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Operation manual for floating ball valves

DN10 – DN150

with equipment and accessories

DTR-FB.01_EN

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0. Registry of changes

Revision	Revision no.	Introduced by	Revision date	Revised paragraph	Revision scope
02	Z-040/15	KST	2015-03-19	7	Update
03	Z-218/16	KST	2016-10-10	4.2 ; 4.8.1	Update of PED Directive
04	Z-163/17	KST	2017-12-14	4.3; 4.5.3; 6.6; 8.1	Add DN10
05	Z-083/19	ASN	2019-06-26	The entire document	Change of the company name

1 Introduction

This Operation Manual includes all necessary information concerning use, design, shipping, storage, assembly, commissioning and operation of ball valves. The Manual is intended for assembly, service, operating and supervision personnel. The Manual is intended to provide the user with all required information and help in performing all necessary tasks quickly and correctly.

This Manual describes the design of a ball valve and its equipment and optional accessories. The valve type and specific parameters are described in detail further in the Manual.

The aforementioned personnel must read, understand and follow this Manual. The Manual must always be at hand.

It is especially important to read all safety precautions in this Manual.

BROEN POLAND sp. z o.o. shall accept no responsibility for damage and operating faults caused by failure to follow this Operation Manual.

BROEN POLAND sp. z o.o. reserves the right to engineering changes in text and data contained herein to improve ball valve components and equipment.

2 Legal advice

2.1 Copyright

BROEN POLAND sp. z o.o. is the sole owner of copyright to this Operation Manual.

No information or drawings contained herein may be copied, distributed or used for commercial purposes or disclosed to third parties in part or in whole without authorisation.

2.2 General legal advice

Assembly, commissioning, maintenance and supervision shall be carried out only by authorised personnel and in compliance with all safety requirements of relevant standards and regulations of law.

Upon receiving the delivery, check all components (the ball valve, all equipment and/or accessories if present) for any damaged during transport. Only faultless components can be installed and/or used.

Negligence in maintenance or improper maintenance voids the warranty. Only the genuine spare parts guarantee quality, safety and interchangeability.

All unauthorised modifications are strictly prohibited by BROEN POLAND sp. z o.o.. Failure to follow this instruction voids the manufacturer's warranty.

Failure to follow instructions voids the manufacturer's warranty!



3 Safety precautions and rules

Always follow the precautions and rules contained in this chapter! Failure to follow the precautions and rules voids your warranty rights!



3.1 Scope of application

The ball valve manufactured by BROEN POLAND sp. z o.o. is cut-off fittings.

This Operation Manual also covers the equipment components installed on the ball valve ("equipment components" definition, see 4.9).

This Operation Manual does not cover the accessories installed on the ball valve ("accessory" definition, see 9).

Depending on the seal system used, the ball valves can be operated with gaseous and/or liquid media.

3.2 Use

Intended use of the product includes compliance with the guidelines and indications of this Manual, as well as compliance with the operation conditions stated on the product nameplate, the declaration of conformity (or the certificate of acceptance) and compliance with valid local OHS and environmental protection regulations.

The ball valve and its equipment have been designed, manufactured and tested in accordance with recognised processes and internal quality parameters of BROEN POLAND sp. z o.o., and they have been released from the factory in faultless condition.

3.3 Safety rules

If the fittings and its equipment are operated in an improper manner or against their intended use, they may become a hazard to persons, property and the environment.

All media other than listed and/or used beyond the permitted ranges of pressure and temperature may result in damage and/or leaks which can be hazardous to persons, property and the environment.

The ball valve and its equipment cannot be subjected to any modifications without a written permission from the manufacturer which may become hazardous to persons, property and the environment.

Every person involved in assembly, commissioning, operation and supervision of the fittings and its equipment must read and understand this Operation Manual in full and they must also have documented qualifications for such work.

This Manual must always be kept at hand in a suitably secure location near the fittings.

If any faults occur which can be potential safety hazards to persons, property and/or the environment, immediately notify the manufacturer and take proper corrective action.

All work on the ball valve and its equipment, such as repairs, shall only be carried out by the BROEN POLAND sp. z o.o. Service and only when the fittings are depressurized with the power isolated from the accessories.

All work on the ball valve and its equipment, such as inspection and maintenance, shall only be carried out with extreme caution and in compliance with all applicable OHS rules.

During all work which may result in contamination and/or damage of the ball valve and its equipment, the products must be properly secured against contamination and damage.

4 Introduction

4.1 General

The ball valve manufactured by BROEN POLAND sp. z o.o. is cut-off fittings used to close and open the flow of media.

The medium flow direction is irrelevant - the ball valve guarantees bidirectional seal.

The ball valve is intended to cut-off the flow of medium in pipeline systems; it does not feature regulating, control, safety, non-return, directional control or mixing functions.

The type of the working medium conditions the selection of ball valve construction materials and it is listed in the supplied documentation and on the nameplate.

4.2 Application

The ball valve manufactured by BROEN POLAND sp. z o.o. is intended for group 1 and 2 media according to the Directive 2014/68/UE. Depending on the seal system used, the ball valve can be operated with gaseous and/or liquid media.

4.3 Valve type

This Operation Manual applies to the following ball valve types manufactured by BROEN POLAND sp. z o.o.:

Valve type	DN marking	PN marking	CL marking	Ends
AH-2c-MK...	10; 15; 20; 25	(6), (10), 16, 25, 40,	150, 300	flanged, FxF
AH-2c-MP...	10; 15; 20; 25	(6), (10), 16, 25, 40,	150, 300	welded, WxW
AH-2c-MG...	10; 15; 20; 25	(6), (10), 16, 25, 40,	150, 300	threaded, GxG
AH-2c... AH-2cd...	32; 40; 50; 65; 80;	(6), (10), 16, 25, 40,	150, 300	flanged, FxF
AH-2cp...	32; 40; 50; 65; 80;	(6), (10), 16, 25, 40,	150, 300	welded, WxW
AH-2cg...	32; 40; 50; 65; 80;	(6), (10), 16, 25, 40,	150, 300	threaded, GxG
AH-11c...	100; 125; 150	(6), (10), 16, 25, 40,	150, 300	flanged, FxF
AH-12c...	100; 125; 150	(6), (10), 16, 25, 40,	150, 300	welded, WxW
AH-3...	10; 15; 20; 25; 32; 40; 50; 65	63, 100	(400), 600	flanged, FxF
AH-3p...	10; 15; 20; 25; 32; 40; 50; 65	63, 100	(400), 600	welded, WxW
AH-3g...	10; 15; 20; 25; 32; (40); (50); (65)	63, 100	(400), 600	threaded, GxG
AH-5w...	80	63, 100	(400), 600	flanged, FxF
AH-5pw...	80	63, 100	(400), 600	welded, WxW

The blank "... " can feature the following additional marking letters, e.g.

