

GESTRA Steam Systems

Product Range A4

Control Valve with Radial Stage Nozzle ZK and Tandem Shut-off

ZK 313 ASME B 16.34

1" – 3", Class 2500

ZK 313 ASME

Description

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

- Injection-cooling 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 in several steps in order to reduce the flow velocity, thus leading to a considerable reduction in wear and noise (sound level ≤ 85 dB(A)).

Design

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 valve body is available as straight-through or angle version (1" – 3").

The valve can be easily fitted with a pneumatic actuator.

ZK 313-.../20

D = Straight-through
E = Angle

Leak rates in accordance with DIN 3230 B01. Tightness better than ANSI Class V.

Differential pressure

- △ PMX one stage 40 bar
- △ PMX three stages 300 bar
- △ PMX three stages with additional nozzle 370 bar

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		

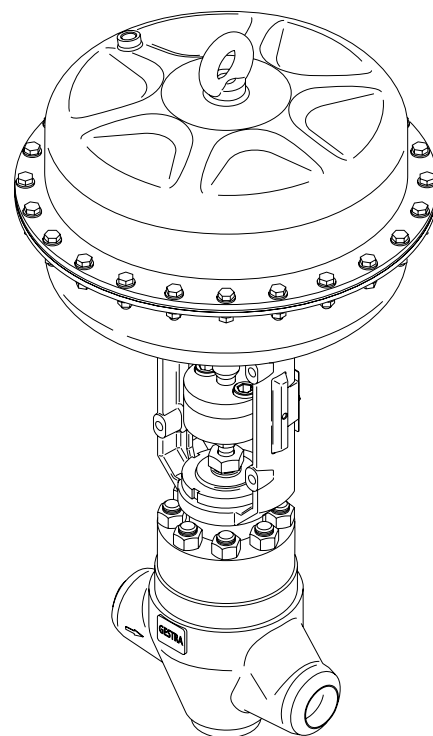
End connections

Butt-weld ends, socket-weld ends

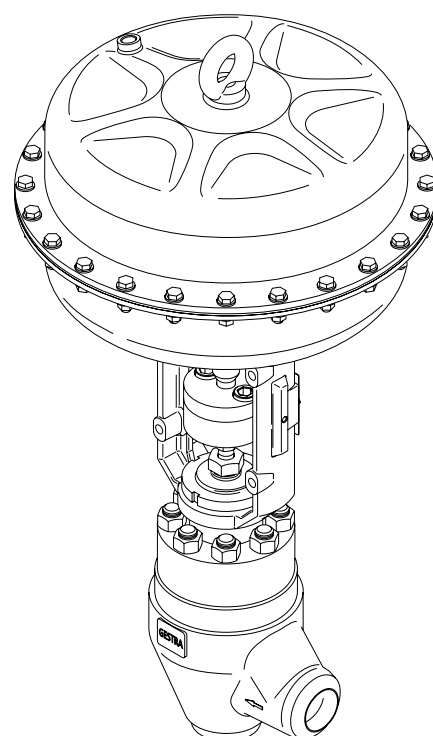
Pressure / Temperature Ratings

Service Pressures for Class 2500 in [bar] to ASME B16.34						
Temperature in [°C]	Standard Class			Limited Class		
	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
100	388.4	429.4	429.4	398.9	430.3	430.9
200	368.1	406.5	406.5	398.9	416.9	430.9
300	350.2	357.1	357.1	398.9	413.7	430.9
400	304.9	304.9	304.9	398.9	396.0	418.3
450	281.8	281.8	281.8	390.8	372.0	393.1
500	196.4	231.7	235.0	255.6	303.9	303.9
515	149.6	204.7	219.6	195.6	268.2	279.1
520	137.5	192.6	217.3	181.8	255.3	277.3
530	113.3	168.4	212.6	154.0	229.6	273.6
535	101.2	157.1	210.6	140.1	216.9	272.1
550		127.9	208.0		179.2	270.7
560		110.2	207.3		154.4	270.7
570		94.4	201.5		132.2	266.2
580		81.0	189.5		113.4	256.2
590		67.6	177.4		94.7	246.2
595		62.5	169.9		87.6	236.9

