



Control Valve with  
ZK Radial Stage Nozzle®  
ZK 39/15 Version for  
electrical rotary actuator  
ZK 39/20 Version for  
pneumatic diaphragm actuator

# ZK 39

# Contents

Page

## Important Notes

Usage for the intended purpose .....	4
Safety note .....	4
Danger .....	4
Attention .....	5

## Explanatory Notes

Scope of supply .....	6
Description .....	6
Function .....	7

## Technical Data

Pressure/temperature ratings ZK 39 (valve without connections) .....	8
Materials ZK 39 .....	8
$kV_S$ values ZK 39 .....	8
Weight .....	8
Corrosion resistance .....	9
Name plate / identification marks .....	9
Dimensions ZK 39 .....	9
Capacity chart ZK 39, cold water .....	10
Capacity chart ZK 39, hot water ts $-5$ K .....	11
Backpressure chart ZK 39 .....	11

## Design

ZK 39/15, sectional drawing (example) .....	12
Key ZK 39/15 .....	13
ZK 39/20, sectional drawing (example) .....	14
Key ZK 39/20 .....	15

## Installation

ZK 39 .....	16
Design with butt-weld ends .....	16
Heat treatment of welds .....	16
Pickling and rinsing .....	16
Attention .....	16

## Commissioning

ZK 39.....	17 – 18
Tightening torques for the stuffing box ZK 39/15.....	17
Tightening torques for the stuffing box ZK 39/20.....	17
Activating the mechanical lift limitation.....	19

## Operation

ZK 39.....	20
Attention.....	20

## Maintenance

ZK 39.....	21
------------	----

## Maintenance / Repair

Removing the valve cover with yoke and the electrical actuator for ZK 39/15.....	22
Removing the valve cover and the pneumatic diaphragm-actuator for ZK 39/20 .....	22
Removing the radial stage nozzle.....	22
Installing the radial stage nozzle.....	23
Removing the stuffing box ZK 39/15 .....	23
Removing the stuffing box ZK 39/20 .....	23
Removing the spindle bearing ZK 39/15.....	24
Installing the spindle bearing ZK 39/15 .....	24
Installing the stuffing box with cover and yoke ZK 39/15.....	24
Installing the stuffing box with cover and actuator mounting ZK 39/20.....	25
Installing the valve cover on the body ZK 39/15 .....	25
Installing the valve cover on the body ZK 39/20 .....	26
Installing the lift limitation for ZK 39/15 .....	26
Installing the actuator on ZK 39/15 .....	26

## Decommissioning

Danger .....	27
Disposal.....	27

## Important Notes

### Usage for the intended purpose

#### ZK 39:

The control valve, series ZK 39, is intended for cutting off and/or regulating the flow of fluids consisting of water, steam, or steam condensate. Its use is permissible only within the allowable limits of pressure and temperature, and only if the chemical and corrosive influences on the pressure equipment are taken into account. Before installation and operation, a check must be performed to ascertain that the valve is resistant to the medium in the operational conditions that will exist.

To ensure safe operation of the valve ZK 39, only actuators named and specified by GESTRA may be installed on the control valve.

### Safety note

Installation, commissioning, maintenance and conversion work must only be performed by adequately trained persons who have a recognized level of competence and have received special instruction and authorization.



#### Danger

The equipment is under pressure during operation.

When loosening the flanged connections, sealing plugs or stuffing boxes, it is possible that hot water or steam may escape.

Installation and maintenance work should only be carried out when the system is depressurized! Isolate the valve from both upstream and downstream pressure. Make sure that the pressure in control lines is zero.

The valve becomes hot during operation. This presents the danger of severe burns to hands and arms. Installation and maintenance work should only be carried out when the system is cold.

Risk of severe burns and scalding over the entire body!

Before performing maintenance work on the valve or flanged connections or undoing the stuffing-box connections or sealing plugs, ensure that all the connected pipes are pressureless (0 bar) and have cooled down to room temperature (20 °C).

Danger of crushing: During operation, moving internals can cause serious injury to hands. Do not touch the valve during operation! The control valves ZK 39 are remote-controlled and can open and close abruptly.

Sharp edges on internal parts present a danger of cuts to hands. Always wear industrial gloves for installation work.

Danger of eye injuries: Always wear safety goggles when assembling or checking the equipment.

If valves are radioactively contaminated, observe the local regulations on protection against radiation.

## Important Notes – continued –



### Attention

The name plate indicates the technical specification of the equipment.  
Do not commission or operate a valve without such a name plate.

## Explanatory Notes

### Scope of supply

#### ZK 39

- 1 Control valve ZK 39 according to specification
- 1 Actuator according to specification (optional)
- 1 Parts list with drawing of components
- 1 Inspection certificate detailing equipment-specific technical data
- 1 Installation manual

### Description

The control valve is used to reduce large differential pressures. It is used in nuclear power stations as:

- Spray injection valve
- Warm-up valve
- Drain valve
- Feedwater control valve
- Leak-off valve
- Steam control valve

The pressure drop is decreased in the ZK radial stage nozzle® in several steps.

The valve consists of the valve body, a yoke suitable for the various actuators, and a ZK radial stage nozzle® with valve plug integrated into the valve body to act as the control element.

Depending on requirements, the bodies are designed as Z-pattern or angle versions.

The control valve can be operated by means of various actuators, e. g. electric rotary actuators, pneumatic actuators or by means of a handwheel.

If the operating conditions of the plant change, the  $Kv_s$  value and the characteristic curve of the control valves can be adapted to suit the new conditions by turning of the sleeve insert of the ZK radial stage nozzle®, without having to remove the valve from the line.