- Letter „f” – Fire Safe version of the valve

The information listed in parentheses is available as special products upon ordering.

4.4 Design and operating principle

The ball valve type AH-2c-MK...; AH-2c-MP...; AH-2c-MG...; AH-2c...; AH-2cd...; AH-2cp...; AH-2cg...; AH-11c...; and AH-12c... is designed as a steel screwed body or fully welded body with external anti-corrosion protection and the ball seated between two seals made of PTFE or PTFE+C. At least one seal is installed in a holder which moves against the body and is pressed to the ball by a set of springs. The closed ball valve maintains seal by pre-tensioning between the seals and the ball caused by the set of spring and the medium pressure. All these valve types are impervious to thermal expansion of their components and they are protected against excessive pressure rise inside the valve body (the valves feature thermal and volumetric compensation).

The ball valve type AH-3...; AH-3p...; AH-3g... is designed as a steel screwed body or fully welded body with external anti-corrosion protection and the ball seated between two seals made of PTFE+C. The assembly method ensures pre-clamping between the ball and the seals which produces preliminary sealing forces. The valve does not have thermal and volumetric compensation. At low pressure values, both seals act as the seal and bearing of the ball. The liquid enclosed at a fixed volume between the body and the ball may reach a significant pressure rise when heated from the outside. The pressure rise is minimum in operation with gaseous media. Hence the ball operated with liquids must not be exposed to external sources of heat. The pre-clamping force decreases when the operating pressure

increases, whereas the pressure of the ball on the outlet seal increases. The closed valve maintains seal by pre-tensioning between the ball and the seals and by the medium pressure.

The ball valve AH-5w...; AH-5pw... is designed as a fully welded steel body with external anti-corrosion protection and the ball seated between two seals made of PTFE+C. One seal is permanently fitted inside of the body, while the other is installed in a sliding holder which is pressed against the ball by a set of springs. The closed valve maintains seal by pre-tensioning between the seals and the ball caused by the set of spring and the medium pressure. The ball valve type AH-5w...; AH-5pw... is impervious to thermal expansion of its components and they are protected against excessive rise of the liquid phase medium pressure inside the valve body (the valve features thermal and volumetric compensation).

The ball is turned by a stem sealed against the body and terminated with an end for a lever or a drive (attachment for part-turn drives acc. to EN ISO 5211). The turn angle limiter ensures proper positioning of the ball in the closed and the open position. The ball valve is open when the indicator mark on the stem face is parallel to the bore axis of pipeline installation and the angle limiter rests against the stop. The flow is cut off by turning the stem clockwise to the stop position of the angle limiter. The indicator mark in the closed position is perpendicular to the bore axis of pipeline installation.

Depending on the valve type, the body is terminated on both sides with flanged ends or welded ends or threaded ends (specific ends type, see 4.3).

4.5 Technical parameters

Abbreviations:

PS - maximum permissible pressure

PO - operating pressure

TS - maximum permissible temperature

TO - operating (working) temperature

4.5.1 Work temperature range – TO

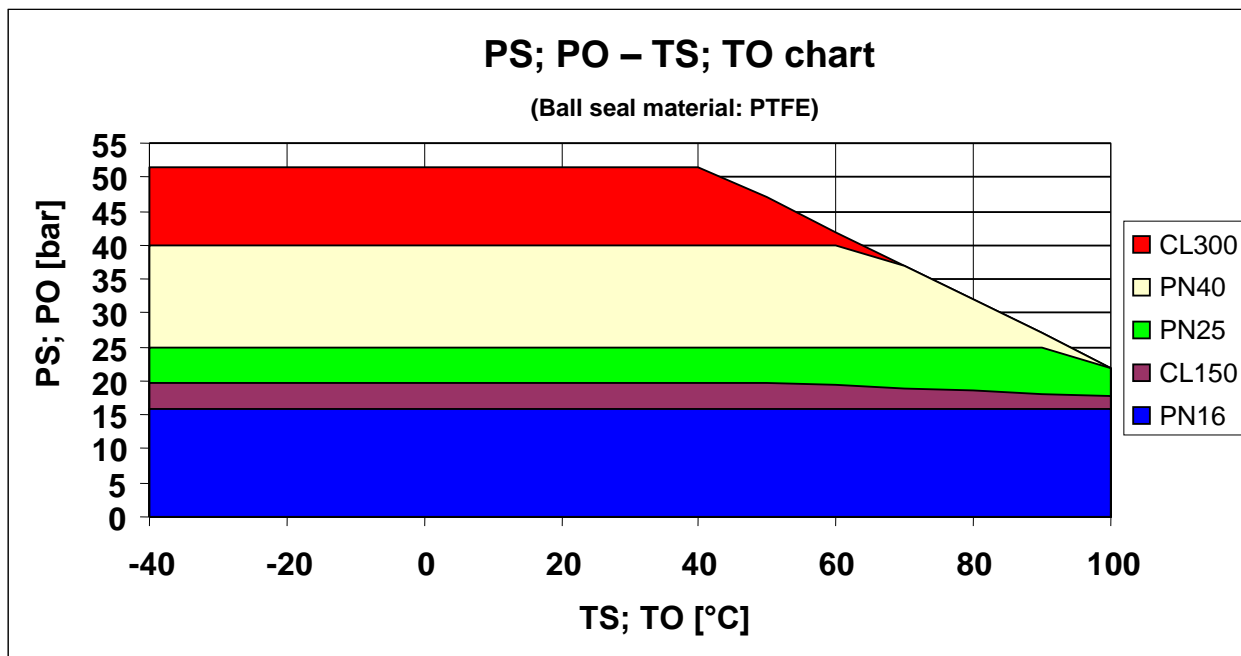
Temperature range – TO	Ball valve type
-30 ÷ +100°C	AH-2c-MK...; AH-2c-MP...; AH-2c-MG... AH-2c...; AH-2cd...; AH-2cp...; AH-2cg... AH-11c...; AH-12c... AH-3...; AH-3p...; AH-3g... AH-5w...; AH-5pw...
-40 ÷ +100°C	AH-2c-MK...; AH-2c-MP...; AH-2c-MG... AH-2c...; AH-2cd...; AH-2cp...; AH-2cg... AH-11c...; AH-12c... AH-3...; AH-3p...; AH-3g... AH-5w...; AH-5pw...
-20 ÷ +150°C	AH-2c-MK...; AH-2c-MP...; AH-2c-MG... AH-2c...; AH-2cd...; AH-2cp...; AH-2cg... AH-11c...; AH-12c...
-10 ÷ +200°C	AH-2c-MK...; AH-2c-MP...; AH-2c-MG... AH-2c...; AH-2cd...; AH-2cp...; AH-2cg... AH-11c...; AH-12c...

