

VAG MOK Plug 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 / Category: Installation and Operation Instructions).

Alterations of this product and the parts supplied with it are not allowed. VAG will not assume any liability for consequential damage due to non-compliance with these instructions.

When using this valve, generally accepted engineering principles should be observed (e.g. national standards, EN 1074 Part 1 / 2, AWWA, ANSI standards, local codes & regulations 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 3717).

VAG valves are designed and manufactured to the highest standards and their safety of operation is generally ensured in general. However, valves may be potentially dangerous if they are operated improperly or are not installed for their intended use. It is strongly urged that all personal dealing with the assembly, disassembly, operation, maintenance and repair of this valve must read and understand the complete Operating and Maintenance Instruction Manual (Accident Prevention Regulations, VBG 1 §§ 14 and following [Regulations issued by the Trade Associations] and ANSI Z535).

Before removing any protective devices and/or performing any work on the valve, depressurize the pipeline section and ensure it is free of any hazard. Unauthorized, unintentional, and unexpected actuation as well as any hazardous movements caused by stored energy (pressurized air, water under pressure) should 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. In case of equipment that must be monitored and inspected, all relevant laws, regulations, and applicable codes, must be complied with.

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 should be taken in case of emerging residue which may continue flowing.

1.2 Proper use

VAG MOK Plug Valve is a shut-off valve designed for installation in pipelines.

The VAG MOK Plug Valve is intended to shut off the medium. Its use as a control valve is only possible within certain limits. For any control operating conditions or applications, the manufacturer's written approval must be obtained.

For the respective technical application ranges (e.g. operating pressure, medium, temperature) please refer to the specific product-related documentation (KAT-A 3717).

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

These Operation and Maintenance Operation Instructions contain important information on the safe and reliable operation of the VAG MOK Plug 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 equipment
- Improve the operational safety and useful life of the equipment.

1.3 Identification

All valves bear an identification label.

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

- Figure number of the valve
- Flange rating
- Order Number
- Serial Number

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. It must be ensured 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 crated for protection with (IPPM) heat treated wood. This is specific for all export shipments.

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



Picture 1: Transport position - flange side

VAG MOK Plug Valve must be transported with its plug slightly open. For transport, place the valve onto its flange side or in upright position.

If the valve is equipped with actuation assemblies, be sure that the actuators are safely stored to prevent transverse loads from affecting the connections. Avoid jerks and jolts when lifting or lowering the load, as the forces generated in the process may damage both the valve and the lifting devices.

For transport purposes and also to support assembly, lifting devices such as cables and belts must only be attached to the flange holes by use of eyebolts or rods. Use at a minimum two holes when lifting the equipment. The length and positioning of the cables/belts must ensure that the valve is in a horizontal position during the entire lifting procedure.

- When lifting the valve caution should be taken to ensure that the flanges are not damaged!
- Be careful during each lifting action as the valve can have a tendency to “flip” as it is lifted!
- DO NOT handle the valve using the operating shaft, actuator, or through water-way as they are not designed to handle the stress of lifting the valve!

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.

- Suspended Load!

The valve can tilt and can be damaged while being lowered! Danger of injury during lifting and transport.

- Avoid valve’s tilting by always moving it cautiously during lifting and transport.
- Wear protective equipment (safety helmet, safety gloves and safety shoes).
- Make sure that no attachments can be jammed.

- The valve can fall down during lifting!

Death or serious injury can result if body parts are hit and/or crushed!

- Never stand under a suspended load!
- Only use hoists and slinging tackles which are safe to support the load!
- Lift the valve carefully until it is freely suspended.
- Balance the valve carefully. Consider the centre of mass!
- The valve can now be hoisted and cautiously transported to the installation site.

2.2 Storage

VAG MOK Plug Valves should be stored with its plug slightly open.

The equipment is best stored indoors, in a dry environment with ambient temperatures. The equipment can be stored in the crate in which the equipment was shipped.

If the equipment must be stored outdoors, the following precautions and warnings should be addressed: The equipment is shipped from our facility free of water. Remove any moisture to avoid freezing / water damage. All parts should be protected from ex-



Picture 2: Transport position - upright position

cess exposure to direct sunlight and/or UV light otherwise their long-term sealing function could become compromised. Store the valve in a dry and well aerated place and avoid direct heat. Protect any components critical to the proper function, such as plug, stem and actuator against dust and other dirt, with adequate covering.

