



HANKUN QUALITY DRIVING THE FUTURE

**HITORK<sup>®</sup>**

## Electric Actuators

USER  
MANUAL 

[www.hankunfluid.com](http://www.hankunfluid.com)

[info@hankunchina.com](mailto:info@hankunchina.com)

Headquarters(Beijing) :

Address : Room2606,22nd Floor,Building 3,No.16 South Third Ring West Road,Fengtai District,Beijing

Fax: +86-(0)10-63265498

Tel : +86-(0)10-63260308

Version 1.0

Note : As the products improvements, specifications are subject to change without notice.Please kindly contact us for latest information

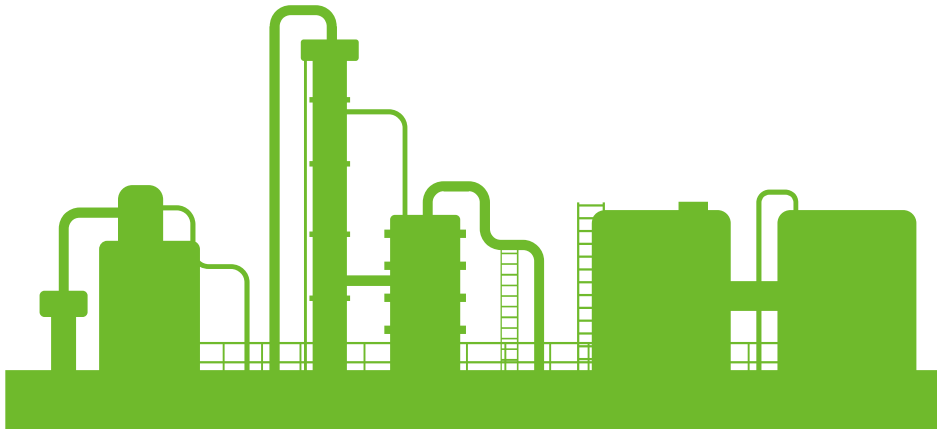


**HKP.2**  
Part-turn Series

**Scope of use:** HITORK® second-generation compact part turn series electric actuator.

All actuators must be checked and set up to meet the requirements of field operation and process control system before being put into use. Please ensure that you read and understand this manual completely.

As our products are constantly developing and improving, the design of HITORK® actuator is subject to change without notice. Please contact us for the latest technical information.



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## 1.Operator Interface

The operator interface of HITORK® compact part turn electric actuator consists of handwheel, display interface, on-off knob, local-remote knob and remote controller, as shown in Figure 1 below:

- 1) Display
- 2) On-off knob
- 3) Local-remote knob
- 4) Handwheel
- 5) Remote controller



Figure 1: The operator interface

## 2.Manual Operation

The actuator can be manually driven to rotate forward or reverse to achieve the purpose of opening and closing the valve through the actuator handwheel when the actuator is not operating electrically. This series of actuators have the function of automatic switching between electric and manual. When the actuator runs electrically, the hand wheel drive fails automatically. When operating the handwheel, please turn the actuator Local-remote knob to the "stop" state.

In general, the default direction of turning the handwheel clockwise is the valve closing direction, while the default direction of turning the handwheel counterclockwise is the valve opening direction.

