

# MA Series



Electric Multi-turn Actuator

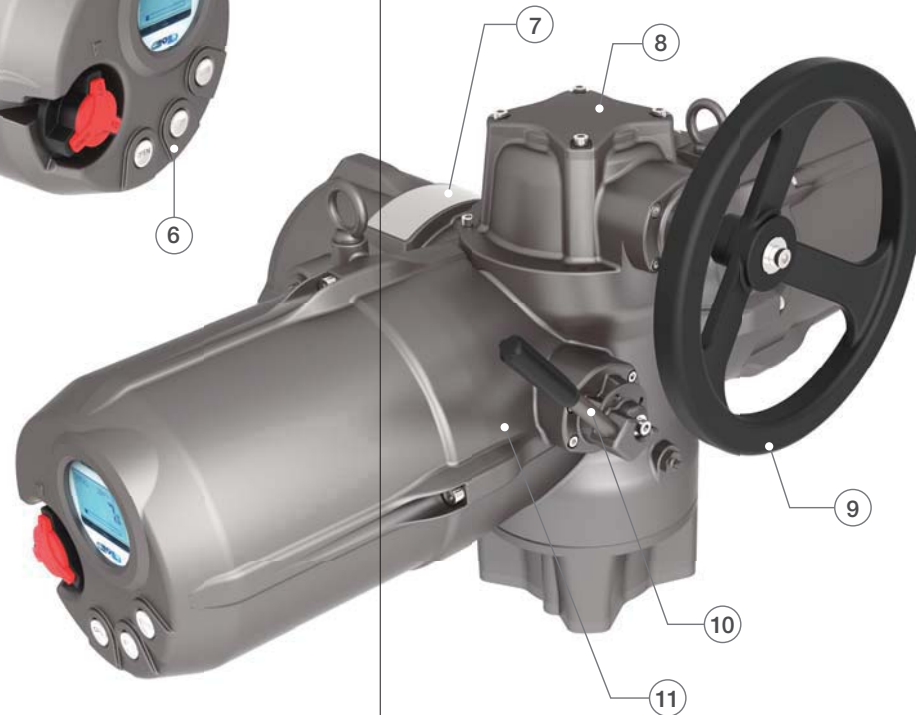




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## I Configuration



- ① Motor
- ② Eye Bolts
- ③ Terminal Cover
- ④ Cable Entries
- ⑤ Base
- ⑥ Local Control Unit
- ⑦ Nameplate
- ⑧ Stem Cover
- ⑨ Handle
- ⑩ Manual Lever
- ⑪ Body
- ⑫ Setting Tool

# MA

## Features

### Motor

Insulated Class F, 3phase squirrel cage motor.  
Built in thermal protector( $130^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ).  
IE1 grade and IE2 grade(optional specification)  
are available and the duty cycle is S2 30min.

### Case

MA series are finished in polyester powder (Polyester, TGIC-Free) after anodized with aluminum alloy to prevent corrosion. The actuators provide the explosion proof protection Explosion Proof Ex d IIC T4) as an optional specification and ultimate performance.

### Terminal

The double-sealed terminal protects the actuators from environment such as dust and moisture.

### Torque Control

Output torque of the worm shaft is read by a precise sensor to prevent overload. Errors in voltage, frequency, temperature is resolved. Torque can be set between 30%~100% when the rated torque is 100%.

### Manual Operation

The bevel gear (MA01, MA02) structure and worm gear (MA03, MA04) enable manual operation effectively. The actuator can be returned to electric operation by an auto/manual clutch.

