

High Performance Double Eccentric Butterfly Valve KKD-82

Installation, Operation,
& Maintenance Manual

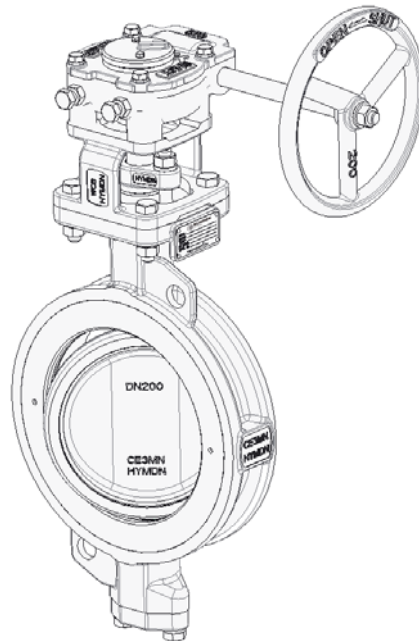


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Chapter I

Introduction

The manual is provided to ensure proper installation, operation & maintenance for High Performance Double Eccentric Butterfly Valve, KKD-82, 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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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 KKD-82 High Performance Double Eccentric Butterfly Valve 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 the disc and seat surfaces. 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.

Exceeding the pressure or temperature limitations marked on the name plate may cause damage and lead to uncontrolled pressure release. The practical and safe use of the valve is determined by both the body and seat ratings due to variety of seat and body materials. Please check both rating before installing to prevent valve damage and possible injury of personals.

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

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. Ensuring media is released by operating valve slowly to the half open position. Ideally, the valve should be decontaminated when the disc is in the half open position.

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 caps or plastic paper to prevent dirt from entering and damaging inner parts.

It is the purchaser's responsibility to take the necessary precautions for the protection of valves in storage.

All KLINGER Die Erste cast carbon steel and alloy steel cast valves are shipped from the factory with painting on un-machined surfaces and with a rust preventative sprayed on machined surfaces. In addition, plastic end protectors are installed on both end connections for protection from damage and to prevent entrance of foreign materials into the valve. Valves received in the above condition and in their original shipping containers may be stored for up to one (1) year with no additional protection; provided they are stored indoors, above floor level, and in a low humidity atmosphere.

If valves are to be stored indoors for a longer period of time in a high humidity atmosphere, it is suggested that each item be periodically inspected every four to six (4-6) month, inside and out, for rust and/or corrosion.

Chapter II Installation

Flush the pipeline carefully before installing the valve. The particles of dirt or debris or welding may damage the disc sealing surface and seats. Also, before installing, check all valve and mating flanges to ensure gasket surfaces are free from defects.

The butterfly valve shall be installed between two mating flanges. Before installing the valve in the line, fully close the valve to prevent the damage of collision between disc and mating flanges.

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.

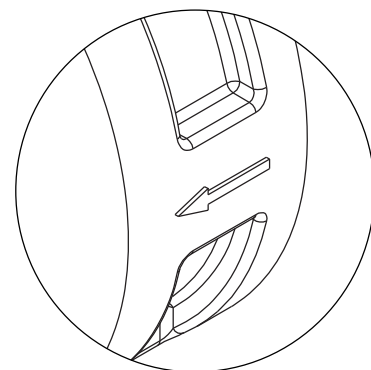


Figure 2.1. Direction arrow on valve body

2) Position

The butterfly valve is mostly recommended to be installed with the stem in the vertical position.

For slurries, sludge, mine tailing, pulp stock, dry cement, and any media with sediment or particles, we recommend the valve be installed with the stem

in the horizontal position with the lower disc edge opening in the down- stream direction.

Note:

An upside-down position may cause the particles or dirt to enter the body cavity, and thus damage the stem packing.

3) Fittings

Select the correct size of fittings according to the pipeline specification. Tighten the 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 be 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 flanged end surfaces as well to ensure tight sealing.

2.2 Installation of Wafer Ends

The wafer type butterfly valve should be centered between flanges to prevent any damage to the disc or shaft which could be caused by the disc striking the pipe wall.

