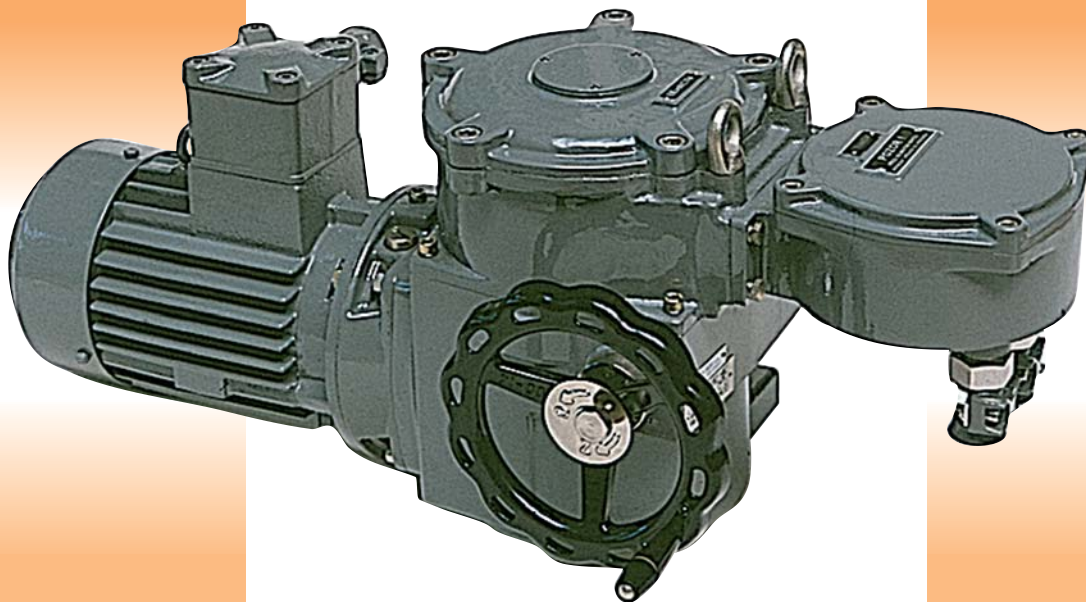
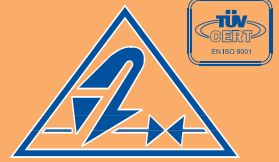


ZPA PEČKY, a.s.



**Explosion Proof Electric
Multi-turn Actuators**

MODACT MO EEx

Type No. 52 120 - 52 125



EN ISO 9001:2000
Certificate No. 041005161/000-E01



CERTIFICATE

The TÜV CERT Certification Body
for QM systems of RWTÜV Systems GmbH

hereby certifies in accordance with TÜV CERT
procedure that

ZPA Pečky, a.s.
Třída 5. května 166
289 11 Pečky
Czech republic

has established and applies a quality system for

**Development and production of electric actuators,
enclosures and sheet metal production**

An audit was performed, Report No. 624362

Proof has been furnished that the requirements according to

ISO 9001 : 2000 / EN ISO 9001 : 2000

are fulfilled. The certificate is valid until **11. November 2006**

Certificate Registration No. **041005161/000-E01**

The company has been certified since **1995**



Essen, 14.11.2003



TÜV CERT Certification Body
of RWTÜV Systems GmbH

1. APPLICATION

The MODACT MO electric multi-turn actuators in explosionproof design EEx de IIC T4 are intended for remote control and operation in the environment where there is the risk of explosion of the explosive gas atmosphere according to EN 50014 in zone 1 (formerly SNV 2) and zone 2 (formerly SNV 1) according to ČSN EN 60079-10 (ČSN 33 2320) - idt. IEC 79-10: 1995. They have been designed for actuating control devices (slide valves, valves and, in combination with a suitable gearbox, also flaps which are required to be tightly closed in their end positions) by a reverse rotary motion. Nevertheless, they can be also used for controlling ball valves and other devices for which they are in respect of their properties suitable. If another application than the control of valves is contemplated this should be consulted beforehand with the manufacturer.

2. DESCRIPTION AND FUNCTION

The **MODACT MO EEx** electric actuators consist of explosion proof three-phase motor, power gearing containing an epicyclic gear unit, and a control section with a terminal board. The control section embraces torque- and position-limit switching units, a signalling unit and an anti-condensation heater used for microclimate conditioning of the control box. The actuators can be fitted with a potentiometer of 1 x 100 Ω or a current transmitter with a unified signal of 4 to 20 mA in a two-wire circuit arrangement (without power supply).

3. OPERATING CONDITION

The **MODACT MO EEx** actuators should withstand the effect of operating conditions and external influences, Classes AA7, AB7, AC1, AD5, AE5, AF2, AG2, AH2, AK2, AL2, AM2, AN2, AP3, BA4, BC3 and BE3N2, according to ČSN Standard 33 2000-3 (mod. IEC 364-3:1993).

If the actuator is to be installed in the open-air space it should be provided with light roofing for protection against the effect of direct solar radiation.

If the actuator is used at a location with an ambient temperature under - 10 °C and/or relative humidity above 80%, at a sheltered location, or in the tropical atmosphere, the anti-condensation heater which has been built in all actuators, should be always used. One or two heater elements should be connected, as required.

Installation of the actuators at a location with incombustible and non-conducting dust is possible only if this has noadverse effect on their function. It is advisable to remove dust whenever the layer of dust becomes as thick as about 1 mm.

Notes:

A sheltered location is considered a space where atmospheric precipitations are prevented from falling at an angle of up to 60° from the vertical.

The location of the electric motor should be such that cooling air has free access to the motor and no heated-up blown-out air is drawn in the motor again. For air inlet, the minimum distance from the wall is 40 mm. Therefore, the space in which the motor is located should be sufficiently large, clean and ventilated.

Classes of external influences:

Basic characteristics - as extracted from ČSN Standard 33 2000-3 (mod. IEC 364-3:1993).

- 1) AA7 - Simultaneous effect of ambient temperature of - 25 °C to + 55 °C with relative humidity from 10 % upwards
- 2) AB7 - Ambient temperature to Point 1); minimum relative humidity 10%, maximum relative humidity 100% with condensation
- 3) AC1 - Altitude ≤ 2,000 m above sea level
- 4) AD5 - Splashing water in all directions
- 5) AE5 - Small dust content of air; mean layers of dust; daily dust fall more than 35 mg/m², but not exceeding 350 mg/m²
- 6) AF2 - Corroding atmosphere and pollutants; the presence of corroding pollutants is significant.
- 7) AG2 - Average mechanical stress; in current industrial plants
- 8) AH2 - Medium vibrations; in current industrial plants
- 9) AK2 - Serious risk of growth of vegetation and moulds
- 10) AL2 - Serious danger of the occurrence of animals (insects, birds, small animals)
- 11) AM2 - Harmful effect of escaping vagabond currents

