

VAG AW Non-Return Valve



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1 General

1.1 Safety



These Operating and Maintenance Instructions must be observed and applied at all times along with the general "VAG Installation and Operating Instructions for Valves".

When using this valve, the generally acknowledged rules of technology have to be observed (e.g. DIN standards, DVGW technical rules, VDI guidelines etc.). The installation must only be carried out by qualified staff.

For further technical data and information such as dimensions, materials or applications, please refer to the respective documentation (KAT 2450-A).

Arbitrary alterations of this product and the parts and accessories supplied with it are not allowed. VAG GmbH will not assume any liability for hazards or consequential damage resulting from the improper use of this product or failure to use as prescribed and due to non-compliance with the instructions contained in this document.

1.2 Proper use

The VAG AW Non-Return Valve is designed for installation in pipelines.

Its standard version is suitable for admitting the flow of the medium in one direction in pressurized pipelines and for automatically preventing the backflow of the medium.

Its technology is based on the principle of swing-check valves.

For information about the technical limits of operation (e.g. operating pressure, medium, temperature, etc.), please refer to the product-related documentation (KAT-2450-A).



The manufacturer's written approval must be obtained for any deviating operating conditions and applications!

2 Transport and storage

2.1 Transport

For transportation to its installation site, the valve must be packed in stable packaging material suitable for the size of the valve. The packaging must ensure that the valve is protected against atmos-

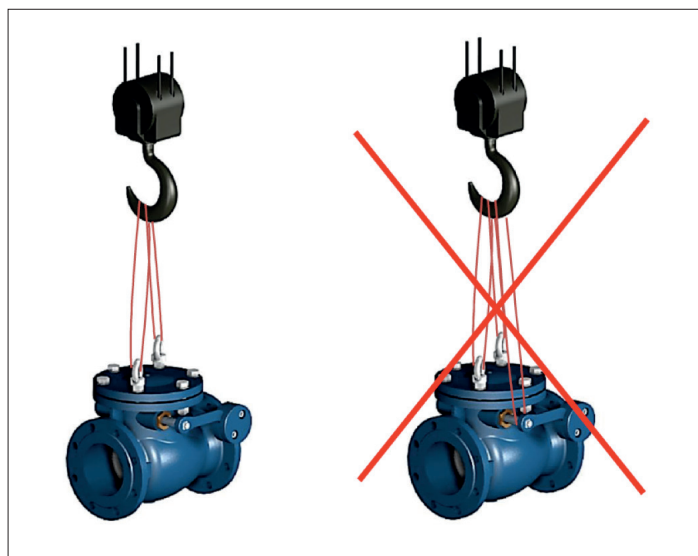


Figure 1.1: Lifting lugs (eyebolts)

pheric influences and external damage.

When the valve is shipped under specific external climatic conditions (e.g. overseas transport), it must be specially protected by wrapping it in plastic film and a desiccant must be added.

The AW Non-Return Valve must be transported with its disk in the closed position. For this purpose, the valve should preferably be placed on its inlet-side flange (see Figure 1).

The factory-applied corrosion protection and any assemblies (e.g. lever, weight, guard, sensors, etc.) need to be specially protected.

To facilitate their assembly, valves of larger nominal diameters are equipped with eyebolts to which the transportation and lifting devices can be attached. Lifting devices must not be attached to the lever or any other parts of the valve as this may damage the valve. For vertical installation, the flange holes can be used to attach lifting devices (see Figure 1.1).

2.2 Storage

The AW Non-Return Valve must be stored with its disk in the closed position. For this purpose, the valve should preferably be placed on its inlet-side flange (see Figure 1). The elastomeric parts (seals) must be protected against direct sunlight as otherwise their long-term sealing function cannot be guaranteed.

Store the valve in a dry and well-ventilated place and avoid direct exposure to radiant heat coming from radiators.

