

YMD系列安装维护手册
YMD Range
Installation and Maintenance Instruction

电动执行机构
ELECTRIC ACTUATOR



天津市宝恒控制阀门有限公司
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目录

1: 相关安全事项	2
2: 运输与存储	3
3: 产品安装	3
4: 电器连接	4
5: 执行机构调整	7
6: 产品维护及故障处理	16

Contents

1: Terms concerned with safety	2
2: Transport and storage	3
3: Installation	3
4: Electric connection	4
5: Adjustment of actuator	7
6: Maintenance and troubleshooting	16



1: 相关安全事项

电动执行机构装备于大电流工作条件下的工业场所，在使用过程中，设备内部带有危险的、未经过绝缘的、裸露的电器零件，同时具有运动或旋转的机械部件。所有不经过授权的打开机壳、不恰当的使用、不正确的操作或维修都有可能伤害到人身安全或者造成财产的损失。

产品使用工厂的安全负责人员应该确保遵守以下内容

- 只有具备资质的工程师可以进行设备的安装调试
- 应该向经常操作使用设备的相关人员提供正确的操作手册及其它的相关设备文件，以确保他们在所有时间内都能遵循设备手册或文件的指导内容进行操作使用。
- 不具备相关资质的人员不允许操作设备或接近设备
- 注意设备可以使用范围的技术数据和技术参数（安装、连接、环境及使用条件），以上数据应该包括在产品样本、订货合同、操作手册中。用户应该在产品文件中保留产品铭牌的详细内容。

如果用户对产品有疑问，特别是对产品技术参数的疑问，可以通过我公司的销售部门进行确认。确认时请提供使用产品的铭牌数据及系列号。

1: Terms concerned with safety

The electric actuators are equipment which is intended for use in heavy current industrial plants. During operation, this equipment has dangerous, uninsulated live parts and moving or rotating parts. Serious damage to health or property can therefore result from unauthorized removal of the necessary covers, improper use, incorrect operation or inadequate maintenance.

Those persons responsible for plant safety must therefore ensure that

- Only qualified persons are instructed to perform work on the equipment
- These persons have constant access to the operating instructions supplied and all other product documentation that is applicable to the work being carried out and that they are instructed to observe this documentation at all times
- Unqualified persons are not permitted to work on the machines or in the vicinity of the machines
- The technical data and specification concerning the permitted use (installation, connection, ambient and operating conditions) which are included in the catalogue, order documentation, operating instructions, the details on the name and rating plate and the remaining product documentation

In the event of doubt, especially in cases of a lack of product-specific details, clarification must be obtained via our sales department. Please quote the product type and serial number in any correspondence.

2: 运输与存储

- 使用坚固的包装将电动执行机构运输到安装地点
- 不允许使用设备的手轮作为吊装位置
- 电动执行机构应该存储在干燥、通风良好的房间里
- 电动执行机构在一年中应该至少接通电源一次，以保证电容器充满电（防止电解液干枯）
- 设备要避免放置于潮湿地面，应置于货架托盘之上
- 应当保证电器密封盖密封紧密，即使电缆出口也要严格密闭

3: 产品安装

- 在安装电动执行机构之前应检查其外形及安装尺寸，安装时执行机构周围要留出足够的空间以便调试、操作及检修。同时要避免执行机构受到强烈震动。
 - 虽然执行机构本身具有防水外壳，但是不能侵入水中使用，如果安装位置可能长期受水冲刷，用户应考虑额外的防水措施。
 - 对于直连式法兰安装的设备，电动执行机构可以水平、垂直或倾斜安装。法兰尺寸符合ISO5216的设计标准。如果需要非标准的安装尺寸请及时于我公司联系。
 - 对于底座型安装的设备，电动执行机构通常建议水平安装。安装平面应平整。使用球形铰链或其它连接形式应该注意以下几个问题。
- ① 连接阀门的输出臂尺寸应该与电动执行机构的输出臂尺寸长度相同。
- ② 两个输出臂在安装时应保持平行并且在一个平面上。执行机构的机械零位应于阀门零位保持一致。

2: Transport and storage

- Transport equipment to the installation location in rigid packaging
- Do not attach lifting gear to the hand-wheel
- Store in a dry, well-ventilated room
- The actuators are to be connected the main supply at least once per year to fully regenerate the capacitor
- Protect against damp floors by storing on a shelf or palette
- Keep covers of the electrical control unit closed as well as the through-holes for cables

3: Installation

- Before installation, checked the configuration and dimensions of actuator. When the actuator is mounted, it should have enough space to manual operation, adjustment and inspection.
 - For flange mounted equipment, the actuator may be installed vertically, horizontally or inclined, the dimension of flange is keeping with the ISO 5216 standard. If it is non-standerd, please consult with us.
 - For foot-plate mounted equipment, the actuator recommend be installed horizontally. The installation plane should be smooth. The connection of actuator with valve can be realized by means of link lever or ball-joints. To pay attention to the following notes:
- ① The valve connective size of output arm in keeping with actuator`s.
- ② The two output arms should be mounted to keep parallel and keep in the same plane.

