Gate valves

STAAL 40 AKD/AKDS
STAAL 100 AKD/AKDS

AKD

AKDS

Contents

1 EC Declaration of Conformity

Herewith we,	**KSB Aktiengesellschaft** **An der Wethmarheide 25** **44536 Lünen** **Registered office: Frankenthal (Pfalz)** **Germany**

declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of valve types:	**Gate valve**		
	– STAAL AKD/AKDS	PN 1-100	DN 250-2000
Applicable technical code:	**DIN 3840, AD 2000 code**		
Suitable for:	**Fluids in Groups 1 and 2**		
Conformity assessment procedure:	**Module H**		
Name and address of the notified body responsible for approval and surveillance:	**TÜV Süd Industrie Service GmbH** **Dudenstraße 28** **68167 Mannheim** **Germany**		
Identification number of the notified body:	**0036**		

Rainer Michalik

Integrated Management

Date: 01.10.2009

(This document has been prepared electronically and is valid without signature.)

2 General

The valves are manufactured within a QM system certified to DIN EN ISO 9001 which ensures that production is controlled and protected. The valve has been designed in accordance with state-of-the-art technology and recognized safety regulations. Pressure and temperature related dangers are eliminated by appropriate calculations, material selection and inspection and test procedures. Nevertheless, during use, danger to life and limb of the user or third parties, or damage to the valve and other material assets may still arise. Every person in the owner's plant who is involved in the storage, transport, installation, commissioning, operation, maintenance and repair of the valve must have read and understood these operating instructions. The manufacturer shall not accept any liability if the instructions set forth in this manual are not complied with. The operator must ensure that work on the valve is performed by authorized personnel only.

Caution The valves must not be operated outside the permissible operating range, especially with regard to pressure and temperature. The limits are indicated on the name plate or currently applicable type series booklet. The nominal pressure classes only apply up to a temperature of 50 °C. For temperatures exceeding 50 °C refer to the pressure-temperature ratings included in the type series booklets.These ratings must not be exceeded under any circumstances. Operation of the valves outside these conditions may result in overloads which may damage the valves.

2.1 Marking

All permissible operating data are documented on the valve name plate.

The valves are marked in accordance with Pressure Equipment Directive 97/23/EC and EN 19, i.e.

Name plate:

- Designation, DN, PN with Pmax/Tmax, or PS with TS,
- Manufacturer, body material, works No., year of manufacture (YYYY),
- Inspector's or works specialist's stamp,
- CE marking, if necessary.
- identification number of notified body

Stamp on body:

- works No., inspector's or works specialist's stamp

The name plate is made of stainless steel and permanently attached to the valve. Data specifically relating to the valve are shown on the manufacturer's valve data sheet.

2.2 Exclusion of liability

The manufacturer is not liable for any claims resulting from a failure to implement or implement properly the instructions contained in these operating instructions or resulting from the actions of a third party.
In particular, the manufacturer is not liable for direct or indirect consequential damage that has occurred for whatever reason.

3 Safety

3.1 Marking of instructions in the manual

The safety instructions contained in this manual whose non-observance might cause hazards to persons or the environment, or cause extensive damage to property, are specially marked with the hazard sign

The electrical danger warning sign is

The word

Caution

is used to introduce safety instructions whose non-observance may lead to damage to the valve or its accessories and their functions.

Instructions attached directly to the valve (e. g. name plate data) must always be complied with and be kept in a perfectly legible condition at all times.

3.2 Personnel qualification

All personnel involved in the storage, transport, installation, commissioning, maintenance and repair of the valve must be fully qualified to carry out the work involved. Personnel competence and supervision must be clearly defined by the operator. In addition, the operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

3.3 Hidden defects

Residual risks (e.g. from escaping hazardous fluids) due to hidden defects can never be totally ruled out. For this reason, personnel must be instructed before carrying out any work on the valve that unexpected dangers may arise from hidden defects. The relevant health and safety regulations and pertinent legal provisions must be adhered to.

