

**Electric rotary (90°) actuators
for ball valves and flaps
- outside containment of nuclear
power plants**

MODACT MOKA

Type numbers 52 325 - 52 329



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

1. USING

Actuators **MODACT MOKA** manufactured in compliance with technical conditions 32-03/07 are intended for controlling shut-off and regulating valves, including valves of protective systems installed in the non-sealed part of nuclear power plants with reactors of type VVER and in attended rooms of nuclear power plants with reactors of type RBMK. The actuators are used to control the valves by turning its control element to the angle of 90°.

Working position of actuators – arbitrary.

Protective enclosure min. IP 65.

The actuators fitted with the position transmitter with unified signal 4 – 20 mA can also be used in circuits of automatic regulation of regime S4.

2. OPERATING CONDITIONS

The actuators in version **MODACT MOKA** must operate reliably with the following parameters of environment:

| | |
|-------------------|--|
| Temperature | -20 °C to +60 °C (up to 90 °C for 5 h, once in 6 months, 5 cycles for the period of the actuator operation*) |
| Pressure | from under-pressure 50 Pa to over-pressure 0.1 MPa |
| Relative humidity | up to 90 % (at 60 °C) |

*) *The actuator remains operational in this regime even after its termination. In case of the actuators, revision after termination of the mentioned regime is not required.*

Resistance against seismic effects. Resistance against vibrations

The actuators correspond to the I. category of seismic resistance according to NP-031-01 and maintain their operating ability during as well as after the seismic effects of intensity up to MP3.

The actuators are resistant against vibrations and seismic shocks of acceleration 8 g in different directions within the range of excitation frequency 20 to 50 Hz for the period of action 20 s. In addition, operation ability is confirmed by seismic resonance test in the frequency range 5 to 20 Hz.

The actuators are resistant to shocks in the frequency range 5 to 100 Hz under the action of vibrational load in two directions with acceleration up to 1 g and amplitude of oscillations up to 50 µm.

Resistance against action of deactivating solutions

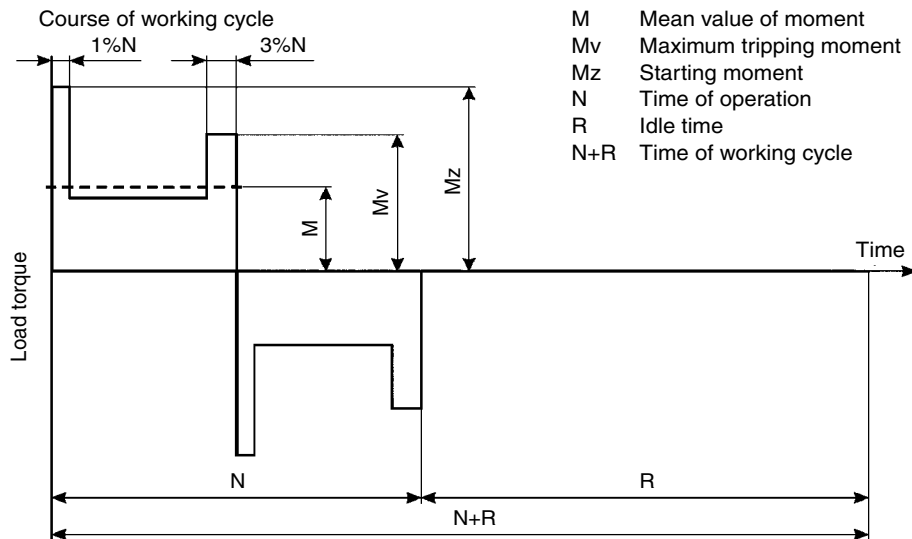
The actuators must be resistant against the action of deactivation solutions. Composition of the solutions is stated in the technical conditions. Composition of deactivation solutions on every single object can be arbitrary in compliance with NP-068-05.

Dipping of the actuators in a vat with the deactivation solution is unacceptable.

3. OPERATING REGIME

Maximum duration of the working cycle (closed – open – closed) is 10 min at surrounding temperature +50 °C and with ratio of time in the state of operation to idle time 1:3 (repeated short-time regime with the period of switching-off PV = 25 %). Mean value of loading moment during the period of switching-on is 60 % of the maximum tripping moment.

The actuators can also operate in a discontinuous regime (e.g. in controlling the regulating valve) with frequency of switching-on up to 1200 h⁻¹ with the ratio of time of operation to idle time 1:3. Mean value of loading moment during operation is 40 % of the maximum tripping moment.



4. BASIC TECHNICAL DATA

If the actuator is not equipped by overcurrent protection in a moment of purchase, it is necessary to use external protection.

Service life of actuators. Reliability

Service life of the actuators is min. 40 years.

The actuators belong to the category of restoring products of standardized reliability. During operation, preventative inspections are carried out with period of min. 15,000 hours. The interval between repairs is min. 4 years.

The specified service life in the interval between two repairs is 1500 cycles (open – closed), wherein probability of faultless operation is min. 0.98. Probability of faultless operation with 25 working cycles per 4 years is 0.998. Confidence probability for calculation of the lower confidence limit of faultless operation is 0.95.

Criteria of the actuators failure are as follows:

- discrepancy in output parameters of the actuators with parameters described in these technical conditions;
- failure to meet acceptable deviations of output parameters;
- failure to meet regulating range of output parameters;
- failure to meet insulation resistance;
- leakage of lubricants from the actuators.

Criteria of limit states of the actuators are as follows:

- rupture of integrity of the body parts that prevents normal function;
- changed shape and dimensions of parts (power kinematic circuits and control units);
- as a result of wear or deformation preventing normal function;
- elapsed specified period of service life.

