Description of installation and operation of M0 series electric actuator

Chongqing Chuanyi Automation Co., LTD

Actuator branch

V1.1

I. Product summary

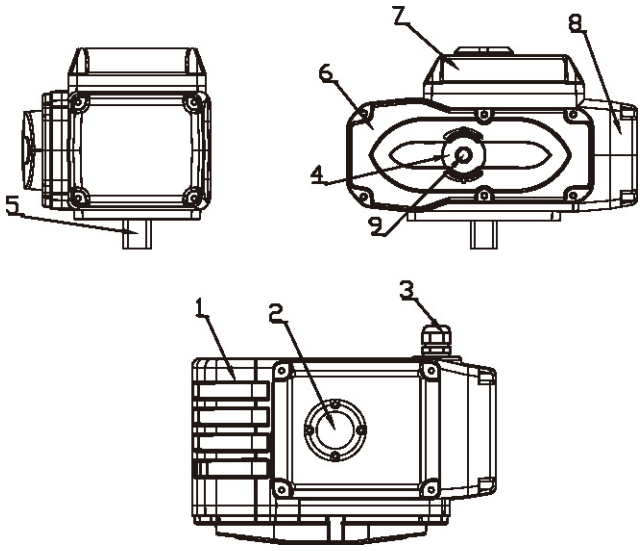
The M0 series electric actuator is developed by the company on the basis of digital products. It can receive the switching signal issued by the controller such as PLC in the DCS system (passive dry contact, active 24V, active 220V, the point can be switched) or analog signal (DC4 ~ 20mA, 0 ~ 10V, etc.), can be directly driven, or can be driven by contactor or solid state relay electric actuator action. Output DC4 ~ 20mA feedback current and four relay contacts (on, off, remote control, fault alarm). The component integrates servo control unit, liquid crystal display unit, knob operation unit and so on. With easy operation and complete protection functions, this product is the best choice for you to redefine high quality and simple intelligence.

2.Product characteristics

- Beautiful appearance, small and light, compact structure, easy installation, easy disassembly and maintenance.
- 90 degree rotation open and close quickly, good adjustment performance.
- No refueling, no spot inspection, waterproof and rust prevention, arbitrary Angle installation.
- Aluminum die-cast housing, fine and smooth, and reduce electromagnetic interference.
- Powerful, there are a variety of control signals and feedback signals to choose from.
- Worm gear output shaft integrated design, high transmission accuracy.
- Safe and reliable, can pass AC1500V voltage test, choose H class insulated motor
- The intelligent control module is highly integrated into the body of the electric device, and no external positioner is required. Digital setting, digital tuning, highly accurate, self-diagnosis, multi-function.
- IP67 High standard protection level (IP68 can be customized).

3.Appearance and name of each part

1	Box
2	Opening meter
3	Incoming wire lock
4	Handle shaft rubber cover
5	Output shaft
6	Retarder cap
7	Electric cap
8	Connection cover
9	Handle shaft hole

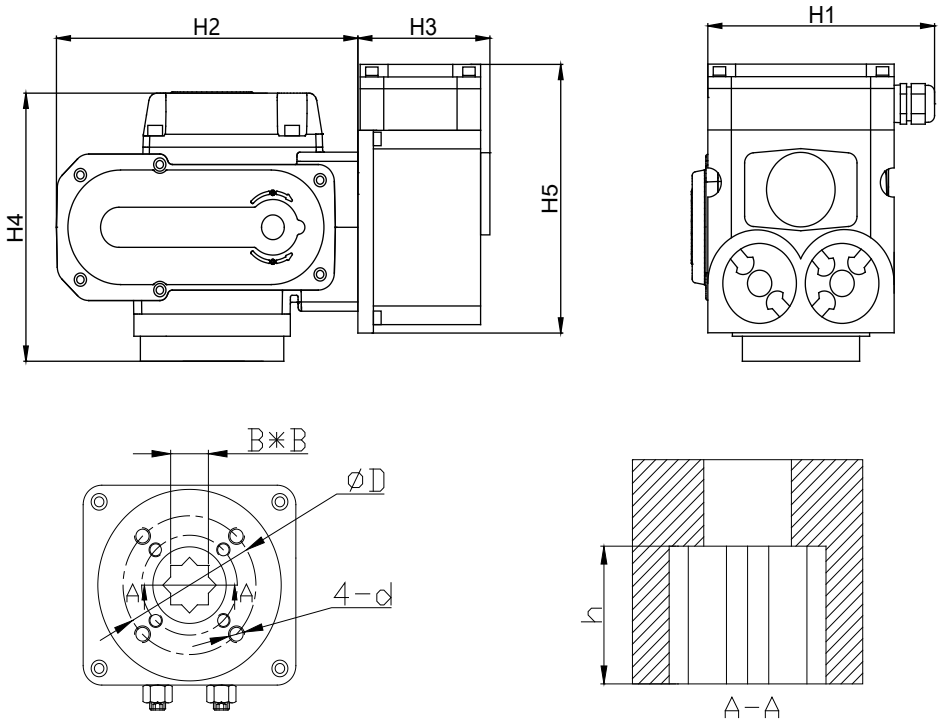


4.Electric actuator shape and performance parameters

property \ Model	M03 (04) 01	M03 (04) 02	M03 (04) 03	M03 (04) 04	M03 (04) 05	M03 (04) 06	M03 (04) 07
Power	AC220V						
AC power	10W	23W	23W	50W	90W	110W	110W
AC220V current	0.24A	0.32A	0.32A	0.48A	0.92A	1.2A	1.2A
Standard time / torque	24s/50Nm	30s/100Nm	30s/160Nm	30s/250Nm	30s/500Nm	60s/1000Nm	110s/2000Nm
Power	AC380V						
AC380V current	0.15A	0.19A	0.19A	0.25A	0.45A	0.5A	0.5A
Standard time / torque	24s/50Nm	30s/100Nm	30s/160Nm	30s/250Nm	30s/500Nm	60s/1000Nm	110s/2000Nm
Power	DC24V						
DC power	20W	40W	40W	90W	90W	110W	110W
DC24V current	2A	2.4A	2.4A	8A	8A	9A	9A
Standard time / torque	10s/50Nm	12s/100Nm	12s/160Nm	10s/250Nm	10s/500Nm	20s/1000Nm	40s/2000Nm
Weight	4.3Kg	5.8Kg	5.8Kg	9.1Kg	9.8Kg	15.5Kg	18.7 Kg
Rotation Angle	0-90°						
Pressure rating		500VAC/1 min (DC24V/AC24V)		1500VAC/1 min (AC110V/AC220V)		2000VAC/1 min (AC380V)	
Class of protection	IP67(Special order IP68）)						
Ambient temperature	-25℃～+60℃ Optional temperature-40℃～+70℃						
Mounting Angle	Arbitrary Angle						
Box material	Aluminum alloy die casting						

Note: The M03 series is of the intelligent switch type. The M04 series is an intelligent regulating type

