

The following operation instructions are valid for the Gate valves (soft sealing).

FLAT BODY- and OVAL BODY

Fig. 014S PN 16 / from DN 200 PN 10 / Fig. 024S PN 16 / from DN 200 PN 10

Fig. 017S PN 16 / from DN 200 PN 16 / Fig. 027S PN 16 / from DN 200 PN 16

INSTRUCTIONS FOR SAFE HANDLING

Product: **GATE VALVE TYPE**

Maximum working – operating pressure:

- PN 10 = 10 bar
- PN 16 = 16 bar

Maximum working temperature of the medium: 60 °C

Maximum needed torque values for sealing of the valve by closing (MOT) according to EN 1074-2:

| | | |
|-----------------|-----------------|-----------------|
| DN 50 = 50 Nm | DN 150 = 150 Nm | DN 400 = 400 Nm |
| DN 65 = 65 Nm | DN 200 = 200 Nm | DN 500 = 500 Nm |
| DN 80 = 80 Nm | DN 250 = 250 Nm | DN 600 = 600 Nm |
| DN 100 = 100 Nm | DN 300 = 300 Nm | |
| DN 125 = 125 Nm | DN 350 = 350 Nm | |

Min. strength torque (MST) according to EN 1171 category 3:

| | | |
|-----------------|-----------------|------------------|
| DN 50 = 180 Nm | DN 125 = 375 Nm | DN 300 = 900 Nm |
| DN 65 = 225 Nm | DN 150 = 450 Nm | DN 350 = 975 Nm |
| DN 80 = 225 Nm | DN 200 = 600 Nm | DN 400 = 1050 Nm |
| DN 100 = 300 Nm | DN 250 = 750 Nm | DN 500 = 1575 Nm |

INTRODUCTION

The gate valves are designed for fully open or fully closed service installed in pipelines as isolating valves, and should not be used as control or regulating valves. The valves can be used for installation in potable water, wastewater, or neutral liquids depending on the specified application stated in the datasheet. Working conditions must be limited by temperature and pressure as stated, normally between -20 and +60 °C, maximum 5 m/s flow velocity and up to 16 bar differential pressure.

IMP gate valves may not be installed and used as anchor points, and should at all times be kept free from stress arising from the pipeline or installation. The gate valve is designed with a cast body and bonnet assembled with screws of stainless steel. It is operated with a stem of stainless steel and a wedge of ductile iron fully vulcanized with rubber. Materials and coating vary according to the application of the valve. Full material specifications are found in the datasheets. All valves are pressure tested according to EN 12266.

Operation of the gate valve is performed doing an either clockwise to close (CTC) rotating motion of the stem. When operating the valve stem the wedge moves up or downwards on the threaded part of the stem. The gate valves are designed to be self-cleaning due to the full and straight bore.



To get the full benefit of this recommends installing the valve in upright position or in a 45-degree angle. Upside down installation is not recommended. Specific operation conditions may apply for valves equipped with an ISO flange for mounting gearbox or actuator, please refer to the actuator manufacturer's instructions.

As the gate valve is designed for installation directly in the ground, it is designed to be maintenance-free throughout the expected lifetime of the valve. Thus spare parts are not needed and repair of the valve in case of malfunction is not intended. To maintain full functionality of the valve throughout the expected lifetime frequent operation of the valve is recommended. Depending on the media flowing through the valve, the frequency of operation may vary from once a year to several times per month.

HEALTH AND SAFETY PRECAUTIONS

Whenever the gate valves are installed or operated the inherent dangers of pressurized liquid and gas must be addressed. Never attempt to dismantle the valves when the system is under pressure. Gate valves are heavy, especially in large dimensions, so always use appropriate lifting devices to avoid injuries. It is essential that staff undertaking these operations is adequately trained to avoid accidents. This installation and maintenance instruction will not replace adequate training and correct craftsmanship of qualified staff and the producer will not be held responsible for any accidents arising from incorrect installation.

Likewise before, during and after installation the applicable standards, codes and regulations for installation and for the prevention of accidents must be observed.

STORAGE

The gate valves should be stored in a location that protects the valve from any pollution or contamination. The valves must be stored in upright position and in an almost closed position to prevent long-term compression of the wedge rubber. The valve must be kept out of sunlight to prevent oxidation of the rubber and coating. Valves stored in cold storage must be protected against freezing. Therefore, the "first in, first out" principle is recommended.

