



## Product Description

PT QT series electric actuators are used for controlling 0° -270° rotation of the valves and other similar products, such as butterfly valves, ball valves, dampers, flapper valves, plug valves, louver valves, etc., which can be widely applied in petroleum, chemical, water treatment, shipping, paper making, power plant, heating, building automation, light industry and other industries.

Driven by 380v/220v/110v AC power, inputs with  $\pm$ 20mA current signal or 0-10V DC voltage signal as control signal, which can move the valve to the required position and achieve its automatic control, the maximum output torque is 5000Nm . This series products have got CE and explosion-proof certification, explosion-proof class is ExdII BT4.

## Performance characteristics

**Shell:** The shell is made of hard aluminum alloy, with anodic oxidation treatment and polyester coating. It is strong corrosion-resistant. Enclosure IP67. NEMA 4 and 6. IP68 is optional.

**Motor:** Fully enclosed squirrel cage motor, small size, large torque, low inertia force, F-class insulation rating, built-in overheat protection switch to prevent overheating from damaging the motor.

**Manual structure:** The design of the hand wheel is safe, reliable, labor-saving and small. If without power, the clutch handle can be manually operated. When the power is on, the clutch is automatically reset (Note: the electric actuator will remain permanently manual status when power off)

**Indicator :** The indicator is mounted on the central shaft and the valve position can be observed. The lens is designed with a convex mirror, which makes it easier to observe and no water accumulated.

**Space heater :** It is used to control the temperature to prevent moisture condensation inside the actuator due to temperature and weather changes, and to keep the internal electrical components dry.

**Limit switch:** Mechanical and electronic double limit The mechanical limit screw is adjustable, safe and reliable. The electronic limit switch is controlled by the cam mechanism. Set the position accurately and conveniently by simple adjustment, battery not needed (The micro-switch contactors are all silver contactors)

**Torque switch:** (Except PTQT 010) It can provide overload protection. When the valve is jammed, the motor will cut the power automatically, to protect the valve and electric actuator from damage more effectively (Please do not change the factory default settings at will)

**Self-locking :** The precision worm and worm gear mechanism can transmit high torque with high efficiency, low noise (maximum 50 db). long life, self-locking function, anti-reverse. stable and reliable transmission parts. No need to refuel.

**Anti-off bolt:** When the shell is removed, the bolts are attached to the shell and will not fall off. The external bolts are all made of stainless steel.

**Installation :** The bottom mounting dimensions conform to the ISO5211 international standard, and the drive sleeve can be removed to process as required, and the adaptability is strong. It can be installed either vertically or horizontally.

**Circuit:** The control circuit conforms to single-phase or three-phase power supply standards, the line layout is compact and reasonable, and the connecting terminal can effectively meet the requirements of various additional functions. The valve open and closed position both have a passive contact output (can be processed according to customer requirements)

## Performance characteristics

**Intelligent module:** It adopts high integration and low power consumption microcomputer mixed with the analog circuit board, and the whole metal external mounting is used to effectively isolate the heat source of the actuator motor from the control board, which greatly improves the anti-interference and temperature resistance of software and hardware.

**The display of Valve position :** During the opening or closing of the actuator, the change of the valve position is displayed meantime on the LCD screen with large numbers.

**Phase sequence automatic adjustment :** The intelligent actuator automatically detects the phase sequence of the connected three-phase power supply, eliminating the need for the user to consider the phase sequence of the three-phase power supply.

## Standard Specification

Shell	Waterproof level IP67, NEMA4 and 6
Motor Power	110/220v AC 1 phase, 380/440 AC 3 phase. 50/60Hz, ±10%
Motor	Squirrel cage asynchronous motor
Limit switch	Open/Close, 2xSPDT,250V AC 10A
Auxiliary Limit switch	Open/Close, 2xSPDT,250V AC 10A
Torque switch	Open/Close, 2xSPDT,250V AC 10A (Except PTQT 010)
Stroke	90°±10° (0°-270° optional)
Stall Protection/ Operating Temperature	Built in thermal Protection, open 100°C ± 5°C / Close 97°C±5°C
Indicator	Continuous position indicator
Manual operation	Declutching mechanism, cooperate with handwheel
Self-locking device	Self-locking by worm and worm gear
Mechanical limit	2xexternal adjustable screws
Space heater	7-10W (110/220v AC )
Conduit entry	2xpF 3/4"
Ambient temperature	-25°C - -t-60°C
Lubrication	Molybdenum base grease ( EP type)
Material	Steel. Aluminum alloy. Aluminum bronze, Polycarbonate
Ambient humidity	Max 90% RH, Non-condensing
Anti-vibration	XYZ 10g, 0.2-34Hz, 30 minutes
External coating	Dry power epoxy polyester high anti-corrosion