The components essential for proper function, such as the disk or the shaft, are protected against dust and other external dirt by

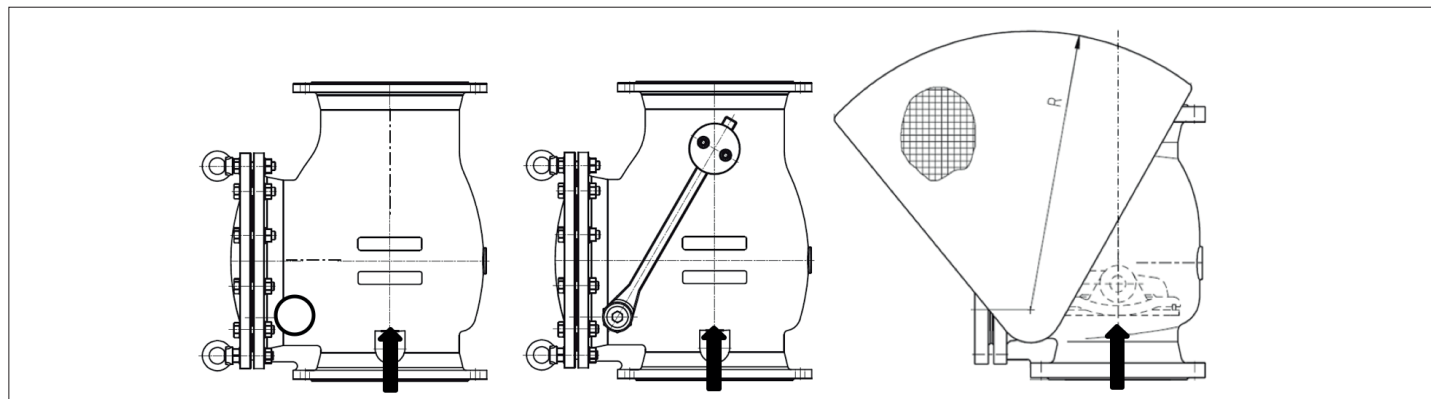


Figure 1: Preferred transportation position

protective caps/films on the flanges. These protective materials must not be removed until the valve is installed.

3 Product and function description

3.1 Features and function description

The AW Non-Return Valve is a fully flanged check valve and thus suitable for installation between pipeline flanges. Non-return valves have no actuator of their own. Pressure surges or slamming of the disk, if any, are not caused by the non-return valve but are due to the routing of the pipeline. The disk merely reacts to the flow parameters acting in the system. The system planner needs to consider this fact. The manufacturer of the non-return valve cannot assume any warranty for it.

3.1.1 AW Non-Return Valve with internal shaft

The non-return valve works according to the operating principle of a swing-check valve driven by the medium flowing through it. Via a double bearing on the lever and via a featherkey on the disk shaft, the valve disk runs on two rotatable bearings inside the body. The entire shaft is located on the inside in a pressure-tight enclosure.

3.1.2 AW Non-Return Valve with external shaft, lever and weight

The non-return valve works according to the operating principle of a swing-check valve driven by the medium flowing through it. Via a double bearing on the lever and via a featherkey on the disk shaft, the valve disk runs on two rotatable bearings. The shaft is guided outside the body on the right in flow direction. The lever-and-weight unit is connected to the shaft via a square end. The position of the lever and weight can be changed by 90°, making the non-return valve suitable for horizontal and vertical installation (if necessary, the position can be changed at the site of installation).

3.1.3 AW Non-return valve with external shaft, lever and weight and guard

This version of the AW Non-Return Valve can be equipped with an additional, factory-assembled guard made of stainless steel or EPP-coated steel. When ordering the version with guard, please state the installation position (horizontal / vertical) in your order as the guard cannot be rotated. All other features are the same as those described in Section 3.1.2. The guard is perforated so that the position of the lever can be seen from the outside.

3.2 Applications

Due to its NBR sealing materials, the VAG AW Non-Return Valve is suitable for use with the following media:

- Raw and cooling water, municipal wastewater, weak acids and alkaline solutions
- Media containing oil

For information about the technical limits of operation (e.g. operating pressure, medium, temperature, etc.), please refer to the product-related documentation (KAT-2450-A).

The manufacturer must be consulted in case of any deviating operating conditions and applications.

3.3 Permissible and impermissible modes of operation



The maximum operating temperatures and operating pressures specified in the technical documentation (KAT 2450-A) must not be exceeded. The pressure applied to the closed non-return valve must not exceed its nominal pressure.

The highest permissible flow velocity (at stable flow) is in accordance with EN 1074-1:

- PN 16 valves: maximum flow velocity of 4 m/s

In turbulent flows (e.g. when the valve is installed downstream of elbows etc.), an asymmetric flow is generated which causes heavy unilateral strain on the bearings in the valve. This is why the flow velocity must be reduced accordingly (see Section 4). Should this be impossible, the maintenance intervals (Section 6) must be reduced.

