

# 电动紧急切断阀

型号：FHDQ-0040-0050



## 使用说明书

The Use Specification

上海永龙阀门厂

## 1、产品概述 Summary

电动执行器用于控制  $0^{\circ}\sim 270^{\circ}$  旋转的阀门及其他同类产品，如蝶阀、球阀、风门、挡板阀、旋塞阀、百叶阀等，可以广泛应用于石油、化工、水处理、船舶、造纸、电站、供热、楼宇自控、轻工等各行业。它以 380V/220V/110V 交流电源为驱动电源，以 4-20mA 电流信号或 0-10V DC 电压信号为控制信号，可使阀门运动到所需位置，实现其自动化控制，最大输出扭矩达 4000N·M。

series electric actuator is used for controlling  $0^{\circ}\sim 270^{\circ}$  rotation of the valves and other similar products, such as butterfly valve, ball valve, damper, flapper valves, cock valves, etc. It's widely used in petroleum, chemical, water treatment, shipping, paper making, power plants, heating, building auto-control, light industry and other industries. It drives by 380V/220V/110V AC power. Control signal is 4-20mA current signal or 0-10V DC voltage signal, enables move the valve to the desired position, achieving its automation, maximum output torque is up to 4000N·M.

## 2、性能特点 Performance Features

### 2.1 壳体 Shell

壳体为硬质铝合金，经阳极氧化处理和聚酯粉末涂层，耐腐蚀性强，防护等级为 IP67，NEMA4 和 6，并有 IP68 和防爆型供选择。

The shell is made of horniness aluminium alloy, pass through anodic oxidation treatment and polyester powder coating, so it has strong corrosion resistance. Protection grade is IP67, NEMA 4 AND 6, and optional IP68 type and explosion-proof model.

### 2.2 电机 Motor

全封闭式鼠笼式电机，体积小，扭矩大，惯性力小，绝缘等级为 F 级，内置过热保护开关，可防止损坏电机。

Fully enclosed Squirrel-cage motor, small volume, large torque, and small inertia force, F-class insulation rating, built-in thermal protection switch, avoiding damage the electric machinery.

### 2.3 手动结构 Manual Structure

手轮的设计保证安全可靠、省力、体积小。不通电时，扳动离合器手柄可进行手动操作。通电时，离合器自动复位。（注：在不通电的状况下，电动执行器将保持永久手动状态。）

The design of handwheel ensure safe, reliable, labor-saving, small volume. When it don't have electricity, it can be manually operated by clutch handle. When it has electricity, the clutch will reset automatically.

### 2.4 指示器 Indicator

指示器安装在中心轴上，可以观察阀门位置。镜面采用凸透镜设计，不积水，观察更方便。

Indicator installs in the center axis, so it can observe the valve position. It adopts convex mirror design, no cumulate water, more convenient to observe.

### 2.5 干燥器 Space Heater

用来控制温度，防止由于温度和天气变化导致执行器内部水分凝结，保持内部电气元件的干燥。

It is used for controlling temperature, avoiding internal moisture of electric actuator condensed because of the changing of temperature and weather, keep inner electric device dry.

### 2.6 限位开关 Limit Switch

机械，电子双重限位。机械限位螺钉可调，安全可靠；电子限位开关由凸轮机构来控制，简单的调整机构能精确并方便地设定位置。

Mechanical, electronic double limit. Mechanical limit screw is adjustable, safe and reliable; electron limit switch is controlled by the cam mechanism, easy adjustment institutions can set the position accurately and conveniently.

## 2.7 扭矩开关 Torque Switch

(005/008/010 除外) 可提供过载保护, 在阀门卡涩, 有异物时, 自动断开电机电源, 更有效的保护阀门和电动执行器不受损坏。(出厂前已设定好, 请用户不要随意更改设置)

(Except -005/008/010) Providing over loading protect, avoiding damage the valve and electric actuator. (It's already setted up before leave the factory, please don't change the settings)

## 2.8 自锁 Self-locking

精密的双蜗轮蜗杆机构可高效传输大扭矩, 效率高, 噪音低 (最大 50 分贝), 寿命长有自锁功能, 防止反转, 传动部分稳定可靠, 无需再加油。

Exact worm and worm gear can efficiently transfer large torque, high efficiency, low noise (max. 50 dB), long life, and it has self-locking function to prevent the inversion, transmission part is stable and reliable, no need to add oil.

## 2.9 防脱螺栓 Anti-off Bolt

拆除外壳时, 螺栓附在壳体上, 不会脱落。

When removed the shell, the bolt would be attached to the shell and didn't fall off.

## 2.10 安装 Install

底部安装尺寸符合 ISO5211 国际标准, 驱动轴套可拆下根据需要进行加工, 适应性强。可以垂直安装, 也可以水平安装。

The installation size of the bottom conforms to the international standard ISO5211 / DIN3337, The holes are double square so that it's easy to fix the linear or 45° corner valves attached square bar, adaptable. It can be installed vertically, and also can be installed level.

## 2.11 线路 Circuitry

控制线路符合单相或三相电源标准, 线路布置紧凑合理, 接线端子可有效满足各种附加功能的要求。(可根据客户要求另行加工。)

Control circuit conforms to the single-phase or three-phase power supply standard, reasonably compact line layout, wiring terminals can effectively satisfy a variety of additional functional requirements.