Service Pressures for Class 2500 in [psig] to ASME B16.34						
Temperature in [°F]	Standard Class			Limited Class		
	Type F1	Type F22	Type F91	Type F1	Type F22	Type F91
68	5,784.1	6,248.1	6,248.1	5,784.1	6,248.1	6,248.1
212	5,631.8	6,226.3	6,226.3	5,784.1	6,239.4	6,248.1
392	5,337.5	5,894.3	5,894.3	5,784.1	6,045.1	6,248.1
572	5,077.9	5,178.0	5,178.0	5,784.1	5,998.7	6,248.1
752	4,421.1	4,421.1	4,421.1	5,784.1	5,742.0	6,065.4
842	4,086.1	4,086.1	4,086.1	5,666.6	5,394.0	5,700.0
932	2,847.8	3,359.7	3,407.5	3,706.2	4,406.6	4,406.6
959	2,169.2	2,968.2	3,184.2	2,836.2	3,888.9	4,047.0
968	1,993.8	2,792.7	3,150.9	2,636.1	3,701.9	4,020.9
986	1,642.9	2,441.8	3,082.7	2,233.0	3,329.2	3,967.2
995	1,467.4	2,278.0	3,053.7	2,031.5	3,145.1	3,945.5
1022		1,854.6	3,016.0		2,598.4	3,952.5
1040		1,597.9	3,005.9		2,238.8	3,952.2
1058		1,368.8	2,129.8		1,916.9	3,859.9
1076		1,174.5	2,747.8		1,644.3	3,714.9
1094		980.2	2,572.3		1,373.2	3,569.9
1103		906.3	2,463.6		1,270.2	3,435.1

