

Wey Knife Gate Valve VN/VS



# Instruction Manual

## Wey® Knife Gate Valves VN / VS

### 1. GENERAL

- 1.1 - Safety
- 1.2 - Designated service, ATEX
- 1.3 - Structure and function
- 1.4 - Marking

### 2. TRANSPORTATION, STORAGE

- 2.1 - Transportation
- 2.2 - Storage

### 3. INSTALLATION

- 3.1 - Preparation before installation
- 3.2 - Installation site
- 3.3 - Installation position
- 3.4 - Flow and pressure direction
- 3.5 - Mounting

### 4. COMMISSIONING

- 4.1 - General measures
- 4.2 - Safety measures
- 4.3 - Function test
- 4.4 - Pneumatically operated valves
- 4.5 - Hydraulically operated valves
- 4.6 - Electrically operated valves

### 5. MAINTENANCE

- 5.1 - Inspection
- 5.2 - Operating cycles
- 5.3 - Repacking
- 5.4 - Seal replacement
- 5.5 - Cleaning / Lubrication

### 6. TROUBLE SHOOTING

### 7. REMOVAL

### 8. DISPOSAL

### 9. FINAL REMARKS

Version 2012.04

## 1. GENERAL

### 1.1 Safety

Prior to any work or start-up and in order to ensure a proper functioning of our products, The instruction manual must be observed.

Alterations on the products need our written approval. For consequential damages due to neglect of this direction, we have to reject any liability.



This symbol marks safety and risk advice. Follow all such advice in order to prevent any damage to human life and objects.

The installation must be carried out according to established procedures and only by qualified personnel.

Project related data of valves, e.g. dimensions, materials and service range are found in the respective documentation.

The responsibility for the service application remains the sole duty of the end user.

### 1.2 Designated service

Wey® Knife gate valves are deigned to shut-off pressurized piping systems.

Depending of the construction, finishing equipment and material valves can be used in fluid group 1 and 2 according to PED 97/23/EC up to category III.

Wey® Knife gate valves may be installed as end-of-line service, provided that the valves are classified according to Art.3 (3) PED 97/23/EC. The max. working pressure must not exceed 0.73-times of the max. nominal pressure at room temperature. In addition the chapter 3.5 must be considered.

For the valve design working limitations refer to the relevant project data documentation and the maintenance manual.

Should the Wey® knife gate valve be installed in an explosion-protected area, the valve and the electrical and non-electrical equipment must meet the explosion zone RL 94/9EG, ATEX

