

# USER MANUAL

## JYL series electric actuators



THANK YOU for buying JYS series electric actuators of our company. Before you install and connect parts and install the equipment on site and conduct control operation, please carefully read this manual. Follow various instructions in the manual and you will get convenience and excellent performance at work.

## **Cautions**

### **Make sure you observe them**

- 1, When it is energized, it is forbidden to operate it manually.
- 2, Inside the actuator, there is a overtemperature protection device, so when electromotor temperature rises beyond 125°C, the overheat protector will turn off the power automatically.
- 3, When using it, you must mount an electricity leakage protection device .
- 4, Please make sure the input voltage and wiring connection points are correct .
- 5, You must not link the power lines of 2 or more electric drive devices in parallel connection . You must not control several electric drive devices from one single connection point.Or else, it may get out of control and the electromotor may superheat.
- 6, The in-leads of wiring must have the sealing for waterproof cable connector according to operation manual . Or else, the electric drive device may be damaged due to intrusion of water or filthy mud.
- 7, The intelligent regulation type must be wired and commissioned according to operation manual, to avoid damage.
- 8, Installation and commissioning staff must have related operation qualification.
- 9, Electric drive devices must not be used under overload .
- 10, The manufacturer does not bear responsibility for improper change or repair of electric drive device.

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## I, Product overview

JYL series electric actuators are new generation products we develop after importing foreign latest technology. 90 % of its components are imported with original packaging. So they have adequate assurance of stability of performance. JYL series electric actuators have high intelligence, high guarding ability, compactness, high degree of integration, long performance life, stable performance and other merits. It allows operation on site. It also allows remote control. It suits ball valve, butterfly valve, throttle valve separating wall and other equipment that rotate by 90 degrees. It can satisfy various requirements of industrial automation piping control. It has widespread use in many industries. Including : metallurgy, petroleum, chemical engineering, generating station, printing and dyeing, water treatment, shipbuilding, paper-making, food processing, pharmacy and building automation system etc.

## II, Product features

- 1, Strong features: intelligent regulation type, proportion type, switch type, various signal output type, everything that you expect to find;
- 2, Small and light: Its volume and weight are merely equal to about 35 % of traditional products;
- 3, Elegant appearance: aluminum alloy cast shell, refined and fluent, reducing electro-magnetic interference;
- 4, Reliable performance: key components like shaft bearings and electrical elements are imported famous-brand products;
- 5, High protection standard: IP 68 high standard protection level (detected by Shanghai instrumentation and autonomous system inspection and test institute);
- 6, Precise and wear resistant: The worm wheel output shaft adopts integrated forging from special copper base alloy, and has high strength and good wearability;
- 7, Extremely small return difference: its integrated structure avoids the gap of key-joints, and has high driving accuracy;
- 8, Safety guarantee: it has passed 1500 V voltage endurance detection, it has class F insulation electromotor, and it has CE accreditation, so it has higher safety guarantee;
- 9, Simple to mate: it adopts single phase power supply and simple connection loop, and we can also make it 380 V or DC.
- 10, Convenient to use: no need to oil and no need to make spot-check, and it is waterproof and rust-proof, and can install at any angle;
- 11, Multi-speed: its whole range time is 9 Seconds, 13 Seconds, 15 Seconds, 30 Seconds, 50 Seconds, 100 Seconds, and 150 Seconds (already set when leaving factory);
- 12, Intelligent digital control: the intelligent control module is integrated in the electric actuator, so it need not connect an external localizer; digital setting, digital calibration, high precision, self-diagnosis, and multiple - feature in one device.

## II, Coding of the model

J Y L - 1 0 A / 3 0 S / A C 2 2 0 V / F 0 5 - 0 7 / G C

"N" Heater and dehumidifier,  
"N" when not selected

"N" Over-moment protection,  
"N" when not selected

installation mode: F signifies direct installation  
(ISO5211 standard), B signifies standard type

power supply type

0~90° opening and closing time

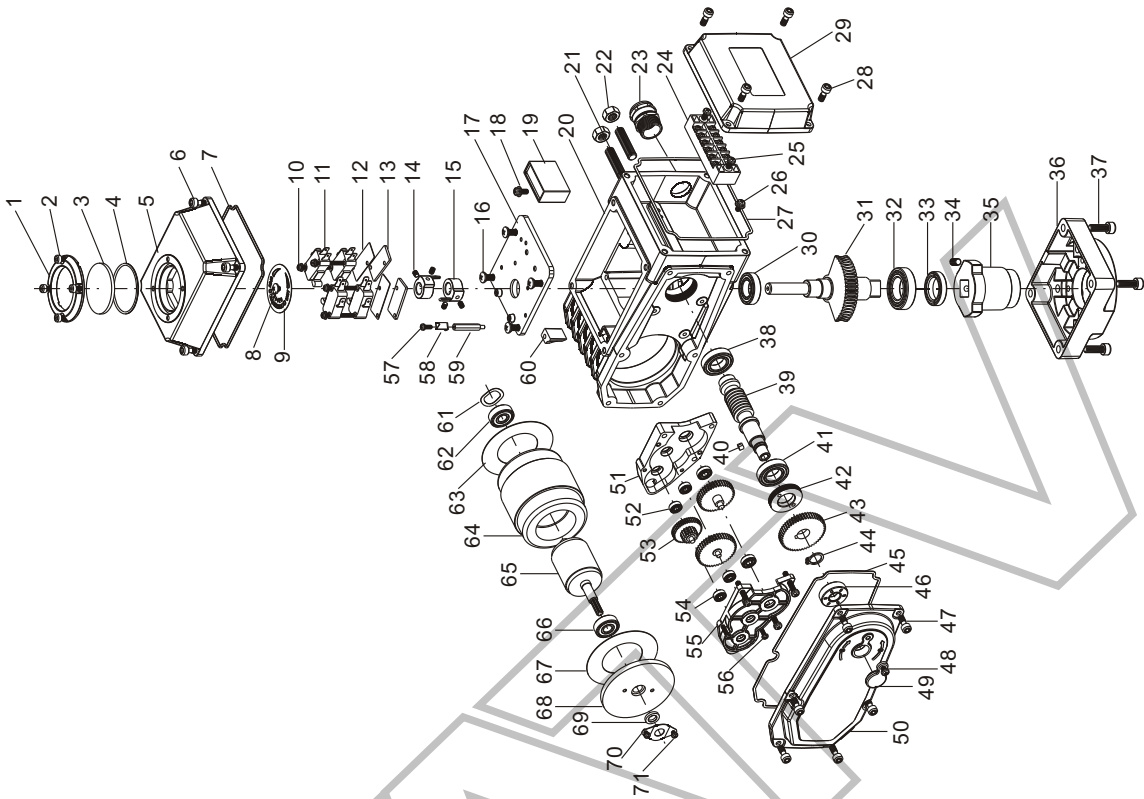
control loop type

actuator output moment ÷10

model of electric actuator series

Spare and reserve parts

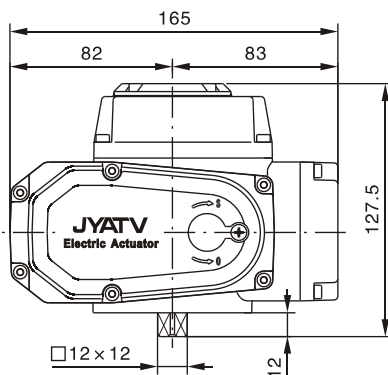
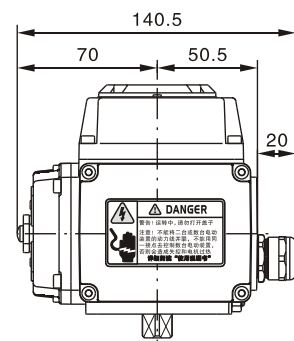
No.	Qty	Part name	No.	Qty	Part name
1	1	Indication window hood	37	4	Internal hexangular fillister head screw
2	4	Internal hexangular fillister head screw	38	1	Bearing
3	1	Viewing glass3	39	1	Worm screw
4	1	O-ring	40	1	Flat key
5	1	Electric fitting: top cap	41	1	Bearing
6	4	Anti-breakoff hex type socket screw	42	1	Locknut
7	1	O-ring	43	1	Gear on worm
8	1	Cross bolt	44	1	Axis shield ring
9	1	Dial	45	1	O-ring
10	4	Cross bolt(component)	46	1	Oil seal
11	4	Travel switch4	47	6	Anti-breakoff hex type socket screw
12	2	Insulation plate guard	48	1	Cross bolt(component)
13	2	Insulating pad	49	1	Dustproof end plug
14	4	Hex type socket holding screw	50	1	Electric fitting: front cap
15	2	Stroke dogs	51	1	Electric fitting: speed down case 1
16	4	Cross bolt(component)	52	3	Bearing
17	1	Electric fitting: inner cap	53	3	Electric fitting: reduction gear component
18	1	Cross bolt(component)	54	3	Bearing
19	1	Electric capacitor	55	1	Electric fitting: speed-down case 2
20	1	Electric fitting: case body	56	5	Cross bolt(component)
21	2	Limit bolt	57	1	Cross bolt(component)
22	2	Hexagonal nut	58	1	Dial needle
23	1	Waterproof cable joint	59	1	Pointer rod
24	1	Connecting terminal	60	1	Rubber end plug
25	2	Cross bolt	61	1	Wavy spring washer
26	1	Cross bolt	62	1	Bearing
27	1	O-ring	63	1	Insulating division board
28	4	Anti-breakoff hex type socket screw	64	1	Electromotor stator
29	1	Electric fitting: lead-in cap	65	1	Electromotor rotor
30	1	Bearing	66	1	Bearing
31	1	Worm wheel	67	1	Insulating division board
32	1	Bearing	68	1	Electromotor cap
33	1	Oil seal	69	1	Oil seal
34	1	Hex type socket holding screw	70	1	Oil seal stop plate
35	1	Connecting bushing (ISO5211)	71	2	Cross bolt(component)
36	1	Fixing base (ISO5211)			



