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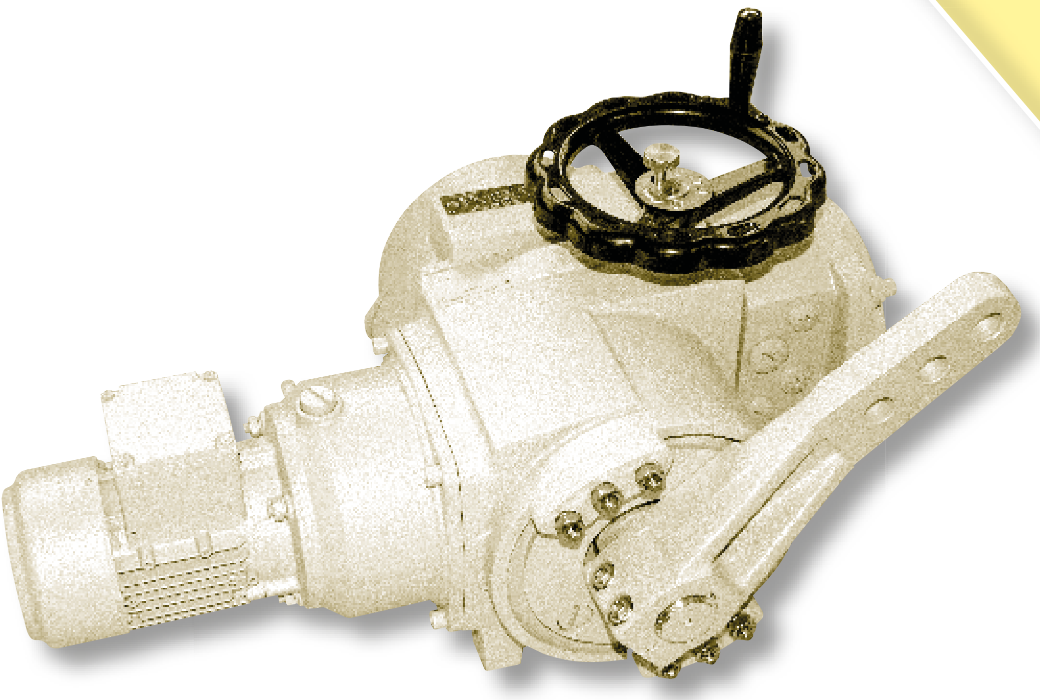
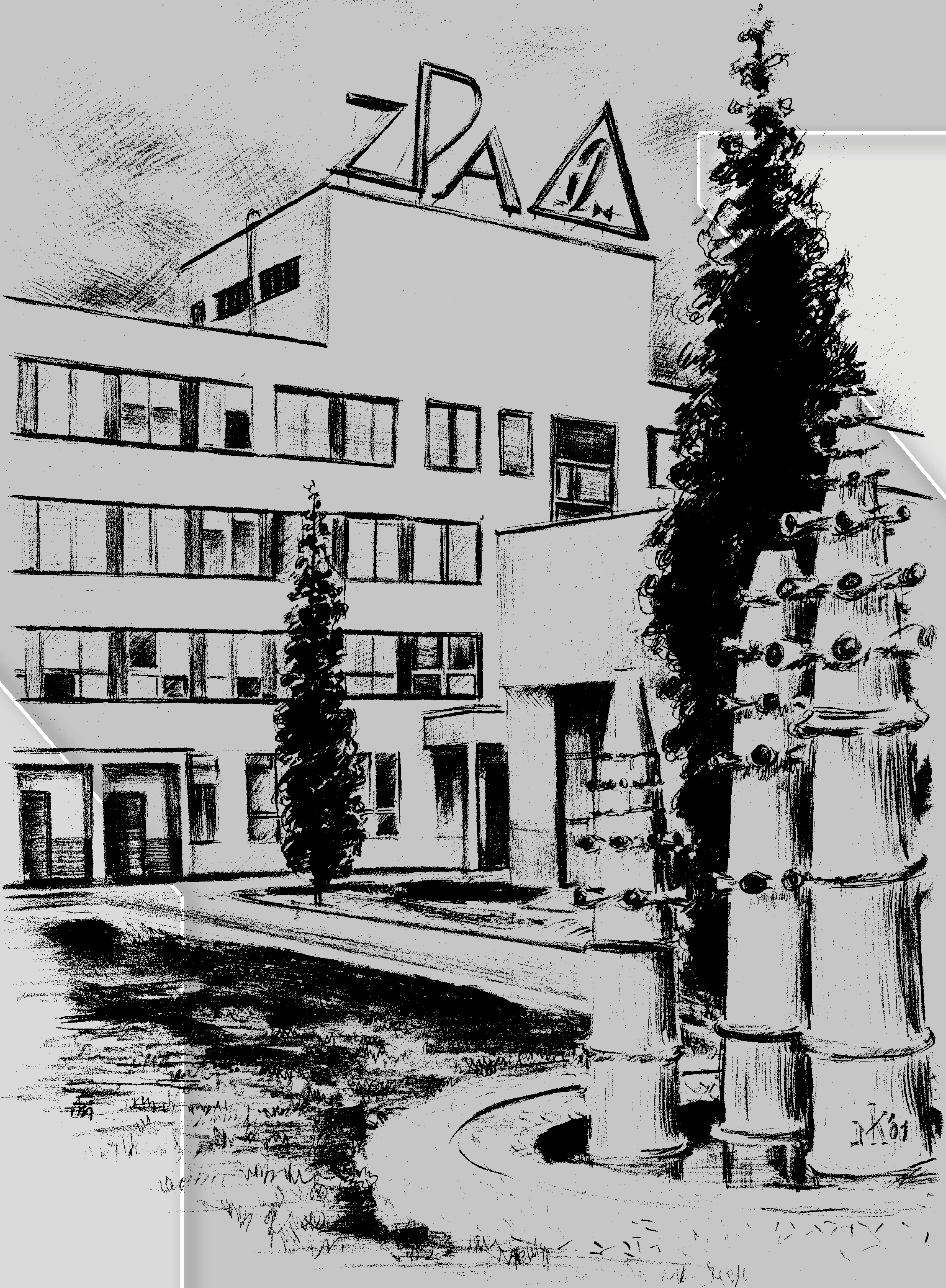


MOUNTING INSTRUCTIONS

Electric part-turn lever actuators
with constant control speed

MODACT MPS, MPSP
MODACT MPS, MPSP CONTROL

Type numbers 52 260 - 52 266



ZPA Pečky, a.s. is certified company in accordance with ISO 90001 as amended.

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1. APPLICATION

The **MODACT MPS** and **MPSP** electric part-turn *(lever)* actuators operating at a constant speed are used for remote control and automatic regulation of flaps, louvers and valves and to control the regulation members of the heating and air-conditioning or other devices, for which they are suitable with their characteristics. The **MODACT MPS** and **MPSP Control** actuators are designed for use in automatic control systems employing a continuous control signal.

2. OPERATING CONDITIONS, OPERATING POSITION

Operating conditions

The actuators **MODACT MPS,MPSP** ***(MODACT MPS, MPSP Control)*** are resistant against influence of operating conditions and external effects of classes AC1, AD5, AD7, AE4, AE6, AF2, AG2, AH2, AK2, AL2, AM-2-2, AN2, AP3, BA4 and BC3 according to ČSN 33 2000-5-51 ed. 3.

When the actuator is installed on a free area it is recommended to fit it with a light shelter against direct impact of atmospheric effects. The shelter should overlap the actuator contour by at least 10 cm at the height of 20 – 30 cm.

When actuators are to be installed in the working environment with temperature below -10 °C and in the environment with relative humidity above 80 %, it is always necessary to use an anti-condensation heater fitted to all actuators.

The electric actuators can be installed in areas with non-flammable and non-conductive dust, provided that this does not adversely influence their function. Here, it is necessary to strictly observe ČSN 34 3205. It is recommended to remove dust as soon as its layer is about 1 mm thick.

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.

Temperature

Surrounding temperature for actuators **MODACT MPS** ***(MPS CONTROL):*** from -25 °C to +70 °C and from -40 °C to +60 °C. Surrounding temperature for actuators **MODACT MPSP** ***(MPSP CONTROL):*** from -25 °C to +60 °C and from -40 °C to +60 °C *(except 52 260).*

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

Class:

1) AC1 – above-sea level ≤ 2000 m
2) AD5 – spouting water; water may spout in all directions
   AD7 – shallow immersion, possible sporadic partial or full coverage *(only MPSP)*
3) AE4 – slight dust formation
   AE6 – strong dust formation *(only for MPSP type)*
4) AF2 – occurrence of corrosive or polluting agents is atmospheric; presence of corrosive pollutants is significant
5) AG2 – mean mechanical strain; in normal industrial operations
6) AH2 – mean vibrations; in normal industrial operations
7) AK2 – serious risk of plant and moulds growth
8) AL2 – serious risk of occurrence of animals *(insects, birds, small animals)*
9) AM-2-2 – normal level of signal voltage. No additional requirements.
10) AN2 – mean solar radiation. Intensity > 500 and ≤ 700 W / m^2.
11) AP3 – mean seismic impacts; acceleration > 300 Gal ≤ 600 Gal
12) BA4 – capability of persons; instructed persons
13) BC3 – frequent contact of persons with ground potential; persons often touch foreign conductive parts or stand on conductive substrate

The arctic version *(type no. 52 261-6.6xx0; 52 261-6.6xx9; 52 261-6.8xx0; 52 261-6.8xx9; 52 261-6.9xx0;5 2 261-6.9xx9)* for surrounding temperature from -40 °C to +40 °C. The actuators in the arctic version should be resistant against impacts of operating conditions characterized by temperature in ranging from -40 °C to +40 °C and relative humidity from 5 % to 95 % at temperature +33 °C. These actuators will be designated with the letter F on the last place of the supplementary type number *(e.g. 52 261-6xx0F).*

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 operated in any operating position.

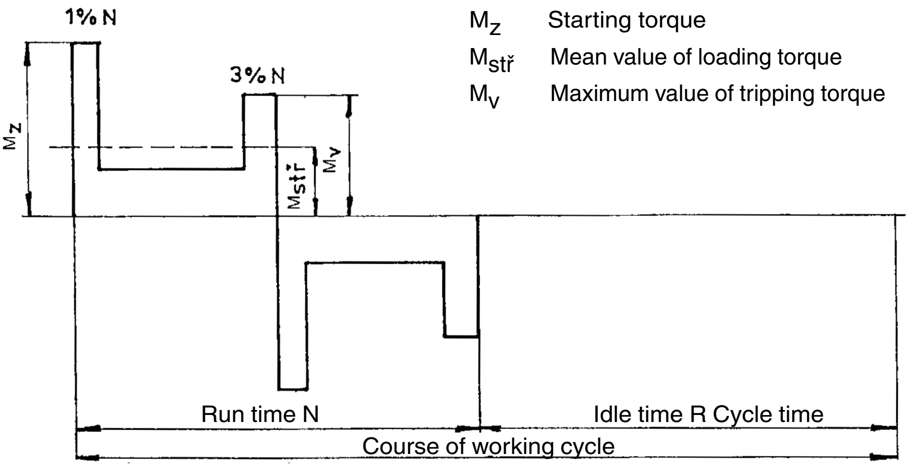
3. OPERATION MODE, SERVICE LIFE OF ACTUATORS

Operation mode

The actuators can be operated with the type of loading S2 according to ČSN EN 60 034-1. The run period at temperature +50 °C is 10 minutes; the mean value of loading torque should not exceed 60 % of the value of maximum tripping torque M_V.

The actuators can also work in the regime S4 *(interrupted run with start-up)* according to ČSN EN 60 034-1. Load factor N/N+R is max. 25 %; the longest working cycle *(N+R)* is 10 minutes *(course of working cycle is shown in the figure).* The highest number of closing operations in automatic regulation is 1200 cycles per hour. Mean value of loading torque with load factor 25 % and surrounding temperature +50 °C is not higher than 40 % of maximum tripping torque M_V.

The highest mean value of loading torque is equal to rated torque of the actuator.



Course of working cycle

5

Service life of actuators

The actuator designed for shut-off valves must be able to perform at least 10,000 working cycles *(Close-Open -Close).*

The actuator designed for regulation purposes must be able to perform at least 1 million cycles with running time *(when the output shaft is moving)* at least 250 hours. Service life in operating hours *(h)* depends on loading and number of switching actions. High frequency of switching is not always beneficial for precision of regulation. For reaching the longest possible faultless period and service life, it is recommended to set frequency of switching to the lowest possible number of switching actions necessary for the given process. Orientational data of service life derived from the set regulation parameters are shown in the following table.

Service life of electric actuators for 1 million starts

Service life [h]	830	1000	2000	4000
Number of starts [1/h]	max. number of starts 1200	1000	500	250

4. TECHNICAL DATA

Supply voltage

Rated value of alternating power supply voltage of the electric motor for the actuators is 3-phase 230/400 V, -15 % to +10 %, 50 Hz, the actuator type No. 52 260 equipped with electric motors 20 W, 60 W – 1 x 230 V, 50 Hz. Other supply voltage for electric actuators should be discussed with the manufacturer. The actuators **MODACT MPS, MPSP Control** 3 x 230/400 V, -15 % to +10 %, 50 Hz only.

Protective enclosure

Protection of the actuators **MODACT MPS *(MODACT MPS Control)*** is IP 55 according to ČSN EN 60 529.

Protection of the actuators **MODACT MPSP *(MODACT MPSP Control)*** is IP 67 *(except 52 260)* according to ČSN EN 60 529.

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.

Self-locking

Self-locking is given by using a worm gear in the countershaft box.

Working stroke

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

Manual control

Manual control is performed by a hand wheel directly *(without a clutch)* and is also possible when the electric motor is running *(resulting motion of the output shaft is given by the differential gear function).* By rotating the hand wheel in the clock-wise direction the actuator output shaft rotates also in the clock-wise direction *(when viewing the shaft into the control box).* Provided that the valve nut has a left thread, the electric 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, MZ *(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. The tripping torque can be adjusted within the range shown in Table 1.

Position-limit switches

The PO, PZ position-limit switches limit the actuator working stroke, each being adjusted to operate in either end position

Actuators with resistive transmitter – type B 611, 2 pieces

Actuators type No. 52 260, actuators with current transmitter and actuators without transmitter – type DB1G-A1LC, 2 pieces

Position signalling

For signalling position of the actuator output shaft, two signalling switches, i.e. the SO, SZ signalling switch, each for one direction of movement of the output shaft are used. The operating point of the microswitches can be set within the whole working stroke range except the narrow band before the operating point of the microswitch used to switch off the electric motor.

Actuators type No. 52 260, actuators with current transmitter and actuators without transmitter – type DB1G-A1LC, 2 pieces

Position transmitters

The **MODACT MPS, MPSP** electric actuators can be supplied without position transmitter or can be fitted with position transmitter:

a) Resistance transmitter 1 x 100 Ω.

Technical parameters:

Position scanning	resistance
Turning angle	0° – 320°
Non-linearity	≤ 1 %

Transition resistance	max. 1,4 Ω
Permitted 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 Ω. 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 Ω
Output signal	4 – 20 mA or 20 – 4 mA
Supply voltage for R_{load} 0 – 100 Ω	10 to 20 V DC
for R_{load} 400 – 500 Ω	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 ss
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 DCPT active current transmitter. Power supply to the current loop is not a part of the actuator. Maximum loading resistance of the loop is 500 Ω. For variants **MODACT MPS, MPSP Control** with the regulator ZP2.RE5, it is used as a position sensor.

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

Technical parameters of DCPT:

Scanning of position	contact-less magneto-resistant
Working stroke	adjustable 60° – 340°
Non-linearity	max. ±1 %
Loading resistance	0 – 500 Ω
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 DCPT, 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.

Position regulator

The position regulator built-in in the actuator enables to control position of the output shaft of the actuator and thus also the valve by the input analog signal.

The control unit is microprocessor-based programmed for regulating the actuator, ascertaining and repairing error conditions, and for simple setting of regulation parameters.