Supply voltage of actuators

Supply voltage - alternating, three-phase 400/230 V or 380/220 V. Frequency of supply voltage 50 Hz. Possible emergency deviations of frequency of mains voltage:

| Name of regime | Number of load cycles of device per 30 years |
|--|--|
| Emergency deviation of frequency in the network: 51.5 to 52.5 Hz – for up to 5 min one-time, but max. 750 min during operation period; | 10 cycles per year |
| 50.5 to 51.5 Hz – for up to 5 min one-time, but max. 750 min during operation period; | 10 cycles per year |
| 49 to 47.5 Hz – for up to 5 min one-time, but max. 750 min during operation period; | 10 cycles per year |
| 47.5 to 46 Hz – for up to 30 s one-time, but max. 300 min during operation period; | 40 cycles per year |
| Note: 1. With the mentioned emergency deviations of frequency, network voltage must stay at 400/230 V or 380/220 V. 2. With frequency in the range 51.5 to 52.5 Hz, starting and rated moment can decrease by max. 10 %. | |

The actuators of protective systems must be operational under the following conditions:

- Voltage decreased to 80 % of its rated value with simultaneously decreased frequency by 6 % of its rated value for 15 s;
 - Voltage increased to 110 % of its rated value with simultaneously increased frequency by 3 % of its rated value during 15 s.
- Herewith, the actuator must not stop and possibility of the valve functioning must be secured.

Self-locking

The actuators are self-locking. The self-locking of the actuator is ensured by the mechanical brake.

Manual control

The actuators must be fitted with a substitute manual control. When the electric motor turns, torque is not transferred to the manual control device; in operation with the manual control device, its torque is not transferred to the electric motor. The actuator design ensures safety of the operator during control by means of the manual control device. When the hand wheel is turned in the clock-wise direction, the valve closes.

Force on the manual control device does not exceed 735 N at the maximum moment on the output shaft and does not exceed 295 N at 0.4 of the maximum moment value.

Moments in actuators are set up and works, if actuator is under the pressure.

In case, that manual control will be used, it means actuator will be controlled mechanically, moment settings is not working and valve may be damaged.

Anti-condensation heater

The actuators are fitted with the anti-condensation heater preventing condensation of water vapour. Its resistance in actuators MOKA 63 is 12 kohm and in actuators of other types 6.8 kohm. The element is connected to the supply source (to one phase) of voltage 230 V or 220 V.

Switches

The actuators are fitted with two end-limit, two position, and two moment micro-switches. The micro-switches must have one opening and one closing contact. Each contact of the micro-switch has its outlet at the terminal board. On agreement with the client, the end-limit and position micro-switches can have a single change-over contact, and the moment switches – a single opening contact.

The end-limit, position, and moment switches must be functional under the following conditions:

In the circuits of alternating voltage up to 250 V of frequency 50 and 60 Hz. Current through the closed contacts up to 500 mA, wherein the loss of voltage on the closed contacts must not exceed 0.25 V.

In the circuits of direct voltage 24 and 48 V with current through the closed contacts 1 to 400 mA, wherein the loss of voltage on the closed contacts must not exceed 0.25 V.

The functional diagram of the position switches and the signalling circuits is shown on the page 14.

Position transmitters

In compliance with requirements of the client, the actuator can be fitted with the passive or active, current or resistance position transmitters.

Passive current position transmitter CPT 1AAE

| | |
|--------------------------------------|--|
| Rated output signal | 4 – 20 mA or 20 – 4 mA |
| Rated working run | from 0 – 60° to 0 – 120°, regulated |
| Loading resistance | 0 – 500 ohm |
| Supply voltage | 18 – 28 V DC |
| Dimensions | Ø 40 x 25 mm |
| Waviness of supply voltage | ±5 % |
| Transmitter power input | max. 560 mW |
| Insulation resistance | 20 Mohm at 50 V DC |
| Electric strength of insulation | 50 V DC |
| Temperature of operating environment | -25 to + 80 °C, for short time up to +110 °C (max. 2 hours) |

The limit value of supply voltage (at surrounding temperature -25 to +60 °C) is 30 V. Voltage between the transmitter box and the signalling wire must not exceed 50 V.

The user must provide for connecting the two-wire circuit of the current transmitter to electric earthing of particular regulator, computer, etc. The connection must be realized in a single point at any place of the circuit outside the actuator.

Active current position transmitter DCPT

| | |
|---|---------------------------------|
| Rated output signal | 4 – 20 mA or 20 – 4 mA |
| Rated working run | from 60° to 0 – 340°, regulated |
| Loading resistance | 0 – 500 ohm |
| Non-linearity | max. 1 % |
| Supply voltage | 18 – 28 V DC |
| Dimensions | Ø 40 x 25 mm |
| Waviness of supply voltage | ±5 % |
| Max. current consumption of transmitter | max. 42 mA |
| Insulation resistance | 20 Mohm at 50 V DC |
| Electric strength of insulation | 50 V DC |
| Temperature of operating environment | -25 to + 70 °C |

Voltage between the transmitter box and the signalling wire must not exceed 50 V. The current loop is supplied from the source DCPZ located inside the actuator.

Resistance position indicator

The resistance position indicator is formed of a double-wire resistor of variable resistance, each part of which having resistance 100 ohm.

| | |
|-------------------------|------------------------------------|
| Total resistance | 2 x 100 ohm with deviation +12 ohm |
| Maximum loading current | 100 mA |
| Maximum direct voltage | (against frame) 50 V |
| Working run | 0° to 320° |
| Non-linearity | max. 1 % |

Local position indicator

The local position indicator serves for orientational determination of position of the actuator output shaft.

Actuator terminal board

The actuators are fitted with a common terminal board for connecting external electric circuits. The terminal board is located under the actuator cover. All contacts of the micro-switches, circuits of the electric motor, and the earthing terminal are connected to it. The terminal board enables connection of one wire of cross-section 2.5 mm² or two wires of cross-section up to 1 mm². The actuators are fitted with two cable bushings providing for connection of:

- in actuators **MOKA 63**: one cable of outer diameter 10 – 14 mm for control circuits and one cable of outer diameter 13 – 18 mm for circuits of the electric motor;
- in actuators **MOKA 125, 250**: two cables of outer diameter 13 – 18 mm for control circuits and circuits of the electric motor;
- in actuators **MOKA 500, 1000**: one cable of outer diameter 13 – 18 mm for control circuits and one cable of outer diameter 13 – 20 mm for circuits of the electric motor.

