

**02 - 04.2**

01.14.GB

**Control valves  
RV 805 and RV 806**



## Kv coefficient calculation

Calculation itself is carried out with respect to conditions of regulating circuit and operating medium according to equations mentioned below. Control valve must be designed to be able to regulate maximal flow quantity at given operating conditions. At the same time it is necessary to check whether minimal flow quantity can be even regulated or not.

Because of eventual minus tolerance 10% of  $Kv_{100}$  against  $Kvs$  and requirement for possible regulation within range of maximal flow (decrement and increase of flow), producer recommends to select  $Kvs$  value higher than maximal operating  $Kv$  value:

$$Kvs = 1.2 \div 1.3 Kv$$

It is necessary to take into account to which extent  $Q_{max}$  involve "precautionary additions" that could result in valve oversizing.

## Relations of Kv calculation

		Pressure drop $p_2 > p_1/2$ $\Delta p < p_1/2$	Pressure drop $\Delta p \geq p_1/2$ $p_2 \leq p_1/2$
Kv =	Liquid	$\frac{Q}{100} \sqrt{\frac{\rho_1}{\Delta p}}$	
	Gas	$\frac{Q_n}{5141} \sqrt{\frac{\rho_n \cdot T_1}{\Delta p \cdot p_2}}$	$\frac{2 \cdot Q_n}{5141 \cdot p_1} \sqrt{\rho_n \cdot T_1}$
	Superh. steam	$\frac{Q_m}{100} \sqrt{\frac{v_2}{\Delta p}}$	$\frac{Q_m}{100} \sqrt{\frac{2v}{p_1}}$
	Sat. steam	$\frac{Q_m}{100} \sqrt{\frac{v_2 \cdot x}{\Delta p}}$	$\frac{Q_m}{100} \sqrt{\frac{2v \cdot x}{p_1}}$

## Above critical flow of vapours and gases

When pressure ratio is above critical ( $p_2/p_1 < 0.54$ ), speed of flow reaches acoustic velocity at the narrowest section. This event can cause higher level of noisiness and then it is convenient to use a throttling system ensuring low noisiness (multi-step pressure reduction, damping orifice plate at outlet).

## Dimensions and units

Marking	Unit	Name of dimension
Kv	m <sup>3</sup> /hour	Flow coefficient under conditions of units of flow
$Kv_{100}$	m <sup>3</sup> /hour	Flow coefficient at nominal stroke
Kvs	m <sup>3</sup> /hour	Valve nominal flow coefficient
Q	m <sup>3</sup> /hour	Flow rate in operating conditions ( $T_1, p_1$ )
$Q_n$	Nm <sup>3</sup> /hour	Flow rate in normal conditions (0 °C, 0.101 MPa)
$Q_m$	kg/hour	Flow rate in operating conditions ( $T_1, p_1$ )
$p_1$	MPa	Upstream absolute pressure
$p_2$	MPa	Downstream absolute pressure
$p_s$	MPa	Absolute pressure of saturated steam at given temperature ( $T_1$ )
$\Delta p$	MPa	Valve differential pressure ( $\Delta p = p_1 - p_2$ )
$\rho_1$	kg/m <sup>3</sup>	Process medium density in operating conditions ( $T_1, p_1$ )
$\rho_n$	kg/Nm <sup>3</sup>	Gas density in normal conditions (0 °C, 0.101 MPa)
$v_2$	m <sup>3</sup> /kg	Specific volume of steam when temperature $T_1$ and pressure $p_2$
$v$	m <sup>3</sup> /kg	Specific volume of steam when temperature $T_1$ and pressure $p_1/2$
$T_1$	K	Absolute temperature at valve inlet ( $T_1 = 273 + t_1$ )
x	1	Proportionate weight volume of saturated steam in wet steam

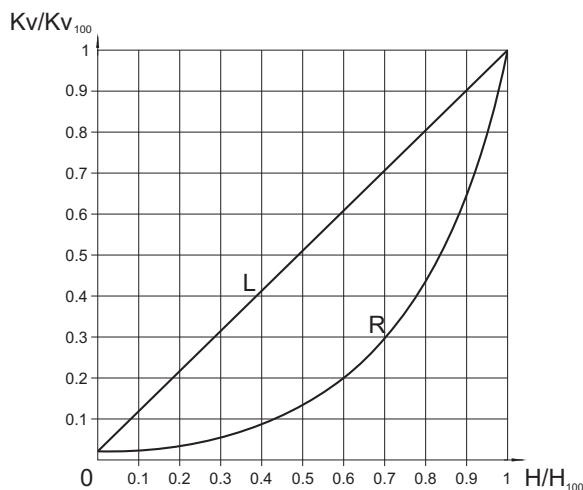
## Cavitation

Cavitation is a phenomenon when there are steam bubbles creating and vanishing in shocks - generally at the narrowest section of flowing due to local pressure drop. This event expressively cuts down service life of inner parts and can result in creation of unpleasant vibrations and noisiness. In control valves it can happen on condition that

$$(p_1 - p_2) \geq 0.6 (p_1 - p_s)$$

Valve differential pressure should be set the way so that neither any undesired pressure drop causing cavitation can occur, nor liquid-steam(wet steam) mixture can create. Otherwise it must be taken into account when calculating  $Kv$  value. If the creation of cavitation still threatens, it is necessary to use a multi-step pressure reduction.

## Valve flow characteristics



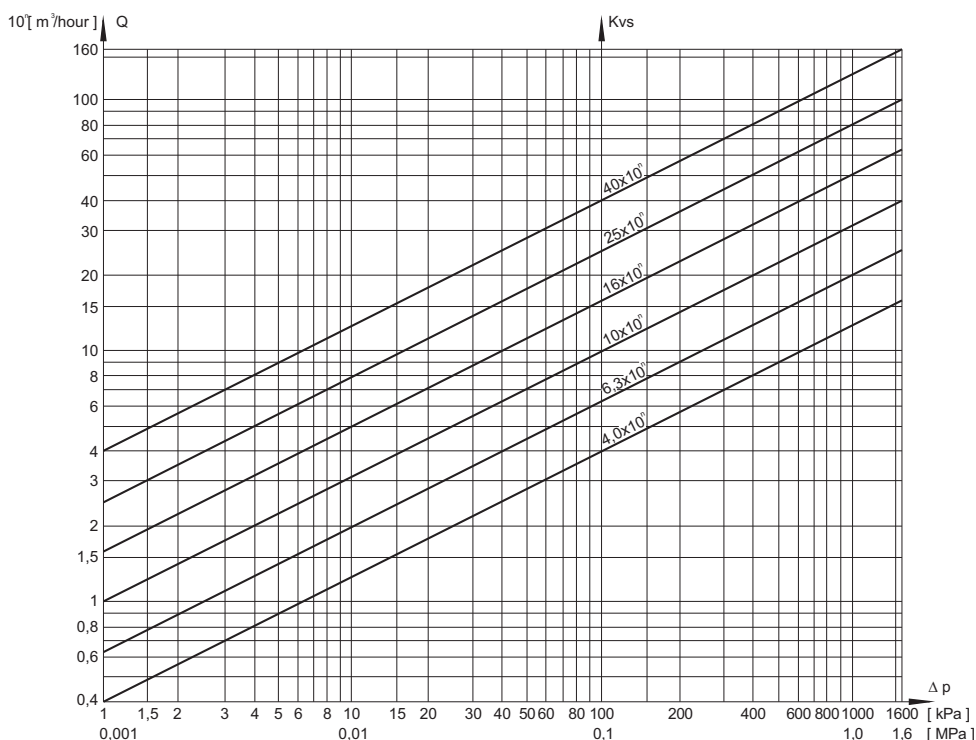
L - linear characteristic

$$Kv/Kv_{100} = 0.0183 + 0.9817 \cdot (H/H_{100})$$

R - equal-percentage characteristic (4-percentage)

$$Kv/Kv_{100} = 0.0183 \cdot E^{(4 \cdot H/H_{100})}$$

## Diagram for the valve Kvs value specification according to the required flow rate of water Q and the valve differential pressure $\Delta p$



The diagram serves to specify the valve Kvs value regarding to the required flow rate of water at a given differential pressure. It can be also used for finding out the differential pressure value of the existing valve in behaviour with the flow rate. The diagram applies to water with the density of  $1000 \text{ kg/m}^3$ .