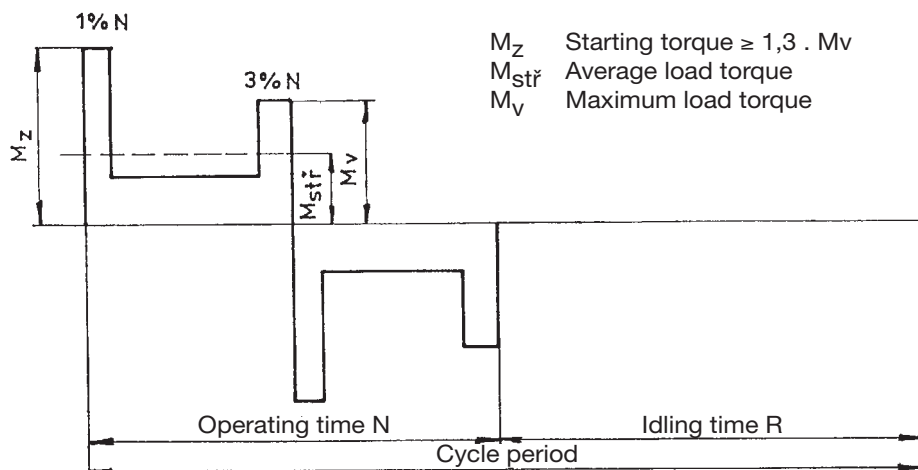
- 12) AN2 - Medium solar radiation with intensities $> 500 \text{ W/m}^2$ and $\leq 700 \text{ W/m}^2$
- 13) AP3 - Medium seismic effects; acceleration $> 300 \text{ Gal}$ $\leq 600 \text{ Gal}$
- 14) BA4 - Personal abilities; instructed people
- 15) BC3 - Frequent contact with the earth potential; persons coming frequently into contact with „live“ parts or standing on a conducting base
- 16) BE3N2 Risk of explosion of combustible gases and steam; according to ČSN EN 60079 - 10 (33 23 21), Zone 1.

4. Duty

According to ČSN EN 60 034-1, actuators can be operated in S2 load category (the course of load is shown in the picture). The operation time at $+50^\circ\text{C}$ shall be 10 minutes, the mean load moment value shall be below or equal to 60 per cent of the maximum switch off moment (M_v).

According to ČSN EN 60 034-1, the actuators can also be operated in the S4 mode (interrupted operation with acceleration intervals). The load factor $\frac{N}{N+R}$ shall be maximum 25 per cent, the longest operation cycle $N + R$ is 10 minutes. The maximum number of switching actions in automatic control mode is 1200 actions per hour. The mean load moment at load factor of 25 per cent and 50°C shall not exceed 40 per cent of the maximum switch off moment (M_v). The mean load moment shall not exceed the nominal moment of the actuator.

Course of working cycle



5. TECHNICAL REQUIREMENTS

General requirements

The basic technical parameters are given in Tab.1 (1a).

Supply voltage

The actuators have been designed to operate at a supply voltage of 3 AC 380 to 690 V/50 Hz. However, they are available in design variants operating at another three-phase supply voltage, upon special request. The supply voltage of the electric motor should be within the tolerance limits of $+ 6\%$ to $- 10\%$ of the rated value and the supply voltage frequency should be within $\pm 2\%$ of the rated value. Within this supply voltage range, all parameters are kept up except the starting torque which varies with the square of supply voltage deviation from the rated value. This dependence is directly proportional to supply voltage variations, no larger supply voltage and frequency fluctuations being permitted.

Operating position

The actuator can operate in any position provided that the electric motor is not downward, i.e., the electric motor axis should not be more than 15° below the horizontal plane. When the actuator is installed with the electric motor upwards oil should be added to ensure lubrication of the motor pinion.

Tripping torque

At the factory, the tripping torque has been adjusted as shown in Tab.1, according to the customer's requirements. If no tripping torque adjustment has been specified by the customer the maximum tripping torque is adjusted.

Starting torque

The starting torque of the actuator is a calculated value determined by the starting torque of the electric motor and the total ratio and efficiency of the actuator. After run reversion, the actuator can produce a starting torque for the duration of 1 to 2 revolutions of the output shaft when torque-limit switching is locked. This can take place in either end position or in any intermediate position.

Self-locking

In compliance with the standard specifications, the actuator is self-locking provided that the load is applied only in the opposite direction to the output shaft motion of the actuator. Self-locking is provided by an arresting roller device that stops the electric motor rotor even in the manual control mode.

For safety reasons, using the actuators for driving lifting appliances that may be used for the transport of persons or equipment in cases where people might be present under the lifted load is strictly prohibited.

Manual control

Manual control is performed directly by a handwheel (without clutch). It can be used even when the electric motor is running (the resulting motion of the output shaft being determined by the function of differential gear). When the handwheel is rotated clockwise the output shaft of the actuator also rotates clockwise (when looking at the shaft towards the control box). On condition that the fitting is provided with left-hand threads, the actuator closes the valve.

Position-limit switches

The OPEN and CLOSE position-limit switches limit the actuator working stroke, each being adjusted to operate in either end position.

Torque-limit switches

The actuator is fitted with two torque-limit switches each of which acts only in one direction of motion of the actuator output shaft. The torque-limit switches can be set to operate at any point of the working stroke except the region in which they are locked (see Starting torque).

The tripping torque can be adjusted within the range shown in Tab.1. The torque-limit switches are locked if the load torque is lost after they have been brought into the OFF-position. This feature secures the actuator against the so-called pumping.

Position signalling

For position signalling of the actuator output shaft, two signalling switches, i.e. the OPEN signalling switch and the CLOSE signalling switch, are used. Each of these switches acts only in one direction of output shaft rotation. The operating point of the microswitches can be set within the whole working stroke range except the narrow band in front of the operating point of the microswitch used to switch off the electric motor.

Sense of rotation

The CLOSE direction of rotation is that in which the hands of a clock move when looking at the output shaft towards the control box.

Rising spindle

In the design variants with connecting dimensions, Shapes A, B1 and C, the actuators can be adapted for mounting to the valve with a rising spindle that projects over the upper end of the actuator output shaft in the end position of the valve. The space reserved for the rising spindle is clearly shown in the dimensional sketches. The user should mount the cylindrical guard of the rising spindle instead of the port cover at the control box top, if required. This guard has not been included in the delivery of the actuator.

Anti-condensation heater

Consisting of one or two elements (see the circuit diagram), the anti-condensation heater should be connected to the AC mains of 230 V. In applications where a temperature exceeding 35 °C is expected only one heater element should be connected.

Dimensions of the actuators

The dimensions of the actuators are given in Appendixes, including connecting dimensions.

Position transmitters

a) **Potentiometer of 1 x 100 Ω** - This is a single-path resistance transmitter with an overall path resistance of 100 Ω plus a maximum of 12 Ω between terminals 50 and 52.

The infinitely variable drive of the transmitter ensures that the transmitter cursor is moved from one end position to the other at any adjustment of the working stroke (within the range shown in the table of design variants). In the „open“ position of the actuator, there is a minimum resistance between terminals 51 and 52 (with the transmitter cursor at the stop of 160°). In the „closed“ position of the transmitter, there is a maximum resistance between terminals 51 and 52 (with the transmitter cursor at the stop of 0°).

b) Current transmitter CPT 1/A

Nominal output signal	4 - 20 mA or 20-4 mA
Rated working stroke	0° - 60° to 0° - 120° (continuously adjustable)
Linearity, including gears	± 2.5 % (for a maximum stroke of 120°)
Hysteresis, including gears	≤ 5 % (for a maximum stroke of 120°)
<i>(The linearity and hysteresis are related to a signal value of 20 mA).</i>	
Load resistance	R_{load} 0 to 500 Ω
Supply voltage	for $R_{load} = 0 - 100 \Omega$ 10 to 20 V DC
	for $R_{load} = 400 - 500 \Omega$ 18 to 28 V DC
Maximum supply voltage ripple	5%
Maximum transmitter power demand	560 mW
Insulation resistance	20 MΩ at 50 V DC
Insulation strength	50 V DC
Operational environment temperature	- 25 °C to + 60 °C
Operational environment temperature - extended range	- 25 °C to + 70 °C

For the extended range, R_{load} should be increased to 500 Ω and the supply voltage should not exceed 25 V. At the operational environment temperature of - 25 °C to + 60 °C, the limit supply voltage is 30 V. If this value is exceeded a permanent damage to the transmitter may be caused. The voltage between the transmitter casing and the signal conductors should not exceed 50 V.

