

Original Assembly and Operating Manual

Wafer-type butterfly valve Z011-AS
with bare shaft



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1 ABOUT THIS OPERATING MANUAL

This is the assembly and operating manual of EBRO ARMATUREN Gebrüder Bröer GmbH for:

- Wafer-type butterfly valve of the type Z011-AS with free shaft

Hereinafter:

- EBRO ARMATUREN Gebrüder Bröer GmbH ► EBRO
- Wafer-type butterfly valve of the type Z011-AS with free shaft ► valve
- Assembly and operating manual ► Operating manual

This operating manual provides important safety and warning information. In addition to other useful information, this operating manual provides particular support during the product life cycle phases of transport, installation, operation, maintenance, and decommissioning to ensure efficient and reliable operation.

Read the operating manual with care and keep it in a safe place. EBRO shall not be liable for any damage caused by failure to observe the operating manual.

The operating manual must be available at the site of use of the valve. The operating manual must be passed on if the site of use or the owner changes.

The operating instructions comply with the requirements of 2014/68/EU (Pressure Equipment Directive) and DIN EN IEC/IEEE 82079-1 (compilation of information for use).

All rights and technical changes reserved.

1.1 Copyright

No part of this documentation must be reproduced or made accessible to any third parties without the explicit permission of EBRO ARMATUREN Gebr. Bröer GmbH.

This documentation, including all of its parts, is protected by copyright. Reproduction, translation, microfilming, as well as storage and processing in electronic systems require the written consent of EBRO ARMATUREN Gebr. Bröer GmbH.

Violations are punishable by law and shall obligate to compensation for damages. EBRO ARMATUREN Gebr. Bröer GmbH reserves all rights to exercise industrial property rights.

1.2 Warranty and liability

Warranty and liability shall be subject to the contractually agreed terms and conditions (for warranty terms and conditions, see Terms of Sale and Delivery of EBRO ARMATUREN Gebr. Bröer GmbH). Report any guarantee or warranty claims to EBRO ARMATUREN Gebr. Bröer GmbH at post@e-bro-armaturen.com immediately after discovering the defect or fault.

EBRO ARMATUREN Gebr. Bröer GmbH accepts no liability for damage caused by improper use, improper storage or improper transportation.

1.3 Figures

All figures in this operating manual are schematic diagrams and serve to clarify the text. The figures only show the valve to the extent necessary for understanding the text.

Figures may show product variants or accessories that are not included in the scope of delivery. Figures never justify any claim for subsequent delivery or modification of the delivered valve.

1.4 Target groups

The target groups of these operating instructions are specialists who carry out activities on the component in the respective life phases.

A specialist is a person who is able to assess the work assigned to them and recognize potential hazards based on their specialist training, knowledge, and experience. Furthermore, the specialist has knowledge of the relevant regulations.

Only adequately qualified and instructed specialists must work on the valve. Persons who are still being trained or instructed must only work on the valve under the constant supervision of a trained or instructed specialist.

Every person who works with the valve or who performs work on the valve must know and apply the content of the operating manual. The owner of the valve is responsible for granting access to the operating manual and conveying its content by way of training and instruction.

1.4.1 Definition of the target groups

Transport personnel

Specialists responsible for the safe and efficient transportation of machines, systems, or components.

Assembly personnel

Specialists responsible for the professional assembly and installation as well as dismantling (decommissioning) of machines, systems, or components.

There may be overlaps with the “commissioning” phase during work of the assembly personnel.

Commissioning personnel

Specialists who are responsible for transferring machines, systems, or components from assembly to operating condition. The tasks of the commissioning personnel include testing, adjusting, and optimizing the systems to ensure safe and efficient operation.

Operating personnel

Specialists who are responsible for the use of machines, systems or components.

The work of operating personnel may overlap with the “commissioning” life phase.

Maintenance personnel

Specialists responsible for extending the service life and maintaining operational safety.

1.4.2 Definition of life phases

Transport

The component is transported to the place of use after production. Suitable transportation methods must be selected at this stage to avoid damage or malfunctions. This shall include packaging, load securing, compliance with transportation regulations, and, if necessary, climatic protection measures.

Assembly

The component is assembled and installed on site. This includes assembling individual parts, connecting them to supply networks (electricity, water, compressed air, etc.), and integrating them into existing production processes. Correct assembly is essential for subsequent functionality and safety of the component.

Commissioning

In this phase, the component is switched on and tested for the first time. This involves making settings, configuring control systems and performing safety checks. Any adjustments or optimizations are made before the component goes into regular operation.

Operation

This phase comprises the actual use of the component for the intended purpose. The focus here is on efficiency, productivity, and safety. Regular monitoring, documentation of operating data, and, if necessary, minor adjustments are required to ensure optimum performance.

Maintenance

Regular maintenance is required to ensure the service life and functionality of the component. This may include inspections, cleaning, lubrication, replacement of wear parts, and preventive maintenance measures.

Decommissioning

If the component is no longer economically or technically viable, it is decommissioned. This includes shutdown, emptying of operating equipment, and possibly temporary storage. We also check whether it makes sense to reuse or sell the product during this phase.

1.4.3 Who-does-what matrix

	Transport personnel	Assembly personnel	Commissioning personnel	Operating personnel	Maintenance personnel
Transport	●				
Assembly		●			
Commissioning		●	●	●	
Operation				●	
Maintenance					●
Decommissioning	●	●			

Tab. 1: Who-does-what matrix

1.5 Notices

Warnings serve to raise awareness of a possible hazardous situation, its avoidance and the physical integrity of persons.

General notices are aimed at preventing material damage or provide useful additional information for better understanding.

Use of mandatory, desired, and optional provisions

Expression	Conclusion on compliance
Mandatory	A mandatory provision contains clearly defined instructions that must be followed, i.e., it does not grant any discretionary space.
Desired	A desired provision is a recommendation. Although a desired provision contains instructions for action, there is a certain amount of discretionary space for exceptions or atypical situations.
Optional	A may-provision contains an option for action that the owner can consider, but do not necessarily have to follow.

Tab. 2: Mandatory, desired, and optional provisions

1.5.1 Meaning of the requirement and warning signs

Mandatory sign

Sign	Meaning
	Use head protection Protects from head injuries caused by objects falling on the head or hitting the head against objects

Sign	Meaning
	Use eye protection Protects from eye injuries due to mechanical, optical, chemical, thermal, biological, electrical hazards
	Use hand protection Protects from hand injuries caused by objects or contact with hot materials or chemicals
	Use foot protection Protects from foot injuries caused by objects or contact with hot materials or chemicals

Tab. 3: Mandatory sign

Warning signs

Sign	Meaning
	General warning sign Observe the danger conveyed by the additional sign.
	Warning of electrical voltage Take care not to come into contact with electrical voltage.
	Warning of suspended load Take care not to be hit by or run into a suspended load.
	Warning about hot surfaces Take care not to come into contact with hot surfaces.
	Warning of automatic start-up Be careful around machines with mechanical parts that start moving automatically and unexpectedly.
	Warning against hand injuries Take care to avoid hand injuries caused by closing mechanical parts of a machine/component.
	Warning of falling objects Take care to avoid being hit by falling objects.

Tab. 4: Warning signs

1.5.2 Definitions and structure of warnings

The purpose of warning notices is to inform users of potential dangers, raise their awareness, and provide safety-related information to prevent accidents or injuries.

Definition of warnings

DANGER



The signal word **“DANGER”** designates a hazard with a high degree of risk. The hazard will result in death or serious injury if it is not avoided.

WARNING



The signal word **"WARNING"** designates a hazard with a medium degree of risk. The hazard may result in death or serious injury if it is not avoided.

CAUTION



The signal word **"CAUTION"** designates a hazard with a low degree of risk. The hazard may result in a minor or moderate injury if it is not avoided.

Structure of warnings

①

CAUTION



② **Medium may escape in an uncontrolled manner and be inhaled.**

③ Irritation of the respiratory tract.

➤ Check the valve for leaks.

④ ➤ Observe the safety data sheet.

Position	Explanation
1	Signal word: The corresponding signal word for the degree of danger is used to emphasize the urgency and nature of the danger.
2	Source of the danger: A clear and concise description of the danger in simple and easily comprehensible terms.
3	Consequence of non-compliance: Possible consequences or effects if the security instructions are not complied with.
4	Risk prevention: Instructions on how the user can avoid the consequences of non-compliance.
5	Pictogram: A pictogram is placed next to the source of the danger to reinforce the warning and emphasize the significance of the danger.

Tab. 5: Structure of warnings

1.5.3 Definition of general notices

NOTICE



A notice with the signal word **"NOTICE"** provides important information for the proper handling of the product.

Non-observance of such notices may cause faults in the product or affect its environment.

1.5.4 Symbols

Sign	Meaning
1. Screw ...	Instructions with step sequence
➤ Observe the safety data sheet.	Instructions without step sequence
• The valve ...	Bullet point
①	Item number in figures for assignment to a list or supplementary information

Tab. 6: Symbols

1.6 Applicable documents

Always also observe the statutory provisions applicable at the site of use of the valve and the owner's instructions in addition to the documentation provided by EBRO.