4.5.2 PS; PO – TS; TO chart

For valve type AH-2c-MK...; AH-2c-MP...; AH-2c-MG...; AH-2c...; AH-2cd...; AH-2cp...;
 AH-2cg...; AH-11c...; AH-12c...

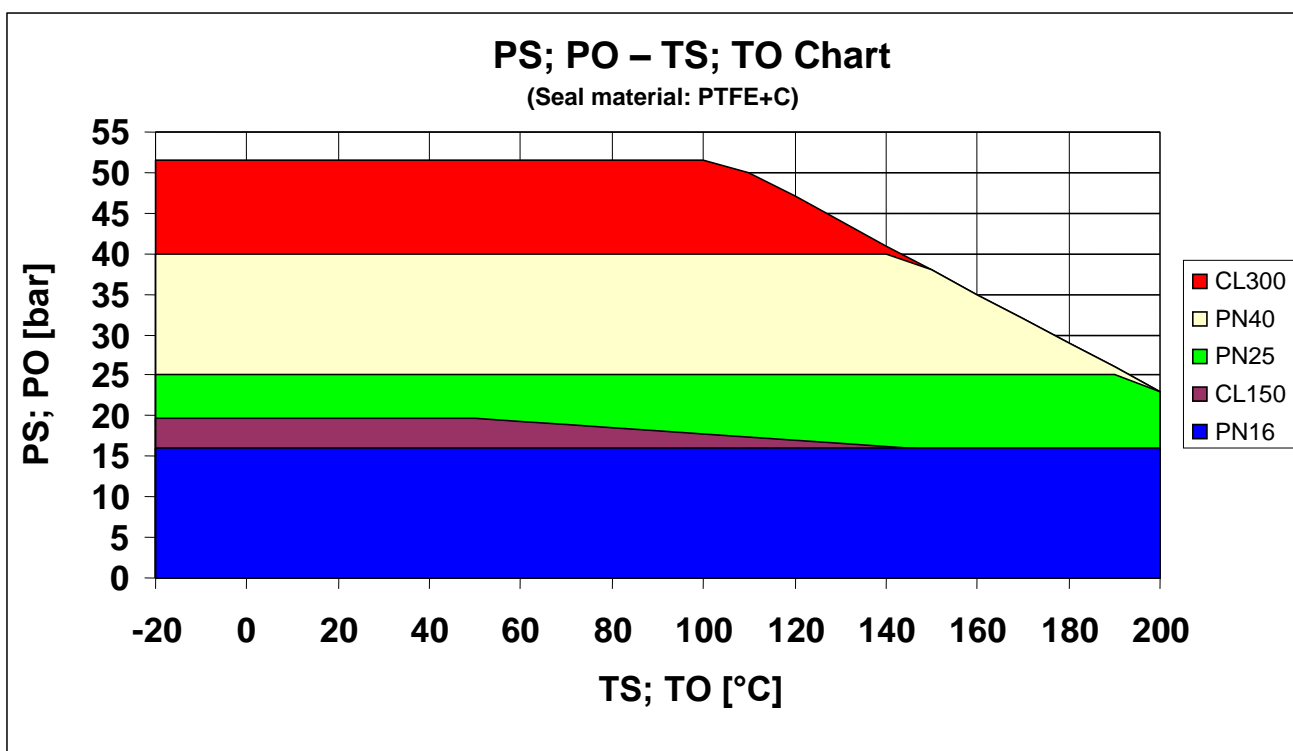
**For temperature range:
 -30 ÷ +100°C and -40 ÷ +100°C**

TS;TO [°C]	PS; PO [bar]				
	PN16	PN25	PN40	CL150	CL300
-40	16	25	40	19.6	51.5
-30	16	25	40	19.6	51.5
-20	16	25	40	19.6	51.5
-10	16	25	40	19.6	51.5
0	16	25	40	19.6	51.5
10	16	25	40	19.6	51.5
20	16	25	40	19.6	51.5
30	16	25	40	19.6	51.5
40	16	25	40	19.6	51.5
50	16	25	40	19.6	47
60	16	25	40	19.3	42
70	16	25	37	18.9	37
80	16	25	32	18.5	32
90	16	25	27	18.1	27
100	16	22	22	17.7	22



