ZPA PEČKY, a.s.

Electric Part-turn Lever Actuators with a Variable Output Speed

MODACT MPR VARIANT

Type No. 52 221 - 52 223

TÜV CERT
EN ISO 9001:2000
Certificate No. 041005161/000-E01

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body for QM systems of RWTÜV Systems GmbH

hereby certifies in accordance with TÜV CERT procedure that

ZPA Pečky, a.s.
Třída 5. května 166
289 11 Pečky
Czech republic

has established and applies a quality system for

Development and production of electric actuators, enclosures and sheet metal production

An audit was performed, Report No. **624362**

Proof has been furnished that the requirements according to

ISO 9001 : 2000 / EN ISO 9001 : 2000

are fulfilled. The certificate is valid until **11. November 2006**

Certificate Registration No. **041005161/000-E01**

The company has been certified since **1995**

Deutscher Akkreditierungs Rat
DAR
TGA-ZM-30-96-00

Essen, 14.11.2003

RWTÜV

TÜV CERT Certification Body
of RWTÜV Systems GmbH

APPLICATION

The MODACT MPR Variant electric lever actuators operating at a variable output speed have been specially designed for the control of actuating variables (final control elemnts of continuous and discontinuous regulating systems - flaps, louvers and valves) in industrial automation and control systems. The MODACT MPR Variant actuators must controlled by a suitable control system.

OPERATING CONDITIONS

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

If the actuator is to be installed in the dry open-air space it should be provided with light roofing for protection against the direct effect of atmospheric exposure.

If the actuator is used at a location with an ambient temperature under - 10 °C and/or relative humidity above 80%, at a sheltered location, or in the tropical atmosphere, the anti-condensation heater which has been built in all actuators, should be always used. One or two heater elements should be connected, as required.

Installation of the actuators at a location with incombustible and non-conducting dust is possible only if this has no adverse effect on their function. In this case, the provisions laid down in ČSN Standard 35 3205 should be strictly observed. It is advisable to remove dust whenever the layer of dust becomes as thick as about 1 mm.

Notes:

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

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

CLASSES OF EXTERNAL INFLUENCES

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

1) AA7 - Simultaneous effect of ambient temperature of - 25 °C to + 55 °C with relative humidity from 10 % upwards
2) AB7 - Ambient temperature to Point 1) supra; minimum relative humidity 10%, maximum relative humidity 100% with condensation
3) AC1 - Altitude ≤ 2,000 m above sea level
4) AD5 - Splashing water in all directions
5) AE5 - Small dust content of air; mean layers of dust; daily dust fall more than 35 mg/m^2, but not exceeding 350 mg/m^2
6) AF2 - Corroding atmosphere and pollutants; the presence of corroding pollutants is significant.
7) AG2 - Average mechanical stress; in current industrial plants
8) AH2 - Medium vibrations; in current industrial plants
9) AK2 - Serious risk of growth of vegetation and moulds
10) AL2 - Serious danger of the occurance of animals (insects, birds, small animals)
11) AM2 - Harmful effect of escaping vagabon currents
12) AN2 - Medium solar radiation with intensities > 500 W/m^2 and ≤ 700 W/m^2
13) AP3 - Medium seismic effects; acceleration > 300 Gal ≤ 600 Gal
14) BA4 - Personal abilities; instructed people
15) BC3 - Frequent contact with the earth potential; persons coming frequently into contat with „live“ parts or standing on a conducting base

DESCRIPTION

The electric actuators consist of the following modules:

Electric motor

- A special type of electric motor with an electromagnetic brake is used. This motor can withstand even continuous short-circuit operation. (It need not be switched off in the end positions).

Countershaft gearbox

- This gearbox serves for reducing the rotational speed between the electric motor and the input of power gearing.

Power gearing

- This is an epicyclic gear unit that is centrally mounted on the output shaft. The internal gearing, together with the worm wheel with a meshing worm, form a whole.
  In addition to manual control, the worm gearing provides for torque-limit switching of the electric actuator. The worm takes up the response of the epicyclic gear to the loading of the output shaft at a torque. Since the worm has been axially spring-loaded it is moved while the electric motor is running and the output shaft loaded. The displacement of the worm is proportional to the load on the output shaft. This displacement performs the torque-limit switching function. The handwheel connected with the worm, enables the electric actuator to be manually controlled.

Control box
- The control box can enclose the following functional control blocks:
a) 2 signalling torque-limit switches
b) 2 signalling position-limit switches (In the design variant with a current position transmitter, 4 signalling position-limit switches are used).
c) position transmitter (potentiometer, or current position transmitter - see Tab. 1)
d) anti-condensation heater
e) capacitor for the electric motor

Lever system
- The lever arrangement consists of a lever fitted on the output shaft of the actuator and a flange provided with adjustable stops for the lever.

Connecting pull-rod
- For connecting the actuator lever to the final control element, a connecting pull-rod is available among special accessories upon special request - see Sketches P-0449 and P-0452.

Operating position
- The electric actuators can be used to operate in any position provided that the axis of the electric motor remains horizontal. They can also work in any position with the electric motor upwards. However, in this case, oil should be added in the power gearing. The actuators should be installed so that easy access is obtained to the handwheel, the terminal board and the control box.

Protective enclosure
- Type IP 55, according to ČSN EN 60529.

Noise
- The sound pressure level A should not exceed 85 dB(A).
- The sound power level A should not exceed 95 dB (A).

TECHNICAL CONDITIONS

Parameter	Unit	Type of electric motor		
		J9A10-00	J10A12-00	J11A11-00
Motor power	W	16	25	50
Excitation phase voltage	V	230	230	230
Control phase voltage	V	230	230	230
Frequency	Hz	50	50	50
Rated voltage of brake	V	230	230	230
Starting torque	Nm	0,33	0,56	1,0
Rated speed of motor	1/min	1150 - 10%	1250 - 10%	1100 - 10%
Rated current of brake	A	0,1 + 10%	0,1 + 10%	0,14 + 10%
Rated current of motor	A	0,31 + 10%	0,41 + 10%	0,78 + 10%
Weight	kg	9	14,5	27

Signalling torque-limit switches
- These switches issue a signal as soon as the preset torque on the output part (lever) has been reached.
- 2 switches, Type DB1G-A1LC 2A, 250 V, 50 - 60 Hz

Signalling position-limit switches
- These switches issue a signal as soon as the preset position of the output part (lever) has been reached.
- 2 switches, Type B 611 2A, 250 V AC
- These switches issue a signal or switch off as soon as the preset position of the output part has been reached.
- 4 switches, Type DB1G-A1LC 2A, 250 V, 50 - 60 Hz (in the design variant with a current position transmitter only).