Also observe any supplier instructions, in particular their safety and warning notices.

1.6.1 Declaration of Conformity/Declaration of Incorporation

The valve may be subject to a directive giving rise to a presumption of conformity. In this case, a supplementary EBRO Declaration of Conformity or an EBRO Declaration of Incorporation is also applicable.

The owner of the valve is responsible for requesting and, if necessary, carrying out the conformity assessment procedure.

1.6.2 Use in potentially explosive atmospheres

The owner must place an explicit order and the manufacturer must take structural precautions and perform tests for use in potentially explosive atmospheres. A supplementary ATEX operating manual is also applicable for the configuration intended for use in potentially explosive atmospheres.

1.7 Contact details

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- 🌐 www.ebro-armaturen.com



2 IMPORTANT SAFETY INSTRUCTIONS

2.1 Intended use

The valve type Z011-AS with a free shaft is designed and built to regulate or shut off the flow of medium within the owner's pipe system. Actuation and signal acquisition are not carried out by EBRO, but are realized by the owner. The valve is intended exclusively for use in industrial applications.

Observe the valve limits for intended use. Limits can be found in the technical data and on the identification plate of the valve.

2.1.1 Reasonably foreseeable misuse

The following items constitute misuse:

- The valve may be used in potentially explosive areas.
- The valve may be used outside of its limits.
- The valve may be used as an end-of-line valve.
- The valve may be used as a stepping aid.

2.1.2 Liners and their areas of application

NOTICE



The properties of the medium have a fundamental influence on the resistance of the valve, in particular the liner and the valve disc. EBRO does not know which medium is being regulated in every order. It is the responsibility of the purchaser of the valve to order the correct material version of the liner and the valve disc for the application. If in doubt, EBRO may provide advice or perform tests with the medium. The owner must verify compatibility before installation.

Short designation	Long designation	Properties	Typical applications
EPDM	Ethylene-propylene-diene rubber	• Resistant to diluted acids, alkalis, and alcohols • Good weather and ozone resistance	Water, steam, hot water, acids, alkalis, air
NBR	Acrylonitrile-butadiene-rubber	• Good mechanical properties, good low-temperature behavior, and higher abrasion resistance than most other elastomers • Good resistance to greases, oils, and fuels • No resistance to ozone	Greases, oils, fuels

Short designation	Long designation	Properties	Typical applications
HNBR	Hydrogenated acrylonitrile rubber butadiene rubber	• Very good mechanical properties • Resistant to mineral oils, vegetable and animal oils, and fats • May be used with hot water, steam and the refrigerant R-134a • Good ozone and weather resistance.	Mineral oils, vegetable and animal oils and fats, hot water, steam, and refrigerant R-134a
FKM	Fluororubber	• Very suitable for use at high temperatures • Good chemical resistance • Due to its low gas permeability, FKM is well suited for high vacuum. • Good resistance to mineral oils, fuels • Ozone and weather resistant	Mineral oils, fuels
PUR	Polyurethane	• Very resistant to abrasion when used with abrasive media due to the higher hardness • Contains no plasticizers	Bulk goods
CSM	Chlorosulfonated polyethylene	• Ozone and weather resistant • Good resistance to acids, oils and solvents	Acids, oils and solvents, chlorinated water, swimming pools
SBR	Styrene-butadiene rubber	• Good resistance to organic and inorganic acids, alcohol • Resistant to most solvents, acids, and alkalis • Inexpensive alternative to EPDM • Not resistant to oils and greases • Significantly poorer resistance to weathering and ozone than EPDM	Abrasive media

Short designation	Long designation	Properties	Typical applications
VMQ	Silicone rubber	- Good high and low temperature behavior - Good weather resistance - Good physiological properties - Unresistant to mineral oils and fuels - Moderate mechanical properties	Hot air, food, and pharmaceutical industry
FVMQ	Fluorosilicone rubber	- High resistance to hot air and excellent flexibility at low temperatures - Good resistance to weathering and ozone	Low temperature, fuels, mineral oils

Tab. 7: Elastomer properties

Temperature limits

NOTICE



Additional requirements to the material may apply at temperatures of less than -10 °C.
The service life of the liner may reduce as the temperature increases!

		TS min. [°C]	TS max. - PS 3 bar [°C]		TS max. - PS 6 bar [°C]		TS max. - PS 10 bar [°C]		TS max. - PS 16 bar [°C]			
Material	Color		5.3106 5.3103 5.1301 1.0619 1.4408	Alu- minum 3.2161 3.2163	5.3106 5.3103 5.1301 1.0619 1.4408	Alu- minum 3.2161 3.2163	5.3106 5.3103 5.1301 1.0619 1.4408	Alu- minum 3.2161 3.2163	5.3106 5.3103 5.1301 1.0619 1.4408	Alu- minum 3.2161 3.2163		
		NBR	black	-10	90		90		80		70	
		NBR	white	-10	80		80		70		60	
		HNBR	black	-10	130		130		120		120	
		EPDM	black	-10	120		120		100		80	
EPDM	white	-10	110		110		90		70			
FKM	blue/black	-10	180	130	180	130	180	130	180	130		
FKM	white	-10	160	130	160	130	160	130	160	130		
CSM	black	-10	60		60		60		60			
SBR	green	-10	70		70		60		60			
NBR (DVGW GAS)	black	-20	60		60		60		60			
GMX (polyurethane)		-30	80		80		80		80			

		TS min. [°C]	TS max. - PS 3 bar [°C]		TS max. - PS 6 bar [°C]		TS max. - PS 10 bar [°C]		TS max. - PS 16 bar [°C]	
Material	Color		5.3106	Alu- minum	5.3106	Alu- minum	5.3106	Alu- minum	5.3106	Alu- minum
			5.3103		5.3103		5.3103		5.3103	
			5.1301		5.1301		5.1301		5.1301	
			1.0619		1.0619		1.0619		1.0619	
			1.4408		1.4408		1.4408		1.4408	
VMQ (silicone)	red	-40	200	130	200	130	160	130	120	
VMQ (silicone)	white	-40	180	130	180	130	160	130	120	
FVMQ (fluorosilicone)	blue	-50	200	130	200	130	160	130	120	

Tab. 8: Temperature limits for valve bodies with elastomers

For further information on materials resilience, see the website of the Bundesanstalt für Materialforschung und -prüfung (Federal Institute for Material Research and Testing) (www.bam.de).

2.2 Markings

NOTICE



Ensure that all markings remain preserved and legible at all times.

NOTICE



Not all information and symbols are used at all times, depending on the type and configuration of the component.

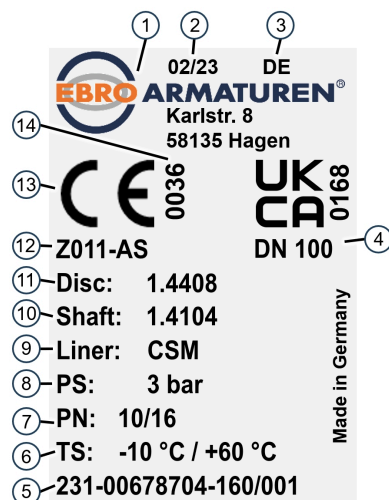


Fig. 1: Example identification plate

Item	Data item	Comment
1	Manufacturer with address	
2	Production month and year	
3	Production site	Country code
4	DN	The DN marking is used to indicate the internal diameter (open diameter) of the valve.
5	Ident. no.	EBRO-internal identification number for traceability
6	TS	Minimum or maximum allowable temperature limit
7	PN	PN indicates the standardized pressure level of a valve that defines the maximal allowable operating pressure at 20 °C.
8	PS	Maximum allowable operating pressure at room temperature
9	Liner:	Liner material
10	Shaft:	Shaft material
11	Disc:	Material of the valve disc
12	Valve type	
13		Certifies conformity with at least one relevant EU directive requiring a CE conformity assessment procedure (if applicable). Other conformity markings are possible.
14	Notified body	Number of the designated office that monitors the production process at EBRO (if applicable)

Tab. 9: Markings on the valve

2.3 Operationally safe condition

The valve must only be operated when in impeccable technical condition. This includes in particular:

- The valve must be fully assembled and properly commissioned.
- The valve must only be operated within its limits (pressure = PS as a function of temperature = TS). The maximum operating pressure and the maximum operating temperature are interdependent.
- All functional tests must have been successfully completed.
- The signage (identification plates, warning stickers, etc.) must be present and recognizable.
- Structural changes are not allowable.

NOTICE



Also observe the thresholds in chapter "Liners and their areas of application".

Shut down the valve immediately if any damage or faults occur. Only put the valve back into operation once you have repaired all damage and malfunctions.

Spare parts and accessories not supplied by EBRO may change the characteristics of the valve. Use of such parts may lead to hazards and damage. Only use genuine spare parts from EBRO and install them correctly.

2.4 Owner's obligations

Everyone charged with any work on the valve must know and apply the relevant contents of the operating manual. The owner of the valve is responsible for permitting access to the operating manual and conveying its content by way of training and instruction.

The owner must ensure that the operating manual is available at the place of use of the valve.

The owner must ensure that only sufficiently qualified and experienced persons with the corresponding specialist knowledge work on the valve.

