

V-Notch Segment Ball Valve

Series MV1F

Installation, Operation,
& Maintenance Manual

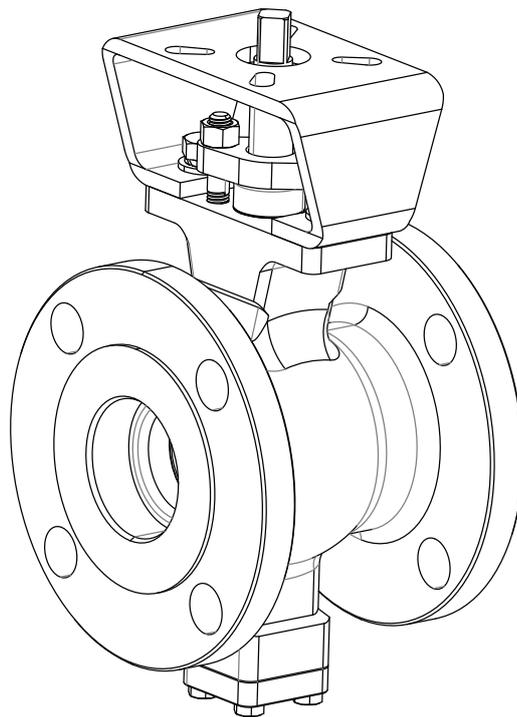


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Chapter I

Introduction

The manual is provided to ensure proper installation, operation, & maintenance for Series MV1F Wafer Type and Flanged V-notch Segmented Ball Valves manufactured and supplied by Sesto Valves. Each valve can be identified by a marking on the body, a name plate or both.

1.1 Contact Information

For information concerning warranties, or for questions pertaining to installation, operation or maintenance of Sesto Valves products, contact:

Sesto Valves.
114 Resource Drive
Wentzville, MO 63385
United States

Phone: +1-636-856-8576
Fax: +1-636-856-8930
Email: sales@sestovalves.com

To order replacement parts, contact Sesto Valves using the information listed above.

1.2 General Notes

The following instructions refer to Sesto Valves Wafer Type and Flanged V-notch Segment Ball Valves as described in the Sesto Valves current catalog.

Keep the protective covers in place until the valve is ready for installation. Valve performance depends upon prevention of damage to ball surface. After removing the cover, make sure that the valve is completely open and free of obstructions, dirt, particles, or any materials that may cause seat or seal damage.

Valves may contain a silicon-based lubricant for transportation, which aids in the assembly of the valve. Lubricant may be removed with a solvent if found objectionable. Alternatively, valves can be ordered free of lubricants upon request.

Certain ferrous valves contain phosphate material and are oil dipped during the manufacturing process. However, the processes used are completely non-toxic.

1.3 Precautions and Warnings

Carefully review application criteria before selecting valve materials. The user should be aware of the operating conditions, fluid properties, and the potential outcomes of implementing valves into their pipeline system. Sesto Valves suggests that the user be prepared with this information before submitting an inquiry.

Fluids can experience property changes under a variety of conditions, especially when left inside the sealed cavity. Failure may occur when temperature and pressure exceed the valves operational capacity. Users should be aware of that excessive pressure and temperature at nearby pipeline system can also cause valve failure as well.

Wafer Type and Flanged V-notch Segment Ball Valves are generally recommended for throttling services as well as on-off functions.

Do not touch the valve surface when high temperature fluid is flowing through the valve.

Do not attempt to remove the bonnet from the body during operation, especially with the presence of high pressure in the pipeline system.

For safety, unstable fluid should not be used in the pipeline system, unless otherwise specified with the category III in Declaration of conformation.

NOTE:

1. Series MV1F Wafer Type and Flanged V-notch Segment Valves are installed between flanges. The body is in one part; the shaft and segment ball are separated.
2. The valve is either soft or metal seated. Depending on customers requirement, the structure of the supplied valve may be different.
3. The valve is designed for both control and shutoff applications.
4. Actuators and accessories are only discussed briefly. Please refer to individual manuals for further information on their IOM manuals.

CAUTION:

Before removing valve from pipeline, operator should be aware of that: media flowing through the valve may be corrosive, toxic, flammable, or of a contaminant nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that

the following safety precautions should be taken when handling valves.