For the transmitter, a two-wire connection is used, i.e., the transmitter, the power supply and the load are connected in series. The user should secure that the two-wire circuit of the current transmitter is connected to the electric earth of the associated controller, computer, etc. This connection should be made only at a single point in any section of the circuit, outside the actuator.

Actuator terminal board

The actuator is equipped with a terminal block for connection to external circuits. This terminal block uses screw terminals allowing both copper and aluminium conductors with a maximum cross-sectional area of up to 4 mm² to be used.

Actuator internal connection

The internal connection diagrams of the MODACT MO EEx actuators with terminal designation are shown in the Appendix.

Each actuator is provided with its internal connection diagram on the inner side of the terminal block cover. The terminals are marked on a self-adhesive label attached to a carrying strip under the terminal block.

Current and voltage ratings of the potentiometer

The rated voltage of the position transmitter is 48 V_{DC}, but the maximum permissible current of 100 mA should not be exceeded.

Current and voltage ratings of the microswitches

The microswitches have been rated at 250 V_{AC, DC} with the following maximum currents:

OPEN and CLOSE torque-limit microswitches:

Type CHERRY ZD-432 - BGAA 250 V_{AC}/2 A, 250 V_{DC}/0.2 A

OPEN and CLOSE signalling microswitches:

Type CHERRY D-433 - B8LD 250 V_{AC}/2 A, 250 V_{DC}/0.2 A OPEN and CLOSE position-limit microswitches:

Type CHERRY D-433 - B8LA 250 V_{AC}/2 A, 250 V_{DC}/0.2 A

Protective enclosure

The type of protective enclosure of the control and terminal boxes is IP 55, according to ČSN EN 60529 (idt. IEC 529:1989). The type of protective enclosure of the electric motor is IP 55 (or IP 54) according to ČSN EN 60034-5 (35 0000) (mod. IEC 34-5:1981).

Insulation resistance

The insulation resistance of electric circuits of the actuator with respect to the chassis and to each other should be at least 20 MΩ. After a damp test, it should be at least 2 MΩ. For the insulation resistance of the CPT 1/A potentiometer, refer to Position transmitter.

Under cold conditions, the insulation resistance of the electric motor should correspond at least to the following equation, according to ČSN 35 0000 - 1 - 1, Paragraph 4.3 (mod. IEC 34-1:1994):

$$R_{is} = \frac{5 U_N}{0.01 P_N + 1000} - M\Omega$$

wherein: U_N is the rated supply voltage [V]

P_N is the rated power output [kW]

Insulation strength of electric circuits

The insulation strength of electric circuits of the actuators should correspond to Technical Institutions TP 12-02/97.

Circuit of remote position transmitter 1 x 100 Ω	500 V, 50 Hz
Circuits of microswitches and anti-condensation heater	500 V, 50 Hz
Circuit of electric motor	1,000 V + 2·Un, at least 1,500 V at 50 Hz
Circuit of the current transmitter CPT 1/A	50 V DC

Deviations of basic parameters

Tripping force	± 12% of the maximum span value
Adjusting speed	- 10% of the maximum span value + 15% of the rated value (in no-load operation)
Setting of signalling switches	± 2.5% of the maximum span value (for the ranges, refer to the Mounting instructions).
Hysteresis of signalling switches	max. 4% of the maximum span value
Setting of position-limit switches	25° of the angle of output shaft displacement (without the influence of running-down)
Hysteresis of position-limit switches	max. 45° of the angle of output shaft displacement
Transmitter non-linearity, incl. gears	± 2.5% of the nominal resistance value transmitter hysteresis, incl. gears max. 4% of the nominal resistance value

(Non-linearity and hysteresis apply to the resistance transmitter of 1 x 100 Ω).

For the data of the CPT1/A current position transmitter, refer to Position Transmitters.

Design variants

The individual design variants of the actuators are available, as specified by combinations of additional type numbers, according to Tab.2.

Protection

For protection against electric shock to ČSN 33 2000 - 4 - 41 (idt. HD CENELEC 384.4.41 S1:1980) (mod. IEC 364-4-41:1992), the actuators are provided with an internal protective terminal in addition to an external protective terminal, according to ČSN 18 6330. The electric motor is also fitted with a protective terminal. The protective terminals are provided with a mark, according to ČSN EN 60417 - 1 and 2 (013 760).

Noise

The maximum acoustic pressure level A is 85 dB (A). The maximum acoustic power level A is 95 dB (A).

Ordering information

When ordering, please specify the following:

- Number of actuators required
- Actuator designation
- Uniform Classification Number Code (9-digit), according to the table of design variant Nos 1 and 2
- Supply voltage and frequency of electric motor - Tripping torque adjustment (If another tripping torque than the maximum is required by the customer).

Example:

In the order, the MODACT MO EEx explosionproof rotary multispeed actuator, Type No. 52 122, in an aluminium design variant with the tripping torque ranging from 160 to 250 Nm and the output shaft adjusting speed of 16 RPM, in standard design with Shape C connecting dimensions, fitted with all units and a potentiometer of 1 x 100 Ω, with the required tripping torque differing from the maximum, designed to operate at the supply voltage of 3 x 230/400 V at 50 Hz, should be specified as follows:

Actuator 52 122 . 7012, torque-limit switches set to 200 Nm, supply voltage of electric motor 3 x 230/400 V, 50 Hz, aluminium design

The delivery will include the required electric actuator as specified by the example in the order, no special tools or spare parts being supplied with the actuator. Spare parts should be ordered separately.

Product certification

The explosionproof electric actuators have been certified and the test certificates issued by the Physical Technical Testing Institute (PTTI), Ostrava - Radvanice, State Testing Laboratories No.210.

Type verification ES certificates

- MO EEx 52 120 - number FTZÚ 02 ATEX 0043 X
- MO EEx 52 121, MO EEx 52 122 - number FTZÚ 02 ATEX 0044 X
- MO EEx 52 123, MO EEx 52 124 - number FTZÚ 02 ATEX 0107 X
- MO EEx 52 125 - number FTZÚ 02 ATEX 0108 X

Type of explosionproof design:  II 2 G EEx de IIC T4

Type tests and verifications carried out according to the following standards:

ČSN EN 50014	Explosionproof electrical equipment. General requirements.
ČSN EN 50018	Explosionproof electrical equipment. Fixed closure.
ČSN EN 50019	Explosionproof electrical equipment. Intrinsically safe design.

The Test (Type) Certificate numbers to which the certificates apply are always quoted on a label attached to the fixed enclosure (control box) of the electric actuator. The results of type tests and verifications have been included in the test reports by PTTI Ostrava-Radvanice.

