OPERATING MANUAL

Knife gate valves

P/N 2005 / 2005 – prepared for operator / 2006 – for buried installation / 2905 – with electric operator

CONTENTS

1. INTENDED USE

P/N 2005, 2006, and 2905 two-way flange-to-flange knife gate valves are intended for ductwork systems which transfer black water sewage, storm water, bulk media, and industrial piping systems. Each valve can be installed in overground and underground pipelines as an integral inline part of the piping. The knife gate valve P/N 2006 can be buried directly in the ground. The valves are two-position valves which can only be set fully open or fully closed, and not intended for operation as control or damper valves.

CAUTION

Due to the limitations caused by application of specific materials in various operating environment types, it is critical to precisely determine the operating conditions, i.e. the temperature, pressure and medium characteristics. This will help eliminate any problems during operation of the valve.

2. TECHNICAL DESCRIPTION

- Production and acceptance according to EN 1074-2 (Valves for water supply. Fitness for purpose requirements and appropriate verification tests. Isolating valves) and EN 12266-1 (Industrial valves. Testing of metallic valves).
- 100% of each valve is leak tested.
- Application temperature range: max. +70°C.
- Nominal diameter range: DN200 to DN50–DN1000 [mm].
- Hydraulic performance: maximum medium flow rate for liquids 4 [m/s] and 30 [m/s] for gases.
- Valve switching driving torque:

DN [mm]	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000
Mmax [Nm]	20	20	20	25	28	50	50	70	70	90	110	160	200	280	480	510	600	680

- Valve control: in the standard version, the closing sense of rotation is clockwise (CW); the closing sense of rotation can be opposite on special order; the gate valves are intended for installation between the opposing flanges specified per PN-EN 1092-2 and with the bolt hole pattern for the pressure rating of PN10.
- Installation length: in accordance with the manufacturer's technical documentation.
- Nominal pressure PN values: - per size:

DN50 to DN400 - 1.0 MPa
DN500 to DN600 0.6 Mpa
DN700 to DN1000 0.25 MPa

- P/N 2005, 2006, and 2905 two-way flange-to-flange knife gate valves feature a full body bore, a non-rising spindle (up to DN400) or a rising spindle (from DN500 to DN1000), and the closure seal with a square section with a knife guide and placed in the body seat. The knife closure remains within the body in the whole closing and opening cycle (for P/N 2006) or it is exposed in the whole closing and opening cycle (for P/N 2005 and 2905). The knife closure seal features a dovetail profile and is reinforced with stainless steel wire located within the inner opening and preventing washing of the seal from the seat. The body seal of the knife is a multi-layered packing compressed by a gland with bolts. The knife gate valve body is a monolithic panel design.
- The gate valve operation is facilitated by:
  - A hand wheel for valves up to DN400 bore size and with addition of an intersecting gearbox from the DN500 bore size;
  - Actuation wrench (for the body P/N 9025) applied to the spindle neck, and in valves from the DN500 bore size, the operation is transferred by an parallel gearbox;
  - Electric operator drive up to the DN400 bore size, operating the non-rising stem (with B3 insert), and in P/N 2905valves from the DN500 bore size, a rising stem is used (A insert).
- Two-way flange-to-flange knife gate valves P/N 2006 are intended for buried installation directly in the ground and have a specified expiry date for installation in the piping. The valve must be installed in the piping

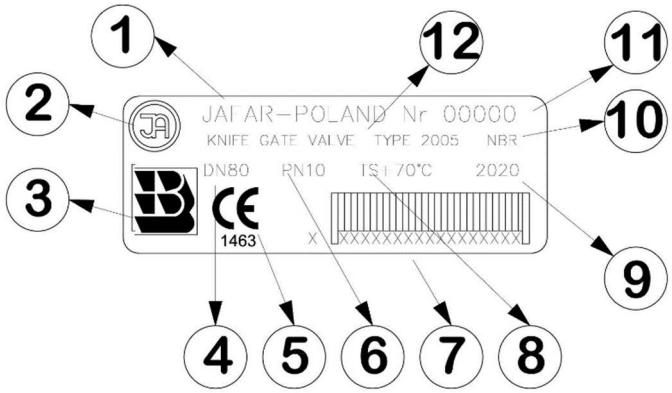
in 3 months from the date of production; past this expiry date, the valve gland must be reset and readjusted to maintain seal integrity, which can only be done by the manufacturer or its authorized technical service.

