

APPLICATION

The **MODACT MTN, MTP** actuators are used for remote two-position or three-position control of the valves by a reverse rectilinear motion.

The **MODACT MTN, MTP Control** actuators are fitted with an electronic position controller. In association with the valve exhibiting a suitable control characteristic, they form a position servo-loop. The output pull-rod of these actuators is automatically brought into a position corresponding to the input signal value of the controller.

The actuators can be used even for other devices for which they are in respect of their characteristics and parameters suitable. In some special cases, the contemplated use of the actuators should be consulted with the manufacturer.

OPERATING CONDITIONS

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

If the actuator is to be installed in the open-air space it should be provided with light roofing for protection against direct atmospheric effects. The shelter should overlap 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. One or two heater elements should be connected, as required.

Installation of the actuators at a location with incombustible and non-conducting dust is possible only if this has no adverse effect on their function. It is advisable to remove dust whenever the layer of dust becomes as thick as about 1 mm.

Notes:

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

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

Classes of external influences

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

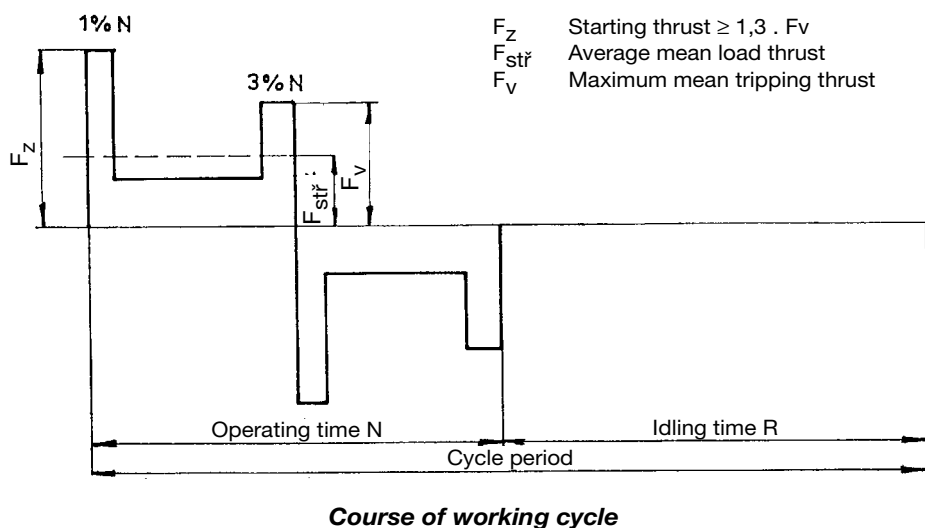
- 1) AA7 – Simultaneous effect of ambient temperature of -25 °C to $+70\text{ °C}$ with relative humidity from 10 % upwards
- 2) AB7 – Ambient temperature to Point 1); minimum relative humidity 10 %, maximum relative humidity 100 % with condensation
- 3) AC1 – Altitude $\leq 2,000$ m above sea level
- 4) AD5 – Splashing water in all directions
- 5) AE5 – Small dust content of air; mean layers of dust; daily dust fall more than 35 mg/m^2 , but not exceeding 350 mg/m^2
- 6) AF2 – Corroding atmosphere and pollutants; the presence of corroding pollutants is significant.
- 7) AG2 – Average mechanical stress; in current industrial plants
- 8) AH2 – Medium vibrations; in current industrial plants
- 9) AK2 – Serious risk of growth of vegetation and moulds
- 10) AL2 – Serious danger of the occurrence of animals (insects, birds, small animals)
- 11) AM2 – Harmful effect of escaping vagabond currents
- 12) AN2 – Medium solar radiation with intensities $> 500\text{ W/m}^2$ and $\leq 700\text{ W/m}^2$
- 13) AP3 – Medium seismic effects; acceleration $> 300\text{ Gal}$ $\leq 600\text{ Gal}$
- 14) BA4 – Personal abilities; instructed people
- 15) BC3 – Frequent contact with the earth potential; persons coming frequently into contact with „live“ parts or standing on a conducting base

WORKING MODE

According to ČSN EN 60 034-1, actuators can be operated in S2 load category (the course of load is shown in the picture). The operation time at $+50\text{ °C}$ shall be 10 minutes, the average mean load thrust value shall be below

or equal to 60 per cent of the maximum tripping thrust F_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 maximum number of switching actions in automatic control mode is 1200 actions per hour. The average mean load thrust at load factor of 25 per cent and 50 °C shall not exceed 40 per cent of the maximum tripping thrust F_V .

The maximum average mean of the load thrust equals the rated thrust of the actuator.



Service life of actuators

Service life of actuators is 6 years, at the least.

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

TECHNICAL REQUIREMENTS

Rated supply voltage

The rated supply voltage of the actuators is 3 x 230 / 400 V, 50 Hz (3 x 220 / 380 V, 50 Hz) with permissible line voltage fluctuations between +10 % and -15 % and frequency shift within ± 2 %. Over these ranges, the rated values of all parameters are retained except for the readjusting speed of the output part and the starting force; the latter is directly proportional to the square of line voltage variation. Actuators employing another voltage and/or frequency are available upon special request. The basic technical parameters should be determined individually for each supply voltage and frequency.

Operating position

The actuators MODACT MTN, MTP, type no. 52 442, 52 443 can be used in any operating position.

Tripping thrust

At the factory, the tripping thrust has been adjusted within the min./max. range, according to the customer's requirements. If no tripping thrust adjustment is required the actuator is adjusted to its maximum tripping thrust.

Coverage

Coverage of the electric actuators

MODACT MTN (MODACT MTN Control): IP 55;
MODACT MTP (MODACT MTP Control): IP 67.

Insulation resistance

Insulating resistance of electric circuits against the frame or between each other at normal conditions should be at least 20 Mohm; after the test under damp conditions it should be at least 2 Mohm. For more detailed information see the technical specifications.

Electric strength

The electric strength of circuit insulation of the actuators must correspond to TP 27-02.1-54/94.

Test voltage:

circuit of remote position transmitter	500 V, 50 Hz
circuits of microswitches and anti-condensation heater	1,500 V, 50 Hz
circuit of electric motor	1,000 V + 2·U _r , 50 Hz, at least 1,500 V

Noise

Acoustic pressure level A	85 dB (A) max.
Acoustic power level A	95 dB (A) max.

DESCRIPTION AND FUNCTION

A) MODACT MTN, MTP electric actuators

The MTN actuators are based on MODACT MON actuator series. Moreover, they are designed with linear transmission unit for converting rotary motion into linear motion.

An asynchronous motor drives, via a geared countershaft, the sun gear of a epicyclic gear unit enclosed in the supporting actuator box (power transmission). In the mechanical power control mode, the crown gear of a planet epicyclic gear unit is held in steady position by a self-locking worm gear drive. Alternatively, the handwheel, connected with the worm allows manual control to be accomplished even during motor operation without any risk of operator's injury.

The output shaft is fixedly coupled to the planet-gear carrier. It is extended to the control box in which all controls of the actuator are concentrated.

The operation of the position-limit switches, the signalling switches and the position transmitter is derived from the rotary motion of the output shaft via drive mechanisms. The operation of the torque-limit switches is derived from the axial displacement of the „floating“ worm of the manual control unit, which is sensed and transferred to the control box by means of a lever.

All controls are accessible after removal of the cover of the control box.

Terminal block

The actuator is fitted with a terminal block for connecting external circuits. Using screw terminals, the terminal block allows conductors with a maximum cross section of 2.5 mm² to be connected. Access to the terminal block is obtained after removal of the terminal box cover. All electric control circuits of the actuator are brought out to the terminal block. The terminal box is provided with cable bushings for connecting the actuator. The electric motor is equipped with a separate box with a terminal block and a cable bushing. Alternatively, actuators with a push-on cable connection (hereinafter referred to as connector) can be supplied - see the table of design variants.

Push-on cable connection

According to the customer's requirements, the MODACT MTN, MTP electric actuators can be fitted with a push-on cable connection (the connector) allowing control circuits to be connected and, in the case of Type No. 52 442, even with an unlocking switch of the electric motor.

Self-locking

The actuator is self-locking provided that the load is applied only in the opposite direction to the output shaft motion of the actuator. Self-locking is provided by an arresting roller that stops the electric motor even in the manual control mode.

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

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 movement of the output pull-rod being determined by the function of differential gear).

When the handwheel is rotated clockwise (when looking at the shaft towards the control box) the output pull-rod of the actuator is shifted out.

Block of local control of the MODACT MTN, MTP electric actuators

Local control of the MODACT MTN, MTP electric actuators with a connection to the connector can be performed by a control switch (having three positions: CLOSE, STOP and OPEN) with the stable STOP position or by the so-called unlocking switch which, in the local control mode, is used to disconnect remote control from the switchboard or control console. The electric actuators which are connected via a terminal block, use the same local control box as the MODACT MTN, MTP Control electric actuators.

Position transmitters

The **MODACT MTN, MTP** electric actuators can be supplied without position transmitter can be fitted with position transmitter:

a) Resistance transmitter 2 x 100 ohm.

Technical parameters:

Position scanning	resistance
Turning angle	0° – 160°
Linearity	1 %
Transition resistance	max. 1.4 ohm
Permitted voltage	50 V DC
Maximum current	100 mA

b) Passive current transmitter 4 – 20 mA, type CPT 1. 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 1 is set by a potentiometer on the transmitter body and its starting value by corresponding partial turning of the transmitter.