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

Any electrical control boxes should be stored indoors.

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, the unit should be warmed up to at least +5° C before installation and before put into actual operation. Valve should remain on the shipped skid and have adequate ventilation.

3 Product features

3.1 Features and function description

The VAG MOK Plug Valve DN 80...600 is a round ported valve.

Plug valves are designed with eccentric rubber disc seating surfaces. The plug rotates ¼ turn to provide shutoff in pipes. Tighter shutoff is provided by the eccentric seating action as the actuator is adjusted to provide for more rotation. The valve can be adjusted to a maximum of 10 degrees over travel. Pipeline flow can be regulated by positioning the plug between 15 and 90 degrees open under certain (limited) operating conditions agreed by us beforehand.

Manually operated plug valves are powered by the following methods: 2” direct nut, lever handle or gear actuators. The gear actuators include: handwheel, chainwheel, and travelling nut operators. These operators convert input turns into ¼ turn valve operation. Physical stops in the actuator housing, limit the travel of the valve plug in a gear actuator.



Do not force the handwheel, chainwheel, or nut against the stops. This may damage the actuator and will not provide tighter shutoff of the valve. Only actuator adjustments will affect valve shutoff.

Gear actuators power motor operated valves. The gear actuators convert multiple motor input turns into ¼ turn valve operation. The physical stop in the actuator housing and limit switches in the

motor housing, limit the travel of the valve plug. Settings of the limit switch and physical stop will affect the valve shutoff.

Limit switches and/or physical stops must be set properly in order to avoid damage to the motor and/or actuator.

A gear box and double acting cylinder are used to power hydraulically operated valves. The gear box converts the linear stroke of the cylinder into ¼ turns. Hydraulic power to the cylinder is directed by auxiliary controls. The auxiliary controls are also used to control the operating speed of the cylinder.

3.2 Applications

VAG MOK Plug Valve can be used for the following media:

- Raw water and cooling water
- Municipal wastewater (must be mechanical screened)

The use of media containing oil and gas may cause the destruction of the rubber lining and is therefore impermissible.

VAG MOK Plug Valves should only be used in media in which there is no risk of clogging.

For information about the corresponding temperature limits, please refer to the product-related technical documentation (KAT-A 3717).

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

3.3 Allowable and non-allowable modes of operation

The maximum operating temperatures and operating pressures specified in the technical documentation (KAT-A 3717) must not be exceeded.

The pressure applied to the closed valve must not exceed its rated pressure.

No operation in intermediate position / control operation.

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

4 Installation into the pipeline

4.1 Conditions required on site

When installing the valve between two pipeline flanges, these must be coplanar and in alignment. If the pipes are not in 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 as tension-free as possible. The space between the flanges should be wide enough to prevent damage to the coating of the flange gasket frames 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.



Danger of crushing between valve body and pipeline (-flanges) during installation!

Death or serious injury can result if persons remain between valve and pipeline!

- Never stand under a suspended load!
- Lift the valve carefully until it is freely suspended.
- Avoid valve's tilting by always moving it cautiously during lifting and transport.
- Make sure that no person stays in hazardous area.

For assembly in drinking water pipelines, suitable sealing materials, lubricants and process materials must be used which are approved for use in drinking water pipelines. All applicable codes and standards should be followed.

Before putting the valve into operation, clean and purge the corresponding pipeline sections.

4.2 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.

The pressure on the closed valve must not exceed its nominal pressure (see KAT-A 3717).

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

4.2.1 Installations in the pipeline upstream and downstream of the valve

- If the valve is used in contaminated media, a screen with a suitable mesh size must be provided upstream of the valve in order to prevent malfunction. For valves \leq DN 250 we recommend an upstream screening no larger than DN/4. For valves $>$ DN 250 we recommend an upstream screening no larger than 75 mm.
- There is no minimum recommended upstream and/or downstream distance for the installation of inspection valves, elbows, T-pieces, and Y-filters.
- The max. and min. temperature limits (0°C- 50° C) of the flow medium must not be exceeded.
- The nominal pressure is the maximum pressure which may be exerted on the closed valve.

4.2.2 Seat positioning

Always take note of the seat end when installing plug valves. Raised letters are cast into the flange on the seat end of the valve reading "SEAT" (see picture 3 and also picture 5 for the following description).

Wastewater applications:

For applications where suspended solids are likely to build up in the valve body, the valve should be installed with the fluid entering the seat end first. The valve can be installed with the plug horizontal and rotating upward into the top portion of the valve body cavity to open, in extreme cases.



