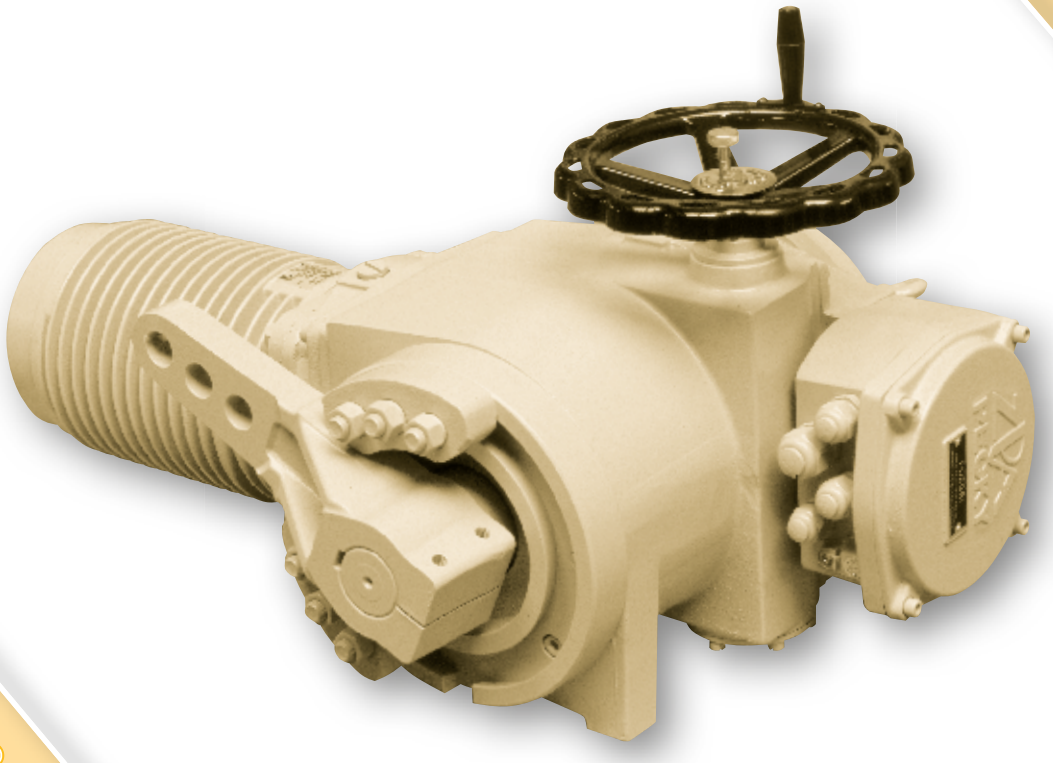
ZPA PEČKY, a.s.

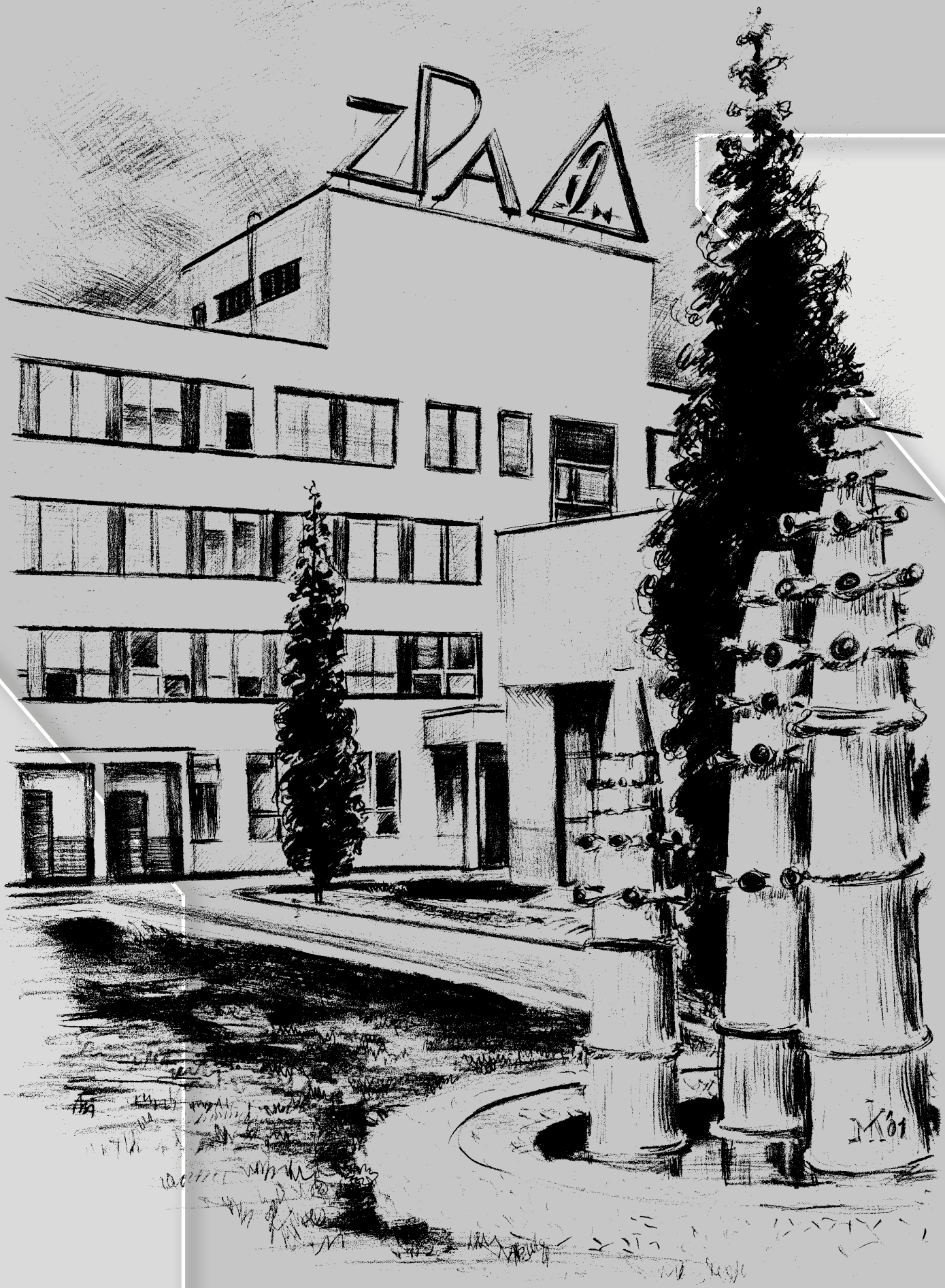


MOUNTING INSTRUCTIONS

Electric part-turn lever actuators with a variable setting speed

MODACT MPR

Type numbers 52 221 - 52 223



ZPA Pečky, a.s. is certified company in accordance with ISO 9001 as amended.

CONTENS

1. APPLICATION

The **MODACT MPR Variant** electric lever actuators operating at a variable control speed have been specially designed for the control of actuating variables *(final control elements of continuous and discontinuous regulating systems - flaps, louvers and valves)* in industrial automation and control systems.

2. OPERATING CONDITIONS, OPERATING POSITION

Operating conditions

The electric actuators should withstand the effect of operating conditions and external influences, Classes AC1, AD5, AE4, AF2, AG2, AH2, AK2, AL2, AM-2-2, AN2, AP3, BA4 a BC3, according to ČSN Standard 33 2000-5-51 ed. 3.

When placed on an open area, the actuator is recommended to be fitted with a light shelter to protect it against direct action of atmospheric effects. The shelter should overhang the actuator contour by at least 10 cm at the height of 20 – 30 cm.

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.

Installation of the actuators at a location with incombustible and non-conducting dust is possible only if this has no adverse effect on their function. In this case, the provisions laid down in ČSN Standard 35 3205 should be strictly observed. 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 room in which the motor is located should be sufficiently large, clean and ventilated.

Protective enclosure

Type IP 55, according to ČSN EN 60529.

Temperature

Operating ambient temperature for actuators **MODACT MPR** is -25° to +70°C.

Classes of external influences – as extracted from ČSN Standard 33 2000-5-51 ed. 3.

Class:

1) AC1 – Altitude ≤ 2,000 m above sea level
2) AD5 – Splashing water in all directions
3) AE4 – Small dust content of air
4) AF2 – Corroding atmosphere and pollutants; the presence of corroding pollutants is significant.
5) AG2 – Average mechanical stress; in current industrial plants
6) AH2 – Medium vibrations; in current industrial plants
7) AK2 – Serious risk of growth of vegetation and moulds
8) AL2 – Serious danger of the occurance of animals *(insects, birds, small animals)*
9) AM2-2 – Harmful effect of escaping vagabon currents
10) AN2 – Medium solar radiation with intensities > 500 W/m^2 and ≤ 700 W/m^2
11) AP3 – Medium seismic effects; acceleration > 300 Gal ≤ 600 Gal
12) BA4 – Personal abilities; instructed people
13) BC3 – Frequent contact with the earth potential; persons coming frequently into contat with “live” parts or standing on a conducting base

Corrosion protection

Actuators are standardly delivered with surface treatment corresponding to category of corrosion aggressiveness C1, C2 and C3 according to ČSN EN ISO 12944-2.

On customer's request is possible to do surface treatment correcponding to category of corrosion aggressiveness C4, C5-I and C5-M.

In following table is provided and overview of environment for each categories of corrosion aggressiveness according to ČSN EN ISO 12944-2.

Corrosion aggressiveness level	Example of typical environment	
	Outdoor	Indoor
C1 (very low)		Heated buildings with clean atmosphere e.g. offices, shops, schools, hotels.
C2 (low)	Atmosphere with low level of pollution. Mostly outdoor areas.	Unheated buildings, in which may occur condensation, e.g. stocks, sports halls.
C3 (middle)	Urban industrial atmospheres, mild pollution of sulfur dioxide. Seaside areas with middle salinity.	Production areas with high humidity and low air pollution, e.g. food industry, processing factories, breweries.
C4 (high)	Industrial areas and seaside areas with middle salinity.	Chemical plants, swimming pools, seaside shipyard.
C5-I (very high – industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with predominantly continuous condensation and high air pollution.
C5-M (very high – seaside)	Seaside areas with high salinity.	Buildings or areas with predominantly continuous condensation and high air pollution.

Operating position

The actuators can be used in any operating position.

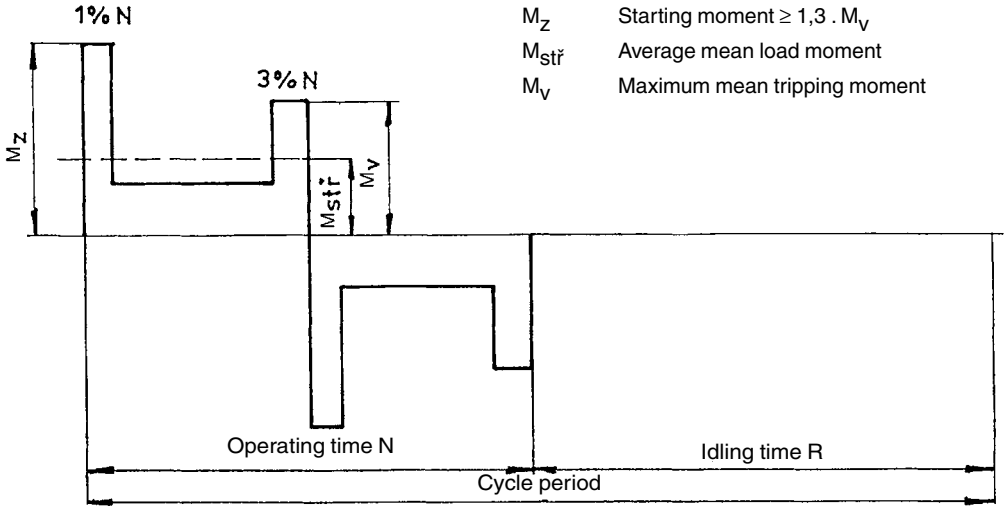
3. OPERATION MODE, SERVICE LIFE OF ACTUATORS

Operating mode

According to ČSN EN 60 034-1, actuators can be operated in S2 load category. The operation time at +50 °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 N/N+R shall be maximum 25 per cent, the longest operation cycle N+R is 10 minutes *(the course of load is shown in the picture).* The maximum number of switching actions in automatic control mode is 1200 actions per hour. The average mean load moment at load factor of 25 per cent and 50 °C shall not exceed 40 per cent of the maximum tripping moment *(M_V).*

The average mean load moment shall not exceed the nominal moment of the actuator.



M_z Starting moment ≥ 1,3 . M_V
$M_{stř}$ Average mean load moment
M_V Maximum mean tripping moment

Course of working cycle

Service life of actuators

The actuator intended for shut-off valves must be able to perform at least 10,000 operating cycles *(C - O - C).*

The actuator intended for regulating purposes must be able to perform at least 1 million cycles with operation time *(during which the output shaft is moving)* at least 250 hours. Service life in operating hours *(h)* depends on load and number of switching. Not always, high frequency of switching influences positively accuracy of regulation. For attaining the longest possible faultless period and service life, frequency of switching is recommended to be set to the lowest number of switching necessary for the given process. Orientation data of service life derived from the set regulation parameters are shown in the following table.

