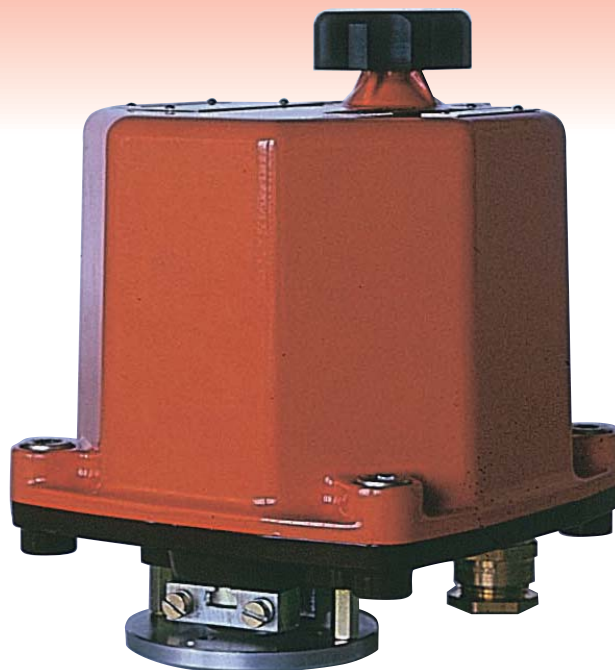


ZPA PEČKY, a.s.



Electric Part-turn Actuator

**KP MINI
KP MINI CONTROL**

Type No. 52 997, 52 998



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



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**



Essen, 14.11.2003



TÜV CERT Certification Body
of RWTÜV Systems GmbH

1. APPLICATION

The **KP MINI (KP MINI Control)** electric actuators have been specially designed for actuating fittings (ball and flapper valves), louvers, air flaps and other devices for which they are in respect of their characteristics suitable. They can be used in remote and automatic control circuits.

When equipped with an electronic position controller with position feedback, these actuators can act as a final power control element of continuous-action control circuits used for controlling physical variables.

2. OPERATING CONDITIONS

The **KP MINI (KP MINI Control)** electric actuators should withstand the effects of operating conditions and external influences, Classes AA7, AB7, AC1, AD7, AE6, AF2, AG2, AH2, AK1, AL1, AM2, AN2, AP3, BA4 and BC3, according to IEC 364-3:1993. In explosion-proof design variant, Type No. 52 998, the electric actuators should be also capable of operating under Class BE3N2 environmental conditions.

Classes of external influences

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

- 1) Surrounding temperature from -25 to +55 °C
- 2) Atmospheric conditions in surroundings: - temperature from -20 to +55 °C
- relative humidity from 10 to 100 % with condensation
- 3) AC1 - elevation above sea level \leq 2000 m
- 4) AD7 - water occurrence - shallow dipping
- 5) AE6 - occurrence of foreign solid bodies - strong dustiness. Thick dust layers. Fall-out of dust more than 350 and not more than 1000 mg/m² per day
- 6) AF2 - occurrence of corrosive or polluting substances from atmosphere Presence of corrosive polluting substances is significant
- 7) AG2 - medium mechanical stress by impacts - common industrial processes
- 8) AH2 - medium mechanical stress by vibrations - common industrial processes
- 9) AK1 - occurrence of plant species or moulds without danger
- 10) AL1 - no serious danger of occurrence of animals
- 11) AM2 - harmful effects of escaping stray currents
- 12) AN2 - medium sun radiation. Intensity from 500 to 700 W/m²
- 13) AP3 - medium seismic effects. Acceleration from 300 to 600 Gal
- 14) BA4 - staff capability. Instructed persons.
- 15) BC3 - frequent contact of persons with earth potential. Persons often touch foreign conductive parts or stand on conductive base.
- 16) BE3N2 - danger of explosion of combustible gases and vapours. ČSN 33 2320 - ZONE 1.

3. DESCRIPTION AND FUNCTION

The **KP MINI (KP MINI Control)** electric actuators consist of the following basic units:

- reversible synchronous motor with a permanently connected starting capacitor
- power gearing with a shaft, fitted with a universal output
- electric equipment

The power gearing consists of a pinion attached to the output shaft of the electric motor, spur gearings and a geared segment coupled with the output shaft of the electric actuator. Supported on bearings, the output shaft is fitted on its outside with a universal clamp providing for connection to the driven shaft (diameter of 12 to 22 mm or square $s = 9$ to 17 mm). For control of the position-limit and signalling switches, adjustable cams are fitted at the other end of the output shaft, which is extended in length into the actuator control part.