The cross-sections and diameters of cables must be specified in the order.

The actuators are fitted with the earthing terminals including a device against spontaneous releasing. The design prevents the control circuits from being influenced by the power circuits.

The actuators are supplied with blinded bushings.

Insulation resistance

At temperature 20 ±5 °C and humidity 30 to 80 %, the insulation resistance is min. 20 Mohm. Under the most severe working conditions, resistance of the insulation of electric circuits against each other and against the frame is min. 0.3 Mohm.

Electric strength of insulation

Insulation of electric circuits against frame as well as against each other at temperature 20 ±5 °C and humidity 30 to 80 % must withstand testing alternating voltage of sinus shape of frequency 50 Hz for 1 minute:

| | |
|---|----------------------------------|
| Electric circuits of actuator of rated voltage max. 250 V | Testing voltage 1500 V, 50 Hz |
| Remote transmitter of rated voltage max. 50 V | 500 V, 50 Hz |
| Electric motor of rated three-phase voltage 400 V (380 V) | 1800 V, 50 Hz |
| | According to GOST 183-74 |
| Circuit of current transmitter CPT 1AAE | 50 V DC |

Noise

The value of mean level of acoustic pressure (*in no-load operation of actuators*) does not exceed 80 dB.

Run-out of output shaft

Motors of type no. 52 325, 52 326, 52 328

max. 1.5°

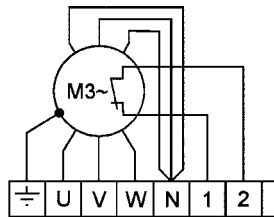
Motors of type no. 52 327, 52 329

max. 2.5 °

Thermal protection of electric motor

Actuators MODACT MOKA 500, type no. 52 328.xx2x and MODACT MOKA 1000, type no. 52 329.xx3x are fitted with the three-phase electric motor (400 V) of power 120 W without a thermal protection. Automatic fuses are built-in in electric motors of other actuators listed in Table 1; they switch off power supply to the electric motor in case of over-heating (after cooling down, the power supply is automatically switched on). Their circuits are not connected to the terminal board of the electric motor. The built-in thermal fuses disconnect the electric motor from power supply in case the temperature of the electric motor winding exceeds +155 °C.

Electric motor FT2B52C is fitted with an automatic fuse the circuit of which is connected to the terminal board of the actuator (see the wiring diagram below). Switched-over load: current 2.5 A at voltage 250 V.



Deviations of basic parameters

Rated values of torques of the output shaft (with acceptable deviations) are given for rated supply voltage with deviation from -15 % to +10 % and for rated frequency of supply voltage in the range ± 2 %, wherein the deviations of voltage and frequency must not have opposite signs.

Acceptable deviations of respective parameters:

| | |
|--|---|
| Tripping moment | ± 15 % of maximum value |
| Time of turning by 90° | +10 % to – 15 % of rated value (idle run) |
| Hysteresis of end-limit and position switches | max. 4° |
| Setting of working run | ± 1 ° |
| Non-linearity of position transmitter | ± 2.5 % of rated value of transmitter output signal |
| Hysteresis of position transmitter does not exceed | 2.5 % of rated value of transmitter output signal |

ORDERING INFORMATION

When ordering, please specify the following:

- Number of actuators required
- Actuator designation
- Complete Type Number, according to Tab. 1 (10 – digit)
- Adjustment of tripping torque (If no tripping torque adjustment has been specified the maximum tripping torque will be adjusted by the manufacturer).

The position-limit switches, the signalling switches and the position transmitter are not adjusted at the factory.

Right is reserved to change the dimensions and design without notice.

Example of specification in the order

The rotary single-revolution actuator in the version for nuclear power plants MODACT MOKA, type no. 52 326, with tripping torque ranging between 63 and 125 Nms (Nm), resetting speed of the output shaft 20 s / 90°, connecting dimensions F07, square 19 mm in basic position, fitted with resistance position transmitter 2 x 100 ohm, with supply voltage 3 x 230 / 400 V, 50 Hz, should be specified in the order as follows:

Actuator MOKA 125 type no. 52 326.6068A, supply voltage of electric motor 3 x 400 V, 50 Hz.

Meaning of numerical characters of the type number is explained in Tables no. 1 and 2.

Table 1 – Basic technical parameters and characteristics of actuators, type MODACT MOKA for valves, installed in attended areas of nuclear power plants with reactors VVER or RBMK

