



ZB5Z~40Z

ZC45Z~1000Z

ZB5BZ~40BZ

ZC45BZ~1000BZ

整体普通型及整体防爆型多回转阀门电动装置

使用说明书

OPERATION INSTRUCTION MANUAL

FOR

INTEGRATED NORMAL TYPE AND INTEGRATED

EXPLOSION-PROOF TYPE MULTI-TURN

ELECTRIC VALVE ACTUATORS

中华人民共和国常州电站辅机总厂有限公司

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THE PEOPLE'S REPUBLIC OF CHINA

一、概述 General Description

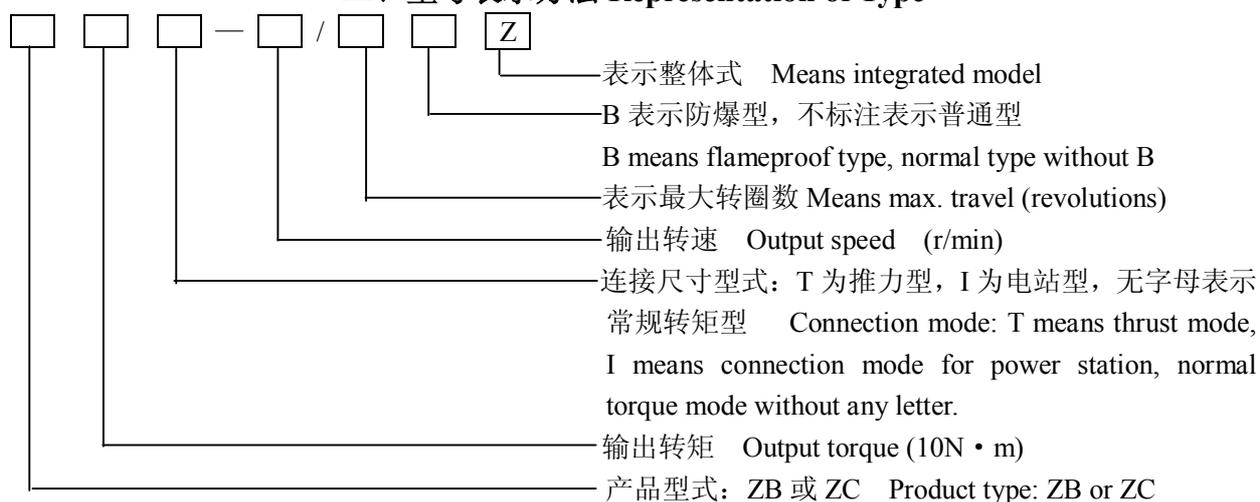
整体普通型、整体防爆型多回转阀门电动装置由 ZB5~ZB40、ZC45~250 及 ZB5~ZB40B、ZC45~ZC250B 阀门电动装置附加控制电气元件组成，而 ZC350~ZC1000BZ 由 ZC180~250BZ 叠加减速装置组成。本系列阀门电动装置内置控制模块，大容量接触器，可不再使用电控箱，因此具有体积小，功能全（加设了相序自动纠正及缺相保护功能，远程控制有四种方式，另加紧急关阀功能），安装接线简单（只需接入三相动力线，即可现场操作），检修方便（电气回路通过 DC24V 电压控制，电气部件之间采用接插件连接）等特点。

本产品性能指标达到 JB/T8528-1997《普通型阀门电动装置技术条件》的规定，防爆型性能指标达到 GB3836.1-2000《爆炸性环境用防爆电气设备 通用要求》、GB3836.2-2000《爆炸性环境用防爆电气设备 隔爆型电气设备“d”》及 JB/T8529-1997《隔爆型阀门电动装置技术条件》的规定。

Integrated normal type and integrated explosion type multi-turn electric valve actuators consist of ZB5~ZB40, ZC45~250 and ZB5B~ZB40B, ZC45B~ZC250B electric valve actuators and additional electric control elements. And ZC350~ZC1000BZ actuators are combined with ZC180~250BZ actuators and additional gear reducers. With control module and big capacity contactors built in, these series electric valve actuators need no more electric control box. And so they are small in size and of complete functions (provided with automatic correction of phase sequence, protection of phase-lacking, four modes of remote control, and the function of emergent valve shut in addition), simple in installation and wiring (once the 3-phase power supply is connected, can local operation be carried out), easy to maintain and repair (electric circuit is controlled by DC 24V voltage, electric elements are connected one another with plugs and sockets).

Performance index of these products meets with the requirements of Std JB/T 8528—1997 TECHNICAL SPECIFICATIONS OF NORMAL ELECTRIC VALVE ACTUATORS and performance index of explosion-proof type actuators meets with Std GB3836.1—2000 ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES—PART I: GENERAL REQUIREMENTS and Std GB3836.2—2000 ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES—PART 2: FLAMEPROOF ENCLOSURE “d” and Std JB/T 8529—1997 TECHNICAL SPECIFICATIONS OF FLAMEPROOF ELECTRIC VALVE ACTUATORS.

二、型号表示方法 Representation of Type



例：ZB30T-18/40BZ 表示输出额定转矩 300N · m (30kg · m) 推力型，输出转速 18r/min，最大转圈数 40，防爆型，整体式。For example: ZB30T-18/40BZ represents actuator of rated output torque 300N · m (30 kg · m) thrust mode, output speed 18 r/min, max travel 40 turns, flameproof type, integrated model.

三、工作环境及主要技术参数 Service Environment and Main Technical Parameters

(一) 电源 Power Supply

电机: Motor 380V, 50Hz (特殊订货可 60Hz, 60 Hz for special order)

远程控制: DC24V, 控制信号门限为“on”的最小值为 20V; “off”的最大值为 1.5V; 控制信号的拉电流为 15mA (相当于 1.6k Ω , 0.36W 负载)

Remote Control: DC 24V, minimum value for “on” of control signal gate is 20V, and maximum value for “off” is 1.5V; actuating current of control signal is 15 mA (approximate the load of 1.6k Ω , 0.36W)

(二) 工作环境 Service Environment

(1) 防爆型产品: 按标准分类, 本装置有 d I (煤矿井下用电气设备) 和 d II BT4 (工厂用) 两种, d II BT4 所适用环境为 II A、II B 级 T1~T4 组的爆炸性气体混合物。特殊订货可 d II CT4 (详见 GB3836.1 《爆炸性环境用防爆电气设备 通用要求》)。

Flameproof type: according to the standard, these actuators are provided with Class dI (as electric apparatus for colliery mine) and Class dIIBT4 (for plant and works). Class dIIBT4 is suitable to the atmosphere of explosive gases mixture specified by groups T1~T4 of Class IIA and Class IIB. Class dIICT4 is for special order (for details, see Std GB3836.1—2000 ELECTRICAL APPARTAS FOR EXPLOSIVE GAS ATMOSPHERES—PART I: GENERAL REQUIREMENTS)

(2) 普通型产品: 不含有腐蚀性、易燃、易爆的介质

Normal type: no corrosive, flammable or explosive media

(3) 环境温度: -20 ~ +60 $^{\circ}$ C Ambient temperature: -20~60 $^{\circ}$ C

(4) 环境相对湿度: \leq 90% (+25 $^{\circ}$ C 时) Relative humidity: \leq 90% (at 25 $^{\circ}$ C)

(5) 防护等级: IP55 (特殊订货可达 IP67) Protection: IP55 (IP67 for special order)

(三) 本装置为短时工作制, 额定运行时间为 10 分钟。

These actuators are for short time duty. The rated operating time is 10 minutes.

(四) 规格和主要技术参数 Specifications and Main Technical Parameters

型号 type	电机 功率 power kW	电流 current A	输出转速 output speed r/min								公称 推力 thrust k \cdot N	最大阀 杆直径 max. dia of stem	最大 转圈 数 max. rev	手动 速比 hand ratio	参 考 重 量 kg
			12	18	24	30	36	42	48	60					
			输出转矩 output torque N \cdot m												
ZB ₁₅ ⁵ (B)Z	0.09	0.68	100	50							40	28	6 10 20 30 40	1	35~ 65
	0.12	0.74			50										
	0.18	1.22	150	100	80	60	50								
	0.25	1.4		150	100	80	70	60	50						
	0.37	1.8			150	130	100	90	80	50					
	0.55	2.4					150	130	100	90					
ZB ₄₀ ²⁰ (B)Z	0.25	1.4	250								100	40	60 80 100 120, 160	1	65~ 85
	0.37	1.8	400	300											
	0.55	2.4		350	250	200									
	0.75	3			400	300	250	200							
	1.10	4				400	350	300	250	200					
	1.50	5						400	350	300					
	2.20	7								400					

续前表 continued from above table

type	kW	A	12	18	24	30	36	42	48	60	kN	stem	rev	ratio	kg
ZC ₆₀ ⁴⁵ (B)Z	0.75	3	600	450							150	50	6 10 20 30 40 60 80 100 120 160	37	95~
	1.10	4		600	450										135
	1.50	5			600	450	450								
	2.20	7				600	600	450	450						
	3.0	8.7						600	600	450					
	4	10.5								600					
ZC ₁₂₀ ⁹⁰ (B)Z	1.10	4	900								200	60	6 10 20 30 40 60 80 100 120 160	37	104~ 175
	1.50	5	1200	900											
	2.20	7		1200	900										
	3.0	8.7			1200	900	900								
	4.0	10.5				1200	1200	900	900						
	5.0	13.8						1200	1200	900					
	7.5	17.5								1200					
ZC ₂₅₀ ¹⁸⁰ (B)Z	3.0	8.7	2500	1800							325	70	6 10 20 30 40 60 80 100 120 160	41	170~ 265
	4.0	10.5		2500	1800										
	5.5	13.8			2500	1800	1800								
	7.5	17.5				2500	2500	1800	1800						
ZC ₅₀₀ ³⁵⁰ Z	4.0	10.5	3500								700	75	6 10 20 30 40 60 80 100 120 160	31	340~ 400
	5.5	13.8	5000	3500	3500										
	7.5	17.5		5000											
ZC ₁₀₀₀ ⁸⁰⁰ Z	15	30	8000 10000								1100	100	6 10 20 30 40 60 80 100 120 160	42	650

注：粗线框内为正常供货，其它供用户选用，作特殊供货。Note: Specifications in thick line frame are provided as normal supply. Others are for users to choose to be special supply.

