

# VAG PICO<sup>®</sup> H Pilot Operated Control 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 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 data sheets, VDI directives, etc.). The installation must only be carried out by qualified staff (see also Section 6 General safety instructions). For further technical information such as dimensions, materials or applications, please refer to the respective documentation (KAT-A 2032).

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, 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 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.

Before dismantling the VAG PICO® H Pilot Operated Control Valve from the pipeline, always make sure that the diaphragm chamber and the control circuit have been depressurised. This can be checked by opening the purging cock at the filter.

Also remember that the VAG PICO® H Pilot Operated Control Valve can only be operated properly with the ball valves on the control circuit open. Closing the ball valve on the upstream pressure side during operation may cause the control function of the valve to be ineffective.

## 1.2 Proper use

The VAG PICO® H Pilot Operated Control Valve is a control valve intended for installation in horizontal pipelines (for exceptions see Section 4.4). When the valve is installed between pipeline flanges, the flanges must be plane parallel and in true alignment. As shown in Figure 1, the VAG PICO® H Pilot Operated Control Valve



(C) should preferably be installed between two shut-off valves (A + D) and a strainer (B) on the upstream pressure side. **We strongly recommend using a suitable support for the pipeline.** It must be ensured that the valve and especially its control circuit are easily accessible for operation and maintenance. For emergency operation a bypass line may be useful. The arrows on the valve body indicate the flow direction and need to be observed when the valve is installed. For proper use of the VAG PICO® H Pilot Operated Control Valve, the control circuit must be properly assembled at the main valve. The control circuit may only be modified by the manufacturer itself or in close consultation with the manufacturer. Improper modification may cause the valve to lose its control function and lead to consequential damage. For proper use and to prevent malfunction, a damping zone of 2 to 3 times DN should be provided upstream of the VAG PICO® H Pilot Operated Control Valve. On the downstream side, we recommend a damping zone of at least 5 times the nominal diameter (see also Section 4.3).

For pressure-reducing valves, we recommend the installation of a safety valve on the downstream-pressure side.

The control valve is available in several varieties and performs control tasks in water supply systems. The following varieties of the VAG PICO® H Pilot Operated Control Valve are available:

• Pressure-reducing valve  
• Pressure-sustaining valve/Pressure-relief valve  
• Float valve  
• Level-control valve

- Pressure-reducing valve
- Pressure-sustaining valve/Pressure-relief valve
- Float valve
- Level-control valve

For the respective technical application ranges (e.g. operating pressure, medium, temperature) please refer to the specific product-related documentation (KAT-A 2032).

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

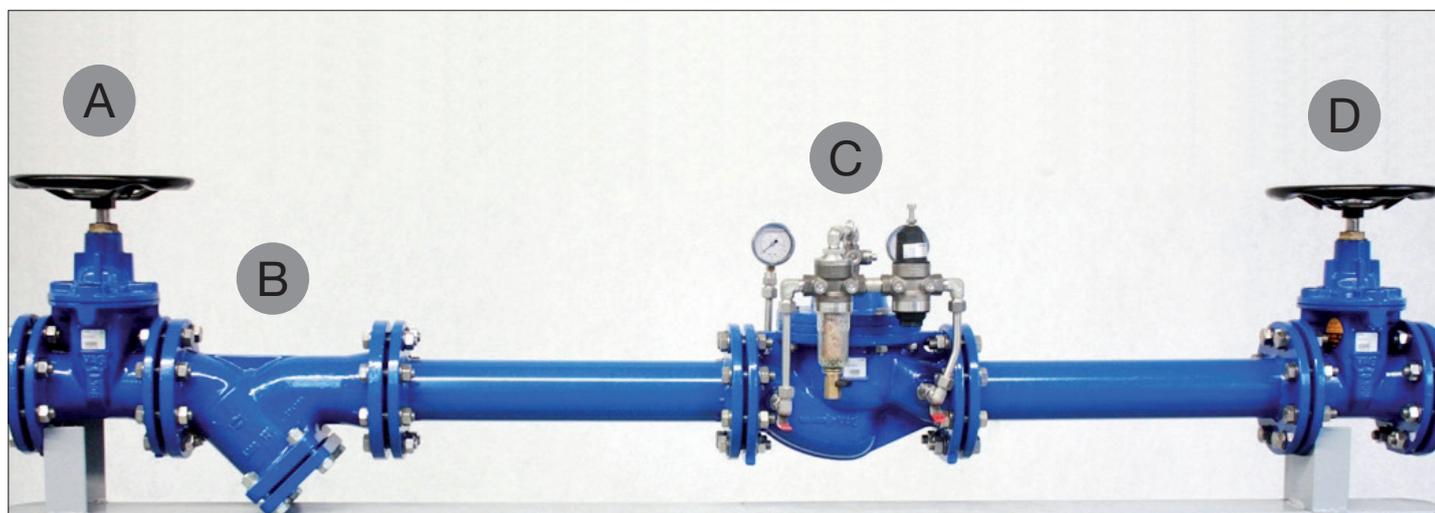


Figure 1: Installation recommendation of the VAG PICO® H Pilot Operated Control Valve

These Operation and Maintenance Instructions contain important information on the safe and reliable operation of the VAG PICO® H Pilot Operated Control Valve.

Observing these Operation and Maintenance Instructions 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 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
PICO	registered product name of VAG-Armaturen GmbH
DN	Nominal diameter of the valve
PN	Nominal pressure of the valve
Date of manufacture	
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. 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.

When transporting the VAG PICO® H Pilot Operated Control Valve ensure that the lines of the control circuit are protected against damage by tipping.

For transport purposes and also to support assembly, lifting devices such as cables and belts must only be attached to the transport bores provided (A) at the top of the body (see Figure 2). Select the length and position of the cables and belts so that they ensure the horizontal position of the valve during the entire lifting procedure.

Please remember that lifting or suspending the VAG PICO® H Pilot Operated Control Valve at the pilot lines may cause damage to 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.

### 2.2 Storage

When storing the VAG PICO® H Pilot Operated control Valve, ensure that it is adequately protected against dirt and dust. The manufacturer recommends using suitable desiccants in the container.

Store the valves in dry and well ventilated place where they are protected against dirt and damage. The elastomeric parts (seals) must be protected against direct sunlight and/or UV light as otherwise their long-term sealing function cannot be guaranteed. Protect the valve against direct radiation from heat sources.

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 installation and before it is put into operation.

## 3 Product features

### 3.1 Features and function description

The VAG PICO® H Pilot Operated Control Valve is a straightway control valve and can be installed in a pipeline system via flanged connections. It has been designed to perform control tasks in water supply systems and, unlike butterfly valves and gate valves which merely perform shut-off tasks, it is suitable to meet the special requirements of regulation.

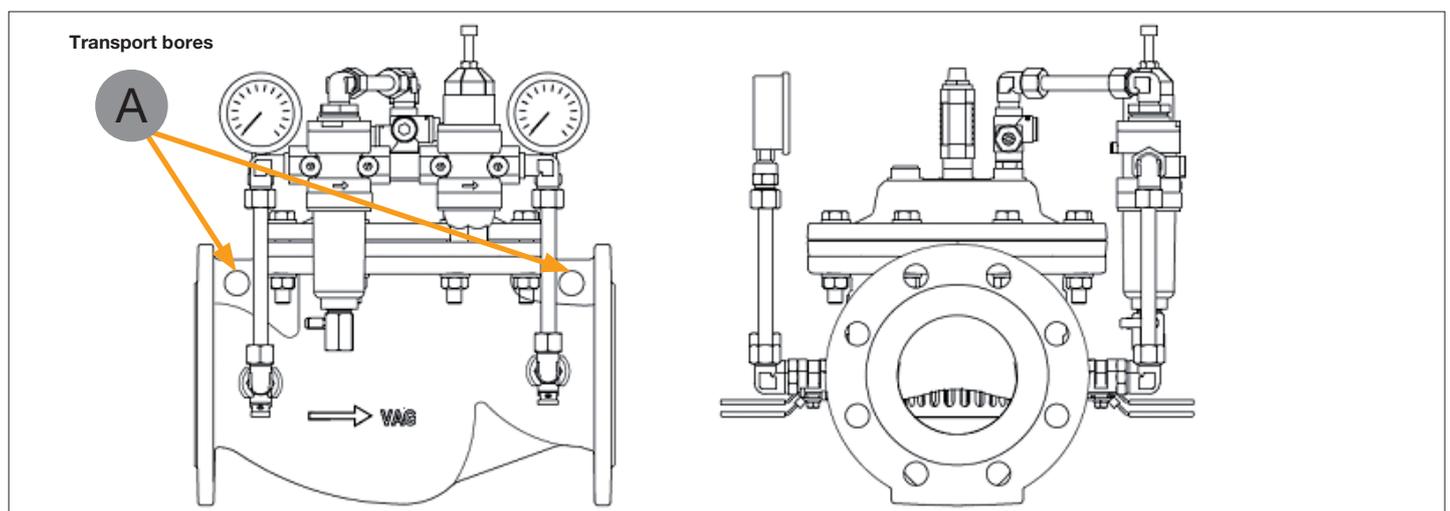


Figure 2: Transport position

The main valve consists of the body, the diaphragm retaining disk, the bonnet and the internal parts with the diaphragm, the control insert and the valve stem. The control lines with filter and pilot valve attached to the main valve as well as the separately assembled pressure gauges form the VAG PICO® H Pilot Operated Control Valve. The seat of the valve is sealed by a profiled sealing ring.

