

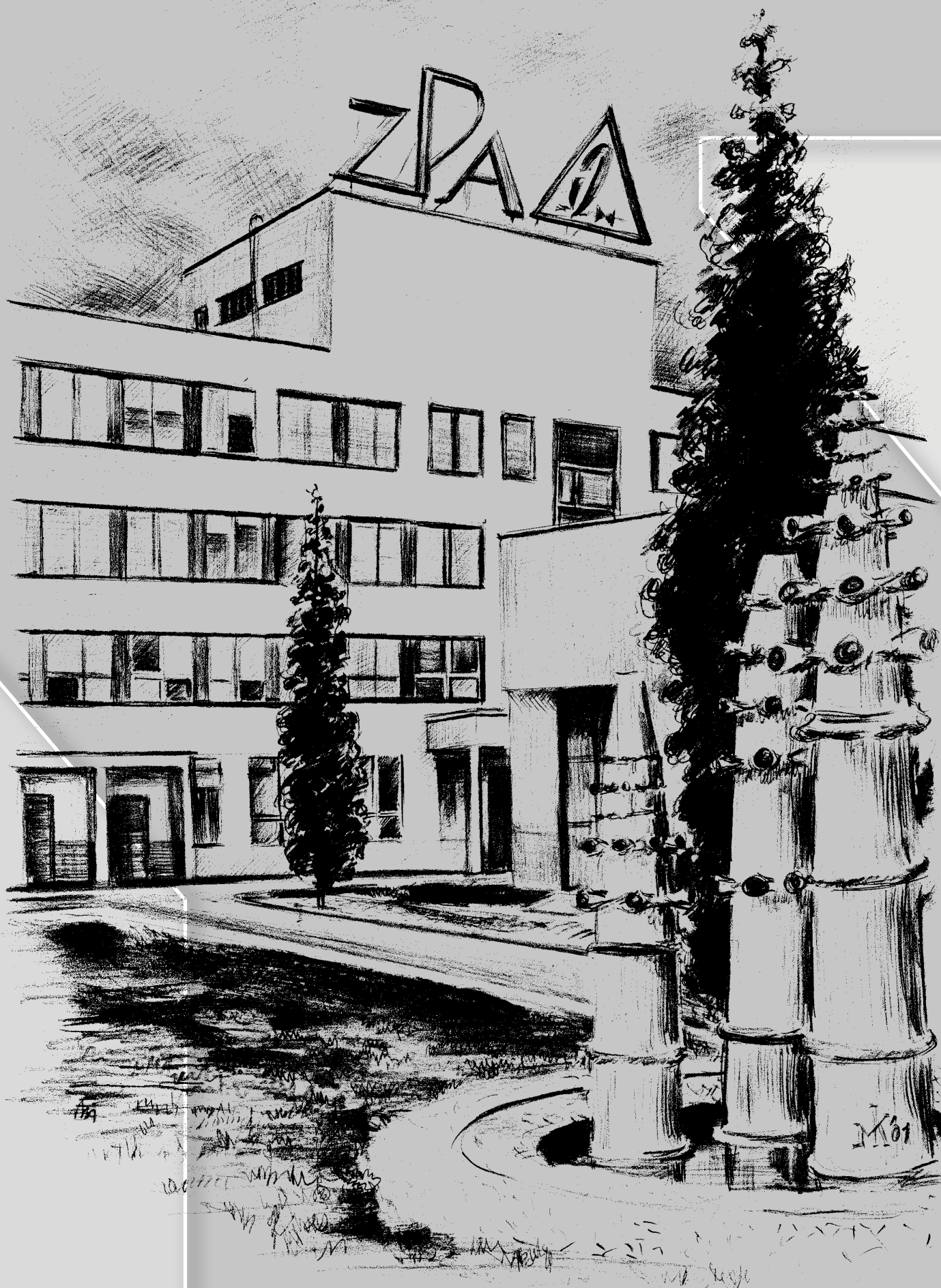


MOUNTING INSTRUCTIONS

**Electric Multi-turn
Actuators**

MODACT MOPED

Type number 52 039



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

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1. APPLICATION

The electric actuators **MODACT MOPED** are designed for shifting control elements by a reversible rotary motion (e.g. slide valve and other elements) for which they are suitable with their properties. Typical example of using is remote two-position or multi-position control of elements where tight closure in end positions is required.

The electric actuators are also suitable for automatic regulation in the regime S4 - see Working regime.

2. OPERATING CONDITIONS, OPERATING POSITIONS

Operating conditions

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

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

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

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

Notes:

The area under a shelter means the one where falling of atmospheric precipitations under and angle up to 60° from the vertical is prevented.

The electric actuator must be installed in a place where cooling air has a free access. Minimum distance from a wall for access of air is 40 mm. Therefore, the area where the electric actuator is installed must be sufficiently large, clean and ventilated.

Surrounding temperature

Operating temperature for the **MODACT MOPED** 52 039 is from -25 °C to +60 °C.

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

Class:

- 1) AC1 – above-sea level ≤ 2000 m
- 2) AD7 – shallow immersion, possible sporadic partial or full coverage
- 3) AE6 – strong dust formation
- 4) AF2 – occurrence of corrosive or polluting agents is atmospheric; presence of corrosive pollutants is significant

- 5) AG2 – mean mechanical strain; in normal industrial operations
- 6) AH2 – mean vibrations; in normal industrial operations
- 7) AK2 – serious risk of plant and moulds growth
- 8) AL2 – serious risk of occurrence of animals (*insects, birds, small animals*)
- 9) AM-2-2 – normal level of signal voltage. No additional requirements.
- 10) AN2 – mean solar radiation. Intensity > 500 and ≤ 700 W / m²
- 11) AP3 – mean seismic impacts; acceleration > 300 Gal ≤ 600 Gal
- 12) BA4 – capability of persons; instructed persons
- 13) BC3 – frequent contact of persons with ground potential; persons often touch foreign conductive parts or stand on conductive substrate

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 corresponding to category of corrosion aggressiveness C4, C5-I and C5-M.

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

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

Operating position

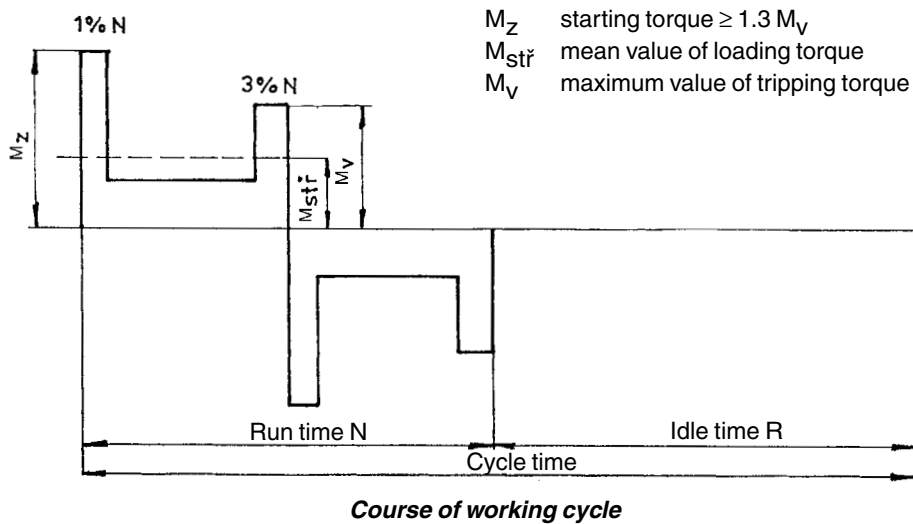
The actuators can be operated in any operating position.

3. WORKING REGIME, SERVICE LIFE OF ACTUATORS

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.



Service life of actuators

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

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

Service life of electric actuators for 1 million starts

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

4. TECHNICAL PARAMETERS

Supply voltage

Supply voltage of electric motor

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

(or as shown on the motor rating plate)

Protective enclosure

Protective enclosure of actuators - IP 67 according to ČSN EN 60529.

Noise

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

Breakaway torque

Breakaway torque is a calculated value, determined by electric motor's breakaway torque, actuator's total ratio and effectiveness. Actuator can produce breakaway torque after run reversing operation for 1 to 2 revolutions of the output shaft, while torque tripping is interlocked. This may occur either in end position or in any optional intermediate position.

Self-locking

Actuator is self-locking provided that load acts against the motion of the actuator's output shaft. Self-locking function is provided by a roller lock, which immobilizes actuator's rotor even in case of manual operation.

With respect to safety regulations, it is unacceptable to apply actuators for operating transport lifting equipment with possible transport of persons, or for equipment where persons may be present below the lifted load.

Sense of rotation

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

Working stroke

According to 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 **DMS** and **DMS 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 / 230V.

6. ELECTRIC PARAMETERS

External electric connection

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 mm² to be connected. Access to the terminal board is obtained after removal of the actuator cover. All control circuits of the electric actuator are brought out to the terminal board.

Connecting of actuators with connector – on special request.

Actuator internal wiring

The internal wiring diagrams of the **MODACT MOPED, 52 039** 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 actuator cover. 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. See Technical specifications for more details.

Current-carrying capacity and maximum voltage of micro switches

Micro switches maximum voltage is 250 V AC and DC at the following maximum current values:

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

Micro switches can be used only as single-circuit micro switches. Two voltages of varying values or phases must not be connected to the terminals of one micro switches.

Electric strength of electrical 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	±10 % of max. value of range
Adjusting speed	-10 % of max. value of range
	+15 % of rated value (<i>in idle run</i>)

Protection

Actuators are provided with one internal and one external protective terminal serving as protection from electric shock. Protective terminals are identified with a sign complying with ČSN IEC 417 (34 5555).

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

7. 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	
Source unit	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	
Contactors or contactless block	
Electronic brake	

Parameters:

Scanning of position	Contact-less, magnetic
Scanning of torque	Contact-less, magnetic
Working stroke	according Table 1
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-mechanical board**

The provided relay contacts substitute position, torque and signalling micro-switches; 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.

Relé 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 close
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.

Relay 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
<div style="border: 1px solid black; padding: 5px;"> Relé 3 / SZ Relé 4 / SO vypnuto poloha O poloha Z moment O moment Z moment a poloha O moment a poloha Z otevirání zavírání pohyb poloha poloha negovaná ovládání-místní ovládání-dálkové ovládání-vypnuto moment O nebo Z pohyb-blikač </div> Relay 3/SZ Relay 4/SO OFF position O position Z torque O torque Z torque + position O torque + position Z opening closing motion position negated position local control remote control control OFF torque O or Z motion - blinker	<div style="border: 1px solid black; padding: 5px;"> Relé Ready vypnuto varování chyby varování nebo chyby chyby nebo není dálkové chyby nebo var. nebo není dál. moment O nebo Z </div> Ready Relay OFF warning errors warning or errors errors or no remote errors or warning or no remote torque O or Z

Setting program

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

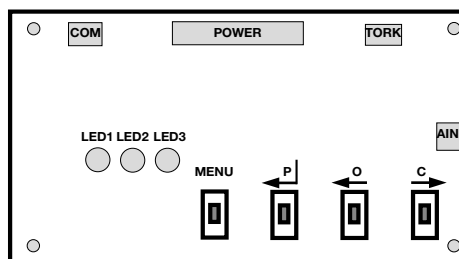
Note: In the window "Parameters" of the setting program, column "Access", the word "NO" designates parameters that cannot be changed by the user (change of these parameters is blocked).

