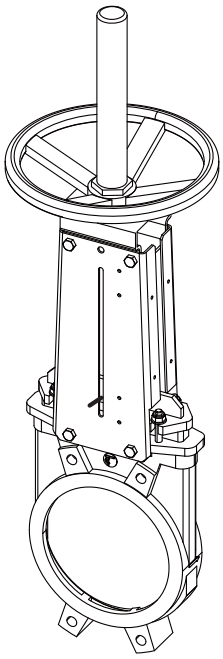
KLINGER
Die Erste

Uni-directional Knife Gate Valve (Outer Seat Ring Type)

KSD-OKG

Installation, Operation,
& Maintenance Manual



IOM-KSD-OKG-110_V1.0_EN

CERTIFIED ISO 9001 UKAS MANAGEMENT SYSTEMS 001

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Chapter I Introduction

The manual is provided to ensure proper installation, operation & maintenance for KSD-OKG Uni-directional Knife Gate Valve (Outer Seat Ring Type), 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:

KLINGER DIE ERSTE INDUSTRY CO., LTD.
5F-1, No.936, Sec. 4, Wen-Xin Road,
Taichung City, Taiwan 406

Phone: +886 4 22310059
Fax: +886 4 22360236
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 KSD-OKG Uni-directional Knife Gate 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 gate and seat surfaces. After removing the cover make sure that the valve can be 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 gate 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 Outer 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.

Note:

Remove the rust on the valve stem by cleaning the stem periodically. Rust on the stem may cause binding of operation.

Chapter II Installation

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

Re-torque all bolting to factory specifications to compensate for possible bolt relaxation, which may occur during long storage.

⚠ **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

This valve is unidirectional. Please install it in accordance with the arrow on the valve body and the direction from high pressure to low pressure when the valve is closed.

In most cases, the direction of fluid flow is from the high-pressure end to the low-pressure end. However, under special conditions, the flow direction and pressure difference are not always the same.

Note:

When the situation that the valve is installed in a vertical pipeline while fluid flow is from bottom to top, although the pressure source is at the bottom, as long as the valve is fully CLOSED, the gravity of the fluid at the top side of valve may generate a reverse pressure to damage the gate.

⚠ **CAUTION:**

It must be confirmed that the valve is installed according to orientation of pressure exerted on the opposite of the "SEAT SIDE" indication on the valve body when it is closed.

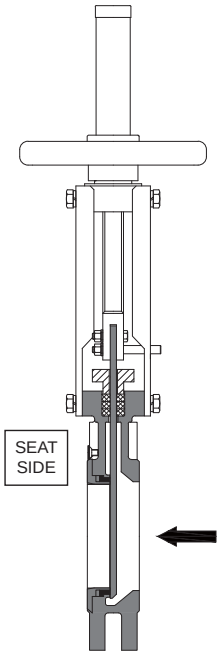


Figure 2.1 Pressure should be exerted on the opposite of the "SEAT SIDE".

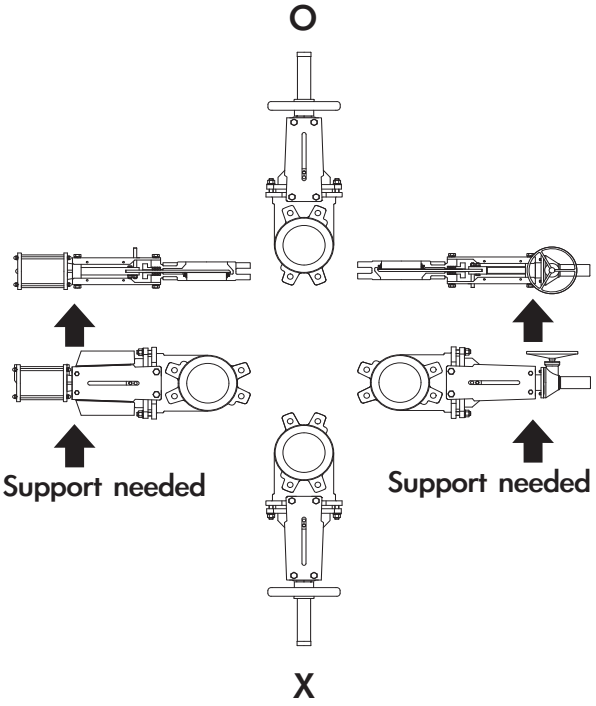


Fig.2.2 Recommended installation.
The construction of suitable supports is always required

2) Position

Be sure to install the valve so that pressure enters the upstream side of the valve and flows downstream side of the valve. Install the valve so that the higher pressure is pushing the gate against the seat. Failure to install the valve properly can lead to excessive seat leakage and/or damage the valve.

