

Operating Instructions

**VARIVENT®**

**Mixproof Valve Type K**

Edition 09/09/2016 English

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**Product** Mixproof Valve Type K

**Document** Operating Instructions

Edition 09/09/2016

English

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Notes for the Reader

**Notes on the Illustrations**

**Notes for the Reader**

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The present Operating Instructions are part of the user information for the valve. The Operating Instructions contain all the information you need to transport, install, commis sion, operate and carry out maintenance for the valve.

**Binding Character of These Operating Instructions**

These Operating Instructions contain the manufacturer's instructions to the operator of the valve and to all persons who work on or use the valve regarding the procedures to follow.

Carefully read these Operating Instructions before starting any work on or using the valve. Your personal safety and the safety of the valve can only be ensured if you act as described in the Operating Instructions.

Store the Operating Instructions in such a way that they are accessible to the operator and the operating staff during the entire life cycle of the valve. When the location is changed or the valve is sold make sure you also provide the Operating Instructions.

**Notes on the Illustrations**

The illustrations in these Operating Instructions show the valve in a simplified form. The actual design of the valve can differ from the illustration. For detailed views and dimen sions of the valve please refer to the design documents.

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**Symbols and Highlighting**

**Symbols and Highlighting**

In these Operating Instructions, important information is highlighted by symbols or special formatting. The following examples illustrate the most important types of high lighting.

**DANGER**

**Warning: Fatal Injuries.**

Failure to observe the warning can result in serious damage to health, or even death. 🡺 The arrow identifies a precautionary measure you have to take to avoid the hazard.

**EXPLOSION HAZARD**

**Warning: Explosions.**

Failure to observe the warning can result in a severe explosion.

🡺 The arrow identifies a precautionary measure you have to take to avoid the hazard.

**WARNING**

**Warning: Serious Injuries.**

Failure to observe the warning can result in serious damage to health. 🡺 The arrow identifies a precautionary measure you have to take to avoid the hazard.

**CAUTION**

**Warning: Injuries.**

Failure to observe the warning can result in minor or moderate damage to health. 🡺 The arrow identifies a precautionary measure you have to take to avoid the hazard.

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Notes for the Reader

**Abbreviations and Terms**

**IMPORTANT NOTE**

**Warning: Damage to Property.**

Failure to observe the warning can result in serious damage to the valve or in the vicinity of the valve.

🡺 The arrow identifies a precautionary measure you have to take to avoid the hazard.

Carry out the following steps: = Start of a set of instructions.

**1.** First step in a sequence of operations.

**2.** Second step in a sequence of operations.

⮩ Result of the previous operation.

✔The operation is complete, the goal has been achieved.

***NOTE***

Further useful information.

**Abbreviations and Terms**

|  |  |
| --- | --- |
| Abbreviation | Explanation |
| BS | British Standard |
| bar | Unit of measurement of pressure [bar]  All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise. |
| approx. | approximately |
| °C | Unit of measurement of temperature [degree Celsius] |
| dm3n | Unit of measurement of volume [cubic decimetre]  Volume (litre) at standard temperature and pressure |
| DN | DIN nominal width |
| DIN | German standard issued by DIN (Deutsches Institut für Normung e.V, German Institute for Standardization) |
| EN | European Standard |
| EPDM | Material designation  Short designation according to DIN/ISO 1629:  Ethylene Propylene Diene Rubber |
| °F | Unit of measurement of temperature [degree Fahrenheit] |
| FKM | Material designation, short designation according to DIN/ISO 1629: Fluorine rubber |
| h | Unit of measurement of time [hour] |

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**Abbreviations and Terms**

|  |  |
| --- | --- |
| Abbreviation | Explanation |
| HNBR | Material designation  Short designation according to DIN/ISO 1629:  Hydrogenated Acrylonitrile Butadiene Rubber |
| IP | Protection class |
| ISO | International standard issued by the International Organization for Standardi zation |
| kg | Unit of measurement of weight [kilogram] |
| kN | Unit of measurement of force [kilonewton] |
| Kv value | Flow coefficient [m³/s]  1 KV = 0.86 x Cv |
| l | Unit of measurement of volume [litre] |
| max. | maximum |
| mm | Unit of measurement of length [millimetre] |
| μm | Unit of measurement of length [micrometre] |
| M | metric |
| Nm | Unit of measurement of work [newton metre]  UNIT OF TORQUE 1 Nm = 0.737 lbft  Pound-Force (lb) + Feet (ft) |
| PA | Polyamide |
| PE-LD | Low-density polyethylene |
| psi | British and American unit of measurement  [Pound force per square inch]  All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise. |
| SET-UP | Self-learning installation  During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages. |
| a/f | Indicates the size of spanners  width across flats |
| T.VIS | Tuchenhagen Valve Information System |
| V AC | Volt alternating current |
| V DC | Volt direct current |
| W | Unit of measurement of power [Watt] |
| TIG | Welding method  Tungsten inert gas welding |
| Inch | Unit of measurement of length  In the Anglo-American language area |
| Inch OD | Pipe dimension acc. to British standard  (BS), Outside Diameter |
| Inch IPS | US pipe dimension  Iron Pipe Size |

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Safety

**Operator's Duties**

**Safety**

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**Safety Note**

The valve is operationally reliable. It was built according to state-of-the-art standards.

Nevertheless, the valve can pose dangers, especially if

• the valve is not used in accordance with its intended use,

• the valve is not used correctly,

• the valve is operated under impermissible operating conditions.

**Operator's Duties**

In your capacity as operator of the facility you bear a particular responsibility for the proper and safe handling of the valve in your facility. Only use the valve when it is in perfect condition to prevent danger to persons and property.

These Operating Instructions contain the information you and your staff need for the safe and reliable operation during the entire service life of the valve. Be sure to read these Operating Instructions carefully and ensure that the measures described here are observed.

The operator's duty of care includes planning the necessary safety measures and moni toring that these measures are observed. The following principles apply:

• Only allow qualified staff to work on the valve.

• The operator must authorize the staff to carry out the relevant tasks.

• Working areas and the entire environment of the valve must be neat and clean.

• The staff must wear suitable work clothing and personal protective equipment. As the operator of the facility make sure that work clothing and personal protective

equipment are used.

• Instruct the staff with regard to any properties of the product which might pose a health risk and the preventative measures to be taken.

• Have a qualified first-aider on call during the operation, who can initiate the neces sary first-aid measures in case of an emergency.

• Clearly define processes, lines of authority and responsibilities associated with the valve. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.

• The signs relating to the valve must always be complete and legible. Check, clean and replace the signs as necessary at regular intervals.

***NOTE***

Carry out regular checks. This way you can ensure that these measures are actually observed.

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**Qualification of Staff**

**Qualification of Staff**

This section contains information about the qualifications that staff working on the valve must have.

Operating and maintenance staff must

• have the necessary qualification to carry out their tasks,

• be instructed with regard to possible dangers,

• know and observe the safety instructions given in the documentation.

Only allow qualified electricians to carry out work on the electrical equipment or have a qualified electrician supervise the work.

Only allow specially trained staff to carry out any work on explosion-protected equip ment. When working on explosion-protected equipment observe the standards DIN EN 60079-14 for gases and DIN EN 50281-1-2 for dusts.

The following minimum qualifications are required:

• Vocational training as a specialist who can work on the valve independently.

• Sufficient instruction to work on the valve under the supervision and direction of a qualified specialist.

Each member of staff must meet the following requirements to be allowed to work on the valve:

• Personal qualification for the relevant task.

• Sufficient professional qualification for the relevant task.

• Instructed with regard to the function of the valve.

• Instructed with regard to the operating sequences of the valve.

• Familiar with the safety devices and their function.

• Familiar with these Operating Instructions, especially with the safety instructions and the information which is relevant for the task on hand.

• Familiar with the basic regulations with regard to occupational health and safety and accident prevention.

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Safety

**Supplementary Regulations**

For work to be carried out on the valve the following user groups are distinguished:

**User groups**

|  |  |
| --- | --- |
| Staff | Qualifications |
| Operating staff | Adequate instruction and sound knowledge in the following areas: • Function of the valve  • Valve operating sequences  • What to do in case of an emergency  • Lines of authority and responsibilities with respect to the task |
| Maintenance staff | Adequate instruction as well as sound knowledge of the design and function of the valve.  Sound knowledge in the following areas:  • Mechanical equipment  • Electrical equipment  • Pneumatic system  Authorization with regard to safety engineering standards to carry out the following tasks:  • Setting devices into operation  • Earthing of devices  • Marking of devices  The relevant certificates of qualification must be submitted before work can be carried out on ATEX certified machines. |

**Supplementary Regulations**

In addition to the instructions in this documentation the following also has to be observed:

• pertinent accident prevention regulations,

• generally accepted safety rules,

• national regulations applicable in the country of use,

• work and safety instructions applicable in the facility,

• installation and operating regulations for use in potentially explosive areas.

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Safety **13** 

**Instructions for the Safe Operation**

**Instructions for the Safe Operation**

Dangerous situations during the operation can be avoided by safety-conscious and proactive behaviour of the staff.

**General Principles**

To ensure the safe operation of the valve the following principles apply:

• The Operating Instructions must be kept ready to hand at the valve's place of use. They must be complete and in clearly legible form.

• Only use the valve for its intended use.

• The valve must be functional and in good working order. Check the condition of the valve before starting work and at regular intervals.

• Wear tight-fitting work clothing for all work on the valve.

• Ensure that nobody can get hurt on the parts of the valve.

• Immediately report any faults or noticeable changes on the valve to the person responsible.

• Observe the accident prevention regulations and all local regulations.

**Installation**

For installation, the following principles apply:

• Only properly qualified staff is allowed to install, assemble and set the valve into operation.

• Ensure that adequate working and traffic areas are available at the place of installa tion.

• Observe the maximum load-bearing capacity of the installation surface. • Observe the transport instructions and markings on the part(s) to be transported.

• Remove any nails protruding from transport crates immediately after opening the crate.

• Under no circumstances should anyone stand under a suspended load. • During assembly, the valve safety devices might not be working effectively.

• Reliably secure machine parts which have already been connected against inadvert ently being switched on.

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Safety

**Instructions for the Safe Operation**

**Commissioning/Setup Mode**

For commissioning, the following principles apply:

• Take protective measures against dangerous contact voltages in accordance with pertinent regulations.

• The valve must be completely assembled and correctly adjusted. All screw connec tions must be securely tightened. All electrical cables must be installed correctly.

