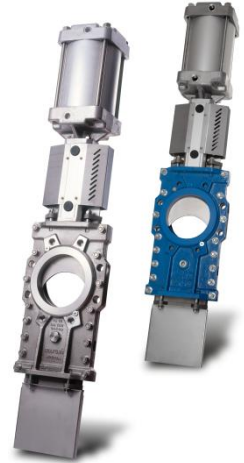


Maintenance instruction

This maintenance instruction is a step-by-step instruction for service and maintenance on Stafsjö's HG valve. Same procedure also applies for HL, HP and HPT. The instruction shall be available for the persons responsible for service and maintenance on the Stafsjö knife gate valves.

The following procedures are described:

- A – Change of seat**
- B – Change of box packing**
- C – Change of box packing when the valve is installed in a system**
- D – Torque for nuts on gland**
- E – Change of gate, guide strips and body gasket**
- F – Torque for valve body screw joint reinforcement**
- G – Change from hand wheel (HW) to pneumatic cylinder (AC)**



For more detailed information on the technical data of the Stafsjö knife gate valves, actuators or accessories, please see data sheets on www.stafsjo.com, or contact Stafsjö Valves AB or your local representative.

Each knife gate valve is identified with the metal plate containing the valve article number and serial number. When corresponding with Stafsjö Valves AB or your local representative, please have these numbers available.

Stafsjö does not accept any responsibility for the product if service and maintenance on the knife gate valve is not performed according to this instruction. Nor does Stafsjö Valves AB accept any responsibility of the product if any significant change has been done to the product.

Spare parts

Recommended spare parts are described in spare part data sheets for each knife gate valve type on www.stafsjo.com. Stafsjö recommends the customer to keep one set of spare parts for each valve type and size in store.

Spare parts can be ordered from Stafsjö or your local representative. Spare part data sheets and addresses are available on www.stafsjo.com.

Safety information



No work is allowed on the knife gate valve when the system is pressurised or the actuator is installed. The system must be free from pressure and empty. Actuator and accessories must be disconnected before any work is commenced.

All gate guards must be installed after finished maintenance on the knife gate valve.

