

Product overview

- ⊙ Rated voltage: AC230V 【AC95-265V】 ,AC/DC24V
- ⊙ Rated torque: 15Nm
- ⊙ Running time: about 15s
- ⊙ Install below 12Nm valves: 2way,3way ball valve and butterfly valve
- ⊙ Control signal: 4-20mA、0-20mA、0-5V、1-5V、0-10V、2-10V
- ⊙ Position feedback: 4-20mA 0-5V 0-10V
- ⊙ Power-cut reset: KT,actuator could act after power-cut by setting menu, KEEP or ON or OFF Command
- ⊙ Alarm Output: Relay Contact
- ⊙ Position accuracy: ±1%(set by software)
- ⊙ High performance brushless motor,Overload protection of internal motor
- ⊙ It can be used 20,000 times*1



Product features

- △ 0.96" OLED screen,no visual dead angle,highly bright,energy saving and eco-friendly,real time to show valve opening angle and external control command.Enter sleeping state automatically after about 5 minutes,while it could prompt location state and its control command at sleeping time.
- △ Original valve adjustment mode--free cover-opening and interactive:
 - step1:saving "anticlockwise full open position" by using the button to control valve;
 - step2:saving "clockwise full close position" by using the button to control valve;
 Thoroughly eliminate the complex and inconvenience caused by mechanical positioning.
- △ Adopt 16 High-performance microcontrollers,12 high-precision AD conversion,built-in unique algorithm, thoroughly eliminate mechanical hysteresis,greatly reduce valve position control error.
- △ Built-in motor control module,motor frequency speed control can realize accurate positioning.
- △ Adopt non contact positioning,control unit module design and potting processing,guarantee components reliability and greatly improve product service life;Interface use standard connectors,convenient for installment, adjustment and replacement.
- △ Menu can report real-time failure,including stuck or other reasons which lead actuator fail to realize valve on/off integrally,and output failure warning signal.
- △ Menu can realize valve control command exchange.
- △ Menu can switch freely between remote control and local setting,by pressing the button to adjust valve position locally,built in position limit and show limit status.
- △ Menu can set valve close position deviation to on or off direction,thoroughly eliminate the complex and inconvenience bring by "Normal On/Off mechanical positioning" to local valve adjustment.
- △ Menu can restore factory default setting.

*1.Test condition:Rated load,test at under 25℃ working temperature and 50% humidity,lead the result from 2 times switching cycle,which will be influenced by different load and working environment.

