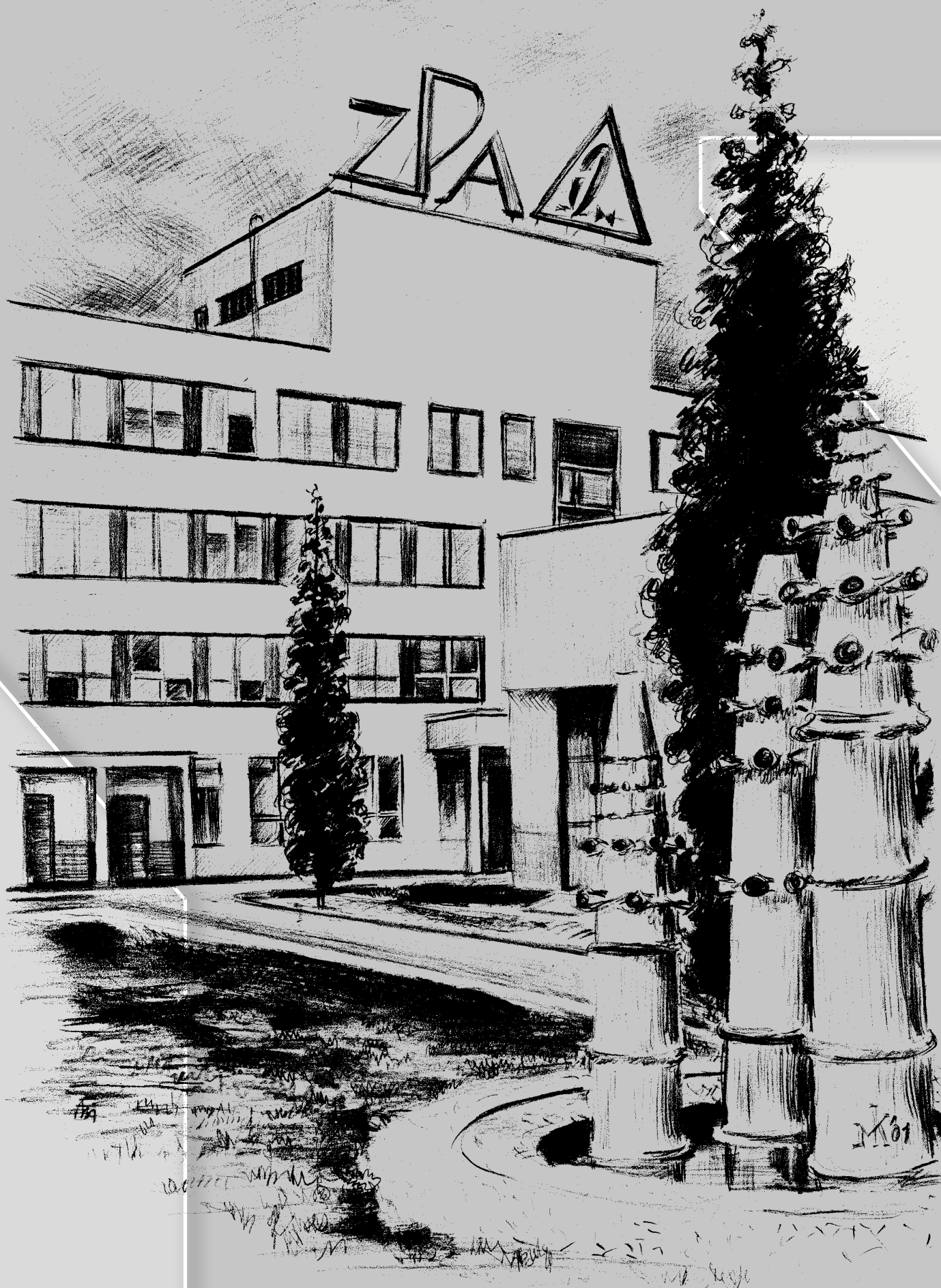# ZPA PEČKY, a.s.

**Electric Part-turn Lever Actuators
with a Constant Output Speed**

MODACT MPSED, MPSPED
MODACT MPSED, MPSPED CONTROL

Type numbers 52 260 - 52 266

11/18

CONTENTS

1. APPLICATION

The **MODACT MPSED, MPSPED Konstant** electric part-turn *(lever)* actuators operating at a constant speed are used for remote control and automatic regulation of flaps, louvers and valves. They have been specially designed for industrial plants. The actuators should not be used for other purposes than those specified, without prior consultation with the manufacturer.

2. OPERATING CONDITIONS, OPERATING POSITION

Operating conditions

The **MODACT MPSED, MPSPED** actuators should withstand the effect of operating conditions and external influences, Classes AC1, AD5, AD7, AE4, AE6, AF2, AG2, AH2, AK2, AL2, AM-2-2, AN2, AP3, BA4, BC3 a BE3 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.

Surrounding temperature

Operating temperature for the **MODACT MPSED** *(MPSED Control)* is from -25 °C to +70 °C or from -40 °C to +60 °C.

Operating temperature for the **MODACT MPSPED** *(MPSPED Control)* is from -25 °C to +60 °C or from -40 °C to +60 °C *(except 52 260).*

Relative humidity from 10 to 100 % with condensation.

Classes of external effects – excerpt from ČSN 33 2000-5-51 ed. 3.

Class:

1) AC1 – elevation above sea level ≤ 2000 m
2) AD5 – splashing water in all directions
   AD7 – water occurrence – shallow dipping
3) AE4 – medium dustiness
   AE6 – strong dustiness *(MPSPED only)*
4) AF2 – occurrence of corrosive or polluting substances from atmosphere. Presence of corrosive polluting substances is significant.
5) AG2 – medium mechanical stress by impacts – common industrial processes
6) AH2 – medium mechanical stress by vibrations – common industrial processes
7) AK2 – serious risk of growth of vegetation and moulds
8) AL2 – serious danger of the occurance of animals *(insects, birds, small animals)*
9) AM-2-2 – normal level of the signal voltage. No additional requirements.
10) AN2 – medium solar radiation with intensities > 500 and ≤ 700 W / m^2
11) AP3 – medium seismic effects; acceleration > 300 Gal ≤ 600 Gal
12) BA4 – personal abilities. Instructed people.
13) BC3 – frequent contact with the earth potential. Persons coming frequently into contat with "live" parts orstanding on a conducting base.

Corrosion protection

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

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

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

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

Operating position

The actuators can operate 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.

M_Z starting torque $\geq 1{,}3 \cdot M_V$
$M_{stř}$ mean value of loading torque
M_V maximum value of tripping torque
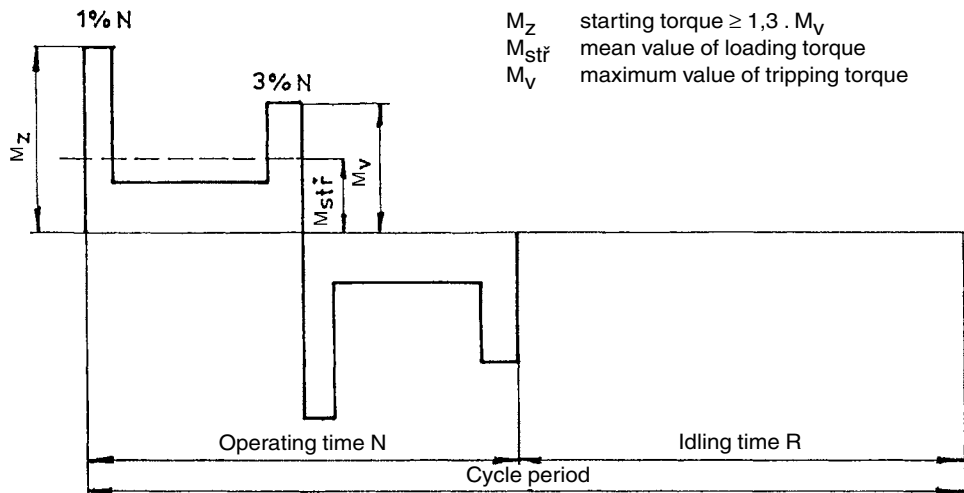
Course of working cycle

Service life of actuators

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

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

When using reversing contactor unit the service life of actuator is 1 million starts

Service life [h]	830	1000	2000	4000
Number of starts [1/h]	Max, Number of starts 1200	1000	500	250

When using reversing contactless unit the service life of actuator is 3 million starts

Service life [h]	2490	3000	6000	12000
Number of starts [1/h]	1200	1000	500	250

4. TECHNICAL DATA

Supply voltage

Supply voltage of electric actuator: **MODACT MPSED, MPSPED** 1 x 230 V, +10 %, -15 %, 50 Hz, ±2 %

3 x 230/400 V, +10 %, -15 %, 50 Hz, ±2 %

Actuators designed to operate at another voltage and frequency than those given above are available upon special request. For more details, refer to the Technical conditions.

Enclosure

Protective enclosure of actuators: **MODACT MPSED** *(MPSED Control)* is IP 55 according to ČSN EN 60 529.

MODACT MPSPED *(MPSPED Control)* is IP 67 according to ČSN EN 60 529.

Noise

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

Tripping torque

Tripping torque is set at the manufacturer according to the customer's requirements within the range given in Table No. 1. If setting of tripping torque is not required maximum tripping torque of the required type number of the electric actuator is set.

Starting torque

The starting torque of the actuator is a calculated value determined by the starting torque of the electric motor and the total gear ratio and efficiency of the actuator. After run reversation, the actuator can produce a starting torque for the duration of 1 to 2 revolutions of the output shaft when torque-limit switching is locked. Torque switching is blocked only at the end positions. Blocking time is adjustable from 0–20 s.

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

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

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

5. ACTUATOR OUTFIT

Position indicator

The actuator can be fitted with a display as an option for electronic system **DMS2 ED.** Actuator with electronic system DMS2 is equipped with two-line display.

Anti-condensation heater

Anti-condensation heater is connected to **DMS2** and **DMS2 ED** electronic circuit. Switching of the anti-condensation heater is controlled by a thermostat. From the factory is the switching temperature set to 10 °C. The temperature is adjustable by adjusting software **DMS2.** Input power of the anti-condensation heater is 10W / 230 V.

Local control

Local control serves for controlling the actuator from the site of its installation. For DMS2 ED electronic system includes two change-over switches: one with positions "Remote control - Off - Local control", the other "Open - Stop - Close".

The first 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. If the actuator is equipped with **DMS2** electronic system local control consists of 3 buttons - "Open", "Stop", "Close" and rotary switch "Local, Remote, Off".

Dynamic brake

The brake is an optional accessory to the actuators fitted with electronics **DMS2** and **DMS2 ED Control.** As switching elements are used contactors *(mechanical contacts)* or SSR *(modern contactless switching elements).*

After opening the switching element *(contactor or SSR),* it induces dynamic braking moment in the motor for several tenths of second. During the rest period of the actuator no braking torque is developed. The brake reduces dramatically time of the actuator run-down and regulation is thus more precise. The used brakes BR2 are controlled, impulse for action comes form the control unit. Corresponding variant of the brake is chosen according to the electric motor output and the type of switching elements.

Corresponding variant is chosen according to the electric motor power:

contactors	**BR2 550**	output up to 550 W
	BR 2,2	output up to 2,2 kW
SSR	**BR2 BK 550**	output up to 550 W
	BR BK 2,2	output up to 2,2 kW

Switching of electric motor

The actuators in variants Control are fitted with built-in reversing contactor combinations or SSR switches. First variant is assembled from two contactors and second variant from contactless switches.

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. Contactors have defined service life at least 1 million cycles.

To extend the service life we recommend using contactless reversing unit with a minimum service life of 3 million cycles. The standard control voltage is 24V DC. It is used for output into 4 kW or 7.5 kW. The unit consists of semiconductor elements - thyristors.

6. ELECTRIC PARAMETERS

External electric connection

a) Actuator terminal board

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

b) Connector

According to the customer's requirements the **MODACT MPSED, MPSPEDJ** 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 4 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 MPSED, MPSPED** actuators with terminal designation are shown in this Mounting and operating instructions.

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

Isolation resistance

Isolation resistance of electric control circuits against the frame and against each other is min. 20 MΩ. After a 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

Circuits of 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
Shifting time	+10 % of the maximum range value
	-15 % of the rated value
Working stroke	1 %
Angled lever play	max 1 %

Protection

The actuators are fitted with one internal and one external protection terminal for ensuring protection against electric shock injury according to ČSN 33 2000-4-41. One protection terminal is also installed on the electric motor. The protection terminals are marked according to ČSN EN 60 417-1 and 2 *(013760)*.

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**
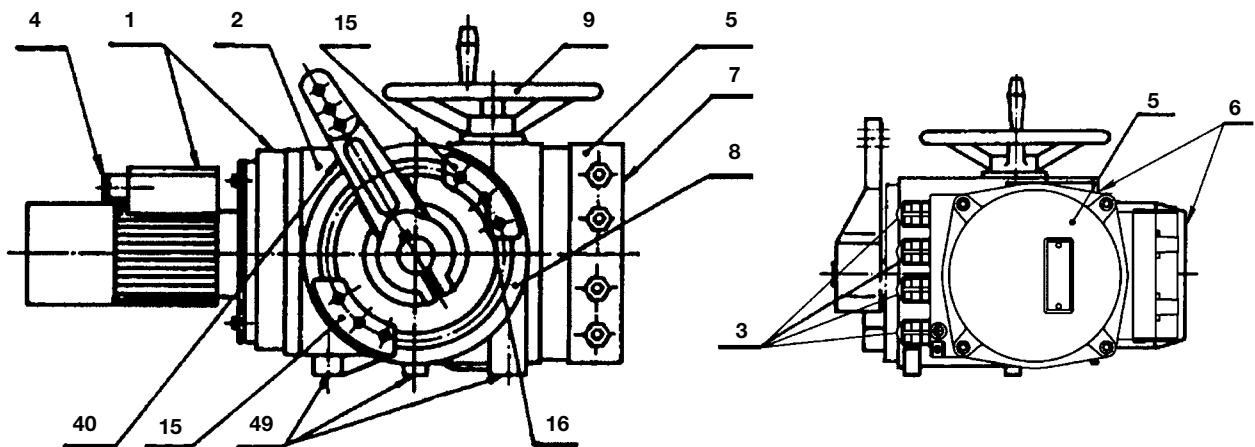
e) Terminal box **5**

Fig. 1 - *Actuator assembly*

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 box enlosing 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.

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 usual position *(axis of the output shaft in horizontal plane),* the box is installed on the actuator side – opposite to the lever. The position gearbox 15 *(Fig. 2)* is installed in the box on the motherboard of the control part *(Fig. 2, 2a).* The modules are mutually and with the terminal board box interconnected with cables *(see the figure).*

The control box is covered with the lid 6 *(Fig. 1).*

To facilitate assembling, the output shaft is realized as sectional. The output end of the shaft is attached directly to the control board and this assembly is then pushed into the output shaft cavity.

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 board box 5 *(Fig. 1)*

It is connected with the control box by a flange and serves for fitting other parts, control circuits, and terminals for inlet conductors. The terminal board box can accommodate local control and, in case of the version DMS2, also a display.

Bushings or the connector are screwed in the terminal board box 5 *(Fig. 1).*
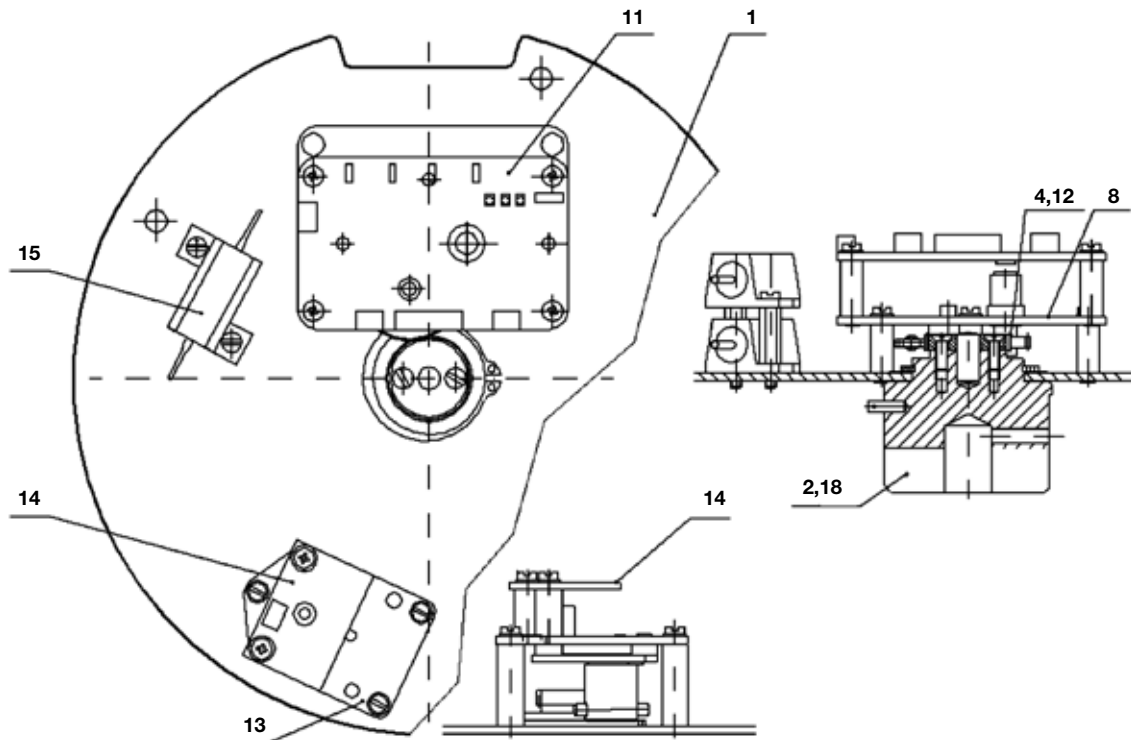
Fig. 2 - *Basic plate*

The terminal board and other components *(for instance, connector for service connection of a computer)* in the terminal board box are easily accessible after removing the cover of the terminal board box. Cable bushings are used for tight passing of the cables into the terminal board box.

Other version of the terminal board box is fitted with a connector for connecting supply voltage and control signals. The connector counterpart with two bushings is included in the delivery.

8. ELECTRONIC OUTFIT

Electro-mechanical control board is replaced with the electronic system **DMS2** or **DMS2 ED.** Both systems scan position of the output shaft and torque of the electric actuator by contact-free magnetic sensors. Long service life is guaranteed for the contact-free sensors that do not get mechanically worn.

The sensor of the output shaft position is absolute and does not require any backup power supply in case supply voltage is disconnected during operation of the electric actuator. Both systems can be set

and monitored by a computer with controlling program *(set parameter can be backed up on a computer)* or manually without a computer *(for the electronics DMS2, parameters can be manually set and it can be checked without computer only if the system is equipped with a display and local control).* They contain diagnostic functions – error messages on the display, memory of recent failures and number of occurrences of respective failures.

The more simple system **DMS2 ED** substitutes the electro-mechanical board and/or provides for controlling the electric actuator by input analog signal as in the version Control.

The system **DMS2** enables the electric actuator to be used for two-position and three-position regulation or to be connected to the industrial bus bar Profibus.

DMS2 ED

Basic outfit:

Control unit	main part of the system DMS2.ED – includes microcomputer, position sensor, 3 signal lamps LED, 4 push-buttons for simple setting and checking the actuator, connectors for connecting the torque sensor, source board, and interface RS 232 *(connection of computer for setting and diagnostics).*
Torque unit	
Power supply	electronic power supply, user's terminal board *(connection of power supply and control signals),* 2 torque relays, 2 position relays, 2 signalling relays, 1 relay for signalling errors *(READY),* switch of resistance anti-condensation heater, connectors for connecting electronic brake, resistance heater of analog module, and connector for interconnection with the control unit.

Optional outfit:

Analog module	output of feed-back signal 4 – 20 mA, in version CONTROL input of control signal 0/4 – 20 mA
Position indicator	LED display
Local control	
Contractors or contactless unit	
Electronic brake	*(Actuator Type No. 52260 can not be produced in versions with electronic brake.)*

Parameters:

Scanning of position	contact-less, magnetic
Scanning of torque	contact-less, magnetic
Working stroke see	Tables 1, 2, 3
Torque blocking	0 – 20 s at reversing in limit positions
Input signal	0(4) – 20 mA with switched on regulator function
	Local/Remote control, Local open/close
Output signal	7 x relay 250 V AC, 3 A *(MO, MZ, PO, PZ, SO, SZ, READY)*
	Position signal 4 – 20 mA max. 500 ohm, active/passive, galvanic-isolated, LED display
Power supply of electronic	230 V AC, 50 Hz, 4 W, over-voltage category II

Realization:

Replacement of electric	the provided relay contacts substitute position, torque and signalling micro-switches mechanical board current feed-back signal 4 – 20 mA can also be brought out; the actuator is controlled by the superior control system with signals **"open"** and **"close".**
CONTROL	The electronics covers also function of the regulator; the output shaft position is controlled by analog input signal.

Function and setting of output relays

The output relays replace end-limit micro-switches; to some extent, function of the output relays differs according to chosen mode of electronics or it can be selected, preferably by the setting program.

Relay MO, MZ, PO, PZ

Relay	DMS2 ED	DMS2 ED Control
MO	*torque open* *(also changes-over to errors)*	*motor open*
MZ	*torque closed* *(also changes-over to errors)*	*motor closed*
PO	*position open*	*torque open* (also changes-over to errors) + optional tripping in position open (*parameter Tripping*)
PZ	*position closed*	*torque closed* (also changes-over to errors) + optional tripping in position closed (*parameter Tripping*)

In the version Control, the **function of relay MO/MZ** is same as that of motor relays.

Their operation is controlled by: - **regulation loop** *(deviation of required and actual position)*
                                                    - **active errors**

Any induced active error will change over both relays to a standstill position *(coils not energized)*. In case of errors, the relays with a function of torque relays *(in both versions **DMS2 ED** and **DMS2 ED Control**)* are also controlled.