3.4 Non-compliance with safety instructions

STAAL gate valves are intended for use in gate positions “closed” or “fully open” only. Any other use or use beyond that for which they are intended is deemed non-intended use. The manufacturer shall not accept any liability for any damage resulting thereof. The risk must be borne by the customer alone. Non-compliance with safety instructions can jeopardize the safety of personnel, the environment, the valve and/or the system and will lead to forfeiture of any and all rights to claims for damages. In particular, non-compliance can, for example, result in:

- failure of important valve / system functions,
- failure of prescribed maintenance and servicing practices,
- hazard to persons by electrical, mechanical and chemical effects,
- hazard to persons and the environment due to leakage of hazardous substances.

3.5 Safety instructions for the operator / user

Make sure that the following is heeded:

- the provisions of the operating manual for all work on the valve,
- health and safety regulations and all other pertinent legal provisions,
- general and legal requirements concerning personal protective equipment,
- all information plates or markings on the valve,
- hazards from hydraulic or pneumatic energy.

Electrical hazards must be eliminated. (For details please refer to the relevant regulations for electrical installation (VDE) and the regulations laid down by the local energy supply companies.)

3.6 Safety instructions for maintenance, repair and installation work

- The operator is responsible for ensuring that all maintenance, repair and installation work be performed by authorized, qualified specialist personnel
- Suitable tools and devices must be used.
- As a rule, work on the valve must only be carried out after the valve has cooled down and valve pressure has been released. The fluid temperature must be below the vaporization temperature limit in all areas in contact with the fluid.
- Work on (actuated) valves must be carried out only during standstill. The shutdown procedure described in the manual for taking the valve out of service must be adhered to without fail.
- Valves handling fluids injurious to health must be decontaminated.
- Immediately following completion of the work, all safety-relevant and protective devices must be re-installed and / or re-activated. Please refer to the instructions for commissioning before returning the valve to service.

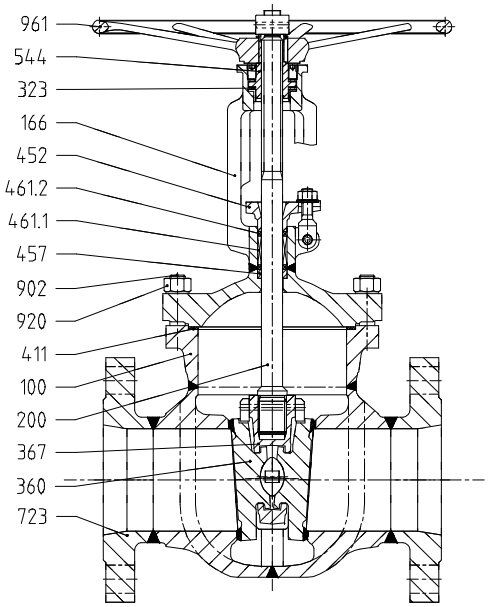
3.7 Unauthorized modification and manufacture of spare parts

Modifications or alterations of the valve supplied are only permitted after consultation with the manufacturer. Only original spare parts and spare parts authorized by the manufacturer shall be used. The use of other parts will invalidate any liability of the manufacturer for consequential damage.

4 Valve designation and design features

The illustration below is merely an example of specific designs of our STAAL gate valve. Order-specific designs are shown in documentation drawings, if applicable.

STAAL AKD/AKDS



Part No.	Description
100	Body
166	Yoke
200 *)	Stem
323 *)	Thrust bearing
360 *)	Wedges
367 *)	Wedge holder
411 *)	Joint ring
452	Gland cover
457 *)	Gland ring
461.1 *)	Gland packing
461.2 *)	
544 *)	Threaded bush
723	Flange
902	Stud
920	Hex. nut
961	Handwheel

*) Recommended spare parts

STAAL gate valves are of welded construction made from ductile material, with flanges or weld ends. It has been calculated and designed for predominantly static internal pressure loading and thus for at least 1,000 load cycles. If the dynamic internal pressure load is expected to exceed this value, or cyclic thermal stressing is expected, the customer must specifically point out this fact. The gate valve is not designed to take external loads from the pipework to which it is connected. The customer will be responsible for any damage resulting from disregarding this warning.

