

## VAG LIMU-STOP® Non-Return Valve



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## 1 General

### 1.1 Safety



These Operation and Maintenance Instructions must be observed and applied at all times along with the general „VAG Installation and Operation Instructions for Valves“ (see [www.vag-group.com](http://www.vag-group.com) / Category: Installation and Operation Instructions).

Arbitrary alterations of this product and the parts supplied with it are not allowed. VAG will not assume any warranty or liability for consequential damage due to non-compliance with these instructions. When using this valve, the generally acknowledged rules of technology have to be observed (e.g. DIN standards, DVGW technical rules, etc.). The installation must only be carried out by qualified staff (see also Section 7.1 General safety instructions). For further technical information such as dimensions, materials or applications, please refer to the respective documentation (KAT-A 1547).

VAG valves are designed and manufactured to the highest standards and their safety of operation is generally ensured. However, valves may be potentially dangerous if they are operated improperly or are not installed for their intended use.

All personnel dealing with the assembly, disassembly, operation, maintenance and repair of the valves must have read and understood the complete Operating and Maintenance Instructions (Accident Prevention Regulations, regulations issued by the Trade Associations and ANSI Z535).

Before removing any protective devices and/or performing work on the valves, depressurise the pipeline section and ensure it is free of hazards. Unauthorised, unintentional and unexpected actuation as well as any hazardous movements caused by stored energy (pressurised air, water under pressure etc.) must be prevented.

In case of equipment that must be monitored and inspected, all relevant laws and regulations, such as the Industrial Code, the Accident Prevention Regulations, the Ordinance of Steam Boilers and instructional pamphlets issued by the Pressure Vessels Study Group must be complied with. In addition, the local accident prevention regulations must be observed.

When a valve needs to be dismantled from a pipeline, fluid may emerge from the pipeline or the valve. The pipeline must be emptied completely before the valve is dismantled. Special care needs to be taken in case of residue which may continue flowing.

### 1.2 Proper use

The VAG LIMU-STOP® Non-Return Valve is a valve designed for installation into pipelines.

The standard model is suitable to permit the flow of the medium in pressurised pipelines in one direction and to prevent the return flow of the medium automatically.

Its technology is based on the principle of the freely swinging valve disk.

For the respective technical application ranges (e.g. operating pressure, medium, temperature) please refer to the product-related documentation (KAT-A 1547).

For any deviating operating conditions and applications, the manufacturer's written approval must be obtained!

These Installation and Operation Instructions contain important information on the safe and reliable operation of the VAG LIMU-Stop® Non-Return Valve.

Observing these Installation and Operation Instruction helps you to:

- Prevent hazards
- Reduce repair costs and down-times of the valve and/or the entire plant
- Improve the operational safety and useful life of the plant.

### 1.3 Identification

According to DIN EN 19, all valves bear an identification label specifying the nominal diameter (DN), nominal pressure (PN) and the manufacturer's logo.

A rating plate is attached to the body and contains at least the following information:

VAG	Manufacturer's name
DN	Nominal diameter of the valve
PN	Nominal pressure of the valve

Date of manufacture

## 2 Transportation and storage

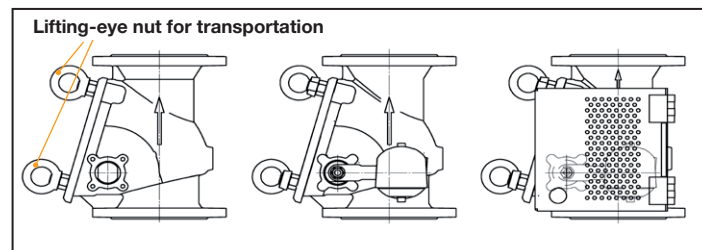
### 2.1 Transportation

To transport the valve to its installation site, it must be packed in a stable, properly sized container. Ensure that the valve is protected against atmospheric influences and external damage.

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

The VAG LIMU-STOP® Non-Return Valve must be transported with the disk in closed position. Preferably the valve should be placed on its inlet-side flange (see Fig. 1).

The factory-applied corrosion protection and all mounted parts (e.g. lever and weight, wire guard, sensors etc.) must be specially protected.



Picture 1: Transport position

For transportation purposes and also to support assembly, lifting devices such as cables and belts must always only be attached to the lifting-eye nuts provided for transportation. The lever, weight, wire guard and sensors are not suitable for this purpose. The length and positioning of the cables/belts must ensure that the valve is in a horizontal position during the entire lifting procedure.

For valves that have been factory-packed in transport crates (wooden crates), the centre of gravity of the entire unit must be taken into account. The centre of gravity is marked on each side of the crate at our factory and must be considered for all lifting operations.

## 2.2 Storage

The VAG LIMU-STOP® Non-Return Valve must be stored with the disk in closed position. Preferably the valve should be placed on its inlet-side flange (see Fig. 1).

The elastomeric parts (seals) must be protected against direct sunlight and/or UV light as otherwise their long-term sealing function cannot be guaranteed.

