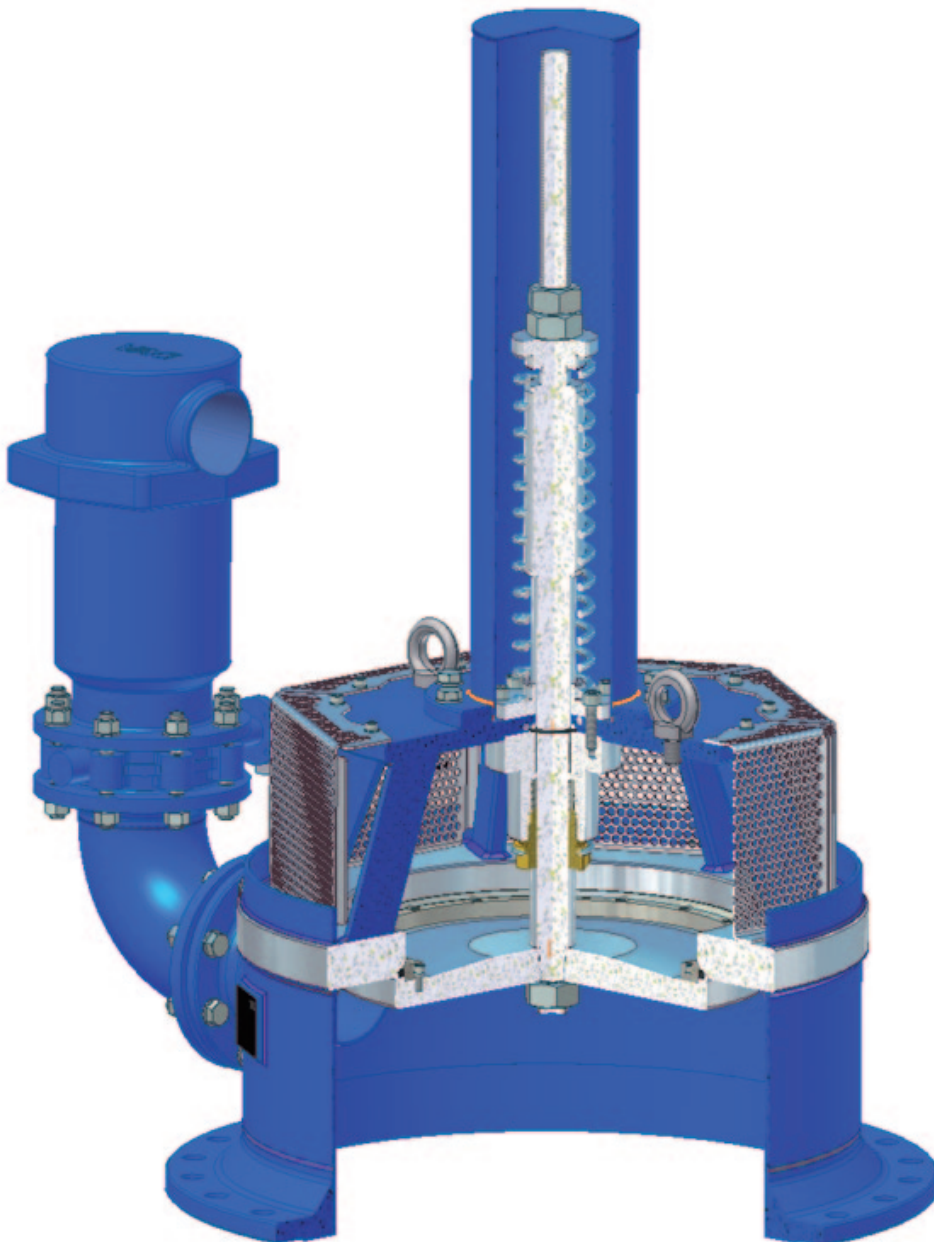


VAG Spring Loaded Air Valve



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VAG reserves the right to make technical changes and use materials of similar or better quality without prior notice. The pictures used are typical and non-binding.

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 / Category: Installation and Operation Instructions).