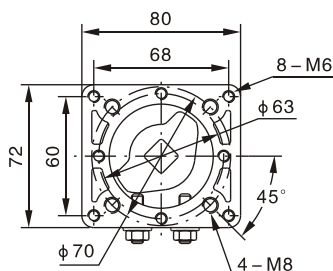
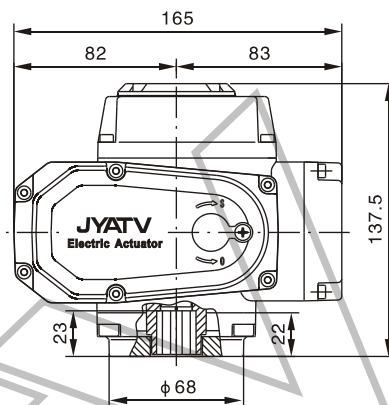
Note: This structure diagram is for JYL-10B/30S/AC220V/F05~07/NN (power-less contact point type)



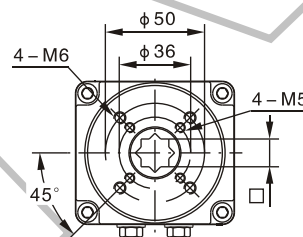
standard type



direct installation type(ISO5211 standard)

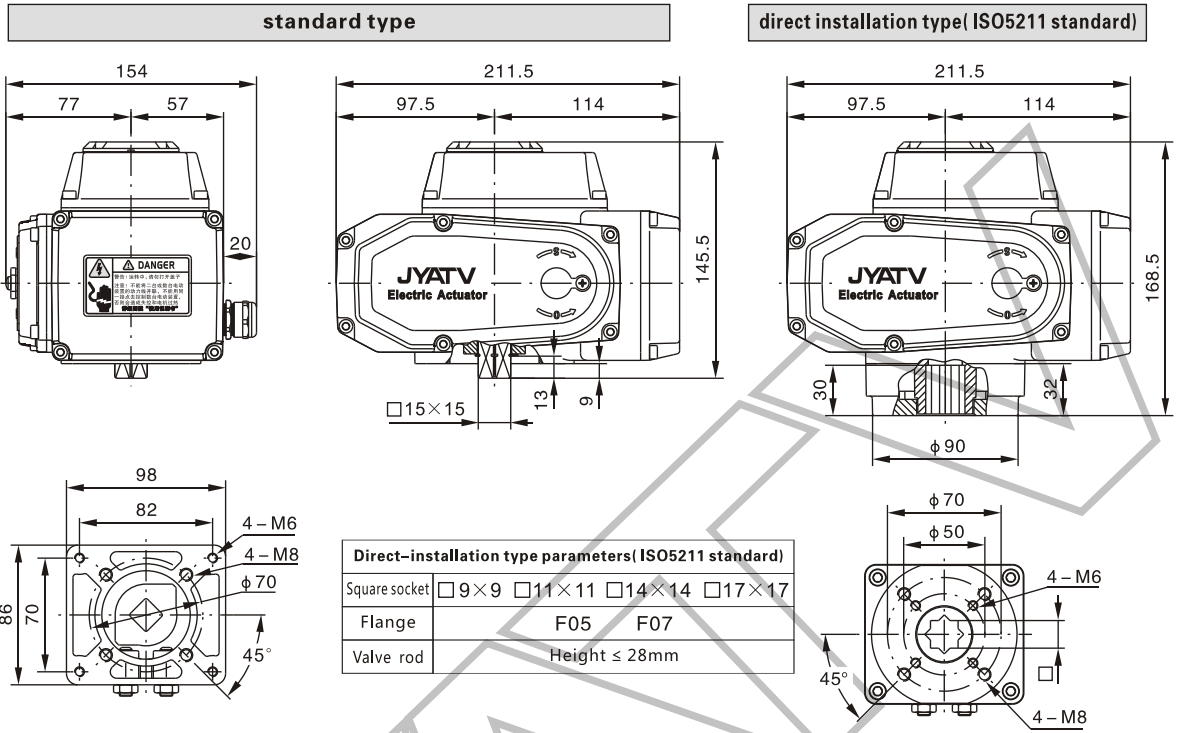


Direct-installation type parameters(ISO5211 standard)		
Square socket	9×9	11×11 14×14
Flange	F03	F05
Valve rod	Height ≤ 20mm	



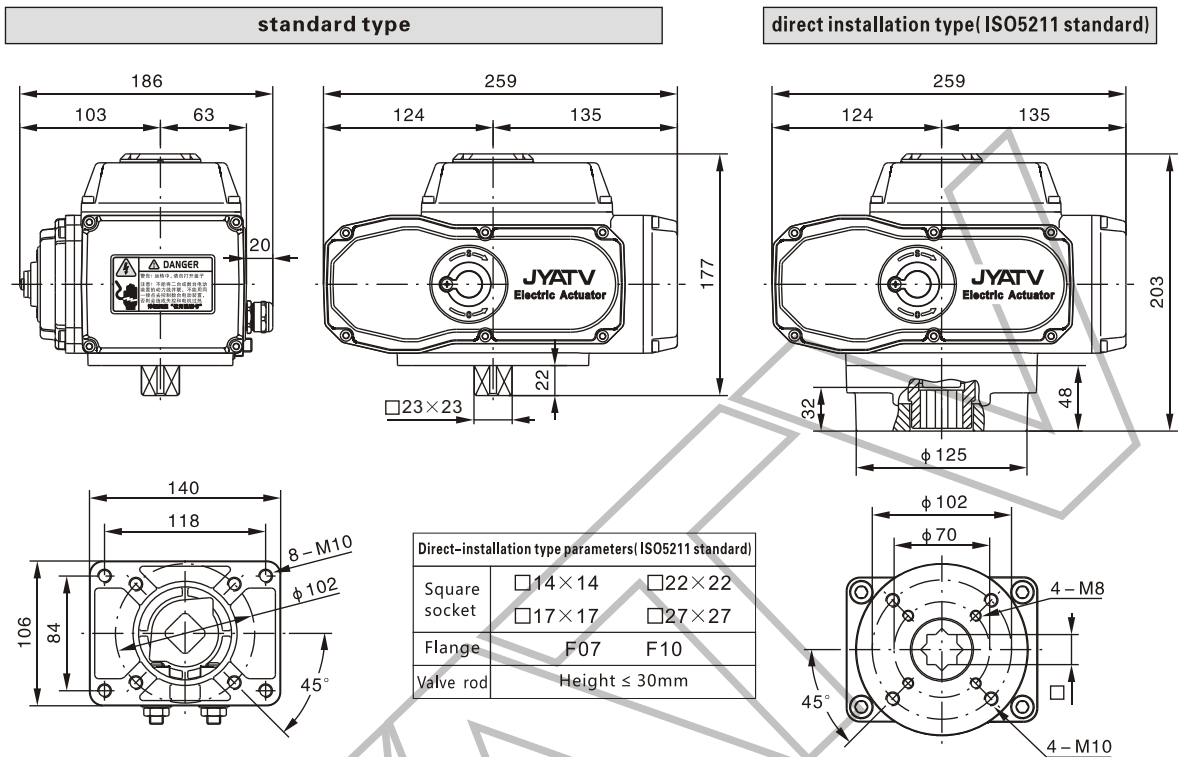
Model Power supply Parameters Performance	JYL – 05						
	DC12V	DC24V	DC220V	AC24V	AC110V	AC380V	AC220V
Power	20W			10W			
Rated current	3.8A	2A	0.21A	2.2A	0.48A	0.15A	0.24A
Output moment	30Nm/50Nm			15Nm/30Nm/50Nm			
Running time	6S / 10S			10S / 20S / 30S			
Control loop	Type A, B, C, D, E, F, G, H						
Rotation angle	0~360° adjustable						
Whole machine weight	2.4Kg						
Insulation resistance	100MΩ/300VDC			100MΩ/500VDC			
Voltage endurance level	500VAC/1 minute1			500VAC/1minute			
Protection level	IP67						
Ambient temperature	- 25℃ ~ +60℃(other temperature range is open for customizing)						
Installation angle	360°, any angle						
Shell material	Aluminum alloy precision press-forged piece						
Optional featuresHeater	Dehumidifier						