The regulator design enables to switch off the regulator feeding. If the regulator is not under voltage it does not regulate but, after its feeding is switched on, the regulator function is automatically restored; the parameters and diagnostic data stored in the regulator memory are retained.

The regulator circuits compare the input signal with the feedback signal from the position transmitter of the actuator output shaft. If there is a difference between the input and feedback signals the regulator closes one of the built-in contactors in the actuator so that the actuator shaft is reset to the position corresponding to magnitude of the input signal. When the feedback signal is equal to the input signal the actuator stops.

The control parameters are set by functional push-buttons on the regulator or by PC connected to the regulator via a serial interface for the period of setting the parameters or during the communication module.

Electro-dynamic brakes

It reduces the actuators run-down time from 0.5 – 1.3 s to 40 – 60 ms. This significant reduction in run-down time precise the control. When the actuator is in a standstill no braking moment is exerted

BAM-002 it´s the optional equipment of **MPS, MPSP Control** actuator without regulator

The brake operates autonomously and is run by auxiliary contact of the contactor.

BR2 it´s always part of **MPS, MPSP Control** actuator with regulator

The brake is interconnected with the regulator that provides impulse for action.

Switching of electric motor, contactor unit

The actuators in variants Control are fitted with built-in reversing contactor combinations. These are assembled of two contactors and an over-current relay. The combination also includes mechanical blocking that prevents both contactors from being closed at the same time. This could, for instance, happen in case of wrong connection of jumpers on the terminal board. The blocking is not dimensioned for long-term action. The over-current relays protects the electric motor against over-loading and is dimensioned with respect to its output. According to the actuator version, the contactors are controlled by the regulator, change-over switch of local control or external input. Control voltage is 230 V / 50 Hz as a standard; it is supplied via contacts of position and/or moment micro-switches. Thus, these micro-switches need not be led out of the actuator.

The contactors used have a long mechanical service life and great reserve in switching ability; consequently, the electric service life is also sufficient for particular use. The thermal relay is chosen so that it would reliably protect the electric motor against overload. Set-up and outfit of the actuators provide for simple connection to power-supply and control circuits.

The power-supply circuits can be common for the whole group of actuators, which will save the cabling.

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 2,5 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 MPS, MPSP** 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 MPS, MPSP** actuators with terminal designation are shown in this Mounting 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 microswitches 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 MΩ. After dump test, isolation resistance of control circuits is min. 2 MΩ. Isolation resistance of the electric motor is min. 1,9 MΩ. See Technical specifications for more details.

Electric strength of electric circuits isolation

Circuit of the resistance transmitter		500 V, 50 Hz
Circuit of the current transmitter		50 V DC
Circuits of microswitches and anti-condensation heater		1 500 V, 50 Hz
Electric motor	Un = 1 x 230 V	1 500 V, 50 Hz
	Un = 3 x 230/400 V	1 800 V, 50 Hz

Deviations of basic parameters

Tripping torque	±15 % of the maximum range value
Adjusting speed	+10 % of the maximum range value -15 % of the rated value
Working stroke	1 %
Angled lever play	max 1 %

Protection

The control panel is connected to the protective terminal, which is located in the terminal box. During assembly is necessary to connected the protective terminal according to ČSN 33 2000-4-41. **MODACT MPS, MPSP Control** actuators have internal protective terminal in the electronic box.

If isn´t the actuator equipment with overcurrent protection when purchased is needed to ensure that the protection is added externally.

7. DESCRIPTION

The actuators consist of the following modules *(see Fig. 1)*

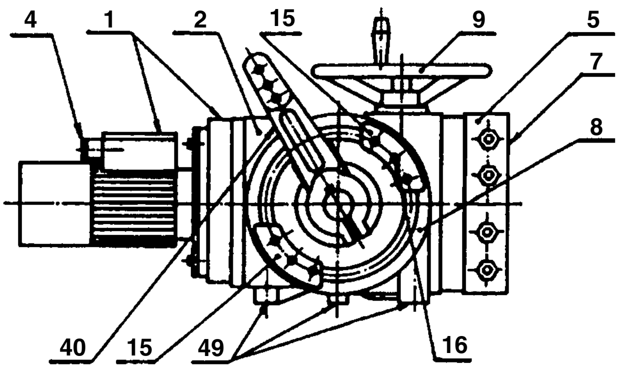
a)	Electric motor with gearbox	**1**
b)	Power gear unit with manual control	**2, 9**
c)	Control box with cover	**6**
d)	Lever assembly	**40, 8, 15**
e)	Terminal box	**5**

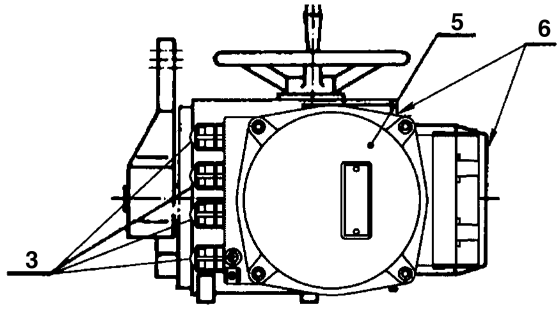
a) Electrical motor with gearbox *(Fig. 1)*

This module consists of a three-phase asynchronous motor and a flanged gear box with worm gear drive and spur gears whose selection allows different control speeds of the actuator to be obtained. The worm gear drive gives the whole actuator a self-locking feature.

b) Power gear unit with manual control *(Fig. 1)*

This module is a central mounting part of the actuator. It consists of a cast-iron box enclosing a differential planetary gear unit. When motor drive is used the sun gear of the differential planetary gear unit is actuated by the input spur-gear drive to which the movement is transmitted from the gearbox of an electric motor. The crown wheel of the planetary gear unit is fixedly coupled to the worm wheel of the manual worm drive. Provided with a handwheel, the handwheel worm is axially resilient-mounted by means of two sets of conical disk springs. In the manual control mode, the sun gear of the planetary gear unit is braked, while the crown wheel which is driven with the help of the handwheel via the planetary gearing by means of the worm gear drive, actuates a carrier that is fixedly connected to the output shaft.





Legend:
1 – Electric motor with countershaft gear box
2 – Power gear unit with hand control
3 – Control cable bushings
4 – Cable bushing of electric motor
5 – Terminal box
6 – Control box with cover
7 – Terminal box with cover
8 – Flange of lever assembly
9 – Handwheel
15 – Leverage stops
16 – Lock screws of leverage stops
40 – Lever
49 – Lower drive wheel

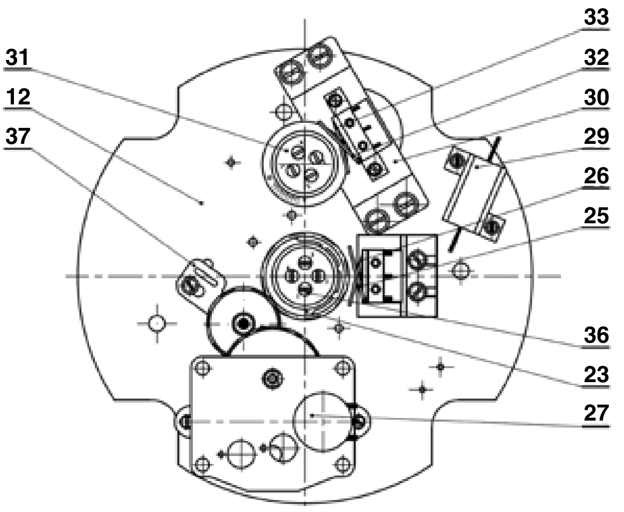
Fig. 1 – ***Actuator assembly***

The handwheel is provided with a *(right-hand threaded)* locking screw that should be loosened before manual control is used. At the end of manual control, the locking screw should be retightened. The planetary gearbox provides for dependable motor and manual control. The box housing the power gear unit is fitted with three tapped feet for mounting the actuator.

c) Control box *(Fig. 1)*

With the actuator in its normal position *(i.e., with the axis of the output shaft in the horizontal plane),* the control box is on the actuator side wall opposite to the lever. Within the box, all electrical and mechanical devices *(Figs. 2, 3, 6),* e.g., position-limit switches 25, torque-tripping unit 30, potentiometer 27 *(Figs. 2, 6)* or current position transmitter 61 *(Figs. 3, 4, 5)* are accommodated on the mounting plate of the control section *(Fig. 2).* The actuators always employ a single position transmitter.

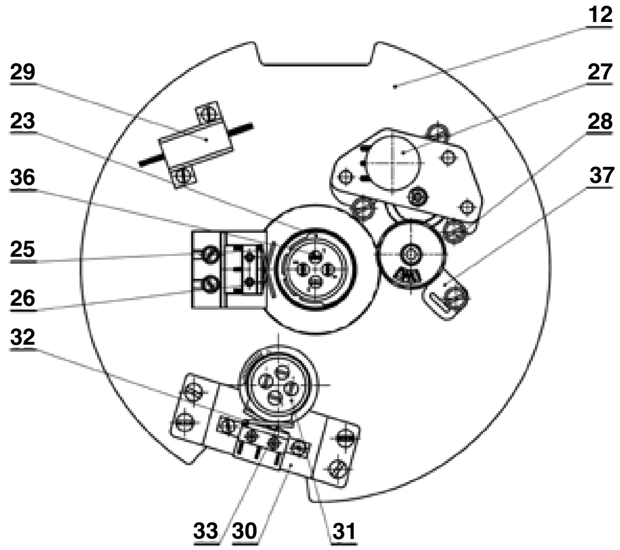
The control box is provided with cover 6 *(Fig. 1).* Three cable bushings or a connector are screwed in the terminal box 5 *(Fig. 1).*



Legend:

12 – Mounting plate of control section
23 – Upper cam for the OPEN position-limit switch (PO)
25 – Position-limit switch PO
26 – Position-limit switch PZ
27 – Potentiometer
29 – Anti-condensation heaters
30 – Torque shutdown
31 – Tripping cams
32 – OPEN torque-limit switch (MO)
33 – CLOSE torque-limit switch (MZ)
36 – Cam screws
37 – Transfer

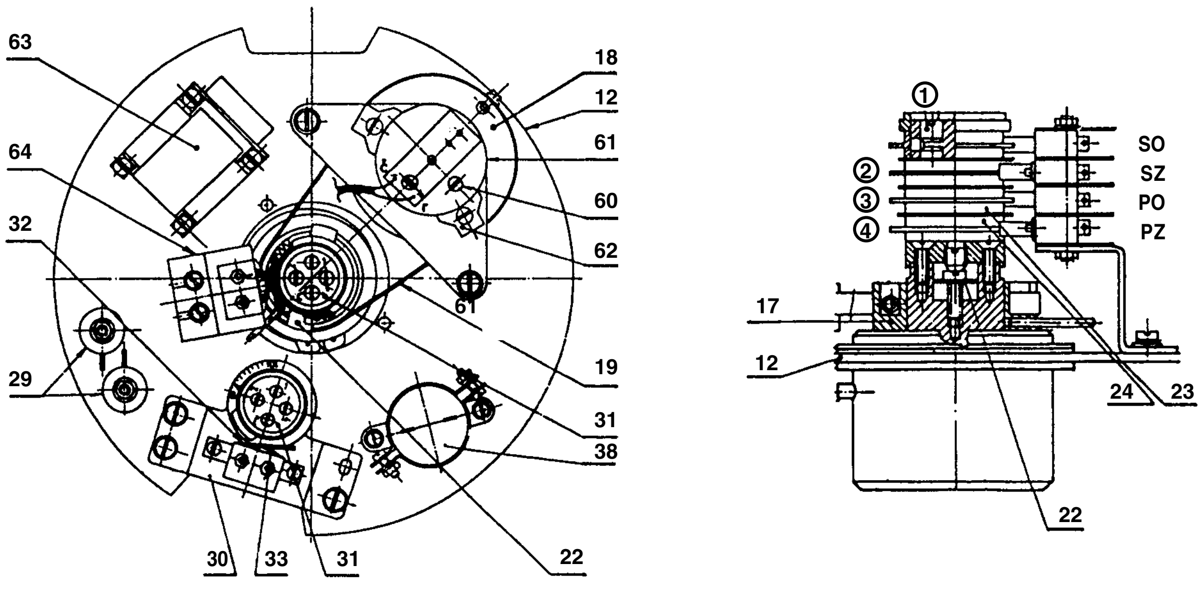
Fig. 2a – ***Base plate of actuator 52 260 with potentiometer 1x100 Ω***



Legend:

12 – Mounting plate of control section
23 – Upper cam for the OPEN position-limit switch (PO)
25 – Position-limit switch PO
26 – Position-limit switch PZ
27 – Potentiometer
29 – Anti-condensation heaters
30 – Torque shutdown
31 – Tripping cams
32 – OPEN torque-limit switch (MO)
33 – CLOSE torque-limit switch (MZ)
36 – Cam screws
37 – Transfer

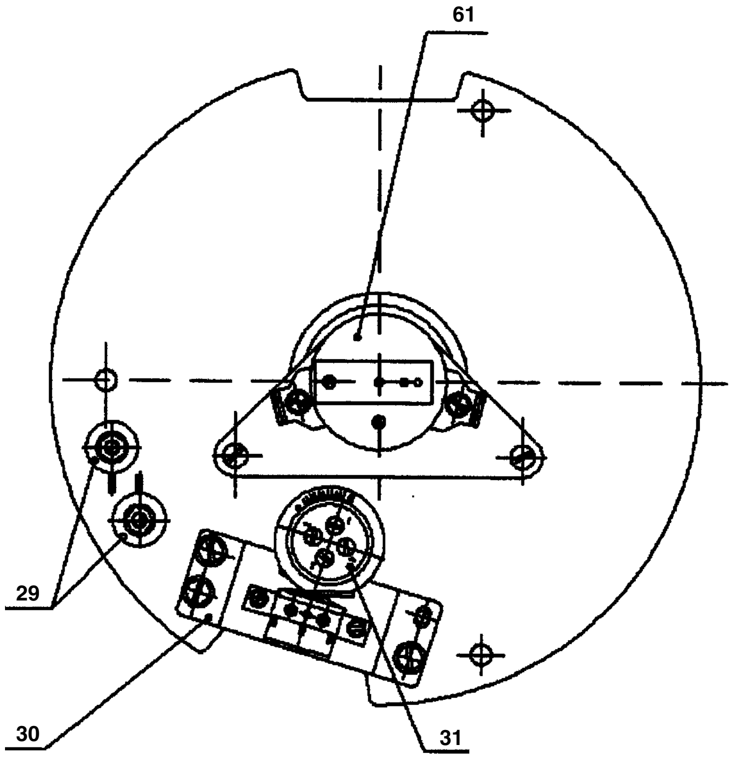
Fig. 2b – ***Base plate of actuators 52 261–52 266 with potentiometer 1x100 Ω***

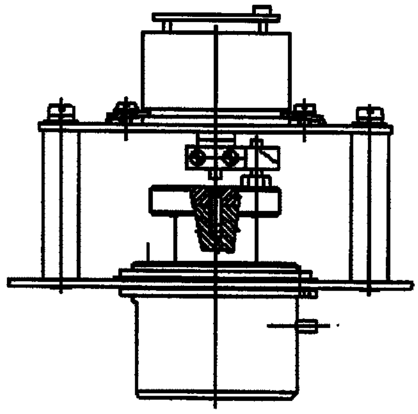


Legend:

12 – Mounting plate of control section
17 – Drive wheel
18 – Change wheel
19 – Steel band trade–named CHRONIFER
22 – Clutch spring
23 – Upper cam for the OPEN position–limit switch (PO)
24 – Lower cam for the CLOSE position–limit switch (PZ)
29 – Anti–condensation heaters
30 – Torque–limit switching unit
31 – Can drum shown in Fig.3
32 – OPEN torque–limit switch (MO)
33 – CLOSE torque–limit switch (MZ)
38 – Capacitor
60 – Potentiometer of current transmitter
61 – Current transmitter
62 – Transmitter shim
63 – Power supply of 24 V DC for current transmitter
64 – Unit of position–limit and signalling switches

