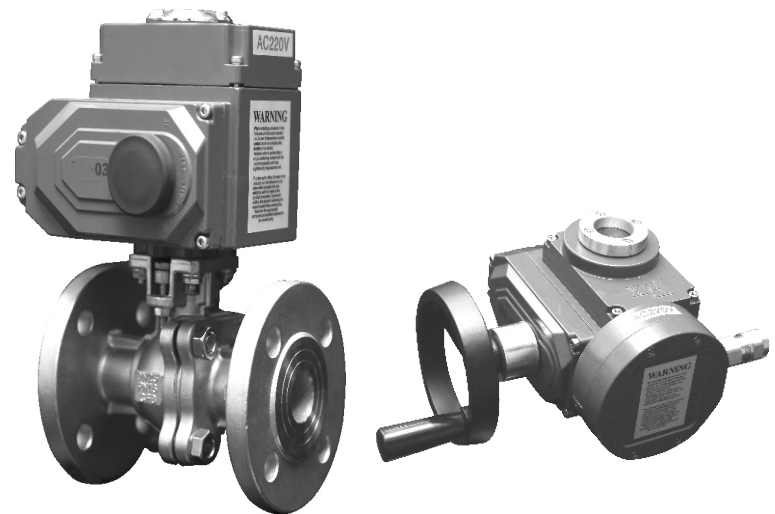


OPERATING INSTRUCTION

Electric actuator



PRECAUTIONS

Must obey

1. Manual operation is prohibited when power is on.
2. The actuator is equipped with an overheat protection device. When the motor motor temperature exceeds 125 °C, the motor power will be cut off by the overheat protection device automatically.
3. Leakage protection device must be installed when using.
4. Please confirm whether the input voltage and wiring contacts are correct.
5. The power lines of two or more products cannot be connected in parallel, and the same contact cannot be used to control several actuators. Otherwise, it will cause runaway and motor overheating.
6. The wiring inlet must be sealed according to the instructions of the waterproof cable connector or the entry of dirt will damage the product.
7. The intelligent adjustment type must be wired and debugged in accordance with the instruction manual to avoid damage.
8. Installation and commissioning personnel must have relevant operating qualifications.
9. Overload use of the actuator is prohibited.
10. The manufacturer is not responsible for any improper changes or repairs to the actuator.

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Series Product Overview, Features and Modeling

一、 Product Overview

Series electric actuators are the new generation of products developed by introducing the latest technology. They are unique in design and fashionable; they are characterized by high intelligence, high protection performance, small size, high integration, long service life and stable performance. It can be operated on site or remotely. It is suitable for controlling 0 ~270° rotation valve and other similar products. Which can also meet the various requirements of industrial automation control management.

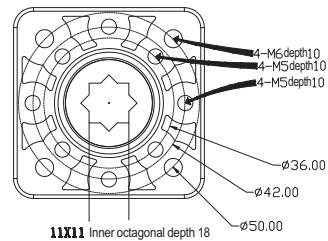
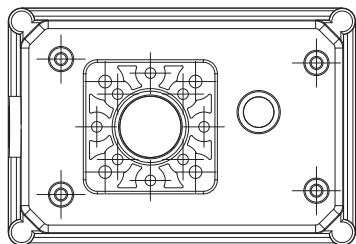
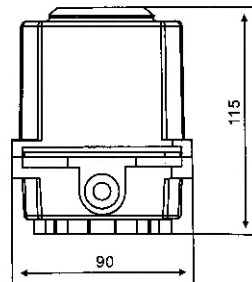
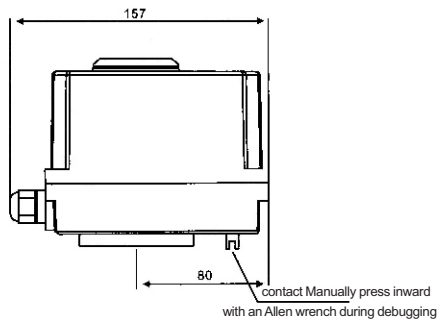
It takes 380V / 220V / 110VAC power as the driving power ,4-20mA current signal or 0-10VDC voltage signal as the control signal. It can move the valve to the required position and realize its automatic control. The maximum output torque is 6000Nm. The products are widely used in petroleum, chemical, metallurgy, water treatment, shipbuilding, papermaking, power plants, printing and dyeing, food processing, pharmaceutical and building automation systems and many other industries.

二、 Product Features

1. Powerful functions: intelligent adjustment type, proportional type, switch type, all kinds of signal output types;
2. Small and light weight: volume and weight are only equivalent to about 35% of traditional products;
3. Beautiful and elegant: aluminum alloy die-casting shell, exquisite and smooth, and can reduce electromagnetic interference;
4. Reliable performance: High quality of key components such as bearings and electrical components;
5. Precision wear resistance: The worm gear output shaft is integrated with a special copper alloy forging, with high strength and good wear resistance;
6. Minimal backlash: the integrated structure avoids the gap of the key connection and high transmission accuracy;
7. Safety guarantee: 1500V withstand voltage test, F-class insulated motor, safe and secure;
8. Simple supporting: single-phase power supply, simple external circuit, 380V, DC power supply;
9. Easy to use: free of oil, free of inspection, waterproof and rust-proof, installation at any angle;
10. Various speeds: 9 seconds, 13 seconds, 15 seconds, 30 seconds, 50 seconds, 100 seconds, 150 seconds set up);
11. Intelligent CNC: The intelligent control module is integrated in the body of the electric actuator, no need to contact another swan, digital setting, highly accurate, automatic diagnosis, multi-function with one machine.
12. The intelligent electric actuator adopts integrated and modular technology, which has the characteristics of reliable performance and complete functions.
It integrates position feedback and servo amplification, and it is easy to adjust and use. The wiring is particularly simple and expand communication interface.
13. With on-site digital display and manual operation functions: the actuator control module has a digital display screen, which can display the actuator opening degree; and can be operated on-site through the keys on the control module.
14. With menu setting function: the intelligent control module has a menu setting key, and The control method, control accuracy, protection measures of the actuator can be set freely through the menu key .
15. With automatic adjustment function: When the actuator's electrical stroke (electrical zero position, full position) is determined, the actuator can automatically calibrate electrical zero and full output ,no need the additional manual adjustment.
16. There is a program to set the upper and lower limit functions: the upper and lower limits of the actuator can be set by pressing the button.
17. There is a break signal to set the action mode of the actuator. The actuator can choose three states at no signal condition: full open, stop and full closed.
18. With electronic brake function: When the actuator needs to stop running, the control module outputs a reverse signal to achieve electronic brake.
19. With error code fault function: When the actuator fails, the control module screen shows an error code, indicating cause of failure.