For the value  $Q = q \cdot 10^n$ , it is necessary to calculate with  $Kvs = k \cdot 10^n$ . Example: water flow rate of  $16 \cdot 10^{-1} = 1,6 \text{ m}^3/\text{hour}$  corresponds to  $Kv = 2,5 = 25 \cdot 10$  when differential pressure  $40 \text{ kPa}$ .

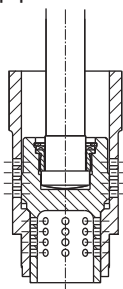
### Application of multi-step pressure reduction

When the valves are designed for operating in a differential pressure higher than recommended or in above-critical differential pressure ( $p_1/p_2 < 0,54$  when throttling steam and

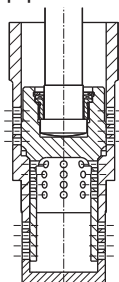
gases), it is effectual to use a throttling system in two or three steps to prevent the cavitation from creating and to ensure both a long service life of the valve inner parts and low noisiness when operating.

Type of trim: cage - perforated plug

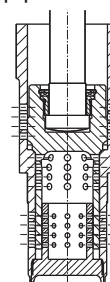
Two-step pressure reduction



Three-step pressure reduction

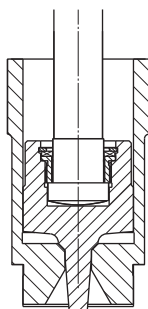


Four-step pressure reduction

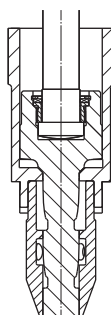


Type of trim: seat - contoured plug

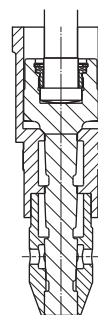
One-step pressure reduction



Two-step pressure reduction



Three-step pressure reduction



# RV 805 RV 806



**Control valves**  
**DN 25, 40, 50**  
**PN 160, 250, 400**

## Description

The control valves series RV 805 and RV 806 are single-seated valves of a unit construction that provides a great variety of control elements. Thanks to such a combination, it is possible to satisfy the customers' requirements and demands. The valve is equipped with "Live Loading" packing.

The valve connection is weld ends in angle execution (type RV 805) or "Z"-shaped execution (RV 806). Material of weld ends is optional. The dimensions of connection correspond to ČSN 13 1075 and their shape to EN 12 627.

The valve can also be supplied with the connection specified by the customer. The valve is supplied with an electric actuators of the producers ZPA Pečky, ZPA Křížik Prešov, Auma, Schiebel and pneumatic actuators Flowserve.

## Process media

The valves are especially designed to control the flow and pressure of cooling water to steam. The producer recommends to pipe a strainer into pipeline in front of the valve when impurities are present. Impurities can affect the quality and reliability of regulation and can cause a reduction of the

valve service life. It is necessary to take into account the used materials when the valves is used for any other process media.

## Application

The valves series RV 805 and RV 806 are especially designed as control elements for control of injection water supply into steam pipeline. Thanks to their high nominal working pressure (PN 400) and ability to manage high differential pressures (ordinarily 15 MPa, max. 20 MPa), owing to a multi-step pressure reduction, the valves can be used in every application to which any other common valve cannot resist due to its low service life. The max. permissible operating pressures correspond to EN 12 516-1 also mentioned on the page 21 of this catalogue.

## Installation

The valve can be piped in any way except the position when the actuator is under the valve body, The flow direction is indicated by the arrows on the valve body.

## Technical data

Series	RV 805		RV 806	
Type of valve	Control valve, single-seated, angle, with weld ends		Control valve, single-seated, "Z"- shaped, with weld ends	
Nominal size range	25, 40, 50 (unbalanced valve), 65, 80, 100 (balanced valve)			
Nominal pressure	160, 250, 400			
Body material	Stainless steel 1.4922 (X20CrMoV11-1)			
Material of weld ends	Cast steel 1.0425 (P 265 GH)	Alloy steel 1.7335 (13CrMo4-5)	Cast steel 1.0425 (P 265 GH)	Alloy steel 1.7335 (13CrMo4-5)
Operating temp. range	-20 to 400 °C	-20 to 550 °C	-20 to 400 °C	-20 to 550 °C
Connection	Weld ends acc. to ČSN 13 1075 (3/1991)			
Type of trim	Cage - perforated plug; seat - contoured plug (for small Kvs values)			
$\Delta p_{max}$ for 1 step of reduction	4,0 MPa for perforated plug, 2,0 MPa for contoured plug			
Flow characteristic	Linear, equal-percentage acc. to ČSN EN 60534-1 (4/1997)			
Leakage rate	Class IV. acc. to ČSN EN 1349 (5/2001)			

## Range of Kvs values

DN	25	40	50	65	80, 100	25	40	50	65, 80, 100
	Kvs values [m <sup>3</sup> /h]								
Pressure reduction	Linear characteristic					Equal-percentage characteristic			
	Type of trim: cage - perforated plug								
1	---			6.3 - 40	6.3 - 50	---			6.3 - 32
2	2.5 - 4.0	2.5 - 8.0	2.5 - 12.5	6.3 - 40	6.3 - 50	3.2 - 4.0	3.2 - 8.0	3.2 - 12.5	6.3 - 32
3	2.0 - 3.2	2.0 - 6.3	2.0 - 9.0	5 - 40	5 - 50	2.8 - 3.2	2.8 - 6.3	2.8 - 9.0	5 - 25
4	1.6 - 2.8	1.6 - 5.6	1.6 - 7.1	---	---	2.5 - 2.8	2.5 - 5.6	2.5 - 7.1	---
	Type of trim: seat - contoured plug								
1	0.63 - 4.5			---		1.6 - 4.5			---
2	1.0 - 2.24			---		1.4 - 2.8			---
3	0.8 - 1.8			---		1.0 - 2.5			---

## Dimensions and weights for the type RV 805

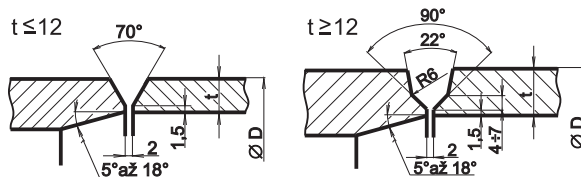
DN	PN 160, 250, 400						
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	L	H	m
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
25	250	126	286	160	160	25	34
40	250	126	286	160	165	25	35
50	250	126	286	160	175	25	36
65	340	195	390	160	260	40	110
80	340	195	390	160	260	40	115
100	340	195	390	160	260	40	120

## Connection dimensions of weld ends

DN	PN 160		PN 250		PN 400	
	D	t	D	t	D	t
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	33.7	4	33.7	5	33.7	7.1
40	48.3	5	48.3	7	48.3	11
50	60.3	6.3	60.3	8	60.3	12.5
65	76.1	7	76.1	10	76.1	17.5
80	88.9	8	88.9	12.5	88.9	19
100	114.3	10	114.3	14	114.3	20