- 1) Always wear eye shields.
- 2) Always wear gloves and footwear.
- 3) Wear protective headgear.
- 4) Ensure that running water is readily accessible.
- 5) Fire extinguisher must be obtainable if media is flammable.

Check the line gauge to ensure that no pressure is present at the valve. Slowly operate the valve to the half OPEN position and check that the media has completely exited the valve. The valve should be decontaminated at this point.

These valves, when installed, have body connections which form an integral part of the pipeline. The valve cannot be removed from the pipeline without being dismantled.

1.4 Storage

If the valves will not be immediately installed, it is preferable to store them indoors and in a clean dry place. The valve ports should be sealed by plastic caps to prevent dirt from entering and damaging interior parts.

Note:

1. The valve is delivered in the closed position. Before storing, check to see that the valve is in the CLOSED position in order to avoid damage to the seal.
2. The surface of the valves should be greased properly for protection.

Chapter II

Installation

Flush the pipe line carefully before installing the valve. Dirt, welding, or other debris particles may damage the balls sealing surface and seats. Before installation, check all valve and mating flanges to ensure gasket surfaces are free from defects.

CAUTION:
Do not exceed the valve performance limitations.

CAUTION:
Before installing, make sure the line pressure has been relieved and any hazardous fluids have been drained or purged from the system.

2.1 General Notes

1) Direction

The valves are designed with a preferred flow direction. Install the valve according to the direction marked on the valve body. Valves installed in a reversed flow direction will not seal properly.

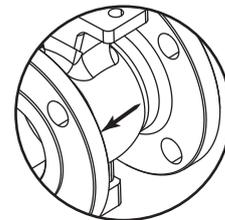


Figure 2.1 Flow Direction Indication

In the case of valve automation with actuators, install the valves with the actuator at or above the centerline of the horizontal piping, as shown in Figure 2.1.

CAUTION:
Do not fasten supports to the flange bolting or the actuator.

NOTE:
User should avoid installing the valve so that the shaft points downwards. Otherwise, impurities traveling in the pipeline may enter the body cavity and damage the packing gland.