Relays SZ, SO, READY

Relay **3/SZ** *- It usually signalizes position closed,* it can be changed-over to any offered signalization Relay **4/SO** *- It usually signalizes position open,* it can be changed-over to any offered signalization	Relay **READY** *- It usually signalizes errors + warning + not remote,* it can be changed-over to any offered signalization

Relé 3/SZ Relé 4/SO	Relay 3/SZ Relay 4/SO	Relé Ready ▼	Ready Relay
vypnuto	OFF	vypnuto	OFF
poloha O	position O	varování	warning
poloha Z	position Z	chyby	errors
moment O	torque O	varování nebo chyby	warning or errors
moment Z	torque Z	chyby nebo není dálkové	errors or no remote
moment a poloha O	torque + position O	chyby nebo var. nebo není dál.	errors or warning or no remote
moment a poloha Z	torque + position Z	moment O nebo Z	torgue O or Z
otevírání	opening		
zavírání	closing		
pohyb	motion		
poloha	position		
poloha negovaná	negated position		
ovládání-místní	local control		
ovládání-dálkové	remote control		
ovládání-vypnuto	control OFF		
moment O nebo Z	torgue O or Z		
pohyb-blikač	motion - blinker		

For the SO and SZ relays the following functions were added:

Moment O negated: when the set torque is reached in the open direction, the relay is disconnected.

Moment Z negated: When the set torque is reached in the closed direction, the relay is disconnected.

Moment O or Z is negated: When the set torque is reached in the closed or open direction, the relay is disconnected.

Setting program

The setting program is same for communication with the electronics **DMS2ED** and **DMS2.** The users' version can be freely downloaded.

Note: *In the window "Parameters" of the setting program, column "Access", the word "NO" designates parameters that cannot be changed by the user (change of these parameters is blocked).*

Parametr	Změna	Chyba	Přístup	
Setrvačnost [0.1%]			NE	5
Setr Doběh [0.1s]			NE	6
Necitlivost [%]				1

Parametr – Parametres
Změna – Change
Chyba – Fault
Přístup – Access
Setrvačnost (0,1 %) – Inertia [0.1 %]
Setr. Doběh (0,1 s) – Inertia deceleration [0.1 s]
Necitlivost (%) – Insensitivity [%]
NE – NO

PROCEDURE OF SETTING PARAMETERS BY MEANS OF PUSH-BUTTONS

For simple programming of required operating parameters, the control unit is fitted with four push-buttons: **MENU, P, O, C** and three signal lamps.
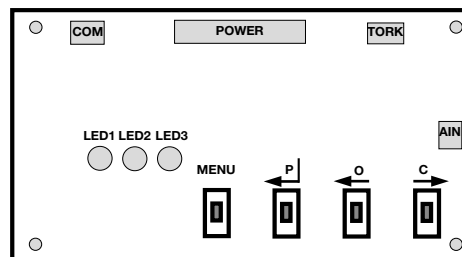
Colours of diodes:
LED1 – yellow *(menu number)*
LED2 – red *(parameter value)*
LED3 – green

Push-buttons and signal lamps LED on control unit DMS2.ED.S and DMS2.ED.S90

Yellow	Red	Green	State
-	-	-	System without feeding
-	-	lit on	Everything OK – working regime *(remote, local or switched off control)*
-	blinking	lit on	Error or warning – working regime *(remote, local or switched off control)*
lit on	-	lit on	Enter or exit of Setting of parameters by means of push-buttons or Setting of parameters by means of PC
blinking	-	lit on	Setting of parameters by means of push-buttons
blinking	blinking	lit on	
blinking	blinking	lit on	

In adjustment, follow the paragraphs "VERIFICATION of APPARATUS FUNCTION And its LOCATION", "fitting on VALVE" and "ADJUSTMENT of ACTUATOR with VALVE" of these instructions.

For safety reasons, the system is delivered in the state of induced error of Calibration when the functions are limited in order to reduce the risk of damage to the actuator by wrong wiring.

Record of position CLOSED, OPEN and AUTOCALIBRATION

– The actuator must be adjusted in such a way that the recorded position would switch off the actuator before it is switched off by torque. For tight closure, the torque relay for torque Closed is only connected into the control circuit. The actuator can be shifted either manually or electrically. The actuator in version CONTROL can be started from menu MOTOR in program DMS2. In this case, the actuator does not react to the set position and can only be stopped by the torque relay. In controlling from menu MOTOR, no torque may be induced. The torque must be left manually.

If, during adjustment, the torque is reached in the end-limit position, the torque must be left by means of a hand wheel.

– The actuator is set to position Closed and position Closed is stored by long pressing of push-button C *(without entering the Menu).*

– The actuator is set to position Open and position Open is stored by long pressing of push-button O.

– The calibration routine is started by means of push-button P *(in remote control)* that, in the three-position regulation, will measure actual inertial masses of the system and store them into the memory of the control unit. In the two-position regulation, pressing of push-button P only cancels the error of Calibration.

– In recording the end-limit positions, signalling relays and the position transducer are also set.

– In case the actuator stroke is to be increased and the switching off is set to "from position", the actuator will switch off during shifting in position O or 100 %. To further change the position, press C or O, and, while keeping it depressed, the actuator can be further shifted. After required position is reached, it is stored to memory by pressing push-button C or O.

Parameters that can be changed by user are set by manufacturer as follows:

1. Tripping torques: 100% or required value *(it is not recommended to change the value without consulting the supplier of the valve, etc.).*

2. Relay 3 and relay 4: signalization SZ 1 % and SO 99 % of stroke

3. Time of blocking: 2 – 8 s according to rate of actuator shifting

4. Position of blocking: 5 % of stroke from end-limit positions *(it is not recommend to change the value by more than 10 %)*

5. Characteristics of position transducer: closed 4 mA, open 20 mA

6. Relay READY: errors + warning + not remote

In version CONTROL:

1. Setting of control signal: closed 4 mA, open 20 mA

2. Insensitivity of actuator in regulation: 1 % *(it is not recommended to set insensitivity higher than 3 %)*

3. Response in case of loss of control signal: stop

4. Way of switch off in end-limit positions: torque + PO + PZ

Overview of MENU

BROWSING THROUGH MENU

– The setting regime is entered by pressing and keeping depressed push-button **MENU** for at least 2 s; LED1 is then lit on.

– Shortly press **MENU** to select the basic MENU – menu M1 to M8 *(LED1 signalizes the menu number);* by short pressing of P, O, C they are entered *(LED2 signalizes particular parameter).*

– Shortly press P to select required value of the parameter. In case the parameter can be set to several values, they are changed by short pressing of P *(number of blinking of LED2 indicates its value).* Keep pressing of P to record the chosen parameter; the record is confirmed by lighting on of LED2.

– Shortly press **MENU** to gradually set the required menu and parameters.

– After setting all required parameters, exit the setting menu by pressing and keeping depressed push-button MENU for at least 2 s. The setting menu will also be left in case that no push-button is pressed within 1 minute.

MENU 1 – Setting of tripping torques

– After entering the menu by means of push-button C or O, select required torque.

– Shortly press P to select the set value of the parameter 50 – 100 % *(5 – 10 blinking of LED2)* and keep pressing push-button P to store the parameter to memory.

MENU 2 – Setting function of signalling relays

– Basic setting of the signalling relays is SZ 1 % and SO 99 % of stroke.

– In case different setting is required, it can be changed after shifting the actuator to required position by means of push-button C or O.

– Using push-button P, perform basic setting SZ 1 % and SO 99 % of stroke.

MENU 3 – Setting of blocking of torque in end-limit positions

– Shortly press P to select the set value of blocking time 0 – 20 s *(0 – 20 blinking of LED2)* and keep pressing push--button P to store the parameter to memory.

– Keep pressing push-button C to store actual position for blocking torque on the side Closed to memory.

– Keep pressing push-button O to store actual position for blocking torque on the side Open to memory.

MENU 4 – Setting transducer characteristics

– Shortly press P to select the value 4 – 20 mA – 1x blinking of LED2 or 20 – 4 mA – 2x blinking of LED2, and keep pressing push-button P to store the parameter to memory.

Other menus only serve for board setting in version Control

MENU 5 – Setting control signal in 3P regulation

– Shortly press P to select value   4 – 20 mA   - 1x blinking of LED2,

                             or 20 – 4 mA   - 2x blinking of LED2,

                             or 0 – 20 mA   - 3x blinking of LED2,

                             or 20 – 0 mA   - 4x blinking of LED2

and keep pressing push-button P to store the parameter to memory.

MENU 6 – Setting insensitivity in three-position regulation

– Shortly press P to select value 1 – 10 % *(1 – 10x blinking of LED2)* and keep pressing push-button P to store the parameter to memory.

MENU 7 – Response in case of losing control signal in three-position regulation

– Shortly press P to select value   OPEN   - 1x blinking of LED2,

                             or CLOSE   - 2x blinking of LED2,

                             or STOP   - 3x blinking of LED2,

and keep pressing push-button P to store the parameter to memory.

MENU 8 – Way of switching off in end-limit positions in 3P regulation

– Shortly press P to select value   TORQUE   - 1x blinking of LED2,

                           or TORQUE + PO - 2x blinking of LED2,

                           or TORQUE + PZ - 3x blinking of LED2,

                            TORQUE + PO + PZ - 4x blinking of LED2,

And keep pressing push-button P to store the parameter to memory.

PROCEDURE of SETTING PARAMETERs by PROGRAM DMS2

– Before starting the actuator, it is necessary to set some parameters of the system by means of program DMS2 on PC.

– For safety reasons, the system is delivered in the state of induced error of Calibration when the functions are limited in order to reduce the risk of damaging the actuator by wrong wiring. In controlling the actuator from program DMS2, its run is stopped when any torque is induced.

Main window of setting program

Working torque

– Check and, if necessary, set the value of working torque 50 – 100 % in program DMS2, which you change only after consultation with the armature manufacturer.

Record of positions OPEN, CLOSED and AUTOCALIBRATION

The actuator should be adjusted so that the recorded position would stop the actuator before it is switched off by torque. The actuator is shifted manually or electrically. The actuator in version CONTROL can be started from menu MOTOR in program DMS2. In this case, the actuator does not respond to the set position and is switched off by torque. In controlling from menu MOTOR, no torque may be induced. The torque should be left manually.

Record of position CLOSED:

– In the required position, press push-button Z in the program and confirm the approved record.

Record of position OPEN:

– In the required position, press push-button O in the program and confirm the approved record.

The recorded values are confirmed by pressing push-button START in program DMS2. For the actuator in version CONTROL, change over the actuator to remote control and, by pressing push-button START, start the autocalibration. By short starting of the motor in both directions, the actuator measures inertia and changes over to the regulating regime. Information on the course of autocalibration is signalized next to push-button START. The autocalibration cannot be started in case the torque relay is switched off. The torque should be left manually.

Other parameters

Check and, if necessary, change other parameters:

Control signal	4 – 20 mA, 20 – 4 mA, 0 – 20 mA, 20 – 0 mA
Insensitivity	1 – 10 %
Function in case of error	open, close, stop, to position
Time of torque blocking in end-limit positions	0 – 20 s
Position of torque blocking in end-limit positions	1 – 10 %
Output of position signal	4 – 20 mA, 20 – 4 mA
Function READY	combined error

Note: Signal READY is brought out as contact of the relay on the terminal board. If the state ERROR or WARNING is not detected (setting can be made of what is to be evaluated as error or warning), the contact is closed; in case of error, warning, or if feeding of electronics is interrupted, the contact is opened. The state of the relay READY is indicated by the LED diode on the source board.

AUTODIAGNOSTICS

DMS2 ED performs continuously its diagnostics and, if a problem is detected, it reports warning or error. The warning or error is signalized by LED of the display and, possibly, by relay Ready. The warning has no effect on operation of the system, the error stops the actuator.

Assigning or switching off of warnings and errors is set in window "Warning and error" of the setting program *(it is opened by clicking one of parameters Warning 1 – 4 or Error 1 – 4 in window "Parameters").*

The error or warning are reported by opening the relay READY and by blinking of the red LED diode on the control unit. Particular error is specified by program DMS2 or on the display.

RESTORING PARAMETERS FROM BACKUP

With the feeding switched off, press push-buttons O and C at the same time. Then, switch on feeding and wait until red and yellow LED diodes light on. The backup parameters are read.

In DMS2 setting program we will restore the parameters from backup by pressing button "Restore".
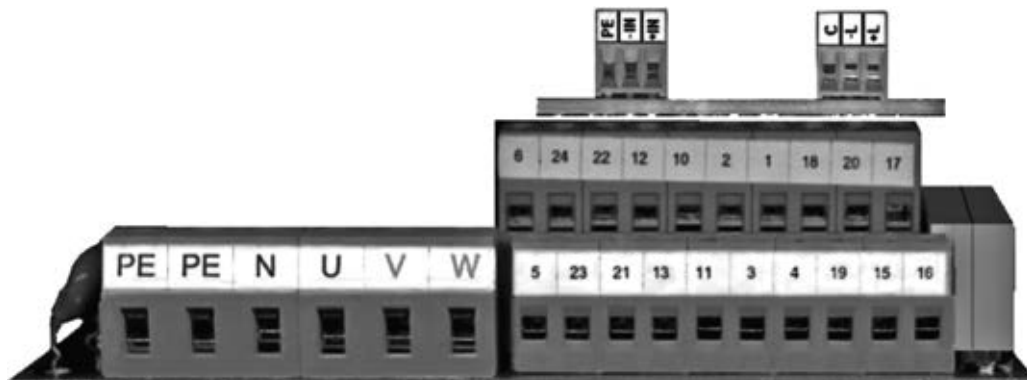
Terminal board of the actuator with electronics DMS2ED

If the actuator is of the single-phase version the power supply is connected only to terminals **PE, N, U.** The terminals **V, W** remain non-connected. If the actuator is of the version "Replacement of electric-mechanical board" with three-phase electric motor without power relays, the electric motor is connected to a separate terminal board *(not shown here).*

List of warnings and errors

No.	Name	Warning[1]	Error[1]	Description
1	Safe *	X		Input Safe activated
2	Control signal	X		Value of control signal ≤ 3 mA *(it applies to ranges 4 – 20/20 – 4 mA)*
4	Torque	X		Induced torque beyond end-limit positions or disconnected torque sensor
6	Thermal protection		X	Thermal protection input activated
7	Sense of rotation		X	Reverse sense of rotation *(for CONTROL only)*
8	EEPROM	X		Wrong control sum of parameters in EEPROM
9	RAM		X	Wrong control sum of parameters in RAM
10	Parameters		X	Wrong parameters in EEPROM
11	Setting regimes	X		Setting regime from push-buttons or PC
12	Torque sensor		X	Disconnected or defective torque sensor
13	Sensor 1		X	Error of sensor of position 1 *(lowest stage)*
14	Sensor 2		X	Error of sensor of position 2
15	Sensor 3		X	Error of sensor of position 3
16	Sensor 4		X	Error of sensor of position 4 *(highest stage)*
17	Calibration	X		Autocalibration not carried out
18	Torque setting		X	Wrong setting of torques *(parameters Torque O/Z 50/100 %)*
19	Stroke		X	Wrong setting of stroke *(parameters Position O/Z)*
20	Rotation error		X	The actuator does not rotate
21	High temperature	X		Permitted max. temperature exceeded *(parameter Temperature max.)*
22	Low temperature	X		Permitted min. temperature exceeded *(parameter Temperature min.)*
23	LCD internal *	X		Display of LCD internal does not communicate or not added in parameter CAN of configuration
24	LCD external *	X		Display of LCD external does not communicate or not added in parameter CAN of configuration
25	Fieldbus *	X		Module of industrial bus does not communicate or not added in parameter CAN of configuration
26	CAN *	X		Error of bus CAN *(short circuit, interruption, only sensor communicates)*
27	Fieldbus activity*	X		Connection to industrial bus not active
28	Phase *		X	Inverse order of phases or some phase missing
29	Relay of service life	X		Service life of relay MO/MZ at CONTROL exceeded (parameter Relay of service life)
30	Reset	X		Non-standard Reset of unit induced *(watchdog etc.)*
31	ROM		X	Wrong control sum of program in ROM
32	CAN version *	X		Sensor, LCD display or module Fieldbus have incompatible versions of firmware
33	Wrong command *		X	Commands Open and Close entered at the same time
34	Wrong inertia	-	-	Wrong inertia measured by autocalibration *(for autocalibration only)*
35	Wrong run-down	-	-	Wrong run-down measured by autocalibration *(for autocalibration only)*
41	Wrong position		X	Servo-drive is in position 25 % behind working stroke

[1] *) Assignment can vary depending on the version of firmware of the sensor control unit.*

* Applies to DMS2 only.

Memory of number of induced warnings and errors

– For all ascertained warnings and errors, DMS2.ED uses counters of occurrence of these warnings and errors during operation of the system.

– Values of the counters are stored to the EEPROM memory and are preserved even in case of the power supply fall-out.

– Reading of the counters is possible by means of the program for PC

– Clearing of the counters is possible by means of the program for PC with the level of authorization "SERVICE".

Memory of recently induced warnings and errors

– DMS2.ED stores three recently induced warnings and errors to the EEPROM memory.

– Recent warnings and errors can be displayed and erased by means of the program for PC.

Example of wiring diagram of electronics **DMS2 ED**
in version **Substitution of electro-mechanical board**
(actuators MODACT MPSED, MPSPED)
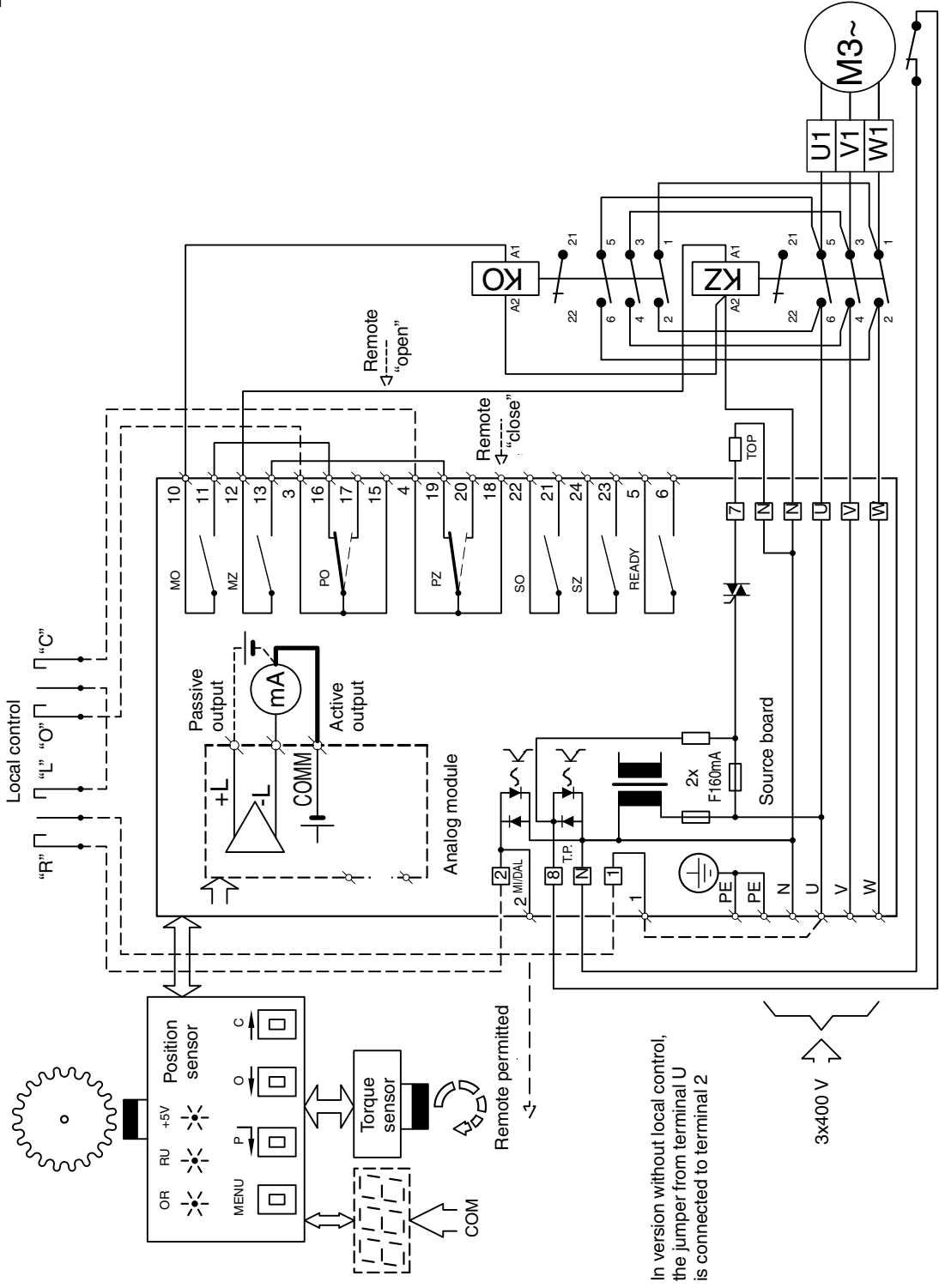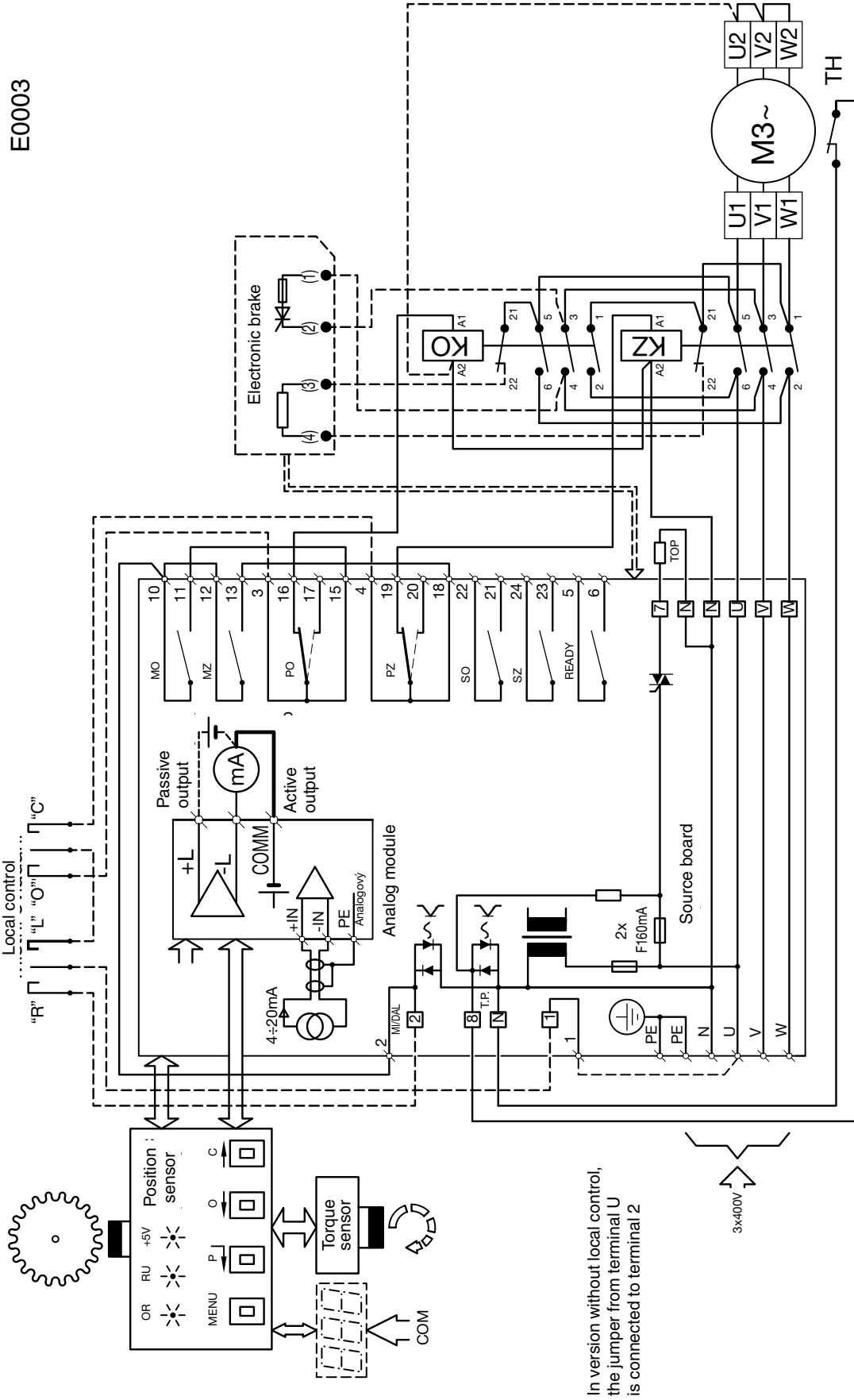
E0001
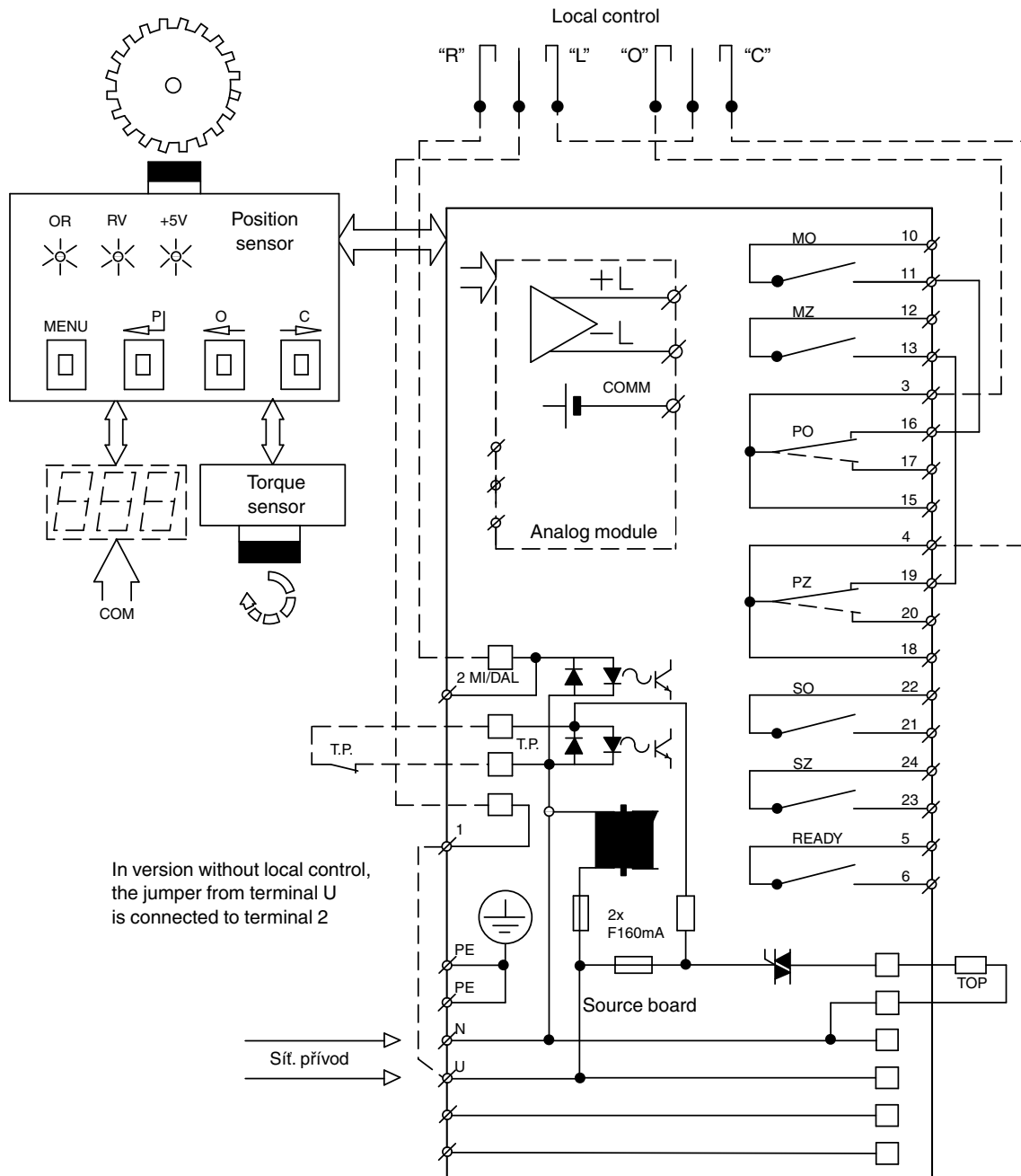
Local control