Store the valve in a dry and well-aerated place. Avoid direct radiator heat.

Protect any assembly units important for proper function, such as the disk or bearing, against dust and other dirt by flange protection caps or other adequate covering.

Do not remove the protective caps of the connections / flanges and the packaging materials until immediately prior to assembly into the pipeline.

The valve can be stored in ambient temperatures ranging from -20° C to + 50° C (protected by adequate covers). If the valve is stored at temperatures below 0° C, it should be warmed up to at least +5° C before it is installed and before it is put into operation.

connection on the disk shaft, rotatable in two bearings in the body. The entire shaft is located on the inside and pressure-tight encapsulated.

### 3.1.2 LIMU-STOP® AL+HG with external shaft, lever and weight

The non-return valve works according to the principle of function of a swing check valve operated by the medium conveyed. The disk runs on a flexible double-bearing on the lever, via a feather-key connection on the disk shaft, is rotatable and runs on two bearings. The shaft is guided out of the body on the right in flow direction. The lever and weight unit is connected to the shaft via a featherkey connection. When the valve is delivered, it is factory-assembled for vertical installation (Figure 2); the lever with weight is positioned turned by 90° to the flow direction.

### 3.1.3 LIMU-STOP® AL+HG with external shaft, lever and weight and wire guard

The LIMU-STOP® AL+HG version can be completed by a pre-assembled stainless-steel wire guard. All other features are the same as those of the AL+HG version. The wire guard can easily be opened via a lock and opened 180° for maintenance and inspection purposes.

The cover of the wire guard is perforated so that the position of the lever is visible from the outside.

## 3 Product and function description

### 3.1 Features, function description

The VAG LIMU-STOP® is a non-return valve in fully flanged design and can thus be installed between two flanges or used as an end-of-line valve without counter-flange.

#### 3.1.1 LIMU-STOP® IL with internal shaft

The non-return valve works according to the principle of function of a swing check valve operated by the medium conveyed. The disk runs on a flexible double-bearing on the lever, via a keyway

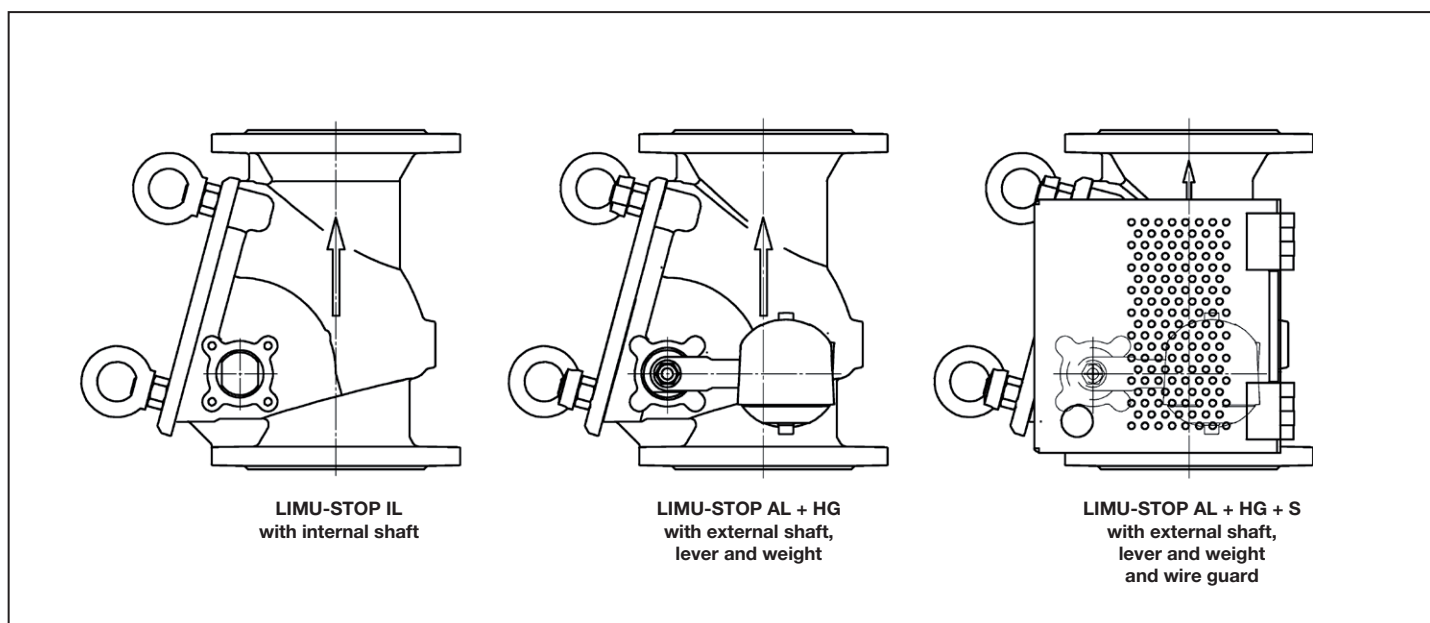
### 3.2 Fields of application

Due to the NBR sealing materials used, the VAG LIMU-STOP® Non-Return Valve is suitable for the following media:

- Drinking water, raw- and cooling water, domestic sewage, weak acids and alkaline solutions
- Oil-containing media

For the respective technical application ranges (e.g. operating pressure, medium, temperature) please refer to the product-related documentation (KAT-A 1547).

