



BUTTERFLY VALVE

31500 SERIES

INSTRUCTIONS FOR INSTALLATION, USE AND MAINTENANCE



1. Overview

Read these instructions carefully before starting the valve installation and start-up work. Safe keep the instructions in the proximity of the valve for easy access by the valve operators.

HÖGFORS OY takes no responsibility for any damage caused by the valve's incorrect transportation, handling, installation or use.

The non-leakage warranty exclusively applies to the valves that are provided with a manual gear or an actuator installed at the manufacturer's factory, provided that the manual gear or actuator in question has not been removed or adjusted by the user.

2. Marking.

The valve's identification shield is attached to the actuator attachment flange in the valve frame. The shut-off seal is located on the opposite side of the frame, seen from the identification shield.

The marking groove on the shaft end indicates the valve disc position. The valve closes clockwise and opens counter-clockwise, by turning 90 degrees in both directions.

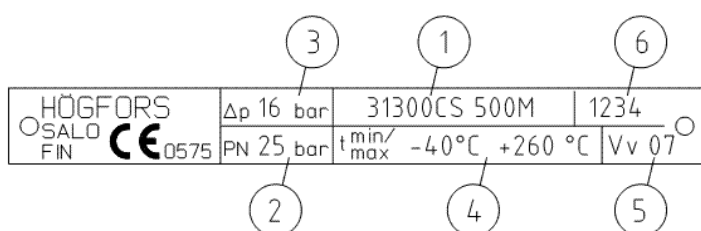


Fig. 1: Product identification shield

Valve manufacturer

1. Valve type
2. Nominal pressure
3. Max shut-off pressure difference
4. Temperature max / min
5. Year of manufacture
6. Serial number

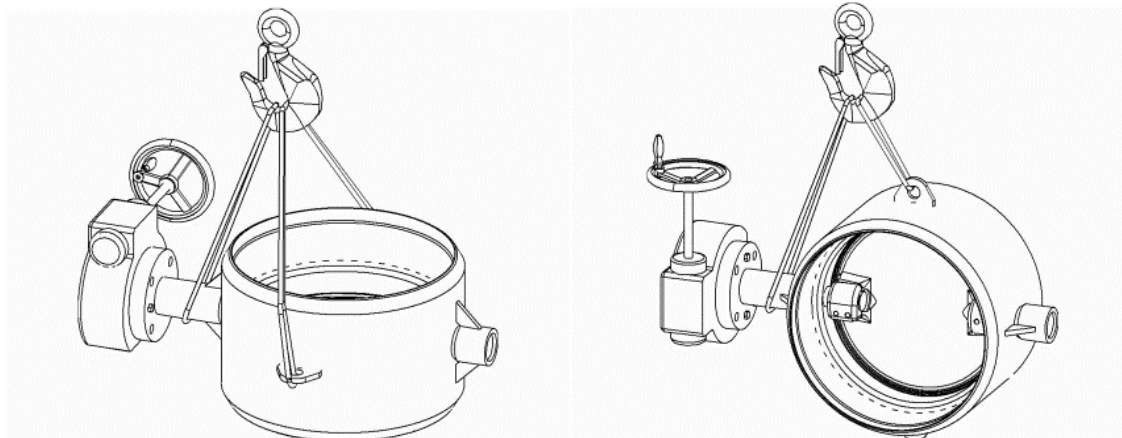
3. Receiving, storage and transportation.

During the receiving inspection, check that the valve and its accessories are free from any transportation-induced damage. During storage, the valve must be protected against sand, dust and any other impurities. Avoid long-term storage of the valve outdoors exposed to the effects of rain, sunlight or frost.

When hoisting the valve, always use lifting straps threaded through the lifting lugs and around the valve's upper neck. Hoisting the valve with the lifting straps threaded around the actuator is forbidden. Use special caution when hoisting, transporting and installing the valve. The actuator's centre of gravity may deviate from the valve centre line.



This may tilt the valve and actuator during lifting. Even minor impacts may damage the actuator or change the actuator's or valve's adjustments.



Method of slinging

4. Installation.

Assemble set of valve, flanges and flange gaskets by 4-6 studs. Do not tighten stud's nuts too much.

Install unit into pipeline and tack weld it. Make sure that all parts are coaxial and parallel to each other.

Remove valve and make final welding of flanges to pipeline.

After completion of flange welding, make sure that valve will not be under excess load, that flanges are parallel and coaxial to each others.

Clean the pipework carefully before installing the valve. Any welding debris and other impurities remaining inside the pipework may damage the valve's shut-off surfaces at a later stage. In this connection, it is also advisable to check that the valve is free from any impurities induced by transportation and storage.

The most recommendable installation position for a butterfly valve is with the valve shaft in a horizontal position. Do not install the valve close to a pump or a curved pipe section, due to the turbulent flow that they cause. The flow must be laminar at the valve.