The standard KSD-OKG Uni-directional Knife Gate Valve is designed for horizontal piping installation. For non-horizontal piping installation, the construction of suitable supports is always required, as special request must be generated to ensure proper function. Note that installation upside down is not recommended.

Note:

For valves equipped with gearboxes or cylinders, it is strongly recommended to place support brackets on the gearboxes and cylinders when installing non-horizontal pipelines.

3) Fittings

Select the correct size of fittings according to the pipeline specification. Mating the flanges 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 Ends

1. Before installing the valves, make sure the lug and the pipe flange 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.
4. 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.

Note:
Taper threaded fitting should not be over tightened.

Chapter III Operation

KSD-OKG Uni-directional Knife Gate Valves are designed to assure non-clogging shut-off with suspended solids. The gate is designed to completely stop flow and form a tight seal against pressure in one direction. In the open position, the gate is completely out of the flow stream. The Knife Gate valves are not recommended for throttling use.

KSD-OKG Knife Gate Valves are designed for simplicity and ease of operation. To open this valve, turn the handwheel in a counterclockwise direction and continue turning until interference is felt. At this point, the valve will be fully OPEN. To close the valve, turn the handwheel in a clockwise direction and continue turning until interference is felt. At this point, the valve will be fully CLOSED.

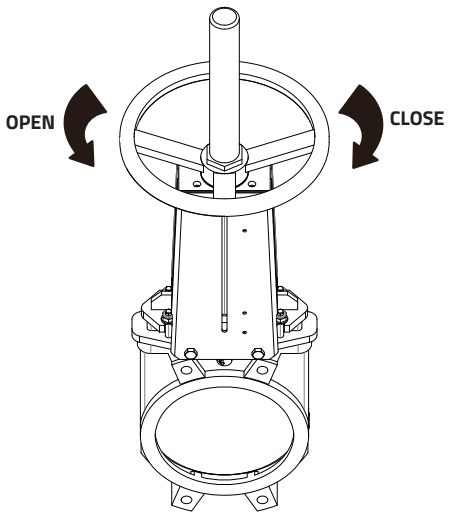


Fig.3.1 Rotation Direction of handwheel top view for CLOSED and OPEN position

3.1 Handling

Only qualified riggers should handle the valves. The pick-up point for all KSD-OKG Knife Gate Valves is by the use of a strap or chain between the gland area and bore such that the valve is balanced. Do not pick up KSD-OKG valves by use of straps or chains on or around the handwheels, yoke, gear box, motor or cylinder operator, or any override attachment. Do not pick up a valve by the packing bolting or other interior connections. After the weight of the

valve is supported by a strap or chain around the above-mentioned area, other lines may be attached for steadying the valve in place during installation.

Note:
Do not lift the valve through the flow bore. Damage to the surface of the valve seat may cause the valve to leak.

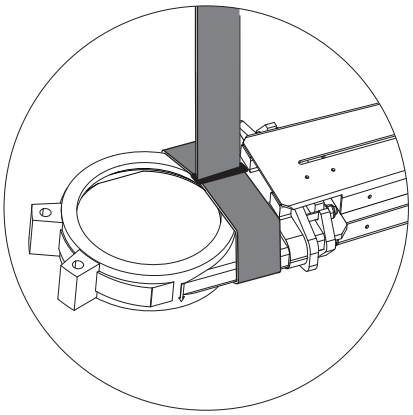


Fig.3.2 For horizontal movement, the valve shall be lifted mainly from the body and the yoke.

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. For cleaning operation, first step is put the valve bore perpendicular to the ground and clean, ensure all the dusts are be 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

KSD-OKG Knife Gate Valve has multi-turn operation to open in the counterclockwise direction. When the top of valve stem protrudes vertically from the hand wheel surface, the valve is OPEN. When the top of valve stem is at the same height as the handwheel surface, the valve is CLOSED.

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.

Position Indicator indicates the CLOSED and OPEN status without removing the STEM PROTECTOR for HANDWHEEL type or SAFETY COVER for CYLINDER type. As shown in Fig 3.3 below.