The control valve is controlled automatically via the pilot valve in the control circuit. When the pilot valve is closed, the valve disk is kept in closed position at the same pressures, which is due to the larger effective area in the diaphragm chamber as compared to the valve seat. When the pilot valve is closed, the pressure inside the diaphragm chamber rises to the upstream pressure level and the main valve closes. When the pilot valve is open and there is flow in the control line, the pressure in the diaphragm chamber drops and the main valve opens.

As a standard the valve is delivered with a slotted cylinder (see Figure 3) which has been designed based on the operating conditions.

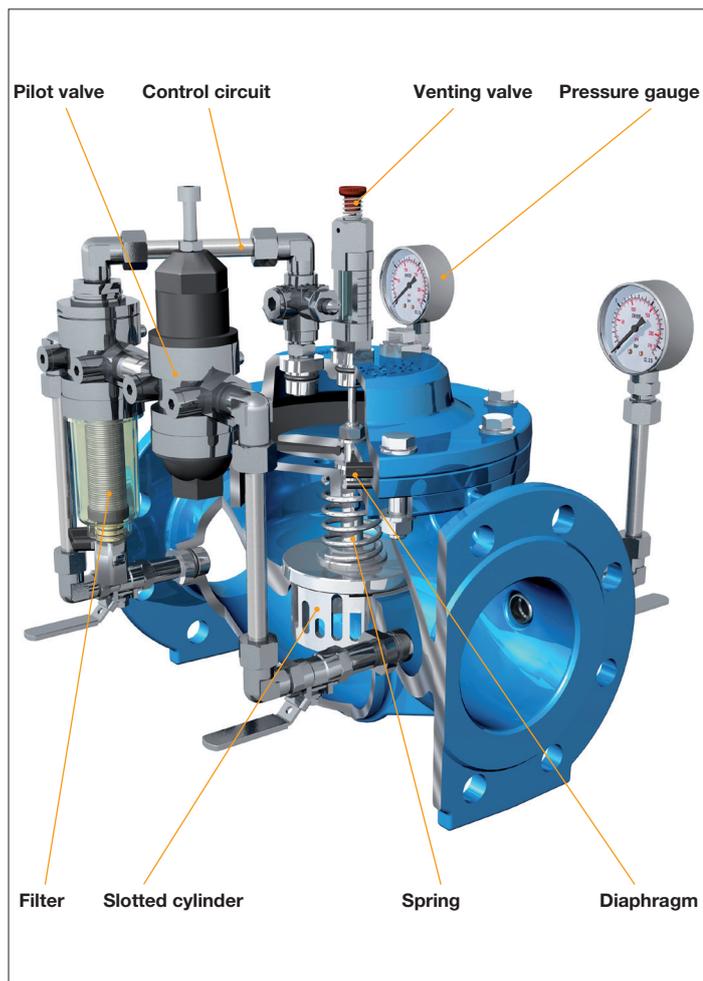


Figure 3: VAG PICO® H Pilot Operated Control Valve as pressure-reducing valve

### 3.2 Applications

The VAG PICO® H Pilot Operated Control Valve in its standard version can be used for the following media due to its EPDM sealing materials:

- Drinking water
- Service water

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

### 3.3 Permissible and impermissible modes of operation

The maximum operating temperatures and operating pressures specified in the technical documentation (KAT-A 2032) must not be exceeded.

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

To ensure the reliable function of the pilot operated control valve, a differential pressure of 0.5 bar is required.

The maximum permissible flow velocity (at stable flow) is that according to EN 1074-1.

In addition to this, the valve, irrespective of its nominal pressure, can be operated at a flow velocity of 5m/s maximum.

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.

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.

### 4.2 Installation location

To ensure trouble-free function and a long service life of the valve, several factors have to be taken into consideration with regard to its location in the system.

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.

A submerged installation position is not admissible for this type of valve.

### 4.3 Installations in the pipeline upstream and downstream of the valve



The VAG PICO® H Pilot Operated Control Valve should preferably be installed between two shut-off valves and a strainer with suitable mesh size on the upstream pressure side to filter coarse dirt particles upstream of the valve and to prevent clogging of the control lines.

### 4.4 Installation position

The VAG PICO® H Pilot Operated Control Valve must be installed in a horizontal position. Any other installation positions require the manufacturer's express approval (Figure 5).

Exception: Up to and including nominal diameter DN 100 a vertical installation position is also possible. However, the flow must be from the bottom to the top according to the flow direction arrow on the main valve.

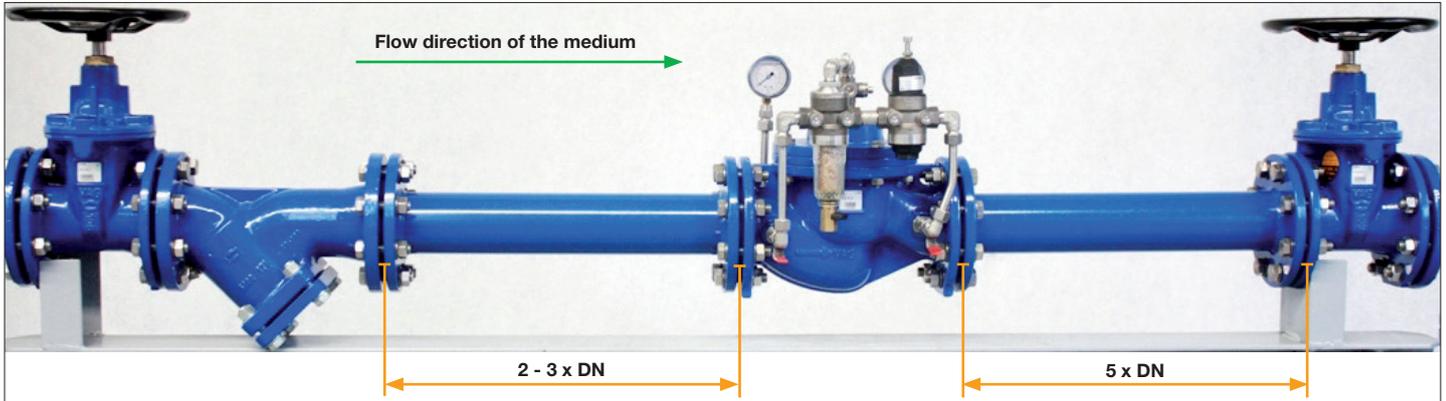


Figure 4: Installation situation of a VAG PICO® H Pilot Operated Control Valve

For this purpose, the following requirements must be observed:

- Directly upstream (2 to 3 x DN) and downstream (5 x DN) of the VAG PICO® H Pilot Operated Control Valve, no inspection valves, elbows, T-pieces and Y-filters should be provided as otherwise irregular flow might impair the proper function of the VAG PICO® H Pilot Operated Control Valve.
- The temperature limits for the medium conveyed must not be exceeded.
- The nominal pressure is the maximum pressure which may be applied when the valve is closed.

### 4.5 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. VAG does not assume any liability for consequential damage caused by dirt, shot-blasting gravel residue etc.

It should be checked before installation whether all function parts (e.g. ball valves, adjustment screws) run well and are fully operational.

