

INSTALLATION, OPERATION & MAINTENANCE MANUAL

**INDEX**

	<u>Page</u>
0.- Description .....	2
1.- Handling .....	2
2.- Installation .....	2
3.- Actuators .....	5
4.- Maintenance .....	5
4.1.- Gland packing replacement .....	5
4.2.- Seal replacement.....	6
4.3.- Gasket replacement .....	7
4.4.- Lubrication .....	8
5.- Flush Ports .....	8
6.- Storage .....	8
7.- Parts list & drawing .....	9



## 0.- DESCRIPTION

The CW model knife gate is a bonneted, uni-directional valve with full flange. It is designed to work with high-pressure fluids.

## 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

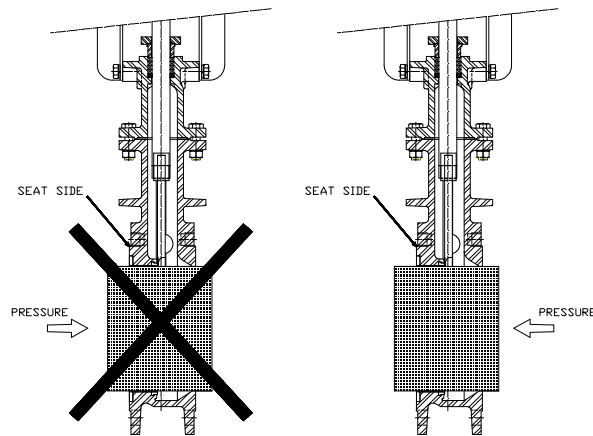


To avoid personal injury or damage to property from the release of process fluid:

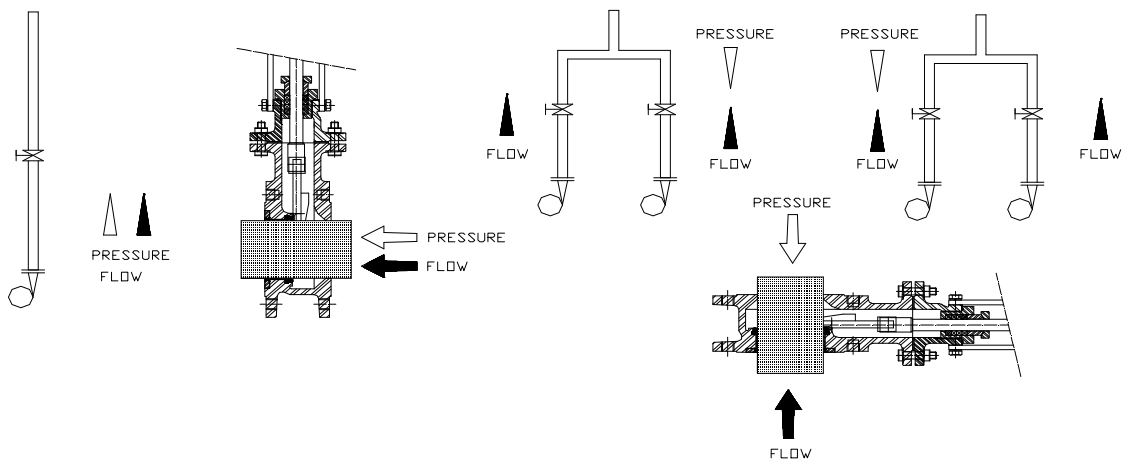
- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.

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.



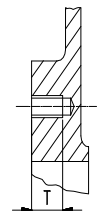
It should be noted that the direction of flow and differential pressure, do not always coincide.



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.