4 Installation into the pipeline

4.1 Conditions required on site

When the valve is installed between pipeline flanges, these must be coplanar and in alignment. If the pipelines are not in alignment, they must be aligned before the installation of the valve as otherwise this may result in impermissibly high loads acting on the body, which may eventually even cause the body to break.

When installing the valve into the pipeline, make sure the pipeline is tension-free. No pipeline forces must be transmitted to the valve.

The space between the flanges should be wide enough to prevent damage to the coating of the flange gasket frames when the valve is installed.

If works causing dirt (e.g. painting, bricklaying or concrete work) are performed close to the valve, it must be effectively protected by an adequate cover.

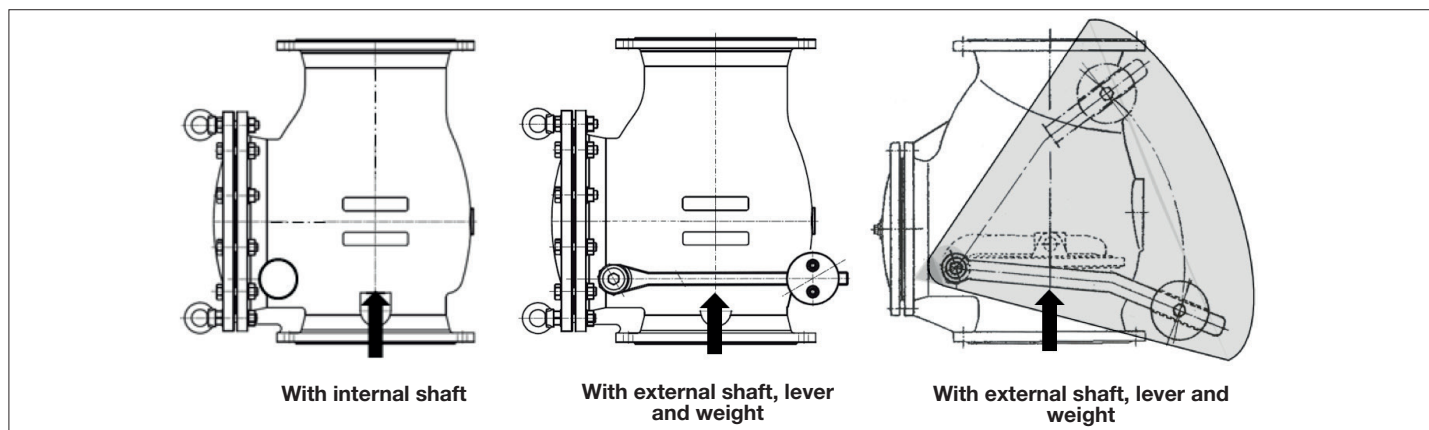


Figure 2: Versions

4.2 Installation location

The location selected for the installation of the valve must ensure that enough space is available for its operation (lever and weight), later function checks and maintenance work (e.g. cleaning of the valve).

If the valve is installed outdoors, it must be effectively protected against extreme atmospheric influences, such as the formation of ice, by an adequate cover.

Several factors regarding the position of the valve have to be observed to ensure the trouble-free function and a long service life of the non-return valve:

4.2.1 Stable flow

A constant, steady flow ensures the stable position of the disk in the flow even at higher flow velocities (see Section 3.3). To achieve steady flow, a straight damping zone of a length of $5 \times DN$ should be provided upstream of the non-return valve (Figure 3a).

If a damping zone of this length cannot be provided, an installation position as shown in Figures 3b or 3c is to be preferred.



If the damping zone as shown in Figure 3a cannot be provided, turbulences in the flow may cause vibration on the disk and bearings and reduce their service life. As a means of compensation, the flow velocity should be reduced to a maximum of 2 m/s (e.g. by installing a valve with a larger nominal diameter) or the maintenance intervals should be shortened.

