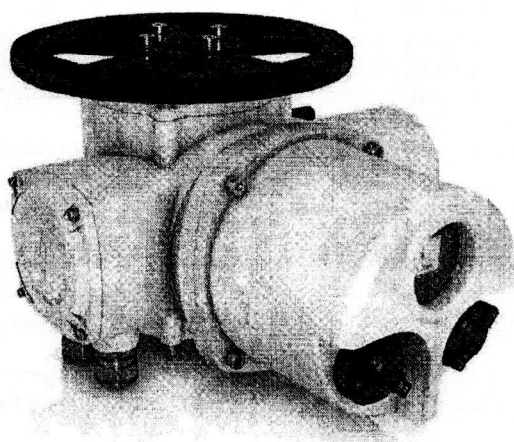


# CLZ 系列阀门电动装置 使用说明书

**Instruction Manual for the electric  
device of CLZ Series Valve**



用于多回转阀门

**Used for multi-turn valve**

# 请在使用本公司产品前仔细阅读本说明书

## Please read this manual carefully prior using our product

请正确的使用本公司产品，不必要的损失和事故将会得到避免！同时应遵守本说明书的规定，因为该机电设备是在工业强电流的条件下使用的！

Please use our product correctly, then there will be no unnecessary damage and accidents! At the same time, the instructions specified in this manual should be strictly followed, because this machinery is used at industry level condition with strong current!

在操作中，给设备上有些裸露零件带电，同时有些零件能够运动或转动，是很危险的。因此，在未经许可拆下所需的罩盖；不合理的使用；不正确的操作或不合适的维护，均会造成严重的人身伤害或损坏设备性能。为了设备的安全，必须保证：

While using, if some of the bare parts of the equipment were charged and can move or rotate at the same time, it will be extremely dangerous. So, un-authorized removal of the cap, improper use, improper operation or maintenance, will all cause serious physical damage or to human and/or to the properties of the equipment. For the safety of the equipment, below rules should be followed:

一、仅允许有资质的人员对这些机械和设备进行使用；

1. Only qualified personnel can have the authorization to operate these equipment

二、无论何时，在上述有资质的人员对该机械和设备进行作业时，应具备有这些机械和设备的操作说明书或其它产品文件，以便按说明书的要求执行；

2. While above mentioned personnel is using the equipment, the relevant instruction manual and/or other product files should be always prepared in a way to make the requirements of this manual be followed.

三、通电前请再次确认输入电压、频率及配线接点是否准确，因线序或电压引起的电机损坏，厂家不承担维修和更换；

3. Before the power is on, please double check the input voltage, frequency and connections are right. Any motor damage caused by wrong wire sequence or wrong voltage, the manufacturer will not be responsible for the maintenance and replacement.

四、阀门连接所用螺栓强度不得低于 8.8 级。

4. The connection bolts for connecting valves should not be less than Class 8.8.

五、不得在阴雨天于户外打开电气箱盖、电机等密封部位。

5. The Electric cabinet cap and motor etc. sealing area should not be opened during cloudy or rainy days.

六、电动执行器采用阀门专用电机，为短时工作制，持续工作时间不得超过铭牌标定时间。

6. Special motor was used for the electric actuator, the lasting time is short. Continuous working time should not be over the limit specified on the nameplate.

七、不经常使用时，应定期检查、保养并运行操作，建议1次/月，时间不超过10分钟。

7. While the equipment is not usually used, it should be checked, maintained and activated on a regular basis. The recommend frequency is 1 time/month, and the duration should be less than 10 mins.

八、不得在爆炸环境下带电拆去与电气有关的箱盖，打开电气箱盖时，必须先切断电源。

8. Electric related caps should not be removed at explosive environment while there is still electricity. Whenever someone want to open the electric cabinet cap, the power should be cut off.

九、安装前应将电动执行器存放于清洁干燥的室内，若存放于室外，应与地面保持一定的高度，并应有防潮、防雨措施。

9. The electric actuator should be stored inside a room with clean and dry condition prior to installation. If installed outside the room, it should be kept at a certain height away from the ground, and anti-humidity, anti-rain procedures should be performed.

十、安装或重装后，首次电动操作，必须使阀门处于中间位置检查开、关方向，必须按调试要求进行逐项调试，检查各部件正常后，才能投入使用。

10. While initial electric operation after installation or re-installation is required, the valve should be in the middle position to check the open/close direction. Tests should be performed one by one according to the commissioning procedure and all parts should be checked at normal status prior to using.

# 目 录

## Contents

一、概述.....	5
1. General description .....	5
二. 型号表示方法.....	6
2. Designation of type .....	6
三. 工作环境和主要技术参数.....	7
3. Working environment and main technical parameters.....	7
四. 安装和拆卸.....	8
4. Installation and disassembly.....	8
五. 接线注意事项.....	8
5. Matters need attention while connecting wires.....	8
六. 转矩控制机构调整.....	9
6. Adjustment of torque control device.....	9
七. 行程控制机构调整.....	10
7. Adjustment of travel control device.....	10
八. 智能型行程控制机构调整.....	13
8. Adjustment of Intelligent travel control device.....	13
九. 连接尺寸.....	14
9. Connecting dimension.....	14
十. 参数表.....	15
10. Parameters.....	15
十一. 外形尺寸.....	16
11. Outline dimension.....	16
十二. 电器原理图及典型接线图.....	17
12. Electrical schematic diagram & typical wire connection drawing.....	17
十三. 智能型端子接线图.....	19
13. Intelligent terminal connection drawing.....	19
十四. 非侵入控制器调试说明.....	20
14. Instruction of commissioning of Non-invasive control unit.....	20
十五. 故障及排除方法.....	29
15. Failure and Solving method.....	29



## 一、概述

### 1. General description

Z 型多回转阀门电动执行装置适用于闸阀、截止阀、节流阀、隔膜阀等做多回转的阀门，其派生产品也可适用于球阀，蝶阀和风门等部分回转的阀门。用于对阀门的开启、关闭或调节。作为稳定可靠的多回转电动执行装置，可适用于不同控制系统，不同工作环境的需求。传动机构一体化的设计，使产品具有更小的体积和简洁的外观。安全可靠的手动设计，切换手柄的全自动手/电动切换。良好的防护等级可满足多种设计的需要：普通型、隔爆型、整体开关型、整体调节型。

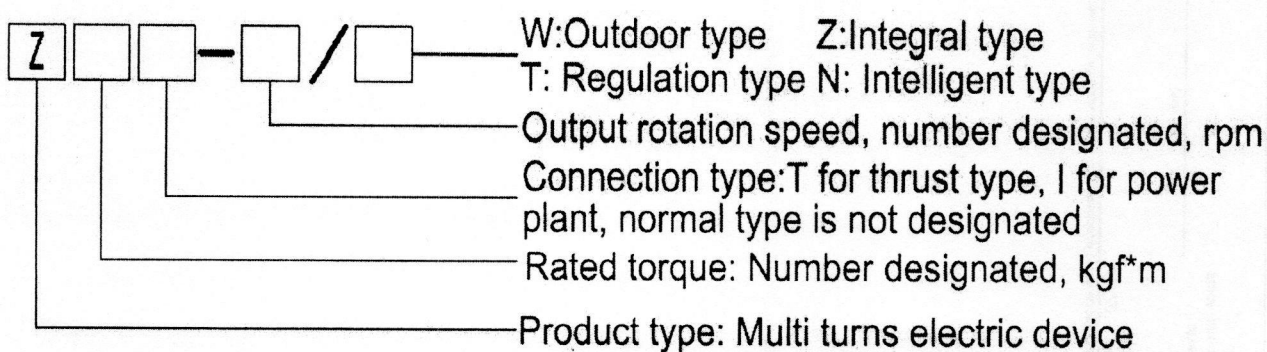
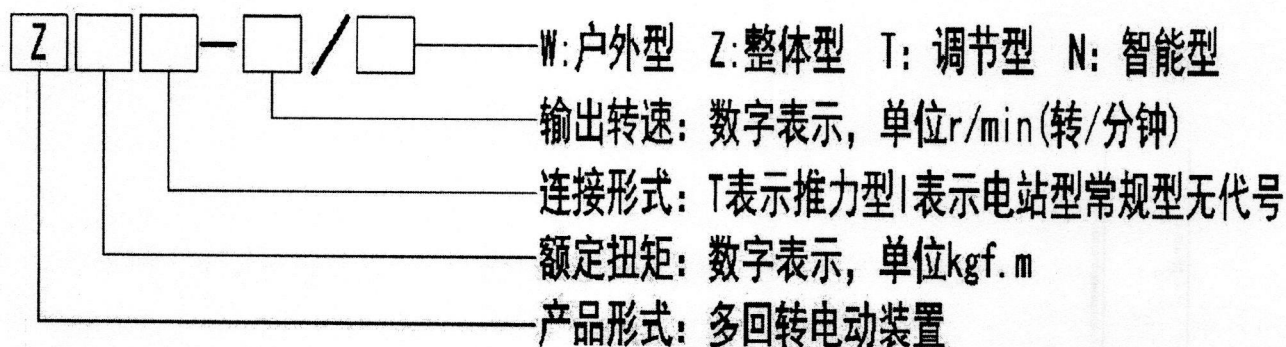
Z series multi-turn valve electric actuator device is suitable for gate valve, globe valve, throttle valve, and diaphragm valve etc., its derived product can also be suitable for ball valve, butterfly valve and air door etc. partial rotation valve, and is used to open, close or adjustment for the valve. As a steady and trustworthy multi-turn electric actuator device, it is applicable for different control systems for different working environment use. It is designed to integrate the transmission system, which makes it has smaller size and concise appearance. It also has safe and reliable manual operation design and fully automatic switch between manual mode and electric mode with hand shank. Its good protection class makes it suitable for all kinds of design: Normal type, Explosion-proof type, integral switching type and integral regulation type.

