

Series HK Electric Actuator Installation and Debugging Instructions

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One、Machining of the Drive Bush

1.1 Thrust Base Type

- 1) Turn actuator onto its side, remove the two cap-headed screws holding base plate onto thrust base. Pull out the drive bush complete with its bearing assembly. Remove the thrust bearing of the drive bush's double end (The two thrust bearing stop ring near the mid bulgy – the shoulder of the drive bush need not be removed.) (Refer to diagram1-1 ,1-2).
- 2) According to the thread dimension of the valve stem, machine the internal screw thread of the drive bush.
- 3) Remove all dirt from the drive bush and others components removed, ensuring that they are in good condition, clean and greased. According to the above steps, with reverse steps we can refit the drive bush and base assembly on the actuator, ensuring that the slots in the drive bush are located into the drive claw of the hollow output shaft. (The bearing modules must be topped with lubricating oil).



diagram 1-1



diagram 1-2



diagram 1-3

1.2 Non-Thrust Base Type (Refer to diagram 1-3).

- 1) Turn actuator onto its side and remove the base. The retaining clip on top of the drive bush can be seen now.
- 2) Turn the retaining clip slots until they reach the drive claw of the output shaft, or with a screwdriver remove the retaining clip. We can now remove the drive bush. According to the connection type of the configured value, we can machine the hole of the drive bush shaft, key slot or combinative-claws, and refit the assembly on the actuator. Next, fit on the retaining clip and base. Before fitting on the base, lubricating – oil must be daubed between base and drive bush.

Two、Installation of the Actuator

2.1 Installation with Visible Stem Valves:

2.1.1 Install the Thrust Base Type:

1. When leaving the factory, according to customer requests, the screw thread inside the drive bush has been machined well. The combination of actuator and drive bush is assembled with valve.
First, activate the hand – operating clutch, then place the actuator onto valve. Align the screw thread of the actuator and the valve stem. Wind the hand-wheel in the open direction to engage the drive bush onto the stem. Continue winding until the actuator is firmly connected to the valve flange. Wind two further turns, fit the securing bolts and tighten fully.
2. If the customer machines the internal screws of the drive bush, according to section 1.1, machine and fit them the drive

bush. According to the above section “ 1 ”, install the assembly.

2.1.2 Installing the Non - thrust Base Type

Ensuring that the drive bushes of the non- thrust type has been machined, assemble the actuator and valve as a combined unit.

First, activate the hand – operating clutch of the actuator, then place the actuator onto the valve. Place the valve stem into the hole of the drive bush, or secure the combinative – claw of the drive bush to the combinative – claw of the valve. Wind the hand-wheel in open direction until the actuator is firmly connected to the valve flange. Wind two further turns, fit the securing bolts and tighten fully.

2.2 Installation with Valve and Gear-box

Check that the drive bush, input shaft, key and key slot are all appropriate or not. Fit the base and drive bush assembly on the actuator, then correctly place the actuator onto the flange of the gear case. Place the input shaft of the gear case into the hole of the drive bush shaft. Wind the hand-wheel, ensuring that the key is located into the key – slot of the drive bush. Finally, fit the securing bolts and tighten fully.

2.3 Installation with Hidden - Stem Valve

According to the section 2.1.2, use the same assembly method. If the actuator supports thrust, we should use the thrust – type connection with thrust bearing.

2.4 Hand-wheel Sealing

Ensure that the sealing plug in center of hand-wheel is sealed with PTFE tape and tightened fully. Ensure that moisture does not pass down the output shaft of the actuator.

2.5 Connecting to Terminals and Cable Entry

1. According to the control needs, connect the power wires and signal wires.
2. The actuator has specific ground terminals. To ensure that persons and equipment are safe, the actuator should be grounded correctly.
3. Only appropriate certified Explosion – Proof entry conduit plug may be used in hazardous locations. They must be waterproof and firm. Unused conduit plugs must also be sealed.

Three、 Operating your Actuator

3.1 Operating by Hand

The actuator provides operating a hand-wheel and Electric/Hand-wheel clutch lever. In special circumstances (e.g. main power failure or control circuit failure), the actuator can operated by hand. Before operating the hand-wheel, firstly set the mode selection knob to the “ stop ” or “ local ” position. To engage hand-wheel drive, depress the Electric/Hand-wheel clutch lever to “ Hand ” position. While the clutch lever is depressed, turn the hand-wheel slowly to engage the clutch. With the actuator in “ Hand-wheel ” mode, the lever can now be released and returned to its free position by its clockwork spring.

The actuator’s internal clutch has been latched in the “ Hand ” position. The hand-wheel will now drive the output shaft, thus enabling hand operating.

The clutch is skillfully designed, electric operation takes precedence over hand operation. When the actuator’s motor

starts, the clutch will automatically switch to the electric operating position.

The clutch lever can be locked in the electric operation position or the hand operation position by a padlock. Please pay attention: if the lever is locked in the hand operating position by a padlock, motor operation will not automatically set clutch to the electric operation position.

3.2 Local Operation

If you want to use local operation, you should set the mode selection knob (red knob) to the local position. The actuator can now be controlled by the operation knob (black knob). Local operation has two modes: push to run and maintained. These are set by the setting tool. The two modes are described as follows:

Push to run: when you set the operation knob (black knob) to the close position, the actuator will turn in the closing direction. When you release the operation knob, it will return to the original position and the closing action will be stopped immediately. When you set the operation knob to the open position, the actuator will turn towards the opening direction. If the operation knob is released, the motor of the actuator will stop turn immediately.

