

V-Notch Segment Ball Valve

KHD-SGF

Installation, Operation,
& Maintenance Manual

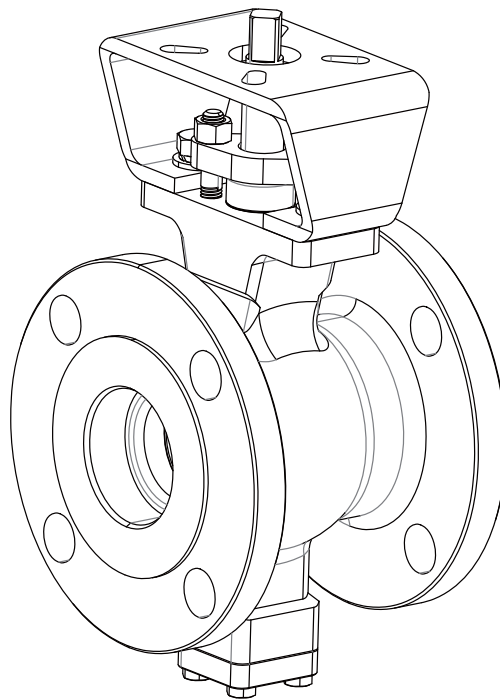


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Chapter I

Introduction

The manual is provided to ensure proper installation, operation & maintenance for KHD-SGF, the Wafer Type and Flanged V-notch Segment Ball Valve with metal seat and soft seat, manufactured and supplied by KLINGER DIE ERSTE INDUSTRY CO., LTD. The valves are identified by marking on the body or on a name plate or both.

1.1 Contact Information

For information concerning warranties, or for questions pertaining to installation, operation or maintenance of KLINGER Die Erste products, contact:

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Email: sales@die-erste.com

To order replacement parts, contact KLINGER Die Erste sales at address listed above.

1.2 General Notes

The following instructions refer to KLINGER Die Erste Wafer Type and Flanged V-notch Segment Ball Valve with soft seat and metal seat as described in the KLINGER Die Erste 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 course of manufacture. However, the processes used are completely non-toxic.

1.3 Precautions and Warnings

Choose the correct material of valve for different applications before obtaining the valve. The user should be aware of the operating situation, fluid properties, and the possible outcomes when implementing valves into the pipeline system. KLINGER Die Erste suggests that the user should make estimation beforehand.

Fluid undergoes property changes with respect to outside factors, particularly fluid left inside the sealed cavity. When temperature and pressure exceed allowable value, valve failure may occur. User 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 open the bonnet and the cap during operation, especially with the presence of high pressure in the pipeline system.

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

NOTE:

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

Check the line gauge to ensure that no pressure is present at the valve. Ensuring media is released by operating valve slowly to the half open position. Ideally, the valve should be decontaminated when the ball is in the half open position.

These valves, when installed, have body connectors which form an integral part of the pipeline and the valve cannot be removed from the pipeline without being dismantled- see DISMANTLING section for reference.

1.4 Storage

If the valves are not to be installed immediately, please store the valve carefully before installation, preferably indoors in a dry and clean place.

Also, the valve ports should be sealed by plastic caps to prevent dirt from entering and damaging inner 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 pipeline carefully before installing the valve. The particles of dirt or debris or welding may damage the segment sealing surface and seats. Also, before installing, check all valve and mating flanges to ensure gasket surfaces are free from defects.

CAUTION:
Do not exceed the valve performance limitation.

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. Valve installed with reversed flow direction will not seal properly.

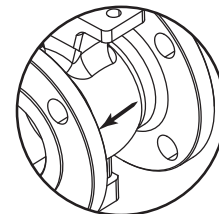


Figure 2.1 Flow Direction Indication

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 point downwards because impurities traveling in the pipeline may enter the body cavity and damage the gland packing.