• Reliably secure machine parts which have already been connected against inadvert ently being switched on.

• Relubricate all lubricating points.

• Make sure lubricants are used properly.

• After conversion of the valve, residual risks must be reassessed.

**Setting into Operation**

For setting into operation, the following principles apply:

• Only allow properly qualified staff to set the valve into operation. • Establish all connections correctly.

• The safety devices for the valve must be complete, fully functional and in perfect condition. Check the function before starting any work.

• When the valve is switched on, the danger zones must be free.

• Remove any liquids that have escaped without leaving residues.

**Operation**

For operation, the following principles apply:

• Monitor the valve during the operation.

• Safety devices must not be changed, removed or taken out of service. Check all safety devices at regular intervals.

• All guards and hoods must be fitted as intended.

• The place of installation of the valve must be adequately ventilated at all times.

• Structural alterations of the valve are not permitted. Immediately report any changes on the valve to the person responsible.

• Always keep danger zones clear. Do not leave any objects in the danger zone. Only allow persons to enter the danger zone when the machine is de-energized.

• Regularly check that all emergency stop devices are working correctly.

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**Instructions for the Safe Operation**

**Shutting Down**

For shutting down, the following principles apply:

• Switch off the compressed air.

• Switch off the valve via the main switch.

• Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.

• For longer periods of standstill, observe the storage conditions, see Storage (Page 22).

**Maintenance and Repair**

Before starting any maintenance and repair work on the electrical devices of the valve, carry out the following steps in accordance with the "5 safety rules":

• Isolate from the power supply

• Take appropriate measures to prevent switch on

• Test absence of voltage

• Earthing and short-circuiting

• Cover or safeguard any adjacent live parts.

For maintenance and repair, the following principles apply:

• Observe the intervals specified in the maintenance schedule.

• Only allow qualified staff to carry out maintenance or repair work on the valve.

• Before starting any maintenance or repair work, the valve must be switched off and secured against being switched back on. Work may only be started once any residual energy has been discharged.

• Block access for unauthorized persons. Put up notice signs which draw attention to the maintenance or repair work going on.

• Do not climb on the valve. Use suitable access aids and working platforms. • Wear suitable protective clothing.

• Only use suitable and undamaged tools to carry out maintenance work.

• When replacing parts only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose.

• Before setting the unit back into operation refit all safety devices as originally provided in the factory. Then check that all safety devices are working correctly.

• Make sure lubricants are used properly.

• Check pipes are firmly secured, also check for leaks and damage.

• Check that all emergency stop devices are working correctly.

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Safety

**Instructions for the Safe Operation**

**Disassembly**

For disassembly, the following principles apply:

• Only allow qualified staff to disassemble the valve.

• Before starting disassembly, the valve must be switched off and secured against being switched back on. Work may only be started once any residual energy has been discharged.

• Disconnect all power and utility lines.

• Markings, e.g. on lines, must not be removed.

• Do not climb on the valve. Use suitable access aids and working platforms.

• Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.

• Protect open line ends with blind plugs against ingress of dirt.

• Pack sensitive parts separately.

• For longer periods of standstill, observe the storage conditions, see “Storage“ (Page 22).

**Environmental Protection**

Harm to the environment can be avoided by safety-conscious and proactive behaviour of the staff.

For environmental protection the following principles apply:

• Substances harmful to the environment must not be discharged into the ground or the sewage system.

• Always observe the pertinent regulations relating to waste avoidance, disposal and utilization.

• Substances harmful to the environment must be collected and stored in suitable containers. Clearly mark the containers.

• Dispose of lubricants as hazardous waste.

**Electrical Equipment**

For all work on electrical equipment, the following principles apply:

• Access to electrical equipment should only be allowed to qualified electricians. Always keep unattended switch cabinets locked.

• Modifications of the control system can affect the safe and reliable operation. Modifi cations are only permitted with the express permission of the manufacturer.

• After completion of all work, check that the protective devices are fully functional.

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**Signage**

**Signage**

Dangerous points on the valve are indicated by warning signs, prohibition signs and mandatory signs.

The signs and notes on the valve must always be legible. Any illegible signs must be replaced immediately.

**Signs on the valve**

|  |  |
| --- | --- |
| Sign | Meaning |
|  | General hazard warning |
|  | Warning Crushing |
|  | Explosive atmosphere hazard warning |

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Safety

**Residual Risk**

**Residual Risk Hazard Areas**

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Please observe the following notes:

• In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.

• Never reach into the lantern (9) or the valve housing (401) when the valve is switching. Fingers can be crushed or cut off.

• On a spring-closing valve there is danger of injury when the clamp connections (43, 46) are opened, as the released spring pretension will suddenly lift the actuator. Therefore, release the spring tension before detaching the clamp connections (43, 46) by supplying the actuator (A) with compressed air.

• Before starting any service, maintenance or repair work, disconnect the valve from the power supply and secure it against inadvertently being switched back on again.

• Only allow a qualified electrician to carry out any work on the electrical power supply.

• Check the electrical equipment of the valve at regular intervals. Immediately remedy loose connections and molten cables.

• If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.

• The housing sockets have very sharp edges. When transporting and assembling the valve be sure to wear suitable protective gloves.

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Safety **19** 

**Residual Risk**

**Residual Dangers**

Dangerous situations can be avoided by safety-conscious and proactive behaviour of the staff and by wearing personal protective equipment.

**Residual dangers on the valve and measures**

|  |  |  |
| --- | --- | --- |
| Danger | Cause | Measure |
| Danger to life | Inadvertent switch-on of the valve | Effectively disconnect all components, effec tively prevent switch-on. |
| Electric power | Observe the following safety rules:  1 Isolate from the power supply.  2 Take appropriate measures to prevent switch on.  3 Test absence of voltage.  4 Earthing and short-circuiting.  5 Cover or safeguard any adjacent live parts. |
| Spring tension in the actu ator | Danger to life caused by compression spring in the actuator. Do not open the actuator but return it to GEA Tuchenhagen for proper disposal. |
| Danger of injury | Danger presented by  moving or sharp-edged parts | The operator must exercise caution and prudence.  For all work:  • Wear suitable work clothing.  • Never operate the machine if the cover panels are not correctly fitted.  • Never open the cover panels during the oper ation.  • Never reach into openings.  As a precautionary measure, wear personal protective equipment in the vicinity of the valve: • Protective gloves  • Safety shoes |
| Environmental damage | Operating materials with properties which are  harmful to the environment | For all work:  • Collect lubricants in suitable containers. • Dispose of lubricants in accordance with the pertinent regulations. |

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Safety

**Declaration of Conformity**

**Declaration of Conformity**

|  |
| --- |
| **Declaration of Conformity**    in accordance with the EC Machinery Directive 2006/42/EC  We hereby declare that the machine designated below, based on its design and type as well as in the version brought to market by us, complies with the basic safety and health protection requirements of the EC Machinery Directive.  This declaration will become invalid if any alterations are made to the machine which have not been agreed with us.  Designation of the machine: Valve with actuator  Machine type: VARIVENT®  Relevant EC directives: 2006/42/EC  Applicable harmonized standards: DIN EN ISO 12100  Authorised representative for compilation Authorised representative – of the technical documentation CE documentation  GEA Tuchenhagen GmbH  Am Industriepark 2-10  21514 Büchen  Büchen, 16/02/2015  Franz Bürmann i.V. Matthias Südel  Managing Director Team Leader Product Development |

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Transport and Storage **21** 

**Transport**

**Transport and Storage**

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**Scope of Supply**

On receipt of the valve check whether

• the details on the type plate correspond to the data in the order and delivery docu ments,

• the equipment is complete and all components are in good order.

**Transport**

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For transport, the following principles apply:

• When transporting the valve be sure to unscrew the control top and the switch bar from the actuator (2) and use the screwed-in eye bolt (1), material no. 221-104.98,

to lift the valve.

• Only use suitable lifting gear and slings for transporting the package units/valves.

• Observe the pictograms on the package.

• Handle valves with care to avoid damage caused by impact or careless onloading and unloading. The outside synthetic materials are susceptible to breaking.

• Only allow qualified staff to transport the valve.

• Movable parts must be properly secured.

• Only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose. Observe the maximum load-bearing capaci

ties.

• Secure the valve against slipping. Take the weight of the valve into account and the position of the point of gravity.

• Under no circumstances should anyone stand under a suspended load.

• Take care when transporting the valve. Do not grip sensitive parts of the unit to lift or push the unit or to support yourself. Avoid putting the unit down with a jerk.

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Transport and Storage 

**Storage**

**Storage**

The valves, valve inserts or spare parts should be stored in a dry place, free of vibra tions and dust. To avoid damage, leave the components in their original packaging if possible.

If, during transport or storage, the valve is going to be exposed to temperatures ≤ 0°C, it must be dried and suitable measures must be taken to protect it from damage.

***NOTE***

We recommend that the valve should be stored at a temperature of ≥ 5 °C for a period of 24 hours prior to any handling (disassembling the housings / activation of actuators) so that any ice crystals formed by condensation water can melt.



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Intended Purpose **23** 

**Pressure Equipment Directive**

**Intended Purpose**

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**Designated Use**

The Mixproof valve type K is used for the mixproof shut-off of cleaning media at inter section points in pipe systems. Cleaning the leakage cavity is not possible. It can be

used as a cleaning and gas valve in CIP systems and gas fittings.

The medium should preferably flow in the opening direction of the valve disk to avoid pipe hammers when the valve is opened or closed.

If the valve operates in the opposite way (valve disk closes with the flow), a damping

cylinder can be used to protect the valve against pipe hammers.

Do not install the valve with actuator spring-to-open action because the valve will then open in case of power or air failure and cause product intermixing.

In a closed pipe system, hydraulic pressure build-up may occur when the valve switches and result in seal damage.

***NOTE***

The manufacturer will not accept any liability for damage resulting from any use of the valve which is not in accordance with the designated use of the valve. The risk of such misuse lies entirely with the operator of the facility.



**Requirements for the Operation**

The prerequisite for the reliable and safe operation of the valve is proper transportation and storage as well as professional installation and assembly. Operating the valve within the limits of its designated use also involves adhering to the operating, inspection and maintenance instructions.

**Pressure Equipment Directive**

The Mixproof valve type K is a piece of pressure equipment (without safety function) in the sense of the pressure equipment directive: Directive 97/23/EC. It is classified

according to Annex II, article 3, section 3. In the event of any deviations, GEA Tuchen hagen GmbH will supply a special Declaration of Conformity.