Insulation resistance of electric circuits
- in dry condition 20 MΩ
- during damp tests 2 MΩ

Working conditions
- in continuous operation (including short-circuit run)
- in one-phase operation with a functional brake switching rate: 200 operations per hour
- short-time operation (max. 24 hours) with lifetime of 4.5 x 10^6 operations switching rate: 660 operations per hour
- with NOTREP controller continuous operation

Minimum switching time with reversing 50 ms
Minimum switching pulse length 150 ms
Maximum lever play - Type No. 52 223 2°
- other Type Nos 1°

Switching torque adjusting accuracy	0 to + 30% of the maximum value of the adjustment range
Working stroke adjusting accuracy	1°
Hysteresis of position-limit switches	4° max.
Control time tolerance at rated supply voltage and rated torque in two-phase connection	+15 % to -30 % of the nominal control time value
Supply voltage of electric motor (including brake)	230 V, + 5 %, - 15 %; 50Hz, ± 2%

POSITION TRANSMITTERS

Potentiometer ZPA 2 x 100 Ω

Initial resistance	5 Ω max.(in the OPEN position)
Final resistance	93 Ω min. (in the CLOSE position)
Maximum resistance	100 + 12 Ω (112 Ω max.)
Working stroke	160°
Linearity (incl.actuator gear)	± 1.5% of the rated path resistance
Hysteresis(incl.actuator gear)	≤ 1.5% of the rated path resistance
Operating voltage	50 V max.
Current load	100 mA max.

Current position transmitter CPT 1/A 4 - 20 mA

Rated output signal	4 ÷ 20 mA or 20 ÷ 4 mA
Rated working stroke	0° ÷ 60° to 0° ÷120° (continuously adjustable)
Linearity	± 1% (for minimum stroke of 60°)
Hysteresis ≤ 0.5 %	
(Linearity and hysteresis are related to the output signal of 20 mA)	
Load resistance R_{load}	0 ÷ 500 Ω
Supply voltage for R_{load} 0 - 100 Ω	10 ÷ 20 VDC
R_{load} 400 - 500 Ω	18 ÷ 28 VDC
Limit supply voltage	30 VDC
Maximum supply voltageripple	5%
Maximum transmitter power demand	560 mW
Insulation resistance	20 MΩ at 50 VDC

Tab.1 MODACT MPR Variant electric actuators - technical parameters, determination of the Type No.

Type designation	Rated torque [Nm]	Quiescent torque [Nm]	Actuating time range [s/90°]	Electric motor [W]	Electric motor [μF]	Electric motor Excitation phase/control phase [A]	Oil volume [kg]	Weight [kg]	Type number basic	Type number supplementary
MPR 6,3 - 10	63 - 100	290	11-19	16	2,5	0,33/0,1	3,0	62	52 221	x x 0 x
MPR 10 - 16	100 - 160	510	14-27							x x 1 x
MPR 16 - 25	160 - 250	600	22,5-46							x x 2 x
MPR 20 - 32	200 - 320	950	20-39	25	3,5	0,45/0,1		67		x x 3 x
MPR 25 - 40	250 - 400	1400	10-19	50	8	0,85/0,14	4,4	104	52 222	x x 0 x
MPR 40 - 63	400 - 630	1750	14-30							x x 1 x
MPR 63 - 100	630 - 1000	2650	30-55							x x 2 x
MPR 100 - 200	1000 - 2000	4550	50-80	50	8	0,85/0,14	4,4	282	52 223	x x 0 x
MPR 160 - 300	1600 - 3000	5950	73-138							x x 1 x
MPR 250 - 400	2500 - 4000	8940	130-195							x x 2 x
Design										
with terminal block									x x x x	6 x x x
with KBNS connector										7 x x x
Working stroke										
60° Type No. 52 221.2				67,5° Type No. 52 223					x x x x	x 1 x x
90° Type No. 52 221.2				90° Type No. 52 223						x 2 x x
120° Type No. 52 221.2				112,5° Type No. 52 223						x 3 x x
160° Type No. 52 221.2				157° Type No. 52 223						x 4 x x
90° Type No. 52 221.2; direct connection										x 5 x x
Additional equipment										
–	Design variant without transmitter								x x x x	x x x 0
V2	Potentiometer ZPA 2 x 100 Ω									x x x 1
CPT 1+GS	Current transmitter CPT 1/A 4 - 20 mA; two-wire connection with built-in power supply									x x x 7
CPT 1	Current transmitter CPT 1/A 4 - 20 mA; two-wire connection without built-in power supply									x x x 9
Pull-rods										
- with simple pull-rod earmarked for export only									x x x x	x x x x/3
- with double pull-rod earmarked for export only										x x x x/4

Insulation strength	50 VDC
Ambient temperature	- 25 °C to + 60 °C

The transmitter uses a two-wire connection in which the transmitter, power supply and load are connected in series.

Supply voltage of the ZPT1 power supply unit	230 V ± 6%, 50 Hz

Instrument female and male connector KBNS:

Number of poles	32
Maximum voltage between poles	400 V/50 Hz, 250 VDC
Maximum current	2.5 A AC and DC
Maximum conductor cross-section	0.75 mm^2
Outside cable diameter - bushing P16	11.5 to 14 mm
- bushing P21	15.5 to 18 mm

Note:

The instrument female and male connector KBNS should not be split when the circuit is energized. Even after the connector KBNS has been disconnected the actuator should remain connected to a protective conductor. The lead-in cables of the connector KBNS should be attached to the frame at a point not more than 150 mm apart from the connector KBNS.

ORDERING INFORMATION

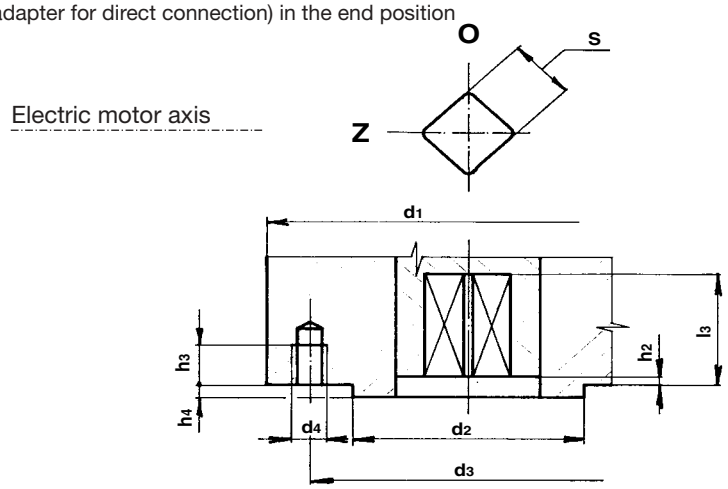
When ordering, please specify the following:
- Number of actuators required
- Actuator designation and type
- Type No. (including supplementary numbers)
- Working stroke (angle of lever rotation)
- Tripping torque adjustment (The tripping torque will be adjusted to a maximum, unless specified).
- Position transmitter type

Example:

If two MODACT MPR Variant 16-25 electric actuators, Type No. 52 221, with cable bushings (terminal block), the working stroke of 90°, the torque range of 160 to 250 Nm, adjustment to 200 Nm and a current transmitter of 4 to 20 mA with built-in power supply are required, they should be specified in the order as follows: *2x Electric Actuator MPR 16-25, Type No. 52 221.0227, working stroke 90°, 160-250 Nm, adjustment 200 Nm, 4÷20 mA*