JYL-10 series dimensions and performance parameters



Model	JYL – 10						
Power supply	DC12V	DC24V	DC220V	AC24V	AC110V	AC380V	AC220V
Performance	40W			23W			
Rated current	4.8A	2.4A	0.32A	3A	0.64A	0.19A	0.32A
Output moment	100Nm			50Nm/60Nm/100Nm			
Running time	10S			13S /15S /20S/ 30S			
Control loop	Type A, B, C, D, E, F, G, H						
Rotation angle	0~90° adjustable						
Whole machine weight	4.2Kg						
Insulation resistance	100MΩ/300VDC			100MΩ/500VDC			
Voltage endurance level	500VAC/1 minute1			1500VAC/1 minute1			
Protection level	IP67						
Ambient temperature	- 25℃ ~ +60℃(other temperature range is open for customizing)						
Installation angle	360°, any angle						
Shell material	Shell materialAluminum alloy precision press-forged piece						
Optional featuresHeater	Over-moment protection, heater dehumidifier						

# JYL-20/40/50/60 series dimensions and performance parameters

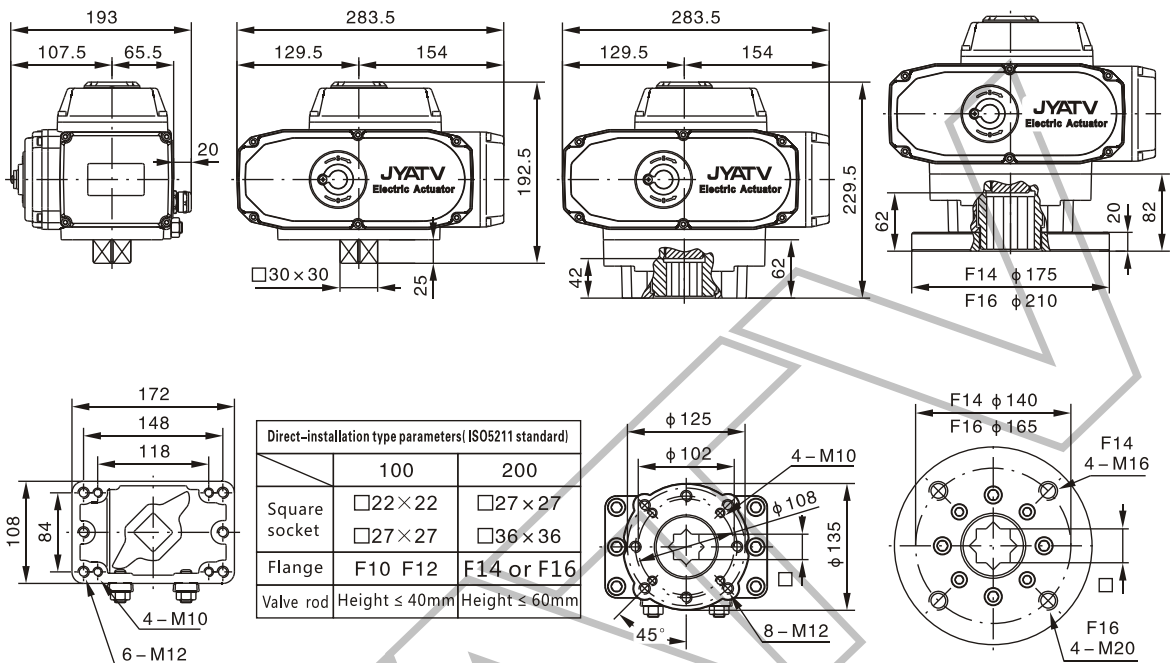


Model Parameters Performance	JYL – 20/40						JYL – 50/60					
	DC24V	DC220V	AC24V	AC110V	AC380V	AC220V	DC24V	DC220V	AC24V	AC110V	AC380V	AC220V
Power	40W/60W						90W					
Rated current	8A	0.35A	5A	0.9A	0.25A	0.48A	7A	0.9A	8A	2A	0.45A	0.92A
Output moment	200Nm		200Nm/400Nm				500Nm/600Nm					
Running time	10S		15S/30S/60S				15S /30S/ 60S					
Control loop	Type A, B, C, D, E, F, G, H											
Rotation angle	0~90° adjustable											
Whole machine weight	7.2Kg						8Kg					
Insulation resistance	100MΩ/300VDC		100MΩ/500VDC				100MΩ/300VDC		100MΩ/500VDC			
Voltage endurance level	500VAC/1 minute1		1500VAC/1 minute1				500VAC/1 minute1		1500VAC/1 minute1			
Protection level	IP67											
Ambient temperature	- 25℃ ~ +60℃(other temperature range is open for customizing)											
Installation angle	360°, any angle											
Shell material	Shell materialAluminum alloy precision press-forged piece											
Optional featuresHeater	Over-moment protection, heater dehumidifier											

# JYL-100/200 series dimensions and performance parameters

standard type

direct installation type(ISO5211 standard)



Model Power supply Parameters Performance	JYL – 100				JYL – 200			
	AC24V	AC110V	AC380V	AC220V	AC24V	AC110V	AC380V	AC220V
Power	100W				100W			
Rated current	9A	2.2A	0.48A	1.2A	9A	2.2A	0.48A	1.2A
Output moment	300Nm/800Nm/1000Nm				2000Nm			
Running time	15S/30S/50S				100S			
Control loop	Type A, B, C, D, E, F, G, H							
Rotation angle	0~90° adjustable							
Whole machine weight	11.5Kg				12.1Kg			
Insulation resistance	100MΩ/500VDC							
Voltage endurance level	1500VAC/1 minute1							
Protection level	IP67							
Ambient temperature	- 25℃ ~ +60℃(other temperature range is open for customizing)							
Installation angle	360°, any angle							
Shell material	Shell materialAluminum alloy precision press-forged piece							
Optional featuresHeater	Over-moment protection, heater dehumidifier							

## Intelligent adjustment type (E type) performance parameters

Model Power supply Parameters Performance	JYL-05E	JYL-10E	JYL-20E	JYL-40E	JYL-50E	JYL-60E	JYL-100E	JYL-200E
	DC12V、DC24V、DC220V、AC24V、AC110V、AC220V、AC380V; 50/60Hz							
Electromotor power	10W	23W	40W	40W	90W	90W	100W	100W
Rated current	0.24A ( AC220V )	0.32A ( AC220V )	0.48A ( AC220V )	0.48A ( AC220V )	0.92A ( AC220V )	0.92A ( AC220V )	1.0A ( AC220V )	1.2A ( AC220V )
Output moment <sup>5</sup>	50Nm	100Nm	200Nm	400Nm	500Nm	600Nm	1000Nm	2000Nm
Running time	30S	30S	30S	30S	30S	30S	50S	100S
Rotation angle	0 ~ 90°	0 ~ 90°	0 ~ 90°	0 ~ 90°	0 ~ 90°	0 ~ 90°	0 ~ 90°	0 ~ 90°
Whole machine weight	2.4Kg	4.2Kg	7.2Kg	7.2Kg	8Kg	8Kg	11.5Kg	12.1Kg
Input signal	4~20mA DC, 1-5VDC, 0~ 10VDC ( others can be selected before leaving factory )							
Output signal	4-20mA DC ( others can be selected before leaving factory )							
Basic deviation	*no greater than ±1%							
Return difference	*less than 0.3%							
Dead zone	0.4%-1.5% adjustable							
Damping eature	0 times							
Device repetitive error	0%							
Insulation resistance	DC24V: 100MΩ/300VDC			100MΩ/500VDC				
Voltage endurance level	DC24V: 500VAC/1 minute			1500VAC/1minute				
Protection level	IP67							
Ambient temperature	-25℃ ~ +60℃(other temperature range is open for customizing)							
Installation angle	360°, any angle							
Shell material	Aluminum alloy precision press-forged piece							
Optional features	Over-moment protection, heater dehumidifier, power-less contact point type							