### Absolute Encoder

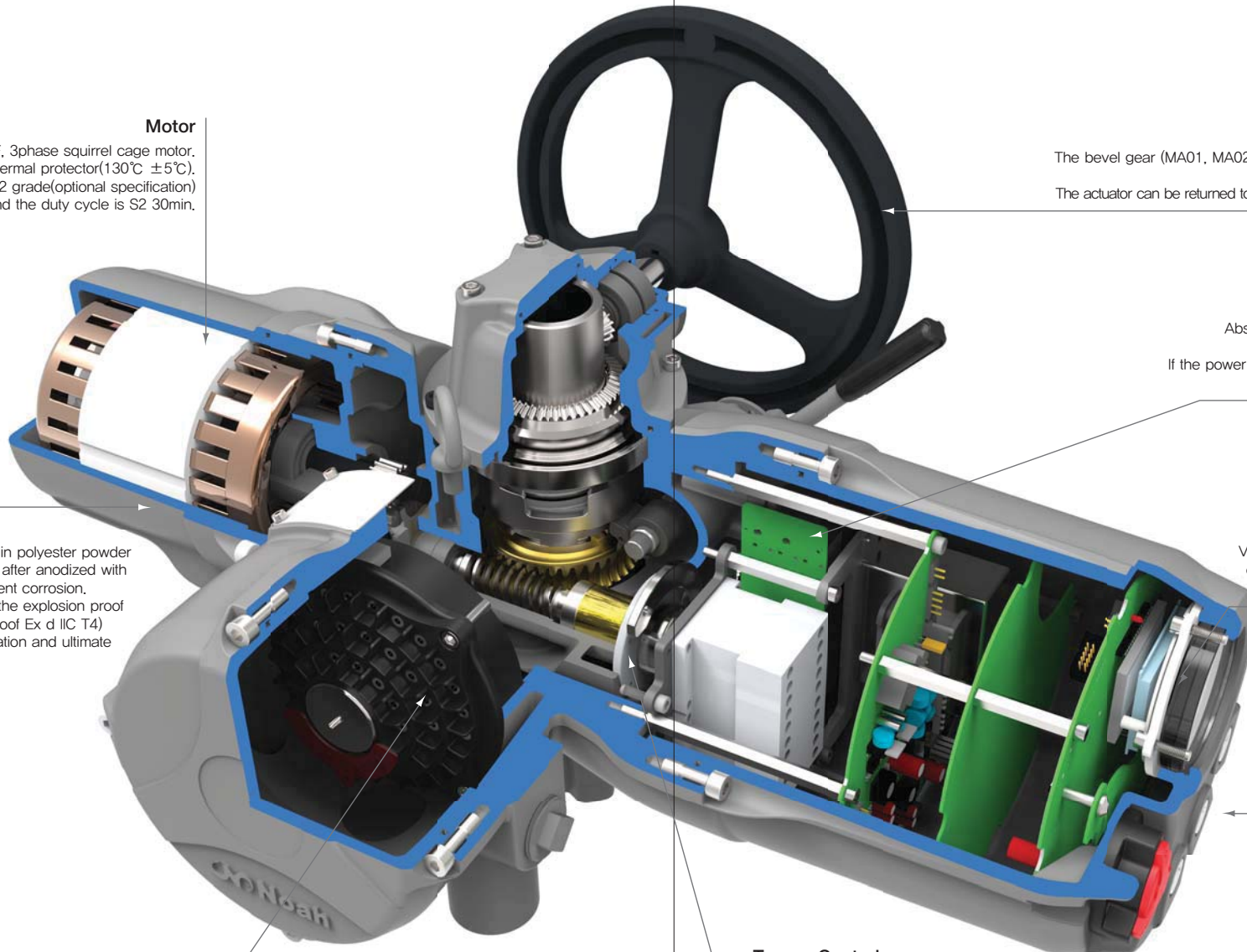
Absolute encoder is used as a valve position measurement with low error range. If the power is shut off, it remember the valve position so users don't need to set limits again.

### LCD & Setting Tool

Valve's position and settings are presented on the display. Setting Tool enables actuator setting without removing its cover.


### Local Control

Actuators can be controlled by push buttons on the actuator cover. Unpierced buttons can protect the actuator from moisture.



