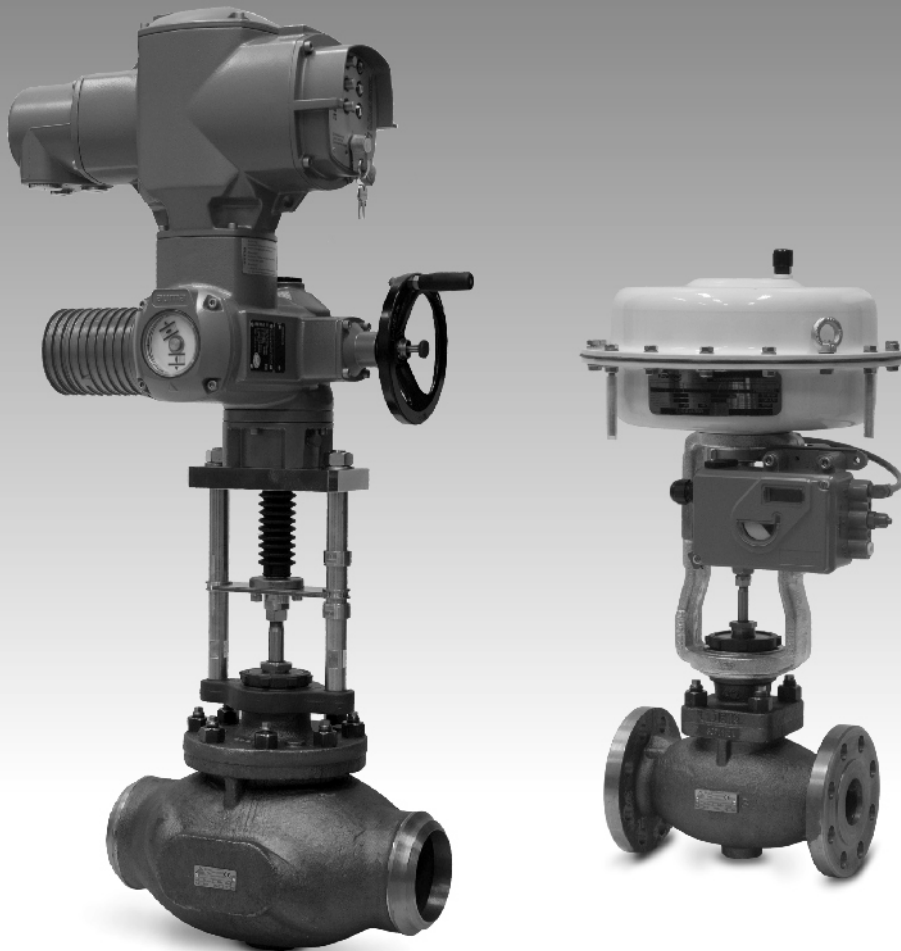




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## CONTROL AND SHUT-OFF VALVES

# 300 line dle ANSI/ASME



# 300 line

## CV / SV 320 (Ex) CV / SV 330 (Ex)

single-seated,  
control (shut-off) valve

## CV 322 (Ex) CV 332 (Ex)

single-seated,  
control valve with  
pressure-balanced plug

Control valves (shut-off) **CV / SV 300 line** are single seated designed for regulation and shut-off of process liquid flow. **In Ex proof version** meet the requirements II 1/2G IIC TX Ga/Gb acc. to ČSN EN ISO 80079-36 (9/2016) and ČSN EN 1127-1 ed.2 (1/2012).

The selected materials correspond to the recommendations of **ASME B16.34-2013** or ČSN EN 12516-1 (1/2006).

Due to the wide range of actuators used, they are suitable for control at low and high pressure drops under the most diverse operating conditions. Flow characteristics, Kvs coefficients and leakage comply with international standards.

### Control

hand wheel,  
electro-mechanics actuators of producers  
**Regada, Schiebel, Auma, Rotork**  
pneumatic actuators **Flowserve, A. Hock**

### Application

**CV / SV 3xx** - heating, ventilation, power generation and chemical processing industries  
**CV / SV 3xx Ex** - technical and fuel gases and inflammable liquids

### Process media

**CV / SV 3xx** - flow and pressure of liquids, gases and vapours without abrasive particles e.g. water, steam, air and other media compatible with material of the valve body and inner parts  
**CV / SV 3xx Ex** - technical and fuel gases and inflammable liquids

To ensure a reliable regulation, the producer 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 must be piped the way so that the direction of medium flow will coincide with the arrows on the valve body. The valve can be installed in any position except position when the actuator is under the valve body.

When medium **temperature** exceeds **150°C (300 °F)**, it is necessary to protect the actuator against glowing heat from the pipeline e.g. by the means of proper insulating of the pipeline and valve or by tilting the valve away from the heat radiation.

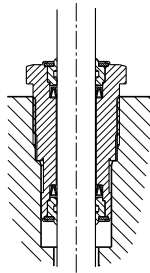
*Detailed informations are given in the „Instruction for installation and service“ sheets.*

## Packings

### DRSpack® (PTFE)

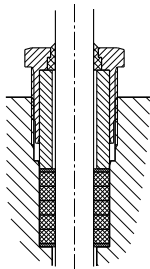
DRSpack® (Direct Radial Sealing Pack) is a packing with high tightness at both low and high operating pressure values.

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 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.

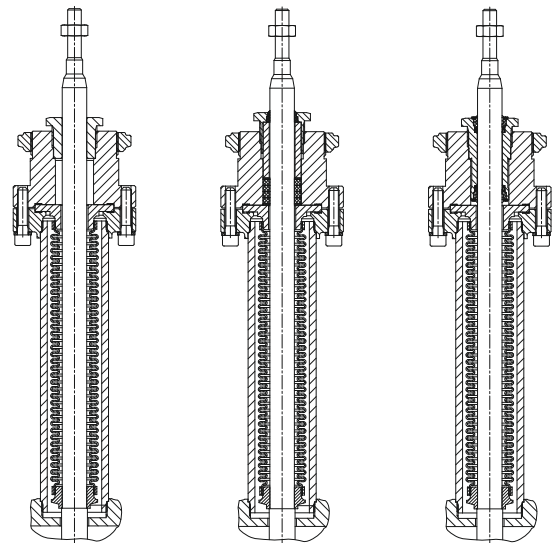


## Principles for plug type selection

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.

## Bellows

Bellows packing is suitable for low and high temperatures ranging from -50 °C to 550 °C. Bellows ensures absolute tightness to environment. Packing is equipped with safety PTFE packing as standard to prevent medium from leaking in case of damage to bellows. Intensive linear forces are not required.



Bellows without safety packing

Bellows with safety graphite packing

Bellows with safety PTFE packing

## Application of bellows packing

Bellows packing is suitable for applications with very aggressive, toxic or other dangerous media that require absolute tightness to environment.

In such case, it is necessary to check compatibility of used body material as well as the valve inner parts material with process medium. It is recommended to use bellows with safety packing preventing medium from leaking in case of damage to bellows when there is an extremely dangerous process medium used.

Bellows is also a great solution to use of process medium either with temperature below zero when ice accretions cause premature damage to packing or with high temperatures when bellows ensures medium cooling.

## 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 3x0

Control  
and shut-off valves

**NPS 1/2" - 16",  
Class 150, 300 and 600**

## Technical data

Series	CV / SV 320 (Ex)	CV / SV 330 (Ex)
<b>Type of valve</b>	<b>Two-way, single-seated, control (shut-off) valve</b>	
<b>Nominal size range</b>	NPS 1/2" - 16"	
<b>Nominal pressure</b>	Class 300 and 600 (Class 150, 300 and 600 (weld ended))	
<b>Body material</b>	Cast steel A216 WCB, A217 WC6	Stainless steel A351 CF8M
<b>Seat material:</b> NPS 1/2" - 2"	1.4028	1.4571
<b>DIN W.Nr./+ČSN</b> NPS 3" - 16"	1.4027	1.4581
<b>Plug material:</b> NPS 1/2" - 2"	1.4021	1.4571
<b>DIN W.Nr./+ČSN</b> NPS 3" - 16"	1.4027	1.4581
<b>Stem material</b>	1.4923	1.4980
<b>Operating temperature range</b>	-50 to 550 °C (-58 to 1020 °F) - (the negative temperature requirement must be specified in the order)	
<b>Face to face dimensions</b>	Acc. to ISA-75.08.01-2002 (R2007) for version with flanges Acc. to ISA-75.08.03-2001 (R2007) for weld ends - version Socket Weld Acc. to ISA - 75.08.05-2002 (R2007) for weld ends - version Butt Weld	
<b>Connection flanges</b>	Acc. to ČSN EN 1092-1+A1 (7/2013)	
<b>Flange faces</b>	Type B1 (raised-faced) or Type B2 (plain face) or Type F (female), or Type D (groove) acc. to ČSN EN 1092-1+A1 (7/2013)	
<b>Weld ends</b>	Weld ends acc. to ČSN EN 12627-2 (8/2000)	
<b>Type of plug</b>	V-ported, contoured, perforated	
<b>Flow characteristic</b>	Linear, equal-percentage, LDMspline®, parabolic, on - off	
<b>Kvs value</b>	0.01 to 1600 m <sup>3</sup> /h	
<b>Leakage rate</b>	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 Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv) for shut-off valve	
<b>Leakage rate for Ex version</b>	CV 3xx class IV. acc. to ANSI/FCI 70-2-2013 (< 0.01% Kvs); SV 3xx step C acc. to ISO 5208:2008	
<b>Rangeability r</b>	50 : 1	
<b>Packing</b>	DRSpack® (PTFE) t <sub>max</sub> = 260 °C (500°F), Expanded graphite t <sub>max</sub> = 550 °C (1020°F), Bellows (DN15-150) t <sub>max</sub> = 550°C (1020°F)	

## Cv (Kvs) values and differential pressures $\Delta p_{max}$ [MPa], [psi] of valves NPS 1/2" - 16" with countoured and V-ported plugs flow direction below plug) with electro-mechanic actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed.

Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. 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 ( $\Delta p$  up to 4,0 MPa / 580 psi) or sealing surfaces of seat and plug with a hard metal overlay ( $\Delta p$  up to 2,5 MPa / 363 psi).

For further information on actuating, see actuators' catalogue sheets			Actuating (actuating)											ST 0		Auma		ST 1 Ex		
			Marking in valve specification No.											ST 0.1		Schiebel		ST 0.1		
			Linear force											CVL-1000				CVL-1500		
														EPK		EA...		EPJ		
														EPL		EZ...		EPL		
														EQL				EQL		
														4 kN		5 kN		6,3 kN		
			Kvs [m <sup>3</sup> /h]											$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		
			Cv [US gallon/min]											packing		packing		packing		
														graphite		graphite		graphite		
														PTFE		PTFE		PTFE		
NPS	H[mm]	Ds[mm]	1	2	3	4	5	6	7	8	9									
1/2"	16	3	---	---	---	---	---	---	---	---	0.16 <sup>3)</sup>	0.1...0.01 <sup>3)</sup>		10	10	10	10	10	10	
		6	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18 <sup>3)</sup>	0.116...0.012 <sup>3)</sup>		1450	1450	1450	1450	1450	1450	
		8	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	---	---	---	10	10	10	10	10	10
		12	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	---	---	---	---	6.42	10	10	10	10	10
		15	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	---	---	---	---	8.91	10	10	10	10	10
1"	16	3	---	---	---	---	---	---	---	---	---	0.16...0.01 <sup>3)</sup>		10	10	10	10	10	10	
		6	---	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18...0.012 <sup>3)</sup>	1450	1450	1450	1450	1450	1450	1450	
		8	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	---	---	10	10	10	10	10	10
		12	---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	---	---	6.42	10	10	10	10	10
		15	---	---	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	---	---	8.91	10	10	10	10	10
		20	---	6.3 <sup>2)</sup>	---	---	---	---	---	---	---	---	---	---	4.33	10	10	10	10	10
		25	10.0	6.3 <sup>4)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	---	---	---	---	2.59	6.48	7.16	10	10	10
1 1/2"	16	6	---	---	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.29 <sup>1)</sup>	10	10	10	10	10	10	
		8	---	---	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	10	10	10	10	10	10	
		12	---	---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	6.42	10	10	10	10	10	
		15	---	---	---	---	4.0 <sup>1)</sup>	---	---	---	---	---	---	8.91	10	10	10	10	10	
		20	---	---	---	---	6.3 <sup>2)</sup>	---	---	---	---	---	---	4.33	10	10	10	10	10	
		40	25	16	10	6.3 <sup>4)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	---	0.90	2.42	2.68	4.19	4.45	5.97	
2"	20	50	40	25	16	10	6.3 <sup>4)</sup>	---	---	---	---	---	0.50	1.40	1.56	2.47	2.63	3.53		
		46.2	28,9	18.5	11.6	7.28 <sup>4)</sup>	---	---	---	---	---	---	72	240	226	358	381	512		

the table continues on the next page

<sup>1)</sup> parabolic plug <sup>2)</sup> V-ported plug with linear characteristic, parabolic plug with equal-percentage and LDMspline<sup>®</sup>  
<sup>3)</sup> valve with micro-throttling trim. Execution with Kvs = 0,16; 0,1; 0,063; 0,04; 0,025; 0,016; 0,01 (Cv = 0,18; 0,11; 0,073; 0,046; 0,029; 0,018; 0,011)  
<sup>4)</sup> V-ported plug with linear characteristic only  
 LDMspline<sup>®</sup> and parabolic characteristic from Kvs≥1,0. Equal-percentage characteristic from Kvs≥0,4.

For further information on actuating, see actuators' catalogue sheets			Actuating (actuating)										Auma Schiebel ST 1 IQM 10		Auma Schiebel ST 1 Modact MTR IQM 10		Auma Schiebel IQM 10		Hand wheel		
			Marking in valve specification No.										EA... EZ... EPI EQ...		EA... EZ... EPI EQ...		EA... EZ... EQ...		Rxx		
			Linear force										7.5 kN		10 kN		15 kN				
NPS	H[mm]	Ds[mm]	Kvs [m <sup>3</sup> /h] Cv [US galon/min]										$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		
			1	2	3	4	5	6	7	8	9		graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE			
1/2"	16	3	---	---	---	---	---	---	---	0.16 <sup>3)</sup>	0.1...0.01 <sup>3)</sup>		10	10	10	10	---	---	10	10	
		6	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18 <sup>3)</sup>	0.12...0.012 <sup>3)</sup>		10	10	10	10	---	---	10	10	
		8	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	---	10	10	10	10	---	---	10	10	
		12	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	---	---	10	10	10	10	---	---	10	10	
		15	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	---	---	10	10	10	10	---	---	10	10	
1"	16	3	---	---	---	---	---	---	---	---	0.16...0.01 <sup>3)</sup>		10	10	10	10	---	---	10	10	
		6	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18...0.012 <sup>3)</sup>	---	---	10	10	10	10	---	---	10	10
		8	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	10	10	10	10	---	---	10	10	
		12	---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	10	10	10	10	---	---	10	10	
		15	---	---	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	10	10	10	10	---	---	10	10	
		20	---	6.3 <sup>2)</sup>	---	---	---	---	---	---	---	---	10	10	10	10	---	---	10	10	
		25	10.0	6.3 <sup>4)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	---	---	7,16	10	10	10	---	---	10	10	
1 1/2"	16	6	---	---	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	10	10	10	10	---	---	10	10	
		8	---	---	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	0.29 <sup>1)</sup>	10	10	10	10	---	---	10	10	
		12	---	---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	10	10	10	10	---	---	10	10	
		15	---	---	---	---	4.0 <sup>1)</sup>	---	---	---	---	---	10	10	10	10	---	---	10	10	
		20	---	---	---	---	6.3 <sup>2)</sup>	---	---	---	---	---	10	10	10	10	---	---	10	10	
		40	25	16	10	6.3 <sup>4)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	2.68	4.19	4.45	5.97	---	---	4.45	5.97	
2"	20	50	40	25	16	10	6.3 <sup>4)</sup>	---	---	---	---	1.56	2.47	2.63	3.53	4.75	5.66	2.63	3.53		

the table continues on the next page

<sup>1)</sup> parabolic plug <sup>2)</sup> V-ported plug with linear characteristic, parabolic plug with equal-percentage and LDMspline®  
<sup>3)</sup> valve with micro-throttling trim. Execution with Kvs = 0,16; 0,1; 0,063; 0,04; 0,025; 0,016; 0,01 (Cv = 0,18; 0,11; 0,073; 0,046; 0,029; 0,018; 0,011)  
<sup>4)</sup> V-ported plug with linear 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.  
 LDMspline® and parabolic characteristic from Kvs≥1,0. Equal-percentage characteristic from Kvs≥0,4.

For further information on actuating, see actuators' catalogue sheets			<b>Actuating (actuating)</b>					<b>Auma Schiebel ST 1</b>	<b>Auma Schiebel ST 1 IQM 10</b>	<b>Modact MTR</b>	<b>Auma Schiebel IQM 10</b>	<b>Modact MTR ST 2 CVL-5000</b>	<b>Hand wheel</b>
			<b>Marking in valve specification No.</b>					<b>EA... EZ... EPI</b>	<b>EA... EZ... EPI EQ...</b>	<b>EPD</b>	<b>EA... EZ... EQ...</b>	<b>EPD EPM EQL</b>	<b>Rxx</b>
			<b>Linear force</b>					7.5 kN	10 kN	10 kN	15 kN	16 kN	
			<b>Cv [US galon/min]</b>					$\Delta p_{max}$ [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]
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>Kvs [m³/h]</b>					packing	packing	packing	packing	packing	packing
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE
<b>3"</b>	<b>40</b>	<b>80</b>	100	63	40	25	16	0.28 0.73	0.73 1.18	0.73 1.18	1.63 2.08	1.81 2.26	1.81 2.26
			<b>116</b>	<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>18.5</b>	<b>41</b> <b>106</b>	<b>106</b> <b>171</b>	<b>106</b> <b>171</b>	<b>236</b> <b>302</b>	<b>263</b> <b>328</b>	<b>263</b> <b>328</b>
<b>4"</b>		<b>100</b>	160	100	63	40	25	0.16 0.45	0.45 0.74	0.45 0.74	1.03 1.32	1.15 1.44	1.15 1.44
	<b>185</b>		<b>116</b>	<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>23</b> <b>65</b>	<b>65</b> <b>108</b>	<b>65</b> <b>108</b>	<b>150</b> <b>192</b>	<b>167</b> <b>209</b>	<b>167</b> <b>209</b>	
<b>6"</b>		<b>150</b>	360	250	160	100	63	0.05 0.18	0.18 0.31	0.18 0.31	0.44 0.58	0.50 0.63	0.50 0.63
			<b>416</b>	<b>289</b>	<b>185</b>	<b>116</b>	<b>72.8</b>	<b>7</b> <b>26</b>	<b>26</b> <b>45</b>	<b>26</b> <b>45</b>	<b>64</b> <b>83</b>	<b>72</b> <b>91</b>	<b>72</b> <b>91</b>

the table continues on the next page

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 $\Delta p_{max}$  for bellows must be consulted with the producer.  
 LDMspline® and parabolic characteristic from  $Kvs \geq 1,0$  . Equal-percentage characteristic from  $Kvs \geq 0,4$ .

For further information on actuating, see actuators' catalogue sheets  *) max. NPS 12"			Actuating (actuating)					Auma Schiebel IQM 10		Modact MTR ST 2 CVL-5000		Auma Schiebel ST 2 CVL-5000 IQM12		Modact MTR ST 2		Auma Schiebel IQM 20		Ruční kolo	
			Marking in valve specification No.					EA... EZ... EQ...		EPD EPM EQL		EA... EZ... EPM EQL EQ...		EPD EPM		EA... EZ... EQ...		Rxx	
			Linear force					15 kN		16 kN		20 kN		25 kN		32 kN			
			Kvs [m³/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		$\Delta p_{max}$ [MPa] packing		$\Delta p_{max}$ [MPa] packing	
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
3"		80	100	63	40	25	16	1.63	2.08	1.81	2.26	2.53	2.98	3.43	3.88	---	---	1.81	2.26
			<b>116</b>	<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>18.5</b>	<b>236</b>	<b>302</b>	<b>263</b>	<b>328</b>	<b>367</b>	<b>432</b>	<b>498</b>	<b>563</b>	---	---	<b>263</b>	<b>328</b>
4"	40	100	160	100	63	40	25	1.03	1.32	1.15	1.44	1.62	1.91	2.20	2.49	---	---	1.15	1.44
			<b>185</b>	<b>116</b>	<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>150</b>	<b>192</b>	<b>167</b>	<b>209</b>	<b>234</b>	<b>277</b>	<b>319</b>	<b>361</b>	---	---	<b>167</b>	<b>209</b>
6"		150	360	250	160	100	63	0.44	0.58	0.50	0.63	0.71	0.84	0.97	1.11	---	---	0.50	0.63
			<b>416</b>	<b>289</b>	<b>185</b>	<b>116</b>	<b>72.8</b>	<b>64</b>	<b>83</b>	<b>72</b>	<b>91</b>	<b>103</b>	<b>122</b>	<b>141</b>	<b>160</b>	---	---	<b>72</b>	<b>91</b>
8"	80	100	---	---	250	160	100	0.85	1.19	0.97	1.31	1.44	1.79	2.04	2.38	2.87	3.21	3.81	4.15
			---	400	---	---	---	0.36	0.51	0.41	0.56	0.62	0.78	0.89	1.05	1.27	1.42	1.69	1.85
			<b>462</b>	---	---	---	<b>52</b>	<b>74</b>	<b>60</b>	<b>82</b>	<b>91</b>	<b>113</b>	<b>129</b>	<b>152</b>	<b>183</b>	<b>206</b>	<b>245</b>	<b>268</b>	
8"	80	200	570	---	---	---	---	0.19	0.28	0.22	0.31	0.34	0.43	0.49	0.58	0.70	0.79	0.95	1.03
			<b>659</b>	---	---	---	<b>27</b>	<b>40</b>	<b>32</b>	<b>44</b>	<b>49</b>	<b>62</b>	<b>71</b>	<b>84</b>	<b>102</b>	<b>115</b>	<b>137</b>	<b>150</b>	
			---	---	400	250	160	0.21	0.39	0.27	0.44	0.48	0.66	0.75	0.93	1.13	1.31	1.56	1.74
10"	80	200	---	630	---	---	---	0.11	0.20	0.14	0.24	0.26	0.36	0.41	0.51	0.62	0.72	0.87	0.97
			<b>728</b>	---	---	---	<b>15</b>	<b>30</b>	<b>20</b>	<b>34</b>	<b>37</b>	<b>52</b>	<b>60</b>	<b>74</b>	<b>91</b>	<b>105</b>	<b>126</b>	<b>141</b>	
			800	---	---	---	0.07	0.15	0.10	0.17	0.19	0.26	0.30	0.38	0.47	0.54	0.65	0.73	
10"	80	230	<b>925</b>	---	---	---	---	<b>11</b>	<b>21</b>	<b>14</b>	<b>25</b>	<b>27</b>	<b>38</b>	<b>44</b>	<b>55</b>	<b>68</b>	<b>79</b>	<b>95</b>	<b>106</b>
			---	---	400	250	0.21	0.39	0.27	0.44	0.48	0.66	0.75	0.93	1.13	1.31	1.56	1.74	
			---	---	630	---	---	0.11	0.20	0.14	0.24	0.26	0.36	0.41	0.51	0.62	0.72	0.87	0.97
12"	80	200	---	---	630	---	---	0.11	0.20	0.14	0.24	0.26	0.36	0.41	0.51	0.62	0.72	0.87	0.97
			<b>728</b>	---	---	---	<b>15</b>	<b>30</b>	<b>20</b>	<b>34</b>	<b>37</b>	<b>52</b>	<b>60</b>	<b>74</b>	<b>91</b>	<b>105</b>	<b>126</b>	<b>141</b>	
			800	---	---	---	0.07	0.15	0.10	0.17	0.19	0.26	0.30	0.38	0.47	0.54	0.65	0.73	
12"	80	230	<b>925</b>	---	---	---	---	<b>11</b>	<b>21</b>	<b>14</b>	<b>25</b>	<b>27</b>	<b>38</b>	<b>44</b>	<b>55</b>	<b>68</b>	<b>79</b>	<b>95</b>	<b>106</b>
			1000	---	---	---	0.06	0.12	0.08	0.14	0.16	0.22	0.25	0.32	0.39	0.46	0.55	0.61	
			<b>1160</b>	---	---	---	<b>8</b>	<b>18</b>	<b>11</b>	<b>21</b>	<b>23</b>	<b>32</b>	<b>37</b>	<b>46</b>	<b>57</b>	<b>66</b>	<b>80</b>	<b>89</b>	
16"	100	150	---	---	400	250	0.21	0.39	0.27	0.44	0.48	0.66	0.75	0.93	1.13	1.31	1.56	1.74	
			---	---	630	---	---	0.11	0.20	0.14	0.24	0.26	0.36	0.41	0.51	0.62	0.72	0.87	0.97
			<b>728</b>	---	---	---	<b>15</b>	<b>30</b>	<b>20</b>	<b>34</b>	<b>37</b>	<b>52</b>	<b>60</b>	<b>74</b>	<b>91</b>	<b>105</b>	<b>126</b>	<b>141</b>	
16"	100	200	---	---	630	---	---	0.11	0.20	0.14	0.24	0.26	0.36	0.41	0.51	0.62	0.72	0.87	0.97
			---	---	1000	---	---	0.06	0.12	0.08	0.14	0.16	0.22	0.25	0.32	0.39	0.46	0.55	0.61
			<b>1160</b>	---	---	---	<b>8</b>	<b>18</b>	<b>11</b>	<b>21</b>	<b>23</b>	<b>32</b>	<b>37</b>	<b>46</b>	<b>57</b>	<b>66</b>	<b>80</b>	<b>89</b>	
16"	100	250	---	---	---	---	---	0.02	0.06	0.04	0.07	0.08	0.12	0.14	0.17	0.22	0.25	0.31	0.35
			1600	---	---	---	<b>4</b>	<b>9</b>	<b>5</b>	<b>11</b>	<b>12</b>	<b>17</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>37</b>	<b>45</b>	<b>50</b>	
			<b>1850</b>	---	---	---	<b>4</b>	<b>9</b>	<b>5</b>	<b>11</b>	<b>12</b>	<b>17</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>37</b>	<b>45</b>	<b>50</b>	

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

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

LDMspline® and parabolic characteristic from  $Kvs \geq 1,0$ . Equal-percentage characteristic from  $Kvs \geq 0,4$ .



## Cv (Kvs) values and differential pressures $\Delta p_{max}$ [MPa], [psi] of valves NPS 1/2" - 16" with countoured and V-ported plugs (flow direction below plug) with pneumatic actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed.

Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. 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 ( $\Delta p$  up to 4,0 MPa / 580 psi) or sealing surfaces of seat and plug with a hard metal overlay ( $\Delta p$  up to 2,5 MPa / 363 psi).

For further information on actuating, see actuators' catalogue sheets

			Pneumatic actuators								Flowserve PA 253		A. Hock 2109							
			Actuator function								direct	indirect	direct	indirect						
			Specification No. of actuator								BDYxAA	BFYxZA	P2-0K-EL1	P2-0K-HL2						
			Spring range [bar]								1.0 - 2.4	2.0 - 4.8	0.2 - 1.0	1.5 - 3.8						
			[psi]								<b>15 - 35</b>	<b>29 - 70</b>	<b>2.9 - 15</b>	<b>22 - 55</b>						
			Spring setting [bar]								1.0 - 2.12	2.56 - 4.8	0.2 - 0.84	1.96 - 3.8						
			[psi]								<b>15 - 31</b>	<b>37 - 70</b>	<b>2.9 - 12</b>	<b>28 - 55</b>						
			Feeding pressure [bar]								4.8	5.8	3.0	4.6						
			[psi]								<b>70</b>	<b>84</b>	<b>44</b>	<b>67</b>						
			Marking in valve specification No.								PFA		PHF							
			Linear force								6.4 kN	6.4 kN	6.3 kN	5.7kN						
NPS	H[mm]	Ds[mm]	Kvs [m <sup>3</sup> /h]										$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]				
			Cv [US gallon/min]										packing	packing	packing	packing				
			1	2	3	4	5	6	7	8	9		graphite	PTFE	graphite	PTFE	graphite	PTFE		
1/2"	16	3	---	---	---	---	---	---	---	0.16 <sup>3)</sup>	0.1...0.01 <sup>3)</sup>		10	10	10	10	10	10		
		6	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18 <sup>3)</sup>	0.116...0.012 <sup>3)</sup>		1450	1450	1450	1450	1450	1450		
		8	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	---	10	10	10	10	10	10		
		12	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	---	---	1450	1450	1450	1450	1450	1450		
		15	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	---	---	1450	1450	1450	1450	1450	1450		
1"	16	3	---	---	---	---	---	---	---	---	0.16...0.01 <sup>3)</sup>		10	10	10	10	10	10		
		6	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	0.18...0.012 <sup>3)</sup>	---	---	1450	1450	1450	1450	1450		
		8	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	---	---	10	10	10	10	10	10		
		12	---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---	---	---	---	1450	1450	1450	1450	1450	1450		
		15	---	---	4.0 <sup>1)</sup>	---	---	---	---	---	---	---	1450	1450	1450	1450	1450	1450		
1 1/2"	16	20	---	6.3 <sup>2)</sup>	---	---	---	---	---	---	---	---	8.46	10	8.46	10	8,16	10	6,39	
		25	10.0	6.3 <sup>3)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	---	---	5.15	9.04	5.15	9.04	4,97	8,86	3,87	7,76
		40	25	16	10	6.3 <sup>4)</sup>	4.0 <sup>4)</sup>	---	---	---	---	---	7.28	11.6	7.28	11.6	7.20	12.85	5.61	11.26
		6	---	---	---	---	---	---	---	---	---	0.25 <sup>1)</sup>	10	10	10	10	10	10	10	10
		8	---	---	---	---	---	---	1.0 <sup>1)</sup>	0.63 <sup>1)</sup>	0.4 <sup>1)</sup>	---	10	10	10	10	10	10	10	10

the table continues on the next page

<sup>1)</sup> parabolic plug <sup>2)</sup> V-ported plug with linear characteristic, parabolic plug with equal-percentage and LDMspline<sup>®</sup> <sup>3)</sup> valve with micro-throttling trim. Execution with Kvs = 0,16; 0,1; 0,063; 0,04; 0,025; 0,016; 0,01 (Cv = 0,18; 0,11; 0,073; 0,046; 0,029; 0,018; 0,011) <sup>4)</sup> V-ported plug with linear 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. LDMspline<sup>®</sup> and parabolic characteristic from Kvs≥1,0. Equal-percentage characteristic from Kvs≥0,4.

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators					Flowserve PA 253		Flowserve PB 503		A. Hock 2109		A. Hock 2112-30									
			Actuator function					direct	indirect	direct	indirect	direct	indirect	direct	indirect								
Specification No. of actuator			BDYxAA					BFYxZA		BBLxAA		BFYxZA		P2-0K-BL1	P2-0K-HL2	P2-0K-BM1	P2-0K-WM2						
Spring range			[bar]					1.0 - 2.4	2.0 - 4.8	0.5 - 0.9	2.0 - 4.8	0.8 - 2.2	1.5 - 3.8	0.8 - 2.2	1.4 - 2.8								
			[psi]					15 - 35	29 - 70	7 - 28	29 - 70	12 - 32	22 - 55	12 - 32	20 - 40								
Spring setting			[bar]					1.0 - 2.4	2.0 - 4.8	0.5 - 1.9	2.0 - 4.8	0.8 - 1.92	1.5 - 3.8	0.8 - 1.73	1.87 - 2.8								
			[psi]					15 - 35	29 - 70	7 - 28	29 - 70	12 - 28	22 - 55	12 - 25	27 - 40								
Feeding pressure			[bar]					6.0	5.8	5.3	5.3	4.4	4.6	3.5	3.2								
			[psi]					87	84	77	77	64	67	50	46								
Marking in valve spec. No.			PFA					PFB		PHF		PHA											
Linear force			8.5 kN					5 kN	10 kN	10 kN	6.4 kN	4.4kN	10 kN	10.5kN									
Kvs [m <sup>3</sup> /h]								$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]							
Cv [US gallon/min]								packing	packing	packing	packing	packing	packing	packing	packing	packing							
NPS	H [mm]	Ds [mm]						graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE							
2"	20	50	40	25	16	10	6.3 <sup>4)</sup>	1.99	2.89	0.50	1.40	2.63	3.53	2.63	3.53	1.09	2.00	0.24	1.15	2.63	3.53	2.84	3.74
			46.2	28.9	18.5	11.6	7.28 <sup>4)</sup>	288	420	72	204	381	512	381	512	159	290	35	167	381	512	412	543

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators					Flowserve PB 503		Flowserve PB 701		A. Hock 2112-50		A. Hock 2112-50									
			Actuator function					direct	indirect	direct	indirect	direct	indirect	direct	indirect								
Specification No. of actuator			BBLxAB					BFYxZB		BBLxAB		BFYxZB		P2-0K-DI1	P2-0K-XI2	P2-0K-DI1	P2-0K-SI2						
Spring range			[bar]					0.5 - 1.9	2.0 - 4.8	0.5 - 1.9	2.0 - 4.8	0.5 - 1.7	0.7 - 2.5	0.5 - 1.7	0.8 - 2.8								
			[psi]					7 - 28	29 - 70	7 - 28	29 - 70	7 - 25	10 - 36	7 - 25	12 - 40								
Spring setting			[bar]					0.5 - 1.9	2.0 - 4.8	0.5 - 1.9	2.0 - 4.8	0.5 - 1.43	1.06 - 2.5	0.5 - 1.46	1.2 - 2.8								
			[psi]					7 - 28	29 - 70	7 - 28	29 - 70	7 - 21	15 - 36	7 - 21	17 - 40								
Feeding pressure			[bar]					4.1	5.4	4.1	5.3	3.2	3.0	5.0	3.3								
			[psi]					59	78	59	77	46	44	73	48								
Marking in valve spec. No.			PFA					PFB		PHA		PHA											
Linear force			10 kN					10 kN	14 kN	14 kN	10 kN	6 kN	20 kN	6.9 kN									
Kvs [m <sup>3</sup> /h]								$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]							
Cv [US gallon/min]								packing	packing	packing	packing	packing	packing	packing	packing	packing							
NPS	H [mm]	Ds [mm]						graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE							
3"	40	80	100	63	40	25	16	0.73	1.18	0.73	1.18	1.45	1.90	1.45	1.90	0.73	1.18	---	0.46	2.53	2.98	---	0.62
			116	72.8	46.2	28.9	18.5	106	171	106	171	210	276	210	276	106	171	---	67	367	432	---	90
4"	40	100	160	100	63	40	25	0.45	0.74	0.45	0.74	0.92	1.21	0.92	1.21	0.45	0.74	---	0.27	1.62	1.91	---	0.38
			185	116	72.8	46.2	28.9	65	108	65	108	133	175	133	175	65	108	---	40	234	277	---	55
6"	40	150	360	250	160	100	63	0.18	0.31	0.18	0.31	0.39	0.52	0.39	0.52	0.18	0.31	---	0.10	0.71	0.84	---	0.15
			416	289	185	116	72.8	26	45	26	45	57	76	57	76	26	45	---	14	103	122	---	21

the table continues on the next page

<sup>4)</sup> V-ported plug with linear 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.

