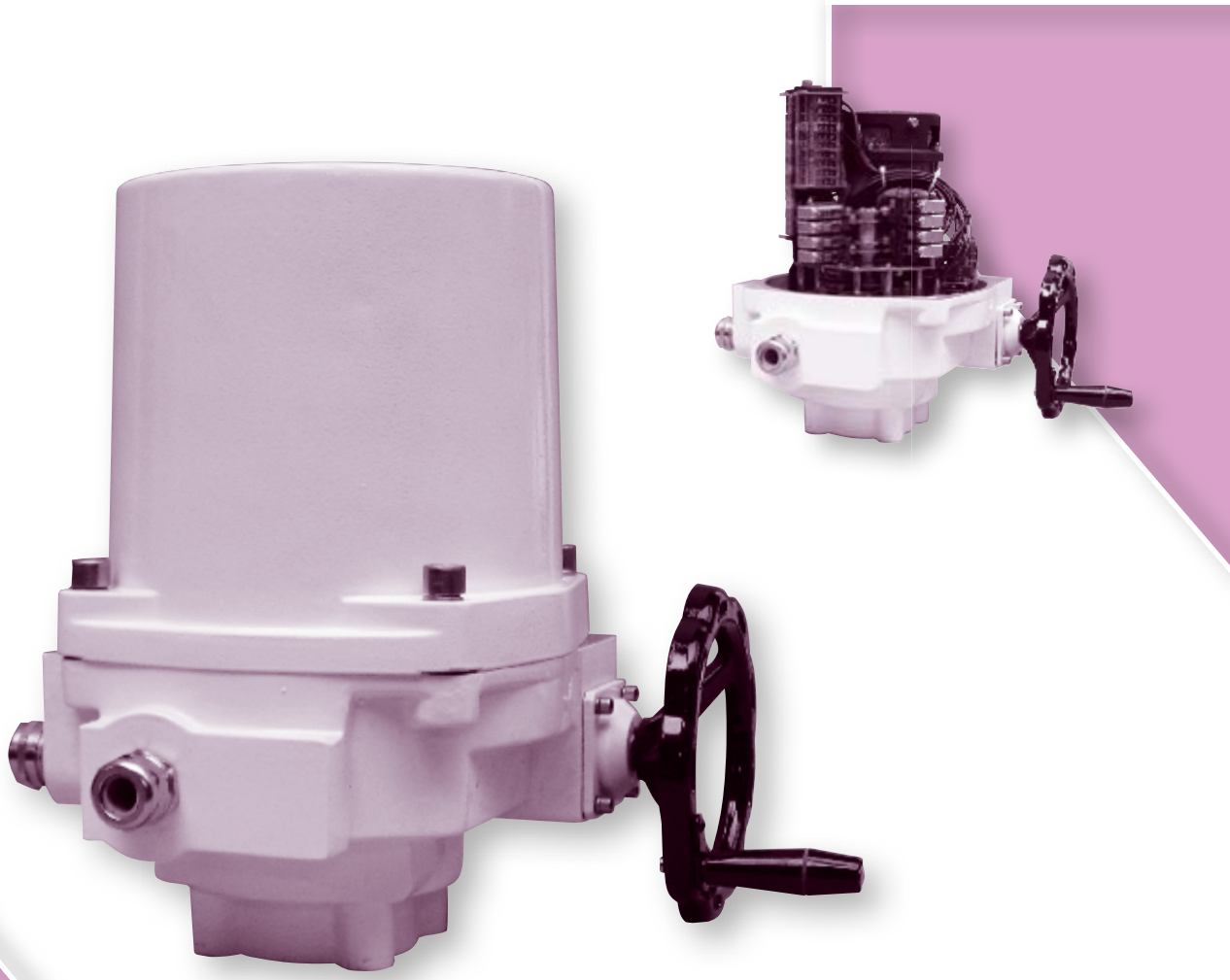
ZPA PEČKY, a.s.

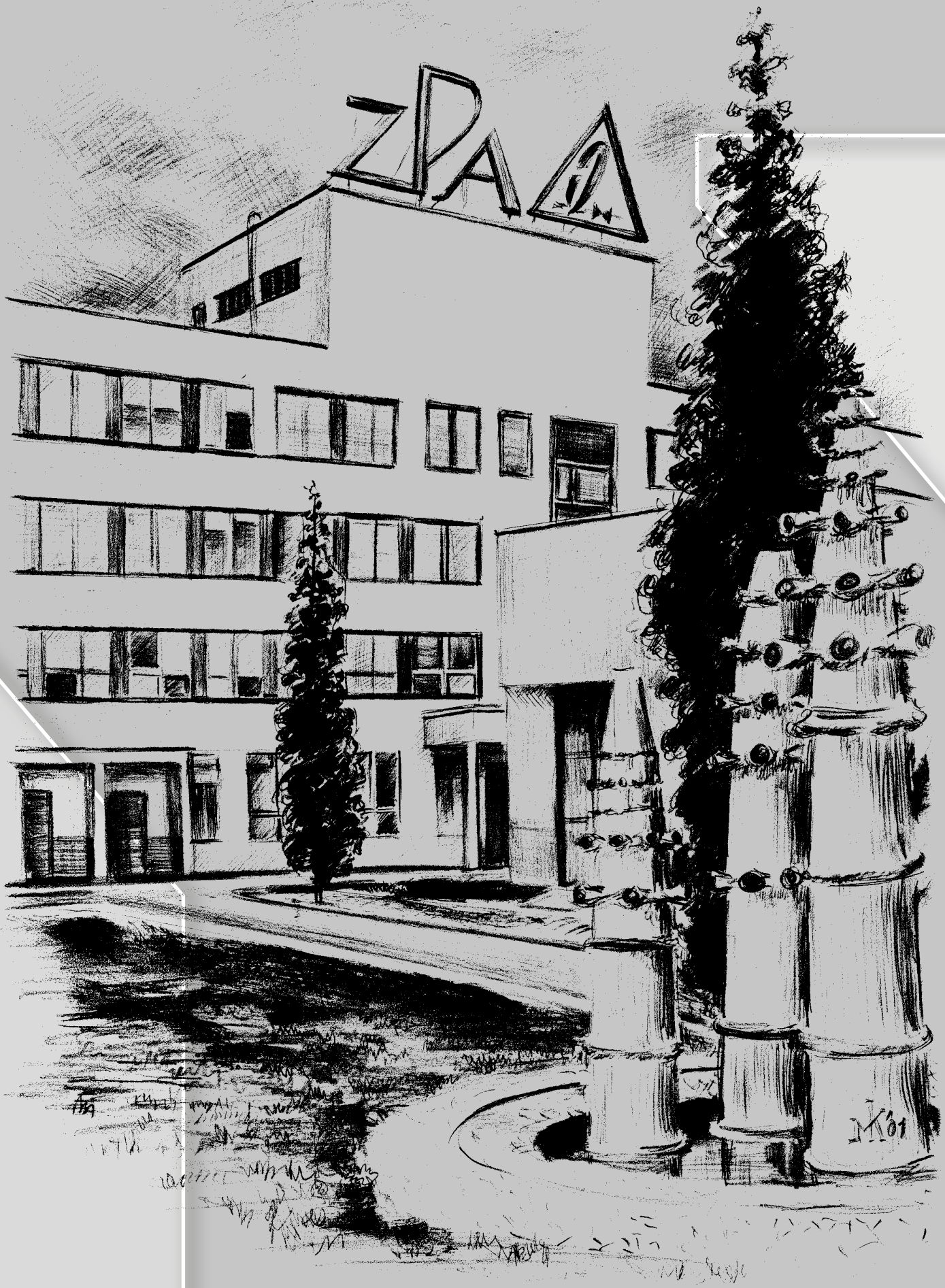


MOUNTING INSTRUCTIONS

Electric multi-revolution actuator for nuclear power plants inside containment

MODACT MOA OC

Type number 52 079



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

CONTENS

1. APPLICATION

The electric rotary multi-revolution actuators **MODACT MOA OC** are intended for remote control of special valves installed in hermetic boxes or under the containment of nuclear power plants with reactors VVER or RBMK. They are intended for safety circuits as well as for normal use.

