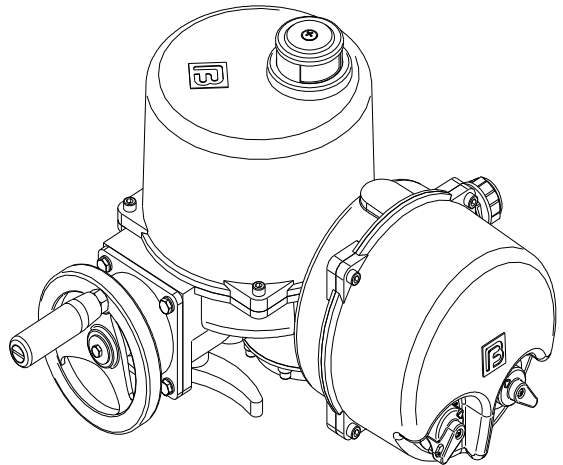


810 SERIES ELECTRIC ACTUATORS WITH CONTROL PACKAGE

INSTRUCTION MANUAL

This manual should be used together with
《810 series electric actuators instruction manual》.



TIANJIN BEIFANG VALVE ACTUATOR CO., LTD.

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Thank you for purchasing and using our products. This manual is valid for the control package of 810 series electric quarter-turn actuators.

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Warnings and notes

Non-observance of the **warnings** and **notes** may lead to serious injuries or damages. Qualified personnel must be thoroughly familiar with all **warnings** and **notes** in these operation instructions.



This sign means: Hint!
Explain the topic in detail.



This sign means : Note!
Non-observance of these notes may lead to the blight to products or the failure of operation.



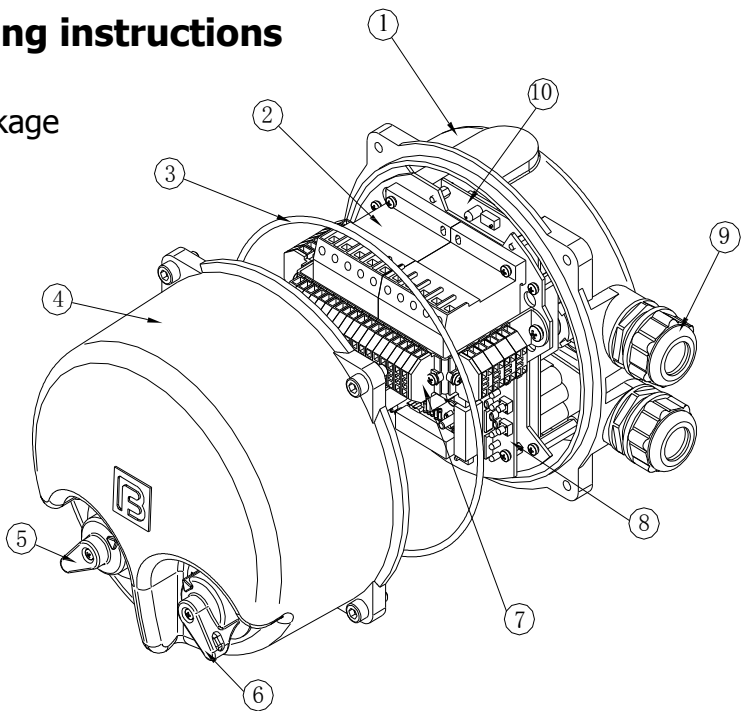
This sign means : **Warning**!
If not carried out the "warnings" correctly can affect the safety of persons or material.

Please tell us some information about your product when contact with us:

Model, Factory Number, Production Date, etc.

