

Product overview

- ⊙ Rated voltage: DC12V
- ⊙ Rated torque: **20Nm**
- ⊙ Running time: **about 10s**
- ⊙ Install valves: 2way,3way ball valve and butterfly valve
 ※ **Note: Please reserve torque safety factor when selecting**
- ⊙ Control signal: 4-20mA、0-20mA、0-5V、1-5V、0-10V、2-10V (A: Alarm Output)
- ⊙ Position feedback: 4-20mA、0-20mA、0-5V、1-5V、0-10V、2-10V
- ⊙ Alarm output: A(Relay contact feedback)
- ⊙ Position accuracy: $\pm 1\%$
- ⊙ Adopted high-performance brushless motor,Overload protection of internal motor
- ⊙ It can be used 20,000 times*1
- ⊙ Two or more actuators can be used in paralle



Product features

- △ 1.3" 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;it makes valve adjustment easier.
 Thoroughly eliminate the complex and inconvenience caused by mechanical positioning.
- △ Adopt 32 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°C 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	DC12V
	Rated voltage range	DC10-15V
	Power consumption	25W@max;10w@running;1.6W@holding
	Peak current	2.1A@5ms@DC12V
	Fuse	4A
	Connecting cable	7*0.3mm ² cable, voltage withstand AC300V(Length 800mm) 3*0.3+7*0.2mm ² cable, voltage withstand AC300V(Length 800mm)
Functional data	Rated torque	20Nm@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 10s (per 90°)
	Operating mode	S3-75%(AC),S3-85%(DC)(loading ≤85% rated torque refer to IEC60034-1)*1
	Sound power level	65dB(A)
	Position indicator	Mechanical and screen
Working conditions	Electricity safety level	III Type (safety low voltage)
	Inflaming retarding level	HB/ UL94 test method
	Enclosure	IP67 As Per En60529/GB4208-2008 (all directions) F type can add dehumidifying heater
	Insulation resistance	100MΩ/500VDC
	Withstand voltage	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	△ Not explosion proof products, do not use in flammable and explosive environment.
	Ambient temp *3	-15°C~+45°C (ABS) ; -15°C~+60°C (Aluminum)
	Non-operation temp	≤-40°C or ≥80°C
	Ambient humidity	5-95%RH non-condensing
	Vibration Shock	≤2g
	Vibration amplitude	※ 10 to 55 Hz, 1.5 mm double amplitude
	Installation notes	360°any angle, need manual operation or allow for wiring space
	Maintenance	Free maintenance
	Certification	CE
Dimensions / weight	Dimensions (LXWXH)	See "Dimensions"
	Connection standard	ISO5211 F03、F04、F05
	Output axis specification	Female octagonal or male square
	Hole deepness	≤15mm(Female octagonal)/6.5mm(Male square)
	Weight	ABS material 0.62kg,Casting aluminum 0.82kg

*2 Operating mode: The testing environment temperature is 25 °C inside the factory. The testing standard as per IEC 60034-1-2017.The operation mode will be S3-90% if the loading less than 60% rated torque..

*3.(1) It is customized item when used and stored under special ambient temperature of -20°C~-40°C, and special instructions are required.

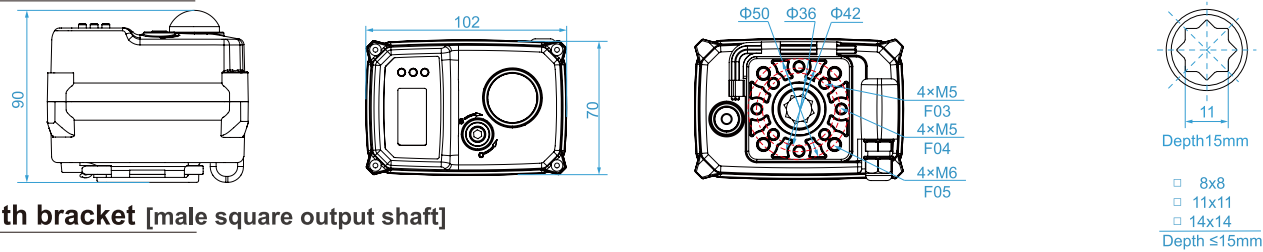
(2) At the ambient temperature of -40 °C, power on is required for more than 15 minutes (30 minutes is recommended) before use. The higher the ambient temperature is, the shorter the power on time can be.

(3) If user use the product at the ambient temperature of -40°C for long time, it needs to be insulated.For example,add heating cable around the actuator.If the ambient temperature is over -20°C, then the heating cable can be canceled.

