

**Intelligent Non-Invasive Electric Actuator**  
**Electronic control module debugging**  
**instructions**

（智能非侵入型电动执行器  
电控组件调试说明）

Version V21

（版本 V21）

# 1 Summary (概述)

This component can receive the DCS system on-off signals (passive dry contact of active, active 24 v, 220 v, keep running can switch) or analog signals (DC4-20 ma, 0 to 10 v, etc.), direct drive electric actuators switch action or adjust the action. Output DC4-20 ma feedback current and contact/remote control state instructions. The component integration the servo control unit, solid-state drive unit, liquid crystal display unit, knobs and other ancillary units and aluminum shell assembly operation. The product operates as a fool camera is simple, like intelligent perfect protection function.

(智能非侵型可接收 DCS 系统中 PLC 等控制器发出的开关量信号(无源干触点、有源 24V、有源 220V, 点动保持可切换)或模拟量信号(DC4~20mA、0~10V 等), 可直接驱动, 也可通过接触器或固态继电器驱动电动执行器动作。输出 DC4~20mA 反馈电流和四个继电器触点(开位、关位、远控、故障报警)。该组件集成了伺服控制单元、液晶显示单元、旋钮操作等单元。本产品操作简单, 保护功能完善, 是您重新定义高品质和智能型的最佳选择。)

## 2 Operating Instructions (操作说明)

### 2.1 Knob Operating Instructions (旋钮操作说明)

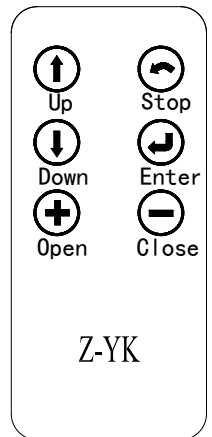
The red knob is the mode button, can be switched between Local/Stop/Remote. Or in a set state, to save the menu contents (from the stop bit screwed to the site) or to exit the menu (from the stop bit screwed into the remote).

Black knob for the operating button can be opened or closed operation at the local. Or to plus or minus in the set state.

With button operation, short time effect for the inching mode. When the operation button is effective for more than 3 seconds, in the lower right corner of the LCD, the **bc** is displayed automatically entered into the hold mode. When actuator movement, click the action button reverse rotation or spin mode button to **Stop**, the actuator stops.

(红色旋钮为方式钮, 可在现场/停止/远方之间切换; 或在设定状态实现菜单的**保存**(从停位旋到现场)和**退出**(从停位旋到远方)。

黑色旋钮为操作钮, 可在现场模式进行打开或关闭操作, 或在设定状态进行加减设置。现场旋钮操作时, 短时间作用为现场<sub>2</sub>点动模式, 当操作钮有效作用时间超过 3



秒钟后报警区显示“bc”为自动进入现场保持模式，反向旋操作钮或将方式钮旋到停止，即停止动作。)

## 2.2 setting tool description (setting tool are optional, need to please when ordering special instructions) (遥控器操作说明 (遥控器为选配件，需要时请在订货时特殊说明))

"Up" button = Open calibration key

"Down" button = close calibration key

"Enter" button = Confirm key or Save key

"Stop" button = stop key

"Open" button = open key

"Close" button = close key

Up --开位标定键

Down --关位标定键

Enter --确认/保存键

Stop --停止/退出键

Open --现场打开键

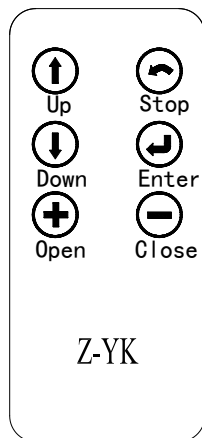
Close --现场关闭键

When mode button at **Local** location, press "**Open**" button to perform open, press "**Close**" button to perform off. In the action, press the "**Stop**" button to stop the move

In local mode, even by three "Up" key to enter the open position calibration status, "Open", "Close" and "Stop" keys to control the electric actuator to open, close and stop, "Enter" key to save the trip, "Stop" key is used to return.

In local mode, even by three "Down" key to enter the closed position calibration status, like the rest of the operation as above.

