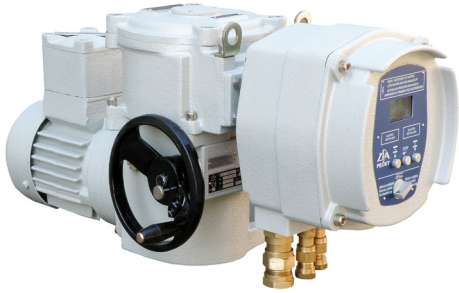




UNIMACT



MODACT



ISOMACT



# MARVEL

## ELECTRIC ACTUATORS & GEARBOXES

FOR CONTROL AND REGULATION

ZPA

**REGADA**

**MASTERGEAR**  
WORLDWIDE



PRODUCTION OVERVIEW

## Introduction



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Today, in a dynamic world, high-quality management technologies and production processes in industry, plays an important role in achieving the goals, cost-effectiveness of projects, safety and ecology of life.

This high-quality management can be achieved by ever-increasing level of automation in process management. Where required automation of valves is particularly important drives. Our company MARVEL, has long been supplying a wide range of electric actuators for all industries.

Thanks to the modular design of the control Modact, and Isomact, managed to simplify and unify a number of components, whose application makes it easy to create electric actuators providing any, to the customer, a convenient feature for controlling or regulating pipeline valves.

### **Ranges of products supplied are the following electric actuators:**

- Electric multi-turn actuators: to manage and control the operation of gates and valves;
- Electric part-turn actuators: to manage and control the operation of ball valves and dampers (shutters);
- Electric linear actuators: to manage and control the operation of valves and gates.

### **The application of electric actuators:**

- Thermal and nuclear power energy;
- Oil and gas, petrochemical and chemical industries;
- Metallurgy;
- Water supply;
- Air conditioning, etc.

Significant benefits we supply are high efficiency electric actuators, a wide range of options, including the electronic control system **MATIC** and the ability to work in the **PROFIBUS** and **MODBUS**, high precision setup, torque (power) off in both directions with the ability to configure each separate micro switch, a wide range set up speed control and speed, high durability.

The entire range of electric actuators adapted to the requirements of the Russian market, which is confirmed by the presence of certificates, and any other required permits, indicating the possibility of production facilities in Russia.

Electric actuators attachment is in accordance with standards **DIN**, **ISO** and **GOST R**.

During the years of activity, electric actuators proved to be reliable, quality product, which is confirmed by good references, mostly from consumers in Central and Eastern Europe. After-sales service of electric actuators provides a service center where qualified personnel are ready at any time, technical consulting, as well as provide recommendations on the use and maintenance products.

For more information on the proposed electric we can get from the product catalogs, as well as the companies website:

[www.marvelpit.sk](http://www.marvelpit.sk)

**Application**

Electric actuators Isomact and Modact are designed for remote and local control of closing bodies and for automatic control of regulating bodies.

They can be used and installed in heating and nuclear power energy, gas and oil industrial, air-conditioning and other technological systems to control industrial valves.

Electric actuators in the performance MATIC are equipped with intellectual control unit, which allow modular design solution and intellectualization of system control. Provide opportunity sets output bodies depending on the input signals and operate in automatic control system by:

- analogue input signal 0/4-20 mA and 0/2-10V (3 P operation),
- permanent or impulse control by voltage 24V DC (2P operation).

In the performance with unit of local control with LCD display, make it possible to configure of electric actuators without opening the electric actuators with using the desk set.

Unit of local control in regime "local" make it possible:

- local control "Open – Stop! – Close",
- enter to the menu and change the settings in the range of access rights.

**The main functions and description**

**Type of duty:**

- "Open – Close" duty (standard performance), short – time duty S2; 10 min and S4 – 25 % from 6 to 90 cycles/h.
- Three – position control duty S4 – 25%, max. 1200 cycles/h for regulation

**Resources control**

Resources control are available in different modifications, from the operating "Open & Close", until the performance with intelligent control unit with registration of operating data and connection to the production bus "Profibus".

Concrete choice of resource control of electric actuators depends on operating regime industrial valves in concrete operating conditions. The electric actuator performance depends on the type of control.

**Electric actuators performance "STANDART"**

**Switches**

Electric actuators are equipped with a control board with a block of the torque, limit and additional switches position. Depending on the type of industrial valves, electric actuators must be switched off in the end position by torque or limit switches.

**Position transmitters**

In operation, "Open - Close" electric actuators can be equipped with a position transmitter depending on the required type of signal of feedback:

- resistance position transmitter 100 Ω or 200 Ω,
- electronic position transmitter with output current signal 0/4 – 20 mA, (DC) 2 – wire version or 3 – wire version (passive/active),
- current position transmitter with output current signal 4 – 20 mA (DC) (passive/active).

**Regulator**

In operation "Automatic control mode" as an option, the actuators can be fitted with electronic position regulator ZP2.RE5 that shifts the output spindle according to value of the control signal 4 – 20 mA. In order to prevent a log-time run-out of the actuator, which could impair properties of the regulating loop, the outfit can be completed with the electro-dynamics brake. The control unit is microprocessor-based programmed for regulating the actuator, ascertaining and repairing error conditions, and for simple setting of regulation parameters. The regulator circuits compare the input signal with the feedback signal from the position transmitter of the actuator output spindle. If there is a difference between the input and feedback signals the regulator closes one of the built-in contactors in the actuators so that the actuator spindle is reset to the position corresponding to magnitude of the input signal. When the feedback signal is equal to the input signal the actuator stops. The control parameters are set by functional push-buttons on the regulator or by PC connected to the regulator via a serial interface for the period of setting the parameters or during the communication module.

**Block of local control:**

Block of local control is used for controlling of electric actuators from its place of installation.

It includes two change-over switches:

- one with positions "Remote control – OFF – Local control" and the other with positions "Opens – Stop – Closes",
- at the customer's request, the electric actuators can be equipped with electric blinker providing electric pulses when the output spindle is moving. The power supply unit for the blinker is not built-in the actuator.

**Electric actuators performance "MATIC"**

Depending on the electronic control board, electric actuators can be supplied in two types of manufacturing:

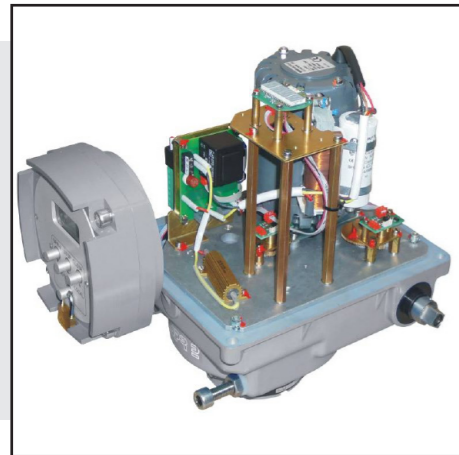
1. **Electric actuators with electronic control board DMS2** can be supplied in 2 versions:

- Performance with the electronic system DMS2 ED, takes the position of the output spindle of torque by using the non-contact magnetic detectors. Electronic system DMS2 ED allows controlling electric actuators by using voltage.



**Performance with the electronic system DMS2**

take the position of output spindle torque, by using non contact magnetic detectors and allows to operate in two – point 2P "Open – Close" and in three – point 3P automatic control and also with the possibility connecting to the production bus "Profibus".



**Performance with the electronic system DMS3**

electric actuators can be equipped with the new generation of intelligent control units "MATIC" which allows a modular solution and intellectualization of the control system.

**2. Electric actuators with electronic control board DMS3** can be supply in two versions:

- Performance with the electronic system DMS3 ED is used for operation in the 2 P "ON – OFF". The control by the supply voltage 220/230 V AC with connection of electric motor through relays or supply voltage 3x380/3x400 V AC with connection of electric motor through reversing starters or a non-contact relays. The output analog signal 4-20 mA, passive. One relay READY, 2 relays free for programing. Parameterization is done by the buttons and LED diodes of control unit or via program's on the PC. ESD safety function-response to failure.
- Performance with electronic system DMS 3 is used for operation 2 P "ON – OFF" or modulating operation. Electronic actuators are controlled by voltage 24 V DC (2P operation) or by analogue input signal 0/4 – 20 mA or 0/2 – 10V (3P operation) switching of the electromotor is performed by opto-components. Connection 3 – phase electric motor is made through non – contact relays or reversing starters.

**More details about the possible operation modes:**

- Mode 2P impulse control, control by 24V DC impulse without permanent voltage supply.
- Mode 2P control-two-position control. Control command signal by permanent voltage 24V DC, max. 10 mA. Designed for closing operation <Open – Close>.
- Mode 3P control – three – position control. Control by analogue input signal 0/4-20 mA (0/2 – 10V) with outpout 4-20 mA passive. Designed for continuous control operation. Limit position control (tight closing, full opening).
- 3P/2P/12 – switching 3P/2P/12 (impulse control).
- Operation timing mode.
- ESD safety function – response to failure.