### 1.3 Structure and function

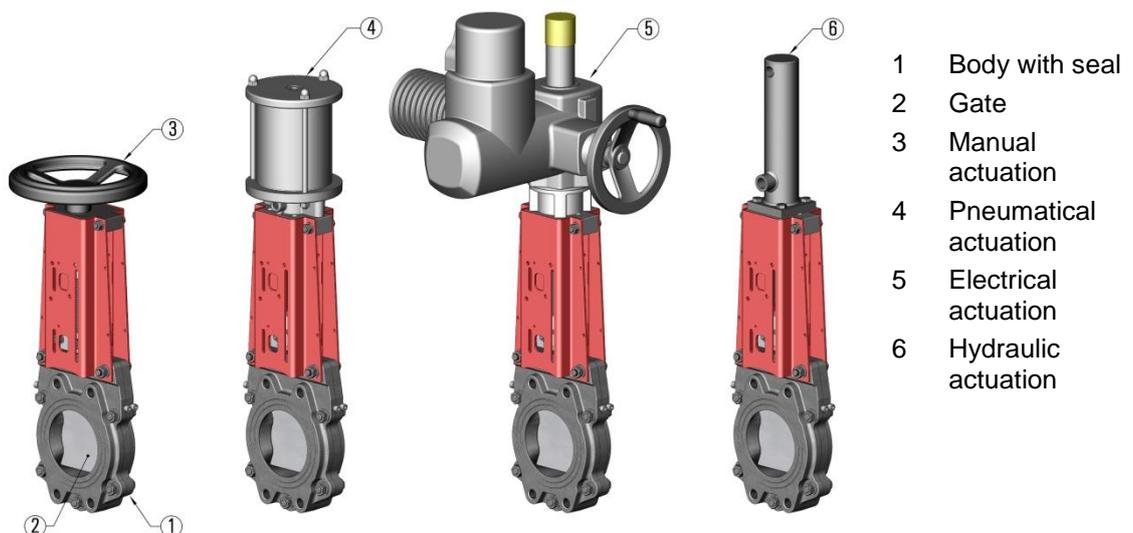


Fig. 1

## 1.4 Marking

Manufacturer  
 Type / Material  
 Size / Flange drilling  
 Year / Fabr. No.  
 Nominal pressure.  
 Operating pressure  
 Medium temp.  
 Ambient temp.  
 Air supply pressure <sup>1)</sup>  
 Conformity / No notified body <sup>1)</sup>

<sup>1)</sup> if applicable

### Example



## 2. TRANSPORTATION, STORAGE

### 2.1 Transportation

Transportation of the valves to their final destination (building site) shall take place in solid crates adapted to the valves' size. The valves shall be protected against exterior damage and atmospheric exposure.

Depending on the duration of transportation or storage and in view of the conditions, preservation shall take place by welding valves into PE-film or adding sufficient drying agent or equal.

### 2.2 Storage

Until final installation the valves shall be stored in a dry, vented area. All function relevant parts shall be suitably covered against humidity, dust or other contamination.

For longer storage periods or in case of unfavourable storage conditions which might affect later functioning, all blank surfaces, e.g. stem, piston rod, sealing surfaces shall be suitably protected by long-term preservatives against corrosion.

Factory applied preservatives shall be checked for possible transport damages and appropriately repaired, if necessary.

For accessories mounted to the valves, such as electric actuators, limit switches, solenoids, etc., the respective storage instructions of the manufacturer shall be observed with priority.

## 3. INSTALLATION

### 3.1 Preparation before installation

Before installation, please make sure that the subject Wey® Knife gate valve is in conformance to the service conditions. The responsibility regarding applied service medium (corrosion resistance, pressure, temperature etc.) is with the end-user. Please check, if the valve to be installed in an explosion protected area, the valve meets the rules for the relevant zone.

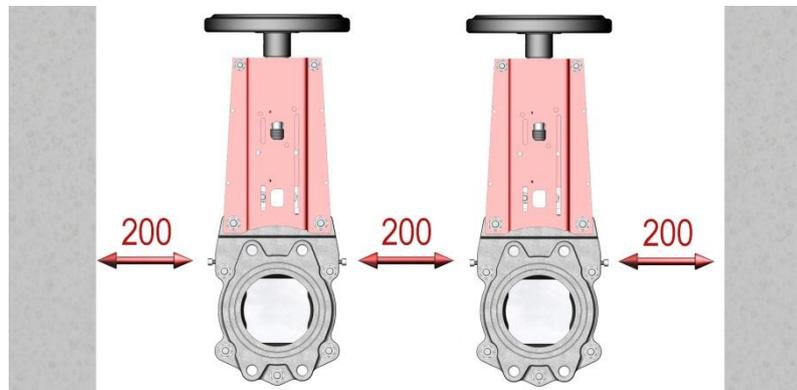
Not correctly aligned pipelines must, by all means, be corrected before installation in order to avoid tensions or even cracking of the valve body.

Before final installation of the valves, any possibly applied corrosion protection shall be thoroughly removed. All parts, and in particular the gate, stem and piston rod shall be free of dust and dirt.

### 3.2 Installation site

The mounting position must be chosen in such a way, that the knife gate valve can be checked and repaired at any time without risks.

For repacking purpose the small side of the valve body shall be freely accessible (Fig. 2).



→ = Repacking feature

Fig. 2



Additional directives and guidelines for installation and operation of explosion protection equipment, when installed into Ex-zones, must also be observed. Check if the equipment fulfils the safety requirements at site.

For outdoor installations, the valves shall be protected at site with shields or covers against severe weather conditions like snow and ice.

### 3.3 Installation position

Wey® Knife gate valves will be installed in one of the positions shown in fig.3. Avoid a different installation position whenever possible.