- The two-way flange-to-flange knife gate valves with the V-ports must have the latter positioned on the medium outflow end when installed.

3. PRODUCT IDENTIFICATION MARKING

The gate valve marking meets the following standards: EN 19 (Industrial valves. Marking metal fittings), Marking of metallic valves), EN 1074-1 (Valves for water supply. Fitness for purpose requirements and appropriate verification tests. Part 1: General requirements). The gate valve bodies feature markings on the front and back walls of the body chamber. The marking contains the following data:

- manufacturer's trademark;
- heat no;
- nominal diameter;
- nominal pressure;
- body material type;



1. Manufacturer's company and country of origin.
2. Manufacturer's company logo.
3. Polish construction mark (for the full range of diameter values).
4. Diameter, bore and nominal size (DN).
5. CE marking
6. Alphanumerical reference designation for the bolt hole pattern drilling on the flange to be connected to the piping (PN).
7. Barcode.
8. Maximum permissible temperature (TS).
9. Year of manufacture of the product.
10. Seal material.
11. Production serial no. in the calendar year.
12. Product name.

4. STORAGE & TRANSPORT

The products are packed on EURO pallets (1200x800 mm) or in custom containers, as applicable. Store the valves in clean indoor rooms without microbiological or chemical contaminants and at a room temperature between -40°C and 70°C. Protect the paint coat and rubber parts from prolonged exposure to UV radiation. Protect against mechanical damage during storage and transport.
Do not compress any rubber parts. Keep the knife closure of the valve halfway open. Secure the products against shifting during shipping and handling. Use suitable belt slings for lifting and handling heavy valves in size DN350 and larger. Secure the valves against rotation on the slings. Do not handle by the handwheel, the operator gearbox, or the operator/gearbox housing.

5. INSTALLATION

P/N 2005, 2006, and 2905 two-way flange-to-flange knife gate valves are intended for installation in overground and underground horizontal or vertical piping. The maximum tilt from the vertical plumb for valve sizes from DN50 to DN600 must not be higher than 45º when installed. The knife gate valves are designed for installation between flanged ends of the pipelines sized for the PN10 bolt hole pattern acc. to PN-EN 1092-2. Note that the system must not expose the (gate) valve to bending or tensile stress from loading with the weight of unsupported pipeline sections.

Install the product properly aligned with the piping centreline and with proper parallelism and flatness of the mating connection flanges, with prevention of hydraulic shock, and with due compensation of the pipeline dimensional changes from temperature and pressure.

Knife gate valves allow for gland seal adjustment (tightening) in order to eliminate any leaks from the gate valve. In order to ensure additional sealing of a gland seal, tighten the nuts crosswise with a tightening torque adjusted to a given size (see the table below). Once installed and adjusted as above, the gate valve is ready for commissioning.

Any other work on disassembly of the valve components (except for the gland) may result in loss of seal and warranty rights.

Before attempting to install the valve, check the technical and commercial documents delivered with the product to verify that your media and pipeline operating parameters comply with the manufacturer's declaration. Any change in the operating conditions must be consulted with the manufacturer beforehand. Before attempting to install the valve, remove the threaded hole plugs, check the inner surfaces of the valve and thoroughly flush with water, if necessary. Install the gate valve on a base or a support adequate to the size and weight of the valve, to prevent strain of the piping with the valve. Use suitable piping flanges, gaskets and bolts for the valve flange ends. The valve and piping flange holes must be aligned. Tighten the connection flange bolts crosswise to ensure a proper seal pressure. The gate valve location must prevent exposure to freezing of the medium flowing through the gate valve. Provide the gate valve with a suitable control, e.g. a spindle handwheel with a flexible or rigid housing, an electric drive unit and a pedestal. When installing a housing, it is necessary to use a street box founded on a base slab. When using a spindle extension, make sure that the weight of the extension is not transferred to the gate valve spindle. To prevent the load transfer, use holding pieces, mounted to the chamber/vault walls. Spindle extensions over 3000 mm long shall be attached via Cardan joints. Having completed the installation, perform a pressure test at a maximum test pressure equal to 1.5 times the nominal pressure.