型号 type	电机 功率 kW	电流 current A	输出转速 output r/min						公称 推力 thrust k·N	配用一级 头电装 1st step actuator	最大阀 杆直径 max. dia of stem	最大转圈 数 max. rev	手动 速比 hand ratio	参考 重量 weight kg
			9	10	12	15	18	24						
			输出转矩 output torque N·m											
ZC ₅₀₀ ³⁵⁰ (B)Z	4.0	10.5			3500			700	ZC180	75	40 60	82	410	
							3500				ZC250			80 120 160
	5.5	13.8			5000				ZC250		210 270			
				6000					ZC250		50 60 80			
	7.5	17.5					3500		ZC180		120 170 220			98
							5000		ZC250		40 60 80 120			82
				6000			ZC250	160 210 270	98					
ZC ₁₀₀₀ ⁸⁰⁰ (B)Z	7.5	17.5	8000					1100	ZC200	100	40 60 80	164	550	
			10000						ZC250		105 135			

四、外形及连接尺寸 Overall Size and Connection Dimensions

(一) 外形图 Contour

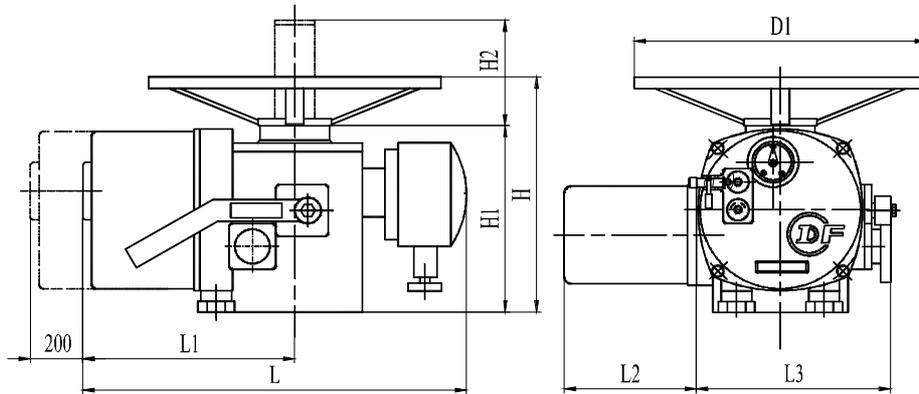


图 1 ZB5-40(B)Z 外形图 Fig. 1 Overall size of ZB5-40(B)Z

尺寸 size 型号 type	L	L1	L2	L3	H	H1	H2	D1
ZB ₁₅ ⁵ (B)Z	534	290	140~230	273	304	259	90	Φ250
ZB ₄₀ ²⁰ (B)Z	573	319	205~240	327	336	291	115	Φ360
					355	310		

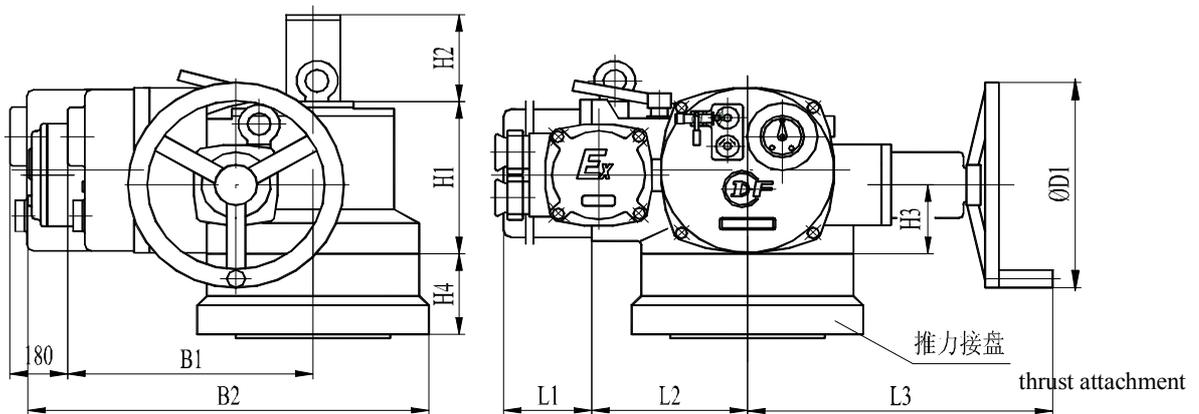


图 2 ZC45-250(B)Z 外形图 Fig. 2 Overall size of ZC45-250(B)Z

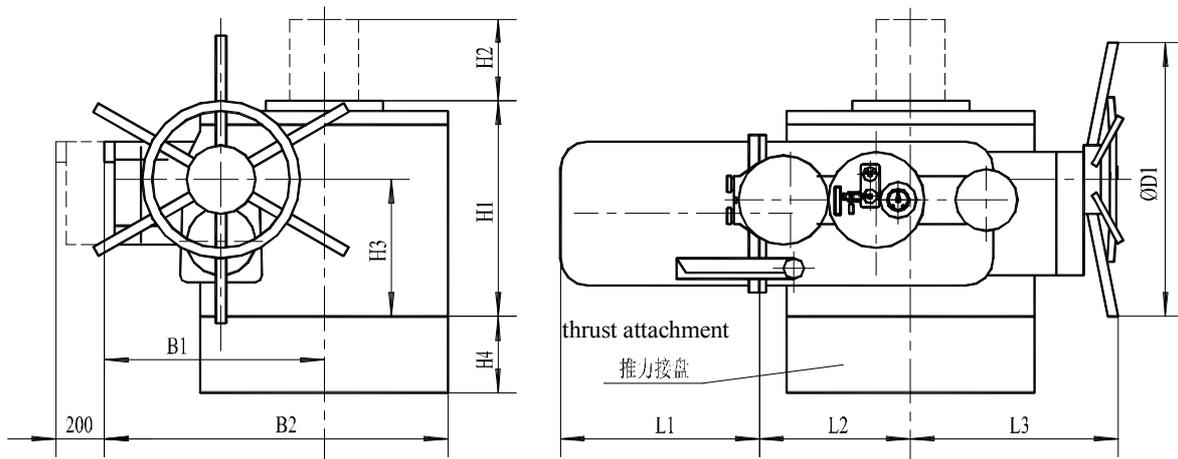
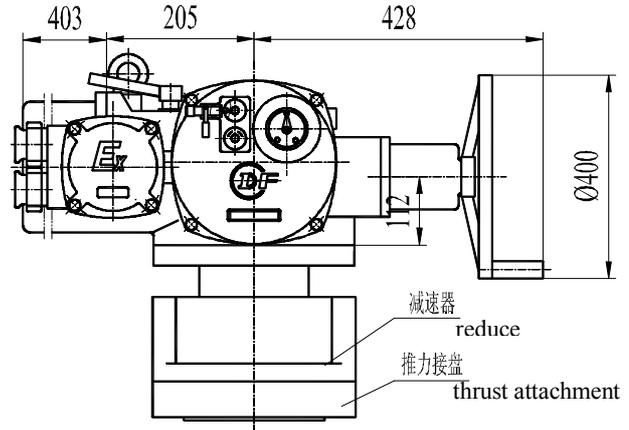
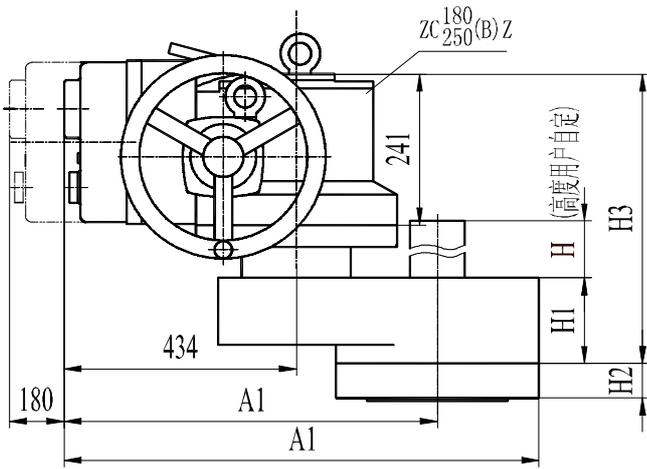