Technical parameters of CPT1:

Scanning of position	capacity
Working stroke	adjustable 0° – 40° to 0° – 120°
Linearity	1 %
Loading resistance	0 – 500 ohm
Output signal	4 – 20 mA or 20 – 4 mA
Power supply	18 – 28 V DC
Working temperature	-25 °C to +60 °C -25 °C to +70 °C (with feeding voltage max. 25 V DC and loading resistance 500 ohm permanently)
Dimensions	ø 40 x 25 mm

c) Active current transmitter 4 – 20 mA, type DCPT. Power supply to the current loop is not a part of the actuator. Maximum loading resistance of the loop is 500 ohm. For variants MODACT MTN, MTP Control with the regulator ZP2RE5, 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, discreteness 0.0879°
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

Rating capacity and rated voltage of the resistance position transmitter

The position transmitters can be used for voltage up to 48 V DC; however, maximum permitted current 100 mA must not be exceeded.

Position indicator

The electric actuator can be equipped with a local position indicator (with the exception of the design variant with a current transmitter).

Position-limit switches

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

Torque-limit switches

The electric actuators are fitted with 2 torque-limit switches to be switched off when the tripping force on the output pull-rod has been reached. Each switch operates in either direction of movement of the actuator output shaft. The torque-limit switches can operate at any point of the working stroke excepting the region of pull-rod travel after reversing in which they are inactive. i.e., 3 to 6 mm or 5 to 10 mm in the actuators, Type Nos 52 443 and 52 442, respectively.

Current-carrying capacity and maximum voltage of the microswitches

250 V AC / 2 A, 250 V DC / 0.1 A, blinker 250 V AC / 0.2 A, $\cos \varphi = 1$

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

Anti-condensation heater

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

B) MODACT MTN, MTP Control electric actuators

The MODACT MTN, MTP Control electric actuators can be fitted with an electronic position controller. In association with a fitting having a suitable regulating characteristic, they create a position servo-loop. The output shaft of these actuators is automatically brought into the position which corresponds to the input signal value of the controller.

For application, operating conditions, technical parameters and functional description, refer to the part dealing with the MODACT MTN, MTP electric actuators. All provisions therein also apply to the MODACT MTN, MTP Control electric actuators. A list of the types of MODACT MTN, MTP Control electric actuators now in production can be found in Table 1.

In addition, the MODACT MTN, MTP Control electric actuators can be fitted with a position controller of the output shaft, a reversing contactor combination of the output shaft, a thermal relay providing for overload protection of the electric motor and an electronic brake of asynchronous motors (BAM-002 - actuators fitted with contactors only; BR2 - actuators fitted with ZP2.RE5 position controller).

All these units are enclosed in the contactor box which is installed instead of the terminal box of the MODACT MTN, MTP actuators. These electric actuators can be supplied without position controller and BR2 brake.

Connection of electric circuits from the control box to external circuitry is made via a terminal block; the latter has added terminals for connecting the supply voltage of 3 x 230/400 V, 50 Hz.

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.

The following parameters can be set by the regulator push-buttons:

- type of control signal
- response to the TEST signal and to an error detected by the regulator
- mirroring
- regulator insensitivity
- type of control

Other parameters can be set by PC. The computer can also be used for ascertaining diagnostic data on the regulator operation, e.g. the time for which the regulator has been in operation.

After setting the control parameters, during the so-called auto-calibration, the regulator is adjusted to the actuator and the valve it should control. The type of the feedback transmitter, end positions and inertia of the actuator output shaft are automatically detected and recorded into the regulator as parameters.

Error conditions detected by the regulator are signalized by LED diodes on the regulator. The regulator has an OK change-over contact, from which it is possible to lead out an error status signal. During a faultless operation and with the switched-off regulator, this contact is opened; during an error condition it is closed.

If PC is connected to the regulator the detected error is displayed on the computer. In case of an error, the regulator responds according to the set parameter "response to the signal TEST".

REGULATOR ZP2.RE5

Description

The basic part of the regulator ZP2.RE5 is a microcomputer with control program, programmed in its internal memory. The microcomputer includes A/D converters for processing the control and feedback signal. The regulator provides for automatic setting of the actuator output shaft depending on the value of the current control signal. The regulator compares the value of the control signal with the value of the feedback signal from the position transmitter. In case a regulating deviation is found, the regulator activates the output signals FO or FZ controlling the actuator run until the output shaft is set into the position corresponding to the control signal value.

Note: The regulator sets the position, however, it does not influence the rate of resetting. This is given by the type and version of the actuator.

The regulator also monitors some process states and signalizes detected failures.

The regulator parameters can be set by the push-buttons SW1 and SW2, and/or by the computer with service program. The computer is connected via a communication module to the connector J7. The set parameters are stored in the memory of the EEPROM type, so that switching off of the feeding voltage does not damage the memory content.

Technical parameters

Feeding voltage:	230 V + 10 % -15 %, 50 – 60 Hz
Regulator linearity:	0,5 %
Regulator insensitivity:	1 – 10 % (adjustable)

Input signals – double-value (N / 230 V):

UDRIVE	Control phase for outlets FO, FZ, protected by fuse F 1.6 A
TEST1,2	Activation of regime TEST
MO, MZ	States of actuator limit switches
TP	Condition of motor thermal protection

Input signals - analog:

Control signal:	0/4 – 20 mA
Feedback signal:	Current transmitter 4 – 20 mA

Output signals - double-value:

FO, FZ	Control phase, closing contacts of relay 5A / 230V
Relay OK	Signalization of failure, change-over contact 5A / 230V
BRAKE	Control signal for brake module ZP3-BR (2 mA)

Output signal - analog:

Signalization of position	Galvanically isolated passive transmitter 0/4 – 20 mA, external feeding 15 – 30 V, load impedance max 500 ohm
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Signalization:

D1 (yellow)	setting / failure message
D2 (red)	setting / failure message
D3 (green)	feeding
D4 (green)	drive opens
D4 (red)	drive closes

Error messages:

Regime TEST
Control signal missing (only when signal 4 – 20 mA is used)
Actuator was switched off by limit switch in other than limit position
Error of position sensor
Thermal protection of motor TP activated
Actuator is under local control

Response to failure:

Regime TEST	Error message + actuator into position according to setting P2
Error in control signal	Error message + actuator into position according to setting P2
Error in position sensor	Error message + actuator stop
Failure of thermal protection	Error message + actuator stop

Adjustable elements:

button for communication connector (for connection to PC) 2x push-setting parameter without computer

Range of working temperatures:

-25 °C – +75 °C

Dimensions:

75 x 81 x 25 mm

Block of local control of the MODACT MTN, MTP Control actuators

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 "Opens – Stop – Closes".

On the customer's requirement, the actuator can also be fitted with a blinker providing electric pulses when the output shaft is moving. The power supply unit for the blinker is not built-in in the actuator.

Position transmitter

The active position transmitter 0/4 – 20 mA is an optional accessory to the actuators with the regulator ZP2RE5; it works on the principle of pulse-width modulation (PWM). The transmitter is galvanic-isolated from other circuits of the regulator (position sensor DCPT and control signal); the current loop is fed from an independent power source ZPT01. Maximum loading impedance can be 500 ohm. Range of the transmitter is set during Auto-calibration.

Switching of electric motor

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.

Dynamic brake

The brake is an optional accessory to the actuators MTN, MTP Control. After opening the contactor, it induces dynamic braking moment in the electric motor lasting for several tenths of second. It reduces dramatically the run-down time and regulation is thus more precise. When the actuator is in a standstill no braking moment is exerted.

The actuators without regulator are fitted with autonomous brake **BAM-002**. For its function, it requires auxiliary contacts of the contactors and auxiliary contact of the over-current relay. It is dimensioned for electric motors 3 x 230 / 400 V, output up to 550 W.

The actuators with regulator ZP2RE5 are fitted with simpler controlled brakes **BR2**. They are interconnected with the regulator that provides impulse for action.

According to the electric motor output, corresponding variant is chosen:

- BR2 550** of output up to 550 W,
- BR 2.2** of output up to 2.2 kW.

If outputs higher than 2.2 kW are to be braked, electric motors of special version with an electromagnetic brake should be used.

Reversing contactor combinations and thermal relay

The contactors used feature a long mechanical lifetime and a large margin of switching capacity so that even the electrical lifetime is sufficient in the given application. The thermal relay has been selected for dependable overload protection of the motor. Due to their simple arrangement and outfit, the actuators can be connected to power supply and control circuits in a simple way.

Common power supply circuits can be used for a group of actuators to effect a saving in the amount of cabling.

Deviations of basic parameters

Tripping thrust	±12 % of the maximum value on the range
Readjusting speed	-10 % of the rated value +15 % (in no-load operation)
Setting of signalling switches	±2.5 % of the maximum value on the range (for the ranges, refer to the Mounting instructions).
Hysteresis of signalling switches	max. 4 % of the maximum value on the range
Setting of position-limit switches	±0.2 mm of the output pull-rod displacement (without the influence of running-down)
Hysteresis of position-limit switches	max. 1.2 mm of the output pull-rod displacement
Transmitters linearity, incl. gears	±2.5 % of the rated signal
Transmitter 2 x 100 ohm hysteresis, incl. gears	max. 4 % of the rated resistance
Transmitter CPT1/A hysteresis, incl. gears	max. 2.5 % of the rated current
Clearance of output part	max. 1 mm

ORDERING INFORMATION

When ordering, please specify the following:

- number of actuators required.
- actuator designation and type.
- working stroke of output part (if the working stroke has not been specified the equipment will be adjusted to the maximum working stroke of the output part).
- tripping force (if the tripping force has not been specified the equipment will be adjusted to the maximum tripping force).
- supply voltage of electric motor (another supply voltage than that given above, should be agreed upon beforehand with the manufacturer).