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Intended Purpose **Conversion Work**

**ATEX Directive**

If valves type K are used in areas with a potentially explosive atmosphere, you must absolutely comply with directive 94/9/EC with respect to all ignition hazards. The supple mentary "EX" operating instructions for VARIVENT valves must be observed.

For details regarding the marking of valves for potentially explosive areas refer to the additional "Ex" operating instructions for VARIVENT valves.

**Improper Operating Conditions**

The operational reliability of the valve cannot be ensured under improper operating conditions. Therefore avoid improper operating conditions.

Operating the valve is not permitted if

• Persons or objects are in the danger zone.

• Safety devices are not working or were removed.

• Malfunctions have been detected on the valve.

• Damage has been detected on the valve.

• Maintenance intervals have been exceeded.

**Conversion Work**

You should never make any technical modifications to the valve. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Direc tive on your own.

In general, only original spare parts supplied by GEA Tuchenhagen GmbH should be fitted. This ensures the reliable and economical operation of the valve.

Operating Instructions · VARIVENT® Mixproof Valve Type K Edition 09/09/2016

Design and Function **25** 

**Design**

**Design and Function**

**Design**

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| No. | Designation | No. | Designation |
| A | Actuator | 15 | Valve disk |
| B | Control top | 16 | Double-disk |
| 1 | Sealing ring | 18 | Pressure spring |
| 2 | Bearing | 22 | Air connection |
| 3 | Sealing disk | 24 | Electrical connection |
| 4 | Bearing disk | 37 | Leakage pipe |
| 9 | Lantern | 401 | Valve housing |
| 13 | Spring plate |  |  |

**26**

Design and Function 

**Function**

**Function**

**Closing Direction**

The actuator is of the spring-closing type (Z).

**Distinguishing Feature of Spring-To-Close Actuator (Z)**

The valve is closed in the non-actuated position.

Identification:

– Green steady light (1): valve in non-actuated position

– Yellow steady light (1): valve in end position (actuated position)

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Installation and Commissioning **27** 

**Valve with Detachable Pipe Connection Elements**

**Installation and Commissioning**

****

**Notes on Installation**

The valve can be installed in any position. Care must be taken to ensure that the valve housing and the pipe system can drain properly. If the valve is installed in horizontal

position, pay attention that the vent hole in the actuator is aligned horizontally on one side.

To prevent damage, make sure that

• the valve is installed in the pipe system free of tension and

• no foreign materials (e.g. tools, bolts, lubricants) are left in the system.

**Control Top**

If external valves are connected in a control top with several solenoid valves, make sure that the control air pressure in the main actuator does not fall below the operating pres sure.

**Valve with Detachable Pipe Connection Elements**

This section describes the procedure to fit the valve.

**CAUTION**

**Liquids in pipes**

Danger of injury due to liquid spraying out

🡺 Therefore, before releasing any pipe connections or clamp connections: drain the pipe and, if necessary, clean or rinse it.

🡺 Separate the pipe section in which the valve is to be fitted from the rest of the piping system to prevent product entering again.



Carry out the following steps:

🡺 Fit valves with detachable pipe connection elements – using suitable connection

fittings – directly into the pipe system.

✔Done

**28** 

Installation and Commissioning

**Valve with Welding Ends**

**Valve with Welding Ends**

This section describes the welding procedure for the valve.

**WARNING**

**Spring tension in the valve**

Danger of injury when opening the clamp connections on the actuator or on the housing as the released spring pretension will suddenly lift the actuator.

🡺 Therefore, release the spring tension before detaching the clamp connections by pressurizing the actuator with compressed air at max. 8 bar.



**IMPORTANT NOTE**

**Seals are wearing parts**

Old seals will cause malfunction of the valve

🡺 When fitting the valve be sure to fit new housing O-rings.



Carry out the following steps:

**1.** Release the spring tension.

**2.** Remove the valve insert, see chapter “Disassembling the Valve“ (Page 36).

**3.** Weld the housing, without sealing rings, into position, ensuring that the connection is free of stress.

**4.** Fit the housing into place and tack it.

**5.** Always close the housing before welding.

**6.** Flush the housing with forming gas from the inside to push the oxygen out of the

system.

**7.** Weld the housing into the pipe system; use welding filler if necessary. Use the TIG welding with pulse method.

**8.** Passivate the seam after welding.

**9.** Fit the seals.

**10.**Assemble the valve and depressurize the actuator.

⮩ The valve disk is lowered.

✔Done

***NOTE***

Welding method

We recommend using the automatic orbital welding method.

Housing O-rings

When assembling the valve always replace the housing O-rings to ensure that the valve is tight.



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Installation and Commissioning **29** 

**Pneumatic Connections**

**Pneumatic Connections**

**Air Requirement**

|  |  |  |  |
| --- | --- | --- | --- |
| Actuator type | Actuator diameter  (mm) | Air requirement  (dm3n/stroke)  dm3n at 1.01325 bar  at 0°C as per DIN 1343 | Use |
| A... | 98 | 0.16 | DN 25 - DN 100  1" - 4" OD, 2" - 4" IPS |
| B... | 109 | 0.26 |
| C... | 135 | 0.42 |
| D... | 170 | 0.70 |
| E... | 210 | 1.10 |
| R...¹ | 170 | 1.60 |
| S...¹ | 210 | 2.00 |
| T...¹ | 210 | 2.20 |
| D...6 | 170 | 1.30 | DN 125 + DN 150  6" OD, 6" IPS |
| E...6 | 210 | 2.00 |
| S...6 | 261 | 3.20 |
| T...6¹ | 210 | 4.00 |
| U...6¹ | 261 | 5.20 |
| 1. Actuators with booster cylinder for increasing the pneumatic actuating force when lower control air pressures are used | | | |

**Establishing Hose Connections**

To ensure reliable operation, the compressed air hoses must be cut exactly square.

Tools required: · A hose cutter

Carry out the following steps:

**1.** Shut off the compressed air supply.

**2.** Use the hose cutter to cut the pneumatic hoses square.

**3.** Push the air hose into the air connector on the control top.

**4.** Re-open the compressed air supply.

✔Done

**30** 

Installation and Commissioning **Commissioning**

**Electrical Connections**

**DANGER**

**Live parts**

Electrical shock can result in serious personal injury or death.

🡺 Only allow properly qualified staff to carry out work on the electrical equipment. 🡺 Prior to establishing electrical connections check the maximum permissible oper ating voltage.



**EXPLOSION HAZARD**

**Explosive gases or dusts**

An explosion can result in serious personal injury or death.

🡺 Observe the installation and operating regulations for use in potentially explosive areas.



Carry out the following steps:

🡺 Connect in accordance with the connection diagram and the instructions in the corresponding operating instructions for the control top.

✔Done

***NOTE*** The proximity switches are factory set. During transport and installation it can happen that the settings are changed, so that readjustment may be required (see the Operating Instructions for the control top).



**Commissioning**

Before starting commissioning observe the following:

• Make sure that there are no foreign materials in the system.

• Actuate the valve once by applying compressed air.

• Clean the pipe system prior to the first product run.

• During commissioning, regularly check all sealing points for leaks. Replace defective seals.

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Cleaning and Passivation **31** 

**Cleaning**

**Cleaning and Passivation**

****

**Cleaning**

All parts in contact with product must be cleaned at regular intervals. Always observe the safety data sheets issued by the cleaning agent manufacturers. Only use cleaning agents which do not cause damage to the seals and the inner parts of the valve. When the pipe is cleaned, the cleaning medium also flows through and cleans the valve hous ings.

With respect to the cleaning method and parameters like detergents, temperatures,

times and intervals, the component manufacturer can merely make recommendations but cannot provide any generally applicable details. Method and parameters should be determined and defined by the operator in accordance with the relevant process.

The cleaning effect must be checked regularly by the operator!

**Cleaning Process Examples**

**Typical cleaning parameters in dairy operations**

Example of a two-phase cleaning process:

• Sodium hydroxide and combination products based on sodium hydroxide in concen trations from 0.5% to 2.5% at 75 °C to 80 °C.

• Phosphoric acid or nitric acid and combination products based on these acids in

concentrations from 0.3 to 1.5% at approx. 65 °C.

Example of a cleaning operation in one cleaning step:

• Formic acid and combination products based on formic acid at up to 85 °C.

**Typical cleaning parameters in breweries**

• Sodium hydroxide and combination products based on sodium hydroxide in concen trations from 1% to 4% at approx. 85 °C.

• Phosphoric acid or nitric acid and combination products based on these acids in

concentrations from 0.3 to 1.5% at 20 °C.

**32** 

Cleaning and Passivation **Passivation**

**Cleaning Effect**

The cleaning effect depends on the following factors:

• Temperature

• Time

• Mechanics

• Chemicals

• Degree of soiling

These factors can be combined in such a way as to make an optimal cleaning result probable.

**Cleaning the Leakage Cavity**

Cleaning of the leakage cavity of the Mixproof Valve Type K is not possible. The valve is therefore mainly used for CIP and gas applications. Switching leakages are discharged via the leakage pipe in the lantern.

**Passivation**

Before commissioning a plant, passivation is commonly carried out for long pipes and tanks.

Valve blocks are usually excepted from this. Passivation is typically performed using nitric acid (HNO3) at approx. 80°C (176 °F) at a concentration of 3% and a contact time of 6 to 8 hours.

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Malfunctions **33**

**Malfunctions**

****

In the event of malfunctions immediately deactivate the valve and secure it against inad vertent reactivation. Malfunctions may only be remedied by qualified staff, who must

observe the safety instructions.

|  |  |  |
| --- | --- | --- |
| Malfunction | Cause | Remedy |
| Valve does not work | Fault in the control system | Check the system configura tion |
| No compressed air or  compressed air too low | Check the compressed air supply  Check air hoses for free  passage and air tightness |
| Fault in the electrical system | Check actuation / external controller and routing of elec trical lines |
| Solenoid valve defective | Replace the solenoid valve |
| Valve does not close | Dirt/foreign material between valve seat and valve disk | Clean valve housing and valve seat |
| Valve closes too slowly | O-rings in actuator and control top are dry (friction losses) | Grease O-rings |
| Leakage in the area of the valve housing | Housing O-rings defective | Disassembling the Valve Replace the housing O-rings |
| Leakage in the lantern | Sealing ring defective | Replace the sealing ring |
| Leakage in the leakage cavity | V-rings defective | Replace the V-rings |

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Maintenance

**Inspections**

**Maintenance**

****

**Inspections**

Between the maintenance periods, the valves must be checked for leakage and proper function.

