be certain that the pins are installed from the direction shown in **Figure 8 or 9**. 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 spacer (7), the packing (8), the compression ring (9) (30"– 48"(DN 350-1200) Type K815, 14"– 36"(DN 350-900) Type K830, 14"– 24"(DN 360-600) Type K860 only). If the packing is of the PTFE chevron type, be certain that it is installed in the orientation shown in **Figure 9**.
10. If the studs (14) have been removed from the valve, reinstall them in the holes shown in **Figure 8 or 9**.
11. 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.
12. On valves with cover plates, install bottom bearing spacer (43) in 14"– 16"(DN 350-400) 830W and 830L valves only. Assemble the cover plate (53) and gasket (54) to the cap screws (55) and lockwashers (56). Torque the cap screws per **Table 3**. Place the plug seal in the recess at the bottom of the valve and install the plug. 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.
13. Cycle the valve fully closed. If the seat is to be re-placed as recommended, do so at this point. For details see seat replacement sections 3.3 and 3.4, as applicable.
14. Install the seat (5), insert (2), and insert screws (21) as shown in **Figure 8 or 9**. Torque values are given in **Table 1**.
15. 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.

5. VALVE TESTING PROCEDURE

Should it become necessary to perform a leak test of the valve prior to its installation in the pipeline, follow the procedure outlined below.

NOTE: This valve is intended for cryogenic service. It is important that you take every precaution to keep moisture out of the valve. **DO NOT** test the valve with water. It is recommended that an inert gas such as nitrogen or helium be used to perform leak testing of cryogenic valves.

1. In the following test, suitable gaskets or seals are required between the faces of the valve and the test hardware.
 2. Before pressurizing the valve be sure all actuator linkage fasteners are tight, and that the power or pressure is applied to the actuator to maintain the valve in the closed position. The offset design of the valve can cause it to rotate when pressure is applied to one side of the disc.
 3. The valve should be installed between flanges or in a testing apparatus using suitable gaskets. If using flanges, refer to Section 2 step 6. If a testing device other than flanges is used, the clamping force of the device must be comparable with flange bolt loads on the valve.
 4. Cycle the valve slightly open. Verify that you do not have a seal between the seat and disc. Exercise caution when cycling a valve in the test apparatus to avoid possible disc damage from striking the test fixture.
 5. Cap the downstream vent and apply 100 psig (6.9 bar) to the valve. Check the shaft seals, pressure plug or cover plate, and flange gaskets for leakage. This can be done by applying a liquid mixture of soap and water at all seal joints and watching for bubbles.
- IMPORTANT:** If leakage is detected between the valve and flanges **STOP IMMEDIATELY**. Mark the area of leak-age. Vent the valve and, when it has returned to 0 psig, retighten the flange bolts in that area. Re-pressurize the valve, checking the whole gasket again. If leakage persists, disassemble and inspect for damage.
6. If leakage is detected at the shaft seals, tighten only enough to stop the leak.
 7. Vent the valve and, when it has returned to 0 psig, cycle the valve closed.
 8. Attach a small tube or hose to the downstream flange (shaft side of valve).
 9. Be sure power/pressure is still applied to the actuator. Pressurize the upstream flange (insert side of valve) to 100 psig (6.9 bar). Check for leakage passing through the free end of the tube/hose.
 10. If leakage is detected, vent the valve and make an actuator close-stop adjustment as described in the appropriate IMO listed on page 8.
 11. Re-pressurize the valve and check the leakage. If the valve still leaks, repeat step 10. If leakage cannot be stopped, adjust the actuator stop so that leakage is minimized.

- Rebuilt valves may have some minor leakage due to damage to the disc. With the valve still pressurized, insert the free end of the tube/hose into a beaker of water and check for bubbles. In the absence of other test standards, observe leakage after it has reached a stable condition. Because of the volume of air that must be exhausted from a cycled valve, it may be necessary to wait several minutes for the leakage to stabilize or stop. One bubble per inch of valve diameter per minute may be considered acceptable for re-built valves.

6. ACTUATOR MOUNTING

6.1 WARNINGS

BEFORE INSTALLING THE VALVE AND ACTUATOR, BE SURE THAT THE INDICATOR POINTER ON TOP OF THE ACTUATOR IS CORRECTLY INDICATING THE VALVE'S POSITION. FAILURE TO ASSEMBLE THESE PRODUCTS TO INDICATE CORRECT VALVE POSITION COULD RESULT IN PERSONAL INJURY.

