



01 - 10.2

11.21.GB

CONTROL AND
SHUT-OFF VALVES
IN SEISMIC VERSION

200 line
acc. to ANSI/ASME



200 line

CV / SV 220 (Ex)
CV / SV 230 (Ex)

control or shut-off valve

CV 222 (Ex)
CV 232 (Ex)

control valve with
pressure-balanced plug

Control valves **CV / SV 200 SP (Ex)** are designed for regulation and shut-off of process liquid flow, for which seismic resistance of the device is required. The valves meet the conditions of **seismic resistance** in the sense of maintaining mechanical integrity and functionality after a seismic event with a response spectrum of up to 30 m.s^{-2} in all directions, in the band 0 to 33 Hz. Thus, they meet the requirements of **seismic classification 1b of fittings for nuclear energy according to OTT 87/91** and in non-nuclear applications meet the conditions for use in earthquake-prone areas with a maximum intensity of up to 9 degrees of the international scale EMS-98, or MSK-64 (9 bal).

Vesion Ex meets demands of II 1/2G IIC T6...T1 Ga/Gb acc. to ČSN EN ISO 80079-36 (9/2016) and ČSN EN 1127-1 ed.2 (1/2012). Flow characteristics, Kvs coefficients and leakage comply with international standards.

The maximal permissible operating pressures in behaviour with types of material and temperature are specified in the table on page 23 of this catalogue.

Control

hand wheel
seismically resistant electromechanical actuators **Auma**, or other manufacturers

Application

CV / SV 2xx SP - heating, ventilation, power generation and chemical processing industries
CV / SV 2xx SPEx - gas and chemical industries

Process media

CV / SV 2xx - liquids, gases and vapours without abrasive particles
e.g. water, steam, air and other media compatible with material of the valve inner parts
CV / SV 2xx Ex - technical and fuel gases and inflammable liquids

To ensure a reliable regulation, the producers recommends to pipe a strainer in front of the valve into pipeline or ensure in any other way that process medium does not contain abrasive particles or impurities

Installation

The valve can be installed in any position except position when the actuator is under the valve body. The valve is to be piped the way so that the direction of medium flow will coincide with the arrows on the body.

It is necessary to protect the actuator from excessive heat from the pipeline at medium **temperatures** above **150 °C (300 °F)**, e.g. by appropriately insulating the pipeline and valve and tilting the actuator from the vertical axis.

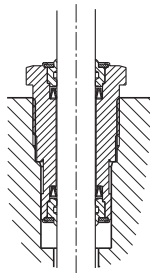
When the valve is used as diverting, process medium flows through common valve port AB and split streams leave through valve ports A and B). Detailed informations are given in the instruction for installation and service.

Packings

DRSpack® (PTFE)

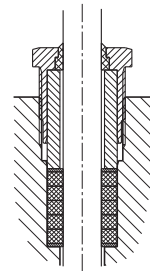
DRSpack® (Direct Radial Sealing Pack) is a packing with high tightness at both low and high operating pressure values.

It is the most used type of packing suitable for temperatures ranging from 0°C to 260°C. The pH range is from 0 to 14. The packing enables using of actuators with low linear force. The design enables an easy change of the whole packing. The average service life of DRSpack® is more than 500 000 cycles.



Graphite

This type of packing can be used for media **with temperature up to 550°C (1020 °F)** and pH range: 0 to 14. Packing can be "sealed up" either by screwing the packing screw in or adding another sealing ring. In regard of intensive frictional forces, graphite packing is suitable for actuators with a sufficient linear force.



Principles for plug type selection

V-ported plugs should not be used in supercritical differential pressures with inlet pressure $p \geq 0,4$ MPa and for regulation of saturated steam. In these cases we recommend to use a perforated plug. The perforated plug should be also used always when cavitation may occur due to a high differential pressure value or valve ports erosion caused by high speed of process medium flow. If the parabolic plug is used (because of small Kvs) for supercritical differential pressures, it is necessary to close both plug and seat with a hard metal overlay, i.e. stellite trim.

Rangeability

Rangeability is the ratio of the biggest value of flow coefficient to the smallest value. In fact it is the ratio (under the same conditions) of highest regulated flow rate value to its lowest value. The lowest or minimal regulated flow rate is always higher than 0.



CV/SV 2x0^{SP}

Control
and shut-off valves
in seismic version

NPS 1/2" - 10"
Class 150

Technical data		
Series	CV / SV 220 SP (Ex)	CV / SV 230 SP (Ex)
Type of valve	Two-way, single-seated, control (shut-off) valve	
Nominal pressure	NPS 1/2" to 10"	
Body material	Class 150	
Seat material:	Cast steel	Stainless steel
	A216 WCB, A217 WC6	A351 CF8M
NPS 1/2"-2"	1.4028	1.4571
NPS 2 1/2"-10"	1.4027	1.4581
Plug material:	1.4021	1.4571
NPS 1/2"-2 1/2"	1.4027	1.4581
NPS 3"-10"	1.4923	1.4980
Stem material	-10 to 550 °C (14 to 1020 °F)- (request for negative temperature need to be specified in order)	
Operating temperature range	acc. to ISA-75.08.01-2002 /R2007) for version with flanges	
Face to face dimensions	Acc. to ASME B16.5-2013	
Connection flanges	RF (Raised Face), LFF (Large Female Face), SFF (Small Female Face), LGF (Large Groove Face), SGF (Small Groove Face)	
Flange faces	V-ported, contoured, perforated	
Type of plug	Linear, equal-percentage, LDMspline®, parabolic, on - off	
Flow characteristic	0,01 to 800 m³/h (0,012 to 950 US gallon/min)	
Kvs value	Class III. acc. to ANSI/FCI 70-2-2013 (<0,1% Cv) for c. valves with metal-metal seat sealing	
Leakage rate	Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv) for c. valves with metal-PTFE seat sealing	
	Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv) for shut-off valve	
Leakage rate for Ex version	CV 2xx Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv); SV 2xx Rate C acc. to ISO 5208:2008	
Rangeability r	50 : 1	
Packing	DRSpack* (PTFE) t _{max} = 260°C (500°F), exp. graphite t _{max} = 550°C (1020°F), bellows (NPS 1/2" - 6") t _{max} = 550°C (1020°F)	
Seismic resistance	0 to 33 Hz, 30 m.s ⁻²	

Kvs values and differential pressures $\Delta p_{\max}$ [Mpa], [psi] of valves NPS 1/2" - 10" with V-ported plugs, contoured plugs (flow direction below plug) for electromechanical actuators

$\Delta p_{\max}$ value is the valve max. differential pressure when open - close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa, 232 psi. Otherwise it is suitable to use perforated plug, or sealing surfaces of seat and plug with a hard metal overlay.

For further information on actuating, see actuators' catalogue sheets			Actuating (actuator)										Auma	Auma	Auma	Hand wheel
			Marking in valve specification No.										EA...	EA...	EA...	Rxx
			Linear force										5 kN	7.5 kN	10 kN	
			Kvs [m ³ /h] Cv [US galon/min]										$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing
NPS	H[mm]	Ds[mm]	1	2	3	4	5	6	7	8	9	graph.PTFE	graph.PTFE	graph.PTFE	graph.PTFE	
1/2"		16	3	---	---	---	---	---	---	0.16 ³⁾ 0.18 ³⁾	0.1...0.01 ³⁾ 0.116...0.012 ³⁾	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			6	---	---	---	---	---	0.25 ¹⁾ 0.29 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			8	---	---	---	1.0 ¹⁾ 1.16	0.63 ¹⁾ 0.73	0.4 ¹⁾ 0.46	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			12	---	2.5 ¹⁾ 2.89	1.6 ¹⁾ 1.85	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			15	4.0 ¹⁾ 4.62 ¹⁾	---	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
3/4"		16	3	---	---	---	---	---	---	---	0.16...0.01 ³⁾ 0.18...0.012 ³⁾	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			6	---	---	---	---	---	0.25 ¹⁾ 0.29 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			8	---	---	---	1.0 ¹⁾ 1.16 ¹⁾	0.63 ¹⁾ 0.73 ¹⁾	0.4 ¹⁾ 0.46 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			12	---	---	2.5 ¹⁾ 2.89 ¹⁾	1.6 ¹⁾ 1.85 ¹⁾	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			15	---	4.0 ¹⁾ 4.62 ¹⁾	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			20	6.3 ²⁾ 7.28 ²⁾	---	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
1"		16	3	---	---	---	---	---	---	---	0.16...0.01 ³⁾ 0.18...0.012 ³⁾	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			6	---	---	---	---	---	0.25 ¹⁾ 0.29 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			8	---	---	---	1.0 ¹⁾ 1.16 ¹⁾	0.63 ¹⁾ 0.73 ¹⁾	0.4 ¹⁾ 0.46 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			12	---	---	2.5 ¹⁾ 2.89 ¹⁾	1.6 ¹⁾ 1.85 ¹⁾	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			15	---	---	4.0 ¹⁾ 4.62 ¹⁾	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			20	---	6.3 ²⁾ 7.28 ²⁾	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	
			25	10 11.6	6.3 ⁴⁾ 7.28	4.0 ⁴⁾ 4.62	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290	

the table continues on next page

1) shaped plug

2) shaped plug with linear characteristic, parabolic plug with equal-percentage, LDMspline® or parabolic characteristic

