

NELES

Jamesbury™ Wafer-Sphere™ Butterfly valve model C 3" - 12" (DN80 - 300) class 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.

1. GENERAL

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the installation, operation and maintenance of the Jamesbury™ Model C Wafer-Sphere Butterfly Valves. Please read these instructions carefully and save them for future reference.

WARNING:

AS THE USE OF THE VALVE IS APPLICATION SPECIFIC, A NUMBER OF FACTORS SHOULD BE TAKEN INTO ACCOUNT WHEN SELECTING A VALVE FOR A GIVEN APPLICATION. THEREFORE, SOME OF THE SITUATIONS IN WHICH THE VALVES ARE USED ARE OUTSIDE THE SCOPE OF THIS MANUAL.

IF YOU HAVE ANY QUESTIONS CONCERNING THE USE, APPLICATION OR COMPATIBILITY OF THE VALVE WITH THE INTENDED SERVICE, CONTACT NELES FOR MORE INFORMATION.

1.2 OFFSET SHAFT DESIGN

One of the design features of the Wafer-Sphere valve that is responsible for its superior performance is the valve's offset shaft design. The shaft is offset in two planes: (1) away from the valve disc centerline and (2) behind the disc sealing plane (See Figure 1). 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 Figure 1).

WARNING:

IF THE VALVE DOES NOT HAVE EITHER A HANDLE ON AN ACTUATOR DO NOT PRESSURIZE. UNRESTRAINED DISC MAY OPEN OR CLOSE DUE TO PIPELINE PRESSURE.

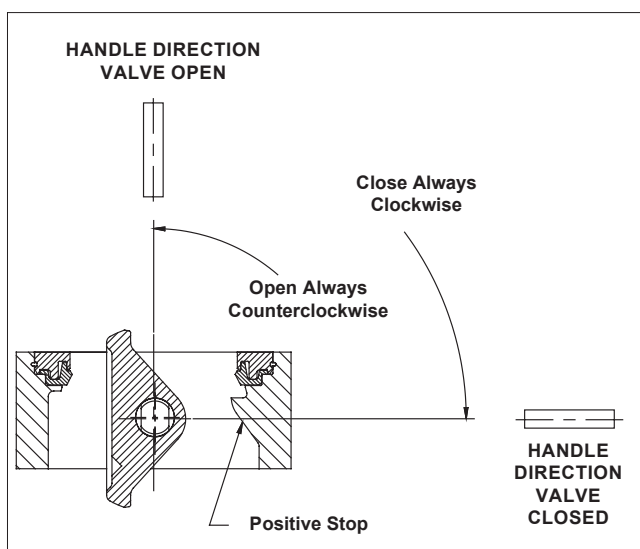


Figure 1. Offset Shaft Operation

1.3 POSITIVE STOP FEATURE

To prevent seat damage from over-travel of the disc beyond the closed position (usually 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 shown in (Figure 1).

1.4 WAFER BODY DESIGN

Some wafer designs (See Figure 2) 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.

1.5 SNAP-IN INSERTS

Snap-in inserts on wafer style valves must be clamped before cycling the valve when out of the pipeline. Use soft-faced clamps across the body to avoid damaging the gasket surface. Damage to body seals can result if snap-in inserts are not clamped when valve is cycled.

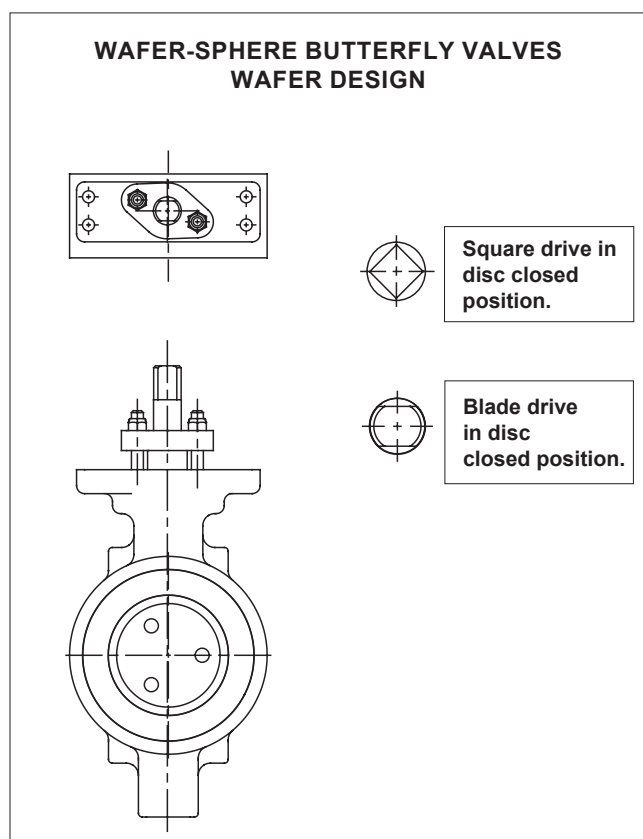


Figure 2. Wafer Body Design

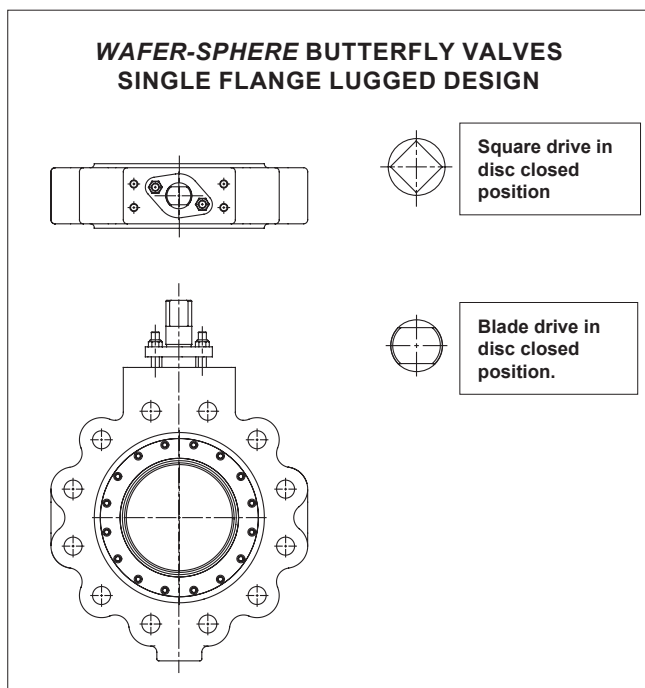


Figure 3. Single Flange Body Design

1.6 VALVE MARKINGS

The valve has an identification plate attached to the valve body (see Figure 4).

