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上海奥玛测控设备集团有限公司

Shanghai Aoma Measurement and Control Equipment Group Co., Ltd

上海奥玛自控阀门有限公司

Shanghai Aoma Automatic Control Valve Co., Ltd

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单位:上海奥玛自控阀门有限公司

地址:上海市浦东新区航头路1808号

奥玛

Professional
Electric Actuators
专业电动执行器



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COMPANY PROFILE



企业简介

上海奥玛自控阀门有限公司座落于:中国魔都上海浦东新区航头路1808号,公司是一家致力于电动执行器、电动阀门、气动执行器、气动阀门和控制阀解决方案的生产销售及技术服务的企业。

立足市场,着眼未来服务于环保水务、石油化工、冶金电力、食品酿造及自动化领域。

我们始终坚信质量是企业的生命这一理念,以“务实求品质,创新铸造品牌”为企业宗旨,走科技创新之路,“科技创新,开拓进取”是我们奥玛企业孜孜以求、不断努力的方向。以匠心精神“做专、做强、做精”,描绘奥玛企业发展的宏伟蓝图,将以优良的品质、完善的服务体系,真诚的欢迎您光临和惠顾。

Shanghai Aoma Automatic Control Valve Co., Ltd. is located in: No. 1808, Hangtou Road, Pudong New Area, China. The company is a company dedicated to electric actuators, electric valves, pneumatic actuators, pneumatic valves and control valve solutions Program production, sales and technical service enterprises.

Based on the market, focus on the future to serve environmental protection water, petrochemical, metallurgical power, food brewing and automation Chemical.

We always firmly believe that quality is the life of the enterprise, with the concept of "pragmatic quality, innovation to cast the brand" For the purpose of the enterprise, take the road of scientific and technological innovation, "scientific and technological innovation, pioneering and enterprising" is our Aoma enterprise diligent pursuit, The direction of continuous efforts. With the spirit of ingenuity "be specialized, strong, and refined", it depicts the magnificent blue of Aoma's enterprise development Figure, with excellent quality, perfect service system, sincerely welcome you to visit and patronize.



奥玛多年来致力于阀门驱动装置设计和材料方面的研发与改进

Aoma has been committed to valve design for many years Research work on planning and materials



产品展示 Product Showcase

矿用电动执行器

ELECTRIC ACTUATORS FOR MINING



Z/Q型智能一体化执行器

Z/Q TYPE INTELLIGENT INTEGRATED ACTUATOR



产品展示 Product Showcase



产品展示 Product Showcase

使用说明 INSTRUCTIONS FOR USE



一：产品概述 PRODUCT OVERVIEW

多回转阀门电动执行器，统称为Z系列执行器，是阀门实现开启、关闭、调节控制的驱动设备。本系列执行器具有功能全、性能可靠、控制系统先进、体积小、重量轻、使用维护方便等特点。

Z系列执行器适用于启闭件做直线运动的阀门、如闸阀、截止阀、隔膜阀、柱塞阀、截流阀、水闸门等，可用于明杆阀，也可用于暗杆阀。可对阀门进行远控、集控和自动控制，广泛应用于电力、冶金、石油、化工、制药、污水处理、农业灌溉等行业。

本系列普通型产品性能符合GB/T24923-2010《普通型阀门电动装置技术条件》的规定；

本系列隔爆型产品性能符合GB3836.1-2010《爆炸性环境 第1部分：通用要求》、GB3836.2-2010《爆炸环境 第2部分：由隔爆外壳“d”保护的设 备》及GB/T24922-2010《隔爆型阀门电动装置技术条件》的规定。

Multi-turn valve electric actuator, collectively known as Z series actuator, is the driving equipment for valve opening, closing and adjustment control. This series of actuators has full functions, reliable performance, advanced control system, Small size, light weight, easy to use and maintain.

Z series actuators are suitable for valves with linear movement of opening and closing parts, such as gate valves, globe valves, diaphragm valves, plunger valves, shut-off valves, sluice gates, etc., which can be used for open rod valves and dark rod valves. Can be on the valve Remote control, centralized control and automatic control, widely used in electric power, metallurgy, petroleum, chemical, pharmaceutical, sewage treatment, agricultural irrigation and other industries.

The performance of this series of ordinary products conforms to the provisions of GB/T24923-2010 "Technical Conditions for Ordinary Valve Electric Devices";

The performance of this series of flameproof products complies with GB3836.1-2010 "Explosive atmospheres - Part 1: General requirements", GB3836.2-2010 "Explosive atmospheres - Part 2: Protected by flameproof shell "d" and GB/T24922-2010 "Technical Conditions for Flameproof Valve Electric Devices".

二：产品分类 PRODUCT CLASSIFICATION

按控制方式分：普通型、智能开关型、智能调节型（Profibus现场总线、Modbus现场总线、Hart现场总线、FF现场总线、Device Net现场总线）；

按防护类型分：户外型和防爆型；

按连接方式分：转矩型和推力型；

According to the control mode: ordinary type, intelligent switch type, intelligent adjustment type (Profibus fieldbus, Modbus fieldbus, Hart fieldbus, FF fieldbus, Device Net fieldbus);

According to the type of protection: outdoor type and explosion-proof type;

According to the connection method: torque type and thrust type;

三：主要技术指标 MAIN TECHNICAL INDICATORS

输入信号 Input signal	4mA~20mA;无源触点 Passive contact	
供电电源 Power supply	常规 Conventional	三相 Three phase:AC380V(50Hz)
	特殊 Special	三相 Three phase:AC660V、AC440V、AC415V(50Hz、60Hz)
		单相 Simplex:AC220V、AC110V(50Hz、60Hz)
		DC24V
基本误差限 Basic error limit	≤1%	
防护等级 Protection class	IP65、IP68	
防爆型等级 Explosion proof grade	ExdII Bt4、ExdII CT4、ExdII CT6;	
环境温度 Ambient temperature	-30°C~+70°C(可选 Optional: -40°C~+100°C)	
环境湿度 Environment humidity	≤95% (25°C时)	
电机工作制: 标配长时电机, F级绝缘 Motor working system: Standard long-term motor, F-class insulation		

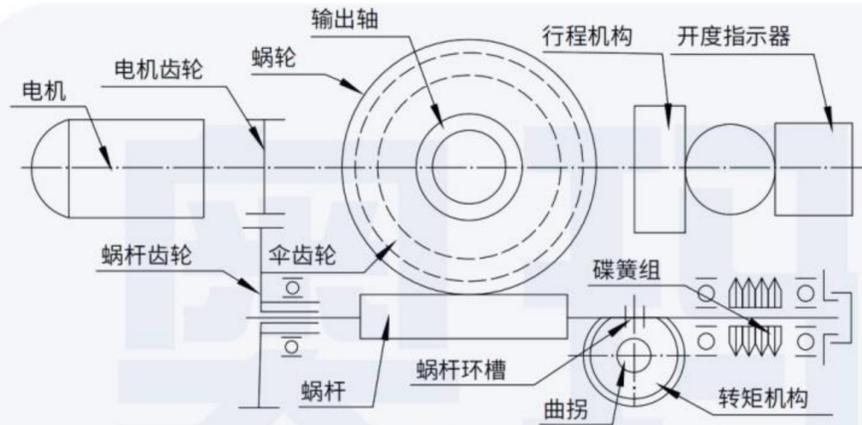
四：性能参数表 PERFORMANCE PARAMETER TABLE

型号/规格 Model/Specification	输出转矩 Output torque (N.m)	输出转速 Output speed (min)	手动速比 Manual speed ratio (手轮/输出) (handwheel/output)	电机功率(KW) Motor power (380V)	额定电流(A) Rated current (380V)	参考重量 Reference weight (Kg)
AMZ05	50	18/24	1:1	0.09/0.12	0.26/0.40	15.2
AMZ10	100	18/24	1:1	0.12/0.18	0.40/0.80	15.8
AMZ15	150	18/24	1:1	0.18/0.25	0.80/0.90	16.2
AMZ20	200	18/24	1:1	0.37/0.55	1.05/1.30	24.2
	200	36/48	1:1	0.55/0.75	1.30/1.80	25.8
AMZ30	300	18/24	1:1	0.55/0.75	1.8	25.8
AMZ45	450	18/24	1:1	1.1	2.5	63.2
AMZ60	600	18/24	1:1	1.5	3.2	65.2
	600	36/48	1:1	2.2	4.5	67.5
AMZ90	900	18/24	1:1	2.5	5.2	68.5
	900	36/48	1:1	3.0	6.3	69.8
AMZ120	1200	18/24	1:1	3.0	6.3	69.8

注：表示电站型联接尺寸
 以上参数为常规供货，如有特殊需要可在订货时说明
 Note: Indicates the size of the power station type connection
 The above parameters are regular supply, if there are special needs, they can be specified at the time of order

五：结构 STRUCTURE

阀门电动装置有六个部分组成，电机，减速器，控制机构，手-电动切换机构，手轮部件及电气部分，其传动原理见图一。
 The valve electric device is composed of six parts, motor, reducer, control mechanism, hand-electric switching mechanism, handwheel parts and electrical part, and its transmission principle is shown in Figure 1.