Electric equipment consists of four microswitches of which two are used for tripping the actuator when the end positions of the output shaft have been reached and two can be used for the position signalling of the output shaft, the actuator is also fitted with a position transmitter. When viewing from the top (from the side of manual control) the sequence of micro-switches is as follows: PO, SO, PZ, SZ.

In addition, the actuator is fitted with a position transmitter (potentiometer) of rated value of resistance 1 x 100 W. The gearing to the transmitter is fitted with a friction clutch which, in connection with the transmitter stoppers, provides for automatic adjustment.

Outlets of the micro-switches, position transmitter, and electric motor are connected to a terminal board which serves for electric connection of the actuator to external circuits by means of a cable with conductors of maximum cross-section 1.5 mm².

For sealing of inlet cables, the actuator is fitted with two cable bushings. Cable bushings PG 11 (for cables Δ 5 - 10mm) are used for the actuators of type 52 997. Cable bushings CMP 20 - A2F (for cables Δ 11 - 14mm) are used for the actuators of the version EEx, type 52 998. Protection against shock voltage is provided for by internal and external protective terminals.

A heating element is installed for establishing a micro-climate in the space of the control part.

Note: If the actuator works in the environment of temperature exceeding 35 °C the heating element will not be switched on. In other cases the heating element should be used.

4. TECHNICAL PARAMETERS

Basic technical parameters - table of design variants

Type	Rated torque [Nm]	Working stroke [°]	Adjusting time (90°) [s]			Electric motor				Type number	
			DC	50 Hz	60 Hz	Typ	DC	AC 50Hz	AC 60Hz	basic	supplementary
KP MINI (EEx)	30	90		30		SMR		300/1200		52 997 (52 998)	x x 1 x
				60	48	SMR		300/1200	300/1200		x x 2 x
				90	72	SMR		300/600	300/800		x x 3 x
				120	96	SMR		300/600	300/600		x x 4 x
			64-88			ITT	402.907				x x 5 x
			7			ITT	403.903			52 997 x x 8 x	
Frequency, supply voltage											
AC 50 Hz			230 V				52 997 (52 998)		1 x x x		
			24 V						3 x x x		
110 V				5 x x x							
AC 60 Hz			230 V						2 x x x		
			24 V						4 x x x		
			110 V				6 x x x				
			120 V				7 x x x				
DC			24 V				8 x x x				
Position transmitter - Electronic position transmitter ZP 2.RE											
with position transmitter 1x100Ω			without controller				52 997 (52 998)		x x x 4		
			with controller						x x x 5		
without position transmitter			without controller						x x x 6		
with position transmitter 2x100Ω			with controller						x x x 7		
union flange size			flange F03						x 1 x x		
			flange F04				x 2 x x				
			flange F05				x 3 x x				
			flange F07				x 4 x x				

Additional technical parameters

Duty:	S2 - 10 min.; S4 - 30% - 1,200 cycles/hour
Weight:	4 kg
Output shaft play:	1.5°
Insulation resistance:	at least 20 MΩ under dry condition; at least 2 MΩ after a damp test
Actuator life:	at least 1x10 ⁶ operations with a running time of 0.75 s at the rated torque
Design in respect of explosion-proofness:	standard design - Type No. 52 997 (BNV - according to ČSN 33 2320) explosion-proof design EExd II CT 6 - Type No. 52 998
Noise:	acoustic pressure level A does not exceed 75 dB (A). acoustic power level A does not exceed 85 dB (A).
Protective enclosure:	IP 67

Technical parameters of the electric motors used

Type of electric motor	Power [W]	Supply voltage [V]	Frequency [Hz]	Current [A]
SMR 300 - 1200	3,8	230	50	0,068
			60	0,078
		110	50	0,161
			60	0,177
		24	50	0,615
			60	0,68
SMR 300 - 800	2,5	230	50	0,046
			60	0,05
		110	50	0,087
			60	0,096
		24	50	0,52
			60	0,57
SMR 300 - 600	1,9	230	50	0,036
			60	0,039
		110	50	0,072
			60	0,078
		24	50	0,310
			60	0,350
ITT 402.907	2,5	24 DC	-	0,25
ITT 403.903	16	24 DC	-	1

