Valve’s electric actuator User’s Guide

Multi return actuator

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Ⅰ. Summary

The multi-turn vale electric actuator , generally known as z-type , can be utilized on linear-action valve such as gate valve ,diaphragm valve , check valve and water valve . Used to open , close or modulate valves . The actuator is indispensable for the remote control , centralized control or self-control of the valves . This versatile deice features small size , light weight , reliable performance , advanced control system and ease of maintenance ; which allows for a wide range of use in many industries like petroleum and chemical industries, power stations , water treatment and paper-making industries . In terms of working environment , the equipment can be classified into four types ： DZW(The outdoor type) ; DZB(The explosion-proof type) ; DZZ(The integral type) ; DZT(The integrated-requlating type) .

The performance of this product conforms to the stipulation of JB/T8528-1997"General valve Electric Actuator Technical conditions" Its explosion-proof performance conforms to the stipulations of 6B3836 .1-2000 "Electrical Apparatus for Explosive Gas Atmospheres Part 1 ： General Requirements",GB3836.2-2000"Electrical Apparatus for Explosive Gas Atmosphere's Part 2 : Flameproof Enclosured and JB/T8529-1997" Explosion-proof valve Electric Actuator Technical
Conditions"

Ⅱ. Working Conditions and Technical Data

1. Power Source : The is three-phase AC.
   380V (special orders 220V or 660V) , 50HZ (special orders 60HZ); The control line is 220v , 50HZ (Special orders 60HZ) ; Remote control is 24V DC.
2. Ambient Temperature：-20℃～ +60℃ (special orders-60℃ ～+80℃).
3. Relative Humidity：≤90% (when 25℃).
4. Surrounding Mediums: The outdoor type is used for environment free of combustible, explosive and corrosive mediums ; The explosion-proof products include dⅠ and dⅡBT4 ; dⅠ is suitable for the wording face of the coal mine where no excavating undertaken; and dⅡBT4 can be applied in the factories , where the explosive gases mixture meets the requirements for the Environment (ⅡA, ⅡB T1-T4).
5. Protection Class : IP55 - Ip67 for the outdoor type and explosion-proof type.
6. Operation Rule: Only 10 minutes at a stretch (special orders 30 minutes)

Technical Data of Z-type series sheet1

Model Number	Rated Torque (N.m)	Max Control Torque (N.m)	Min Control Torque (N.m)	Max Stem mm	Max Turn r	Manual Ratio i	Output Torque (r/min)	Motor Power KW	Motor Power Current A	Weight Kg
Z5	50	75	≤25	28	50	1:1	12	0.18	0.9	28
Z10	100	150	≤50	28	50	1:1	24	0.25	1.5	61
							36	0.37	1.6	
Z15	150	225	≤75	28	50	1:1	24	0.37	1.6	63
							36	0.55	2.4	
Z20	200	300	≤100	40	50	1:1	24	0.55	2.4	63
							36	0.75	3	
Z30	300	450	≤150	40	50	1:1	24	0.75	3	65
Z45	450	675	≤225	48	120	1:1	24	1.1	3.4	110
							36	1.5	4.5	
Z60	600	900	≤300	48	120	1:1	24	1.5	4.5	112
							36	2.2	6.5	
Z90	900	1350	≤450	60	120	1:1	24	2.2	6.5	139
							36	3	9	
Z120	1200	1800	≤600	60	120	1:1	24	3	9	142
Z180	1800	2160	≤900	70	150	25:1	24	4	11	261
							36	5.5	14	
Z250	2500	3000	≤1250	70	150	25:1	24	5.5	14	264
Z350	3500	4200	≤1750	75	150	13:1	18	7.5	19	430
Z500	5000	6000	≤2500	75	150	13:1	18	10	26	440

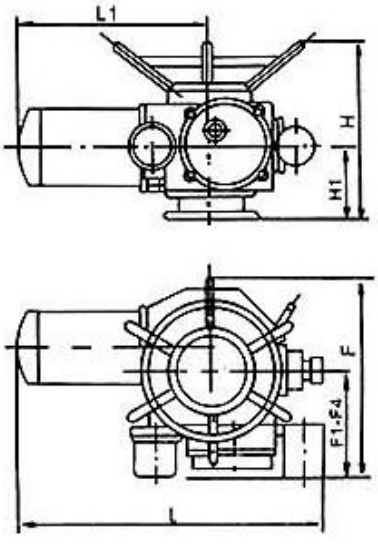
Note:we provide the electric actuators of other rotational speeds according to the use's requirements.

Ⅲ、Outline and Connection Dimension

1. Outline dimension see Picture 1 and Sheet 2 .

Sheet 2 Outline Dimension

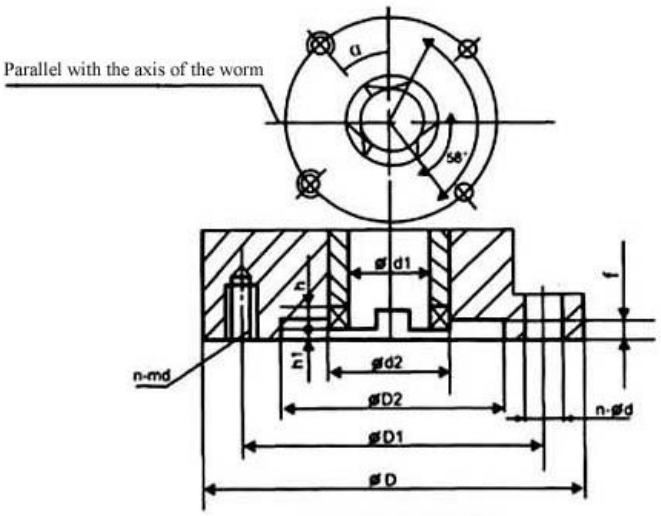
Model Number	H	H1	L	L1	F	F1	F2	F3
Z5	232	96	410	275	261	156	/	290
Z10/15	320	135	565 610	340 385	441	235	286	370
Z20/30	320	135	610	385	441	235	286	370
Z45/60	425	172	755	510	552	270	320	337
Z90/120	456	180	825	535	621	315	350	371
Z180/250	585	250	870	564	710	322	380	415
Z350/500	649	252	1162	764	710	408	456	415



Note:F1 are the outdoor type,F2 are the expiosion – proof type, F3 are the integral type.

Picture 1 Outline drawing.

2、types and sizes of connection see picture 2and sheet 3



Pidture 2 : Connection dimension drawing

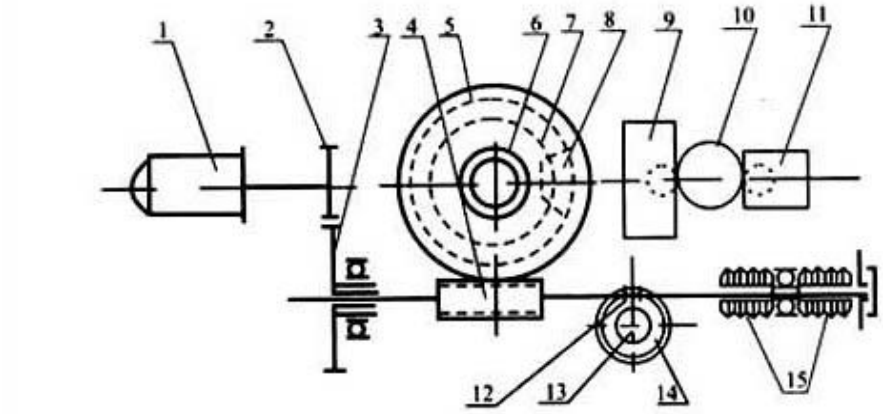
Sheet 3 : Connection dimension

Model Number	Torque Type JB2920											
	Flanged Number	D	D1	D2 (H9)	h1	f	h	d1	d2·	d	n	α
Z5/10 /15	2	145	120	90	2	4	8	30	45	M10	4	45°
	2I	115	95	75			6	26	39	M8		
Z20/30	3	185	160	125			10	42	58	M12		
	3I	145	120	90			8	30	45	M10		
Z45/60	4	225	195	150		5	12	50	72	Φ18		
Z90/120	5	275	235	180			14	62	82	Φ22		
	5I	230	195	150			12	50	72	Φ18		
Z180/250	7	330	285	220			16	72	98	Φ26		
Z350/500	8	380	340	280			20	80	118	Φ22	8	22.5°

Note : (I) show's the connection dimensions of the power stations.

Ⅳ. Components.

Z-type electric actuator consists of motor , speed reducer , moment of force control apparatus, traveling control apparatus , opening indicator , manual-electrical changing mechanism ,hand wheel and electrical part . The outdoor type utilizes the incorporate round rim and O-ring to seal; while the seal design of the explosion –proof type is the same as that of the outdoor type but an explosion-proof face is addied to the explosion-proof type in addition to the same seal design . The explosion-proof junction box and three –phase motor which specially designed to the outdoor type , corrosion and explosion-proof the electrical valve of series YBDF. See picture 3 about its transmission principle:

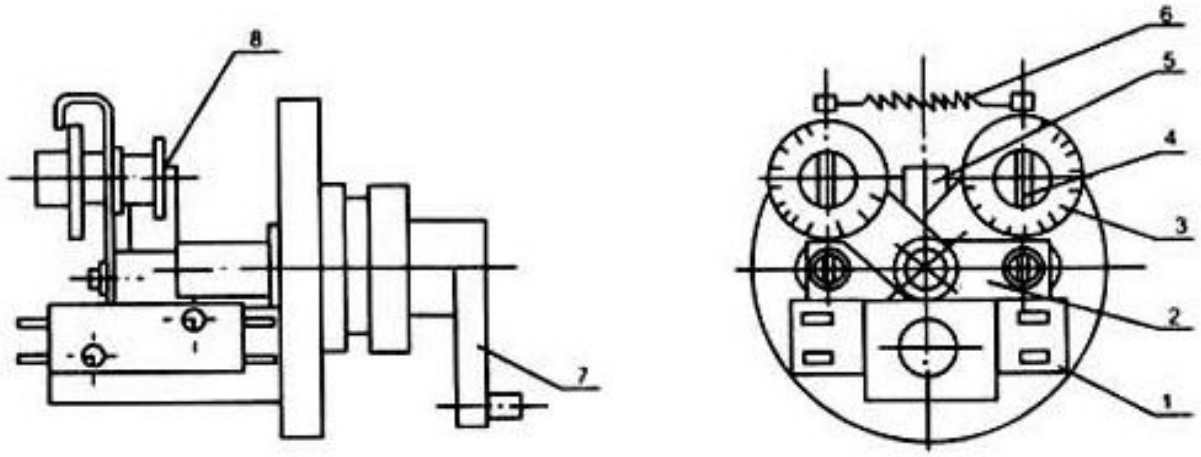


1. Motor 2.3 . Spur Gear. 4. Worm 5 .Worm gear. 6. Output Shaft. 7. 8 Bevel Gear 9. Travelling Control Apparatus. 10 .Middle Gear 11. Opening Indictor 12. Worm Round Grave 13. Crank 14. Torque Control Apparatus. 15 .Butterfly Spring .

1.1 Motor : The outdoor type utilizes the YDF-type motor and the explosion-proof type adopts the YBDF-type three-phase as ynchronous motor which specially designed for the valve.

1.2 Speed reducer : Speed reducer is composed of a pair of spur gears and worm gear pairs .The motive force of the motor transfers from speed reducer to the output shaft.

1.3 Torque control apparatus : Torque control apparatus is a commonly used part for the z-series , its components see Picture 4. When a certain amount of torque is applied to the output shaft , the worm will rotate and move to drive the crank which in turn causes the block collision to press the cam and raise the support will lift until the microswitch disconnects the power source and stops the motor so as to control the output and protect the valve .