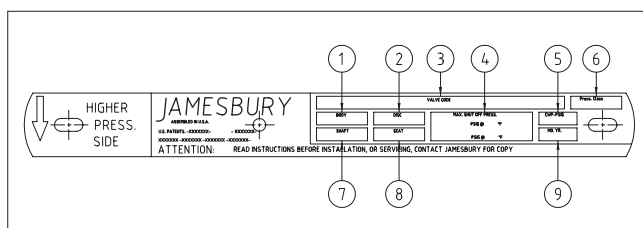


Figure 4. Identification Plate

Identification plate markings:

1. Trim material
2. Valve catalog code
3. Seat Material
4. Body Material
5. Maximum operating pressure
6. Maximum/minimum shut-off pressure/temperature
7. Approvals/Special Service marking
8. Model
9. Assembly date

1.7 SAFETY PRECAUTIONS

WARNING:

DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

EXCEEDING THE PRESSURE OR TEMPERATURE LIMITATIONS MARKED ON THE VALVE IDENTIFICATION PLATE AND INSTALLATION TAG 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 INSTALLATION TAG 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:

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 (SEE FIGURE 5).

WARNING:

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.

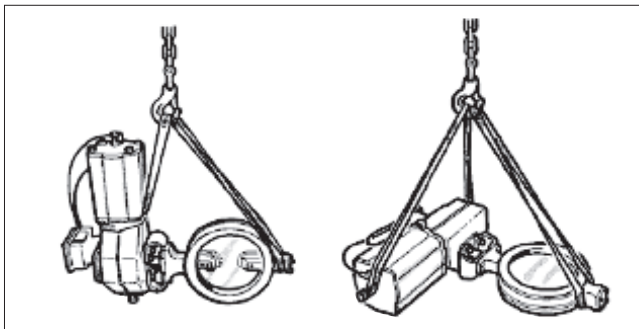


Figure 5. Lifting the valve

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 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.

3.2 INSTALLING IN THE PIPELINE

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.

The valve may be installed in any position and offers tightness in both directions. For lowest operating torque it is recommended, however, that the valve be installed with the body insert towards the higher pressure, (shaft downstream).

1. Read all **WARNINGS!**
2. **IMPORTANT:** Only operating handle stops or actuator stop screws must be used to stop the disc position. DO NOT use the "positive stop" by itself to limit travel.
3. Visually check the position of the disc when valve is in the closed position and the insert is fully compressed. The disc should be parallel to the flanges within 1/32" (0.79mm).
4. Before installing a closed valve in the pipeline, be sure that the handle or actuator is attached so that a counter-clockwise rotation, viewed from above, opens the valve (**See Figure 1**). Fully close the valve again before installing in the pipeline.
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 installation 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. It is not recommended to install the valve with the stem on the underneath side because dirt in the pipeline may then enter the body cavity and potentially damage the stem packing (**see Figure 6**).

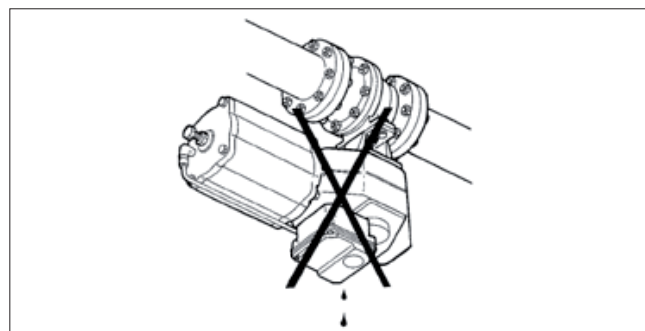


Figure 6. Avoid this mounting position

Refer to the **Section 4, MAINTENANCE** for stem seal adjustment. If there is weepage past the stem seals 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 stem seal adjustment described in the **MAINTENANCE** section.

3.3 VALVE INSULATION

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve (see Figure 7).

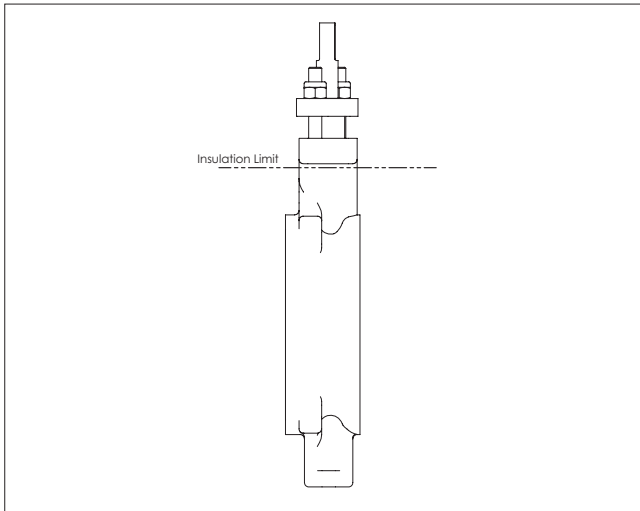


Figure 7.

