

Consider People As a Boat,  
Consider Seriousness As Her Helm,  
And Consider Wisdom As Her Sail.



THEOBORN

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THEOBORN

# THEOBORN AUTO-CONTROL

BQ Series Electric Actuator



(BQ006—BQ600)

Zhejiang Theoborn Auto-control Valves Co.,Ltd.

[www.theoborn.com](http://www.theoborn.com)



## Company Profile

Zhejiang Theoborn Auto-Control Valves Co., Ltd. is dedicated to manufacturing pneumatic actuators and electric actuators.

Our products fundamentally transform the complex traditional usage of valves, incorporating high technology with the control process of valves, greatly improving the efficient usage of valves, largely diminishing the controlling cost, and obtaining considerable profits for enterprises.

Our company is located in Wenzhou City which possesses a long history of manufacturing valves and actuators. Inspired by our experience of manufacturing valves and actuators, supported by exquisite manufacturing technique, and enveloped with the special innovative consciousness and serious spirit, Theoborn endeavors to culminate the wisdom, aspires to make the best products, and desires to benefit human beings.

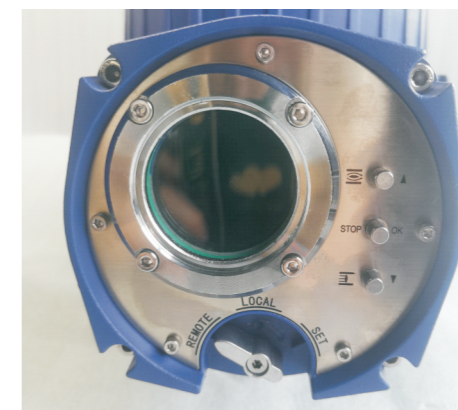
Theoborn people believe that we should consider people as boat, consider wisdom as helm and consider seriousness as sail. Theoborn believes that professional technology, along with sincere service, will obtain customers' hearts, win customers' credits, and move customers.

Striving for excellence Focus on quality

## Machining Center



## Assembly and test



## Enterprise Culture

### Corporate philosophy

- ◆ Consider people as boat, consider wisdom as helm and consider seriousness as sail.

### Quality policy

- ◆ People-oriented Technology innovation
- Continuous improvement Create world brand.

### Quality target

- ◆ 100% qualified rate;
- ◆ Customer satisfaction average rate 98% in two years.

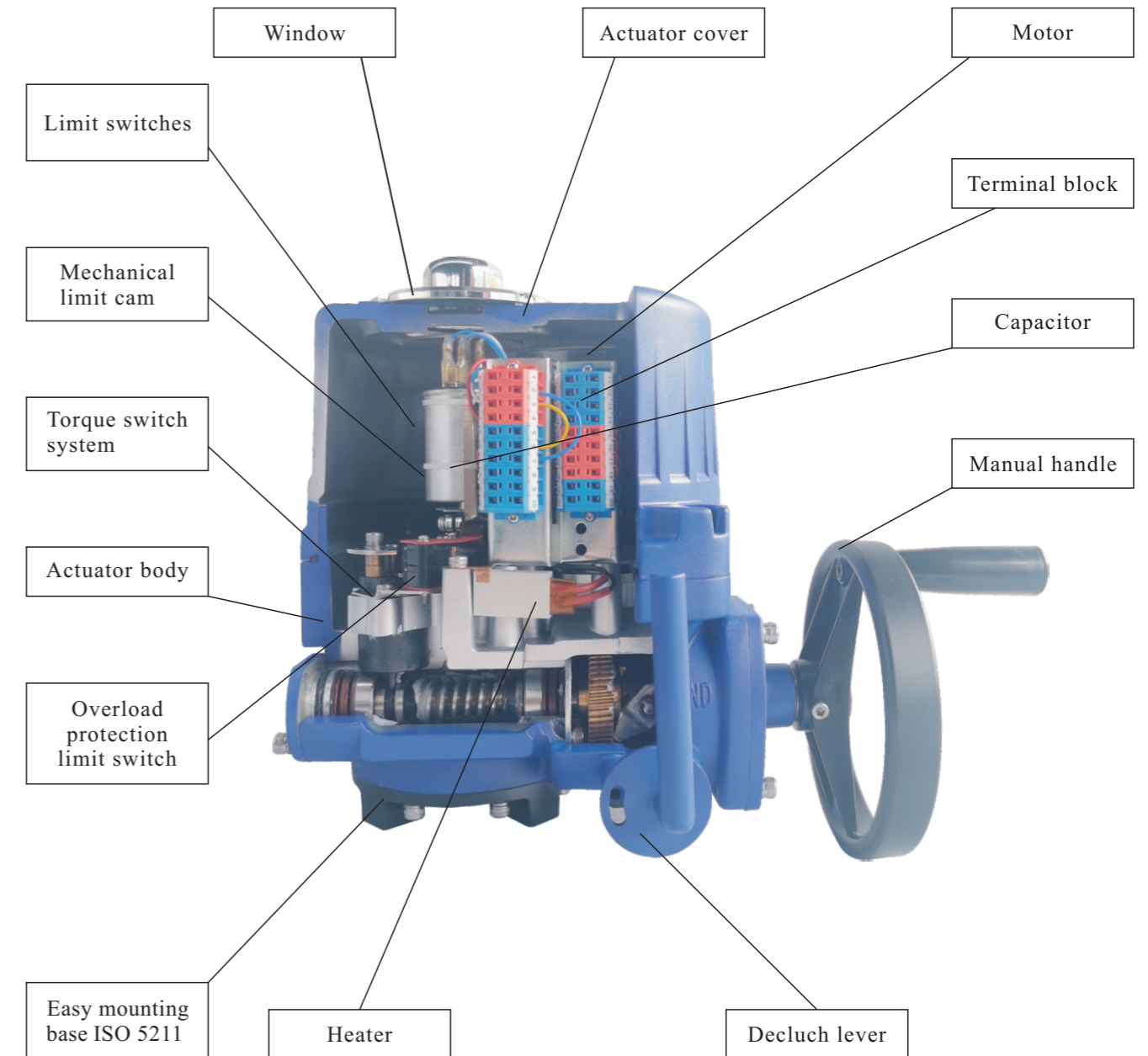
## Products Introduction

BQ Series electric actuator can be used for driving and controlling the butterfly valve, ball valve, plug valve and all kinds of 90 °rotating valve. The actuator is used for valve opening and closing, it can be either remotely controlled or local controlled. With the advantages of complete functions, reliable performance, advanced control system, convenient in operation and maintenance, etc. BQ series electric actuators are widely used in the fields such as electric power, metallurgy, chemical industry, paper making, coal, water drainage etc.