2. OPERATING CONDITIONS

The actuators **MODACT MOA OC** must work reliably with the following parameters of surrounding environment.:

Normal working regime:

Temperature	from 5 to 70 °C
Pressure	from 0.085 to 0.1032 Mpa
Relative humidity	up to 95 + 3 %
Level of radiation	up to 1 Gy/h

Working regime during failure in heat removal - reactors VVER:

Temperature	from 5 °C do 75 °C
Pressure	0.05 to 0.12 MPa
Relative humidity	up to 100%
Level of radiation	up to 1 Gy/h
Period of regime duration	up to 15 h
Frequency of regime occurrence	once a year

Emergency regime of small leakage (reactor VVER):

Temperature	up to 90 °C
Pressure	up to 0.17 Mpa
Relative humidity	steam-air mixture
Level of radiation	up to 1 Gy/h
Period of emergency regime duration (emergency pressure, temperature)	up to 5 hours
Period post-emergency regime duration (post-emergency pressure, temperature)	up to 720 hours
Post-emergency pressure	0.05 to 0.12 MPa
Post-emergency temperature	from 5 to 60 °C
Frequency of regime occurrence	1 x in 2 years

Emergency regime in boxes caused by lack of equipment tightness (reactor RBMK)

Temperature	up to 105 °C
Pressure	up to 0.15 Mpa
Relative humidity	to 100 %
Level of radiation	up to 1 Gy/h
Period of regime duration	6 hours
Frequency of regime occurrence	1 x in 2 years

Emergency regime of large leakage (reactor VVER):

Temperature	150 °C
Pressure	up to 0.5 Mpa
Relative humidity	steam-air mixture
Level of radiation	up to 1x 10^3 Gy/h
Period of regime duration (emergency pressure, temperature)	up to 10 hours
Period of duration of post-emergency regime (post-emergency pressure, temperature)	up to 720 hours
Post-emergency pressure	0.05 to 0.12 MPa
Post-emergency temperature	from 5 to 60 °C
Frequency of regime occurrence	1 x in 30 years

3. TECHNICAL PARAMETERS

Basic technical parameters are listed in the design table.

Feeding voltage of electric motor - 3 x 400 V, 50 Hz (or according to data on rating plate)
Type of protective enclosure of actuator - IP 67
Working position - working position is arbitrary

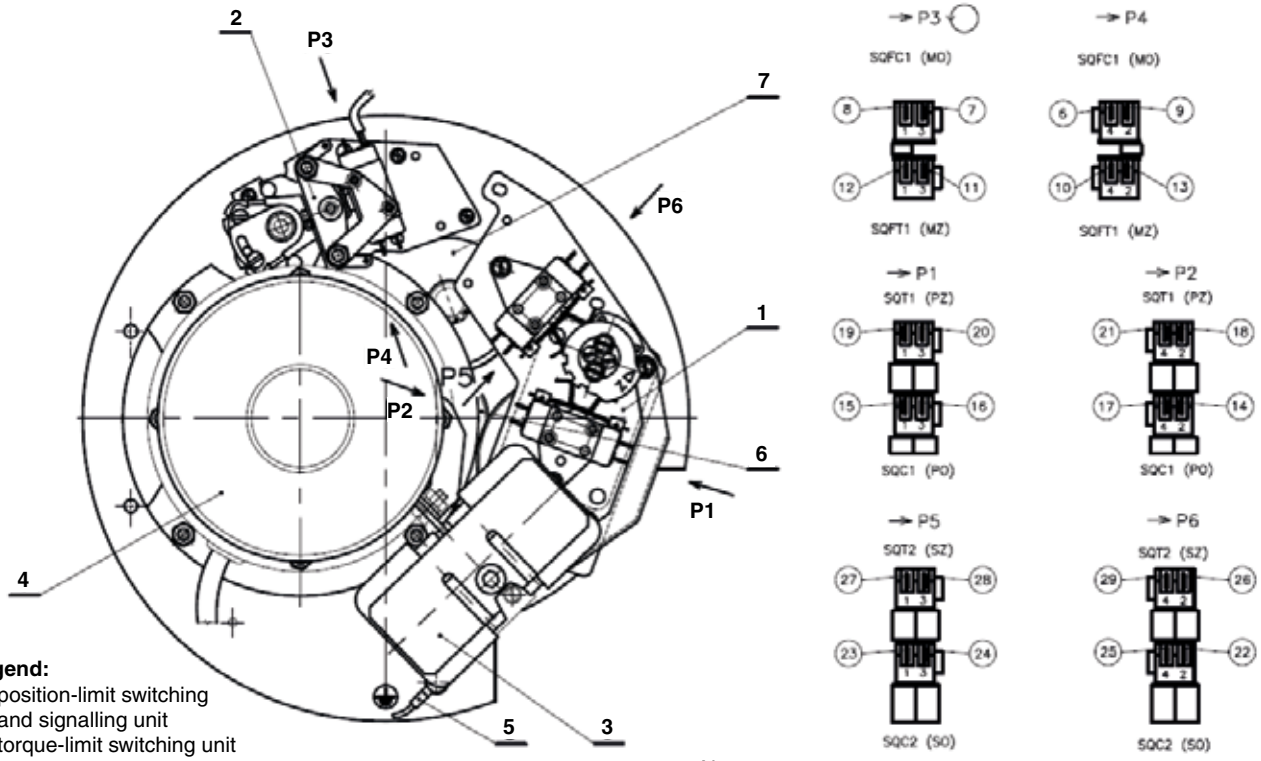
Resistance against seismic shocks, against effect of deactivation agents, and other parameters are given in the Technical Conditions TP 07-02/05.

4. DESCRIPTION

The actuators are designed for direct assembly on a valve and connection is realized by means of a flange according to ISO 5210 and a clutch according to DIN 3210, shape C or E or D.