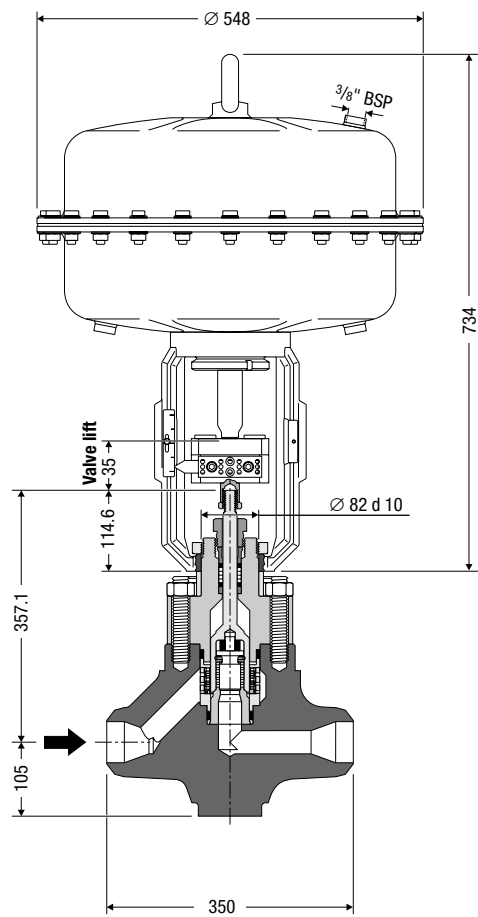


ZK 313-D/20

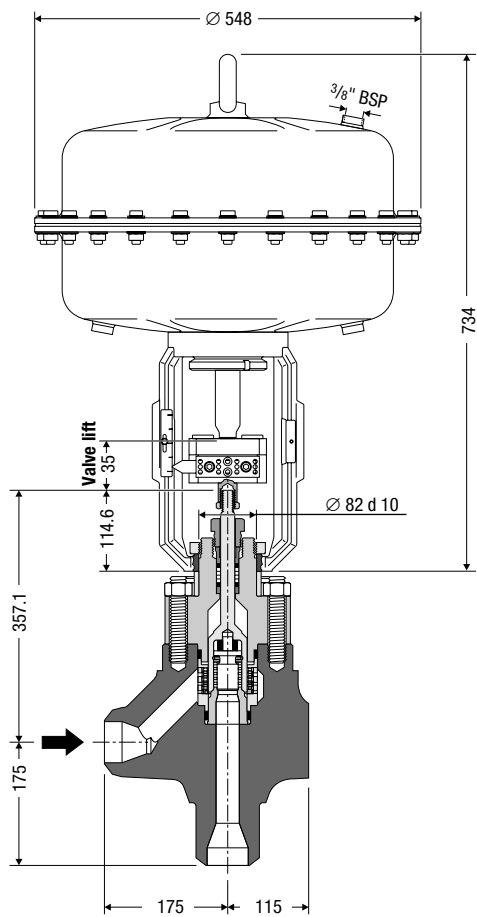


ZK 313-E/20

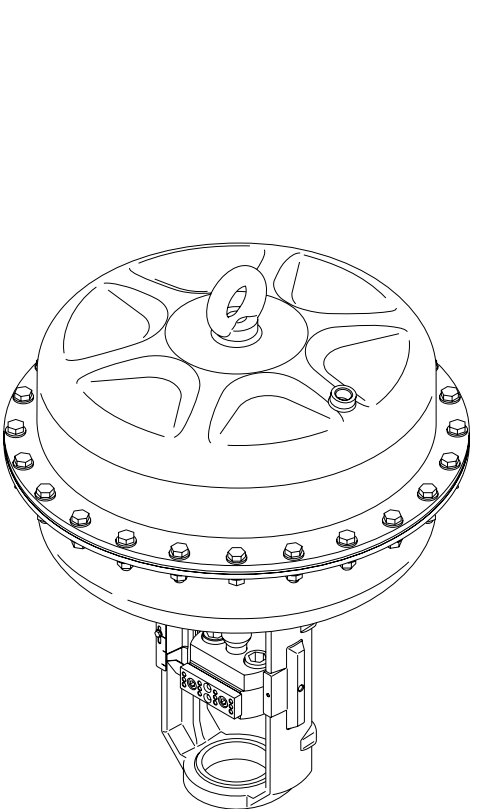
Dimensions



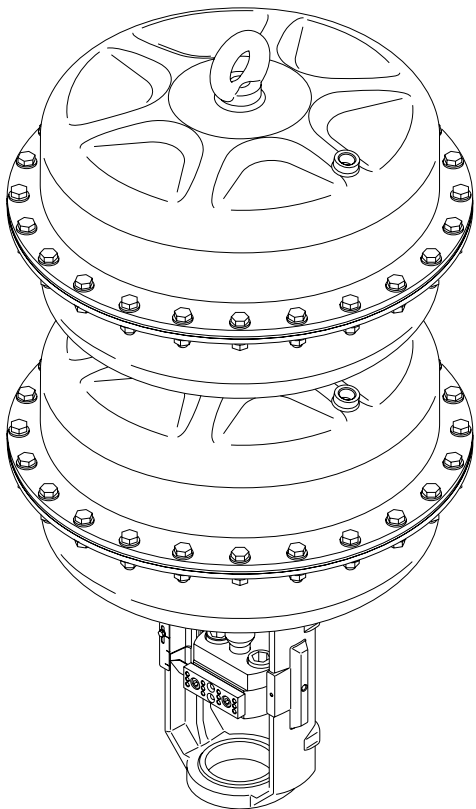
ZK 313-D/20 with actuator PB 1502



ZK 313-E/20 with actuator PB 1502

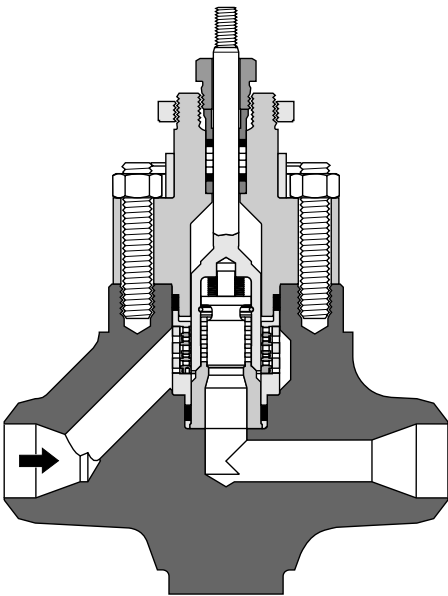


Actuator PB 1502
1500 m²
Supply air: max. 6 barg
Actuating force up to 30 kN

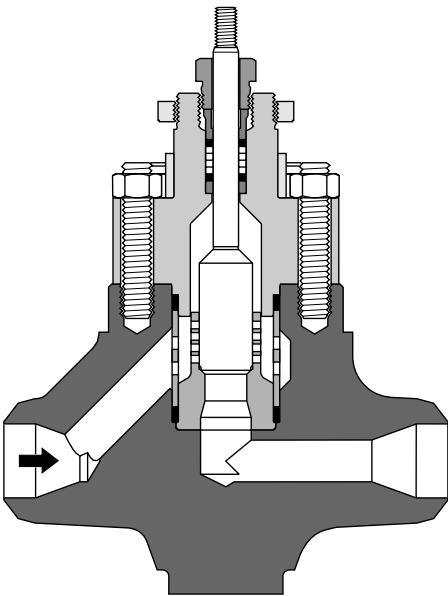


Actuator PB 3002
3000 m²
Supply air: max. 6 barg
Actuating force up to 60 kN

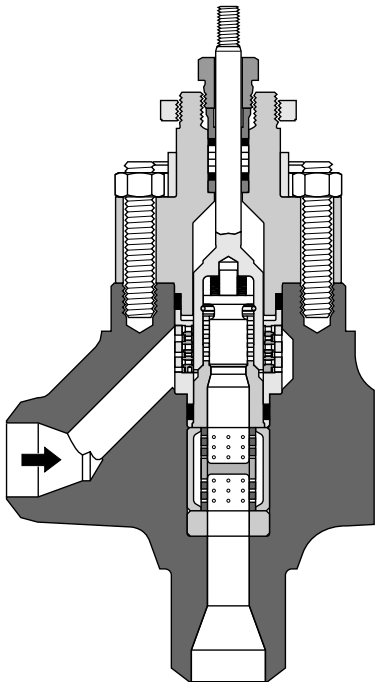
Radial Stage Nozzle ZK



Standard nozzle Δp_{max} 300 bar / 4350 psi



Special nozzle Δp_{max} 40 bar / 580 psi
(without tandem seat)



Special nozzle Δp_{max} 370 bar / 5365 psi
(only angle-type design)

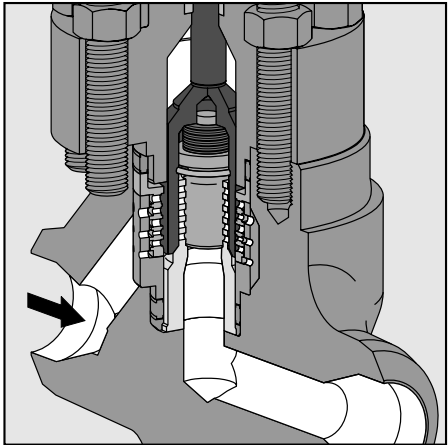
kv_s values

Size (DN)	Characteristic	Δp max. [bar] [psi]	kv_s (Cv)								Valve stroke [mm]
			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)	
1" to 3"	linear/ equal-percentage	300 4350									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

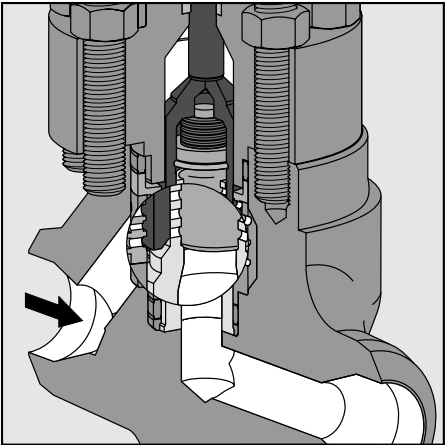
