

Read more in the chapter "General information" on page 4.



**Warning!** Media can be hot and cause burning.  
Do use safety goggles and gloves.

Read more in the chapter "Installation and welding" on page 8.



**Warning!** Wrong installation can result in several damage or that the valve is not functioning correctly. These general instructions do not cover all possible operating scenarios.  
For a more specific guidance about the usage of the valve or its qualification at the desired use, please contact BROEN A/S.

Read more in the chapter "Change of gasket set" on page 26.



**Warning!** Media can be hot and cause burns.  
Use safety goggles and gloves.

## CONTENT

### BROEN BALLOMAX® valves user manual

1. General information .....	4
2. Marking.....	5
3. Transportation and storage.....	6
4. Instructions and precautions before installation and operation .....	7
5. Installation and welding.....	8
6. Commissioning and use.....	9
7. Operation and labelling.....	10
8. Maintenance.....	10
9. Scrapping.....	11
10. Appendix.....	12

### BROEN BALLOMAX® – further useful information

11. Mounting and disassembly of gears on a valve as well adjustment.....	13
12. Instructions for transportable gears.....	17
13. Flexible extensions and planetary gear for underground valves.....	20
14. Change of gasket sets .....	26

## 1. General information

### **BROEN BALLOMAX® Steel ball valves**

BROEN BALLOMAX® is designed with highest possible safety and functionality in mind, but we recommend reading this manual thoroughly.

The technical data is not binding and can be changed without any notice. Please see our general terms and conditions. Further information can be obtained upon request. It is the responsibility of the project owner and installer to choose products suitable for the intended purpose and secure that pressure data and performance data is not exceeded. Updated installation manuals apply.

The entire system should be depressurized and emptied before any kind of removal, change or repair of a single component – no matter if the components are defective or not.

BROEN ball valves are intended for installation in heating-, cooling- and district heating- installations with treated water, that does not corrode neither carbon steel nor materials in the O-rings or seals.

The valve house is made in carbon steel and the stem and ball are made in stainless steel.

The ball seats are made of carbon reinforced Teflon (PTFE). The stem stuffing box is done with FPM- (Viton) and EPDM- O-rings.

The valve is tight in both directions and can be mounted in both directions. Local legislation must always be observed.

### **Approvals**

BROEN BALLOMAX® ball valves in steel are approved according to the demands in (PED) 2014/68/EU for pressurized equipment, module H. Module H is the module for complete quality control.

### **Quality management**

BROEN A/S has been ISO 9001 certified since 1991. The ISO certificate has been approved by Bureau Veritas Quality International Ltd., London, one of the leading international authorities in the field of ISO certification. Bureau Veritas conducts regular audits to check the operation of the system. ISO 9001 covers all processes of production flow and customer service - from the first idea to the product, through drawings, materials, production, as well as control and testing procedures, packaging, shipping, personnel training, contracts and technical documentation, maintenance and claims handling.

## 2. Marking

Each product is marked with a self-adhesive label, based on aluminum foil, resistant to weather conditions, on which all relevant information about the product are given.

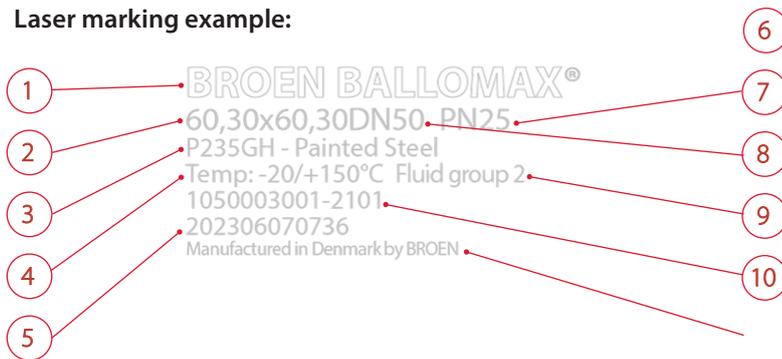
### Label example:



- |                       |                       |
|-----------------------|-----------------------|
| 1: Product brand      | 5: Pressure class, PN |
| 2: Size, DN           | 6: Material           |
| 3: Design Temperature | 7: Production date    |
| 4: Fluid group        | 8: Producer           |

The product may also be labelled with a laser marking where all relevant information is provided.

### Laser marking example:



- |                              |                       |
|------------------------------|-----------------------|
| 1: Product brand             | 6: Pressure class, PN |
| 2: Size of connections       | 7: Size, DN           |
| 3: Material                  | 8: Fluid group        |
| 4: Design Temperature        | 9: Item number        |
| 5: A unique numerical number | 10: Producer          |

### 3. Transportation and storage

It is important to check if the valve or its parts has been damaged during transportation. If there are any transportation damages BROEN A/S recommends receiving the delivery and then immediately contacting BROEN A/S.

BROEN A/S recommends to control that the delivery is as agreed – number, size, type and equipment and etc.

Information about damages, defects or irregularities according to the agreement should immediately be informed to BROEN A/S.

Store the valve in a clean and dry place before installation. Do not remove the protection caps before immediate installation.

**Use lifting straps when lifting larger valves. Do not lift the valve in its actuator, stem or handle (Fig. 1, 2 & 3).**

If in doubt about the weight of the valve to be lifted, you can see its weight in the BROEN BALLOMAX® catalogue or on BROEN's homepage – [www.broen.com](http://www.broen.com).



Fig. 1.