3) valve with micro-throttling trim. Version with Kvs = 0.16; 0.1; 0.063; 0.04; 0.025; 0.016; 0.01

4) V-ported plug with linear characteristic only

Max. differential pressures specified in table apply to PTFE and graphite packing. Δp for bellows must be consulted with the producer

For further information on actuating, see actuators' catalogue sheets			Actuating (actuator)										Auma	Auma	Auma	Hand wheel
			Marking in valve specification No.										EA...	EA...	EA...	Rxx
			Linear force										5 kN	7.5 kN	10 kN	
NPS	H[mm]	Ds[mm]	Kvs [m ³ /h] Cv [US galon/min]										$\Delta p_{\max}$ [MPa] packing graph.PTFE	$\Delta p_{\max}$ [MPa] packing graph.PTFE	$\Delta p_{\max}$ [MPa] packing graph.PTFE	$\Delta p_{\max}$ [MPa] packing graph.PTFE
1¼"	16	6	---	---	---	---	---	---	---	---	---	0.25 ¹⁾ 0.29 ¹⁾	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		8	---	---	---	---	---	1.0 ¹⁾ 1.16 ¹⁾	0.63 ¹⁾ 0.73 ¹⁾	0.4 ¹⁾ 0.46 ¹⁾	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		12	---	---	---	---	2.5 ¹⁾ 2.89 ¹⁾	1.6 ¹⁾ 1.85 ¹⁾	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		15	---	---	---	4.0 ¹⁾ 4.62 ¹⁾	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		20	---	---	6.3 ²⁾ 7.28 ²⁾	---	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		32	16 18.5	10 11.6	6.3 ⁴⁾ 7.28 ⁴⁾	---	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		6	---	---	---	---	---	---	---	---	---	0.25 ¹⁾ 0.29 ¹⁾	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		8	---	---	---	---	---	---	1.0 ¹⁾ 1.16 ¹⁾	0.63 ¹⁾ 0.73 ¹⁾	0.4 ¹⁾ 0.46 ¹⁾	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		12	---	---	---	---	2.5 ¹⁾ 2.89 ¹⁾	1.6 ¹⁾ 1.85 ¹⁾	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		15	---	---	---	4.0 ¹⁾ 4.62 ¹⁾	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
1½"	20	20	---	---	6.3 ²⁾ 7.28 ²⁾	---	---	---	---	---	---	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
		40	25 28,9	16 18.5	10 11.6	6.3 ⁴⁾ 7.28 ⁴⁾	4.0 ⁴⁾ 4.62 ⁴⁾	---	---	---	---	---	1.54 2 224 290	2 2 290 290	2 2 290 290	2 2 290 290
		50	40 46.2	25 28,9	16 18.5	10 11.6	6.3 ⁴⁾ 7.28 ⁴⁾	---	---	---	---	---	0.50 1.79 72 259	1.95 2 282 290	2 2 290 290	2 2 290 290
		65	40 46.2	25 28,9	16 18.5	10 11.6	6.3 ⁴⁾ 7.28 ⁴⁾	---	---	---	---	---	0.50 0.88 72 128	1.15 1.7 167 247	1.8 2 261 290	1.8 2 261 290
		2½"	65	40 46.2	25 28,9	16 18.5	10 11.6	6.3 ⁴⁾ 7.28 ⁴⁾	---	---	---	---	0.50 0.88 72 128	1.15 1.7 167 247	1.8 2 261 290	1.8 2 261 290

the table continues on next page

1) shaped plug

2) shaped plug with linear characteristic, parabolic plug with equal-percentage, LDMspline® or parabolic characteristic

3) valve with micro-throttling trim. Version with Kvs = 0.16; 0.1; 0.063; 0.04; 0.025; 0.016; 0.01

4) V-ported plug with linear characteristic only

Max. differential pressures specified in table apply to PTFE and graphite packing. Δp for bellows must be consulted with the producer

For further information on actuating, see actuators' catalogue sheets			Actuating (actuator)					Auma		Auma		Auma		Auma		Auma		Hand wheel		
			Marking in valve spec. No.					EA...		EA...		EA...		EA...		EA...		Rxx		
			Linear force					7.5 kN		10 kN		15 kN		20 kN		32 kN				
			Kvs [m³/h] Cv [US galon/min]					Δp _{max} [MPa] [psi] packing		Δp _{max} [MPa] [psi] packing		Δp _{max} [MPa] [psi] packing		Δp _{max} [MPa] [psi] packing		Δp _{max} [MPa] [psi] packing		Δp _{max} [MPa] [psi] packing		
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graph.PTFE		graph.PTFE		graph.PTFE		graph.PTFE		graph.PTFE		graph.PTFE		
2"	20	50	40 46.2	25 28.9	16 18.5	10 11.6	6.3 ⁽⁴⁾ 7.2 ⁽⁴⁾	1.95 282	2 290	2 290	2 290	2 290	--- ---	--- ---	--- ---	2 290	2 290			
2½"		65	40 46.2	25 28.9	16 18.5	10 11.6	6.3 ⁽⁴⁾ 7.2 ⁽⁴⁾	1.15 167	1.7 247	1.8 261	2 290	2 290	--- ---	--- ---	--- ---	1.8 261	2 290			
3"	40	80	100 116	63 72.8	40 46.2	25 28.9	16 18.5	0.65 94	1.1 159	1.1 159	1.55 224	2 290	2 290	2 290	2 290	--- ---	2 290	2 290		
4"		100	160 185	100 116	63 72.8	40 46.2	25 28.9	0.4 57	0.69 100	0.69 100	0.98 142	1.27 184	1.56 227	1.85 296	2 290	--- ---	1.15 167	1.68 244		
5"		125	250 289	160 185	100 116	63 72.8	40 46.2	0.24 34	0.43 62	0.43 62	0.62 89	0.8 117	0.99 144	1.18 172	1.37 199	--- ---	1.69 245	1.07 155		
6"		150	360 416	250 289	160 185	100 116	63 72.8	0.15 22	0.29 44	0.29 41	0.42 61	0.55 80	0.68 99	0.82 118	0.95 138	--- ---	0.5 72	0.74 107		
8"	80	100	---	---	250 289	160 185	100 116	---	---	---	---	1.21 225	1.55 125	1.8 262	2 290	2 290	2 290	2 290		
		150	---	400 462	---	---	---	---	---	---	---	---	0.52 75	0.67 98	0.79 114	0.94 136	1.43 207	1.58 229	1.85 269	2 290
		200	570 659	---	---	---	---	---	---	---	---	---	0.28 41	0.37 53	0.43 63	0.52 75	0.8 116	0.88 128	1.04 151	1.13 163
150		---	---	400 462	250 289	160 185	---	---	---	---	---	0.48 70	0.66 95	0.75 109	0.93 134	1.4 203	1.57 228	1.83 266	2 290	
200		---	630 728	---	---	---	---	---	---	---	---	0.26 37	0.36 52	0.41 59	0.51 74	0.78 112	0.87 127	1.02 148	1.12 162	
10"		230	800 925	---	---	---	---	---	---	---	---	---	0.19 27	0.26 38	0.3 44	0.38 55	0.58 84	0.66 95	0.77 111	0.84 122

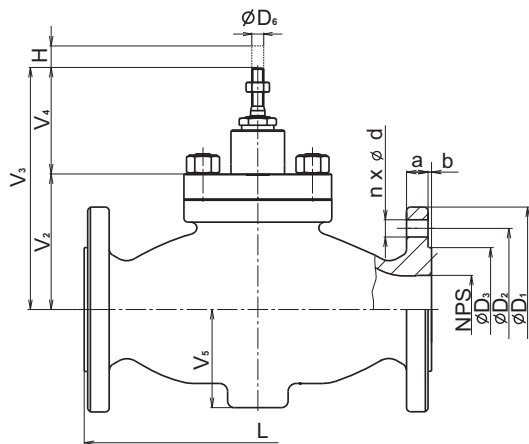
Kvs values and differential pressures $\Delta p_{\max}$ [MPa], [psi] of valves NPS 1/2" - 10" with perforated plugs (flow direction above plug)