Graphical representation



property / Model	H1	H2	H3	H4	H5	ØD	d	B*B			h
M03(04)01	135	153	92	158	159	36	4-M5	9*9	11*11	14*14	16
						50	4-M6				
						70	4-M8				
M03(04)02	135	188	86	167	159	50	4-M6	11*11	14*14	17*17	21
						70	4-M8				
M03(04)03	135	188	86	167	159	50	4-M6	11*11	14*14	17*17	21
						70	4-M8				
M03(04)04	135	235	86	202	159	70	4-M8	14*14	17*17	22*22	23
						102	4-M10				
M03(04)05	135	235	86	202	159	70	4-M8	14*14	17*17	22*22	23
						102	4-M10				
M03(04)06	135	256	86	238	159	102	4-M10	22*22		27*27	43
						125	4-M12				
M03(04)07	135	256	86	258	159	140or165	4-M16or4-M20	22*22	27*27	36*36	63

Note: The M03 series is of the intelligent switch type. The M04 series is an intelligent regulating type

5.Power supply and product circuit diagram

Selection of fuse and break switch

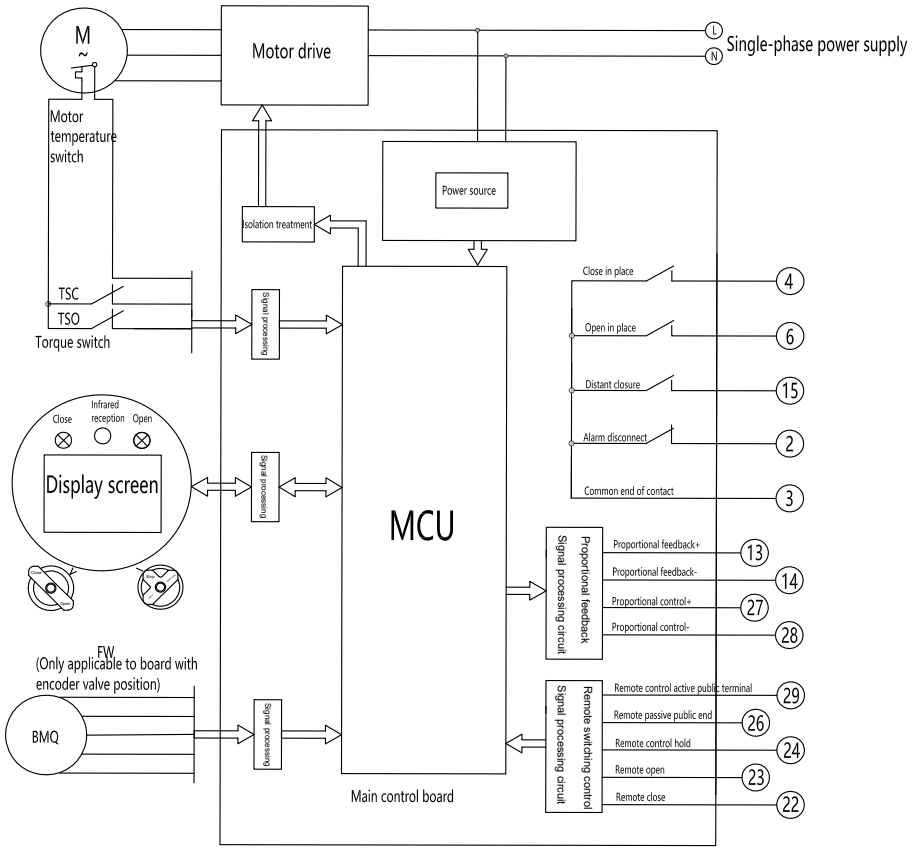
◆Disconnect switch is based on the table on the right (AC220).

*The power lines of two or more electric devices cannot be connected in parallel; Cannot use the same contact to control several electric devices, otherwise it will cause loss of control and motor overheating.

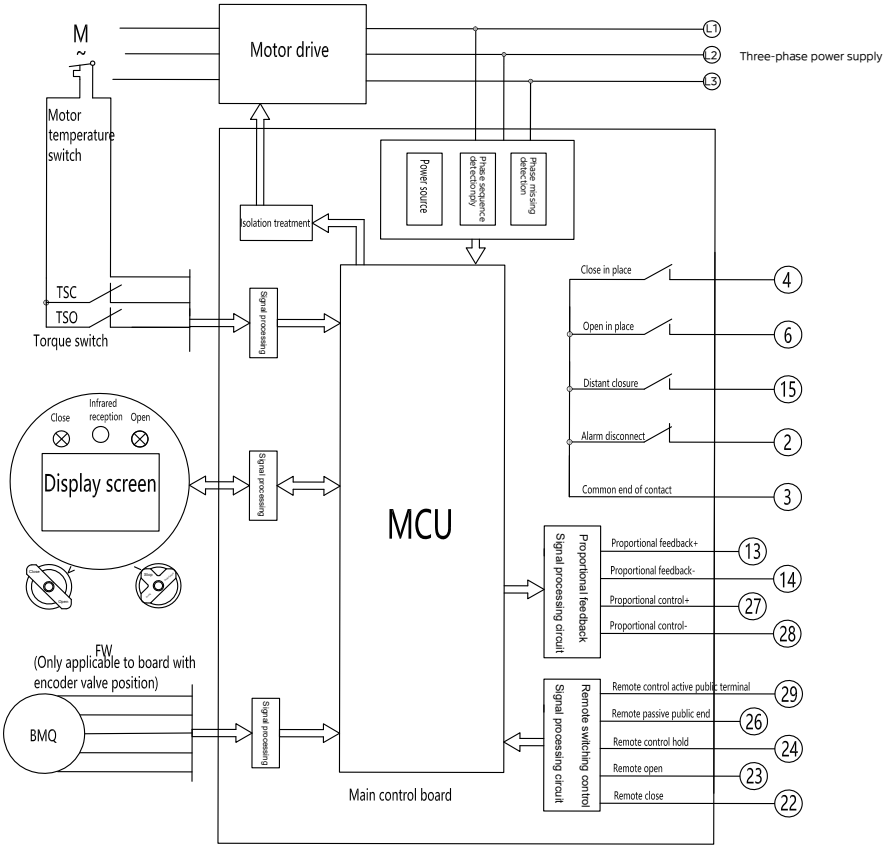
05	3A
10/20	5A
50/100/200	7A

Wiring diagram

AC220V



AC380V



6.Operation instruction

6.1 Knob definition

6.1.1 Definition for mode knob (red knob) :

There are 3 locations: "Live", "Stop", "Far away".

Confirmation function: Mode button from "Stop" position - > "Scene" position;

Back to function: Mode button from "Stop" position - > "Distance" position.

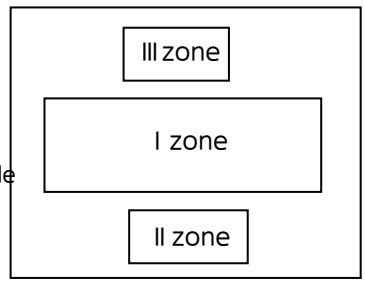
6.1.2 Definition of on-off valve knob (black knob) :

There are 2 gears: "On" and "off".