Tab. 1 - Basic technical parameters and design

Basic outfit:		1 electric motor type AVM			2 torque-limit switches (OPEN and CLOSE)			2 anti-condensation heaters			2 position-limit switches (OPEN and CLOSE)									
Type designation	Torque [Nm]		Speed [RPM]	Working stroke [revolutions]	Electric motor					Weight [kg]		Type number								
	tripping	starting			Type AVM	Power [kW]	Speed [1/min]	In (400 V)	I _n / In	Design		basic					supplementary			
			cast-iron	aluminium						1	2	3	4	5	6	7	8	9		
MO EEx 40/90 - 25	20 - 40	90	25	2 - 250 (2 - 620)	71MK04	0,25	1360	0,75	3,4	-	47	5 2 1 2 0	x	x	1	x				
MO EEx 40/80 - 40	20 - 40	80	40		71M04	0,37	1360	1,05	3,1	-	49		x	x	2	x				
MO EEx 63/90 - 25	40 - 63	90	25		71MK04	0,25	1360	0,75	3,4	-	47		x	x	3	x				
MO EEx 63/80 - 40	40 - 63	80	40		71M04	0,37	1360	1,05	3,1	-	49		x	x	4	x				
MO EEx 100/130 - 25	63 - 100	130	25		71M04	0,37	1360	1,05	3,1	-	49		x	x	5	x				
MO EEx 125/160 - 11	80 - 125	160	11		71MK04	0,25	1360	0,75	3,4	-	47		x	x	6	x				
MO EEx 100/130 - 25	63 - 100	130	25	2 - 250 (2 - 620)	80MK06	0,37	910	1,1	3,3	70	57	5 2 1 2 1	x	x	1	x				
MO EEx 100/130 - 40	63 - 100	130	40		80MK04	0,55	1390	1,45	4,2	71	58		x	x	2	x				
MO EEx 85/110 - 63	63 - 85	110	63		80M04	0,75	1380	1,9	3,9	71	58		x	x	3	x				
MO EEx 85/110 - 100	63 - 85	110	100		90LK04	1,1	1410	2,7	4,6	78	65		x	x	4	x				
MO EEx 160/210 - 16	100 - 160	210	16		80MK06	0,37	910	1,1	3,3	70	57		x	x	5	x				
MO EEx 160/210 - 25	100 - 160	210	25		80M06	0,55	910	1,6	3,4	70	57		x	x	6	x				
MO EEx 130/170 - 40	100 - 130	170	40		80M04	0,75	1380	1,9	3,9	71	58		x	x	7	x				
MO EEx 130/170 - 65	100 - 130	170	65		80LK04	1,1	1410	2,7	4,6	78	65		x	x	8	x				
MO EEx 130/170 - 100	100 - 130	170	100		90L04	1,5	1410	3,4	4,8	79	66		x	x	9	x				
MO EEx 160/210 - 125	100 - 160	210	125		90L02	2,2	2865	4,5	6,0	80	67		x	x	A	x				
MO EEx 250/325 - 10	160 - 250	325	10	2 - 250 (2 - 620)	80MK06	0,37	910	1,1	3,3	70	57	5 2 1 2 2	x	x	0	x				
MO EEx 250/325 - 16	160 - 250	325	16		80M06	0,55	910	1,6	3,4	71	58		x	x	1	x				
MO EEx 210/280 - 25	160 - 210	280	25		90LK06	0,75	940	2,1	3,9	81	68		x	x	2	x				
MO EEx 210/280 - 40	160 - 210	280	40		90LK04	1,1	1410	2,7	4,6	78	65		x	x	3	x				
MO EEx 210/280 - 65	160 - 210	280	65		90L04	1,5	1410	3,4	4,8	79	66		x	x	4	x				
MO EEx 250/330 - 80	160 - 250	330	80		90L02	2,2	2865	4,5	6,0	80	67		x	x	5	x				
MO EEx 400/520 - 16	250 - 400	520	16	2 - 240 (2 - 470)	90L08	0,75	695	2,6	3,3	126	113	5 2 1 2 3	x	x	0	x				
MO EEx 400/520 - 25	250 - 400	520	25		90L06	1,1	935	2,9	4,1	125	112		x	x	1	x				
MO EEx 500/650 - 40	250 - 500	650	40		112M06	2,2	945	5,4	5,0	146	126		x	x	2	x				
MO EEx 400/520 - 63	250 - 400	520	63		100L04	3,0	1435	6,5	5,9	132	112		x	x	3	x				
MO EEx 400/520 - 100	250 - 400	520	100		112M04+	4,0	1430	8,5	6,5	150	130		x	x	4	x				
MO EEx 630/820 - 16	320 - 630	820	16	2 - 240 (2 - 470)	100L08+	1,1	690	3,1	3,6	128	108	5 2 1 2 4	x	x	0	x				
MO EEx 550/715 - 25	320 - 550	715	25		100L06+	1,5	940	3,9	4,9	128	108		x	x	1	x				
MO EEx 630/820 - 63	320 - 630	820	63		112M04+	4,0	1430	8,5	6,5	150	130		x	x	2	x				
MO EEx 960/1250 - 32	630 - 960	1250	32	2 - 240 (2 - 470)	132M08+	3,0	725	7,3	5,5	239	-	5 2 1 2 5	x	x	1	x				
MO EEx 1100/1400 - 45	630 - 1100	1400	45		132MK06+	4,0	975	9,2	7,0	240	-		x	x	2	x				
MO EEx 1100/1400 - 63	630 - 1100	1400	63		132M06+	5,5	970	12,5	6,5	248	-		x	x	3	x				
MO EEx 920/1200 - 100	630 - 920	1200	100		132M04+	7,5	1455	15,5	6,8	243	-		x	x	4	x				

- Notes:
- The rated torque is 60% of the maximum tripping torque in duty S2 and 40% of the maximum tripping torque in duty S4.
 - In the first, second and fourth positions of the supplementary number, the respective numbers should be inserted instead of x, according to Tab.2.
 - Design variants operating at another supply voltage than that given in the table, are available upon special request.
 - Electric motors designated in the table with + have built-in thermistors PTC connected to the terminal cover on two non-exposed bushings. This built-in heat protection, in combination with the control system, shall isolate the electric motor from the mains supply if heating-up of the electric motor winding exceeds temperature of 145 °C during thermal overloading caused by failures.