Example:

MODACT MTN 40 electric actuator, Type no. 52 443, with working stroke 100 mm, adjusting speed 125 mm.min⁻¹, maximum adjusted tripping force 40 kN, 3 x 230 / 400 V, 50 Hz, version according to ČSN 186314, clutch B, without moment blocking, resistance transmitter, without local controller and position regulator should be specified in the order as the type number 52 443.6124N. The version without moment blocking and without transmitter should be specified in words.

The meaning of the 6th, 8th and 9th digits of the Type No. is given in the Table 1.

The meaning of the 7th digit: Type No.52 442 - in the Table 2
 Type No.52 443 - the Figs 4, 5, 6 and 7

Table 1 – MODACT MTN, MTN Control, MODACT MTP, MTP Control electric actuators
– basic technical parameters, design

Basic electrical equipment: 2 thrust-limit switches (OPEN - MO, CLOSE - MZ) 2 position-limit switches (OPEN - PO, CLOSE - PZ) 2 signalling switches (OPEN - SO, CLOSE - SZ) 1 potentiometer of 2 x 100 ohm or current position transmitter 1 anti-condensation heater 1 three-phase asynchronous motor																			
Basic technical parameters:																			
Type	MTN Control, MTP Control	Adjustment range of tripping thrust [kN]	Starting thrust [kN]	Speed [mm/min]	Stroke [mm]	Type of electric motors	Electric motor				Weight [kg]	Type Number							
							Power [W]	Revolutions per minute [1/min]	I _n (400 V) [A]	I _Z /I _n									
												basic	additional						
											12 3 4 5	6 7 8 9 10							
MTN 15 MTP 15	C	11,5 - 15	17	50	10 - 100	1xx7070-6AA	180	850	0,74	2,3	33	5 2 4 4 2	x x 0 x x						
	C			80		1xx7070-6AA	180	850	0,74	2,3			x x 1 x x						
	C			125		1xx 7070-4AB	250	1350	0,77	3,0			x x 3 x x						
	C			36		1xx7073-8AB	120	645	0,51	2,2			x x 2 x x						
	C			27		1xx7073-8AB	120	645	0,51	2,2			x x A x x						
MTN 25 MTP 25	C	15 - 25	32,5	50		10 - 100	1xx7070-6AA	180	835	0,74			2,3	60	5 2 4 4 3	x x 4 x x			
	C			80			1xx7070-6AA	180	835	0,74			2,3			x x 5 x x			
	C			125			1xx7070-4AB	250	1350	0,77			3,0			x x 6 x x			
	C			36			1xx7073-8AB	120	645	0,51			2,2			x x 7 x x			
	C			27			1xx7073-8AB	120	645	0,51			2,2			x x 8 x x			
MTN 40 MTP 40 1)	C	25 - 40	52	80	20 - 120		1xx7083-6AA	550	910	1,6	3,4	60	5 2 4 4 3			x x 1 x x			
	C			125			1xx7080-4AA	550	1395	1,45	3,9					x x 2 x x			
MTN 63 MTP 63	C	40 - 63	82	80			20 - 120	1xx7090-6AA	750	915	2,1					3,7	63	5 2 4 4 3	x x 4 x x
	C			125				1xx7090-4AA	1100	1415	2,55					4,6			x x 5 x x
Weather resistance, electrical connection											with block of terminals					6 x x x x			
											with connector			7 x x x x					
Connecting dimensions											Type No. 52 442.xxxxx (Figs. 1, 2, 3)								
											Type No. 52 443.x1xxx (Figs. 4, 5, 6)								
											Type No. 52 443.x2xxx (Fig. 7)								
Transmitters for actuators											current transmitter without power supply (CPT)			current transmitter with power supply (DCPT)					
											current transmitter 4 – 20 mA		x x x 0 x						
											current transmitter 4 – 20 mA with BMO		x x x 1 x						
											potentiometer 2 x 100 ohm		x x x 2 x						
											potentiometer 2 x 100 ohm with BMO		x x x 3 x						
											without transmitter, with BMO		x x x P x						
without transmitter, without BMO		x x x Z x																	
Additional electric outfit											potentiometer 2 x 100 ohm	current transmitter without power supply (CPT)	current transmitter with power supply (DCPT)						
Design MODACT MTN, MTP Control (with built-in contactor combination)	without BMO	without brake and position regulator				x x x 4 x	x x x A x	x x x K x											
		with brake, without position regulator				x x x 5 x	x x x B x	x x x L x											
		with brake and position regulator						x x x C x											
	with BMO	without brake and position regulator				x x x 7 x	x x x D x	x x x M x											
		with brake, without position regulator				x x x 8 x	x x x E x	x x x N x											
		with brake and position regulator						x x x F x											

Notes:

- Design with clutch internal threads and a flange (non-standard) is available only in the design variants, Type No. 52 443.x21xx and 52 443.x22xx (Type MTN, MTP 40).
- The design variant with BR2 brake is available only in case of actuators without regulator (with contactors) with up to 550 W of electric motor power, inclusive. The design variant with BR2 brake is available in case with ZP2.RE5 regulator.
- If a design variant with flashing indication is required this should be specified in words: Design with flashing indication.
- Design without force locking after reversion have at end position capital letter M (for example 52 442.6211NM).
- The MODACT MTN, MTP Control actuators with ZP2.RE5 regulator - the digit "5" is put on the 11th place.
- Type of electric motors: For actuators MODACT MTN, MTN Control and MODACT MTP, MTP Control the symbols xx are replaced with letters LA and PP, respectively.

Table 2 – Connecting dimensions

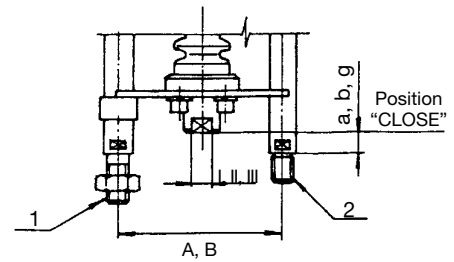
– specification of the 7th place of Type No. 52 442.xxxxx

Design	Type number	
	basic	additional
Aa1I	52 442	x0xxx
Aa1II	52 442	x1xxx
Aa1III	52 442	x2xxx
Aa2I	52 442	x3xxx
Aa2II	52 442	x4xxx
Aa2III	52 442	x5xxx
Ab1I	52 442	x6xxx
Ab1II	52 442	x7xxx
Ab1III	52 442	x8xxx
Ab2I	52 442	x9xxx
Ab2II	52 442	xAxxx
Ab2III	52 442	xBxxx

Design	Type number	
	basic	additional
Ba1I	52 442	xCxxx
Ba1II	52 442	xD1xxx
Ba1III	52 442	xExxx
Ba2I	52 442	xFxxx
Ba2II	52 442	xGxxx
Ba2III	52 442	xHxxx
Bb1I	52 442	xIxxx
Bb1II	52 442	xJxxx
Bb1III	52 442	xKxxx
Bb2I	52 442	xLxxx
Bb2II	52 442	xMxxx
Bb2III	52 442	xPxxx
Bg2I	52 442	xRxxx

Deliveries in design III with coupling M 10 x 1 upon special request only.

Spacing of columns	A		160 mm
	B		150 mm
„Closed“ position	a	Short columns	30 mm
	b	Long columns	74 mm
	g	Column length 130 mm	130 mm
Thread of coupling	I		M 20 x 1,5
	II		M 16 x 1,5
	III		M 10 x 1



Dimensional sketch of
MODACT MTN, MTP 15
MODACT MTN, MTP 25
 electric actuators, Type No. 52 442.xxxxx