The actuators consist of two parts:

- Power part – It generates and transmits torque to the output shaft of the actuator – It includes three-phase asynchronous electric motor, countershaft gearbox, epicyclic gearbox with output shaft, mechanism for manual control with hand wheel and floating worm.
- Control part – It ensures respective working functions of the actuator, such as torque-limit switching, position-limit switching, signalization, and remote reporting on position; it is composed of the following mechanical groups (units) installed on the control board according to Fig. no. 1 - position-limit switching and signalling unit 1, torque-limit switching unit 2, and terminal



Legend:
1 - position-limit switching and signalling unit
2 - torque-limit switching unit
3 - terminal board
4 - electric motor
5 - internal protective terminal
6 - drive wheel
7 - change-over wheel

Note:
Numbers in circles correspond to numbers of terminals on the terminal board.

Fig. 1 – ***Control board***

board 3. The position-limit switching and signalling unit is fitted with four micro-switches, always two for each direction of rotation of the output shaft. The point of changing-over of each micro-switch can be separately adjusted within the working stroke of the actuator. The torque-limit switching unit is fitted with micro-switches – one for each direction of rotation.

The torque-limit switches are blocked against tripping at engagement torque. The position-limit switching and signalling unit derives its motion from the output shaft of the actuator via the drive wheel 6. The torque-limit switching unit is driven by the „floating worm" of manual control where displacement of the worm is directly proportional to the torque on the output shaft of the actuator. This allows the electric motor to be switched off when the value of torque is reached to which the torque-limit switching unit is set.

Cable inlets are realized through two cable bushings M 25 x 1.5. The cable bushings will seal the cable diameter 9 to 16 mm.

Description and function of control units

a) Torque-limit switching unit - Fig. 2 is, as an independent assembly unit, composed of basic board -19- carrying micro--switches -20– and, at the same time, forms bearings for the shaft of torque control -22- and the shaft of blocking -29-.

The shaft of torque control transmits motion of the floating worm from power gearing by means of segments -23- or The The shaft of torque control transmits motion of the floating worm from power gearing by means of segments -23- or -24- and levers -45- or -46- to micro-switches MO or MZ. By moving round the segments against the tripping levers magnitude of tripping torque is set. For shifting the tripping torque outside the factory, segments -23, 24- are fitted with a scale on which points for setting maximum and minimum torque are individually marked with index lines on each piece of actuator. The set torque is then shown by slots in segments -27- and -28-.

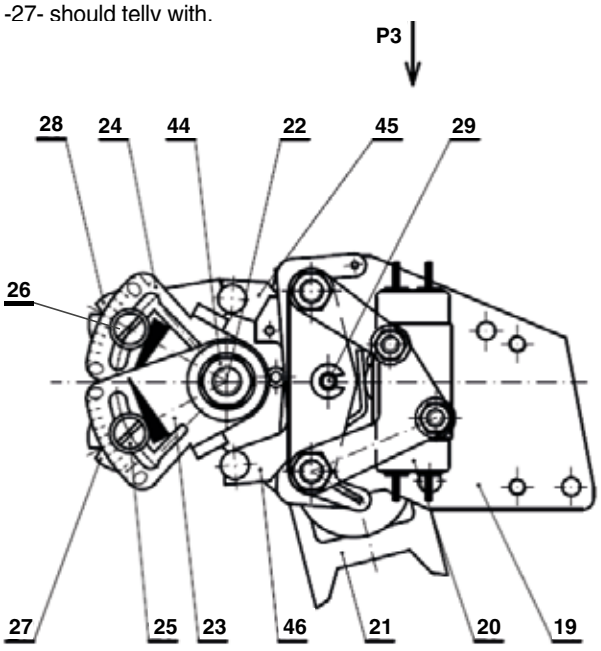
The numbers on this scale do not show setting of tripping torque directly. Divisions on this scale serve just for more precise dividing of the range of points of maximum and minimum tripping torque and, thus, more precise resetting of tripping torque out of the factory in case a loading bench is not at disposal. Segment -28- is intended for direction „close", segment -27- for direction „open".

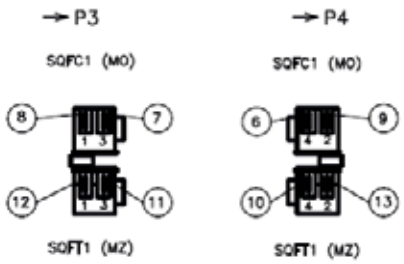
The unit of torque control is also fitted with a blocking mechanism. After tripping of the torque-limit switch, the blocking mechanism will ensure its blocking and thus prevent its re-closing and pulsing of the actuator. Moreover, the blocking mechanism prevents tripping of the torque-limit switch after reversing the actuator run and, thus, it provides for full utilization of engagement torque of the electric motor. The blocking mechanism operates with both motion directions of the output shaft of the actuator in limit positions as well as in intermediate position for the time specified by the second complementary number of the actuator in revolutions of the output shaft after reversing its motion.

When the output shaft of the actuator is loaded with anti-torque, the shaft of the torque control -22- and also segments -23- and -24- are partially moved round; motion is thus transferred to tripping lever -45- or -46-. After the torque on the output shaft of the actuator reaches a value to which the torque-limit switching unit is set, the tripping lever presses down the push-button of the particular micro-switch; the electric motor is thus disconnected from the supply mains and the actuator stops.

Procedure of setting torque-limit switching unit

In setting different tripping torque than that to which the unit was set in the factory, the procedure is as follows: release lock nut -44- (see Fig. 2) and particular lock screw -26- (for direction „close") or -25- (for direction „open"). Then, insert a screwdriver into the slot in top segment -24- or -23- and turn the segment until the slot in segment -28- or -27- matches with particular point on the scale. This point is determined by dividing the difference between the maximum and minimum adjustable torque in Nm by the number of divisions between the mark of the maximum and minimum torque. The result shows which part of the tripping torque (in Nm) corresponds to one division of the scale; interpolation is used for determining the point on the scale which the slot in segment -28- or -27- should tally with.





Legend:

19 - basic board	26 - lock screw „close"
20 - micro-switches MO, MZ	27 - segment bottom „open"
21 - shifter	28 - segment bottom „close"
22 - torque control shaft	29 - shaft of blocking
23 - segment top „open"	44 - lock nut
24 - segment top „close"	45 - tripping lever „close"
25 - lock screw „open"	46 - tripping lever „open"

Note:
Numbers in circle correspond to numbers of terminals on the terminal board.

Fig. 2 – ***Torque-limit switching unit***

The mark > on top segments -23- and -24- indicates direction in which the torque is increased or decreased, and which coloured index line on the scale indicates the point of setting maximum tripping torque and the point of setting minimum torque. The unit of torque control must never be set so that the slot in the bottom segment would fall beyond the range demarcated by the coloured index lines on the scale.

After setting the tripping torque, lock screw -26- or -25- and lock nut -44- are retightened.

Tripping torque must not be set to higher values than those corresponding to respective type designations in Table no. 1.

b) Position-limit switching and signalling unit - Fig. 3 – provides for tripping of the position-limit switches PO or PZ after the set number of revolutions of the output shaft has been reached and, by means of signalling switches SO and SZ, sending electric signal for signalization of position of the output shaft of the actuator. The unit drive is realized by gearwheel -38- from the output shaft via the multi-speed gearbox to cams controlling micro-switches PO, PZ, SO, SZ. The moment of closing of the signalling switches can be chosen at any point of the working stroke of the actuator except for a narrow range around the limit positions (the signalling switch must close before the position-limit switch when the output shaft is still in motion).

