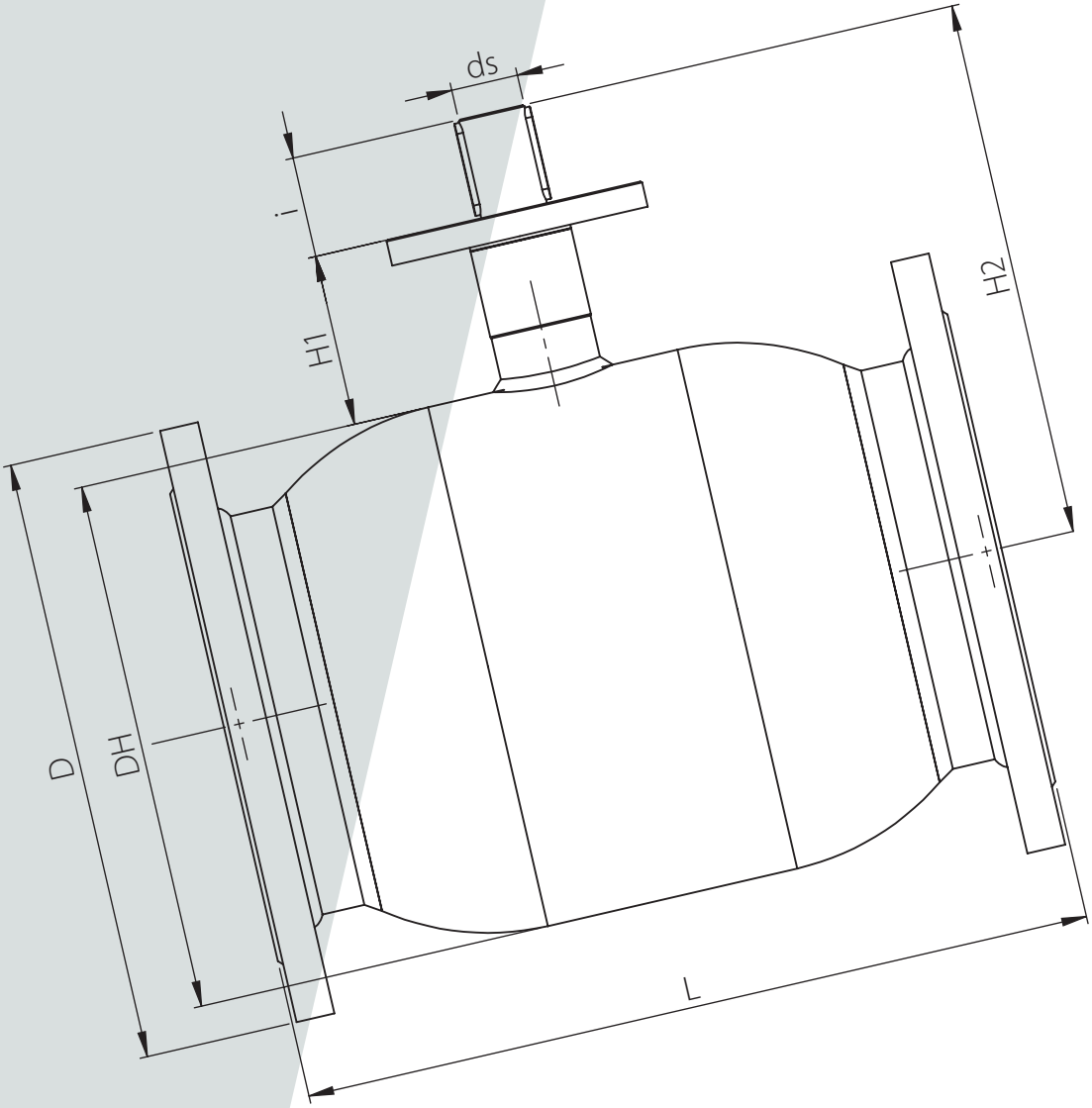
BROEN
VALVE TECHNOLOGIES



BROEN
BALLOMAX®

BROEN BALLOMAX® STEEL BALL VALVES

Floating Ball Valves - User Manual

Version 6.2 - September 2026

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 severel 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 APS.

Read more in the chapter “Change of gasket set” on page 28.



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



Branching and hot tap valves
Fully welded systems are state of the art.
Sealing caps of branching valves and hot tap valves must be welded with a sealing seam.

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BROEN BALLOMAX® valves user manual

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1. Scope

These operating instructions refer to BROEN BALLOMAX® steel ball valves DN 15 - DN 500 RD | DN 10 - DN 400 FB, which were developed and built according to the 'floating ball' design principle.

Further operating instructions are available for trunnion-mounted BROEN BALLOMAX® ball valves and for the BROEN tapping system.

Please read this manual carefully to ensure safe operation and use as intended.

2. 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 PTFE. The stem is sealed against the atmosphere using FPM, FKM, EPDM or PTFE elements.