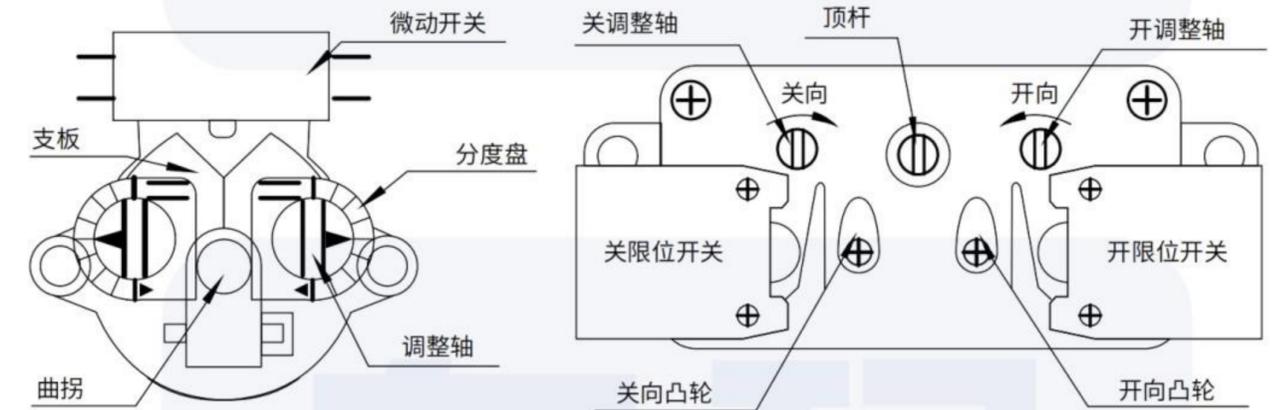


- | | | | |
|------------------------|--------------------------|-------------------|---------------|
| 电机: Electric machinery | 行程机构: Travel mechanism | 蜗杆齿轮: Worm gear | 蜗杆: worm |
| 电机齿轮: Motor gear | 开度指示器: Opening indicator | 伞齿轮: Bevel gear | 曲拐: Crank |
| 碟簧组: Disc spring group | 蜗杆环槽: Worm grooves | 输出轴: output shaft | 蜗轮: Worm gear |
| 转矩机构: Torque mechanism | | | |

图一 传动原理图
 Figure 1 Transmission schematic

- 电动机:采用YDF2-W户外型三相异步电机,该电机为短时工作制,额定持续工作时间为10分钟。
- 减速器:由一对正齿轮和蜗轮付组成,电动机的动力经减速器传递给输出轴。
- 控制机构:由转矩控制机构,行程控制机构及可调式开度指示器组成,用以控制阀门的开启和关闭及阀位指示。
 (1) 转矩控制机构(图二.一):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,以实现了对电动装置输出转矩的控制。

- Motor: YDF2-W outdoor three-phase asynchronous motor is adopted, the motor is a short-time working system, and the rated continuous working time is 10 minutes.
- Reducer: It is composed of a pair of spur gears and worm gears, and the power of the motor is transmitted to the output shaft through the reducer.
- Control mechanism: composed of torque control mechanism, stroke control mechanism and adjustable opening indicator, to control the opening and closing of the valve and the valve position indication.
 (1) Torque control mechanism (Figure 2. 1): It is composed of twists, stops, cam indexing plates, support plates and micro switches, when the output shaft is subjected to a certain resistance torque, the worm in addition to rotation, but also produces axial displacement, The rotation of the curve is driven and the stop is also produced by an angular displacement, which approaches the cam and lifts the support plate. When the torque on the output shaft increases to a predetermined value, the support plate is raised until the microswitch is activated and cut The power supply is cut off, and the motor is stopped to realize the control of the output torque of the electric device.



图二.一 转矩控制机构
 Figure 2.1 torque control mechanism

图二.二 行程控制机构
 Figure 2.Two stroke control mechanism

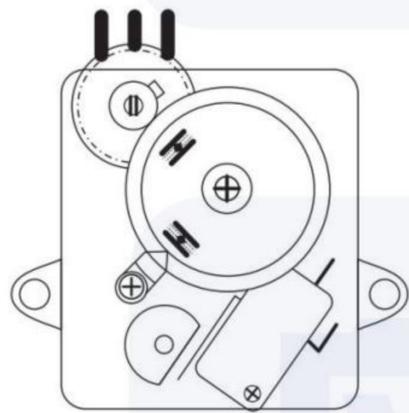
- | | | | |
|------------------------|---------------------------|--------------------------|--------------------|
| 微动开关: The micro switch | 关限位开关: Close limit switch | 调整轴: Adjustingshaft | 顶杆: Ejector pin |
| 支板: Supporting plate | 开限位开关: Open limit switch | 关调整轴: Offadjusting shaft | 关向: Guan Dao |
| 曲拐: Crank | 关向凸轮: Closed cam | 开调整轴: Adjusting shaft | 开向: Open direction |
| 分度盘: Dividingdisc | 开向凸轮: Open cam | | |

(2)行程控制机构(图二.二):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°,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°或270°再压迫微动开关动作。

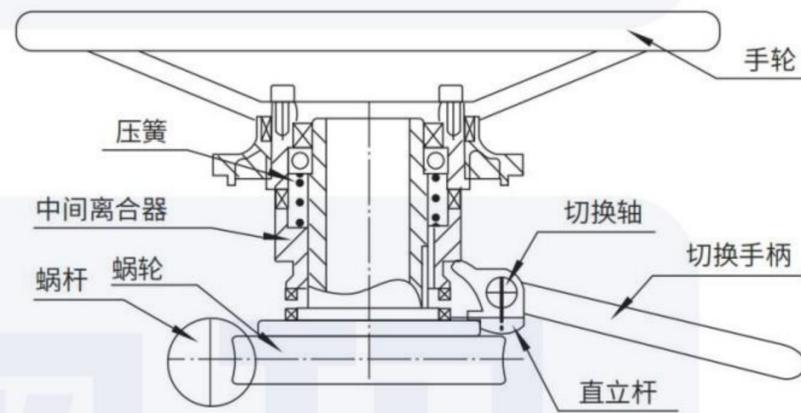
(2) Stroke control mechanism (Figure 2. Two): It is composed of decimal gear set, ejector rod, cam and micro switch, referred to as counter. Its working principle is driven by an active pinion (Z=8) in the gearbox The counter works. If the counter has been adjusted according to the position where the valve is open or closed, the cam will be turned 90° to compress the microswitch when the counter moves to the pre-adjusted position (number of turns) with the output shaft Act, cut off the power supply, the motor stops to achieve control of the stroke (number of turns) of the electric device. In order to control the valve with a large number of revolutions, the cam can be adjusted to rotate 180° or 270° and then compress the microswitch action.

(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,可根据所配阀门开圈的圈数,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,指示阀门的开变量,指示角度与阀门开变量同步,供远传指示阀门位置用。

(3) Adjustable opening indicator (Figure 3): It is composed of reduction gear set, adjusting gear, valve opening dial, cam, micro switch, and potentiometer. During on-site commissioning, it can be switched according to the equipped valve Number of turns, adjust the adjusting gear to the desired position and engage with the reduction gear set (there is a number for the desired number of turns on the column). When the valve is in the process of opening or closing, the opening disc rotates after deceleration, which refers to Show the switching amount of the valve, the indication angle is synchronized with the valve switch, for remote transmission to indicate the valve position.



图三 开度指示器
Fig.3 opening indicator



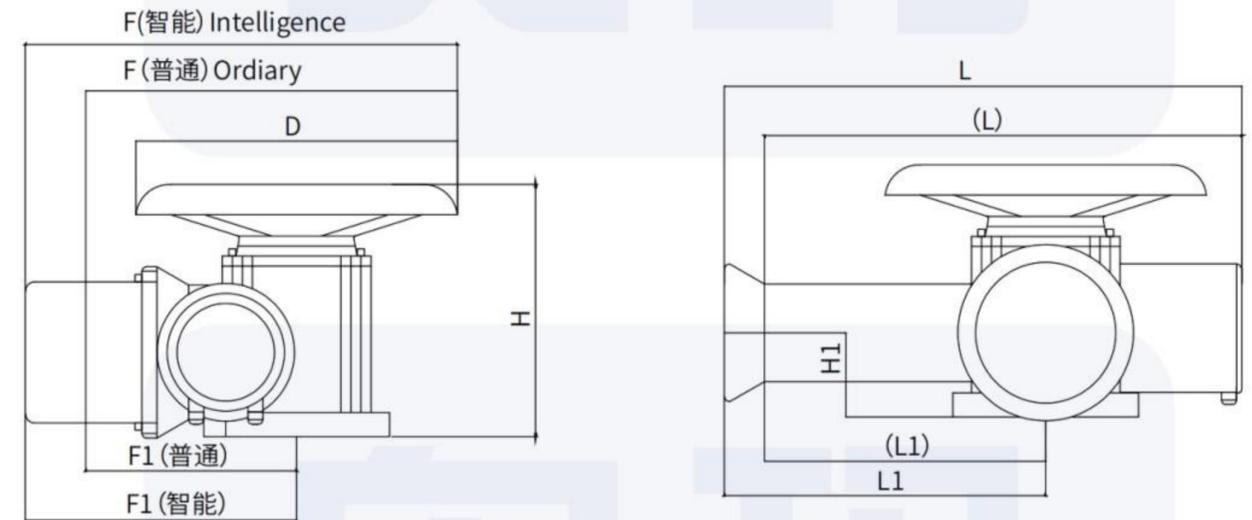
图四 手-电动切换机构
Figure.4 hand electric switching mechanism

压簧: Pressure spring
切换轴: Switching axis
直立杆: Upright pole
中间离合器: Intermediate clutch
切换手柄: Handover handle
手轮: handwheel
蜗轮: Worm gear
蜗杆: worm