BQ series electric actuators are intelligent products. It can be added additional function options to meet the requirements of all kinds of industrial process control.

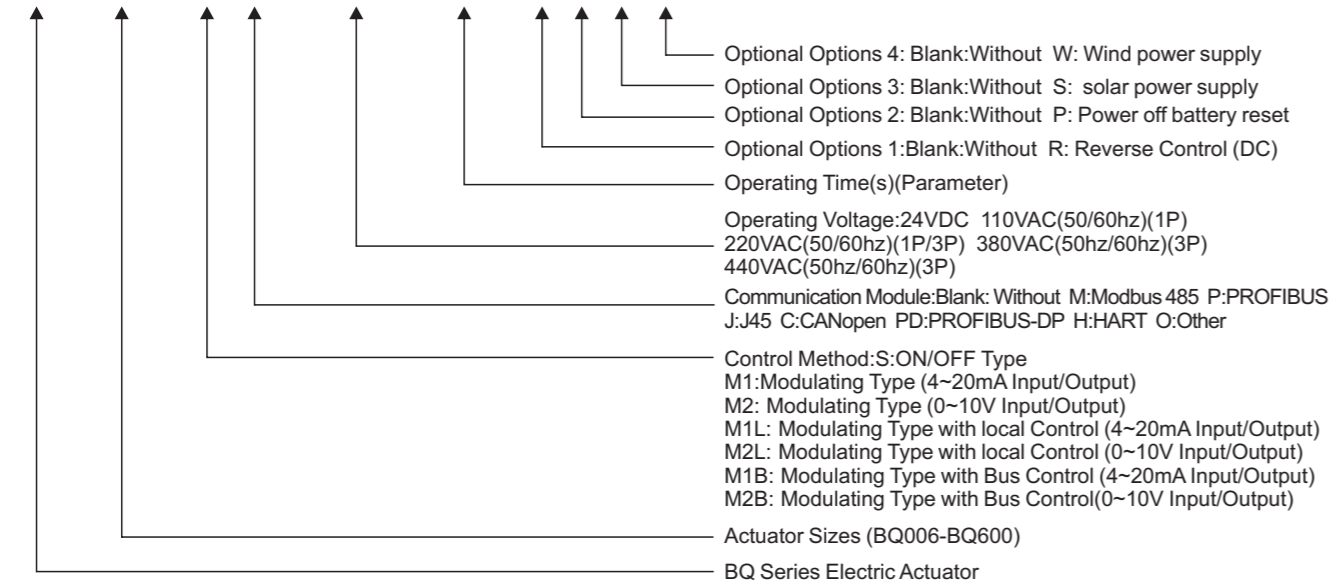
Actuator external coating processing can be adapted to corrosive environment. With explosion-proof structure, it can be applied to IIB level T1 - T4 level explosive mixture of 1, 2, dangerous work environment.

## Construction



## Model Instructions

**BQ — 006 — ML(M) — 24VDC — 30 — (R)(P)(S)(W)**



## Performance

Model	Output torque N·M	Working system S1/S2	Operating time (S)	Motor 50Hz Power (W)	Rated current 50/Hz(A)		Bore size (mm)	Weight (KG)	Handwheel outer circle mm
					220V	380V			
BQ006	60	S1/S2	30	20	0.5	0.3	14x14	7.8	125
BQ010	100	S1/S2	30	20	0.6	0.3	14x14	7.8	125
BQ020	200	S2	30	40	0.61	0.4	17x17	16	160
BQ030	300	S2	35	60	1.2	0.6	22x22	21	200
BQ050	500	S2	35	90	1.4	0.6	22x22	21	200
BQ080	800	S2	40	120	2.0	1.0	27x27	26.5	300
BQ120	1200	S2	45	180	2.2	1.2	27x27	26.5	300
BQ150	1500	S2	80	120	2.0	1.0	36x36	53.5	300
BQ200	2000	S2	90	180	2.2	1.2	36x36	53.5	300
BQ250	2500	S2	120	120	2.0	1.0	36x36	53.5	300
BQ300	3000	S2	135	180	2.2	1.2	36x36	53.5	300
BQ400	4000	S2	200	120	2.0	1.0	36x36	75	300
BQ600	6000	S2	220	180	2.2	1.2	36x36	75	300

Note: Please contact us for other voltage request, e.g 110VAC/440VAC etc.

## Standard Specification

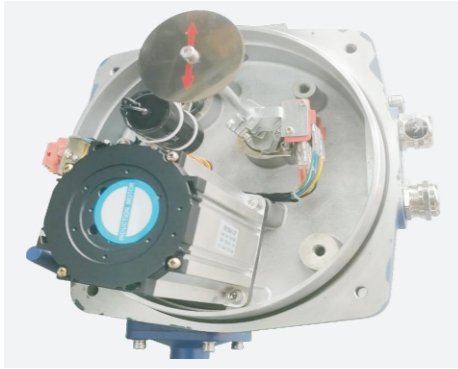
Power supply	110/220V AC 1PH,380/400V AC 3PH 50/60Hz,±5%
Control power supply	110/220V AC 1PH 50/60Hz,±5%
Motor	Induction motor class F
Limit switches	Open/close, SPDT,250V AC 10A rating
Torque switches	Open/close, SPDT,250V AC 10A rating (except BQ010)
Shutdown protection (temperature)	Built-in thermal protection, open 120°C ± 5°C/close 97°C ± 5°C
Travel angle	90°±5° (180°/270° option)
Indicator	Disc with indicator arrow
Manual override	separable
Self-lock	turbine worm mechanism
Mechanical limit	one for ON and one for OFF , External adjustable
Heater	5W (110/220V AC) anti-condensation
Cable entry	2-G3/4 screw
Lubrication	EP lubricating oil
terminal	Spring terminals
Ambient Temp.	-20°C~+70°C(except for circuit board option)
Ambient humidity	90%RH Max
insulating strength	1500V AV 1minute
Coating	Dry powder (polyester)

## Standard Configuration



### Body

- ◆ The body is made of aluminum, hard anodized, epoxy coated, with high corrosion resistance. Protection class IP67.