## 3、主要技术参数, 标准件 Primary Technical Parameter

### 3.1 角行程电动执行器技术参数

series angle stroke electric actuator technical parameter

型号 Model	最大输出 扭矩 Max output torque	90°动作时 间 60/50Hz Operating time	最大轴径 Max bore size	电机 F 级 F-class Motor	额定电流 Rated Current (A) 50HZ				重量 Weight
					单相 single phase		三相 three phase		
	N·M	S	mm	W	1.10/0.95	0.55/0.54	0.3/0.3	N/A	Kg
005	50	18/22	φ20	20	1.10/0.95	0.55/0.54	0.3/0.3	N/A	7.5
008	80	18/22	φ20	20	1.10/0.95	0.55/0.54	0.3/0.3	N/A	7.5
010	100	18/22	φ20	20	1.65/1.67	0.88/0.84	0.31/0.31	0.30/0.31	7.5
015	150	21/25	φ22	40	1.67/1.67	0.89/0.85	0.31/0.31	0.30/0.31	17.3
020	200	21/25	φ22	40	1.85/1.86	0.92/0.92	0.35/0.35	0.34/0.34	17.3
030	300	26/31	φ35	40	3.60/3.62	1.55/1.58	0.59/0.59	0.58/0.58	22
050	500	26/31	φ35	90	3.65/3.62	1.60/2.20	0.60/0.59	0.59/0.58	23
060	600	26/31	φ35	90	4.10/4.10	2.15/2.20	0.85/0.85	0.79/0.79	23
080	800	31/37	φ45	180	4.20/4.10	2.35/2.30	0.87/0.87	0.81/0.81	29
120	1200	31/37	φ45	180	4.10/4.10	2.15/2.20	0.85/0.85	0.79/0.79	29

200	2000	93/112	φ65	180	4.20/4.10	2.35/2.30	0.87/0.87	0.81/0.81	75
300	3000	93/112	φ65	180	1.10/0.95	0.55/0.54	0.3/0.3	N/A	75

### 3.2 标准规格 Standard Specification

外壳 Shell	防水级别 IP67,NEMA4 and 6 Waterproof leve:IP67,NEMA4 and 6		
电机电源 Power Supply	110/220V AC 1Phase,380/440V AC 3Phase, 50/60Hz, ±10%		
控制电源 Control Power Supply	110/220V AC 1Phase, 50/60 Hz, ±10%		
电机 Motor	鼠笼式异步电机 Squirrel-cage Asynchronous Motor		
限位开关 Limit Switch	2 X 开(Open)/关(Close), SPDT,250V AC 10A		
辅助限位开关 Additional Limit Switch	2 X 开(Open)/关(Close), SPDT,250V AC 10A		
扭矩开关 Torque switch	开(On)/关(Off), SPDT,250V AC 10A	除 005/008/010 Except 005/008/010	
行程 Travel angle	90°±10°	0°~270°	
失速防护/操作温度 Stall protection/ Operating temperature	内置热保护, 开 110°C ±5°C /关 97°C ±5°C Built-in thermal protection, Open 110°C ±5°C/Close97°C ±5°C		
指示器 Indicator	连续的位置指示 Continuous position indicator		
手动操作 Manul override	机械离合机构 Declutching mechanism		
自锁装置 Self-locking device	蜗轮, 蜗杆机构提供自锁 Provide self-locking by worm and worm gear		
机械限位 Mechanical Limit	2 个外部调整螺栓 2 × external adjustable screws		
干燥器 Space heater	7-10W (110/220V AC) 防冷凝 Anti-Condensation		
接线孔 Conduit entry	2 × PF 3/4"		
环境温度 Ambient temperature	-20°C--+70°C		
润 滑 Lubrication	铝基润滑脂 (EP 型) Grease moly (EP type)		
材 料 Material	钢,铝合金, 铝青铜, 聚碳酸脂 Steel, Aluminium alloy, Aluminium bronze,Polycarbonate		
环境温度 Ambient humidity	最大(Max) 90% RH	非凝结 Non-Condensing	
抗震性能 Anti-vibration	X Y Z 10g,0.2~34 Hz,30 分钟(minutes)		
外 涂 层 External coating	干粉, 环氧聚酯 Dry powder, Epoxy polyester		

### 3.3 可选规格 Option Specification

EX A	防爆执行器 (Exd II BT4,Exd II CT6) Explosion-proof Actuator (Exd II BT4,Exd II CT6)	
PIU	电位计 (1K-10K) Potentiometer Unit (1K-10K)	
PC U	比例控制单元 (输入, 输出 4-20mA DC) Proportion Control Unit(input,output 4-20mA DC)	
LC U	现场控制单元 (过程控制开/停/关选择开关) Local Control unit (process control open/stop/close selection switch)	
EX T	120°, 180°, 270°转角 120°, 180°, 270°Rotor angle	
DC M	直流电机 (24V DC) Direct current electrical machinery (24V DC)	
WT A	防水外壳 (IP68,10M,250HR) Water-proof shell (IP68,10M,250HR)	
IMS	反向电磁控制和传送集成电机启动器 Reverse electromagnetic control and transmission integration electrical machinery starter	
ATS	附加扭矩开关 (SPDT X 2 250V AC 10A) Attachment torque switch (SPDT X 2 250V AC 10A)	除 005/008/010
CP T	电流位置传感器 (输出 4-20mA DC) Electric current position transducer (Output 4-20mA DC)	
HT A	耐高温执行器 (-10°C~+100°C) High temperature resistance actuator (-10°C~+100°C)	
LTA	耐低温执行器 (-40°C~+70°C) Low temperature resistance actuator (-40°C~+70°C)	
LS A	低速执行器 low speed actuator	