When using this valve, the generally acknowledged rules of technology have to be observed (e.g. international standards, DVGW data sheets W 334 (Aeration and Bleeding of Drinking Water Pipes), etc.). The installation must only be carried out by qualified staff (see also Section 6.1 General safety instructions). For further technical information such as dimensions, materials or applications, please refer to the respective documentation (KAT-A 1913).

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 personell 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 and ANSI Z535, as well).

The spring loaded air valve is a safety valve controlled by underpressure in the pipeline and which accordingly may open suddenly at any time. The greatest allowable underpressure in the pipeline is 0.55 bar absolute or -0.45 bar in relation to atmospheric pressure. The greatest air velocities that may occur are approximately 200 m/s. For this reason, great care should be taken when people are allowed access near the valve when in operation.

Loud wind noises during venting may require the use of ear protection.

Before removing any protective devices and/or performing any 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) must be prevented.

In the 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 residues which may continue flowing.

1.2 Proper use

The VAG spring loaded air valve is, under normal circumstances a valve attached to a pipe. In its standard version it is suitable for enabling air to be quickly fed into a pipeline should underpressure occur (e.g. via a pipe break) and may thus prevent pipeline collapse.

The integrated VAG DUOJET® Automatic Air Valve also allows the pipe to be vented when being filled and venting under operation is possible as well. For further details refer to the operating instructions for the VAG DUOJET® Automatic Air Valve (KAT-B 1912).

For the respective technical application ranges (e.g. operating

pressure, medium, temperature, maximum rate of air in-flow, etc.) please refer to the specific product-related documentation (KAT-A 1913, KAT-A 1912).

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

These Operation and Maintenance Instructions contain important information on the safe and reliable operation of the VAG Spring Loaded Air Valve.

Observing these Operation and Maintenance Instructions helps you to:

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

1.3 Identification

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

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

VAG	Manufacturer's name Valve type
DN	Nominal diameter of the valve
PN	Nominal pressure of the valve Date of manufacture

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. 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.

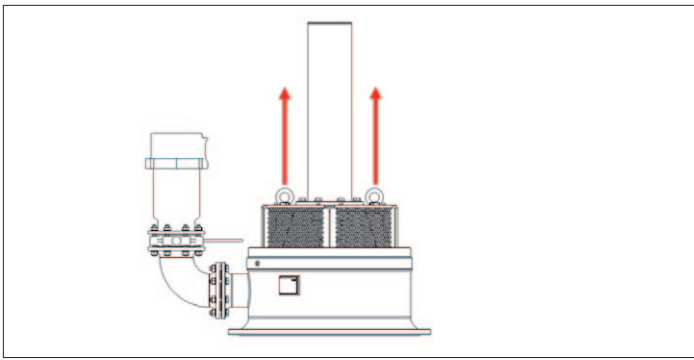
The factory-applied corrosion protection and any assemblies must be protected against damage by external influences during transport and storage.

The VAG Spring Loaded Air Valve should be transported with the valve positioned upright resting on the flange (see Figure 1).

For transport as well as assembly support lifting devices such as ropes and belts should only be attached to the eye bolts (see arrows in Figure 1).

The pipe outlet on the side, the inspection valve and the VAG DUOJET® Automatic Air Valve are not suitable lifting points. The length and position of the ropes/belts must be chosen in such a way that the valve is always in a horizontal position during the lifting operation.

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.



Picture 1: Transport position

2.2 Storage



The VAG Spring Loaded Air Valve must be stored upright resting on the flange.

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 and avoid direct radiator heat. Protect any assembly units important for the function such as the stem, disk and seals against dust and other dirt by adequate covering.

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

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

3 Product features

3.1 Features and function description

The VAG Spring Loaded Air Valve is a safety valve controlled by

underpressure in the pipeline and is primarily used to input large quantities of air into the pipeline (see Figure 2 for details). The integrated VAG DUOJET® Automatic Air Valve also allows the pipe to be vented when being filled and operational venting is also possible as well. For further details about its function refer to the Operation and Maintenance Instructions for the VAG DUOJET® Automatic Air Valve (KAT-B 1912).

For servicing, an inspection valve (VAG CEREX® 300 Butterfly Valve) is connected upstream of the VAG DUOJET® Automatic Air Valve. For function and servicing of the butterfly valve refer to document KAT-B 1331.