Z 型多回转阀门电动执行装置的整机性能符合 GB/T24923-2010《普通型阀门电动装置技术条件》的规定。隔爆型性能符合 GB3836.1-2010《爆炸性环境 第 1 部分：设备 通用要求》，GB3836.2-2010《爆炸性环境 第 2 部分：由隔爆外壳“d”保护的的设备》及 GB/T24922-2010《隔爆型阀门电动装置技术条件》的规定。

Z series multi turn valve electric actuator device is entirely in accordance with the requirements specified in GB/T 24923-2010, Technical specifications of basic version electric valve actuators. It's explosion-proof version have features that are in accordance with the requirements specified in GB3836.1-2010 << Explosive atmospheres—Part 1:Equipment—General requirements>> , GB3836.2-2010 << Explosive atmospheres—Part 2:Equipment protection by flameproof enclosures “d”>> and GB/T24922-2010<< Technical specifications of explosion-proof version electric valve actuators>>.

## 二. 型号表示方法

### 2. Designation of type



#### 型号示例:

Z10-24/N: 表示为智能开关型多回转电动装置, 额定输出扭矩为 100N·m (10kgf·m), 输出轴转速为 24r/min, 额定电压 380V。

#### Example:

Z10-24/N: Stands for intelligent switching type multi-turns electric device, the rated output torque is 100N·m(10kgf·m), the rated output shaft rotation speed is 24r/min, the rated voltage is 380V.

### 三. 工作环境和主要技术参数

#### 3. Working environment and main technical parameters

3.1 供电电源: 额定电压: 三相 AC380V (特殊订货单相 220V、三相 440V、660V 等)  
额定频率: 50HZ (特殊 60HZ)

3.1 Power supply: rated voltage: 3 phase AC 380V (for special orders we can provide single phase 220V, 3 phase 440V, 660V etc.)

3.2 防护等级: IP65/67 (特殊订货 IP68);

3.2 IP protection class: IP65/67 (For special orders IP68).

3.3 绝缘等级: F 级

3.3 Insulation class: Class F

3.4 环境温度:  $-20\sim+60^{\circ}\text{C}$  (特殊订货  $-40\sim+70^{\circ}\text{C}$ );

3.4 Ambient temperature:  $-20\sim+60^{\circ}\text{C}$  (for special orders  $-40\sim+70^{\circ}\text{C}$ )

3.5 相对湿度:  $\leq 95\%$  ( $+25^{\circ}\text{C}$  时);

3.5 Relative humidity:  $\leq 95\%$  (temperature at  $25^{\circ}\text{C}$ )

3.6 工作制: 短时 10 分钟 (特殊订货 15-30 分钟);

3.6 Working time duration: short time 10 mins (For special orders we provide 15-30Mins)

3.7 防爆标志: Exd II BT4 适用于环境为 II A、II B 级 T1-T4 组的爆炸性气体环境;

3.7 Explosion-proof: Exd II BT4, suitable for T1-T4 explosive air condition while the environment is IIA, IIB class.

3.8 工作环境: 普通型用于无易燃易爆和强腐蚀介质的场所;

3.8 Working environment: Regular type, used for non-inflammable, non-explosive, and non-strong corrosive environment.

3.9 防腐涂装: 高温烤漆。

3.9 Coating: high temperature stoving varnish.

## 四. 安装和拆卸

### 4. Installation and disassembly

4.1 允许阀门电动装置任意位置安装，但必须注意电机尽量呈水平位置，电器箱盖呈水平或垂直向上状态为推荐安装方式，这样有利于润滑、调试、维护和手动操作。

4.1 Allow valve electric device to be installed at any position, but make sure the motor should be put as much horizontally as possible, the recommended installation method is to make the electric cabinet cap at horizontal position or vertical upward position, because such installation is helpful for grease, commissioning, maintenance and manual operation.

## 五. 接线注意事项

### 5. Matters need attention while connecting wires

5.1 用手轮将阀门开启至 50%开度处，按下开发或关阀键，检查阀门的旋向是否与按键对应，如果不一致立即按停止按钮。切断三相电源，调换三相电源中的任意两相。

5.1 Use hand wheel to open valve at 50% opening, press open or close valve button, check the rotation direction of valve to see if it is the same with the button, if not , immediately press stop button. Cut off the 3-phase power supply, interchange any of the two phases of the 3-phase power supply.



## 六.转矩控制机构调整

### 6. Adjustment of torque control device

#### 6.1 普通型

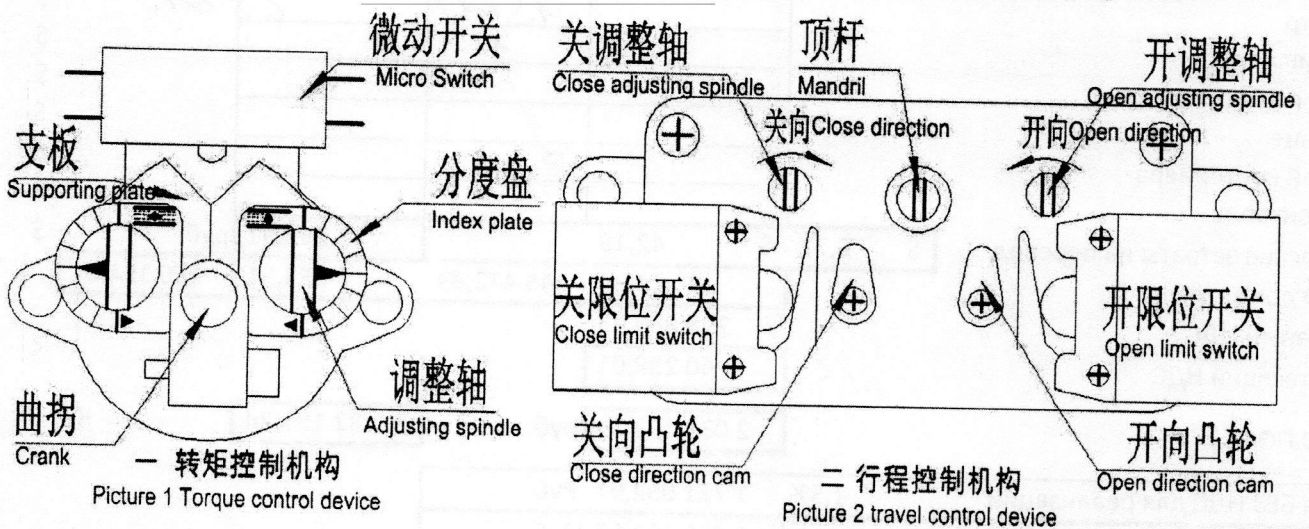
#### 6.1 Regular type

6.1.1 转矩控制机构 (如下图一): 由曲拐, 挡块, 凸轮分度盘, 支板和微动开关组成, 当输出轴受到一定阻转矩后, 蜗杆除旋转外, 还产生轴向位移, 带动曲拐旋转, 同时使挡块也产生一个角位移, 从而迫近凸轮, 使支板上抬。当输出轴上的转矩增大到预定值时, 则支板上抬直至微动开关动作, 切断电源, 电机停转, 以实现电动装置输出转矩的控制。