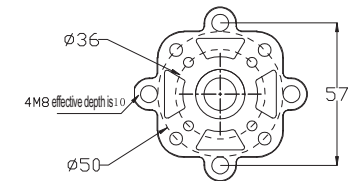
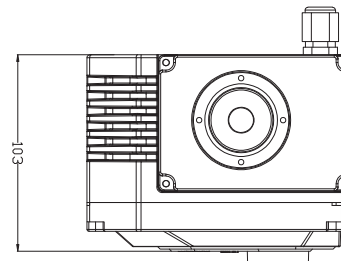
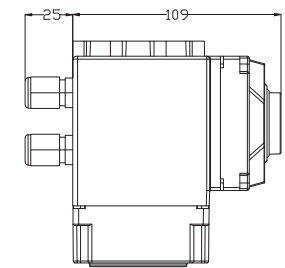
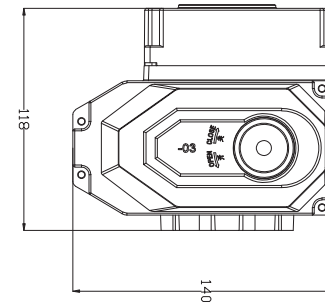
-03 Plastic Series Dimensions and Performance Parameters

model performance	-03					
	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V
Motor power	2W		20W			
Rated current	0.2A	—	0.2A	—	0.1A	0.05A
Output torque	25~30Nm		30Nm			
Operating Time	5S/10S/15S		10S/15S			
Output shaft	Square: 11×11, Depth: 18; Circle: φ12.6, Depth: 18					
Circuit control	B type, S type, R type, H type, A type, K type, D type, T type					
Rotation angle	0~270°					
Weight	1.4kg					
Protection class	IP-67					
Ambient temperature	-25°C~60°C(other temperatures can be customized)					
Installation angle	Any angle					
Body material	Plastic Parts					
Model	Match ball valve	Match butterfly valve	Signal	Special function Passive		
03S	10~20	32~65	Contact signal	Passive contact		



-03 Series Dimensions and Performance Parameters

model performance	-03					
	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V
Motor power	9W			7W		
Rated current	0.7A	—	—	—	0.2A	—
Output torque	40Nm/65Nm		15Nm/30Nm/45Nm/65Nm			
Operating Time	18S			9S/10S		
Output shaft	Square: 11×11, Depth: 17; Circle: φ12.6, Depth: 17					
Circuit control	B type, S type, R type, H type, A type, K type, D type, T type					
Rotation angle	0~270°					
Weight	2.35kg					
Withstand voltage class	500VAC/1minute		1500VAC/1minute			
Insulation resistance	100MΩ/300VDC		100MΩ/500VDC			
Protection class	IP-67					
Ambient temperature	-25°C~60°C(other temperatures can be customized)					
Installation angle	Any angle					
Body material	Aluminum alloy die-casting					
Optional function	Over-torque protection, heating dehumidifier					
Model	Match ball valve	Match butterfly valve	signal	Special function		
03S	10~20	32~65	contact signal	Passive contact		
03R	10~20	32~65	opening signal	1K, 5K potentiometer		
03P	10~20	32~65	4~20mA	Internal module control		

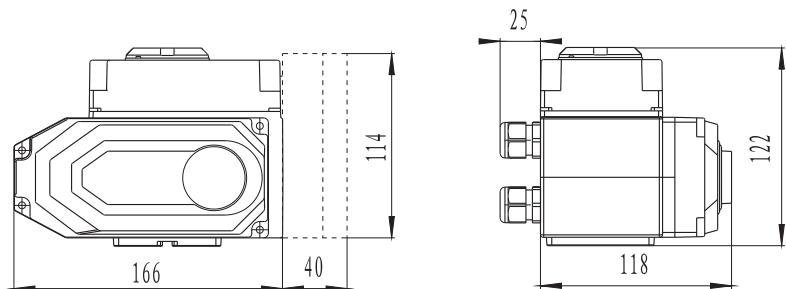


-05series dimensions and performance parameters

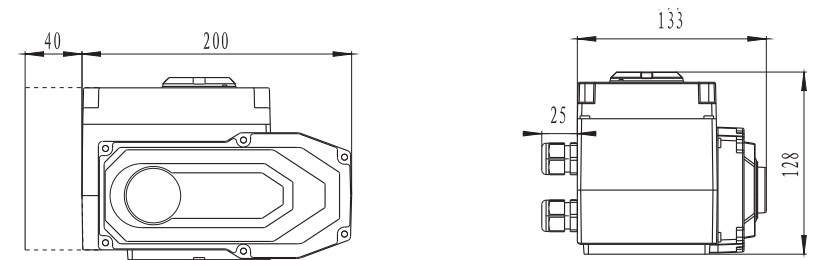
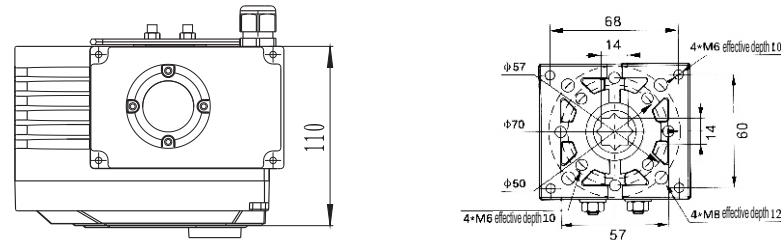
model power	-05					
	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V
Motor power	20W		10W			
Rated current	2A	0.21A	2.2A	0.48A	0.24A	0.15A
Output torque	30Nm/50Nm		15Nm/30Nm/50Nm			
Operating Time	6S/10S		10S/20S/30S			
Output shaft	Square: 11×11/14×14, Depth: 15/18; Circle: φ 12.6, Depth: 26					
Circuit control	B type, S type, R type, H type, A type, K type, D type, T type					
Rotation angle	0~270°					
Weight	3.26kg					
Withstand voltage class	500VAC/1minute	1500VAC/1minute				
Insulation resistance	100MΩ/300VDC	100MΩ/500VDC				
Protection class	IP-67					
Ambient temperature	-25°C~60°C(other temperatures can be customized)					
Installation angle	Any angle					
Body material	Aluminum alloy die-casting					
Optional function	Over-torque protection, heating dehumidifier					
Model	Match ball valve	Match butterfly valve	signal	Special function		
05S	15-40	32-80	contact signal	Passive contact		
05R	15-40	32-80	opening signal	1K, 5K potentiometer		
05P	15-40	32-80	4-20mA	Internal module control		

-10/16 Series Dimensions and Performance Parameters

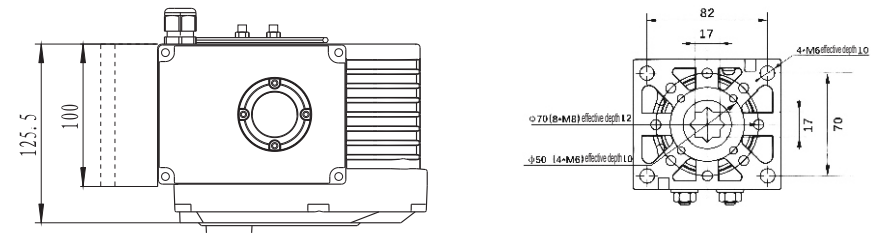
model power	-10/16					
	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V
Motor power	40W		25W/30W			
Rated current	2.4A	0.32A	3A	0.64A	0.32A	0.19A
Output torque	100Nm		50Nm/60Nm/100Nm			
Operating Time	10S		13S/15S/20S/30S			
Output shaft	Square: 14×14/17×17, Depth: 18/23; Circle: φ 15.7/φ 18.95, Depth: 28					
Circuit control	B type, S type, R type, H type, A type, K type, D type, T type					
Rotation angle	0~270°					
Weight	4.6kg					
Withstand voltage class	500VAC/1minute	1500VAC/1minute				
Insulation resistance	100MΩ/300VDC	100MΩ/500VDC				
Protection class	IP-67					
Ambient temperature	-25°C~60°C(other temperatures can be customized)					
Installation angle	Any angle					
Body material	Aluminum alloy die-casting					
Optional function	Over-torque protection, heating dehumidifier					
Model	Match ball valve	Match butterfly valve	signal	Special function		
10/16S	25-50	80-125	contact signal	Passive contact		
10/16R	25-50	80-125	opening signal	1K, 5K potentiometer		
10/16P	25-50	80-125	4-20mA	Internal module control		