In case of differing operating conditions and applications, please consult the manufacturer.



Picture 2: Type varieties

### 3.3 Permissible and impermissible modes of operation



The maximum operating temperatures and operating pressures specified in the technical documentation (KAT-A 1547) must not be exceeded. The pressure applied to the closed non-return valve must not exceed its nominal pressure.

The maximum permissible flow velocity (stable flow) is that specified in the EN 1074-1 standard:

- For valves with a nominal pressure of PN 16, the maximum flow velocity is 4 m/s.

Turbulent flow (e.g. if the valve is installed downstream of elbows) causes asymmetric flow which may lead to heavy one-sided stress acting on the bearings in the valve. For this reason, the flow velocity must be reduced accordingly (see Section 4). If this is not possible, maintenance intervals must be shorter (see Section 6).

## 4 Installation into the pipeline

### 4.1 On-site requirements

When installing the valve between two pipeline flanges, these must be coplanar and in true alignment. If the pipes are not in true alignment, they must be aligned before installation of the valve, as otherwise this may result in impermissibly high loads acting on the valve body during operation, which may eventually even lead to fracture.

When installing the valve into the pipeline, make sure it 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 raised faces of the flanges during installation.

In case of works around the valve causing dirt (e.g. painting, masonry or working with concrete), the valve must be protected by adequate covering.

Before putting the valve into operation, clean and purge the corresponding pipeline sections. For use with drinking water, DVGW Technical Rules W 291 and W 346 must be observed.

### 4.2 Place of installation

The installation location of the valve must be selected so that sufficient space is provided for operation (lever and weight), latter function checks and maintenance works (e.g. cleaning of the valve).

If the valve is installed in the open, it must be protected against extreme atmospheric influences, such as the formation of ice, by adequate covers.

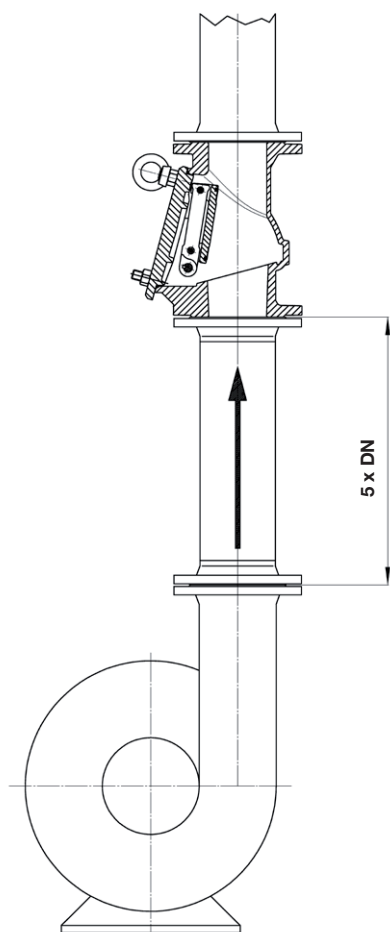
To ensure the trouble-free function and long service life of the non-return valve, several factors have to be taken into account when positioning the valve.

#### 4.2.1 Stable flow

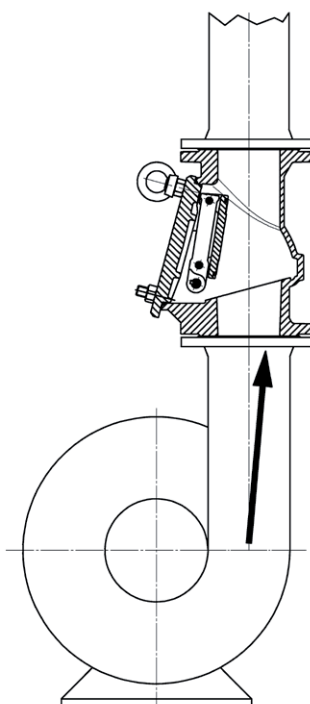
Subcritical and even flow ensures the vibration-free position of the disk in the flow even at higher flow velocities (see Section 3.3). To achieve subcritical flow, a straight damping zone of 5 x DN should be provided upstream of the non-return valve (Picture 3a).

Should this be impossible, an installation position as shown in Picture 3b or 3c is to be preferred.