FLANGE, according to DIN 5211, Part I;
dimensions of the square end to ON 1331 19 (DIN 79)

Electric actuator (adapter for direct connection) in the end position

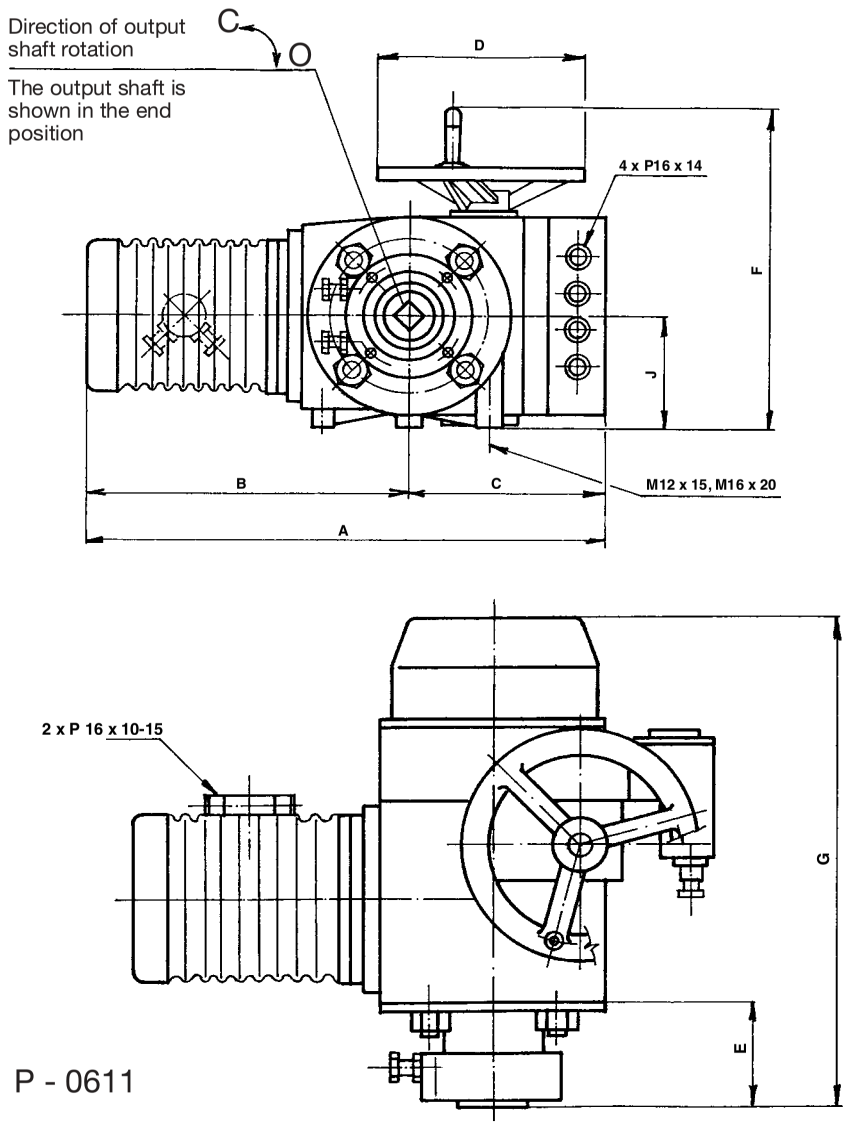


	52 221 F 10	52 222 F 14
d1	125	175
d2	70	100
d3	102	140
d4	M 10	M 16
h2	max 2	max 2
h3	min 16	min 25
h4	max 3	max 4
S H11	22	36
l3	min 24	min 38

	52 221	52 221	52 222
	16 W	25 W	50 W
A	580	637	782
B	350	407	517
C	230	230	265
D	∅ 200	∅ 200	∅ 250
E	81	81	120
F	355	355	420
G	451	451	556

Dimensional sketches of the **MODACT MPR Variant** electric actuators, Type Nos 52 221 and 52 222, with adapter for direct connection

Design variant with a terminal block



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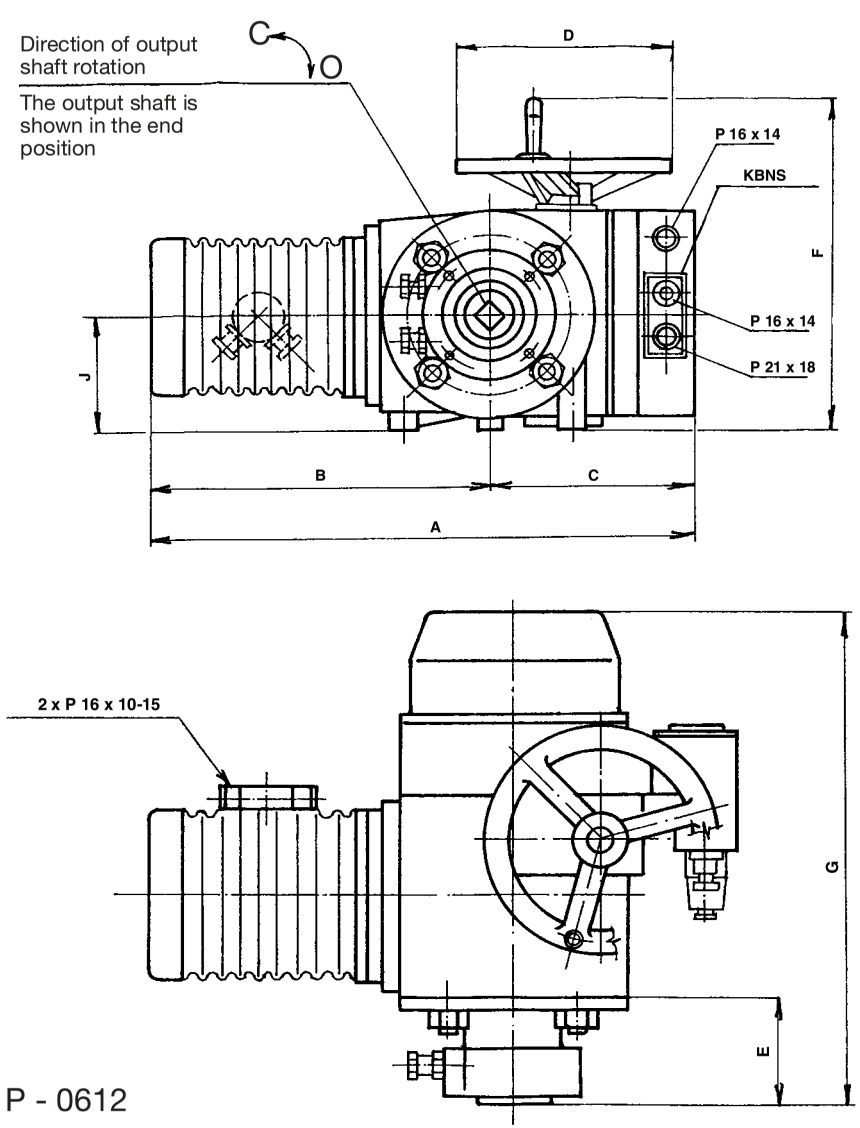
Design variant with the KBNS connector