## Dimensions and weights for the type RV 806

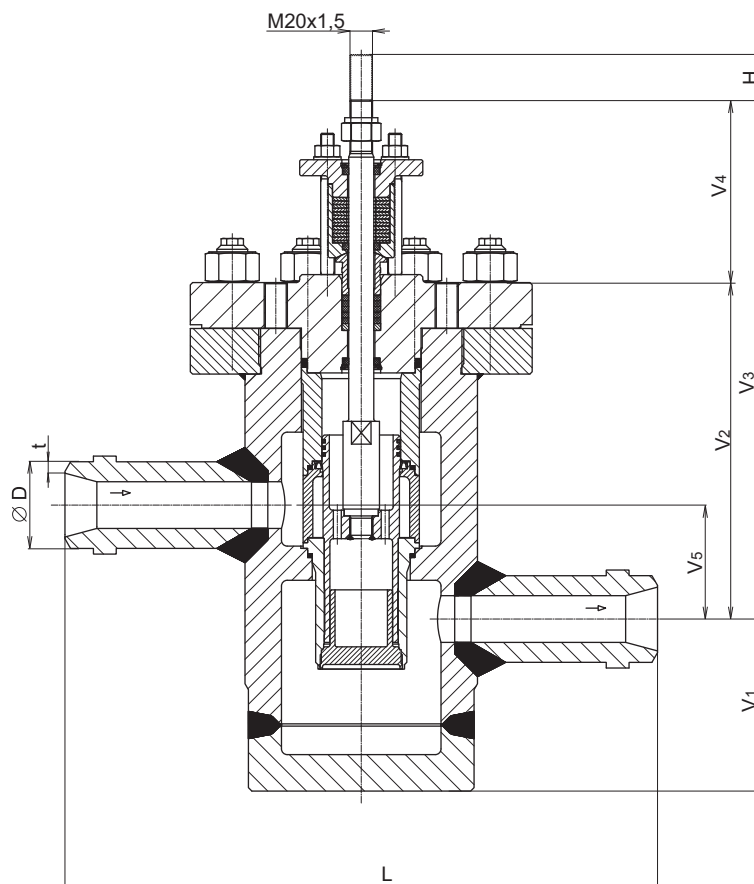
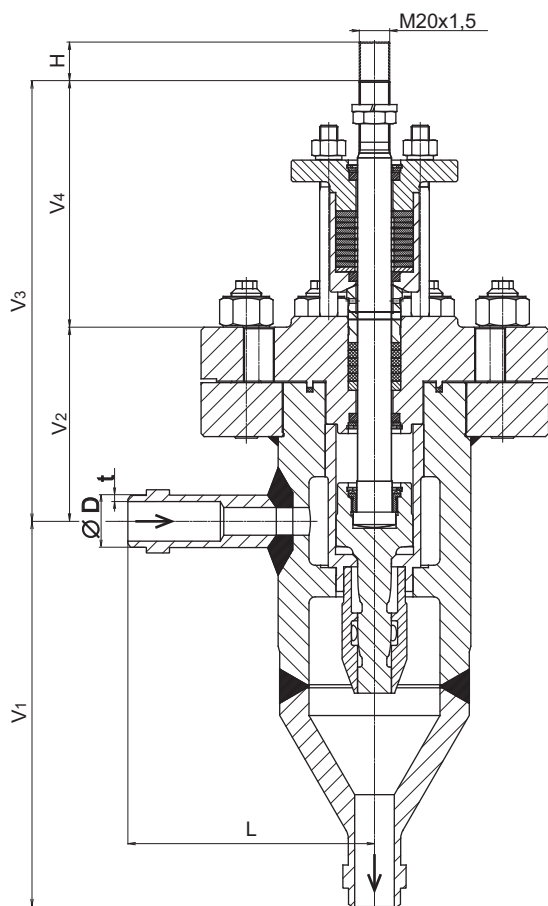
DN	PN 160, 250, 400							
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	L	H	m
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
25	55	201	361	160	75	320	25	34
40	55	201	361	160	75	330	25	35
50	55	201	361	160	75	350	25	36
65	150	295	455	160	100	520	40	125
80	150	295	455	160	100	520	40	130
100	150	295	455	160	100	520	40	135



Other shapes of weld ends on customer demands

Control valve RV 805 angle

Control valve RV 806 "Z"-shaped



## Valve complete specification No. for ordering RV 805 and RV 806

		XX	XXX	XXX	XXXX	XX	-	XXX	/	XXX	-	XXX
1. Valve	Control valve	RV										
2. Series	Control valve, straight-through		805									
	Control valve "Z"-shaped		806									
3. Type of actuating	Electric actuator					E						
	Pneumatic actuator					P						
	Electric actuator Modact MTR					EPD						
	Electric actuator Modact MTN Control					EYA						
	Electric actuator Modact MTN					EYB						
	Electric actuator Modact MOP 52 030					EYE						
	Electric actuator Modact MOP Control 52 030					EYF						
	Electric actuator Modact MOP 52 031					EYG						
	Electric actuator Modact MOP Control 52 031					EYH						
	Electric actuator Auma SAR 10.2					EAJ						
	Electric actuator Schiebel rAB8					EZK						
Electric actuator Flowserve PO 1502					PFD							
4. Connection	Weld ends				4							
5. Weld ends material <i>(operating temp. ranges are specified in the parentheses)</i>	Cast steel 1.0425 (P 265 GH) (-20 to 400°C)				2							
	Alloy steel 1.7335 (13CrMo4-5) (-20 to 550°C)				6							
	Other material on request				9							
6. Packing	Graphite - Live Loading				5							
7. Multi-step pressure reduction	One-step pressure reduction				1							
	Two-step pressure reduction				2							
	Three-step pressure reduction				3							
	Four-step pressure reduction				4							
8. Flow characteristic	Linear					L						
	Equal-percentage					R						
9. No. of orifice plate	Without					0						
10. Nominal pressure PN	PN 160							160				
	PN 250							250				
	PN 400							400				
11. Operating temperature °C	Acc. to process medium								XXX			
12. Nominal size	DN - acc. to the valve selection										XXX	

**Order example:** Control valve, angle, injecting, DN 40, PN 250, with electric actuator Modact Control MTN, body material: wrought carbon steel, packing: graphite, three-step pressure reduction, with linear flow characteristic, is specified as follows: **RV 805 EYA 4253 L0 250/400-40.**

### Note

A different type of actuating can be delivered after agreement with the producer.



## Electric actuator Modact MTR Regada

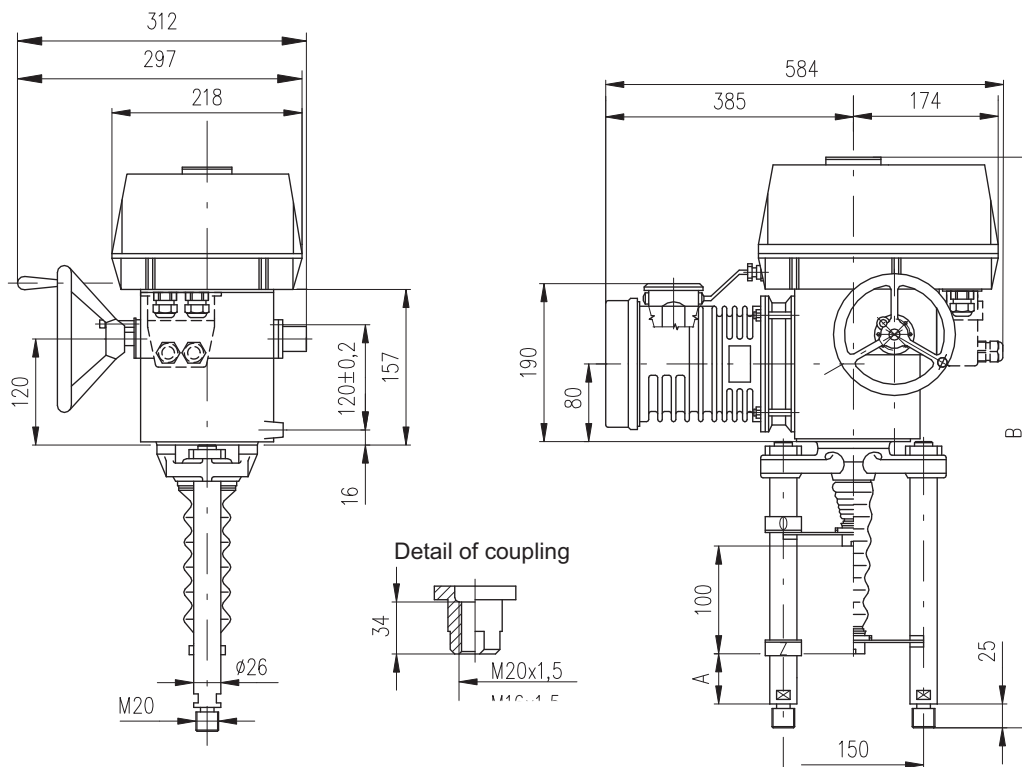
### Technical data

Type	Modact MTR
Marking in valve specification No.	EPD
Voltage	230 V
Frequency	50 Hz
Motor power	16 or 25 W
Control	3 - pos. c. (in connection with NOTREP positioner - continuous)
Nominal force	25 kN
Travel	25 and 40 mm
Enclosure	IP 55 / IP 67
Process medium max. temperature	Acc. to used valve
Ambient temperature range	-25 to 55°C
Ambient humidity limit	90 %
Weight	27 to 31 kg