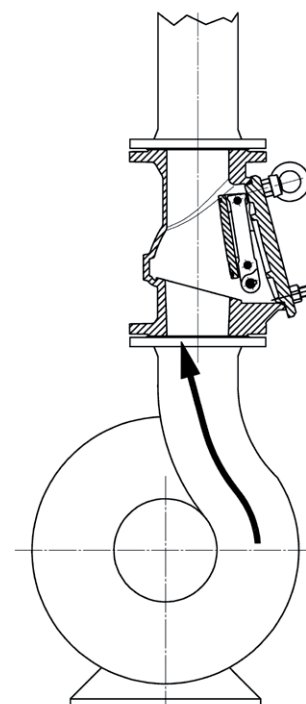
If the damping zone according to Picture 3a cannot be observed, turbulences in the flow may cause the disk and bearings to vibrate and reduce their useful life. To prevent this from happening, the flow velocity should be reduced to 2 m/s max. (e.g. by choosing



Picture 3a: Stable flow



Picture 3b



Picture 3c

Picture 3: Stable flow



a valve with a larger nominal diameter) or maintenance intervals should be shortened.

## 4.2.2 Flow velocity

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

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



If installation without a damping zone is inevitable, increased wear of the disk and bearings may be expected. To prevent this from happening, the flow velocity should be reduced to 2 m/s max. (e.g. by choosing a valve with a larger nominal diameter) or maintenance intervals should be shortened.

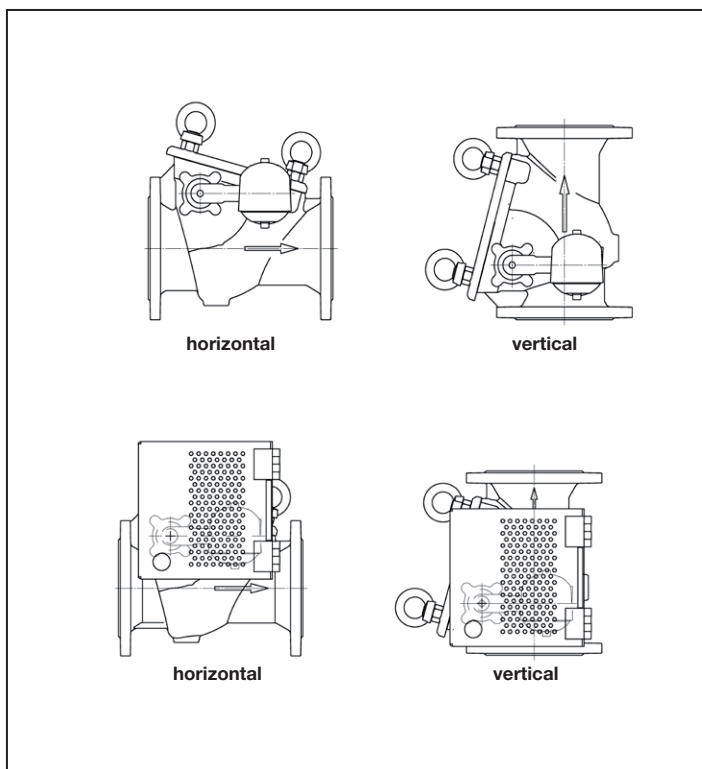
If the valve is operated in sewage water containing solids and in vertical pipelines, the flow velocity selected should be as high as possible within the operation limits to prevent the valve from being clogged by deposits (see ATV-A 134). The flow velocity in vertical rising pipelines should not fall below 2 m/s.

## 4.3 Installation position

The VAG LIMU-STOP® Non-Return Valve can be installed in horizontal or rising pipelines with an angle of slope of 90° maximum (observe the flow arrow on the body of the valve!). In all other installation positions the valve is not capable of functioning (Picture 5).

When the valve is delivered, it is factory-assembled for vertical installation; the lever with weight (and optionally also the wire guard) is positioned turned by 90° to the flow direction (Pictures 4.1 and 4.2).