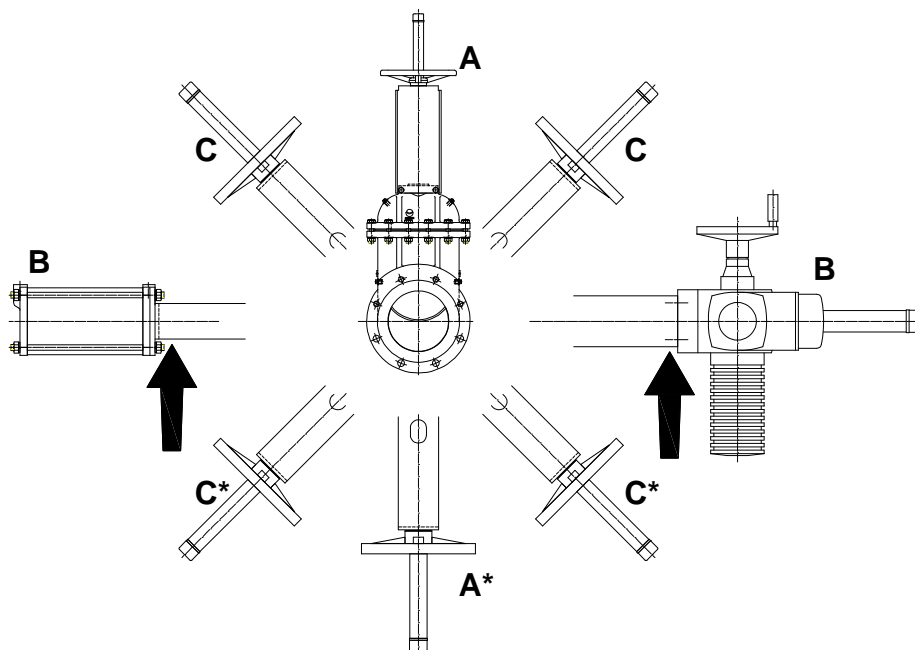
The following table gives the maximum torque values for the valve fixing bolts. Also shown is the maximum depth (T) allowed for the tapped blind boltholes drilled into the valve body.

DN	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000
T (mm)	13	13	13	13	18	18	21	25	25		25	25		35		
Kg.m	6	6	7	7	7	11	11	15	15	19	19	23	23	28	28	34



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.

Where 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 (5) during installation. Once performance has been tested, the valve can be put into operation.

### 3.- ACTUATORS

#### 3.1.- Handwheel

To open the valve turn the handwheel (11) anticlockwise. To close turn the handwheel clockwise.

#### 3.2.- 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.

#### 3.3.- 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.

The only maintenance required is to change the gland packing (4) 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 (4):



Although the design of the valve bonnet allows the stuffing box of the bonnet to be sealed from below, we advise that the valve is depressurised prior to beginning any maintenance.

- 1) Open the valve fully, to tighten the stem against the stuffing box.
- 2) Remove gate guards (if the valve has them).
- 3) Loosen the nuts of the gland follower (5) and remove it. (Photo 1)
- 4) Remove the old packing (4) and clean the stuffing box.
- 5) Insert the new packing rings (4), making sure that the ring joints alternate (the first on one side of the gate, the next on the other and so on). (Photo 2)
- 6) Once the necessary packing rings (4) have been inserted, proceed with a steady initial tightening, of the gland follower (5). (Photo 1)



Photo 1

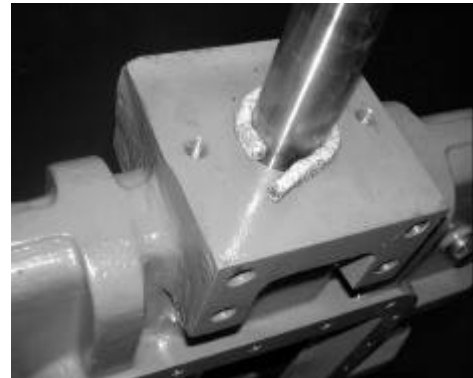


Photo 2

- 7) Remount the gate guards (if the valve has them).
- 8) Carry out some operations with a loaded circuit and then re-tighten the gland follower (5) to prevent leakage.