### 4、结构 Structure

电动执行器主要由以下几部分组成：

Electric actuators is make up of the following parts

- ◎ 壳体部分：包括外壳及底座部分；

Shell: including shell and pedestal

- ◎ 驱动部分：以高性能全封闭鼠笼式电机为动力源；

Drive parts: Full sealing high-performance squirrel-cage motor for the power source

- ◎ 传动机构：双蜗轮与离合器部分；

Driving mechanism: Worm and gear drive parts

- ◎ 比例控制部分：与机械部分分离，便于调试；

Ratio control parts: separate with the mechanical parts, easy to debug

- ◎ 力矩开关与限位开关部分；

Torque switch and limit switch Part

- ◎ 开度检测与反馈部分。

Opening Detected and Feedback Parts.

### 5、外观图 Outside View

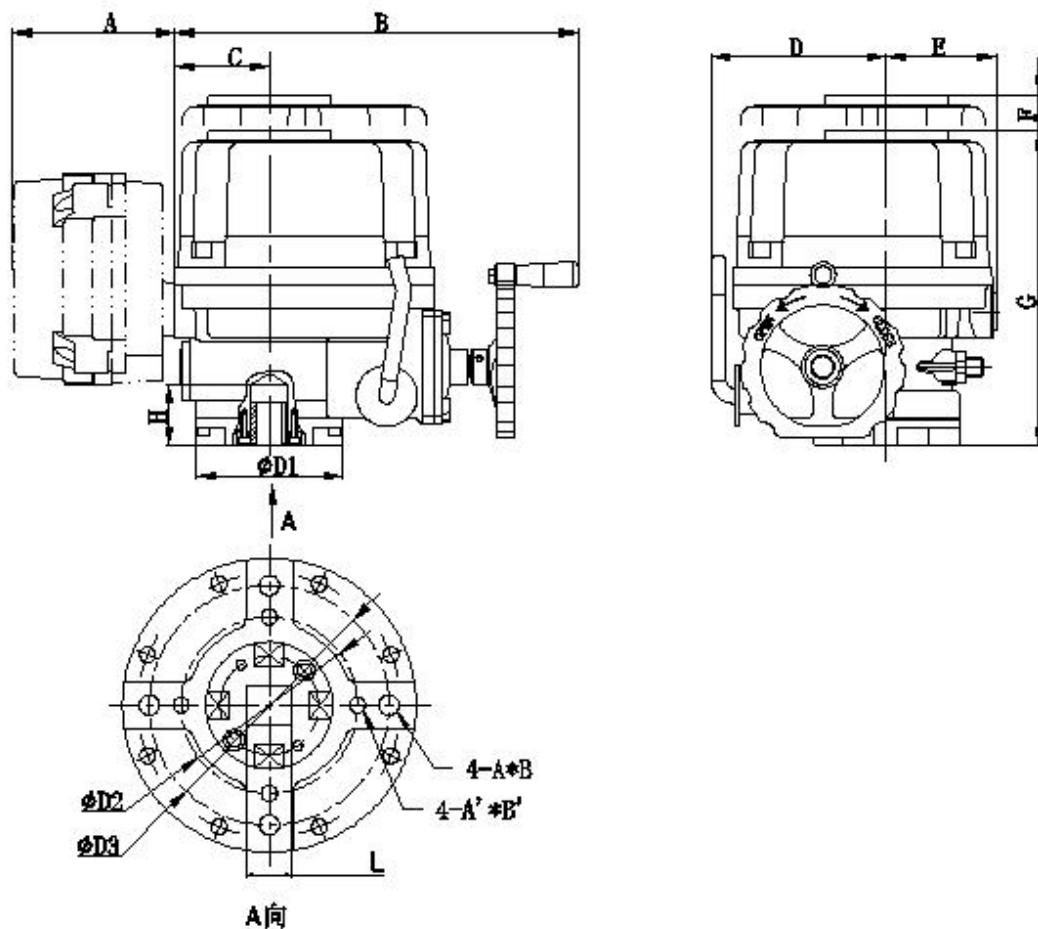


图 1

尺寸表 Dimensions:

Model	$\Phi D2/D3$	A*B	A'*B'	A	B	C	D	E	F	G	H	L	$\Phi D1$
-005	$\Phi 70$	M8*12	-	136.5	269.5	53.5	90	71	120	233.5	40	11	90
008												14	
010												14	
015	$\Phi 70/102$	M10*17	M8*17	140	346	81	140	100	160	270	45	17	125
020												17	
030	$\Phi 102/125$	M12*17	M10*17	140	358	82	140	100	180	290	55	22	150
050												22	
060												27	
080	$\Phi 125/140$	M16*20	M12*20	140	390	100	140	100	210	322	65	27	180
120												36	