(The dashed line is an analog control box, The switch type does not have this size)



(The dashed line is an analog control box, The switch type does not have this size)

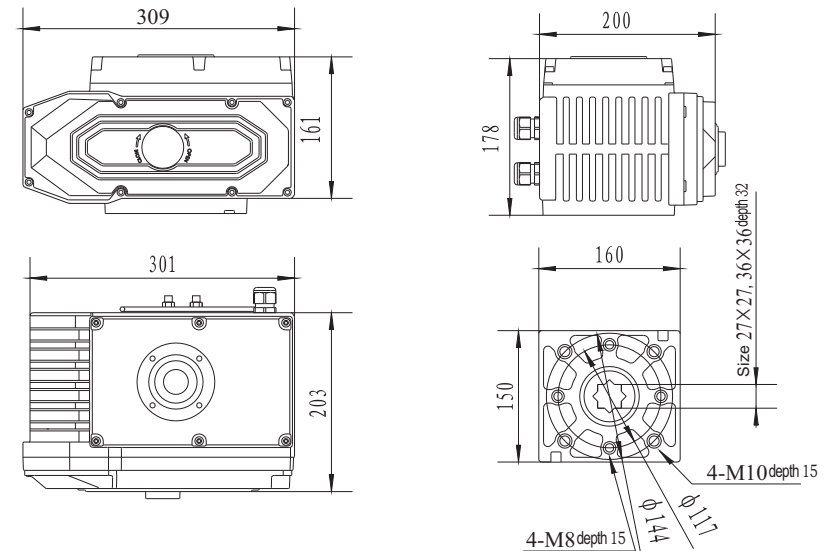
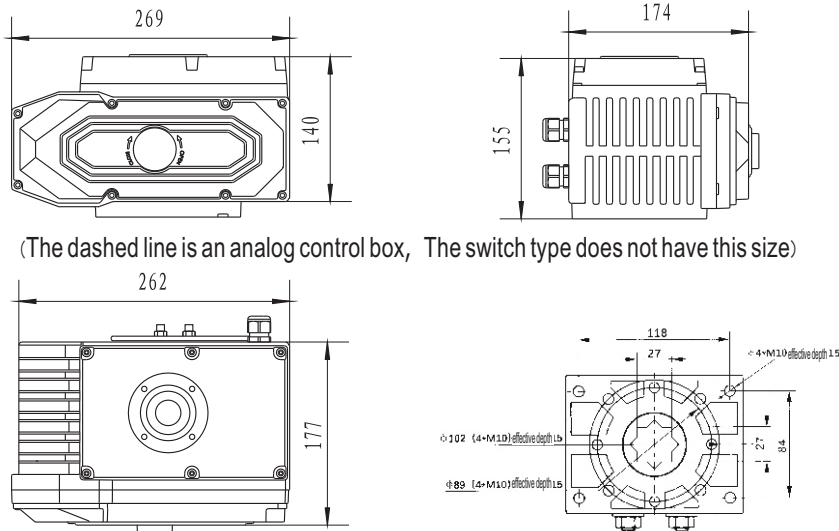


-20/60series dimensions and performance parameters

model performance power	-20						-60					
	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V	DC24V	DC220V	AC24V	AC110V	AC220V	AC380V
Motor power	40W						90W					
Rated current	8A	0.35A	5A	0.9A	0.48A	0.25A	7A	0.9A	8A	2A	0.92A	0.45A
Output torque	200Nm			80Nm/100Nm/150Nm/200Nm			150Nm/250Nm/300Nm/500Nm					
Operating Time	10S		9S/15S/20S/30S/60S				9S/15S/20S/30S/60S					
Output shaft	Square: 14×14/17×17, Depth: 18/32; Circle: φ15.7/φ18.95, Depth: 28											
Circuit control	B type、S type、R type、H type、A type、K type、D type、T type											
Rotation angle	0~270°											
Weight	10kg						10.8kg					
Withstand voltage class	100VAC/1minute			1500VAC/1minute								
Insulation resistance	500MΩ/300VDC			100MΩ/500VDC								
Protection class	IP-67											
Ambient temperature	-25°C~60°C(other temperatures can be customized)											
Installation angle	Any angle											
Body material	Aluminum alloy die-casting											
Optional function	Over-torque protection、heating dehumidifier											
Model	Match ball valve	Match butterfly valve	signal			Special function						
20/60S	50-80/50-125	125-250/125-300	contact signal			Passive contact						
20/60R	50-80/50-125	125-250/125-300	opening signal			1K、5K potentiometer						
20/60P	50-80/50-125	125-250/125-300	4-20mA			Internal module control						

-100/200 Series Dimensions and Performance Parameters

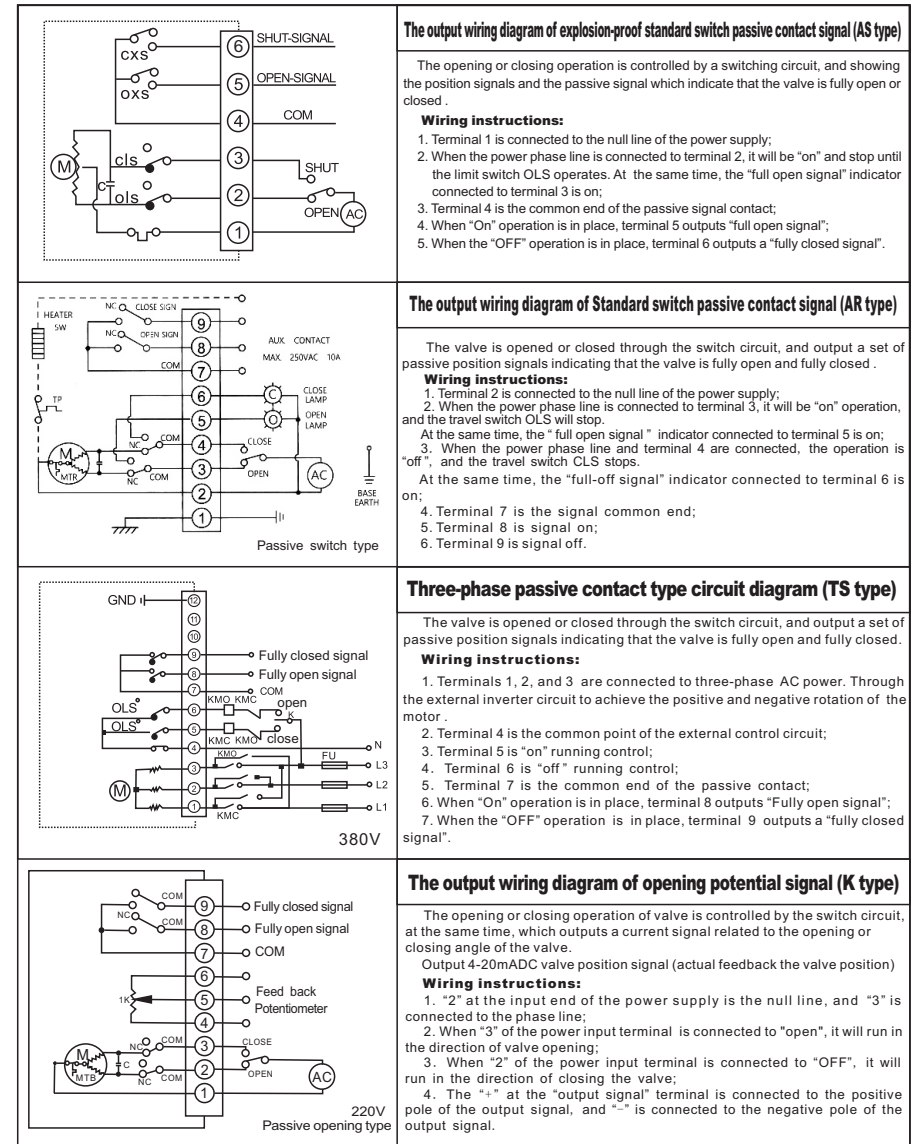
model performance power	-100				-200			
	AC24V	AC110V	AC220V	AC380V	AC24V	AC110V	AC220V	AC380V
Motor power	150W				250W			
Rated current	9A		2.2A		1.2A		0.48A	
Output torque	800Nm/1000Nm				2000Nm			
Operating Time	30S/50S				100S			
Output shaft	Square:27×27, Depth:32; Circle:φ31.65, Depth:45				Max φ45, Depth:65			
Circuit control	B type、S type、R type、H type、A type、K type、D type、T type							
Rotation angle	0~270°							
Weight	11.9kg				12.2kg			
Withstand voltage class	1500VAC/1minute							
Insulation resistance	100MΩ/500VDC							
Protection class	IP-67							
Ambient temperature	-25°C~60°C(other temperatures can be customized)							
Installation angle	Any angle							
Body material	Aluminum alloy die-casting							
Optional function	Over-torque protection、heating dehumidifier							
Model	Match ball valve	Match butterfly valve	signal		Special function			
100/200S	65-150/65-250	125-350/125-400	contact signal		Passive contact			
100/200R	65-150/65-250	125-350/125-400	opening signal		1K、5K potentiometer			
100/200P	65-150/65-250	125-350/125-400	4-20mA		Internal module control			