Down function: operation button from "Stop" - > "close" position;

Move up function: Operate button "Stop" - > "Open" position.

6.1.3 Liquid crystal display



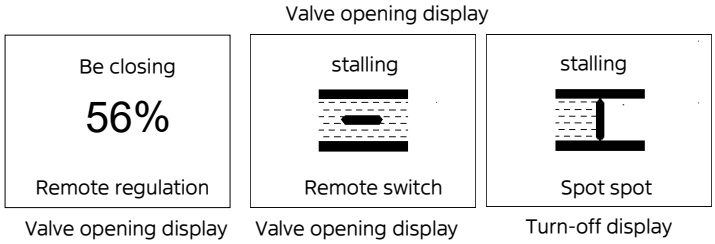
The actuator is equipped with a dot matrix linear LCD display screen. Its layout includes Zone I, Zone II, and Zone III.
Zone I is the valve position display area, which displays the current valve position value in real-time in the form of valve opening percentage; Zone II is the control mode display area; Zone III is the display area for operational status and alarm information (see "Alarm Information" below).
When entering the menu for setting working parameters, the LCD screen will uniformly use Zone I, Zone II, and Zone III.

6.2 Power on or reset
6.2.1 System power-on self-check

After the actuator is powered on, the control system of the actuator first self-checks the instruction, program area, data area and A/D conversion function in turn. If the self-test is normal, the valve position display area of the LCD display

displays the percentage of the current valve position opening alarm area is cleared. If an item is abnormal during the self-test, the alarm area will always display the abnormal code of the item, and the control system will not accept any operation and wait for processing.

After the actuator is powered on and initialized, the entire LCD screen displays the percentage of actuator opening in large font. At the limit position of the valve position, the display of the actuator opening is displayed in a graphical manner simulating the butterfly valve (see the figure below).



6.3 Working parameter setting

Note 1: When performing menu operations, if the user does not press buttons within 1 minute, the display will automatically return to the non-setting screen. In addition, after each menu operation, the return key should be used until the setting screen is withdrawn, so that the valve position opening percentage of the non-setting screen can be seen when the motor is rotating.

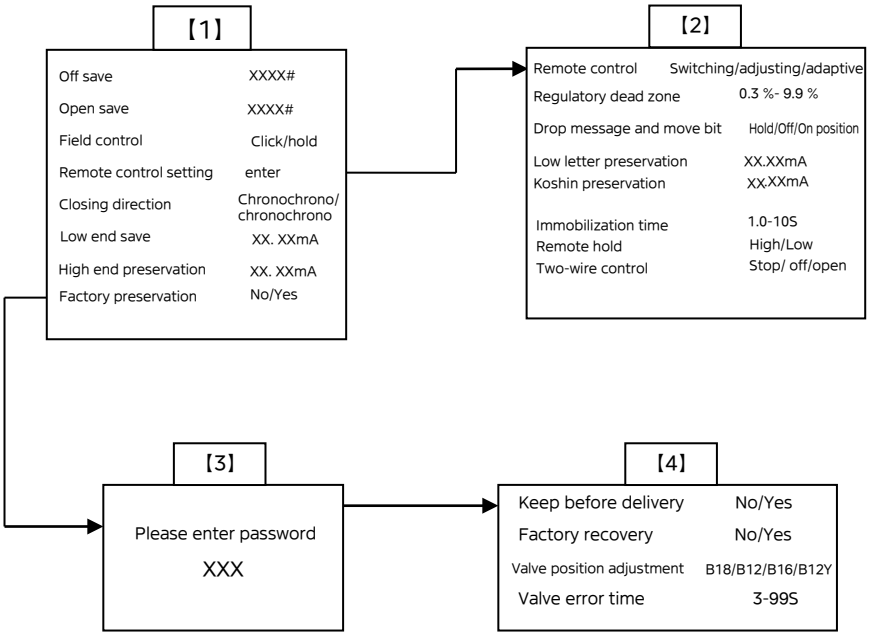
Note 2: After entering the menu operation, the setting item or the setting value displayed for the first time is the stored value after the last setting. Users can use this feature to view the previous setting value.

6.3.1 Enter the menu

Put the mode knob (red) in the "Stop" position, turn the on-off valve knob (black) to the open valve position and hold it for more than 5S, and the control system will enter the main menu screen of work setting.

Note: For the convenience of the following description and display, the selected menu is indicated by "【】". In the menu display of the LCD screen, the selected item indicates the position of the cursor in a back-display way; Items that are not selected are displayed in the usual way.

In the menu, turn the on-off valve knob (black) "Move up" or "Move down" to select the desired item. Mode knob (red) rotated from "Stop" to "Live" to confirm, the corresponding submenu is displayed or parameters are saved.



6.3.2 Parameter setting

6.3.2.1 Stroke setting

The sequence of limit setting is unlimited, the user can first set the off bit and then set the open bit, or you can first set the open bit and then set the off bit.

6.3.2.2 Off save

In the menu [1], after selecting the "Save Off" item by turning the on-off valve knob (black) with "Move up" or "move down", the coded value (0 to 65535) for the current position of the absolute encoder output will be displayed on the right side of the line. Mode knob (red) is rotated from "Stop" to "field" to select this menu, turn the on-off valve knob (black) to adjust the actuator to the off limit, rotate mode knob (red) to the "Stop" position and then to the "field", the right side of the line displays "Saved" and flashes 2 times, indicating that the actuator has set the position to the off limit. If the mode knob (red) in the Stop position does not rotate to the Live position, but to the Distant position, the off position is not set, and the previous menu is returned.

6.3.2.3 Open save

In the menu [1], after selecting the "Save on" item with "Move up" or "Move down" by turning the on-off valve knob (black), the encoded value (0 to 65535) for the current position of the absolute encoder output will be displayed on the right side of the line. Mode knob (red) is rotated from "Stop" to "field" to select the menu, switch valve knob (black) to adjust the actuator to the open limit, rotate mode knob (red) to "Stop" and then rotate to "field", the right side of the line displays "Saved" and flashes 2 times, indicating that the actuator has set the position as the open limit. If the mode knob (red) in the Stop position does not rotate to the Live position, but to the Distant position, the open limit is not set and returns to the previous menu.

Note 1: The encoder values 0 and 65535 are the minimum and maximum encoder values of the absolute encoder, respectively, and they coincide. The full stroke can pass through this coincidence point during the setting of the on and off limits, but it should be ensured that the full stroke does not exceed the range represented by the absolute encoder.
Note 2: If the matched encoder is BM12 series, the minimum encoding value of the encoder displayed in the "Save Off" and "Save on" menu is 0 and the maximum encoding value is 4095.
Note 3: If the potentiometer is matched, the minimum code value of the potentiometer displayed in the "off save" and "open save" travel menu is 0 and the maximum code value is 1000, and the dead zone of the potentiometer must be ensured that it is not within the travel range when actually used.