## Performance Parameters

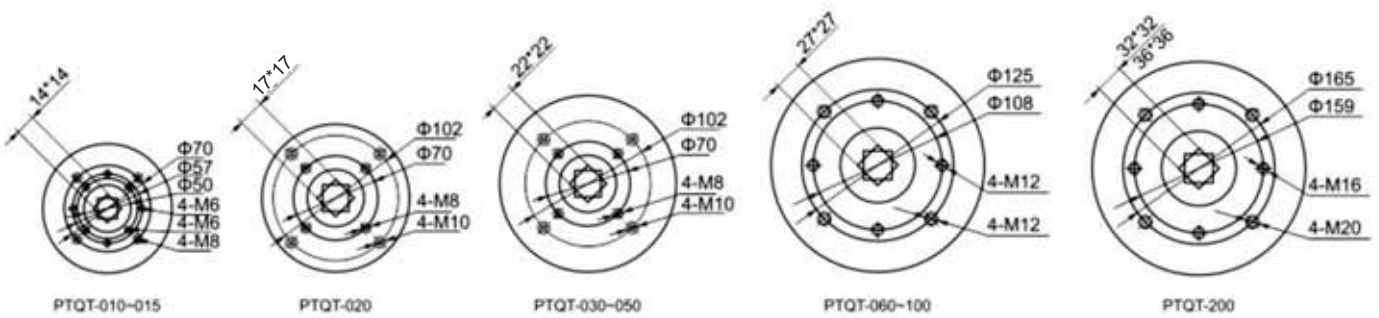
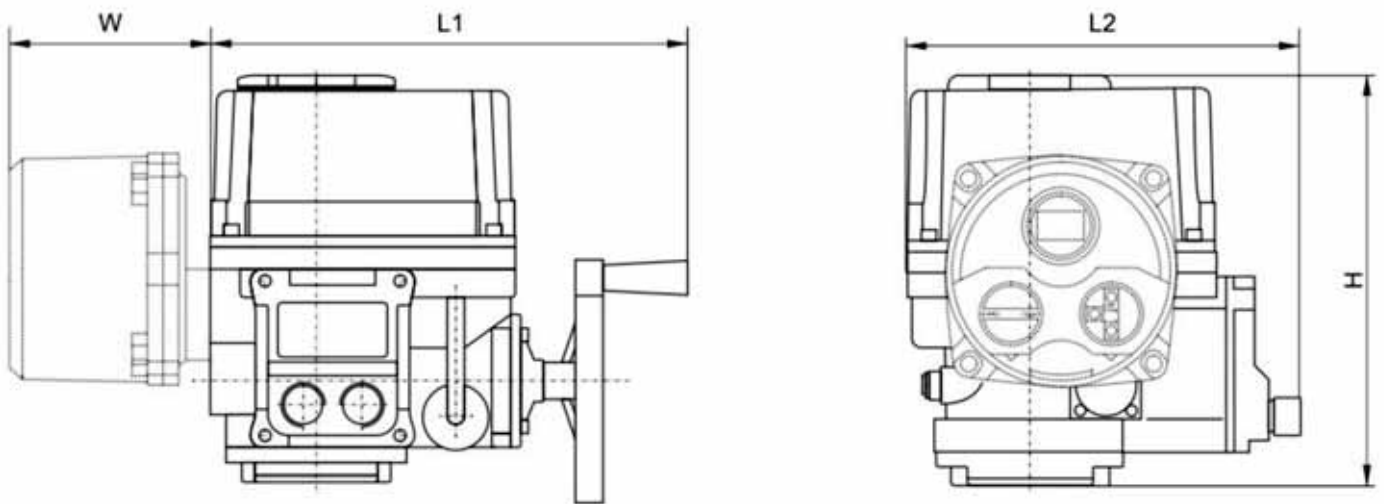
Mode	Max. Output Torque (N·m)	Operating Time (90°) (S)	Motor Power (F-class) (W)	Rated Current(A) 50Hz		Handle Wheel Turns (N)	Weight (kg)
				single-phase	three-phase		
				220V	380V		
PTQT-010	100	18/22	25	0.55	0.15	10	12
PTQT-015	150	18/22	40	0.9	0.2	10	12
PTQT-020	200	21/25	40	0.9	0.2	11	15
PTQT-030	300	21/25	60	1	0.3	11	20
PTQT-040	400	26/31	90	1.2	0.4	14	21
PTQT-050	500	26/31	90	1.2	0.4	14	21
PTQT-060	600	26/31	120	1.9	0.5	14	26
PTQT-080	800	26/31	120	1.9	0.5	18	26
PTQT-090	900	31/37	180	2.4	0.8	18	27
PTQT-100	1000	31/37	200	2.6	0.9	18	27
PTQT-200	2000	93/112	200	2.6	0.9	50	64
PTQT-300	3000	93/112	200	2.6	0.9	50	64
PTQT-400	4000	155/185	200	2.6	0.9	83	83
PTQT-500	5000	155/185	200	2.6	0.9	83	83

## Optional Specification

No.	Optional Scheme
1	Explosion-proof Actuator (Exd IIC T4)
2	Water-proof Actuator(IP68.10M 250HR)
3	Potentiometer Unit (IK-IOk)
4	Proportion Control Unit (input,output 4-20mADC/1-5V/1-10V)
5	Local control units (local control/open/stop/close selector, local/remote switch)
6	Stroke 120MQO°,270°
7	Direct current motor (24V DC)
8	Torque switch(2xSPDT 250V AC 10A) (Except PTQT 010)
9	Electric current position transfer (Output 4-20mADC)
10	Power off,the electric valve can open or close automatically
11	High temperature resistance actuator (-10°C to +100°C)
12	Low temperature resistance actuator (-40°C to ^YO°C)
13	Low speed actuator

**Overall and Connection Dimensions**

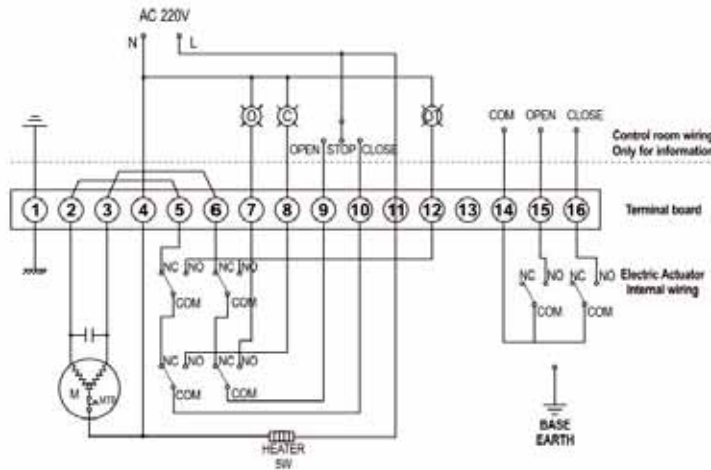
The part of broken line is control box of analog quantity of actuator, ON-OFF type do not have this part and size.