Intelligent adjustment type (p type) performance parameters

model	03P	05P	10/16P	20P	60P	100P	200P
	parameters	DC24V, DC220V, AC24V, AC110V, AC220V, AC380V/50/60Hz					
performance							
Motor power	8W	15W	25W	40W	90W	150W	250W
Rated current	0.2A (AC220V)	0.24A (AC220V)	0.32A (AC220V)	0.48A (AC220V)	0.92A (AC220V)	1.0A (AC220V)	1.2A (AC220V)
Output torque	40Nm	50Nm	100Nm	200Nm	600Nm	1000Nm	2000Nm
Operating Time	18S	20S	23S	45S	45S	60S	60S
Rotation angle	0~270°	0~270°	0~270°	0~90°	0~90°	0~90°	0~90°
Weight	2.35kg	3.26kg	4.6kg	10kg	10.8kg	11.9kg	12.2kg
Input signal Output signal	4~20mADC, 1~5VDC, 0~10VDC (Others can be selected before delivery)						
Output signal	4~20mADC (Others can be selected before delivery)						
Accuracy class	1%						
Backlash	< 0. 3%						
Dead zone	0. 4%~1. 5% Adjustable						
Insulation resistance	DC24V:100MΩ/300VDC			100MΩ/500VDC			
Withstand voltage class	DC24V:500VAC/1minute			1500VAC/1minute			
Protection class	IP67						
Ambient temperature	-25°C~60°C (other temperatures can be customized)						
Mounting angle	360° Installation at any Angle						
Housing material	Aluminum alloy precision die casting						
Optional function	Over-torque protection, heating dehumidifier, passive contact type						

Control circuit



Note: The dotted line in the control circuit is the internal circuit of the actuator. The other drawings beyond the dotted line are for reference only when the user is wiring.
Note: The power lines of two or more actuators cannot be connected in parallel, and the same contact cannot be used to control several actuators, otherwise it will cause runaway and motor overheating.

Control Circuit

1	2	3	4	5	6	7	8	9
220VAC		Input signal 4~20mA		Output signal 4~20mA		Passive signal		
		+	-	+	-	Common end		Signal off
L	N					Signal on		

The circuit diagram of intelligent adjustment type (P type)

The standard signal input by an external computer or industrial instrument controls the opening and closing angle of the valve, and synchronously outputs the corresponding standard signal.

Wiring instructions:

1. "L" at the "power" input terminal is connected to the null line, and "N" is connected to the phase line;
2. "+" At the "external control" terminal is connected to the positive pole of the input signal, and "-" is connected to the negative pole of the input signal;
3. "+" At the "Feedback" terminal is connected to the positive pole of the output signal, and "-" is connected to the negative pole of the output signal.

The output wiring diagram of analog passive contact signal (PS type)

The standard signal input by an external computer or industrial instrument controls the opening and closing angle of the valve, and synchronously outputs the corresponding standard signal. And output a set of passive position signals indicating that the valve is fully open and fully closed.

Wiring instructions:

1. Terminal 1 is connected to the power null line; Terminal 2 is connected to the power phase line;
2. Terminal 3 is the positive pole of the input signal, and terminal 4 is the negative pole of the input signal;
3. Terminal 5 is the positive pole of the output signal, and terminal 6 is the negative pole of the output signal;
4. Terminal 7 is the common end of the passive contact;
5. When "On" operation is in place, terminal 8 outputs "Fully open signal";
6. When the "OFF" operation is in place, terminal 9 outputs a "Fully closed signal".

220V intelligent regulation type

The output circuit diagram of LCD digital display with feedback 4-20mA signal and passive signal (KS type)

1. You can enter the IP through parameter P=9.1 to choose freely as the adjustable type or the switching value type as one of its working modes, but you cannot use the adjustable type and the switching value type at the same time (5 kinds of switching value control methods). The factory default adjustment type is ip=0 or the switch value is ip=1. For other control styles, please refer to 《Remote Control Signal Setting》.

2. To open and close the torque port, you need to connect a limit switch with the normally closed point switch. The factory default value is Md=2. When this function is not used, you can modify the Md=1 parameter by P=9.5 to block this portfunction. Please refer to 《Actuator Wiring Type Setting》.

3. The common terminal of switch value control is DC24V +, the voltage of which is provided by this module, no need to connect the external power supply.

4. The product can be connected to a potentiometer or encoder, please refer to 《Selection of Valve Position Sampling》.

Internal wiring (passive signal output)

Internal wiring (switching control)

Internal wiring (analog control)

The output wiring diagram of DC24V intelligent regulation type

Note: The dotted line in the control circuit is the internal circuit of the actuator. The other drawings beyond the dotted line are for reference only when the user is wiring.

Note: The power lines of two or more actuators cannot be connected in parallel, and the same actuator cannot be used to control several products, otherwise it will cause runaway and motor overheating.

Using requirements

Power voltage

Please select the power supply voltage according to the product nameplate or wiring diagram. Several possible voltages are as follows:

Note: When using AC380V, pay attention to the phase sequence when wiring. Make sure that the travel switch can control the opening and closing of the valve correctly, otherwise the actuator will be damaged.

Selection of fuse and circuit breaker:

In order to better protect electric actuators, eliminate short circuits, and reduce accidental damage, a disconnect switch can be added to the power input end of each electric actuator, and select the appropriate fuse as per the following sheet.

model	voltage fuse					
	AC380V	AC220V	AC110V	AC24V	DC220V	DC24V
03	—	0.2A	—	—	—	0.7A
05	2A	2A	3A	5A	2A	5A
10	2A	3A	5A	7A	3A	7A
20/60	3A/5A	5A/7A	7A/10A	10A/11A	5A/7A	15A
100/200	5A	7A	10A	20A	20A	

Requirements for the installation environment

Note for indoor installation:

1. It is a non-explosion-proof actuator, do not install it in the room with explosive gas;
2. When installing in a place with rain and splashing of raw materials, please install a protective cover covering the whole machine;
3. Please reserve space for wiring and manual operation.

