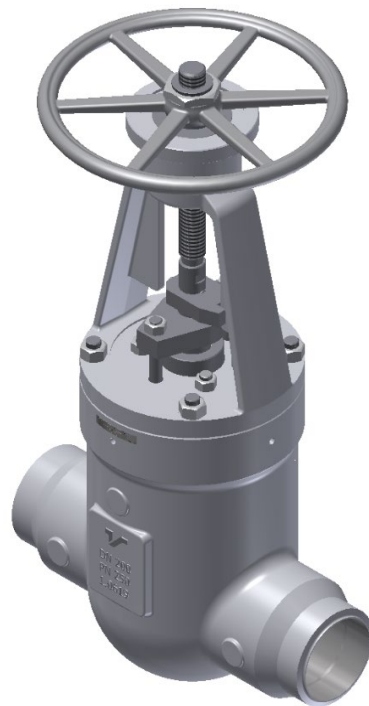




IOM - Instructions for installation,  
operation and maintenance of:

## **High Pressure Gate Valves [GHP]**



**“TERMOVENT” SC  
Temerin**

**Republic of Serbia**

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## 1. General safety information's

- Instructions for installation, start-up and maintenance during the period of exploitation of valves manufactured in the "TERMOVENT" SC should be used as a manual intended for all personnel directly or indirectly involved in dealing with the aforementioned goods.
- These instructions are only related to High Pressure Gate Valves.
- Operators in charge of installation, operation and maintenance of gate valves during the period of use, should be fully trained for the correct / optimal performance of these tasks. If gate valves are equipped with mechanical actuators, the operator should be trained for the adequate operation of such valves.
- Information about temperatures and allowable working pressures shown in our technical data sheets are according to ASME B16.34, Table 2 and EN 12516. Under no circumstances should the valves be operated at conditions outside these tables.
- Before the service or reinstallation of the gate valves, the plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).
- Because valves in working conditions have hot parts (handwheel, body and bonnet) and may cause burns, the operator has an obligation to undertake all necessary precautions to avoid such by using protective facilities.
- These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken.

## 2. Product description

- The main purpose of the gate valves is to isolate fluid flow through pipeline.
- If anything is unclear at the time of installation, start-up or during use, and not covered in these instructions, the departments of the "TERMOVENT" SC should be contacted directly in order to obtain the required support.

All gate valves manufactured in "TERMOVENT" SC are marked with following marks:

- Identification of manufacturer ("TERMOVENT" SC logo);
- Nominal diameter of valve DN (mm) or NPS (inch);
- Nominal pressure (PN) or Class rating (#);
- Material designation of body and bonnet;
- Body and bonnet melt identification/heat number;
- Trim identification- material grade for stem, wedge and seats;
- Unique serial number
- Arrow mark for allowable direction of flow;
- Date of manufacture (month and year)
- Maximum allowable pressure at maximal temperature (EN 12561 or ANSI B16.34)
- The product standard designation: i.e. ANSI B16.34;
- Valve ends flanges grooved with ring joints corresponding ring number;
- CE marking (if it is manufactured in accordance with 2014/68/EU (PED 97/23/EC)) or API marking (if it is manufactured in accordance with API Specification);
- Other marks in accordance with customer request or product standard.