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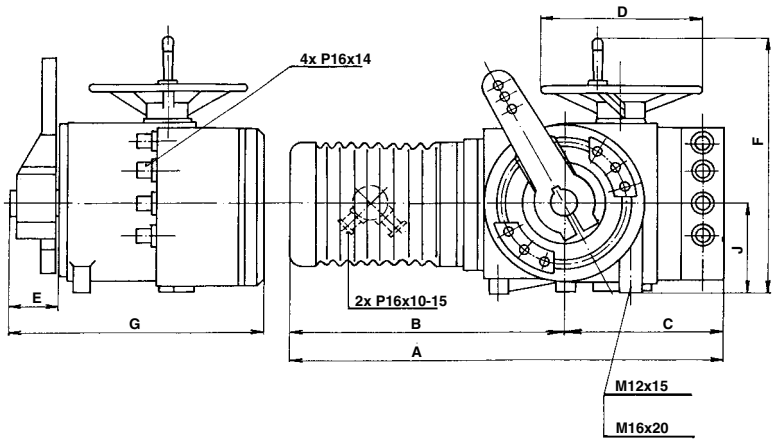
Dimensional sketches of the **MODACT MPR Variant** electric actuators, Type Nos 52 221 and 52 222

Design variant with a terminal block



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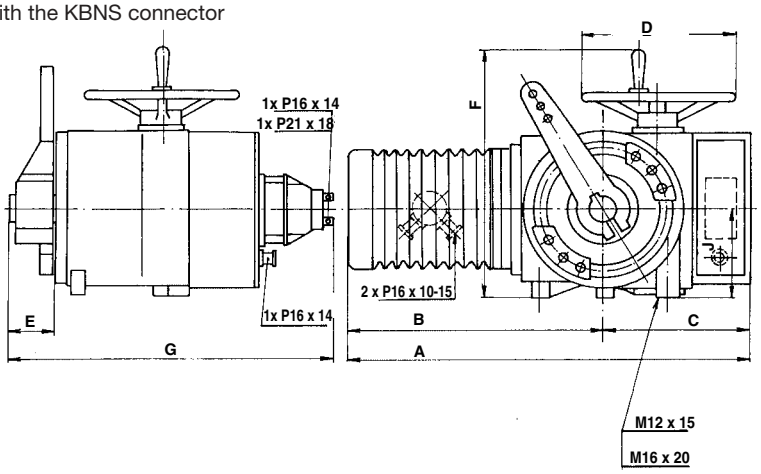
Design variant with the KBNS connector



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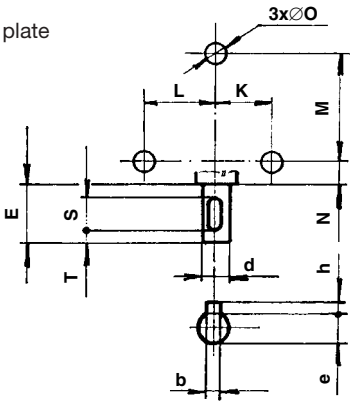
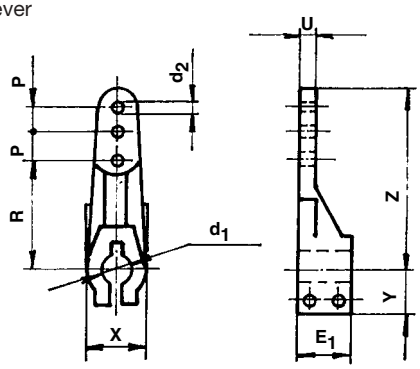
	terminal block			connector KBNS		
	52 221		52 222	52 221		52 222
	16 W	25 W	50 W	16 W	25 W	50 W
A	580	637	782	580	637	782
B	350	407	517	350	407	517
C	230		265	230		265
D	Ø 200		Ø 250	Ø 200		Ø 250
E	65		85	65		85
E_1	60		80	60		80
F	355		420	355		420
G	455		555	455		555
J	120		145	120		145
K	70		100	70		100
L	90		110	90		110
M	140		200	140		200
N	41		57	41		57
O	Ø 14		Ø 18	Ø 14		Ø 18
P	40					
R	170					
S	56		70	56		70
T	4		7	4		7
U	25		30	25		30
X	66		80	66		80
Y	41		55	41		55
Z	273		278	273		278
d h8	Ø 40		Ø 50	Ø 40		Ø 50
d_1	Ø 40		Ø 50	Ø 40		Ø 50
d_2 H8	3 x Ø 20		3 x Ø 25	3 x Ø 20		3 x Ø 25
b P9	12		16	12		16
h	8		10	8		10
e	35		43,8	35		43,8

base plate

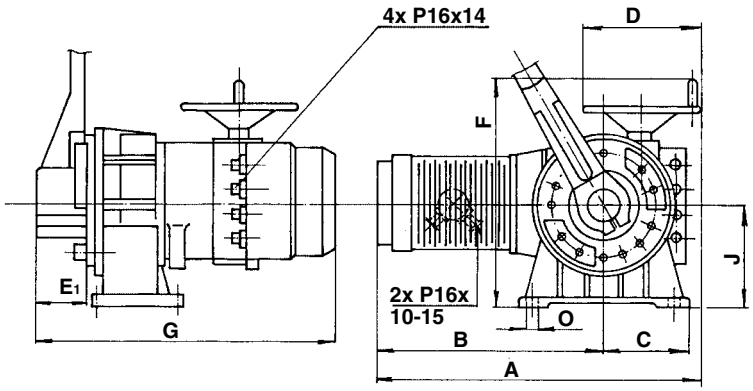


lever



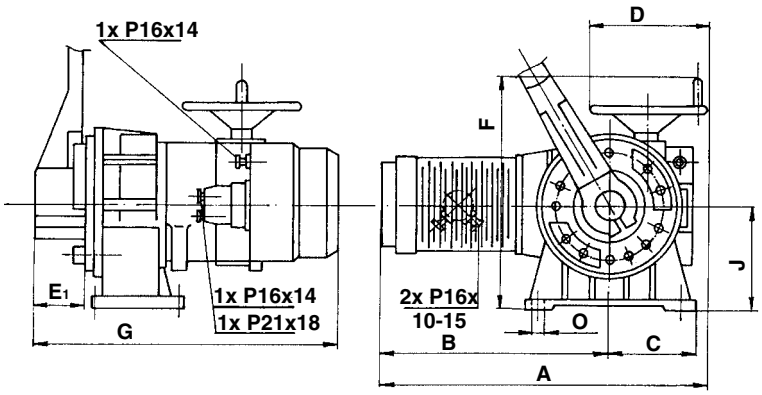
Dimensional sketches of the **MODACT MPR Variant** electric actuator, Type No. 52 223