**DMS3 system**

**Parameters setting of the DMS3 system:**

- Pushbuttons and LEDs on the control unit.
- Multifunction pushbuttons on the local control module.
- The EHL explorer software on a laptop or a PC.

This performance has possibility connecting to the production bus "Progibus".



**Main advantages:**

- Absolute position detection.
- Easy installation.
- Storing the set parameters.

**Climate groups**

Climate group	Marks	Temperatures ambient
Standard	Restricted( R )	From -25°C to +55°C
Cold	Moderate (M)	From -40°C to +40°C
Universal	General (G)	From -25°C to +55°C
Sea	World-wide (WW)	From -40°C to +40°C
Tropics	Warm temperatures (WT)	From -50°C to +40°C
Extreme cold	Extreme moderate (ExM)	From -60°C to +40°C

**Lifetime**

The service lifetime is minimum 40 years with respect of following conditions of operation:

• **in operation „Open & Close“**

Typ	Number of cycles
SO 2 / MO 3 / MON (52 030) / MON (52 031) / SO 2-Ex / MO EEx (52 120) / MO EEx (52 121) / SP 0 / SP 0.1 / SP 1 / UP 1 / SP 2 / SP 1-Ex / UP 1-Ex / SP 2-Ex / ST mini / ST 0.1 / ST 1 / ST 2 / UL 0-Ex / ST 1-Ex / UL 1-Ex	20 000
MON (52 032) / MON (52 033) / MON (52 034) / MO EEx (52 122) / MO EEx (52 123) / SP 3 / UP 2 / UP 2.4 / UP 2-Ex / UP 2.4-Ex / SP 2.3-Ex / SP 2.4-Ex / ST 2 / MT 3 / UL 1-Ex	15 000
MON (52 035) / MON (52 036) / MO EEx (52 124) / MO EEx (52 125) / UP 2.5 / UP 2.5-Ex / MTN 3 / MT 3 Ex	10 000

• **In operation „Regulation“**

Typ	Number of launches (min.)	Switching frequency per hour while waiting for the service life			
		2 000 h	4 000 h	8 000 h	15 000 h
SO 2 / MO 3 / MON (52 030) / MON (52 031) / SO 2-Ex / MO EEx (52 120) / MO EEx (52 121) / SP mini / SP 0 / SP 0.1 / SP 1 / SP 2 / SP 1-Ex / SP 2-Ex / ST mini / ST 0.1 / ST 1 / ST 2 / UL 0-Ex / ST 1-Ex / UL 1-Ex / UP 1 / UP 1-Ex / UP 2 / UP 2-Ex	5	1200 s/h	800 s/h	500 s/h	320 s/h
MON (52 032) / MON (52 033) / MON (52 034) / MO EEx (52 122) / MO EEx (52 123) / SP 2.3-Ex / SP 2.4-Ex / ST 2 / MT 3 / UL 2-Ex / UP 2.4 / UP 2.4-Ex	3.5	800 s/h	630 s/h	360 s/h	180 s/h
MON (52 035) / MON (52 036) / MO EEx (52 124) / MO EEx 52 125 / MTN 3 / MT 3-Ex / UP 2.5 / UP 2.5-Ex	3.0	630 s/h	500 s/h	320 s/h	160 s/h

**Noise**

Noise	Type of electric actuators
62 dB(A)	ISOMACT SP 0, ST 0, SP 0.1 / Unimact UP 0
75 dB(A)	ISOMACT ST 0.1, SP1, SP 2.4, ST 2, SO 2 / Unimact UP 1, UP 2, UP 2.4, UP 2.5
85 dB(A)	MODAC MO, MON, MONED



**Purpose and scope**

Electric part-turn actuators are designed for remote and local control of bodies rotary motion with angle of rotation to 360° (ball valves, valves, dampers) in operational mode “Open – Close” and regulating.



Electric part-turn actuator - SP x

- **ISOMACT**
- Switching off torque 4 - 500 Nm
- Operating time 15 - 160 s/90°
- Weight 1,4 - 22 kg



Electric part-turn actuator - UP x

- **UNIMACT**
- Switching off torque 110 - 1 700 Nm
- Operating time 20 - 160 s/90°
- Weight 45 - 52 kg

**Electric motors**

Electric actuators are equipped with synchronized electric motors with permanently connected capacitor, and three – phase electric motors with wide range of power output. Electric connection of electric actuators can be made via cable glands to terminal board or to connector.

**Supply voltage**

- 24V DC; 24V AC, 50Hz.
- 220V AC; 230V AC; 50Hz.
- 3x220/380 V AC, 50Hz.
- 3x230/400 V AC, 50 Hz.

**Further types of mechanical connections on request**

- Stand, output spindle, key.
- Stand + lever.
- Stand + lever + pull-rod TV 360°.

**Valve attachment**

Valve attachment is standard performed in conformity with ISO 5211.

Norm	SP 0	SP 0.1	SP 1	SP 2	SP 2.3	SP 2.4	UP 2.4	UP 2.5
ISO 5211	F03-F04	F05-F07	F05-F07	F05-F07	F07-F10	F10-F12	F10-F12	F14 (F10-F12)

ELECTRIC PART-TURN ACTUATORS		Type	SP 0	SP 0.1	SP 1	SP 2	SP 2.3	SP 2.4	UP 2.4	UP 2.5
Standard equipment	Basic parameters	T. n.	280	331	281	282	290	284	343	344
Protection enclosure IP 67 / 68	Starting torque	Nm	-	-	46-90	72-145	290	575	110 - 800	300-1900
Operating position: any position	Switching off torque	Nm	4-40	16-50	40-80	63-125	250	500	110 - 700	240-1700
Manual control available (hand wheel)	Operating time	s/90°	15-160	10-160	10-80	5-80	20-160	40-160	20-160	20-160
	Operating angle	°	0-270	60-360	0-360	0-360	0-360	0-360	0-360	0-360
	Additional equipment									
Connection to terminla boar	Supply voltage 220/230	V AC	•	•	•	•	•	•	•	-
	Supply voltage 3X380 / 3x400	V AC	-	□	□	□	□	□	□	•
	Built-in reverse contractors		-	-	-	□	□	□	□	□
	Supply voltage 24	V AC	□	□	□	□	□	□	□	-
	Supply voltage 24	V DC	□	□	□	□	□	□	□	-
	Others	V DC	110-120	110-120	110-120	110-120	110-120	120	120	120
	Thermoswitch in the winding of electric motor		-	•	•	•	•	•	•	•
	Weight	kg	1,4-2,4	3,2-5,2	6,5-9	12-15,2	15-16,7	21-22	29-33	45-52

STANDARD		Type	SP 0	SP 0.1	SP 1	SP 2	SP 2.3	SP 2.4	UP 2.4	UP 2.5
Standard equipment	Operating ON-OFF	T. n.	280	331	281	282	290	284	343	344
ON/OFF - Controlling by supply voltage 230 V AC	2 torque switches		-	-	•	•	•	•	•	•
	2 position switches		□	□	□	□	□	□	□	□
Local position indicator	Resistance transmitter	Ω	□	□	□	□	□	□	□	□
	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□	□	□	□
	Capacity current transmitter	4-20 mA	-	□	□	□	□	□	□	□
	Local control		-	-	□	□	□	□	□	□
	Conector conection		-	□	□	□	□	□	□	□
	Space heater		□	□	□	□	□	□	□	□
	Thermal switch		□	□	□	□	□	□	□	□

REMATIC		Type	SPR 0PA	SPR 0.1PA	SPR 1PA	SPR 2PA	SPR 2.3PA	SPR 2.4PA	UPR 2.4PA	UPR 2.5PA
Standard equipment	Control board DMS3	T. n.	230	238	231	232	233	234	383	384
Control by supply voltage or impulse 24 V DC	LED local indicator		-	□	•	•	•	•	•	•
Control by unified signal 0/4 – 20 mA	Modul of additional relays R3, R4, R5		-	□	□	□	□	□	□	□
Relay READY	Switching off in limit positions from the position		•	•	•	•	•	•	•	•
2 freely programmable relay RE1, RE2 (position, torque)	Adjustable switching off-torque from 50 to 100 %		-	-	-	•	•	•	•	•
Safe function ESD (failure reaction)	Torque blocking in limit positions		-	-	-	•	•	•	•	•
Timing mode/regime of operation	Torque blocking during the start		-	-	-	•	•	•	•	•
Output for failure messages	Electronic position transmitter - passive	4-20 mA	•	•	•	•	•	•	•	•
Output for failure messages	Auxiliary voltage 24 V DC, max 40 mA for supply of the control inputs	24 V DC	-	•	•	•	•	•	•	•
	Heating resistance		□	□	□	□	□	□	□	□
	Thermal switch		□	□	□	□	□	□	□	□
	Local controlling with LED display		-	□	□	□	□	□	□	□
Digital Bus Control	MODBUS, PROFIBUS & 24 V DC		□	□	□	□	□	□	□	□

• – standard equipment.  
□ – additional equipment.



