



## INSTALLATION, OPERATION & MAINTENANCE MANUAL

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## 0.- DESCRIPTION

The EK model knife gate is a uni-directional wafer valve designed for general industrial service applications. The design of the body and seat assures non-clogging shut-off with suspended solids.

## 1.- HANDLING

When handling an Orbinox valve please pay attention to the following points:



- **Do NOT attach lifting gear to the valve actuators or gate guards.**  
They are not designed to bear the weight, and could easily be damaged.
- **Do NOT lift the valve by the valve bore.**  
This can cause damage to the seating surfaces and seals.

Ideally when using lifting gear to move an Orbinox valve, it should be supported by two or more eyebolts screwed into the tapped fixing holes in the valve body.

### SAFETY WARNING:

- Check that the lifting gear is rated to carry the weight of the valve.
- Make sure the eyebolts have the same thread as the boltholes and that they are well secured.

During installation it is recommended to lift the valve via soft straps. These can be to the upper part of the valve body.

## 2.- INSTALLATION

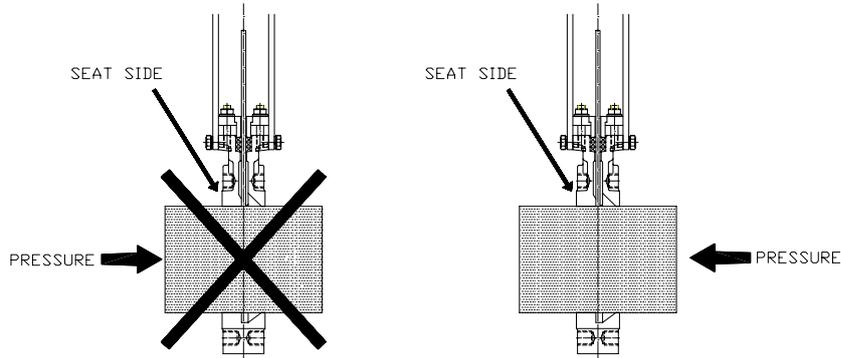


To avoid personal injury or damage to property from the release of process fluid:

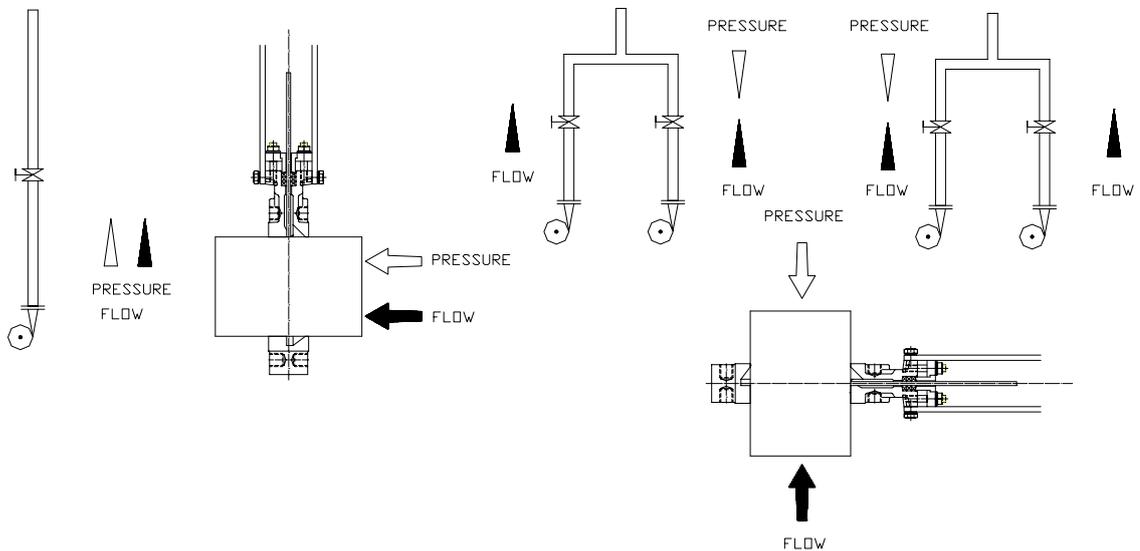
- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.
- According to **EN 13463-1 (15)**, during installation and maintenance operations, use hand tools (**non electric**) with Working Allowance.