Model	L1	L2	H	W
PTQT-010-015	320	220	270	140
PTQT-020	355	250	275	140
PTQT-030-050	375	290	315	140
PTQT-060-100	400	330	360	140
PTQT-200	400	330	520	140

## Electrical Wiring Diagram

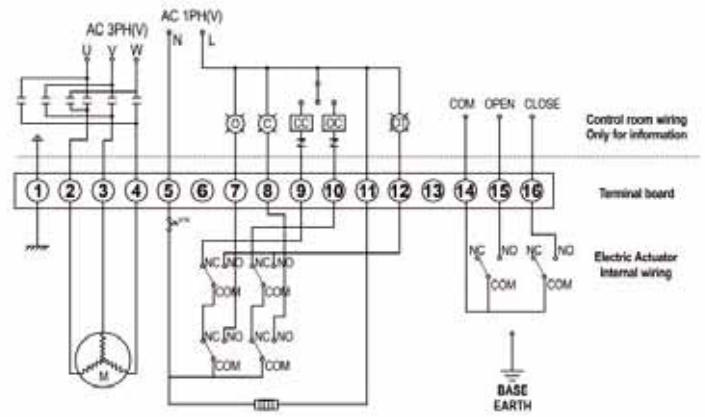
PTQT Series 220VAC 50/60HZ 1PH, ON-OFF Standard Type



Terminal Function

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ground Connection			Power supply N			Open lamp	Close lamp	Open valve	Close valve	Heater I	Over torque lamp	Common Terminal	Common Terminal	Limit open	Limit close

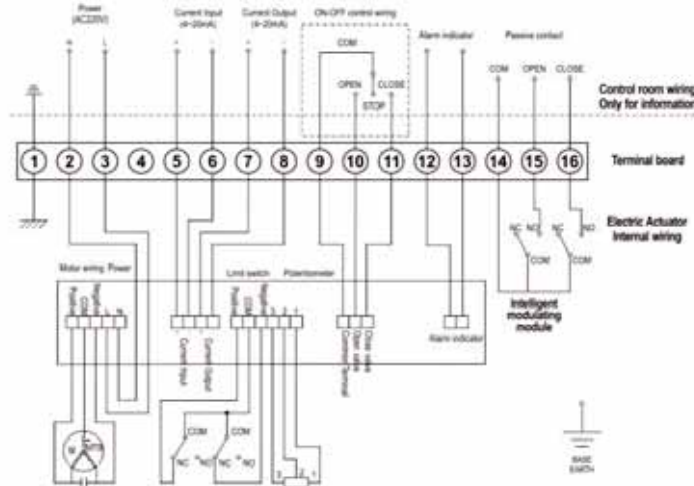
PTQT Series 380VAC 50/60HZ 3PH, ON-OFF Standard Type



Terminal Function

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Ground Connection	Motor Power			Power supply N			Open lamp	Close lamp	Open valve	Close valve	Heater I	Over torque lamp	Common Terminal	Common Terminal	Limit open	Limit close

PTQT Series 220VAC 50/60HZ, 1PH Modulating Type

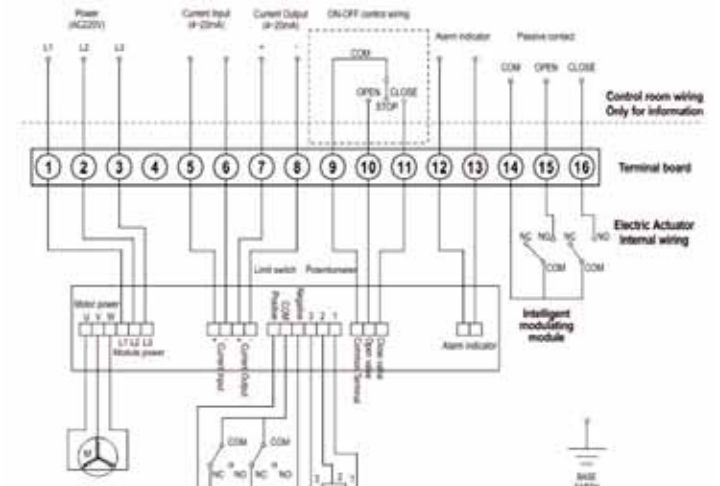


Terminal Function

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ground Connection	Power supply		Alarm output	Current Input		Current Output		Common Terminal	Open valve	Close valve	Alarm indicator	Common Terminal	Limit open	Limit close	
	N	L		+	-	+	-								

Note: 24VDC power for on-off control is provided by intelligent modulating module, no need to access external power

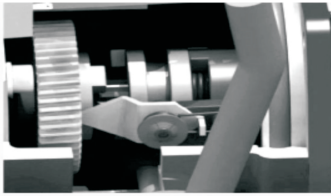
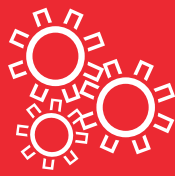
PTQT Series 380VAC 50/60HZ 3PH, Integrated Modulating Type



Terminal Function

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Power supply			Alarm output	Current Input		Current Output		Common Terminal	Open valve	Close valve	Alarm indicator	Common Terminal	Limit open	Limit close	
L1	L2	L3		+	-	+	-								

Note: 24VDC power for on-off control is provided by intelligent modulating module, no need to access external power



### << Manual operation(Clutching system)

- Manual/Auto convert to handle and handwheel used for emergency manual operation
- Powered, handle will automatically reset to auto operation

### Cam and limit switch >>

- Tighten with two screws and simple setting
- Each cam can be set separately
- Once set, each cam will be on the position forever.

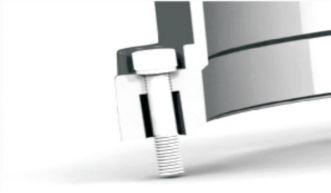


### << Space heater

- 7-10W, ceramic housing with thermostat to prevent overheat comparing with set temperature
- Without risk of electricity leakage.

### Terminal block >>

- Enough terminal for customer's convenience (Max 22 points)
- Proven reliability and tight wiring connection
- Terminal length: 8-9mm(2.5mm')
- Terminal dimension: 10 x 22 x 32mm.

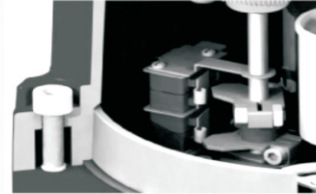


### << Anti-off bolt

- Cover bolts are specially designed to prevent falling down during maintenance or installation.
- All external bolts are stainless steel for rust prevention.

### Indicator sustained by spring >>

- Direction of indicator has been set by factory
- If change direction of indicator, just grip the indicator plate to change it
- Spring under the indicator plate sustains the set position unchanged
- No need to loose screw and tight against stall.

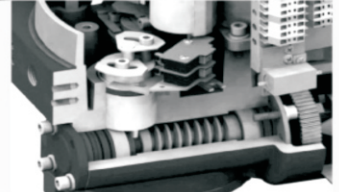


### << Inclined plane

- For other actuators, it is hard to take off cover because of little tolerance when the interface between cover and body is vertical.
- For QT actuators, it is easy to take off cover as small tolerance, the design of interface is 3 degree inclined plane.