| Type | ACTUATOR | | | | | | | | | | ELECTRIC MOTOR | | | | | | | | | | | | | | | | | | | |
|-----------|-------------|------------|----------------------|-----------------------|---------------------------------------|--|------------------------------|---|------------|-------------------|----------------|-----------------------|----------------|----------------------|----------------------------------|-----------------------------------|-------------|-----------------------|------|--------------|-----|-------|------|------|------|-------|-------|------|----------|-------|
| | Type number | | Tripping torque [Nm] | Shifting time [s/90°] | Gear ratio from output shaft to motor | Gear ratio from output shaft to hand wheel | Max. force on hand wheel [N] | Weight of actuator with electric motor [kg] | Type | Nominal power [W] | Voltage [V] | Motor speed [1 / min] | Efficiency [%] | Power factor [cos φ] | Start-up to nominal moment ratio | Start-up to nominal current ratio | Current [A] | Start-up torque [mNm] | | | | | | | | | | | | |
| | basic | complem. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOKA 63 | 12 3 4 5 | 6 7 8 9 10 | 16 – 32 | 10 | 1850 | 73 | 10 | 7,4 | FCJ2B52VA | 15 | 1x230 | 2750 | 37,9 | 0,99 | 2,14 | 0,18 | min. 52 | | | | | | | | | | | | | |
| | | | 25 – 80 | 20 | 3713 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 25 – 45 | 40 | 7224 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 52 3 2 5 | 16 – 32 | 10 | 1850 | 73 | | | | | | | | | | | | | 10 | 7,4 | FCT2B54MA | 4 | 3x400 | 2680 | 1270 | 16,3 | 0,879 | 1,235 | 0,13 | min. 34 | |
| | | | | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | 3713 |
| | | | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | 7224 |
| | | | | 1907 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOKA 125 | 52 3 2 6 | 63 – 125 | 63 – 125 | 80 | 7332 | 65 | 10 | 12,3 | FCT4C54N | 20 | 1x230 | 1350 | 29,2 | 0,775 | 1,58 | 0,4 | min. 100 | | | | | | | | | | | | | |
| | | | 80 | 1907 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 20 | 3623 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 52 3 2 6 | 125 – 250 | 20 | 14963 | 132 | | | | | | | | | | | | | 10 | 12,7 | FT4C52NA | 90 | 3x400 | 2770 | 2770 | 62,3 | 0,63 | 1,82 | 0,34 | min. 560 | |
| | | | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | 7394 |
| | | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | 14963 |
| | | | | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | 3890 |
| MOKA 500 | 52 3 2 8 | 250 – 500 | 250 – 500 | 20 | 3890 | 72 | 32 | 21 | FCJ4C52N | 60 | 1x230 | 2770 | 52,2 | 0,952 | 2,23 | 0,53 | min. 140 | | | | | | | | | | | | | |
| | | | 40 | 7394 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 80 | 14963 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 52 3 2 9 | 500 – 1000 | 80 | 3506 | 139 | | | | | | | | | | | | | 10 | 20,5 | FCT4C54N | 20 | 3x400 | 1350 | 2770 | 29,2 | 0,775 | 1,58 | 0,4 | min. 100 | |
| | | | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | 7394 |
| | | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | 14963 |
| | | | | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | 3890 |
| MOKA 1000 | 52 3 2 9 | 500 – 1000 | 500 – 1000 | 20 | 3890 | 139 | 32 | 21 | EAMR56N04A | 20 | 3x400 | 1440 | 29 | 0,50 | 2,7 | 0,20 | min. 530 | | | | | | | | | | | | | |
| | | | 40 | 7394 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 80 | 14963 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 52 3 2 9 | 500 – 1000 | 80 | 1875 | 139 | | | | | | | | | | | | | 10 | 27 | 1PK 7060-4AB | 120 | 3x400 | 1350 | 2770 | 55 | 0,75 | 2,0 | 0,42 | 1700 | |
| | | | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | 3506 |
| | | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | 7640 |
| | | | | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | 14790 |
| 52 3 2 9 | 500 – 1000 | 80 | 3630 | 139 | 10 | 45 | 1PK 7060-4AB | 120 | 3x400 | 1350 | 2770 | 55 | 0,75 | 2,0 | 0,42 | 1700 | | | | | | | | | | | | | | |
| | | | 40 | | | | | | | | | | | | | | 6787 | | | | | | | | | | | | | |
| | | | 80 | | | | | | | | | | | | | | 14790 | | | | | | | | | | | | | |
| | | | 160 | | | | | | | | | | | | | | 14790 | | | | | | | | | | | | | |
| | | | 160 | | | | | | | | | | | | | | 14790 | | | | | | | | | | | | | |

Note:

1) In table is mentioned one power from power pairs, acting on handwheel circuit. Electrical connection of actuators – by stuffing gland – terminal block. Rated current is mentioned for voltage 400 V, 50 Hz. For U = 380 V is: rated current $I_{n30} = I_{n400} \cdot 400/380$. The same proportions is for starting current as well.

Additional type number:

6th position - equipped by position transmitters of output shaft:

6xxxA – resistive transmitter 1x100 ohm;

7xxxA – current transmitter 4-20 mA;

8xxxA – no position transmitter;

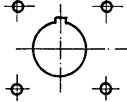
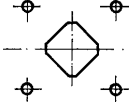
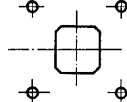
9xxxA – current position transmitter 4-20mA with built in power supply.

7th position – reserve: x0xxx – for all types;

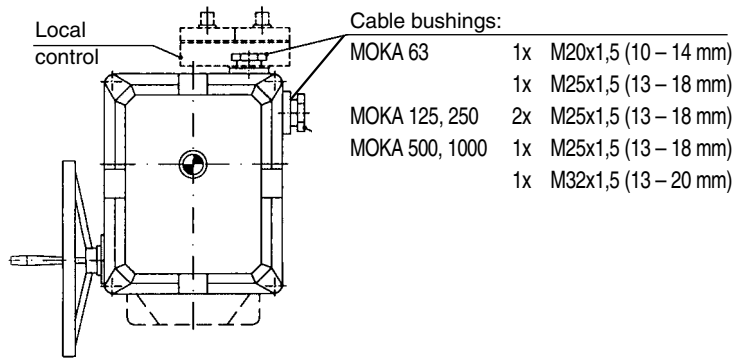
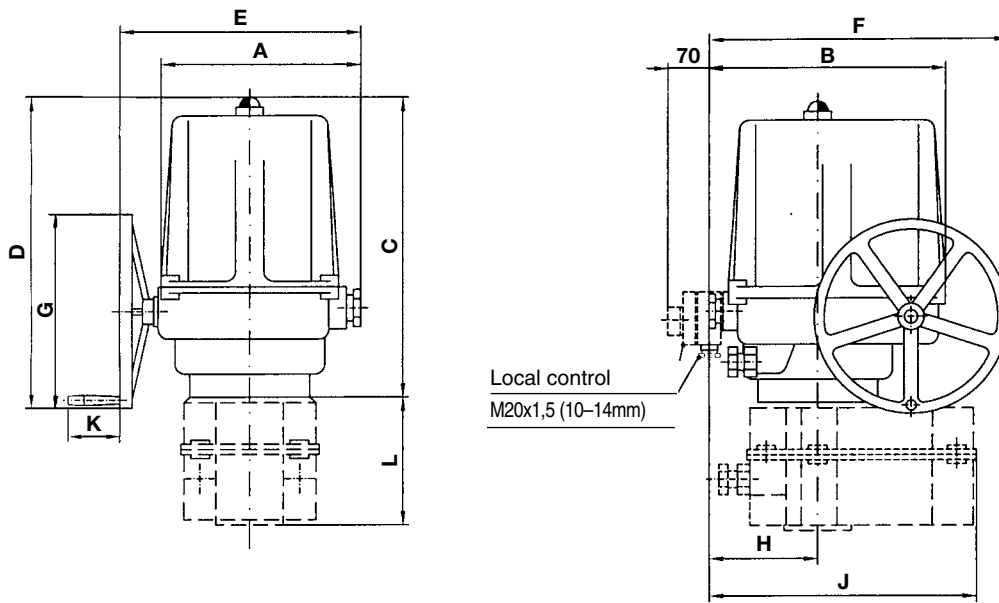
8th position – tripping torque of actuator and adjusting time of output shaft of 90 degrees (according to Table 1).