3.4 ACTUATOR

WARNING:

WHEN INSTALLING THE ACTUATOR ON THE VALVE, MAKE SURE THAT THE VALVE ASSEMBLY FUNCTIONS PROPERLY. INFORMATION ON ACTUATOR INSTALLATION IS GIVEN IN SECTION 6 OR IN THE SEPARATE ACTUATOR INSTRUCTIONS.

The actuator should be installed in a manner that allows plenty of room for its removal.

The upright position is recommended for the actuator.

The actuator must not touch the pipeline, because pipeline vibration may interfere with its operation.

In certain cases it may be considered advantageous to provide additional support to the actuator. These cases will normally be associated with large actuators, extended stems, or where severe vibration is present. Please contact Neles for advice.

3.5 COMMISSIONING

Ensure that there is no dirt or foreign objects left inside the valve or pipeline. Flush the pipeline carefully. Make sure that the valve is fully open when flushing.

Ensure that all nuts, fittings, and cables are properly fastened.

If so equipped, check that the actuator positioner and/or switch are correctly adjusted. Actuator adjustment is explained in **Section 6**. To adjust any accompanying device(s) refer to the separate control equipment instruction manuals.

4. MAINTENANCE

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. Neles 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 the hex head cap screws (15) in **(Figure 13)** periodically to compensate for stem seal wear.

Overhaul maintenance consists of replacing seats and seals. A standard repair kit consisting of these parts may be obtained through your authorized Neles Distributor.

NOTE: Repair kits include thrust bearings (13), secondary stem seal (7), seats (5), and body seal (6) and stem seals (8). Refer to the Repair Kit chart (see **Table 4**).

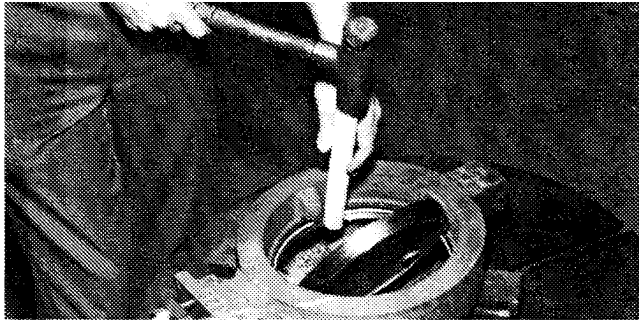
WARNING:

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

WEAR ANY PROTECTIVE CLOTHING OR EQUIPMENT NORMALLY REQUIRED WHEN WORKING WITH THE FLUID INVOLVED.

DEPRESSURIZE THE PIPELINE AND CYCLE THE VALVE AS FOLLOWS:

- A. PLACE THE VALVE IN THE OPEN POSITION AND DRAIN THE PIPELINE.
- B. CYCLE THE VALVE TO RELIEVE RESIDUAL PRESSURE IN THE BODY CAVITY BEFORE REMOVAL FROM THE PIPELINE.
- C. AFTER REMOVAL AND BEFORE ANY DISASSEMBLY, CYCLE THE VALVE AGAIN SEVERAL TIMES.



Removing Insert



Placing Spring Into Groove



Tapping End Of Spring Into Body



Installing Seat And Insert Assembly Into Body.
Angled As To Engage Insert Spring



Tapping Insert Assembly Into Body

Figure 8. Insert Removal / Installation

4.2 ACTUATED VALVE

It is generally most convenient to detach the actuator and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire assembly.

NOTE: To ensure proper reassembly, observe the position of the actuator and positioner/limit switch with respect to the valve before detaching the actuator.

WARNING:

ALWAYS DISCONNECT THE ACTUATOR FROM ITS POWER SOURCE, PNEUMATIC, HYDRAULIC OR ELECTRICAL, BEFORE ATTEMPTING TO REMOVE IT FROM THE VALVE!

WARNING:

DO NOT REMOVE A SPRING-RETURN ACTUATOR UNLESS A STOP-SCREW IS CARRYING THE SPRING FORCE!

1. Detach the air supply, electrical supply, hydraulic supply and control signal cables or pipes from their connectors.
2. Loosen screws of no-play coupling.
3. Unscrew the actuator mounting bracket screws.
4. Lift the actuator straight up in line with the valve stem until the coupling between actuator drive and valve stem is completely disengaged.
5. Place actuator in a safe location to avoid damage or personal injury.

4.3 VALVE REMOVAL

1. Read all **WARNINGS!**
2. Valve must be fully closed before removing it from the pipeline.
3. **CAUTION:** Valves equipped with spring-to-open (air-to-close) actuators must be disconnected from the actuators and then closed. Valves must be closed while removing them from the pipeline.

4.4 SEAT REPLACEMENT STANDARD VALVES

Numbers in () refer to items shown in (Figure 13).

1. After removing the valve from the line, place it on a bench. Take care not to damage the sealing edge of the valve disc.
2. Insert Styles:

A. Bolted Insert:

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. Do not strike the valve directly with a hammer.

B. Snap-In Insert (See Figure 8):

Using a wooden or plastic rod and hammer, drive the insert out of the body from the shaft side. The rod should be placed on either side of the positive stop in the body. Do not strike the valve directly with a hammer. (**NOTE:** Removal of the insert often results in damage to the seat being replaced.)

3. Remove the seat (5) and discard it.
4. Remove the body seal (40) when applicable, (3" and 4" [DN 80 and 100] Series 860L).
5. Clean the valve, and deburr the insert.
6. Carefully clean and polish the disc sealing surface. It should be free of all grooves and scratches.
7. If the disc is slightly damaged, it may be possible to smooth the sealing surface with crocus cloth, a fine stone, or the equivalent. If deep scratches are present, replace disc or return the valve to the factory for service.
8. Place the new body seal (40) into the groove in the body (when applicable).
9. Install the seat (5) into the insert (2).
10. Insert Styles:

A. Bolted Insert:

With the valve in the closed position, replace the insert and seat together, using the insert screws. Tighten the screws uniformly. Torque valves are given in (Table 1). Open the valve and retorque the insert screws per (Table 1). Take care not to damage the sealing edge of the disc. Close the valve.