- with block of terminals

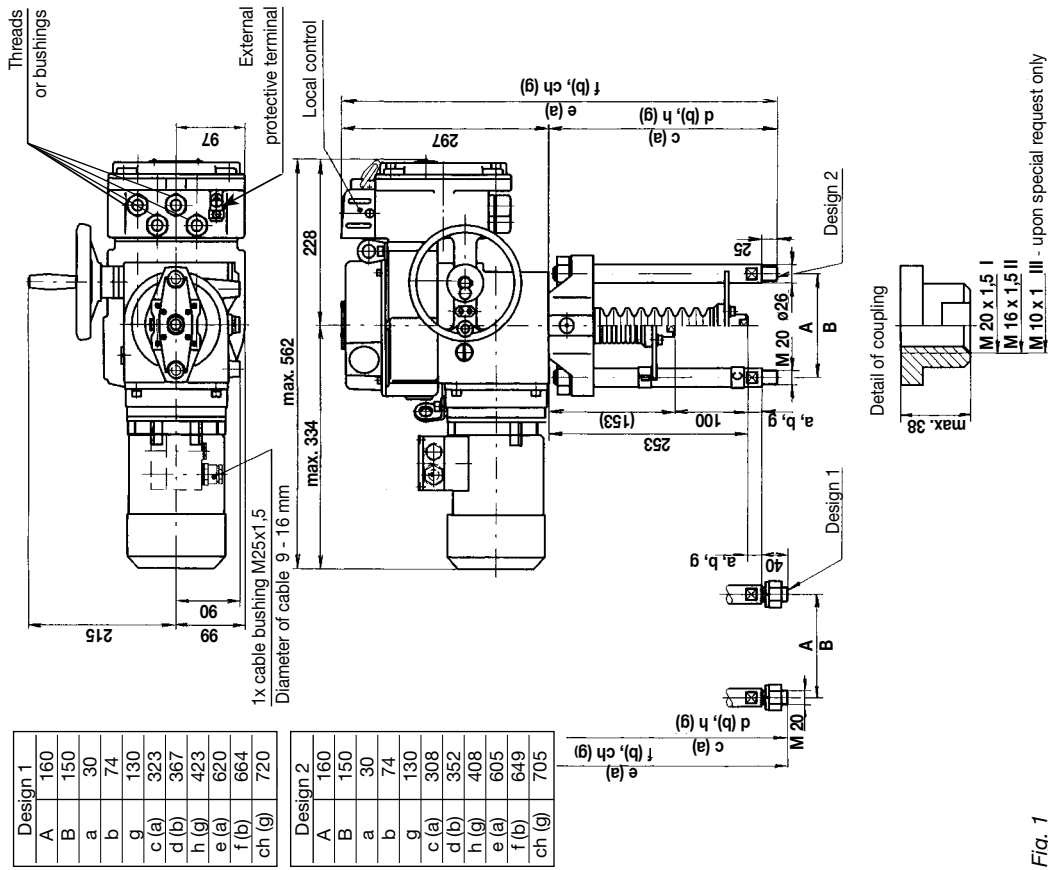


Fig. 1

Note: For actuators MODACT MTN, the switchboard box has threads for bushings: 3 x thread M20 x 1.5; 1 x thread M25 x 1.5; 1 x thread M25 x 1.5 (the bushings are included in the delivery - wrapped-together part).
 For actuators MODACT MTP, the switchboard box has bushings: 1 x M25 x 1.5, range of ϕ 13 - 18 mm; 2 x M20 x 1.5 range of ϕ 10 - 14 mm; 1 x M20 x 1.5 range of ϕ 6 - 12 mm.
 The electric motor (except for the actuator version with the switchboard box) is always delivered with the motor interconnect with the switchboard box. Connector Harting is always fitted with cable bushings.

Dimensional sketch of
MODACT MTN, MTP 15; MTN, MTP 15 Control
MODACT MTN, MTP 25; MTN, MTP 25 Control
 electric actuators, Type No. 52 442.xxxxx

- with connector

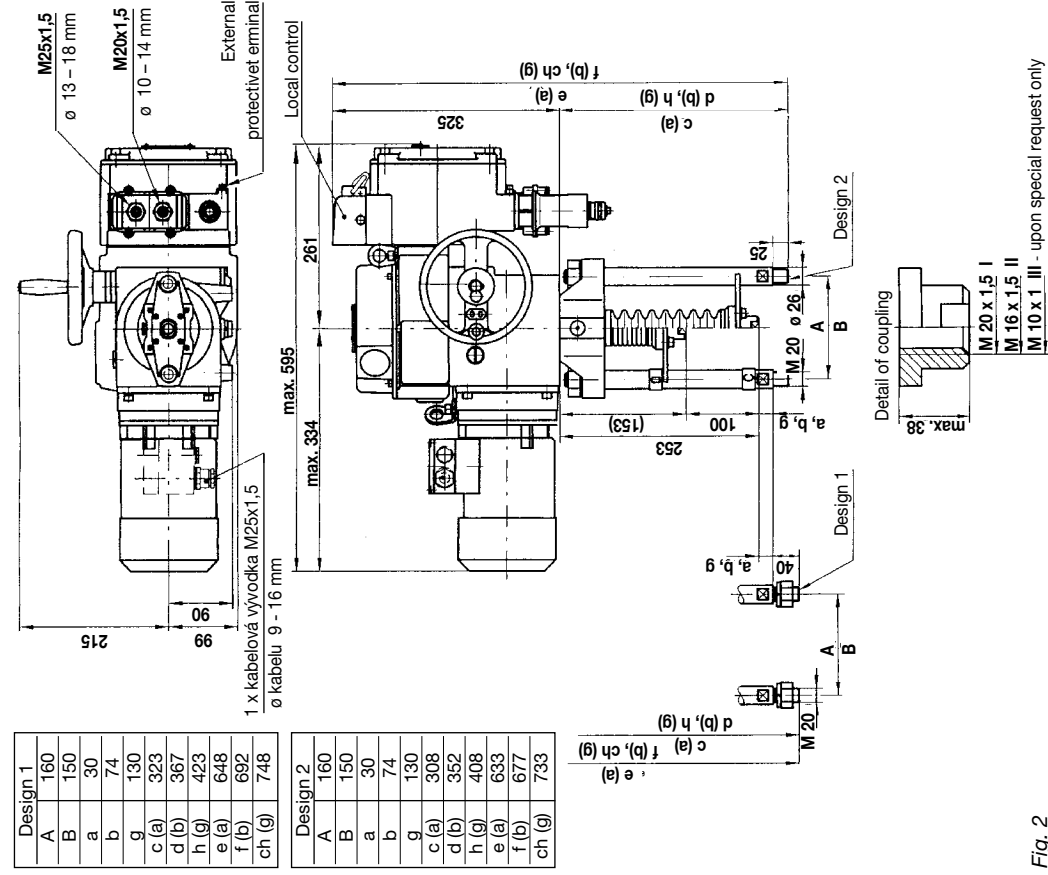


Fig. 2

Dimensional sketch of
MODACT MTN, MTP 40
MODACT MTN, MTP 63
 electric actuators, Type No. 52 443.x1xxx

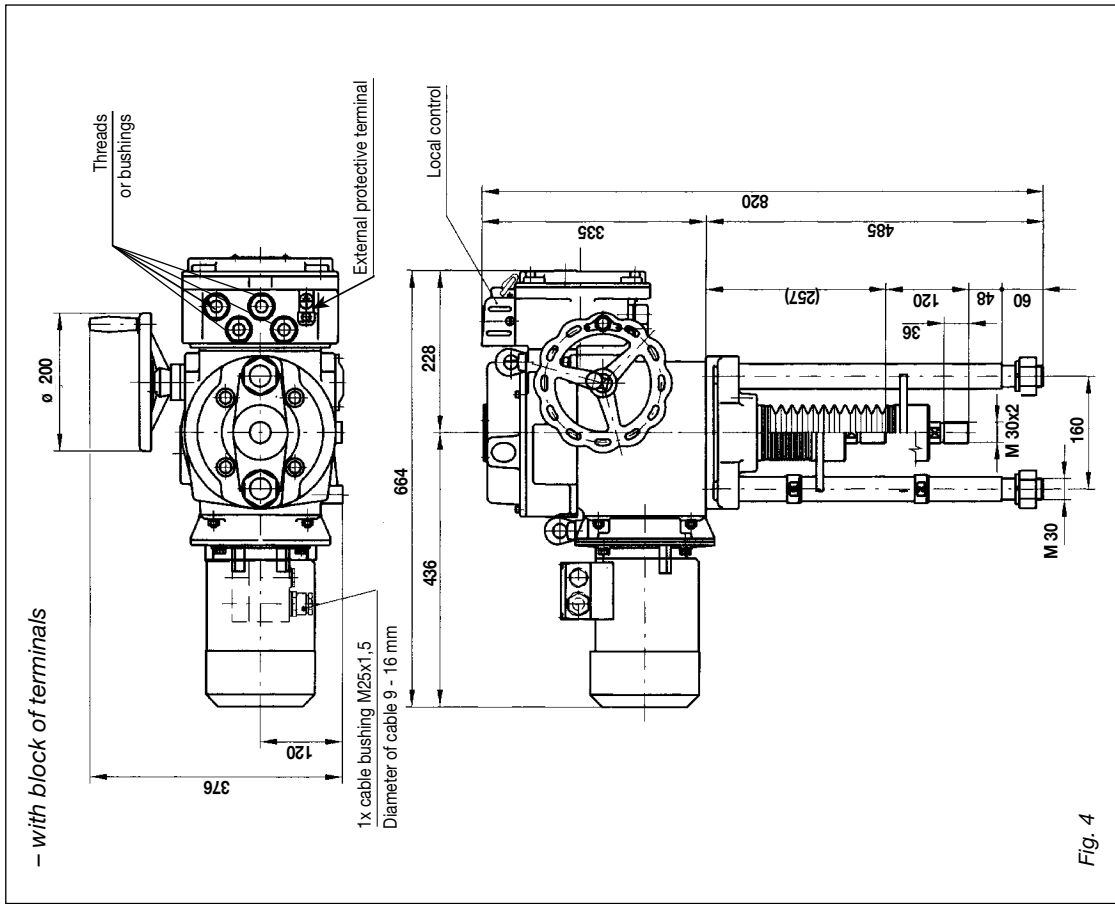


Fig. 4

Dimensional sketch of
MODACT MTN, MTP 15 Control
MODACT MTN, MTP 25 Control
 electric actuators, Type No. 52 442.xxxxx