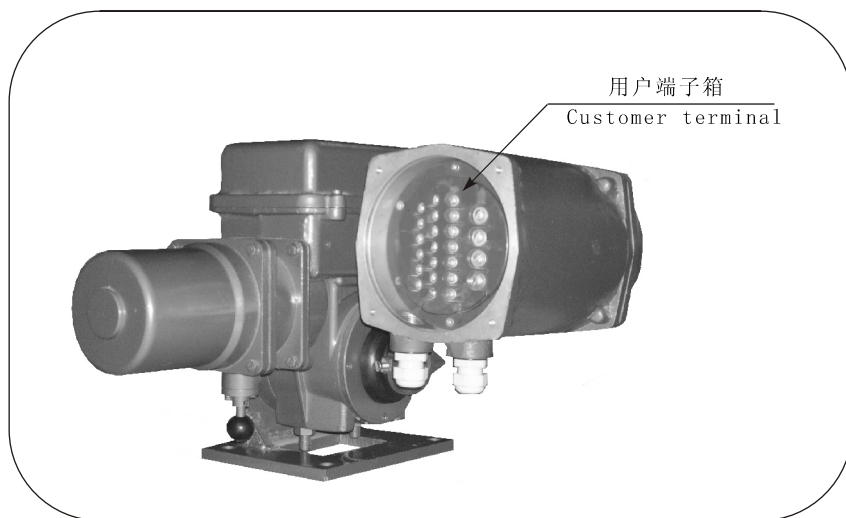


③ 两个球形铰链的张力作用点应在一个平面上，两个输出臂保持在平行平面以避免附加力矩。

④ 出于防锈及维修考虑所有与阀门的安装配合面应涂抹润滑脂，并且定期检查加油。

4: 电器连接

- 电动执行机构一旦正确接线，在所有接线端子上会带有危险的电压，请勿直接触摸端子区域，防止触电。
- 所有的电动执行机构控制元件均连接到接线端子排上，打开接线端子外盖，通过电缆接线孔将电缆引入执行机构并接到端子排上。在接线前请检查电源电压是否与产品的铭牌相符合，按照接线图的正确接线。接线后，通过手轮将执行机构旋转到中间位置，通电检查执行机构的旋转方向是否正确。



③ The tension point of two ball-joints is keeping same plane, it is necessary to keep parallel with the plane of two output arms, to avoid the additional torque.

④ For the rust proof and convenient maintenance to coat the grease on the mounted plane when the actuator connected with valve.

4: Electric connection

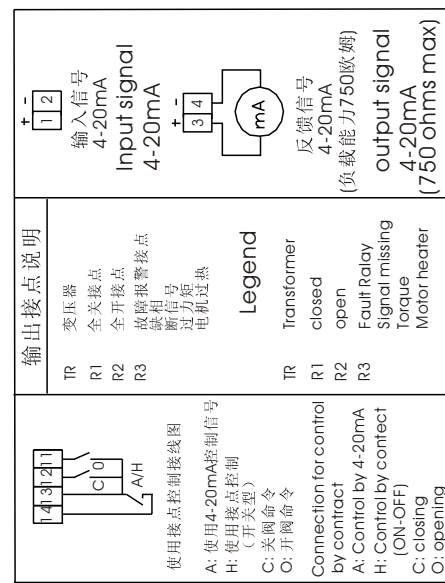
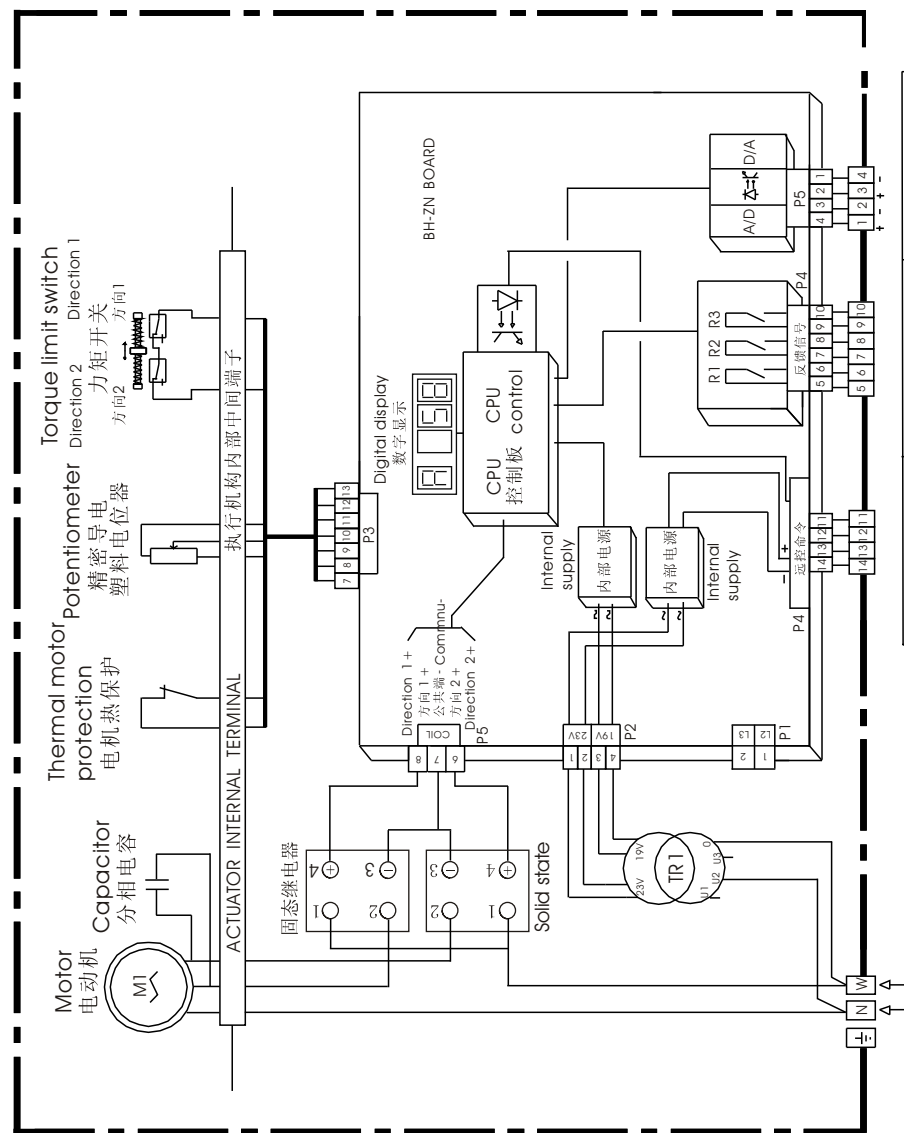
- DANGER: The component are designed such that once correctly connected, uninsulated, live parts cannot be touched directly in the terminal area. Protection against electric shock is provide.
- All actuator control elements are wire to a terminal strip in the switch compartment. Remove the cover and insert the cables through the cable glands in order to reach the terminal strip. The connections are made in accordance with the diagram. Before beginning this procedure, make sure that power supply voltage is in accordance with the actuator nameplate. After the terminal connections have been made, move the valve manually to the half-open position and verify proper rotation electrically.