CAUTION: WHEN INSTALLING A LINKAGE OR SERVICING A VALVE/ACTUATOR ASSEMBLY, THE BEST PRACTICE IS TO REMOVE THE ENTIRE ASSEMBLY FROM SERVICE.

CAUTION: AN ACTUATOR SHOULD BE REMOUNTED ON THE SAME VALVE FROM WHICH IT WAS REMOVED. THE ACTUATOR MUST BE READJUSTED FOR PROPER OPEN AND CLOSE POSITION EACH TIME IT IS REMOUNTED.

WARNING:

THE LINKAGE HAS BEEN DESIGNED TO SUPPORT THE WEIGHT OF JAMESBURY ACTUATORS AND RECOMMENDED ACCESSORIES. USE OF THIS LINKAGE TO SUPPORT ADDITIONAL EQUIPMENT SUCH AS PEOPLE, LADDERS, ETC. MAY RESULT IN THE FAILURE OF THE LINKAGE, VALVE OR ACTUATOR, AND MAY CAUSE PERSONAL INJURY.

CAUTION:

Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to ensure that the package can be properly reassembled. Mounting an open actuator to a closed valve may result in valve stem damage.

CAUTION:

When handling the valve or the valve package, bear in mind its weight!

WARNING:

Do not detach a spring-return actuator unless a stopscrew is carrying the spring force!

CAUTION:

Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

NOTE:

When Valmet supplies whole valve-actuator assembly, the actuator is mounted at Valmet factory on the valve and the stroke limit stops are adjusted by Valmet.

6.2 ACTUATOR MOUNTING INSTRUCTIONS

- When a spring return actuator is being mounted, the valve should be in the closed position for spring-to-close operation, or in the open position for the spring-to-open operation. When an electric or double acting pneumatic actuator is being mounted, the valve position should correspond to the actuator indicator call out.

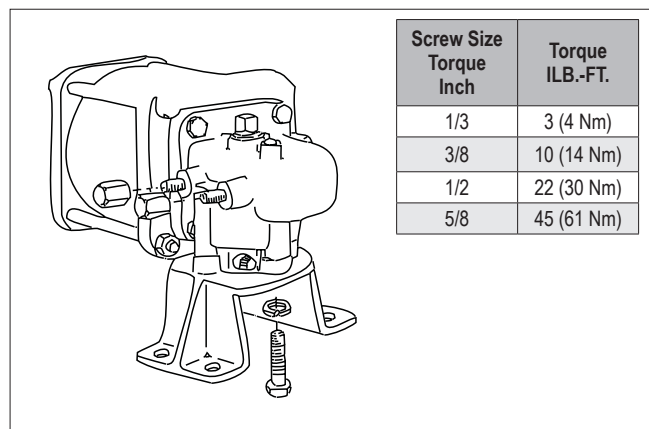


Figure 5.

- Assemble bracket to actuator as shown in **Figure 5**, torquing screws to the values shown in the table.
- Place the coupling onto the valve shaft. If the linkage contains a split, no-play coupling, assemble the coupling loosely on the valve stem. Use socket head cap screws and lock nuts. See **Figure 6**.

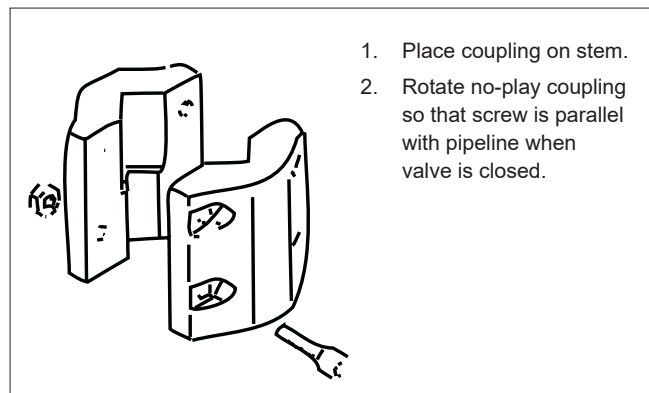


Figure 6.

- Lower actuator and bracket onto the valve while engaging actuator stem driver into coupling. Tighten screws just enough to firmly mate bracket to valve. This should allow the bracket to slip somewhat to align itself. See **Figure 7**.