Service life of actuators for 1 million starts

Service life [h]	830	1 000	2 000	4 000
Number of starts [1/h]	Max. number of starts 1200	1 000	500	250

4. TECHNICAL DATA

If there is not the actuator equipped overcurrent protection when you buy, it is necessary, that this protection will be ensure externally.

Parameter	Unit	Type of electric motor		
		J9A10-00	J10A12-00	J11A11-00
Motor power	W	16	25	50
Excitation phase voltage	V	230	230	230
Control phase voltage	V	230	230	230
Frequency	Hz	50	50	50
Rated voltage of brake	V	230	230	230
Starting torque	Nm	0,33	0,56	1,0
Rated speed of motor	1/min	1150 - 10 %	1250 - 10 %	1100 - 10 %
Rated current of brake	A	0,1 + 10 %	0,1 + 10 %	0,14 + 10 %
Rated current of motor	A	0,41 + 10 %	0,51 + 10 %	0,92 + 10 %
Weight	kg	9	14,5	27

Noise

Level of acoustic pressure A	max. 85 dB *(A)*
Level of acoustic output A	max. 95 dB *(A)*

Tripping torque

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

Sense of rotation

When looking at the output shaft in the direction towards the control box, the CLOSE direction of rotation is identical with the clockwise sense.

Working stroke

The ranges of working stroke are given in Table No. 1.

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 is determined by the function of the 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 valve nut is provided with left-hand thread, the actuator closes the valve.

Torque-limit switches in the actuator are set and work when the actuator is under voltage.

When using the manual control, ie. actuator is controlled mechanically, the torque-limit switches doesn´t work and the valve can be damaged.

5. ACTUATOR OUTFIT

Torque-limit switches

The actuator is fitted with two torque-limit switches *(MO – OPEN, MZ – CLOSE) (type DB1G-A1LC),* 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 Table 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 switches

Position PO, PC position switches define the working stroke of the actuator – each one end position. Actuators with current transmitter, resistive transmitter and transmitter – type DB1G-A1LC - 2 pcs.

Signal switches

Output shaft positioning of the actuator is signaled by two signal switches SO, SC, each for one direction Movement of the output shaft. The point of switching of the microswitches can be adjusted in the entire working stroke range exceptOf the narrow band before the switch point of the microswitch, which switches off the electric motor.

Position transmitters

MODACT MPR servomotors can be supplied without a position transmitter or can be equipped with a position transmitter:

a) 1 x 100 Ω Resistive Transmitter

Technical parameters:

Position sensing	odporové
Angle of rotation	0°– 320°
Linearity	≤ 1 %

Transient resistance	max. 1,4 Ω
Allowed voltage	50 V DC
Maximum current	100 mA

b) Type CPT 1Az passive current transmitter. Power supply to the current loop is not a part of the actuator. Recommended feeding voltage is 18 – 28 V DC, at maximum loading resistance of the loop 500 ohm. The current loop should be earthed in one point. Feeding voltage need not be stabilized; however, it must not exceed 30 V or else the transmitter could be damaged.

Range of CPT 1Az is set by a potentiometer on the transmitter body and its starting value by corresponding partial turning of the transmitter.

Technical parameters of CPT 1Az:

Scanning of position		capacity
Working stroke		adjustable 0° – 40° to 0° – 120°
Non-linearity		≤ 1 %
Non-linearity, including gears		≤ 2.5 % *(for a maximum stroke of 120°)*
Hysteresis, including gears		≤ 5 % *(for a maximum stroke of 120°)*
(*The non-linearity and hysteresis are related to a signal value of 20 mA*).		
Loading resistance		0 – 500 ohm
Output signal		4 – 20 mA or 20 – 4 mA
Supply voltage	for R_{load} = 0 – 100 ohm	10 to 20 V DC
	for R_{load} = 400 – 500 ohm	18 to 28 V DC
Maximum supply voltage ripple		5 %
Maximum transmitter power demand		560 mW
Insulation resistance		20 Mohm 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 *(additional on demand)*
Dimensions		ø 40 x 25 mm

c) Type DCPT3 active current transmitter. Power supply to the current loop is not a part of the actuator. Maximum loading resistance of the loop is 500 ohm.

DCPT3 can be easily set by two push-buttons with LED diode on the transmitter body.

Technical parameters of DCPT3:

Scanning of position	contact-less magneto-resistant
Working stroke	adjustable 60° – 340°
Non-linearity	max. ±1 %
Loading resistance	0 – 500 ohm
Output signal	4 – 20 mA or 20 – 4 mA
Power supply	15 – 28 V DC, < 42 mA
Working temperature	-25 °C to +70 °C
Dimensions	ø 40 x 25 mm

For the transmitters CPT 1Az as well as DCPT3, 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 regulator, computer, etc. This connection should only be made at a single point in any section of the circuit, outside the actuator.

Anti-condensation heater

The actuators are fitted with an anti-condensation heater preventing condensation of water vapour. It is connected to the AC mains of voltage 230 V.

Local control

Local control serves for controlling the actuator from the site of its installation. It includes two change-over switches: one with positions “Remote control - Off - Local control”, the other “Open - Stop - Close”. The former change-over switch can be built-in as two-pole or four-pole. The change-over switches are installed in a terminal-board box and the control elements on the lid of this terminal-board box.

6. ELECTRIC PARAMETERS

External electric connection

a) Actuator terminal board

The electric actuator is equipped with a terminal board for connection to external circuits. This terminal board uses screw terminals allowing conductors with a maximum cross-section 4 mm^2 to be connected. Access to the terminal board is obtained after removal of the terminal box cover. All control circuits of the electric actuator are brought out to the terminal board. The terminal box is fitted with cable bushings for connecting the electric actuator. The electric motor is fitted with an independent box with a terminal board and a bushing.

b) Connector

According to the customer's requirements the **MODACT MPR** actuators can be fitted with the connector to provide for connection of control circuits. This connector uses screw terminals allowing conductors with a maximum cross-section 2.5 mm^2 to be connected. ZPA Pečky, a.s. also supplies a counterpart for the cable. In order to connect the cable to this counterpart it is necessary to use special crimping pliers.

Actuator internal wiring

The internal wiring diagrams of the **MODACT MPR** actuators with terminal designation are shown in this Mounting and operating instructions.

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

Current rating and maximum voltage of microswitches

Maximum voltage of mikroswitches is 250 V AC as well as DC, at these maximum levels of currents.

MO, MZ	250 V AC / 2 A; 250 V DC / 0.2 A
SO, SZ	250 V AC / 2 A; 250 V DC / 0.2 A
PO, PZ	250 V AC / 2 A; 250 V DC / 0.2 A

The microswitches can only be used as single-circuit devices. Two voltages of different values and phases cannot be connected to the terminals of the same microswitch.

Isolation resistance

Isolation resistance of electric control circuits against the frame and against each other is min. 20 Mohm. After a dump test, isolation resistance of control circuits is min. 2 Mohm. See Technical specifications for more details.

Electric strength of electric circuits isolation

Circuit of resistance transmitter	500 V, 50 Hz
Circuit of current transmitter	50 V DC
Circuits of microswitches and anti-condensation heater	1 500 V, 50 Hz
Electric motor 230 V	1 500 V, 50 Hz

Deviations of basic parameters

Maximum lever play	– Type No. 52 221, 52 222	1°
	– Type No. 52 223	2°
Switching torque adjusting accuracy range		0 to +30 % of the maximum value of the adjustment
Working stroke adjusting accuracy		1°
Hysteresis of position-limit switches		4° max.

Control time tolerance at rated supply voltage and rated torque in two-phase connection	+15 % to -30 % of the nominal control time value
Supply voltage of electric motor *(including brake)*	230 V, +10 %, -15 %; 50 Hz, ±2 %

Protection

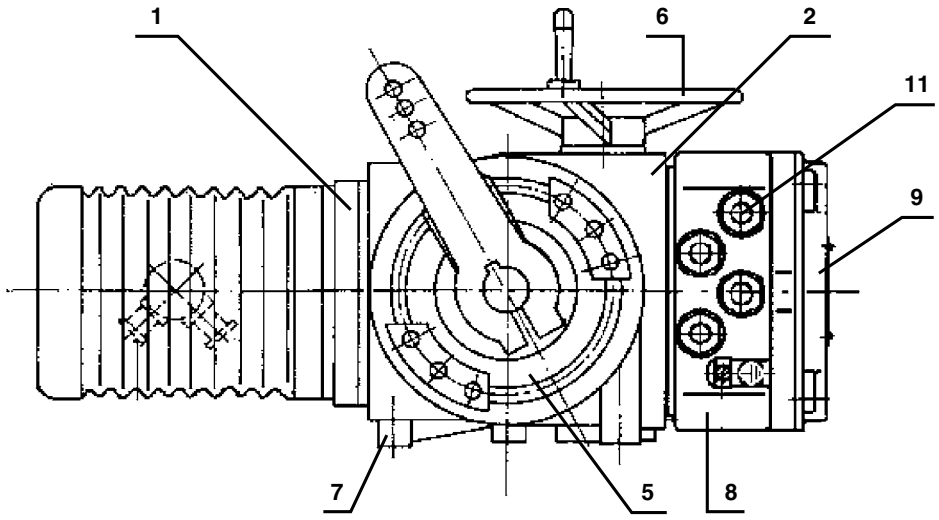
Actuators are provided with one internal and one external protective terminal serving as protection from electric shock as per ČSN 33 2000-4-41. Also the electric motor is provided with one protective terminal. Protective terminals are identified with a sign complying with ČSN EN 60 417-1 and 2 (013760).

If actuator is not provided with over-current protection when purchased, such protection must be provided externally.

7. DESCRIPTION

Based on the principle of modular construction of Series MODACT actuators, the **MODACT MPR Variant** actuators consist of the following assemblies *(modules) (Fig. 1):*

a)	Countershaft gearbox with a special electric motor	1
b)	Power gear unit 2 with manual operation	6
c)	Control box	3
d)	Lever assembly	5
e)	Terminal box	8



Legend:

1 – Countershaft gearbox with electric motor
2 – Power gear unit with hand control
3 – Control box
5 – Lever assembly
6 – Handwheel
7 – Fixing lugs
8 – Terminal box
9 – Terminal box cover
10 – Control box cover
11 – Cable bushings

Fig. 1 - ***Power gear unit***

Countershaft gearbox with electric motor

This gearbox consists of an asynchronous two phase squirrel cage motor and a box enclosing one to three pairs of spur gears. A pinion extended from the gearbox meshes with a gear of the power gear unit. The electric motors have been engineered to withstand permanent short circuit run *(in the braked condition).*

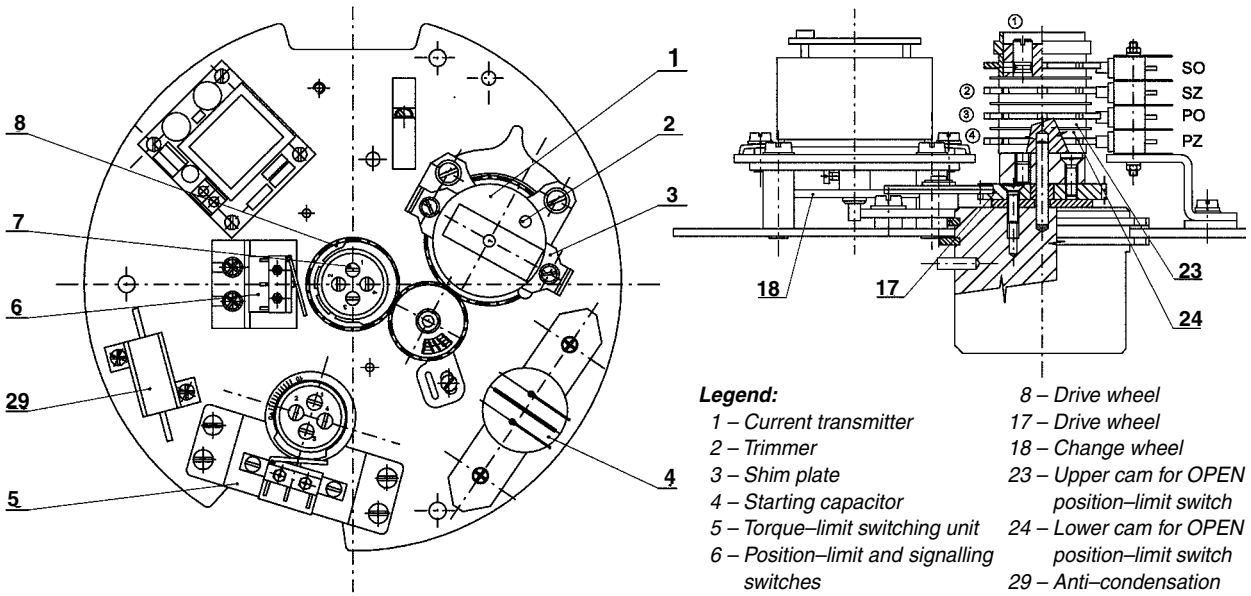
Power gear unit

The power gear unit uses a central mounted train of planetary gears driven by bevel gearing. This box also encloses a worm shaft for manual cotrol and a worm wheel that is fixedly coupled to the crown gear. The worm shaft is slidably mounted and supported on a torque sensing spring. The handwheel 6 is used for adjusting the controlled device if a power supply failure occurs. On the opposite side there are three tapped lugs 7 for fixing the actuator.