Before installation, inspect the valve body and components for any damage that may have occurred during shipping or storage. Make sure the internal cavities within the valve body are clean. Inspect the pipeline and mating flanges, making sure the pipe is free of foreign material and that the flanges are clean.

The valve is unidirectional. It should be installed with pressure exerted against the seat. The words "SEAT SIDE" are marked on the valve body to indicate the position of the valve seat. Installation and the correct orientation with respect to the direction of the flow is the responsibility of the user.



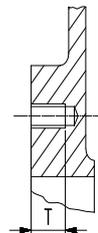
It should be noted that the direction of flow and differential pressure, do not always coincide.



Special care should be taken to maintain the correct distance between the flanges and to ensure that they are parallel to the valve body. Incorrect alignment of the valve can cause deformations, which can lead to difficulties in operation.

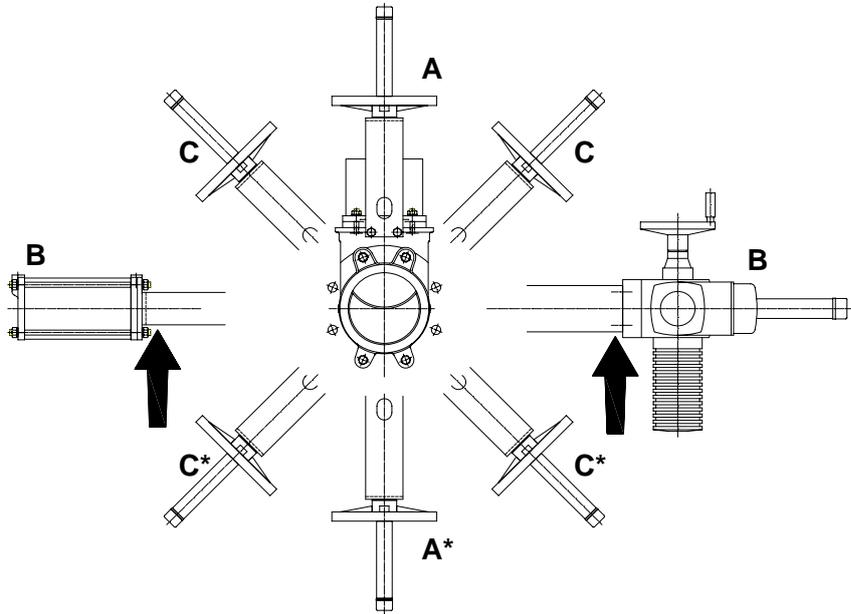
The following table gives the maximum torque values for the valve fixing bolts. Also shown is the maximum depth (T) allowed for the tapped blind boltholes drilled into the valve body.

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
T (mm)	10	10	10	10	10	14	14	18	18	22	24	24	24	24
Kg.m	6	6	6	6	7	7	7	11	11	15	15	19	19	23



The valve can be mounted in any position with regard to the pipe. However, it is advisable to place it vertically in horizontal pipeline (A) if the installation allows it. (Please consult the technical department at Orbinox).

With larger diameters (> 300 mm), heavy actuators (pneumatic, electric, etc.), or with the valve installed horizontally (B) or at an angle (C) on a horizontal pipeline, the installation will require the construction of suitable supports. (See the following diagram and consult the technical department at Orbinox).