Main components in the Stafsjö knife gate valve HG

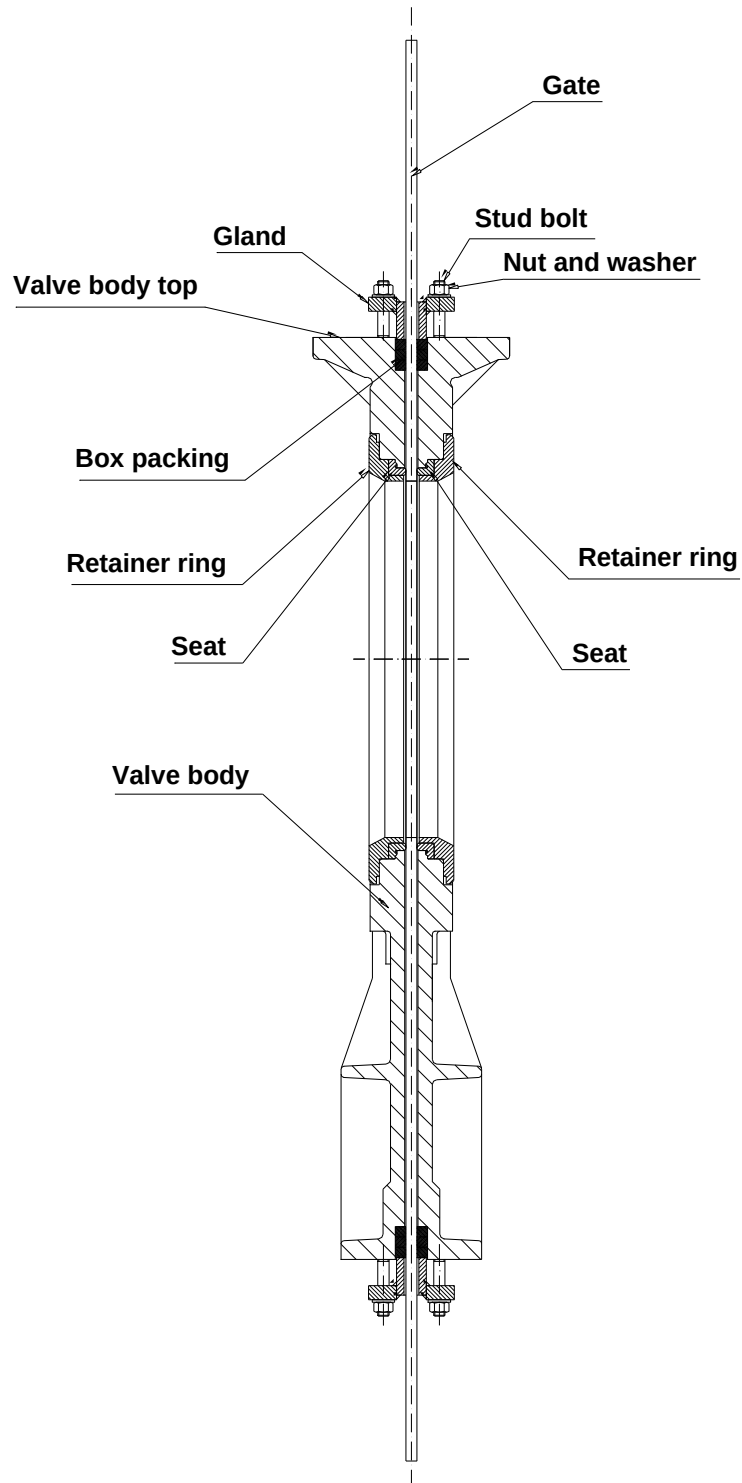


Figure 1

Part list of the Stafsjö knife gate valve HG

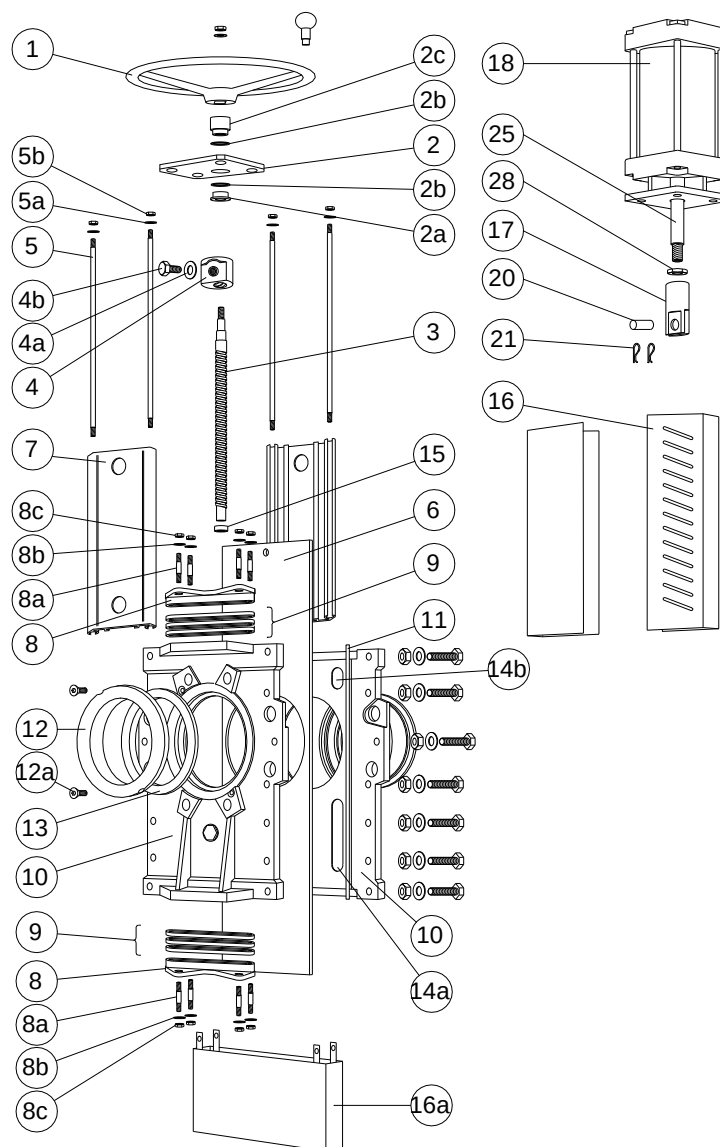


Figure 2

Pos	Part
1	Hand wheel
2	Yoke
2a	Bearing
2b	Bearing washer
2c	Bearing
3	Stem
4	Stem nut
4a	Washer
4b	Screw

Pos	Part
5	Tie rod
5a	Washer
5b	Nut
6	Gate
7	Beam
8	Gland
8a	Stud bolt
8b	Washer
8c	Nut

Pos	Part
9	Box packing*
10	Valve body
11	Body gasket
12	Retainer ring
12a	Locking screw
13	Seat*
14a	Guide strip
14b	Guide strip, top
15	Bushing

Pos	Part
16	Gate guard, not for HW
16a	Gate guard, not for HW
17	Gate clevis
18	Cylinder
20	Clevis pin
21	Split pin
25	Piston rod
28	Locking nut

*** Recommended spare parts**

Service and maintenance

See figure 1-2 for identification of the parts in the HG knife gate valve. Parts differ depending on the valve size and date of manufacture. Please contact Stafsjö Valves AB or your local representative if you have any questions.

For more information on installation and operation of the knife gate valve and pneumatic cylinder, please see Operating instruction for knife gate valves and pneumatic cylinders on www.stafsjo.com or contact Stafsjö Valves AB or your local representative.

Stafsjö offers the customer service and maintenance of Stafsjö knife gate valves, either in the customer's plant or at the Stafsjö workshop. Please contact Stafsjö Valves AB or your local representative for more information.

For procedures A, B, E, F and G the knife gate valve must not be installed in a system.