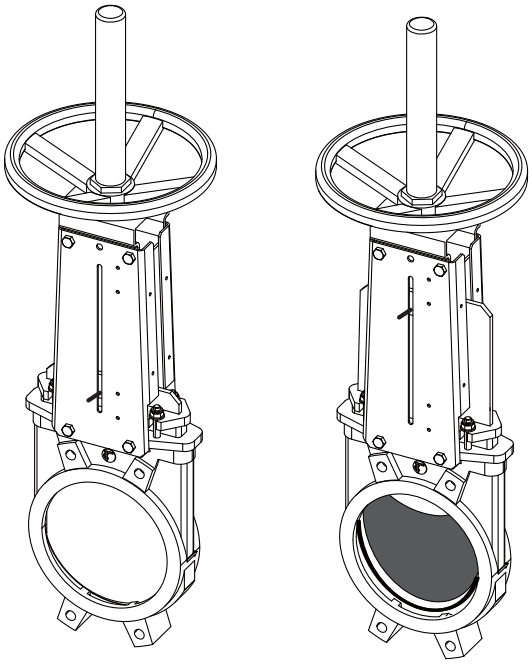


Fig.3.3 Position indicator

3.4 Remote Control

For remote control, the valve can be provided with a double-acting cylinder actuator. It is recommended to use dry, filtered and lubricated air to be supplied to the actuator to ensure an automated life cycle.

Chapter IV: Maintenance

> ⚠ **CAUTION:**
> Do not dismantle the valve or remove it from the pipeline while the valve is pressurized.

4.1 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 KSD-OKG Uni-directional Knife Gate Valve, KLINGER Die Erste recommends inspecting the valve at least every (1) year.

4.2 Valve Disassembly

The only maintenance required for the KSD-OKG Knife Gate Valve is the replacement of GLAND PACKING and SEAT.

1. Remove the valve from the pipeline and place the valve horizontally in the OPEN position.
2. Unscrew the screw and take off the RETAINER RING (3) from the downstream side of valve. If the snap ring is stuck, use a screwdriver to carefully bend a few places around the hole between the snap ring and the valve body until the snap ring loosens.
3. Replace the worn SEAT (4), O-RING (5) and clean the RETAINER RING (3).
4. Place the valve in the CLOSED position.
5. Release the valve STEM (8) from the GATE (2).
6. Loosen the lower bolts of the SUPPORT YOKE (9) and remove them.

> **Note:**
> Not disassembling HANDWHEEL (12) from YOKE (10) will not affect the disassembly of the main body. It is not necessary to remove the handwheel when replacing the gland packing and seat unless otherwise required.

7. Loosen the GLAND NUT (14) and remove them and GLAND (7).
8. Remove GATE (2) and the old PACKING (6) and clean the stuffing box.

4.3 Valve Reassembly

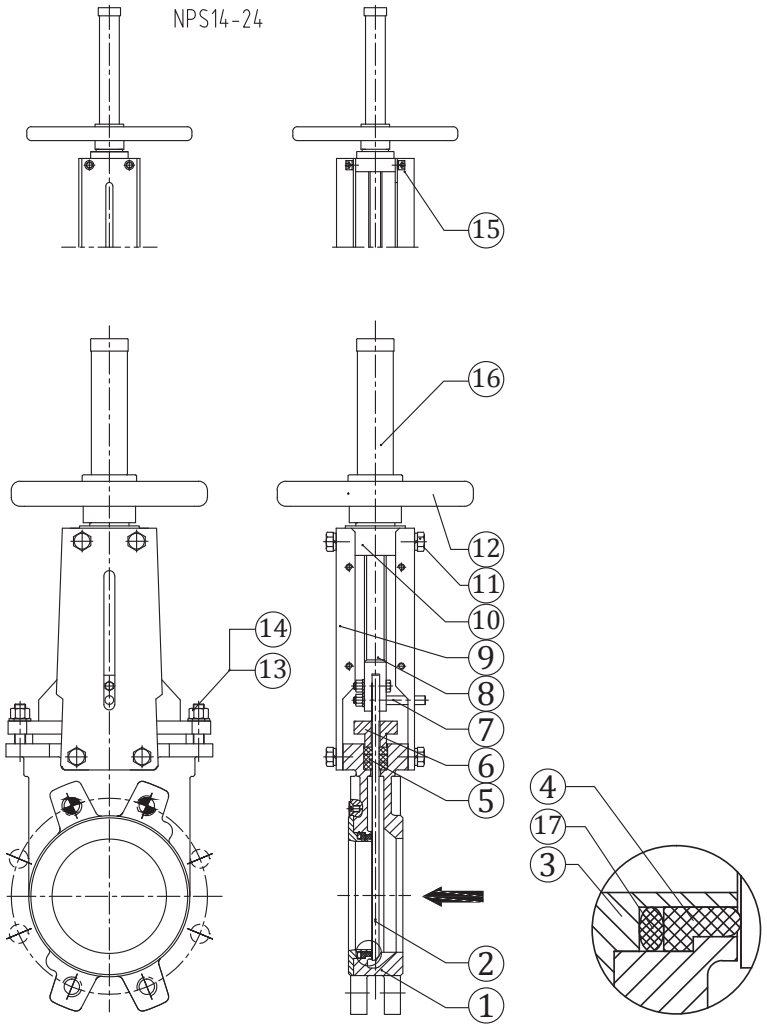
1. Remount the GATE (2) in to BODY (1).
2. Once the necessary PACKING (6) have been inserted, tighten GLAND NUTS (14) adequately. Over tightening may cause unsmooth operation.
3. Place the valve to CLOSED position.
4. Install a new SEAT (4) and O-RING (5) on the RETAINER RING (3) and place them into the BODY (1) from the downstream side of valve.
5. Lubricate the SEAT (4) and the O-RING (5) with a synthetic lubricator to make the installation easier.
6. Lock the RETAINER RING (3) in place with the screws.
7. Place the SUPPORT YOKE (10) with CYLINDER (12) and screw them to BODY (1).
8. Fix the STEM (9) to the GATE (2).