The VAG Spring Loaded Air Valve is kept closed via the pretensioned spring and is factory adjusted so that it opens at 0.95 above bar absolute or -0.05 bar relative to ambient pressure, allowing air into the pipeline.

Due to the integrated friction cylinder the disk's vibration excitations during aeration are damped.

The drain hole on the rim of the spring-loaded valve allows the discharge of any accumulating condensate or water.

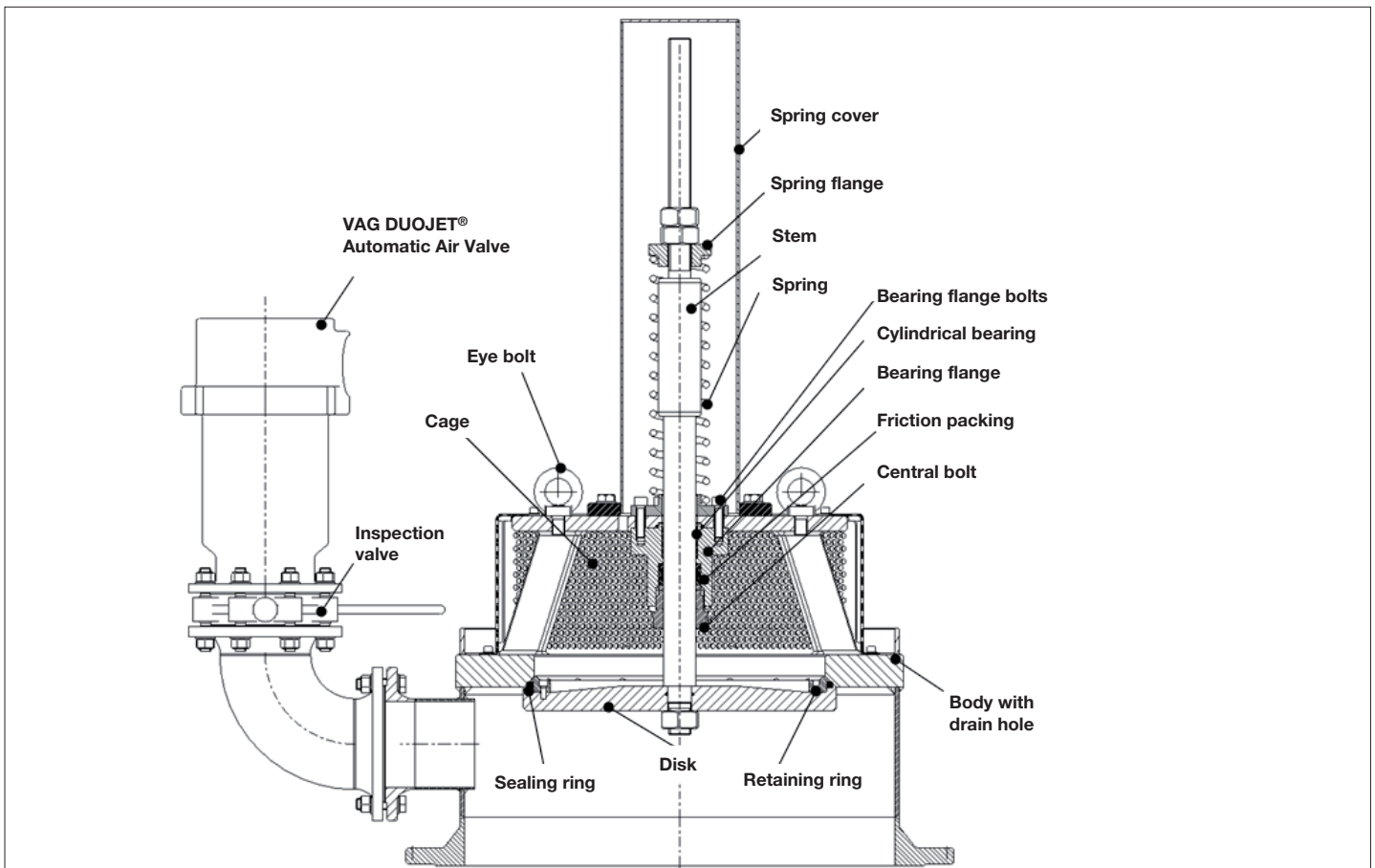
3.2 Applications

The VAG Spring Loaded Valve in its standard version can be used for the following media due to its NBR sealing materials:

- Water
- Raw water and cooling water

For information about the corresponding temperature limits, please refer to the product-related technical documentation (KAT-A 1913).