Picture 3: Seat positioning

4.2.3 Valve support pedestal

For dimensions bigger than DN 300 the valve body should be supported by a pedestal or pier, but not rigidly restrained, so as not to act as an anchor for the system piping.



Picture 4: Valve support pedestal

4.3 Installation position

The VAG MOK Plug Valves must be installed in horizontal or vertical pipelines. The valve can be installed with the motor operator in horizontal or vertical position. Plug valves are designed with bi-directional shut off. However we recommend the following installation position for save and proper function.

4.4 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 VAG MOK Plug Valve 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 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 sandblasted 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 MOK Plug Valve you must be ensured that proper load suspension devices as well as means of transport and lifting devices are available.

If the end user would use this information on only one hole it could damage the body.

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 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 for by other means.

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.

While the valve is being installed, it must be made sure 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 residues 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 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.

Subsequent lubrication is not necessary.

5.2 Function check and pressure test

Prior to installation, the moving parts of the valve have to be opened and closed completely at least once and should be checked for trouble-free operation. Close valve before installing.



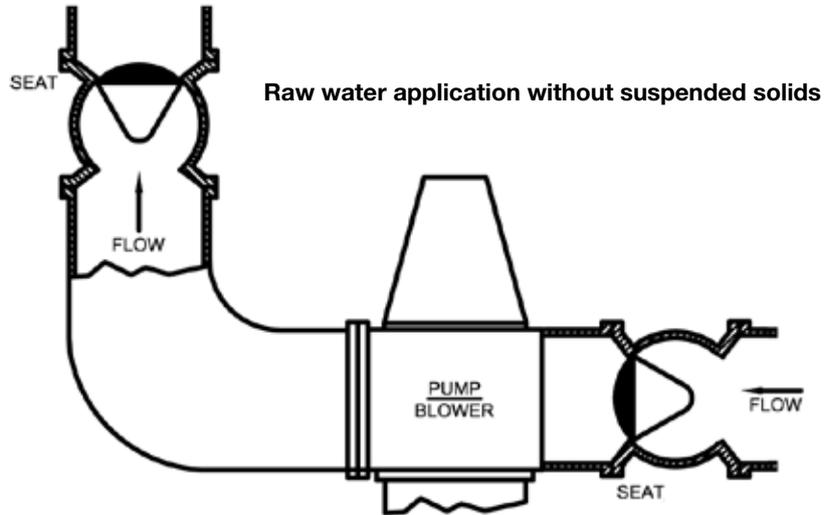
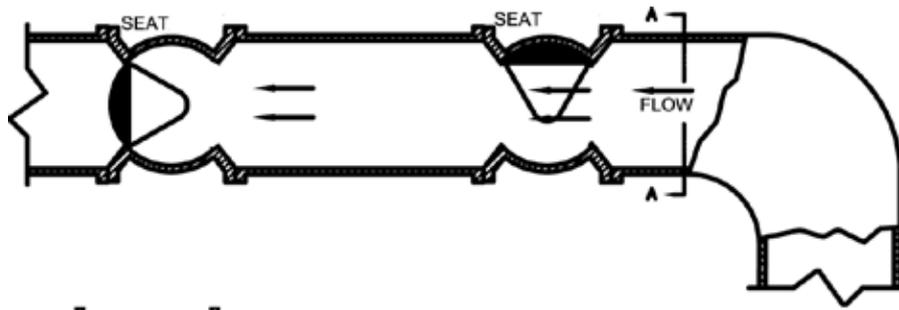
Warning!! The pressure exerted on the closed valve must not exceed its nominal pressure (see technical data sheet KAT-A 3717).

When a pressure test is performed in the pipeline with a test pressure exceeding the allowable nominal pressure in closing direction, the pressure must be compensated by way of a bypass.