For further information on actuating, see actuators' catalogue sheets			Actuating (actuator)					Auma	Auma	Auma	Auma	Auma	Auma	Auma	Hand wheel
			Marking in valve spec. No.					EA...	EA...	EA...	EA...	EA...	EA...	EA...	Rxx
			Linear force					5 kN	7.5 kN	10 kN	15 kN	20 kN	32 kN	32 kN	
			Kvs [m ³ /h] Cv [US galon/min]					$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]	$\Delta p_{\max}$ [MPa] [psi]
NPS	H[mm]	Ds[mm]	1	2	3	4	5	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE	packing graph.PTFE
1"	16	25	---	6.3 7.28	4 4.62	2.5 ⁵⁾ 2.89	1.6 ⁵⁾ 1.85	2 2 290 290	2 2 290 290	2 2 290 290	---	---	---	---	2 2 290 290
1 1/4"		32	---	10 11.6	6.3 7.28	4 4.62	2.5 ⁵⁾ 28.9	2 2 290 290	2 2 290 290	2 2 290 290	---	---	---	---	2 2 290 290
1 1/2"		40	---	16 18.5	10 11.6	6.3 7.28	4 4.62	1.54 2 224 290	2 2 290 290	2 2 290 290	---	---	---	---	2 2 290 290
2"	20	50	---	25 28.9	16 18.5	10 11.6	6.3 7.28	0.50 1.79 72 259	1.95 2 282 290	2 2 290 290	1.95 2 289 290	---	---	---	2 2 290 290
2 1/2"		65	---	40 46.2	25 28.9	16 18.5	10 11.6	0.50 0.88 72 128	1.15 1.7 167 247	1.8 2 261 290	1.15 1.7 167 247	---	---	---	1.8 2 261 290
3"	40	80	---	63 72.8	40 46.2	25 28.9	16 18.5	---	0.65 1.1 94 159	1.1 1.55 159 224	2 2 290 290	2 2 290 290	---	---	2 2 290 290
4"		100	---	100 116	63 72.8	40 46.2	25 28.9	---	0.4 0.69 57 100	0.69 0.98 100 142	1.27 1.56 184 227	1.85 2 296 290	---	---	1.15 1.68 167 244
5"		125	---	160 185	100 116	63 72.8	40 46.2	---	0.24 0.43 34 62	0.43 0.62 62 89	0.8 0.99 117 144	1.18 1.37 172 199	---	---	1.69 1.07 245 155
6"		150	---	250 289	160 185	100 116	63 72.8	---	0.15 0.29 22 44	0.29 0.42 41 61	0.15 0.29 80 99	0.82 0.95 118 138	---	---	0.5 0.74 72 107
8"	80	200	---	400 462	250 289	160 185	100 116	---	---	---	0.28 0.37 41 53	0.43 0.52 63 75	0.8 0.88 116 128	1.04 1.13 151 163	
10"		230	---	630 728	400 462	250 289	160 185	---	---	---	0.19 0.26 27 38	0.3 0.38 44 55	0.58 0.66 84 95	0.77 0.84 111 122	

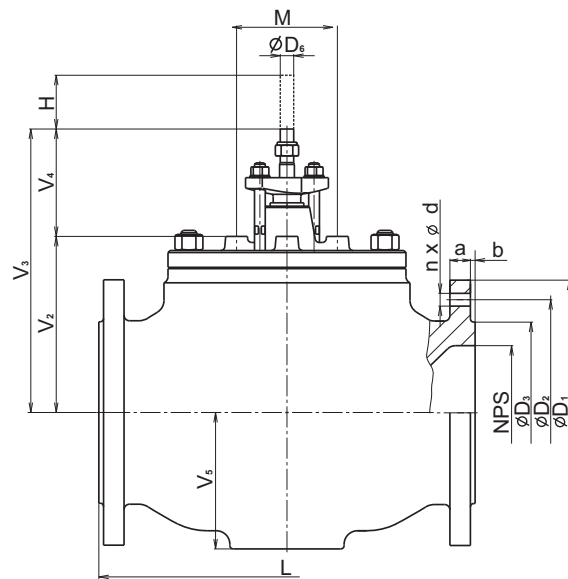
5) only with linear characteristic

Dimensions and weights of valves CV / SV 2x0 SP (Ex)

NPS	H	V ₂	V ₃	V ₄	M	ØD ₆	V ₅	m	RF	LFF SFF LGF SGF	ØD ₁	ØD ₂	ØD ₃	d	n	a	b	
	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	kg			[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]
½"	16 0.63	63	152	89	---	M10x1	47 1.85	5.5	184 7.24	194 7.64	90 3.54	60.3 2.37	34.9 1.38	15.9 5/8"	4	9.6 0.38	2 0.06	
¾"		2.480	5.984				47 1.85	6	184 7.24	194 7.64	100 3.94	69.9 2.75	42.9 1.69			11.2 0.44		
1"		73 2.874	162 6.378				52 2.047	7	184 7.24	194 7.64	110 4.33	79.4 3.13	50.8 2.0			12.7 0.5		
1¼"							49 1.929	8.5	200 7.87	210 8.27	115 4.53	88.9 3.5	63.5 2.5			14.3 0.56		
1½"							52 2.047	10	222 8.74	232 9.13	125 4.92	98.4 3.87	73 2.88			15.9 0.62		
2"	20 0.787	104 4.094	193 7.598	73 2.874		16	254 10	264 10.39	150 5.91	120.7 4.75	92.1 3.62	17.5 0.69						
2½"				73 2.874		21	276 10.87	286 11.26	180 7.09	139.7 5.5	104.8 4.13	19.1 ¾"	20.7 0.81					
3"				40 1.575		139 5.472	245 9.646	106 4.173	M16x1,5	105 4.133	33	298 11.73	308 12.13	190 7.48	152.4 6	127 5.0		22.3 7/8"
4"	139 5.472	245 9.646	106 4.173			105 4.133	46	352 13.86		362 14.25	230 9.06	190.5 7.5	157.2 6.19	22.3 0.88				
5"	157 6.181	264 10.393	107 4.213			133 5.236	70	403 15.87		413 16.26	255 10.04	215.9 8.5	185.7 7.31	22.3 0.88				
6"	179 7.047	281 11.063	102 4.016			134 5.275	105	451 17.76		461 18.15	280 11.02	241.3 9.5	215.9 8.5	23.9 0.94				
8"	80 3.15	262 10.314	422 16.614		160 6.299	150 5.905	M20x1,5	203 7.992		200	543 21.38	553 21.77	345 13.58	298.5 11.75	269.9 10.62	25.4 1"	12	
10"		346 13.622	506 19.921	160 6.299	253 9.961			350	673 26.5	683 26.89	405 15.94	362 14.25	323.8 12.75	28.6 1.13				



NPS ½" - 6"



NPS 8" - 10"



CV 2x2_{SP}

Control valves,
pressure-balanced,
in seismic version

NPS 1"- 10"
Class 150

Series	CV 222 SP (Ex)	CV 232 SP (Ex)
Type of valve	Two-way, single-seated, control valve with pressure balanced plug	
Nominal size range	NPS 1" to 10"	
Nominal pressure	Class 150	
Body material	Litá ocel A216 WCB, A217 WC6	Litá korozivzdorná ocel A351 CF8M
Seat material: NPS ½"-2"	1.4028	1.4571
NPS 2½"-10"	1.4027	1.4581
Plug material: NPS ½"-2½"	1.4021	1.4571
NPS 3"-10"	1.4027	1.4581
Stem material	1.4923	1.4980
Operating temperature range	-10 to 550 °C (14 to 1020 °F)- (request for negative temperature need to be specified in order)	
Face to face dimensios	acc. to ISA-75.08.01-2002 /R2007)	
Connection flanges	acc. to ASME B16.5-2013	
Flange faces	RF (Raised Face), LFF (Large Female Face), SFF (Small Female Face), LGF (Large Groove Face), SGF (Small Groove Face)	
Type of plug	V-ported, contoured, perforated	
Flow characteristic	Linear, equal-percentage, LDMspline®, parabolic, on - off	
Kvs value (Cv)	1,6 to 800 m ³ /h (1,85 to 950 US gallon/min)	
Leakage rate	Class III. acc. to ANSI/FCI 70-2-2013 (<0,1% Cv) for c. valves with metal-metal seat sealing Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv) for c. valves with metal-PTFE seat sealing	
Leakage rate for Ex version	Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv)	
Rangeability r	50 : 1	
Packing	DRSpack® (PTFE) t _{max} = 260°C (500°F), Exp. graphite t _{max} = 550°C (1020°F)	
Seismic resistance	0 to 33 Hz, 30 m.s ⁻²	

Kvs values and differential pressures $\Delta p_{\max}$ [MPa], [psi] of valves with pressure balanced plugs NPS 1" - 10" with electromechanic actuators

$\Delta p_{\max}$ value is the valve max. differential pressure when open - close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa, 232 psi. Otherwise it is suitable to use perforated plug, (Δp up to 2,0 MPa, 290 psi) or sealing surfaces of seat and plug with a hard metal overlay (Δp up to 2,0 MPa, 290 psi).