**For temperature range:
 -20 ÷ +150°C and -10 ÷ +200°C**

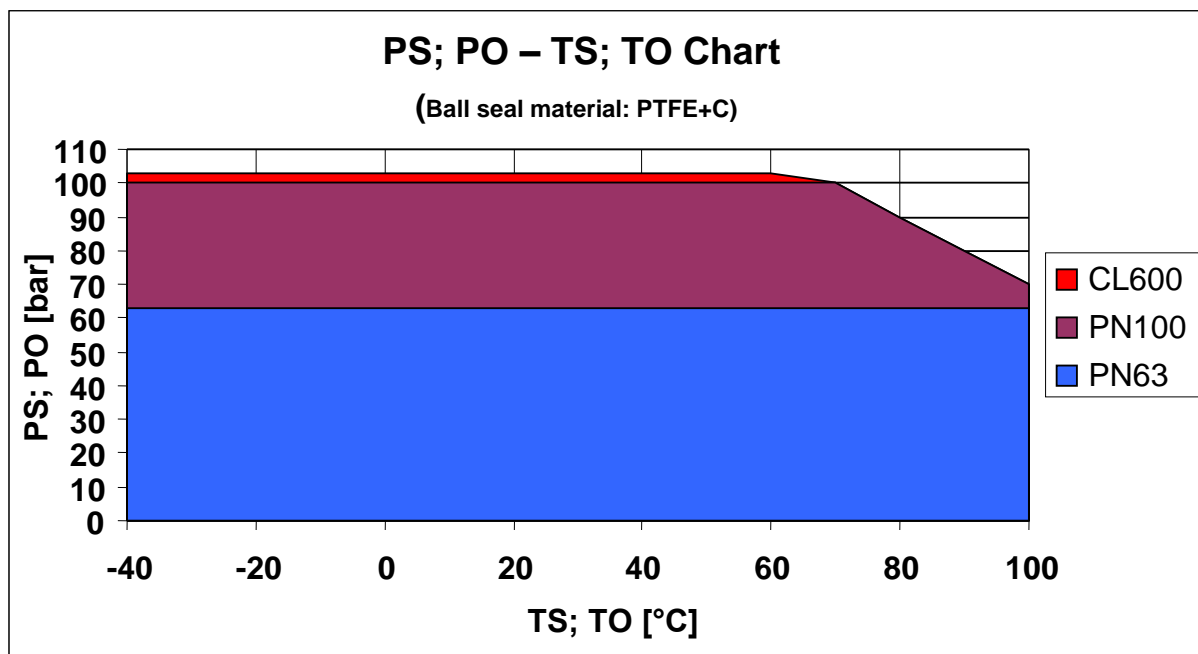
TS; TO [°C]	PS; PO [bar]				
	PN16	PN25	PN40	CL150	CL300
-20	16	25	40	19.6	51.5
-10	16	25	40	19.6	51.5
0	16	25	40	19.6	51.5
10	16	25	40	19.6	51.5
20	16	25	40	19.6	51.5
30	16	25	40	19.6	51.5
40	16	25	40	19.6	51.5
50	16	25	40	19.6	51.5
60	16	25	40	19.3	51.5
70	16	25	40	18.9	51.5
80	16	25	40	18.5	51.5
90	16	25	40	18.1	51.5
100	16	25	40	17.7	51.5
110	16	25	40	17.4	50
120	16	25	40	17	47
130	16	25	40	16.6	44
140	16	25	40	16.2	41
150	16	25	38	15.8	38
160	16	25	35	15.4	35
170	16	25	32	15	32
180	16	25	29	14.6	29
190	16	25	26	14.2	26
200	16	23	23	14	23



For valve type AH-3...; AH-3p...; AH-3g...; AH-5w...; AH-5wp...

**For temperature range:
 -30 ÷ +100°C and -40 ÷ +100°C**

TS; TO [°C]	PS; PO [bar]		
	PN63	PN100	CL600
-40	63	100	103
-30	63	100	103
-20	63	100	103
-10	63	100	103
0	63	100	103
10	63	100	103
20	63	100	103
30	63	100	103
40	63	100	103
50	63	100	103
60	63	100	103
70	63	100	100
80	63	90	90
90	63	80	80
100	63	70	70



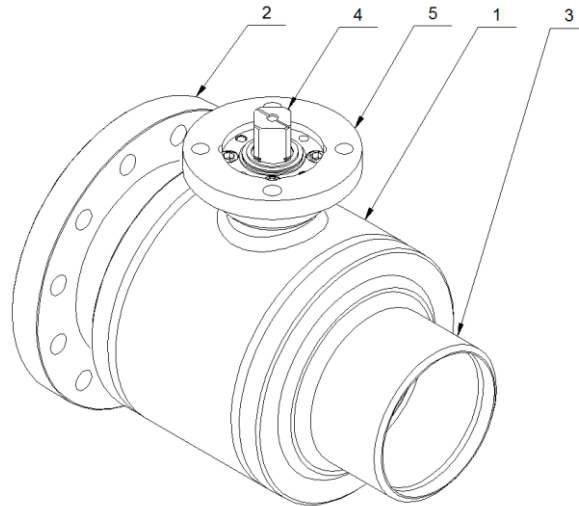
4.5.3 Maximum torque

The maximum torque (M max) value for switching of a given valve type and DN is presented below. The value is limited due to the mechanical strength of switched components. The actual valve opening torque depends on the operating parameters (PO, TO, medium, switching frequency, etc.).

Valve type	DN	M max [Mm]
AH-2c-MK... AH-2c-MP... AH-2c-MG...	10	50
	15	50
	20	50
	25	75
AH-2c... AH-2cp... AH-2cd... AH-2cg...	32	100
	40	120
	50	160
	65	300
	80	380
AH-11c... AH-12c...	100	650
	125	1400
	150	2500
AH-3... AH-3p... AH-3g...	10	50
	15	50
	20	50
	25	75
AH-3... AH-3p...	32	160
	40	160
	50	300
	65	380
AH-5w... AH-5pw...	80	1000

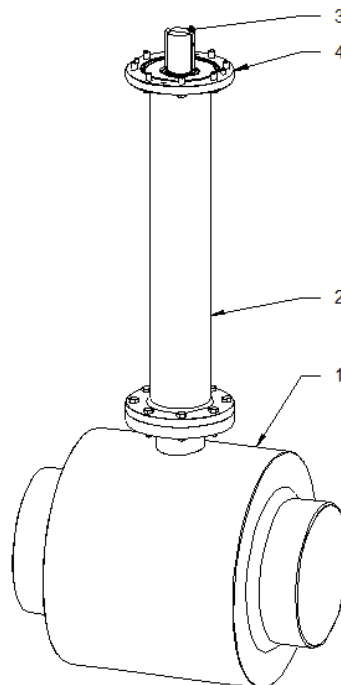
4.6 Valve version

4.6.1 Overground



- 1 – body
- 2 – flanged end (double-sided FxF is possible, see 4.3)
- 3 – welded end (double-sided WxW is possible, see 4.3)
- 4 – stem
- 5 – actuator attachment acc. to EN ISO 5211 (see 4.8.4)

4.6.2 Underground



- 1 – ball valve (WxW) - i.e. main valve
- 2 – stem extension column (see 4.9.1)
- 3 – stem
- 4 – actuator attachment acc. to EN ISO 5211 (see 4.8.4)

4.7 Anti-corrosion protection

4.7.1 External surfaces

The ball valve overground version has its external surfaces protected against corrosion with a paint coat (film thickness: approx. 100 µm). Specific components of the valve are protected against corrosion with electroplated coating.