6.1.1 Torque control device (as shown in below picture 1): consists of crank, block, cam index plate, supporting plates and micro switch. When the output shaft was resisted by a certain torque, the worm will not only rotate, but also have an axial displacement, which will make the crank rotate and cause an angle displacement on the block, thus make it approaching the cam and make the supporting plates move upwards. When the torque on the output shaft has increased to a pre-set value, the supporting plates will move to a point to make the micro switch on and cut off the power supply, and then the motor will stop, this will be the control on the output torque of the electric device.

6.1.2 转矩控制机构调整: 首先调整关转矩; 从小转矩值开始, 逐渐增大转矩值直到阀门关严为止。根据阀门工作特性调整开关方向转矩, 一般开放向转矩要比关方向转矩大。以上调整均在空载无介质压力等因素下调整, 在有压力, 温度时应注意其能否关严。如关不严则要适当增加转矩值以关得严打得开为准。

6.1.2 Adjustment of the torque control device: First adjust the off torque, starting from a small torque value, the value is gradually increased until the valve is completely shut off. The adjustment of open/close direction torque is based on the working features of the valve, in general the torque for open direction is greater than that for close direction. All above adjustment should be performed while there is no load and no medium pressure etc. Check whether it can be completely closed while the pressure and temperature factors are applied. If it cannot be completely closed, the torque value should be increased to an appropriate value to make the valve can be both completely closed and completely opened.



## 七.行程控制机构调整

### 7. Adjustment of travel control device

7.1 行程控制机构(如上图二):由十进位齿轮组,顶杆,凸轮和微动开关组成,简称计数器。其工作原理是由减速箱内的一主动小齿轮( $Z=8$ )带动计数器工作。如果计数器按阀门开或关的位置已经调整好,当计数器随输出轴转到预先调整好的位置(圈数)时,则凸轮将被转动 $90^\circ$ ,压迫微动开关动作,切断电源,电机停转,以实现电动装置行程(圈数)的控制。为了控制较多转圈数的阀门,可调整凸轮转 $180^\circ$ 或 $270^\circ$ 再压迫微动开关动作。

7.1 Travel control device (refer to above picture 2): consists of decimal gear, mandril, cam and micro switch, in short can be called as counter. It's working mechanism is the drive pinion( $Z=8$ ) inside the reduction gearbox will drive the counter to work. If the counter is adjusted to the valve open or close position, when the counter is rotated to the pre-set position (turns), the cam will be turned for  $90^\circ$ , and will press on the micro switch and make it work, cut off the power supply and the motor will stop running, so as to control the travel(turns) of the electric device. For controlling valves with many turns, the cam can be turned for  $180^\circ$  or  $270^\circ$  while press on the micro switch and make it work.

7.2 行程控制机构调整:用手动将阀门关严。脱开行程控制机构,即用螺丝刀将行程控制机构中顶杆推进并转 $90^\circ$ ,使主动小齿轮与计数器个位齿轮组脱开。用螺丝刀旋转“关”向调整轴,按箭头方向旋转直到凸轮压住弹簧压板使微动开关动作停止,则关向行程初步调好。

7.2 Adjustment of travel control device: Shut off the valve completely. Dis-engage the travel control device, that is to use a screw driver to push the mandril of the travel control device and rotate for  $90^\circ$ , and make the drive pinion dis-engage with the digit pinion of the counter. Use the screw driver to rotate the “close” direction adjusting spindle, rotate as the arrow direction until the cam pressed on the spring bearer plate and make the micro switch response, then the “close” direction adjustment is preliminarily finished.

松开顶杆使主动齿轮与两边个位齿轮正确啮合,为保证其正确啮合,在松开顶杆后,必须用螺丝刀稍许左右转动调整轴,此时可以电动打开几圈,而后关闭,视关向行程是否符合要求,如不合要求,可以按上述程序重新调整。

Release the mandril to make the drive pinion engage correctly with the digit pinions of both sides. To make them engage correctly, when the mandril is released, a screw driver should be used to rotate the adjusting spindle slightly at left and right direction, at this time the valve can be electric opened for several turns and then closed. Check whether the close direction travel is satisfactory, if not, please re-adjust as above procedure.

开方向调整:在关方向调整以后,用手将阀门开到所需位置(注意此时行程控制机构不能脱开,否则关向调整又被打乱),然后脱开行程控制机构,旋转“开”向调整轴,按箭头方向旋转直到凸轮压住弹簧压板使微动开关动作为止。再使行程机构与主动齿轮啮合,则开向行程调完。行程控制机构调完后,可反复操作几次。一般开阀门控制在 $90\%$ 左右。

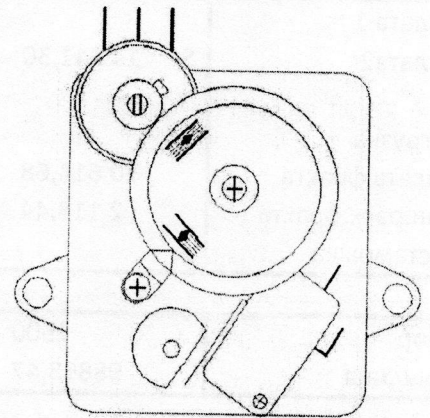
Close direction adjustment: After adjusting the close direction, open the valve manually to required position(please pay attention during this period the travel control device cannot be disengaged, otherwise the close direction adjustment will be a chaos), then dis-engage the travel control device, rotate the “open” direction adjusting spindle, rotate as the arrow direction until the cam pressed on the



spring bearer plate and make the micro switch response, then engage the travel device and the drive pinion, then the "open" direction travel adjustment is finished. After adjusting the travel control device, the valve can be operated for several times. In general the valve open control is set at around 90%.

7.3 可调式开度指示器 (图三): 由减速齿轮组, 调节齿轮, 阀门开度表盘, 凸轮, 微动开关, 及电位器组成。在现场调试时, 可根据所配阀门开关的圈数, 将调节齿轮调整到所需的位置, 并与减速齿轮组啮合 (在立柱上有所需圈数的数字)。当阀门在开启或关闭的过程中, 开度盘经减速后转动, 指示阀门的开关量, 指示角度与阀门开关量同步。供远传指示阀门位置用。

7.3 Adjustable open position indicator(Picture 3): consists of reduction gears, adjusting pinion, valve open position scale, cam, micro switch and potentiometer. While adjusting at site, adjust the gear to required position based on the turns needed for corresponding valve, and engage with the gear of the reduction gear box(the number of turns needed is indicated on the column). When the valve is opening or closing, open position scale will rotate after gear reduction, and will indicate the open position. The indicating angle will be synchronized with the opening extent of the valve. This is used for long range transmission of the valve position.



