

**02 - 01.2**

10.07.GB

**Control valves  
RV 701**



## 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).

## 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

## Dimensions and units

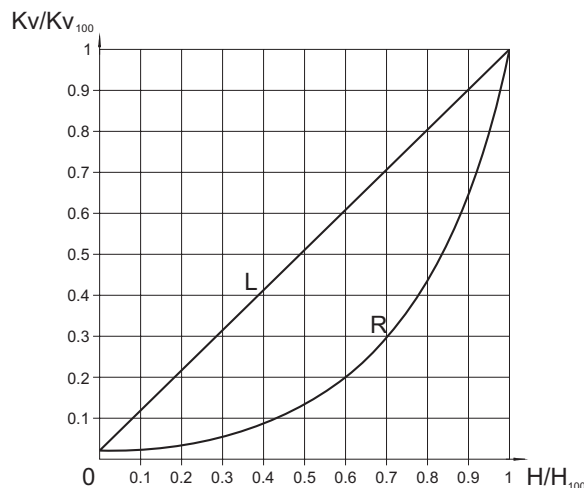
Marking	Unit	Name of dimension
Kv	m <sup>3</sup> /hour	Flow coefficient under conditions of units of flow
$Kv_{100}$	m <sup>3</sup> /hour	Flow coefficient at nominal stroke
Kvs	m <sup>3</sup> /hour	Valve nominal flow coefficient
Q	m <sup>3</sup> /hour	Flow rate in operating conditions ( $T_1, p_1$ )
$Q_n$	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

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)

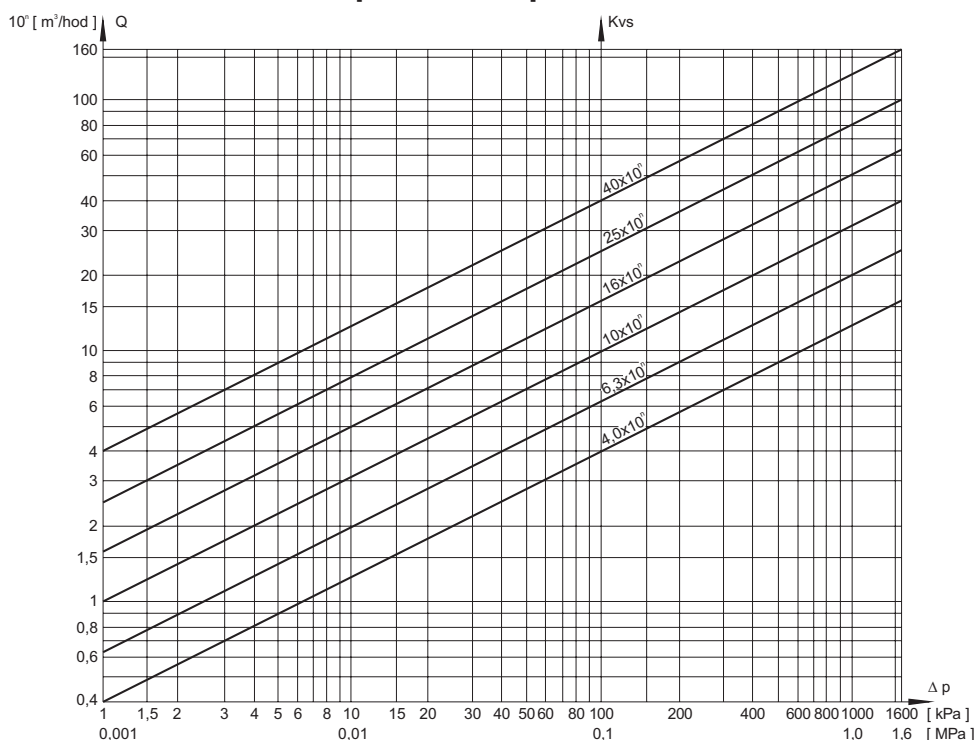
$$Kv/Kv_{100} = 0.0183 \cdot E^{(4 \cdot H/H_{100})}$$

## 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.

## 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 kg/m<sup>3</sup>.

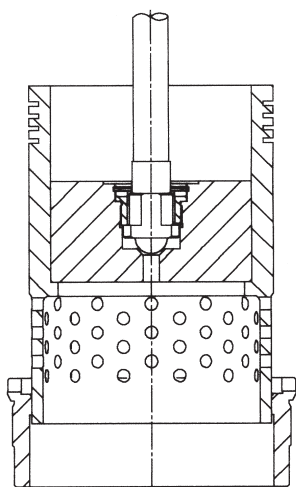
For the value  $Q = q \cdot 10^3$ , it is necessary to calculate with  $Kvs = k \cdot 10^3$ . Example: water flow rate of  $16 \cdot 10^3 = 1,6 \text{ m}^3/\text{hour}$  corresponds to  $Kv = 2,5 = 25 \cdot 10$  when differential pressure 40kPa.

## Application of multi-step pressure reduction

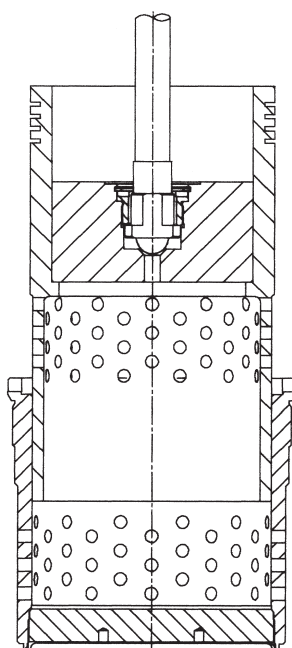
When the valves are designed for operation in above-critical differential pressure ( $p_2/p_1 < 0,54$  when throttling steam and gases), or when diff. pressure value is higher than the recom-

mended service diff. pressure, 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.

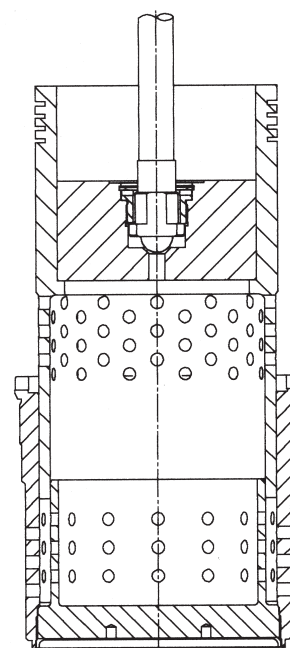
One-step pressure reduction



Two-step pressure reduction



Three-step pressure reduction





## Control valves DN 25, 50, 100, 125, 150, 250 PN 160 to 400

### Description

The valves series RV 701 are single-seated control valves of a unit construction designed to fit in all demands of an appliance the valve is designed for. The pressure-balanced, multi-step throttling system is always designed with regard to the resistance to creation and effects of cavitation and noisiness. The valve is equipped with packing type "Live Loading".

The valves are delivered with weld ends.

The valves are actuated with linear actuators. The connection is designed for using both domestic and foreign actuators of the following producers: ZPA Pečky, Regada Prešov, Auma, Schiebel and Foxboro.

### Process media

The valves are especially designed for the flow and pressure control of the process medium without impurities, however they can be used for gases and vapours when inlet and outlet flow velocities are kept within the permissible range. The common process media are for example water, steam and other media with no special demands on the used type of material of the valve. 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. The valve application for any other media should be consulted with the producer because of the type of material that is in contact with the process medium.