For further information on actuating, see actuators' catalogue sheets			Actuating (actuator)					Auma	Auma	Auma	Auma	Hand wheel
			Marking in valve spec. No.					EA...	EA...	EA...	EA...	Rxx
			Linear force					7.5 kN	10 kN	15 kN	20 kN	
			Kvs [m ³ /h] Cv [US gallon/min]					$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing	$\Delta p_{\max}$ [MPa] packing
NPS	H[mm]	DS[mm]	1	2	3	4	5	graph.PTFE	graph.PTFE	graph.PTFE	graph.PTFE	graph.PTFE
1"	16	25	10 11.6	6.3 ⁵⁾ 7.28	4 ⁵⁾ 4.62	2.5 ⁵⁾ 2.89	1.6 ⁵⁾ 1.85	2 2 290 290	---	---	---	2 2 290 290
1¼"		32	16 18.5	10 11.6	6.3 ⁵⁾ 7.28	4 ⁵⁾ 4.62	2.5 ⁵⁾ 28.9	2 2 290 290	---	---	---	2 2 290 290
1½"		40	25 28.9	16 18.5	10 11.6	6.3 ⁵⁾ 7.28	4 4.62	2 2 290 290	---	---	---	2 2 290 290
2"	20	50	40 46.2	25 28.9	16 18.5	10 11.6	6.3 ⁵⁾ 7.28	2 2 290 290	---	---	---	2 2 290 290
2½"		65	63 72.8	40 46.2	25 28.9	16 18.5	10 11.6	2 2 290 290	---	---	---	2 2 290 290
3"	40	80	100 116	63 72.8	40 46.2	25 28.9	16 18.5	2 2 290 290	2 2 290 290	---	---	2 2 290 290
4"		100	160 185	100 116	63 72.8	40 46.2	25 28.9	2 2 290 290	2 2 290 290	---	---	2 2 290 290
5"		125	250 289	160 185	100 116	63 72.8	40 46.2	2 2 290 290	2 2 290 290	---	---	2 2 290 290
6"		150	360 416	250 289	160 185	100 116	63 72.8	2 2 290 290	2 2 290 290	2 2 290 290	---	2 2 290 290
8"	80	200	630 728	400 462	250 289	160 185	100 116	---	2 2 290 290	2 2 290 290	2 2 290 290	2 2 290 290
10"		230	800 925	630 728	400 462	250 289	160 185	---	---	---	2 2 290 290	2 2 290 290

5) linear characteristic only

Perforated plug available only with Kvs values in shadowed frames with the following restrictions:

- Perforated plug with Kvs value acc. to column No. 2 available with linear or parabolic characteristic only

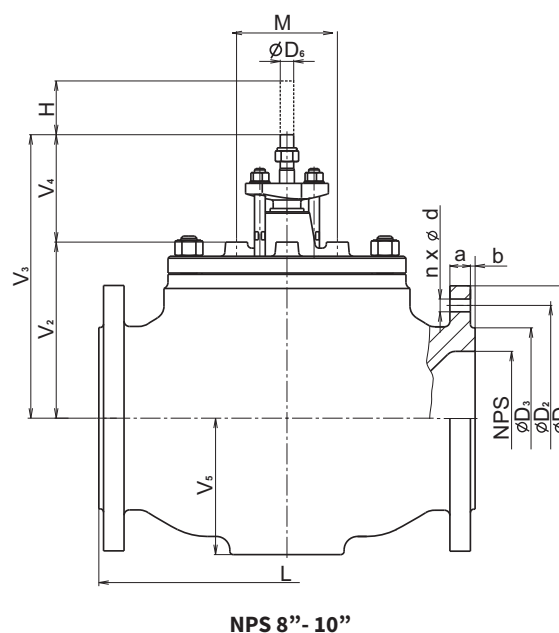
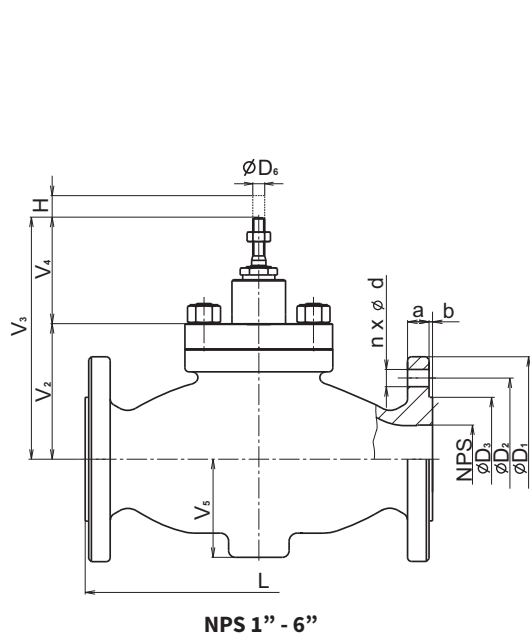
Max. differential pressures specified in table apply to PTFE and graphite packing.

$\Delta p_{\max}$ for bellows must be consulted with the producer.

Dimensions and weights of valves CV / SV 2x2 SP (Ex)

NPS	H	V ₂	V ₃	V ₄	M	ØD ₆	V ₅	m	L	RF	LFF SFF LGF SGF	ØD ₁	ØD ₂	ØD ₃	d	n	a	b
	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	kg	[mm] [inch]		[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]
1"							52 2.047	7.5	184 7.24		194 7.64	110 4.33	79.4 3.13	50.8 2.0			12.7 0.5	
1¼"	16 0.63	73 2.874	162 6.378				49 1.929	9	200 7.87		210 8.27	115 4.53	88.9 3.5	63.5 2.5	15.9 5/8"		14.3 0.56	
1½"				89 3.504			52 2.047	11	222 8.74		232 9.13	125 4.92	98.4 3.87	73 2.88		4	15.9 0.62	
2"							73 2.874	17	254 10		264 10.39	150 5.91	120.7 4.75	92.1 3.62			17.5 0.69	
2½"	20 0.787	104 4.094	193 7.598		---		73 2.874	22	276 10.87		286 11.26	180 7.09	139.7 5.5	104.8 4.13	19.1 ¾"		20.7 0.81	
3"		139 5.472	245 9.646	106 4.173			105 4.133	35	298 11.73		308 12.13	190 7.48	152.4 6	127 5.0			22.3 0.88	2 0.06
4"		139 5.472	245 9.646	106 4.173			105 4.133	48	352 13.86		362 14.25	230 9.06	190.5 7.5	157.2 6.19			22.3 0.88	
5"	40 1.575	157 6.181	264 10.393	107 4.213			133 5.236	73	403 15.87		413 16.26	255 10.04	215.9 8.5	185.7 7.31		8	22.3 0.88	
6"		179 7.047	281 11.063	102 4.016			134 5.275	108	451 17.76		461 18.15	280 11.02	241.3 9.5	215.9 8.5	22.3 7/8"		23.9 0.94	
8"	80(63) ¹⁾ 3.15 (2.48)	262 10.314	422 16.614	160 6.299	150 5.905		203 7.992	205	543 21.38		553 21.77	345 13.58	298.5 11.75	269.9 10.62			27 1.06	
10"	80 3.15	346 13.622	506 19.921	160 6.299			253 9.961	355	673 26.5		683 26.89	405 15.94	362 14.25	323.8 12.75	25.4 1"	12	28.6 1.13	

¹⁾ DN 200 with graphite pressure balancing - stroke = 63 mm



Valve complete specification No. for ordering CV / SV 2x0 SP (Ex) and CV 2x2 SP (Ex)

		XX	XXX	XXX	XXXX	XX	XXX	/	XXX	-	XXX	XXXX
1. Valve	Control valve	CV										
	Shut-off valve	SV										
2. Series	Valves made of cast steel		2 2									
	Valves made of stainless steel		2 3									
	Direct valve		0									
	Pressure-balanced valve		2									
3. Actuating *)	Electric actuator			E X X								
	Pneumatic actuator			P X X								
	Hand wheel			R X X								
4. Connection	Flange RF (raised face)				1							
	Flange LFF (large female face)				3							
	Flange SFF (small female face)				4							
	Flange LGF (large groove face)				5							
	Flange SGF (small groove face)				6							
5. Body material	Cast steel A216 WCB (-29 to 425 °C); (-20 to 800 °F) ⁵⁾				1							
	CrMo steel A217 WC6 (-29 to 550 °C); (-20 to 1020 °F) ⁵⁾				7							
	Stainless steel A351 CF8M (-50 to 550 °C); (-58 to 1020 °F) ⁵⁾				8							
	Other material on request				9							
6. Seat sealing	Metal - metal				1							
	Soft sealing (metal - PTFE) ²⁾				2							
	Hard metal overlay on sealing surfaces				3							
	Balanced by graphite, metal - metal ³⁾				5							
	Balanced by graphite, hard metal overlay ³⁾				7							
	Hard metal overlay for CV 2x2, plug with metal seal ⁴⁾				8							
7. Packing	DRSpack® (PTFE)				3							
	Exp. graphite				5							
8. Flow characteristic	Linear				L							
	Equal-percentage in straight way				R							
	LDMspline®				S							
	On-off				U							
	Parabolic				P							
	Linear - perforated plug				D							
	Equal-percentage - perforated plug				Q							
	Parabolic - perforated plug				Z							
9. Kvs	Column no. acc. to Kvs value table				X							
10. Nominal pressure PN	Class 150					150						
11. Max. operat. temp.	Acc. to version 260 - 550°C (500 - 1020°F)						XXX					
12. Nominal size DN	DN (NPS)									XXX		
13. Version	Seismically resistant										SP	
	Seismically resistant, non-explosive										SPEX	

