

# HOLON



智能型  
电液联动执行器

Intelligent  
Electro-Hydraulic  
Actuator

深圳市厚隆科技有限公司  
Shenzhen Holon Technology Co., Ltd

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## 企业简介 Company profile

深圳市厚隆科技有限公司，成立于2014年02月25日，是一家专业的电液联动执行器生产商。

我司电液联动执行器主要应用于石油、天然气、化工、制药、电力、水处理等各个行业领域。针对不同工况，我司可提供电液联动执行器定制化服务。

电液联动执行器，根据结构不同，分为单作用弹簧复位电液联动执行器、双作用电液联动动执行器和蓄能器复位电液联动执行器；根据阀种不同，分为直行程电液联动执行器和角行程电液联动执行器。目前，我司电液联动执行器已应用于各个行业，性能稳定，安全可靠。

厚隆让流体实现智能化，是我司的终极目标！

**HOLON**

## 电液联动执行器 Electro-hydraulic Actuator



双作用电液执行器  
Double Acting



单作用弹簧复位电液执行器  
Spring Return



直行程电液执行器  
Linear Actuator



齿轮齿条电液执行器  
Rack and Pinion Actuator

## 1. 智能型电液联动执行器概述 General

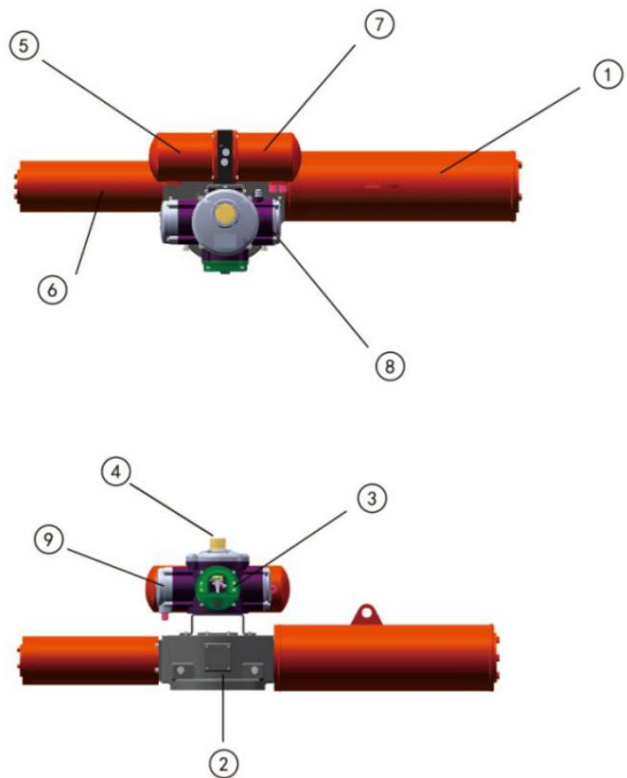
智能一体式多功能执行器,基本具备了不同工况对执行器的要求,比如ESD、PST、快开快关、调节、游动、控制精度高等的要求,是气动执行器与电动执行器的综合体,具备了电动执行器和气动执行器的共同优势。同时解决分体电液执行器体积大,防爆防护等问题。基于我公司产品的高度集成,在生产成本上也有大幅降低。电液执行器也是未来执行器行业的主导方向。

The electro-hydraulic actuator is a kind of intelligent integrated full-function actuator. Basically it can meet all the requirements of the actuator, such as ESD, PST, quick opening and closing, adjustment, swimming, and high control precision etc. With the advantages of both electric and pneumatic actuators, so it is a kind of combination for pneumatic actuator and electric actuators. At the same time, it solves the problems of large volume and explosion-proof protection of the split electro-hydraulic actuator. Based on its high integration, it will also be the primary trend of the actuator industry in the future.

## 2. 结构组成 Structural composition

电液执行器主要由液压总成,控制单元,执行单元,嵌入式软件等几大模块组成。具有性能稳定、使用寿命长、智能化程度高等优点。

Electro hydraulic actuator is mainly composed of hydraulic assembly, control unit, executive unit, embedded software and other modules. It has the advantages of stable performance, long service life and high degree of intelligence.

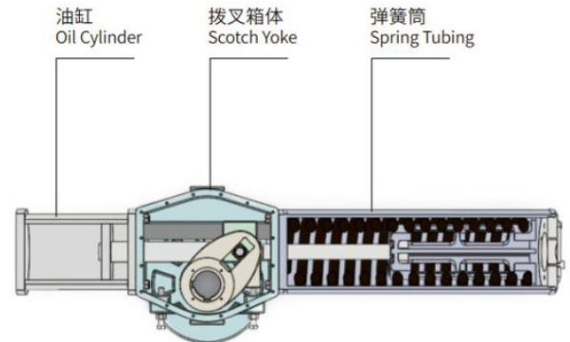


- |                             |                       |                                      |
|-----------------------------|-----------------------|--------------------------------------|
| 1. 弹簧筒<br>Spring Tubing     | 4. 位置指示器<br>Indicator | 7. 驱动电机<br>Drive Motor               |
| 2. 拨叉箱体<br>Scotch Yoke      | 5. 动力单元<br>Power Unit | 8. 电控系统<br>Electronic Control System |
| 3. 操作窗口<br>Operating System | 6. 油缸<br>Oil Cylinder | 9. 接线端盖<br>Junction Box Cover        |