INSTALLATION

The gate valves must be protected from damage during transportation, loading and handling. Lifting by means of a crane or any other lifting device should only be done using the flange holes, lifting eyes or appropriate straps. Never suspend the valve in a hand wheel, gearbox or actuator.

Before installation a visual check must be performed. Special attention should be paid to checking the stem, valve seat area, flanges and coating. Check for defects, bend or out of place parts, dents, scratches and other damages. Actions should be taken to repair or replace the valves if any defects are detected.

Gate valves with flanges must be installed using suitable gaskets, screws, washers and nuts. Maiden flanges must be designed to adapt standard flange drillings appropriate to the specific flange drilling on the valve. Correct installation of the valve is the condition for its correct operation.



The valve is flanged and it is installed between two flanges, installation according to EN 558-1, series 14 or 15, screw connection and flange gaskets according to DIN 2501, EN 1092-2 (depends upon DN and PN). For installation of the short version attention should be paid to choosing the correct length of screws, because otherwise they can damage the body of the valve. The valve is made symmetrically, therefore the position of installation with regard to direction of the medium flow is not important.

Before installation the flow has to be stopped or the pipeline has to be empty, and if the temperature of the pipeline is increased, it has to be cooled to the room temperature.

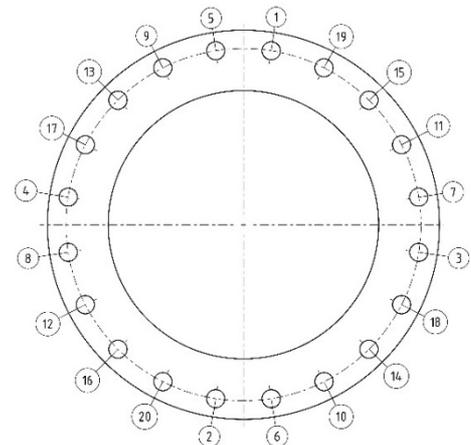
Screws must be tightening in a criss-cross pattern and screw torques must be applied according to the flange gasket manufacturer’s recommendations. Actions should be taken to ensure that the valve flanges are aligned to ensure an even pressure on the gasket surface. See table 1 for screw sizes.

During installation in the pipeline system care must be taken to ensure that the connecting flanges of the pipeline getting in contact with the gate valve are arranged parallel to each other and are exactly aligned to avoid any tension loads acting upon the valve body. For the same reason, and to achieve a regular mounting of the flange sealings, it is also necessary to tighten the connecting screws regularly in a cross pattern (see figure 1). The screw tightening torques are to be informed by the gasket supplier.

Table 1

| Screw sizes | | | | | | |
|-------------|------------------------|-------|----------|-------|--------------|---------|
| DN | Working pressure (bar) | | Quantity | | Screw lenght | |
| mm | PN 10 | PN 16 | PN 10 | PN 16 | PN10 | PN 16 |
| 40 | M16 | M16 | 4 | 4 | M16X65 | |
| 50 | M16 | M16 | 4 | 4 | | |
| 65 | M16 | M16 | 4 | 4 | | |
| 80 | M16 | M16 | 8 | 8 | | |
| 100 | M16 | M16 | 8 | 8 | | |
| 125 | M16 | M16 | 8 | 8 | | |
| 150 | M20 | M20 | 8 | 8 | M20X70 | M20X70 |
| 200 | M20 | M20 | 8 | 12 | M20X70 | M20X70 |
| 250 | M20 | M24 | 12 | 12 | M20X70 | M24X75 |
| 300 | M20 | M24 | 12 | 12 | M20X75 | M24X85 |
| 350 | M20 | M24 | 16 | 16 | M20X85 | M24X90 |
| 400 | M24 | M27 | 16 | 16 | M24X90 | M27X95 |
| 500 | M24 | M30 | 20 | 20 | M24X100 | M30X105 |
| 600 | M27 | M33 | 20 | 20 | M27X110 | M33X115 |

Figure 1



OPERATION

Gate valves are typically operated with an extension spindle in below ground installations. In manholes or in above ground installations hand wheels or electric actuators may be used. Ensure proper sizing of the hand wheel and/or operating keys, extension spindles and actuators. Please



refer to IMP datasheets for further information. When installing gate valves mounted with electric actuators, please observe closing torques and number of turns from the datasheet. When the valve is installed in a chamber with an extension spindle going to above ground level, ensure that no vertical force from the extension spindle presses down directly on the valve stem top. The extension spindle must be supported by wall mounts or similar to prevent vertical forces and thereby supporting the weight of the extension spindle.