Basic electric equipment:

- 2 position-limit switches (OPEN and CLOSE)
- 2 signalling switches (OPEN and CLOSE)
- 1 synchronous motor
- 2 cable bushings
- 1 terminal board
- 1 anti-condensation heater

Additional electric equipment (according to the customer's requirements):

- 1 electronic position controller
- 1 resistance position transmitter

5. POSITION REGULATOR

A built-in position regulator allows automatic positioning of the actuator output shaft to be performed, depending on the analog input signal. At the regulator input, the input control signal is compared with the feedback signal of the position transmitter. The resulting control deviation, if any, is used for actuator run control, the actuator output shaft being brought into the position corresponding to the input control signal value.

This regulator uses the high performance of the RISC processors MICROCHIP for performing all its functions, while at the same time enabling continuous system self-diagnosis to be effected and error messages to be displayed whenever a failure occurs. Due to this facility, the user need not make complicated adjustment as in the case of a current analog regulator. For this purpose, it is sufficient to start the initializing program to make the regulator perform all necessary functions.

REGULATOR SOFTWARE

- 1) The regulator can be programmed to perform the required functions in the following two ways:
- By a PC after the RS 232 interface.
 - By means of the functional keys and LEDs on the regulator.

The following parameters can be programmed:

- Control signal
- Regulator response to the TEST signal and the error state (depending on the programmed requirements)
- Mirroring (ascending or descending characteristic of the control signal)
- Regulator insensitivity
- Type of feedback transmitter (potentiometer, current transmitter)

- 2) All operating states of the regulator can be monitored by a PC after the RS 232 interface. In this case, the regulator issues error messages by means of LEDs or PC.

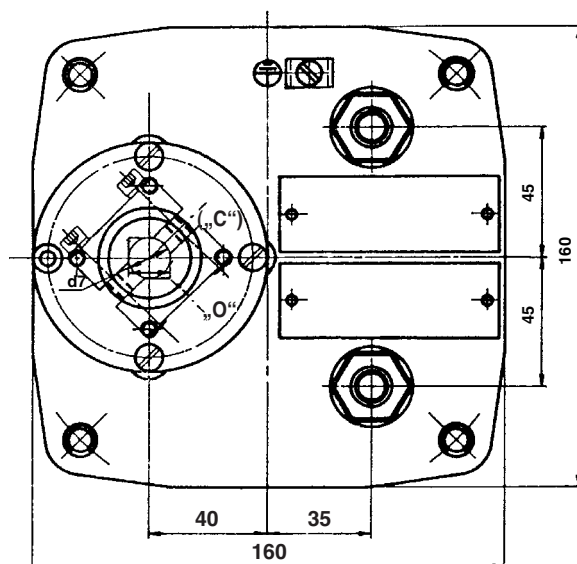
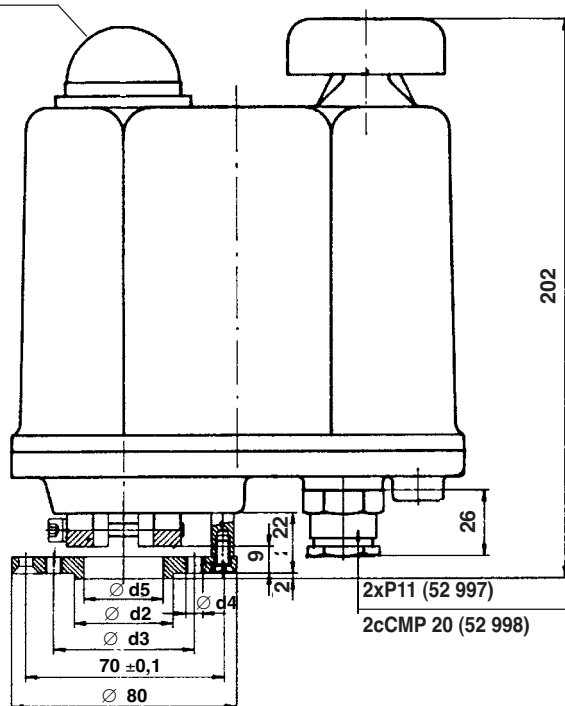
- Presence of the TEST signal
- Control signal is missing
- Limit switches (faulty connection)
- Failure of position sensor
- Failure of thermal protection