Control box

At lever actuator is on the side, that means on the opposite side to the module 5 of lever mechanism. To control box is mounted the terminal box 8, where is placed terminal, acccessible after removing the lid 9. In control box is placed the control board 12 (Figs 2,3). Control box is covered by lid 10 *(Fig. 1).* In terminal box are screwing three bushings GP 16 11. On control board are placed individual function units.

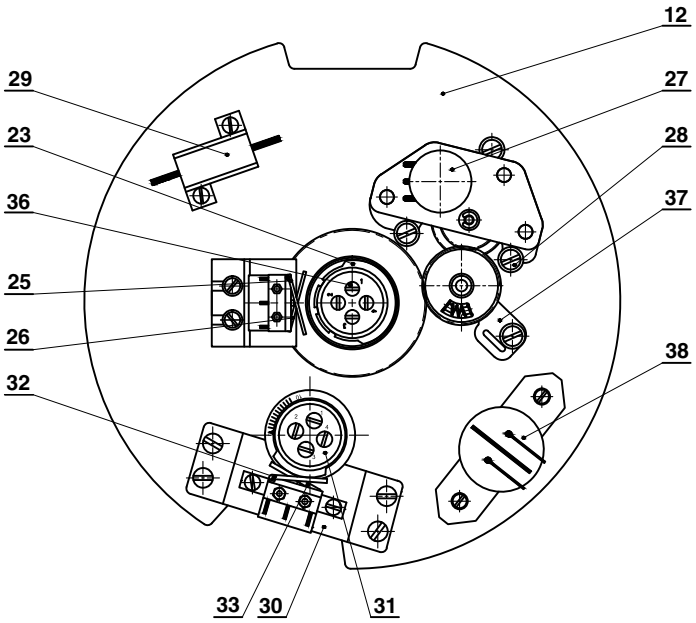
a) Torque-limit switches 32,33 *(Fig. 3)*
b) Position-limit switches 25, 26 *(Figs 3, 5)*



Legend:

1 – Current transmitter
2 – Trimmer
3 – Shim plate
4 – Starting capacitor
5 – Torque–limit switching unit
6 – Position–limit and signalling switches
7 – Cam screws
8 – Drive wheel
17 – Drive wheel
18 – Change wheel
23 – Upper cam for OPEN position–limit switch
24 – Lower cam for OPEN position–limit switch
29 – Anti–condensation heaters

Fig. 2 - ***Control board with current position transmitter***



Legend:

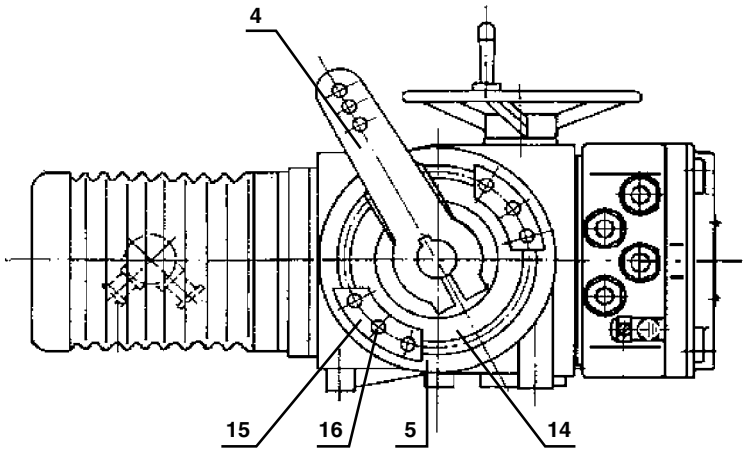
12 – Support plate of the control part
23 – Top cam for position switch PO
25 – Position switch PO
26 – Position switch PZ
27 – resistance transmitter
28 – Transmitter Screws
29 – Heating resistance
30 – Torque shutdown
31 – Tripping cams
32 – Momentary switch MO
33 – Torque switch MZ
36 – Cam screws
37 – Transfer
38 – Condenser

Fig. 3 - ***Control board with potentiometer 1 x 100 ohm***

c)	Potentiometer	27	*(Figs 3, 5)*
	Current position transmitter	1	*(Fig. 2)*
d)	Adjusting cams of position-limit switches	23, 24	*(Figs 3, 5)*
e)	Capacitor	38	*(Fig. 3)*
f)	Anti-condensation heater *(dual)*	29	*(Fig. 3)*

Lever system *(fig. 4)*

The lever mechanism consists of the lever 4 attached to the output shaft of the power gear unit and the circular flange 14 fitted on its face with a T-groove in whichadjustable stops 15 are mounted for limiting the lever motion. The flange with stops is fixedly connected to the power gearbox.



Legend:
4 – Lever
5 – Lever assembly
14 – Leverage flange
15 – Leverage stops
16 – Lock screws of leverage stops

Fig. 4 - ***Level system***

Terminal box

Flange coupled with the control box, the terminal box provides accommodation for the terminal board to which all electrical devices of the control box are connected; easy access to the terminal board is obtained after removal of the terminal box cover. For sealing the cable entries into the terminal box, three cable bushings are used. In another design variant, the terminal box is equipped with an instrument plug and socket, Type Connector; all electrical circuits of the control box, i.e., position-limit and torque-limit switches, output shaft position transmitters and anti-condensation heaters, are brought out to the instrument socket. In the plug, the lead-in cables are sealed by cable bushings P 21 and P 16. In either design variant of the terminal box, in addition to the main terminal board, a subsidiary 4 terminal board is mounted allowing connection to the terminal board of the electric motor. However, this connection is not carried out at the factory.

8. DESCRIPTION OF CONTROLS

In the following, the CLOSE direction means the clockwise rotation of the output shaft, when viewing the output shaft towards the control chamber. The “OPEN” direction means the reverse direction.

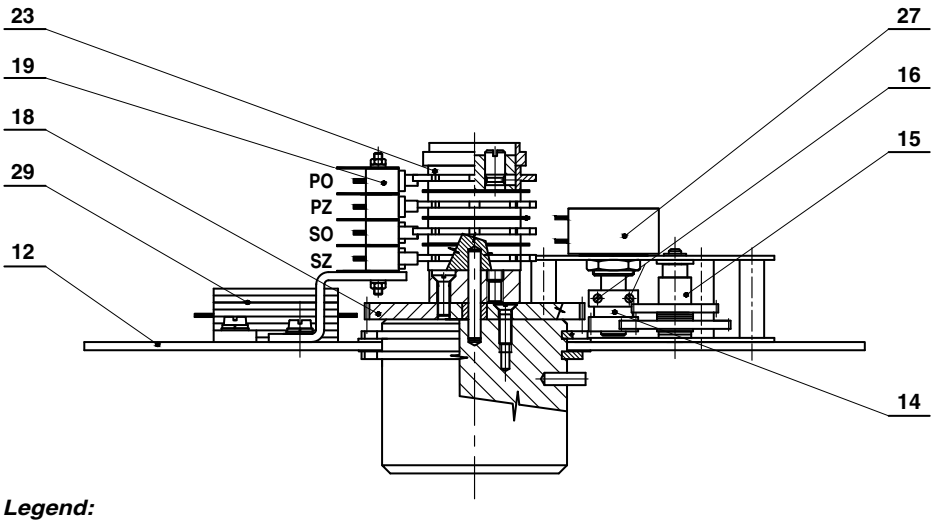
a) Torque tripping *(Fig. 3)*

The torque tripping unit 30 consists of two parts mounted on a common mounting plate:
- OPEN and CLOSE torque-limit microswitches MO 32 and MZ 33, respectively
- Tripping cams 31

The tripping cams are mounted on a roller fitted with auxiliary scales for adjusting the tripping torque. On the scale, the colour mark corresponds to the maximum torque whereas the zero mark corresponds to the minimum torque. Secured in position by screws, the switching cams and the scales are marked with numbers 1 to 4 stamped on the roller face. Screw No.1 is used to secure the cam at the top etc.

b) Position switches and cams

Designed with a resistive, current transmitter and without a transmitter *(Fig. 2, Fig. 3).* This version is equipped four switches responding to the output shaft position – PO, PC, SO, SC. Switches SO, SC can be used for example to indicate the position of the output shaft.



Legend:

12 – Support plate of the control part
14 – Pinion
15 – Intermediate Assembly
16 – Plank bolts
18 – Drive wheel
19 – Microswitches
23 – Cam for position switch PO
27 – Transmitter
29 – Heating resistance

Fig.5 - ***Control board with potentiometer 1 x 100 ohm***

c) The resistance position transmitter *(Fig. 5)*

The gear shaft 18 is mounted on the output shaft. Via the transmission 37, its rotary motion is transmitted to the pinion of the resistive transmitter either directly *(in the case of output shaft lift 90°, 120°, 160°),* or through the assembly Intermediate 15. The resistor transmitter pinion is equipped with a sliding clutch which stops at the end positions resistive transmitter. To set the resistive transmitter, this occurs automatically when the output is offset servomotor shaft to one of the end positions *("open" or "closed").*

d) Connection of current transmitter with drive *(Fig. 2)*

The current transmitters CPT 1Az and DCPT3 are installed on two pillar on the control board 12; they are connected with the actuator output shaft by a gearing of constant gear ratio. The gearing can be doubled depending on required stroke of the actuator and on the current transmitter used. The gearwheel listed in the following table belong to each gearing.

Current transmitter used	Actuator working stroke	Gearwheel 17 on output shaft	Gearwheel 18 on current transmitter shaft
DCPT3	60° – 160°	224652260 *(105 teeth)*	214634374 *(64 teeth)*
CPT 1Az	60°		
	90° – 160°	224653280 *(64 teeth)*	214634375 *(90 teeth)*

Position of the shaft of the transmitter DCPT3 or transmitter CPT 1Az with respect to the actuator shaft is unimportant. The transmitters can be adjusted with any position of the output shaft – see setting of the current transmitters bellow.

9. UNPACKING AND STORING

Packing of the actuators is carried out to suit the transport conditions and the distance of the place of destination. When unpacking the actuator, check that no damage to the equipment was caused during transport and compare the data on the actuator rating plates with those contained in the order and accompanying documentation.

Any discrepancy, defect or damage should be immediately reported to the supplier. When the actuator is not immediately installed it should be stored in a clean room with temperature within the range of 0 °C to + 40 °C and relative humidity up to 80%. It is only before the actuator is installed that excessive slush grease should be removed. Prior to installation, make sure that the actuator was not damaged during storing. If the actuator is to be stored for a long time it is advisable to place a bag with 100 g of drying agent trade marked KORROSION or another suitable kind of drying agent in the control chamber and the terminal box.

10. LOCATION AND INSTALLATION OF ACTUATOR

The lever actuators can operate in any position except the position in which the electric motor axis is at an angle of 15° from the horizontal plane. The actuator should be located so that easy access is provided to the handwheel and the terminal box. For installation, make sure that the location corresponds to the Operating Conditions described above. If another method of installation is required with regard to the local conditions, please consult the contemplated application beforehand with the manufacturer. The electric lever actuators should be mounted through tapped holes in their bearing feet 7 by means of screws *(Fig. 1)*. The bearing surfaces on which the actuators are mounted, should be levelled out so that no deformation of the actuator box can be caused by retightening the screws. In their basic design variant, the lever actuators are supplied complete with a lever and stops. In this design variant, they are suitable for their main purpose, i.e., actuation and control of turning motion of flaps, louvers and valves. When the actuator is used for actuation or control of the rotary motions the connection of the actuator to the controlled device can be accomplished at the free end of the shaft *(without lever)* by means of a coupling; the latter is not available from the actuator manufacturer. During mounting of the lever and the pull rod, care should be taken to ensure that, in either extreme position, the angle between the pull rod and the actuator lever is not in excess of 160° or less than 20° *(Fig. 6)*.

If the actuator is governed by the NOTREP thyristor controller then, during adjustment, the stops should be withdrawn by about 1 mm after the end position has been reached so that a sufficient torque can be produced for operation of the torque-limit switches.

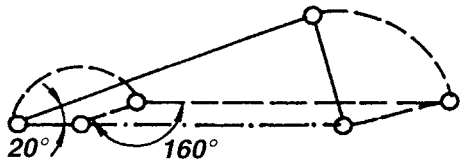


Fig.6 - ***Working stroke of lever of electric actuator with pull rod***

When wiring the actuators, the corresponding regulations should be observed.

In the design variant with the Connector plug and socket, attention should be paid to the following:

a) Fix the lead in cables at a maximum distance of 150 mm from the end of the cable inlet on the plug. The attachment should be made to the frame on which the actuator is mounted.
b) Earth the actuator via the external ground terminals with which both the electric motor and the terminal box are fitted.
c) Prior to disconnection or connection of the instrument plug and socket Connector, make sure that the actuator is disconnected from the AC mains.
d) Avoid pulling or pushing the lead-in wires during connection or disconnection.
e) Consider that plugging or removing of the Connector connector can only be made after the actuator earthing has been checked.