9th position – connection dimensions (according to Table 2).

Table 2 – MODACT MOKA – way of mechanical connection
(specification of 9th place of type number)

| Type Number | Flange size | Connection or square size with [mm] | Square position | Marking on the 9th place of type number |
|---|-------------|---|---------------------|---|
| 52325 | F05 | keyway, \varnothing 22 | – | xxx0A |
| | | 14 | basic | xxx1A |
| | F04 | keyway, \varnothing 18 | – | xxx2A |
| | | 11 | basic | xxx3A |
| | F05 | 14 | positioned at a 45° | xxx4A |
| | | 11 | | xxx5A |
| | F04 | 12 | basic | xxx6A |
| | | | positioned at a 45° | xxx7A |
| | F05 | 16 | basic | xxx8A |
| positioned at a 45° | | | xxx9A | |
| 52326 | F07 | keyway, \varnothing 28 | – | xxx0A |
| | | 17 | basic | xxx1A |
| | F05 | keyway, \varnothing 22 | – | xxx2A |
| | | 14 | basic | xxx3A |
| | F07 | 17 | positioned at a 45° | xxx4A |
| | | 14 | | xxx5A |
| | F05 | 16 | basic | xxx6A |
| | | | positioned at a 45° | xxx7A |
| | F07 | 19 | basic | xxx8A |
| positioned at a 45° | | | xxx9A | |
| 52327 | F10 | keyway, \varnothing 42 | – | xxx0A |
| | | 22 | basic | xxx1A |
| | F07 | keyway, \varnothing 28 | – | xxx2A |
| | | 17 | basic | xxx3A |
| | F10 | 22 | positioned at a 45° | xxx4A |
| | | 17 | | xxx5A |
| | F07 | 19 | basic | xxx6A |
| | | | positioned at a 45° | xxx7A |
| | F10 | 24 | basic | xxx8A |
| positioned at a 45° | | | xxx9A | |
| 27 | | | basic | xxxAA |
| | | | positioned at a 45° | xxxBA |
| 52328 | F12 | keyway, \varnothing 50 | – | xxx0A |
| | | 27 | basic | xxx1A |
| | F10 | keyway, \varnothing 42 | – | xxx2A |
| | | 22 | basic | xxx3A |
| | F12 | 27 | positioned at a 45° | xxx4A |
| | | 22 | | xxx5A |
| | F10 | 24 | basic | xxx6A |
| | | | positioned at a 45° | xxx7A |
| | | | 27 | basic |
| | | | positioned at a 45° | xxx9A |
| F12 | 32 | basic | xxxAA | |
| | | positioned at a 45° | xxxBA | |
| 52329 | F12 | keyway, \varnothing 50 | – | xxx0A |
| | | 27 | basic | xxx1A |
| | | | positioned at a 45° | xxx4A |
| | | | basic | xxx5A |
| | | | positioned at a 45° | xxx6A |
| Electric actuator output shaft (when viewing towards the local position indicator). The handwheel tallies with the CLOSED position | | Keyway connection | | |
| | | closed | | |
| | |  | | |
| | | Square | | |
| | | basic position closed | | |
| | |  | | |
| | | angular position on 45° closed | | |
| | |  | | |