Note for outdoor installation:

1. Please install a protective cover covering the whole machine to avoid rain and direct sunlight;
2. Please reserve space for wiring and manual operation.

Note: Direct sunlight outdoors will cause high temperature, accelerate the aging of components and even failure, and rain will accelerate the aging of rubber pads.

Ambient temperature, fluid temperature conditions

1. The ambient temperature should be in the range of -25 °C ~60 °C;
2. When the temperature of the fluid is high, the drive unit should be installed on the valve using a high-temperature type connecting frame and joint.

Note: When using it at a temperature below zero or within a large temperature difference, select a model with a dehumidification heater to prevent condensation.

Field cable and wire tube installation requirements

1. When using electric conduit, please install as shown in figure (1);
- ①. Outer diameter of wire tube $\phi 8 \sim \phi 12$;
- ②. Take waterproofing measures adequately;
- ③. The actuator should be higher than the electric conduit so that water droplets in the electric conduit cannot flow into the actuator to ensure safety;
2. When using a cable, the outer diameter of the cable is $\phi 8$ to $\phi 12$. As shown in (2), it is not allowed to use the waterproof cable connector to enter the actuator to damage all internal parts;
3. In principle, shielded wires should be used for signal wires, and they should be separated from power wires.

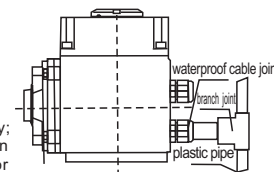


Figure 1

Power requirements

1. Provide corresponding on-site power supply according to the type of power supply used by the model ordered;
2. The on-site power supply and voltage should obey the following requirements:

AC380V $\pm 10\%$ 50/60Hz AC220V $\pm 10\%$ 50/60Hz
 AC110V $\pm 10\%$ 50/60Hz AC24V $\pm 10\%$ 50/60Hz
 DC24V $\pm 5\%$

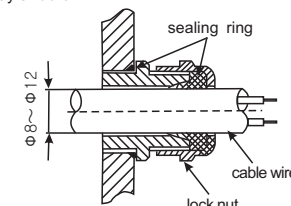


Figure 2

Installation of actuator and valve (Figure 3-4)

1. Turn the valve manually to confirm that there are no abnormal conditions, and turn the valve to the fully closed position;
2. Fix the bracket on the valve lightly with bolts;
3. Put the actuator on the bracket and screw it on lightly with bolts and nuts;
4. Turn the handle of the actuator to the fully closed position (pointer point CLOSE, close the scale mark), and fix the valve shaft core and the output shaft of the actuator with couplings and screws;
5. Screw on the screws between the actuator and the bracket;
6. Use the handle to rotate the actuator, confirm that there is no eccentricity, no bend, no jamming, and stable operation, and check whether the valve can be fully closed and fully opened within the range of the actuator opening indication.

Note: Do not push too hard, otherwise it will lead to overrunning of the actuator and cause damage. When installing, pay attention to make the switch of the actuator match the switch of the valve. The flange on the bottom of the actuator meets the ISO5211 standard. If the valve connected also meets this standard, it can be easily connected; if it does not meet this standard, an additional bracket connection is required.

Special Note

For users who bring their own brackets and couplings, please note:

- ① The bracket and coupling shall be designed and processed by professional technicians and shall comply with (Figure 4) labeling requirements;
- ② The machining of the shaft holes at both ends of the coupling should ensure the necessary accuracy. Eliminate transmission gaps as much as possible to avoid backlash during valve operation;
- ③ The position of the shaft holes at both ends of the coupling should be strictly guaranteed, otherwise it may exceed the working range of the actuator design, resulting in the valve not working normally because the actuator stroke cannot be adjusted.

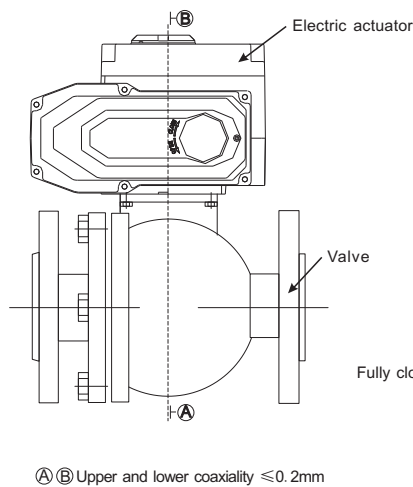


Figure 3

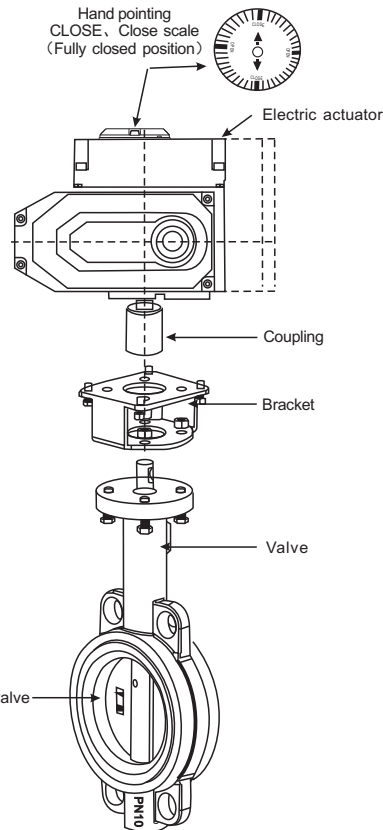


Figure 4

The adjustment of switch type

一、 Adjustment of electrical limit (Figure 5)

1. Before adjusting the electrical limit, loosen the adjustment screw of the mechanical limit. After the electrical limit is adjusted, re-fix the mechanical limit to prevent the machine from being stuck.
2. Turn the handwheel to move the actuator to the fully closed position of the valve, and then use a wrench to loosen the firm nut of the limit cam, turn the limit cam (yellow on, red off) and adjust it to the position where the limit switch (CLS) is depressed, and then tighten the limit cam nut. In this way, the position of the actuator's fully closed stroke limit is finished setting. Position adjustment for full opening is also set in the same method.
 - ⚠ Manual operation is prohibited when powered on
 - ⚠ When adjusting the electric actuator with a rotation angle of 0 to 90°, don't adjust the angle too much or enlarge it at will.

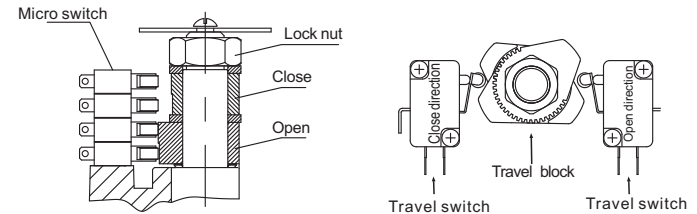


Figure 5

二、 Adjustment of mechanical limit (Figure 6)

1. Use the handle to drive the actuator to the fully closed position (a 'click' sound will be issued when the travel switch is actuated);
2. Loosen the lock nut of the mechanical limit screw, and then move the actuator manually to the fully closed position. Rotate the limit nut, it stop rotating when hits the sector gear inside, and then back out two turns, finally tighten the locknut.
3. The same method can be used to adjust the mechanical block in the fully open position.
 - ⚠ The electrical and mechanical limit positions of the electric actuator must meet the requirements of (Figure 7). If the mechanical limit is ahead or heavier than the electrical limit, the motor of the electric actuator will be blocked, causing heat or burned.