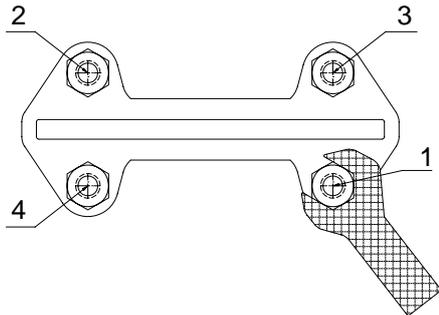
*\* For these positions please consult Orbinox.*

In vertical pipelines, the construction of suitable supports is always required (for further information please consult the technical department at Orbinox).

Once the valve is installed, test that the flanges have been fastened correctly and that all electrical and/or pneumatic connections have been properly made.

In the place the electric accessories are mounted on the valve (i.e. solenoid valves, electro-pneumatic positioners, etc.), the valve must be earthed correctly before being put into operation.

First, operate the valve with no flow in the pipeline. Then test operation and valve seal with flow. It should be noted that the packing material might settle in shipping/storage, which can cause minor leakage. This can be remedied by tightening the gland follower (7) during installation. The nuts shall be tightened gradually and crosswise until the leakage stops (see the next figure). Check that there is no metal contact between the gland follower (7) and the gate (2).



If the glandfollower nuts are pulled to hard, the force needed to operate the valve will increase, the valve function will be affected and the box packing lifetime will be shortened.

The table below shows the maximum torque value for tightening the glandfollower nuts.

ND	Torque (N.m)
50 - 100	20
125 - 200	30
250 - 1000	35

Once performance has been tested, the valve can be put into operation.

## 3.- ACTUATORS

### 3.1. - Handwheel

To open the valve, turn the handwheel (14) anticlockwise. To close, turn the handwheel clockwise.

### 3.2. - Lever

To operate the valve with this device, first loosen the locking clamp located on the top of the yoke (10). Then either open or close the valve by moving the lever in the desired direction. Finally, fix the position of the lever with the locking clamp.

### 3.3. - Pneumatic

Valves are usually supplied with a double acting pneumatic actuator although, upon request, we can supply single-acting actuators. In both cases, the inlet air pressure should be, between 3,5 to 10 Kg/cm<sup>2</sup>.

It is essential for a good maintenance of the cylinder that air should be well dried, filtered and lubricated.

It is recommended to actuate the cylinder 3-4 times before the start up, once it is installed in the pipeline.

### 3.4. - Electric actuator

Depending on the type or make of the electric actuator, specific instructions (i.e. a manufacturer's manual) will be supplied.

## 4.- MAINTENANCE



To avoid personal injury or damage to property from the release of process fluid:

- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.
- According to **EN 13463-1 (15)**, during installation and maintenance operations, use hand tools (**non electric**) with Working Allowance.

The only maintenance required is to change the gland packing (6) or the seal (3) if the valve is a resilient seated type.

The life of these elements will depend on the working conditions of the valve such as: pressure, temperature, abrasion, chemical action, number of operations, etc.

#### 4.1. - Replacement of the gland packing (6):

- 1) Depressurise the circuit and place the valve in close position.
- 2) Remove the gate guards (for automatically actuated valves only).
- 3) - Non rising stem.Photo 1: Release the stem nut (8) from the gate (2).  
- Rising stem valves.Photo 2: Release the spindle or stem (9) from the gate (2).