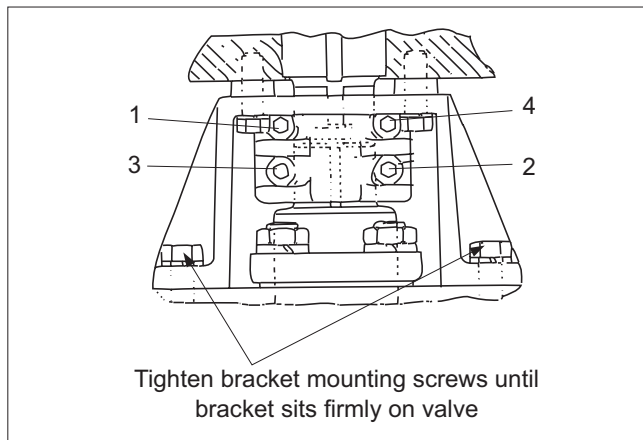


Figure 7.

- Tighten no-play coupling screws, if appropriate, in the sequence and to the torques shown in **Figure 7**.
- Cycle actuator. See actuator IMO's listed in table at right.
- Fully torque screws holding bracket to valve to the torques to 30-lb-ft (41 Nm) for 3/8-inch screws or 75-lbft (102 Nm) for 1/2" screws.
- Recheck and, if necessary, adjust no-play coupling screw torques. See **Figure 7**.
- As described in the actuator IMO (see table at right), adjust the actuator travel stops to the proper valve open and closed positions.

Valve Open: Disc face perpendicular with the flange face.

Valve Closed: Disc face parallel to the flange face within 1/32" (.79mm).

7. SERVICE / SPARE PART

We recommend that valves be directed to our service centers for maintenance. The service centers are equipped to provide rapid turn-around at a reasonable cost and offer new valve warranty with all reconditioned valves.

NOTE: When sending goods to the service center for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. Include the material safety datasheet(s) (MSDS) for all media flowing through the valve. Valves sent to the service center without MSDS datasheet(s) will not be accepted.

For further information on spare parts and service or assistance visit our web-site at www.valmet.com/flowcontrol.

NOTE: When ordering spare parts, always include the following information:

- Valve catalog code from identification plate,
- If the valve is serialized – the serial number (from identification plate)
- From **Figures 8 or 9**, the ballooned part number, part name and quantity required.

Table 2	
Installation, Maintenance & Operating Instructions*	
Actuator	IMO-
VANE	510
QUADRA-POWR® II	31
QUADRA-POWR®	32
ST60, 90, 115, 175MS	23
ST200/400	26
ST600/1200	24
ST160, 240, 290, 440MS	27
ST1800	506
MANUAL GEAR	63
BC, B1C	71
BJ, B1J	71
VP	35

Table 3	
Standard Torque Table	
Bolt Size	Torque Max/Min (Nm)
1/4"	10/7 FT.-LB. (14/9 Nm)
5/16"	20/14 FT.-LB. (27/19 Nm)
3/8"	33/23 FT.-LB. (45/31 Nm)
7/16"	55/38 FT.-LB. (75/52 Nm)
1/2"	83/56 FT.-LB. (113/76 Nm)
9/16"	121/83 FT.-LB. (164/113 Nm)
5/8"	165/113 FT.-LB. (224/153 Nm)
3/4"	275/188 FT.-LB. (373/255 Nm)
7/8"	413/281 FT.-LB. (560/381 Nm)
1"	638/435 FT.-LB. (865/590 Nm)