图 3 ZC350-1000Z 外形图 Fig. 3 Overall size of ZC350-1000Z

图 2 和图 3 尺寸表 overall size table for fig.2 and fig.3

尺寸 size 型号 type	B1	B2	L1	L2	L3	H1	H2	H3	H4	D1
ZC ⁴⁵ ₆₀ (B)Z	392	493	283~338	185	379	208	300,500	94	85	280
ZC ⁹⁰ ₁₂₀ (B)Z		530	283~403			255	750		115	
ZC ¹⁸⁰ ₂₅₀ (B)Z	434	589	338~403	205	428	241	1000	112	130	400
ZC ³⁵⁰ ₅₀₀ Z	510	720	320~400	302	403	400	600	253	170	600
ZC ⁸⁰⁰ ₁₀₀₀ Z	565	820	475	331	439	470	1130	300	202	600



注：转矩型电装无推力盘 Note: Actuator of torque mode without thrust attachment

图 4 ZC350-1000BZ 外形图 Fig. 4 Overall size of ZC350-1000BZ

ZC350-1000(B)Z 外形尺寸 overall size of ZC350-1000(B)Z

尺寸 size 型号 type	A	A1	H1	H2	H3
ZC ³⁵⁰ ₅₀₀ BZ	668	885	273	170	636
ZC ⁸⁰⁰ ₁₀₀₀ BZ	720	1010	300	202	650

(二) 连接尺寸 connection dimensions

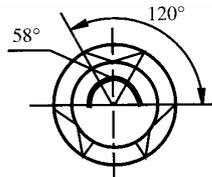


图 5 中螺孔位置与电机轴线成错开对称分布
Screwed hollows are distributed staggered and equally to the axis of motor spindle in Fig.5.

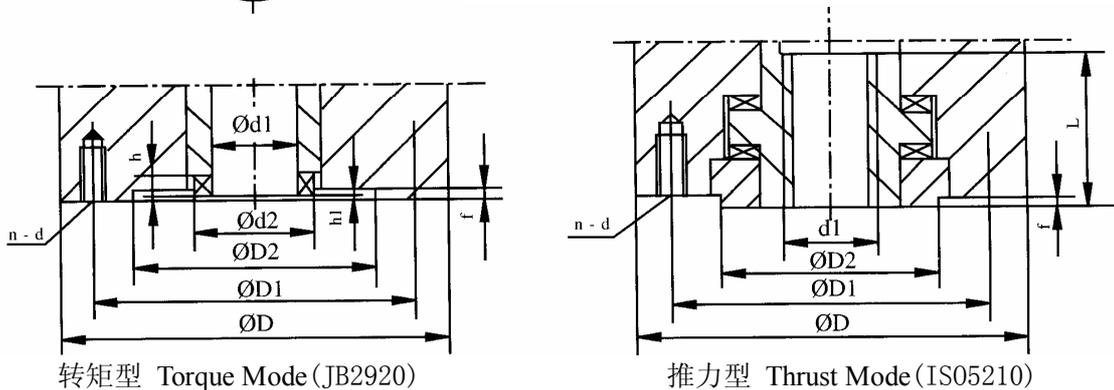


图 5 连接尺寸图 Fig. 5 Connection Dimensions

连接尺寸表 connection dimensions (I 表示电站型 I is suitable for power station)

型号 type	转矩型 torque mode JB2920											推力型 thrust mode GB12222								
	机座号	D	D1	D2	h1	f	h	d1	d2	d	n	法兰号	D	D1	D2	f	d1 max	d	L	n
ZB ₁₀ ⁵ (B)Z	2	140	120	90	2	4	8	30	45	M10	4	F10	126	102	70	3	T28	M10	40	4
	2I	140	95	75	2	4	6	26	39	M8	4									
ZC ₄₀ ²⁰ (B)Z	3	180	160	125	2	4	10	42	58	M12	4	F14	175	140	100	4	T36	M16	50	4
	3I	180	120	90	2	4	8	30	45	M10	4									
ZC ₆₀ ⁴⁵ (B)Z	4	225	195	150	2	5	12	46	72	M16	4	F16	210	165	130	5	T50	M20	80	4
ZC ₁₂₀ ⁹⁰ (B)Z	5	275	235	180	2	5	14	58	82	M20	4	F25	300	254	200	5	T60	M16	114	8
	5I	230	195	150	2	5	12	46	72	M16	4									
ZC ₂₅₀ ¹⁸⁰ (B)Z	7	330	285	220	3	6	16	73	98	M24	4	F30	350	298	230	5	T70	M20	130	8
ZC ₅₀₀ ³⁵⁰ (B)Z	8	380	340	280	3	6	20	80	118	M20	8	F35	415	356	260	5	T100	M30	170	8
ZC800(B)Z	9	510	380	300	3	8	25	85	128	M24	8	F40	510	406	300	8	T120	M36	230	8
ZC1000(B)Z	10	510	450	360	3	8	30	105	158	M30	8									

Note: 机座号 i.e. Frame size; 法兰号 i.e. Flange size

五、结构 Structure

整体型电动装置主要有行程控制器、力矩控制器、开度机构、手轮部件、阀门电动机、减速器、电气控制部分等组成。电气控制部分主要有多功能控制模块（DGN-2）、主控模块（Yk-2）、旋钮组件、开度指示盘（LED）及交流接触器等组成。其中多功能控制模块（DGN-2）由相序自动纠正电路、远程控制电路及输入输出接口组成。主控模块（Yk-2）由 AC/DC 电源回路和相序鉴别电路组成。电气控制部分结构见下图，其余结构参见 ZB 或 ZC 普通型和防爆型说明书

The integrated electric valve actuators are mainly consisted of travel limit mechanism, torque limit mechanism, valve position indicating mechanism, handwheel assembly, valve motor, gear reducer, electric control elements. The main electric control elements are multifunction control module (DGN-2), main control module (Yk-2), knob assembly, position indicating dial (LED) and AC contactors. The multifunction control module (DGN-2) is combined with automatic correction circuit of phase sequence, remote control circuit, interfaces of input and output. Main control module (Yk-2) consists of AC/DC power supply loop and discrimination circuit of phase sequence. For electrical control structure, see the figures below; for other structure, see the operation instruction for normal type ZB or ZC actuators and the operation instruction for flameproof type ZB or ZC actuators