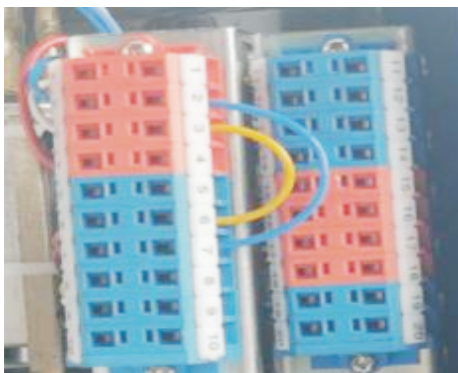
**Squirrel cage induction motor**

- ◆ Totally enclosed squirrel cage induction motor, small volume, big torque, small inertia force;
- ◆ Insulation Class E, Built-in thermal protection, prevent the motor from overheating.



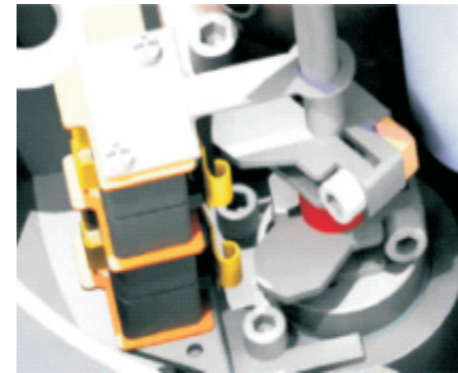
**Indicator**

- ◆ The indicator is installed on the center axis, the mirror is with dome type design, easy to observe.
- ◆ The shell of indicator is protected by steel to prevent damage.



**Terminal block**

- ◆ Enough number of terminal strips for customer's convenience;
- ◆ Proven reliability and tight wiring connection;
- ◆ Control circuits conform to the standard of power supply 1phase and 3phases.



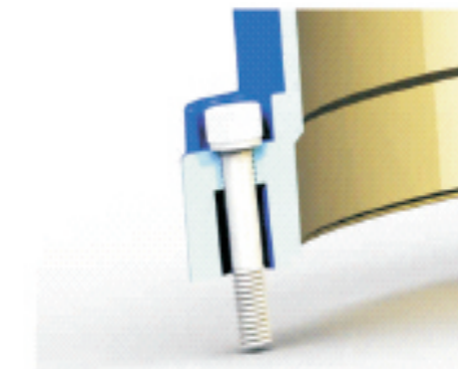
**Limit switches**

- ◆ Mechanical and electrical double limit;
- ◆ Mechanical limit screw adjustable, safe and reliable;
- ◆ The electrical limit switch is controlled by CAM mechanism;
- ◆ Simple operation and accurate positioning.



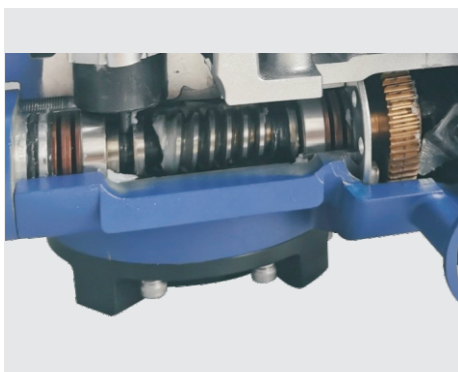
**Heater**

- ◆ 5W Ceramic housing with thermostat to prevent over heat comparing with set temperature;
- ◆ No risk of electricity leakage.



**Captive cover bolt**

- ◆ When the shell is removed, the bolt attached to the shell will not fall off;
- ◆ The outer bolts are made of stainless steel.



**Self-locking**

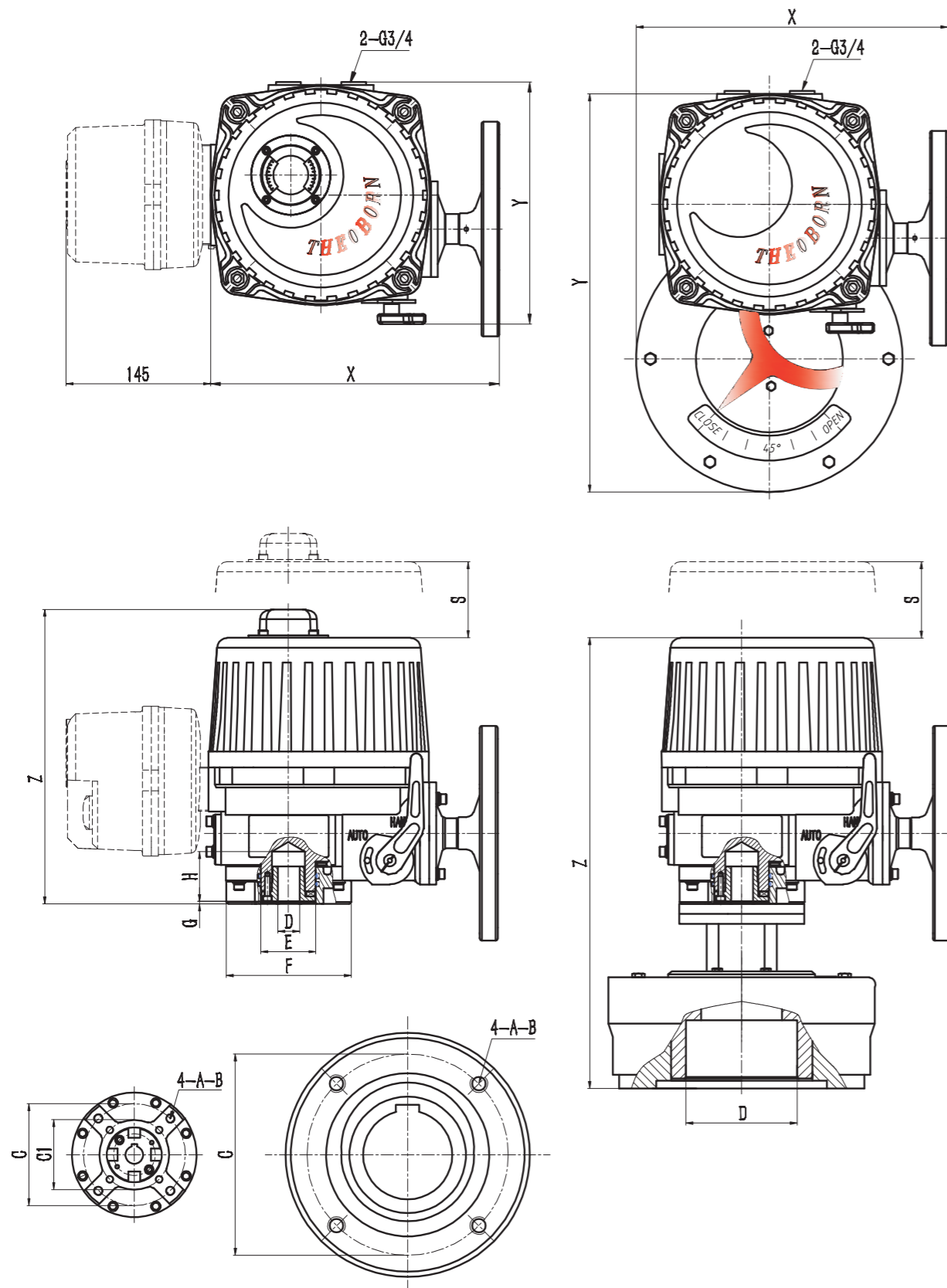
- ◆ Two worm gear assembly self-locking to prevent the reverse with minimum backlash in the transmission ;
- ◆ Low noise, long life ;
- ◆ No need to add lubricate when use.