The valve is tight in both directions and can be mounted in both directions.

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

Since 1991, BROEN ApS has maintained ISO 9001 certification, a testament to its commitment to quality, safety and continuous improvement. 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.

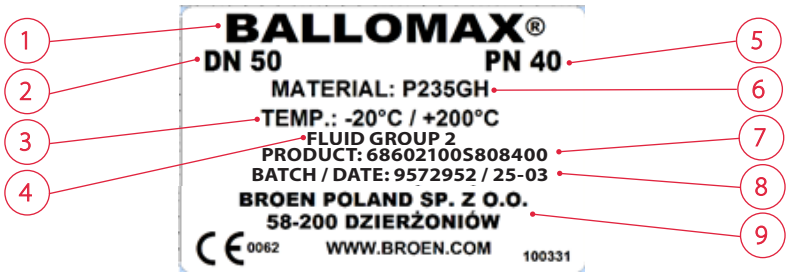
All BROEN valves are tested prior to delivery in accordance with EN 12266-1 P10, P 11 and P 12; EN 12266-2 F 20 and are marked in accordance with the Pressure Equipment Directive.

The requirements of Class A - Bubble tight - are met.

3. Marking

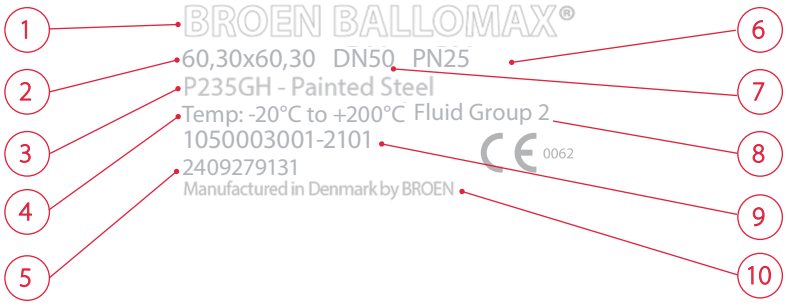
All BROEN fittings are labelled in accordance with EN 19.
The following markings are used:

Label example type:



1: Product brand
2: Size, DN (R = reduced)
3: Design Temperature
4: Fluid group
5: Pressure class, PN
6: Material
7: Item number
8: Batch number / Manufacturing date (YY-MM)
9: Producer

Laser marking example:



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

4. Transportation and storage

It is important to check whether the valve or any of its parts have been damaged during transport.
Please note transport damage on shipping paper upon receipt.

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

BROEN ApS must be notified immediately of any damage, defects or irregularities in accordance with the contract.

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

Use lifting straps when lifting 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.

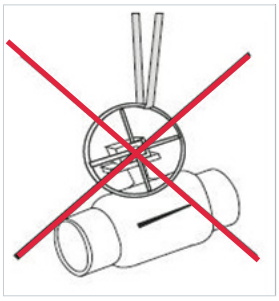


Fig. 1.

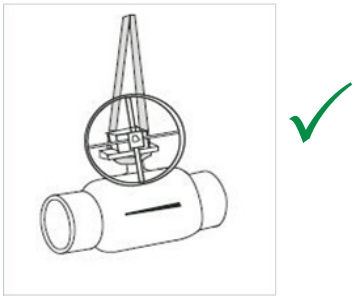


Fig. 2.

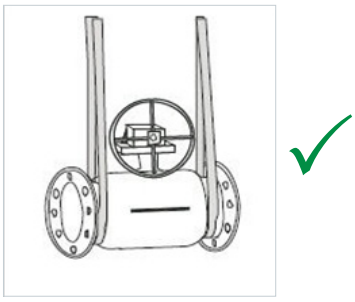


Fig. 3.

5. Instructions and precautions before installation and operation

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

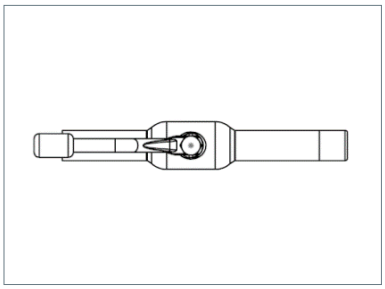


Fig. 4.

- 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 BROEN valve suitable for high temperatures must be used.
- BROEN BALLOMAX® ball valves are designed for use in closed water circuits. The medium must be treated in such a way that no corrosion damage can occur to the valve and the sealing elements.
- Solids and impurities can damage the sealing elements of the valve - make sure the medium in your pipe system is clean.
- 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. The valve should remain in the OPEN position. (Figure 4).
- To ensure safe operation, the manual gearbox or actuator cannot be removed or disassembled when the valve is under pressure and/or flow without special precautions.
- 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.
- From DN 125 R we recommend the use of gearboxes or actuators to achieve controlled opening and closing of the valve and to prevent water hammer in the system.
- The usual breakaway torques | actuating torques are lower than the values listed in table 1.
- If gearboxes and drive units are retrofitted, the maximum possible weights in the table below must be taken into account. (Table 2).