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators					Flowserve PO 1502															
			Actuator function					direct	indirect	direct	indirect	direct	indirect	direct	indirect								
			Specification No. of actuator					BGFxAD	BVCxZD	BGFxAD	BFSxZD	BGFxAD	BAJxZD										
			Spring range [bar]					0.4 - 2.0	1.5 - 2.7	0.4 - 2.0	2.0 - 3.5	0.4 - 2.0	2.6 - 4.2										
			Spring setting [bar]					0.4 - 2.0	1.5 - 2.7	0.4 - 2.0	2.0 - 3.5	0.4 - 2.0	2.6 - 4.2										
			Feeding pressure [bar]					3.5	3.1	4.0	3.9	4.6	4.6										
			Feeding pressure [psi]					51	45	58	57	67	67										
NPS			H[mm]			Ds[mm]			Marking in valve spec. No.					PFD									
									Linear force					22,5 kN	22,5 kN	30 kN	30 kN	38 kN	38 kN				
									Kvs [m³/h]					$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]		
1			2			3			4			5			packing		packing		packing		packing		
															graphite		PTFE		graphite		PTFE		graphite
8"			80			100			1.74	2.08	1.74	2.08	2.63	2.97	2.63	2.97	3.58	3.92	3.58	3.92			
									250	160	100	252	302	252	302	381	431	381	431	519	568	519	568
150			400			---			0.76	0.91	0.76	0.91	1.16	1.31	2.63	1.31	1.59	1.74	1.59	1.74			
									110	132	110	132	168	190	168	190	230	252	230	252			
200			570			---			0.42	0.50	0.42	0.50	0.64	0.73	0.64	0.73	0.89	0.97	0.89	0.97			
									60	73	60	73	93	106	93	106	129	141	129	141			
10"			80			150			0.62	0.79	0.62	0.79	1.02	1.20	1.02	1.20	1.46	1.63	1.46	1.63			
									400	250	160	90	115	90	115	149	174	149	174	211	237	211	237
									462	289	185	90	115	90	115	149	174	149	174	211	237	211	237
200			630			---			0.33	0.43	0.33	0.43	0.56	0.66	0.56	0.66	0.81	0.91	0.81	0.91			
									49	63	49	63	82	96	82	96	117	132	117	132			
230			800			---			0.25	0.32	0.25	0.32	0.42	0.50	0.42	0.50	0.61	0.68	0.61	0.68			
									36	47	36	47	61	72	61	72	88	99	88	99			
12"			80			150			0.62	0.79	0.62	0.79	1.02	1.20	1.02	1.20	1.46	1.63	1.46	1.63			
									400	250	160	90	115	90	115	149	174	149	174	211	237	211	237
									462	289	185	90	115	90	115	149	174	149	174	211	237	211	237
									630	---	---	49	63	49	63	82	96	82	96	117	132	117	132
200			---			630			0.33	0.43	0.33	0.43	0.56	0.66	0.56	0.66	0.81	0.91	0.81	0.91			
									49	63	49	63	82	96	82	96	117	132	117	132			
230			800			---			0.25	0.32	0.25	0.32	0.42	0.50	0.42	0.50	0.61	0.68	0.61	0.68			
									36	47	36	47	61	72	61	72	88	99	88	99			
250			1000			---			0.21	0.27	0.21	0.27	0.35	0.42	0.35	0.42	0.51	0.57	0.51	0.57			
									30	39	30	39	51	60	51	60	74	83	74	83			

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators					Flowserve PO 1502				Flowserve PO 3002										
			Actuator function					direct	indirect	direct	indirect	direct	indirect	direct	indirect							
			Specification No. of actuator					BGFxAD	BVCxZD	BGFxAD	BFSxZD	BGFxAD	BFSxZD	BGFxAD	BFSxZD							
			Spring range [bar]					0.9 - 1.9	2.0 - 4.3	0.9 - 1.9	1.2 - 2.6	0.9 - 1.9	1.2 - 2.6	0.9 - 1.9	1.2 - 2.6							
			Spring setting [bar]					0.9 - 1.9	2.0 - 4.3	0.9 - 1.9	1.2 - 2.6	0.9 - 1.9	1.2 - 2.6	0.9 - 1.9	1.2 - 2.6							
			Feeding pressure [bar]					4.0	5.2	4.5	3.2	4.0	5.2	4.5	3.2							
			Feeding pressure [psi]					58	75	65	46	58	75	65	46							
NPS			H[mm]			Ds[mm]			Marking in valve spec. No.					PFE								
									Linear force					30 kN	30 kN	38 kN	36 kN					
									Kvs [m³/h]					$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]		
1			2			3			4			5			packing		packing		packing		packing	
															graphite		PTFE		graphite		PTFE	
16"			100			150			1.02	1.20	1.02	1.20	1.46	1.63	1.35	1.52						
									400	250	149	174	149	174	211	237	196	221				
									630	---	---	82	96	82	96	117	132	108	123			
									728	---	---	82	96	82	96	117	132	108	123			
200			---			630			0.56	0.66	0.56	0.66	0.81	0.91	0.75	0.85						
									82	96	82	96	117	132	108	123						
250			1000			---			0.35	0.42	0.35	0.42	0.51	0.57	0.47	0.53						
									51	60	51	60	74	83	68	78						
330			1600			---			0.19	0.23	0.19	0.23	0.29	0.32	0.26	0.30						
									28	34	28	34	41	47	38	43						

the table continues on the next page

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 $\Delta p_{max}$  for bellows must be consulted with the producer.

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>A. Hock</b> <b>2116-100</b>	<b>A. Hock</b> <b>2116S-100</b>	<b>A. Hock</b> <b>2116-100</b>	<b>A. Hock</b> <b>2116S-100</b>					
			<b>Actuator function</b>					direct	indirect	direct	indirect					
			<b>Specification No. of actuator</b>					<b>P2-0K-BN1</b>	<b>P2-0K-YN2</b>	<b>P2-0K-BN1</b>	<b>P2-0K-ZN2</b>					
			<b>Spring range</b> [bar]					0.8 - 2.2	1.3- 3.0	0.8 - 2.2	1.5 - 3.5					
			[psi]					<b>12 - 32</b>	<b>19 - 44</b>	<b>12 - 32</b>	<b>22 - 51</b>					
			<b>Spring setting</b> [bar]					0.8 - 1.92	1.64 - 3.0	0.8 - 1.92	1.9 - 3.5					
			[psi]					<b>12 - 28</b>	<b>24 - 44</b>	<b>12 - 28</b>	<b>28 - 51</b>					
			<b>Feeding pressure</b> [bar]					3.6	4.0	5.1	4.5					
			[psi]					<b>52</b>	<b>58</b>	<b>74</b>	<b>65</b>					
			<b>Marking in valve spec. No.</b>					<b>PHC</b>								
<b>Linear force</b>					20 kN	19.6 kN	38 kN	22.8 kN								
<b>Kvs [m³/h]</b>					<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]								
<b>Cv [US galon/min]</b>					packing	packing	packing	packing								
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	
8"	80	100	---	---	250	160	100	1.44	1.79	1.40	1.74	3.58	3.92	1.78	2.12	
					<b>289</b>	<b>185</b>	<b>116</b>	<b>210</b>	<b>259</b>	<b>203</b>	<b>252</b>	<b>519</b>	<b>568</b>	<b>258</b>	<b>307</b>	
		150	---	400	---	---	---	0.62	0.78	0.60	0.76	1.59	1.74	0.77	0.93	
							<b>91</b>	<b>113</b>	<b>87</b>	<b>110</b>	<b>230</b>	<b>252</b>	<b>112</b>	<b>135</b>		
		200	570	---	---	---	---	0.34	0.43	0.33	0.42	0.89	0.97	0.42	0.51	
			<b>678</b>					<b>49</b>	<b>62</b>	<b>48</b>	<b>60</b>	<b>129</b>	<b>141</b>	<b>62</b>	<b>74</b>	
10"	80	150	---	---	400	250	160	0.48	0.66	0.46	0.64	1.46	1.63	0.63	0.81	
					<b>462</b>	<b>289</b>	<b>185</b>	<b>70</b>	<b>96</b>	<b>67</b>	<b>92</b>	<b>211</b>	<b>237</b>	<b>92</b>	<b>118</b>	
		200	---	630	---	---	---	0.26	0.36	0.25	0.35	0.81	0.91	0.34	0.44	
							<b>37</b>	<b>52</b>	<b>36</b>	<b>50</b>	<b>117</b>	<b>132</b>	<b>50</b>	<b>64</b>		
		230	800	---	---	---	---	0.19	0.26	0.18	0.25	0.61	0.68	0.25	0.33	
			<b>925</b>					<b>27</b>	<b>38</b>	<b>26</b>	<b>37</b>	<b>88</b>	<b>99</b>	<b>37</b>	<b>48</b>	
12"	80	150	---	---	---	400	250	0.48	0.66	0.46	0.64	1.46	1.63	0.63	0.81	
						<b>462</b>	<b>289</b>	<b>70</b>	<b>96</b>	<b>67</b>	<b>92</b>	<b>211</b>	<b>237</b>	<b>92</b>	<b>118</b>	
		200	---	---	630	---	---	---	0.26	0.36	0.25	0.35	0.81	0.91	0.34	0.44
						<b>728</b>			<b>37</b>	<b>52</b>	<b>36</b>	<b>50</b>	<b>117</b>	<b>132</b>	<b>50</b>	<b>64</b>
		230	---	800	---	---	---	0.19	0.26	0.18	0.25	0.61	0.68	0.25	0.33	
				<b>925</b>				<b>27</b>	<b>38</b>	<b>26</b>	<b>37</b>	<b>88</b>	<b>99</b>	<b>37</b>	<b>48</b>	
		250	1000	---	---	---	---	0.16	0.22	0.15	0.21	0.51	0.57	0.21	0.28	
			<b>1160</b>					<b>23</b>	<b>32</b>	<b>22</b>	<b>31</b>	<b>74</b>	<b>83</b>	<b>31</b>	<b>40</b>	

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>A. Hock</b> <b>2116-100</b>	<b>A. Hock</b> <b>2116S-100</b>	<b>A. Hock</b> <b>2116-100</b>	<b>A. Hock</b> <b>2116S-100</b>					
			<b>Actuator function</b>					direct	indirect	přidirect	indirect					
			<b>Specification No. of actuator</b>					<b>P2-0K-BN1</b>	<b>P2-0K-YN2</b>	<b>P2-0K-BN1</b>	<b>P2-0K-ZN2</b>					
			<b>Spring range</b> [bar]					0.8 - 2.2	1.3- 3.0	0.8 - 2.2	1.5 - 3.5					
			[psi]					<b>12 - 32</b>	<b>19 - 44</b>	<b>12 - 32</b>	<b>22 - 51</b>					
			<b>Spring setting</b> [bar]					0.8 - 2.2	1.3- 3.0	0.8 - 2.2	1.5 - 3.5					
			[psi]					<b>12 - 32</b>	<b>19 - 44</b>	<b>12 - 32</b>	<b>22 - 51</b>					
			<b>Feeding pressure</b> [bar]					3.9	3.0	5.4	4.5					
			[psi]					<b>71</b>	<b>58</b>	<b>93</b>	<b>65</b>					
			<b>Marking in valve spec. No.</b>					<b>PHC</b>								
<b>Linear force</b>					20 kN	15.6 kN	38 kN	18 kN								
<b>Kvs [m³/h]</b>					<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]	<b>Δp<sub>max</sub></b> [MPa]								
<b>Cv [US galon/min]</b>					packing	packing	packing	packing								
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	
16"	100	150	---	---	---	400	250	0.48	0.66	0.25	0.42	1.46	1.63	0.38	0.55	
						<b>462</b>	<b>289</b>	<b>70</b>	<b>96</b>	<b>36</b>	<b>61</b>	<b>211</b>	<b>237</b>	<b>54</b>	<b>80</b>	
		200	---	---	630	---	---	---	0.26	0.36	0.12	0.22	0.81	0.91	0.20	0.30
						<b>728</b>			<b>37</b>	<b>52</b>	<b>18</b>	<b>32</b>	<b>117</b>	<b>132</b>	<b>29</b>	<b>43</b>
		250	---	1000	---	---	---	0.16	0.22	0.07	0.13	0.51	0.57	0.12	0.18	
				<b>1160</b>				<b>23</b>	<b>32</b>	<b>10</b>	<b>19</b>	<b>74</b>	<b>83</b>	<b>17</b>	<b>26</b>	
		330	1600	---	---	---	---	0.08	0.12	0.03	0.07	0.29	0.32	0.06	0.10	
			<b>1850</b>					<b>12</b>	<b>17</b>	<b>5</b>	<b>10</b>	<b>41</b>	<b>47</b>	<b>8</b>	<b>14</b>	

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

## Cv (Kvs) values and differential pressures $\Delta p_{max}$ [MPa], [psi] of valves NPS 1/2" - 16" with perforated plugs (flow direction above plug) for electro-mechanical actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed. Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. In regard of service life of seat and plug, it is recommended so that permanent differential pressure of the valves with perforated plug is limited to max. 4,0 MPa / 580 psi.

For further information on actuating, see actuators' catalogue sheets			Actuating (actuating)					ST 0 ST 0.1 CVL-1000		Auma Schiebel		ST 1 Ex ST 0.1 CVL-1500		Auma Schiebel ST 1 IQM 10		Auma Schiebel ST 1 IQM 10		Modact MTR IQM 10		Auma Schiebel IQM 10		Hand wheel			
Marking in valve specification No.			EPK EPL EQL					EA... EZ...		EPJ EPL EQL		EA... EZ... EPI EQ...		EA... EZ... EPI EQ...		EPD EQ...		EA... EZ... EQ...		Rxx					
Linear force			4 kN					5 kN		6.3 kN		7.5 kN		10 kN		10 kN		15 kN							
Kvs [m <sup>3</sup> / h]			$\Delta p_{max}$ [MPa]					$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]					
Cv [US galon/min]			packing					packing		packing		packing		packing		packing		packing		packing					
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE		
1"	16	25	---	6.3	4.0	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	0.77	4.66	2.59	6.48	4.97	8.86	7,16	10,0	10,0	10,0	10,0	10,0	10,0	---	---	10	10	
				<b>7.28</b>	<b>4.62</b>	<b>2.89<sup>5)</sup></b>	<b>1.85<sup>5)</sup></b>	<b>111</b>	<b>675</b>	<b>376</b>	<b>940</b>	<b>720</b>	<b>1285</b>	<b>1038</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	<b>1450</b>	
1½"	40	40	---	16	10	6.3	4.0	0.19	1.70	0.90	2.42	1.83	3.34	2,68	4,19	4,45	5,97	4,45	5,97	4,45	5,97	---	---	4.45	5.97
					<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	<b>4.62</b>	<b>28</b>	<b>247</b>	<b>131</b>	<b>350</b>	<b>265</b>	<b>484</b>	<b>388</b>	<b>608</b>	<b>646</b>	<b>866</b>	<b>646</b>	<b>866</b>	<b>646</b>	<b>866</b>	<b>646</b>	<b>866</b>	<b>646</b>
2"	20	50	---	25	16	10	6.3	0.07	0.98	0.50	1.40	1.05	1.96	1.56	2.47	2.63	3.53	2.63	3.53	4.75	5.66	2.63	3.53	2.63	3.53
					<b>28.9</b>	<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	<b>10</b>	<b>142</b>	<b>72</b>	<b>204</b>	<b>152</b>	<b>284</b>	<b>226</b>	<b>358</b>	<b>381</b>	<b>512</b>	<b>381</b>	<b>512</b>	<b>689</b>	<b>821</b>	<b>381</b>	<b>512</b>	<b>381</b>
3"	40	80	---	63	40	25	16	---	---	---	---	---	---	0.28	0.73	0.73	1.18	0.73	1.18	1.63	2.08	1.81	2.26	1.81	2.26
					<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>18.5</b>	<b>41</b>	<b>106</b>	<b>106</b>	<b>171</b>	<b>106</b>	<b>171</b>	<b>106</b>	<b>171</b>	<b>106</b>	<b>171</b>	<b>236</b>	<b>302</b>	<b>263</b>	<b>328</b>	<b>263</b>	<b>328</b>	<b>263</b>
4"	40	100	---	100	63	40	25	---	---	---	---	---	---	0.16	0.45	0.45	0.74	0.45	0.74	1.03	1.32	1.15	1.44	1.15	1.44
					<b>116</b>	<b>72.8</b>	<b>46.2</b>	<b>28.9</b>	<b>23</b>	<b>65</b>	<b>65</b>	<b>108</b>	<b>65</b>	<b>108</b>	<b>65</b>	<b>108</b>	<b>65</b>	<b>108</b>	<b>150</b>	<b>192</b>	<b>167</b>	<b>209</b>	<b>167</b>	<b>209</b>	<b>167</b>
6"	150	150	---	250	160	100	63	---	---	---	---	---	---	0.05	0.18	0.18	0.31	0.18	0.31	0.44	0.58	0.50	0.63	0.50	0.63
					<b>289</b>	<b>185</b>	<b>116</b>	<b>72.8</b>	<b>7</b>	<b>26</b>	<b>26</b>	<b>45</b>	<b>26</b>	<b>45</b>	<b>26</b>	<b>45</b>	<b>26</b>	<b>45</b>	<b>64</b>	<b>83</b>	<b>72</b>	<b>91</b>	<b>72</b>	<b>91</b>	<b>72</b>

the table continues on the next page

<sup>5)</sup> linear characteristic only

For further information on actuating, see actuators' catalogue sheets			<b>Actuating (actuating)</b>					<b>Auma Schiebel IQM 10</b>	<b>Modact MTR ST 2 CVL-5000</b>	<b>Auma Schiebel ST 2 CVL-5000 IQM 12</b>	<b>Modact MTR ST 2</b>	<b>Auma Schiebel IQM 20</b>	<b>Hand wheel</b>
			<b>Marking in valve specification No.</b>					<b>EA... EZ... EQ...</b>	<b>EPD EPM EQL</b>	<b>EA... EZ... EPM EQL EQ...</b>	<b>EPD EPM</b>	<b>EA... EZ... EQ...</b>	<b>Rxx</b>
			<b>Linear force</b>					15 kN	16 kN	20 kN	25 kN	32 kN	
			Kvs [m <sup>3</sup> /h] <b>Cv [US gallon/min]</b>					$\Delta p_{max}$ [MPa] [psi] packing	$\Delta p_{max}$ [MPa] [psi] packing	$\Delta p_{max}$ [MPa] [psi] packing	$\Delta p_{max}$ [MPa] [psi] packing	$\Delta p_{max}$ [MPa] [psi] packing	$\Delta p_{max}$ [MPa] [psi] packing
<b>NPS</b>	<b>H [mm]</b>	<b>Ds [mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE
<b>3"</b>	<b>40</b>	<b>80</b>	---	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	16 <b>18.5</b>	1.63 2.08 <b>236 302</b>	1.81 2.26 <b>263 328</b>	2.53 2.98 <b>367 432</b>	3.43 3.88 <b>498 563</b>	---	1.81 2.26 <b>263 328</b>
<b>4"</b>		<b>100</b>	---	100 <b>116</b>	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	1.03 1.32 <b>150 192</b>	1.15 1.44 <b>167 209</b>	1.62 1.91 <b>234 277</b>	2.20 2.49 <b>319 361</b>	---	1.15 1.44 <b>167 209</b>
<b>6"</b>		<b>150</b>	---	250 <b>289</b>	160 <b>185</b>	100 <b>116</b>	63 <b>72.8</b>	0.44 0.58 <b>64 83</b>	0.50 0.63 <b>72 91</b>	0.71 0.84 <b>103 122</b>	0.97 1.11 <b>141 160</b>	---	0.50 0.63 <b>72 91</b>
<b>8"</b>	<b>80</b>	<b>200</b>	---	400 <b>462</b>	250 <b>289</b>	160 <b>185</b>	100 <b>116</b>	0.19 0.28 <b>27 40</b>	0.22 0.31 <b>32 44</b>	0.34 0.43 <b>49 62</b>	0.49 0.58 <b>71 84</b>	0.70 0.79 <b>102 115</b>	0.95 1.03 <b>137 150</b>
<b>10"</b>		<b>230</b>	---	630 <b>728</b>	400 <b>462</b>	250 <b>289</b>	160 <b>185</b>	0.07 0.15 <b>11 21</b>	0.10 0.17 <b>14 25</b>	0.19 0.26 <b>27 38</b>	0.30 0.38 <b>44 55</b>	0.47 0.54 <b>68 79</b>	0.65 0.73 <b>95 106</b>
<b>12"</b>		<b>250</b>	---	800 <b>925</b>	630 <b>728</b>	400 <b>462</b>	250 <b>289</b>	0.06 0.12 <b>8 18</b>	0.08 0.14 <b>11 21</b>	0.16 0.22 <b>23 32</b>	0.25 0.32 <b>37 46</b>	0.39 0.46 <b>57 66</b>	0.55 0.61 <b>80 89</b>
<b>16"</b>	<b>100</b>	<b>330</b>	---	1000 <b>1160</b>	630 <b>728</b>	400 <b>462</b>	250 <b>289</b>	0.02 0.06 <b>4 9</b>	0.04 0.07 <b>5 11</b>	0.08 0.12 <b>12 17</b>	0.14 0.17 <b>20 25</b>	0.22 0.25 <b>32 37</b>	0.31 0.35 <b>45 50</b>

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 $\Delta p_{max}$  for bellows must be consulted with the producer.

## Kvs values and differential pressures $\Delta p_{max}$ [MPa], [psi] of valves NPS 1/2" - 8" with perforated plugs (flow direction above plug) with pneumatic actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed.

Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. Due to the service life, the permanent working pressure drop for valves with a perforated plug is limited up to 4,0 MPa / 580 psi).

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators		Foxboro PA 253				Foxboro PB 503		A. Hock 2109				
			Actuator function	direct	indirect	direct	indirect	direct	indirect	direct	indirect				
Specification No. of actuator			BVCxAA	BVCxZA	BVCxAA	BVCxZA	BVCxAA	BVCxZA	P2-0K-VL1	P2-0K-HL2					
Spring range [bar]			1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.2 - 3.0	1.5 - 3.8					
Spring range [psi]			22 - 39	22 - 39	22 - 39	22 - 39	22 - 39	22 - 39	17 - 44	22 - 55					
Spring setting [bar]			1.5 - 2.46	1.75 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.2 - 2.64	1.96 - 3.8					
Spring setting [psi]			22 - 36	22 - 39	22 - 39	22 - 39	22 - 39	22 - 39	17 - 38	28 - 55					
Feeding pressure [bar]			4.5	4.5	4.5	4.5	4.5	4.5	3.9	5.8					
Feeding pressure [psi]			65	65	65	65	65	65	57	84					
Marking in valve spec. No.			PFA				PFB		PHF						
Linear force			4.3 kN	4.3 kN	3.7 kN	3.7 kN	7.5 kN	7.5 kN	3.5 kN	5.7 kN					
Kvs [m³/h]			$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]						
Cv [US gallon/min]			packing		packing		packing		packing						
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
1"	16	25	---	6.3	4.0	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	0.77	1.55	0.77	1.55	---	---	---	---
				<b>7.28</b>	<b>4.62</b>	<b>2.89<sup>5)</sup></b>	<b>1.85<sup>5)</sup></b>	<b>111</b>	<b>224</b>	<b>111</b>	<b>224</b>	---	---	---	---
												0.47	1.25	1.28	2.06
												<b>69</b>	<b>182</b>	<b>185</b>	<b>298</b>
1½"	16	40	---	16	10	6.3	4.0	0.30	0.60	0.30	0.60	---	---	---	---
				<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	<b>4.62</b>	<b>43</b>	<b>87</b>	<b>43</b>	<b>87</b>	---	---	---	---
												0.18	0.49	0.50	0.80
												<b>27</b>	<b>71</b>	<b>72</b>	<b>116</b>
2"	20	50	---	25	16	10	6.3	0.18	0.36	0.18	0.36	0.13	0.31	0.13	0.31
				<b>28.9</b>	<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	<b>26</b>	<b>52</b>	<b>26</b>	<b>52</b>	<b>19</b>	<b>45</b>	<b>19</b>	<b>45</b>
												<b>65</b>	<b>92</b>	<b>65</b>	<b>92</b>

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators		A. Hock 2112-30										
			Actuator function	direct	indirect	direct	indirect	direct	indirect	direct	indirect				
Specification No. of actuator			P2-0K-BM1	P2-0K-BM2	P2-0K-BM1	P2-0K-BM2	P2-0K-VM1	P2-0K-MM2							
Spring range [bar]			0.8 - 2.2	0.8 - 2.2	0.8 - 2.2	0.8 - 2.2	1.4 - 2.8	1.6 - 3.2							
Spring range [psi]			12 - 32	12 - 32	12 - 32	12 - 32	20 - 41	23 - 46							
Spring setting [bar]			0.8 - 1.55	1.45 - 2.2	0.8 - 1.73	1.27 - 2.2	1.4 - 2.33	2.13 - 3.2							
Spring setting [psi]			12 - 22	21 - 32	12 - 25	18 - 32	20 - 34	31 - 46							
Feeding pressure [bar]			2.4	3.7	2.6	3.5	3.8	5.4							
Feeding pressure [psi]			35	54	38	51	55	78							
Marking in valve spec. No.			PHA												
Linear force			4.6 kN	8.3 kN	4.6 kN	7.3 kN	8.0 kN	12.2 kN							
Kvs [m³/h]			$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]						
Cv [US gallon/min]			packing		packing		packing		packing						
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
1"	16	25	---	6.3	4.0	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	0.88	1.66	2.23	3.01	---	---	---	---
				<b>7.28</b>	<b>4.62</b>	<b>2.89<sup>5)</sup></b>	<b>1.85<sup>5)</sup></b>	<b>127</b>	<b>240</b>	<b>323</b>	<b>436</b>	---	---	---	---
												---	---	---	---
1½"	16	40	---	16	10	6.3	4.0	0.34	0.64	0.87	1.17	---	---	---	---
				<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	<b>4.62</b>	<b>49</b>	<b>93</b>	<b>126</b>	<b>170</b>	---	---	---	---
												---	---	---	---
2"	20	50	---	25	16	10	6.3	---	---	0.20	0.39	0.43	0.62	0.49	0.67
				<b>28.9</b>	<b>18.5</b>	<b>11.6</b>	<b>7.28</b>	---	---	<b>30</b>	<b>56</b>	<b>63</b>	<b>89</b>	<b>72</b>	<b>98</b>
												<b>123</b>	<b>150</b>		

the table continues on the next page

<sup>5)</sup> linear 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.

			Pneumatic actuators					Foxboro PB 503		Foxboro PB 701		A. Hock 2112-50		A. Hock 2116-40									
			Actuator function					direct	indirect	direct	indirect	direct	indirect	direct	indirect								
			Specification No. of actuator					BVCxAB	BVCxZB	BVCxAB	BVCxZB	P2-0K-SI1	P2-0K-SI2	P2-0K-BN1	P2-0K-BN2								
			Spring range [bar]					1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	0.8 - 2.8	0.8 - 2.8	0.8 - 2.2	0.8 - 2.2								
			Spring setting [bar]					1.5 - 2.46	1.75 - 2.7	1.5 - 2.7	1.5 - 2.7	0.8 - 2.4	1.2 - 2.8	0.8 - 1.36	1.64 - 2.2								
			Feeding pressure [bar]					4.5	4.5	4.5	4.5	3.3	4.0	2.2	3.9								
			Marking in valve spec. No.					PFB		PFC		PHA		PHC									
			Linear force					7.5 kN	7.5 kN	10.5 kN	10.5 kN	4.6 kN	6.9 kN	9.6 kN	19.5 kN								
			Kvs [m <sup>3</sup> /h]					$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]	$\Delta p_{max}$ [MPa]								
			Cv [US gallon/min]					packing	packing	packing	packing	packing	packing	packing	packing								
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE						
3"	40	80	---	63	40	25	16	0.18	0.27	0.18	0.27	0.28	0.37	0.28	0.37	0.07	0.16	0.15	0.24	0.25	0.34	0.61	0.70
		100	---	72.8	46.2	28.9	18.5	26	39	26	39	41	54	41	54	10	24	22	36	37	50	88	101
4"	40	100	---	100	63	40	25	0.11	0.17	0.11	0.17	0.31	0.24	0.18	0.24	0.05	0.11	0.10	0.16	0.16	0.22	0.39	0.45
		150	---	116	72.8	46.2	28.9	17	25	17	25	26	35	26	35	7	15	15	23	24	32	57	66
6"	40	150	---	250	160	100	63	0.05	0.08	0.05	0.08	0.08	0.11	0.08	0.11	0.02	0.05	0.05	0.07	0.07	0.10	0.18	0.21
		150	---	289	185	116	72.8	8	11	8	11	11	16	11	16	3	7	7	10	10	15	26	16

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 $\Delta p_{max}$  for bellows must be consulted with the producer.