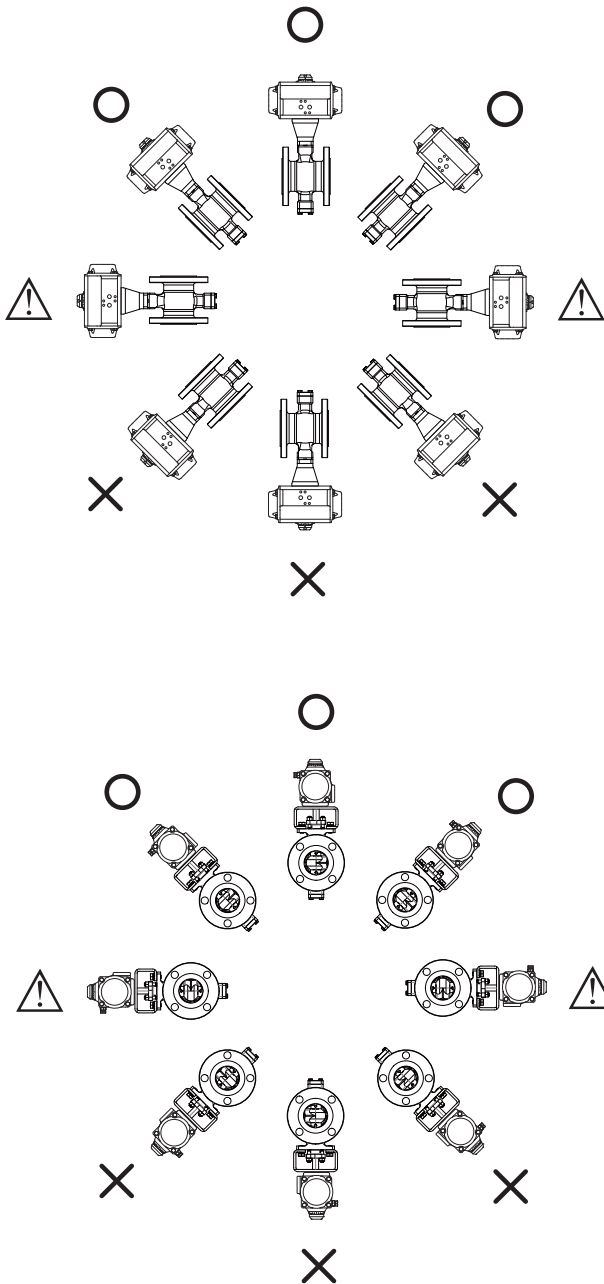


Figure 2.2 Proper position while piping

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 make the pressure from the pipeline, and stress to concentrate on the connecting area of body and cap. Ball, seat, and stem will be damaged.

Consequently, deformation and leakage may occur.

3) Fittings

Select the correct size of fittings according to the pipeline specification. Tighten the segment valve to the pipeline adequately with appropriate bolts. Do not attempt to correct pipeline misalignment by means of flanged bolting.

4) Systems hydrostatic test

Before delivery, valves are tested 1.5 times the allowable pressure at ambient temperature in open position. However, after installation, the piping system may subject to system tests, as condition not to exceed the marking pressure.

5) Pre-Installation Wash

Before the valve installation, clean the pipeline system to remove any foreign deposits by water. Clean the connecting wafer end surfaces as well to ensure tight sealing.

2.2 Installation of Ends

1) Wafer End

1. Verify valve is in the fully OPEN position.
2. Use the appropriate size bolt and heavy hex nut (not included) as recommended for flange size and class.
3. Do not over tighten the joints bolting.
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 the valves, 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 valve face-to-face dimension and gaskets to fit between.
3. Tighten the flange bolts in a crossover pattern, with a torque values determined by the gasket manufacturer, other variables like gasket type and material, bolt, flange and lubricant affect the

tightening torque values.

- Note that the bolts tightening must be uniform in order to create a parallel movement of the two flanges and uniform deformation of the gasket in between them.

2.3 Pneumatic and Electrical Connections

When installing the actuator, make sure that the valve-actuator combination functions properly. The valve OPEN and CLOSED position are indicated by a groove at the top of valve shaft. See Figure 2.2.

al times. This rotation breaks the torque that may have built up during long-term storage.

NOTE:

When the valve is in a bare-stem state, be careful not to rotate the valve ball OVER the FULLY OPEN and FULLY CLOSED positions. Operation over the positions may restrict the valve ball from returning to the normal operation.

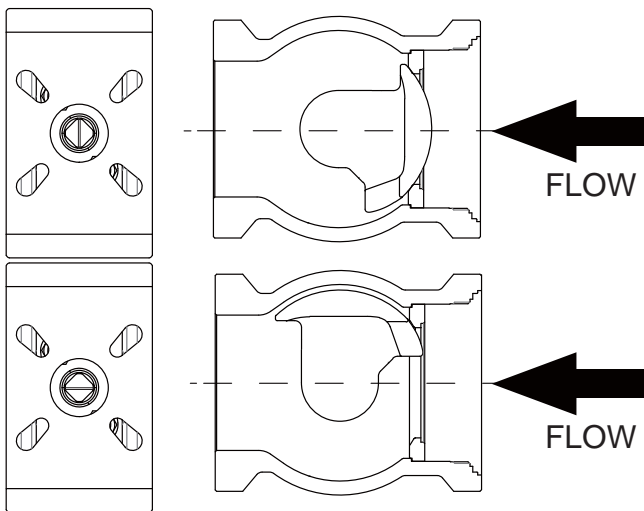


Figure 2.3 The top graph indicates an OPEN valve, and the bottom one represents a CLOSED valve

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 manual shipped with the automation devices for the installed actuator, positioner, filter/regulator, solenoid, and/or limit switches.