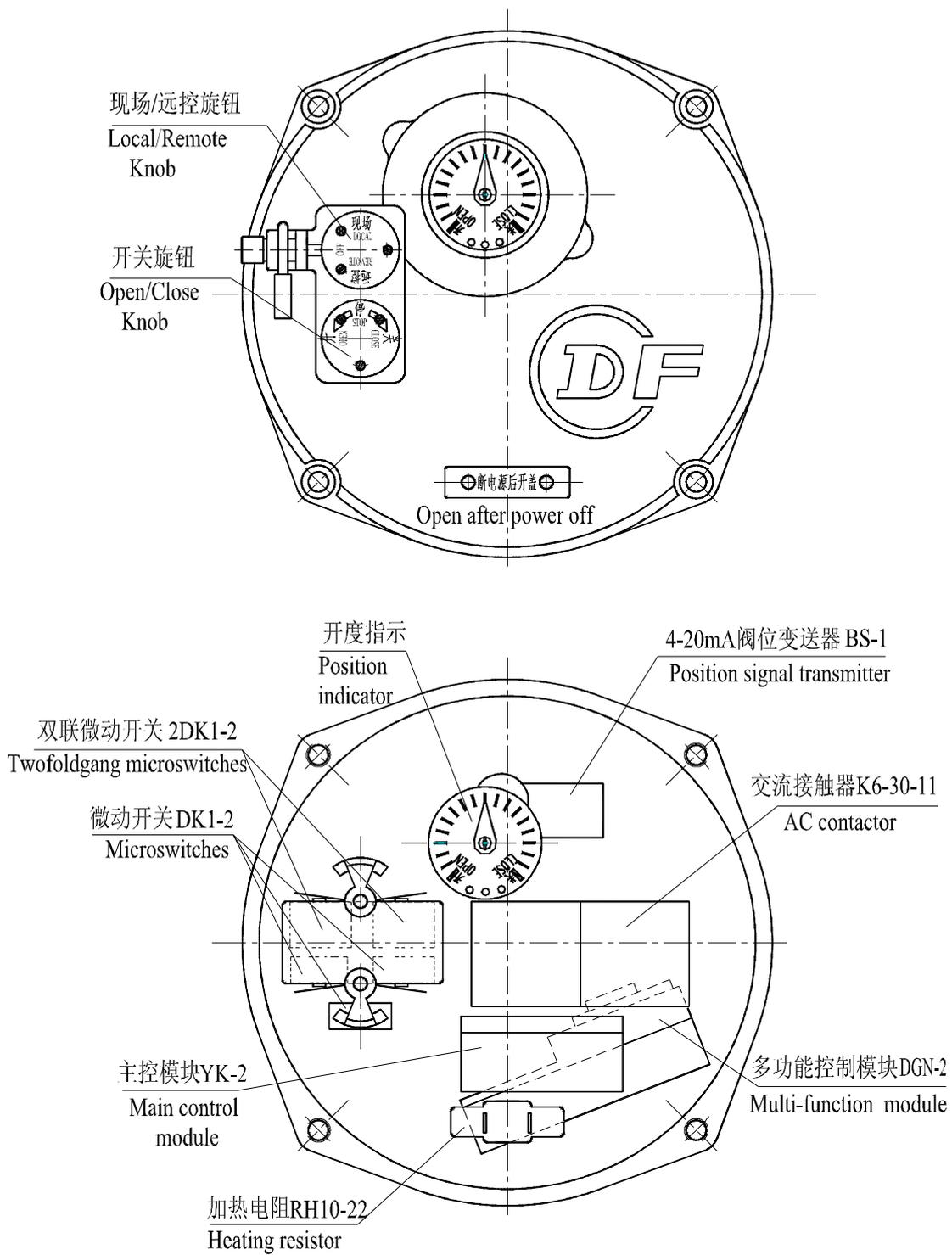


图 6 ZB5-40(B)Z 电气部件图
Fig. 6 Electric elements of ZB5-40(B)Z actuators

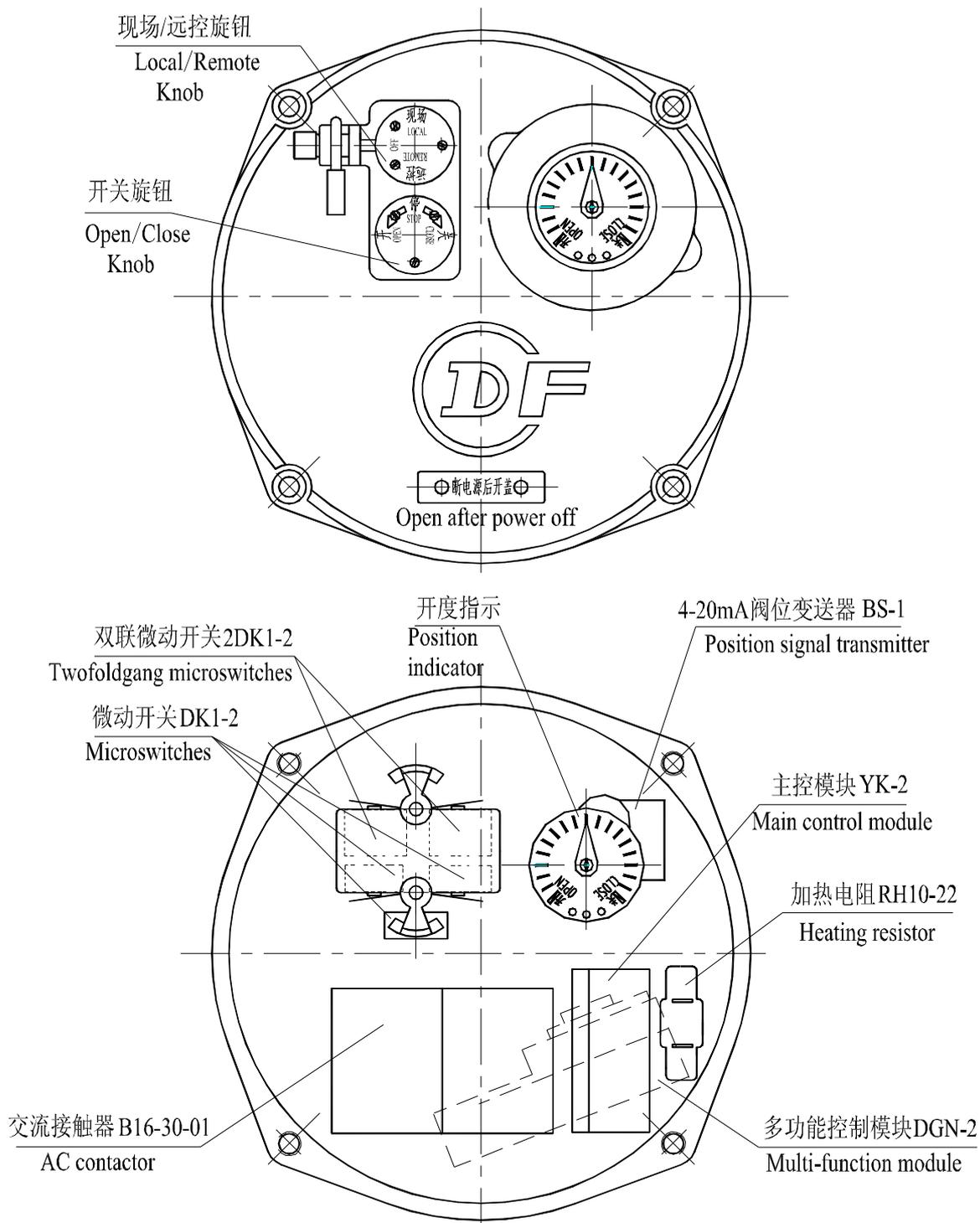


图 7 ZC45-ZC250(B)Z 及 ZC350-1000BZ 电气部件图
 Fig. 7 Electric elements of ZC45-ZC250(B)Z and ZC350-1000BZ actuators