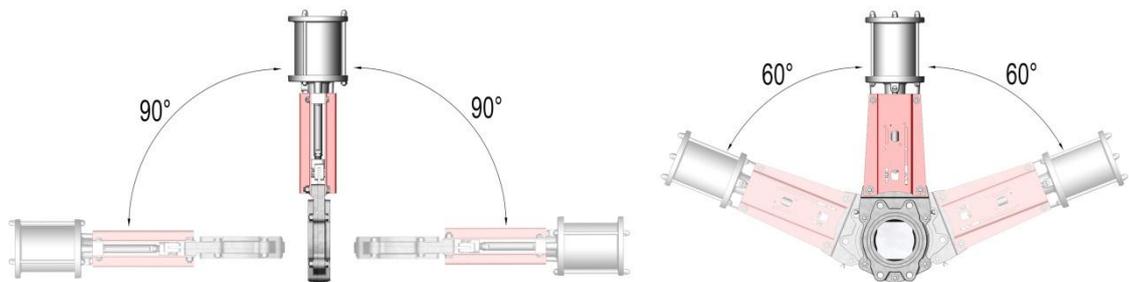


Fig. 3

Wey® Knife gate valves from size DN400 up with extended or heavy actuators, which are not vertical installed, should be supported on site. This is also recommended, if vibrations of the piping line may occur.

### 3.4 Flow and pressure direction

The Wey® Knife gate valve is a bi-directional design (fig.4). Depending on applications and valve design options a preferred flow direction must be considered.

<b>Liquid, gaseous and pneumatic conveyed solid fluids</b>	
Flow direction	Bi-directional possible (A,B)
	With the application of a wear ring from the entry side (B)
Pressure direction	Against gate bevel preferred (A)
<b>Powder and granulate at gravity discharge</b> (vertical piping)	
Flow direction Pressure direction	The gate bevel is positioned on the descending side, also when a cone insert is used (B)

The preferred pressure direction must especially be considered, if the valve is working at 60 – 100% of the nominal pressure.

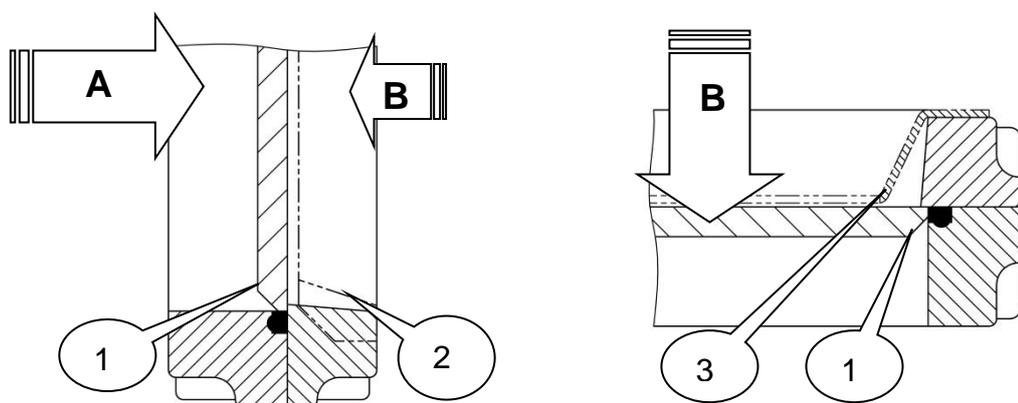


Fig. 4

- 1 Gate bevel shape
- 2 Wear ring (option)
- 3 Cone insert / contracted bore (option)

For difficult service conditions or for custom-made valves, please contact the manufacturer regarding the installation position.

### 3.5 Mounting

Before mounting, check valves for possible transportation or storage damages.

The valves shall be protected against construction work at site.

For additional painting of the valves, the stem, piston rod, electric accessories and the valve gate protruding the body shall not be painted. Before any sand blasting, the valves shall be protected with covers.

For valves with a stem extension, the pipeline flange must be exactly in line with the extension. The exact position of the flange holes in relation to the extension shall also be observed.