TECHNICAL PARAMETERS OF THE REGULATOR

Alternative supply voltages:	A. 230 V +10%, -15% 50 - 60 Hz
	B. 120 V +10%, -15% 50 - 60 Hz
	C. 24 V +10%, -15% 50 - 60 Hz
Control signal	0 to 20 mA, 4 to 20 mA, 0 to 10 V
Position sensor	Resistance transmitter of 100 to 10,000 Ω
Regulator linearity	0.5%
Regulator insensitivity	1 to 10% (adjustable)
Operating temperature range	- 25 °C to + 75 °C
LED error messages	- TEST mode
	- Failure of position sensor
	- Reversed position switches
	- Control signal is missing
	- Actuator switched off in an intermediate position
Response to failure:	Failure of sensor - Actuator in the TEST position, LED error message
	Control signal is missing - Actuator in the TEST position, LED error message
	TEST mode - Actuator in the TEST position, LED error message
Output signal:	Power outputs - 2x relay of 5 A, 230 V
	Central failure - Switching contact of 24 V, 2 W
	5x LED (power supply, failure, adjustment, opens, closes)
Adjusting devices:	- 2x calibrating and parameter adjusting push-button
	- Communication connector
Dimensions:	- 75 x 75 x 25 mm

Dimensional sketch of the **KP MINI** electric actuators, Type No. 52 997, 52 998 design with flange F03, F04, F05 (actuator in OPEN position)

only Type No. 52 997

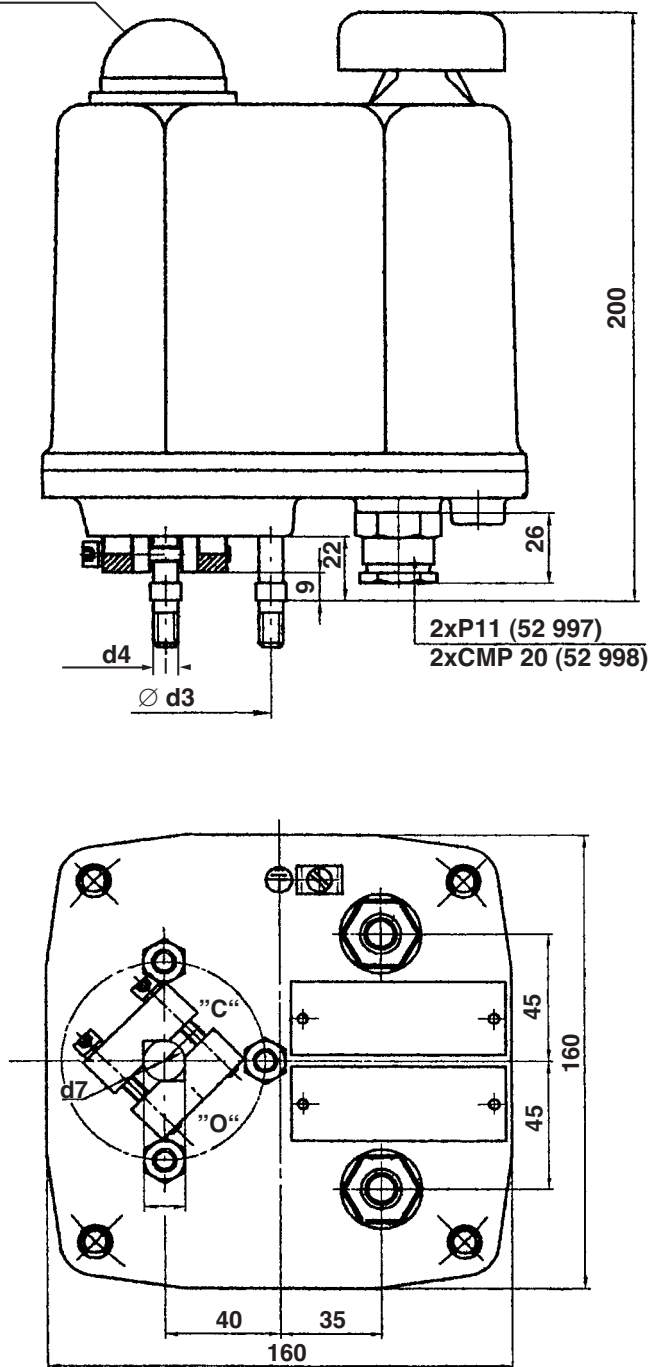


Connecting dimensions for actuator connection to a fitting
(any other connection should be consulted with the manufacturer beforehand).