### Torque switch >>

- Torque switch protect motor and internal electric components from overheat caused by overload of valve.
- If torque works, the actuator stop at once.

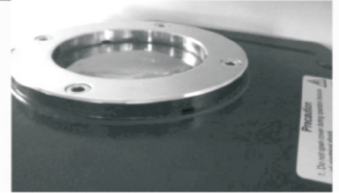


### << Removable drive sleeve

- Sleeve is removable as different requirement
- 4 under hungs for tightening or loosening between drive shaft and sleeve.
- Easy installation with valve.

### Two slots on window glass >>

- Two slots on the window covers and convex are convenient for draining and observing, and ensure the well sealing of the cover.



## Outside view

The part of broken line is used for analog quantity control box, on/off model don't have this size.

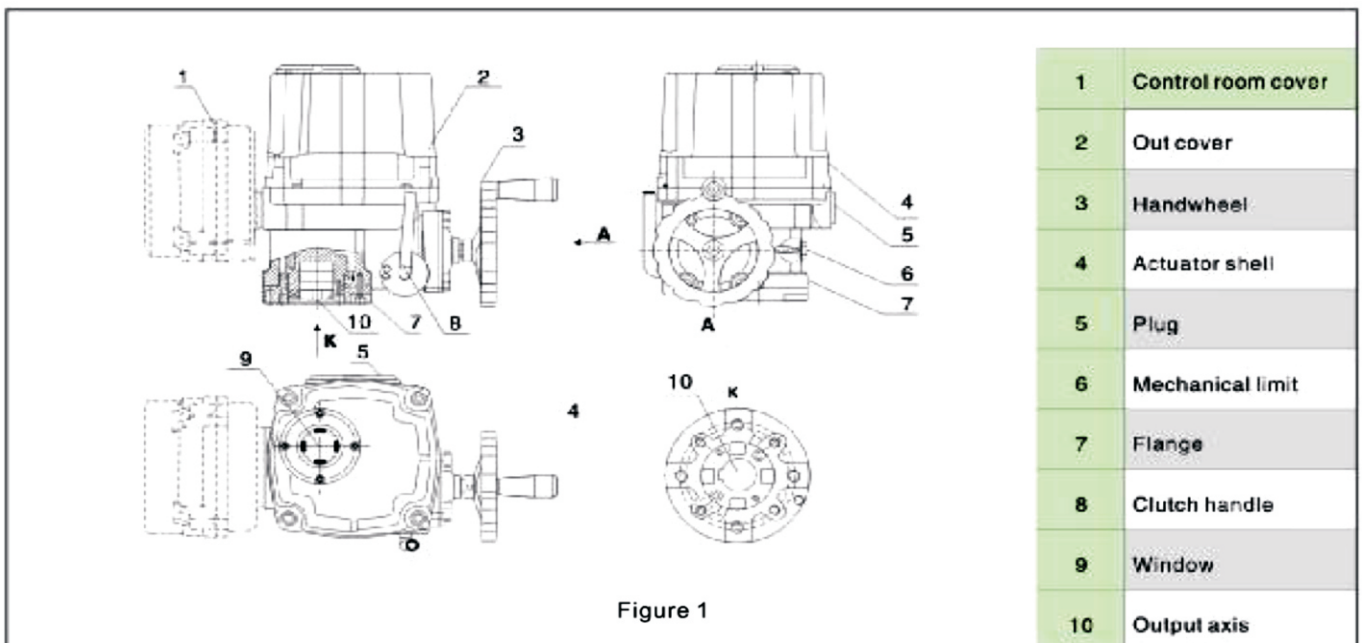
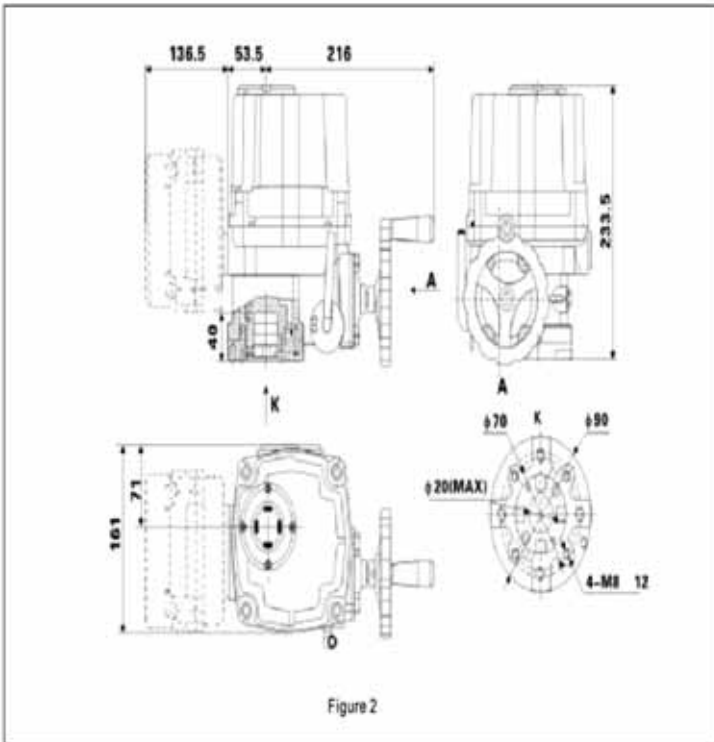