8. EXPLODED VIEW AND PARTS LIST

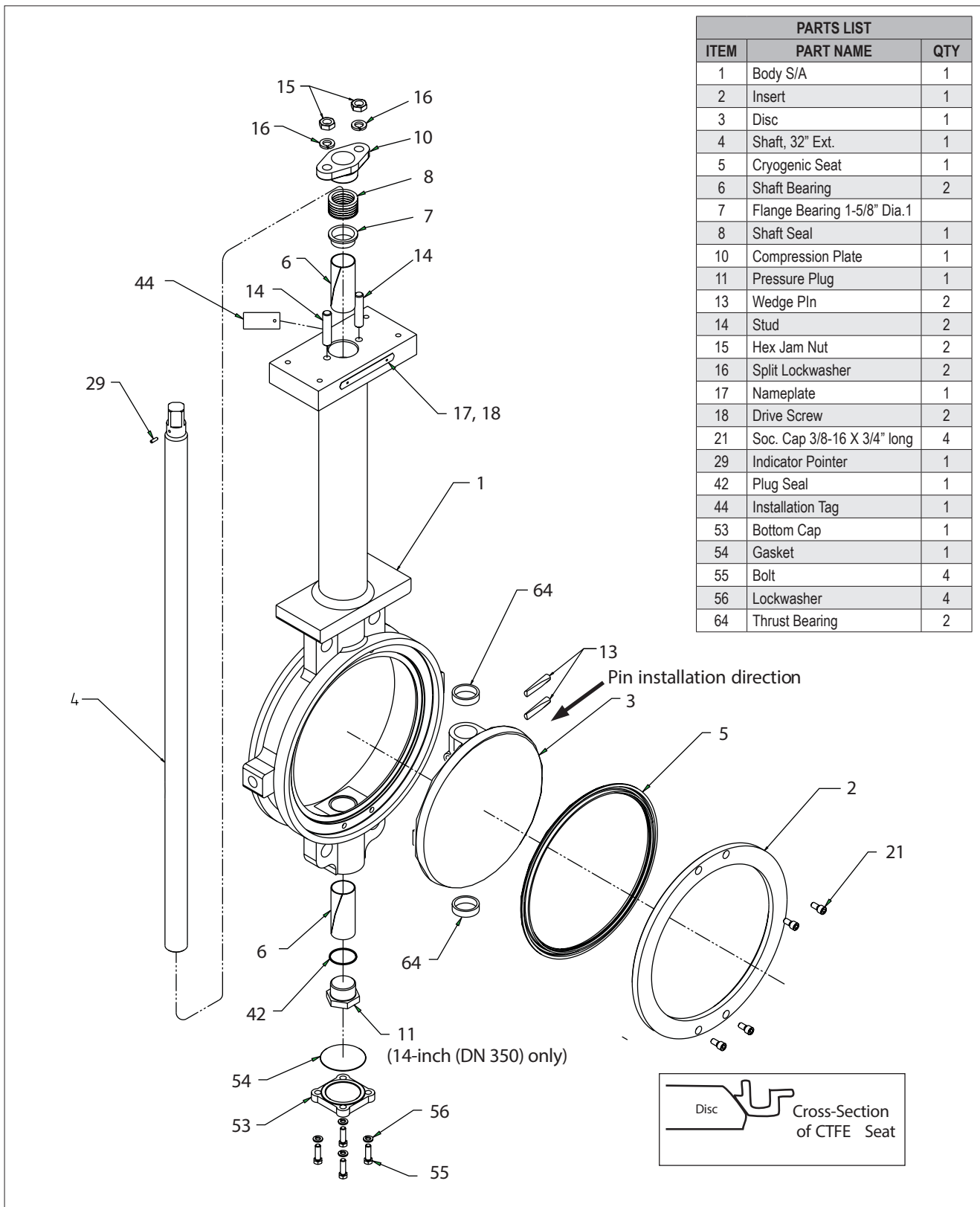


Figure 8.