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

Parametr – Parameter
 Změna – Change
 Chyba – Error
 Přístup – Access
 Setrvačnost (0,1 %) – Inertia [0.1 %]
 Setr. Doběh (0,1 s) – Inertial run-out [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	Input or output for setting parameters with push-buttons or setting parameters by means of PC
blinking	-	lit on	Setting parameters with 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 twoposition 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 (<i>it is not recommended to change the value without consulting the supplier of the valve, etc.</i>) |
| 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 (<i>it is not recommend to change the value by more than 10 %</i>) |
| 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 % (<i>it is not recommended to set insensitivity higher than 3 %</i>) |
| 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

LISTING THROUGH MENU

- The setting regime is opened by keeping depressed the push-button **MENU** for at least 2 s; the LED1 is then lit up.
- By short pressing of **MENU**, select basic MENU – menu M1 through M8 (LED1 signalizes the menu number); by short pressing of **P, O, C** you will open them (LED2 signalizes particular parameter).
- By short pressing of **P**, select required value of the parameter. If the parameter can be set to several values they will be changed by short pressing of **P** (number of LED2 blinking indicates its value). By long pressing of **P**, the selected parameter is entered; the entry is confirmed by lit-up LED2.
- By short pressing of **MENU**, gradually set the required menu and parameters.
- After setting all required parameters, the setting menu is left by keeping depressed the push-button **MENU** for at least 2 s. The setting Menu will also be terminated in case that no push-button is depressed within one minute.

MENU 1 – Setting of tripping torques:

- After opening the menu by means of the push-button **C** or **O**, select the torque to be set.
- By short pressing of **P**, select the value of the parameter 50 – 100 % to be set (5 – 10 blinking of LED2) and by long pressing of the push-button **P** the parameter is stored into the memory.

MENU 2 – Setting of function of signalling relays:

- Basic setting of the signalling relays is SZ 1% and SO 99% of the stroke.
- In case that a different setting is required, it can be changed after shifting the actuator to the required position by means of the push-button **C** or **O**.
- By means of the push-button **P**, basic setting SZ 1% and SO 99% of the stroke is performed.

MENU 3 – Setting of torque blocking in limit positions:

- By short pressing of **P**, select the value of blocking time 0 – 20 s to be set (0 – 20x blinking of LED2) and by long pressing of the push-button **P** the parameter is stored into the memory.
- By long pressing of the push-button **C**, store the actual position for torque blocking on the Closed side into the memory.
- By long pressing of the push-button **O**, store the actual position for torque blocking on the on the Open side.

MENU 4 – Setting of transducer characteristics:

- By short pressing of **P**, select the value 4 – 20 mA – 1 blinking of LED2 or 20 – 4 mA – 2x blinking of LED2 and by long pressing of the push-button **P**, store the parameter into the memory.

The menus below serve only for setting the board in the version Control.

MENU 5 – Setting of control signal in 3P regulation:

- By short pressing of **P**, select the 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 by long pressing of the push-button **P**, store the parameter into the memory.

MENU 6 – Setting of insensitivity in three-position regulation:

- By short pressing of **P**, select the value 1 – 10 % (1 – 10x blinking of LED2) and by long pressing of the **P** push-button, store the parameter into the memory.

MENU 7 – Response to lost control signal in three-position regulation:

- By short pressing **P**, select the value
 - OPEN - 1x blinking of LED2,
 - or CLOSE - 2x blinking of LED2,
 - or STOP - 3x blinking of LED2

and by long pressing of the push-button **P**, store the parameter into the memory.

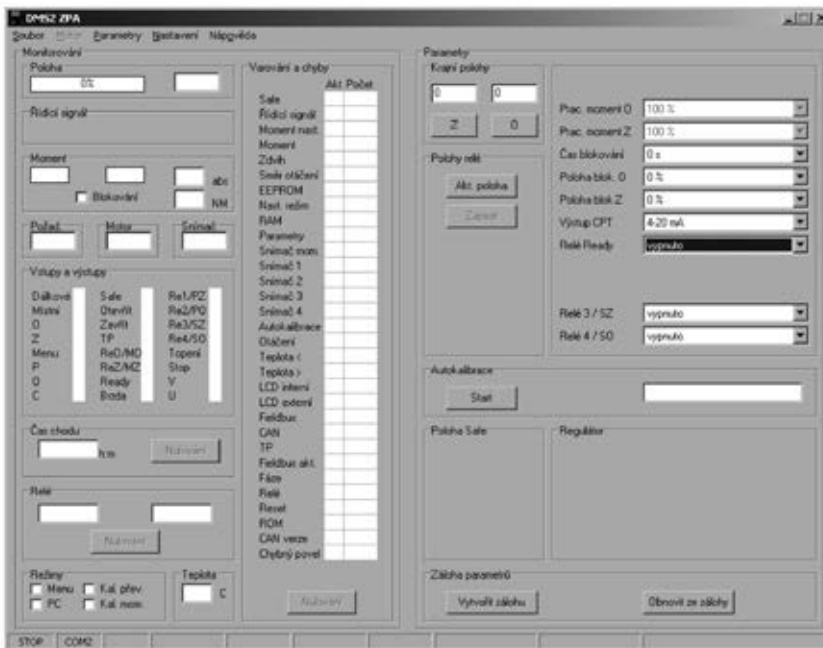
MENU 8 – Way of tripping in limit positions in 3P regulation:

- By short pressing of **P**, select the value
 - TORQUE - 1x blinking of LED2,
 - or TORQUE + PO - 2x blinking of LED2,
 - or TORQUE + PZ - 3x blinking of LED2,
 - or TORQUE + PO+PZ - 4x blinking of LED2

and by long pressing of the push-button **P**, store the parameter into the memory.

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 the program DMS2 on PC.
- For safety reasons, the system is delivered in the state of an induced error of Calibration when its functions are limited in order to reduce the risk of damaging the actuator by incorrect connection. When the actuator is controlled by the program DMS2 its operation is stopped if any torque is induced.



Main window of setting program



Selection of electronics

Working torque

- Check and, if necessary, set the value of the working torque 50 – 100 % in the program DMS2.

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 signaled 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 the relay contact on the terminal board. If an error or warning state has not been detected (setting is possible of what should be evaluated as an error or warning) the contact is closed; in case of an error, warning or if the power supply is electronically cut out the contact is opened.

The state of the relay READY is indicated by the LED diode on the source board.

AUTO-DIAGNOSTICS

DMS2.ED performs continuously its diagnostics and, in case a problem is found, it signalizes warning or error.

Warning or error are signalized by LED, display, and/or relay Ready.

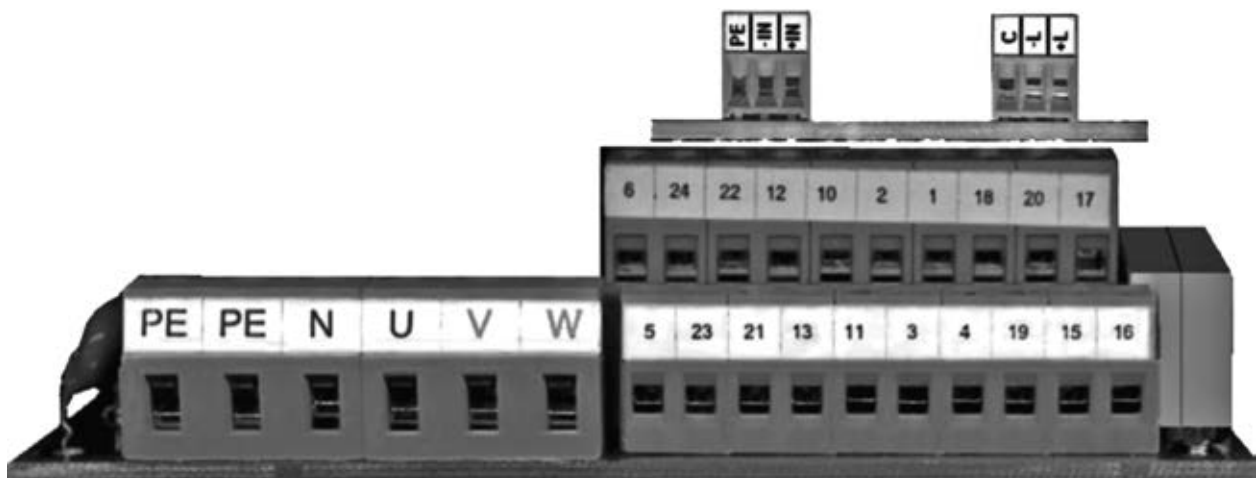
The warning has no influence on the system operation; the error stops the drive.

Assignment or switching-off of the warning and error is set in the window "Warnings and errors" of the setting program (it is opened by clicking on one of the parameters Warning 1 – 4 or Error 1 – 4 in the window "Parameters").

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 actuator with electronics DMS2ED.

If the actuator is of the single-phase version the power supply is connected only to terminals E, 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 (<i>it applies to ranges 4 – 20/20 – 4 mA</i>)
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 (<i>for CONTROL only</i>)
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 (<i>lowest stage</i>)
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 (<i>highest stage</i>)
17	Calibration	X		Autocalibration not carried out
18	Torque setting		X	Wrong setting of torques (<i>parameters Torque O/Z 50/100 %</i>)
19	Stroke		X	Wrong setting of stroke (<i>parameters Position O/Z</i>)
20	Rotation error		X	The actuator does not rotate
21	High temperature	X		Permitted max. temperature exceeded (<i>parameter Temperature max.</i>)
22	Low temperature	X		Permitted min. temperature exceeded (<i>parameter Temperature min.</i>)
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 (<i>short circuit, interruption, only sensor communicates</i>)
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 (<i>parameter Relay of service life</i>)
30	Reset	X		Non-standard Reset of unit induced (<i>watchdog etc.</i>)
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 (<i>for autocalibration only</i>)
35	Wrong run-down	-	-	Wrong run-down measured by autocalibration (<i>for autocalibration only</i>)
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

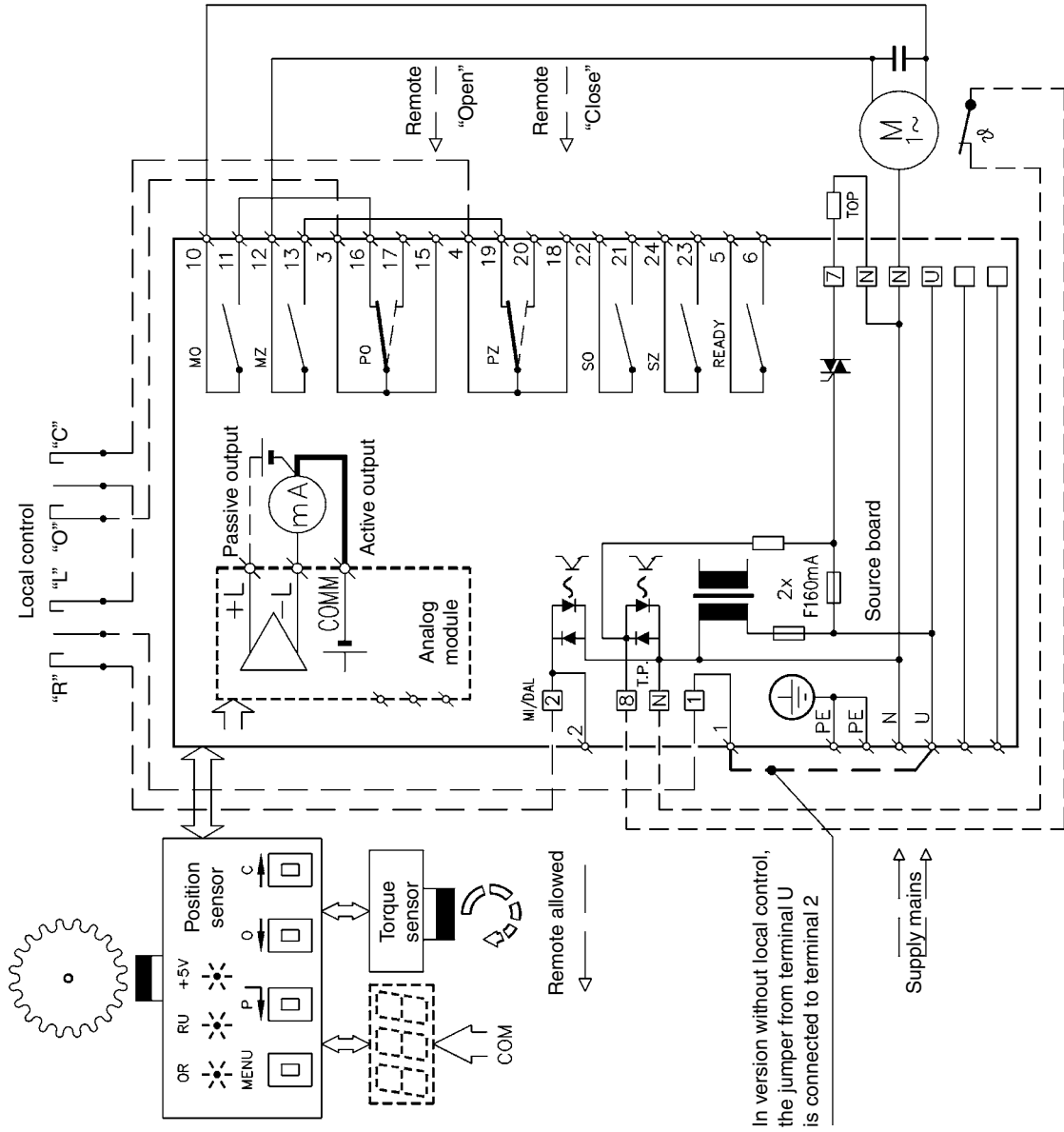
- For all ascertained warnings and errors, DMS2.ED uses counters of occurrence of these warnings and errors during operation of the system.
- Values of the counters are stored to the EEPROM memory and are preserved even in case of the power supply fall-out.
- Reading of the counters is possible by means 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.