Flange	Dimension					
	d2	d3	d4	d5	s	d7
FO3	25	36	M5	20	9-14	12-20
FO4	30	42	M5	25	9-17	12-22
FO5	35	50	M6	28	9-17	12-22

Dimensional sketch of the **KP MINI** electric actuators, Type No. 52 997, 52 998
design with flange F07 (actuator in OPEN position)

only Type No. 52 997



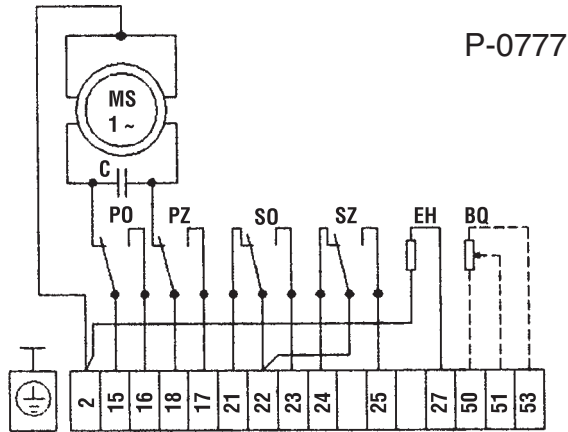
Connecting dimensions for actuator connection to a fitting
(any other connection should be consulted with the manufacturer beforehand).

Flange	Dimension					
	d2	d3	d4	d5	s	d7
FO7	-	70	M8	-	9-17	12-22

Internal wiring diagrams of the **KP MINI** electric actuators

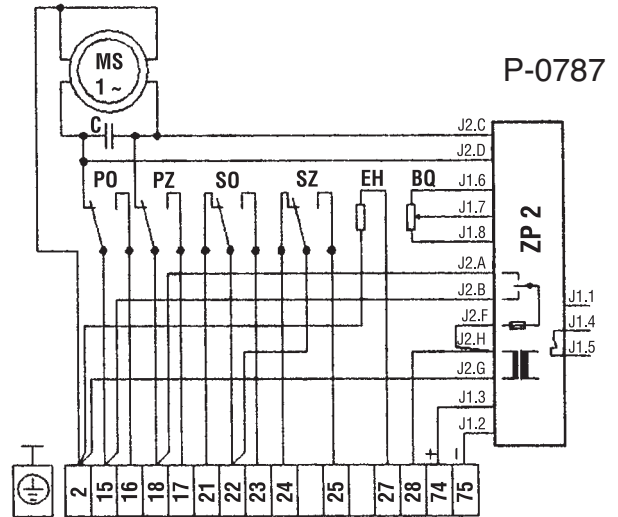
KP MINI electric actuator, Type No. 52 997

- with one-phase motor and resistance position transmitter
or without transmitter



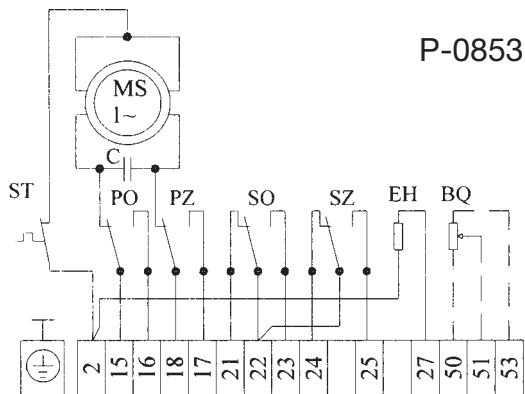
KP MINI Control electric actuator, Type No. 52 997