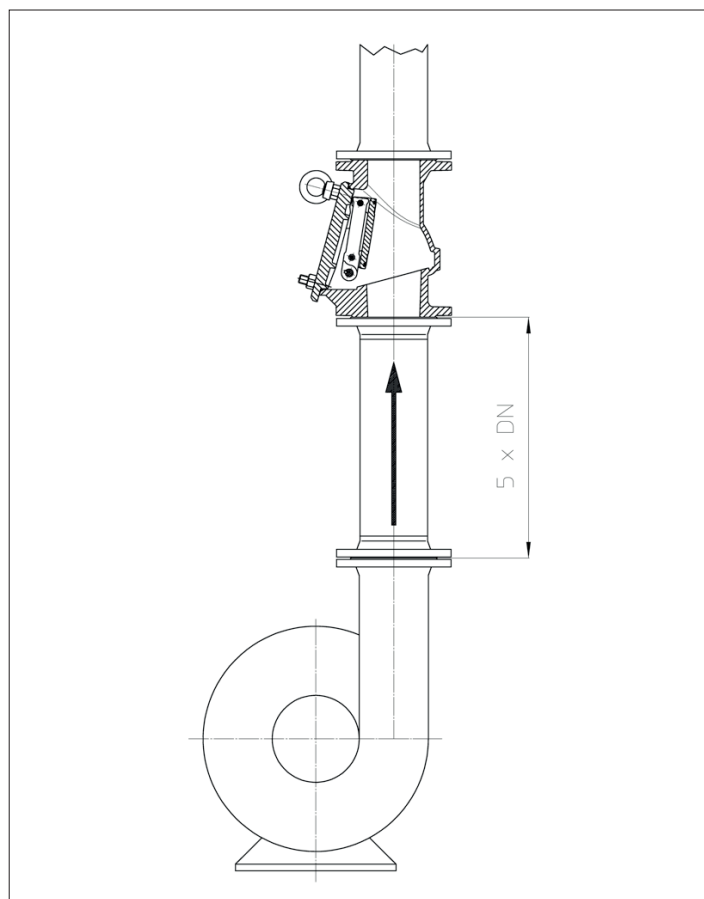


Figure 3a: Preferred installation position in stable flow

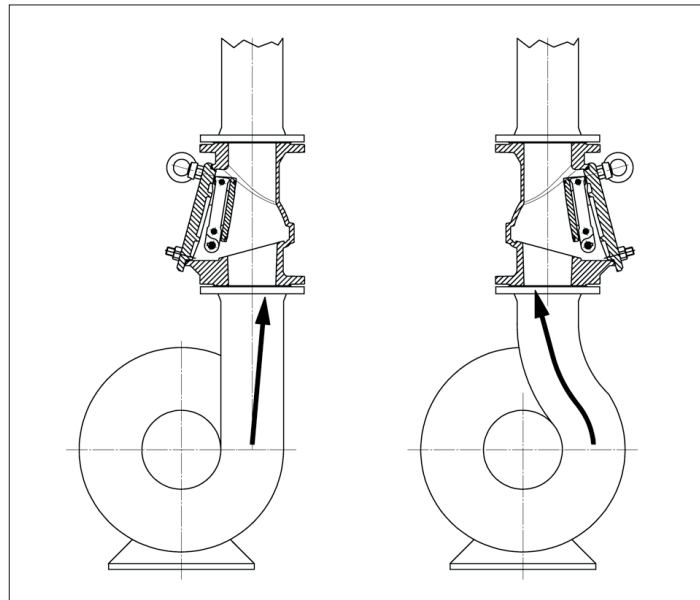


Figure 3b und 3c: Preferred installation positions in turbulent flow

4.2.2 Flow velocity

The VAG AW Non-Return Valve is suitable for operation at the maximum flow velocity according to EN 1074-1 (see Section 3.3).

This requires its installation with an upstream damping zone (see Section 4.2.1, Figure 3a).



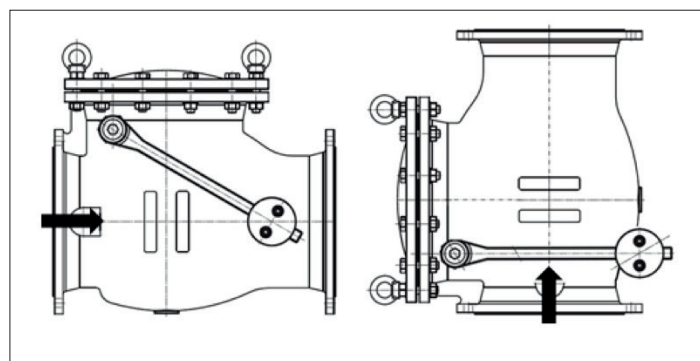
If installation with a damping zone is not possible, this may lead to increased wear of the disk and bearings. As a means of compensation, the flow velocity should be reduced to a maximum of 2 m/s (e.g. by installing a valve with a larger nominal diameter) or the maintenance intervals should be shortened.

