



INSTALLATION, OPERATION & MAINTENANCE MANUAL

MODEL BC



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0.- DESCRIPTION

The BC model knife gate is a square-port low-pressure valve for solid loaded fluids, mainly used in bulk handling and silo outlet applications.

The BC valve complies with the following European directives:

- DIR 98/37/EC (machines)
- DIR 97/23/EC (PED) Fluid: Group 1 (b), 2 (Cat. I, mod.A)

It may also comply with the directive:

- DIR 94/9/EC (Explosive Atmospheres)



The EX valve may comply with the directive regarding equipment and protective systems for their use in explosive atmospheres. In these cases, the logotype  shall appear on the identification label of the valve. This label shows the exact classification of the zone where the valve can be used. The user will be liable for its use in any other zone.

This directive only applies in the following atmospheric conditions:

$$0,8 \text{ bar} \leq P \leq 1,2 \text{ bar}$$

$$-20^{\circ}\text{C} < T < 60^{\circ}\text{C}$$

Any increase in temperature due to frictional warmth is negligible, since the relative speed of the moving parts is extremely low.

The risk analysis associated to this directive does not take into account the fluid that goes through the valve, even when such fluid produces an explosive atmosphere. The user must take into account the risks that the fluid generates, such as:

- heating of the valve surface.
- generation of electrostatic charges caused by displacement of the fluid.
- shock waves caused by the installation (water hammer), internal crashes generated by the pellets or the risks due to foreign bodies susceptible of being present in the installation.

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

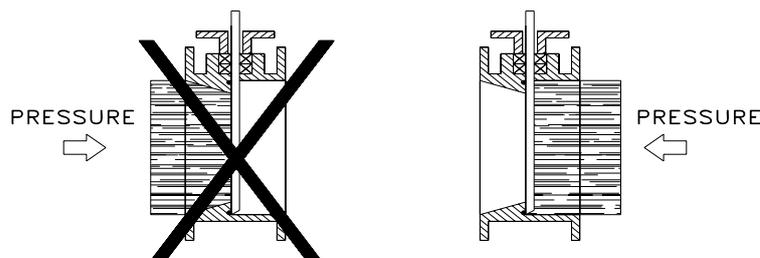
To avoid personal injury or damage to property from the release of process fluid:

- 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.

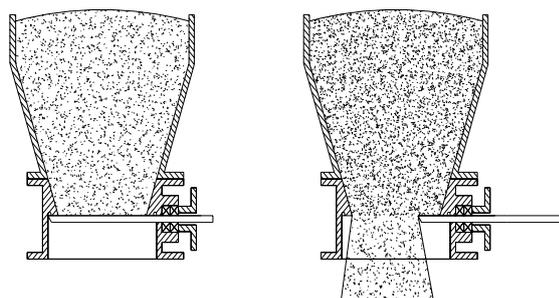
The valve is unidirectional. The valve should be set up so that the greatest pressure acts towards the seat. Except on those cases where the valve is mounted under silo (see next pictures).

a) Pressure towards the seat

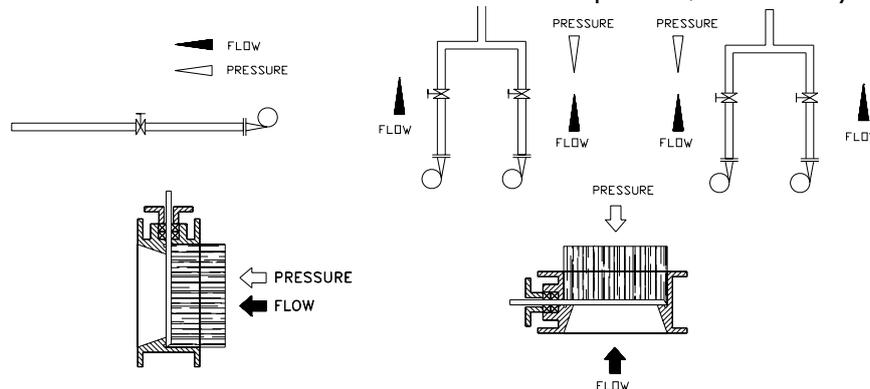


b) Valve under silo

It is worth making a special mention of assemblies at the outlet of a hopper or silo where pressures are low and the valve is used as an isolation valve for solids. In these cases the cleanliness of the sliding guides takes priority, and the valve should be placed as shown in the following diagram.



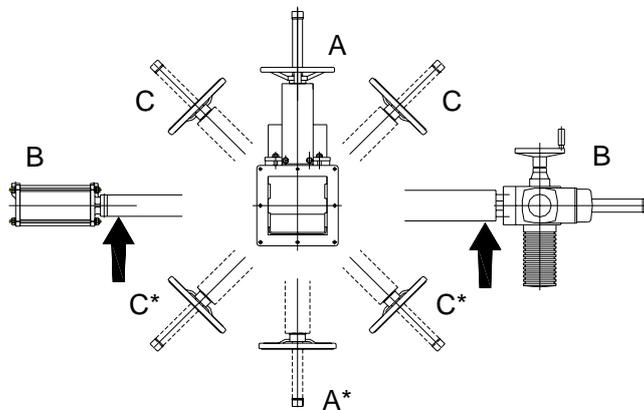
It should be noted that the direction of flow and differential pressure, do not always coincide.