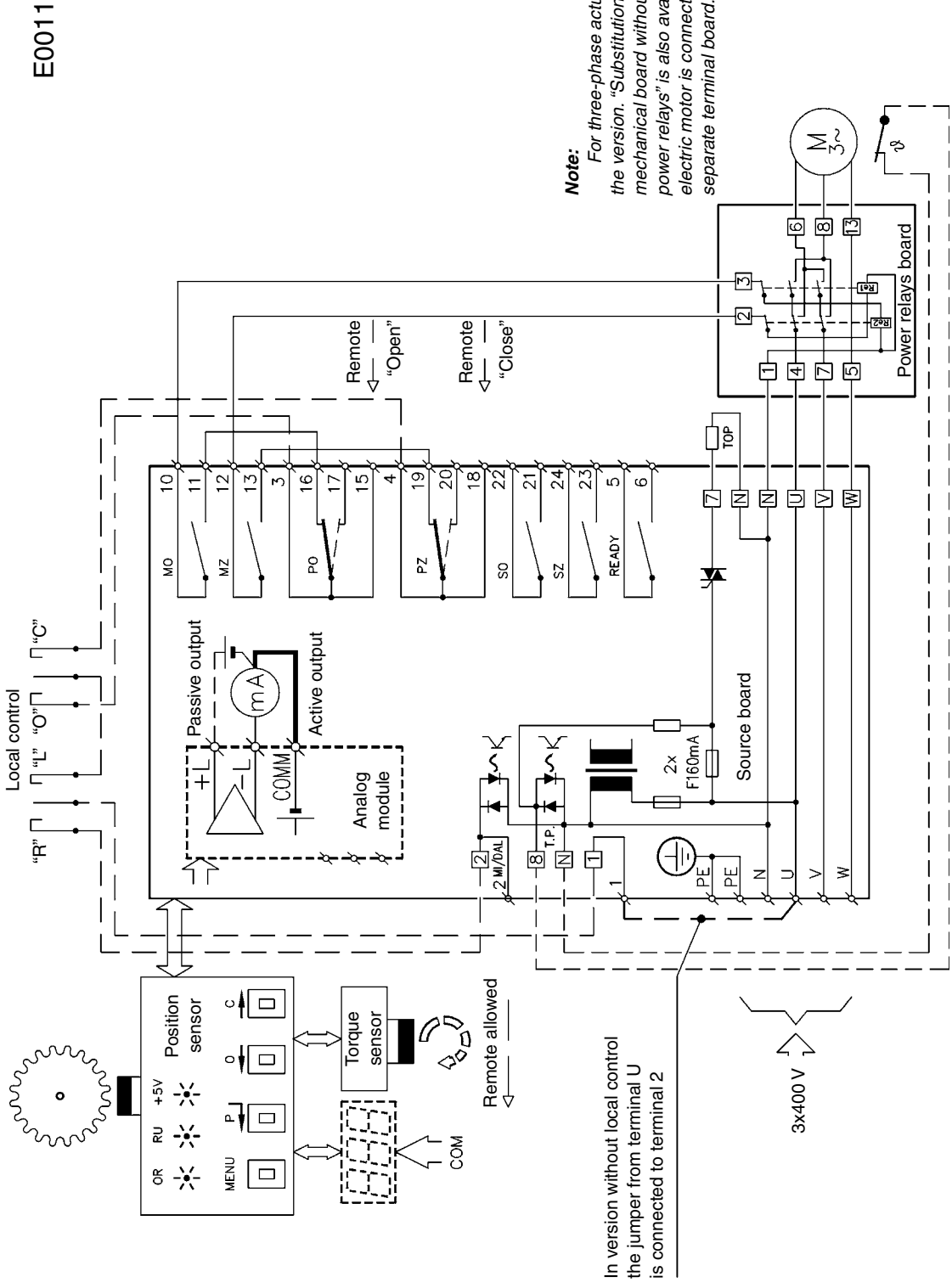
Example of wiring diagram of electronics **DMS2 ED** in version **Substitution of electro-mechanical board** with single-phase electric motor

E0010



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

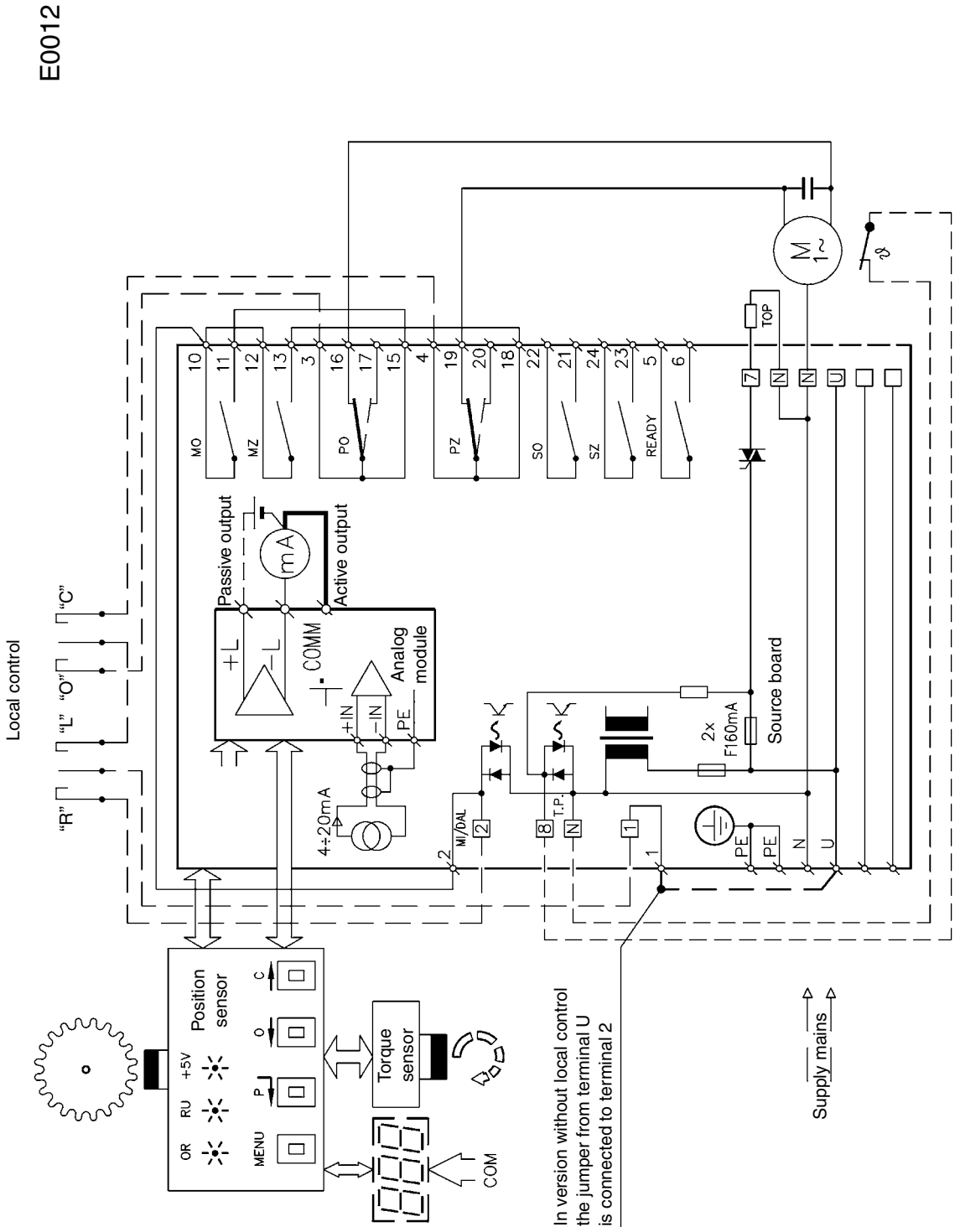
Example of wiring diagram of electronics **DMS2 ED** in version **Substitution of electro-mechanical board** with three-phase electric motor



E0011

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

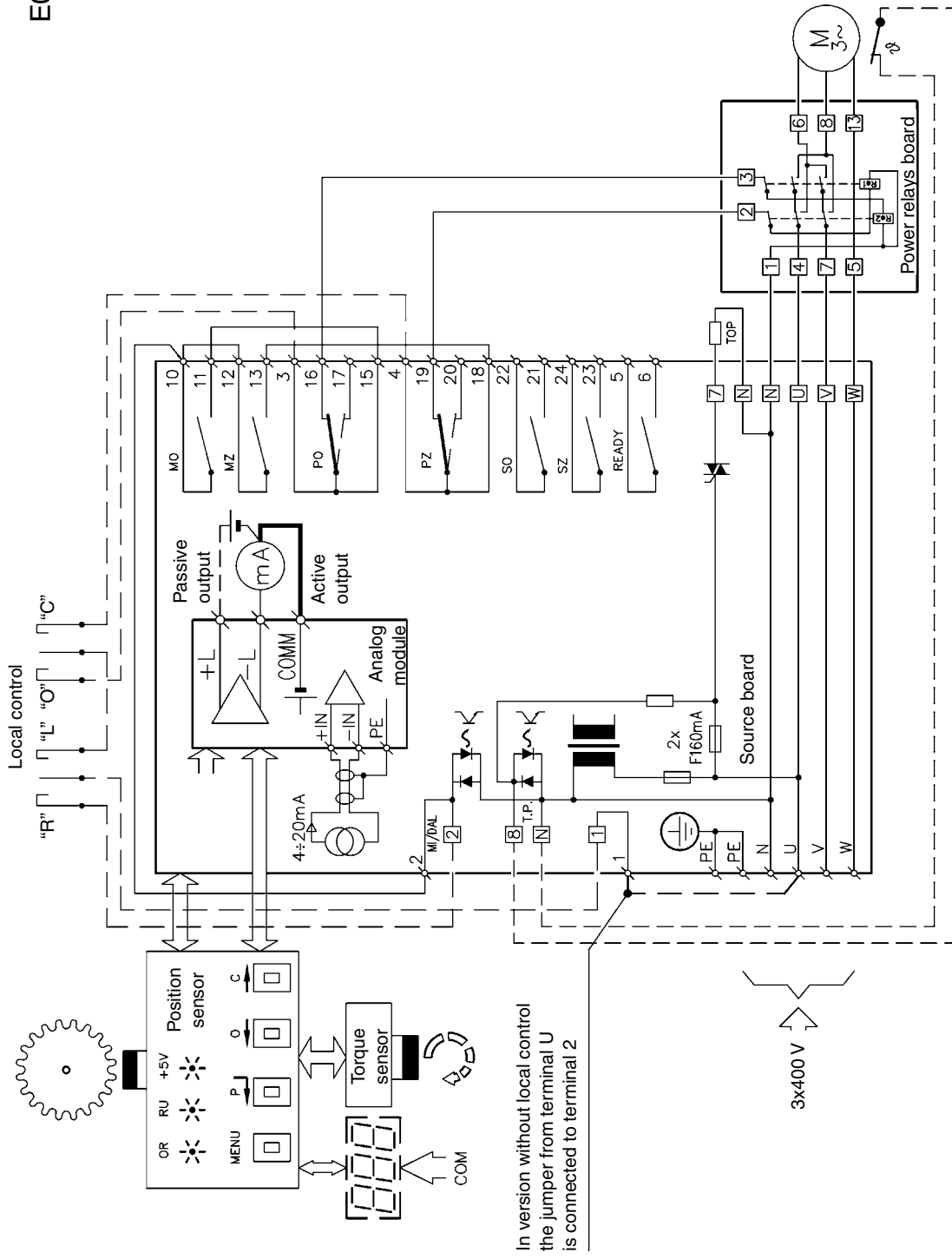
Example of wiring diagram of electronics **DMS2 ED** in version **Control** with single-phase electric motor