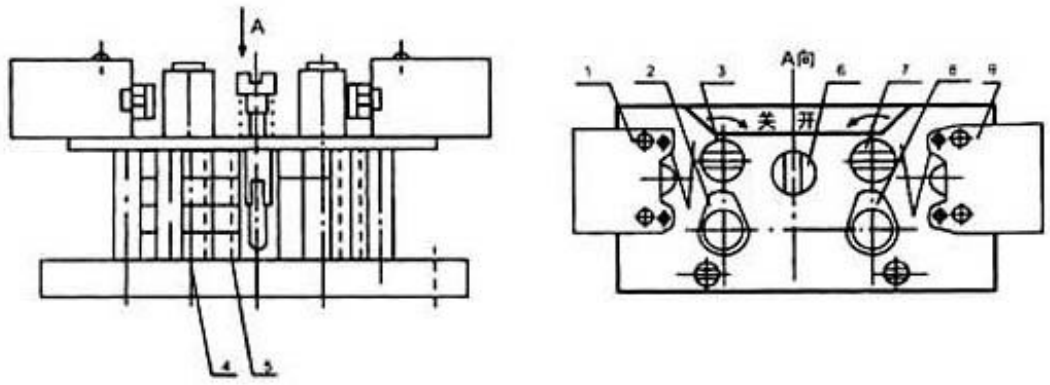


1. Microswitch 2. Support 3. Calibrated Dial 4. Adjustment Shaft 5. Block Collision 6. Extension Spring 7. Crank 8.Cam

Picture 4: Torque control apparatus

1.4 travelling control apparatus: traveling control apparatus utilizes the same principle as the

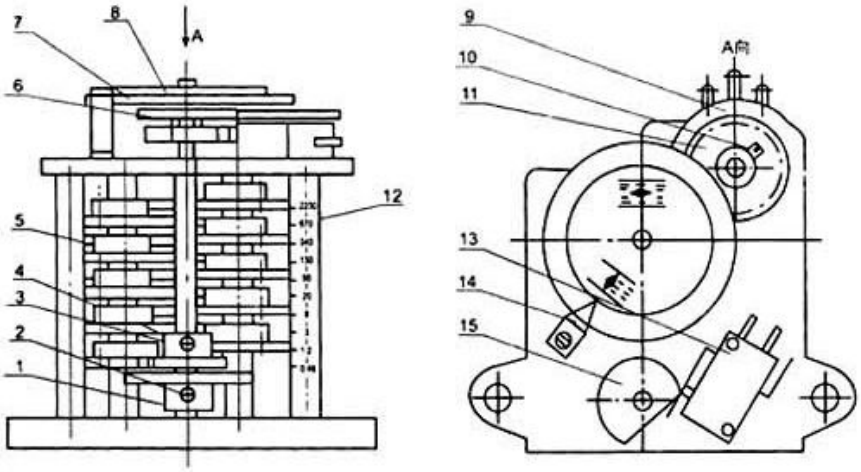
decimal counter with a high precision. It is also the commonly used part for the Z-series (see picture 5).Its working principle is as follows :A pair of big and small bevel gears in the speed reducer box drive the active small gear (z=8),and drive the counter to work. If the counter has been adjusted according to the closed /opening position of the valve, then when the counter reaches the preset point , the cam will turn 1/4-turn and force the microswitch to cut off the power source and stop the at this time, thereby controlling the revolutions number



1. Close Microswitch 2. Close Cam 3. Closed Adjustment Shaft 4. Idle Wheel 5. Counting Gear
6. Roof Bar 7.Opening Adjustment Shaft 8. Opening Cam 9.Knife Microswitch

Picture 5 : Travelling Control Apparatus

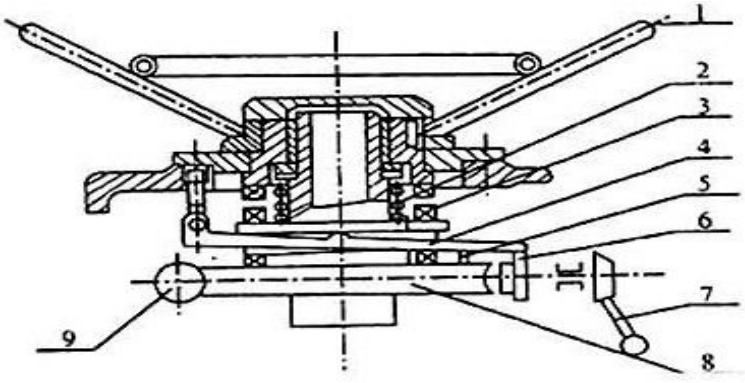
1.5.Opening indicator: opening indicator is also a commonly used part for z-series. see picture 6.started by the unit gear of the counter , input gear slow down and turn the indictor dial to indicate the close/opening of the valve. The potentiometer rotor turns as the indicator dial rotates ,which enables the opening indication of remote transmission , the opening indicator is equipped with a microswitch and cam, the rotational cam periodically causes the microswith to act during the operation of the actuator , its frequency being one 1 tow actions for one turn of the output shaft, which provides the flash signal .



1. Input Gear 2. Fixing Screw 3. Fixing Screw 4. Revolutions Adjustment Gear 5. Step Gear
6. Opening Gear 7.Closed Indicator Dial 8.Opening Indicator Dial 9. Potentiometer 10. Fixing Screw
11. Potentiometer Gear 12. Revolutions Signal 13. Flash Switch 14. Pointer 15. Flash Cam

Picture 6 : Machinery-type Opening Indicator

1.6 manual – electrical changing mechanism : manual – electrical changing mechanism is a semi-automatic system , which consists of handle ,cam, frame work ,vertical bar, middle clutch, pressed spring and so on, see picture7,when the hand wheel is used for operation, first push the transfer handle in the manual direction and cause the cam to turn with the handle shaft, lift the framework the idle clutch and in turn so to press the pressed spring. The idle clutch disengages from the worm gear and meshes with the hand wheel when the handle is pushed to a certain position, then the acting force of the hand wheel transfers to the output shaft to reach the manual state. when the frame work rises to a certain height, the vertical bar will erect on the surface of worm gear by the torsion spring force, which supports the framework so as to keep the idle clutch from falling down, release the handle when it is pushed to the manual position and the use the hand wheel to operate. The vertical bar falls down as the motor drives the rotation of the worm gear, the idle clutch moves to the worm gear by the pressed spring force and meshes with the worm gear, there by reaching the electrical state



1、Handwheel
2、Pressed Spring
3、Idle Clutch
4、Frame work
5、Vertical Bar
6、Cam
7、Transfer Handle
8、Worm Gear
9、Worm

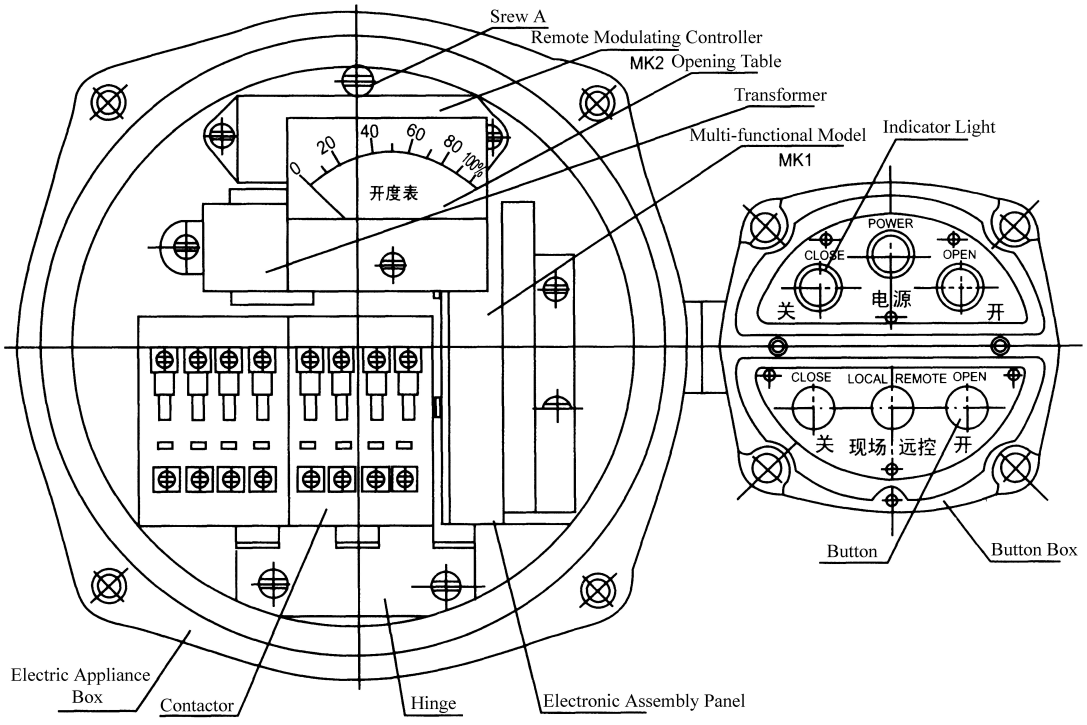
Picture 7 Manual-electrical Changing Mechanism

1.7 The electrical parts of the integral and regulating types:

The integral type, which derives from the outdoor type . Contains many added electrical components. The electrical part of the integrated – outdoor type consists of multi – functional module MK1 . remote modulating controller MK2 , indicator light of the button box , opening table, contactor and so on .

The multi-functional module MK1 is composed of phase position indentification XS, interlock protection HB of the contactor and direct curren DC. Four solid-state relays and three switches comprise the remote modulating controller MK2. The electrical part of the integrated-regulating type consists of adjustment module TMK, contactor, thermal relay and so on. The adjustment module can relieve and send out standard signal 4-20MA. The electrical components are equipped on a reversible panel so as to adjust the moment of force controller, traveling controller and opening apparatus .The button box has three buttons ,the middle one being local /remote change-over button , the left one being the local closed valve and the right one being remote control button , remote control is performed with the box closed and on the contrary, local control is performed.

See picture about the electrical control part.



Picture 8 Electrical Components drawing of the integrated-general type

2. The schematic drawing and wiring of the electrical control

2.1 The principle of the outdoor type

The electrical control drawing of the DZW-Type is the same as the DZB-Type, see picture 9(a),which is explained as follows ;

(1) This picture is designed in accordance with "'95' Typically Designed lines"

which was enacted by the general department of the power planning. It can meet the needs of various control lines picture 9(a)is the shematic drawing of the opening table, wiring which is for reference only. because the actuator does not have this kind of line.

(2) If the closed torque Tsc is used to control the closed valve the self-maintained line of the closed button SC1 should be connected with A41 ; but if the closed torque LSC l is used to control the closed valve, and the closed TSC used as a protection, the self-maintained line should be connected with A42.

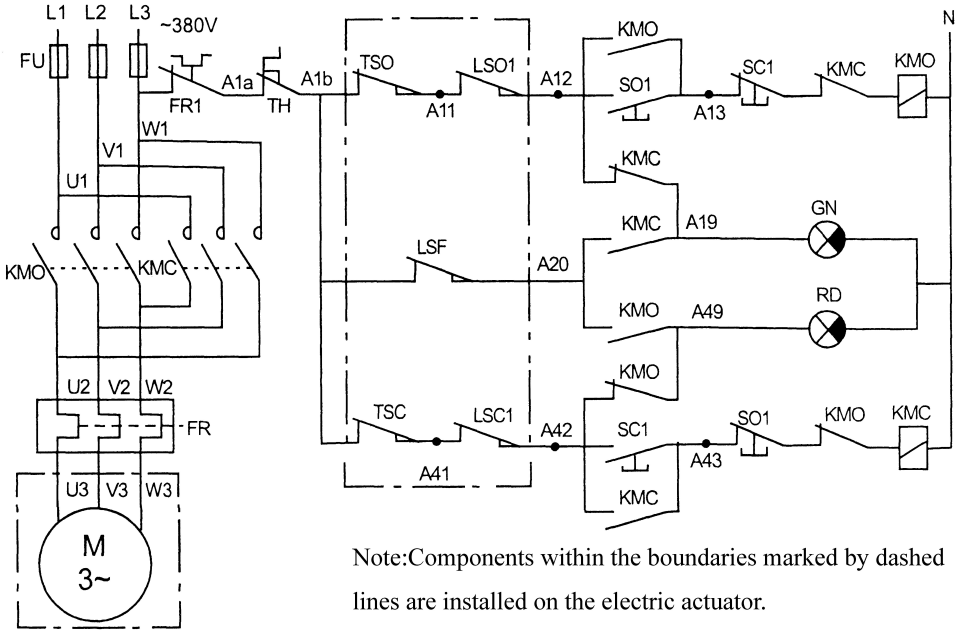
(3) Remote Opening indication utilizes the potentiometer to provide the user with a resistance value which varies with the action of the valve. The user can see picture 9(b) as reference.

(4) Remote Opening indication cannot be equipped together with the indicator light type opening indication simultaneously, but it can be used with the indicator light which inside of the control cabinet.

(5) The indicator light can be paralleled with A19, N, A49 directly to transmit the signals to the remote place.

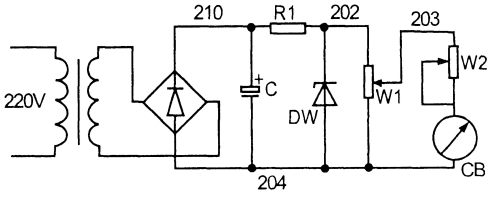
In order to provide the user with enough control points the traveling control apparatus can be equipped with four groups of microswitches at most, and use the connection terminal of 51 fuses (provided for special orders).Two opening and two closed microswitches are namely provided.

The sequence of the electrical components is as picture 9(d).

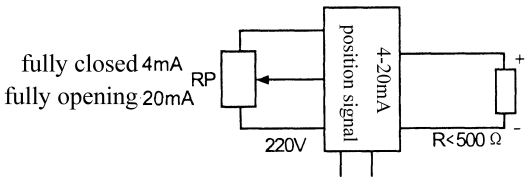


Note:Components within the boundaries marked by dashed lines are installed on the electric actuator.