**Manual device**

- ◆ Safe, reliable, small and labor-saving;
- ◆ When the power is off, the clutch handle can be operated manually;
- ◆ When energized, the clutch will be reset automatically.

## Dimension



Model	BQ006 BQ010	BQ020	BQ030	BQ050	BQ080 BQ120
Flange IS05211	F07	F07	F10	F10	F12
		F10	F12	F12	F14
C1	Φ70	Φ70	Φ102	Φ102	Φ125
C		Φ102	Φ125	Φ125	Φ140
A	M8	M8/M10	M10/M12	M10/M12	M12/M16
B	14	14/17	18/20	18/20	20/25
Dmax (round)	Φ22	Φ25	Φ40	Φ40	Φ48
Dmax (square)	14*14	17*17	22*22	22*22	27*27
E	Φ50	Φ55	Φ75	Φ75	Φ90
F	Φ90	Φ125	Φ150	Φ150	Φ180
G	2.5				
H	33	45	50		60
S	100	115	145		170
X	227	310	315		356
Y	195	242	256		286
Z	255	300	330		360

Model	BQ150	BQ200	BQ250	BQ300	BQ400	BQ600
Flange IS05211	F16		F16		/	
C	Φ165		Φ165		Φ235	
A	4-M20		4-M20		4-M20	
B	32		32		32	
Dmax(round)	Φ50		Φ50		Φ60	
Dmax (square)	36*36		36*36		46*46	
S	145		145		170	
X	356		356		375	
Y	380		390		450	
Z	500		480		500	

Note: The mounting dimensions could be customized by the user.

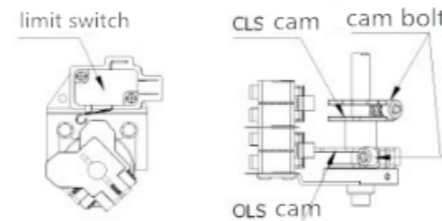
## Setting

### 1. manual operation

- a Pull the clutch handle towards the handwheel until it is upright.
- b If the handle is not upright, pull it again and turn the handwheel slowly.
- c Clockwise is the closed direction and counterclockwise is the open direction.
- d Do not operate manually after the actuator is energized, and the handle will be restored to its original position automatically by the internal clutch mechanism.

### 2. Limit switch setting

- a Pull the handle for manual operation and rotate the handwheel to make the actuator run to the original position.
- b Loosen the cam retaining bolt with a wrench, and rotate the cam to achieve the required adjustment angle (according to actual requirements of the valve) and tighten the bolt again.

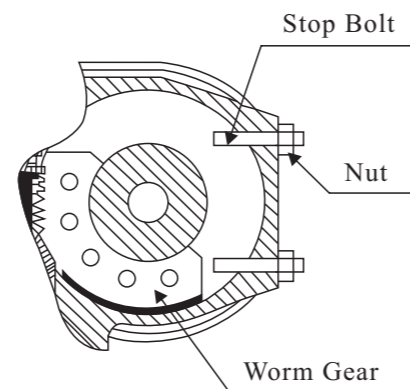


### 3. Torque switch

- a Torque switch has been set before delivery, the user does not need to set the switch again.
- b Note: We cannot guarantee the performance if the switch is reset by the user.

### 4. Setting of stop bolt

- a When the error more than 5°, need to readjust set retaining bolt.
- b When setting, remove the stop bolt by 2 turns and tighten the nut.



### 5. Indicator setting

- a Make the actuator run to the closed position and rotate the actuator by hand.
- b Align the number of the lens in the direction.
- c Tighten the bolts (be careful not to touch the side of the indicator disc).

Note: factory set, usually does not need to set again.

### 6. Attention for connection

- a The cable interface is G3/4" screw hole, sealed with plug before delivery.
- b If the user does not use either cable interface, please keep the plug as it is.
- c Please seal the interface after wiring to prevent water inflow.
- d If the user use explosion-proof actuator, be sure to use same level connection components. If users use unqualified components, we cannot guarantee the performance of explosion-proof actuator.