**Purpose and scope**

Electric part-turn actuators with explosion-proof performance are designed for explosive atmosphere and can be used for remote and local control of bodies' rotary motion with angle of rotation to 360° (ball valves, valves, dampers) in operation mode "Open – Close" or regulating.



Electric part-turn actuators with explosion-proof performance - UP x-Ex

- **UNIMACT**
- Switching off torque 10 - 1 700 Nm
- Operating time 5 - 160 s/90°
- Weight 7 - 52 kg

Electric part-turn actuators with explosion-proof performance - UPR x PA-Ex



- **UNIMACT**
- Control board DMS 3
- Switching off torque 10 - 1 700 Nm
- Operating time 5 - 160 s/90°
- Weight 7 - 52 kg

**Electric motors**

Electric actuators are equipped with synchronized electric motors with permanently connected capacitor, and three – phase electric motors with wide range of power output. Electric connection of the electric actuators can be made via cable glands to terminal board or to connector.

**Supply voltage**

- 230V AC; 24V AC, 50Hz, 24V DC.
- 3x400 V AC, 50 Hz.

**Further types of mechanical connections on request**

- Stand, output spindle, key.
- Stand + lever.
- Stand + lever + pull-rod TV 360°.

**Explosion protection**

In case of installing electric actuators in explosion areas, the electric actuators meet the following standards of protection:

Type of electric actuators	Explosive protection	Description
UP 0-Ex	Ex d IIB+H2 T6	Design and model testing to meet standards: EN 60079-0, EN 60079-1, EN 60079-7.
SP 1-Ex	Ex de IIB T6	
UP 1-Ex	Ex d IIC T5	
SP 2-Ex	Ex de IIB T5	
SP 2.3-Ex	Ex de IIB T5	
UP 2-Ex	Ex d IIC T5	
SP 2.4-Ex	Ex de IIB T5	
UP 2.4-Ex	Ex d IIC T5	
UP 2.5-Ex	Ex d IIC T5	

**Valve attachment**

Valve attachment is standard performed in conformity with ISO 5211.

Norm	UP 0-Ex	SP 1-Ex	UP 1-Ex	SP 2-Ex	SP 2.3-Ex	UP 2-Ex	SP 2.4-Ex	UP 2.4-Ex	UP 2.5-Ex
ISO 5211	F04-F05	F05-F07	F05-F07	F05-F07	F07-F10	F07-F10	F10-F12	F10-F12	F12-F14

ELECTRIC PART-TURN ACTUATORS WITH EXPLOSION-PROOF PERFORMANCE		Type	UP 0-Ex	SP 1-Ex	UP 1-Ex	SP 2-Ex	SP 2.3-Ex	UP 2-Ex	SP 2.4-Ex	UP 2.4-Ex	UP 2.5-Ex
Standard equipment	Basic parameters	T. n.	335	291	336	292	293	337	294	338	339
Protection enclosure IP 67 / 68	Starting torque	Nm	12-63	46-90	22-170	72-145	290	75-300	575	180-800	500-1900
Operating position: any position	Switching off torque	Nm	10-54	40-80	25-45	63-125	250	102-255	500	110-680	300-1700
Manual control available (hand wheel)	Operating time	s/90°	5-80	10-80	5-80	5-80	20-160	5-80	40-160	20-160	20-160
	Operating angle	°	0-360	0-360	0-360	0-360	0-360	0-360	0-360	0-360	0-360
	Additional equipment										
Connection to terminal board	Supply voltage 220/230	V AC	•	•	•	•	•	•	•	•	•
	Supply voltage 3X380 / 3x400	V AC	-	□	□	□	□	□	□	□	□
	Built-in reverse contractors		-	-	-	□	□	□	□	□	□
	Supply voltage 24	V AC	□	□	-	□	□	-	□	□	□
	Supply voltage 24	V DC	-	□	-	□	□	-	□	□	□
	Others	V AC	-	-	-	-	-	-	-	□	□
	Thermosvitche in the winding of electric motor		•	•	•	•	•	•	•	•	•
	Explosion protection		Ex d IIB+H2 T6	Ex de IIB T6	Ex d IIC T5	Ex de IIB T5	Ex de IIB T5	Ex d IIC T5	Ex de IIB T5	Ex d IIC T5	Ex d IIC T5
	Weight	kg	5-6	6,5-9	20,5-21,5	12-15,2	15-16,7	28-29	21-22,7	29-33	48-52

STANDARD		Type	UP 0-Ex	SP 1-Ex	UP 1-Ex	SP 2-Ex	SP 2.3-Ex	UP 2-Ex	SP 2.4-Ex	UP 2.4-Ex	UP 2.5-Ex
Standard equipment	Operating ON-OFF	T. n.	335	291	336	292	293	337	294	338	339
ON/OFF - Controlling by supply voltage 230 V AC	2 Torque switches		•	•	•	•	•	•	•	•	•
2 position switches	2 additional position switches		□	□	□	□	□	□	□	□	□
Local position indicator	Resistance transmitter	Ω	□	□	□	□	□	□	□	□	□
	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□	□	□	□	□
	Capacity current transmitter	4-20 mA	□	□	□	□	□	□	□	□	□
	Space heater		□	□	□	□	□	□	□	□	□
	Thermal switch		□	□	□	□	□	□	□	□	□

REMATIC		Type	-	-	UPR 1PA-Ex	-	-	UPR 2PA-Ex	-	UPR 2.4PA-Ex	UPR 2.5PA-Ex
Standard equipment	Control board DMS3	T. n.	-	-	346	-	-	347	-	348	349
Control by supply voltage or impulse 24 V DC	LED position indicator		-	-	•	-	-	•	-	•	•
Control by unified signal 0/4 – 20 mA	Modul of additional relays R3, R4, R5		-	-	□	-	-	□	-	□	□
Relay READY	Switching of f in limit positions from the position		-	-	•	-	-	•	-	•	•
2 freely programmable relays RE1, RE2, (position,torque...)	Adjustable switching off-torque from 50 to 100 %		-	-	•	-	-	•	-	•	•
Safe function ESD (failure reaction)	Torque blocking in limit positions		-	-	•	-	-	•	-	•	•
Timing mode/ regime of operation	Torque blocking during the start		-	-	•	-	-	•	-	•	•
Output for failure messages	Electronic position transmitter - passive	4-20 mA	-	-	•	-	-	•	-	•	•
	Auxiliary voltage output 24 V DC, max 40 mA for supply of the control inputs	24 V DC	-	-	•	-	-	•	-	•	•
	Space heater operated by control unit		-	-	□	-	-	□	-	□	□
	Thermal switch		-	-	□	-	-	□	-	□	□
	Local controlling with LED display		-	-	□	-	-	□	-	□	□
	Built-in contractless relay 3-phase motor		-	-	□	-	-	□	-	□	□
Digital Bus Control	MODBUS, PROFIBUS & 24 V DC		-	-	□	-	-	□	-	□	□

• – standard equipment.  
□ – additional equipment.



**Purpose and scope**

Electric multi-turn actuators are designed for remote and local control of bodies rotary motion (gate valves, valves, ball valves and regulation valves) in operation "Open – Close" and for regulating.

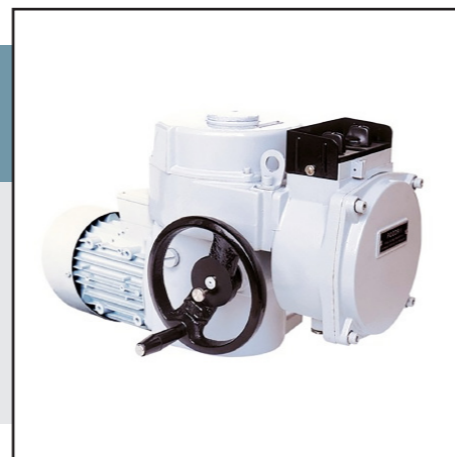


**Electric multi-turn actuators - 50 x**

- **ISOMACT**
- Switching off torque 7,5 - 100 Nm
- Operating time 10 - 40 1/min
- Weight 12 - 18,5 kg

**Electric multi-turn actuators - MON**

- **MODACT**
- Switching off torque 20 - 4 000 Nm
- Operating time 7 - 145 1/min
- Weight 27 - 315 kg



**Electric motor**

Electric actuators are equipped with synchronized electric motors with permanently connected capacitor, and three – phase electric motors with wide range of power output. Electric connection of the electric actuators can be made via cable glands to terminal board or to connector.