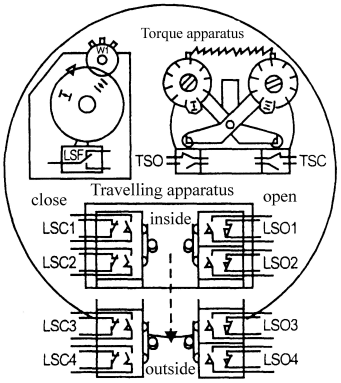
(a) Electrical Schematic diagraw



(b)The wiring diagram of the opening table



(c)The square drawing of the standard sihnal

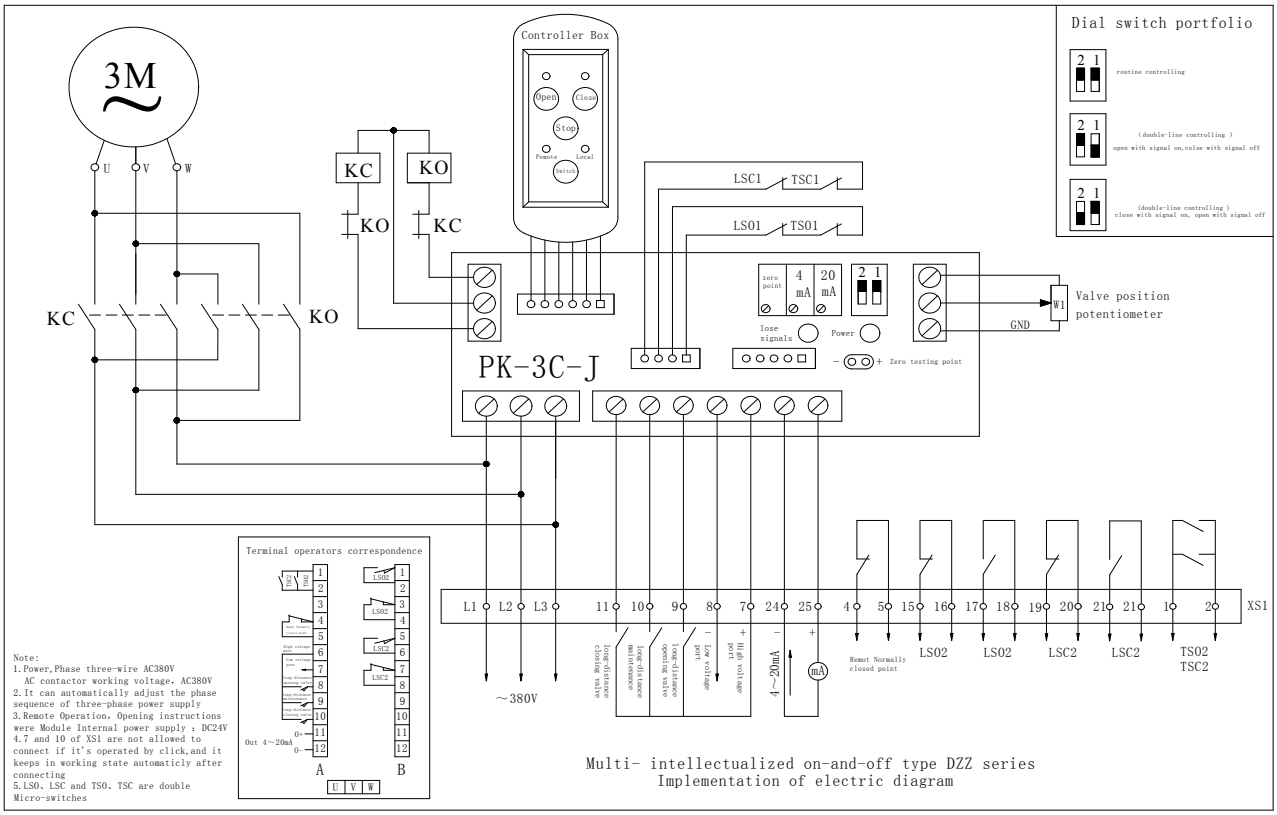


(d) The position diagram of ’95’typically designed electrical.

Picture 9 :The electrical schematic diagram of DZW, DZBoutdoor type.

3, The electrical schematic diagram of the integral type

3.1 The electrical schematic diagram of The integral type DZZ, The integral explosion-proof type DZZB, see picture 10, which is explained as follows.



Picture 10： The electrical schematic diagram of The integral type DZZ, The integral explosion-proof type DZZB

Sheet 4 Electrical Components Table

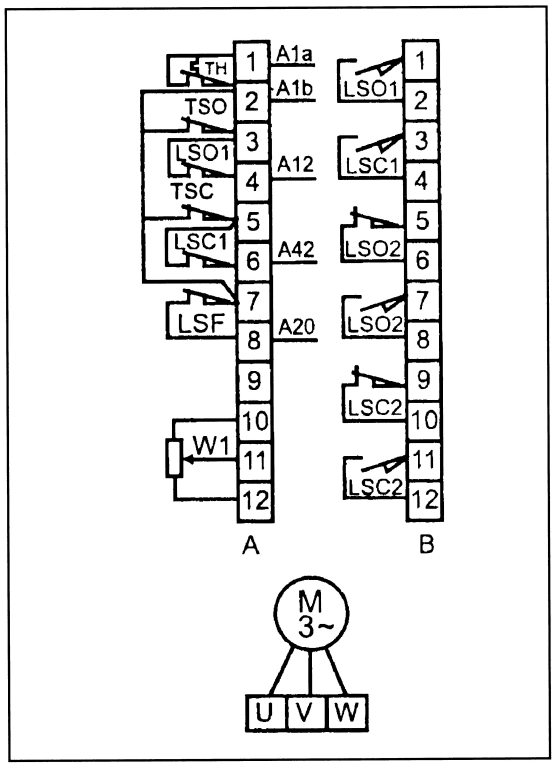
Code	Name	Model Spcifications	Quant ity	Used in Outdoor Type	Used in Integral Type	Used in Regulating Type
KO,KC	AC Cont actor	CJx8-9 or CJ10	2	√	√	√
FR	Thermal Relay	JR16B	1	√		√
LSF	Flashlight Switch	V-157	1	√		
LSD,LSC	Travel switch	Wk1-1 or WK3-1	4	√	√	√
TSO,TSC	Torque Switch	KN1-203	2	√	√	√
SA	In patients Switch	KN1-203	1	√		
SBD,SBC	Button	MK1-1	2		√	√
QC2	Local/Remote TorqueSwitch	MK1-1	2		√	√
SO,SC,SS	Buttcn	LA11-A11D	3	√		
TH	Thermal Switch	T11	1	√	√	
FU	Fuse	BLx-1	1	√	√	√
CB	Opening Table	1-10mA	1	√	√	
W1	Potentiometer	WX10-330n	1	√	√	
RPC	Precision Potentiometer	Wx701-5K				√
W2	Potentiometer	WX10-2.2K	1	√	√	
RH	Heating Resistor	RX20-25	1		√	√
M	Motor	YDF/YBDF	1	√	√	√
B	Transformer	220V/9V/6V	1	√		
C	Electrolytic Capacitor	220/uF,1V	1	√		
V	Diode	2CP10	4	√	√	

YD,RD,GD	Indicator Light	ND3 or NDL3	3	√	√	√
TMK	Automatical Modulating controller	Homemade Pieces controller	1			√
MK1	Phase Sequence Identification and protection	Homemade Pieces	1		√	√
DC	DC Power	DC 24V	1		√	
MK2	Remote Modulating Controller	Homemade Pieces	1		√	
HS	Interlock Protection	Homemade Pieces	1		√	

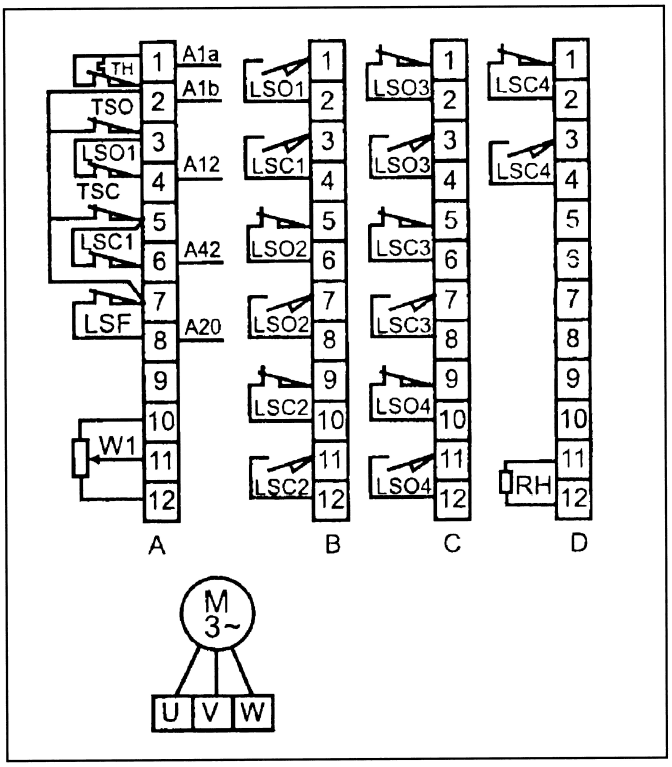
4.The wiring of the outdoor type

a) Non-typically designed terminal wiring diagram (See Picture 10 ;

b) ‘95’typically designed 51-fuses terminal wiring diagram (See Picture 11(Non-typically designed terminal wiring diagram doesn’t have C, D terminals)



Picture10: : Non-typically designed termina wiring diagram.

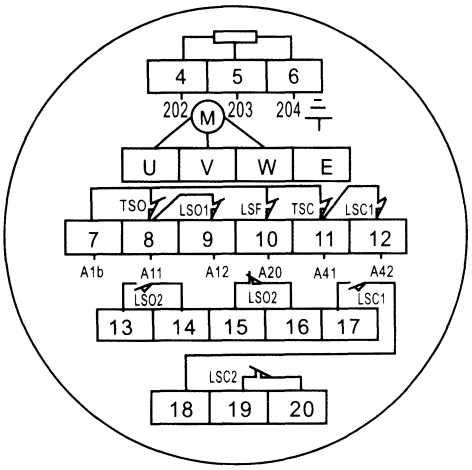


Picture 11 ‘95’typically designed 51-fuses terminal wiring diagram.

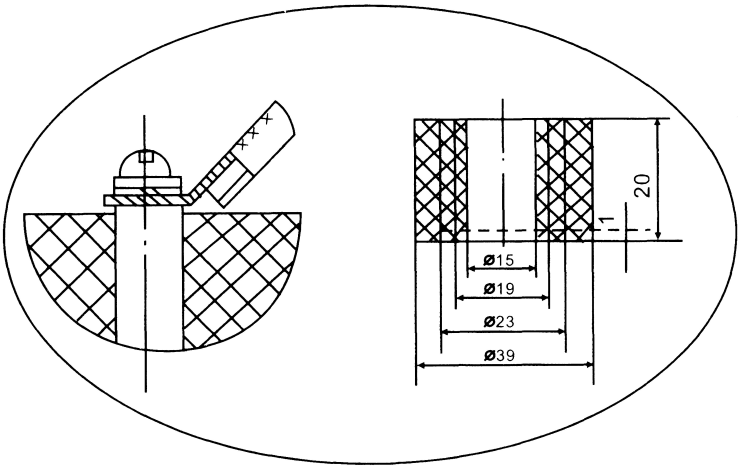
Note: TH is thermal switch in the motor ;RH is space heater in the electric actuator .We provide TH and RH according to the user's requirements.

5 .The wiring of the explosion-proof type (DZB), see picture 12The terminal wiring should be strong by griping the wires with bend , see picture 13as a reference . The electrical gap between different potential conductive parts which in the junction box must meet the following requirements.

The gap should be not less than 6mm when the voltage is 220v,and not less than 8mm when 380v. There are two entry devices in the junction box , one leads into the power cable of the motor and the other leads into the control cable ,but the power cable must have earth wire which connects with the earth terminal .The diameter specifications of the entrance cable see picture 14and sheet 5.Pack and press the sealing ring tightly after the connection . The shore hardness of the sealing ring ranges from 45 degree to 55 degree and it must be changed immediately when damaged and worn .



Picture 12 The terminal wiring diagram of the explosion-proof type (DZB).



Picture 13:The method of the terminal wiring .

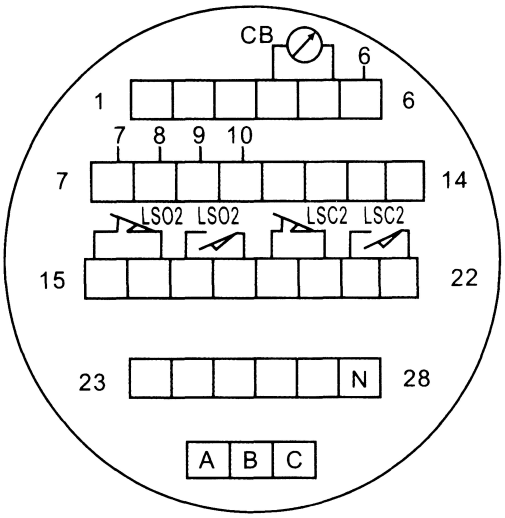
Picture 14 : Sealing ring.