"R" "L" "O" "C"

Note: *Here, contacts of relays MO, MZ, SO, SZ are shown with power supply switched off; with power supply switched off contacts PO, PZ are shifted to the position drawn in dashed line.*

Example of wiring diagram **Substitution of electro-mechanical board with contactors and three-phase electric motor**
(actuators MODACT MPSED, MPSPED)

E0002

Example of wiring diagram of electronics **DMS2 ED** in version **Control** (*actuators MODACT MPSED, MPSPED*)
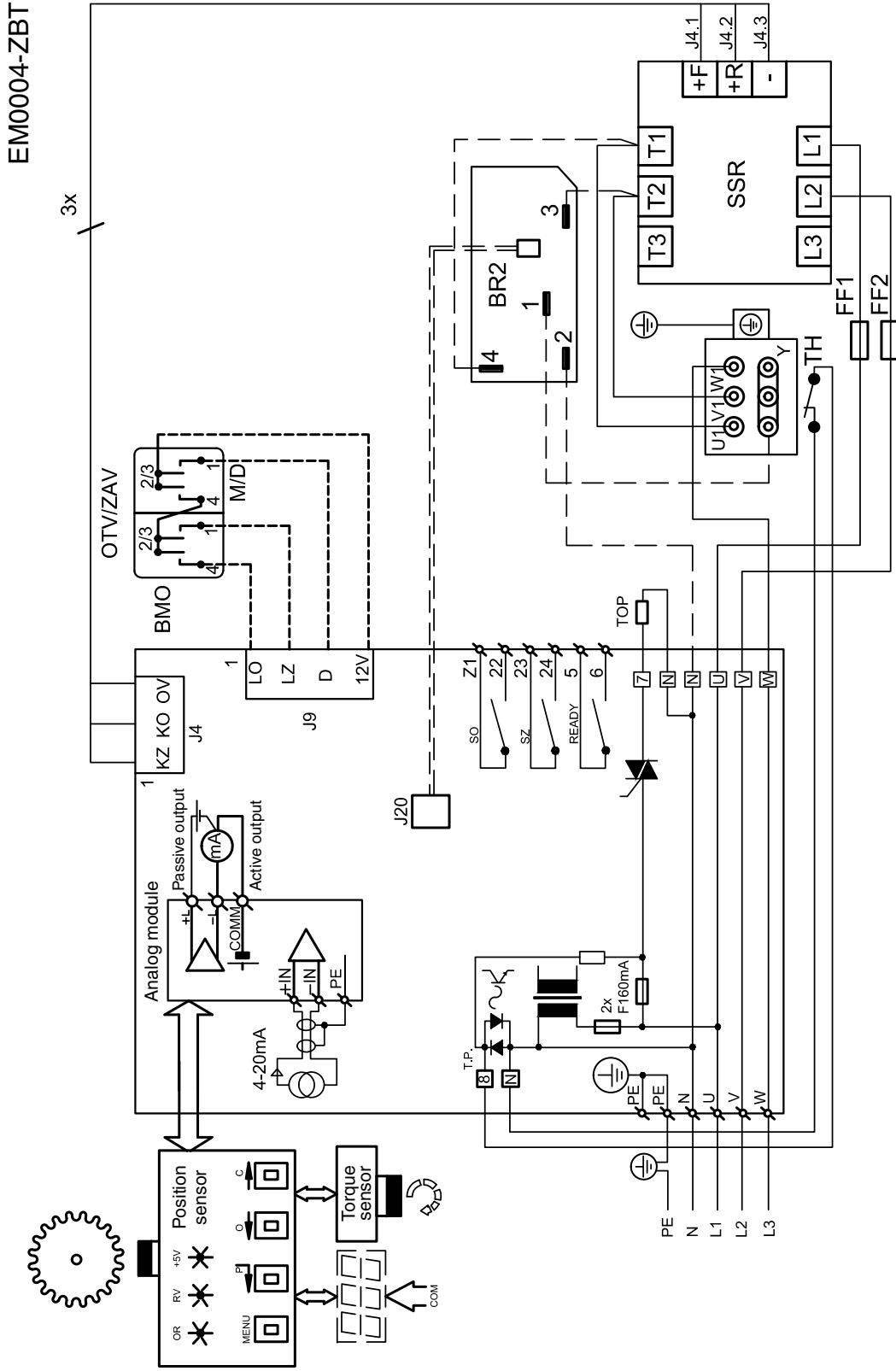
E0003

Electronic brake

KO A1 A2 21 22 5 6 3 4 1 2
KZ A1 A2 21 22 5 6 3 4 1 2

U2 V2 W2
M3~
U1 V1 W1
TH

MO
MZ
PO
PZ
SO
SZ
READY

10 11 12 13 3 16 17 15 4 19 20 18 22 21 24 23 5 6

TOP
7

Passive output
Active output
mA
COMM
+L
–L
+IN
–IN
PE
Analog module
Analogový
4÷20mA
MI/DAL
T.P.
2x F160mA
Source board
PE PE N U V W

Local control
"R" "L" "O" "C"

Position sensor
OR RU +5V
MENU P O C
Torque sensor
COM

3×400V

In version without local control,
the jumper from terminal U
is connected to terminal 2

Note: *Here, contacts of relays MO, MZ, SO, SZ are shown with power supply switched off; with power supply switched off contacts PO, PZ are shifted to the position drawn in dashed line.*

20

Example of wiring diagram of electronics **DMS2 ED** in version **Control with contact-less switching of electric motor**

EM0004-ZBT

3x

OTV/ZAV
M/D
BMO
2/3 1 4
2/3 1 4

BR2
4 1 2 3

SSR
T3 T2 T1
L3 L2 L1

+F +R -
J4.1 J4.2 J4.3

U1 V1 W1
Y
TH
FF1 FF2

KZ KO OV
J4
1

LO
LZ
D
12V
J9
1

Analog module
Passive output
mA
Active output
+ − COMM
+IN −IN PE
4-20mA

Position sensor
OR RV +5V
Torque sensor
C
O
PI
MENU
COM

TOP
J20

SO Z1 22
SZ 23 24
READY 5 6
7 N N U V W
T.P. 8 N
2x F160mA

PE
PE PE
N
U
V
W

PE
N
L1
L2
L3

Note: *Here, contacts of relays MO, MZ, SO, SZ are shown with power supply switched off; with power supply switched off contacts PO, PZ are shifted to the position drawn in dashed line.*

DMS2

Main properties of DMS2:
– Complete control of the actuator run of the two- and three-position regulation or connection to the industrial bus Profibus.
– Synoptic signalization of operation and service data on the character LCD display 2 x 12.
– Autodiagnostics of error reports on the LCD display, memory of recent failures and number of occurrences of respective failures.
– Setting of parameters by the PC program and by local control provided that the actuator is fitted with local control.

Basic outfit:
The control unit is the main part of the system DMS2; it comprises:
– Microcomputer and memory of parameters
– Position sensors
– 2 signalling LED
– Connectors for connecting the torque sensor, relay board, and two-position inputs, source board, communication adapter, LCD display, and local control

Torque unit provides for scanning torque by the contactless sensor

Source unit – two types exist:
DMS2.ZAN for the two-position or three-position control of the actuator by binary signals "Open" and "Close" or by analog signal 0 *(4)* – 20 mA.
DMS2.ZPR for controlling the actuator by the industrial bus Profibus.

Both units include the feeding source for electronics, two relays for controlling the power switches *(contactors or contactless switches)* of the electric motor, guarding of sequence of phases *(in case the actuator is fed by three-phase voltage),* circuits for connecting the anticondensation heater, and input terminals for connecting the thermo-contact from the electric motor. The units are fitted with the power terminal board for connecting the power supply. The units are fitted with a connector for the display and local control.

Unit DMS2ZAN also contains:
– input circuits for the two-position and three-position control of the actuator and terminals for connecting external control signals
– input of signal SAFE – information on external failure
– relay – total of five; four (signalling) can be set for reporting of position, torque, or other operation states of the actuator; the fifth (Ready) is used for reporting of errors, warnings, and other states when the actuator cannot faultlessly perform its function, and the terminals to which contacts of the relay are connected
– circuits of the feedback current signal – information on position of the actuator output shaft

Unit DMS2.ZPR also contains:
– circuits for communication with the superior control system through the industrial bus Profibus DP, input and output terminals for connecting the bus, and termination resistors with a switch.

Display unit – two-row display, 2 x 12 alpha-numeric characters
Unit of push-buttons – sensors of push-buttons *"open", "close", "stop"* and the rotary switch *"local, remote, stop".*
The actuator can be fitted with contactors or contactless switching of the electric motor; it can be fitted with an electronic brake.

PROCEDURE OF SETTING PARAMETERS BY PROGRAM DMS2

Before putting the actuator into operation, it is necessary to set some parameters of the system by means of program DMS2 on PC.
Before adjustment, check the actuator according to the paragraph ASSEMBLing And putting the ACTUATOR into operation.

Warning:
For safety reasons (reduced risk of damage to the actuator by wrong wiring), the system is delivered in the state of the induced error of CALIBRATION when the functions are limited and, during controlling the actuator from program DMS2, its run is stopped if any torque is induced.

Note:
The setting program is the same for electronics DMS2 ED. See the figure on page 13 for the main window and the window of Selection of electronics.

Working torque

– Check and, if necessary, set the value of the working torque 50 – 100 % in program DMS2, which you change only after consultation with the armature manufacturer.

Tripping in end-limit positions

– Check and, if necessary, set the way of tripping in the end-limit positions::
– Torque
– Torque + position O
– Torque + position Z
– Torque + position O + Z

End-limit positions - working stroke

– Position Z
– Shift to position Closed either manually or by means of menu Motor in program DMS2.
– The actuator can only be controlled by means of the program if no torque is induced. The torque should be left manually.
– Press push-button Z to confirm consent with the record.
– Position O
– Shift to position Open either manually or by means of menu Motor in program DMS2.
– The actuator can only be controlled by means of the program if no torque is induced. The torque should be left manually.
– Press push-button O to confirm consent with the record.

Autocalibration

– The autocalibration can only be started by means of the program if no torque is induced. The torque should be left manually.
– The autocalibration is started by push-button Start in program DMS2.
– Wait until the autocalibration is completed; information on its course is signalized next to push-button Start.

Other parameters

Check and, if necessary, change other parameters:

Control signal	4 – 20 mA	20 – 4mA	0 – 20 mA	20 – 0 mA
	2 position	Bus		
Insensitivity	1 – 1 0 %			
Function SAFE	Open	Close	Stop	To position
Active SAFE	O V	230 V		
Time of blocking torque in end-limit positions	0 – 20 s			
Position of blocking torque in end-limit positions	1 – 10 %			
Output of position signal	4 – 20 mA	20 – 4 mA		
Function READY - Combined error	Switched off	Warning	Errors	Warning or error
	Errors or not remote	Errors or warning or not remote	Torque "O" or "Z"	
Relay 1 – 4	Switched off	Position O	Position Z	
	Torque O	Torque Z	Torque and position O	Torque and position Z
	Opening	Closing	Motion	Position
	position N	Local control	Emote control	Control switched off
	Torque O/Z	Motion - blinker		
Position Relay 1 – 4	0 – 100 %			

Note:

SAFE - input information on the error of an external device can be set so that the actuator would respond as to its own error.

Autodiagnostics

The table List of errors – same as for electronics DMS2 ED *(page 14)*

Memory of number of induced errors

– For all detected errors, DMS2 uses the counter of occurrence of these errors during operation of the system.
– Values of the counters are stored to the EEPROM memory and are preserved even in case of the power supply fall-out.
– Reading and clearing of the counters is possible by means of the program for PC.

Memory of recently induced errors

– DMS2 stores 3 recently induced errors to the memory EEPROM.
– DMS2 provides for displaying the errors by means of the PC program or the switches of the local/ remote control.
– The display in MENU 22 INFORMATION shows ERROR 1, ERROR 2, ERROR 3. ERROR 1 is the latest error.

Setting parameters by means of push-buttons of local control

Signalization of operation regimes by means of diodes LED on the position sensor board:

Red	Green	State
-	-	System without feeding
-	lit on	Everything OK – working regime *(remote, local, or switched off control)*
blinking	lit on	Error or warning – working regime *(remote, local, or switched off control)*
lit on	lit on	Setting parameters by means of push-buttons or PC

Signalization of operation regimes by means of the display:
The display shows the actuator position in %, the state of local control and/or reaching of torque. In case of an error, blinking of this state alternates with number of actual error. In case of more errors, these errors repeat cyclically.

Overview of MENU

	Name	Parameter value	Meaning
1	JAZ/LANGUAGE	CZECH	Menu LANGUAGE
		ENGLISH	
2	POLOHA O, Z	POSITION OPEN	End-limit position Open or Closed
		POSITION CLOSED	
3	KALIBRACE	START	Starting of autocalibration
4	KONCOVA POL.	TORQUE	Tripping in end-limit positions
		TORQUE + POSITION OPEN	
		TORQUE + POS. CLOSED	
		TORQUE + POSITION OPEN + CLOSED	
5	MOMENT PR. O	50 – 100 %	Working torque Open *(selection 50 – 69 % depends on parameter Torque min.)*
6	MOMENT PR. Z	50 – 100 %	Working torque Closed *(selection 50 – 69 % depends on parameter Torque min.)*
7	CAS BLOK.MOM	0 – 20 s	Time of torque blocking
8	POLOHA BL. O	0 – 50 %	Position of torque blocking Open
9	POLOHA BL. Z	0 – 50 %	Position of torque blocking Closed
10	CPT	4 – 20 mA	Characteristics of current transducer
		20 – 4 mA	
11	RIDICI SIGN.	4 – 20 mA	Analog control signal
		20 – 4 mA	
		0 – 20 mA	
		20 – 0 mA	
12	NECITLIVOST	1 – 10 %	Range of insensitivity
13	SAFE	OPEN	Response to signal Safe and loss of control signal
		CLOSE	
		STOP	
		POSITION	

	Name	Parameter value	Meaning
14	SAFE AKTIV.	0 V	Active signal Safe
		230 V	
15	TP SAFE	blocking SAFE	Response with thermal protection activated
		SAFE activ	
16	TP NULOVANI	AUTOMATICALLY	Zeroing of thermal protection
		LOCAL CONTROL	
17	RELE READY	OFF	Function of Relay Ready
		WARNING	
		FAULTS	
		WARNING + FAULTS	
		FAULTS + NOT REMOTELY	
		WARNING + FAULTS + NOT REMOTE	
		TORQUE OPENED / CLOSED	
18	RELE 1	OFF	Function of Relay 1
		POSITION OPEN	
		POSITION CLOSED	
		TORQUE OPEN	
		TORQUE CLOSED	
		POSITION OPEN + TORQUE OPEN	
		POSITION CLOSED + TORQUE CLOSED	
		OPENING	
		CLOSING	
		MOVEMENT	
		POSITION	
		LOCAL CONTROL	
		REMOTE CONTROL	
		CONTROL OFF	
		TORQUE OPENED / CLOSED	
		MOVEMENT + BLINKER	
19	RELE 2	same as RELE 1	Function of Relay 2
20	RELE 3	same as RELE 1	Function of Relay 3
21	RELE 4	same as RELE 1	Function of Relay 4
22	INFORMACE	SENSOR	Information on the system
		INTERN DISPLAY	
		EXTERN DISPLAY	
		ED DISPLAY – electronical desk	
		COLLECT CONTROL	
		FAULT 1	
		FAULT 2	
		FAULT 3	
		TORQUE	
		TEMPERATURE	
23	ZALOHA PAR	RESTART PARAMETRES	Creation of backup parameters, restoring from backup parameters
		CREATE A BACKUP	
24	ADRESA	1 – 125	Address of actuator on industrial bus
25	TAKT MOD	OFF	Mode of cycle regime
		DIRECTION OPEN	
		DIRECTION CLOSED	
		DIRECTION O+C	
26	TAKT BEH	1 – 250 s	Time of motor run down in cycle regime
27	TAKT PAUSA	1 – 250 s	Time of motor pause in cycle regime

Setting actuator by means of push-buttons:

– Shift the change-over switch of local control to position OFF

– Keep pressing push-button STOP to enter the MENU. Using push-buttons O or Z, browse through the MENU *(MENU1 – MENU27).* Shortly press push-button STOP in a selected menu to enter this menu and, using push-buttons O or Z, select the parameter. Keep pressing push-button STOP to store the parameter to memory. Shortly press push-button STOP to exit the setting of parameters and proceed with browsing through another menu.

Keep pressing push-button STOP to exit the set menu; or keep pressing push-button STOP in the item END after the last MENU 27 to terminate the setting regime.

Setting end-limit positions by means of push-buttons of local control

Shift the change-over switch LOCAL – REMOTE to position OFF. Keep pressing push-button STOP to enter the setting regime. Using push-button "Z", choose MENU2. Shortly press push-button STOP to select setting of position "O". Shift the change-over switch to position "LOCAL" and start the actuator. After the required position is reached, shift the switch to position "OFF" and keep pressing of push-button "STOP" to store the position to memory.

Shortly press push-button "Z" to select setting of position "Z". Shift the change-over switch again to position "LOCAL" and start the actuator in direction "Z". After the required position is reached, shift the switch to position "OFF" and keep pressing push-button "STOP" to store the position to memory.