STAAL gate valves are available in standard wedge gate and flexible wedge gate design with outside screw and non-rising handwheel, which can be replaced by an actuator after fitting a suitable conversion kit. The pressure retaining body components are made of unalloyed elevated temperature resistant steel grades (e.g. P 250 GH, P 265 GH, St35.8, P 355 NH). For high temperatures, low-alloyed materials (e.g. 16 Mo 3, 13 CrMo 4-5) are used. The gland packing and the gasket between the bonnet and the body are usually made of pure graphite. The threaded bush is made of alloyed machining steel with good sliding properties and is free from non-ferrous metals. From pressure class PN 63 upwards, serrated bonnet gaskets with pure graphite coating are used. Nuts and bolts/screws comply with AD 2000 regulation W7 (issued by German Pressure Vessel Society).

The pressure/temperature ratings for PN valves are given in the applicable type series booklets.

As the obturator engages in the body seats, the wedge or flexible wedge is pressed against the outlet side body seat by the inlet side pressure, thus providing metal-to-metal seating. When the valve is opened, the obturator is fully retracted out of the flow path.

5 Delivery, transport, storage and installation

The valves are supplied with the obturator in closed position, to prevent damage to the stem during transport and storage. Flanges or weld ends are closed with protective covers.
A one-coat alkyd/acryl enamel, blue RAL 5002, is applied at the factory to protect the external surfaces. The flange faces have been coated with an anti-corrosive which can easily be removed. The inner surfaces are protected with fully synthetic silicone-free anti-corrosive (water hazard class 1) for long-term preservation (12 months if stored indoors). For longer storage periods, the valves must be provided with additional preservation and protected from the elements. Stocked valves should be used first to ensure that storage periods are as short as possible.

⚠ Make sure that transport vehicles/equipment are only handled by suitably qualified personnel. The relevant health and safety regulations and pertinent legal provisions must be adhered to. During transport, storage (if any) and installation, the valves must be protected from weather and other adverse conditions (e.g. acid-laden air, sand, corrosive substances). Valves must not be thrown, dropped or subjected to hard impacts. The valves must only be stored and transported on the manufacturer's original storage and material handling equipment (e.g. pallets). The manufacturer cannot accept any liability if other material handling equipment is used. The centres of gravity of the valves or the entire packaging unit must be taken into account. Use any transport lugs provided on the valve. Make sure that lifting tackle is properly attached to the valve (see illustration 1 to 6 below), and not to "movable" components such as handwheel, gear unit, actuator, pipe indicator, bypass lines, remote actuation components or other attachments. The weight data shown on the valve's data sheet must be heeded. Suitable protective clothing must be worn and suitable parting tools must be used when removing the transport straps.

Hoisting the valve for installation into horizontal pipeline (examples)

Fig. 1, 2, 3: Straps must be tied around the valve body. To hold the valve in the position shown below and to avoid tilting, both straps should be routed to the lifting hook between the handwheel arms. If required by the valve's centre of gravity, a third strap shall be used to prevent the valve from flipping over.
Fig. 4: The third strap serves to keep the valve in horizontal position.

Fig.1: recommended up to DN 250 (incl.)