### Application

The sphere of application of these valves continues in the sphere of application for the valves series RV 501. They are especially designed for industry applications such as heating plants, power plants or regulation of technology processes. The max. permissible operating pressure values correspond to EN 12 516-1 see page 23 of this catalogue.

### Installation

The valves must be piped the way so that the process medium flow will coincide with the arrows indicated on the valve body. They can be installed in horizontal, vertical or inclined pipeline in any position except the position when the actuator is under the valve body. The valves DN 250 can be piped in horizontal pipeline only. The actuator cannot be tilted.

### Recommended differential pressures

In regard to the pressure balancing of the plug and to linear forces of usable actuators, the valves' application in high differential pressures is not limited by the forces caused by process medium pressure but by the type of used throttling system. A recommended max. differential pressure for one step of a multi-step pressure reduction is 4.0 MPa when perforated plug and perforated cage are used and 2.0 MPa when a parabolic plug is used. It is recommended to consult the producer and discuss the concrete cases with regard to pressure ratio and service parameters of other equipment.

### Technical data

Series	RV 701		
Type of valve	Control valve, single-seated, straight-through, with pressure-balanced plug		
Nominal size range	DN 25 to 250		
Nominal pressure	PN 160, 250, 320	PN 160, 250, 320, 400	
Body material	Carbon steel 1.0619 (GP 240 GH)	Alloy steel 1.7357 (G17CrMo5-5)	Stainless steel 1.4931 (GX23CrMoV12-1)
Seat material: DN 25, 50, 100, 125, 150, 250	17 021.6 (1.4006); 42 2906.5 (1.4027) + stellited seat STELIT 6		
Plug material: DN 25, 50, 100, 125, 150, 250	17 348.4 (1.4571) + stellited seat STELIT 6		
Operating temp. range	-20 to 400°C	-20 to 550°C	-20 to 600°C
Weld ends	Acc. to ČSN 13 1075 (3/1991)		
Type of trim	One - three-step pressure reduction Perforated plug - seat(cage)		
Flow characteristic	Linear, equal-percentage		
Leakage rate	Acc. to ČSN EN 1349 (5/2001) Class III, execution with higher tightness - Class V		
Packing	Graphite - Live Loading		

## Range of Kvs values

DN	25 **)	50	100	125	150	250
Multi-step press. reduction	Kvs values [m <sup>3</sup> /h] - linear flow characteristic					
1	0.1 - 8.0	3.2 - 32	10 - 125	16 - 360 *)	16 - 360 *)	40 - 630
2	0.1 - 8.0	2.5 - 32	8.0 - 125	12.5 - 250	12.5 - 250	40 - 500
3	1.6 - 8.0	2.0 - 32	8.0 - 100	12.5 - 200	12.5 - 200	40 - 400
Multi-step press. reduction	Kvs values [m <sup>3</sup> /h] - equal-percentage flow characteristic					
1	0.63 - 8.0	6.3 - 25	16 - 63	32 - 125	32 - 125	50 - 320
2	0.63 - 6.3	5.0 - 20	12.5 - 50	25 - 80	25 - 80	50 - 200
3	1.6 - 4.0	4.0 - 16	10 - 40	20 - 63	20 - 63	50 - 160

\*) For PN 160 and 250 only, for PN 320 and 400  $Kvs_{max} = 250 \text{ m}^3/\text{h}$

\*\*) for Kvs 0,1 - 1,6 contoured plug

Nominal values of Kvs are understood as multiples of 10 of

the progression of selected numbers R10 (1.0; 1.25; 1.6; 2.0; 2.5; 3.2; 4.0; 5.0; 6.3; 8.0; 10.0). They are specified individually for every valve acc. to the customer's requirements and value within the appropriate range shown in the table above.

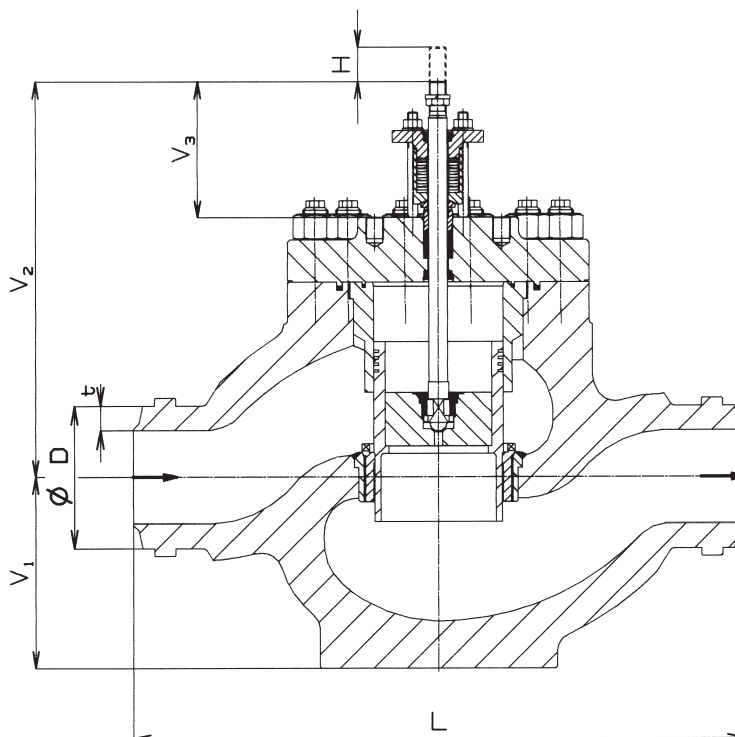
## Dimensions and weights of RV 701 with weld ends

DN	PN 160	PN 250	PN 320*	PN 400*	PN 160 to 400						
	t [mm]	t [mm]	t [mm]	t [mm]	D [mm]	L [mm]	V <sub>1</sub> [mm]	V <sub>2</sub> [mm]	V <sub>3</sub> [mm]	H [mm]	m [kg]
25	4	5	6	7.1	33.7	270	100	260	160	16	40
50	6.3	8	10	14.2	60.3	390	110	320	160	25	85
100	10	14	16	20	114.3	580	200	410	160	40	290
125	12.5	18	20	23	139.7	720	225	466	160	63	420
150	14	20	23	26	168.3	720	225	466	160	63	420
250	22	32	35	38	273	990	345	675	210	100	1500

\* For PN 320, 400 - weld ends connection acc. to LDM execution.

Note: The values of weight are approximate.