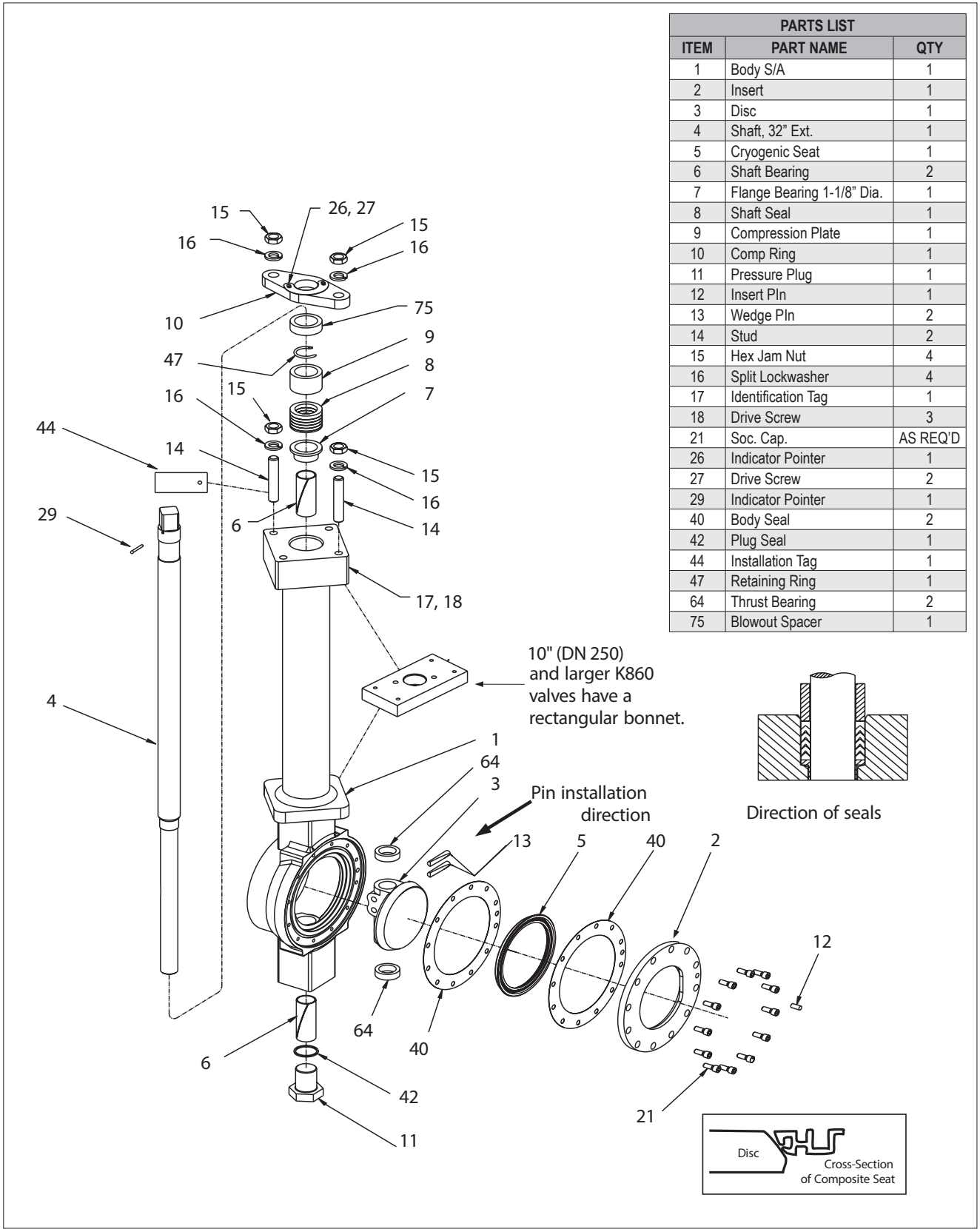


Figure 9.

9. GENERAL SAFETY WARNINGS AND DISCLAIMERS

General safety warnings

Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are intended to be used with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Trim (Disc, Ball or Plug) movement even when the valve is disassembled. Trim may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement of the trim. Do not leave objects near or in the valve port which may fall in and need to be retrieved.

General disclaimers

Receiving, handling and unpacking.

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
6. Remove the valve endcaps just before mounting into the pipeline.
7. **FOR YOUR SAFETY IT IS IMPORTANT TO FOLLOW THESE PRECAUTIONS BEFORE REMOVAL OF THE VALVE FROM THE PIPELINE OR ANY DISASSEMBLY:**
 - Be sure you know what flow medium is in the pipeline. If there is any doubt, confirm with the proper supervisor.
 - Wear any personal protective equipment (PPE) required for working with the flow medium involved in addition to any other PPE normally required.
 - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline flow medium.
 - Cycle the valve to relieve any residual pressure in the body cavity.
 - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
 - The valves with offset shaft (Butterfly, eccentric rotary plug) have greater trim area on one side of the shaft. This will cause the valve to open when pressurized from the preferred direction without a locking handle or an actuator installed.
 - **WARNING: DO NOT PRESSURIZE THE ECCENTRIC VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!**
 - **WARNING: DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM AN ECCENTRIC VALVE WHILE PRESSURIZED!**
 - Before installing the eccentric valve in or remove it from the pipeline, cycle the valve closed. Eccentric valves must be in the closed position to bring the trim within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

Operating

8. The identification plate (ID-plate, type plate, nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.

10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process medium. Damage or personal injury may result.
11. The operating torque of the valve may rise over time due to wear, particles or other damage of the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, several factors should be considered when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.
25. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
 - See IMO for the correct stem position.
 - Consider that the positioner may give the wrong signals.
26. Sealing materials (soft sealing parts) should be changed when the valve in maintenance. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
27. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
28. Valve pressure retaining parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure retaining parts. Damaged pressure retaining parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
29. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
30. Check the condition of sealing surfaces on the seats, trim (disc, ball, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
31. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
32. Do not weld on pressure retaining parts without an ASME and PED qualified procedure and personnel.
33. Pressure retaining parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
34. Make sure that the valve is positioned in the correct flow direction into the pipeline.
35. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
36. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
37. Never store a valve in maintenance without flow port protection.
38. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
39. Actuator mounting and unmounting:
 - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
 - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
 - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories either as is or with additional actuator support. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.

Maintenance

21. Respect the safety warnings above!
22. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.
23. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
24. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.

40. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
41. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
- Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
 - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
 - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test medium during the test.
 - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.

Subject to change without prior notice.

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