Some sizes of KKD-82 with wafer ends, contain holes on valve body to ONLY help to align to mating flanges properly when installing to the pipeline. Note that the alignment holes or grooves do not apply to any pipe pressure.

The flange or pipe, if required, must be welded prior to the installation of the valve. If it cannot be done, a protective cover screen should be placed between the valve and welding part.

2.3 Installation of Lug Ends

Bolting between flanges and lugs must use 2-stage locking in diagonal sequence with a less than 60 Nm

torque in average. The flanges must keep parallel during installation to prevent the leakage through flange face.

Note:

The taper threaded fitting should not be over tightened.

2.4 Installation of Double Flanged Ends

The general installation guides are the following:

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, with a torque value determined by the gasket manufacturer, other variables like gasket type and material, bolt, flange and lubricant affect the tightening torque values.
4. Note: 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.
5. Before pressure testing the valves, bring the valves to the half OPEN position to ensure pressure reaches the stem seals and to avoid unnecessary loading of the seats. Fail-to-close actuated valves should be brought to the half-OPEN position.

⚠ CAUTION:

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

2.5 Pneumatic and Electrical Connections

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

If possible, install the valve so that the actuator can be dismantled 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 several times. This rotation breaks the torque that may have built up during long-term storage.

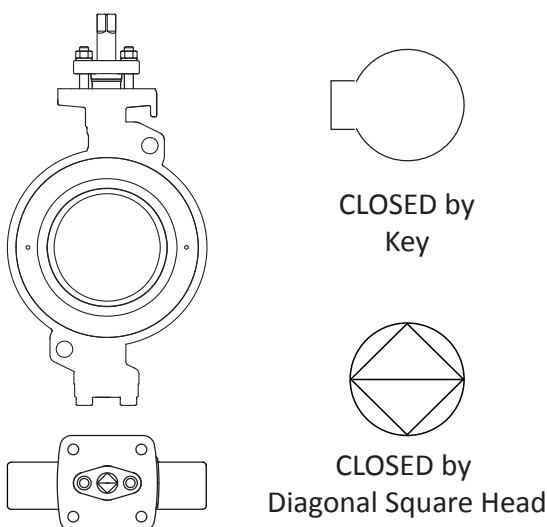
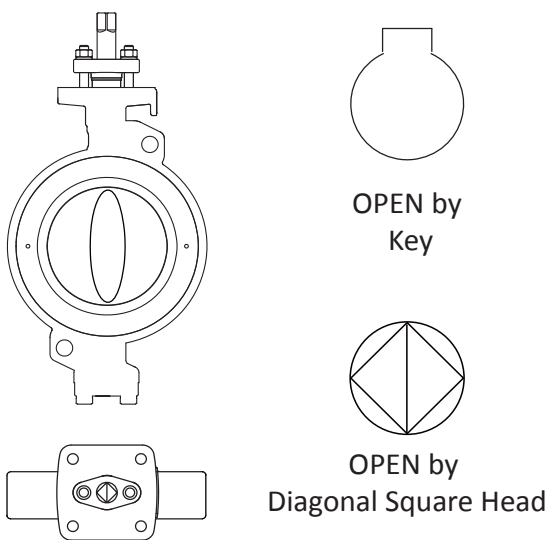


Figure 2.2 The top graph indicates an OPEN valve, and the bottom one represents a CLOSED valve

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. Figure 2.2 and the below Figure 3.1 provides the visual understanding of above explanation.

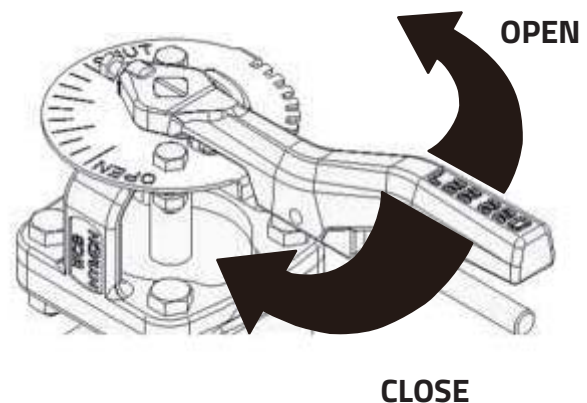


Figure 3.1 Rotation Direction for CLOSED and OPEN position

3.1 Handling

During the butterfly 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. 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 present, 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 Double Eccentric Valves 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.