When the valve is installed in horizontal position, the lever with

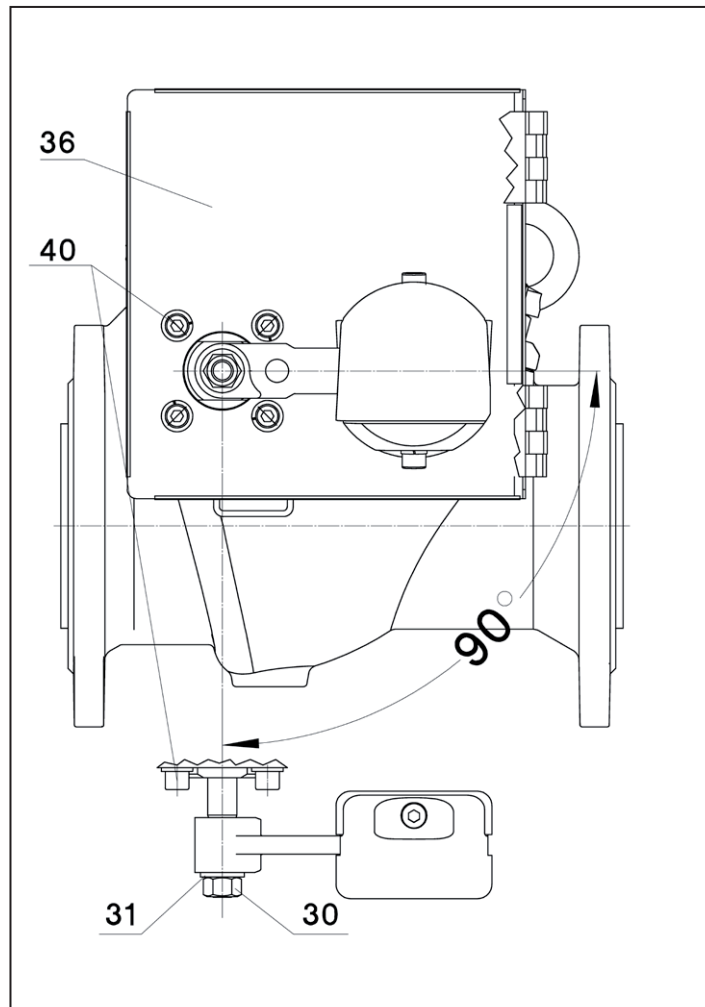


Picture 4.1: Installation position of the valve and position of the lever and weight

weight (and optionally also the wire guard) is to be turned counter-clockwise by 90° (see Picture 4.2) at the place of installation.

To turn the lever with weight, only open the nut (30), pull off the lever in axial direction, turn it counter-clockwise by 90° and then reassemble it. Reassemble the nut (30) and washer (31).

For the version with additional wire guard, also unfasten the cheese head screws (40), turn the wire guard (36) counter-clockwise by 90° and then reassemble it.

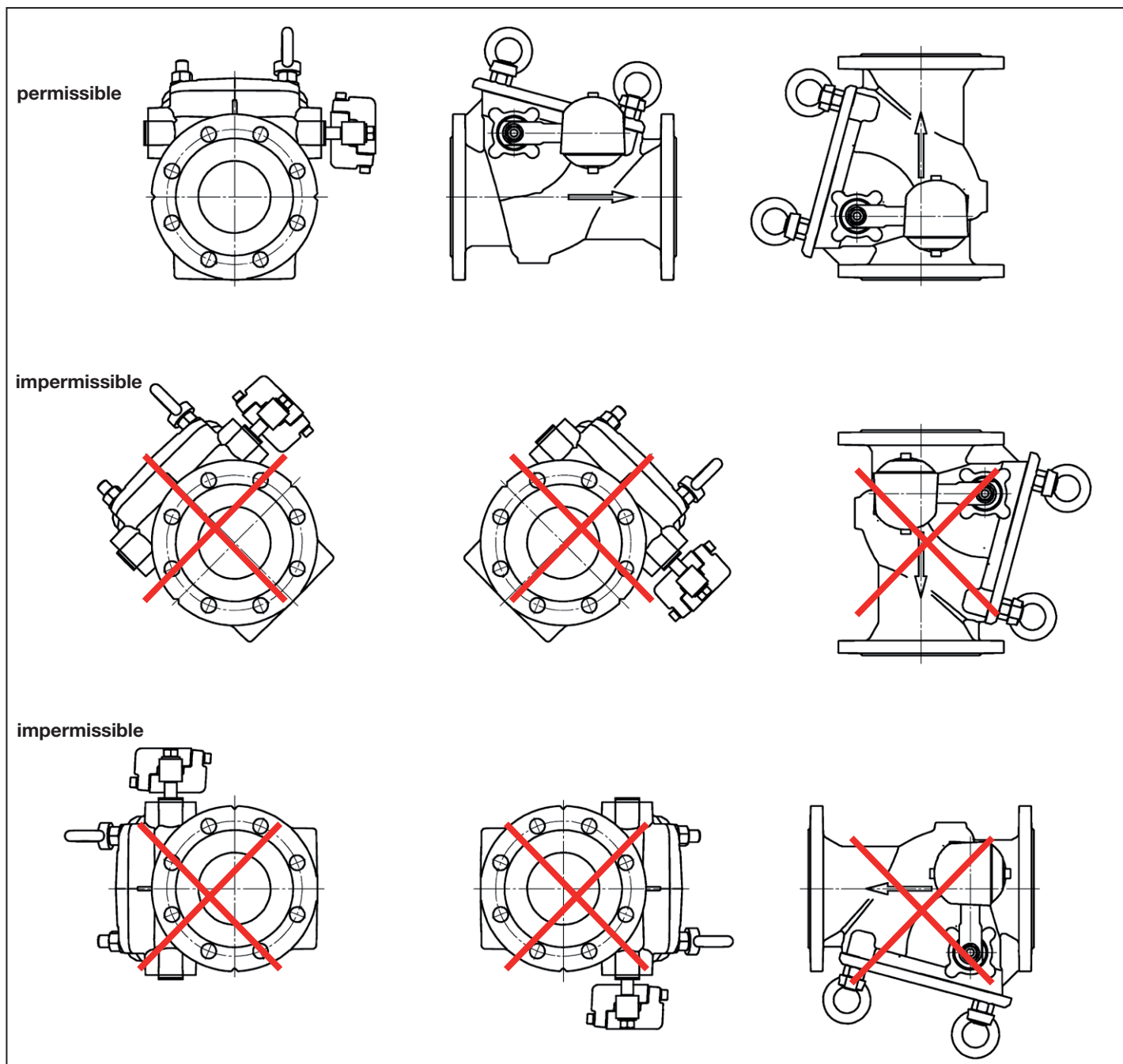


Picture 4.2: Reassembling the wire guard



When the valve is used in sewage water containing solids, the **horizontal** installation position should be preferred as this prevents the valve from being clogged by deposits.