Note :Please specify if the terminal is not enough.

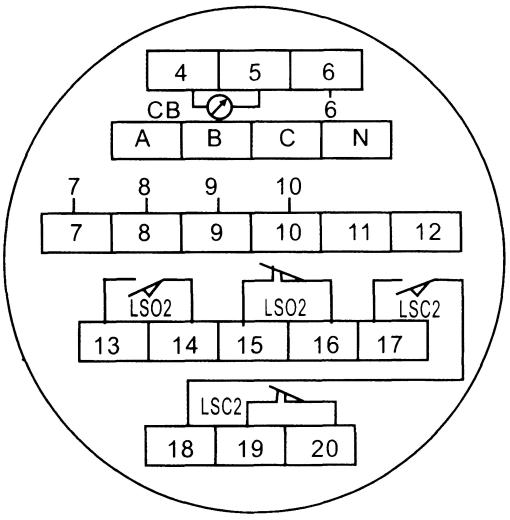
Sheet 5 Cable Diameter

The inner diameter in the concentric groove of the sealing ring (mm)	ϕ 15	ϕ 19	ϕ 23
The nominal diameter of the entrance cable permitted (mm)	ϕ 15±1	ϕ 19±1	ϕ 23±1

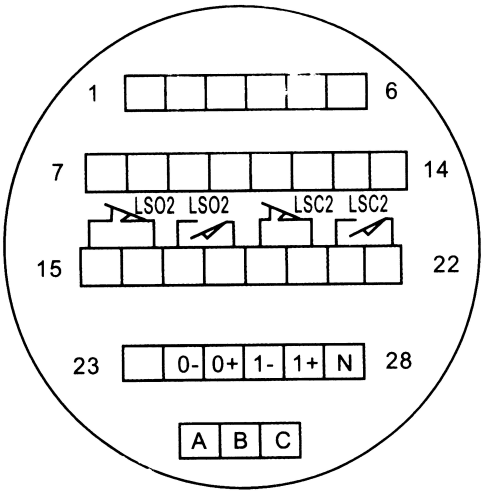
7. The terminal connection diagram of the integrated outdoor type , integrated explosion-proof type, integrated regulating type and integrated regulating explosion-proof type(See Picture 15 16,17and18)



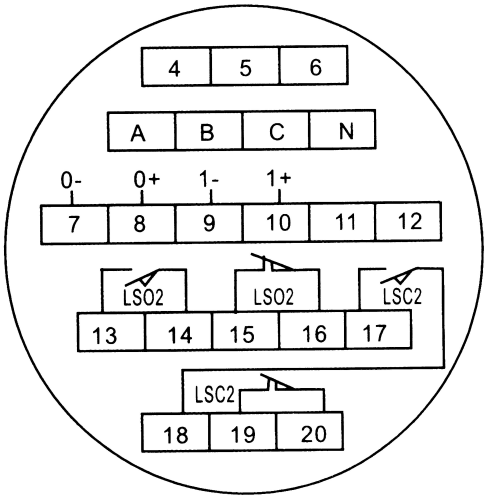
Picture15The terminal wiring diagram of the Integrated outdoor type(DZZ).



Picture16:The terminal connection diagram of the integrated explosion-proof type(DZBZ)



Picture17The terminal connection diagram of The integrated regulating type(DZT)



Picture18: The terminal connection diagram of the integrated regulating explosion-proof type (DZBT) .

Ⅴ.Adjustment

After the electric actuators and valves are installed , you must adjust the torque controller , traveling controller and opening indicator separately before putting the valves into use ; prior to the adjustment , you must make sure that the potentiometer on the opening indicator is withdrawn (By loosening the fixing screw of the gear which on the potentiometer shaft) to prevent damage ; Finally check the rotational direction of motor and the control lines in case that the motor may get

out of control.

The adjustment procedure applies to the torque , traveling controllers and opening indicators of the DZW, DZZ, and DZT.

1. The adjustment of the torque control apparatus (See Picture 4)

   We already adjusted according to the user's requirments prior to the delivery . To reset the setting valve ,you can turn the adjustment shaft of the cams to the corresponding scale, first the close direction, then the opening direction.

2. The adjustment of the traveling control apparatus (See Picture 5) .

3. The adjustment of the fully closed position

   a) Tightly close the valves manually ;

   b) Press the roof bar with the screw driver and make a 1/4 turn to wedge ;

   c) Revolve the closed adjustment shaft according to the arrow until the cam acts ;

   d) Rotate the roof bar to its original position .

4. The adjustment of the fully opening position.

   a). Manually start the valves to the necessary position ;

   b) Press the roof bar and make a 1/4 turn to wedge ;

   c) Revolve the opening adjustment shaft according to the arrow until the cam alts;

   d) Turn the roof bar to its original position.

5. The adjustment of the indicator (See Picture 6)

   Adjust the local indicator and remote transmission potentiometer after the adjustment of the torque and travel ; Prior to adjustment , you must loosen the potentiometer gear .

   The methods of adjustment is as follows :

   a). Move the revolutions adjustment gear to the necessary position;

   b). Close the valves manually or electrically ;

   c). Revolve the closed indicator dial so that the closed mark can aim at the pointer ;

   d). Grip the revolution shaft of the potentiometer and face to approach the terminal position in the counter-clockwise direction , then tighten up the fixing screw of the potentiometer;

   e). Electrically or manually operate the valves to the fully opening position and keep the calibrated dial of the closed direction motionless, then revolve the opening indicator dial so that the opening mark can aim at the pointer ;

f). Electrically operate the valves to check the flash light.

A flashing red light will illuminate during the process of starting valve , then a steady red light indicates a fully opened valve condition ; a flashing green light will illuminate during the process of closing valve, then a steady green light indicates a fully closed valve condition.

6. The adjustments of the integral type and modulating type.

7. Check the power source

If the yellow light fails to illuminate after the power cords are plugged in , which means that the mistake of the numbers of the power cords or lack of phase, you should exchange randomly two phase until the yellow light is on .

8. The adjustments of the moment of force controller., travelling controller and opening apparatus.

Open the cover of the electrical box and loosen the screw A on the electronic assembly panel(See Picture 8) and reverse the panel 1/4 turn prior to the adjustments of the moment of force controller , traveling controller and opening apparatus.

9 . Local / Remote control operation

integral actuator is equipped with button boxes , which provides the user with two control modes , that is , local control and remote control

1).local control：Open the cover of the button box and use the buttons to open and close. Green light is on while the valve id fully closed; red light is on while the valve is fully opened . Local operation ends with the lid closed

2).Remote control：Remote control may begin with the button box closed.

The integrated—outdoor type and the integrated explosion-proof type are equipped with modulating controller , which provides the users with 5 modes of remote of remote control , we will provide the second control mode unless the user specifies.

Ⅵ. Assembly and Disassembly

1. There is no special request about the installment of this equipment . Provided that the motor and the electrical box are recommended to be placed at the horizontal or vertical position to facilitate , which is better for the lubrication , testing and maintenance and manual operation.
2. While installing the equipment , ensure enough room for maintenance personnel to disassemble the parts .

3. The axial clearance of the installment and jaw linkage is not less than 1-2 ㎜.
4. Check whether the extension of the stem equals to the length of the guard shield when the actuator is used for the rising stem valve.
5. Cause no damage to the sealing face, sealing pieces and explosion-proof face of the explosion-proof actuator during the process of assembly, testing and disassembly, moreover you should spread some rust – resistant oil on the explosion –proof face.
6. The disassembly proceeds under the condition that the valve is slightly opened by turning the handwheel several turns.

Ⅶ. Words of caution

1. The power source should be cut off prior to opening the cover of electrical box under the explosive condition (or don't remove and test the equipment with the power under the explosive condition) ;
2. The window of the opening apparatus cannot collide with hard objects ;
3. Don't open any sealing parts such as the cover of electrical box , out doors in the overcast and rainy day ;
4. After inspection and maintenance , cover the sealing parts tightly , which avoids the electrical components from damage because of rain water and humidity ;
5. The first time you operate the actuator electrically after assembly or reassembly , make sure that the valve is in the middle position and you must check the closed and opening directions , and test item by item according to the testing requirements , make sure all the parts work properly before put into use ;
6. This equipment utilizes three-phase asynchronous motor which is specially designed for the valve with rated working time less than 10 minutes ,don't over work it which protects the motor from over heating ;
7. The guard shield of the stem or the valve cap on this equipment must be turned tightly. when you remove them to maintain or repair , cover the top of the equipment to protect the stem / nut from the damage by dust , sand or other foreign objects ;
8. Prior to the manual operation , push the transfer handle in accordance with the direction of the arrow . If you fail to push it , you should turn the handwheel as you push the transfer handle . Don't push transfer handle with force or turn back it to the electric position with force , or else the internal parts will be damaged ;

9. When the valve is rarely used , make rules to inspect the electric equipment at regular intervals

Ⅷ. Problems and Solutions

Items	Problems	Reason	Solutions
1	Can't be started	① The power cords disconnect ; ② Control lines disengage ; ③ Travelling or the moment of ; force apparatus fail ;	① Check the power cords ; ② Fix the lines ; ③ Remove the problem of; the traveling and the moment of force apparatus ;
2	The rotational direction of the output haft doesn't conform to the stipulation	The phase sequence of power source is connected improperly	Exchange two random power cords
3	The motor overheat	① The running time is too long ; ② Motor cannot match with the electric actuator; ③ One phase disengages ;	① Stop operating and cool the electromotor ; ② Check the necessary condition ; ③ Check the power cords ;
4	Motor stops during the operation	① The actuator is over loaded and the moment of force acts; ② The valve has a breakdown ;	① Increase the setting moment of force ; ② Inspect the valve ;
5	The motor still rotates or the light is not bright though the valve is in the right position	① The travelling or the moment of force apparatus has a break down ; ② Travelling controller may not be adjusted properly ;	① Inspect the setting moment of force apparatus ; ② Readjust the traveling control apparatus ;
6	No position signal available	① Remote transmission potentiometer has breakdown ; ② The fixing screw of the potentiometer gear gets loosen ;	① Inspect or change the potentiome ; ② Tighten up the fixing screw of the potentiometer gear ;

Ⅸ.Notice for Orders

1. Please specify the model number and the necessary torque of the close / opening direction . We will provide you with the actuators according to the specifications of ours unless you specify ;
2. You must state clearly if the actuator must be used under the explosive environment which must conform to the stipulations of the explosion-proof standard in this user's guide ;
3. Please specify the standard of connection dimension , the diameter and extention length of the stem . If they don't conform to this guide , please consult us for possible solutions ;
4. A clockwise rotation of the handwheel is assumed to closed valve , please specify if your practice is just the opposite ;
5. We provide the electric actuators of other rotational speed according to the customer's requirements .

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Contact Us

Valve’s electric actuator User’s Guide

Rotary actuator

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Contact Us

Q 型电动执行机构使用说明书
Instruction Manual for Q-type Electric Actuator

1、概述 General Instruction

部分回转型阀门电动执行机构适用于蝶阀、球阀、旋塞阀和风门等做 90°回转的阀门，用于阀门的开启、关闭或调节控制，可远距离控制，也可现场操作。广泛用于电力、冶金、石油、化工、食品、纺织、造纸、制药、水厂和污水处理等行业。

Part-turn valve electric actuator, which can be applicable to the valves that can make turning of 90°, such as butterfly valve, ball valve, plug valve and air door etc., is used for opening, closing or adjusting the valves; and it can be controlled remotely, and also can be operated locally. The actuator can be widely used in the industries like electric power, metallurgy, petroleum, chemical engineering, food, textile, paper-making, pharmaceutical, water work, and sewage disposal and so on.

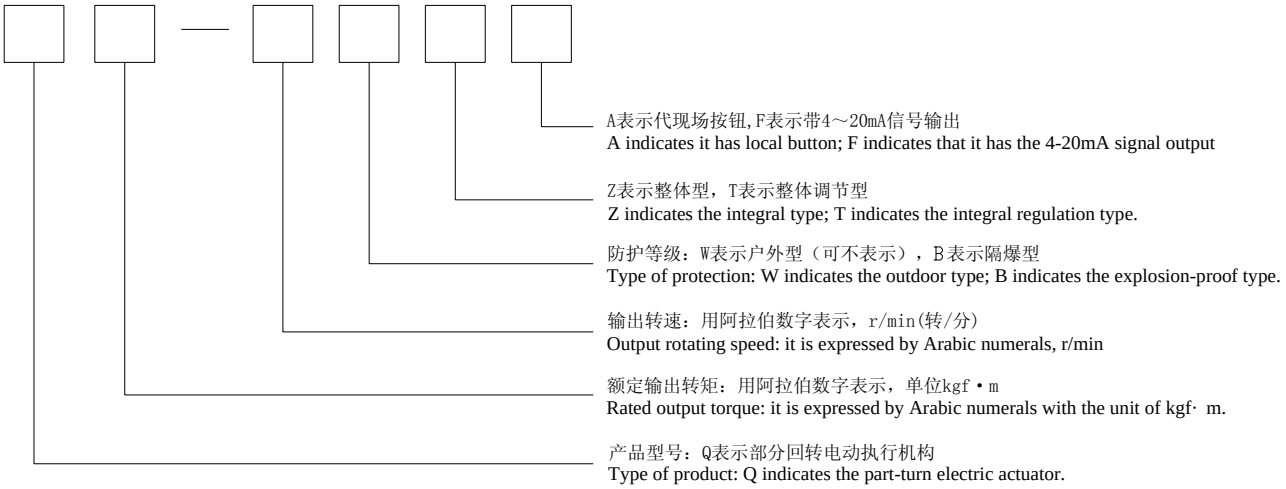
部分回转电动执行机构分为：户外型、隔爆型、整体型、整体调节型、隔爆整体型、隔爆整体调节型。

There are many types for part-turn electric actuator: outdoor type, explosion-proof type, integral type, integral-regulation type, integral explosion-proof type.