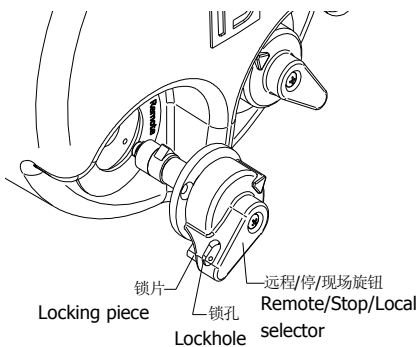
1. Functions and operating instructions

1.1 Structure of the control package



1	Control box	6	Local control knob
2	Components group	7	Terminal strips
3	Seal ring	8	Regulating module
4	Package cover	9	Cable connector
5	"Local/Stop/Remote" selector	10	Functional module

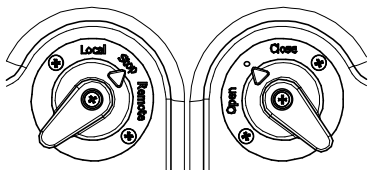
1.2 Control knob



The package cover ④ is equipped with a "Local/Stop/Remote" selector ⑤ and an open/stop/close local control knob ⑥. The selector in three positions can be locked to prevent from mistaken operation.

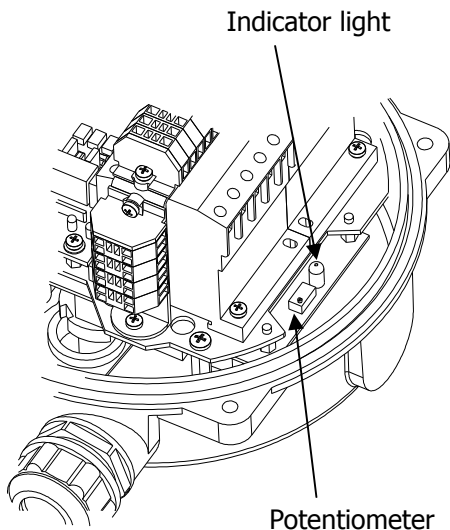


The selector ⑤ can be locked when push in the locking piece.



- When the selector ⑤ is in "Remote", the Local control knob ⑥ doesn't work and the product is in the remote operation condition.
- When the selector ⑤ is in "Local", turning the local control knob ⑥ may control the actuator in site.
- When the selector ⑤ is in "stop", the actuator can't be remote or local operated.

1.3 Functional module



The functional module with functions of sequence identification, missing-phase protection and over-current protection consists of transformer, relay, singlechip, unicircuit, etc.

•Sequence identification and missing-phase protection **(only for three-phase power products)**.

The functional module real-time monitor the power sequence and missing-phase fault. Once the fault appears, the module will cut off the control circuit, at the same time prompt the fault type by function indicator.

•Over-current protection

Motor stall or other reasons may lead to motor current rising rapidly and even burning motor. The functional module real-time monitor the line current of the motor. When the current exceeds the control value and for one second, the module will judge to be the over-current fault and cut off the control circuit, at the same time prompt the fault type by function indicator.

 The functional module will re-test after 10 minutes of over-current protection. If the fault has been ruled out, the actuator will be back to normal work.

 The potentiometer in the functional module is for setting the current control value, which was set at the factory. Please don't adjust this value freely, so as not to affect the normal use.

• State table of function indicator:

Fault type	State of indicator
Normal	Lights.
Misphase	Flashes twice continuously.
Loss of phase	Intermittent flashes.
Over-current	Flashes three times and intermittent once.
Other faults	Does not light.

 When the actuator is energized the first time, the functional module tests for 3 seconds and the indicator flashes 3 times, then the actuator begins to work properly.

1.4 Regulating module

1.4.1 Major function



The regulating module is only mounted in the regulating product.

The module proportional control the valve by receiving 4~20mA (or 0~5V) signal. With embedded CPU system, the module has features of high precision, rich functions and great applicability.

- **Auto-adjusting the accuracy**

According to its own parameters, the valve position signal, the control input signal and the mechanical error, the module auto-adjust the tracking accuracy by optimization.

- **Adjustable sensitivity**

There are 16 grades to signal responding range ($\pm 0.5\%$, $\pm 1\%$, $\pm 1.5\%$, $\pm 3\%$, $\pm 4\%$, $\pm 5\% \sim \pm 15\%$), the bigger the value, the lower sensitivity you get. Users may set it according to control need.