The minimum flow velocity should not be less than 1.5 m/s.

When the valve is operated in wastewater containing solids and when it is installed in vertical pipelines, the flow velocity should be as high as permissible within the operating limits as this will prevent the valve from becoming clogged by deposits (see ATV-A 134). The flow velocity in vertical ascending pipes should not be less than 2 m/s.

4.3 Installation position

The VAG AW Non-Return Valve can be installed in horizontal and vertical pipelines (with a 90° angle of ascent). (Always observe the arrow indicating the flow on the body of the valve). The valve will not function in any other installation position (Figure 5).



horizontal

vertical

Figure 4.1: Installation positions and position of the lever + weight

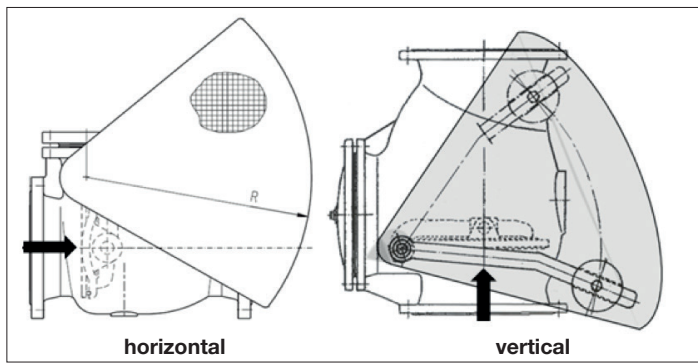


Figure 4.1: Installation positions and position of the lever + weight

Upon its delivery, the valve is pre-assembled for vertical or horizontal installation as specified in the order (Figure 4.1).

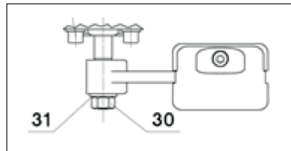


Figure 4.2 Change of the position of lever and weight (version without guard *)

When the valve is not equipped with a guard, the position of the lever and weight can be turned on the construction site (see also 3.1.2). To turn the lever with weight, just unfasten the nut (30), pull of the lever axially, turn it counter-clockwise by 90° and push it on again. Reassemble the nut (30) and the washer (31).

*Not possible for the version with guard.



When the valve is used in wastewater containing solids, horizontal installation should be preferred as this prevents the valve from becoming clogged by deposits.

When the valve is operated in wastewater containing solids and when it is installed in vertical pipelines, the flow velocity should be as high as permissible within the operating limits as this will prevent the valve from becoming clogged by deposits (see ATV-A 134). **The flow velocity in vertical ascending pipes should not be less than 2 m/s.**

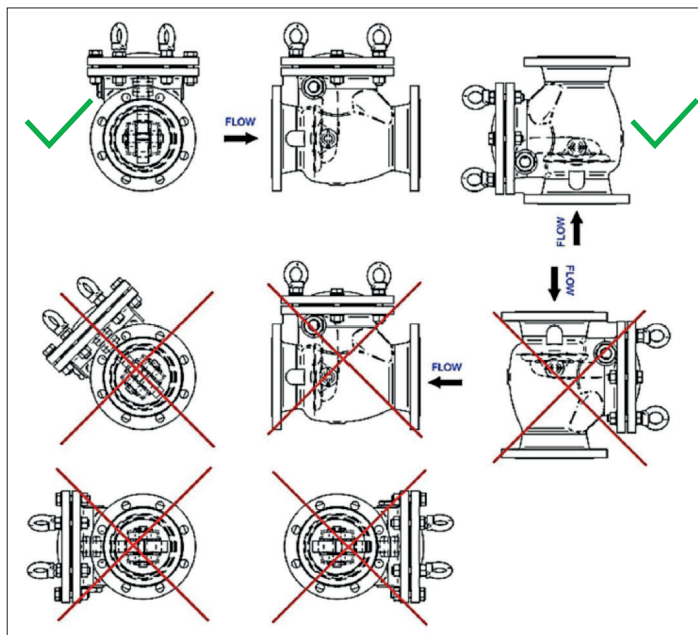


Figure 5: Permissible and impermissible installation positions (schematic representation)

4.4 Assembly instructions, fittings

Before assembling the valve, check it for any damage that may have occurred during transport and storage. Protect the valve against dirt from the construction site by an adequate cover until its installation. When the valve is installed, its functional parts such as the disk and bearings must be free from dust and dirt. VAG does not assume any liability for consequential damage caused by dirt, shot-blasting gravel residues etc.