Tab. 1a - Basic technical parameters and design

Basic outfit:		1 electric motor type 4KTC 2 anti-condensation heaters		2 torque-limit switches (OPEN and CLOSE) 2 position-limit switches (OPEN and CLOSE)													
Type designation	Torque [Nm]		Speed [RPM]	Working stroke [revolutions]	Electric motor					Weight [kg]		Type number					
	tripping	starting			Type 4KTC	Power [kW]	Speed [1/min]	In (400 V)	Iz In	Design		basic		supplementary			
			cast-iron	aluminium						1	2	3	4	5	6	7	8
MO EEx 40/90 - 25	20 - 40	90	25	2 - 250 (2 - 620)	71A - 4	0,25	1355	0,75	3,8	-	49	5 2 1 2 0	x	x	A	x	
MO EEx 40/80 - 40	20 - 40	80	40		71B - 4	0,37	1350	1,05	3,8	-	50		x	x	B	x	
MO EEx 63/90 - 25	40 - 63	90	25		71A - 4	0,25	1355	0,75	3,8	-	49		x	x	C	x	
MO EEx 63/80 - 40	40 - 63	80	40		71B - 4	0,37	1350	1,05	3,8	-	50		x	x	D	x	
MO EEx 100/130 - 25	63 - 100	130	25		71B - 4	0,37	1350	1,05	3,8	-	50		x	x	E	x	
MO EEx 125/160 - 11	80 - 125	160	11		71A - 4	0,25	1355	0,75	3,8	-	49		x	x	F	x	
MO EEx 100/130 - 25	63 - 100	130	25	2 - 250 (2 - 620)	80A - 6	0,37	925	1,1	3,6	76	63	5 2 1 2 1	x	x	B	x	
MO EEx 100/130 - 40	63 - 100	130	40		80A - 7	0,55	1410	1,38	4,6	76	63		x	x	C	x	
MO EEx 100/130 - 63	63 - 100	130	63		80B - 4	0,75	1400	1,8	5,0	77	64		x	x	D	x	
MO EEx 100/130 - 100	63 - 100	130	100		90S - 4	1,1	1410	2,4	5,4	83	70		x	x	E	x	
MO EEx 160/210 - 16	100 - 160	210	16		80A - 6	0,37	925	1,1	3,6	76	63		x	x	F	x	
MO EEx 160/210 - 25	100 - 160	210	25		80B - 6	0,55	915	1,5	4,1	76	63		x	x	H	x	
MO EEx 160/210 - 40	100 - 160	210	40		80B - 4	0,75	1400	1,8	5,0	77	64		x	x	I	x	
MO EEx 160/210 - 65	100 - 160	210	65		90S - 4	1,1	1410	2,4	5,4	83	70		x	x	J	x	
MO EEx 160/210 - 100	100 - 160	210	100		90L - 4	1,5	1405	3,25	5,8	86	73		x	x	K	x	
MO EEx 160/210 - 125	100 - 160	210	125		90L - 2	2,2	2845	4,4	6,9	86	73		x	x	A	x	
MO EEx 250/325 - 10	160 - 250	325	10	2 - 250 (2 - 620)	80A - 6	0,37	925	1,1	3,3	76	63	5 2 1 2 2	x	x	A	x	
MO EEx 250/325 - 16	160 - 250	325	16		80B - 6	0,55	915	1,5	3,4	77	64		x	x	B	x	
MO EEx 250/325 - 25	160 - 250	325	25		90L - 6	1,1	915	3,0	4,1	87	74		x	x	C	x	
MO EEx 250/325 - 40	160 - 250	325	40		90S - 4	1,1	1410	2,4	5,4	83	70		x	x	D	x	
MO EEx 210/280 - 65	160 - 210	280	65		90L - 4	1,5	1405	3,25	5,8	86	73		x	x	E	x	
MO EEx 250/325 - 80	160 - 250	325	80		90L - 2	2,2	2845	4,4	6,9	86	73		x	x	F	x	
MO EEx 500/650 - 16	250 - 500	650	16		2 - 240 (2 - 470)	100LB - 8	1,1	695	3,25	3,8	135		122	5 2 1 2 3	x	x	A
MO EEx 500/650 - 25	250 - 500	650	25	100L - 6		1,5	930	3,7	4,7	134	121	x	x		B	x	
MO EEx 500/650 - 40	250 - 500	650	40	112M - 6		2,2	960	5,00	6,1	153	133	x	x		C	x	
MO EEx 400/520 - 63	250 - 400	520	63	100LB - 4		3,0	1400	6,4	5,3	137	117	x	x		D	x	
MO EEx 400/520 - 100	250 - 400	520	100	112M - 4		4,0	1430	8,2	6,6	151	131	x	x		E	x	
MO EEx 550/715 - 16	320 - 550	715	16	100LB-8		1,1	695	3,25	3,8	137	117	5 2 1 2 4	x	x	A	x	
MO EEx 630/820 - 25	320 - 630	820	25	100L-6		1,5	930	3,7	4,7	137	117		x	x	B	x	
MO EEx 630/820 - 63	320 - 630	820	63	112M-4		4,0	1430	8,2	6,6	151	131		x	x	C	x	
MO EEx 950/1235 - 32	630 - 950	1235	32	2 - 240 (2 - 470)		132M-8	3,0	710	7,2	4,8	237	-	5 2 1 2 5	x	x	A	x
MO EEx 950/1235 - 45	630 - 950	1235	45			132MA-6	4,0	960	8,8	6,3	240	-		x	x	B	x
MO EEx 950/1235 - 63	630 - 950	1235	63		132MB-6	5,5	955	11,8	6,1	247	-	x		x	C	x	
MO EEx 950/1235 - 100	630 - 950	1235	100		132M-4	7,5	1455	14,8	6,5	245	-	x		x	D	x	

Notes: ¹⁾ The rated torque is 60% of the maximum tripping torque in duty S2 and 40% of the maximum tripping torque in duty S4.
²⁾ In the first, second and fourth positions of the supplementary number, the respective numbers should be inserted instead of x, according to Tab.2.
³⁾ Rated currents for different feeding voltages than those given in the table are available on request at the manufacturer.
⁴⁾ Electric motors have built-in thermistors PTC connected to the terminal box cover on 2. If, in case of thermal overloads caused by failures, the electric motor winding is heated up to more than 145 °C this built-in thermal protection, in cooperation with the control system, will disconnect the electric motor from the supply mains.

Tab. 2-Attachment, electrical connection and environmental design variant

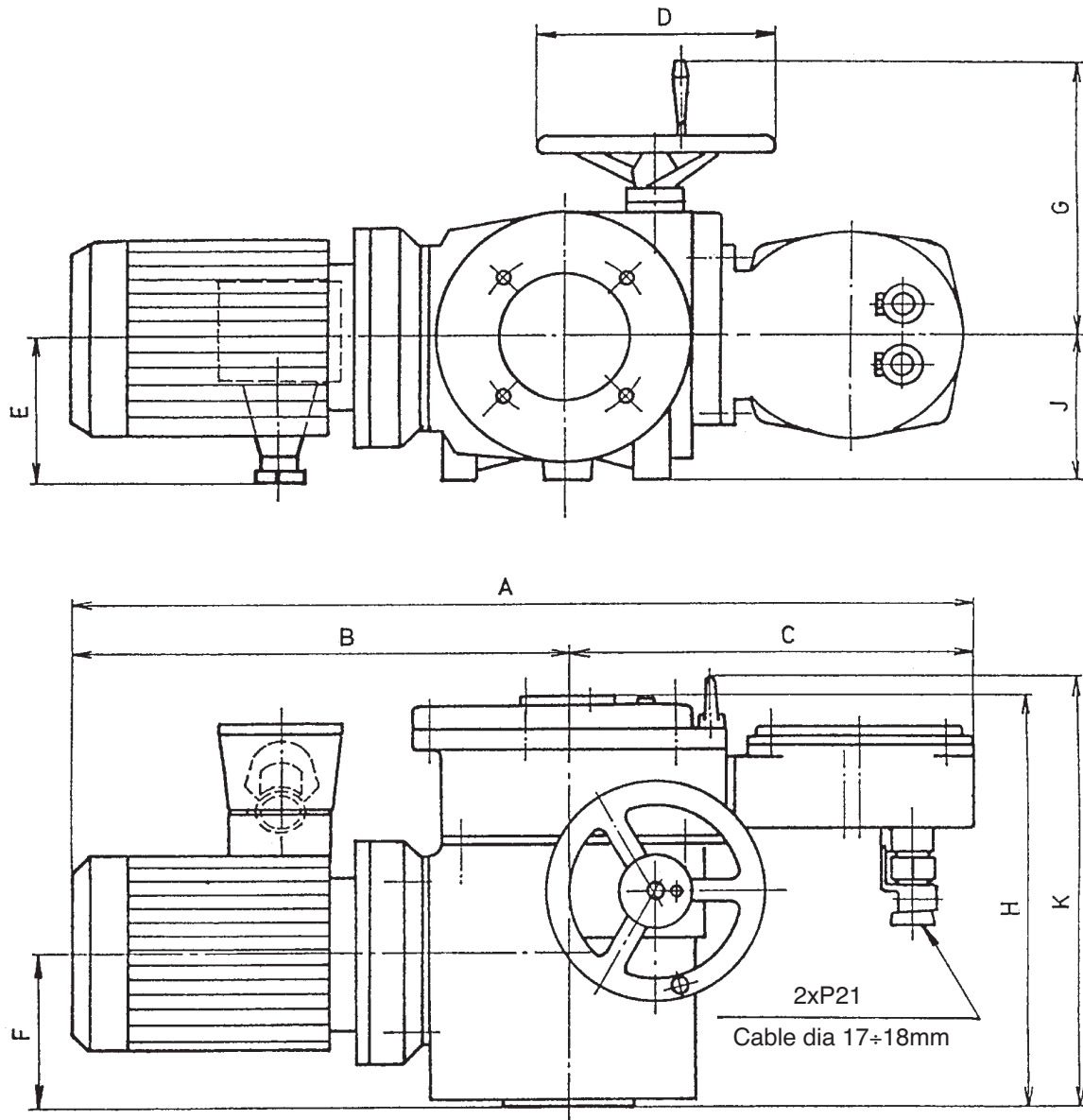
Type number.....	5	2	1	2	x	.	x	x	x	x
Attachment	Shape A			5						
	Shape B			6						
	Shape C			7						
	Shape D			8						
	Shape E			9						
Working stroke (revolutions)										
2 - 250 (2 - 240)								0	-	
2 - 620 (2 - 470)								-	A	
Tripping torque, speed and other technical parameters are given in Tab. 1 and Tab 1a including designations. In this position, the figure or letter corresponding to the required parameters should be given.										
Signalling, position transmitter										
- without signalling and position transmitter (basic design)										0
- without position transmitter, with signalling										1
- with all units and potentiometer 1 x 100 Ω										2
- with all units and current position transmitter CPT 1/A 4 - 20 mA										3
- without signalling, with potentiometer 1 x 100 Ω										4
- without signalling, with current position transmitter CPT 1/A 4 - 20 mA										5