#### The ZK 39 is fitted with:

- Connection for sealing fluid
- Self-tightening stuffing box
- Adjustable mechanical lift limitation in the closing position
- Possibility of pressing out the stuffing box rings hydraulically
- Purge position of the valve plug for brief increase in performance (optional)

## Function

All pressure parts of the ZK 39 are forged. The internals, including the seat, are easily exchangeable, even after a long period of use. The ZK radial stage nozzle® combines the function of a control valve with a conventional shut-off valve and guarantees maximum wear protection and absolutely tight shut-off.

Each control valve of the ZK series is equipped with a radial stage nozzle®.

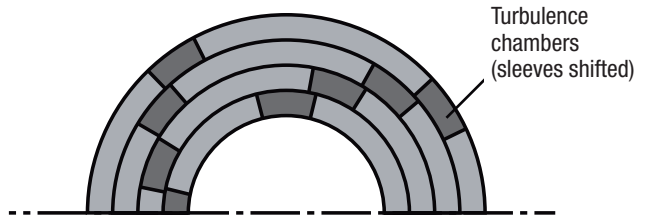
This system consists of several sleeves nesting within one another, containing radial orifices drilled in them. By rotation of the sleeves, the orifices are shifted relative to one another, thus forming a large number of throttling points in parallel, with turbulence chambers (expansion chambers) in between.

The flowrate through the ZK radial stage nozzle® is set by means of the valve plug. Depending on its position, this valve plug opens up the individual orifices partially or completely, thus producing different flowrates.

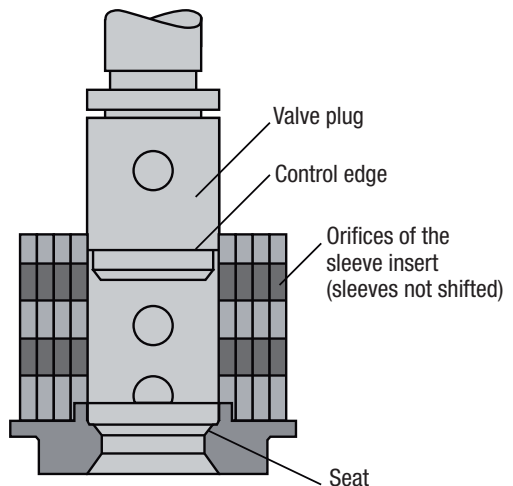
As a result of this design, the pressure drop is reduced in steps and the medium flowing through is split up into many partial flows. This ensures high resistance to wear and reduces the noise level.

On the valve plug, there is a control edge which is separate from the seat surface and which closes the orifices of the sleeve insert before the valve plug comes to rest completely against the seat ring. As a result, wear is prevented on the surfaces of the seat. Because of the multiple, step-by-step expansion in the turbulence chambers, the pressure drop in the region of the seat is minimized.

**Fig. 1**  
*Cross-section of the  
ZK 39 radial stage nozzle*



**Fig. 2**  
*ZK 39 radial stage nozzle with  
special valve plug*



## Technical Data

### Pressure/temperature ratings ZK 39 (valve without connections)

The pressure and temperature ratings are individually calculated for each valve and recorded on the name plate. In addition, the pressure/temperature ratings form part of the corresponding pre-testing documents.

Admissible working differential pressure of the radial stage nozzle: 100 bar

### Materials ZK 39

Designation	DIN / EN		
Body	1.5415	1.7335	1.7383
Cover	1.5415	1.7335	1.7335
Threaded bolts	1.7709		
Nuts	1.7709		
Spindle	1.4122		
Plug	1.4122		
Valve seat	1.4122		

### kv<sub>s</sub> values ZK 39

DN	Charac- teristic	kv <sub>s</sub>			Valve stroke [mm]	Revolutions for full stroke of valve	Valve stroke with optional purge position [mm]	Revolutions for full stroke of valve with optional purge position	Max. admissible torque for opening / closing	Type / size of actuator  DIN ISO 5210
		[m <sup>3</sup> /h]								
25	Linear	3	6	9	33	8.3	45	11.3	60	B1 – F10
25	Equal %	3	5.5	8	33	8.3	45	11.3	60	B1 – F10
50	Linear	3	6	9	33	8.3	45	11.3	60	B1 – F10
50	Equal %	3	5.5	8	33	8.3	45	11.3	60	B1 – F10
80	Linear	14	21	28	45	11.3	60	15.1	60	B1 – F10
80	Equal %	9	15	21	45	11.3	60	15.1	60	B1 – F10

### Weight

DN	[mm]	25	50	80
Weight with butt-weld ends	[kg]	26	30	55



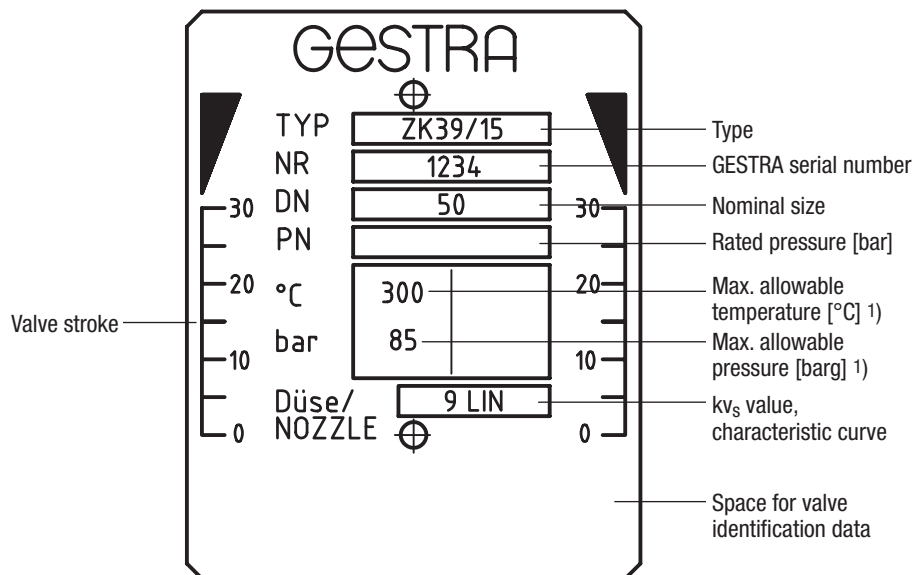
## Technical Data – continued –

### Corrosion resistance

When used for its intended purpose, the safe functioning of the equipment will not be impaired by corrosion.