Maintained: Turning the operation knob to the closing position will start the actuator running in the close direction. If the operation knob had been released, and return to the original position, however the actuator will continue running in the close direction. To start the actuator running in open direction, set the operation knob to the open position. If the operation knob had been released, and return to the original position, however, the actuator will continue to run in the opening direction.

3.3 Remote Operation

Please see 4.4.2 section

Four、 Debugging your Actuator

4.1 Intrinsically Safe Setting Tool.

The Setting Tool is used to be going to not invade type for actuator parameter set. If you want to use the Setting Tool, you must set the Mode Knob to the “Local” or “Stop” position beforehand. When a button is depressed on the Setting Tool, the relevant instruction is transmitted to the actuator via infra-red pulses. The Setting Tool must be pointed directly to the front of the actuator indicator window and at a distance no greater than 1.00m. The following describe Setting Tool button functions:

↓: Down Button. It is used for selecting the next item of the current menu. When the last item is reached, pressing the Down Button again will return selection to the first item of the current menu.

+: Plus Button. Increase / Change displayed function's value or option setting.

-: Minus Button. Decrease / Change displayed function's value or option setting.

↵: Enter Button. Enter displayed value or option setting.

↶: Return Button. Return from current menu to previous menu.

R: Reset Button. If the actuator enters into an error condition, press this button and the Setting Tool will transmit a hardware reset signal to the actuator. The actuator will recover to the normal operation.

Notice: When Mode Knob is set to the “Local” position, pressing the “+” button and “↓” button simultaneously will cause the actuator to execute the “Local Opening” action. Pressing the “-” button and “↵” button simultaneously will cause the actuator to execute the “Local Closing” action.

Setting Tool Model: HK;

Explosion-Proof Mark: Exia IICT4;

Working Condition: Temperature: -30℃~+50℃, Relative Humidity: ≤95%, Atmospheric pressure :0.86 MPa~1.06 MPa,

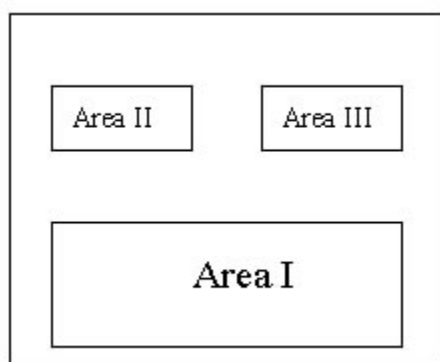
Power Supply: two common size 5 batteries.

Setting Tool Notes: 1. Do not remove the back cover in the hazardous areas; 2. Do not replace or alter the components and configuration if they affect the Explosion-Proof capabilities of the Setting Tool; 3. The Setting Tool should be cleaned with cleaning agent or damp cloth.

Attention: Setting Tool is not available if: 1) the Mode Knob is lying in the “ Remote ” position, 2) in the “ Local” position with the motor is running , 3) the motor is stopped but still in the non-action pause (2 seconds) after each motor motion.

4.2 Operation Setting

On the surface of the electrical cover, there is a display LCD. There are three areas on the LCD.



Area I: display of the valve position;

Area II: display of operation setting or the status alarm. Operation settings start with the character “H”; status alarms start with characters “F” or “A”.

Area III: display of operation setting values or the status of the battery. During the operation parameter configuration, this area displays the parameter value. During normal operation, this area will display “00” when the electrical amperage of the battery is insufficient, meaning the battery must be changed.

With the Mode Select knob (red knob) at the “Stop” or “Local” position, aim the setting tool at the display screen. Depressing any button other than the reset button will cause the LCD to display “H—01” in area II. Using “↓” key, area II will cycle through the following codes:

H—01: the option of Direction to Close

H—02: the option of Valve-position Control Current Calibration

H—03: the option of Local Control Mode

H—04: the option of Closing Limit Protection

H—05: the option of Closing and Opening Torque Protection

H—06: the option of Dead-band Range Modulation

H—07: the option of ESD (Emergency Shutdown)

H—08: the option of Losing Signal

H—09: the option of Limit Position Setting

H—10: the option of Current Torque Display

H—11: the option of Remote Control Priority

H—12: the option of Inhibit Moving Time

H—13: the option of Feedback Electric-current Modulation (this function is not provided unless the clients specially declaring)

For any of the above options, you can use the setting tool “↓” button to select the submenu and the enter button enter that submenu. The following describe each submenu option and operating setting.

4.2.1 The option of Direction to Close

The running direction of the output shaft can be set by this item. In the “H—01” menu, area III will display “0”(Clock-wise operation) or “1”(Anti-clockwise operation). The number of the first displayed is the default value. Use the “↓” Button to change the number and use the enter button for confirmation .

4.2.2 The option of Valve-position Control Current Calibration

If you want to use the 4~20mA analogue signal to control the valve position, you must enter this menu to calibrate the electric-current signal. Before calibration you must input the electric-current signal into the terminals 26(+) and 27(-) of the sunflower-pan.

Enter into the menu "H-02", area III will display "0" (4mA calibration), depress "↓" button the area III will display "1" (20mA calibration).

When the area III display "0", depress "enter button", area II will display "H-20", area III will display the electric-current that the actuator collected. Area I will display the default valve position opening that the 4 mA calibrated. You can change the valve position opening value by the "+" or "-" button. At this moment, you must input the 4 mA electric-current into the terminals 26 (+) and 27 (-), and let the valve position opening be changed to the required value, then depress the "enter button" calibration, this process is called as " Low signal calibration".