Figure 1

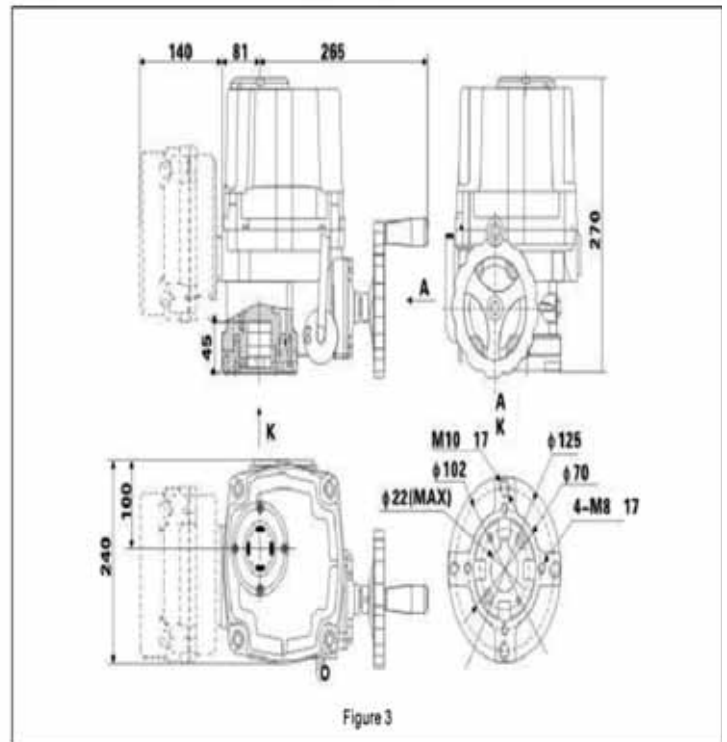
**1.QT-010 Appearance and installation dimension**

(The part of broken line is used for analog quantity control box,on/off model don't have this size)



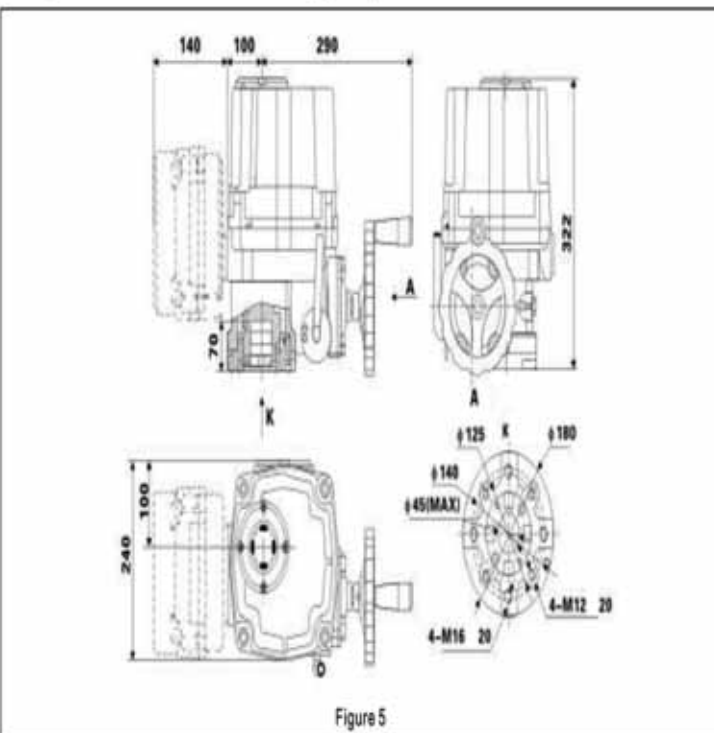
**2.QT-015-020 Appearance and installation dimension**

(The part of broken line is used for analog quantity control box,on/off model don't have this size)



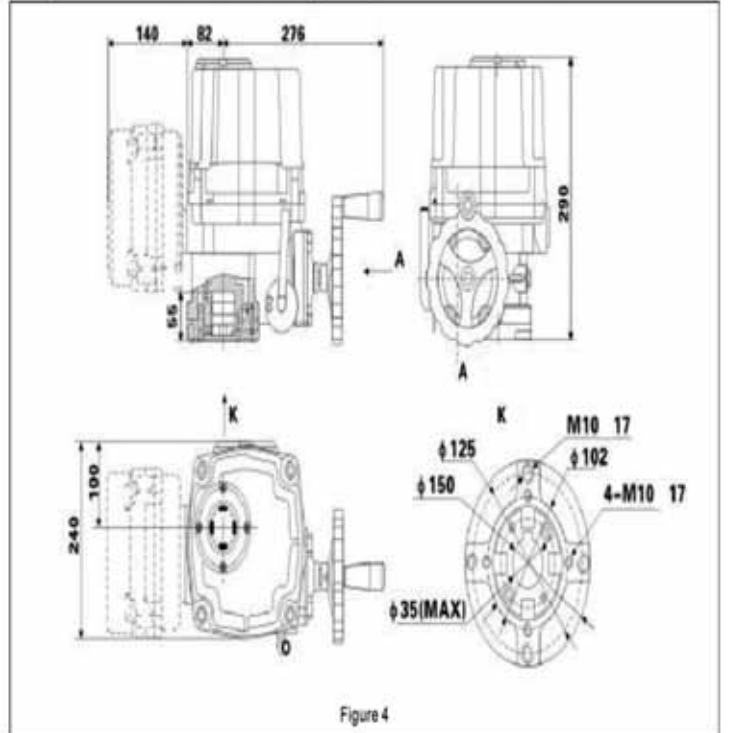
**4.QT-080-200 Appearance and installation dimension**

(The part of broken line is used for analog quantity control box,on/off model don't have this size)



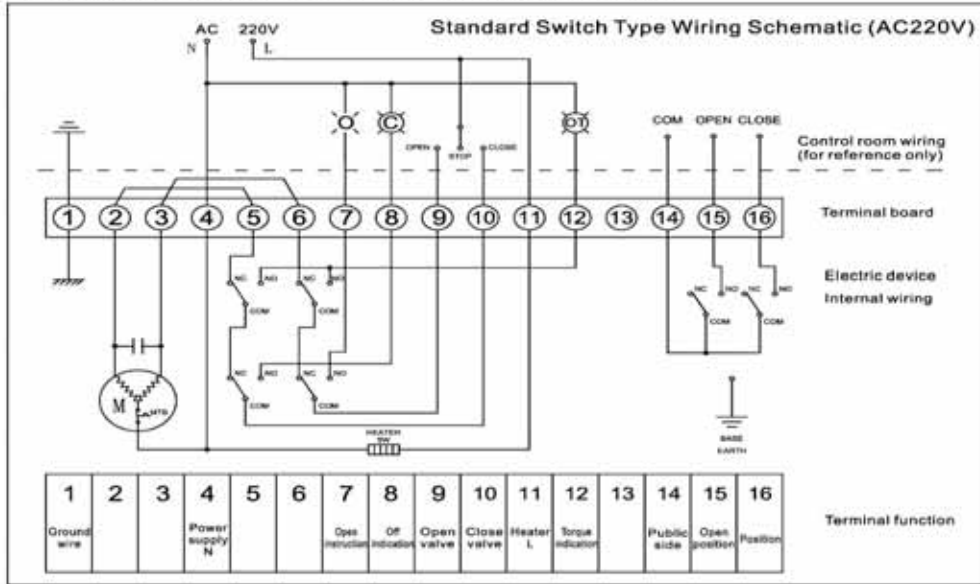
**3.QT-030-060 Appearance and installation dimension**