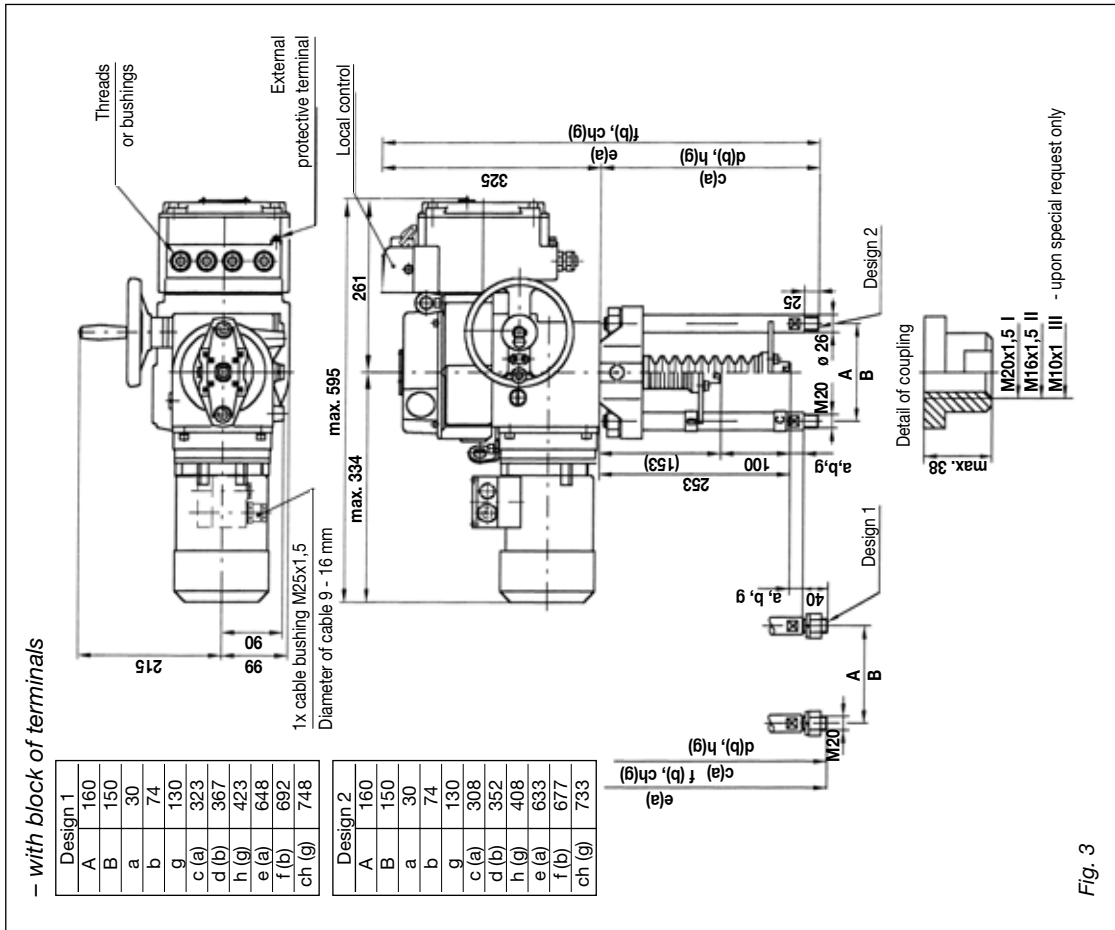


Fig. 3

Dimensional sketch of
MODACT MTN, MTP 40; MODACT MTN, MTP 40 Control
MODACT MTN, MTP 63; MODACT MTN, MTP 63 Control
 electric actuators, Type No. 52 443.x1xxx
 – with connector

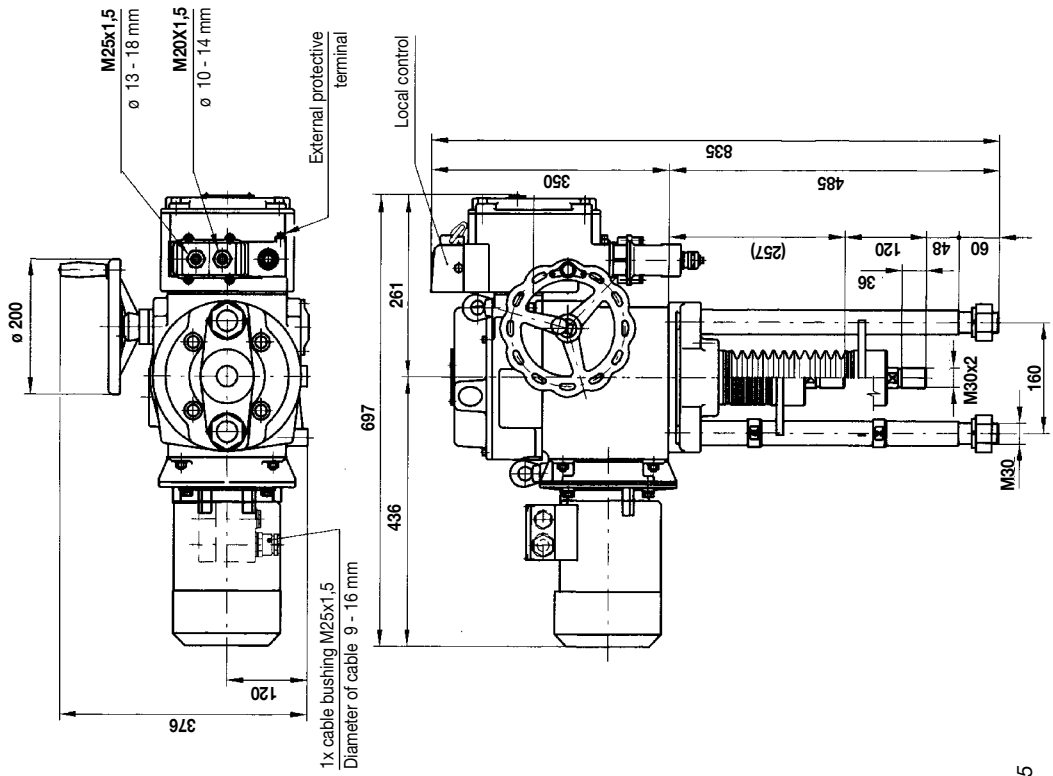


Fig. 5

Dimensional sketch of
MODACT MTN, MTP 40 Control
MODACT MTN, MTP 63 Control
 electric actuators, Type No. 52 443.x1xxx
 – with block of terminals

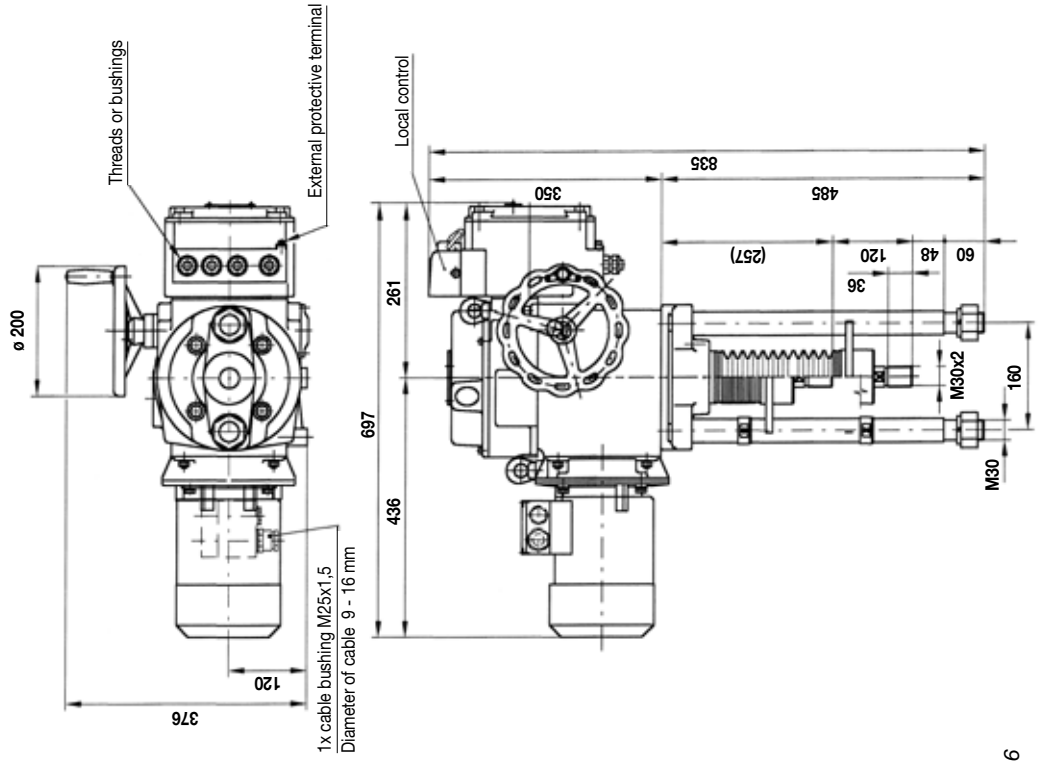


Fig. 6

Dimensional sketch of linear transmission unit for **MODACT MTN, MTP 40** electric actuators,
 Type No. 52 443.x2xxx
 – design with flange – non standard
 (other dimensions and designs of actuators are according to fig. 4, 5, 6)