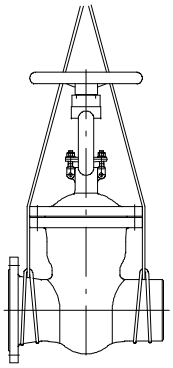


Fig. 3

Fig. 2: recommended from DN 300

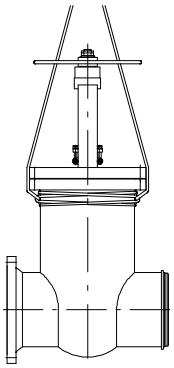
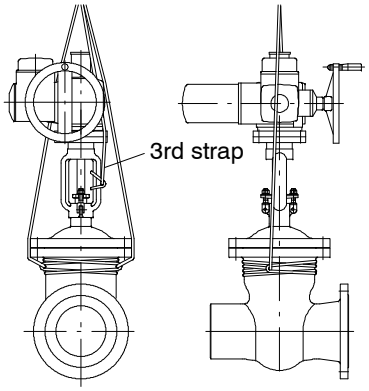
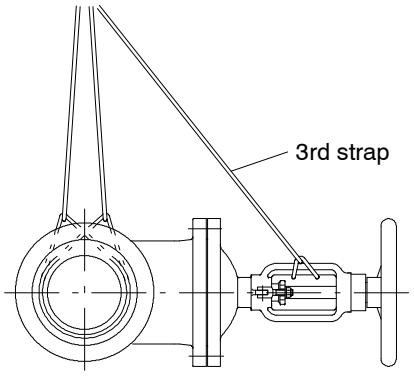


Fig. 4





Hoisting the valve for installation into vertical pipeline (examples)
Fig. 5, 6: Straps must be tied around the valve body. The third strap serves to keep the valve in horizontal position.

Fig. 5

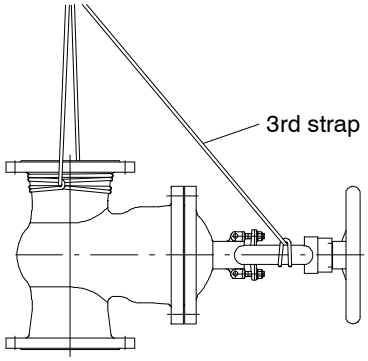
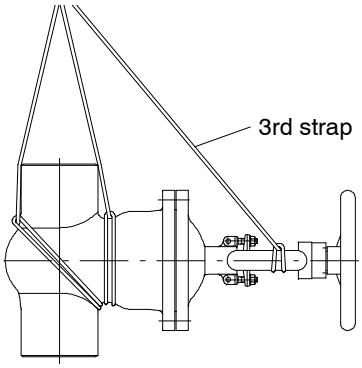


Fig. 6



5.1 Proper and intended use

The design parameters of the valve, such as pressure, fluid and temperature, must be heeded. The valve is not designed for traffic, wind and earthquake loads.

STAAL gate valves are shut-off valves.

Caution Shut-off valves are not suitable for regulating volume flow. For this reason, intermediate positions of the obturator are not permitted. The valve must not be used as blow-out valve. Its operating range as specified in the valve data sheet must be adhered to. Any other application or operating range is subject to the manufacturer's prior approval

5.2 Moving parts

In order to avoid injury from the uncontrolled movement of movable parts, the following instructions must be complied with:

- Protective elements must not be removed until immediately before installation.
- Any transport locks must not be removed until immediately before installation.
- Do not reach into the valve during valve installation.
- Centres of gravity must be taken into account.
- Movable parts such as remote actuation components must be locked by suitable means. Any locks previously removed must be re-installed.
- Prior to commissioning, suitable precautions and safety clearance space must be provided for rotating and rising components on site (e.g. remote actuation components, rising stem).

5.3 Misuse of protruding components as footholds

To avoid the danger of falling, never use protruding or projecting parts of the valve as footholds. The relevant health and safety regulations and pertinent legal provisions must be adhered to.

5.4 Anti-corrosive oil (slushing oil)

Anti-corrosive oil may escape when the protective elements are removed. To prevent soil contamination, the anti-corrosive oil must be properly collected on site (e.g. using spill trays or impermeable tarpaulins, etc.) The relevant health and safety regulations and pertinent legal provisions must be adhered to.

5.5 Desiccant

To prevent health hazards, the user shall ensure that any desiccant that may have been used is properly removed on site.

5.6 Proper handling

To prevent hazards to persons or the environment resulting from breakage or individual components breaking off (e.g. due to excessive stresses on the valve materials or in-transit damage), the following points must be followed:

- No alterations must be made to the valve; in particular, no parts must be welded on or attached in any other way.
- Prior to installation, the valve must be inspected for in-transit damage.
- Before installation, the valve must be checked for its designated use (marking). At the same time, the data given in these operating instructions and the manufacturer's data sheet must also be taken into account.