(在现场方式时，按“Open”键执行保持方式开阀，按“Close”键执行保持方式关阀，按“Stop”键停动。现场方式，连接三次“Up”键进入开位标定状态，“Open”、“Close”、“Stop”键可控制电动执行器开、关、停，“Enter”键用于保存“Stop”键用于返回。现场方式，连接三次“Down”键进入关位标定状态，其它操作同上。)



## 3 Signal query (LCD lower left corner for a signal check area)

(信号查询 (显示屏左下角为信号查询区))

### 3.1 Remote control signal inquiry (远控信号查询)

When the mode button is screwed into the Remote, the remote control signal received is displayed in the lower-left corner of the LCD. Switch type: show OP represents a open signal, show CL represents a close signal, show BC represents a keep signal (multi state of coexistence of alternate display). Regulating type: to display the received control current value or voltage value.

（方式钮旋到远方，在显示屏的左下角显示接收到的远控信号。开关型：**OP** 代表有远方打开；**CL** 代表有远方关闭；**bc** 代表有远方保持（多状态并存时交替显示）。调节型：显示收到控制电流值或电压值。）

### **3.2 Valve position signal query（阀位信号查询）**

When the mode button is screwed onto the Local, the LCD shows the valve position signal in lower left corner. When using a potentiometer, show the percentage of resistance (d01 ~ d99); When using 12 encoder, shows the percentage of the encoder (b01 ~ b99); When using 18 encoder, display micrometer ratio of the encoder (001 to 999).

（方式钮旋到现场，显示屏左下角显示阀位信号。阀位采集为电位器时显示阻值的百分比（d01~d99）；阀位采集为 12 位编码器时显示编码器的百分比（b00~b99）；阀位采集为 18 位编码器时显示编码器的千分比（000~999）。）

## **4 Stroke calibrations（行程标定）**

### **4.1 Calibration for close limit（关位标定）**

The mode button at the Stop position, the rotary operation knob to the Close position for about 3 seconds, until the letter L is flashing of the LCD to release operation button, then the mode button to the Local position, now letter L no longer flashes and the system into the closed position calibration status. The actuator can open or close by the operating button. When the actuator operates to the closed position, then the mode button to spin the Stop position, and back to the Local position, at this time the red LED flashing two times said the closed position calibration is completed. If the mode button is screwed to the Remote position from Stop position, that exit travel calibration.

（停止位置旋操作钮至关闭约 3 秒钟，等到闪烁显示字母 L 时松开操作钮并将方式钮旋到现场，此时 L 不再闪烁表示进入**关位标定状态**。可通过操作钮执行电动开或电动关动作，调整到关位后将方式钮旋到停止再旋回现场，此时红灯和字母 L 闪两次，输出 4mA 反馈电流、显示 0%表示关位标定完成。若方式钮由停止旋至远方则直接退出行程标定。）

### **4.2 Calibration for open limit（开位标定）**

The mode button at the Stop position, the rotary operation knob to the Open position for about 3 seconds, until the letter H is flashing of the LCD to release operation button, then the mode button to the Local position, now letter H no longer flashes and the system into the open position calibration status. The actuator can open or close by the operating button. When the actuator operates to the open limit position, then the

mode button to spin the Stop position, and back to the Local position, at this time the green LED flashing two times said the open limit position calibration is completed. If the mode button is screwed to the Remote position from Stop position, that exit travel calibration.

(停止位置旋操作钮至打开约 3 秒钟, 等到闪烁显示字母 H 时松开操作钮并将方式钮旋到现场, 此时 H 不再闪烁表示进入**开位标定状态**。可通过操作钮执行电动开或电动关动作, 调整到开位后将方式钮旋到停止再旋回现场, 此时绿灯和字母 H 闪两次, 输出 20mA 反馈电流、显示 100%表示关位标定完成。若方式钮由停止旋至远方则直接退出行程标定。)

**Note: When you save a stroke, display Fu or Fn characters on the LCD, please re-adjust potentiometer or rotary encoder range, and recalibrate the trip.**

(注: 保存行程时, 出现 Fu 或 Fn 报警时, 请重新调整电位器或编码器的旋转区间, 并重标行程。)

## **5 Feedback current trimming (输出电流微调)**

### **5.1 Feedback current 4mA trimming (4mA 输出电流微调)**

The mode button at the Stop position, the rotary operation knob to the Open position for about 10 seconds, until the letter LF is flashing of the LCD to release operation button, then the mode button to the Local position and back to the Stop position, and the system into the 4mA current trimming status. At this point, the size of the output current can be adjusted by the operating button. When adjusting the output current reaches 4mA, then mode button to spin the Local position, this time the red LED flashes three times, said 4mA output current trim is complete. If the mode button to Stop position from Remote position, which exit status of the output current trim.