## Base & Drive Bushing

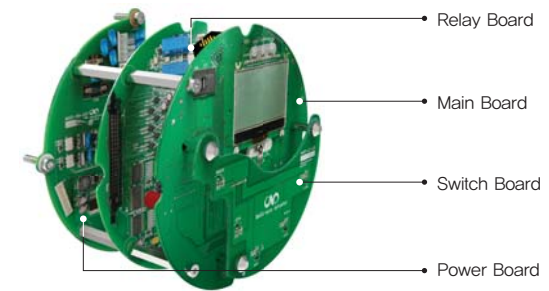
Manufactured in accordance with ISO5210 and both Thrust type and Non-Thrust type are available.

Thrust Type	Non-Thrust Type
	
<ul style="list-style-type: none"> <li>In case of mounting the valve with the actuator directly. For gate valves or glove valves.</li> </ul>	<ul style="list-style-type: none"> <li>When there is a gear box between the valve and the actuator. For butterfly valves or ball valves.</li> </ul>

## Base & Drive Bushing & Cable Entries SPEC.

Model	Flange (ISO5210)	P.C.D	Tap	Max Size		Cable Entries Standard	Cable Entries Option
				Screw	Key		
MA01	F10	Ø102	4 - M10	40	30	2 x NPT1" 1 x NPT1 1/2"	4 x NPT1" 1 x NPT1 1/2"
MA02	F14	Ø140	4 - M16	58	46		
MA03	F16	Ø165	4 - M20	72	58	2 x M25 Pitch1.5 1 x M40 Pitch1.5	4 x M25 Pitch1.5 1 x M40 Pitch1.5
MA04	F25	Ø254	8 - M16	97	82		

## Board



- Main Board**
  - A main board provides precise control depending on the user's need
  - Output 4~20mA
  - The saved settings can be reset again.
- Relay Board**
  - Valve's running direction can be measured by 8 relays on the board. (terminal number 24~42)
  - Provided 4 relays(terminal number4~11) can be used as the user's need among the 10 functions.
- Power Board**
  - It receives the 3phase power and provides the power supply to internal boards.
  - It delivers the control signal to the magnet switch to operate the motor.
  - It includes safety circuit against external noise and depending on the environment a heater can be added.
- LCD & LED**
  - It can be controlled by push buttons and setting tool, and all the settings and are presented on the LCD. Valve position and actuator's mode are shown on the LED.
- ESD**
  - Decision of behavior for Emergency shut down signal
- Auto reversing magnetic contactors**
- MOTOR TP**
  - Motor protection. If the temperature of the motor exceeds 130°C ±5°C, the thermal protector is disconnected to protect the motor.
- Connector**
  - connectors' shapes and colors are different for ease of assembly and produced against vibration.

## Battery

If the power is shut off, valve position and running direction can be presented on the display by the battery. If there is no operation in actuators, LCD screen is turned off for the battery lifespan and recover when there is operation.

Manufacturer / Model	XENOENERGY / XL-100F	Voltage	3.6V	Capacity	3500mAh	UL Approval Number	MH28122
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## Setting Tool



This is to set actuators and operate locally.

Battery	1.5V AA Size 2EA
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### Setting Tool Method of Operation

<b>+</b>	In OFF mode, menus and values can be set. In LOCAL mode, operate the actuator to open direction.
<b>-</b>	In OFF mode, menus and values can be set. In LOCAL mode, operate the actuator to close direction.
<b>S</b>	In OFF mode, to enter the setting menu.
<b>J</b>	In OFF mode, select the menu.
<b>↻</b>	In OFF mode, to return to previous menu. In LOCAL mode, to stop the actuator.