When the area III display "1", depress "enter button", area II will display "H-21", area III will display the electric-current that the actuator collected. Area I will display the default valve position opening that the 20 mA calibrated. You can change the valve position opening value by the "+" or "-" button. At this moment, you must input the 20 mA electric-current into the terminals 26 (+) and 27 (-), and let the valve position opening be changed to the required value, then depress the "enter button" for calibration, this process is called as " High signal calibration".

Notice: If your electric-current signal is 2~10mA, you must specially declare in your order form.

You can also use 1~5V electric-voltage signal to control the actuator, but we do not commend using the electric voltage signal to control the actuator, because the electric-current signal is better than the electric-voltage signal for the anti-jamming.

4.2.3 The option of the Local Control Mode

In this menu, you can select “Push to Run” or “Maintained” local operation mode. Upon entering the “H—03” menu, area II will display “0” (Push to Run) or “1”(Maintained). The number of the first display is the setted sets value. Use the “↓”

button for selection and use the "enter button" for confirmation .

4.2.4 The option of the Closing Limit Protection

In this menu, you can activate or de-activate the Limit Protection in the closing direction. In the “H—04” menu, area III will display “0”(No Protection) or “1”(Protection). The number first displayed is the default value. Use the “↓”button for selection and the enter button for confirmation . If you select "0" (No Protection), when the actuator runs to the closing limit position, the red LED will be lightened but the actuator will not stop unless the current torque is bigger than the closing torque protection.

4.2.5 The option of the Closing and Opening Torque Protection

Upon entering the torque trip submenu (“H—05”), when area III displays "0", depress the "enter button", area II will display "H-50", and the area III will display the close torque protection value setted formerly, the range can be varied between 40% and 120% of rated torque. Select the required torque protection value by using the “+” button to increase, or the “-” button to decrease, Press the "enter button" for setting confirmation.

Upon entering the torque trip submenu (“H—05”), when area III displays "1", depress the "enter button", area II will display "H-51", and the area III will display the open torque protection value setted formerly, the range can be varied between 40% and 120% of rated torque. Select the required torque protection value by using the “+” button to increase, or the “-” button to decrease, Press the "enter button" for setting confirmation.

4.2.6 The option of Dead-band Range Modulation

Upon entering the submenu (“H—06”), area III displays the dead-band value setted formerly, the range can be varied between 3‰ and 60‰ of the full stroke. Select the required value by using the “+” button to increase, or the “-” Button to decrease, Use the “enter button” for setting confirmation.

4.2.7 The option of the ESD (Emergency shutdown)

This function is used to stipulate the actuator’s action in the emergency circumstances. Upon entering the “H—07” menu, area III will display “0” (Execute the close action) or “1” (Execute the open action) or “2” (No moving). The number first displayed is the default value. Use the “↓” button for selection and the “enter button” for confirmation . If “0” or “1” is selected and confirmed, area II will display “H—70”. In this menu, area III will display “0” (Low-Voltage Active) or “1” (High-Voltage Active). The initial value displayed is the default value. Use the “↓”button for selection and the “enter button” for confirmation.

4.2.8 The option of losing signal

When the 4~20mA electric-current signal is losed or this electric-current signal is less than the half of the "Low signal calibration", this menu can decide that the actuator will be excuted what action. Enter into this menu, the area III will display "0"(Execute the close action), "1"(Execute the open action), or "2"(No moving). The initial value displayed is the default value. Use the “↓”button for selection and the “enter button” for confirmation.

4.2.9 The option of the Limit Position Setting

This item decides the limit position of the valve. When area II displays “H—09”,you can depress the “enter button”. Area III will display "0" (close limit position), or "1" (open limit position).

When area III displays "0", depress the "enter button", the actuator will confirm this position as the full close limit position of the valve. At this moment the red LED will be lightened, area I will display 0. Don't exit from the menu and don't depress the "↓: Down Button". Then you can use the hand-wheel or the opening operation of the "Local" mode to let the actuator run up to the full open limit position. In order to protect the actuator and the valve, we commend that you must turn the actuator to the close direction half circle or one circle. At this moment you can depress the "enter button", the green LED will be lightened and the actuator will confirm this position as the full open limit position, the area I will display 100. Then the actuator's stroke is performed.

4.2.10 The option of the Current Torque

Red knob is placed at the local position. Enter into the "H—10" menu. When opening or closing the valve, the current torque percentage is displayed in the area III, and the current valve position (opening percentage) is displayed in area I.

4.2.11 The option of Remote Control Priority

When the Remote opening signal and Remote closing signal exist at the same time, this item is used to decide that who has the priority.

After entering the "H-11", area III will display "0" (Open firstly), "1" (Close firstly), or "2" (Inhibit moving). The number of the first displayed is the default value. Use the "↓" button to change the number and use the enter button for confirmation.

If you select "1", when the Remote opening signal and Remote closing signal exist at the same time, the actuator will perform closing action only. Similarly, if you select "0", when the Remote opening signal and Remote closing signal exist at the same time, the actuator will perform opening action only. If you select "2", when the Remote opening signal and Remote closing signal exist at the same time, the actuator will do not move, and display error signal "F-21" at the area II on the LCD.

4.2.12 The option of Inhibit Moving Time

Enter into the "H-12" menu, area III will display number between 1 and 99, this means the "inhibit moving time" is between 0.1 and 9.9 seconds. You can use the "+" or "-" button to modulate the number of the area III. Then use the "enter button" to affirm the parameters.