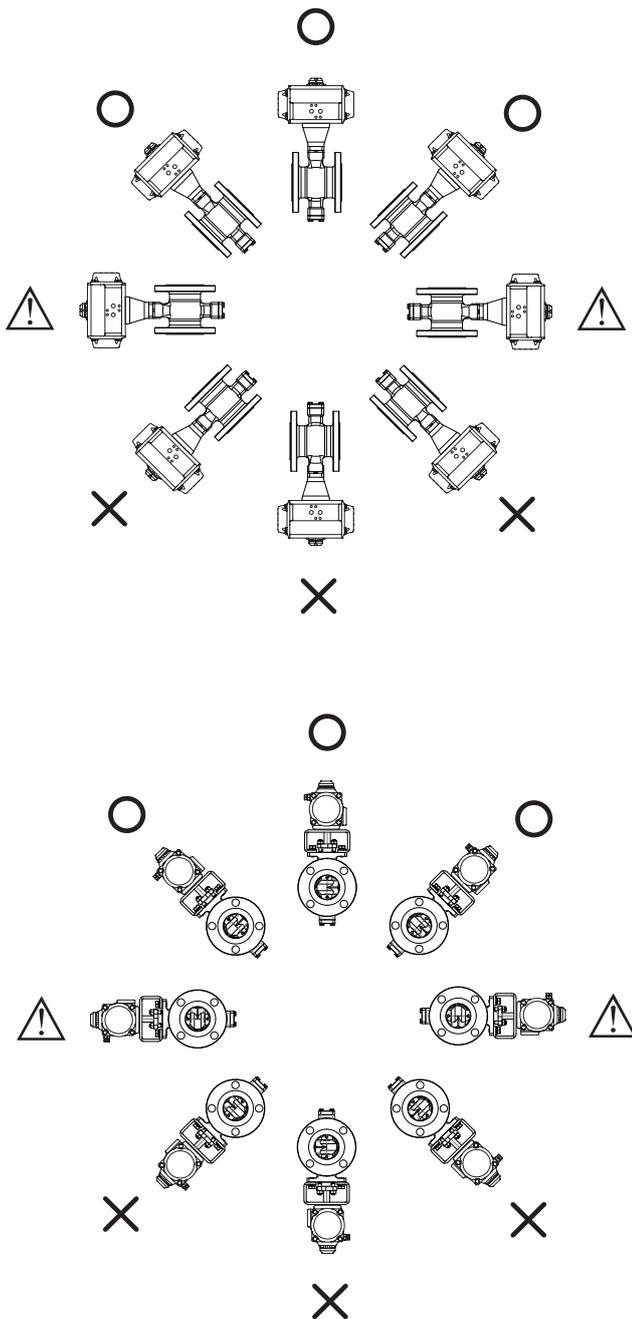


Figure 2.2 Proper position while piping

NOTE:

When installing horizontally, the support of the actuator must be strengthened to avoid valve leakage caused by valve stem deflection.

2) Position

The body, cap, and gasket are in the connection area of ball valve and pipeline. The bear weight ability and gradient are very important to the pipe installation. Do not allow the pressure and stress from the pipeline to concentrate on the connecting area of the body and cap.

Otherwise, the ball, seat, and stem could be damaged, deformed, and leak.

Note:

Over tightening of any side may cause leakage.

3) Fittings

Select the correct fitting sizes according to the pipeline specifications and mate the valve to the pipeline adequately with appropriate bolts. Do not attempt to correct pipeline misalignment using the flanged bolting.

4) Systems hydrostatic test

Before delivery, valves are tested in the OPEN position to 1.5 times the allowable pressure under ambient conditions. **However, after installation, the piping system may need to be re-tested, if possible, to ensure the application conditions do not exceed the tolerable pressure of the valve.**

5) Pre-Installation Wash

Before installing the valve, clean the pipelines of the system to remove any foreign deposits. Clean the connecting flanged end surfaces as well to ensure a tight and uncompressed seal.

2.2 Installation of Ends

1) Wafer End

1. Verify valve is in the fully OPEN position.
2. Use the appropriate size bolt and hex nut (not included) as for flange size and class.
3. Do not over tighten when bolting the joints.
4. Place gasket on each flange connection (not included).
5. Follow gasket manufacturer's recommended practice for tightening flange bolts.

2) Flanged End

1. Before installing, make sure the flanges and the pipe are free from grit, dirt or burrs.
2. The flanges must be aligned and parallel with the correct distance to allow the valves face-to-face dimension and gaskets to fit between the gap.
3. Tighten the flange bolts in a crossover pattern. The gasket type, bolts, flange, and lubricant

affect the tightening torque values so it is important to review this information first.

4. Note that the bolts must be tightened in uniform order to create a parallel movement of the two flanges therefore a uniform deformation of the gasket in between them.

Before installing the actuator, use an adjustable wrench to manually rotate the valve stem several times. This rotation breaks the torque that may have built up during long-term storage.

2.3 Pneumatic and Electrical Connections

When installing the actuator, make sure that the valve-actuator combination functions properly. The flow direction is indicated by a slit at the top of valve stem. See Figure 2.2.

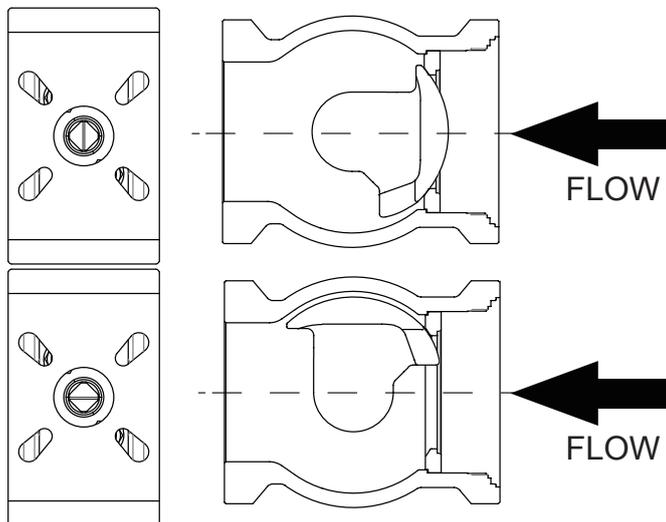


Figure 2.3 The top graph indicates an OPEN valve, and the bottom one represents a CLOSED valve

If possible, install the valve so that the actuator can be disconnected without removing the valve from the piping.