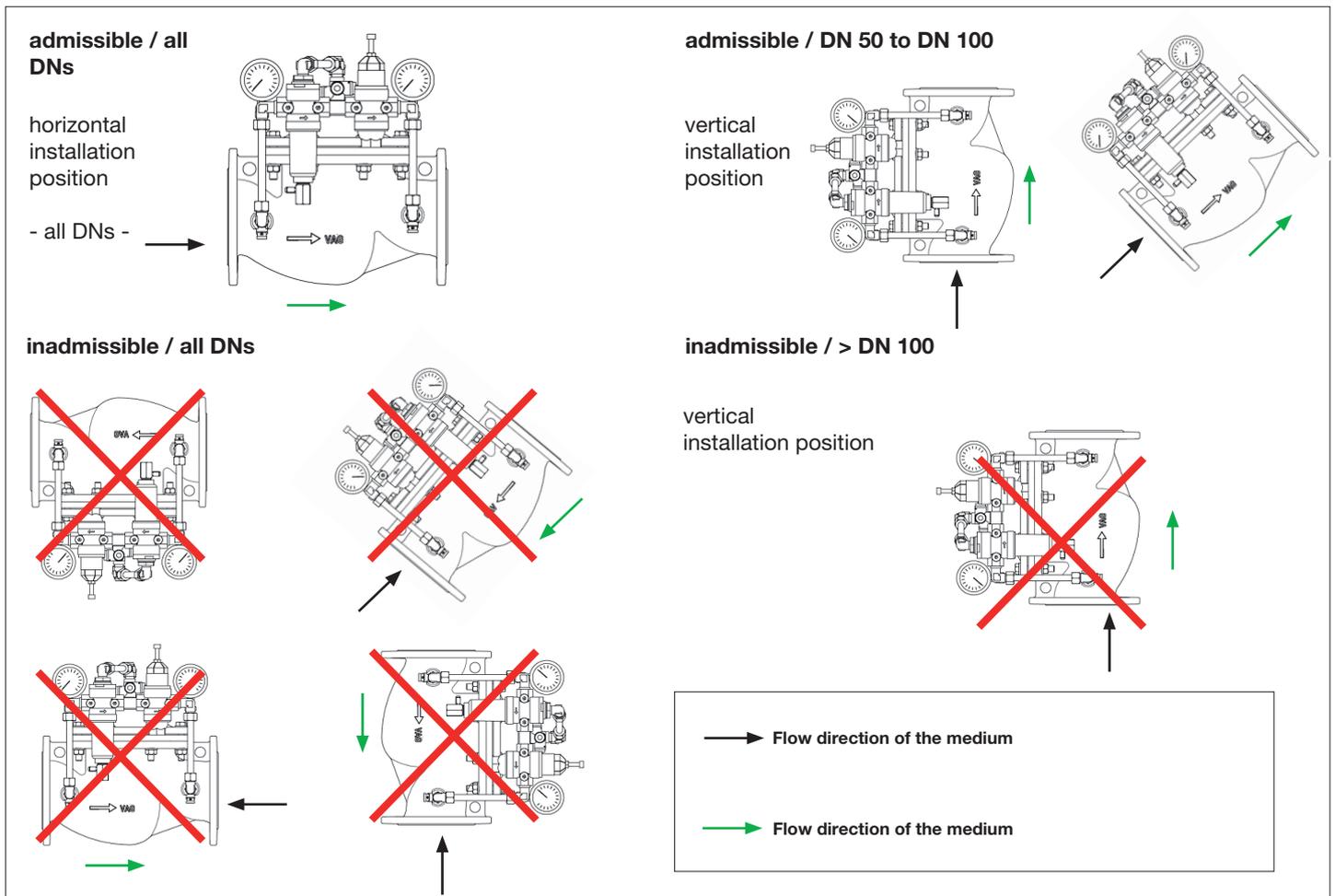


Figure 5: Installation position of the valve

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 PICO® H Pilot Operated Control Valve you must ensure that proper load suspension devices as well as means of transport and lifting devices are available.

The valve may only be suspended using the transport devices provided for this purpose. Any other method of suspension may lead to damage or destruction.

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 by thicker seals.

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.

Prior to the commissioning of new plants and in particular after repair work performed on existing plants, the pipeline system has to be purged. During purging, the materials of the valve must not be attacked. During pressure tests the valve should only be exposed to pressures not exceeding its nominal pressure. A pressure test of the valves has already been performed by the manufacturer.

### 5.2 Function check and pressure test

The pressure applied to the closed valve must not exceed 1.1 times its nominal pressure (see Technical Data Sheet KAT-A 2032). When a pressure test is performed in the pipeline with a test pressure exceeding the admissible nominal pressure in closing direction, pressure compensation must be ensured via 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.

### 5.3 Putting the valve into operation

The following sections describe the commissioning of the VAG PICO® H Pilot Operated Control Valve step by step. The commissioning procedure depends on the type of control valve, i.e.

- VAG PICO® H Pilot Operated Control Valve as pressure-reducing valve
- VAG PICO® H Pilot Operated Control Valve as pressure-sustaining valve / pressure-relief valve
- VAG PICO® H Pilot Operated Control Valve as float valve
- VAG PICO® H Pilot Operated Control Valve as level-control valve

Depending on the valve used, different steps will have to be performed for putting it into operation.

#### 5.3.1 VAG PICO® H Pilot Operated Control Valve as pressure-reducing valve

1. Close the shut-off valves upstream and downstream of the pressure-reducing valve.
2. Completely release the tension of the spring of the pilot valve by unfastening the counter-nut and by turning the adjustment screw counter-clockwise (see Figure 6). This can be done manually by hand or with the use of tools. For this purpose a 6 mm fixed spanner and a 13 mm open-ended spanner are needed.
3. Put all ball valves at the control circuit into open position. The ball valves are open when the manual levers run in parallel to the piping of the control circuit (see Figure 7). Make sure that the ball valve at the filter and the venting valve are completely closed (exception: for varieties with automatic venting the venting valve does not need to be checked).
4. The opening and closing speed is adjusted via throttle valves in the control circuit (see Figure 8). This allows both speeds to be adjusted separately. The adjustment screw for the opening speed is marked OS (opening speed) and the adjustment screw for the closing speed is marked CS (closing speed). The speeds are adjusted using a slot-head screwdriver. Before the response speeds can be adjusted, the adjustment screws first



Figure 6: Releasing the tension of the spring

have to be completely closed (turn in “-“ direction) to set the initial position to zero turns. Afterwards the speeds can be adjusted. VAG recommends the following standard adjustments:

- Opening speed: one turn in “+“ direction
- Closing speed: 3 turns in “+“ direction

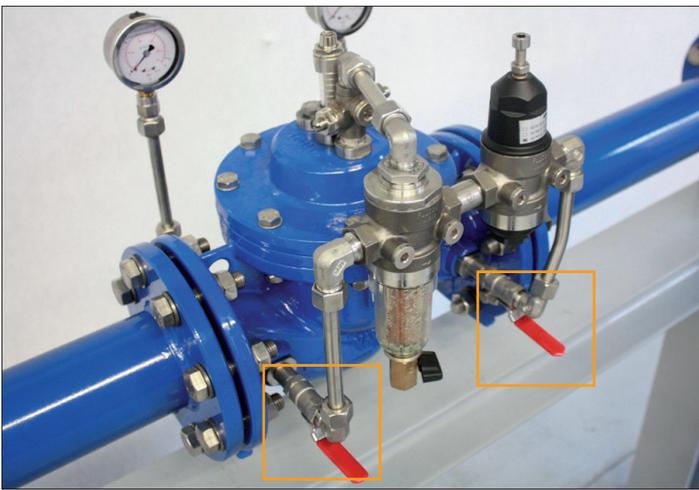


Figure 7: Open ball valves with manual levers running in parallel to the piping of the control circuit

If required, the response speed may be increased or reduced. To increase the response speed turn the adjustment screw in “+” direction and to reduce the response speed turn the adjustment screw in “-“ direction. Each adjustment screw can be moved 4 full turns (= 4 x 360°).

5. The pressure-reducing valve is filled by slow and careful opening of the upstream pressure valve (e.g. a gate valve, see Figure 9) with 1 – 3 turns.
6. On the upstream and downstream pressure sides of the pressure-reducing valve two pressure gauges are installed. They record the upstream and downstream pressure on the valve. When the pressure-reducing valve is being filled, the downstream pressure may rise.
7. The filter integrated in the control circuit must be purged. For purging, open the stop cock at the filter and leave it open until all dirt particles and any trapped air have been removed. (see Figure 10). After purging do not forget to close stop cock again.



Figure 8: Adjustment of the opening and closing speed

8. When you fill the valve, air may be trapped in the upper diaphragm chamber. To ensure proper function of the valve, the venting valve must be slightly opened and remain open until a steady jet of water emerges (This step is not necessary with varieties with automatic venting) (see Figure 11).



Figure 9: Partial opening of the upstream pressure valve

9. Now the upstream pressure shut-off valve is opened completely. Before the downstream pressure can be adjusted, the adjustment screw on the pilot valve must be completely unfastened again after filling (see step 2). Afterwards, the downstream-pressure shut-off valve is partly opened (2 – 4 turns; see Figure 12). The pressure-reducing valve should now be closed. Now possibly the static downstream pressure from the plant is present.

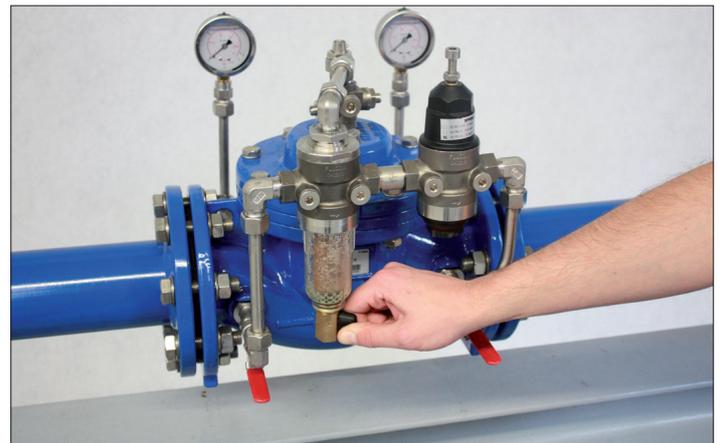


Figure 10: Opening the stop cock

10. Now the desired downstream pressure can be adjusted. For adjustment turn the adjustment screw of the pilot valve slowly clockwise until the required pressure level is reached (see Figure 13). To see whether the pressure is correct, check it on

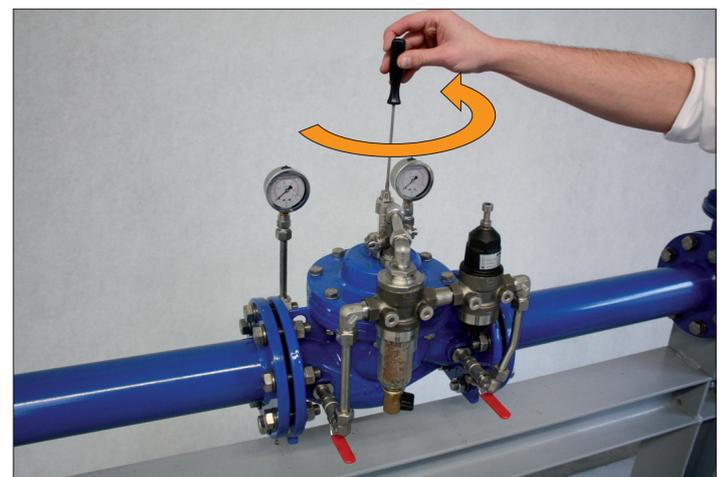


Figure 11: Opening the venting valve

the downstream pressure gauge.