Design variant with a terminal block



P - 0433

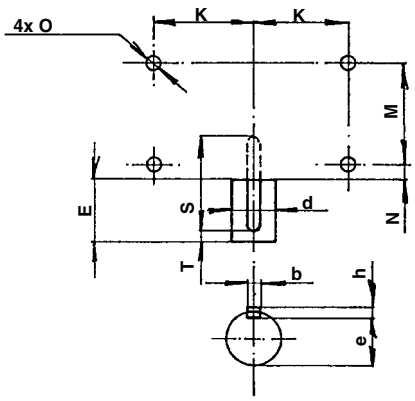
Design variant with the KBNS connector



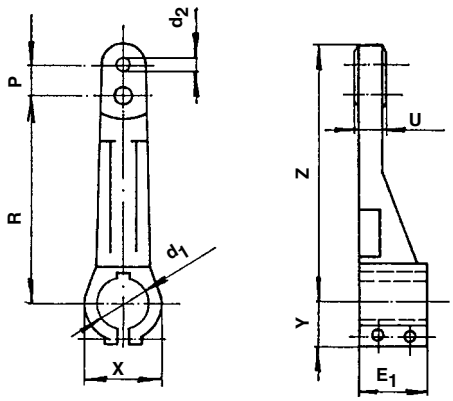
P - 0435

	52 223
A	793
B	548
C	220
D	Ø 250
E	123
E_1	120
F	560
G	750
J	260
K	185
M	200
N	33
O	Ø 22
P	55
R	400
S	180
T	11
U	36
X	130
Y	80
Z	490
d	Ø 90h8
d_1	Ø 90h7
d_2	Ø 40h8
b	25P9
h	14
e	81,3

base plate



lever



Internal wiring diagrams of the **MODACT MPR Variant** electric actuators

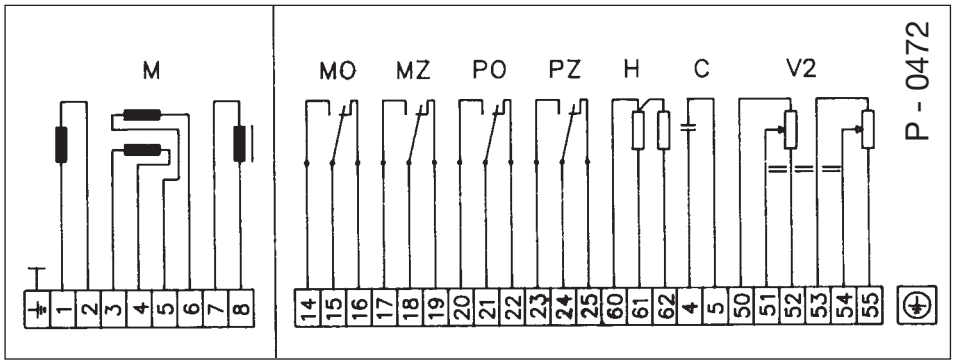
LEGEND:

MO	- OPEN torque-limit switch
MZ	- CLOSE torque-limit switch
PO	- OPEN position-limit switch
PZ	- CLOSE position-limit switch
SO	- OPEN signalling switch
SZ	- CLOSE signalling switch
H	- Anti-condensation heaters
C	- Capacitor
CPT1	- Current position transmitter CPT1/A 4 - 20 mA
GS	- Power supply of 220 VAC/24VDC for the current transmitter
V2	- Potentiometer ZPA 2 x 100 Ω
M	- Asynchronous two-phase motor
Z	- Connector „KBNS“

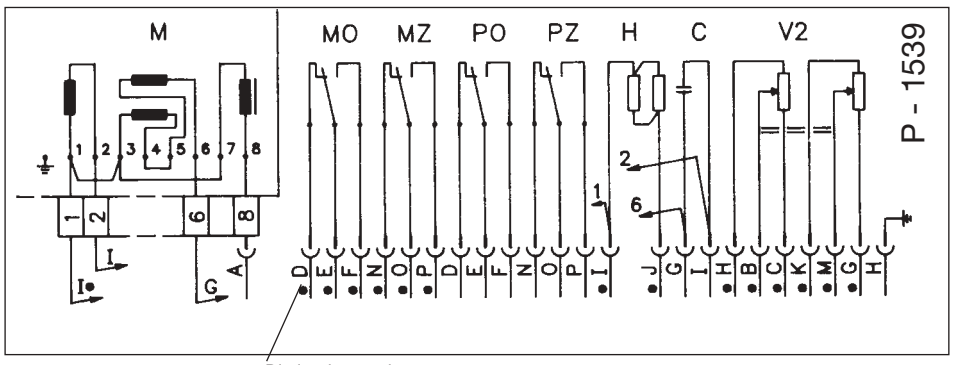
Internal wiring diagrams of the **MODACT MPR Variant** electric actuators

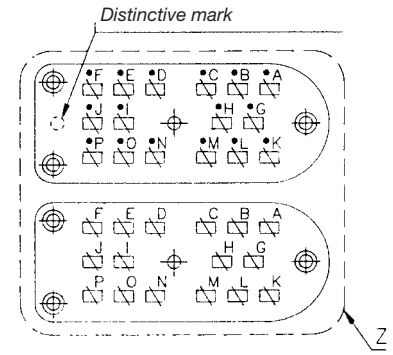
- with potentiometer ZPA 2 x 100 Ω

Design variant with a terminal block

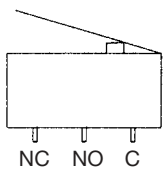


Design with the KBNS connector





View of the solder side

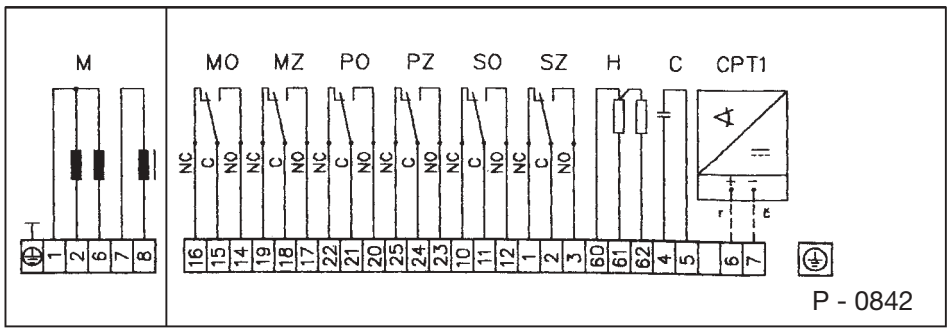


The above distinctive mark is used to distinguish the two male connector bodies provided with an identical alphabetic designation of soldering tags. It is shown in colour on one of the connector bodies. In the circuit diagrams, the soldering tags of the marked connector body are designated by dots.