Please refer to the appropriate instruction manuals when installing automation packages using an actuator, positioner, filter/regulator, solenoid, and/or limit switch.

When making pneumatic connections, it is recommended to use PTFE tape or paste on threaded joints, unless otherwise specified by the components instruction manual. The pneumatic supply, such as dry air or nitrogen, should be clean. When making electrical connections, wiring of components should be in accordance with any and all applicable local and national codes and standards.

Chapter III

Operation

For manual operation, shift the handle in clockwise direction to CLOSE the valve and counter-clockwise to OPEN it. If the handle is parallel to the direction of flow, the valve is OPEN. If the handle is perpendicular to the direction of flow, the valve is CLOSED.

When installing actuator or if the valve is operated with removable handle, the user should be aware of the position of the valve. The line on the top of the stem indicates whether the valve is in the OPEN or CLOSED position.

3.1 Handling

Lift small individual valves by the body during installation. When using a cable or other overhead lifting device make sure it is strong enough to safely handle the weight and follow strict procedure. Never lift the automation package by the actuator, positioner, limit switch, or piping. Always lift or secure straps/cables to the valve body during installation. Follow these steps to prevent valve damage or human injury.

3.2 Cleaning

No matter the circumstance, the operator must check for any foreign body or dust particles inside the bore. If anything is present, clean the valve before installation using water, compressed air, or steam. However, valve automation packages shall be cleaned only with water or steam. **Using compressed air to clean the valve automation devices is strictly prohibited.** To clean, place the valve bore perpendicular to the ground and clean until all debris has been removed from the bore. Then check and clean the bores on all of the connecting pipes and connection areas. To avoid the blocking and leakage, no flush, rust, or foreign bodies are allowed within the bore.

3.3 Manual Operation

Sesto Vales MV1F Ball Valves have have $\frac{1}{4}$ turn operation opening in a counter-clockwise direction. When the handle is positioned across the pipeline,

this indicates that the valve is closed. When the handle is positioned parallel with the pipeline, this indicates the valve is open.

In cases where it is difficult to operate a manual valve due to large torque requirements, it is recommended to use a gear operator.

The hand wheel on the gear box indicates the opening and closing direction of the valve. Generally speaking, the clockwise direction of the hand wheel is the closing direction, and the counter-clockwise direction is the opening direction. As shown in Fig 3.2 below.

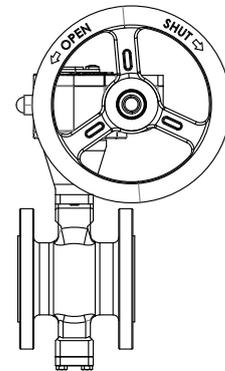


Figure 3.2 Handwheel Rotation Direction for CLOSED and OPEN position of a gear box

NOTE:

Due to the spring structure, when manually operating the soft-seated ball valve, be sure not to over-rotate the ball. Opening more than 90-degrees may cause the ball to deviate from the effective path of the spring, making it impossible to use it normally.

3.4 Remote Operation

Where manual operation is not required, valves may be automated for remote operation, instrument controls etc. Sesto Valves offers a wide range of pneumatic and electric actuators for different working conditions.