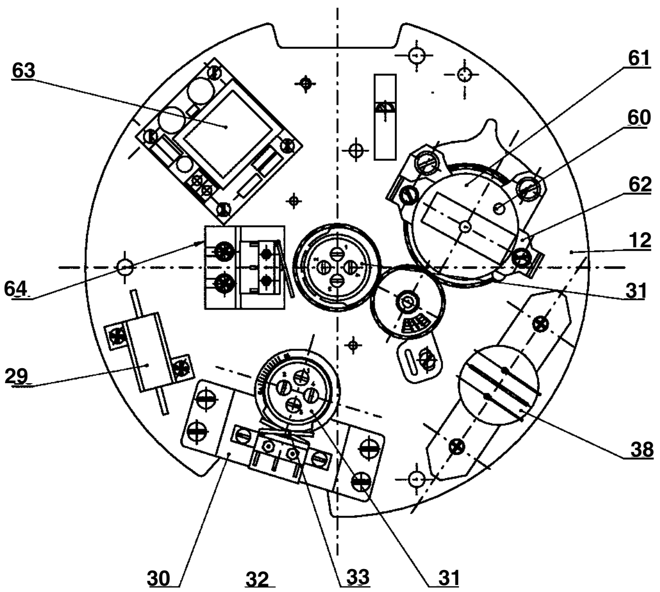
Fig. 3 – ***Base plate – version with current position transmitter (Type No. 52 260)***

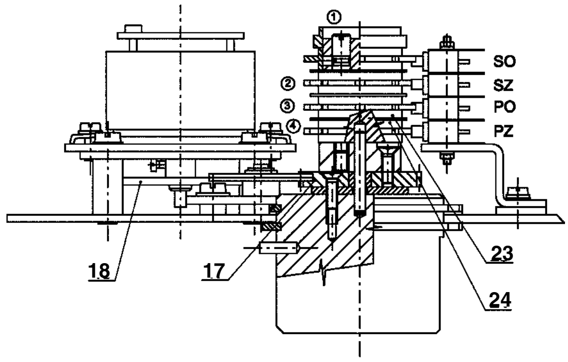




Legend:
29 – Heating elements
30, 31 – Moment unit
61 – Current transmitter

Fig. 4 – ***Base plate with current transmitter*** *– without position and signalling switches*
– transmitter directly on output shaft
(this version is designated with the digit 9 at the second place of the supplementary number, e.g. 52 261.x9xx)





Legend:

12 – Mounting plate of control section
17 – Drive wheel
18 – Change wheel
23 – Upper cam for the OPEN position–limit switch (PO)
24 – Lower cam for the CLOSE position–limit switch (PZ)
29 – Anti–condensation heaters
30 – Torque–limit switching unit
31 – Can drum shown
32 – OPEN torque–limit switch (MO)
33 – CLOSE torque–limit switch (MZ)
38 – Capacitor
60 – Potentiometer of current transmitter
61 – Current transmitter
62 – Transmitter shim
63 – Power supply of 24 V DC for current transmitter
64 – Unit of position–limit and signalling switch

Fig. 5 – ***Base plate – version with current position transmitter (Type No. 52 261 – 52 260)***

The control board carries the following functional units:

1. Position-limit switches with cams	25, 23	*(Fig. 2, 3, 5)*
2. Torque-limit switching unit	30, 31	*(Fig. 3, 5)*
3. Potentiometer with drive	27	*(Fig. 2, 6)*
4. Anti-condensation heaters	29	*(Fig. 2, 3, 5)*
5. Current transmitter CPT 1Az 4 – 20 mA	61	*(Fig. 3, 5)*
with the ZPT1 power supply unit of 230 V, 50 Hz/24 VDC	63	*(Fig. 3, 5)*

The **design with the resistance switch** is fittes on the output shaft 13 of the actuator *(Fig. 6)* with two cams that control the position switches.

For ease of assembly, the output shaft is split. The output end of the shaft is mounted directly into the shaft control panels and then insert it into the output shaft cavity. In addition, it is on the output shaft a drive wheel 18 *(Fig. 6)* is mounted which transmits the output shaft movement to the position transmitter.

d) Lever assembly *(Fig. 1)*

The lever assembly consists of lever 40 mounted on the output shaft of the power gear unit and circular flange 8 fitted on its face with a T-groove in which stops 15 are adjustably mounted to limit the lever movement. The flange and the stops are fixedly connected to the cast-iron box of the power gear unit.

e) Terminal box 5 *(Fig. 1)*

Connected to the control box by a flange, this box encloses a terminal board to which all electrical devices comprised in the control box are brought out. Easy access to the terminal board is provided after removal of the terminal box cover. For sealed cable entry, the box has three cable bushings. In another design variant, the box is fitted with an instrument plug-and-socket *(connector).* Brought out to the instrument socket are all electrical circuits, including position-limit and torque-limit switches, remote position transmitters of the output shaft and anti-condensation heaters. Leading-in cables are sealed in the plug by cable inlets. They are brought into it from the control box side.

Description of controls

a) Torque-limit switching

The torque-limit switching unit 30 *(Fig. 3)* consists of the following two independent parts

– Cam drum with scales 31

– OPEN and CLOSE torque-limit switches 32 *(MO)* and 33 *(MZ),* respectively

The axial displacement of the manual control worm *("floating worm"),* which is proportional to the output shaft torque of the actuator, is converted to the rotary motion of the cam drum. The cams used for actuating the torque-limit switches are provided with a pointer to indicate the adjusted tripping torque on a scale fitted on the cam drum. Both the cams and the scales are secured by screws with opposite numbers 1 to 4.

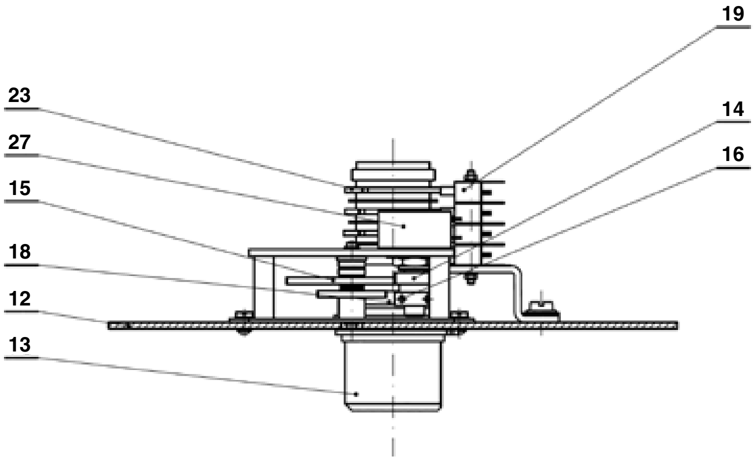
Screw No.1 secures the control cam of the OPEN torque-limit microswitch. This is the first cam from above. On the scale, the zero indicates a minimum tripping torque, while the red mark indicates the maximum tripping torque. In any design variant of the actuator, the torque-limit switching unit is identical.

b) Position-limit switches and cams

The position-limit switches are arranged above each other. Intended for operation in the OPEN position, the upper position-limit switch 25 is controlled with the help of leaf actuator 43 by the cam 23 fitted on the output shaft. The cam is used to release screws 36 *(Fig. 2).* Designed for operation in the CLOSE position, the lower position-limit switch 26 is controlled with the help of leaf actuator 44 by the cam 24, which is used to release and fix screws 37 *(Fig. 2).* Due to the application of microswitches and direct mounting of the cams on the output shaft, the switching hysteresis has been reduced. In the design variant with the CPT 1Az current transmitter, two switches have been added to the position-limit switches to signal the output shaft position of the actuator (Fig. 3). The cams are secured by means of screws No. 1 to 4 as in the case the torque-limit switching unit. The sequence of cams and microswitches is shown in Fig. 3.

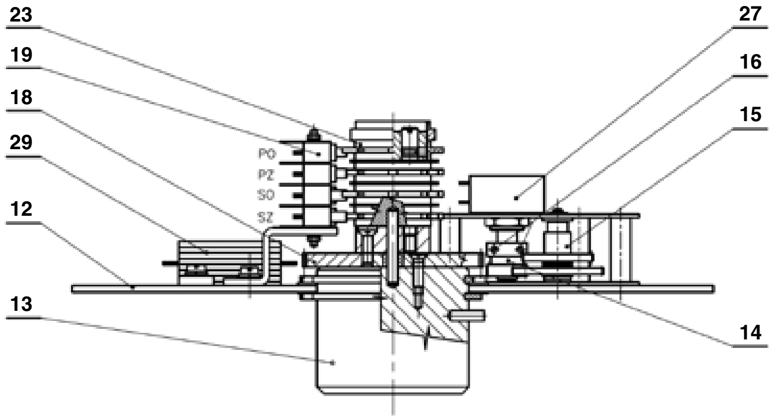
c) Shooting of the resistive position transmitter

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 the output shaft stroke 90°, 120°, 160°)* or through the intermediate sleeve assembly 15. The resistor transmitter pinion is provided with a sliding clutch which stops at the end positions of the resistive transmitters. To set the resistive transmitter this occurs automatically when the output shaft of the servomotor is set to some of the end positions "open" or "closed".



Legend:
12 – Mounting plate of control section
13 – Shaft
14 – Pinion
15 – Intermediate Assembly
16 – Plank bolts
18 – Drive wheel
19 – Microswitches
23 – Cam for the OPEN position–limit switch (PO)
27 – Potentiometer

Fig. 6a – ***Connection of resistive transmitter with drive in actuators 52 260***



Legend:
12 – Mounting plate of control section
13 – Shaft
14 – Pinion
15 – Intermediate Assembly
16 – Plank bolts
18 – Drive wheel
19 – Microswitches
23 – Cam for the OPEN position–limit switch (PO)
27 – Potentiometer
29 – Heating resistance

Fig. 6b – ***Connection of resistive transmitter with drive in actuators 52 261–52 266***

d) Drive of the position transmitter – current transmitter, actuators Type no. 52 260 *(Fig. 3)*

Fitted on the output shaft, the driving gear 17 is connected to this shaft by means of the coupling formed by spring 22. The amount of transmitted torque between the shaft and the driving gear 17 can be varied by tightening the attachment screw of spring 22. This screw should be secured by a lock screw. The two screws are accessible after removal of the cam drum along with the holder. When replacing the stainless steel band 19, the actuator should be repositioned to the working stroke centre, while the individual parts of the position transmitter gearing are set, as shown in Fig 3. On the base plate 12 *(Fig. 3)* there are stops the pin of the driving gear 17 strikes after completion of the working stroke to prevent further rotation of the gear and thus any mechanical stress on the band during adjustment of the actuator.

e) Connection of current transmitter with drive, actuators Type no. 52 261 – 52 266 *(Fig. 5)*

The current transmitters CPT 1Az and DCPT 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**
DCPT	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 DCPT 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.

8. UNPACKING AND STORING

Packaging of the actuators is carried out to suit the transport conditions and the distance of the place of designation. 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 a temperature within the range of - 25 °C to + 55 °C and relative humidity up to 85 % where there are no aggressive vapours. It is only before the actuator is installed that excessive slush should be removed.

If the actuator is to be stored or shut down for a longer period it is advisable to place a bag with the drying agent in the control chamber and the terminal box. The agent is not available from the actuator manufacturer *(is not supplied).*

9. CHECKING OF EQUIPMENT CONDITION

Prior to installation, check that the actuator was not damaged during storing. Make a visual check to be sure that the individual parts and particularly the control and terminal boxes have not corroded.

10. ACTUATOR LOCATION

The actuators can operate in any position provided that the axis of the electric motor remains horizontal. The actuators can be used even in a position with the electric motor upwards.

The actuator should be located so that easy access is obtained to the handwheel and the terminal box. The actuators should be located so that there is no risk of injury to persons and/or damage to the property during installation, operation, adjustment, maintenance or dismantling. If this is not possible the organisation making the project or installing the technological equipment integrated with the actuator should take such precautions that the risk of injury to persons and damage to the property is completely avoided.

11. INSTALLATION

The actuators should be mounted through tapped holes 49 in their bearing feet 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 box can be caused by retightening. In their basic design variant, the actuators are supplied complete with a lever and stops. In this design variant, they are suitable for their main application, i.e., control of turning flaps, louvers and valve levers.

When the actuator used is fitted with a lever and stops the lever of the actuator should be coupled to that of the controlling device by means of a pull rod. During mounting, care should be taken to ensure that, in either extreme position, the angle between the pull rod and the actuator lever is not less than 20°, but not more than 160° since otherwise there is the danger of an uncontrolled increase in the acting forces and thus the risk of damage to the actuator and/or reduction of its service life. A similar principle should be also applied on the side of the controlled device *(Fig. 7).* The arrangement of the mechanism (length of the actuator lever, pull-rod length, lever arm length of the fitting) should be selected so that the actuator can be brought into either extreme position of the regulating unit and that, in the case of the design variant with a transmitter, the desired transmitter signal can be obtained, according to the local conditions and the general directions.

Nevertheless, the actuators can be supplied without lever and stops. In this case, they can be used for direct flanged connection to a flap, a ball valve, etc. When the torque-limit switching facility is to be used the controlled device should be fitted with stops.

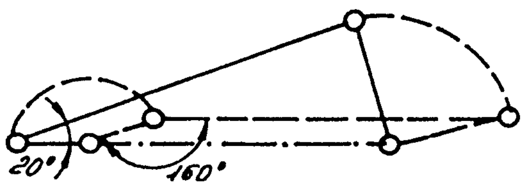


Fig. 7 - ***Working stroke of the actuator lever with pull rod***

When wiring the actuators, the corresponding standards and other 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 minimum distance of 150 mm from the end of the cable inlet in 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) Before the instrument socket is disconnected from, or connected to the 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 disconnection or connection can be made only after the actuator earthing has been checked.

If the actuator is fitted with the local control unit *(LCU)* the control voltage should be applied to the LCU switch first to disable remote control in the local control mode.

When mounting and/or adjusting the actuator, a proper lighting should be catered for.

Adjustment and setting-up of actuators

The adjustment and setting-up of the actuators should be made only by a qualified technician.

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 torque. At the factory, they have been adjusted to the rated torque *(Tab.1).* It is advisable that this adjustment is not changed.

Adjustment of the OPEN and CLOSE limit switches – potentiometer 1 x 100 Ω

This adjustment can be made only 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. 6)* by loosening screws 36 and 37 *(Fig. 2).* Bring the actuator into the “closed” position by the handwheel, while turning the lever 40 *(Fig. 1)* in the CLOSE direction, i.e., clockwise when looking into the control box. In its end position, the lever should be arrested by stop 15 of the lever assembly *(Fig. 1).* Now, rotate the lower cam 24 clockwise till the leaf actuator 44 depresses the push-button of the CLOSE position-limit switch 26 (Fig. 6). For adjustment, it is advisable to use an illuminated tester connected to the switch termimal to light up at that moment. In this position, secure the cam 24 in position by retightening two screws 37 *(Fig. 2).* Then, move the actuator to the opposite position, in which case the lever should be turned in the OPEN direction, i.e., anticlockwise when looking into the control box. After the lever has been arrested in the desired position by a stop turn the upper cam 23 *(Fig. 6)* anticlockwise till it changes over the OPEN position-limit switch 25. 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 limit and signalling switches – current transmitter

Bring the handwheel into the *“closed”* position by rotating it clockwise. In the position, move the stop to the output lever and secure the stops in position by screws. Then, adjust the CLOSE position-limit switch by loosening the cam screw 4 and turn the cam clockwise till the microswitch operates. Next, retighten the screw 4. Then, after loosening the screw 2, adjust the cam of the CLOSE signalling switch *(the second cam from above)* in a similar way. Bring the output lever into the “open” position anticlockwise and secure it by a stop. In this position, adjust the cam of the OPEN signalling microswitch 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 by such an amount that the cams can be turned since further rotation of the screws might clamp the cam again*

Setting the resistive position transmitter and the working stroke *(the angle of rotation of the lever)*

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.