4.2.13 The option of Feedback Electric-current Modulation for the Full Close Position (this function is not provided unless the clients specially declare)

This menu is only used for the feedback electric-current's increase or decrease modulation of the full close position.

After entering into "H-13" menu, area III will display "0" or "1". When display "0", that means the increase modulation of the feedback electric-current. Depress the "enter button" and enter into the sub-menu "H-31", area III will display number between 0 and 99, this means the increase value of the feedback electric-current.

After entering into "H-13" menu, area III will display "0" or "1". When display "1", that means the decrease modulation of the feedback electric-current. Depress the "enter button" and enter into the sub-menu "H-32", area III will display number between 0 and 99, this means the decrease value of the feedback electric-current.

When you want to make the feedback electric-current increase, you must make the number in the submenu "H-31" increase and at the same time you must make the number in the submenu "H-32" to be changed as 0.

When you want to make the feedback electric-current decrease, you must make the number in the submenu "H-32" increase and at the same time you must make the number in the submenu "H-31" to be changed as 0.

4.3 Actuator electrical wiring diagram

Notice: all the numbers shown in the wiring diagram means the terminal port number.

4.3.1 Series HK basic type (wiring diagram B)

Series HK basic type may control motors rotary orientation without any external control relay (cabinet) and the ways of control include: Local control, remote control and ESD control. The wiring diagram of about remote controlling refer to figures from 1-1 to 1-9. This series actuators also provide single phase AC motor, terminal port 1 and 2 are power supply input with AC220V, port 3 is not used

Actuators wiring diagram refer to the right-side figures.

O1/C1 – normally opening contact; when the open/close limit position , the contact is closed.

O2/C2 – normally closing contact; when the open/close limit position, the contact is open.

QO/QC – normally closing contact; when open/close over torque, the contact is open.

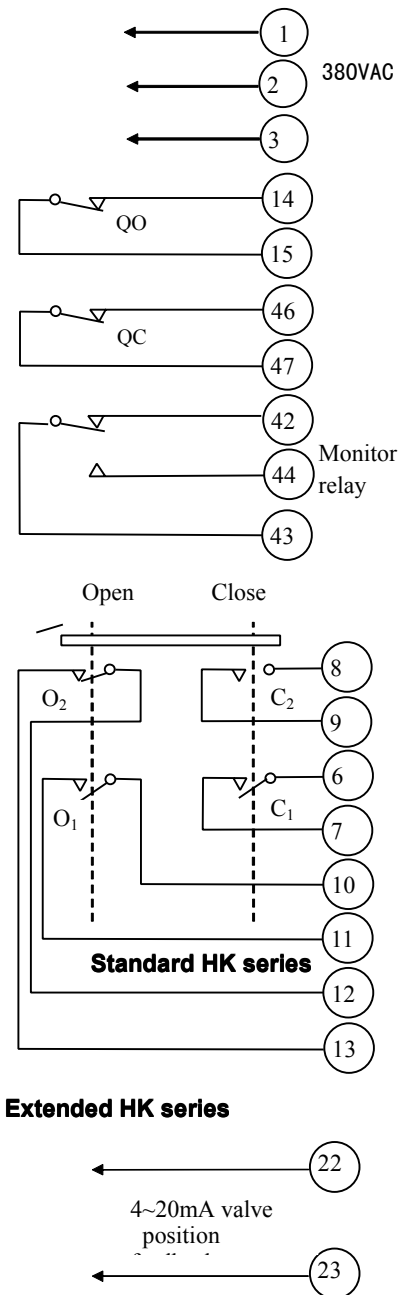
Above relays contract rating 5A/250VAC or 5A/30VDC.

The monitor relay contract rating 5A/250VAC or 5A/30VDC. While monitor relay do not be at de-energized, terminal port 43 link with 42; while monitor relay is at energized, port 43 does not link with 42 but links with 44. In following cases relay should be at de-energized: Main power supply failed or phase lose; main control circuit failed; Local/remote selection knob at Local; thermostat tripped. All above that, monitoring the Local/remote control status by monitor relay is possible.

4.3.2 Series HK extended type (wiring diagram is BI,BO,BIO)

The type of the extended series HK is added a 4 ~ 20mA feedback signal module and a 4~20mA valve position control signal module to the basic type Series HK, its wiring diagram is divided into three kinds, first one is BI (add a 4~20mA valve position control signal module to the basic type Series HK), second one is BO (add a 4~20mA feedback signal module to the basic type Series HK), the third one is BIO (add a 4~20mA valve position control signal module and a 4~20mA feedback signal module to the basic type Series HK)

This extended type Series HK is 600 starts per hour as its operation frequency.



Notice: If have any special requirement orders please contact us.