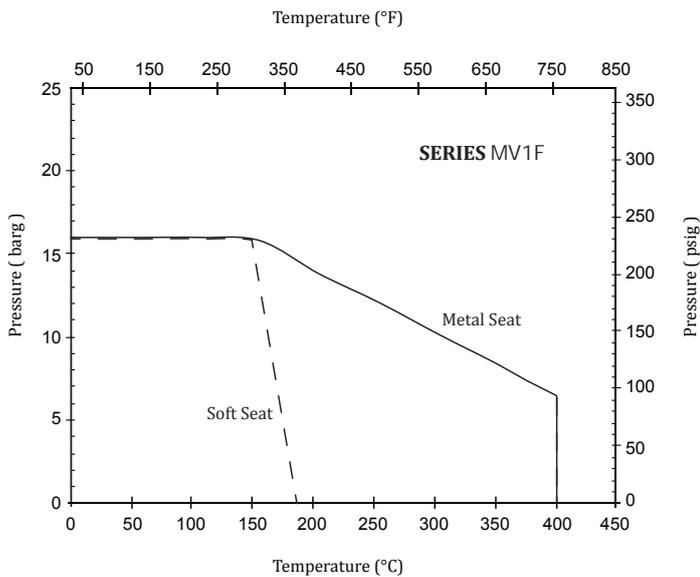
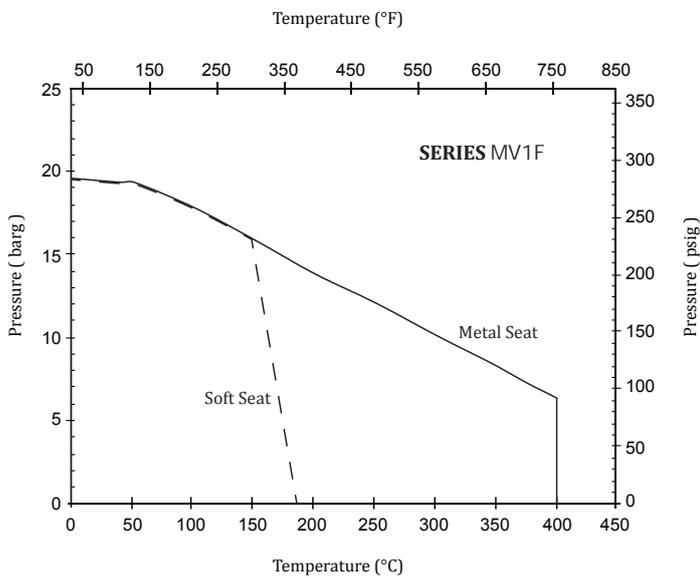
When automated with an actuator, no travel stop plate is installed since this is controlled by the actuator. Operation will be in accordance with Sesto Valves Installation, Operation and Maintenance Instructions for the relevant actuator.

⚠ CAUTION:

Keep hands, other parts of the body, tools and other objects out of the open flow port. Do not leave any foreign object inside the pipeline. When the valve is isactuated, the ball segment acts as a cutting device. Failure to use caution may result in damage or personal injury.

3.5 Technical Data

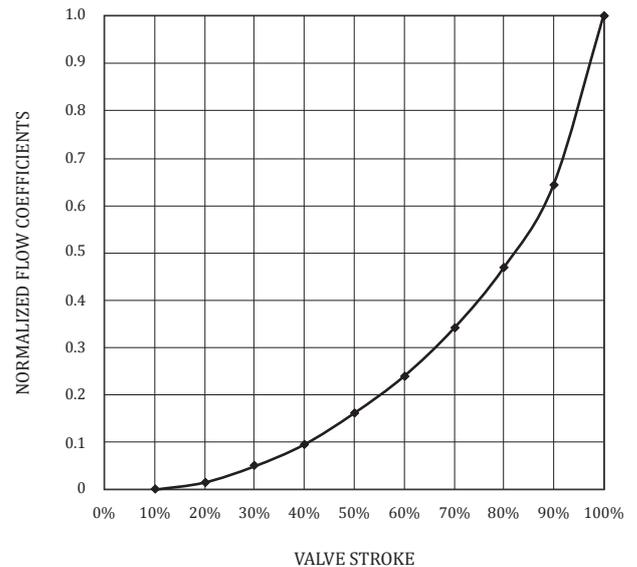
3.5.1 Pressure-Temperature Chart



3.5.2 Break Torque at Room Temperature

| DN | NPS | Torque N*M | Torque inch*lb |
|-------|--------|------------|----------------|
| DN25 | 1" | 26 | 230 |
| DN32 | 1-1/4" | 30 | 266 |
| DN40 | 1-1/2" | 52 | 460 |
| DN50 | 2" | 69 | 611 |
| DN65 | 2-1/2" | 76 | 673 |
| DN80 | 3" | 107 | 947 |
| DN100 | 4" | 115 | 1018 |
| DN125 | 5" | 153 | 1354 |
| DN150 | 6" | 230 | 2036 |
| DN200 | 8" | 384 | 3399 |
| DN250 | 10" | 615 | 5443 |
| DN300 | 12" | 1076 | 9524 |
| DN350 | 14" | 1538 | 13613 |
| DN400 | 16" | 2230 | 19738 |