6.3.2.4 Field control

In menu [1], after selecting the Field Control item by turning the on-off valve knob (black) "Move up" or "move down", the previous set value (" Click "or" Hold ") will be displayed on the right side of the row. Mode knob (red) rotates from "Stop" to "Live" to select the menu, and then back to the "Stop" position. Rotate the on-off valve knob (black) to "Move up" and "Move down" to switch the set value between "Point" and "Hold". Rotate Mode knob (red) to "Live" to confirm saving the selected set value.

6.3.2.5 Remote control setting

In the menu [1], after "Remote Control Setting" is selected by rotating the switch valve knob (black) to "move up" or "move down", "Enter" will be displayed on the right side of the line to prompt the user whether to set remote control parameters. After the mode knob (red) is rotated from "Stop" to "scene", the menu [2] is entered.

6.3.2.5.1 Remote control

In menu No. [2], after selecting the item "Remote control" by rotating the switch valve knob (black) "move up" or "move down", the previous set value (" switching quantity ", "adjusting quantity", "adaptive") will be displayed on the right side of the line. "Switching quantity" means that the remote is controlled by the switch quantity, and "adjusting quantity" means that the remote is controlled by the analog quantity. "Adaptive" refers to the remote priority control, and the analog signal takes precedence over the switching signal. Rotate mode knob (red) to "Stop" and then to "Field" to confirm the selection of the menu, and then back to the "Stop" position. By rotating the on-off valve knob (black) to "move up" or "move down", the set value can be switched between "Switch", "Adjust" and "Adaptive". After selecting the button, rotate mode knob (red) to "Field" to confirm the saving of the selected set value.

6.3.2.5.2 Regulatory dead zone

Dead zone Meaning: This function is effective in remote automatic control mode. In this control mode, the actuator calculates the desired valve position value according to the control current, and then compares the value with the current valve position value. If the absolute value of the difference is greater than the dead zone value, the actuator starts to operate, so that the current valve position is close to the target valve position. If the absolute value of the difference between the current valve position and the desired valve position is within the dead zone, the actuator stops operating. Setting a proper dead zone prevents the actuator from oscillating near a given valve position.

In the menu [2], after selecting the "Adjust dead zone" item by rotating the switch valve knob (black) "Move up" or "move down", the previous set value (0.3% ~ 9.9%) will be displayed on the right side of the row. Rotate Mode knob (red) to "Stop" and then to "Field" to confirm the selection of the menu, and then back to "Stop". The user can change the dead zone value by rotating the on-off valve knob (black) to "move up" or "move down". After selecting the desired dead zone value, turn the mode knob (red) to "Live" to confirm that the changes you made are saved.

6.3.2.5.3 Drop message and move bit

Lost message: When the actuator works in the remote automatic control mode, and the control current is less than 1/2 of the low-end current, the actuator believes that the control signal is lost, referred to as lost message.

Drop action: The drop action defines the position to which the actuator should run in the event of a drop. This item has three optional values: "Hold", "On" and "Off". Among them, "holding position" refers to maintaining the original position when the letter is lost, "opening position" refers to the action to the full open position when the letter is lost, and "closing position" refers to the crucial position when the letter is lost.

In menu No. [2], after selecting the "Drop action" item by turning the on-off valve knob (black) "Move up" or "move down", the previous set value (" Hold "or" off "or" on ") will be displayed on the right side of the row. Rotate Mode knob (red) to "Stop" and then to "Field" to confirm the selection of the menu, and then back to "Stop" to select the desired value by rotating the on-off valve knob (black) to "move up" or "move down" to select the desired value, and then rotate mode knob (red) to "Field" to confirm the saving of the selected set value。

6.3.2.5.4 Current calibration

When the 4mA ~ 20mA current sent to the actuator by the user is different from the previous calibration value of the actuator, this function can be used to re-calibrate the current sent by the user, so that the actuator and the user's 4mA ~ 20mA current sending equipment have the same measurement standard, so as to improve the accuracy of the actuator control.

For the convenience of description, 4mA is defined as the low end of the signal (referred to as low signal), and 20mA is defined as the high end of the signal (referred to as high signal).

Low signal save: In the menu [2], after selecting the item "Low signal Save" by rotating the on-off valve knob (black) "Move up" or "move down", the control current value (mA) collected by the actuator will be displayed on the right side of the line. Rotate mode knob (red) to "Stop" and then rotate to "Field" to confirm the selection of the menu, and then turn back to the "Stop" bit, the user can send the low end signal to control the current to the actuator, and wait until the current is stable, rotate mode knob (red) to "field" to confirm the current value collected.

High voltage save: In the menu [2], after selecting the "high voltage Save" item by rotating the on-off valve knob (black) "Move up" or "move down", the control current value (mA) collected by the actuator will be displayed on the right side of the line. Rotate mode knob (red) to "Stop" and then rotate to "Field" to confirm the selection of the menu, and then turn back to the "Stop" bit, the user can send a high-end signal to control the current to the actuator, and wait until the current is stable, rotate mode knob (red) to "field" to confirm the current value collected.

At any time, the user can use the control current calibration menu to query the current value sent by the user, but before the control current signal is not calibrated, the query value is not accurate.

6.3.2.5.5 Immobilization time

Shutdown time refers to the shutdown time interval between two actuator actions (1-10S).。

In the menu No. [2], after selecting the "Disable Time" item by rotating the on-off valve knob (black) "Move up" or "move down", the previously set actuator stop time value (S) will be displayed on the right side of the row. Rotate Mode knob (red) to "Stop" and then to "Live" to confirm that the menu is selected, and then back to the "Stop" position. By rotating the on-off valve knob (black), you can select the desired value within 0 to 10S. After the selection, rotate Mode knob (red) to "Live" to confirm that the changes are saved.

6.3.2.5.6 Remote hold

In the menu [2], after selecting the "Distant Hold" item by turning the switch valve knob (black) "up" or "Down", the previously set remote hold signal level setting (" high "or" low ") will be displayed on the right side of the row. Rotate Mode knob (red) to "Stop" and then to "Field" to confirm the selection of the menu, and then back to "Stop". By rotating the on-off valve knob (black), the set value can be switched between "High" and "Low". After the selection, rotate mode knob (red) to "Field" to confirm the saving of the selected set value.

6.3.2.5.7 Two-wire control

Two-wire control refers to the working mode when the actuator accepts the remote two-wire electric operation.

In the menu [2], after selecting the "two-wire control" item by rotating the on-off valve knob (black) "Move up" or "move down", the previously set two-wire control mode will be displayed on the right side of the line. Rotate mode knob (red) to the "Stop" position, then rotate to the "field" position to confirm the selection of the menu, and then turn back to the "Stop" position. By rotating the on-off valve knob (black), you can select the two-wire control as one of the stops, on and off, and select the rotary mode knob (red) to the "field" confirmation to save the selected set value.

"Stop" means that the two-line control mode is invalid; "Signal off" means that the actuator is closed when there is a voltage signal on the connection between the central control room and the actuator; The actuator opens when there is no voltage signal on the line. "Open letter" means that the actuator is opened when there is a voltage signal on the line between the central control room and the actuator; When there is no voltage signal on the line, the actuator is closed.