本产品的性能符合 JB/T8528-1997《普通型阀门电动装置技术条件》的规定；隔爆型的性能符合 GB3836.1-2000《爆炸性气体环境用电气设备第 1 部分：通用要求》，GB3836.2-2000《爆炸性气体环境用电气设备第 2 部分：隔爆型“d”》及 JB/T8529-1997《隔爆型阀门电动装置技术条件》的规定。并经国家防爆电气产品质量监督检验测试中心检定，取得了防爆合格证，经中华人民共和国国家质量监督检验检疫总局批准取得全国工业产品生产许可证。

The performance of the product shall conform to the specification in JB/T8528-1997 *Technical Condition for Common Valve's Electrical Devices*. The performance of the explosion-proof product shall conform to the specifications in GB3836.1-2000 *The Electrical Equipment used in Explosive Gas Atmosphere: the first part: General Requirements*, GB3836.2-2000 *The Electrical Equipment used in Explosive Gas Atmosphere: the second part: Explosion-proof type "d"*, and JB/T8529-1997 *Technical Condition for Explosion-proof Valve's Electrical Devices.* And it has passed the verification of National Quality Supervision & Testing Centre for Explosion-proof Electrical Products, and has got the Conformity Certificate of Protection of the whole series. And we have got the manufacturing license of industrial products approved by General Administration of Quality Supervision, Inspection and Quarantine.

2、 型号表示方法 **Presentation of Model**



型号示例：

1）Q10-1B 表示电动执行机构为部分回转，输出转矩 100 N·m（10kgf·m），输出转速 1 r/min，隔爆型。

2）Q120-0.5T 表示电动执行机构为部分回转，输出转矩 1200 N·m（120kgf·m），输出转速为 0.5r/min，整体调节型。

Sample of Model:

1. Q10-1B: Indicate that the electric actuator is part-turn; the output torque is 100N·m（10kgf·m）; the output rotating speed is 1r/min; explosion-proof type.
2. Q120-0.5T: Indicate that the electric actuator is part-turn; the output torque is 1200N·m（120kgf·m）; The output rotating speed is 0.5r/min; integral-regulation type.

3 、工作环境和主要技术参数 **Operating Environment and Major Technical Parameters**

3.1 电源：常规：单相 220V、三相 380V，远程 DC24V（50HZ）

特殊：单相 110V、三相 415V、660V（50HZ、60HZ）

Power supply: general: single-phase 220V, three-phase 380V (50Hz), long distance DC24V

Special: single-phase 110V, three-phase 415V, 660V, (50Hz, 60Hz)

3.2 工作环境 Operating environment：

3.2.1 环境温度：-20~+60℃（特殊订货-60~+80℃）

Ambient temperature: -20~+60℃ (special order -60~+80℃)

3.2.2 相对温度：≤90%（25℃时）

Relative humidity：95%（when 25℃）

3.2.3 周围介质：户外型用于无易燃、易爆和无腐蚀性介质的场所；隔爆型产品有 dI 和 dIIBT4 两种，dI 适用于煤矿非采掘工作面；dIIBT4 用于工厂，适用于环境为 IIA、IIB 级 T1-T4 组的爆炸性气体混合物。（详见 GB3836.1）

Surrounding medium: The outdoor type can be used in the places without inflammable/explosive and corrosive medium; There are two types of explosion-proof products dI and DIIBT4: dⅠ can be applicable to non-excavating working area for coal mine, and dⅡBT4, which is applicable to the environment with ⅡA, ⅡB grade T1~T4 explosive gas mixture, can be used in the factory. (For details refer to GB3836.1)

3.2.4 防护等级：IP55（IP65、IP67）。

Degree of protection: IP55 (IP65、IP67).

3.3 工作制：为短时 10 分钟（特殊定货 15~60 分钟）。

Working time: 10 minutes for short time (special order can reach to 15-60 minutes)

3.4 型号规格和主要技术参数

model and major performance parameter

3.4.1 主要技术参数见表 1

Refer to Table 1 for major performance parameter.

表 1　　Table 1

型号 规格 **Model &Spec.**	输出转矩 N·m **Torque (N·m)**	最大阀杆直径 Mm **Maximum diameter of valve stem (mm)**	手动速比 **Manual ratio**	输出转速 r/min **Output rotating speed (r/min)**	电机功率 KW **Motor power (KW)**	参考重量 Kg **Referential weight (Kg)**
Q10	100	28	88	0.5/1/2/3	0.03/0.06/0.09/0.18	23
Q20	200	28	88	0.5/1/2/3	0.06/0.09/0.12/0.25	24
Q30	300	28	88	0.5/1/2/3	0.06/0.12/0.18/0.37	25
Q60	600	42	74	0.5/1/2/3	0.18/0.25/0.37/0.55	53
Q90	900	42	74	0.5/1/2/3	0.18/0.25/0.37/0.75	55
Q120	1200	42	74	0.5/1/2/3	0.18/0.37/0.55/1.1	57
Q200	2000	60	67	0.5/1/2/3	0.37/0.55/1.1	87
Q250	2500	60	67	0.5/1/2	0.55/0.55/1.1	88
Q300	3000	60	67	0.5/1/2	0.55/0.75/1.5	90
Q400	4000	60	67	0.5/1	0.55/0.75	92
Q500	5000	60	67	0.5/1	0.75/1.1	92

注：以上输出转速为常规供货，如需特殊转速订货时请说明。

Note: Normally, we provide the products with the above rotating speed, if user requires special rotating speed, please give clear indication when placing an order.

3.4.2 电机技术参数见表 2　Refer to Table 2 for the technical parameter of motor.

表 2　Table 2

功率 Power　(KW)	0.03	0.06	0.09	0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	3	4	5.5	7.5
电流 Current(A)	0.3	0.48	0.6	0.7	0.95	1.3	1.6	2.4	3.0	3.4	4.5	9	11	14	19

4、 结构 Structure

4.1 Q 型电动执行机构由阀门专用电机、减速器、行程控制器、力矩控制器、开度指示器、手轮、机械限位机构等组成。隔爆型是在户外型的基础上增加了隔爆面，采用了隔爆接线盒和隔爆型电动机。Q 型的传动原理见图 1。

Q type electric actuator is consisted of motor special for motor, speed reducer, motion controller, torque controller, opening position indicator, hand wheel, mechanical limit, and so on. The explosion-proof type has the additional explosion-proof surface on the basis of outdoor type, and applies explosion-proof type connecting box and explosion-proof motor. The transmission principal for Q type is shown on Figure 1.

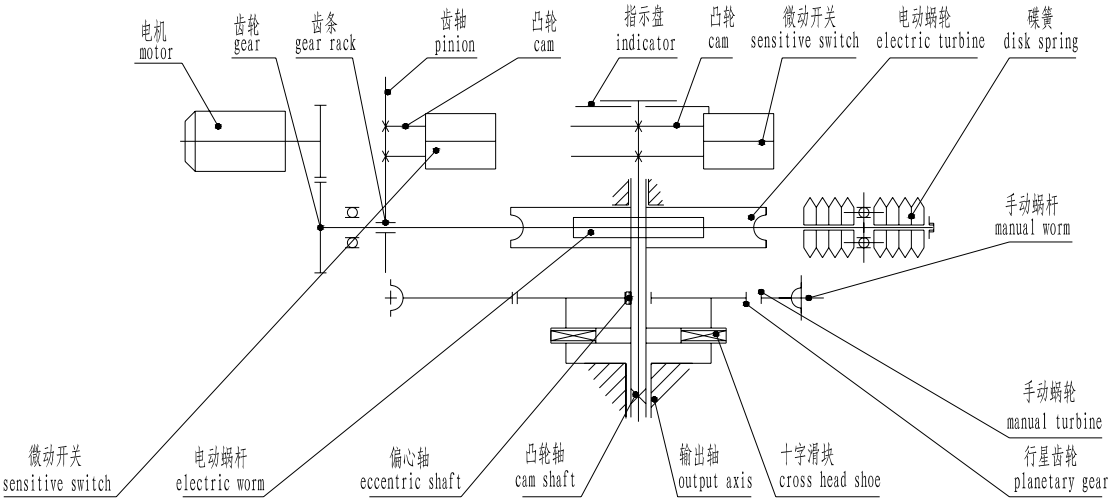


图 1 Figure 1

4.2 整体型是在常规普通型电动执行机构的基础上派生而成，其电气控制部分结构见图 2。

The integral electric actuator is derived from the common type. Refer to Figure 2 for its electric control.

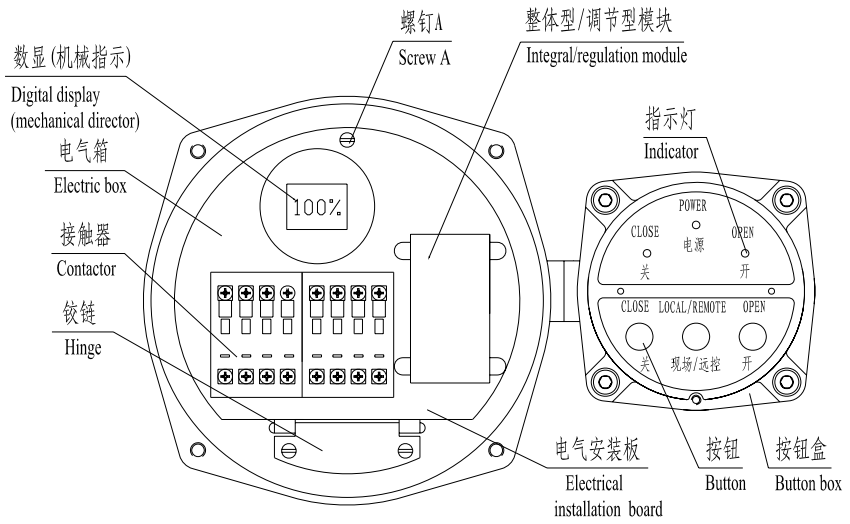


图 2 Figure 2

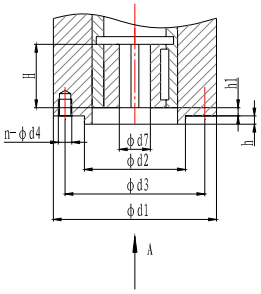
5. 外形及连接尺寸 Outline and connection dimension

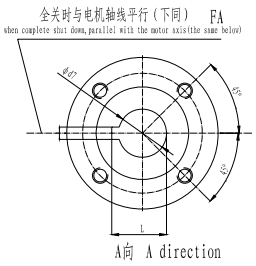
5.1 连接尺寸 Outline and connection dimension

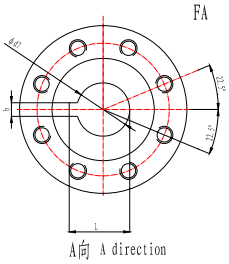
Q 型电动执行机构与阀门的连接型式和尺寸见表 3 Refer to table 3 for the connection type and dimension.

表 3 table 3

连接型式 Connection Type　　法兰螺孔及尺寸 The bolt hole and dimension of flange



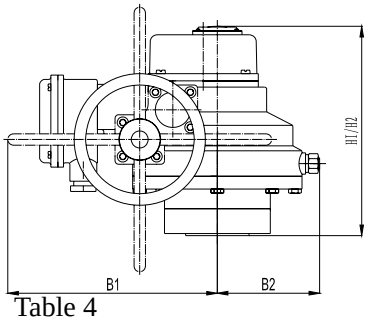




法兰号 No. of flange	电装型号 model	d1	d2(f8)	d3	d4	d7		H	h	h1
						预留尺寸 Reserved dimension	最大尺寸 Maximum dimension			
F05	Q5	65	35	50	4-M6	10	22	40	3	3
F05	Q10	65	35	50	4-M6	10	22	40	3	3
F07	Q20	90	55	70	4-M8	15	28	45	3	3
F07	Q30	90	55	70	4-M8	15	28	45	3	3
F10	Q30	125	70	102	4-M10	15	42	45	3	3
F10	Q60	125	70	102	4-M10	15	42	65	3	3
F12	Q90	150	85	125	4-M12	20	50	65	3	3
F14	Q120	175	100	140	4-M16	20	50	65	3	3
F14	Q200	175	100	140	4-M16	20	60	80	3	2
F14	Q250	175	100	140	4-M16	20	60	80	3	2
F16	Q300	210	130	165	4-M20	20	60	80	3	2
F16	Q400	210	130	165	4-M20	20	60	80	3	2
F16	Q500	210	130	165	4-M20	20	60	80	3	2
F25	Q500	300	200	254	8-M16	20	60	100	3	2

5.2 外形和外形尺寸 The outline and dimension

Q 型电动执行机构外形和外形尺寸见图 3 和表 4
Refer to Figure 3 and Table 4 for the outline
and dimension of Q-type electric actuator.