(The part of broken line is used for analog quantity control box,on/off model don't have this size)

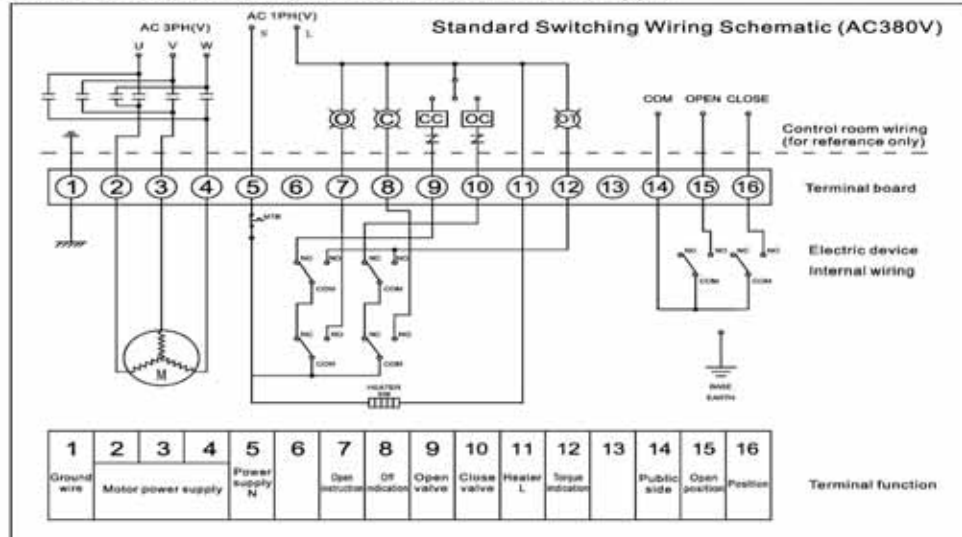


**Wiring diagram**

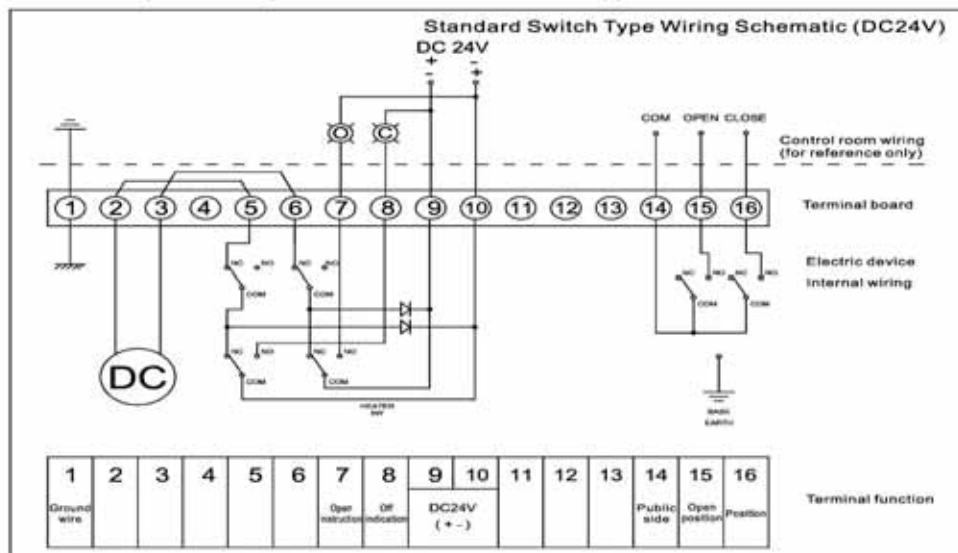
**1.AC220V explosion-proof standard switch type**



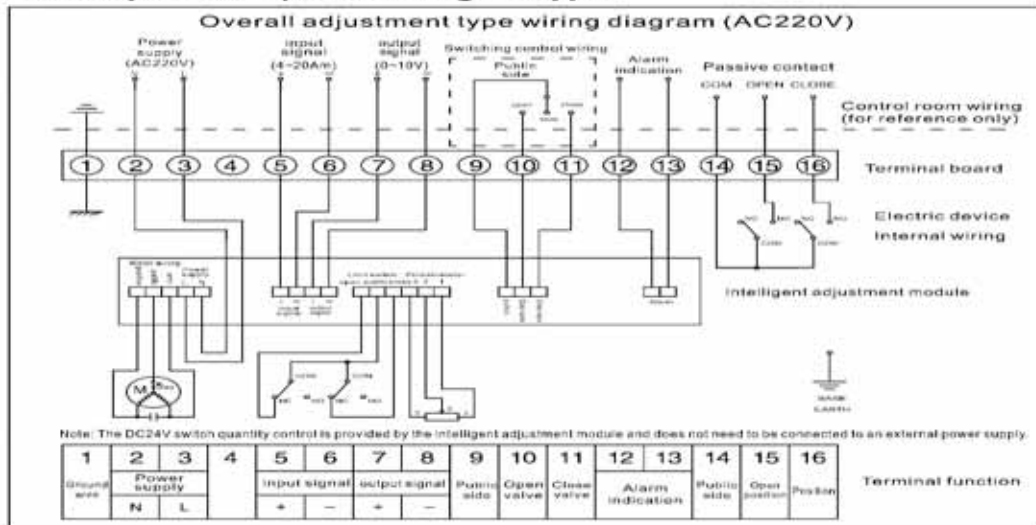
**2.AV380V explosion-proof standard switch type**