Table 1

FP DN	RP DN	Maximum torque [Nm]
40	50	**80**
50	65	**120**
65	80	**200**
80	100	**300**
100	125	**400**
125	150	**810**
150	200	**1100**

Table 2

FP DN	RP DN	Weight [Kg]
40	50	**20**
50	65	**20**
65	80	**20**
80	100	**20**
100	125	**28**
125	150	**28**
150	200	**38**

6. Installation and welding

Welding

The pipework must be properly cleaned before installing the valves, as any impurities may damage the surface of the ball or sealing elements.

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 ApS customer service Email: broen@broen.com or phone: +45 6471 2095.

Arc welding (TIG, MIG) is recommended for all BROEN BALLOMAX® ball valves in steel. Valves larger than DN 150 should always be welded in the pipe line by means of arc welding.

Do not overheat the valve during the welding – there is a risk for damage of the seals. Welding must be done by qualified welders.

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 or stem 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. During the entire welding process the valve must be in OPEN position.

At risk of overheating there should a pause in the welding process.
The ground connection of welding equipment must be connected to the pipe and not the valve.

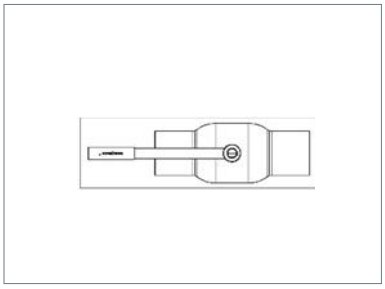


Fig. 5.

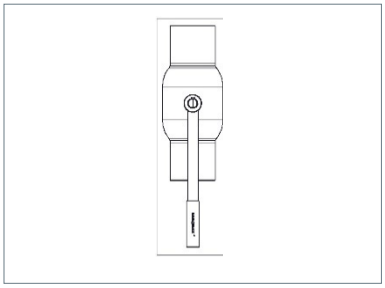


Fig. 6.

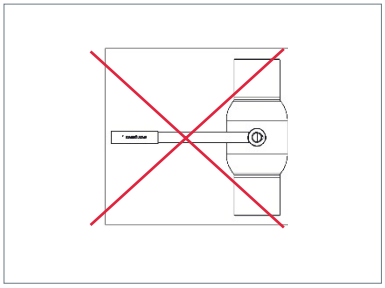


Fig. 7.

Flange mounting

Installation of the valve should only be carried out by qualified personnel and be in accordance with applicable standards and regulations.

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 or ball.

The mating surface of the flange on the pipe must 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.

7. Commissioning and operation

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

Testpressure at commissioning

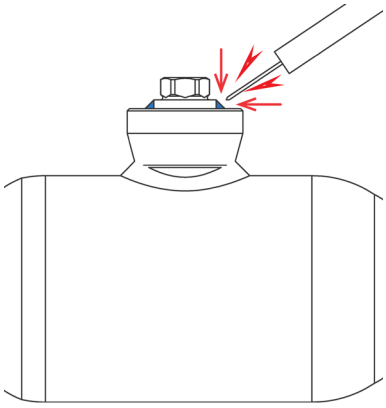
If a pressure test of the system is needed, the following procautions are to be considered:

- The building of pressure must be done slowly and gradually in order to prevent pressure surge and hammering.
- During the pressure test of the pipeline (max 1,5 x PN) the valve must be in the HALF 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.
- The operating parameters must not exceed the values of the P/T diagram for the valve used.

If hot tapping valves or branch valves are installed in a pipe system, please note that fully welded systems are state of the art in underground installations.

We recommend to weld the plug by TIG or arc welding after commissioning of the connected pipeline.

Alternatively, LOCTITE® 577 [medium strength for metallic thread sealing - operating range: -55°C to +150°C] can be used after written agreement with the end customer.



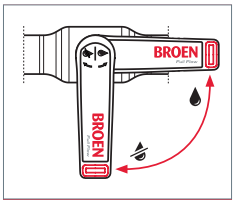
8. Operating and labelling

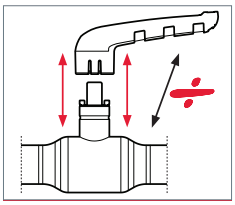
BROEN BALLOMAX® DN 15 - 50 are operated via the ergonomic metal-reinforced composite handle. Full operation is achieved by rotating the L-handle or T-handle 90 degrees (Clockwise to close | counterlockwise to open position of the ball). A longitudinal position corresponds to a fully open valve, while a transversal position results in a fully closed valve applies to both L-handle and T-handle. The valves are designed to be either fully open or fully closed and must 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.