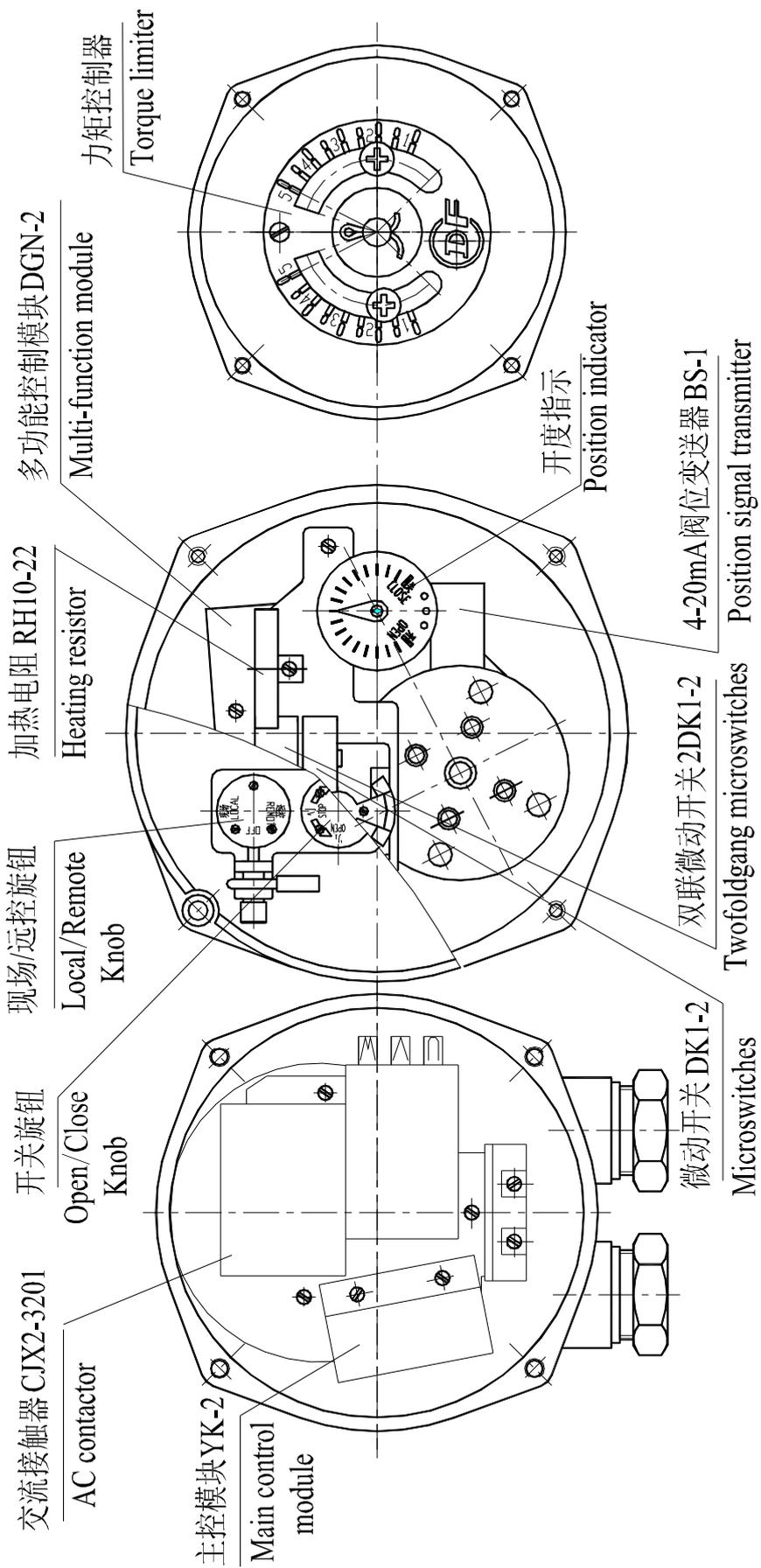


图 8 ZC350-1000Z 电气部件图

Fig. 8 Electric elements of ZC350-1000Z actuators

六、电气原理及接线 Schematic Diagram and Wiring Diagram

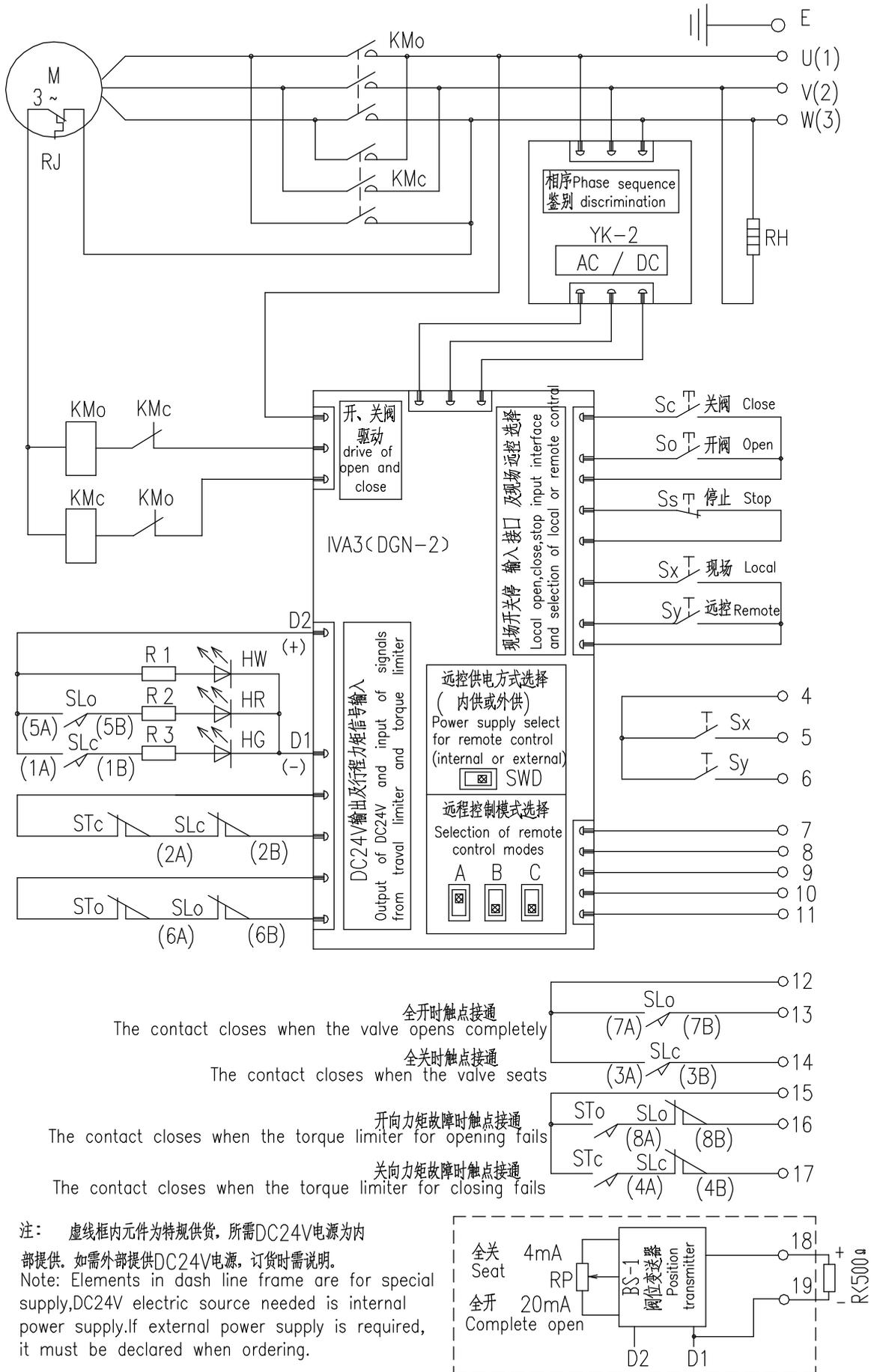
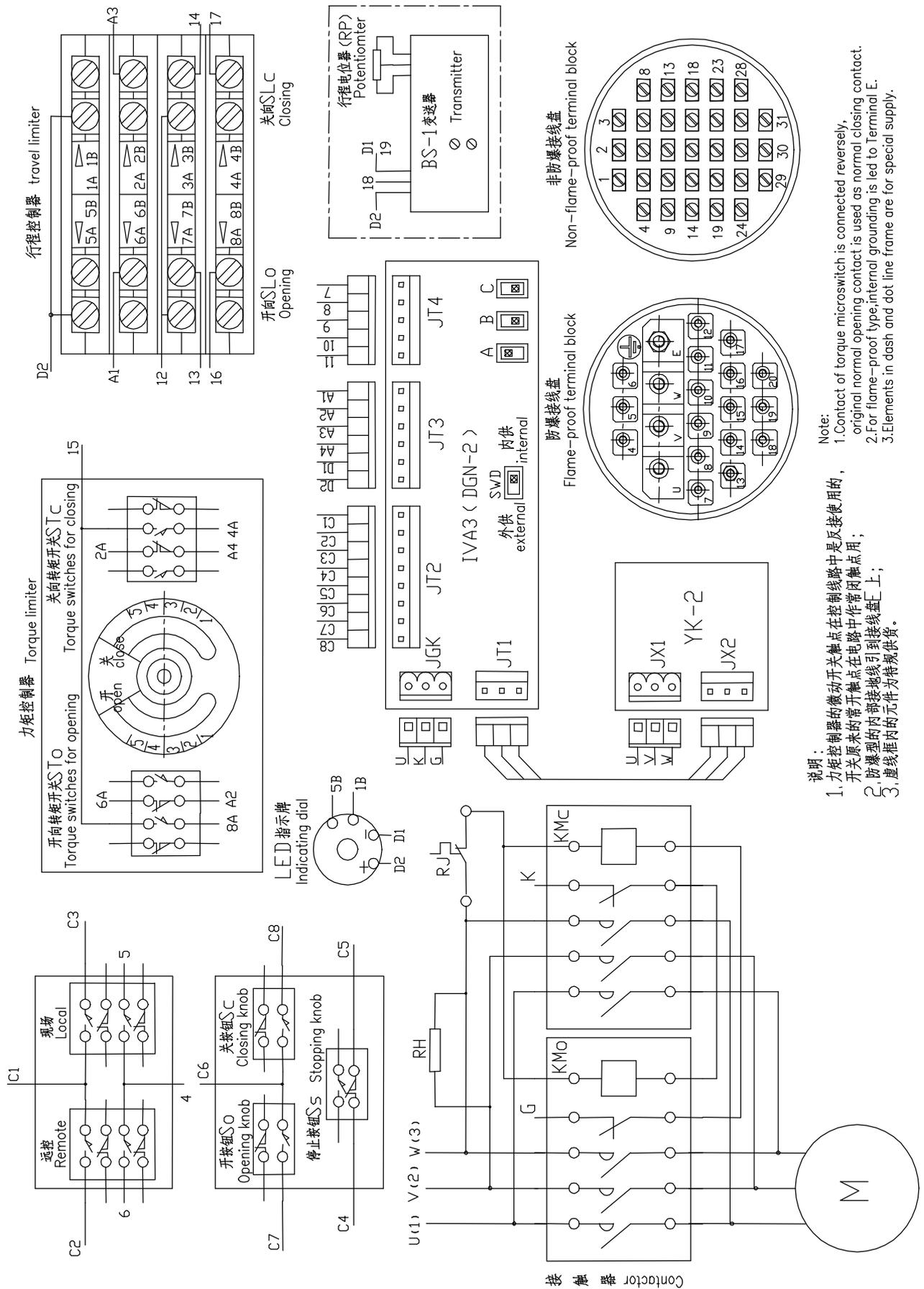


图9 电气原理图 Fig.9 electric schematic drawing



说明:

1. 力矩控制器的微动开关触点在控制线路中是反接使用的, 开关原来的常开触点在电路中作常闭触点用;
2. 防爆型的内部接地线引到接线盒E上;
3. 虚线框内的元件为特殊供货。

Note:

- 1.Contact of torque microswitch is connected reversely, original normal opening contact is used as normal closing contact.
- 2.For flame-proof type,internal grounding is led to Terminal E.
- 3.Elements in dash and dot line frame are for special supply.