**Product Contact Seals**

Carry out the following steps:

🡺 Regularly check:

– Stem seal between upper housing and lantern

– V-ring in the valve disks

– O-rings between the valve housings

✔Done

**Pneumatic Connections**

Carry out the following steps:

**1.** Check the operating pressure at the pressure reducing and filter station.

**2.** Regularly clean the air filter in the filter station.

**3.** Check that the air hoses sit firmly in the air connections.

**4.** Check the lines for kinks and leaks.

**5.** Check the solenoid valves for proper function.

✔Done

**Electrical Connections**

Carry out the following steps:

**1.** Check that the cap nut on the cable gland is tight.

**2.** Check that the cable connections are firmly secured.

**3.** Check the solenoid valves for proper function.

✔Done

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Maintenance **35** 

**Prior to Disassembly**

**Maintenance Intervals**

To ensure the highest operational reliability of the valves, all wearing parts should be replaced at longer intervals.

The actual maintenance intervals can only be determined by the user since they depend on the operating conditions, for instance:

• daily period of use,

• switching frequency,

• type and temperature of the product,

• type and temperature of the cleaning solution,

• ambient conditions.

**Maintenance Intervals**

|  |  |
| --- | --- |
| Applications | Maintenance Intervals  (guideline values) |
| Media at temperatures of  60 °C to 130 °C  140 °F to 266 °F | approx. every 3 months |
| Media at temperatures of  < 60 °C (< 140 °F) | approx. every 12 months |

**Prior to Disassembly**

Requirement · Make sure that during maintenance and repair work no process is in operation in the area concerned.

Carry out the following steps:

**1.** Drain all pipe system elements that lead to the valve and, if necessary, clean or rinse them.

**2.** Shut off the control air supply.

**3.** Disconnect the power supply.

**4.** Take the valve out of the pipe section, with all housings and housing connections if possible.

✔Done

**36** 

Maintenance

**Disassembling the Valve**

**Disassembling the Valve Removing the Valve Insert**

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Requirement · No solenoid valve must be actuated electrically or manually. · The pneumatic and electrical connections on the plant side can remain on the control top.

· When carrying out maintenance and repair work, make sure that no process is in operation in the area concerned.

· All pipe system elements that lead to the valve must have been drained and, if necessary, cleaned or rinsed.

· The control air supply must be shut off, unless it is required for disassembling. · The power supply must be disconnected.

· Take the valve out of the pipe section, with all housings and housing connections if possible.

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Maintenance **37** 

**Disassembling the Valve**

**IMPORTANT NOTE**

**The permanent magnet on the switch bar is fragile.**

Damage to the permanent magnet.

🡺 Protect the permanent magnet against impact stress.



**WARNING**

**Spring tension in the valve**

Danger of injury when detaching the clamp connection (43, 46) as the released spring pretension will suddenly lift the actuator.

🡺 Before detaching the clamp connections, pretension the actuator using an emer gency manual actuator (H).



Carry out the following steps:

**1.** Unscrew the control top (B).

**2.** Before unscrewing the valve disk, pretension the actuator using an emergency manual actuator (H) (material no. 221.310.74).

**3.** Remove the clamp connection (43) between the housing and the lantern. **4.** Depressurize the actuator.

**5.** Withdraw the valve from the housing.

✔Done

**38** 

Maintenance

**Disassembling the Valve**

**Separating the Valve Insert from the Actuator**

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**IMPORTANT NOTE**

**Sensitive valve parts**

Damage to valve parts.

🡺 Protect the valve parts against impact stress.



Carry out the following steps:

**1.** Unscrew the hex. nut (38) and the leakage pipe (37).

**2.** Unscrew the clamp connection (46) between the actuator and the lantern.

**3.** Hold the actuator (A) in position with a strap wrench. Apply an open end spanner to the spanner flat on the valve disk (15) and unscrew the actuator.

**4.** Pull the valve insert out of the lantern.

***!*** The bearing disk (4) and the sealing disk (3) must not hit the stem (16) of the double disk when the valve insert is withdrawn.

**5.** Grip the valve disk (15) at the spanner flat. Unscrew the spring plate (13) with an open end spanner.

**6.** Pull off the pressure spring (18), leakage outlet (14), bearing disk (4), bearing (2), sealing ring (1) with sealing disk (3) and the double disk (16) from the valve disk (15).

✔Done

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Maintenance **39** 

**Maintenance**

**Maintenance**

**Cleaning the Valve**

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**IMPORTANT NOTE**

**The stem of the valve disk (15), the housing seat (401), the valve seat (16.1) and the V-ring groove (A) are precision parts.**

Damage to these parts can result in a malfunction.

🡺 Handle the valve with care!



**IMPORTANT NOTE**

**Damage to the valve**

Damage to the valve can result in a malfunction.

🡺 Observe the safety information sheets issued by the detergent manufacturers! 🡺 Only use detergents which are non-abrasive and not aggressive towards stainless steel.



Carry out the following steps:

**1.** Disassemble the valve, see “Disassembling the Valve“ (Page 36). **2.** Carefully clean the individual parts.

✔Done

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Maintenance

**Maintenance**

**Replacing Seals**

**Note on Seal Replacement**

Replace defective seals, but always fit new housing O-rings to ensure the tightness of the valve. Always use original spare parts.

**Replacing the V-Ring**

****

V-ring insertion tool

Requirement · Insert V-rings without grease. To facilitate fitting, use water with a drop of washing up liquid to remove the surface tension. In order that no rust is transferred, the

washing-up liquid solution must be made up in a ceramic, plastic, or stainless steel container.

Tools required: · V-ring insertion tool

**CAUTION**

**The scriber can slip off when the V-ring is removed.**

Danger of injury!

🡺 Grip the valve disk in a vice with protected jaws.

🡺 Unscrew the curved side of the scriber.



Carry out the following steps:

**1.** Put a scriber into the V-ring and take it out.



**2.** Before fitting, wet the V-ring on the side not in contact with product (rear side). Pay attention that water does not drip into the V-ring groove on the valve disk.

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Maintenance **41** 

**Maintenance**

**3.** Put in the V-ring. Make sure the installation position of the V-ring is correct (see illus tration).

**4.** Use the insertion tool to press in the V-ring – evenly press in at several opposite points along the circumference.







**5.** Insert the V-ring evenly.

**6.** Replace all the other seals identified in the spare parts lists.

✔Done

***NOTE*** Used seals must not be used again, since the proper function of the seal can no longer be ensured.



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Maintenance 

**Maintenance**

**Lubricating Seals and Threads**

**CAUTION**

**Damage to seals and threads**

Damage to seals and threads can result in a malfunction.

🡺 Ensure that an adequate film of lubricant is applied. No grease residues must be visible after fitting the entire valve.

🡺 For product contact seals only use suitable greases and oils.

🡺 Observe the safety information sheets issued by the lubricant manufacturer!



Carry out the following steps:

**1.** Lightly grease the valve disk thread.

**2.** Grease all seals – including the O-rings at the top and bottom of the actuator piston rod – very thinly.

***!*** Do not grease the V-ring

✔Done

***NOTE***

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF H1 (USDA H1) registration. They do not affect the taste or the consistency of the prod ucts and are compatible with the seals in contact with product. PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under material no. 413-064, and Rivolta F.L.G. MD 2 can be ordered under material no. 413-071. Using other types of grease can result in malfunctions or in premature seal failure. The warranty will also become null and void. A Manufacturer's Declaration for these products can be obtained from GEA Tuchenhagen if required.

A thin film of grease is required on the seals to ensure the proper function of the fittings. It reduces friction and extends the service life of the seals. This is absolutely harmless from a health and hygienic point of view.

Running dry must be avoided!



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Maintenance **43** 

**Installation**

**Installation**

Assemble the valve in reverse order of disassembly. Observe the notes and instructions given in the following sections when doing so.

**O-Ring**

****Use the installation mandrel to fit the O-ring (25).

**Guide Rings**

After fitting the double disk (16) and the leakage outlet (14), push the guide rings (21) through the opening in the leakage outlet and fit them.

**Spring**

****

****

Before the spring is inserted into the CIP bonnet both faces must be greased.

**44** 

Maintenance

**Installation**

**Fitting the Seat Ring Between the Housings**

****

The seat rings are marked with an arrow to indicate the correct mounting direction. When fitting make absolutely sure that the seat ring is inserted in the right direction between the housings so that the arrow later points in the direction of the actuator after the valve has been completely reassembled.

**Leakage Pipe**

Before fitting, rub the thread sealant (Pipetite stick, material no. 418-017) over the male thread of the leakage pipe several times. The sealing compound is pressed between the turns of the thread when the parts are screwed together, and forms a permanent seal without hardening.

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Maintenance **45** 

**Installation**

**Torques for the Clamps and Clamp Connections**

Tighten the clamp connections and clamps on the valve to the torques specified in the table.

**Tightening torques required**

|  |  |  |  |
| --- | --- | --- | --- |
| Torques |  | Nm | lbft |
| Clamps on the control top |  | 1 | 0.7 |
| Clamp connections  Cast clamps | M6 | 9 | 6.6 |
| Clamp connections  Cast clamps | M8 | 22 | 16.2 |
| Cast clamps | M10 | 45 | 33 |

**Checking the Function**

**Setting the Stroke**

Carry out the following steps:

**1.** Actuate the valve with compressed air.

**2.** Check the stroke of the valve in accordance with the “Valve Stroke“ (Page 45). ✔Done

**Strokes Depending on Size**

**Valve Stroke**

|  |  |  |  |
| --- | --- | --- | --- |
| Valve size | Valve stroke (mm) | Valve size | Valve stroke (mm) |
| **Metric** |  | **Inch OD** |  |
| 25 | 20 | 1" | 16 |
| 40 | 25 | 1.5" | 25 |
| 50 | 31 | 2" | 31.5 |
| 65 | 30 | 2.5" | 31 |
| 80 | 30 | 3" | 29 |
| 100 | 30 | 4" | 30.5 |
| 125 | 60 | 6" | 57 |
| 150 | 60 | **Inch IPS** |  |
|  |  | 2" | 30 |
|  |  | 3" | 30 |
|  |  | 4" | 30 |
|  |  | 6" | 60 |

**46** 

Maintenance

**Disposal**

**Disposal**

**General Notes**

Dispose of the machine at the end of its life cycle in an environmentally friendly manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The valve is made of the following materials:

• Metals

• Synthetic materials

• Electronic parts

• Lubricants containing oil and grease

Separate the different materials and dispose of them correctly sorted. Also observe the instructions regarding disposal in the operating instructions for the individual compo nents.