The high pressure in the pipe produces a powerful force and may throw the handle out of the operator's hands. So for valves which sizes are smaller than DN100 (4") while the pressure difference exceeds 20.7 bar (300 psi), sizes between DN125 (5") to DN200 (8") while pressure difference exceeds 10.35 bar (150 psi) and sizes larger than DN250 (10") while pressure difference exceeds 3.45 bar (50 psi), the use of worm gears, pneumatic or electric devices are highly recommend.

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.

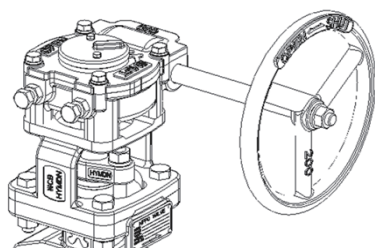


Figure 3.2 Handwheel Rotation Direction for CLOSED and OPEN position of a gear box

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.

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

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.

It may be considered advantageous to provide additional support to the actuator when associated with larger actuators, extended stems, or where severe vibration is present.

Chapter IV: Maintenance

⚠ CAUTION:

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

⚠ CAUTION:

The valve should be closed when removed from the pipeline to prevent possible collision of the disc.

4.1 General Notes

Numbers in () refer to items shown in the figures.

Routine maintenance consists of periodically re-tightening the gland nuts of packing GLAND (16) to compensate for stem seal wear. However, the stem packing cannot be pressed down too much. Over-forced tighten will shorten the life of the shaft seal.

A wider range of maintenance work, including Packing Replacement and Seat Replacement and Disc/Stem, is described below.

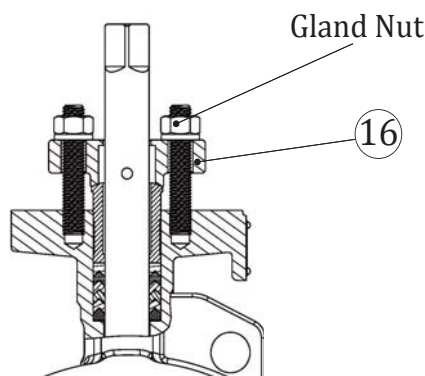


Figure 4.1 Gland nuts and packing gland

4.2 Maintenance Frequency

The maintenance frequency is determined based upon the application of the valve. User should consider the following factors when determining the maintenance time internally: fluid type, flow velocity, operation frequency, pressure and temperature.

Note:

For the KKD-82 High Performance Butterfly valve, KLINGER Die Erste recommends inspecting the valve at least every (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.

⚠ CAUTION:

Pipeline and valve must be depressurized by shutting off the valve and bleed line, cycle the valve once and leave it half open to relieve the pressure from the body cavity.

4.3 Replacement of Stem Packing

1. For valves with yoke, remove the yoke bolts and spring washers, and then remove the yoke; for valves with actuators, loosen the yoke screws and straightly remove the whole set of actuator and yoke as Fig. 4.2.

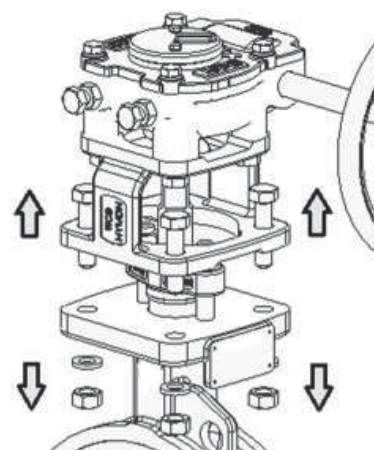


Figure 4.2 Yoke disassembly

2. Remove the GLAND (16) after loosening the gland nuts and spring washers.
3. Remove the ANTI-BLOWOUT PIN (15) pin and GLAND BUSHING (14) sequence, and then remove the GLAND PACKING (10) by Gland Packing Extractors as Fig. 4.3.