Any hazard for the health and safety of personnel must be avoided. The owner must take appropriate organizational measures or use suitable work equipment.

The owner must perform hazard assessments etc. for the personnel based on national laws and regulations.

The owner must instruct the personnel in particular on the following items:

- Intended use and limits of the valve
- Danger points
- Function, position, and operation of the protective devices
- Operation and monitoring

2.4.1 Checking the scope of delivery and configuration

The owner must verify that the valve is complete and undamaged after delivery.

The owner is responsible for ensuring that the valve configuration corresponds to its application.

2.4.2 Risk assessment/hazard assessment

The valve is a partly completed machinery within the meaning of Directive 2006/42/EC (Machinery Directive).

After installation in other partly completed machinery or equipment or complete machinery, the integrator must perform a risk assessment. The owner must perform a risk assessment and take protective measures if necessary.

2.4.3 Residual risks

Attachments

The valve may be designed with external, driven components and attachments that pose a risk of crushing or shearing. Structural or spatial protective measures may be required as part of the owner's hazard assessment at the place of use.

Noise emission

The valve can cause a sound pressure of > 80 dB(A). Structural or spatial protective measures may be required as part of the owner's hazard assessment at the place of use. Persons in the vicinity of the valve must wear hearing protection if necessary.

3 DESCRIPTION OF THE COMPONENTS

The valve comprises several components that are mechanically connected to each other for their intended use or that are part of the casting.

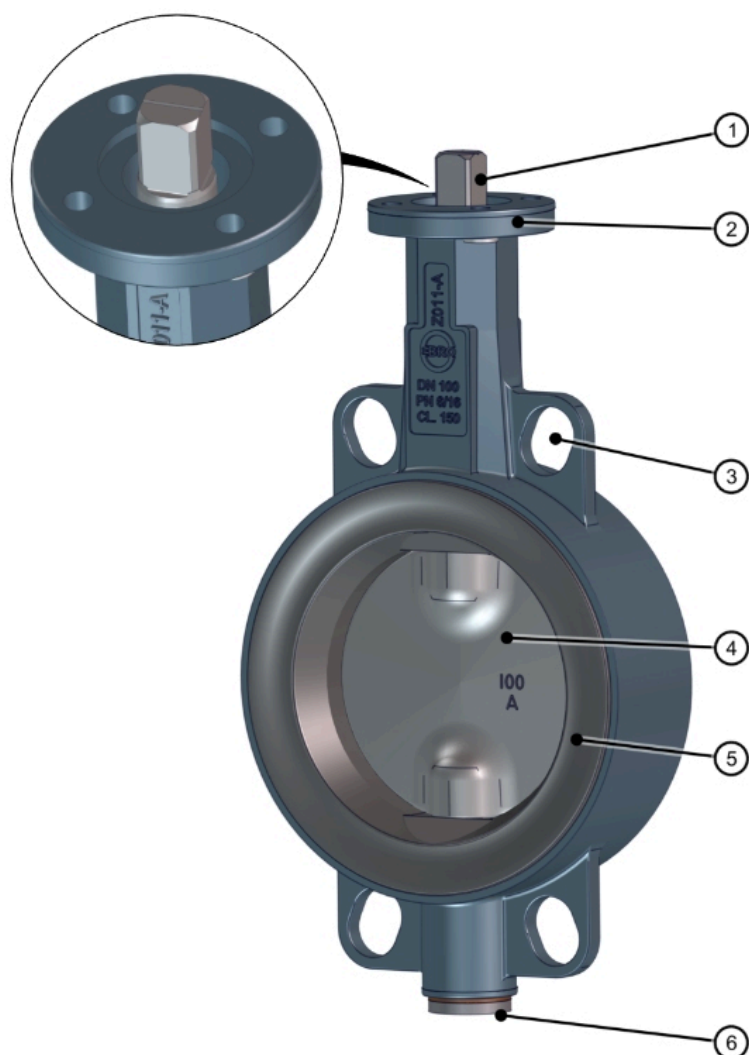


Fig. 2: Components

Position	Component
1	Free shaft
2	Top flange
3	Centering eye
4	Valve disc
5	Liner
6	Screw plug

Tab. 10: Designation the components

Top flange

The top flange forms the interface between a valve and the actuator. The head flange meets the requirements of the DIN EN ISO 5211:2024-10.

Centering eye

Valves for installation between pipe flanges must be carefully centered with the flange screws during installation. The valve between the pipe flanges is installed via the flange screws through the centering eyes first for this purpose.

Valve disc

The valve disc regulates the flow. Depending on the actuator type, the valve disc can go to positions from fully open to fully closed. Throttling or control operation with an opening angle of less than 20° is not allowable in continuous operation, as the high flow velocities can lead to high abrasion on the valve disc or liner up to destruction of the liner.

Liner

The liner seals the interior of the valve against the valve body and the pipe flanges. The valve disc seals over the liner and stops the flow when the valve disc is closed. Special requirements are placed on the liner with regard to the material in combination with the medium.

Screw plug / end cap

The screw plug closes the valve. Removal of the screw plug becomes necessary for replacement of the liner, the valve disc, or the shafts. In larger dimensions, the lower housing seal may be designed as an end cap.

3.1 Technical data

Designation	Description
Nominal size	DN 50 - DN 300
Temperature range ¹	-10 °C to +100 °C
Maximum allowable pressure (PS)	3 bar
Exterior coating	Epoxy resin
Notices ¹ Depending on pressure, medium and material selection	

Tab. 11: Technical data Z011-AS

Standards

Designation	Description
Standard of use	DIN EN 593:2018-01
Marking	DIN EN 19:2024-03
Top flange	DIN EN ISO 5211:2024-10
Face-to-face	DIN EN 558:2022-09 Series 20
	ISO 5752:2021-06 Series 20
	API STD 609:2021-04 Table 1

Designation	Description
Flange connection ¹	DIN EN 1092-1:2018-12 (Form A/B) PN 6/10/16
	ASME B16.3:2021 Class 150 (RF, FF)
	AS 4087:2011 PN 16
Tightness test ¹	DIN EN 12266-1:2012-06 (Leakage rate A)
	ISO 5208:2015-06, category AA
Notices ¹ Others upon request	