Control valve RV 701 with weld ends



## Valve complete specification No. for ordering RV 701

		XX	X X X	X X X	X X X X	X X	- XXX	/ XXX	- XXX
1. Type of valve	Control valve	RV							
2. Series	Control valve, straight-through		7 0 1						
3. Type of actuating  <sup>1)</sup> Pneumatic actuators only for DN 150  <sup>2)</sup> Applicable to max. DN 150	Electric actuator			E					
	Pneumatic actuator			P					
	Electric actuator Modact MTR <sup>2)</sup>			E P D					
	Electric actuator Modact MTN Control <sup>2)</sup>			E Y A					
	Electric actuator Modact MTN <sup>2)</sup>			E Y B					
	Electric pphon Modact MOP 52 030			E Y E					
	El. actuator Modact MOP Control 52 030			E Y F					
	Electric actuator Modact MOP 52 031			E Y G					
	El. actuator Modact MOP Control 52 031			E Y H					
	Electric actuator Auma SAR 7.5			E A G					
	Electric actuator Auma SAR Ex 7.5			E H H					
	Electric actuator Auma SAR 10.1			E A K					
	Electric actuator Auma SAR Ex 10.1			E A J					
	Electric actuator Schiebel rAB5			E Z G					
	Electric actuator Schiebel exrAB5			E Z H					
	Electric actuator Schiebel rAB8			E Z K					
Electric actuator Schiebel exrAB8			E Z L						
Pneumatic actuator Foxboro PO 700 <sup>1)</sup>			P F G						
Pneumatic actuator Foxboro PO 1502 <sup>1)</sup>			P F D						
4. Connection	Weld ends				4				
5. Body material  <i>(operating temp. ranges are specified in parentheses)</i>	Cast steel 1.0619 (-20 to 400°C)				1				
	Alloy steel 1.7357 (-20 to 550°C)				7				
	Alloy steel 1.4931 (-20 to 600°C)				9				
	Other material acc. to request								
6. Packing	Graphite - Live Loading				5				
7. Multi-step pressure red.	One-step pressure reduction				1				
	Two-step pressure reduction				2				
	Three-step pressure reduction				3				
8. Flow characteristic	Linear - Leakage rate class III.					L			
	Linear - Leakage rate class V.					D			
	Equal-percentage - Leakage rate class III.					R			
	Equal-percentage - Leakage rate class V.					Q			
9. No. of orifice plates	Without					0			
10. Nominal pressure	PN 160						160		
	PN 250						250		
	PN 320						320		
	PN 400						400		
11. Operating temperature °C	Acc. to process medium							XXX	
12. Nominal size	DN - acc. to the valve's execution								XXX

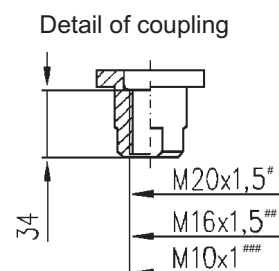
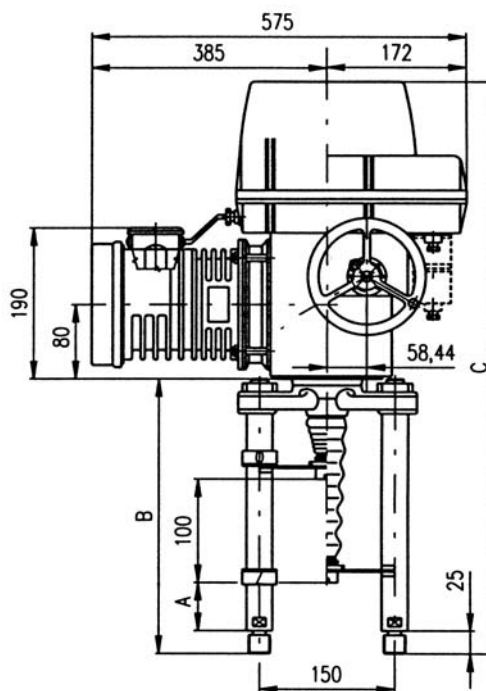
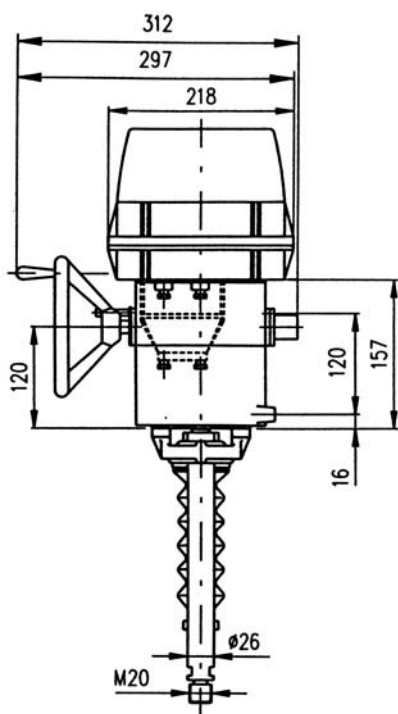
**Ordering example:** Two-way, control valve DN 50, PN 160, with electric actuator Modact MTN Control, body material: cast steel, weld ends, packing Graphite, two-way pressure reduction, linear flow characteristic is specified as follows: **RV 701 EYA 4152 L0 160/400-50.**

### Note

Other type of actuator available on request.


**Electric actuator Modact MTR  
Regada**
**Technical data**

Type	Modact MTR
Marking in valve specification No.	EPD
Voltage	230 V
Frequency	50 / 60 Hz
Motor power	16 or 25 W
Control	3 - pos. c. (in connection with NOTREP positioner - continuous)
Nominal force	10, 16, 25 kN
Travel	12,5 to 100 mm
Enclosure	IP 54 ( IP 65 on request)
Process medium max. temperature	Acc. to used valve
Ambient temperature range	-25 to 50°C
Ambient humidity limit	90 % (tropical execution 100 % condensation)
Weight	27 to 31 kg

**Dimensions of Modact MTR**


Columns	with acme thread			Columns	with ball bolt			
	Version	A	B		C	Version	A	B
P-1045a/C	130	378	707	P-1045a/H	130	400	729	

#) RV 701, DN 100÷250

##) RV 701, DN 50

###) RV 701, DN 25



## 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 +50 °C)					0														
Electric connection		Voltage			Wiring diagram														
To terminal board		230 V AC			Z296														
To connector									9										
Screw version		Switching-off thrust <sup>1)2)</sup>	Rated operating speed	Operating speed	Electric motor														
					Power	Speed	Current												
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					
	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					
Control board version		Operating stroke			Wiring diagram														
Electromechanical control board - without local control		16 mm			Z298									B					
		25 mm															C		
		40 mm																E	
		63 mm																F	
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										P		
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											Z	
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 M16x1.5, M10x1		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			

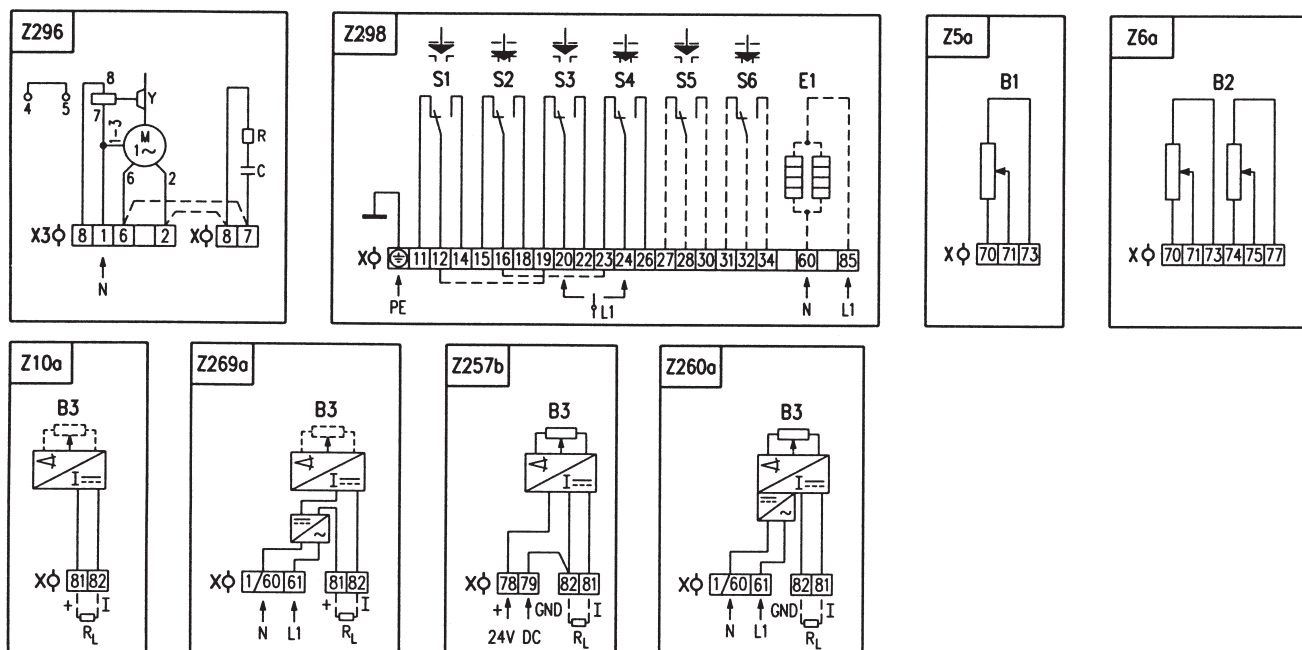
Combinations available and specification codes: A+B = 07

### Notes:

- 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.