The signalling and position-limit switching unit is designed as an independent assembly unit. It is assembled on the supporting plate -39- under which the gearings arranged according to the kinematic diagram Fig. -4- are fitted. The gearing is assembled so that the shifting wheel K4 can be shifted to various levels (I, II, III, IV, V,) after releasing lock screw -47-. Shifting of wheel K4 changes the range of setting of the position-limit and signalling switches according to working stroke of the actuator – see the table below.

Range of setting of working stroke

Working stroke of actuator (rev.)	1.5 - 2.6	2.6 - 5.2	5.2 - 10	10 - 19.5	19.5 - 38.1
Gear stage of unit	I	II	III	IV	V

Setting of position-limit switching and signalling unit

If the range of setting of the position-limit and signalling switches is to be changed, position of the shifting wheel K4 should be changed. After shifting, the lock screw -47- should be retightened.

Layout of the cams and micro-switches of the position-limit switching and signalling unit is shown in Figs. 3 and 4. The cam shoulders control the levers of micro-switches PO, PZ, SO and SZ.

In setting the position-limit switches, the procedure is as follows: First, set the output shaft to the position in which the micro-switch being set should trip. Then, release particular lock screws -32- (for SQT1 and SQT2 - direction „close“) or -33- (for SQC1 and SQC2 - direction „open“).

Then, rotate the particular cam V1, V2, V3, V4 (Fig. 4) in the direction of arrow until the micro-switch changes over. In this position the cams are secured by tightening the lock screws.

The signalling switch must be set so that it changes over before the particular position limit or torque-limit switch.

Legend:
30 - cams for direction „close“
31 - cams for direction „open“
32 - lock screws for direction „close“
33 - lock screws for direction „open“
34 - signalling micro-switches
(top „close“, bottom „open“)
35 - position-limit micro-switches
(top „close“, bottom „open“)
38 - gear (drive) wheel
39 - supporting plate of unit

Note:
Numbers in circle correspond to numbers of terminals on the terminal board.

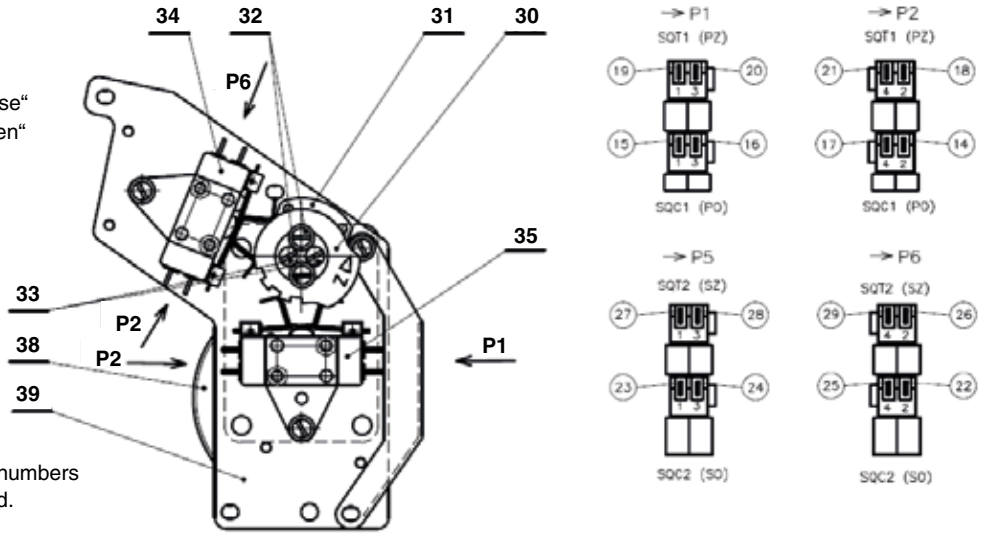


Fig. 3 – ***Position-limit switching and signalling unit***

Legend:
K1 - gearwheel of output shaft
K2 - intermediate wheel
K3 - drive wheel
K4 - shifting wheel
47 - lock screw of shifting wheel
48 - cam shaft
V1 – cam of micro-switch of signalization „close“
V2 – cam of micro-switch of position „close“
V3 – cam of micro-switch of signalization „open“
V4 – cam of micro-switch of position „open“

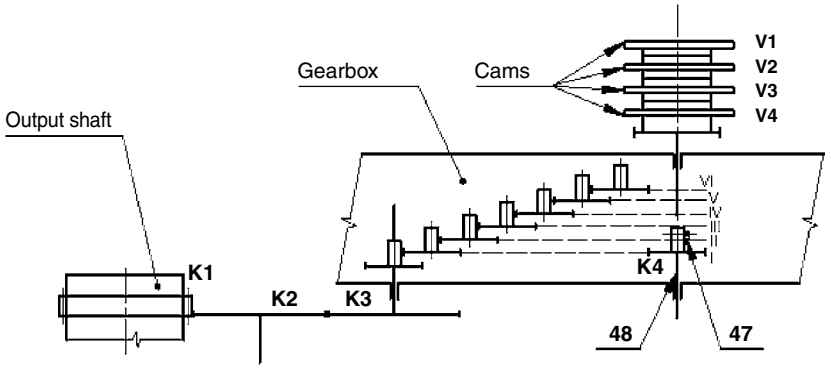


Fig. 4 – ***Kinematic diagram of gearings***

Warning

After each manipulation with the lock screws in the control part of the actuator, these screws should be secured against releasing through vibration by a drop of quick-drying varnish. In case these screws were already secured with varnish, the rests of old varnish should be removed during adjustment and the area under them properly degreased.

Manual control

The output shaft of the actuator can be shifted also manually by means of the hand wheel. By rotating the hand wheel in the clockwise direction, the valve closes (left thread in the valve is assumed). The actuator can be shifted both manually and using motor.

5. PACKING AND STORING

The actuators are packed together with the valve to which they are to be fitted. The way of packing the complete with the valve must be specified in the technical conditions for the valves with the fitted actuator.

The actuators are transported from the manufacturer of actuators to completion at the manufacturer of valves in our country using sheltered vehicles or transport boxes. In this case, the actuators are transported unpacked. In case of direct delivery of actuators to the nuclear power plant (JE) packing is made according to art. 6 of the technical conditions TP 07-02/05.

In case of deliveries of actuators to foreign customers, the actuators must be packed. Type of packing and its design must be adapted to conditions of transport and distance to the place of destination.

After receiving the actuators from the manufacturer, the customer should check whether they have not been damaged during transportation. Check should be made whether data on the rating plates of the actuator agree with the order and with the accompanying documentation. Possible discrepancies, defects and damages should be immediately reported to the supplier. In this case, the actuator cannot be put into operation.

If the unpacked actuator is not mounted immediately, it must be stored in a dust-free room with temperature ranging between -25°C and +50 °C and relative humidity up to 80 %; the room should be free of caustic gases and vapours and protected against harmful climatic effects. If actuators have been stored for a period longer than 4 years it is necessary, before putting it into operation, to replace the lubricant. Any manipulation at temperatures below -25 °C is prohibited. The actuators must not be stored in the open area or in rooms not protected against rain, snow and frost. Surplus conserving grease should be removed just before putting the actuator into operation. When unpacked actuators are to be stored for a period longer than 3 months, it is recommended to insert a sachet with silicagel or another suitable desiccant under the actuator cover.