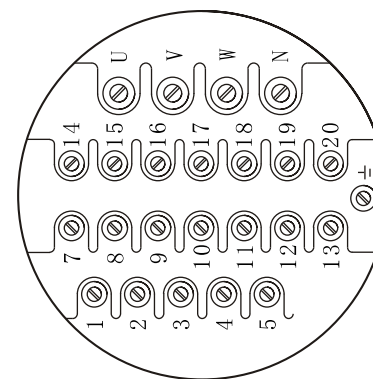
● YMD 系列相关的接线图

● Wiring diagram of YMD range

编号: BH1000/02



单相电源 220V
SINGLE PHASE SUPPLY 220V



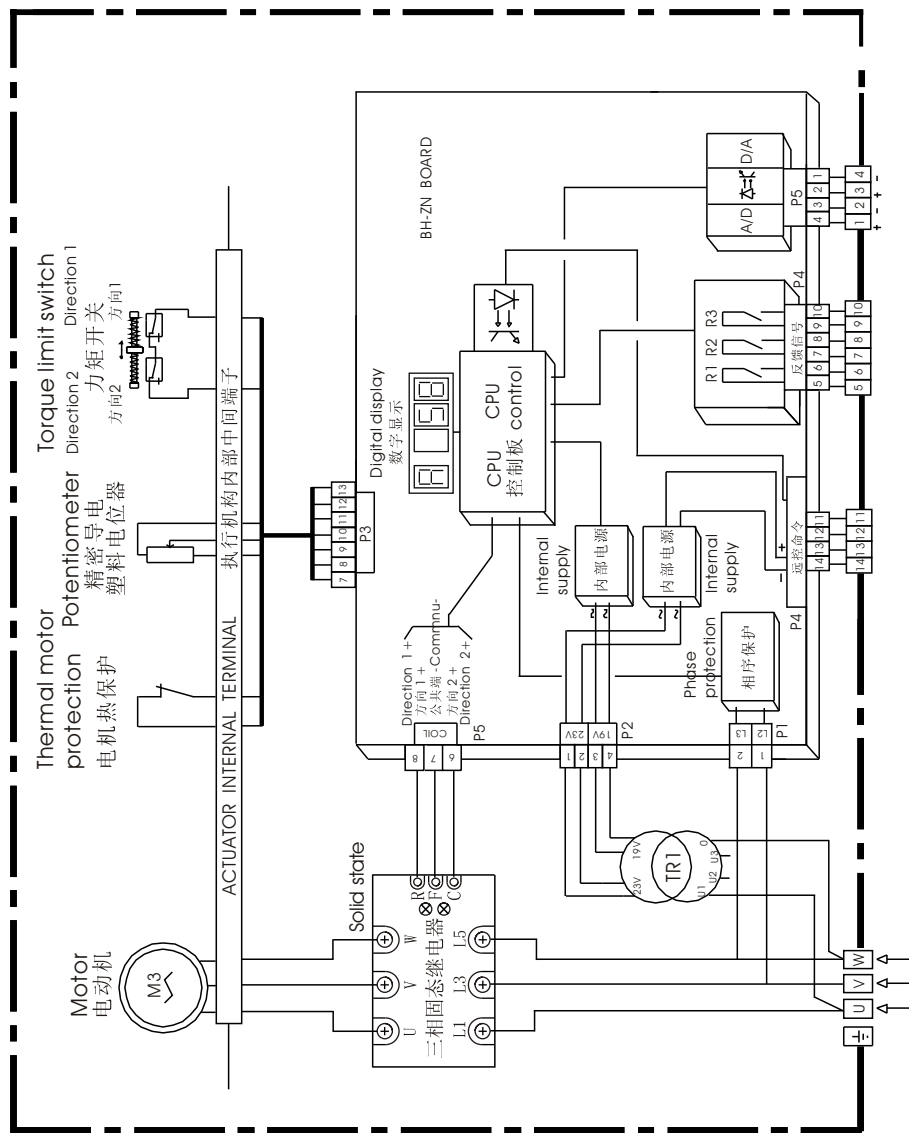
执行机构外接端子
ACTUATOR CUSTOMER TERMINAL

单相电源 YMD 接线原理图

● YMD 系列相关的接线图

● Wiring diagram of YMD range

编号: BH2000/02

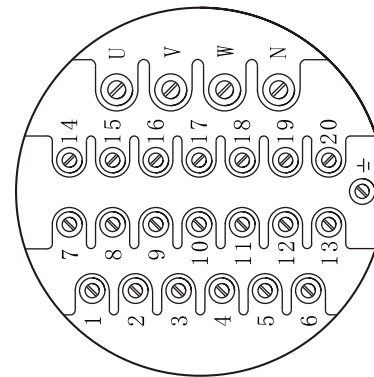


三相电源 380V

用户不需要考虑相序, 执行机构具有鉴相功能, 如果缺相执行机构停止并报警。

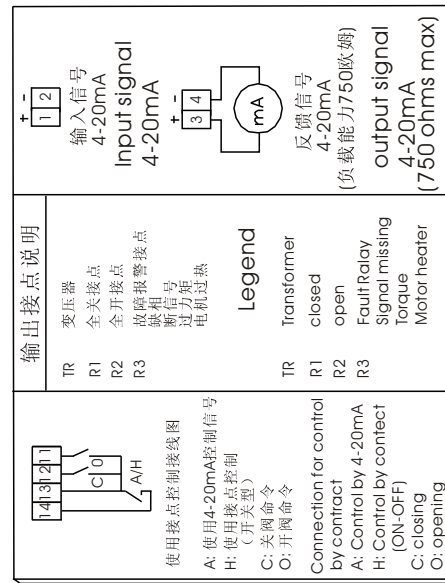
THREE PHASE SUPPLY 380V

The order in phase is not important. If one phase is missing, the Actuator will not start and gives a signal (fault Relay).