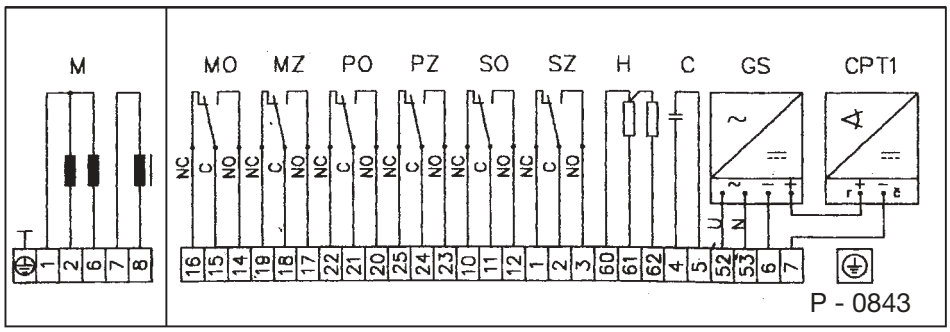
Internal wiring diagrams of the **MODACT MPR Variant** electric actuators
with current transmitter CPT 1/A

Design variant with a terminal block

- without built-in power supply

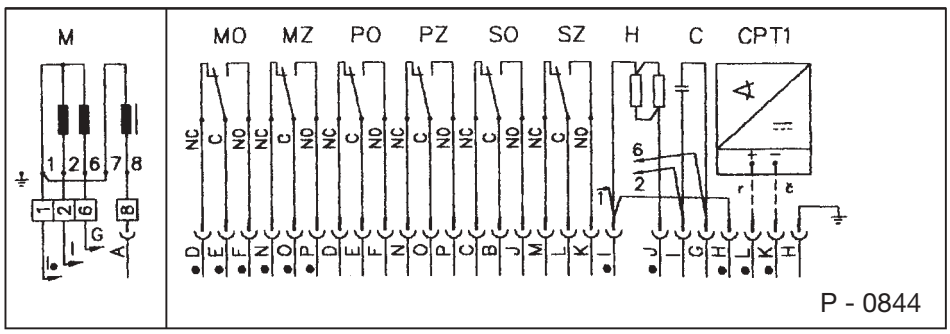


- with built-in power supply

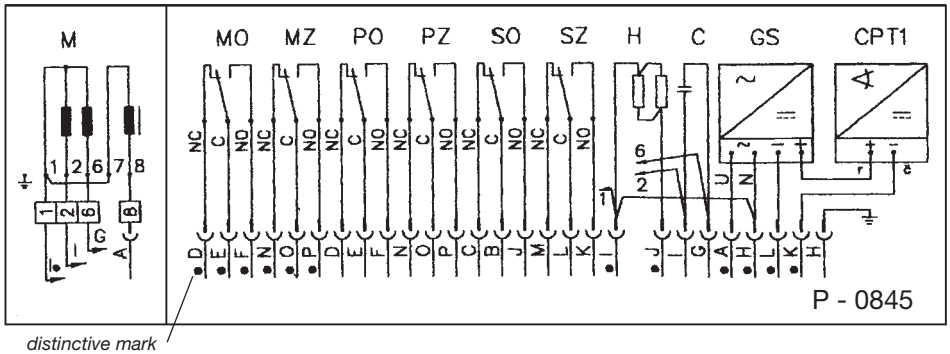


Design with the KBNS connector

- without built-in power supply

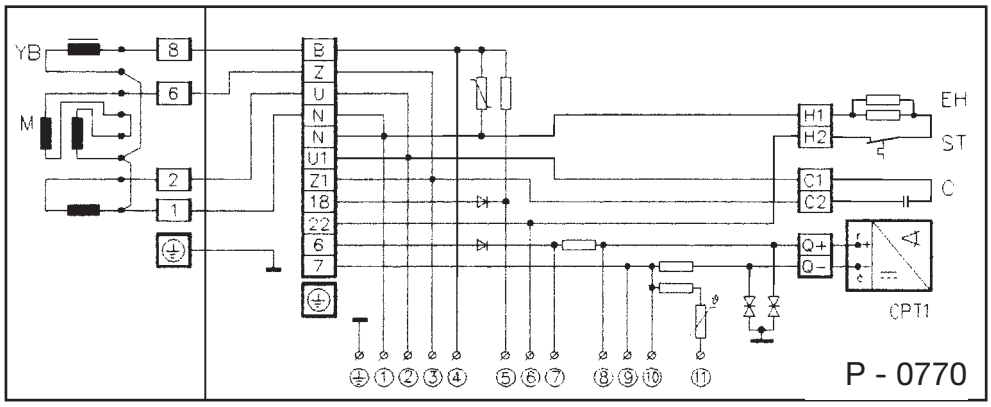


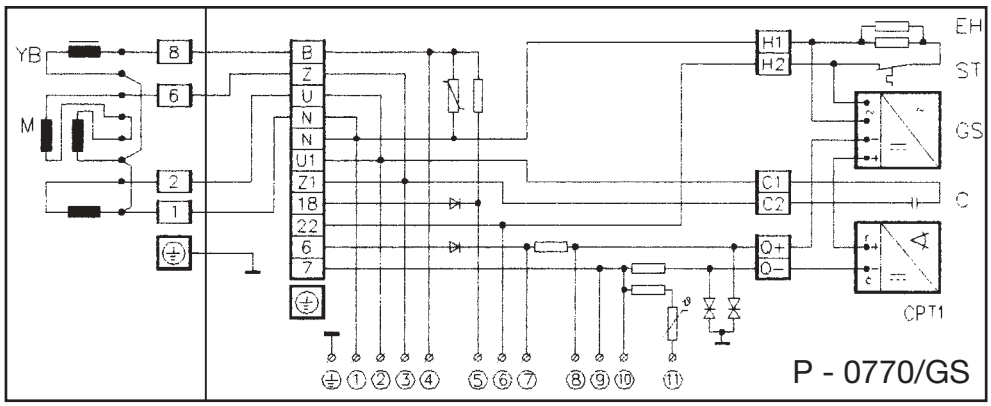
- with built-in power supply



distinctive mark

Internal wiring diagrams of the **MODACT MPR Variant** electric actuators
Type No. 52 22x.06x9, working stroke 60÷160°, with position transmitter CPT1,
with power supply GS - ZPT1 or without power supply





ST - temperature monitor
⏚, ①÷⑪ - testing equipment connector contacts

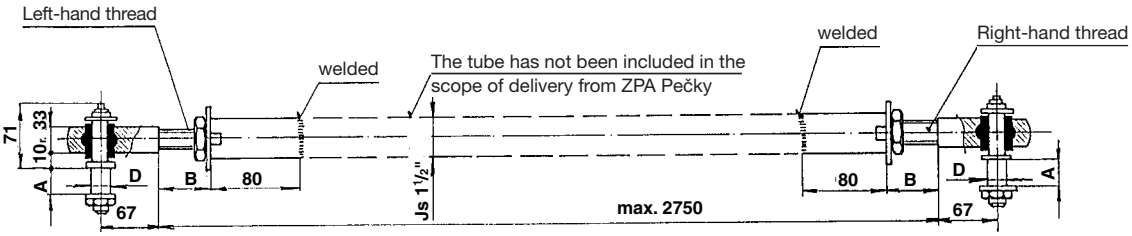
Testing equipment supplied dy DICONT, a.s., Prvního pluku 12a, 186 00 Prague 8 - Karlín, CZ.