Shortly press push-button "STOP" to exit MENU 2. Keep pressing push-button "STOP" to exit the setting regime.

Change over the local control to position OFF, enter the menu *(by long pressing of push-button STOP),* and change over to position "LOCAL"; the actuator can now be shifted by means of push-buttons "O" and "Z" beyond the set end-limit positions. In this case, the actuator will trip after the set tripping torque is reached.
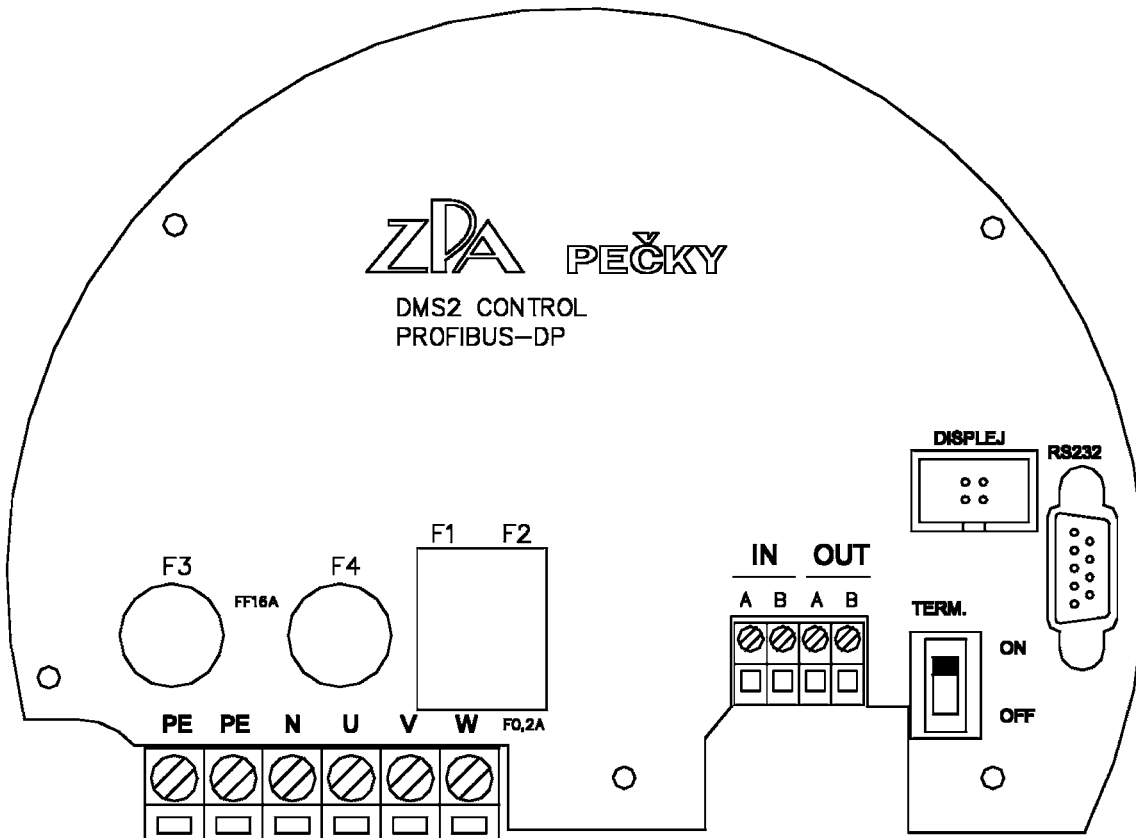
Autocalibration

In the setting regime choose MENU 3. Shortly press push-button "STOP" to enter MENU 3 and keep pressing push-button "STOP" to start autocalibration. By short starting of the motor in both directions, the actuator will measure inertia. Completion of the autocalibration is announced by the message AUTOCALIBRATION OK.
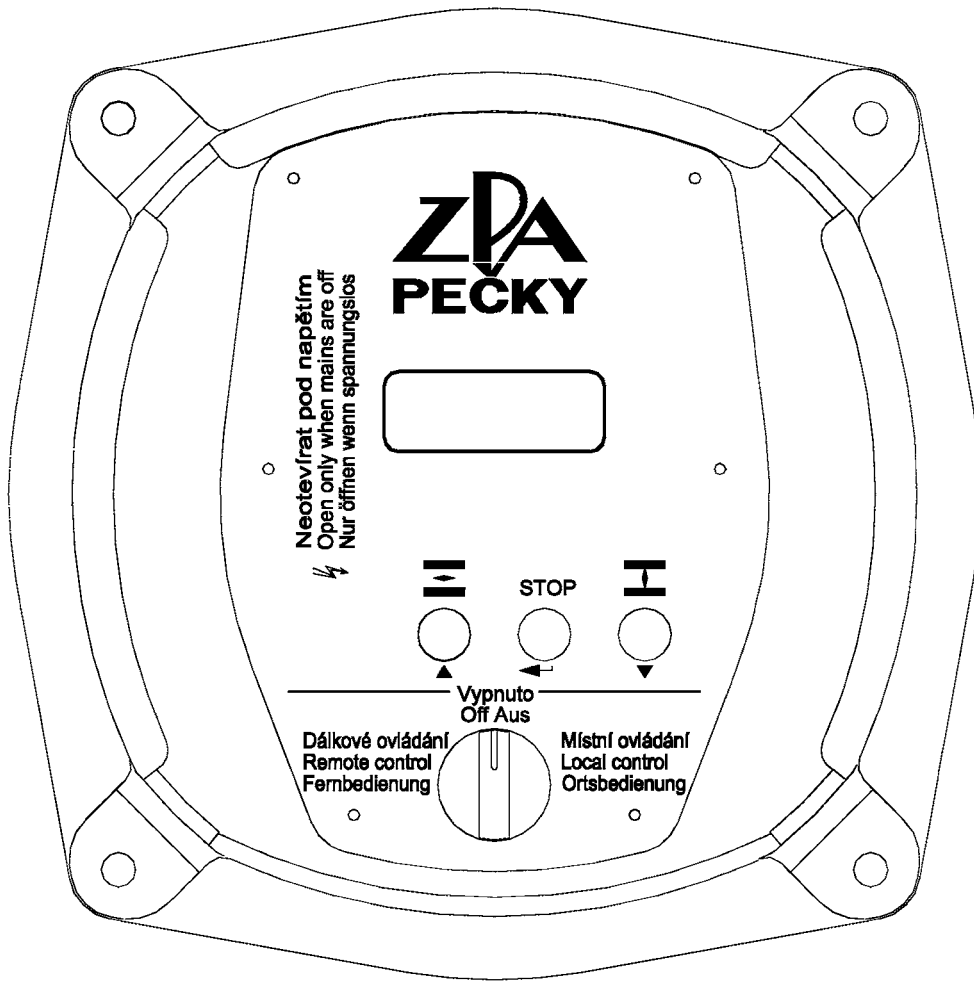
Shortly press push-button "STOP" to return to MENU 3 and keep pressing of push-button "STOP" to exit the setting regime.

COM 1
RE4 2
RE3 3
RE2 4
RE1 5
NC 6
READY NO 7
COM 8

ZPA PEČKY
DMS2 CONTROL

1 2 3 4 5 6 7 8   10 11 12 13 14 15

15 COMM
14 -L
13 +L
12 PE
11 -IN
10 +IN

DISPLEJ   RS232

F3   F4   F1   F2

FF16A

O PWR
O SAFE
O OPEN
O CLOSE

23 OPEN
24 CLOSE
25 N24-48V
26 N230V

N230V 22
N24-48V 21
SAFE 20

PE PE N U V W   F0,2A

20 21 22 23 24 25 26

Connector to connect local display *(not used here)*
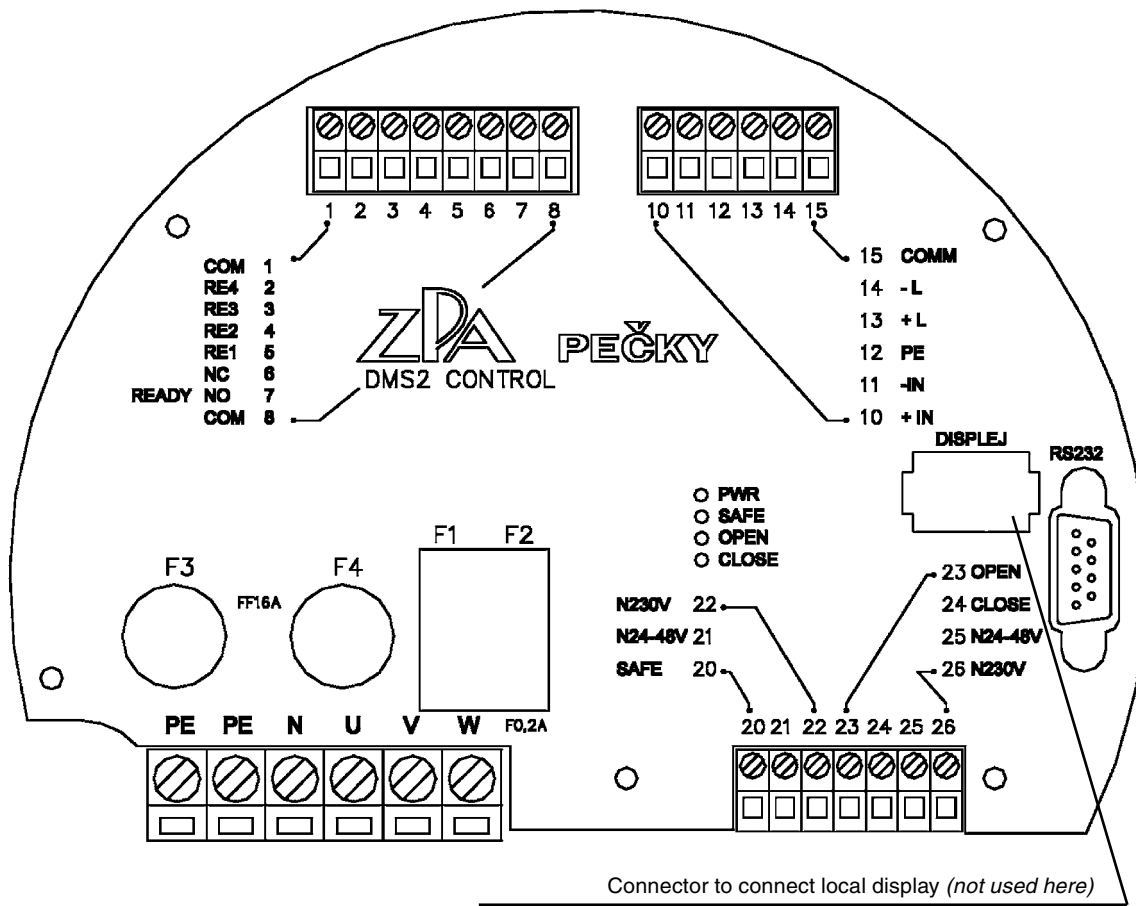
Terminal board of DMS2 Analog

ZPA PEČKY
DMS2 CONTROL
PROFIBUS–DP

DISPLEJ   RS232

F3   F4   F1   F2

FF16A

IN   OUT
A B   A B

TERM.

ON

OFF

PE PE N U V W   F0,2A

Terminal board of DMS2 Profibus

27

DMS2 - local control and display

Note:

The setting program enables data to be copied from the memory of parameters of the electronics DMS2 and DMS2ED into the computer as a file with suffix "par" (in the example in the figure the file 52 030.par is created in the directory Flash). The file can serve as a back-up for the case that it will be necessary to replace the position sensor in the given actuator and to set it in the same way as the replaced one; or it can be sent as an enclosure to e-mail to the manufacturing or service firm in solving possible problems..
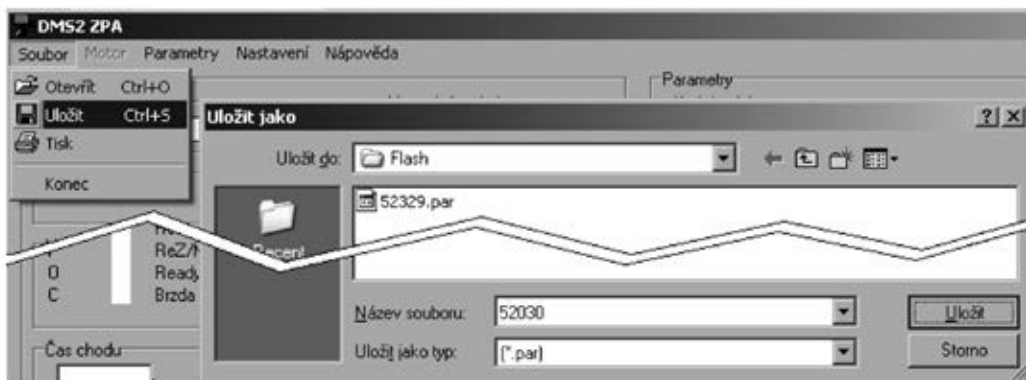
Example of wiring diagram of electronics **DMS2 Analog** in version **Control** *(actuators MODACT MPSED, MPSPED)*

E0006
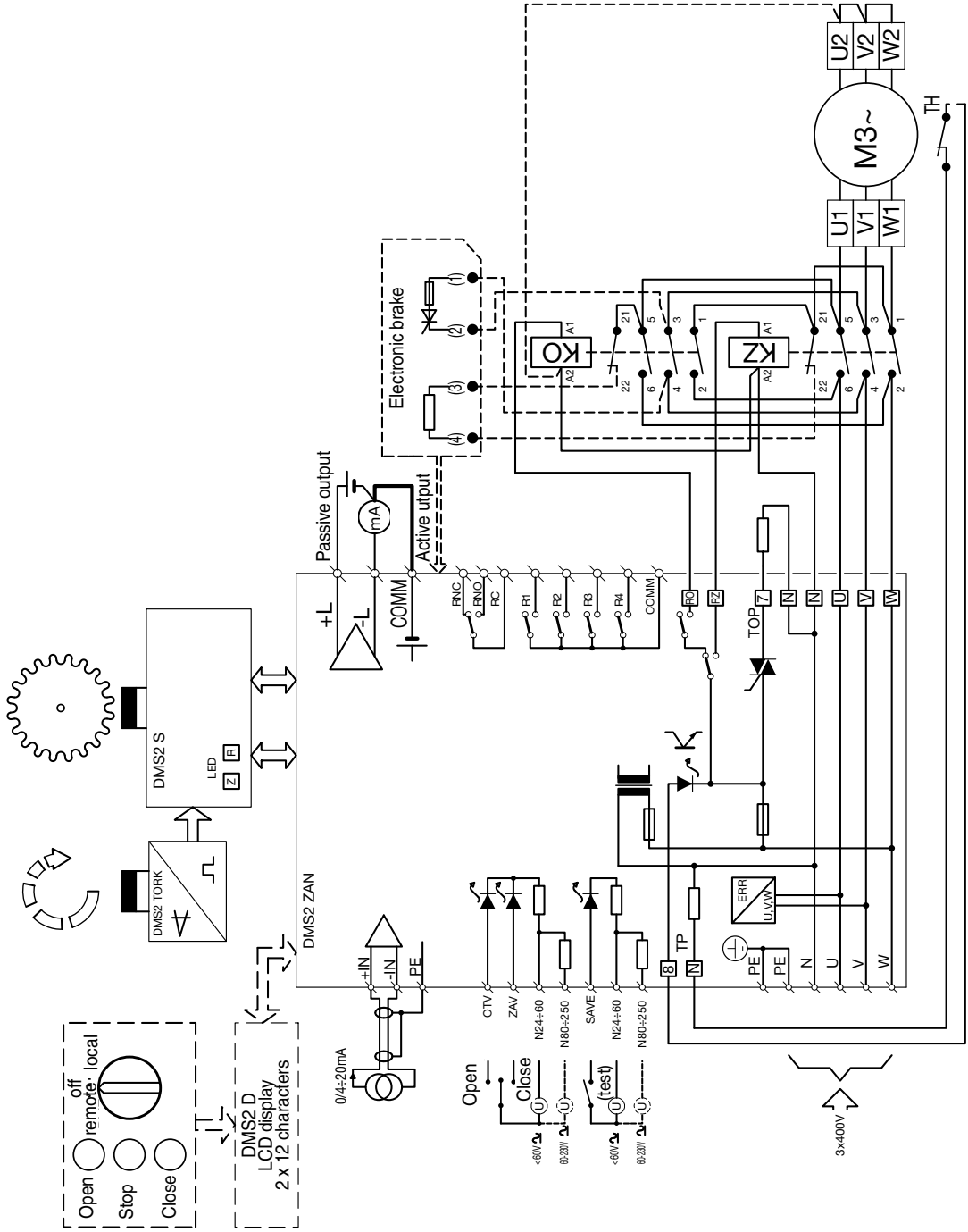
Example of wiring diagram of electronics **DMS2 Analog** in version **Control** with connector connection
(actuators MODACT MPSED)

E0032K
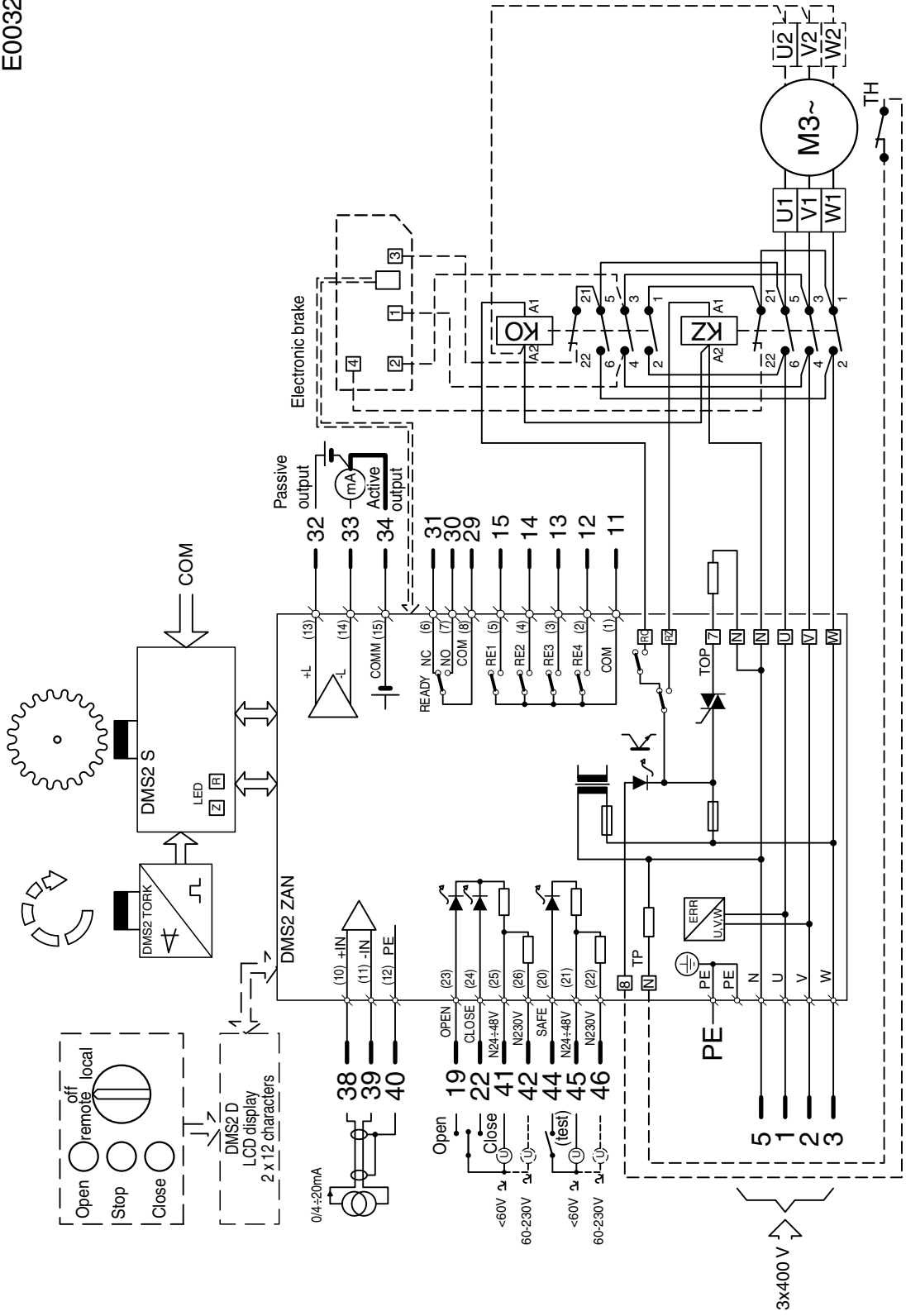
Example of wiring diagram of electronics **DMS2 Analog** with contact-less switching of electric motor
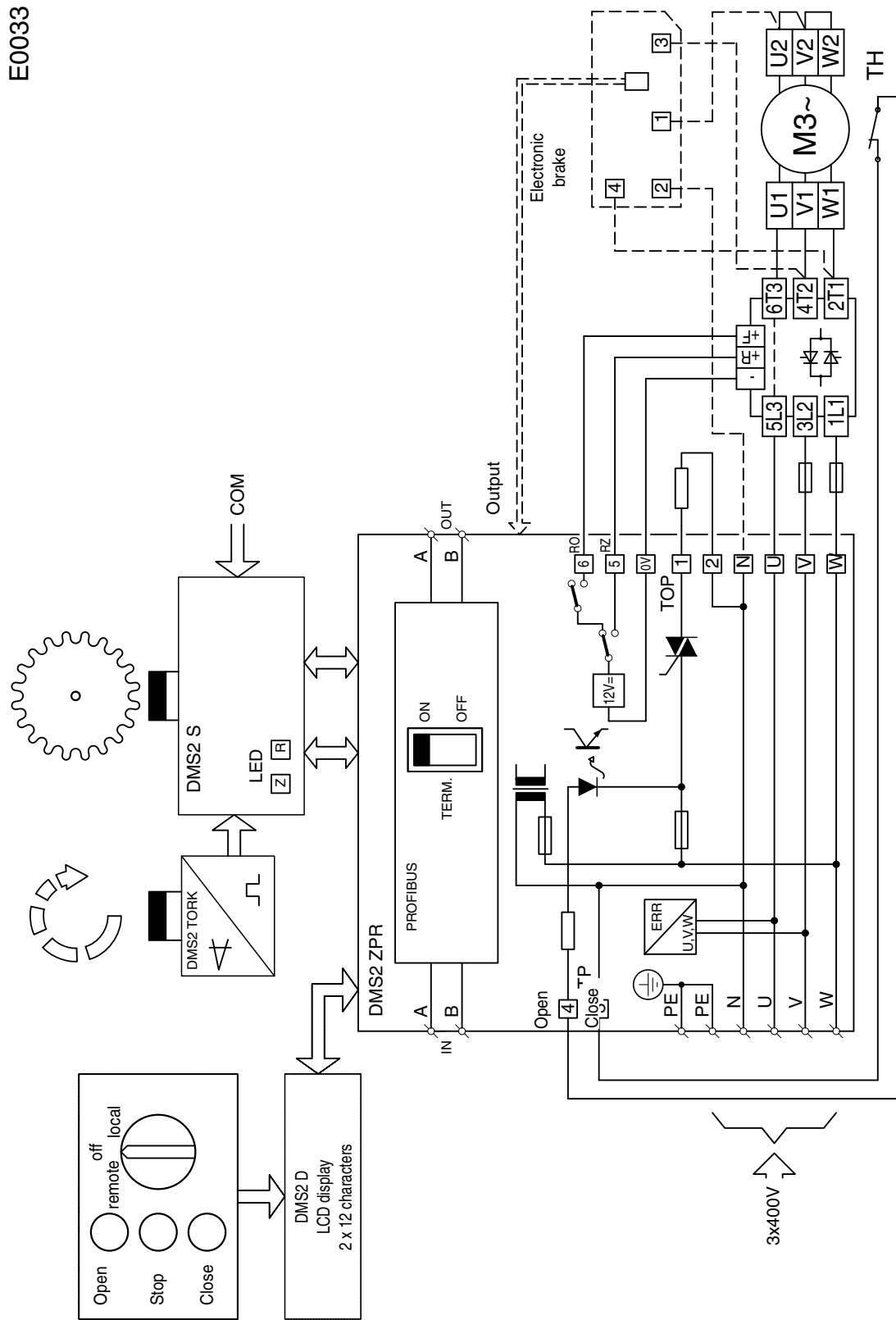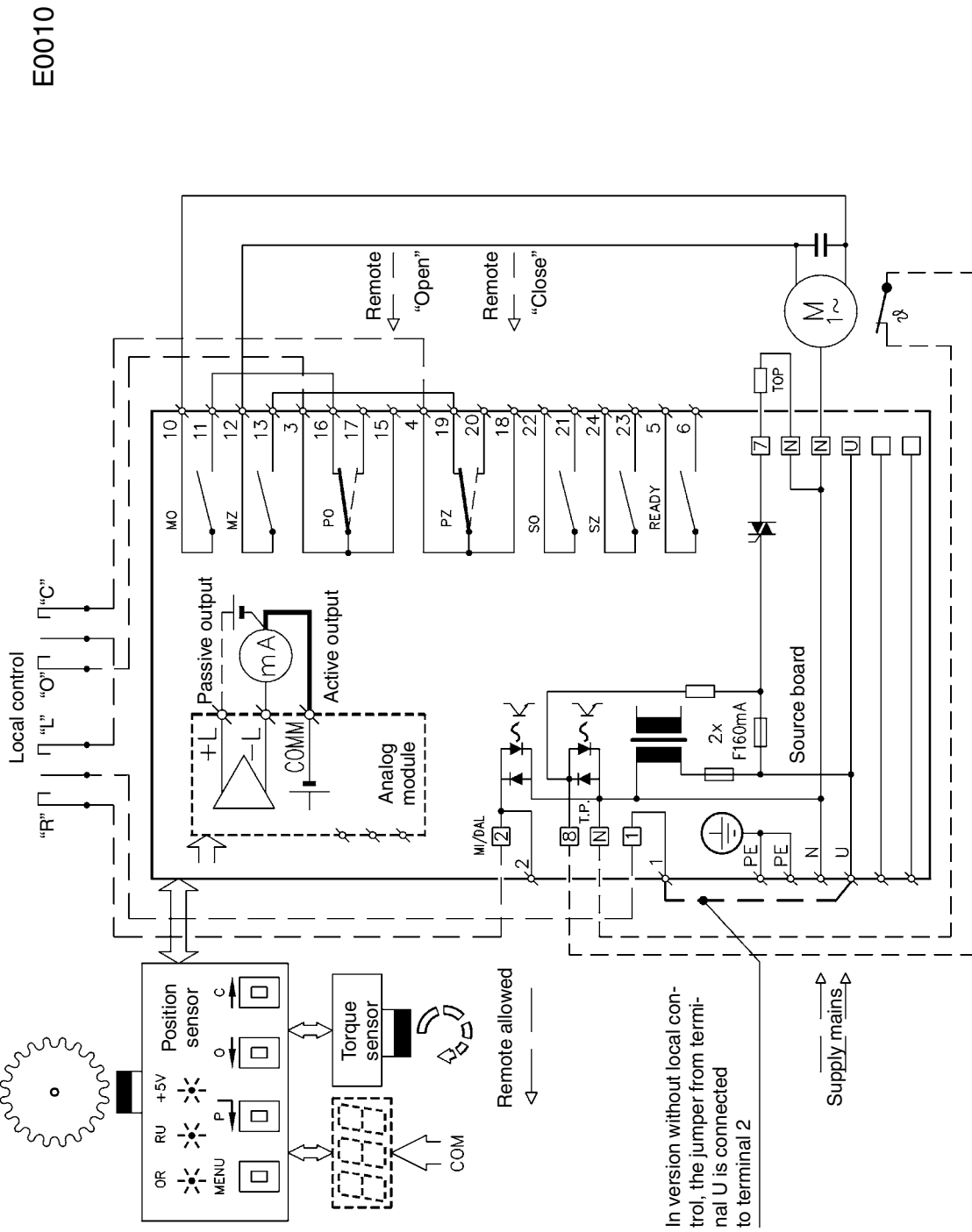*(actuators MODACT MPSED)*