Note:

The power supply of 24 VDC, 2 W, which is required for operating the CPT I/A current transmitter, has not been built in the **MODACT MO EEx** electric actuators.

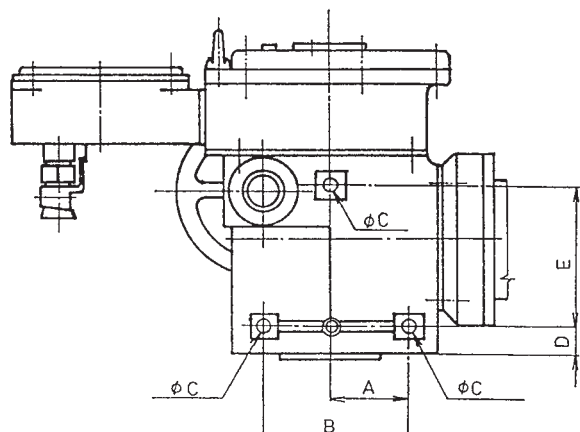
* Design with this designation for working stroke 2 - 240 rev. - basic design.

Dimensional sketch of the **MODACT MO EEx** electric actuator



Dimension	Type number			
	52 120	52 121, 2	52 123, 4	52 125
A max.	665	794	918	1052
B max.	340	462	573	684
C	325	332	345	368
D	∅ 160	∅ 200	∅ 250	∅ 375
E	130	130	165	165
F	80	92	123	153
G	215	256	310	362
H max.	306	318	382	438
J	90	120	145	178
K	315	335	400	442

Holes for additional attachment of the **MODACT MO EEX** electric actuator

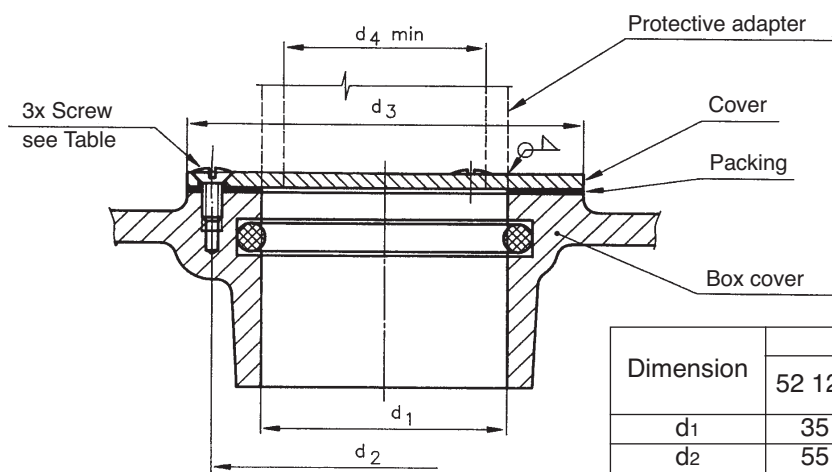


Dimension	Type number			
	52 120	52 121, 2	52 123, 4	52 125
A	61	90	110	120
B	110	160	210	240
$\varnothing C$	M 10	M 12	M 16	M 20
D	16	21	23	47
E	120	140	200	220

Note:

The holes intended for the additional attachment of the MODACT electric actuators serve only for supporting the actuator weight and should not be exposed to the action of another additional force.

Modification for the rising spindle



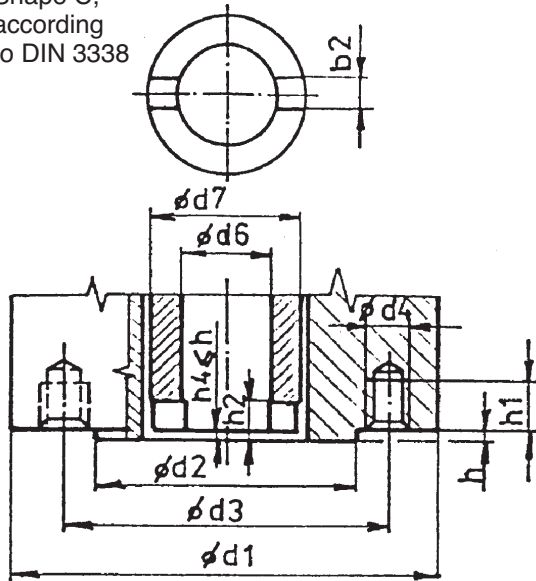
Dimension	Type number			
	52 120	52 121 52 122	52 123 52 124	52 125
d ₁	35	50	75	80
d ₂	55	70	100	100
d ₃	65	80	112	112
d ₄	28	41,5	53	72
Screw ČSN EN ISO 2010	M4x10	M4x10	M5x10	M5x10

Connecting dimensions of the MODACT MO EEx electric actuators

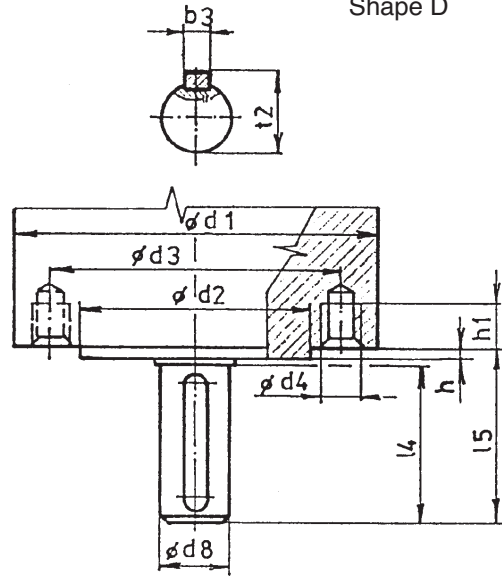
The electric actuators have been designed for direct mounting to the controlled device (fitting, etc.). They can be connected by means of a flange or clutch, according to ČSN Standard 186314. The flanges of the actuators also correspond to ISO Standard 5210. The clutches used for the transmission of motion to the fittings are:

- Shape A (with adapter), according to ČSN EN ISO 5210 (13 3090)
- Shape B1 (with adapter), according to ČSN EN ISO 5210 (13 3090)
- Shape B3 (without adapter), according to ČSN EN ISO 5210 (13 3090)
- Shape D (without adapter)
- Shape C (without adapter), according to DIN 3338

Shape C,
according
to DIN 3338



Shape D



Shape B3,
according to ČSN EN ISO 5210

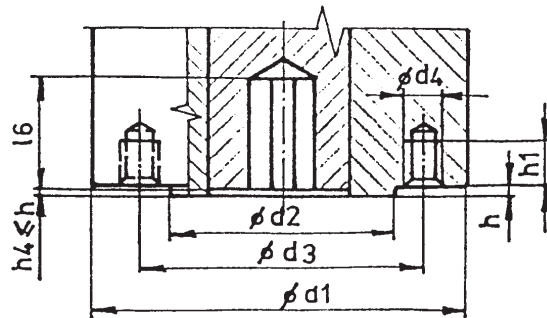
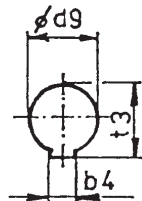
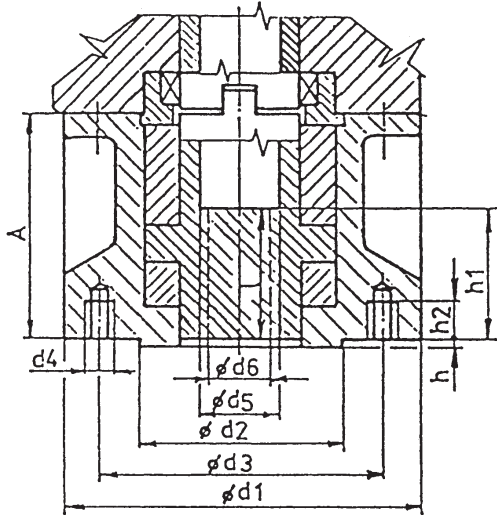


Table of connecting dimensions of the **MODACT MO EEx** electric actuators

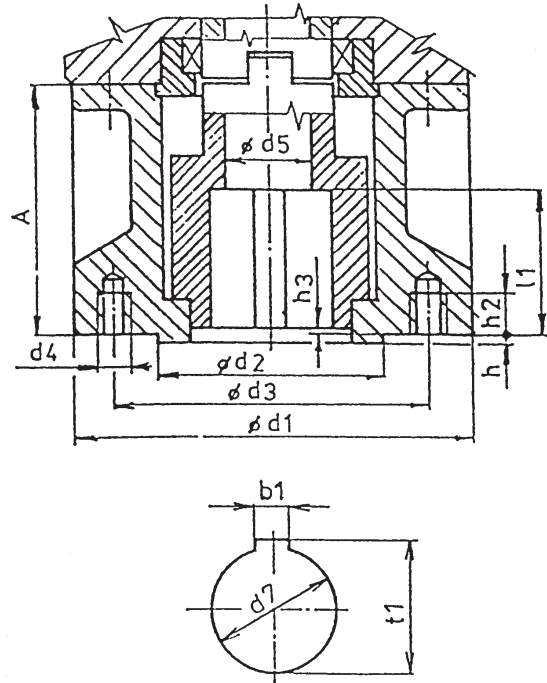
Shape	Dimension	Type number / Flange			
		52 120 F 10	52 121, 2 F 14	52 123, 4 F 16	52 125 F 25
C, D, B3 (identical dimensions)	\varnothing d1 (orientation value)	125	175	210	300
	\varnothing d2 f8	70	100	130	200
	\varnothing d3	102	140	165	254
	d4	M 10	M 16	M 20	M 16
	Number of tapped holes	4	4	4	8
	$h_{-0,2}^0$	3	4	5	5
	h1 min. 1,25 d4	12,5	20	25	20
C	\varnothing d7	40	60	80	100
	h2 min.	10	12	15	16
	b2 H11	14	20	24	30
	\varnothing d6	28	41,5	53	72
D	\varnothing d8 g6	20	30	40	50
	l4	50	70	90	110
	t2 max.	22,5	33	43	53,5
	b3 h9	6	8	12	14
	\varnothing l6	55	76	97	117
B3	\varnothing d9 H8	20	30	40	50
	l6 min.	55	76	97	117
	t3	22,8	33,3	43,3	53,8
	b4 Js9	6	8	12	14

Adapters for the **MODACT MO EEx** electric actuators

Shape A,
according to ČSN EN ISO 5210



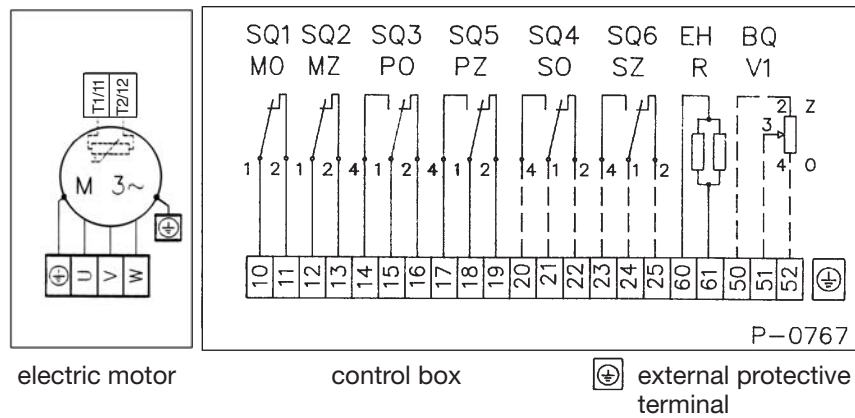
Shape B1,
according to ČSN EN ISO 5210



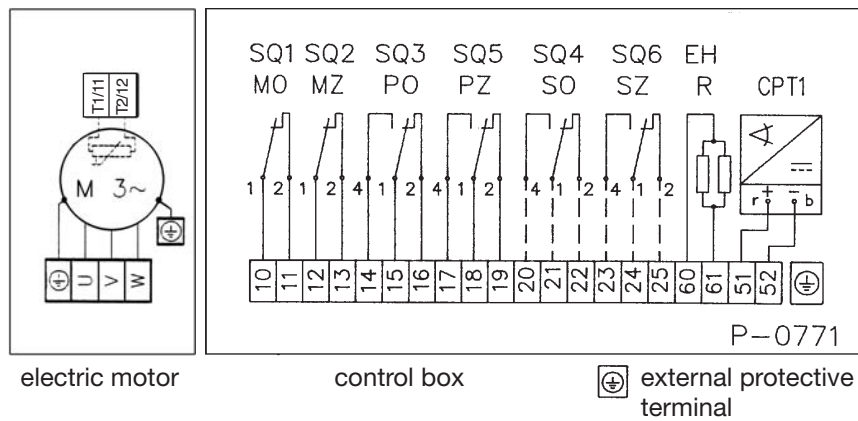
Assignment of adapters to actuators

Shape	Dimension	Type number			
		52 120	52 121, 2	52 123, 4	52 125
A,B1 (identical dimensions)	$\varnothing d1$	125	175	210	300
	$\varnothing d2 f8$	70	100	130	200
	$\varnothing d3$	102	140	165	254
	d4	M 10	M 16	M 20	M 16
	Number of holes d4	4	4	4	8
	h	3	4	5	5
	h2 min.	12,5	20	25	20
A	A	63,5	110	179	155
	$\varnothing d5$	30	38	53	63
	$\varnothing d6 \text{ max.}$	26	36	44	60
	h1 max.	43,5	65	92	110
	l min.	45	55	70	90
B1	A	63,5	110	122	155
	$\varnothing d5$	30	40	50	65
	l1 min.	45	65	80	110
	h3 max.	3	4	5	5
	b1	12	18	22	28
	$\varnothing d7 H9$	42	60	80	100
	t1	45,3	64,4	85,4	106,4