Contact the manufacturer in the event of alternative operating conditions and areas of application.



Picture 2: VAG Spring Loaded Air Valve with VAG DUOJET® Automatic Air Valve and inspection valve

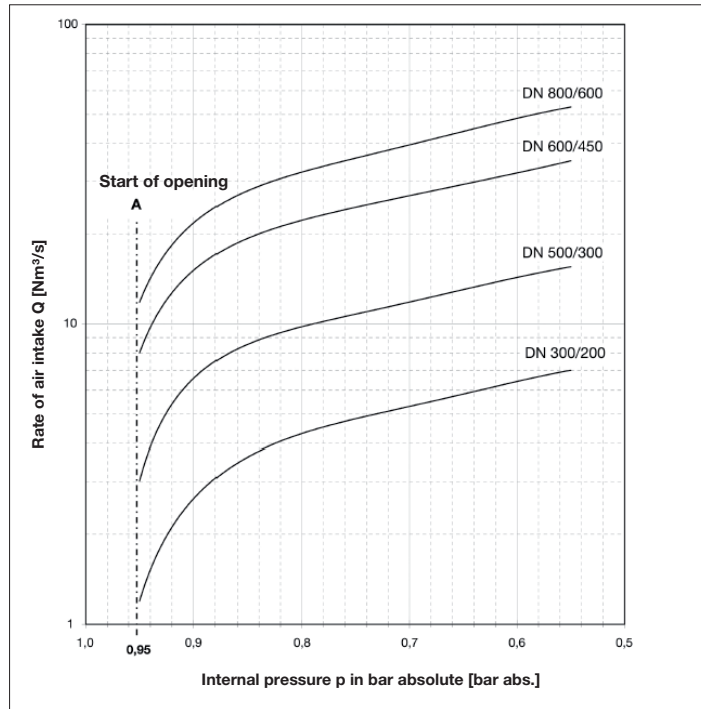
3.3 Performance limits

The minimum pressure for sealing the venting cross-sections is 0.3 bar.

The large disk cross section is used to input large quantities of air for rapid shut-downs, quick draining or pipe breaks.

Refer to the following diagram (see Figure 3) for the rate of air inflow in relation to internal pressure for different nominal diameters.

The design of the VAG Spring Loaded Air Valve can also be done with VAG's own software, VAG UseCAD®, in which a design program for VAG Automatic Air Valves is integrated.



Picture 3: Air intake – Large disk cross-section

3.4 Permissible and impermissible modes of operation

The maximum operating temperatures and operating pressures specified in the technical documentation (KAT-A 1913) must not be exceeded.

In closed position the inspection valve may only be subjected up to nominal pressure and must therefore be put into open position prior to inspection.

The greatest allowable underpressure in the pipeline is 0.55 bar absolute or -0.45 bar in relation to atmospheric pressure. The greatest air velocities that may occur are approximately 200 m/s.

Any exceptions from the above require the manufacturer's express written approval.

4 Installation on the pipeline

4.1 Installation location

The installation location of the valve must be selected to provide sufficient space for function checks and maintenance works (e.g. dismantling and cleaning of the valve).

If the valve is installed in the open, it must be protected against extreme atmospheric influences (e.g. formation of ice etc) by adequate covers.

Access of unauthorized persons near the valve should be prevented, because the air valve opens immediately when underpressure occurs and high air velocities can be expected.

A sufficient supply of air must be provided on site (provide a ventilation grille) should the air valve be actuated, which is why buried installation and flooding of the valve are not permitted.