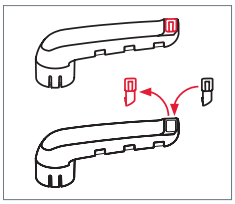
The handle on the valve is easily removed with a controlled, moderate pull away from the valve housing. It is recommended that you secure the valve while doing this. After removing the handle, it can be mounted freely in the desired direction. Do not use any kind of tools in connection with operation,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

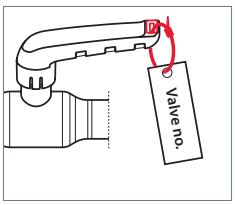
It is possible to mark each valve with different coloured clips in order to enable identification of hot and cold water or return and non-return, for example. Clips in red and blue respectively included when buying valve. The clips also make it possible to label the individual valve. This labelling can be advantageous as regards sectional building. The clips also make it possible to label the individual valve. This labelling can be advantageous as regards sectional building.

L-handle & T-handle:









Gear handle:

For BROEN BALLOMAX® DN 10 - 50 gear handle applies:
The opening is achieved by turning the gear ring in a counterclockwise direction. To close the ball, the gear ring is turned in a clockwise direction. When the BROEN logo has a longitudinal position the valve is fully open, while a transversal position of the BROEN logo is fully closed. 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. 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.

9. Maintenance

The valves do not require any special maintenance under normal conditions, but it is recommended to open and close the valves once a year to ensure that the valve operate correctly.

Correct functionallity 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 must be avoided. Either install the valve in a dry environment or provide the valve with waterproof insulation or other surface protection (not oil).

The stem seals are designed to last the life of the valve.
Under particularly unfavorable conditions, small leakages may occur. This can be solved by replacing the O-ring.

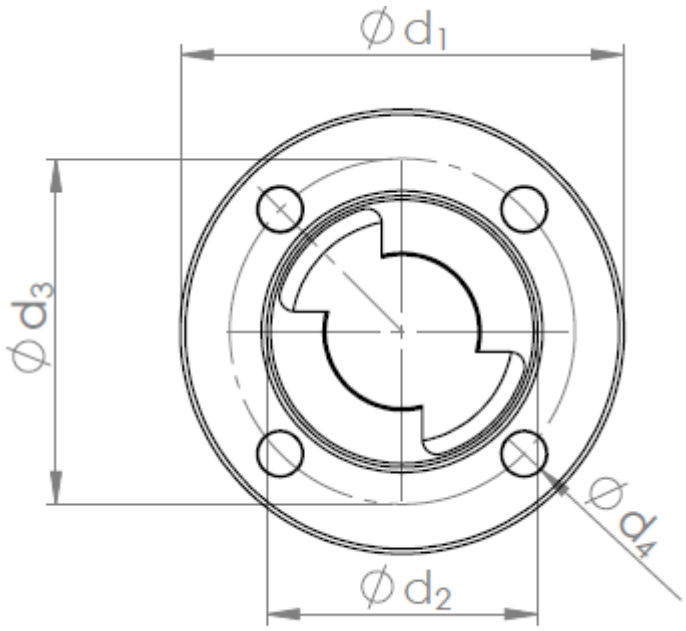
If it is necessary to change O-rings on the stem, BROEN ApS should be consulted for guidance and safety instructions.

10. 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.

11. Appendix

Standard mounted flange for gears – ISO 5211



Full port DN valve	Reduced port DN valve	Flange type	D1	D2	D3	D4	t	Boltholes
40	50	F05	65	35	50	7	12	4
50	65	F05	65	35	50	7	12	4
65	80	F07	90	55	70	9	12	4
80	100	F07	90	55	70	9	12	4
100	125	F07	90	55	70	9	13,5	4
125	150	F10	125	70	102	11	14,5	4
150	200	F12	150	85	125	13	14,5	4
200	250	F14	175	100	140	17	17,6	4
250	300	F16	210	130	165	21	23,5	4
300	350	F16	210	130	165	21	23,5	4
350	400	F25	300	200	254	17	27,5	8
400	500	F30	350	230	298	21	28,5	8

12. 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 ApS, 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.

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 ApS recommends, that the gear is mounted and adjusted before the valve is installed in the pipe line, while there 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 and deformation on the seats of the valve and leakage from the valve in closed position.

Disassembly of the gear from the valve:

1. Move the valve to the 'CLOSED' position.
2. Remove the four (or eight) mounting screws.
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. Select the desired installation position for the gearbox. Bring the gearbox into position so that the bolts can be inserted.
4. Mount the gear box (and if necessary also an insulation gasket) upon the valve by means of the four (or eight) mounting screws.