### 7. Electrical wiring

- a A wiring diagram (inside the electrical hatch cover) is attached to the actuator.
- b Wiring according to the wiring diagram provided, such as power supply, control power supply, internal wiring and grounding, etc.
- c If necessary, the external electrical source is from the dryer to keep the actuator dry.
- d Make sure the terminals are firmly connected.
- e Make sure that an external controller operates only one actuator.  
(Can not operate more than 2 sets actuators at one time).
- f Make sure the actuator is clean and free of sundries after wiring.

### 8. Check the rotation direction

- a For three-phase actuator, the rotation direction of the actuator should be checked before the electric operation (operator).
- b If the direction of operation is incorrect, the limit switch will not work, resulting in plug damage or motor overheating.
- c Manually put the actuator in the position of 50% on (or off), power the actuator, and confirm the direction of rotation.
- d If the signal is on, the actuator will rotate and run in the open direction, then the direction is correct.  
But if you go to the other way, you need to change the wiring and switch any 2 of the 3 power cords.
- e Check the rotation direction again and confirm it.

## Trial operation

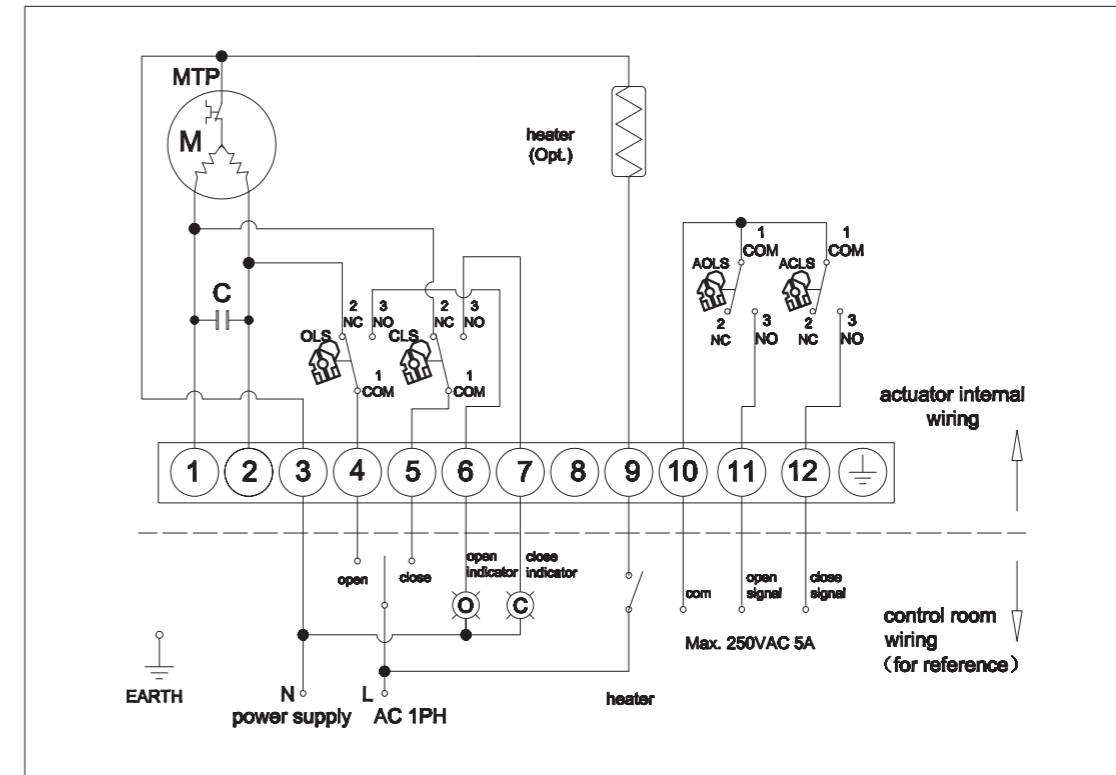
1. Make sure to check the rotation direction of the actuator before operation.
2. Check the function of limit switch and torque switch, direction of indicator and space heater.
3. Make sure the action of the handle is normal (clutch handle).
4. Check the indicator light on the control panel.
5. After the trial operation, please tighten the 4 bolts of the electrical hatch cover.

## Maintenance

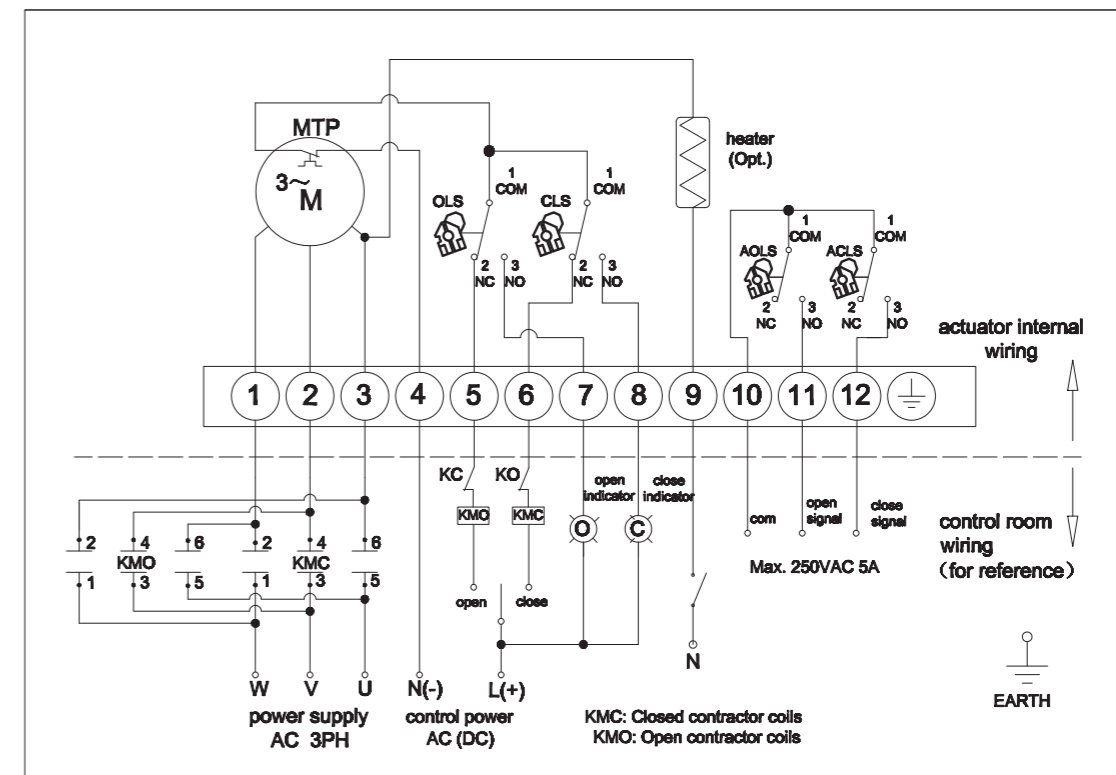
1. The actuator has been filled with the lubricants, it generally doesn't need to add lubricants during normal
2. It's better to keep the power supply for the actuator and have a run test every week regularly.
3. For better the performance of the actuator, it is highly suggested to do the regular inspection and maintenance once year, together with checking the action status, surface corrosion, ect.