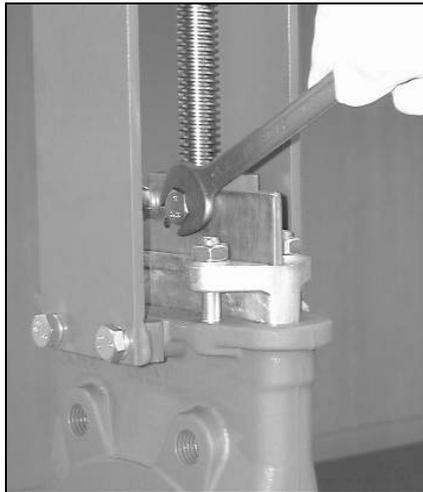


Photo 1



Photo 2

- 4) Loosen the screws of the yoke (10) and remove it (without loosening the actuator).
- 5) Loosen the nuts of the gland follower (7) and remove it. (Photo 3).
- 6) Remove the old packing rings (6) and clean the stuffing box.
- 7) Insert the new packing rings (6), making sure that the ring joints alternate (the first on one side of the gate, the next on the other and so on). (Photo 4).
- 8) Once the necessary packing rings (6) have been inserted, proceed with a steady initial tightening of the gland follower (7). (Photo 3).
- 9) Place the yoke (10) (with the actuator) and screw it.
- 10) Fix the stem nut (8) to the gate. (Non rising stem. Photo 1) or fix the stem (9) to the gate (2) (Rising stem valves..Photo 2).
- 11) Remount the gate guards (for automatically actuated valves only).
- 12) Carry out some operations with a loaded circuit and then re-tighten the gland follower (7) to prevent leakage.



Photo 3

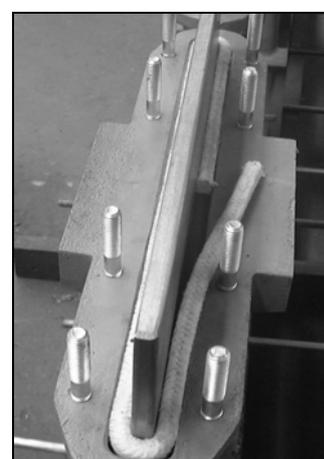
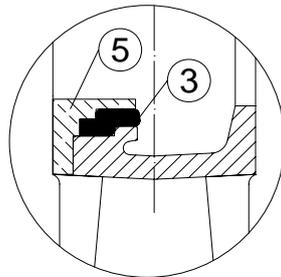


Photo 4

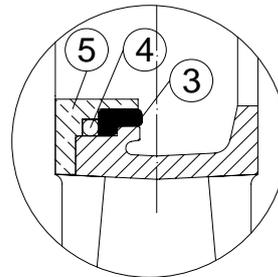
#### 4.2. - Replacement of the seal (3) (only applicable to resilient seated valves):

- 1) Remove the valve from the pipeline.
- 2) Remove the gate guards (for automatically actuated valves only).
- 3) Release the stem nut (8) from the gate (2). (Non rising stem.Photo 1) or release the spindle or stem (6) from the gate (2). (Rising stem valves.Photo 2).
- 4) Loosen the screws of the yoke (10) and remove it (without loosening the actuator).
- 5) Loosen the nuts of the gland follower (7) and remove it.(Photo 3)
- 6) Remove the old packing (6) and the gate (2) and clean the stuffing box.
- 7) Remove the seal retainer ring (5) which supports the seal (3).
- 8) Remove the worn seal (3) and clean the seal housing.
- 9) Insert the new seal (3) in the retainer ring (5).  
If the valve has PTFE seal (3): first, place an O-ring (4) in the retainer ring (5) and later place the PTFE seal (3). (see the following detail).

EPDM / NITRILE



PTFE



- 10) Insert the seal retainer ring (5) and the seal (3) altogether by hammering gently around the edge.
- 11) Remount the gate (2).
- 12) Once the necessary packing rings (6) have been inserted, proceed with a steady initial tightening of the gland follower (7). (Photo 3) following the steps of point 4.1.