## Wiring diagram of actuator Modact MTR



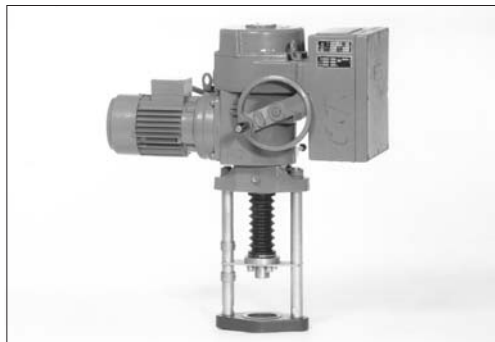
### Notes:

- For the EA version with connection to the terminal board, the terminal 1/60 (the wiring diagrams Z269a and Z260a) is leaded out to the terminal No. 1.
- For EA version with connection to the terminal board the actuator is not equipped by the jumper X3:6-X:7 and X3:2-X:8 (Z296) from manufacturing plant (it is necessary to connect it by customer).

### Legend:

Z5a connection of single resistive transmitter  
 Z6a connection of double resistive transmitter  
 Z10a connection of resistive with current converter of capacitive transmitter - 2-wire without supply  
 Z257b connection of resistive transmitter with current converter - 3-wire  
 Z260a connection of resistive transmitter with current converter - 3-wire with power supply  
 Z269a connection of resistive transmitter with current converter or capacitive transmitter - 3-wire with power supply  
 Z296 connection of 1-phase electric motor  
 Z298 connection of thrust and position switches and space heater

B1 resistive transmitter (potentiometer) single  
 B2 resistive transmitter (potentiometer) double  
 B3 capacitive transmitter  
 S1 thrust switch "open"  
 S2 thrust switch "closing"  
 S3 position switch "open"  
 S4 position switch "closed"  
 S5 additional position switch "open"  
 S6 additional position "closed"  
 M motor  
 C capacitor  
 Y motor's brake  
 E1 space heater  
 X terminal board  
 X3 electric motor's terminal board  
 I/U input (output) current (voltage) signals  
 R reducing resistor  
 R<sub>L</sub> loading resistor



**Electric actuators Modact MTN and Modact MTN Control ZPA Pe ky**

**Technical data**

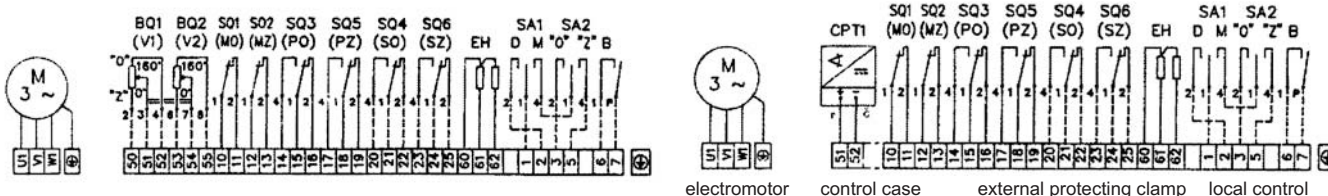
Type	Modact MTN Control	Modact MTN
Marking in valve specification No.	EYA	EYB
Voltage	3 x 220 V / 400 V (3 x 220 V/380V)	
Frequency	50 Hz	
Motor power	See specification table	
Control	3 - position control or continuous	
Nominal force	15000 and 25000 N	
Travel	10 to 100 mm	
Enclosure	IP 55	
Process medium max. temperature	Acc. to used valve	
Ambient temperature range	-25 to 55 °C	
Ambient humidity range	5 - 100 % with condensation	
Weight	45 kg	

**Wiring diagram of actuator Modact MTN**

Execution - terminal board

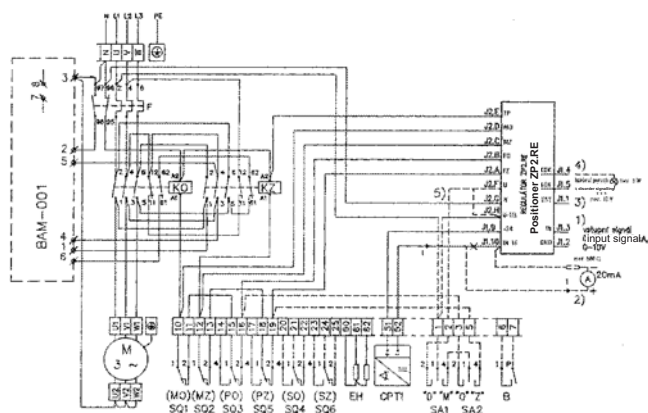
Position transmitter : resistance 2x100 W or without

Position transmitter : capacity CPT 1 1/A 4 - 20 mA



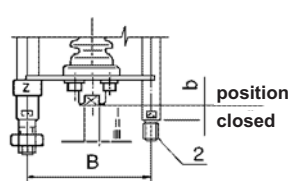
**Wiring diagram of actuator Modact MTN Control**

With current transmitter, built-in contactor combination, brake BAM and positioner.



- SQ1 (MO) power switch in "opening" direction
- SQ2 (MZ) power switch in "closing" direction
- SQ3 (PO) limit switch in "opening" direction
- SQ5 (PZ) limit switch in "closing" direction
- SQ4 (SO) signalisation switch in "opening" direction
- SQ6 (SZ) signalisation switch in "closing" direction
- EH heaters 2 x TR 551 10k/A
- CPT1 capacity position transmitter CPT1/A4 - 20 mA
- BAM-001 dynamic brake
- KO contactor in "opening" direction
- KZ contactor in "closing" direction
- F thermal relay
- SA1 control switch "local - remote"
- SA2 switch "open - close"
- BQ1, BQ2 position transmitter 2 x 100 W
- ZP2.RE electronic positioner

**Connection dimensions - details of additional specification 52 442**



Columns pitch	B	150
Position "closed"	b	74
	g	130
	I	M 20x1,5
Clutch thread	II	M 16x1,5
	III	M 10x1

Execution	Specification No.		RV 701
	basic	additional	
Bg2II	52 442	XMXX	DN 40÷80
Bg2III	52 442	XPXX	DN 25
Bg2I	52 442	XRXX	DN 100÷250