执行机构外接端子

ACTUATOR CUSTOMER TERMINAL



三相电源 YMD 接线原理图

5: 执行机构调整

YMD调节型执行机构的调整

- 电动执行机构在出厂前已经调试完毕，一般情况，不需要用户重新调整。
- 如果执行机构输出臂的位置与阀门位置不对应，请拆下输出臂，改变位置重新装配。

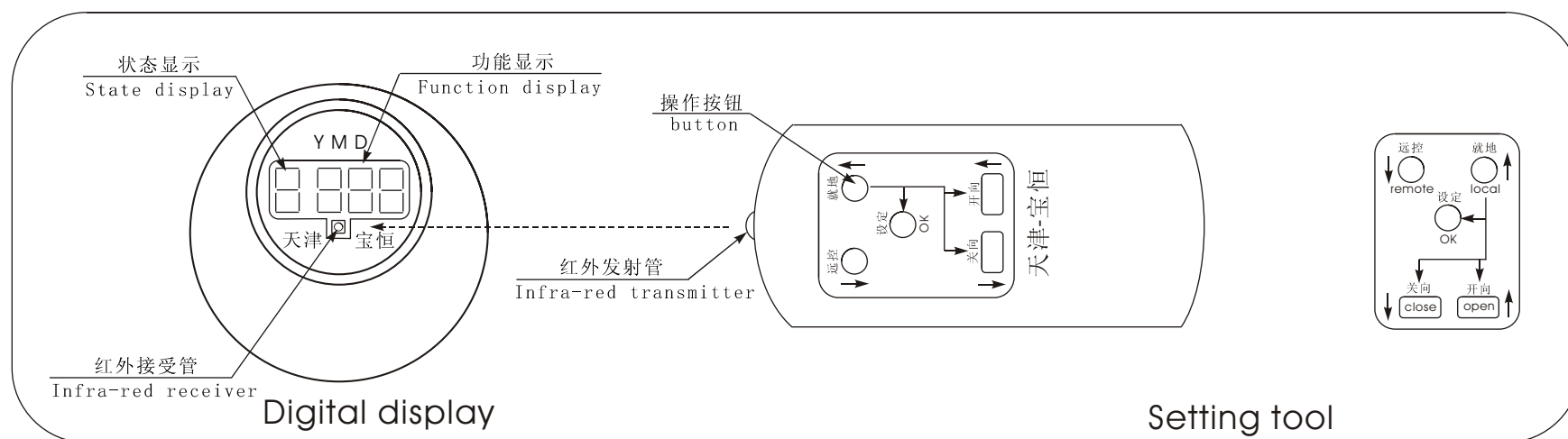
关于遥控器和数字显示

5: Adjustment of actuator

Adjustment of integral -type modulating YMD range

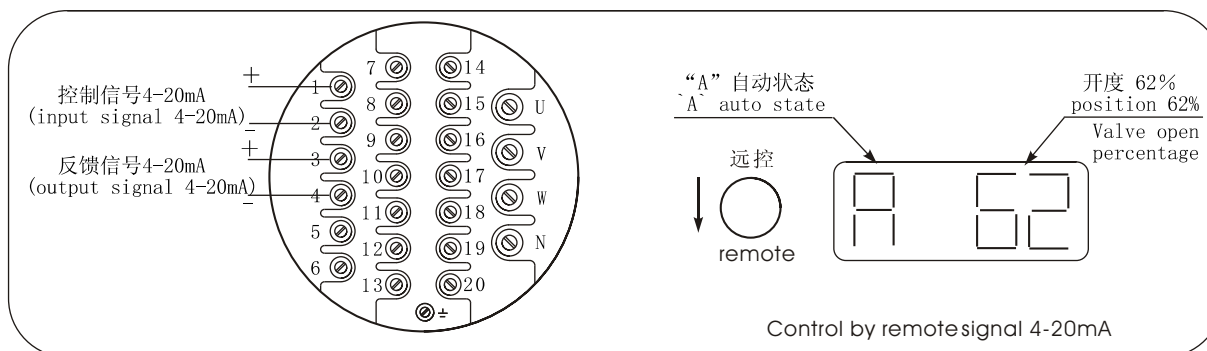
- The adjustment of integral-type actuators have been done in our factory. Generally, It is not necessary to re-adjust.
- If the arm of actuator is not a good position with the valve, please taking the arm apart from actuator, changing the position and re-assembly it.

Digital display and the setting tool



● 使用远方信号 4-20mA 控制执行机构

按下“远控”键，执行机构接受远控 4-20mA 信号控制，状态位显示“A”，功能位显示执行机构开度。

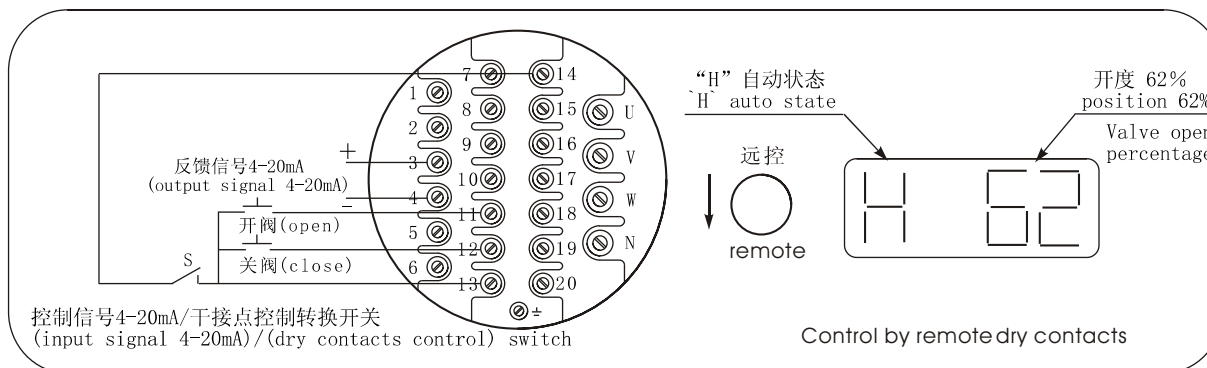


● Control by remote signal 4-20mA

Pressing the 'remote' button, the actuator control by signal 4-20mA. State displayed is 'A', function displayed is position.