## 6、接线图 Wiring diagram

### 6.1 005~010 110/220VAC/50/60HZ,1Ph (标准开关型 Standard Open/Close Model)

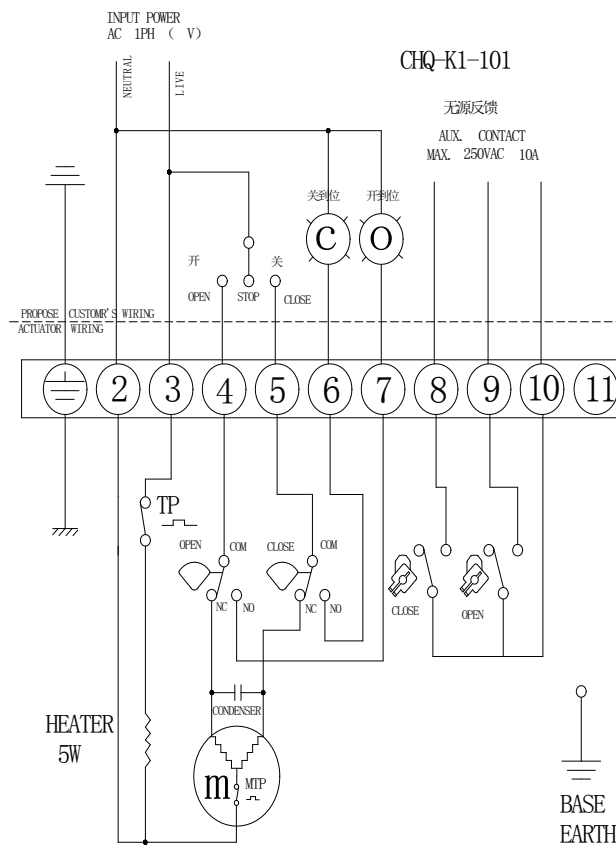


图 2

### 6.2 015~300 110/220VAC/50/60HZ,1Ph (标准开关型 Standard Open/Close Model)

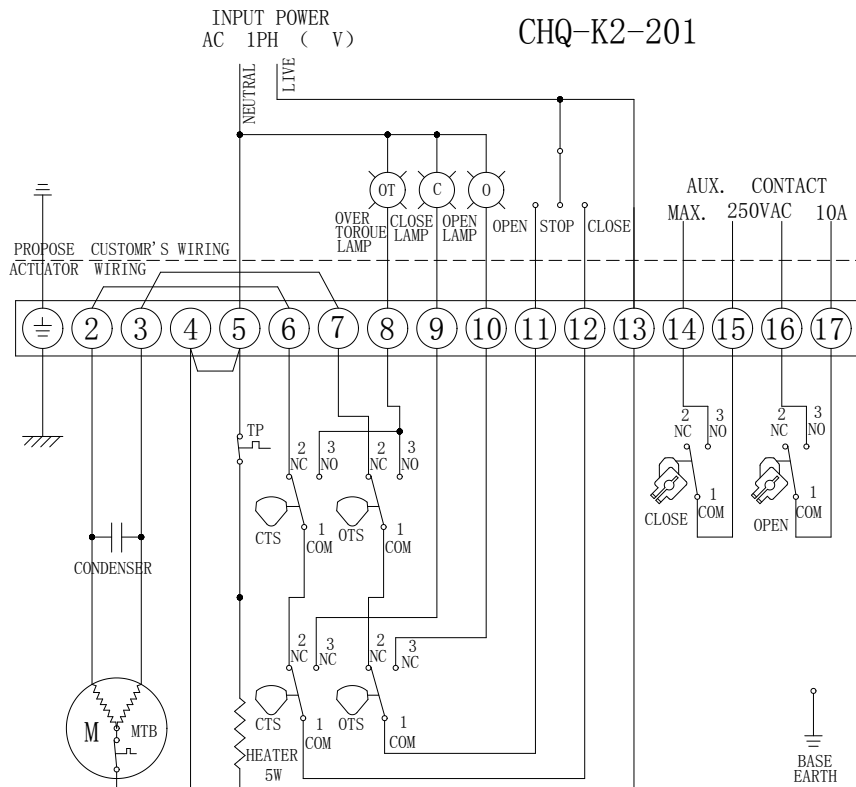


图 3

6.3 005~010 模拟量无源触点信号输出线路图