B. Snap-In Insert:

Place the insert spring (77) into the groove in the body, opposite the positive stop (See Figure 8). Lightly tap one end of the spring into the body groove. Be sure the spring is positioned snugly into the groove.

TABLE 1		
Insert Screw Torque Table (FT•LBS Unless Otherwise Specified)		
Screw Size	Torque Carbon Steel FT•LBS (N•m)	Torque Stainless Steel FT•LBS (N•m)
#10	50 IN•LBS (6)	23 IN•LBS (3)
1/4"	14 (19)	6 (8)

Lightly tap the other end of the spring into the groove. Make sure that the ends of the spring are embedded into the body groove to prevent spring movement. With the seat assembled into the insert and the disc slightly open, install the assembly into the body such that it is angled into the body to engage the insert spring. Once the insert spring is engaged, "pop" the opposite side of the insert into the body by lightly tapping the insert with a block of wood and a hammer. Close the valve.

11. Set the actuator stops as described in the **MOUNTING INSTRUCTION** Section. After installation of a new seat, torque will be higher for a few cycles.

4.5 SEAT REPLACEMENT FIRE-TITE VALVES

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. Insert Styles:

A. Bolted Insert:

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. Do not strike the valve directly with a hammer.

B. Snap-In Insert:

Using a wooden or plastic rod and hammer, drive the insert out of the body from the shaft side. The rod should be placed on either side of the positive stop in the body. Do not strike the valve directly with a hammer.

NOTE: Removal of the insert often results in damage to the seat being replaced.

3. Remove the seat (5) and discard. Remove the body seal (40) from the insert and body.
4. Carefully clean the gasketing surfaces with a suitable solvent. They should be free of all grooves and scratches. If deep scratches are present, polish or repair is required.
5. Clean the valve and deburr the insert.
6. Carefully clean and polish the disc. It should be free from 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 disc or return the valve to the factory for service.
8. Cycle the valve closed.

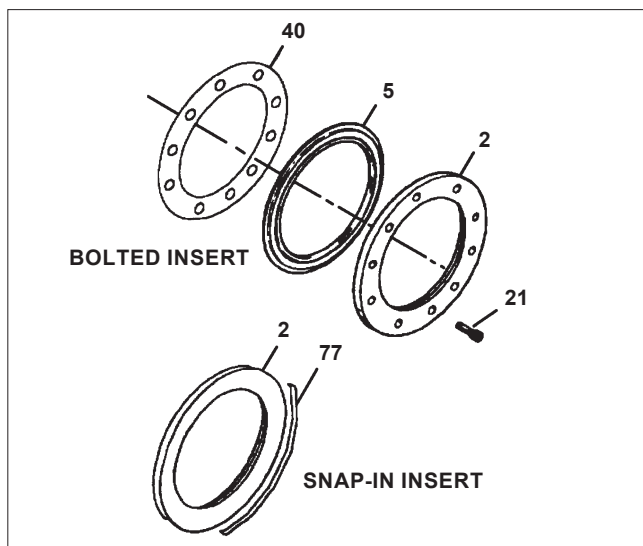


Figure 9.

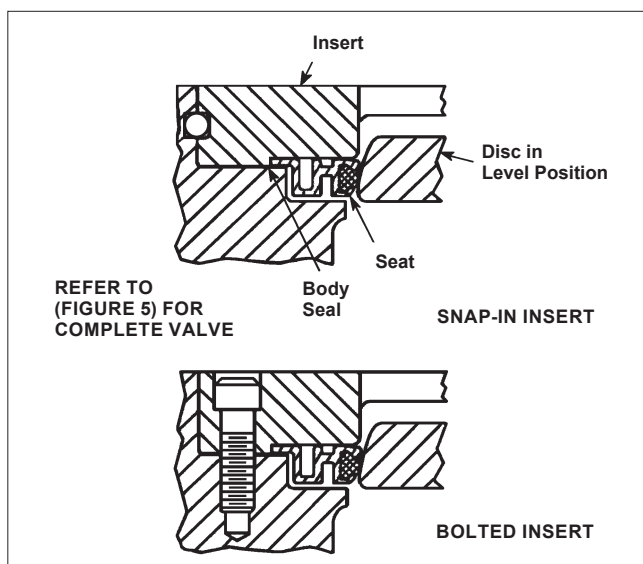


Figure 10.

9. A body seal (40) is required between the seat tail and body as shown in (Figure 10). The valve uses a graphite type gasket. This is installed in accordance with the following steps:
 - a. **IMPORTANT:** Exercise care at all times not to damage the gasket. A break may cause the gasket to leak.
 - b. The bottom surface of the insert is to be free of all foreign particles. Clean thoroughly with suitable solvent.
 - c. Apply the gasket to the body, and if a lug style, take care to align the holes in the gasket with the insert screw holes.
10. Verify that the disc is in the level position. Install new seat and insert (See Figure 9 & 10). For bolted inserts, install the insert screws, and tighten them uniformly. Torque values are given in (Table 1). Whenever possible, open the valve and retorquing the insert screws per (Table 1). Take care not to damage the sealing edge of the disc. Close the valve. For snap-in inserts, place the retaining spring into the groove in the body, opposite the positive stop (See Figure 8). The tips of the spring should be toward the insert side of the valve. Lightly tap one end of the spring into the body groove. Be sure the spring is positioned snugly into the groove. Lightly tap the other end of the spring into the groove. Make sure the tips of the spring are embedded into the body groove to prevent spring movement. With the seat assembled into the insert, and the disc slightly open, install the assembly into the body, such that it is angled into the body to engage the retaining spring. Once the retaining spring is engaged, "pop" the opposite side of the insert into the body by lightly tapping the insert with a block of wood and a hammer.
11. Set the actuator stops as described in the **ACTUATOR MOUNTING INSTRUCTIONS** Section. Do not install and tighten flanges on a newly resealed 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.