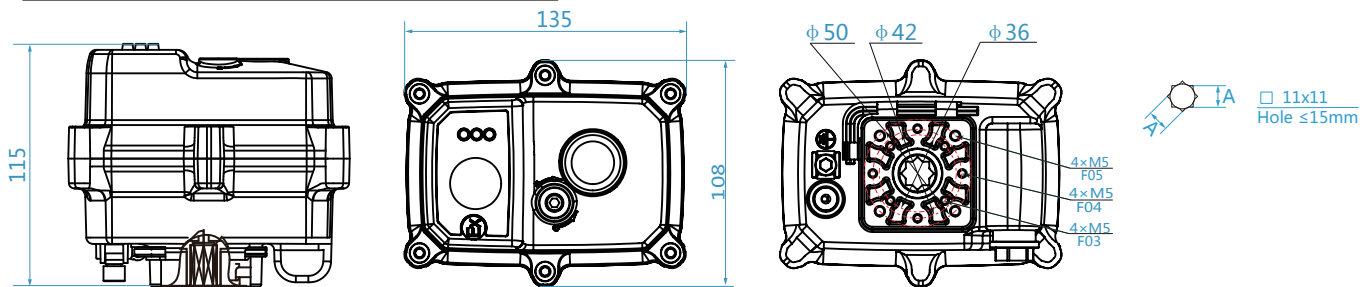
Technical data

Electrical data	Rated voltage	AC230V (50/60HZ)	AC/DC24V	
	Rated voltage range	AC95-265V/DC100-300V	AC18-26V/DC22-32V	
	Power consumption	40W@running 1.6W@holding	36W@running 0.25W@holding	
	Peak current	35mA@5ms@AC230V 90mA@5ms@AC110V	1500mA@5ms@DC24V	
	Fuse	1A	5A	
	Connecting cable	7*0.2mm ² cable, voltage withstand AC300V(Length 800mm)		
Functional data	Rated torque	15Nm@rated voltage		
	Angle of rotation	90±2°		
	Max angle of rotation	330±5°		
	Manual operation	※ Matching hexagon wrench, using at no power		
	Running time	About 15s (per 90°)		
	Operating frequency	Continuous running		
	Sound power level	Max65dB(A)		
	Position indicator	Mechanical and screen		
	Working conditions	Electricity safety level	I Type (ground protection)	III Type (ground protection)
		Inflaming retarding level	V0 UL94 test method	
Enclosure		IP67 As Per En60529/GB4208-2008 (all directions) F type can add dehumidifying heater		
Insulation resistance		100MΩ/1000VDC	100MΩ/1000VDC	
Withstand voltage		1500VAC@1Min	500VAC@1Min	
Medium temperature		≤80° can install with actuator directly ※ >80° need to install bracket or heat radiation stand		
Working environment		Indoor or outdoor; if exposed to the rain or sunshine, need to install protective device for the actuator		
Explosion-proof level		Class I, Div I, Group C&D		
Ambient temp		-10℃ ~ 80℃ (Standard); -20℃ ~ 80℃ (Customized)		
Non-operation temp		※ ≤ -40℃ or ≥ 80℃		
Humidity		5-95%RH non-condensing		
Shock resistance		≤ 300m/s ²		
Vibration		※ 10 to 55 Hz, 1.5 mm double amplitude		
Installation notes		360° any angle, The need for manual operation or the wiring space		
Maintenance		Free maintenance		
Certification		Exd II B T6 Gb; Ex tD A21 IP68 T80 C		
Dimensions (LXWXH)		See "Dimensions"		
Connection standard		ISO5211 F03、F04、F05		
Dimensions / weight		Output axis specification	Female octagonal / male square	
		Hole deepness	≤ 15mm (Female octagonal) / 6.5mm (Male square)	
		Casting aluminum 1.70kg		

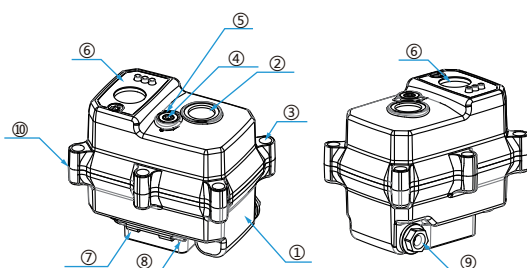
Dimension 【TCN-02TEX_Die-casting Aluminium】

unit: mm

Direct mount [female octagonal output shaft]



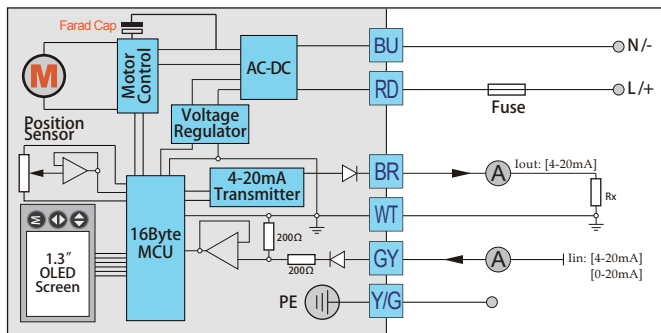
Main parts



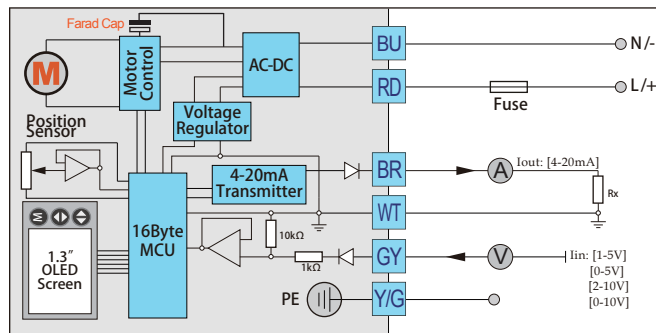
Parts	Material	Parts	Material
1 Actuator	Casting aluminum	6 Label	PVC
2 Indicator	Transparent AS	7 Wrench fixed	Heatproof_ABS
3 Screw X 6	304	8 Hexagon wrench	Tool steel
4 Manual shaft	304	9 Waterproof cable connector	304
5 Oil seal	NBR	10 Lid seal	NBR