**Valves Cv3x0 NPS 8" - 16" with perforated plugs and pneumatic actuators are not supplied.**

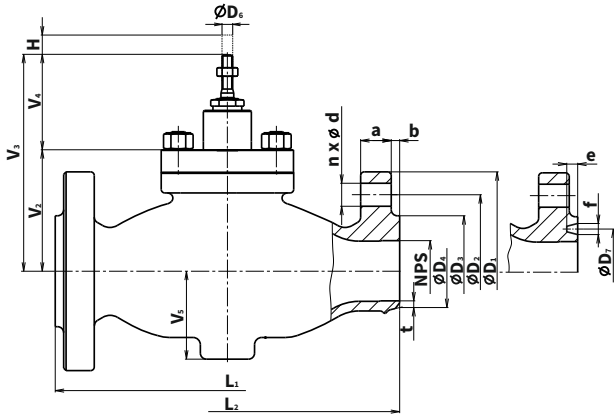


**Dimensions and weights of valves CV/SV 320 (Ex) and CV/SV 330 (Ex) with flanges and weld ends, NPS ½" - 16"**

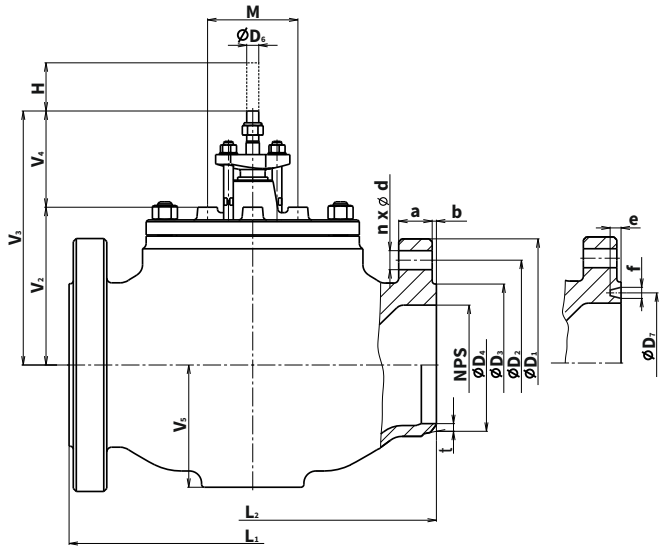
NPS	H	V <sub>2</sub>	V <sub>2</sub> <sup>#</sup>	V <sub>3</sub>	V <sub>3</sub> <sup>#</sup>	V <sub>4</sub>	ØD <sub>5</sub>	M	ØD <sub>6</sub>	V <sub>5</sub>	m <sub>1</sub>	m <sub>2</sub>	m <sub>v</sub>	Class 300			Class 600			Class 150-600
														L <sub>1</sub>			L <sub>1</sub>			BTW
														RF	RTJ	LFF SFF LGF SGF	RF	RTJ	LFF SFF LGF SGF	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	kg	kg	kg	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	kg	kg	kg	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	
½"	16	90	328	220	458					47	7	5	4	190	201	200	203	202	200	203
	<b>0.63</b>	<b>3.543</b>	<b>12.913</b>	<b>8.661</b>	<b>18.031</b>					<b>1.85</b>				<b>7.5</b>	<b>7.91</b>	<b>7.87</b>	<b>8.0</b>	<b>7.95</b>	<b>7.87</b>	<b>8.0</b>
1"	16	100	336	230	466					52	9	6	4	197	210	207	210	210	207	210
	<b>0.63</b>	<b>3.937</b>	<b>13.228</b>	<b>9.055</b>	<b>18.346</b>					<b>2.047</b>				<b>7.75</b>	<b>8.25</b>	<b>8.15</b>	<b>8.25</b>	<b>8.25</b>	<b>8.15</b>	<b>8.25</b>
1½"	16	100	336	230	466					52	15	8	4	235	248	245	251	251	248	251
	<b>0.63</b>	<b>3.937</b>	<b>13.228</b>	<b>9.055</b>	<b>18.346</b>					<b>2.047</b>				<b>9.25</b>	<b>9.76</b>	<b>9.64</b>	<b>9.88</b>	<b>9.88</b>	<b>9.76</b>	<b>9.88</b>
2"	20	132	330	262	460	130	65	---		73	20	13	4	267	283	277	286	289	283	286
	<b>0.787</b>	<b>5.197</b>	<b>12.992</b>	<b>10.314</b>	<b>18.110</b>	<b>5.118</b>	<b>2.559</b>			<b>2.874</b>				<b>10.5</b>	<b>11.14</b>	<b>10.9</b>	<b>11.25</b>	<b>11.38</b>	<b>11.14</b>	<b>11.25</b>
3"	40	164	489	294	619					105	41	28	6	318	332	328	337	340	334	337
	<b>1.575</b>	<b>6.456</b>	<b>19.252</b>	<b>11.575</b>	<b>24.370</b>					<b>4.133</b>				<b>12.5</b>	<b>33.22</b>	<b>12.91</b>	<b>13.25</b>	<b>13.38</b>	<b>13.15</b>	<b>13.25</b>
4"	40	164	489	294	619					105	67	37	6	368	384	378	394	397	391	394
	<b>1.575</b>	<b>6.456</b>	<b>19.252</b>	<b>11.575</b>	<b>24.370</b>					<b>4.133</b>				<b>14.5</b>	<b>15.12</b>	<b>14.88</b>	<b>15.5</b>	<b>15.63</b>	<b>15.39</b>	<b>15.5</b>
6"	40	200	492	330	622					134	160	105	7	473	489	483	508	511	505	508
	<b>1.575</b>	<b>7.874</b>	<b>19.370</b>	<b>12.992</b>	<b>24.488</b>					<b>5.275</b>				<b>18.62</b>	<b>19.25</b>	<b>19.01</b>	<b>20.0</b>	<b>20.12</b>	<b>19.88</b>	<b>20.0</b>
8"	80(63 <sup>1)</sup> 3.15 (2.48) <sup>#</sup>	262	---	422	---					203	280	200	---	568	584	578	610	613	607	610
		<b>10.314</b>		<b>16.614</b>						<b>7.992</b>				<b>22.38</b>	<b>22.99</b>	<b>22.75</b>	<b>24.0</b>	<b>24.13</b>	<b>60.72</b>	<b>24.0</b>
10"	80	346	---	506	---	160	---	150		253	540	370	---	708	724	718	752	755	749	752
	<b>3.15</b>	<b>13.622</b>		<b>19.921</b>		<b>6.299</b>		<b>5.905</b>		<b>9.961</b>				<b>27.88</b>	<b>28.5</b>	<b>28.27</b>	<b>29.62</b>	<b>29.72</b>	<b>29.49</b>	<b>29.62</b>
12"	80	395	---	555	---					296	680	520	---	775	791	785	819	822	816	819
	<b>3.15</b>	<b>15.551</b>		<b>21.85</b>						<b>11.654</b>				<b>30.5</b>	<b>31.14</b>	<b>30.91</b>	<b>32.25</b>	<b>32.36</b>	<b>32.13</b>	<b>32.25</b>
16"	100	512	---	672	---					382	1380	1130	---	1057	1073	1067	1108	1111	1105	1108
	<b>3.937</b>	<b>20.157</b>		<b>26.457</b>						<b>15.039</b>				<b>41.62</b>	<b>42.24</b>	<b>42.01</b>	<b>43.62</b>	<b>43.74</b>	<b>43.5</b>	<b>43.62</b>

m<sub>1</sub> - weight of flanged version    m<sub>2</sub> - weight of weld ends version    1) NPS 8" balanced by graphite - travel = 63 mm (2,48 inch)  
 # - for valve with bellows packing    #m<sub>v</sub> - weight to be added to weight of valve equipped with bellows packing

NPS	RF Class 300							RF Class 600							RTJ Class 300 a 600				Groove Number
	ØD <sub>1</sub>	ØD <sub>2</sub>	ØD <sub>3</sub>	d	n	a	b	ØD <sub>1</sub>	ØD <sub>2</sub>	ØD <sub>3</sub>	d	n	a	b	ØD <sub>7</sub>	e	f		
	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	
	[inch]	[inch]	[inch]	[inch]		[inch]	[inch]	[inch]	[inch]	[inch]	[inch]		[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	
½"	95	66.7	34.9	15.9		12.7		95	66.7	34.9	15.9		14.3		34.14	5.54	7.14		
	<b>3.75</b>	<b>2.62</b>	<b>1.38</b>	<b>5/8"</b>		<b>0.5</b>		<b>3.75</b>	<b>2.62</b>	<b>1.38</b>	<b>5/8"</b>		<b>0.56</b>		<b>1.344</b>	<b>0.219</b>	<b>0.281</b>	R11	
1"	125	88.9	50.8	19.1	4	15.9		125	88.9	50.8	19.1	4	17.5		50.8	6.35	8.74	R16	
	<b>4.88</b>	<b>3.5</b>	<b>2.0</b>	<b>¾"</b>		0.62		<b>4.88</b>	<b>3.5</b>	<b>2.0</b>	<b>¾"</b>		<b>0.69</b>		<b>2.0</b>	<b>0.25</b>	<b>0.344</b>		
1½"	155	114.3	73	22.3		19.1		155	114.3	73	22.3		22.3		68.27	6.35	8.74	R20	
	<b>6.12</b>	<b>4.5</b>	<b>2.88</b>	<b>7/8"</b>		<b>0.75</b>		<b>6.12</b>	<b>4.5</b>	<b>2.88</b>	<b>7/8"</b>		<b>0.88</b>		<b>2.688</b>	<b>0.25</b>	<b>0.344</b>		
2"	165	127	92.1	19.1		20.7		165	127	92.1	19.1		25.4		82.55	7.92	11.91	R23	
	<b>6.5</b>	<b>5.0</b>	<b>3.62</b>	<b>¾"</b>		0.81		<b>6.5</b>	<b>5.0</b>	<b>3.62</b>	<b>¾"</b>		<b>1.0</b>		<b>3.25</b>	<b>0.312</b>	<b>0.469</b>		
3"	210	168.3	127	22.3	8	27		210	168.3	127	22.3	8	31.8		117.48	7.92	11.91	R30	
	<b>8.25</b>	<b>6.62</b>	<b>5.0</b>	<b>7/8"</b>		1.06		<b>8.25</b>	<b>6.62</b>	<b>5.0</b>	<b>7/8"</b>		<b>1.25</b>		<b>4.625</b>	<b>0.312</b>	<b>0.469</b>		
4"	255	200	157.2	22.3		30.2		275	215.9	157.2	25.4		38.1		149.23	7.92	11.91	R37	
	<b>10</b>	<b>7.88</b>	<b>6.19</b>	<b>7/8"</b>		1.19	0.06	<b>10.75</b>	<b>8.5</b>	<b>6.19</b>	<b>1"</b>		<b>1.5</b>	0.25	<b>5.875</b>	<b>0.312</b>	<b>0.469</b>		
6"	320	269.9	215.9	22.3		35		355	292.1	215.9	28.6		47.7		211.12	7.92	11.91	R45	
	<b>12.5</b>	<b>10.62</b>	<b>8.5</b>	<b>7/8"</b>		<b>1.38</b>		<b>14.0</b>	<b>11.5</b>	<b>8.5</b>	<b>1 1/8"</b>		<b>1.88</b>		<b>8.312</b>	<b>0.312</b>	<b>0.469</b>		
8"	380	330.2	269.9	25.4	12	39.7		420	349.2	269.9	31.8	12	55.6		269.9	7.92	11.91	R49	
	<b>15</b>	<b>13.0</b>	<b>10.62</b>	<b>1"</b>		<b>1.56</b>		<b>16.5</b>	<b>13.75</b>	<b>10.62</b>	<b>1 1/4"</b>		<b>2.19</b>		<b>10.625</b>	<b>0.312</b>	<b>0.469</b>		
10"	445	387.4	323.8	28.6	16	46.1		510	431.8	323.8	34.9	16	63.5		323.85	7.92	11.91	R53	
	<b>17.52</b>	<b>15.25</b>	<b>12.75</b>	<b>1 1/8"</b>		<b>1.82</b>		<b>20.08</b>	<b>17</b>	<b>12.75</b>	<b>1 3/8"</b>		<b>2.5</b>		<b>12.75</b>	<b>0.312</b>	<b>0.469</b>		
12"	520	450.8	381	31.8	16	49.3		560	489	381	34.9	20	66.7		381	7.92	11.91	R57	
	<b>20.47</b>	<b>17.75</b>	<b>15</b>	<b>1 1/4"</b>		<b>1.94</b>		<b>22.05</b>	<b>19.25</b>	<b>15</b>	<b>1 3/8"</b>		<b>2.63</b>		<b>15</b>	<b>0.312</b>	<b>0.469</b>		
16"	650	571.5	469.9	34.9	20	55.6		685	603.2	469.9	41.3	20	76.2		469.9	7.92	11.91	R65	
	<b>25.59</b>	<b>22.5</b>	<b>18.5</b>	<b>1 3/8"</b>		<b>2.19</b>		<b>26.97</b>	<b>23.75</b>	<b>18.5</b>	<b>1 5/8"</b>		<b>3</b>		<b>18.5</b>	<b>0.312</b>	<b>0.469</b>		



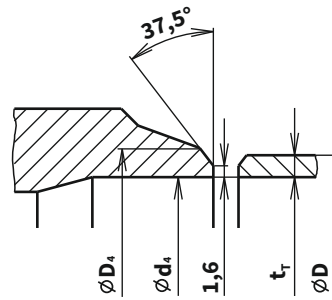
NPS 1/2" - 6"



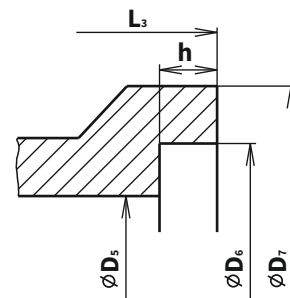
NPS 8" - 16"

NPS	Dimensions of weld ends for pipes ASME B36.10M [mm] [inch]						$\varnothing D_{4,max}$	$\varnothing D_{4,min}$
	$\varnothing D_4$	$\varnothing D$	Sch. No. 40	Sch. No. 80	Sch. No. 100	$t_r$		
1/2"	22 <b>0.866</b>	21.3 <b>0.839</b>	2.8 <b>0.109</b>	3.9 <b>0.154</b>	---	30 <b>1.181</b>	13 <b>0.512</b>	
1"	35 <b>1.378</b>	33.4 <b>1.315</b>	3.4 <b>0.133</b>	4.6 <b>0.179</b>	---	40 <b>1.575</b>	23 <b>0.906</b>	
1 1/2"	50 <b>1.969</b>	48.3 <b>1.66</b>	3.7 <b>0.14</b>	5.1 <b>0.191</b>	---	57 <b>2.244</b>	35 <b>1.378</b>	
2"	62 <b>2.44</b>	60.3 <b>2.375</b>	3.9 <b>0.154</b>	5.5 <b>0.218</b>	---	67 <b>2.638</b>	43 <b>1.693</b>	
3"	91 <b>3.583</b>	88.9 <b>3.5</b>	5.5 <b>0.216</b>	7.6 <b>0.3</b>	---	100 <b>3.937</b>	72 <b>2.835</b>	
4"	117 <b>4.606</b>	114.3 <b>4.5</b>	6.0 <b>0.237</b>	8.6 <b>0.337</b>	---	128 <b>5.039</b>	92 <b>3.622</b>	
6"	172 <b>6.772</b>	168.3 <b>6.625</b>	7.1 <b>0.28</b>	11.0 <b>0.432</b>	---	188 <b>7.402</b>	136 <b>5.354</b>	
8"	223 <b>8.78</b>	219.1 <b>8.625</b>	8.2 <b>0.322</b>	12.7 <b>0.5</b>	15.1 <b>0.594</b>	228 <b>8.976</b>	178 <b>7.008</b>	
10"	278 <b>10.945</b>	273.0 <b>10.748</b>	9.3 <b>0.366</b>	15.1 <b>0.594</b>	18.3 <b>0.72</b>	278 <b>10.945</b>	229 <b>9.016</b>	
12"	329 <b>12.953</b>	323.9 <b>12.752</b>	10.3 <b>0.406</b>	17.5 <b>0.689</b>	21.4 <b>0.843</b>	329 <b>12.953</b>	281 <b>11.063</b>	
16"	413 <b>16.26</b>	406.4 <b>16.0</b>	12.7 <b>0.5</b>	21.4 <b>0.843</b>	26.2 <b>1.031</b>	426 <b>16.772</b>	345 <b>13.583</b>	

t-wall thickness of weld ends:  $t = [D_4 - (D - 2 * t_r)] / 2$



NPS	Dimensions of weld ends for pipes ASME B16.11 [mm] [inch]									
	SW Class 150 and 300					SW Class 600				
	$\varnothing D_5$	$\varnothing D_6$	$\varnothing D_7$	$L_3$	h	$\varnothing D_5$	$\varnothing D_6$	$\varnothing D_7$	$L_3$	h
1/2"	15 <b>0.59</b>	22 <b>0.87</b>	33 <b>1.3</b>	206 <b>8.11</b>	9.5 <b>0.37</b>	12 <b>0.47</b>	22 <b>0.87</b>	35 <b>1.38</b>	206 <b>8.11</b>	9.5 <b>0.37</b>
1"	26 <b>1.02</b>	34.1 <b>1.34</b>	47 <b>1.85</b>	210 <b>8.27</b>	12.5 <b>0.49</b>	21 <b>0.83</b>	34.1 <b>1.34</b>	51 <b>2.01</b>	210 <b>8.27</b>	12.5 <b>0.49</b>
1 1/2"	41 <b>1.61</b>	49 <b>1.93</b>	62 <b>2.44</b>	251 <b>9.88</b>	12.5 <b>0.49</b>	34 <b>1.34</b>	49 <b>1.93</b>	67 <b>2.64</b>	251 <b>9.88</b>	12.5 <b>0.49</b>
2"	52 <b>2.05</b>	61.4 <b>2.42</b>	76 <b>2.99</b>	286 <b>11.26</b>	16 <b>0.63</b>	43 <b>1.69</b>	61.4 <b>2.42</b>	84 <b>3.31</b>	286 <b>11.26</b>	16 <b>0.63</b>





## CV 3x2

Control  
and shut-off valves

**NPS 1/2" - 16",  
Class 150, 300 and 600**

Technical data		
Series	CV 322 (Ex)	CV 332 (Ex)
Type of valve	Two-way, single-seated, control (shut-off) valve with pressure balanced plug	
Nominal size range	NPS 1" - 16"	
Nominal pressure	Class 300 and 600 (Class 150, 300 and 600 (weld ended))	
Body material	Cast steel A216 WCB, A217 WC6	Stainless steel A351 CF8M
Seat material:	NPS 1/2" - 2" 1.4028	1.4571
DIN W.Nr./+ČSN	NPS 3" - 16" 1.4027	1.4581
Plug material:	NPS 1/2" - 2" 1.4021	1.4571
DIN W.Nr./+ČSN	NPS 3" - 16" 1.4027	1.4581
Stem material	1.4923	1.4980
Operating temperature range	-50 to 550 °C (-58 to 1020 °F) - (the negative temperature requirement must be specified in the order)	
Face to face dimensions	Acc. to ISA-75.08.01-2002 (R2007) for version with flanges Acc. to ISA-75.08.03-2001 (R2007) for weld ends - version Socket Weld Acc. to ISA - 75.08.05-2002 (R2007) for weld ends - version Butt Weld	
Connection flanges	Acc. to ASME B16.5-2013	
Flange faces	RF (Raised Face), RTJ (Ring Joint Face), LFF (Large Female Face), SFF (Small Female Face), LGF (Large Groove Face), SGF (Small Groove Face)	
Weld ends	Butt Weld 1/2" - 16" acc. to ASME B16.25-2012; Socket Weld 1/2" - 2" acc. to ASME B16.11-2011	
Type of plug	V-ported, contoured, perforated	
Flow characteristic	Linear, equal-percentage, LDMspline®, parabolic	
Kvs value	1,6 to 1600 m <sup>3</sup> /h (1,85 to 1850 US gallon/min)	
Leakage rate	Class III. acc. to ANSI/FCI 70-2-2013 (<0,1% Cv) for control valves with metal-metal seat sealing Class IV. acc. to ANSI/FCI 70-2-2013 (<0.01% Cv) for control valves with metal-PTFE 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 <sub>max</sub> = 260 °C (500°F), Expanded graphite t <sub>max</sub> = 550 °C (1020°F), Bellows (DN15-150) t <sub>max</sub> = 550°C (1020°F)	

## Cv (Kvs) values and differential pressures $\Delta p_{max}$ [MPa], [psi] of pressure balanced valves NPS 1" - 16" with electro-mechanic actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed.

Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. 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 ( $\Delta p$  up to 4,0 MPa / 580 psi) or sealing surfaces of seat and plug with a hard metal overlay ( $\Delta p$  up to 2,5 MPa / 363 psi).

For further information on actuating, see actuators' catalogue sheets			Actuating (actuating)					CVL-500		ST 0		CVL-1000		Auma Schiebel		ST 1 Ex ST 0.1 CVL-1500		ST 1 IQM 10		ST 1 IQM 10		Hand wheel	
*) max. NPS 12"			Marking in valve specification No.					EQL		EPK		EQL		EA... EZ...		EPJ EPL EQL		EPI EQ...		EPI EQ...		Rxx	
5) linear characteristic only			Linear force					2 kN		2.5 kN		4 kN		5 kN		6.3 kN		7.5 kN		10 kN			
			Kvs [m <sup>3</sup> / h] Cv [US gallon/min]					$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing			
NPS	H [mm]	Ds [mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
1"	16	25	10	6.3 <sup>5)</sup>	4.0 <sup>5)</sup>	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	---	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			11.6	7.28 <sup>5)</sup>	4.62 <sup>5)</sup>	2.89 <sup>5)</sup>	1.85 <sup>5)</sup>	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
1½"	40	40	25	16	10	6.3 <sup>5)</sup>	4.0 <sup>5)</sup>	---	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			28.9	18.5	11.6	7.28 <sup>5)</sup>	4.62 <sup>5)</sup>	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
2"	20	50	40	25	16	10	6.3 <sup>5)</sup>	---	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			46.2	28.9	18.5	11.6	7.28 <sup>5)</sup>	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
3"	40	80	100	63	40	25	16	---	---	---	---	---	---	10	10	10	10	10	10	10	10	10	10
			116	72.8	46.2	28.9	18.5	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
4"	40	100	160	100	63	40	25	---	---	---	---	---	---	10	10	10	10	10	10	10	10	10	10
			185	116	72.8	46.2	28.9	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
6"	150	150	360	250	160	100	63	---	---	---	---	---	---	10	10	10	10	10	10	10	10	10	10
			416	289	185	116	72.8	---	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450

For further information on actuating, see actuators' catalogue sheets			Actuating (actuating)					Auma Schiebel IQM 10		ModactMTR ST 2 CVL-5000		Auma Schiebel IQM 12		ModactMTR ST 2		Hand wheel	
*) max. NPS 12"			Marking in valve specification No.					EA... EZ... EQ...		EPD EPM EQL		EA... EZ... EQ...		EPD EPM		Rxx	
5) linear characteristic only			Linear force					15 kN		16 kN		20 kN		25 kN			
			Kvs [m <sup>3</sup> / h] Cv [US gallon/min]					$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing	
NPS	H [mm]	Ds [mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
3"	40	80	100	63	40	25	16	---	---	10	10	---	---	---	---	10	10
			116	72.8	46.2	28.9	18.5	---	1450	1450	---	---	---	---	1450	1450	---
4"	40	100	160	100	63	40	25	---	---	10	10	---	---	---	---	10	10
			185	116	72.8	46.2	28.9	---	1450	1450	---	---	---	---	1450	1450	---
6"	150	150	360	250	160	100	63	---	---	10	10	---	---	---	---	10	10
			416	289	185	116	72.8	---	1450	1450	---	---	---	---	1450	1450	---
8"	80	200	570	400	250	160	100	10	10	10	10	10	10	---	---	10	10
			659	462	289	185	116	1450	1450	1450	1450	1450	1450	---	---	1450	1450
10"	80	230	800	630	400	250	160	---	---	10	10	10	10	10	10	10	10
			925	728	462	289	185	---	1450	1450	1450	1450	1450	1450	1450	1450	1450
12"	250	250	1000	800	630	400	250	---	---	10	10	10	10	10	10	10	10
			1160	925	728	462	289	---	1450	1450	1450	1450	1450	1450	1450	1450	1450
16"	100	330	1600	1000	630	400	250	---	---	10	10	10	10	10	10	10	10
			1850	1160	728	462	289	---	1450	1450	1450	1450	1450	1450	1450	1450	1450

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 Perforated plug available only with Cv (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

## Cv (Kvs) values and differential pressures $\Delta p_{max}$ [MPa], [psi] of pressure balanced valves NPS 1" - 16" with pneumatic actuators

$\Delta p_{max}$  value is the valve max. differential pressure when max open - close function is always guaranteed.

Differential pressure must not exceed 2,0 MPa (290 psi) for valves Class 150 and 5,0 MPa (750 psi) for valves Class 300. 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 ( $\Delta p$  up to 4,0 MPa / 580 psi) or sealing surfaces of seat and plug with a hard metal overlay ( $\Delta p$  up to 2,5 MPa / 363 psi).

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators		Flowserve PA 253				A. Hock 2109						
			Actuator function		direct	indirect	direct	indirect	direct	indirect	direct	indirect			
			Specification No. of actuator		BVCxAA	BVCxZA	BVCxAA	BVCxZA	P2-0K-VL1	P2-0K-HL2	P2-0K-VL1	P2-0K-HL2			
			Spring range [bar]		1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.2 - 3.0	1.5 - 3.8	1.2 - 3.0	1.5 - 3.8			
		[psi]		22 - 39	22 - 39	22 - 39	22 - 39	17 - 44	22 - 55	17 - 44	22 - 55				
Spring setting [bar]		1.5 - 2.46	1.75 - 2.7	1.5 - 2.7	1.5 - 2.7	1.2 - 2.64	1.96 - 3.8	1.2 - 3.0	1.5 - 3.8						
		[psi]		22 - 36	25 - 39	22 - 39	22 - 39	17 - 38	28 - 55	17 - 44	22 - 55				
Feeding pressure [bar]		4.5	4.5	4.5	4.5	3.9	5.8	4.2	5.3						
		[psi]		65	65	65	65	57	84	61	77				
Marking in valve spec. No.		PFA				PHF									
Linear force		4.3 kN	4.3 kN	3.7 kN	3.7 kN	3.5 kN	5.7kN	3.5 kN	4.4kN						
Kvs [m <sup>3</sup> /h]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]							
Cv [US galon/min]		packing		packing		packing		packing							
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
1"	16	50	10	6.3 <sup>5)</sup>	4.0 <sup>5)</sup>	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	10	10	10	10	---	---	---	---
			11.6	7.28 <sup>5)</sup>	4.62 <sup>5)</sup>	2.89 <sup>5)</sup>	1.85 <sup>5)</sup>	1450	1450	1450	1450	---	---	---	---
1½"	16	80	25	16	10	6.3 <sup>5)</sup>	4.0 <sup>5)</sup>	10	10	10	10	---	---	---	---
			28.9	18.5	11.6	7.28 <sup>5)</sup>	4.62 <sup>5)</sup>	1450	1450	1450	1450	---	---	---	---
2"	20	50	40	25	16	10	6.3 <sup>3)</sup>	---	---	10	10	10	10	---	---
			46.2	28.9	18.5	11.6	7.28 <sup>5)</sup>	---	---	1450	1450	1450	1450	---	---

For further information on actuating, see actuators' catalogue sheets			Pneumatic actuators		A. Hock 2112-30										
			Actuator function		direct	indirect	direct	indirect	direct	indirect					
			Specification No. of actuator		P2-0K-BM1	P2-0K-BM2	P2-0K-BM1	P2-0K-BM2	P2-0K-VM1	P2-0K-MM2					
			Spring range [bar]		0.8 - 2.2	0.8 - 2.2	0.8 - 2.2	0.8 - 2.2	1.4 - 2.8	1.6 - 3.2					
		[psi]		12 - 32	12 - 32	12 - 32	12 - 32	20 - 41	23 - 46						
Spring setting [bar]		0.8 - 1.55	1.45 - 2.2	0.8 - 1.73	1.27 - 2.2	1.4 - 2.33	2.13 - 3.2								
		[psi]		12 - 22	21 - 32	12 - 25	18 - 32	20 - 34	31 - 46						
Feeding pressure [bar]		2.4	3.7	2.6	3.5	3.8	5.4								
		[psi]		35	54	38	51	55	78						
Marking in valve spec. No.		PHA													
Linear force		4.6 kN	8.3 kN	4.6 kN	7.3 kN	8.0 kN	12.2 kN								
Kvs [m <sup>3</sup> /h]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]		$\Delta p_{max}$ [MPa]									
Cv [US galon/min]		packing		packing		packing									
NPS	H[mm]	Ds[mm]	1	2	3	4	5	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
1"	16	25	---	6.3	4.0	2.5 <sup>5)</sup>	1.6 <sup>5)</sup>	10	10	10	10	---	---	---	---
			---	7.28	4.62	2.89 <sup>5)</sup>	1.85 <sup>5)</sup>	1450	1450	1450	1450	---	---	---	---
1½"	16	40	---	16	10	6.3	4.0	10	10	10	10	---	---	---	---
			---	18.5	11.6	7.28	4.62	1450	1450	1450	1450	---	---	---	---
2"	20	50	---	25	16	10	6.3	---	---	10	10	10	10	---	---
			---	28.9	18.5	11.6	7.28	---	---	1450	1450	1450	1450	1450	1450

the table continues on the next page

<sup>5)</sup> linear characteristic only

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

Perforated plug available only with Cv (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

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>Flowserve PB 503</b>				<b>Flowserve PB 701</b>			
			<b>Actuator function</b>					direct	indirect	direct	indirect	direct	indirect		
			<b>Specification No. of actuator</b>					<b>BVCxAA</b>	<b>BVCxZA</b>	<b>BVCxAB</b>	<b>BVCxZB</b>	<b>BVCxAB</b>	<b>BVCxZB</b>		
			<b>Spring range</b> [bar]					1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7		
			<b>Spring range</b> [psi]					<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>		
			<b>Spring setting</b> [bar]					1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7	1.5 - 2.7		
			<b>Spring setting</b> [psi]					<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>	<b>22 - 39</b>		
			<b>Feeding pressure</b> [bar]					4.5	4.5	4.5	4.5	4.5	4.5		
			<b>Feeding pressure</b> [psi]					<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>		
			<b>Marking in valve spec. No.</b>					<b>PFB</b>				<b>PFC</b>			
<b>Linear force</b>					7.5 kN	7.5 kN	7.5 kN	7.5 kN	10.5 kN	10.5 kN					
<b>Kvs [m<sup>3</sup>/h]</b>					<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>					
<b>Cv [US galon/min]</b>					packing	packing	packing	packing	packing	packing					
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite	PTFE	graphite	PTFE	graphite	PTFE	graphite	PTFE
<b>2"</b>	<b>20</b>	<b>50</b>	40 <b>46.2</b>	25 <b>28.9</b>	16 <b>18.5</b>	10 <b>11.6</b>	6.3 <sup>5)</sup> <b>7.28<sup>5)</sup></b>	10	10	10	10	---	---	---	---
<b>3"</b>		<b>80</b>	100 <b>116</b>	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	16 <b>18.5</b>	---	---	10	10	10	10	10	10
<b>4"</b>	<b>40</b>	<b>100</b>	160 <b>185</b>	100 <b>116</b>	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	---	---	10	10	10	10	10	10
<b>6"</b>		<b>150</b>	360 <b>416</b>	250 <b>289</b>	160 <b>185</b>	100 <b>116</b>	63 <b>72.8</b>	---	---	10	10	10	10	10	10

<sup>5)</sup> linear characteristic only

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>A. Hock 2112-50</b>		<b>A. Hock 2116-40</b>			
			<b>Actuator function</b>					direct	indirect	direct	indirect		
			<b>Specification No. of actuator</b>					<b>P2-0K-SI1</b>	<b>P2-0K-SI2</b>	<b>P2-0K-BN1</b>	<b>P2-0K-BN2</b>		
			<b>Spring range</b> [bar]					0.8 - 2.8	0.8 - 2.8	0.8 - 2.2	0.8 - 2.2		
			<b>Spring range</b> [psi]					<b>12 - 41</b>	<b>12 - 41</b>	<b>12 - 32</b>	<b>12 - 32</b>		
			<b>Spring setting</b> [bar]					0.8 - 2.4	1.2 - 2.8	0.8 - 1.36	1.64 - 2.2		
			<b>Spring setting</b> [psi]					<b>12 - 35</b>	<b>17 - 41</b>	<b>12 - 20</b>	<b>24 - 32</b>		
			<b>Feeding pressure</b> [bar]					3.3	4.0	2.2	3.9		
			<b>Feeding pressure</b> [psi]					<b>48</b>	<b>58</b>	<b>32</b>	<b>57</b>		
			<b>Marking in valve spec. No.</b>					<b>PHA</b>		<b>PHC</b>			
<b>Linear force</b>					4.6 kN	6.9 kN	9.6 kN	19.5 kN					
<b>Kvs [m<sup>3</sup>/h]</b>					<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>	<b>Δp<sub>max</sub> [MPa]</b>					
<b>Cv [US galon/min]</b>					packing	packing	packing	packing					
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite	PTFE	graphite	PTFE	graphite	PTFE
<b>3"</b>		<b>80</b>	100 <b>116</b>	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	16 <b>18.5</b>	10	10	10	10	10	10
<b>4"</b>	<b>40</b>	<b>100</b>	160 <b>185</b>	100 <b>116</b>	63 <b>72.8</b>	40 <b>46.2</b>	25 <b>28.9</b>	10	10	10	10	10	10
<b>6"</b>		<b>150</b>	360 <b>416</b>	250 <b>289</b>	160 <b>185</b>	100 <b>116</b>	63 <b>72.8</b>	10	10	10	10	10	10

the table continues on the next page

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 Perforated plug available only with Cv (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

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>Flowserve PO 1502</b>		<b>Flowserve PO 1502</b>		<b>Flowserve PO 1502</b>	
			<b>Actuator function</b>					direct	indirect	direct	indirect	direct	indirect
			<b>Specification No. of actuator</b>					<b>BVCxAD</b>	<b>BVCxZD</b>	<b>BVCxAD</b>	<b>BVCxZD</b>	<b>BJIOAE</b>	<b>DJIOZE</b>
			<b>Spring range</b> [bar]					1.5 - 2.7	1.5 - 2.7	2.0 - 3.5	2.0 - 3.5	1.8 - 3.8	1.8 - 3.8
			<b>Spring setting</b> [bar]					1.5 - 2.7	1.5 - 2.7	2.0 - 3.5	2.0 - 3.5	1.8 - 3.8	1.8 - 3.8
			<b>Feeding pressure</b> [bar]					4.5	4.5	5.5	5.5	5.6	5.6
			<b>Feeding pressure</b> [psi]					<b>65</b>	<b>65</b>	<b>80</b>	<b>80</b>	<b>81</b>	<b>81</b>
			<b>Marking in valve spec. No.</b>					<b>PFD</b>		<b>PFD</b>		<b>PFD</b>	
			<b>Linear force</b>					22.5 kN	22.5 kN	30 kN	30 kN	27 kN	27 kN
			<b>Cv [US galon/min]</b>					$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing	
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE
8"	80	200	570	400	250	160	100	10 10	10 10	10 10	10 10	---	---
			<b>659</b>	<b>462</b>	<b>289</b>	<b>185</b>	<b>116</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	---	---
10"	80	230	800	630	400	250	160	---	---	10 10	10 10	---	---
			<b>925</b>	<b>728</b>	<b>462</b>	<b>289</b>	<b>185</b>	---	---	<b>1450 1450</b>	<b>1450 1450</b>	---	---
12"	80	250	1000	800	630	400	250	---	---	10 10	10 10	---	---
			<b>1160</b>	<b>925</b>	<b>728</b>	<b>462</b>	<b>289</b>	---	---	<b>1450 1450</b>	<b>1450 1450</b>	---	---
16"	100	330	1600	1000	630	400	250	---	---	---	---	10 10	10 10
			<b>1850</b>	<b>1160</b>	<b>728</b>	<b>462</b>	<b>289</b>	---	---	---	---	<b>1450 1450</b>	<b>1450 1450</b>

For further information on actuating, see actuators' catalogue sheets			<b>Pneumatic actuators</b>					<b>A. Hock 2116S-100</b>							
			<b>Actuator function</b>					direct	indirect	direct	indirect	direct	indirect	direct	indirect
			<b>Specification No. of actuator</b>					<b>P2-0K-YN1</b>	<b>P2-0K-YN2</b>	<b>P2-0K-ZN1</b>	<b>P2-0K-ZN2</b>	<b>P2-0K-ZN1</b>	<b>P2-0K-ZN2</b>		
			<b>Spring range</b> [bar]					1.3 - 3.0	1.3 - 3.0	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5		
			<b>Spring setting</b> [bar]					1.3 - 2.66	1.64 - 3.0	1.5 - 3.1	1.9 - 3.5	1.5 - 3.5	1.5 - 3.5		
			<b>Feeding pressure</b> [bar]					4.0	4.0	4.6	5.4	5.0	5.0		
			<b>Feeding pressure</b> [psi]					<b>58</b>	<b>58</b>	<b>67</b>	<b>78</b>	<b>73</b>	<b>73</b>		
			<b>Marking in valve spec. No.</b>					<b>PHC</b>		<b>PHC</b>		<b>PHC</b>			
			<b>Linear force</b>					16 kN	19.6 kN	18 kN	22.8 kN	18 kN	18 kN		
			<b>Cv [US galon/min]</b>					$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing		$\Delta p_{max}$ [MPa] [psi] packing	
<b>NPS</b>	<b>H[mm]</b>	<b>Ds[mm]</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE	graphite PTFE		
8"	80	200	570	400	250	160	100	10 10	10 10	10 10	10 10	---	---		
			<b>659</b>	<b>462</b>	<b>289</b>	<b>185</b>	<b>116</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	---	---		
10"	80	230	800	630	400	250	160	10 10	10 10	10 10	10 10	---	---		
			<b>925</b>	<b>728</b>	<b>462</b>	<b>289</b>	<b>185</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	---	---		
12"	80	250	1000	800	630	400	250	10 10	10 10	10 10	10 10	---	---		
			<b>1160</b>	<b>925</b>	<b>728</b>	<b>462</b>	<b>289</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	<b>1450 1450</b>	---	---		
16"	100	330	1600	1000	630	400	250	---	---	---	---	10 10	10 10		
			<b>1850</b>	<b>1160</b>	<b>728</b>	<b>462</b>	<b>289</b>	---	---	---	---	<b>1450 1450</b>	<b>1450 1450</b>		