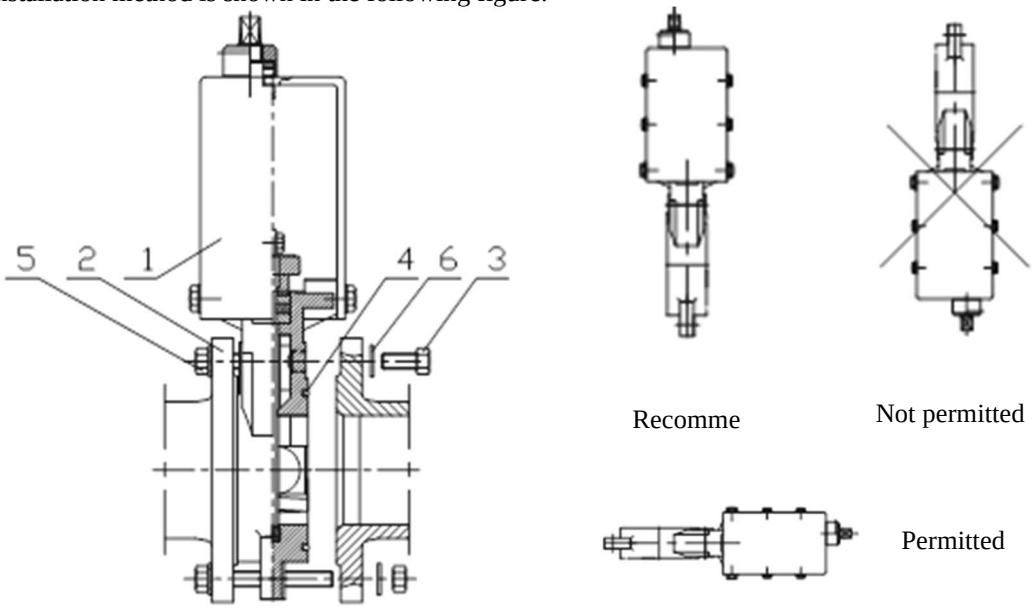
Caution!
If the product has mechanical damage, do not install it in the pipeline.
If the knife gate valve is installed at a system termination, use counterflanges at the connection.

Caution! When mounting the valve with the electric actuator in the horizontal position, it is absolutely necessary to use a support or slings in order to relieve the valve, see example below.

Bolt thread size	Bolt tightening torque		
	Bolt strength class	Flange bolts	Gland bolts
	8.8		
	[Nm]	[mm]	
M10	51		DN50 - DN80
M12	87		DN100 - DN200
M14	135		DN250
M16	210	DN50 - DN125	DN300 - DN1000
M20	410	DN150 - DN350	
M24	710	DN400 - DN500	
M27	1050	DN600 - DN700	
M30	1430	DN800 - DN900	
M33	1940	DN1000	

