

GESTRA Steam Systems

ZK 313 ASME

GESTRA



Installation Instructions 818542-00

Control Valve ZK 313 ASME



Contents

Page

Important Notes

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

Explanatory Notes

Scope of supply	6
System description	6
Function	7
Design	7

Technical Data

Pressure / temperature ratings for ZK 313 ASME (valve without connections)	8
Service pressure for Class 2500 in [bar] to ASME B 16.34	8
Service pressure for Class 2500 in [psig] to ASME B 16.34	8
Admissible differential pressure	8
Naterials	8
<pre>kvs values</pre>	9
Neight	9
Corrosion resistance	9
Sizing	9
Name plate / marking	9
Dimensions	/11
Capacity chart ZK 313 ASME, cold water	12
Capacity chart ZK 313 ASME, hot water ts-5K	13

Design

Design ZK 313 ASME, straight-through valve	14
Design ZK 313 ASME, angle valve	15
Key	16

Installation

K 313 ASME	.17
ttention	.17
alve with socket-weld ends	. 17
alve with butt-weld ends	.17
leat treatment of welds	.17
ickling and rinsing	. 18
ttention	18

Contents - continued -

Page

Commissioning

ZK 313 ASME	18
Attention	18

Operation

ZK 313 ASME	19
Attention	19

Maintenance

ZK 313 ASME 19	9
----------------	---

Decommissioning

Danger	19
Disposal	19

Important Notes

Usage for the intended purpose

ZK 313 ASME

The control valve ZK 313 ASME is intended solely 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 313 ASME only actuators named and specified by GESTRA may be installed on the control valve.

Safety note

The control valve must only be installed by qualified staff.

"Qualified staff" are persons who are familiar with the procedures for installation and commissioning of the product, and who have qualifications appropriate for their work, for example staff who have received the following:

- Training as specialists.
- Training or instruction in the use of appropriate safety procedures in accordance with regulations concerning safety standards.
- Training or instruction in first aid and in accident prevention regulations.



Danger

The valve is under pressure during operation.

When loosening flanged connections, sealing plugs or stuffing boxes, hot water and/or steam may escape.

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

The valve is 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 carrying out maintenance work on the valve or loosening flanged connections, stuffing boxes or sealing plugs make sure that all connected lines are depressurised (0 bar) and cooled down to room temperature (20 °C).

Danger of bruising: During operation moving internals can cause contusions to hands. Do not touch the valve during operation! The control valves ZK 313 ASME are remote controlled and can open and close very abruptly.

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

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

Important Notes - continued -



Attention

The name plate states the technical features of the equipment. A valve without such a name plate must neither be commissioning nor operated.

Explanatory Notes

Scope of supply

ZK 313 ASME

- 1 High-pressure control valve ZK 313 ASME according to specification
- 1 Actuator according to specification
- 1 Parts list with drawing of components
- 1 Inspection certificate detailing equipment-specific technical data
- 1 Declaration of conformity (when valve is used within EU)
- 1 Declaration of manufacturer (when valve is used within EU)
- 1 Installation manual

Description

Control valve for reducing high differential pressures. Application in industrial plants and power stations as

- Injection control valve
- Warm-up valve
- Drain valve
- Continuous blowdown valve
- Feedwater control valve
- Leak-off valve
- Steam control valve

The pressure drop is decreased in the radial stage nozzle^{\otimes} in several steps in order to reduce the flow velocity – especially in the orifice –, thus leading to a considerable reduction in wear and noise (\leq 85 dB (A)).

Explanatory Notes - continued -

Function

All pressure parts of the ZK 313 are forged. Internals (incl. seat) are easily exchangeable, even after a long period of use. The radial stage nozzle[®] ZK combines the function of a control valve with a conventional shut-off valve and guarantees maximum wear protection and absolutely tight shut-off.

The radial stage nozzle[®] ZK consists of several sleeves nesting within one another, containing radial orifices drilled in them. 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, where potential energy in the form of pressure is converted into kinetic energy in the form of flow. Due to the successive expansion in the flash chambers the pressure drop at the seat of the valve plug is considerably reduced.