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。

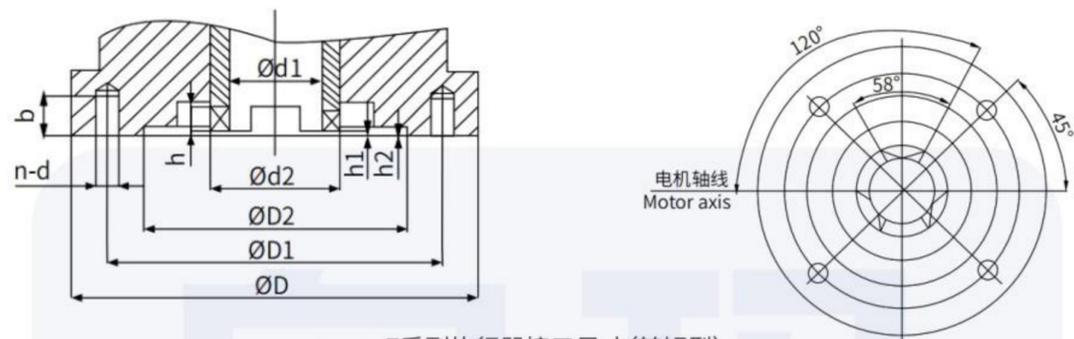
Hand-electric switching mechanism (Fig. 4): It is semi-automatic switching, and the switch handle needs to be triggered when the electric transformation is manual to manual, and it is carried out by itself when changing from manual to automatic (no need to trigger the switching handle). By electricity When the movement becomes manual, the switch handle is manually triggered to move the middle clutch on the output shaft upwards and compress the spring. When the handle is pushed to a certain position, the clutch disengages from the worm gear and engages with the manual shaft jaw, The force on the handwheel can be transmitted to the output shaft through the intermediate clutch, that is, it becomes a manual state. When the manual becomes electric, it switches automatically, and when the motor rotates to drive the worm gear to rotate, the upright rod immediately falls, in Under the action of the pressure spring, the middle clutch quickly moves in the direction of the worm gear, disengages from the manual shaft, and engages with the worm gear, then it becomes electric.

六: 外形尺寸 FORM FACTOR



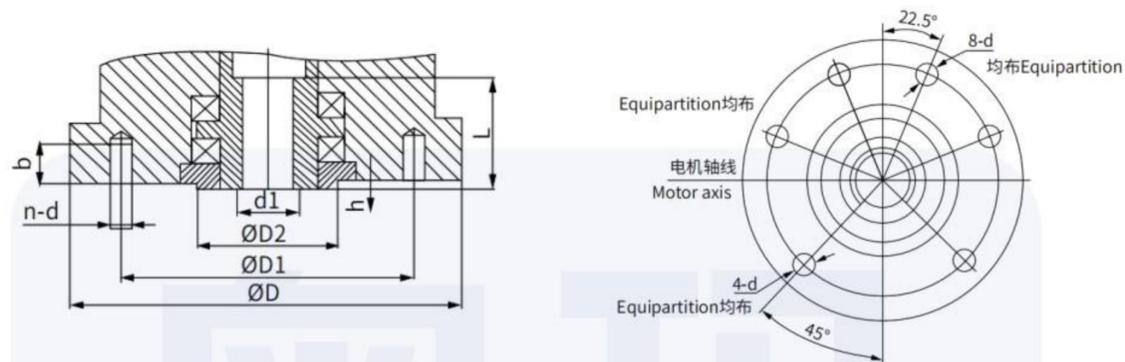
尺寸 SIZE 型号 MODEL	H	H1	F		F1		D	(L)	L	(L1)	L1
			普通	智能	普通	智能					
Z10	230	87	330	390	187	247	180	415	445	230	260
Z30	250	100	370	439	210	270	320	475	515	280	320
Z60	295	100	425	500	294	Z10	400	552		310	

七：法兰结构与连接尺寸 FLANGE STRUCTURE AND CONNECTION DIMENSIONS



Z系列执行器接口尺寸(转矩型)
Z series actuator interface size(torque type)

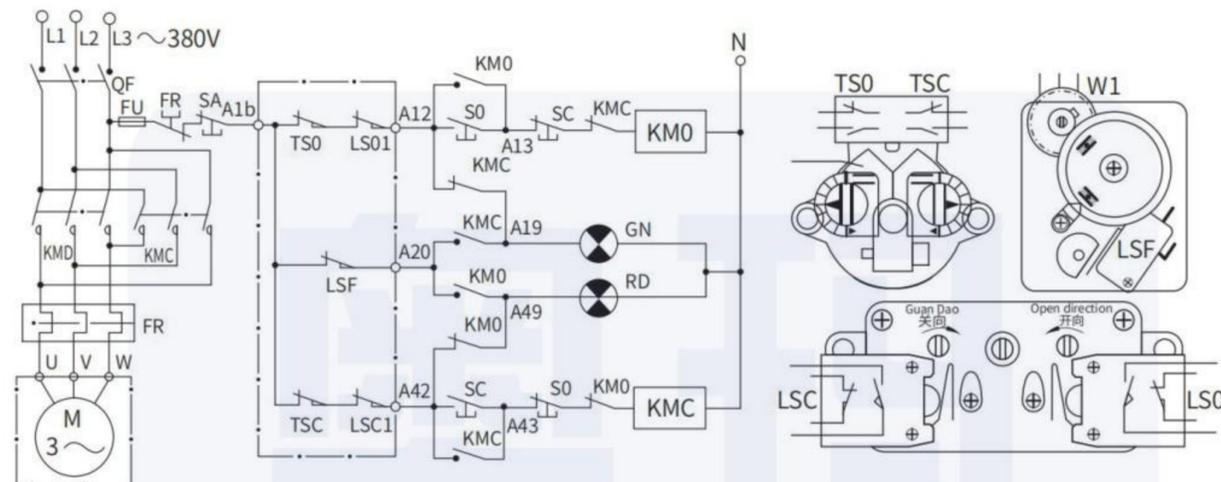
执行器型号 Model/Specification	法兰型号 Flange type	执行器输出接口尺寸明细Actuator output interface size details (转矩型Torque type Jb2920)										
		D	D1	D2	d1	d2	n-d	b	螺孔方向Direction of screw holes	h	h1	h2
Z05 Z10 Z15	2#(∪)	115	95	75	26	39	4-M8	20	45°	6	2	5
Z20 Z30	3#(∪)	145	120	90	30	45	4-M10	20	45°	8	2	5
Z45 Z60	4#	185	160	90	42	58	4-M12	20	45°	10	2	5
Z90 Z120	5#(∪)	225	195	125	52	68	4-M16	27	45°	12	2	5
Z90 Z120	5#	275	235	180	62	80	4-M20	40	45°	14	2	5



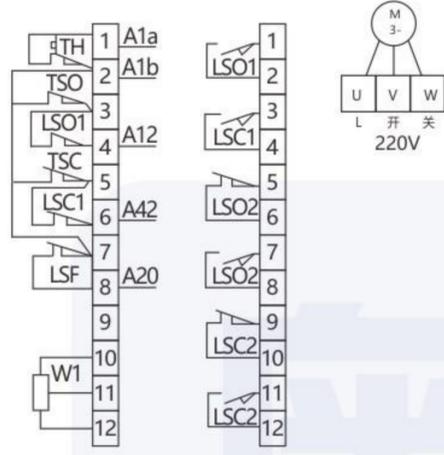
Z系列执行器接口尺寸(推力型)
Z series actuator interface size(Thrust type)

执行器型号 Model/Specification	法兰型号 Flange type	执行器输出接口尺寸明细Actuator output interface size details (推力型Thrust type GB1222)								
		D	D1	D2	d1梯形螺纹Trapezoidal thread (max)	n-d	b	螺孔方向Direction of screw holes	h	L
Z05 Z10 Z15	F10	125	102	70	Tr28	4-M10	16	45°	3	40
Z20 Z30	F14	175	140	100	Tr36	4-M16	25	45°	4	55
Z45 Z60	F16	210	165	130	Tr44	4-M20	35	45°	5	70
Z90 Z120	F25	300	254	200	Tr60	8-M16	30	22.5°	4	90

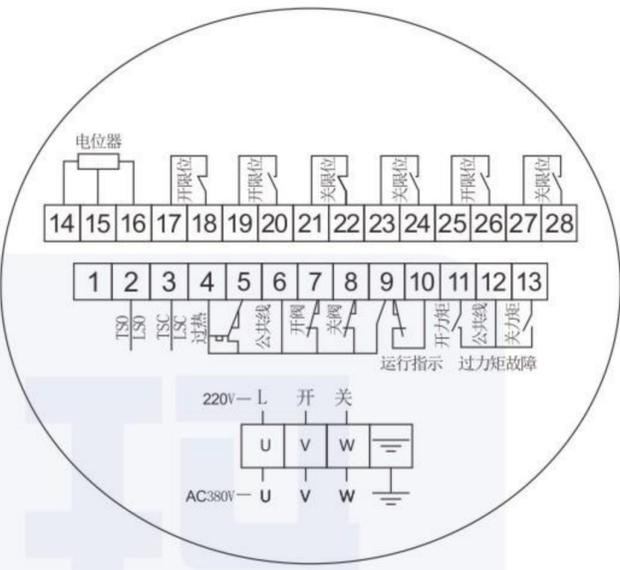
八：电器控制部分 ELECTRICAL CONTROL SECTION



代号 Code name	名称 Name	型号 Model	数量 Number	备注 Remarks	代号 Code name	名称 Name	型号 Model	数量 Number	备注 Remarks
FR	热继电器 Thermal relay		1	用户自备 User self provided	LSF	闪光开关 Flash switch	V-157	1	
KMOKMC	交流接触器 AC contactor	Gj10	1	用户自备 User self provided	W1	电位器 potentionmeter	WX14-12	1	
SASOSC	按钮 Button	LA11-11D	1	用户自备 User self provided	M	电机 Electric machinery	YDF2-W	1	
TSOTSC	转矩开关 Torque switch	DK3-2A	1	用户自备 User self provided	TH	热敏开关 Thermosensitive switch		1	特殊订货 Special order
LSOLSC	行程开关 Travel switch	HWK-22A	1	用户自备 User self provided	RT	空调加热器 Space heater		1	特殊订货 Special order