- **Off signals protection** (Note: 0~5V input signal has no this function)

The input signal of less than 3mA is judged to be signal loss, which will lead to system out of control, and even cause catastrophic accidents. The module has the function of off signal protection, and there are four choices in case of signal loss: keep in place, full open, full close, middle position. **The factory setting is keeping in place.**

- **Running delay protection**

The current shock of motor caused by instant start and stop leads to the lack of tracking precision. The setting of running delay protection is to reduce the lack and overcome the effect of inertia of actuators. The delay time can be set to 2S, 3S, 4S and 5S. **The factory setting is 4S.**



If users need to modify it, the running delay time should be set greater than the inertia stopped time of actuators, otherwise it may lower control accuracy although it can increase the response speed of the module.

1.4.2 Technical data

	Item	Details
1	Control signal	4~20mA(or 0~5V), input impedance is 250 Ω
2	Output signal	Isolated 4~20mA, load capacity $\leq 450 \Omega$
3	Sensitivity	$\pm 0.5\%$, $\pm 1\%$, $\pm 1.5\%$, $\pm 3\%$, $\pm 4\% \sim \pm 15\%$, 16 grades could be set.
4	Control accuracy	Adaptive adjustment of precision.
5	Running delay time	2S, 3S, 4S, 5S could be set.

1.4.3 Settings and calibration



This module with strong and weak electricity must only be installed in accordance with the applicable rules by electricians who possess electrician safe operation permits.



The module must be set after the setting of the limit switch and the position indicator of the actuator (please refer to the instruction manual provided with the valve actuator).



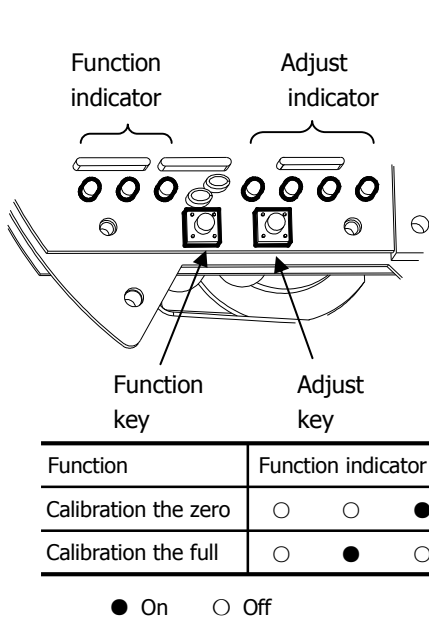
Set the module together with the operation of the actuator. When the selector of actuator is in "Local", the module can only output 4~20mA valve position signal; When the selector is in "Remote", the module can trace the input signal and analog regulate the valve position. (Note: According to the different wiring diagram, when the actuator is in "Remote" state, the inputting mode could be manual or auto, the module can only work properly in "auto" mode.)



If the users need to replace the module, please connect wires correctly according to the wiring diagram supplied with the actuators.



The zero and full must be calibrated before the module putting into work, and the full must be calibrated after the calibration of zero.



Calibration steps

(The output signal 4mA corresponds to zero, 20mA corresponds to full.)

- Calibration the zero

Fully close the valve, then press the function key to make the function indicator light as "Zero calibration" state, then press the adjust key until the four adjust indicators flash and the zero calibration is finished. At this time the output signal is 4mA.

- Calibration the full

Fully open the valve, then press the function key to make the function indicator light as "Full calibration" state, then press the adjust key until the four adjust indicators flash and the full calibration is finished. At this time the output signal is 20mA.

- Return to auto working state

Press function key until the first indicator next to the function key flashes, or without pressing any key for 30s, the module will automatically return to the auto working state.

 The module can finely tune the output signal: Set the slide switch SW1 to ON and the adjust indicators lighting shows the calibration is finished and the fine-tuning can be carried out, here the function and adjust keys are turned to "+" and "-" keys. Press the function key to slightly increase the output signal and press the adjust key to slightly reduce the output signal until outputting 4mA/20mA. Set the slide switch SW1 to OFF to finish the zero/full fine-tuning.

 After calibration and parameter setting, before the actuator putting into use, the necessary adaptive operations are suggested to run to adapt to inertia effect of different actuators (or the error is bigger during the several initial use).
Set the actuators in "Remote" state, then input control signal (e.g. 10mA ~ 15mA) to make the valve run in a reciprocating way at least four times.

