INSTRUCTIONS FOR INSTALLATION,
OPERATION & MAINTENANCE

GHP

HIGH PRESSURE GATE VALVE

TERMOVENT since1963 SC

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1. INSTRUCTIONS for INSTALLATION, OPERATION & MAINTENANCE

1.1 General safety information

- Instructions for installation, start-up and maintenance during the period of exploitation of valves manufactured by TERMOVENT SC should be used as a manual intended for all personnel directly or indirectly involved in dealing with the products.
- Operators in charge of installation, operation and maintenance of GHP during the period of use should be fully trained for the correct/optimal performance of these tasks. If GHP is equipped with mechanical actuators, the operator should be trained for the adequate operation of such valves.
- Information about temperatures and allowable working pressures are shown in Table A.8 according to ASME B16.34 and Table A.9, Table A.10 and Table A.11 according to EN 12516-1. Under no circumstances should the valves be operated under conditions outside these tables.
- Before the service or reinstallation of the GHP, the plant or installation should be taken out of operation (zero pressure, 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 is required to undertake all necessary precautions to avoid this by using protective equipment.
- These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken.

1.2 Storage & handling

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

1.2.1 Recommended storage conditions

- Storage conditions shall be: ambient temperature between +10ºC and +35ºC and the humidity up to 85%
- The valves must be stored in closed, clean, dry and ventilated storage facilities.
- Do not store the valves outside.
- Store the valves in their original shipped packaging.
- Protect the valve from contact with solvents, lubricants, fuels or other chemicals.
- Store the valve in vibration-free conditions.
- Valve should be taken out of crates or removed from the covering of a pallet just before installation.
- Spare parts such as soft sealing elements, plastic or lubricants should be stored in a dry place at room temperature protected from light.

1.2.2 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 of this is found the valves are to be thoroughly cleaned and dried.
- Slight external rusting may occur on valves. This will not affect their performance.
- If valves are stored for more than 6 months we recommend the following:
  - ➔ Valves should 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

1.2.3 Handling requirements

- For valve handling and/or lifting the lifting equipment must be sized and selected while taking into consideration the valve weight indicated on the packing list.
- Do not use the lifting points located on the actuator (Figure A.16).
- Do not lift GHP via the handwheel (Figure A.17).
- If possible, lift GHP via the lifting lugs or yoke (Figure A.18 or Figure A.19).
- Caution must be taken during the handling to avoid that this equipment passing over the workers' heads.
- 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.

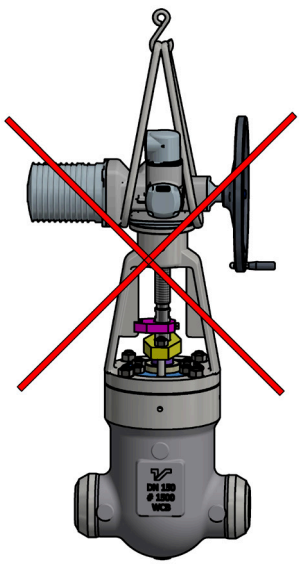

Figure A.16

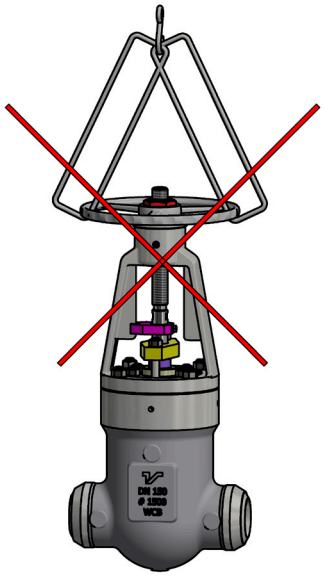

Figure A.17

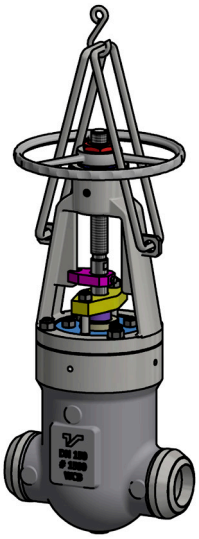

Figure A.18

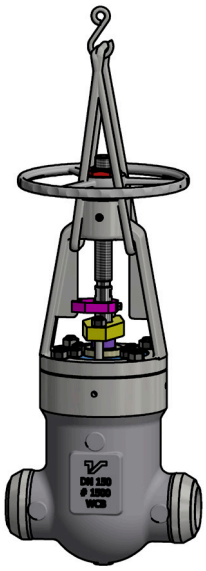

Figure A.19

WARNING!!!