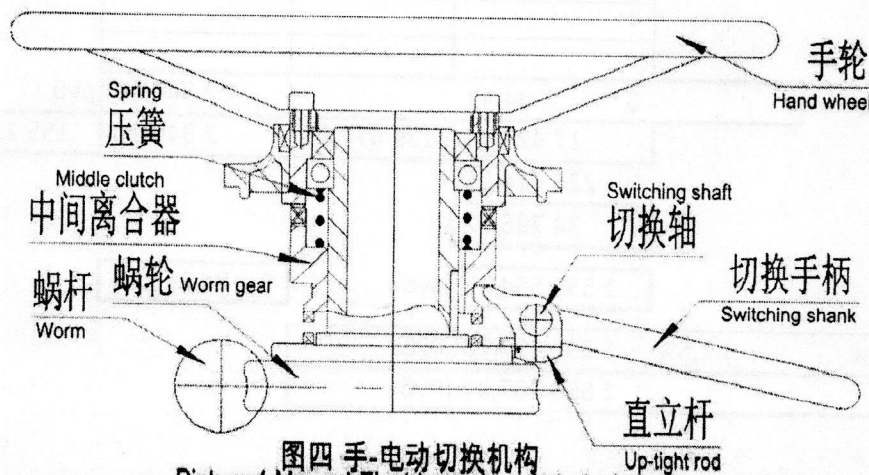
图三 开度指示器  
Picture 3 Open position indicator

7.4 可调式开度指示器的调整: 在调整好转矩, 行程的基础上调整可调式开度指示和远传电位器。

将阀门关闭 (手动或电动) 首先根据阀门的最大转圈数将齿轮组上的调节齿轮调到相应的位置上, 再将表板的关符号推到指针处, 转动电位器, 使电位器在零位上, 并使电位器轴上的齿轮与开度轴上的齿轮啮合, 拧紧电位器轴上齿轮的紧定螺钉即可。

7.4 Adjusting of the adjustable open position indicator: After adjusting the torque and travel, adjust the open position indicator and long range transmission potentiometer.

Shut off the valve(Manually or Electrically), first adjust the adjusting pinions to the corresponding position based on the maximum turns of the valve, then push the close symbol of the scale to the pointer position, rotate the potentiometer and make it at zero, and engage the shaft pinion of the potentiometer and shaft pinion for the open position, tighten the set screw on the pinion of the potentiometer shaft and it will be finished.



图四 手-电动切换机构  
Picture 4 Manual-Electric mode switch device

7.5 手-电动切换机构（图四）：为半自动切换，电动转变为手动操作需扳动切换手柄，由手动转变为自动时系自行进行（不需要扳动切换手柄）。由电动变为手动时即用人工扳动切换手柄，使输出轴上的中间离合器向上移动，压迫弹簧。当手柄推到一定位置时中间离合器脱离蜗轮与手动轴爪啮合，则可使手轮上的作用力通过中间离合器传到输出轴上，即成为手动状态。手动变为电动时自动切换，当电机旋转带动蜗轮转动时直立杆立即倒下，在压簧作用下中间离合器迅速向蜗轮方向移动，与手动轴脱开，与蜗轮啮合，则成为电动状态。

7.5 Manual-Electric mode switch device (Picture 4): This is half automatic switch. Switching from electric mode to manual mode will need to pull the changing shank, switching from manual mode to electric mode is performed automatically(No need to pull the switching shank). Switching from electric mode to manual mode is to pull the switching shank manually, this makes the middle clutch of the output shaft move upward and press on the spring. When the shank was pulled to a certain position, the middle clutch will disengage the worm gear and engage with manual shaft jaw, this makes the force on the hand wheel is transmitted to the output shaft via. the middle clutch, this is the manual mode. Manual mode switching to electric mode is automatically made, when the motor rotates, it makes the worm gear rotates and the up-tight rod will fall down immediately, with the force of the spring the middle clutch will move toward the worm gear quickly and dis-engage the manual shaft, and then engage with the worm gear and this makes it in the electric mode.



## 八. 智能型行程控制机构调整

### 8. Adjustment of Intelligent travel control device

方式按钮（红钮）旋到现场位置，用手轮将阀门转到全关位置（关到位后退上两圈），用红外设定器进入菜单：“基本设置”，用上移或下移键选择“关位设置”，按下“确认键”，保存关位值。再用手动方式将阀门开到全开位置（开到位后退两圈），进入菜单：“基本设置”，选择“开位设置”，按下“确认键”，保存开位值，退出菜单。用电动方式操作电动装置全开全关，检查阀门开关是否都刚好到位，如果没有必须按上述步骤重新设置到位。

Rotate the mode button (red button) to "site" position, use the hand wheel to make the valve at full stop position (while reached the position, rotate backwards for 2 circles), use the infrared setting tool to log on to the main menu: "basic setting", use the "up" or "down" button to select "close position setting" and press "confirm" to save the close position value.

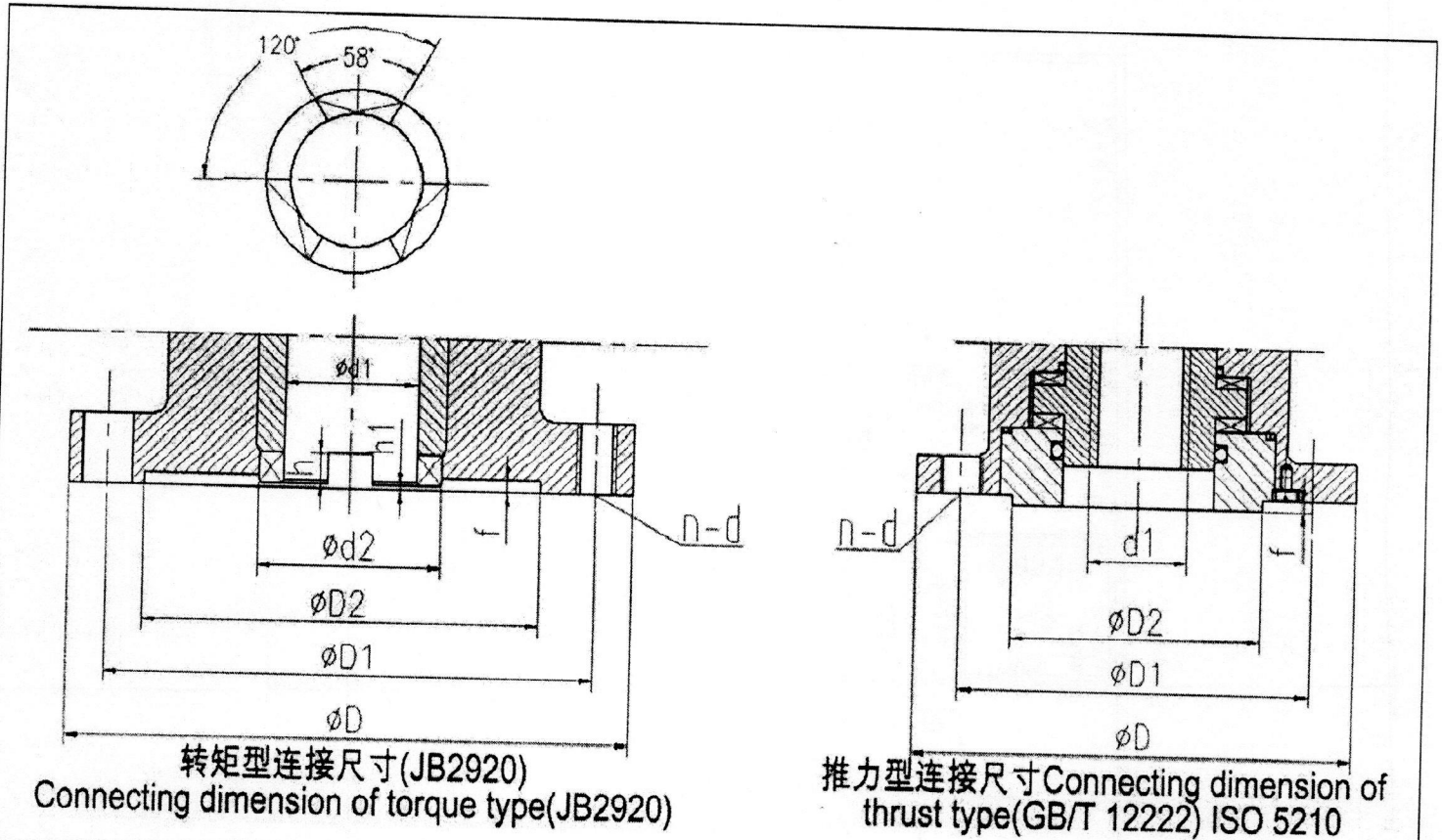
And then use the hand wheel to make the valve at full open position (while reached the position, rotate backwards for 2 circles), enter the main menu: "basic setting", select "open position setting" and press "confirm" to save the open position value and log off.