If the valve is operated in sewage water containing solids and in **vertical** pipelines, the flow velocity selected should be as high as possible within the operation limits to prevent the valve from being clogged by deposits (see ATV-A 134). **The flow velocity in vertical rising pipelines should not fall below 2 m/s.**



Picture 5: Permissible and impermissible installation positions

#### 4.4 Assembly instructions, connection fittings

Check the valve for any damage that it may have suffered during transportation and storage. Protect the valve against dirt caused on the construction site by adequate covering until installation. The assembly units important for proper function, such as the disk or bearing are protected against dust and other dirt by flange protection caps. These must not be removed before the valve is installed.

Prior to installation all components essential for proper function, such as the disk and bearings must be thoroughly cleaned to remove all dirt particles. VAG does not assume any liability for consequential damage caused by dirt, shot-blasting gravel residues etc.

The functional parts should be checked for proper operation prior to installation.

Should the valves be repainted later on, it must be ensured that no paint is applied to the functional parts.

The identification plates must not be painted over either. If the equipment is sand-blasted to clean it prior to installation, these parts must be adequately covered. If solvents are used for cleaning, you should ensure that they do not destroy the seals of the pipeline or the valve.

For the assembly of the VAG LIMU-STOP® Non-Return Valve, it must be ensured that suitable load suspension devices as well as transportation and lifting equipment are available.

To make its assembly easier, the valve is equipped with lifting-eye nuts to which the transportation and lifting equipment can be attached. Fastening lifting equipment to the lever or to any other components is impermissible and may lead to damage.



When connecting the valve with the pipeline flanges, hexagon bolts and nuts with washers from flange to flange must be used in the through holes.

Fasten the bolts evenly and crosswise to prevent unnecessary tension that may result in cracks or breaks in the flange.

The pipeline must not be pulled towards the valve. Should the gap between valve and flange be too wide, this should be compensated by thicker seals. The pipeline forces transmitted to the valve must not exceed those specified by EN 1074-3.

We recommend using steel-reinforced rubber seals to DIN EN 1514-1 Shape IBC. If you use raised face flanges, the use of IBC seals is mandatory.

While the valve is being installed, it must be ensured that the flanges of the pipeline it is connected to are aligned and level with each other. Welding works on the pipeline must be performed before the valves are installed to prevent damage to the seals and the corrosion protection. Welding residue must be removed before the equipment is put into operation.

The pipeline must be laid in a way that prevents harmful pipeline forces from being transmitted to the valve body. Should construction works near or above the valve not be completed yet, the valve must be covered to protect it from dirt.

## 5 Putting the valve into operation

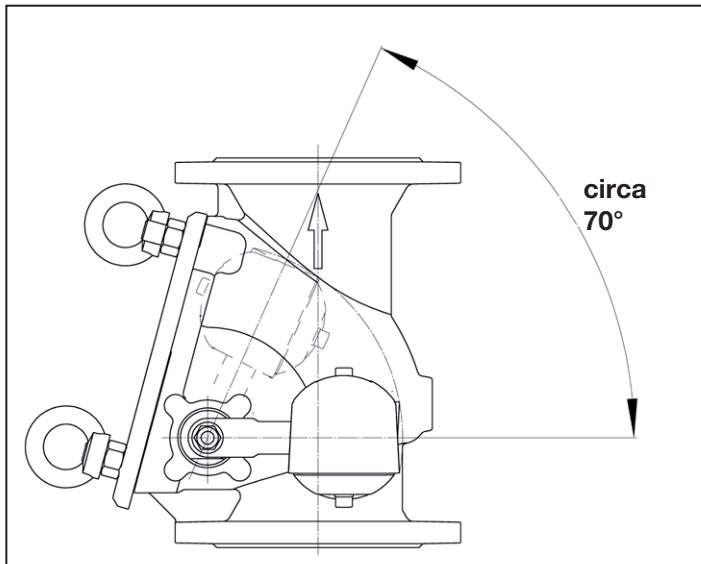
### 5.1 Visual inspection

Before putting the valve and the equipment 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, all functional parts (disk, lever and weight) should be opened and closed completely at least once and they should be checked for ease of operation. The ease of operation of the bearing (version AL+HG) should be checked by verifying the rotation range of about 70° on the valve (Picture 6). For this purpose, lift the weight until it reaches the limit stop in open position and then drop it. The disk must fall into the seat without pressure.