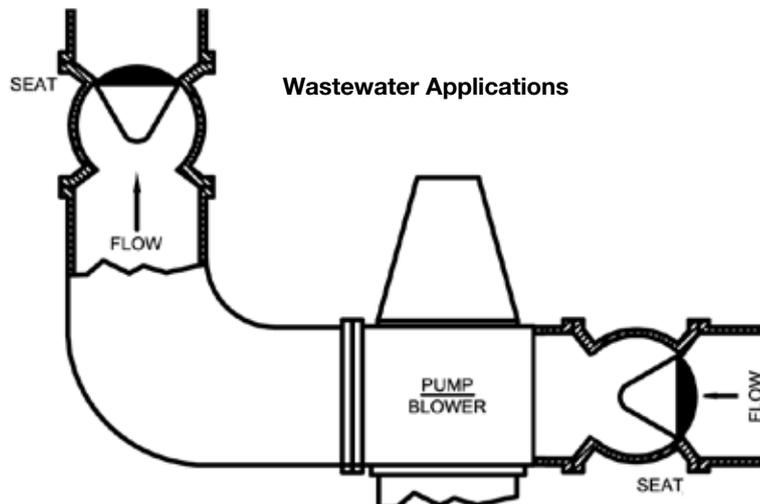
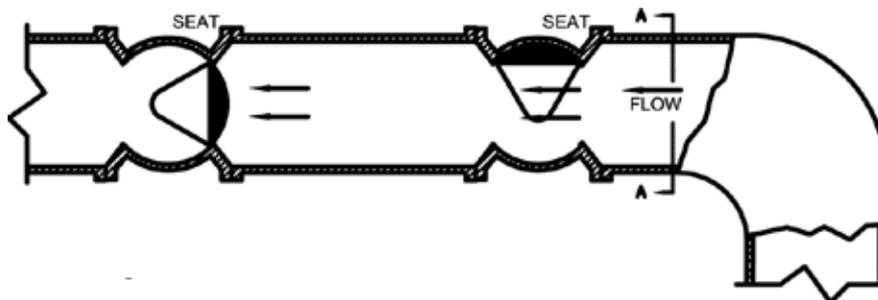
Newly installed pipeline systems should first be thoroughly purged to remove all foreign particles. If residues or dirt particles are present in the pipeline, they might clog the installations while the pipeline is being purged. This may impair the function of the valve or even block it.

In particular after repair work or upon the commissioning of new equipment, the pipeline system is to be purged again with the valve being fully open. If detergents or disinfectants are used it must be ensured they do not attack the valve materials.

Usual installation in raw water applications without suspended solids



Usual installation in wastewater applications with suspended solids



Picture 5: Installation positions

6 Actuators

For detailed information about actuator please refer to the O&M of the actuator producer.

6.1 Wrench operated plug valves

Wrench operated eccentric plug valves are closed by turning the valve 90 degrees clockwise. The torque collar on these valves serves the following different functions.

1. Open Memory Stop: Tightening the torque collar adjustment after the correct flow is achieved allows the plug to be set.
2. Closed Memory Stop: The closed stop is pre-set at the factory and only requires readjustment in the event of wear or leakage through the valve when closed.

In the event of leakage through a closed valve or excessive wear to either the plug or the seat, the plug can be adjusted by simply adjusting the closed stop. If this fails to stop the flow, repeat the procedure until the flow stops and then re-set the lock nut on the closed memory stop to prevent the position from being altered.

6.2 Gear operated plug valves

Gear operated eccentric valves are closed by turning the gear input shaft in a clockwise direction until the plug is closed.

Closed Memory Stop: The closed stop is pre-set at the factory and only requires readjustment in the event of wear or leakage through the valve when closed.

In the event of leakage through a closed valve or excessive wear to either the plug or the seat, the plug can be adjusted by simply adjusting the closed stop. If this fails to stop the flow, repeat the procedure until the flow stops and then re-set the lock nut on the closed memory stop to prevent the position from being altered.

6.3 Electric actuated plug valves

Specific wiring details are contained in the electric actuator manual. As with any plug valve, the actuator will cause the valve to rotate through ¼ turn to open or close the valve.

The output motion of the actuator is limited by mechanical stops in the gearing. These are factory set and should not need adjustment. The actual positioning of the valve plug will be done by limit switches in the motor actuator. The switches are also set at the factory, but adjustment is sometimes required if the actuator unit is installed on a separate mounting base or floor stand. Detailed procedures are given in the actuator manual if adjustment is needed for the mechanical stops or the limit switches.

7 Maintenance and repair

7.1 General safety instructions

Prior to inspection and maintenance work on the valve or its assemblies, shut-off the pressurised pipeline, depressurize it and secure it against inadvertent activation. Depending on the type and hazard risk of the fluid within, comply with all required safety regulations!

After completing the maintenance work and before resuming operation, check all connections for tightness. Perform the steps described for initial set-up as described under Section 5 "Set-up and Operation".