COM

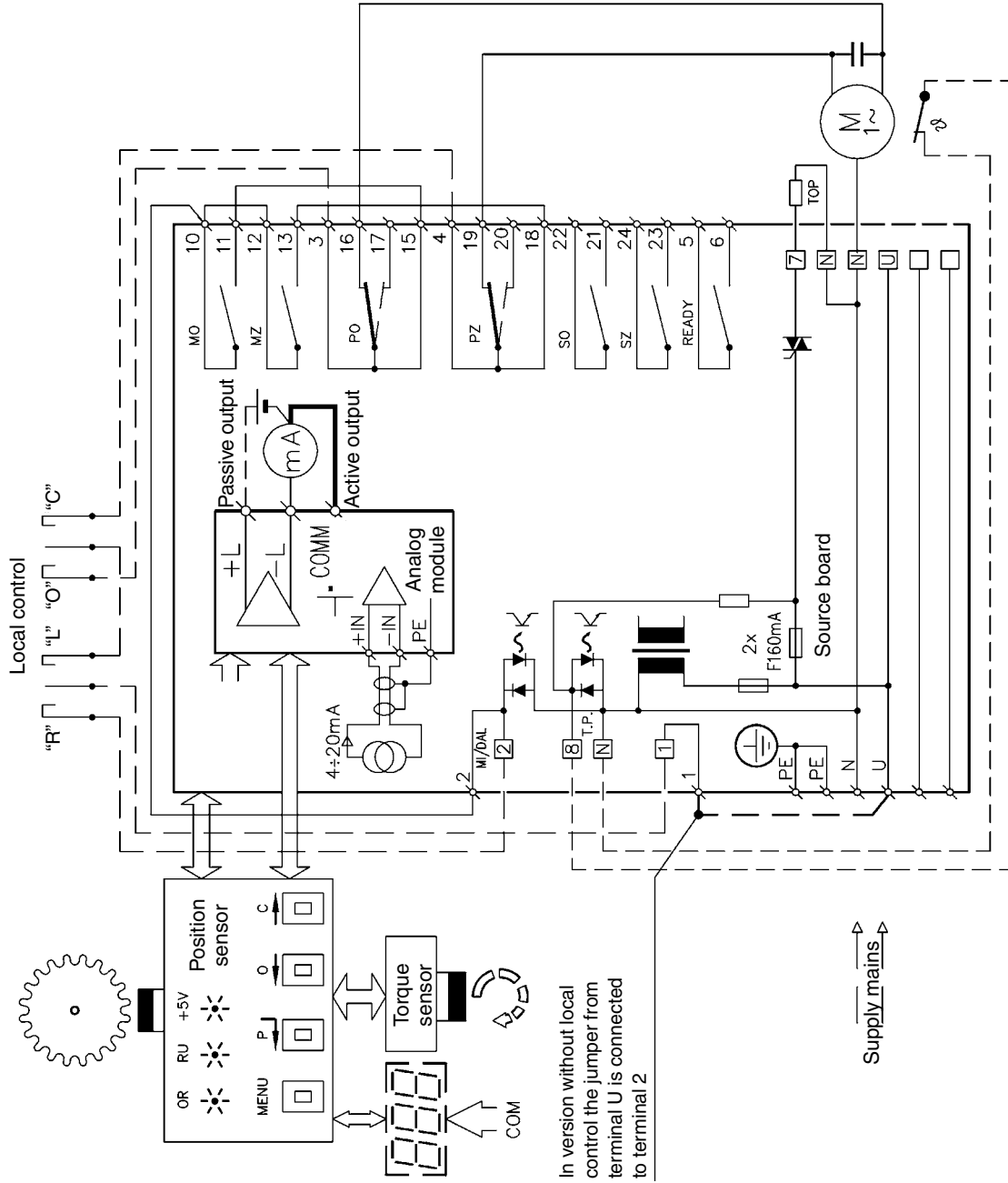DMS2 S

LED
Z R

DMS2 TORK

DMS2.ZAN_DC

DMS2 D
LCD display
2 x 12 characters

Open
Stop
Close

off
remote   local

0/4÷20mA

Open

Close

(test)

<60V
60-230V
N230V
N24÷48V

OPEN (23)
CLOSE (24)
N24÷48V (25)
N230V (26)
SAFE (20)
N24÷48V (21)
N230V (22)

(10) +IN
(11) -IN
(12) PE

Passive output

Active output

+L (13)
-L (14)
COMM (15)

mA

READY NC (6)
NO (7)
COM (8)
RE1 (5)
RE2 (4)
RE3 (3)
RE4 (2)
COM (1)

RO 6
RZ 5
0V
TOP 1
2
N
U
V
W

12V

TP
4
3

PE
PE
N
U
V
W

ERR
U,V,W

Electronic brake

3
1
4 2

6T3
4T2
2T1
+ R.F -
5L3
3L2
1L1

U2
V2
W2

M3~

U1
V1
W1

TH

3x400 V
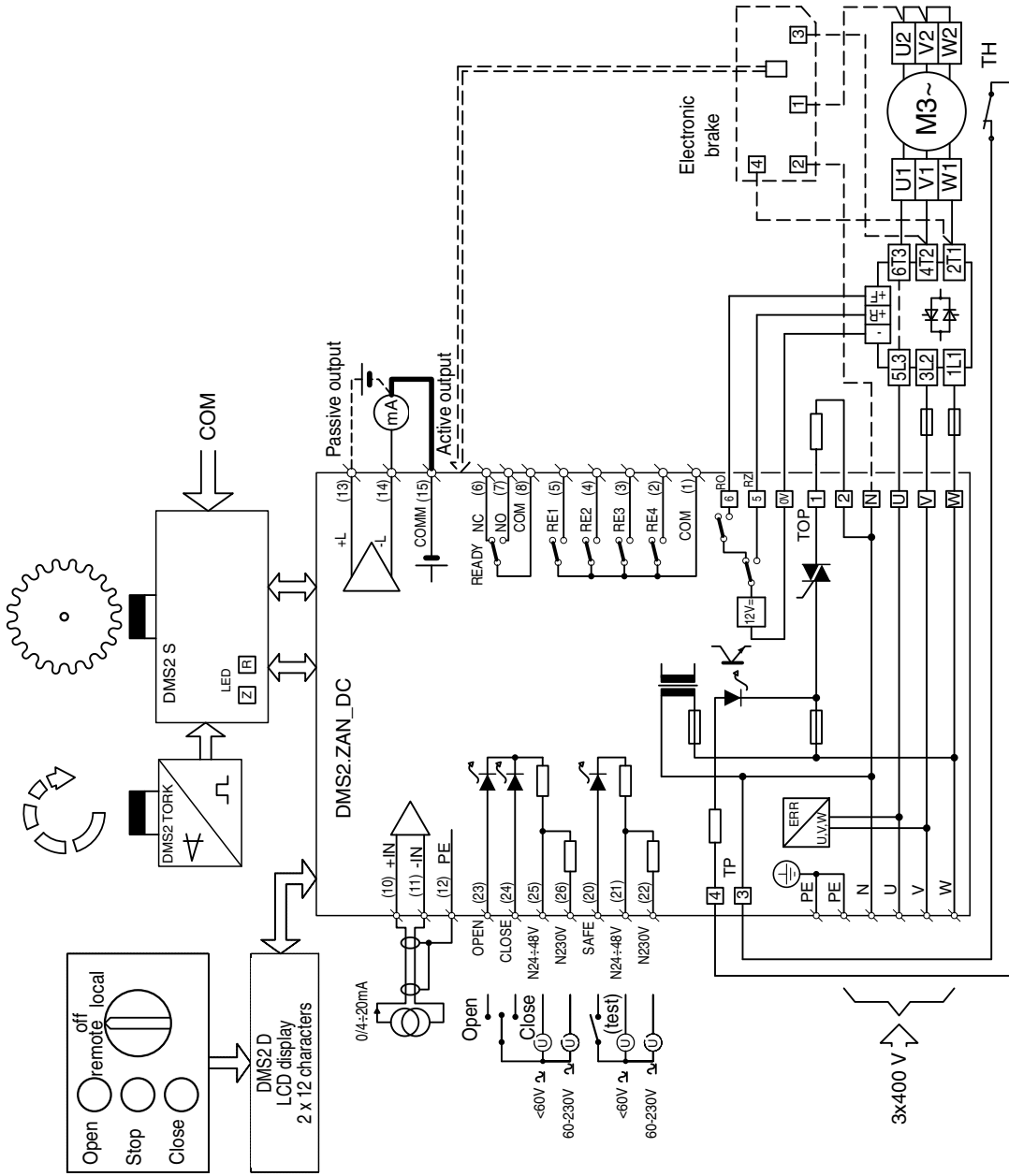
Example of wiring diagram of electronics **DMS2 Profibus** (*actuators MODACT MPSED, MPSPED*)

E0008

Electronic brake

U2 V2 W2

M3~

TH

U1 V1 W1

KO   KZ

A1 A2

21 5 3 1   22 6 4 2

DMS2 S

LED G R

DMS2 TORK

PROFIBUS

ON OFF TERM.

DMS2 ZPR

A B

IN OUT

RO RZ

TOP 7 N N U V W

TP 8 N

PE PE N U V W

ERR U,V,W

3x400V

DMS2 D
LCD display
2 x 12 characters

off
remote local

OPEN
STOP
CLOSE
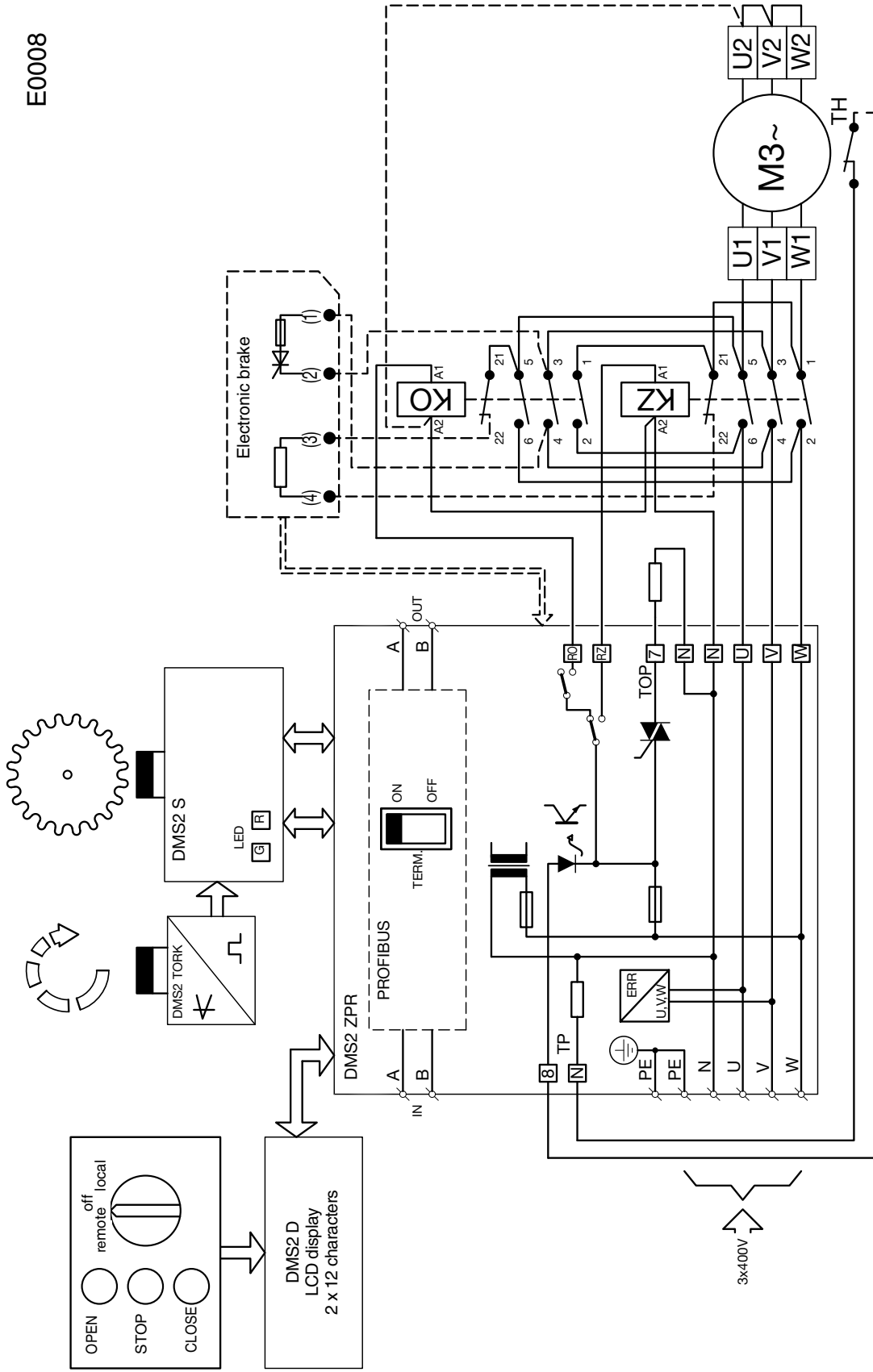
Example of wiring diagram of electronics **DMS2 Profibus** with contact-less switching of electric motor
(actuators MODACT MPSED)

E0033

Example of wiring diagram of electronics **DMS2 ED** in version **Substitution of electro-mechanical board** (*actuators MODACT MPSED, MPSPED 52 260*) with single-phase electric motor

E0010

In version without local control, the jumper from terminal U is connected to terminal 2

Note: Here, contacts of relay MO, MZ, SO, SZ are shown with power supply switched off, with power supply switched off contacts PO, PZ are shifted to the position drawn in dashed line.
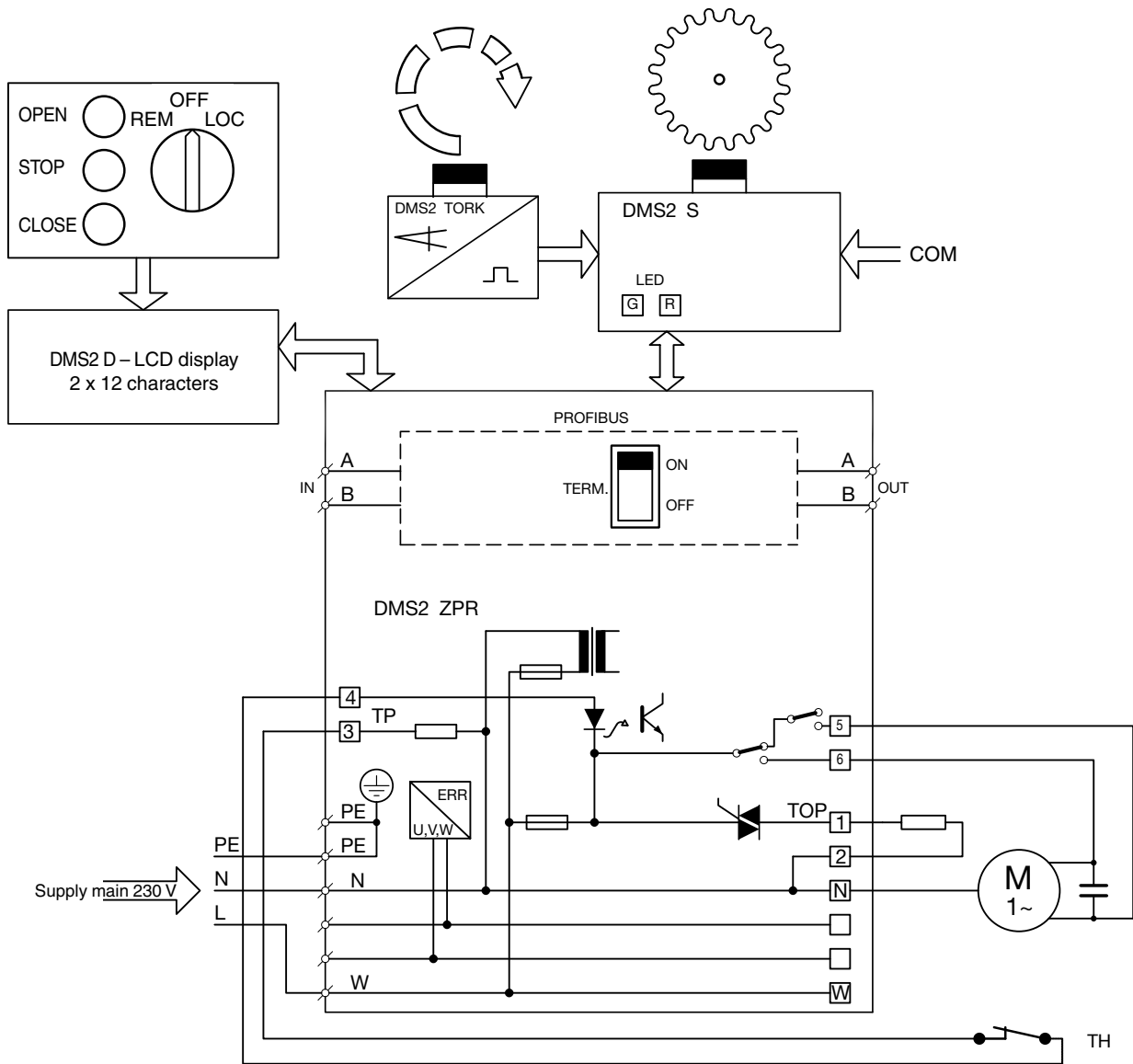
Example of wiring diagram of electronics **DMS2 ED** in version **Control**
(actuators MODACT MPSED, MPSPED 52 260) with single-phase electric motor

E0012

Local control

"R" "L" "O" "C"

Position sensor
OR RU +5V
MENU P O C
COM

Torque sensor

Passive output
Active output
mA
+L
−L
COMM

Analog module
+IN −IN PE
4÷20mA
MI/DAL

T.P.