Tightening torques for gearbox bolts shown in table A:

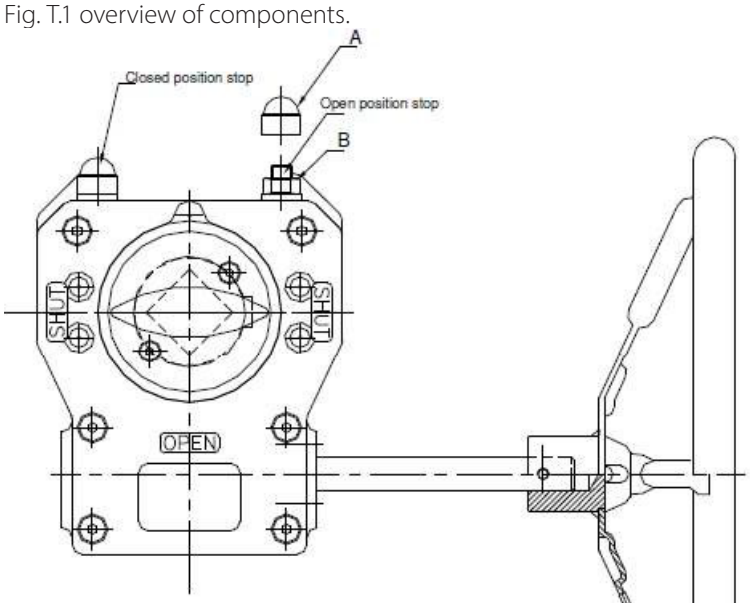
Tabel A - Torque

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

5. 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 end stops ensure that the OPEN + CLOSED position is reached exactly.

The end stops are each set and fixed separately.

A presetting is not given.

The setting for the CLOSED end position is shown below.

Adjustment of gear after mounting on valve

Size DN 40 (smallest dimension for ISO Flange) - DN 500

How to adjust the stop for closed position:

1. Remove the protection cap (A) from the counter nut on the stopscrew for the closed position.
2. Loosen the lock nut (B) at the end of the thread for the 'CLOSED' position by a few turns.
3. Turn the handwheel (or another operating device) so the valve is in closed position.
4. Turn the stop screw for the closed position until resistance can be felt - the rotary movement of the worm gear is now limited.
5. Hold the end screw so it does not turn, when the counter nut (B) is tightened.
6. 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 - The rotary motion of the worm gear is now is limited.
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.

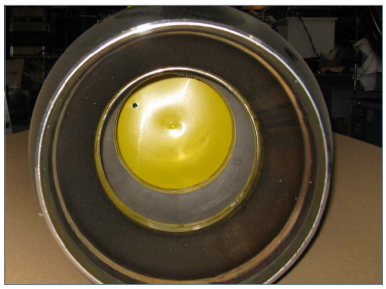


Fig. 8.

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 Fig 8: The ball is optimally adjusted when the ball is line with the seat rings / sealing rings of the valve.
The ball must cover sealing element completely.

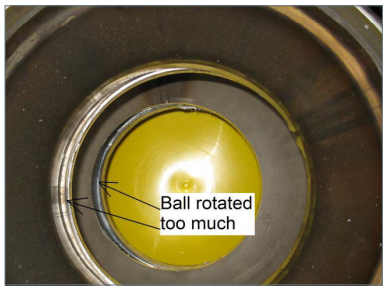


Fig. 9.

If the ball is rotated too far - see Figure 9 - readjustment is required.

How to adjust the stop for CLOSE position:

When adjusting, it is important to rotate the ball with the gearbox before each adjustment in order to minimize the play between the adapter and the stem shaft.



Fig. 10.

In order to set the exact 'CLOSED' position, the ball in the intermediate position is lubricated with grease / lubricant. Fig. 10.

To check that the exact adjustment has been achieved, measure the overlap on both sides of the ball
- it must be equal the exact 'CLOSED' position has been achieved. Fig. 11.



Fig. 11.

Valve	DN 250	DN 300 & DN 350	DN 400	DN 500
	Examples for the overlapping Area			
	21 mm	28 mm	34 mm	43 mm

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 APS.

Reduced flow	Full flow	Maximum output torque from gear [Nm]
DN 250	DN 200	1500
DN 300/350	DN 250	3000
DN 400	DN 300/350	6500
DN 500	DN 400	16000

13. Instructions for transportable gears

BROEN ApS transportable gears is available in two sizes, MPII and MPIII.
The transportable gears are used for the operation of underground ball valves., as well as branching- and hot tap valves in larger dimensions.
Branching- / hot tap valves require an adapter ring and a special torque socket SW 27 mm - BROEN material no. : 601571.
The MP II provides a maximum output torque of approx. 3,500 Nm.
Underground valves with reduced bore are operated as follows:
DN 100 to DN 150 with adapter SW 70 and torque socket SW 27
DN 200 to DN 300 with adapter SW 90 and torque socket SW 50
The MP III provides a maximum output torque of approx. 6,000 Nm and is used with adapter SW 90 and torque socket SW 50.