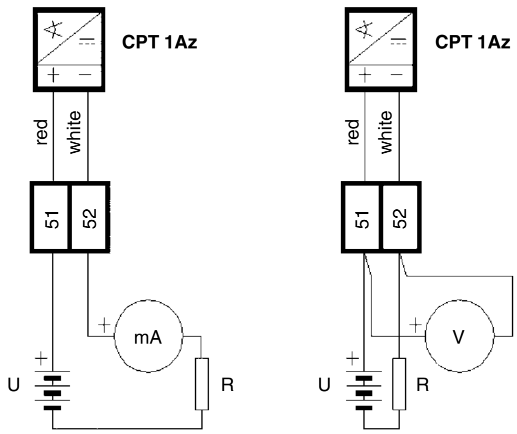
The setting is automatically set by turning the actuator lever into one of the "open" or "closed". When using the 1x100Ω resistive transmitter it is connected as V1.

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 DCPT – 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 DCPT. 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 DCPT.

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 DCPT)* 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:

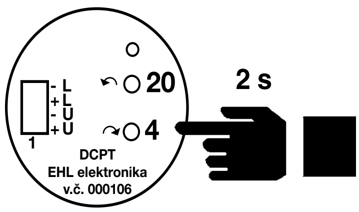
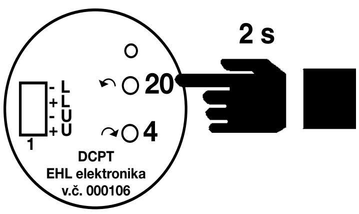
Press the push-button **“20”,** then the push-button **“4”** and keep them depressed until LED blinks.

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

<table>
<tr><td>Position „4 mA“</td><td rowspan="2">
</td></tr>
<tr><td>Set the actuator to required position
(usually Closed)
and keep the push-button 4 depressed until LED blinks.</td></tr>
<tr><td>Position „20 mA“</td><td rowspan="2">
</td></tr>
<tr><td>Set the actuator to a required position
(usually Open)
and keep the push-button 20 depressed until LED blinks.</td></tr>
</table>

Operation

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. It is the user's duty to ensure that the actuator is given the specified maintenance attention and is protected against the harmful 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 a bag of drying agent in the terminal box.

In any outdooor installation, anti-condensation heaters should be used. At an ambient temperature above 35 °C, only one anti-condensation heater is required.

The actuators should not be operated with their guards removed. When the actuator has been readjusted by the handwheel the latter should be secured by means of a screw in its hub. *(This does not apply to Type No. 52 260).*

12. MAINTENANCE

The actuators are lubricated with plastic consistent lubricants. The types of lubricant and amounts are listed in the table. Lubricants in the drive units supplied are designed to last the entire useful life of the unit.

If actuator operates in dusty environment, dust must be regularly removed from its surface, to avoid insufficient cooling.

Note:

The CIATIM 221 lubricant is designed for the friction points of rubber bushing against metal surfaces, roller brake, the hub of an outer gearwheel of a planetary-gear differential of 52260 (for locations of friction between the shaft and the other surfaces).

Adapter of actuators 52265 and 52266 is to be filled with lubricant LV 2-3 PM, quantity 1 kg.

During the time when the actuator is in use,it is not necessary to change or monitor the amount of the lubricant. For all types are used lubricants CIATIM 201 and CIATIM 221. The amount of lubricant for different types of actuators is shown in Table 1.

Any repair, maintenance or adjustment of the actuators should be made only by the qualified technician. Prior to any repair, the actuator should be disconnected from the AC mains and secured against inadvertent reconnection. If the actuator is fitted with the local control unit *(LCU),* the LCU switch should be rotated to the OFF position.

When making repairs or adjustments, a suitable lighting of the control and terminal boxes should be provided. Making any modifications in the actuators is strickly prohibited without manufacturer's consent.

Table 1 – MODACT MPS, MPSP, MODACT MPS MPSP Control electric actuators
– basic technical parameters, design variants

BASIC OUTFIT:		Additional Type No.
1 electric motor 2 Torque-limit switches *(OPEN and CLOSE)* 2 Position-limit switches *(OPEN and CLOSE)* 2 Signalling switches *(OPEN and CLOSE) (actuators t. no. 52 260, actuators with current transmitter and actuators without transmitter)* 1 Anti-condensation heater		
Electrical connection	terminal board	6 x x x
	connector	7 x x x
	terminal board + local control unit	8 x x x
	connector + local control unit	9 x x x

TECHNICAL PARAMETERS

Type designation	Tripping torque range [Nm]	Operating time [s/90°]	Motor power [W]	Voltage [V]	Motor current In [A]	Starting motor current [A]	Amount of lubricant [kg]	Weight [kg]	Type Number basic	Type Number additional
MPS, 8/8	20 – 80	8	90	400	0,34	1	0,3	26	5 2 2 6 0	x x 1 x
MPS, 8/16		16								x x 2 x
MPS, 8/32		32	60	230	0,53	1,15				x x 3 x
MPS, 8/63		63	20	230	0,4	1,63		27		x x 4 x
MPS, 12,5/8	60 – 125	8	90	400	0,34	1		26		x x 5 x
MPS, 12,5/16		16								x x 6 x
MPS, 12,5/32		32	60	230	0,53	1,15				x x 7 x
MPS, 12,5/63		63	20	230	0,4	0,63		27		x x 8 x
MPS, (MPSP) 16/16	100 – 160	16	120	400	0,42	1,44	0,5	70	5 2 2 6 1	x x 1 x (P)
MPS, (MPSP) 16/32		32						49		x x 2 x (P)
MPS, (MPSP) 16/63		63						70		x x 3 x (P)
MPS, (MPSP) 16/120		120								x x 4 x (P)
MPS, (MPSP) 32/16	160 – 320	16	180	400	0,56	1,82	0,5	50	5 2 2 6 2	x x 1 x (P)
MPS, (MPSP) 32/32		32						48		x x 2 x (P)
MPS, (MPSP) 32/63		63						49		x x 3 x (P)
MPS, (MPSP) 32/120		120						70		x x 4 x (P)
MPS, (MPSP) 63/16	320 – 630	16	370	400	1,03	3,25	0,7	120	5 2 2 6 3	x x 1 x (P)
MPS, (MPSP) 63/32		32	180	400	0,56	1,82				x x 2 x (P)
MPS, (MPSP) 63/63		63						94		x x 3 x (P)
MPS, (MPSP) 63/ 120		120						120		x x 4 x (P)
MPS, (MPSP) 125/16	630 – 1250	16	370	400	1,03	3,25	0,7	120	5 2 2 6 4	x x 1 x (P)
MPS, (MPSP) 125/32		32								x x 2 x (P)
MPS, (MPSP) 125/63		63								x x 3 x (P)
MPS, (MPSP) 125/120		120	180	400	0,56	1,82				x x 4 x (P)
MPS, (MPSP) 200/45	1250 – 2000	45	370	400	1,03	3,25	0,7	267	5 2 2 6 5	x x 0 x (P)
MPS, (MPSP) 400/45	2500 – 4000								5 2 2 6 6	x x 0 x (P)

Notes:

1) Not available in Type No. 52 265 and 52 266.
2) Type No. 52 264 – 52 266 can be manufactured in IP 67.
   10th position of Type No. will be marked with letter P.

Working stroke - mechanical connection with the controlled device	with lever and flange with stops	60°	x 1 x x
		90°	x 2 x x
		120°	x 3 x x
		160°	x 4 x x
	flanged design without lever and flange with stops 1)	60°	x 5 x x
		90°	x 6 x x
		120°	x 7 x x
		160°	x 8 x x

ATTACHMENTS MODACT MPS, MPSP actuators	Additional Type No.
Resistance transmitter 1 x 100 Ω	x x x 1
Design without position transmitter	x x x 0
Current position transmitter DCPT 4 – 20 mA with built-in power supply unit	x x x 7
Current position transmitter CPT 1Az 4 – 20 mA without built-in power supply unit	x x x 9

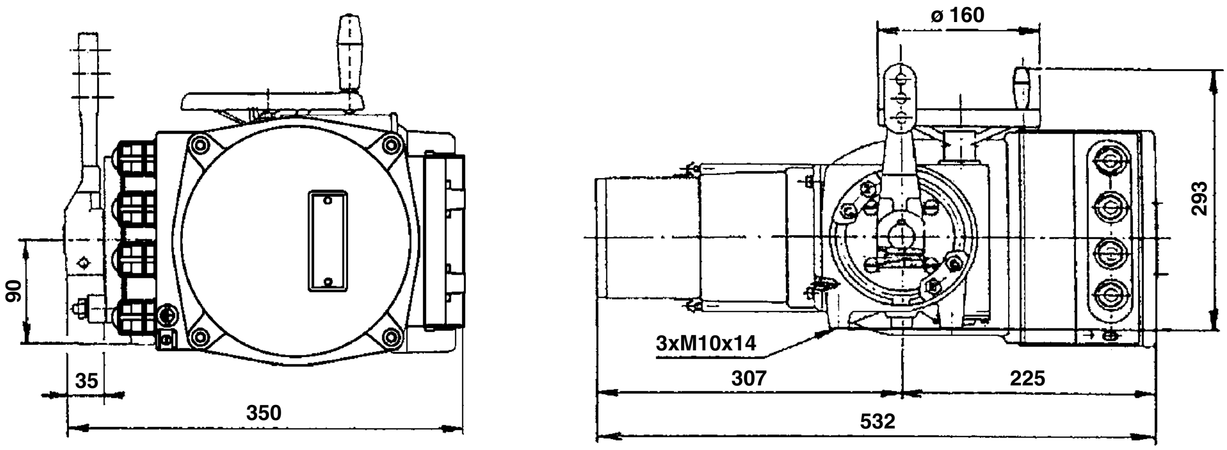
ATTACHMENTS MODACT CONTROL MPS, MPSP actuators Type No. 52 261 - 52 266	Letter in the last position of Type number – Actuator design: Complete with position regulator, brake and reversing contactors		Without position regulator, with brake and reversing contactors		Without position regulator and brake, with reversing contactors	
LCU – local control unit	with BMO	without BMO	with BMO	without BMO	with BMO	without BMO
Without position transmitter	–	–	.xxxC	.xxxL	.xxxG	.xxxR
Resistance transmitter 1 x 100 Ω	–	–	.xxxD	.xxxM	.xxxH	.xxxS
Current position transmitter DCPT 4 – 20 mA with built-in power supply unit	.xxxA	.xxxB	.xxxE	.xxxN	.xxxJ	.xxxT
Current position transmitter CPT 1Az 4 – 20 mA without built-in power supply unit	–	–	.xxxF	.xxxP	.xxxK	.xxxU

NOTE: *The actuators MODACT MPS, MPSP Control with the regulator ZP2.RE5 – the digit 5 should be put at the 10th place.*

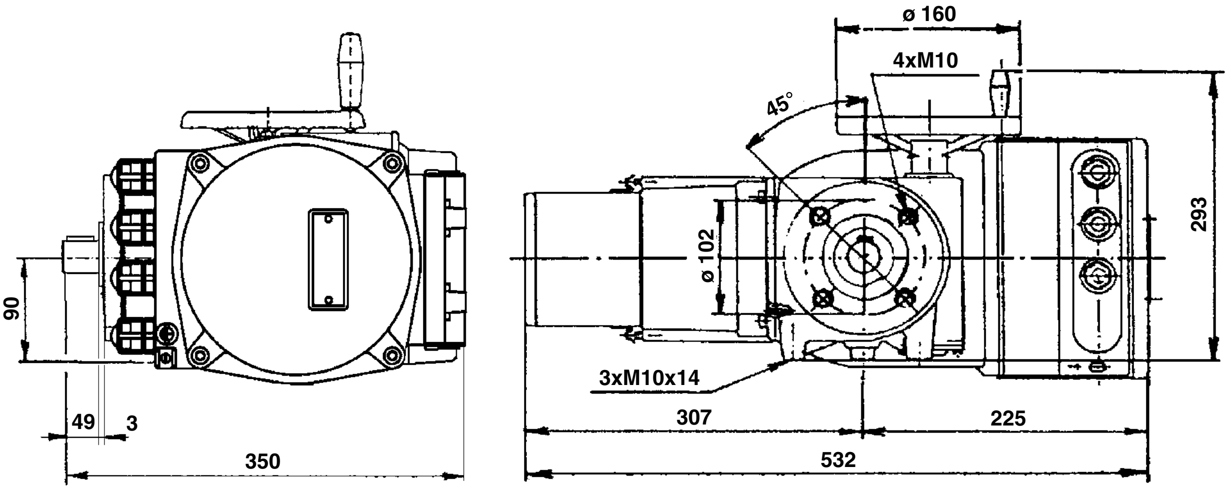
11th place:	
-25 °C to +70 °C	no identification
-40 °C to +60 °C	F1

MODACT MPS electric part-turn actuator, Type No. **52 260**

– Design with terminal board

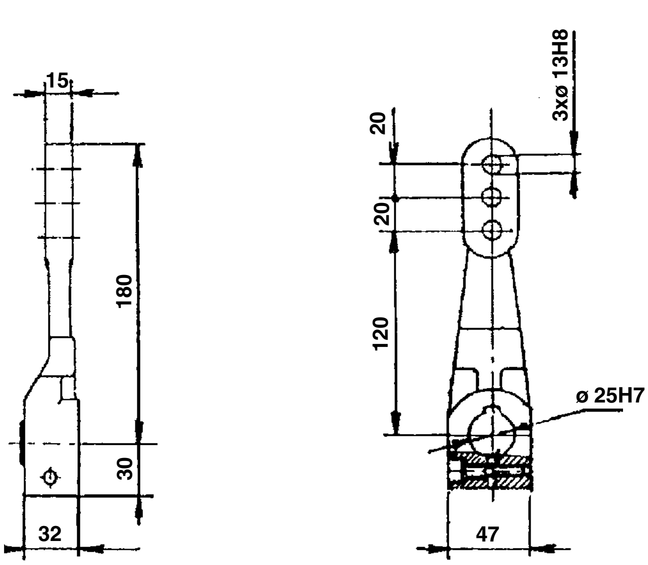


– Flanged design with terminal board

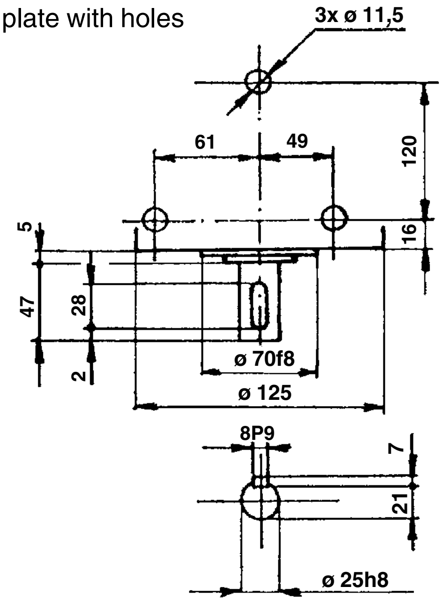


Note: *Threads for cable bushings in the terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (cable bushings are included – attached).*