2x F160mA
Source board

TOP

MO MZ PO PZ SO SZ READY

10 11 12 13 3 16 17 15 4 19 20 18 22 21 24 23 5 6

7 N N U

PE PE N U

M 1~

In version without local control the jumper from terminal U is connected to terminal 2

Supply mains

Note: *Here, contacts of relay MO, MZ, SO, SZ are shown with power supply switched off; with power supply switched off contacts PO, PZ are shifted to the position drawn in dashed line.*

Example of wiring diagram **of system DMS2 Analogue**
with single-phase electric motor *(actuators MODACT MPSED, MPSPED 52260)*

E0018
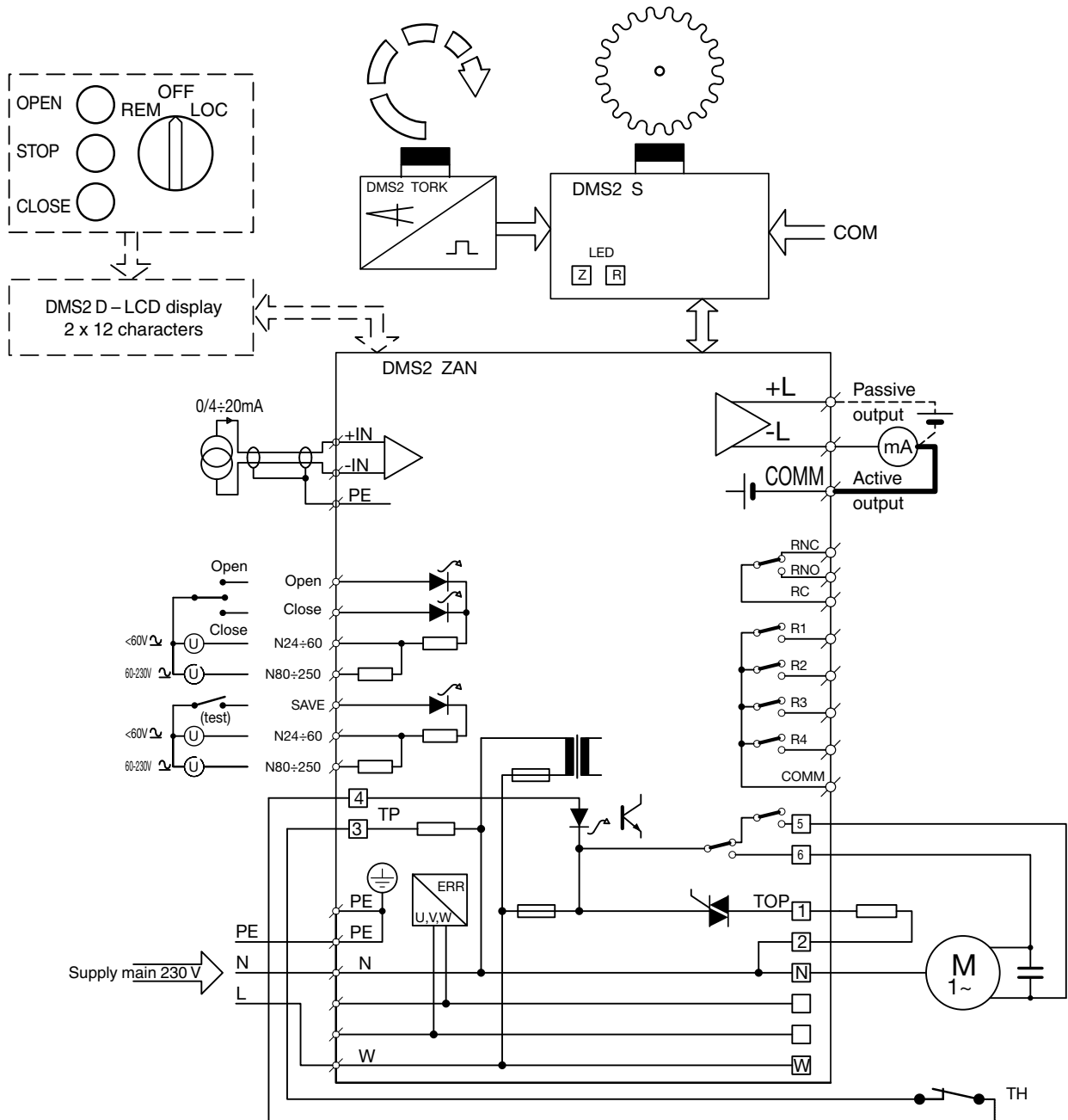
Example of wiring diagram **of system DMS2 in version Profibus** **with single-phase electric motor** *(actuators MODACT MPSED, MPSPED 52260)*
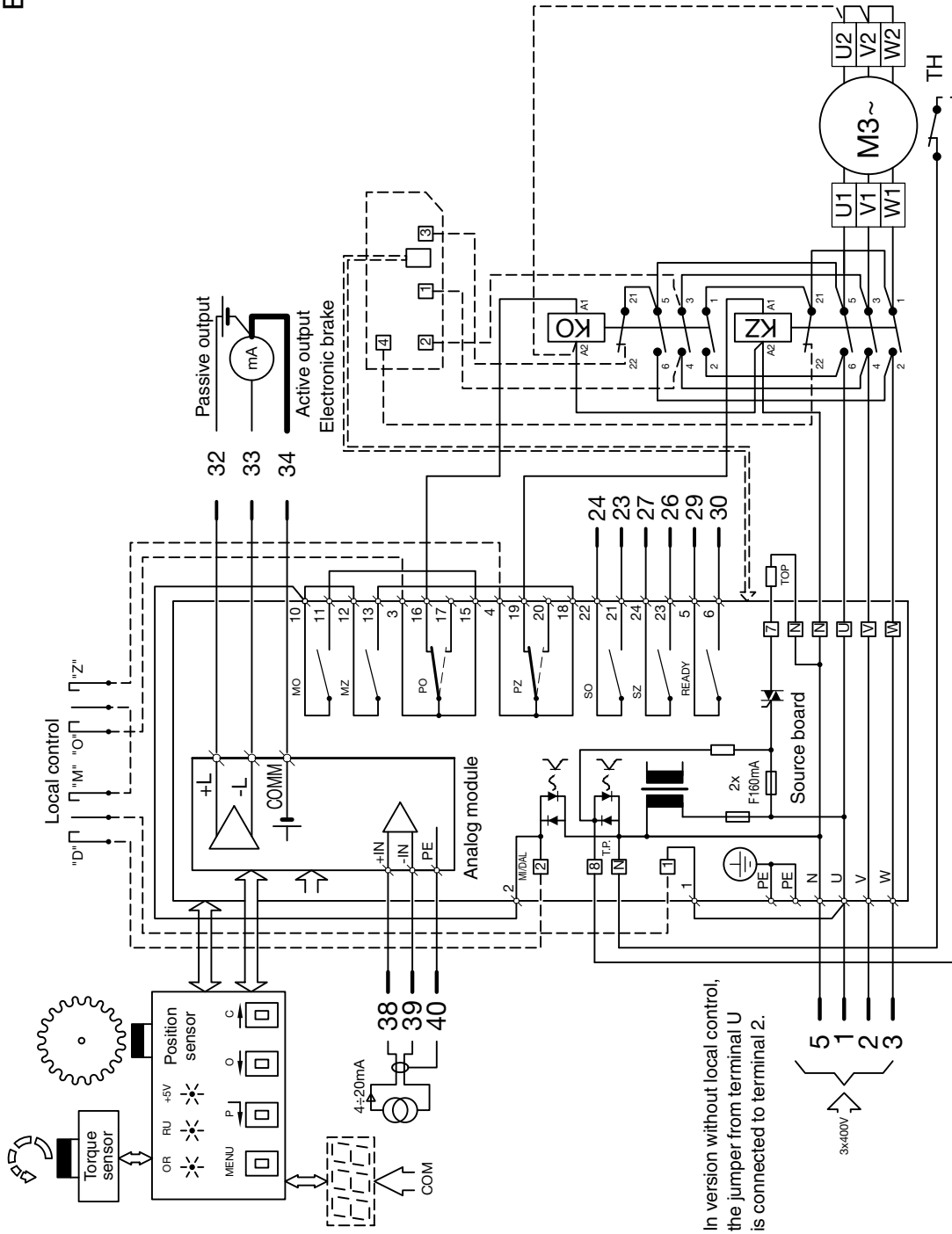
E0019

OPEN
STOP
CLOSE
OFF
REM   LOC

DMS2 TORK

DMS2 S

COM

LED
G R

DMS2 D – LCD display
2 x 12 characters

PROFIBUS

A
IN
B

TERM.
ON
OFF

A
B
OUT

DMS2 ZPR

4
3   TP

PE
PE

ERR
U,V,W

PE

Supply main 230 V

N   N
L

W

5
6

TOP
1
2
N
W

M
1~

TH

37

Example of wiring diagram of electronics **DMS2 ED** in version **Control** with contact-less switching of electric motor with connector connection

EM0043K-ZBT
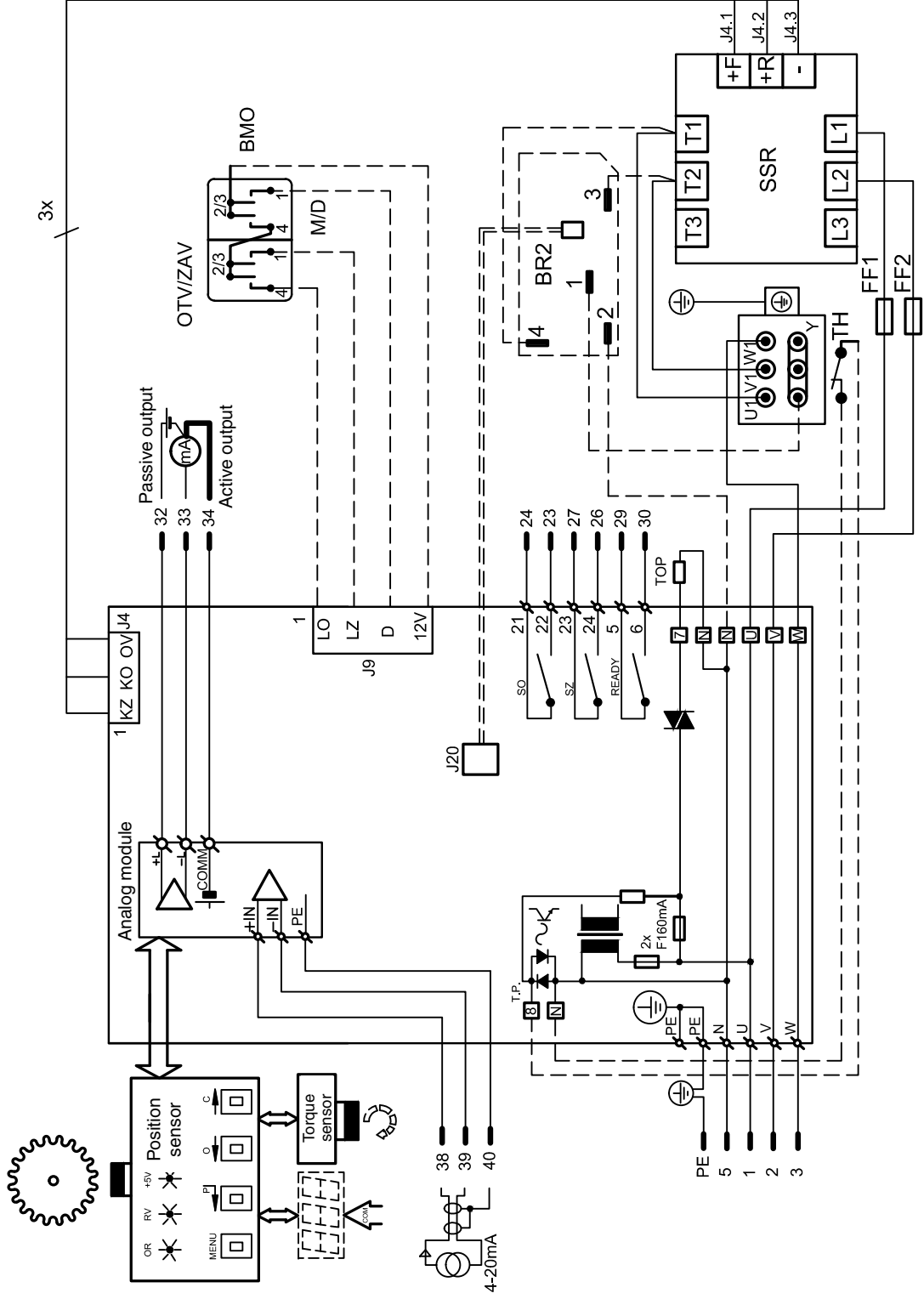
Wiring diagram of electrical actuators **MODACT MPSED, MPSED, MPSPED 52 261 - 52 266**
in version **DMS2 ED Control with connector**

E0027K

In version without local control,
the jumper from terminal U
is connected to terminal 2.

Wiring diagram of electrical actuators **MODACT MPSED, MPSED, MPSPED 52 261 - 52 266** in version **DMS2 ED - Substitution of electro-mechanical board with connector**

E0028K

40
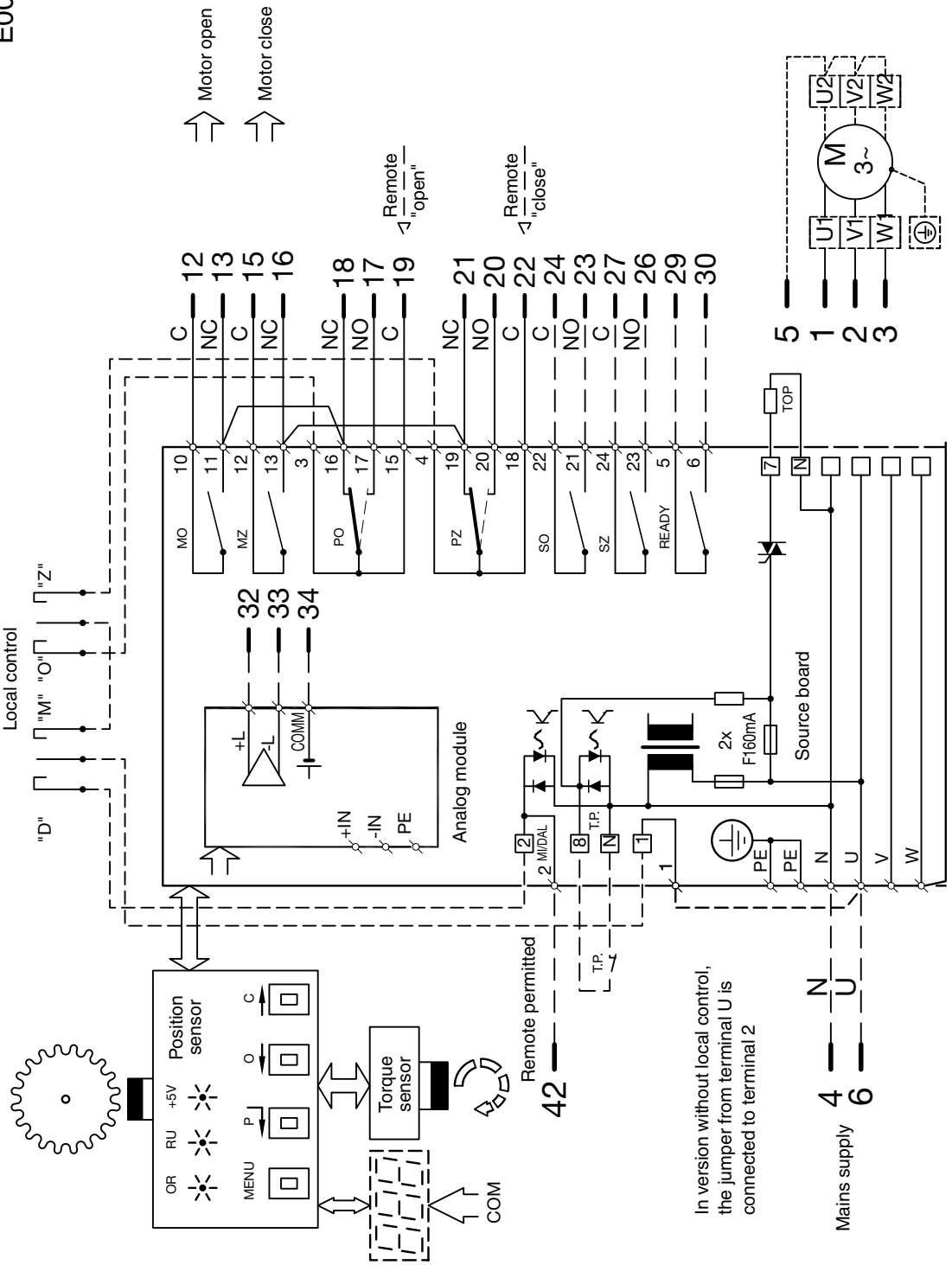
Table 1a – MODACT MPSED, MODACT MPSED Control (IP55) electric actuators
– basic technical parameters

Type designation	Tripping torque range [Nm]	Operating time [s/90°]	Motor power [W]	Voltage [V]	Motor current In [A]	Starting motor current Iz [A]	Volume of lubricant [kg]	Weight [kg]	Type Number basic	Type Number additional
MPSED, MPSPED 8/8	20 – 80	8	90	400	0.34	1	0.3	26	5 2 2 6 0	x x 1 x x xD
MPSED, MPSPED 8/16		16	90	400	0.34	1				x x 2 x x xD
MPSED, MPSPED 8/32		32	60	230	0.53	1.15				x x 3 x x xD
MPSED, MPSPED 8/63		63	20	230	0.4	1.63				x x 4 x x xD
MPSED, MPSPED 12,5/8	60 – 125	8	90	400	0.34	1				x x 5 x x xD
MPSED, MPSPED 12,5/16		16	90	400	0.34	1				x x 6 x x xD
MPSED, MPSPED 12,5/32		32	60	230	0.53	1.15				x x 7 x x xD
MPSED, MPSPED 12,5/63		63	20	230	0.4	0.63				x x 8 x x xD
MPSED, MPSPED 16/16	100 – 160	16	120	400	0.42	1.44	0.5	70	5 2 2 6 1	x x 1 x x xD
MPSED, MPSPED 16/32		32								x x 2 x x xD
MPSED, MPSPED 16/63		63								x x 3 x x xD
MPSED, MPSPED 16/120		120								x x 4 x x xD
MPSED, MPSPED 32/16	160 – 320	16	180	400	0.56	1.82	0.5	70	5 2 2 6 2	x x 1 x x xD
MPSED, MPSPED 32/32		32								x x 2 x x xD
MPSED, MPSPED 32/63		63								x x 3 x x xD
MPSED, MPSPED 32/120		120								x x 4 x x xD
MPSED, MPSPED 63/16	320 – 630	16	370	400	1.03	3.25	0.7	120	5 2 2 6 3	x x 1 x x xD
MPSED, MPSPED 63/32		32	180	400	0.56	1.82				x x 2 x x xD
MPSED, MPSPED 63/63		63								x x 3 x x xD
MPSED, MPSPED 63/120		120								x x 4 x x xD
MPSED, MPSPED 125/16	630 – 1250	16	370	400	1.03	3.25	0.7	120	5 2 2 6 4	x x 1 x x xD
MPSED, MPSPED 125/32		32								x x 2 x x xD
MPSED, MPSPED 125/63		63								x x 3 x x xD
MPSED, MPSPED 125/120		120	180	400	0.56	1.82				x x 4 x x xD
MPSED, MPSPED 200/45	1250 – 2000	45	370	400	1.03	3.25	0.7	267	5 2 2 6 5	x x 0 x x xD
MPSED, MPSPED 400/45	2500 – 4000								5 2 2 6 6	x x 0 x x xD

Note:

Currents of electric motors apply to Un = 3 x 230/400 V, 50 Hz, Un = 1 x 230 V, 50 Hz.
The values of parameters apply to working conditions according to ČSN 186330 Cl. 4.1 through 4.5.
Permitted deviation of the shifting time according to ČSN 186330 Cl. 4.19 is -15 % to +10 % of the rated value.
MPSED where x: E = DMSED

Table 1b – MODACT MPSED electric actuators (IP67)

Type designation	Tripping torque range [Nm]	Operating time [s/90°]	Motor power [W]	Voltage [V]	Motor current In [A]	Starting motor current Iz [A]	Volume of lubricant [kg]	Weight [kg]	Type Number basic	Type Number additional
MPSPED 16/16	100 – 160	16	120	400	0.42	1.44	0.5	70	5 2 2 6 1	x x 1 x x PED
MPSPED 16/32		32								x x 2 x x PED
MPSPED 16/63		63								x x 3 x x PED
MPSPED 16/120		120								x x 4 x x PED
MPSPED 32/16	160 – 320	16	180	400	0.56	1,82	0.5	70	5 2 2 6 2	x x 1 x x PED
MPSPED 32/32		32								x x 2 x x PED
MPSPED 32/63		63								x x 3 x x PED
MPSPED 32/120		120								x x 4 x x PED
MPSPED 63/16	320 – 630	16	370	400	1.03	3.25	0.7	120	5 2 2 6 3	x x 1 x x PED
MPSPED 63/32		32	180	400	0.56	1.82				x x 2 x x PED
MPSPED 63/63		63								x x 3 x x PED
MPSPED 63/120		120								x x 4 x x PED
MPSPED 125/16	630 – 1250	16	370	400	1.03	3.25	0.7	120	5 2 2 6 4	x x 1 x x PED
MPSPED 125/32		32								x x 2 x x PED
MPSPED 125/63		63								x x 3 x x PED
MPSPED 125/120		120	180	400	0.56	1.82				x x 4 x x PED
MPSPED 200/45	1250 – 2000	45	370	400	1.03	3.25	0.7	267	5 2 2 6 5	x x 0 x x PED
MPSPED 400/45	2500 – 4000								5 2 2 6 6	x x 0 x x PED

Electric actuators MODACT MPSED

– Specification of meaning of the 6th to 10th place of the type number:

Place in the type number: 1th 2th 3th 4th 5th   6th   7th   8th   9th   10th
Type number 5   2   2   6   x.   x   x   x   x   x E D

Table 2 – Specification of individual positions in the type number

6th place	Connecting dimensions, electric connection		6 – terminal board
			7 – connector
7th place	output shaft end, working stroke *(version 5 – 8 is not available for type no. 52 265 and 52 266)*	1 – lever, 60°	5 – without lever, 60°
		2 – lever, 90°	6 – without lever, 90°
		3 – lever, 120°	7 – without lever, 120°
		4 – lever, 160°	8 – without lever, 160°
8th place	shifting time 90°		**Table 1**
9th place	fitting of electronics	at 10th place: 1, 3, 5, 7, 9	**Table 3**
		at 10th place: 2, 4, 6, 8	**Table 4**
10th place	type of electronics, power switches		**Table 5**

Table 3 – Actuator fitted with electronics DMS2 ED

Outfit		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	H	J	K	L	M	N	V	W
Local control			x		x		x		x		x		x		x		x		x		x		x		x
Display				x	x			x	x			x	x			x	x			x	x			x	x
Contactors or contact-less control						x	x	x	x					x	x	x	x					x	x	x	x
Analog module	transmitter									x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	regulator																	x	x	x	x	x	x	x	x

In case the actuator is equipped with electronics DMS2ED in configuration Replacement of Electro-mechanical Board (it does not include regulator) it is not fitted with electronic brake.