## Wiring Diagram

**BQ006/010 110V/220VAC 50/60Hz 1PH ON/OFF TYPE**

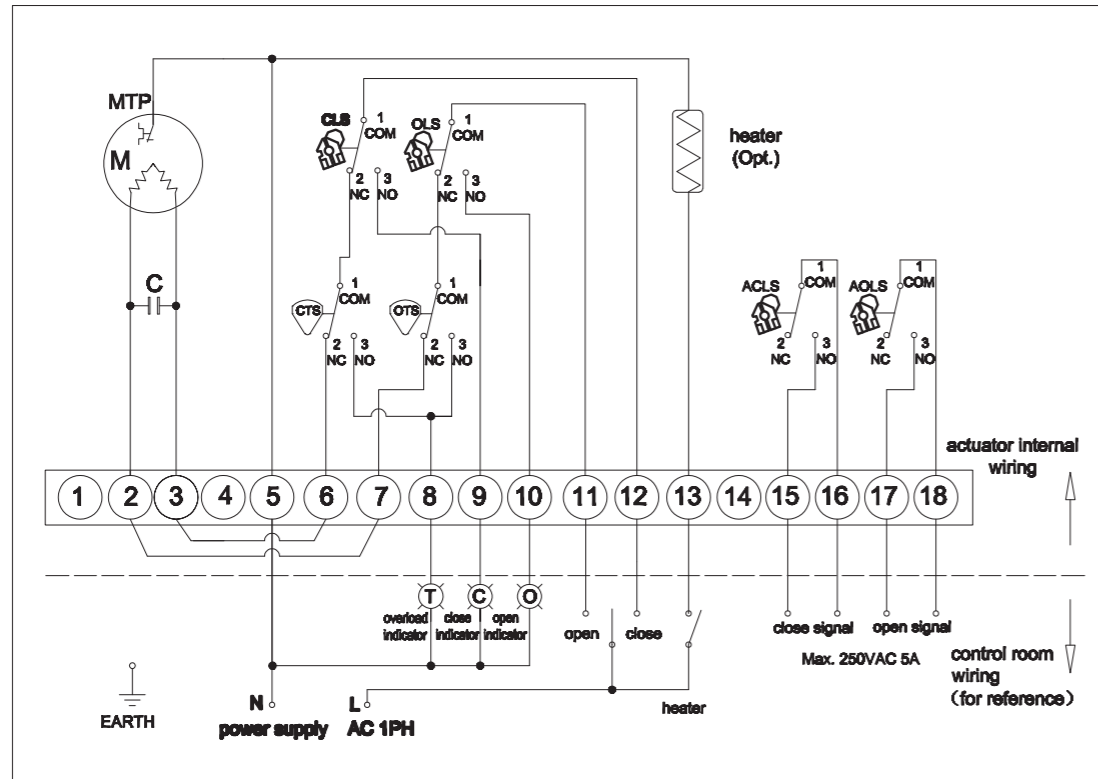


**BQ010 380V/440VAC 50/60HZ 3PH ON/OFF TYPE**

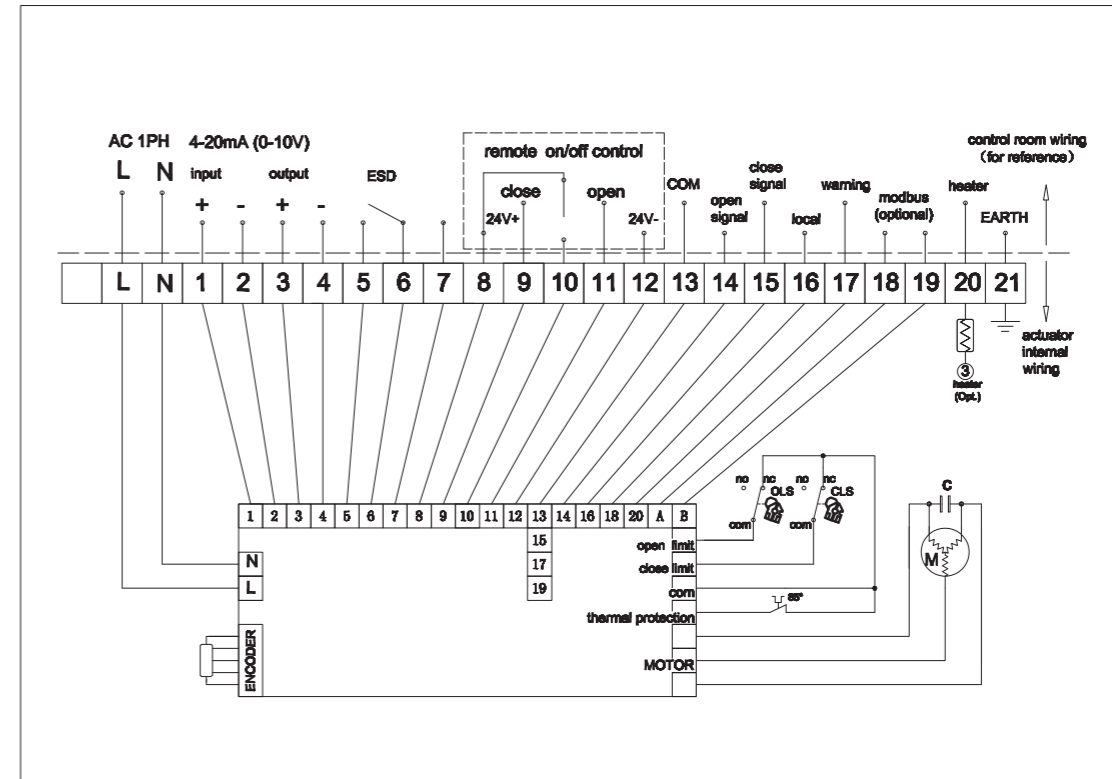