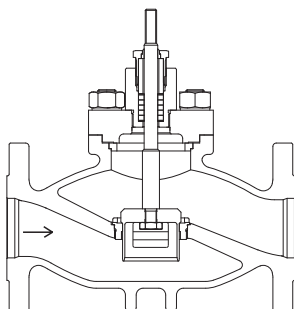
DN	NPS	DN	NPS	Temp.
				°C °F
015	½"	065	2½"	260 500
020	¾"	080	3"	300 570
025	1"	100	4"	315 600
032	1¼"	125	5"	400 750
040	1½"	150	6"	425 800
050	2"	200	8"	500 930
		250	10"	550 1020

Ordering example of version with flanges: CV220 EAC 1135 L1 300/400-080SP

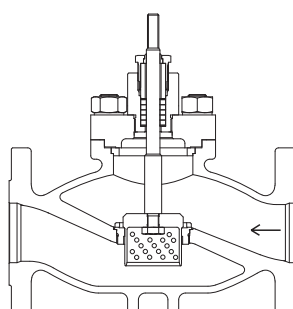
*) For marking of actuators in specification code, refer to table on page 23 of this catalogue

Valves CV / SV 2x0 SP (Ex)

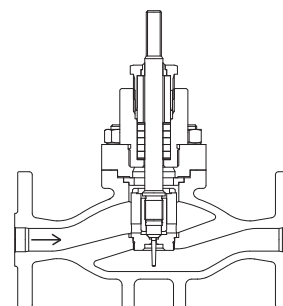
Section of valve
with V-ported plug



Section of valve
with perforated plug

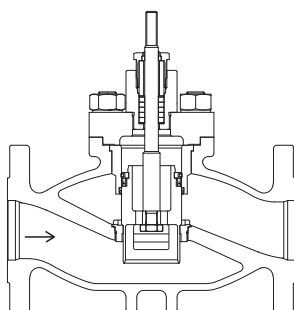


Section of valve
with micro-throttling system

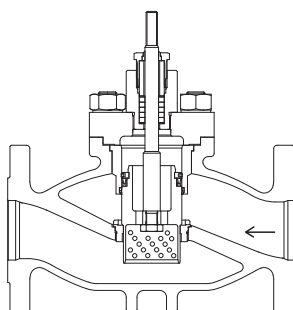


Valves CV 2x2 SP (Ex)

Section of pressure-balanced valve
with V-ported plug



Section of pressure-balanced valve
with perforated plug





Electric actuators

Auma

**SA 07.2, SA Ex 07.2,
SAR 07.2, SAR Ex 07.2,
SA 07.6, SA Ex 07.6,
SAR 07.6, SAR Ex 07.6**

marking in type number:

**EAA, EAB, EAC, EAD
EAE, EAF, EAG, EAH**

Technical data								
Type	SA 07.2	SA Ex 07.2	SAR 07.2	SAR Ex 07.2	SA 07.6	SA Ex 07.6	SAR 07.6	SAR Ex 07.6
Marking in valve spec. No.	EAA	EAB	EAC	EAD	EAE	EAF	EAG	EAH
Voltage	3-phase ~ 380 or 400 V AC (1-phase ~ 230 V AC cannot be used - high weight)							
Frequency	50 Hz							
Power consumption	see specification table							
Control	3 - point or with signal 4 - 20 mA							
Nominal force	10 Nm~5 kN; 15 Nm~7,5 kN; 20 Nm~10 kN				30 Nm~15 kN; 40 Nm~20 kN			
Travel	acc. to used valve16, 20, 40 mm				acc. to used valve 40, 80 mm			
Enclosure	IP 68							
Process medium max. temp.	acc. to used valve							
Ambient temperatrure range	-40 to 80°C	-20 to 60°C	-40 to 60°C	-20 to 60°C	-40 to 80°C	-20 to 60°C	-40 to 60°C	-20 to 60°C
Ambient humidity range	100 %							
Weight	20 - 33 kg				21 - 33kg			
Vibration resistance dle EN 60068-2-6					AUMA NORM: 2g, 10-200Hz AUMA MATIC: 1g, 10-200Hz AUMATIC: 1g, 10-200Hz			

→ **Note:** Specifications and technical data are for information only.

Detailed technical informations can be found in producer's data sheet or on the webside www.auma.com

Specification of Auma actuators												
								SA	X	XX		07.X
Type								SA				
Duty			control ON - OFF						R			
Version			standard non-explosive							Ex		
Actuator size												07.2 07.6
Output shaft type A (thread TR 16x4 LH, connection flange F07) ... for RV 2xx DN 15 to 150												
Output speed [ot/min]		Tripping torque	SA 07.2 SA Ex 07.2	SAR 07.2 SAREx07.2	Motor power [kW]	SA 07.2 S2-15min	SA Ex 07.2 S2-15min	SAR 07.2 S4-25%	SAR Ex 07.2 S4-25%			
	4		10-30 Nm	15-30 Nm		0,02	0,02	0,02	0,02			
	5,6					0,02	0,02	0,02	0,02			
	8					0,04	0,04	0,04	0,04			
	11					0,04	0,04	0,04	0,04			
	16					0,06	0,06	0,06	0,06			
	22					0,06	0,06	0,06	0,06			
	32					0,10	0,10	0,10	0,10			
	45					0,10	0,10	0,10	0,10			
Output shaft type A (thread TR 20x4 LH, flange F10) ... for RV 2xx DN 80 to 400												
Output speed [ot/min]		Tripping torque	SA 07.6 SA Ex 07.6	SAR 07.6 SAREx07.6	Motor power [kW]	SA 07.6 S2-15min	SA Ex 07.6 S2-15min	SAR 07.6 S4-25%	SAR Ex 07.6 S4-25%			
	4		20-60 Nm	30-60 Nm		0,03	0,03	0,03	0,03			
	5,6					0,03	0,03	0,03	0,03			
	8					0,06	0,06	0,06	0,06			
	11					0,06	0,06	0,06	0,06			
	16					0,12	0,12	0,12	0,12			
	22					0,12	0,12	0,12	0,12			
	32					0,20	0,20	0,20	0,20			
	45					0,20	0,20	0,20	0,20			

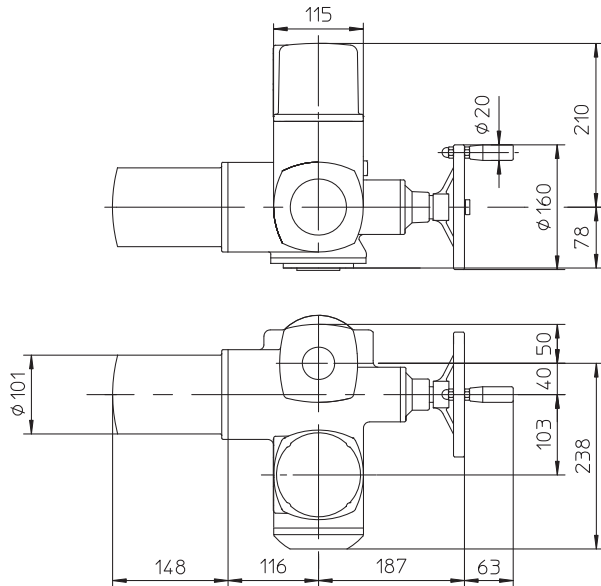
Accessories

- 2 TANDEM switches
- Gearing for signalisation of position
- Mechanical position indicator
- Potentiometer 1x200 Ω
- Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 2-wire
- Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 3/4-wire
- Inductive position transmitter IWG, 4 - 20 mA
- MATIC - or continuous control (specification of accessories acc. to catalogue of producer: IP 67; -25 to +70°C; ...), weight + 7 kg
- AUMATIC - or continuous control (specification of accessories acc. to catalogue of producer: IP 68; -25 to +70°C; ...), weight + 7kg

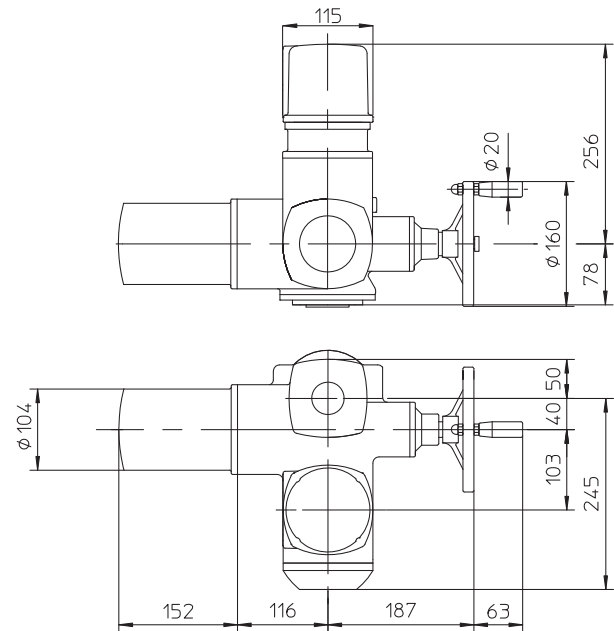
Other accessories acc. to catalogue of producer of actuators.