### Name plate / identification marks

For the pressure and temperature ratings, see the data given on the name plate.  
The arrow indicating the flow direction is on the body. Further information is given in the pre-testing documents relating to the valve.



1) If no rated pressure is specified on the name plate, the ratings for the max. allowable pressures are given with the corresponding temperatures.

### Dimensions ZK 39

The valve dimensions are given in the outline drawings of the pre-testing documents.

Capacity chart ZK 39, cold water

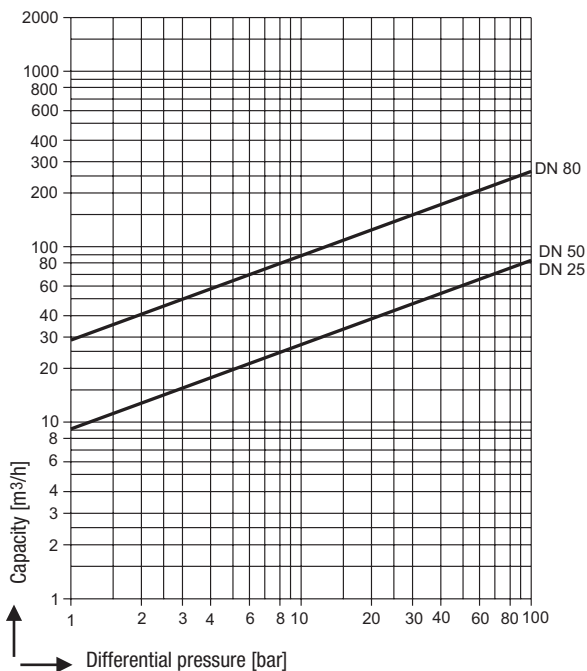
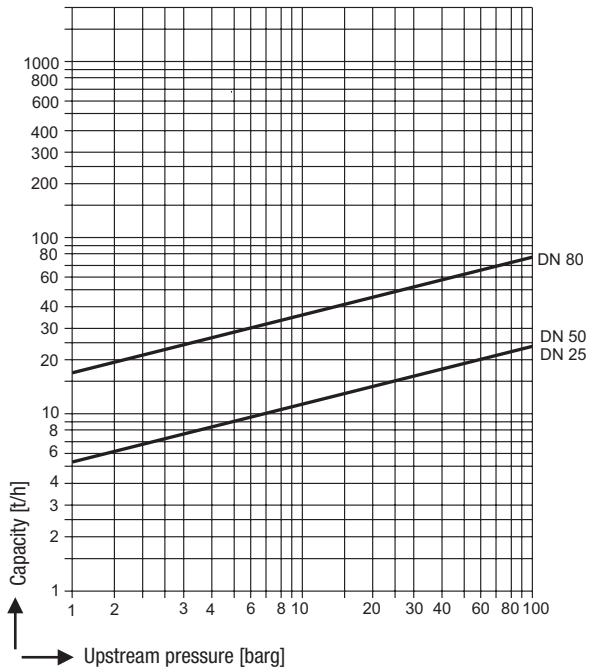


Fig. 3

The chart shows the maximum flowrates of cold water at the extreme regulation position with linear characteristic curves and maximum  $Kv_S$  value without purge position.

**Capacity chart ZK 39, hot water  $t_s -5\text{ K}$**

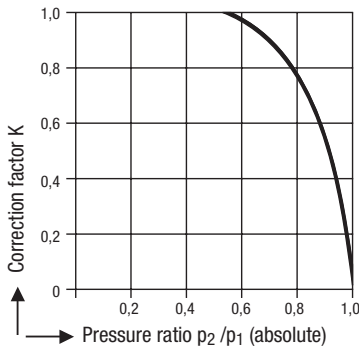


**Fig. 4**

The chart shows the maximum flowrates of hot water at the extreme regulation position with linear characteristic curves and maximum  $Kv_s$  value without purge position.

If  $p_2/p_1 > 0.5$  multiply the chart reading by the correction factor  $K$  taken from the backpressure chart below.