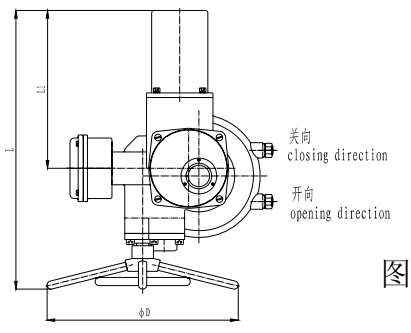


图 3 Figure 3

表 4 Table 4

尺寸 Dimension / 型号 Model	B1	B2	H1	H2	L	L1	ΦD
Q10/30	207	100	227	389	477	260	200
Q10/30B	311	100	262	444	527	310	200
Q60/120	252	145	293	455	550	323	375
Q60/120B	356	145	336	510	584	363	375
Q200/500	282	180	311	459	662	390	510
Q200/500B	386	180	346	495	662	390	510

注：H1 为户外型、防爆型，H2 为整体型/整体调节型

Note: H1 is outdoor type, explosion-proof type, and H2 is integral type/integral-regulation type.

6. 控制原理和接线　Control principle and connection

6.1 电气控制原理图　The schematic diagram of electric control

6.1.1 Q 型电动执行机构户外型、隔爆型电气控制原理图见图 4。

Refer to Figure 4 for the electric control principles of outdoor type and explosion-proof type of Q type electric actuator.

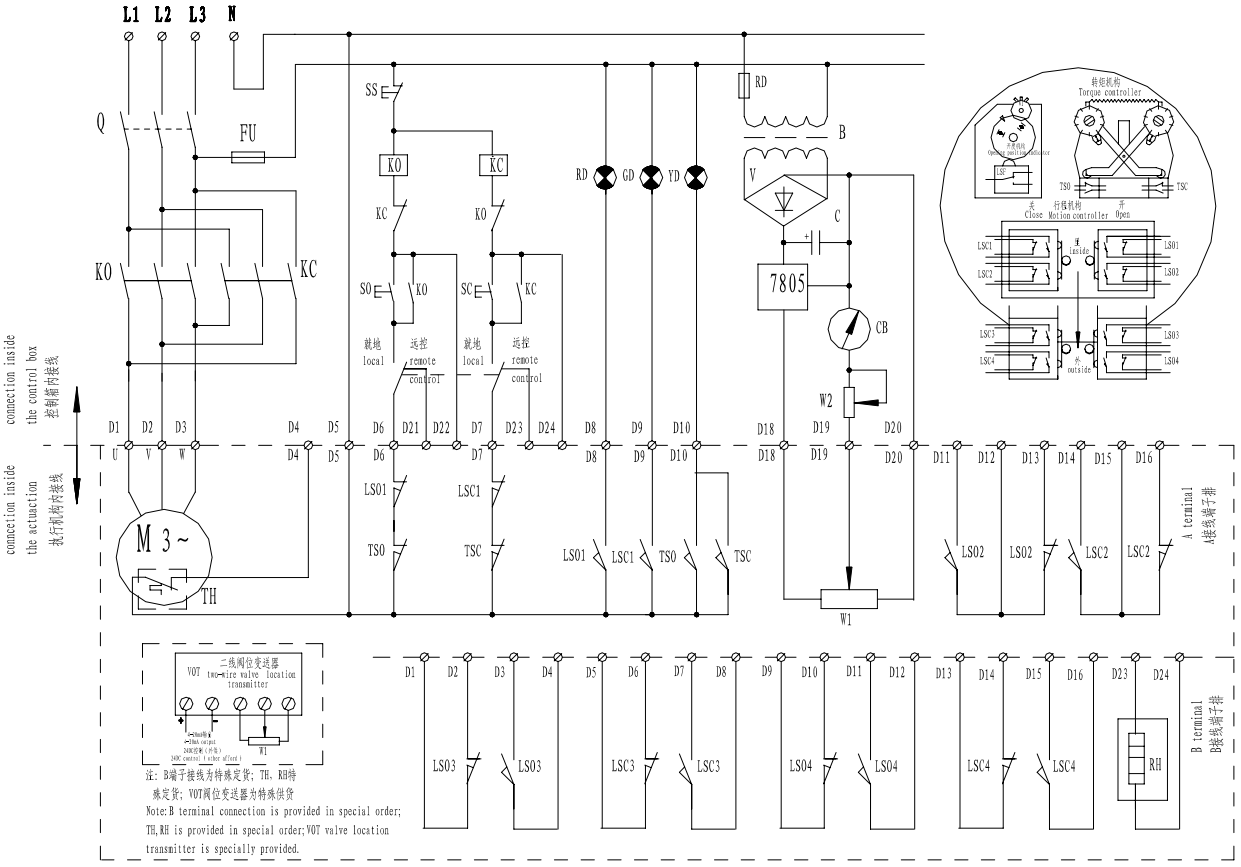


图 4　Figure 4

6.1.2 Q 整体型和隔爆整体型电气控制原理图见图 5 Refer to the Figure 5 for the schematic diagram of electric control of integral type and integral explosion-proof type.

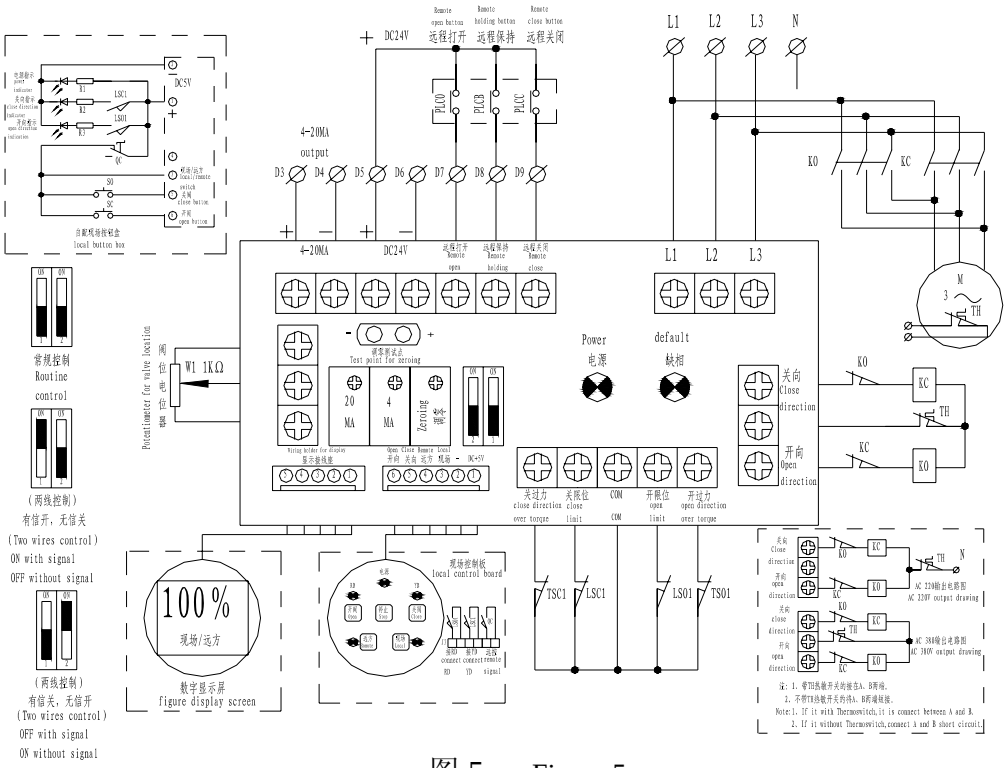


图 5 Figure 5

6.1.3 Q 整体型调节型和隔爆整体调节型电气控制原理图见图 6。Refer to the Figure 6 for the schematic diagram of electric control of integral adjusting type and explosion-proof integral adjusting type.

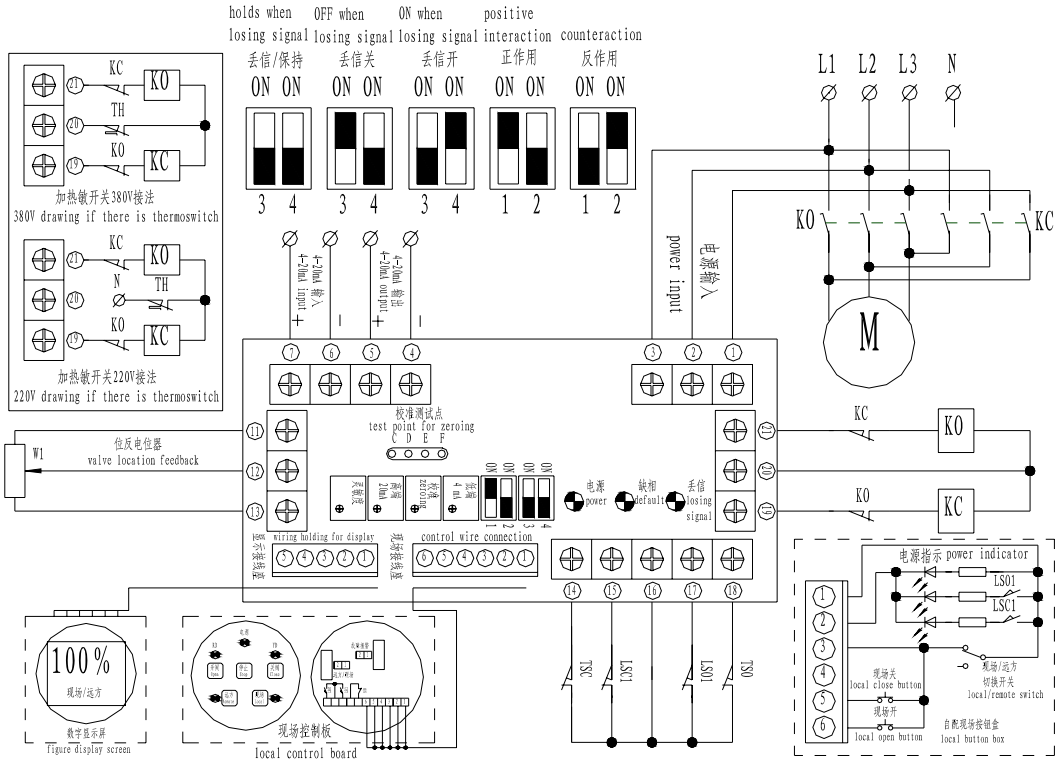
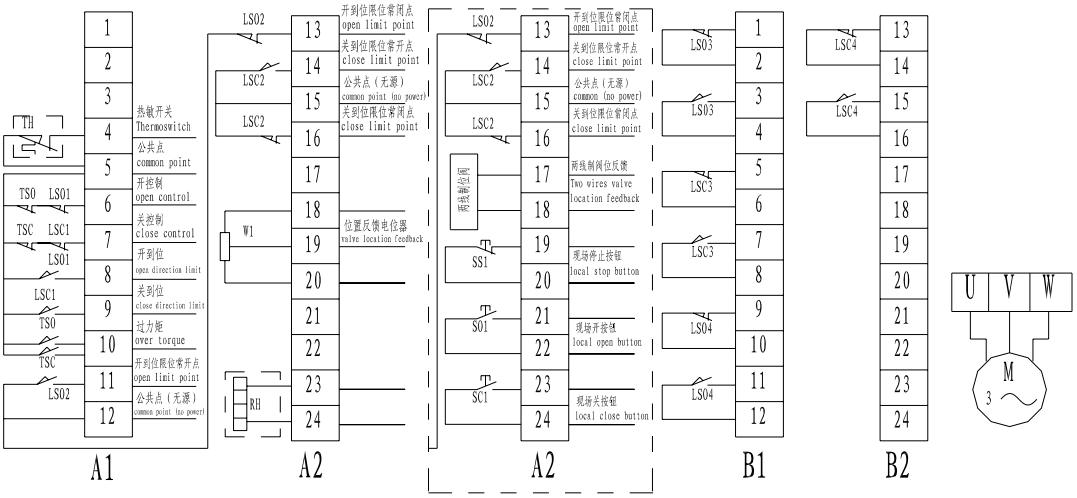


图 6 Figure 6

6.2 接线 Wire connection

6.2.1 Q 户外型接线端子见图 7 ，Q 隔爆型接线端子见图 8。 Refer to the Figure 7 for the connection terminal of outdoor type, and to the Figure 8 for the explosion-proof type.