005~010 Analog quantity passive contact signal output circuitry

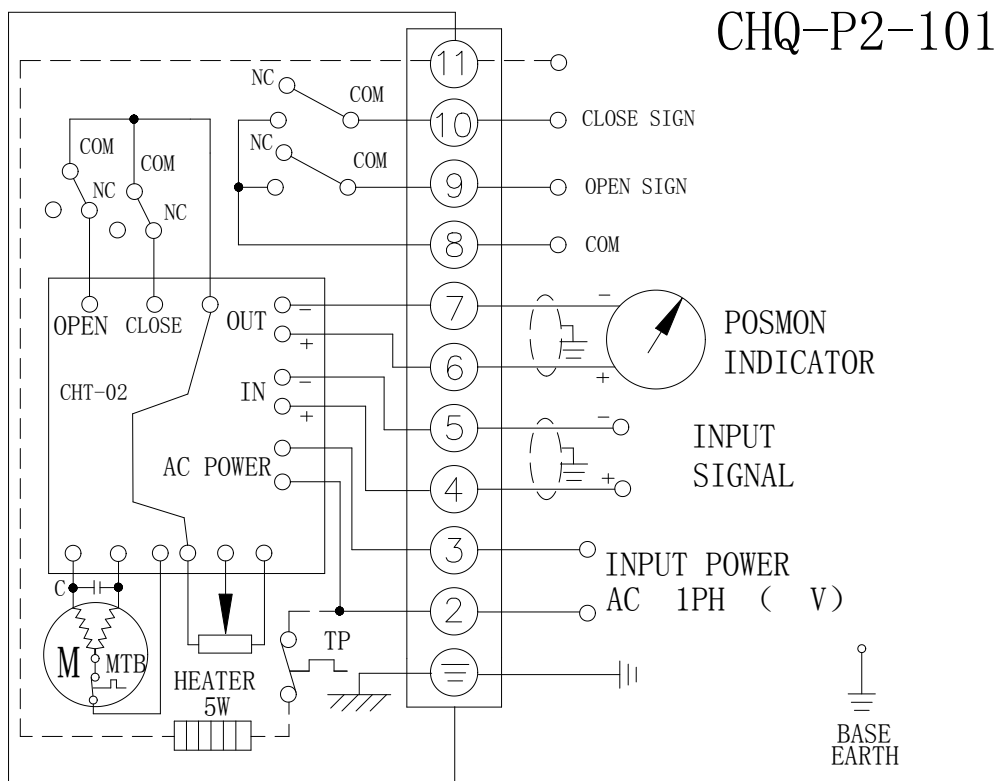


图 4

6.4 015~300 110/220VAC/50/60HZ,1Ph (调节 T2A 型 Adjustable model T2A)

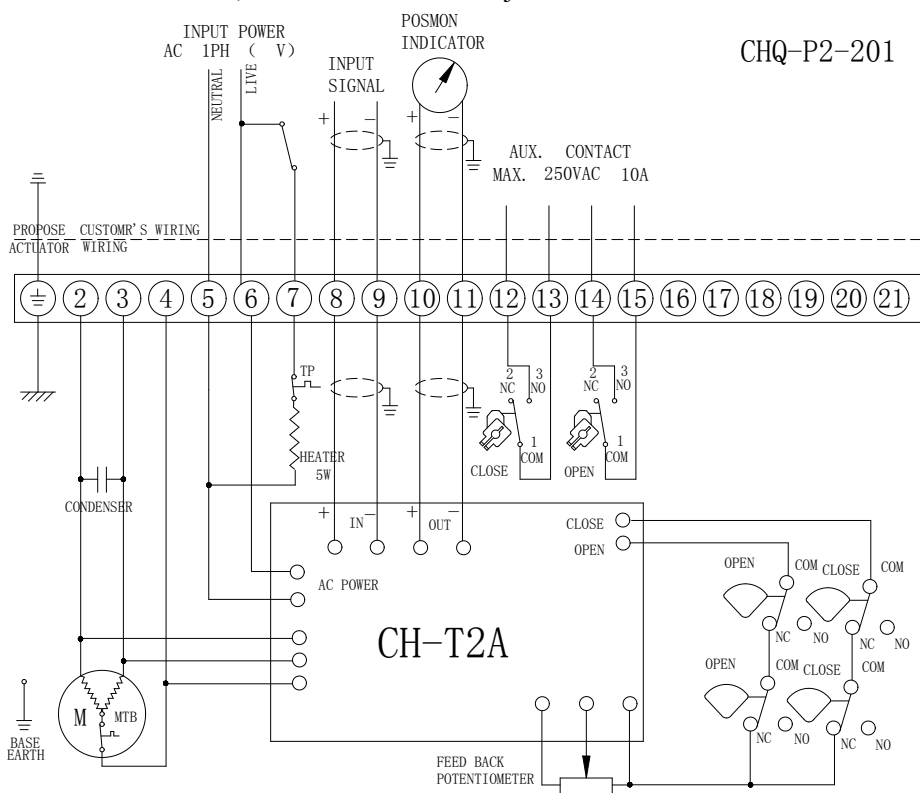


图 5



6.5015~400 380/440VAC/50/60HZ,3相 (外置标准开关型)

015~400 380/440VAC/50/60Hz,3phase (Outer Standard Open/Close model)