Picture 6: Rotation range of the disk



**Caution!!** The pressure exerted on the closed valve must not exceed its nominal pressure (see technical data sheet KAT-A 1547). For the pressure test of the pipeline with a test pressure exceeding the permissible nominal pressure in the closing direction of the non-return valve, slightly open the disk to prevent excessive stress from acting on the elastomeric parts. For opening the disk, e.g. a lever and weight may be used.

## 6 Maintenance, servicing

### 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. During operation, the lever and weight are moved in dependence of the flow velocity and may cause injuries. Depending on the type and risk of the fluid conveyed, comply with all the necessary safety regulations!

After completing the maintenance works and before resuming operation, check all connections for tightness. Perform the steps described for initial set-up specified in Section 5.

### 6.2 Inspection and operation intervals

The condition and function of the valve should be checked at least once per year (DVGW Technical Rules W 392). In case of extreme operating conditions or heavily polluted media, the valve should be operated more frequently.

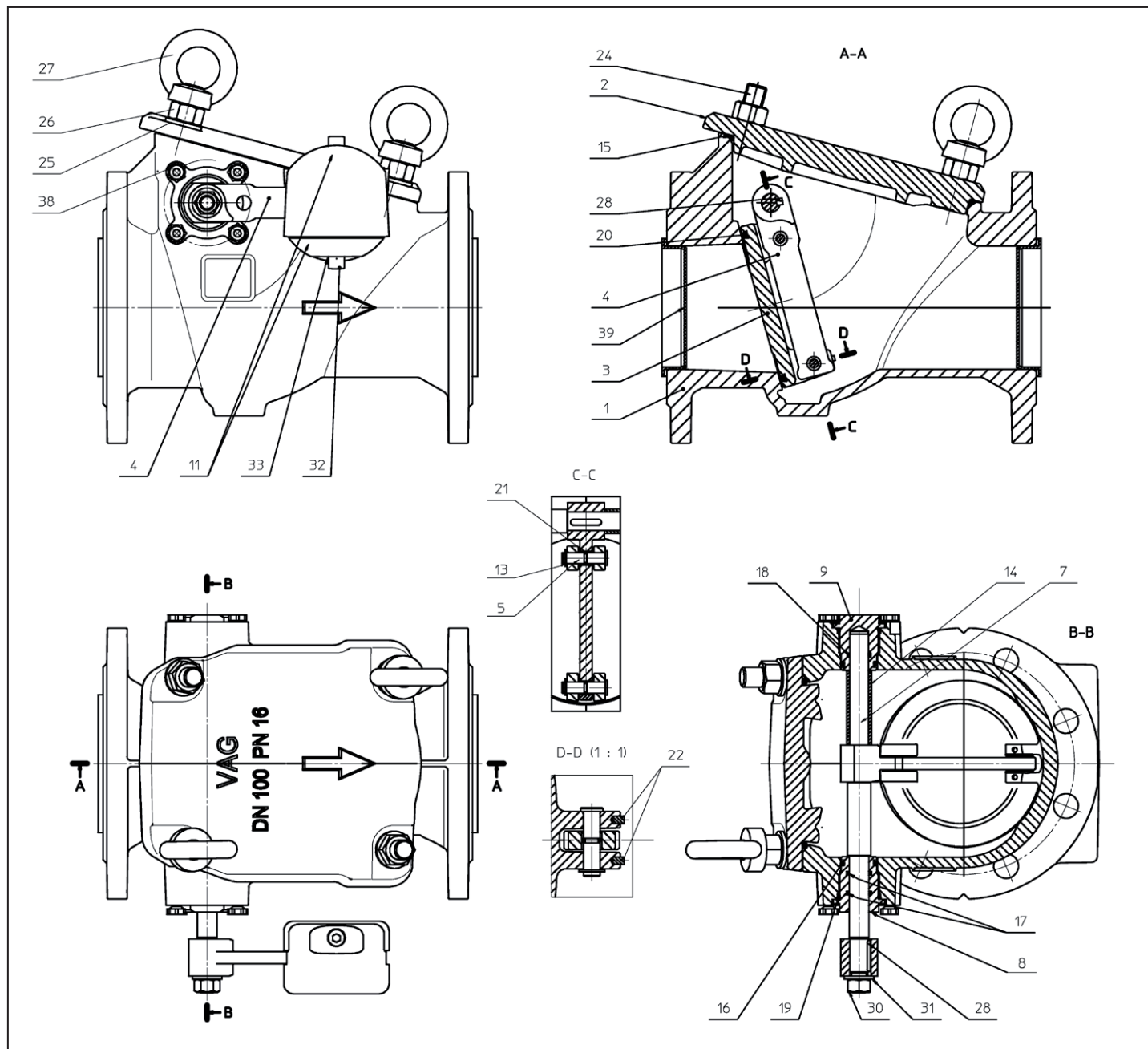
The following elements should be checked:

- Corrosion of visible components (repair or replacement)
- Tightness of the shaft bushing or bearing seal towards the body
- Ease of operation of the disk (if necessary, disassemble it and clean and lubricate the moving parts)
- Seal on the disk (replace sealing ring, if necessary)

### 6.3 Maintenance work and replacement of parts

The spare parts and wearing parts needed can be found in the KAT 1547-E spare parts list.