**Valve Actuator Disposal**

**DANGER**

**The spring forces in the actuator can be as much as 24 kN.**

The pre-stressed spring can cause serious personal injury or death. 🡺 Never open the actuator.

🡺 GEA Tuchenhagen accepts unopened actuators and arranges for proper disposal free of charge.



Carry out the following steps:

**1.** Remove the actuator.

**2.** Safely pack the actuator and send it to GEA Tuchenhagen GmbH. ✔Done

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Technical Data **47** 

**Technical Data**

**Technical Data**

****

**Type Plate**

The type plate clearly identifies the valve.



The type plate provides the following key data:

**Key data of the valve**

|  |  |
| --- | --- |
| Type | Mixproof Valve Type K |
| Serial | Serial number |
| Material | 1.4404(AISI316L)/FKM (FDA) |
| Control air pressure bar/psi | min. 6.0 (87); max. 8.0 (116) |
| Product pressure bar/psi | 5.0 (72.5) |

**Technical Data**

Refer to the following tables for the key technical data of the valve:

**Technical data: Valve**

|  |  |
| --- | --- |
| Designation | Description |
| Size | DN 25 to DN 150  1 to 6" OD  2" to 6" IPS |
| Material of product contact parts | Stainless steel 1.4404 |
| Installation position | Vertical |

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Technical Data 

**Technical Data**

**Technical data: Ambient temperatures**

|  |  |
| --- | --- |
| Designation | Description |
| - Valve | 0 ... 45 °C (32 ... 113 °F), standard  < 0 °C (32 °F): use control air with a low dew point. Protect valve stems against freezing. |
| - Proximity switch | -20 ... +80 °C (-4 ... +176 °F) |
| - Control top type T.VIS M-15, A-15 | -20 ... +50 °C (-4 ... +122 °F) |
| - Control top type T.VIS P-15 | -20 ... +50 °C (32 ... 122 °F) |
| Product temperature and operating tempera ture | Depending on the sealing material |

**Technical data: Compressed air supply**

|  |  |
| --- | --- |
| Designation | Description |
| Air hose |  |
| - Metric | Material PE-LD  Outside dia. 6 mm  Inside dia. 4 mm |
| - Inch | Material PA  Outside dia. 6.35 mm  Inside dia. 4.3 mm |
| Product pressure | 5 bar (72.5 psi) standard  max. 10 bar (116 psi) |
| Control air pressure | 6 bar, max. 8 bar |
| Control air | acc. to ISO 8573-1 |
| - Solid particle content: | Quality class 6  Particle size max. 5μm  Particle density max. 5 mg/m3 |
| - Water content: | Quality class 4  max. dew point +3 °C  If the unit is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accord ingly. |
| - Oil content: | Quality class 3, preferably oil free  max. 1 mg oil in 1m3 air |

Operating Instructions · VARIVENT® Mixproof Valve Type K

Edition 09/09/2016

Technical Data **49** 

**Resistance of Sealing Materials**

**Resistance of Sealing Materials**

The resistance of sealing materials depends on the type and temperature of the medium conveyed. The exposure time can adversely affect the service life of the seals. The

sealing materials comply with the regulations of FDA 21 CFR 177.2600 or FDA 21 CFR 177.1550.

Resistance:

• + = good resistance

• o = limited resistance

• – = no resistance

**Table of resistance of seals**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Medium | Temperature | Sealing material (general operating temperature\*) | | |
|  |  | EPDM  -40...+135°C  -40...275°F | FKM  -10...+200 °C  +14...+392°F | HNBR  -25...+140 °C  -13...+284°F |
| Caustics up to 3% | up to 80 °C (176°F) | + | o | + |
| Caustics up to 5% | up to 40 °C (104°F) | + | o | o |
| Caustics up to 5% | up to 80 °C (176°F) | + | – | – |
| Caustics at more than 5% |  | o | – | – |
| Inorganic acids up to 3% | up to 80 °C (176°F) | + | + | + |
| Inorganic acids up to 5% | up to 80 °C (176°F) | o | + | o |
| Inorganic acids up to 5% | up to 100 °C (212°F) | – | + | – |
| Water | up to 80 °C (176°F) | + | + | + |
| Steam | up to 135 °C (275°F) | + | o | o |
| Steam, approx. 30 min | up to 150 °C (302°F) | + | o | – |
| Fuels/hydrocarbons | | – | + | + |
| Product with a fat content of max. 35% | | + | + | + |
| Product with a fat content of more than 35% | | – | + | + |
| Oils |  | – | + | + |
| \* depending on the installation conditions | | | | |

**50**

Technical Data 

**Pipe Ends**

**Pipe Ends**

**Dimensions for Pipes in DN**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Metric  DN | Outside diameter | Wall thickness | Inside diameter | Outside diameter acc. to DIN 11850 |
| 25 | 29 | 1.5 | 26 | x |
| 40 | 41 | 1.5 | 38 | x |
| 50 | 53 | 1.5 | 50 | x |
| 65 | 70 | 2.0 | 66 | x |
| 80 | 85 | 2.0 | 81 | x |
| 100 | 104 | 2.0 | 100 | x |
| 125 | 129 | 2.0 | 125 | x |
| 150 | 154 | 2.0 | 150 | x |

**Dimensions for Pipes in Inch OD**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Inch OD | Outside diameter | Wall thickness | Inside diameter | Outside diameter acc. to BS 4825 |
| 1" | 25.4 | 1.65 | 22.1 | x |
| 1.5" | 38.1 | 1.65 | 34.8 | x |
| 2" | 50.8 | 1.65 | 47.6 | x |
| 2.5" | 63.5 | 1.65 | 60.2 | x |
| 3" | 76.2 | 1.65 | 72.9 | x |
| 4" | 101.6 | 2.11 | 97.38 | x |
| 6" | 152.4 | 2.77 | 146.86 | x |

**Dimensions for Pipes in Inch IPS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Inch IPS | Outside diameter | Wall thickness | Inside diameter | Outside diameter acc. to  DIN EN ISO 1127 |
| 2" | 60.3 | 2 | 56.3 | x |
| 3" | 88.9 | 2.3 | 84.3 | x |
| 4" | 114.3 | 2.3 | 109.7 | x |
| 6" | 168.3 | 2.77 | 162.76 | x |

Operating Instructions · VARIVENT® Mixproof Valve Type K

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Technical Data **51** 

**Lubricants**

**Dimensions Leakage Pipe**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Size | Leakage pipe, 90° | | | Leakage pipe, straight | | |
| Outside diam eter | Wall thickness | Inside diameter Outside diam | eter | Wall thickness | Inside diameter |
| DN 25 - 100  1" - 4" | 16 | 1,5 | 13 | 18 | 2,5 | 13 |
| DN 125 - 150  6" | 22 | 1,5 | 19 | 21,5 | 3,25 | 15 |

**Tools**

|  |  |
| --- | --- |
| Tools | Material no. |
| Manual emergency actuator | 221.310.74 |
| Hose cutter | 407-065 |
| Belt wrench | 408-142 |
| V-ring insertion tool | 229-109.88 |
| Hex key, 3 mm DN 25/40/50 | 408-121 |
| Open end spanner, 10 mm | 408-033 |
| Open end spanner, 13mm | 408-034 |
| Open end spanner, ends ground, a/f 17-19 | 229-119.01 |
| Open end spanner, ends ground, a/f 21-23 | 229-119.05 |
| Open end spanner, ends ground, a/f 22-24 | 229-119.03 |
| Open end spanner, a/f 30-32 | 408-041 |
| Installation mandrel DN 25 ... 50 | 229-109.95 |
| Installation mandrel DN 65 ... 100 | 229-109.96 |

**Lubricants**

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| --- | --- |
| Lubricants | Material no. |
| Rivolta F.L.G. MD-2 | 413-071 |
| PARALIQ GTE 703 | 413-064 |

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| **Date: 09/09/2016**  **Page: 52 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts Lists**

**Mixproof Valve Type K**

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Spare Parts Drawing

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| **Date: 09/09/2016**  **Page: 53 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

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Housing combinations

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**Spare Parts List – Metric Sizes DN 25 to DN 65**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | DN 25 | DN 40 | DN 50 | DN 65 |
| Set of seals | | EPDM  FKM  HNBR | 221-304.12  221-519.32  221-519.75 | 221-304.13  221-519.33  221-519.76 | 221-304.13  221-519.33  221-519.76 | 221-304.14  221-519.34  221-519.77 |
| 1\* | Sealing ring | EPDM  FKM  HNBR | 924-084  924-082  924-311 | 924-084  924-082  924-311 | 924-084  924-082  924-311 | 924-085  924-083  924-313 |
| 2 | Bearing  Bearing, 3A | PTFE/carbon  SUSTA-PVDF | 935-001  935-098 | 935-001  935-098 | 935-001  935-098 | 935-002  935-099 |
| 3 | Sealing disk | 1.4404 | 221-141.01 | 221-141.02 | 221-141.02 | 221-141.03 |
| 4 | Bearing disk | 1.4301 | 221-142.01 | 221-142.02 | 221-142.02 | 221-142.03 |
| 5\* | O-ring | EPDM  FKM  HNBR | 930-309  930-168  930-637 | 930-144  930-171  930-633 | 930-144  930-171  930-633 | 930-150  930-176  930-634 |
| 6\* | O-ring | NBR | 930-004 | 930-004 | 930-004 | 930-004 |
| \*\*7\* | V-ring AX | EPDM  FKM  HNBR | 932-046  932-030  932-087 | 932-021  932-033  932-088 | 932-021  932-033  932-088 | 932-024  932-035  932-090 |
| \*\*8\* | V-ring AX | EPDM  FKM  HNBR | 932-017  932-029  932-085 | 932-019  932-032  932-084 | 932-019  932-032  932-084 | 932-023  932-034  932-089 |
| 9 | Lantern | 1.4301 | 221-121.01 | 221-121.02 | 221-121.02 | 221-121.03 |
| 13 | Spring plate K | 1.4301 | 221-155.06 | 221-155.04 | 221-155.04 | 221-155.04 |
| 14 | Leakage outlet | 1.4301 | 221-153.04 | 221-153.01 | 221-153.01 | 221-153.02 |
| 15 | Valve disk K | 1.4404 | 221-124.01 | 221-124.02 | 221-124.10 | 221-124.04 |
| 16 | Double-disk K | 1.4404 | 221-125.01 | 221-125.02 | 221-125.10 | 221-125.04 |
| 18 | Pressure spring | 1.4310 | 931-208 | 931-001 | 931-001 | 931-249 |
| 21 | Guide ring | Turcite | 935-022 | 935-022 | 935-022 | 935-010 |
| 22\* | O-ring | EPDM  FKM  HNBR | 930-268  930-164  930-639 | 930-268  930-164  930-639 | 930-268  930-164  930-639 | 930-243  930-244  930-640 |