6.3.2.6 Closing direction

In the menu No. [1], after the item "Off direction" is selected by rotating the on-off valve knob (black) to "move up" or "move down", the previous set value (" clockwise "or" counterclockwise ") will be displayed on the right side of the row, rotate the mode knob (red) to the "field" position to confirm the selection of the menu, and then return to the "Stop" position. The set value can be switched between "clockwise" and "counterclockwise" by rotating the on-off valve knob (black), and then rotate the mode knob (red) to "Field" to confirm saving the selected set value.

Note: The stroke must be recalibrated after the actuator changes the closing direction.

6.3.2.7 Feedback current fine-tuning

6.3.2.7.1 Low end save

In menu [1], by turning the on-off valve knob (black) "Move up" or "move down" to select the "Low Save" item, the actuator will send 4mA current. When the user thinks that the 4mA current sent is not correct, rotate mode knob (red) to "Field" to confirm the selection of the menu, and then turn back to "Stop" to increase or decrease the output current by rotating the on-off valve knob (black). After adjustment, rotate mode knob (red) to "Field" to confirm the saving of the set value.

6.3.2.7.2 High end preservation

In menu [1], by turning the on-off valve knob (black) "Move up" or "move down" to select the "High-end Save" item, the actuator will send 20mA current. When the user thinks that the sent 20mA current is not correct, rotate mode knob (red) to "Field" to confirm the selection of this menu, and then turn back to "Stop" to increase or decrease the output current by rotating the on-off valve knob (black). After adjustment, rotate mode knob (red) to "Field" to confirm the saving of the set value.

6.3.2.7.3 Fault output

In the menu [1], select the item "Fault Output" by turning the on-off valve knob (black) "Move up" or "move down", and the right side of the line will display the fault output signal that was previously set (" on "or" off "). Rotate mode knob (red) to "Stop" and then to "Field" to confirm the selection of the menu, and then back to the "Stop" position. By rotating the on-off valve knob (black), the set value can be switched between "On" and "off". After the selection, rotate mode knob (red) to "Field" to confirm the saving of the selected set value.

"Closed" means that the fault output is normally closed, and the feedback signal common end and fault point are normally closed when there is no alarm; "Disconnect" means that the fault output is normally open, and the common end of the feedback signal and the fault point are normally open when there is no alarm.

6.3.2.8 Factory preservation

In the menu No. [1], select the item "Factory Save" by rotating the switch valve knob (black) to "move up" or "move down", and the set value "No" will be displayed on the right side of the line. Rotate the mode knob (red) to the "field" position to confirm the selection of the menu and then turn back to the "Stop" position. After adjustment, rotate the mode knob (red) to "Scene" and enter the menu No. [4].

After entering the correct password in menu No. [4], rotate mode knob (red) to "Stop" and then rotate to "Field" to enter menu No. [5]. This item is used to set and query product parameters and operation data before the manufacturer leaves the factory.

6.3.2.8.1 Keep before delivery

In the menu No. [5], after selecting the item "Save Factory" by rotating the on-off valve knob (black) "move up" or "move down", the set value "No" will be displayed on the right side of the row, rotate the mode knob (red) to the "Stop" position, then rotate to the "Field" position to select the menu, and then return to the "Stop" position.By rotating the on-off valve knob (black), the set value can be switched between "No" and "Yes". After changing the set value to "Yes",

rotating the mode knob (red) to "Field" will save the current actuator parameter values.

6.3.2.8.2 Factory recovery

If you set the parameters incorrectly during menu setting, you can use this parameter to restore the factory setting values except for the "On", "Off", and "Off Direction" parameters of the travel. In the menu No. [5], after selecting the item "Factory Recovery" by rotating the on-off valve knob (black) "move up" or "move down", the set value "No" will be displayed on the right side of the row, rotate the mode knob (red) to the "Stop" position, then rotate to the "scene" position to select the menu, and then return to the "Stop" position. By rotating the on-off valve knob (black), the set value can be switched between "No" and "Yes". After the set value is changed to "Yes", the related parameter values of the rotating mode knob (red) to the "field" actuator will be restored to the factory default values.

6.3.2.8.3 Valve position adjustment

In the menu [5], after selecting the item "Valve position adjustment" by rotating the on-off valve knob (black), the set value (" B12E ", "DWQ", "B16", "B12", "B18", "B12Y") will be displayed on the right side of the row, rotate the mode knob (red) to the "Stop" position, and then rotate to the "Field" to select the menu. Then return to the "Stop" position, and select the desired setting by rotating the on-off valve knob (black), and then rotate the mode knob (red) to "Live" to confirm saving the selected setting.

6.3.2.8.4 Valve error time

Valve error time refers to the response time of the valve position protection function when the valve position does not change due to the actuator rotation blockage or other reasons.

In menu [5], after selecting the item "Valve wrong Time" by turning the on-off valve knob (black) "Move up" or "move down", the previous time setting value (S) will be displayed on the right side of the row. Rotate mode knob (red) to "Stop" and then rotate to "Field" to select the menu, and then return to the "Stop" position. By rotating the on-off valve knob (black), you can select the desired value within the time range of 0 ~ 200S. After selecting, rotate mode knob (red) to "Field" to confirm saving the selected set value.

6.4 General product factory default Settings

Field control:	inching	Remote control: adaptive	
Remote hold:	high	Two-wire control:	stalling
Dropping action:	Position retention	Regulatory dead zone:	1.5 %
Closing direction:	Be on time	Immobilization time:	2 S
OUT1 switch:	Close in place	OUT2 switch:	Open in place closure
OUT3 switch:	Closing torque (optional)	OUT4 switch:	Open torque closure (optional)
OUT5 switch:	Distant closure	OUT6 switch:	Fault alarm

6.5 Alarm message

6.5.1 When "off torque" is displayed in the alarm area, it means that during the valve closing process, the torque value borne by the actuator exceeds the rated value. At this time, the actuator will stop the motor rotation, and prohibit the action in the direction of off. At the same time, the "MONI-NC" end and "MONI-COM" end of the alarm relay will be closed. . Move a short distance in the open direction or re-power on to clear the closing valve overtorque sign;

6.5.2 When the alarm area displays "open overtorque", it means that during the valve opening process, the torque value borne by the actuator exceeds the rated value, at this time, the actuator will stop the motor rotation, and prohibit the action in the open direction, and at the same time, the "MONI-NC" end of the alarm relay and the "MONI-COM" end are closed; . Move a short distance in the off direction or re-power on to clear the opening valve overtorque sign;

6.5.3 When the alarm area shows "lack of phase", it means that the actuator detects a power supply lack of phase, at this time the actuator will stop the motor rotation, and make the alarm relay "MONI-NC" end and "MONI-COM" end close;

6.5.4 When "lost message" is displayed in the alarm area, it means that the 4mA ~ 20mA control current signal of the input actuator has been lost. The actuator will operate according to the set value of "lost message action" in "Working Parameter Setting", and the "MONI-NC" end and "MONI-COM" end of the alarm relay will be closed;

6.5.5 When the alarm area shows "switch together", it means that the actuator receives two signals at the same time, the remote close and the remote open, the actuator will stop the motor rotation, and the monitoring relay "MONI-NC" end and "MONI-COM" end are closed;

6.5.6 When "Wrong turn" is displayed in the alarm area, it means that when the valve position change is detected

incorrectly during the actuator rotation (possibly the rotation direction is wrong, or the valve position encoder has a problem), the actuator will stop the motor rotation.