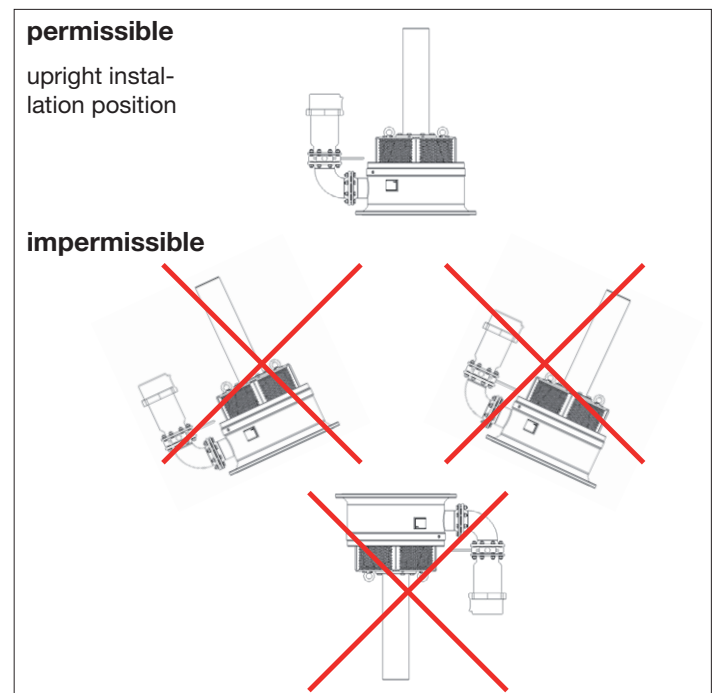
It may be wise to install an inspection valve (e.g. VAG EKN® Butterfly Valve) below the spring loaded valve to enable safe servicing while the pipeline is in operation. However, this is only wise if the safety function of the spring loaded valve can be done without for the duration of servicing work.

To ensure trouble free operation and long service life of the spring loaded air valve several factors should be considered when positioning the valve. Refer to DVGW specification sheet W334 for further details. Alternatively, the air valve layout program on the VAG UseCAD® DVD includes instructions for positioning in the plant.

4.2 Installation position



The VAG Spring Loaded Valve must be installed upright on the pipeline. Correct functionality can only be guaranteed if the valve is installed in the vertical position.



Picture 4: Installation positions of the VAG Spring Loaded Air Valve

4.3 Assembly instructions and fittings

Check the valve for possible damage that it may have occurred during transport or storage. Protect the valve against dirt from the construction site by adequate covering until installation. Prior to installation all components essential for proper function, such as stem, disk and seals must be thoroughly cleaned to remove all dirt particles. VAG does not assume any liability for consequential damage caused by dirt, shot-blasting gravel residue etc.

The function parts should be checked for proper operation pri-

or to installation (the same procedures as described in section 5 “Set-up and operation”).

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 for any reason prior to installation, these parts must be adequately covered. If solvents are used for cleaning, You should ensure that they do not damage the seals of the pipeline or the valve.

For the assembly of the VAG Spring Loaded Valve you must ensure that proper load suspension devices as well as means of transport and lifting devices are available.

Any attachments must be secured to the eye bolts (see Figure 1). Connect lifting devices via any other part may result in damage.

When connecting the valve with the pipeline flange, 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 cracks or breaks in the flange.

Only suitable sealing materials, lubricants and auxiliary materials that are certified for use in drinking water lines must be used for assembly of the valve into the pipeline.

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

Welding works on the pipeline must be performed before the valves are installed to prevent damage to the seals and the corrosion protection. Welding residues must be removed before the equipment is put into operation.

The appropriate pipe sections are to be cleaned and rinsed prior to being put into operation. Please observe local guidelines and practices.

5 Set-up and operation of the valve

5.1 Visual inspection and preparation

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. The inspection valve must be in open position.

The valves are sufficiently lubricated at the factory for purposes of installation, storage and transport, but depending on condition the stem bearing must be relubricated when being put into operation (see section 6.3.5 “Cleaning, lubrication”).

5.2 Function check and pressure test

Prior to installation the working parts of the valve must be opened up completely and closed at least once and the movement checked (see 6.3.4).