● 使用远方信号 干接点控制执行机构

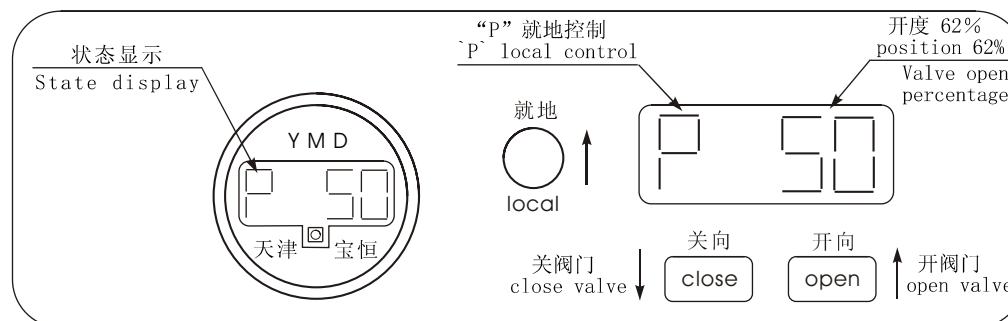
按下“远控”键，转换开关“S”闭合，执行机构接受干接点信号控制，状态位显示“H”，功能位显示执行机构开度。



Pressing the `remote` button, switch is on, the actuator control by dry contact. State displayed is `H`, function displayed is position.

● 就地操作执行机构

按下“就地”键，执行机构可以使用手轮操作，也可以使用遥控器上的“开向、关向”键操作执行机构，状态位显示“P”，功能位显示开度值。



Pressing the `local` button, the actuator can be operate by handwheel, also control by the setting tool, pressing the key `OPEN or CLOSE`, the actuator will active. State displayed is `P`, function displayed is position.

● 进入设定菜单

注意：只有在“就地”状态下可以进入设定菜单。

在“就地”状态下，按下“设定”（以下简称“OK”键）进入设定菜单，数字显示“C 000”，同时第一位“0”处于闪烁状态。需要输入正确的密码才能继续。

YMD 系列执行机构使用通用的密码值“1、2、3”，只有输入正确的密码才能进入设定菜单。

● Set up the menu

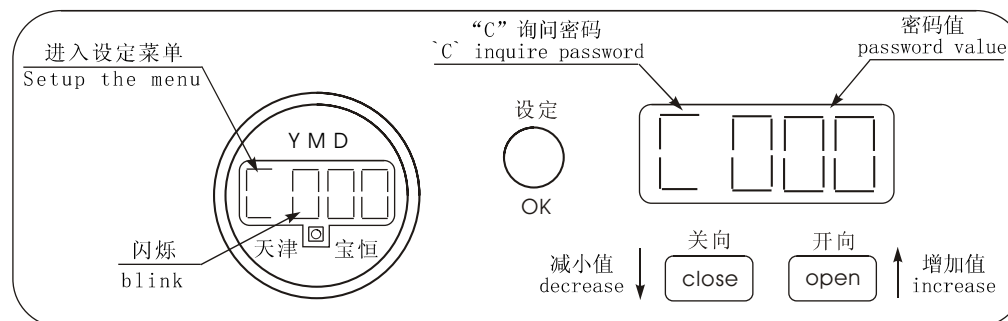
Attention :only in `local` state, setting the menu is possible

Under `local` state, pressing the `OK`, the menu may be setup. Digit displayed `C 000`, the 1st `0` is blink. A password is required to continue.

The actuator for YMD-range use the same code `1,2,3` as password. If the code is correct, access is authorized.

如果输入“C 000”，然后按下“OK”键，执行机构退出设定菜单，回到“就地”状态。

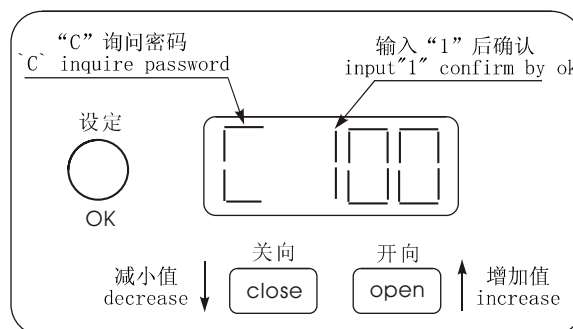
If input `C 000`, and pressing `OK`, the actuator return to the `local` state.



● 输入密码

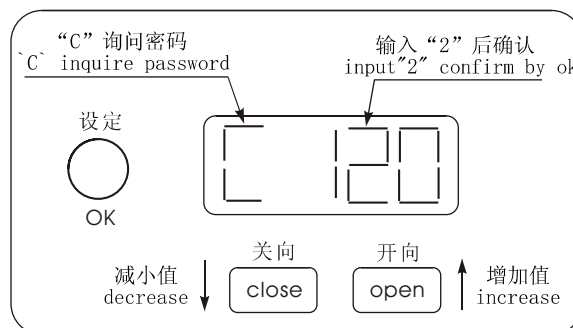
● Input a password

按下“开向”键一次，使第一位“0”变为“1”，然后按下“OK”键确认，第一位数字停止闪烁，第二位“0”开始闪烁。



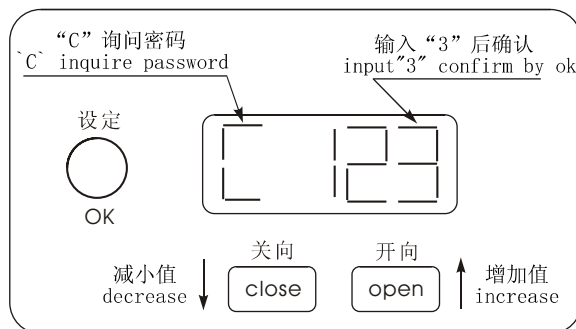
Pressing the `open` once, the 1st `0` change to `1`, confirmed by `OK`. The 1st `1` stop blink, the 2nd `0` start blink.