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

- 1) Remove the valve from the pipeline.
- 2) Remove the seal retainer ring (10) which support the seals (3).
- 3) Remove the worn seal (3) and clean the seal housing.
- 4) Once the new seal (3) is cut according to size, insert it into the seat housing (making sure that the union of the seal is at the top). (Photos 3 and 4)

#### Seal lengths

ND	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Lengths (mm)	205	255	295	365	440	510	680	860	1020	1190	1350	1510	1630	2010

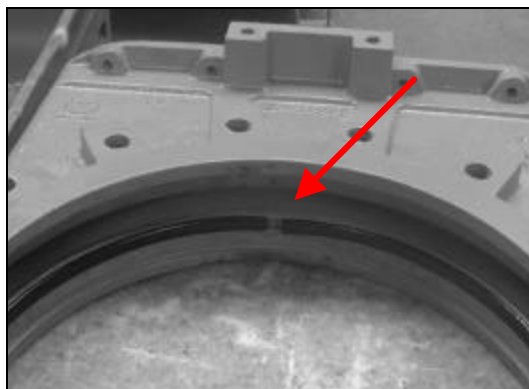


Photo 3

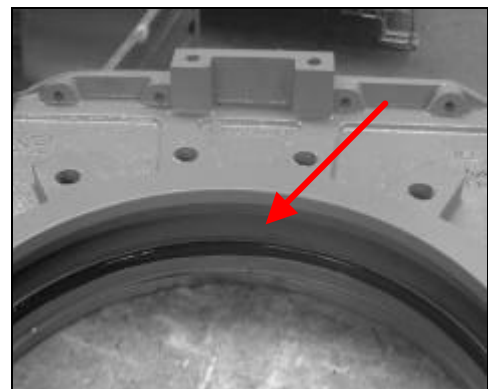


Photo 4

- 5) Insert the seal retainer ring (10) by hammering gently around the edge. (Photos 5 and 6)
- 6) Open and close the valve two or three times before returning it to the installation.



Photo 5



Photo 6

#### 4.3. - Replacement of the gasket (7):

- 1) Remove the valve from the pipeline.
- 2) Loosen the nuts between the body (1) and the bonnet (13). (Photo 7)
- 3) Lift the bonnet (13), until the gate (2) is free. (Photo 8)

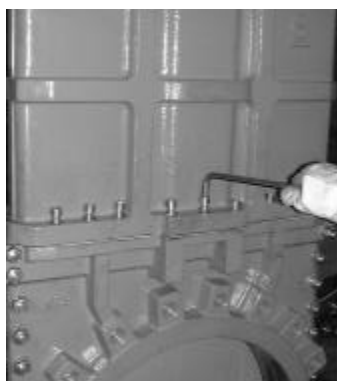


Photo 7



Photo 8

- 4) Change the gasket (7), between body (1) and bonnet (13). (Photo 9)



Photo 9

- 5) Remount the bonnet onto the valve (with the gate cleaned), and screw it into the body (1). (Photos 8 and 7)
- 6) Open and close the valve two or three times before returning it to the installation.

#### 4.4. - Lubrication:

Twice a year, it is recommended to remove the protection cap (12) and fill up the stem protector (15) halfway with a calcium-based grease with the following characteristics: highly water resistant, low ash content, and excellent adherence.

## 5.- FLUSH PORTS

The valves come fitted with flush ports (14) to allow connection to a cleaning system to flush the bonnet with water or air. The ports are plugged with threaded metal plugs. These can be removed for connection to a cleaning system, or for flushing the bonnet in the event of a blockage.

