

## INSTALLATION AND OPERATING MANUAL KNIFE GATE VALVES BIDIRECTIONAL S-GATE

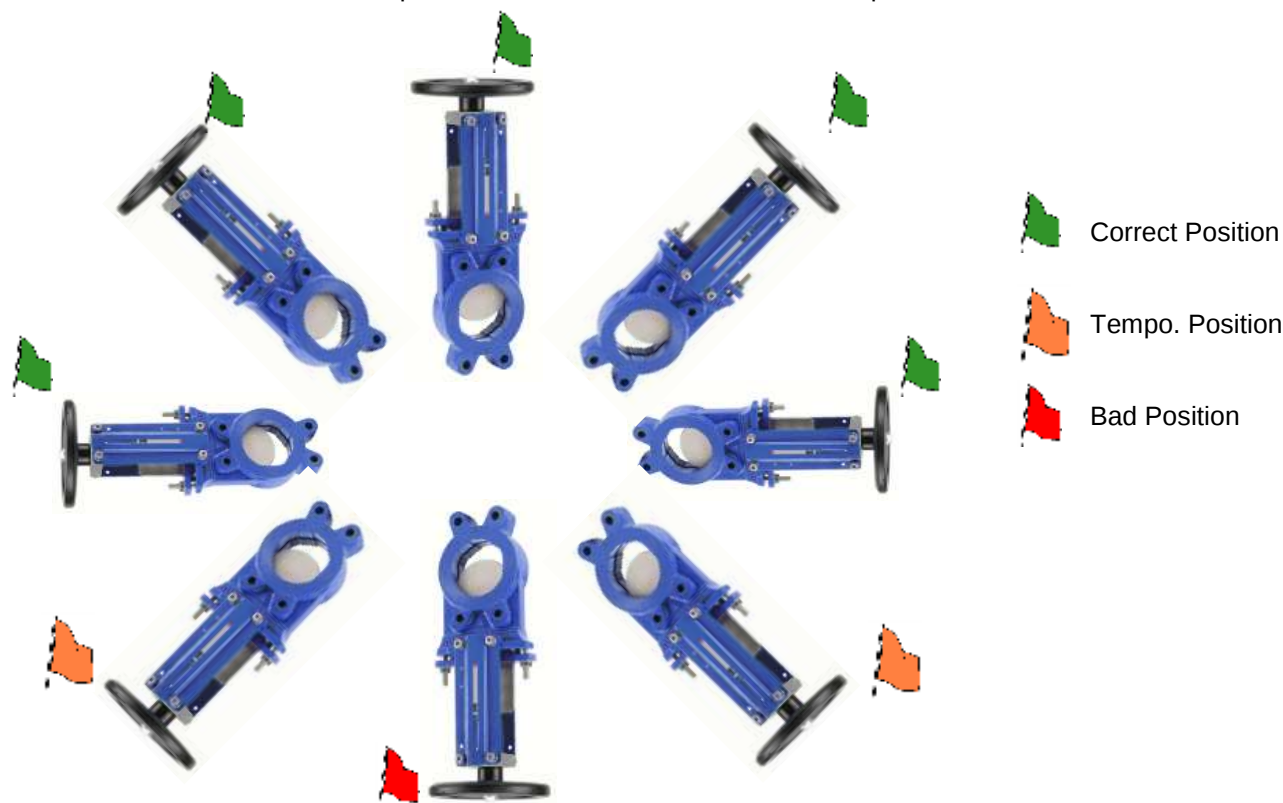
### INSTALLATION INSTRUCTIONS :

#### GENERAL GUIDELINES :

- Ensure that the valves to be used are appropriate for the conditions of the installation (type of fluid, pressure and temperature).
- Be sure to have enough valves to be able to isolate the sections of piping as well as the appropriate equipment for maintenance and repair.
- Ensure that the valves to be installed are of correct strength to be able to support the capacity of their usage.
- **Installation of all circuits should ensure that their function can be automatically tested on a regular basis (at least two times a year).**