6. CHECKING OF INSTRUMENT FUNCTION AND ITS COMMISSIONING

Before commencing the assembly, inspect the actuator once again for possible damage during storage. Functionality of the electric motor can be verified by connecting it to the supply mains via a switch and short-time starting. It is sufficient to verify whether the electric motor starts running and the output shaft moves round. The actuators must be located so that easy access is provided to the wheel of manual control and to the control board. It is also necessary to verify once again whether location corresponds to provisions of par. „Working conditions“. If different way of assembly is required by local conditions agreement with the manufacturer is necessary.

7. ATTACHMENT TO VALVE

The actuator is fitted onto the valve so that the output shaft snaps reliably into the valve clutch; the actuator is connected with the valve by four screws. By rotating the hand wheel check correct connection of the actuator with the valve. Remove the actuator cover and carry out electric connection of the actuator according to the internal and external wiring diagram.

8. ADJUSTMENT OF ELECTRIC ACTUATOR WITH VALVE

After fitting the actuator onto the valve and verifying mechanical connection, setting and adjustment takes place.

1) Shift the actuator manually into intermediate position.
2) Connect the actuator to the supply mains and, by short starting in the middle of the working stroke, verify correct direction of rotation of the output shaft. When viewing into the control box the output shaft rotates in the clockwise direction during motion in the direction „close".
3) Shift the actuator electrically into the vicinity of the position „close"; remaining shifting into the position „close" is carried out by means of the hand wheel. In this position „close" set the position-limit switching unit (micro-switch PZ) according to point 4b.
4) Shift the output shaft into the position in which the signalling switch SZ should change over. Adjust the switch SZ according to point 4b.
5) Shift the output shaft of the actuator by a required number of revolutions and set the switch of the position PO „open" according to point 4b.
6) Shift the output shaft to the position in which the signalling switch SO should change over. Adjust the switch SO according to point 4b.

Setting of the position-limit and signalling switches should be verified several times.

Warning:

When assembling the valve to the piping, the valve should be set into intermediate position using the hand wheel of the actuator. Short starting of the electric motor is used for checking whether the actuator rotates in the correct direction. If this is not the case, two phase conductors of the electric motor feeding should be interchanged.

9. 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

Once in four years, it is necessary to lightly smear the gearing teeth in the gearbox and the bearings in which these gearings are seated. Lubrication is accomplished using the lubricating grease CIATIM 221. To increase resistance against corrosion, all springs and metal strips in the control part are also smeared with the lubricating grease.

During all inspections and maintenance, it is necessary to retighten properly ally screws and nuts which influence creation of sufficient pressure on rubber sealing ensuring tightness of the actuator.

10. FAILURES AND THEIR REMOVAL

1) 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, dismount the actuator and release the closure mechanically.
2) If, after starting the actuator from the limit position of the output shaft of the actuator, it stops spontaneously it is necessary to ensure that the slot in the change-over wheel (Fig. 1) stops in the limit position of the output shaft of the actuator (after tripping of the torque-limit switch) before it runs on the shifter -21- Fig. 2. This is achieved by suitable moving-round the actuator output shaft when connecting the actuator with the valve or by suitable moving-round the change-over wheel with respect to the output shaft. To allow for this, the change-over wheel is fitted with additional two holes.

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.

Operation instructions

- It is prohibited to put into operation the electric actuator if it is not accompanied by a passport or the Instructions for assembly, operation, treatment and maintenance which the user should observe.
- Intervals between two preventative inspections of the actuator are four years.
- When installing the electric actuator, care should be paid to ensuring conditions necessary for carrying out inspections, repairs and manual control.
- It is prohibited to use the electric actuators according to these TP in the environment and under conditions not corresponding to provisions of these TP.
- It is prohibited to carry out disassembly, maintenance and treatment in case that disconnection of the actuator from the supply mains is not secured.
- During operation, maintenance, and repairs, the actuators must be properly earthed.

11. PREVENTIVE INSPECTIONS AND REPAIR OF ACTUATORS FOR NPPS

The service life of the MOAOC series actuators is 40 years. Based on the qualification tests and long-term operating experience, the actuator manufacturer recommends that the following range and periods of preventive inspections and repairs be carried out over the useful life:

1. **Preventive inspections and revisions of actuators** – once in 3 years

It is performed by the operator of the actuators and includes the following activities:

– Visual inspection of the actuator for crack, corrosion, check of sealing status, fastening status, leakage check of cable glands, tightening of screw connections. In the event of a fault finding, remove these defects or set the removal procedure.

– After uncoupling the actuator cover, visual inspection of the wiring and marking of the wires, inspection of the internal parts of the actuators, tightening the terminal blocks, checking the connection of protective conductors and wires from the protective connection system are performed.

– Check the transient resistance of the protective conductor connections – $R_p < 0.1\ \Omega$.

– Control unit units – With CIATIM 221 is easy to lubricate the transmission unit, control springs, camshaft circumference and planes.

– Perform a functional test of both extreme positions by means of a remote or local electrical control, checking the setting and function of the position, torque and signaling switches and setting the position indicator and position transmitter. Identify deficiencies in the settings and remove the feature, or determine how to remove them.

2. **Minor repairs** – in case of loss of functionality or damage

The operator of the actuators can make minor repairs by replacing damaged or worn parts such as seals, microswitches, motor, bearings, gear wheels, etc. This can only be done by trained personnel with a valid certificate for this activity.

3. **General actuator repairs** *(overhaul)*

The overall actuator repairs *(overhaul)* are carried out in the event of a major actuator failure or in old and heavily worn actuators. Its aim is to put the actuator in a state close to the new actuator with guaranteed technical parameters.

It is advisable to correct this range in case of operationally important positions and positions of emergency systems that are exposed to increased radiant thermal effects or corrosive effects in order to maintain the continuous operational reliability of the equipment throughout the lifetime *(eg inaccessible, partially or fully closed Areas of steam piping, outdoor spaces, and the like)*.

This can only be done by the manufacturer of actuators, in exceptional cases by the manufacturer's authorized and trained service organization.

Typical technological procedures are introduced to perform reprocessing activities, but its mode and scope always depend on the condition of the actuator and the customer's requirements.