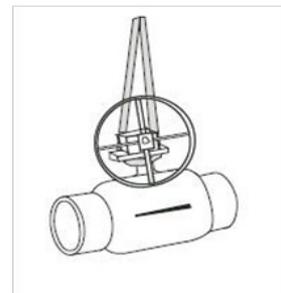


Fig. 2.

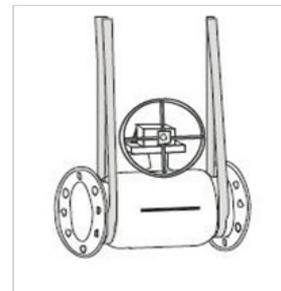


Fig. 3.

## 4. Instructions and precautions before installation and operation

Present instructions should be carefully reviewed before mounting and operation of BROEN BALLOMAX® ball valves:

- Control that the valve is suitable and approved for the used media and the desired application. The valve is not suitable for steam! Here a valve suitable for high temperatures is to be used.
- Operate the valve, if possible, to ensure that the valve is not defective from storage or transportation.
- If the valve is used as an end valve in the pipeline, there has to be installed a pressure tight ending or blind flange after the valve and the valve is to be left in the open position (Figure 4).
- In order to ensure safe operation the manual gear or actuator cannot be removed or dismantled, without special precautions are taken, if the valve is under pressure and/or there is a flow.
- BROEN A/S recommends, that the valve is installed in the pipeline with minimal vibrations. In the installation it is recommended to avoid stress and to relieve the valve for exposed longitudinally pressure and tensile load.

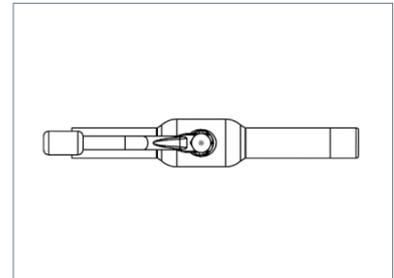


Fig. 4.

## 5. Installation and welding

### Welding

The pipe line is to be cleaned thoroughly before the installation of the valves, as any impurities can damage the surface of the valve and seals.

Do not remove the manual gear or actuator from the valve unless it is absolutely necessary. In the event the manual gear or actuator is to be removed during or after the installation, then contact BROEN A/S customer service or see instructions in the chapter "Instruction for mounted gear".

Electric welding (TIG, MIG) is recommended for all BROEN BALLOMAX® ball valves in steel. Valves larger than DN150 should always be welded in the pipe line by means of electric welding.

Do not overheat the valve during the welding – there is a risk for damage of the seals. It is recommended, that the welding is done by qualified personnel.

Cool the valve (after welding) before normal use. The valve should only be operated, when the valve is cooled sufficiently.

The welding is only to be done on the ends of the valve and not on the body of the valve, as this will damage the seals in the valve.

For further information refer to the guidance on the valve.

The valve can be placed in both vertical and horizontal position, and during the entire welding process it should be noticed, that the valve must be in open position.

Welding of larger valves  $\geq$  DN 200 full port / DN 250 reduced port.  
The valve must remain open during welding to protect the ball.

***At risk of overheating there should a pause in the welding process.***

The ground connection must not be connected to the valve.

### Flange mounting

The valve should only be mounted by qualified personnel and follow valid norms and standards.

The valve should be in open position during mounting in order to ensure, that dirt and coatings do not ruin the surface of the seals.

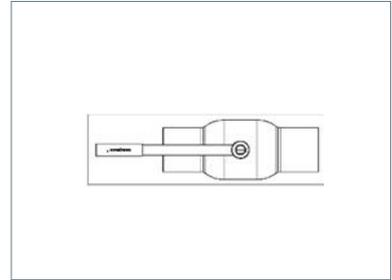


Fig. 5.

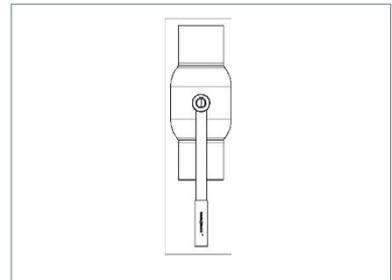


Fig. 6.

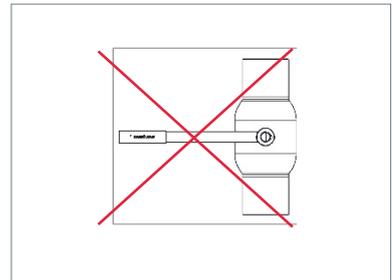


Fig. 7.

The mating surface of the flange on the pipe should be parallel to the mating surface of the valve.

The centerline of the valve and the pipeline should also be correctly aligned.

The length of the valve should be the same as the length between the flanges in the pipeline also taking account the thickness of the gaskets.

The flanges of the pipeline should be compatible with the flanges on the valve. For detailed information, please see standard EN 1092-1.

## 6. Commissioning and operation

After installation of the valve the pipe line should be flushed thoroughly. During this process the valve is to be open.

### **Testpressure at commissioning**

If a pressure test of the system is needed, the following precautions are to be considered:

- The building of pressure is to be done slowly and gradually in order to prevent pressure surge and hammering.
- During the pressure test of the pipeline (1,5 x PN) the valve is to be in the open position.
- BROEN BALLOMAX® ball valves are designed to be fully open or fully closed. Control that the valve is either fully open or fully closed position against the endstop.
- Take care that the maximum and minimum temperatures, of the valve, is not exceeded! The maximum operating pressure and minimum-/ maximum-temperatures are shown on the label of the valve.