Picture 7: Single parts and item number

Item	Designation	Material	Item	Designation	Material
1	Body	EN-JS 1030 (DCI 40)	20	O-ring	NBR
2	Cover	EN-JS 1030 (DCI 40)	21	O-ring	NBR
3	Disk	Stainless steel 1.4308 (CF8)	22	Damping elements	NBR
4	Lever	Stainless steel 1.4308 (CF8)	24	Stud bolt	Stainless steel A4
5	Bolt	Stainless steel 1.4057	25	Washer DIN 125	Stainless steel A4
7	Shaft	Stainless steel 1.4057	26	Hexagon nut ISO 4032	Stainless steel A4
8	Bearing	Bronze	27	Lifting-eye nut DIN 582	Stainless steel A4
9	Bearing	Bronze	28	Featherkey DIN 6885	Stainless steel A4
11	Weight	EN-JL 1040 (grey cast iron 25)	30	Hexagon nut ISO 4032	Stainless steel A4
13	Retaining ring	Stainless steel A4	31	Washer DIN 125	Stainless steel A4
14	Sleeve	Plastic	32	Cheese head screw ISO 4762	Stainless steel A4
15	O-ring	NBR	33	Washer DIN 125	Stainless steel A4
16	O-ring	NBR	36	Wire guard	Stainless steel 1.4541
17	O-ring	NBR	38	Screw plug	Plastic
18	O-ring	NBR	39	Flange protection cap	Plastic
19	O-ring	NBR	40	Cheese head screw ISO 4762	Stainless steel A4

### 6.3.1 Inspection of the disk

According to the recommended intervals, the valve should be opened and the disk cleaned. For this purpose, unscrew the cover (2) and turn the disk (3) out of the body. For version AL+GL, the lever may be used for assistance here. For the version with additional wire guard, open the door with the key provided and then fully open it by 180°. When performing this working step, you can also check the bearing of the disk for ease of operation. Afterwards check the sealing ring in the disk and the sealing seat in the body for damage. Should the sealing ring be damaged, just remove it from the groove and replace it.

### 6.3.2 Leaks on the body seals

After a longer period of operation or frequent opening of the valve, leaks on the cover seal (15) or bearing (8, 9) may occur due to material fatigue. In this case replace all worn and leaky seals.

### 6.3.3 Cleaning, lubrication

To ensure the trouble-free function of the disk and bearing, clean the valve body at the recommended intervals. The bearing as well as the suspension of the disk should be lubricated.

Recommended lubricant:

KLÜBERSYNTH VR 69-252N (with KTW approval for drinking water)

### 6.3.4 Recommendations for the replacement of parts

(For parts list and spare parts kits: see KAT 1547-E)

- a) Replacement of the disk seal (20) - every 2 years
- b) Replacement of the bearing seals (16, 17, 18, 19) - whenever necessary

In case of extreme operating conditions, replacement intervals may be shorter than the recommended replacement intervals.

## 7 Trouble-shooting

For all repair and maintenance work, please observe the general safety instructions described in Section 6.1!

Problem	Possible causes	Remedial action
Disk does not seal	Foreign particle jammed in the seat area	Flush the valve; open cover, if necessary, and remove foreign particle; you can use the lever and weight to help you
	Deposits from the medium on the seat or disk	Open the cover, clean the seat and the disk
	Insufficient back-pressure	For complete sealing, the back-pressure should be at least 5 m water column
	Seal of the disk defective	Replace the seal (20) on the disk
	Wrong installation position	Change installation position (cf. Section 4)
	Unfavourable installation position and thus unfavourable flow on the disk (because e.g. installed too close downstream of an elbow etc.)	Change installation position (cf. Section 4)
Disk slamming	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 installation position (cf. Section 4)
Valve is polluted too quickly	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 operation limits of the valve
	Deteriorated seals	Replace seals (cf. Section 6)
Leaks at the body	Leaky bearing	Replace bearing seals (cf. Section 6)
	Cover seal leaky	Replace cover seal (15) and clean the seat of the cover
Disk operates sluggishly	Not enough grease in the bearing	Relubricate bearing (cf. Section 6)
	Bearings worn out	Replace bearings (8, 9) and bearing seals; examine bearing shaft (7) and replace, if necessary

## 8 How to contact us

### Head office

VAG GmbH

Carl-Reuther-Str. 1

68305 Mannheim

Germany

Telephone: +49 (621) 749-0

Fax: +49 (621) 749-2153

[info@vag-group.com](mailto:info@vag-group.com)

<http://www.vag-group.com>

### Service

Our service hotline can be reached 24/7 world-wide. In case of emergency, please contact us directly by phone.

Service hotline: +49 621 - 749 2222

Service per email: [service@vag-group.com](mailto:service@vag-group.com)



[www.vag-group.com](http://www.vag-group.com)

[info@vag-group.com](mailto:info@vag-group.com)