## 3.Electric Operation

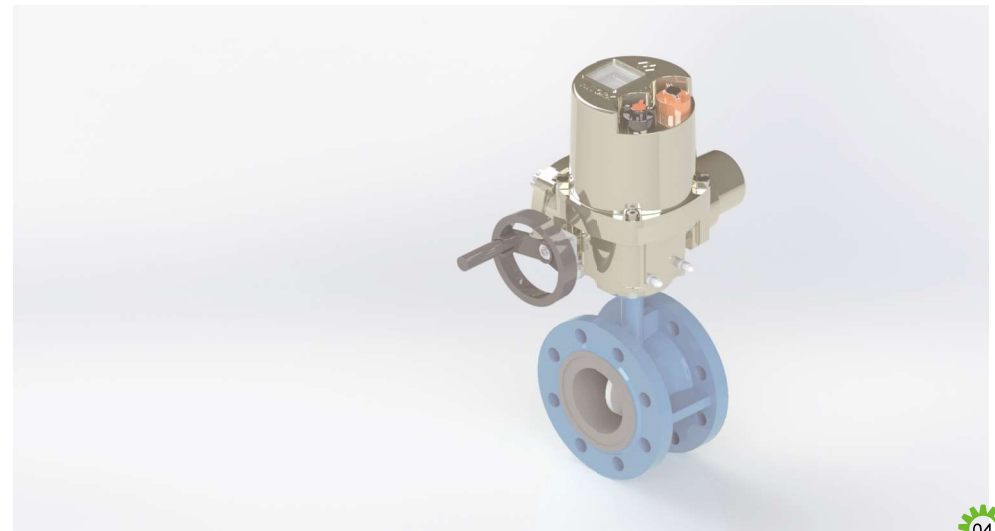
### ⚠ Warning

**Power Supply:** Check the power supply voltage, make sure it is consistent with the voltage on the actuator nameplate, and then turn on the power.

**Local-remote knob (red knob):** three states can be switched among local/remote/stop. The stop function remains active when the knob is locked in the local or remote position. When the knob is locked in the stop state, it can prevent local or remote operations from being performed.

**Local control:** turn the red knob to the local state, rotate the black knob next to it to on or off state, then conduct the local electric operation.

**Remote control:** change the red knob to remote state, at this time the local switch is failed, the actuator can be controlled by remote on-off signal or analog signal.



## 4.Display

The composition of the actuator display interface is shown in Figure 2:

- 1) Green-Valve closing indicator
- 2) Red—Valve opening indicator
- 3) IR sensor (remote controller receiver)
- 4) Valve position mechanical indicator
- 5) LCD

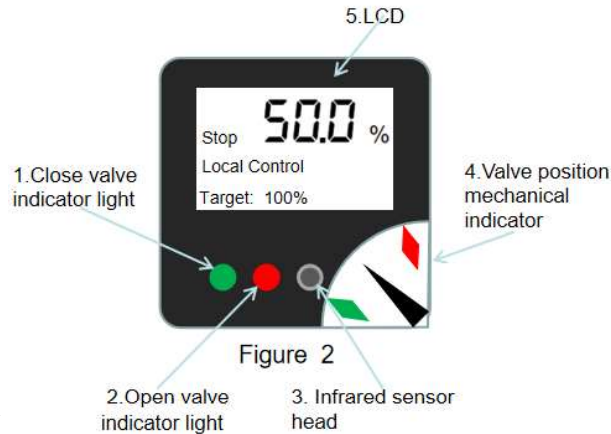


Figure 2

The corresponding status of LED indicator:

- 1) Opening process: red indicator light flash
- 2) Closing process: the green indicator light flash
- 3) Fully open state: the red light is constantly lighting
- 4) Fully closed state: green indicator light is constantly lighting
- 5) Alarm Status: red light and green light flash simultaneously

LCD display:

The actuator is powered on and the system is initialized and loaded, the default display contents of the LCD display screen are shown in figure 3.

Display specific content as:

- 1) Valve position indication area: valve stroke indication, 0%~100%
- 2) Actuator operating status: stop, valve closing, valve opening
- 3) Current control mode: stop, local control, remote on-off control, remote analog control, remote bus control
- 4) Target valve position and alarm indication area: it will show the target valve position when the actuator is in normal state; it will show specific alarm information when the actuator is in alarm state

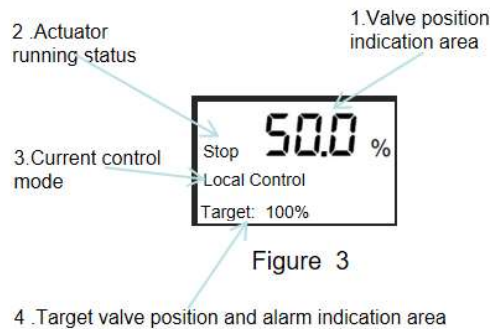


Figure 3

## 5.Remote Controller

Description:

- 1.Up: select to move up
- 2.Down: select to move down
- 3.Undo/back: used to undo the Settings or menu function back.
- 4.Enter/confirm: menu entry; menu selection confirmation; parameter setting confirmation.
- 5.Open: used to locally open the valve by remote controller
- 6.Close: used to locally close the valve by remote controller
- 7.Stop: Stop the actuator from opening and closing the valve
8. Infrared signal transmitter