Table 4 – Actuator fitted with electronics DMS2

Two-position or three-position control *) – DMS2	**R**
Profibus – DMS2	**P**
Two- or three-position control, without display and local control *) – DMS	**T**
Modbus	**Y**

*) Two- or three-position regulation of the actuator is set at the manufacturer. Unless otherwise specified in the order, the actuator will be set for three-position regulation (control by signal 4 – 20 mA).

Table 5 – Type of electronics, power switches, brake

Electronics DMS2 ED	– without power switches	**1**
Electronics DMS2	– with contactors	**2**
Electronics DMS2 ED	– with contact-less switches	**3**
Electronics DMS2	– with contact-less switches	**4**
Electronics DMS2 ED	– with contactors and brake	**5**
Electronics DMS2	– with contactors and brake	**6**
Electronics DMS2 ED	– swith contact-less switches and brake	**7**
Electronics DMS2	– with contact-less switches and brake	**8**
Electronics DMS2 ED	– with contactors	**9**

Notes: The actuators with one-phase electric motors are available in the versions 52 26x.xxxx1xD, 52 26x.xxxx2xD or 52 26x.xxxx9xD.
In case the actuator is equipped with electronics DMS2 (character P, R or T at the 9th place) and the character 2 is at the 10th place the actuator with three-phase electric motor is fitted with contactors; the actuator type no. 52 260 with one-phase electric motor is not fitted with contactors.

Dimensional sketch of **MODACT MPSED, MPSPED electric actuator, Type No. 52 260**
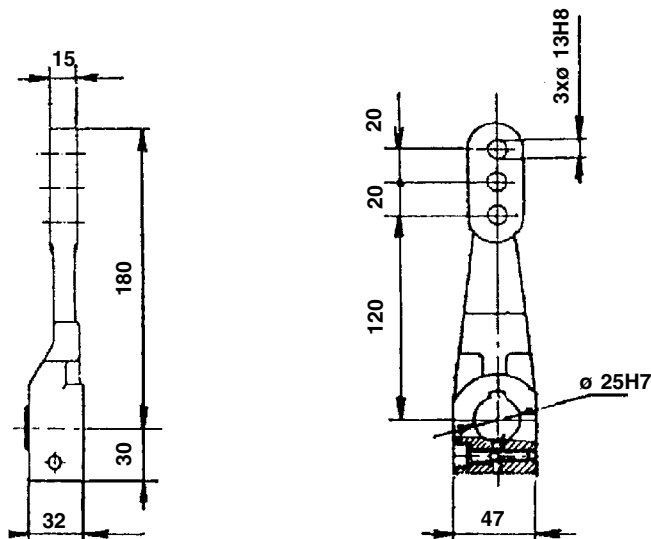
– Design with terminal board
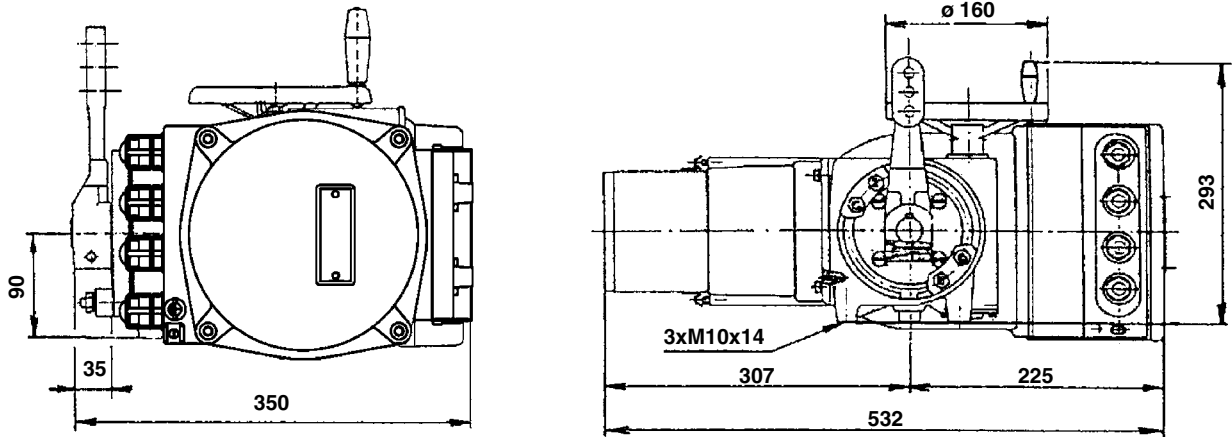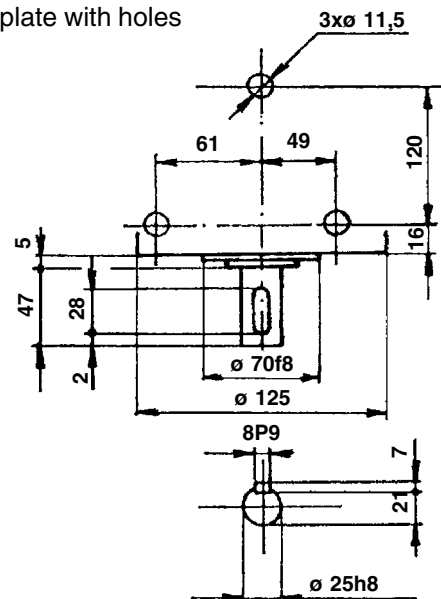

– Flanged design with terminal board
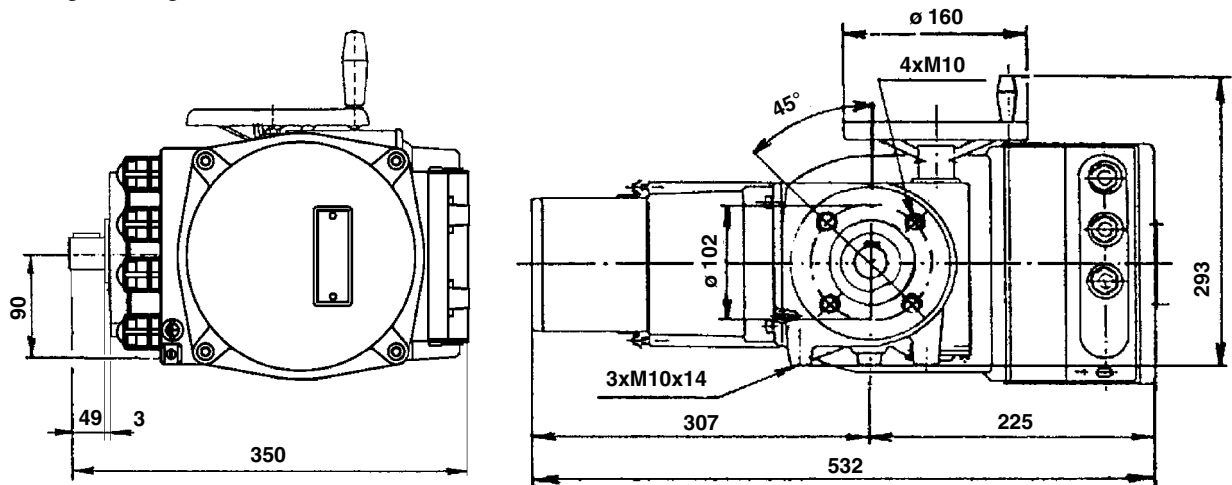
Note: *Threads for budhings in terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (the bushings are included in the delivery - wrapped-together part).*
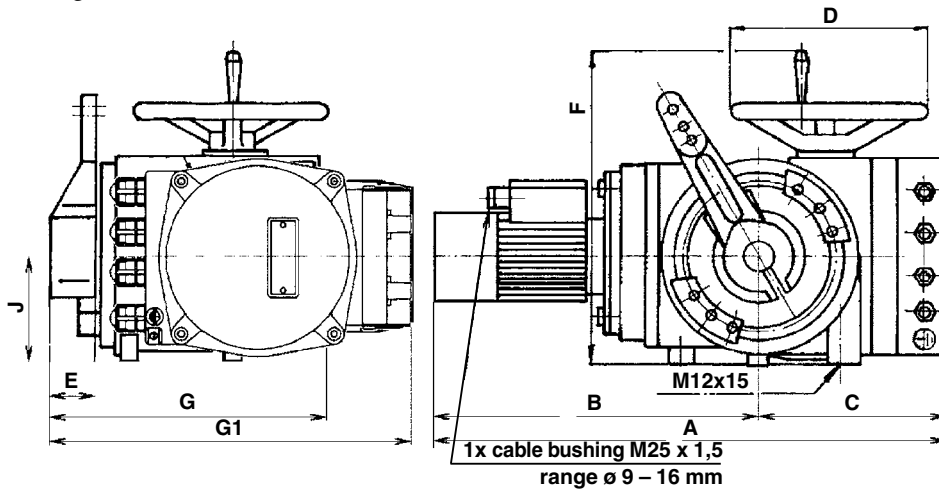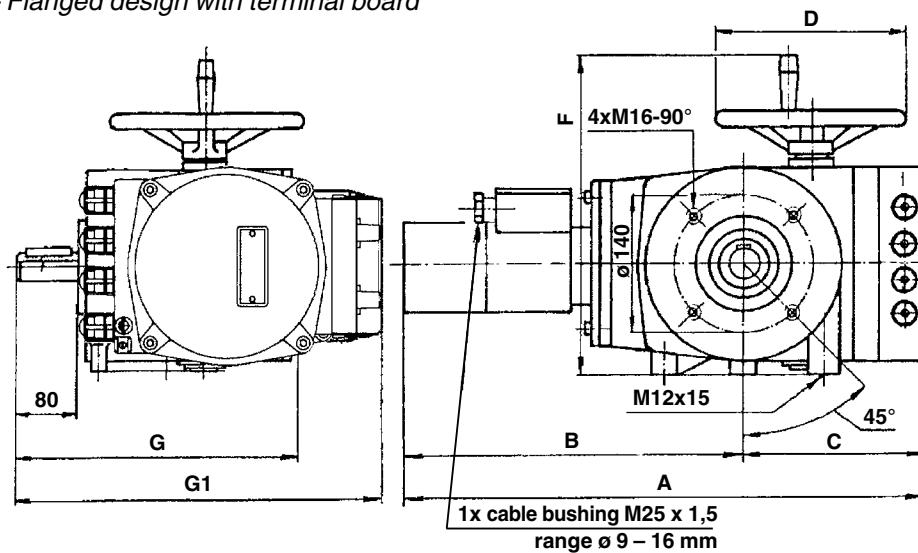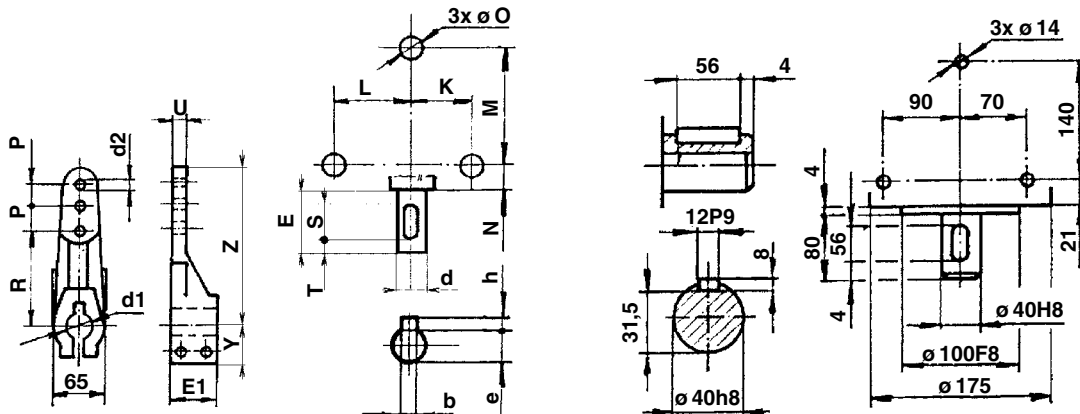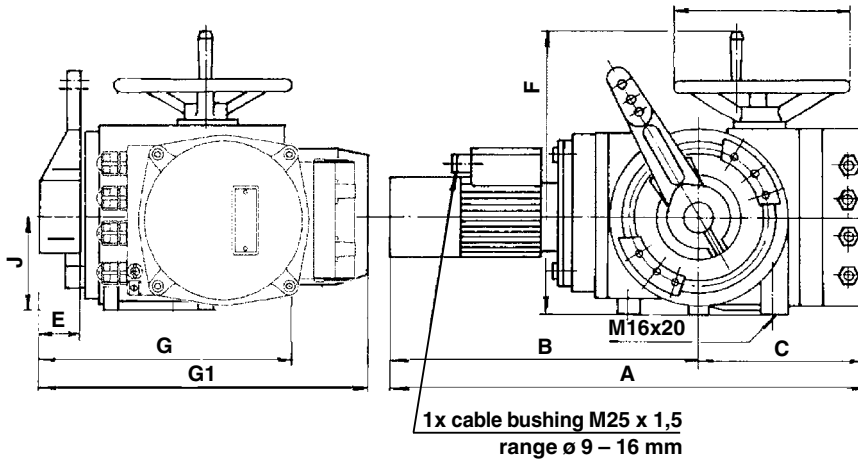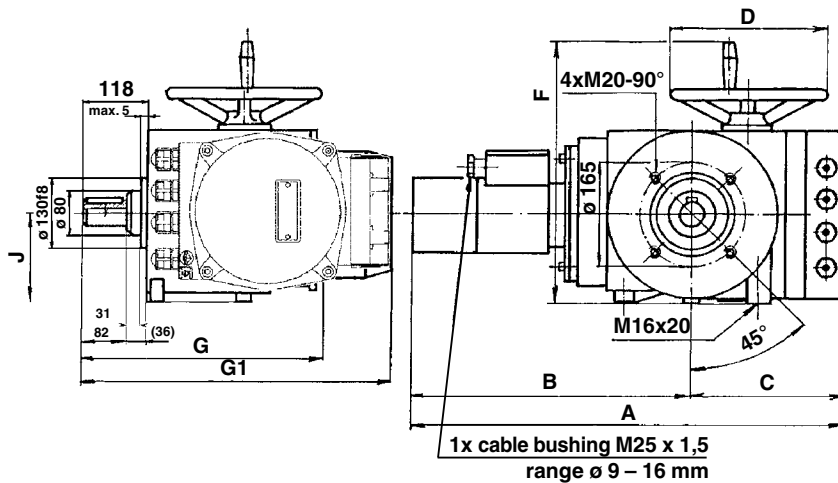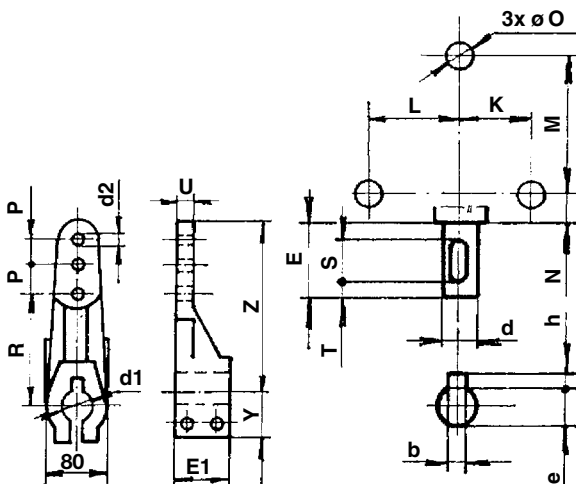
Lever

Mounting plate with holes

Dimensional sketch of **MODACT MPSED, MPSPED electric actuator, Type No. 52 261, 52 262**

– Design with terminal board

D

M12x15

B

A

C

E

G

G1

J

F

1x cable bushing M25 x 1,5
range ø 9 – 16 mm

– Flanged design with terminal board

D

4xM16-90°

ø 140

M12x15

45°

80

G

G1

B

A

C

F

1x cable bushing M25 x 1,5
range ø 9 – 16 mm

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

Note: *Threads for budhings in terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (the bushings are included in the delivery - wrapped-together part).*
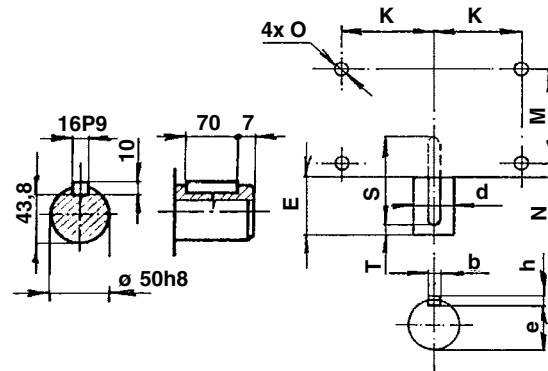
Lever   Mounting plate with holes   Output shaft   Mounting plate with holes

3x ø O

L

K

M

E

S

N

T

d

h

b

e

U

P

P

d2

R

Z

d1

Y

65

E1

3x ø 14

90

70

140

80

56

4

4

21

ø 40H8

ø 100F8

ø 175

56

4

12P9

8

31,5

ø 40h8

44

Dimensional sketch of MODACT MPSED, MPSPED electric actuators, Type No. 52 263, 52 264

– *Design with terminal board*

1x cable bushing M25 x 1,5
range ø 9 – 16 mm

M16x20

– *Flanged design with terminal board*

1x cable bushing M25 x 1,5
range ø 9 – 16 mm

4xM20-90°

M16x20

		Design	
		Terminal board	
		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	

Note: *Threads for budhings in terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (the bushings are included in the delivery - wrapped-together part).*

Lever   Mounting plate with holes

3x ø O

Output shaft   Mounting plate with holes

4x O

45

Dimensional sketch of **MODACT MPSED, MPSPED electric actuators, Type No. 52 265, 52 266**
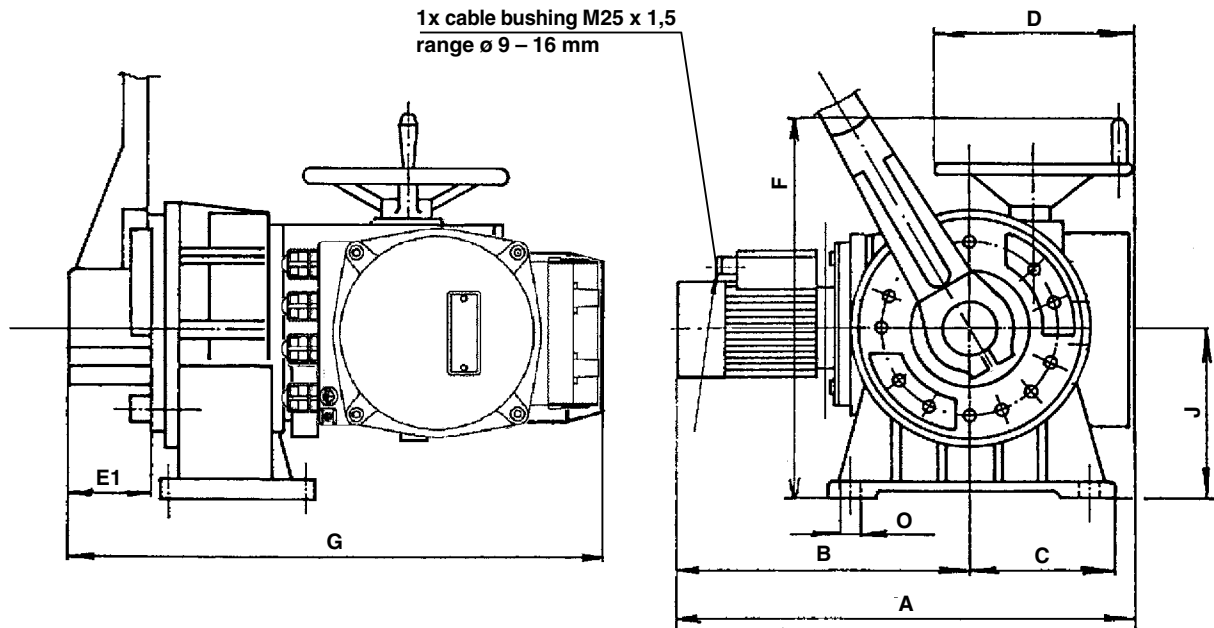
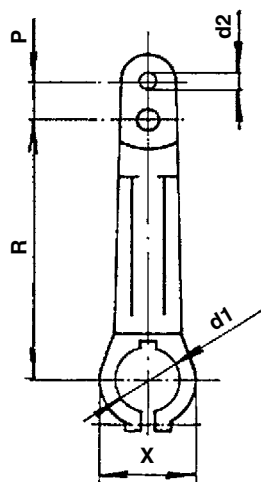**1x cable bushing M25 x 1,5 range ø 9 – 16 mm**