	<h3>Common switch type (A)</h3> <p>Valve open /close operation is realized by switch loop, and a set of powered position signal is output to signify the valve being full-open or full-shut.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, Terminal 1 connects zero line of the power supply ;</li> <li>2, When power supply phase line connects to terminal 2, it runs "ON", till the travel switch CLS acts;</li> <li>3, When power supply phase line connects to terminal 3, it runs "OFF", till the travel switch CLS acts;</li> <li>4, When power supply phase line connects to terminal 2, it runs "ON", and when it runs in place, The "full-open signal" indicator connected to terminal 4 lights up;</li> <li>5, When power supply phase line connects to terminal 3, it runs "OFF", and when it runs in place, the "full-shut" indicator connected to terminal 5 lights up.</li> </ol>
	<h3>Power-less contact point type (B)</h3> <p>Valve open /close operation is realized by switch loop, and a set of powered position signal is output to signify the valve being full-open or full-shut.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, Terminal 1 connects zero line of the power supply ;</li> <li>2, When power supply phase line connects to terminal 2, it runs "ON", and when it runs till travel switch OLS acts ;</li> <li>3, When power supply phase line connects to terminal 3, it runs "OFF" till travel switch CLS acts ;</li> <li>4, Terminal 4 is power-less contact point common terminal ;</li> <li>5, When " ON " runs in place, the terminal 5 outputs "full-open signal";</li> <li>6, When " OFF " runs in place, the terminal 6 outputs "full-shut signal";</li> </ol>
	<h3>Openness degree signal type (C)</h3> <p>Valve open /close operation is realized by switch loop, and electric resistance signal is output corresponding to the openness position.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, Terminal 1 connects zero line of the power supply ;</li> <li>2, When power supply phase line connects to terminal 2, it runs "ON", and when it runs till travel switch OLS acts ;</li> <li>3, When power supply phase line connects to terminal 3, it runs "OFF" till travel switch CLS acts ;</li> <li>4, Terminal 4 is the low end of the potentiometer, so when running "ON", the impedance between terminal 4 and terminal 5 increases with the valve opening;</li> <li>5, Terminal 5 is the movable arm of potentiometer;</li> <li>6, Terminal 6 is the high end of the potentiometer, so when running "OFF", the impedance between terminal 5 and terminal 6 increases with the valve closing;</li> </ol>
	<h3>With position transmitter (D)</h3> <p>Valve open /close operation is realized by switch loop, and electric current signal is output corresponding to the valve openness angle.</p> <p>4-20mA DC valve-location signal is output (to exercise travel feedback to valve location)</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, On the power input side "N" is the zero line, and, " L " links to phase conductors ;</li> <li>2, When " L " on the power input side links to "ON ", it runs to the direction of opening the valve;</li> <li>3, When " L " on the power input side links to "OFF ", it runs to the direction of closing the valve;</li> <li>4, The " + " on the "output signal " side links to the positive pole of the output signal, and " - " links to the negative pole of output signal.</li> </ol>

Note: In the control loop, the part inside the dotted line is the internal loop of the electric-driven device, and the part outside is for reference by the user while wiring.

Caution!: Never connect the power cords of two or more electric-driven devices in parallel, never control multiple electric-driven devices with one single contact point, or else the system may malfunction or the electromotor may overheat.



	<h3>Intelligent adjustment type (E)</h3> <p>The external computer or industrial instrument inputs a standard signal to control the open/shut degree of the valve and meanwhile feedbacks the corresponding standard signal.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, On the power input side "N" links to the zero line, and, " L " links to phase conductors ;</li> <li>2, The " + " on the "external control" side links to the positive pole of the input signal, and " - " links to the negative pole of input signal.</li> <li>3, The " + " on the "feedback " side links to the positive pole of the output signal, and " - " links to the negative pole of output signal.</li> </ol>
	<h3>DC switch type (F)</h3> <p>By switching over the positive/negative polarity of the external DC power supply, the valve "OPEN" or "SHUT" operation is realized, and meanwhile a set of power-less contact point signal is output to signify the value being full-open or full-shut.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, When terminal 1 links to power supply positive pole, terminal 2 links to the power supply negative pole, and that is "ON " operation ;</li> <li>2, When terminal 1 links to power supply negative pole, terminal 2 links to the power supply positive pole, and that is "OFF " operation ;</li> <li>3, Terminal 4 is power-less contact point common terminal ;</li> <li>4, When " ON " runs in place, the terminal 5 outputs "full-open signal";</li> <li>5, When " OFF " runs in place, the terminal 6 outputs "full-shut signal";</li> </ol>
	<h3>3-Phase switch type (G)</h3> <p>Valve open /close operation is realized by switch loop, and a set of powered position signal is output to signify the valve being full-open or full-shut.</p> <p><b>Wiring method:</b></p> <ol style="list-style-type: none"> <li>1, Terminal 1, 2, 3 link to three-phase alternating current, and external phase inverting circuit is used to realize positive and negative rotation of electromotor;</li> <li>2, Terminal 4 is the common point of external control loop;</li> <li>3, Terminal 5 is " ON " operation control ;</li> <li>4, Terminal 6 is " OFF " operation control ;</li> <li>5, When " ON " runs in place, the terminal 57 outputs "full-open signal";</li> <li>6, When " OFF " runs in place, the terminal 8 outputs "full-shut signal";</li> </ol>
	<h3>3-Phase power-less contact-point type (H)</h3> <p>Valve open /close operation is realized by switch loop, and a set of power-less position signal is output to signify the value being full-open or full-shut.</p> <ol style="list-style-type: none"> <li>1, Terminal 1, 2, 3 link to three-phase alternating current, and external phase inverting circuit is used to realize positive and negative rotation of electromotor;</li> <li>2, Terminal 4 is the common point of external control loop;</li> <li>3, Terminal 5 is " ON " operation control ;</li> <li>4, Terminal 6 is " OFF " operation control ;</li> <li>5, Terminal 7 is power-less contact point common terminal ;</li> <li>6, When " ON " runs in place, the terminal 8 outputs "full-open signal";</li> <li>7, When " OFF " runs in place, the terminal 9 outputs "full-shut signal";</li> </ol>

Note: In the control loop, the part inside the dotted line is the internal loop of the electric-driven device, and the part outside is for reference by the user while wiring.

Caution!: Never connect the power cords of two or more electric-driven devices in parallel, never control multiple electric-driven devices with one single contact point, or else the system may malfunction or the electromotor may overheat.

# Use requirements

## I, Installation environment requirement

- 1, The product can be installed indoors or outdoors;
  - 2, The product is not explosion protection product so please avoid flammable and explosive environment;
  - 3, In an environment where there is rainwater, raw material splatter, and sunlight direct radiation on long term, you must install a protective hood to shield over the whole electric actuator.
  - 4, Please reserve room for wiring, manual operation and installation and repair work;
  - 5, Periphery environmental temperature should keep in 30 ~ 60 °C range;
- Note: when using it in environment of big temperature difference or below zero point, you should use the model which has heater dehumidifier to prevent moisture condensation.

## II, Working medium temperature requirement

- 1, When mating with valve, the working medium temperature is transmitted to actuator, and make its temperature rise;
- 2, When the working medium has high temperature, the bracket linking to valve works to reduce heat conducting;
- 3, When the working medium temperature is below 0°C, please select standard bracket;
- 4, When the working medium temperature is above 80°C, please select high temperature bracket;

## III, On-site cable lines, wiring tubes installation requirement

- 1, When using wire tube, please install as per Fig. ( 1 );
- (1), wiring tube outer diameter  $\Phi$  8- 12;
- (2), It should have adequate waterproof countermeasure;
- (3), The actuator shall be higher than wiring tube, so the water drops in wiring tube cannot flow into actuator, thus ensuring its safety;
- 2, When using cable, its outer diameter is  $\Phi$  8- 12 .See Fig. ( 2 ). Cable that mismatch the waterproof cable connector inner diameter must not be adopted, or else the water can flow from waterproof cable connector into actuator and damage all internal components;
- 3, Signal wire in principle shall adopt shrouding wire, and its wiring should be separate from power line wiring.