5.7 Operating data

The following maximum operating pressures must not be exceeded; refer to the identical information in the respective type series booklets.

Permissible operating pressures to EN 1092-1 in bar (static load)

Type series STAAL 40

Nominal pressure	Material	Permissible operating pressures in bar at temperatures in °C							
PN		RT [1])	100	150	200	250	300	350	400
10	P 250 GH / P 265 GH	10	9.2	8.8	8.3	7.6	6.9	6.4	5.9
16		16	14.8	14.0	13.3	12.1	11.0	10.2	9.5
25		25	23.2	22.0	20.8	19.0	17.2	16.0	14.8
40		40	37.1	35.2	33.3	30.4	37.6	25.7	23.8

[1]) RT: room temperature (–10 °C to +50 °C)
Operating pressures to DIN 2401 are also permissible.

5.8 Place of installation and installation position

To prevent hazards to persons or the environment from escaping fluid, e.g. due to seal or material failure, or failure of the valve to operate, due to incorrect installation position, the following instructions must be followed:

- The data given in these operating instructions and the manufacturer's data sheet must be adhered to.
- Before installation, the valve must be checked for its designated use (marking).
- The valve must not be used as an anchorage point.
- The valve must not be fitted downstream of tees, level or three-dimensional double bends.
- The position and flow direction must be in accordance with the manufacturer's data.

5.9 Proper installation

The seat/disc sealing system allows the valve to be installed in any position. The preferred orientation for the valve is vertical, with the stem pointing upwards. Make sure that the non-rising handwheel can be operated and that there is sufficient clearance available for the rising stem.

The following requirements must be met for proper installation:

- The relevant health and safety regulations and pertinent legal provisions must be adhered to.
- Protective elements must not be removed until immediately before installation.
- Damaged parts must not be installed.
- Make sure that there is no foreign matter, contamination, etc. inside the valve.
- The mating flange faces must be clean and undamaged.
- Do not forget the flange gasket when connecting the valve to the mating flanges. The flange gasket must be properly centered.
- When connecting to a flange, only the flange bolt holes provided by the manufacturer must be used.
- Always use all flange bolt holes provided.
- When connecting the valve to the pipe flanges, the tightening torques specified for the screwed connection must be complied with.
- Before welding the valve into the pipeline, make sure that the valve is in 'open' position.
- The welding procedure, filler metals and welding data shall be defined by the customer's personnel responsible on site.
- The welding cable (opposite pole) must not be attached to the valve during welding.
- When welding in, make sure the gap towards the pipe is uniform and without any radial offset.
- Gland packings must not be lubricated with oil.
- Valves used as dead-end valves in a pipeline must be suitably protected against unintentional opening and sealed off on the outlet side, e.g. by a blind flange, torispherical head or similar.

Before putting the valve into service, please verify the following:

- Reliable and correct actuation of the valve by repeatedly opening and closing it to the respective limit positions and checking the open or closed position by visual inspection. Make sure that the direction of actuation is correct.
- the existence and proper function of locking devices,
- that sealing elements and packing are free of leakage
- the correct function of closing cylinders

that electrical connections have been correctly wired,

- that limit switches respond in accordance with the information in the operating instructions,
- that the electrical data such as voltage, current, frequencies, etc. agree with the data for the mains connection provided on site,
- that the hydraulic hoses for the cylinders have been properly laid.

Caution During the pressure test of the pipeline, the valve must be in the half-open position.

5.10 Flushing or pickling

To avoid fluid leakage due to the chemical destruction of materials, only suitable flushing or pickling agents shall be used.

5.11 On-site coating

Caution To prevent corrosion damage to the external surfaces of the valve when installed in corrosive environments, it must be coated with a coating which is suitable for the conditions specific to the plant. Moving parts (e.g. stems) must not be coated, so as not to impair the reliable function of the valve.