4.4 Troubleshooting

Symptom	Possible fault	Actions
Irregular gate movement	Valve stem is stuck due to long time without operation	Apply lubricant to the stem screw engagement part by injecting grease through the grease nipple.
	Foreign particles in on the outside screw of stem	Clean the screw of stem
	Gland bots/nuts are overtightened	Loose gland bolts/ nuts and re-tighten them adequately

4.5 Technical Data and Product Information

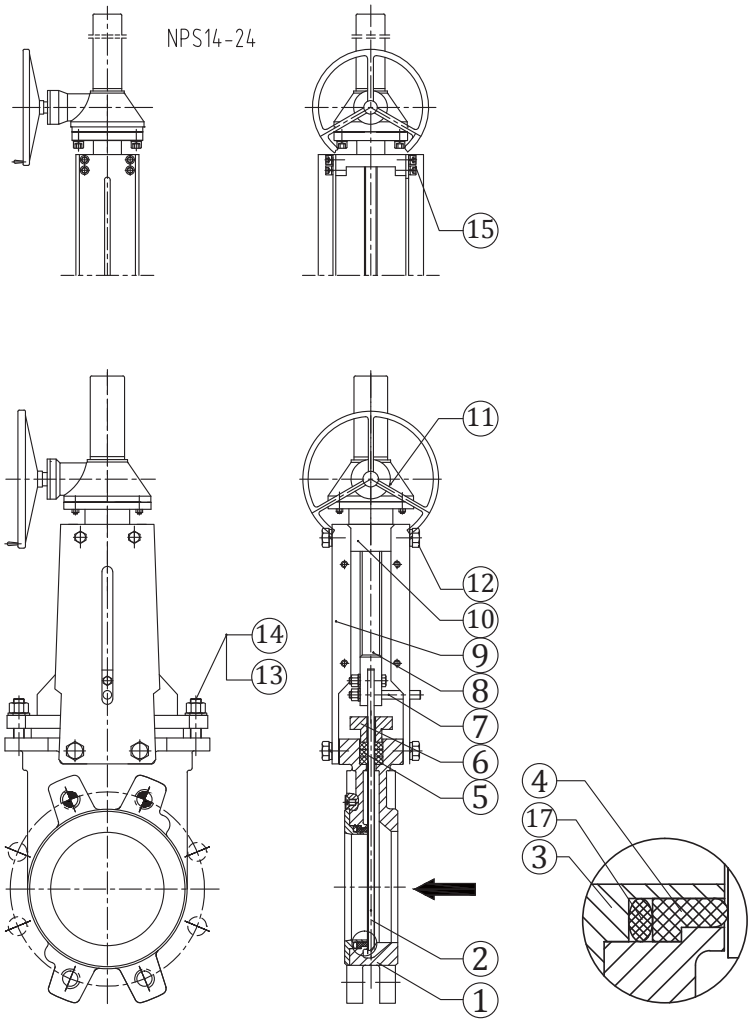
KSD-OKG with HANDWHEEL



NO	PART NAME	MATERIAL
1	BODY	ASTM A536 65-45-12
2	GATE	SS304
3	RETAINER RING	SS304
4	SEAT	EPDM
5	PACKING	PTFE
6	GLAND	ASTM A216 WCB/D.I.
7	POSITION INDICATOR	ASTM A276 420
8	STEM	ASTM A182 F6a