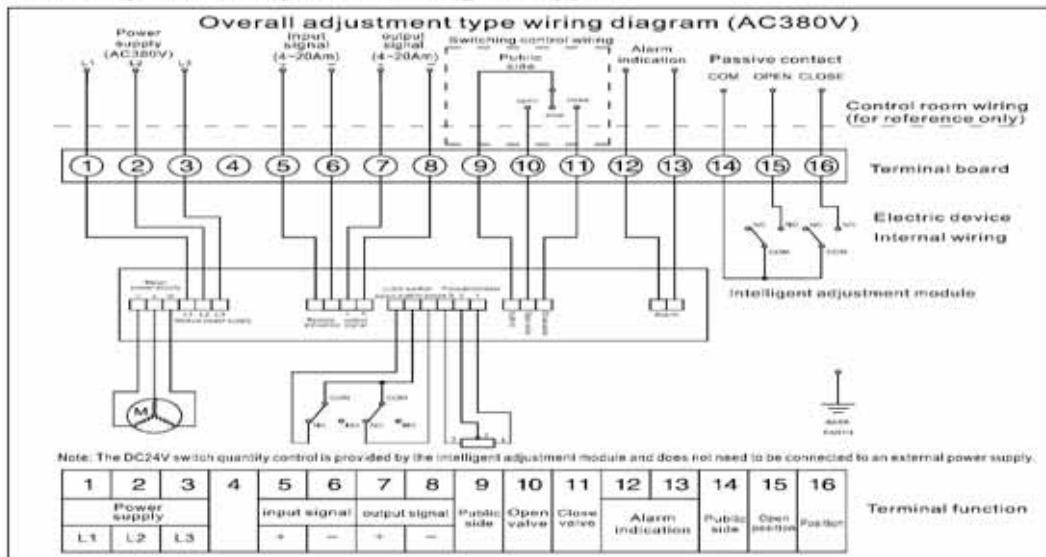
**2.DC24V explosion-proof standard switch type**



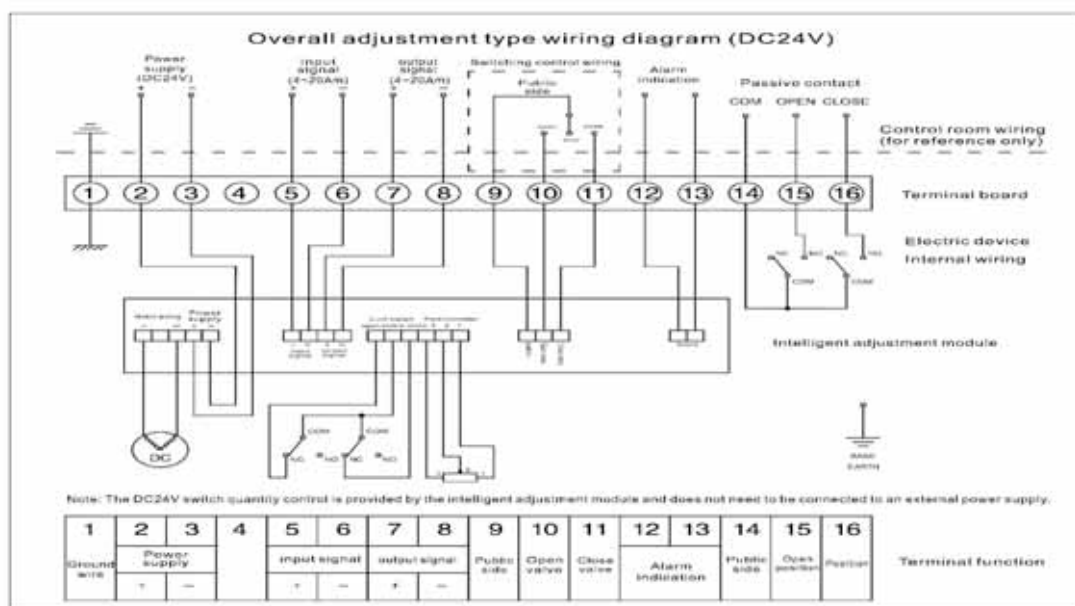
### 4.AC220V explosion-proof integral type



### 5.AC380V explosion-proof integral type



### 6.DC24V explosion-proof integral type





## Output current fine-tuning

**1. 4mA output current trimming :** Stop the position and turn the operation button to close for about 10 seconds. When the letter LF is flashing, release the operation button and rotate the mode button to the field and then rotate it back to stop, that is, enter the 4mA output current fine adjustment state. At this time, the output current can be adjusted by the operation button. After adjusting the output current to 4mA, the mode button will be rotated to the scene. At this time, the letter LF flashes twice to indicate that the 4mA output current is finely adjusted. If the mode button is rotated from the stop to the far side, the output current trimming state is directly exited.

**2. 20mA output current trimming :** Stop the position and turn the operation button to open for about 10 seconds. When the letter HP is flashing, release the operation button and rotate the mode button to the field and then rotate it back to stop, that is, enter the 20mA output current fine adjustment state. At this time, the output current can be adjusted by the operation button. After adjusting the output current to 20mA, the mode button will be rotated to the scene. At this time, the letter LF flashes twice to indicate that the 20mA output current is finely adjusted. If the mode button is rotated from the stop to the far side, the output current trimming state is directly exited.

## Remote control mode (switch adjustment integrated with this function)

For the switch-regulated integrated control module, the switch can be switched far by the 'remote automatic' signal. The square control is manual mode (switching amount) or regulation mode (analog amount).

Example: When using the internal power supply of the module, short-circuit "remote automatic" and "passive control common", the remote control is the adjustment mode, and the disconnection is the manual mode.

## Advanced settings

To stop the mode, turn the operation button to open for about 18 seconds. When the flashing of the letter CF is displayed, release the operation button and turn the mode button to the scene and then rotate it back to stop. The advanced setting menu is displayed.

When operating remotely, press the "Enter\*" button three times in the live mode to enter the advanced setting menu single.

Note: In the menus of all levels, if the mode button is turned to stop to the far side (or press the "Stop" button on the remote control), return to the previous level or exit the menu.

**1. CF—Close direction (default value—clockwise) :** Move the menu item to "CF" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the closing direction setting, at this time the lower left corner of the display shows the parameter value C—clockwise, A—counterclockwise, you can adjust the parameter value by operating the button (or press the remote control) Open", "Close" button), after adjusting, turn the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, CF flashes twice to indicate that the closing direction setting is completed and the upper menu is returned.