➔ Lifting and handling must be performed by qualified personnel only.
➔ You must not remove the protection covers from the valve connection ends.
➔ Store the valves in the 'closed' position.
➔ You must not lift the valves using the connection flange holes, handwheel or actuators.

1.3 Installation & Start-up

- GHP 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 the valve is performed by turning the handwheel in a CW (clockwise) direction. On the handwheel there 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 by the manufacturer of the gaskets.
- GHP with flanged ends shall be installed in a slightly open to fully open position.
- GHP with welding ends up to DN 100 (4“) should be welded on the pipeline in the **CLOSED** position.
- GHP with welding ends over DN 100(4“) shall be welded on pipeline in **OPEN** position.
- Welding must be performed 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 pipeline load on the valve should be reduced. The same also applies to temperature oscillation, hydraulic impact and similar. The valve should not be used as a support for a pipeline.
- When installing the GHP equipped with an overpressure safety device (described in Section 4.1), you must take into consideration the permitted flow direction. Allowed flow direction is defined by the arrow located on the GHP body.
- Manually operated gate valves should be relieved of maximum seating force when the gate valve wedge is closed. Relieving of the force shall be provided by moving the handwheel CCW (counterclockwise) to the open position by ¼ of a turn. Regarding this action, contact between the stem and wedge will be disengaged. The described action will prevent damage to the seating surfaces caused by excessive thermal stem expansion.
- We recommend installation of GHP with stem in vertical position. GHP could be installed with the stem in a horizontal position but for vertical pipelines. We do not recommend the installation of GHP over DN 150 (6”) with a horizontal stem on the horizontal pipelines.
- After the installation, start-up and operating parameters are set, it is possible to detect a leakage on the stem packing. In this case, it is necessary to tighten the gland nuts equally. The tightness should not go beyond more than necessary to allow comfortable manipulation of GHP (opening/closing).
- Recommendation: GHP should be installed with a minimum of 5x nominal diameter of straight pipeline in front of and behind the GHP.

WARNING!!!

- ➔ Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- ➔ 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.
- ➔ During the installation, check if there is enough space for normal and safe manipulation.
- ➔ Installation of valves with an overpressure safety device (Section 4.1) must be in accordance with the allowed flow direction.
- ➔ The valve should not be used as support for a pipeline.

1.4 Usage & maintenance

- 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 (Figure A.20). Torque for tightness gland nuts shown in Table A.13. 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.

Table A.13

	M10	M12	M14	M16	M18	M20	M24	M27	M30	M33	M36
Torque /Nm/	15÷40	26÷65	42÷100	64÷150	100÷175	125÷300	210÷500	305÷730	410÷1000	550÷1350	710÷1720

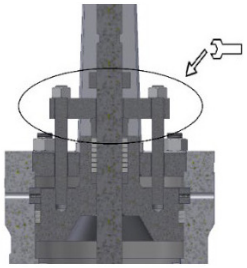

Figure A.20 – Stem packing gland tightening

- Stem packing must be replaced, depending on the working conditions and maintenance level, during packing replacement, special care must be taken to remove all old packing from the packing chamber. The preparation of new packing rings is shown in Figure A.21. Packing rings replacement is shown in Figure A.22 with a general note that every next packing ring must be rotated relative to the previous one (not less than 90º).

Figure A.21 – Stem packing ring

Figure A.22

- Lubrication of thread between stem (Pos.8 – Figure A.1) / stem nut (Pos.9 – Figure A.1) is highly important. To lubricate the bearings (Pos.23 – Figure A.1) on manual, gearbox or electric-operated valves, we suggest using quality-level grease, as shown in the following Table A.14. 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 performed with lubrication nipples (Pos.25 – Figure A.1) on the yoke (Pos.4 – Figure A.1).
- 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.30 – Figure A.1) and (Pos.29 – Figure A.1) it is necessary to remove the protective tube then grease the stem (Pos.8 – Figure A.1) and return the protective tube. Some of the lubricants we use for lubrication are in the Table A.14

Table A.14

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

- GHP delivered with an actuator is adjusted for proper work. GHP delivered with connection for later build on it the electric actuator must be adjusted. The closing of GHP should be adjusted by the torque switch and the opening by the limit switch. The torque and limit switch settings must be in accordance with the instructions from “TERMOVENT SC”.