When making pneumatic connections, it is recommended that PTFE tape or paste is used 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.

Before installing the actuator, use an adjustable wrench to manually rotate the valve stem sever-

Chapter III

Operation

For manual operation, shift the handle in clockwise direction for CLOSED and counter-clockwise for OPEN. If the handle is in parallel position with the flow direction, the valve is OPEN. If the handle is in right angle position with the flow direction, the valve is CLOSED.

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

3.1 Handling

During the segment ball valve installation, it must follow the procedure to handle at the both side of the bodies. If using cable for big size valve, make sure the cable must be strong enough to ensure the safety during the installation.

Never lift the valve package by the actuator, positioner, limit switch or their piping. The Valve damage or personal injury may occur from falling parts.

3.2 Cleaning

Even though the valves were transported under a clean environment, operator must check if there is any foreign body or dusts inside the bore. If yes, clean the valve before installation. Operator may clean the valves by water, compression air, or steam. However, valve automation devices shall be cleaned only with water or steam, using compression air to clean the valve automation devices is strictly prohibited. For cleaning operation, first step is put the valve bore perpendicular to the ground and clean, ensure all the dusts are removed from the bore. The second step is to check and clean all the connecting pipe bore and connection area. No flush, rust and foreign bodies are allowed to avoid the blocking and leakage.

3.3 Manual Operation

KLINGER Die Erste V-notch Segment Ball Valves have ¼ 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 provide a gear operator for the valve.

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

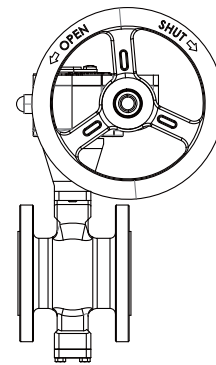


Figure 3.2 Handwheel Rotation Direction for CLOSED and OPEN position of a gear box

NOTE:

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

3.4 Remote Operation

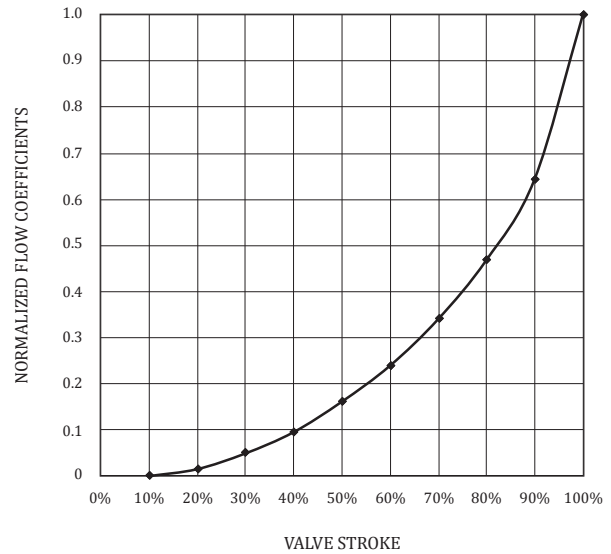
Where manual operation is not required valves may be automated for remote operation, instrument controls etc. KLINGER Die Erste offers a wide range of pneumatic and electric actuators for different working conditions.

When an actuator is used, no stop plate is fitted to the valve since end stops are an integral part of the actuator. Operation will be in accordance with KLINGER Die Erste Installation, Operation and Maintenance Instructions for the relevant actuator.