Dimensional sketch of **MODACT MOKA** electric actuators

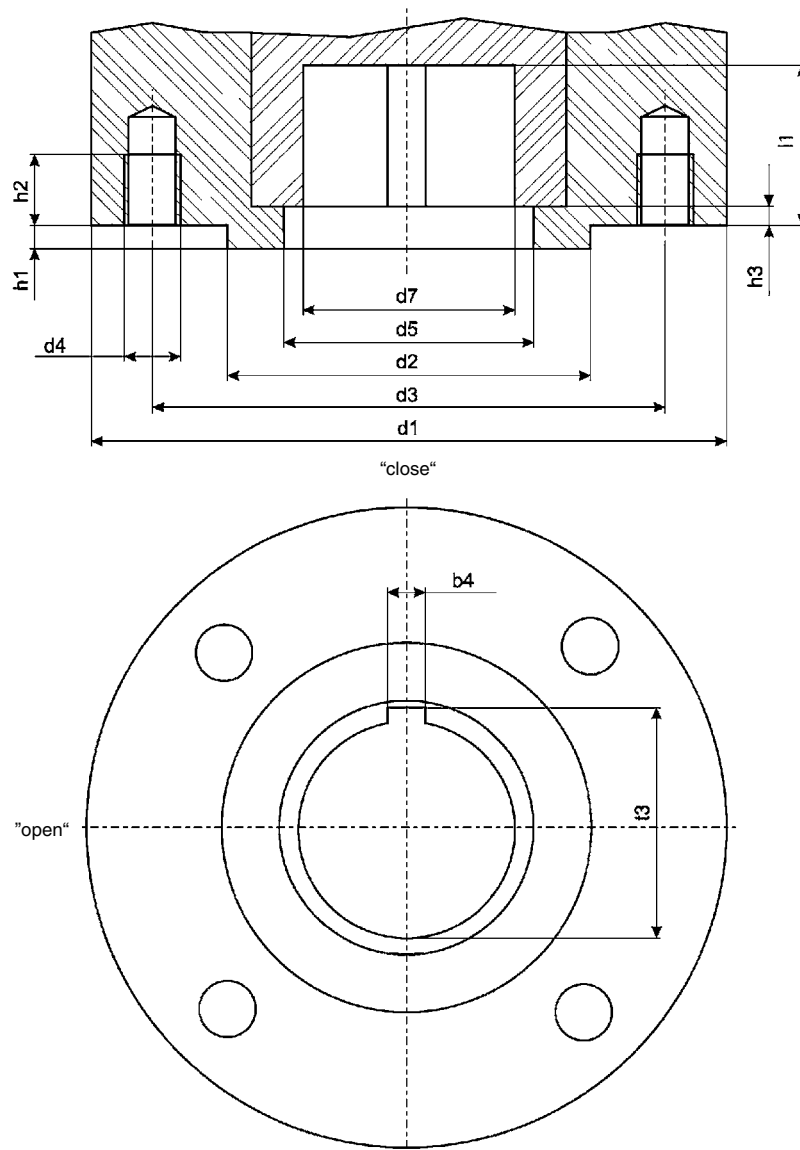


| Type | A | B | C | D | E | F | G | H | J | K | L |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
| MOKA 63 | 173 | 203 | 247 | 244 | 213 | 245 | 160 | 98 | - | 72 | - |
| MOKA 125 | 204 | 237 | 325 | 347 | 252 | 290 | 200 | 111 | - | 73 | - |
| MOKA 250 | 204 | 237 | 325 | 347 | 252 | 290 | 200 | 111 | 263 | 73 | 128 |
| MOKA 500 | 250 | 290 | 386 | 398 | 325 | 362 | 250 | 128 | - | 78 | - |
| MOKA 1000 | 250 | 290 | 386 | 398 | 325 | 362 | 250 | 128 | 323 | 76 | 155 |

Connection dimensions of **MODACT MOKA** actuators

– for valves and control devices with spindles that are provided with a tight-fit keyway

Position of the keyway, according to ISO 5211 and DIN 3337 (The groove is in the CLOSE position whereas the OPEN position is on the left side when viewing the local position indicator).



Size, mm

| Flange | d_1 | d_2 f 8 | d_3 | d_4 | d_7 H 9 | h_1 max. | h_2 max. | h_3 max. | l_1 min. | b_4 ls 9 | t_3 | d_5 |
|--------|-------|--------------|-------|-------|--------------|---------------|---------------|---------------|---------------|---------------|-------|-------|
| F04 | 65 | 30 | 42 | M6 | 18 | 3 | 12 | 3 | 26 | 6 | 20,5 | 25 |
| F05 | | 35 | 50 | | 22 | | | | 30 | | 24,5 | 28 |
| F07 | 90 | 55 | 70 | M8 | 28 | 13 | 35 | 8 | 30,9 | 40 | | |
| F10 | 125 | 70 | 102 | M10 | 42 | 16 | 45 | 12 | 45,1 | 50 | | |
| F12 | 150 | 85 | 125 | M12 | 50 | 20 | 53 | 14 | 53,5 | 70 | | |

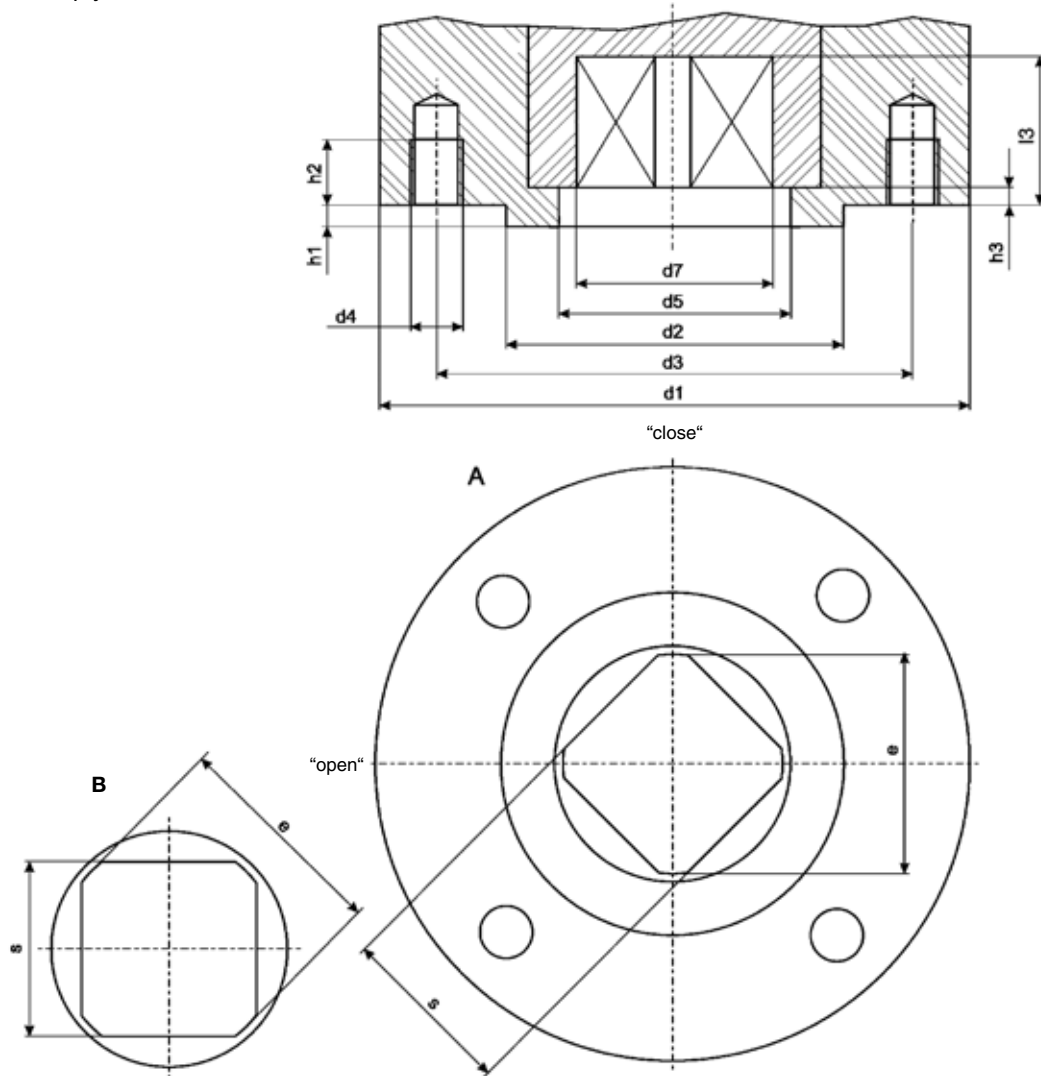
Connection dimensions of **MODACT MOKA** actuators