6.5.7 When "valve dislocation" is displayed in the alarm area, it means that the valve position change cannot be detected during the actuator rotation (it may be that the electric gear is not hung, or the reverse rotation time span is too long, or there is a problem with the encoder), and the actuator will stop the motor rotation.

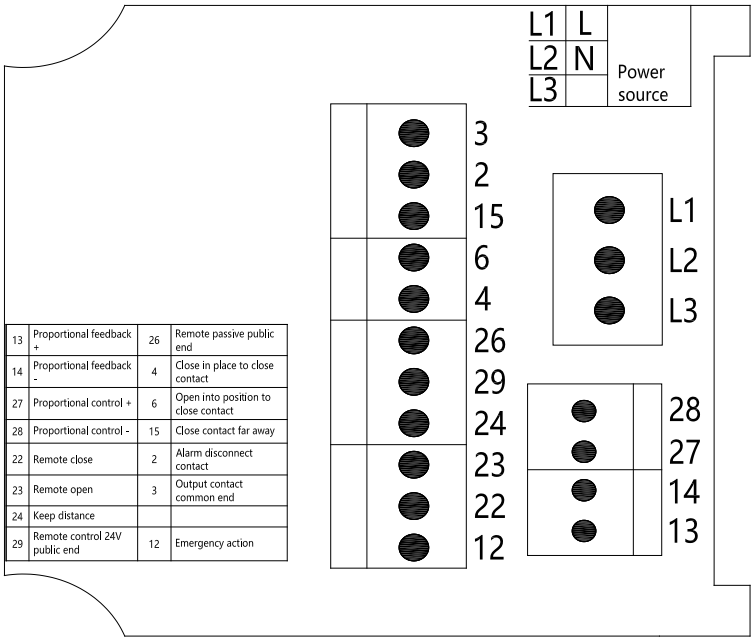
6.5.8 When "Overheat" is displayed in the alarm area, it means that the motor temperature of the actuator is too high, and the actuator will stop the motor rotation. Attempts to perform other electric operations on the actuator, either locally or remotely, are invalid, and the "MONI-NC" end and "MONI-COM" end of the alarm relay are closed.

Note: In no alarm state, the "MONI-NO" end and "MONI-COM" end of the alarm relay are closed.

7.Actuator wiring instructions

7.1 Terminal definition

A crimping terminal is used for external wiring of the wiring tray. This terminal can reliably crimp 0.8 ~ 2.5mm2 conductors and is easy to operate. The serial number of the wiring tray is shown on the right:



Terminal number	Terminal name	Meaning of terminal	Terminal number	Terminal name	Meaning of terminal
L1	Power	Ac power input 1	22	Remote shut-off valve	Remote turn off the control signal input
L2		Ac power input 2	23	Remote opening valve	Remote open control signal input
L3		Ac power input 3	24	Remote hold	Remote hold signal input
2	breakdown	Alarm disconnect output contact	26	Remote passive public end	Remote low voltage signal common end
3	Common end	Output relay common end	27	Proportional control	Valve position controls the current input (+) end
4	Shut in place	Close in place to close output contact	28		Valve position control current input (-) end
6	Drive into place	Open in position to close output contact	29	Remote 24V public end	Remote 24V signal public end
13	Proportional feedback	Valve position current feedback (+) end			
14		Valve position current feedback (-) end			
15	Distant place	The mode button indicates the output contact at a distance			

Note: For single-phase actuators, L1, L2 terminals are connected to 110Vac or 220Vac, and L3 terminals are idle;

7.1 Remote switch quantity (switch) control

7.1.1 Provide 24VDC low voltage control inside the actuator, see Figure 1, Figure 2 and Figure 3 for connections.

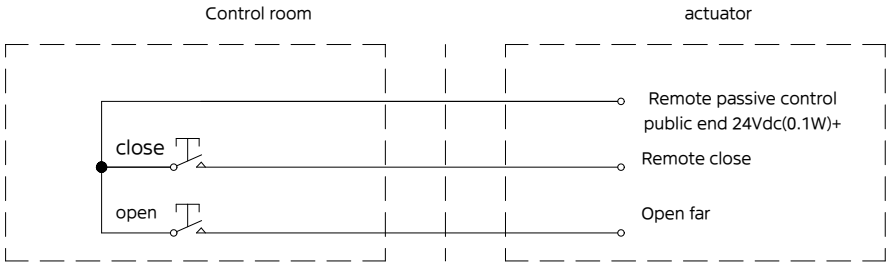


Figure 1: Point-motion open and close control, the actuator can be stopped at any position in the middle

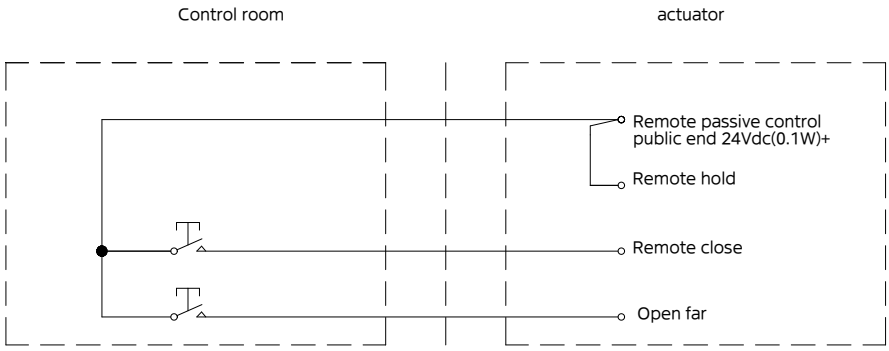


Figure 2 Hold open and close control, reversible stroke, but can not stop in the halfway position