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| **Date: 09/09/2016**  **Page: 54 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Metric Sizes DN 25 to DN 65 (Cont.)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | DN 25 | DN 40 | DN 50 | DN 65 |
| 25\* | O-ring | EPDM  FKM  HNBR | 930-311  930-335  930-803 | 930-311  930-335  930-803 | 930-311  930-335  930-803 | 930-276  930-277  930-627 |
| 29\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 30\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 34 | Seat ring D | 1.4404 | 221-108.01 | 221-108.02 | 221-108.02 | 221-108.03 |
| 35 | Cover | 1.4301 | 221-144.01 | 221-144.02 | 221-144.02 | 221-144.03 |
| 37 | Leakage pipe, 90° | 1.4301 | 221-154.07 | 221-154.07 | 221-154.07 | 221-154.07 |
| Leakage pipe, straight | 1.4301 | 221-154.03 | 221-154.03 | 221-154.03 | 221-154.03 |
| 38 | Hex nut | 1.4301 | 709-014 | 709-014 | 709-014 | 709-014 |
| 43 | Clamp connection KL | 1.4401 | 221-507.02 | 221-507.04 | 221-507.04 | 221-507.09 |
| 46 | Clamp connection KL | 1.4401 | 221-507.06 | 221-507.06 | 221-507.06 | 221-507.06 |
| 401 | Housing V1 | 1.4404 | 221-101.19 | 221-101.21 | 221-101.22 | 221-101.05 |
| 402 | Housing V2 | 1.4404 | 221-102.41 | 221-102.43 | 221-102.44 | 221-102.05 |
| 403 | Housing KL | 1.4404 | 221-438.02 | 221-438.01 | 221-438.03 | 221-438.04 |
| 404 | Housing KT | 1.4404 | 221-439.01 | 221-439.02 | 221-439.03 | 221-439.04 |
| 420 | Housing connection D | 1.4404 | 221-571.02 | 221-571.04 | 221-571.06 | 221-571.09 |
| A | Actuator | See spare parts list/dimension sheet for the VARIVENT actuator | | | | |
| B | T.VIS control top | See spare parts list for T.VIS control top | | | | |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | 413-136 | | | |
| \* Items 1, 5, 6, 7, 8, 22, 25, 29 and 30 are included in the sealing set.  \*\*Do not grease item 7 and 8 | | | | | | |

**Spare Parts List – Metric Sizes DN 80 to DN 150**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | DN 80 | DN 100 | DN 125 | DN 150 |
| Set of seals | | EPDM  FKM  HNBR | 221-304.14  221-519.34  221-519.77 | 221-304.15  221-519.35  221-004176 | 221-304.16  221-519.36  -- | 221-304.17  221-519.37  -- |
| 1\* | Sealing ring | EPDM  FKM  HNBR | 924-085  924-083  924-313 | 924-085  924-083  924-313 | 924-088  924-087  -- | 924-088  924-087  -- |
| 2 | Bearing  Bearing, 3A | PTFE/carbon  SUSTA-PVDF | 935-002  935-099 | 935-002  935-099 | 935-003  935-102 | 935-003  935-102 |
| 3 | Sealing disk | 1.4404 | 221-141.03 | 221-141.04 | 221-141.07 | 221-141.05 |
| 4 | Bearing disk | 1.4301 | 221-142.03 | 221-142.03 | 221-142.04 | 221-142.04 |
| 5\* | O-ring | EPDM  FKM  HNBR | 930-150  930-176  930-634 | 930-156  930-178  930-863 | 930-372  930-409  -- | 930-260  930-259  -- |

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| **Date: 09/09/2016**  **Page: 55 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Metric Sizes DN 80 to DN 150 (Cont.)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | DN 80 | DN 100 | DN 125 | DN 150 |
| 6\* | O-ring | NBR | 930-004 | 930-004 | 930-007 | 930-007 |
| \*\*7\* | V-ring AX | EPDM  FKM  HNBR | 932-024  932-035  932-090 | 932-028  932-039  932-100 | 932-060  932-062  -- | 932-042  932-041  -- |
| \*\*8\* | V-ring AX | EPDM  FKM  HNBR | 932-023  932-034  932-089 | 932-027  932-038  932-099 | 932-059  932-063  -- | 932-045  932-044  -- |
| 9 | Lantern | 1.4301 | 221-121.03 | 221-121.04 | 221-121.06 | 221-121.22 |
| 13 | Spring plate K | 1.4301 | 221-155.04 | 221-155.04 | 221-155.02 | 221-155.02 |
| 14 | Leakage outlet | 1.4301 | 221-153.02 | 221-153.02 | 221-153.03 | 221-153.03 |
| 15 | Valve disk K | 1.4404 | 221-124.05 | 221-124.06 | 221-124.09 | 221-124.08 |
| 16 | Double-disk K | 1.4404 | 221-125.05 | 221-125.06 | 221-125.09 | 221-125.08 |
| 18 | Pressure spring | 1.4310 | 931-249 | 931-002 | 931-093 | 931-093 |
| 21 | Guide ring | Turcite | 935-010 | 935-010 | 935-018 | 935-018 |
| 22\* | O-ring | EPDM  FKM  HNBR | 930-243  930-244  930-640 | 930-243  930-244  930-640 | 930-356  930-357  -- | 930-356  930-357  -- |
| 25\* | O-ring | EPDM  FKM  HNBR | 930-276  930-277  930-627 | 930-276  930-277  930-627 | 930-270  930-163  930-637 | 930-270  930-163  930-637 |
| 29\* | O-ring | NBR | 930-026 | 930-026 | 930-035 | 930-035 |
| 30\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 34 | Seat ring D | 1.4404 | 221-108.03 | 221-108.04 | 221-108.12 | 221-108.06 |
| 35 | Cover | 1.4301 | 221-144.03 | 221-144.04 | 221-144.06 | 221-144.05 |
| 37 | Leakage pipe, 90° | 1.4301 | 221-154.07 | 221-154.07 | 221-154.09 | 221-154.09 |
| Leakage pipe, straight | 1.4301 | 221-154.03 | 221-154.03 | 221-154.06 | 221-154.06 |
| 38 | Hex nut | 1.4301 | 709-014 | 709-014 | 709-013 | 709-013 |
| 43 | Clamp connection KL | 1.4401 | 221-507.09 | 221-507.11 | 221-507.13 | 221-507.14 |
| 46 | Clamp connection KL | 1.4401 | 221-507.06 | 221-507.06 | 221-507.11 | 221-507.11 |
| 401 | Housing V1 | 1.4404 | 221-101.06 | 221-101.07 | 221-101.18 | 221-101.66 |
| 402 | Housing V2 | 1.4404 | 221-102.06 | 221-102.07 | 221-102.29 | 221-102.09 |
| 403 | Housing KL | 1.4404 | 221-438.05 | 221-438.06 | 221-438.17 | 221-438.24 |
| 404 | Housing KT | 1.4404 | 221-439.05 | 221-439.06 | 221-439.17 | 221-439.24 |
| 420 | Housing connection D | 1.4404 | 221-571.11 | 221-571.14 | 221-571.16 | 221-571.19 |
| A | Actuator | See spare parts list/dimension sheet for the VARIVENT actuator | | | | |
| B | T.VIS control top | See spare parts list for T.VIS control top | | | | |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | 413-136 | | | |
| \* Items 1, 5, 6, 7, 8, 22, 25, 29 and 30 are included in the sealing set.  \*\*Do not grease item 7 and 8 | | | | | | |

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| **Date: 09/09/2016**  **Page: 56 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Inch Sizes 1" OD to 2,5" OD**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | 1" OD | 1.5" OD | 2" OD | 2.5" OD |
| Set of seals | | EPDM  FKM  HNBR | 221-304.12  221-519.32  221-519.75 | 221-304.13  221-519.33  221-519.76 | 221-304.13  221-519.33  221-519.76 | 221-304.14  221-519.34  221-519.77 |
| 1\* | Sealing ring | EPDM  FKM  HNBR | 924-084  924-082  924-311 | 924-084  924-082  924-311 | 924-084  924-082  924-311 | 924-085  924-083  924-313 |
| 2 | Bearing  Bearing, 3A | PTFE/carbo n  SUSTA  PVDF | 935-001  935-098 | 935-001  935-098 | 935-001  935-098 | 935-002  935-099 |
| 3 | Sealing disk | 1.4404 | 221-141.01 | 221-141.02 | 221-141.02 | 221-141.03 |
| 4 | Bearing disk | 1.4301 | 221-142.01 | 221-142.02 | 221-142.02 | 221-142.03 |
| 5\* | O-ring | EPDM  FKM  HNBR | 930-309  930-168  930-632 | 930-144  930-171  930-633 | 930-144  930-171  930-633 | 930-150  930-176  930-634 |
| 6\* | O-ring | NBR | 930-004 | 930-004 | 930-004 | 930-004 |
| \*\*7\* | V-ring AX | EPDM  FKM  HNBR | 932-046  932-030  932-087 | 932-021  932-033  932-088 | 932-021  932-033  932-088 | 932-024  932-035  932-090 |
| \*\*8\* | V-ring AX | EPDM  FKM  HNBR | 932-017  932-029  932-085 | 932-019  932-032  932-084 | 932-019  932-032  932-084 | 932-023  932-034  932-089 |
| 9 | Lantern | 1.4301 | 221-121.01 | 221-121.07 | 221-121.07 | 221-121.08 |
| 13 | Spring plate K | 1.4301 | 221-155.06 | 221-155.04 | 221-155.04 | 221-155.04 |
| 14 | Leakage outlet | 1.4301 | 221-153.04 | 221-153.01 | 221-153.01 | 221-153.02 |
| 15 | Valve disk K | 1.4404 | 221-124.01 | 221-124.02 | 221-124.10 | 221-124.04 |
| 16 | Double-disk K | 1.4404 | 221-125.01 | 221-125.02 | 221-125.10 | 221-125.04 |
| 18 | Pressure spring | 1.4310 | 931-208 | 931-001 | 931-001 | 931-249 |
| 21 | Guide ring | Turcite | 935-022 | 935-022 | 935-022 | 935-010 |
| 22\* | O-ring | EPDM  FKM  HNBR | 930-268  930-164  930-639 | 930-268  930-164  930-639 | 930-268  930-164  930-639 | 930-243  930-244  930-640 |
| 25\* | O-ring | EPDM  FKM  HNBR | 930-311  930-335  930-803 | 930-311  930-335  930-803 | 930-311  930-335  930-803 | 930-276  930-277  930-627 |
| 29\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 30\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 34 | Seat ring D | 1.4404 | 221-108.01 | 221-108.02 | 221-108.02 | 221-108.03 |
| 35 | Cover | 1.4404 | 221-144.01 | 221-144.02 | 221-144.02 | 221-144.03 |
| 37 | Leakage pipe, 90° | 1.4301 | 221-154.07 | 221-154.07 | 221-154.07 | 221-154.07 |
| Leakage pipe, straight | 1.4301 | 221-154.03 | 221-154.03 | 221-154.03 | 221-154.03 |
| 38 | Hex nut | 1.4301 | 709-014 | 709-014 | 709-014 | 709-014 |