# EYE, EYF EYG, EYH



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

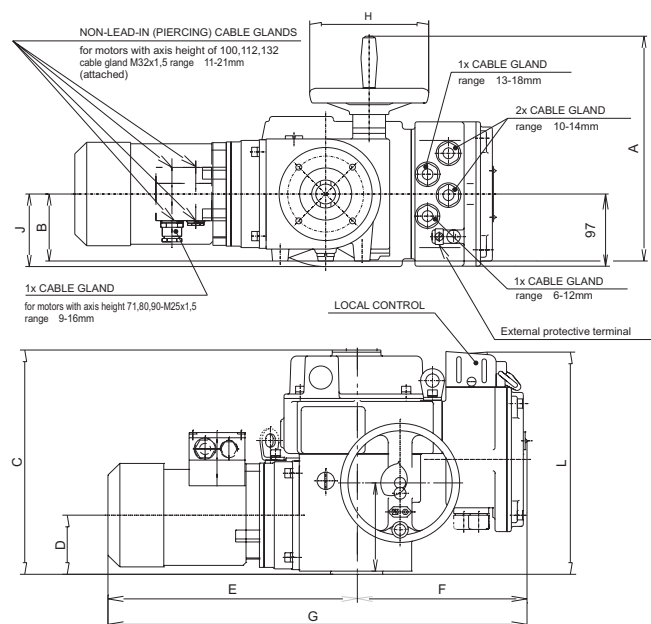
### Technical data

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	3x 230/400 V			
Frequency	50 Hz			
Motor power	See specification table			
Control	3 - position control or continuous			
Nominal force	20 Nm			
Travel	Acc. to given stroke			
Enclosure	IP 67			
Process medium max. temperature	Acc. to used valve			
Ambient temperature range	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

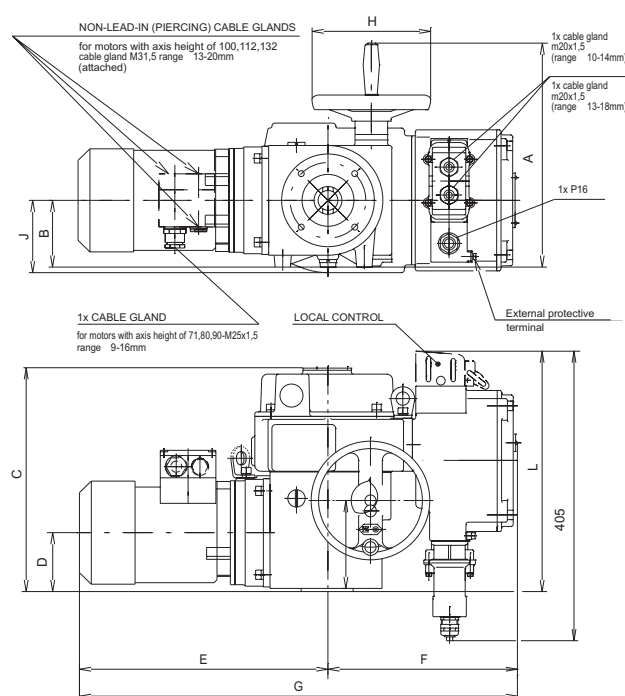
DIMENSIONAL DRAWING OF ACTUATORS MODACT MOP

52 030 a 52 031 EXECUTION WITH TERMINAL BOARD



DIMENSIONAL DRAWING OF ACTUATORS MODACT MOP

52 030 a 52 031 EXECUTION WITH CONECTOR

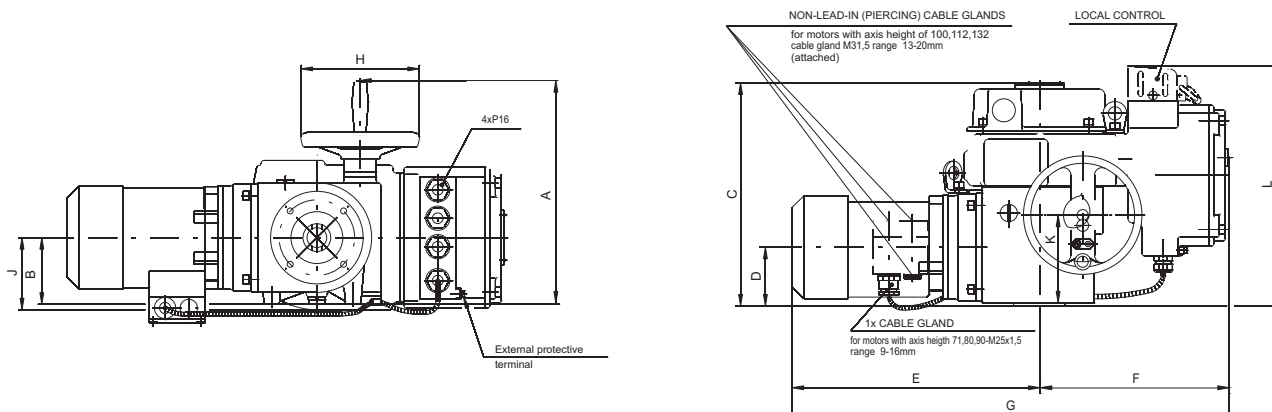


Type marking	A	B	C	D	E	F	G	H	J	K	L
52 030	305	90	300	78	334	228	562	160	99	120	300
52 031	376	120	328	92	436	228	664	200	-	144	328

Type marking	A	B	C	D	E	F	G	H	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	H	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

### Specifikace pohonu Modact MOP

Connection dimensions		Output shaft type A	Via terminal board	XX XXX	X	X	X	X	X				
			With connector		5								
					F								
Local control, position indicator													
Resistance transmitter or execution without transmitter		Without local control, without position indicator						1					
		Local 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	Moment		Running speed	Stroke	Electromotor								
	Tripping	Driving			Power	rpm	$I_n$ (400V)	$I_z / I_n$					
	(Nm)	(Nm)	(1/min.)	(ot)	(kW)	(1/min.)	(A)	(-)					
MOP 40/70 - 7	20-40	70	7	2-250	0,05	650	0,42	1,6	52 030			J	
MOP 40/65 - 9		65	9		0,06	830	0,34	2,0		0			
MOP 40/55 - 15		55	15		0,09	870	0,47	2,0		1			
MOP 40/75 - 25		75	25		0,18	1350	0,56	3,0		2			
MOP 40/65 - 40		65	40		0,25	1350	0,76	3,0		3			
MOP 40/50 - 50		50	50		0,25	2830	0,68	4,0		4			
MOP 40/60 - 80		60	80		0,37	2740	1,00	3,5		5			
MOP 80/135 - 7		40-80	135		7	0,09	630	0,36		2,2	K		
MOP 80/140 - 9	140		9		0,12	890	0,60	2,5	6				
MOP 80/135 - 15	135		15		0,18	835	0,62	2,3	7				
MOP 80/105 - 25	105		25		0,25	1350	0,76	3,0	8				
MOP 100/130 - 9	63-100	130	9		0,12	890	0,60	2,5	0	52 031			
MOP 100/130 - 15		130	15		0,25	850	0,78	2,7	1				
MOP 100/150 - 25		150	25		0,37	920	1,20	3,1	2				
MOP 100/170 - 40		170	40		0,55	1395	1,45	3,9	3				
MOP 100/150 - 63		150	63		0,75	1395	1,86	4,0	4				
MOP 100/200 - 80		200	80	1,1	2845	2,40	6,1	E					
MOP 100/150 - 100		150	100	1,1	1410	2,65	4,3	5					
MOP 100/150 - 145		150	145	1,5	2860	3,30	5,5	F					

the table continues on next page

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

		XX XXX	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	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	