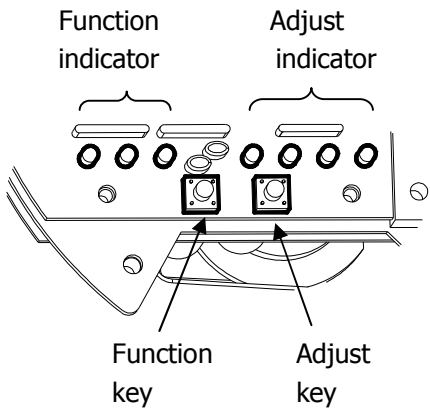
1.4.4 Advanced settings

 Users can further flexible use the module by setting the parameters.

 Please make sure that the operators are familiar with all parameters before the advanced settings, or else normal operation of the actuator could be affected.

Setting steps

- ① Unlock first : In the normal, pressing adjust key makes three function indicators light and the four adjust indicators light after 5s, thus open the parameter setting function.
- ② Press Function key repeatedly to make the three function indicators show the state of setting the parameter.
- ③ Press Adjust key repeatedly to make what the four adjusting indicators show meets the setting need.
- ④ Repeat the above steps to set other parameters.
- ⑤ End of the parameter setting: Press Function key until to auto working state, or automatically exit to auto working state without pressing any key for 30s.



Setting parameters	Function indicator	Adjust indicator	Setting value
Off signal protection (Set the valve movement in case of off signals.)	● ○ ○	● ○ ○ ○	Set to full open.
		○ ● ○ ○	Keep in place.
		○ ○ ● ○	Set to full close.
		○ ○ ○ ●	Set to middle position.
Delay (The delay time of re-start the motor.)	● ● ○	● ○ ○ ○	2s
		○ ● ○ ○	3s
		○ ○ ● ○	4s
		○ ○ ○ ●	5s
Open mode	● ● ●	● ○ ○ ○	4mA open, 20mA close.
		○ ○ ● ○	4mA close, 20mA open.
Sensitivity (The minimum difference between the input signal to start the valve and the valve position signal.)	○ ● ●	○ ○ ○ ○	0.5%
		○ ○ ○ ●	1%
		○ ○ ● ○	1.5%
		○ ○ ● ●	3%
		○ ● ○ ○	4%
		○ ● ○ ●	5%
		○ ● ● ○	6%
		○ ● ● ●	7%
		● ○ ○ ○	8%
		● ○ ○ ●	9%
		● ○ ● ○	10%
		● ○ ● ●	11%
		● ● ○ ○	12%
		● ● ○ ●	13%
		● ● ● ○	14%
		● ● ● ●	15%

Indicators status: ● On ○ Off

1.4.5 Factory default

If the factory settings are need to be restored, long press the function and adjust keys at the same time while all indicators light until all indicators go out after 10s.

The factory settings are:

Sensitivity	Off signal	Delay time	Open mode
1.5%	Keep in place	4S	4mA close

2. Installation and debugging



Installation with control package's underside should be avoided or the reliability and life time of the contacts will be reduced.



Open the package cover carefully to avoid damaging switches or terminals for the control knob is wiring the terminal strip.



Disconnect all incoming power to the unit prior to opening the package cover.



Work on the electrical system or equipment must only be carried out by an electrician who possess operating certificate and operate in accordance with the applicable electrical engineering rules.

When finish installation, connect wires according to the wiring diagram supplied with the unit.

- Wire connection

Connect the wire to the terminal strip according to the wiring diagram. The connection is finished if the wire can't be pulled out.

- Debugging

Calibration the zero and full is necessary before the regulating actuator is used. Please refer to the section 1.4.3 for the calibration steps.

 Tianjin Beifang Valve Actuator Co., Ltd

Address : Yi Xing Fu Science & Technology
Area Beichen District, Tianjin 300410, China
Tel: (022) 26308907 26309159

Fax: (022) 26300975

<http://www.tj-beifang.com>

e-mail: bf@tj-beifang.com