**Backpressure chart ZK 39**



**Fig. 5**

# Design

## ZK 39/15, sectional drawing (example)

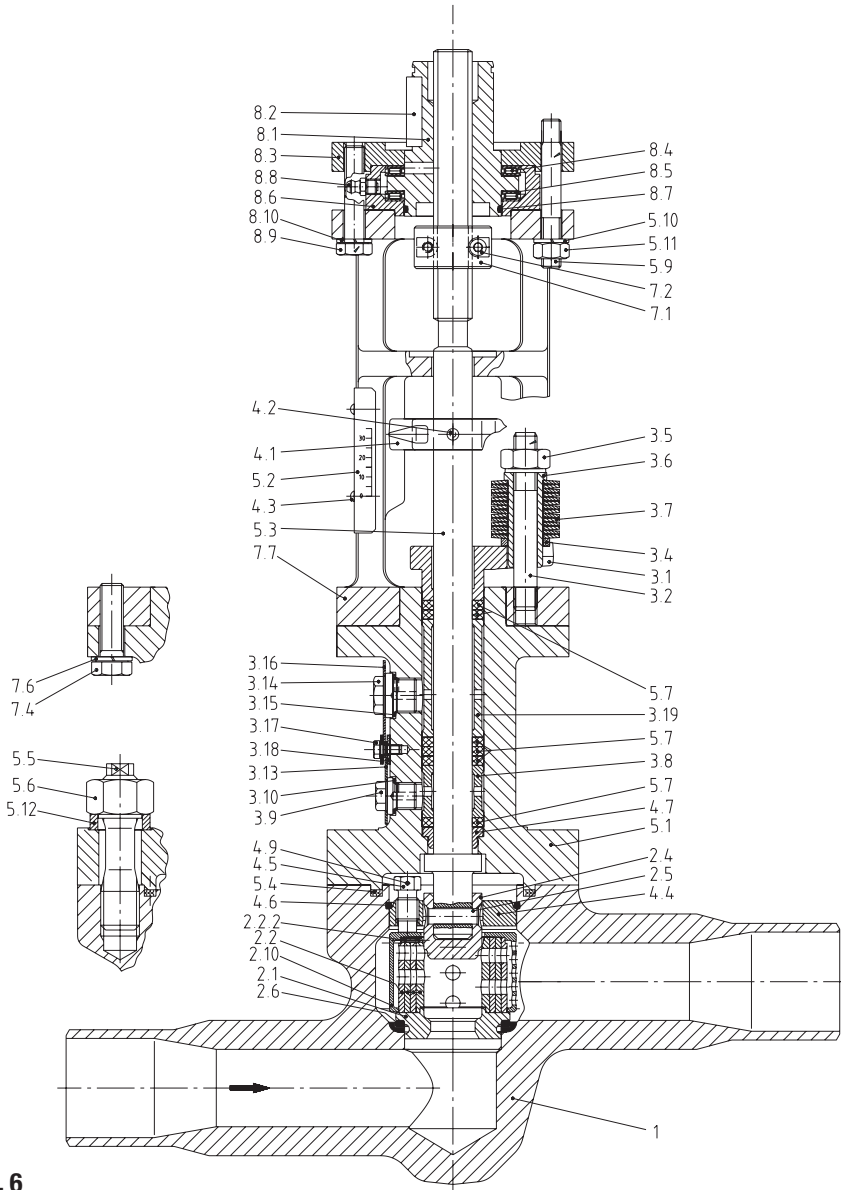


Fig. 6

## Key ZK 39/15

1	Body	4.4	Thrust ring
2	Parts for assembly of the nozzle	4.5	Hexagon screw
2.1	Seat ring	4.6	Circlip
2.2	Sleeve insert, complete; 2.2.1 pinned together with 2.2.2	4.7	Base bushing
2.2.1	Sleeve insert (not adjusted!) See 2.2	4.9	Wire 0.8 soft, DIN 177, 500 mm
2.2.2	Slotted straight pin 2x10 See 2.2	5.1	Cover
2.4	Valve plug	5.2	Indicator plate
2.5	Rivet	5.3	Spindle
2.6	Gasket, grooved	5.4	Spiral-wound gasket
2.10	Wear-protection sleeve	5.5	Threaded bolt
3.1	Stuffing box gland	5.6	Hexagon nut
3.2	Stud	5.7	Gland packing ring
3.4	Washer	5.9	Stud
3.5	Hexagon nut	5.10	Lock washer
3.6	Sleeve	5.11	Hexagon nut
3.7	Disc spring	5.12	Spacer sleeve
3.8	Ring	7.1	Adjusting nut
3.9	Plug M14x1.5	7.2	Socket-head cap screw
3.10	Gasket A 14x18	7.4	Hexagon screw
3.13	Locking plate	7.6	Lock washer 27
3.14	Plug M18x1.5	7.7	Yoke
3.15	Gasket A 18x22	8.1	Yoke bush Tr20x4
3.16	Locking plate	8.2	Locating key A 12x8x36
3.17	Hexagon screw	8.3	Flange F10-B1 DIN EN ISO 5210
3.18	Washer	8.4	Axial needle cage
3.19	Ring	8.5	Axial washer
4.1	Fork	8.6	Bearing casing
4.2	Spring pin	8.7	O-ring
4.3	Roundhead grooved pin	8.8	Grease nipple
		8.9	Hexagon screw
		8.10	Lock washer

ZK 39/20, sectional drawing (example)