Before installing the valve, check its functional parts for easy operability.

If the valve is repainted later on, no paint must be applied to its functional parts.

The components essential for proper function, such as the disk and bearings, must be protected from dust and other external dirt by plastic film. The film must not be removed until installation.

To facilitate its assembly, the valve is equipped with eyebolts to which transportation and lifting devices can be attached. Lifting devices must not be attached to the lever or any other parts of the valve as this may damage the valve.



When bolting the valve to the pipeline flanges, use hexagonal bolts and nuts with washers in the through holes from flange to flange.

Fasten the bolts evenly and in diagonally opposite sequence to prevent unnecessary tension and cracks or breaks that may result therefrom (see Figure 6).

The pipeline must not be pulled towards the valve. If the gap between the valve and the flange is too large, this should be compensated by thicker seals. Pipeline forces must only be transmitted to the valve in compliance with the specifications of EN 1074-3.

We recommend the use of steel-reinforced rubber seals to DIN EN 1514-1 Form IBC. If raised face flanges are used, these seals are mandatory.

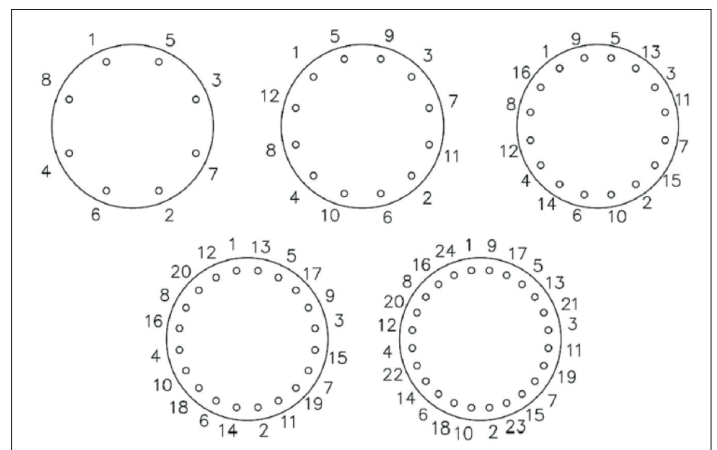


Figure 6: Examples of fastening patterns

5 Putting the valve into operation

5.1 Visual inspection and preparation



Before putting the valve and the system into operation, perform a visual inspection of all functional parts. Check whether all bolted connections have been properly fastened.

5.2 Function check and pressure test



Prior to the installation of the valve, its functional parts (disk, lever and weight) have to be completely opened and closed at least once and checked for operability.

The operability of the bearing (version AL+HG) has to be verified by checking the slewing range (closed position up to the stop on the body, see Figure 7).

For this purpose, lift the weight up to the stop of the open position and then drop it. The disk must move into the seat without pressure.

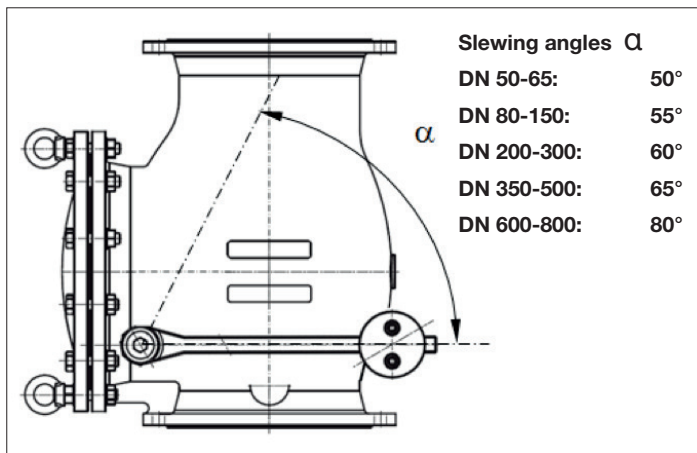


Figure 7: Slewing range of the disk



Caution!! The pressure applied to the closed non-return valve must not exceed its nominal pressure (see PN column in Table 1). When a pressure test in the pipeline is performed with a test pressure exceeding the admissible nominal pressure in the closing direction of the non-return valve, the disk must be slightly opened to prevent excessive strain on the elastomeric parts. The lever and weight can be used to open the disk.