## 7. Operating and labelling

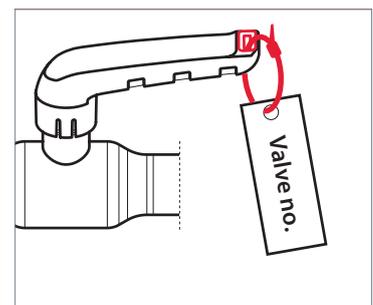
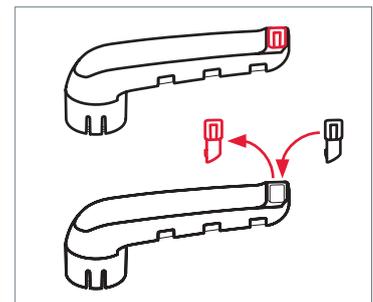
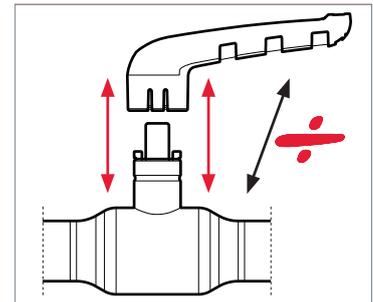
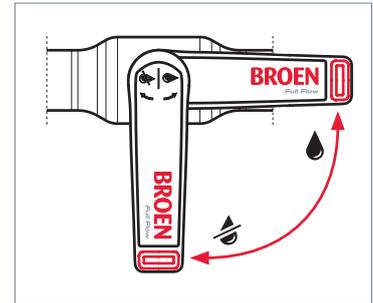
BROEN BALLOMAX® DN10-50 are operated via the ergonomic metal-reinforced nylon handle. Full operation is achieved by rotating the handle 90 degrees. A longitudinal position corresponds to a fully open valve, while a transversal position results in a fully closed valve.

The valves are designed to be either fully open or fully closed and should be used in this way. Positioning the ball in intermediate positions for long periods can result in a loss of tightness between the ball and the seals.

The handle on the valve is easily removed with a controlled, moderate pull away from the valve housing. It is recommended that you secure the valve while doing this. After removing the handle, it can be mounted freely in the desired direction. Do not use any kind of tools in connection with operation, mounting or removal of the handle.

It is possible to mark each valve with different coloured clips in order to enable identification of hot and cold water or return and non-return, for example. Clips in red and blue respectively included when buying valve.

The clips also make it possible to label the individual valve. This labelling can be advantageous as regards sectional building.



## 8. Maintenance

The valves do not demand extra service under normal conditions, but to ensure correct function of the valves, it is recommended to open and close the valves once yearly.

Correct functionality of the valve demands correct quality of the water and installation. The valve house is made in carbon steel and is as such not resistant to corrosion.

Corrosion from the outside can be avoided by either installing the valve in dry environment or equip the valve with a watertight insulation or another surface protection (not oil).

The stuffing box in the stem is designed to last for the lifetime of the valve. In specially unfavorable conditions minor leakages can occur. This can be solved with a change of the o-ring, which can be done without draining the valve of pressure or media.

Be aware of all special conditions and contact BROEN A/S if necessary.

If it is necessary to change O-rings on the stem, BROEN A/S should be consulted for guidance and safety instructions.

### Gasket sets:

#### Hexagon with dolly:

Size:	Item number:	
DN20-80 RB	DN25-65 FB	600262
DN100 RB	DN80 FB	600263
DN125-150 RB	DN100-125 FB	600264
DN200 RB	DN150 FB	600269

#### ISO-flange:

Size:	Item number:	
DN200 RB		600266
DN250-300 RB	DN200-250 FB	600265
DN400 RB	DN300 FB	600267
DN500 RB	DN400 FB	600268

#### DN10-50 FULL FLOW:

Size:	Item number:	
DN10-20		600940
DN25-32		600941
DN40-50		600942

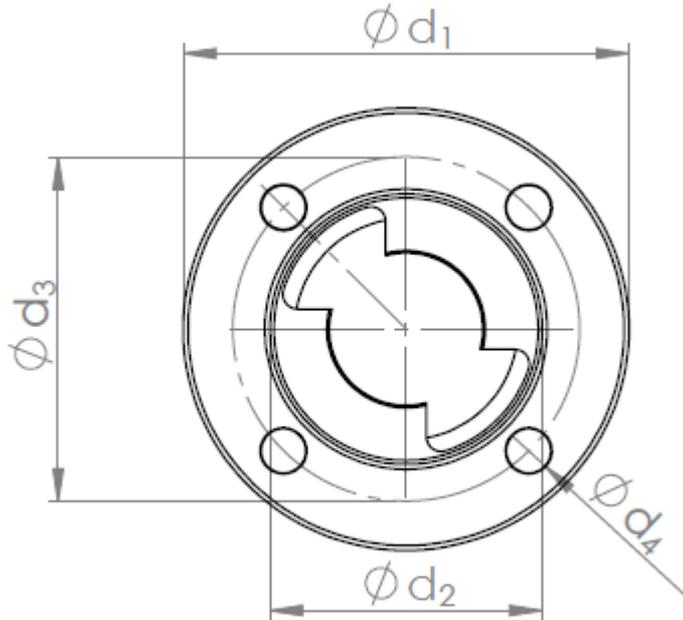
## 9. Scrapping

Almost every part in BROEN BALLOMAX® valves are made of reusable materials.