Function of the tandem seat

At the beginning of the opening process the valve plug is lifted off the main seat but the valve cone follows only after a certain lift. As a consequence at the moment of

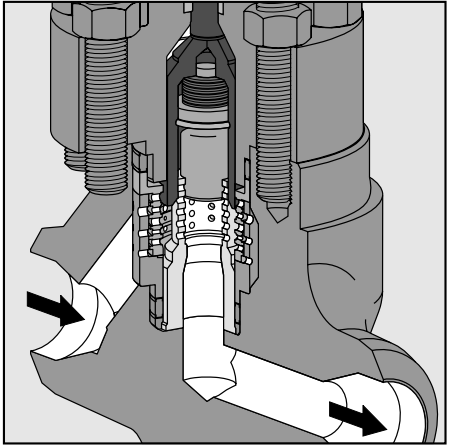
closing and at the beginning of opening the flow velocity at the valve seat is zero, which means that wire drawing is prevented.



Valve plug in closed position



Valve no longer in closed position but
internal valve cone still closing



Valve plug in control position

Control Valve with Radial Stage
 Nozzle ZK and Tandem Shut-off
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Capacity Charts

The charts indicate the maximum capacities of hot and cold water for linear characteristics. A later modification from linear to equal-percentage is possible by exchanging the complete nozzle insert.

Order and Enquiry Specification

Control valve with radial stage nozzle
 ZK 313 ASME
 Design data: p =bar / psi t = °C / °F
 Operation: Load conditions (1–3)

	1	2	3
p1 [bar] / [psi]			
t1 [°C] / [°F]			
p2 [bar] / [psi]			
Δp [bar] / [psi]			
ṁ [t/h] / [lb/h]			

Please enter data.