4.6 SHAFT SEAL REPLACEMENT

Numbers in () refer to items shown in (Figure 13).

NOTE: See IMO-317 for live loaded shaft seals.

CAUTION: Read the **WARNINGS** before proceeding.

1. Remove the actuator coupling.
2. Remove the nuts (15) from above the compression plate (10). Remove the compression plate (10). The studs (14) do not have to be removed.
3. Remove C-shaped retainer ring (47) from the shaft.
4. Remove the compression ring (9).
5. Remove the old shaft seal (8) segments. Do not score the shaft or body bore!
6. The spacer (7) need not be removed for shaft seal replacement.
7. Replace the old shaft seal with a new shaft seal. **NOTE:** If the seal is of the PTFE V-ring type, keep the seal rings stacked in the same order as removed from kit. Note the orientation in (Figure 13). This orientation is preferred for all applications, including vacuum.
8. Reinstall the compression ring (9), the retainer ring (47), the compression plate (10), the nuts (15). **NOTE:** If the compression ring initially sits too high to install the retainer ring it may be necessary to precompress the shaft seals somewhat. In that case, install the compression plate and tighten the nuts enough to accomplish the precompression. Remove the compression plate to install the retainer ring and then complete the reassembly.
9. Close the valve.
10. With the valve 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 after they have both come into contact with the compression plate.

4.7 VALVE DISASSEMBLY

Numbers in () refer to items shown in **(Figure 13)**.

NOTE: If complete disassembly becomes necessary, replacement of seats and all seals is recommended.

1. Place the valve on a bench or other suitable working space.
2. If the seat is to be replaced or removed, follow Steps 2, 3, 4 and 5 in the **SEAT REPLACEMENT** Section. **NOTE:** It is good practice to replace the seat, shaft and body seals and bearings any time a valve is disassembled.
3. Remove the shaft seal compression hardware as detailed in Steps 1-4 in the **SHAFT SEAL REPLACEMENT** Section. The seal material itself can be more easily removed after the shaft has been removed from the valve.
4. Remove the disc pin welds by grinding or machining off the welds. Drive out the pins opposite the installation direction shown in **(Figure 13)**.
5. Remove the shaft (4). **NOTE:** When removing the shaft and freeing the disc, be careful not to scratch the sealing surface of the disc.
6. Remove the disc (3) and upper and lower thrust bearings (64).
7. Remove the top bearing (6) either through the top of the valve or the waterway.
8. Remove the bottom bearing (6).

4.8 CHECKING PARTS

1. Clean all disassembled parts.
2. Check the shaft (4) and disc (3) for damage. Pay particular attention to the sealing areas.
3. Check all sealing and gasket surfaces of the body (1) and insert (2).
4. Replace any damaged parts.

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

- a. Valve catalog code from Identification plate,
- b. If the valve is serialized – the serial number (stamped on the valve body),
- c. From **Figure 13**, the ballooned part number, part name and quantity required.

4.9 VALVE ASSEMBLY

Numbers in () refer to items shown in **(Figure 13)**.

1. Clean all valve components.
2. Inspect all components for damage before assembling the valve. Look for damage to the sealing areas on the disc, shaft, and body, and for wear in the bearing areas.
3. Carefully clean and polish the disc sealing surface. It should be free from 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. To ease assembly of the shaft into the disc, it may be necessary to coat the shaft and the disc bore lightly with a lubricant compatible with the media to be handled by the valve.
7. Slide the shaft through the top bearing and engage the top thrust bearing (64). With the two pin holes toward the bonnet, place the disc in the waterway and slide the shaft through

the shaft bore in the disc. Place the lower thrust bearing (64) below the disc, slide the shaft through and into the lower shaft bearing (6). Use caution to prevent damage to the shaft bearings and disc sealing surface.

8. Insert the disc pins (13), as shown in **(Figure 13)**, and drive them into place. The pins must be driven so that both pins are the same depth within 1/16" (1.56 mm). When they are correctly installed the drive shaft will be as shown in **(Figures 2 and 3)**. Weld both ends of the pins, small end first, grounding the shaft only (body on blocks of wood). After the disc cools, clean the welds with a wire brush. **CAUTION:** Use care to keep contamination out of the valve.
9. Install the upper bearing spacer (41) when applicable, the spacer (7) with chamfered side toward disc, the shaft seal (8), the compression ring (9) and the retainer ring (47). If the shaft seal is of the PTFE V-ring type, be certain that it is installed in the orientation shown in **(Figure 13)**.
10. If the studs (14) have been removed from the valve, reinstall them in the holes shown in **(Figure 5)**, using LOCTITE® or other locking compound to prevent vibration loosening. Stud protrusion should be 1.97 inches for 3" & 4" (DN 80 & 100), 2.35 inches for 6" & 8" (DN 150 & 200) and 2.06 inches for 10" & 12" (DN 250 & 300).
11. Place the compression plate (10) over the shaft (4) and studs (14). Install the nuts (15), but do not tighten.
12. Cycle the valve fully closed. Install new unused seat and body seal. See the **SEAT REPLACEMENT** Section for details.
13. With the valve still closed, tighten the nuts (15) on the compression plate evenly until the shaft seals are adequately compressed to prevent leakage. This should require tightening the nuts approximately 1-1/2 to 2 full turns after they have both come into contact with the compression plate.
14. Set the actuator stops as described in the **ACTUATOR MOUNTING INSTRUCTIONS** Section. Tighten the screws holding the ratchet plate.