#### 4.3. - Lubrication:

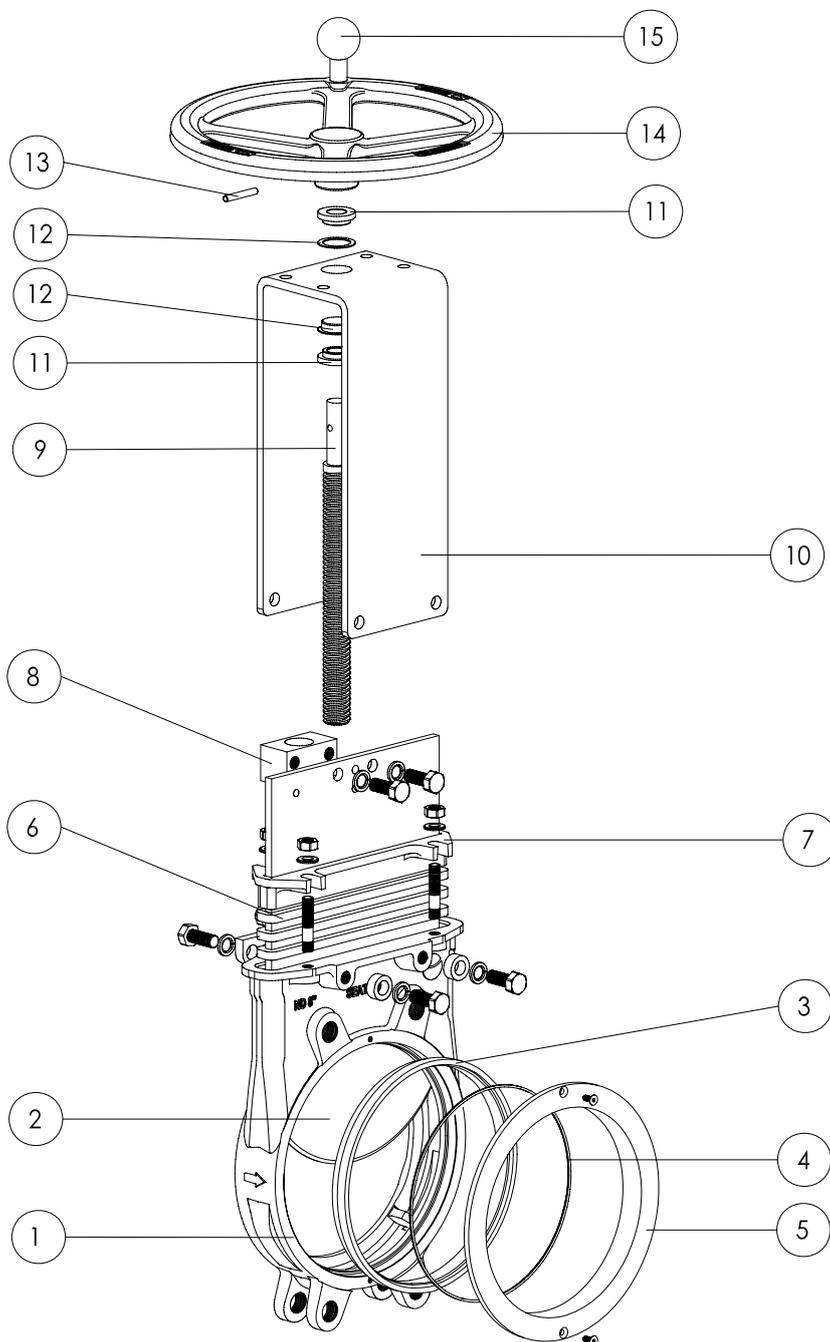
Lubricate the stem every 30 days with a calcium-based grease with the following characteristics: highly water resistant, low ash content, and excellent adherence.

## 5.- STORAGE

For long periods it is recommended to store the valves in a well-ventilated room. Valves should not be exposed to temperatures higher than 30°C, as some soft seal materials can be damaged when exposed to higher temperatures.

If outdoor storage cannot be avoided, cover the valve and protect it from sources of heat or direct sunlight. Provide good ventilation to avoid moisture.

## 6.- PARTS LIST &amp; DRAWINGS



- 1. - BODY
- 2. - GATE
- 3. - SEAL
- 4. - O-RING (only if the seal 3 is PTFE)
- 5. - "K" RING
- 6. - PACKING
- 7. - GLAND
- 8. - STEM NUT

- 9. - STEM
- 10. - YOKE
- 11. - BUSHING
- 12. - BUSHING + WASHER
- 13. - SPRING PIN
- 14. - HANDWHEEL
- 15. - KNOB