Lever

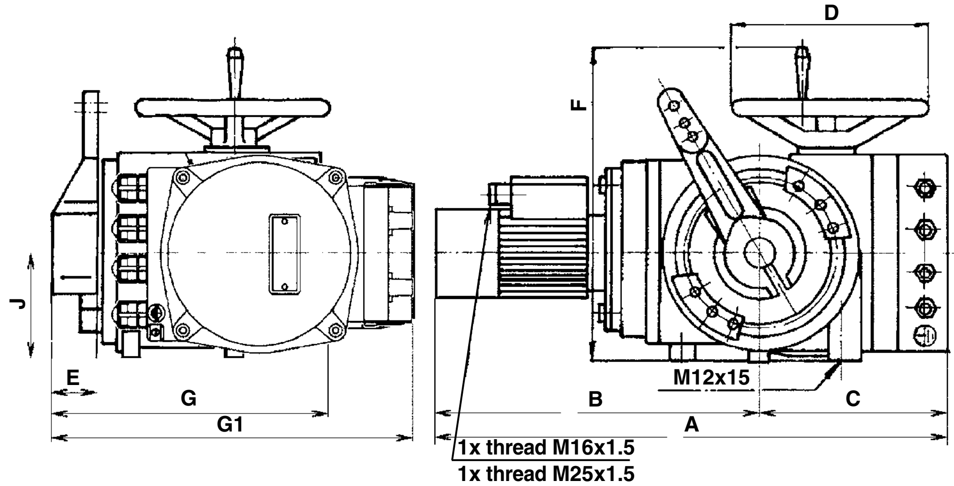


Mounting plate with holes



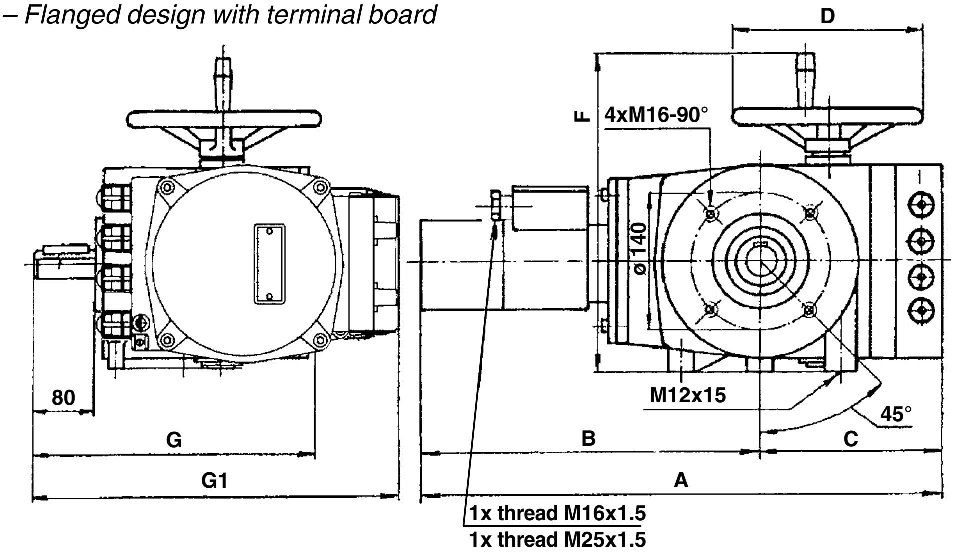
MODACT MPS, MPSP electric part-turn actuators, Type No. **52 261, 52 262**

– Design with terminal board



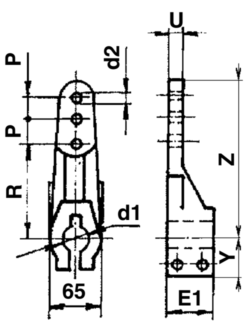
A	620
B	386
C	234
D	ø 200
E	62
E_1	60
F	346
G	340
G_1	456
J	120
K	70
L	90
M	140
N	41
O	ø 14
P	40
R	170
S	56
T	4
U	25
X	65
Y	41
Z	273
d	ø 40 h 8
d_1	ø 40 H 7
d_2	3 x ø 20 H 8
b	12 P9
h	8
e	35

– Flanged design with terminal board

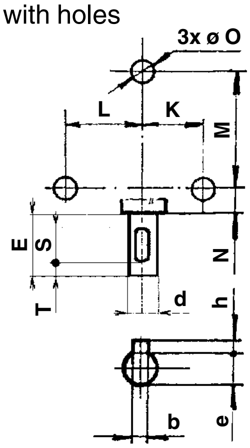


Note: *Threads for cable bushings in the terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (cable bushings are included – attached).*

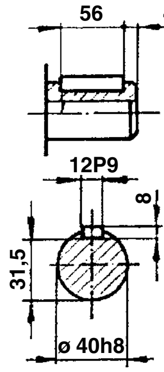
Lever



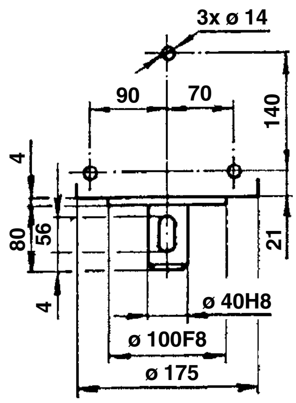
Mounting plate with holes



Output shaft



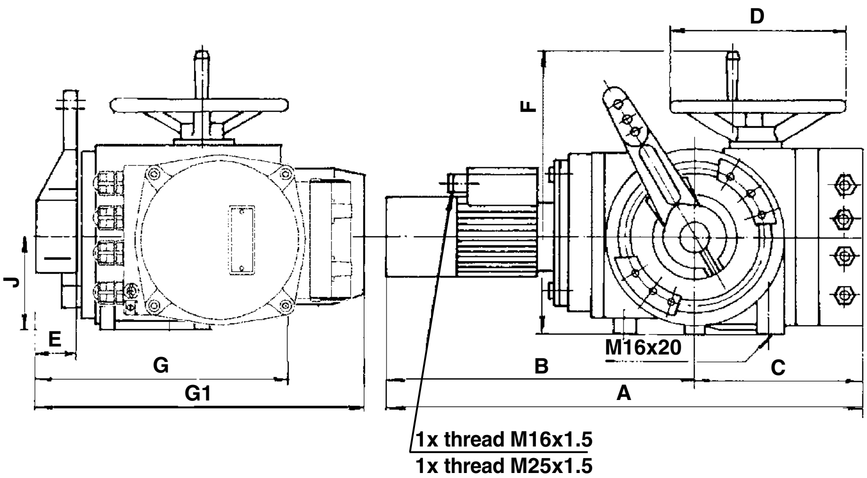
Mounting plate with holes



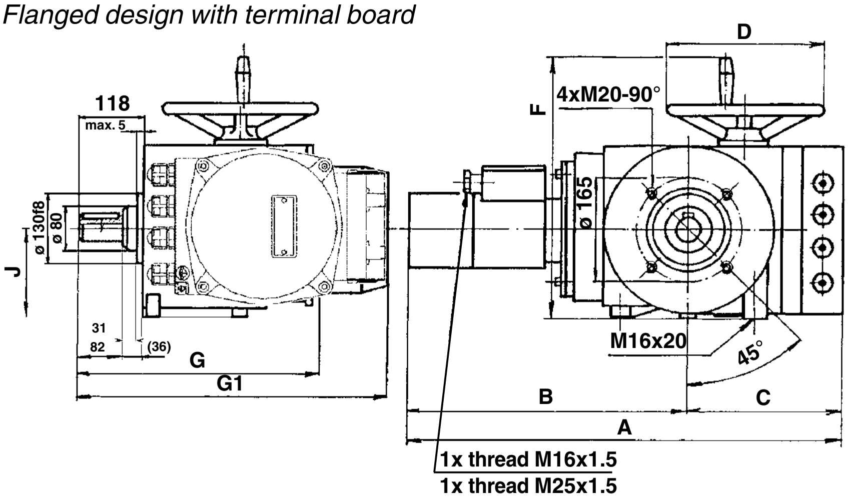
MODACT MPS, MPSP electric part-turn actuators, Type No. **52 263, 52 264**

	52 263	52 264
A	712	731
B	460	479
C	252	
D	ø 250	
E	82	
E_1	80	
F	420	
G	445	
G_1	562	
J	145	
K	100	
L	110	
M	200	
N	60	
O	ø 18	
P	40	
R	170	
S	70	
T	7	
U	30	
X	80	
Y	55	
Z	278	
d	ø 50 h 8	
d_1	ø 50 H 7	
d_2	3 x ø 25 H 8	
b	16 P9	
h	10	
e	43,8	

– Design with terminal board

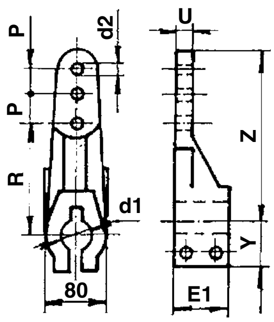


– Flanged design with terminal board

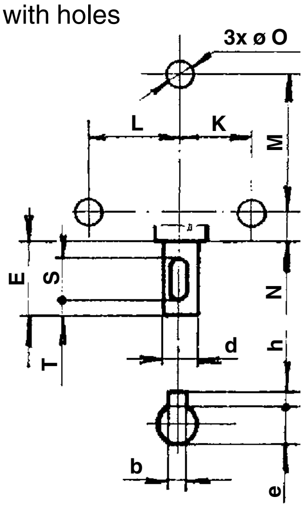


Note: *Threads for cable bushings in the terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (cable bushings are included – attached).*

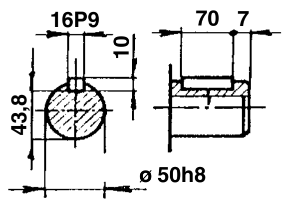
Lever



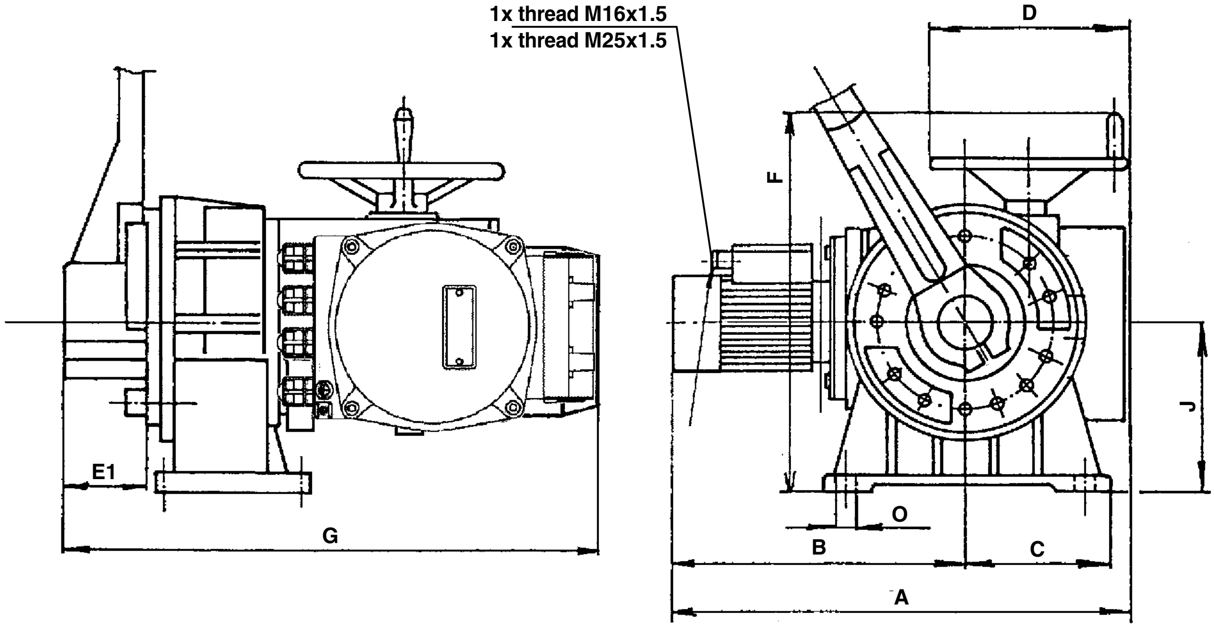
Mounting plate with holes



Output shaft

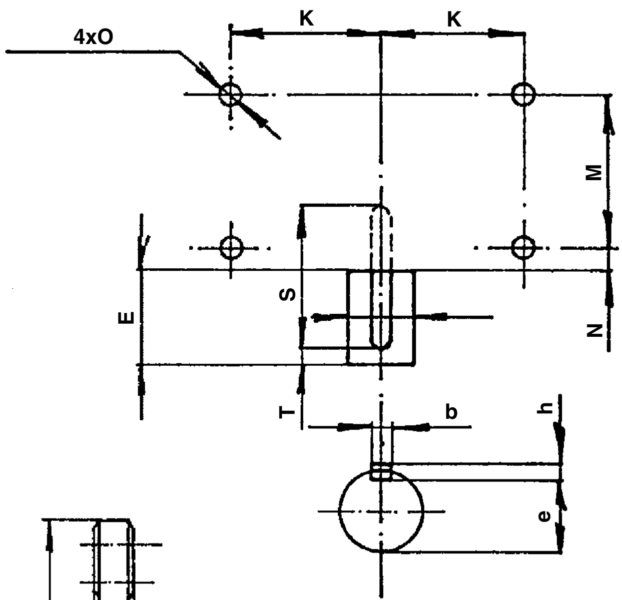


MODACT MPS, MPSP electric part-turn actuators, Type No. **52 265, 52 266**



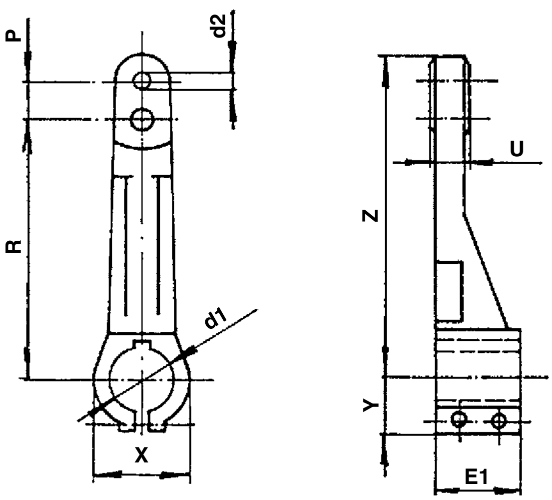
Note: *Threads for cable bushings in the terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (cable bushings are included – attached).*

Mounting plate with holes

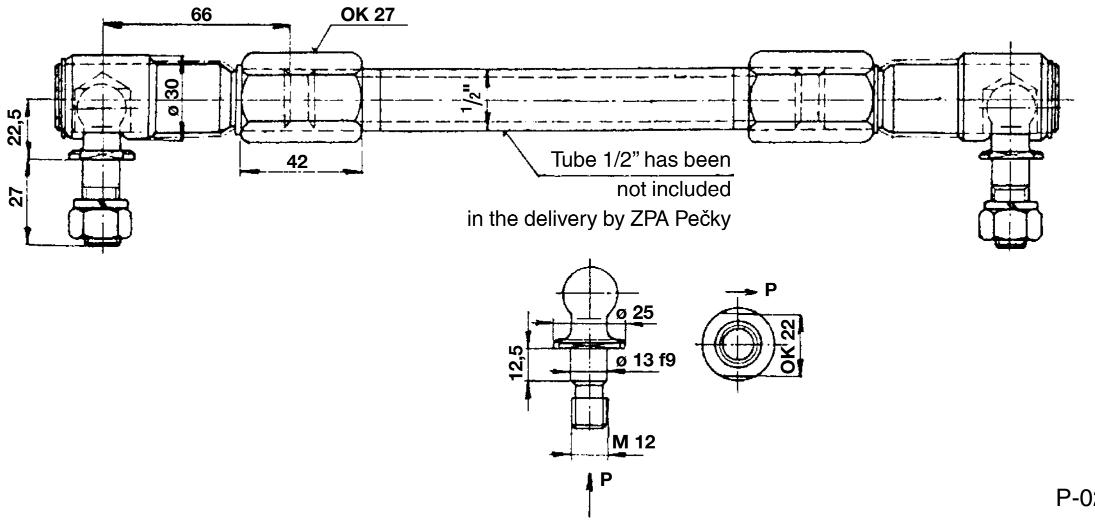


A	743
B	498
C	220
D	ø 300
E	123
E_1	120
F	560
G	760
J	260
K	185
M	200
N	33
O	ø 22
P	55
R	400
S	180
T	11
U	36
X	130
Y	80
Z	490
d	ø 90 h8
d_1	ø 90 H7
d_2	ø 40 H8
b	25 P9
h	14
e	81,3