按下“开向”键两次，使第二位“0”变为“2”，然后按下“OK”键确认，第二位数字停止闪烁，第三位“0”开始闪烁。



Pressing the `open` twice, the 2nd `0` change to `2`, confirmed by `OK`. The 2nd `2` stop blink, the 3rd `0` start blink.

按下“开向”键三次，使第三位“0”变为“3”，然后按下“OK”键确认。



Pressing the `open` thrice, the 3rd `0` change to `3`, confirmed by `OK`. The 3rd `3` stop blink.

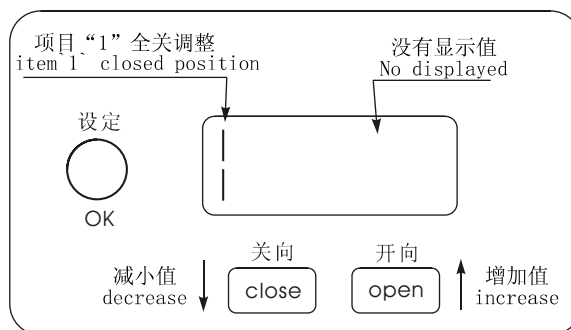
● 检查或改变参数

● Check or change the parameters

● 状态位变为“1”，按下“OK”确认，进入项目1。如果按下“远控”或“就地”键可以改变设定项目号进行不同项目的设定。

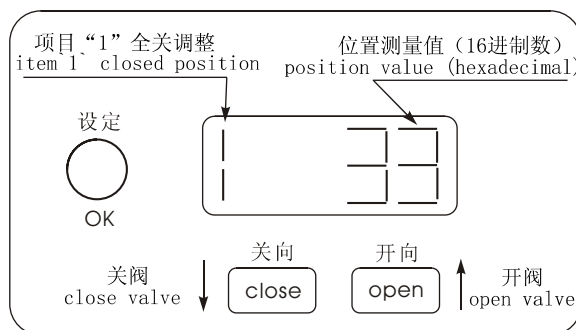
● State displayed change to `1`, confirm by pressing `OK`, the menu is item 1. Before this, If you are pressing the key of `remote` or `local`, maybe change in to the other item.

状态位变为“1”（功能位没有显示值），按下“OK”确认，进入项目1（功能位显示数字）。



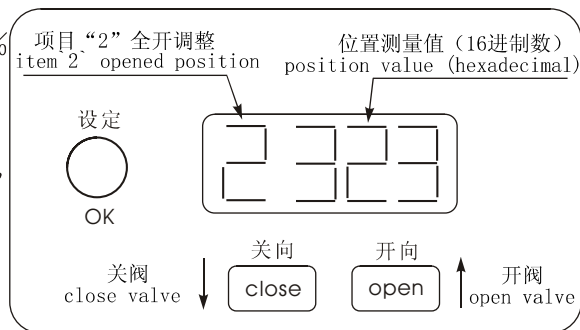
State displayed change to `1` (No display in function), confirm by pressing `OK`, the menu is item 1 (function displayed).

● 项目1：全关调整，使用手轮或者“开向”、“关向”键使执行机构动作到0%的位置，功能位的三个数字显示的是执行机构的测量位置值（用16进制数表示，可以忽略），到达0%位置后按下“OK”键确认。执行机构会自动存储数据，同时显示退回到项目1。选择状态（后三位数字不显示）。



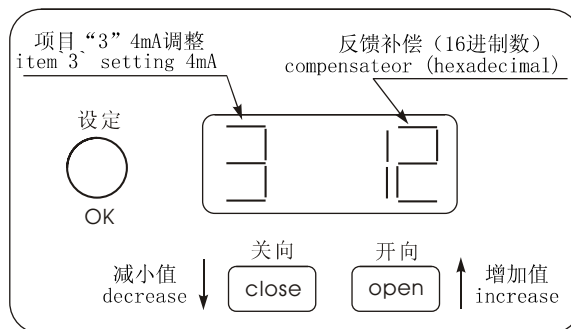
● Item 1: full close position, Operating the actuator with the handwheel or the setting tool, pressing the `close` or `open`, until it arrive the desired 0% position. Function display the measured position (value with hexadecimal, maybe ignored), confirm by `OK`. The actuator store the data automatically, the displayed return to item 1, (last three digit LED do not display).

- 项目2: 全开调整, 使用手轮或者“开向”、“关向”键使执行机构动作到100%的位置, 功能位的三个数字显示的是执行机构的测量位置值(用16进制数表示, 可以忽略), 到达100%位置后按下“OK”键确认。执行机构会自动存储数据, 同时显示退回到项目2。选择状态(后三位数字不显示)。



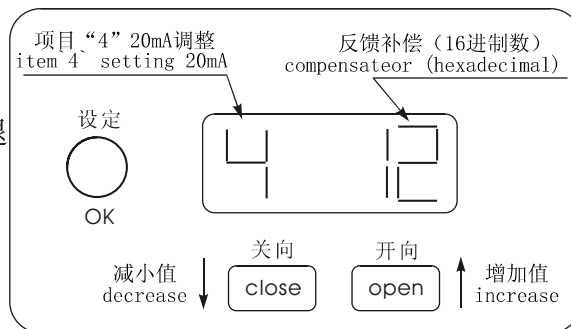
- Item2: full open position, Operating the actuator with the handwheel or the setting tool, pressing the `close` or `open`, until it arrive the desired 100% position. Function display the measured position (value with hexadecimal, maybe ignored), confirm by `OK`. The actuator store the data automatically, the displayed return to item2, (last three digit LED do not display).