七、远程控制模式和远程监控 Remote Control Mode and Remote Monitor

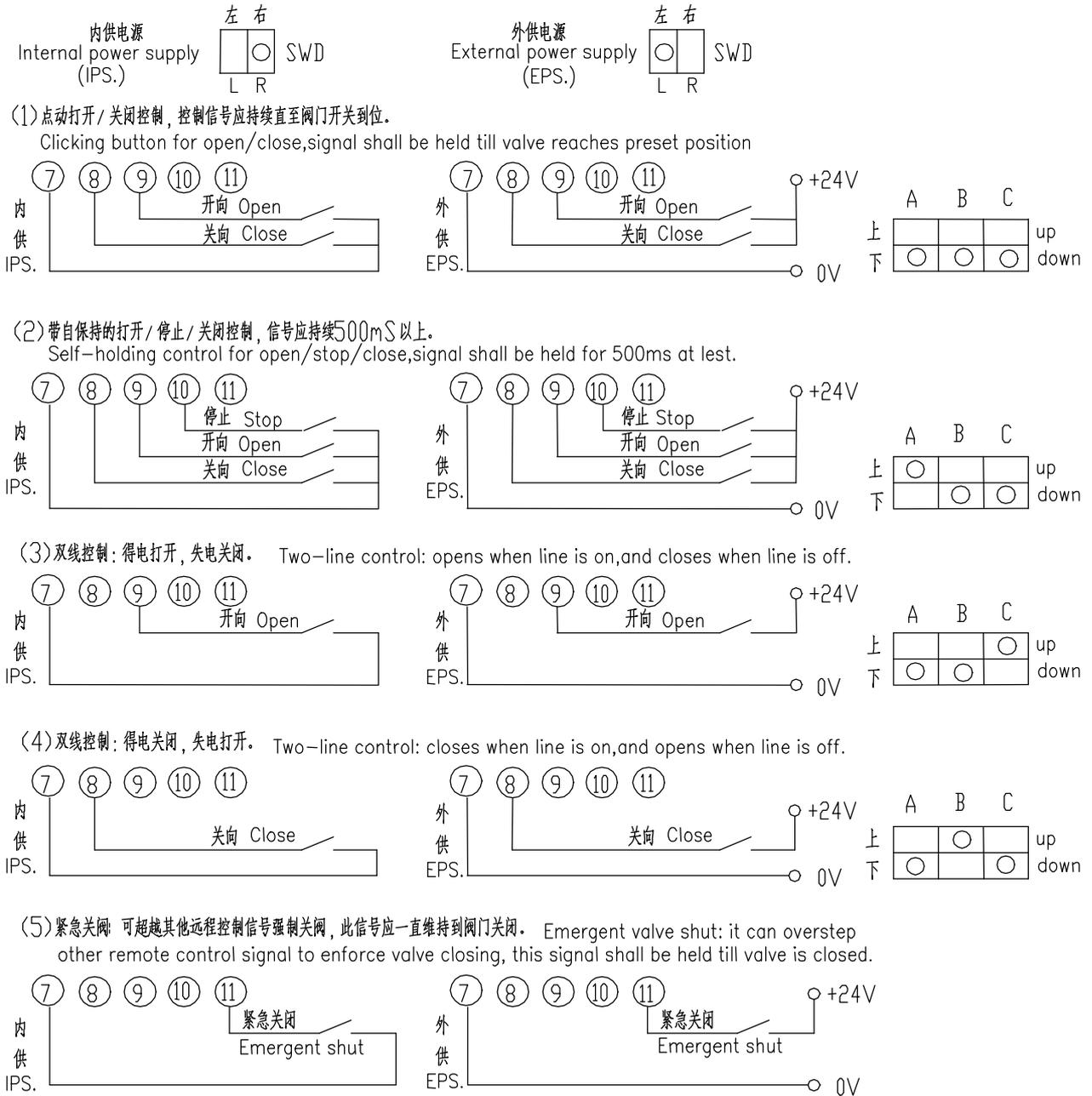
(一) 远程控制的几种模式 The modes of remote control

在整体型电动装置内的 DGN-2 上, 设有三个拨码开关 A, B, C, 通过拨码开关组合可得到以下几种控制模式。用户如无特殊要求, 产品出厂时, 选择为第二种控制模式。通过拨码开关 SWD 可选择远控的供电方式 (内供或外供)。以上拨码开关的具体位置详见图 10。

Three unit selector switches A, B, C are connected to DGN-2 built in integrated electric actuators. Following are available unit switch selecting. If users have no special requirements, the actuator is set to the second mode when delivering. With unit switches SWD, internal power supply (IPS.) or external power supply (EPS.) may be chosen for remote control. Details of unit switches selecting is shown in Fig. 10.

通过 IVA3 (DGN-2) 电路板上拨码开关 SWD 选择远控供电方式 DC24 内供或外供。

With unit switches SWD on IVA3(DGN-2), internal or external power supply may be chosen for remote control.



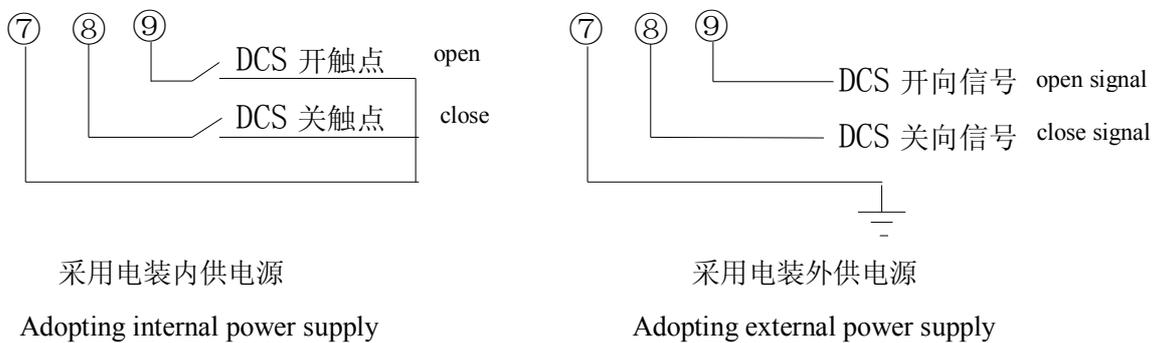
(二) 远程监控 Remote monitor

本系列电动装置可将全开、全关、故障、控制状态等无源结点信号输出给控制单元。也可通过 BS-1 模块直接输出 4-20mA 阀位信号（如需此项功能，订货时需说明），以监控阀门全开到全关的全过程。

These series electric valve actuators are able to transmit passive contact signal of complete opening, seating, failure, control status to control unit. With BS-1 module, they are also able to transmit 4-20mA valve position signal (if such function is required, it must be declared when ordering) to monitor and control the whole process of valve from complete open to seating.

(1) 远程监控采用 DCS 集散控制系统 本系列电动装置如作为 DCS 集散控制系统的前端执行机构，可采取如下连接方式：

As the front end operating device of DCS (distributed control and centralized display) system, these actuators may adopt following connection mode:



注：本系列电动装置远控默认采用 DC24V 电平控制，如用户 DCS 采用其它电压值的开关量可特殊供货。
Note: Default remote control of these series actuators adopt DC24V electrical level control. If user's DCS needs other switching quantity of voltage, it can be supplied as special ordering.

(2) 远程监控采用 PLC 电控柜集中操作方式 远程监控采用 PLC 电控柜可实现以下特殊功能：
Remote monitoring and control adopts PLC electrical box for centralized operating mode.

PLC electrical box for remote monitoring and control is able to carry out following special functions:

- 1) 每个电动装置均可单独操作，电动装置工作状态可动态显示（根据要求可设计成液晶显示）；
- 2) 可实现多个电动装置之间的互锁和联动；
- 3) 可根据外部条件（如一定的温度、压力、流量）来开启或关闭电动装置；
- 4) 通过 RS485 接口可将电动装置工作状态传送给上位机，并能接受上位机的操作命令。

注：由于 PLC 电控柜控制要求多样，订货时需将技术要求详细说明。

- 1) Each electric actuator is able to be operated separately, and its operating status can be displayed dynamically (it can be designed to display by LCD);
- 2) Interlocking and interaction can be carried out among many electric actuators;
- 3) To open or close electric actuators according to external conditions (such as certain temperature, pressure, rate of flow etc.);
- 4) The operating status of electric actuator can be transmitted to superior control through RS485 interface and it can also receive operating command from superior control.

Note: Owing the varied control specifications of PLC electrical control box, detailed specifications must be declared particularly when ordering.

八、调整 Adjustment

整体式电装的电气箱盖上，设置两只旋钮分别为现场远控旋钮和开关旋钮。用于切换工作方式及现场的开、关、停操作。通过箱盖上的视窗孔，可以看到开度指示盘上三只发光二极管，其中黄灯亮表示电源正常，红灯亮表示行程开到位，绿灯亮表示行程关到位。整体式电动装置与阀门组装后，应对电气控制部分，力矩控制器，行程控制器，开度机构分别调整方可使用。具体调整如下：

On the cover of the electrical compartment of integrated actuators, two knobs are provided respectively for local/remote and open/close to use for the changing of operating modes and operations of opening, closing and stopping. Looking into the window on the cover, three LED can be seen on the position indicating dial. Among them, yellow lamp lighting indicates that the power supply is normal; red lamp lighting indicates that the opening course is finished; and the green lamp lighting indicates that the closing course is finished. After the integrated electric actuators are assembled with the valves, only the electrical control compartment, torque limit mechanism, travel limit mechanism and position indicating mechanism has been properly adjusted, may the assembly be put into operation. Specific adjustment is shown as following:

(一)检查电源

打开防爆接线盒接入动力线。接通电源，如果开度指示牌上黄色发光二极管不亮，则说明电源缺相（可能出现电源缺相，黄色发光二极管仍然亮的情况，但这时电动装置被锁住，不能进行开关操作）。应查明缺相原因，做适当处理。当接通电源黄色发光二极管亮了即可进行调试操作。

Check power supply

Open the cover of the flameproof terminal box and wire in it with power supply. If the yellow LED on indicating dial does not light, it indicates the absence of phase. (Sometimes the absence of phase occurs but the yellow LED does still light normally. In such case, the actuator is locked and can not run.) The failure shall be found out and properly handled. When the power supply is turned on and the yellow LED lights, the actuator can be put into operation at once.

(二)力矩控制器、行程控制器、开度机构的调整

拆下电气安装板螺丝，行程上下限位、力矩及开度机构的调整与普通型产品相同。调整完以后旋上安装螺丝，合上电气箱盖。至此，整体电动装置可以进行现场操作了。

Adjustment of torque limiter, travel limiter and position indicating mechanism

Remove screws on electrical installation board, adjustment of travel limiter, torque limiter and position indicating mechanism is the same of normal type product. After the adjustment, tighten the fixing screws, put the cover on the electric compartment and fix it. Thus, the integrated electric actuators can be put into local operation.