**Note:**

Detailed technical informations and wiring diagrams can be found in producer's datasheet or on the website [www.regada.sk](http://www.regada.sk)

### Dimensions of Modact MTR



Columns	with ball bolt	
	A	B
verze		
P-1045a/H	130	702

## Specification of Modact MTR

Electric actuator MTR, linear					52 420.			X	-	X	X	X	X	X	/	X	X		
Mild up to hot dry with temperature range (-25 °C to +55 °C)					Enclosure IP 55			0											
					Enclosure IP 67			1											
Electric conection		Voltage			Wiring diagram														
To terminal board		230 V AC			Z296														
To connector																			
Screw version	Switching-off thrust <sup>1)2)</sup>	Rated operating speed	Operating speed	Electric motor															
				Power	Speed	Current													
ball screw	25 000/32-G	10.0 - 25.0 kN	32 mm/min.	38 - 32 mm/min.	25 W	1 250	0.41 A											G	
Control board version		Operating stroke		Wiring diagram															
Electromechanical control board - without local control		25 mm		Z298														C	
		40 mm																	
Transmitter		Connection		Output		Wiring diagram													
Without transmitter		—		—		—												A	
Resistive	Single		—		1x100 Ω		Z5a											B	
	Double				2x100 Ω		Z6a												C
	Single				1x2000 Ω		Z5a												F
	Double				2x2000 Ω		Z6a												
Resistive with current converter	Without power supply		2-wire		4 - 20 mA		Z10a											S	
	With power supply				Z269a														Q
	Without power supply		3-wire		0 - 20 mA		Z257a											T	
	With power supply				Z260a														U
	Without power supply				4 - 20 mA		Z257a												V
	With power supply				Z260a														
	Without power supply		0 - 5 mA		Z257a														Y
	With power supply				Z260a														
Capacitive CPT	Without power supply		2-wire		4 - 20 mA		Z10a											I	
	With power supply				Z269a														J
Mechanical connection	Connecting height / stroke		Pillar spacing / Bore of flange		Thread of stem <sup>3)</sup>		Dimensional drawing												
Columns	130/100		150/ —		M20x1.5		P-1045a/C; P-1045a/H											C	
Additional equipment					Wiring diagram														
Without additional equipment; adjusted max. switching-off thrust from range																		0 1	
A 2 additional position switches S5,S6					Z298													0 2	
B Adjustment of switching-off thrust for required value																		0 3	

Combinations available and specification codes: A+B = 07

### Notes:

- 1) State the switching-off thrust in your order by words. If not stated it is adjusted to the maximum rate of the corresponding range. Can not be adjust on site.
- 2) 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
- 3) The thread in the coupling is to be specified in the order by words.





**Electric actuators Modact MTN  
and Modact MTN Control  
ZPA Pečky**

**Technical data**

Type	Modact MTN Control, Modact MTP Control	Modact MNT, Modact MTP
Marking in valve specification No.	EYA	EYB
Voltage	3 ~ 230 V AC / 400 V AC	
Frequency	50 Hz	
Motor power	See specification table	
Control	3 - position control or continuous with regulator ZP2.RE5	
Nominal force	25000 N	
Travel	25 a 40 mm	
Enclosure	IP 55	IP 67
Process medium max. temperature	Acc. to used valve	
Ambient temperature range	-25 až 55°C	
Ambient humidity range	10 - 100 % with condensation	
Weight	33 to 45 kg	

**Wiring diagram of actuators**

Note:

Detailed technical informations and wiring diagrams can be found in producer's datasheet or on the webside [www.zpa-pecky.cz](http://www.zpa-pecky.cz).

## Specifikace pohonů Modact MTN, MTP a Modact MTN, MTP Control

Basic equipment:	2 power switches MO, MZ	1 position transmitter - resist. 2x100 W or cap. CPT1/A
	2 limit switches PO, PZ	1 anti-condensation heater
	2 limit and signalisation switches SO, SZ	1 three phase, asynchronous motor

### Basic technical data:

Type	Power switch setting range kN	Direct power kN	Resetting speed mm.min <sup>-1</sup>	Travel mm	Power W	Electric motor			Weight Aluminium [kg]	Specification	
						RPM 1/min	In (400V) A	I <sub>z</sub> /I <sub>n</sub>		Basic	Additional <sup>2)</sup>
MTN 25 MTP 25	15 - 25	32,5	50	10 - 100	180	835	0.74	2.3	33	52 442	XX4XXM
			80		180	835	0.74	2.3			XX5XXM
			125		250	1350	0.77	3.0			XX6XXM
			36		120	645	0.51	2.2			XX7XXM
			27		120	645	0.51	2.2			XX8XXM

### Execution, electric connection

With terminal board	6XXXXM
With conector HARTING	7XXXXM
Provedení Modact MTN; Modact MTN Control ... enclosure IP55	XXXXNM
Provedení Modact MTP; Modact MTP Control ... enclosure IP67	XXXXPM

		Current transmitter without power supply (CPT)	Current transmitter with power supply (DCPT)
		Position transmitters	current 4 - 20 mA
	current 4 - 20 mA with BMO	XXX1XM	XXXSXM
	resistance 2x 100 Ω	XXX2XM	
	resistance 2x 100 Ω with BMO	XXX3XM	
	without transmitter, with BMO	XXXPXM	
	without transmitter, without BMO	XXXZXM	

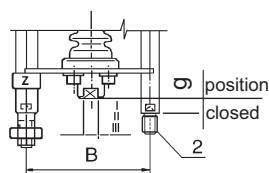
### Additional electric equipment

Control execution (with built-in contactor combination)	Without local control		Resistive transmitter 2x 100 Ω	Current transmitter without power supply (CPT)	Current transmitter with power supply (DCPT)
			With local control <sup>1)</sup>	Without brake BAM and positioner	XXX4XM
With brake BAM, without positioner	XXX5XM	XXXBXM		XXXLXM	
With brake BAM and positioner		XXXCX5M <sup>3)</sup>			
Without brake BAM and positioner	XXX7XM	XXXDXM		XXXMXM	
With brake BAM, without positioner	XXX8XM	XXXEXM		XXXNXM	
With brake BAM and positioner		XXXFX5M <sup>3)</sup>			

### Notes:

- <sup>1)</sup> When execution with blinker is requested, please specify this requirement in writing - execution with blinker
- <sup>2)</sup> Design without force locking there is capital letter M at end position of an actuator specification nr. (for example 52442.6R41NM)
- <sup>3)</sup> The Control execution of actuators with ZP2.RE5 regulator - the digit "5" is put on the 11th place. (for example 52442.6R41N5M)

## Connection dimensions - details of additional specification No. of 52 442

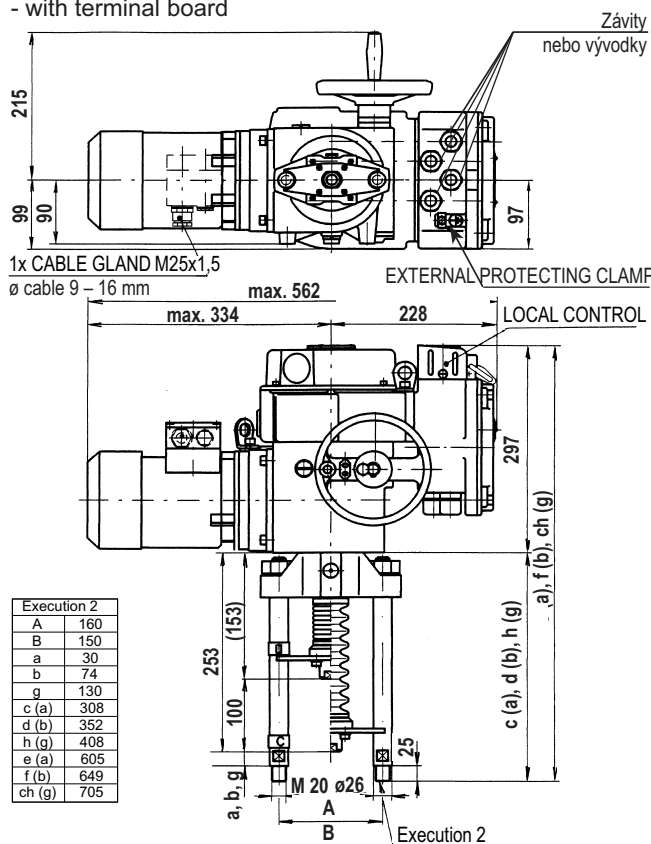


Pitch of columns	B	150
Position "closed"	g	130
Clutch thread	I	M 20x1,5

Execution	Specification No.		For valves
	basic	additional	
Bg2I	52 442	XRXXM	RV 80x DN 25 to 100