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** with three-phase electric motor

E0013



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

DMS2

Main features of DMS2:

- Complete control of the actuator operation by two and three-position regulation or connection to an industrial bus-bar Profibus.
- Well-arranged signalization of operating and service data on a character-type LCD display 2 x 12.
- Auto-diagnostics of error messages on an LCD display, memory of recent failure and number of occurrences of respective failures.
- Parameter setting by means of PC program or local control in case the actuator is fitted with the local control.

Basic outfit:

The control unit is a main part of the system DMS2; it includes:

- Micro-computer and memory of parameters
- Position sensors
- 2 signalling LED
- Connectors for connecting torque sensor, boards of relays and two-position inputs, source boards, communication adapter, LCD display, and local control.

The **torque unit** provides for scanning torque by a contact-less 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 the program DMS2 on PC.

Warning: *For safety reasons (to reduce the risk of damaging the actuator by incorrect connection), the system is delivered in the state of an induced error of Calibration when its functions are limited. When the actuator is controlled by the program DMS2 its operation is stopped if any torque is induced.*

Note: *The setting program is same for the electronics DMS2ED. Main window and window Electronics selection – see figure on page 9.*

Working torque

- Check and, if necessary, set the value of the working torque 50 – 100 % in the program DMS2.

Tripping in limit positions

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

Limit positions - working stroke

- Position Z:
 - Move to the position Closed manually or by means of the menu Motor in the program DMS2.
 - The actuator can only be controlled by means of the program if no torque is induced. The torque must be left manually.
 - Press the push-button Z to confirm your consent with the entry.
- Position O:
 - Move to the position Open manually or by means of the menu Motor in the program DMS2.
 - The actuator can only be controlled by means of the program if no torque is induced. The torque must be left manually.
 - Press the push-button O to confirm your consent with the entry.

Auto-calibration

- The auto-calibration can only be started by means of the program if no torque is induced. The torque must be left manually.
- The auto-calibration is started by the push-button Start in the program DMS2.
- Wait until the auto-calibration ends; the information on its course is signaled next to the 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-bar		
Insensitivity	1 – 10 %			
Function SAFE	Open	Close	Stop	To position
Active SAFE	0 V	230 V		
Time of torque blocking in limit positions	0 – 20 s			
Position of torque blocking in 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 of information on error of an external device can be set so that the actuator would respond as if the error were its own.

Autodiagnostics

The table List of errors – same as for electronics DMS2 ED (page 12)

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 (<i>remote, local, or switched off control</i>)
blinking	lit on	Error or warning – working regime (<i>remote, local, or switched off control</i>)
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	CESKY	Menu LANGUAGE
		ENGLISH	
2	POLOHA O, Z	POL.OTEVR.	End-limit position Open or Closed
		POL.ZAVRENO	
3	KALIBRACE	SPUSTIT	Starting of autocalibration
4	KONCOVA POL.	MOMENT	Tripping in end-limit positions
		MOMENT+POL.O	
		MOMENT+POL.Z	
		MOMENT+P.O+Z	
5	MOMENT PR. O	50 – 100 %	Working torque Open (<i>selection 50 – 69 % depends on parameter Torque min.</i>)
6	MOMENT PR. Z	50 – 100 %	Working torque Closed (<i>selection 50 – 69 % depends on parameter Torque min.</i>)
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	OTEVIRAT	Response to signal Safe and loss of control signal
		ZAVIRAT	
		ZASTAVIT	
		POLOHA	

	Name	Parameter value	Meaning
14	SAFE AKTIV.	0 V 230 V	Active signal Safe
15	TP SAFE	blokuje SAFE SAFE aktivni	Response with thermal protection activated
16	TP NULOVANI	AUTOMATICKY MISTNIM OVL.	Zeroing of thermal protection
17	RELE READY	VYPNUTO VAROVANI CHYBY VAR.+CHYBY CHYBY+NENÍ D VAR+CHYBY+ND MOMENT O/Z	Function of Relay Ready
18	RELE 1	VYPNUTO POL.OTEVRENO POL. ZAVRENO MOM.OTEVRENO MOM. ZAVRENO POL.O.+MOM.O POL.Z.+MOM.Z OTEVIRA ZAVIRA POHYB POLOHA POL. N. OVL. MISTNI OVL. DALKOVE OVL. VYPNUTO MOMENT O/Z POHYB-BLIKAC	Function of Relay 1
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	SNIMAC DISP I DISP E DISP ED FLDBUS CHYBA 1 CHYBA 2 CHYBA 3 MOMENT TEPLOTA	Information on the system
23	ZALOHA PAR	OBNOVIT PAR VYTVORIT ZAL	Creation of backup parameters, restoring from backup parameters
24	ADRESA	1 – 125	Address of actuator on industrial bus
25	TAKT MOD	VYPNUTO SMER O SMER Z SMĚR O+Z	Mode of cycle regime
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.

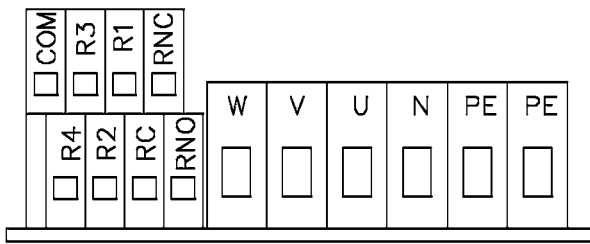
Change over the local control to position OFF, enter the menu (*by long pressing of push-button STOP*), and change over to position “LOCAL”; the actuator can now be shifted by means of push-buttons “O” and “Z” beyond the set end-limit positions. In this case, the actuator will trip after the set tripping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

Autocalibration

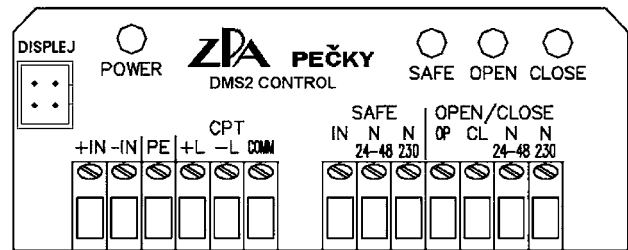
In the setting regime choose MENU 3. Shortly press push-button “STOP” to enter MENU 3 and keep pressing push-button “STOP” to start autocalibration. By short starting of the motor in both directions, the actuator will measure inertia. Completion of the autocalibration is announced by the message AUTOCALIBRATION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

Shortly press push-button “STOP” to return to MENU 3 and keep pressing of push-button “STOP” to exit the setting regime.

Terminal board of actuator with electronics **DMS2**



Terminals on source board



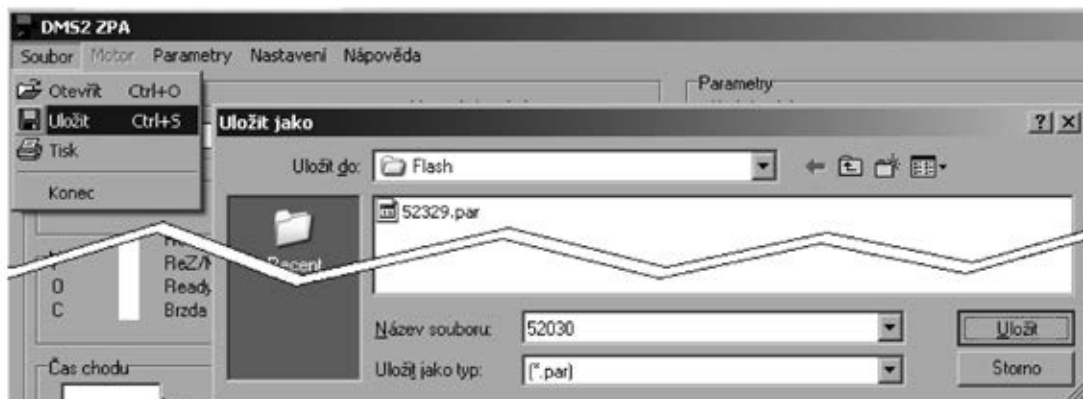
Terminals in local control box

If the actuator is of the single-phase version the power supply is connected to terminals **PE, N U** only. Terminals **V, W** remain unconnected.