The flowrate through the radial stage nozzle is determined by the valve plug. According to its position the individual stage nozzles are either partially or completely set free, thus producing different flowrates. The valve plug and the seat form the shut-off unit of the radial stage nozzle.

The control valve ZK 313 is also equipped with a dual (tandem) shut-off. At the moment of closing and at the beginning of opening the flow velocity at the valve seat is zero, which means that wire drawing and wear on the seating surfaces is prevented. The lift difference between the control piston and the leading valve plug is balanced out by disc springs.

Depending on the pressure drop to be coped with different stage nozzles and valve plugs are available.

Due to the special design of the radial stage nozzle[®] ZK the noise level is reduced to a minimum. As a result of the expansion through a multitude of individual nozzles, the noise emitted by the control valve is below 85 dB (A) within the control range of the valve.

The valve body is available as straight-through or angle version, sizes 1" to 3". The valve can be easily fitted with a pneumatic actuator. Leak rates in accordance with EN 12266-1. Tightness better than ANSI Class V.

Design

ZK 313 ASME-D/20:

Straight-through valve with butt-weld ends. Fig. 6

ZK 313 ASME-E/20:

Angle valve with butt-weld ends. Fig. 7

Pressure / Temperature Ratings ZK 313 ASME

Service pressure for Class 2500 in [bar] to ASME B16.34			Service pressure for Class 2500 in [psig] to ASME B16.34												
Tempe-	Sta	ndard C	idard Class		Limited Clas			Tempe-	ss Tempe-		ndard (Class	Lin	nited C	ass
in [°C]	Type F1	Type F22	Type F91	Type F1	Type F22	Type F91		in [°F]	Type F1	Type F22	Type F91	Type F1	Type F22	Type F91	
20	398.9	430.9	430.9	398.9	430.9	430.9		68	5,784.1	6,248.1	6,248.1	5,784.1	6,248.1	6,248.1	
100	388.4	429.4	429.4	398.9	430.3	430.9		212	5,631.8	6,226.3	6,226.3	5,784.1	6,239.4	6,248.1	
200	368.1	406.5	406.5	398.9	416.9	430.9		392	5,337.5	5,894.3	5,894.3	5,784.1	6,045.1	6,248.1	
300	350.2	357.1	357.1	398.9	413.7	430.9		572	5,077.9	5,178.0	5,178.0	5,784.1	5,998.7	6,248.1	
400	304.9	304.9	304.9	398.9	396.0	418.3		752	4,421.1	4,421.1	4,421.1	5,784.1	5,742.0	6,065.4	
450	281.8	281.8	281.8	390.8	372.0	393.1		842	4,086.1	4,086.1	4,086.1	5,666.6	5,394.0	5,700.0	
500	196.4	231.7	235.0	255.6	303.9	303.9		932	2,847.8	3,359.7	3,407.5	3,706.2	4,406.6	4,406.6	
515	149.6	204.7	219.6	195.6	268.2	279.1		959	2,169.2	2,968.2	3,184.2	2,836.2	3,888.9	4,047.0	
520	137.5	192.6	217.3	181.8	255.3	277.3		968	1,993.8	2,792.7	3,150.9	2,636.1	3,701.9	4,020.9	
530	113.3	168.4	212.6	154.0	229.6	273.6		986	1,642.9	2,441.8	3,082.7	2,233.0	3,329.2	3,967.2	
535	101.2	157.1	210.6	140.1	216.9	272.1		995	1,467.4	2,278.0	3,053.7	2,031.5	3,145.1	3,945.5	
550		127.9	208.0		179.2	270.7		1022		1,854.6	3,016.0		2,598.4	3,952.5	
560		110.2	207.3		154.4	270.7		1040		1,597.9	3,005.9		2,238.8	3,952.2	
570		94.4	201.5		132.2	266.2		1058		1,368.8	2,129.8		1,916.9	3,859.9	
580 *)		81.0	189.5		113.4	256.2		1076 *)		1,174.5	2,747.8		1,644.3	3,714.9	
590 *)		67.6	177.4		94.7	246.2		1094 *)		980.2	2,572.3		1,373.2	3,569.9	
595 *)		62.5	169.9		87.6	236.9		1103 *)		906.3	2,463.6		1,270.2	3,435.1	

*) Service temperatures above 570 °C / 1050 °F increase wear on the nozzle insert of the control valve.