Max. differential pressures specified in table apply to PTFE and graphite packing.  
 Perforated plug available only with Cv (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

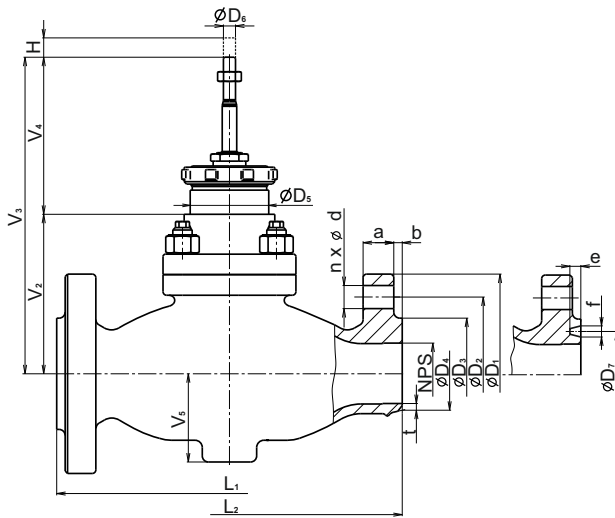
## Dimensions and weights of valves CV 322 (Ex) CV 332 (Ex) with flanged and welded connection, NPS 1" - 16"

NPS	H	V <sub>2</sub>	*V <sub>2</sub>	V <sub>3</sub>	*V <sub>3</sub>	V <sub>4</sub>	ØD <sub>5</sub>	M	ØD <sub>6</sub>	V <sub>5</sub>	m <sub>1</sub>	m <sub>2</sub>	*m <sub>v</sub>	Class 300			Class 600			Class 150-600					
														L <sub>1</sub>			L <sub>1</sub>			BTW					
														RF	RTJ	LFF SFF LGF SGF	RF	RTJ	LFF SFF LGF SGF						
[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	kg	kg	kg	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]							
1"	16 0.63	100 3.937	336 13.228	230 9.055	466 18.346	130	65	---	---	M10x1	52 2.047	9.5	6.5	4	197 7.75	210 8.25	207 8.15	210 8.25	210 8.15	207 8.15	210 8.25				
1½"	16 0.63	100 3.937	336 13.228	230 9.055	466 18.346					M10x1	52 2.047	15.5	8.5	4	235 9.25	248 9.76	245 9.64	251 9.88	251 9.88	248 9.76	251 9.88				
2"	20 0.787	132 5.197	330 12.992	262 10.314	460 18.110					M10x1	73 2.874	21	14	4	267 10.5	283 11.14	277 10.9	286 11.25	289 11.38	283 11.14	286 11.25				
3"	40 1.575	164 6.456	489 19.252	294 11.575	619 24.370					M16x1.5	105 4.133	43	31	6	318 12.5	332 33.22	328 12.91	337 13.25	340 13.38	334 13.15	337 13.25				
4"	40 1.575	164 6.456	489 19.252	294 11.575	619 24.370					M16x1.5	105 4.133	69	39	6	368 14.5	384 15.12	378 14.88	394 15.5	397 15.63	391 15.39	394 15.5				
6"	40 1.575	200 7.874	492 19.370	330 12.992	622 24.488					M16x1.5	134 5.275	163	108	7	473 18.62	489 19.25	483 19.01	508 20.0	511 20.12	505 19.88	508 20.0				
8"	80 3.15	262 10.314	---	422 16.614	---					160	---	150	M20x1.5	203 7.992	292	212	---	568 22.38	584 22.99	578 22.75	610 24.0	613 24.13	607 60.72	610 24.0	
10"	80 3.15	346 13.622	---	506 19.921	---									M20x1.5	253 9.961	555	385	---	708 27.88	724 28.5	718 28.27	752 29.62	755 29.72	749 29.49	752 29.62
12"	80 3.15	395 15.551	---	555 21.85	---									M20x1.5	296 11.654	706	546	---	775 30.5	791 31.14	785 30.91	819 32.25	822 32.36	816 32.13	819 32.25
16"	100 3.937	512 20.157	---	672 26.457	---									M20x1.5	382 15.039	1423	1173	---	1057 41.62	1073 42.24	1067 42.01	1108 43.62	1111 43.74	1105 43.5	1108 43.62
						---	---	---	---						---	---	---	---	---	---	---	---	---		

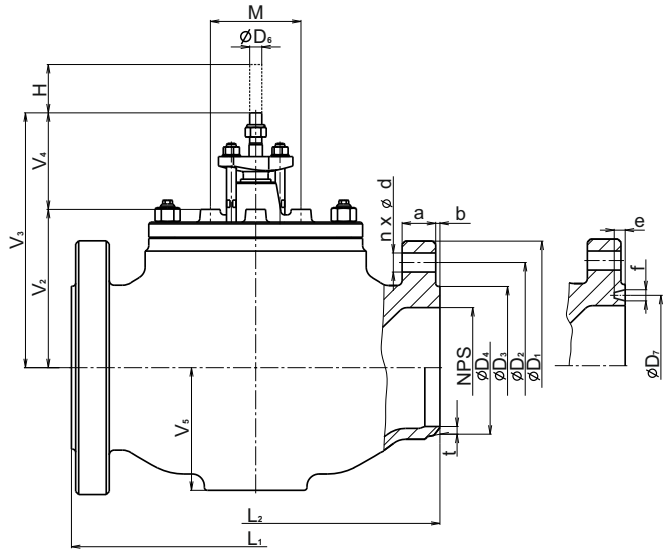
m<sub>1</sub> - weight of flanged version    m<sub>2</sub> - weight of weld ends version    1) NPS 8" balanced by graphite - travel = 63 mm (2,48 inch)  
 \* - for valve with bellows packing    \*m<sub>v</sub> - weight to be added to weight of valve equipped with bellows packing

NPS	RF Class 300							RF Class 600							RTJ Class 300 a 600				
	ØD <sub>1</sub>	ØD <sub>2</sub>	ØD <sub>3</sub>	d	n	a	b	ØD <sub>1</sub>	ØD <sub>2</sub>	ØD <sub>3</sub>	d	n	a	b	ØD <sub>7</sub>	e	f	Groove Number	
	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]		[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]	[mm] [inch]		
1"	125 4.88	88.9 3.5	50.8 2.0	19.1 ¾"	4	15.9 0.62	2	125 4.88	88.9 3.5	50.8 2.0	19.1 ¾"	4	17.5 0.69	7	50.8 2.0	6.35 0.25	8.74 0.344	R16	
1½"	155 6.12	114.3 4.5	73 2.88	22.3 7/8"		19.1 0.75		155 6.12	114.3 4.5	73 2.88	22.3 7/8"		22.3 0.88		68.27 2.688	6.35 0.25	8.74 0.344	R20	
2"	165 6.5	127 5.0	92.1 3.62	19.1 ¾"	8	20.7 0.81		165 6.5	127 5.0	92.1 3.62	19.1 ¾"	8	25.4 1.0		0.25	82.55 3.25	7.92 0.312	11.91 0.469	R23
3"	210 8.25	168.3 6.62	127 5.0	22.3 7/8"		27 1.06		210 8.25	168.3 6.62	127 5.0	22.3 7/8"		31.8 1.25			117.48 4.625	7.92 0.312	11.91 0.469	R30
4"	255 10	200 7.88	157.2 6.19	22.3 7/8"	12	30.2 1.19		275 10.75	215.9 8.5	157.2 6.19	25.4 1"	12	38.1 1.5			149.23 5.875	7.92 0.312	11.91 0.469	R37
6"	320 12.5	269.9 10.62	215.9 8.5	22.3 7/8"		35 1.38		355 14.0	292.1 11.5	215.9 8.5	28.6 1 1/8"		47.7 1.88			211.12 8.312	7.92 0.312	11.91 0.469	R45
8"	380 15	330.2 13.0	269.9 10.62	25.4 1"	16	39.7 1.56		420 16.5	349.2 13.75	269.9 10.62	31.8 1 1/4"	16	55.6 2.19			269.9 10.625	7.92 0.312	11.91 0.469	R49
10"	445 17.52	387.4 15.25	323.8 12.75	28.6 1 1/8"		46.1 1.82		510 20.08	431.8 17	323.8 12.75	34.9 1 3/8"		63.5 2.5			323.85 12.75	7.92 0.312	11.91 0.469	R53
12"	520 20.47	450.8 17.75	381 15	31.8 1 1/4"	20	49.3 1.94		560 22.05	489 19.25	381 15	34.9 1 3/8"	20	66.7 2.63			381 15	7.92 0.312	11.91 0.469	R57
16"	650 25.59	571.5 22.5	469.9 18.5	34.9 1 3/8"		55.6 2.19		685 26.97	603.2 23.75	469.9 18.5	41.3 1 5/8"		76.2 3			469.9 18.5	7.92 0.312	11.91 0.469	R65





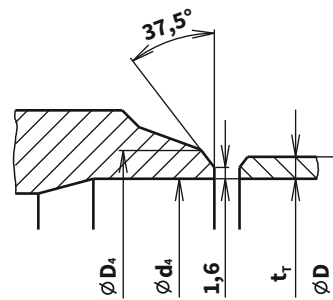
NPS 1" - 6"



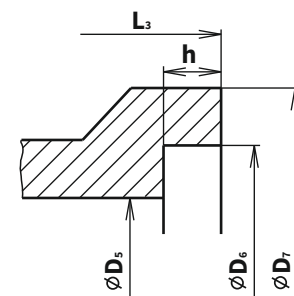
NPS 8" - 16"

NPS	Dimensions of weld ends for pipes ASME B36.10M					[mm]	
	$\varnothing D_4$	$\varnothing D$	Sch. No. 40	Sch. No. 80	Sch. No. 100	$\varnothing D_{4max}$	$\varnothing D_{4min}$
1"	35	33.4	3.4	4.6	---	40	23
	<b>1.378</b>	<b>1.315</b>	<b>0.133</b>	<b>0.179</b>	---	<b>1.575</b>	<b>0.906</b>
1½"	50	48.3	3.7	5.1	---	57	35
	<b>1.969</b>	<b>1.66</b>	<b>0.14</b>	<b>0.191</b>	---	<b>2.244</b>	<b>1.378</b>
2"	62	60.3	3.9	5.5	---	67	43
	<b>2.44</b>	<b>2.375</b>	<b>0.154</b>	<b>0.218</b>	---	<b>2.638</b>	<b>1.693</b>
3"	91	88.9	5.5	7.6	---	100	72
	<b>3.583</b>	<b>3.5</b>	<b>0.216</b>	<b>0.3</b>	---	<b>3.937</b>	<b>2.835</b>
4"	117	114.3	6.0	8.6	---	128	92
	<b>4.606</b>	<b>4.5</b>	<b>0,237</b>	<b>0.337</b>	---	<b>5.039</b>	<b>3.622</b>
6"	172	168.3	7.1	11.0	---	188	136
	<b>6.772</b>	<b>6.625</b>	<b>0,28</b>	<b>0.432</b>	---	<b>7.402</b>	<b>5.354</b>
8"	223	219.1	8.2	12.7	15.1	228	178
	<b>8.78</b>	<b>8.625</b>	<b>0.322</b>	<b>0.5</b>	<b>0.594</b>	<b>8.976</b>	<b>7.008</b>
10"	278	273.0	9.3	15.1	18.3	278	229
	<b>10.945</b>	<b>10.748</b>	<b>0.366</b>	<b>0.594</b>	<b>0.72</b>	<b>10.945</b>	<b>9.016</b>
12"	329	323.9	10.3	17.5	21.4	329	281
	<b>12.953</b>	<b>12.752</b>	<b>0.406</b>	<b>0.689</b>	<b>0.843</b>	<b>12.953</b>	<b>11.063</b>
16"	413	406.4	12.7	21.4	26.2	426	345
	<b>16.26</b>	<b>16.0</b>	<b>0.5</b>	<b>0.843</b>	<b>1.031</b>	<b>16.772</b>	<b>13.583</b>

t-wall thickness of weld ends:  $t = [D_4 - (D - 2 * t_r)] / 2$



NPS	Dimensions of weld ends for pipes ASME B16.11					[mm]				
	$\varnothing D_5$	$\varnothing D_6$	$\varnothing D_7$	$L_3$	h	$\varnothing D_5$	$\varnothing D_6$	$\varnothing D_7$	$L_3$	h
1"	26	34,1	47	210	12.5	21	34.1	51	210	12.5
	<b>1.02</b>	<b>1.34</b>	<b>1.85</b>	<b>8.27</b>	<b>0.49</b>	<b>0.83</b>	<b>1.34</b>	<b>2.01</b>	<b>8.27</b>	<b>0.49</b>
1½"	41	49	62	251	12.5	34	49	67	251	12.5
	<b>1.61</b>	<b>1.93</b>	<b>2.44</b>	<b>9.88</b>	<b>0.49</b>	<b>1.34</b>	<b>1.93</b>	<b>2.64</b>	<b>9.88</b>	<b>0.49</b>
2"	52	61,4	76	286	16	43	61.4	84	286	16
	<b>2.05</b>	<b>2.42</b>	<b>2.99</b>	<b>11.26</b>	<b>0.63</b>	<b>1.69</b>	<b>2.42</b>	<b>3.31</b>	<b>11.26</b>	<b>0.63</b>



## Valve complete specification No. for ordering CV/SV 3x0 (Ex), CV 3x2 (Ex)

		XX	XXX	XXX	XXXX	XX	XXX	XXX	XXX	XXX	XX
<b>1. Valve</b>	Control valve	CV									
	Shut-off valve	SV									
<b>2. Series</b>	Valves made of steel		3 2								
	Valves made of stainless steel		3 3								
	Straight-through		0								
	Straight-through with pressure balanced plug		2								
<b>3. Actuating</b>	Electric actuator				E X X						
	Pneumatic actuator				P X X						
	Hand wheel				R X X						
<b>4. Connecting</b>	Flange RF (Raised Face)										1
	Flange RTJ (Ring Joint Face)										2
	Flange LFF (Large Female Face)										3
	Flange SFF (Small Female Face)										4
	Flange LGF (Large Groove Face)										5
	Flange SGF (Small Groove Face)										6
	Weld ends BW (Butt Welding)										7
	Weld ends SW (Socket Welding)										8
<b>5. Body material</b>	Cast steel A216 WCB (-29 to 425°C); (-20 to 800°F) <sup>5)</sup>										1
	CrMo steel A217 WC6 (-29 to 550°C); (-20 to 1020°F) <sup>5)</sup>										7
	Stainless steel A351 CF8M (-50 to 550°C); (-58 to 1020°F) <sup>5)</sup>										8
	Other material on request										9
<b>6. Seat sealing</b>	Metal - metal										1
	Soft sealing (metal - PTFE) <sup>2)</sup>										2
	Hard metal overlay on sealing surfaces										3
	Balanced by graphite, metal-metal <sup>3)</sup>										5
	Balanced by graphit, hard metal overlay <sup>4)</sup>										7
<b>7. Packing</b>	DRSpack® (PTFE)										3
	Expanded graphite										5
	Bellows <sup>1)</sup>										7
	Bellows with safety packing PTFE <sup>1)</sup>										8
	Bellows with safety packing Graphite <sup>1)</sup>										9
<b>8. Flow characteristic</b>	Linear										L
	Equal-percentage										R
	LDMspline®										S
	On-off										U
	Parabolic										P
	Linear - perforated plug										D
	Equal-percentage - perforated plug										Q
	Parabolic - perforated plug										Z
<b>9. Cvs</b>	Column No. acc. to Kvs value table										X
<b>10. Nominal pressure</b>	Class 150 (weld ends only)										150
	Class 300										300
	Class 600										600
<b>11. Max. operating temperature<sup>a</sup> °C (°F)</b>	Acc. to version 260 - 550°C (500 - 1020°F)										XXX
<b>12. Nominal size</b>	DN (NPS)										XXX
<b>13. Execution</b>	Standard										
	Non-explosive										Ex

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

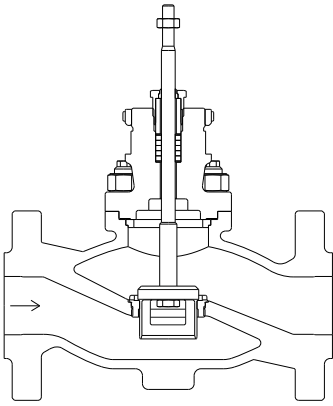
Ordering example of flanged execution:  
**CV320 ENC 2135 L1 300/400-080**

Ordering example of weld ends execution:  
**CV320 ENC 7135 L1 300/400-080,**  
**weld ends size Ø 88,9 x 5,5**

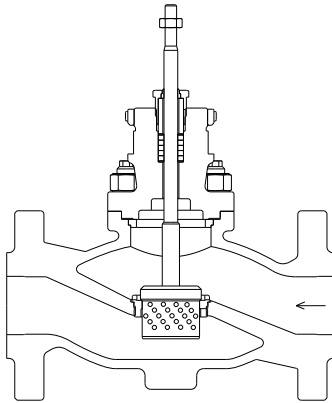
\*) For marking of actuators in specification code, refer to table on page No. 74 of this catalogue

## Valves CV / SV 3x0 (Ex)

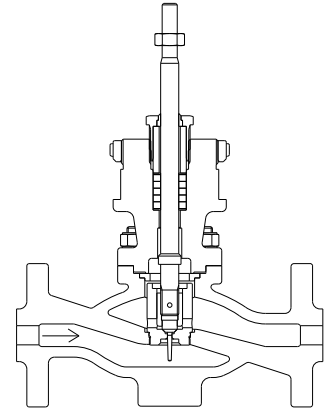
Section of valve with V-ported plug



Section of valve with perforated plug

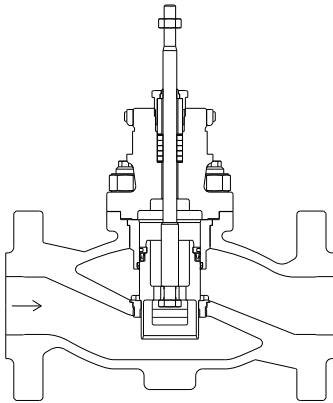


Section of valve with micro-throttling system

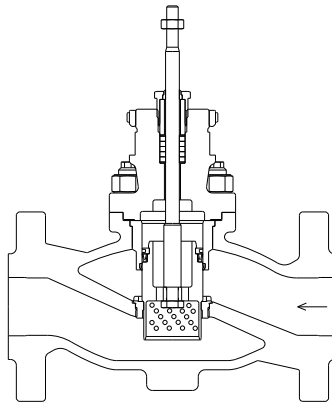


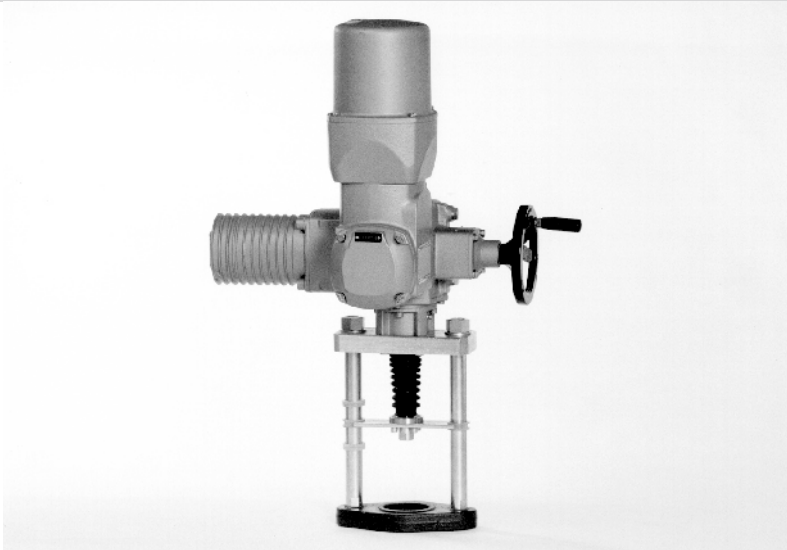
## Valves CV 3x2 (Ex)

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.	<b>EAA</b>	<b>EAB</b>	<b>EAC</b>	<b>EAD</b>	<b>EAE</b>	<b>EAF</b>	<b>EAG</b>	<b>EAH</b>
Voltage	1 ~ 230 V AC; 3 ~ 380 or 400 V AC							
Frequency	50 Hz							
Power consumption	see specification table							
Control	3 - position control 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 valve 16, 25, 40 mm				acc. to used valve 40, 80 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	-40 to 80°C	-20 to 60°C	-40 to 60°C	-20 to 60°C
Ambient humidity range	100 %							
Weight								
- single-phase	25 - 62 kg				25 - 62kg			
- three-phase	20 - 33 kg				21 - 33 kg			

→ **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](http://www.auma.com)

Specification of Auma actuators											
							SA	X	XX	07.X	
Type							SA				
Duty	control ON - OFF							R			
Version	standard non-explozive								Ex		
Actuator size										07.2 07.6	
Output shaft type A (thread TR 16x4 LH, connection flange F07) ... for CV 3xx NPS ½" - 6"											
Output speed [ot/min]	Tripping torque	SA 07.2 SA Ex 07.2	SAR 07.2 SAREx 07.2	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				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	10-30 Nm		15-30 Nm	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 CV 3xx DN 3" - 16"									
Output speed [ot/min]	Tripping torque	SA 07.6 SA Ex 07.6	SAR 07.6 SAREx 07.6	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				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	20-60 Nm		30-60 Nm	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		

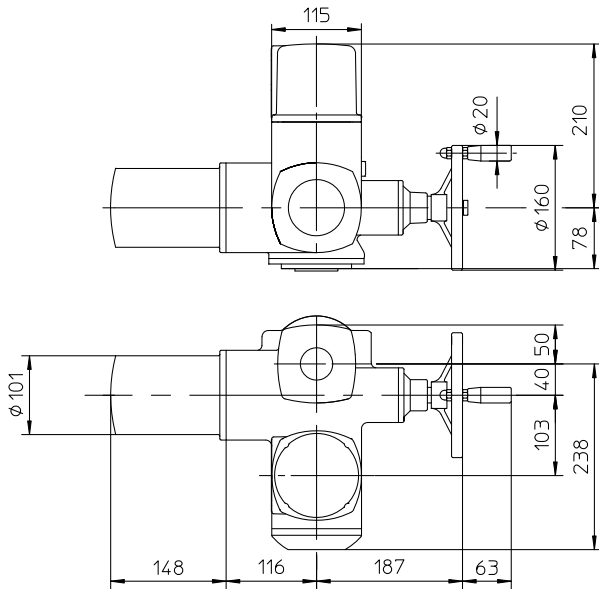
## Accessories

- 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

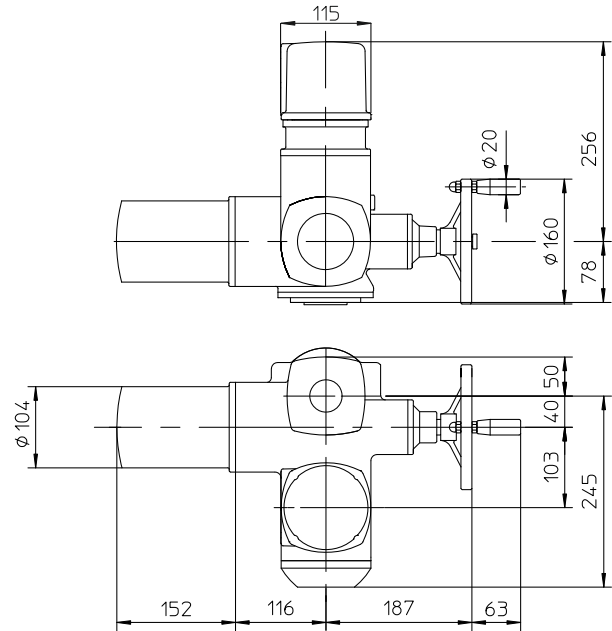
Other accessories acc. to catalogue of producer of actuators.

## Dimensions of actuators Auma series 07.2 and 07.6

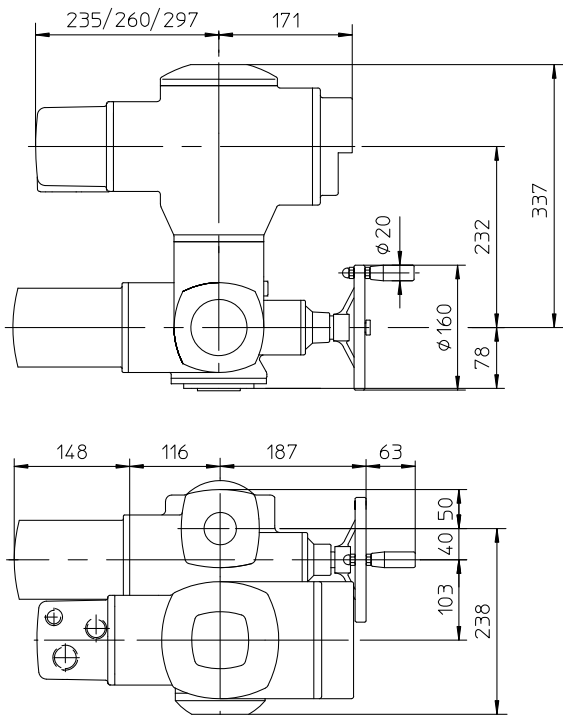
### Normal version



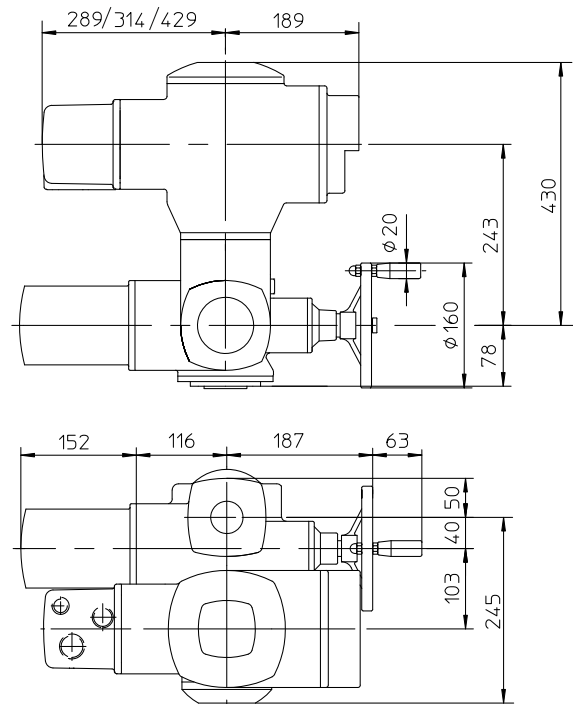
### Version Ex norm



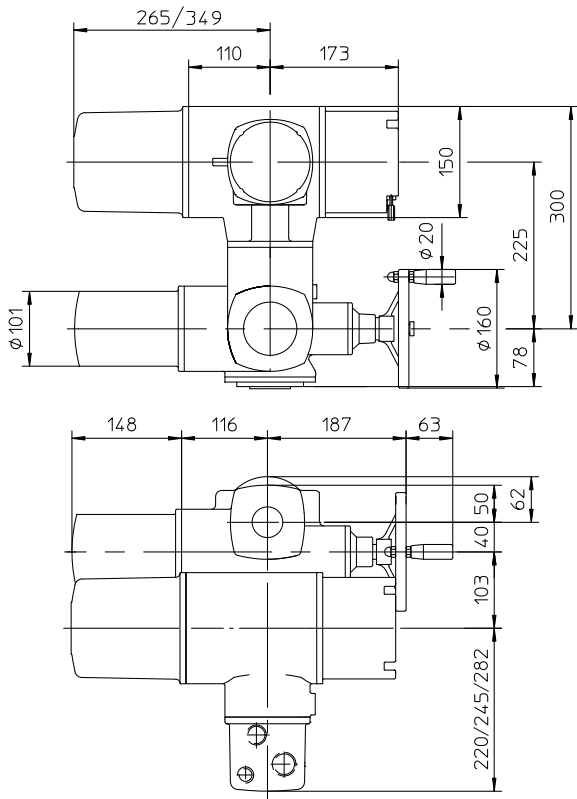
### Version MATIC



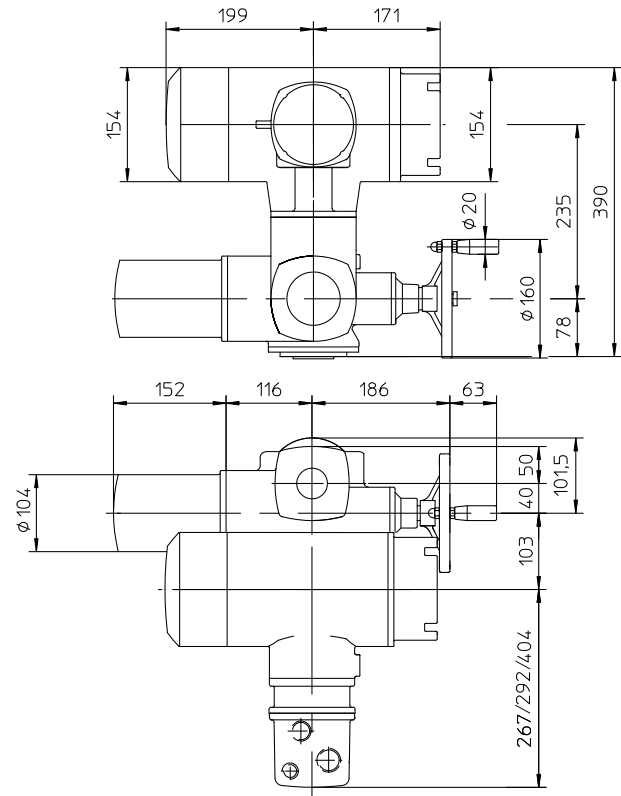
### Version Ex MATIC



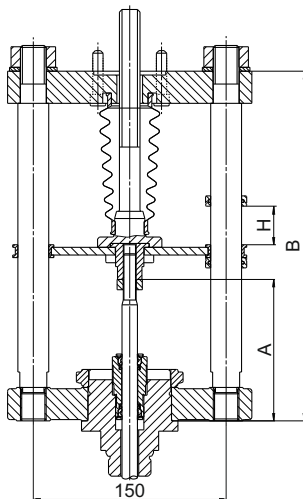
**Version with AUMATIC**



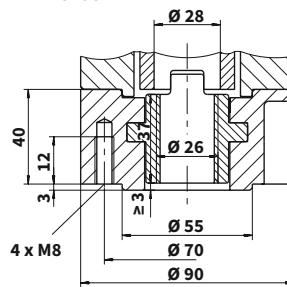
**Version Ex AUMATIC**



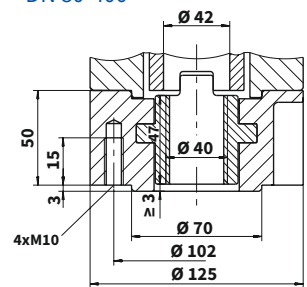
**Attachment yoke (2 or 4 columns)**



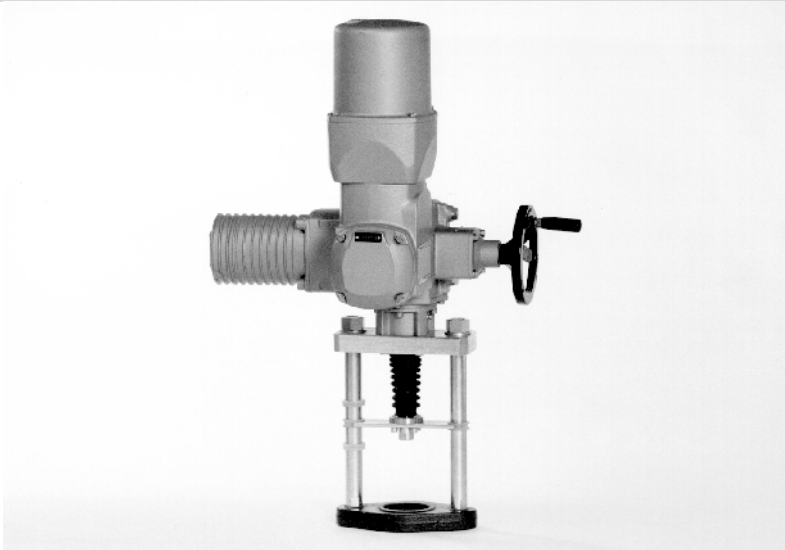
**Output drive type A, F07  
DN 15-65**



**Output drive type A, F10  
DN 80-400**



For valves	Number of columns	A	B	Weight
CV 3xx NPS 1/2" - 6"	2	110	272	~ 8 kg
CV 3xx NPS 8" - 16"	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](http://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 CV 3xx NPS 8" - 16"							
Output speed [ot/min]	Tripping torque	SA 10.2	SAR 10.2	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