6 Commissioning and operation

STAAL gate valves are intended for use in gate positions “closed” or “fully open” only. Any other use or use beyond that for which they are intended is deemed non-intended use. The manufacturer shall not accept any liability for any damage resulting from non-intended use. The risk must be borne by the operator alone.

6.1 Contact with hot (> 50 °C) and cold (< 0 °C) components

To avoid burns or freeze burns, the operator must attach contact guards or suitable insulation or warning signs to prevent contact with hot/cold components.

6.2 Risk of ice formation

Caution The formation of ice may cause the actuating element to block. For this reason, the entire valve – including the actuating element, if necessary – must be properly insulated.

6.3 Electrical voltages

Electrical hazards must be eliminated. (For details please refer to the relevant regulations for electrical installation (VDE) and the regulations laid down by the local energy supply companies.) Any work on electrical equipment of the valve shall only be carried out by a qualified electrician or personnel instructed and supervised by a qualified electrician. The relevant health and safety regulations and pertinent legal provisions must be adhered to. All electrical equipment of the valve without the requisite type of protection must be installed in dry rooms protected against flooding.

6.4 Effects of external force

If the valve is damaged, components may be torn off or flung off. Therefore, suitable precautions shall be taken on site against the effect of external force.

6.5 Contact between stem and back seat

Caution Temperature differences and the resulting changes in length may cause the stem to jam. In this case, valve closure will only be possible by tearing the stem free or using considerable force. For this reason, the stem must not be in contact with the back seat during operation.

6.6 Pressure and temperature related dangers

The permissible pressures in relation to the temperatures to which they are assigned on the valve data sheet and the name plate must be heeded. No work is permitted on a valve in operating condition.

6.7 Operating the handwheel

Caution

- The use of levers to turn the handwheel is not permitted.
- Platforms shall be provided for operating handwheels with a handle height greater than 1200 mm.
- Suitable precautions shall be taken by the operator to prevent unauthorized operation of the valve.

7 Monitoring, maintenance and repair work

STAAL gate valves do not require regular maintenance. The intervals for any monitoring and maintenance must be established by the operator primarily on the basis of the actual operating conditions, plant requirements and experience (statistical quality control). If the valve was selected on the basis of creep rupture parameters (see section LEERER MERKER), please bear in mind that regular inspections by a technical supervisory body may be required. To ensure operating reliability and to reduce repair costs, all valves should however be checked regularly, i. e.they should be actuated at least once or twice per year (opened/closed), in particular those valves which are rarely used or difficult to access. The external stem thread and the rolling element bearing shall be lubricated with acid-free grease via the lubrication nipple.

Maintenance and repair work shall be carried out by qualified staff only. The relevant health and safety regulations and other pertinent legal provisions must be adhered to. During all maintenance and repair work, the following requirements and the safety instructions given in section 3, Safety, must be complied with.

- Before commencing any work on the valve, make sure that the valve and all equipment mounted on it have cooled down and that pressure has been released. Be aware that even with the pipeline in a pressureless state, the valve body may still be under pressure when the valve is in closed position. For this reason, the valve must be in the semi-open position when the pressure is released from the pipeline.
- During routine inspections, the loss of material due to erosion or corrosion shall be checked. The standard valve design includes an erosion or corrosion allowance of 1 mm. The operator is responsible for ensuring that loss of material due to erosion or corrosion does not exceed 1 mm throughout the entire service life of the valve.

Caution

- Always use suitable tools.
- In the event of prolonged shutdowns, fluids which change their physical condition due to changes in concentration, polymerization, crystallization, solidification, etc. must be drained from the piping. If required, flush the piping with the valves fully opened.
- If toxic or easily inflammable fluids were handled, or fluids whose residues may cause corrosion in conjunction with air humidity, drain the valve and flush or vent it. If required, wear safety clothing and a protective mask!
- During maintenance or repair work, the valve/system must be secured against unauthorized start-up.
- When the valve is removed from the pipeline, it shall be handled in such a way that individual valve components do not come off.
- Screws and bolts shall only be tightened or loosened with the valve in the unpressurized state.
- Gland packings must only be replaced or additional packing rings added when the valve is unpressurized and the fluid is cold and relaxed.
- Gland packings must not be lubricated with oil.
- Only original spare parts and spare parts authorized by the manufacturer shall be used.
- Modifications or alterations of the valve supplied are only permitted after consultation with the manufacturer.
- Use new sealing elements and packing rings whenever the valve is reassembled.
- Make sure to reassemble all dismantled components in their original installation position.