1. 力矩控制器的调整 力矩控制器的结构见图 11。力矩控制器在出厂前已根据订货要求整定好并填在产品证明书上(如用户未指定，通常开向整定在公称值上，关向为公称值的 0.7)，一般不允许再调整，若一定要调的话，必须十分谨慎，可参考产品证明书上的力矩曲线，查找对应刻度值，进行调整。方法如下：松开该方向的螺钉，将调整臂调到对应的刻度值，再紧固螺钉即可。决不能盲目调大，否则关严后可能打不开，如果超出力矩机构的控制范围将烧毁电机。

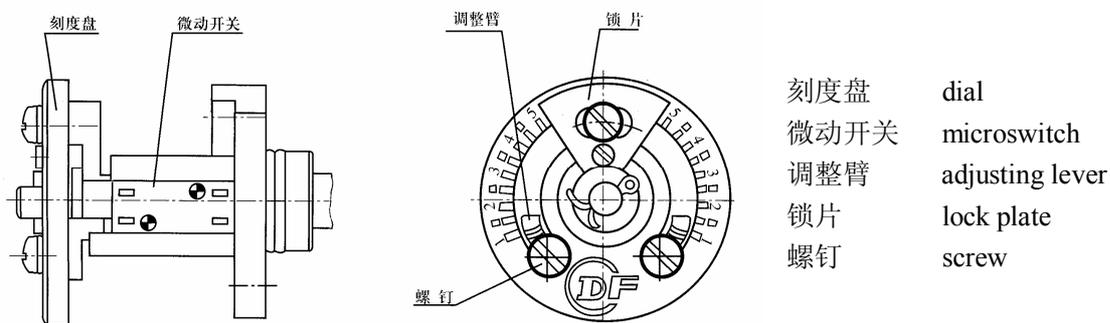


图 11 力矩机构 Fig.11 torque mechanism

1. Adjustment of torque mechanism

Structure of torque mechanism refer to Fig. 11. Torque mechanism has been preset according to customer's order and the numerical value of torque is filled in the certificate so it need not be reset usually. (If the customer has not specified, the set torque value for opening is generally the nominal value, and that for closing is 0.7 time of the nominal) If rated torque value needs resetting, refer to torque curve in the certificate and check corresponding scale. Adjust as following: Loosen screw, set the handle to corresponding scale and then fix screw. The setting is by no mean able to increase the value random, or the valve will not be able to open after seating, and the motor may be destroyed if the set value oversteps the control range.

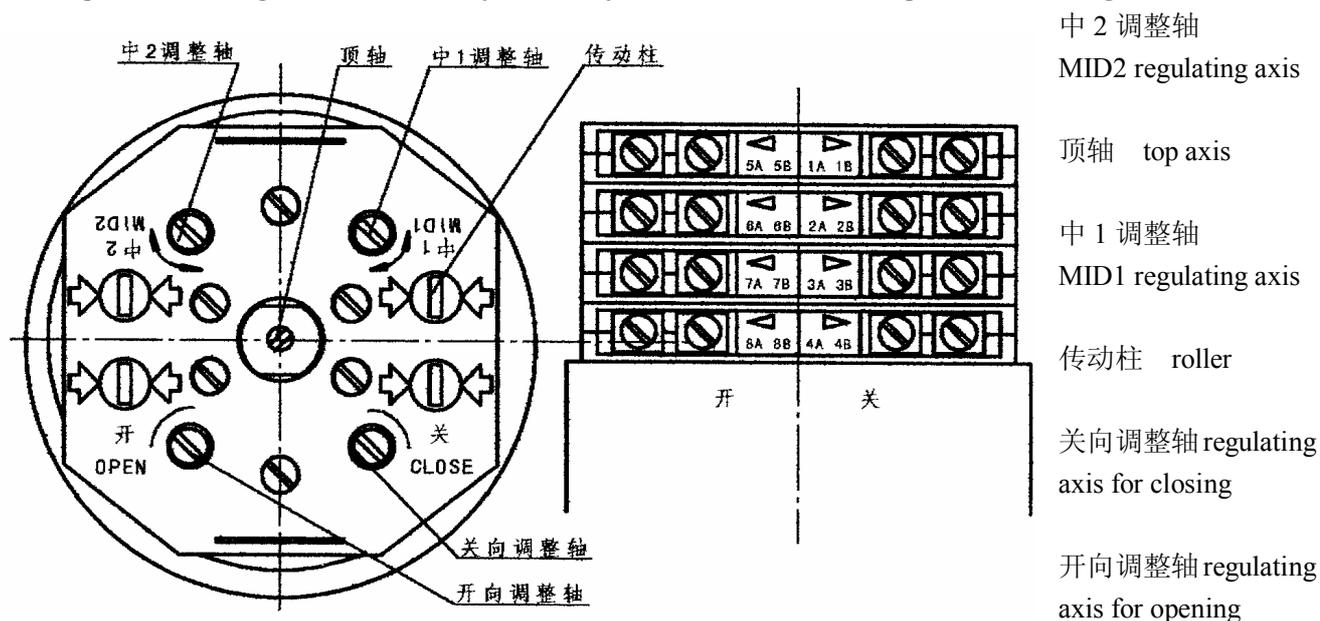


图 12 行程控制器 Fig.12 travel limit

2. 行程控制器的调整 Adjustment of travel limit.

行程控制器的结构见图 12. The structure of travel limit refer to Fig.12

(1) 阀门“全关”位置的调整

- ① 将手动切换手柄按箭头方向推，用手动将阀门“全关”，再从这个位置稍退回一点。
- ② 用螺丝刀压下顶轴，并转 90° 可卡住为止。
- ③ 按关向箭头旋转“关向”调整轴，直到转动柱上的小凸台方向与两旁箭头方向基本一致为止。
- ④ 旋回顶轴，使之复位。

Adjustment of “Seating”

Pull the lever of hand/auto exchanger direction; Operate the valve to seating by hand wheel and then retreat a little from seating position.

Press top axis down by screwdriver and rotate and rotate the axis a quarter circle to be clamped.

Rotate closing regulating axis following closing arrow until the project bar on roller and arrows on both side are basically in same direction.

Return top axis to original position.

(2) 阀门“全开”位置的调整

- ① 在阀门“全关”位置调好的基础上，手动或电动将阀门开到“全开”位置之前停下（建议开到全行程的 95%左右）。
- ② 用螺丝刀压下顶轴，并转 90° 可卡住为止。
- ③ 按开向箭头旋转“开向”调整轴，直到转动柱上的小凸台方向与两旁箭头方向基本一致为止。
- ④ 旋回顶轴，使之复位。

Adjustment of “complete open”

Operate the valve from seated position to open by hand wheel or electric operating and stop before the valve is complete open (operation of 95% stroke).

Press top axis down by screwdriver and rotate the axis a quarter circle to be clamped.

Rotate opening regulating axis following opening arrow until the project bar on roller and arrows on both side are basically in the same direction.

Return top axis to original position.

(3) 中间位置的调整

中 1 和中 2 两个中间位置作为特殊规格供货，其标号图中未画出。用户可以根据需要用于开向或关向的中间位置，或用于增加开、关向的触点数。这时调整轴的旋转方向视中 1、中 2 是用于开向还是关向而定，若用于开向则与开向调整轴的旋向一致，若用于关向则与关向调整轴的旋向一致。

Adjustment of medium positions

MID1 and MID2 are supplied as special order. Their codes have not been indicated in the Fig. Customers can apply MID1 and MID2 to medium positions in opening course or closing course, or to increase the number of contacts if need be, when adjusting, the rotation of regulating axis depends on whether MID1 or MID2 is used for opening or closing. If used for opening, it will rotate in the same direction in which regulating axis for opening rotates, if used for closing, it will rotate in the same direction in which regulating axis for closing rotates.

行程控制器全部调好后，需电动试运转，控制器控制的整个行程应符合要求，否则需要重新进一步调整。

在行程控制器的调整过程中，如果出现调过头或者还没有开始调转动柱已经处于动作状态（即转动柱上小凸台方向与两旁箭头基本一致），这时需反方向旋转调整轴，直到恢复动作前状态，再按箭头方向重新调。

When the setting of travel limit is finished, the actuator need to be put into trial electric operation to check if the whole travel of the limit mechanism meets with the requirements, or it should be set once more. During the setting of travel limit, if it is overstepped or the roller acts before setting (i.e. raised part on roller is consistent with the arrows on both sides basically) it is necessary to rotate the regulating axis reversely till it recovers the status before acting. Then reset it according to the arrow direction.