注: 1、如用户需要4-20mA阀位反馈信号，开、关、停按钮则A2端子改为以上接线方式。
Note: 1、If user requires 4-20mA valve location feedback, or local open, close, stop button, the connection way for terminal A2 shall be changed to above.

2、A端子为常规产品，行程开向、关向各一对常开常闭辅助接点；特殊定货加B端子，
行程开向、关向各三对常开常闭辅助接点，TH、RH为特殊定货。

2、A terminal is normal product,there is one pair of normal open auxiliary contact and normal close auxiliary contact for each open and close direction of the travel; B terminal will be additional in special order,and there are three pairs of normal open auxiliary contact and normal close auxiliary contact and normal close auxiliary contact for each open and close direction of travel;TH,RH is specially provided.

图 7 Figure 7

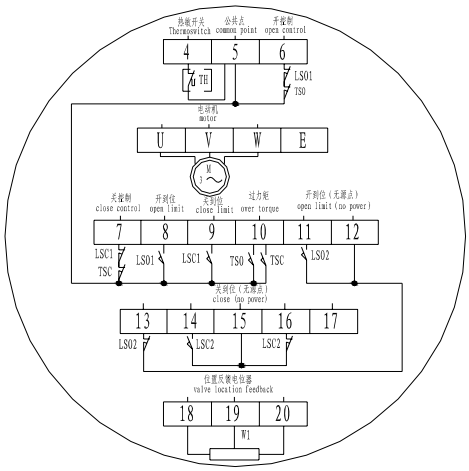
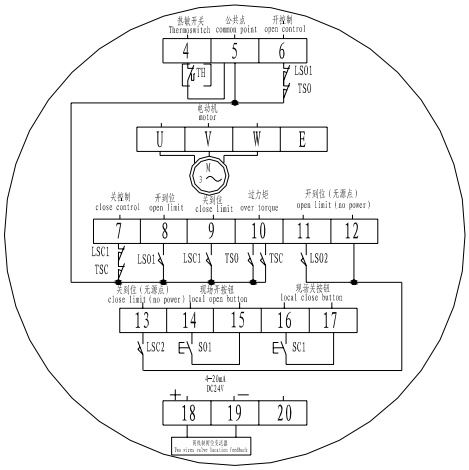


图8 隔爆型端子接线图
Fiqure 8 Terminal drawing for common explosion-proof electric actuator



注: 如用户需要4-20mA阀位反馈信号或现场开、关按钮的防爆端子接线方式，TH为特殊供货。
Note: If user requires 4-20mA valve location feedback or local open ,close button , the connection for explosion-proof terminal shall be changed to the above way, TH is specially provided.

图 8 Figure 8

6.2.2 整体型、隔爆整体型、整体调节型、隔爆整体调节型端子接线图分别见图 9、10、11 和 12。

Refer to Figure 9,10,11,12 for the terminal connection diagram of Integral type, integral explosion-proof type, integral regulation type, integral regulation explosion-proof type separately.

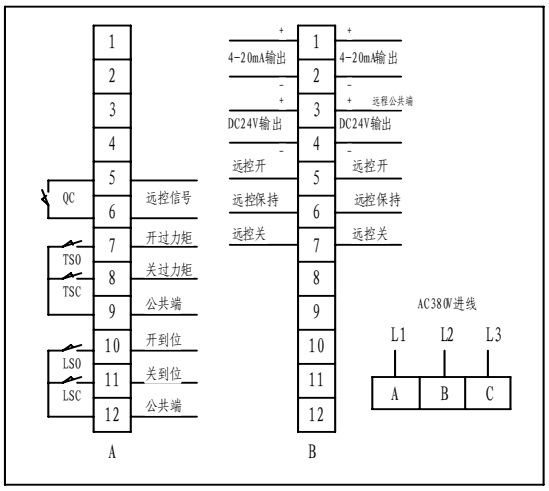


图 9 整体开关型电动执行机构端子接线图

Figure9 Terminal drawing for integral switching type electric actuator

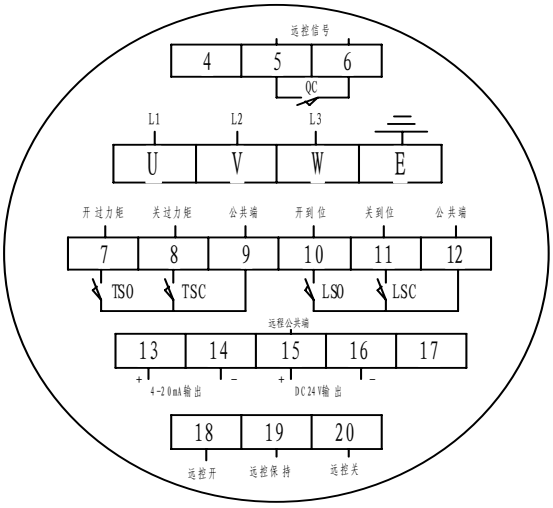


图 10 隔爆整体开关型电动执行机构端子接线图

Figure 10 Terminal drawing for integral explosion-proof switching type electric actuator

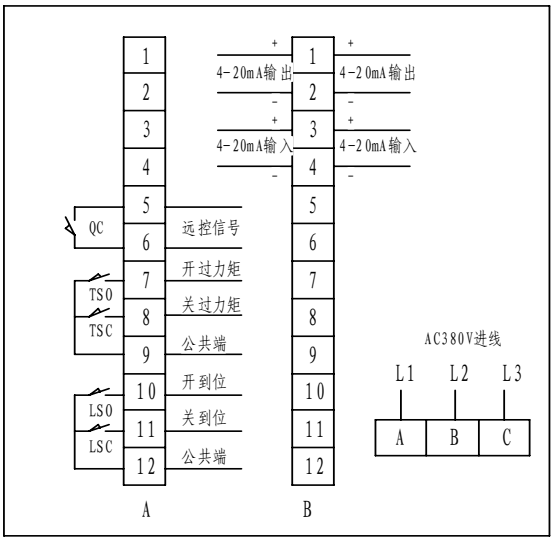


图 11 整体调节型电动执行机构端子接线

Figure 11 Terminal drawing for integral regulation explosion-proof switching type electric actuator

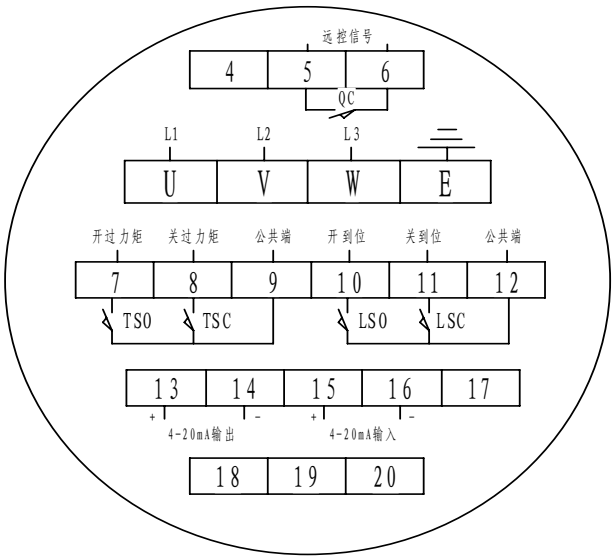


图 12 隔爆整体调节型电动执行机构端子接线

Figure 12 Terminal drawing for integral regulation explosion-proof switching type electric actuator

7．安装和拆卸　Installation and dismantling

7.1 本电动执行机构的安装形式无原则要求，但电机处于水平状态，电气箱盖处于水平或垂直向上状态为推荐安装形式，这样有利于润滑、维护和手动操作。

There is no principle requirements for the mounted form of this electric actuator, but it is suggested that the motor shall be in level position, and the cover of electrical box shall be in level position or in upright position, which will be of great advantage to the lubricating, maintenance and manual operation。

7.2 安装时应保证维修检查人员拆卸各部件所需的空间。

when installing, ensure the space that the maintenance people required for dismantling each parts.

7.3 安装拆卸调试时不可损伤密封面、密封件和防爆电动执行机构的防爆面，并应在隔爆面上涂上防锈油。

during installation, dismantling, and debugging, do not damage the sealing surface, sealing member and the explosion-proof surface of explosion-proof electric actuator, and spread the rust preventive oil on the explosion-proof surface.

8．调整 Adjustment

电动执行机构与阀门组装后，必须对力矩控制器、行程控制器、开度指示器分别进行调整，方可使用。调整前，必须检查开度指示器上的电位器齿轮是否已脱开（把电位器齿轮的紧定螺钉松开即可）以防损坏；检查电机的旋向，控制线路是否正确，以防电机失控。

After assembling the electric actuator and valve, the torque controller, motion controller, and opening position indicator must be adjusted separately, and then it can be used. Before adjusting, we must check that if the potentiometer gear in the opening position indictor has been disengaged (loose the set screw of potentiometer gear) in order to prevent the damage; we shall check the turning direction of motor and check if the control wiring is correct in order to make sure that the motor will not be out of control.

8.1 Q 型电动执行机构的调整

The adjustment for Q-type electric actuator

Q 型电动执行机构的力矩控制器、行程控制器及开度指示器相同，故调整方法一样。

The torque controller, motion controller and opening position indicator of Q-type electric actuator are same, so the adjusting methods are same.

8.1.1 力矩控制器的调整

The adjustment for torque controller

力矩控制器的结构见图 13。力矩控制器在出厂前已根据订货要求调整好，并填在产品合格证上，一般不需再调整。若需调整，只要松开螺钉 7（图 13），微微拔动开、关向凸轮，再将螺钉紧固，先调关向，后调开向。

Refer to Figure 13 for the structure of torque controller. Before delivery, the torque has been adjusted according to the requirements of users, and has been filled on the quality certificate, so normally additional

adjustment is not required. If the user wants to change the setting value, he just need to loose the screw 7 (Figure 13), pull slightly the opening, closing direction cam, then tighten the screw, first adjust the closing position, and then adjust the opening position.

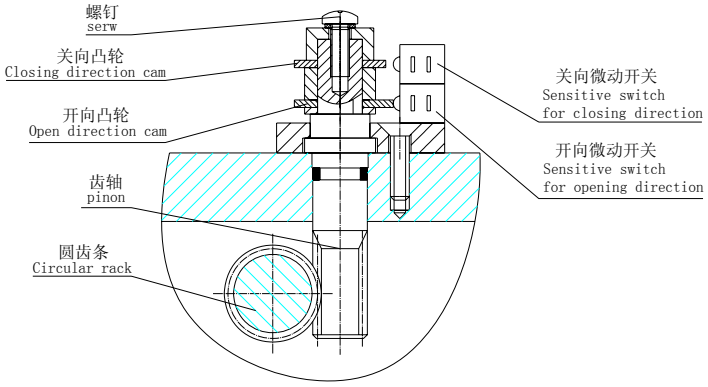


图 13　Figure 13

8.1.2 行程控制器和开度指示器的调整 The adjustment for motion controller

行程控制器和开度指示器的结构见图 14。Refer to the Figure 14 for the structure of motion controller and opening position indicator.

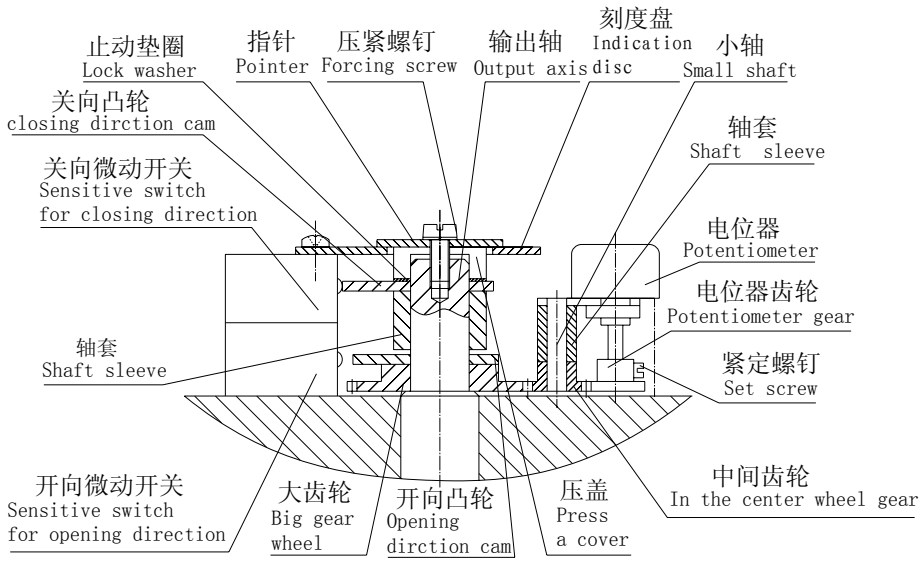


图 14　　Figure 14

注：如用户需要，本公司还可提供带中间阀位的行程控制器。

Note: if user requires, our company can provide the motion controller with middle valve location.