- As soon as the desired downstream pressure level has been reached, the downstream-pressure shut-off valve can be opened further. We recommend filling the low-pressure network slowly to ensure it is properly vented and to prevent water hammers.

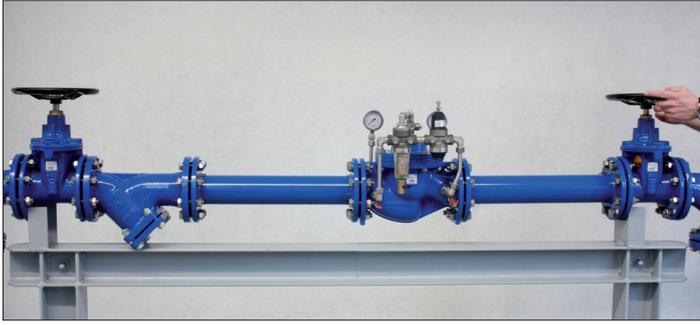


Figure 12: Complete opening of the upstream pressure valve and partial opening of the downstream-pressure valve

- Allow enough time for the system to stabilise. Afterwards the downstream-pressure shut-off valve can be opened completely.
- If required, the opening and closing speed can be adjusted to the operating conditions.
- The last step for putting the valve into service is the fine adjustment of the pilot valve, in this case the fine adjustment of the downstream pressure.



Figure 13: Adjustment of the desired downstream pressure

- Clockwise turn=Increasing the downstream pressure
- Counter-clockwise turn=Reducing the downstream pressure

To keep the downstream pressure at the level adjusted, fix the adjustment screw with the counter-nut (see Picture 14).

### 5.3.2 VAG PICO® H Pilot Operated Control Valve as pressure-sustaining valve / pressure-relief valve

- Close the shut-off valves upstream and downstream of the pressure-sustaining valve.
- Pre-tension the external spring of the pilot valve by turning the nut clockwise (see Figure 15). For this purpose, a 13 mm open-ended spanner is needed.
- Put all ball valves at the control circuit in open position. The ball valves are open when the manual lever runs in parallel to the piping of the control circuit (see Figure 16). Make sure that

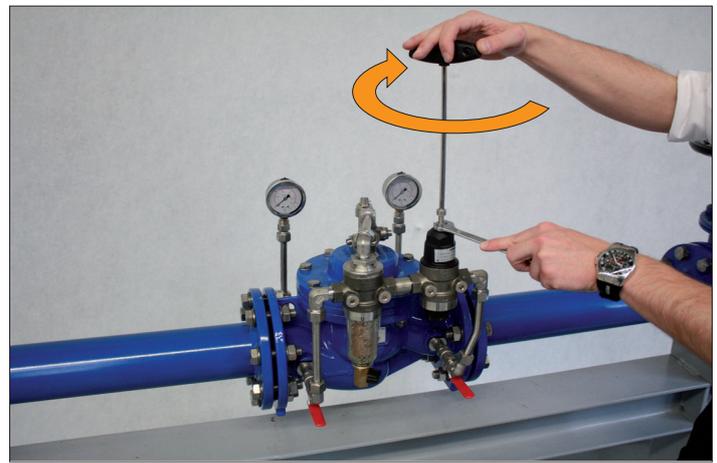


Figure 14: Fixing the adjustment screw

the ball valve at the filter and the venting valve are completely closed (exception: for varieties with automatic venting the venting valve does not need to be checked).

- The opening and closing speed is adjusted via throttle valves in the control circuit (see Figure 17). This allows both speeds to be adjusted separately. The adjustment screw for the opening speed is marked OS (opening speed) and the adjustment screw for the closing speed is marked CS (closing speed). The speeds are adjusted using a slot-head screwdriver. Before the response speeds can be adjusted, the adjustment screws first



Figure 15: Pre-tensioning the spring

have to be completely closed (turn in “-“ direction) to set the initial position to zero turns. Afterwards the speeds can be adjusted. VAG recommends the following standard adjustments:

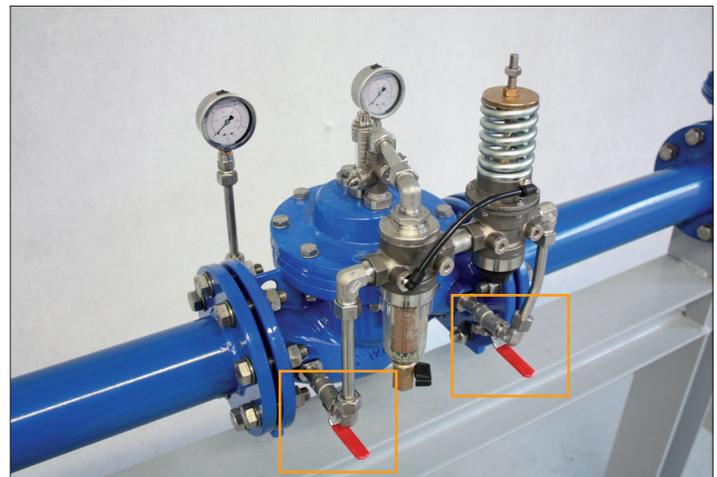


Figure 16: Open ball valves with hand levers running in parallel to the piping

- Pressure-sustaining valve
  - Opening speed: 3 turns in “+” direction
  - Closing speed: 3 turns in “+” direction
- Pressure-relief valve
  - Opening speed: 4 turns in “+” direction
  - Closing speed: 1 turns in “+” direction

If required, the response speed may be increased or reduced. To increase the response speeds turn the adjustment screw in “+” direction and to reduce the response speeds turn the adjustment screw in “-“ direction. Each adjustment screw can be moved 4 full turns (= 4 x 360°).

5. The pressure-sustaining valve is filled by slow and careful opening of the upstream pressure valve (e.g. a gate valve, see Figure 18) with 1 – 3 turns.
6. On the upstream and downstream pressure sides of the pressure-sustaining valve two pressure gauges are installed. They record the upstream and downstream pressure on the valve.
7. The filter integrated in the control circuit must be purged. For purging, open the stop cock at the filter and leave it open until all dirt particles and any trapped air have been removed (see Figure 19). After purging do not forget to close stop cock

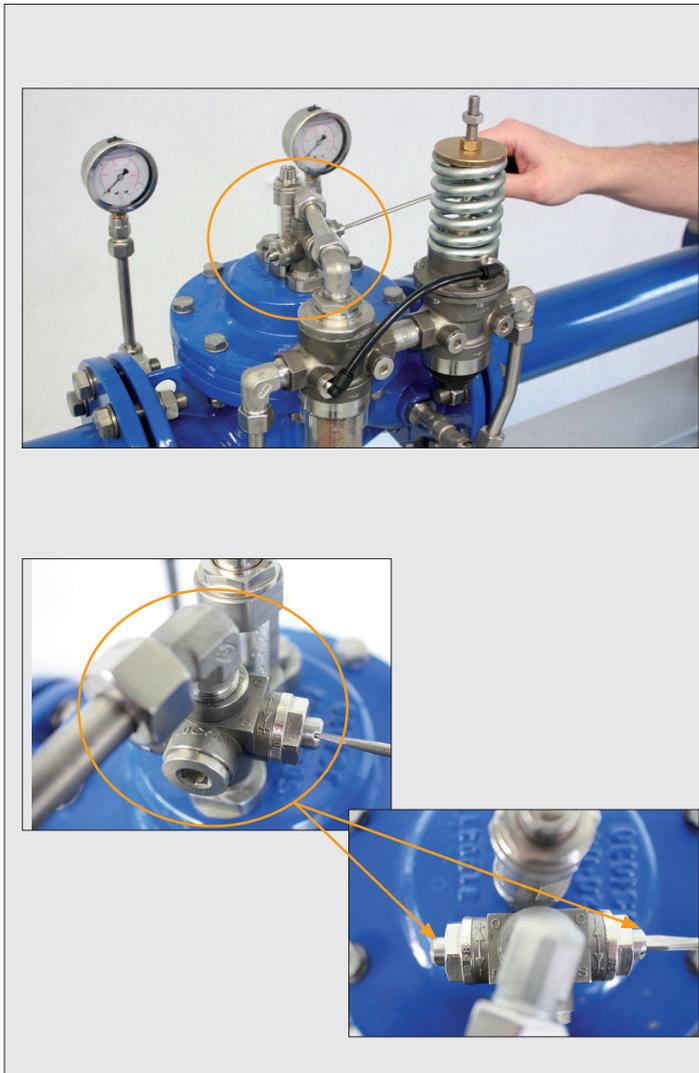


Figure 17: Adjustment of the opening and closing speed

again.

8. When you fill the valve, air may be trapped in the upper diaphragm chamber. To ensure proper function of the valve, the

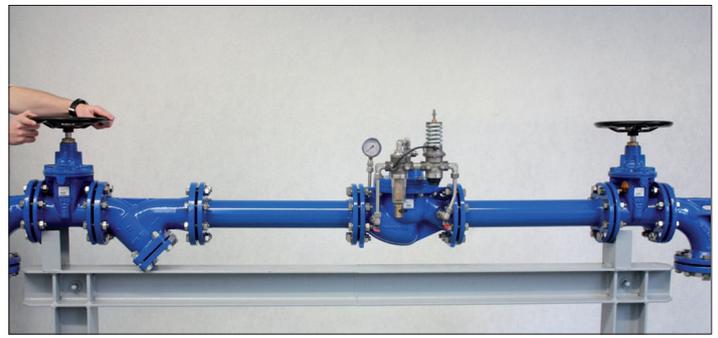


Figure 18: Partial opening of the upstream pressure valve

venting valve must be slightly opened and remain open until a steady jet of water emerges (This step is not necessary with varieties with automatic venting) (see Figure 20).