Tab. 12: Standards

3.2 Dimensions and weights

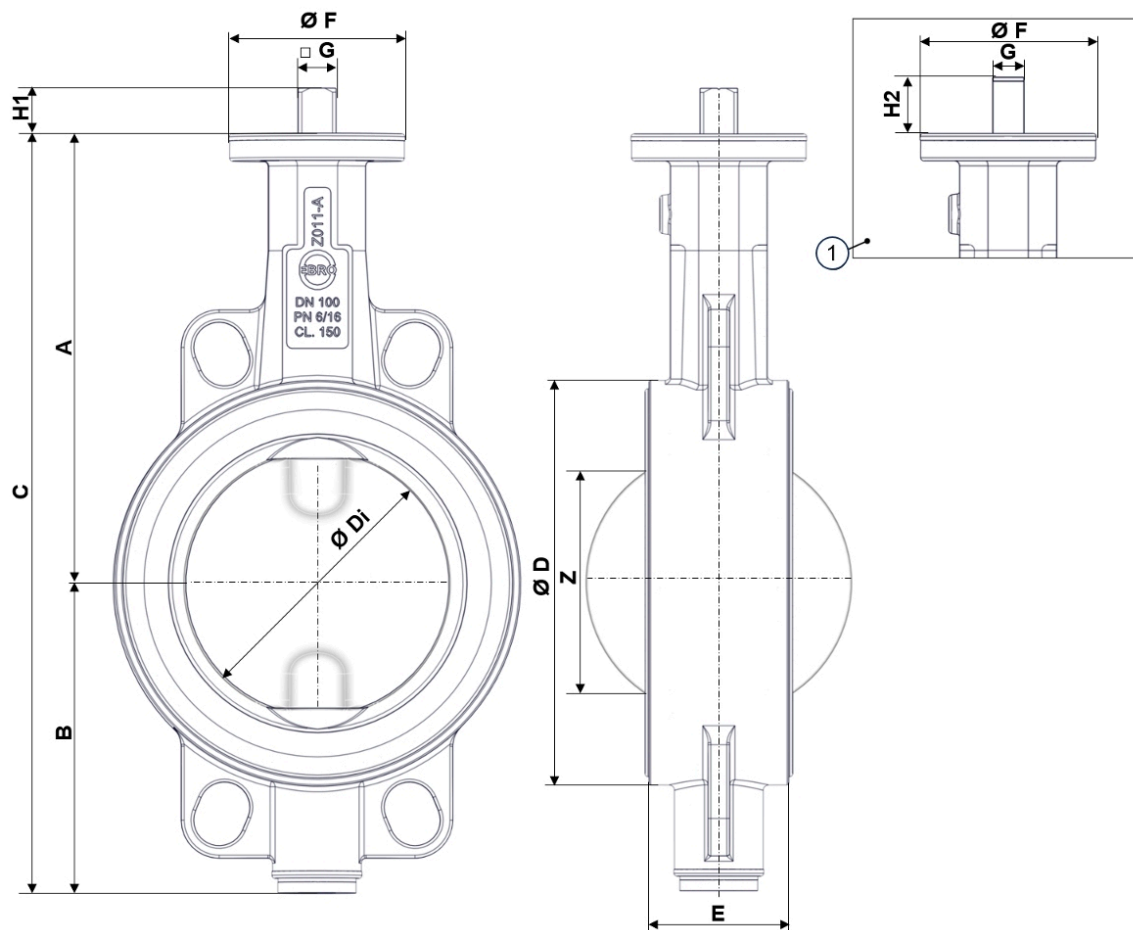


Fig. 3: Main dimensions Z011-AS

		Main dimensions [mm]												Weight [kg]
DN	NPS	A	B	C	Ø D	Ø Di	E	Ø F	Flange	□ G	H1	H2	Z	
50	2	126	84	210	95	48.5	43	54	F04	11	12	19	25	1.1
65	2½	134	93	227	115	63.5	46	54	F04	11	12	19	45	1.4
80	3	157	104	261	131	78.5	46	65	F05	14	16	25	65	1.9
100	4	167	115	282	151	98.5	52	65	F05	14	16	25	85	2.4
125	5	180	127	307	182	123.5	56	65	F05	14	16	25	111	3.2
150	6	203	150	353	200	141.6	56	90	F07	17	19	30	130	4.6
200	8	228	176	404	260	199	60	90	F07	17	19	30	190	6.8
250	10	266	212	478	316	248	68	125	F10	22	24	39	240	12.6
300	12	291	237	528	360	281.1	78	125	F10	22	24	39	270	17.5
Item 1 = Double-D option														

Tab. 13: Main dimensions Z011-AS

3.3 Torques

NOTICE



The values listed in the table are breakaway torques determined for liquid/lubricating media from the position of the valve disc. They should be considered reference values since the actual torques depend on various factors such as operating pressure, medium, operating conditions, etc. The safety factor for the design of the actuation is also necessary.

Valve discs in special designs can be provided.

		Torque (Md) / pressure rating [Nm]
DN	Size	3 bar valve disc
50	2	9
65	2½	18
80	3	24
100	4	18
125	5	15
150	6	36
200	8	59
250	10	150

		Torque (Md) / pressure rating [Nm]
DN	Size	3 bar valve disc
300	12	200
Additions for other media - Powder (non-lubricating) media $Md \times 1.3$ + safety factor - Dry gases/high viscosity liquids $Md \times 1.2$ + safety factor		

Tab. 14: Torqueswafer-type butterfly valve

3.4 K_v values

NOTICE



The K_v value [m^3/h] indicates the water flow rate at a temperature of 5 °C to 30 °C and a Δp of 1 bar. The allowable flow velocity V_{max} is 4.5 m/s for liquids and 70 m/s for gases.

At an opening angle of 30° to 70°, the valve disc is in the optimum control range. The curve is flat between 20° and 30° and between 70° and 90°, so that changing the opening angle has little effect on the flow control. Avoid cavitation.

		Opening angle α°							
DN	NPS	20°	30°	40°	50°	60°	70°	80°	90°
50	2	3.84	10.1	20.7	34.4	49.7	65.2	79.5	91.2
65	2½	9.5	16.6	39.1	72.6	113	157	199	235
80	3	15.6	20.6	51.4	102	165	234	304	368
100	4	24.9	39.8	96.5	183	288	398	503	589
125	5	51.8	67.2	135	256	428	652	926	1250
150	6	76.5	97.3	197	375	629	957	1360	1830
200	8	137	187	373	697	1160	1760	2510	3400
250	10	227	271	563	1090	1850	2830	4010	5390
300	12	287	409	820	1550	2610	4050	5880	8120
Information in m^3/h .									

Tab. 15: K_v values

3.5 Conversion tables

Mass m

	kg	lb	cwt	t	sh ton
kg	1	2.205	0.0197	0.001	0.0011
lb	0.454	1	0.0089	4.54×10^{-4}	5.0×10^{-4}

	kg	lb	cwt	t	sh ton
cwt	50.802	112	1	0.0508	0.056
t	1000	2204.6	19.684	1	1.1023
sh ton	907.2	2000	17.857	0.9072	1

Tab. 16: Conversion table for mass m

Temperature t

°C	°F	°C	°F	°C	°F	°C	°F
-140	-220	-40	-40	60	140	160	320
-135	-211	-35	-31	65	149	165	329
-130	-202	-30	-22	70	158	170	338
-125	-193	-25	-13	75	167	175	347
-120	-184	-20	-4	80	176	180	356
-115	-175	-15	5	85	185	185	365
-110	-166	-10	14	90	194	190	374
-105	-157	-5	23	95	203	195	383
-100	-148	0	32	100	212	200	392
-95	-139	5	41	105	221	205	401
-90	-130	10	50	110	230	210	410
-85	-121	15	59	115	239	215	419
-80	-112	20	68	120	248	220	428
-75	-103	25	77	125	257	225	437
-70	-94	30	86	130	266	230	446
-65	-85	35	95	135	275	235	455
-60	-76	40	104	140	284	240	464
-55	-67	45	113	145	293	245	473
-50	-58	50	122	150	302	250	482
-45	-49	55	131	155	311	255	491

Tab. 17: Conversion table for temperature t

4 TRANSPORT AND ASSEMBLY

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform assembly work while the system is depressurized.
- Only perform assembly work while the device is de-energized.
- Do not reach between the valve body and the valve disc.

NOTICE



The valve is supplied with a valve disc in the slightly open position and is not secured against movement.

Wear personal protective equipment!



Moving parts

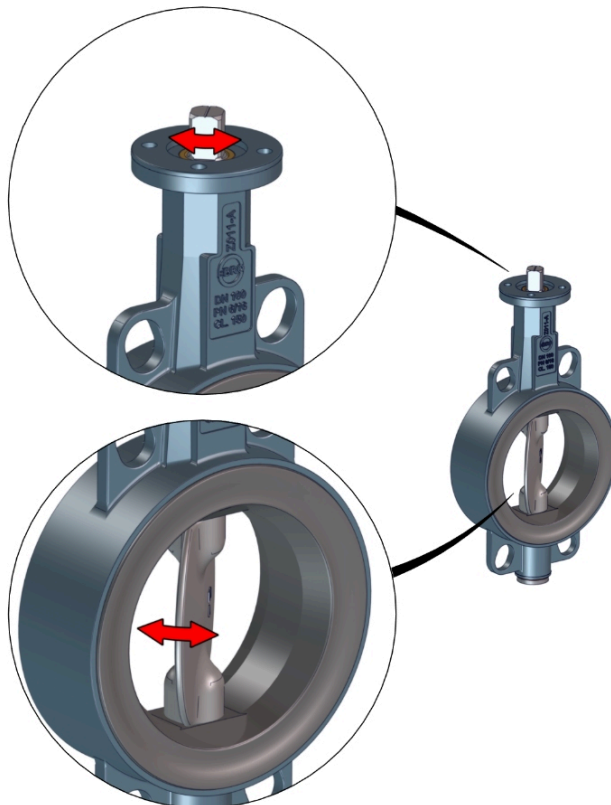


Fig. 4: Moving parts

General rules for storage, transport, and assembly

- Recommended storage conditions:
Room temperature >5 °C, <25 °C (>41 °F, <77 °F)
Relative humidity 50-60%
Avoid condensation
Protection against direct sunlight
- Leave the components secured in the factory packaging until assembly.
- Actuate components in bearings at regular intervals to ensure that they move freely. Integrate the stored components into the operational maintenance concept.
- Protect any attachments from damage (e.g., solenoid valves or handwheels).
- Protect the components from dirt and moisture.
- Protect flanges and unprotected parts with suitable grease or oil.
- Leave all connections and electrical plug contacts closed until assembly.
- Use suitable round slings to lift the components; avoid chains if necessary.
- Check the valve for damage before assembly.
- You can install the valve independently of the medium flow direction.
- Install the valve between the pipe flanges with the valve disc almost closed.
- Make sure that the pipe flanges do not contain any additional seals.
- Preferred orientation of the valve is with the shaft in the vertical position. If a part-turn actuator is installed in a lateral position, the owner must decide whether the part-turn actuator must be supported due to bending forces.

Special rules for the storage of elastomer seals

NOTICE



Elastomer seals can become unusable due to hardening, softening, breaking, cracking or other types of surface degradation. Such changes result from specific individual or combined influencing factors such as deformation, oxygen, ozone, light, heat, moisture or oils, and solvents.

- Room temperature > 5 °C, < 25 °C (> 41 °F, < 77 °F)
Protect against direct contact with heat sources such as sunlight.
- Relative humidity < 70 %
Avoid extremely humid or dry conditions and condensation.
- Leave secured and protected in the factory packaging until assembly.
- Protect from UV light sources.
- Do not allow to come into contact with solvents, oils or greases.
- Protect from oxygen and ozone.
- Store in a relaxed state, free of compression and deformation.
- Protect from contact with particular metals such as manganese, iron, copper, and their alloys, e.g., brass.