# EAG, EAH EAJ, EAK

**Electric actuators  
SAR 07.5, SAR Ex 07.5  
SAR 10.1, SAR Ex 10.1  
Auma**

## Technical data

Type	SAR 07.5	SAR Ex 07.5	SAR 10.1	SAR Ex 10.1
Marking in valve's specification No.	EAG	EAH	EAJ	EAK
Voltage	380 or 400 V			
Frequency	50 Hz			
Motor power	See specification table			
Control	3 - position control or with signal 4 - 20 mA			
Nominal force	20 Nm ~ 10 kN; 25 Nm ~ 12,5 kN; 30 Nm ~ 15 kN			
Travel	Acc. to the valve stroke 16, 25, 40, 63, 100 mm			
Enclosure	IP 67			
Process medium max. temperature	Acc. to used valve			
Ambient temperature range	-25 až 40°C			
Ambient humidity limit	100 %			
Weight	20 kg			

## Specification of Auma actuators

Type		SA	X	XX	XX.X
Duty	Control	SA	R		
Execution	Normal			Ex	
	Non-explosive				
Actuator's size	07.5				07.5
	10.1				10.1

### Output drive type A (thread TR 36x6 LH, flange size F10)

Output speed (rpm)	Tripping torque	SAR 10.1 SAR Ex 10.1	Motor power [ kW ]	SAR 10.1, SAR Ex 10.1	
		60-120 Nm		0,09	
				0,09	
				0,18	
				0,18	
				0,37	
				0,37	
				0,75	
				0,75	

### Output drive type A (thread TR 20x4 LH, flange size F10)

Output speed (rpm)	Tripping torque	SAR 07.5 SAR Ex 07.5	Motor power [ kW ]	SAR 07.5, SAR Ex 7.5	
		30-60 Nm		0,045	
				0,045	
				0,09	
				0,09	
				0,18	
				0,18	
				0,37	
				0,37	



## Accessories

2 TANDEM switches

Gearing for signalisation of position

Mechanical position indicator

Potentiometer 1x200  $\Omega$

Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 2-wire

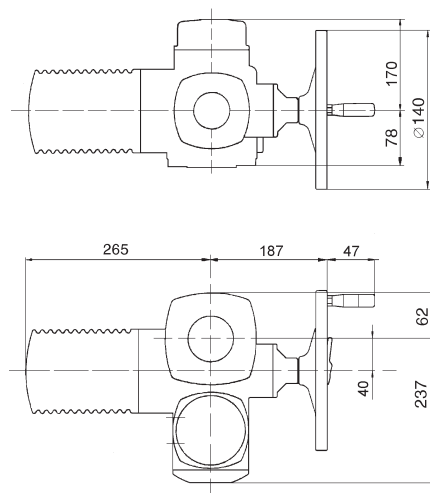
Electronic position transmitter RWG (potentiometer included), 4 - 20 mA, 3/4-wire

Inductive position transmitter IWG, 4 - 20 mA

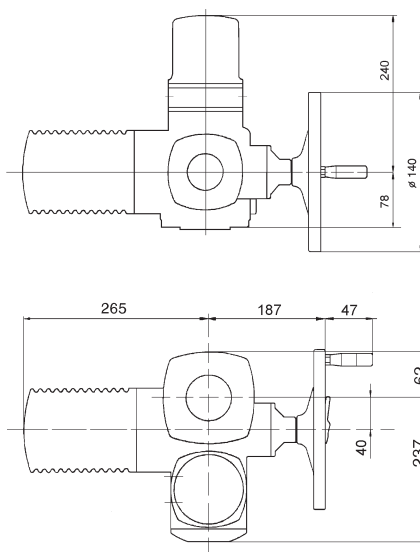
AUMATIC - for continuous control (specification of accessories acc. to catalogue of producer)

## Dimensions of actuators Auma

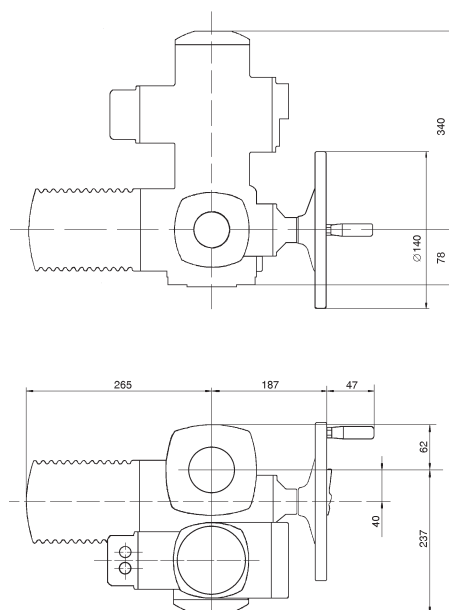
Normal execution



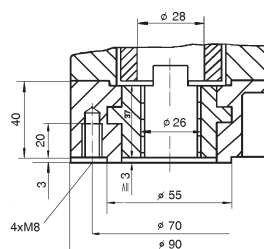
Ex version



Version with AUMATIC

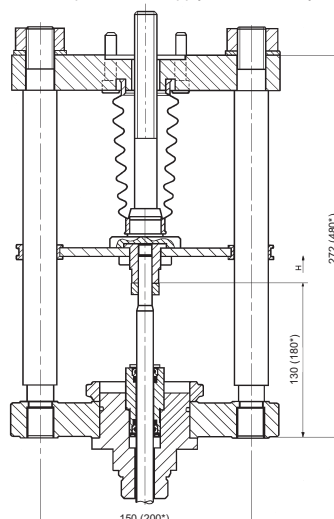


Output shaft A, flange F10



Attachement yoke (4 columns)

\* Data in parentheses apply to DN 250 only





**EZG**  
**EZH**

**Electric actuators ...AB5  
Schiebel**

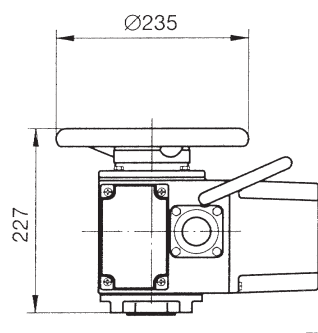
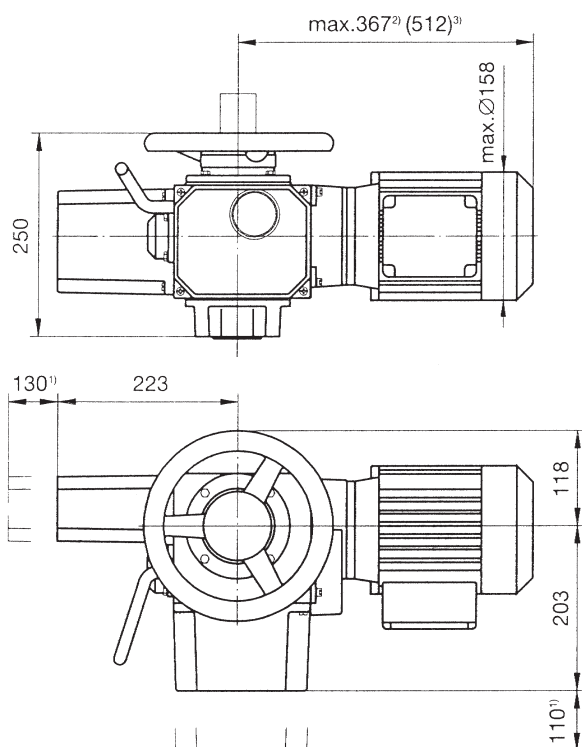
**Technical data**