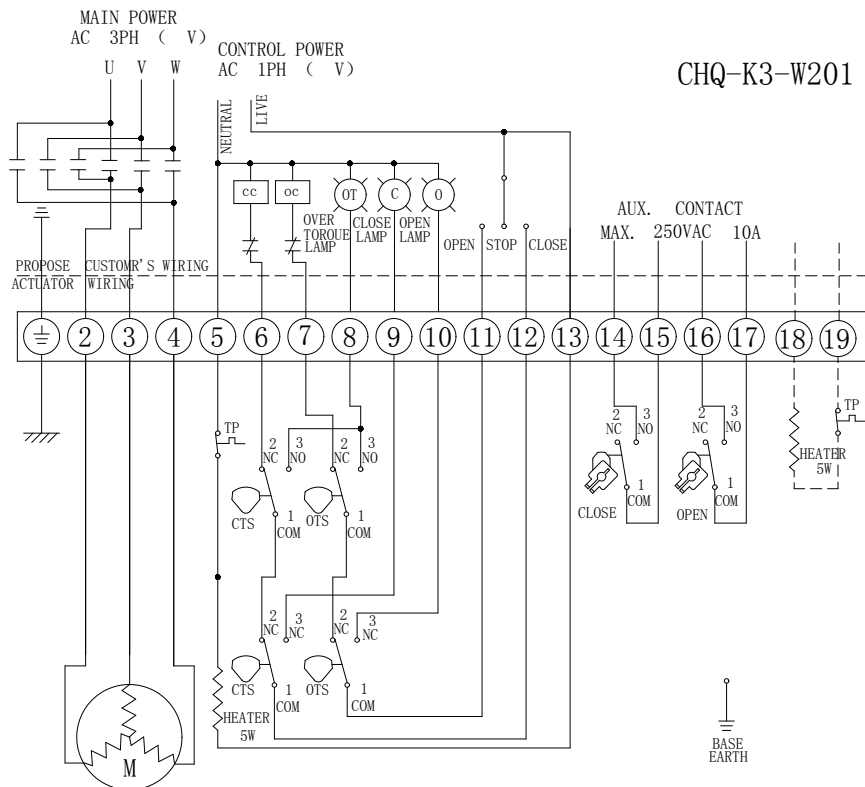


图6

6.6 380/440VAC/50/60HZ,1Ph (现场控制开关型 On site control Open/Close model)

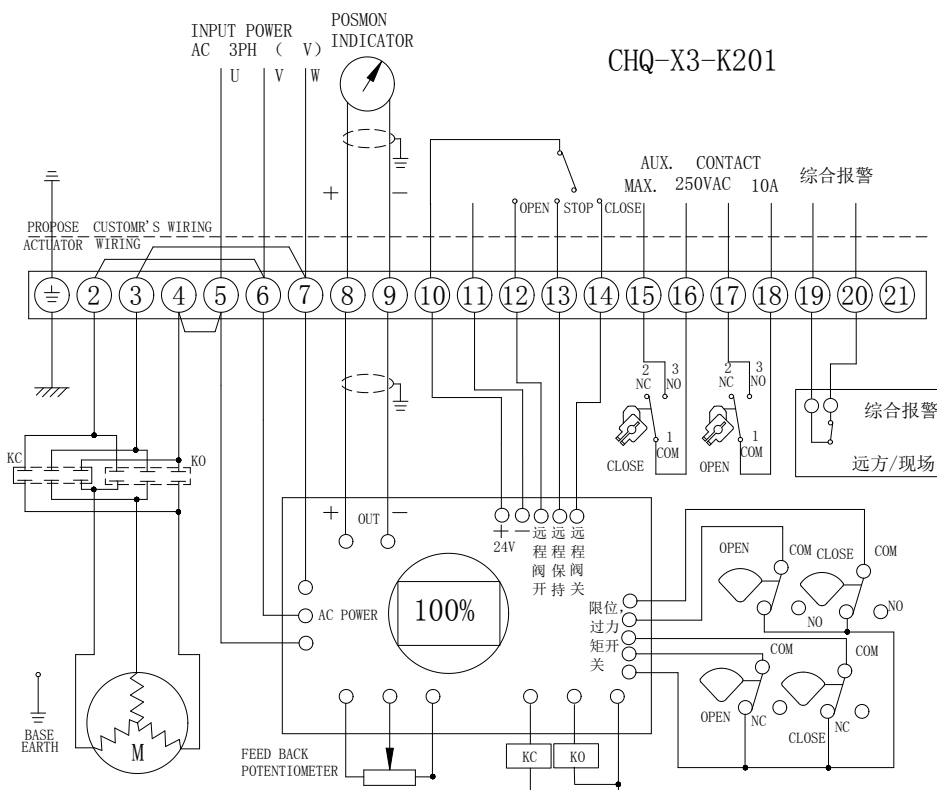


图7

## 7、调试说明 Debug Description

### 7.1 行程限位的调整 Adjustment of stroke limit

首先，合上离合器手柄，转动手轮使执行器运动到阀门全关的位置。然后，用扳手松开限位凸轮，将其调整到恰好压下限位开关（CLS）的位置，再将限位凸轮固紧。这样就设定好了执行器全关时电器限位的位置。全开时的位置同样可设定。

At first, close the clutch handle, turn round handwheel making the electric actuator moved to the full-closed position. And then loosen nuts on limit cam by spanner, adjusting to just push down limit switch (CLS) position, and then screw limit cam nut. So, it's the way to set the full-closed stroke limit position of the electric actuator. Full-opened position is setting as the same way.