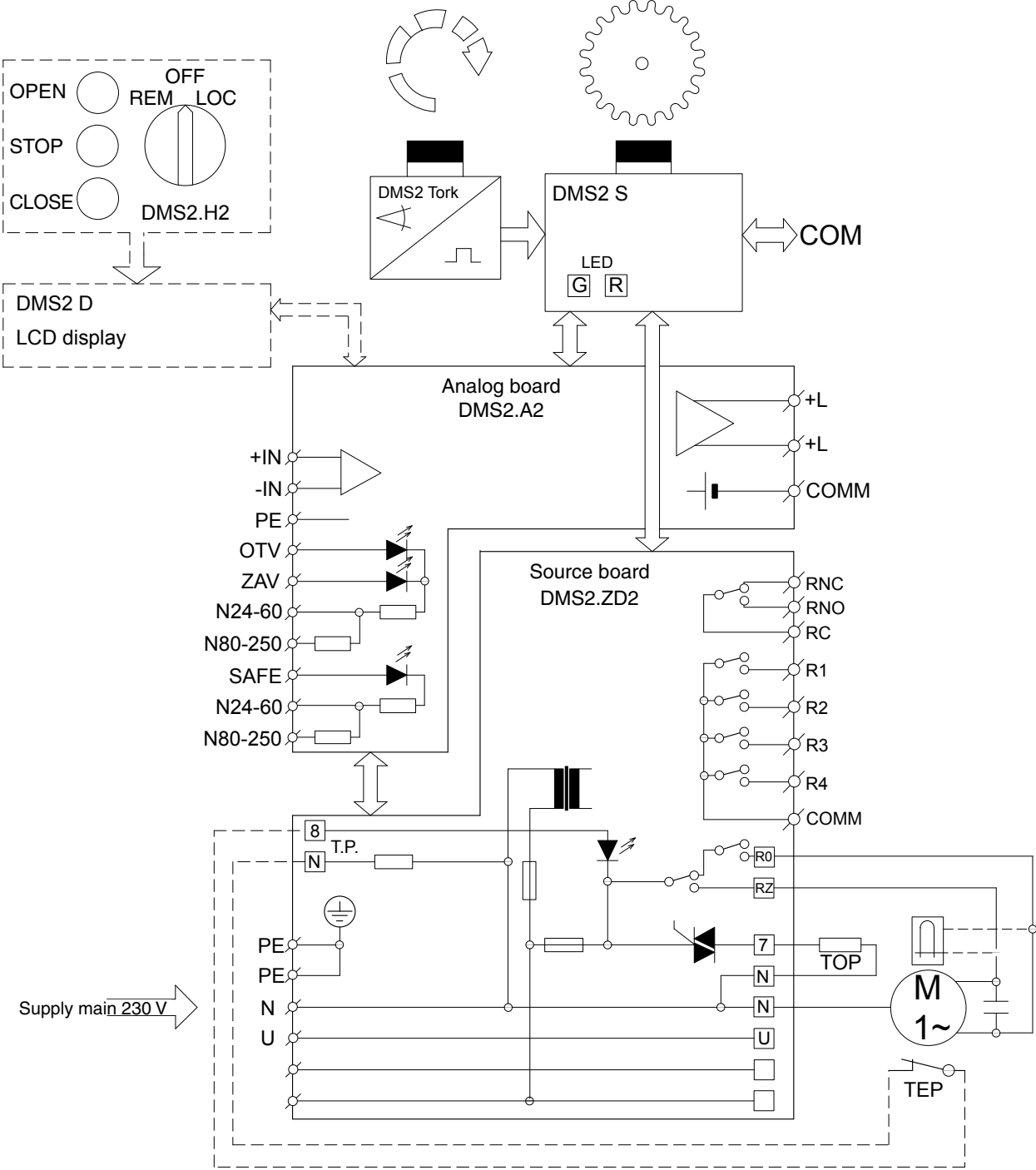
Local control with two-line display

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..



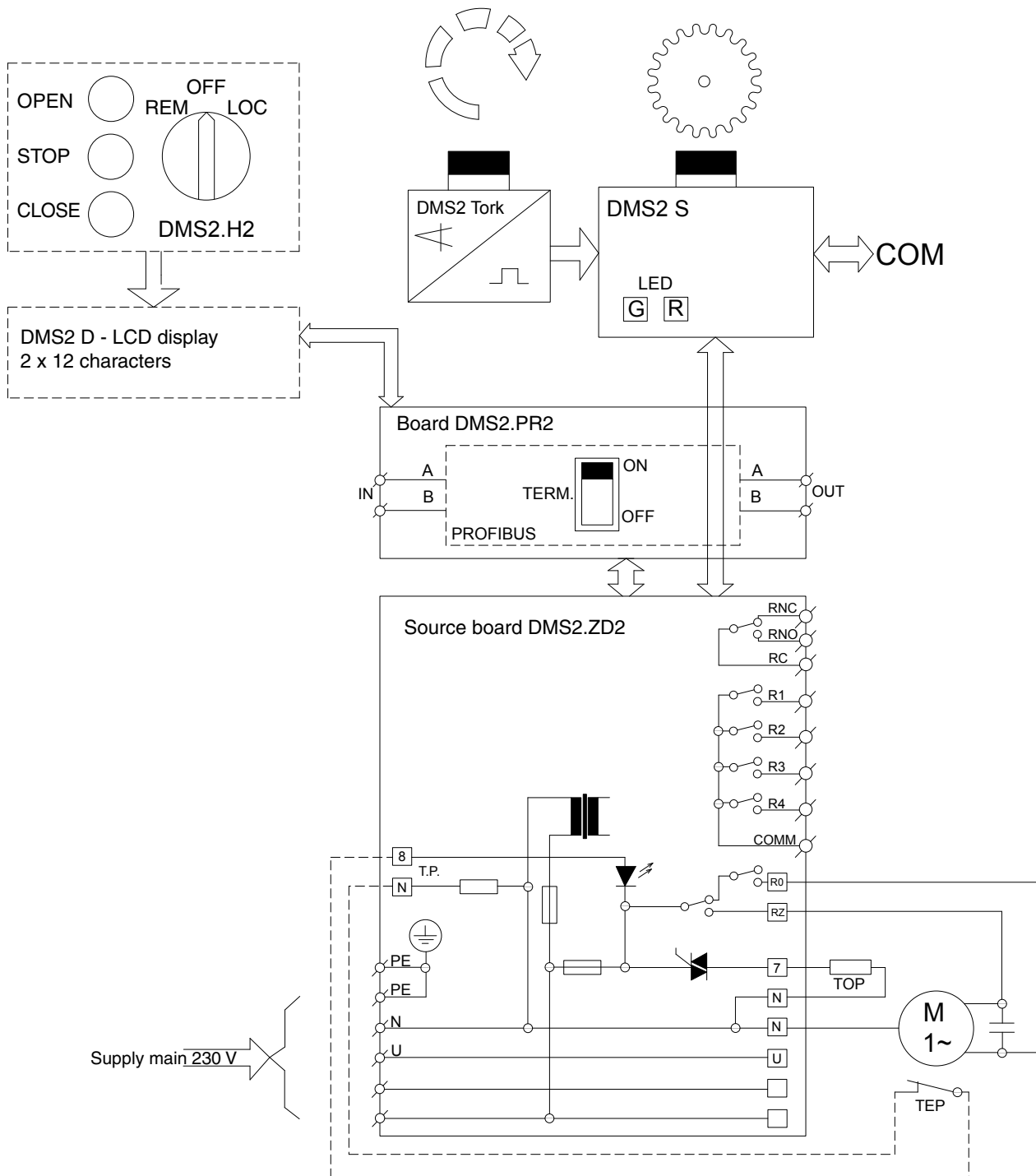
Example of wiring diagram of system **DMS2** in version for control with signals “open” and “close” or in version for control with analog current signal with single-phase electric motor

E-0014



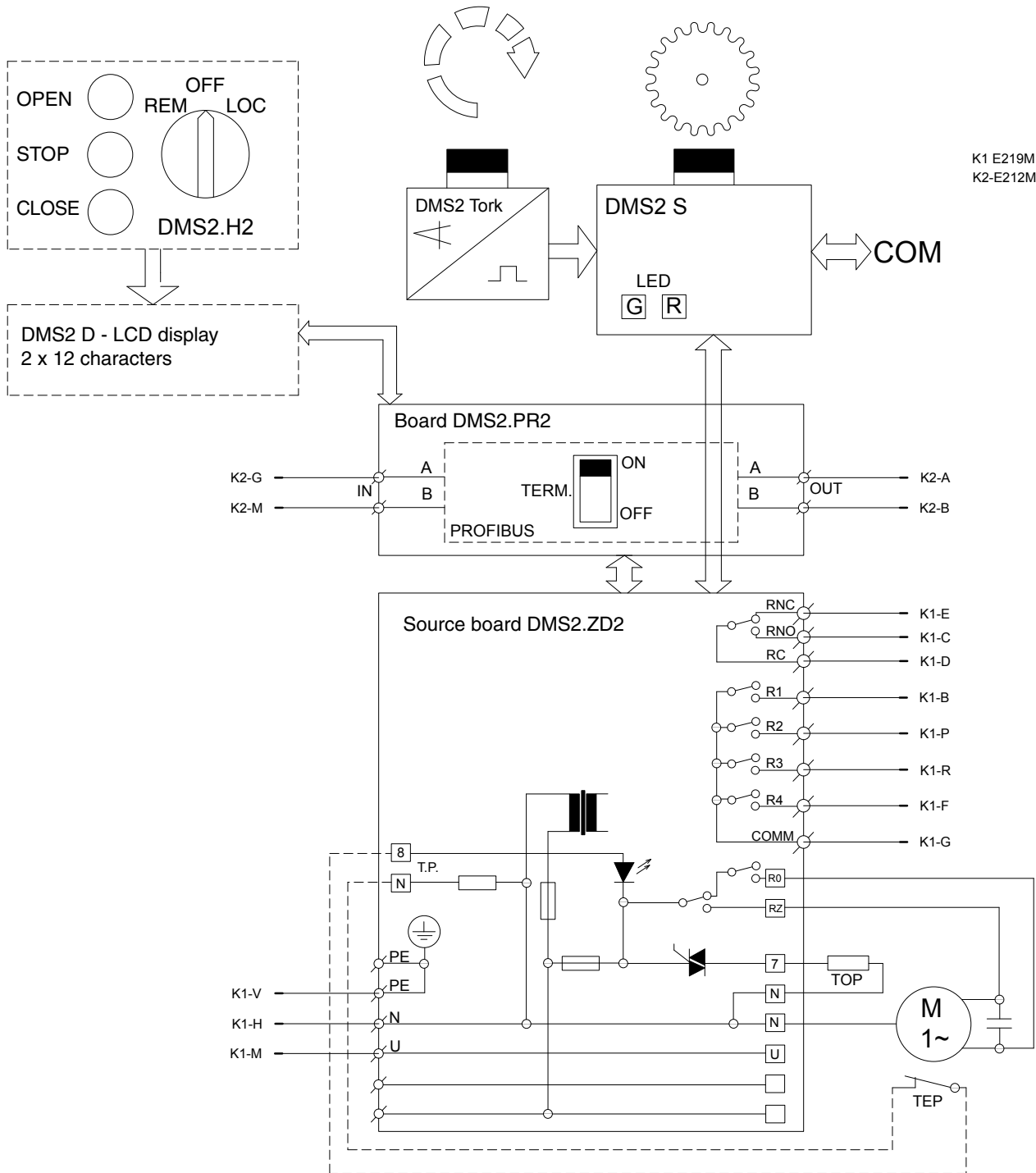
Example of wiring diagram of system **DMS2** in version Profibus
with single-phase electric motor

E-0015



Example of wiring diagram of system **DMS2** in version Profibus
 with single-phase electric motor
 – connection with connector ECTA