Wiring diagrams_1

4-20mA-KT/0-20mA-KT



0-5V-KT/1-5V-KT/0-10V-KT/2-10V-KT



Control instructions - [No Alert/ 7-core] :

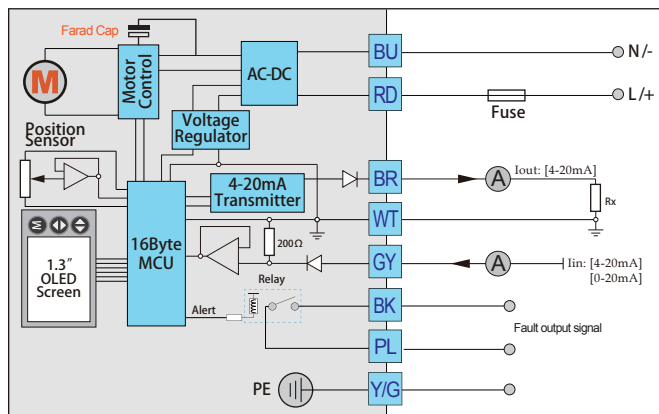
- 1 [RD][BU] are power supply.
- 2 [GY][WT][BR] are Zontrial input and feedback output.
※ They are forbidden to connect the power supply, otherwise it will damage the control module.
- 3 Make sure voltage practicable range, ※ otherwise it will damage the control module.
- 4 [GY] is feedback current input: 4-20mA, 0-20mA, 0-5V, 0-10V, 2-10V, input impedance refers to relevant wiring diagram.
- 5 [BR] is control current output: 4-20mA.
- 6 $V_{out}=I_{out} \cdot R_x$,
 ΔR_x is recommended to use low TCR resistor.
 $\Delta V_{OUT} \le 8V$, so $R_x \le 400\Omega$ (recommended $V_{out}=5V, R_x=250\Omega/0.25W$).
- 7 ※ For "4-20mA/1-5V/2-10V" control, from "user setting", user can set no control signal valve to full-open, full-close or keep. For other control (0-20mA, 0-10V, 0-5V), such setting is invalid.
- 8 When actuator is stuck or other working failures, output failure signal.
Contactor loading capacity: 0.1A/DC24V, 50mA/230V.



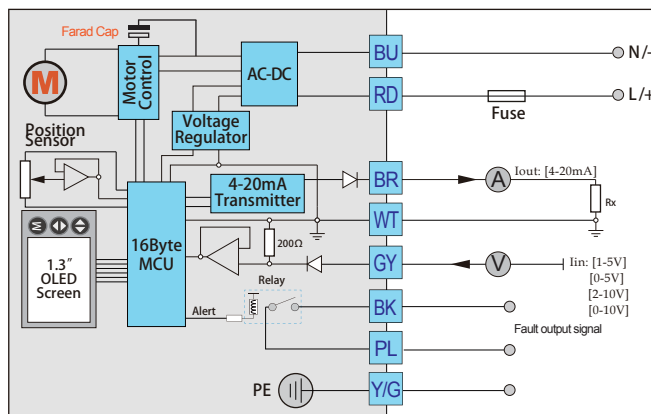
Figure 1 (7wiring diagram)

Wiring diagrams_2

4-20mA-KT-A/0-20mA-KT-A [Alarm Output]



0-5V-KT-A/1-5V-KT-A/0-10V-KT-A/2-10V-KT-A



Control instructions - [Alert / 9-core] :