## 九.连接尺寸

### 9. Connecting dimension

Z 系列阀门电动装置与阀门连接的结构示意图及尺寸见表。

The Connection drawing and dimensions between Z series valve electric device and valve can be found in below table.



转矩型 Torque type JB2920

推力型 Thrust type GB/T12223-2005

电装型号 Type	机座号 Engine base	D	D1	D2 H9	d2	d1	h	h1	f	n-d	法兰号 Flange No.						
											D	D1	D2 f8	d1 (Max)	n-d	f	
Z5-15	2	145	120	90	45	30	8	2	5	4-M10	F10	125	102	70	Tr28	4-M10	3
	21	115	95	75	39	26	6	2	4	4-M8							
Z20-30	3	185	160	125	58	42	10	2	5	4-M12	F14	175	140	100	Tr36	4-M16	4
	31	145	120	90	45	30	8	2	5	4-M10							
Z45-60	4	225	195	150	72	50	12	2	5	4-M16	F16	210	165	130	Tr44	4-M20	5
Z90-120	5	275	235	180	82	62	14	2	5	4-M20	F25	300	254	200	Tr60	8-M16	5
	51	230	195	150	72	50	12	2	5	4-M16							
Z180-250	7	330	285	220	98	72	16	3	6	4-φ27	F30	350	298	230	Tr70	8-M20	5
Z350-500	8	380	340	280	118	82	20	3	6	8-φ22	F35	415	356	260	Tr80	8-M30	5

注：以上参数为常规供货，如有特殊需要可在订货时说明。

Note: Above parameters are for regular product, for specified requirements, it can be specified in the purchase order.

## 十.参数表

### 10. Parameters

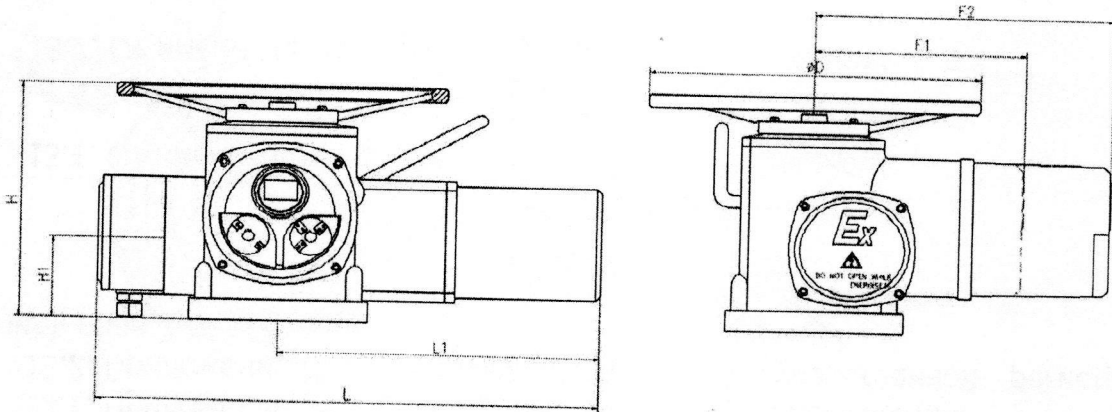
型号 规格 Type	输出扭矩 Output torque (N/m)	输出转速 Output rotation speed r/min	最大阀杆 直径 Max. valve rod dia.( mm)	手 动 速 比 Manual speed ratio	电机功率 Motor power(W)	额定电流 Rated current(A)	参考重量 Reference weight(Kg)
Z5	50	18	28	1:1	0.12	0.6	20
Z10	100	18	28	1:1	0.18	1	20
Z15	150	18	28	1:1	0.25	1.2	20
Z20	200	18	40	1:1	0.37	1.38	26
Z30	300	18	40	1:1	0.55	2.7	26
Z45	450	24	48	1:1	1.1	4	110
Z60	600	24	48	1:1	1.5	4.12	120
Z90	900	24	60	1:1	2.2	5.25	139
Z120	1200	24	60	1:1	3	7.9	142
Z180	1800	18	70	22.5:1	4	8.87	250
Z250	2500	18	70	22.5:1	5.5	12.05	255
Z350	3500	18	80	20:1	7.5	15.6	330
Z500	5000	18	80	20:1	10	20.5	350

注：以上参数为常规供货，如有特殊需要可在订货时说明。

Note: Above parameters are for regular product, for specified requirements, it can be specified in the purchase order.

# 十一.外形尺寸

## 11. Outline dimension

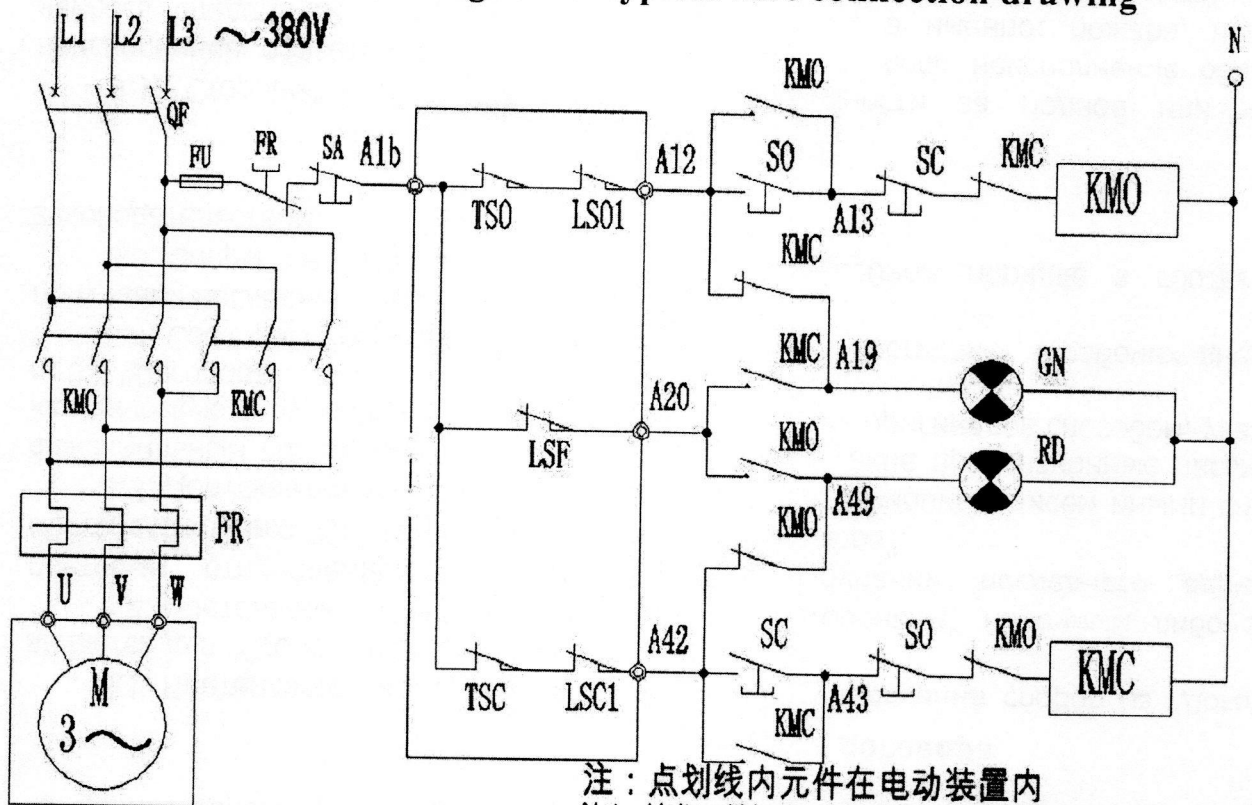


尺寸 Size 型号 Type	L	L1	H	H1	F1 普通型 Normal type	F2 智能型 Intelligent type	φD
Z5-15	382	228	233	87	150	203	300
Z20-30	435	278	248	90	157	210	350
Z45-60	640	410	325	116	268	380	420
Z90-120	830	540	450	200	685	510	550
Z180-250	870	565	600	250	740	535	320
Z350-500	1170	770	710	280	840	450	570