11. ADJUSTMENT AND SETTING-UP OF ACTUATORS

Adjustment of the OPEN and CLOSE torque-limit switches

Having no starting torque blocking facility on reversal of the sense of motor rotation, the torque-limit switches are responsive to any out-of-limit value of the adjusted tripping torque.

At the factory, they have been adjusted to the customer-specified or maximum tripping torque *(Tab. 1)*. It is advisable that this adjustment is not changed.

Adjustment of the OPEN and CLOSE position-limit switches

This adjustment can only be made after the position transmitter has been adjusted. The OPEN and CLOSE position-limit switches can be used for switching off the actuator in a preset end position and/or for signalling. When adjusting the position-limit switches, the procedure is the following:

First, release the two cams 23 and 24 *(Fig. 5).*

Bring the actuator into the CLOSE position by the handwheel, while turning the lever in the CLOSE direction. In its end position, the lever should be arrested by stop 15 of the lever assembly. Now, rotate the lower cam 24 clockwise till the leaf actuator 44 depresses the push button of the CLOSE position-limit switch 26 *(Fig. 5)*. For adjustment, it is advisable to use an illuminated tester connected to the switch termimal with lights up at that moment. In this position, secure the cam 24 by retightening the two screws 37 *(Fig. 3).* Then, move the actuator to the opposite position, in which case the lever should be turned in the OPEN direction. After the lever has been arrested in the desired position by stop 15, turn the upper cam 23 *(Fig. 5)* anticlockwise till the cam changes over the OPEN position-limit switch

25 and the lamp of the illuminated tester connected to the switch terminal goes ON. In this position, the cam should be secured by screws 36.

Adjustment of the OPEN and CLOSE position-limit and signalling switches in the design variant with the current transmitter *(Fig. 2)*

Bring the handwheel into the “closed” position by rotating it clockwise. In the position, move the stop to the output lever and secure it in position by screws. Then, adjust the CLOSE position-limit switch by looseningthe cam screw 4 and turn the cam clockwise till the microswitch operates. Next, retighten the screw 4. Then, after loosing the screw 2, adjust the cam of the CLOSE signalling switch *(the second cam from above)* in a similar way. Bring the output leverinto the “open” position anticlockwise and secure it by a stop. In this position, adjust the cam of the OPEN signalling micro-switch by means of the cam screw 1 *(the first cam from above)* and the cam of the OPEN position-limit microswitch by means of the cam screw 3 *(the third cam from above).* The OPEN and CLOSE signalling microswitches should be adjusted to operate before the OPEN and CLOSE position-limit microswitches are operated.

WARNING! The cam screws should be loosened only to such an extent that the cams can be turned since further rotation of the screws might clamp the cam again.

Change in the nominal operating stroke *(the angle of lever displacement)* - design with potentiometer

If the nominal working stroke is to be changed *(sectors 60°, 90°, 120°, 160°)*, the procedure is the following:

1. Look up the correct change wheel 18 *(Fig. 5)* in Tab. 3.
2. Remove the screws 37 and withdraw the cams. *(Fig. 3)*
3. Remove the screws 28 and withdraw the potentiometer assembly. *(Fig. 5)*
4. Remove the screws 20 and the clip ring 11.
5. Lift the spring 21 from the drive wheel groove and remove the steel band.
6. Remove the wheel 18 and replace it by a new one, according to Tab. 3 *(Use a new steel band for the required gear ratio, according to Tab. 2).*
7. Attach the new band to the change wheel 18 by a screw. Position the wheel so that the screws in the change wheel and the groove in the drive wheel are on the opposite sides in the straight line over the axes of revolution. In this position, put the end of the band in the groove in the drive wheel, pull in the spring 21 and fit it in the circular groove of the drive wheel. The two ends of the band will be of the same length provided that the correct procedure has been adhered to. *(Secure the band by the screws 20 and shim.)*
8. Secure the change wheel in position by the clip ring 11, seize the transmitter 27, fit a pin in the groove of the change wheel 18 and fix the transmitter again by screws 28.
9. Put the cams 23 and 24 in their correct position on the shaft and secure them by screws 37.

Supplied with the actuator are only the change wheel and the band designed for a single operating travel, according to the order. If a change is to be made, please order the necessary change wheel and the band from the manufacturer.

Operating stroke *(sector)*	Drawing No.	Spacing of holes
60°	4-61393	365
90°	4-61394	380
120°	4-61395	395
160°	4-61396	420

Tab.2 - Lenghts of CHRONIFER SPECIAL bands

Operating stroke *(sector)*	Drawing No. of wheel 18	Wheel outside diameter *(mm)*
60°	4-58710-1	22,5
90°	4-58710-2	33,75
120°	4-58710-3	45
160°	4-58710-4	60

Tab.3 - Change wheels

The operating stroke *(the angle of lever displacement)* can be changed within the range of -30° to +10° from the nominal value with a full transmitter deflection by mechanical adjustment of the gearing between the actuator lever and the transmitter. This can be done by displacing the transmitter support plate in the oval hole from position A to B - see the following paragraph.

Adjustment of the potentiometer and operating stroke *(lever sector)*

The resistance transmitter transducer is designed so that at the nominal stroke of the servomotor lever *(60°, 90°, 120° and 160°)* covered the entire resistance path. The transmitter is equipped with a friction clutch.

The setting is automatically set by turning the actuator lever into one of the extreme positions "open" or "closed". When using a 1 x 100 Ω resistive transmitter it is connected as V1.

Setting of current position transmitter CPT 1Az

Before starting setting the current transmitter it is necessary to set the end-limit positions *(torque or position switches)* of the actuator and connect them into the tripping circuit of the electric motor. In case of an external source of feeding voltage, verification must be carried out that it does not exceed the maximum value 30 V DC *(limit value when CPT 1Az is still not damaged).* Recommended value is 18 – 28 V DC.

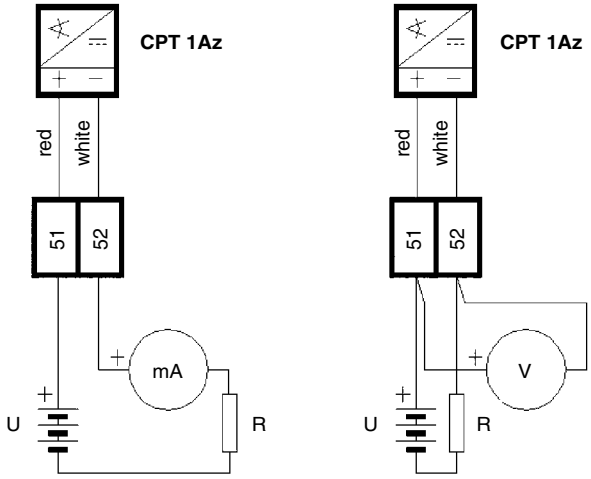
Positive pole of the source is connected to the positive pole of the transmitter CPT 1Az; a milli-ammeter of precision at least 0.5 % connected into the circuit. The current loop must be earthed in one point. The figure does not show the earthing that can be made at any point of the circuit.

1 Shift the output shaft into the position Closed. During closing, the current signal value should decrease. If it increases release the transmitter body and, by turning of about 180°, shift to the descending part of the outputcharacteristics. Set 4 mA by fine turning. Tighten the shim plates to secure the transmitter against spontaneousturning.

2. Shift the output shaft to the position Open and set 20 mA using a potentiometer on the transmitter body. The potentiometer has a range of 12 revolutions and it has no stops so that it cannot be damaged by furtherturning.

3. Once again verify the current value in the position Closed. If it has changed too much repeat the points 1. and 2. If the required corrections are large this procedure should be repeated several times. After the setting, securethe transmitter against turning and drip the screws with varnish.

4. Use a voltmeter to check the voltage on the CPT 1Az terminals. In order to keep linearity of the output signal the voltage must not drop below 9 V, not even with off-take 20 mA. If this condition is not met it is necessary to increase the feeding voltage (within the range of recommend values) or to decrease total resistance of the current loop R.



Warning!

Do not connect transmitter CPT 1Az without prior check of feeding voltage. Transmitter outlets must not be connected in the actuator with actuator ground conductor or earth, not even incidentally.

Prior to checking feeding voltage, fi rst disconnect transmitter from power supply source. On actuator's terminals, where the transmitter is connected to, determine voltage firstly using voltmeter with input resistance at least 1 MΩ. Voltage must lie between 18 to 25 V=, and must in no case exceed 30 V *(this would result in transmitter destruction).* Then connect transmitter so that the positive pole of power supply source is connected to positive pole of transmitter, i.e. to pin with red insulator *(r)* + *(closer to transmitter's centre).* Terminal with white collar *(connected to terminal 52)* is connected to negative pole of transmitter *(white insulator).* On newer versions, the red conductor is +, black conductor is -.

Connect mA-meter, digital as far as possible, with an accuracy of at least 0.5 %, in series with the transmitter. Set output shaft to "closed" position. While doing so, the signal value must sink. If this is not the case, turn the output shaft in "closing" direction until the signal starts decreasing and until the output shaft reaches *"closed"* position.

Then release screws on adaptors of transmitter so that the whole transmitter can be turned. Turn the whole transmitter to adjust current to 4 mA, and tighten adapter screws. Subsequently adjust actuator output shaft to *"open"* position. Use resistance trimmer in the front part of transmitter *(closer to the edge)* to set current to 20 mA. The trimmer's range is 12 revolutions and has no dead stops, so it cannot be damaged by overturning.

If correction of 20 mA has been significant, repeat adjustments to 4 mA and 20 mA once again. Then disconnect the mA-meter. It is forbidden to turn the screw with varnish drops close to the centre. Properly tighten screws that lock the transmitter adapters, and use varnish to protect them from release.

After adjustment, use voltmeter to verify voltage on transmitter terminals. It must lie between 9 and 16 V at the current of 20 mA.

Note:

The transmitter's curve has two branches – a decreasing branch relatively to "Z" position, or a rising branch relatively to "Z" position. To select transmitter's curve, turn the transmitter body.

Current position transmitter DCPT3 – setting

1. Set of end-limit positions

Before starting the setting, verification must be carried out that the end-limit positions are within the range **60° – 340°** of revolution DCPT3. Otherwise, after setting, an error arises *(LED 2x).*

1.1. Position "4 mA"

Set the drive into the required position and press the push-button **"4"** until LED blinks *(about 2 s).*

1.2. Position „20 mA"

Set the drive into the required position and press the push-button **"20",** until LED blinks *(about 2 sec).*

2. Setting of sense of rotation

The sense of rotation is specified by viewing from the side of the panel DCPT3.

2.1. Rotating anti-clockwise

Press the push-button **"20"**, then the push-button **"4"** and keep them depressed until LED blinks.

2.2. Rotating clockwise

Press the push-button **"4",** then the push-button **"20"** and keep them depressed until LED blinks.

When the sense of rotation is changed the end-limit positions **"4 mA"** and **"20 mA"** remain valid but the working range *(track DCPT3)* between these points is changed to a complement of the original working range. In this way, the permitted working range can be exceeded *(LED 2x)* – may be lower than 60°.

3. Error messages

In case of an error the diode LED blinks an error code:

1x	Sensor position out of working range
2x	Working range incorrectly set
3x	Off the tolerance level of magnetic field
4x	Wrong parameters in EEPROM
5x	Wrong parameters in RAM

4. Calibration of currents 4 mA and 20 mA

On switching-on the power supply, keep the push-buttons **"4"** and **"20"** depressed and release them after a single blink of LED. In this way the option menu 4.1 Calibration of current 4 mA is entered.

4.1. Calibration of current 4 mA

Connect the ammeter to testing terminals. Press the push-button **"20".** Keep depressed the push-button to evoke the auto-repeat of current decrease. Release the push-button to make record of the present value.

4.2. Calibration of current 20 mA

Connect the ammeter to testing terminals. Press the push-button **"4".** Keep depressed the push-button to evoke the auto-repeat of current increase. Release the push-button to make record of the present value.

4.3. Switching-over between option of calibration 4 mA and 20 mA

Entry of option of calibration 4 mA:

Press the push-button **"4",** then the push-button **"20"** and keep them depressed until LED blinks. Entry of option of calibration 20 mA:

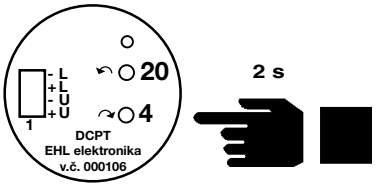
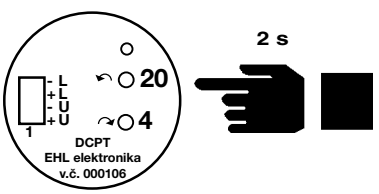
Press the push-button **"20",** then the push-button **"4"** and keep them depressed until LED blinks.

5. Record of standard parameters

On switching-on the power supply, keep the push-buttons "4" and "20" depressed and release them after a double blink of LED.