Storage duration and control

The service life of valves with elastomer seals depends to a large extent on the type of elastomer. If the above recommendations for storage are followed, the following storage times can be assumed for the different elastomers:

- AU, thermoplastics: 4 years
- NBR, HNBR, CR: 6 years
- EPDM: 8 years
- FKM, VMQ, FVMQ: 10 years
- FFKM, Isolast®: 18 years
- PTFE: unlimited

4.1 Transporting components

WARNING



The valve may fall if lifting gear and lifting devices with insufficient load-bearing capacity are used.

Injuries or even death due to crushing, shearing or impacts.

- Only use lifting gear and lifting devices with sufficient load-bearing capacity.
- Only use lifting gear and load handling attachments that are in an undamaged condition.
- Never stand underneath any suspended loads.

NOTICE



The outer edge of the valve disc is precision-machined to ensure the valve is leak-proof.

Ensure that this surface remains undamaged during transport, assembly, and commissioning activities!

NOTICE



You can find the weight of your assembly in chapter "Dimensions and weights".

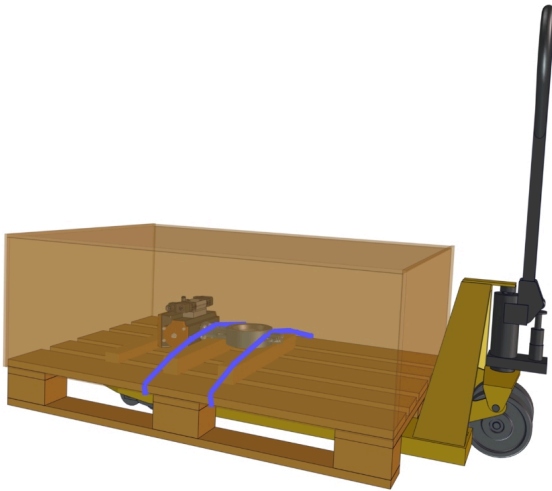


Fig. 5: Example illustration for transporting components

1. Transport the valve to its place of use using a suitable means of transport, for example a pallet truck/forklift truck.

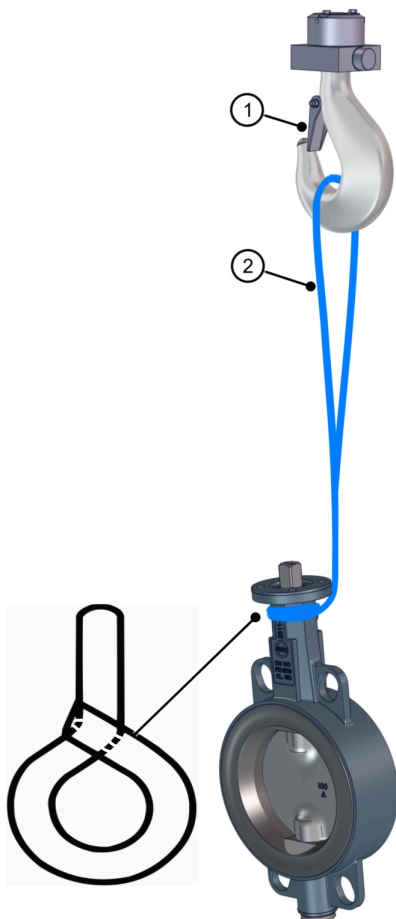


Fig. 6: Lifting wafer-type butterfly valve with a crane

2. Guide the round sling (item 2) as a loop around the neck of the valve.
3. Hang the round sling on the crane hook.
Ensure that the crane hook safety catch (item 1) is closed.
4. Lift the valve out of the transport box.
5. Transport the valve to its installation site.

4.2 Mounting components

WARNING



The shaft can start to move unexpectedly.

Injuries caused by pulling in, catching, grabbing, rubbing, scraping, or skidding.

- Keep a safe distance from the moving parts.
- Only pressurize the piping with the actuator installed on the valve.

NOTICE



The outer edge of the valve disc is precision-machined to ensure the valve is leak-proof.
Ensure that this surface remains undamaged during transport, assembly, and commissioning activities!

NOTICE



The valve is supplied assembled ex works. However, it may be necessary to assemble components in the event of retrofitting or replacement, for example.

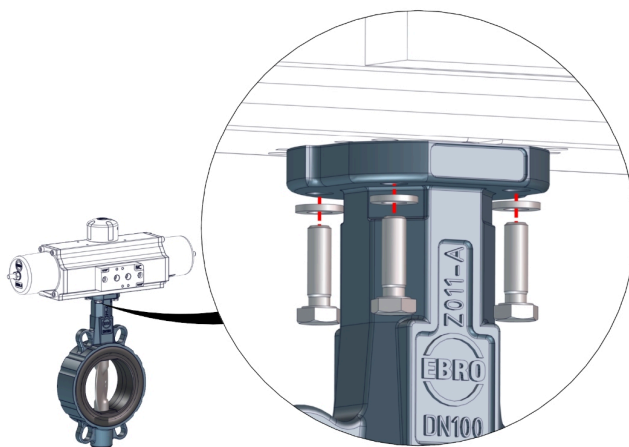
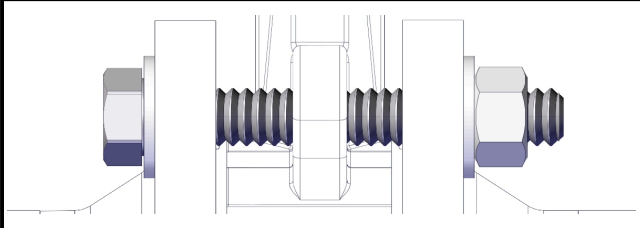
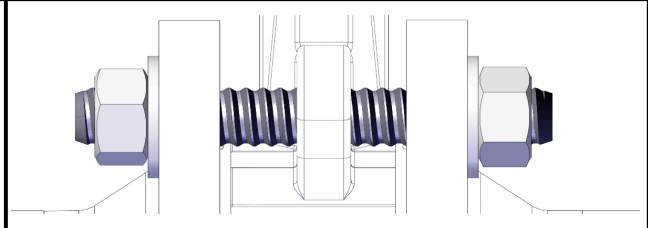


Fig. 7: Principle for mounting components

ISO flange size	F03	F04	F05	F07	F10	F12	F14	F16	F25
Thread size	5	M5	M6	M8	M10	M12	M16	M20	M16
Tightening torque in Nm	4.5	4.5	7.7	18.7	37.1	64.7	161.2	314.9	161.2
A tolerance of up to +10% is allowable for the tightening torques.									

Tab. 18: Tightening torques for the drive flange

Mounting the valve

Connection type Through hole/screw (lubricated)	Connection type Through hole/threaded rod (lubricated)
	

Tab. 19: Connection type (stylized)

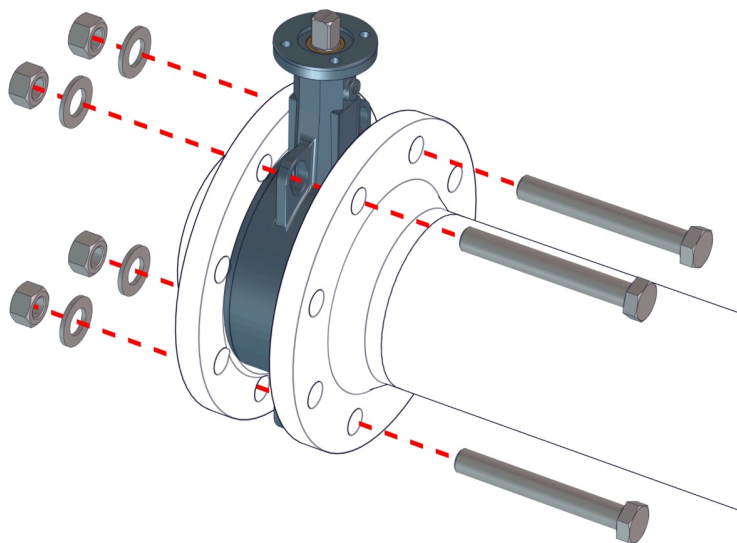


Fig. 8: Positioning the wafer-type butterfly valve

1. Check the pipe ends for alignment, plane-parallel connection surfaces and integrity of the flange sealing surfaces.
2. Clean the pipe flanges and the liner thoroughly.
3. Move the valve disc to its nearly closed position.
4. Place the valve between the pipe flanges.
5. Insert the 2 flange screws through the upper centering eyes.

6. Insert the 2 flange screws through the lower centering eyes.
7. Tighten the flange screws slightly so that adjustment remains possible.