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 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 valves ($\geq 400 \times 400$), 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.



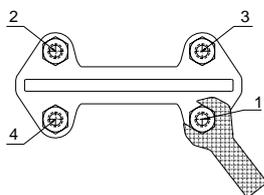
Where electric accessories are mounted on the valve (i.e. solenoid valves, electro-pneumatic positioners, etc.), or is in an ATEX zone, the corresponding earth connections must be made before it is put into operation.



The operation of automated valves is limited only with fitted gate covers.

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. 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 glandfollower (5) 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.

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

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



In an ATEX zone, the continuity between the body of the valve and the pipe must be checked (test in accordance with EN 12266-2 Standard, annex B, points B.2.2.2. and B.2.3.1).

It must also be verified that the pipe is connected to earth and that there is electrical conductivity between the two pipes (outlet/inlet).

Approximate weight of the handwheel-operated valve (rising stem):

Size	200x200	250x250	300x300	350x350	400x400	450x450	500x500	600x600
Weight (Kg)	27	32	38	58	66	75	85	110

3.- ACTUATORS

3.1.- Handwheel

To open the valve turn the handwheel (11) 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 (8). 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/cm². However, the size of the actuator for each valve has been designed for a feed pressure of 6 Kg/cm².

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

The valve must not undergo any modifications without a previous agreement with ORBINOX. ORBINOX shall not be liable for any damages that may arise due to the use of non original parts or components



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.



In an ATEX zone, there may be electrostatic charges in the internal parts of the valve. These electrostatic charges, caused by the evacuation of the fluid, may entail a risk of explosion. It is the responsibility of the user to take extreme precautions to minimize this risk.



Safety in an ATEX zone:

- The maintenance personnel must be made fully aware of the risks of explosion, and it is advisable that they receive specific training regarding ATEX.
- Should the fluid transported create an internal explosive atmosphere, the user must check periodically the correct water-tightness of the installation
- Clean the valve periodically to prevent dust accumulation.
- Assembly at the end of the line is not allowed.
- Avoid repainting the products supplied.

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):

- 1) Depressurise the circuit and place the valve in close position.
- 2) Remove the gate guards (for automatically actuated valves only).
- 3) Release the spindle or stem (9) from the gate (2). Foto 1

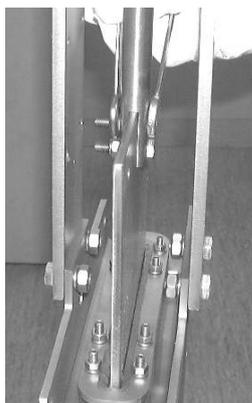


Photo 1

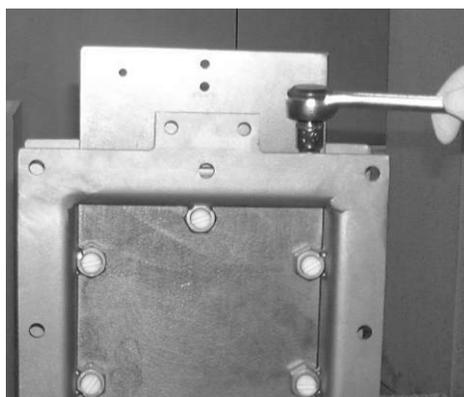


Photo 2

- 4) Loosen the screws of the yoke (8) and remove it (without loosing the actuator).
- 5) Loosen the nuts of the gland follower (5) and remove it. (Photo 2)
- 6) Remove the old packing rings (4) and clean the stuffing box.
- 7) 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 3)
- 8) Once the necessary packing rings (4) have been inserted, proceed with a steady initial tightening of the gland follower (5). (Photo 2)
- 9) Place the yoke (8) (with the actuator) and screw it.
- 10) Fix the stem (9) to the gate (2). (Photo 1)
- 11) Remount the gate guards.
- 12) Carry out some operations with a loaded circuit and then re-tighten the gland follower (5) to prevent leakage.

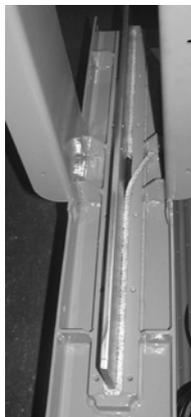
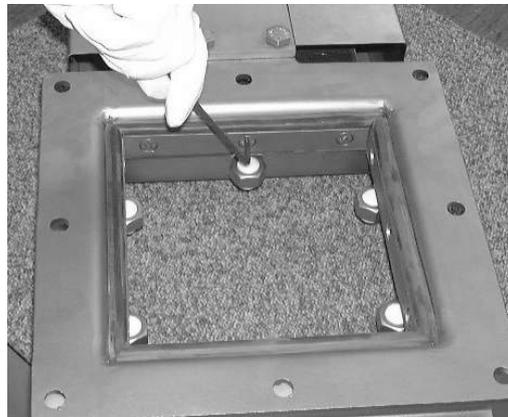