PRESSURE TESTING

After installation, perform a pressure test before the trench is closed. Secure the pipe and gate valve against movement. If the pipeline and gate valve are tested with water, ensure that the pipeline and gate valve are drained in order to prevent frost damage. IMP gate valves are designed to resist a test pressure of $1,5 \times PN$.

MAINTENANCE AND REPAIRS

The gate valve is of simple construction and does not need any special maintenance.

In case of leakage on spindle "O" rings should be replaced. The procedure of the "O" rings replacement is following:

DN 50 – DN 200:



- Empty the pipeline ($p=0$ bar) and in case of increased temperature of the medium wait until the system cools down.
- Operate the gate valve until it is open 100%.
- Remove the drive (hand wheel, extension spindle ...).
- Remove the cap (12).
- Unscrew the cover nut (6).
- Rotate the spindle (4) clockwise for maximum 10 turns and pull it out so much that "O" rings can be replaced.
- Replace "O" rings (9) and (11).
- Replace the nut gasket (10).
- Insert the spindle (4) back into cover (2). Pay attention to the limiter (8).
- Screw the cover nut (6). The cover nut (6) must be secured against unscrewing with thread locker such as "Loctite".
- Mount the cap (12) back again.
- Mount the drive onto the spindle (4) and check the operating function (open - closed position) with rotation.
- Fill the system with medium and check tightness.

DN 250 – DN 600:



- Empty the pipeline ($p=0$ bar) and in case of increased temperature of the medium wait until the system cools down.
- Operate the gate valve until it is open 100%.
- Remove the drive (hand wheel, extension spindle ...).
- Remove the caps or wax (16) from screws.
- Unscrew all screws (17) and remove spindle bonnet (15).



- Replace "O" ring (11) on the spindle (4).
- Replace the nut gasket (10).
- Mount the spindle bonnet (15) back again.
- Fix the spindle bonnet (15) onto the cover (2) with screws (17) using the right torque (Screws M10 T=45 Nm, M12 T=75 Nm und M16 T=110 Nm) and put protective caps or wax (16) on them.
- Mount the drive onto the spindle (4) and check the operating function (open - closed position) with rotation.
- Fill the system with medium and check tightness.