#### INSTALLATION INSTRUCTIONS :

- **Before installing the valves, clean and remove any objects from the pipes** (in particular bits of sealing and metal) which could obstruct and block the valves.
- **Ensure that both connecting pipes either side of the valve (upstream and downstream) are aligned** (if they're not, the valves may not work correctly).
- **Make sure that the two sections of the pipe (upstream and downstream) match, the valve unit will not absorb any gaps. Any distortions in the pipes may affect the tightness of the connection, the working of the valve and can even cause a rupture.** To be sure, place the kit in position to ensure the assembling will work.
- **If sections of piping do not have their final support in place, they should be temporarily fixed. This is to avoid unnecessary strain on the valve.**
- During installation operation, do not carry the valves by the handwheel.
- Valves can be installed in all positions but we recommend the above positions :



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### **INSTALLATION INSTRUCTIONS ( SUITE ) :**

- If the valve is installed at the end of the pipe, it must be between 2 flanges.
- The knife gate valves are unidirectional, respect the flow direction indicated on the body by the arrow.  
When using powders, inverse flow direction
- Tighten the bolts in cross. For blind holes, use studs to have a good tightening and tighten them carefully so that they don't touch the gate.
- During cleaning operation, the valves must be opened.
- Tests must be done with cleaned installation and pipe.
- Test must be done with partially opened valve. Test pressure must not exceed valve specification according to ISO 5208.
- Open carefully the valve.
- Tighten the gland packing at the first start of the installation ( with a moderate torque ) so that there's no leakage and the handwheel is easy to operate. Make sure there's no contact between the gate and the gland.
- Keep greased the stem.
- It's recommended to operate the valve ( open and close ) 1 time per month

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### **INSTALLATION :**

- Remove the valve end protection.
- The inside of the valve should be inspected and blown out with compressed air. Adjacent piping must be clean and free from debris to prevent damage to the valve.
- To prevent valve distortion, inefficient operation or early maintenance problems, support piping on each side of the valve.
- Make sure the valve is positioned such that there is sufficient space so that the hand wheel is easily and safely reached and there is enough clearance for the stem when the valve is open.
- Install the valve according to the flow indicator on the valve body. In some special cases, valves could be installed in the opposite direction of the direction arrow on the body.

Valves with unidirectional seat have an arrow on the body indicating the normal flow direction. In certain cases, valves are suggested to be mounted against the normal direction (for powders for example).

To avoid leakage and damage of valves, assure that pipeline flanges are aligned and in parallel with the valve facing surfaces.

Supervise correct distance between pipe flanges.

When using machine bolt for blind holes, well measure body thread profound, flange thickness to be sure that bolt length is limited that bolting will not weaken the blind hole when torqueing.

Refer to Product datasheet for information.

- It is suggested that the valve be kept in the closed position when installing on the pipeline.
- Valves should be installed with the stem in a horizontal position or in a position above the horizontal. Use of valves with the stem position hanging below is not recommended.

Installation of flanged valves should follow prevailing site standards. The following will also be considered.

- The valve ends and the pipe ends/ flanges should be aligned.
- Pipe work in flanged construction should have the correct gasket thickness.
- Flange bolting for end flanged shall be of the correct size, length and the material for the service conditions.
- Assemble all bolts and hand tight. Evenly tighten the bolts. Refer to Annex of bolting torques.

Valves should be installed vertically with actuator on the top.

On vertical pipeline, valves should be installed with horizontally with seat at the lower side.

In general case, valve actuator should be supported for DN>250. The valve on site supporting could be necessary for smaller valves in considering actuator weight and service conditions like vibration or frequent actuating.

When valve is in end line service, a counter flange must be used. The service pressure is limited to half of normal service pressure. Assure also protection against any human intrusion in the downstream zone of the valve. A counter flange should always be used.

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### MAINTENANCE AND REPAIR :

#### Inspection and Maintenance

A periodic maintenance inspection should be recommended at least every 6 months. This periodicity may be shorter depending on the installation environment of the valve, at the evaluation of the installer. It must be shorter also if the fluids conveyed are corrosive or dangerous.