Photo 3



Phot 4

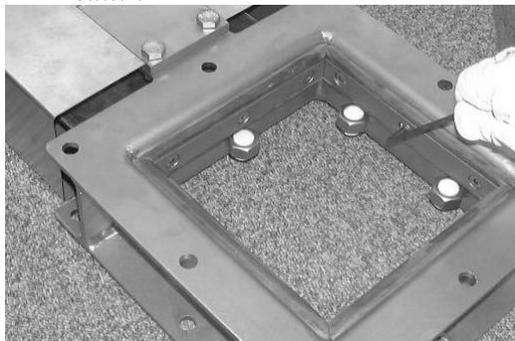


Photo 5

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

- 1) Remove the valve from the pipeline.
- 2) Set the gate (2) in open position.
- 3) Take off the plates (6), which retain the seals (3).
- 4) Remove the old seals (3) from the valve and clean the seats.
- 5) Once the correct length is known, cut the new sets of seals (3).
- 6) Place the new seal (3) on the top of the body (packing gland side) and secure the top plate (6). (Photo 4)
- 7) Place the next seal (3) on the bottom and secure the bottom plate (6). Finally secure the side plates (6) and side seal (3). (Photo 5)
- 8) Set the gate (2) in closed position.
- 9) Check that the seal (3) and the gate (2) are in contact and then retighten all the plates(6).
- 10) Open and close the valve two or three times prior to reinstallation.

4.3. - Lubrication:

Twice a year, it is recommended to remove the protection cap (12) and fill up the stem protector (13) halfway with a calcium-based grease with the following characteristics: highly water resistant, low ash content, and excellent adherence.



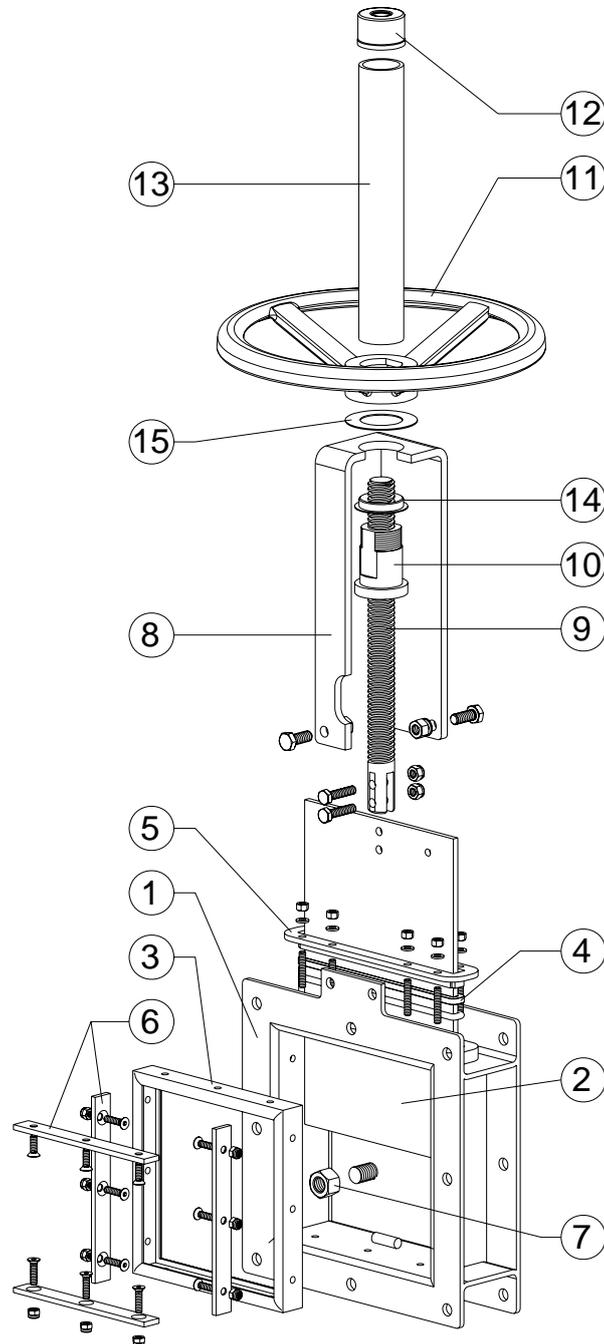
After maintenance, and in an ATEX zone, it is obligatory to verify the electrical continuity between the pipe and the different valve components, such as the body, the gate, the supports,... (test in accordance with EN 12266-2 Standard, annex B, points B.2.2.2. and B.2.3.1).

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 & DRAWINGS



- | | |
|-------------------------|----------------------|
| 1.- BODY | 8.- YOKE |
| 2.- GATE | 9.- STEM |
| 3.- SEAL | 10.- STEM NUT |
| 4.- PACKING RING | 11.- HANDWHEEL |
| 5.- GLAND FOLLOWER | 12.- CAP |
| 6.- SEAL RETAINER PLATE | 13.- STEM PROTECTOR |
| 7.- SLIDER SUPPORT | 14.- COLLAR |
| | 15.- FRICTION WASHER |