Dimensional sketch of the pull rods TV 40 and TV 50

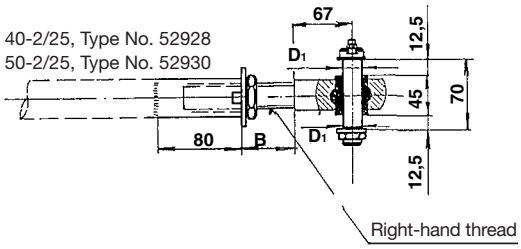
Actuator side

Controlled device side

Design TV 40-1/20, Type No. 52927
TV 50-1/25, Type No. 52929



Design TV 40-2/25, Type No. 52928
TV 50-2/25, Type No. 52930



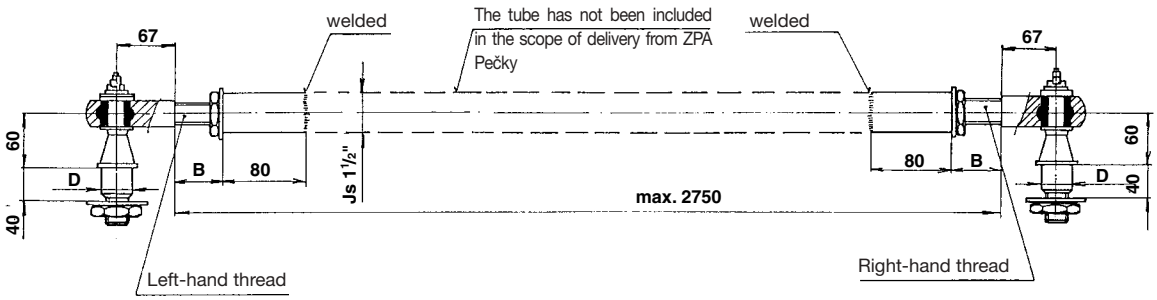
Type	Type No.	Dimensions				Intended for actuator, Type No.
		∅ D j7	∅ D_1 j7	A	B	
TV 40-1/20	52 927	20	25	23	min. 20 max. 50	52 221
TV 40-2/25	52 928					
TV 50-1/25	52 929	25	25	28		52 222
TV50-2/25	52 930					

P - 0449

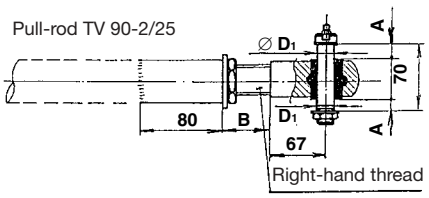
Dimensional sketch of the pull rods TV 90-1/40