4.10 TESTING THE VALVE

WARNING:

WHEN PRESSURE TESTING, EXERCISE CAUTION AND MAKE SURE ALL EQUIPMENT USED IS IN GOOD WORKING CONDITION AND APPROPRIATE FOR THE INTENDED PRESSURE.

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

1. In the following test, suitable gaskets 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 on the valve may cause it to rotate when the test pressure is applied to one side of the disc.
3. The valve should be installed between flanges or in a testing apparatus. If flanges are used, refer to **INSTALLATION** Section. 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. Slightly open the valve. Verify that you do not have a seal between the seat and the disc. Exercise caution when cycling a valve in the test apparatus to avoid possible disc damage from the disc striking the test fixture.

5. Cap the downstream vent and apply 100 psi (6.9 bar) to the valve. Check the shaft seals, 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 leakage. Vent the valve, and when it has returned to 0 psi (0 bar), retighten the flange bolts in the area. Repressurize the valve checking the gasket again. If leakage persists, disassemble and inspect for damage.

6. If leakage is detected at the shaft seals, tighten the bonnet nuts only enough to stop the leak.
7. Vent the valve, and when it has returned to 0 psi (0 bar), cycle the valve closed.
8. Attach a small tube or hose to the downstream flange (shaft side of the valve).
9. Be sure power/pressure is still applied to the actuator. Pressurize the upstream flange (insert side of valve) to 100 psi (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 *Jamesbury* actuator IMO, listed in **Table 2**.
11. Repressurize the valve and check the leakage. If valve still leaks, repeat step 10. If leakage cannot be stopped, adjust the actuator stop so that leakage is minimized.
12. 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 (25.4 mm) of valve diameter per minute may be considered acceptable for rebuilt soft seated or *Fire-Tite* valves.

5. ACTUATOR

WARNING:

BEFORE INSTALLING THE VALVE AND ACTUATOR, BE SURE THAT THE INDICATOR POINTER ON TOP OF THE ACTUATOR IS CORRECTLY INDICATING THE VALVE POSITION. FAILURE TO ASSEMBLE THESE PRODUCTS TO INDICATE CORRECT VALVE POSITION COULD RESULT IN DAMAGE OR 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 valve from which it was removed. The actuator must be readjusted for proper open and close position each time it is remounted.

CAUTION: The linkage has been designed to support the weight of the *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.

WARNING:

WHEN MOUNTING THE ACTUATOR MAKE SURE THAT THE VALVE AND ACTUATOR ARE BOTH IN THE SAME POSITION. MOUNTING AN OPEN ACTUATOR TO A CLOSED VALVE MAY RESULT IN VALVE STEM DAMAGE.

NOTE: When a single-acting STMS pneumatic spring-return actuator is mounted to a *Wafer-Sphere* valve, it can be mounted only in the spring-to-close mode (air-to-open).

5.1 ACTUATOR MOUNTING INSTRUCTIONS

1. 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 indicated actuator position.
2. Assemble bracket to actuator as shown in (**Figure 11**). Tighten to torque listed in (**Table 3**).
3. Place the coupling onto the valve stem. If the valve has a two-piece "no-play" bolted coupling, assemble the coupling loosely on the valve stem. Use socket head cap screws and lock nuts (See **Figure 12**).
4. Lower actuator and bracket onto valve while engaging actuator stem driver into coupling. Tighten screws just enough to firmly mate bracket to valve. This should allow bracket to shift, allowing the coupling to align the valve and actuator shafts (See **Figure 14, Step 3A**.)

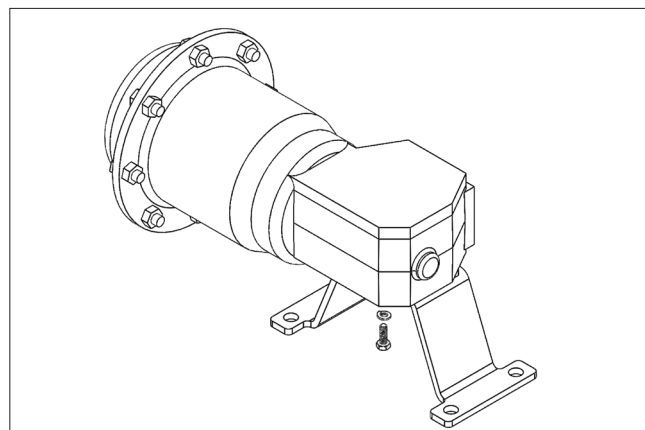


Figure 11.

Table 2

Actuator	IMO
Manual Gear	IMO-549 & IMO-554
Valv-Powr™	IMO-553
Quadra-Powr™	IMO-215
BC, B1C	6 BC 71
BJ, B1J	6 BJ 71

5. Tighten the no-play coupling screws to torques shown in (**Figure 14, Step 3B**). Use alternating sequence shown.
6. Cycle actuator. See actuator instructions.
7. Fully tighten the screws holding the bracket to the valve, as shown in (**Figure 14, Step 3C**).
8. Recheck no-play coupling screw torques, using the torques in (**Figure 14, Step 3B**). Use alternating sequence shown.
9. Adjust the actuator travel stops as described in the actuator instructions to these proper valve open and closed positions:

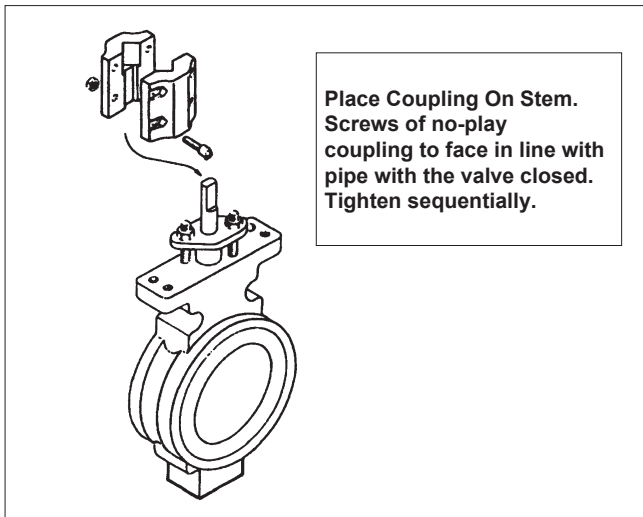


Figure 12.