(停止位置旋操作钮至关闭约 10 秒钟, 等到闪烁显示字母 LF 时松开操作钮并将方式钮旋到现场再旋回停止, 即进入 4mA 输出电流微调状态。此时可通过操作钮调整输出电流的大小, 调整输出电流达到 4mA 后将方式钮旋到现场, 此时红灯闪烁三次表示 4mA 输出电流微调完成。若方式钮由停止旋至远方则直接退出输出电流微调状态。)

### **5.2 Feedback current 20mA trimming (20mA 输出电流微调)**

The mode button at the Stop position, the rotary operation knob to the Open position for about 10 seconds, until the letter HF is flashing of the LCD to release operation button, then the mode button to the Local position and back to the Stop position, and

the system into the 20mA current trimming status. At this point, the size of the output current can be adjusted by the operating button. When adjusting the output current reaches 4mA, then mode button to spin the Local position, this time the green LED flashes three times, said 20mA output current trim is complete. If the mode button to Stop position from Remote position, which exit status of the output current trim.

（停止位置旋操作钮至打开约 10 秒钟，等到闪烁显示字母 HF 时松开操作钮并将方式钮旋到现场再旋回停止，即进入 20mA 输出电流微调状态。此时可通过操作钮调整输出电流的大小，调整输出电流达到 20mA 后将方式钮旋到现场，此时绿灯闪烁三次表示 20mA 输出电流微调完成。若方式钮由停止旋至远方则直接退出输出电流微调状态。）

## 6 About dead zone（死区设置）

The dead zone to adapt automatically, without setting can ensure that in any conditions without oscillation, and the positioning precision is higher.

（死区为自调整，无需设置，且精度更高无振荡）

## 7 Advanced Settings（高级设置）

**NOTE: All the Advanced Settings can be set after the mode button in the "Local" position. Advanced settings must open the electrical box cover and you can operate. The Close Key and Open Key mentioned below are in the electronic control board.**

（注：高级设置时，需电源断电，方式钮在停止位置；红灯（关位灯）、绿灯（开位灯）、关位键、开位键在线路板上。）

**7.1 Action when the control current loss:** (Only positioning type, default: Remain in Situ) 丢信动作（仅调节型有此设置，默认设置——丢信保位）

**7.1.1** To press the “**Close Key**” and power up for 3 seconds until the red LED on the board is lit. And you release the key, then the red LED flashes three times; the “**Full Close**” setup is completed.

**7.1.2** To press the “**Open Key**” and power up for 3 seconds until the green LED on the board is lit. And you release the key, then the green LED flashes three times; the “**Full Open**” setup is completed.

**7.1.3** Simultaneously press two keys and power up for 3 seconds until the green and red LED on the board are lit. And you release the two keys simultaneously, then the two LED flashes three times; the “**Remain in Situ**” setup is completed.

（按下关位键上电约 3 秒钟，红灯第一次亮释放按键，红灯闪烁三下，丢信关设置完成；按下开位键上电约 3 秒钟，绿灯第一次亮释放按键，绿灯闪烁三下，丢信开设置完成；同时按两按键上电约 3 秒钟，两灯同亮释放按键，两灯同闪三下，丢信保位设置完成。）

## **7.2 Control current calibration:** (Only positioning type) (控制电流标定 (仅调节型有此设置))

**7.2.1** To send 4mA control current to the module from the outside, press the “**Close Key**” and power up for 10 seconds until the red LED on the board is lighted second times. And you release the key, then the red LED flashes three times; and the 4mA calibration is completed.

**7.2.2** To send 20mA control current to the module from the outside, press the “**Open Key**” and power up for 10 seconds until the green LED on the board is lighted second times. And you release the key, then the green LED flashes three times; and the 20mA calibration is completed.