Lever

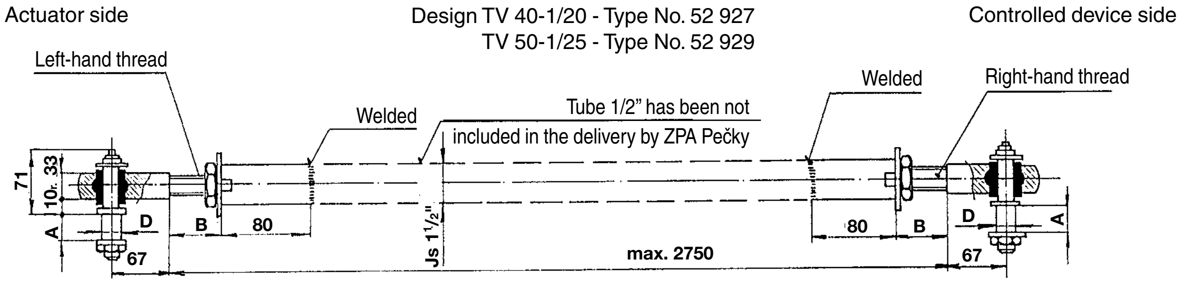


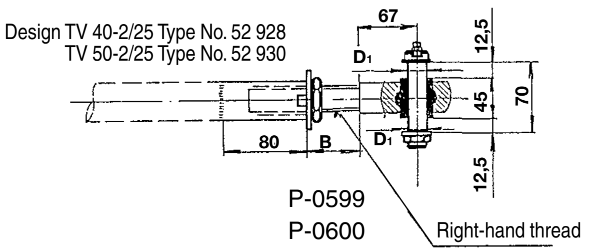
Dimension drawing Pull Rod TV 360, Type No. 52 933 for actuators, **Type No. 52 260**



P-0210

Dimension drawing – Pull Rods TV 40 and TV 50

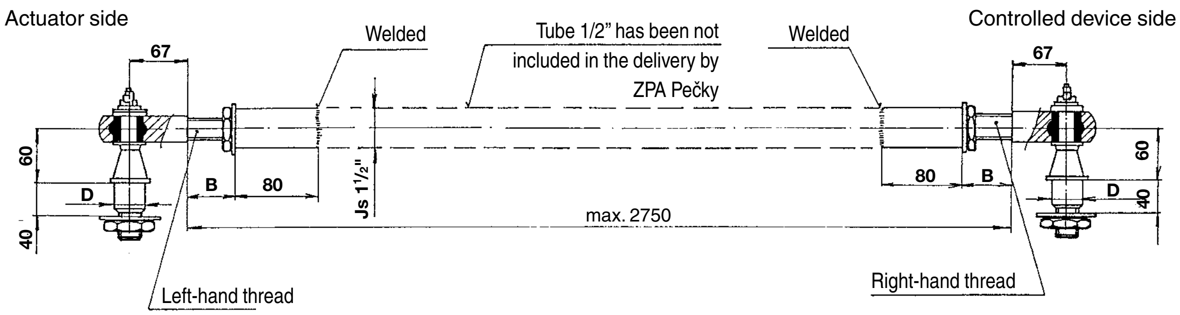


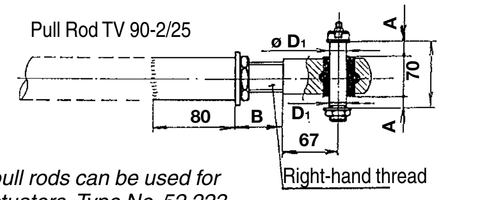


Type	Type No.	Dimensions				Designed for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 40 - 1/20	52 927	20	-	23	min. 30 max. 50	52 261
TV 40 - 2/25	52 928		25			52 262
TV 50 - 1/25	52 929	25	-	28		52 263
TV 50 - 2/25	52 930		25			52 264

P-0599
P-0600

Dimension drawing – Pull Rod TV 90





Type	Type No.	Dimensions				Designed for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 90 - 1/40	52 934	40	–	–	min. 20	52 265
TV 90 - 2/25	52 935		25	12,5	max. 50	52 266

These pull rods can be used for MPR actuators, Type No. 52 223.

P-0452

Designed for connecting the actuators to the controlled device, these pull rods provide for the transmission of movements of the output section of the actuators to the controlled device. Not included in the delivery, they should be ordered separately.

Internal wiring diagrams of **MODACT MPS, MPSP** electric part-turn actuators

Legend:

SQ1 *(MO)*	– OPEN torque-limit switch
SQ2 *(MZ)*	– CLOSE torque-limit switch
SQ3 *(PO)*	– OPEN limit switch
SQ4 *(PZ)*	– CLOSE limit switch
SQ5 *(SO)*	– OPEN signalling switch
SQ6 *(SZ)*	– CLOSE signalling switch
BMO	– block of local control *(LCU)*
SA1 *(M/D)*	– LOCAL/0/REMOTE control switch
SA2 *(O/Z)*	– OPEN/0/CLOSE switch
BQ1,BQ2 *(V1,V2)*	– potentiometer 1 x 100 Ω *(V1, V2)*
CPT 1Az	– current position transmitter, analogue adjustable
DCPT	– current position transmitter, digitally adjustable
DCPZ	– power supply for DCPT
EH	– anti-condensation heater
C	– capacitor
F	– overcurrent protection of electric motor
FT	– filter of supply voltage
MS	– terminal board for electric motor connecting
M1~	– one-phase asynchronous motor
M3~	– three-phase asynchronous motor

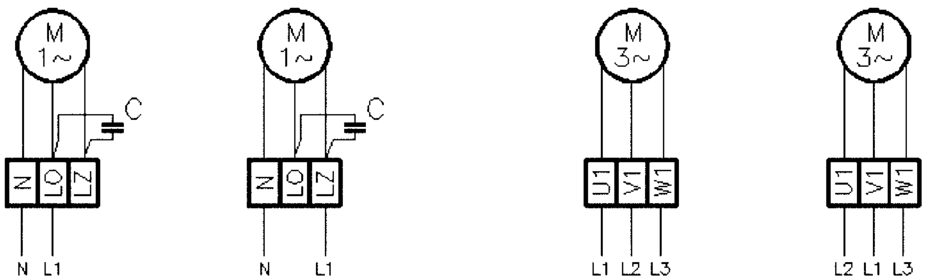
Selectors positions: M – local control; D – remote control; Z, CLOSE – closed; O, OPEN – open

MODACT MPS, MPSP actuators – applied electric motors:

Single- as well as three-phase motors in the version with outlets are used in the types **MODACT MPS, MPSP 52 260.**

In the actuators with the connecting terminal block, the motors are connected to this terminal block; in the actuators with connecting connector, the electric motors are also connected to this connector.

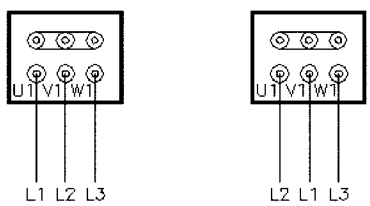
1-phase motor 3-phase motor



Open Close Open Close

In the types **MODACT MPS, MPSP 52 261-6,** just **three-phase motors in the version with the terminal block** are used. In the actuators with the connecting terminal block, they are connected separately; in the actuators with the connecting connector, the electric motors are also connected to this connector.

3-phase motor



Open Close

Optional accessories:

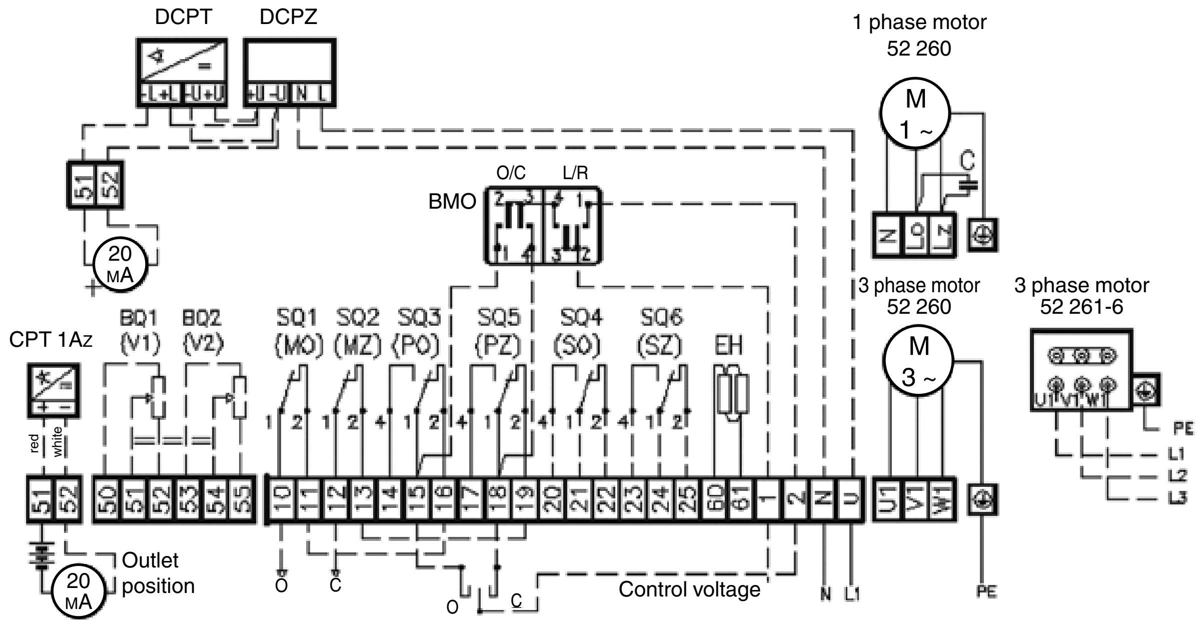
Position transmitter – resistance V1, V2
– current, passive CPT 1Az
– current, active DCPT + DCPZ
– without transmitter

Block of local control BMO
Signalling switches SO, SZ
Electrodynamic brake BAM-002 *(for Control version)*

Note: *The actuators MODACT, MPS, MPSP 52 261-6 with resistance transmitter V1, V2 are not fitted with the signalling switches SO, SZ.*

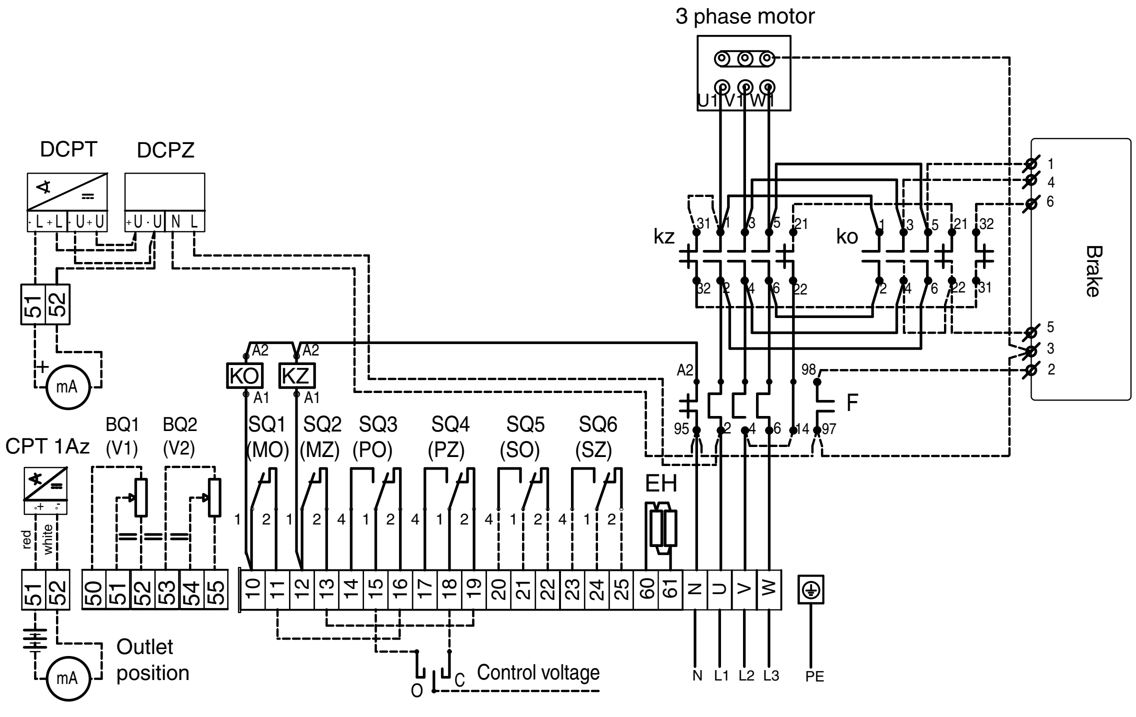
Wiring diagram of electric actuators **MODACT MPS, MPSP**
T. No. 52 260 and 52 261 - 6

– with terminal board **PM0946**



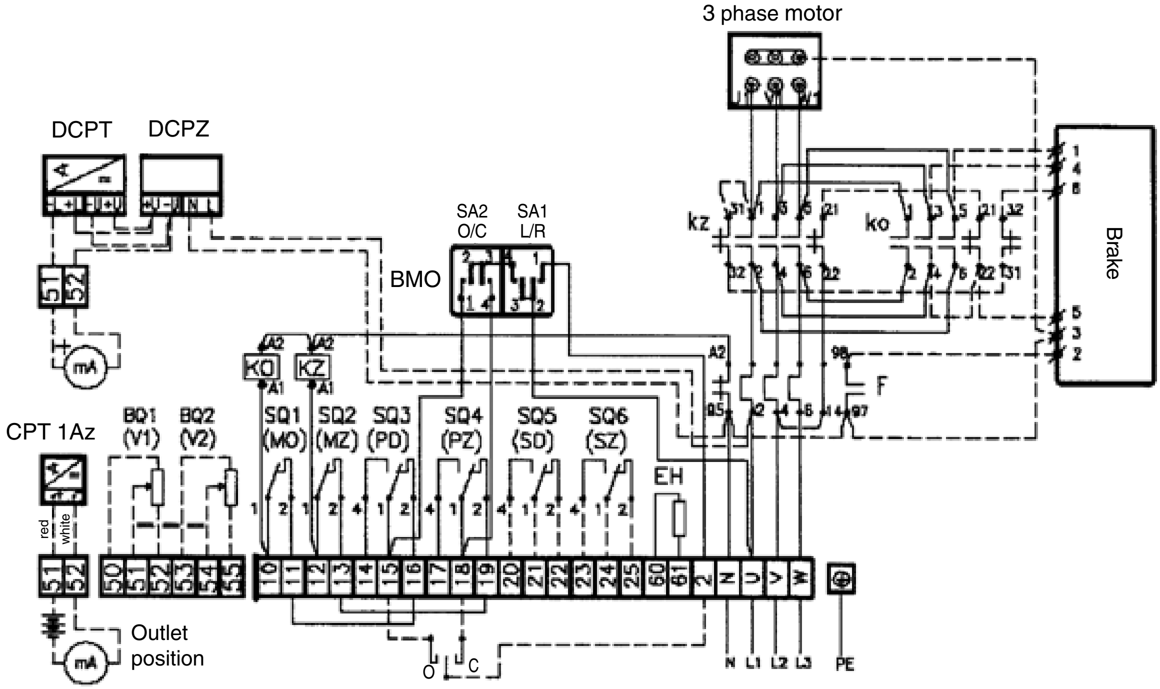
Wiring diagram of electric actuators **MODACT MPS, MPSP Control**
– with contactors