A periodic inspection should include the following:

- Examine the valve stem for cleanliness and lubrication. The stem threads should be coated with a clean grease lubricant.
- Some valves have a grease fitting in the bonnet or yoke. If it is dry, lubricate with a hand grease gun.
- Open and close the valve. The actions should be smooth without any binding of the stem through full travel.
- If valve is in service and under pressure:

a. Examine the body to bonnet connection for leakage through the gasket. If leakage is found tighten the bonnet nuts evenly in a star pattern until the leakage stops. Do not exceed the maximum torque values as specified in the Annexe. If the leakage persists, see "Troubleshooting" section.

b. Check the stem packing for any leakage during the opening and closing action. If a leak is found tighten the gland nuts alternately with no more than a quarter turn on each nut until the leak stops. If the leakage persists, see "Trouble-shooting" section.

c. Inspect the exterior of the valves for cleanliness. Remove any dirt, grime or oil from the valve body and bonnet.

| DN                               | 50-200    | 250-500   | 600-800   |
|----------------------------------|-----------|-----------|-----------|
| <b>Gland torque<br/>Max (Nm)</b> | <b>35</b> | <b>50</b> | <b>70</b> |

### **Trouble-shooting :**

The following table will cover the various problems which are common to valves. The information provided will aid in isolating and correcting these problems.

| PROBLEM                     | POSSIBLE PROBLEM ORIGIN                                                                                   | SOLUTION                                                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Problems in operating valve | a. Stem binding during travel<br>b. Stem packing exerts excessive force on the stem<br>c. Stem is damaged | a. Remove dirt and lubricate stem with grease<br>b. Check torque on gland nuts.<br>c. Examine stem through full open and close action. Repair or replace as required |
| Gland Leakage               | d. Gland nuts are loose<br>e. Gasket is damaged                                                           | d. Tighten to values as specified.<br>e. Disassemble and install a new gasket.                                                                                       |
| Seat Leakage                | f. Valve not properly seated<br>g. Internal components damaged or worn                                    | f. Check to see if valve is tightly closed<br>g. Inspect internal components and repair as required (for detailed repair consult IVALTEC)                            |

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### **Packing Replacement.**

To prevent injury, ensure that all pressure is removed from the valve both upstream and downstream before disassembly.

Valves do not contain any dangerous materials. Used packing and seat materials should be collected for treatment or recycling facility in compliance with local regulations.

- a. Check original tightness of valve operation. Remove gland nuts. Lift the gland up the stem clear of the packing chamber.
- b. Remove the existing or defective packing rings with a sharp tool or packing remover. Do not scratch or score the machined surfaces of the stem or packing chamber.
- c. Install new packing with joints at opposite position one to another. Install rings individually using a split ring spacer, compressing each ring by hand tightening +1/4 turns on each gland nut.
- d. When packing chamber becomes filled with packing, reassemble gland and gland flange. Alternately tighten gland flange nuts 1/4 turn at a time until valve packing tightness.
- e. Compare valve operation to original tightness. If valve operation is considerably tighter than original operating tightness, back off 1/4 turn on each gland nut and recheck tightness.
- f. Several hours after a repacked valve has been returned to service, inspect the packing area to ensure full compression, tight bolting and no leakage. Should leakage occur, tighten gland nuts at 1/4 turn increments until leakage stops.

### **Seat Replacement.**

- a. Loose packing gland and open the valve totally.
- b. Unscrew the connection between the support plates and valve body.
- c. Put valve horizontally with seat up. Draw slightly the gate so that the gate edge is no more opposing the seat retainer (Part 6).
- d. Chase the seat retainer away by using a pin hunt and a hammer. Move slightly the retainer all around until it goes out without being damaged.
- e. Now turn the valve with seat downside. Take away the old seat. Deform the new seat in heart form and put it into the body.
- f. Put the seat retainer evenly into the seat by taping the retainer edge all around. Note that when taping, you need to hold the other side of the retainer to prevent it getting out.

### **VALVE OPERATION**

By turning the hand wheel counter-clockwise, the stem, to which the gate is attached at the base, is drawn up through the yoke sleeve. By turning the hand wheel clockwise, the action is reversed and the gate is lowered into the closed position.

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### **Disassembly and Reassembly Instructions**

#### **Disassembly**

- a. Assured there is no more pressure in the line.
- b. Take away by unscrewing the lateral security protection in case of automatic valve.
- c. Unscrew supporting plates from actuator and valve body,
- d. Unscrew the connection between the stem and gate,
- e. Dissociate the actuator (handwheel, gear, cylinder, electric motor) from the valve part.
- f. remove the gland nuts. Take away the packing material.
- g. Lift the gate out of the body.
- h. Tape the seat retainer lightly and evenly on its interior periphery with brass bar (or other soft metal) and a hammer until the retainer gets out of the body.
- i. Take away the seat.