（输入 4mA 电流，按下关位键上电约 10 秒钟，红灯第二次亮释放按键，红灯闪烁三下标定完成。输入 20mA 电流，按下开位键上电约 10 秒钟，绿灯第二次亮释放按键，绿灯闪烁三下标定完成。）

## **7.3 Polarity for the control current:** (Only positioning type, default: 20mA = Full Open) 正反作用 (仅调节型有此设置，默认设置——正作用)

Simultaneously press “**Open Key**” and “**Close Key**” and then power up for 10 seconds. To release the key after the red LED and green LED second lights up. Short press “**Open Key**” or “**Close Key**” to alternately lit red LED or green LED. The red LED light represents “**20mA = Full Open**”, the green LED light represents “**4mA = Full Open**”. Simultaneously press “**Open Key**” and “**Close Key**” for 3 seconds. To release two keys after the two LEDs lights up. Then corresponding LED flashes three times, the **polarity for the control current** setup is complete.

（同时按下两按键上电约 10 秒钟，两灯第二次亮释放按键。红灯亮为正作用，绿灯亮为反作用。短按任意键进行切换，同时按下两按键约 3 秒钟两灯同亮释放按键，

对应灯闪烁三下设置完成。)

## 7.4 Two-Wire Control: (Only on-off type, default: **Disable**)

**两线控制设置** (仅开关型有此设置, 默认设置---常规控制)

### 7.4.1 Close First (关优先)

You press “**Close Key**” and then power up for 10 seconds. The key is released after the red LED second light up. And the red LED flashes three times, this setup is complete.

This **Close First** refers to the actuator close operation when voltages signal on the “**Remote Close**” terminal of the actuator. But no voltage signal, actuators open operation.

When wiring, “**Remote Open**” terminal connected to 24V +.

### 7.4.2 Open First (开优先)

You press the “**Open Key**” and then power up for 10 seconds. The key is released after the green LED second light up. And the green LED flashes three times, this setup is complete.

This **Open First** refers to the actuator open operation when voltages signal on the “**Remote Open**” terminal of the actuator. But no voltage signal, actuators close operation.

When wiring, “**Remote Close**” terminal connected to 24V +.

### 7.4.3 Disable (常规控制)

You press the two keys simultaneously and then power up for 10 seconds. The key is released after the two LEDs second lights up. Then the two LEDs flashes three times, this setup is complete.

(按住关按键上电约 10 秒钟, 红灯第二次亮时释放按键, 红灯闪烁三下设置为 “有信关无信开”; 按住开按键上电约 10 秒钟, 绿灯第二次亮时释放按键, 绿灯闪烁三下设置为 “有信开无信关”; 同时按两按键上电约 10 秒钟, 两灯第二次亮时释放按键, 两灯闪烁三下设置为 “常规控制”。)



## 7.5 Close direction: Clockwise /Anti-clockwise (default: Clockwise)

关闭方向(默认设置——顺时针)

You press the “Open Key” and “Close Key” simultaneously and then power up for 20 seconds. The keys are released after the red LED and green LED third lights up. Short press “Open Key” or “Close Key” to alternately lit red LED or green LED. Red LED light represents “Clockwise”, green LED light represents “Anti-clockwise”. You press the two keys simultaneously for 3 seconds. The keys is released after the two LEDs light up. Then corresponding LED flashes three times, the **Close direction** setup is complete.

(同时按下两按键上电约 20 秒钟，两灯第三次亮释放按键。红灯亮为顺时针，绿灯亮为逆时针。短按任意键进行切换，同时按下两按键约 3 秒钟两灯亮释放按键，对应灯闪烁三下设置完成。)

## 8 Alarm description (error code displayed on the LCD in the lower right corner)

报警信息说明 (显示屏右下角为报警区)

Fault code	Fault information
FA	Actuator running direction error
Fu	Valve position potentiometer or encoder Angle is too large
Fn	Valve position potentiometer or encoder Angle is too small
FP	Power phase
FF	Broken valve position potentiometer, rotary to blind or pick the wrong line, or encoder failure.
FC	Over closed torque
FO	Over open torque
FH	Remote control signals to open and close signals exist (only on-off type)
FS	Control current signal is lost (only positioning)
Fb	Current control signal calibration error(only positioning)
Fd	Stall or other causes the valve position does not change