– with terminal board **P0947**



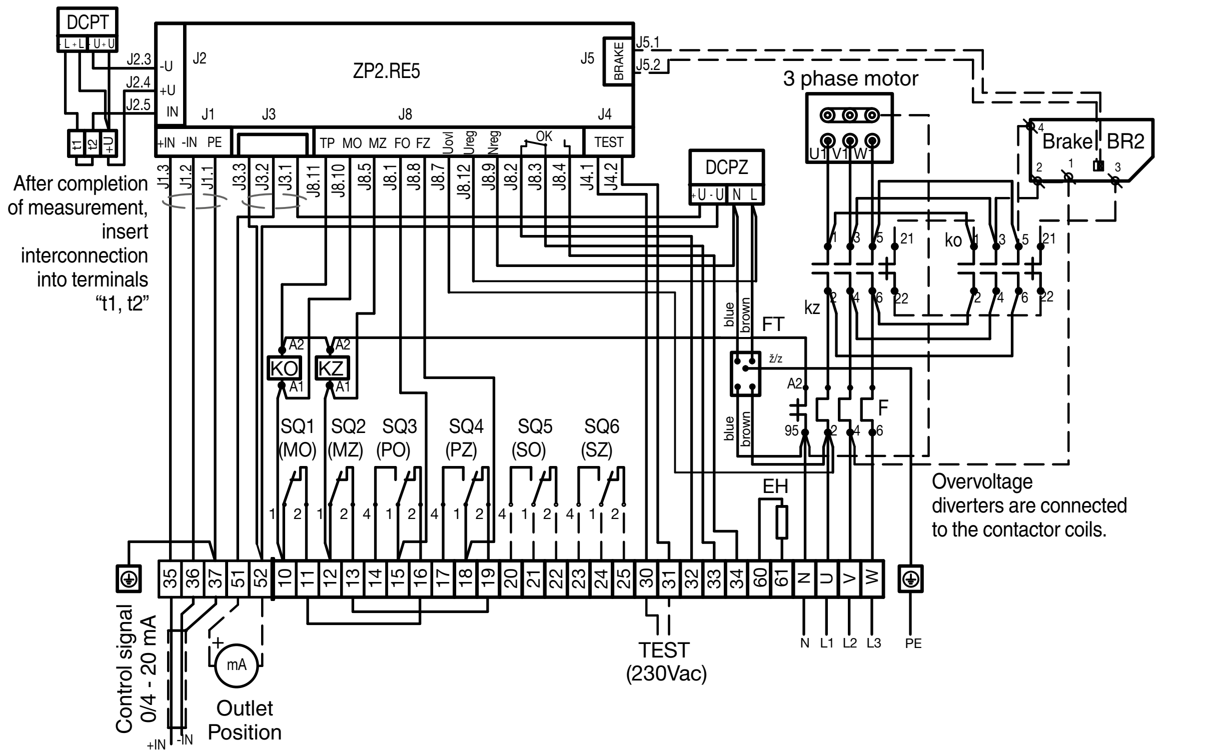
Wiring diagram of electric actuators **MODACT MPS, MPSP Control**
– with contactors and BMO

– with terminal board **PM0948**



Wiring diagram of electric actuators **MODACT MPS, MPSP Control, T. No. 52 261- 6,**
– with regulator ZP2.RE5

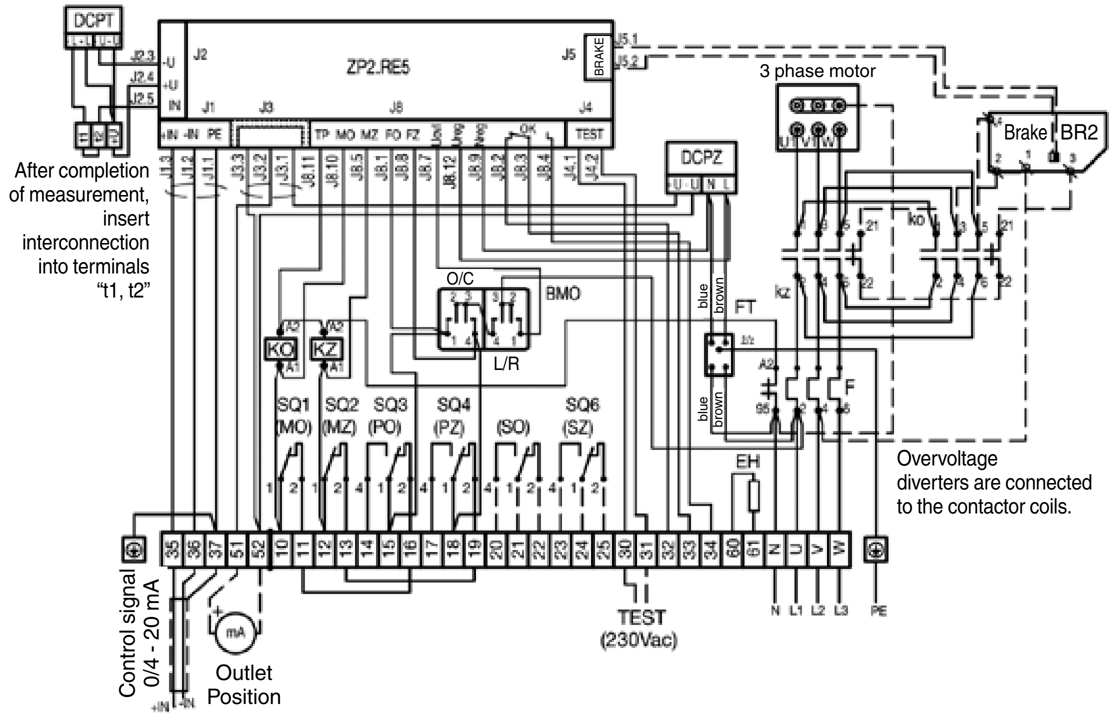
– with terminal board **P0949**



Wiring diagram of electric actuators **MODACT MPS, MPSP Control, T. No. 52 261- 6**
– with BMO and regulator ZP2.RE5

– with terminal board

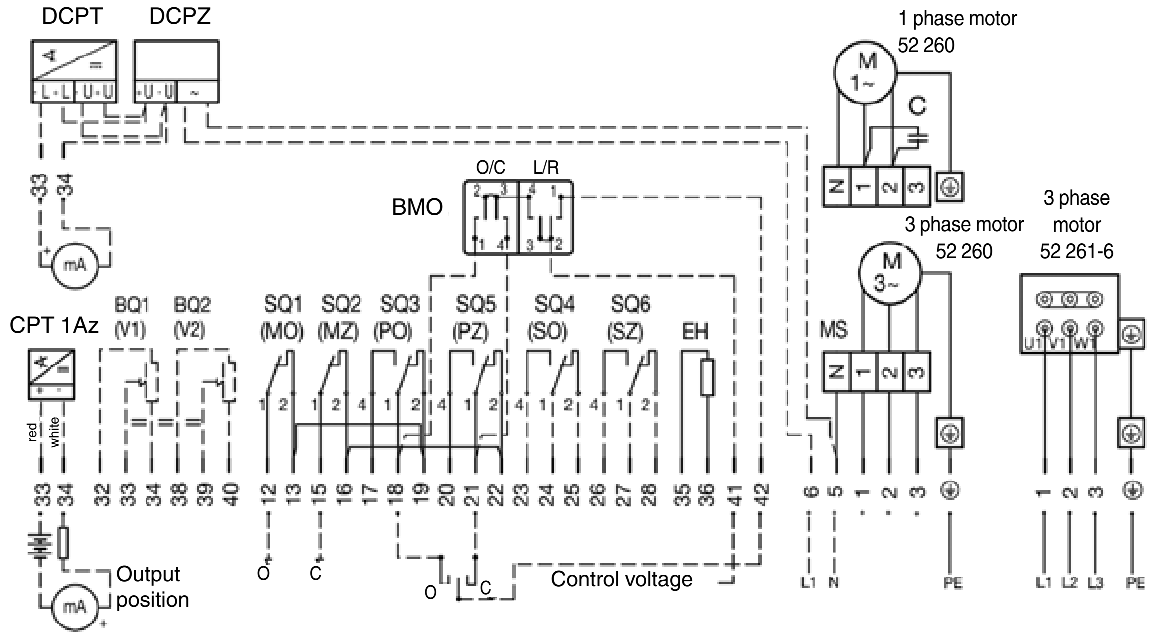
PM0950



Wiring diagram of electric actuators **MODACT MPS, MPSP**
T. No. 52 260 and 52 261-6

– with connector

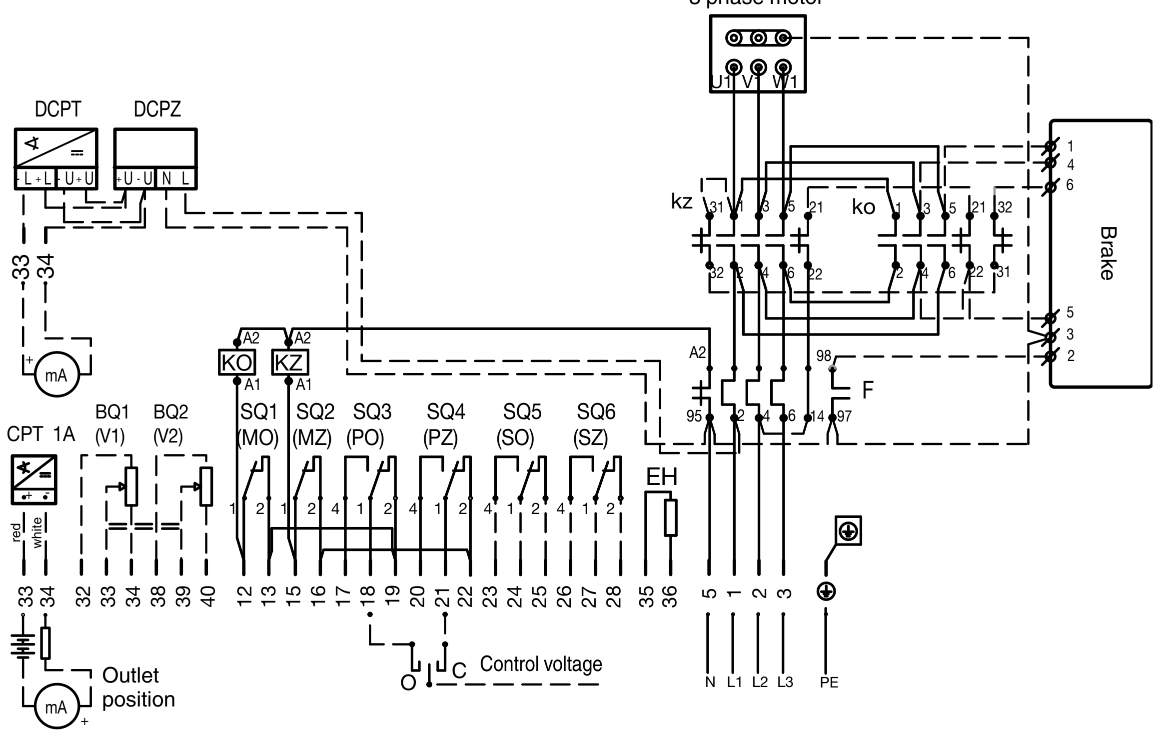
PM0952



Wiring diagram of electric actuators **MODACT MPS, MPSP Control** – with contactors

– with connector

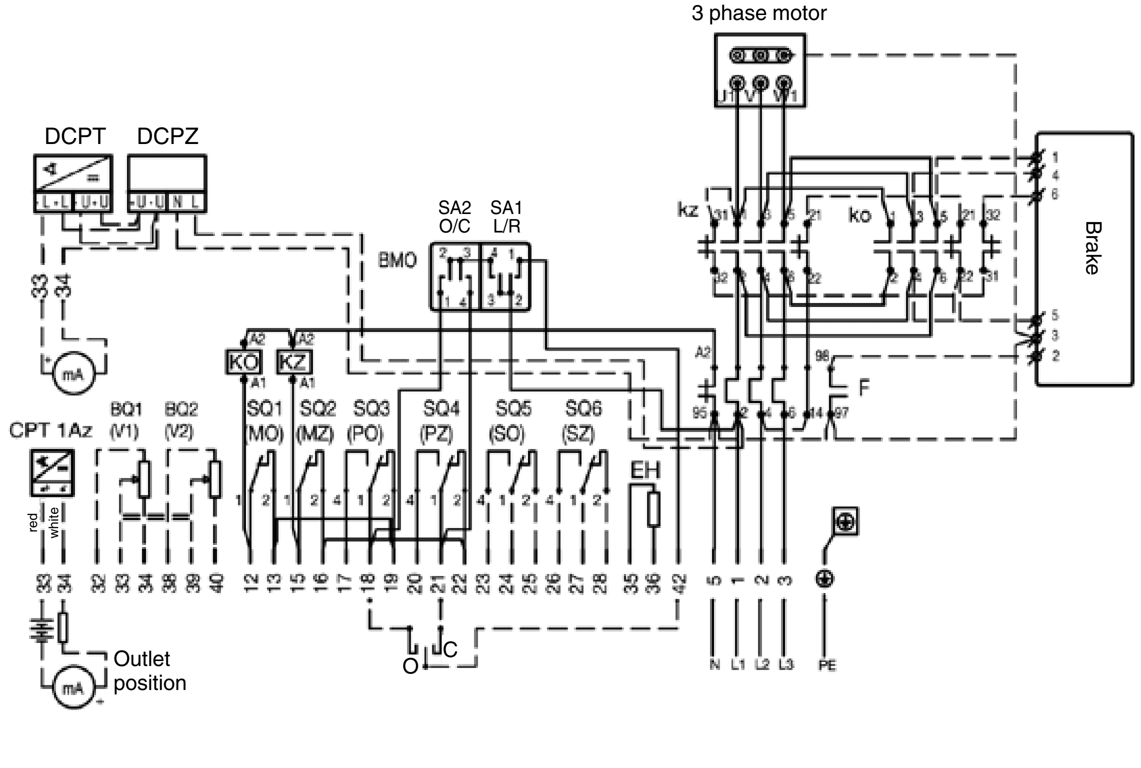
P0953



Wiring diagram of electric actuators **MODACT MPS, MPSP Control** – with contactors and BMO

– with connector

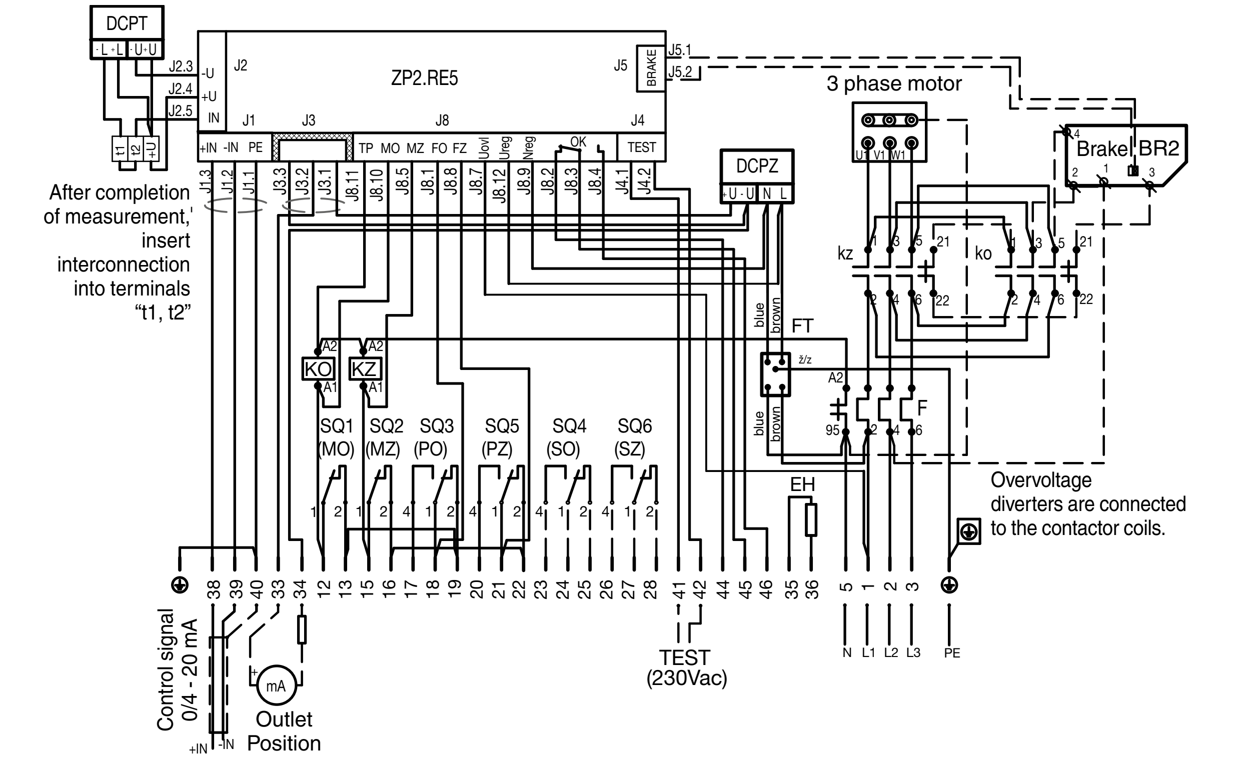
PM0954



Wiring diagram of electric actuators **MODACT MPS, MPSP Control, T. No. 52 261- 6,** – with contactors, with regulator ZP2.RE5