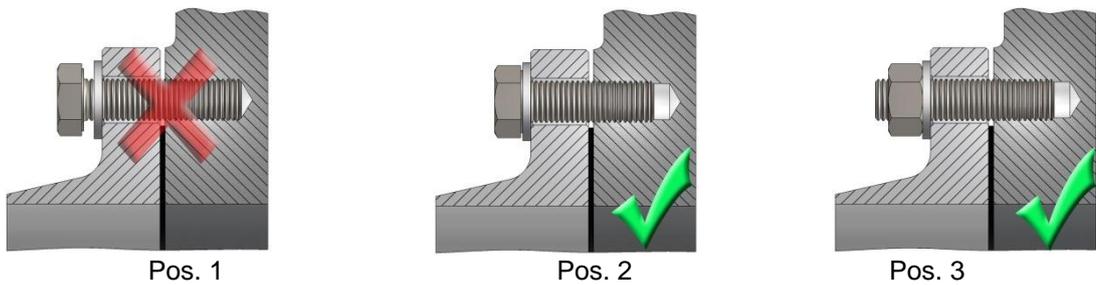
Wey® Knife gate valves are installed between two piping flanges with thru bolts and with bolts for body blind holes.



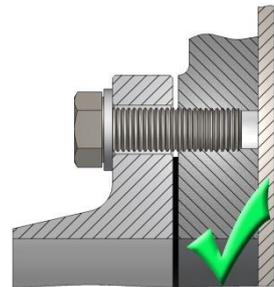
Piping system misalignments must never be corrected using the valve body. Tighten bolts with caution, so that tensions in the body do not cause any cracking or breaking. No tilting, steady crosswise tightening.

Bolt torques are to be observed. Table 1

Apply flange bolts according Fig. 5 into tapped blind holes.



- Pos. 1 : Wrong assembly  
Tightened bolts shall not touch the bottom of the tapped blind holes.
- Pos. 2 : Correct assembly
- Pos. 3 : Also correct assembly.  
Insert stud, then tighten nut.
- Pos. 4 Valve sizes DN80 – DN200 come with tapped thru holes in the chest area. Make sure to use the correct screw length. The screws must under no circumstance touch the gate as otherwise the gate will be blocked and damaged.



Pos. 4

Fig. 5

Remaining flange holes to be applied with through bolts acc. Fig. 6

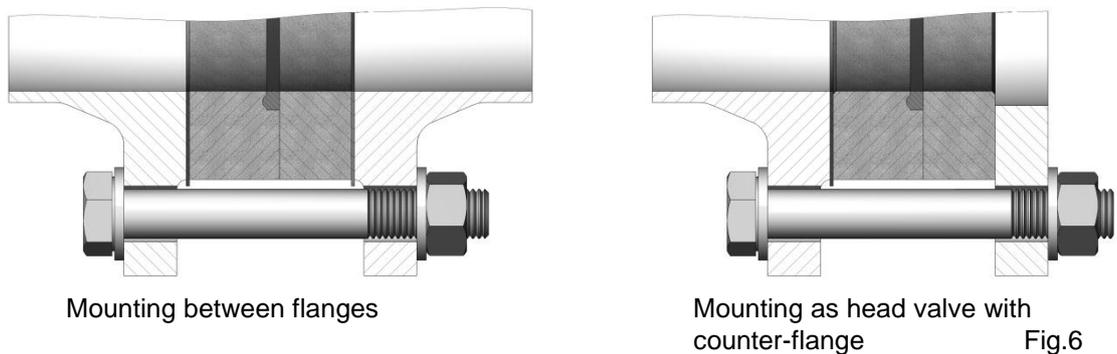


Fig.6

The dimensions of the flange bolts, its number are found in the documentation.

Size [mm]	Bolt thread [mm]	Torque [Nm]
50-125	M16	60
150-350	M20	120
400-500	M24	220
600-700	M27	320
800-900	M30	440

**Table1 Torque for flange bolts**

Based upon type of flange gasket, manufacturer's instructions are to be observed. It is to ensure that the flange connection is tight. Leakage can be dangerous to humans and environment.

When using bordering flanges special care applies. The flange face for type VN/VS have a reduced outside diameter compared with standard flanges. Therefore it is advisable to use rubber-steel-gaskets. Special care must be taken to ensure accurate centring of the gasket during installation.