WARNING!!!

➔ During usage, GHP must be completely in an open or closed position.

➔ Valve opening and closing by handwheel should be done without the use of auxiliary means such as a rod or similar.

➔ GHP cannot be used for flow control.

➔ A Strainer being installed before the valve will increase its reliability and proper working.

1.5 Service & Repair

- Only authorized persons should perform service and repair with appropriate tools and, if possible, use original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.
- Using the wrong or defective spare parts may pose a hazard for personnel, or result in damage, malfunctions or even total failure.
- For GHP standard spare parts are Bonnet and Stem packing.
- Contact “TERMOVENTSC” if You need other spare parts like a Stem, Wedge, Stem nut, etc.
- Every GHP serviced or repaired should be subject to all necessary tests usually performed for a newly produced valve.

WARNING!!!

➔ 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).

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

1.5.1 Stem packing rings replacement

Only authorized persons should perform service and repair with appropriate tools and, if possible, using original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.

Requirements before disassembling:

➔ The plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).

➔ GHP must be completely opened.

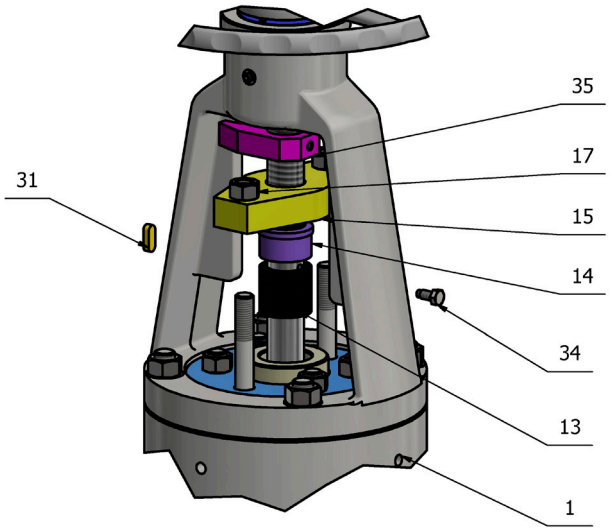

Figure A.23 –Stem packing rings replacement

Disassembling

Step 1 ›	Unscrew gland nuts (Pos.17)
Step 2 ›	Remove screw (Pos.34)
Step 3 ›	Lift upwards stem plate (Pos.35)
Step 4 ›	Remove stem key (Pos.31)
Step 5 ›	Lift upwards gland flange (Pos.15)
Step 6 ›	Lift upwards packing gland (Pos.14)
Step 7 ›	Take out stem packing rings (Pos.13). All stem packing rings shall be removed (Pos.13)
Step 8 ›	The packing chamber shall be cleaned

Assembling

Step 1 ›	The packing chamber shall be filled with new stem packing rings (Pos.13)
Step 2 ›	Put down packing gland (Pos.14)
Step 3 ›	Put down gland flange (Pos.15)
Step 4 ›	Put back and tighten gland nuts (Pos.17)
Step 5 ›	Put back stem key (Pos.31)
Step 6 ›	Put down the stem plate (Pos.35)
Step 7 ›	Tighten Screw (Pos.34)

1.5.2 Bonnet packing rings replacement

Only authorized persons should perform service and repair with appropriate tools and, if possible, use original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.

Requirements before disassembling:

➔ The plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).

➔ GHP must be closed.