The type of the materials is described on the data sheet of each valve.

## 10. Appendix

### Standard mounted flange for gears – ISO 5211



#### Reduced port

DN valve	Flange type	D1	D2	D3	D4	t	Boltholes
125	F07	90	55	70	9	13,5	4
150	F10	125	70	102	11	14,5	4
200	F12	150	85	125	13	14,5	4
250	F14	175	100	140	17	17,6	4
300	F16	210	130	165	21	23,5	4
350	F16	210	130	165	21	23,5	4
400	F25	300	200	254	17	27,5	8
500	F30	350	230	298	21	28,5	8

#### Full port

DN valve	Flange type	D1	D2	D3	D4	t	Boltholes
100	F07	90	55	70	9	13,5	4
125	F10	125	70	102	11	14,5	4
150	F12	150	85	125	13	14,5	4
200	F14	175	100	140	17	17,6	4
250	F16	210	130	165	21	23,5	4
300	F16	210	130	165	21	23,5	4
350	F16	210	130	165	21	23,5	4
400	F30	350	230	298	21	28,5	8

## 11. Mounting and disassembly of gear on a valve as well as adjustment

Please read the instructions thoroughly before beginning of the procedures and contact BROEN A/S, if there are any questions.

The valve is a shut-off valve. The valve is to be left in the fully open or fully closed position.

Normally the valve is delivered in fully open position. In fully open position the indicator line on the end of the stem is pointing in the longitudinal axis of the valve.

The operation of the valve (from fully open to fully closed position) is done by rotating the stem the maximum distance. The distance in gear and valve is 90°.

Note: BROEN A/S recommends, that the gear is mounted and adjusted before the valve is installed in the pipe line, while there still is free view to the ball inside the valve. Is the gear mounted and adjusted after the installation of the valve in the pipe line, then it is no longer possible to control, that the position of the ball is in fully open or fully closed position. Wrongly positioning of the ball can cause damage on the seats of the valve and leakage from the valve in closed position.

### **Disassembly of the gear from the valve:**

1. Close the valve.
2. Remove the four (or eight) mounting screws and lock washers.
3. Remove the gear from the valve.

### **Mounting of gear on the valve (handwheel or chainwheel):**

1. Place the gear and the valve in the same position (both open or both closed).
2. Most gearboxes comprise a reduction cone, which is equipped with a key. If the reduction cone is supplied separately or falls out, the cone has to be fitted/placed correctly.
3. Choose the wanted mounting position of the gear box. Activate the gear box with the valve stem and put the gear box in position upon the valve.
4. Mount the gear box (and if necessary also on insulation gasket) upon the valve by means of the four (or eight) mounting screws.

**DO NOT FORGET THE LOCK WASHERS!**

Tighten the screws as shown in table A below.

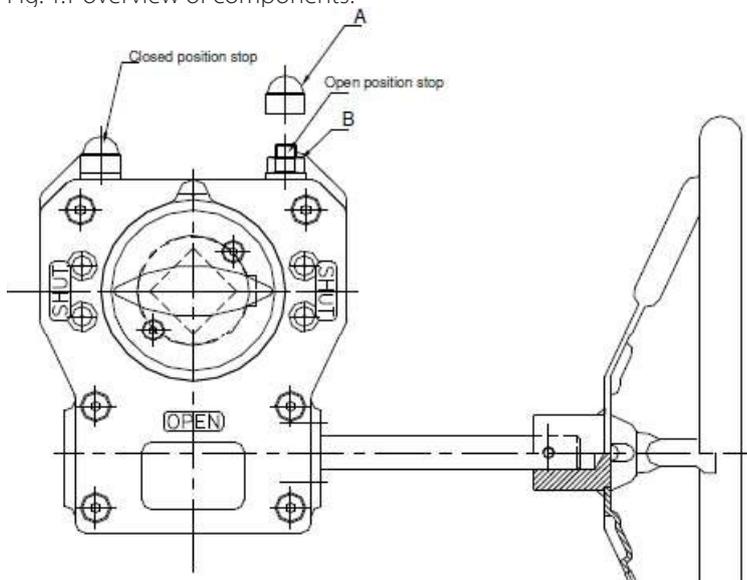
Tabel A - Torque

Fastener dimension	M6	M8	M10	M12	M16	M20	M30	M36
Bolt dimension: <b>Steel</b>	8,5 Nm	20,5 Nm	41 Nm	71 Nm	170 Nm	350 Nm	1190 Nm	2100 Nm
Bolt dimension: <b>Galvanized steel (klass 70)</b>	5,9 Nm	14,5 Nm	30 Nm	50 Nm	50 Nm	244 Nm	445 Nm	651 Nm

- Adjust the open and close position stop as shown in the following chapter "Adjustment of gear after mounting upon the valve".

### Adjustment of the position end screws

Fig. T.1 overview of components.



The open and close position stops prevent the actuator of rotating beyond the open and closed positions of the valve. Each stop can be adjusted. The stops are not preadjusted by the gear box manufacturer. We refer also to the instructions of the valve for specific demands of the closed position of the valve.

### Adjustment of gear after mounting on valve

#### Size DN10 - DN150

#### How to adjust the stop for closed position:

- Remove the protection cap (A) from the counter nut on the stopscrew for the closed position.
- Loosen the counter nut (B) on the end screw for the closed position and loosen the end screw a few turns.
- Turn the handwheel (or another operating device) so the valve is in closed position.
- Turn the stopscrew for the closed position clockwise until there is a feeling of resistance from the end screw, when it is in contact with the gear in the actuator.
- Hold the end screw so it does not turn, when the counter nut (B) is tightened.
- Put the protection cap back (A) on the counter nut.