Electrical connections must be dead and isolated from the power supply.

- If actuators powered by an external source of energy (electric, pneumatic, hydraulic) need to be removed from the valves or dismantled, the energy supply must be shut down and secured against unauthorized re-starting prior to starting any work.
- Any work on the actuators shall be governed by the instructions and specifications of the actuator manufacturers.
- Always check the limit switch settings when dismantling and reassembling actuators.
- After repair work has been completed, check the limit switches to make sure they respond.
- In both its end position, shutdown of the electrical actuator shall primarily be travel-dependent.
- The torque switch settings shall be made in accordance with the torques specified by the valve manufacturer and indicated on the valve data sheet.
- When setting the travel-dependent limit switch in opening direction, make sure that the stem does not touch the back seat after the electrical actuator has stopped.
- Use suitable tools when dismantling and reassembling actuators with integrated spring mechanism.
- Use suitable tools when dismantling and reassembling pneumatic or hydraulic cylinders.
- During commissioning or maintenance work on pneumatic or hydraulic cylinders, the instructions and specifications of the cylinder manufacturers must be complied with.
- Following completion of the work, all safety-relevant and protective devices must be re-installed and / or re-activated. Please refer to the instructions for commissioning before returning the valve to service.
- Any parts which have been replaced must be properly disposed of. Valves handling fluids injurious to health must be decontaminated before commencing any servicing, maintenance or repair work.

8 Converting or retrofitting the valve with gearbox and/or actuator Maintenance and repair work to gearbox and/or actuator

If a valve with handwheel which has not been prepared by the factory for fitting a gearbox and/or actuator is to be converted, it will be necessary to weld on a mounting flange. The threaded bush may have to be changed, too, depending on the model.

8.1 Correct fitting of mounting flange, correct installation of threaded bush

Conversion work must only be carried out by qualified personnel. The relevant health and safety regulations and other pertinent legal provisions must be adhered to. The instructions given below and the safety instructions contained in section 3, Safety, must be observed and complied with.

Caution Always use suitable tools.

- Assembly must be carried out in accordance with the manufacturer's assembly instructions.
- Only original spare parts and conversion parts authorized by the manufacturer shall be used.

- Before commencing any work on the valve, make sure that the valve and all equipment mounted on it have cooled down and that pressure has been released. Be aware that even with the pipeline in a pressureless state, the valve body may still be under pressure when the valve is in closed position. For this reason, the valve must be in the semi-open position when the pressure is released from the pipeline.
- During conversion or upgrading work, the system must be secured against unauthorized start-up.

Electrical connections must be dead and isolated from the power supply.

- The welding procedure, filler metals and welding data for fitting the mounting flange shall be defined by the customer's personnel responsible on site.
- The welding cable (opposite pole) must not be attached to the valve during welding. If, in exceptional cases, it is necessary to connect the earth cable to the valve, make sure the earth cable is only attached to the valve yoke or the strut but never to the valve stem. Damaged paintwork must be repaired.
- After changing a threaded bush (if necessary), make sure that the screw ring has been re-installed as locking device and that it cannot work loose.
- If the threaded bush is secured by means of a circlip, it is essential that the circlip be reassembled to give reliable operation after the threaded bush has been replaced.

8.2 Correct mounting of handwheel-operated gearbox, maintenance and repair work to gearbox

Handwheel operated gearboxes must only be mounted by qualified personnel. The relevant health and safety regulations and other pertinent legal provisions must be adhered to. During all assembly, maintenance and repair work, the following requirements and the safety instructions given in section 3, Safety, must be complied with.

- The instructions provided by the gearbox manufacturer shall be complied with.