9. Completely open the upstream pressure shut-off valve. Then completely open the downstream-pressure shut-off valve (see Figure 21). We recommend the slow filling of the low-pressure network to ensure venting of the network and to prevent water hammer. The pressure-sustaining valve should now be closed.

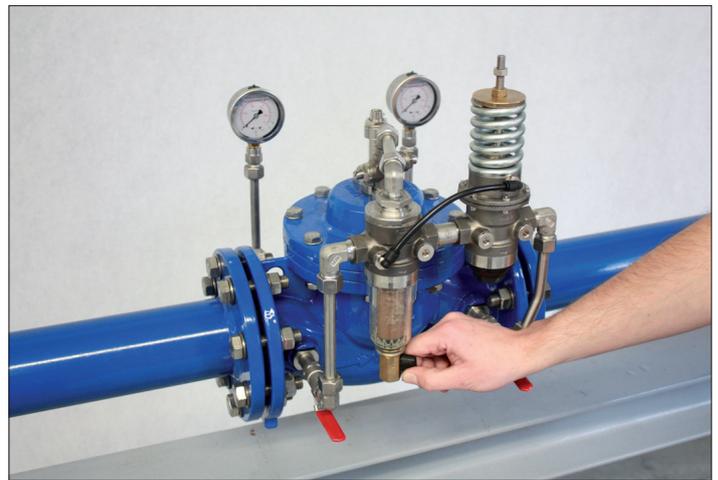


Figure 19: Opening the stop cock

If it is not closed, the spring must be pre-tensioned further.

10. Now the upstream pressure can be adjusted. For adjustment turn the adjustment screw of the pilot valve slowly clockwise until the required pressure level is reached (see Figure 22). To see whether the pressure is correct, check it on the upstream

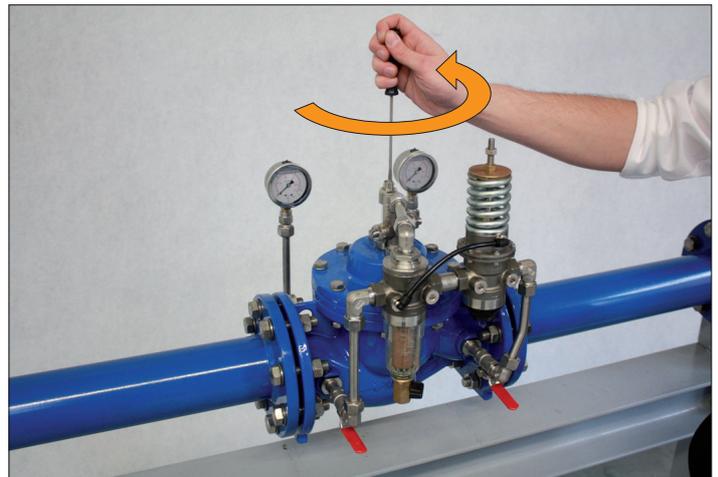


Figure 20: Opening the venting valve

pressure gauge. It may be necessary to ensure a sufficient pressure drop on the downstream pressure side (e.g. by opening a hydrant) to enable the upstream pressure to drop until the desired level is reached.

11. Allow enough time for the system to stabilise.

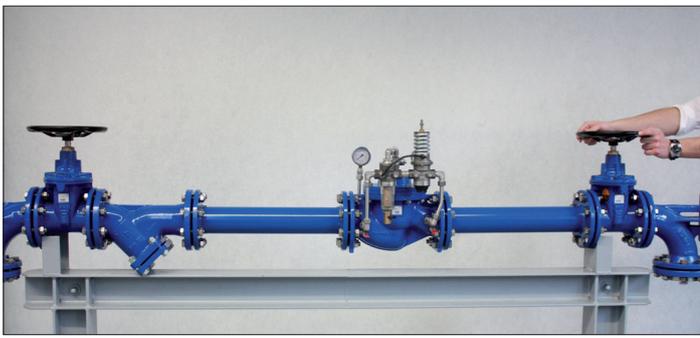


Figure 21: Complete opening of the upstream pressure valve and complete opening of the downstream-pressure valve

12. If required, the opening and closing speed can be adjusted to the operating conditions.

13. If required, the opening and closing speed can be adjusted to the operating conditions.

- Clockwise turn = Increasing the upstream pressure
- Counter-clockwise turn = Reducing the upstream pressure



Figure 22: Adjustment of the desired upstream pressure

To keep the downstream pressure at the level adjusted, fix the adjustment screw with the counter-nut (see Picture 23).

### 5.3.3 VAG PICO® H Pilot Operated Control Valve as float valve

1. Close the shut-off valves upstream and downstream of the float valve.
2. It must be ensured that **the ball valve on the upstream pressure side in the control circuit is open and the ball valve in the connection line to the float is closed.** The ball valves are open when the manual levers run in parallel to the piping of the control circuit. The ball valve on the float side should be closed

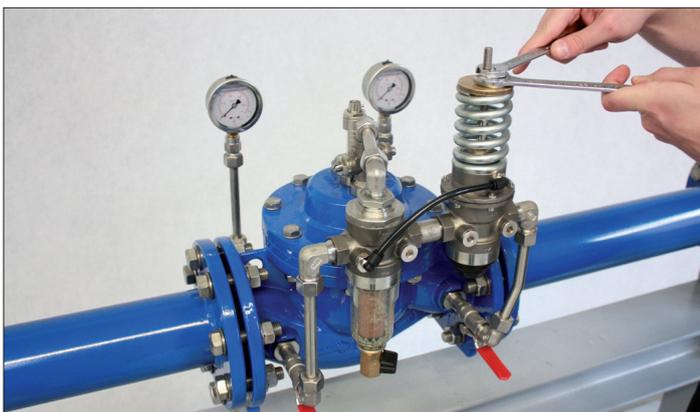


Figure 23: Fixing the adjustment screw

by a clockwise quarter turn.

3. The float valve is filled by slow and careful opening of the upstream pressure valve (e.g. a gate valve, see Figure 25) with 1 – 3 turns.
4. The opening and closing speed is adjusted via throttle valves in the control circuit (see Figure 26). This allows both speeds to be adjusted separately. The adjustment screw for the opening speed is marked OS (opening speed) and the adjustment screw for the closing speed is marked CS (closing speed).

The speeds are adjusted using a slot-head screwdriver. Before the respon-

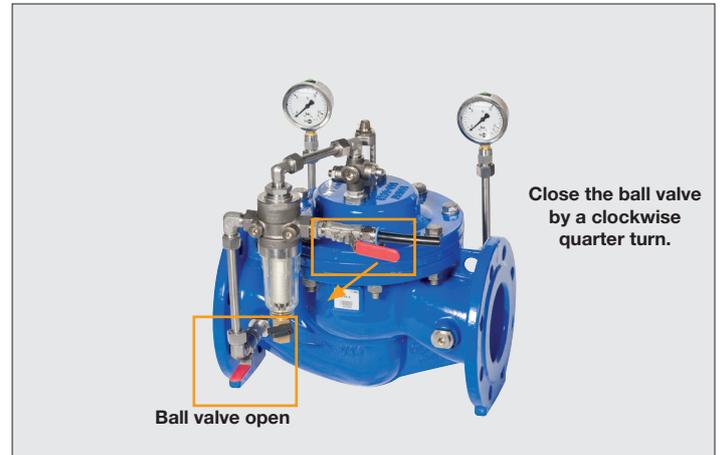


Figure 24: Open and closed ball valve

se speeds can be adjusted, the adjustment screws first have to be completely closed (turn in “-“ direction) to set the initial

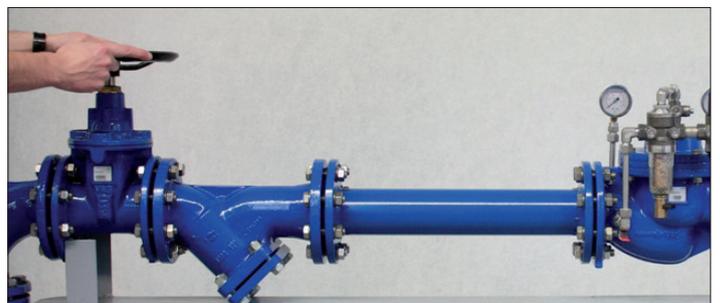


Figure 25: Partial opening of the upstream pressure valve

position to zero turns. Afterwards the speeds can be adjusted. VAG recommends the following standard adjustments:

- Opening speed: 1 turn in “+“ direction
- Closing speed: 1 turn in “+“ direction

If required, the response speed may be increased or reduced. To increase the response speeds turn the adjustment screw in “+“ direction and to reduce the response speeds turn the adjustment screw in “-“ direction. Each adjustment screw can be moved 4 full turns (= 4 x 360°).

5. On the upstream and downstream pressure side of the float valve two pressure gauges are installed. They record the upstream and downstream pressure on the valve.
6. The filter integrated in the control circuit must be purged. For purging, open the stop cock at the filter and leave it open until all dirt particles and any trapped air have been removed (see Figure 27). After purging do not forget to close stop cock again.
7. When you fill the valve, air may be trapped in the upper dia-



Figure 26: Adjustment of the opening and closing speed

phragm chamber. To ensure proper function of the valve, the venting valve must be slightly opened and remain open until a steady jet of water emerges (This step is not necessary with varieties with automatic venting).