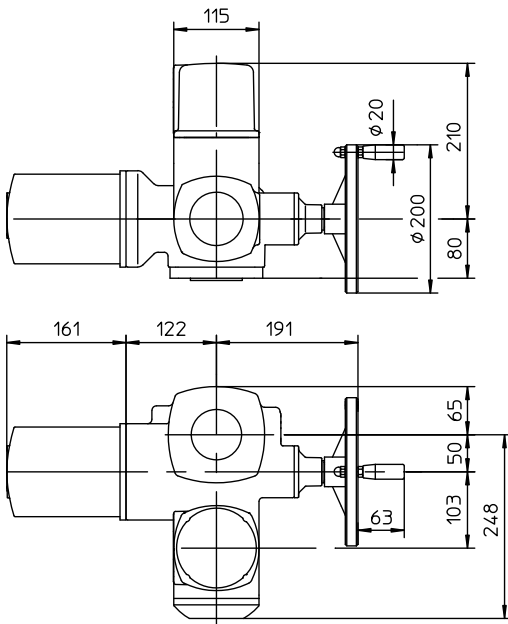


## Accessories

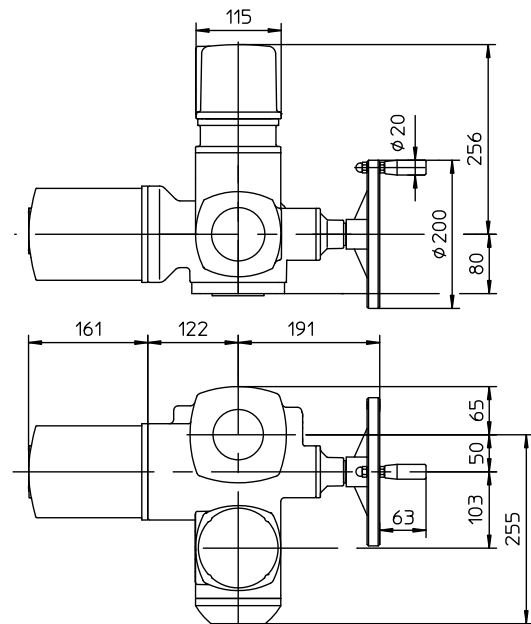
- 2 TANDEM switches
  - Gearing for signalisation of position
  - Mechanical position indicator
  - Potentiometer 1x200 Ω
  - MATIC - or continuous control (specification of accessories acc. to catalogue of producer: IP 67; -25 to +70°C; ...), weight + 7 kg
  - AUMATIC - or continuous control (specification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

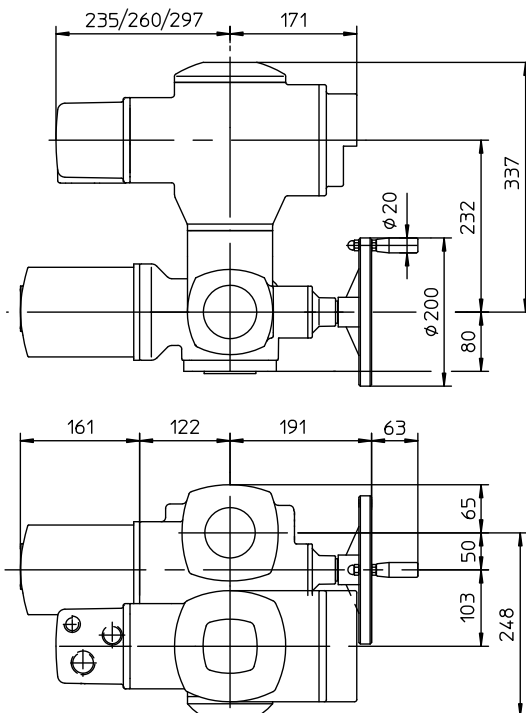
### Normal version



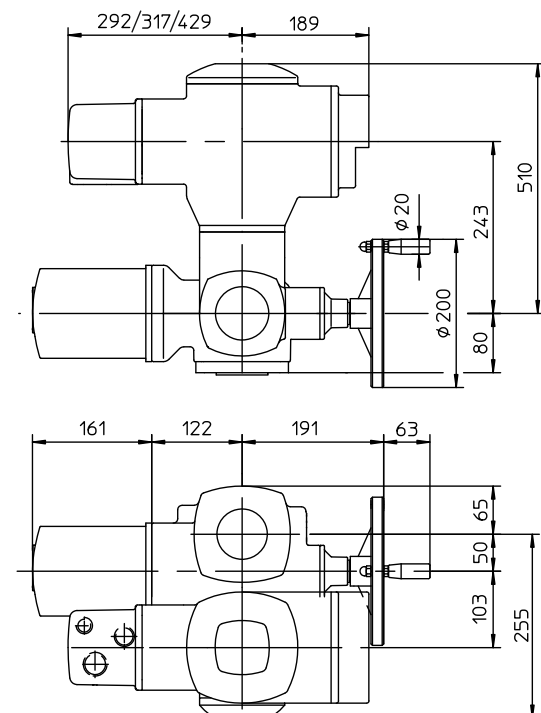
### Ex norm version



### Version with MATIC



### Version with Ex MATIC







## Elektric actuators **Schiebel**

**AB3, AB5**

marking in type number:

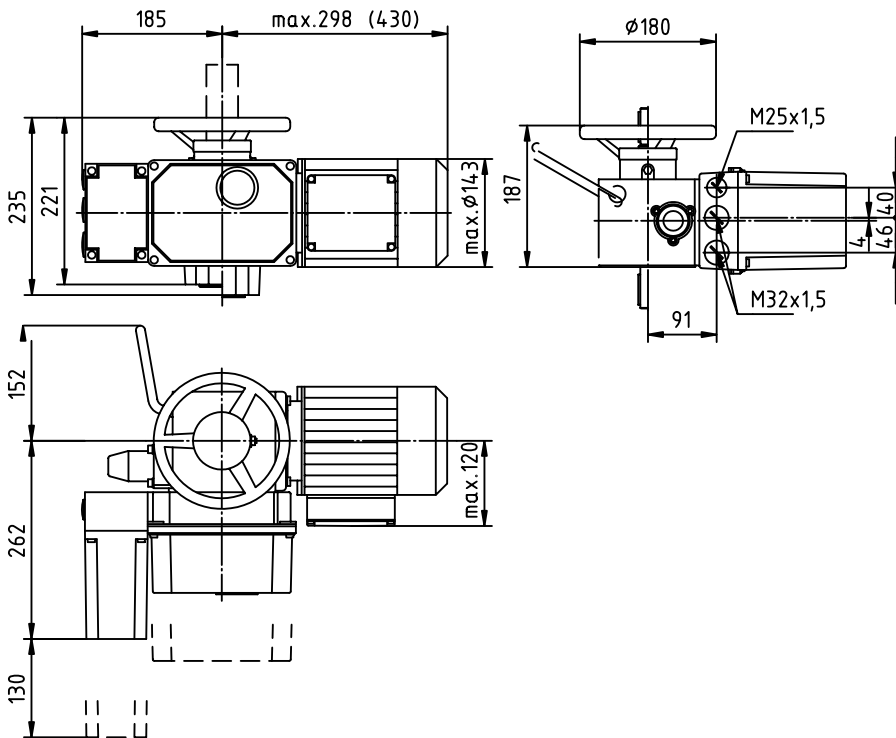
**EZA, EZB, Ezc, EZD  
EZE, EZF, EZG, EZH**

Technical data								
Type	AB3	AB5	exAB3	exAB5	rAB3	rAB5	extrAB3	extrAB5
Marking in valve spec. No.	<b>EZA</b>	<b>EZE</b>	<b>EZB</b>	<b>EZF</b>	<b>Ezc</b>	<b>EZG</b>	<b>EZD</b>	<b>EZH</b>
Voltage	400 / 230 V; 230 V		400 / 230 V		400 / 230 V; 230 V		400 / 230 V	
Frequency	50 Hz							
Power consumption	see specification table							
Control	3-position 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 valve 16, 25, 40, 80 mm							
Enclosure	IP 66		IP 65		IP 66		IP 65	
Process medium max. temp.	acc. to used valve							
Ambient temperatrure range	-25 to 80 °C		-25 to 40 °C		-25 to 60 °C		-20 to 40 °C	
Ambient humidity range	90 % (tropical version: 100 % with condensation)							
Weight	16 - 20 kg							

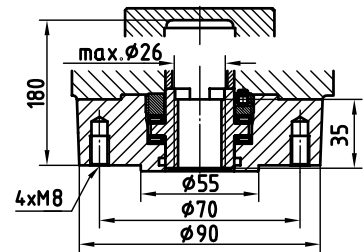
→ **Note:** Specifications and technical data are for information only.

Detailed technical informations can be found in producer's data sheet or on the webside [www.schiebel.com](http://www.schiebel.com)

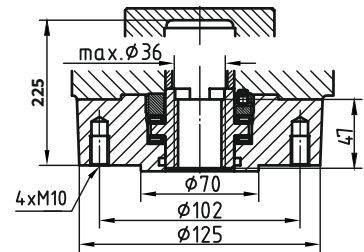
### Dimensions of actuators ...AB5



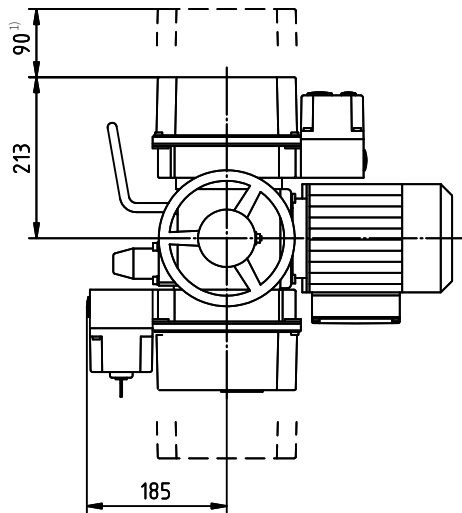
Output drive shaft A, flange F07



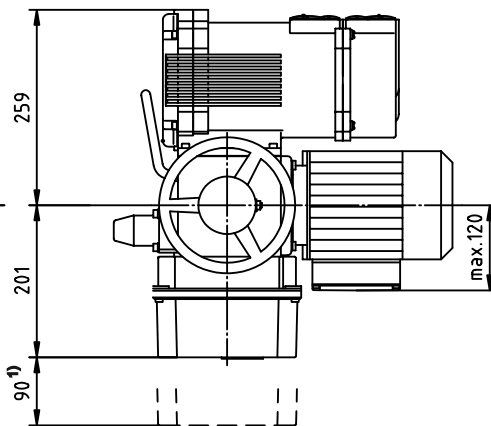
Connection acc. to ISO 5210, output drive shaft A, F10



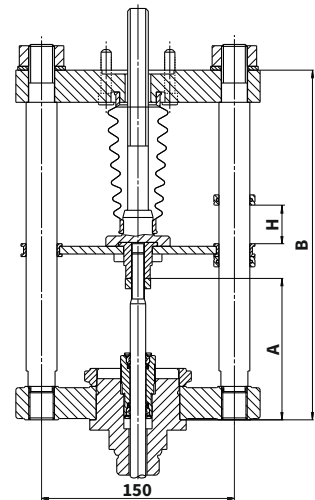
With ACTUMATIC R position regulator



With SMARTCON control unit

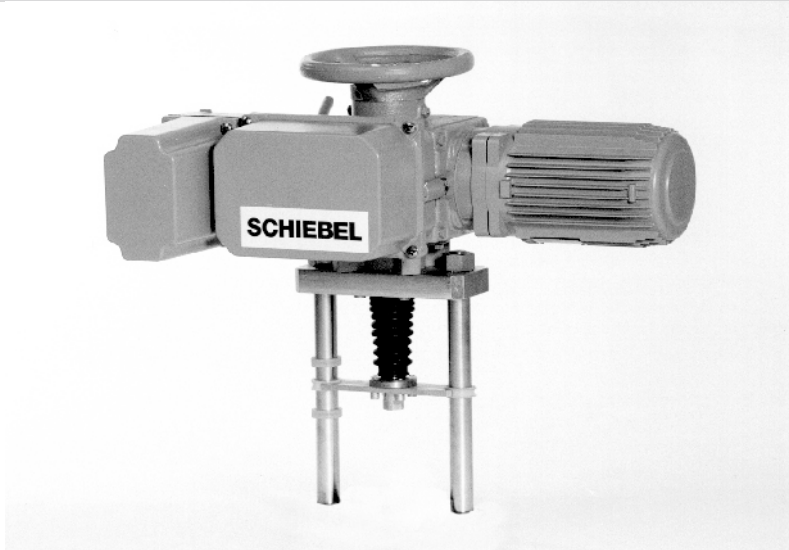


Attachment (2 or 4 columns)



For valves	Number of columns	A	B	H	Weight [kg]
CV 3xx NPS 1/2" - 6"	2	149	295	40	12
CV 3xx NPS 8" - 16"	4	141	295	80	12

Specification of actuators										XX	X	AB3	A	X	+	XXXXX			
<b>Version</b>		non-explosive standard								ex									
<b>Function</b>		control ON - OFF									r								
<b>Actuator size</b>												AB3							
<b>Output shaft type A</b> (thread TR 16x4 LH, connection flange F07 ... NPS 1/2" to 2 1/2")												AB5							
<b>Output speed [ot/min]</b>	<b>Tripping torque</b>	<b>AB3</b>	<b>rAB3</b>	<b>Motor power [ kW ]</b>	<b>AB3</b>		<b>rAB3</b>		<b>exAB3</b>	<b>exrAB3</b>									
		<b>exAB3</b>	<b>exrAB3</b>		<b>400/230V</b>	<b>230V</b>	<b>400/230V</b>	<b>230V</b>	<b>400/230V</b>	<b>400/230V</b>									
		7 - 30 Nm	tripping 7 - 30 Nm		0,09	0,09	0,09	0,09	0,09	0,09							0,09	0,09	2,5
					0,03	0,12	0,03	0,12	0,12	0,12							0,12	0,12	5
					0,09	0,09	0,09	0,09	0,09	0,09							0,09	0,09	7,5
					0,09	0,09	0,09	0,09	0,09	0,09							0,09	0,09	10
					0,18	0,09	0,09	0,18	0,09	0,09							0,09	0,09	15
					0,18	0,18	0,09	0,37	0,09	0,09							0,09	0,09	20
					0,18	0,25	0,18	0,25	0,37	0,18							0,18	0,18	30
0,18	0,25			0,18	0,55	0,37	0,18	0,18	0,18	40									
<b>Output speed [ot/min]</b>	<b>Tripping torque</b>	<b>AB5</b>	<b>rAB5</b>	<b>Motor power [ kW ]</b>	<b>AB5</b>		<b>rAB5</b>		<b>exAB5</b>	<b>exrAB5</b>									
		<b>exAB5</b>	<b>exrAB5</b>		<b>400/230V</b>	<b>230V</b>	<b>400/230V</b>	<b>230V</b>	<b>400/230V</b>	<b>400/230V</b>									
		7 - 60 Nm	tripping 7 - 60 Nm		0,09	0,09	0,09	0,09	0,09	0,09							0,09	0,09	2,5
					0,06	0,12	0,06	0,12	0,12	0,12							0,12	0,12	5
					0,09	0,09	0,09	0,18	0,09	0,09							0,09	0,09	7,5
					0,09	0,18	0,09	0,37	0,09	0,09							0,09	0,09	10
					0,18	0,18	0,18	0,37	0,18	0,18							0,18	0,18	15
					0,18	0,55	0,18	0,75	0,18	0,18							0,18	0,18	20
					0,37	0,55	0,37	1,10	0,37	0,37							0,37	0,37	30
0,37	0,55			0,37	1,10	0,37	0,37	0,37	0,37	40									
<b>Accessories</b>																			
Potentiometer 1 x 1000 Ω																	F		
Double potentiometer 2 x 1000 Ω																	FF		
Electronic transmitter 4 - 20 mA, 2-wire																	ESG-Z		
Electronic transmitter 4 - 20 mA, 2-wire, opto-electronic																	ESM21		
SMARTCON control unit																	CSC		
Additional torque switches																	2DER 2DEL		
Additional signalisation switches																	2WER 2WEL		



## Electric actuators **Schiebel**

### AB8

marking in type number:

**EZK, EZL**

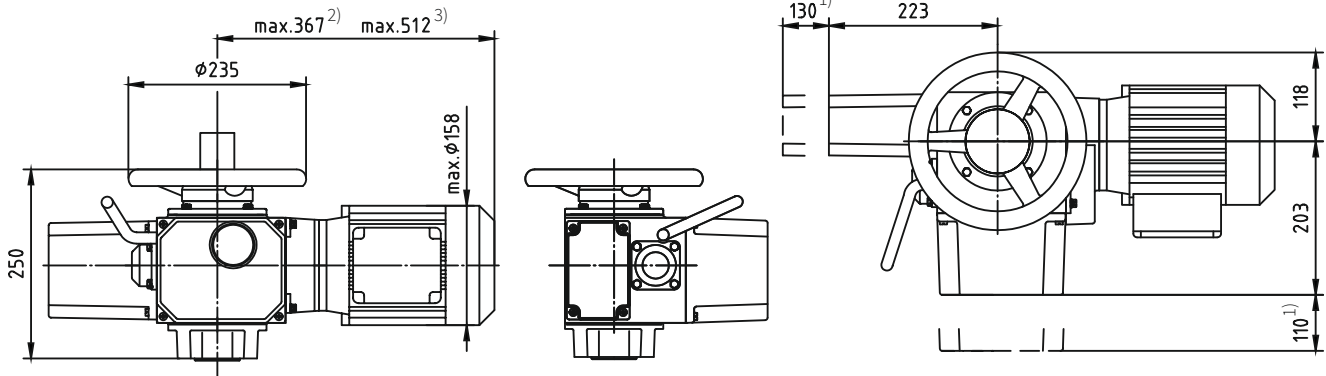
Technical data		
Type	<b>rAB8</b>	<b>exrAB8</b>
Marking in valve spec. No.	<b>EZK</b>	<b>EZL</b>
Voltage	400 / 230 V; 230 V	400 / 230 V
Frequency	50 Hz	
Power consumption	see specification table	
Control	3-position or with signal 4 - 20 mA	
Nominal force	(Tr 36x6 LH) 80 Nm ~ 21,6 kN; 100 Nm ~ 27 kN; 120 Nm ~ 32 kN	
Travel	80, 100 mm	
Enclosure	IP 66	IP 65
Process medium max. temp.	acc. to used valve	
Ambient temperature range	-25 to 60°C	-20 to 40°C
Ambient humidity range	90 % (tropical version: 100 % with condensation)	
Weight	24 - 35 kg	

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

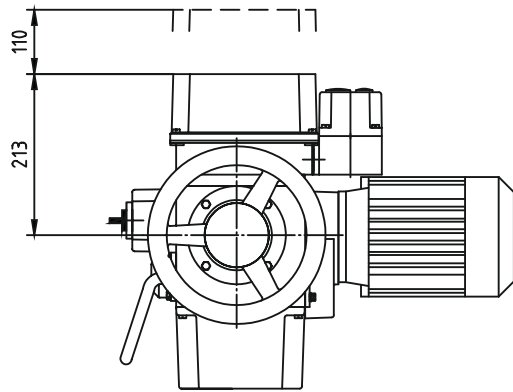
Detailed technical informations can be found in producer's data sheet or on the website [www.schiebel.com](http://www.schiebel.com)

Specification of actuators				xx	x	XXX	X	X	+	XXXXX
Version	normal									
Function	control				r					
Actuator size						AB8				
Output drive shaft A	(thread TR 36x6 LH, flange F10)									A
Output speed [ot/min]	Tripping torque	rAB8		rAB8						
				400/230V	230V					
		2,5	vypínací 50 - 120 Nm	0,06	0,12				2,5	
		5		0,12	0,25			5		
		7,5		0,18	0,37			7,5		
		10		0,18	0,75			10		
		15	zatěžovací 30 - 80 Nm	0,37	0,75				15	
		20		0,37	1,10			20		
30	0,75	1,10				30				
40	0,75	1,10				40				
Accessories				Potentiometer 1 x 1000 Ω						F
				Double potentiometer 2 x 1000 Ω						FF
				Electronic transmitter 4 - 20 mA, 2-wire						ESM21
				Electronic transmitter 4 - 20 mA, 2-wire, opto-electronic						CMR
				SMARTCON control unit						CSC
				Additional torque switches						2DER 2DEL
				Additional signalisation switches						2WER 2WEL

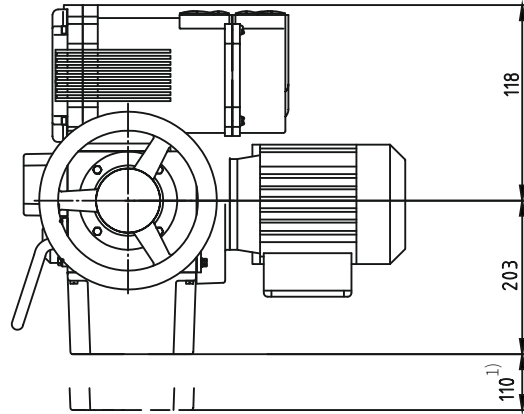
## Dimensions of actuators ...AB8



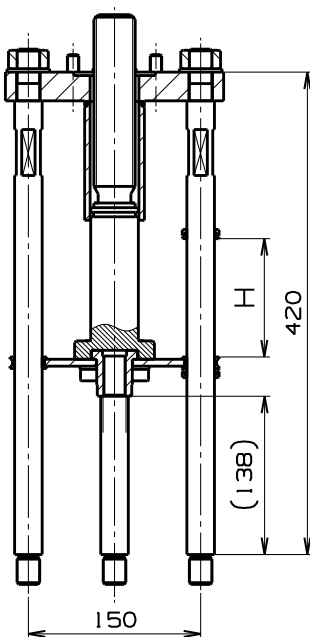
### With ACTUMATIC R position regulator



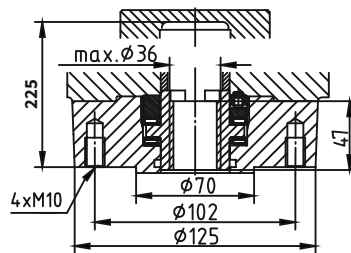
### With SMARTCON control unit



### Attachment yoke DN200-400 Connection A, F10, Tr36x6-LH



### Connection acc. to ISO 5210, output drive shaft A, F10





## Electric actuator **Regada**

### Modact MTR

marking in type number:

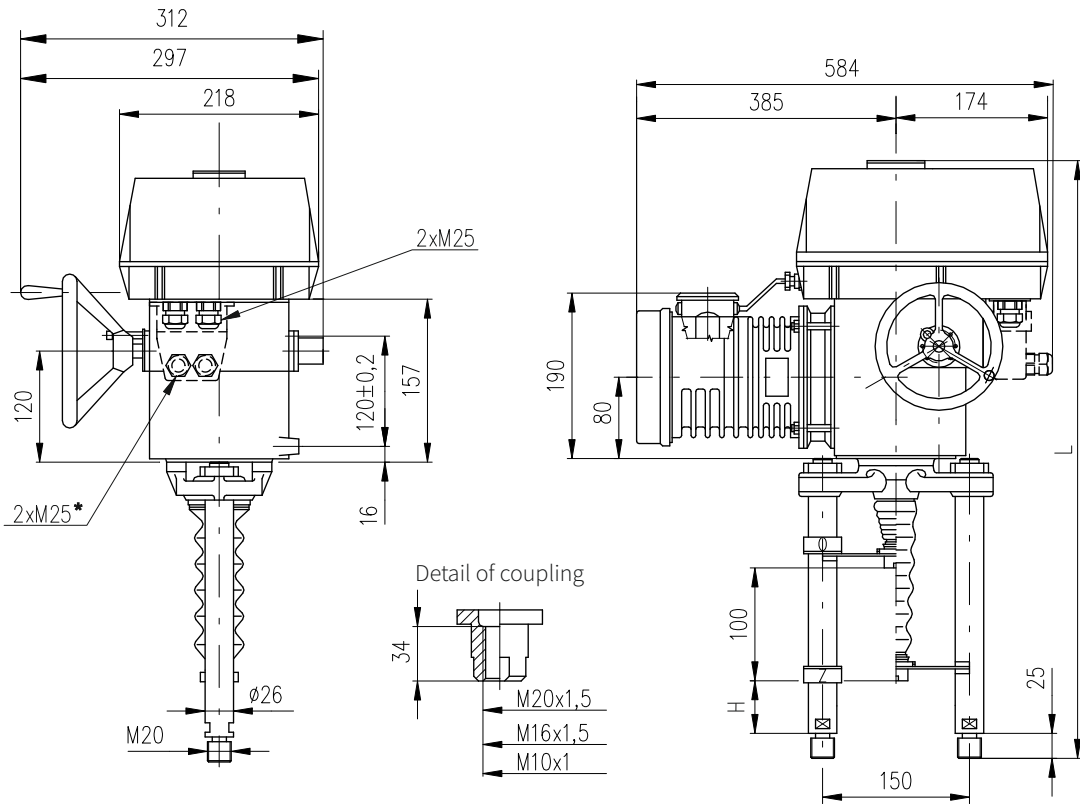
**EPD**

Technical data	
Type	Modact MTR
Marking in valve spec. No.	EPD
Voltage	230 V AC
Frequency	50 Hz
Power consumption	16 nebo 25 W
Control	3-position (with regulator NOTREP)
Nominal force	6.3, 10, 16, 25 kN
Travel	12,5 to 100 mm
Enclosure	IP 55 / IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-25 to 55 °C
Ambient humidity range	90 %
Weight	27 to 31 kg

→ **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.regada.sk](http://www.regada.sk)



## Dimensions of actuator Modact MTR



\*only execution with connector

Columns version	with acme thread		Columns version	with ball bolt		For valves
	H	L		H	L	
P-1045b/B	74	622	P-1045b/E	74	646	CV 3xx NPS ½" - 6"
P-1045b/C	130	680	P-1045b/H	130	702	CV 3xx NPS 8" - 16"

## Specification of Modact MTR

Electric motor linear MTR				52 420.			X	-	X	X	X	X	X	X	/	X	X							
Climatic resistance	Standard	-25°C to +55°C	Enclosure IP 55	0																				
	Tropical	-25°C to +55°C	Enclosure IP 67	1																				
			Enclosure IP 67	6																				
<b>Electric connection</b>				<b>Voltage</b>																				
To terminal board				230 V AC														9						
To connector																		8						
Screw version	Switching-off thrust <sup>32)33)</sup>	Rated operating speed	Operating speed	Electric motor																				
				Power	Speed	Current																		
trapezoidal	6 300/32	4.0 - 6.3 kN	32 mm/min.	38 - 32 mm/min.	16 W	1 150	0.31 A											A						
	4 000/50	2.5 - 4.0 kN	50 mm/min.	60 - 50 mm/min.																B				
	10 000/32	6.3 - 10.0 kN	32 mm/min.	38 - 32 mm/min.	25 W	1 250	0.41 A											C						
	6 300/50	4.0 - 6.3 kN	50 mm/min.	60 - 50 mm/min.																D				
ball screw	16 000/32-G	10.0 - 16.0 kN	32 mm/min.	38 - 32 mm/min.	16 W	1 150	0.31 A											E						
	10 000/50-G	6.3 - 10.0 kN	50 mm/min.	60 - 50 mm/min.																F				
	25 000/32-G	10.0 - 25.0 kN	32 mm/min.	38 - 32 mm/min.	25 W	1 250	0.41 A											G						
	16 000/50-G	10.0 - 16.0 kN	50 mm/min.	60 - 50 mm/min.																H				
	10 000/63-G	6.3 - 10.0 kN	63 mm/min.	75 - 63 mm/min.																	J			
	6 300/100-G	4.0 - 6.3 kN	100 mm/min.	120 - 100 mm/min.																	K			
<b>Control board version</b>				<b>Operating stroke</b>																				
Electromechanical control board - without local control				16 mm															B					
				25 mm (for stroke 20 mm)																	C			
				40 mm																	E			
				80 mm																	G			
<b>Transmitter</b>				<b>Connection</b>		<b>Output</b>																		
Without transmitter				—		—												A						
Resistive	Single	—	—	—	—	—	1x100 Ω											B						
	Double						2x100 Ω														C			
	Single						1x2000 Ω															F		
	Double						2x2000 Ω															P		
Resistive with current converter	Without power supply	2-wire	—	—	—	—	4 - 20 mA											S						
	With power supply																				Q			
	Without power supply						0 - 20 mA																T	
	With power supply																						U	
	Without power supply	3-wire	—	—	—	—	4 - 20 mA												V					
	With power supply																						W	
	Without power supply						0 - 5 mA																	Y
	With power supply																							Z
Capacitive CPT	Without power supply	2-wire	—	—	—	—	4 - 20 mA											I						
	With power supply																						J	
<b>Mechanical connection</b>		<b>Connection height / stroke</b>		<b>Pillar spacing / Bore of flange</b>		<b>Thread of stem<sup>3)</sup></b>		<b>Dimensional drawing</b>																
Columns		130		150 / —		M20x1.5 M16x1.5		P-1045b/B; P-1045b/E P-1045b/C; P-1045b/H											B C					
<b>Additional equipment</b>																								
	Without additional equipment; adjusted max. switching-off thrust from range																0	1						
A	2 additional position switches S5,S6																0	2						

Possible combinations and version: A+B = 07

### Notes:

- State the switching-off thrust in your order by words. If not stated it is adjusted to the maximum rate of the corresponding range. The load torque equals minimally the maximum switching-off thrust of the choosing range multiplied by 1.3.
- The maximum load thrust equals the max. Switching-off thrust multiplied by:
  - 0.8 for duty cycle S2-10 min., or S4-25%, 6 - 90 cycles per hour
  - 0.6 for duty cycle S4-25%, 90 - 1200 cycles per hour
- The thread in the coupling is to be specified in the order by words.



## Electric actuators **Regada**

**ST 0**  
**STR 0**

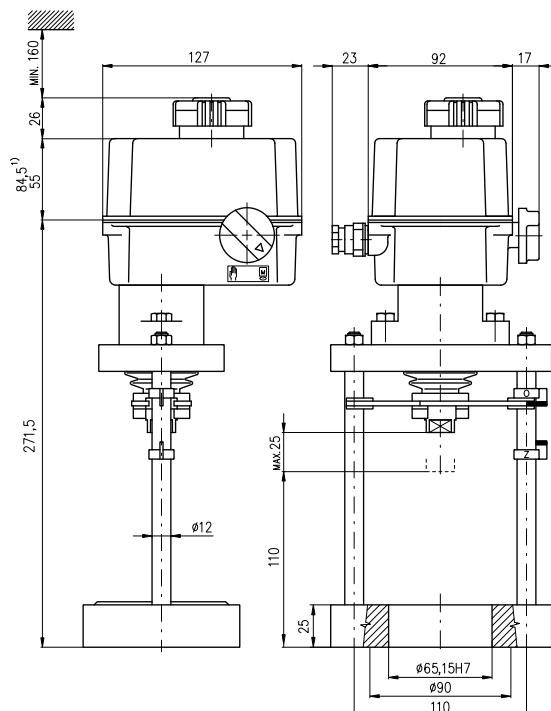
marking in type number:

**EPK**

Technical data	
Type	ST 0, STR 0
Marking in valve spec. No.	EPK
Voltage	230 V AC, 24 V AC
Frequency	50 Hz
Power consumption	1 W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	2,9 kN a 4,5 kN
Travel	16, 25 mm
Enclosure	IP 54/ IP 67
Process medium max. temp.	daná použitou armaturou
Ambient temperature range	-25 to 55 °C
Ambient humidity range	5 - 100% s kondenzací
Weight	2,5 to 4,5 kg

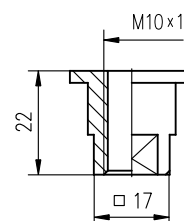
→ **Note:** Specifications and technical data are for information only. Detailed technical informations can be found in producer's data sheet or on the website [www.regada.sk](http://www.regada.sk)

### Dimensions of actuator



<sup>1)</sup> applies for version with electronic transmitter

#### Detail of coupling







## Electric actuators **Regada**

**STR OPA**

marking in type number:

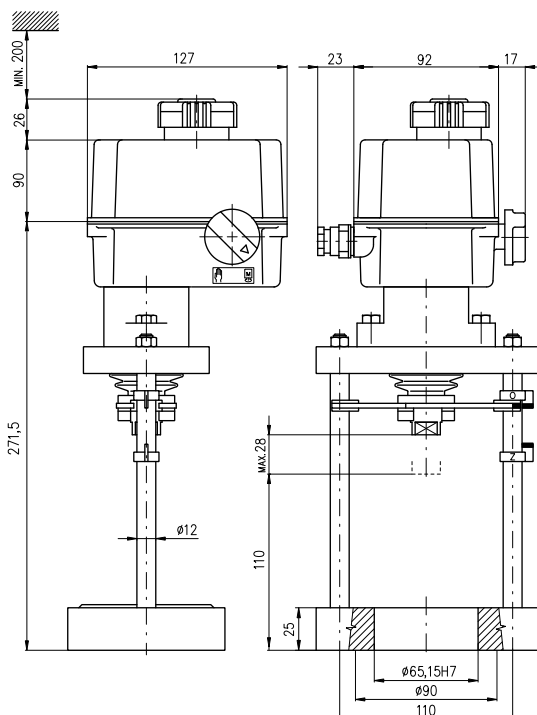
**EPK**

### Technical data

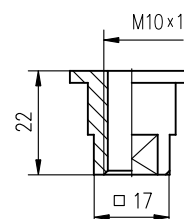
Type	<b>STR OPA</b>
Marking in valve spec. No.	<b>EPK</b>
Voltage	230 V AC, 24 V AC
Frequency	50 Hz
Power consumption	1 W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	2,4 kN and 4,5 kN
Travel	10 to 28 mm
Enclosure	IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-25 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	2,5 to 4,5 kg

→ **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.regada.sk](http://www.regada.sk)

### Dimensions of actuator



#### Detail of coupling



## Specifikace pohonu STR OPA

Electric servomotor STR OPA						430.	X	-	X	X	X	X	X	/	X	X
<b>Climatic resistance</b>	Standard	-25°C to +55°C	IP 67			<b>1</b>										
	Tropical	-25°C to +55°C	IP 67			<b>6</b>										
<b>Electric connection</b>		To terminal board	<b>Voltage</b>		230 V AC											
					24 V AC											
<b>Nominal force [ N ]</b>	4500	<b>Running speed</b>			5 mm/min											
	4000				10 mm/min											
	2400				16 mm/min											
<b>Travel</b>		10-28 mm														
<b>Control board</b>	DMS3	<b>Control</b>	modulating	0/4 - 20 mA	ON - OFF and pulse	24 V DC	<b>Output</b>	4 - 20 mA passive								
				0/2 - 10 V												
<b>Mechanic connection</b>		- flange, connection height 110 mm, thread of stem M10x1														
<b>Accessories</b>		Without accessories														
		Setting the stroke position to the desired value														<b>0 1</b>