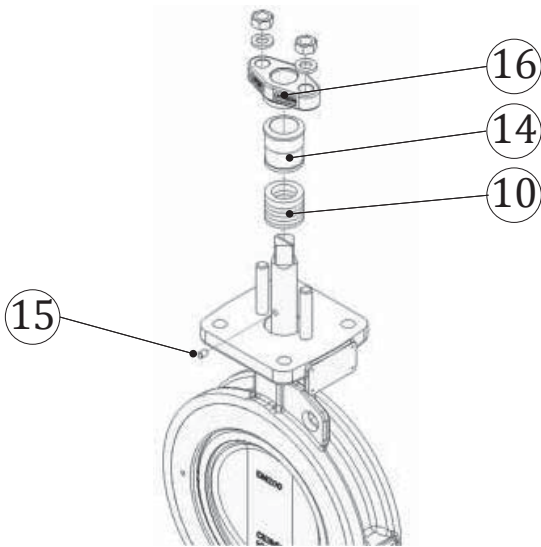


Figure 4.3 Stuffing box disassembly

Note:

Be careful not to damage the surfaces of inside wall of stuffing box bore and the stem. The defects might cause external leakage.

4. Install the new GLAND PACKINGS (10) through the STEM (4) into the stuffing box cavity. Before installing new packings, check the cleanliness of the inside walls of the stuffing box bore. If you find debris particles on this surface, be sure to clean it up.

Note:

Please pay attention to the installation orientation of the V-shaped packing. Inverted V-shaped packing installation can effectively block fluid leakage.

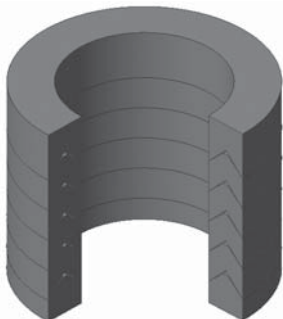


Figure 4.4 Inverted V-shaped packing orientation

5. Install the GLAND BUSHING (14) into the stuffing box bore, and then place the ANTI-BLOWOUT PIN (15) and install the GLAND (16).
6. Finger tight the gland nuts and tighten one side snugly, then the one diagonally across. Repeat

for other nuts until the torque is observed per bolting torque data.

7. Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn. Ensure smooth operation of valve during opening and closing.

Note:

Tighten nuts with corresponding torque reference to the Tightening Torque Table below to ensure tightness.

Table 4.1 Tightening Torque Table of Gland Nuts

Size		Tighten Torque (N.M)	
DN	Inch	PTFE Packings	Graphite Packings
DN50 - DN100	2"-4"	11	15
DN125 - DN150	5"-6"	17	25
DN200	8"	23	32
DN250	10"	25	35
DN300	12"	52	72
DN350	14"	60	84
DN400 - DN450	16"-18"	87	121
DN500	20"	132	182
DN600	24"	141	195
DN700	28"	192	265
DN750	30"	215	300

4.4 Replacement of Seat

Design of RETAINER RING (6) can be in two types according to the size, namely "LOCK PIN (8) type" and "thread type".

8. Lay the valve flat on a clean and soft surface with its RETAINER RING (6) facing up.
9. Rotate the RETAINER RING (6) counterclockwise to 22.5° or 45°, depending on sizes, to unlock it from the valve BODY (1) for the "locking pin type" while 3 to 4 turns for the threaded version.

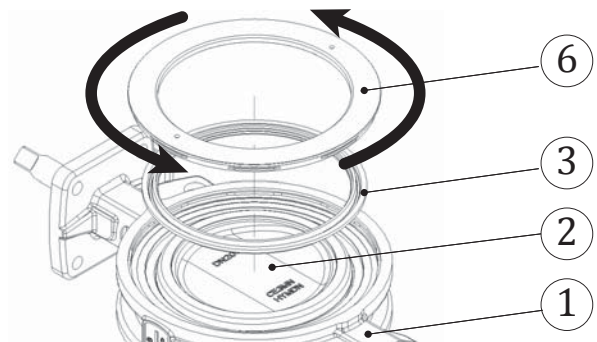


Figure 4.5 Retainer Ring

10. Carefully remove the valve SEAT (3) from the BODY (1). Clean the BODY (1) and valve DISC (2). And then check if it is scratched or damaged on the DISC (2).
11. Place the new SEAT (4) carefully into the valve BODY (1).