## 十二. 电器原理图及典型接线图

### 12. Electrical schematic diagram & typical wire connection drawing



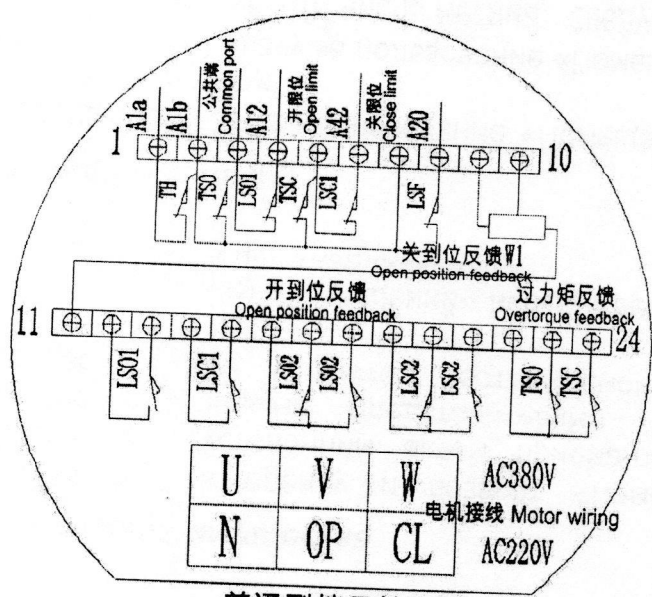
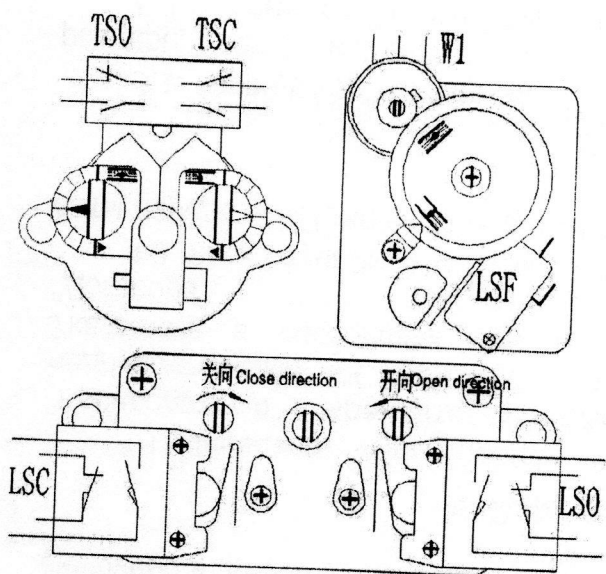
注：点划线内元件在电动装置内

Note: Units within the dotted line are inside the electric device

◎ 为引出线号

is the symbol of extension line

代号 Code	名称 Name	型号 Model	数量 Qty	备注 Note	代号 Code	名称 Name	型号 Model	数量 Qty	备注 Note
FR	热继电器 Thermorelay		1	用户自备 Customer provide themselves	LSF	闪光开关 Flash switch	V-157	1	
KMO KNC	交流接触器 AC Contactor	GJ10	1		W1	电位器 Potentiometer	WX14-12	1	
SA SO SC	按钮 Button	LA11-11D	3		M	电机 Motor	YDF2-W	1	
TSO TSC	转矩开关 Torque switch	DK3-2A	1		TH	热敏开关 Thermal switch		1	特殊订货 Special Order
LSO LSC	行程开关 Travel switch	HWK-22A	1		RT	空间加热器 Space heater		1	



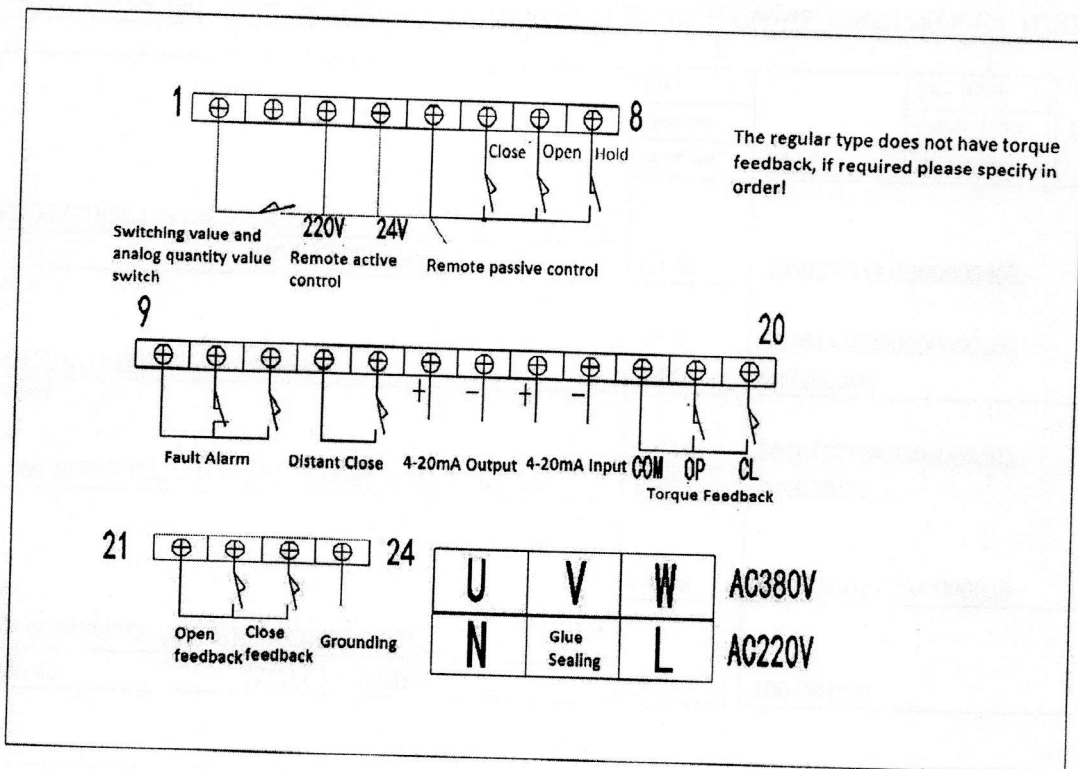
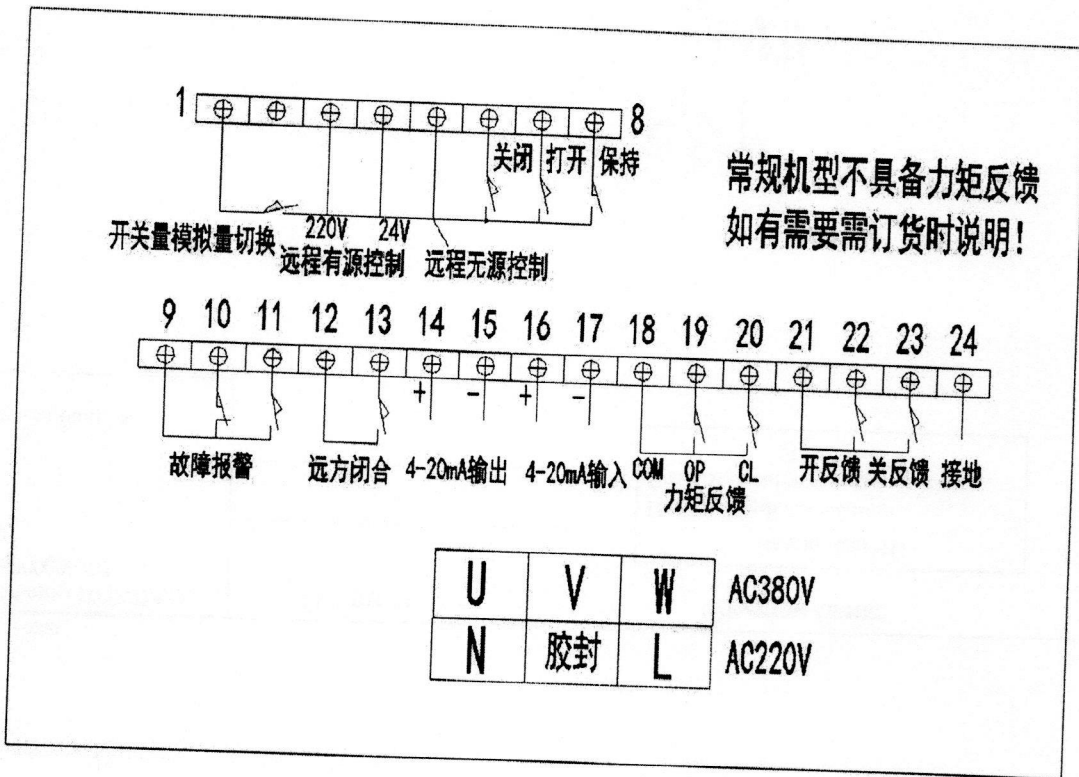
普通型端子接线图  
Terminal Wiring diagram for Normal type

注：具体接线以实际为准，以上接线仅供参考！

Note: Above wire connection is only for reference, actual wire connection should refer to the product!