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| **Date: 09/09/2016**  **Page: 57 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Inch Sizes 1" OD to 2,5" OD (Cont.)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | 1" OD | 1.5" OD | 2" OD | 2.5" OD |
| 43 | Clamp connection KL | 1.4401 | 221-507.02 | 221-507.04 | 221-507.04 | 221-507.09 |
| 46 | Clamp connection KL | 1.4401 | 221-507.06 | 221-507.06 | 221-507.06 | 221-507.06 |
| 401 | Housing V1 | 1.4404 | 221-101.27 | 221-101.28 | 221-101.29 | 221-101.30 |
| 402 | Housing V2 | 1.4404 | 221-102.52 | 221-102.53 | 221-102.54 | 221-102.55 |
| 403 | Housing KL | 1.4404 | 221-438.07 | 221-438.08 | 221-438.09 | 221-438.10 |
| 404 | Housing KT | 1.4404 | 221-439.07 | 221-439.08 | 221-439.09 | 221-439.10 |
| 420 | Housing connection D | 1.4404 | 221-571.01 | 221-571.03 | 221-571.05 | 221-571.08 |
| A | Actuator | | See spare parts list/dimension sheet for the VARIVENT actuator | | | |
| B | T.VIS control top | | See spare parts list for T.VIS control top | | | |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | 413-136 | | | |
| \* Items 1, 5, 6, 7, 8, 22, 25, 29 and 30 are included in the sealing set.  \*\*Do not grease item 7 and 8 | | | | | | |

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| **Date: 09/09/2016**  **Page: 58 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Inch Sizes 3" OD to 6" OD**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | 3" OD | 4" OD | 6" OD |
| Set of seals | | EPDM  FKM  HNBR | 221-304.14  221-519.34  221-519.77 | 221-304.15  221-519.35  221-004176 | 221-304.17  221-519.37  -- |
| 1\* | Sealing ring | EPDM  FKM  HNBR | 924-085  924-083  924-313 | 924-085  924-083  924-313 | 924-088  924-087  -- |
| 2 | Bearing  Bearing, 3A | PTFE/carbon SUSTA-PVDF | 935-002  935-099 | 935-002  935-099 | 935-003  935-102 |
| 3 | Sealing disk | 1.4404 | 221-141.03 | 221-141.04 | 221-141.05 |
| 4 | Bearing disk | 1.4301 | 221-142.03 | 221-142.03 | 221-142.04 |
| 5\* | O-ring | EPDM  FKM  HNBR | 930-150  930-176  930-634 | 930-156  930-178  930-863 | 930-260  930-259  -- |
| 6\* | O-ring | NBR | 930-004 | 930-004 | 930-007 |
| \*\*7\* | V-ring AX | EPDM  FKM  HNBR | 932-024  932-035  932-090 | 932-028  932-039  932-100 | 932-042  932-041  -- |
| \*\*8\* | V-ring AX | EPDM  FKM  HNBR | 932-023  932-034  932-089 | 932-027  932-038  932-099 | 932-045  932-044  -- |
| 9 | Lantern | 1.4301 | 221-121.08 | 221-121.09 | 221-121.22 |
| 13 | Spring plate K | 1.4301 | 221-155.04 | 221-155.04 | 221-155.02 |
| 14 | Leakage outlet | 1.4301 | 221-153.02 | 221-153.02 | 221-153.03 |
| 15 | Valve disk K | 1.4404 | 221-124.05 | 221-124.06 | 221-124.08 |
| 16 | Double-disk K | 1.4404 | 221-125.05 | 221-125.06 | 221-125.08 |
| 18 | Pressure spring | 1.4310 | 931-249 | 931-002 | 931-093 |
| 21 | Guide ring | Turcite | 935-010 | 935-010 | 935-018 |
| 22\* | O-ring | EPDM  FKM  HNBR | 930-243  930-244  930-640 | 930-243  930-244  930-640 | 930-356  930-357  -- |
| 25\* | O-ring | EPDM  FKM  HNBR | 930-276  930-277  930-627 | 930-276  930-277  930-627 | 930-270  930-163  930-637 |
| 29\* | O-ring | NBR | 930-026 | 930-026 | 930-035 |
| 30\* | O-ring | NBR | 930-026 | 930-026 | 930-026 |
| 34 | Seat ring D | 1.4404 | 221-108.03 | 221-108.04 | 221-108.06 |
| 35 | Cover | 1.4404 | 221-144.03 | 221-144.04 | 221-144.05 |
| 37 | Leakage pipe, 90° | 1.4301 | 221-154.07 | 221-154.07 | 221-154.09 |
| Leakage pipe, straight | 1.4301 | 221-154.03 | 221-154.03 | 221-154.06 |
| 38 | Hex nut | 1.4301 | 709-014 | 709-014 | 709-013 |
| 43 | Clamp connection KL | 1.4401 | 221-507.09 | 221-507.11 | 221-507.14 |

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| **Date: 09/09/2016**  **Page: 59 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Inch Sizes 3" OD to 6" OD (Cont.)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Item | Designation | Material | 3" OD | 4" OD | 6" OD |
| 46 | Clamp connection KL | 1.4401 | 221-507.06 | 221-507.06 | 221-507.11 |
| 401 | Housing V1 | 1.4404 | 221-101.31 | 221-101.32 | 221-101.72 |
| 402 | Housing V2 | 1.4404 | 221-102.56 | 221-102.57 | 221-102.58 |
| 403 | Housing KL | 1.4404 | 221-438.11 | 221-438.12 | 221-438.25 |
| 404 | Housing KT | 1.4404 | 221-439.11 | 221-439.12 | 221-439.24 |
| 420 | Housing connection D | 1.4404 | 221-571.10 | 221-571.13 | 221-571.17 |
| A | Actuator | | See spare parts list/dimension sheet for the VARIVENT actuator | | |
| B | T.VIS control top | | See spare parts list for T.VIS control top | | |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | 413-136 | | |
| \* Items 1, 5, 6, 7, 8, 22, 25, 29 and 30 are included in the sealing set.  \*\*Do not grease item 7 and 8 | | | | | |

**Spare Parts List – Inch Sizes 2" IPS to 6" IPS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material  Material | 2" IPS | 3" IPS | 4" IPS | 6" IPS |
| Set of seals | | EPDM  FKM  HNBR | 221-304.13  221-519.33  221-519.76 | 221-304.14  221-519.34  221-519.77 | 221-304.15  221-519.35  221-004176 | 221-304.17  221-519.37  -- |
| 1\* | Sealing ring | EPDM  FKM  HNBR | 924-084  924-082  924-311 | 924-085  924-083  924-313 | 924-085  924-083  924-313 | 924-088  924-087  -- |
| 2 | Bearing  Bearing, 3A | PTFE/carbon SUSTA-PVDF | 935-001  935-098 | 935-002  935-099 | 935-002  935-099 | 935-003  935-102 |
| 3 | Sealing disk | 1.4404 | 221-141.02 | 221-141.03 | 221-141.04 | 221-141.05 |
| 4 | Bearing disk | 1.4301 | 221-142.02 | 221-142.03 | 221-142.03 | 221-142.04 |
| 5\* | O-ring | EPDM  FKM  HNBR | 930-144  930-171  930-633 | 930-150  930-176  930-634 | 930-156  930-178  930-863 | 930-260  930-259  -- |
| 6\* | O-ring | NBR | 930-004 | 930-004 | 930-004 | 930-007 |
| \*\*7\* | V-ring AX | EPDM  FKM  HNBR | 932-021  932-033  932-088 | 932-024  932-035  932-090 | 932-028  932-039  932-100 | 932-042  932-041  -- |
| \*\*8\* | V-ring | EPDM  FKM  HNBR | 932-019  932-032  932-084 | 932-023  932-034  932-089 | 932-027  932-038  932-099 | 932-045  932-044  -- |
| 9 | Lantern | 1.4301 | 221-121.12 | 221-121.10 | 221-121.11 | 221-121.05 |
| 13 | Spring plate K | 1.4301 | 221-155.05 | 221-155.05 | 221-155.05 | 221-155.02 |
| 14 | Leakage outlet | 1.4301 | 221-153.01 | 221-153.02 | 221-153.02 | 221-153.03 |
| 15 | Valve disk K | 1.4404 | 221-124.13 | 221-124.11 | 221-124.12 | 221-124.08 |
| 16 | Double-disk K | 1.4404 | 221-125.13 | 221-125.11 | 221-125.12 | 221-125.08 |