ATTENTION! With this record, the transmitter calibration is also overwritten and, therefore, it must be repeated!!

Parameter setting

Position "4 mA" Set the actuator to required position *(usually Closed)* and keep the push-button 4 depressed until LED blinks.	
Position "20 mA" Set the actuator to a required position *(usually Open)* and keep the push-button 20 depressed until LED blinks.	

12. OPERATION AND MAINTENANCE

Depending on the operating conditions, the operation of the actuators usually involves only some checks and the transmission of pulses, as required for the individual functions.

In the event of a power supply failure, readjust the controlled device by the handwheel. If the actuator has been connected in the circuit of automatic equipment, it is advisable that manual remote control units are connected in the circuit so that the actuator can be controlled even if a failure of the automatic equipment occurs. With the electric motor running, the phase should be connected to the motor braking winding directly, not via the starting capacitor.

It is the operator's duty to ensure that the actuator is given the specified maintenance attention and is protected against the detrimental effects of the environment and climatic conditions. If the actuator is to be shut down for a relatively long period it is advisable to place suitable desiccant in the control and terminal boxes. In any outdoor installation, anti-condensation heaters should be used. At an ambient temperature of up to +35 °C, the two anti-condensation heaters should be connected in parallel. At an ambient temperature above 35 °C, only one anti-condensation heater is required. In the actuator design variant with the Connector connector where the two anti-condensation heaters are connected in parallel, one of the heaters should be unsoldered at an ambient temperature exceeding 35 °C.

For lubrication are used plastic consistent greases. Type of greases and their uses are listed in table. Grease in delivered actuators is determined for their hole lifetime. During the period of operating is not necessary to change or check its quantity. For all types are used grease CIATM 201 and CIATM 221.

In the case of actuator, Type No. 52 223, the adapter box has been packed with about 1 kg of grease PM LV 2-3 and need not be topped up. For the volume of gearbox oil in the individual types of electric actuator, refer to Tab.1

Note: *Grease CIATM 221 are lubricated chafing rubber bellow with a metal surface.*

13. DISMANTLING AND FORWARDING FOR REPAIR

Disconnect the lead from the terminal board and dismantle the actuator so that it is disconnected from the controlled device and separated from the footing or the supporting structure.

Pack the actuator in waxed paper, put it in a box and secure therein against undesired movement. Attach the packing list. Post all other documents, particularly an explanatory letter containing the type and cause of the failure and the conditions under which the machine operated when the failure occured. After repair, please observe these instructions.

14. PULL RODS

For the **MODACT MPR Variant** lever actuators, levers with ball and socket joints are manufactured. Each pull rod consists of a left hand or right hand threaded knuckle pin and a connecting tube; the latter has not been included in the delivery of the actuator. The right threaded knuckle pin is available in two design variants, i.e., for connection to a simple lever or to a bifurcated lever. The knuckle pin consists of an eye in which the ball and socket joint is mounted by means of two inner retaining rings. The pin fitted in the ball and socket joint has an external calibrated surface which has been ground. At its rear end, it is provided with surfaces allowing it to be held by a single ended wrench, and secured in the axial direction by a shackle retaining ring. At the front end of the pin there is fine thread for a clamping nut. For additional lubrication of the ball and socket joint, a lubricating nipple is fitted in the axis in the rear part of the pin. The ball and socket joint is safeguarded by shaft sealing rings. The knuckle pins are screwed in tube fittings and secured in the set position by lock nuts. During mounting, both the right and the left knuckle pins are welded on the connecting tube. The spacing between the knuckle pins can be adjusted by turning the pull rod during adjustment of the whole gearing. For the dimensions, refer to sketches P-0449 and P-0452.

Table 1 – *MODACT MPR Variant electric actuators*

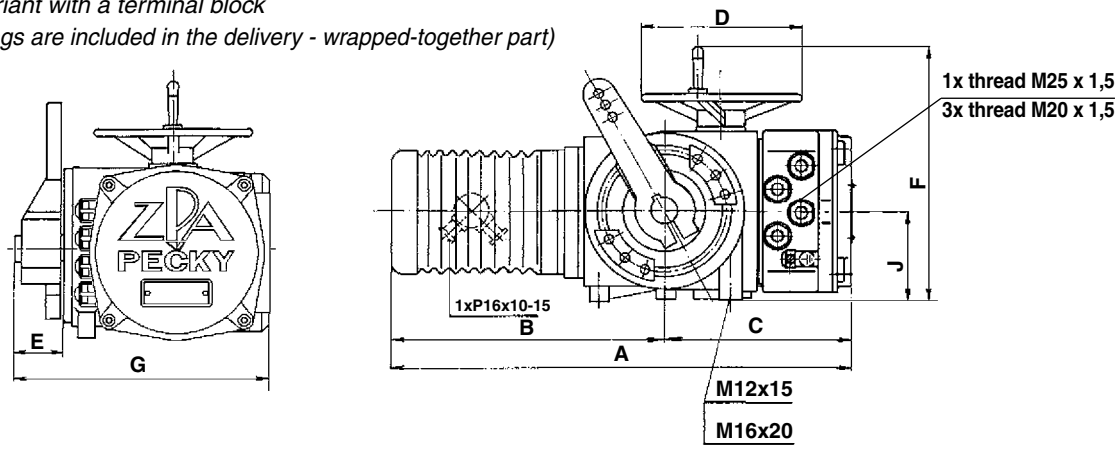
– technical parameters, determination of the Type No.

Type designation	Rated torque [Nm]	Quiescent torque [Nm]	Actuating time range* [s/90°]	Electric motor [W]	Electric motor [µF]	Electric motor Excitation phase/control phase [A]	Oil volume [l]	Weight [kg]	Type number basic	Type number supplementary
MPR 6,3 - 10	63 - 100	290	11-19	16	2,5	0,41/0,1	0,5	50	52 221	x x 0 x
MPR 10 - 16	100 - 160	510	14-27							x x 1 x
MPR 16 - 25	160 - 250	600	22,5-46							x x 2 x
MPR 20 - 32	200 - 320	950	20-39	25	3,5	0,51/0,1		67		x x 3 x
MPR 25 - 40	250 - 400	1400	10-19	50	8	0,92/0,14	0,7	109	52 222	x x 0 x
MPR 40 - 63	400 - 630	1750	14-30							x x 1 x
MPR 63 - 100	630 - 1000	2650	30-55							x x 2 x
MPR 100 - 200	1000 - 2000	4550	50-80	50	8	0,92/0,14	0,7	239	52 223	x x 0 x
MPR 160 - 300	1600 - 3000	5950	73-138							x x 1 x
MPR 250 - 400	2500 - 4000	8940	130-195							x x 2 x
Design										
with terminal block without BMO									52 22x	6 x x x
with connector without BMO										7 x x x
with terminal block and with BMO										8 x x x
with connector and with BMO										9 x x x
Working stroke										
Working stroke	60° for Type No. 52 221,2			67,5°	Type No. 52 223				52 22x	x 1 x x
Working stroke	90° for Type No. 52 221,2			90°	Type No. 52 223					x 2 x x
Working stroke	120° for Type No. 52 221,2			112,5°	Type No. 52 223					x 3 x x
Working stroke	160° for Type No. 52 221,2			157°	Type No. 52 223					x 4 x x
Working stroke	90° for Type No. 52 221,2; direct connection									x 5 x x
Additional equipment										
–	Design variant without transmitter								52 22x	x x x 0
V2	Potentiometer ZPA 1 x 100 ohm									x x x 1
DCPT3	Current transmitter DCPT3 4 - 20 mA; two-wire connection with built-in power supply									x x x 7
CPT 1Az	Current transmitter CPT 1Az 4 - 20 mA; two-wire connection without built-in power supply									x x x 9
Pull-rods – order according to sketches P-0449 or P-0452 verbally.										

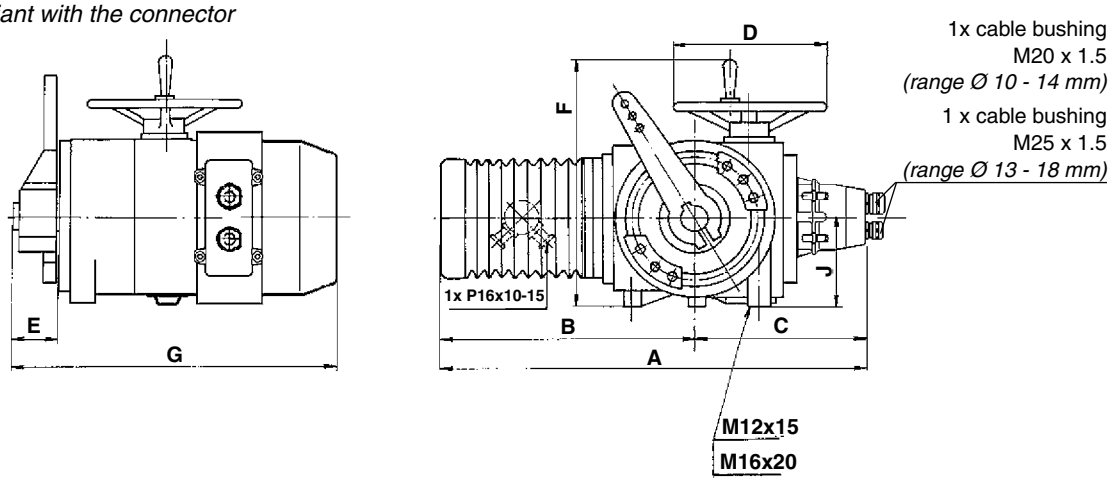
** Range of control time depends on magnitude of load on the output shaft (control time increases with load).*

Dimensional sketches of the **MODACT MPR Variant** electric actuators, Type Nos 52 221 – 52 222

– Design variant with a terminal block
(the bushings are included in the delivery - wrapped-together part)



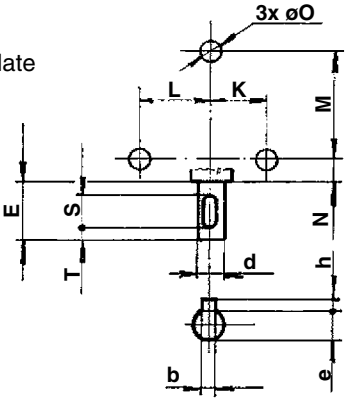
– Design variant with the connector



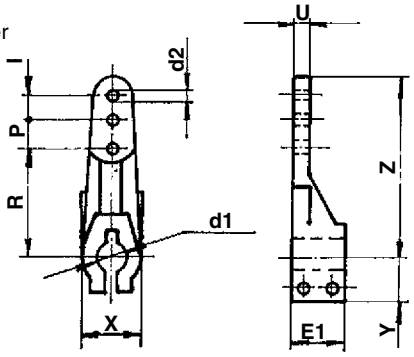
1x cable bushing
M20 x 1.5
(range Ø 10 - 14 mm)
1 x cable bushing
M25 x 1.5
(range Ø 13 - 18 mm)

	terminal block			connector		
	52 221		52 222	52 221		52 222
	16 W	25 W	50 W	16 W	25 W	50 W
A	580	637	782	580	637	782
B	350	407	517	350	407	517
C	230		265	230		265
D	Ø 200		Ø 250	Ø 200		Ø 250
E	65		85	65		85
E_1	60		80	60		80
F	355		420	355		420
G	455		555	455		555
J	120		145	120		145
K	70		100	70		100
L	90		110	90		110
M	140		200	140		200
N	41		57	41		57
O	Ø 14		Ø 18	Ø 14		Ø 18
P	40					
R	170					
S	56		70	56		70
T	4		7	4		7
U	25		30	25		30
X	66		80	66		80
Y	41		55	41		55
Z	273		278	273		278
d h8	Ø 40		Ø 50	Ø 40		Ø 50
d_1	Ø 40		Ø 50	Ø 40		Ø 50
d_2 H8	3 x Ø 20		3 x Ø 25	3 x Ø 20		3 x Ø 25
b P9	12		16	12		16
h	8		10	8		10
e	35		43,8	35		43,8