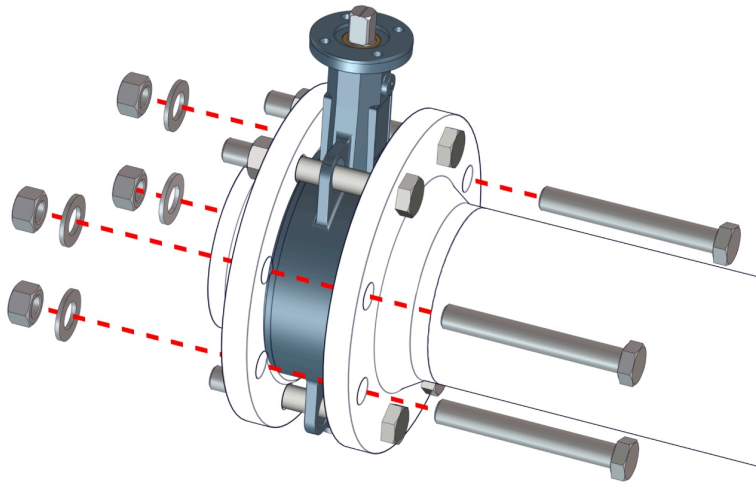


Fig. 9: Screwing on the wafer-type butterfly valve

8. Insert the remaining flange screws through the flange holes.
9. Center the valve (same distance to the edge of the pipe flange all around).
10. Tighten all flange screws crosswise to the required tightening torque. The pipe flanges rest on the body of the valve.
Also observe chapter "Tightening torques for flange screws"

NOTICE



Screw the valve to the piping at all flange holes.
Pressing forces on the valve must only be exerted by the
tightening torque of the flange screws.

NOTICE



Avoid tension and vibrations in the piping. Stress and vibrations
can lead to leaks and malfunctions in the valve.

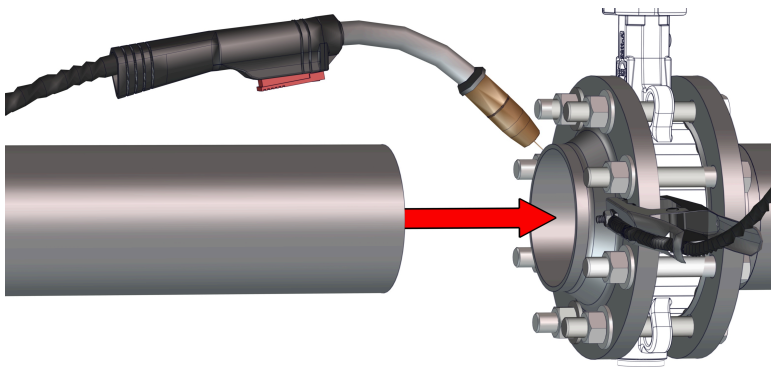


Fig. 10: Welding the pipe to flange

11. Shorten the pipe to the proper length and prepare it for welding before guiding it to the flange.
12. Center the pipe and place it flush with the flange.
13. Staple the pipe at least in 3 spots so that it can no longer move.
14. Disassemble the pipe with the flange attached.
Alternatively: Remove the valve for the subsequent welding process and the cooling time.
15. Weld the pipe completely to the flange.
16. Wait until the pipe with the flange has cooled down.
17. Check the valve and flanges for damage and contamination caused by welding.
18. Screw the pipes to the valve as described.
19. Remove the round sling.

NOTICE

Actuation and signal acquisition are not carried out by EBRO, but by the owner.

4.2.1 Installation recommendations

NOTICE

Generally, a distance of $6 \times DN$ to other piping components should be observed up- and downstream of the valve!

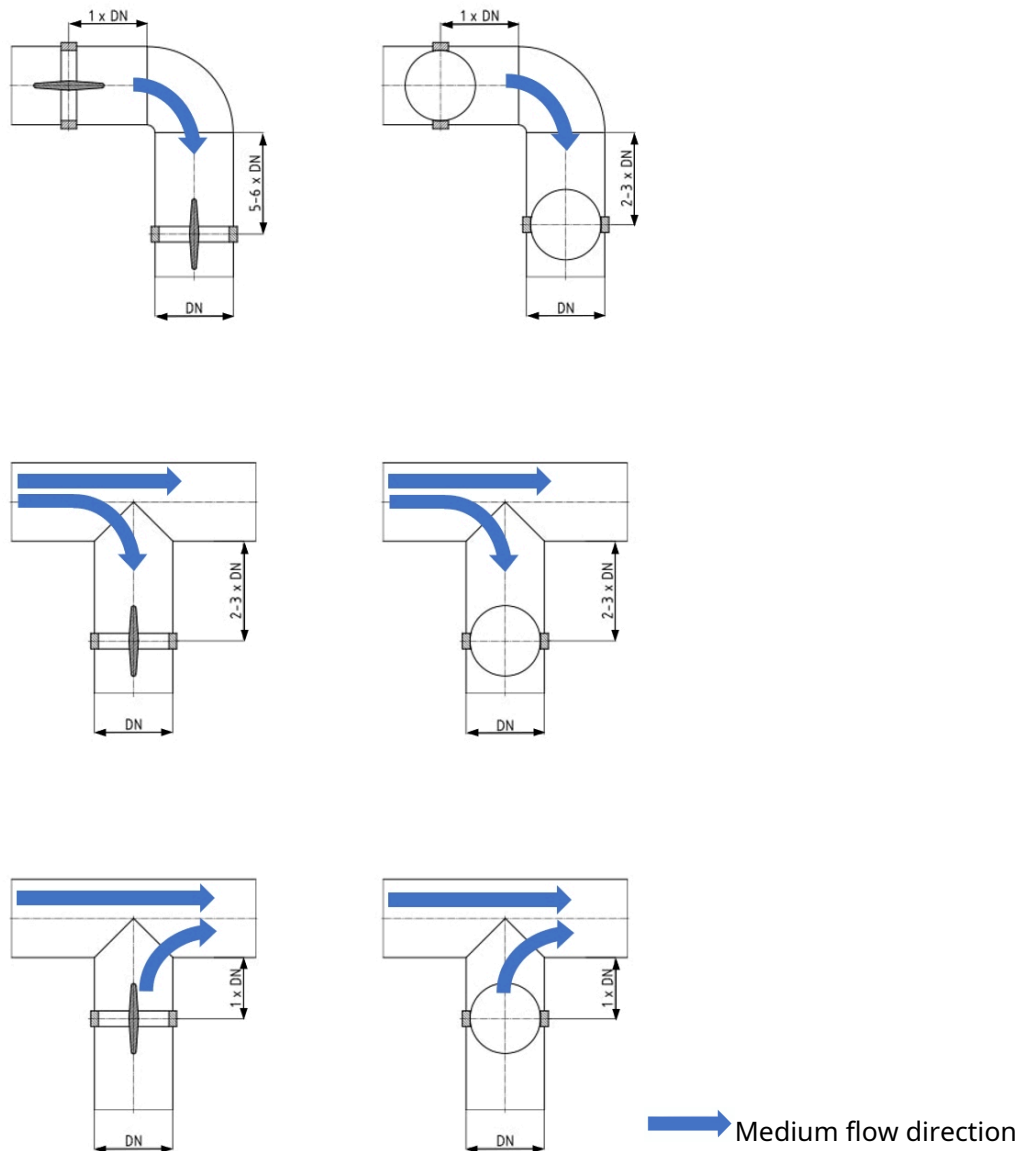


Fig. 11: Distances to pipe branches

4.2.2 Tightening torques for flange screws

The allowable strength characteristics of the flange bolts are based on 285.7 MPa (up to M39 for 5.6) and 419 MPa (greater than M39 for 25CrMo4). If screws with lower strength properties are used, the tightening torque must be converted as follows:

- Up to and including M39 ► $M_{A\text{new}} = M_A \cdot R_{P0,2\text{new}} / 300$
- From M39 ► $M_{A\text{new}} = M_A \cdot R_{P0,2\text{new}} / 430$

Max. tightening torques MA in Nm (ft lbf) for flange screws (lubricated) in accordance with DIN EN 1092-1:2018-12 Chapter E3.4			
Size	Size	Solid shank (DIN EN ISO 4014:2022-10)	Stud bolts with UNC/8UN thread
M10	3/8	30 (22)	25 (18)
M12	1/2	50 (37)	55 (41)

Max. tightening torques MA in Nm (ft lbf) for flange screws (lubricated) in accordance with DIN EN 1092-1:2018-12 Chapter E3.4			
Size	Size	Solid shank (DIN EN ISO 4014:2022-10)	Stud bolts with UNC/8UN thread
M16	5/8	115 (85)	110 (81)
M20	3/4	230 (170)	195 (144)
M24	7/8	530 (391)	425 (313)
M27	1	780 (575)	635 (468)
M30	1 1/8	1070 (789)	925 (682)
M33	1 1/4	1440 (1062)	1290 (951)
M36	1 3/8	1865 (1376)	1750 (1291)
M39	1 1/2	2415 (1781)	2300 (1696)
M42	1 5/8	4400 (3245)	4340 (3201)
M45	1 3/4	5500 (4057)	5480 (4041)
M48	1 7/8	6640 (4897)	6790 (5007)
M52	2	8500 (6269)	8300 (6121)
M56	2 1/4	10495 (7741)	11950 (8813)
	2 1/2		16500 (12168)

Tab. 20: Tightening torques for flange screws with solid shank

Max. tightening torques MA in Nm (ft lbf) for expansion screws Ts > 300 °C		
Size	Size	Expansion shank (e.g., DIN 2510)
M12	1/2	35 (26)
M16	5/8	85 (63)
M20	3/4	165 (122)
M24	7/8	385 (284)
M27	1	560 (413)
M30	1 1/8	790 (583)
M33	1 1/4	1060 (782)
M36	1 3/8	1350 (996)
M39	1 1/2	1810 (1335)
M42	1 5/8	3260 (2404)
M45	1 3/4	4170 (3076)
M48	1 7/8	4980 (3673)
M52	2	6380 (4706)
M56	2 1/4	7860 (5797)

Tab. 21: Tightening torques for flange screws with expansion shank

Order of pipe flange screw connection

NOTICE



General instructions:

Tighten the screws evenly spread around the bolt circle and crosswise.