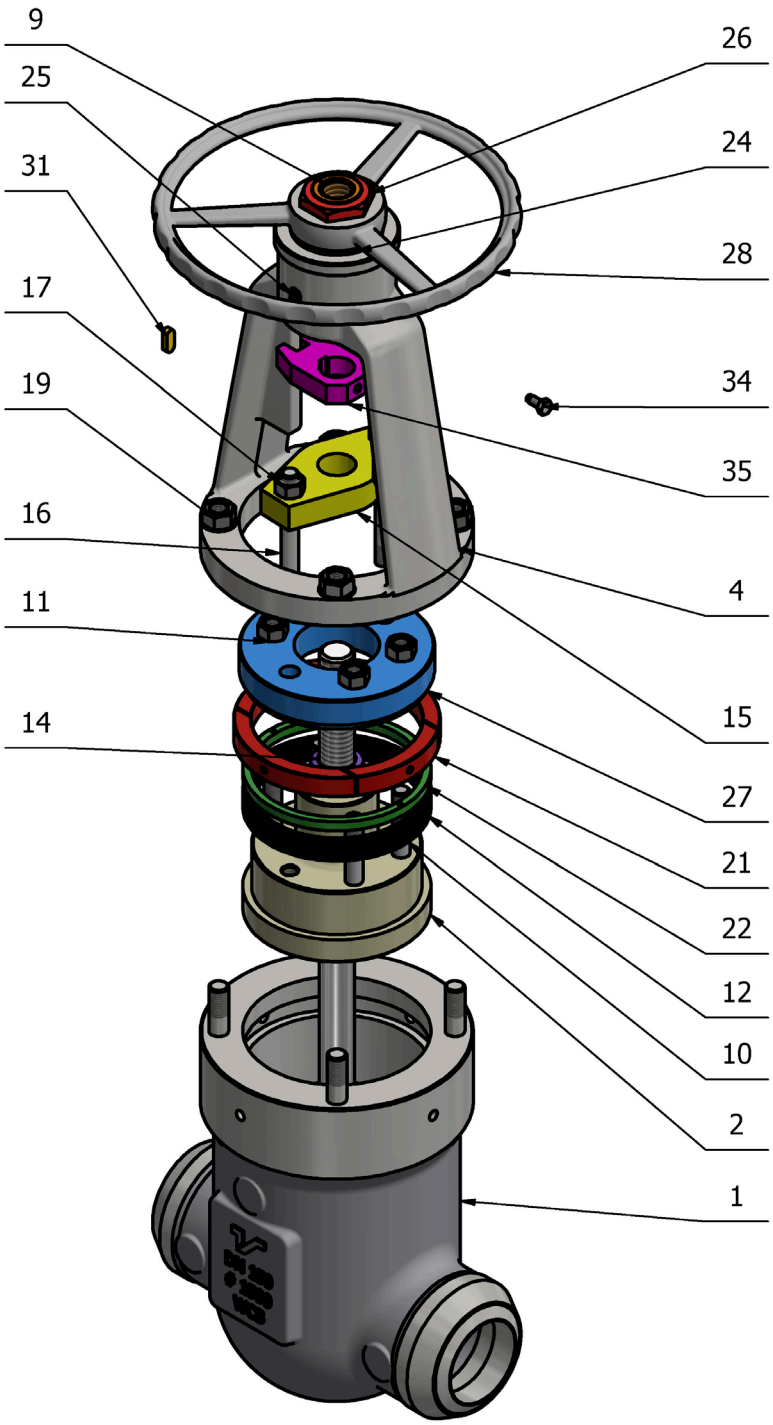

Figure A.24 –Bonnet packing rings replacement

Disassembling

Step 1 › Attach the yoke (Pos.4) to the hoist using lifting straps

Step 2 › Unscrew and remove nuts (Pos.19)

Step 3 › Unscrew and remove the screw (Pos.34)

Step 4 › Unscrew and remove gland nuts (Pos.17)

Step 5 › Unscrew and remove gland bolts (Pos.16)

Step 6 › Push up stem plate (Pos.35)

Step 7 › Remove stem key (Pos.31)

Step 8 › Move the handwheel (Pos.28) in CCW (counterclockwise) direction (opening direction).

Step 9 › By turning the handwheel in the opening direction, remove the following parts from the body (Pos.1) as a single piece. These parts do not need to be disassembled to be removed from the gate valve.):

- › handwheel nut (Pos.26)
- › handwheel (Pos.28)
- › yoke (Pos.4)
- › cover bearing (Pos.24)
- › stem nut (Pos.9)
- › grease injector (Pos.25)
- › stem plate (Pos.35)
- › gland flange (Pos.15)

Step 10 › Unscrew and remove nuts (Pos.11)

Step 11 › Remove clamping lid (Pos.27) from the Body (Pos.1)

Step 12 › Push down the bonnet (Pos.2) using a special tool (for a special tool You can contact Termovent SC)

Step 13 › When the bonnet (Pos.2) is moved down segment rings (Pos.21) could be taken out

Step 14 › Take out the bonnet (Pos.2) together with bonnet packing rings (Pos.12), bonnet metal ring (Pos.22), packing gland (Pos.14), stud bolts (Pos.10)

Step 15 › Remove the bonnet metal ring (Pos.22)

Step 16 › Take out bonnet packing rings (Pos.12). All bonnet packing rings (Pos.12) shall be removed.