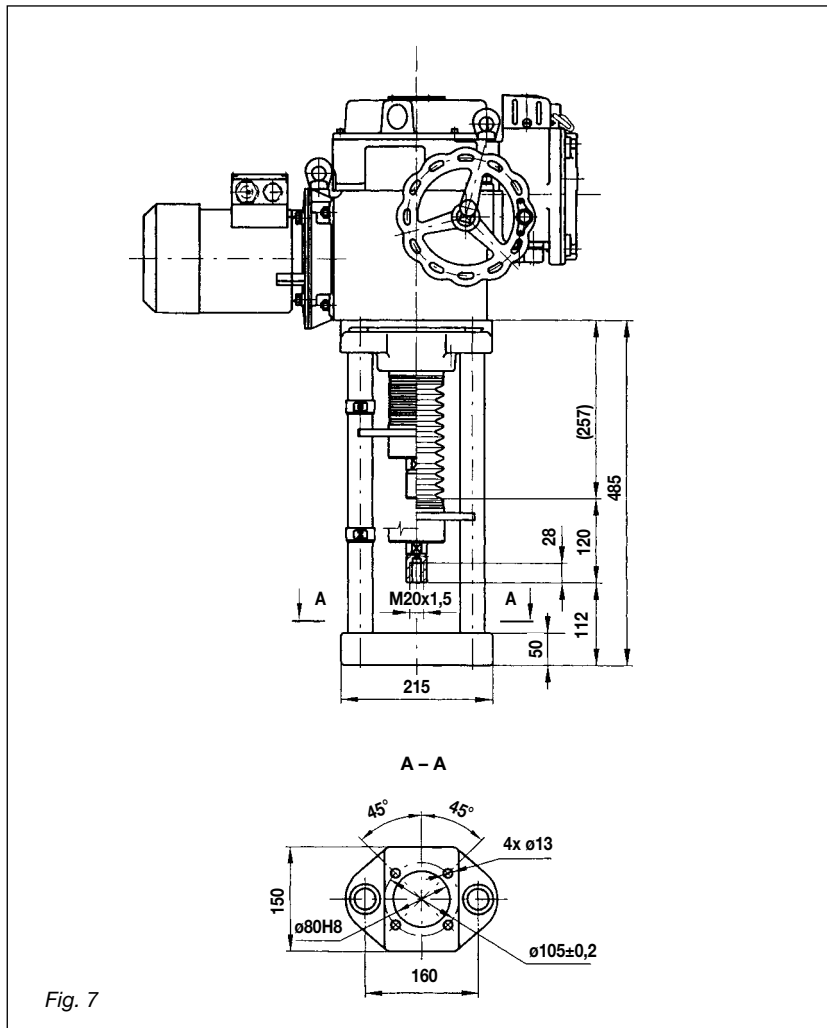


Fig. 7

Wiring diagrams of **MODACT MTN, MTP** electric actuators

Legend:

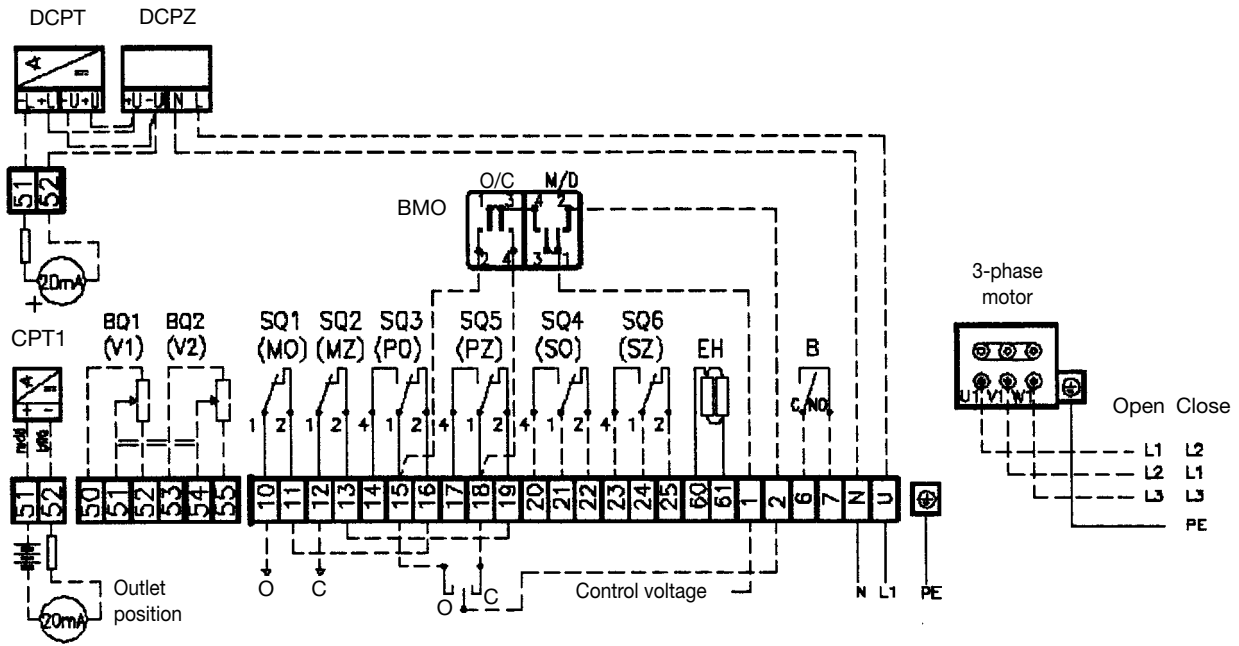
SQ1 (MO) – OPEN torque-limit switch	DCPZ – Power source of DCPT transmitter
SQ2 (MZ) – CLOSE torque-limit switch	ZP2.RE – Three-position motor regulator
SQ3 (PO) – OPEN position-limit switch	KO – OPEN-direction contactor
SQ5 (PZ) – CLOSE position-limit switch	KZ – CLOSE-direction contactor
SQ4 (SO) – OPEN signalling switch	F – Thermal relay
SQ6 (SZ) – CLOSE signalling switch	SA1 – LOCAL-REMOTE control switch
EH – Anti-condensation heaters	SA2 – OPEN-CLOSE control switch
BR2 – Electronic brake	M3~ – Three-phase motor
ZP3-BR – Electronic brake	B – Blinker
BQ1, BQ2 – Resistance position transmitter of 2 x 100 ohm	FT – supply mains filter
CPT1 – Current position transmitter CPT1/A	BMO – block of local control
DCPT – Current position transmitter DCPT	SSR – contact-less switches

Positions of the LOCAL/REMOTE control switches: M“ – local, „D“ – remote, „O“ – open, „Z“ – close

Wiring diagram of **MODACT MTN, MTP** electric actuators

- terminal board

P0938-E

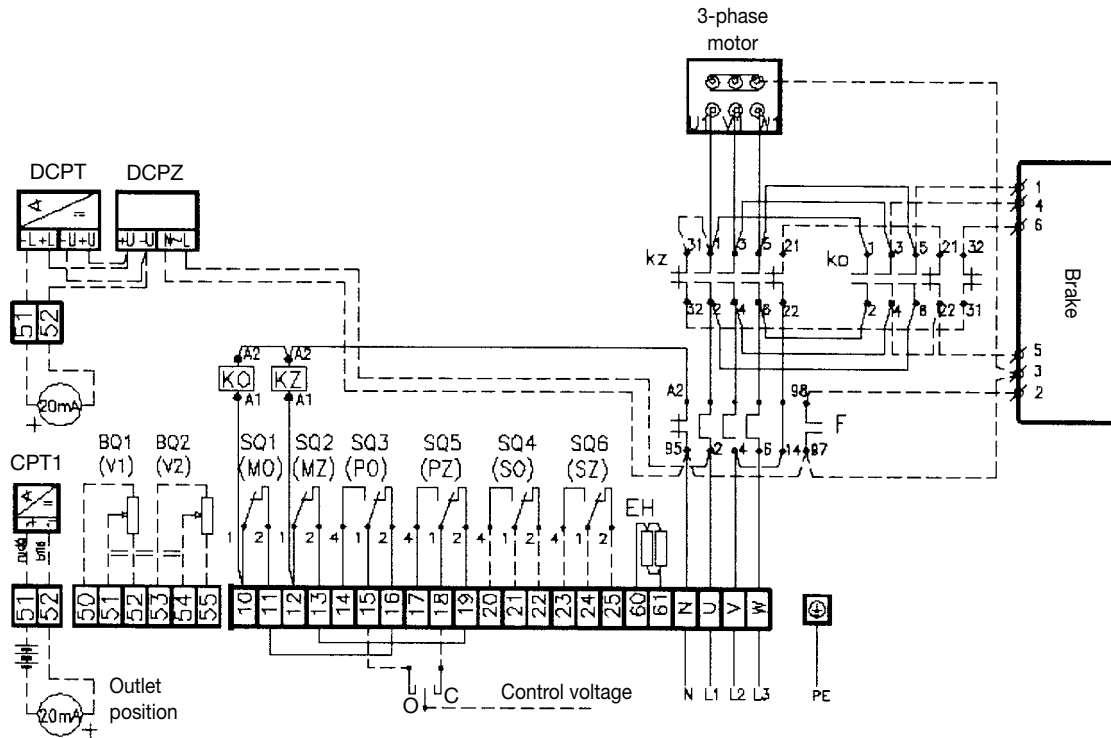


Wiring diagram of **MODACT MTN, MTP** electric actuators

- contactors

- terminal board

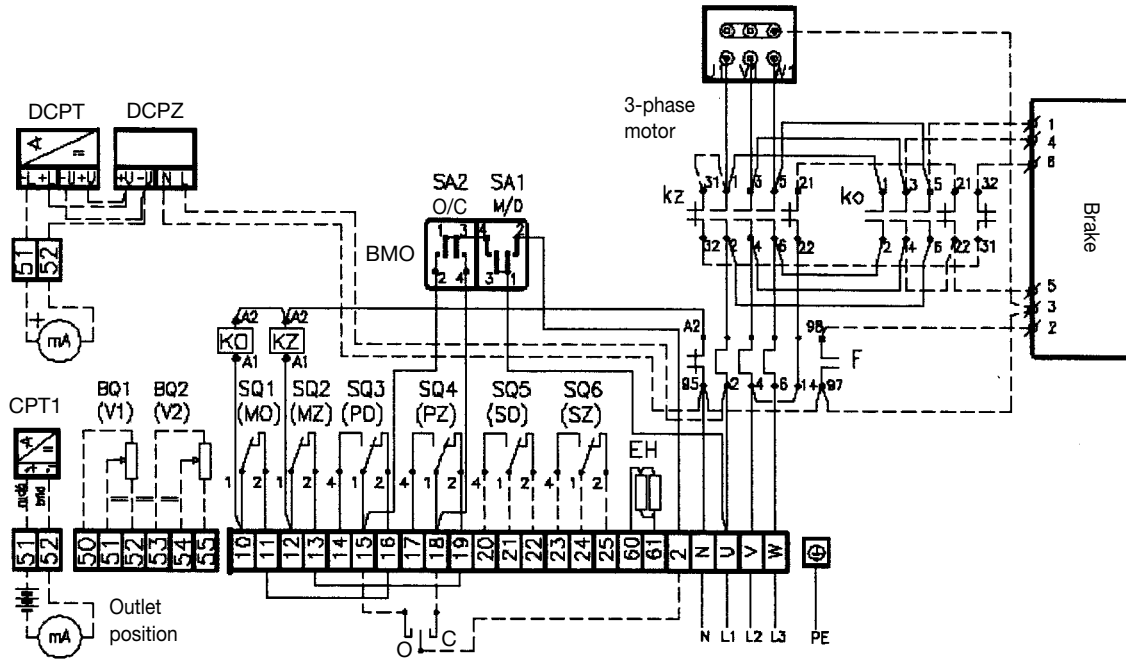
P0947



Wiring diagram of **MODACT MTN, MTP** electric actuators
 – contactors and block of local control