MPII gear components


1 Adapter


2 Planetary gear


3 Power nut


4 Ratchet

MPIII gear components


1 Adapter


2 Planetary gear


3 Power nut


4 Ratchet

Preparation:

1. Insert the gear unit with the teeth through the counter support (70 mm or 90 mm, depending on the valve size to be operated).
2. Turn the pre-assembled unit so that you can insert the 1' x (SW 27 mm or SW 50 mm) power nut onto the gear.
3. Place the counter support with the assembled gearbox and power nut on the counter support of the valve. Ensure all parts are seated correctly.
4. insert the telescopic ratchet into the ½' square socket on the gearbox.
   Pull the ratchet apart by the handle to extend the power transmission lever.
5. Set the desired direction of rotation (right/left) on the directional switch on the telescopic ratchet.
   Right (clockwise) - closes the valve - Left (counter-clockwise) - opens the valve.
6. I n order to ensure the transmission ratio of the gearbox and thus easy operation of the valve, the transmission function of the gearbox must be activated.
7. To do this, pull the gearbox head with the ½' square socket slightly upwards so that the two flanks are free in the gearbox head.

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 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.

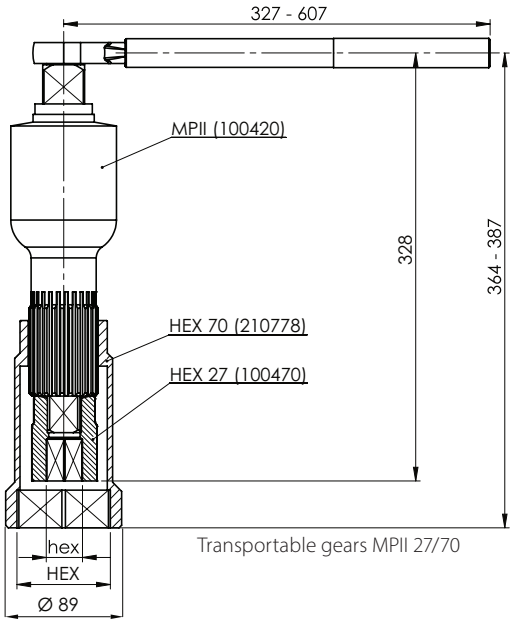
Transportable gear:

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

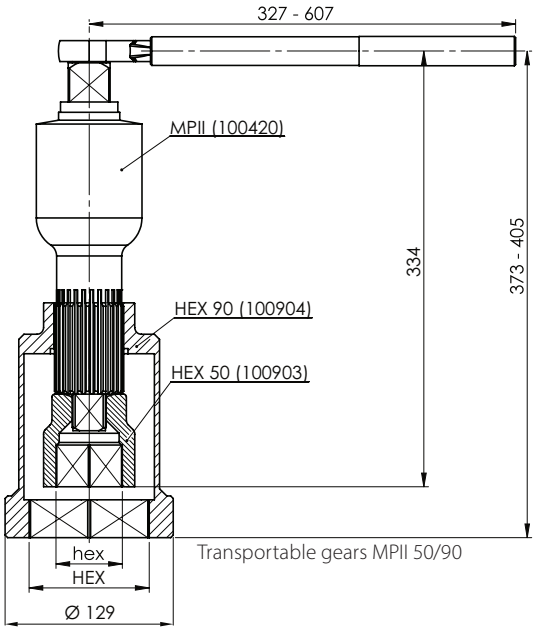
Overtightening the ball will destroy the stop!

The MP II gearbox requires 3 full turns of the telescopic ratchet to perform a 90° movement on the stem shaft.

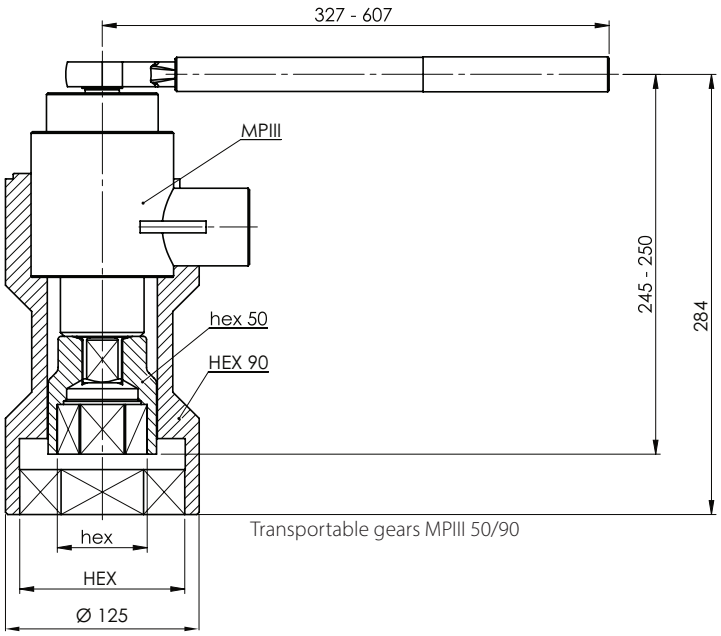
Measurements for MPII and MPIII complete



Transportable gears MPII 27/70



Transportable gears MPII 50/90



Transportable gears MPIII 50/90

14. Flexible extensions and planetary gear for underground valves

Planetary gear is mounted on the valve from the factory. The planetary gear is hereby adjusted.