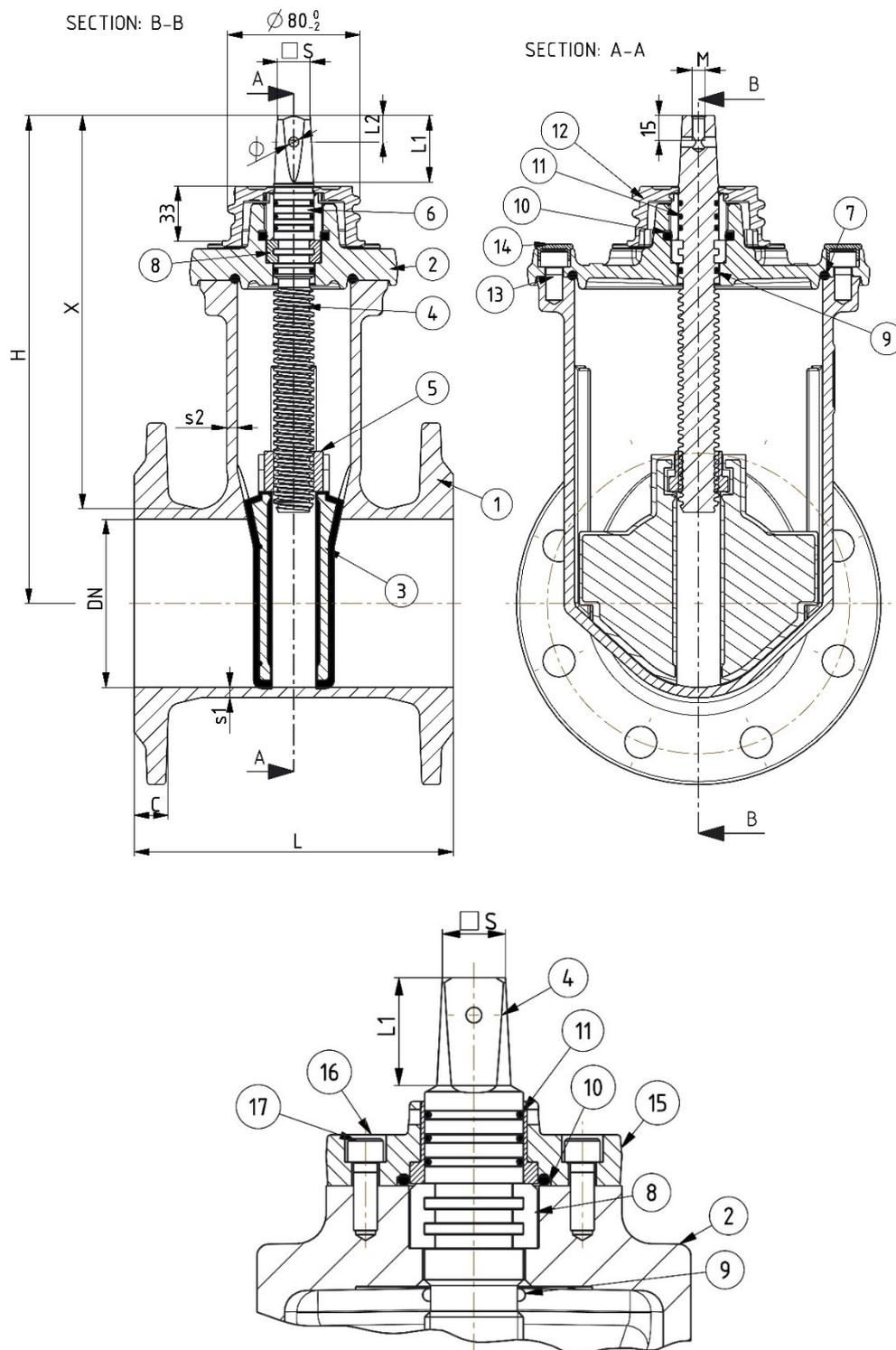
In case of non-sealing or damage of closing element (the wedge), the wedge should be replaced. The procedure of the wedge replacement is following:



- Empty the pipeline (p=0 bar) and in case of increased temperature of the medium wait until the system cools down.
- Remove the drive (hand wheel, extension spindle ...).
- Remove the protective caps (16) or wax from screws.
- Unscrew all screws (13) on cover.
- Take the cover (2) together with wedge (3) and spindle (4) out from the body (1).
- Remove the wedge (3) from spindle nut (5).
- Take the new wedge (3) and insert the spindle nut (5).
- Replace the gasket (7) on cover (2).
- Insert the cover (2) completed with gasket (7), spindle (4) and wedge (3) into the body. Press the cover (2) onto the body T-flange and pay attention to the right position of the gasket (7) in order to prevent leakage.
- Fix the cover (2) onto the body (1) with screws (13) using the right torque (Screws M10 T=45 Nm, M12 T=75 Nm und M16 T=110 Nm) and put protective caps or wax (16) on them.
- Mount the drive onto the spindle (4) and check the operating function of gate valve (open - closed position) with rotation.
- Fill the system with medium and check tightness.

| POS. | DESCRIPTION | POS. | DESCRIPTION |
|------|-------------|------|----------------|
| 1 | Body | 10 | Nut Gasket |
| 2 | Cover | 11 | "O" Ring |
| 3 | Wedge | 12 | Cap |
| 4 | Spindle | 13 | Screw |
| 5 | Spindle Nut | 14 | Cap or wax |
| 6 | Cover Nut | 15 | Spindle Bonnet |
| 7 | Gasket | 16 | Cap or wax |
| 8 | Limiter | 17 | Screw |
| 9 | "O" Ring | | |

When ordering spare parts following has to be indicated: dimension (DN) of the gate valve and position of assembly part with description.



Upper part of cover for gate valve DN 250 mm up to DN 600 mm

The Producer reserves the right to change the instructions for safe handling.