Caution: The closed inspection valve may only be put under a load up to its nominal pressure (see technical data sheet KAT-A 1331 CEREX® 300 Butterfly Valve). The inspection valve must be in open position during a pressure test of the pipeline with test pressure greater than the allowable nominal pressure.

Newly installed pipeline systems should first be thoroughly purged to remove all foreign particles. If residue or dirt particles are present in the pipeline, they might clog the installation while the pipeline is being purged. This may impair the function of the valve or even block it. If detergents or disinfectants are used you must ensure that they do not contaminate the valve materials.

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. Depending on the type and hazard risk of the fluid conveyed, comply with all required safety regulations!

After completing the maintenance works and before resuming operation, check all connections for tightness. The individual steps of initial operation are to be carried out according to section 5 “Set-up and operation”.

Statutory and local provisions as well as the safety and accident prevention regulations must be observed and complied with at all times.

Servicing, maintenance and inspection work as well as the replacement of spare parts must be carried out by qualified personell. The plant operator is responsible for determining the suitability of the personell or for ensuring that they have all relevant qualifications.

In case the operator’s employees do not have the qualifications required, they should attend a training course. Valve related training courses can be undertaken by VAG Service employees.

In addition to this, the plant operator needs to ensure that all employees have understood these Operation and Maintenance Instructions as well as all further instructions referred to in them.

Protective equipment such as safety boots, safety helmets, goggles, protective gloves etc. must be worn during all work requiring such protective equipment or for which such protective equipment is prescribed.

6.2 Inspection and operation intervals

The valve should be checked for tightness proper operation and corrosion at least once per year (DVGW instruction sheet W 392).

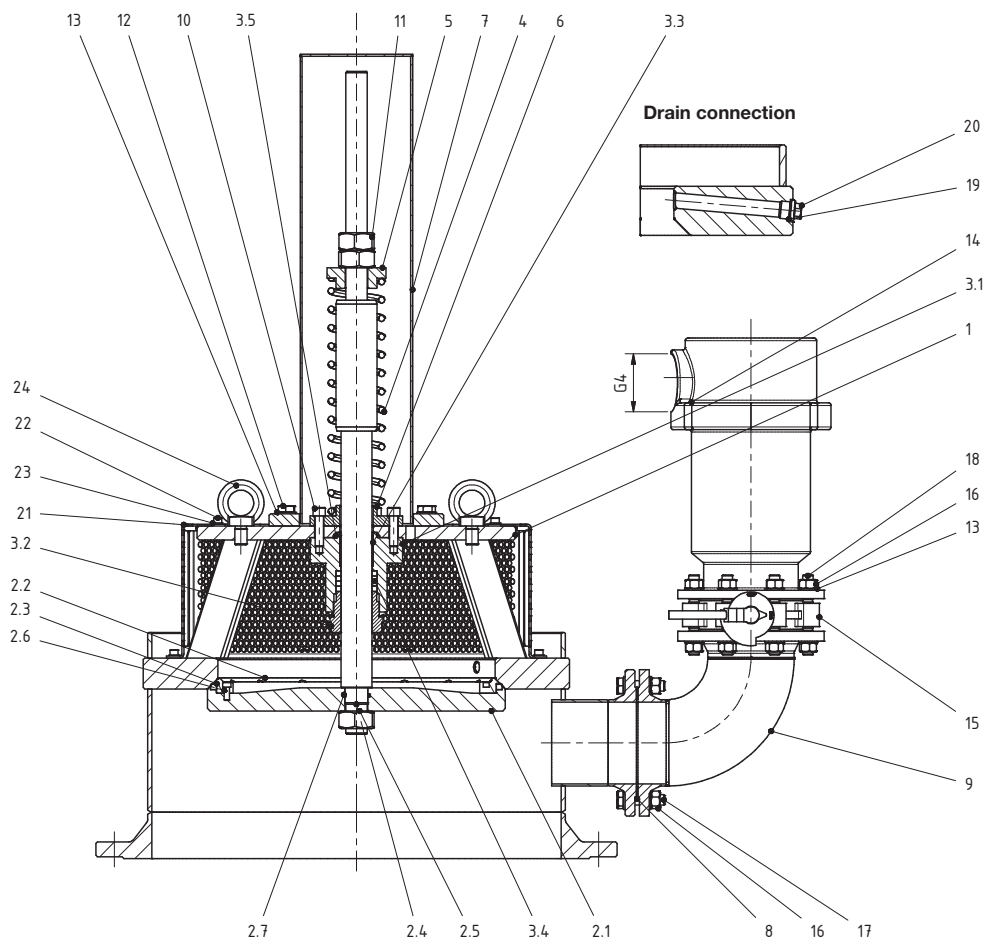
In case of extreme operating conditions inspection should be performed frequently.