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.



Fig. 18.

Regulation of the length of the stem extensions

Illustrated parts and tools are also going to be used:



Fig. 19.

Length calculation of the stem extension

Calculation example:

Adjustment of the standard extension (L=1000m 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. 20.



Fig. 21.

The flexible extension is shortened with mm:

Decribtion		Measurments in X mm
Desired total height	TH	1620 mm
Distance to cover	Minus	-200 mm
Total length of extension	FKV	1420 mm
Extension from valve	SH	585 mm
Height of Planetary gear	Y	195 mm
	X = (FKV - (SH + Y))	640 mm
Lenght of extension	L - X	360 mm

The adjustment of the length of the flexible extension

The flex extensions are usually supplied with a position indicator (2) which is screwed onto the actuating stem (3). This prevents the actuating shaft (3) from slipping out of the hexagonal counter tube (4) during transport. The position indicator (2) is not required when using the planetary gearbox and must be removed by loosening the socket screw (5).

No.	Component
1	Stem
2	Position indicator
3	Socket screw
4	Hexagon adapter
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.

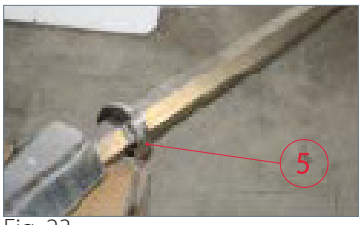


Fig. 23.

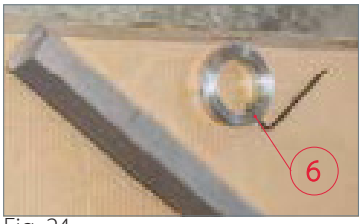


Fig. 24.



Fig. 25.



Fig. 26.



Fig. 27.

Reducing the hexagon counter tube (the bottom part):

The surface of the cut should be protected with durable corrosion protection (e.g. Coldzinc paint – Not included in the scope of delivery).

Shorten the stainless steel operating spindle (Fig. 27. + 28.) at the upper end by the required dimension (L - X).



Fig. 28.

Preparing the hexagonal tube for installation

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

Alternatively:

Three threads are made with an alteration of 120° on three sides of the pipe of the hexagon tube. 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 the extension on the fitting after shortening.

1. Remove the planetary gearbox from the ball valve by loosening the Allen grub screws - see picture below.
2. Mount the inner guide ring on the stem Fig. 34 - then Place the stem on the valve and fix it.
3. Place the hexagonal sleeve tube over the stem and secure with the M8 screws on the SW 70 / SW 90 hexagon of the valve.
4. Finally, place the planetary gearbox on the flex extension and fix it with the grub screws.



Remember that you must only loosen the lower pointed screws.

See next chapter for the reinforcement of the stem extension.

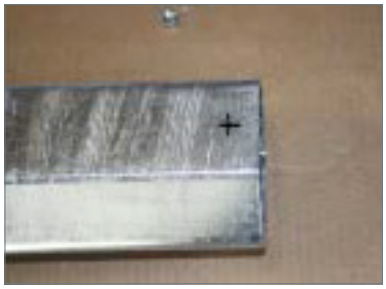


Fig. 29.



Fig. 30.



Fig. 31.



Fig. 32.



Fig. 33.



Fig. 34.

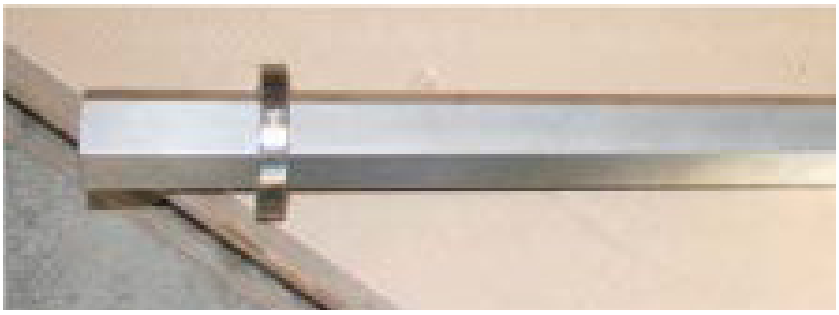


Fig. 34. Measurement from upper edge of the stem.



Fig. 36.

NOTE!

For valves with gearbox, the protection tube for the expansion pads on the spindle must be shortened (at least 50 mm) so that the hexagon socket screws on the gearbox are always accessible with a tool.



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.