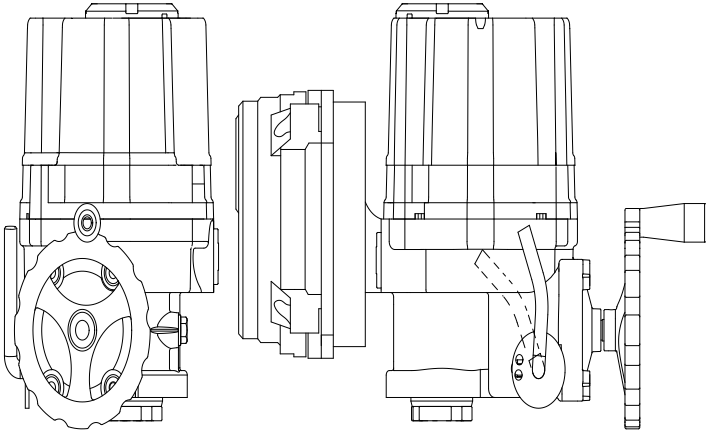


图 8

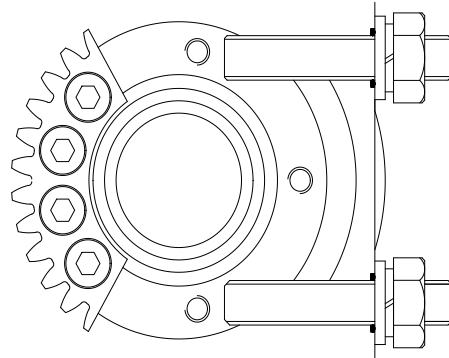


图 9

### 7.2 机械限位的调整 Adjustment of mechanical limit

松开机械限位螺钉的锁紧螺母，然后手动使执行器运动到全关的位置，旋转限位螺母，当其碰到里面的扇形齿轮后停止转动，再旋出两圈，最后上紧锁紧螺母。这样就设定好了执行器全关时的机械限位的位置。全开时的位置可同样设定。如图 10 所示：

Loosen the nuts of the mechanical limit, and then move the electric actuator to the full-closed position by hand, rotating the limit nuts, stop rotating when it comes across inside the fan-shaped gear, and then circle out two circles, screw the nuts at last. So, it's the way to set the full-closed mechanical position of the electric actuator. Full-open position is setting as the same way. Follow as the picture 10:

图 10

### 7.3 比例调节式（PCU）调试说明 Proportion adjustable (PCU) Debug Description

#### 7.3.1 技术参数 Technical parameters

##### ① 输入 Input:

—输入信号 Input signal: 4~20mA DC; 2~10V DC; 0~5V DC 0~10V DC; 1~5V DC

—输入电阻 Input resistance: 250Ω

—反馈信号 Feedback signal: 100Ω~10KΩ

##### ② 输出 Output:

—输出信号 Output signal: 4~50mA DC

—负载电阻 Load resistance: 最大 Max750Ω

—控制输出 Control output: 继电器接点 Relay tip, 250V AC, 10A (电阻负载 resistance load)

- ③ 分辨率 Resolution: 最小 Min 1/1000
- ④ 死区调整 Dead band width Adjustment: 0.1%~4.5% (每格 0.3%, 共 15 格, per grid 0.3%, 15 grids altogether)
- ⑤ 工作温度 Working temperature: -10°C~60°C
- ⑥ 相对湿度 Relative humidity: 最大 Max 90% (不凝结 Non-Condensed)
- ⑦ 位置转换精度 Position transform precision:  $\pm 0.5\% \sim \pm 1.5\%$
- ⑧ 电介质耐压值 Dielectric Vol.Proof: 1500AC /分钟 min (输入对输出, 电源对地 Input to output, Power supply to each)
- ⑨ 震动或冲击 Shock or impact (X, Y, Z): 10g

### 7.3.2 电位计的调整 Potentiometer adjustment

- ◎ 使执行机构处于关的状态  
make the actuator in closed status
- ◎ 调整 P1 和 P2 (橙和紫) 导线间的电阻为 80~120Ω  
Adjust resistance between P1 and P2 (orange and purple) wire to 80~120Ω
- ◎ 使电位计的齿轮与传动轴齿轮啮合并用扳手把螺钉拧紧  
Potentiometer gear mesh with the transmission shaft gear, and screw down the bolts by spanner
- ① 在 PCU 控制板上, 将电位计三根线中的 P1 和 P3 两线互换;  
On control panel, interchange P1 and P3 wires in three wires of potentiometer
- ② 在 PCU 控制板上, 将开 (OP) 和关 (CL) 两线互换;  
On control panel, interchange open and close wires

#### ★注意 NOTE:

- ◎ 检查接线图, 电源, 输入/输出信号是否正确。  
Check wiring diagram, power supply, input/output signal correctly.
- ◎ 尽量不要改变内部接线。  
Don't change the internal wiring.
- ◎ 如果电源为 3PH, 应检查旋转方向。  
If the power supply is 3 phase, it should be checking the rotating direction.
- ◎ 手动使执行机构处于半开/关位, 通电并输入开信号。  
Enable the electric actuator lies in a half on/off position, turn on electricity and input the open signal.
- ◎ 如果执行机构向开位运行, 则说明接线正确。  
If the electric actuator runs to the open position, it means the wiring is correct.
- ◎ 如果运动方向相反, 则必须交换 3 根电源线中的两根。  
If the running direction is opposite, it must be change 2 pieces wiring in 3 pieces of wiring.