4.3.3 Control and Wiring

Please see the table “Terminals description sheet”

Terminals description sheet

No.	Name	Operation	No.	Name	Operation
$\equiv$	Grounding	Wiring ground port	23	Valve position feedback- signal (-)*	Valve position current signal feedback port (-)
1	POW-VAC1**	380VAC Input port 1	25	ESD	Emergency shut down signal input port
2	POW-VAC2**	380VAC Input port 2	26	Valve-position control signal (+) *	Control current input +
3	POW-VAC3**	380VAC Input port 3	27	Valve-position control signal (-) *	Control current input -
4	DC 0V	DC 24V “-” output port	33	Remote close	Remote close signal input port
5	DC 24V	DC 24V “+” output port	34	Stop/Maintained	Stop/Maintained signal input port
6	C1 relay port 1	Close position relay 1, normally open port 1			
7	C1 relay port 2	Close position relay 1, normally open port 2	35	Remote open	Remote open signal input port
8	C2 relay port 1	Close position relay 2, normally open port 1	36	Remote low voltage Common-port	ESD, stop/ Maintained,remote open/close input signal low voltage Common-port
9	C2 relay port 2	Close position relay 2, normally open port 2			
10	O1 relay port 1	Open position relay 1, normally open port 1	39	Manual/automatic input *	Manual/automatic mode select input port
11	O1 relay port 2	Open position relay 1, normally open port 2	40	Remote-high voltage Common-port -	ESD,stop/ Maintained,remote open/close input signal low voltage Common-port
12	O2 relay port 1	Open position relay 2, normally close port 1	41	Manual/automatic common-port *	Manual/automation low voltage common-port
13	O2 relay port 2	Open position relay 2, normally close port 2	42	Monitor relay port 1	Monitor relay contact normally close port
14	QO relay port 1	Open over torque protection relay contact, normally close port 1	43	Monitor relay port 2	Monitor relay contact common Port
15	QO relay port 2	Open over torque protection relay contact, normally close port 2	44	Monitor relay port 3	Monitor relay contact normally open port
18	Extended relay port 1***	This relay is as the flash alarming relay or the "Local/remote" Indication relay	45	Manual/automatic common-port *	Manual/automatic high voltage common-port
19	Extended relay port 2***		46	QC relay port 1	Close over torque protection relays contact normally close port 1
22	Valve position feedback signal (+) *	Valve position current signal feedback port (+)	47	QC relay port 2	Close over torque protection Relays contact,normally closeport 2

Notice: Mark of “” items are only used in single phase actuator, No.1 and No.2 port are connected with 220VAC, No.3 port is void; “*” items is only used in type of extended or enhanced actuator. “***” items is not provided unless the clients specially noted in the sale order.**

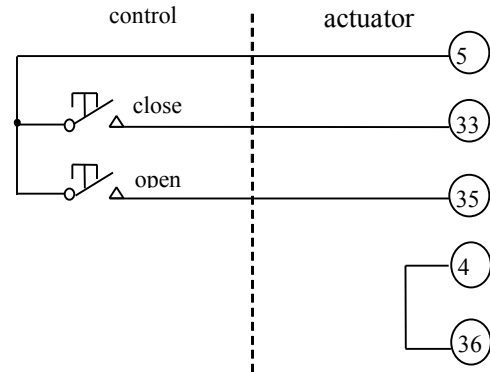
The above table “Terminals description sheet” Is also suitable for the HKE range actuator.

4.4 Control mode

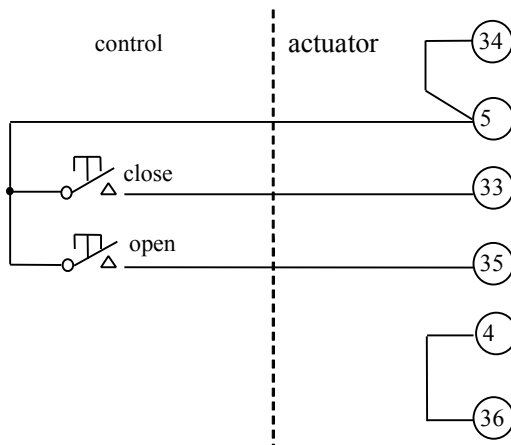
4.4.1 Local control

For all Series HK actuators, when the mode selection knob positioned at the “Local Position” as well as operated the operation knob that can control the actuator open or close. The local operation mode of actuators can be set as “Maintained local control ” or “Push to Run control” (according to the primitive parameter setting). In addition the setting tool can control the actuator open or close in “maintained local control” mode.

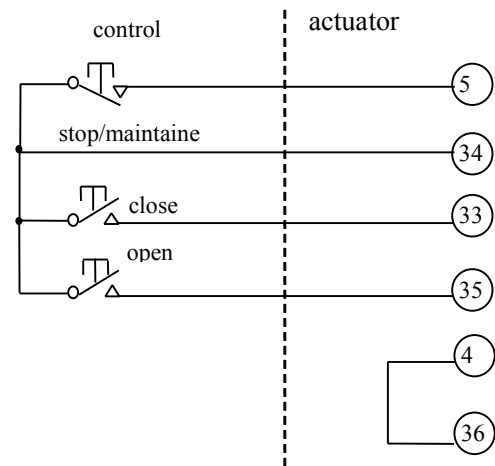
4.4.2 Remote control (1-1 to 1-9):



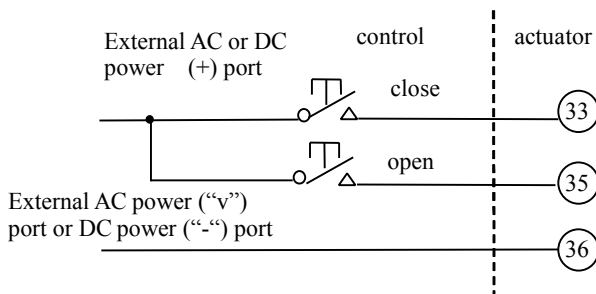
1-1 push to run open/close control, the valve intermediate positioning is possible