Follow one of the patterns shown.

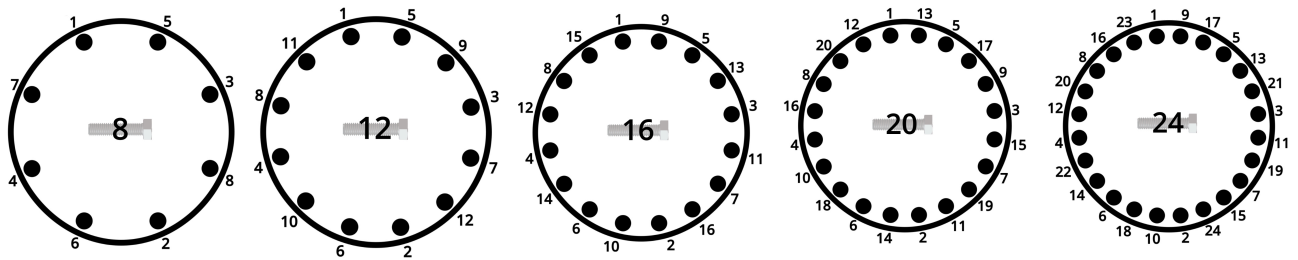


Fig. 12: Order of pipe flange screw connection

5 COMMISSIONING

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

NOTICE



Open and close the valve only using the matching, assembled actuator.

5.1 Flushing the pipe

NOTICE



Before the 1. Hard/abrasive soiling (welding beads, rust particles, etc.) must be removed from the pipe section before closing the valve disc.

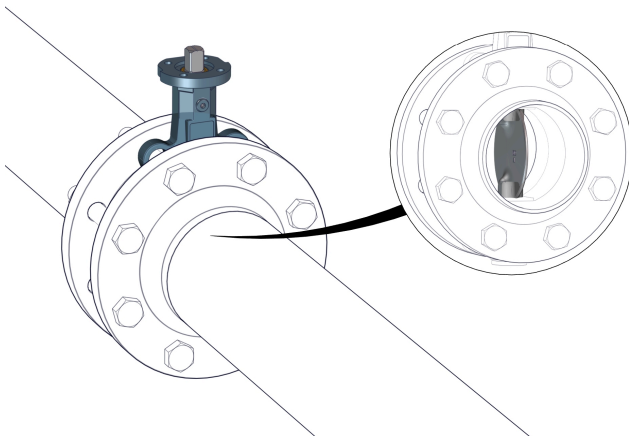


Fig. 13: Flushing the pipe

1. Open the valve counterclockwise.
2. Flush the pipe with water.

5.2 Checks

Equipotential bonding

- Check the equipotential bonding between all electrically conductive components of the valve and the system-side equipotential bonding system. Equipotential bonding prevents occurrence of different potentials and permits safe discharge of static charges.

Functional testing

NOTICE



The outer edge of the valve disc is precision-machined to ensure the valve is leak-proof. Ensure that this surface remains undamaged during transport, assembly, and commissioning activities!

1. Slowly and carefully check the movement of the valve disc. The valve disc must be able to move freely in the piping.
2. Check the shut-off function by opening and closing it several times.

Pressure testing

WARNING



The pressurized valve may leak medium to the outside.

Leaking or spraying medium.

- Close the pipe end on the valve with a blind flange.
- Secure the test area and keep a distance.
- Only test for leaks using a suitable, non-hazardous medium, such as water.
- Depressurize the pipe system if there are any leaks.

The valve was subjected to a leak and final test by EBRO ex works.

The test conditions of the pipe section apply with the following restrictions for pressure tests on the valve:

- When the valve disc is in the open position, the test pressure of the valve must not exceed the value $1.5 \times PS$ (according to the valve identification plate).
- When the valve disc is in the closed position, the test pressure of the valve must not exceed the value $1.1 \times PS$ (according to the valve identification plate).

6 OPERATION

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

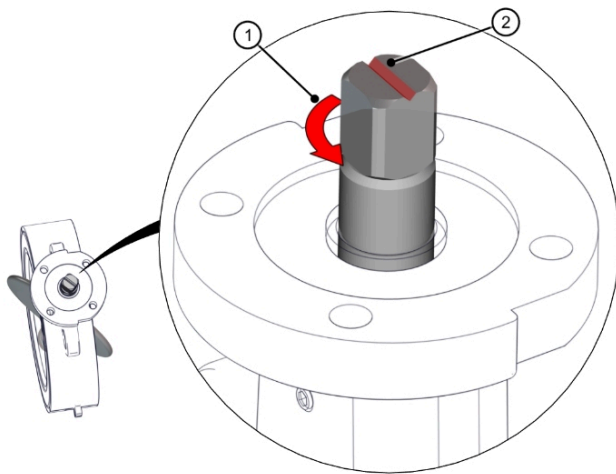


Fig. 14: Actuating direction

The actuator is realized by the owner.

Open the valve counterclockwise (item 1), close the it clockwise. The marking on the shaft (item 2) indicates the valve disc position.

Actuation of the valve with manual operation requires normal manual force. Only actuate the valve with the assembled manual actuator and not with an extension (valve hook or the like)!

7 MAINTENANCE

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform assembly work while the system is depressurized.
- Only perform assembly work while the device is de-energized.
- Do not reach between the valve body and the valve disc.

CAUTION



Assembly and disassembly of actuators when the valve is under pressure.

Parts may be accelerated in an uncontrolled manner.

- Only perform assembly and disassembly work when the valve is depressurized.

NOTICE



Maintenance depends on various factors, such as the local environment, medium, temperature, and actuation. The owner will determine maintenance intervals in accordance with operational conditions and requirements.

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

Maintenance work is limited to an external inspection of the valve:

- Keep the valve free from deposits.
- Check the valve for leaks and, if necessary, check the tightening torque of the flange screws.
- Check the valve for smooth movement.
- Check that the signage (identification plate / warning and mandatory stickers, if applicable) is complete and intact.
- Check the design of the valve for compliance with the operating conditions.
- Check the piping for pressure surges.

In cases of faults:

Type of fault	Measure
Leakage at the pipe flange	Ensure that the pipe flanges are aligned and parallel. Ensure that the sealing surfaces are clean and undamaged. Tighten the flange screw connection while in compliance with the tightening torques. The valves and the pipe flange must not be tightened until metal contact is made.
Leakage at the shaft seal	Repair required! Please contact EBRO service.
Leak in the through-passage seal (valve disc / liner seal)	Check the valve for foreign objects and damage. Open and close the valve multiple times. If the valve is still leaking: Repair required! Please contact EBRO service.
Malfunction	Remove the valve and check it for damage. • Foreign bodies • Broken or tensed shaft • Valve disc broken or tensed • Valve body broken • Deposits If the valve is damaged: Repair or replacement required! Please contact EBRO service.

Tab. 22: Troubleshooting wafer-type butterfly valve

Contact

 +49 2331 904-0
 service@ebro-armaturen.com



7.1 Bill of materials

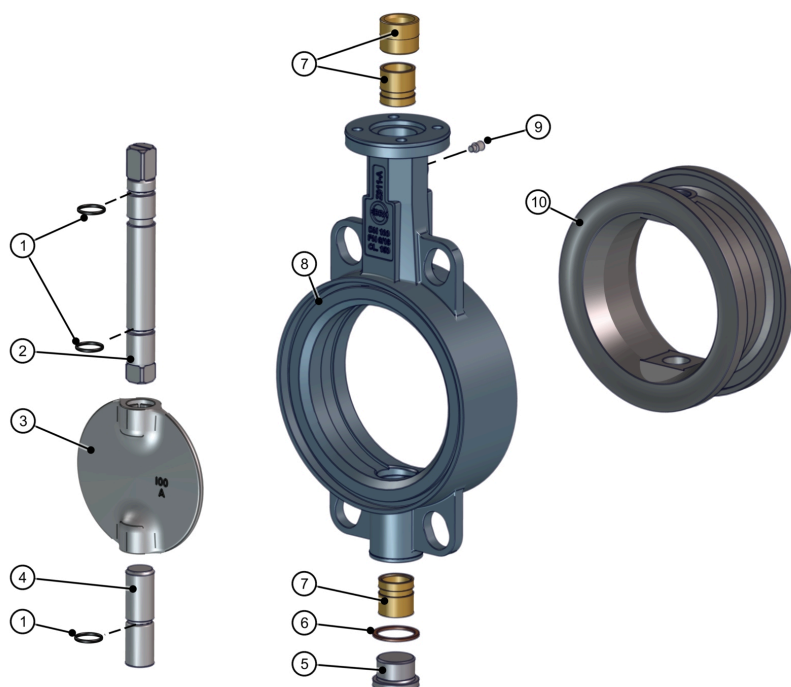


Fig. 15: Bill of materials Z011-AS

Item	Naming	Piece	Material group ¹	Material no.
1	O-ring	3	NBR	
			FKM	
2	Upper shaft	1	Stainless steel	1.4104, 1.4401, 1.4404
3	Valve disc	1	Stainless steel	1.4408, 1.4469
4	Lower shaft	1	Stainless steel	1.4104, 1.4401, 1.4404
5	Screw plug	1	Stainless steel	1.4408
6	Seal ring	1	Copper	
7	Bearing bushing	3	Brass	2.0401
8	Valve body	1	Die-cast aluminum	3.2163.05
9	Blow-out protection ²	1	Steel	45 H galvanized
			Stainless steel	1.4401
10	Liner	1	NBR	Acrylonitrile-butadiene-rubber
			FKM	Fluoro rubber

¹ Materials in the default version. Other materials and surface treatments available upon request

² Operation without blow-out protection not allowable!