Function:

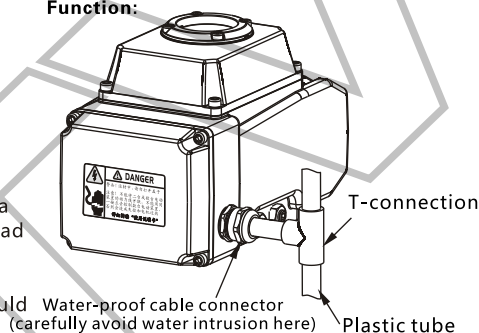


Fig. 1

## IV, Power supply requirement

- 1, According to power supply type of the model you order, you provide relevant on-site power supply;
- 2, The voltage of on-site power supply shall comply with 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%

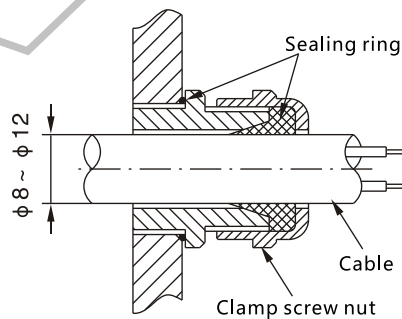


Fig. 2

## V, Selection of breaker switch fuse:

Model	Voltage	AC380V	AC220V	AC110V	AC24V	DC220V	DC24V	DC12V
	Fuse							
JYL-05		2A	2A	3A	5A	2A	5A	10A
JYL-10		2A	3A	5A	7A	3A	7A	14A
JYL-20/40/50/60		3A/5A	5A/7A	7A/10A	10A/11A	5A/7A	15A	
JYL-100/200		5A	7A	10A	20A	20A		

## Actuator and valve installation

### I, Actuator and valve installation (Fig. 3)

- 1, Manually operate the valve, make sure there is no abnormal condition, turn the valve to full-shut position;
- 2, Lightly fix the bolt to the valve with a bracket;
- 3, Fit one end of the coupler over the valve stem;
- 4, Drive the electric actuator by manual handle to the full-shut position ( Pointer just points to SHUT, 0 mark ), insert the output shaft in the square hole of coupler;
- 5, Lightly fix the electric actuator to the bracket with a bolt;
- 6, Drive the electric actuator by manual handle through its full travel range. Make sure the operation is smooth, without deviation from center, and without skew or blockage, and examine whether the valve can realize full-shut and full-open within the openness indication range of the actuator .

Note: Don't use forcibly strong force, or else the actuator may run beyond limit and be damaged.

#### Special hints:

If you prepare your bracket or coupler by yourself, please notice:

- (1) Bracket and coupling shall be designed and processed by specialized technicians and conform to remark requirements in Fig. 4;
- (2) The axis hole processing on both ends of coupling shall guarantee necessary precision, and remove transmission gap as far as possible, in case the valve has return difference while working;
- (3) You shall strictly guarantee position of axis holes on both ends of coupling. Or else it may go beyond actuator's designed scope of work. And the result is actuator travel range can not adjust and thus the valve cannot work normally.

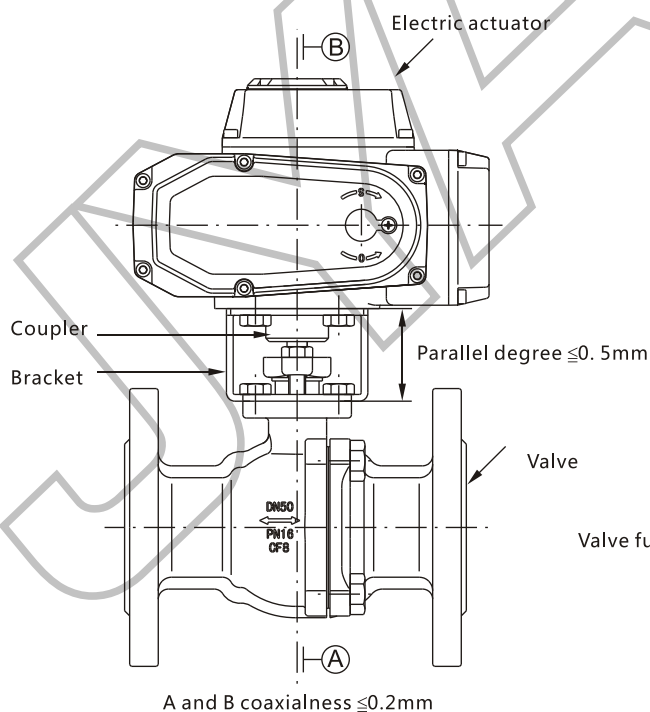


Fig. 4

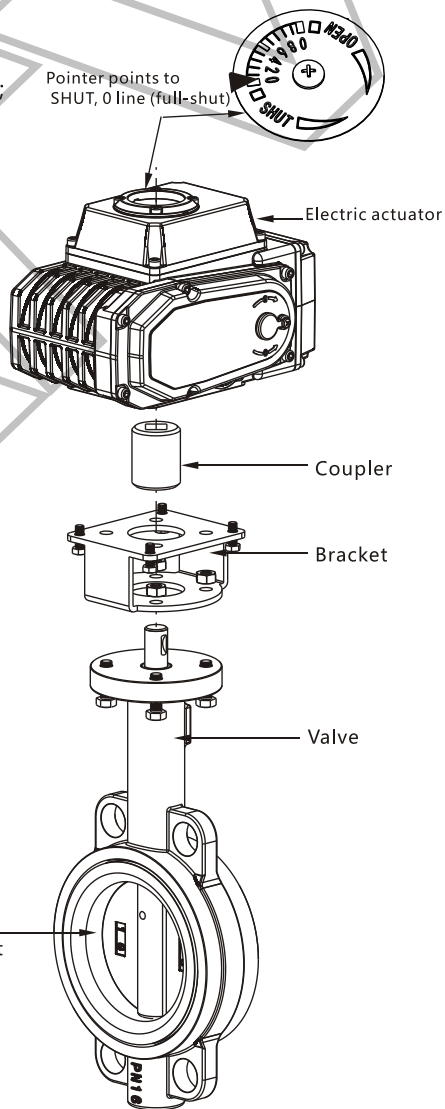


Fig. 3

## I, Switch type adjustment

### Electric limiter adjustment

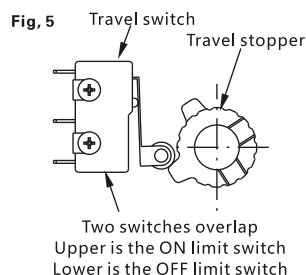
1, Before adjusting the electric limiter, you shall loosen adjusting screw of mechanical limiter, and when the electric limiter is adjusted, retighten the mechanical limiter, to avoid mechanical blockage;

2, Loosen the screw of stroke dog, and tap the stroke dog with screwdriver, so you can adjust the angle of stroke dog, thereby change the switch angle of electric limiter, and when travel switch acts, it gives the "katsa" noise. In the end, firmly fasten the screw of stroke dog.

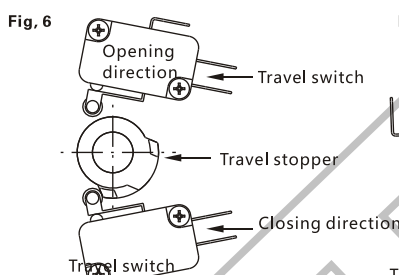
△ When it is energized, it is forbidden to operate it manually.

△ When you adjust the actuator whose angle of rotation adjustment range is 0 ~ 90 degrees, you should not adjust beyond range, or randomly enlarge the rotating angle.

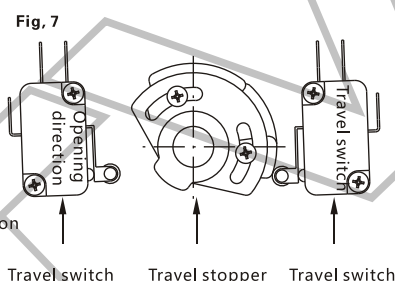
Layout of JYL -05 stroke dog and travel switch



Layout of JYL -10 stroke dog and travel switch



Layout of stroke dog and travel switch of JYL -20 / 40 / 50 / 60 / 100/200



## II, Mechanical limiter adjustment (Fig. 8)

1, Drive the actuator by manual handle to the full-shut position (when travel switch acts, it gives "katsa" sound);

2, Loosen locknut, clockwise turn the adjusting screw, to make it contact with mechanical stopper, and then counterclockwise turn the screw for half-lap, to let the mechanical limiter at the full-shut position lag behind the electric limiter by about 2~3° angular distance, and fasten the nut;

3, In the same method, you can adjust the mechanical stopper at the full-open position.

△ The electric limiter position and mechanical limiter position of the actuator must meet the requirement of (Fig. 9). If mechanical limiter is ahead of or coincides with electric limiter, actuator electromotor may be blocked. It can heat up and even burn the electromotor.