## Standard Specification

Enclosure	Watertight Ingress Protection 68 Nema 4 and 6
Ambient Temperature	-20°C to +70°C
Power Supply	3PH 220 / 380 / 400 / 415 / 440 / 460 / 480 VAC 50/60Hz
Stall Protection	Built - in Thermal Protection
Manual Override	Manual /electric operating device
Limit Switch	Absolute Encoder
Torque Switch	Torque Sensor
Handle	MA01,02: Bevel Gear, MA03,04: Worm Gear
Duty Cycle	S2 30min
Base	ISO5210
Self Locking	Provided by means of Worm Gearing
Lubrication	Shell Gadus S2 V220 00
Material	Aluminium
Surface Treatment	Anodizing
External Coating	Polyester(TGIC-Free)

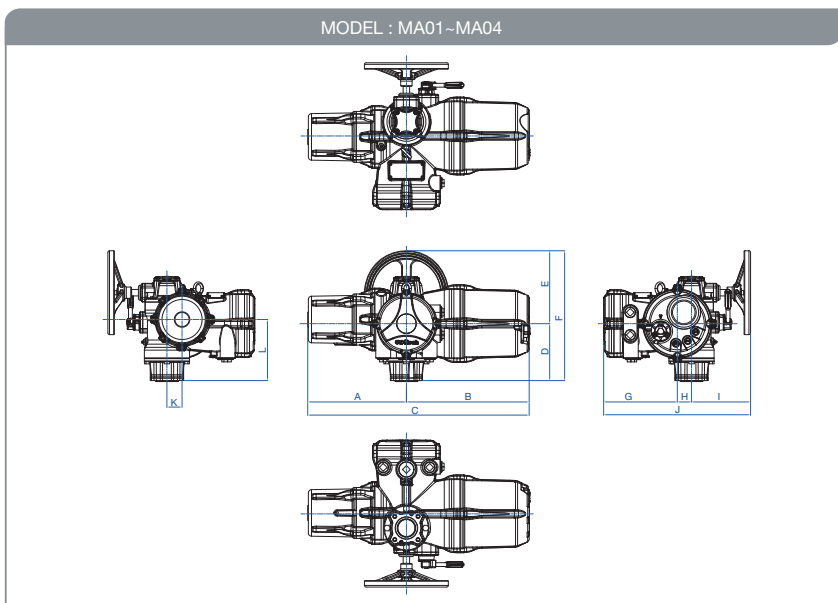
## Optional Specification

E X P	Explosion Proof / Ex d IIC T4
P C U	Proportional Control Unit (Input : DC 4-20mA, DC 0~10V / Output: DC 4-20mA)
C P T	Current Position Transmitter (Output: DC 4-20mA)
Field-Bus	Profi-Bus, Mod-Bus, Can-Bus