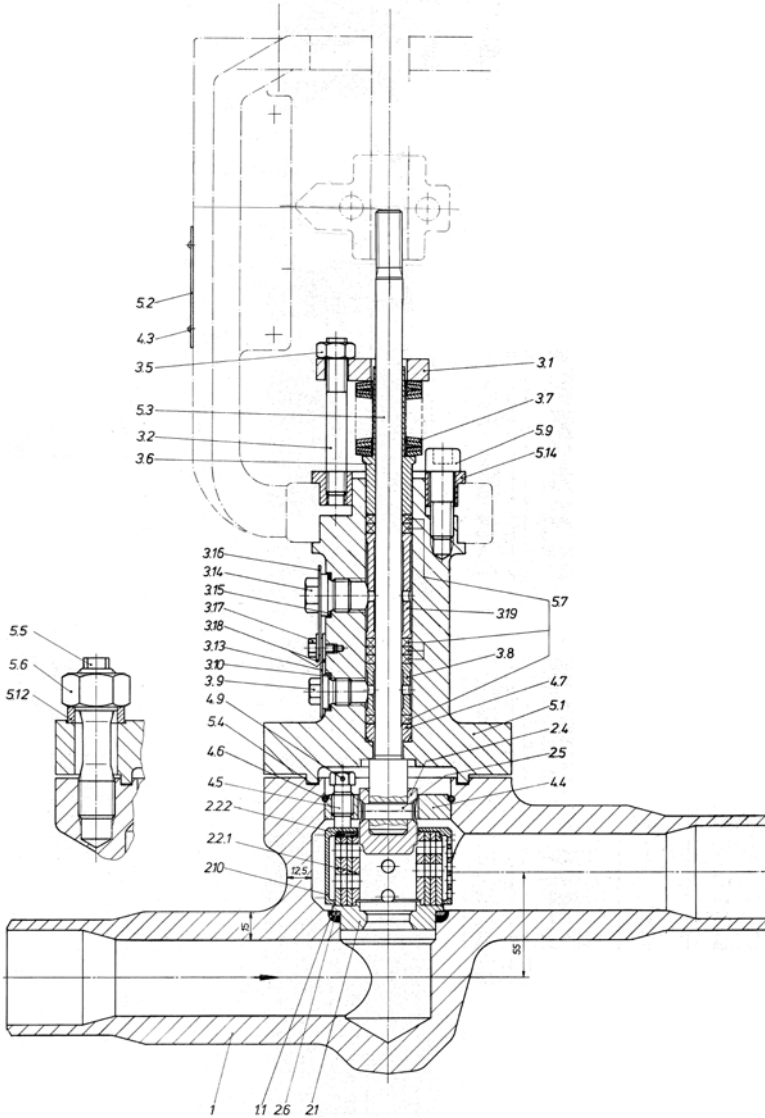


Fig. 7

## Key ZK 39/20

1	Body	4.7	Base bushing
2	Parts for assembly of the nozzle	4.9	Wire 0.8 soft, DIN 177, 500 mm
2.1	Seat ring	5.1	Cover
2.2	Sleeve insert, complete; 2.2.1 pinned together with 2.2.2	5.2	Indicator plate
2.2.1	Sleeve insert (not adjusted!) See 2.2	5.3	Spindle
2.2.2	Slotted straight pin See 2.2	5.4	Spiral-wound gasket
2.4	Valve plug	5.5	Threaded bolt
2.5	Rivet	5.6	Hexagon nut
2.6	Gasket, grooved	5.7	Gland packing ring
2.10	Wear-protection sleeve	5.9	Socket-head cap screw
3.1	Stuffing box gland	5.12	Spacer sleeve
3.2	Stud	5.14	Flange
3.5	Hexagon nut		
3.6	Stuffing box		
3.7	Disc spring		
3.8	Ring		
3.9	Plug M14x1.5		
3.10	Gasket A 14x18		
3.13	Locking plate		
3.14	Plug M14x1.5		
3.15	Gasket A 18x22		
3.16	Locking plate		
3.17	Hexagon screw		
3.18	Washer		
3.19	Ring		
4.3	Roundhead grooved pin		
4.4	Thrust ring		
4.5	Hexagon screw		
4.6	Circlip		

## Installation

### ZK 39

The control valve ZK 39 is supplied equipped with or without an actuator and ready for installation. If an actuator is mounted on site, the technical documentation issued by the manufacturer of the actuator must be taken into consideration before commissioning the equipment and archived together with the installation manual "ZK 39".

### Design with butt-weld ends

- Use only suitable and approved lifting equipment in order to put the control valve in the mounting position.
- Before mounting the control valve, provide a static support at the place of installation to counterbalance the weight of the actuator.
- Observe the direction of flow. The arrow indicating the flow direction is on the valve body **1**.
- Consider the space required for opening or servicing the valve. When the control valve is installed, the minimum servicing space (as specified in the pre-testing drawing) is required for removing or mounting the actuator.
- Remove any plastic plugs; they are only used as transit protection.
- Clean the butt-weld ends.
- Apply the locally approved welding procedure to mount the valve.
- It is not necessary to remove the valve for the welding process or for heat treatment of the butt-weld ends.

### Heat treatment of welds

After the control valve has been welded in place, the welds require a heat treatment (annealing process for stress relief to DIN EN 10529 or QW-406 PWHT (Postweld Heat Treatment)). The heat treatment is limited to the area immediately around the weld.

### Pickling and rinsing

The pipe system of a new installation usually has to be pickled and rinsed before it can be commissioned, in order to remove dirt and foreign matter that has accumulated during the mounting procedure.

Note that the nozzle inserts of ZK 39 valves must be removed and the valve bodies have to be provided with blind flanges before pipes where control valves ZK 39 are installed can be pickled and rinsed. After that, the radial stage nozzle must be mounted again, together with the seat and **new** gaskets.

Please contact the manufacturer or your local agent if you want to pickle and rinse your installation.



### Attention

- The nozzle inserts of the ZK 39 must be removed before pickling and rinsing the system. The valve bodies must be closed off with suitable blind flanges.
- Installation and deinstallation work must only be performed by the manufacturer or by qualified personnel.



# Commissioning

## ZK 39

The task of commissioning the control valve is performed when the valve is put into operation for the first time, and also after repairs. Commissioning may only be carried out by qualified staff who have read and understood the installation instructions.

- Observe the “Danger” notes on page 4.
- Take note of the corresponding parts list.
- For the actuators, the additional documents issued by the manufacturers must be observed.

Before commissioning, perform a check to ensure that all fastenings have been securely tightened. Unless agreed otherwise, the control valve is delivered in the closed state. The travel distance of the valve plug is stated on the name plate.

**Before commissioning the equipment, perform the following settings and adjustments:**

### 1. Setting the tension of the disc-spring assemblies

The valves are delivered with almost no tension in the disc-spring assemblies. When the stuffing-box packings are renewed on site, the disc-spring assemblies are also almost completely relaxed. Before commissioning the valve, tighten the nuts **3.5** in accordance with the data given in the corresponding pre-testing drawing. If no details are available, tighten the nuts **3.5** in relation to the upstream pressure  $p_1$  according to the table below.