8. Now open the upstream pressure shut-off valve completely. To do so, slowly open the ball valve installed in the connection line to the float until the line is completely filled. Then slowly open the downstream-pressure shut-off valve (see Figure 29).
9. If no fluid is removed from the tank the valve closes when the



Figure 27: Opening the stop cock

level has reached the assembly height of the float.

**Note:** The float is mounted to the tank wall with 4 dowels. The spaces are pre-defined by a plate with holes on the float.

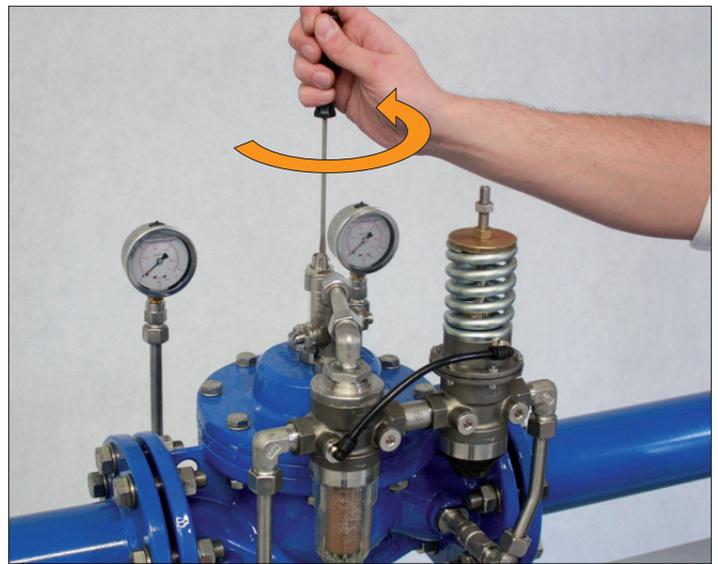


Figure 28: Opening the venting valve

### 5.3.4 VAG PICO® H Pilot Operated Control Valve as level-control valve

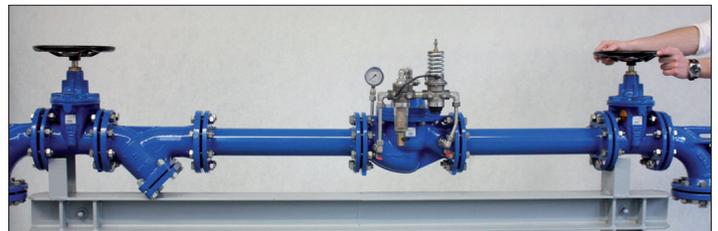


Figure 29: Complete opening of the upstream- and downstream pressure shut-off valve

**Note!**



Before operating the valve, it is necessary to install a control line connecting the pilot valve to the bottom of the tank. The control pipe must be provided and installed on site. It is mounted (G1 / 8 "8 mm tube L-Fitting) via the existing on the pilot valve fittings and is therefore an outer diameter of 8 mm own. Use INOX pipe or a pressure resistant PA pipe with appropriate hygienic approval.

1. Close the shut-off valves upstream and downstream of the level control valve.



2. Completely release the spring inside the pilot valve by unfastening the counter-nut and by turning the adjustment screw counter-clockwise (see Picture 30). For this purpose a 13 mm open-ended

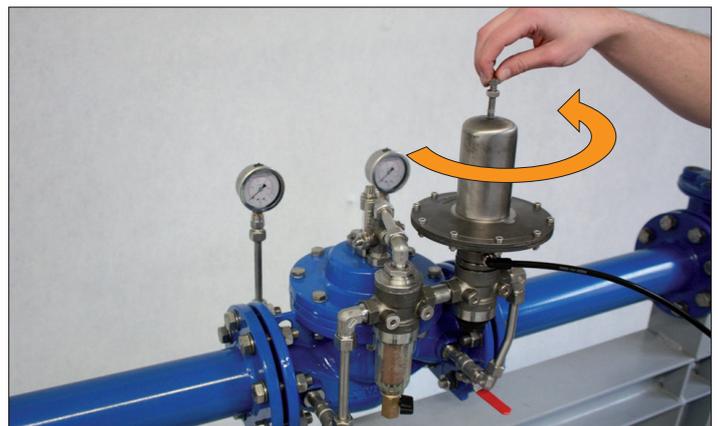


Figure 30: Releasing the spring

spanner and 6 mm fixed spanner are needed.

- Put all ball valves at the control circuit into open position. The ball valves are open when the manual levers run in parallel to the piping of the control circuit (see Figure 31). Make sure that the ball valve at the filter and the venting valve are completely closed (exception: for varieties with automatic venting the ven-

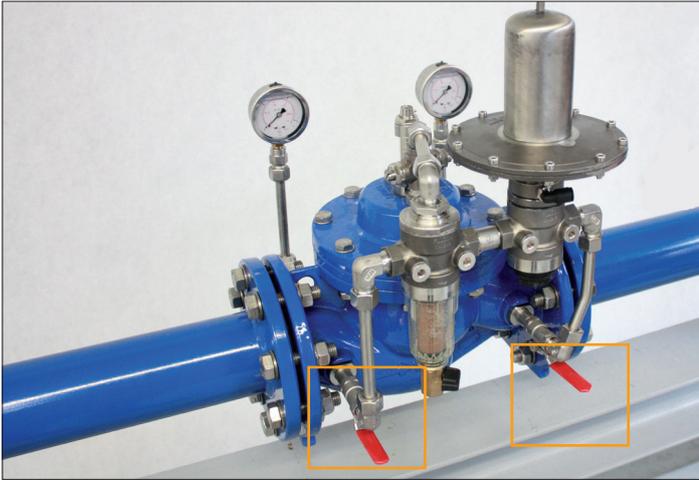


Figure 31: Open ball valves with manual levers running in parallel to the piping of the control circuit

ting valve does not need to be checked).

- The opening and closing speed is adjusted via throttle valves in the control circuit (see Figure 32). This allows both speeds to be adjusted separately. The adjustment screw for the opening speed is marked OS (opening speed) and the adjustment screw for the closing speed is marked CS (closing speed). The speeds are adjusted using a slot-head screwdriver. Before the response speeds can be adjusted, the adjustment screws first have to be completely closed (turn in “-“ direction) to set the initial position to zero turns. Afterwards the speeds can be adjusted. VAG recommends the following standard adjustments:

- Opening speed: 2 turns in “+“ direction



Figure 32: Adjustment of the opening and closing speed

- Closing speed: 2 turns in “+“ direction

If required, the response speed may be increased or reduced. To increase the response speeds turn the adjustment screw in “+“ direction and to reduce the response speeds turn the adjustment screw in “-“ direction. Each adjustment screw can be moved 4 full turns (= 4 x 360°).

- The level control valve is filled by slow and careful opening of the upstream pressure valve (e.g. a gate valve, see Figure 33)

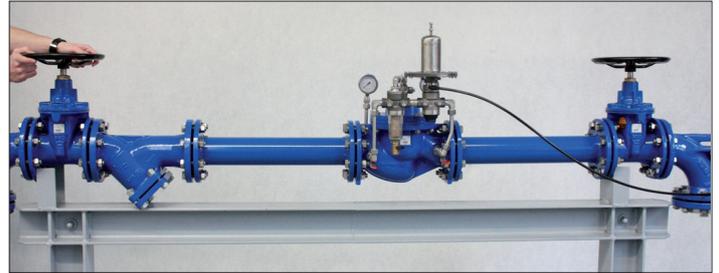


Figure 33: Partial opening of the upstream pressure valve

with 1 – 3 turns.

- On the upstream and downstream pressure sides of the level control valve two pressure gauges are installed. They record the upstream and downstream pressure on the valve.
- The filter integrated in the control circuit must be purged. For purging, open the stop cock at the filter and leave it open until all dirt particles and any trapped air have been removed (see Figure 34). After purging do not forget to close stop cock again.

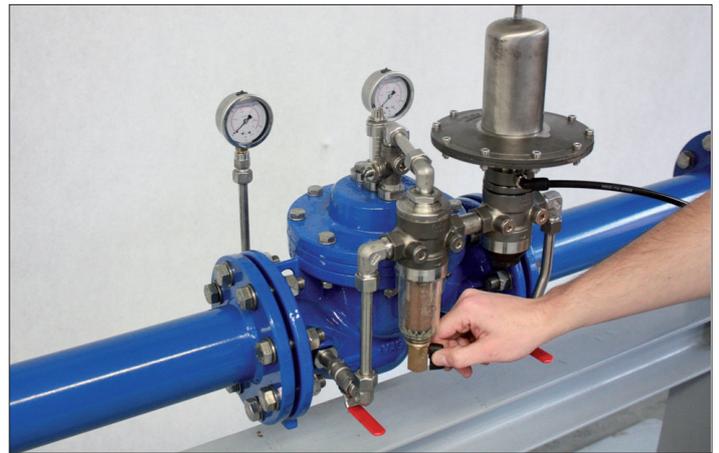


Figure 34: Opening the stop cock

- When you fill the valve, air may be trapped in the upper diaphragm chamber. To ensure proper function of the valve, the venting valve must be slightly opened and remain open until a steady jet of water emerges (This step is not necessary with varieties with automatic venting) (see Figure 35).