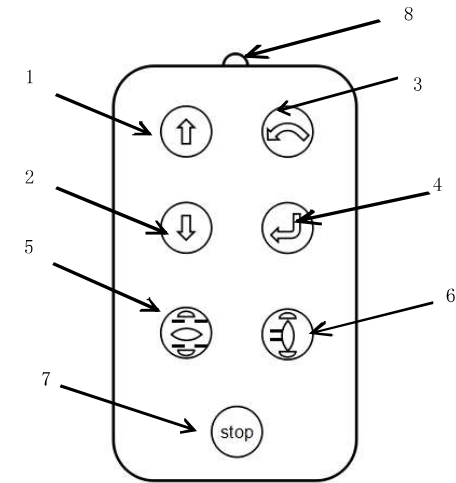


Figure 4

Use of remote controller :

When use the remote controller to set up and operate the actuator, turn the local-remote knob (red knob) to be locked at the local state,then the actuator can be set and switched on and off by the buttons on the remote controller,for better remote control response,aim the infrared signal transmitter at the display interface during operation.

Note:Actuator knob setting instructions

HITORK® intelligent electric actuators also support knob setting to meet the needs of actuator parameter setting in emergency situations. Local-remote knob (red knob) is locked at the stop state and keep the on-off knob (black knob) in the open state for more than 3 seconds,you can enter the parameter setting mode.

In the parameter setting mode, the knob combination action can correspond to the key setting function of the remote controller:

The local-remote knob from the stop state to the local state corresponding to the enter/confirm function of the remote controller (Enter/confirm button).

The local-remote knob from the stop state to the remote state corresponding to the function of undo/back function of the remote (Undo/back button).


The local-remote knob is in the stop state.


On-off knob inching for On is to move downwards,corresponding to the function of remote controller (Down arrow button).

On-off knob inching for Off is to move upwards,corresponding to the function of remote controller (Up arrow button).

## 6. System Program

After the actuator is powered on and initialized, it enters the system interface. It shows the current valve position, running status, control mode and target valve position of the actuator.

Operating the remote controller and press the key  to enter the next screen, which can display the current torque, running time, number of actions, program version and system temperature of the actuator.

Press the key  again to display the machine code input interface. After entering the correct actuator machine code in this interface, you can enter the actuator parameter setting interface. Note that only in the local mode is allowed to enter the system setting interface, and the control mode knob (red knob) needs to be set to the local position.

System parameter settings mainly include the following functions:

- 1) Valve settings: parameter settings related to valve operation.
- 2) Contact settings: function definition of actuator feedback contact.
- 3) Control mode settings: basic parameters settings related to actuator control.
- 4) Remote control settings: relevant parameter settings involved in remote signal control.
- 5) Interrupt timer: also known as the mid-stop function settings, which defines the parameters related to the automatic interruption of the actuator.
- 6) Machine code settings: change the machine code, the machine code can be used as a simple password for entering parameter settings to prevent misoperation.
- 7) Language settings: Chinese and English menus are supported.