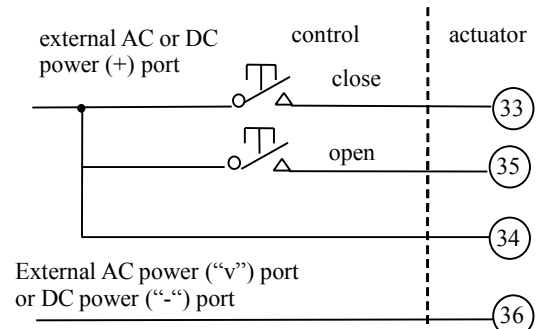
1-2 maintained open/close control, support reversion, intermediate positioning impossible



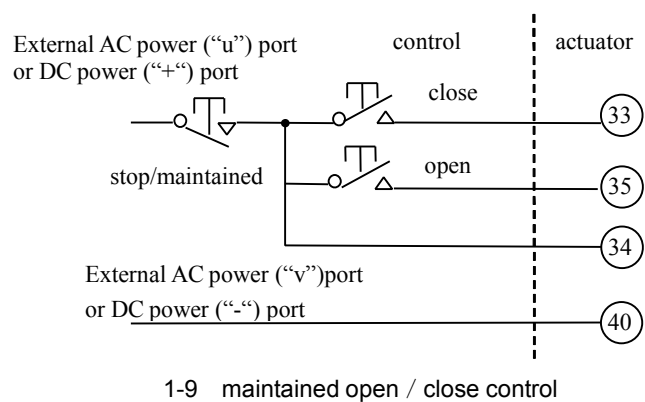
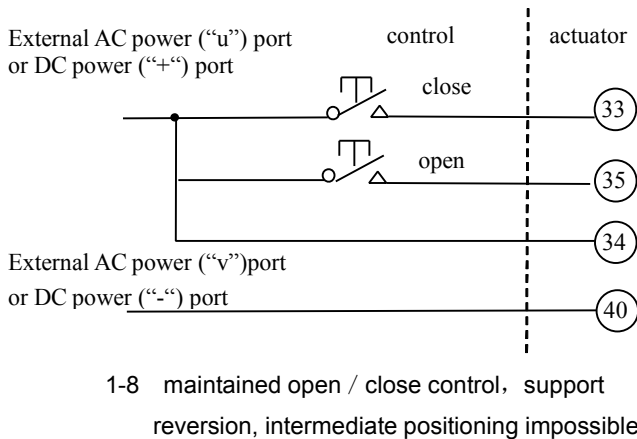
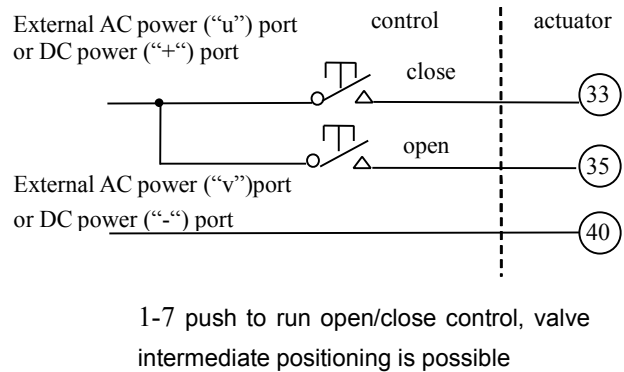
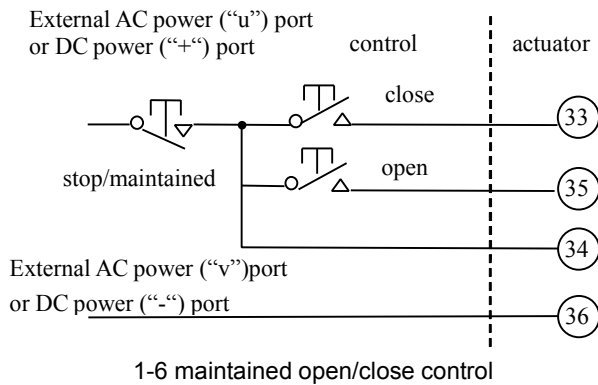
1-3 maintained open/close/stop control



1-4 push to run open/close control, valve intermediate positioning is possible



1-5 maintained open / close control, support reversion, intermediate positioning impossible



Five、Alarm Message Display

When the actuator is running, alarm signals are displayed in the alarm area (area II) of the LCD screen. The following list the alarm codes and their meanings:

- (1) F—01(Instruction Error): On power-up self-diagnostic, if an instruction is bad, this message will be displayed.
- (2) F—02(ROM Error): On power-up self-diagnostic, if the Read-Only Memory (ROM) is bad, this message will be displayed.
- (3) F—03(RAM Error): On power-up self-diagnostic, if the Random Access Memory (RAM) is bad, this message will be displayed.
- (4) F—04(A/D Error): On power-up self-diagnostic, if the A/D is bad, this message will be displayed.
- (5) F—05(Reset Limit Position): If the actuator's valve position is bad, you must set the open/close limit position again.
- (6) F—06(Torque over): When the actuator starts up, if the torque exceeds maximum torque, the actuator will stop and display this message.
- (7) F—07(Memory Error): A memory error occurred while the actuator is running. There are two possible reasons for this error: One is random, requiring only that actuator be reset with the setting tool; the other possible reason is that the RAM is damaged, in which "F—07" displays even after actuator is reset. Damaged RAM (the second possibility) requires changing

the main-board.

(8) F—08(Valve Position Overrun): When the actual valve position exceeds the allowed tolerance of the limit open, this alarm sign will be displayed. If the overrun or under-run signal appears, the valve position counter value is wrong, The limit open and close limit should be reset.