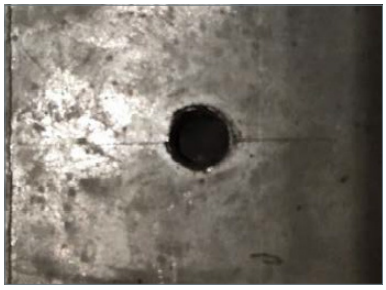


Fig. 38.



Fig. 39.



Fig. 40.



Fig. 41.

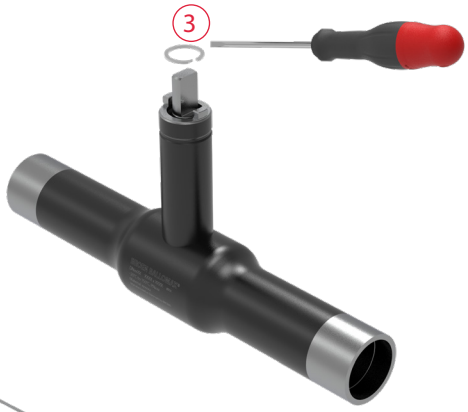
15. Change of gasket sets



BROEN BALLOMAX® DN 10 - 50

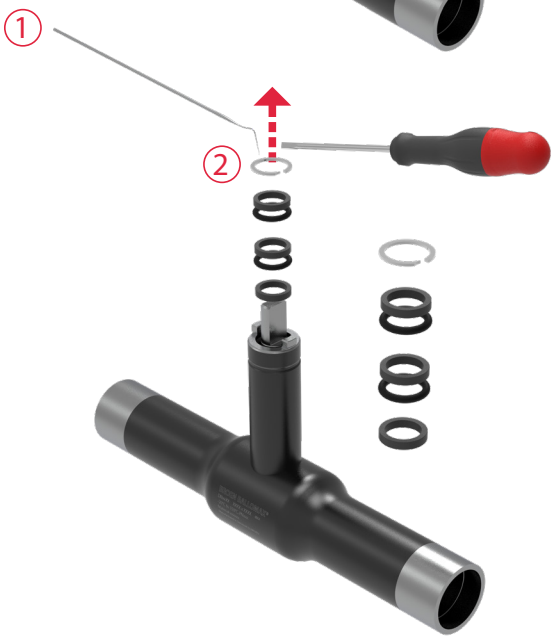
STEP 1:

1. **IMPORTANT!** Operate the valve a few times and close the valve.
2. ⓘ Pull handle straight up
3. Use a thin flat screwdriver to pull the Lock ring up



STEP 2:

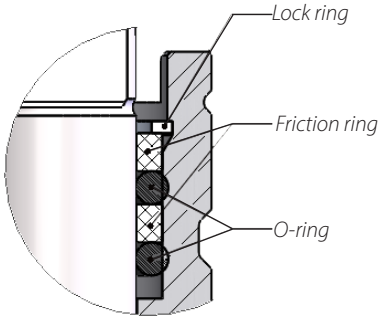
1. Use the supplied disassembly tool to remove the other components
2. Insert the disassembly tool into respectively: Support ring, Friction rings and O-rings. If necessary, pull them up individually



NOTE!
It is very important not to leave scratches or marks on the spindle and inside the spindle housing!

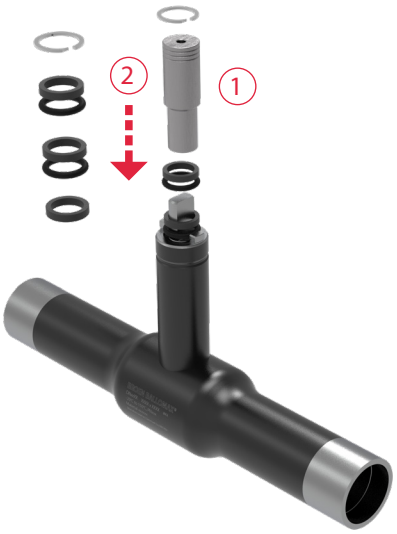
STEP 3:

1. Install new gasket kit in the order shown



STEP 4:

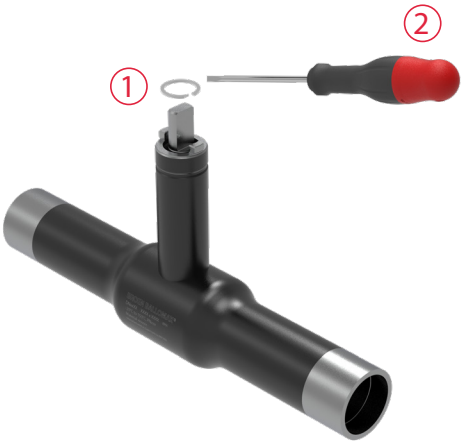
1. Use the provided mandrel (It is important not to pinch or cut the O-rings on the edge of the spindle)
2. Press or gently hammer the gasket set into place



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 in order to avoid water hammering



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

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