Base plate

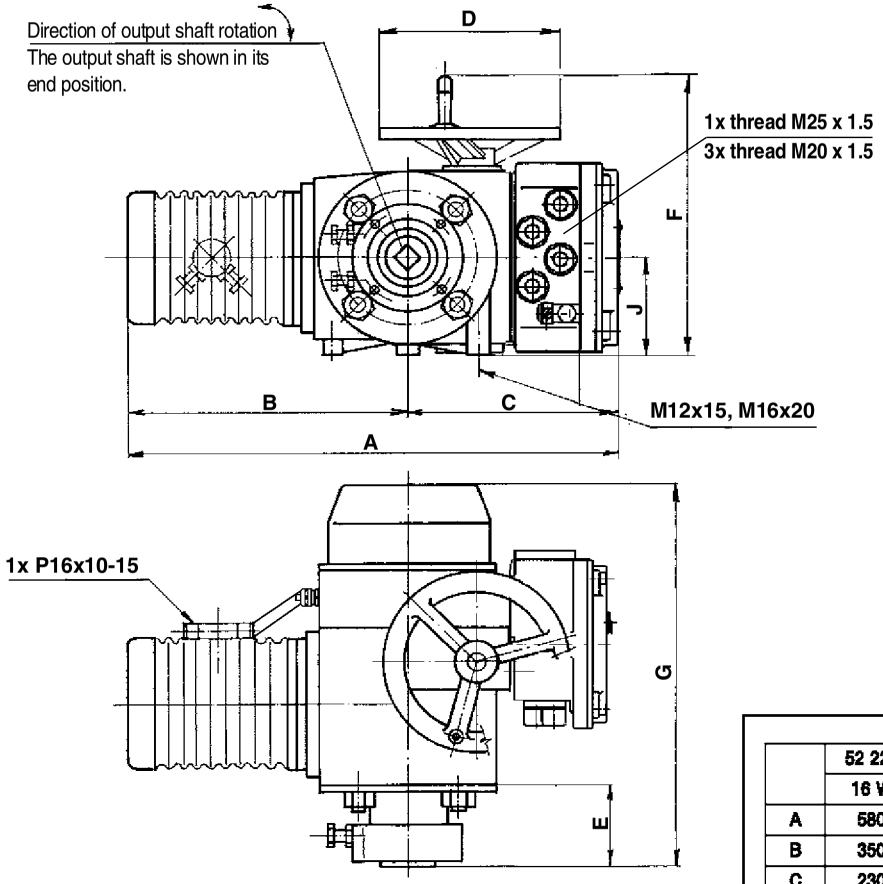


Lever

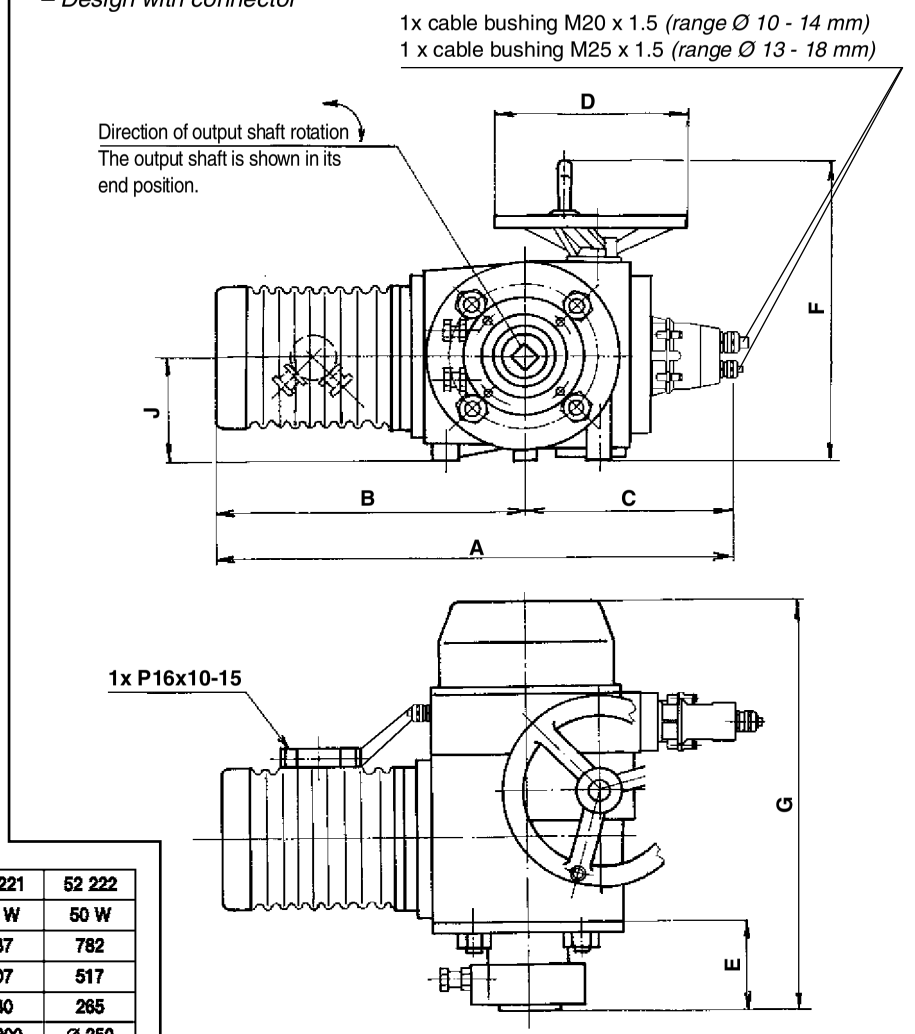


Dimensional sketches of **MODACT MPR Variant** electric actuators, Type Nos 52 221 and 52 222 with a direct-connecting adapter

– Design with terminal board
(the bushings are included in the delivery - wrapped-together part)



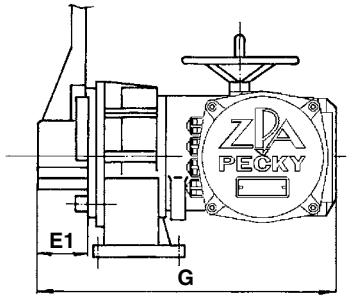
– Design with connector

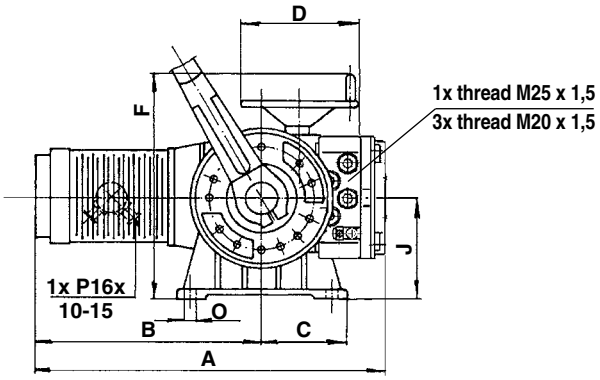


	52 221	52 221	52 222
	16 W	25 W	50 W
A	580	637	782
B	350	407	517
C	230	230	265
D	Ø 200	Ø 200	Ø 250
E	81	81	120
F	355	355	420
G	451	451	556

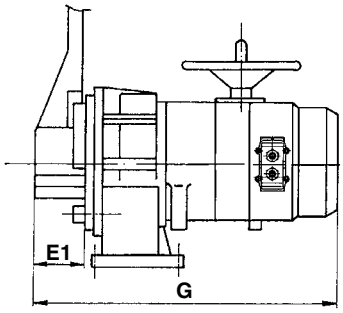
Dimensional sketches of the **MODACT MPR Variant** electric actuator, Type No. 52 223

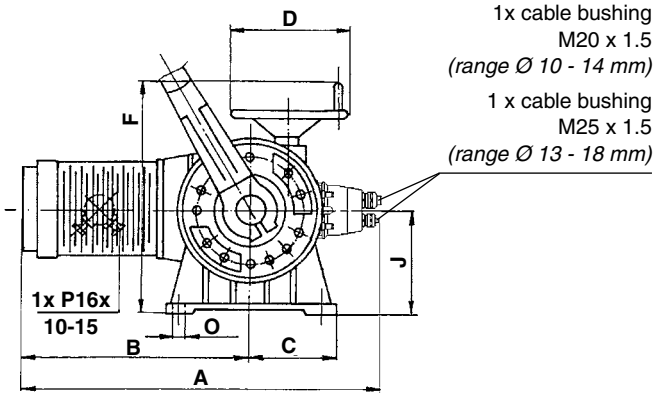
– Design variant with a terminal block
(the bushings are included in the delivery - wrapped-together part)





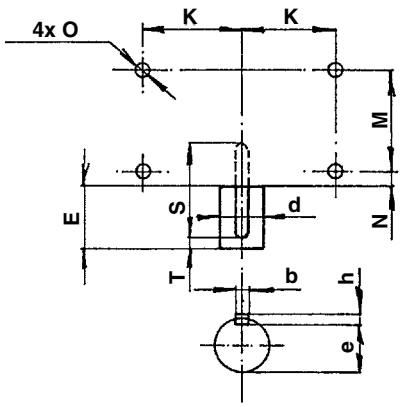
– Design variant with the connector



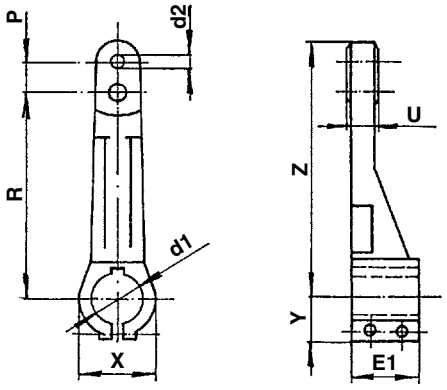


	52 223
A	793
B	548
C	220
D	Ø 250
E	123
E_1	120
F	560
G	750
J	260
K	185
M	200
N	33
O	Ø 22
P	55
R	400
S	180
T	11
U	36
X	130
Y	80
Z	490
d	Ø 90h8
d_1	Ø 90h7
d_2	Ø 40h8
b	25P9
h	14
e	81,3

Base plate



Lever



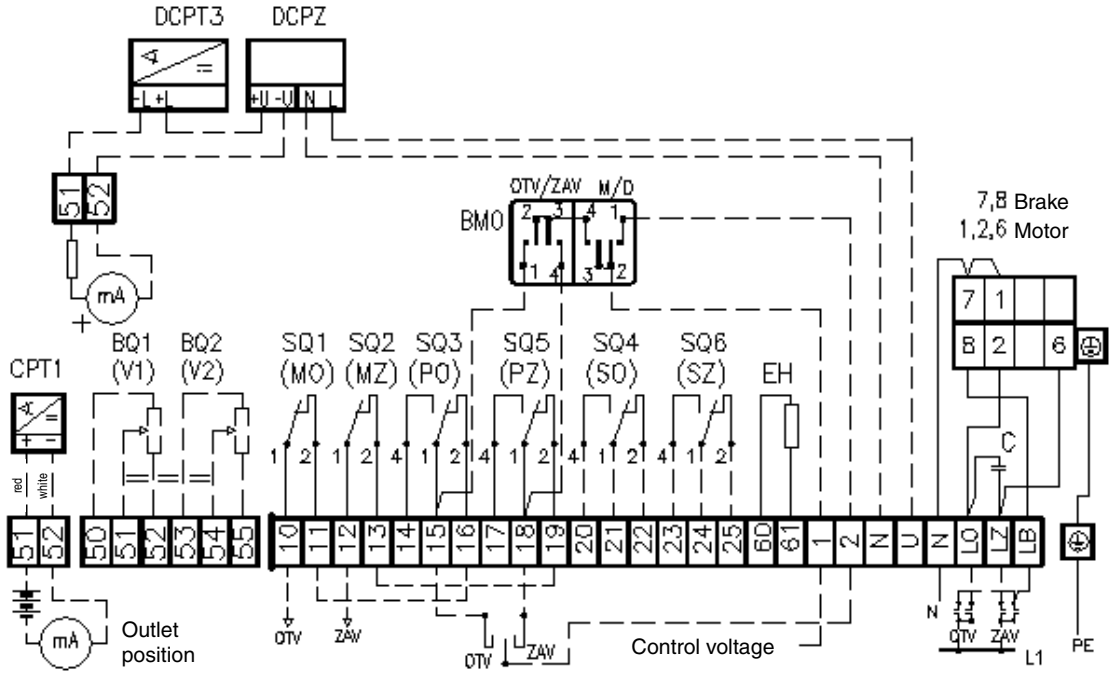
Internal wiring diagrams of the **MODACT MPR Variant** electric actuators

Legend:

MO	– OPEN torque-limit switch	BQ1,BQ2	– potentiometer 1 x 100 Ω
MZ	– CLOSE torque-limit switch	CPT 1Az	– Current position transmitter CPT 1Az 4 – 20 mA
PO	– OPEN position-limit switch	DCPT3	– Current position transmitter DCPT3
PZ	– CLOSE position-limit switch	DCPZ	– Power supply for the current transmitter DCPT3
SO	– OPEN signalling switch	M	– Asynchronous two-phase motor
SZ	– CLOSE signalling switch	MS	– Terminal board
H	– Anti-condensation heaters	Z	– Connector
C	– Capacitor	ST	– Temperature monitor

Internal wiring diagrams of the **MODACT MPR Variant** electric actuators

– with terminal board **P3-0957**

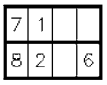


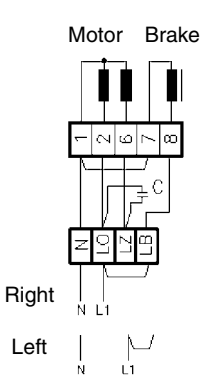
Optional accessories:

Position transmitter
- – resistance V1, V2
- – current passive CPT 1Az
- – current active DCPT3, DCPZ
- – without transmitter

Actuators with resistance transmitter V1, V2
are not fitted with signalling switches SO, SZ.

