

Type D



INSTALLATION, OPERATION & MAINTENANCE MANUAL

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0.- DESCRIPTION

The D model knife gate is a wafer valve designed for a wide range of industrial applications. The double-seated design provides bi-directional shut off. The design of the valve body and the two rubber sleeves (3) makes the D valve well suited for handling abrasive slurries.

The two sleeves (3) are in permanent contact with each other when the valve is open. While the valve is either open or closed, the media does not come into contact with the interior of the body. Minimal leakage may occur from the bottom of the valve during opening and closing cycles.

A bottom splashguard (8) option is available to avoid such leakage. The splashguard can be connected to a fluid return pipe. This allows fluid to be recycled into the main pipeline or for the splashguard to be emptied without disrupting operation.

1.- HANDLING

When handling an AKO 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 AKO 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.

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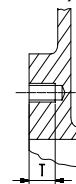
The valve is bi-directional, and consequently permits installation without considering the flow direction.

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.

Additional flange gaskets are not required as the outer face of the sleeve acts against the outlet flange to provide a tight seal. Sufficient space should be left between the flanges to permit ease of movement for the valve gate with sleeves installed, without damaging them.

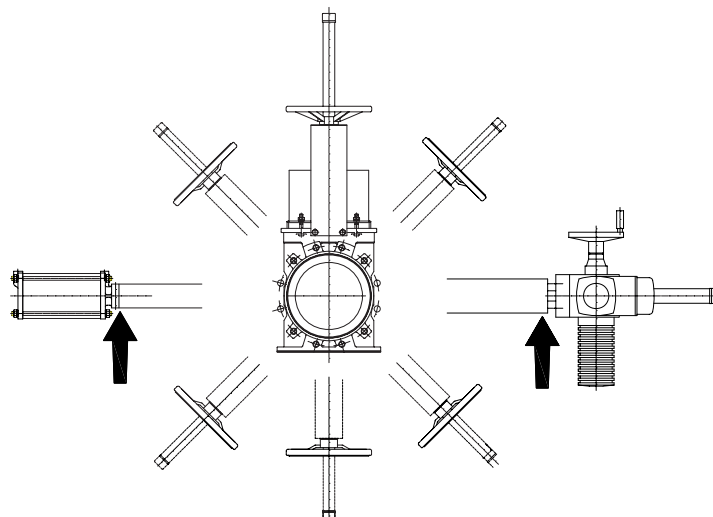
The following table gives the maximum torque values for the valve fixing bolts. Also shown is the maximum depth (T) allowed for the tapped blind boltholes drilled into the valve body.

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
T (mm)	8	8	8,7	8,7	8,7	10,3	12	12	12	15	15	15	22,2	22,2
Kg.m	3	3	3	3	3,5	3,5	3,5	5,5	5,5	7	7	9	9	11



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 our technical department).

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 our technical department).



** For these positions please consult AKO.*

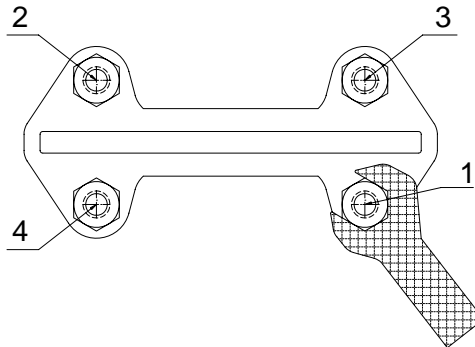
In vertical pipelines, the construction of suitable supports is always required (for further information please consult our technical department).

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.

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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.

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.

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

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Weight (Kg)	10	13	14,5	22	24	26	39,5	63	72	96	188	216	274	318

3.- ACTUATORS

3.1.- Handwheel

To open the valve turn the handwheel (12) 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.

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.

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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.

The only maintenance required is to change the gland packing (4) and the two rubber sleeves (3) as well as the use of the grease nipples (7) for regular lubrication.

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.

To allow optimal operation, the lower part of the valve, accessible through the splashguard (8) should be cleaned regularly. If the gate is brushed and cleaned regularly, the wear of the sleeves (3) can be minimised.

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 (10) from the gate (2).
- 4) Loosen the screws of the yoke (6) and remove it (without loosening the actuator).
- 5) Loosen the nuts of the gland follower (5) and remove it.
- 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).
- 8) Once the necessary packing rings (4) have been inserted, proceed with a steady initial tightening of the gland follower (5).
- 9) Place the yoke (6) (with the actuator) and screw it.
- 10) Fix the stem (10) to the gate (2).
- 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.