Internal wiring diagrams of the **MODACT MO EEx** electric actuators



-design with current transmitter CPT 1/A



LEGEND:

BQ1 (V1) - Resistance position transmitter 1 x 100 Ω

CPT1 - Current transmitter CPT1/A 4 - 20 mA

SQ1 (MO)

- OPEN torque switch

SQ2 (MZ) - CLOSE torque switch

SQ3 (PO) - OPEN position-limit switch

SQ5 (PZ) - CLOSE position-limit switch

SQ4 (SO) - OPEN signalling switch

SQ6 (SZ) - CLOSE signalling switch

EH (R) - Anti-condensation heaters

T1, T2 - Thermistors

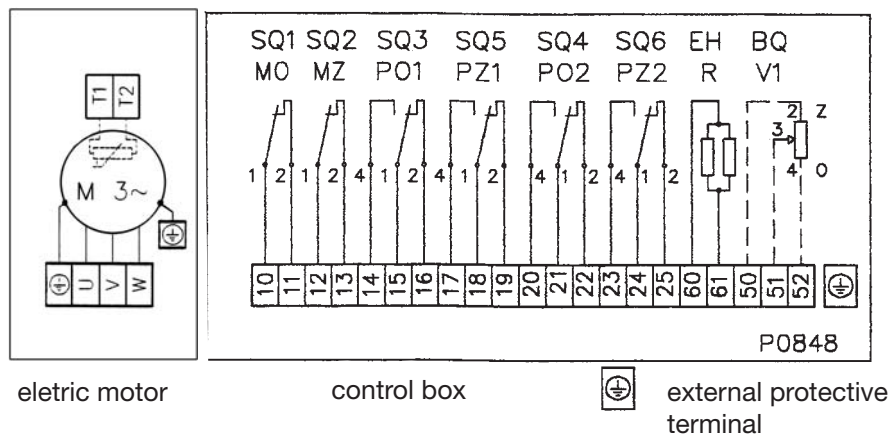
**) Some electric motors are fitted with thermistors (see Sheet 13, Note 4 of TP 12-02/92, dashed line on this sheet). The thermistors should be interconnected with the circuits of thermistor protection of the motors (eg. Siemens Sirius 3RN1). These circuits are not provided by ZPA Pečky a.s.*

NOTE:

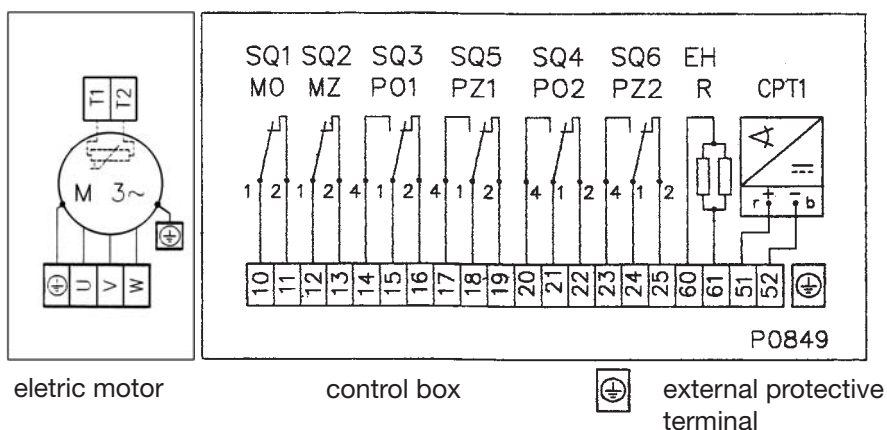
In the design variant with the CPT1/A current transmitter, the user should provide for connection of the two-wire circuit of the current transmitter to the electric earth of the associated controller, computer, etc. The connection should be made only at a single point in any section of the circuit outside the electric actuator. The voltage between electronics and the current transmitter case should not exceed 50 V_{DC}.

Wiring diagrams of electric connection of MODACT MO EEx electric actuators,
 Type No. 52 120 - 52 125, version without signaling change-over switches
 with two doubled position change-over switches.

The doubled position change-over switches (PO1, PO2, and PZ1, PZ2) always switch at the same time
 -design with resistance position transmitter 1 x 100 Ω or without transmitter.



-design with current position transmitter CPT1/A



LEGEND:

- | | | |
|--------|------|---|
| BQ1 | (V1) | - Resistance position transmitter 1 x 100 Ω |
| CPT1 | | - Current transmitter CPT1/A 4 - 20 mA |
| SQ1 | (MO) | - OPEN torque switch |
| SQ2 | (MZ) | - CLOSE torque switch |
| SQ3 | (PO) | - OPEN position-limit switch |
| SQ5 | (PZ) | - CLOSE position-limit switch |
| SQ4 | (SO) | - OPEN signalling switch |
| SQ6 | (SZ) | - CLOSE signalling switch |
| EH | (R) | - Anti-condensation heaters |
| T1, T2 | | - Thermistors |

**) Some electric motors are fitted with thermistors (see Sheet 13, Note 4 of TP 12-02/92, dashed line on this sheet). The thermistors should be interconnected with the circuits of thermistor protection of the motors (eg. Siemens Sirius 3RN1). These circuits are not provided by ZPA Pečky a.s.*

NOTE:

In the design variant with the CPT1/A current transmitter, the user should provide for connection of the two-wire circuit of the current transmitter to the electric earth of the associated controller, computer, etc. The connection should be made only at a single point in any section of the circuit outside the electric actuator. The voltage between electronics and the current transmitter case should not exceed 50 V_{DC}.

SURVEY OF PRODUCED ACTUATORS

KP Mini

Electric part-turn actuators (up to 30 Nm)

Modact MOK, MOK-P, MOK-P EEx

Electric part-turn actuators for ball valves and flaps

Modact MON

Electric multi-turn actuators

Modact MO EEx

Explosion proof electric multi-turn actuators

Modact MOA

Electric part-turn actuators for nuclear power stations
application outside containment

Modact MOA OC

Electric multi-turn actuators for nuclear power stations
application inside containment

Modact Variant MPR

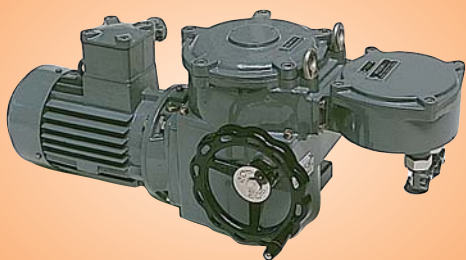
Electric part-turn lever actuators with a variable output speed

Modact Konstant MPS

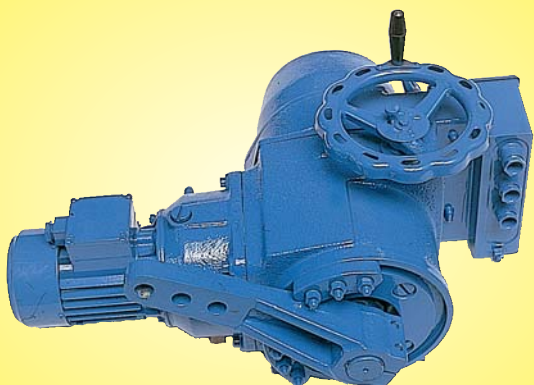
Electric part-turn lever actuators with a constant output speed

Modact MTN

Electric linear thrust actuators with a constant output speed



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