Terminal board of electric motor MODACT MPR Variant

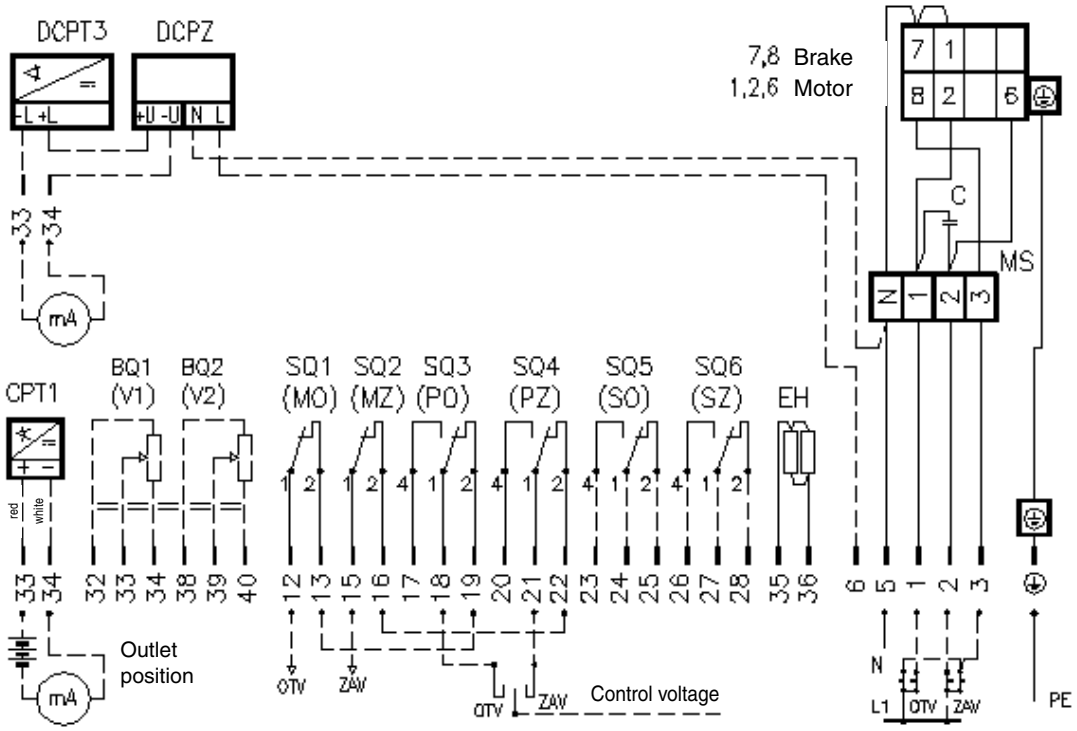




Electric motor wiring

The motor and brake windings are connected to the terminal board.
Without voltage, the brake is engaged.
In switching the motor, voltage must also be connected to the brake for its releasing together with the control phase.

– with connector **P3-0958**

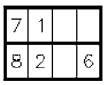


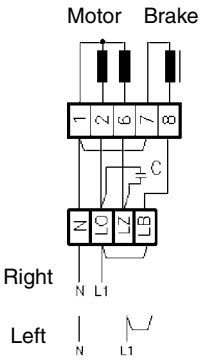
Optional accessories:

Position transmitter
- – resistance V1, V2
- – current passive CPT 1Az
- – current active DCPT3, DCPZ
- – without transmitter

Actuators with resistance transmitter V1, V2
are not fitted with signalling switches SO, SZ.

Terminal board of electric motor MODACT MPR Variant

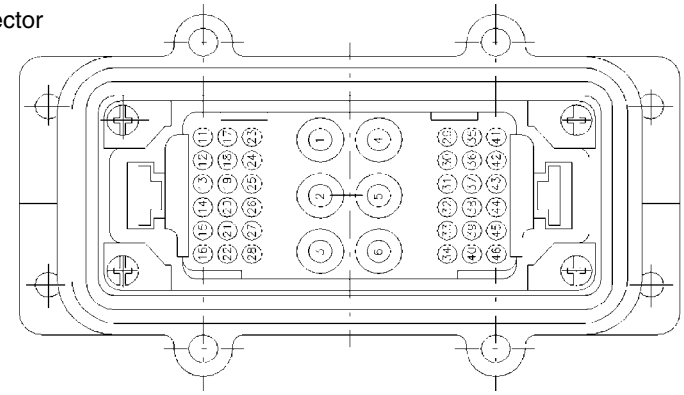




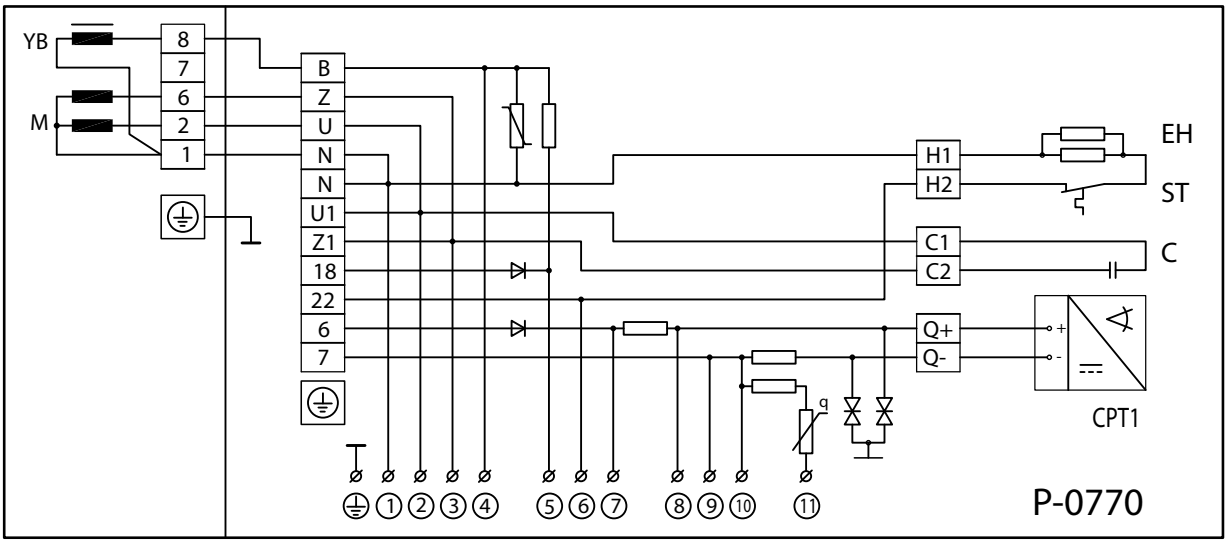
Electric motor wiring

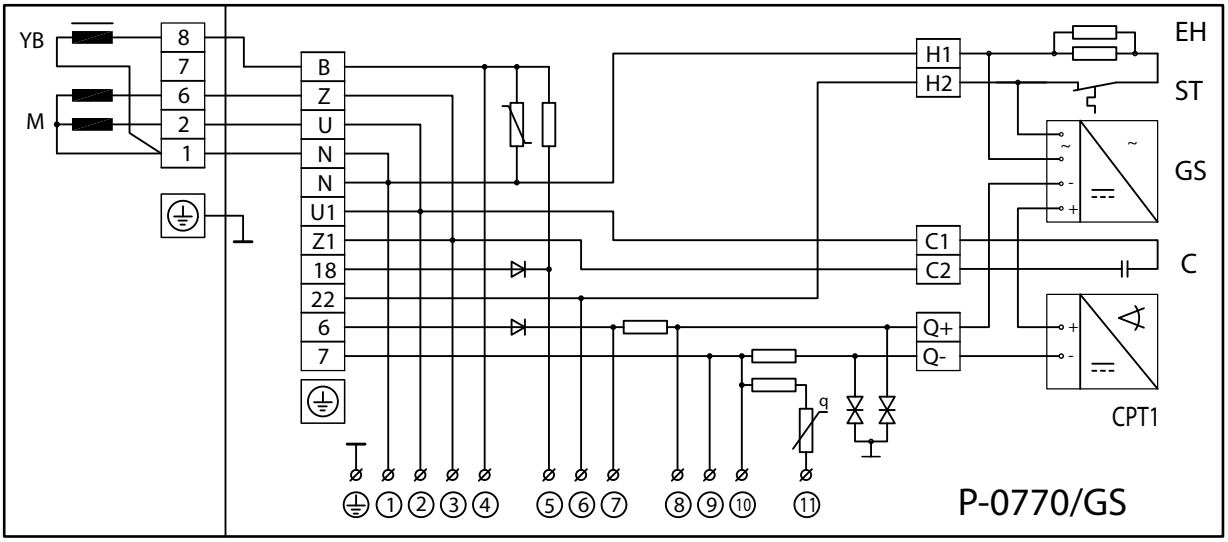
The motor and brake windings are connected to the terminal board.
Without voltage, the brake is engaged.
In switching the motor, voltage must also be connected to the brake for its releasing together with the control phase.

– layout of signals on the connected connector



Internal wiring diagrams of the **MODACT MPR Variant** electric actuators
Type No. 52 22x.06x9, working stroke 60 – 120°, with position transmitter CPT 1Az,
with power supply GS – ZPT1 or without power supply

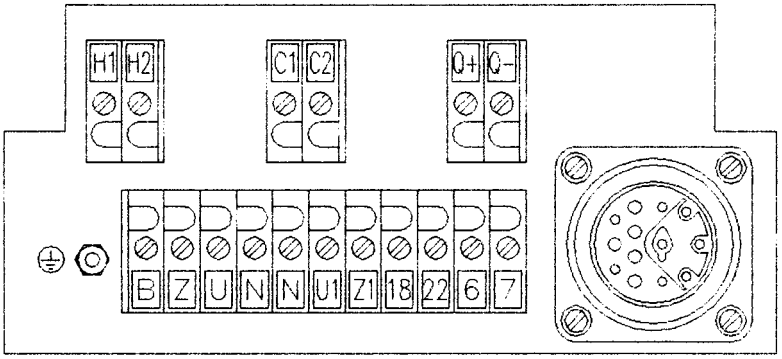




ST – temperature monitor
⏚, ① ÷ ⑪ – testing equipment connector contacts

Testing equipment supplied dy DICONT, a. s., Prvního pluku 12a, 186 00 Prague 8 - Karlín, CZ.

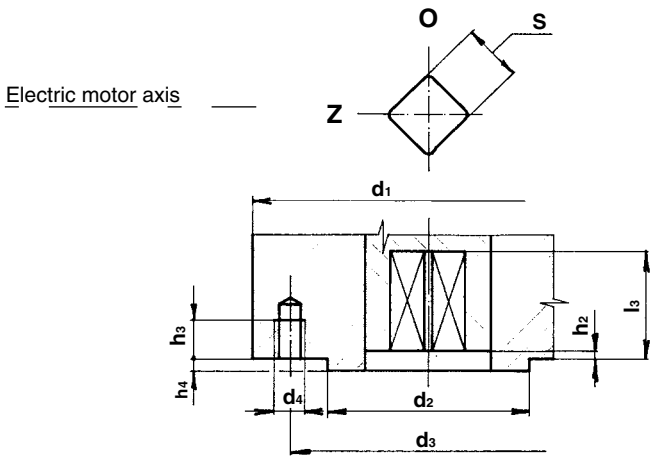
Position of terminals and connector on terminal board of actuator



FLANGE, according to DIN 5211, Part I;

dimensions of the square end to ON 1331 19 *(DIN 79)*

Electric actuator *(adapter for direct connection)* in the end position



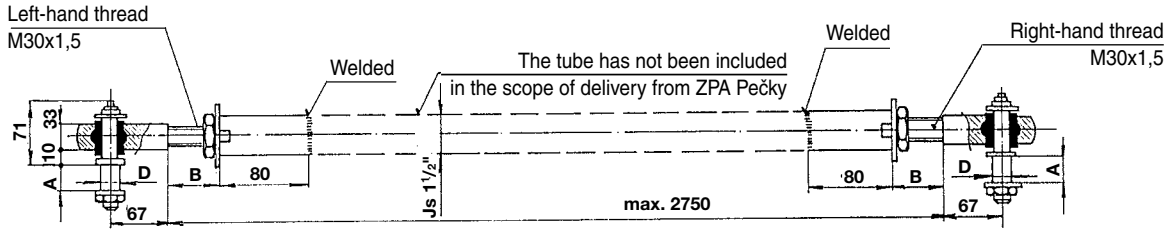
	52 221 F 10	52 222 F 14
d1	125	175
d2	70	100
d3	102	140
d4	M 10	M 16
h2	max 2	max 2
h3	min 16	min 25
h4	max 3	max 4
S H11	22	36
l3	min 24	min 38

	52 221	52 221	52 222
	16 W	25 W	50 W
A	580	637	782
B	350	407	517
C	230	230	265
D	∅ 200	∅ 200	∅ 250
E	81	81	120
F	355	355	420
G	451	451	556

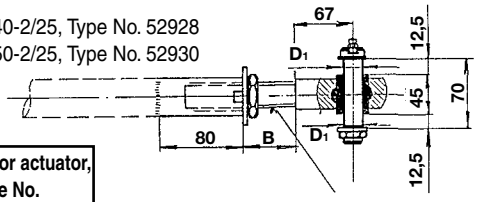
Dimensional sketch of the pull rods TV 40 and TV 50