3.5.3 Flow Coefficients



| DN | NPS | Max. Kv | Max. Cv |
|-------|--------|---------|---------|
| DN25 | 1" | 23 | 27 |
| DN32 | 1-1/4" | 40 | 46 |
| DN40 | 1-1/2" | 60 | 69 |
| DN50 | 2" | 94 | 109 |
| DN65 | 2-1/2" | 145 | 168 |
| DN80 | 3" | 240 | 277 |
| DN100 | 4" | 403 | 466 |
| DN125 | 5" | 600 | 694 |
| DN150 | 6" | 668 | 772 |
| DN200 | 8" | 1473 | 1703 |
| DN250 | 10" | 1800 | 2081 |
| DN300 | 12" | 3256 | 3764 |
| DN350 | 14" | 5515 | 6375 |
| DN400 | 16" | 7292 | 8430 |

Chapter IV: Maintenance

4.1 General Notes

Due to the nature of the control valve, it has different maintenance requirements than normal ball valves. When necessary, valves may be refurbished using a minimal number of components, none of which require machining. Sesto Valves valves are designed for easy service and assembly in the field. The following notes should help to extend valve life.

⚠ CAUTION:

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

4.2 Maintenance Frequency

The maintenance frequency is determined by the application of the valve. Users should consider the following factors when determining a suitable maintenance schedule: fluid type, flow velocity, operation frequency, pressure, and temperature.

Note:

Sesto Valves recommends inspecting the valve at least once per year.

Note:

Please use genuine spare parts to ensure the valve functions well.

Note:

When sending back the valve to Sesto Valves for investigation, do not disassemble it. Clean the valve carefully and flush the valve internals. If possible, inform us of the service conditions.

4.3 Disassembly

1. Valve shall be positioned vertically by resting the body side flanges on a clean surface (preferably covered with a rubber sheet).
2. Turn the valve to CLOSED position.
3. Remove the handle, lever, or gear box if applicable.
4. Loosen the BRACKET BOLTS (15) and detach the BRACKET (16) from the mounting pad of the valve.
5. Loosen the bottom bolts and remove the TRUNNION CAP (5) and THRUST WASHER (4).
6. Loosen the GLAND NUTS (19) evenly. Remove the GLAND (17) and GLAND STUDS (18) from mounting pad of the valve.
7. Put the downstream end of the valve upward and lay it flat on the clean surface.
8. Remove the pins between the SEGMENT BALL (8), UPPER STEM (13), and LOWER SHAFT (2) either by grinding or using a spindle. Detach the pins (7) by drilling.

Note:

Be careful not to damage the original bores of the pins.

9. Place the valve on the table with the downstream end up. Use a flathead screwdriver and soft hammer to push the UPPER STEM (13) away from the SEGMENT BALL (8).
10. Pull the UPPER STEM (13) and V-Ring STEM PACKING (14) out of the valve stuffing box.
11. Push the LOWER SHAFT (2) away from the ball cavity and the lower end of valve. At this time, the SEGMENT BALL (8) can be taken out from the downstream port of the valve.

⚠ CAUTION:

Since there are several compression springs between the inner wall of the upstream end and the segment ball, it should be noted that when the lower shaft is removed, the segment ball may pop out of the valve body and cause personal injury.

Note:

Please make sure that the Segment Ball (8) is not going to fall out of the valve and be damaged.

12. Inspect the Segment Ball (2) for any damages.
13. Put the upstream end of the valve upwards and lay it flat on the table. Tap the METAL SEAT (10) or SOFT SEAT RING (10A) on the upstream end of the valve with a soft hammer to move it out of the other end. Note that this step may cause damage to the seat when it hits the tabletop. Make sure that the tabletop is protected and clean.
14. For metal-seated models, use a flathead screwdriver to take out the SPRING (9). The upper and lower BUSHINGS (3) can be hooked out to be replaced.
15. Replace the O-RING (11) on METAL SEAT (10) or SOFT SEAT RING (10A) models if necessary.
16. For soft-seated model, replace the SOFT SEAT (10B) from the SOFT SEAT RING (10A).
17. Carefully clean and inspect all parts for wear and damage. Make sure all gaskets and packing residue are thoroughly cleaned before the valve is reassembled. Sesto Vales recommends **all sort parts** be replaced.