The ball valve underground version has its external surfaces protected against corrosion with a PUR coat (acc. to EN 10290) or another coat as required by the customer. The top part of the columns and the top part of the additional lubrication system is protected against corrosion with a paint coat.

Specific surfaces of the valve, i.e. flange sealing surfaces, butt-welded ends, etc., are protected against corrosion with a preservative used for transport and storage.

4.7.2 Internal surfaces

The internal surfaces of the valve body are protected against corrosion with a preservative used for transport and storage.

The preservation made by the manufacturer protects the valve during transport and storage to a maximum of 6 months!



The components, i.e. the ball, the holders and other internal parts, are protected against corrosion by electroplating and/or as made from stainless or acid-resistant steel.

Detailed information about anti-corrosive coats is provided by BROEN POLAND sp. z o.o..

The grade, type and colour of paint coats can be different on request when ordering.

4.8 Functional components

4.8.1 Antistatic protection

The antistatic protection conforms to the requirements of EN 1983 / API Specification 6D / ISO 14313.

Each valve designed for group I media acc. to the Directive 2014/68/UE has antistatic protection

4.8.2 Fire Safe

The Fire Safe protection conforms to the requirements of EN ISO 10497.

The ball valve also features a plate which reads "ISO FT".

Applies to valves with "f" in the nameplate type designation.

4.8.3 Stem anti-blow system

The stem anti-blow system, conforms to the requirements of EN 1983 and API Specification 6D / ISO 14313.

Each valve features anti-blow system.

4.8.4 Actuator attachment.

The attachment for part-turn actuator in accordance with EN ISO 5211 is designed to connect different types of actuators to the ball valve.

Valves with actuator attachments, see 4.10

4.9 Equipment components

4.9.1 Stem extension column

The stem extension column extends and moves the stem end at a distance from the valve (pipeline) axis. This component is designed only to transfer the actuator torque on the main valve stem and to carry the accessory mass.

The column must not be exposed to bending forces and torques!



4.10 Equipment configuration

Legend:

X – standard version

(X) – custom version; agreed during ordering

FxF – flange ends on both sides

WxW – welded ends on both sides

GxG – threaded ends on both sides

CH – valve switched by lever

ISO F – valve switched by actuator; adaptation for the actuator acc. to EN ISO 5211

KO – stem extension column

Valve type	Ends	CH	ISO F	KO
AH-2c-MK...	FxF	X	(X)	(X)
AH-2c-MP...	WxW	X	(X)	(X)
AH-2c-MG...	GxG	X	(X)	(X)
AH-2c...	FxF	X	(X)	(X)
AH-2cd...	FxF	X	(X)	(X)
AH-2cp...	WxW	X	(X)	(X)
AH-2cg...	GxG	X	(X)	(X)
AH-11c...	FxF	X	(X)	(X)
AH-12c...	WxW	X	(X)	(X)
AH-3...	FxF	X	(X)	(X)
AH-3p...	WxW	X	(X)	(X)
AH-3g...	GxG	X	(X)	(X)
AH-5w...	FxF	X	(X)	(X)
AH-5pw...	WxW	X	(X)	(X)

4.11 Factory testing

The valve has been factory tested in accordance with the requirements of EN 12266-1 and 2 or in accordance with a different specification defined in the order.

All valves are tested (100%).

Standard tests of the valve:

- shell strength – P10;
- shell tightness – P11;
- seat tightness – P12; the valve seat tightness has been tested for both flow directions – closing seal class A acc. to EN 12266-1 item A.4.3;
- functional test – F20.

5 Delivery

5.1 Inspection of delivery

- The valve should be placed in a durable and genuine protective packaging; damage of packaging may indicate damage to the valve; if present, all damage shall be documented by photography.
- The valve ends should be protected by stoppers; remove the stoppers directly before installing the valve in the pipeline system (see 6).
- The valve must be open.
- Check the delivery for completeness and correctness against the shipping list, the enclosed documents and the nameplate markings of the valve and accessory.

5.2 Packaging

The valve is contained in a durable packaging. The packaging is made of environmentally-friendly materials which are easy to sort and recyclable. The packaging materials include wood, cardboard, paper and PE film. Disposal of the packaging shall be handled by a recycling company.

5.3 Transport

- The valve must be open during transport.
- Exercise extreme caution when unloading or transshipping the valve with or without its equipment and/or accessory;
- The valve and its packaging shall be permanently fixed to the transport vehicle and/or protected against movement and falling during transport.
- The customer is responsible for correct unloading and/or transshipment (see the description in 6.3 and 6.4).

When handling valves equipped with accessories and/or the column, do not use these components for resting, gripping, lifting, etc.!



Damage caused by improper transport methods does not substantiate warranty claims.

5.4 Storage

- The valve ends should be protected by stoppers; remove the stoppers directly before installing the valve in the pipeline system (see 6).
- All uncoated surfaces of the valve shall be preserved with an anti-corrosive agent.
- Store the ball valve in rooms which are protected from weather conditions and corrosive agents; it is best to store on flat surfaces in dry, clean and sheltered areas.
- The valve shall be in a stable position in a safe place during storage.
- The valve must be open.

The preservation made by the manufacturer protects the valve during transport and storage to a maximum of 6 months!