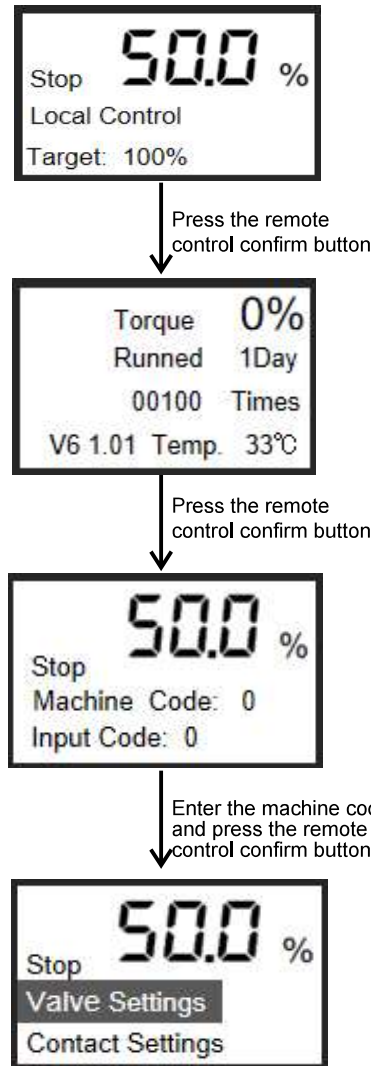
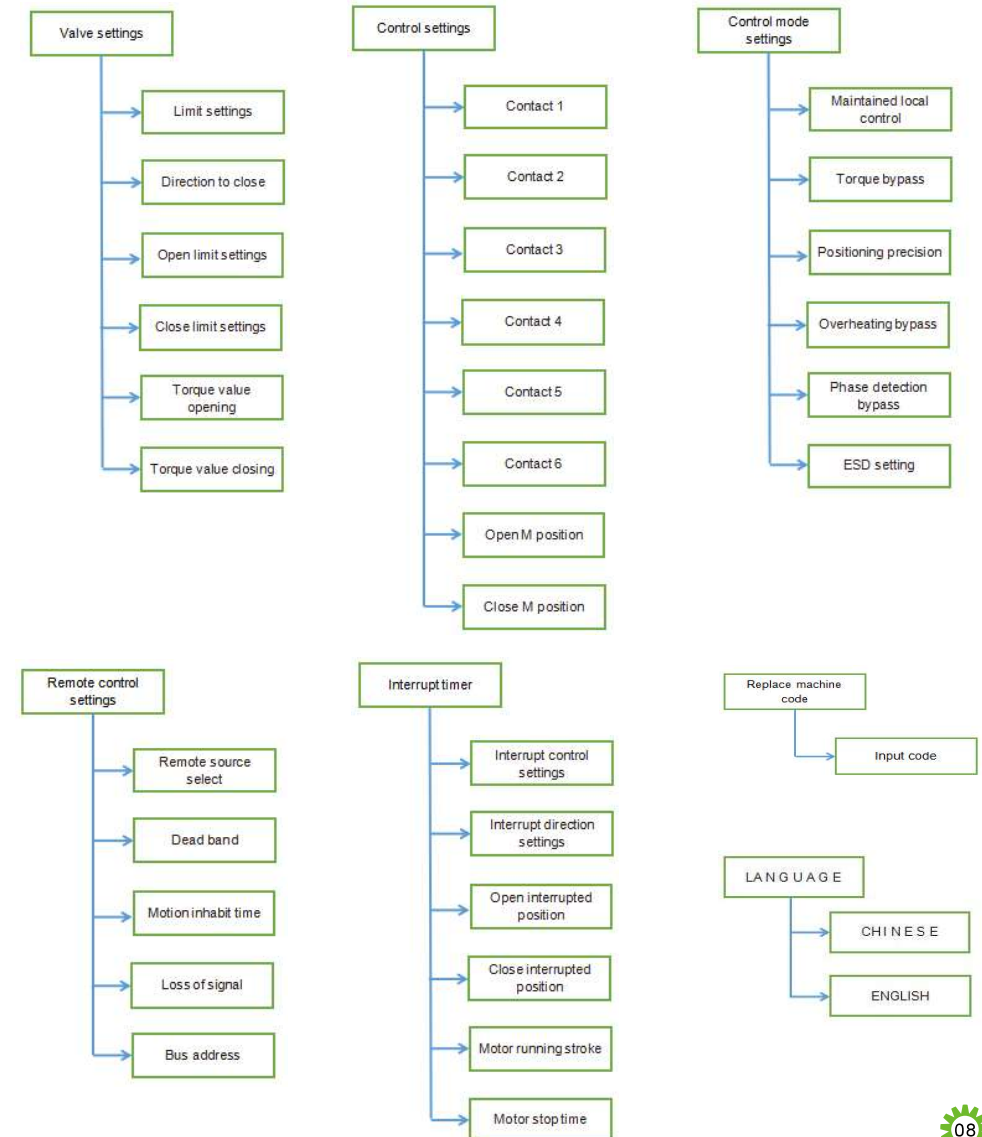


Figure 5. System Program

## 【System Menu Structure】

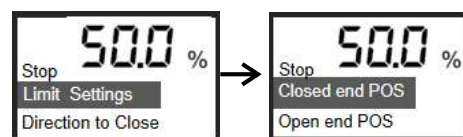


## 【Valve Settings】

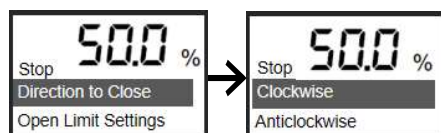


Figure 5 : Parameter settings

**【 Valve Settings 】** It is the basic parameter settings of the valve actuator. Before the normal use of the actuator, the necessary settings and adjustment of the parameters should be carried out, including the valve limit settings, the direction to close, open & close limit settings, tarque value opening & closing.