## Speed-torque table

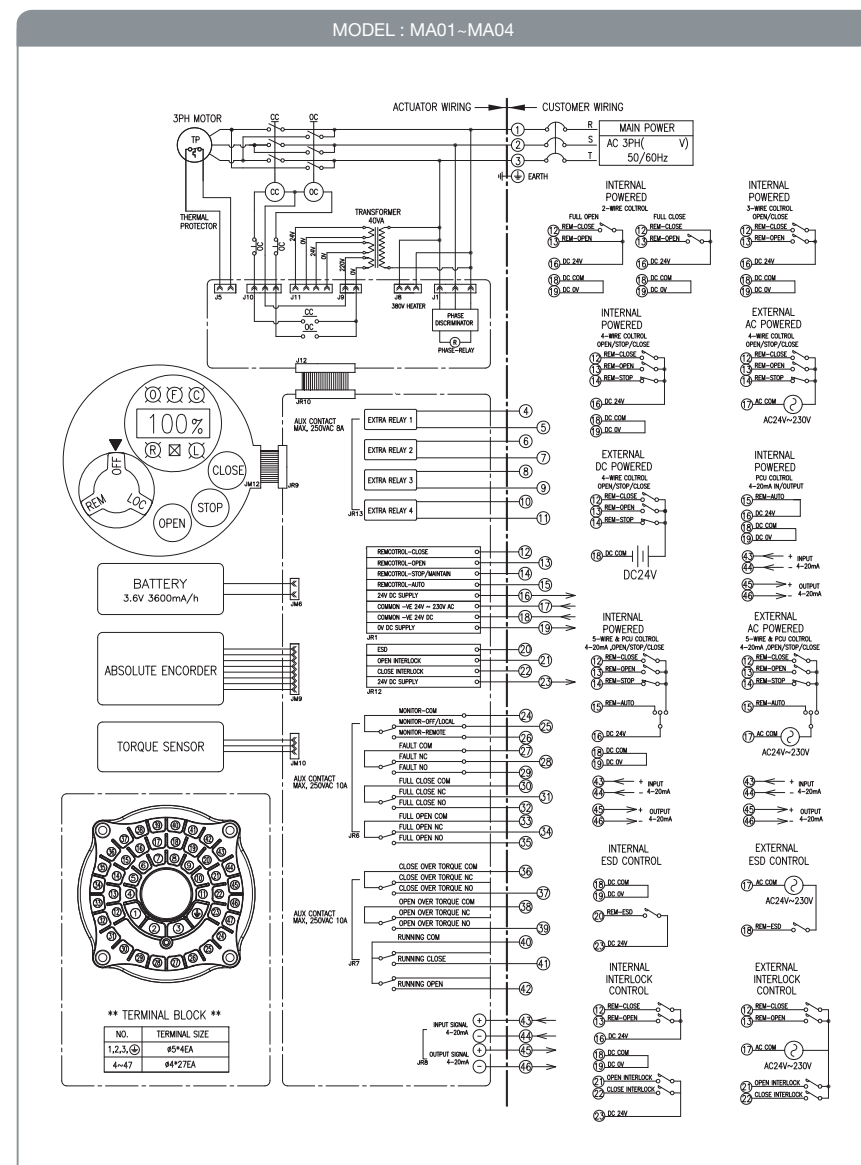
Model	Hz	Max torque: N·m Ft·lbf															
		50	60	50	60	50	60	50	60	50	60	50	60	50	60		
	rpm	16.0	19.2	20.0	24.0	27.7	33.3	35.4	42.5	45.1	54.2	62.5	75.1	78.4	94.2		
MA01	0.2	82	64	46	37	29	21	-									
		60	47	34	27	21	15	-									
	0.4	138	127	92	73	58	42	32									
		102	94	68	54	43	31	24									
	0.75	138	138	138	127	101	73	56									
		102	102	102	94	74	54	41									
MA02	0.75	302	246	169	-	-	-	-									
		223	181	125	-	-	-	-									
	1.5	415	415	340	270	214	155	120									
		306	306	251	199	158	114	89									
	2.2	415	415	415	372	295	214	165									
		306	306	306	274	218	158	122									
MA03	2.2	793	613	444	-	-	-	-									
		585	452	327	-	-	-	-									
	3.7	845	845	720	572	454	328	254									
		623	623	531	422	335	242	187									
	5.5	845	845	845	826	655	474	367									
		623	623	623	609	483	350	271									
MA04	5.5	1774	1436	1040	-	-	-	-									
		1308	1059	767	-	-	-	-									
	7.5	1774	1774	1340	1064	844	611	473									
		1308	1308	988	785	623	451	349									
	11	1774	1774	1774	1445	1147	830	642									
		1308	1308	1308	1066	846	612	474									

## Dimension (MA01~MA04)



Type	A	B	C	D	E	F	G	H	I	J	K	L
MA01	306	380.5	686.5	176.5	226	402.5	228.5	44	183	455.5	46.8	189.5
MA02	388	395	783	193	263.5	456.5	228	37.8	205.5	471.3	34.5	217.5
MA03	483.75	420.75	904.5	227	280.5	507.5	228	53	206	487	33.5	254.5
MA04	549.5	521	1070.5	270.5	323.5	594	249	69	235	553	74	332

## Wiring



※ The above wiring diagram is for the multi-turn actuator with full optional specification. Please contact EMICO or its distributor to get the wiring diagrams with other specification.