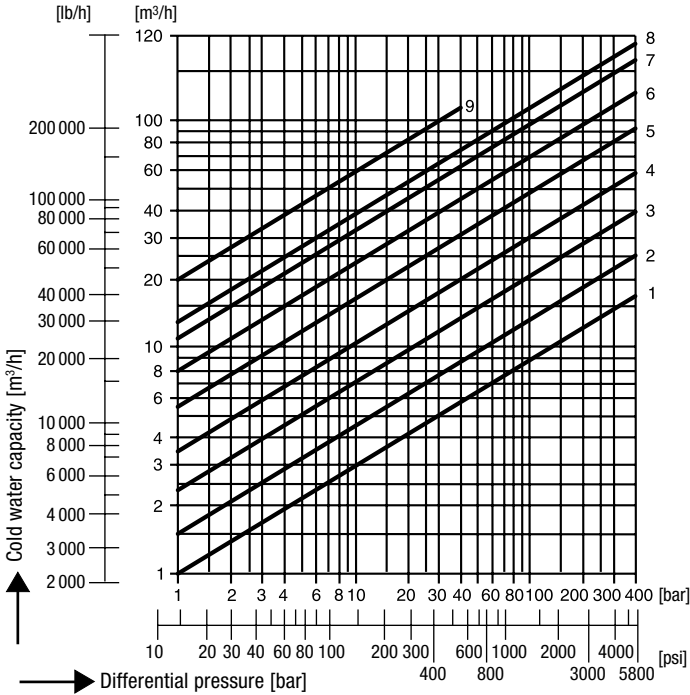
Fluid:
 Actuator: pneumatic Type
 Spring to open ☐
 Spring to close ☐
 Handwheel yes/no
 Positioner yes/no
 Δp_{max} for sizing of actuator bar
 Supply air bar

The following test certificates can be issued on request, at extra cost:
 In accordance with EN 10204/2.1, -2.2 and -3.1B.
 All inspection requirements have to be stated with the order. After supply of the equipment certificates can no longer be established. Charges and extent of the above mentioned certificates as well as the different tests confirmed therein are listed in our leaflet "Test and Inspection Charges for Standard Equipment". For other tests and inspections than those listed above, please consult us.

Supply in accordance with our general terms of business.

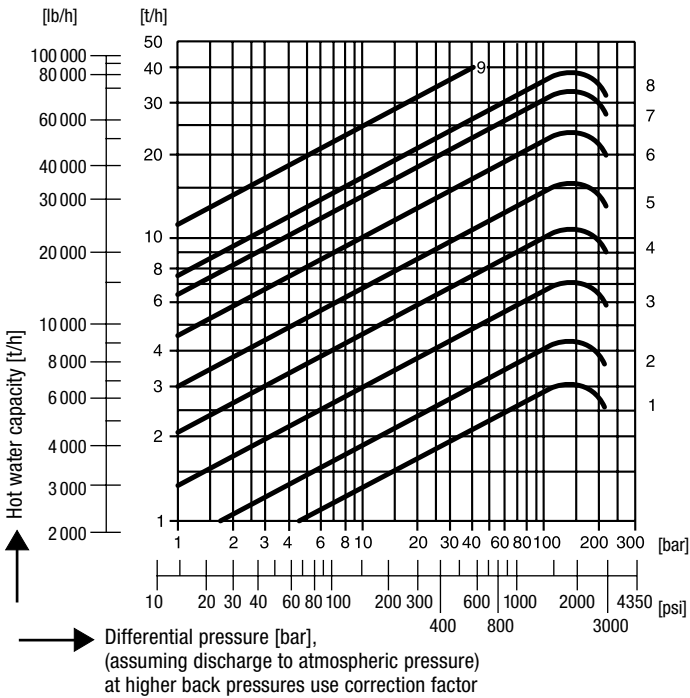
Cold water

Curve	kv _s value [m³/h]
1	1
2	1.5
3	2.3
4	3.6
5	5.5
6	8
7	11
8	13
9	20



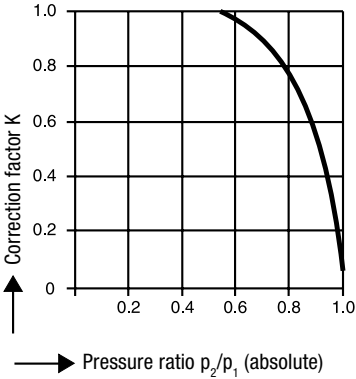
**Hot water
 ts-5 K**

Curve	C _v -value [m³/h]
1	1.2
2	1.7
3	2.7
4	4.2
5	6.4
6	9.4
7	12.7
8	15.0
9	23.1



Back-pressure chart

With hot water the flowrate is reduced by the factor K.



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