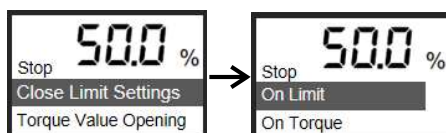
**【 Limit Settings 】** It is used to set the position of the valve corresponding to the actuator travel. After entering this menu, you can first manually rotate the valve to the fully closed position, select **[ Closed end POS ]** on the remote controller, and press  $\leftarrow$  to set the close limit; then manually rotate the valve to the fully open position, select **[ Open end POS ]**, press  $\leftarrow$  to set the open limit.



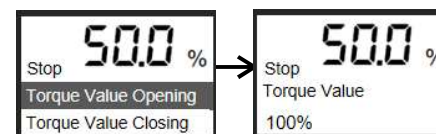
**【 Direction to Close 】** is used to set the direction of the valve corresponding to the actuator travel. According to the actual position of the valve, select **[ Clockwise ]** or **[ Anticlockwise ]**, press  $\leftarrow$  to save the setting.



**【 Open Limit Settings 】** is used to set the stop mode when the actuator drives the valve to the fully opened position. The default is **[ On Limit ]**. When the stroke reaches 100%, the actuator stops driving. When it is necessary to use the torque value to judge the valve opening position, this item can be set as **[ On Torque ]**.

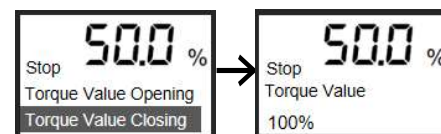


**【 Close Limit Settings 】** is used to set the stop mode when the actuator drives the valve to the fully closed position, the default is **[ On Limit ]**, when the stroke reaches 0%, the actuator stops driving. When it is necessary to use the torque value to judge the valve closing position, this item can be set as **[ On Torque ]**.



**【 Torque Value Opening 】** The protection torque of the opening direction is expressed as a percentage of the rated torque. When the torque value of the actuator in the process of opening direction exceeds the set protection torque value, it will automatically shut down and display the alarm information. Setting range of protection torque of turn-on direction is: 40%~120% (default: 100%).

Note: This function is only suitable for actuator products equipped with independent torque sensors.



**【 Torque Value Closing 】** The protection torque of the closing direction is expressed as a percentage of the rated torque. When the torque value of the actuator in the process of closing direction exceeds the set protection torque value, it will automatically shut down and display the alarm information. Setting range of protection torque of turn-off direction is: 40%~120% (default: 100%).

Note: This function is only limited to actuator products equipped with independent torque sensors.

## 【Contact Settings】



**【 Contact Settings 】** is used to set the function definition of the actuator feedback contacts, there are 6 groups of feedback contacts in total, of which: **[ Contact 1 ]**~**[ Contact 5 ]** are single-state relays, and the default is normally open; **[ Contact 6 ]** is two-state relay, 1 normally open and 1 normally closed.

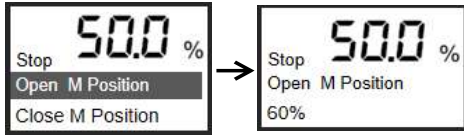
Contact function definitions include:

- |                                  |                              |
|----------------------------------|------------------------------|
| <b>[ Open End Position ]</b>     | <b>[ Loss of Signal ]</b>    |
| <b>[ Close End Position ]</b>    | <b>[ Torque Trip ]</b>       |
| <b>[ Open M Position ]</b>       | <b>[ Torque Trip Open ]</b>  |
| <b>[ Close M Position ]</b>      | <b>[ Torque Trip Close ]</b> |
| <b>[ Actuator for opening ]</b>  | <b>[ Motor Stalled ]</b>     |
| <b>[ Actuator for closing ]</b>  | <b>[ Lost Phase ]</b>        |
| <b>[ The actuator Rotating ]</b> | <b>[ Low Battery ]</b>       |
| <b>[ Local Stop ]</b>            | <b>[ Thermalstat Trip ]</b>  |
| <b>[ Local Control ]</b>         | <b>[ EEPROM Error ]</b>      |
| <b>[ Remote Control ]</b>        | <b>[ Alarm ]</b>             |

Among them: **[ Open M Position ]** and **[ Close M Position ]** can also be set the percentage value corresponding to the full stroke.