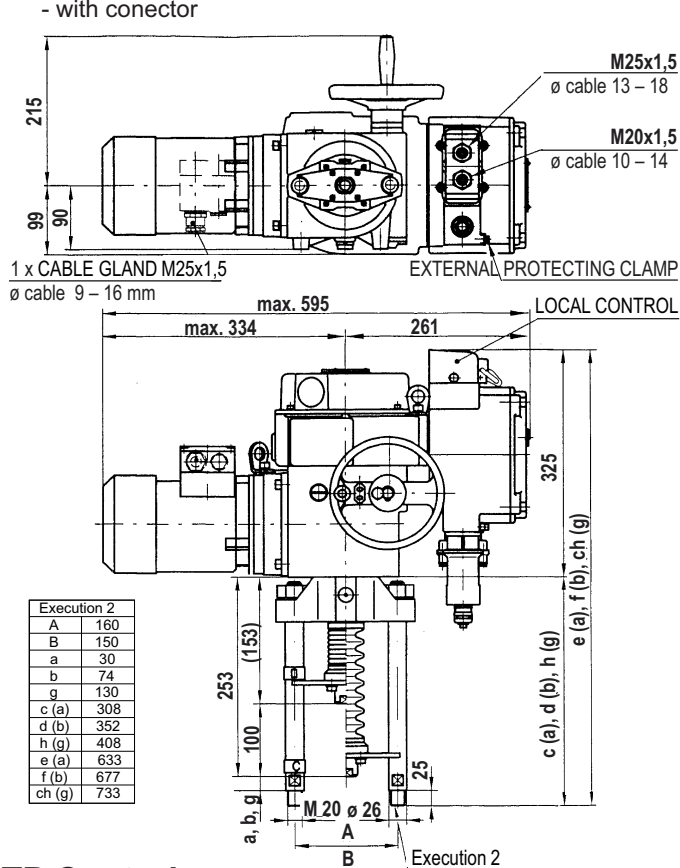
## Dimensions of actuator Modact MTN, MTP

- with terminal board



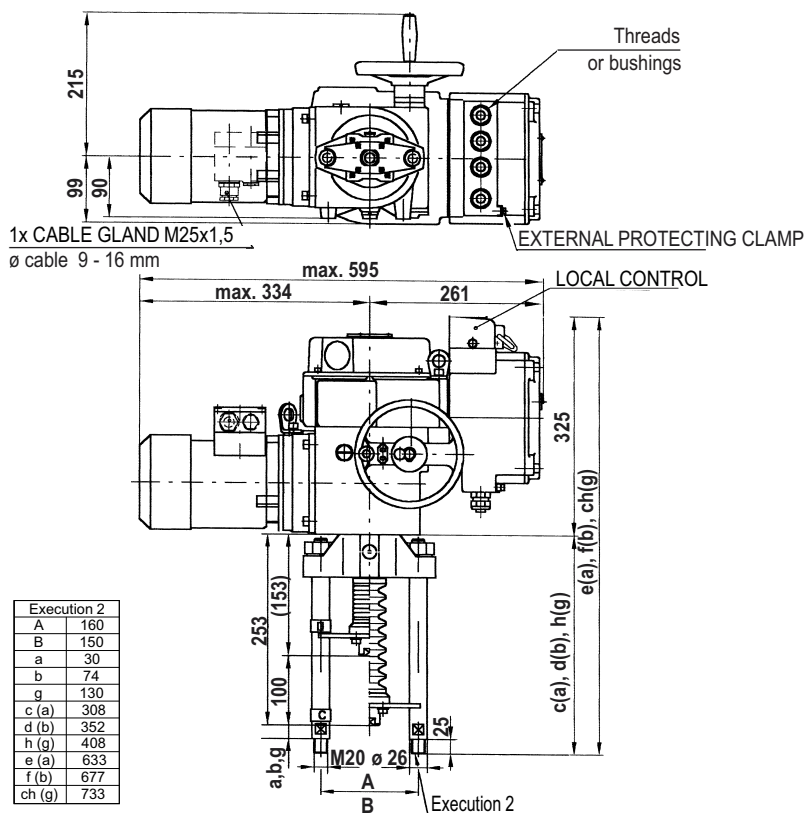
## Dimensions of actuator Modact MTN, MTP and Modact MTN, MTP Control

- with conector

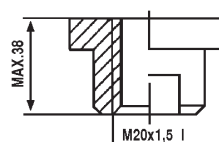


## Dimensions of actuator Modact MTN, MTP Control

- with terminal board



Detail of coupling



# EYE, EYF EYG, EYH



## Electric actuators Modact MOP and Modact MOP Control ZPA Pečky

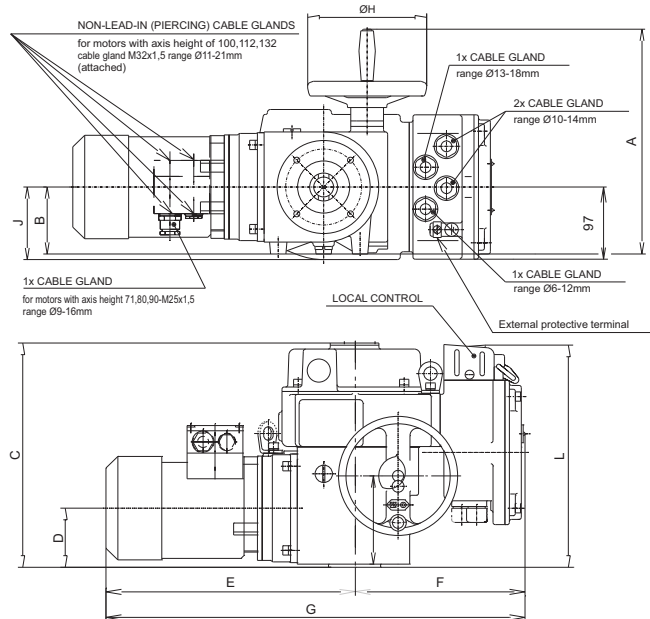
### Technical data

Type	52 030 MOP	52 030 MOP Control	520 31 MOP	52 031 MOP Control
Marking in valve specification No.	EYE	EYF	EYG	EYH
Voltage	3 ~ 230/400 V			
Frequency	50 Hz			
Motor power	See specification table			
Control	3 - position control or continuous			
Nominal force	100 Nm ~ 27 kN; 120 Nm ~ 32 kN			
Travel	Acc. to given stroke			
Enclosure	IP 67			
Process medium max. temperature	Acc. to used valve			
Ambient temperature range	-50 to 60°C acc. to ČSN 33 2000-3, class AA7, AB7, AC1, AD5, AE5, AF2, AG2, AH2, Ak2, AL2, AM2, AN2, AP3, BA4, BC3			
Working condition	Loading S2 acc. to ČSN EN 60 034-1			
Weight	23 - 36 kg		33 - 59 kg	

### Dimensions of Modact MOP

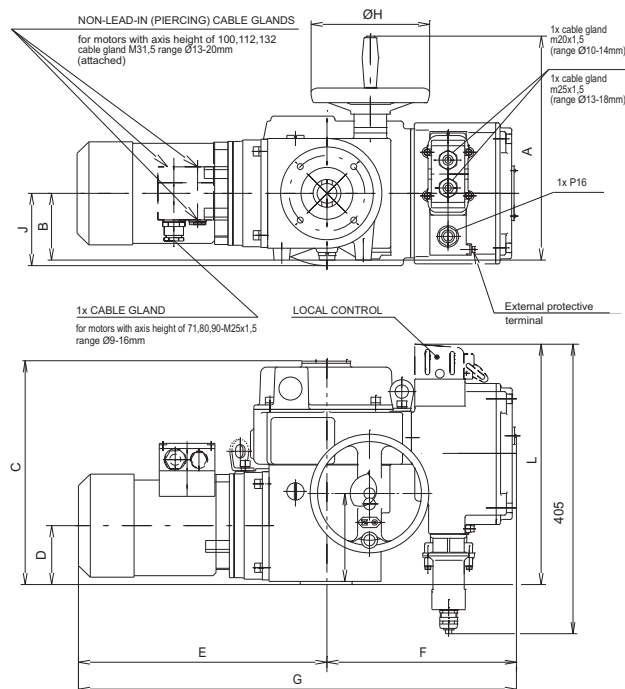
DIMENSIONAL DRAWING OF ACTUATORS MODACT MOP