In most cases, the overhaul involves the following activities:

– Replacement of sealing elements (seals, O-rings)

– Replacing lubricant

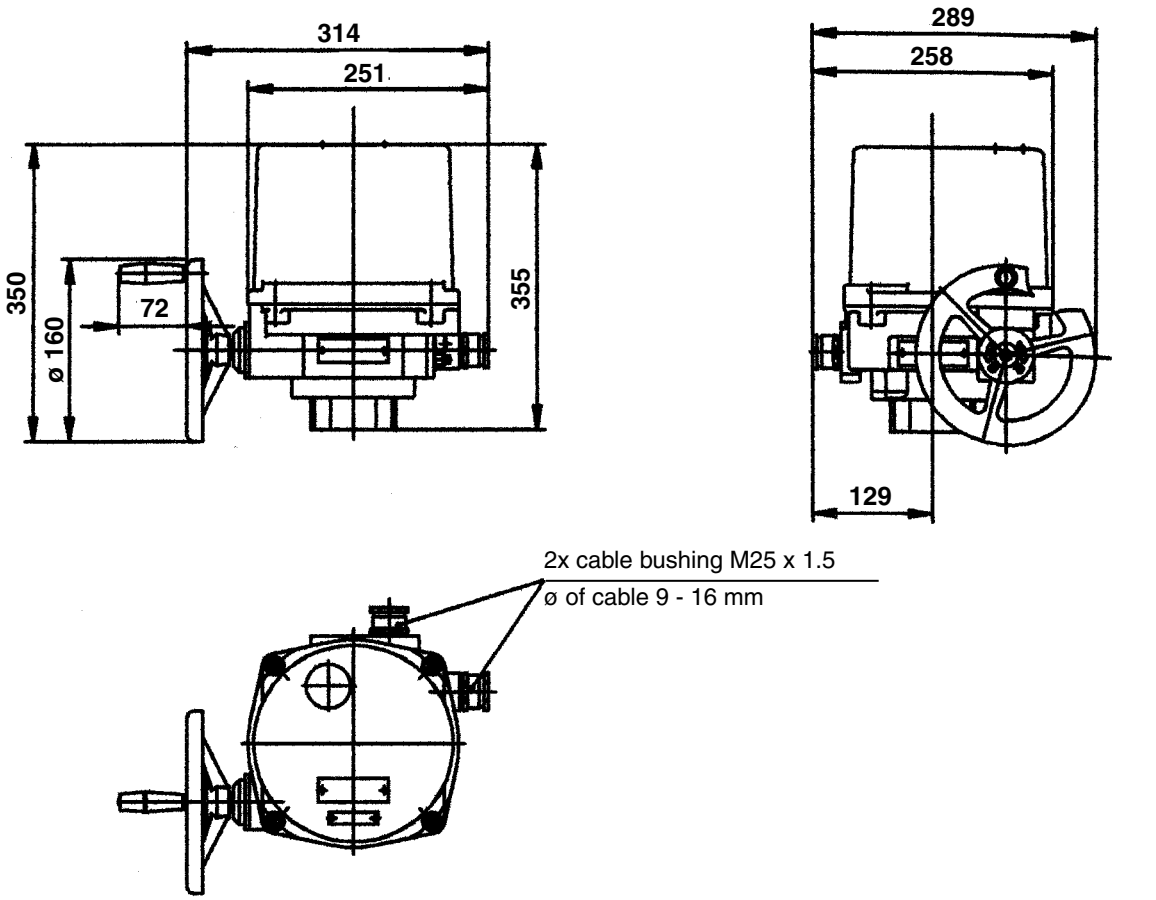
– Changing torque springs

– Replacing the control units or the entire control panel

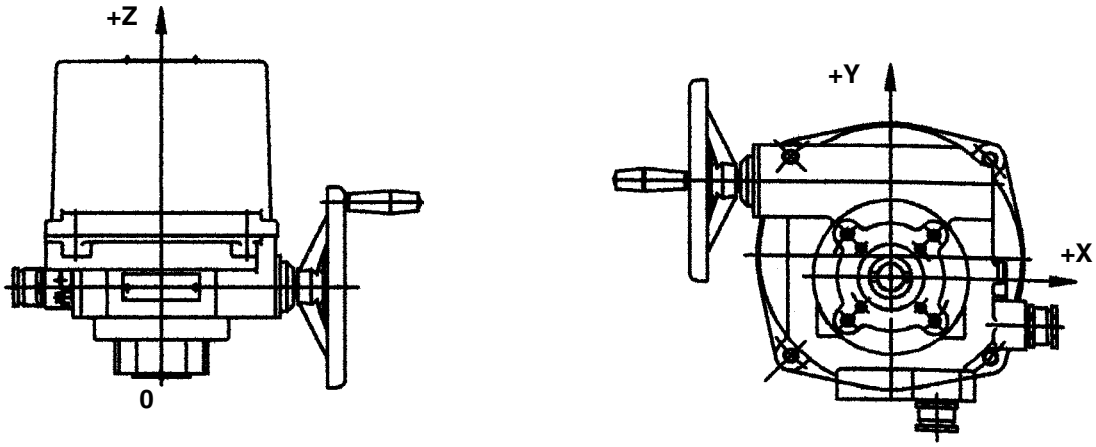
– Replacement of fasteners

For extensive repairs involving large quantities and types of actuators, it is advisable to agree on a reprocessing procedure and to agree on the way they are verified *(eg inspection and testing plans for remanufactured actuators).*

Dimensional sketch of actuator **MODACT MOA OC**, Type No. 52 079



Centre of mass of actuator **MODACT MOA OC**, Type No. 52 079



Type number	Coordinates of centre of mass			Actuator weight (kg)
	x (mm)	y (mm)	z (mm)	
52079.xx10	-1,5	+24,5	+158,5	17,5
52079.xx20	-1,5	+24,5	+160	18
52079.xx30	-1,5	+24,5	+162	18,5
52079.xx40	-1,5	+24,5	+164	19,5

Table 1 – Basic technical parameters and characteristics of actuator, type MODACT MOA OC for shut-off vales installed under containment of nuclear power plants with reactors VVER or RBMK

Size of connecting flange	ACTUATOR											ELECTRIC MOTOR										
	Type designation	Type number		Range of setting torque tripping	Range of setting output revolutions (of stroke)	Speed of output shaft resetting	Gear ratio output shaft / electric motor	Gear ratio output shaft / hand wheel	Max. force on hand wheel	Min. guaranteed M_{CLOSE} at $U = 80\% U_{nom}$	Weight of actuator incl. electric motor	Type	Output	Speed of electric motor	Rated current	Engagement current	Efficiency	Power factor	Ratio of engagement / rated torque	Ratio of engagement / rated current	Engagement torque	Weight of electric motor
		Basic	Complementary	[Nm]	[rev.]	[min^{-1}]			[N] 1)	[Nm] 3)	[kg]		[kW]	[min^{-1}]	[A]	[A]	[%]	[cos φ]			[Nm]	[kg]
F10 (F07)	MOA OC 30-9	52 079. x x 1 0		10 – 30	1,5 – 38	9	1:155	1:93	4	43	17,5	1AJSI 89K-4	0,03	1465	0,37	1,2	33,8	0,37	2,5	3,2	0,5	3,8
	MOA OC 30-15	52 079. x x 2 0				15	1:91			41	18	1AJSI 89A-4	0,055	1455	0,45	1,6	45,6	0,41	2,2	3,6	0,8	4,2
	MOA OC 30-25	52 079. x x 3 0				25	1:54			60	18,5	1AJSI 89B-4	0,12	1420	0,7	2,5	54,2	0,52	2,4	3,6	2	4,8
	MOA OC 30-40	52 079. x x 4 0				40	1:34			59	19,5	1AJSI 89D-4	0,30	1342	1,1	3,7	60,7	0,63	1,4	3,3	3	5,7

1) The table shows one force from pair of forces acting at diameter of the hand wheel.

2) The cables are connected through a gland bushing.