Contact function definition process: enter the function menu, select the contact that needs to be set, press  $\leftarrow$  to enter the contact function menu, select the function definition that needs to be set, press  $\leftarrow$  set function definition, enter the contact normal setting, select the contact normal (The normal state of the contact is the state of the corresponding contact when the function definition is not triggered after the actuator is powered on), and then press  $\leftarrow$  save settings to complete the function definition of the contact.



[ **Open M Position** ] If the contact feedback function is defined as "Open M Position", this item can be used to set the specific middle position, expressed as a percentage of the full stroke.



[ **Close M Position** ] If the contact feedback function is defined as "Close M Position", this item can be used to set the specific middle position, expressed as a percentage of the full stroke.

## 【Control Mode Settings】



[ **Control Mode** ] It is used to set the parameters related to the control of the actuator.

The setting items including:

[ **Maintained Control** ] [ **Torque Bypass** ] [ **Positioning Precision** ]  
[ **Overheating Bypass** ] [ **Phase Detection Bypass** ] [ **ESD control** ]



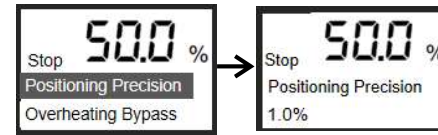
[ **Maintained Control** ] Set the local control mode of the actuator, including:

[ **Local Inching Control** ] Press and hold the on-off knob or the open and close button of remote controller, the actuator acts; when the on-off knob or the open and close button of remote controller is released, the actuator stops running.

[ **Maintained Control** ] Local on-off knob and remote control open and close button, as long as it is triggered once, the actuator will be driven to the open or closed position according to the command. If you want to stop running during the driving process, you need to operate the Local-remote knob to stop or press the stop button on the remote controller.



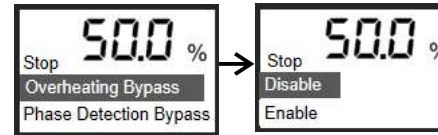
[ **Torque Bypass** ] can be set to Disable or Enable, and the default setting is Disable. When set to Enable, the actuator output torque exceeds the set protection torque, it will automatically ignore the torque alarm and continue to operate normally.



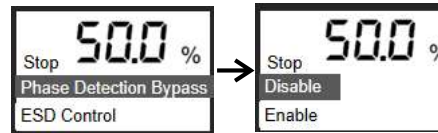
[ **Positioning Precision** ] when the valve position signal is given by the analog signal, the positioning accuracy of the actuator's actual travel is expressed as the percentage of the full travel, which is set as 1.0% by default.



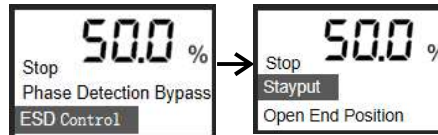
Position precision setting cannot be less than the setting value of control deadband.



[ **Overheating Bypass** ] can be set to Disable or Enable, and the default setting is Disable. When set to Enable, the actuator motor thermal protection will automatically ignore the thermal protection alarm and continue normal operation.



[ **Phase Detection Bypass** ] can be set to Disable or Enable, and the default setting is Disable. When set to Enable, the actuator power supply will automatically ignore the phase-loss alarm and continue normal operation.



[ **ESD Protection** ] Set what the actuator will execute when the ESD event is triggered ESD protection action: [ **Stayput** ] [ **Open End Position** ] [ **Closed End Position** ]:

[ **Stayput** ] It maintains the current valve position and does not perform any operation. (default)

[ **Open End Position** ] It automatically runs to the full open position.

[ **Closed End Position** ] It automatically runs to the full closed position.

## 【Remote Control Settings】



[ **Remote Control** ] Used to set the relevant parameters involved in the remote control signal, including [ **Remote Source Select** ] [ **Deadband** ] [ **Motion Inhibit Time** ] [ **Bus address** ].