– for valves and control devices with spindles that are provided with a square hole

A – Square-end joint in the basic position

B – Square-end joint positioned at an angle of 45°

Position of the square hole in the end position of the actuator. The OPEN position is on the left of the CLOSE position, when viewing the local position indicator. The square hole corresponds to DIN 79. The connecting dimensions comply with DIN 3337 or ISO 5211.

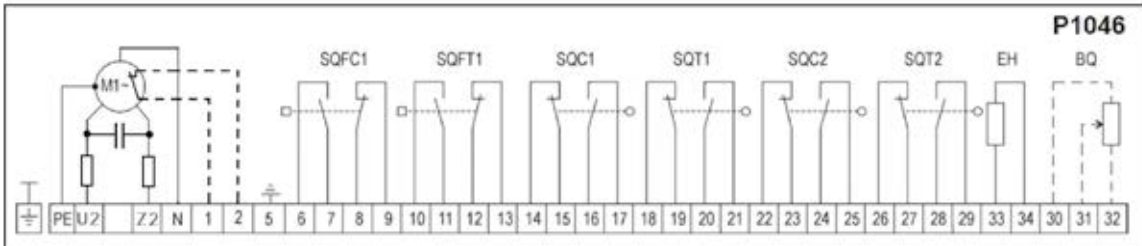
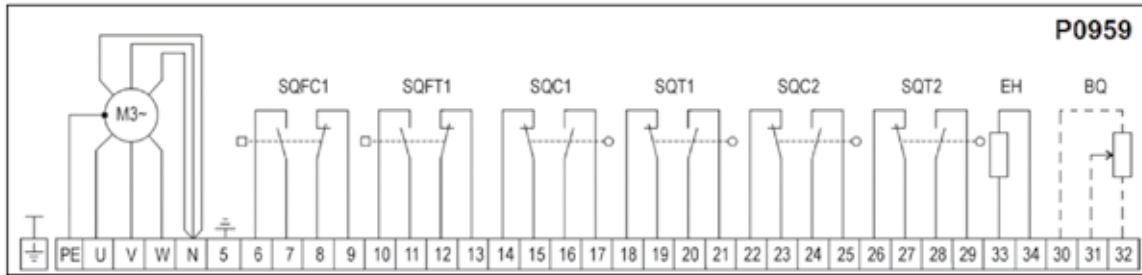


Size, mm

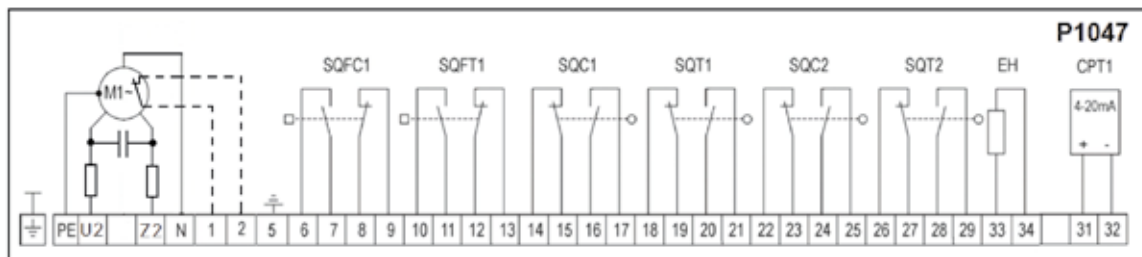
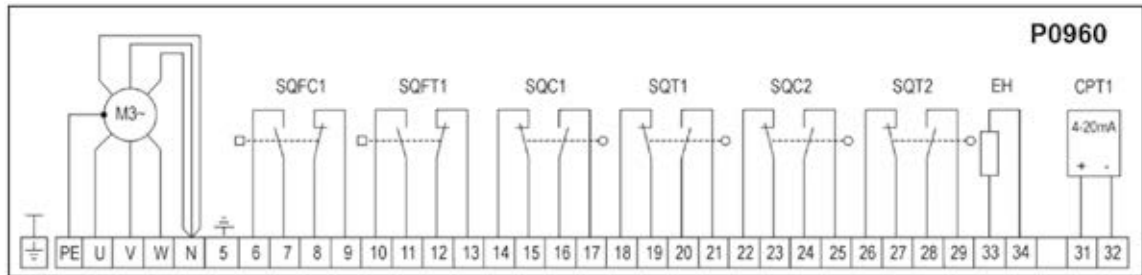
| Flange | d_1 | d_2 f 8 | d_3 | d_4 | h_1 max. | h_2 min. | h_3 max. | h_4 | | s H11 | e min. | l_3 min. | d_5 |
|--------|-------|--------------|-------|-------|---------------|---------------|---------------|-------|------|----------|-----------|---------------|-------|
| | | | | | | | | max. | min. | | | | |
| F04 | 55 | 30 | 42 | M6 | 3 | 12 | 3 | 1,5 | 0,5 | 11 | 14,1 | 15,1 | 25 |
| F05 | 65 | 35 | 50 | | | | | | | 12 | 12 | 12 | |
| F07 | 90 | 55 | 70 | M8 | 3 | 13 | 3 | 3 | 3 | 14 | 18,1 | 19,1 | 28 |
| F10 | 125 | 70 | 102 | M10 | 3 | 16 | 3 | 3 | 1 | 17 | 22,2 | 23,1 | 40 |
| | | | | | | | | | | 19 | 25,2 | 26,1 | |
| F12 | 150 | 85 | 125 | M12 | 3 | 20 | 3 | 3 | 1 | 22 | 28,2 | 30,1 | 50 |
| | | | | | | | | | | 24 | 32,2 | 33,1 | |
| | | | | | | | | | | 27 | 36,2 | 37,1 | 70 |
| | | | | | | | | | | 32 | 42,2 | 44,1 | |