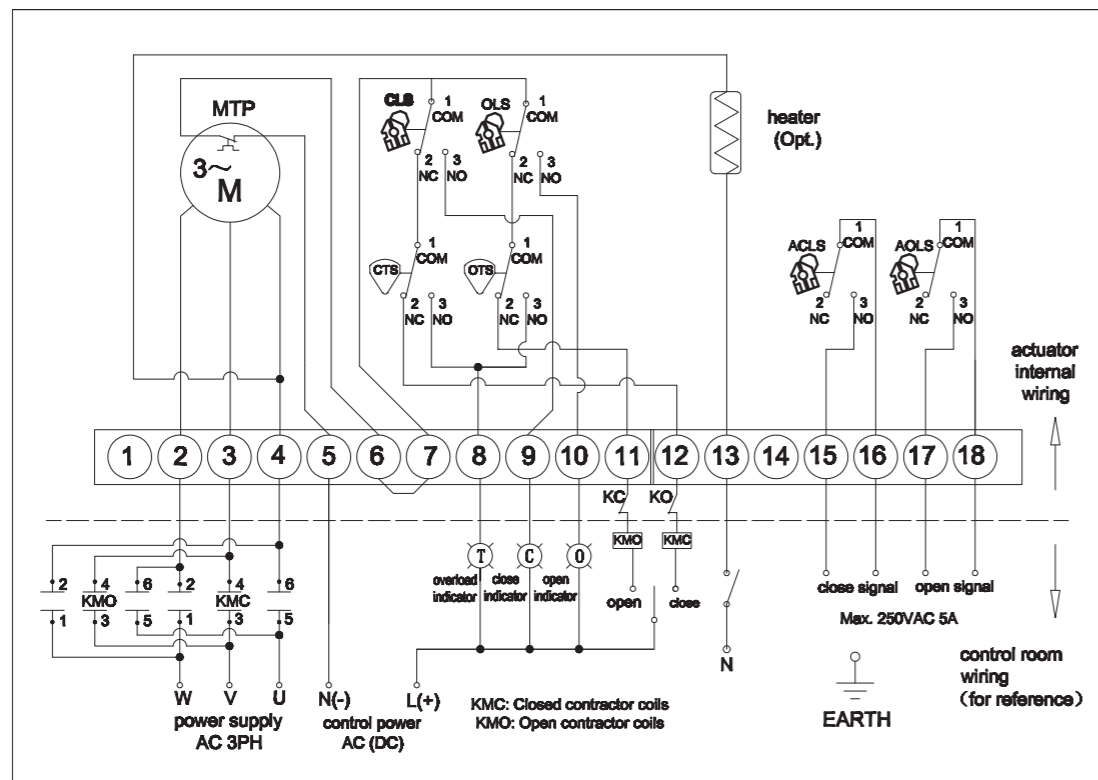
**BQ020-BQ600 110V/220VAC 50/60Hz 1PH ON/OFFTYPE**



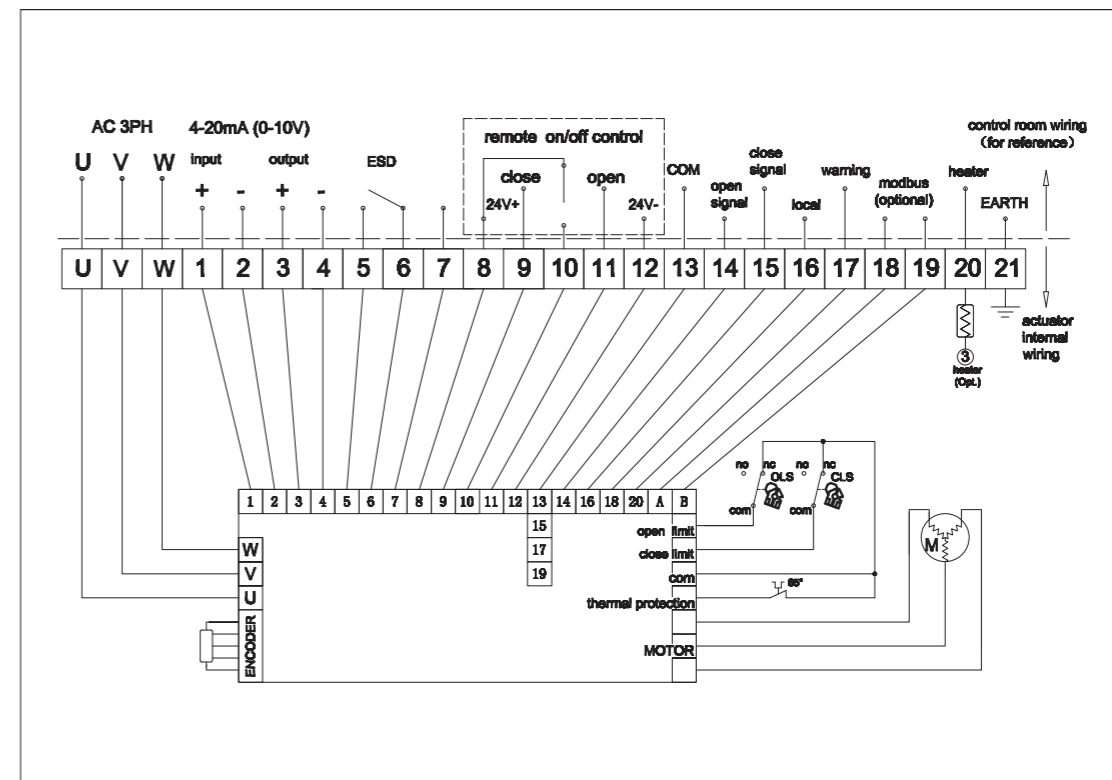
**BQ006/010 110V/220VAC 50/60Hz 1PH MODULATING TYPE**