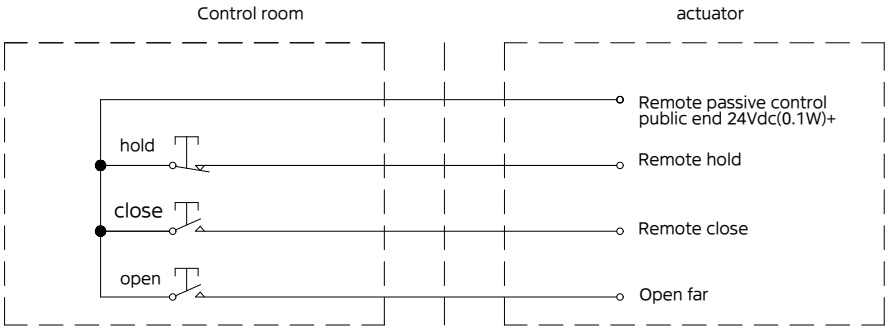


Figure 3 Hold open, close and stop controls

7.1.2 External 24V DC voltage is used to achieve control, and the connection is shown in Figure 4, Figure 5, Figure 6.

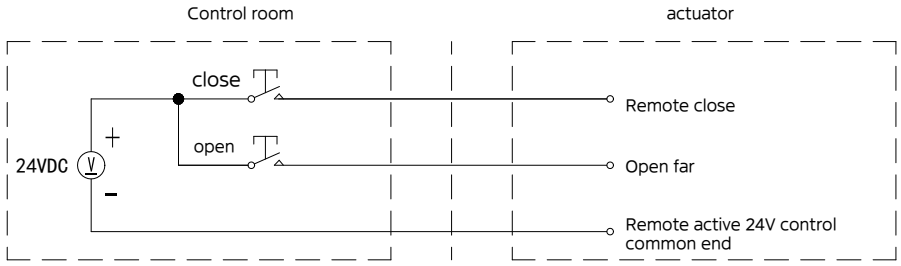


Figure 4: Point-action open and close control, the actuator can be stopped at any position in the middle (using external 24V power supply)

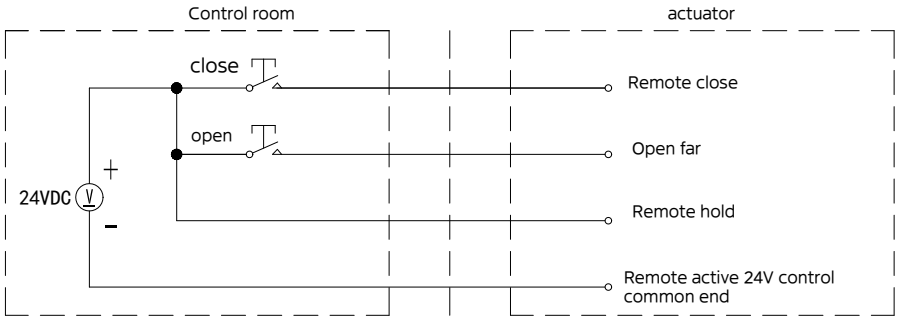


Figure 5 Hold open and close control, reversible stroke, but can not stop in the middle position (using external 24V power supply)

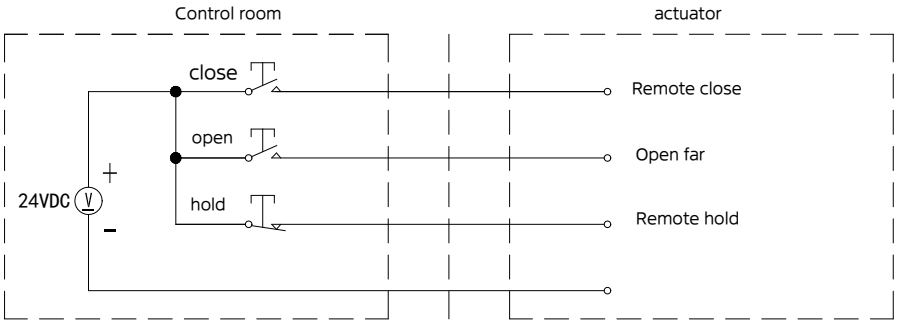


Figure 6 Hold open, close and stop control (using external 24V power supply)

7.1.3 Two-wire control, the cable can be connected according to Figure 7, Figure 8, Figure 9, Figure 10. The two lines in the menu should be set to "open" or "Close" according to actual needs.

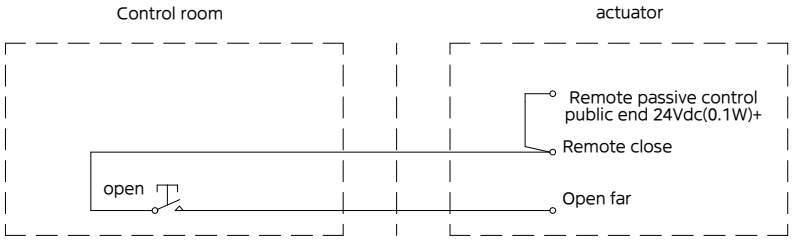


Figure 7 Two-wire control, with a letter open, no letter close

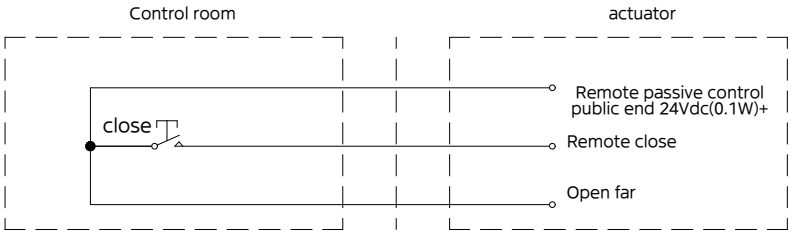


Figure 8 Two-wire control, with a letter off, no letter open

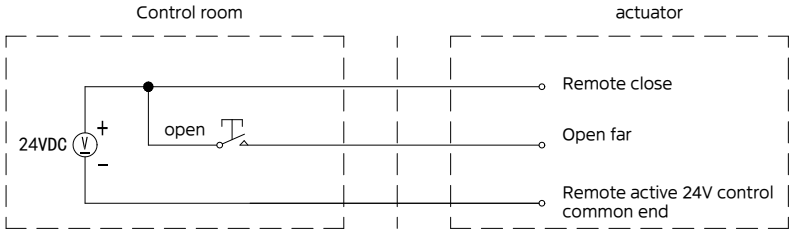


Figure 9 Two-wire control, on and off
(using external 24V power supply)

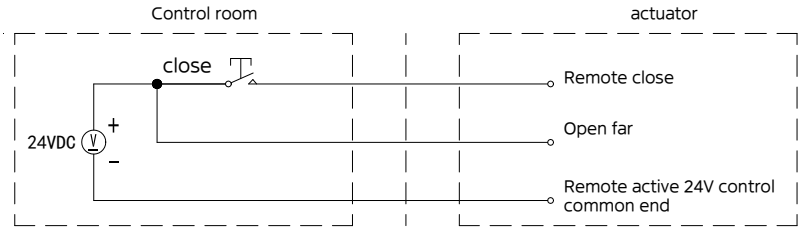


Figure 10 Two-wire control, with a letter off, no letter on
(using external 24V power supply)

Note: If external 110V or 220V high voltage control is required, please specify whether it is required when ordering.

7.2 Position feedback signal

The control system can provide 4 ~ 20mA position feedback signal. The maximum external load allowed is 750Ω with an accuracy of 0.5% (this is optional and must be clearly required at the time of ordering).

7.3 Remote analog (adjustment) control

The control system can receive 4mA ~ 20mA analog signal control (this is optional, it must be clear whether it is needed when ordering).