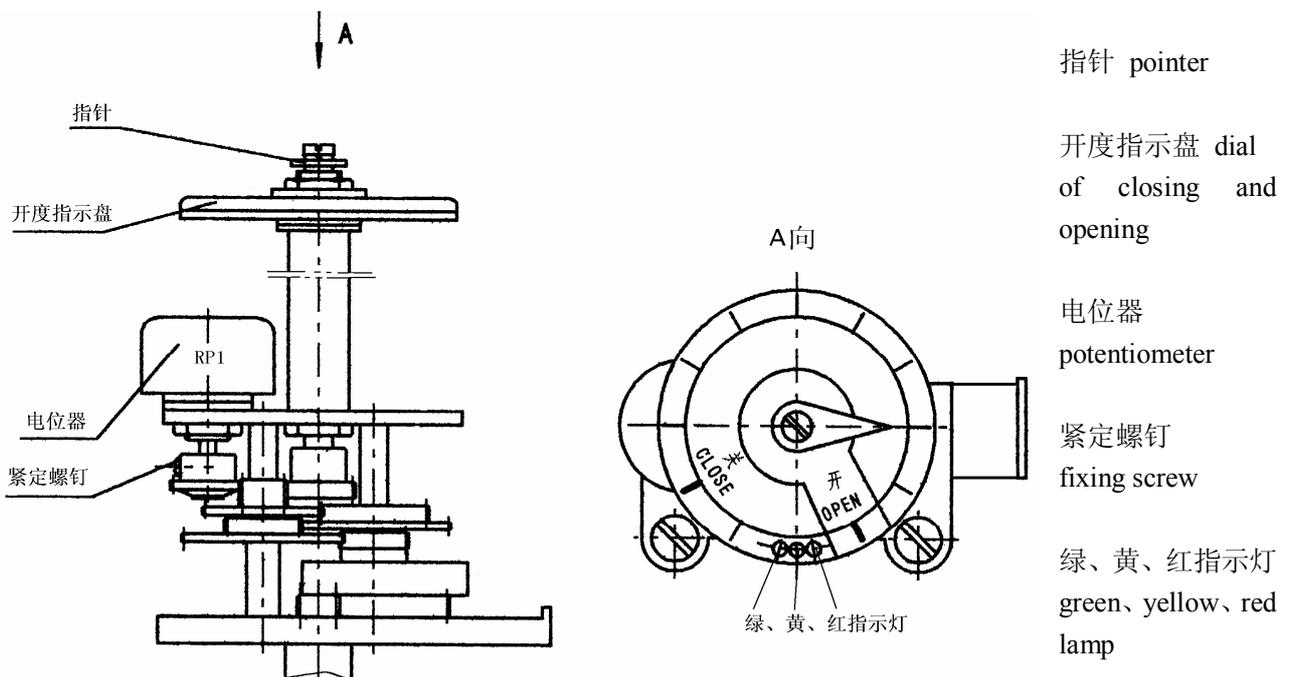


图 13 开度机构 Fig.13 position indicator

3. 开度机构的调整 Adjustment of position indicator

开度机构结构见图 13, 调整方法如下: Structure of position indication refer Fig.13, It should be adjusted as following:

- (1) 电动或手动操作, 将阀门关至“全关”位置后, 切断电源。
- (2) 松开开度指示盘上的指针螺钉, 使指针与刻度盘上的“关”对齐, 再将螺钉拧紧。
- (3) 电动或手动将阀门“全开”, 保持“关”指示盘不动, 转动“开”指示盘至指针所在的位置。

Operate the valve electrically or by hand wheel to “seated” position, then cut off power supply.

Loosen screw of pointer on indicating dial, set pointer pointing to “CLOSE”, then fix screw. Operate the valve electrically or by hand wheel to “complete opening” position, keeping the “closing dial” at original position, turn the “opening dial” to align with the pointer.

(三)现场/远程操作 Local/remote operation

(1) 现场操作, 需将现场/远控旋钮旋到现场位置, 并用插销锁定。这时旋转开关旋钮(旋转的方向见旋钮上的指示), 即可进行现场开、关、停操作。每当阀位关到位, 开度指示盘上的绿色指示灯亮。开到位, 红色指示灯亮。运行过程中, 按下开关旋钮电装即停在中间位置。

For local operation, turn the local/remote knob to local control position and lock it with the latch. Then turn the operating knob (rotating direction as shown on knob) to carry out local operation of opening, closing or stopping. Once the valve is seated, the green lamp on position indicating dial lights; and the red lamp lights as the valve reaches preset position. During operation, once the knob is pressed down, the electric actuator stops at medium position.

(2) 远程控制, 需将现场/远程旋钮旋到远控位置, 并用插销锁定。整体式电动装置设有多种远控方式, 可根据说明书中电气原理部分的控制方式进行选取。具体通过多功能控制模块(DGN-2)上三只拨码开关的不同组合来调整, 并在接线盒中接远控控制线(根据不同控制模式, 7~11号线端子上需接2~5根线), 即可实现远程控制电动装置。如用户没有特殊要求, 产品出厂时, 远程控制方式为第二种带自保持的打开/停止/关闭控制方式。

For remote operation, turn the local/remote knob to remote control position and lock it with the latch. Integrated model electric actuators are provided with many modes of remote control. Control mode can be selected according to electrical schematic diagram in this instruction manual and can be regulated particularly by different combinations of three unit selector switches on multi-function module (DGN-2). At the same time, wire remote control lines in the terminal box (2~5 lines are needed for No.7~No. 11 terminals according to different control modes). Thus, the electric actuators can be controlled remotely. If users have not put forward any special requirements, the remote control modes is set to second control mode of opening/closing/stopping with self-holding when the actuator is delivered.

(四) 阀位变送器的调整 Adjustment of transmitter

BS-1 阀位变送器其取样电位器选用高精度导电塑料电位器(独立线性度 $<1\%$, 寿命 10×10^6 次)。图 14 中 18、19 为接线板端子号(即电流输出端)D1 和 D2 为内部接线号, H 为指示灯, 其亮度随输出电流的增大而变亮。调整方法如下:(以输出轴顺时针转动为关阀为例)使阀门处于全关位置, 关方向旋转取样电位器转轴, 使输出电流从大到小接近 4mA (导电塑料电位器无限位)调节 T1 微型电位器, 直至输出电流精确为 4mA ; 打开阀门至全开位置, 调节 T2, 直至输出电流精确为 20mA 。如果输出轴逆时针转动为关阀, 则红线和绿线需对调并电位器的调节旋向应相反。需要注意, 阀门从全关到全开, 取样电位器转角必须保证在 $150 \sim 270^\circ$ 之间, 否则需更换电动装置最大转圈数的规格。高精度导电塑料电位器的安装位置为替代图 13 中的普通电位器。

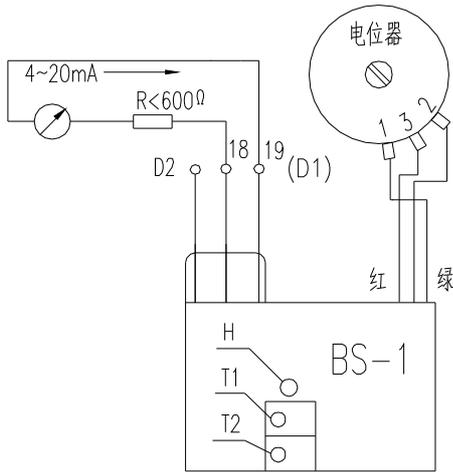


图 14 阀位变送器 Fig.14 transmitter
exchange each other. Give your attention to that the rotation angle must be within the range between 150~270°, or the electric actuator should be replaced by a larger size with much more maximum revolutions. The position of common potentiometer in Fig.13 can also be the installation position for conductive plastic potentiometer as substitute.

The potentiometer is made up of conductive plastics of high precision (independent linearity <1%, life time: 10×10^6 cycles). The adjusting is as following: (Take seating of valve by clockwise rotation of output shaft as example) Make valve seated, turn the axle of sampling potentiometer to make current decreasing gradually approach 4 mA. (Conductive plastic potentiometer has no rotation limit) Regulate T1 until output current is accurately 4mA. Unseat the valve to complete opening to regulate T2 until output current is 20mA. If counterclockwise rotation of output shaft providing valve seating is required, exchange the red wire connector and green wire connector to the potentiometer

九、注意事项 Cautions

1. 打开电气箱盖时,现场/远控旋钮需处于断开位置。

Before opening the electrical compartment, the local/remote knob shall be in disconnected condition.

2. 力矩、行程控制器调整完毕, 安装电气安装板时需拧紧螺钉, 以保证现场、远控旋钮, 开关旋钮操作时正确到位。

When the adjustment of torque limiter and travel limiter is finished, the installation board shall be fixed and tightened with screws to ensure the proper and accurate operation of local /remote selecting knob and open/close selecting knob.

3. 调整力矩、行程控制器翻转电气安装板时, 需注意控制连线, 以免受损。

When turning over the installation board to adjust torque limiter and travel limiter, take care of the wiring of control line to avoid damaging.

4. 起吊 ZC350-1000BZ 型阀门电动装置时, 按图 15 所示操作。

To lift Type ZC350-1000BZ electric valve actuator, operate as shown in the Figure 15.

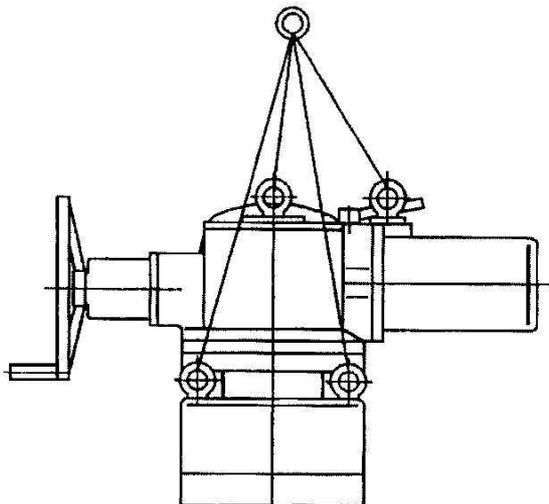


图 15 ZC350~1000BZ 起吊示意