If the Wey® Knife gate valves are installed as end-of-line service a counter-flange should be used. The chapter 1.2 must be considered. For an installation without counter-flange not all flange screws can be used. Due to this the nominal pressure reduction according to below table 2 applies. A rubber-steel-gaskets must be used.

**Table 2 Reduction of nominal pressure**

Body Material	With counter flange	Without counter flange
Cast steel	0.73 * PN	0.73 * PN
Cast iron	0.73 * PN	0.50 * PN



The installation as an end or head valve requires special attention. In service, the downstream side must not be accessible for persons. See also chapter 1.2 and 4.2.

After installation a correct earthing connection must be verified. This is normally done through the flange bolt connection. If this is not the case, the potential or guard wire must be drawn to the terminal clamp.

Should there be a longer time period between mounting and power connection of electrically operated valves, it shall be ensured that the integral heater of the actuator is already connected during mounting of the valves in order to avoid the formation of condensate water (or protect actuator with suitable drying agent).

## 4. COMMISSIONING

### 4.1 General measures

Before taking the valves into service, all function relevant parts (gate, stem, piston rod, etc.) shall be thoroughly cleaned. Damages, in particular to the seal caused by remains of grit, welding beads, foreign rust or similar on the gate, are not covered by the warranty.

For powder or granular service, it should be observed that wetted or humid media which has tendency to cake to the gate is thoroughly removed before start-up.

The valves are factory preserved and lubricated for transportation and storage, but they require depending on the service conditions, another lubrication before start-up. Recommended are water-repellent, temperature resistant and long lasting lubricants. (Get your nearest supplier's recommendation).

### 4.2 Safety measures



For automated valves installed in an area where valve movement could be dangerous for people (or animals/objects), it must be ensured by the user on-site that all moving parts are fenced with a suitable cover or protection shield.

Should they not already be mounted, such covers are optionally available from manufacturer. Protection goals can also be reached through suitable on-site measure. Unprotected valves must not be commissioned.



If hot gases or fluids are transported in the pipeline, ensure that no persons can touch the hot surfaces.

It is also to ensure that no external interference of the control circuits can actuate the valve unintentionally.

### 4.3 Function Test

Before commissioning a function test must be performed. Open and close the valve one time as a minimum.

If the pipeline is pressure tested, it is to ensure that the applied pressure is not higher than the maximum allowed test pressure of the valve.

### 4.4 Pneumatically operated valves



Preventive measures must be taken, that the maximum tank pressure is not exceeding ( 8 bar), also not in a breakdown situation.

For operation of the actuator use only dry, filtered air acc. Class 4/5 ISO 8573-1

max. dust particle size	40 µm
max. dust particle concentration	10 mg/m <sup>3</sup>
max. excess oil concentration	5 mg/m <sup>3</sup>
pressure dew-point	below minimal ambient temperature

Solenoid valves shall be mounted as close as possible to the actuating cylinder.



Air hoses, especially plastic pipes must be mounted and secured so that they cannot be unintentionally interrupted or torn. In order to keep a valve tight in its closed position, the piston must be permanently under pressure.

The size of the air supply pipes has to be in relation to the air volume.

Before start-up, all on-site mounted supply pipes and solenoid valves shall be thoroughly flushed and cleaned, if necessary.

Factory mounted solenoid valves are normally provided without accessories like throttle or muffler. On-site regulations must therefore be observed.

Pneumatically operated valves shall not be closed instantly in order to avoid the risk of pressure shocks.

### 4.5 Hydraulically operated valves

Before start-up, all on-site mounted supply pipes shall be thoroughly cleaned. Hydraulically actuated valves shall not be closed instantly in order to avoid the risk of pressure shocks.

The maximum design air-supply pressure must not exceed. Higher air-supply pressure may damage the valve.

### 4.6 Electrically actuated valves



For electrical installations observe local rules, standards and directives.

Additional directives and guidelines for installation and operation of explosion protection equipment, when installed into Ex-zones must also be observed.

Check if the equipment fulfils the safety requirements at site:

After installation a correct earthing connection must be verified. This is normally done through the flange bolt connection. If this is not the case, the potential or guard wire must be drawn to the terminal clamp.