220V/380V普通开关型接线图
220/380V common switch type



220V/380V防爆端子接线图
220V380 Explosion-proof terminal wiring diagram

九:安装方法及使用注意事项 INSTALLTION METHODS AND PERCAUTIONS FOR USE

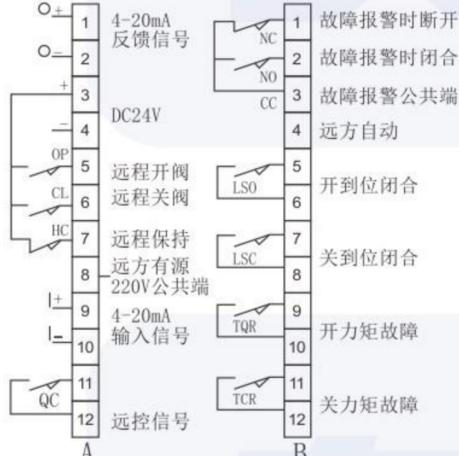
- 1.本装置可垂直安装,水平安装,当电机不可向下,应便于接线,调试和手动操作。
 - 2.安装与阀门联接的牙嵌轴向间隙不小于1-2毫米。
 - 3.安装后初次使用必须按调试要求进行逐项调试,经查各部件正常后才能投入使用。
 - 4.本装置系采用电动装置用三相异步电机,额定持续工作时间为10分钟调试时应予注意。
 - 5.搬运时要小心轻放,保持干燥,防止接触腐蚀性物质,以免损坏电气元件和机械零件。
1. The device can be installed vertically and horizontally. When the motor cannot be installed downward, it shall be convenient for wiring, debugging and manual operation.
 2. The axial clearance of the jaw connected with the valve shall not be less than 1-2mm.
 3. The first use after installation must be debugged item by item according to the debugging requirements, and the components can only be put into use after they are normal.
 4. The device adopts three-phase asynchronous motor for electric device, and attention shall be paid when the rated continuous working time is 10 minutes for commissioning.
 5. Handle with care, keep dry and prevent contact with corrosive substances to avoid damage to electrical components and mechanical parts.

十:调整 ADJUSTMENT

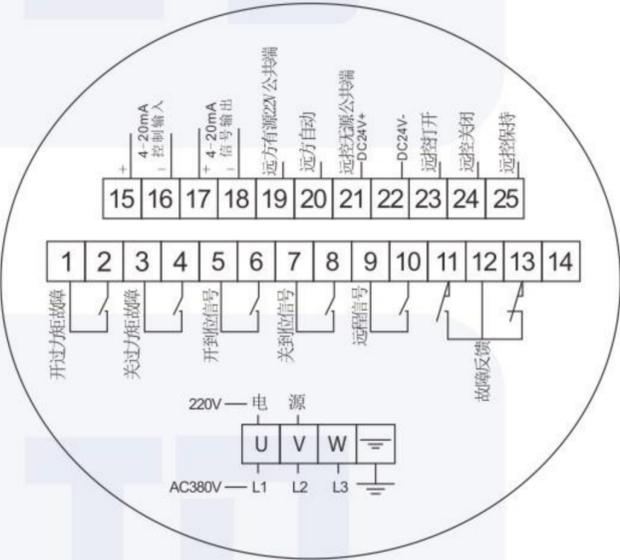
调整转矩,行程时,必须检查位置指示器上的电位器是否已脱开(把电位器轴上齿轮的紧定螺钉松开即可脱开)以防损坏。特别注意:新安装的电动装置首次电动时,必须检查电机相序,控制线路接线是否正确,以防电机失控。

When adjusting the torque and stroke, it is necessary to check whether the potentiometer on the position indicator is disengaged (loosen the set screw of the gear on the potentiometer shaft to be disengaged) to prevent damage. Special attention: when the newly installed electric device is powered for the first time, it is necessary to check the phase sequence of the motor and whether the wiring of the control circuit is correct, so as to prevent the motor from losing control.

- 1.转矩控制机构调整:
- (1) 首先调整关转矩。
 - (2) 从小转矩值开始,逐渐增大转矩值直到阀门关严为止。
 - (3) 根据阀门工作特性调整开关方向转矩,一般开方向转矩要比关方向转矩大。
 - (4) 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。
1. Adjustment of torque control mechanism:
- (1) First adjust the closing torque.
 - (2) Starting from small torque value, gradually increase the torque value until the valve is closed tightly.
 - (3) Adjust the torque of the switch direction according to the working characteristics of the valve. Generally, the torque in the open direction is larger than that in the close direction.
 - (4) All the above adjustments are made under no-load without medium pressure and other factors. when there is pressure and temperature, attention should be paid to whether it can be closed tightly, if it is not closed tightly, increase the torque value appropriately according to whether it is closed tightly or opened tightly.



220V/380V智能一体化
220V/380V intelligent integration



220V/380V防爆智能一体化接线图
220V/380V Explosion-proof intelligent integrated wiring diagram

注:以现场接线图为准
Note: subject to the field wiring diagram

故障反馈 Fault feedback	开阀 Valve opening	关限位 Limit position	控制输入 Control input
信号输出 Signal output	关阀 Shutoff valve	公共线 Common line	
远控打开 Remote control open	开力矩 Open torque	关力矩 Moment of closure	
远控常闭 Remote normal closure	开限位 Opening limit	电位器 Potentiometer	
运行指示 Operation instructions	过力矩故障 Overtorque fault	远控关闭 Remote control shutdown	
远控保持 Remote control and maintenance	远控无源公共端 Remote control passive common terminal		

2.行程控制机构调整:

- (1) 用手动将阀门关严。
- (2) 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°,使主动小齿轮与计数器个位齿轮组脱开。
- (3) 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为止,则关向行程初步调好。
- (4) 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。
- (5) 开方向调整:在关方向调整好以后,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。

2.Adjustment of travel control mechanism:

- (1) Close the valve by hand.
- (2) Disconnect the travel control mechanism, that is, use a screwdriver to push the ejector pin in the travel control mechanism and turn it 90° to separate the driving pinion from the counter gear set.
- (3) Use a screwdriver to turn "close" to the adjusting shaft, and turn in the direction of the arrow until the cam presses the spring pressing plate to make the microswitch act, then the closing stroke is preliminarily adjusted.
- (4) Loosen the ejector pin to make the driving gear and the individual gears on both sides mesh correctly. In order to ensure their correct engagement, after loosening the ejector pin, it is necessary to turn the adjusting shaft slightly left and right with a screwdriver. At this time, it can be electrically opened for several turns and then closed, depending on whether the closing stroke meets the requirements. If it does not meet the requirements, it can be readjusted according to the above procedures.
- (5) Opening direction adjustment: after the closing direction is adjusted, open the valve to the required position by hand (note that the travel control mechanism cannot be disengaged at this time, otherwise the closing direction adjustment will be disturbed). Then disconnect the travel control mechanism, rotate the "opening" direction adjustment shaft, and rotate in the direction of the arrow until the cam presses the spring pressing plate to make the microswitch act. Then make the stroke mechanism mesh with the driving gear, then the opening stroke is adjusted completely. After the stroke control mechanism is adjusted, it can be operated repeatedly for several times. Generally, the valve opening is controlled at about 90%.

3.可调式开度指示器的调整:

- (1) 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。(2) 将阀门关闭(手动或电动)
- (3) 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。

3.Adjustment of adjustable opening indicator:

- (1) On the basis of adjusting torque and stroke, adjust adjustable opening indicator and remote potentiometer.
- (2) Close the valve (manual or electric)
- (3) First, adjust the adjusting gear on the gear set to the corresponding position according to the maximum turns of the valve, and then push the closing symbol of the meter board to the pointer, turn the potentiometer to make it at the zero position, and make it on the potentiometer shaft. The gear of is meshed with the gear on the opening shaft. Tighten the set screw of the gear on the potentiometer shaft.