52 030 a 52 031 EXECUTION WITH TERMINAL BOARD



DIMENSIONAL DRAWING OF ACTUATORS MODACT MOP

52 030 a 52 031 EXECUTION WITH CONECTOR

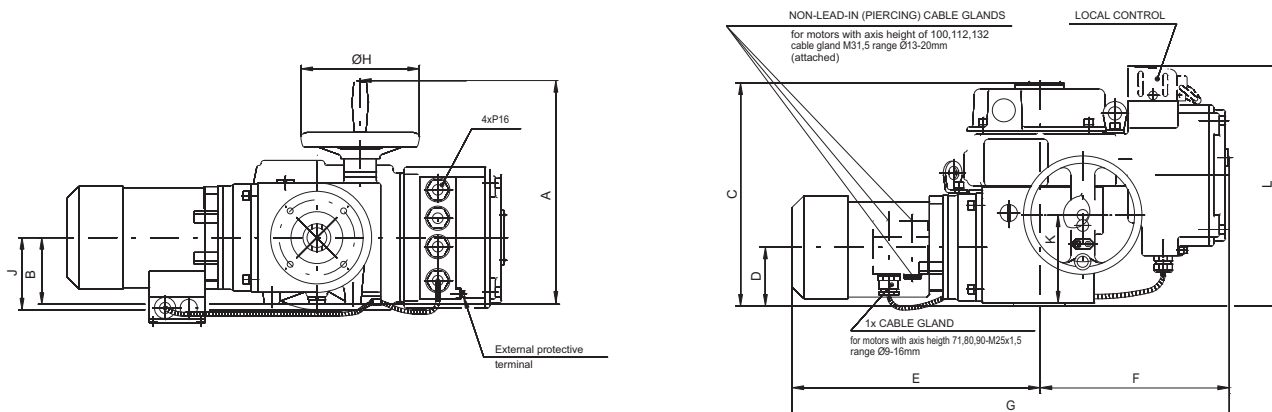


Type marking	A	B	C	D	E	F	G	ØH	J	K	L
52 030	305	90	300	78	334	228	562	160	99	120	300
52 031	376	120	328	92	436	228	664	200	-	144	328

Type marking	A	B	C	D	E	F	G	ØH	J	K	L
52 030	305	90	300	78	334	258	592	160	99	120	325
52 031	376	120	328	92	436	258	694	200	-	144	350

DIMENSIONAL DRAWING OF ACTUATORS MODACT MOP CONTROL

52 030 a 52 031



Type marking	A	B	C	D	E	F	G	ØH	J	K	L
52 030	305	90	300	78	334	258	592	160	99	120	325
52 031	376	120	328	92	436	258	694	200	-	144	328

**Specification of actuator Modact MOP**

Connection dimensions		Output shaft type A		To terminal board to connector				52 03X		X	X	X	X	X	X	X	X		
										5									
										F									
Local control, position indicator				Without local control, without position indicator															
				Local control							1								
				Local control for actuators Modact MOP Control							4								
				Local control for actuators Modact MOP Control							7								
Capacity transmitter CPT 1/A				Without local control, without position indicator							B								
				Local control							E								
				Local control for actuators Modact MOP Control							H								
Type marking	Control	Moment		Running speed	Stroke	Electric motor				52 030									
		Tripping	Starting			Power	RPM	I <sub>n</sub> (400V)	I <sub>z</sub> / I <sub>n</sub>										
		(Nm)	(Nm)															(1/min.)	(ot)
MOP 125/200 - 7	C	80-125	200	7	2-250	0,12	645	0,51	2,2	52 030								L	
MOP 125/220 - 9			220	9		0,18	850	0,74	2,3									C	
MOP 125/200 - 15			200	15		0,25	860	0,79	2,7									D	
MOP 120/155 - 25			80-120	155		25	0,37	1370	1,05									3,3	E
MOP 115/150 - 50			80-115	150		50	0,55	2800	1,36									4,3	H
MOP 160/210 - 9			100-160	210		9	0,18	850	0,74									2,3	6
MOP 160/220 - 16		220		16		0,37	920	1,20	3,1									7	
MOP 160/250 - 25		250		25		0,55	910	1,60	3,4									8	
MOP 160/245 - 40		245		40		0,75	1395	1,86	4,0									9	
MOP 160/300 - 65		300		65		1,5	1420	3,40	5,0									A	
MOP 160/250 - 80		250		80		1,5	2860	3,25	5,5									H	
MOP 160/210 - 100		210	100	1,5		1420	3,40	5,0	B										
MOP 160/250 - 145	250	145	2,2	2880	4,55	6,3	J												

the table continues on the next page

continuation of the table of the specification of Modact MOP from the previous page

		52 03X	X	X	X	X	X	X(X)	
Signalization, position transmitter, blinker									
Only for actuators Modact MOP	Without signalisation, position transmitter and blinker						0		
	Position transmitter						1		
	Signalization switches						2		
	Signalization switches and position transmitter						3		
	Blinker						4		
	Position transmitter, blinker						5		
	Signalization switches and blinker						6		
	Signalization switches, position transmitter, blinker						7		
Signalization, position transmitter, blinker									
Only for actuators Modact MOP Control	Complete equipment Sch P-0781 <sup>1)</sup>	Position transmitter					A		
		Signalization switches and position transmitter					B		
		Position transmitter, blinker					C		
		Signalization switches, position transmitter and blinker					D		
	Without positioner	Without signalization, without posit. transmitter and blinker						E	
		Position transmitter						F	
		Signalization switches						G	
		Signalization switches and position transmitter						H	
		Blinker						I	
		Position transmitter, blinker						J	
		Signalization switches, blinker						K	
		Signalization switches, position transmitter and blinker						L	
	Without positioner and brake BAM	Without signalization, without position transm. and blinker						M	
		Position transmitter						N	
		Signalization switches						O	
		Signalization switches and position transmitter						P	
		Blinker						R	
		Position transmitter, blinker						S	
		Signalization switches, blinker						T	
		Signalization switches, position transmitter and blinker						U	
	This mark is valid for the the types of the actuators							P	
	Ambient temperature range	-25 to 60°C							-
		-40 to 60°C							F1
		-50 to 60°C							F

<sup>1)</sup> The Control execution of actuators with ZP2.RE5 regulator - the digit "5" is put on the 11th place. (for example 52030.57D1P5F1)



**Electric actuators  
SAR 10.2  
Auma**

**Technical data**

Type	SAR 10.2
Marking in valve specification No.	EAJ
Voltage	3 ~ 380 or 400 V AC
Frequency	50 Hz
Motor power	See specification table
Control	3 - position control or with signal of 4 - 20 mA
Nominal torque	100 Nm ~ 27 kN; 120 Nm ~ 32 kN
Stroke	25 a 40 mm
Enclosure	IP 67
Process medium max. temperature	Acc. to used valve
Ambient temperature range	-40 to 60°C
Ambient humidity limit	100 %
Weight	1-phase motor 49 kg; 3-phase motor 22 kg

Note:

Detailed technical informations and wiring diagrams can be found in producer's datasheet or on the website [www.auma.com](http://www.auma.com)

**Specification of Auma actuators**

Type	Control	SA	X	XX	XX.X
Duty		SA			
Execution	Normal		R		
Actuator size	10.1				10.2

Output shaft type A (connection flange size F10, thread 36x6)

		SAR 10.1	SAR 10.2	
Tripping torque	4	60-120 Nm	Motor power [ kW ]	0,06
	5,6			0,06
	8			0,12
	11			0,12
	16			0,25
	22			0,25
	32			0,4
	45			0,4

## 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 - for continuous control (specification of accessories acc. to catalogue of producer), weight + 7kg