6 Installation in systems

6.1 Introduction

- Notify BROEN POLAND sp. z o.o. about installation of the valve within 6 working days in prior.
- The valve must be installed by a properly trained personnel who have read and understood the requirements of this Manual.
- The valve delivered to the customer is ready for installation on a system following unpacking and removal of all protective components.
- The medium flow direction is irrelevant - the ball valve guarantees bidirectional seal.
- The ball valve can be installed at a termination of the pipeline system only if it is permanently plugged on the outlet end, see the requirements in 6.5; 6.6; 6.7.
- Standard lifting devices, including all lifting components (i.e. slings, hooks, etc.) must have an adequate lifting capacity, which shall be not less than the weight of the valve or the valve with its equipment and/or accessory. The lifting devices must allow safe manoeuvring.

6.2 Unpacking and preparation for installation

6.2.1 Unpacking

Unpacking involves:

- removal of protective packaging components;
- removal of all components which fasten the product to the packaging;
- thorough inspection of the valve and its equipment and/or accessories; if any damage to components or paint coats is found, immediately notify BROEN POLAND sp. z o.o. which will then select the method of repair and release for further installation.

Remove the protective packaging with professional tools only, designated for that purpose!



6.2.2

6.2.3 Preparation for installation

Preparation for installation involves:

- ensuring that the valve is to be installed in the specific point of the system; check the nameplate data against the data in the engineering manuals of the system;
- cleaning the connection point of the pipeline system;
- cleaning the internal voids of the system free of all contaminants;
- disassembly of the ball valve stopping components, i.e.
 - ends stoppers;
 - removing the stem position lock if the valve features no actuator;

Remove the stopping components only directly before installing the valve in the system! Earlier removal may result in permanent damage of the valve!



- ensuring that the valve is in the open position; if it is not, immediately notify BROEN POLAND sp. z o.o. which will then decide to release the product for further installation;

The valve must be open during installation!



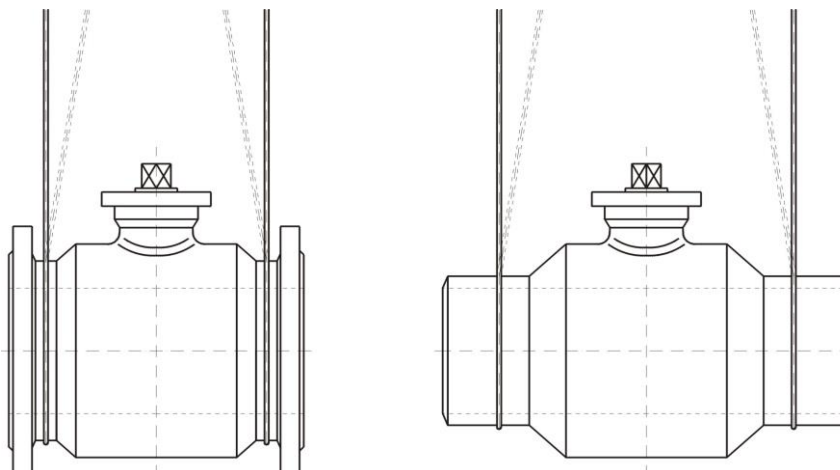
- checking that the interior of the ball valve (the bore) is clean;
- removing the preservative from the ends and internal components of the ball valve (for removal use extraction naphtha or Peter-Lacke PLP 00020 diluent);

The preservative must be removed!



6.3 Fastening during handling

The ball valve without transport grips must be carried by hand or with standard lifting equipment (see the figure below).



Handle with extreme caution!

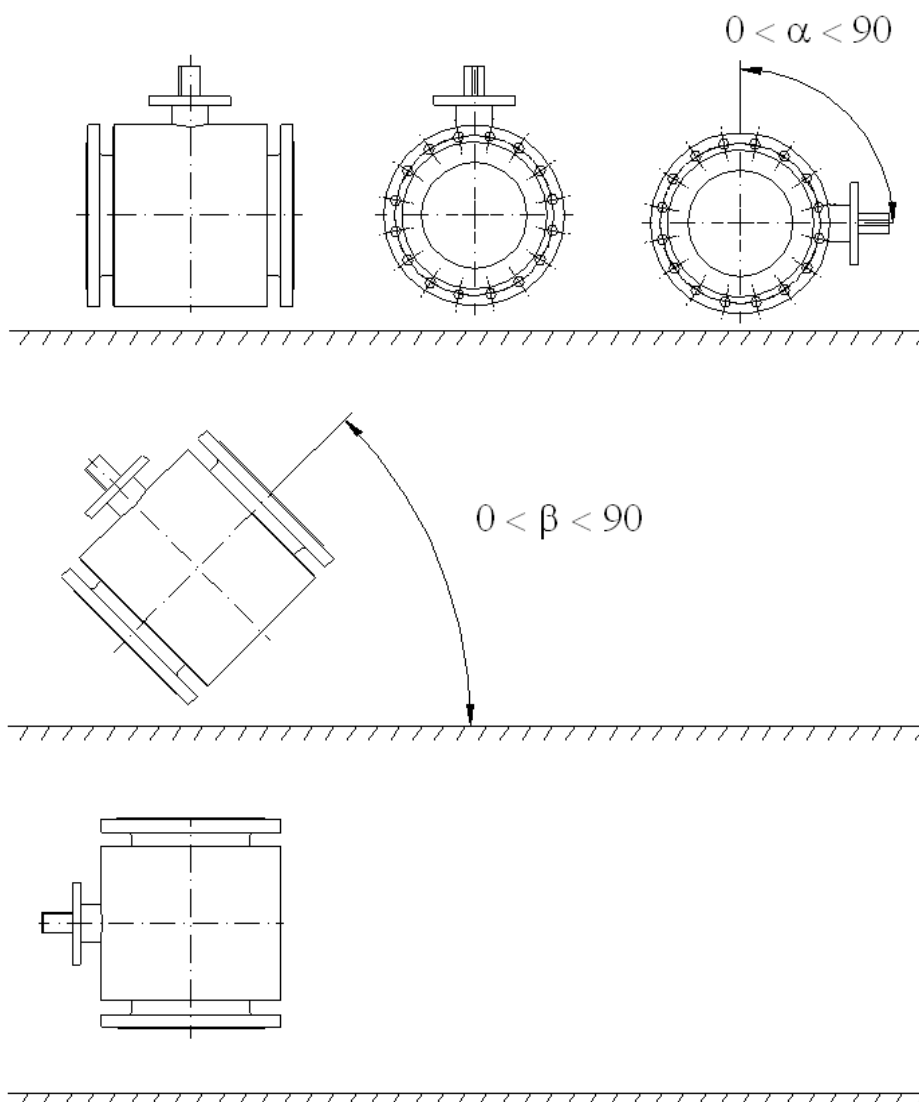
Lifting components must not press and/or rest against the accessory!