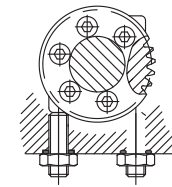


Figure 6

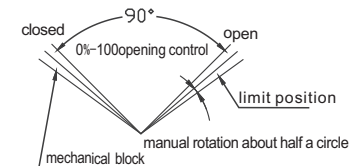


Figure 7

三、 The adjustment of the potentiometer (applicable to K, KS, P, PS type) (Figure 8) (generally no need to be adjusted)

1. The resistance value of the potentiometer is: 1K Ω (5K Ω);
2. Use the handle to drive the actuator to the fully closed position;
3. Loosen the screws of the opening gear, turn the opening gear, adjust the potentiometer, and use a multimeter to measure the resistance value between the 4~5 terminals, making the resistance value between the 4~5 terminals is about 10 Ω . Strong opening gear lock screw. (If it is an adjustable seven-wire connector, please measure the resistance of the two RV and RS jacks). You can also loosen the potentiometer directly to adjust, but when fixing, please pay attention to the tooth of the potentiometer gear and the opening gear, The gap should not be too large or too tight, otherwise it will affect the overall accuracy of the actuator.

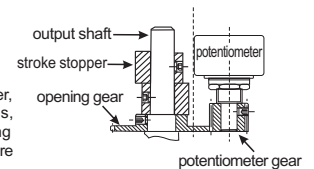


Figure 8

Debugging of adjustable type(P type)

The adjustment of the adjustable type

The adjustment of the actuator

Before adjusting the intelligent positioner, the adjustment method of the switching angle should be known, and the electrical limit, potentiometer and mechanical limit of the actuator should be adjusted according to the full close and full open of the valve.

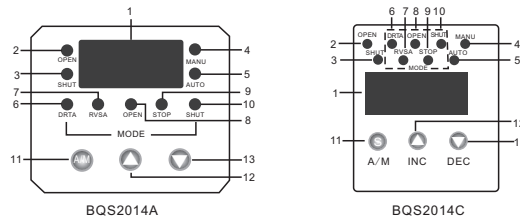


Figure 9

Locator panel

Parameter display	1	LED window	Display the actual opening value, setting opening value of valve, temperature in the positioner shell and setting parameters by pressing the button to switch.
Status indication	2	OPEN	Output control "open" circuit breaker close
	3	SHUT	Output control "closed" circuit breaker close
	4	MANU	Manual state
	5	AUTO	Automatic state
	Mode indication	6	DRTA
7		RVSA	In reverse action mode, the corresponding input signal is showing as follows: 4mA—zero position (normally calibrated as fully closed); 20mA—full position (normally calibrated as fully open)
8		OPEN	When the input signal interrupted as "On", the actuator is opened to the maximum opening limit
9		STOP	When the input signal interrupted as "stop", the actuator stop at the current position
10		SHUT	When the input signal interrupted as "closed", the actuator is opened to the minimum opening limit
Press key	11	A / M	Manual / automatic switching, parameter entry modification and switching keys
	12	▲	The value increase key is also used to switch and display the valve position to set the opening value in the automatic state, and the position is "on" in the manual state.
	13	▼	The value decrease key is also used to switch and display the temperature inside the positioner shell in the automatic state, and the position is "closed" in the manual state.

Wiring instructions

The BQS2014 intelligent positioner is connected to the electric actuator through a seven-wire connector.

There is a six-wire resilient pressure-locked terminal block (Figure 10) in the positioner, where N and L are connected to 220VAC single-phase neutral and phase line, Two 4~20mA (or 1~5V, etc.) IN terminals are connected to control current (voltage), and the two 4~20mA terminals are for feedback current signal output. It can be connected to the ammeter to indicate the actual valve opening, or left unconnected. The connecting wire can be single-core or multi-core infrared insulated wire with a core of $\Phi 1\sim\Phi 2\text{mm}$ (Figure 11). Remove 7mm insulation, if multi-core wire is used, it is best to be twisted tighten and tinned, so the connection will be much easier. When wiring, you can insert a single-core wire or multi-core wire after tinning into the hole, when you feel the elastic resistance, continue to insert 4~5mm, if the wire is soft, put the wire into the hole; after the resistance appears, use a flat-blade screwdriver to press down the elastic lock switch on the side of the corresponding hole; then insert the wire into 4~5mm, Then release the elastic lock switch and the wire is locked tightly. After the wire is locked, it cannot be pulled down normally.

When it needs to be pulled out, use a flat-blade screwdriver to press down the elastic lock switch on the side of the corresponding hole. Then the line can be pulled out.

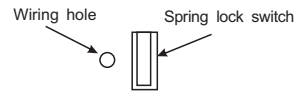


Figure 10

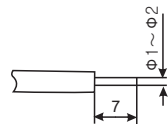


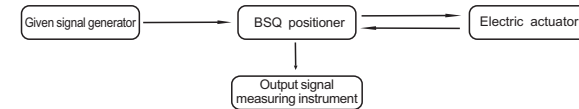
Figure 11

Debugging of adjustable type(P type)

Setting operation method of intelligent positioner

Connect the wiring among the given signal source, positioner, electric actuator, output signal measuring instrument and power supply according to the wiring diagram.

1. Power on, the actual opening value of the valve position is displayed, and the positioner is in the automatic measurement control state;
2. Press A / M key to switch to manual state, press ▲ and ▼ key separately, the detection of actuator should respond with "open" and "close" trend action;
3. In the automatic state, press ▲ to view the valve position to set the opening value. At this time, you can check the change trend and stability of the input signal;
4. In the automatic state, press ▼ to observe the temperature inside the housing shell of the positioner. When the temperature exceeds 70 °C (can be amended), the positioner stops the opening and closing control of the actuator;
5. In the automatic state, press the A / M key for about 4 seconds, please refer to the setting parameters of the following table. The parameter values can be modified by pressing the ▲ and ▼ keys. For details, see the operation flowchart.



Parameter list

Parameter	Display value	Meaning	factory default
U0	X. X	Electronic brake 0. 0: invalid 1. 0: valid	1. 0
U1	X. X	Positive and negative effects 1. X: negative effects 0. X: positive effects Reaction mode: input signal 4mA-zero position (fully closed); 20mA-full position (fully open) Positive action mode: input signal 4mA-full position (full open); 20mA-zero position (full close) Interrupt signal mode: 0. 0: ignore (not alarm); 0. 1: open 0. 2: stop 0. 3: closed When the input signal is disconnected, the actuator performs the above setting operations	1. 2
U2	XX. X	The lower limit value of control output is $0 \leq U2 < 100. 0$, which is not limited by this parameter during manual and calibration of zero point and full position.	0. 0
U3	XXX. X	The upper limit value of control output is $0 < U3 \leq 100. 0$, which is not limited by this parameter during manual and calibration of zero point and full position.	100. 0
U4	0. X	Positioning accuracy: X. X/100 positioning error, setting range: 0. 1~9. 9 If the accuracy value is too small, the actuator is easy to oscillate; if the accuracy value is too large, affecting the control accuracy.	0. 2
U5	-oh-xxxx	At the -oh- prompt, if you continue to press the A / M key, you will enter the actuator corner manual calibration. If you press ▲ ▼ to change the password value of U5, enter the corresponding special function.	xxxx
U6	xxx	Confirm the zero position of the actuator, press the ▲ ▼ key. When the designated zero position is reached, press the A / M key to confirm the zero position, and then enter U7.	xxx
U7	xxxx	Confirm the full position of the actuator. Press the ▲ ▼ key. When the designated full position is reached, press the A / M key to confirm the full position.	xxxx

Note: Other parameters are reserved by the company. If necessary, please refer to the appendix.