**Supply voltage**

- 24V DC; 24V AC, 50Hz.
- 220/230V AC, 50Hz.
- 3x380/3x 400 V AC, 50 Hz.

**Valve attachment**

Valve attachment is standard performed by in conformity with ISO 5210; or DIN 3338; and under the order in conformity with russia standard GOST R 55510.

Norm	SO 2	MO 3	MON (52 030)	MON (52 032)	MON (52 033)	MON (52 034)	MON (52 035)	MON (52 036)
ISO 5210	F10-F07	F10	F10	F14	F16	F16	F25	F30
GOST R 55510	M, A	M, A, Б	M, A, Б	A, Б ,B	Б, B	Б, B	Б, Г	Г, Д

ELECTRIC MULTI-TURN ACTUATORS		Type	SO 2	MO 3	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)
Standard equipment	Basic Parameters	T. n.	062	52 000	52 030	52 032	52 033	52 034	52 035	52 036
Protection enclosure IP 67	Switching off torque	Nm	7,5-100	20-200	20-200	160-400	250-500	500-1000	630-2000	2 000-4000
Operating position: any position	Starting torque	Nm	10-130	26-260	60-320	310-630	650-765	1210-1530	1200-2600	2600-5600
Manual control available (hand wheel)	Operating speed	1/min	10-40	10-95	7-80	7-145	16-100	16-63	45-100	20-145
	Operating stroke		3,125-320	1-685	2-250	2-250	2-240	2-240	2-240	1-100
	Additional equipment									
Connection to terminal board	Supply voltage 220/230	V AC	•	□	□	□	□	□	□	□
	Supply voltage 3X380 / 3x400	V AC	□	•	•	•	•	•	•	•
Thermoswitch in the winding of electric motor	Supply voltage 24	V AC/V DC	□	-	-	-	-	-	-	-
	Others	V AC	110-120	440/60	440/60	440/60	440/60	440/60	440/60	440/60
	Built-in reverse contractors		□	□	□	□	□	□	□	□
	Protection enclosure IP 67		•	□	□	□	□	□	□	□
	Weight	kg	12-18,5	26,5-35	27-29	45-58	90-97	97-109	206-217	304-315

STANDARD		Type	SO 2	MO 3	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)
Standard equipment	Operating ON/OFF	T. n.	062	52 000	52 030	52 032	52 033	52 034	52 035	52 036
ON/OFF - Controlling by supply voltage	Resistance transmitter 1x100Ω or 2x100Ω	Ω	□	□	□	□	□	□	□	□
2 position switches	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□	□	□	□
2 torque switches	Current position transmitter	4-20 mA	□	□	□	□	□	□	□	□
2 additional position switches	Local electric control		□	□	□	□	□	□	□	□
Space heater	Connector conection		□	□	□	□	□	□	□	□
Thermal switch	Local position indicator		□	□	□	□	□	□	□	□
Regulation mode	Regulator ZP2.RE5		□	□	□	□	□	□	□	□

REOMATIC		Type	SOR 2PA	MOR 3PA	MONED	MONED	MONED	MONED	MONED	MONED
Standard equipment	Control board DMS2/DMS3 ED	T. n.	067	094	52 030	52 032	52 033	52 034	52 035	52 036
ON/OFF - Controlling by supply voltage 230 V AC	Switching off in limit positions from the position or thrust		•	•	•	•	•	•	•	•
Torque (thrust) blocking in limit positions	Adjustable switching off-torque from 50 to 100 %		•	•	•	•	•	•	•	•
Torque (thrust) blocking during the start	Modul of additional relays R3, R4, R5		□	□	□	□	□	□	□	□
Space heater operated by control unit	Local control		□	□	□	□	□	□	□	□
Relay READY	Electronic position transmitter - passive	4-20 A	•	•	•	•	•	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...)	LED position indicator		•	•	•	•	•	•	•	•
Output for failure messages			•	•	•	•	•	•	•	•

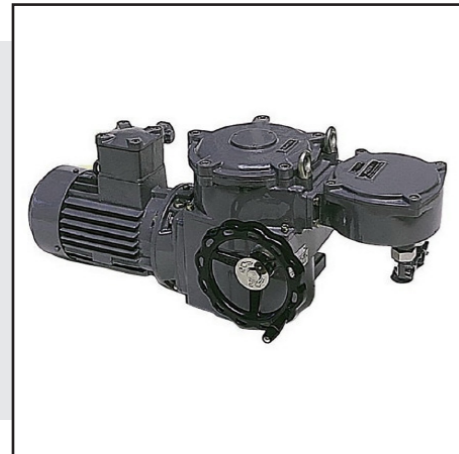
STANDARD		Type	SO 2	MO 3	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)	MON (ED)
Standard equipment	Control board DMS2 / DMS3									
Control by supply voltage or impulse	24 V DC LED position indicator		•	•	•	•	•	•	•	•
Control by unified signal 0/4 - 20 mA or 0/2 - 10 V	0/4 - 20 mA Modul of additional relays R3, R4, R5		□	□	□	□	□	□	□	□
Relay READY	Switching off in limit positions from the position or thrust		•	•	•	•	•	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...)	Adjustable switching off-torque from 50 to 100 %		•	•	•	•	•	•	•	•
Safety function ESD (failure reaction)	Torque blocking in limit positions		•	•	•	•	•	•	•	•
Timing mode/regime of operation	Torque blocking during the start		•	•	•	•	•	•	•	•
Output for failure messages	Electronic position transmitter - passive	4-20 mA	•	•	•	•	•	•	•	•
Built-in reverse contractor for 3-phase	Auxiliary voltage output 24 V DC, max. 100 mA for supply of the control inputs	24 V DC	• (40 mA)	•	-	-	-	-	-	-
Space heater operated by control unit	Local control with LED display		□	□	□	□	□	□	□	□
Thermal switch	Control and correction sequential phases		-	□	□	□	□	□	□	□
	Built-in contactless relay 3-phase motor		□	□	□	□	□	□	□	□
Digital Bus Control	MODBUS, PROFIBUS & 24 V DC		□	□	□	□	□	□	□	□

• – standard equipment.  
 □ – additional equipment.  
 In complete with gear box can be achieved increasing torque up to 19 600 Nm.



**Purpose and scope**

Electric multi-turn actuators with explosion-proof performance are designed and can be used for remote and local control of bodies' rotary motion (gate valves, valves, ball valves and regulation valves) in operation "Open – Close" and regulating.



Electric multi-turn actuators with explosion-proof performance - MO EEx

- **MODACT**
- Switching off torque 320 - 1 100 Nm
- Operating time 16 - 100 1/min
- Weight 108 - 243 kg

Electric multi-turn actuators with explosion-proof performance - MOED EEx

- **MODACT**
- Control board DMS 2
- Switching off torque 320 - 1 100 Nm
- Operating time 16 - 100 1/min
- Weight 108 - 243 kg



**Electric motors**

Electric actuators are equipped with three phase electric motors with wide range of power output with Ex performance. Electric connection of the electric actuators can be made via cable glands to terminal board or to connector.

**Supply voltage**

- 3x220/380V AC, 50Hz.
- 3x230/400V AC, 50 Hz.

**Explosion protection**

In case of installing electric actuators in explosive areas, the electric actuators meet the following standards of protection:

Type of electric actuators	Explosion protection	Description
SO 2-Ex	Ex de IIB T5	Design and model testing to meet standards: EN 60079-0, EN 60079-1, EN 600079-7.
UM 1-Ex / UM 2-Ex / MO 3-Ex / MO 4-Ex / MO 5-Ex	Ex d IIC T5	
MON EEx (52 120-125)	I12G EEx de IIB T4	
MOED EEx (52 120-125)	I12G EEx de IIC T4	

**Valve attachment**

Valve attachment is standard performed in conformity with ISO 5210; or DIN 3338; and under the order according to russia standard GOST R 55510.