A VAG MOK Plug Valve is not self-locking. The actuator/the gear

must not be disassembled as long as the valve is pressurised. This also applies in case the complete valve is dismantled.

Statutory and local provisions as well as safety and accident prevention regulations must be observed and complied with at all times. Couplings and connections must never be disassembled when they are under pressure. Servicing, maintenance and inspection work as well as the replacement of spare parts must be carried out by qualified personnel. The plant operator is responsible for determining the suitability of the personnel or for ensuring that they have all relevant qualifications.

In the case where the operator's employees do not have the qualifications required, attending of a training course is necessary. This training course can e.g. be held 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, protective eyewear, protective gloves etc. must be worn during all work requiring such protective equipment or for which such protective equipment is prescribed. Improper or wrong use of the valve should be avoided. Prior to the enactment of any work on the valve and equipment, it must be ensured that the relevant pipeline section has been depressurized and/or de-energized.

- Danger of crushing between valve body and pipeline (-flanges) during installation! Death or serious injury can result if persons remain between valve and pipeline!
 - Never stand under a suspended load!
 - Lift the valve carefully until it is freely suspended.
 - Avoid valve's tilting by always moving it cautiously during lifting and transport.
 - Make sure that no person stays in hazardous area.
- Dangers from electrical current.
 - Death or serious injury can result when coming into contact with energized parts.
- Suspended Load! All parts of the valve can tilt and can be damaged while being lowered!
 - Danger of injury during lifting and transport.

7.2 Inspection and operation intervals

The valve should be checked for tightness, proper operation and corrosion protection at least one per year. In case of extreme operating conditions inspection should be performed frequently.

The eccentric valve is designed and manufactured to be long life valve under normal circumstances. It does not require any routine maintenance. Cycling the valve from fully open to fully closed on an annual basis will increase the life of the valve and operator components.

However, if maintenance is required due to unusual wear or service conditions, the following procedure should be followed.

7.3 Maintenance work and replacement of parts

For information about the spare parts and wearing parts needed, please refer to the spare parts list in Section "7.3.1 Design".

7.3.1 Design

7.3.2 Recommendations for the replacement of parts

To perform a repair on the main valve assembly, the motor operator must be removed from the valve. Prior to starting this procedure follow motor operator repair instructions to remove the motor operator from the valve.

7.3.2.1 Disassembly of the packing (10)

The plug valve is a top entry valve; therefore, the body can remain in line during this operation.

1. After the valve is de-pressurized, remove the four actuator bolts (17) that hold the actuator to the valve.
2. Remove the actuator (16) and set it aside.
3. Unlock the gland nuts (13) and disassemble the gland (11).
4. When re-assembling, reverse the above process and use a new packing (10).

When re-assembling, reverse the above process and use a new U-cup seal. To insert the new U-cup seal apply a minimal amount of silicone for lubrication purposes. Before sliding the U-cup over the plug stem, place a shim against the shaft so that it remains between the shaft and the U-cup while the U-cup is fitted into place. This will allow air to escape as the U-cup fills the packing cavity. Once the U-cup is completely in place, remove any shim stock before placing the teflon washer on top of the U-cup.