**How to adjust the stop for open position:**

1. Remove the protection cap (A) from the counter nut on the end screw for the open position.
2. Loosen the counter nut (B) on the end screw for the open position and loosen the open screw a few turns.
3. Turn the handwheel (or another operating device), so that the valve is in open position.
4. Turn the end screw for open position clockwise until there is a feeling of resistance from the end screw, when it is in contact with the gear in the actuator.
5. Hold the end screw, so it does not turn, when the counter nut (B) is tightened.
6. Put the protection cap (A) back on the counter nut.

The exact position of the ball in open and closed position, is very important ensuring the tightness of the valve. If it is possible to see inside the valve, the position has to be controlled carefully.

Open position: The ball is exactly adjusted, so that the opening flush with connection ends and the seal rings of the valve seat. Closed position: There should be full contact/overlap between the ball and the seal rings of the valve seat.

**Size DN200 - DN500****First adjust the open position:**

1. Rotate the stem and ball counterclockwise  from closed position towards open position.
2. While rotating counterclockwise look inside the valve. Continue rotating counterclockwise until the ball is aligned up according to the seat gaskets of the valve. See figure 3.
3. Set the adjustment screw of the gear, so that the operation of the valve is limited to this position.

If the ball is rotated too far – see figure 9 – and a re-adjustment is necessary it is important that the ball is not aligned by rotating clockwise .

**Do instead following:**

1. Close the valve.
2. Align the ball again in open position by rotating the ball counterclockwise .
3. Readjust the adjustment screw.

Note: It is important that the open position always is adjusted by rotating the stem and ball counterclockwise  in order to avoid backlash in the gear and the valve, that disrupts the adjustment.

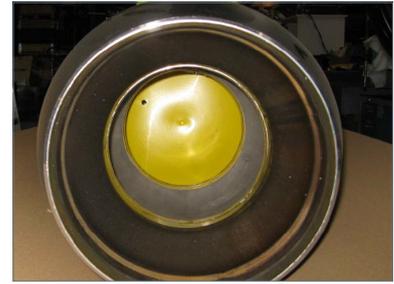


Fig. 8.

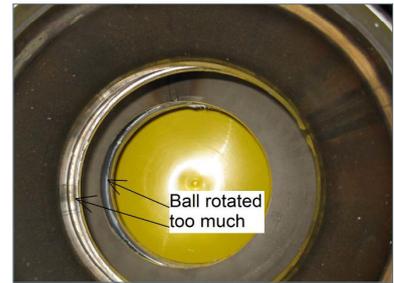


Fig. 9.



Fig. 10.



Fig. 11.

In cases where the disassembly or mounting of valves with electric actuators is needed – follow carefully the instructions in the guidelines of the actuator or contact BROEN A/S.

Reduceret flow	Full flow	Maximum output torque from gear [Nm]
DN250	DN200	1500
DN300/350	DN250	3000
DN400	DN300/350	6500
DN500	DN400	16000

Ventil	DN250	DN300 & DN350	DN400	DN500
Mål	21 mm	28 mm	34 mm	43 mm

## 12. Instructions for transportable gears

BROEN A/S transportable gears is available in two sizes, MP II and MP III.

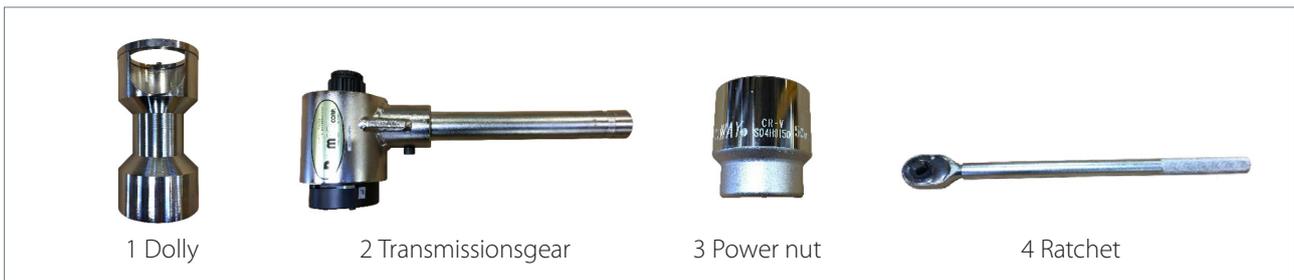
MP II with the 70mm hold has a maximum torque of 800Nm and with a 90mm hold a torque of 1800Nm.

MP III with the 90mm hold has a maximum torque of 6000Nm.

### MP II gear components



### MP III gear components



### Preparation:

1. The transmissiongear (2) is put together with the dolly (1) and depending on the use the 70mm dolly or the 90mm dolly is to be used. The power nut is placed in the dolly.
2. Place the hold (1) together with the transmissiongear (2) and power nut (3) on the dolly of the valve. Turn by hand the input on the transmissiongear until the power nut falls in place upon the hexagon of the valve. Take care that all parts are fitted together on the valve.
3. Place the ratchet (4) on the transmissiongear (2) and extend the lever to increase the torque input to the gear. On the ratchet the desired direction is chosen.  
Right – clockwise – The valve is closed.  
Left – counterclockwise – The valve is opened.
4. To ensure an easier transfer of torque to the valve, the transmission function on the transmission gear has to be activated. In order to activate this transmission the top of the gear should be raised so the two edges are clear.