[ **Remote Source Select** ] Set the type of actuator remote control signal source.

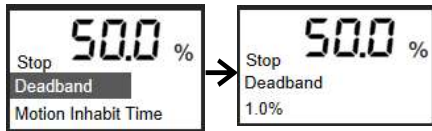
Including:

[ **Hardwired Control** ] When this item is set, wiring panel 19, 20, 21. Foot switch signal is valid

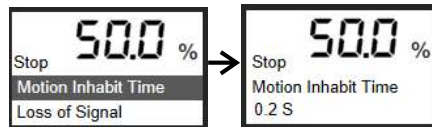
[ **Analog Control** ] Wiring panel 26, 27 analog signal is given valid

[ **Bus Control** ] reserved item, this model does not support temporarily

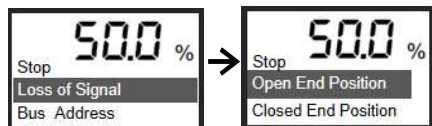
[ **IOT Control** ] reserved item, this model does not support temporarily



[ **Deadband** ] The so-called control deadband refers to certain travel positioning errors which is inevitably caused by the inertia of motor rotation when the actuator is controlled by remote analog signal. This unavoidable positioning error is called control deadband. In order to prevent the actuator from repeatedly oscillating back and forth and entering the dead cycle due to the control deadband problem, a reasonable control deadband range should be set to cover the inevitable travel positioning error. Control deadband setting range of 0.1%~9.9% (default is 1.0%).



[ **Motion Inhibit Time** ] set the response delay of the actuator to the remote control signal., the default is 0.2 seconds.

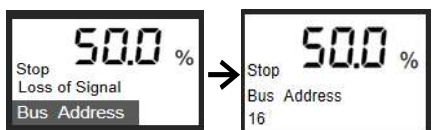


[ **Loss of Signal** ] set the valve operation to be performed by the actuator when remote analog signal is lost.

[ **Stayput** ] It maintains the current valve position and does not perform any operation.

[ **Open End Position** ] It automatically runs to the full open position.

[ **Closed End Position** ] It automatically runs to the full closed position.



[ **Bus Address** ] set the actuator fieldbus address, When the actuator fieldbus is configured, the address in the same fieldbus cannot be repeated.

## 【Interrupt Settings】



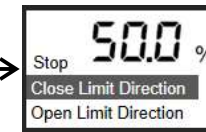
[ **Interrupt Timer** ] The application of the actuator's automatic stop control is used in situations that automatic intermittent drive is required during the opening and closing of the valve. When this function is enabled, the actuator will run automatically and intermittently according to the set motor running time and motor stopping time between the interrupt direction and the interrupt position area until the target stroke.

The function parameter setting items include:

[ **Interrupt Control Enable** ] [ **Interrupt Direction Setting** ] [ **Open Interrupted Position** ] [ **Close Interrupted Position** ] [ **Motor Running Stroke** ] [ **Motor Stopping Time** ]



[ **Interrupt Control Enable** ] is used to set whether to enable the interrupt control function. You can set [ **Disable** ] or [ **Enable** ] through this option.

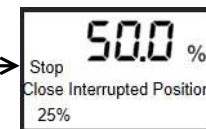


[ **Interrupt Direction Enable** ] is used to set the interval section where the interrupt function takes effect.

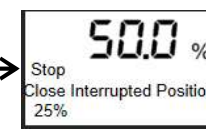
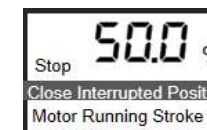
Setting options include:

[ **Close Limit Direction** ] The interrupt function takes effect in the area from the close limit to the interrupt position.

[ **Open Limit Direction** ] The interrupt function takes effect in the area from the open limit to the interrupt position.

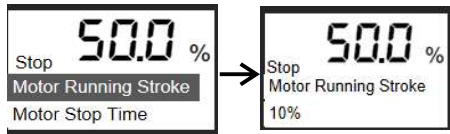


[ **Open Interrupted Position** ] is used to set the effective position of the interrupt function during the valve opening process. This parameter is set as a percentage of the full stroke. Define the effective interval of the interrupt function in conjunction with the interrupt direction.