#### **Reassembly**

- a. Thoroughly clean the valve interior and all components. Remove all scale, oil, grease, or other foreign material. Wipe the seating surface of the gate and valve seat with a solvent soaked cloth. Clean the body and bonnet flange surfaces and all bolting.
- b. Install seat and its retainer
- c. Install the gate in the body paying attention to gate side in case of unidirectional valve.
- d. Install packing material in the body, then the packing gland.
- e. Fix actuator kit on the gate and the supporting plates.
- f. Check good valve functioning by opening/closing valve.
- g. Install the lateral security protection in case of automatic valve.

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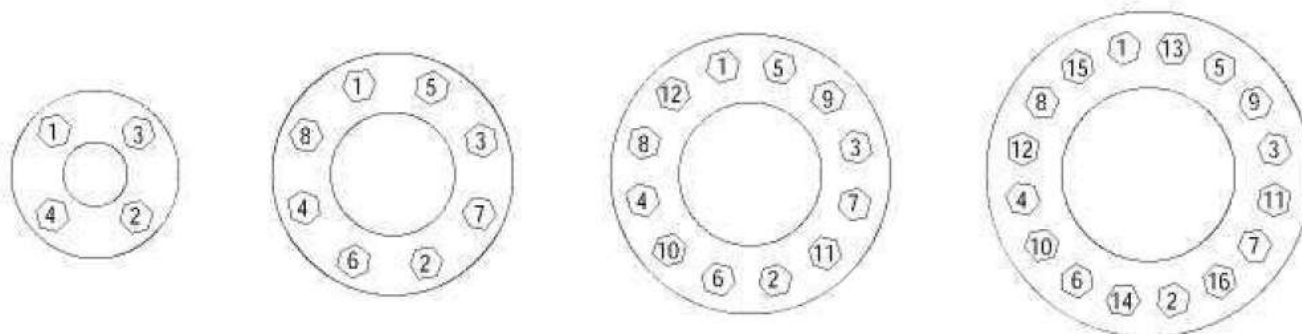
### Flange Installing

#### Gasket

Choose plane gasket material in function of flange type and service conditions

#### Torque Procedure

- Clean studs and nut, assuring the removal of all foreign materials, rust, burrs and previous lubricants.
- Lubricate threads of stud, nut, flange holes and friction contact surfaces.
- All the bolts shall be torqued in a star pattern to ensure uniform gasket loading, as shown in the drawing below.