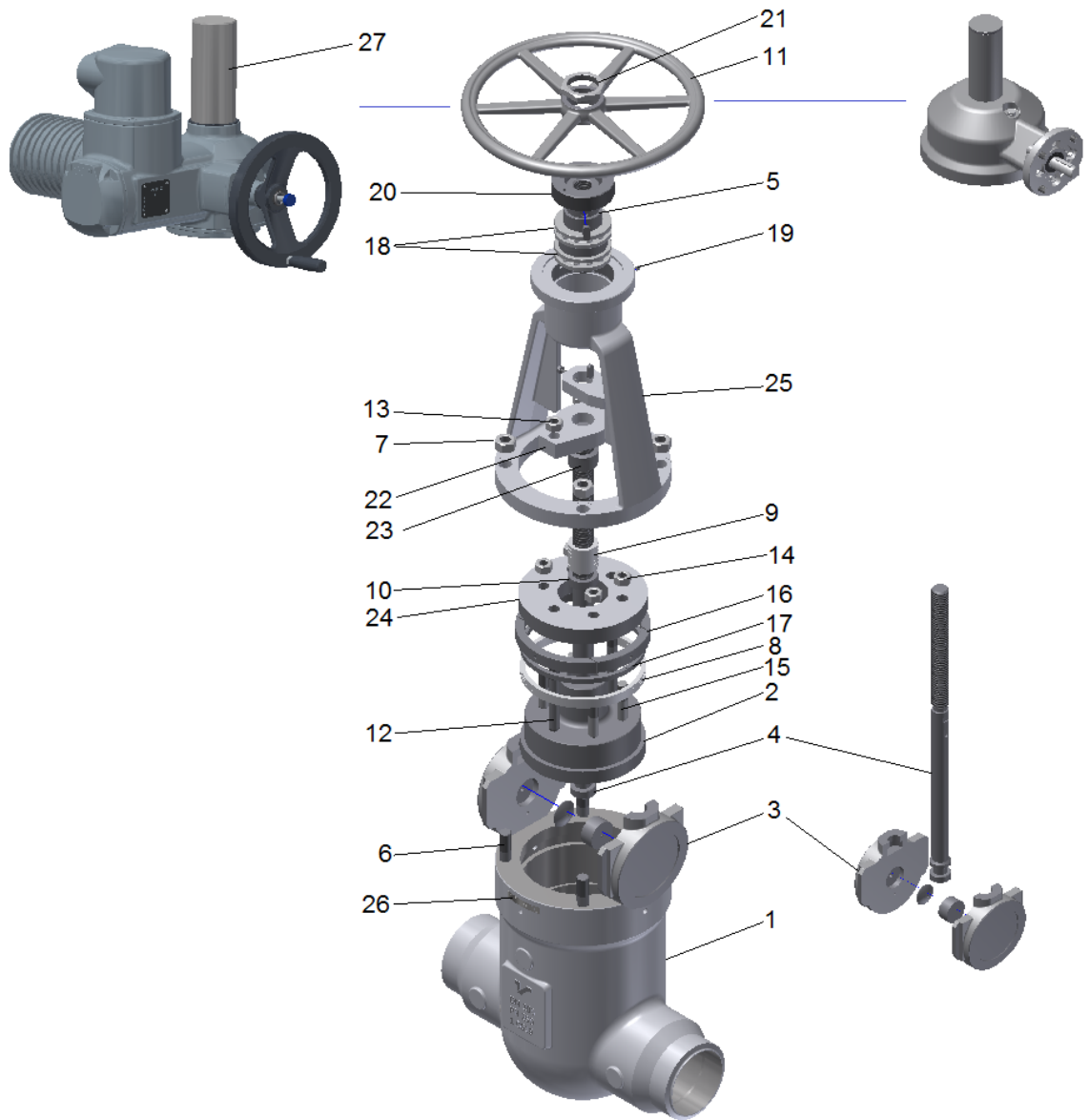


Figure 1. Parts

Table 1.

Pos.	Part Name	Quantity	Spare Parts	Pos.	Part Name	Quantity	Spare Parts
1	Body	1		15	Bonnet Bolts	*	
2	Bonnet	1		16	Segment Ring	1	
3	Wedge	1		17	Bonnet Metal Ring	1	
4	Stem	1		18	Bearings	2	
5	Stem Nut	1		19	Steam Nut Grease Injector	1	
6	Nuts	4		20	Cover Bearing	1	
7	Stud Bolts	4		21	Handwheel Nut	1	
8	Bonnet Packing	1 set	Yes	22	Gland Flange	1	
9	Stem Packing	1 set	Yes	23	Packing Gland	1	
10	Metal Ring	1		24	Bonnet Retainer	1	
11	Handwheel/Gear/Actuator	1		25	Yoke	1	
12	Gland Bolts	2		26	Nameplate	1	
13	Gland Nuts	2		27	Protective tube	1	
14	Bonnet Nuts	*					

\* Quantity depend from DN (NPS) and PN (Class)

### 3. Storage and handling

#### General information

Gate valves are delivered in their wedge in closed position with protective covers on their ends. During storage period protective covers shall not be removed.