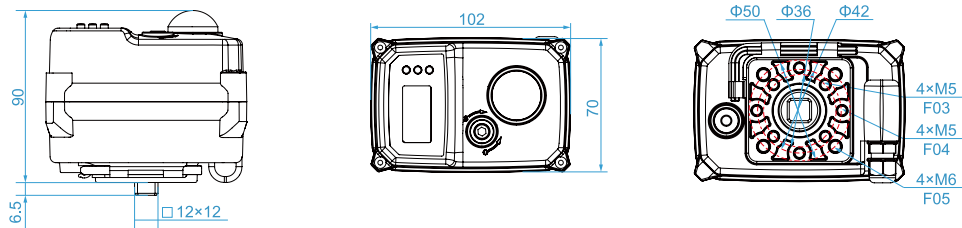
Dimension【TCN-02X-ABS-II-Die-casting Aluminium】

unit:mm

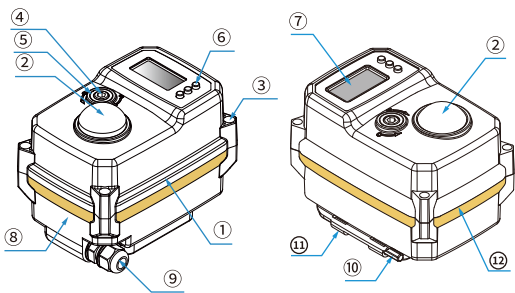
Direct mount [female octagonal output shaft]



With bracket [male square output shaft]



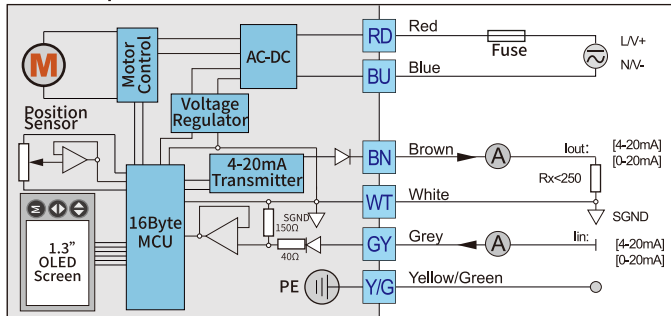
Main parts



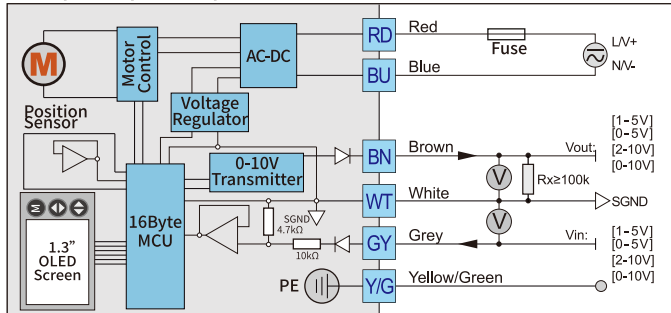
	Parts	Material		Parts	Material
1	Actuator	Heatproof ABS or Casting aluminum	7	1.3" LCD Screen	OLED
2	Indicator	PC	8	Label	PVC
3	Screw X 4	304	9	Waterproof cable connector	Heatproof_ABS
4	Manual shaft	304	10	Hexagon wrench	CR-V
5	Oil seal	NBR	11	Wrench fixed	NiLon
6	KEY	Rubber	12	Lid seal	Silica gel

Wiring diagrams

4-20mA/0-20mA



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



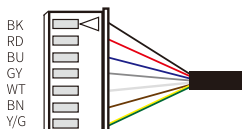
Control instructions -[No Alarm/ 7-core]:

- ☐ 1. **RD BU** are used to connected with supply power. Please confirm the voltage before using.
※ Otherwise, the wrong voltage will damage the control module.
- ☐ 2. **YG** is used to connected PE. Please ensure the actuator is connected with ground.
- ☐ 3. **GY BN WT** is the input and output end. These 3 lines are forbidden to short connect directly.
GY is 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V, the signal input impedance refers to the corresponding wiring diagram.
BN is 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V. User could set the output current/voltage range for the feedback output signal through menu.
- ☐ 5. Current output load RX:
$$\Delta V_{OUT} = I_{OUT} \cdot R_X$$

 ΔR_X is recommended to use resistor with low TCR.
 $\Delta V_{OUT} \leq 8V$, so $R_X \leq 400\Omega$ (recommended $V_{OUT}=5V$, $R_X=250\Omega/0.25W$)
- ☐ 6. ※ User could set the control mode (0-20mA/4-20mA/0-10V/2-10V) through the parameter 'control mode' in menu.
- ☐ 7. For the actuator with Failsafe function, user could set the action of the actuator when the power fails through the user menu. The available options are ON, OFF, KEEP, B33. The default option is OFF.
- ☐ 8. The Loading capacity of output signal 0-10V/2-10V/0-5V/1-5V is $\geq 100K\Omega$. We suggest use the littler wire resistor as The length of wire and resistor will affect the accuracy.