Note: Threads for budhings in terminal box: 1 x M25 x 1.5, 3 x M20 x 1.5 (the bushings are included in the delivery - wrapped-together part).
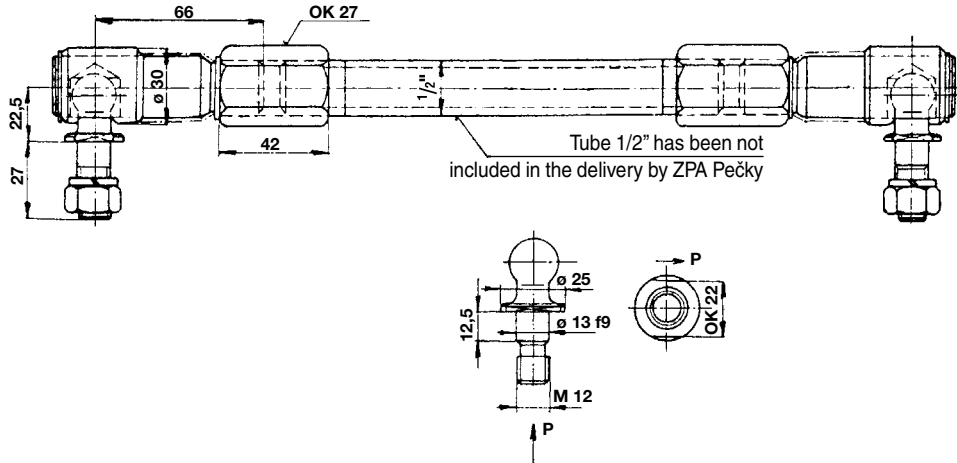
Mounting plate with holes

4xO
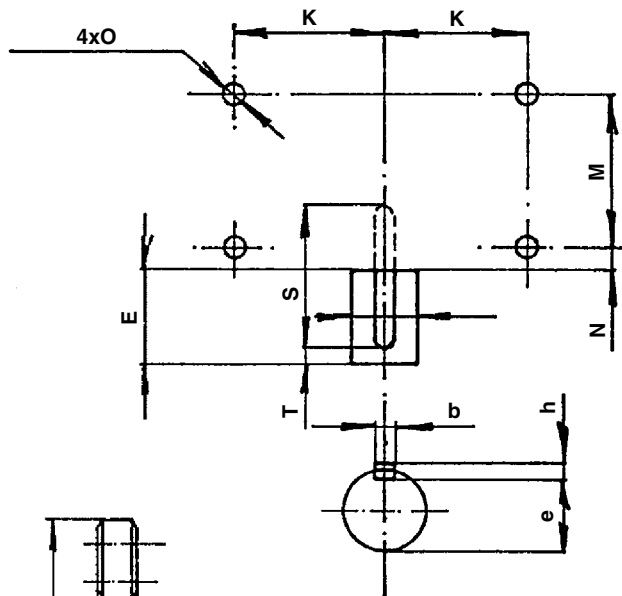
Lever
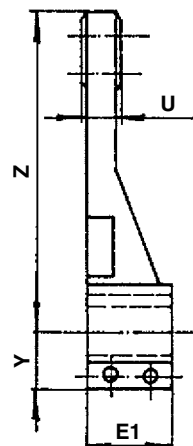
A	743
B	498
C	220
D	ø 300
E	123
E₁	120
F	560
G	760
J	260
K	185
M	200
N	33
O	ø 22
P	55
R	400
S	180
T	11
U	36
X	130
Y	80
Z	490
d	ø 90 h8
d₁	ø 90 H7
d₂	ø 40 H8
b	25 P9
h	14
e	81,3

Pull Rod TV 360, Type No. 52 933 for MODACT MPSED actuators, Type No. 52 260

P-0210

Pull Rods TV 40 and TV 50

Design TV 40-1/20 - Type No. 52 927
TV 50-1/25 - Type No. 52 929

Actuator side   Controlled device side
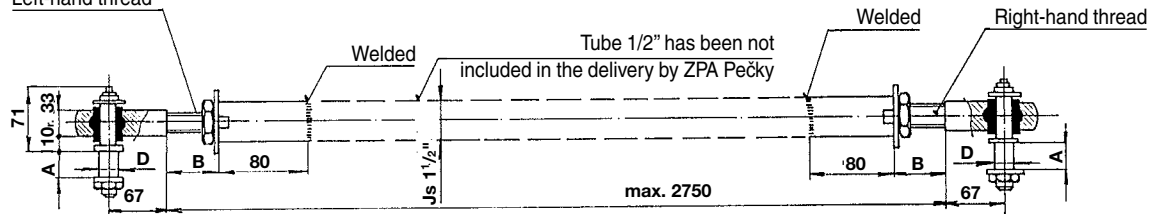
Design TV 40-2/25 Type No. 52 928
TV 50-2/25 Type No. 52 930

P-0599
P-0600
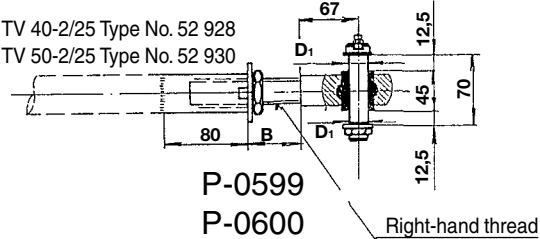
Type	Type No.	Dimensions				Designed for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 40 - 1/20	52 927	20	25	23	min. 30	52 261
TV 40 - 2/25	52 928					52 262
TV 50 - 1/25	52 929	25		28	max. 50	52 263
TV 50 - 2/25	52 930					52 264

Pull Rod TV 90-1/40

Actuator side   Controlled device side

Right-hand thread

Pull Rod TV 90-2/25

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

P-0452
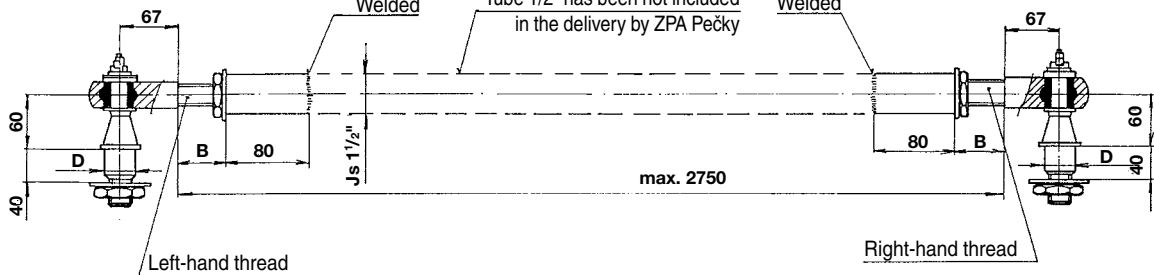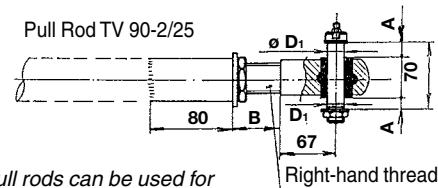
Type	Type No.	Dimensions				Designed for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 90 - 1/20	52 934	40	–	–	min. 20	52 265
TV 90 - 2/25	52 935		25	12,5	max. 50	52 266

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.

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9. 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 + 50 °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).*

10. 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.

11. 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. However, in this case, the gear box should be topped up with oil.

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.

Warning: When shipped to customers, the actuator packets contain bags with silica gel or other suitable siccative in order to protect the actuators against air humidity during transportation. Before putting the actuator into operation, the control box and the terminal board box should be checked whether the silica gel bags have been removed; if not, they should be removed from the actuator and disposed of ecologically.

12. 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. 3)*. 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 according to the local conditions and the general directions.
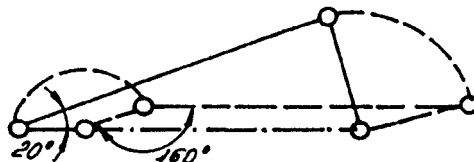

Fig. 3 – *Acturator Lever hub with a rod*

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.

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.

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.

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).*

13. 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. During the time when the drive units are in use, it is not necessary to change or monitor the amount of the lubricant.

The actuators with plastic lubricant are labelled „*Filled: solid grease*" on the power box at the side of the hand-wheel.

Type number of drive unit	Volume of lubricant *(kg)*	Type of lubricant for specific climatic conditions and temperature	
		T1 *(-25 – +70 °C)*	U1 *(-40 – +55 °C)*
52 260	0,30	CIATIM – 201 GOST 6267-74 CIATIM – 221 GOST 9433-80	
52 261, 52 262	0,50		
52 263 – 52 266	0,70		

Note:

Lubricant Ciatim 221 is used for lubricating places where rubber sleeves rub against metal surface and where the collar is fitted on the output shaft of actuators 52 260 (in places of friction with the shaft and on surfaces).

The adapter of the actuator, No. 52 265 and 52 266, should be packed with 1 kg of PM MOGUL LV 2-3 grease.

In case the actuator is operated in a dusty environment its surface should be regularly cleaned from dust in order to prevent deterioration of its cooling.

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 strictly prohibited without manufacturer's consent.

List of spare parts of **MODACT MPSED, MPSPED electric 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
	Sealing washer 16/22	224580840	2	4	Sealing of filling and discharge opening of gearing oil.
	Anti-condensation heater 2337110540	TR 551 10K/A	-	2	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	224631920	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
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	224591870	1	2	Packing between motor flange and countershaft gear box
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 momentů

| Type No.	Designation of spare part and Unified Classification Number Code	Drawing or ČSN Standard No.	Number of pieces for…years of operation		Application
			3	5	
52 263 – 52 266	Sealing ring 200x3 2327311044	PN 02 9281.2	1	2	Packing between control box and power gear box
	Sealing ring 70x2 2327311058	PN 02 9281.2	1	2	Packing of torgue-tripping spring cover
	Packing	224591870	1	2	Packing between motor OV63 flange and countershaft gear box
	Packing	224623470	1	2	Packing between motor OV71 flange and countershaft gear 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

Actuators fitted with electronics DMS2 ED			
Part name	**Part designation**	**Stock item**	**Note**
Source board	DMS2.ED.Z	39620000	
Position sensor multi-revolution	DMS2.ED.S	39620001	
Torque sensor	DMS2.TORK	39620003	common for DMS2.ED and DMS2
Analog module	DMS.ED.CPT	39620004	back signal 4 – 20 mA and software blocked regulator
Display	DMS2.ED.D	39620005	
Actuators fitted with electronics DMS2			
Source board analog	DMS2.ZAN	39620014	only for analog
Source board Profibus	DMS2.ZPR	39620015	only for Profibus version
Position sensor multi-revolution	DMS2.S	39620016	
Torque sensor	DMS2.TORK	39620003	common for DMS2.ED and DMS2
Display	DMS2.DP	39620018	
Board of local control block	DMS2.H1	39620019	
Dynamic brakes (for actuators with electronics DMS2 ED a DMS2)			
Brake	BR2 550	2339610124	
Brake	BR2 BK 550	2339610128	
Brake	BR 2,2	2339610142	
Brake	BR BK 2,2	2339610141	
Braking resistance	TR342 68R	2337110355	

A setting program is available for the actuators (it is described in these Assembly Instructions); it enables the parameters of the electronic outfit of the actuators to be set and checked by a computer.

The electronics is connected to the serial port of the computer by a cable (it is available e.g. under the name "Extending cable for mouse 9F-9M").

In case the computer is not fitted with a serial port the converter USB-RS 232, can be ordered.

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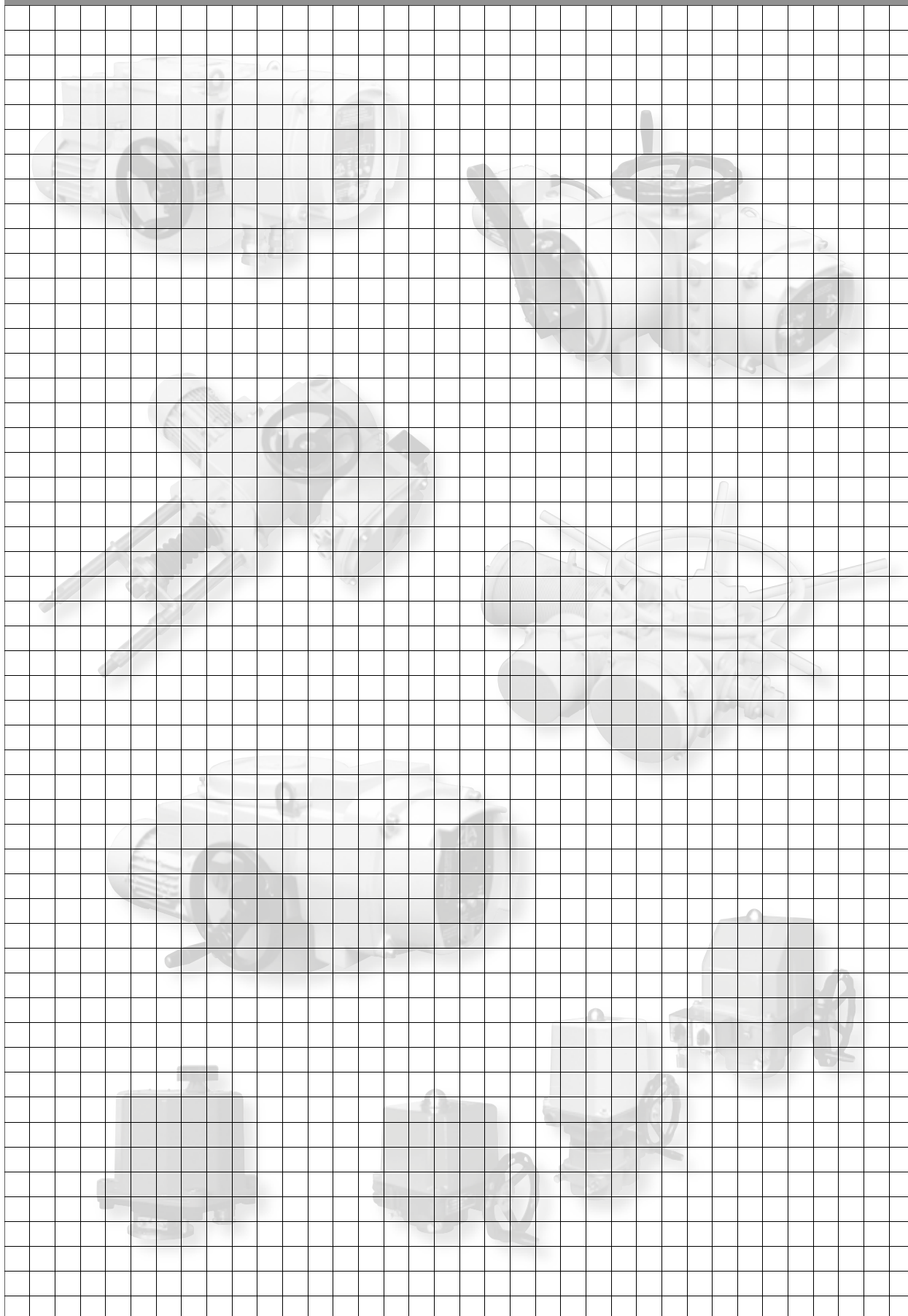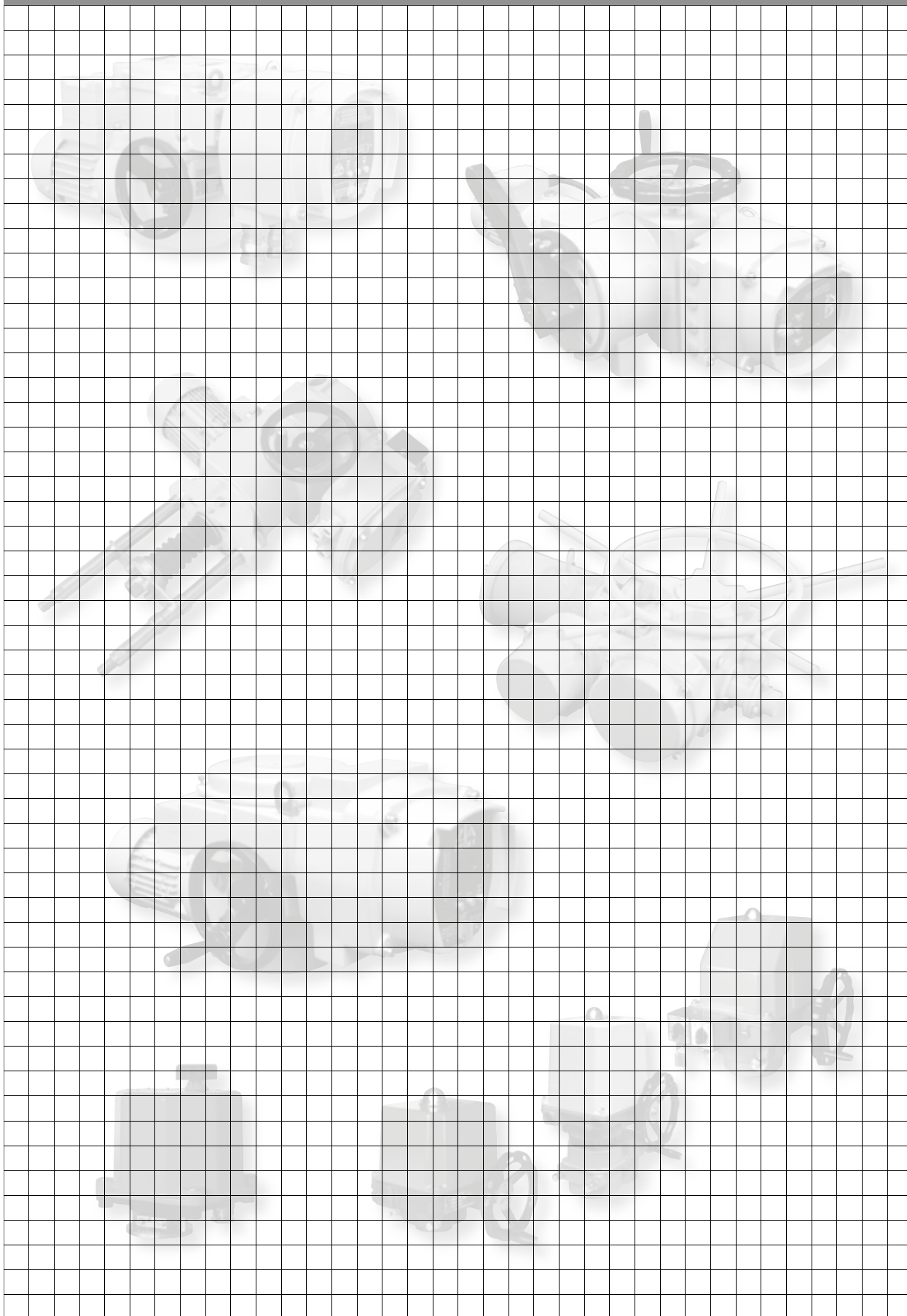
Development, production and services of electric actuators and switchboards.
Top-quality sheet-metal processing (TRUMPF equipment), powder paint shop.

SURVEY OF PRODUCED ACTUATORS

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

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

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

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

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

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

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

MODACT MPR Variant
Electric rotary (160°) lever actuators with a variable output speed
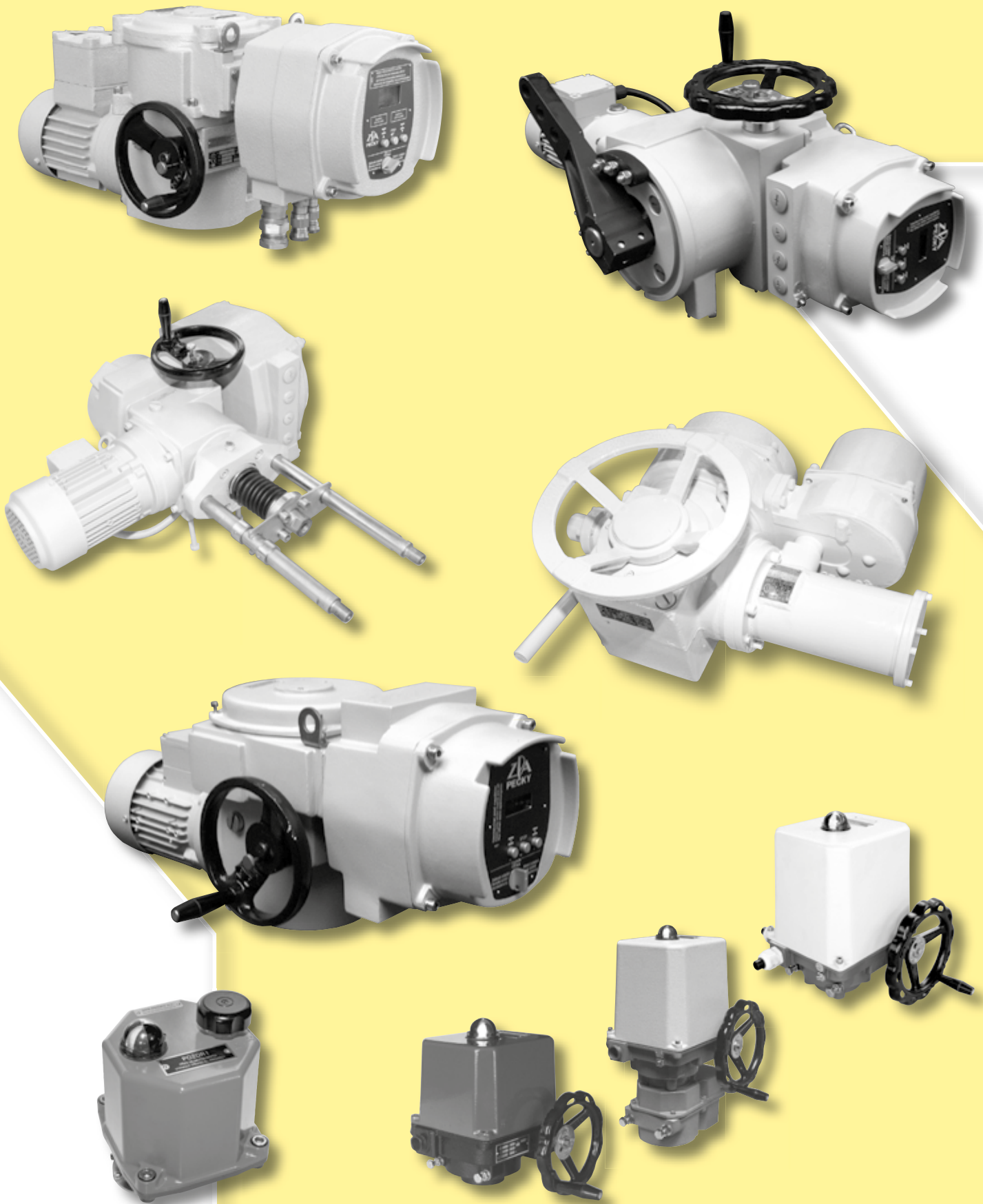
MODACT MPS Konstant, MPSED
Electric rotary (160°) lever actuators with a constant output speed

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

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

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