- 1 RD, BU are power supply.
- 2 GY, WT, BR are control input and feedback output .
※ They are forbidden to connect the power supply, otherwise it will damage the control module.
- 3 Make sure voltage practicable range, ※ otherwise it will damage the control module.
- 4 GY is control current input: 4-20mA, 0-20mA, 0-5V, 0-10V, 2-10V, input impedance refers to relevant wiring diagram.
- 5 BR is feedback current output: 4-20mA.
- 6 $V_{out} = I_{out} \cdot R_x$,
△ R_x is recommended to use low TCR resistor.
△ $V_{OUT} \leq 8V$, so $R_x \leq 400\Omega$ (recommended $V_{out} = 5V, R_x = 250\Omega, 0.25W$).
- 7 ※ For "4-20mA/1-5V/2-10V" control, from "user setting", user can set no control signal valve to full-open, full-close or keep. For other control (0-20mA, 0-10V, 0-5V), such setting is invalid.
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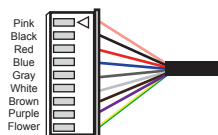
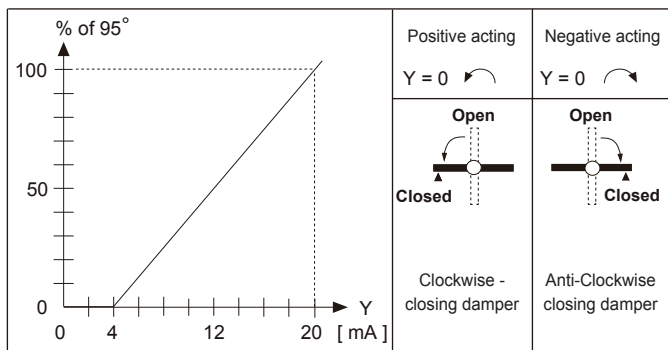
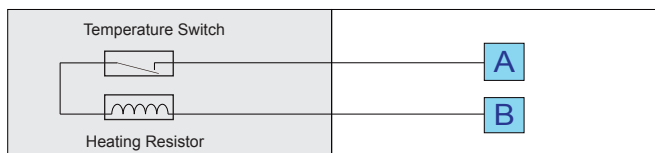


Figure2 (9 wiring diagram)

Position - Control Signal



Anti-condensation heater [Accessory]



- ※ Notice 1: The range of power is 2W-3W;
- ※ Notice 2: The range of constant temperature heating is 25°C ± 20%.