## Electric actuators **Regada**

**ST 0.1**  
**STR 0.1**

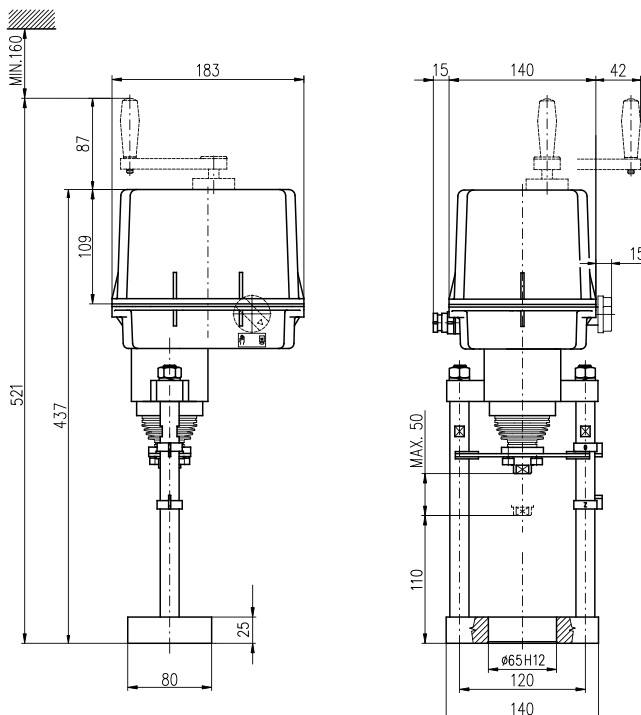
marking in type number:

**EPL**

Technical data	
Type	<b>ST 0.1, STR 0.1</b>
Marking in valve spec. No.	<b>EPL</b>
Voltage	230 V AC, 3 x 400 V AC, 3 x 380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	15W, 20W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	4,6 and 7,2 kN
Travel	16, 25, 40 mm
Enclosure	IP 65 / IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-25 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	5,4 to 8 kg

→ **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.regada.sk](http://www.regada.sk)

### Dimensions of actuator



### Specification of actuator ST 0.1, STR 0.1

Electric servomotor ST 0.1, STR 0.1						498.	X	-	X	X	X	X	X	X	/	X	X		
Climatic resistance	Standard	-25°C to +55°C	IP 65	Without regulator (ST 0.1)		0													
			IP 67			1													
	Tropical	-25°C to +55°C	IP 67	With regulator (STR 0.1)		6													
	Standard	-25°C to +55°C	IP 65		Resistance feedback	A													
		IP 65	Resistance feedback		C														
	Tropicak	-25°C to +55°C	IP 67		Resistance feedback	G													
			IP 67		Resistance feedback	J													
Electric connection		To terminal board			Voltage	24 V DC	A												
		To connector				230 V AC		0											
						24 V AC	3												
						3x400 V AC <sup>(6)</sup>	9												
						3x380 V AC <sup>(6)</sup>	M												
						24 V DC	C												
						230 V AC	5												
						24 V AC	8												
						3x400 V AC <sup>(6)</sup>	7												
						3x380 V AC <sup>(6)</sup>	R												
Nominal force [ N ]	4600	Running speed	10 mm/min		Motor power	15 W (230; 3x400; 20 W (24V AC/DC); 3x380 V AC)													
			16 mm/min																
			25 mm/min																
			32 mm/min																
	7200		10 mm/min																
			16 mm/min																
			25 mm/min																
			32 mm/min																
		40 mm/min																	
Tripping		Doublemoment			Stroke		16 mm											D	
							20 mm											E	
							40 mm											H	
Remote position transmitter	Without transmitter																	A	
	Resistance	Sigle	Wiring	---	Output	1 x 100 Ω													B
		Double <sup>(6)</sup>		---		1 x 2000 Ω													F
	Electronic - current	without its source		2-wire		4 - 20 mA													S
		with its source		2-wire <sup>(6)</sup>		0 - 20 mA													Q
				3-wire <sup>(6)</sup>		4 - 20 mA													T
Capacity	wo its source	2-wire <sup>(6)</sup>		4 - 20 mA		V													
	with its source	2-wire	4 - 20 mA	W															
<b>Mechanical connection</b> - flange, connection height 110 mm, thread on con. stem M10x1 or M16x1,5																	C		
Accessories	<b>A</b> 2 auxiliary position switches <sup>(8)</sup>																	0	0
	<b>B</b> Without space heater																	0	1
	<b>C</b> Space heater without terminal switch																	0	3
	<b>D</b> Manual control without permanent readiness																	0	5

Permissible combinations of accessories and codes:

A+B=02, A+C=04, A+D=06, B+D=07, A+B+D=08, C+D=09, A+C+D=10

Notes:

<sup>(6)</sup> applies for version without regulator

<sup>(8)</sup> it is not possible to choose double transmitter for version with 2 auxiliary position switches





## Electric actuators **Regada**

**STR 0.1PA**

marking in type number:

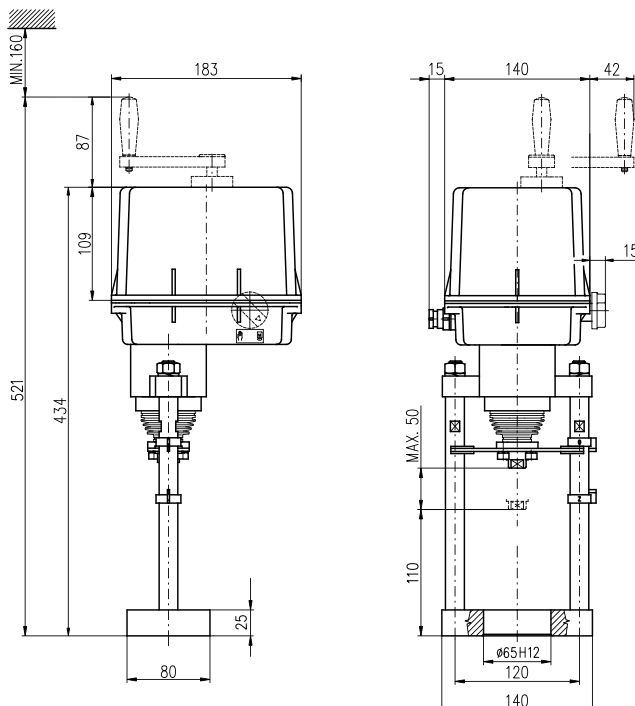
**EPL**

### Technical data

Type	<b>STR 0.1PA</b>
Marking in valve spec. No.	<b>EPL</b>
Voltage	230 V AC, 24 V AC
Frequency	50 Hz
Power consumption	15 W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	4,6 and 7,2 kN
Travel	16, 25, 40 mm
Enclosure	IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-25 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	5,4 to 8 kg

→ **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.regada.sk](http://www.regada.sk)

### Dimensions of actuators



## Specification of actuator STR 0.1PA

Electric servomotor STR 0.1PA										438.		X	-	X	X	X	X	X	/	X	X						
<b>Climatic resistance</b>		Standard	-25°C to +55°C		IP 67						1																
		Tropical	-25°C to +55°C		IP 67						6																
<b>Electric connection</b>		To terminal board			<b>Voltage</b>		230 V AC						0														
							24 V AC						3														
							3x400 V AC								2												
							3x380 V AC								N												
<b>Nominal force [ N ]</b>		4600		<b>Running speed</b>		10 mm/min								G													
						16 mm/min								H													
						25 mm/min								I													
						32 mm/min								J													
		7200		<b>Running speed</b>		10 mm/min										K											
						16 mm/min								T													
						25 mm/min								U													
						32 mm/min								V													
						40 mm/min								W													
														Y													
														I													
<b>Control board</b>	DMS3	<b>Control</b>	Modulating	0/4 - 20 mA 0/2 - 10 V	ON - OFF and pulse	24 V DC	<b>Output</b>	4 - 20 mA pasive																			
<b>Mechanical connection</b> - flange, connection height 110 mm, thread on con. stem M10x1 or M16x1,5																											
<b>Accessories</b>		Without accessories																									
		<b>A</b> Setting the stroke position to the desired value																		0	1						
		<b>B</b> LED display (position indicator)																		0	4						
		<b>D</b> Auxiliary relay module (system DMS3 RE3)																		0	5						
		<b>F</b> Local control for actuators with system DMS3 and LCD																		0	7						

Permissible combinations of accessories and codes:

A+B=20, A+D=22, A+F=25, A+B+D=52, B+D=29, D+F=40



# Electric actuators Regada

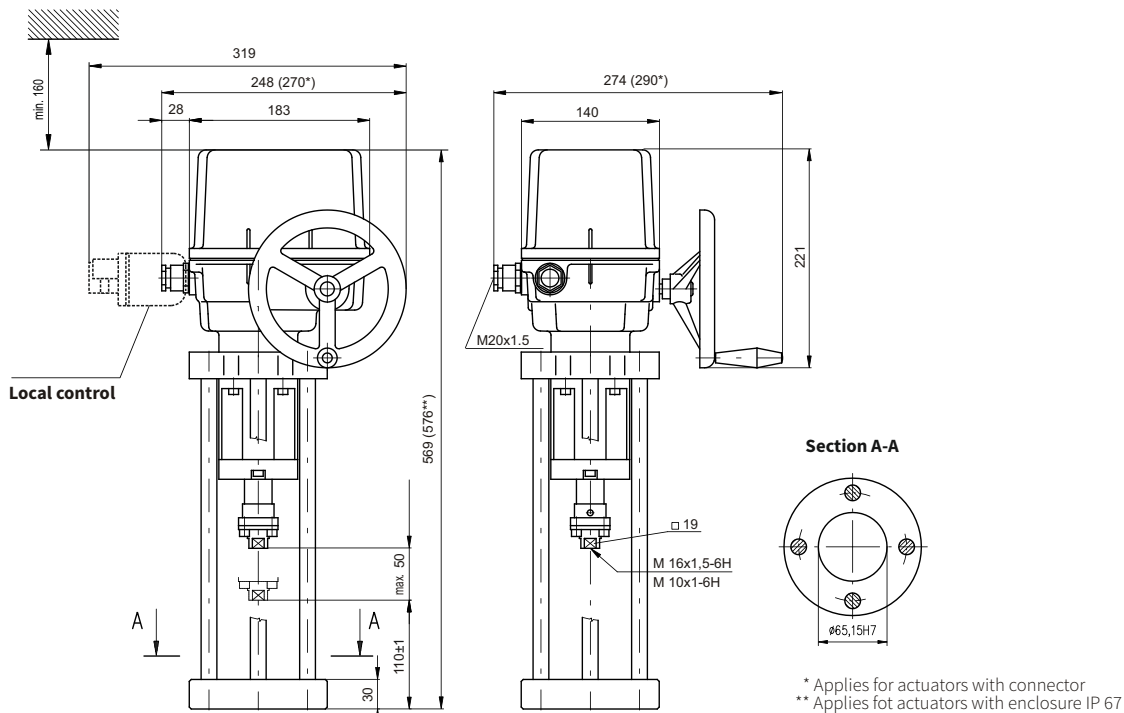
**ST 1**  
**STR 1**

marking in type number:  
**EPI**

Technical data	
Type	<b>ST 1, STR 1</b>
Marking in valve spec. No.	<b>EPI</b>
Voltage	230 V AC, 3 x 400 V AC, 3 x 380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	15 W, 20 W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	7,5 and 10 kN
Travel	16 - 40 mm
Enclosure	IP 65 / IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-50 to 55 °C
Ambient humidity range	5 to 100% with condensation
Weight	8,5 to 10,9 kg

→ **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.regada.sk](http://www.regada.sk)

## Dimensions of actuator



## Specification of actuators ST 1, STR 1

Electric servomotor ST 1, STR 1						491.	X	-	X	X	X	X	X	X	/	X	X						
<b>Climatic resistance</b>	Standard	-25°C to +55°C	IP 65	Without regulator <b>(ST 0.1)</b>		0																	
			IP 67			1																	
		Tropical	-25°C to +55°C			IP 67	6																
	Universal	-50°C to +40°C	IP 67			8																	
	Standard	-25°C to +55°C	IP 65			With regulator <b>(STR 0.1)</b>	Resistance feedback	A															
							Current feedback	C															
Tropical	-25°C to +55°C	IP 67	Resistance feedback	G																			
			Current feedback	J																			
<b>Electric connection</b>	To terminal board				<b>Voltage</b>		24 V DC	A															
							230 V AC	0															
						24 V AC	3																
						3x400 V AC <sup>6)</sup>	9																
						3x380 V AC <sup>6)</sup>	M																
						24 V DC	C																
	To connector					<b>Voltage</b>	230 V AC	5															
							24 V AC	8															
							3x400 V AC <sup>6)</sup>	7															
							3x380 V AC <sup>6)</sup>	R															
							15 W (230; 3x400; 3x380 V AC)	0															
							20 W (24V AC/DC)	1															
<b>Nominal force [N]</b>	10000	<b>Running speed</b>	8 mm/min	<b>Motor power</b>		2																	
			10 mm/min			5																	
	16 mm/min		6																				
	32 mm/min		5																				
7500			20 mm/min			6																	
<b>Stroke</b>						16 mm											D						
						20 mm											E						
						40 mm											H						
<b>Remote position transmitter</b>	Without transmitter																	A					
	Resistance	Single		---		1 x 100 Ω												B					
						1 x 2000 Ω												F					
	Double <sup>6)</sup>			---		2 x 100 Ω												K					
						2 x 2000 Ω												P					
	Electronic - current	without its source	<b>Wiring</b>	2-wire	<b>Output</b>	4 - 20 mA													S				
						0 - 20 mA													T				
		3-wire <sup>6)</sup>		4 - 20 mA		V																	
				4 - 20 mA		W																	
	Capacity	wo its source		2-wire <sup>6)</sup>		4 - 20 mA													I				
with its source		2-wire		J																			
<b>Mechanical connection</b> - flange, connection height 110 mm, thread on con. stem M10x1 or M16x1,5																	K						
<b>Accessories</b>	A 2 auxiliary position switches <sup>8)</sup>																0	0					
	E Space heater with terminal switch																0	2					
	C Local control																0	7					
	D Space heater																1	5					

Permissible combinations of accessories and codes:  
 A+E=04, A+C=08, E+C=10, A+E+C=12, A+D=16, C+D=17, A+C+D=18

Notes:

<sup>6)</sup> applies for version without regulator

<sup>8)</sup> it is not possible to choose double transmitter for version with 2 auxiliary position switches

## Specification of actuators STR 1PA

Electric servomotor STR 1PA						431.	X	-	X	X	X	X	X	/	X	X	
<b>Climatic resistance</b>	Standard	-25°C to +55°C	IP 67			<b>1</b>											
	Cold	-25°C to +55°C	IP 67			<b>3</b>											
	Tropical	-25°C to +55°C	IP 67			<b>6</b>											
<b>Electric connection</b>	To terminal board			<b>Voltage</b>	230 V AC	<b>0</b>											
					24 V AC	<b>3</b>											
					3x400 V AC	<b>2</b>											
					3x380 V AC	<b>N</b>											
<b>Nominal force [ N ]</b>	10000	<b>Running speed</b>	8 mm/min		<b>0</b>												
			10 mm/min		<b>5</b>												
			16 mm/min		<b>1</b>												
	7500		32 mm/min		<b>2</b>												
			20 mm/min		<b>6</b>												
<b>Stroke</b>	10-50 mm																
<b>Control board</b>	DMS3	<b>Control</b>	Modulating	0/4 - 20 mA	ON - OFF	24 V DC	<b>Output</b>	4 - 20 mA pasive									
	0/2 - 10 V			and pulse													
<b>Mechanical connection</b> - flange, connection height 110 mm, thread on con. stem M10x1 or M16x1,5																	
<b>Accessories</b>	Without accessories																
	<b>A</b>	Setting the stroke position to the desired value															<b>0 1</b>
	<b>D</b>	Auxiliary relay module R3, R4, R5 (module DMS3 RE3)															<b>0 5</b>
	<b>E</b>	Auxiliary relay module R1, R2, R3, R4, R5, READY (module DMS3 RE6)															<b>0 6</b>
	<b>F</b>	Local control for actuators with system DMS3 and LCD															<b>0 7</b>

Permissible combinations of accessories and codes:  
 A+D=22, A+E=23, A+F=24, D+F=40, E+F=44, A+D+F=63, A+E+F=67



## Electric actuators **Regada**

**STR 1PA**

marking in type number:

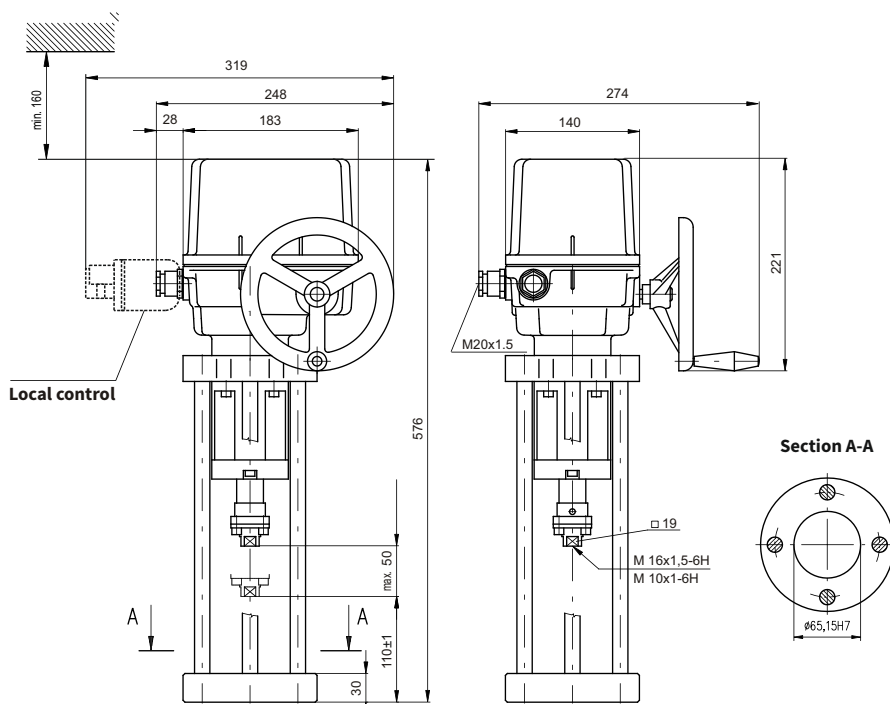
**EPI**

### Technical data

Type	<b>STR 1PA</b>
Marking in valve spec. No.	<b>EPI</b>
Voltage	230 V AC, 3 x 400 V AC, 3 x 380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	15 W, 20 W
Control	3-position (0 - 10 V, (0)4 - 20 mA)
Nominal force	7,5 and 10 kN
Travel	10 - 50 mm
Enclosure	IP 67
Process medium max. temp.	accorded to used valve
Ambient temperature range	-40 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	8,5 to 10,9 kg

→ **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.regada.sk](http://www.regada.sk)

### Dimensions of actuator





## Electric actuators **Regada**

**ST 1-Ex**

marking in type number:

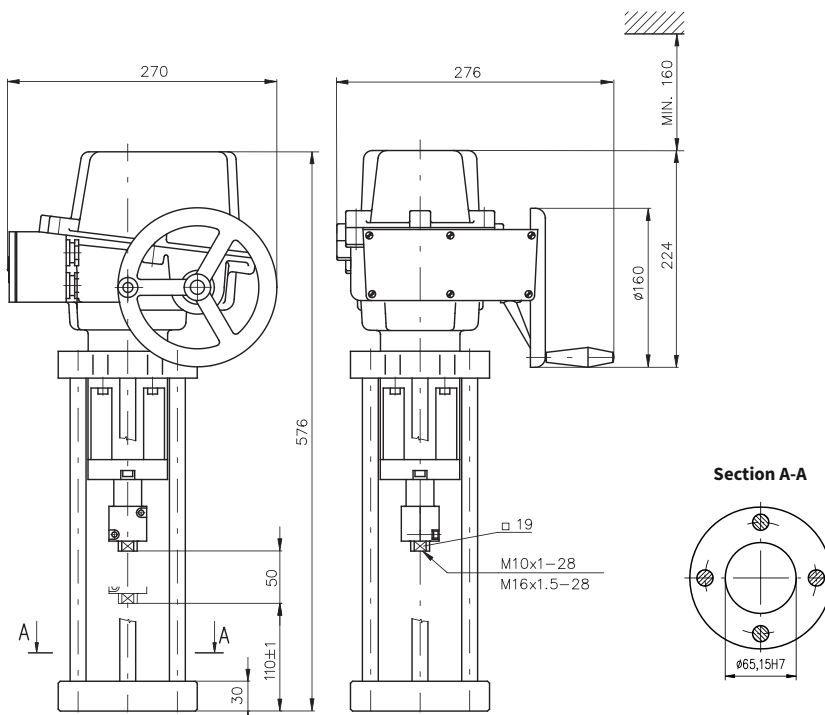
**EPJ**

### Technical data

Type	<b>ST 1-Ex</b>
Marking in valve spec. No.	<b>EPJ</b>
Voltage	230 V AC, 3 x 400 V AC, 3 x 380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	15 W, 20 W
Control	3-position, with regulator 0 - 10 V; (0) 4 - 20 mA
Nominal force	7,5 and 10 kN
Travel	16, 25, 40 mm
Enclosure	IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-50 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	11 to 15 kg

→ **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.regada.sk](http://www.regada.sk)

### Dimensions of actuator



## Specification of actuators ST 1-Ex

Electric servomotor ST 1-Ex						411.	X	-	X	X	X	X	X									
<b>Climatic resistance</b>	Standard	-25°C to +55°C	<b>Basic version (without regulator)</b>			IP 67	<b>1</b>	<b>8</b>	<b>B</b>	<b>D</b>	<b>K</b>	<b>M</b>										
	Universal	-50°C to +40°C				<b>With regulator</b>									Resistance feedback	IP 67						
	Standard	-25°C to +55°C	Current feedback	IP 67																		
	Universal	-50°C to +40°C	Resistance feedback		IP 67																	
			Current feedback																			
<b>Electric connection</b>		To terminal board	<b>Voltage</b>			24 V DC							<b>A</b>									
						230 V AC							<b>0</b>									
						24 V AC							<b>3</b>									
						3x400 V AC <sup>6)</sup>							<b>9</b>									
<b>Nominal force [N]</b>	10000 N		<b>Running speed</b>	8 mm/min	<b>Motor power</b>	15 W							<b>0</b>									
	7500 N			16 mm/min		(230; 3x400;							<b>1</b>									
	10000 N			32 mm/min		3x380 V AC)							<b>2</b>									
	8600 N			10 mm/min		20 W							<b>5</b>									
	8600 N			20 mm/min		(24V AC/DC)							<b>6</b>									
	5800 N			40 mm/min									<b>7</b>									
Maximal stroke (without transmitter) acc. to mechanical connection				50 mm	<b>Stroke</b>	16 mm							<b>D</b>									
For actuators without transmitter is possible to set up the stroke in between 0 to max.						20 mm							<b>E</b>									
						40 mm							<b>H</b>									
<b>Remote position transmitter</b>	Without transmitter												<b>A</b>									
	Resistance	Single	<b>Wiring</b>	---	<b>Output</b>	1 x 100 Ω								<b>B</b>								
		Dvojity <sup>6) 58)</sup>				1 x 2000 Ω								<b>F</b>								
	Electronic - current	Wo its source		2 - wire		2 x 100 Ω																<b>K</b>
				3 - wire <sup>6)</sup>		2 x 2000 Ω																<b>P</b>
				2 - wire		4 - 20 mA																<b>S</b>
		With its source <sup>59)</sup>		3 - wire <sup>6)</sup>		0 - 20 mA																<b>T</b>
				2 - wire		4 - 20 mA																<b>V</b>
				3 - wire <sup>6)</sup>		0 - 20 mA																<b>U</b>
	Capacity	Wo its source		2 - wire <sup>6)</sup>		4 - 20 mA								<b>W</b>								
Wi its source <sup>59)</sup>		4 - 20 mA				<b>I</b>																
Wi its source <sup>51)</sup>		4 - 20 mA			<b>J</b>																	
<b>Mechanical connection</b> - D-shape flange, connection height 110 mm, thread on con. stem M10x1 or M16x1,5												<b>K</b>										

### Notes:

<sup>6)</sup> applies for version without regulator

<sup>51)</sup> Only for version with regulator and current feedback, in this excution the output signal is not galvanically separated from the input signal

<sup>58)</sup> applied just for version without auxiliary position switches S5, S6 for 24 V DC

<sup>59)</sup> position transmitter with its source for feeding voltage 24 V DC after agreement with producer





# Electric actuators Regada

**ST 2**  
**STR 2**

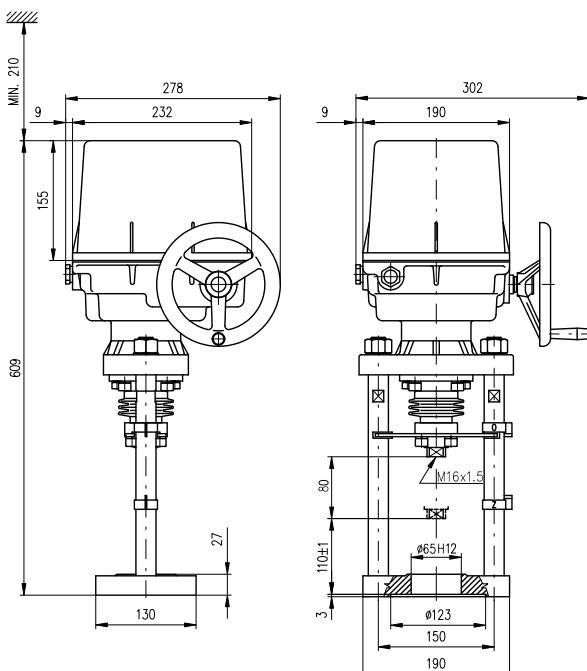
marking in type number:  
**EPM**

Technical data	
Type	ST 2, STR 2
Marking in valve spec. No.	EPM
Voltage	230 V AC, 3x400 V AC, 3x380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	see specification table
Control	3-position, with regulator 0 - 10 V; (0) 4 - 20 mA
Nominal force	16 and 25 kN
Travel	40, 80 mm
Enclosure	IP 65 / IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-50 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	17 to 21,5 kg

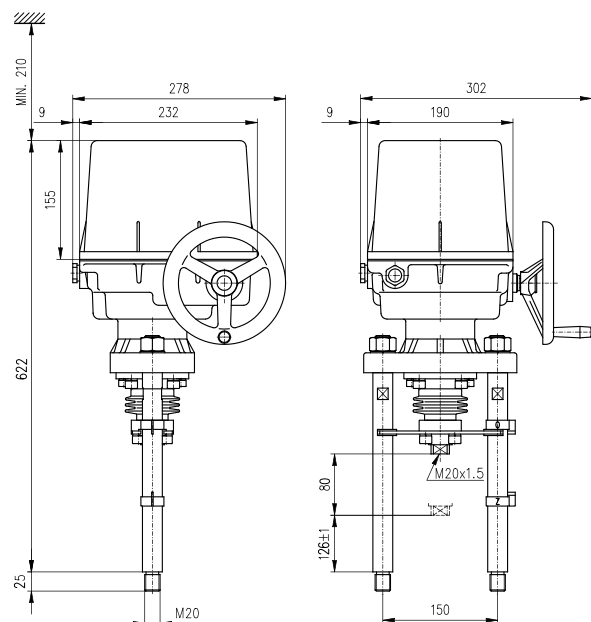
→ **Note:** Specifications and technical data are for information only. Detailed technical informations can be found in producer's data sheet or on the website [www.regada.sk](http://www.regada.sk)

## Dimensions of actuator

### DN 80 - 150 (connection D)



### DN 200 - 300 (connection M)



## Specification of actuator ST 2, STR 2

Electric servomotor ST 2, STR 2						492.	X	-	X	X	X	X	X	X	/	X	X		
<b>Climatic resistance</b>	Standard	-25°C to +55°C	IP 65	Without regulator <b>(ST 2)</b>		<b>0</b>													
			-25°C to +55°C		IP 67		<b>1</b>												
		Tropical	-25°C to +55°C		IP 67		<b>6</b>												
	Universal	-50°C to +40°C	IP 67			<b>8</b>													
	Standard	-25°C to +55°C	IP 67		With regulator <b>(STR 2)</b>	Resistance feedback	<b>B</b>												
						Current feedback	<b>D</b>												
Resistance feedback				<b>G</b>															
Tropical	-25°C to +55°C	IP 67	Current feedback	<b>J</b>															
<b>Electric connection</b>	To terminal board			Voltage	24 V DC	<b>A</b>													
					230 V AC	<b>0</b>													
					24 V AC	<b>3</b>													
					3x400 V AC <sup>6)</sup>	<b>9</b>													
					3x400 V AC <sup>28)</sup>	<b>2</b>													
					3x380 V AC <sup>6)</sup>	<b>M</b>													
					3x380 V AC <sup>28)</sup>	<b>N</b>													
	24 V DC				<b>C</b>														
	230 V AC				<b>5</b>														
	24 V AC				<b>8</b>														
	3x400 V AC <sup>6)</sup>				<b>7</b>														
	3x400 V AC <sup>28)</sup>				<b>6</b>														
	3x380 V AC <sup>6)</sup>				<b>R</b>														
	3x380 V AC <sup>28)</sup>				<b>S</b>														
<b>230 V AC, 24 V AC/DC - 65W</b>		<b>3x400 V AC</b>																	
<b>Nominal force [ N ]</b>	25 000	20 W	<b>Nominal force [ N ]</b>	<b>Motor power</b>	90 W	<b>Running speed</b>	10 mm/min	<b>A</b>											
								20 000	<b>H</b>										
								16 000	<b>J</b>										
								25 000	<b>B</b>										
								20 000	<b>K</b>										
								16 000	<b>L</b>										
	25 000	<b>M</b>																	
	20 000	<b>N</b>																	
	16 000	<b>P</b>																	
	25 000	<b>C</b>																	
	20 000	<b>Q</b>																	
	16 000	<b>R</b>																	
	20 000	<b>S</b>																	
	16 000	<b>T</b>																	
	---	<b>U</b>																	
	20 000	<b>D</b>																	
	16 000	<b>V</b>																	
	---	<b>W</b>																	
16 000	<b>E</b>																		
---	<b>Y</b>																		
---	<b>F</b>																		
---	<b>Z</b>																		
<b>Stroke</b>	Max. (without transmitter) <sup>41)</sup> ... 100 mm			Wi transmitter	40 mm		<b>H</b>												
					80 mm		<b>K</b>												

Continued on next page

<b>Remote position transmitter</b>	Without transmitter		<b>Wiring</b>	<b>Output</b>	1 x 100 Ω	<b>A</b>				
	Resistance	single			1 x 2000 Ω					<b>B</b>
		double			2 x 100 Ω					
	Electronic - current				wo its source					2 x 2000 Ω
		with its source			4 - 20 mA					<b>P</b>
		wo its source			0 - 20 mA					
		with its source								4 - 20 mA
		wo its source			4 - 20 mA					
		with its source								4 - 20 mA
	Capacity	wo its source			2-wire <sup>6)</sup>					
with its source <sup>51)</sup>		2-wire	<b>W</b>							
<b>Mechanical connection</b>			Flange, connection height 110 mm, stem thread M16x1,5		<b>D</b>					
			Columns, connection height 126 mm, stem thread M20x1,5						<b>M</b>	
<b>Accessories</b>			<b>A</b> 2 auxiliary switches							
			<b>E</b> Space heater with terminal switch						<b>0 0</b>	
			<b>C</b> Local control						<b>0 2</b>	
			<b>D</b> Space heater						<b>0 7</b>	
			<b>G</b> Setting up the tripping torque on demanded position						<b>1 5</b>	
					<b>2 5</b>					

Permissible combinations of accessories and codes:

A+E=04, A+C=08, C+E=10, A+C+E=12, A+D=16, C+D=17, A+C+D=18, A+G=26, E+G=27, C+G=28, D+G=29, A+E+G=30, A+C+G=31, A+D+G=32, C+E+G=33, C+D+G=34, A+D+E+G=35, A+C+D+G=36

Notes:

- <sup>6)</sup> applies for version without regulator
- <sup>21)</sup> version with connector only for -40°C
- <sup>28)</sup> version with reverse contactors
- <sup>41)</sup> version without transmitter - it is possible to set up stroke 0 - 80 mm
- <sup>51)</sup> only for version with regulator and current feedback



# Electric actuators Regada

**STR 2PA**

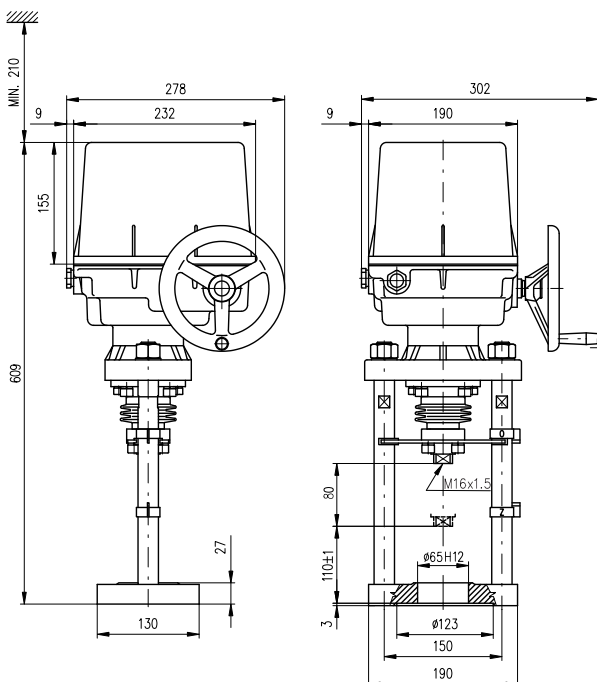
marking in type number:  
**EPM**

Technical data	
Type	<b>STR 2PA</b>
Marking in valve spec. No.	<b>EPM</b>
Voltage	230 V AC, 3x400 V AC, 3x380 V AC, 24 V AC, 24 V DC
Frequency	50 Hz
Power consumption	see specification table
Control	3-position, with regulator 0 - 10 V; (0) 4 - 20 mA
Nominal force	16 and 25 kN
Travel	40, 80 mm
Enclosure	IP 67
Process medium max. temp.	acc. to used valve
Ambient temperature range	-40 to 55 °C
Ambient humidity range	5 - 100% with condensation
Weight	17 and 21,5 kg