Caution

- Always use suitable tools.
- Only original parts and conversion parts authorized by the manufacturers (e.g. nuts, bolts, screws, adapter flange, adapter sleeve, keys, etc.) must be used.
- Make sure the gearbox is permissible for the valve in terms of actuation torque and mounting method. Contact the manufacturer for permissible torques and the correct mounting method.
- The direction of rotation (clockwise at the gearbox handwheel – to close the valve; anti-clockwise at the gearbox handwheel – to open the valve) must not change as a result of gearbox installation.
- On valves with rising stem the gearbox must be fitted with a protective tube, or other precautions shall be taken by the customer.
- Before commissioning, check the correct function of the gearbox/valve combination.
- Verify the existence and proper function of locking devices on the gearbox.
- During maintenance or repair work on the gearbox, the valve/system must be secured against unauthorized start-up.

Electrical connections must be dead and isolated from the power supply.

- Repairs, modifications or alterations of the gearbox supplied are only permitted after consultation with the gearbox manufacturer.
- Only original spare parts and spare parts authorized by the gearbox manufacturer shall be used.
- The service life and any maintenance work required on the gearbox are indicated in the gearbox manufacturer's documentation.

8.3 Correct mounting of electrical actuator or gearbox/electrical actuator combination, maintenance and repair work

Electrical actuators or gearboxes / electrical actuator combinations must only be mounted by qualified personnel. The relevant health and safety regulations and other pertinent legal provisions must be adhered to. During all assembly, maintenance and repair work, the following requirements and the safety instructions given in section 3, Safety, must be complied with.

Caution Always use suitable tools.

- The relevant regulations for electrical installation (VDE) must be heeded.
- The instructions provided by the actuator and gearbox manufacturer shall be complied with.
- Only original parts and conversion parts authorized by the manufacturers (e.g. nuts, bolts, screws, adapter flange, adapter sleeve, keys, etc.) must be used.
- For mounting the actuator and the gearbox use all flange bolt holes provided.
- All electrical equipment of the valve without the corresponding type of protection must be installed in dry rooms protected against flooding.
- Check whether the electrical actuator and/or actuator/gearbox combination is permissible for the valve in terms of actuation torque range and mounting method. Contact the manufacturer for permissible torques and the correct mounting method.
- The electrical data such as voltage, current, frequencies, etc. of the electrical actuator must match the data for the power supply connection provided on site.
- Make sure the direction of rotation of the actuator is correct when connecting to the electrical power supply.
- On actuator/gearbox combinations make sure that the direction of rotation of the electrical actuator matches that of the valve, i.e. a ”close” command at the actuator will result in a closing movement of the valve, while the ”open” command at the actuator results in a opening movement of the valve.
- After repair work has been completed, check the limit switches to make sure they respond. For the torques required please contact the manufacturer.
- In both its end position, shutdown of the electrical actuator shall primarily be travel-dependent.
- The torque settings at the torque switches must be in compliance with the permissible torques indicated by the valve manufacturer.
- When setting the travel-dependent limit switch in opening direction, make sure that the stem does not touch the back seat when the electrical actuator has stopped.
- On valves with rising stem the actuator or gearbox must be fitted with a protective sleeve/tube or other precautions shall be taken by the customer.
- Before commissioning, check the correct function of the actuator/gearbox combination.
- Verify the existence and proper function of locking devices on the actuator.
- During installation, maintenance or repair work on the actuator and/or gearbox, the valve/system must be secured against unauthorized start-up.

Electrical connections must be dead and isolated from the power supply.

- Repairs, modifications or alterations of the electrical actuator and/or gearbox are only permitted after consultation with the actuator or gearbox manufacturer.
- Only original spare parts and spare parts authorized by the actuator or gearbox manufacturer shall be used.
- The service life and the instructions from the actuator or gearbox manufacturer on maintenance work must be taken into account.

9 Special designs

Important information about special designs is provided in the operating instructions of the relevant model.

For bypass arrangements the instructions provided in the operating manual of the bypass valve manufacturer must be complied with.

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