– terminal board

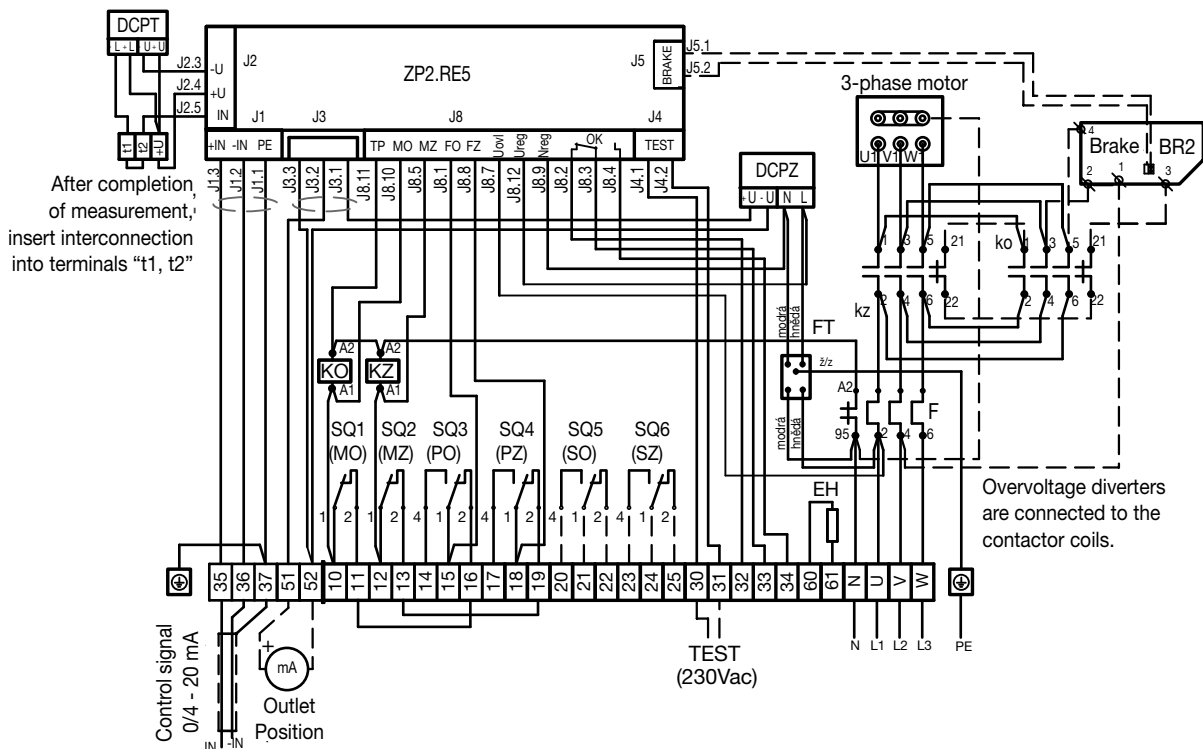
P0948



Wiring of electric actuators **MODACT MTN, MTP** Control,
 - with regulator **ZP2RE5**

– terminal board

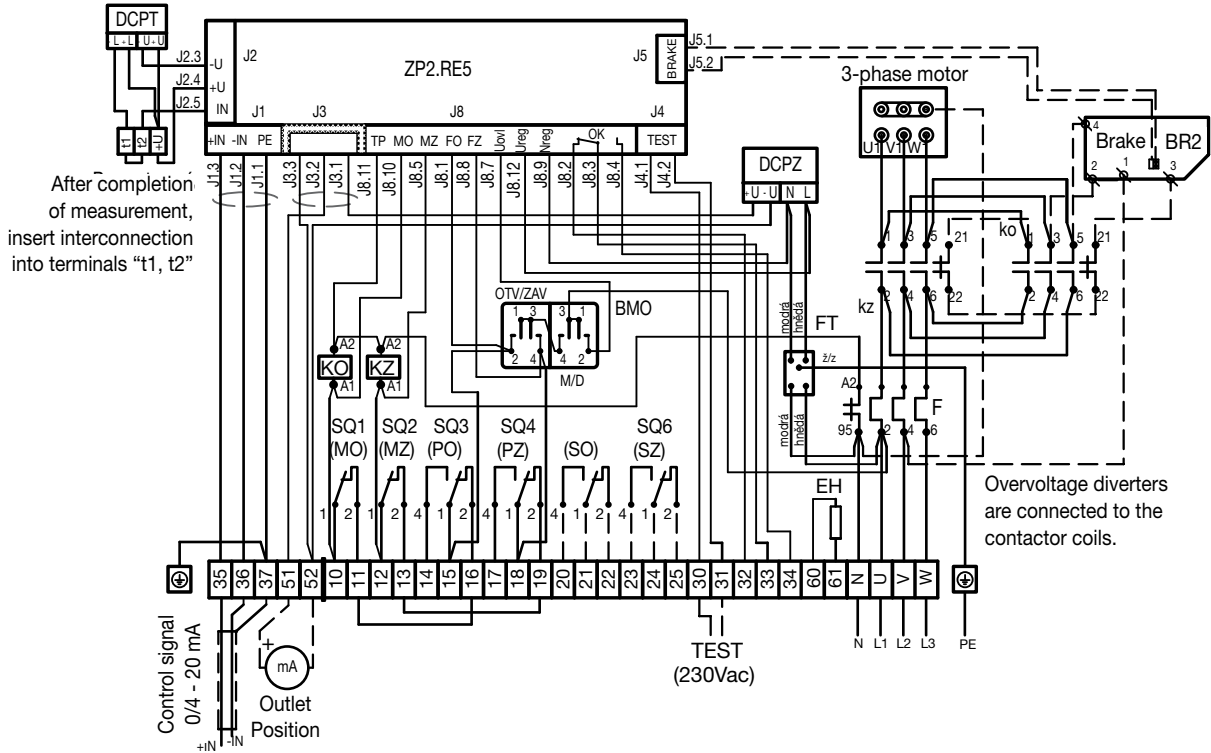
P0949



Wiring of electric actuators **MODACT MTN, MTP Control**,
 - with BMO and regulator ZP2RE5