The calibration of the actuator has been completed before leaving the factory. The user only needs to connect the power source, signal source, and output signal measuring instrument (optional), and it can be used directly, and it can be used directly without recalibration. If you do want to recalibrate, follow the steps below.

Calibrating the zero and full positions of the actuator. This calibration has no effect on the input and output signals of the positioner. After the actuator is readjusted, the corner of the actuator must be calibrated, thus the positioner can work normally. There are two methods for calibration:

Method one (manual calibration) (refer to the operation procedure):

1. Enter U5, when the -oh- symbol is displayed, then press the A / M key again to enter the U6 parameter (calibrating zero position), press ▲ or ▼, the actuator will operate in the direction of "open" or "close". At the same time, the actual opening value of the valve position is gradually increased or decreased accordingly. When the desired zero position is reached (generally set at the fully closed position), press the A / M key to confirm the zero position and enter the U7 parameter;
2. Enter U7 parameter (calibration full position), press ▲ or ▼ to the desired full position (usually set to the fully open position), press A / M key to confirm the full position, and the actuator will return to the measurement control state automatically.
3. Next, enter the setting menu, press the A / M key until U5, press the key to make U5 = -0A- state, and then press the A / M key to enter the automatic calibration state.

Method two (automatic calibration):

1. In the automatic state or manual mode, press and hold the A / M key first, and then press the ▼ key lightly to start the automatic calibration procedure. At this time, Release the key, there will be no other effects on the key operation. The actuator first moves in the direction of closing, and after the limit switch is closed, it moves to the open direction to confirm the zero position (Corresponding to valve position 0. 0), then continue to move in the open direction, until the open limit switch is activated, move in the closed direction and confirm the full position (corresponding to valve position 100). After the calibration is completed, the data flashes, when the user press the A / M key to confirm, it can return to the automatic state.
2. During the measurement control of the positioner, the actuator may oscillate due to the quality of the input signal and external electromagnetic interference, which may cause heating. In order to avoid continuous vibration of the actuator, you can modify U4 (If the accuracy value is too small, the actuator is easy to oscillate; if the accuracy value is too large, affecting the control accuracy).

Note: If there is 10S idle during parameter modification, it will automatically return to the measurement control state.

Operating procedures

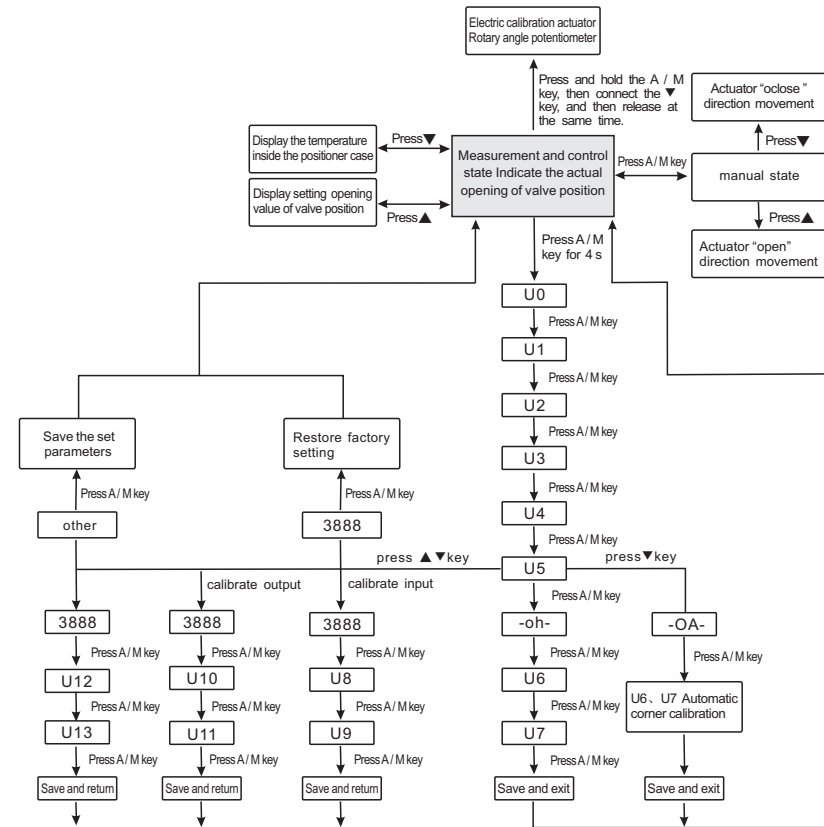


Figure 12

List of error codes

Error code	meaning
-E1-	Only valid for 4~20mA input signal. When the external input signal is $\leq 3.0\text{mA}$, it is judged as a signal interruption, and a signal interruption processing program will be performed. (Actuator open / stop / close / ignore action), the digital tube displays -E1-. When the signal is restored, continue to work and release the alarm.
-E3-	The signal feedback line or open / close line between the positioner and the actuator is inversely connected, and the power failure is checked.
-E4-	The actuator is locked-rotor when turning in the closed direction
-E5-	The actuator is locked-rotor when turning in the open direction
Relay alarm	When the above E1-E5 error code appears, the alarm relay contacts are closed, and the contacts are disconnected after being released.

Other calibration operations: input signal, output signal and other calibration methods

This operation is generally not required after leaving the factory. If necessary, please use it under the guidance of an engineer

1. Input signal calibration

①. In the normal measurement and control state of the positioner, press the A/M key for about 4 seconds to enter the setting parameter state; Displaying the parameter of "U0". Select the "U5" parameter by pressing the A/M key.

Press the ▲▼ keys to modify the value of "U5" to be 288; (Refer to the table below for numerical value meanings).

②. Enter the "U8" parameter for the calibration of input current zero point: when calibrating, input the zero signal (usually 4mA) by the external instrument, press A / M to confirm, and enter "U9" parameter.

③. "U9" parameter is the calibration input current full scale: when calibrating, input the full scale signal (usually 20mA) by an external instrument, press A/M key to confirm, and then enter the "U5" parameter; Press A / M to confirm and return to U5 / 288 wheel display menu.

The above operations ensure the cleanness and stability of the input signal.

If you feel that the previous calibration is not ideal, you can press A/M to enter U8 and U9 to recalibrate. If continue other calibrations, press the ▲ or ▼ keys to adjust to the corresponding special digit and continue with other calibrations. If you want to save and exit, press ▲ or ▼ key, make the digit not to be 288, 588, 1888, 3888, and then press A / M key to save and exit.

2. Output signal calibration

①. In the normal measurement and control state of the positioner, press the A/M key for about 4 seconds to enter the setting parameter state; Displaying the parameter of "U0". Select the "U5" parameter by pressing the A/M key.

Press ▲▼ keys to modify the value of "U5" to be 588; (Refer to the table below for numerical value meanings).

②. When entering "U10", press ▲ or ▼ key to adjust the positioner value and observe the display data of the measuring instrument. When it is equal to the lowest position of the output signal (such as 4mA) through the whole process, Press the A/M key to confirm, switch to U11, press ▲ or ▼ key to adjust the positioner digit, and observe the display data of the measurement instrument, when it is equal to the highest position (e.g., 20mA) of the output signal through the whole process, Press A/M key to confirm, and return to U5 / 588 wheel display menu.