Wiring diagrams of **MODACT MOKA** electric actuators

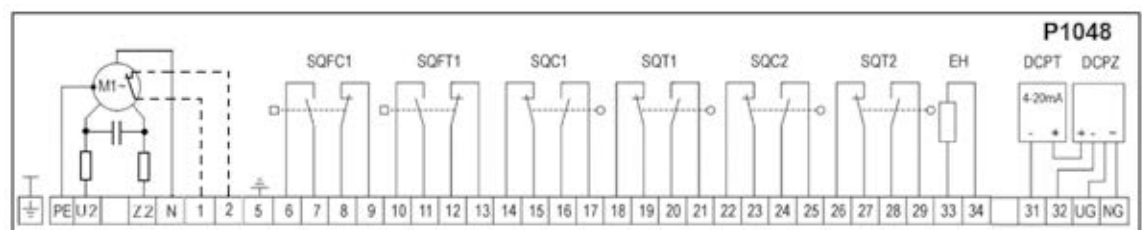
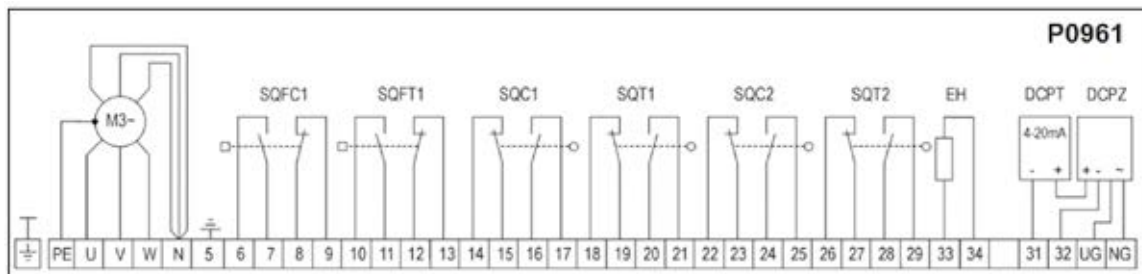
Design with potentiometer or without transmitter



Design with pasive current position transmitter



Design with active current position transmitter (with power source)



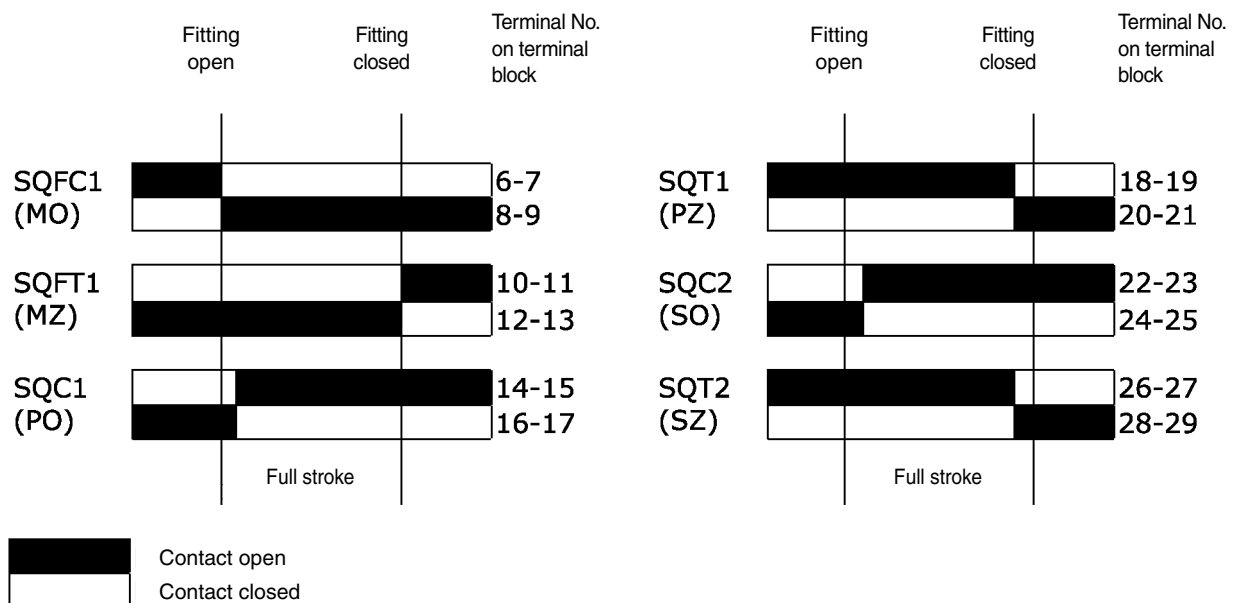
Legend:

- SQFC1 (MO) – OPEN torque-limit switch
- SQFT1 (MZ) – CLOSE torque-limit switch
- SQC1 (PO) – OPEN position-limit switch
- SQT1 (PZ) – CLOSE position-limit switch
- SQC2 (SO) – OPEN signalling switch
- SQT2 (SZ) – CLOSE signalling switch

- BQ – Resistance position transmitter 100 ohm
- CPT1 – Current position transmitter CPT 1AAE
- DCPT – Current position transmitter DCPT (active)
- DCPZ – Power supply DCPT
- M3~, (M1~) – Three-phase (one-phase) motor
- EH – Heating resistor

Both ends of all windings of the three-phase electric motor are brought out (they are marked U1, U2, V1, V2, W1, W2). The connection “star” or “delta” can be used for external connection. The electric motor in this actuator has “star” connection, which means that the ends U2, V2, W2 are connected together and to terminal N. This terminal is usually not connected and serves to special purposes when bringing-out of electric zero of the winding is required.

Operation diagram of torque-, position-limit and signalling units





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

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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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