Actuator side — Controlled device side

Design TV 40-1/20, Type No. 52927
TV 50-1/25, Type No. 52929



Design TV 40-2/25, Type No. 52928
TV 50-2/25, Type No. 52930



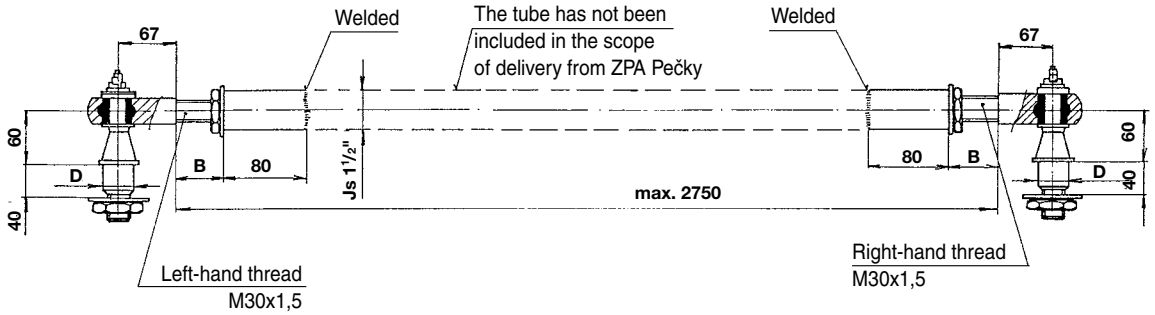
Right-hand thread
M30x1,5

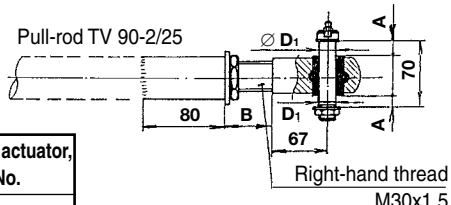
Type	Type No.	Dimensions				Intended for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 40-1/20	52 927	20	25	23	min. 20 max. 50	52 221
TV 40-2/25	52 928					
TV 50-1/25	52 929	25	25	28		52 222
TV 50-2/25	52 930					

P-0449

Dimensional sketch of the pull rods TV 90-1/40

Actuator side — Controlled device side





Type	Type No.	Dimensions				Intended for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 90-1/40	52 934	40	–	–	min. 20 max. 50	52 223
TV 90-2/25	52 935		25	12,5		

P-0452

SPARE PARTS for 3 and 5 years of operation

Designation Drawing or Standard No.	Number of pieces		Application or location
Common spare parts for Type No 52 221 - 52 223			
Anti-condensation heater TRA 25 5K1/J 2337110500	2	4	Mounted on control board
Microswitch DB1G-A1LC - torque-limit switch MO, MZ 2337441092	–	1	Mounted on control board
ZPA potentiometer 1 x 100 ohm RP 19 2340510210	–	1	Mounted on control board
Sealing washer 22/16 224580840	2	4	Sealing of gearbox oil filling and outlet holes
"O" ring 180x3 PN029281.2 2327311043	1	1	Packing of terminal board cover
"O" ring 10x6 ČSN 02 9280.2 2327311001	1	2	Sealing of torque tripping shaft
"O" ring 125x5 PN029281.2 2327311404	1	2	Packing between terminal box and control box
Spare parts for the design variant with current transmitter			
Microswitch DB1G-A1LC MO, MZ, PO, PZ, SO, SZ 2337441092	–	1	Mounted on control board
Current transmitter CPT 1Az 2340510416	–	1	Mounted on control board
Current transmitter DCPT3 214664480	–	1	Mounted on control board
Power source DCPT3 21465832	–	1	To be mounted in terminal box
Spare parts for Type No. 52 221			
Rubber copper sealing ring 60x75x8 ČSN 02 9401.0 2327352090	2	4	Output shaft sealing
Rubber copper sealing ring 55x70x8 ČSN 02 9401.0 2327352083	1	2	Output shaft sealing in control box
Rubber copper sealing ring 20x32x7 ČSN 02 9401.0 2327352027	1	2	Handwheel shaft sealing
Rubber copper sealing ring 8x22x8 ČSN 02 9401.0 2327352002	1	1	Electric motor shaft sealing
"O" ring 190x3 ČSN 02 9281.2 2327311056	1	2	Control box cover sealing
	1	2	Control box sealing
"O" ring 160x3 ČSN 02 9281.2 2327311048	1	2	Packing between power gear unit and countershaft gear box

Designation Drawing or Standard No.	Number of pieces	Application or location
"O" ring 95x85 2327311029 ČSN 02 9280.1	1 2	Output shaft ring sealing
"O" ring 50x2 2327311028 ČSN 02 9281.2	1 2	Worm shaft cover sealing
Packing 2327224010 23465366	1 2	Packing between electric motor and countershaft gear box
Aluminium plug 224599760	4 8	Sealing of connecting screws for electric motor

Spare parts for Type No. 52 222

Rubber copper sealing ring 80x100x10 2327352096 ČSN 02 9401.0	2 4	Output shaft sealing
Rubber copper sealing ring 80x100x13 2327352097 ČSN 02 9401.0	1 2	Output shaft sealing in control box
Rubber copper sealing ring 27x40x10 2327352044 ČSN 02 9401.0	1 2	Handwheel shaft sealing
"O" ring 200x3 2327311044 ČSN 02 9281.2	1 2	Sealing between power gear unit and countershaft gearbox
	1 2	Sealing of control box cover
	1 2	Sealing of control box
"O" ring 125x110 2327311019 ČSN 02 9280.2	1 2	Output shaft ring sealing
"O" ring 70x2 2327311058 ČSN 02 9281.2	1 2	Worm shaft cover sealing
Packing 2327224010 23354382	4 8	Sealing between electric motor and countershaft gearbox

Spare parts for Type No. 52 223 (identical to those used for Type No. 52 222 with the following additional items):

Rubber copper sealing ring 130x160x15 2327352110 ČSN 02 9401	- 1	Adapter output shaft sealling
Rubber copper sealing ring 30x47x10 2327352053 ČSN 02 9401	- 1	Sealing of output shaft from control board

Electric motors

- for Type No 52 221 2335962002	J9A10-00 *(16 W)*	It is recommended that one electric motor of each type is kept in stock per 10 actuators installed
- for Type No 52 221 2335962022	J10A12-00 *(25 W)*	
- for Type No 52 222 and 52 223 2335962052	J11A11-00 *(50 W)*	

ZPA PEČKY, a.s.

Development, production and services of electric actuators and switchboards.
Top-quality sheet-metal processing (TRUMPF equipment), powder paint shop.

SURVEY OF PRODUCED ACTUATORS

KP MINI, KP MIDI
Electric rotary (90°) actuators (up to 30 Nm)

MODACT MOK, MOKED, MOKP Ex, MOKPED Ex
Electric rotary (90°) actuators for ball valves and flaps

MODACT MOKA
Electric rotary (90°) actuators for nuclear power stations
application outside containment

MODACT MON, MOP, MONJ, MONED, MOPED, MONEDJ
Electric rotary multi-turn actuators

MODACT MO EEx, MOED EEx
Explosion proof electric multi-turn actuators

MODACT MOA
Electric multi-turn actuators for nuclear power stations
application outside containment

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

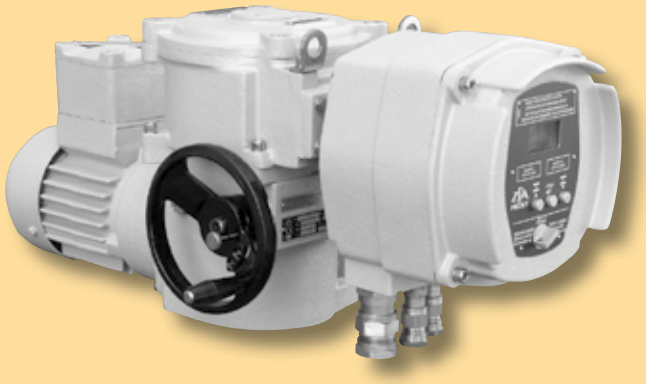
MODACT MPR Variant
Electric rotary (160°) lever actuators with a variable output speed

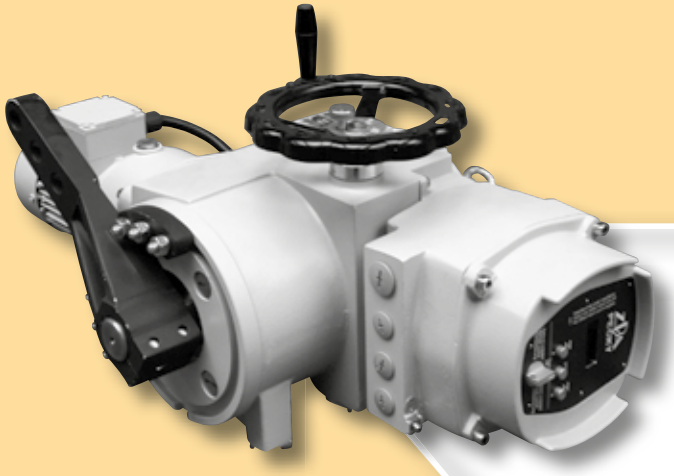
MODACT MPS, MPSP, MPSED, MPSPED
Electric rotary (160°) lever actuators with a constant output speed

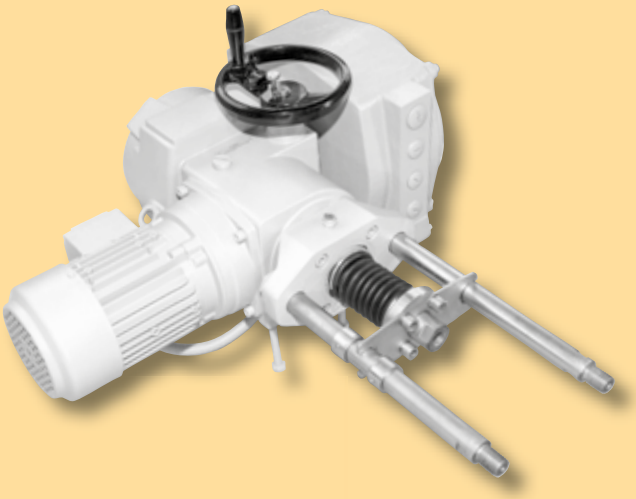
MODACT MTN, MTP, MTNED, MTPED
Electric linear thrust actuators with a constant output speed

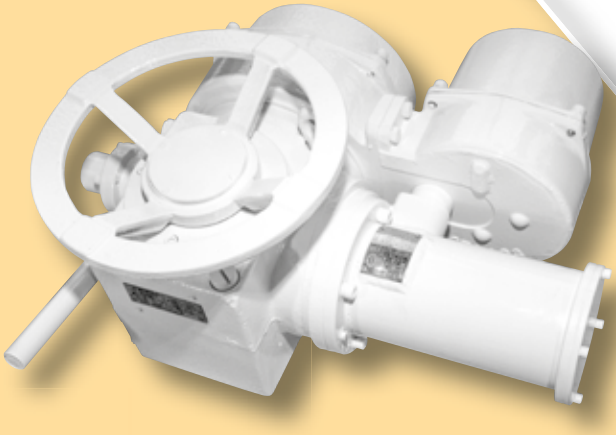
Deliveries of assembled actuator + valve (or MASTERGEAR gearbox) combinations

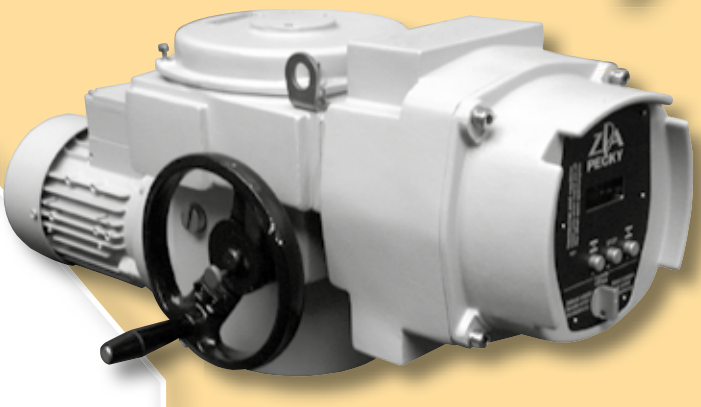
TRADITION • QUALITY • RELIABILITY

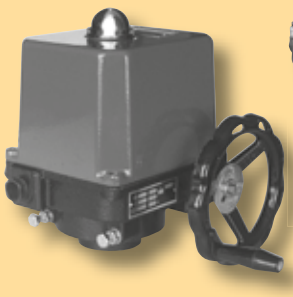


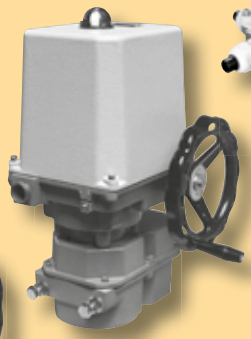












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