6.3 Maintenance work and replacement of parts

Refer to section 6.3.1 “Design” for the required spares and consumable parts on the spare parts list.

6.3.1 Design

The design view in Figure 5 below is a partial overview of the following descriptions of the work procedures.



Pos.	Name	Spare part
1	Body	
2.1	Disk	
2.2	Retaining ring	
2.3	Profile sealing ring	x
2.4	Stem	
2.5	Hexagonal nut	
2.6	Cylinder screw	
2.7	O-ring	x
3.1	Bearing flange	
3.2	Central nut	
3.3	Cylindrical bearing	x
3.4	Packing	x
3.5	O-ring	x
4	Spring	
5	Spring flange	
6	Lower spring flange	
7	Spring cover	

Pos.	Name	Spare part
8	Flat seal	x
9	Pipe	
10	Cylinder screw	
11	Hexagonal nut	
12	Hexagonal bolt	
13	Washer	
14	DUOJET® Automatic Air Valve	
15	CEREX® 300-L Butterfly Valve wafer type	
16	Hexagonal nut	
17	Hexagonal bolt	
18	Stud bolt	
19	Sealing ring	x
20	Plug	
21	Cage	
22	Cylinder screw	
23	Washer	
24	Eye bolt	

Picture 5: Design and spare parts

6.3.2 Recommendations for the replacement of parts

When required, the housing seals and the friction packing may be replaced depending on the type of medium. VAG recommends replacement of all seals every five years to prevent signs of ageing.

Under extreme operating conditions it may be necessary to shorten these recommended replacement intervals.

6.3.3 Detaching the spring

This work procedure is necessary to check the movement of the valve, but is also preparation for other servicing activities.

a) Detaching the spring:

- Remove spring cover (item 7)
- Mark spring tension on the stem (item 2.4)
- Loosen tightened nuts (item 11) and reduce spring tension until the valve disk (item 2.1) moves

b) Pretension the spring

Carry out steps from a) in reverse order until the spring is pretensioned at the marked position.

6.3.4 Checking valve movement

After the cage (item 21) is removed, the valve disk (item 2.1) can be pressed downwards by hand. Movement is good when it automatically moves back to closed position.

If manual force is not enough to push the disk, the spring can be loosed as described in section 6.3.3. In this case movement is good when the disk reacts without overdue delay following changes to spring tension.

If stiffness occurs the stem should first be lubricated (see 6.3.5). If this doesn't work it will be necessary to clean or replace the bearing and/or stem.

6.3.5 Cleaning, lubrication

The stem bearing must be free from dirt and always well lubricated. It should be cleaned and lightly relubricated commensurate with the conditions of use. For use in drinking water systems lubricants approved for food or drinking water are recommended.

Recommended lubricant:

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

Manufactured by Klüber Lubrication München AG.

Lubricating the central nut:

- Loosen spring tension as described in 6.3.3
- Remove cage (item 21)
- Lightly lubricate stem
- Pretension the spring again and reattach cage and spring cover

Lubricating the cylindrical bearing:

Due to the materials used no lubrication of the cylindrical bearing should be necessary. However, if dirt or incrustations have formed, the stem, disk and bearing flange (see 6.3.7) must be

disassembled in order to be able to clean or replace the bearing.

6.3.6 Adjusting the friction cylinder

The friction packing for damping disk movement is altered by adjusting the central nut. The stronger the central nut is tightened, the greater the friction. If the valve is too stiff or free moving the friction cylinder will have to be readjusted.



Caution: Tightening the central nut too firmly may cause the valve to become blocked! Proper functioning can then no longer be guaranteed.