4.4 Reassembly

Before reassembly, inspect the valve for any interior/exterior damage

Note:

Damaged internals are to be replaced Sesto Valves repair kits only.

1. Insert upper and lower BUSHINGS (3) from the top of the stuffing box and the bottom of the valve respectively.
2. Place the O-RING (11) on the groove of the SEAT (10) and apply a lubricant.
3. Put the downstream end of the valve upward and lay it flat on the clean surface.
4. For metal-seated models, put the METAL SEAT(10) and O-RING (11) into the valve cavity and push it towards the upstream end. Put the SPRING (9) into the groove between the SEAT (10) and the upstream end using needle-nose pliers.
5. For soft-seated model, put the SOFT SEAT RING (10A), SPRINGS (9A), O-RING (11) and SOFT SEAT (10B) into the valve cavity and push it

towards the upstream end.

6. Put the KEY (12) into UPPER STEM (13) and ensure it matches the SEGMENT BALL (8), UPPER STEM (13). Then lubricate them.
7. Carefully insert the SEGMENT BALL (8) into the valve cavity with the valve closed. At the same time, push the UPPER STEM (13) and KEY (12) **from the stuffing box to match the valve stem with SEGMENT BALL (8).**
8. Push in the LOWER SHAFT (2) from the bottom, tap the bottom of the valve stem lightly to align the upper end of the LOWER STEM with the lower hole plane inside the SEGMENT BALL, as shown in the figure.
9. Tap the top of the UPPER STEM (13) to align the bottom end with the upper hole inside the SEGMENT BALL, as shown in the figure.
10. Lock the pins with the UPPER STEM (13) and LOWER SHAFT (2) to the SEGMENT BALL (8).

Note:

If the SEGMENT BALL (8) has been disassembled using a drill, please confirm the size of the pin hole and use the corresponding PIN (7).

11. Put the inverted V-shaped PACKING (14) into the stuffing box.
12. Screw the GLAND STUDS (18) into the valve mounting flange. Install the GLAND (17) and fasten the GLAND NUT (19).
13. Insert the TRUST WASHER (4) to the bottom of the valve and install the TRUNNION CAP (5) with the O-RING (6) with bolts.
14. Check that it is assembled correctly and in the CLOSED position.
15. Install the BRACKET (20) to the valve with BOLTS (15) and WASHER (16). Install the handle or automation devices if applicable.