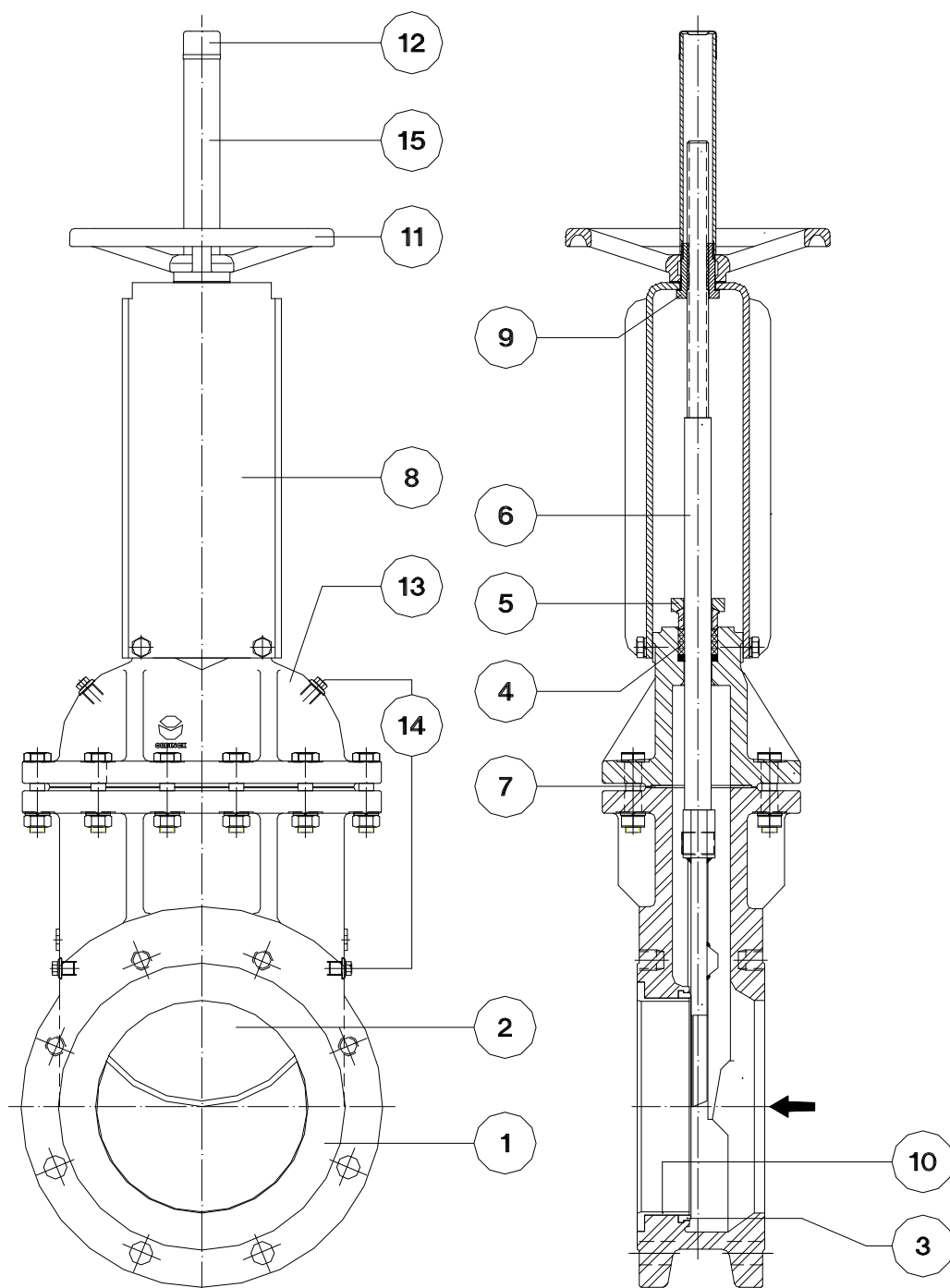
## 6.- STORAGE

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.



## 7.- PARTS LIST &amp; DRAWINGS



- 1. – BODY
- 2. – GATE
- 3. – SEAL
- 4. – PACKING
- 5. – GLAND FOLLOWER
- 6. – STEM
- 7. – GASKET

- 8. – YOKE
- 9. – STEM NUT
- 10. – SEAL RETAINER RING
- 11. – HANDWHEEL
- 12. – CAP
- 13. – BONNET
- 14. – FLUSH PORTS
- 15. – STEM PROTECTOR