Work procedures:

- Loosen spring (item 4) as described in 6.3.3
- Remove cage (item 21)
- Loosen the central nut (item 3.2) and then lightly attach it so that stem movement is very slightly damped.
- Check stem movement
- Secure central nut from being twisted with Loctite bolt adhesive or similar
- Pretension the spring again and reattach cage and spring cover

6.3.7 Disassembling stem, disk and bearing flange

The disk will have to be disassembled if the bearing, the friction cylinder or the sealing ring has to be serviced or replaced.

Work procedures:

- Unscrew valve from pipeline
- Loosen spring tension as described in 6.3.3
- Remove spring (item 4), reattach and tighten prestressing nuts (item 11)
- Remove cage (item 21)
- Remove fastening nut (item 2.5) of the disk (item 2.1) while holding up the tightened nuts (item 11) and supporting the disk from falling down
- Alternative: Turn valve around and hold up on upper edge of body



Caution: When turning around the disk will slam shut. The stem may not be bent while twisting!

- Then first loosen the disk from the stem
- Remove disk and stem from the body
- Unscrew bearing flange bolts and remove bearing flange

For assembly carry out the steps in reverse order.

It is recommended to replace the following items at the same time:

- The friction packing (item 3.4)
- The sealing ring (item 3.8)
- The O-ring in the disk (item 2.7)
- The O-ring on the bearing flange (item 3.5)
- Possibly the cylindrical bearing (item 3.3) and/or the central nut (item 3.2)

6.3.8 Replacing the sealing ring (item 2.3)

In order to replace the sealing ring the disk must be disassembled as described in 6.3.7.

Subsequent work procedures:

- Fit the new sealing ring (item 2.3) with retai-

- ning ring (item 2.2) on disk (item 2.1)
- Fit stem and disk outside the body
- Grind sealing ring so that it is round towards the stem and still overlaps by approx. 1 mm



Caution: Take care not to bend the stem!

- Disassemble disk and stem again and put everything back together again (fit) in the body

6.3.9 Replacing the cylindrical bearing (item 3.3)

To replace the cylindrical bearing the bearing flange will have to be disassembled as described in 6.3.7.

Subsequent work procedures:

- Pull out old bearing bush
- Secure new bearing bush with Loctite bolt adhesive and press in evenly.



Caution: Use adhesive sparingly and let dry thoroughly so that the stem is not stuck.

6.3.10 Adjusting the response pressure

Required items:

- A backing pump
- A pressure gauge
- A blind flange appropriate for the fitting with connection for backing pump and pressure gauge

Work procedures:

- Remove fitting from the pipeline
- Connect blind flange and backing pump
- Close inspection valve
- Change spring tension by adjusting the nuts (item 11) until the desired response pressure is obtained
- Tighten nuts and mark setting on the stem
- Reopen inspection valve.

Recommended (and set at the factory) is a response pressure of 0.95 bar absolute or -0.05 bar relative to ambient pressure.

7 Troubleshooting



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

Problem	Cause	Remedial action
Valve is stiff or doesn't work correctly	Plant is still under pressure	Remove fitting immediately and depressurize plant
	Central nut fastened too tight	Check settings (see 6.3.6)
	Bearing needs lubrication	Lubricate bearing (see 6.3.5)
	Bearing dirty or encrusted	Clean bearing (see 6.3.5)
	Stem bent	Replace stem
Leaks in body seat	Fitting is not completely closed	Increase spring tension
	Sealing ring damaged or worn	Replace sealing ring (see 6.3.8)
Response pressure can't be adjusted (pressure gauge stays at ambient pressure)	Inspection valve is open	Close inspection valve
	Inspection valve is faulty	Replace inspection valve
The VAG DUOJET® Automatic Air Valve does not vent	Inspection valve closed	Open inspection valve
	other causes	see KAT-B 1912 VAG DUOJET® Automatic Air Valve
Other faults with the VAG DUOJET® Automatic Air Valve		see KAT-B 1912 VAG DUOJET® Automatic Air Valve
Other faults with the inspection valve		see KAT-B 1331 VAG CEREX® 300 Butterfly Valve

8 How to contact us

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