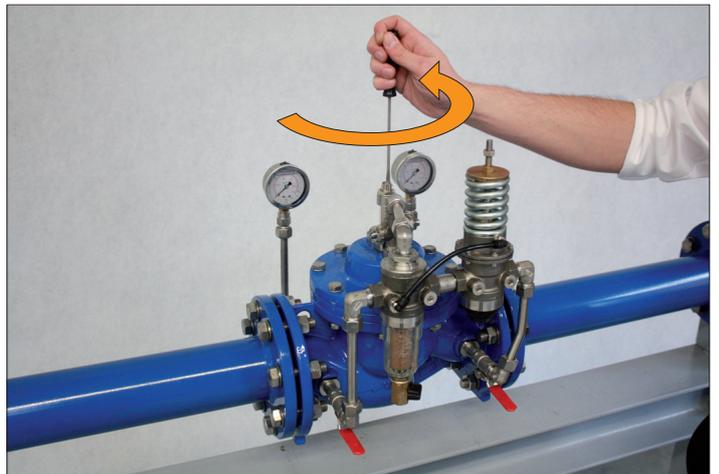


Figure 35: Opening the venting valve

- Open the upstream pressure shut-off valve completely. Then partly open the downstream-pressure shut-off valve (see Figure 36) with 2 – 4 turns.

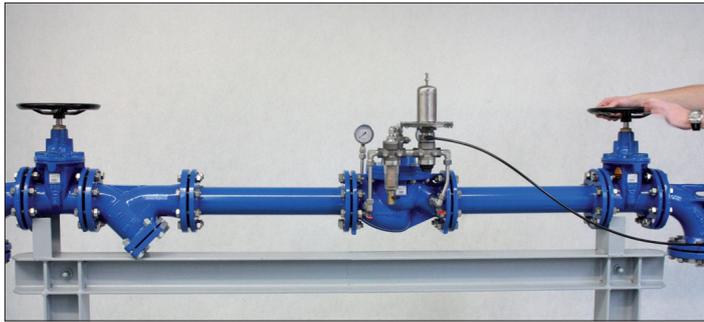


Figure 36: Complete opening of the upstream pressure shut-off valve and partial opening of the downstream-pressure shut-off valve

- Now the desired filling or tank level can be adjusted. To do so, turn the adjustment screw of the pilot valve clockwise until the required filling level is reached (see Figure 37).

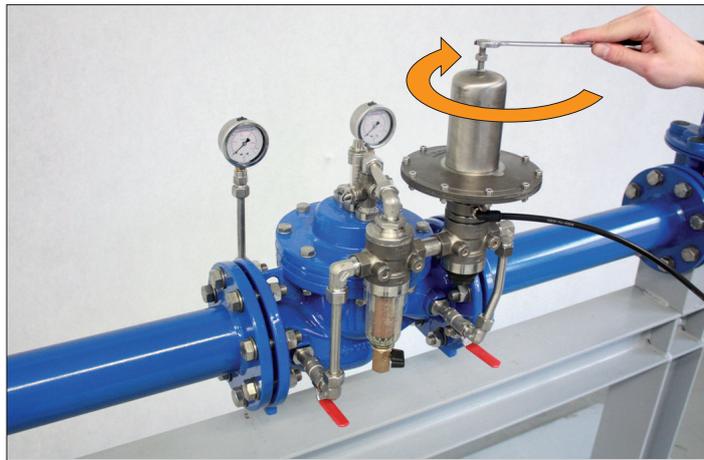


Figure 37: Adjusting the desired tank level

- Once the desired tank level has been reached, the downstream-pressure shut-off valve can be opened further. We recommend filling the tank slowly.
- Allow enough time for the system to stabilise. Afterwards the downstream-pressure shut-off valve can be opened completely.
- The last step for putting the valve into service is the fine adjustment of the pilot valve, in this case the fine adjustment of the level.
  - Clockwise turn = Increasing the level
  - Counter-clockwise turn = Reducing the level

To keep the adjusted level, fix the adjustment screw with the counter-nut.



Figure 38: Fixing the adjustment screw

## 6 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. Perform the steps described for initial set-up as described under 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.

Connections must never be disconnected unless they have been depressurised or de-energised.

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 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.

## 7 Inspection and operation intervals

The valve should be checked for tightness, proper operation and corrosion protection (DVGW Instruction Sheet W 392).

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

The body seals and the diaphragm can be replaced when and as required by the medium. However, we recommend the replacement of the diaphragm and of all rubber seals after five years at the latest.

### 7.1 Cleaning the filter

Use the inspection glass to check the condition of the filter and clean it, if dirty. To clean the filter, the purging cock at the filter can be opened shortly during operation. It can remain open until all dirt particles or trapped air have been removed.

**Caution:** If the purging cock is left open too long (> 10 seconds) this may affect the control behaviour of the valve.



If simple purging is not enough to clean the filter, the following steps must be observed when disassembling the filter.

- First close the downstream-pressure shut-off valve and then the upstream pressure shut-off valve.

2. Relieve the pressure in the valve by opening the purging cock at the filter.
3. Remove the inspection glass using the spanner supplied (see Figure 39).
4. Removing the internal parts of the filter (see Figure 40).



**Caution:** The cover on the filter must be handled with the greatest care and reassembled after cleaning. It is essential for the trouble-free control function of the valve.



Figure 39: Removing the inspection glass

5. The internal parts can now be disassembled for further cleaning or be replaced (see Figure 41).

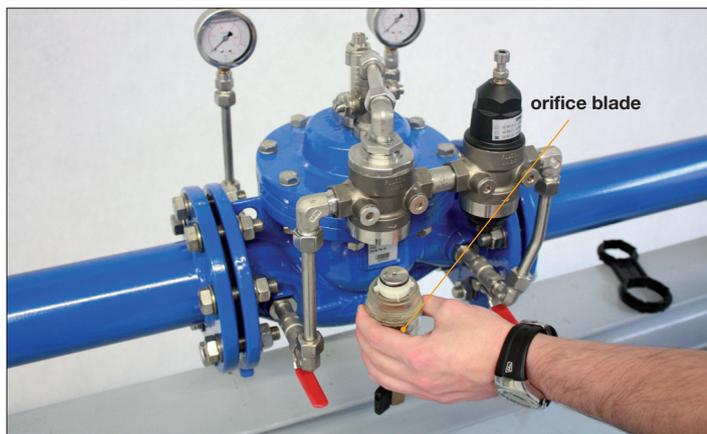


Figure 40: Removal of the filter internal parts

## 7.2 Inspection and cleaning of the pilot valve with the pressure-reducing pilot valve as an example

The pilot valve should be inspected and cleaned at least once per year. The pressure-reducing pilot valve is disassembled in the following steps:



Figure 41: Internal parts of the filter

1. Unfasten the counter-nut and turn the adjustment screw counter-clockwise to loosen it (see Figure 42). This procedure releases the spring inside the pilot valve.



Figure 42: Unfastening the adjustment screw

2. Remove the bonnet with the help of open-ended spanner size 36 (see Figure 43).



Figure 43: Removing the bonnet

3. Remove the spring with the spring plate (see Figure 44).



Figure 44: Removing the spring and the spring plate

4. Remove the internal parts of the body from above (see Figure 45).
5. Now the internal parts can be cleaned or replaced.

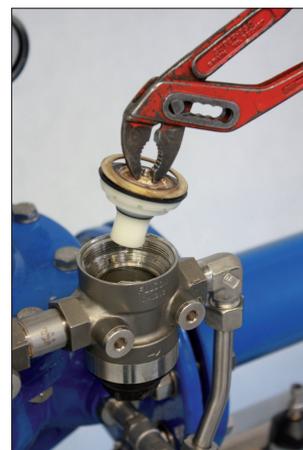


Figure 45: Removing the internal parts



5.1 When replacing the internal parts of the pilot valve, use an open-ended spanner size 30 to loosen the lower cap and to remove it (see Figure 46).

5.2 Remove the screen and take the cylinder seal out of the body from below (see Figure 47).

5.3 Install the new seal in the body from below. Then install the screen and reassemble the cap.



Figure 46: Loosening the lower cap



Figure 47: Removing the screen

**Note:** The screen only has a supporting function for the rubber seal. Missing screen holes do not constitute a defect.

6. Reinstall the internal parts into the body of the pilot valve in reverse order.
7. Reinstall the internal parts into the body of the pilot valve in reverse order.

### 7.3 Maintenance of the main valve

The following steps must be observed for the maintenance of the main valve:

1. Close the downstream-pressure shut-off valve.
2. Close the upstream pressure shut-off valve.
3. Open the purging cock at the filter to relieve the pressure in the valve.
4. Loosen the threaded retaining ring connections (see Figure 48, Item 1) between the filter and the opening/closing time adjustment with the help of a size 19 open-ended spanner and a size 17 open-ended spanner for steadying.
5. Loosen the cutting ring connection (see Figure 48, Items 2 and 3) to the left of the filter unit and to the right of the pilot valve