- 项目3: 反馈值4mA调整, 使用“OK”键确认项目3后, 使用毫安表观察执行机构的输出电流, 如果是4mA则直接确认后退出, 可以使用“开向”或“关向”键增加或减少输出补偿值, 到达4mA后使用“OK”键确认, 程序退回项目3。



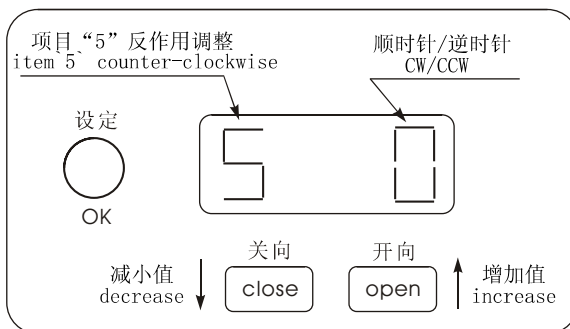
- Item3: setting of 4mA. After confirm by `OK`, A milliammeter is used for check the feedback current, if the current is 4mA, confirm by `OK`, otherwise, using the `close` (or `open`) decrease (or increase) the value of feedback current. Until 4mA is accuracy, confirm by `OK`, programme return to item3.

- 项目4: 反馈值20mA调整, 使用“OK”键确认项目4后, 使用毫安表观察执行机构的输出电流, 如果是20mA则直接确认后退出, 可以使用“开向”或“关向”键增加或减少输出补偿值, 到达20mA后使用“OK”键确认, 程序退回项目4。



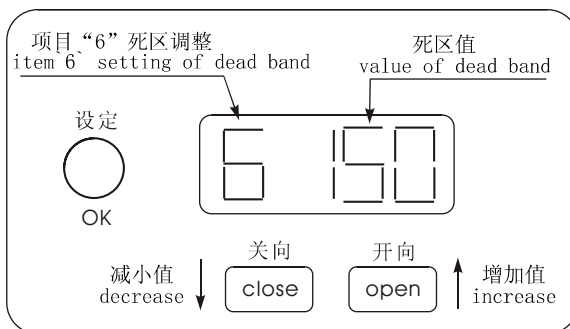
- Item4: setting of 20mA. After confirm by `OK`, A milliammeter is used for check the feedback current, if the current is 20mA, confirm by `OK`, otherwise, using the `close` (or `open`) decrease (or increase) the value of feedback current. Until 20mA is accuracy, confirm by `OK`, programme return to item4.

- 项目5: 正反作用调整, 使用“OK”键确认项目5后, 功能位的“0”表示正作用, “1”表示反作用, 使用“开向”或“关向”键改变了执行机构的动作方向, 使用“OK”键确认, 程序退回项目5。



- Item5: Rotation of actuator (cw or ccw), choosing the item5, confirm by `OK`. Function `0` is rotation of clockwise, function `1` is rotation of counter-clockwise. Using the `close` or `open` may setting `0` or `1`. Confirm by `OK`, programme return to item5.

- 项目6: 死区调整, 使用“OK”键确认项目6后, 功能位的“150”表示死区值, 使用“关向”或“开向”键可以改变死区范围, 共有0.75%、1%、1.25%、1.5%、1.75%、2.0%、2.25%、2.5%、2.75%、3%可以选择, 使用“OK”键确认, 程序退回项目6。

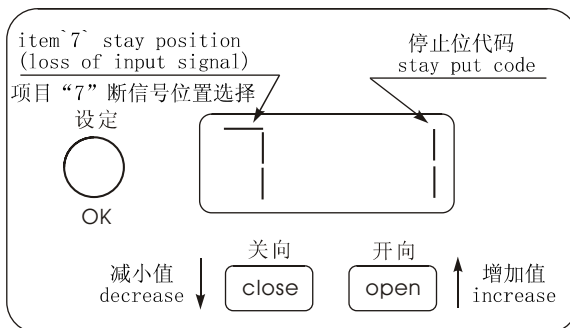


- Item6: Rotation of actuator (cw or ccw), choosing the item6, confirm by `OK`. Function display `150`, it is the value of dead band, using the key of `close` or `open`, you can change from 0.75% to 3%, choosing one and Confirm by `OK`, programme return to item6.

特殊注意: 如果死区范围太小会引起执行机构振荡。

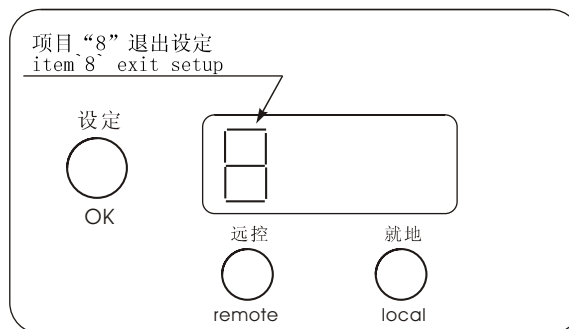
Caution: reducing the dead band too much will provoke `hunting` of the actuator.

- 项目7: 断信号位置选择, 使用“OK”键确认项目7后, 功能位的“1”表示输入信号断失后执行机构停止在原位, 使用“关向”或“开向”键可以改变功能位为“2”表示执行机构断信号后动作到全关, 或“3”执行机构动作到全开, 使用“OK”键确认, 程序退回项目7。



- Item7: stay position in case of loss of input signal(4-20mA), choosing the item7, confirm by `OK`. Function display `1`, when input signal lost, the actuator stoped in last position, using the key of `open`, function change to `2`, the actuator will stop in full close, if choosing `3`, the actuator will full open, Confirm by `OK`, programme return to item7.

- 项目8: 退出设定程序, 进入项目8以后如果需要改变其它的项目设定, 使用“远控”或“设定”键可以选择其它项目, 或者按下“OK”键退出设定程序。



- Item8: exit set up , entering the item8, if you want to re-setting other item, using the key of `remote` or `local` change into the desired item. Otherwise , pressing the key of `OK` exit setup.