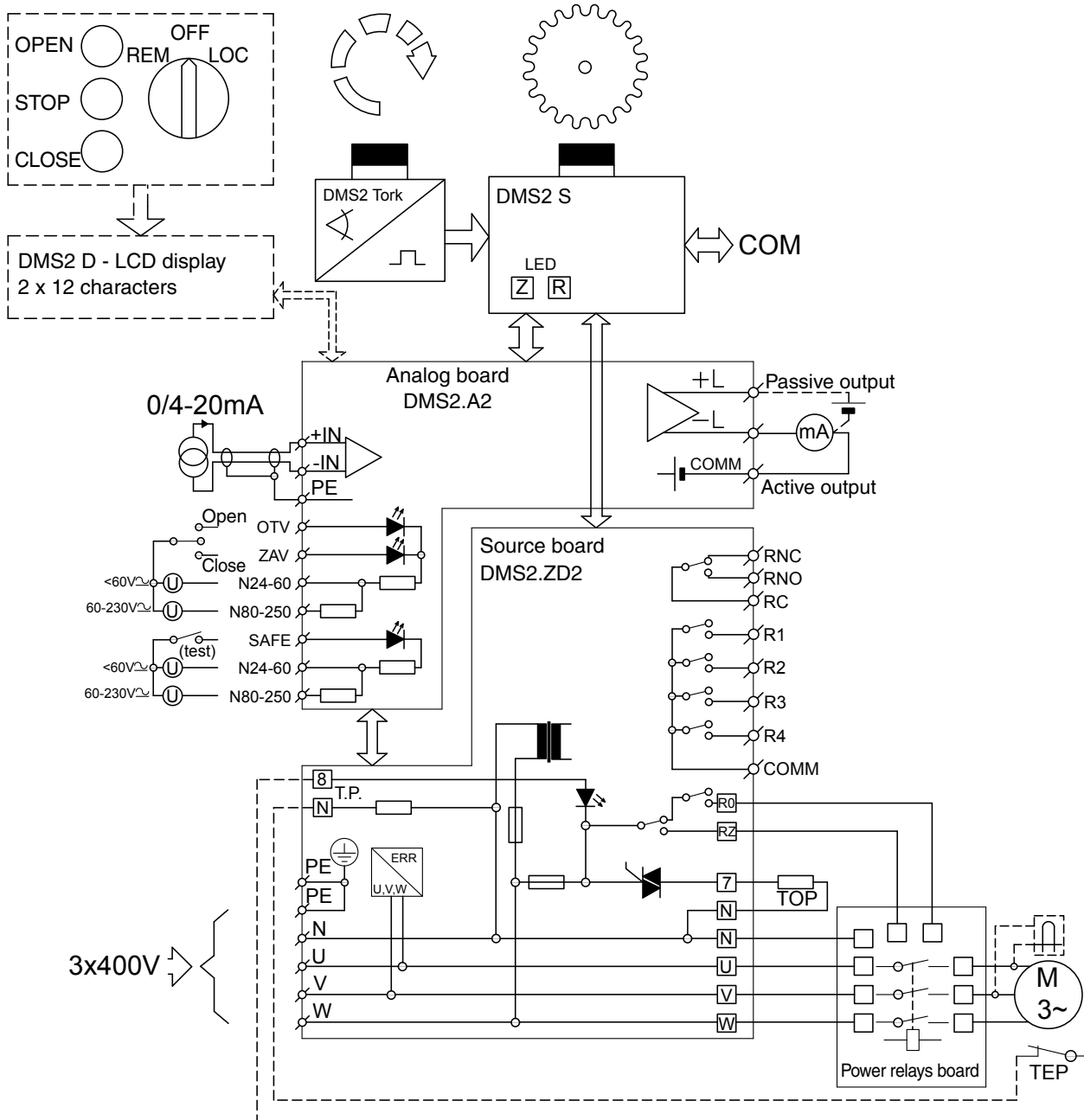
E-0015-K



K1 E219M
 K2-E212M

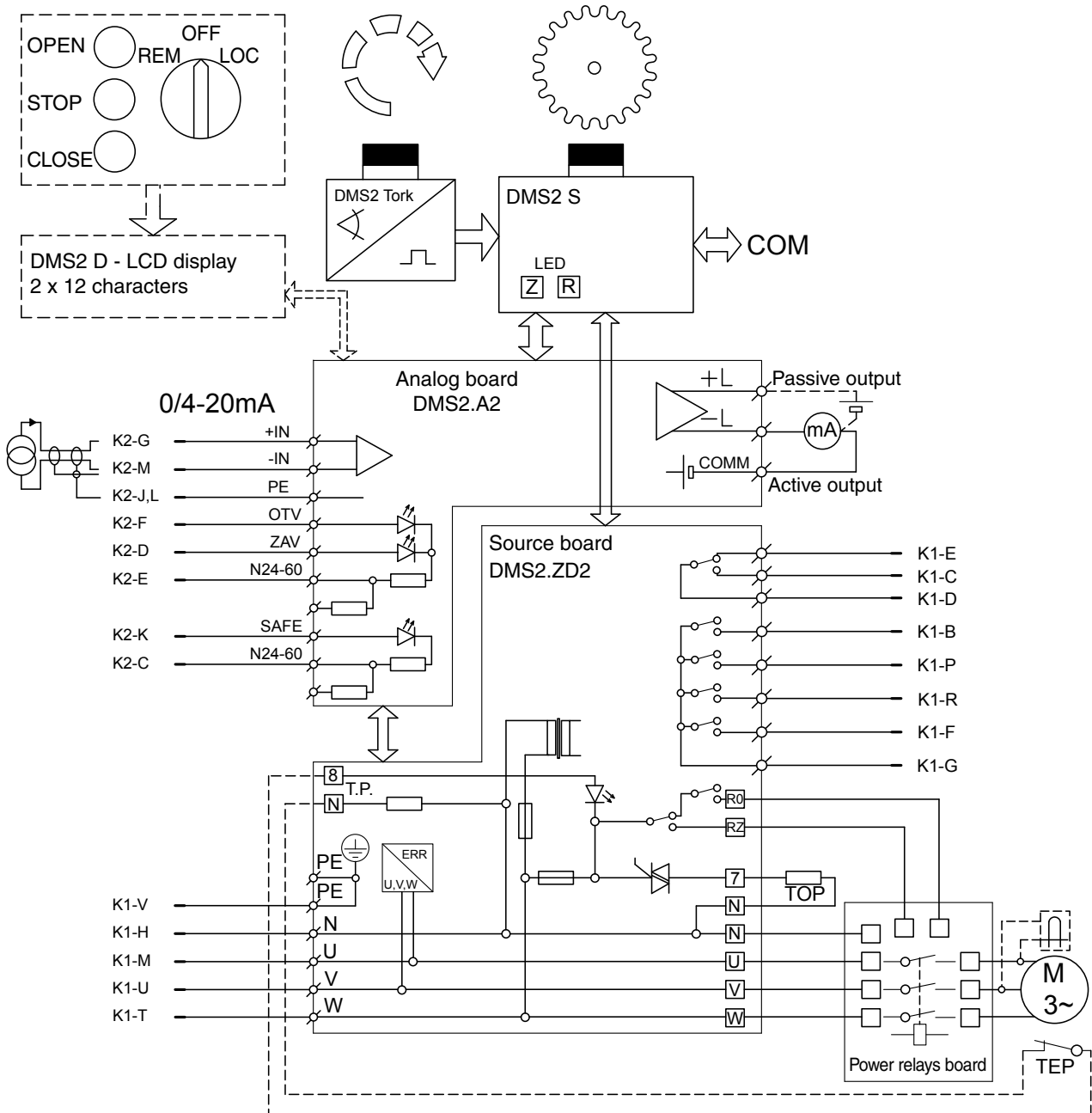
Example of wiring diagram of system **DMS2**
in version for control with signals “open“ and “close“ or in version for control
with analog current signal with three-phase electric motor

E-0016



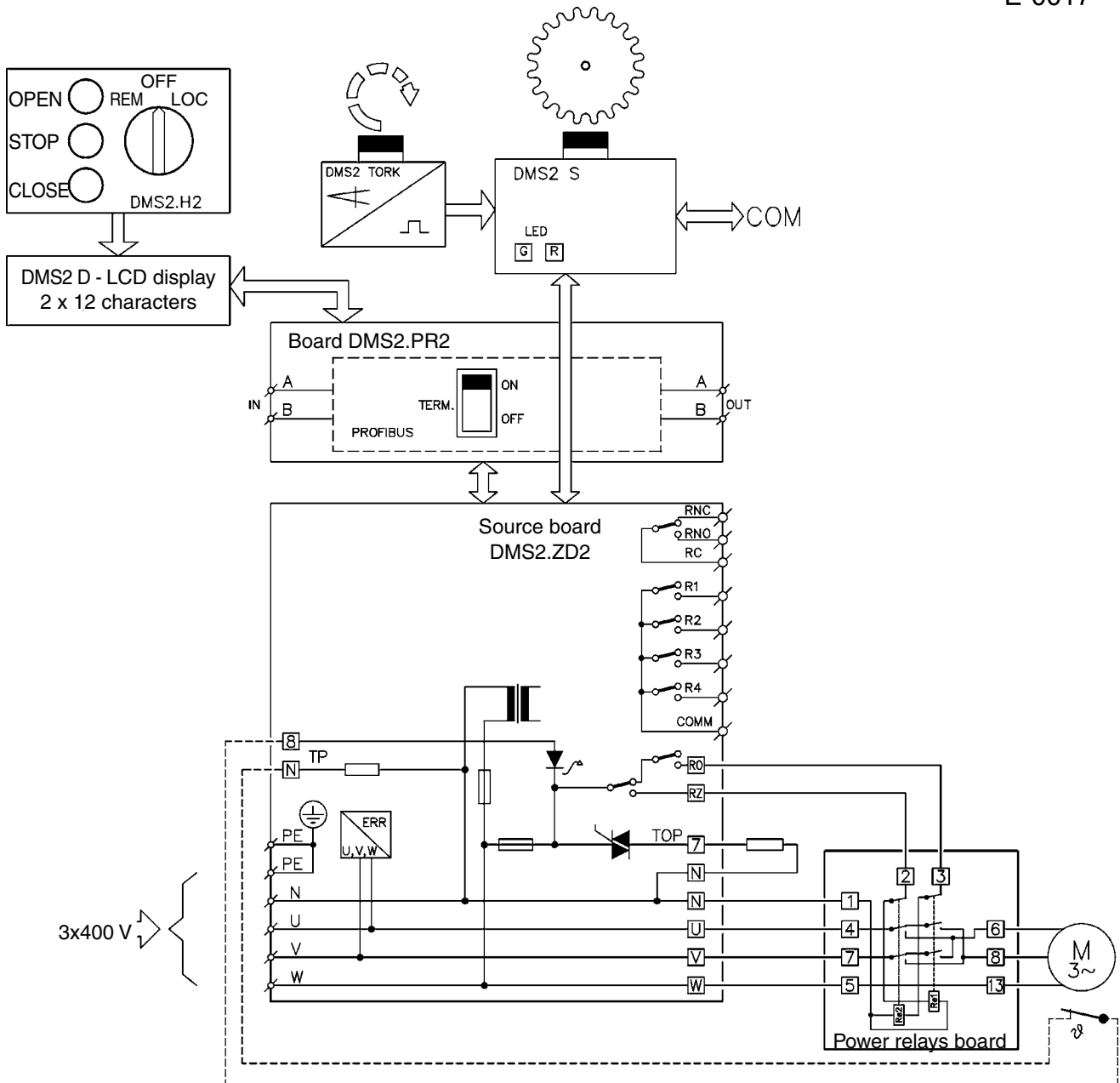
Example of wiring diagram of system DMS2
in version for control with signals “open” and “close” or in version for control
with analog current signal with three-phase electric motor
– connection with connector ECTA

E-0016-K



Example of wiring diagram of system **DMS2** in version Profibus with tree-phase electric motor

E-0017



Example of wiring diagram of system **DMS2** in version Profibus
with tree-phase electric motor
– connection with connector ECTA