Dimensions of actuators Auma series 07.2 and 07.6

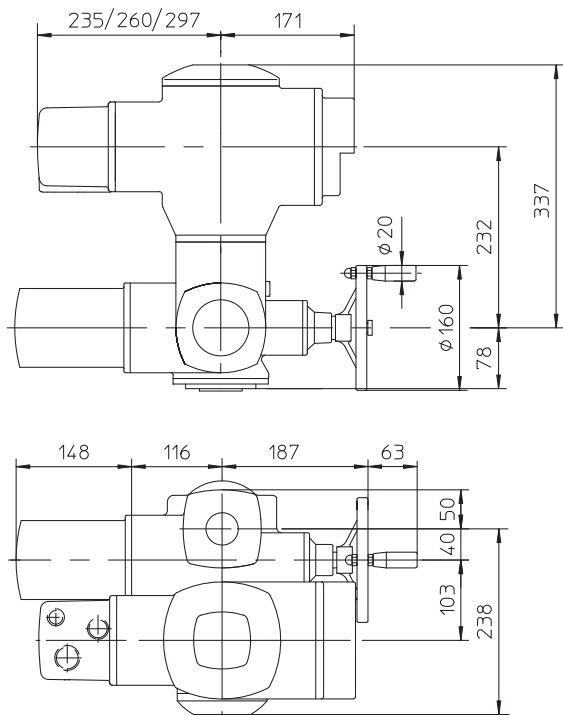
Normal version



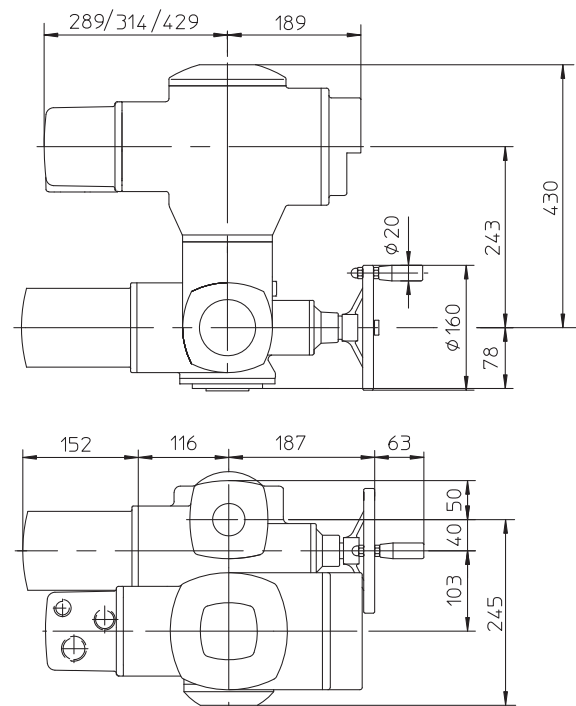
Version Ex norm

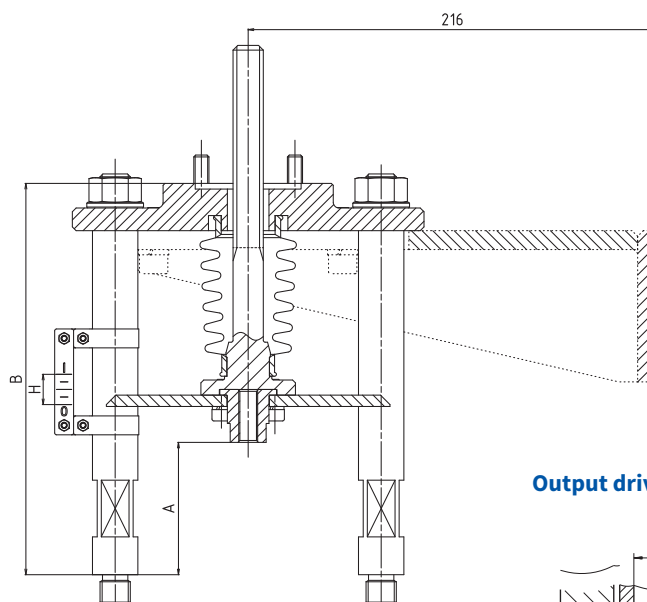
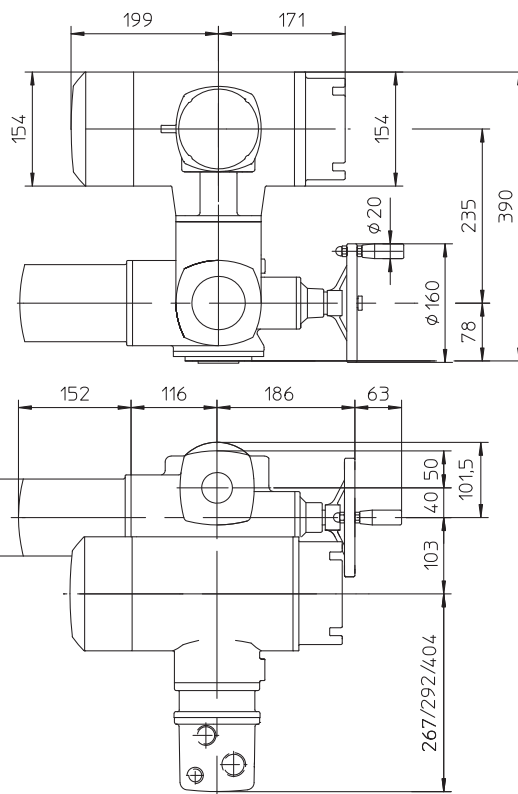


Version MATIC

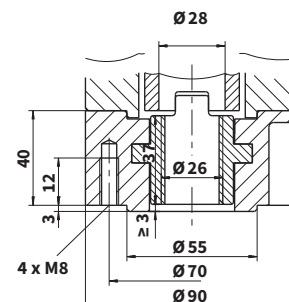


Version Ex MATIC



Version Ex AUMATIC

For valves	Number of columns	A	B	Weight [kg]
CV 2xx NPS 1/2" - 2 1/2"	4	70	207	6 kg (+ 6 kg console)
CV 2xx NPS 3" - 6"	4	80	245	8 kg
CV 2xx NPS 8" - 10"	4	140	420	15 kg





Electric actuators

Auma

SA 10.2, SA Ex 10.2
SAR 10.2, SAR Ex 10.2

marking in type number:

EAI, EAJ, EAK, EAL

Technical data				
Type	SA 10.2	SA Ex 10.2	SAR 10.2	SAR Ex 10.2
Marking in valve spec. No.	EAI	EAL	EAJ	EAK
Voltage	3-phase ~ 380 or 400 V AC (1-phase ~ 230 V AC not applicable - high weight)			
Frequency	50 Hz			
Power consumption	see specification table			
Control	3 - point or with signal 4 - 20 mA			
Nominal force	80 Nm ~ 21,6 kN; 100 Nm ~ 27 kN; 120 Nm ~ 32 kN			
Travel	80, 100 mm			
Enclosure	IP 68			
Process medium max. temp.	acc. to used valve			
Ambient temperature range	-40 to 80 °C	-20 to 60 °C	-40 to 60 °C	-20 to 60 °C
Ambient humidity range	100 %			
Weight	22 to 47 kg			
Vibration resistance acc. to EN 60068-2-6	AUMA NORM: 2g, 10-200Hz; AUMA MATIC: 1g, 10-200Hz; AUMATIC: 1g, 10-200Hz			

→ **Note:** Specifications and technical data are for information only.Detailed technical informations can be found in producer's data sheet or on the website www.auma.com