**2. LS—Control low letter :** Move the menu item to "LS" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the control low signal setting, at this time, the lower left corner of the display shows the received control current value or voltage value. When the control signal changes, the parameter value changes synchronously. After adjusting, the mode button is rotated to the scene. Rotate to stop (or press the "Enter" button on the remote control). At this time, LS flashes twice to indicate that the control low letter setting is completed and the upper menu is returned.

**3. MS—Control Gaoxin :** Move the menu item to "HS" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the control low signal setting, at this time, the lower left corner of the display shows the received control current value or voltage value. When the control signal changes, the parameter value changes synchronously. After adjusting, the mode button is rotated to the scene. Rotate to stop (or press the "Enter" button on the remote control). At this time, HS flashes twice to indicate that the control low letter setting is completed and the upper menu is returned.

**4. CS—Done message action (default value lost letter hold, this setting is valid when the adjustment type) :** Move the menu item to "CS" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the lost action setting, at this time the lower left corner of the display shows the parameter value OP—loss of letter open, CL—loss of letter, SP—trusted position, can be operated Button or adjust the parameter value (or press the "Open\*" and "Close" buttons on the remote control). After adjusting, turn the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, CS flashes twice. The message is set and returned to the previous menu.

**5. en—Two-wire control (default value - normal control, this setting is valid when switching type) :** Move the menu item to "CH" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the two-line control setting.

At this time, the lower left corner of the display shows the parameter value OP—There is no signal to open, CL— there is no signal to open, SP—regular control, you can adjust the parameter value by operating the button (or press the remote control) "Open". "Close"

button), after adjusting, turn the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, CH flashes twice to indicate that the two-wire control setting is completed and the previous menu is returned.

**6. CU—Positive and negative (default value—positive effect, this setting is valid when adjusting type) :** Move the menu item to "CLT and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control) "Enter" key, that is, enter the positive and negative settings, at this time the lower left corner of the display shows the parameter value P—positive action, n—reaction, can be operated by the button or adjust the parameter value (or press the remote control) Open", "Close" button), after adjusting, turn the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, the CU flashes twice to indicate that the closing direction setting is completed and the upper menu is returned.

**7. Cd—blocking time (default value - 20) :** Move the menu item to "Cd" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control). "Enter" key, that is, enter the stall time setting. At this time, the parameter value 03-99 is displayed in the lower left corner of the display. You can adjust the parameter value by operating the button (or press the "Open" and "Close" buttons on the remote control). After adjusting, turn the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, Cd flashes twice to indicate that the closing direction setting is completed and the upper menu is returned.

**8. CE—Restore factory value :** If the parameters are set in the menu setting process, this item can be used to restore the factory setting values except the "open", "closed" and "closed" parameters of the stroke. The specific method is: the menu item is moved to "CE" and then the mode button is rotated to the scene and then rotated back to the stop. Stop (or press the "Enter" button on the remote control) to enter the factory default setting. At this time, the parameter value is displayed in the lower left corner of the display, no—not saved, yes—save, you can adjust the parameter value by operating the button (Or press the "Open" and "Close" buttons on the remote control), then rotate the mode button to the scene and then rotate it back to stop (or press the "Enter" button on the remote control). At this time, the CE flashes twice to indicate that the factory default is completed and the system returns to the previous level menu.

**9. SA—Save factory value :** Move the menu item to "SA" and then rotate the mode button to the scene and then rotate it back to stop (or press the remote control). "Enter" key, that is, enter the factory value setting, the parameter value is displayed in the lower left corner of the display, no—not saved, yes—save, you can adjust the parameter value by operating the button (or press the remote control) "Open" and "Close" keys. After adjusting, turn the mode button to the scene and then rotate it back to stop (or press "Enter" on the remote control). At this time, SA flashes twice to save the factory settings and return to the previous menu.

**Ten - Explanation of alarm information (the alarm area in the lower right corner of the display)**

Error code	Accident details	Error code	Accident details
FA	Turning error	Fb	Proportional calibration error Fb flashes 3 times
FC	Closed moment	FO	Open moment
Fd	Valve position does not change due to stall or other causes	FP	Power shortage
FS	DC4-20mA remote control signal loss	FH	Remote control on and off signals are in the same
FE	Motor temperature switch open or torque common open	FH	Valve position fault (potentiometer open, wrong wiring or encoder fault)

**Eleven common problem handling methods**

- **Power-on indicator and display are not displayed :** A. The power supply is not actually connected. B. The voltage is too low. C. Wiring wrong D. Circuit is bad
- **Lamp and display show abnormality during work :** A. Fault code B. Query information C. The indicator light or the display is bad, the circuit needs to be replaced.
- **Power on site and remote control are not active :** A. Wiring is wrong or open circuit B. Fault protection C. The motor is broken or stuck D. The starting capacitor is broken E. The circuit is broken
- **The site works normally but the remote control does network :** A. No signal or wiring reverse B. Knob plate is bad or not in the distance C. Positive/reverse action setting D. Circuit is bad
- **The scene does not move but the remote control works normally:** A. The knob board is broken or not in live mode B. The operation button is not screwed into place C. The circuit is broken
- **Can not open or can not be opened :** A. Torque or travel switch open circuit B. to limit or torque C. The motor is broken or blocked or the wiring is wrong D. The circuit is broken
- **No control signal is energized immediately :** A. Wiring error B. Control signal actually exists C. Lost letter action D. Set to two-wire control E. Circuit is bad
- **The middle position can move to the limit without moving :** A. Torque switch wiring error B. It happens that the motor is broken or the wiring is open.
- **Action direction:** A. Motor wiring reverse B. Valve position calibration C. Positive/reverse or closed direction is set to reverse D. Signal is reversed
- **No proportional feedback output or sometimes no :** A. Output wiring is wrong or bad contact B. Potentiometer or encoder malfunction or poor contact C. Circuit is bad
- **Proportional feedback is too large or too small or constant :** A. Potentiometer or encoder failure B. Calibration error C. The potentiometer is not well meshed with the transmission gear D. The circuit is broken

**Note:** Wiring should be connected in strict accordance with the electrical wiring diagram.

**Twelve: Ordering instructions**

Please specify the following when ordering:

- Torque required for valve switch (N-M);
- Product use environment;
- Size and type of connection with valve;
- Electrical control requirements;
- Other special requirements;