Type	rAB5	exrAB5
Marking in the valve's specification No.	EZG	EZH
Voltage	400 / 230 V; 230 V	400 / 230 V
Frequency	50 Hz	
Motor power	See specification table	
Control	3 - position control or with signal 4 - 20 mA	
Nominal force	25 Nm ~ 12,5 kN; 30 Nm ~ 15 kN	
Stroke	Acc. to valve's stroke 16, 25, 40, 63, 100 mm	
Enclosure	IP 66	IP 65
Process medium max. temperature	Acc. to used valve	
Ambient temperature range	-25 to 80°C	-20 to 40°C
Ambient humidity limit	90 % (tropical version 100 % with condensation)	
Weight	16 - 18 kg	16 kg

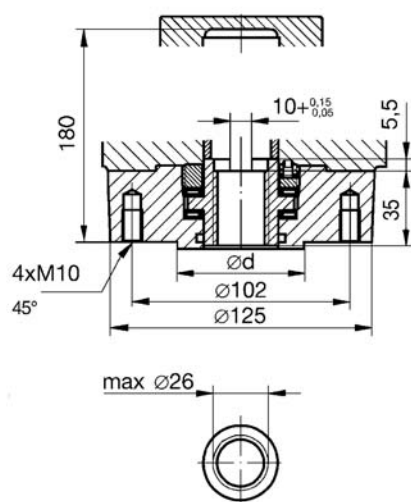
**Specification of actuators**

		XX	X	AB5	A	X	+	XXX	
Execution		Non-explosive	ex						
		Normal							
Duty		Control	r						
Actuator's size				AB5					
Output drive type (thread TR 20x4 LH, flange F10)					A				
Output speed (rpm)	Tripping torque	rAB5 exrAB5	10-30 Nm	Motor power [ kW ]	rAB5		exrAB5		
					400/230V	230V	400/230V		
					0,09	0,09	0,09		
					0,12	0,12	0,12		
					0,09	0,09	0,09		
					0,12	0,12	0,18		
					0,18	0,18	0,18		
					0,18	0,18	0,37		
					0,37	0,37	0,37		
40							40		
Accessories		Potentiometer 1x1000 Ω						F	
		Double potentiometer						FF	
		Electronic transmitter 4 - 20 mA						ESM21	
		Positioner ACTUMATIC R						CMR	

## Dimensions of actuators ...AB8

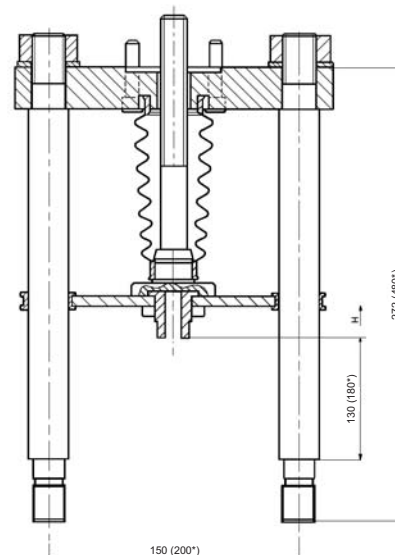


### Output shaft type A, flange F10



### Attachement yoke (4 columns)

\* Data in parentheses apply to DN 250 only





**EZK  
EZL**

**Electric actuators ...AB8  
Schiebel**

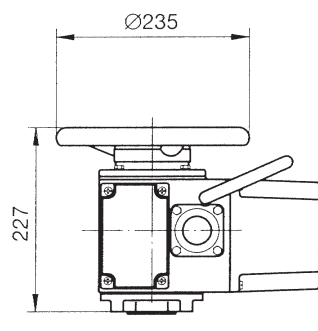
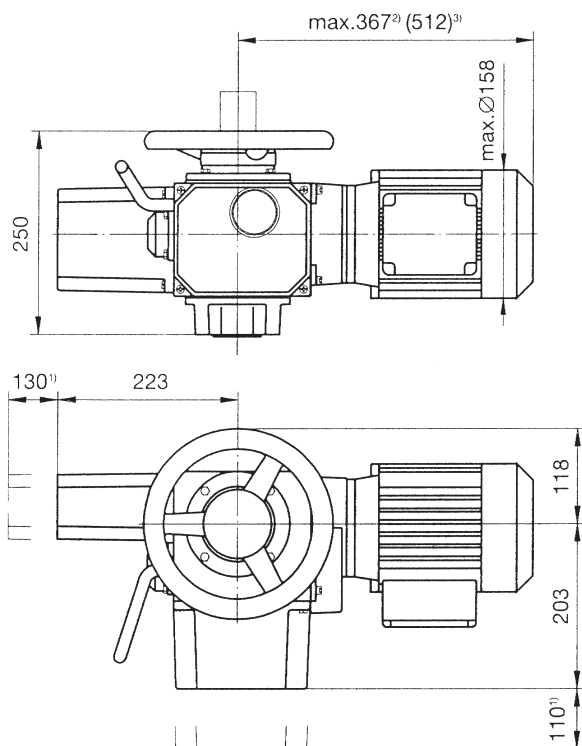
**Technical data**

Type	rAB8	exrAB8
Marking in valve's specification No.	EZK	EZL
Voltage	400 / 230 V; 230 V	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	60 Nm	
Stroke	25 mm	
Enclosure	IP 66	IP 65
Process medium max. temp.	Acc. to used valve	
Ambient temperature range	-25 to 80°C	-20 to 40°C
Ambient temperature limit	90 % (tropical version 100 % with condensation)	
Weight	24 kg	20 kg

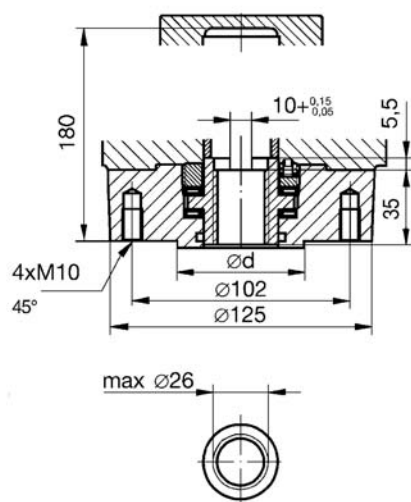
**Specification of actuator**

Execution		Non-explosive	XX	X	AB8	A	X	+	XXX			
		Normal	ex									
Duty		Control		r								
Actuator size					AB8							
Output shaft type (connection flange size F10, thread 36x6)						A						
Output speed [rpm]	Tripping torque	rAB8  30-80 Nm	Motor power [kW]	rAB8		exrAB8						
				400/230V	230V	400/230V						
				2,5	0,12	0,12					0,12	2,5
				5	0,12	0,12					0,12	5
				7,5	0,18	0,18					0,18	7,5
				10	0,37	0,37					0,18	10
				15	0,37	0,37					0,37	15
				20	0,55	0,75					0,37	20
				30	0,75	1,10					0,75	30
40	1,10	1,10	1,10	40								
Accessories		Potentiometer 1x1000 Ω							F			
		Double potentiometer							FF			
		Electronic transmitter 4 - 20 mA								ESM21		
		Positioner ACTUMATIC R								CMR		