8.1.2.1 行程控制器的调整　　The adjustment for the motion controller.

1）转动手轮使阀门“全关”;

Turn the hand wheel to make the valve “completely closed”;

2） 松开输出轴上的螺钉，顺时针转动关向凸轮，使其刚好压动关向微动开关，再拧紧螺钉;

Loose the screw on the output axis, and turn clockwise the closing direction cam to make it just press

the sensitive switch for closing direction, and then tighten the screw;

3） 手动开阀至中间位置，电动关阀，检查阀门关闭是否符合要求，按上述方法微调关向凸轮，直至符合要求为止；

Open the valve to the middle position manually, close the valve with motor, and check if the valve closing can meet the requirements, if not, adjust slightly the closing direction cam with the above methods till meeting the requirements;

4） 手动开阀至全开位置，松开螺钉，逆时针转动开向凸轮，使其刚好压动开向微动开关，再拧紧螺钉；

Open completely the valve manually, and loose the screw, turn counterclockwise the opening direction cam to make it just press the sensitive switch for opening direction, and then tighten the screw;

5） 手动或电动关阀，电动开阀，检查阀门开启是否会合要求，如不符合要求，按步骤 4）微调开向凸轮，直至符合要求为止。

Close the valve manually or electrically, open the valve with motor, check if the valve opening can meet the requirements, if not, adjust slightly the closing direction cam according to the step 4 till meeting the requirements;

8.1.2.2 开度指示器的调整 The adjustment for the opening position indicator.

参见图 14，把阀门关到全关位置，松开输出轴上的压紧螺钉，转动指针，对准刻度盘上的“C”位指针，拧紧螺钉。

Refer to the Figure 14, close completely the valve, loose the forcing screw on the output axis, turn the pointer to aim at the C pointer in index disc and then tighten the screw.

8.1.2.3 电位器的调整 Adjustment for the potentiometer.

参见图 14，手动或电动关闭阀门，挂上电位器齿轮,拧紧电位器螺母,面对电位器，顺时针转动电位器小轴接近终端位置，然后拧紧电位器齿轮上的紧定螺钉即可。

Refer to the Figure 14, close the valve manually or with motor, place the potentiometer gear, tighten the nut of potentiometer; turn clockwise the small shaft of potentiometer to approach the terminal, and then tighten the set screw of potentiometer gear.

8.2 整体型、隔爆整体型、整体调节型、隔爆整体调节型电装调整

Adjustment for the integral type, integral explosion-proof type, integral regulation type and integral regulation explosion-proof type electric actuator.

8.2.1 力矩控制器、行程控制器、开度指示器的调整

The adjustment for torque controller, motion controller and opening position indicator.

打开电气箱盖，松开电器安装板上的螺钉 A（见图 2），把电器安装板翻转 90，即可对力矩控制器、行程控制器、开度指示器进行调整。调整方法见 8.1.1、8.1.2，整体型电动装置开度表支架上装有开度表调整电位器，用于调整开度表。

Open the cover of electrical box, loose the screw A (refer to the Figure 2) on the electrical installation plate, and turn the electrical installation plate with the angle of 90, and then adjust the torque controller, motion controller, and opening position indicator. Refer to 8.1.1、8.1.2 for the adjusting method. The support of the opening position meter for integral type is equipped with an adjusting potentiometer which is used for adjusting the opening meter.

8.2.2 现场/远控操作　Local/remote control operation

整体型和整体调节型电动执行机构上设有按钮盒，为用户提供现场控制和远程控制两种控制方式。

Integral and integral regulation electric actuator is equipped with a button box, which can provide two control modes: local control and remote control for the users.

8.2.2.1 现场控制：打开按钮盒盖即可用按钮盒内的开、关按钮现场操作。现场打开、关闭为自保持。阀门全关时绿灯亮，阀门全开时红灯亮。盖上盒盖现场操作停止。

Local control: open the cover of button box, and then can carry out the local control with the opening and closing button inside the button box. The local opening and closing are self keeping. The green light will be on when the valve is fully closed, and the red light will be on when the valve is fully opened. The local operation will stop if the cover is closed.

8.2.2.2 远程控制：盖上按钮盒盖即转入远程控制。

Remote control: it starts the remote control if the cover of button box is closed.

8.2.3　模块调试方法　Module debugging method

8.2.3.1 调节型模块调试方法　Debugging method for adjusting module

a.、先通过执行器的手轮将电动阀门打到中间位置；

First adjust the electric valve to the middle position through the hand wheel of the actuator;

b、接通 AC380 电源，电源指示灯亮,若电源缺相，缺相指示灯亮；

Turn on the power of AC380, the power indicator will be on; if the power supply loses phase, the open-phase indicator will be on;

c、拔码开关的正作用和反作用不能同时拔为有效;

It will be effective if the positive interaction and counteraction of the DIP switch can not dial at the same time.

d、正作用时位置反馈信号调节。将电动装置打到全关位置，判断电装内电位器的旋转方向，（电位器的旋转方向为开阀时 GND 对电位器滑动触点的电压是增大的，否则将电位滑动触点外的两根线对调），啮合两齿轮，将执行器关到位，调节“调零”电位器，使两测试点的电压小于 2mV，然后调节“4mA”电位器使位置反馈信号为 4mA，然后将电动装置打到全开位置，调节“20mA”电位器，使反馈信号为 20mA.，如发现顺时针旋转上述电位器时，输出信号减小，请将阀位电位器两边的线互换。

During the positive interaction, the method is the position feed back signal conditioning. Adjust the

electric actuator to the fully closing position, and judge the rotating direction of the potentiometer inside the electric fitting, (the rotating direction of the potentiometer is when opening the valve, the voltage of GND to the sliding contact of the potentiometer shall increase, otherwise exchange the two wires at the external of the sliding contact of the potentiometer), engage the two gears, close the actuator, adjust the "zeroing" potentiometer to make the voltage of the two test points be less than 2mV, adjust the "4mA" potentiometer to make the position feed back signal be 4mA, and then put the electric actuator to the complete opening position, adjust the "20mA" potentiometer to make the feedback signal be 20mA. If you find that when you rotate the above potentiometer clockwise, the output signal will reduce, please exchange the wires at the both sides of the potentiometer for valve location.

e、"调零""4mA""20mA"电位器均为顺时针方向旋转输出信号增大，反之减小;

If turn clockwise the potentiometer of "zeroing", "4mA", "20mA", the output signal will increase, on the contrary, it will decrease.

f、为了保证电动装置在自动控制中的定位精度，必须调节灵敏度。灵敏度小，定位精度高，但容易产生振荡；灵敏度大，不容易振荡，但定位精度差。调节"灵敏度"电位器可在二者之间取舍，使其不产生振荡为最佳调整值；

In order to ensure the positioning accuracy of the electric actuator during the automatic control, you must adjust the sensitivity. If the sensitivity is low, the positioning accuracy is high, but it will cause oscillation easily; if the sensitivity is high, it will not easily cause oscillation, but the positioning accuracy is low. Adjusting the "sensitivity" potentiometer can avoid the above two situations and can get the optimum setting value which will not cause oscillation.

g、输入控制信号丢失后，丢信指示灯亮。

If the input control signal loses, the indicator for signal losing will be on.

h、当出现开阀及关阀某一方向锁死后，向另一方向运行 3 秒即可解锁。

If one position between opening valve and closing valve is locked, it can be unlocked if move to the other position for 3 seconds.

8.2.3.2 整体型模块调试方法　The debug method of one-piece module

a、先通过执行器的手轮将电动阀门打到中间位置；

First adjust the electric valve to the middle position through the hand wheel of the actuator;

b、接通 AC380 电源，电源指示灯亮,若电源缺相，缺相指示灯亮；

Turn on the power of AC380, the power indicator will be on; if the power supply loses phase, the open-phase indicator will be on;

c、常规控制时位置反馈信号调节。将电动装置打到全关位置，判断电装入电位器的旋转方向，磨合两齿轮，调节“调零”电位器，使两测试点的电压接近零（≤2mV），然后调节“4mA”电位器使输出信号为 4mA，将电动装置打到全开位置，调节“20mA”电位器使输出信号为 20mA.上述调节只需一次即可完成；

During the conventional control is position feedback signal adjusting. Adjust the electric actuator to the fully closing position, and judge the rotating direction of the potentiometer inside the electric fitting, wear the two gears, adjust the “zeroing” potentiometer to make the voltage between the two test points approach to zero (≤2mV), and then adjust the “4mA” potentiometer to make the output signal be 4mA; Adjust the electric actuator to the fully opening position; adjust the “20mA” potentiometer to make the output signal be 20mA. The above adjustment can be finished at one time.

d、“调零”“4mA”“20mA”电位器均为顺时针方向旋转输出信号增大，反之减小，如发现顺时针旋转上述电位器时，输出信号减小，请将阀位电位器两边的线互换。

If turn clockwise the potentiometers of “zeroing”, “4mA”, “20mA”, the output signal will increase, on the contrary, it will decrease. If turn clockwise the above potentiometers, the output signal will decrease, please exchange the two wires outside of the sliding contact of the potentiometer for valve location.

8.2.4 数显标定 Scaling for the digital display

a、以上调试工作完成后，将电动执行机构关到位，此时输出电流为 4mA，先按数显后面的标定按钮 RESET，再按 0%标定按钮做记忆， 此时显示屏上显示 L 闪烁；

After finishing the above the debugging, close the electric actuator, and then the output current is 4mA. First, press the scaling button RESET at the back of the digital display, and then press scaling button 0% for memory, at this time, the L displayed in the digital display is flashing;

b、将电动执行机构开到位，此时输出电流为 20mA，先按数显后面的标定按钮 RESET，再按 100%标定按钮做记忆， 此时显示屏上显示 H 闪烁，标定完成。

Open the electric actuator, and then the output current is 20mA. First, press the scaling button RESET at the back of the digital display, and then press scaling button 100% for memory, at this time, the H

displayed in the digital display is flashing, then the scaling finishes.

9. 故障及及排除方法　　Trouble and trouble shooting

序号 No.	故障 Trouble	原因 Cause	排除方法 Trouble shooting
1	电机起不动 the motor can not start	1. 电源线脱开 The power line disconnects. 2. 控制线路故障 control circuit is faulty 3. 行程或力矩控制器失灵 the motion controller and torque controller break down	1. 检查电源线 check the power line 2. 排除线路故障 remove the line fault 3.排除行程或力矩控制器故障 Remove the fault of motion controller or torque controller.
2	输出轴旋向不符合规定 the turning direction of output axis can not meet the specification	电源相序接反 the phase sequence of power supply has been connected wrongly	调换任意两电源线 Exchange any two power lines.
3	电机过热 the motor is overheating	1. 连续工作时间太长 the continuous operating time is too long 2. 电机与电动执行机构不配套 The motor can not match the electric actuator. 3. 一相断开 one phase conductors disconnects	1. 停止运行，使电机冷却 stop running, and make the motor cool down 2. 检查配套情况 check the matching situation 3. 检查电源线 check the power line
4	运行中电机停转 the motor stops when running	1. 电动执行机构过载力矩控制器动作 the overload torque controller of electric actuator actuates 2. 阀门有故障 the valve is faulty	1. 增大整定转矩 increase the setting torque 2. 检查阀门 check the valve
5	阀门到位后电机不停转或灯不亮 When the valve is in place, the motor can not stop running or the light is off.	1. 行程或力矩控制器有故障 the motion controller and torque controller are faulty 2. 行程控制器调整不当 The motion controller has been adjusted improperly.	1. 检查行程或力矩控制器 check the motion or torque controller 2.重调行程控制机构 readjust the motion controller

6	远方无阀位信号 no signal of valve location in distant place	1. 远传电位器故障 remote-transmitting potentiometer is faulty 2.电位器齿轮紧定螺钉松动 the set screw for gear of the potentiometer looses	1. 检查更换电位器 check and replace the potentiometer 2. 拧紧电位器齿轮紧定螺钉 screw down the set screw for gear of the potentiometer

10.订货须知 Notice for order

10.1 请按型号表示方法写明型号，开、关向所需转矩必须分别说明，若不说明则按本公司规定提供。

Give clear indication of model number according to the expression measure of model number; the torque required by opening and closing must be provided, if not, we will follow the specification of our company.

10.2 环境具有爆炸性气体必须说明，并必须符合本说明书中的防爆标志的规定。

If there is explosion gas in the environment, please give an indication in advance, and shall conform to the regulations for the explosion-proof sign in this manual.

10.3 若连接尺寸与本说明书不符，可与本公司协商解决。

If the connection can not conform to this manual, please negotiate with our company for settlement.

10.4 手轮顺时针旋转为关阀，如与此相反必须说明。

Turning the hand wheel clockwise means closing the valve, please give indication if the uses wants converse.

10.5 所需规格一般由用户选择，若有困难本公司可为用户选用。

Normally the user shall choose the required specification, if the user has difficulty, our company can choose for user