### 7.4 电流位置传感器 (CPT) Electric current position transducer

#### 7.4.1 CPT 线路板简图 CPT circuit board diagram

#### 7.4.2 调试说明 Debug Description

- ① 取下端盖 remove the cover
- ② 检查线路板并连接好线 Check circuit board diagram and connect the wires
- ③ 通电, 看输出电流信号是否正确: turn on electricity, check the output electric current signal:

—当执行器全部关闭时，电流信号应为 4 mA；

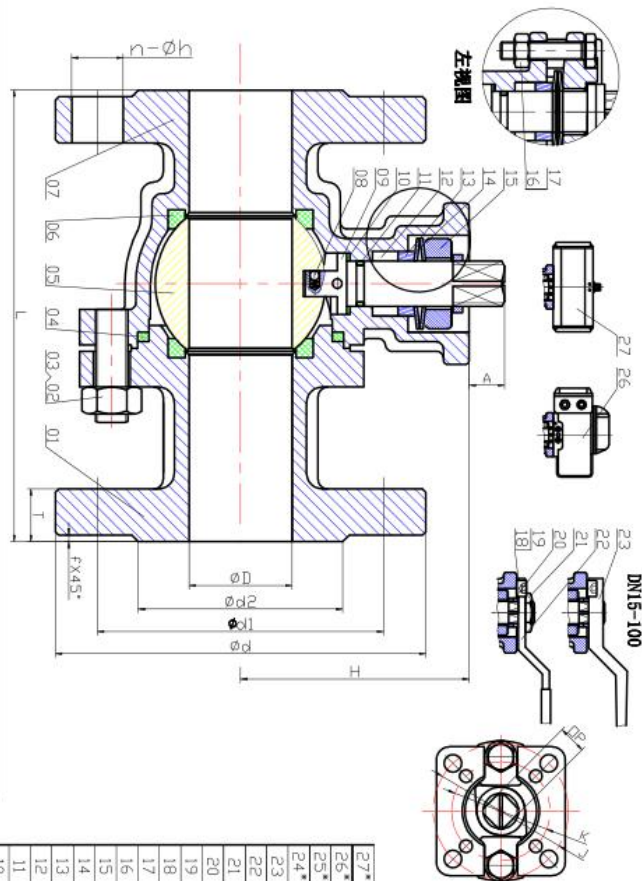
—When the actuator is full-closed, electric current signal is 4 mA

—当执行器全部打开时，电流信号应为 20 mA。

—When the actuator is full-open, electric current signal is 20 mA.

注：其他不详或特殊规格，请与本公司技术部联系。

DN	PN	∅D	∅d1	∅d2	L	n	∅h	T	f	H	A	∅P	K	J
15	16-40	15	95	65	45	130	4	14	16	2	51	9	9	36
20	16-40	20	105	75	58	130	4	14	18	2	55	9	9	36
25	16-40	25	115	85	68	140	4	14	18	2	63	11	11	42
32	16-40	32	140	100	78	165	4	18	18	2	71	11	11	42
40	16-40	38	150	110	88	165	4	18	18	2	81	14	14	50
50	16-40	50	165	125	102	203	4	18	20	2	88	14	14	50
65	16	65	185	145	122	222	8(4)	18	18	2	114	17	17	70
80	16	76	200	160	138	241	8	18	20	2	124	17	17	70
100	16	100	220	180	158	305	8	18	22	2	147	17	17	70
125	16	125	250	210	188	356	8	18	22	2	179	22	22	102
150	16	150	285	240	212	394	8	22	22	2	207	27	27	102
200	16	200	340	295	265	457	12	22	24	2	246	36	36	125



**技术要求**

1. 结构长度按 GB/T12221-2005
2. 设计制造按 GB/T12237-2008
3. 法兰连接按 GB/T9113-2010
4. 检验和试验按 GB/T13927
5. 耐火试验按 JB/T6899

**材料**

序号	名称	材料	原
1	阀盖	A193 B7	A193 B8
2	双头螺栓	A193 B7	A193 B8
3	螺母	A194 2H	A194 8
4	网体密封垫	PTFE	PTFE
5	球体	SS304	SS316
6	阀座	TFM1600	TFM1600
7	网体	WCB	CF8M
8	防静电装置	SS	SS
9	阀杆	304	316
10	止推垫片	RTFE	RTFE
11	∅型圈	TFM1600	TFM1600
12	填料	WCB	SS
13	填料压环	SS	SS
14	锥形弹簧	SS	SS
15	填料压盖	WCB	SS
16	六角头螺栓	A193 B7	A193 B8
17	螺母	A194 2H	A194 8
18	定位螺栓	A194 B7	A194 B8
19	螺母	A194 2H	A194 8
20	环套	SS	SS
21	锁紧螺母	SS	SS
22	普通手柄	CS	SS
23	铸造手柄	WCB	SS
24	三通套	WCB	SS
25	手柄	WCB	WCB
26	电动执行器	WCB	WCB

序号	名称	材料	原
1	阀盖	A193 B7	A193 B8
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6	阀座	TFM1600	TFM1600
7	网体	WCB	CF8M
8	防静电装置	SS	SS
9	阀杆	304	316
10	止推垫片	RTFE	RTFE
11	∅型圈	TFM1600	TFM1600
12	填料	WCB	SS
13	填料压环	SS	SS
14	锥形弹簧	SS	SS
15	填料压盖	WCB	SS
16	六角头螺栓	A193 B7	A193 B8
17	螺母	A194 2H	A194 8
18	定位螺栓	A194 B7	A194 B8
19	螺母	A194 2H	A194 8
20	环套	SS	SS
21	锁紧螺母	SS	SS
22	普通手柄	CS	SS
23	铸造手柄	WCB	SS
24	三通套	WCB	SS
25	手柄	WCB	WCB
26	电动执行器	WCB	WCB

**国际法兰标准**

**外形尺寸图**

上海永德阀门

上海永龙阀门厂

**Shanghai enterprise valve factory**

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网址：<http://www.shylfm.com>

**“我们不是最好，但我们尽力做得更好”**