For trouble-free commissioning of electric actuators, we recommend to call on our specially trained customer service specialist.

On-site electric installations shall be in accordance with respective connecting diagram of the supplier. In addition, the specific operating instructions of the actuator supplier shall be observed.

Before the first electrical operation, the valve gate shall be set to an intermediate position with the manual override, and then started.

When connecting to the power supply, the phase sequence has to be observed.



With wrong phase sequence, limit and torque switches are ineffective.

The switch off shall be in accordance to our instructions/diagrams, i.e.:

- Switch-off in closing direction: usually by limit switches, exceptionally by torque switches (for abrasive service applications).
- Switch-off in opening direction: by limit switches only, as the torque switch serves as overload protection.

## 5. MAINTENANCE

### 5.1 Inspection

When in operation with dangerous fluids especially the leak-tightness against atmospheric area must be controlled on a regular basis. At possible indication of leakage must be repacked.

### 5.2 Operating cycles

During one service year, at least four (4) operating cycles shall take place, whereby all components shall be checked. Under severe service conditions, such functional checks shall take place more frequently.

### 5.3 Repacking

During a longer storage period of the Wey® Knife gate valves or in case of great temperature fluctuations, the packing material in the transverse seal may shrink. This could lead to slight leakage through the transverse seal in the body chest area.

Should a leakage be detected at the transverse seal which remains even after repeated actuation of the gate, the valve can be repacked easily and quickly while installed. During this work however, the valve should possibly not be under full service pressure.

Mostly, it is only necessary to firmly tighten the four (4) packing screws on the side by 1-2 turns.

Did the leakage not stop (after packing screws are fully tightened), then remove the screws from the valve body (Fig. 7)

Insert packing pellet into holes and compress firmly with packing tool. Repeat until valve is absolutely tight.

Please observe that the valve gate is not pressed against the valve body due to the repacking. One-sided and too powerful repacking can cause the valve gate to jam.

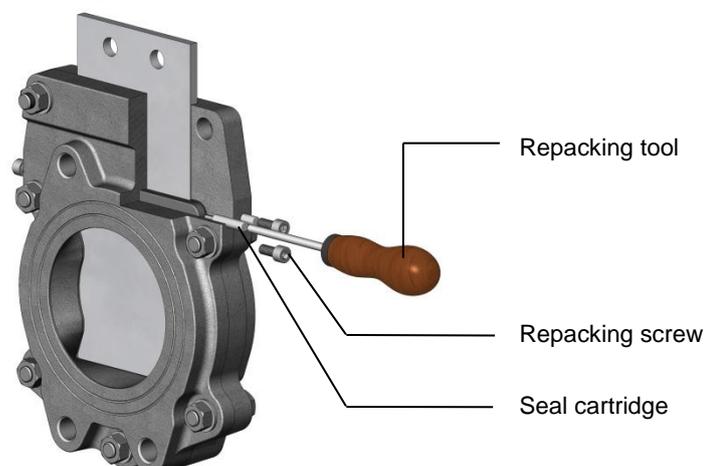


Fig. 7

#### **5.4 Seal replacement**

Should a leakage through the bore passage occur, the cause is mostly damage or wear of the body seal.

The valve body seal can only be replaced when the valve is removed from the pipeline.

Seal replacement can be performed by trained personnel according instructions or at any time in our works.

#### **5.5 Cleaning / Lubrication**

Stem rods, pull and piston rods shall be free of dirt and contamination and shall always be well lubricated.

Lubrication points on handwheel bearings shall be regularly lubricated based on the operating conditions, but at least every 3 months.

Pneumatic cylinders with closing cushion are fitted with a self-lubricating rod seal.

Any leakages on the cylinders require the exchange of all sealing components.

For valves with electric actuators, the lubrication point on the drive should be especially observed.

The respective operating instructions of the actuator supplier are binding.

Depending on the service conditions of the valves, the gate is to clean and needs possibly slight lubrication.