No work is allowed on the Stafsjö knife gate valve when the system is pressurized or the automatic actuator is connected. The system must be empty and free from pressure before dismantling of the valve begins. The actuator and accessories must be disconnected.

The gate guards must be installed after finished maintenance on the knife gate valve.

A – Change of seat

Place the valve horizontally with the seat side up to simplify changing the seat.

1. Open the valve.
2. Loosen the locking screws (12a) the retainer ring (12) is locked with.
3. Lift of the retainer ring (12). If the retainer ring is stuck, use a screw driver or similar and bend carefully between the retainer ring and the valve body in several places around the bore until the retainer ring is loose.
4. Check the gate (6) for damages such as dents and scrapes. If the gate is damaged it can wear out the box packing (9) and the seat (13), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
5. Clean the area for the seat on the retainer ring and the valve body.
6. Install a new seat (13) on the retainer ring (12) and place the retainer ring in the valve body (10). For PTFE or metal seat, o-rings must also be installed, see fig. 3. Lubricate the seat and the o-rings with a synthetic lubricator to make the installation easier.
7. Lock the retainer ring (12) with the locking screws. Note! The function of the screws is only to keep the retainer ring in place. The retainer ring function come into force when the valve is installed in a system between pipe flanges.
8. Turn the valve over and follow the same procedures 2-7 for the seat on the other side.
9. Install the valve in the system according to the operating instruction.
10. Operate the valve a few times before the system is pressurised.