Norm	UM 1-Ex	UM 2-Ex	MO 3-Ex	MO 4-Ex	MO 5-Ex	MO EEx (52 124)	MO EEx (52 125)
ISO 5210	F07-F10	F07-F10	F07-F10	F10	F10	F14	F16
GOST R 55510	M / A	M / A	A / Б	Б	Б / B	Б	Б / Г



ELECTRIC LINEAR ACTUATORS WITH EXPLOSIVE-PROOF PERFORMANCE		Type	UM 1-Ex	UM 2-Ex	MO 3-Ex	MO 4-Ex	MO 5-Ex	MO EEx	MO EEx
Standard equipment	Basic parameters	T. n.	136	137	100	165	167	52 124	52 125
Protection enclosure IP 66 / 68	Switching off torque	Nm	4-64	18-100	26-150	95-500	500-1000	320-630	630-1100
Operating position: any position	Starting torque	Nm	6-85	24-130	34-195	125-650	650-1300	750-1000	1200-1400
Manual control available (hand wheel)	Operating speed	1/min	10-80	10-40	16-95	16-180	15-100	16-63	32-100
	Operating stroke		3-160	3-160	1,75-685	1,75-685	1,25-500	2-240	2-240
	Additional equipment								
Connection to terminal board	Supply voltage 220/230	V AC	•	•	-	-	-	-	-
	Supply voltage 3X380 / 3x400	V AC	□	□	•	•	•	•	•
Thermosvitche in the winding of electric motor	Supply voltage 24	V AC/V DC	□	□	-	-	-	-	-
	Others	V AC	□	□	□	□	□	□	□
	Built-in reverse contractors		□	□	□	□	□	□	□
	Protection enclosure IP 66 / 68		•	•	•	•	□	□	□
	Explosion protection		Ex d IIC T5	Ex d IIC T5	Ex d IIC T5	Ex d IIC T5	Ex d IIC T5	Ex d IIB T4	Ex d IIB T4
	Weight	kg	14-15	20-24	45-55	65-70	93-103	108-130	239-243

STANDARD		Type	UM 1-Ex	UM 2-Ex	MO 3-Ex	MO 4-Ex	MO 5-Ex	MO EEx	MO EEx
Standard equipment	Operating ON-OFF	T. n.	136	137	100	165	167	52 124	52 125
ON/OFF - Controlling by supply voltage	Resistance transmitter 1x100Ω or 2x100Ω	Ω	□	□	□	□	□	□	□
2 position switches	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□	□	□
2 torque switches	Current position transmitter	4-20 mA	□	□	□	□	□	□	□
2 additional position switches	Local electric control		□	□	□	□	□	□	□
Space heater	Connector connection		□	□	□	□	□	□	□
Thermal switch	Local position indicator		□	□	□	□	□	□	□
Regulation mode	Regulator ZP2.RE5		□	□	□	□	□	□	□

REMIC		Type	UMR 1PA-Ex	UMR 2PA-Ex	MOR 3PA-Ex	MOR 4PA-Ex	MOR 5PA-Ex	MOED EEx	MOED EEx
Standard equipment	Control board DMS2/DMS3 ED	T. n.	146	147	109	110	168	124	125
ON-OFF - Controlling by supply voltage 230 V AC	Close position and torque switches		•	•	•	•	•	•	•
Torque (thrust) blocking in limit positions	Adjustable switching off-torque from 50 to 100 %		•	•	•	•	•	•	•
Torque (thrust) blocking during the start	Module of additional relays R3, R4, R5		□	□	□	□	□	□	□
Space heater operated by control unit	Local control		□	□	□	□	□	□	□
Relay READY	Electronic position transmitter - passive	4-20 mA	•	•	•	•	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...)	LED position indicator		•	•	•	•	•	•	•
Output for failure messages									

STANDARD		Type	UMR 1PA-Ex	UMR 2PA-Ex	MOR 3PA-Ex	MOR 4PA-Ex	MOR 5PA-Ex	MOED EEx	MOED EEx
Standard equipment	Control board DMS2 / DMS3								
Control by supply voltage or impulse	24 B DC	LED position indicator	•	•	•	•	•	•	•
Control by unified signal 0/4 - 20 mA or 0/2 - 10 V	0/4 - 20 mA	Modul of additional relays R3, R4, R5	□	□	□	□	□	□	□
Relay READY		Switching off in limit positions from the position or thrust	•	•	•	•	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...)		Adjustable switching off-torque from 50 to 100 %	•	•	•	•	•	•	•
Safety function ESD (failure, reaction)		Torque blocking in limit positions	•	•	•	•	•	•	•
Timing mode/ regime of operation		Torque blocking during the start	•	•	•	•	•	•	•
Output for failure messages		Electronic position transmitter - passive	4-20 mA	•	•	•	•	•	•
Built-in reverse contractor for 3-phase		Auxiliary voltage output 24 V DC, max. 100 mA for supply of the control inputs	24 V DC	• (40 mA)	• (40 mA)	•	•	-	-
Space heater operated by control unit		Local control with LED display	□	□	□	□	□	□	□
Thermal switcher		Control and correction sequential phases	-	-	□	□	□	□	□
		Built-in contactless relay 3-phase motor	□	□	□	□	□	□	□
Digital Bus Control		MODBUS, PROFIBUS & 24 V DC	□	□	□	□	□	□	□

• – standard equipment.  
□ – additional equipment.  
In complete with gear box can be achieved increasing torque up to 13 000 Nm.



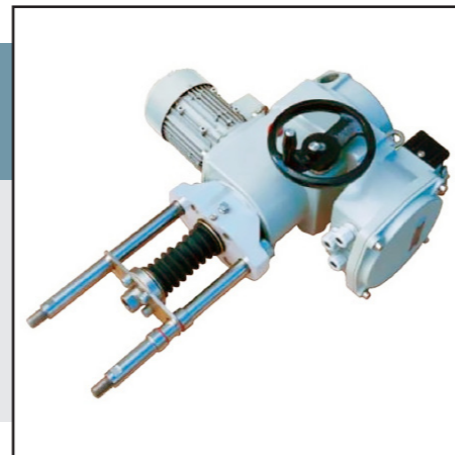
**Purpose and scope**

Electric linear actuators are designed for remote and local control for bodies of valves (gate valves, valves, ball valves and regulation valves) by reversing linear movement in operation mode "Open – Close" or regulating.



Electric linear actuators - STR x PA

- **ISOMACT**
- Control board DMS 3
- Switching off thrust 220 - 21 500 N
- Operating time 5 - 120 mm/min
- Weight 3,3 - 21,5 kg



Electric linear actuators - MTN

- **MODACT**
- Switching off thrust 36 000 - 82 000 N
- Operating time 27 - 125 mm/min
- Weight 60 - 81 kg

**Electric motors**

Electric actuators are equipped with synchronized electric motors with permanently connected capacitor, and three – phase electric motors with wide range of power output. Electric connection of the electric actuators can be made via cable glands to terminal board or to connector.

**Supply voltage**

- 24V DC; 24V AC, 50Hz.
- 230V AC; 50Hz.
- 3x220/380 V AC, 50Hz.
- 3x230/400 V AC, 50 Hz.

**Valve attachment**

Valve attachment is standard performance in conformity with DIN 3358; under order can be made columnar with flange or columnar.

Norm	ST MINI	ST 0	ST 0.1	ST 1	ST 2	MT 3	MTN
Pillars							Under order
Pillars and flange							Under order
Special 4-pillars							Under order
Flanged under DIN 3358	-	F05	F05	F05	F07-F10	-	-

ELECTRIC LINEAR ACTUATORS		Type	ST MINI	ST 0	ST 0.1	ST 1	ST 2	MT 3	MTN
Standard equipment	Basic parameters	T. n.	472	490	498	491	492	52 400	52 443
Protection enclosure IP 67	Starting thrust	kN	0,25-1,1	0,36-4,5	1,9-7,2	2,3-10	12,0-25	4,8-36	36-82
Operating position: any position	Switching off thrust	kN	0,22-1	0,32-4	1,6-6,3	2,5-8,7	10,5-21,5	3,8-28,8	36-63
Manual control available (hand wheel)	Operating speed	mm/min	5-40	4-40	10-83	8-80	10-120	32-180	27-125
	Max. operating stroke	mm	25	40	50	8-80	8-100	100	120
	Additional equipment								
Supply voltage 220/230 V AC	Supply voltage 3X380 / 3x400	V AC	-	-	□	□	□	•	•
Connection to terminal board	Built-in reverse contractors		-	-	-	-	□	□	□
	Supply voltage 24	V AC	□	□	□	□	□	-	-
	Supply voltage 24	V DC	-	□	□	□	□	-	-
	Others	V AC	-	110-120	110-120	110-120	110-120	-	-
	Thermosvitche in the winding of electric motor		-	-	•	•	•	□	□
	Weight	kg	3,3-3,7	2,5-4,5	5,4-8	8,5-10,9	17-21,5	30-35	60-81

STANDARD		Type	ST MINI	ST 0	ST 0.1	ST 1	ST 2	MT 3	MTN
Standard equipment	Operating ON-OFF	T. n.	472	490	498	491	492	52 400	52 443
ON/OFF - Controlling by supply voltage 230 V AC	2 switches trust		•	•	•	•	•	•	•
2 position switches	2 additional switches position		□	□	□	□	□	•	•
Local position indicator	Resistance transmitter	Ω	□	□	□	□	□	□	-
	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□	□	□
	Current position transmitter	4-20 mA	-	-	□	□	□	□	□
	Local control		-	-	-	□	□	□	□
	Conector conection		-	-	□	□	□	□	□
	Space heater		-	□	□	□	□	□	□
	Thermal switch		-	□	□	□	□	□	□