Specification of Auma actuators												
								SA	X	XX		10.2
Type								SA				
Duty			control ON - OFF						R			
Version			standard non-explosive								Ex	
Actuator size												10.2
Output drive shaft type A (thread TR 36x6 LH, flange F10) ... for RV 2xx DN 200 - 400												
Output speed [ot/min]		Tripping torque	SA 10.2	SAR 10.2	Motor power [kW]	SA 10.2	SA Ex 10.2	SAR 10.2	SAR Ex 10.2			
			SA Ex 10.2	SAR Ex 10.2		S2-15min	S2-15min	S4-25%	S4-25%			
	4		40-120 Nm	60-120 Nm		0,06	0,09	0,09	0,09			
	5,6					0,06	0,09	0,09	0,09			
	8					0,12	0,18	0,18	0,18			
	11					0,12	0,18	0,18	0,18			
	16					0,25	0,37	0,37	0,37			
	22					0,25	0,37	0,37	0,37			
	32					0,40	0,75	0,75	0,75			
	45					0,40	0,75	0,75	0,75			

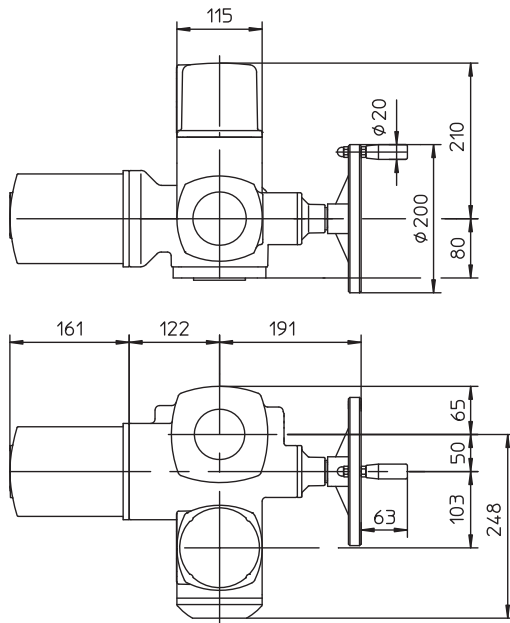
Accessories

- 2 TANDEM switches
 - Gearing for signalisation of position
 - Mechanical position indicator
 - Potentiometer 1x200 Ω
 - MATIC - or continuous control (specification of accessories acc. to catalogue of producer: IP 67; -25 to +70°C; ...), weight + 7 kg
 - AUMATIC - or continuous control (specification of accessories acc. to catalogue of producer: IP 68; -25 to +70°C; ...), weight + 7kg
- Other accessories acc. to catalogue of producer of actuators.

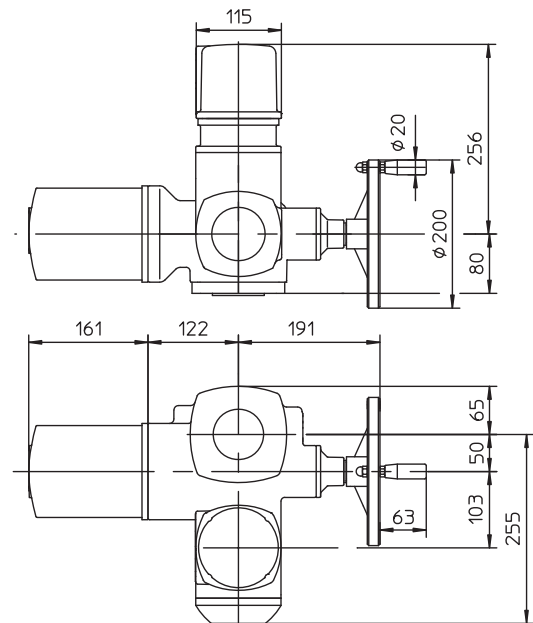
- Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 2-wire
- Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 3/4-wire
- Inductive position transmitter IWG, 4 - 20 mA