十一: 故障排除方法 TROUBLESHOOTING METHODS

故障 falut	原因 Reason	排除方法 Elimination method
失控, 转矩, 行程控制机构均不起作用 Out of control, torque, stroke control mechanism do not work	1. 线序接错 Wrong wiring sequence	1. 调换线序 Exchange line order
	2. 接触器线圈接错 Wrong connection of contactor coil	2. 调换接线 Switch wiring
	3. 接触器吸铁不释放 Contactor iron absorption does not release	3. 清洁或调换接触器 Clean or replace the contactor
行程控制机构失灵 Travel control mechanism failure	1. 微动开关损坏 Microswitch damaged	1. 更换 replace
	2. 微动开关位置移动 Microswitch position move	2. 检查拧紧 Check tightening
转矩控制机构失灵 Torque control mechanism failure	1. 微动开关损坏 Microswitch damaged	1. 更换 replace
	2. 碟簧特性破坏 Failure of disc spring characteristics	2. 更换 replace
开度指示控制机构失灵 Failure of opening indication control mechanism	1. 电位器损坏 Potentiometer damaged	1. 更换 replace
	2. 啮合齿轮松动 Loose engagement gear	2. 拧紧紧定螺丝 Tighten the set screw
	3. 导线接触不良 Wrong wire connection	3. 更换新线 Follow the new line
电机运转不正常, 有连续嗡嗡声 The motor runs abnormally, with continuous buzzing	二相运行 Two phase operation	检查动力回路接通三相 Check that the power circuit is connected to three phases

十二：用行程与转矩控制阀门终端位置的选择（供参考）

Use stroke and torque to control the selection of valve terminal position (for reference)

阀门种类 Valve type	控制方法 Control method	
	关向 Direction of closing	开向 Direction of opening
自密封(闸阀) Self sealing(gate valve)	行程 Trip	行程 Trip
强制密封(闸阀) Forced seal (gate valve)	转矩 torque	行程 Trip
截止阀 Globe valve	转矩 torque	行程 Trip
密封蝶阀 Sealed butterfly valve	转矩 torque	行程 Trip
非密封蝶阀 Unsealed butterfly valve	行程 Trip	行程 Trip
球阀 Globe valve	行程 Trip	行程 Trip

智能非侵电动执行器 INTELLIGENT NON-INVASIVE ELECTRIC ACTUATOR

一、产品概述 PRODUCT OVERVIEW

本产品为智能型非侵电动执行器。采用液晶显示,红外遥控操作,自诊断故障报警。就地操作采用非接触感应元件无需开盖调试,简单耐用;位置检测采用先进绝对值编码器,无死区,编码器位置控制精确无误,无须使用行程开关限位;电机驱动有交流接触器驱动型(继电器输出,驱动交流接触器线圈)和电机直接驱动型(可控硅直接驱动三相或单相电机)两种;本产品结合了多项自主研发创新的高科技技术,具有完备的先进功能,可靠的稳定性及高性价比的优点。调试简单,安装简便,轻松设定。

This product is an intelligent non-invasive electric actuator. It adopts liquid crystal display, infrared remote control operation, self-diagnosis fault alarm. The on-site operation adopts non-contact sensing elements without opening the lid for debugging, which is simple and durable; bit The setting detection adopts advanced absolute value encoder, no dead zone, accurate encoder position control, no need to use stroke switch limit; The motor drive has AC contactor driven type (relay output, drive AC contactor coil) and motor direct drive type (thyristor direct drive three-phase or single-phase motor); This product combines a number of independent research and development and innovative high-tech technology, with complete advanced functions, reliable The advantages of stability and high cost performance. Simple commissioning, easy installation, easy setup.

二、技术参数 TECHNICAL PARAMETERS

- 1、工作电压范围。三相:380VAC。范围:340VAC~420VAC;单相:220VAC。范围:200VAC~240VAC;其他输入电压可另行订制。
 - 2、工作温度范围。-20°C~70°C;存储温度范围。-40°C~85°C。
 - 3、使用湿度范围。≤90%RH,不结露,周围不含强腐蚀性、易燃易爆气体或粉尘。
 - 4、模拟信号反馈。反馈当前阀门开度信号,常规为DC4~20mA电流信号,负载能力≤750Ω。
 - 5、开关信号反馈。可反馈4组继电器开关信号。分别为远程状态、故障状态、开到位和关到位。
 - 6、模拟信号输入。检测输入开度信号,常规为DC4~20mA电流信号,内部负载大小195Ω。
 - 7、开关信号输入。无源干接点输入,内置24V直流电源,公共端为24V+。检测远程打开、关闭、保持等控制信号输入。
 - 8、各路信号隔离。各输入输出端子通过继电器、光电耦合器隔离,可承受2000V浪涌电压。
 - 9、驱动信号输出。继电器或可控硅输出可选。适用于可逆控制,接通持续率50%,每小时接通次数≤1200次。
1. Working voltage range. Three-phase: 380VAC. Range: 340VAC~420VAC; Single phase: 220VAC. Range: 200VAC~240VAC; Other input voltages can be customized separately.
 2. Working temperature range. -20°C~70°C; Storage temperature range. -40°C~85°C.
 3. Use humidity range. ≤ 90%RH, no condensation, no corrosive, flammable and explosive gases or dust.
 4. Analog signal feedback. Feedback the current valve opening signal, the conventional DC4~20mA current signal, the load capacity ≤ 750Ω.
 5. Switch signal feedback. It can feedback 4 sets of relay switching signals. They are remote status, fault status, on in place, and off in place.
 6. Analog signal input. Detect the input opening signal, which is usually DC4~20mA current signal, and the internal load size is 195Ω.
 7. Switch signal input. Passive dry contact input, built-in 24V DC power supply, common terminal is 24V+. Detect remote open, close, hold, and other control signal inputs.
 8. All signals are isolated. Each input and output terminal is isolated by relay and photocoupler, and can withstand 2000V surge voltage.
 9. Drive signal output. Relay or thyristor outputs are available. Suitable for reversible control, the connection duration rate is 50%, and the number of connections per hour ≤ 1200.

三、主要部件 MAIN COMPONENTS

- 控制单元人机界面包括液晶显示屏、位置选择旋钮和操作旋钮3个部件。
- 1、阀门开度和参数类型
 - (1)即阀门当前开度百分比(常规状态下);
 - (2)调零、调满时,显示字符“LL”和“HH”;调整反馈电流时,显示字符4mA“LF”和20mA“HF”;
 - (3)标定输入4mA和20mA时,显示字符“04”和“20”。
 - 2、控制模式
 - (1)现场状态下,显示字符“bc”(保持)和“dd”(点动);
 - (2)远程状态下,调节型,显示字符“Cxx”,表示有输入电流。显示字符“C-”,表示“丢信”;
 - (3)远程状态下,开关型,没有远程信号,没有显示;有远程开信号,显示“OP”,有远程关信号显示“CL”,有远程保持信号,显示“bc”,反之显示“dd”(多种状态,交替显示);
 - (4)停止状态下,用遥控器进入设置状态下,显示字符“Pxx”,表示设置的参数标号,从0开始计数;
 - (5)停止状态下,在非设置状态下,显示字符“xxx”,第1个字符表示编码器类型;第2个字符表示电机驱动方式;第3个字符表示电源及远程控制方式。
- 注意:进入设置状态必须使用红外遥控器!

3、阀门状态

有故障时,显示字符“Exx”,显示故障代号;

无故障时,显示字符“bxxx”显示编码器的真实读数缩小N倍后的值(0-255);

控制单元的两个旋钮:操作旋钮(黑色),位置旋钮(红色)。

1、操作旋钮有两个位置:关闭、打开;

2、位置旋钮有三个位置:现场、停止、远程。

The man-machine interface of the control unit includes three parts: LCD display, position selection knob and operation knob.

1. Valve opening and parameter type

(1) That is, the current opening percentage of the valve (under normal conditions);

(2) When zeroed and full, display the characters "LL" and "HH"; When adjusting the feedback current, the characters 4mA "LF" and 20mA "HF" are displayed;

(3) When the calibration input is 4mA and 20mA, the characters "04" and "20" are displayed.

2. Control mode

(1) In the field state, the characters "bc" (hold) and "dd" (jogging) are displayed;

(2) In the remote state, the adjustment type displays the character "Cxx", indicating that there is an input current. Display the character "C-", which means "lost letter";

(3) In the remote state, switch type, no remote signal, no display; There is a remote on signal, showing "OP", there is a remote off signal showing "CL", there is a remote hold signal, displaying "bc", and vice versa "dd" (multiple statuses, alternately displayed);

(4) In the stop state, use the remote control to enter the setting state, and display the character "Pxx", indicating the parameter number of the setting, counting from 0;

(5) In the stopped state, in the non-set state, the character "xxx" is displayed, and the first character indicates the encoder type; The second character indicates the motor drive mode; The third character indicates power supply and remote control Manner.

Note: You must use the IR remote control to enter the setup state!

3. Valve status

When there is a fault, the character "Exx" is displayed to display the fault code;

When trouble-free, the display character "bxxx" shows the value of the encoder after N times the true reading is reduced by N times (0-255);

Two knobs of the control unit: operation knob (black), position knob (red).

1. The operation knob has two positions: close and open;

2. The position knob has three positions: site, stop, and remote.

四、控制单元操作说明 CONTROL UNIT OPERATING INSTRUCTIONS

1、现场操作

现场位置下,操作旋钮旋至打开或关闭3秒,现场控制方式由点动(dd)变为保持(bc);方向操作旋钮或位置旋钮至停止,即停止动作。

2、遥控器操作(遥控器为选配)

控制单元可使用遥控器进行现场操作或进行参数设置。红外遥控器带有6个操作按键。

各按键功能如下:

(1)开按键(增加按键)。在现场操作时,可作为打开按键使用;进入参数设置时,作为增加键使用,每按一次,被设置的数字增加一次;

(2)关按键(减少按键)。在现场操作时,可作为关闭按键使用;进入参数设置时,作为减少键使用,每按一次,被设置的数字减少一次;设置确定键。

在停止位置,长按此键可进入参数设置状态。在菜单设置状态下,再按一下,可进入下一个菜单;

(3)停止键(返回按键)。在现场操作时,可作为停止按键使用;在菜单设置状态下,按一下可返回上一个菜单,直至退出;

(4)上移按键。在菜单设置状态下,可调整参数;

(5)下移按键。在菜单设置状态下,可调整参数;

1、位置标定

电动执行机构和阀门连接后,先确定电动执行机构的转向和力矩接线正确,调整好编码器的最佳旋转角度(一般大于90度),无需开盖即可对阀门位置进行标定。

1. On-site operation

Under the field position, the operation knob is turned on or off for 3 seconds, and the field control mode is changed from jogging (DD) to holding (BC); The directional operation knob or position knob stops the action.