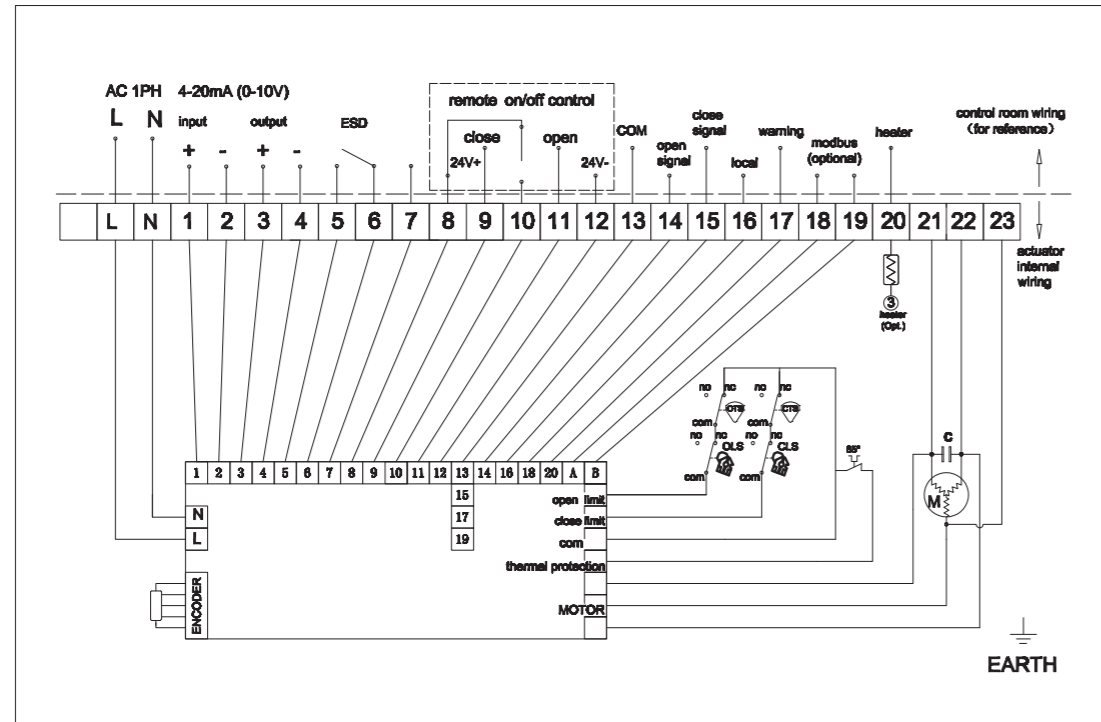
**BQ020-BQ600 380V/440VAC 50/60Hz 3PH ON/OFFTYPE**



**BQ010 380V/440VAC 50/60HZ 3PH MODULATING TYPE**



**BQ020-BQ600 110V/220VAC 50/60Hz 1PH MODULATING TYPE**

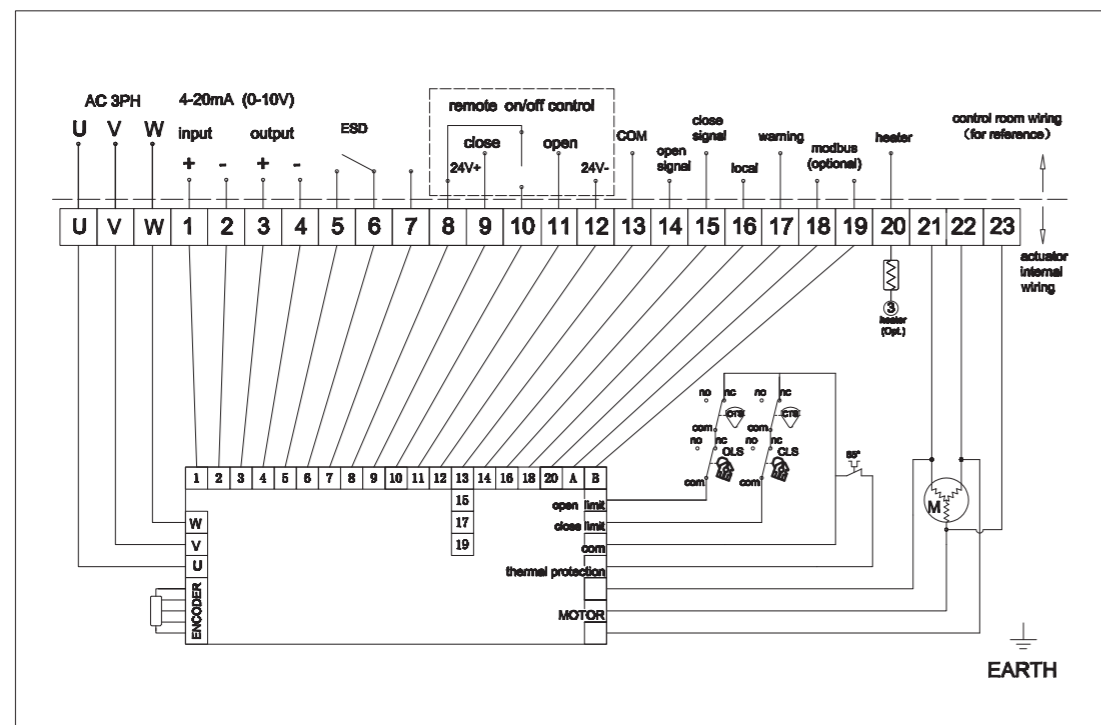


BQ006-120 ON/OFF Type



BQ006-120 Modulating Type

**BQ020-BQ600 380V/440VAC 50/60Hz 3PH MODULATING TYPE**



BQ150-600 ON/OFF Type



BQ150-600 Modulating Type

**Note**

1. The above wiring diagram is for reference only. Please refer to the standard wiring diagram inside of the actuator cover.
2. For modulating type actuator, pls refer to the instructions of the actuator control module.