#### 3.1 Recommended storage facilities

- The valves have to be stored in closed, clean, dry and ventilated storage facilities.
- Storage conditions shall be: ambient temperature in the range +10°C to +35°C and the humidity up to 85%
- Store the valves in their original shipped packing.
- Gate valves should be taken out of crates or removed from the covering of a pallet just before installation.

#### 3.2 Storage inspection

- Periodical inspection should be performed on all stored valves. At the minimum, all valves should be inspected every 3-4 months for dirt, moisture or any other type of contamination. If any is found the valves is to be thoroughly cleaned and dried.
- Slight external rusting may occur on valves. This will have no effect on their performance.
- If valves are stored for more than 6 months we recommended following:
  - Valves be cycled open to close 2-3 times every 6 months to keep packing from adhering to the stem and help lubricate the stem and stem nut.
  - Preservation of inner surfaces, inner parts, stem, flange facing, butt welding ends and threads shall be repeated every 6 months with appropriate corrosion preventive coating

#### 3.3. Handling requirements

- For valve handling and/or lifting the lifting equipment must be sized and selected while taking into account the valve weight indicated at packing list. Lifting and handling must be made only by qualified personnel. Do not use the lifting points located on the actuator. Caution must be taken during the handling to avoid that this equipment passes over the workers. For valve handling or lifting the lifting equipment must be sized and selected while taking or over any other place where a possible fall could cause damage.

#### **WARNING !!!**

- You must not lift the valves using the connection flange holes or the handwheel – you should use lifting straps;
- You must not remove the protection covers from the valve connection ends;
- Store the valves in the 'closed' position.

### 4. Installation and start-up

- Gate valves are delivered with their wedge in the closed position and they are ready for use. After the removal of the protection covers it is necessary to thoroughly clean inside the valve with compressed air without first opening the valve.
- Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.

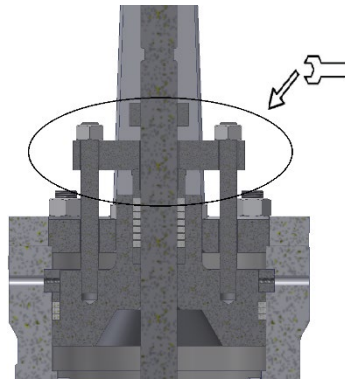
- Closure of valve is performed by turning the handwheel in a clockwise direction. On the handwheel is an arrow and the letter “C” indicating the closing direction, and another arrow and the letter “O” indicating the opening direction.
- When installing valves with flanged ends it is necessary to take into consideration the selection of adequate bolt material and the appropriate type of gasket depending on the type of working fluid, pressure, temperature, and the type of flange facing. It is necessary to install gaskets strictly in accordance with instructions given from the manufacturer of the gaskets.
- Gate valves with flanged ends shall be installed in slightly open to fully open position.
- Gate valves with welding ends should be welded onto the pipeline in the closed position by an expert and with appropriate WPS. After welding, if necessary, local normalization should be performed and the inside of the pipeline should be cleaned to remove possible welding remains.
- At the moment of installation the influence of the load of the pipeline on valve should be reduced. The same also applies for temperature oscillation, hydraulic impact and similar. The valve should not be used as a support for a pipeline.
- When installing the gate valve equipped with overpressure safety device (Figure No. 4) you must take into account the permitted flow direction. Allowed flow direction is defined by the arrow located on the gate valve body.
- Manually operated gate valves should be relieved of maximum seating force when left in the closed position. By relieving this force, it may help prevent damage caused by excessive thermal stem expansion. Care should be taken however to ensure that the valve is not opened, only that the torque/thrust has been removed from the stem.
- **We recommend installation of gate valves with stem in vertical position. Gate valves could be installed with stem in horizontal position but for vertical pipelines. We do not recommend installation of gate valves over DN 150 ( 6”) with horizontal stem on the horizontal pipelines.**
- It is possible after the installation, start-up and operating parameters are set to detect a leakage on the stem packing. In this case it is necessary to tighten the gland nuts equally. The tightness should not exceed more than necessary to allow comfortable manipulation of the high pressure gate (opening / closing). If it is necessary, new stem packing rings of the same quality should be added to the packing.