NO	PART NAME	MATERIAL
9	SUPPORT YOKE	ASTM A36
10	YOKE	ASTM A216 WCB/D.I.
11	UPPER YOKE BOLT	CS/DI; COMBINATION
12	HANDWHEEL	A2-70 (A193 B8)
13	GLAND STUD	ASTM A193 B8
14	GLAND NUT	ASTM A194 8
15	UPPER YOKE BOLT	AISI 1035
16	STEM PROTECTOR	ASTM A36
17	O-RING	FKM

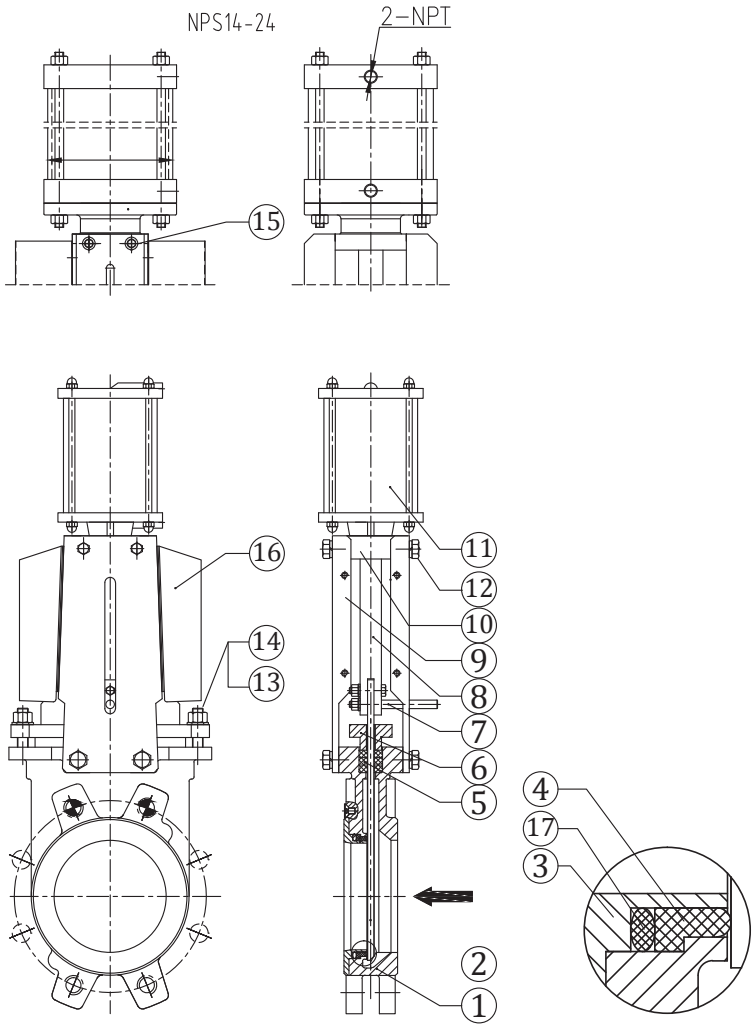
KSD-OKG with BEVEL GEAR



NO	PART NAME	MATERIAL
1	BODY	ASTM A536 65-45-12
2	GATE	SS304
3	RETAINER RING	SS304
4	SEAT	EPDM
5	PACKING	PTFE
6	GLAND	ASTM A216 WCB/D.I.
7	POSITION INDICATOR	ASTM A276 420
8	STEM	ASTM A182 F6a

NO	PART NAME	MATERIAL
9	SUPPORT YOKE	ASTM A36
10	YOKE	ASTM A216 WCB
11	BEVEL GEAR	COMBINATION
12	UPPER YOKE BOLT	A2-70 (A193 B8)
13	GLAND STUD	ASTM A193 B8
14	GLAND NUT	ASTM A194 8
15	UPPER YOKE BOLT	AISI 1035
17	O-RING	FKM

KSD-OKG with CYLINDER



NO	PART NAME	MATERIAL
1	BODY	ASTM A536 65-45-12
2	GATE	SS304
3	RETAINER RING	SS304
4	SEAT	EPDM
5	PACKING	PTFE
6	GLAND	ASTM A216 WCB/D.I.
7	POSITION INDICATOR	ASTM A276 420
8	STEM	ANSI 1045+Cr

NO	PART NAME	MATERIAL
9	SUPPORT YOKE	ASTM A36
10	YOKE	ASTM A216 WCB
11	CYLINDER	COMBINATION
12	UPPER YOKE BOLT	A2-70 (A193 B8)
13	GLAND STUD	ASTM A193 B8
14	GLAND NUT	ASTM A194 8
15	UPPER YOKE BOLT	AISI 1035
16	SAFETY COVER	SS304
17	O-RING	FKM