The pipes must be provided with appropriate support. An inadequately supported section of pipework will cause excessive stress on the valve, possibly resulting in leakage from the shut-off surfaces.

Pipework temperature variations will cause thermal contractions and expansions which must be allowed to occur freely, with the aid of bellow-type compensators, for example. Without these, or other similar solutions, pipework expansions will excessively burden the joints.

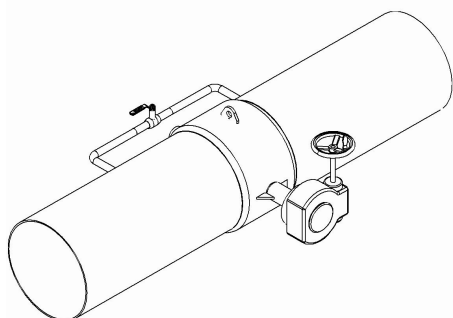
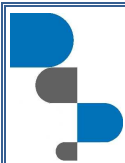


Fig. 6 Bypass

Fill the pipework via the by-pass valves. Install a by-pass valve in order to avoid pressure impacts and to reduce the forces that are caused by opening the butterfly valve under pressure.

The valve disc must not be the final item that separates the content of the pressure vessel (tank and pipeworks) from the environment. However, in cases where this cannot be avoided, secure non-leakage by other means, by welding a solid flange to cover the valve's open end, for example.



5. Start-up.

Flush the pipework thoroughly once the valve installation has been completed.

All valves delivered to the Customer passed the hydro test at the factory; however, it is necessary to check that there are no faults due to transportation and handling.

Make sure that the valve-actuator combination functions without problems prior to the start-up procedure. Always close the valve using the actuator's mechanical travel stops; stay below the maximum torque limit. Avoid the use of excessive force in closing as this cannot improve the valve's tightness.

A valve provided with an electric actuator must always be opened electrically, with the travel limit serving as the closing limit. In an emergency, you may open and close the valve by turning the electric actuator hand wheel.

In these cases, however, observe that the hand wheel's closing limit has been set to turn the valve disc 2-3 hand wheel revolutions beyond the optimal closed position. This means that the optimal tightness is achieved by turning the hand wheel 2-3 revolutions in the opening direction, starting from the gear's mechanical closing limit.

6. Maintenance.

Högfors valves are durable and dependable. An appropriately selected and carefully installed valve will not require maintenance during its life cycle.

Leakage from the valve's shut-off surfaces is often caused by wear and tear, pipework impurities or damage resulting from pressure impacts. Impurities can be removed by opening the valve and allowing the flow to flush the shut-off surfaces clean.

Probability of hydro-stress can be excluded by using by-pass valves.

The scope of maintenance and repair work consists of:

- Cleaning of internal surfaces.
- Replacement of main gasket.
- Tightening or replacement of stem sealing. This work is possible to carry out when valve is on-line if pipeline is not under pressure. For rest of the repair works, the valve must be taken away from line.

6.1 Manual gear removal and installation

Avoid removing the manual gear from the valve. The manual gear adjustments have been made at the factory so as to secure the valve's tightness. Removing the manual gear requires that the adjustment sequence be repeated.

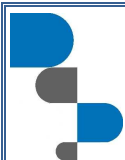
Removing the manual gear is prohibited while the valve is under pressure.

Removal:

- Turn disk to position "close".
- Mark the manual gear in relation to the valve.
- Turn out bolts between actuator and valve, take out actuator.
- Remove wedges.

Installation:

- Install the manual gear with the valve in closed position. Make sure that the manual gear is in the closed position as well.
- Place wedges.



- Install the manual gear in original position. Attach the manual gear to the valve with bolts. Tighten the bolts evenly in a crosswise sequence. Apply locking agent to the bolts.

Adjust the manual gear as instructed in section 8.2

6.2 Manual gear adjustment

- Open the manual gear travel limit locking bolts 2 and 4, and open adjustment screws 1 and 3.
- Use the turn gear wheel to turn valve in closed position, so that the disk is parallel to the seal. Right position check by measuring the distance X from flange of valve to the disk surface. (Figure. 8). The distance must be equal on both sides of the disk. The approximate position of the disk can be defined by marking groove on the end of shaft. (Figure. 9). The disk is parallel to the marking groove.