### 十三.智能型端子接线图

### 13. Intelligent terminal connection drawing



## 十四.非侵入控制器调试说明

### 14. Instruction of commissioning of Non-invasive control unit

#### (一). 操作说明

##### Part 1. Instruction of operation

##### 1. 旋钮操作说明

##### (1) Instruction of operation of buttons

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，反向旋或将方式钮旋到停止，即停止动作。

The red button is the mode button, it can be switched between Site/Stop/Distant. It can also be achieved by save the menu (from "Stop" to "Site") or log out (from "Stop" to "Distant"). The black button is operation button, it can start off or shut down the operation while at "site" mode, or it can be achieved by add-subtract in the setting mode. While the operation is at the "site" mode, short time operation is site inching mode, and when the effective operation time exceeds 3 seconds, the alarm area will show "bc" means that it goes into Field holding mode, reverse operate the operation button or switched the mode button to "stop", the move will be stopped.

##### 2. 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）

(2) Instruction of operation for the remote control (Remote control is optional, if required please specify in the ordering information)

Up --开位标定键

Open calibration button

Enter --确认/保存键

Confirm/Save button

Open --现场打开键

Site open button

Down --关位标定键

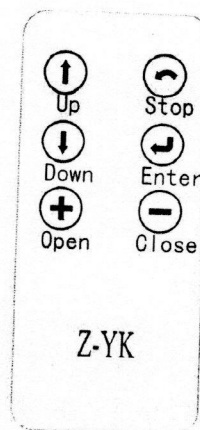
Close calibration button

Stop --停止/退出键

Stop/log out button

Close --现场关闭键

Site close button



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”键用于保存行程，“Stop”键用于返回。



At site mode, press "open" button is to activate open valve at holding mode, press "close" button is to activate close valve at holding mode, press "stop" button is to stop moving. At site mode, press "up" button in consecutive 3 times will enter open position calibration status. "open", "close" and "stop" button will control the electric actuator to perform open, close and stop respectively, "enter" button is used to save the travel, "stop" button is used to get back.

现场方式，连接三次“Down”键进入关位标定状态，其它操作同上。

At site mode, press "down" button in consecutive 3 times will enter close position calibration status, and the other operations are the same as above.

## (二). 信号查询 (显示屏左下角为信号查询区)

### Part 2. Signal finding (the left bottom area is the signal finding area)

#### 1. 远控信号查询

##### a. Remote signal finding

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。

Switch the mode button to "distant", the left bottom area of the screen will show the remote control signal received. Switching type: OP stands for remote open, GL stands for remote close, bc stands for remote holding (If many status co-exists, the signal will show alternately). Regulation type: shows the control circuit value of voltage value received.

#### 2. 阀位信号查询

##### (2) Valve position signal finding

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)。

Switch the mode button to site, the left bottom area of the screen will show the valve position signal. If the valve position detector is potentiometer, it will show the percentage of the resistance (d01~d99). If the valve position detector is 12-digit encoder it will show the percentage of the encoder (b00~b99). If the valve position detector is 18-digit encoder it will show the permillage of the encoder (000~999).

## (三). 行程标定

### Part 3. Travel calibration

注：先确定电动执行器的转向和力矩接线正确，并调整好电位器或编码器的旋转区间。

Note: First make sure the rotation direction of the electric actuator and the wire connection of the torque is correct, and regulate the rotation range of the potentiometer or the encoder.

#### 1. 关位标定

### (1) Close position 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。

At the stop position, rotate the operation button to close for about 3 seconds, wait until flickering display of letter "L" and then release the operation button and switched the mode button to "site". Now the L should not be flickering and that means it enters close position calibration status. Electric open or electric close actions can be achieved by the operation button, when it reached to the close position, switched the mode button to stop and then switched it to site. At this time, the red light and letter "L" will flicker twice, output 4mA feedback current and shows 0% means that the close position calibration is completed. If the mode button was switched from "stop" to "distant" the travel calibration will directly ends.

### 2. 开位标定

#### (2) Close position 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% 表示开位标定完成。若方式钮由停止旋至远方则直接退出行程标定。

At the stop position, rotate the operation button to open for about 3 seconds, wait until flickering display of letter "H" and then release the operation button and switched the mode button to "site", Now the H should not be flickering and that means it enters open position calibration status. Electric open or electric close actions can be achieved by the operation button, when it reached to the open position, switched the mode button to stop and then switched it to site. At this time, the green light and letter "H" will flicker twice, output 20mA feedback current and shows 100% means that the open position calibration is completed. If the mode button was switched from "stop" to "distant" the travel calibration will directly ends.

**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。**

**Note: While saving the travel, if Fu or Fn alarmed, please re-regulate the rotation range of potentiometer or encoder and re-calibrate the travel.**

### (四) 输出电流微调

#### Part 4. Output current micro-adjusting

##### 1. 4mA 输出电流微调

###### (1) 4mA output current micro-adjusting

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。

At the stop position, rotate the operation button to close for about 10 seconds, wait until flickering display of letter "LF" and then release the operation button and switched the mode button to "site" and then to stop, it will enter 4mA output current micro-adjusting status. At this time the output current value can be adjusted by adjusting the operation button, adjust the output current to 4mA and then switched the mode button to site, at this time the red light flickers 3 times and that shows the 4mA output current micro-adjusting is completed. If the mode button was switched from stop to distant the micro-adjusting will directly ends.

## 2. 20mA 输出电流微调

### (2) 20mA output current micro-adjusting

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。

At the stop position, rotate the operation button to open for about 10 seconds, wait until flickering display of letter "HF" and then release the operation button and switched the mode button to "site" and then to stop, it will enter 20mA output current micro-adjusting status. At this time the output current value can be adjusted by adjusting the operation button, adjust the output current to 20mA and then switched the mode button to site, at this time the green light flickers 3 times and that shows the 20mA output current micro-adjusting is completed. If the mode button was switched from stop to distant the micro-adjusting will directly ends.

### (五) . 死区设置 (此功能只适用于调节型)

Part 5. Dead zone setting(This function is only applicable for regulation type)

死区为自调整, 无需设置, 且精度更高无振荡。

Dead zone is self-adjusting and no need for setting.The accuracy is higher and there is no vibration.

### (六) . 高级设置

Part 6. Advanced setting

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。

Note: At advanced setting, the power should be off, the mode button should be at stop position, the red light(close position light), green light(open position light), close position button and open position button should be on the circuit board.

#### 1. 丢信动作 (仅调节型有此设置, 默认设置---丢信保位)

(1) Loss of signal position (only regulation type has such setting, the default setting is fail in place).

a、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。

a. Press the close position button and power on for about 3 seconds, release the button when the red light shines for the first time, the red light flickers for 3 times and the loss of signal is set at "fail to the close position".

b. 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。

b. Press the open position button and power on for about 3 seconds, release the button when the green light shines for the first time, the green light flickers for 3 times and the loss of signal is set at "fail to the open position".

c. 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。

c. Press both buttons and power on for about 3 seconds, release both buttons when both lights shine, both lights flicker for 3 times and the loss of signal is set at "fail in place".