6.4 Assembly positions

The ball valves manufactured by BROEN POLAND sp. z o.o. can be installed in the following positions in the pipeline system:

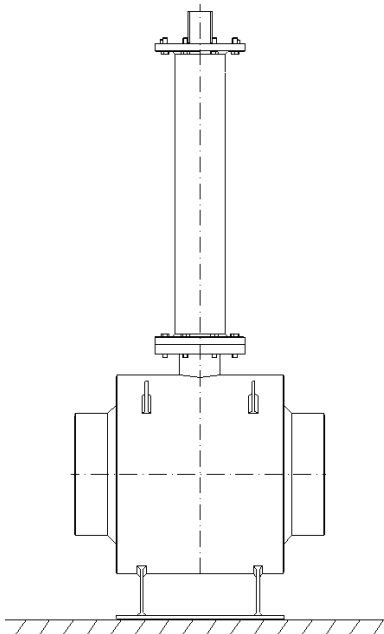
- horizontal: the bonnet can be turned between $0^\circ \leq \alpha \leq 90^\circ$ (clockwise and counter-clockwise)
- at an angle to the floor, between $0^\circ \leq \beta \leq 90^\circ$
- vertical



Do not install the ball valve in any other positions than the shown above.



The assembly position of the ball valve can be different following prior agreement with and a written permission from BROEN POLAND sp. z o.o.. If the valve is equipped with the column, assemble in the vertical position only (see the figure below).



The assembly position of the ball valve with the column can be different following prior agreement with and a written permission from BROEN POLAND sp. z o.o..

6.5 Flange ends valve assembly

Follow the requirements in 6.2, 6.3, 6.4 and do the following:

- set the valve in position in the system with a few bolts to safely and correctly place the flange seal;
- install the flange seal;
- install the remaining bolts in the flanges;
- ensure that the valve bore is aligned with the system pipeline bore, as well as all holes in the flanges are aligned;
- ensure that there are no parallelism faults between the flange sealing surfaces;
- tighten the bolts of the flanged connection in the crosswise pattern to the proper torque.

The pipeline system designer is responsible for proper selection of bolts, nuts and flange seals.

The pipeline system designer is responsible for stating the tightening torque values for flanged ends bolts.

The flanges of the ball valve are made in accordance with EN 1092-1 as type 01 or 11 (other types are available on request); the flange material is group 8E3.

The flanges of the ball valve are made in accordance with EN 1759-1 as type 01 or 11 (other types are available on request); the flange material is group 8E3.

The ball valve installed at the termination of the pipeline system requires plugging of the free outlet. The pipeline system designer and builder are responsible for proper stopping.

Do not operate the valve during installation!
The first closing of the valve can only be carried out following thorough cleaning and/or sucking off contaminants left by the installation!
Failure to follow these guidelines may result in damage of the seal and leaks of the fittings!



6.6 Welded ends valve assembly

The valve must be open!



Follow the requirements in 6.2, 6.3, 6.4 and do the following:

- assemble in accordance with the applicable pipeline assembly process;
- align the valve welded end axis with the pipeline axis;
- ensure that the valve end opening is aligned with the pipe opening;
- weld in accordance with the technical requirements of the pipeline system and the WPS specification;
- monitor the valve body temperature during welding at the distance X from the welding location; if 120°C is exceeded, immediately stop welding;

DN	X [mm]
10; 15; 20; 25; 32; 40; 50; 65; 80; 100	40 - 80
125; 150	100 -120

The ball valve installed at the termination of the pipeline system requires plugging of the free welded end or the free pipe end. The pipeline system designer and builder are responsible for proper stopping.

Do not operate the valve during installation!
The first closing of the valve can only be carried out following thorough cleaning and/or sucking off contaminants left by the installation!
Failure to follow these guidelines may result in damage of the seal and leakage of the valve!



6.7 Threaded ends valve assembly

Follow the requirements in 6.2, 6.3, 6.4 and do the following:

- ensure that the thread gauge of the valve ends matches the system connection fitting thread;
- ensure that the valve end opening (threaded) is aligned with the pipeline system connector;
- tighten to obtain the required tension, following the sound engineering practice;
- hold the valve end stub into which the system connector is screwed.

The pipeline system designer is responsible for proper selection of the threaded connection and its sealing.

The ball valves installed at the termination of the pipeline system require plugging of the free welded end or the free pipe end. The pipeline system designer and builder are responsible for proper stopping.

Do not operate the valve during installation!
The first closing of the valve can only be carried out following thorough cleaning and/or sucking off contaminants left by the installation!
Failure to follow these guidelines may result in damage of the seal and leakage of the valve!



7 Finished installation or prefabrication tests

- Notify BROEN POLAND sp. z o.o. about the finished installation or prefabrication tests within 6 working days in prior.
- The tests must be carried out by a properly trained personnel who have read and understood the requirements of this Manual.
- The finished installation tests should be hydrostatic; pneumatic tests are allowed if there are other engineering reasons or contraindications.
- The tightness tests of the ball valve require a written permission from the manufacturer with the test requirements to prevent damage of the ball valve.

Test only after thorough cleaning and/or purging of the pipeline system to remove solid and other contaminants!
Take all safety measures to prevent any potential hazard to persons, property and the environment!



7.1 Pipeline system strength and tightness test

PS – maximum allowable valve pressure

PT_{inst.} – pipeline system test pressure

Allowable duration of pipeline system pressure test:

	$PT_{inst.} \leq PS$	$PS \leq PT_{inst.} \leq 1,1xPS$	$1,1xPS \leq PT_{inst.} \leq 1,5xPS$
Duration [h]	No restrictions	max. 48h	max. 2h
Comments	-	Longer duration available only after arrangement with BROEN POLAND sp. z o.o.	Longer duration available only after arrangement with BROEN POLAND sp. z o.o.