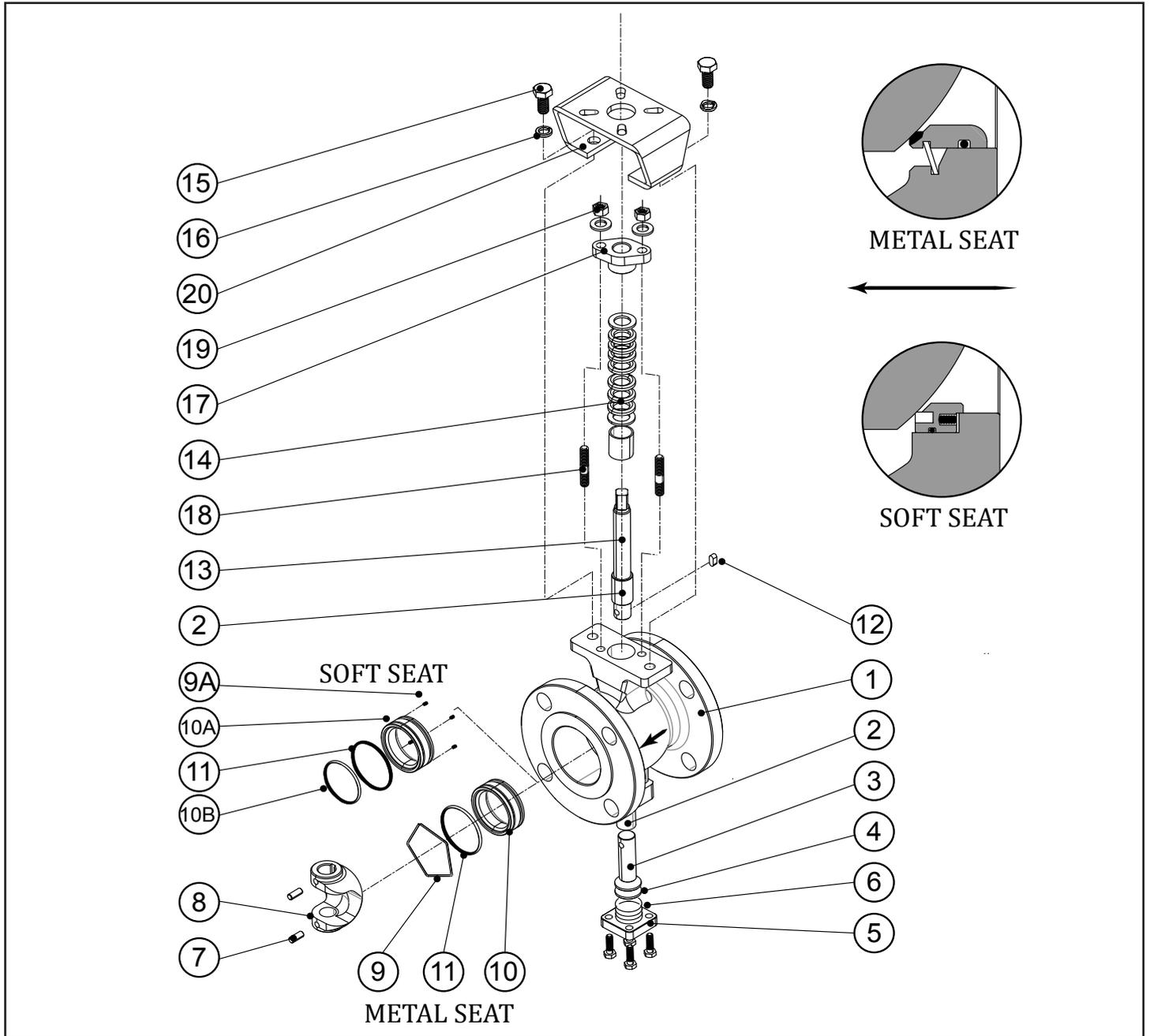
4.5 Troubleshooting

The following table lists the possible malfunctions

Table 4.1 Troubleshooting Table

| Symptom | Possible fault | Actions |
|--|-----------------------------------|--------------------------------------|
| Leakage through a closed Valve (Internal Leakage) | Damaged Segment Ball surface | Replace the Segment Ball |
| | Damaged the seat | Replace the seat |
| | Segment Ball is not aligned | Realign the Segment Ball |
| Irregular segment movement | Fluid accumulated on the surface. | Flush the Segment Ball from inside |
| | Segment Ball or Seat damaged | Clean or replace the segment or seat |
| Valve leaking from stem (External Leakage) | Gland bolts are loosened | Tighten the gland bolts |
| | Parts are worn or damaged | Replace the necessary parts |

4.6 Technical Data and Product Information



| NO | PART NAME | MATERIAL |
|-----|----------------|------------|
| 1 | BODY | CF8M/WCB |
| 2 | BUSHING | SS316+PTFE |
| 3 | LOWER SHAFT | SS316 |
| 4 | THRUST WASHER | PTFE |
| 5 | TRUNNION CAP | CF8M/WCB |
| 6 | O-RING | FKM |
| 7 | PIN | SS316 |
| 8 | SEGMENT BALL | CF8M+Cr |
| 9 | LOCK SPRING | 17-7PH |
| 9A | SPRING | 17-7PH |
| 10 | METAL SEAT | F316+STL |
| 10A | SOFT SEAT RING | F304 |

| NO | PART NAME | MATERIAL |
|-----|------------|--------------------|
| 10B | SOFT SEAT | PTFE |
| 11 | O-RING | FKM |
| 12 | KEY | SS316 |
| 13 | UPPER STEM | 17-4PH |
| 14 | PACKING | PTFE |
| 15 | BOLT | B8M/B7 |
| 16 | WASHER | SS316/Carbon Steel |
| 17 | GLAND | CF8M/WCB |
| 18 | GLAND STUD | B8M/B7 |
| 19 | GLAND NUT | 8M/2H |
| 20 | BRACKET | A3 |