REOMATIC		Type	-	STR 0PA	STR 0.1PA	STR 1PA	STR 2PA	MTR PA	MTNED
Standard equipment	Control board DMS3	T. n.	-	430	438	431	432	407	52 443
Control supply voltage or pulse ON/OFF 24 V DC	LEDI position indicator		-	-	□	•	•	•	•
Control by unified signal 0/4 - 20 mA or 0/2 - 10 V	Modul of additional relays R3, R4, R5		-	-	□	□	□	□	•
Relay READY	Switching off in limit positions from the position or thrust		-	•	•	•	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...)	Adjustable switching off-torque from 50 to 100 %		-	-	-	•	•	•	•
Safe function ESD failure reaction	Torque blocking in limit positions		-	•	•	•	•	•	•
Timing mode/regime of operation	Torque blocking during the start		-	•	•	•	•	•	•
Output for failure messages	Electronic position transmitter - passive	4-20 mA	-	•	•	•	•	•	•
Built-in reverse contractor for 3-phase	Auxiliary voltage output 24 V DC, max. 40 mA for supply of the control inputs	24 V DC	-	-	•	•	•	•	-
	Space heater operated by control unit		-	□	□	□	□	•	•
	Thermal switcher		-	□	□	□	□	•	•
	Local controlling with LED display		-	-	□	□	□	□	□
	Control and correction sequential phases		-	-	-	-	-	•	•
Digital Bus Control	MODBUS, PROFIBUS & 24 V DC		-	□	□	□	□	□	□

• – standard equipment.  
□ – additional equipment.



**Purpose and scope**

Electric linear actuators with explosion-proof performance are designed for explosive atmosphere and can be used for remote and local control of valves bodies by reversing linear moment in operation "Open – Close" and regulating

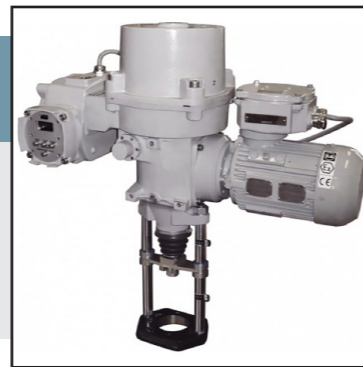


**Electric linear actuators with explosion-proof performance - ULR x PA-Ex**

- **UNMIMACT**
- Control board DMS 3
- Switching off thrust 1 200-17 200 N
- Operating time 10 - 120 mm/min
- Weight 6,5 - 28 kg

**Electric linear actuators with explosion-proof performance - MTR x PA-Ex**

- **MODACT**
- Control board DMS 3
- Switching off thrust 3 800-28 000 N
- Operating time 32 - 180 mm/min
- Weight 52,5 - 55 kg



**Electric motors**

Electric actuators are equipped with synchronized electric motors with permanently connected capacitor, and three – phase electric motors with wide range of power output.

**Supply voltage**

- 24V DC; 24V AC, 50Hz.
- 230V AC; 50Hz.
- 3x220/380 V AC, 50Hz.
- 3x230/400 V AC, 50 Hz.

**Explosion protection**

In case of installing electric actuators in explosive areas, the electric actuators meet the following standards of protection:

Type of electric actuators	Explosion protection	Description
UL 0-Ex	Ex d IIB+H2 T6	Design and model testing to meet standards: EN 60079-0, EN 60079-1, EN 60079-7.
ST 1-Ex	Ex de IIB T6	
UL 1-Ex	Ex d IIC T5	
UL 2-Ex	Ex d IIC T5	
MT 3-Ex	Ex de IIC T5	

**Valve attachment**

Valve attachment is standard performance in conformity with DIN 3358; under order can be made columnar with flange or columnar.

Norm	UL 0-Ex	ST 1-Ex	UL 1-Ex	UL 2-Ex	MT 3-Ex
Pillars			Under order		
Pillars and flange			Under order		
Special 4-pillars			Under order		
Flange under DIN 3358	F05	F05	F05	F07-F10	-

ELECTRIC LINEAR ACTUATORS WITH EXPLOSION-PROOF PERFORMANCE		Type	UL 0-Ex	ST 1-Ex	UL1-Ex	UL 2-Ex	MT 3-Ex
Standard equipment	Basic parameters	T. n.	535	411	536	537	500
Protection enclosure IP 67 / 68	Starting thrust	kN	1,4-6,9	2,3-10	4,8-12,5	7,0-25	4,8-36
Operating position: any position	Switching off thrust	kN	1,2-6	2,5-8,7	6,3-10	8,0-17,2	3,8-28,8
Manual control available (hand wheel)	Operating speed	mm/min	10-40	8-80	10-80	14-120	32-180
	Max. operating stroke	mm	4-40	8-80	4-80	4-100	100
	<b>Additional equipment</b>						
Supply voltage 220/230 V AC	Supply voltage 3X380 / 3x400	V AC	-	□	□	□	•
Connection to terminal board	Built-in reverse contractors		-	-	-	□	□
	Supply voltage 24	V AC	□	□	□	□	-
	Supply voltage 24	V DC	-	□	-	-	-
	Others	V AC	120/60	-	120/60	120/60	-
	Thermosvitche in the winding of electric motor		-	•	•	•	□
	Explosion protection		Ex d IIB+H2 T6	Ex de IIB T6	Ex d IIC T5	Ex d IIC T5	Ex de IIB T5
	Weight	kg	6,5-9	8,5-10,9	16,0-20	26,0-28	52,5-55

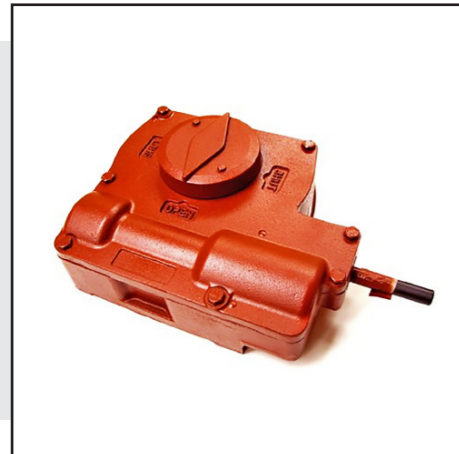
STANDARD		Type	UL 0-Ex	ST 1-Ex	UL1-Ex	UL 2-Ex	MT 3-Ex
Standard equipment	Operating regime ON-OFF	T. n.	535	411	536	537	508
ON/OFF - Controlling by supply voltage 230 V AC	2 switches trust		•	•	•	•	•
2 position switches	2 additional swiches position		□	□	□	□	•
Local position indicator	Resistance transmitter	Ω	□	□	□	□	□
	Electronic position transmitter - passive	4-20 mA	□	□	□	□	□
	Current position transmitter	4-20 mA	□	□	□	□	□
	Local control		-	-	□	□	-
	Space heater		□	□	□	□	□
	Thermal switch		□	□	□	□	□

REMATIC		Type	-	-	ULR 1PA-Ex	ULR 2PA-Ex	MTR 3PA-Ex
Standard equipment	Control board DMS3	T. n.	-	-	546	547	509
Control supply voltage or pulse ON-OFF 24 V DC	LED position indicator		-	-	•	•	-
Control by unified signal 0/4 – 20 mA	Modul of additional relays R3, R4, R5		-	-	□	□	□
Relay READY	Switching off in limit positions from the position or thrust		-	-	•	•	•
2 freely programmable relays RE1, RE2 (position, torque...torque...torque...)	Adjustable switching off-torque from 50 to 100 %		-	-	•	•	•
Safe function ESD (failure reaction)	Torque blocking in limit positions		-	-	•	•	•
Timing mode/regime of operation	Torque blocking during the start		-	-	•	•	•
Output for failure messages	Electronic position transmitter - passive	4-20 mA	-	-	•	•	•
Built-in reverse contractor for 3-phase	Auxiliary voltage output 24 V DC, max. 40 mA for supply of the control inputs	24 V DC	-	-	•	•	• (100 mA)
	Space heater operated by control unit		-	-	□	□	•
	Thermal switch		-	-	□	□	•
	Local controlling with LED display		-	-	□	□	□
	Control and correction sequential phases		-	-	-	-	•
Digital Bus Control	MODBUS, PROFIBUS & 24 V DC		-	-	□	□	□

• – standard equipment.  
□ – additional equipment.