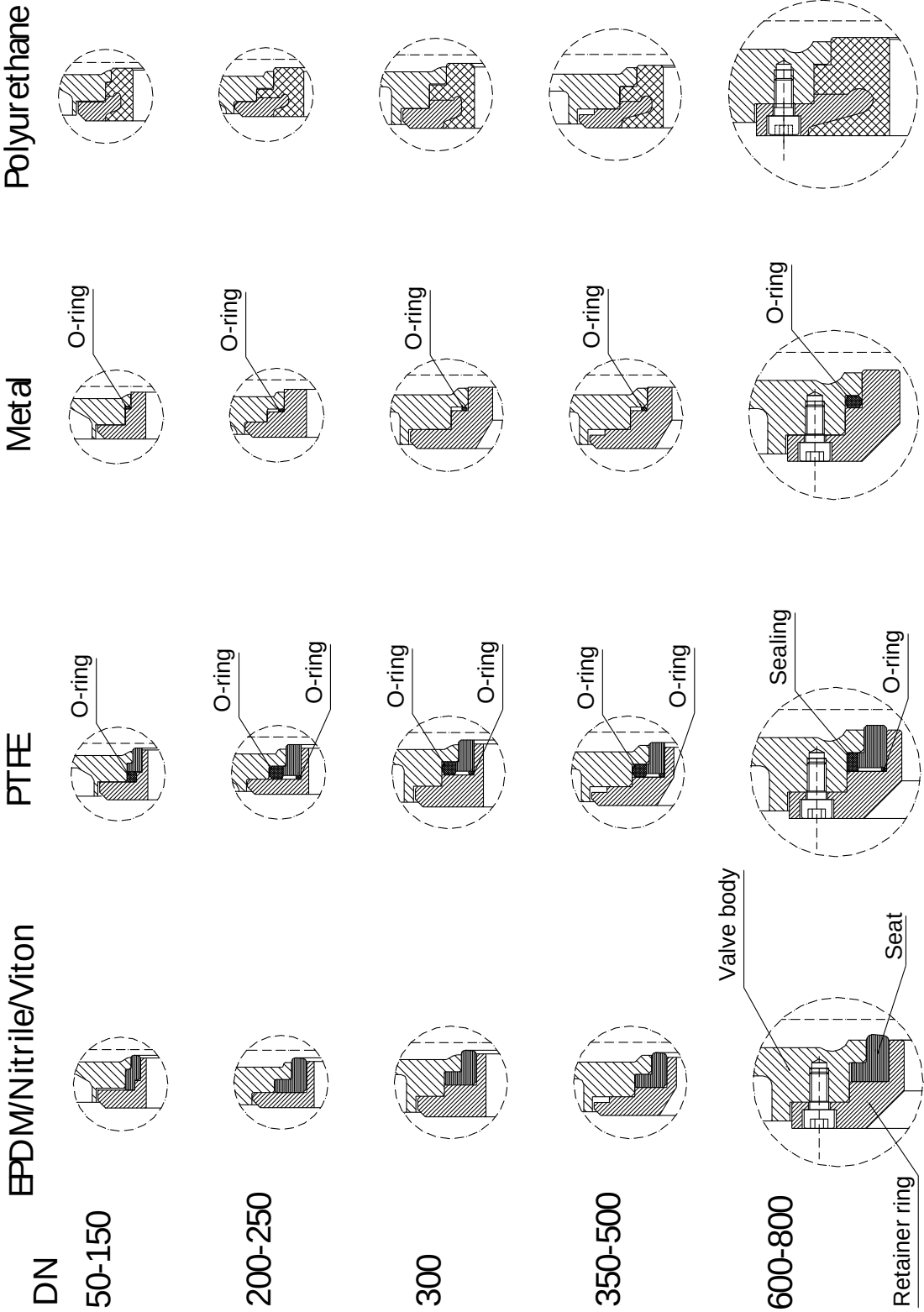


Figure 3

B – Change of box packing

Place the valve upright in for example a screw vice to simplify changing the gate and box packing. Large valves shall be placed on a horizontal work bench.