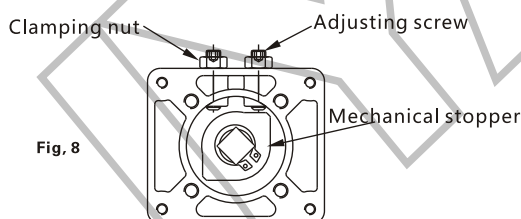
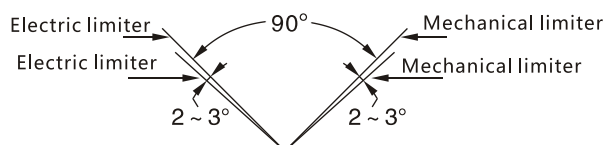


Fig. 9



## III, Adjustment of potentiometer (Fig. 10), suitable for Type C, E (generally, no need to adjust)

1, Resistance value of potentiometer is: 1K Ω (5 K Ω);

2, Drive the actuator by manual handle to its full-shut position; 3, Loosen the screw of openness degree gear, and turn the openness degree gear. Adjust the potentiometer, measure the resistance between connecting terminals 4~5 with universal meter, make the resistance about 100. Fasten the openness degree gear locknut. (if it is the adjustment type seven-line plug-and-socket connection, please measure resistance corresponding to two jack holes RV and RS) △ You can also directly loosen potentiometer to adjust, but when fixing it, please notice the engagement between potentiometer gear and openness degree gear, and the gap shall not be too big or too tight, or else the actuator's complete machine precision will be directly affected.

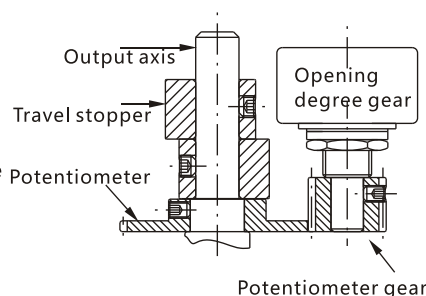


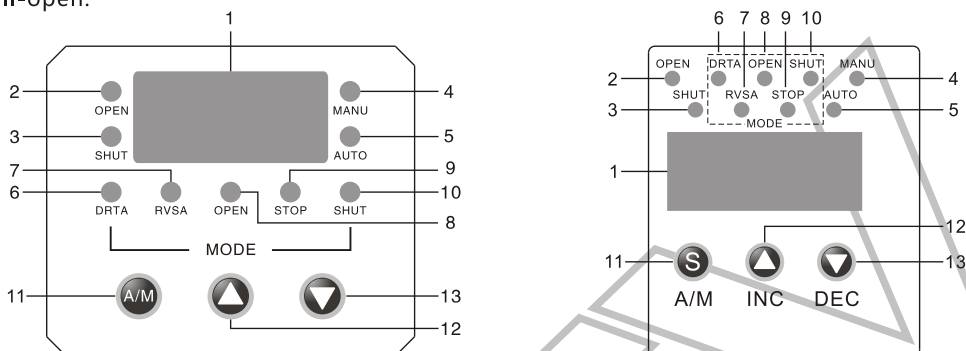
Fig. 10

## Debugging of the adjustment type (E)

### I, How to adjust the adjustment type

#### Adjustment of actuator

1, Before you adjust the intelligent locator, please understand the adjusting method of switching angle, and adjust the actuator electric limiter and potentiometer mechanical limiter according to valve full-shut and full-open.



### II, locator panel

ZXQ2004

ZXQ2004C

Parameter indication			
Status indication	1	LED view	By pushing buttons, you toggle from indication of valve actual openness value, valve setting openness value, locator shell inside temperature to setting parameters
	2	OPEN	Output controls " OPEN " current-breaker to close
	3	SHUT	Output controls " SHUT " current-breaker to close
	4	MANU	Manual operation status
	5	AUTO	Automatic status
Mode indication	6	DRTA	Positive act mode, the input signal corresponds to output as follows: 4 mA --- Fullness position ( generally calibrated as full-open ) ; 20 mA--- zero position ( generally calibrated as full-shut )
	7	RVSA	Negative act mode, the input signal corresponds to output as follows: 4 mA --- zero position ( generally calibrated as full-shut; 20 mA---fullness position ( generally calibrated as full-open )
	8	OPEN	When input signal gets interrupted, it is " OPEN ", to open the actuator till the maximum opening limit
	9	STOP	When input signal gets interrupted, it is "HALT ", to stop the actuator at current position
	10	SHUT	When input signal gets interrupted, it is "SHUT ", to open the actuator to the minimal opening limit
Button	11	A/M	Manual operation / auto operation switchover; the button to access modification of and toggle between parameters
	12	▲	Value Increase button; in the automatic status it also toggle to indicate valve location setting openness value, and in manual operation status, it is "OPEN"
	13	▼	Value decrease button; in the automatic status it also toggle to indicate temperature inside locator shell, and in manual operation status, it is "SHUT"

### III, Wiring explanation

ZXQ 2004 intelligent locator and electric actuator link up through a seven-line plug-and-socket connection .

1, On the locator, there is a six-line elastic clamp line contact bank ( Fig. 11 ) .N, L link to mean line and phase line of 220VAC Single-phase power, two IN terminals 4~20 mA (or 1 ~5V) link to control current (voltage) , two terminals 4 ~20 mA link to current meter, to indicate actual valve opening, and they may also be idle, not linked.Connecting wire can use single core or multi - core infrared insulated wire of conductor core  $\Phi$  1 ~ 2 mm ( Fig. 12 ), and remove the 7 mm insulation skin .If you use multi-core line, you would better twist tight and apply tin to it, thus the connection is easier, and when wiring you can insert single core wire or tinned multi-wire to the hole, and after sensing a resistance you continue to insert 4~5 mm, and that is enough; if the wire is too soft, you can put the wire in hole, and after sensing resistance, you use flat tip screwdriver to press the elastic clamp switch on the rim of the corresponding hole, and then insert the line by 4~5mm, and then loosen the elastic clamp switch, thus clamp the wire.After wire is clamped, it cannot slip out normally.If you need to pull it out, use flat tip screwdriver to press the elastic clamp switch on the corresponding hole rim .Then you can pull wire out.

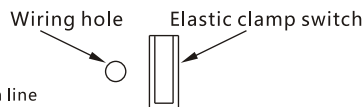


Fig 11

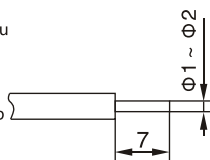
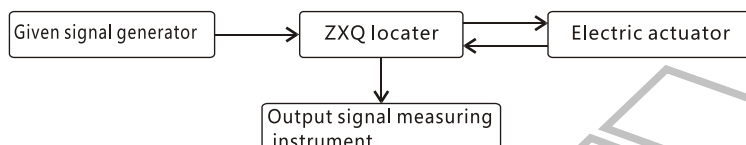


Fig 12

## IV, The setting and operating method for intelligent locator

According to the wiring diagram, link up the given signal source, locator, electric actuator, output signal measuring instrument and wires between power supply .

- 1, Power on, and now it indicates the actual openness degree of valve location, and locator is in the automatic detection and control status;
- 2, Press A/M button to switch to manual operation status, and respectively press ▲ and ▼ buttons, and the detection actuator now shall correspond to " open " and "shut " action;
- 3, In automatic status, press ▲ to check the valve location setting openness value, and now you can examine the change trend and stability of input signal;
- 4, In automatic status, press ▼ to check the temperature inside locator shell, and when temperature exceeds 70 °C(you can correct it), the locator stops control over the open or shut of actuator .
- 5, In automatic status, press A/ M button for 4 seconds, to access parameter setting as shown in the next table.Parameters values can be modified by ▲ and ▼ button, as detailed in the operation flowchart .



**Parameters list**

Parameter	Indicated value	Description	Ex-works value
U0	00x.0	X = 1 allows electric brake, x=0 disallow electric brake	1
	000.x	(1) x = 0 disallow change of positioning accuracy, yet allows change and reset of time (2) x = 1, 2, 3 does not change or reset time, but allows change of positioning accuracy	0
U1	00x.0	Set the positive and negative action.; x=0 is positive, x=1 is negative	1
	000.x	Interrupt signal mode .X = 0 ( neglect ) x=1(open) x=2 (halt) x=3 (shut)	2
U2	xxx.x	Controls the output lower limit value 0 ≤U2 <100, 0; manual operation and the process of calibrating zero position and fullness position are not restricted by this parameter	0.0
U3	xxx.x	Controls the output upper limit value 0 <U2<U3 ≤100, 0; manual operation and the process of calibrating zero position and fullness position are not restricted by this parameter	100.0
U4	00x.x	Precision tunable, equal to x.x / 100	0.4
U5	xxx.x	Operation password, ( U 5 = 003.1, access the actuator openness degree calibration )	000.5
U6	xxx.x	Confirm actuator zero position, operate ▲ ▼ key, and when reaching the setting zero position, press A / M button to confirm zero position, then access	
U7	xxx.x	Confirm actuator fullness position, operate ▲ ▼ key, and when reaching the setting fullness position, press A / M button to confirm fullness position	
Note: other parameters are reserved by the company' s use, and if you need them, please refer to the appendixes.			