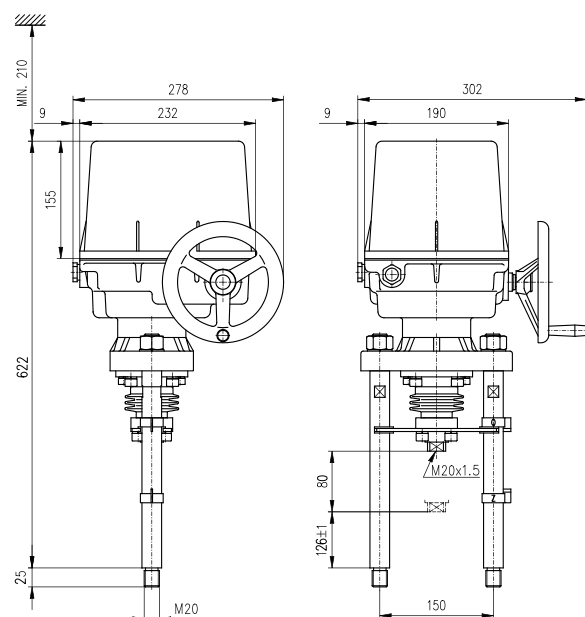
→ **Note:** Specifications and technical data are for information only. Detailed technical informations can be found in producer's data sheet or on the website [www.regada.sk](http://www.regada.sk)

## Dimensions of actuator

### DN 80 - 150 (connection D)



### DN 200 - 300 (connection M)



## Specification of actuator STR 2PA

Electric servomotor STR 2PA				432.		X	-	X	X	X	X	X	/	X	X		
<b>Climatic resistance</b>	Standard	-25°C to +55°C		IP 67		1											
	Cold	-40°C to +40°C		IP 67		3											
	Tropical	-25°C to +55°C		IP 67		6											
<b>Electric connection to terminal board</b>	Switching electromotor	Through optocouplers		Napájecí napětí	230 V AC												
		Through reverse contactors			3x400 V AC												
	Contactless switching		3x380 V AC														
			3x400 V AC														
		3x380 V AC															
<b>Nominal force [ N ]</b>	<b>Running speed</b>		230 V	3x400 V, 3x380 V													
25 000	10 mm/min		●	-													
	20 mm/min		●	●													
	32 mm/min		●	●													
	40 mm/min		●	●													
	50 mm/min		-	●													
	60 mm/min		-	●													
20 000	10 mm/min		●	-													
	20 mm/min		●	●													
	32 mm/min		●	●													
	40 mm/min		●	●													
	50 mm/min		●	-													
	50 mm/min		-	-													
	60 mm/min		●	●													
	60 mm/min		-	●													
16 000	80 mm/min		-	●													
	100 mm/min		-	●													
	10 mm/min		●	-													
	20 mm/min		●	●													
	32 mm/min		●	●													
	40 mm/min		●	●													
	50 mm/min		●	-													
	50 mm/min		-	●													
	60 mm/min		●	-													
	60 mm/min		-	●													
80 mm/min		●	-														
80 mm/min		-	●														
80 mm/min		-	●														
100 mm/min		-	●														
<b>Stroke</b>				20-80 mm													
<b>Control board</b>	DMS3	<b>Control</b>	Modulating	0/4 - 20 mA	ON - OFF and pulse	24 V DC	<b>Output</b>	4 - 20 mA pasive									
				0/2 - 10 V													
<b>Mechanical connection</b>		Flange, connection height 110 mm, stem thread M16x1,5															
		Columns, connection height 126 mm, stem thread M20x1,5															
<b>Accessories</b>		Without accessories															
		<b>A</b> Setting the stroke position to the desired value													0 1		
		<b>D</b> Auxiliary relay module R3, R4, R5 (module DMS3 RE3)													0 5		
		<b>E</b> Auxiliary relay module R1, R2, R3, R4, R5, READY (module DMS3 RE6)													0 6		
		<b>F</b> Local control for actuators with system DMS3 and LCD													0 7		

Permissible combinations of accessories and codes:

A+D=22, A+E=23, A+F=24, D+F=40, E+F=44, A+D+F=63, A+E+F=67



## Electric actuators

# Rotork

### CVL

marking in type number:

**EQL**

Technical data				
Type	CVL-500 (Ex)	CVL-1000 (Ex)	CVL-1500 (Ex)	CVL-5000 (Ex)
Marking in valve spec. No.	EQL			
Version	Electric actuator (optionally with safety function)			
Voltage	230V AC, 24V DC			
Frequency	50 Hz			
Power consumption	4 - 20 mA			
Control	4 - 20 mA			
Speed	6,35 mm/s	2,54 mm/s	2,54 mm/s	2,54 mm/s
Safety function resetting	max. 6 s	max. 20 s	max. 20 s	max. 45 s
Supercapacitor charge time	30 s	100 s	100 s	300 s
Safety function	Adjustable function direct (NO) / indirect (NC)			
Nominal force	2 kN	4 kN	6,3 kN	16 a 20 kN
Travel	16, 20 mm	16, 20 mm	16, 20, 40 mm	40, 80, 100 mm
Enclosure	IP 68			
Process medium max. temp.	acc. to used valve			
Ambient temperature range	-30 to 70°C (for low temperatures -40 to 60°C) version Ex -20 to 60°C (for low temperatures -40 to 60°C)			
Manual control	optional equipment			
Weight	16 kg	24 kg	24 kg	53 kg

→ **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.rotork.com](http://www.rotork.com)

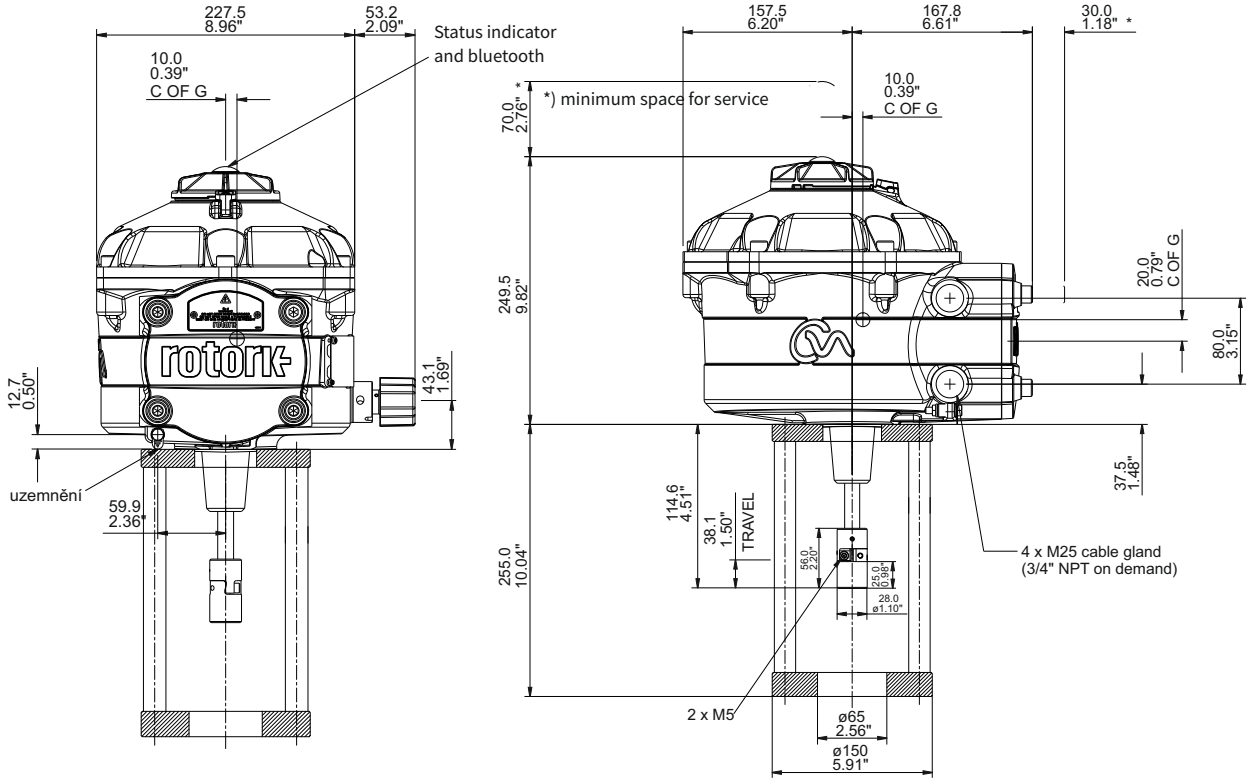
Optional accessories	
Safety function	equipment equipped with supercapacitors, to ensure emergency adjustment
HART	communication protocol
Foundation Fieldbus	communication protocol
Profibus DP	communication protocol
Pakscan P3	2-wire system
Modbus	communication protocol
RIRO	communication protocol

### I / O parameterization

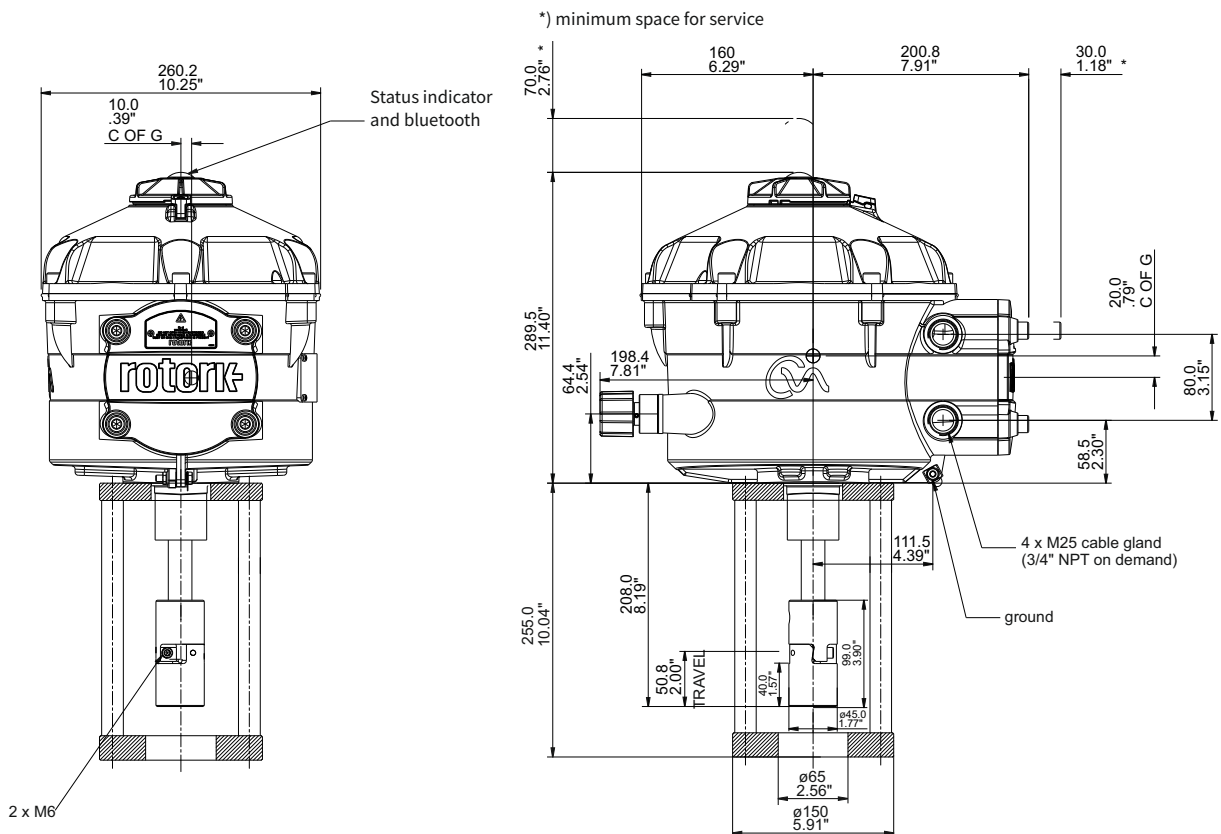
Possibility to set direct / indirect function of the drive, choice of action in case of signal loss. Independent closing and opening settings forces in the range of 40-100%.

## Dimensions of actuator

### CVL-500 (Ex)



### CVL-1000 (Ex), CVL-1500 (Ex)









## Electric actuators

# Rotork

**Ex IQM 10**  
**Ex IQM 12**

marking in type number:  
**EQA, EQB**

Technical data				
Type	IQM 10	IQM 12	Ex IQM 10	Ex IQM 12
Marking in valve spec. No.	EQA		EQB	
Version	Electric multi-turn actuator (3rd generation)			
Voltage	3-phase, 380 or 400V AC			
Frequency	50 Hz			
Control	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 valve travel 16, 20, 40 mm			
Enclosure	IP 68			
Process medium max. temp.	acc. to used valve			
Ambient temperature range	-30 to 70°C (optionally -40 to 70°C, -50 to 40°C)		-20 to 70°C (optionally -40 to 70°C, -50 to 40°C)	
Weight	31 kg			

→ **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.rotork.com](http://www.rotork.com)

### Optional accessories

Expanding 4 pcs of freely programmable potential-free contacts S5 - S8 for signaling drive states.  
The supply voltage of the above contacts can be selected between 24 V DC and 120 V AC

Actuator control via Folomatic module 4-20mA

Position transmitter CPT 4-20 mA

Interrupter timer (intermittent opening/ closing actuator)

HART - communication protocol

Foundation Fieldbus - communication protocol

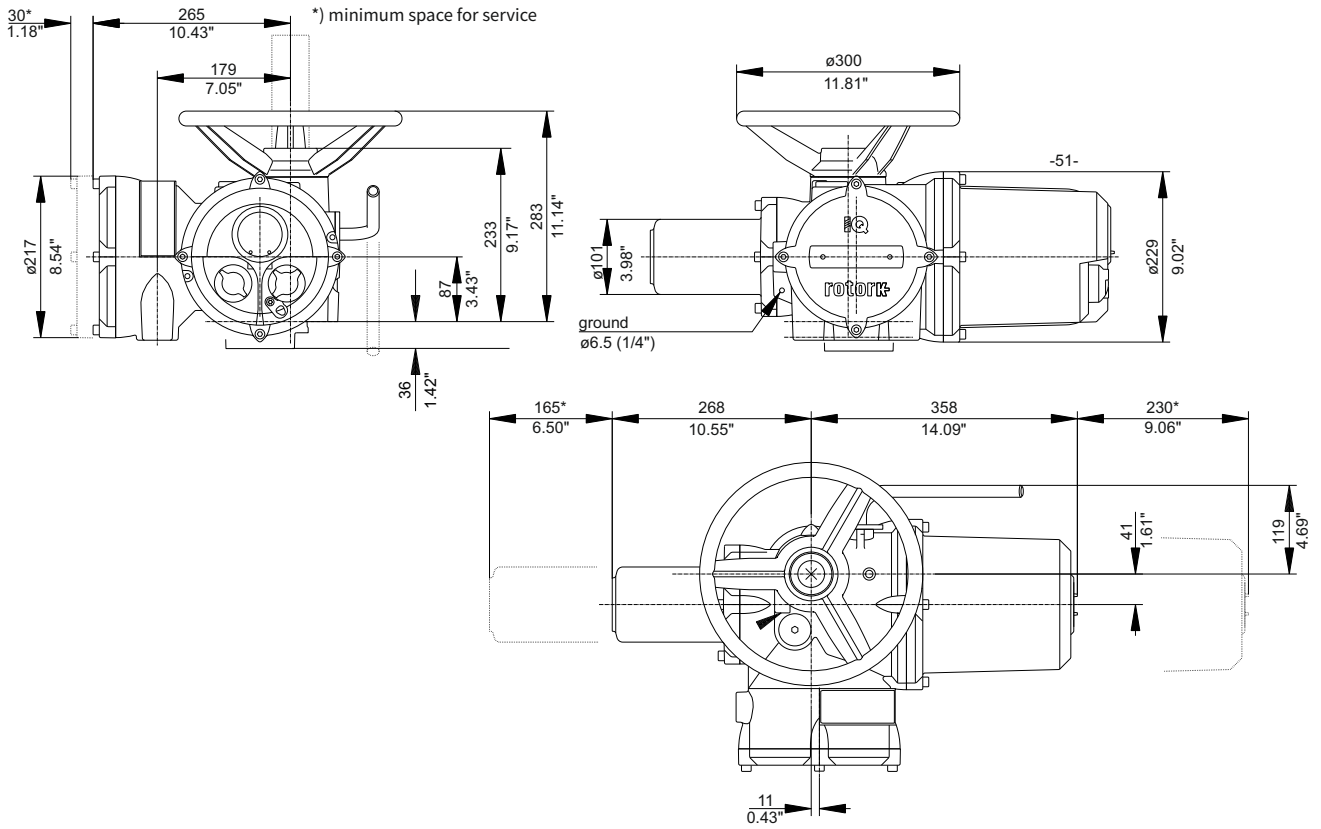
Profibus DP - communication protocol

Pakscan P3 - communication protocol / 2-wire system

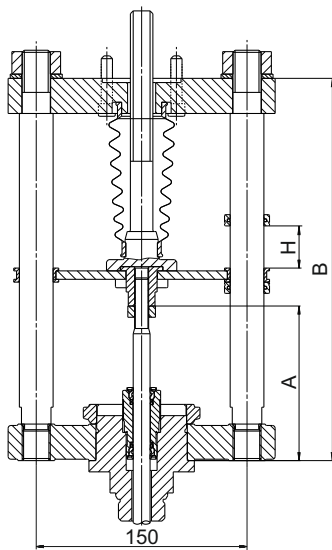
Modbus - communication protocol

## Dimensions of actuator

### IQM 10, Ex IQM 12



### Attachement yoke (2 or 4 columns)



For valves	No. of columns	A	B	Weight
CV 3xx NPS 1/2" - 6"	2	110	272	~ 8 kg
CV 3xx NPS 8" - 16"	4	140	420	~ 15 kg



## Electric actuators

# Rotork

**IQM 20**  
**Ex IQM 20**

marking in type number:  
**EQD, EQE**

Technical data		
Type	IQM 20	Ex IQM 20
Marking in valve spec. No.	EQD	EQE
Version	Electric multi-turn actuator (3rd generation)	
Voltage	3-phase, 380 or 400V AC	
Frequency	50 Hz	
Control	4 - 20 mA	
Nominal force	80 Nm~21,6 kN, 100 Nm~27 kN, 120 Nm~32 kN	
Travel	acc. to valve stroke 80, 100 mm	
Enclosure	IP 68	
Process medium max. temp.	acc. to used valve	
Ambient temperature range	-30 to 70°C (volitelně -40 to 70°C, -50 to 40°C)	-20 to 70°C (volitelně -40 to 70°C, -50 to 40°C)
Weight	54 kg	

→ **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.rotork.com](http://www.rotork.com)

## Optional accessories

Expanding 4 pcs of freely programmable potential-free contacts S5 - S8 for signaling drive states.  
The supply voltage of the above contacts can be selected between 24 V DC and 120 V AC

Actuator control via Folomatic module 4-20mA

Position transmitter CPT 4-20 mA

Interrupter timer (intermittent opening/ closing actuator)

HART - communication protocol

Foundation Fieldbus - communication protocol

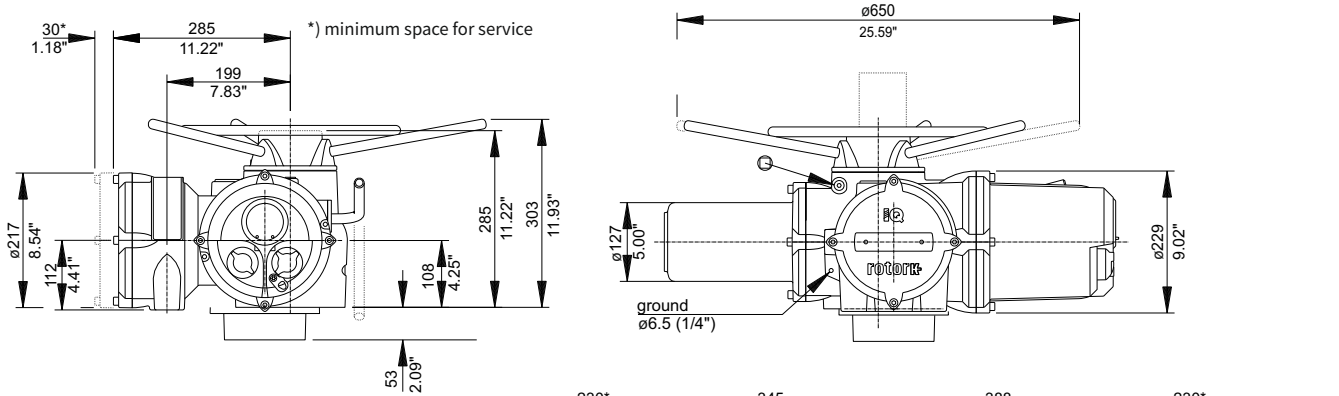
Profibus DP - communication protocol

Pakscan P3 - communication protocol / 2-wire system

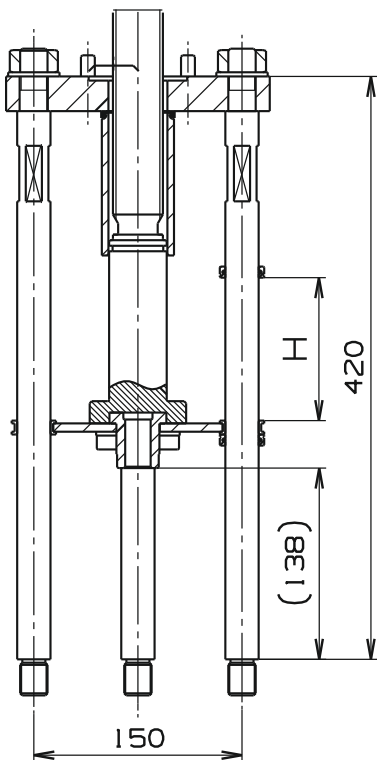
Modbus - communication protocol

## Dimensions of actuator

### IQM 20, Ex IQM 20



### Control NPS 8" - 16" Connection A, F10, Tr36x6-LH





## Pneumatic actuators

# Flowserve

### Series 253 - 701

marking in type number:  
**PFA, PFB, PFC**

#### Technical data

Type	PA 253		PB 503		PB 701	
Marking in valve spec. No.	PFA		PFB		PFC	
Feeding pressure			6,0 bar max			
Function	direct	indirect	direct	indirect	direct	indirect
Control			pneumatic signal 0,2 - 1,0 bar pneumatic signal 0(4) - 20 mA			
Nominal force	according to table of nominal force values					
Travel	25 mm				40 mm	
Enclosure			IP 54			
Process medium max. temp.	CV/SV 300 line ... <b>68</b>		acc. to used valves			
Ambient temperature range			-40 to 80 °C			
Ambient humidity range			95 %			
Weight			see dimensions table			

→ **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.flowserve.com](http://www.flowserve.com)

#### Accessories

<b>Elektropneumatic positioner type SRI 981</b>	Device with electric input of 20 - 100 kPa to control the pneumatic actuators with pneumatic control signal
<b>Elektropneumatic positioner type SRI 986</b>	Analog positioner with input signal 4(0) - 20 mA
<b>Elektropneumatic positioner (analog) type SRD 990</b>	Device with electric input of 4 (0) - 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software
<b>Elektropneumatic positioner (intelligent) type SRD 991</b>	Device with electric input of 4 (0) - 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software
<b>Signalisation switches typ SGE985</b>	Adjustable end position switches
<b>Air set type typ FRS 923 (-40 to 80°C)</b>	Reduces the supply pressure to a value required
<b>Solenoid valve standard type SC G327B001</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4"
<b>Solenoid valve inexplosive EEx em type EM G327B001</b>	Direct operated electromagnetic valve, eversion 3/2, function U (universal) G 1/4", with the increased safety/epoxy encapsulation operator
<b>Solenoid valve inexplosive EEx d type NF G327B001</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4", solid conclusion
<b>Air lock relay, type EIL 200</b>	Retaining device for closing of air pipeline on a pressure drop





## Pneumatic actuators

# Flowserve

**PO 1502**  
**PO 3002**

marking in type number:

**PFD**

### Technical data

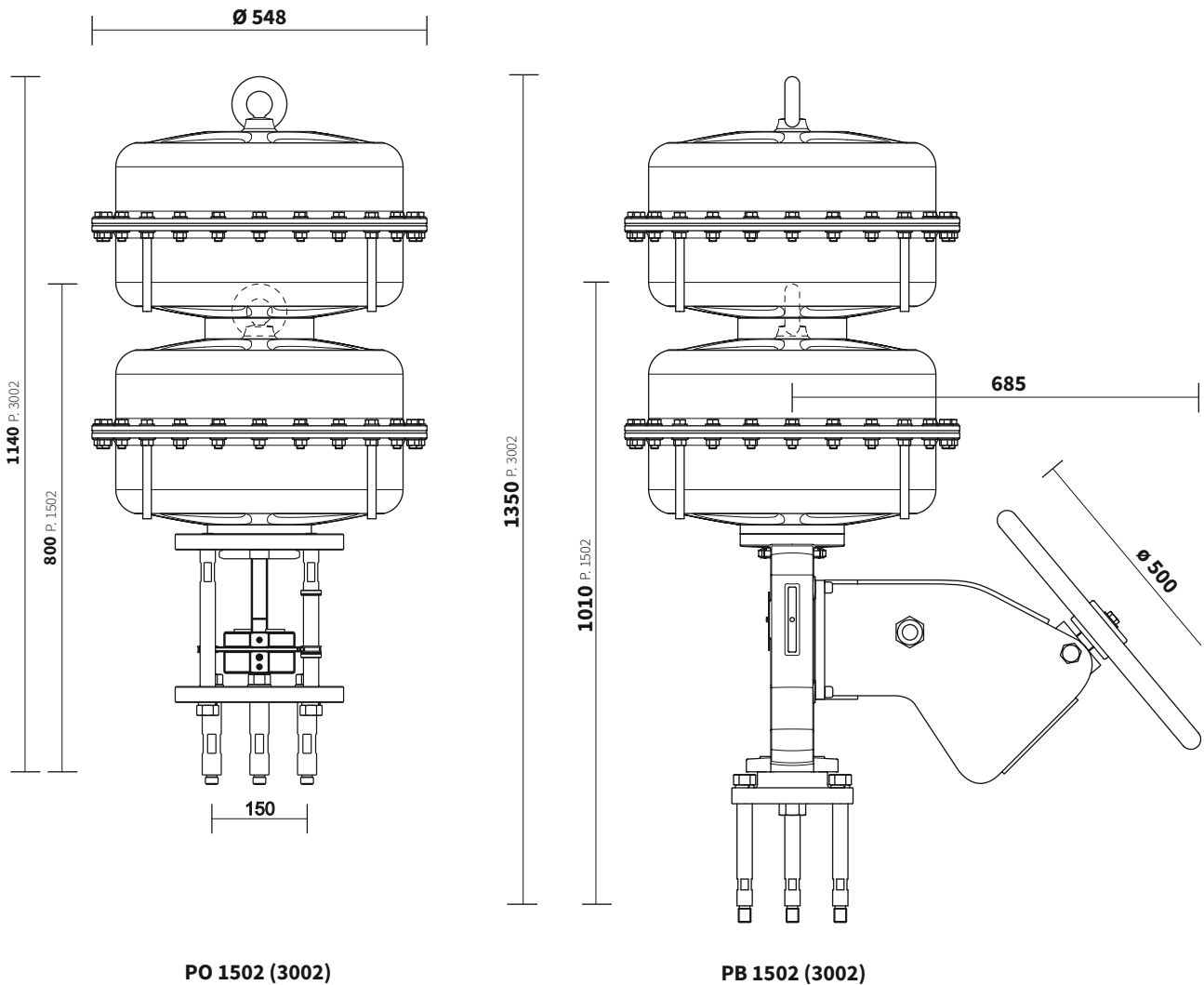
Type	PO 1502		PO 3002	
Marking in valve spec. No.	PFD		PFE	
Feeding pressure	6,0 bar max			
Function	direct	indirect	direct	indirect
Control	pneumatic signal 0,2 - 1,0 bar current signal 0(4) - 20 mA			
Nominal force	according to table of nominal force values			
Travel	80, 100 mm			
Enclosure	IP 54			
Process medium max. temp.	acc. to used valves			
Ambient temperature range	-40 to 80 °C			
Ambient humidity range	95 %			
Weight	124 kg - with hand wheel 174 kg		240 kg - with hand wheel 290 kg	

→ **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.flowserve.com](http://www.flowserve.com)

### Accessories

<b>Elektropneumatic positioner type SRI 981</b>	Device with electric input of 20 - 100 kPa to control the pneumatic actuators with pneumatic control signal
<b>Elektropneumatic positioner type SRI 986</b>	Analog positioner with input signal 4(0) - 20 mA
<b>Elektropneumatic positioner (analog) type SRD 990</b>	Device with electric input of 4 (0) - 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software
<b>Elektropneumatic positioner (intelligent) type SRD 991</b>	Device with electric input of 4 (0) - 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software
<b>Elektropneumatic positioner (intelligent) type SRD 998</b>	Device with electric input of 4 (0) - 20 mA and outlet of controlling air into actuator. Standard equipment: HART, LED display, setting using the multi selector
<b>Elektropneumatic positioner SIPART PS2</b>	Digital positioner with input 4(0) - 20 mA
<b>Elektropneumatic positioner ABB TZIDC</b>	Digital positioner with input 4(0) - 20 mA
<b>Signalisation switches typ SGE985</b>	Adjustable end position switches
<b>Air set type G651 (-20 to 50°C)</b>	Reduces the supply pressure to a value required
<b>Air set type typ FRS 923 (-40 to 80°C)</b>	Reduces the supply pressure to a value required
<b>Solenoid valve standard type SC G551A005</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4"
<b>Solenoid valve standard type SC G327B001</b>	Direct operated electromagnetic valve, version 3/2, function U (universal) G 1/4", with the increased safety/epoxy encapsulation operator
<b>Solenoid valve inexplosive EEx em type EM G327B001</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4", solid conclusion
<b>Solenoid valve inexplosive EEx d type NF G327B001</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4", solid conclusion
<b>Solenoid valve 5/2-way type SCG551B417</b>	Direct operated electromagnetic valve, version 5/2, function U (universal), G 1/4", (use for double-acting actuators)
<b>Air lock relay, type EIL 200</b>	Retaining device for closing of air pipeline on a pressure drop
<b>Booster-valve type EIL 100</b>	Airflow enhancer

## Rozměry pohonů Flowserve 1502 a 3002



PO 1502 (3002)

PB 1502 (3002)

### Specification No. of Flowserve actuators 1502 and 3002

				PX XXXX	X	XX	X	X	X
<b>Type of actuator</b>	1500 cm <sup>2</sup>			<b>PO 1502</b>					
	1500 cm <sup>2</sup>			<b>PB 1502</b>					
	3000 cm <sup>2</sup>			<b>PO 3002</b>					
	3000 cm <sup>2</sup>			<b>PB 3002</b>					
<b>Colour</b>			white					<b>B</b>	
<b>Spring range [bar]</b>	PO 1502	H = 80 mm	0,4 - 2,0					<b>G F</b>	
			1,5 - 2,7				<b>V C</b>		
			2,0 - 3,5				<b>F S</b>		
			2,6 - 4,2				<b>A J</b>		
	PO 1502	H = 100 mm	0,9 - 1,9				<b>HL</b>		
			1,8 - 3,8				<b>J I</b>		
PO 3002	H = 100 mm	2,0 - 4,3				<b>FL</b>			
		1,2 - 2,6				<b>NA</b>			
<b>Hand wheel</b>			without hand wheel					<b>O</b>	
			side light wheel					<b>S</b>	
<b>Function</b>			direct					<b>A</b>	
			indirect					<b>Z</b>	
<b>Travel H</b>			80					<b>D</b>	
			100					<b>E</b>	





## Pneumatic actuators **A. Hock**

**2109, 2112, 2112S  
2112T, 2116, 2116S**

marking in type number:

**PHF, PHA, PHB, PHC**

A. Hock pneumatic actuators are suitable for applications in extreme conditions and have good shock resistance. Actuators can be supplied in direct, reverse and springless configuration. Broad range of accessories is available.