Actuator side

Controlled device side



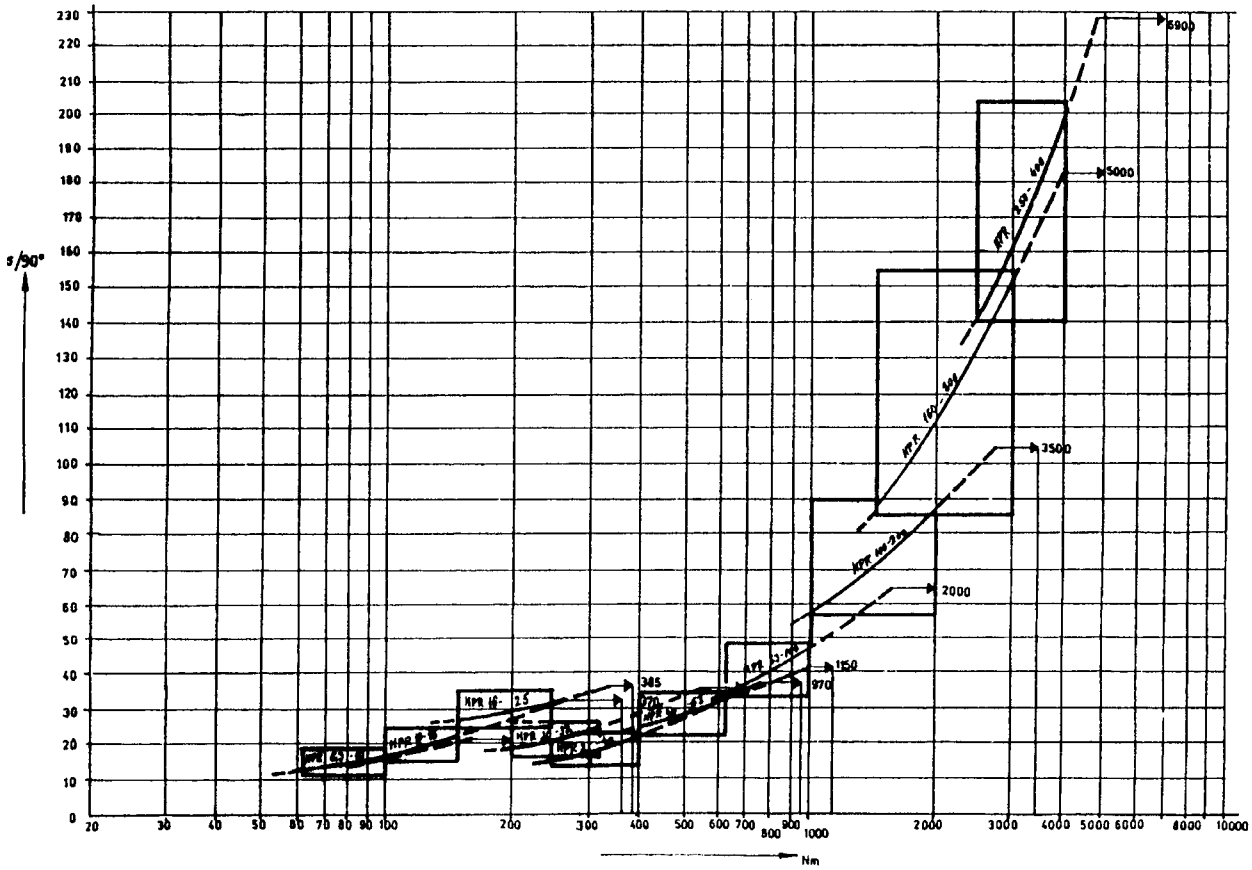
Pull-rod TV 90-2/25



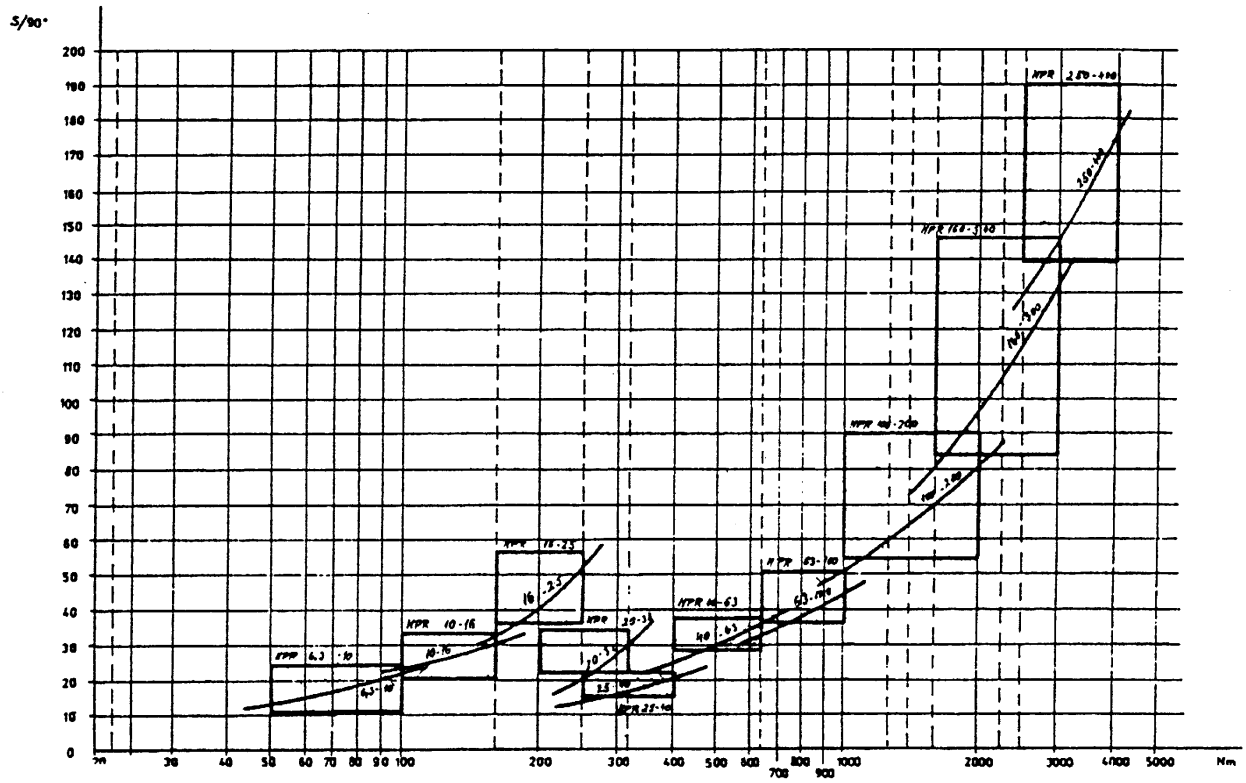
Type	Type No.	Dimensions				Intended for actuator, Type No.
		ø D j7	ø D_1 j7	A	B	
TV 90-1/40	52 934	40	–	–	min. 20 max. 50	52 223
TV 90-2/25	52 935		25	12,5		

P - 0452

Torque characteristics of the MODACT MPR Variant electric lever actuators
- one-phase connection with a capacitor - supply voltage of 230 V



Torque characteristics of the MODACT MPR Variant electric lever actuators
- two-phase connection of 230 V



ZPA PEČKY, a.s.

Electric actuators and switchboards
Development, production, sales, services

SURVEY OF PRODUCED ACTUATORS

KP Mini
Electric part-turn actuators (up to 30 Nm)

Modact MOK, MOK-P, MOK-P EEx
Electric part-turn actuators for ball valves and flaps

Modact MON
Electric multi-turn actuators

Modact MO EEx
Explosion proof electric multi-turn actuators

Modact MOA
Electric part-turn actuators for nuclear power stations
application outside containment

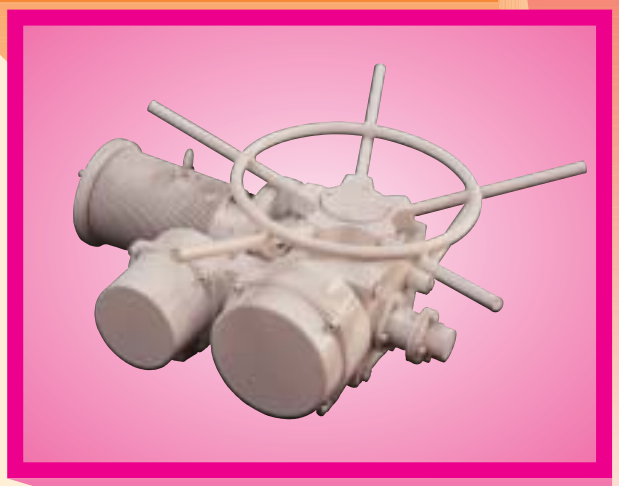
Modact MOA OC
Electric multi-turn actuators for nuclear power stations
application inside containment

Modact Variant MPR
Electric part-turn lever actuators with a variable output speed

Modact Konstant MPS
Electric part-turn lever actuators with a constant output speed

Modact MTN
Electric linear thrust actuators with a constant output speed

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



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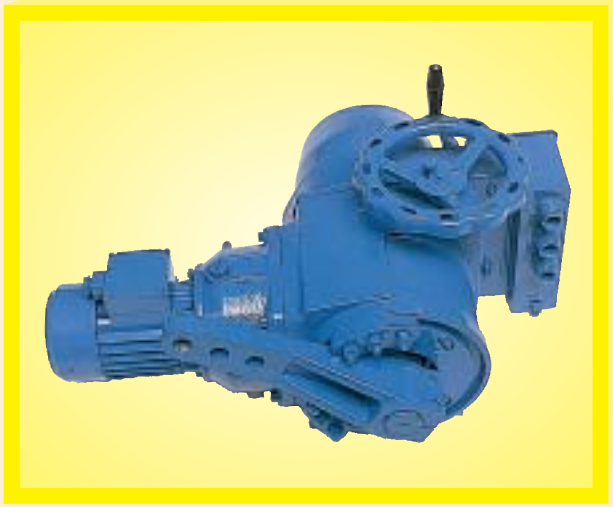

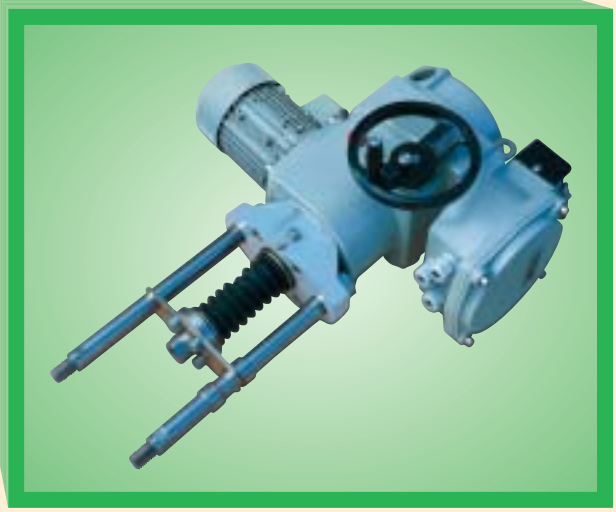

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