4.2.- Replacement of the sealing sleeves (3):

- 1) Remove the valve from the pipeline.
- 2) Remove the sealing sleeves (3).
- 3) Set the gate (2) in the open position.
- 4) Clean within the body (1), filling the inner part of the body adjacent to the stuffing box with lithium-based grease. If necessary, remove the splashguard (8).
- 5) Lubricate the new sleeves (3) and install them.
- 6) Remount the valve in the pipeline, being careful not to deform the laps of the sealing sleeves.
- 7) Tighten the flanges.
- 8) Operate the valve a couple of times before leaving it in the position required for the process.

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4.3. - Lubrication:

The D valve must be lubricated every 75 operations, using the grease nipples (7) provided. This can be done without removing the valve from the pipeline. If the valve is normally in the open position and is only cycled every 15 days or more, it is advisable to lubricate after every operation (use a silicone or lithium based grease).

Twice a year, it is recommended to remove the protection cap (9) 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.

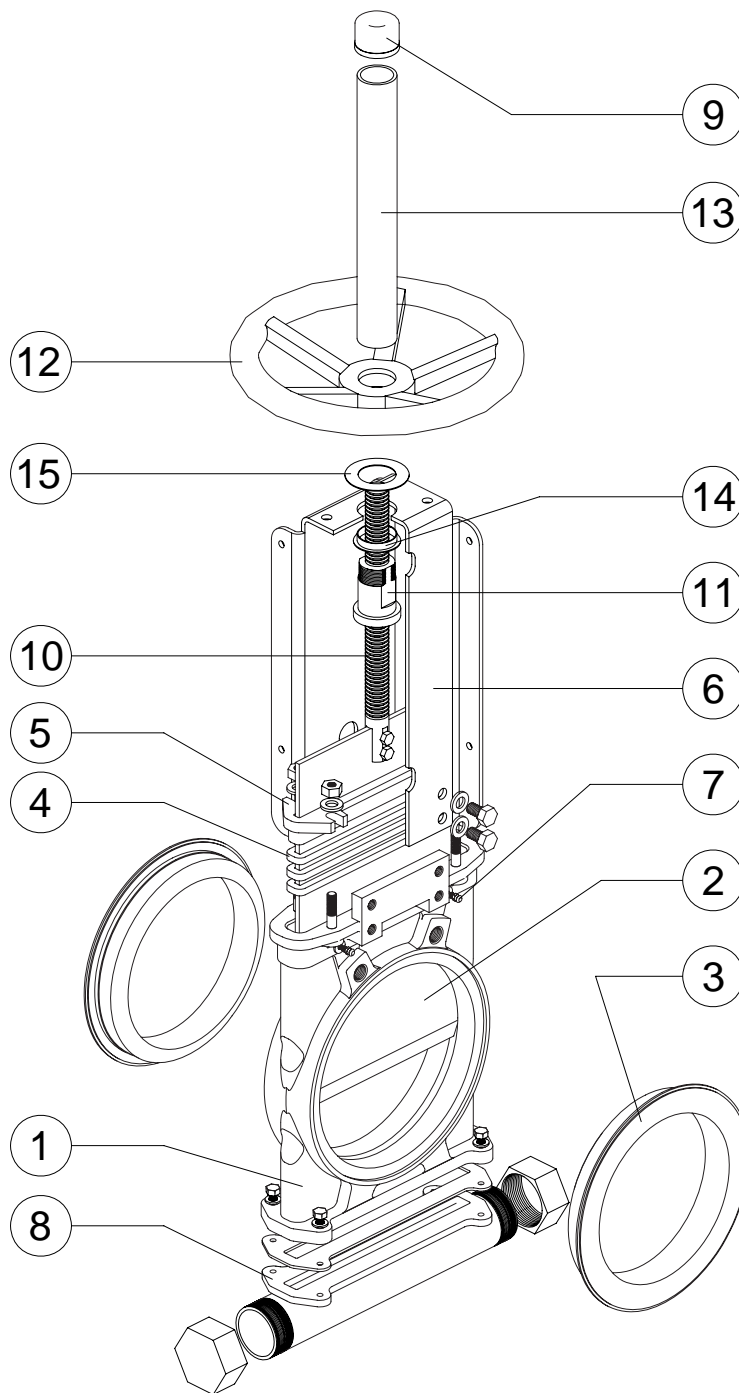
5.- STORAGE

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.

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6.- PARTS LIST & DRAWINGS



- | | |
|---------------------|-----------------------|
| 1. – BODY | 8. – SPLASH GUARD |
| 2. – GATE | 9. – CAP |
| 3. – SLEEVES | 10. – STEM |
| 4. – PACKING | 11. – STEM NUT |
| 5. – GLAND FOLLOWER | 12. – HANDWHEEL |
| 6. – YOKE | 13. – STEM PROTECTOR |
| 7. – GREASE NIPPLE | 14. – COLLAR |
| | 15. – FRICTION WASHER |