**IMPORTANT!**

If you do not secure that item 4 is fulfilled the transmission could be 1:1 and the operation of the valve could become more difficult.

**Opening and closing of the valve****Close:**

The turning direction is clockwise. To release the ball from the seals and not damage the seals, you should first turn the valve so far, until you feel a certain resistance in the ratchet. The occurred torque in the ball will then loosen the ball from the seals and after a short while you can continue turning clockwise to close the valve.

You continue until you again feel an increasing resistance in the ratchet. Gear and stem have now stopped against the mechanical stops. The valve is now closed and secured from reopening by itself.

**Open:**

The turning direction is counterclockwise. The opening of the valve happens in the same way, as when it is closed.

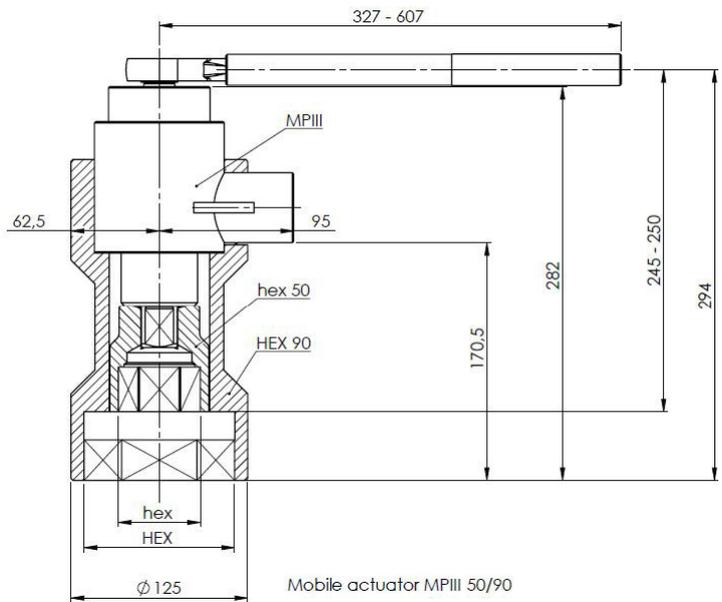
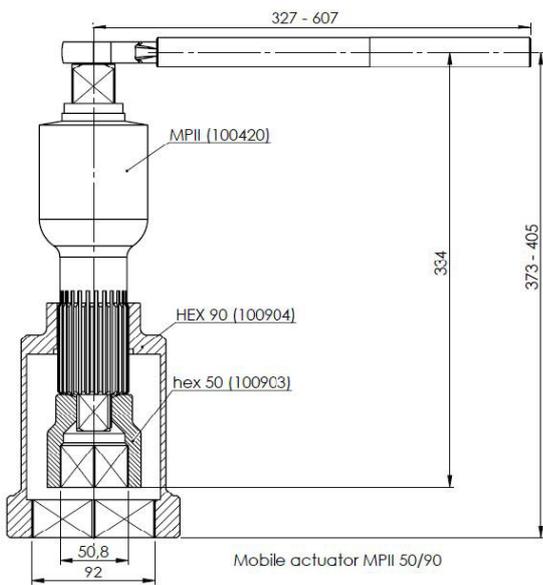
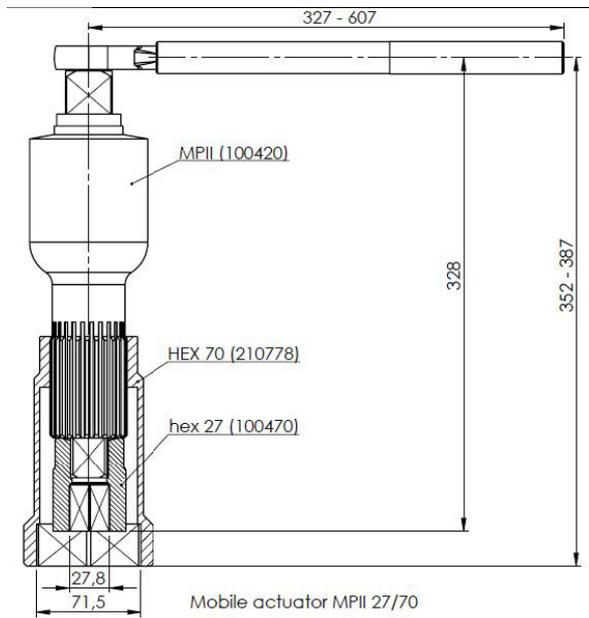
On the stem of the valve there is a position indicator showing the position of the ball, which is either open or closed. In this way it can be checked if the valve is closed when the indication shows a closed valve.

Deviations from this can cause damage on the seals and the ball.

**Transportable gear:**

Type:	Part number:
MPII (27/70)	66361100 060
MPII (50/90)	66361250 070
MPIII (50/90)	66361400 080

Measurements for MP11 and MP111 complete



## 13. Flexible extensions and planetary gear for underground valves

Planetary gear is mounted on the valve from the factory. The planetary gear is hereby adjusted and equipped with a serial number.

The planetary gears belongs to the supplied valves and are not interchangeable. Correspondingly the hexagon on the valve can be extended with the flexible extensions 27/70 or 50/90 with standard lengths of 500mm, 1000mm and 2000mm. In cases where the standard length is not useable, the extension can be shortened.