3) The actuator mass tolerance is ± 5%.

Meaning of complementary numbers in the actuator type number:

- the first complementary number means the way of mechanical connection:
  - 1xxx - connection F07, shape C
  - 2xxx - connection F07, shape D
  - 3xxx - connection F07, shape E
  - 4xxx - connection F10, shape C
  - 5xxx - connection F10, shape D
  - 6xxx - connection F10, shape E

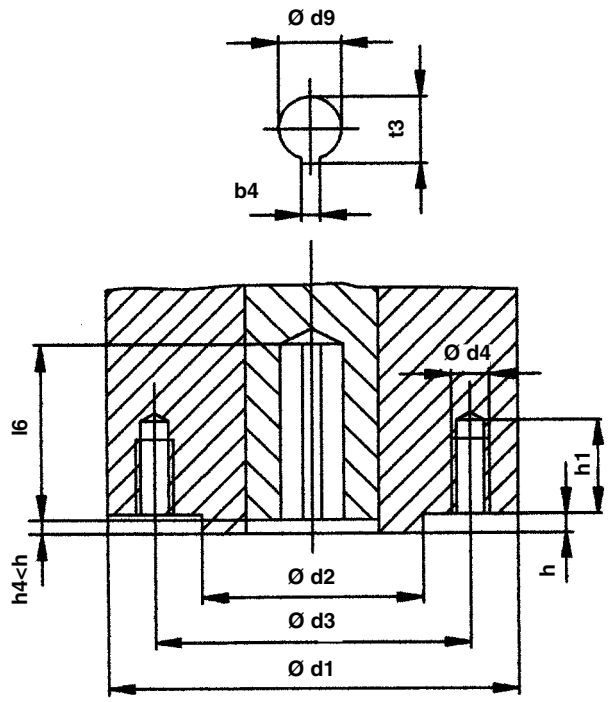
- the second complementary number means the required time of torque blocking:
  - x0xx - time of blocking between 1.5 and 3 revolutions of output shaft after reversing
  - x1xx - time of blocking between 0.75 and 1.5 revolutions of output shaft after reversing
  - x2xx - time of blocking between 0.4 and 0.75 revolutions of output shaft after reversing

- the third complementary number means resetting speed – see the table.

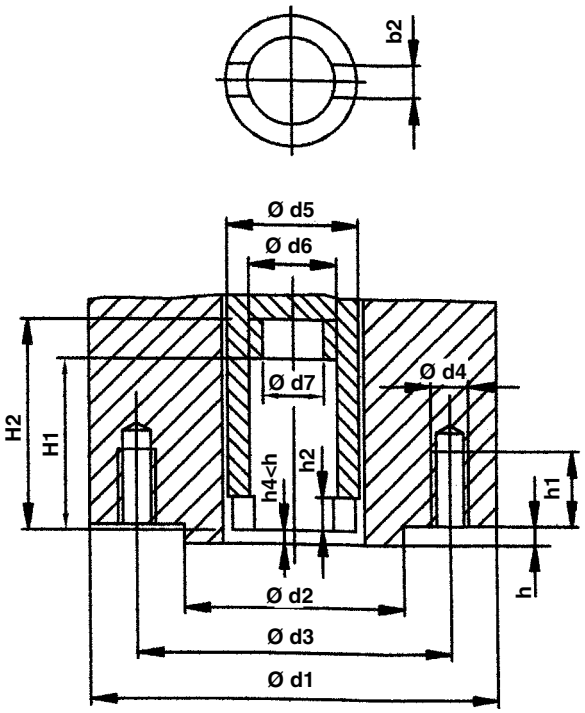
- the fourth complementary number means possible use of position transmitter: 0

Mechanical connecting dimensions of actuator **MODACT MOA OC**, Type No. 52 079

SHAPE E

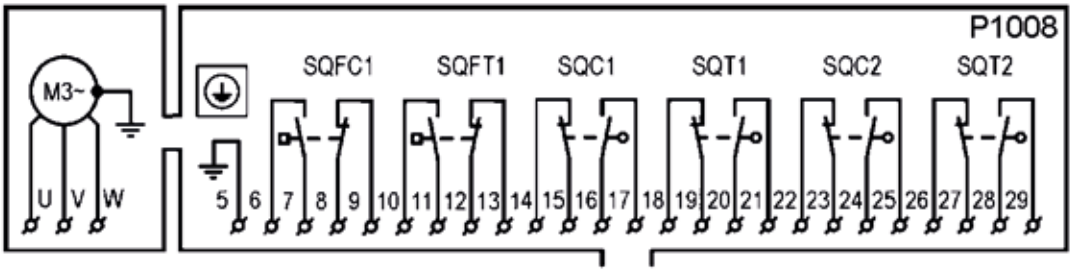


SHAPE C



Flange size	Common data for both shapes							Data for shape C							Data for shape E			
	Ø d1	Ø d2f8	Ø d3	Ø d4	Number of threated holes	h1	h	Ø d5	h2	H1	H2	b2H11	Ø d8	Ø d7	Ø d9 H8	l6	t3	b4Js9
F 07	125	55	70	M8	4	16	3	40	10	75	120	14	28	22	16	40	18,1	5
F 10	125	70	102	M10	4	20	3	40	10	75	120	14	28	22	20	55	22,5	6

Diagram of internal electric wiring of actuators **MODACT MOA OC**, Type No. 52 079

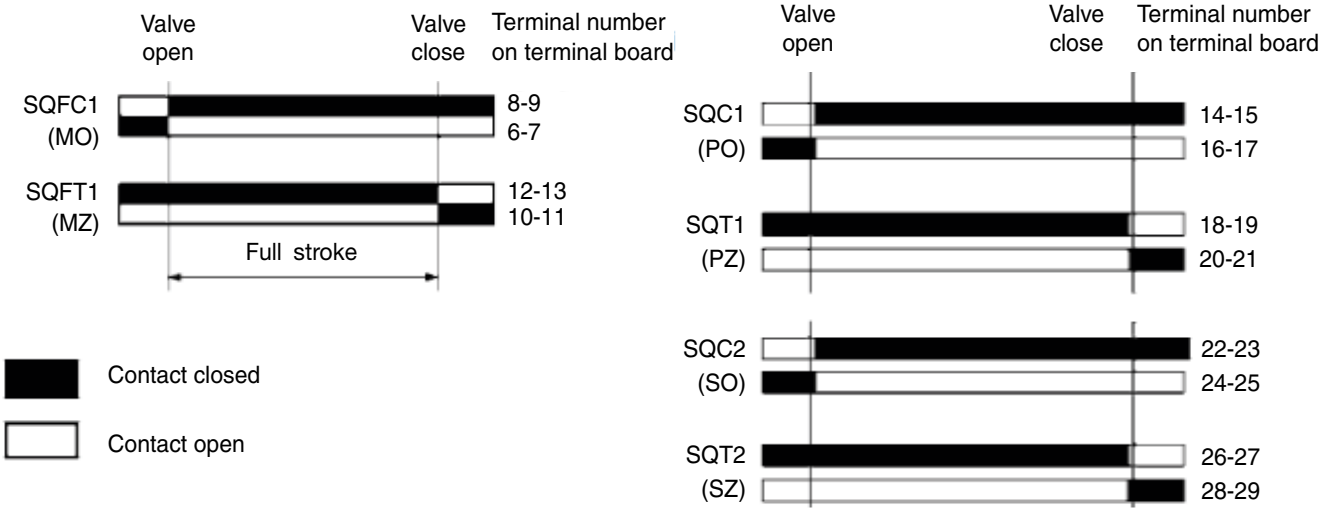


LEGEND:

SQFC1 - torque-limit switch „open“
SQFT1 - torque-limit switch „close“
SQC1 - position-limit switch „open“
SQT1 - position-limit switch „close“
SQC2 - position signalling switch „open“
SQT2 - position signalling switch „close“
M - three-phase asynchronous motor

The contacts of micro-switches are drawn in the intermediate position of the actuator output shaft.