(9) F—09(Valve Position Under-run): When the actual valve position is less than the allowed minimum, this alarm sign will be displayed. If the overrun or under-run signal appears, the valve position counter value is wrong. The limit open and close limit should be reset.

(10) F—10(Counter Overflow): When the actual valve position counter value is more than the allowed maximum, this alarm message will be displayed.

(11) F—11(Close Torque Over): On actuator closing, if the torque exceeds the setted protection value, the actuator will stop and not proceed any further in the close direction. And the “F—11” alarm message is displayed in this circumstance. In order to clear the “Close Torque Over” alarm, let the actuator run in the open direction a few times or reset the close torque protection trip value.

(12) F—12(Open Torque Over): On actuator opening, if the torque exceeds the setted protection value, the actuator will stop and can not proceed any further in the open direction. And the “F—12” alarm message is displayed. In order to clear the “Open Torque Over” alarm, let the actuator run in the close direction a few times or reset the open torque protection trip value.

(13) F—13(Loss Phase): when the actuator is running, if the power supply loses phase, the actuator will stop. This message is displayed

(14) F—14(Temperature Over): when the temperature of the motor exceeds limit, the actuator will stop and this message is displayed.

(15) F—15(Motor Stalled): When the actuator is running, if the actuator can’t detect the valve position change in five seconds, it will stop and display this message.

(16) F—16(Power Down): If the main power fails, this alarm is displayed.

(17) F—17(Direction Errors): If the actuator’s running direction is wrong, this alarm message will be displayed.

(18) F—18(ESD Closing): If ESD is enabled and the ESD signal is active, the actuator is executing ESD close. This message displayed during ESD close.

(19) F—19(ESD Opening): If ESD is enabled and the ESD signal is active, the actuator is executing ESD open. This message displayed during ESD close.

(20) F—20(ESD Effective): When the ESD is enabled and the ESD signal is active, the actuator is executing the “ESD” operation. During this time, additional instructions to open or close the actuator, while the ESD signal is still active, will not be effective. This alarm signal will be displayed in this situation.

(21) F-21(Remote signal exist at the same time): In the menu "H-11", if you select "2", when the Remote opening signal and Remote closing signal exist at the same time, the actuator will do not move, and display error signal "F-21" at the area II on the LCD.

(22) A—01(Instruction Ok): On power-up self-diagnostic, if the micro-controller's instruction is good, this message will be displayed.

(23) A—02(ROM Ok): On power-up self-diagnostic, if the ROM is ok, this message will be displayed.

(24) A—03(RAM Ok): On power-up self-diagnostic, if the RAM is ok, this message will be displayed.

(25) A—04(A/D Ok): On power-up self-diagnostic, if the A/D is ok, this message will be displayed.

Six、Lubrication and Maintenance

To ensure the actuator's smooth running, the HK actuators must use the lubricating agents in the following table. Improper lubrication may adversely affect the dependability of the actuator. The temperature range of the environment is $-22^{\circ}\text{F}/-30^{\circ}\text{C} \sim -160^{\circ}\text{F}/+70^{\circ}\text{C}$. In the extreme climates, there are special requirements: Movement Viscosity at 100°C , flash point of 150°C at minimum, and solidifying point at not more than -45°C .

Lubrication table:

Manufacture Unit	Lubrication trademark
Beijing Changcheng Lubrication CO.,LTD	Burthen vehicle gear wheel oil 75W/90
USA	Mobil SAE80EP

If your actuator has run for six months, change the lubrication once a year.

Lubrication Capacity:

Actuator Spec	Capacity	Actuator Spec	Capacity
HK03	0.3	HK60	1.1
HK08	0.3	HK100	7.5
HK14	0.3	HK150	7.0
HK20	0.8	HK200	7.0
HK30	0.8	HK201	7.0
HK40	0.8	HK300	7.0

Machine Maintenance:

If your actuator has run for six months, you must tighten the installation bolts.

Every actuator has been fully tested before leaving the factory to provide years of trouble free operation.

If your actuator can not be installed immediately, store it in a dry place until you are ready to connect incoming cables. Don't pull out the transit cable entry plugs until you are ready to connect incoming cables.

At the same time you

must pull out the battery until you are ready to install the actuator.

Seven、 Changing Battery

When the battery's power level displays “ 55 ”, the battery is low and should be changed quickly. If the battery's power level is “ 00 ”, the battery is exhausted and must be change immediately. Change the battery while the main power is on. Set the Mode Knob to the “Stop” position before changing the battery. After changing, set mode knob to the primary position.

Notice: If the battery's power level is “ 00 ” and main power is down, we do not ensure current valve position value will be correct after changing the battery. In this circumstance, you should check that the valve position value after changing is the same value before changing the battery. If the value is not the same, you should set the limit position value again (refer to H-09).

Eight、 Important Notices

1. In order to ensure that the torque limit protection value of the close/open direction is appropriate, set the Mode Knob to the “Local” position. Allow the liquid medium to flow through the valve and let the actuator run forward and backward in the open and close direction several times. At the same time, you should adjust the torque limit protection value, in order to ensure that there is no excessive torque while the actuator is in operation.

2. In the following three instances, you must check that the limit open and limit close values are correct.

1) Changing the battery while the main power is down.

2) Main power is down, the battery is exhausted and there is no display on the LCD screen.