## WARNING !!!

- **We recommend installation of gate valves with stem in vertical position. Gate valves could be installed with stem in horizontal position but for vertical pipelines. We do not recommend installation of gate valves over DN 150 ( 6“ ) with horizontal stem on the horizontal pipelines.**
- Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- Each product after assembling is hydraulically tested the result of which is “wetting” of the sealing package. As a result, may be difficult manipulation with handwheel before installation. This does not effect on the functionality of product and this phenomenon will be eliminated after installation gate valve on the pipeline;
- You must not lift the valves using the connection flange holes or the handwheel at the moment of the installation on the pipeline – you should use lifting straps to secure the valves to the lifting equipment;
- Before installation the impurities should be removed from the pipeline or from the appliance;
- Remove protecting covers from the valve ends, degrease and clean the inside of the valve, and in case of a flanged connection, carefully clean the sealing surfaces;
- Make sure that the mark on the gate valve match the projected parameters of the plant (nominal diameter, pressure class, material, etc.).
- Confirm that the velocity of the fluid at the place of the installation is in range of the recommended velocity.
- During the installation check if there is enough space for normal and safe manipulation.
- At the moment of testing of a pipeline or an installed appliance valve; take care about the predicted maximal differential pressure.
- **Installation of valves with overpressure safety device must be according allowed flow direction.**
- **The valve should not be used as a support for a pipeline.**

## 5. Usage and maintenance

- It is convention during usage of the gate valves that all minor defects, if operating conditions allow, should be repaired on the spot. If not, the gate valve should be dismantled from the site in order to perform a full repair. If the gate valve is severely damaged it should be replaced with a new one. Such repairs protect gate valves against further deterioration, being permanently out of work and being the cause of severe accidents in the plant.
- The gate stem packing should be the subject of particular attention as it is important for the qualitative maintenance of tightness and shall be checked every 3 months. If leakage at the stem packing is detected, the gland nuts should be tightened slowly (Fig. 2). When gland nuts are tightened, if the gland falls down more than twice the packing ring height, new packing rings should be added to the stem packing.



• Fig. 2 Stem packing gland tightening

- After a longer period of use, the high pressure gate valve stem packing becomes rigid and unusable so a replacement should be done. When the replacement of stem packing is performed, remains of the old packing should be removed carefully and the sealing chamber should be thoroughly cleaned before the new packing is installed. The packing rings of the new stem packing should be identical in quality as before, especially for valves with high working parameters. Individual packing rings should be used for stem packing (Fig. 3) and arranged in a manner that the connection of one ring is at angle of 90° to the connection of next one.



Fig. 3 Stem packing ring

- In case of leakage through gaskets between gate valve connection flanges or between the bonnet and body, it is necessary to make replacements of the gaskets as soon as possible to prevent damage of the sealing surfaces due to erosion.
- Lubrication of thread between stem/stem nut is highly important. To lubricate the bearings on manual and gearbox operated valves, we suggest to use the grease of quality level, as shown in the following Table 2. Lubrication shall be performed every month, or twice a year, if they are rarely used. Valves used in high temperature applications, use appropriate lubricants to support the temperature range. Lubrication is performing with nipples on the yoke.
- It is recommended to replace the grease in bushes during every general overhaul or during the pipeline revision. The type of grease depends on the temperature in the plant. Remote controls, bushings and gearboxes should be lubricated depending on how frequently they are used, every 3 months. For the lubrication of the actuator (Pos. 11) it is necessary to remove the protective tube (Pos. 27), then grease the stem (Pos. 4) and return the protective tube (Pos. 27). Some of the lubricants we use for lubrication are in the table. 2

Table 2.