<b>FL</b>	Limit contact line or torque contact line reversed
<b>FE</b>	The motor is too hot or the torque public terminal is open

故障码	故障信息
FA	转向出错
Fu	阀位电位器或编码器转角过大
Fn	阀位电位器或编码器转角过小
FP	电源缺相
FF	阀位故障（电位器开路、接线错或编码器故障）
FC	关过矩
FO	开过矩
FH	远控开、关信号同在
FS	DC4-20mA 远控信号丢失
Fb	比例标定错误 Fb 闪烁 3 次
Fd	堵转或其它原因导致的阀位不变化
FL	限位开关、力矩开关接线反或开路
FE	电机温度开关断开或力矩公共端开路

## 9 Common problems to deal with (常见问题处理方法)

Power LED is not lit or digital display does not show	1. Power is not actually access. 2. voltage is too low 3. Wiring fault. 4. Module bad
LEDs and digital display abnormal	1. See fault code.2. Query information.3. Replace the module
After power on ,actuator can be not control in the LOCAL and REMOTE mode	1. Wiring fault or loose wiring. 2. Fault Protection. 3. Motor bad or stuck. 4. Bad start capacitor. 5. module bad
LOCAL mode work is normal but the REMOTE mode can't control	1. No signal or junction anti- , 2. Bad or no knob plate in Remote 3. Positive / reaction set wrong. 4. Module bad
REMOTE mode work is normal but the LOCAL mode can't control	1. Not in LOCAL mode. 2. Knobs board bad or not at the scene mode. 3. Operation button is not properly screwed in place
Actuator can open but not close or can close but not open	1. Torque wiring fault or loose wiring. 2. to limit position or over torque 3. Motor bad or stall or wiring fault. 4. Module bad
The action immediately after power on	1. Wiring fault. 2. control signal is present 3. Implementation the action when the control current loss 4. Set the wrong. 5. module bad
The middle position can move but to the limit position does not move	1. Reverse limit switch line. 2. Motor bad or loose wiring 3. Module bad
The direction of movement is the anti	1. Motor lines reversed. 2. Anti valve calibration. 3. Signal Reverse 4. Polarity for the control current or closing direction set wrong.
No output current or sometimes no	1. The output wiring fault or bad. 2. Module bad 3. potentiometer wiring fault or loose wiring
Feedback current is larger or smaller or unchanged	1.Potentiometer failure. 2. Calibration error. 3. module bad 4. potentiometer meshing with drive gear not well

Note: Please strictly in accordance with the wiring diagram electrical wiring connection.

通电指示灯和显示屏 不显示	A. 电源实际未接入 B. 电压过低 C. 接线错 D. 电路坏
工作中灯和显示屏 显示异常	A. 故障码 B. 查询信息 C. 指示灯或显示屏坏需更换电路
通电现场和远控 均不动作	A. 接线错或开路 B. 故障保护 C. 电机坏或卡死 D. 启动电容坏 E. 电路坏
现场工作正常 但远控不动作	A. 无信号或接线反 B. 旋钮板坏或没在远方 C. 正/反作用设错 D. 电路坏
现场不动作 但远控工作正常	A. 旋钮板坏或没在现场模式 B. 操作钮未旋到位 C. 电路坏
能开不能关 或能关不能开	A. 力矩接线错或开路 B. 到限位或过矩 C. 电机坏或堵转或接线错 D. 电路坏
无控制信号 通电立即动作	A. 接线错 B. 控制信号实际有效存在 C. 丢信动作 D. 设为两线控制 E. 电路坏
中间位置能动作 到限位不动	A. 力矩开关接线反 B. 恰巧到位电机坏或接线开路
动作方向反	A. 电机接线反 B. 阀位标定反 C. 正/反作用或关闭方向设反 D. 信号反
无输出电流 或时有时无	A. 输出接线错或接触不良 B. 电位器或编码器故障或接触不良 C. 电路坏
反馈电流偏大 或偏小或不变	A. 电位器或编码器故障 B. 标定错 C. 电位器与传动齿轮啮合不好 D. 电路坏

**注：接线请严格按照电气接线图连接。**

Like has the change, without notice

(如有更改恕不另行通知)