Test terminal for the cable end_wiring instruction

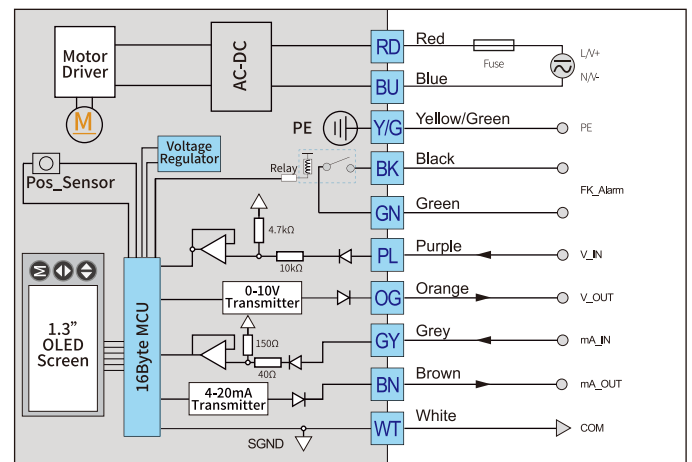
1. Fuse: Refer to the detail corresponding instruction.
2. Some products adopt fly cable, user could wiring according to cable colour.



(User could cut out the cable terminal as it is only used for factory test.)

Cable terminal for test (7pin)

4-20mA-A/0-20mA-A/0-5V-A/1-5V-A/0-10V-A/2-10V-A [Alarm Output]



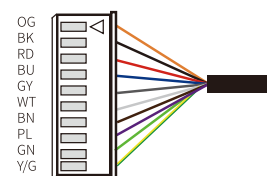
Alarm Output-Wiring instruction

- ☐ 1. **RD BU** are used to connected with supply power. Please confirm the voltage before using.
※ Otherwise, the wrong voltage will damage the control module.
- ☐ 2. **YG** is used to connected PE. Please ensure the actuator is connected with ground.
- ☐ 3. **BK GN** will output alarm signal.
- ☐ 4. **PL OG GY BN WT** is the input and output end. These 5 lines are forbidden to short connect directly.
PL is 1-5V, 2-10V, 0-5V, 0-10V input signal. Impedence refers to the corresponding wiring diagram.
OG is 1-5V, 2-10V, 0-5V, 0-10V feedback output signal. User could set the output voltage range through menu.
GY is 0-20mA, 4-20mA, the signal input impedance refers to the corresponding wiring diagram.
BN is 0-20mA, 4-20mA. User could set the output current range for the feedback output signal through menu.
- ☐ 5. Current output load RX:
$$\Delta V_{OUT} = I_{OUT} \cdot R_X$$

 ΔR_X is recommended to use resistor with low TCR.
 $\Delta V_{OUT} \leq 8V$, so $R_X \leq 400\Omega$ (recommended $V_{OUT}=5V$, $R_X=250\Omega/0.25W$)
- ☐ 6. ※ User could set the control mode (0-20mA/4-20mA/0-10V/2-10V) through the parameter 'control mode' in menu.
- ☐ 7. Once actuator is struck or other working failures, the screen will show alarm information although not alarm signal. Notice the contactor loading capacity is 0.1A/DC24V, 50mA/230V
- ☐ 8. The Loading capacity of output signal 0-10V/2-10V/0-5V/1-5V is $\geq 100K\Omega$. We suggest use the littler wire resistor as The length of wire and resistor will affect the accuracy.

Test terminal for the cable end_wiring instruction

1. Fuse: Refer to the detail corresponding instruction.
2. Some products adopt fly cable, user could wiring according to cable colour.

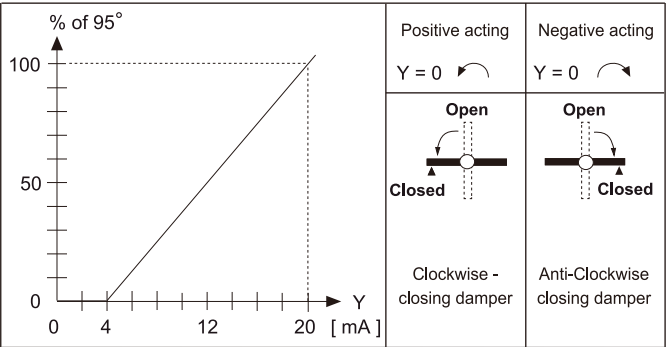


(User could cut out the cable terminal as it is only used for factory test.)