**Purpose and scope**

The cast iron construction and rugged design of the M series range of manual valve actuators has been engineered to meet the arduous requirements demanded of industrial environments. Through corrosion resistant treatment of bare metal surfaces, a paint finish and the use of lip seals with multiple sealing surfaces, the M range is sealed to IP67 and achieves exceptional durability. All models use high performance axial needle roller bearings, which combined with a one piece input wormshaft, maximises the available mechanical advantage and overall unit efficiency.



**Valve actuators series M**

- Max. output torque 205 - 203 400 Nm
- Max. input torque 22,7 - 276,7 Hm
- Valve mounting flange F05 - F48
- Weight 2,6 - 796 kg

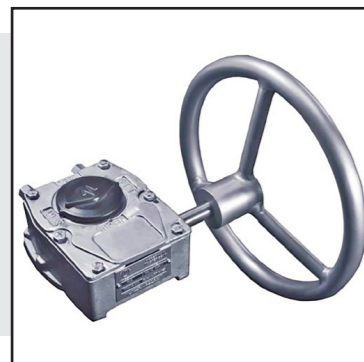
General specification		
Sealed to IP 67	90° + 5° (adjustable) travel	13 frame sizes
Maintenance Free	SLO39 from -40°C to +80°C SLO20 from -60°C to +60°C SLO21 from +20°C to +200 °C SL120 from -60°C to +60°C	Capability to withstand overload to twice maximum output torque rating
Stainless steel execution		Unrivalled versatility for direct fixing to valve

**The subsea worm actuators M\*SS**

Designed to be cost effective designed for 25year + maintenance free life double sealing all sealing faces / double impregnated castings for high integrity Load tested to 3 times max load for 3000 cycles high mechanical advantage hyperbaric tested to 4 000 m actuated for 300 cycles over a 2 hour period at 4 000 m high Integrity coatings for resistance & friction free running factory oil filled and sealed for life Automatic compensation & self adjust for any pressure or thermal.



**The Stainless Steel Gearbox range M\*ST**



Manual gearboxes series MST are produced on the base of long time gearboxes M series production. General designed of M" and MST gearboxes is the same. Gearboxes are the same only material for housing and cover are different. Customer has possibility to specify material of quadrant, input shaft and hand wheel. Gearboxes are marked SLO48. All dimensional and technical parameters are the same for gearboxes type M and MST. Dimensional drawings are the same for both product lines.

**The main technical data**

Gearbox type	Max. output torque		Max. input torque		Ratio	Turns to close angle 90°	Mechanical advantage +10%	Valve mounting flange DIN/ISO 5211	Max. bore in quadrant mm	Max. valve shaft height mm	Recommended handwheel	Weight kg
	5 000 cycels	2 500 cycels	5 000 cycels	2 500 cycels								
	Nm		Nm									
M07	250	300	22,7	27,2	40:1	10	11	F05-F07	25	51	R6-R8	2,6
M10	500	600	45,5	54,5	40:1	10	11	F07-F10	32	57	R-R10-R12	4,2
M12	1 000	1 200	88,5	106,2	42:1	10,5	11,3	F10-F12-F14	45	72	R14-R18	8,2
M14	1 800	2 200	111,1	135,8	60:1	15	16,2	F12-F14-F16	65	81	R14-R18-R24	14,5
M15	3 400	4 100	165,9	200	68:1	17	20,5	F14-F16-F20	86	92	R18-R24	27,2
M16	4 500	5 400	169,8	203,8	88:1	22	26,5	F16-F20-F25	92	113	R18-R24-R30	41,2
M20	6 600	8 000	115,8	140,4	183:1	45,75	57	F16-F20-F25	92	116	R24-R30	44,5
	2 500 cycels	1 000 cycels	2 500 cycels	1 000 cycels								
M30	10 800	13 000	109,1	131,3	309,1:1	77,3	99	F20-F25-F30	124	144	R24-R30	84
M40	20 000	24 000	105,9	127,2	615:1	153,75	188,7	F25-F30-F35-F40	165	203	R24-R30	181,5
M50	41 670	50 000	108,3	130	1 219,8:1	304,95	384,6	F25-F30-F35-F40-F48	180	250	R24-R30	294,3
M55	63 000	68 000	287,7	310,5	1 219,8:1	304,95	346	F25-F30-F35-F40-F48	180	250	R24-R30-R36	294,3
M60	112 584	135 035	102,2	122,5	3 407,8:1	851,96	1 102,2	F40-F48	241	343	R24-R30-R36	796
M70	169 500	203 400	230,6	276,7	3 407,8:1	851,96	735,1	F40-F48	241	343	R24-R30-R36	796

Gearbox type	5 000 cycels	Max. output torque Nm	Max. input torque Nm	Ratio	Turns to close angle 90°	Mechanical advantage +10%	Valve mounting flange DIN/ISO 5211	Max. bore in quadrant mm	Max. valve shaft height mm	Recommended handwheel	Weight kg
										-	24,5
M16SS	class2 ROV	5 400	190	42:1	22	28,4	F16-F20-F25	92	113	R14-R18-R24	61
				60:1						-	68,5
M20SS	class2 ROV	8 000	140	68:1	45,8	57	F16-F20-F25	92	116	R18-R24	83,5
				88:1						-	92
M30SS	class2 ROV	13 000	131	183:1	77,3	99	F20-F25-F30-F35	124	144	R24-R30	130
				309,1:1						-	138
M40SS	class2 ROV	24 000	127	615:1	153,8	153,8	F25-F30-F35-F40-F48	165	203	R24-R30	254
				1 219,8:1						-	262

Gearbox type	Max. output torque		Max. input torque		Ratio	Turns to close angle 90°	Mechanical advantage +10%	Valve mounting flange DIN/ISO 5211	Max. bore in quadrant mm	Max. valve shaft height mm	Recommended handwheel	Weight kg
	5 000 cycels	2 500 cycels	5 000 cycels	2 500 cycels								
	Nm		Nm									
M10st	500	600	45,5	54,5	40:1	10	11	F07-F10	32	57	R-R10-R12	4,2
M12st	1 000	1 200	88,5	106,2	42:1	10,5	11,3	F10-F12-F14	45	72	R14-R18	8,2
M14st	1 800	2 200	111,1	135,8	60:1	15	16,2	F12-F14-F16	65	81	R14-R18-R24	14,5
M15st	3 400	4 100	165,9	200	68:1	17	20,5	F14-F16-F20	86	92	R18-R24	27,2
M16st	4 500	5 400	169,8	203,8	88:1	22	26,5	F16-F20-F25	92	113	R18-R24-R30	41,2
M20st	6 600	8 000	115,8	140,4	183:1	45,75	57	F16-F20-F25	92	116	R24-R30	44,5
	2 500 cycels	1 000 cycels	2 500 cycels	1 000 cycels								
M30st	10 800	13 000	109,1	131,3	309,1:1	77,3	99	F20-F25-F30	124	144	R24-R30	84
M40st	20 000	24 000	105,9	127,2	615:1	153,75	188,7	F25-F30-F35-F40	165	203	R24-R30	181,5
M50st	41 670	50 000	108,3	130	1 219,8:1	304,95	384,6	F25-F30-F35-F40-F48	180	250	R24-R30	294,3

**Purpose and scope**

The MF series of ¼ turn actuators provide a second stage gear reduction for multi turn actuator drivers to meet torques and operating times required by the industry. Applications for buried service or remote drive can also be satisfied by utilizing the input flange feature. The cast iron construction and rugged design of the Mastergear MF range of valve actuators has been engineered to meet the arduous requirements demanded of industrial environments.

Through corrosion resistant treatment of bore metal surface and the use of lip seals, the MF range is dealer to IP67. All models use high performance axial needle bearings which, combined with a one piece wormshaft, maximizes the available mechanical advantage and overall unit efficiency.



**Valve actuators series MF**

- Max. output torque 500 - 169 5000 Nm
- Max. input torque 45,5 - 1 454,9 Hm
- Valve mounting flange F07 - F48
- Weight 7,5 - 797 kg

**General specification**

Sealed IP67	Available for buried service IP68	13 Frame sizes
Maintenance free	Optional drive bushes	Self locking
Capability to withstand an overload of twice their maximum torque rating	SLO39 от -40°C до +80°C SLO20 от -60°C до +60°C SLO21 от +20°C до +200 °C SL120 от -60°C до +60°C	Universal versatility for direct fixing to valves

**Additional spur gear IS 3,5**

For „MF“ o „MF – IS“ series valve actuators is designed special spur gear “IS 3,5”. This spur gear will reduce input torques such, that every requirement regarding input torque and closing time could be meet. Spur gear “IS 3,5” is face gear with ration 3,5 : 1 and efficiency factor cca 3,3.

Spur gear “IS 3,5” is equipped on both ends with F10 mounting flanges according ISO, which allows to mount this gearbox to every type of valve operator with F10 input flange only with screws and nuts. This could be done everywhere, not only in production company.