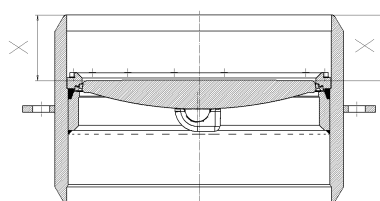
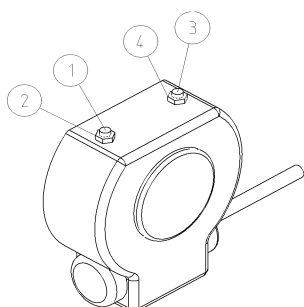


Fig.8: Measuring distance "X"

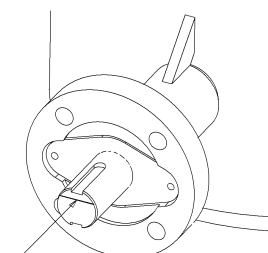


Fig. 9: Marking groove

- Adjust stopper of "Close" position in manual gear. Turn adjustment screw 1 gently until its movement stops. Tighten locking nut 2.
- Turn disk by manual gear by 90 degrees until completely in "Open" position.
- Adjust stopper of Open position in manual gear. Turn adjustment screw 3 gently until its movement stops. Tighten locking nut 4.

6.3 Dismantle and installation of electrical actuator (AUMA SA)

Avoid dismantle of the actuator from valve. The adjustment of the actuator has been made at the factory to secure the valves tightens. Dismantling the actuator requires repeated adjustment.

Dismantling the actuator is prohibited while the valve is under pressure or could be under pressure.

Dismantle:

- Turn the valve to the closed position.
- Switch off voltage supply to the actuator.
- Loosen the actuator attachment bolts and pull actuator out.
- It is necessary to remove the actuator clutch piece, for example, in connection with shaft seal replacement.
- Mark the clutch piece height on the shaft.
- Loosen the locking screw, and pull the clutch piece off the shaft.
- Remove the wedges.

Installation:

- During installation, the valve must be in closed position. Make sure that the actuator itself is in closed position as well.
- Place the wedges. Attach and lock the actuator clutch piece on the valve shaft at its original height.



- Install the actuator to the valve. Attach the actuator to the valve by bolts. Tighten the bolts evenly in a crosswise sequence. Apply a locking agent to the threads.
- For additional instructions, see the manual supplied with the actuator.

Adjust actuator as instructed in section 6.4.

6.4 Electric actuator adjustment.

Use the actuator hand wheel to turn the disk to the half-open position, and check that the valve disk moves in the correct direction when using the switches.

For detailed instructions concerning the actuator's adjustment see the manual supplied with the actuator.

The actuator's adjustment is correct if the entire tooling list below has been done and checked:

1. The limit switcher in the closed position must stop the turning of the disk when the disk is parallel to the seal. Ensure the correct position of the valve disk by measuring distance "X" (Figure. 8). The measure must be the same on both sides of the disk.
2. The torque switchers are adjusted at the values set by the valve's manufacturer (contact the valve vendor or manufacturer for details).
3. The mechanical stopper in the open position is adjusted so that the actuator hand wheel still has 2-4 revolutions from the open position of the limit switcher until the contact with the stopper.
4. The limit switcher in the open position must stop the turning of the disk when the disk is 90 degrees to the seal. At the same time there must be free gap of 2 - 5 revolutions of the hand wheel from the limit switcher till the mechanical stopper.

Non fulfillment of listed adjustments may cause the valves damage or block the actuator.

6.5 Other actuators

For detailed instructions concerning actuator removal, installation and adjustment, contact the supplier or manufacturer.

6.6 Tightening the valve stem seal

Tightening the valve stem seal is included in regular maintenance. Avoid excessive tightening. The sufficient tightness level is reached when the leakage stops. The tension screws are indicated by number 20 in the exploded view attached.

6.7 Valve stem seal replacement

Prior to commencing the replacement procedure, check that the pipework is pressure-free.

The components referred to in the disassembly and installation instructions are set out in the exploded view contained in **Appendix 1**.

Disassembling:

- Remove the actuator as instructed above.
- Remove wedges 11.
- Remove hexagon screws 20.
- Remove seal flange 16.
- Lift out shaft seal bushing 6.
- Remove O-rings 17 and 18 from shaft seal bushing 16.
- Remove shaft seals 15.

**Installation:**

- Carefully clean all surfaces. Prior to commencing the installation work, check that there are no sharp edges on the valve shaft that could damaged the O-rings and sealing.
- Place the shaft sealing 15 and push it by hand.
- Place the O-rings 17 and 18 on the shaft bushing 16 and press it into place. Attach seal flange 19 using hexagon screws 20.
- Install and adjust the manual gear or actuator as instructed above.

6.8 Shut-off seal replacement

Prior to a shut-off seal replacement, remove the valve from the pipework.

It is not necessary to remove the actuator for a shut-off seal replacement.

Turn the valve disc to the closed position.

The components referred to in the disassembly and installation instructions are set out in the exploded view contained in Appendix 1.

Disassembling of shut seal:

- Remove hexagon screws 12 and retaining ring 11.
- Remove shims 24, 9 and seal 10. Note that new shims must have the same thickness as the old ones.