## 6. TROUBLE SHOOTING

Trouble	Possible Cause	Elimination
Leakage at gate in body chest area.	Transverse seal untight	Repacking of transverse seal according to instructions
	Transverse seal damaged	Replacement of transverse seal according to instructions, cleaning of valve gate, if necessary replacement of gate
Leakage in bore passage of valve	Valve gate not completely closed; jammed particles between gate and body internals	<b>Manual valves:</b> <ul style="list-style-type: none"> <li>- Open valve slightly and repeat closing action</li> <li>- Remove jammed particles</li> </ul>
	Jammed particles between stem nut, resp. clevis and body chest	<b>Pneumatically and hydraulically operated valves:</b> <ul style="list-style-type: none"> <li>- Open valve slightly and repeat closing action</li> <li>- Check, if necessary new setting of clevis, resp. stroke</li> <li>- Remove jammed particles</li> </ul>
		<b>Electrically actuated valves:</b> <ul style="list-style-type: none"> <li>- Open valve slightly and repeat closing action, check, possibly reset switches (upon supplier's recommendation)</li> <li>- Remove jammed particles</li> </ul>
	Body seal damaged	Remove valve, replace seals according to instructions
Leakage through valve body halves	Valve distorted during mounting	Untighten flange bolts and re-tighten according to instructions
	Sealant between body halves damaged	Remove valve and replace sealant according to instructions
Valve gate is not movable	Actuating components damaged	<b>Manual valves:</b> <ul style="list-style-type: none"> <li>- Check, clean stem or stem nut, replace if necessary, lubricate</li> </ul>
		<b>Pneumatically and hydraulically operated valves:</b> <ul style="list-style-type: none"> <li>- Check supply pressure Check if current onto solenoid exists. Check solenoid for damages Check hydraulic cylinder for damages (seal)</li> <li>- Clean and lubricate; if necessary replace damaged components acc. to supplier's instructions</li> </ul>
	<b>Electrically actuated valves:</b> <ul style="list-style-type: none"> <li>- Check if current exists</li> <li>- Check if motor defect</li> <li>- Check if limit switches defect or adjusted</li> <li>- Check if gear, stem or stem nut damaged</li> <li>- Clean and lubricate; if necessary replace damaged components acc. to supplier's instructions</li> </ul>	
	Valve clogged; Valve gate contaminated	Remove valve, clean, possibly disassemble completely
Closing or opening stroke ceasing or stagnating	Insufficient supply pressure	<b>Pneumatically and hydraulically operated valves:</b> <ul style="list-style-type: none"> <li>- Check supply pressure, possibly increase supply pressure</li> </ul>
	Solenoid valve dirty	Remove and clean solenoid valve, possibly install filter
	Piston rod seal damaged	Remove and clean piston rod seal, exchange and lubricate cylinder seals
	Valve clogged	Clean valve and lubricate
Pressure loss on supply net	Control pipe connection damaged	Check pipe connections, tighten, replace if necessary
	Cylinder seals damaged	<ul style="list-style-type: none"> <li>- Check and replace cylinder seals, lubricate</li> <li>- Check piston rod seal, clean, lubricate</li> </ul>

## 7. REMOVAL



Before removing the valve, consider that the pipe system can be under pressure and that hazardous media could get into the environment. Respective precaution measures must be taken.

Actuators must, in principle, not be removed if pipeline system is under pressure. Electric actuators must be made current less, respectively disconnected from circuit.

Pneumatic and hydraulic actuators must be pressure less and disconnected from supply lines.

In case the pipe is removed on one side only, ensure before that the valve cannot be operated. Unintentional opening of the valve can be hazardous to people and environment due to drain-off of service medium. Unintentional closing can be very harmful, if a person (or body part) is within the area of the valve gate travel.

## 8. DISPOSAL

Observe that sediments inside of valve or pipe can be harmful to people and environment. Respective precautions measures are to be taken. After finished service life the valve must be disposed skilful and in conformity with environmental regulations.

## 9. FINAL REMARKS

All details given above are to our current up-to-date knowledge and shall provide, together with our technical documentation, information about our products and their range of applications.

They are not thought to assure particular features of the products nor their suitability for a specific application.

Faultless quality is assured within our General Sales Conditions.

For any further information, please call any time on our Customer Service Department.

Alterations reserved