Mounting instructions

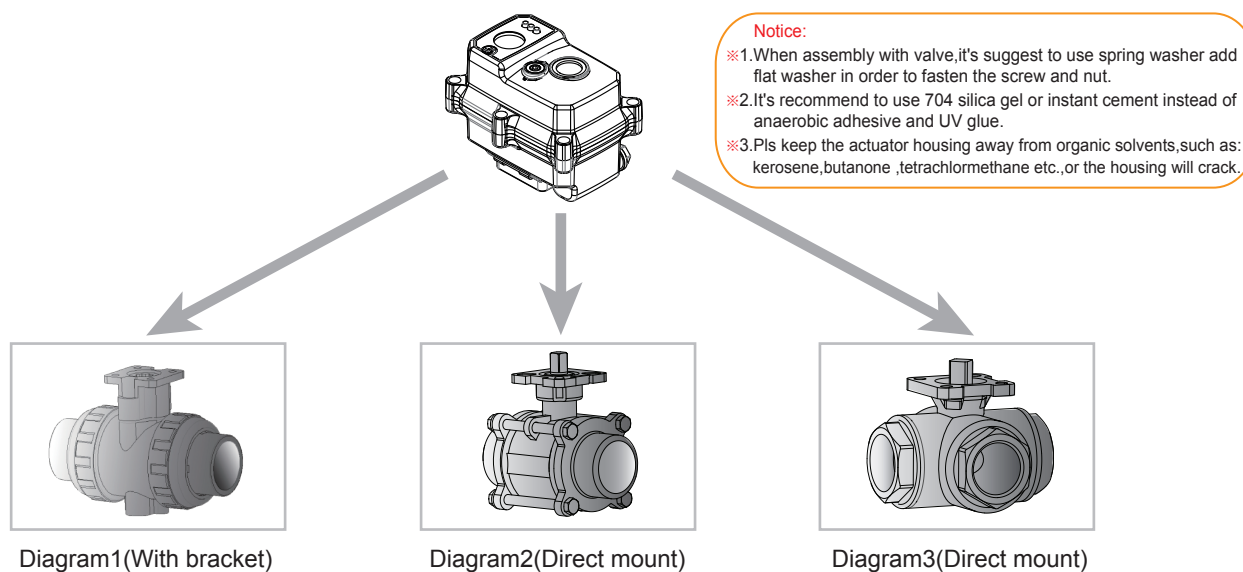


Diagram1 UPVC plastic ball valve+bracket assembly

Diagram2 3piece stainless steel ball valve assembly

Diagram3 3piece stainless steel 3way ball valve assembly

Installed valve technical requirements

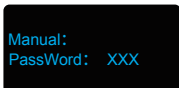
- 1. When installing ball valve, the max torque $\leq 12\text{Nm}$. If the ball valve is out of operation for a long time, and the torque value of first on or off is the max torque. Or you can choose ball valve with elastic sealing.
- 2. When installing butterfly valve, the max torque $\leq 12\text{Nm}$. Because the torque value will increased by 10-20% after installing.
- 3. When installing direct mount model valve, the hole deep $\leq 15\text{mm}$. It requires cutting if the output shaft is longer than 15mm.
- 4. Pls pay attention to the following items if you install the bracket and coupling by yourself:
 - ※ The intensity of bracket should meet the using requirements: the bracket twisting extent $\leq 0.2\text{mm}$ in the process of on or off.
 - ※ The parallelism of bracket $\leq 0.5\text{mm}$.
 - ※ When processing the shaft hole at both end of the coupling, it is necessary to ensure the accuracy and concentricity. The purpose is to make sure the mechanical hysteresis $\leq 10^\circ$, otherwise it will cause the actuator unable to work.
- 5. Screw should be installed spring washer、flat washer, and we suggest you daub some glue cement around the screw in case of screw loosening.
- 6. After installation, user should switch the valve on and off one time with handle device first. Modifying the valve after make sure it works well.

Menus operations ----Manual operation mode

□1 Manual operation mode

After factory default setting ,actuator could be manual operated by the button. Press K3 button simultaneously, until K3 is flicking on top right corner. After 5s, enter "Manual operation mode".

□2 Input password: password=111



Press K2 button to switch single digit/tens digit/hundreds digit, press K3 button once, it will plus 1. when "xxx=111", press M button to enter next item.

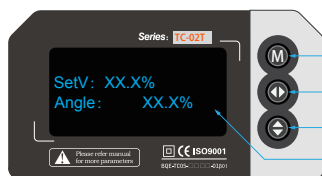
Under "User setting"and "Manual setting"mode, if there is no button pressing for about 80s,system will enter "Auto control mode" automatically.

□3 Manual operation :



Press K3 button, actuator will rotate in anticlockwise direction, and the screen will show the current angle . The actuator will stop as soon as the button is released. If the angle is bigger than 90°, the bottom of the screen will show "Limit"and the actuator will not operate. Press K2 button, actuator will rotate in clockwise direction, and the screen will show the current angle . The actuator will stop as soon as the button is released. If the angle is less than 0°, the bottom of the screen will show "Limit"and the actuator will not operate. Press M button or without pressing any button for 80s means to exit the current mode, and enter auto control mode.

Menus operations ---- User setting mode

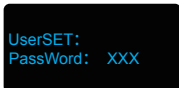


M Key: to switch menus
 K2 Key: to switch Flash item or adjust values
 K3 Key: to modulate numerical value
 Screen : 1.3/0.96"OLED,Blue word against black background, 128X64

□1 User setting mode :

Hold M button, until "M" is flicking on top right corner. After 5s, enter "user setting mode"

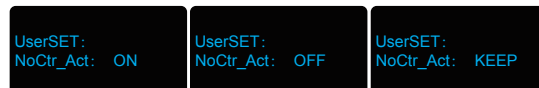
□2 Input password: password=333



Press K2 button to switch single digit/tens digit/hundreds digit, press K3 button once, it will plus 1. when "xxx=333", press M button to enter next setting item.

□5 No control command :

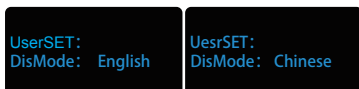
When external control signal is missing, valve can be designed to perform on/off/keep on.



Instructions: Press K3 button to switch these 3 choices in cycle. Press M button to enter the next setting item.
 Default Value: KEEP

□3 Display Mode:

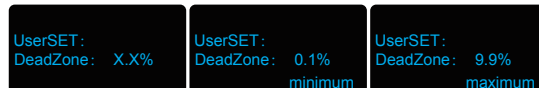
Set menu language.



Operate instructions: press K3 to switch Chinese or English.Then press M to enter the next setting item.

□6 Dead zone setting :

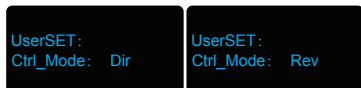
Dead zone setting: main task is to adjust the accuracy and sensitivity, the unit is deviation degree.The bigger the dead zone is, the less accurate and sensitive the valve is. The smaller the dead zone is, the more accurate and sensitive the valve is. But it tends to cause the system oscillation. The range:0.1-9.9%, the system default is 0.8.