Note:

For Standard type KKD-82, it only needs to change valve seat while the metal type needs to replace the metal seat and graphite gaskets both; fire-safe type needs to substitute the metal seat, soft seat, and graphite gaskets.

12. Lock of the RETAINER RING (6)
 - (a) LOCK PIN Type

Place the new SPRING (7) and the LOCK PIN (8) into the RETAINER RING (6) or BODY (1), and rotate the ring to the lock position.
 - (b) Thread Type

Rotate the thread RETAINER RING(6) until it can no longer rotate.
13. Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn. Ensure smooth operation of valve during opening and closing.

4.5 Replacement of Disc/Stem

1. Refer to step 1-3 in **4.3 Replacement of Stem Packing** to disassembly the GLAND PACKING (10) from valve BODY (1).
2. Refer to step 1-3 in **4.4 Replacement of Seat** to disassembly the RETAINER RING (6) and SEAT (3) from valve BODY (1).
3. Use a soft hammer to knock the tapered PINS (5) out of the DISC (2) as following.

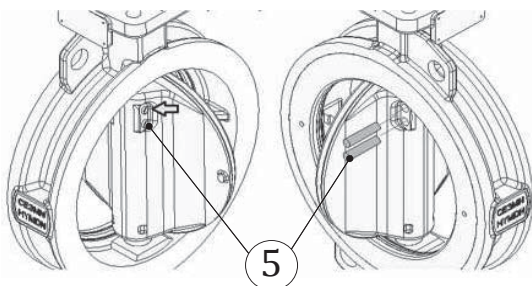


Figure 4.6 Taper Pins

4. Remove the BOTTOM COVER (17) after remove the bottom bolts and spring washer. And then remove the THRUST PLATE (12), bottom cover GASKET (13) and THRUST BEARING (11).

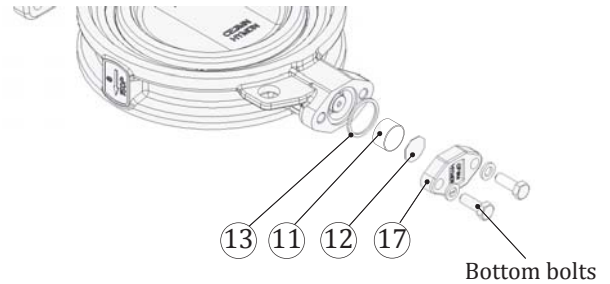


Figure 4.7 Bottom cover

5. Pull the STEM (4) out of the bottom. The DISC (2) can be separated from the valve BODY (1).
6. After cleaning the valve BODY (1), place the replacement DISC (2) in the center of the bore. At this point, insert the replacement STEM(4) into the DISC (2) from the bottom.
7. Gently tap the taper PIN (5) into the DISC (2) to fix it with the STEM (2).
8. Putting back THRUST BEARING (11), THRUST PLATE (12) and bottom cover GASKET (13) from the bottom of BODY (1), and install the BOTTOM COVER (17) with bottom bolts and spring washers equally.
9. Refer to step 4-6 in **4.3 Replacement of Stem Packing** to install the GLAND PACKING (10) and GLAND (16).
10. Check that DISC (2) is centered on BODY (1) by using a vernier caliper to measure the disc-to-body distance up and down. (The error should be within 0.1mm)
11. Refer to step 4-5 in **4.4 Replacement of Seat** to install the RETAINER RING (6) and SEAT (3) to the valve BODY (1).
12. Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn. Ensure smooth operation of valve during opening and closing.