Note that various disc-spring assemblies are used:

$p_1 \leq 100$  bar: 14 disc springs, single layer

$p_1 > 100$  bar: 16 disc springs, double layer

## Tightening torques for the stuffing box ZK 39/15

$p_1$ [barg]	$M_A$ [Nm]	Spring assembly
$\leq 80$	8	14 disc springs, single layer
$> 80 - 100$	10	
$> 100 - 120$	12	16 disc springs, double layer
$> 100 - 120$	14	
$> 140 - 160$	16	

## Tightening torques for the stuffing box ZK 39/20

See the pre-testing drawing

### ZK 39 – continued –

To keep the friction force of the stuffing box as low as possible, it should be adjusted to the specific operating conditions. The torques given in the table above can only serve as reference values, since their calculation takes account of safety factors as well as unfavourable assumptions for the friction forces.

The following procedures is recommended to minimize the stuffing-box friction.

- Tighten the nuts **3.5** evenly to the torque specified in the table.
- Expose the valve to the operating conditions and loosen the nuts **3.5** just so much that no leakage takes place.
- Now subject the spindle to several travel cycles, maintaining the above-mentioned condition by retightening the nuts **3.5** evenly.
- Tension the disc-spring assembly as follows:
  - A) Spring assembly with 14 disc springs, single layer ( $p_1 \leq 100$  bar)  
Tension the spring assembly by tightening the nuts **3.5** evenly by 2 turns.
  - B) Spring assembly with 16 disc springs, double layer ( $p_1 > 100$  bar)  
Tension the spring assembly by tightening the nuts **3.5** evenly by a  $\frac{1}{2}$  turn.
  - C) For the ZK 39/20, please consult the manufacturer.

During the task of commissioning, check all the connections and seals of the valve for leaks. Correct any leaks. In the case of flanged connections, retighten the nuts. It can also be done on the valve by tightening the stuffing box.

In the case of pipes at high temperatures, the valves should not be suddenly exposed to the high temperatures. Allow the valves to warm up slowly.

### Activating the mechanical lift limitation

#### ZK 39/15

When the valve is delivered, the mechanical lift limitation in the closing position is not activated, i.e. the valve can be closed completely.

The mechanical lift limitation **7.1** serves to set a minimum lift for certain types of continuous drainage requiring a continuous flow of condensate. This prevents constant triggering of the switching units, thus protecting the actuator and the valve against unnecessary loading.

With regard to the condensate quantity arising in continuous operation, the mechanical lift limitation must be set such that the drain valve is not opened more than once per hour, if possible.

If no specific data are available before start-up, make the following preliminary settings:

3 mm for DN 25          4 mm for DN 50          5 mm for DN 80

De-energize the electrical actuator and use the handwheel to set the valve to the preselected lift position.

Undo the two socket-head cap screws **7.2** and turn the adjusting nut **7.1** to the end stop in the yoke.

Before tightening the socket-head cap screws **7.2**, ensure that the split adjusting nut **7.1** lies evenly at the end stop.

#### ZK 39/20

For pneumatically actuated ZK 39 valves, a mechanical lift limitation at the actuator is available as an option. When the valve is delivered, the mechanical lift limitation in the closing position is not activated. The adjustment must be made as per installation instructions of the actuator manufacturer. The same preliminary settings apply as for the ZK 39/15.

## Operation

### ZK 39

If there is any leakage at the stuffing box, the nuts **3.5** of the stuffing box gland **3.1** must be retightened as described in the chapter **Commissioning**.



#### Attention

- As the nuts **3.5** are tightened, the break-away force and the friction force of the valve spindle are increased.
- The break-away force and the friction force of the valve spindle must not exceed the maximum operating force of the actuator.
- Excessive tightening of the nuts **3.5** impairs the function of the control valve and may cause blocking of the valve spindle.  
If the valve spindle is blocked, the valve can no longer open, regulate or close.

# Maintenance

## ZK 39

Type of maintenance	Time interval	Activities
Inspection	Quarter-yearly	Checking the stuffing box for leaks <sup>1)</sup>
Inspection	Quarter-yearly	Checking that connections, body seal, valve spindle and threaded spindle are free of wear, are clean, and are not leaking
Inspection	Quarter-yearly	Checking of seat tightness (only necessary if the self-acting lift limitation is not activated)
Inspection	Annually	Checking the fixing bolts of the valve actuator for tightness, if necessary re-tighten
Lubrication	Quarter-yearly	Lubricating the spindle bearing with lithium-saponified grease with penetration grade 2 with MoS <sub>2</sub> additive <sup>2)</sup>
Inspection	Every three years	<ul style="list-style-type: none"> <li>– Checking the ZK radial stage nozzle</li> <li>– Checking the yoke bush, spindle bearing and spindle screw</li> <li>– Exchanging all gaskets and packings</li> <li>– Adjusting the disc-spring tension of the stuffing box</li> </ul>

1) The replenishment of the stuffing box rings may only be performed when there is no pressure in the valve.

**Observe the “Danger” notes on page 4.**

2) The lubricant recommended by the manufacturer is WINIX® 5000 spindle bearing grease with MoS<sub>2</sub>.

In the case of the stuffing box, check the tension of the disc springs **3.7** at the normal inspection times. If necessary, tighten the stuffing-box nuts **3.5**.

If the stuffing-box packing is pressed so far into the stuffing-box chamber that the adjustment range is very limited, it is usually sufficient to add one or two stuffing box rings (with no pressure on the valve) and then to adjust the tension of the stuffing-box springs accordingly (see under **Commissioning**).