- with one-phase motor
and resistance position transmitter



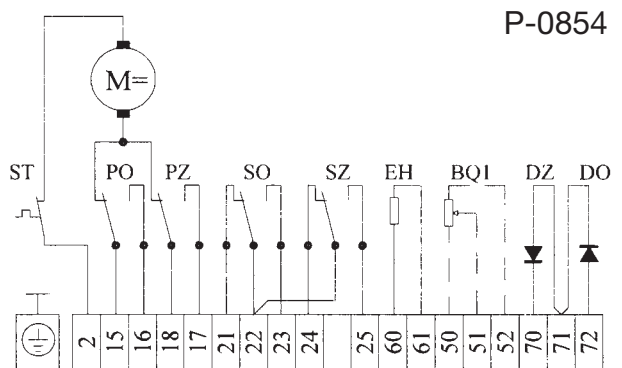
KP MINI EEx electric actuator, Type No. 52 998

- with one-phase motor and resistance position transmitter
or without transmitter



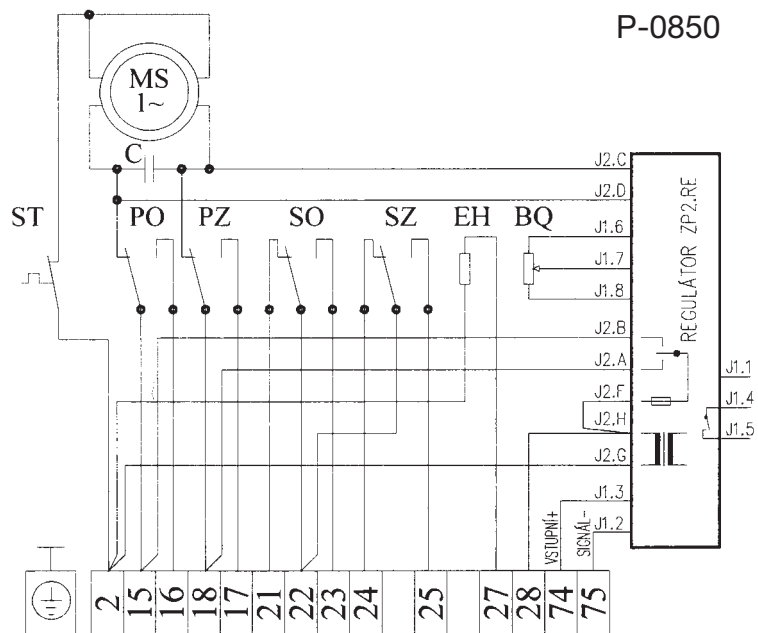
KP MINI EEx electric actuator, Type No. 52 998

- with one-phase motor supplied by direct current
and with resistance position transmitter or without transmitter



Internal wiring diagram of the **KP MINI EEx Control** electric actuator, Type No. 52 998

- with one-phase motor, electronic regulator and resistance position transmitter



Legend:

PO	open position-limit switch
PZ	close position-limit switch
SO	open signalling switch
SZ	close signalling switch
EH	anti-condensation heater
BQ	position transmitter
MS1~	one-phase motor
C	motor capacitor
M=	direct current electric motor
ST	thermostat
DO, DZ	direct current rectifiers of sense of rotation
ZP2.RE	three-position motor controller



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-R, 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

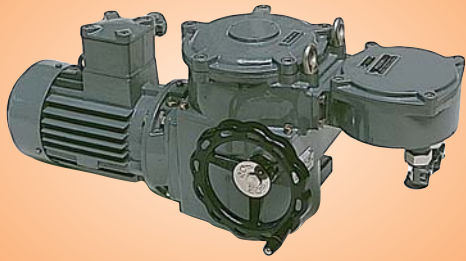
Electric part-turn lever actuators with a variable output speed

Modact Konstant MPS

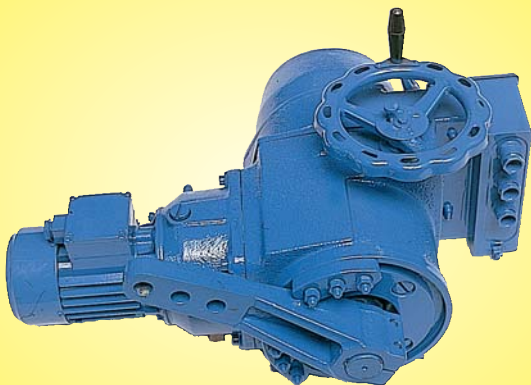
Electric part-turn lever actuators with a constant output speed

Modact MTN

Electric linear thrust actuators with a constant output speed



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