Tab. 23: Bill of materials Z011-AS

8 DECOMMISSIONING/DISASSEMBLY

WARNING



The valve may fall if lifting gear and lifting devices with insufficient load-bearing capacity are used.

Injuries or even death due to crushing, shearing or impacts.

- Only use lifting gear and lifting devices with sufficient load-bearing capacity.
- Only use lifting gear and load handling attachments that are in an undamaged condition.
- Never stand underneath any suspended loads.

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform disassembly work while the system is depressurized.
- Only perform disassembly work while the device is de-energized.
- Do not reach between the valve body and the valve disc.

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

For extended deactivation:

- Rinse the valve.
- Move the valve disc to a slightly open position.
- Protect the valve from soiling and dust.
Also observe the general rules for storage, transport, and assembly in the chapter: "Transport and assembly", page 23.
- Check the valve for damage and function at recommissioning.

For permanent decommissioning:

- Rinse the valve.
- Dispose of the components in an environmentally friendly and professional manner in accordance with local regulations.
- Look out for oily residues in actuators and bearings.

For disassembly, refer to chapter "Transport and assembly" et seq.

For disposal of the individual parts in accordance with type, refer to chapter "Bill of materials".

The manufacturer

**EBRO Armaturen
Gebr. Bröer GmbH
Karlstraße 8
58135 Hagen
Germany**

explains that the valves

**EBRO butterfly valves in centric and eccentric designs
Z, F, M, T, TW, BE, and HP series**

are manufactured in accordance with the requirements of the following standards:

DIN EN 593:2018-01 Product standard butterfly valves with metal body

**DIN EN 13774:2013-05 Valves for gas distribution systems with allowable operating pressures
less than or equal to 16 bar** [only applies when used in gas distribution systems for series Z and F]

DIN EN ISO 12100:2011-03 Safety of machinery - basic concepts, gen. design guidelines

The following product documentation is available:

Planning documents, technical data sheets, catalog sheets

These products comply with the following directives:

Pressure Equipment Directive 2014/68/EU (PED) [applies if Art. 4 c) or Art. 4 d) (3) applies]

The valves comply with this directive. The conformity assessment procedure applied in accordance with Annex III of the Pressure Equipment Directive 2014/68/EU is

- For category I: Module A

- For categories II and III: Module H

Name of the notified body: TÜV SÜD Industrie Service GmbH

Identification no. 0036

Machinery Directive 2006/42/EC (MRL) [applies if the valve is actuated other than by hand].

1. The products are "partly completed machinery" within the meaning of Art. 2 g) of this directive

2. The table overleaf lists whether and how the requirements of this directive are met

3. This declaration is the declaration of incorporation within the meaning of this directive

The following applies to compliance with the above directives:

1. The user must comply with the <intended use> as defined in the "Original assembly and operating manual" (BA 1.0-DGRL/MRL or BA 3.0-DGRL/MRL) enclosed with the delivery and must observe all notices in these instructions. Failure to comply with this instruction may – in important cases – release the manufacturer from their product liability.
2. Commissioning of the valve (and, if applicable, the mounted actuator) is prohibited until the system in which the valve is installed has been declared compliant with all applicable EC directives mentioned above by the person responsible for it. A separate declaration is provided for the above actuator.
3. The manufacturer EBRO-Armaturen is solely responsible for issuing the declaration of conformity and has performed and documented the necessary risk analyses. The employee responsible for this available documentation is Mr. Bernhard Mitschke at EBRO-Armaturen.

Hagen, July 2024

.....
Management, Lydia Bröer

Notice:

This is a translated version of the original document. Only the signed original document in German is legally binding.

The manufacturer	EBRO ARMATUREN Gebr. Bröer GmbH, 58135 Hagen GERMANY
declares that the EBRO butterfly valves in centric and eccentric designs comply with the following provisions:	
Requirement in accordance with Annex I of the Machinery Directive 2006/42/EC	
1.1.1, g) Intended use	See assembly and operating manual.
1.1.2, c) Warnings against misuse	See assembly and operating manual.
1.1.2, c) Required protective equipment	Just like for the pipe section in which the valve is installed.
1.1.2, e) Accessories	No special tools required to replace wear parts.
1.1.3 Parts in contact with media	All materials in contact with media are specified in the type data sheet and in the order confirmation. It is assumed that the user has performed a corresponding risk analysis.
1.1.5 Handling	Complied with by the notices in the assembly and operating manual.
1.2 and 6.2.11 Control system	Subject to the responsibility of the user in coordination with the manual of the actuator.
1.3.2 Prevention of risk of breaking	For pressurized parts of the valve: Certified by certificate of conformity to PED 2014/68/EU.
1.3.4 Sharp corners and edges	Requirement complied with.
1.3.7/8 Risk of injury from moving parts	Requirement met when used as intended Maintenance and repair only when valve/actuator is shut down
1.5.1 – 1.5.3 Energy supply	Subject to the responsibility of the user. See also actuator manual
1.5.5 Allowable exceeding of values. Temperature	See warning notice in the assembly and operating manual, section <intended use>
1.5.7 Explosion	 protection required. Must be explicitly agreed in the purchase contract. In this case: Use only as marked on the valve.
1.5.13 Emission of hazardous substances	Not applicable.
1.6.1 Maintenance	See assembly and operating manual. Coordinate stock-keeping of wear parts with EBRO-Armaturen.
1.7.3 Marking	In accordance with the assembly and operating manual
1.7.4 Operating manual	Necessary additions to the overall instructions of the <complete machinery> are summarized in the assembly and operating manual.
Requirement in accordance with Annex III	The valve is not a <complete machinery>: No CE marking for conformity with the MD.
Requirements in accordance with Annex IV and Annex VIII - XI	Not applicable.
Requirement in accordance with EN 12100:2010	
1. Area of application	The risk analysis for the valve/actuator is performed under the aspect of <partly completed machinery>. The product standard EN 593 was used for the analysis: <Butterfly valves with a metallic valve body> with an actuator in accordance with EN 15714-2 or EN 15714-3, class A taken as a basis. The basis continues to be an industrial application and an average of more than 20 years of experience in the use of the above valve types. This results in the notices and warnings in the above assembly instructions and operating manual. Notice: It must be assumed that the user will perform a risk analysis for the pipe section, including the valves used there, that is specifically tailored to the operating case in accordance with sections 4 to 6 of EN 12100 – this is not possible for the manufacturer EBRO-Armaturen with standard valves.
3.20, 6.1 Inherently safe design	The butterfly valves are designed in accordance with the principle of <inherently safe construction>. <Intended use> is required.

Analysis in accordance with sections 4, 5, and 6	Experience of malfunctions and misuse documented by the manufacturer in the context of cases of damage (documentation in accordance with ISO 9001) was used as a basis.
5.3 Limits of the machinery	The delimitation of the partly completed machinery was made in accordance with <intended use> of both the valve and the actuator.
5.4 Decommissioning, disposal	Not subject to the responsibility of the manufacturer
6.2.2 Geometric factors	This section does not apply since the valve and actuator enclose the functional parts when used as intended.
6.3 Technical protective devices	Only required for special actuators - see order confirmation
6.4.5 Operating manual	Since valves with actuators work “automatically” in accordance with the commands of the control unit, the operating manual describes those aspects that are <valve-typical> and must be made available to the manufacturer of the (piping) system.
7 Risk analysis	The risk analysis has been performed by the manufacturer EBRO-Armaturen in accordance with Annex VII, B) and is documented in accordance with MD Annex VII B).

THE WORLD OF EBRO ARMATUREN

Our international network



- Subsidiaries
- Representative offices

Since the company was founded in 1972, EBRO ARMATUREN has been developing, producing and selling shut-off and control valves as well as automation technology for industrial applications. More than 1,000 employees at two domestic and 30+ international subsidiaries ensure that EBRO products are available in over 100 countries worldwide. Within the global network, production takes place at the headquarters in Germany and in Italy, Sweden, China and Thailand with uniformly high manufacturing and quality standards.

In 2005, the Swedish manufacturer Stafsjö Valves AB was acquired and the product range was extended by an extensive portfolio of knife gate valves.

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