## 2. 控制电流标定 (仅调节型有此设置)

(2) Calibration of control current (only regulation type has such setting).

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。

Input 4mA current, press close position button and power on for about 10 seconds, release the button when the red light shines for the second time, the red light flickers for 3 times shows the calibration is finished.

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。

Input 20mA current, press open position button and power on for about 10 seconds, release the button when the green light shines for the second time, the green light flickers for 3 times shows the calibration is finished.

## 3. 正反作用 (仅调节型有此设置, 默认设置---正作用)

(3) Positive and Negative positioning (only regulation type has such setting, default value-positive positioning).

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。

Below two buttons power on for about 10 seconds, release the button when two lights on for the second time. The red light on stands for positive positioning, the green light on stands for negative positioning. Short press any button to interchange the setting, press below two buttons at the same time for about 3 seconds, release the button when both lights were on, both lights shine for 3 times shows the setting is completed.

## 4. 两线控制设置 (仅开关型有此设置, 默认设置---常规控制)

(4) Two wire control setting (only regulation type has such setting, default value-regular



control).

a、按住关位键上电约 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”。

a. Press the close position button and power on for about 10 seconds, release the button when the red light shines for the second time, the red light flickers for 3 times and the setting is at “Close with signal, Open without signal”

b、按住开位键上电约 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”。

b. Press the close position button and power on for about 10 seconds, release the button when the green light shines for the second time, the green light flickers for 3 times and the setting is at “Open with signal, close without signal”.

c、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”。

c. Press both buttons and power on for about 10 seconds, release both buttons when both lights shines for the second time, both light flickers for 3 times and the setting is at “Regular control”.

5. 关闭方向 (默认设置---顺时针)

(5) Close direction (default value-clockwise).

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。

Press below buttons at the same time for about 20 seconds, release the button when both lights on for the third time. The red light on shows clockwise, red light on shows counterclockwise, short press any button to interchange,press both buttons for about 3 seconds, release the button when both lights are on, the relevant lights flickers for 3 times shows the setting is completed.

(七) 报警信息说明 (显示屏右下角为报警区)

Part 7. Alarming information instruction (Lower right area of the screen is the alarming area)

故障码 Malfunction code	故障信息 Malfunction description	故障码 Malfunction code	故障信息 Malfunction description
FA	转向出错 Wrong rotation direction	FL	限位开关、力矩开关 接线反或开路 Wrong wiring or open circuit for Limit switch, torque switch
Fb	比例标定错误 Ratio calibration mistake Fb 闪烁 3 次 Fb flicker for 3	FO	开过矩 Open over torque

	times		
FC	关过矩 Close over torque	FP	电源缺相 Power supply loss of phase
Fd	堵转或其它原因导致的 阀位不变化 Rotation blocked or valve position stuck caused by other reasons	FS	DC4-20mA 远控信号丢失 DC 4-20mA remote control signal loss
FE	电机温度开关断开 或力矩公共端开路 Motor temperature switch off or torque common port open circuit	Fu	阀位电位器或编码器 转角过大 Valve position potentiometer or excessive encoder rotation angle
FF	阀位故障 (电位器开路、 接线错或编码器故障) Valve position malfunction(potentiometer open circuit, wrong wiring or encoder mistake)	Fn	阀位电位器或编码器 转角过小 Insufficient rotation angle
FH	远控开、关信号同在 Remote control open/close signal on at the sametime		

(八) 常见问题处理方法

Part 8. Handling of common problems

通电指示灯和显示屏不显示 Connection light off and screen display fail	A.电源实际未接入 Power not on B.电压过低 Low voltage C.接线错 Wrong wiring D.电路坏 Broken circuit
工作中灯和显示屏显示异常 Lights and screen display abnormal	A.故障码 Malfunction code B.查询信息 Search for info C.指示灯或显示屏坏需更换电路 Light off or screen damage, need to change circuit
通电现场和远控均不动作 No function on Site and distant mode while power on	A.接线错或开路 Wrong wiring or open circuit B.故障保护 Failure protection C.电机坏或卡死 Motor damage or stuck D.启动电容坏 Starting capacitance broken E.电路坏 Electric circuit broken



<p>现场工作正常但远控不动作 Site mode normal but distant mode does not function</p>	<p>A.无信号或接线反 No signal or wrong wiring B.旋钮板坏或没在远方 Knob board broken or not at the distant mode C.正/反作用设错 Wrong positive/negative positioning D.电路坏 Electric circuit broken</p>
<p>现场不动作但远控工作正常 Site mode does not function but distant mode is normal</p>	<p>A.旋钮板坏或没在现场模式 Knob board broken or not at the site mode B.操作钮未旋到位 operation button not in place C.电路坏 Electric circuit broken</p>
<p>能开不能关或能关不能开 Can open cannot close or can close but cannot open</p>	<p>A.力矩接线错或开路 Torque wiring mistake or open circuit B.到限位或过矩 Reached limit or over torque C.电机坏或堵转或接线错 Motor broken or stuck or wiring wrong D.电路坏 Electric circuit broken</p>
<p>无控制信号通电立即动作 Immediate function once power on without control signal</p>	<p>A.接线错 Wrong wiring B.控制信号实际有效存在 Control signal is actually valid C.丢信动作 Loss of signal position D.设为两线控制 Set as two wire control E.电路坏 Electric circuit broken</p>
<p>中间位置能动作到限位不动 Can move at middle position but cannot move at limit position</p>	<p>A.力矩开关接线反 Opposite torque switch wiring B.恰巧到位电机坏或接线开路 Motor broken or open circuit C.电路坏 Electric circuit broken</p>
<p>动作方向反 Opposite moving direction</p>	<p>A.电机接线反 Opposite Motor wiring B.阀位标定反 Opposite valve position calibration C.正/反作用或关闭方向设反 Opposite positive/negative positioning or closing direction settings D.信号反 Opposite signal</p>
<p>无输出电流或时有时无 No or sporadic output current</p>	<p>A.输出接线错或接触不良 Output wiring mistake or poor contact B.电位器或编码器故障或接触不良 Failure or poor contact of potentiometer or encoder C.电路坏 Electric circuit broken</p>

<p>反馈电流偏大或偏小或不变 Feedback current greater or smaller or does not change</p>	<p>A. 电位器或编码器故障 potentiometer or encoder failure B. 标定错 Wrong calibration C. 电位器与传动齿轮啮合不好 Bad engage of potentiometer and transmission gear D. 电路坏 Electric circuit broken</p>
--	--



## 十五.故障及排除方法

### 15. Failure and Solving method

序号 No.	故障 Failure	原因 Cause	排除方法 Solving method
1	电机无法启动 Motor cannot start	1. 电源线松脱 Loose power supply wire 2. 控制线路故障 Control wire problem 3. 行程或转矩机构失灵 Travel or torque device failure	1. 检查电源线 Check power supply wire 2. 排除线路故障 Check control wire 3. 排除行程或转矩故障 Check travel and torque failure
2	输出轴旋转方向不符合规定 Output shaft rotation direction mistake	电源线相序接反 Opposite phase sequence of power supply wires	调换任意两根电源线 Interchange any two power supply wires
3	电机过热 Motor overheat	1. 连续工作时间太长 Continuous work for too long 2. 电机与电动执行装置不配套 Motor and motor actuator device not suitable 3. 缺相 Loss of phase	1. 停止运行, 使电机冷却 Stop working and cool the motor 2. 检查配套情况 Check the connection between motor and motor actuator 3. 检查电源线 Check power supply wire
4	运行中电机停转 Motor stop rotating at work	1. 转矩控制动作 Move torque control 2. 阀门故障 Valve failure	1. 增大整定转矩 Increase setting torque 2. 检查阀门 Check the valve
5	到位后电机不停或灯不亮 Motor doesn't stop or light not on while in position	1. 行程或转矩机构故障 Travel or torque mechanism failure 2. 行程控制器调整不当 Inappropriate travel control adjustment	1. 检查行程力矩机构 Check the travel torque mechanism 2. 重新调整行程机构 Re-adjust the travel control mechanism

**特别告知: 如有更改恕不另行通知**

**Special Notice: If there is change, we are sorry we will not inform you**