3) The following alarms occur when the actuator is running:

Memory Errors (May reset it with the Setting Tool)

Valve Position Overrun

Valve Position Under-run
Set the Valve Position again

Nine、 Fault is handled

1. The loss phase

The loss phase of the actuator is divided the static and movement. In the “local control” mode, you operate the actuator; If the “loses phase” is presented immediately it is the static loss phase; or if the “loses phase” is presented late 1~2 seconds, it is the movement loss phase.

1.1 The reason and process of the static loss phase

Reason 1: one loss phase of three phases power for the actuator

Process 1: to check-up the voltages of the terminal box of the actuator, and eliminate the loss phase.

Reason 2: fallibility of the links in the actuator

Process 2: to re-connect the links in the actuator

Reason 3: element damages on the power board in the actuator

Process 3: to change the power board in the actuator

1.2 The reason and process of the movement loss phase

Reason 1: fallibility of the links in the actuator

Process 1: to re-connect the links in the actuator

Reason 2: the ac contactor damages in the actuator

Process 2: to change the ac contactor in the actuator

Reason 3: the motor damages in the actuator

Process 3: to change the motor in the actuator

Reason 4: element damages on the power board in the actuator

Process 4: to change the power board in the actuator

2. The Motor Stalled

Reason 1: the electric/Hand-wheel clutch lever of the actuator Lock to die.

Process 1: after to reset the actuator using Setting Tool, to operate electrically the actuator and turn the hand-wheel at the same time, and to ensure the clutch to the electric operation position.

Reason 2: the ac contactor damages in the actuator

Process 2: to change the ac contactor in the actuator

3. Power Down

Reason 1: the fault of power source of the user.

Process 1: to inspect the power source and remove the fault.

Reason 2: the fuse damages on the power board in the actuator

Process 2: to change the fuse

Reason 3: the transformer damages in the actuator

Process 3: to change the transformer in the actuator

Reason 4: fallibility of the links in the actuator

Process 4: to re-connect the links in the actuator

4. Temperature Over

Reason 1: the motor turns for long time, the temperature of motor is over 130°C.

Process 1: to suspend the motor turn, and to resume the motor turn after the temperature drop to 90°C.

5. Close Torque Over

Reason 1: the protection value for torque trip is little small.

Process 1: to increase the protection value for torque trip by using the Setting Tool.

Reason 2: the type selecting of the actuator does not match with the condition on-the-spot

Process 2: to change the actuator for suitable type

Reason 3: the transformer damages in the actuator

Process 3: Outside has the factor that obstructs normal operation

6. Open Torque Over

Reasons and process are similar with Close Torque Over.

7. Valve Position Overrun

Reason 1: the valve position value for the actuator is lost.

Process 1: to reset the actuator with Setting Tool and set the Limit close position and the Limit open position again.

8. Valve Position Under-run

Reasons and process are similar with Valve Position Overrun.

9. The remote mode not to control

Reason 1: the mode selection knob (red knob) not placed at the remote position.

Process 1: to place the mode selection knob at the remote position.

Reason 2: element damages on the knob board in the actuator

Process 2: to change the knob board in the actuator

Reason 3: fallibility or incorrect of the links of the terminal box of the actuator in the actuator

Process 3: to check-up the links and ensure the links correct

10. The abnormal of the display after power on

Reason: the actuator is not reset Reliably after power on.

Process 1: to reset the actuator with Setting Tool.

Process 2: to cut off the actuator's power source, and take out it's battery, after waiting 15~20 minutes,to power on again.

Process 3: to change the main control borad in the actuator

11. The exterior of the actuator seeps oil

Reason: the Oil tie screw of the actuator looses.

Process 1: to tight firmly the screw and apply to wipe oil stain.

About us:

On the road of the progress, we keep to the guidelines of "Prospering with quality, rooting with science and technology" all along, also we can grasp a new direction in market development accurately, innovate continuously and exploit bravely! We continuously hanker for the better knight service and satisfy the consumers' needs farthest!

With an emphasis on supreme technology, the Hurko Science and Technology CO.,LTD is a manufacturer of the intelligent electric actuator that focuses on research & development, production, sales and customer service. We have abundant technology strength, advanced manufacture technics, and perfect machining and test equipment. Our intelligent actuators are provided with excellent quality, high capability & low price and simple manipulation. In the all-over world actuator domain our product is in the one-up status. It is introduced into from the foreign techniques. By our abstraction and amelioration our electric actuator is excogitated. It is a supernal, pithy and top end intelligent product nowadays. It adopts the super large-scale integration, so it has powerful functions and steady performance. Our actuator has the LCD of the Chinese or English menu. It is the mechanical and electric integrative product assembled with intelligent, efficient and human performance.

Our company has the advanced machining equipments and a lot of professional persons with ability in automatization, instrumentation, machine design, motor design and so on. These offer powerful sustainment and guarantee for the quality and performance of the "Hurko®" electrical actuator. Our electric actuator is widely used in the domain of the power station, petroleum, paper-making, chemical plant, refinery, water disposal and so on. Many consumers have already approbated and loved our electric actuator.

Our company has research and development department, technology department, sales department, examination department, production department, personnel department, logistics department and so on. Every department has executed the quality system certificate of ISO9001:2000. In our company, every working-procedure is held the pass strictly. On the road of the progress, we all along make great efforts!

The excellence of our intelligent electric actuators owing to our high-precision numerical-control equipments, high-exactitude detection instruments, high-tech, strict quality management system, professional persons, and high-level science and technology strength! On the road of the progress, we are all along with all our hearts!

If you want to know more about us, please access our web-site [Http://www.hurko.cn](http://www.hurko.cn) .

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