## Dimensions of actuators ...AB8

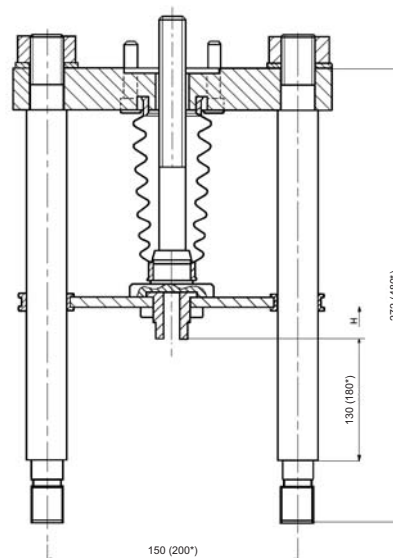


### Output shaft type A, flange F10



### Attachement yoke (4 columns)

\* Data in parentheses apply to DN 250 only





## Pneumatic actuators Foxboro

### Technical data

Type	PO 700		PO 1502	
Marking in valve specification No.	PFG		PFD	
Feeding pressure	p <sub>max</sub> = 0,6 Mpa, p <sub>min</sub> -see in tab.			
Function	direct	indirect	direct	indirect
Control	Pneumatic signal of 20 - 100 kPa Current signal of 0(4) - 20 mA			
Nominal force	According to table of nominal force values			
Stroke	20, 40, 60 mm		60, 80 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 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 to 20 mA and outlet of controlling air into actuator. It is adjusted by PC and special software. Communication HART, Fieldbus Foundation, PROFIBUS.
Electropneumatic positioner (digital) type SRD 991 - D	Device with electric input of 4 to 20 mA and outlet of contr. air into actuator. It is adjusted by a local keyboard and diods, possibly on display.
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
Air set type A 3420	Reduces control air pressure to a value requied
Electropneumatic positioner type SRI 986	Analog positioner with input signal of 4 (0) - 20 mA

### Operating conditions

Pneumatic actuators FOXBORO 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 with both fail to open and fail to close function, possibly with a position blocking (air lock) upon feeding pressure air supply failure. Various accessories can be delivered together with the actuator.

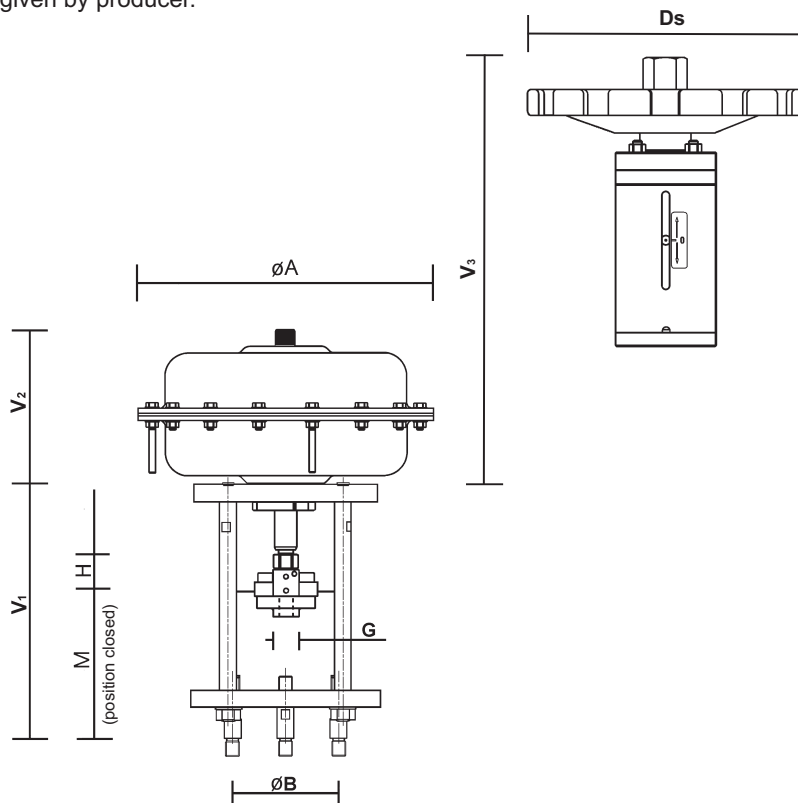
### Direct and indirect functions

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 Foxboro actuators

DN	Actuator	H	A	B	G	M	V1	V2	V3	Ds	m [kg]	m (+ HW)
25	PO 700	16	405	150	M10x1	160	278	227	600	350	65	82
50	PO 700	25	405	150	M16x1,5	160	278	227	600	350	65	82
100	PO 1502	40	550	150	M20x1,5	160	324	409	---	---	148	---
125, 150	PO 1502	63	550	150	M20x1,5	160	337	409	---	---	148	---

Note: Face to face dimensions [mm]  
Missing data to be given by producer.



## Valve specification No. of Foxboro actuators

	PX XXXX	X	XX	X	X	X
Actuator type	PA 700					
	PA 1502					
Colour	white		B			
Spring range [bar]	2,0 - 3,5			FS		
	1,8 - 2,7			JC		
	1,5 - 3,8			VI		
Hand wheel	without wheel				O	
	heavy wheel				H	
Function	direct					A
	indirect					Z
Stroke [mm]	20					A
	40					B
	60					C
	80					D

DN	Actuator type	Function	Stroke [mm]	Spring range [bar]	Setting of spring [bar]	Feeding pressure min. [bar]
25	PO 700 BJCxZA	Fail to close	20	1,8 - 2,7	1,98 - 2,7	4,8
	PO 700 BJCxAA	Fail to open	20	1,8 - 2,7	1,8 - 2,55	4,5
50	PO 700 BVIXZB	Fail to close	40	1,5 - 3,8	2,36 - 3,8	5,3
	PO 700 BVIXAB	Fail to open	40	1,5 - 3,8	1,5 - 2,93	5,3
100	PO 1502 BFSOZC	Fail to close	60	2 - 3,5	2,5 - 3,5	5
	PO 1502 BFSOAC	Fail to open	60	2 - 3,5	2 - 3	4,5
125, 150	PO 1502 BFSOZD	Fail to close	80	2 - 3,5	2,3 - 3,5	5
	PO 1502 BFSOAD	Fail to open	80	2 - 3,5	2 - 3,18	5



## Maximal permissible overpressures [MPa]

Material	PN	Teplota [ °C ]										
		100	150	200	250	300	350	400	450	500	550	600
Cast steel 1.0619	160	13.6	12.7	11.4	10.4	9.40	8.80	8.40	---	---	---	---
	250	21.3	19.8	17.8	16.2	14.7	13.7	13.2	---	---	---	---
	320	27.2	25.4	22.8	20.8	18.8	17.6	16.8	---	---	---	---
	400	34.1	31.7	28.4	26.0	23.5	21.9	21.1	---	---	---	---
Alloy steel 1.7357	160	16.3	15.8	14.9	14.3	13.3	12.3	11.5	10.7	8.90	3.50	---
	250	25.4	24.8	23.3	22.3	20.8	19.3	18.0	16.7	13.9	5.50	---
	320	32.6	31.6	29.8	28.6	26.6	24.6	23.0	21.4	17.8	7.00	---
	400	40.7	39.6	37.4	35.7	33.3	30.9	28.9	26.7	22.3	8.80	---
Stainless Steel 1.4931	160	16.3	15.8	15.4	14.6	13.5	12.7	11.5	10.7	8.90	7.90	4.30
	250	25.4	24.8	24.1	22.9	21.1	19.8	18.0	16.7	13.9	12.3	6.70
	320	32.6	31.6	30.8	29.2	27.0	25.4	23.0	21.4	17.8	15.8	8.60
	400	40.7	39.6	38.5	36.6	33.8	31.8	28.9	26.7	22.3	19.7	10.6

Notes :