E-0017-K

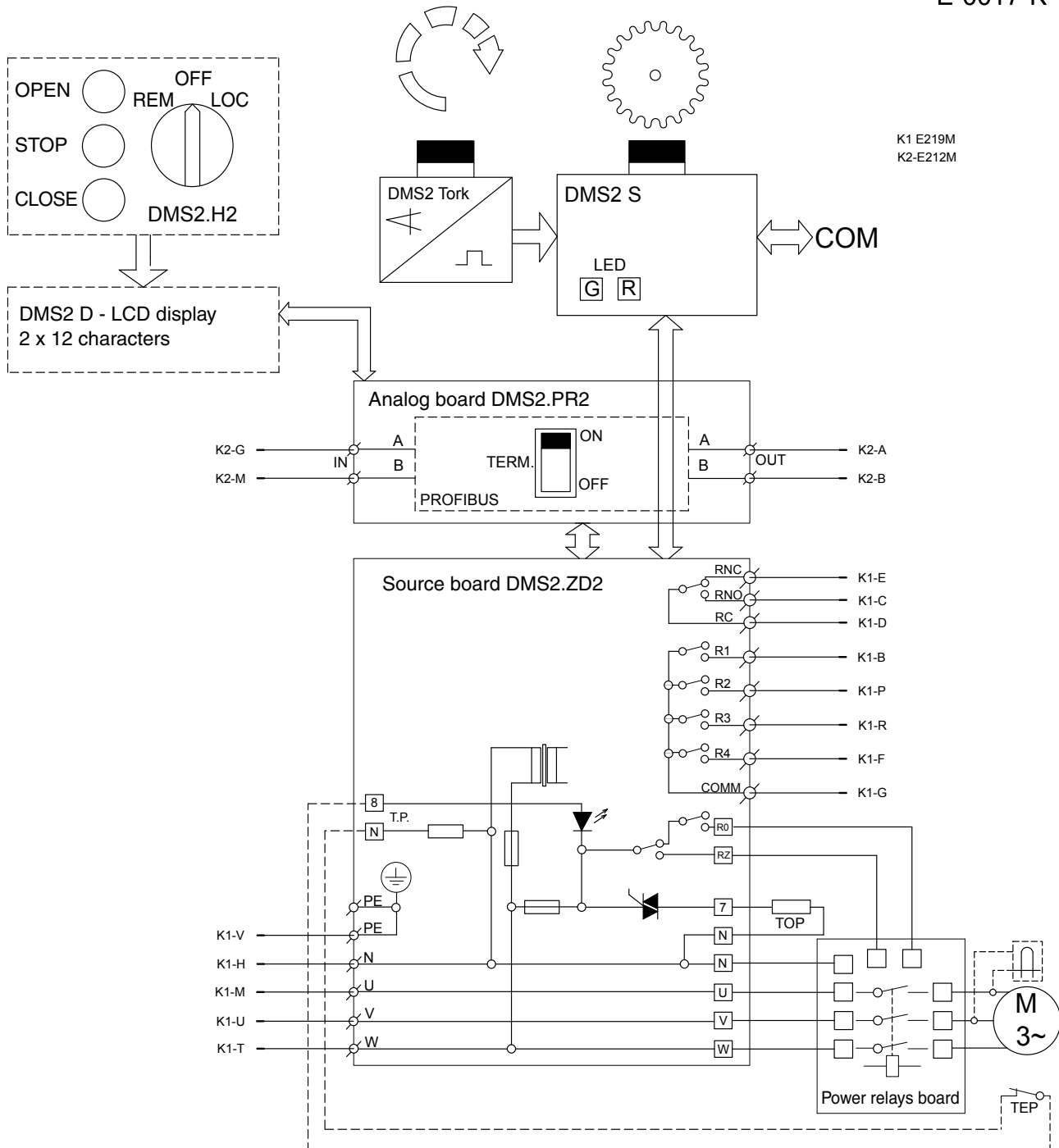


Table 1 – MODACT MOPED electric actuators, type number 52 039

– basic technical parameters

Type of designation	Torque		Shifting speed	Working stroke	Electric motor						Weight	Type number	
	Tripping	Starting			Type	Voltage	Output	Speed	In (400 V)	Iz / In		Basic	Complem.
	[Nm]	[Nm]	[1/min]	[rev.]		[V]	[kW]	[1/min]	[A]		[kg]	1 2 3 4 5	6 7 8 9 1 0
MOPED 30/65-9	10-30	65	9	2-2830	T42RL477	3x400	0,05	1350	0,24	2	17	52 039	xx1xPED
MOPED 30/83-15		83	15		T42RR478	3x400	0,09	1300	0,34	2,5	17		xx2xPED
MOPED 30/58-25		58	25		T42RX479	3x400	0,15	1270	0,53	2,2	17		xx3xPED
MOPED 30/39-40		39	40		T42RX479	3x400	0,15	1270	0,53	2,2	17		xx4xPED
MOPED 30/84-9		84	9		J42RT502	1x230	0,100	1370	0,8	1,7	17		xx5xPED
MOPED 30/56-15		56	15		J42RT502	1x230	0,100	1370	0,8	1,7	17		xx6xPED
MOPED 20/27-25		10-20	27		25	J42RT502	1x230	0,100	1370	0,8	1,7		17
MOPED 60/84-9		84	9		J42RT502	1x230	0,100	1370	0,8	1,7	17		xxDxPED
MOPED 60/140-9	30-60	140	9		T42RR478	3x400	0,09	1300	0,34	2,5	17		xxAxPED
MOPED 60/83-15		83	15		T42RR478	3x400	0,09	1300	0,34	2,5	17		xxBxPED
MOPED 45/58-25	10-45	58	25		T42RX479	3x400	0,15	1270	0,53	2,2	17		xxCxPED

Meaning of respective places in type numbers of electric actuator:

6th place – designates way of mechanical and electrical connection:

Electrical connection and mechanical connection	terminal board	connector
connection F07, shape C	1 x x x PED	C x x x PED
connection F07, shape D	2 x x x PED	D x x x PED
connection F07, shape E	3 x x x PED	E x x x PED
connection F10, shape C	4 x x x PED	J x x x PED
connection F10, shape D	5 x x x PED	K x x x PED
connection F10, shape E	6 x x x PED	L x x x PED
connection F10, shape A	7 x x x PED	F x x x PED
connection F10, shape B1	8 x x x PED	H x x x PED
connection F07, shape B1	9 x x x PED	B x x x PED
connection F07, shape A	0 x x x PED	A x x x PED

7th place – designates type of control electronics:

xExx	actuator fitted with electronics DMS2 ED
xPxx	actuator fitted with electronics DMS2 for connection to Profibus
xRxx	actuator fitted with electronics DMS2 for two- or three-position control

8th place – designates shifting speed (Table 1)

9th place – designates control electronics outfit

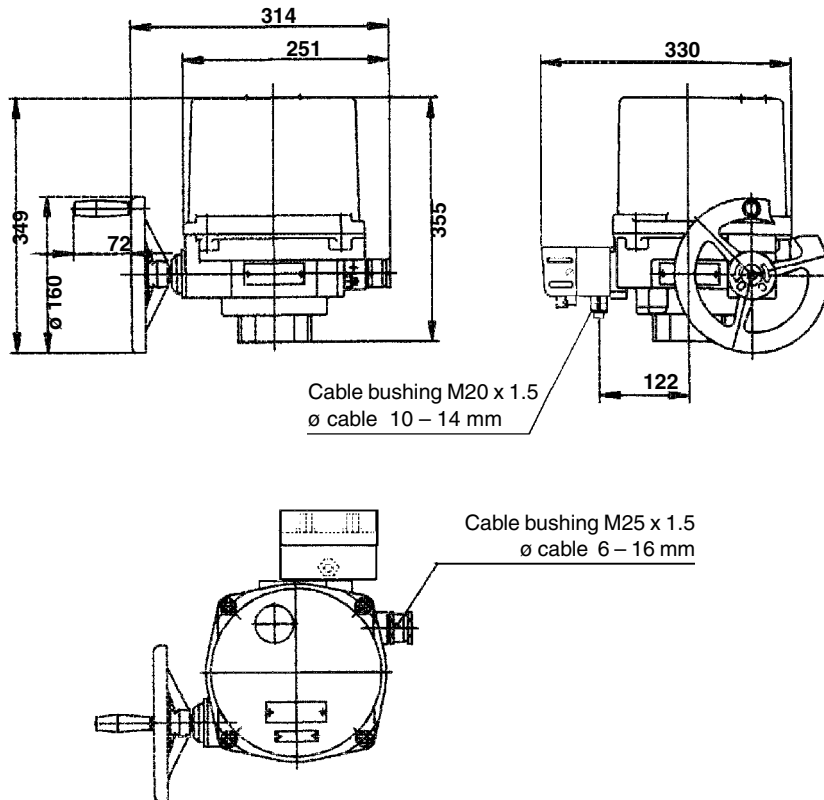
The letter „U“, if the letter **P** or **R** is on the 7th place (electric actuator is fitted with electronics DMS2)

character from Table 2, if the letter **E** is on the 7th place (electronics DMS2 ED)D)

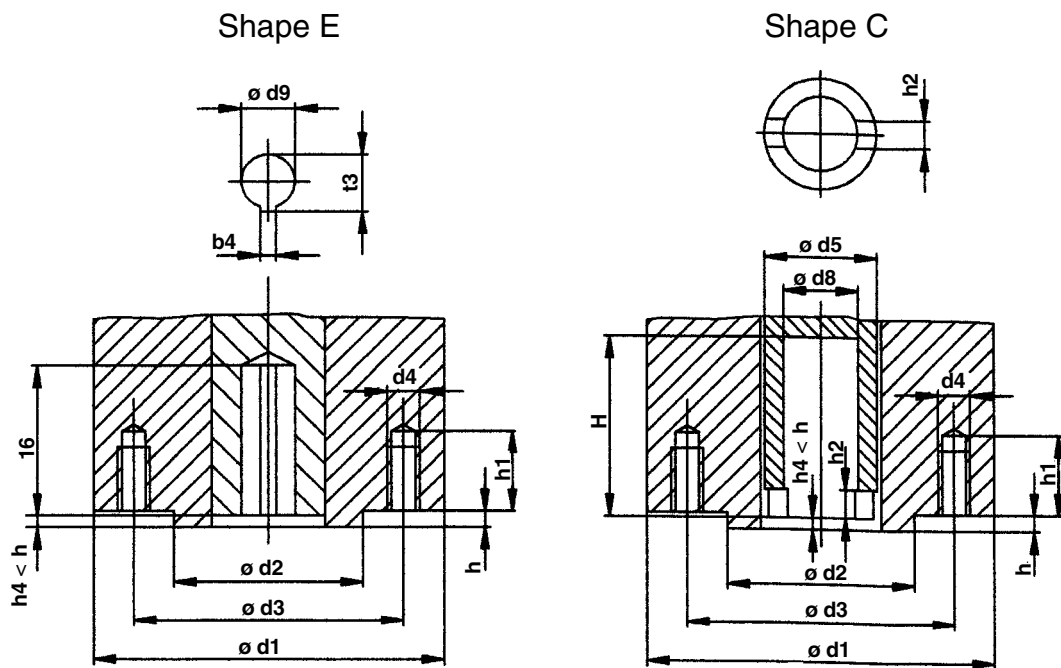
Table 2 – Outfit of control electronics DMS2 ED

Outfit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	H	J	K	L	M	N	P	R
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
Relay					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

Dimensional sketch of **MODACT MOPED** electric actuators, type no. 52 039

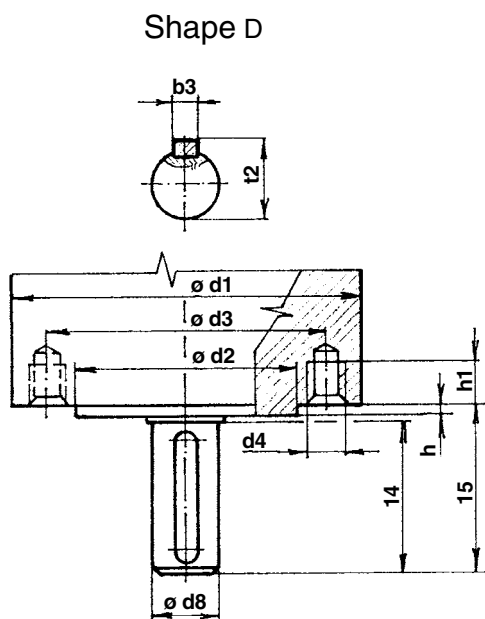


Mechanical connecting dimensions of **MODACT MOPED** electric actuator, type no. 52 039



Flange size	ComMOP data for both shapes								Data for shape C				Data for shape E			
	ø d1	ø d2f8	ø d3	d4	Number of threaded holes	h1	h	ø d5	h2	H	b2H11	ø d8	ø d9H8	l16 min	t3	b4Js9
F 07	125	55	70	M8	4	16	3	40	10	125	14	28	16	40	18,1	5
F 10	125	70	102	M10	4	20	3	40	10	125	14	28	20	55	22,5	6