**The main technical data**

Gearbox type	Max. output torque		Max. input torque		Ratio	Mechanical advantage	Input flange	Valve mounting flange	Max valve stem diameter without drive bush	Max. valve shaft height	Drive bush type	Max valve stem diameter with drive bush	Weight
	5 000 cycels	2 500 cycels	5 000 cycels	2 500 cycels									
MF10	500	600	45,5	54,4	40:1	11	F10	F07-F10	32	57	DB1	25	7,5
MF12	1 000	1 200	88,5	106	42:1	11,3	F10-F14	F10-F12-F14	45	72	DB4	32	12
			26,8	32,4	147:1	37,3	F10						17,5
MF14	1 800	2 200	111,1	135,8	60:1	16,2	F10-F14	F12-F14-F16	65	81	DB7	45,5	17
			33,7	41,1	210:1	53,4	F10						24,5
MF15	3 400	4 100	165,8	200	68:1	20,5	F10-F14	F14-F16-F20	86	92	DB15	70	30,5
			50,2	60,6	238:1	67,6	F10						38
MF16	4 500	5 400	170	203,7	88:1	26,5	F10-F14	F16-F20-F25	92	113	DB16	75	45
			51,5	61,8	308:1	87,4	F10						52,5
MF20	6 600	8 000	116	140	183:1	57	F10-F14	F16-F20-F25	92	116	DB20	70	46-51,5
			218,5	265	96,9:1	30,2	F10						54
			35	42	640,5:1	183							
			66,2	80,3	339,2:1	99,6							
MF30	10 800	13 000	110	132	309,1:1	98,3	F10-F14	F20-F25-F30	124	144	DB30	90	87-92
			177,6	213,8	191,3:1	60,8							
			90,9	110,2	228,3:1	72,6							
			35	42	1 051,5:1	314,5	F10						95,5
MF40	20 000	24 000	106	127	615:1	188,7	F10-F14	F25-F30-F35-F40	165	203	DB40	130	183-187
			240,7	288,8	271:1	83,1							
			167,7	201,2	369:1	119,3							
			117	140,4	557:1	171							
			85,9	103	759:1	233	F10						188,5
			32,1	38,5	2 153,2:1	622,7							
			73	87,5	948,5:1	274,2							
			32,1	38,3	1 291,5:1	381,7							
MF50	41 670	50 000	108,3	130	1 219,8:1	384,6	F10-F14	F25-F30-F35-F40-F48	180	250	DB50	140	307-312
			313,5	376,2	327,1:1	132,9							
			211,7	254	593,2:1	196,8							
			182	218,3	674:1	229	F10						315
			61,7	74	2 076,2:1	675,8							
			32,7	39,4	4 269,3:1	1 269,2							
MF55	63 000	68 000	196,4	209,5	1 219,8:1	346,2	F10-F14	F25-F30-F35-F40-F48	180	250	-	-	307-312
			568,7	606,2	327,7:1	119,6							
			384	409,4	593,2:1	177,1							
			330	351,8	673,8:1	206,1							
MF60	112 500	-	102	-	3 407,8:1	1 102,1	F10-F14	F40-F48	241	343	-	-	786-797
			644,3	-	523,8:1	174,6	F14-F16						
			255,1	-	1 363,1:1	440,9	F10-F14						
			170,1	-	2 044,7:1	661,3	F10-F14						
MF70	169 500	-	231	-	3 407,8:1	735,2	F10-F14	F40-F48	241	343	-	-	786-797
			1 454,9	-	523,8:1	116,5	F16-F25						
			576,3	-	1 363,1:1	294,1	F14-F16						
			384,2	-	2 244,7:1	441,1							

## Bevel gearboxes

### Purpose and scope

Bevel gears can be supplied with simple or double additional spur gear (DE). The application of spur gears is needed to reduce the value of input torque, so that the manual driving of gear is easier.

With bevel gears + spur gears more turns are needed, to make the stroke of valve closing or valve opening. In order to avoid this inconvenient, C.M.L. manufactured the bevel gears with double ratio (2v). The selection between the two ratios is obtained, by axially moving the handwheel for a total stroke of 15 to 20 mm.

The handwheel is always assembled on the same shaft, also when the reduction ratio is changed. This mechanism permits to unlock a valve, by applying a long ratio for few turns. When the valve is unlocked and the differential pressure decreases, the remaining stroke can be made with the shorter ratio.



### Bevel gears operators H

- Max. output torque 206 - 12 963 Nm
- Max input torque 44 - 12 963 Nm
- Input flange F10 - F35
- Weight 8 - 1 095 kg

### General specification

Sealed IP67	SLO39 from -40°C to +80°C SLO21 from +25°C to +200 °C SL120 from -60°C to +40°C	16 Frame sizes
Maintenance free		Force up to 6,500 kN
Meet the requirements of ATEX and is the best in performance in manufactures class		At the open / close the possibility to use axial forces

## The main technical data

Gearbox type	Output flange	Max. output torque	Ratio	Mechanical advantage	Max. input torque	Max. thrust torque	Input flange	Weight	Max. stem capacity	Max. stem capacity
	ISO 5210	Nm		+10%	Nm	kN				
AP1	F10	310	1,762:1	1,50	206	-	F10-F14	8	20	-
H03	F10	300	2,3:1	2,07	145	40	F07-F10	8	40	40
H04	F10	300	4,5:1	4,05	74	40	F07-F10	8,5	60	40
H13	F14	600	4,5:1	4,05	148	135	F07-F10-F14	15	60	60
H24		F16	1 100	4,5:1	4,05	272	F10-F14-F16	25	80	70
				15,7:1	12,77	85		F10-F14		
H33		F25	2 300	4,5:1	4,05	568	F14-F16-F25	55	100	85
				9,0:1	7,28	316	F14-F16-F25	75		
				20,5:1	16,43	140	F10-F14-F16	68		
				70,9:1	51,79	44	F10-F14	64		
H43		F30	3 800	4,5:1	4,05	938	F14-F16-F25	73	112	102
				9,0:1	7,28	521	F14-F16-F25	93		
				20,25:1	16,43	231	F10-F14-F16	96		
				70,9:1	51,79	74	F10-F14	96		
H70		F35	6 000	4,5:1	4,05	1 481	F16-F25-F30	115	130	115
				9,0:1	7,28	824	F16-F25-F30	145		
				36,0:1	29,19	205	F10-F14-F16	146		
				126,0:1	93,30	64	F10-F14	165		
H90		F35	9 000	5,0:1	4,50	2 000	F16-F25-F30	177	160	122
				10,0:1	8,10	1.111	F16-F25-F30	207		
				40,0:1	32,40	277	F10-F14-F16	217		
				140,0:1	102,42	88	F10-F14	227		
H110		F40	16 000	5,0:1	4,50	3 556	F16-F35	315	165	140
				10,0:1	8,10	1 978	F16-F25-F30	345		
				30,0:1	24,37	657	F10-F14-F16	360		
				105,0:1	77,01	208	F10-F14	370		
H110AS		F40	16 000	5,0:1	4,50	3 556	F16-F35	315	165	N/A
				10,0:1	8,10	1 978	F16-F25-F30	345		
				30,0:1	24,37	657	F10-F14-F16	360		
				105,0:1	77,01	208	F10-F14	370		
H120		F48	19 000	5,0:1	4,50	4 222	F16-F35	345	165	140
				135,0:1	98,42	193	-	403		
H200		F48	25 000	5,0:1	4,50	5 556	F35-F40	520	210	180
				30,0:1	24,30	1 030	F14-F16	640		
				50,0:1	40,50	618	F14-F16	640		
				225,0:1	164,31	152	F10-F14	640		
H300		F60	30 000	6,0:1	5,40	5 556	F35-F40	730	250	200
				36,0:1	29,81	1 027	F14-F16	850		
				60,0:1	49,57	618	F14-F16	850		
				270,0:1	200,77	152	F10-F14	863		
H450		F60	45 000	6,0:1	5,40	8 333	F35-F40	830	260	215
				36,0:1	29,22	1 544	F16-F25	950		
				60,0:1	48,60	926	F16-F25	950		
				270,0:1	196,84	229	F10-F14-F16	963		
				288,0:1	209,96	214	F10-F14-F16	960		
				480,0:1	349,94	128	F10-F14-F16	980		
H650		N/A	70 000	6,0:1	5,40	12 963	F35-F40	900	280	230
				22,1:1	17,88	3 915	F16-F25	1 050		
				25,7:1	20,81	3 365	F16-F25	1 050		
				30,1:1	24,34	2 876	F16-F25	1 050		
				52,0:1	42,09	1.663	F16-F25	1 050		
				415,7:1	302,82	231	F10-F14-F16	1 095		





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