Assembling

Step 1 › Put on new bonnet packing rings (Pos.12)

Step 2 › Put back bonnet metal ring (Pos.22)

Step 3 › Put back bonnet (Pos.2) together with bonnet packing rings (Pos.12), bonnet metal ring (Pos.22), packing gland (Pos.14), stud bolts (Pos.10)

Step 4 › Put back segment ring (Pos.21)

Step 5 › Put back clamping lid (Pos.27)

Step 6 › Put back and screw nuts (Pos.11)

Step 7 › Put back the following positions all together in one piece:

- › handwheel nut (Pos.26)
- › handwheel (Pos.28)
- › yoke (Pos.4)
- › cover bearing (Pos.24)
- › stem nut (Pos.9)
- › grease injector (Pos.25)
- › stem plate (Pos.35)
- › gland flange (Pos.15)

Step 8 › Put back stem key (Pos.31)

Step 9 › Push up the stem plate (Pos.35) up to the place where the stem key is (Pos .31)

Step 10 › Tighten screw (Pos.34)

Step 11 › Put back and screw gland bolts (Pos.16)

Step 12 › Put back and screw gland nuts (Pos.17)

Step 13 › Put back and screw nuts (Pos.19)

1.6 Possible malfunctions and solutions

- 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 A.15

Table A.15

Failure	Possible cause	Troubleshooting
Absence of flow	GHP is in closed position	Open the GHP completely with the handwheel (Pos.28)
	GHP is not completely open	Open the GHP completely with the handwheel (Pos.28)
	Protection covers are not removed	Remove protection covers from connection ends
Difficult manipulation	Dry stem /stem nut	Grease stem (Pos.8) or stem nut (Pos.9)
	Gland nuts are too tight	Slightly loosen Gland nuts (pos.17) with precaution to preserve sealing of the stem packing rings (Pos.13)
Leakage on stem packing	Gland nuts are not tightened	Tighten gland nuts (Pos.17)
	Stem packing rings are 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 rings, the same or similar quality (Pos.13)
Leakage on bonnet packing	Bonnet nuts are not tightened	Tighten bonnet nuts (Pos.11).
	Bonnet packing rings are damaged	Disassemble the bonnet (Pos.2) and replace the bonnet packing rings (Pos.12) with new ones.
Leaking on seat	GHP is not completely closed	Turn the handwheel (Pos.28) in the direction indicated for closing without auxiliary means
	Mechanical damage of the seat or wedge	Grind the seats and, if necessary, have damaged components replaced. Check the actuator setting.
	The working medium contains solid dirt particles	Clean the Valve thoroughly. We recommend the installation of a Strainer before the Gate Valve
The valve does not function	The electric actuator does not function	Check the electric actuator as specified in the manufacturer’s documentation.
	The pneumatic actuator does not function	Check the pneumatic actuator as specified in the manufacturer’s documentation.
Malfunction of the valve	Limit switch (for optional electric or pneumatic) is defective	Have the limit switch checked. Prior to readjustment consult with Termovent SC
	Torque switch (with optional electric or pneumatic) is defective	Have the torque switch checked. Prior to readjustment consult with Termovent SC

1.7 Guarantee

- Termovent SC guarantee that each of its products free from defects and work properly for a period of eighteen (18) months from the date of installation or twenty-four (24) months from the date of shipment from the manufacturer, whichever comes first.
- Manufacturer agrees to repair or replace any product which is non-conforming to the Warranty due to defective workmanship or defective material of which the Warranty non-conformance customer notifies the manufacturer in writing during the Warranty Period.
- Warranty does not apply to products that have defects or failures resulting from

  (a) accident, disaster, neglect, misuse, improper handling.

  (b) application of excessive torque to the operating mechanism, presence of foreign matter.

  (c) the products are not being installed or maintained as required by instructions

  (d) modifications or repairs without manufacturer approval.

  (e) natural tears and wear caused by material ageing.

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