Manufacturer	Quality level
AGIP	ISO 6743-9:L-X CCHA 2/ DIN 51 502:K 2K-30
MOBIL	
SHELL	
TOTAL	



- In case in the gate valve in the closed position the temperature of the fluid (mainly water) increase in the chamber above the wedge impermissibly high pressure can occur. In order to prevent failure or damage of pressure-relating parts gate valves should be equipped with some of the presented constructive solutions (Figure 4). For gate valves where flow is always in one direction simplest overpressure safety device should be provided with hole in the wedge / seat (Figure. 4.1) or by equalizing pipe (Fig. 4.2). When gate valve is bidirectional overpressure safety device should be provided by equalizing pipe and bypass valves (Figure 4.3). One of approved execution is installation of safety valve in the gate valve body (Figure. 4.4).

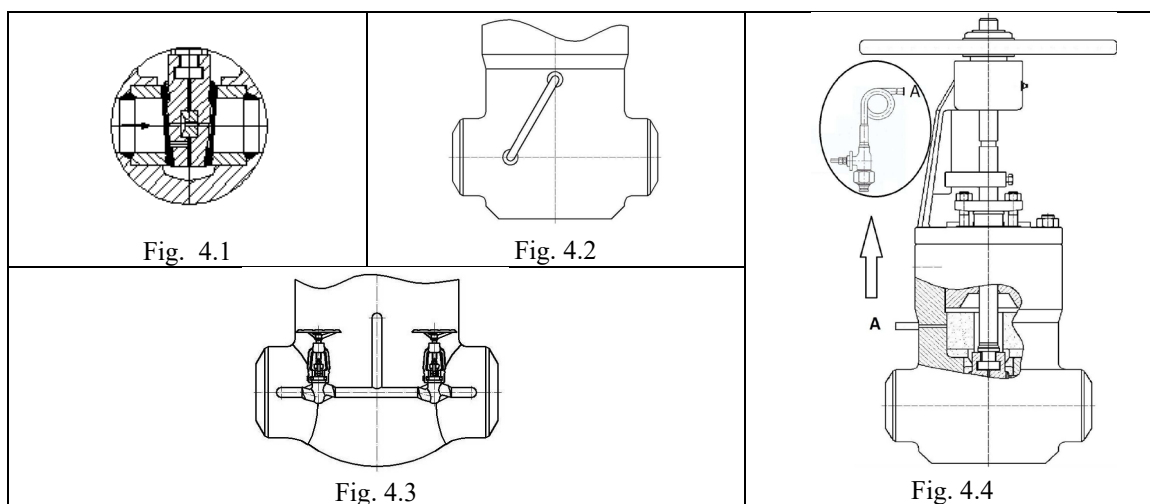




Figure 4. Overpressure safety executions

- Gate valves delivered with actuator is adjusted for proper work. Gate valves delivered with connection for later build on it the electric actuator must be adjusted. Closing of gate valves should be adjusted by torque switch and the opening by limit switch. The setting of torque and limit switches must be in accordance with the instructions from Termovent SC.

ATTENTION - ВНИМАНИЕ - PAŽNJA !	
<b>CLOSED</b> <b>ЗАКРЫТО</b> <b>ZATVOREN</b>	 stop by torque switch отключение по моментным выключателям zaustavljanje prekidačem momenta
<b>OPEN</b> <b>ОТКРЫТО</b> <b>OTVOREN</b>	 stop by limit switch отключение по концевым выключателям zaustavljanje prekidačem položaja

### WARNING !!!

- **During usage gate valves must be completely in an open or closed position;**
- If, when a high pressure gate valve is overhauled, a decrease of wall thickness of more than 30% is detected at any of the ports (due to erosion) the valve should stop being used;
- Any time when a high pressure gate valve is dismantled or reinstalled the gaskets should be replaced with new ones with the appropriate quality;
- Valve opening and closing by handwheel, should be done without use of auxiliary means such as a rod or similar;
- High pressure gate valve maintenance and manipulation during use should be done only by experts and persons well trained for such purpose;

- At the moment of installation of the plant sudden and extreme change of pressure and temperature should be avoided;
- **Gate valve can not be used for flow control.**
- A Strainer being installed before the valve will increase its reliability and proper working.