4.6 Troubleshooting

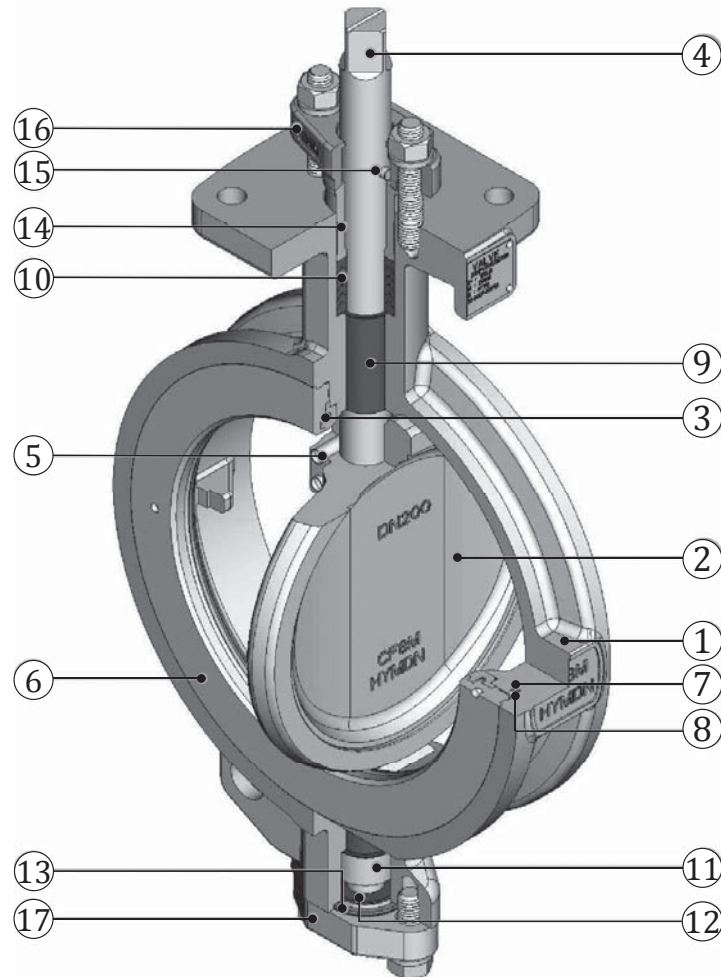
The following table lists the possible malfunctions.

Table 4.2 Troubleshooting Table

Symptom	Possible fault	Actions
Leakage through a closed Valve (Internal Leakage)	Disc not fully closed or past fully closed	Adjust actuator closed position stop
	Disc edge wear or damage	Clean and/or repair disc edge
	Seat wear or damage	Adjust or replace valve seat
Valve leaking from stem (External Leakage)	Stem nut are loosened	Tighten the stem nut
	Packing are worn or damaged	Clean packing bore and replace packing
Bottom cover leaks (External Leakage)	Packing or gasket leak	Replace bottom shaft gasket
Valve too hard to operate	Foreign material in valve	Remove obstructions
	Corroded actuator parts	Clean and grease actuator
	Loose actuator	Apply Loctite or Omni-fit locking compound and tighten bolts
Automatic valve does not actuate	No power source	Check incoming power source and replace fuses or rest pressure
	Improper signal	Check actuating signal sequence
	Burned out or impaired component	Check and repair or replace solenoids, motors and relay devices

4.7 Technical Data and Product Information

KKD-82



NO	PART NAME	MATERIAL
1	BODY	A216 WCB / A351 CF8M
2	DISC	A216 CF8 / A351 CF8M
3	SEAT	PTFE / RTFE / FIRE SAFE
4	STEM	F6a / F304 / F316
5	PIN	A182 F316L
6	RETAINER RING	A216 CF8 / A351 CF8M
7	SPRING	A182 F316
8	LOCK PIN	PTFE
9	STEM BUSHING	PTFE + SS316L

NO	PART NAME	MATERIAL
10	GLAND PACKING	PTFE/RTFE/ GRAPHITE
11	THRUST BEARING	A351 CF8M
12	THRUST PLATE	PTFE + SS316L
13	GASKET	RTFE/GRAPHITE
14	GLAND BUSHING	A351 CF8M
15	ANTI-BLOWOUT PIN	A182 F316
16	GLAND	A351 CF8
17	BOTTOM COVER	A351 CF8M