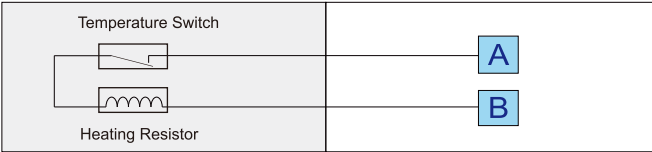
Cable terminal for tes (10pin)

Wiring diagrams

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

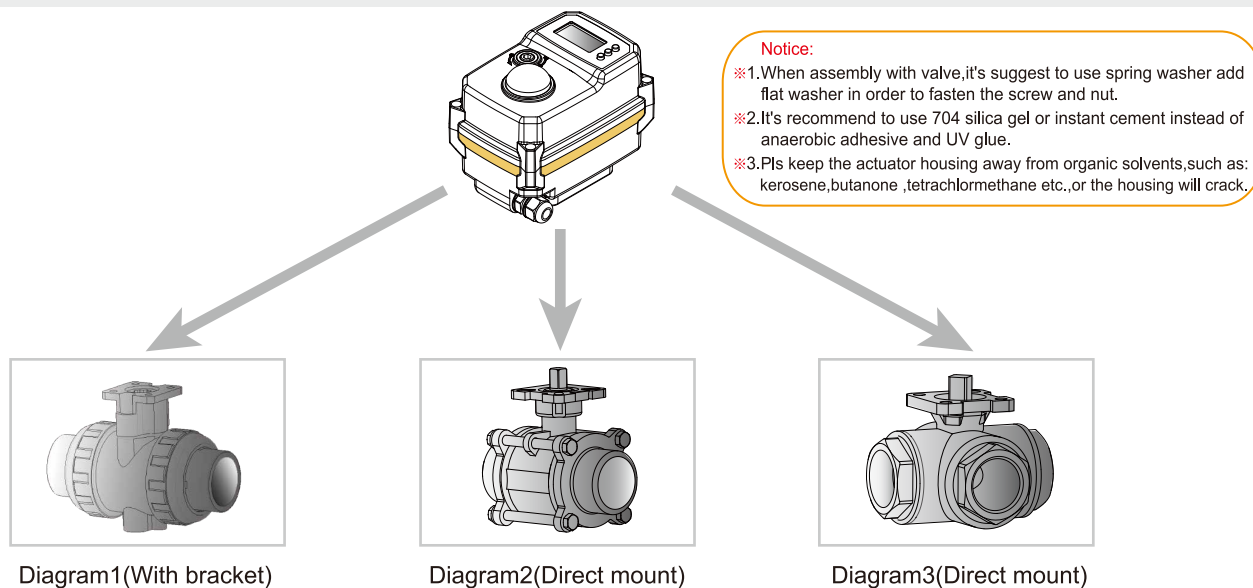


Diagram1 UPVC plastic ball valve+bracket assembly

Diagram2 3piece stainless steel ball valve assembly

Diagram3 3piece stainless steel 3way ball valve assembly

Installed valve technical requirements

Valve type	Recommend install condition
wafer butterfly valve	actuator rate torque ≥ 2 times valve max torque
flange butterfly valve	actuator rate torque ≥ 1.7 times valve max torque
metal ball valve	actuator rate torque ≥ 1.7 times valve max torque
plastic ball valve	actuator rate torque ≥ 1.5 times valve max torque

- 1. 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.
- 2. When installing direct mount model valve, the hole deep ≤ 15 mm. It requires cutting if the output shaft is longer than 17mm.
- 3. 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 ≤ 0.2 mm in the process of on or off.
 - ※ The parallelism of bracket ≤ 0.5 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.
- 4. Screw should be installed spring washer, flat washer, and we suggest you daub some glue cement around the screw in case of screw loosening.
- 5. 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.

Common failures and processing methods

	Fault phenomenon	Fault cause	Processing methods
□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
□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
□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
□4	Actuator interior water ingress	△1 OD of incoming line cable non-standard	Contact the manufacturer to get repair
		△2 waterproof treatment of incoming line incomplete	
		△3 actuator lens wearout	
		△4 screws on connection cover/head cover /slide cover loose	

Working environment

- Indoor and outdoor are both optional.
- Not explosion proof products, ⚠ do not use them in flammable and explosive environment.
- 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.