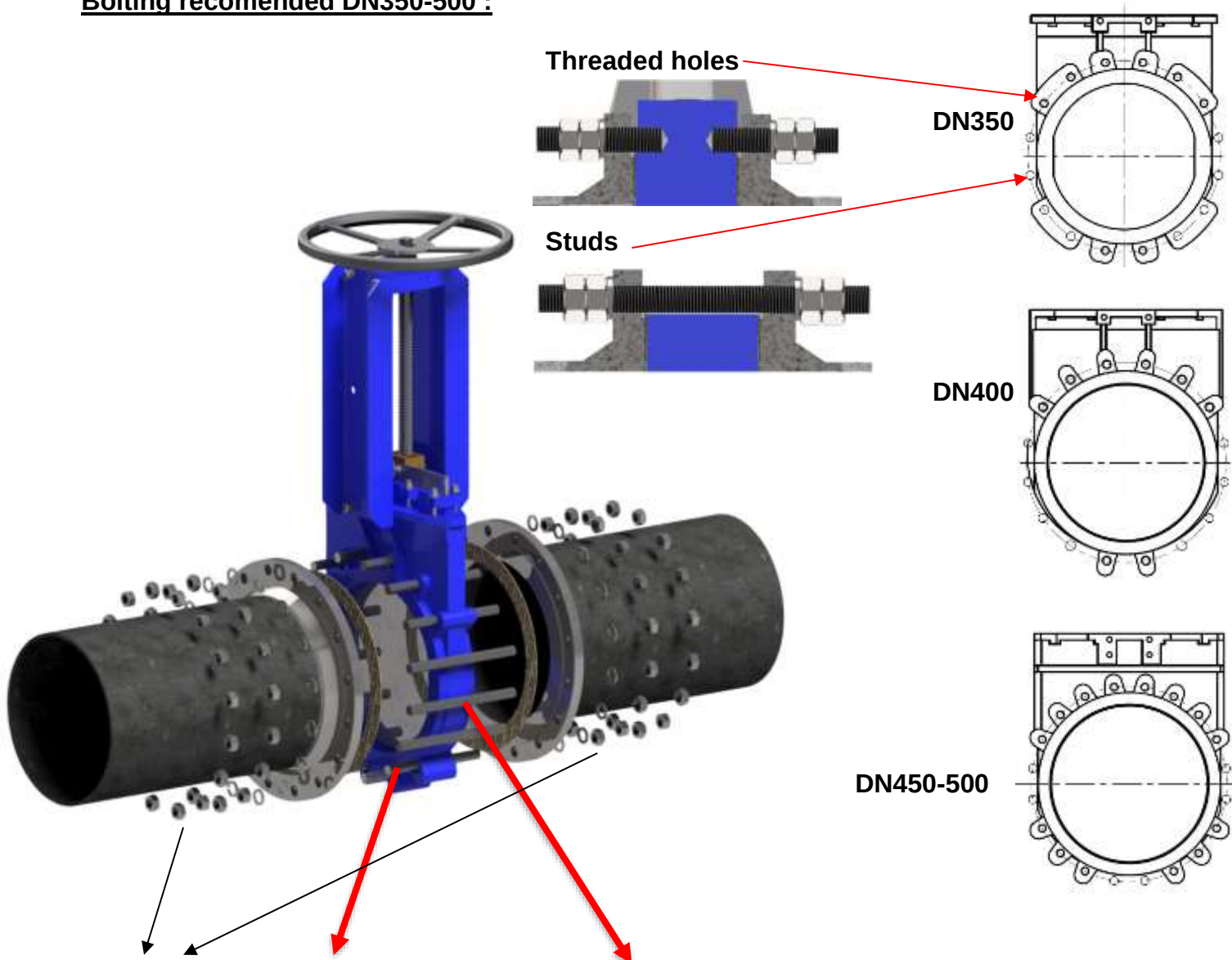


### FLANGE BOLTING TIGHTENING TORQUES

| DN   | Bolting PN10 | Max torque (Nm) |
|------|--------------|-----------------|
| 50   | M16          | 50              |
| 65   |              |                 |
| 80   |              |                 |
| 100  |              |                 |
| 125  |              |                 |
| 150  | M20          | 70              |
| 200  |              | 110             |
| 250  |              |                 |
| 300  |              |                 |
| 350  |              |                 |
| 400  | M24          | 140             |
| 450  |              | 190             |
| 500  |              |                 |
| 600  | M27          | 230             |
| 700  |              |                 |
| 800  | M30          | 280             |
| 900  |              |                 |
| 1000 | M33          | 340             |

## INSTALLATION AND OPERATING MANUAL KNIFE GATE VALVES BIDIRECTIONAL S-GATE

**Bolting recommended DN350-500 :**



| DN  | Number of nuts | Studs for threaded holes | Number of studs | Threaded rod         | Number of studs |
|-----|----------------|--------------------------|-----------------|----------------------|-----------------|
| 350 | 64xM20         | DIN 6379 M20x125         | 24              | Threaded rod M20x250 | 4               |
| 400 | 64xM24         | DIN 6379 M24x125         | 16              | Threaded rod M24x300 | 8               |
| 450 | 80xM24         | DIN 6379 M24x125         | 28              | Threaded rod M24x300 | 6               |
| 500 |                | DIN 6379 M24x125         | 28              | Threaded rod M24x300 | 6               |

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**Installation example :**



## INSTALLATION AND OPERATING MANUAL KNIFE GATE VALVES BIDIRECTIONAL S-GATE

### Packing Change :

- Open totally the valve



Take away one of the supporting plate.

- Note: for easier access, you can take away 2 supporting plates. In that case, you must support the cylinder so that the latter will not move during the changing operation..



- Unscrew all gland nuts



## INSTALLATION AND OPERATING MANUAL KNIFE GATE VALVES BIDIRECTIONAL S-GATE

- Packing nut unscrewed :



- Push the gland to the cylinder side



- Packing are linear type joined together. With a plane screwdriver, get the packing out of the body. There are 2 PTFE square gaskets and 1 O ring.  
Note : Joining sides are crossed.



- Re-assembly : take the reverse steps of dismantling procedure
- Note :
  - You could cut the supplied packing if they are too long.
  - Before tightening totally the support screw, make an open/close movement. **CAUTION: Avoiding being hurt by moving gate!**
  - Gland nuts should be tightened evenly until no leakage under service pressure.