Valve Open:

Disc face (or shaft blade) perpendicular with the flange face.

Valve Closed:

Disc face parallel to flange face within 1/32" (.79 mm).

5.2 DIRECT DRIVE MOUNTING

Follow instructions per Paragraph 6.1 except for coupling assembly.
 (See Figure 15)

6. REPAIR KITS

Standard repair kits are listed in (Table 4). When ordering repair kits for your valve refer to Section 1.6, Valve Markings and check area "3" on your valve's identification plate to determine the correct seat material for your valve.

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.neles.com.

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 **Figure 13**, the ballooned part number, part name and quantity required.

8. EXPLODED VIEW AND PARTS LIST

VALVES WITHOUT COVER PLATES

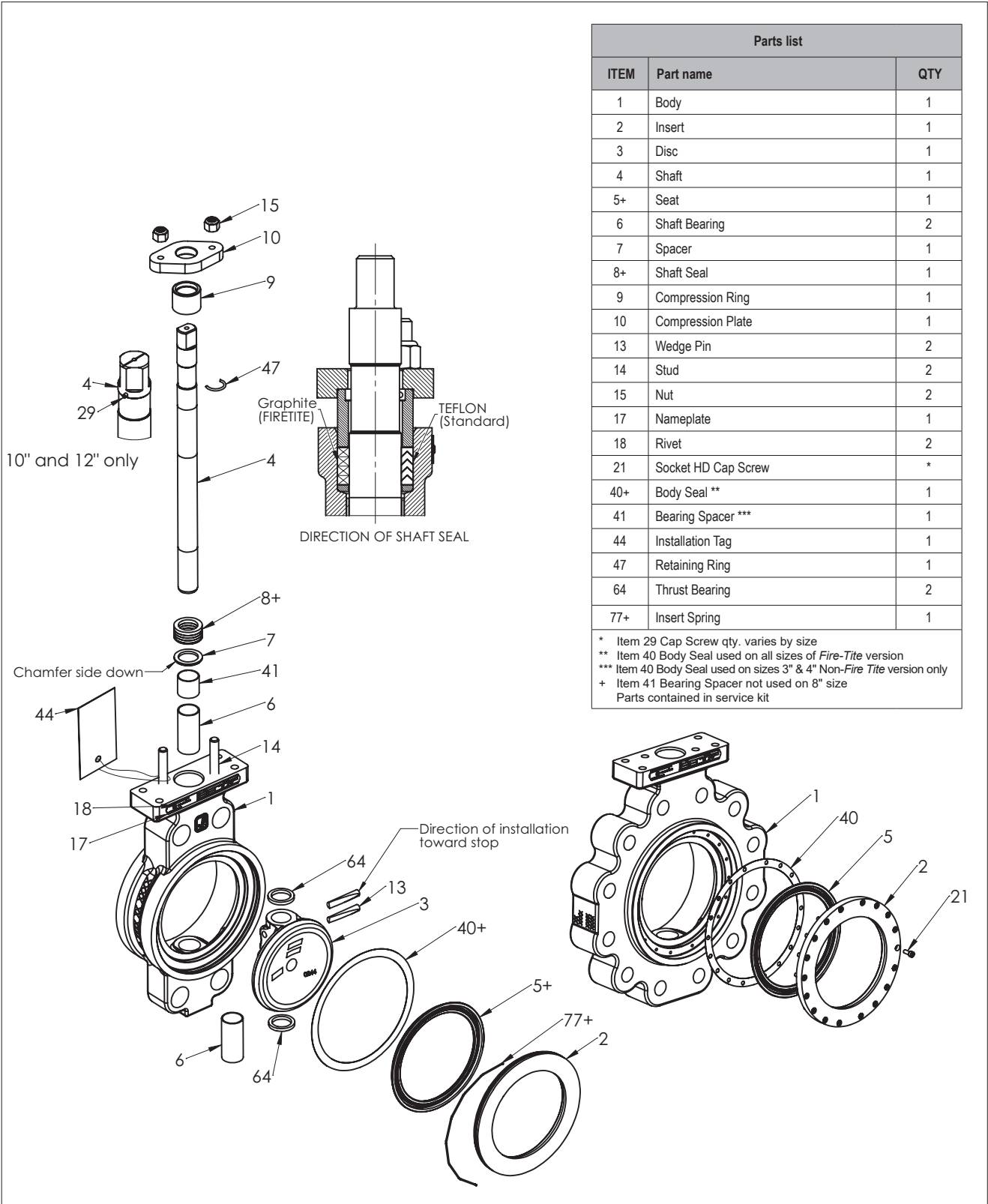


Figure 13.