The range:0.1-9.9%
 Default Value: 0.8%

□4 Control direction setting :

Control direction: Direct acting, Reverse acting. Positive acting: 4mA means valve is totally off, 20mA means valve is totally on. Negative acting: 4mA means valve is totally on, 20mA means valve is totally off.



Instructions: press K3 button to switch positive acting and negative acting.Press M button to enter the next setting item.
 Default Value: Dir

□7 Hysteresis enable setting :

This setting is the precondition of next setting , only in when setting IsGO_Hyste=YES, the setting parameter of Hystere is valid and applicable .



Default Value: NO

□8 Hysteresis setting:

Only when last setting is `IsGO_Hyste=YES`, the parameter of Hysteresis is valid and applicable. In the case of that has a big separation between valve stem and connection of actuator, to increase the accuracy of the valve open degree, if not exist above question, do not set this parameter.

UserSET: Hysteres: XX%	UserSET: Hysteres: 0.1%	UserSET: Hysteres: 9.0%
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The range: 0.1-9.9%
Default Value: 0.2%

□9 Manual operation speed setting:

When user enter into manual operation, the running speed of actuator is decided by this parameter.

UserSET: Manu_spd: XX%	UserSET: Manu_spd: 20	UserSET: Manu_spd: 100
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The range: 20-100%
Default Value: 100%

□10 Motor break delay setting:

To increase the stability of motor, actuator will brake after a little delay when running into position specified. In general, user no need to set this parameter.

UserSET: Brk_Delay: XX%	UserSET: Brk_Delay: 0 Ms	UserSET: Brk_Delay: 95Ms
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The range: 0-95Ms
Default Value: 1Ms

□11 Maximum running speed setting:

The maximum running speed of motor when running. The running speed of motor will affect the output torque, so if user have no special requirement, please do not modify this parameter.

UserSET: Speed_Max: XX%	UserSET: Speed_Max: 20%	UserSET: Speed_Max: 100%
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The range: 20-100%
Default Value: 100%

□12 Minimum running speed setting:

The minimum running speed of motor when running. The running speed of motor will affect the output torque, so if user have no special requirement, please do not modify this parameter.

UserSET: Speed_Min: XX%	UserSET: Speed_Min: 20%	UserSET: Speed_Min: 95%
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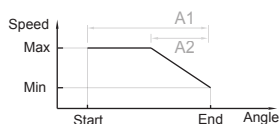
The range: 20-95%
Default Value: 75%

□13 Speed adjustment range setting:

Actuator can calculate the angle of whole-process A1. Actuator will slow running when is almost to specified position, and this slowing process angle is A2. $RangeADJ=A2/A1$

UserSET: RangeADJ: XX.X%	UserSET: RangeADJ: 0.1%	UserSET: RangeADJ: 20.0%
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The range: 0.1-20.0%
Default Value: 10%



□14 Redefine the position of 4mA

Redefine the closing position of valve, that actuator can be used in the situation of other angle.

UserSET: Posi4mA: X.X%	UserSET: Posi4mA: -50.0% minimum	UserSET: Posi4mA: 80.0% maximum
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The range: -50.0-80.0%
Default Value: 0.0%

□15 Redefine the position of 20mA

Redefine the closing position of valve, that actuator can be used in the situation of other angle.

UserSET: Pos20mA: X.X%	UserSET: Pos20mA: 20.0% minimum	UserSET: Pos20mA: 220.0% maximum
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The range: 20.0-220.0%
Default Value: 100.0%

□16 Out_4mA modifying:

If 4mA deviation value of output current is inaccurate, user can adjust it by this item. If the number increases, output current will be bigger, if the number decreases, the output current will be smaller.

UserSET: Out_4mA: XXX_A	UserSET: Out_4mA: 000_A minimum	UserSET: Out_4mA: 481_A maximum
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The range: 000-481_A
Default Value: 191_A

Tips: Confirm the value of Out_4mA less than the value of OUT_20mA, otherwise the feedback signal will be wrong.

□17 Out_20mA modifying:

If 20mA deviation value of output current is inaccurate, user can adjust it by this item. If the number increases, output current will be bigger, if the number decreases, the output current will be smaller.