Actuator already finishes calibration before it leaves factory. User need only link the power supply, signal source and output signal measuring instrument ( or idle it ). Then you can use it directly. No need to calibrate again. If you really need re-calibrate, you can follow the next steps to operate.

Calibrating the zero position and full-position of the actuator does not influence the input and output signals of locator. After actuator is readjusted, we must calibrate the actuator turning angle, and thereafter the locator can work normally. There are two methods of calibration:

### Method 1 ( manual calibration ) ( refer to operation flowchart 13 ):

- 1, Access U 5, modify U5= 003.1, then press A/ M button again. Access U 6 parameter ( calibrate the zero position ) . Press ▲ or ▼, and actuator runs to "OPEN" or "SHUT" direction correspondingly, and meanwhile it shows the valve location actual openness value which gradually increases or decreases. When reaching expected zero position ( normally the full-shut position), press A/M button to confirm zero position, and access U7 parameter;
- 2, Access U 7 parameter ( calibrate the full position ), likewise, press ▲ or ▼ to the expected full position ( normally the full-open position ), and press A/ M button to confirm full position, and the actuator automatically returns to 90 % position and return to U5;
- 3, Modify U 5 = 000.5, return to the detection and control status.

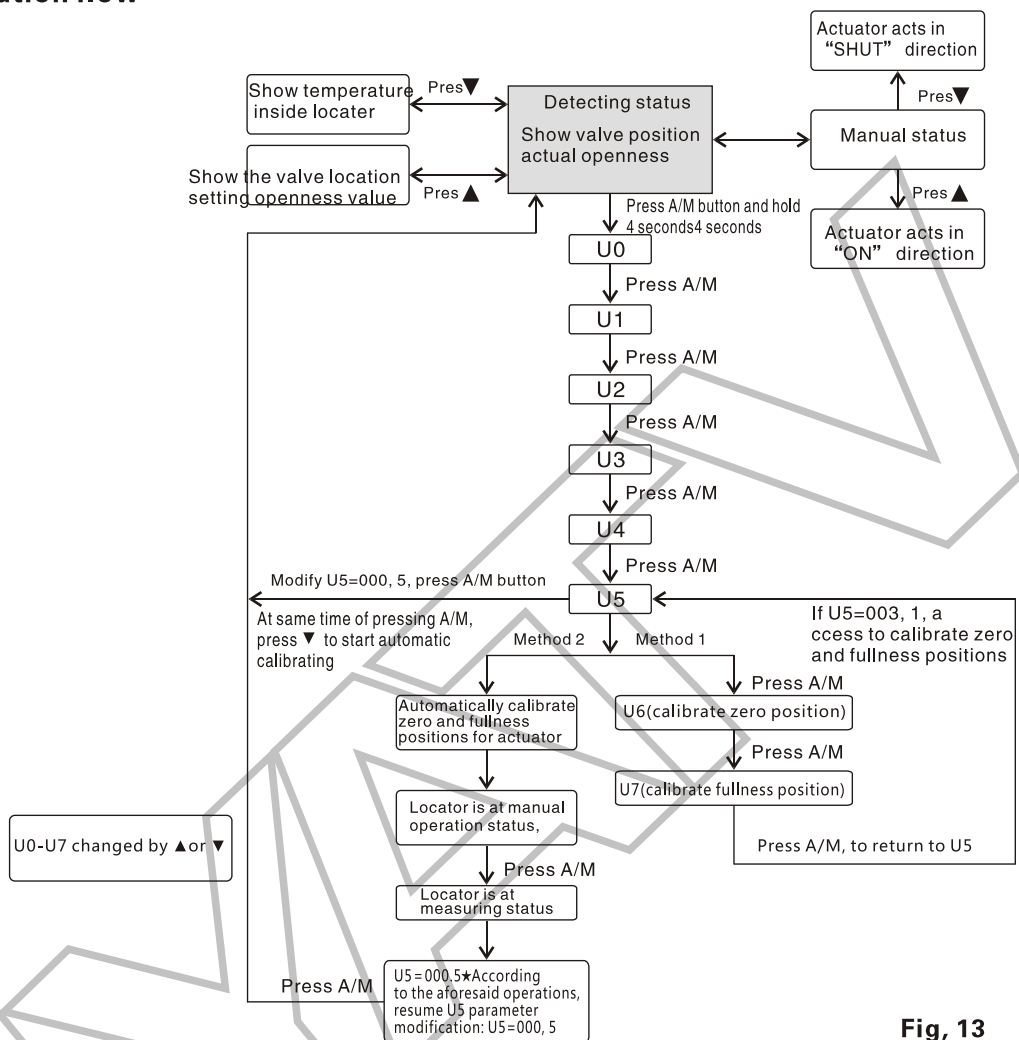
### Method 2 ( Automatic calibration ):

- 1, Access U 5, modify U5= 003.1, press A/ M button, and at the same time push down ▼ button, then release both, so you start up the automatic calibration. At this moment, the locator first calibrate the zero position, and then calibrate the full position. After calibration finishes, the locator is in the manual operation status. ★ again access parameter U5 . Modify U 5 = 000.5( default value ) and then press A / M button, and then the calibration result is saved;
- 2, During detection control process of locator, actuator may oscillate and heat up due to input signal quality and external Electro-Magnetic Interference, so to avoid continued oscillation of actuator, you can modify U0 ( 000.x): set X= 0. Then when the actuator oscillates, the positioning accuracy keeps the setting precision. Yet, the actuator reset time will keep enlarging to 7 seconds, thereby reaching the requirement of exact positioning and intermittent work of actuator.  
X = 1, 2, 3, then when actuator oscillates the reset time remains unchanged (about 2 seconds), but the actuator precision will keep minimizing, thereby reaching the requirement of working at most suitable precision .

Note: During the parameter modification process,



## V, Operation flow



Fig, 13

### Simple automatic calibration method

In the automatic status, press A / M button and at the same time press ▼ button, then release both at the same time, so you start up the automatic calibration (the same function as the method 2: automatic calibration).

### Error code list

Error code	Meaning
E-01	Control signal interrupted or lower than 0.3 mA
E-03	Signal feedback line between locator and actuator or the OPEN-SHUT line is connected in the reverse way, or the program operation is in error
E-05	Actuator has great oscillation, maybe due to instable input signal or feedback signal or too high precision
E-06	Actuator is blocked when moving to shutdown direction
E-07	Actuator is blocked when moving to opening direction
E-08	Locator shell internal temperature exceeds 70°C

Other calibrating operation --- input signal, output signal calibrating method (Fig. 14)

▲ after it leaves factory, normally you need not operate this .If you really need please use it under engineer guidance.

### 1. Input signal calibration

(1) When locator is in normal detection control status, press A/ M button for 4 seconds, to access setting parameter status; it shows " U0 " parameter value. Press A/M button, and select "U 5 " parameter. Press ▲, ▼ to modify " U5 " value, to make it 011 .1: (value meaning is given in next table )

(2) Access " U8 " parameter value, to calibrate input current zero point: when calibrating, use an external meter to input the zero point signal (normally 4 mA ), and press A/ M button to confirm .Then access " U9 " parameter;

(3) Access " U9 " parameter value to calibrate input current full range: when calibrating, use an external meter to input the full range signal (normally 20 mA ), and press A/ M button to confirm .Then access " U 5 " parameter: modify U 5 = 000 .5, press A / M button to confirm and exit, and thus the calibration finishes.

● The aforesaid operation process must ensure input signal is clean and stable.

### 2. Output signal calibration

(1) Access U 5 parameter, modify U5= 001.1, then press A/ M button to access U 6 parameter; skip parameters U 6, U 7, U 8, U 9, and access Ua;

(2) "Ua " calibrates output current zero point: when calibrating, operate ▲, ▼ button, to calibrate output to 4 mA or other value, which corresponds to actuator zero position output signal value, and press A/ M button to confirm; then access " Ub " parameter;

(3) "Ub " calibrates output current full range: when calibrating, operate ▲, ▼ button, to calibrate output to 20 mA or other value, which corresponds to actuator full-position output signal value, and press A/ M button to confirm; then access " Uc " parameter;

(4), " Uc " parameter modifies temperature inside shell; operate ▲, ▼ button to modify it; Press A / M button to confirm, and then return to " U5 " parameter, and modify " U5 " numerical value U5= 000 . 5, press A/ M button to confirm, and return to detection and control status.