## 6. Service and repair

- Only authorized persons should perform service and repair with appropriate tools and, if it is possible, using original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.
- Attention should always be paid to the reliability of the valves and parameters of the working implementation / plant, and only materials which can successfully replace those originally installed should be used.
- For highly reliable valves (valves which work with high temperatures, high pressures or with dangerous fluids) any service, repair or replacement should be done professionally and responsibly in accordance with valid regulations for safe working conditions at the plant.
- Before the service or reinstallation of the valves, the plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).
- Every gate valve serviced or repaired should be subject to all necessary tests usually performed for a newly produced valve.
- Bolts for body sealing should be tightened evenly and crosswise applying appropriate torque when the valve is in the open position.

### WARNING!!!

- Manipulation with body and stem packing should be with high precautions because they could contain stainless steel wire which can cause severe injuries.

## 7. Possible malfunctions and solution

During the period of usage of the installed high pressure gate valve malfunctions may occur. Only experts in the premises of the user should undertake repairs. The most common cause of malfunctions and how to overcome such situations is listed in Table 3.

Table 3.

Failure	Possible cause	Troubleshooting
Absence of flow	Gate valve is in closed position	Open the gate valve completely with handwheel (Pos.11)
	Gate valve is not completely open	Open the gate valve completely with handwheel (Pos.11)
	Protection covers are not removed	Remove protection covers from connection ends
Difficult manipulation	Dry stem (Pos. 4)/stem nut (Pos.5)	Grease stem (Pos.4) or stem nut (Pos.5)
	Gland nuts (Pos.13) are too tight	Slightly loosen Gland nuts (pos.13) with precaution to preserve sealing of the stem packing (Pos.9)
Leakage on stem packing	Gland nuts (Pos.13) are not tightened	Tighten gland nuts (Pos.13)
	Stem packing (Pos.9) is damaged	Completely open the gate valve, remove the worn stem packing and clean the chamber of the stem packing and install the new stem packing, the same or similar quality (Pos.9)
Leakage on bonnet packing	Bonnet nuts (Pos. 14) are not tightened	Tighten bonnet nuts (Pos. 14).
	Bonnet packing (Pos. 8) is damaged	Disassemble bonnet (Pos. 2) and replace bonnet packing (Pos. 8) with new one.
Leaking on seat	Gate valve is not completely closed	Turn handwheel (Pos.11) in direction indicated for closing without auxiliary means

	Mechanical damages of seat or wedge	Contact the manufacturer
	Working medium contains solid dirt particles	Clean Valve thoroughly. We recommend installation of Strainer before Gate Valve

## 8. Guarantee

- The Guarantee issued by “TERMOVENT” SC confirms the safe working of its products under conditions when these products are properly installed in accordance with the instructions in the documentation given to the customer, and usage is in accordance with approved technical conditions and working parameters.
- The Guarantee is void if inappropriate parts from other manufacturers are implemented, if the user changes construction, or if there is any decline in function or malfunction due to natural wear and tear.

### Guarantee conditions:

- The Guarantee is valid for defective parts or defective products, when any such defect is confirmed by an expert engaged by the customer and approved by experts from our company. In such a situation “TERMOVENT” SC will replace the defective part(s) or defective product(s).
- Replacement of defective part(s) or defective product(s) with new one(s) should be done only by an expert engaged by the customer upon approval or by instruction of our experts and in accordance with the instructions for installation.
- The Guarantee period is not valid if installation and manipulation of the gate valves isn't in accordance with these instructions. The Guarantee period for all replaced parts or product(s) starts from the moment the replacement(s) is/are done.

**The Guarantee is valid only if the valves are handled, stored, installed, used and maintained in full accordance to the Instructions and recommendation listed in this Document.**

### WARNING!!!

- After detection of mistakes “Termovent” SC should be informed immediately.
- Claims must be made in writing.