P0950

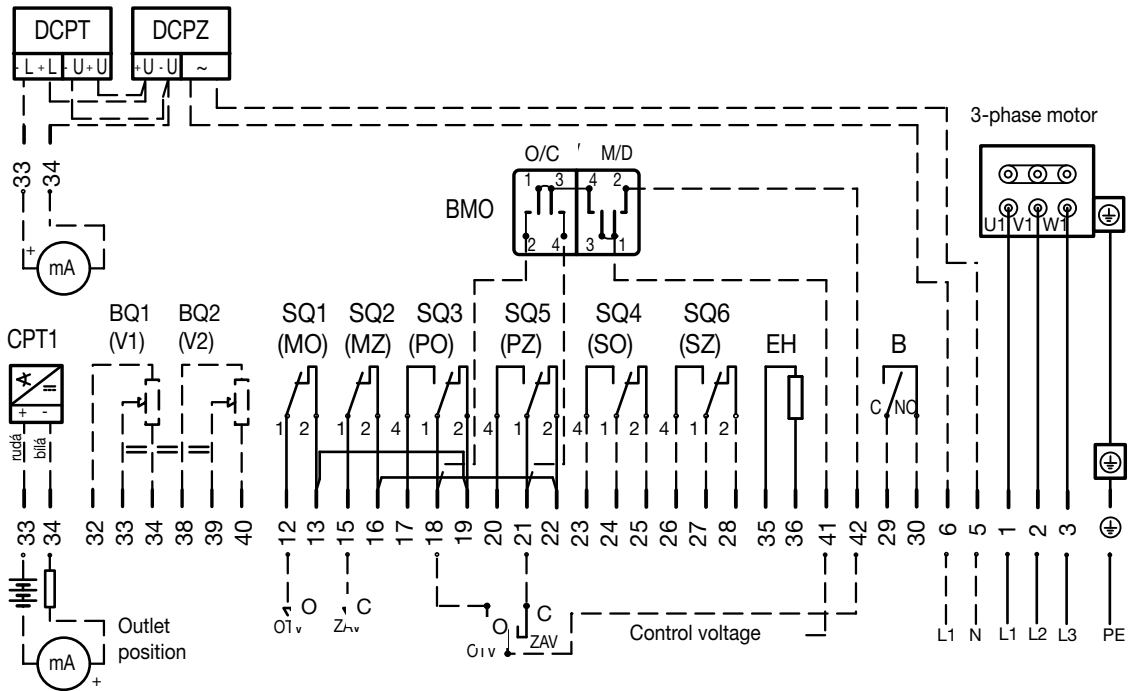
- terminal board



Wiring diagram of **MODACT MTN, MTP** electric actuators

- connector

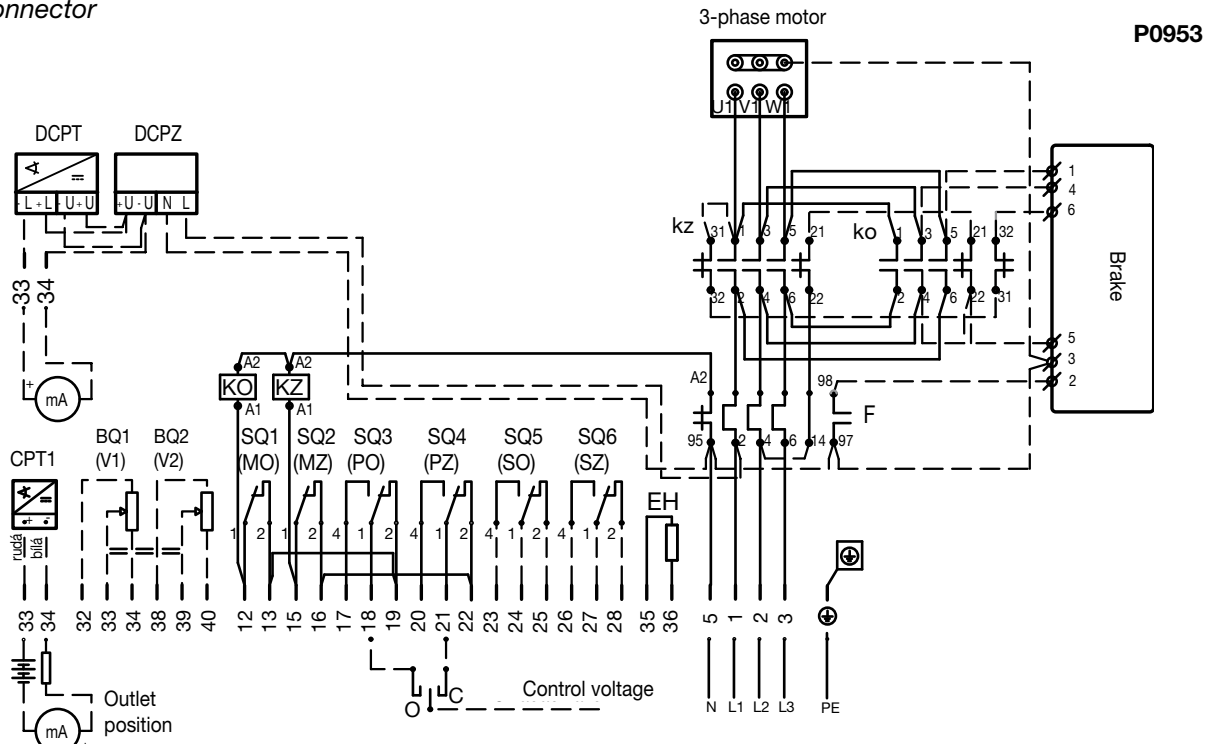
P0940-E



Wiring diagram of **MODACT MTN, MTP** electric actuators

– contactors

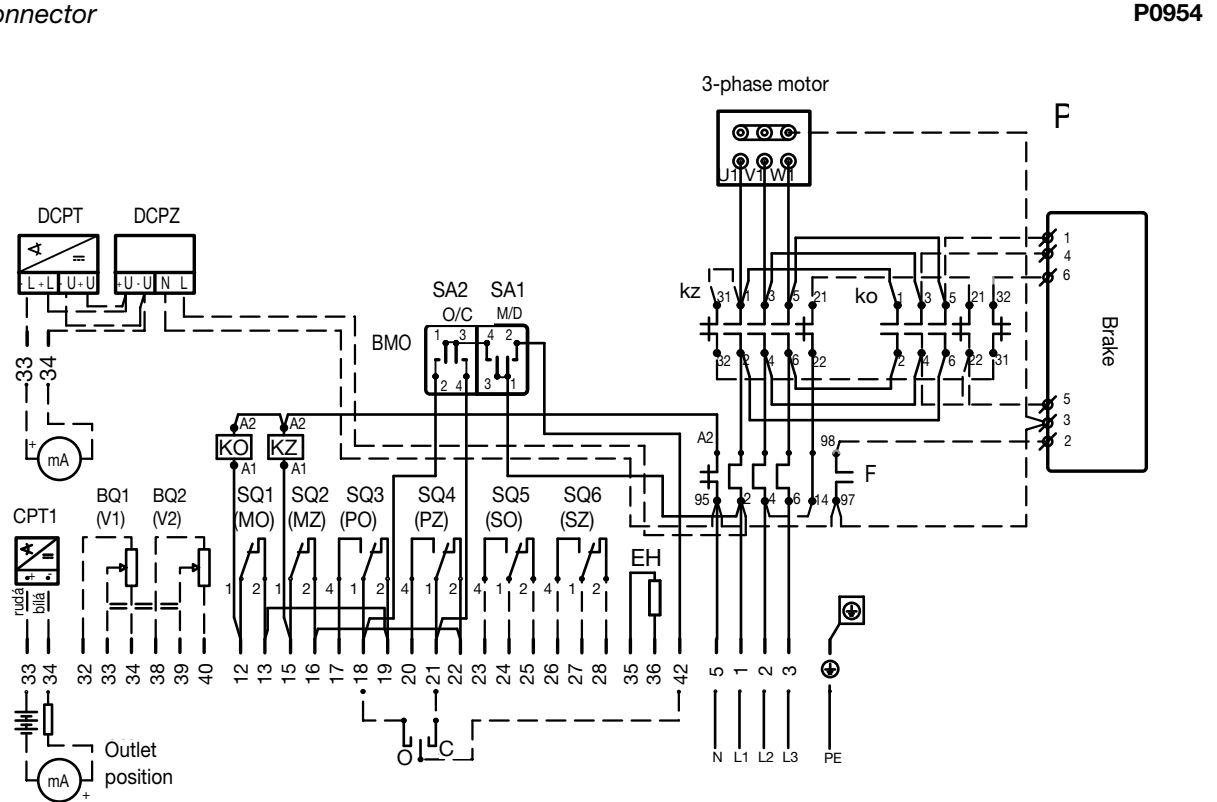
– connector



Wiring diagram of **MODACT MTN, MTP** electric actuators

– contactors and block of local control

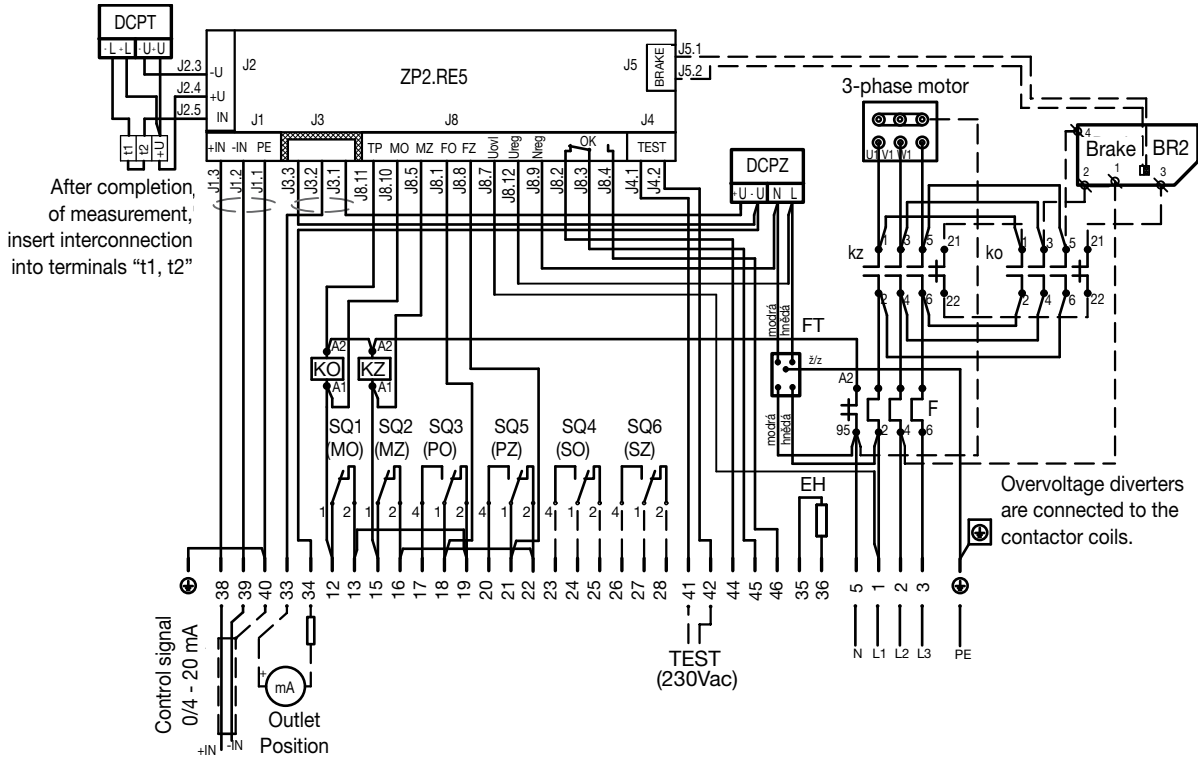
– connector



Wiring of electric actuators MODACT MTN, MTP Control,
 – with connector, with regulator ZP2RE5

– connector

P0955



Wiring of electric actuators MODACT MTN, MTP Control,
 – with connector, with BMO and regulator ZP2RE5

– connector

P0956