Installation:

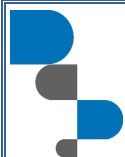
- Prior to installation of new parts, carefully clean all surfaces of frame, disk and retaining ring. Check the condition of sealing surfaces prior to starting the installation work.
- Keep the valve disk in closed position during the shut-off seal replacement procedure.
- Place on the shims 24, 9 and seal 10.

Install the retaining ring 11.

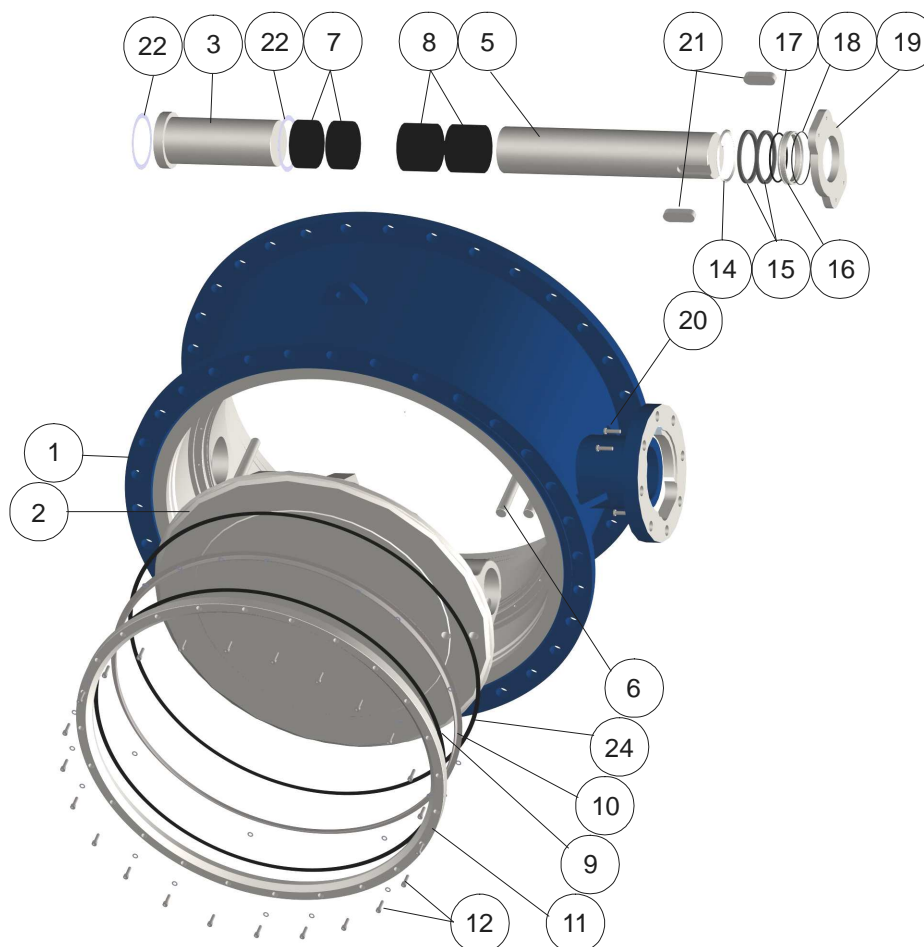
Tighten all hexagon screws 12 evenly in a crosswise sequence. Use the torque key to provide equal torque as 25Hm for M8 screws and 50Hm for M10 screws.

Spare part kit for order.

- Box packing, pos 15 – 2 pcs.
- O-ring, pos 17 and 18,
- Seat ring, pos 10,
- Shim, pos 9 and 24.



APPENDIX 1: Parts list and standard materials



Part	Material
1	Body Carbon steel EN 10028-2 P265GH
2	Disk Stainless steel EN10213-4 1.4408, ASTM A351 CF8M
3	Subshaft Stainless steel EN 10088-3 1.4460
5	Main shaft Stainless steel EN 10088-3 1.4460
6	Conical pin Stainless steel EN10088-3 1.4462
7	Subshaft bearing PTFE on stainless steel net
8	Stem bearing PTFE on stainless steel net
9, 24	Shim Carbon Fiber SFS5811 Graphite for steam version
10	Seat ring Hard chrome plated stainless steel AISI 316 or AISI 904L
11	Retaining ring Carbon steel P265GH
12	Socket screw Stainless steel ISO 3506 A4-80
13	Washer Stainless steel
14	Back-up-ring Stainless steel 1.4404
15	Box packing Graphite
16	Shaft seal bushing Stainless steel 1.4404
17, 18	O-ring FPM Not fitted in steam version
19	Gland Stainless steel 1.4436
20	Hexagonal screw Stainless steel ISO 3506 A4-80
21	Key Carbone steel
22	Bearing plate PTFE on stainless steel net