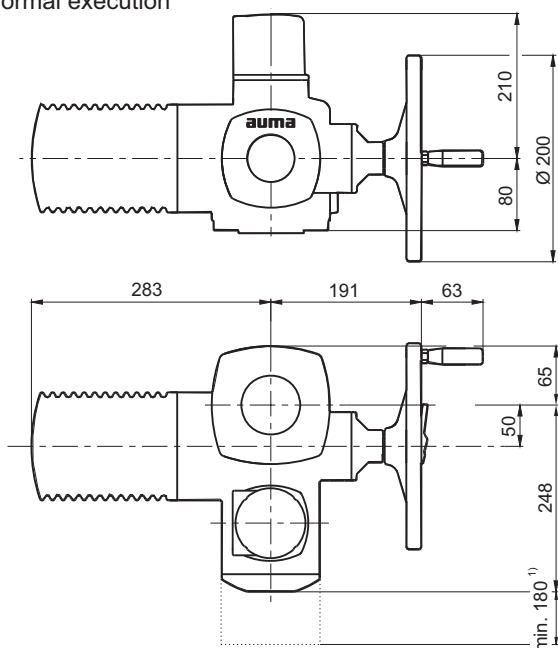
AUMATIC - for continuous control (specification of accessories acc. to catalogue of producer), weight + 7kg

Other accessories acc. to catalogue of producer of actuators ([www.auma.com](http://www.auma.com))

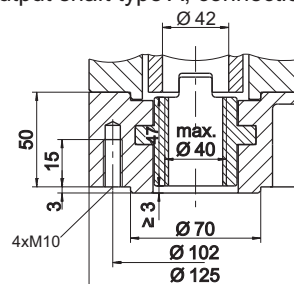
## Dimensions of actuators Auma series 10.2

(for 3-phase execution only, dimensions for 1-phase execution according to catalogue sheets of the producer)

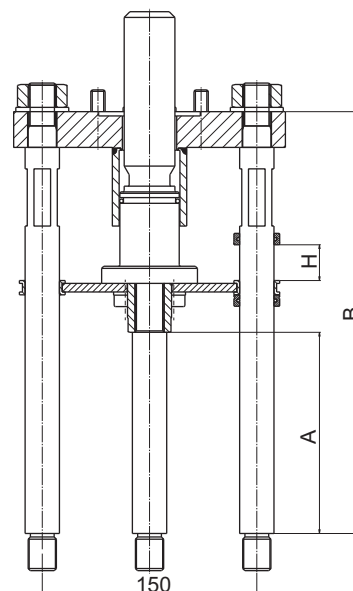
Normal execution



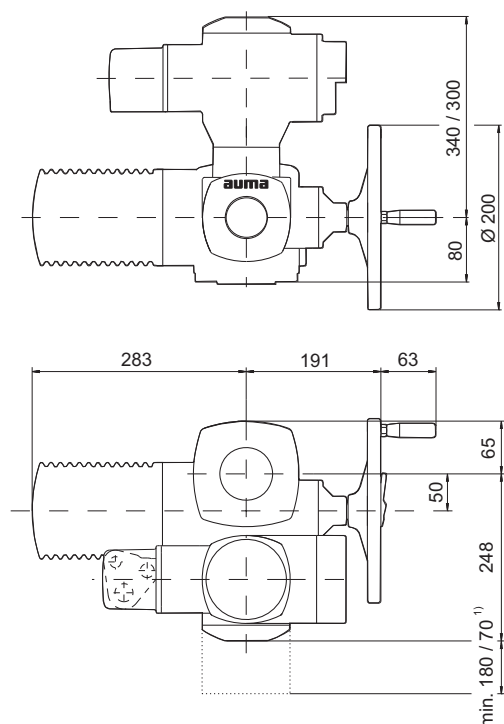
Output shaft type A, connection flange size F10



Connection acc. to ISO 5210,  
Output drive A, F10, Tr36x6-LH



Version with MATIC / AUMATIC



<sup>1)</sup> Space needed for opening the cover

For valves	Number of columns	A	B	H	Weight
RV 80x DN 25 to 50	4	130	295	25	~ 12 kg
RV 80x DN 65 to 100	4	130	310	40	~ 15 kg





## Electric actuators ...AB8 Schiebel

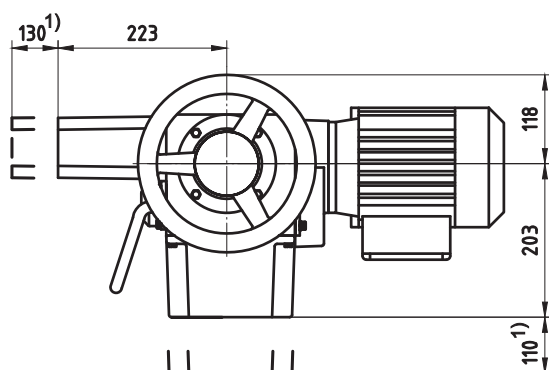
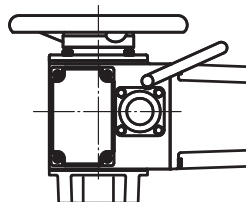
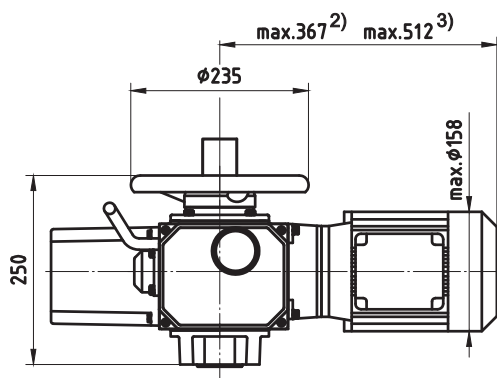
### Technical data

Type	rAB8
Marking in valve's specification No.	EZK
Voltage	400 / 230 V; 230 V
Frequency	50 Hz
Motor power	See specification table
Control	3 - position or with signal of 4 - 20 mA
Nominal force	100 Nm ~ 27 kN; 120 Nm ~ 32 kN
Stroke	25 and 40 mm
Enclosure	IP 66
Process medium max. temp.	Acc. to used valve
Ambient temperature range	-25 to 60°C
Ambient temperature limit	90 % (tropical version 100 % with condensation)
Weight	24 to 35 kg

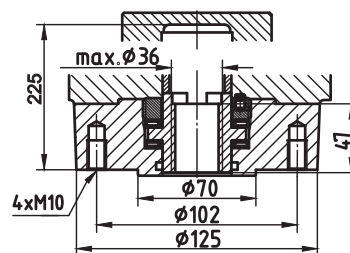
### Specification of actuator

		XX	X	AB8	A	X	+	XXX
Execution	normal							
Duty	control		r					
Actuator size				AB8				
Output shaft type (connection flange size F10, thread 36x6)					A			
Output speed [rpm]	Tripping torque	rAB8		rAB8				
		tripping 50 - 120 Nm	400/230V	230V	2,5			
			0,06	0,12				
		loading 30 - 80 Nm	0,12	0,25	5			
			0,18	0,37	7,5			
			0,18	0,75	10			
			0,37	0,75	15			
			0,37	1,10	20			
			0,75	1,10	30			
			0,75	1,10	40			
Motor power [kW]								
Accessories	Potentiometer 1x1000 Ω						F	
	Double potentiometer						FF	
	Electronic transmitter 4 - 20 mA						ESM21	
	Positioner ACTUMATIC R						CMR	
	SMARTCON control unit						CSC	