③. If you feel that the previous calibration is not ideal, you can press A/M key to enter U10 and U11 to re-calibrate. If continue other calibrations, press ▲ or ▼ to adjust to the corresponding special digit and continue with other calibrations. If you want to save and exit, press ▲ or ▼ key, make the digit not to be 288, 588, 1888, 3888, and then press A / M key to save and exit.

3. Factory recovery and auxiliary settings

①. Factory recovery

In the normal measurement and control state of the positioner, press the A / M key for about 4 seconds, it will enter the setting parameter state; Displaying the parameter of "U0". By pressing the A / M key, select the "U5" parameter.

Press ▲▼ keys to modify the digit of "U5" to be 3888 and press the A/M key to confirm. At this time, the factory settings are recovered, and the automatic control operation status is returned.

Note: After the factory setting are recovered, you need to re-calibrate the actuator corner and reset your own special settings.

②. Temperature calibration and rocked-rotor test time settings

In the normal measurement and control state of the positioner, press the A / M key for about 4 seconds, it will enter the setting parameter state;

Displaying the parameter of "U0". Select the "U5" parameter by pressing the A / M key.

Press ▲▼ keys to modify the digit of "U5" to be 1888 and press the A/M key to confirm. Enter the calibration of U12 (low position of output signal) and U13 (high position of output signal).

③. Rocked-rotor test time is set by U13. When the actuator locks for XX.X seconds without moving, the program performs the locked-rotor test and fault alarm.

Parameter	Display Value	Meaning
U8	U8/XXX	Input signal low-level (e.g., 4mA) calibration: adjust the external signal source to the lowest level of the signal (e.g., 4mA). When the signal digit does not change, press A / M key to confirm.
U9	U9/XXX	Input signal high-level (e.g., 20mA) calibration: adjust the external signal source to the highest level of the signal (e.g., 20mA). When the signal digit does not change, press A / M key to confirm.
U10	U10/XXX	Output signal low-level (e.g., 4mA) calibration: press ▲ or ▼ key to adjust the positioner digit, and observe the display data of the measurement instrument, when it is equal to the lowest position (e.g., 4mA) of the output signal through the whole process, press A / M key to exit.
U11	U11/XXX	Input signal high-level (e.g., 20mA) calibration: press ▲ or ▼ key to adjust the positioner digit, and observe the display data of the measurement instrument, when it is equal to the highest position (e.g., 20mA) of the output signal through the whole process, press A / M key to exit.
U12	U12/XXX	Internal temperature calibration: Press the ▲ or ▼ key to adjust the positioner digit. The setting range is -45.5~85. °C.
U13	U13/XXX	The setting of locked-rotor test time: Press ▲ or ▼ to adjust the positioner digit. Setting range: 5.5~60.0S. When the actuator locked for xx.x seconds without any action, the program performs a locked-rotor test and a fault alarm. When the invalid hysteresis time (transmission error) is larger, the locked rotor time should be set larger to avoid false alarms.

Use and maintenance

Note: This product has passed full commissioning and inspection before leaving the factory. When the product is installed and connected to the valve, the valve may not be fully closed or fully opened due to valve couplings and other reasons. It needs to be readjusted. The following steps should be followed during adjustment:

1. The actuator and the valve should be installed and connected in correct way;

2. Manual trial operation: (Note: When manual operation, the power must be cut off first)

Remove the dust plug on the front cover, insert the attached handle into the hexagonal hole, and turn it clockwise to reduce the valve opening. When the valve is in the fully closed position, observe whether the travel switch in the closing direction actuates or not (a "click" sound will be emitted when the switch is actuated), then turn the handle. Check if the mechanical block hits the adjustment screw; turn the handle counterclockwise to increase the valve opening.

In the same way, check the travel switch in the opening direction and mechanical block. After manual operation, plug the dust plug.

3. Electric trial operation:

Remove the entry cover and wire it correctly as per the circuit diagram;

Before power-on trial operation, manually check whether the opening meter and the angle of the valve (full open, full close) are consistent or not. Check whether the wiring is correct or not. At the same time, you must use an external transfer switch to confirm that the actuator and valve are working properly. Power on after confirmation.

Note: 1. Check the wiring diagram, whether the power, input and output signals are correct or not;

2. Try not to change the internal wiring;

3. If the power supply is three-phase, check whether the rotation direction is correct or not (clockwise is off and counterclockwise is on); manually place the actuator in the middle position, then power on and enter the open instructions; if the actuator runs to the open position and stops after touching the limit switch, the wiring is correct;

4. If the actuator runs in the opposite direction, you must exchange any two of the three-phase power lines.

Maintenance

1. Aiming at the tight structure of this product, the high-quality molybdenum-based grease with long life and good pressure resistance is used, so no need to check and refuel;

2. When the electric valve does not work for a long time or seldom works, please drive the actuator regularly to check for any abnormal tape.

Failures and solutions

failure phenomenon	reason	solution
motor does not run	no connection with the power	connect to the power
	The voltage is incorrect or voltage is too low	check whether the power voltage is normal or not
	Disconnection, the connection is detached from the terminal	Connect the wires, and connect the solid terminals correctly
	The overheat protector activate(whether the ambient temperature is too high and the valve is stuck or not).	Reduce the ambient temperature, and check whether the valve opening and closing is normal by manual method
		Reduce the frequency of use
	Overload	
	The travel switch has been activated	Adjust the travel block
The capacitance of the motor entering phase is damaged	Contact the manufacturer to replace the capacitor	
the switch indicator is not on	DC electric actuator diode break	Contact the manufacturer to replace the diode
	The indicator light is broken	change the indicator light
The motor cannot stop when running to the limiting position	The travel switch is out of order	Change the travel switch
	The travel switch is out of order	Change the travel switch
	Phase sequence of three-phase AC power is reversed	Adjust the phase sequence of three-phase AC power
	The connection between the travel switch and the control circuit is wrong	Adjust the wiring
	The mechanical limit actuates ahead of electrical limit	Readjust the mechanical block as per the adjustment instructions of the mechanical limit block.
	DC electric actuator diode break	Contact the manufacturer to replace the diode
actuator inflow water	Denso sight glass rupture	Contact the manufacturer for repairs
	upper cover, inlet cover, front cover are not fastened and locked.	
	The incoming cable is not standardized or the inlet is not waterproofed as per the instructions.	

Valve configuration specifications

Valve configuration specifications

Product Model	Output torque	Operating Time (0~90°)	Power	Match soft-seal ball valve	Match soft-seal butterfly valve
-03	40~45N.m	4S/9S/18S	AC24V. 110V. 220V. 380V. DC24V	DN10-20	DN32-65
-05	50N.m	10/20S/30S		DN15-40	DN32-80
-08	80N.m	10/20S/30S		DN15-40	DN32-80
-10	100N.m	10/20S/30S		DN25-50	DN80-125
-16	160N.m	10/20S/30S		DN25-65	DN80-150
-20	200N.m	20S/30S/50S		DN50-80	DN125-250
-60	600N.m	20S/30S/50S	AC24V. 110V. 220V. 380V	DN50-125	DN125-300
-100	1000N.m	50S		DN65-150	DN125-350
-200	2000N.m	100S		DN65-250	DN125-400

Due to the large number of valve types, the same specifications of models, different manufacturers, different operating environments, the actual working torque of the valves are also different. Therefore, it is recommended that when selecting the type of electric actuator, the working torque of the valve should be 60~80% of the rated output torque of the actuator.