UserSET: Out_20mA: XXX_A	UserSET: Out_20mA: 191_A minimum	UserSET: Out_20mA: 1000_A maximum
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The range: 191-1000_A
Default Value: 909_A

Tips: Confirm the value of Out_4mA less than the value of OUT_20mA, otherwise the feedback signal will be wrong.

□18 Stall Time:

Adjust the actuator testing sensibility to valve stall. The smaller the value is, the higher the sensitivity is. The bigger the value is, the lower the sensitivity is. The Value should be increased when the actuator rotating speed is set too low.

UserSET: StallTime: 3X	UserSET: StallTime: 1X minimum	UserSET: StallTime: 20X maximum
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The range: 1-20X
Default Value: 3X

□19 Power down command:

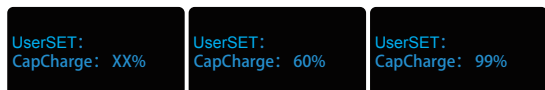
Power down command: means the command actuator operates when the external power supply is cut off (the function will take effect only when there is enough energy-reserving unit inside actuator).

UserSET: PDAction: KEEP	UserSET: PDAction: OFF	UserSET: PDAction: ON
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KEEP: keep the status after power down.
ON: operate valve-on after power down.
OFF: operate valve-off after power down.
Default Value: OFF

20 Capacitor Charge:

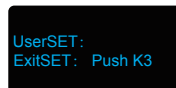
Set capacitor charge percentage,when the charging quality is bigger than setting value, it will enter the system.



The range: 60-99%
Default Value: 95%

Notice: the capacitor charge value should not below 80%,or it will lead power-supply insufficient,and then the actuator will alarm.

21 Exit Setting:



Instructions: Press K3 button to exit setting, press M button to loop the beginning menu. After exiting setting, the system will enter auto control mode.

Common failures and processing methods

	Fault phenomenon	Fault cause	Processing methods
<input type="checkbox"/> 1	Actuator no action	△1 power not connected	Connect power
		△2 voltage below level or incorrect	Check whether voltage is within the normal range
		△3 overload protection of motor after 3s	Check whether valve gets stuck or torque value is too big
		△4 terminal loose or poor contact	Check and correctly connect terminal
		△5 starting capacitance poor run	Contact the manufacturer to get repair
<input type="checkbox"/> 2	No feedback signal	△1 line barrier of user acquisition signal	Connect user acquisition signal
		△2 4-20mA deviation is too big	Adjust the reference value of PWM-4mA by the menu
		△3 4-20mA transducing circuit damage	Contact the manufacturer to get repair
<input type="checkbox"/> 3	Actuator not fully closed	△1 use feedback signal to control actuator	Receive feedback signal doesn't mean actuator is fully closed, so don't cut power off
		△2 return difference increases due to abrasion between actuator and valve rod	1 Adjust valve-off position to realize deviation by the menu 2 Contact the manufacturer to get repair
<input type="checkbox"/> 4	Actuator interior water ingress	△1 OD of incoming line cablenon-standard	Contact the manufacturer to get repair
		△2 waterproof treatment of incomingline incomplete	
		△3 actuator lens wearout	
		△4 screws on connection cover/head cover /slide cover loose	

Working environment

- Indoor and outdoor are both optional.
- You need to install protective device for the actuator if it is exposed to the rain or sunshine.
- Please pay attention to the ambient temp.
- When installing, you need to consider the reserved space for wiring and repairing.
- When power on, ⚠ it is not allowed to dismantle actuator and valve.
- When power on, ⚠ it is not allowed to do wiring.
- ✖ Absolutely no falling down the ground, which will hit the device and lead to improper operation.
- ✖ Absolutely no standing on the device, which will cause device malfunction or personal accident.
- ✖ It is forbidden to do wiring project in rainy day or when there is water splash.

Safety notice

- In order to use the device safely for a long term, please pre-read the manual carefully to ensure correct use.
- Notice item: Please understand the product specification and using method clearly to prevent personal safety danger or device damage.
- In order to indicate damage and danger, here we classify them as “warning ⚠” and “notice ✖”.
- Both of contents are very important, which should be obeyed strictly.
- “Warning ⚠”: It will cause death or serious injury if not obeyed.
- “Notice ✖”: It will cause slight injury or device damage if not obeyed.
- Subject to technical changes.