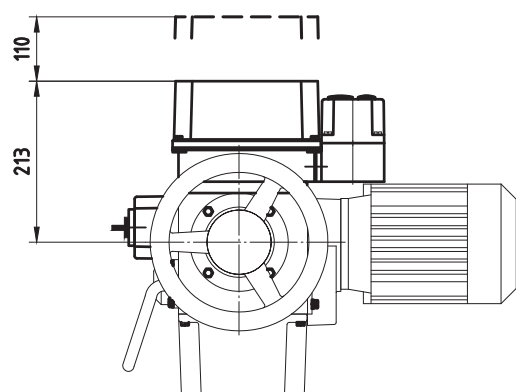
## Dimensions of actuators ...AB8



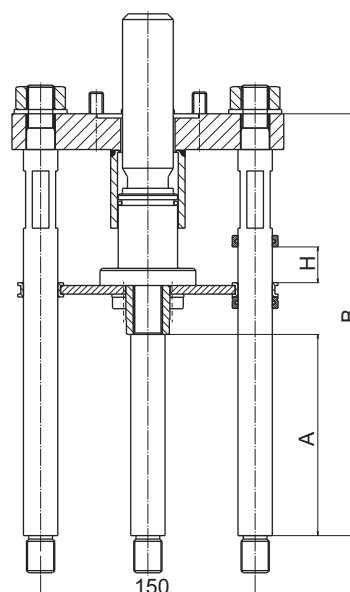
Output drive A, F10



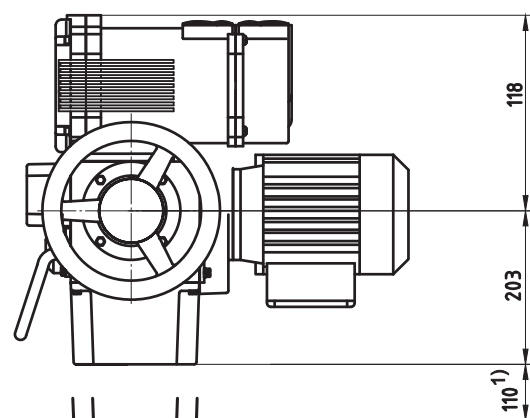
With ACTUMATIC R positioner



Connection acc. to ISO 5210,  
Output drive type A, F10, Tr36x6-LH



With SMARTCON control unit



- 1) space needed for opening the cover
- 2) execution without brake
- 3) execution with brake

For valves	Number of columns	A	B	H	Weight
RV 80x DN 25 to 50	4	130	295	25	~ 12 kg
RV 80x DN 65 to 100	4	130	310	40	~ 15 kg



## Pneumatic actuators Flowserve

### Technical data

Type	PO 1502
Marking in valve specification No.	PFD
Feeding pressure	$p_{max} = 0,6 \text{ Mpa}$ , $p_{min}$ -see in tab.
Function	Normally open (NO)      Normally closed (NC)
Control	Pneumatic signal of 20 - 100 kPa Current signal of 0(4) - 20 mA
Nominal force	According to table of nominal force values
Stroke	60 mm
Enclosure	IP 54
Process medium max. temperature	According to used valve
Ambient temperature range	-40 to 80°C
Ambient humidity limit	95 %
Weight	See table of dimensions

### Accessories

Electropneumatic positioner (analogous) type SRI 990	Device with electric input of 4 (0) to 20 mA and outlet of controlling air into actuator. It is adjusted by switches and potentiometers.
Electropneumatic positioner (intelligent) type SRD 991	Device with electric input of 4 (0) to 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software.
Pneumatic positioner type SRP 981	Device with pneumatic input of 20 to 100 kPa to control the pneumatic actuators with pneumatic control signal
Signalisation switches type SGE 985	Adjustable end position switches
Electropneumatic positioner type SRI 986	Analog positioner with input signal of 4 (0) - 20 mA
Air set type A 3420 (0 to 50°C)	Reduces supply air pressure to a value required
Air set type FRS923 (-40 to 80°C)	Reduces supply air pressure to a value required
Electropneumatic positioner SIPART PS2	Digital with input signal of 4(0) – 20 mA
Solenoid valve, standard type SC G327A001	Direct operated electromagnetic valve, execution 3/2, function U (universal), G 1/4"
Solenoid valve inexplosive, EEx em type EM G327A001	Direct operated electromagnetic valve, execution 3/2, function U (universal), G 1/4", secured execution 3/2, with the increased safety/epoxy encapsulation operator
Solenoid valve inexplosive, EEx d type NF G327A001	Direct operated electromagnetic valve, execution 3/2, function U (universal), G 1/4", flameproof enclosure
Volume Booster-valve, type EIL 100	Flow air volume increaser
Air lock valve, type EIL 200	Retaining device for closing of air pipeline on a pressure drop

### Operating conditions

Pneumatic actuators Flowserve can operate with extremely high ambient temperatures with unique resistance to shock loads. They excel with resistance to vibrations and reached 10<sup>6</sup> of cycles in operation. It is possible to deliver the actuator

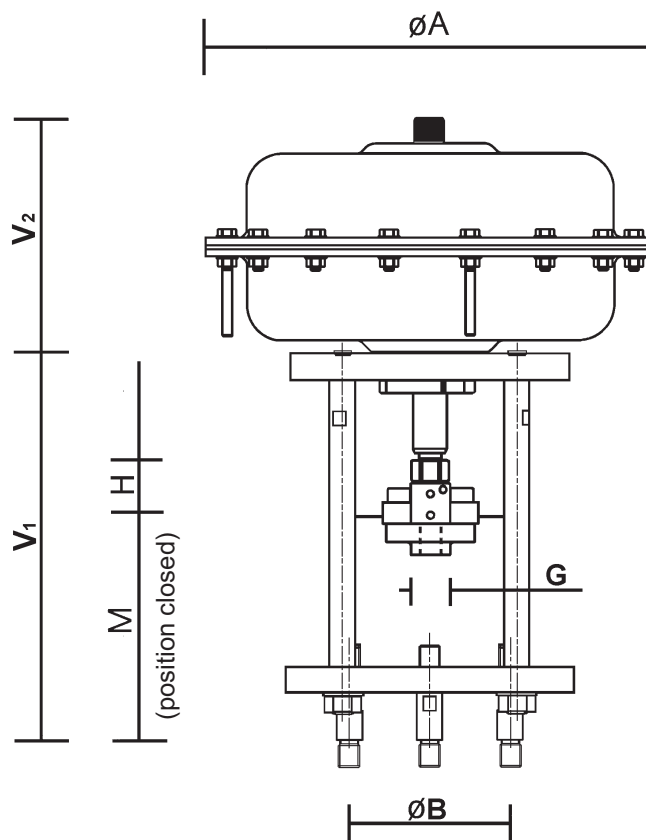
### Direct and indirect functions

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

## Dimensions and weights of Flowserve actuators

DN	Actuator	H	A	B	G	M	V1	V2	m [kg]
25, 40, 50	PO 1502	25	550	150	M20x1,5	160	308	409	148
60, 80, 100		40							

Note: Face to face dimensions [mm]



## Valve specification No. of Flowserve actuators

		PX XXXX	X	XX	X	X	X
Actuator type		PO 1502					
Colour	white		B				
Spring range [bar]	2,0 - 3,5		FS				
	1,5 - 2,7		VC				
Hand wheel	without					O	
	side light wheel					S <sup>1)</sup>	
Function	Normally open						A
	Normally closed						Z
Stroke [mm]	60						C

DN	Actuator type	Function	Actuator stroke [mm]	Valve stroke [mm]	Spring range [bar]	Setting of spring [bar]	Feeding min. [bar]
25, 40, 50	PO 1502 BVCxZC	Fail to close	60	25	1,5 - 2,7	2,2 - 2,7	5
	PO 1502 BFOAC	Fail to open	60	25	2 - 3,5	2 - 2,6	5
60, 80, 100	PO 1502 BVCxZC	Fail to close	60	40	1,5 - 2,7	1,9 - 2,7	5
	PO 1502 BFOAC	Fail to open	60	40	2 - 3,5	2 - 3	5

<sup>1)</sup> The closing function only

**Note:** Appoint instead of „x“: O - without hand wheel, S - with side wheel

## Maximal permissible pressure values acc. to EN 12 516-1 [MPa]

Material	PN	Temperature [ °C ]									
		200	250	300	350	400	450	500	525	550	575
Cast steel 1.0425 (11 416.1)	160	11,4	10,4	9,4	8,8	8,4	---	---	---	---	---
	250	17,8	16,2	14,7	13,7	13,2	---	---	---	---	---
	400	28,4	26,0	23,5	21,9	21,1	---	---	---	---	---
Alloy steel 1.7335 (15 121.5)	160	14,9	14,3	13,3	12,3	11,5	10,7	8,9	---	---	---
	250	23,3	22,3	20,8	19,3	18,0	16,7	13,9	---	---	---
	400	37,4	35,7	33,3	30,9	28,9	26,7	22,3	---	---	---

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