Lubricate the thread of the valve spindle **5.3** and the sliding surfaces of the fork **4.1** after 2000 operating hours (corresponding to every three months for one stroke per hour), by applying spindle bearing grease (e.g. WINIX® 5000) at the grease nipple **8.8**.

After commissioning of the valve, perform the first service after 400 strokes (i.e. after about a week). Take care to ensure that all the old grease is pressed out of the spindle bearing.

## Maintenance / Repair

### Removing the valve cover with yoke and the electrical actuator for ZK 39/15

Observe the “Danger” notes on page 4.

- Remove the supply lines of the actuator
- To detach the actuator from the valve, remove the nuts **5.11** and lock washers **5.10**
- Take off the actuator, looking out for the locating key **8.2**
- Remove the sealing fluid line (if present) from the valve cover **5.1**
- Undo the nuts **5.6** and remove the spacer sleeves **5.12**
- Remove the valve cover together with the yoke from the body, ensuring that the spindle does not get caught in the body

### Removing the valve cover and the pneumatic diaphragm-actuator for ZK 39/20

Observe the “Danger” notes on page 4.

- Remove the supply lines of the diaphragm actuator
- Undo the actuator coupling between the valve spindle **5.3** and the actuator spindle
- Undo the nuts **3.5** evenly and remove them together with the stuffing box gland **3.1** and the disc springs **3.7**
- For the later installation, note the layer sequence of the disc springs
- Undo the socket-head cap screws **5.9** and remove them together with flange **5.14** and the studs **3.2**
- Remove the diaphragm actuator
- Remove the sealing fluid line (if present) from the valve cover **5.1**
- Undo the nuts **5.6** and remove the spacer sleeves **5.12**
- Remove the valve cover together with the yoke from the body, ensuring that the spindle does not get caught in the body

### Removing the radial stage nozzle

- Remove the locking wire **4.9**
- Remove the hexagon screws **4.5**
- Press down the thrust ring **4.4**
- Remove the circlip **4.6**
- Pull out the thrust ring
- Remove the wear-protection sleeve **2.10**, sleeve insert **2.2** and seat ring **2.1**
- Remove the gasket **2.6**

Check the sealing surfaces of the valve plug **2.4** and seat ring **2.1** for signs of wear. If any wear is found, exchange the valve plug and/or seat ring and grind the sealing surfaces against each other. To separate the valve plug from the spindle **5.3**, drill and hammer out the rivet **2.5**. A new rivet must be used to rivet the parts together again. Check all other internals and the body **1** for wear and, if applicable, exchange them.

### Installing the radial stage nozzle

- Clean the sealing surface in the body **1** for the gasket **2.6**
- Put a new gasket **2.6** into the body **1**
- Insert the pinned-together sleeve insert **2.2** so that the setting slots face upwards
- Push the wear-protection sleeve **2.10** over the sleeve insert so that the marker notch points to the centre of the outlet (DN 25 and DN 50). For DN 80, ensure that the orifices of the wear-protection sleeve **2.10** lie between the outlet orifices of the sleeve insert **2.2**. We recommend that you mark both parts appropriately before installing them
- Put in the thrust ring **4.4**
- Insert the circlip **4.6**
- Coat the threaded parts of the hexagon screws **4.5** with lubricant (e.g. DAG® 156) and tighten them evenly in diagonally opposite pairs  
Torques: DN 25 and 50: 40 Nm  
DN 80: 100 Nm
- Fit the locking wire **4.9**

### Removing the stuffing box ZK 39/15

Observe the “Danger” notes on page 4.

- Undo the socket-head cap screws **7.2**
- Remove the adjusting nut **7.1**
- Knock out the spring pin **4.2**
- Remove the hexagon nut **3.5** and sleeves **3.6**
- Remove the disc springs **3.7**, noting the layer arrangement for the later reassembly
- Unscrew the spindle **5.3** from the yoke bush **8.1** and pull it out of the cover **5.1**
- Remove the washers **3.4** and stuffing box gland **3.1**
- Remove the hexagon screws **7.4** and lock washers **7.6**. Separate the yoke **7.7** from the cover **5.1**
- Press out the gland packing rings **5.7** and the rings **3.8** and **3.19** with the aid of an aluminium or copper punch applied to the base bushing **4.7**
- Check the stuffing-box chamber and all parts that have been removed for signs of damage and, if applicable, clean them. Exchange any damaged parts

### Removing the stuffing box ZK 39/20

Observe the “Danger” notes on page 4.

- Remove the valve cover **5.1** as described in the section **Removing the valve cover and the pneumatic diaphragm-actuator for ZK 39/20**
- Pull the spindle **5.3** out of the cover **5.1**
- Press out the gland packing rings **5.7**, the rings **3.8** and **3.19**, and the stuffing box **3.6** with the aid of an aluminium or copper punch applied to the base bushing **4.7**
- Check the stuffing-box chamber and all parts that have been removed for signs of damage and, if applicable, clean them. Exchange any damaged parts

### Removing the spindle bearing ZK 39/15

Observe the “Danger” notes on page 4.