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| **Date: 09/09/2016**  **Page: 60 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Spare Parts List – Inch Sizes 2" IPS to 6" IPS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Item | Designation | Material  Material | 2" IPS | 3" IPS | 4" IPS | 6" IPS |
| 18 | Pressure spring | 1.4310 | 931-001 | 931-249 | 931-002 | 931-093 |
| 21 | Guide ring | Turcite | 935-022 | 935-010 | 935-010 | 935-018 |
| 22\* | O-ring | EPDM  FKM  HNBR | 930-268  930-164  930-639 | 930-243  930-244  930-640 | 930-243  930-244  930-640 | 930-356  930-357  -- |
| 25\* | O-ring | EPDM  FKM  HNBR | 930-311  930-335  930-803 | 930-276  930-277  930-627 | 930-276  930-277  930-627 | 930-270  930-163  -- |
| 29\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-035 |
| 30\* | O-ring | NBR | 930-026 | 930-026 | 930-026 | 930-026 |
| 34 | Seat ring D | 1.4404 | 221-108.02 | 221-108.03 | 221-108.04 | 221-108.06 |
| 35 | Cover | 1.4404 | 221-144.02 | 221-144.03 | 221-144.04 | 221-144.05 |
| 37 | Leakage pipe, 90° | 1.4301 | 221-154.07 | 221-154.07 | 221-154.07 | 221-154.09 |
| Leakage pipe,  straight | 1.4301 | 221-154.03 | 221-154.03 | 221-154.03 | 221-154.06 |
| 38 | Hex nut | 1.4301 | 709-014 | 709-014 | 709-014 | 709-013 |
| 43 | Clamp connection KL | 1.4401 | 221-507.04 | 221-507.03 | 221-507.11 | 221-507.14 |
| 46 | Clamp connection KL | 1.4401 | 221-507.06 | 221-507.09 | 221-507.06 | 221-507.11 |
| 401 | Housing V1 | 1.4404 | 221-101.37 | 221-101.35 | 221-101.36 | 221-101.17 |
| 402 | Housing V2 | 1.4404 | 221-102.62 | 221-102.59 | 221-102.60 | 221-102.17 |
| 403 | Housing KL | 1.4404 | 221-438.13 | 221-438.14 | 221-438.15 | 221-438.16 |
| 404 | Housing KT | 1.4404 | 221-439.13 | 221-439.14 | 221-439.15 | 221-439.16 |
| 420 | Housing connection D | 1.4404 | 221-571.07 | 221-571.12 | 221-571.15 | 221-571.18 |
| A | Actuator | | See spare parts list/dimension sheet for the VARIVENT actuator | | | |
| B | T.VIS control top | | See spare parts list for T.VIS control top | | | |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | 413-136 | | | |
| \* Items 1, 5, 6, 7, 8, 22, 25, 29 and 30 are included in the sealing set.  \*\*Do not grease item 7 and 8 | | | | | | |

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| **Date: 09/09/2016**  **Page: 61 of 61**  **Ersatzteillisten.fm** | **Spare Parts List**  **Mixproof Valve Type K** |  |

**Sealing Sets for VARIVENT® Mixproof Valve Type K**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Qty | Designation | Material  Material | DN 25  1" OD | DN 40/50  1.5"/2" OD | DN 65/80  2.5"/3" OD | DN 100  4" OD | DN 125 | DN 150  6" OD |
| 1 | 2 | Sealing ring | Ø  EPDM  FKM  HNBR | 22  924-084  924-082  924-311 | 22  924-084  924-082  924-311 | 28  924-085  924-083  924-313 | 28  924-085  924-083  924-313 | 35  924-088  924-087  -- | 35  924-088  924-087  -- |
| 5 | 4 | O-ring | Ø  EPDM  FKM  HNBR | 42x3  930-309  930-168  930-632 | 60x3  930-144  930-171  930-633 | 85x4  930-150  930-176  930-634 | 113x4  930-156  930-178  930-863 | 138x4  930-372  930-409  -- | 158x5  930-260  930-259  -- |
| 6 | 1 | O-ring | Ø  NBR | 8x1.6  930-004 | 8x1.6  930-004 | 8x1.6  930-004 | 8x1.6  930-004 | 9x3  930-007 | 9x3  930-007 |
| \*\*7 | 1 | V-ring | Ø  EPDM  FKM  HNBR | 35-5  932-046  932-030  932-087 | 52-6  932-021  932-033  932-088 | 76-6  932-024  932-035  932-090 | 104-6  932-028  932-039  932-100 | 128-6  932-060  932-062  -- | 148-6  932-042  932-041  -- |
| \*\*8 | 1 | V-ring | Ø  EPDM  FKM  HNBR | 28-5  932-017  932-029  932-085 | 44-6  932-019  932-032  932-084 | 68-6  932-023  932-034  932-089 | 96-6  932-027  932-038  932-099 | 120-6  932-059  932-063  -- | 140-6  932-045  932-044  -- |
| 22 | 1 | O-ring | Ø  EPDM  FKM  HNBR | 22x3  930-268  930-164  930-639 | 22x3  930-268  930-164  930-639 | 28x3  930-243  930-244  930-640 | 28x3  930-243  930-244  930-640 | 35x3  930-356  930-357  -- | 35x3  930-356  930-357  -- |
| 25 | 1 | O-ring | Ø  EPDM  FKM  HNBR | 11x3  930-311  930-335  930-803 | 11x3  930-311  930-335  930-803 | 15x3  930-276  930-277  930-627 | 15x3  930-276  930-277  930-627 | 20x3  930-270  930-163  -- | 20x3  930-270  930-163  -- |
| 29 | 1 | O-ring | Ø  NBR | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 | 25x3  930-035 | 25x3  930-035 |
| 30 | 1 | O-ring | Ø  NBR | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 | 20x3  930-026 |
|  | | | | | | | | | |
| Sealing set cpl. | | | EPDM  FKM  HNBR | 221-304.12 221-519.32 221-519.75 | 221-304.13 221-519.33 221-519.76 | 221-304.14 221-519.34 221-519.77 | 221-304.15 221-519.35 221-004176 | 221-304.16 221-519.36 -- | 221-304.17 221-519.37 -- |
| Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set | | | | | | | 413-136 | | |
| \*\*Do not grease item 7 and 8 | | | | | | | | | |

Storing instructions: storage in accordance with DIN 7716

Relative humidity approx. 65%, temperature 15-25°C and protected from light

When replacing seals, observe the instructions in the Operating Instructions! **429-017**

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| **Date: 09/09/2016**  **Page: 62 of 63**  **Maßblatt.fm** | **Dimension Sheet**  **VARIVENT® Mixproof Valve K** |  |

**Dimension Sheets**

**VARIVENT® Mixproof Valve K**

Spare part drawing - Mixproof Valve K

**Mixproof Valve K**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Pipe | Housing | | |  | Actuator | Dimension | | | Valve | |
| Nominal diameter | ∅  [mm] | A  [mm] | B  [mm] | B1  [mm] | C  [mm] | D1  [mm] | H1  [mm] | H2  [mm] | Expansion X [mm] | Stroke S [mm] | Wight  [kg] |
| DN 25 | 29,0 × 1,50 | 50,0 | 31,0 | 58,0 | 90 | 135 | 329,0 | 458,0 | 563 | 22 | 9 |
| DN 40 | 41,0 × 1,50 | 62,0 | 39,0 | 64,0 | 90 | 135 | 338,0 | 467,0 | 572 | 25 | 11 |
| DN 50 | 53,0 × 1,50 | 74,0 | 41,0 | 70,0 | 90 | 135 | 341,0 | 470,0 | 575 | 30 | 11 |
| DN 65 | 70,0 × 2,00 | 96,0 | 52,0 | 83,0 | 125 | 170 | 382,0 | 511,0 | 686 | 30 | 18 |
| DN 80 | 85,0 × 2,00 | 111,0 | 60,0 | 90,5 | 125 | 170 | 399,5 | 528,5 | 704 | 40 | 18 |

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| **Date: 09/09/2016**  **Page: 63 of 63**  **Maßblatt.fm** | **Dimension Sheet**  **VARIVENT® Mixproof Valve K** |  |

**Mixproof Valve K (Cont.)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Pipe | Housing | | |  | Actuator | Dimension | | | Valve | |
| Nominal diameter | ∅  [mm] | A  [mm] | B  [mm] | B1  [mm] | C  [mm] | D1  [mm] | H1  [mm] | H2  [mm] | Expansion X [mm] | Stroke S [mm] | Wight  [kg] |
| DN 100 | 104,0 × 2,00 | 130,0 | 70,0 | 100,0 | 125 | 170 | 409,0 | 538,0 | 713 | 40 | 26 |
| DN 125 | 129,0 × 2,00 | 155,0 | 112,0 | 113,0 | 150 | 210 | 554,5 | 683,5 | 914 | 60 | 57 |
| DN 150 | 154,0 × 2,00 | 180,0 | 125,0 | 125,0 | 150 | 210 | 661,0 | 790,0 | 1020 | 60 | 65 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| OD 1" | 25,4 x 1,65 | 46,0 | 29,0 | 56,0 | 90 | 135 | 327,0 | 456,0 | 561 | 18 | 9 |
| OD 1.5" | 38,1 × 1,65 | 59,0 | 39,0 | 62,5 | 90 | 135 | 336,5 | 465,5 | 571 | 22 | 11 |
| OD 2" | 50,8 × 1,65 | 71,5 | 42,0 | 69,0 | 90 | 135 | 343,0 | 472,0 | 577 | 30 | 11 |
| OD 2.5" | 63,5 × 1,65 | 90,0 | 54,0 | 80,0 | 125 | 170 | 386,0 | 515,0 | 690 | 30 | 17 |
| OD 3" | 76,2 × 1,65 | 103,0 | 54,0 | 86,5 | 125 | 170 | 402,5 | 531,5 | 707 | 39 | 18 |
| OD 4" | 101,6 × 2,11 | 127,5 | 69,0 | 99,0 | 125 | 170 | 411,0 | 540,0 | 715 | 40 | 26 |
| OD 6" | 152,4 × 2,77 | 177,0 | 123,5 | 123,5 | 150 | 210 | 659,5 | 788,5 | 1090 | 60 | 66 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| IPS 2" | 60,3 × 2,00 | 81,0 | 44,0 | 73,5 | 114,3 | 135 | 344,5 | 473,5 | 579 | 29 | 12 |
| IPS 3" | 88,9 × 2,30 | 115,0 | 63,0 | 92,5 | 152,5 | 170 | 401,5 | 530,5 | 706 | 40 | 19 |
| IPS 4" | 114,3 × 2,30 | 140,0 | 75,0 | 105,0 | 152,5 | 170 | 414,0 | 543,0 | 718 | 40 | 27 |
| IPS 6" | 168,2 × 2,77 | 192,0 | 131,0 | 131,0 | 152,5 | 210 | 655,0 | 784,0 | 1014 | 60 | 67 |
| Please note that this type of valve requires a clearance of 10-100mm under the leckage outlet. | | | | | | | | | | | |

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