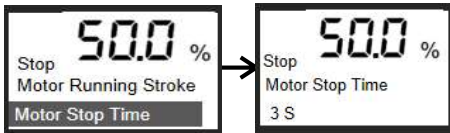


[ **Close Interrupted Position** ] is used to set the effective position of the interrupt function during valve closing. This parameter is set as a percentage of the full stroke. Define the effective interval of the interrupt function in conjunction with the interrupt direction.





[ **Motor Running Time** ] is used to set the intermittent driving time of the motor when the operation is interrupted.



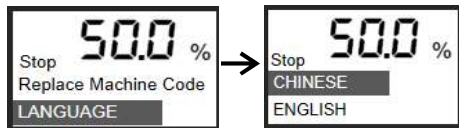
[ **Motor Stop Time** ] It is used to set the time for the motor to stop intermittently when the operation is interrupted.

## 【 Replace Machine Code 】



[ **Replace Machine Code** ] is used to modify the machine code. The machine code can be used as a simple password for entering parameter settings to prevent misoperation. Enter the value to be modified in the input code column, and press save, the machine code column will be updated to the set value.

## 【 LANGUAGE 】



[ **LANGUAGE** ] Used to change the actuator system language, currently supports Chinese and English. After selecting the system language, press to save the setting, and the system interface will automatically switch to the set language.

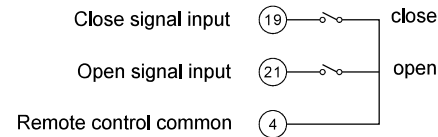
## 7. Electrical Connection

### 7.1 The Definition of Terminal Function

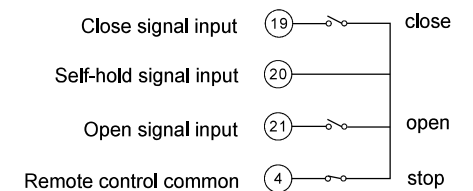
Terminal No.	The definition of terminal function	Terminal No.	The definition of terminal function
U	3phase-U/1phase-L	14	Relay feedback contact 5
V	3phase-V/1phase-N	15	
W	3phase-W	16	Relay feedback contact 6 normally closed
±	GND	17	Relay feedback contact 6 normally opened
1	Standby, vacant	18	Relay feedback contact 6 common
2	Standby, vacant	19	Remote off
3	Standby, vacant	20	Remote self-hold
4	Remote control common	21	Remote on
5	Standby, vacant	22	Remote analog output+
6	Relay feedback contact 1 (default valve position is fully closed)	23	Remote analog output-
7		24	Standby, vacant
8	Relay feedback contact 2 (default valve position is fully opened)	25	Manual/Auto common
9		26	Remote analog input+
10	Relay feedback contact 3 (default comprehensive alarm)	27	Remote analog input-
11		28	Standby, vacant
12	Relay feedback contact 4 (default remote control)		
13			

### 7.2 Common Electrical Control Connection Diagram

#### Inching control

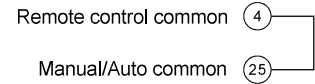
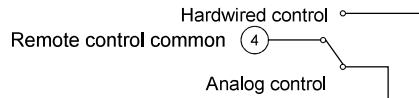
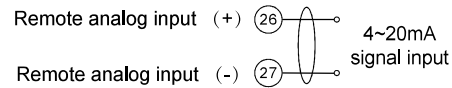
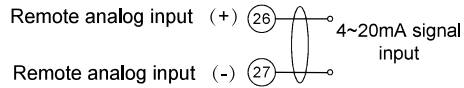


#### Maintained control

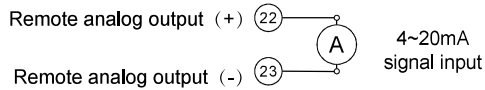
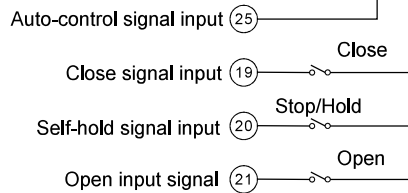


## Both analog & digital control

## Only analog control



## Position feedback



## Attached: HITORK®HKP. 2 series actuator basic wiring diagram

Note: This wiring diagram is only the wiring diagram of the 380V AC conventional actuator. For customized models, please refer to the attached wiring diagram of the device.