- Remove the hexagon screws **8.9** and the lock washers **8.7**
- Pull off the flange **8.3**
- Pull out the yoke bush **8.1** with the axial needle cages **8.4** and axial washers **8.5** from the bearing casing **8.6**
- Remove the O-ring **8.7** from the yoke bush **8.1**
- Clean all parts and check them for signs of damage. Exchange any damaged parts

### Installing the spindle bearing ZK 39/15

- Lubricate all moving parts of the spindle bearing with spindle bearing grease (e.g. WINIX® 5000)
- Put the O-ring **8.7** onto the yoke bush **8.1**
- Put the yoke bush **8.1** with the axial needle cages **8.4** and axial washers **8.5** into the bearing casing **8.6**
- Put on the flange **8.3** and mount with hexagon screws **8.9** and lock washers **8.7** on the yoke **7.7**

### Installing the stuffing box with cover and yoke ZK 39/15

- Insert the spindle **5.3** as far as half of the cover **5.1**
- Protect the seating surface of the valve plug **2.4** against damage
- Place the base bushing **4.7** in the cover **5.1**
- Insert the gland packing rings **5.7** and the rings **3.8** and **3.19** according to the parts drawing
- Screw the studs **3.2** into the yoke **7.7**
- Put the yoke **7.7** onto the cover **5.1** and, at the same time, line up the stuffing box gland **3.1** and the fork **4.1**
- Fasten the fork **4.1** with spindle **5.3** by means of the spring pin **4.2**
- Install the yoke **7.7** using the hexagon screws **7.4** and lock washer **7.6**
- Mount the washers **3.4** and sleeves **3.6** with disc springs **3.7** in the correct layer sequence
- Tighten the hexagon nut **3.5** to obtain a force-fit with the disc springs **3.7**
- Tension the disc-spring assemblies **3.7** according to the section **Commissioning** only after the valve cover has been installed; see the section **Installing the valve cover on the body ZK 39/15**



### Installing the stuffing box with cover and actuator mounting ZK 39/20

- Insert the spindle **5.3** completely into the cover **5.1**
- Protect the seating surface of the valve plug **2.4** against damage
- Place the base bushing **4.7** in the cover **5.1**
- Insert the gland packing rings **5.7** and the rings **3.8** and **3.19** according to the parts drawing
- Install the cover **5.1** on the body **1** according to the section **Installing the valve cover on the body ZK 39/20**
- Put the actuator mounting onto the cover **5.1**
- Mount the stuffing box **3.6** and the disc springs **3.7** in the correct layer sequence
- Put the flange **5.14** onto the actuator mounting and mount it with the socket-head cap screws **5.9** on the cover **5.1**
- Screw the studs **3.2** into the flange **5.14**
- Line the stuffing box gland **3.1** up on the spindle **5.3** and tighten the hexagon nuts **3.5** to obtain a force-fit with the disc springs **3.7**
- Tension the disc-spring assemblies **3.7** according to the chapter **Commissioning** only after the valve cover has been installed; see the section **Installing the valve cover on the body ZK 39/20**

### Installing the valve cover on the body ZK 39/15

- Clean the sealing surfaces of the body **1** and the cover **5.1**, and check them for signs of damage
- Put a new gasket **5.4** into the body **1**
- Coat the thread of the screw bolts **5.5** with high-temperature paste (e.g. OKS® 217)
- Put the cover **5.1** including the spindle **5.3** and yoke **7.7** on the body **1**
- Put the spacer sleeves **5.12** over the screw bolts **5.5** and coat them from above with OKS® 217
- Put on the nuts **5.6** and tighten them evenly in two stages in diagonally opposite pairs, to the torques specified in the pre-testing drawing
- **Attention:** When tightening the nuts **5.6**, check the valve spindle **5.3** repeatedly for free movement
- If there is a sealing fluid line, connect it again by removing the sealing plug **3.14**

**Note:** After this step, perform the tensioning of the disc-spring assemblies **3.7** according to the chapter **Commissioning**

### Installing the valve cover on the body ZK 39/20

- Clean the sealing surfaces of the body **1** and the cover **5.1**, and check them for signs of damage
- Put a new gasket **5.4** into the body **1**
- Coat the thread of the screw bolts **5.5** with high-temperature paste (e.g. OKS® 217)
- Put the cover **5.1** including the spindle **5.3** on the body **1**
- Put the spacer sleeves **5.12** over the screw bolts **5.5** and coat them from above with OKS® 217
- Put on the nuts **5.6** and tighten them evenly in two stages in diagonally opposite pairs, to the torques specified in the pre-testing drawing
- **Attention:** When tightening the nuts **5.6**, check the valve spindle **5.3** repeatedly for free movement
- If there is a sealing fluid line, connect it again by removing the sealing plug **3.14**

**Note:** After this step, perform the tensioning of the disc-spring assemblies **3.7** according to the chapter **Commissioning**

### Installing the lift limitation for ZK 39/15

- Apply the split adjusting nut **7.1** to the trapezoidal thread of the spindle **5.3** and fasten it by means of the socket-head cap screws **7.2**

**Note:** To ensure full valve travel, the mechanical lift limitation for the subsequent actuator adjustment must not be activated yet. With the valve in the closed position, therefore, the adjusting nut **7.1** must be positioned 3 mm above the end stop in the yoke **7.7**. Any activation of the mechanical lift limitation which may be required is performed according to the chapter **Commissioning**.

### Installing the actuator on ZK 39/15

- Insert the locating key **8.2** into the yoke bush **8.1**
- Screw the studs **5.9** into the actuator
- Place the actuator on the flange **8.3** and put on the lock washers **5.10**
- Tighten the nuts **5.11** with 40 Nm, unless specified otherwise in the pre-testing drawing

## Decommissioning



### Danger

Risk of severe burns and scalding over the entire body!

Before undoing the flanged connections, stuffing-box connections or sealing plugs, ensure that all the connected pipes are pressureless (0 bar) and have cooled down to room temperature (20 °C).

### Disposal

Observe the locally applicable decontamination regulations.

Remove the valve and separate the waste materials according to the list of materials given on page 8.

For the disposal of the valve, observe the statutory regulations on waste disposal.



Agencies all over the world: [www.gestra.de](http://www.gestra.de)

## **GESTRA AG**

Münchener Straße 77

28215 Bremen

Germany

Telefon +49 421 3503-0

Telefax +49 421 3503-393

E-mail [info@de.gestra.com](mailto:info@de.gestra.com)

Web [www.gestra.de](http://www.gestra.de)