Test pressure cannot be higher than 1,5xPS

Do not leave the valve closed during the strength and tightness tests of the pipeline system!



Order of actions	Description of an action	Ball position in the valve
1	Operate valve to the open position ($\alpha=0^\circ$)	$\alpha=0^\circ$
2	Fill the pipeline installation with water (clear water or water with corrosion inhibitor)	
3	Operate the valve by $\alpha=75^\circ$ against the open position – max. duration 2h	α
4	Fill up the installation with liquid	
5	Apply strength test pressure of pipeline installation PT_{inst}	
6	Operate valve to the open position ($\alpha=0^\circ$)	$\alpha=0^\circ$
7	Carry out the strength test - Time see table "Allowable duration of pipeline system pressure test"	
8	Operate the valve by $\alpha=15^\circ$ against the open position – max. duration 30 min.	α
9	Decrease the pressure to the required value for tightness test of pipeline installation.	
10	Operate valve to the open position ($\alpha=0^\circ$)	$\alpha=0^\circ$
11	Carry out the tightness test - Time see table "Allowable duration of pipeline system pressure test"	
12	Operate the valve by $\alpha=75^\circ$ against the open position – max. duration 2h	α
13	Discharge the liquid pressure	
14	Operate valve to the open position ($\alpha=0^\circ$)	$\alpha=0^\circ$
15	Empty the pipeline installation from the liquid	
16	Drain and dry the valve (see pt. 7.2)	

7.2 Draining and drying

Thoroughly dry the system with the valve after tests!



7.2.1 Draining

- Operate valve to closed position and then to open position. Repeat these operations to complete draining.

7.2.2 Drying

- Switch the valve into the half-open position ($\alpha=75^\circ$ against the open position),
- Apply the drying medium at the **maximum pressure of 2 bar**.
- The drying medium temperature shall be **+60°C maximum**.
- The drying time in the half-open position - **max. 2h**
- Switch the valve into the open position ($\alpha=0^\circ$).

8 Operation of the valve

8.1 General

Operate the ball valve in accordance with the requirements for cut-off fittings in the open or closed position. Leaving or operating the valve in any other position may damage the ball seal.

Check the ball position on the visual indicator (the mark on the stem or the position indicator on the drive).

The manufacturer anticipates a life of 20 years for the components of a ball valve which works within the PO-TO operating parameters.

Number of cycles during the operating life of the valve which guarantees its operational use is minimum.:

Number of open-close-open cycles	DN
500	125 and higher DN
1000	65; 80; 100
3000	32; 40; 50
10000	10, 15; 20; 25

The actual valve life shall be carried out after obtaining the physical and chemical data of the valve installation environment and of the flowing medium.

**The valve must be operated at least every six months!
If it is not possible to completely cut off the flow,
turn the ball by ~50% of the range (i.e. by ~45°)
and turn it back!**



8.2 Medium

See 4.2 and the valve nameplate.

The parameters of the medium shall meet the physical and chemical characteristics in its safety data sheet.

**Do not operate the valve at the temperature below or equal to the medium freezing point at the given operating pressure!
Do not operate with contaminated media!**



8.3 Relation of operating pressure (PO) to operating temperature (TO)

The relation of operating pressure (PO) to operating temperature (TO), see 4.5.2

8.4 Valve control

The valve is controlled as follows:

- turning the stem clockwise closes the valve,
- turning the stem counter-clockwise opens it.

A lever or an actuator must be installed on the drive. A column which extends the stem can also be installed. See the detailed description in 4.9.1.

Switching should be smooth and without any stuttering, yet with a noticeable steady resistance which proves mutual strain at the contact between the ball and the seal, which guarantees that seal is maintained. Exceeding the maximum torque [M max] may result in damage to the ball, the column or the turn angle limiting components.

Torque values [M max], see 4.5.3.

8.5 Maintenance

The ball valve is maintenance-free during its operating life. Inspect the condition of the anti-corrosive coating and the condition of the connection between the valve and the system. Protect the valve from mechanical damage and keep it clean, especially at the points which allow monitoring the ball position. Replace the valve during pipeline overhauls if necessary due to the assessment of wear. The valves require no spare parts. Overhaul the valve at the manufacturer.

8.6 Troubleshooting

PROBLEM	CAUSE	REPAIR METHOD
Flow not tight	1. The valve is not completely closed	Set the valve in the fully closed position
	2. Incorrect setting of the ball turn limiters	Correct the setting (contact BROEN POLAND sp. z o.o.)
	3. Ball seals damaged	Replace the seals (contact BROEN POLAND sp. z o.o.)
	4. Ball surface damaged	Replace the ball (contact BROEN POLAND sp. z o.o.)
Leak at the stem	1. Stem seals damaged	Replace the seals (contact BROEN POLAND sp. z o.o.)
	2. Stem damaged	Replace the stem (contact BROEN POLAND sp. z o.o.)
Opening and closing is difficult	1. Incorrect pressure rise	Verify the pipeline internal pressure
	2. Contaminants at the ball-seal interface	Wash and clean the valve interior
	3. Sediments in the medium deposit on the ball surface	Remove the sediment
	4. Mechanical damage on the ball and seals surfaces	Replace the ball and the seal (contact BROEN POLAND sp. z o.o.)
	5. Foreign body in the valve bore	Remove flow obstruction
	6. Sticking at the stem	Replace the stem, regenerate the body (contact BROEN POLAND sp. z o.o.)
	7. Incorrect actuator selection	Replace with a correct actuator

8.7 Warnings

Do not disassemble any components which are integral parts of the ball valve!



Do not adjust the positions of the drive stops without written permission or participation of the BROEN POLAND sp. z o.o. Service!



9 Accessories

The term "Accessory" covers the components such as:

- a) lever
- b) mechanical gear (planetary gear, worm gear, etc.)
- c) actuator (electric, pneumatic, electrohydraulic, etc.)
- d) limit position sensor

Accessories (b) and (c) are connected to ball valves or stem extension columns by the part-turn actuator attachment acc. to EN ISO 5211. The size and type of attachment for part-turn actuators is selected by BROEN POLAND sp. z o.o.. The selection depends on the valve types, DN, PN and other operating parameters of specific ball valves.