– with connector

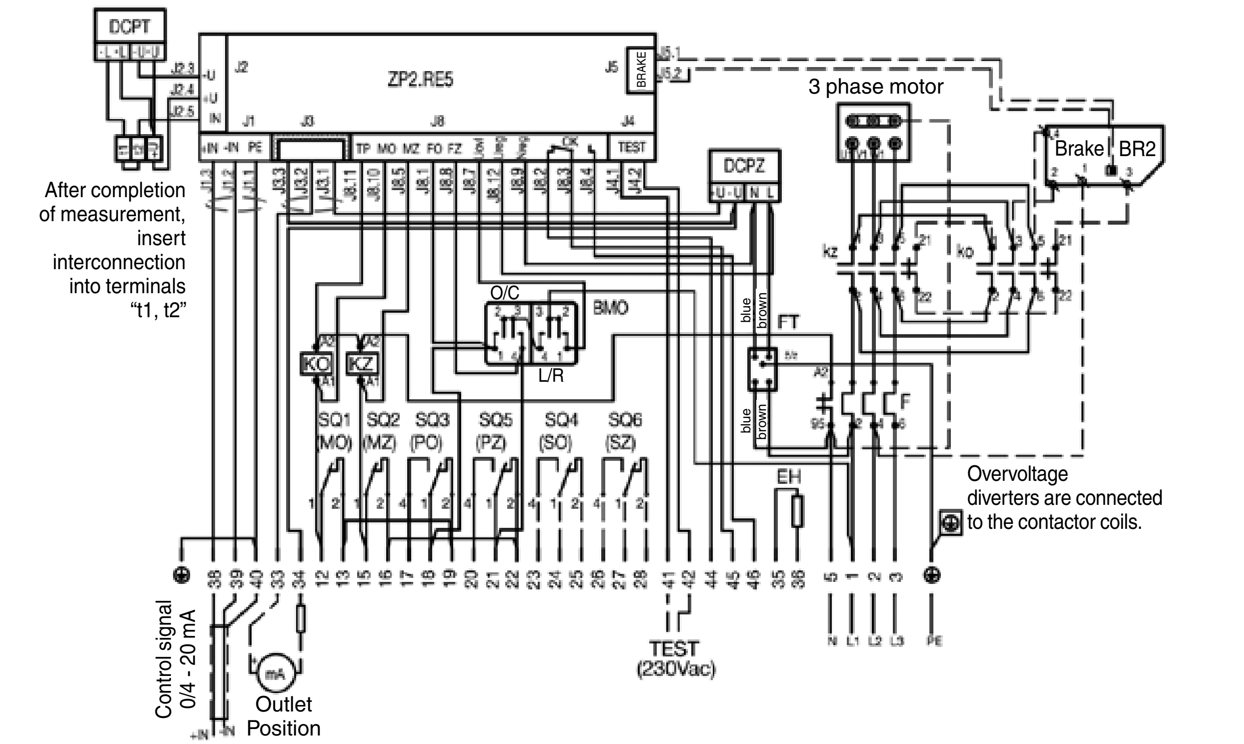
P0955



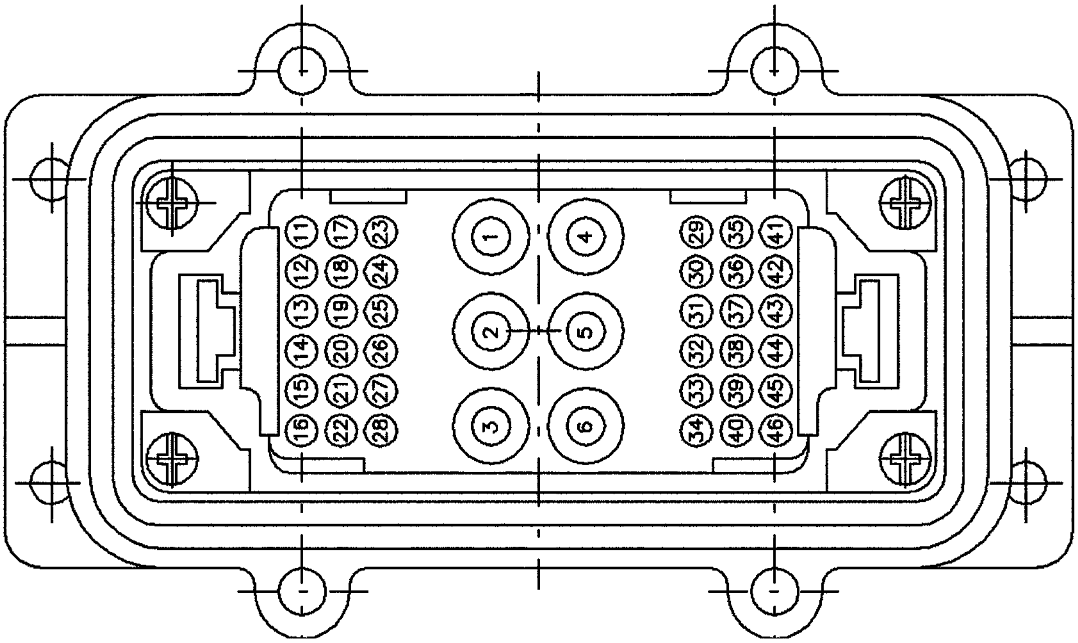
Wiring diagram of electric actuators **MODACT MPS, MPSP Control, T. No. 52 261- 6,** – with contactors, with BMO and regulator ZP2.RE5

– with connector

PM0956



Connector



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LIST OF SPARE PARTS OF MODACT MPS, MPSP ACTUATORS

Type No.	Designation of spare part and Unified Classification Number Code	Drawing or ČSN Standard No.	Number of pieces for...years of operation 3	5	Application
52 260 – 52 266	Sealing ring 125x5 2327311404	PN 02 9281.2	1	2	Packing between control box and terminal box
	Sealing ring 180x3 2327311043	PN 02 9281.2	1	2	Terminal box cover sealing
	Anti-condensation heater 2337110500	TRA 25 5K1/J	-	2	Within control box
	Microswitch *(position-limit)* 2337441092	DB1G-A1LC	-	2	For Type No.52 260 and all Type No. in design with current transmitter and without transmitter
	Microswitch *(torque-limit)* 2337441092	DB1G-A1LC	-	2	Within control box
	Current transmitter 2340510416	CPT 1Az	-	1	Within control box
	Current transmitter 214652060	DCPT	-	1	Within control box
	Power supply for DCPT 21465832	DCPZ	-	1	Within control box
52 260	Radial shaft sealing 17x28x7 2327352023	ČSN 02 9401.0	1	2	Handwheel shaft sealing
	Radial shaft sealing 40x52x7 2327352066	ČSN 02 9401.0	1	2	Output shaft sealing in power gear box
	Sealing ring 36x2 2327311038	PN 02 9281.2	1	2	Torque-tripping spring cover sealing
	Sealing ring 170x3 2327311054	PN 02 9281.2	1	2	Control box cover sealing
	Sealing ring 10x6 2327311001	PN 02 9280.2	1	2	Torque-tripping spring cover sealing
	Radial shaft sealing 40x52x7 2327352066	ČSN 02 9401.0	1	2	Output shaft sealing of control box
	Sealing ring 130x3 2327311041	PN 02 9281.2	1	2	Packing between control box and power gear box
	Packing 2327224024	23465494	1	2	Packing between countershaft gear box and power gear box
	Radial shaft sealing 17x28x7 2327352023	ČSN 02 9401.0	1	2	Motor pinion sealing
	Potentiometer 1x100 Ω 2340510210	RP 19	1	1	Within control box
52 261 + 52 262	Radial shaft sealing 20x32x7 2327352027	ČSN 02 9401.0	1	2	Handwheel shaft sealing
	Radial shaft sealing 60x75x8 2327352090	ČSN 02 9401.0	2	4	Output shaft sealing in power gear box
	Sealing ring 95x85 2327311029	PN 02 9280.2	1	2	Packing piece with rubber-copper sealing rings in the power gear box
	Sealing ring 50x2 2327311028	PN 02 9281.2	1	2	Packing of torque-tripping spring cover
	Sealing ring 190x3 2327311056	PN 02 9281.2	1	2	Control box cover sealing
	Sealing ring 10x6 2327311001	PN 02 9280.2	1	2	Torque-tripping shaft sealing
	Radial shaft sealing 55x70x8 2327352083	PN 02 9401.0	1	2	Output shaft sealing of control box
	Sealing ring 190x3 2327311056	PN 02 9281.2	1	2	Packing between control box and power gear box
	Packing 2327322003	224591870	1	2	Packing between motor flange and countershaft gear box
	Potentiometer 1 x 100 Ω 2340510210	RP 19	1	1	Within control box

Type No.	Designation of spare part and Unified Classification Number Code	Drawing or ČSN Standard No.	Number of pieces for…years of operation 3	5	Application
52 263 – 52 266	Radial shaft sealing 80x100x10 2327352096	ČSN 02 9401.0	2	4	Output shaft sealing in power gear box
	Radial shaft sealing 27x40x10 2327352044	ČSN 02 9401.0	1	2	Handwheel shaft sealing
	Sealing ring 200x3 2327311044	PN 02 9281.2	1	2	Control box cover sealing
	Radial shaft sealing 80x100x13 2327352097	ČSN 02 9401.0	1	2	Output shaft sealing of control box
	Sealing ring 10x6 2327311001	PN 02 9280.2	1	2	Torque-tripping shaft sealing
	Sealing ring 200x3 2327311044	PN 02 9281.2	1	2	Packing between control box and power gear box
	Sealing ring 70x2 2327311058	PN 029281.2	1	2	Packing of torgue-tripping spring cover
	Packing 2327322003	224591870	1	2	Packing between OV63 motor flange and countershaft gear box
	Packing 2327224025	23465481	1	2	Packing between OV71 motor flange and countershaft gear box
	Potentiometer 1x100 Ω 2340510210	RP 19	1	1	Within control box
52 265 + 52 266	Radial shaft sealing 130x160x15 2327352110	ČSN 02 9401.0	-	1	Sealing of the adapter output shaft.
	Radial shaft sealing 30x47x10 2327352053	ČSN 02 9401.0	-	1	Sealing between the output shaft and control board.

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 single turn rotary actuators (up to 30 Nm)

MODACT MOK, MOKED, MOKP Ex, MOKPED Ex
Electric rotary single turn actuators for ball valves and flaps

MODACT MOKA
Electric rotary single turn actuators for nuclear power stations
application outside containmen

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

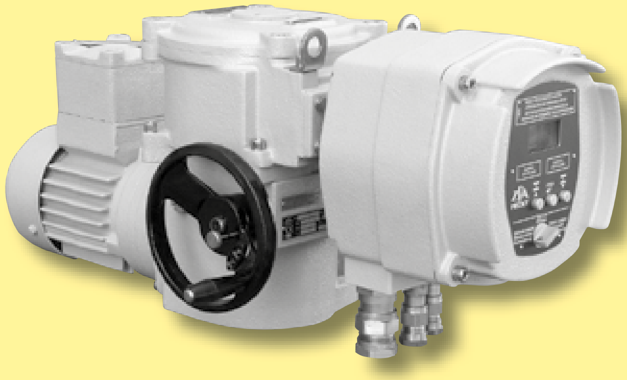
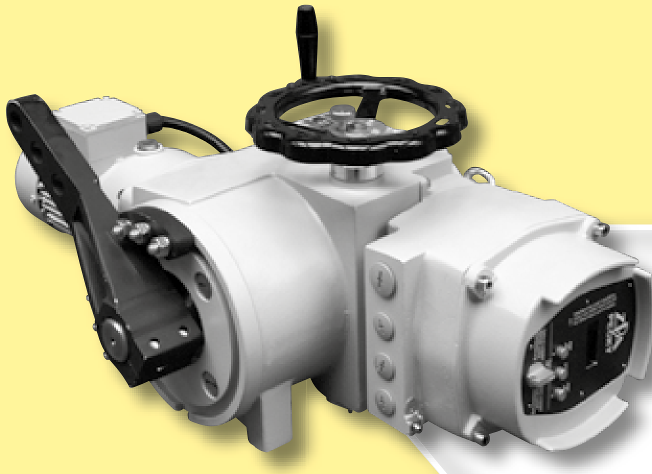
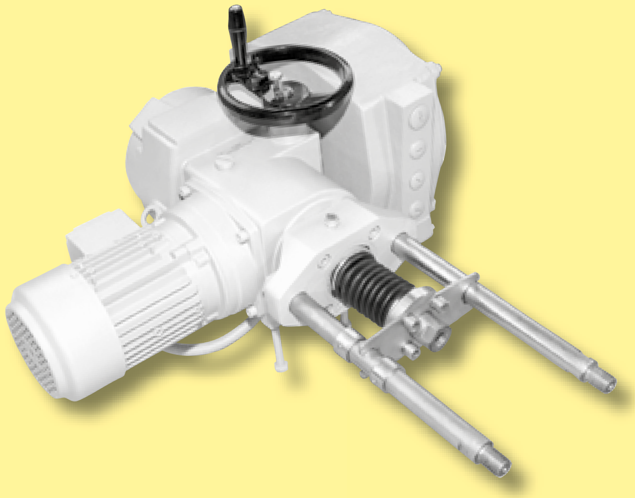
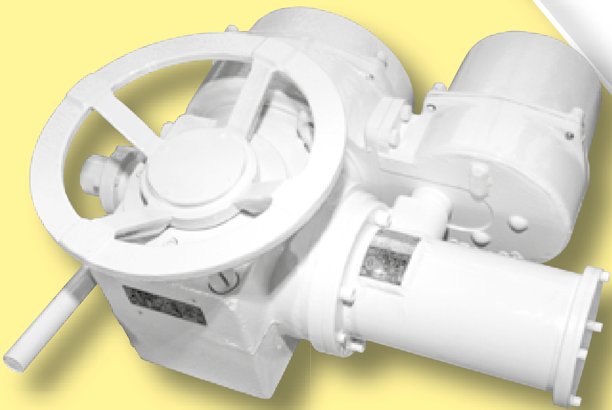
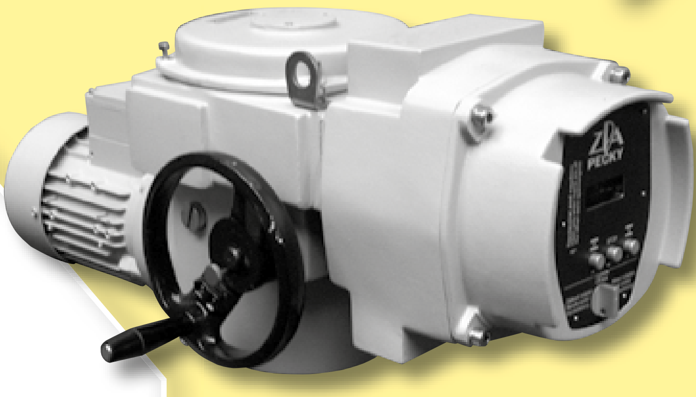
MODACT MPR Variant
Electric rotary (160°) lever actuators with a variable output speed

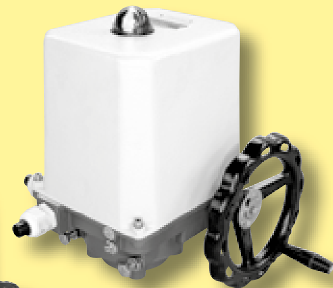
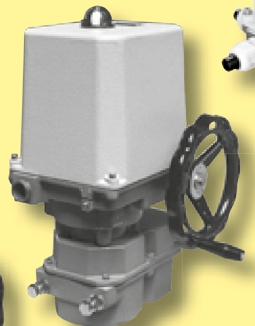
MODACT MPS, MPSP, MPSED, MPSPED
Electric rotary single turn lever actuators with a constant output speed

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

ZPA Pečky, a.s.
tř. 5. května 166
289 11 PEČKY, Czech Republic
www.zpa-pecky.cz

tel.: +420 321 785 141-9
fax: +420 321 785 165
+420 321 785 167
e-mail: zpa@zpa-pecky.cz