Admissible differential pressure ¹) ²)						
Δ PMX 1 stage	[bar] / [psig]	40 / 580				
Δ PMX 3 stages	[bar] / [psig]	300 / 4351				
Δ PMX 3 stages with additional nozzle	[bar] / [psig]	370 / 5365				

¹) Observe pressure and temperature ratings of the equipment
 ²) Inlet pressure minus **outlet** pressure

Materials								
Body	A 182 F1	1.7383 / A 182 F22	1.4903 / A 182 F91					
Upper body part	1.4903 / A 182 F91							
Bolts	A 193 B16							
Nuts		A 194-7						

kv_s values

Size	Characteristic	Δ p max. [bar] [psi]	kv _s (Cv)				Valve lift [mm]				
1" to 3"	linear/ equal-percentage	300 4350	1 (1.2)	1.5 (1.7)	2.3 (2.7)	3.6 (4.2)	5.5 (6.4)	8 (9.4)	11 (12.7)	13 (15)	35
1" to 3"	linear/ equal-percentage	370 5365					4.5 (5.3)	7 (8.2)	9.5 (11)	10.5 (12.1)	35
1" to 3"	linear	40 580	20 (23.1)			35					

Weight

ZK 313 ASME	PB 1502	PB 3002	PB 1502 with manual actuator	PB3002 with manual actuator	
Weight [kg] 67.0	124.0	240.0	174.0	290.0	
Weight [lb] 147.7	273.4	529.1	383.6	639.3	

Corrosion resistance

If the valve is used for its intended purpose, its safety is not impaired by corrosion.

Sizing

The valve body must not be subjected to sharp increases in pressure. The dimensional allowances for corrosion reflect the latest state of technology.

Name plate / marking

According to EN 19 and MSS-SP 25 the type and design are specified on the valve body and the name plate:

- Type designation ZK 313 ASME:
- Version without actuator ZK 313 ASME:
- Version with actuator
- CE 🐼 II 2G/D c X Marking according to ATEX:
- Stamp on name plate, e. g. $\frac{4}{05}$ indicates term and year of production (example: 4th quarter 2005)



Dimensions



Dimensions



Capacity Charts ZK 313 ASME, cold water



Capacity Charts ZK 313 ASME, hot water ts-5k



Design

ZK 313 ASME, straight-through valve



Design - continued -

ZK 313 ASME, angle valve



Design - continued -

Key	
A	Groove nut
B	Hexagon nut 7/8" – 9 UNC, ASME 18.2.2
G	Upper part of valve
D	Valve body, straight-through design
Ø	Valve body, angle design
Ø	Name plate
G	Body bolt 7/8" – 9 UNC, ASME B16.5
0	Stuffing box screw
0	Valve spindle with thread M 18 x 1.5, DIN 13

Installation

ZK 313 ASME

The control valve ZK 313 ASME is supplied equipped with or without an actuator and ready for installation. If an actuator is mounted on site the technical documentation of the manufacturer of the actuator must be taken into consideration before commissioning the equipment and archived together with the installation manual "ZK 313 ASME".



Attention

 Only qualified welders certified e. g. according to DIN EN 287 or ASMW QW-300 WPQ (Welding Performance Qualification) may weld the control valve into pressurized lines.

Valve with socket-weld ends

- 1. Use 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.
- 3. Take direction of flow into consideration. The arrow indicating the flow direction is on the valve body **●** / **●**.
- 4. Consider space required for opening or servicing the valve. When the valve is installed a minimum space of **120 mm** is required for removing or mounting the actuator.
- 5. Remove plastic plugs. They are only used as transit protection.
- 6. Clean socket-weld ends.
- 7. Apply approved standard welding process to mount the valve.