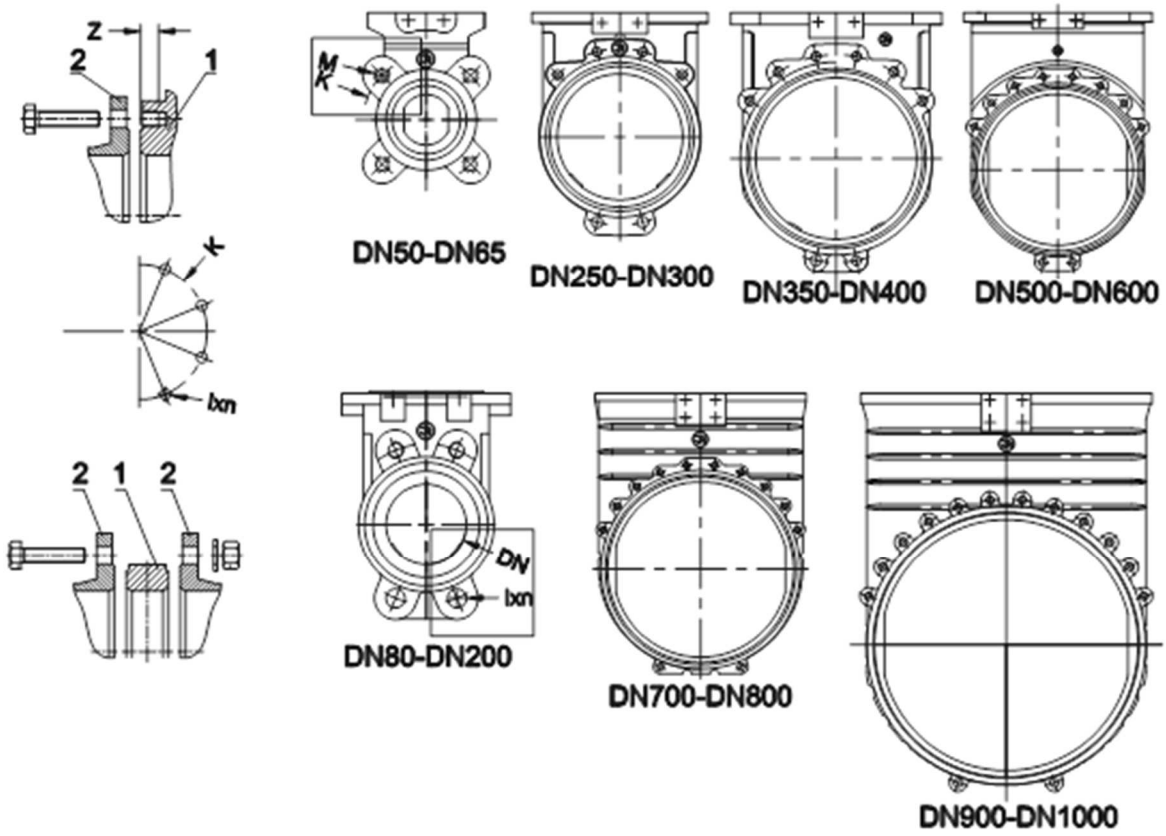
Table 3. Maximum tightening torques of specific bolt types for resealing of the knife gate valve gland.

The installation method is shown in the following figure:



1. - Knife gate; 2. - Pipeline flange end; 3. - Assembly bolt; 4. - Seal; 5. - Nut; 6. - Washer

The upper section of the body is fitted with threaded openings to install the element between flange connections. However, the lower part is fitted with pass-through openings (see the table describing connection screws). Table 4 lists the bolt sizing for flange ends (PN10 bolt hole pattern).



DN [mm]	50	65	80	100	125	150	200	250	300
D [mm]	165	185	200	220	250	285	340	395	445
K [mm]	125	145	160	180	210	240	295	350	400
lxn	4x19	4x19	6x19	6x19	6x19	6x23	6x23	8x23	8x23
Thread-in bolts (l x M x length)	4 M16 x25	4 M16 x25	4 M16 x30	4 M16 x30	4 M16 x40	4 M20 x40	4 M20 x40	8 M20 x40	8 M20x 40
Z [mm]	11	11	12	12	12	13	13	13	15
Bolts with nuts (l x M x length)	4 M16 x90	4 M16 x90	6 M16 x110	6 M16 x110	6 M16 x120	6 M20 x130	6 M20 x140	8 M20 x150	8 M20x 150