2. Remote control operation (remote control is optional)

The control unit can be operated in the field or parameterized using the remote control. The infrared remote control comes with 6 operating buttons.

The functions of each button are as follows:

(1) Turn on the button (add button). When operated in the field, it can be used as an open button; When entering the parameter setting, it is used as an increase key, and the number set is increased once each time it is pressed;

(2) Turn off the button (reduce the button). When operated in the field, it can be used as a closing button; When entering the parameter setting, it is used as a reduction key, and the number that is set is reduced once each time it is pressed; Set the OK key. In the stop position, press and hold this key to enter the parameter setting state. In the menu setting state, press again to enter the next menu;

(3) Stop key (back button). When operated in the field, it can be used as a stop button; In the menu setting state, press once to return to the previous menu until exiting;

(4) Move the button up. In the menu setting state, the parameters can be adjusted;

(5) Move the button down. In the menu setting state, the parameters can be adjusted;

1. Position calibration

After the electric actuator and valve are connected, first determine that the steering and torque wiring of the electric actuator are correct, adjust the optimal rotation angle of the encoder (generally greater than 90 degrees), and the valve can be adjusted without opening the cover The door position is calibrated.

3.1、标定全关 CALIBRATION IS FULLY OFF

(1)第一步,进入标定全关。停止位置下,操作旋钮旋至关闭约5秒,直至闪烁字符“LL”。屏幕上半部分闪烁“LL”;左下角显示横线;右下角显示编码器的值(0-255)。

(2)第二步,调整阀门位置。位置旋钮旋至现场位置,用操作旋钮或遥控器开按键(1)和关按键(2)任意调整阀门位置至关位(不受原先标定的全开全关位置限制)。阀门关位调整好,位置旋钮旋至停止位,可继续完成位置标定。

注:如果阀门已经在全关位置,可省去第二步,直接跳至第三步。

(3)第三步,确定标定全关。阀门关位调整好,位置旋钮旋至停止位,操作旋钮旋一下关,确定将此位置标定为全关。标定成功,“LL”不再闪烁,固定显示“LL”3秒后,退出标定全关,返回至常显界面;

注:由于编码器或阀门安装方向问题,阀门打开时,编码器读数可能为持续增大,也可能为持续减小,为保证开度显示正确,控制系统设有自动学习功能,在位置标定时,使用电动方式持续开阀或关阀保持5秒以上,可进行编码器方向自动学习。

(1) The first step is to enter the calibration level. In the stop position, turn the knob to off for about 5 seconds until the character "LL" is flashed. The upper part of the screen flashes "LL"; A horizontal line is displayed in the lower left corner; The lower right corner shows the compilation The value of the coder (0-255).

(2) The second step is to adjust the valve position. The position knob is rotated to the field position, and the valve position is arbitrarily adjusted to the closed position with the operation knob or remote control button (1) and the close button (2) (not subject to the original calibration On-full off position limit). The valve is adjusted to close the position, and the position knob is turned to the stop position, and the position calibration can be continued.

Note: If the valve is already in the fully closed position, you can skip the second step and skip directly to the third step.

(3) The third step is to determine the calibration of the full pass. The valve closing position is adjusted, the position knob is turned to the stop position, and the operation knob is turned off to determine that this position is calibrated as fully closed. Calibration successful, "LL" no longer flashes, solid After displaying "LL" for 3 seconds, exit the calibration full turn and return to the normal display interface;

Note: Due to the encoder or valve installation direction problem, when the valve is opened, the encoder reading may continue to increase or continuously decrease, in order to ensure that the opening display is correct, the control system is set to automatic Learning function, during position calibration, the electric method is used to continuously open or close the valve for more than 5 seconds, and the encoder direction can be automatically learned.

3.2、标定全开 CALIBRATION IS FULLY OPEN

停止位置下,操作旋钮旋至打开约5秒,直至闪烁字符“HH”。进入标定全开设置。操作方法跟标定全关基本一致(与标定全关不同之处:操作旋钮旋一下开,确认全开)。

4、反馈电流修正

注意:反馈电流修正时,将位置旋钮至“远程”状态,此时DCS室存在信号,可能会导致执行器误动作,应在远程丢信情况下进行此操作。

In the stop position, turn the knob to open for about 5 seconds until the character "HH" flashes. Enter the calibration full open setting. The operation method is basically the same as the calibration of the full pass (different from the calibration of the full pass: operation knob Screw it open to confirm full open).

4. Feedback current correction

Note: When the feedback current is corrected, the position knob is turned to the "remote" state, at this time there is a signal in the DCS chamber, which may cause the actuator to malfunction, and this should be done in the case of remote signal loss.

4.1、反馈4mA修正 FEEDBACK 4MA CORRECTION

首先将阀门调整至全关位置。在远程位置下,操作旋钮旋至关闭约5秒,直至闪烁字符“LF”。

屏幕上半部分闪烁“LF”;左下角显示远程信息,调节型显示电流,“Cxx”。开关型显示是否有远程开关信号;右下角显示编码器的值(0-255)。根据4mA反馈电流的数值,可用操作旋钮修正电流(开旋一下,电流增加一次,关旋一下,电流减小一次),也可用遥控器“+/-”按键调整,电流修正完成后,位置旋钮离开远程位置,退出修正4mA界面,返回至常显界面。

First, adjust the valve to the fully closed position. In the remote position, turn the operation knob to off for about 5 seconds until the character "LF" flashes.

The upper part of the screen flashes "LF"; The lower left corner displays the remote information, and the regulated type displays the current, "Cxx". The switching type shows whether there is a remote switching signal; The lower right corner shows the value of the encoder (0-255). root According to the value of the 4mA feedback current, the current can be corrected by the operation knob (turn it on, increase it once, turn it off, and reduce it once), or you can use the remote control "+/-" button to adjust, and the current correction is completed After that, the position knob leaves the remote position, exits the correction 4mA interface, and returns to the constant display interface.

4.2、反馈20mA修正 FEEDBACK 20MA CORRECTION

首先将阀门调整至全开位置。在远程位置下,操作旋钮旋至打开约5秒,直至闪烁字符“HF”。进入修正20mA设置。操作方法跟反馈4mA修正全一致。

五、内部控制参数设置(需使用遥控器进入设置菜单)

停止状态下,长按遥控器的设置按键5秒,即可进入菜单,进行内部控制参数的设置。

内部控制参数的设置顺序为:1、输入4mA修正,2、输入20mA修正,3、关闭方向,4、丢信位置,5、远程双位。

(1)输入4mA校准(校准范围:3.8~4.5mA)

屏幕上半部分闪烁“04”;左下角显示内部控制参数标号,“P00”;右下角显示“NO”。

此时,向控制单元输入标准4mA控制电流,静置数秒稳定后,按下遥控器的下移键可由“NO”改为“YES”,此时按下遥控器确认键确认当前输入电流为目标0%位置。若设置成功,“LF”不再闪烁,固定显示“LF”3秒后,自动跳至下一个控制参数;若设置不成功,自动跳至下一个控制参数。

(2)输入20mA校准(校准范围:18.5~21.5mA)

操作方法与输入4mA校准完全一致

(3)关闭方向(默认设置:顺时针)

屏幕上半部分显示“CL”;左下角显示内部控制参数标号,“P02”;右下角显示“sS”(顺时针的拼音缩写)和“nS”(逆时针的拼音缩写)。

此时,通过遥控器的上移键和下移键进行“sS”和“nS”的切换,修改好后,按下遥控器的设置键确认。

(4)丢信位置(仅调节型有此功能,默认位置:hd)

屏幕上半部分显示“LS”;左下角显示内部控制参数标号“P03”;右下角显示“hd”(共有“0”、“50”、“100”、“hd”四个位置,分别对应“全关”、“中间位”、“全开”和“保持”)

此时可通过遥控器的上移键和下移键在“0”、“50”、“100”、“hd”之间切换,修改好后按下遥控器的设置按钮确认。

(5)远程双位(仅开关型有此功能,默认设置:OFF)

屏幕上半部分显示“bP”;左下角显示内部控制参数标号“P04”;右下角显示“OFF”(共有“OFF”、“SC”、“SO”三个位置,分别对应“常规控制”、“有信关、无信开”、“有信开、无信关”)

此时可通过遥控器的上移键和下移键在“OFF”、“SC”、“SO”之间切换,修改好后按下遥控器的设置按钮确认,并且退出。

First adjust the valve to the fully open position. In the remote position, turn the knob open for about 5 seconds until the character "HF" flashes. Enter the Fix 20mA setting. The operation method is corrected with feedback 4mA All consistent.

5. Internal control parameter setting (need to use the remote control to enter the setting menu)

When stopped, press and hold the setting button of the remote control for 5 seconds to enter the menu and set the internal control parameters.

The setting order of internal control parameters is: 1. Enter 4mA correction, 2. Enter 20mA correction, 3. Close direction, 4. Drop letter position, 5. Remote double bit.

(1) Input 4mA calibration (calibration range: 3.8~4.5mA)

flashes "04" in the middle of the screen; The lower left corner shows the internal control parameter designator, "P00"; "NO" is displayed in the lower right corner.