Operation diagram of torque, position and signalling switches



List of spare parts for actuators **MODACT MOA OC**, Type No. 52 079

Spare part name	**Order number**	**Use**
Sealing ring 24x20 PN 029280.2	2327311770	Packing of hand wheel shaft
Sealing ring 50x2 PN 029281.2	2327311715	Packing of hand wheel flange
Sealing ring 50x40 PN 029280.2	2327311775	Packing of output shaft
Sealing ring 210x3 PN 029281.2	2327311735	Packing of cover
Micro-switch D3031 4 pieces	2337441086	Position-limit and signalling switches
Micro-switch D3031 2 pieces	2337441086	Torque-limit switches

ZPA PEČKY, a.s.

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

SURVEY OF PRODUCED ACTUATORS

KP MINI, KP MIDI
Electric 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

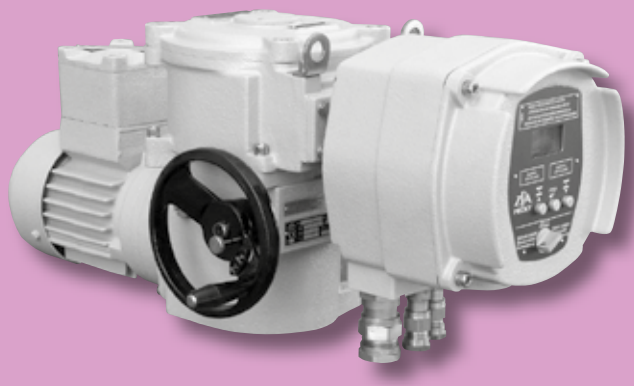
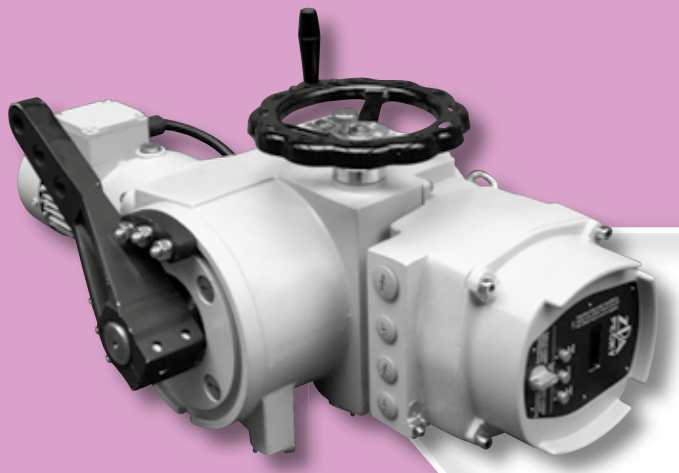
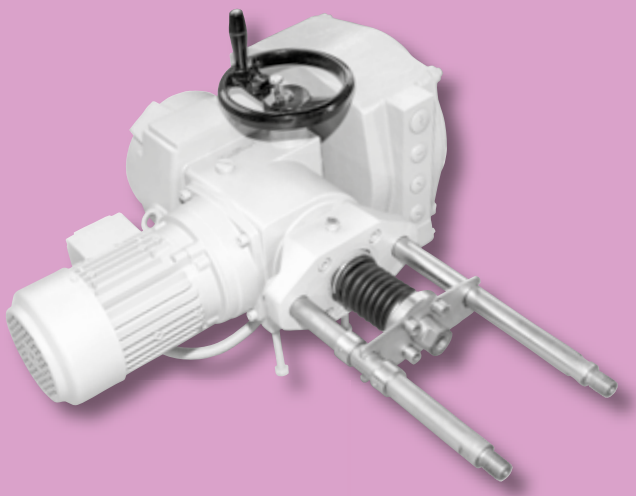
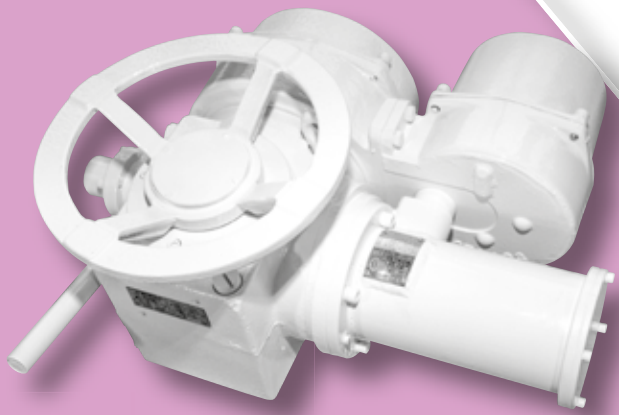
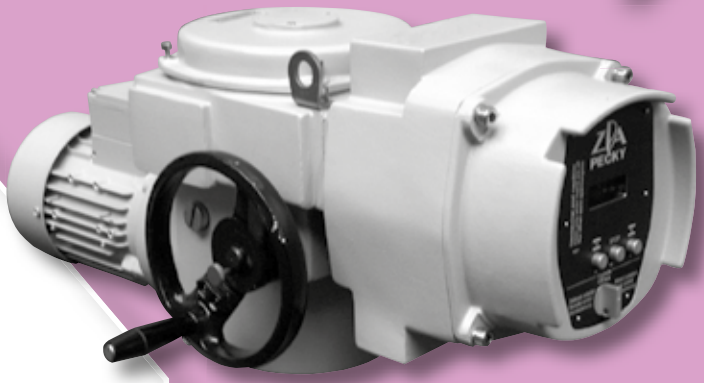
MODACT MPR Variant
Electric rotary (160°) lever actuators with a variable output speed

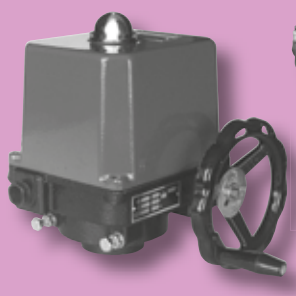
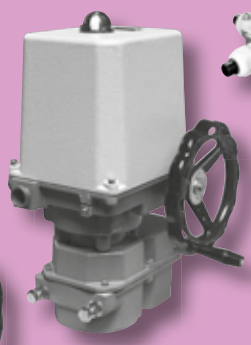
MODACT MPS, MPSP, MPSED, MPSPED
Electric rotary (160°) lever actuators with a constant output speed

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

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

TRADITION • QUALITY • RELIABILITY

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