Note: The proportional control signal and proportional feedback signal are generally 4 ~ 20mA(can also be customized to 0 ~ 10mA,2 ~ 10mA,2 ~ 10V,1 ~ 5V,0 ~ 5V, etc., if necessary, please specify when ordering).

8.Precautions for on-site installation

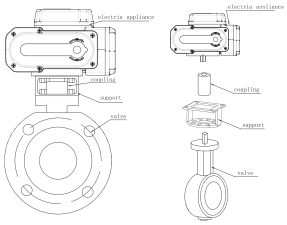
Indoor installation	**1.**Non-explosion-proof products, do not install in the room with explosive gas;
	2.It is recommended to install a protective cover in the case of water splashing.
	3.Please reserve the space required for in-line and manual operation.
Outdoor installation	1.It is recommended to install a protective cover to avoid rain and direct sunlight.
	2.Please reserve the space required for in-line and manual operation.

*Note: Outdoor direct sunlight will cause high temperature, accelerate the aging of components, and even failure; Rain will accelerate the aging of the rubber pad, and in case of improper waterproof operation, instant damage to the product.

Wiring requirements

Wiring requirements	1.Ordinary switch type wire lead M20*1.5; According to the size of the wire lock, please use Φ6~Φ12 cable to ensure the safety and reliability of the connection.
	2.Route the cable through the cable lock, connect the cable according to the color of the cable on the wiring diagram, and secure the cable end to the terminal.
	3.After the cable is connected, tighten the coat of the cable lock to lock the cable and wrap it tightly with waterproof tape.
Distribution tube	1. When using wire tubes, effective waterproof measures must be taken.
	2. Ensure that the valve electric device is higher than the wire tube to prevent water beads from flowing into the electric device along the wire.

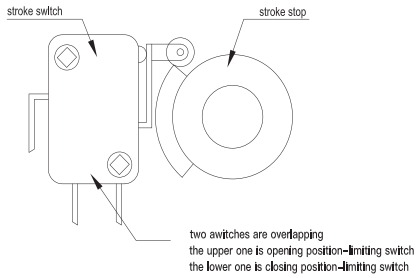
9.Connection of actuator to valve



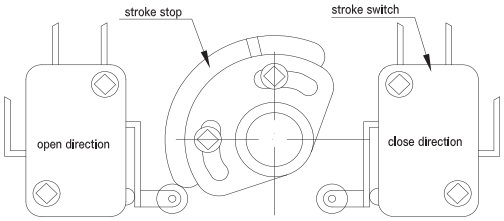
Connection diagram

procedure	1.Align the valve stem with the mounting hole at the bottom of the actuator;
	2. Connect the actuator to the valve body with bolts. If the bolt holes on the actuator and the bolt holes on the support are not aligned, turn the manual device of the electric device with an Allen wrench to align them;
	3. Tighten each bolt.
	4. Turn the manual device or power on the actuator to make the valve operate and ensure that there is no abnormal situation such as eccentricity or stuck
	5. Do not manually operate the power supply.

* When adjusting the electric actuator with a rotation Angle of 0~90°, the rotation Angle should not be excessively adjusted or amplified at will.



M0301/302/303 Travel stop and travel switch layout diagram



M0304/305/306/307 Travel stop and travel switch layout diagram

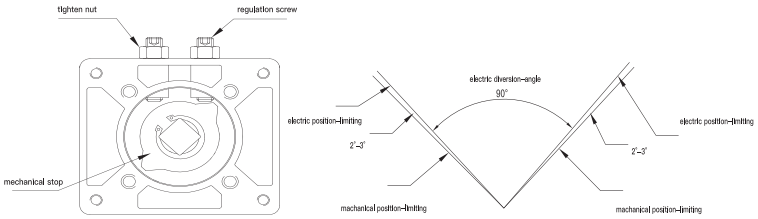
9.1. Mechanical limit adjustment

9.1.1 Turn the handle to the full open position.

9.1.2 Loosen the lock nut, rotate the adjusting screw, so that it is in contact with the mechanical stop, and then turn the screw half a turn in the opposite direction to lock the nut.

9.1.3 The same method can be used to adjust the mechanical stop of the fully closed position

⚠Note
The mechanical limit must lag behind the electrical limit, otherwise it is easy to cause the motor to heat.



10.Solutions to common problems

Power indicator or nixie not displayed	A. The power supply is not connected B. The voltage is too low C. The cable connection is incorrect D. The module is faulty
The light and digital tube display is different in operation	A. See the fault code B. Query information C. Replace the indicator or digital tube
Power on site and remote control are not active	A. Incorrect connection or open circuit B. Fault protection C. The motor is broken or stuck D. The starting capacitor is broken E. Module failure
Field work is normal remote control does not move	A. No signal or reverse wiring B. Wrong valve position calibration C. Wrong positive/negative action setting D. Module failure
No action in the field but the remote control works normally	A. Not in field mode B. The key is faulty C. The module is faulty
Can't open or can't close or can't open	A. Limit wiring wrong or open circuit B. to limit C. motor bad or blocked or wrong wiring D. Module failure
Power-on action	A. The cable connection is incorrect B. The control signal is actually valid C. The message loss action D. The setting is incorrect E. Module failure
The middle position can be moved to the limit	A. The limit switch is incorrectly connected B. The motor is broken or the connection is open C. The module is broken
Reverse action	A. Motor wiring reverse B. Valve position calibration reverse C. Positive/reaction or closing direction reverse D. Signal reversal
None The output current or sometimes none	A. The output cable is incorrectly connected or in poor contact B. The potentiometer is faulty or the cable is open C. The module is faulty
The feedback current is too large or too small or unchanged	A. Potentiometer fault B. Potentiometer and transmission gear meshing is not good C. wrong calibration E. Module failure

11.Use and maintenance

This product has passed comprehensive debugging and quality inspection personnel inspection before leaving the factory. During the installation and connection of the actuator and valve body, the valve may not be fully closed or fully opened due to valve installation and other reasons, and it needs to be re-adjusted. The following steps should be followed when adjusting;

◆Install and connect the actuator and valve correctly;

◆Manual trial run

Remove the rubber plug of the handle shaft, insert the hex plate hand attached to the actuator into the hex hole (or hand wheel), turn clockwise, and the valve opening should be reduced; When the valve is in the fully closed position, observe whether the limit stroke switch in the closing direction works (the switch will make a "click" sound) and then turn the handle for about half a circle to check whether the mechanical stop touches the adjusting screw; Turn the handle counterclockwise, the valve opening should be increased, in the same way, check the opening direction limit stroke switch and mechanical stop, after manual operation, install the gas cap, plug the rubber plug;

◆Electric trial run (Note: manual operation is prohibited when powered on)

Remove the wiring cover and connect the wiring correctly according to the circuit diagram on the cover;

Power test run, pay attention to observe whether the actuator and valve work normally.

maintenance

In view of the tight structure of this product, especially the use of long life, good pressure resistance of molybdenum grease, to achieve no refueling;

When the electric valve does not move for a long time or rarely moves, please start it regularly (3 months) to check whether the driving actuator is abnormal.