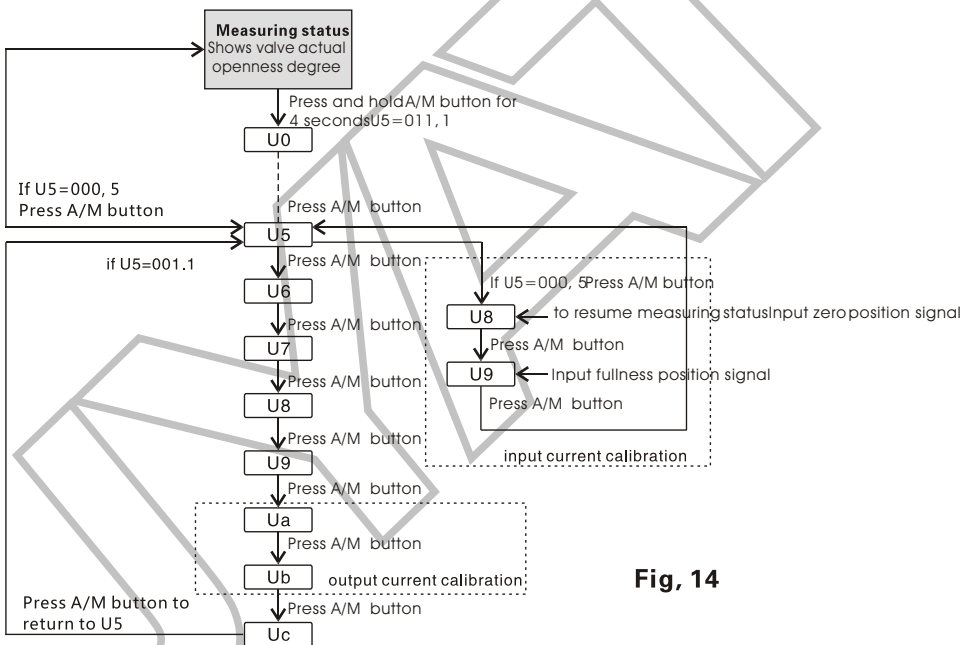


Fig. 14

Parameter	Indication value	Meaning
U5	0XX.X	Access the calibration password: U 5 = 011 .1, access input current calibration; U 5 = 001.1, access output current calibration; U = 003 . 1, access actuator zero and fullness positions calibration
U6	XXX.X	Actuator zero position parameter confirmation
U7	XXX.X	Actuator fullness position parameter confirmation
U8	XXX.X	Calibrate input current zero point parameter
U9	XXX.X	Calibrate input current full range parameter
Ua	XXX.X	Calibrate output current zero position parameter
Ub	XXX.X	Calibrate output current full range parameter
Uc	0.XX.X	Modify shell inside temperature

Note: before the product leaves factory, it has already passed comprehensive debugging and examination. When installing and connecting the product and valve, for reason of valve coupling etc., the valve may not be able to do full-open, full-shut, and so it need readjustment. When adjusting, please follow following steps:

1, Install and connect the actuator and valve correctly;

2, Manually operate trial run;

Take off the dustproof end plug from front cover, insert the attached handle in the hexangular hole. Clockwise turn it, and valve openness degree shall decrease; when the valve is full-shut, observe whether the travel switch in the shutting direction acts (when the switch acts, it gives "katsa" sound ) and then turn the handle, examine whether the mechanical stopper touches the adjusting screw; counterclockwise turn the handle, and valve openness degree shall increase; in the same method, examine the travel switch and mechanical stopper in the opening direction, and after the manual operation trial run finishes, plug back the dustproof end plug .

3, Electric drive trial run:

Demount the lead-in cap .Wire up according to wiring diagram;

Electrify and conduct a trial run. Pay attention to observe whether the actuator and valve work normally.

## I, Maintenance and service

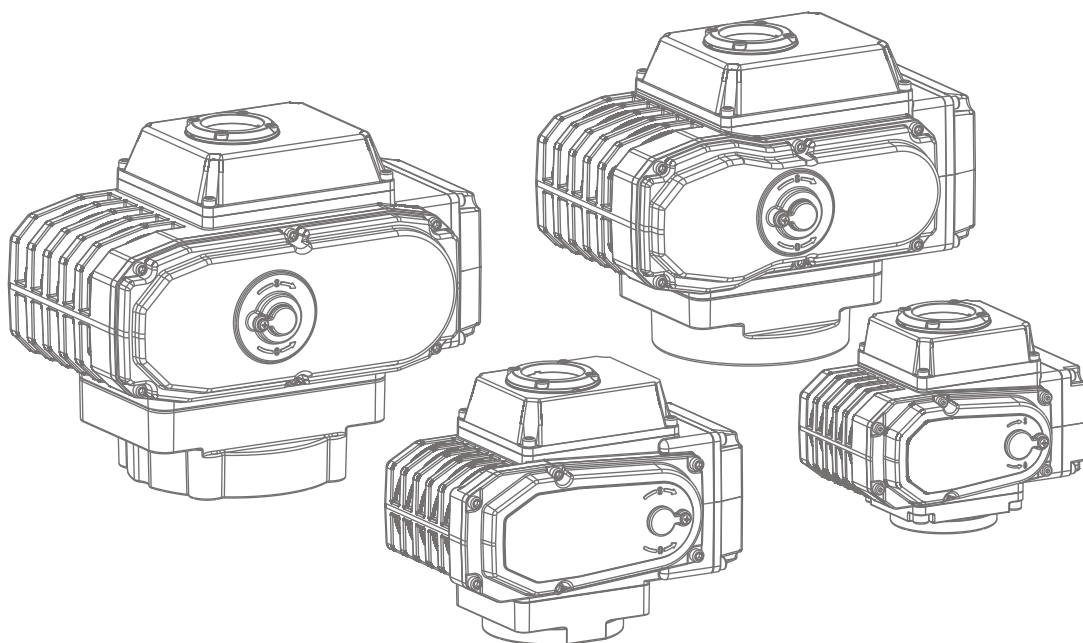
1, As the product has compact structure, it uses in particular long life high pressure-resistant top grade molybdenum lubricating grease, so it needn't spot-check or oiling.

2, When electric valve does not work for long time or seldom works, please regularly drive the actuator to examine whether it malfunctions.

## II, Malfunction and countermeasure

Breakdown phenomena	Cause	Countermeasure
Electromotor does not turn	Not linked to power supply	Connect power supply well
	Power supply voltage wrong or too low	Examine whether supply voltage is normal
	Broke wire, connector breaks away from terminal	Connect wire well , correctly connect the fastening terminal
	Overheat protector acts ( is environmental temperature too high? is valve blocked ? )	Lower the surrounding environment temperature , and examine valve open/close action by manual method to see whether it runs normally
		Reduce frequency of use
		Too heavy load
	Travel switch already acts;	Adjust the stroke dog
Switch pilot lamp does not light up	Electromotor phase-advancer capacitor broken	Contact manufacturer to replace capacitor
	DC actuator diode broken	Contact manufacturer to replace diode
Switch pilot lamp does not light up	Pilot lamp broken	Replace pilot lamp
	Travel switch acts abnormally;	Replace travel switch
When running to limit position, the electromotor does not stop turning	Travel switch acts abnormally;	Replace travel switch
	Three-phase alternating-current supply has reversely connected phase sequence	Adjust three-phase alternating-current supply phase sequence
	Travel switch has error when connecting into control loop	Adjust wiring
	Mechanic limiter acts ahead of the electric limiter	Readjust mechanic stopper according to the adjustment direction of mechanic limit stopper
	DC actuator diode broken	Contact manufacturer to replace diode
Actuator is intruded by water	Electric fitting viewing mirror broken	Contact manufacturer for repair
	Electric fitting top-cap, lead-in cap, front cap etc. Has a bolt not clamped.	
	Lead-in cable is not normal, or in-lead connection position does not follow the user manual requirement of water-proof treatment .	

# LEADING OUT OF PROFESSIONALISM



## **JYATV** Zhejiang Jingyan Flow Control Technology Co., Ltd.

Address: No. 4341 Yongqiang Avenue, Longwan District, Wenzhou Municipality

Tel.: 0577-85858891/85858892/15088999677

Fax: 0577-85858890

Url: [www.jyatv.com](http://www.jyatv.com)

Email: [jy85858890@126.com](mailto:jy85858890@126.com)

QQ: 2428020366

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