Technical data						
Type	2109	2112	2112S	2112T	2116	2116S
Marking in valve spec. No.	PHF	PHA		PHB	PHC	
Max. supply pressure	NO, NC	6 bar		acc. to springs	6 bar	
Function	double-acting	5,5 bar		3 bar	5,5 bar	
Control	direct (NO), reverse (NC), double-acting					
Nominal force	pneumatic signal 20-100 kPa electric signal 4-20 mA					
Stroke	according to springs					
Enclosure	16, 20	16, 20, 25, 40		25, 40	40, 80, 100	
Process medium max. temp.	according to used valve					
Ambient temperature range	standard -40 to 100 °C alternatively -60 to 80 °C					
Weight	see dimensions table					

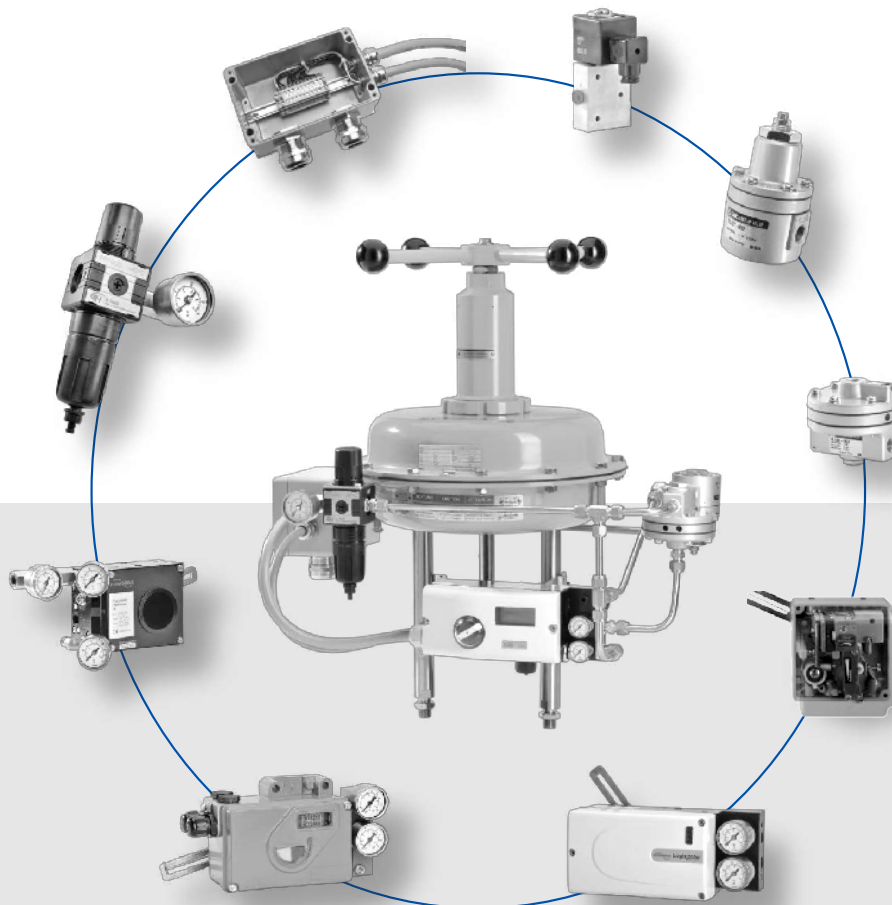
### Direct and reverse functions

**Direct function** ensures that actuator's stem retracts upon control air supply failure (valve opens).

**Reverse function** ensures that actuator's stem extends upon control air supply failure (valve closes).

## Accessories

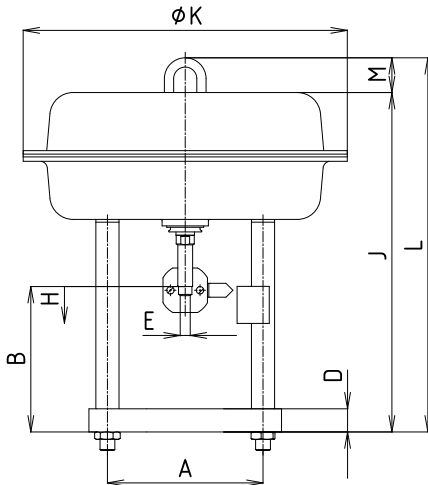
<b>Pneumatic positioner type SRI 981</b>	Device with pneumatic input of 20 - 100 kPa
<b>Electropneumatic positioner type SRI 986</b>	Analog positioner with input signal 4(0) - 20 mA
<b>Electropneumatic positioner (analog) type SRD 990</b>	Device with electric input of 4 (0) - 20 mA and direct pneumatic output into actuator. Adjusted by switches and potentiometers
<b>Electropneumatic positioner (intelligent) type SRD 991</b>	Device with electric input of 4 (0) - 20 mA and outlet of air into actuator. It is adjusted by PC and special software
<b>Electropneumatic positioner (intelligent) type SRD 998</b>	Device with electric input of 4 (0) - 20 mA and direct pneumatic output into actuator. Standard equipment: HART, LED display, adjustment by the multi selector
<b>Electropneumatic positioner SIPART PS2</b>	Digital positioner with input 4(0) - 20 mA
<b>Electropneumatic positioner ABB TZIDC</b>	
<b>Limit switch type SGE985</b>	Adjustable end limit switches
<b>Air set type G651 (-20 to 50°C)</b>	Reduces the supply air pressure to a required value
<b>Air set type FRS 923 (-40 to 80°C)</b>	
<b>Solenoid valve standard type SC G551A005</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4"
<b>Solenoid valve standard type SC G327B001</b>	
<b>Solenoid valve EEx em b type EM G327B001, explosion-proof</b>	Direct operated electromagnetic valve, version 3/2, function U (universal) G 1/4", with increased safety, encapsulated epoxy moulded
<b>Solenoid valve EEx d type NF G327B001, explosion-proof</b>	Direct operated electromagnetic valve, version 3/2, function U (universal), G 1/4", flameproof enclosure
<b>Solenoid valve 5/2-way type SCG551B417</b>	Direct operated electromagnetic valve, version 5/2, function U (universal), G 1/4", (use for double-acting actuators)
<b>Air lock relay, type EIL 200</b>	Retaining device for closing of air pipeline on a pressure drop
<b>Booster-valve type EIL 100</b>	Airflow enhancer



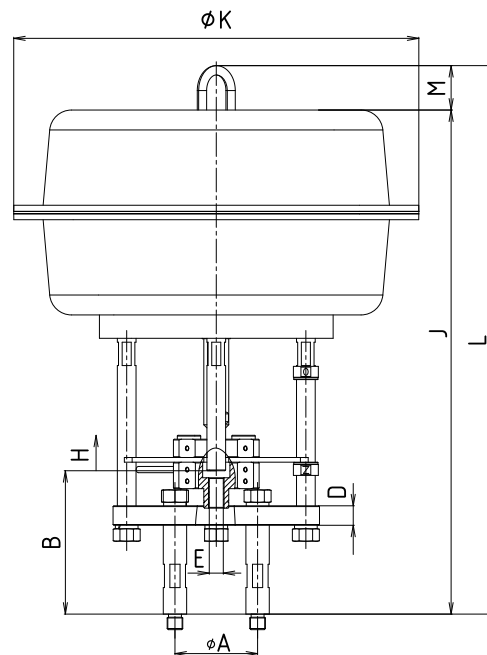
## Dimensions and weight of actuators A. Hock series 2000

Typ	Connection version	Main dimensions of diaphragm actuators and manual control												Weight		Hand wheel	
		A [mm]	B [mm]	D [mm]	E [mm]	J [mm]	K [mm]	L [mm]	M [mm]	R [mm]	U [mm]	V [mm]	W [mm]	0,2-1,0 [kg]	> [kg]	side [kg]	upper [kg]
<b>2109</b>	A252	132	162	22	M10x1	349	268	387	38	297		265	210	10	10	7	6
<b>2112-30 (NC)</b>	A253	168	168	23	M10x1	400	352	438	38	316		350	265	20	20	7	8
<b>2112T-30 (NC)</b>	A253	168	168	23	M10x1	587	352	625	38			350	265	36	36		8
<b>2112-30 (NO)</b>	A255	168	157	25	M10x1	367	352	404	38	316		350	265	21	21	7	8
<b>2112T-30 (NO)</b>	A255	168	157	25	M10x1	555	352	593	38			350	265	38	38		8
<b>2112-30 (NO)</b>	A256	168	167	25	M10x1	377	352	414	38	316		350	265	21	21	7	8
<b>2112T-30 (NO)</b>	A256	168	167	25	M10x1	565	352	603	38			350	265	38	38		8
<b>2112-50 (NC)</b>	A254	168	177	25	M16x1,5	387	352	425	38	316		350	265	22	22	7	8
<b>2112S-50 (NC)</b>	A254	168	177	25	M16x1,5	387	352	425	38			350	265		23		8
<b>2112T-50 (NC)</b>	A254	168	177	25	M16x1,5	575	352	613	38			350	265	40	40		8
<b>2112-50 (NO)</b>	A257	168	177	25	M16x1,5	387	352	425	38	316		350	265	22	22	7	8
<b>2112S-50 (NO)</b>	A257	168	177	25	M16x1,5	387	352	425	38			350	264		23		8
<b>2112T-50 (NO)</b>	A257	168	177	25	M16x1,5	575	352	613	38			350	265	38	38		8
<b>2116-40 (NO, NC)</b>	A258	230	190	26	M16x1,5	597	520	654	57		500		670	105	110		48
<b>2116-100 (NO,NC)</b>	A302	150	184	25	M20x1,5	647	520	704	57		500		670	113	118		48
<b>2116S-100 (NO,NC)</b>	A302	150	184	25	M20x1,5	647	520	704	57		500		670		132		48

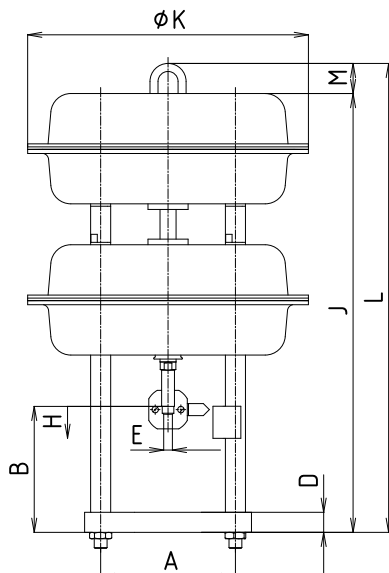
**Standard actuator**

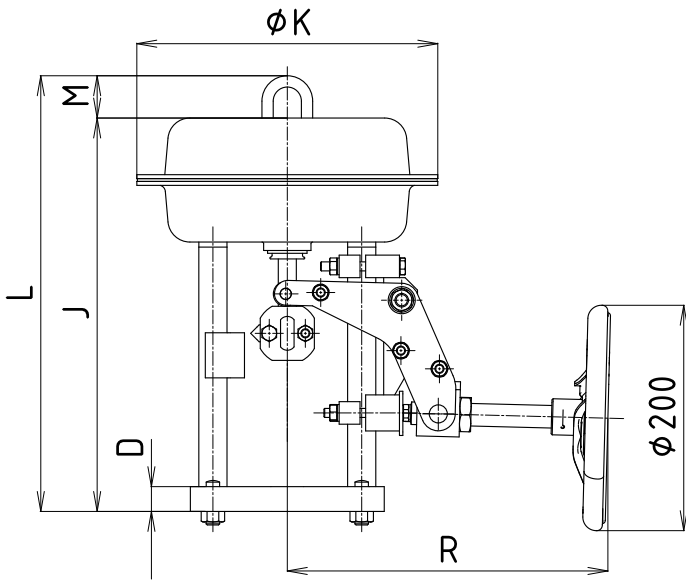


**Standard actuator with linear unit 2116(S)**

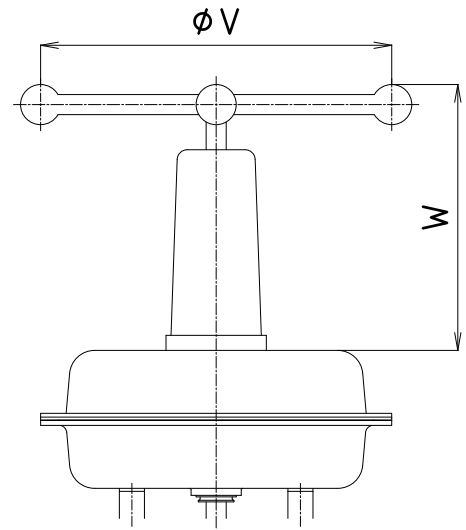


**Tandem-type actuator 2112T**

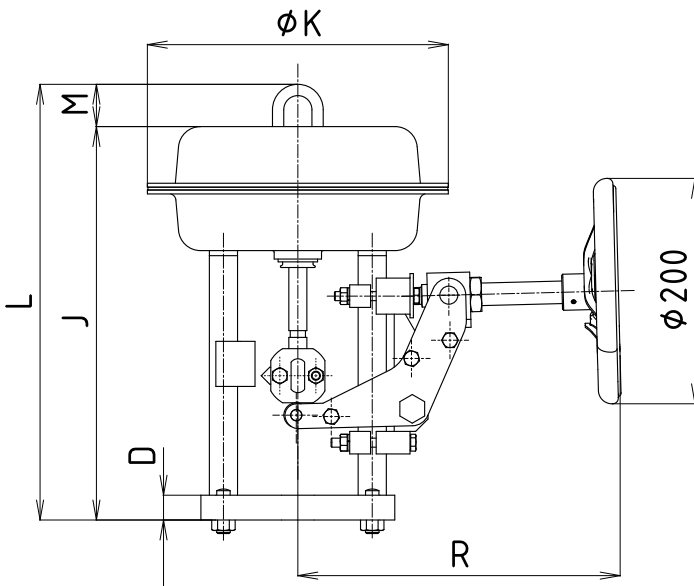




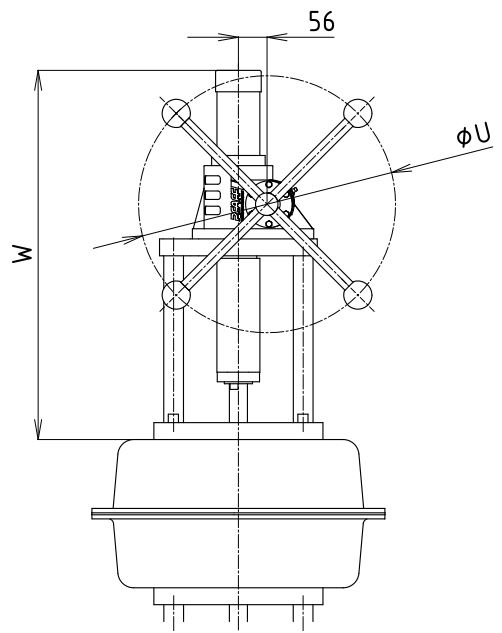
Standard actuator with side wheel (NO)



Upper wheel for actuators  
2109, 2112, 2112S, 2112T



Standard actuator with side wheel (NC)



Upper wheel for actuators  
2116(S)

## Specification No. of actuators A. Hock series 2000

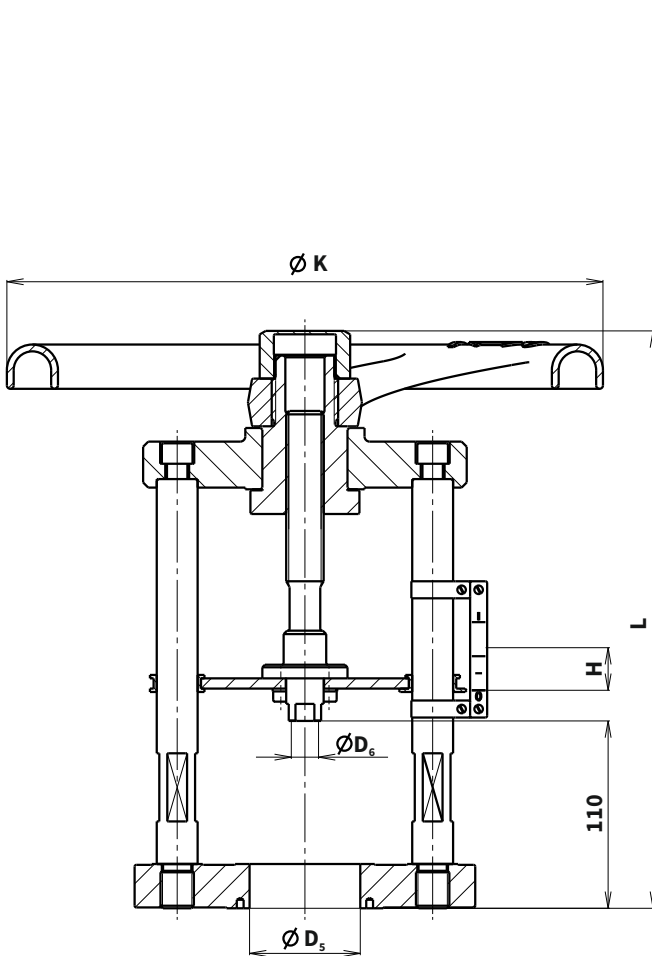
			P2-0K-	X	X	X	(AXXX)
<b>Spring range [bar]</b>	<b>Without hand wheel</b>	0,2 - 1,0	all actuators	<b>A</b>			
		0,8 - 2,2	all actuators, except 2112-50 / 2112T-50	<b>B</b>			
		1,2 - 3,0	2109	<b>V</b>			
		1,5 - 3,8	2109 (NC only)	<b>H</b>			
		1,6 - 3,2	2112-30 (NC only)	<b>M</b>			
		1,4 - 2,8	only 2112-30 / 2112T-30	<b>W</b>			
		1,5 - 3,0	2112T-30 (NC only)	<b>R</b>			
		0,5 - 1,7	2112-50 / 2112T-50	<b>D</b>			
		0,8 - 2,8	2112-50	<b>S</b>			
		0,7 - 2,5	only 2112-50	<b>X</b>			
		0,75 - 2,7	2112T-50 (NC only)	<b>U</b>			
		1,2 - 3,0	only 2112S-50	<b>Y</b>			
		1,4 - 3,4	only 2112S-50	<b>Z</b>			
		1,3 - 3,0	only 2116S-100	<b>Y</b>			
	1,5 - 3,5	only 2116S-100	<b>Z</b>				
	<b>With upper wheel</b>	0,2 - 1,0	all actuators	<b>E</b>			
		0,8 - 2,2	2109 / 2112-30 / 2112T-30	<b>F</b>			
		0,8 - 2,2	2116 / 2116T	<b>F</b>			
		1,2 - 3,0	2109 / 2112S-50	<b>L</b>			
		0,5 - 1,7	2112-50 / 2112T-50	<b>G</b>			
		0,7 - 2,5	2112-50 / 2112T-50	<b>T</b>			
1,4 - 2,8		2112-30	<b>N</b>				
<b>With side wheel</b>	0,2 - 1,0	except 2116 / 2116T	<b>I</b>				
	0,8 - 2,2	2109 / 2112-30	<b>K</b>				
	0,5 - 1,7	2112-50	<b>P</b>				
	0,7 - 2,5	2112-50 (NO only)	<b>Q</b>				
<b>Without hand wheel</b>	Double-acting version		<b>C</b>				
<b>Actuator size / nominal travel</b>	2109-20			<b>L</b>			
	2112-30			<b>M</b>			
	2112-50 / 2112S-50			<b>I</b>			
	2112T-30			<b>P</b>			
	2112T-50			<b>T</b>			
	2116-40, 2116-100, 2116S-100			<b>N</b>			
<b>Function</b>	Direct (NO)					<b>1</b>	
	Reverse (NC)					<b>2</b>	
	Double-acting					<b>3</b>	
<b>Connection version</b>	2109	CV 3XX, NPS ½" - 2½"	<b>A252</b>				
	2112-30 (NC) / 2112T-30 (NC)	CV 3XX, NPS ½" - 2½"	<b>A253</b>				
	2112-30 (NO)	CV 3XX, NPS ½" - 1½"	<b>A255</b>				
	2112-30 (NO) / 2112T-30 (NO)	CV 3XX, NPS 2" - 2½"	<b>A256</b>				
	2112-50 (NC) / 2112S-50 (NC) 2112T-50 (NC)	CV 3XX, NPS 3" - 6"	<b>A254</b>				
	2112-50 (NO) / 2112S-50 (NO) 2112T-50 (NO)	CV 3XX, NPS 3" - 6"	<b>A257</b>				
	2116-40 (only NC & NO)	CV 3XX, NPS 3" - 6"	<b>A258</b>				
	2116-100 / 2116S-100 (only NC & NO)	CV 3XX, NPS 8" - 16"	<b>A302</b>				

Ordering number example: **P2-0K-BL2 (A252)**

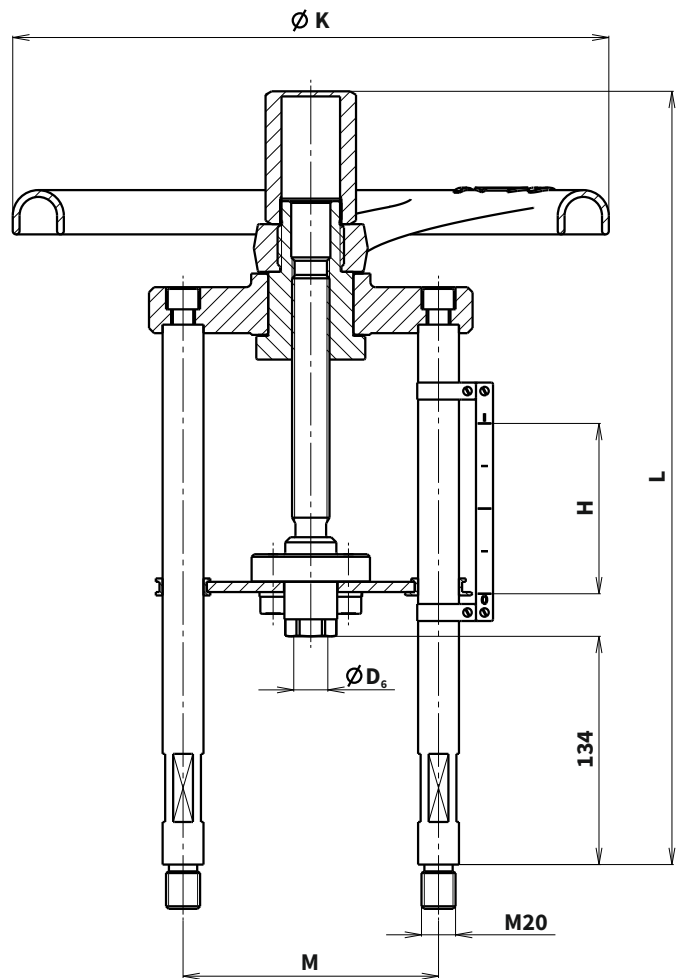
Specification No. of actuators A. Hock (stainless steel version) series 2000				P5-0K-	X	X	X	(AXXX)
Spring range [bar]	Without hand wheel	0,2 - 1,0	all actuators	A				
		0,8 - 2,2	all actuators, except 2112-50 / 2112T-50	B				
		1,6 - 3,2	2112-30 (NC only)	M				
		1,4 - 2,8	only 2112-30 / 2112T-30	W				
		1,5 - 3,0	2112T-30 (NC only)	R				
		0,5 - 1,7	2112-50 / 2112T-50	D				
		0,8 - 2,8	2112-50	S				
		0,7 - 2,5	only 2112-50	X				
		0,75 - 2,7	2112T-50 (NC only)	U				
		1,2 - 3,0	only 2112S-50	Y				
	1,4 - 3,4	only 2112S-50	Z					
	With upper wheel	0,8 - 2,2	2109 / 2112-30 / 2112T-30	F				
		1,2 - 3,0	2109 / 2112S-50	L				
		0,5 - 1,7	2112-50 / 2112T-50	G				
0,7 - 2,5		2112-50 / 2112T-50	T					
1,4 - 2,8		2112-30	N					
Without hand wheel	double -acting		C					
Actuator size / nominal travel	2109-20			L				
	2112-30			M				
	2112-50, 2112S-50			I				
	2112T-30			P				
	2112T-50			T				
Function	Direct (NO)						1	
	Indirect (NC)						2	
	Double-acting						3	
Connection version	2109	CV 3XX, NPS ½" - 2½"					A252	
	2112-30 (NC) / 2112T-30 (NC)	CV 3XX, NPS ½" - 2½"					A253	
	2112-30 (NO)	CV 3XX, NPS ½" - 1½"					A255	
	2112-30 (NO) / 2112T-30 (NO)	CV 3XX, NPS 2" - 2½"					A256	
	2112-50 (NC) / 2112S-50 (NC)	CV 3XX, NPS 3" - 6"					A254	
	2112T-50 (NC)	CV 3XX, NPS 3" - 6"					A254	
	2112-50 (NO) / 2112S-50 (NO)	CV 3XX, NPS 3" - 6"					A257	
2112T-50 (NO)	CV 3XX, NPS 3" - 6"					A257		

Ordering number example: **P5-0K-BL2 (A252)**

### Hand wheels for RV / UV 3x0 and 3x2



Hand wheel actuating of valves DN 15 - 150



Hand wheel actuating of valves DN 200 - 400

Dimensions of hand wheels									
DN	Marking	H [mm]	L [mm]	ØK [mm]	M [mm]	D <sub>s</sub> [mm]	D <sub>e</sub> [mm]	m [kg]	Ordering No. (part list no.)
15	R16	16	247	160	---	65	M10x1	5	S900 0231
20									
25									
32									
40	R20	20	275	195	---	65	M16x1,5	11	S900 0115
50									
65									
80	R28	40	317	280	---	65	M16x1,5	13	S900 0116
100			339						
125	R35	80	454	350	150	---	M20x1,5	15	S900 0141
150									
200									
250									
300									
400	100								

Specification No. of actuators A. Hock (stainless steel version) series 2000				P5-0K-	X	X	X	(AXXX)
Spring range [bar]	Without hand wheel	0,2 - 1,0	all actuators	A				
		0,8 - 2,2	all actuators, except 2112-50 / 2112T-50	B				
		1,6 - 3,2	2112-30 (NC only)	M				
		1,4 - 2,8	only 2112-30 / 2112T-30	W				
		1,5 - 3,0	2112T-30 (NC only)	R				
		0,5 - 1,7	2112-50 / 2112T-50	D				
		0,8 - 2,8	2112-50	S				
		0,7 - 2,5	only 2112-50	X				
		0,75 - 2,7	2112T-50 (NC only)	U				
		1,2 - 3,0	only 2112S-50	Y				
	1,4 - 3,4	only 2112S-50	Z					
	With upper wheel	0,8 - 2,2	2109 / 2112-30 / 2112T-30	F				
		1,2 - 3,0	2109 / 2112S-50	L				
		0,5 - 1,7	2112-50 / 2112T-50	G				
0,7 - 2,5		2112-50 / 2112T-50	T					
1,4 - 2,8		2112-30	N					
Without hand wheel	double -acting		C					
Actuator size / nominal travel	2109-20			L				
	2112-30			M				
	2112-50, 2112S-50			I				
	2112T-30			P				
	2112T-50			T				
Function	Direct (NO)						1	
	Indirect (NC)						2	
	Double-acting						3	
Connection version	2109	RV 3XX, DN 15 - 65					A252	
	2112-30 (NC) / 2112T-30 (NC)	RV 3XX, DN 15 - 65					A253	
	2112-30 (NO)	RV 3XX, DN 15 - 40					A255	
	2112-30 (NO) / 2112T-30 (NO)	RV 3XX, DN 50 - 65					A256	
	2112-50 (NC) / 2112S-50 (NC)	RV 3XX, DN 80 - 150					A254	
	2112T-50 (NC)	RV 3XX, DN 80 - 150					A254	
	2112-50 (NO) / 2112S-50 (NO)	RV 3XX, DN 80 - 150					A257	
2112T-50 (NO)	RV 3XX, DN 80 - 150					A257		

Ordering number example: **P5-0K-BL2 (A252)**



## Actuator marking in valve specification No.

Electric actuator Regada Modact MTR	<b>EPD</b>	Electric actuator Schiebel AB5	<b>EZE</b>
Electric actuator Regada ST 0	<b>EPK</b>	Electric actuator Schiebel exAB5	<b>EZF</b>
Electric actuator Redgada ST 0.1	<b>EPL</b>	Electric actuator Schiebel rAB5	<b>EZG</b>
Electric actuator Regada Isomact ST 1 Ex	<b>EPJ</b>	Electric actuator Schiebel exrAB5	<b>EZH</b>
Electric actuator Regada Isomact ST 2	<b>EPM</b>	Electric actuator Schiebel rAB8	<b>EZK</b>
Electric actuator Auma SA 07.2	<b>EAA</b>	Electric actuator Schiebel exrAB8	<b>EZL</b>
Electric actuator Auma SA Ex 07.2	<b>EAB</b>	Electric actuator Rotork IQM10 and IQM12	<b>EQA</b>
Electric actuator Auma SAR 07.2	<b>EAC</b>	Electric actuator Rotork Ex IQM10 and Ex IQM12	<b>EQB</b>
Electric actuator Auma SAR Ex 07.2	<b>EAD</b>	Electric actuator Rotork IQM20	<b>EQD</b>
Electric actuator Auma SA 07.6	<b>EAE</b>	Electric actuator Rotork Ex IQM20	<b>EQE</b>
Electric actuator Auma SA Ex 07.6	<b>EAF</b>	Electric actuator Rotork CVL-500 to CVL-5000	<b>EQL</b>
Electric actuator Auma SAR 07.6	<b>EAG</b>	Pneumatic actuator Flowserve PA 253	<b>PFA</b>
Electric actuator Auma SAR Ex 07.6	<b>EAH</b>	Pneumatic actuator Flowserve PB 503	<b>PFB</b>
Electric actuator Auma SA 10.2	<b>EAI</b>	Pneumatic actuator Flowserve PB 701	<b>PFC</b>
Electric actuator Auma SAR 10.2	<b>EAJ</b>	Pneumatic actuator Flowserve PO 1502	<b>PFD</b>
Electric actuator Auma SAR Ex 10.2	<b>EAK</b>	Pneumatic actuator Flowserve PO 3002	<b>PFE</b>
Electric actuator Auma SA Ex 10.2	<b>EAL</b>	Pneumatic actuator A. Hock 2109-20	<b>PHF</b>
Electric actuator Schiebel AB3	<b>EZA</b>	Pneumatic actuator A. Hock 2112-30, A. Hock 2112-50	<b>PHA</b>
Electric actuator Schiebel exAB3	<b>EZB</b>	Pneumatic actuator A. Hock 2112T-30, A. Hock 2112T-50	<b>PHB</b>
Electric actuator Schiebel rAB3	<b>EZC</b>	Pneumatic actuator A. Hock 2116-40	<b>PHC</b>
Electric actuator Schiebel exrAB3	<b>EZD</b>	Hand wheel for NPS ½" - 1½"	<b>R16</b>
Electric actuator Schiebel AB5	<b>EZE</b>	Hand wheel for NPS 2"	<b>R20</b>
Electric actuator Schiebel exAB5	<b>EZF</b>	Hand wheel for NPS 3" - 4"	<b>R28</b>
		hand wheel for NPS 6" - 16"	<b>R35</b>

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

Material	Class	Temperature [ °C ]																	
		RT <sup>1)</sup>	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	
<b>A216 WCB</b>	<b>150</b>	1.96	1.92	1.77	1.58	1.38	1.21	1.02	0.93	0.84	0.74	0.65	0.55	---	---	---	---	---	
	<b>300</b>	5.11	5.01	4.66	4.51	4.38	4.19	3.98	3.87	3.76	3.64	3.47	2.88	---	---	---	---	---	
	<b>600</b>	10.21	10.02	9.32	9.02	8.76	8.39	7.96	7.74	7.51	7.27	6.94	5.75	---	---	---	---	---	
<b>A217 WC 6<sup>2)</sup></b>	<b>150</b>	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	
	<b>300</b>	5.17	5.17	5.15	4.97	4.80	4.63	4.29	4.14	4.03	3.89	3.65	3.52	3.37	3.17	2.57	1.49	1.27	
	<b>600</b>	10.34	10.34	10.30	9.95	9.59	9.27	8.57	8.26	8.04	7.76	7.33	7.00	6.77	6.34	5.15	2.98	2.54	
<b>A351 CF8M<sup>3)</sup></b>	<b>150</b>	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	
	<b>300</b>	4.96	4.81	4.22	3.85	3.57	3.34	3.16	3.09	3.03	2.99	2.94	2.91	2.88	2.87	2.82	2.52	2.50	
	<b>600</b>	9.93	9.62	8.44	7.70	7.13	6.68	6.32	6.18	6.07	5.98	5.89	5.83	5.77	5.73	5.65	5.00	4.98	

<sup>1)</sup> -29°C to 38°C

<sup>2)</sup> Normalized annealed material only. The deliberate addition of any element which is not listed in ASTM A 217 is inadmissible, with the exception of Ca and Mg for deoxidation.

<sup>3)</sup> With a temperature above 540°C (1004°F) use only when the carbon content is  $\geq 0,04\%$ .

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

Material	Class	Temperature [ °F ]														
		RT <sup>1)</sup>	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050
<b>A216 WCB</b>	<b>150</b>	285	260	230	200	170	140	125	110	95	80	---	---	---	---	---
	<b>300</b>	740	680	655	635	605	570	550	530	505	410	---	---	---	---	---
	<b>600</b>	1480	1360	1310	1265	1205	1135	1100	1060	1015	825	---	---	---	---	---
<b>A217 WC6<sup>2)</sup></b>	<b>150</b>	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20
	<b>300</b>	750	750	720	695	665	605	590	570	530	510	485	450	320	215	145
	<b>600</b>	1500	1500	1445	1385	1330	1210	1175	1135	1065	1015	975	900	640	430	290
<b>A351 CF8M<sup>3)</sup></b>	<b>150</b>	275	235	215	195	170	140	125	110	95	80	65	50	35	20	20
	<b>300</b>	720	620	560	515	480	450	440	435	425	420	420	415	385	365	360
	<b>600</b>	1440	1240	1120	1025	955	900	885	870	855	845	835	830	775	725	720

<sup>1)</sup> -20°F to 100°F

<sup>2)</sup> Normalized annealed material only. The deliberate addition of any element which is not listed in ASTM A 217 is inadmissible, with the exception of Ca and Mg for deoxidation.

<sup>3)</sup> With a temperature above 540°C (1004°F) use only when the carbon content is  $\geq 0,04\%$ .



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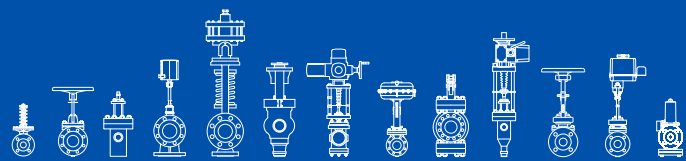
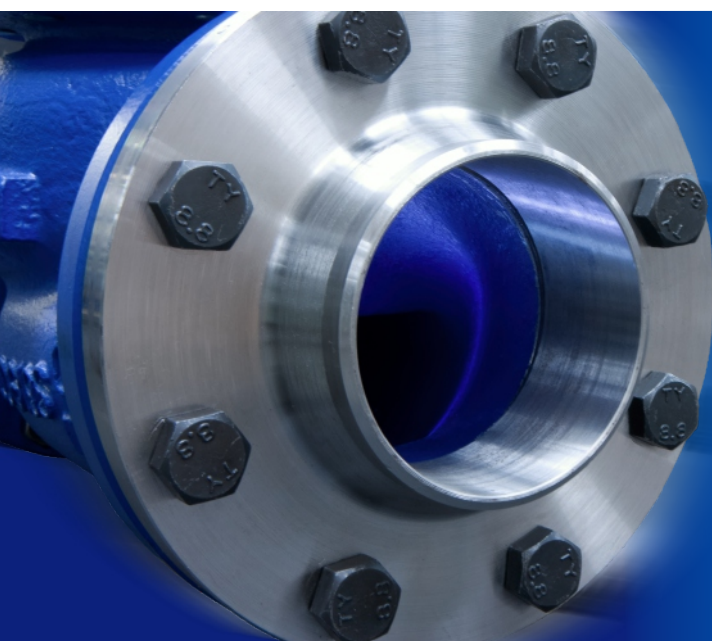
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