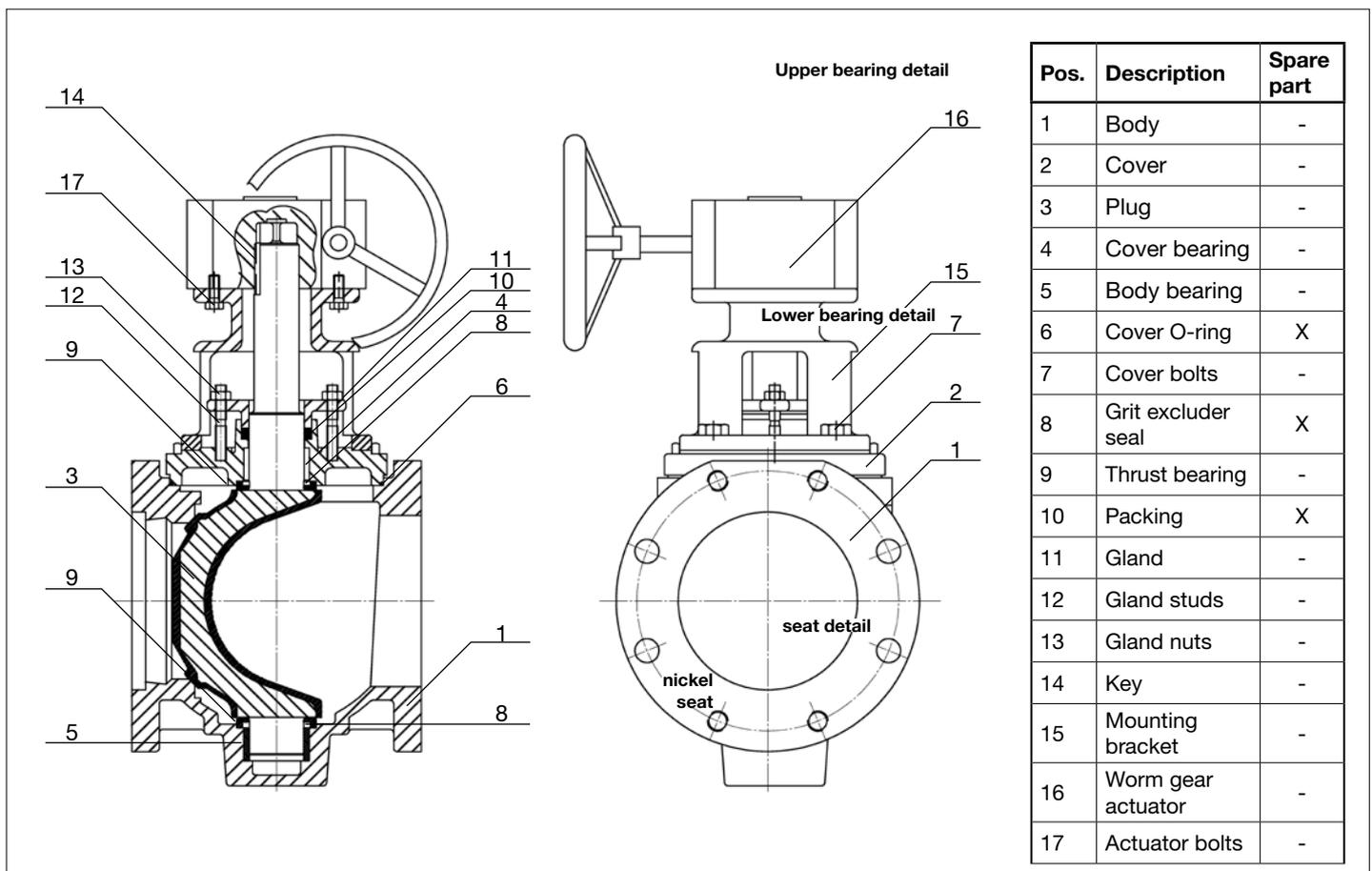
7.3.2.2 Reassembly

When reassembling, reverse the above process and use a new U-cup seal. To insert the new U-cup seal apply a minimal amount of

silicone for lubrication purposes. Before sliding the U-cup over the plug stem, place a shim against the shaft so that it remains between the shaft and the U-cup while the U-cup is fitted into place. This will allow air to escape as the U-cup fills the packing cavity. Once the U-cup is completely in place, remove any shim stock before placing the teflon washer on top of the U-cup.

8 Trouble-shooting

For all repair and maintenance work, please observe the general safety instructions described in Section 7.1!



Picture 6: Design of the VAG MOK Plug Valve (position numbers)

Problem	Cause	Remedial action
Valve will not open	Broken or misadjusted torque collar	Adjust or replace torque collar
	Obstruction in line	Remove obstruction
	Excessive line pressure	Reduce pressure
	Elastomer damage	Replace plug
	No power source	Check incoming power source and/or replace fuses.
	Improper signal	Check actuating signal sequence.
	Burned out or impaired component	Check and repair or replace actuator controls.
Valve will not close	Broken or misadjusted torque collar	Adjust or replace torque collar
	Obstruction in line	Remove obstruction
	Excessive line pressure	Reduce pressure
	Elastomer damage	Replace plug
	No power source	Check incoming power source and/or replace fuses.
	Improper signal	Check actuating signal sequence.
	Improper stop adjustment	Adjust closed stop
	Obstruction in line	Remove obstruction
	Excessive line pressure	Reduce pressure
Valve will not shutoff flow	Elastomer damage	Replace plug
	Improperly set limit switch	Re-Set limit switch
	Actuator torques out	Check for obstructions in valve.
Valve leaks at plug stem	Damaged packing seal	Replace packing seal

9 How to contact us

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