At this time, input a standard 4mA control current to the control unit, and after standing for a few seconds to stabilize, press the down button of the remote control to change from "NO" to "YES", and press the remote control confirmation key to confirm the current input The current is the target 0% position. If the setting is successful, "LF" will no longer flash, and after 3 seconds of fixed display "LF", it will automatically jump to the next control parameter; If the setting is unsuccessful, it automatically skips to the next control parameter.

(2) Input 20mA calibration (calibration range: 18.5~21.5mA)

The operation method is exactly the same as the input 4mA calibration

(3) Turn off direction (default setting: clockwise)

The upper part of the screen displays "CL"; The lower left corner shows the internal control parameter designation, "P02"; The lower-right corner displays "sS" (clockwise phonetic abbreviation) and "nS" (counterclockwise phonetic abbreviation).

At this time, switch between "sS" and "nS" by using the up and down buttons of the remote control, and after modification, press the setting key of the remote control to confirm.

(4) Letter loss position (only the adjustment type has this function, default position: HD)

The upper part of the screen displays "LS"; The lower left corner shows the internal control parameter designator "P03"; "HD" is displayed in the lower right corner (there are four positions of "0", "50", "100", and "HD", corresponding to "All Off" and "Medium", respectively Metaposition, Full Open, and Hold)

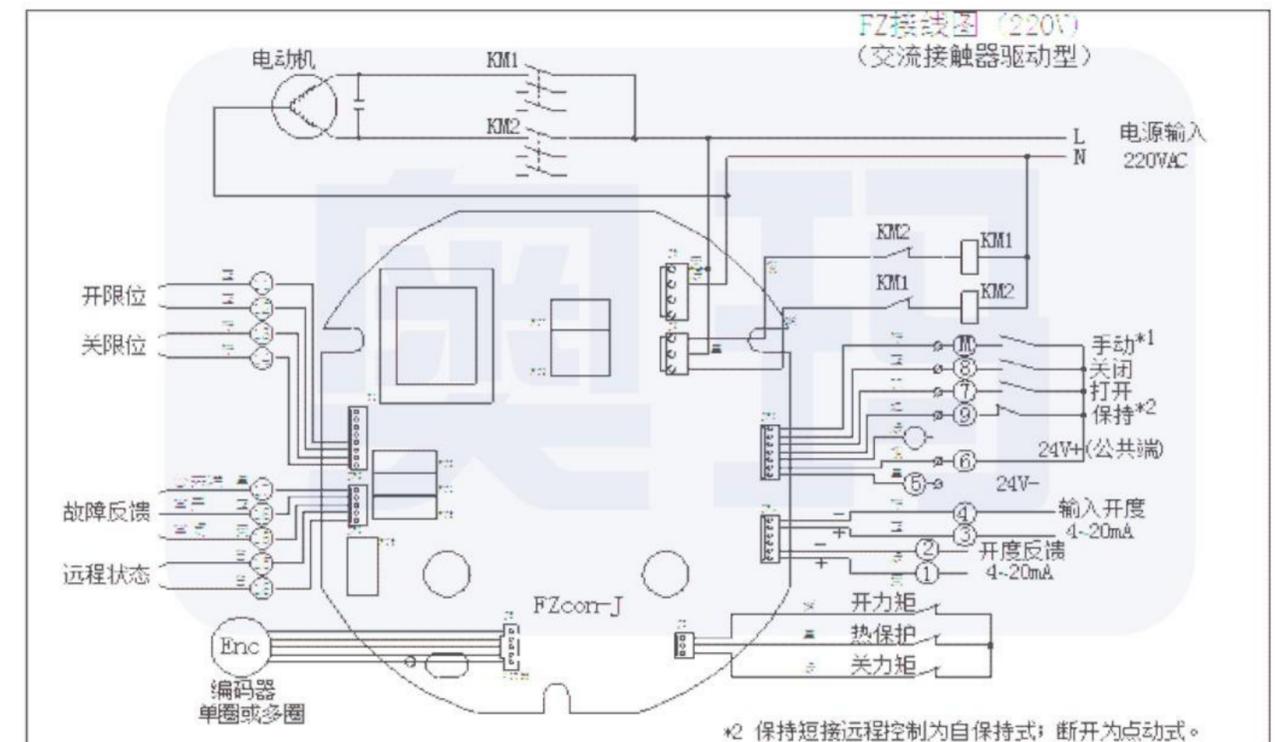
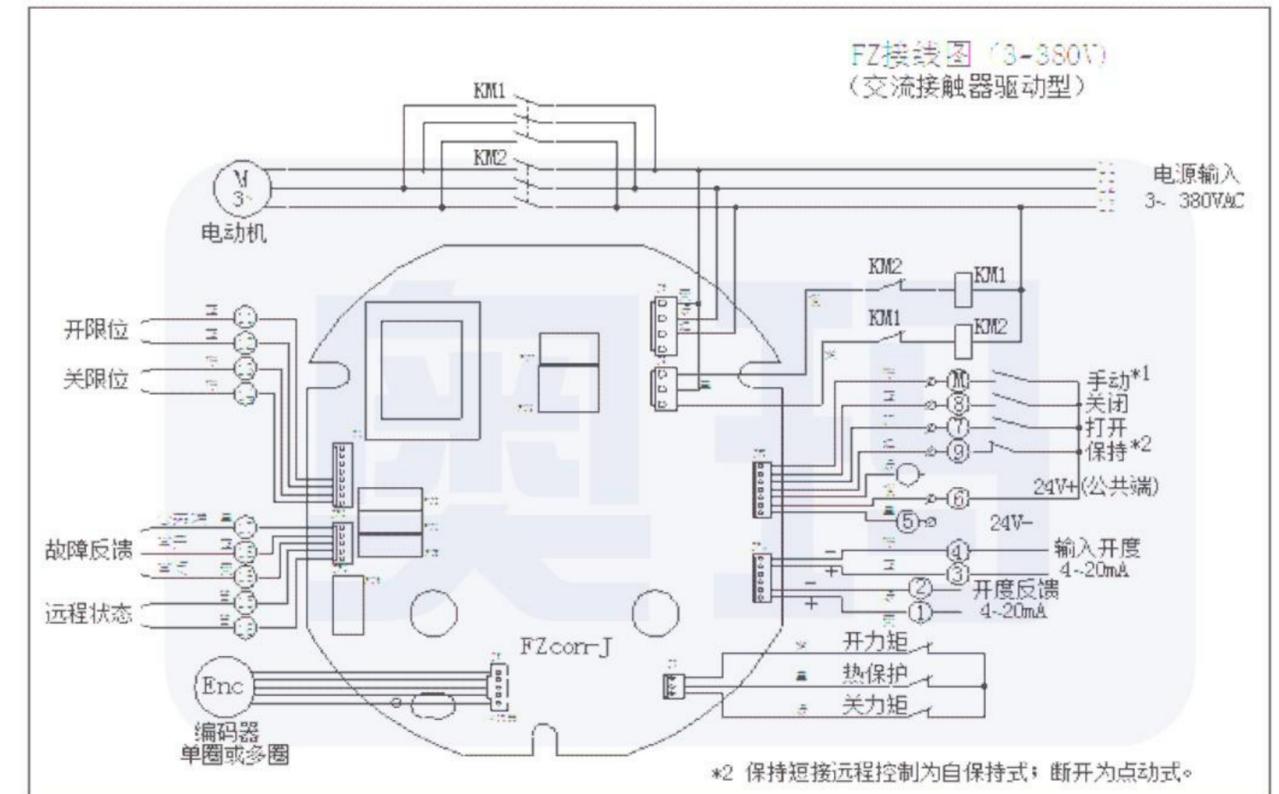
At this time, you can switch between "0", "50", "100", and "HD" by using the up and down keys of the remote control, and press the setting button of the remote control to confirm after modification.