DN [mm]	350	400	500	600	700	800	900	1000
D [mm]	505	565	670	780	895	1015	1115	1230
K [mm]	430	515	620	725	840	950	1050	1160
lxn	10x23	10x28	12x28	12x31	14x31	14x34	16x34	16x37
Thread-in bolts (l x M x length)	6 M20x 55	6 M24x 55	16 M24x 55	16 M27x 55	20 M27x 60	20 M30x 60	24 M30x 60	24 M33x 60
Z [mm]	15	20	20	25	40	40	50	55
Bolts with nuts (l x M x length)	10 M20x 150	10 M24x 200	12 M24x 200	12 M27x 250	14 M27x 280	14 M30x 280	16 M30x 300	16 M33x 300

Table 4. Mounting bolt listing for brand-new gate valves

6. OPERATION AND MAINTENANCE

The gate valve shall be operated in accordance with all relevant requirements for stop valves, i.e. kept either in the fully open or fully closed position. Leaving the gate valve partially opened (or closed) may result in seal failure.
The gate valve can be controlled with:

- a handwheel sized according to the Product Specification Sheet and mounted on the gate valve spindle or a pedestal;
- a T-socket wrench, if the spindle neck is in a housing;
- an electric or pneumatic drive drive unit;
- other driving gear, e.g. a handwheel with a chain.

Valve control requires a specific driving torque (see table in Section 2) and a specific number of spindle turns. Do not exceed the maximum driving torque.

To ensure full operational efficiency, carry out a technical inspection and maintenance at least once a year as follows:

- Operate the gate valve from the fully open position to the fully closed position, or vice versa, as the case may be.
- Follow the driving torque limits specified in the table in Section 2.
- If the valve operation is difficult, i.e. the valve reaches the maximum driving torque before either of its limit positions (e.g. due to scale on the spindle threads), repeat the full operation three times.
- Check the tightness of all connections and seals with the gate valve closed.
- If all the actions above have been completed with a good result, visually inspect the corrosion protection. If the paint coat is damaged, rebuild it with the paint kits available from JAFAR.

Reliable operation and long trouble-free service of the valve is ensured by proper maintenance (lubrication) of moving components, i.e. the operating spindle (shank) and of the knife closure wafer. Use the following consumables:

- Lubricate the spindle with a neutral water-repellent grase, e.g. K-Nate or Ł15
- Lubricate the knife closure with a DRY PTFE LUBRICATING SPRAY, e.g. Pulsar or Kontaflon 85

Exceeding the operating limits of the valve may result in damage that will not covered by the statutory warranty granted by the manufacturer.

Note:

Proper care (by frequent relubrication) for the moving and mating parts will considerably reduce the friction and the closing and opening torque.

The specific operating principle of the gate valves requires the seals to remain wet.

7. SAFETY

All installation and operation tasks related to the product shall be only be done by qualified professionals with sufficient training and experience to assess the current situation and identify and avoid hazards. Failure to follow this warning or this Operating Manual may cause death, severe bodily injury or substantial property damage.
Fabryka Armatur Jafar S.A. shall not be liable for any accidents or emergencies related to incorrect installation or operation of the product. Note that the valve installation could be pressurized or contain various type of stray gas or aggressive liquids. If the installation is operated explosion hazard zones, ATEX requirements may apply; this will require suitably trained professionals (according to ATEX requirements). Do not use tools which may generate electrostatic discharge in the ATEX zone.
Do not use the product without thorough knowledge and understanding of this Operating Manual. Follow the general health and safety rules. Keep this Operating Manual throughout the service life of the product to ensure a safe operation of the latter.

8. WARRANTY

The product assembled, installed and operated in compliance with this Operating Manual and the Product Specification Sheet is covered by a commercial warranty from the manufacturer. The warranty terms, conditions and period are specified in the Warranty Certificate available from www.jafar.com.pl.
The manufacturer may provide this product with custom materials and modifications on order. The final selection of the product which meets the optimum criteria for the installation project in question is made by the installation designer, who should consider this Operating Manual along with other data and information of significance for the correct operation of the product.

Failure to comply with the guidelines and instructions in this Operation and Maintenance Manual releases the manufacturer from all obligations, liability and warranty. Due to continuous business development, the manufacturer reserves the right to modify and change the design of the product shown herein.