Dimensions of actuators Auma series 10.2

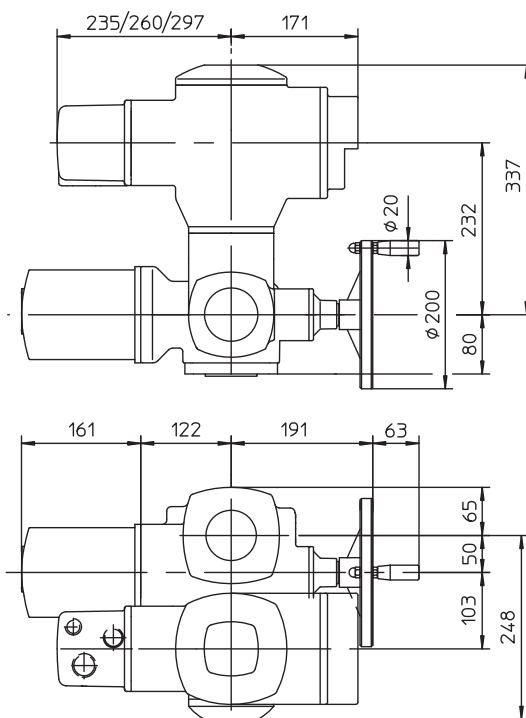
Normal version



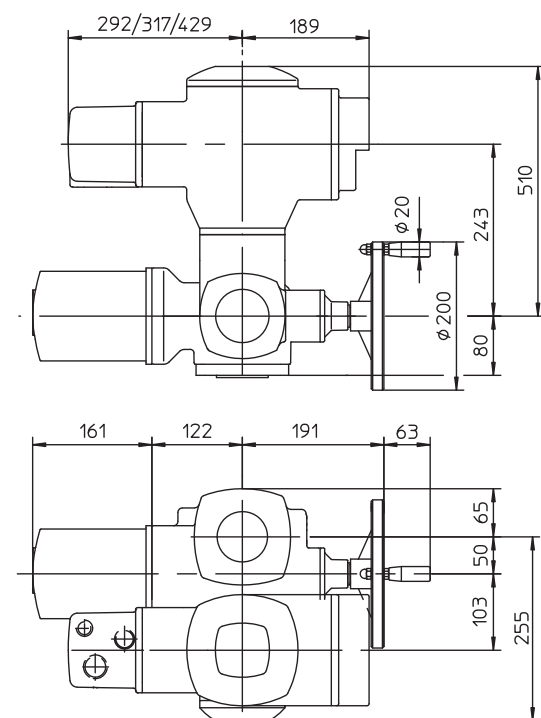
Ex normal version



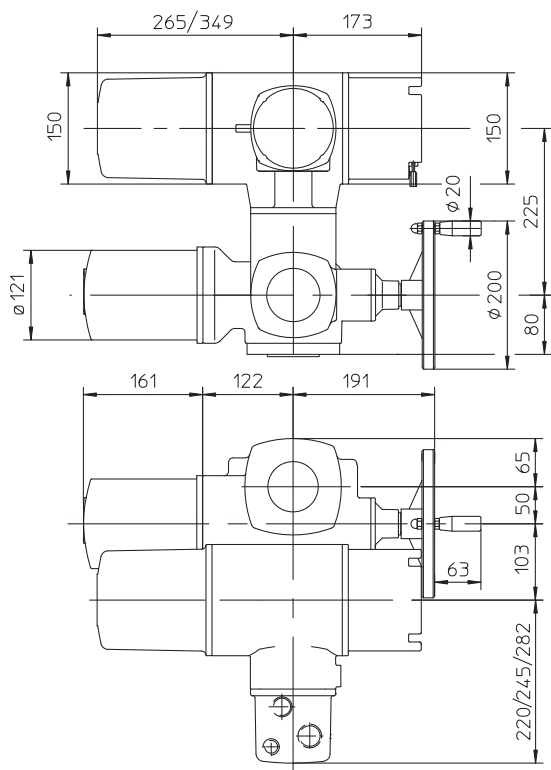
Version with MATIC



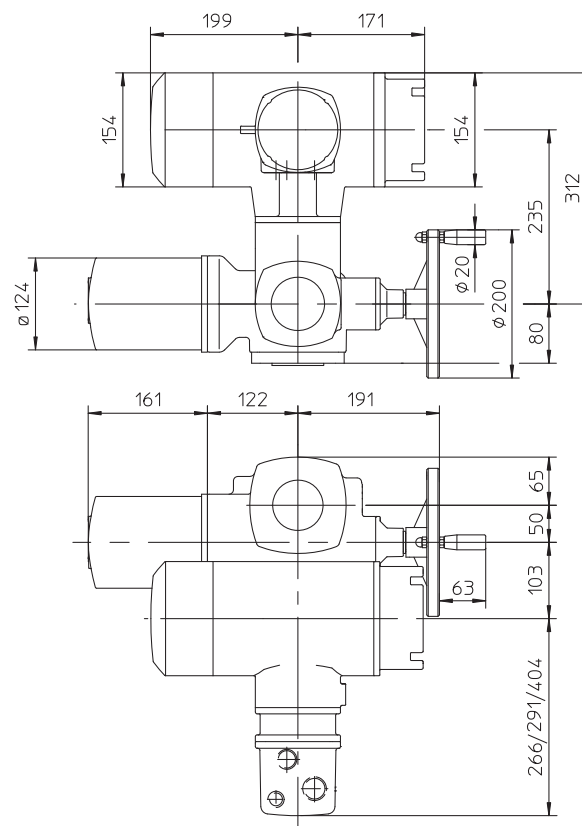
Version with Ex MATIC



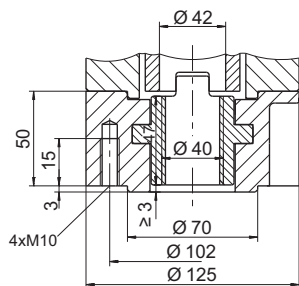
Version AUMATIC



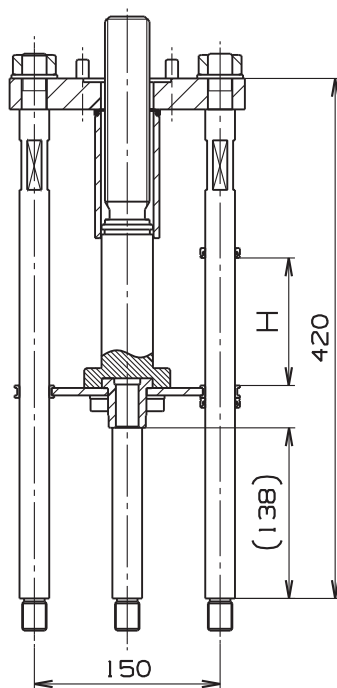
Version Ex AUMATIC



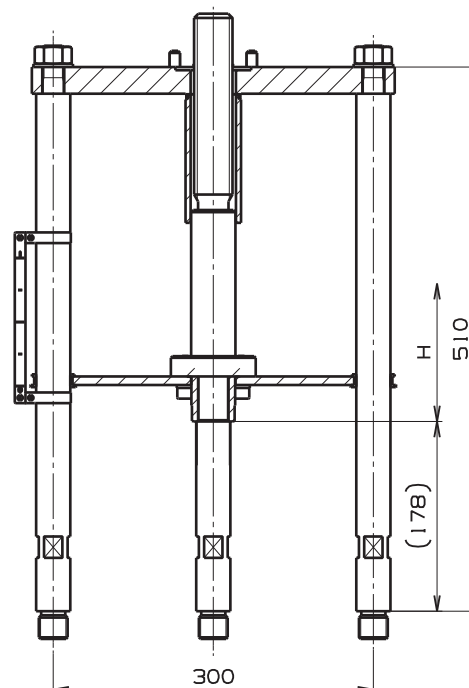
Output drive shaft A, F10



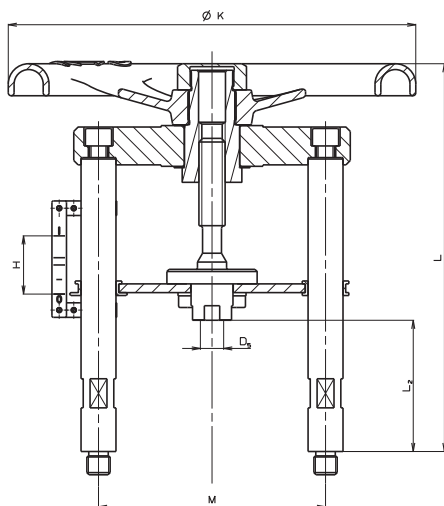
Control DN 200-400 Connection A, F10, Tr36x6-LH



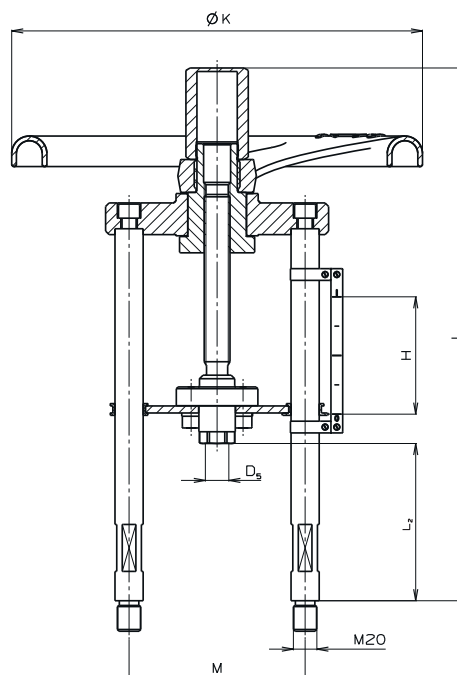
Control DN 600 Connection A, F10, Tr36x6-LH



Hand wheels for CV / SV 2x0 SP a CV 2x2 SP



Hand wheels for valves NPS 1/2" - 6"



Hand wheels for valves NPS 8" - 16"

Dimensions of manual control									
NPS	Mar- king	H [mm] [inch]	L [mm] [inch]	L ₂ [mm] [inch]	ØK [mm] [inch]	M [mm] [inch]	ØD ₅ [mm] [inch]	m kg	Ordering no. (BOM number)
1/2"	R16	16 0.63	209 8.228	70 2.756	160 6.299	140 5.512	M10x1	7	S900 0256
3/4"									
1"									
1 1/4"									
1 1/2"	R20	20 0.787	235 9.252	70 2.756	195 7.677	140 5.512	M10x1	12	S900 0257
2"									
2 1/2"	R28	40 1.575	267 10.512	90 3.543	280 11.024	156 6.142	M16x1,5	14.5	S900 0258
3"									
4"	R35	80 3.15	454 17.874	134 5.276	350 13.78	150 5.906	M20x1,5	15	S900 0141
5"									
6"									
8"									
10"									

Marking of actuators in type no.

Electric actuator Auma SA 07.2	EAA	NPS ½" - 2½"
Electric actuator Auma SA Ex 07.2	EAB	NPS ½" - 2½"
Electric actuator Auma SAR 07.2	EAC	NPS ½" - 2½"
Electric actuator Auma SAR Ex 07.2	EAD	NPS ½" - 2½"
Electric actuator Auma SA 07.6	EAE	NPS 3" - 6"
Electric actuator Auma SA Ex 07.6	EAF	NPS 3" - 6"
Electric actuator Auma SAR 07.6	EAG	NPS 3" - 6"
Electric actuator Auma SAR Ex 07.6	EAH	NPS 3" - 6"
Electric actuator Auma SA 10.2	EAI	NPS 8" - 10"
Electric actuator Auma SAR 10.2	EAJ	NPS 8" - 10"
Electric actuator Auma SAR Ex 10.2	EAK	NPS 8" - 10"
Electric actuator Auma SA Ex 10.2	EAL	NPS 8" - 10"
Hand wheel for NPS ½" - 1½"	R16	
Hand wheel for NPS 2" - 2½"	R20	
Hand wheel for NPS 3" - 4"	R28	
Hand wheel for NPS 5" - 10"	R35	

Maximal permissible operating pressures acc. to ASME B16.34-2013 [MPa]

Material	Class	Temperature [°C]																
		RT ¹⁾	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550
A216 WCB	150	1.96	1.92	1.77	1.58	1.38	1.21	1.02	0.93	0.84	0.74	0.65	0.55	---	---	---	---	---
A217 WC 6²⁾	150	1.98	1.95	1.77	1.58	1.38	1.21	1.02	0.93	0.84	0.74	0.65	0.55	0.46	0.37	0.28	0.14	0.14
A351 CF8M³⁾	150	1.90	1.84	1.62	1.48	1.37	1.21	1.02	0.93	0.84	0.74	0.65	0.55	0.46	0.37	0.28	0.14	0.14

¹⁾ -29°C to 38°C

²⁾ Material only normalized annealed

The intentional addition of any element not listed in ASTM A 217 is not permitted except for Ca and Mg for deoxidation

³⁾ Use at temperatures above 540 °C only when the carbon content is 0.04% or higher

Maximal permissible operating pressures acc. to ASME B16.34-2013 [psig]

Material	Class	Temperature [°F]														
		RT ¹⁾	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050
A216 WCB	150	285	260	230	200	170	140	125	110	95	80	---	---	---	---	---
A217 WC 6²⁾	150	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20
A351 CF8M³⁾	150	275	235	215	195	170	140	125	110	95	80	65	50	35	20	20

¹⁾ -20 °F to 100 °F

²⁾ Material only normalized annealed

The intentional addition of any element not listed in ASTM A 217 is not permitted except for Ca and Mg for deoxidation

³⁾ Use at temperatures above 1000 °F only when the carbon content is 0.04% or higher