1. Close the valve.
2. Demount the actuator and top.

- | | |
|-------------------|---|
| Hand wheel
(1) | <ol style="list-style-type: none">1. Demount the hand wheel (1).2. Loosen the nuts (5b).3. Lift off the bearing (2c), bearing washer (2b), yoke (2), bearing washer (2b) and bearing (2a) from the stem (3).4. Demount the beams (7) and tie rods (5).5. Loosen the screw (4b) from the stem nut (4) and gate (6).6. Lift off the stem (3) and stem nut (4). |
|-------------------|---|

- | | |
|----------------------------|---|
| Pneumatic
cylinder (18) | <ol style="list-style-type: none">1. Loosen the gate guards (16, 16a).2. Demount the split pins (21) and clevis pin (20).3. Loosen the nuts (5b) keeping the cylinder in place.4. Lift off the cylinder (18).5. Demount the beam (7) and tie rods (5) from the valve. |
|----------------------------|---|

3. Loosen the nuts (8c) on the gland (8).
4. Lift of the gland (8) from the stud bolts (8a).
5. Remove the box packing braid (9).
6. Clean the box from residues.
7. Check the gate (6) visually for damages such as dents and scrapes. Do not remove the gate (6) from the valve body (10). If the gate is damaged it can wear out the box packing (9) and the seat (13), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
8. Start the installation of the first braid (9) on one of the long sides of the gate (6). Use a blunt tool in plastic or wood and a hammer to push the braid into the box. Where the braid ends meet, check that the short ends are opposite each other, not on top of each other. It is important to push the first braid evenly into the bottom of the box. The joint of the second and third braid must be placed on the opposite long side of the joint of the previous braid.
9. Place the gland (8) on the stud bolts (8a).
10. Add the washers (8b) and nuts (8c).
11. Put pressure on the gland (8) by tightening the nuts (8c) gradually and crosswise. The box packing must be equally compressed all around. Recommended torque for gland nuts, see chapter D.
12. The gland (8) must put uniform pressure on the box packing (9) and be in level with the top of the valve body (10).
13. The gland (8) must also be in line with the gate (6) with the same distance between the gland and the gate all around. Check that there is no metal contact between the gland (8) and the gate (6).
14. Reinstall the other components in reversed order, step 2.
15. Open the valve.
16. Disconnect the actuator and accessories.
17. Repeat steps 3-13 for the lower box packing.
18. Function test of the knife gate valve.
19. Install the valve in the system according to the operating instruction.
20. Operate the valve a few times before the system is pressurised.

Note:

The box packing may start to leak when the system is pressurised and the temperature increases. This is caused by the box packing material which is a soft material that moves depending on pressure and temperature and when the valve is operated. If the box packing is leaking, tighten the gland nuts (8c) gradually and crosswise according to chapter D.

C – Change of box packing when the valve is installed in a system



No work is allowed on the Stafsjö knife gate valve when the system is pressurized or the automatic actuator is connected. The system must be empty and free from pressure before work begins. The actuator and accessories must be disconnected before work begins.

Work on the knife gate valve when the system is under pressure can cause damages on persons and equipment.

Check that the system is free from pressure by:

- **Observing the pressure measurement on the system**
- **Opening the drain on the pipe**

When the system is free from pressure and empty:

1. Open the valve making a distance between the gland (8) and the stem nut (4) or gate clevis (17).
2. Loosen the nuts (8c) on the gland (8).
3. Lift the gland (8) and connect it to the stem nut (4) or gate clevis (17) with a wire to be able to reach into the box packing (9).
4. Remove the box packing braids (9).
5. Clean the box from residues.
6. Check the gate (6) visually for damages such as dents and scrapes. If the gate is damaged it can wear out the box packing (9) and the seat (13), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
7. Start the installation of the first braid (9) on one of the long sides of the gate (6). Use a blunt tool in plastic or wood and a hammer to push the braid into the box. Where the braid ends meet, check that the short ends are opposite each other, not on top of each other. It is important to push the first braid evenly into the bottom of the box. The joint of the second and third braid must be placed on the opposite long side of the joint of the previous braid.
8. Let down the gland (8) on the stud bolts (8a).
9. Add the washers (8b) and nuts (8c).
10. Put pressure on the gland (8) by tightening the nuts (8c) gradually and crosswise. The box packing must be equally compressed all around. Recommended torque for gland nuts, see chapter D.
11. The gland (8) must put uniform pressure on the box packing (9) and be in level with the top of the valve body (10).
12. The gland (8) must also be in line with the gate (6) with the same distance between the gland and the gate all around. Check that there is no metal contact between the gland (8) and the gate (6).
13. Repeat steps 2-12 for the lower box packing.
14. Operate the valve a few times before the system is pressurised.

Note: The box packing may start to leak when the system is pressurised and the temperature increases. This is caused by the box packing which is a soft material that moves depending on pressure and temperature and when the valve is operated. If the box packing is leaking, tighten the gland nuts (**8c**) gradually and crosswise according to chapter D.

D - Torque for gland nuts

The torque T_G in the table below is a recommended value for tightening the gland nuts (**8c**) when a new box packing has been installed and during operation if the box packing is leaking.

DN	T_G	
	Nm	lbf x ft
50-80	20	15
100-150	25	18
200-300	30	22
350-	35	26

If the gland nuts are pulled to hard, it shortens the lifetime of the box packing and the force needed to operate the valve will increase and the valve function will be affected.

The box packing may leak because it is made of a soft material that moves depending on pressure and temperature and when the valve is operated. If the box packing is leaking, tighten the gland nuts (**8c**). Each nut shall be tightened gradually and crosswise until the leakage stops.

Check that the gland (**8**) is level to the top of the valve body (**10**). Check that there is no metal contact between the gland (**8**) and the gate (**6**).

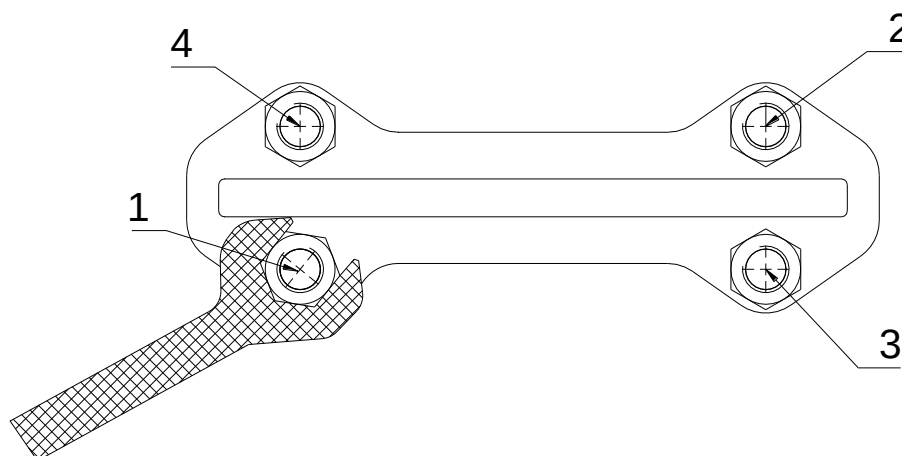


Figure 4: Tighten gland nuts crosswise

E - Change of body gasket, gate and guide strips

To be able to change body gasket, gate and guide strips in the HG knife gate valve, the valve must not be installed in the system. Place the valve horizontally on a work bench. The valve body sides must be divided.

The body gasket in the knife gate valve HG differs depending on the valve size and date of manufacture. Please contact Stafsjö Valves AB or your local representative if you have any questions.