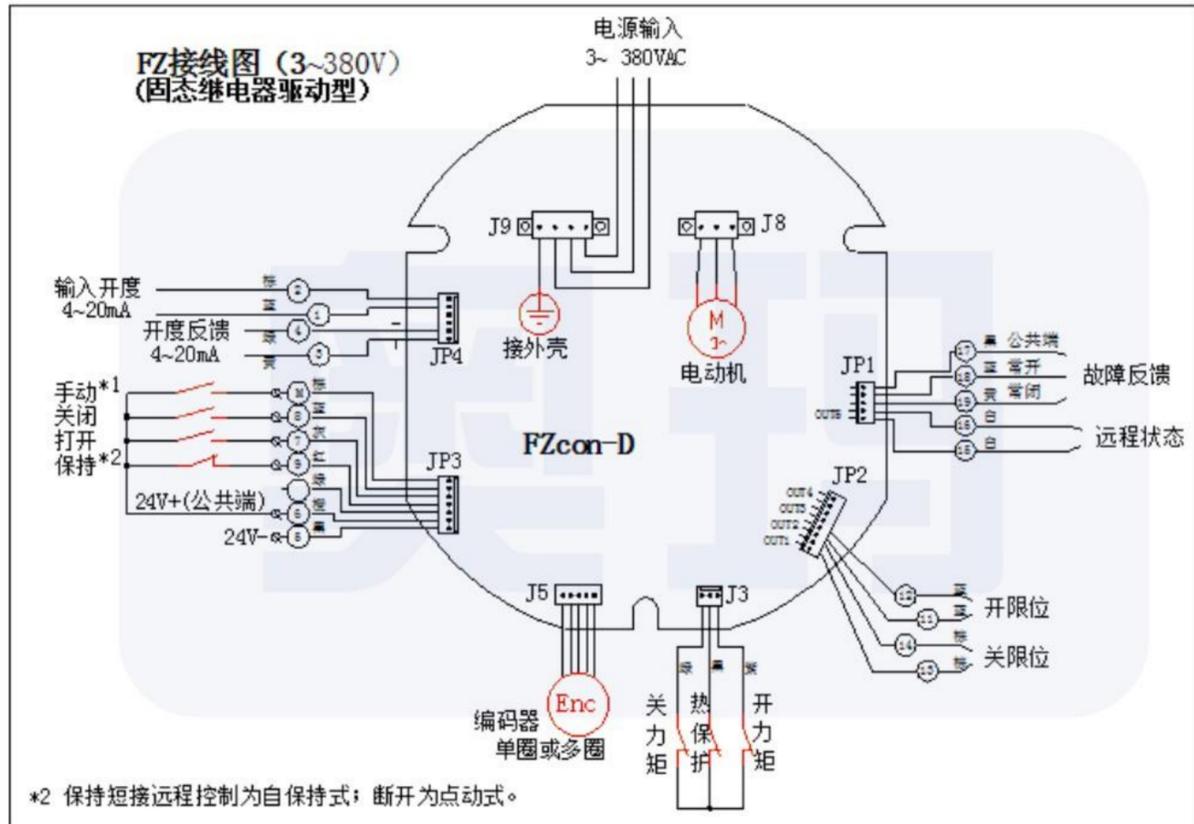
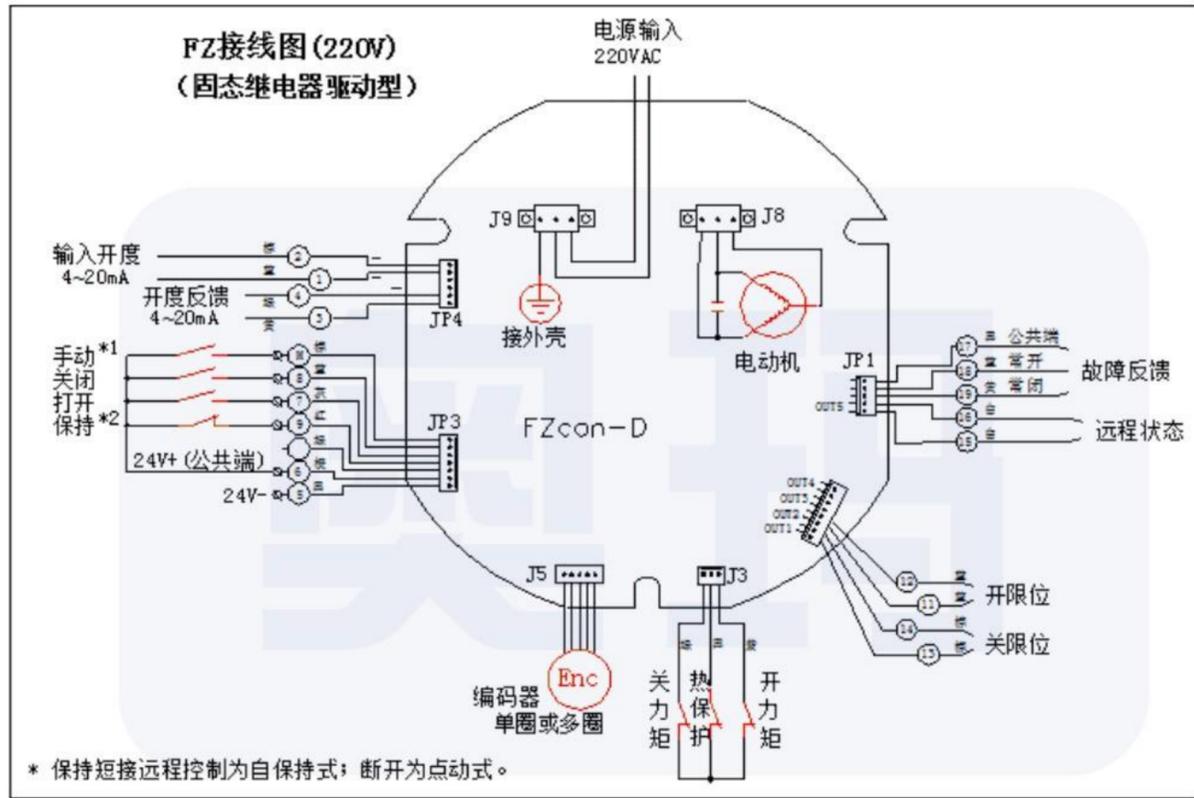
(5) Remote double position (only the switch type has this function, default setting: OFF)

The upper part of the screen displays "bP"; The lower left corner shows that the internal control parameters are marked with "P04"; "OFF" is displayed in the lower right corner (There are three positions: "OFF", "SC", and "so", corresponding to "General Control" and "Yes.") Letter Pass, No Letter Open, "With Letter Open, No Letter Pass")

At this time, you can switch between "OFF", "SC", and "so" by using the up and down keys of the remote control, and press the setting button of the remote control to confirm and exit after modification.

五、电气接线图 ELECTRICAL WIRING DIAGRAM





故障代号及诊断 FAULT CODE AND DIAGNOSIS

出现故障后，会在屏幕右下角显示字符“Exx”，其中xx表示故障编号。本控制单元带有故障诊断功能。主要故障及保护如下表所示：

故障代号 FAULT CODE	故障类型 FAILURE TYPE	发生条件 OCCURRENCE CONDITION	复位条件 RESET CONDITIONS	备注 REMARK
E01	电源缺相 The power supply is out of phase	三相电源缺一相 Three-phase power supplies lack one phase	除非断电不能自动复位 It cannot be automatically reset unless power is off	不能开关 Cannot be switched on/off
E02	过热保护 Overtemperature protection	电机温度开关断开或力矩公共端开路 The motor temperature switch is open or the torque common terminal is open	等到电机温度降低到适合温度 Wait until the motor temperature is reduced to the suitable temperature	不能开关 Cannot be switched on/off
E05	阀位故障 Valve position failure	读取不到编码器信号 The encoder signal cannot be read	编码器正确接入 The encoder is properly accessed	单圈或多圈 Single lap or multi-lap
E06	电机堵转 The motor is stalled	堵转或其他原因导致的阀位不变化 The valve position does not change due to stall rotation or other reasons	编码器数字发生变化后自动回复 Automatic reply when encoder numbers change	阀门卡死或编码器脱扣 The valve is stuck or the encoder trips
E12	开向过距 Drive overrange	开阀时，开向力矩开关动作 When the valve is opened, the open torque switch action	力矩开关复位，执行一下反向操作或切换现场远程模式 The torque switch is reset and the reverse operation is performed Or switch to live remote mode	故障时，只能关阀门不能开 In case of failure, the valve can only be closed and cannot be opened
E16	关向过距 Off the over-distance	关阀时，关向力矩开关动作 When the valve is closed, the closing torque switch action	力矩开关复位，执行一下反向操作或切换现场远程模式 The torque switch is reset and the reverse operation is performed Or switch to live remote mode	故障时，只能开阀门不能关 In the event of a failure, the valve can only be opened and cannot be closed
E17	编码器转角过大 The encoder angle is too large	行程过长 The trip is too long	自动清除，维持3s后故障自动消失 Automatic clearing, the fault will automatically disappear after maintaining 3S	重新标定行程 Recalibrate the stroke
E18	编码器转角过小 The encoder angle is too small	行程过短或单圈编码器超过一圈 The stroke is too short or the singleturn encoder exceeds one revolution	自动清除，维持3s后故障自动消失 Automatic clearing, the fault will automatically disappear after maintaining 3S	重新标定行程 Recalibrate the stroke

常见问题处理方法 HOW TO DEAL WITH COMMON PROBLEMS

通电指示灯和显示屏不显示 The power-on indicator and display are not displayed	A. 电源实际未接入 B. 电压过低 C. 接线错 D. 电路坏	A. The power supply is not actually connected B. The voltage is too low C. Wrong wiring D. Bad circuit
工作中灯和显示屏显示异常 The lights and display display at work are abnormal	A. 是否故障码 B. 指示灯或显示屏坏需更换电路	A. Whether there is a fault code B. The indicator or display is bad and the circuit needs to be replaced
通电现场和远控均不动作 The power-on site and remote control are not active	A. 接线错或开路 B. 故障保护 C. 电机坏或卡死 D. 气动电容环 E. 电路坏	A. Miswired or open circuit B. Fault protection C. The motor is bad or stuck D. The pneumatic capacitor loop is E. The circuit is bad
现场工作正常但远控不正常 The site works normally, but the remote control is not normal	A. 无信号或接线反 C. 正/反作用设错	B. 旋钮板坏或没在远方 D. 电路坏
现场不动作但远控工作正常 The scene does not move, but the remote control works normally	A. 旋钮没在现场模式 B. 操作钮未旋到位	C. 电路坏
能开不能关或能关不能开 Can be turned on or off, or can be closed or not	A. 力矩接线错或开路 C. 电机坏或堵转或接线错	B. 过力矩故障 D. 电路坏
无控制信号，通电立即动作 No control signal, immediate action when power-on	A. 接线错 C. 丢信动作位置错误	B. 控制信号实际有效存在 D. 电路坏
动作方向反 The direction of action is reversed	A. 电机接线反 C. 关闭方向设反	B. 阀位标定反 D. 信号反
无输出电流 No output current	A. 输出接线错或接触不良 B. 电路坏	A. The output wiring is wrong or the contact is poor B. Bad circuit
反馈电流偏大，或偏小或不变 The feedback current is too large, or too small or unchanged	A. 反馈电流未修正 B. 电路坏	A. The feedback current is not corrected B. Bad circuit