DN	PN	Admissible operating over-pressure	Admissible operating temperature For water and wastewater	Test pressure in bar with water	
mm	bar	bar	°C	In the body	In the seat
50 500	16	16	50	24	17,6
50 ... 800	10	10	50	15	11

Table 1: Factory test of the valve to DIN EN 12266-1

Leak tightness of the seat:

- resilient seated: according to DIN EN 12266-1, Table A5, Leak Rate A
- metal-to-metal sealing (> DN 150): according to DIN EN 12266-1, Table A5, Leak Rate G

Required minimum differential pressure (back pressure) on the disk: ≥ 5 m WC

6 Maintenance and repair

6.1 General safety instructions



Prior to the performance of inspection and maintenance work on the valve or its assemblies shut off the pressurised pipeline, depressurise it and secure it against inadvertent activation.

When the valve is in operation, the lever and weight move in dependence of the flow velocity and may cause injuries.

Depending on the kind and dangerousness of the medium conveyed the relevant safety regulations must be complied with!

After completing the maintenance works and before resuming operation, check whether all connections are properly tightened and leak-free.

Perform the steps for initial set-up as described in Section 5.

6.2 Inspection and operation intervals

The condition of the valve should be checked at least once per year (DVGW Technical Rules W 400-3-B1).

In case of extreme operating conditions or operation in heavily polluted media, the valve should be operated more frequently.

The following items are to be checked:

- Corrosion on visible parts (repair or replacement)
- Leak tightness of the shaft bushing or the seal between the bearing and the body
- Easy movement of the disk (disassembly, cleaning and lubrication of the moving parts, if required)
- Seal on the disk (replace the seal, if necessary)

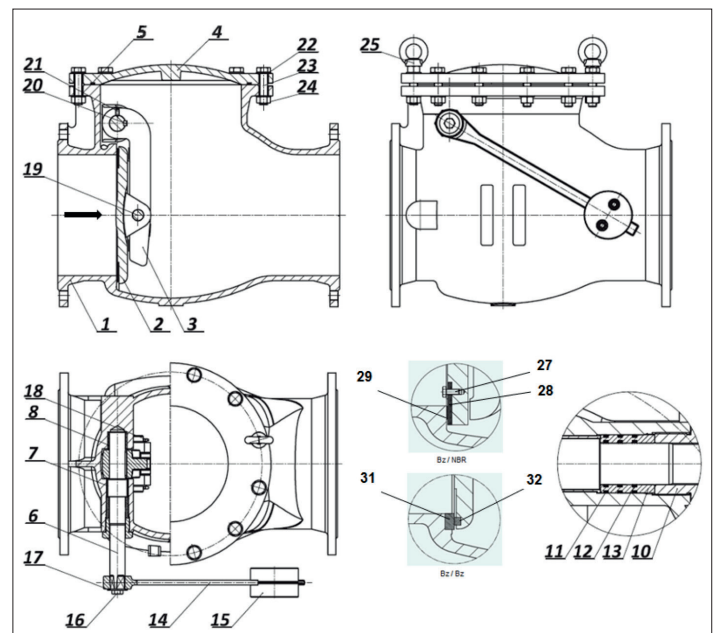


Figure 8: Parts and part numbers

Part	Description	Material *	Part	Description	Material *
1	Body	EN-GJS-400-15 (GGG40)	18	Split pin (2 pieces)	A4
2	Disk	EN-GJS-400-15 (GGG40)	19	Disk shaft	Stainless steel 1.4057
3	Disk lever	EN-GJS-400-15 (GGG40)	20	Featherkey DIN 6885	Stainless steel A4
4	Cover	EN-GJS-400-15 (GGG40)	21	Stud bolt	Stainless steel A4
5	O-Ring	NBR	22	Washer DIN 125	Stainless steel A4
6	Shaft	Stainless steel 1.4057	23	Hexagonal bolt	Stainless steel A4
7	Bearing bush I	Bronze RG 7	24	Hexagonal nut ISO 4032	Stainless steel A4
8	Bearing bush II	Bronze RG 7	25	Eyebolt lifting lug)	C 15 galvanised
10	Bearing nut	Bronze RG 7	26		
11	O-Ring	NBR	27	Hexagonal bolt	Stainless steel A4
12	O-Ring	NBR	28	Disk seal	NBR
13	Seal support	Bronze RG 7	29	Seat ring of body, zinc-free bronze (Bz)	2.1050.01 / 2.1060.01
14	Lever	EN-GJS-400-15 (GGG40)	30		
15	Weight	EN-GJS-400-15 (GGG40)	31 **	Seat ring of body, bronze (Bz)	2.1050.01 / 2.1060.01
16	Hexagonal bolt	Stainless steel A4	32 **	Seat ring of disk, bronze (Bz)	2.1050.01 / 2.1060.01
17	Washer DIN 125	Stainless steel A4			