Previously the body gasket has been a traditional gasket between the HG valve body sides. New sealing principles have gradually been introduced.

The traditional gasket has been replaced by graphite tape for HG DN 80-250.

The body gasket for the larger sizes of the HG knife gate valve is today a round bar of PTFE which is mounted in a groove in between the valve body sides. It can be spotted in each end of the bottom of the box.

Stafsjö recommends the customer to check and if necessary replace the gate and guide strips in the valve body when it is divided for maintenance.

The following instructions describe change of guide strips, gate and body gasket.

Traditional body gasket

1. Remove the actuator (**1,18**) and box packing (**9**), see chapter B.
2. Remove the retainer rings (**12**) and seats (**13**), see chapter A.
3. Divide the valve body (**10**) into two valve body sides.
4. Remove the gate (**6**) and check it for damages such as dents and scrapes. If the gate is damaged it can wear out the box packing (**9**) and the seat (**13**), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
5. Check and if necessary replace the guide strips (**14a,b**) in the valve body sides.
6. Clean the valve body sides (**10**) and gate (**6**) from residues and the old body gasket (**11**).
7. Attach the new gasket (**11**) with gasket glue on one valve body side. If the gasket is cut from a large sheet, cut out a strip as wide as the gasket surface.
8. If the gasket does not have holes for the screw joint reinforcement, press a hole in one end and use a screw to fix the gasket strip while pressing out the rest of the holes.
9. Reinstall the gate (**6**) on the valve body side. Check that the gate clevis hole is placed towards the valve top and actuator.
10. Put gasket glue on the gasket (**11**).
11. Mount the other side of the valve body and guide the gasket and valve body sides with screws in the corners of the valve body.
12. Install greased screws, washers and nuts in the screw joint reinforcement.
13. Tighten the screws crosswise and gradually until they are fully tightened. Recommended torque values are described in chapter F.
14. Install the other components in reversed order, see step 1-2.
15. Install the valve in the system according to the operating instruction.
16. Operate the valve a few times before the system is pressurised.

Graphite tape body gasket

1. Remove the actuator (**1,18**) and box packing (**9**), see chapter B.
2. Remove the retainer rings (**12**) and seats (**13**), see chapter A.
3. Divide the valve body (**10**) into two valve body sides.
4. Remove the gate (**6**) and check it for damages such as dents and scrapes. If the gate is damaged it can wear out the box packing (**9**) and the seat (**13**), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
5. Check and if necessary replace the guide strips (**14a,b**) in the valve body sides.
6. Clean the valve body sides (**10**) and gate (**6**) from residues and the old body gasket (**11**).
7. Attach the new graphite tape (**11**) on one valve body side. The graphite tape must be in one piece and one layer along the gasket surface. Do not overlap the graphite tape. Put the graphite tape as close to the screw joint reinforcement as possible without damaging the graphite tape.
8. Reinstall the gate (**6**) on the valve body side. Check that the gate clevis hole is placed towards the valve top and actuator.
9. Mount the other side of the valve body and guide the valve body sides with screws in the corners of the valve body.
10. Install greased screws, washers and nuts in the screw joint reinforcement.
11. Tighten the screws crosswise and gradually until they are fully tightened. Recommended torque values are described in chapter F.
12. Install the other components in reversed order, see step 1-2.
13. Install the valve in the system according to the operating instruction.
14. Operate the valve a few times before the system is pressurised.