Valve with butt-weld ends

- 1. Use 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.
- 3. Take direction of flow into consideration. The arrow indicating the flow direction is on the valve body **●** / **●**.
- 4. Consider space required for opening or servicing the valve. When the valve is installed a minimum space of **120 mm** is required for removing or mounting the actuator.
- 5. Remove plastic plugs. They are only used as transit protection.
- 6. Clean butt-weld ends.
- 7. Apply approved standard welding process to mount the valve.

Heat treatment of welds

After welding the control valve in place the welds require a heat treatment (annealing process for stress relief to DIN EN 10529 or QW-406 PWHT (Postweld Heat Treatment)).

Materials type F22 and F91 require heat treatment, material type F1 does not require a post weld heat treatment. The heat treatment is restricted to the region of 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 accumulated during the mounting procedure.

Note that the nozzle inserts of ZK 313 ASME valves must be removed and the valve bodies have to be provided with blind flanges before pipes where control valves ZK 313 ASME are installed can be pickled and rinsed.

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



Attention

- The nozzle inserts of the ZK 313 ASME must be removed before pickling and rinsing the system. The valve bodies must be closed off with suitable blind flanges.
- Installation and deinstallation works must only be performed by the manufacturer or by qualified personnel authorised by the manufacturer.

Commissioning

ZK 313 ASME

Retighten the stuffing box (1) if leaking occurs.



Attention

- As the stuffing box screw is 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 stuffing box screw impairs the function of the actuator and may cause blocking of the valve spindle.

If the valve spindle is blocked, the valve can no longer open, regulate or close.

Operation

ZK 313 ASME

Retighten the stuffing box () if leaking occurs.



Attention

- As the stuffing box screw is 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 stuffing box screw impairs the function of the actuator and may cause blocking of the valve spindle.

If the valve spindle is blocked, the valve can no longer open, regulate or close.

Maintenance

Please contact the manufacturer or your local dealer if maintenance is required.

Decommissioning



Danger

Risk of severe burns and scalding over the entire body! Before loosening flanged connections, stuffing box connections or sealing plugs make sure that all connected lines are depressurised (0 bar) and cooled down to room temperature (20 °C).

Disposal

Deinstall the valve and separate the waste materials in accordance with the specifications of the table "Materials" on page 8.

Observe national legal regulations regarding waste disposal.



GESTRA

Agencies all over the world:

www.gestra.de

España

GESTRA ESPAÑOLA S.A.

Luis Cabrera, 86-88 E-28002 Madrid Tel. 00 34 91/51 52 032 Fax 00 34 91/41 36 747; 51 52 036 E-mail: aromero@flowserve.com

Great Britain

Flowserve Flow Control (UK) Ltd. Burrel Road, Haywards Heath West Sussex RH 16 1TL Tel. 00 44 14 44 / 31 44 00 Fax 00 44 14 44 / 31 45 57 E-mail: gestraukinfo@flowserve.com

Italia

Flowserve S.p.A.

Flow Control Division Via Prealpi, 30 I-20032 Cormano (MI) Tel. 00 39 02 / 66 32 51 Fax 00 39 02 / 66 32 55 60 E-mail: infoitaly@flowserve.com

GESTRA AG

P. 0. Box 10 54 60, D-28054 Bremen Münchener Str. 77, D-28215 Bremen Telephone +49 (0) 421 35 03 - 0 Fax +49 (0) 421 35 03 - 393 E-Mail gestra.ag@flowserve.com Internet www.gestra.de

Polska

GESTRA POLONIA Spolka z.o.o.

UI. Schuberta 104 PL - 80-172 Gdansk Tel. 00 48 58 /306 10 -02 od 10 Fax 00 48 58 /306 33 00 E-mail: gestra@gestra.pl

Portugal

 Flowserve Portuguesa, Lda.

 Av. Dr. Antunes Guimarães, 1159

 Porto 4100-082

 Tel.
 00351 22/6 19 87 70

 Fax
 00351 22/6 10 75 75

 E-mail:
 jtavares@flowserve.com

USA

Flowserve DALCO Steam Products

2601 Grassland Drive Louisville, KY 40299 Tel. 00 15 02 / 4 95 01 54, 4 95 17 88 Fax 00 15 02 / 4 95 16 08 E-Mail: dgoodwin@flowserve.com