TABLE 3				
Bracket Bolting Torques for GR.5 Hex Cap Screws				
	Torque to Aluminum Body Actuators			
Bolt Size	No Lubrication to Screws			
inches	FT•LBS	N•m	FT•LBS	N•m
1/4	6	-	8	-
5/16	12	-	16	-
3/8	20	-	27	-
7/16	30	-	45	-
1/2	50	-	67	-
9/16	70	-	100	-
5/8	90	-	135	-
3/4	160	-	225	-
7/8	250	-	335	-
1	360	-	520	-
1-1/8	520	-	700	-
1-1/4	700	-	990	-
M6	-	6.8	-	9.5
M8	-	14.9	-	19.0
M10	-	30	-	38
M12	-	52	-	65
M16	-	122	-	156
M20	-	230	-	305
M30	-	773	-	1062
M36	-	1288	-	1826

TABLE 4				
Repair Kits for Non Cryo Valves				
860 Model C Repair Kits				
Size	Soft Seat		Fire-Tite Seat	
	Wafer	Lugged	Wafer	Lugged
3" (DN 80)	RKW-889	RKW-888	RKW-891	RKW-890
4" (DN 100)	RKW-893	RKW-892	RKW-895	RKW-894
6" (DN 150)	RKW-897	RKW-896	RKW-899	RKW-898
8" (DN 200)	RKW-901	RKW-900	RKW-903	RKW-902
10" (DN 250)	RKW-905	RKW-904	RKW-907	RKW-906
12" (DN 300)	RKW-909	RKW-908	RKW-911	RKW-910

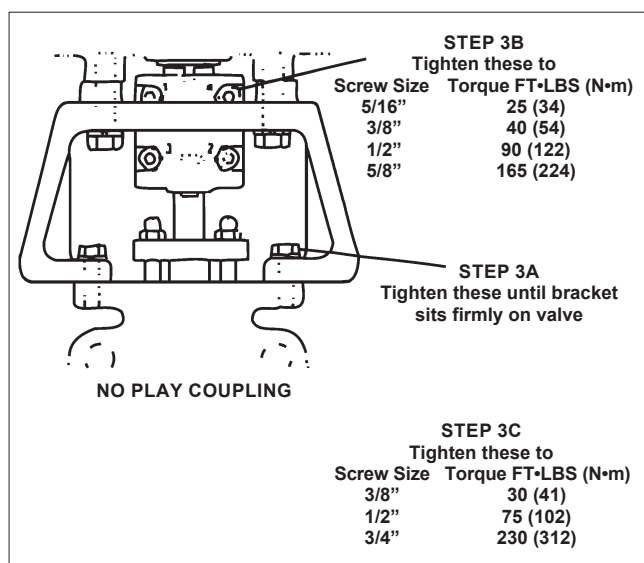


Figure 14

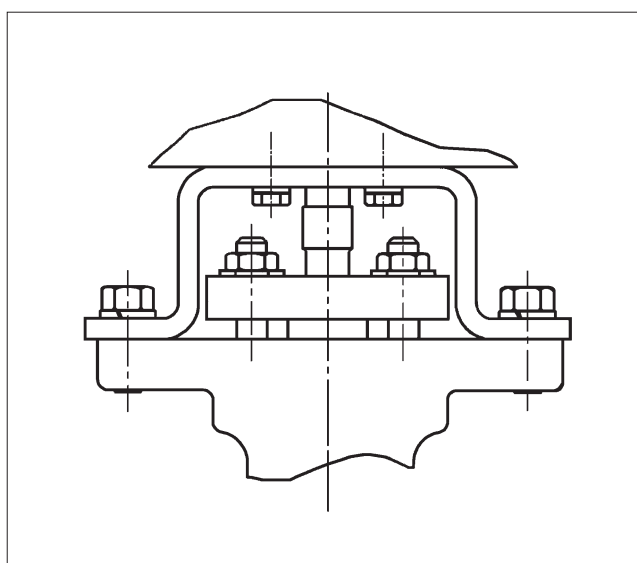


Figure 15

JAMESBURY SERIES 860 WAFER-SPHERE VALVES

WARNING: As the use of the valve is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some of the situations in which the valves are used are outside the scope of this manual. If you have any questions concerning the use, application or compatibility of the valve with the intended service, contact Neles for more information.

HOW TO ORDER SERIES 860 WAFER-SPHERE VALVES

These *Wafer-Sphere* valves are described by size and a multi-character code that defines body configuration, body, disc, shaft, seat and seal materials. Explanation of the code for valves in this bulletin is as follows:

1	2	3	4	5	6	7	8	9	10
6	860	L	-	11	22	HB	XZ	C	-

EXAMPLE: The above example is for a 6" ASME Class 600 single-flange lugged-design valve with carbon steel body, 316 stainless steel disc, 17-4PH stainless steel shaft, *Xtreme* seat, and carbon-filled enhanced PTFE shaft seal.

1	Size*										
inches	3	4	6	8	10	12	14	16	18	20	24
DN	80	100	150	200	250	300	350	400	450	500	600

* When ordering, state size code in inches. Consult factory for larger sizes

2	Pressure Class
860	Standard ASME Class 600
868	Standard ASME Class 600 w/CE Marking and Documentation
F860	Fire-Tite ASME Class 600
F868	Fire-Tite ASME Class 600 w/CE Marking and Documentation

3	Body Style
W	Wafer
L	Single-flange lugged

4	Special Service
O	Oxygen
—	No entry if standard

5	Seat Type
11	Standard (non-Fire-Tite)
31	Fire-Tite

6	Body Material
22	Carbon steel
36	316 Stainless steel

7	Disc & Shaft Material
HB	316 Stainless disc, 17-4 PH stainless shaft (NACE compatible)
00	(not NACE compatible) Same as body material
36	(not NACE compatible) 316 Stainless steel** (not NACE compatible)

** For use with carbon-steel body code. For 316 stainless body with 316 trim, use "00".

8	Seat & Seal Material	
Standard		
XZ	Xtreme	Carbon-Filled Enhanced PTFE
Fire-Tite		
AE	PTFE/Stainless steel	Graphite

9	Model
C	For 3"-12" non Fire-Tite, non Cryo

10	Modifier Code
—	Standard
For others, please describe. Factory will supply code.	

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