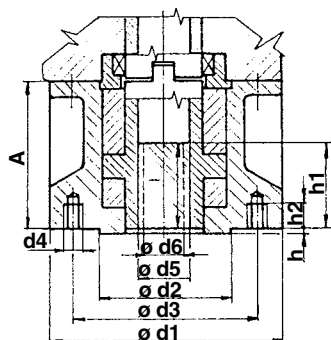
Connecting dimensions of **MODACT MOPED** electric actuator, type no. 52 039
basic version (*without adapter*)



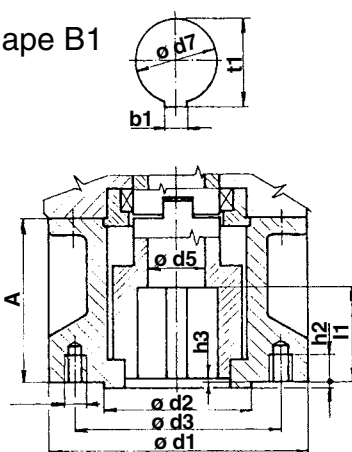
Shape	Dimension (mm)	
D	ø d1 orientational value	125
	ø d2 f8	70
	ø d3	102
	d4	M 10
	number of threaded holes	4
	h max	3
	h1 min. 1,25d4	12,5
	ø d8 g6	20
	l4	50
	t2max	22,5
	b3 h9	6
l5	55	

Adapters for **MODACT MOPED** electric actuator, type no. 52 039

Shape A



Shape B1



	Dimension	52 039
A, B1 (<i>identical dimensions</i>)	ø d1	125
	ø d2 f8	70
	ø d3	102
	d4	M10
	number of holes d4	4
	h	3
	h2 min	12,5
Data for shape A	A	63,5
	ø d5	30
	ø d6 max	26
	h1 max	43,5
	l min	45
Data for shape B1	A	63,5
	ø d5	30
	l1 min	45
	h3 max	3
	b1	12
	ø d7 H9	42
t1	45,3	

8. PACKING AND STORING

For inland freight, the actuators are unpacked. However, they should be transported by covered conveyances or in transport containers.

For delivery abroad, the actuators should be packed, the type and design of package being adapted to the transport conditions and the distance of the place of destination.

Upon receipt of the actuator from the factory, it is essential to check that no damage was caused during transport and to 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 unpacked actuator is not immediately installed it should be stored at a dust-free location with a temperature within the range of -25 °C to +50 °C and relative humidity up to 80% where there are neither aggressive gases nor vapours and which is secured against the harmful effects of climatic conditions.

If the actuator is to be stored for a longer period than 3 years then, prior to commissioning, oil refilling should be made. Any manipulation of the equipment at a temperature below -25 °C is forbidden. Storing the actuator out of doors or at a location that is not protected against the effects of rain, snow or ice accretion should be avoided. Before putting the actuator into operation, excessive slush should be removed. When unpacked actuators are to be stored longer than 3 months it is advisable to place a bag with silica gel or another suitable desiccant in the terminal box.

9. CHECKING OF THE INSTRUMENT FUNCTION AND ITS LOCATION

Prior to installation, be sure that the actuator was not damaged during storing. A functional check of the electric-motor can be made so that it is connected to the AC mains via a circuit breaker and started for short-time operation. In this case, it is sufficient to check that the electric motor starts and turns the output shaft.

The actuator should be installed so that easy access to the handwheel, the terminal box and the control box is provided. It is also imperative to check that the installation complies with the Clause „Operating Conditions“. If another method of installation is required due to local conditions, please consult the manufacturer.

10. ATTACHMENT TO A VALVE

Place the actuator on the valve so that its output pull-rod can be connected to the output pull-rod of the valve. Attach the actuator to the valve and check the attachment by rotating the handwheel. Remove the terminal box cover and wire the actuator, according to the internal and external circuit layouts.

11. ADJUSTMENT OF THE ACTUATOR WITH A VALVE

After fitting the actuator on the valve and checking mechanical connection, the assembly is set up and adjusted.

Setting-up and adjustment can only be carried out by a person with prescribed qualification. These works may not be carried out without properly studying these assembly instructions. Adjustment is accomplished according to instructions for the given type of electronics (DMS2, DMS2 ED) and outfit (manual, program).

12. OPERATION AND MAINTENANCE

Operation of rotary actuators results from process conditions and is usually limited to passing-on impulses to respective functional tasks. In case of the electric current black-out, the controlled unit is shifted using the hand wheel. If the actuator is connected in the automatic circuit it is recommended to install in the circuit components for manual remote control that would provide for controlling the actuator even in case of the automatics failure.

The operator should pay attention to carrying out prescribed maintenance, the actuator being protected from harmful influence of the surroundings and atmospheric effects which are not stated in the paragraph „Working conditions“. Another duty is to ensure that excessive heating of the actuator surface does not occur, rating values are not exceeded and excessive vibrations of the actuator are prevented.

Maintenance

Maintenance of the actuators consists in potential replacement of defective parts. Grease charge is stable for the entire service life of the actuator.

Once in two years, it is recommended to lightly smear the gearing of the position sensor drive. Lubricant CIATIM 201 or PM MOGUL LV 2-3 should be used.

Within half a year at the latest after putting the actuator into operation and then at least once a year, retighten the screws connecting the valve with the actuator. The screws are to be tightened in a cross-wise manner.

13. FAILURES AND THEIR REMOVAL

The actuator is in its limit position and does not start; the motor hums. Make a check for possible interrupted phase.

If the valve is wedged and cannot be moved using the hand wheel or motor, dismantle the actuator and release the closure mechanically.

Cleaning - general inspection

The electric actuators should be kept clean and attention should be paid to prevent their clogging with dirt and dust. Cleaning should be carried out regularly and as often as required by operation conditions. Occasionally, it is necessary to make sure that all connecting and earthing terminals are properly tightened in order to prevent their heating during operation. The general inspection of the actuator is recommended once in 4 operating years unless otherwise specified in the revision regulations of electric devices.

List of spare parts for actuators **MODACT MOPED**, Type No. 52 039

Spare part name	Order number	Use
Sealing ring 24x20 PN 029280.2	2327311500	Sealing hand wheel shaft
Sealing ring 40x2 PN 029281.2	2327311032	Sealing vista indicators
Sealing ring 50x2 PN 029281.2	2327311028	Sealing flanges hand wheel
Sealing ring 50x40 PN 029280.2	2327311007	Sealing of the output shaft
Sealing ring 210x3 PN 029281.2	2327311401	Sealing cover
Supply board DMS2.ED.Z	2339620000	DMS2.ED
Monitoring position MS2.ED.S	2339620001	DMS2.ED
Monitoring moment DMS2.TORK	2339620003	Common for DMS2.ED and DMS2
Analog module DMS.ED.CPT	2339620004	DMS2.ED
Board of power relay DMS2.FIN	2339620031	Common for DMS2.ED and DMS2, only 3-phase
Relay Finder 62.33.8.230.0040	2334513109	Common for DMS2.ED and DMS2, only 3-phase
Display	2339620005	DMS2.ED
Supply board DMS2.ZD2	2339620024	DMS2 for analog and profibus
Analog board DMS2.A22	2339620042	DMS2 analog
Profibus board DMS2.PR2	2339620026	DMS2 profibus
Monitoring position DMS2.S	2339620016	DMS2
Display DMS2.DP	2339620018	DMS2
Board local control DMS2.H3	2339620041	DMS2

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.



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

SURVEY OF PRODUCED ACTUATORS

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Electric rotary (90°) actuators (up to 30 Nm)

MODACT MOK, MOKED, MOKP Ex, MOKPED Ex

Electric rotary (90°) actuators for ball valves and flaps

MODACT MOKA

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

MODACT MON, MOP, MONJ, MONED, MOPED, MONEDJ

Electric rotary multi-turn actuators

MODACT MO EEx, MOED EEx

Explosion proof electric multi-turn actuators

MODACT MOA

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

MODACT MOA OC

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

MODACT MPR Variant

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

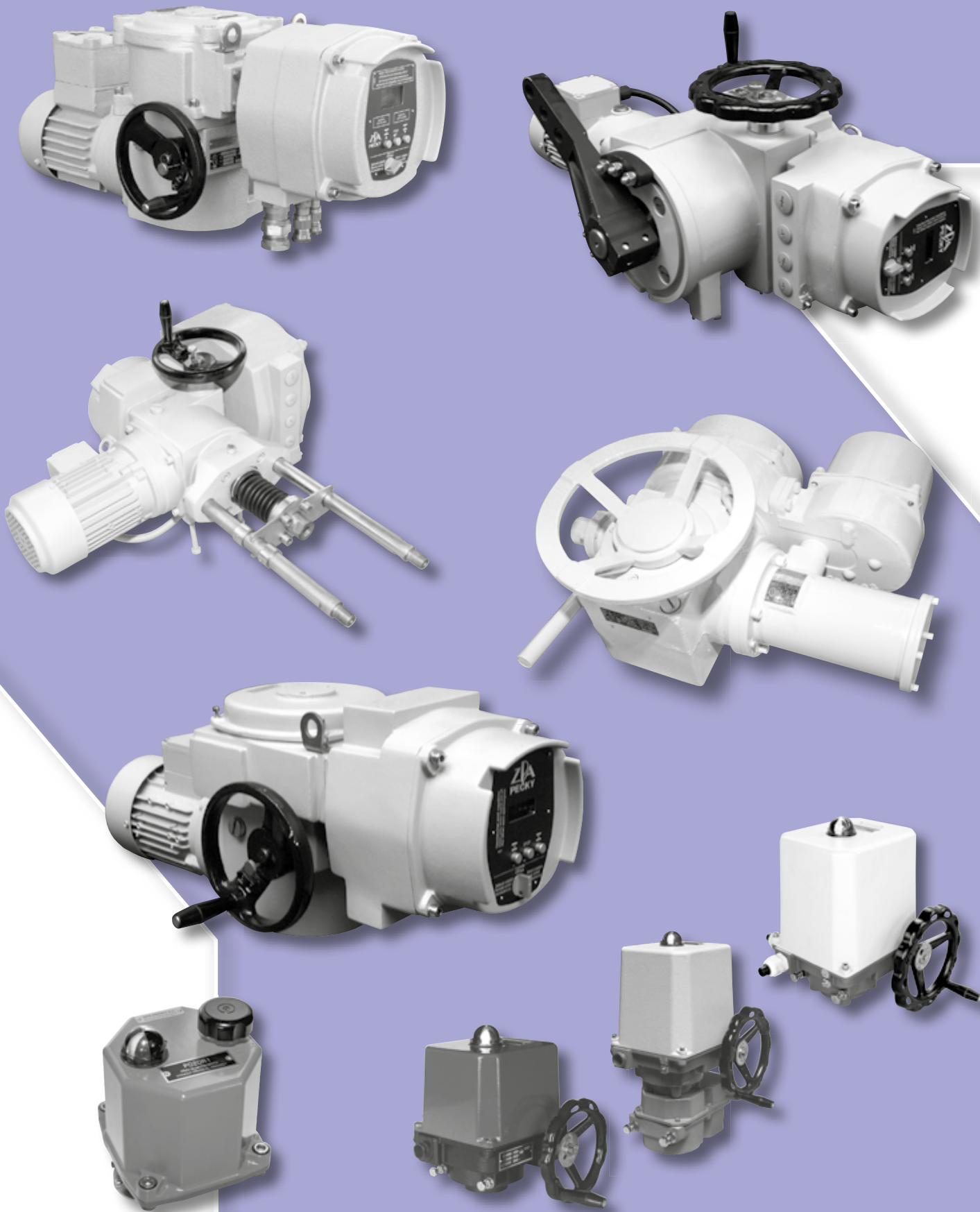
MODACT MPS, MPSP, MPSED, MPSPED

Electric rotary (160°) lever actuators with a constant output speed

MODACT MTN, MTP, MTNED, MTPED

Electric linear thrust actuators with a constant output speed

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