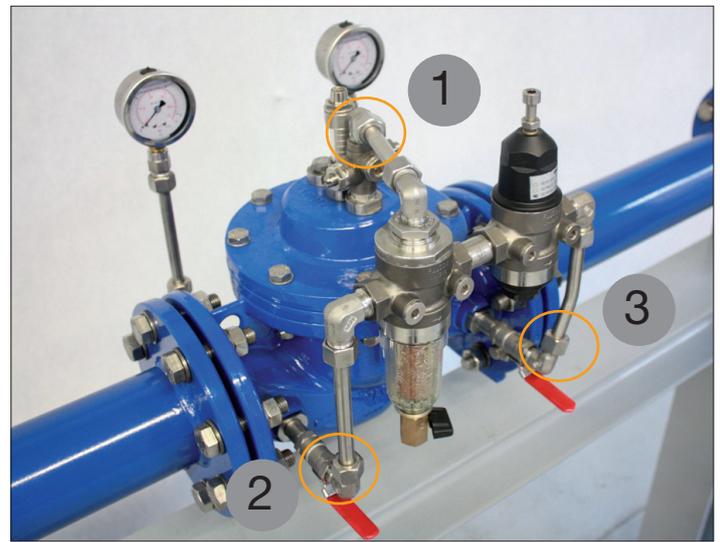
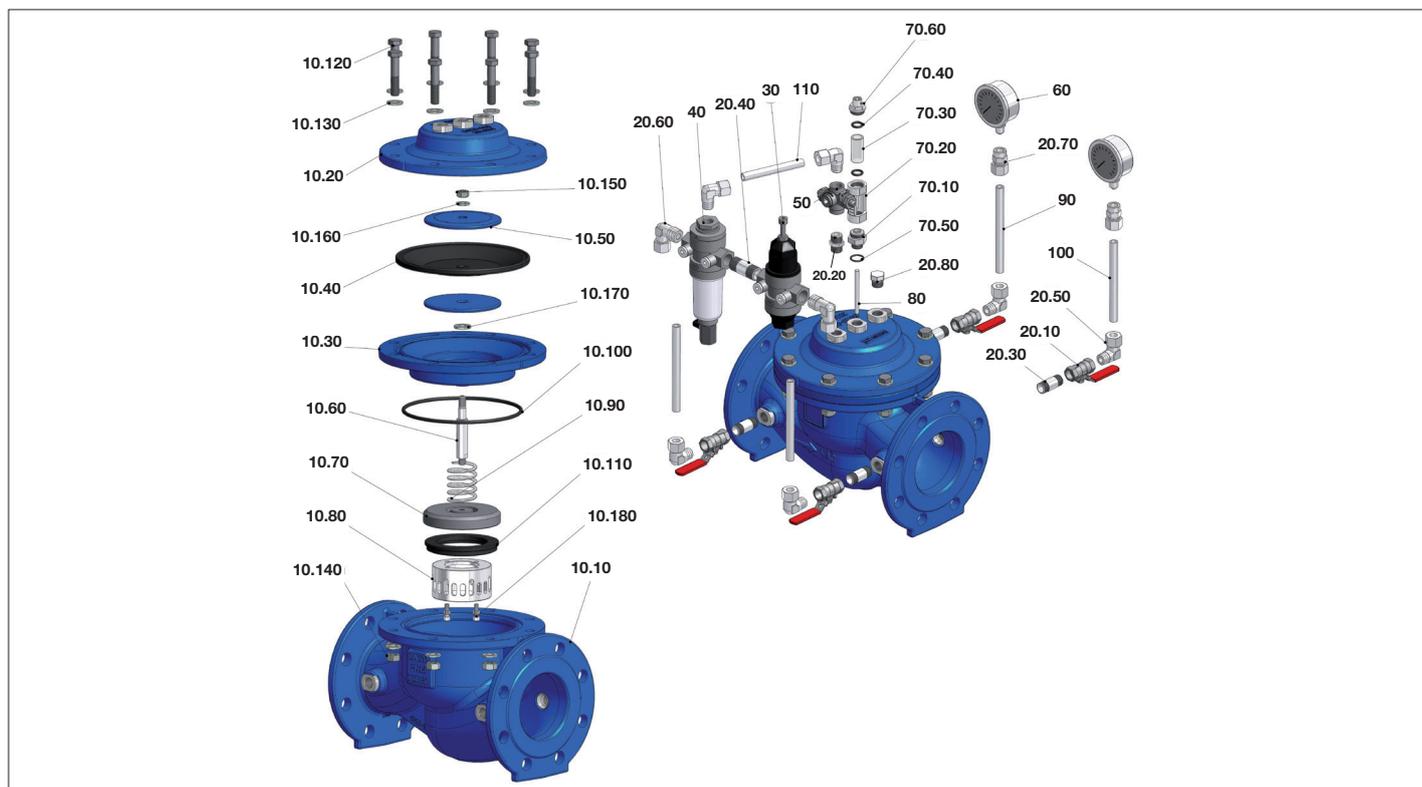


Figure 48: Screwed connections

with the help of a size 17 open-ended spanner.

6. Then lift off the control circuit.
7. Loosen the cover screws with the help of a size 17 open-ended spanner and remove the cover.
8. The internal parts can now be taken out in one piece.
  - 8.1 Replacement of the profiled sealing ring
    - 8.1.1 To replace the profiled sealing ring, loosen the screws of the valve cylinder using a size 5 or size 6 fixed spanner (depending on the nominal diameter).
    - 8.1.2 Remove the profiled seal from the retaining ring and install the new sealing ring.
    - 8.1.3 Put on the valve cylinder and fasten the screws from the inside.
  - 8.2 Replacement of the diaphragm
    - 8.2.1 Loosen the nut on the stem (if necessary, steady at the spindle wrench area).
    - 8.2.2 Remove the upper clamping disk.
    - 8.2.3 Remove the old diaphragm and replace it by a new one.
    - 8.2.4 Reassemble the parts in reverse order.
9. Replace the cover and fasten it with screws. While doing so, make sure it is aligned with the control circuit.
10. Fasten the cover screws crosswise (tightening torques according to Table 7.3.3).
11. Put on the control circuit and fasten the screwed connections.

12. Put the unit into operation as described in Section 5.



Item	Designation	Material	Spare part
10.10	Body	EN-JS1030 (GGG-40)	
10.20	Bonnet	EN-JS1030 (GGG-40)	
10.30	Diaphragm retaining disk	EN-JS1030 (GGG-40)	
10.40	Diaphragm	EPDM	X
10.50	Clamping disk	EN-JS1030 (GGG-40)	
10.60	Stem	1.4122	
10.70	Retaining ring	1.4301	
10.80	Cylinder	1.4301	
10.90	Spring	1.4310	
10.100	O-ring	EPDM	X
10.110	Profiled sealing ring	EPDM	X
10.120	Hexagon screw	A2-70	
10.130	Washer	A4	
10.140	Hexagon nut	A4-70	
10.150	Hexagon nut	A4-70	
10.160	Washer	A4	
10.170	Washer	A4	
10.180	Cheese head screw	A2-70	
20.10	Ball valve	1.4408	
20.20	Double nipple	1.4408	
20.30	Double nipple	1.4571	
20.40	Double nipple	1.4571	
20.50	Elbow-type screwed connection	1.4571	
20.60	Elbow-type screwed connection	1.4571	
20.70	Screwed connection of the pressure gauge	1.4571	
20.80	Threaded plug	1.4571	
30	Pilot valve		X see separate spare parts list (upon request)
40	Filter unit		X see separate spare parts list (upon request)
50	Speed adjustment		
60	Pressure gauge	1.4301	
70.10	Double nipple position indicator	1.4301	
70.20	Body of position indicator	1.4301	
70.30	Inspection glass of position indicator	Borosilicate glass	
70.40	O-ring	EPDM	
70.50	O-ring	EPDM	
70.60	Venting valve		
80	Venting valve indicator pin	1.4301	
90	Pipe	1.4571	
100	Pipe	1.4571	
110	Pipe	1.4571	

Table 1: Parts list

Designation	Item	Size	Tightening torque [Nm]	Spanner/ wrench size
Hexagon socket head screw	10.180	M6	5	5
		M8	10	6
Hexagon screw	10.120	M10	12	17
		M12	20	19
		M16	40	24
		M20	70	30

**Table 2: Tightening torques**

## 7.4 Maintenance work and replacement of parts

The spare parts and wearing parts can be found in the spare parts list provided in Section "7.4.1 Construction".

Problem	Possible causes	Remedial action	
The main valve does not close	A shut-off ball valve in the control circuit is closed	Open the ball valve in the pilot line upstream of the filter	
	The adjustment screws for the opening and closing speeds are closed	Set the adjustment screws to the recommended values	
	An object is jammed between the sealing seat and the obturator	Open the valve bonnet and remove the object	
	No pressure in the diaphragm chamber	Check the line pressure upstream of the valve	
		Check whether the filter is dirty	
		Check the adjustment of the opening and closing speed	
		Check the pilot line for pollution by unfastening some screwed connections	
	The valve guiding rod does not move although pressure is available	Check whether there are deposits in the valve and remove them, if necessary.	
Check whether the valve guiding rod is distorted and replace it, if necessary.			
The main valve does not open	The shut-off valves in the control circuit or the main line are closed	Open the shut-off valves	
	The adjustment screws for the opening and closing speeds are closed	Set the adjustment screws to the recommended values	
	The valve guiding rod does not move although pressure is available	Check whether there are deposits in the valve and remove them, if necessary	
		Check whether the valve guiding rod is distorted and replace it, if necessary	
	The screen on the filter is missing	Disassemble the filter unit and install the screen	

Problem	Possible causes	Remedial action
The main valve is leaky	Deposits/incrustations have built up on the valve seat	Remove the deposits
	The profiled sealing ring in the valve seat is leaky	Replace the profiled sealing ring
The pressure gauges do not indicate any pressure	The stop cocks are closed	Open the stop cocks
The main valve is slamming into the seat	The closing speed adjusted is too high	Set the adjustment screw for the closing speed to the recommended value
	The operating data has changed	Identify the new operating data and contact the VAG Service Department

## 7.4.1 Construction

## 7.4.2 Screw tightening torques

# 8 Trouble-shooting

For all repair and maintenance work, please observe the general safety instructions described in Section 6!

# 9 How to contact us

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