### Regulation of the length of the stem extensions

Illustrated parts and tools are also going to be used:

### Length calculation of the stem extension

#### Calculation example:

Adjustment of the standard extension (L=1000mm for a ball valve DN200)

Standard stem height on valve (SH): 585mm (The height from the centerline of the valve to the upper edge on the hexagon)

Requested total height (TH) – (depending on the buried depth of the valve):  
1700mm, measured from the centerline of the valve to the upper edge of the well cover.

The wanted height from well cover to the upper edge of the operation square is normally 200mm.



Fig. 18.



Fig. 19.



Fig. 20.



Fig. 21.

**The flexible extension is shortened with mm:**

Type	Reductions in X mm
TH=	1620 mm
Minus	-200 mm
FKV	1420 mm
SH=	585 mm
Y=	195 mm
X= (FKV – (SH+Y))	640 mm
ØSL = 1000 mm – X	360 mm

**The adjustment of the length of the flexible extension**

Usually the flexible extension is supplied with a position indicator strapped on the stem. This prevents it in displacing during transportation and slide away from the hexagon dolly on the valve. The position indicator is not used, when the planetary gear is used and can be removed by unscrewing the socket screws.

No.	Component
1	Stem
2	Position indicator
3	Socket screw
4	Hexagon dolly
5	Internal retaining ring
6	Socket screws

**The shortening of the flexible extension:**

In order to shorten the stem the internal retaining ring has to be removed. This is done by unscrewing the socket screws in the ring.



Fig. 22.



Fig. 23.



Fig. 24.



Fig. 25.



Fig. 26.



Fig. 27.

**Reducing the hexagon dolly (the bottom part):**

The surface of the cut should be protected with durable corrosion protection (e.g. Coldzinc paint, not part of supply).

The shortening of the stainless stem (the upper part) to the wanted length (ØSL):



Fig. 28.

### Preparation of retaining of the pipe of the hexagon dolly on the valve

Three holes of 8mm are drilled with an alteration of 120° on three sides of the pipe of the hexagon dolly. M8 nuts (part of supply) are welded on. The pipe of the dolly is retained with screws M8x15.

#### Alternatively:

Three threads are made with an alteration of 120° on three sides of the pipe of the hexagon dolly. The pipe of the dolly is retained with the supplied screws M8x15.

Corrosion protection has to be applied on the machined parts.

### Transfer of the positions indicator on the upper part of the shortened stem

#### Mounting of the flexible extension on the valve.

1. The planetary gear is released from the valve by unscrewing the pointed screws on the gear.
2. Mounting of the internal retaining ring on the stem.
3. The extension stem is placed upon the stem of the valve and is retained by means of three screws.
4. The planetary gear is placed on the stem extension and is retained by means of pointed screws.



Remember to only loosen the lower pointed screws.

See next chapter for the reinforcement of the stem extension.

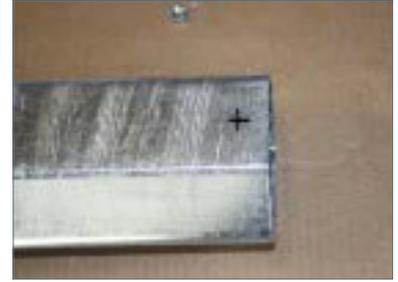


Fig. 29.



Fig. 30.



Fig. 31.



Fig. 32.



Fig. 33.



Fig. 34.

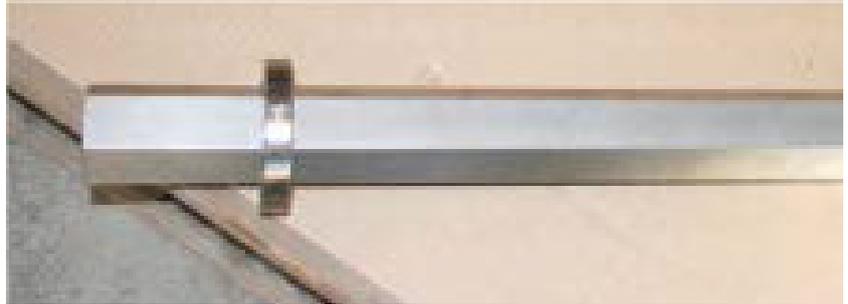


Fig. 34. Measurement from upper edge of the stem.



Fig. 36.

**NOTE!**

The insulated protection pipe on the stem of the valve should be shortened (at least 50mm) in order to maintain the accessibility of the pointed screws.



Fig. 37. Reinforcement

### Assembly guide of the reinforcement of the stem extension

After the shortening of the extension three holes are drilled with 120° on three sides.

Then the reinforcement is placed. Picture 39.

Hereafter the area for welding is marked. Picture 40.

Prior to the welding the zinc protection is to be removed from the marked area.

After the welding the entire area is painted with zincspray for corrosion protection and hereafter mounted on the stem. Picture 41.



Fig. 38.



Fig. 39.



Fig. 40.

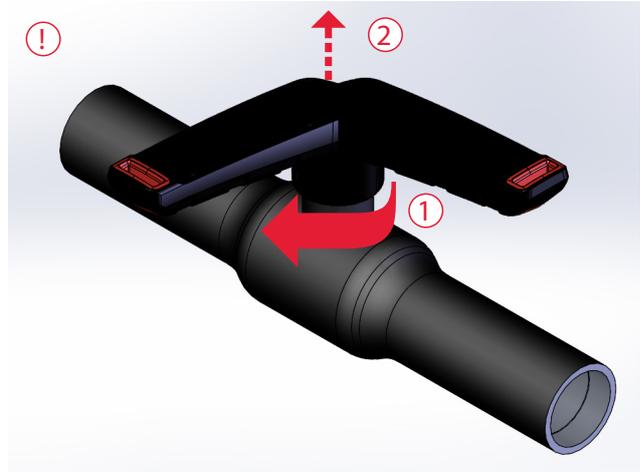


Fig. 41.