● 执行机构运行代码表

状态显示	作用方式	功能显示	阀位百分比
R	接受远方4-20mA控制信号	88	执行机构的目前位置值为65%
H	接受远方无源接点控制信号	100	执行机构的目前位置值为65%
P	接受远方无源接点控制信号	65	执行机构的目前位置值为65%

● Running dialogue of the actuator

State displayed	Command	Functiong displayed	Valve position (percentage)
R	Control by remote signal 4-20mA	88	Valve position in 68% (percentage)
H	Control by remote dry contact	100	Valve position in 100% (percentage)
P	Control the actuator in local	65	Valve position in 65% (percentage)

● 执行机构设定代码表

状态显示	设定项目	功能显示	项目参数
	输入密码	123	输入1、2、3进入设定菜单 输入0、0、0退出设定菜单
	设定全关位置	28	用“开向”、“关向”键 调整位置，使用“OK”确认
	设定全开位置	325	用“开向”、“关向”键 调整位置，使用“OK”确认
	设定4mA反馈电流值	55	用“开向”、“关向”键 补偿输出值，使用“OK”确认
	设定20mA反馈电流值	45	用“开向”、“关向”键 补偿输出值，使用“OK”确认
	设定正反作用	0	用“开向”、“关向”键 改变功能，使用“OK”确认
	设定死区值	150	用“开向”、“关向”键 改变功能，使用“OK”确认
	设定断信号保护停止位置	1	用“开向”、“关向”键 改变功能，使用“OK”确认
	退出设定菜单		按下“OK”键退出设定菜单， 返回运行状态。

● Set up code

State displayed	Item	Functiong displayed	Input parameter
	Required password	123	Input 1-2-3 enter in menu Input 0-0-0 exit menu
	Setting of full close position	28	Pressing `close` or `open` to full close position. confirm by `OK`.
	Setting of full open position	325	Pressing `close` or `open` to full open position. confirm by `OK`.
	Setting of 4mA feedback current	55	Pressing `close` or `open` to set feedback current. confirm by `OK`.
	Setting of 20mA feedback current	45	Pressing `close` or `open` to set feedback current. confirm by `OK`.
	Setting of CCW rotation	0	Pressing `close` or `open` to change the CW to CCW. confirm by `OK`.
	Setting of dead band	150	Pressing `close` or `open` to change from 0.75%--3%. confirm by `OK`.
	Stay position when loss of signal	1	Pressing `close` or `open` to set `stop` - `open` - `close`. confirm by `OK`.
	Exit setup menu		Pressing `OK` exit setup, return normal running .

● 执行机构故障代码表

故障代码	故障原因
F 001	输入4-20mA信号故障。
F 002	电机热保护动作，检查执行机构是否振荡。
F 003	关向过力矩，检查阀门是否卡死。
F 004	开向过力矩，检查阀门是否卡死。
F 005	关向超过极限位置，执行机构只可以向开向动作。
F 006	开向超过极限位置，执行机构只可以向关向动作。
F 007	电源缺相，检查三相电源（仅在使用三相电源时）。

● 故障监视继电器(J3)

故障监视继电器指示出执行机构的不正常操作或故障状态。

故障监视继电器释放时有以下几种情况可能产生：

- 电源丢失一相（在使用三相电源执行机构时）
- 电机热保护开关动作
- 4-20mA控制信号丢失

● 全关、全开指示继电器 J1、J2

J1吸合 = 阀门全关（0%位置）

J2吸合 = 阀门全开（100%位置）

● Fault code

Fault code	Cause
F 001	Loss of input signal 4-20mA
F 002	Tripping of motor thermal protection, (maybe the actuator is hunting).
F 003	Tripping of close torque limit switch, (valve may be jammed).
F 004	Tripping of open torque limit switch, (valve may be jammed).
F 005	The actuator is exceed fully close position, (only moving to open direction).
F 006	The actuator is exceed fully open position, (only moving to close direction).
F 007	Loss of one phase (in case of three phase supply).

● Fault monitoring relay (J3)

The fault-monitoring relay indicates a non-availability of the actuator or an abnormal operation.

The relay is energized upon the following events:

- Loss of one phase (in case of three phase supply)
- Tripping of motor thermal protection
- Loss of input signal 4-20mA (with option positioner)

● Indication for fully close or open(J1,J2)

Relay J1 is energized = full closed (0% position)

Relay J2 is energized = full opened (100% position)



6: 产品维护及故障处理

问 题	原 因	应对措施
执行机构不动作	电源	检查电源，并且与铭牌参数核对
	电机热保护动作	检查电机是否过热，如果电机过热后经过冷却，电路会恢复正常。
	接线松动	检查所有接线端子上的接线是否松动，检查电路板上的连线是否有脱落。
执行机构不跟随控制信号动作	接线错误	检查端子 70 及 71 上的输入信号。
	执行机构在远方接点控制方式	执行机构在远方接点控制方式时 4-20mA 控制信号无效。
	执行机构在就地控制方式	检查执行机构是否切换到远方控制方式。
执行机构没有停在正确位置或振荡。	灵敏度设定不正确	重新调整灵敏度
一直显示故障“F 005”或“F 006”	电机经过重新接线，旋转方向与出厂时相反，（用户更换了电机）	用户更换电机时，应该注意电机的线号，如果与出厂方向不一致，请将电机端子的 2 和 3 线互换。

6: Maintenance and troubleshooting

PROBLEM	CAUSE	CORRECTIVE ACTION
No operation	power	Check the power supply voltage, compare with nameplate.
	Tripping of motor thermal protective device	Check if the motor is hot. The actuator will again be available after the motor has cooled off.
	the wire is loosen	Check the wiring in the terminal and electric board
The actuator dose not follow the commands	Bad wiring	Check input signal connection between the terminals 70 and 71 .
	Remote pulsed control mode	In this mode input signal(4-20mA) can not control the actuator.
	Local control mode	Check the actuator displayed, it sould put on remote position.
The actuator does not stop on the right position and is hunting.	The dead band setting is not correct.	Re-setting the dead band.
`F005` or `F006` is displayed at all time	Motor has been unwired and rotates in the reverse direction (motor replacement)	When replacing a motor, wire markings must be observed. In case of doubt, check rotational direction, change over wires 2 and 3 of the motor terminal strip.



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