PTFE round bar body gasket

1. Remove the actuator (**1,18**) and box packing (**9**), see chapter B.
2. Remove the retainer rings (**12**) and seats (**13**), see chapter A.
3. Divide the valve body (**10**) into two valve body sides.
4. Remove the gate (**6**) and check it for damages such as dents and scrapes. If the gate is damaged it can wear out the box packing (**9**) and the seat (**13**), causing leakage. Stafsjö recommends changing the gate if it is damaged to ensure the function of the valve.
5. Clean the valve body sides (**10**) and gate (**6**) from residues. Check that the groove with the old body gasket (**11**) is clean and free from residues.
6. Check and if necessary replace the guide strips (**14a,b**) in the valve body sides.
7. Reinstall the gate (**6**) on the valve body side. Check that the gate clevis hole is placed towards the valve top and actuator.
8. Mount the other side of the valve body and guide the valve body sides with screws in the corners of the valve body. Use spreaders of 1-2 mm to keep the valve body sides apart to be able to insert the PTFE bar (**11**).
9. Insert the new PTFE bar (**11**) in each groove in the valve body. The PTFE bar must stick out 5-10 mm in the bottom of the box on each side.
10. Take away the spreaders.
11. Install greased screws, washers and nuts in the screw joint reinforcement.
12. Slightly tighten the screws in the screw joint reinforcement crosswise and gradually.
13. Cut off the PTFE bar 0,5-1 mm from the bottom of the box.
14. Seal the groove opening with a flexible sealant.
15. Tighten the screws crosswise and gradually until they are fully tightened. Recommended torque values are described in chapter F.
16. Install the other components in reversed order, see step 1-2.
17. Install the valve in the system according to the operating instruction.
18. Operate the valve a few times before the system is pressurised.

F - Torque for HG valve body screw joint reinforcement

The torque T_s in the table below is a recommended value for tightening the screw joint reinforcement between the two HG valve body sides.

HG knife gate valve DN	Screw joint reinforcement Sd mm	Torque T_s Nm	Torque T_s lbf x ft
80	M12	75	55
100	M12	75	55
125	M12	75	55
150	M12	75	55
200	M12	75	55
250	M12	75	55
300	M12	75	55
350	M12	75	55
400	M16	190	140
450	M16	190	140
500	M16	190	140
600	M16	190	140
700	M20	350	258
800	M20	350	258

G - Change from hand wheel (HW) to pneumatic cylinder (AC)

To be able to adjust the cylinder stroke, the pneumatic cylinder must be installed on the knife gate valve when the valve is not installed in a system.

Large pneumatic cylinders installed horizontally must be supported to not cause tensions in the valve which might affect the valve tightness and ability to manoeuvre.

1. Close the valve.
2. Demount the hand wheel manoeuvre.

- Hand wheel
1. Demount the hand wheel (1).
 2. Loosen the nuts (5b) on the tie rods (5).
 3. Lift off the bearing (2c), bearing washer (2b), yoke (2), bearing washer (2b) and bearing (2a) from the stem (3).
 4. Lift off the beams (7).
 5. Loosen the screw (4b) from the stem nut (4) and gate (6).
 6. Lift off the stem (3) and stem nut (4).
3. Screw the locking nut (28) and the gate clevis (17) halfway on to the cylinder piston rod (25).
 4. Install new beams (7) with holes on the tie rods (5). The holes on the beam are placed on different distances from the short side of the beam. The side of the beam with the longest distance between the hole and the short side shall be placed against the top of the valve body (10).
 5. Mount the cylinder (18) on top of the beams and fixate with washers (5a) and nuts (5b).
 6. Attach the gate clevis (17) to the gate with the clevis pin (20) and the split pins (21).

7. Open the valve completely by gently operating the pneumatic cylinder (**18**). In this position, the bore edge in the gate (**6**) should be in line with the retainer ring edge. If it is not, close the valve, demount the split pins (**21**) and clevis pin (**20**) and adjust the gate clevis (**17**) on the piston rod (**25**) until the gate edge and retainer ring edge are in line with each other when the valve is open.
8. Lock the gate clevis (**17**) with the locking nut (**28**).
9. Function test of the knife gate valve.
10. Reinstall the gate guards (**16**).
11. Install the valve in the system according to the operating instruction.
12. Operate the valve a few times before the system is pressurised.