Table 2: * Materials may deviate if specified in the order acknowledgement

**** ≥ DN 150**

6.3 Maintenance and replacement of parts

The required spare and wearing parts can be found in the KAT 2450-E spare parts list..

6.3.1 Inspection of the disk

The valve should be opened and cleaned in the recommended intervals. For this purpose, unscrew the cover (4) observing the safety instructions provided in Section 6.1 and move the disk (2) towards the top. The lever of the H & G version can be used for this task. For the version with an additional guard, the cover grid must be unscrewed first. During this procedure, it can also be checked whether the disk bearing operates smoothly. Afterwards the seal on the disk (28) and the sealing seat (29) in the body should be checked for damage. If the disk seal is damaged, it must be replaced.

6.3.2 Leaks on the body seals

Leaks on the cover seal (5) or bearings (11, 12) may occur when the valve has been operated for a longer period of time or has been frequently opened. Should this be the case, the seals affected have to be replaced.

6.3.3 Cleaning and lubrication

To ensure the proper function of the disk and the bearings, the valve body has to be cleaned in the recommended intervals.

The bearing and the suspension of the disk should be lubricated (requires the disassembly of parts 6, 10 and 13).

Recommended lubricant: KLÜBERSYNTH VR 69-252 N

6.3.4 Recommendations for the replacement of parts

- a) Disk seal (28): every 2 years
- b) Bearing seals (11,12): whenever required

In case of extreme operating conditions (depending on the system), the replacement of these parts may be necessary at shorter intervals.

7 Trouble-shooting

7.1 Problem, cause and remedial action

Always observe the general safety instructions in Section 6.1 when performing repair and maintenance work.

Problem	Possible cause	Remedial action
Disk does not seal	Foreign matter jammed in the seat area	Flush the valve, open the cover, if required, and remove the foreign matter
	Deposits from the medium on the seat or the disk	Open the cover, clean the seat and the disk
	Back pressure too low	To ensure complete sealing, the back-pressure should be at least > 5 mWC
	Sealing section on the disk defective	Replace the seal (28) on the disk
	Wrong installation position	Change the installation position (see Section 4)
	Unfavourable installation position causing unfavourable flow on the disk (e.g. too close downstream of a bend etc.)	Change the installation position (see Section 4)
Disk hits against the upper wall of the body from time to time (clatter)	Flow velocity of the medium too low	Install a valve with a smaller nominal diameter or increase the flow velocity in the system
	Unfavourable installation position (e.g. vertical installation)	Change the installation position (see Section 4)

Problem	Possible cause	Remedial action
Disk slams into the valve seat (loud bang). See also instructions in Section 3.1.	May be due to missing calculation of pressure surges / damping measures by the system planner (see Section 3.1)	Must always be clarified on a case-by-case basis. (e.g. frequency-controlled shut-down of the pump may help)
Valve becomes quickly soiled	Flow velocity of the medium too low	Install a valve with a smaller nominal diameter or increase the flow velocity in the system within the operating limits of the valve.
	Aged seals	Replace seals (see Section 6)
Leaks on the body	Bearing leaky	Replace bearing seals (11, 12). (See Section 6)
	Cover seal leaky	Replace cover seal (5) and clean cover seat
Sluggish movement of the disk	Not enough grease in the bearing	Re-grease the bearing (see Section 6)
	Bearing worn out	Replace the bearings (7, 8, 10, 13) and bearing seals; inspect the bearing shaft (6) and replace it, if necessary.

Table 3: Störungen, Ursachen und Abhilfe

8 How to contact us

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