## 14. Change of gasket sets

### STEP 1:

1. **IMPORTANT!** Close the valve
2. Pull handle straight up
3. Use a thin flat screwdriver to tilt the Lock ring up

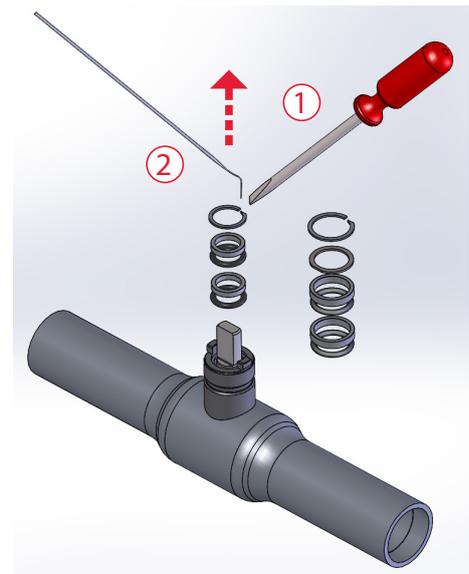


### STEP 2:

1. Use the supplied disassembly tool to tilt up the other components
2. Insert the disassembly tool into respectively: (DN40-50 Support ring), Friction rings and O-rings. If necessary, pull them up individually

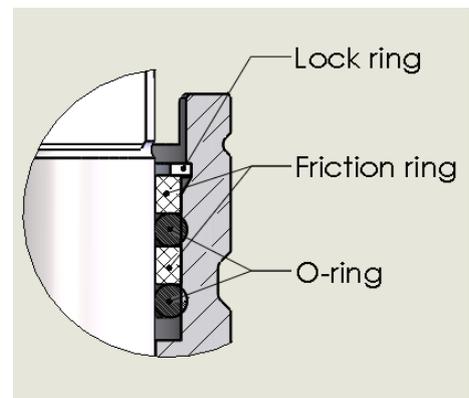
### NOTE!

It is very important not to leave scratches or marks on the spindle and inside the spindle handle)



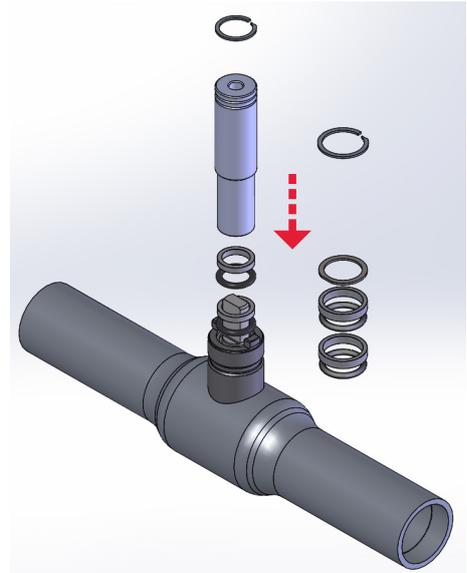
### STEP 3:

1. Install new gasket kit in the order shown

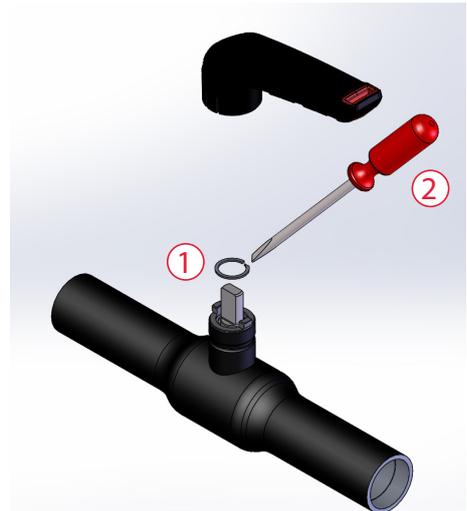


**STEP 4:**

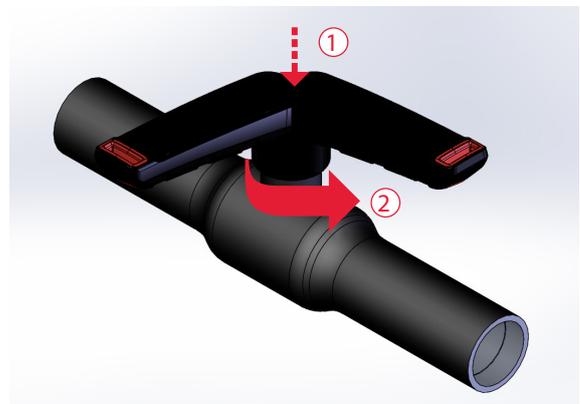
1. Use the provided mandrel (It is important not to pinch or cut the O-rings on the edge of the spindle)
2. Press or gently hammer the gasket set into place

**STEP 5:**

1. Place the Lock ring down on top of the packing kit
2. Use a screwdriver to push it down into place

**STEP 6:**

1. Place handle on spindle and push it down
2. Open the valve carefully



**WARNING!** Media may be hot and cause scalding. Use safety glasses and gloves.



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