⚠ CAUTION:

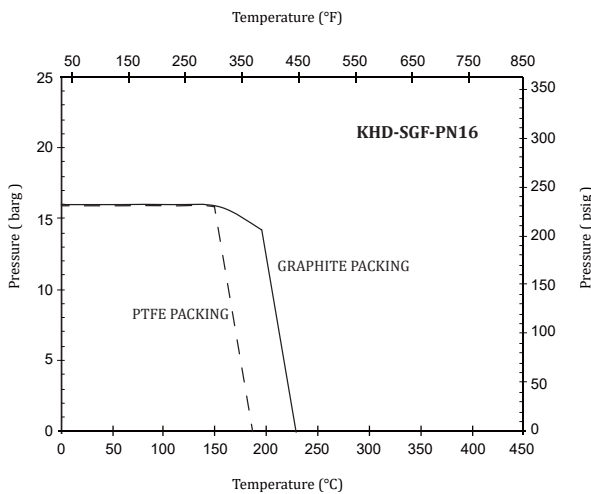
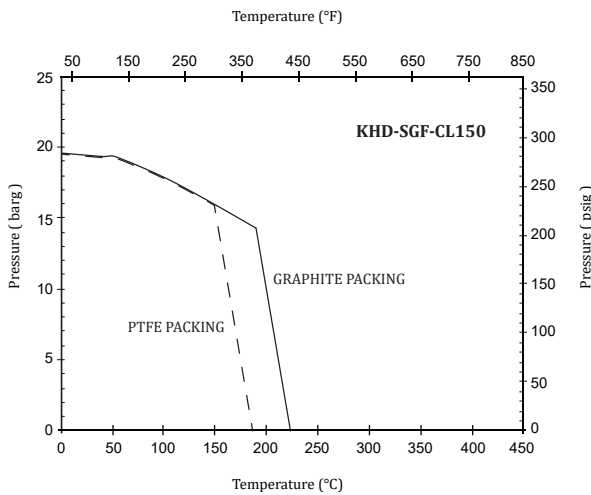
Keep hands, other parts of the body, tool and other objects out of the open flow port. Leave no foreign object inside the pipeline. When the valve is actuated, the ball segment act as a cutting device. Also, the segment position may change when the valve is moved. The failure may result in damage or personal injury.

3.5.2 Flow Coefficients



3.5 Technical Data

3.5.1 Pressure-Temperature Chart



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, the segment ball valve has different maintenance requirements than normal ball valves. When necessary, valves may be refurbished using a minimal number of components, and none of which require machining. KLINGER Die Erste valves are designed for easy service and assembly in the field.

The following aspects should, however, 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

KLINGER Die Erste Segment Ball Valves must undergo a scheduled inspection based on the application. The maintenance frequency is determined based upon the application of the valve. User should consider the following factors when determining the maintenance time interval: fluid type, flow velocity, operation frequency, pressure, and temperature. If the application requires intensive valve opening, closing, and fine adjusting, then the valve should be inspected frequently.

Note:

KLINGER Die Erste recommends inspecting the valve at least every one (1) year.

Note:

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

Note:

When sending back the valve to KLINGER Die Erste for investigation, do not disassemble it. Clean the valve carefully and flush the valve internals. If possible, inform us about the medium used in the valve.

4.3 Disassembly

1. Valve shall be positioned vertically by resting body side flanges on clean ground surface (preferably covered with 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 WAHSER (4) out of the valve.
6. Loosen GLAND NUTS (19) evenly, remove GLAND (17), and remove GLAND STUDS (18) from mounting pad of the valve.
7. Put the downstream end of the valve upward and lay it flat on the desktop
8. Remove the pins locking between 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 flat-blade 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 from the stuffing box.
11. Push the LOWER SHAFT (2) from the ball cavity away 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:

For the soft-seal valve seat, 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 been damaged.

12. Inspect the Segment Ball (2) for any damages.
13. Put the upstream end of the valve up 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 of the seat when it hits the tabletop. Make sure that the tabletop is protected and clean.
14. For metal-seated model, use a flat-blade screwdriver to tick out 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) if necessary.
16. For soft-seated model, replace the SOFT SEAT (10B) from the SOFT SEAT RING (10A).
17. Clean carefully and inspect all parts for wear and damage. Make sure all gaskets and packing residue is thoroughly cleaned before valve is re-assembled. KLINGER Die Erste recommends all sort parts should be replaced.

4.4 Reassembly

Before reassembly, inspect all the valve for any damage on body and all internals.

Note:

Damaged internals to be replaced by KLINGER Die Erste 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 O-RING (11) on the groove of SEAT (10) and apply lubricating oil.
3. Put the downstream end of the valve upward and lay it flat on the desktop.
4. For metal-seated model, put the METAL SEAT (10) with O-RING (11) into the valve cavity and push it toward the upstream end for positioning. Put the SPRING (9) into the groove between the SEAT (10) and the upstream end with needle-nose pliers.
5. For soft-seated model, put the SOFT SEAT RING (10A) with compressed SPRINGS (9A), O-RING (11) and SOFT SEAT (10B) into the valve cavity and push it toward the upstream end for positioning.
6. Put the KEY (12) into UPPER STEM (13), and check whether this KEY (12) is matching SEGMENT BALL (8), UPPER STEM (13). And 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) with 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 plane inside the SEGMENT BALL, as shown in the figure.
10. Lock the pins with UPPER STEM (13) and LOWER SHAFT (2) to the SEGMENT BALL (8).
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.

Note:

If the SEGMENT BALL (8) has been disassembled by drilling before, please confirm the size of the pin hole and use the corresponding PIN (7).

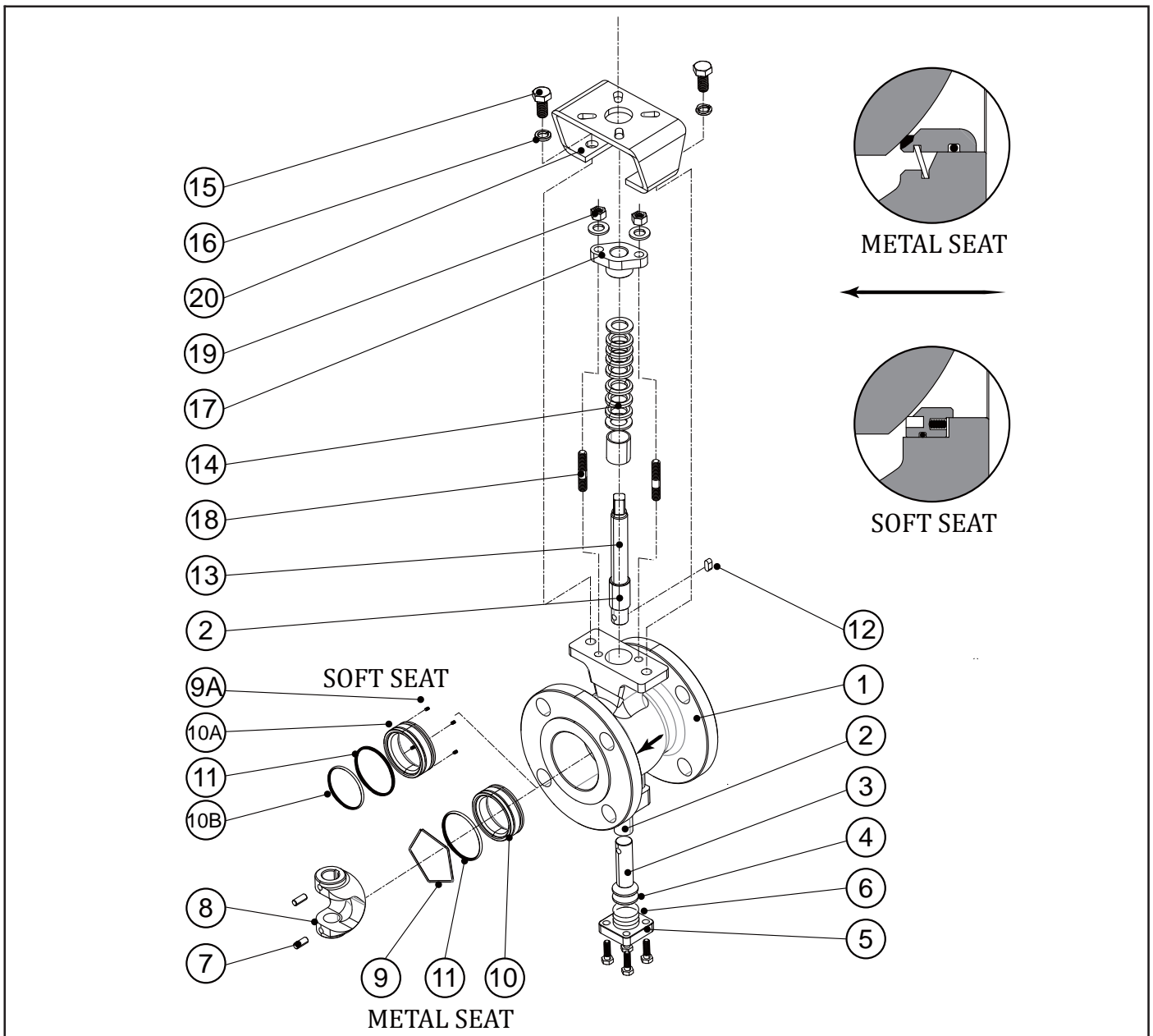
4.5 Troubleshooting

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