### 3. 执行部分 Mechanical part

- 1、电液执行器执行部分，采用拨叉结构与齿轮齿条结构为主体执行部分，由液压缸、箱体模块和控制部分组成；
- 2、在故障位的情况下，我司不仅可使用蓄能罐复位，同时也可选用弹簧复位；
- 3、我司是以气动执行器为主体的单位，对执行器部分生产成本与质量控制。

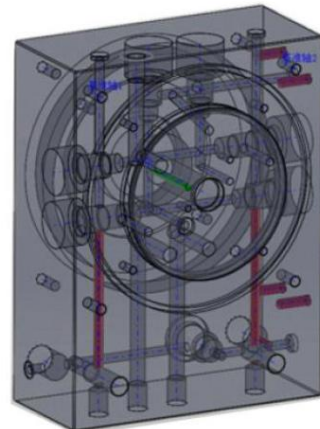
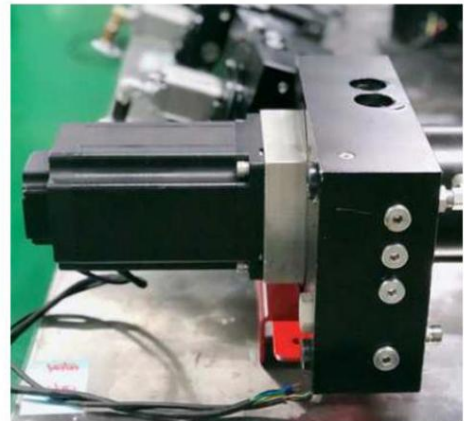
1. The mechanical part of the electro-hydraulic actuator adopts the scotch yoke and rack and pinion of the pneumatic actuator as the main executive part. It is composed of hydraulic cylinder, body module and control part;
2. In the case of failure position, our company can not only use the accumulator reset, but also the spring return type can be offered;
3. Our company is a manufacturer of pneumatic actuator as the main product, which has absolute advantages in the production cost and quality control of the actuator. Moreover.



### 4. 液压总成 Hydraulic assembly

- 1、我司电液执行器采用闭环油路设计，避免了执行器漏油现象的出现；
- 2、采用双向齿轮泵作为动力源，齿轮泵结构简单，定量出油，故障率低等优点；
- 3、双向液压互锁阀块，阀门停止状态下，能有效锁死，所有的插装阀均采用标准产品，便于后续的维修与更换。

1. This electro-hydraulic actuator adopts closed-loop oil circuit, which solves the big problem of oil leakage of hydraulic actuator;
2. Using bidirectional gear pump as power source, the gear pump has the advantages of simple structure, quantitative oil delivery and low failure rate;
3. The two-way hydraulic interlock valve block can effectively lock when the valve is stopped. All cartridge valves are standard products, easy to follow up maintenance and replacement.

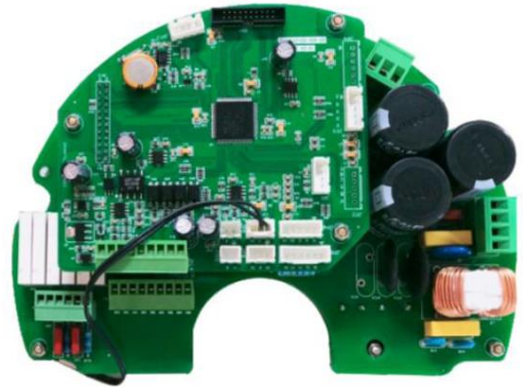


## 5. 电器部分 Electrical part

现电液的控制方式,主要有电磁阀控制,比例阀,伺服比例阀,伺服电机这几种。

- 1、我司采用伺服电机为控制主体,鉴于整个市场智能化的趋势,目前各行各业对于伺服电机控制的技术都比较成熟与稳定;
- 2、伺服控制板,程序板均由我司自行开发,由于阀门行业使用环境恶劣,我们都做了很好的散热与三防处理(防潮湿,防盐雾,防霉菌);
- 3、在抗干扰方面,外部用滤波器,输入输出光耦隔离,接口ESD元件;
- 4、液晶显示屏在低温情况下可以自行加热;
- 5、电压可为110V、220V和380V。

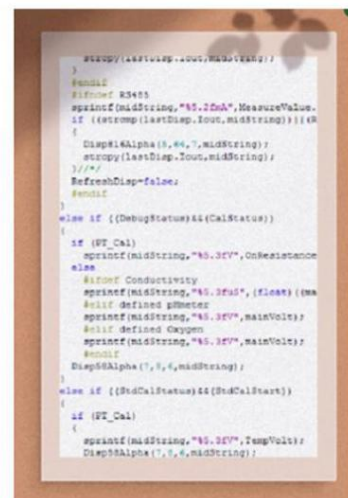
1. Our company adopts servo motor as the main control body, the technology of servo motor control is relatively mature and stable;
2. The servo control board and program board are all developed by our company. Due to the harsh use environment in the valve industry, we have done good heat dissipation and three prevention treatment (anti humidity, salt fog, anti mold);
3. In the aspect of anti-interference, external filter, input and output optocoupler isolation, interface ESD components;
4. LCD can heat itself at low temperature;
5. The voltage can be 110V, 220V and 380V.



## 6. 软件部分 Software System

- 在抗干扰方面,模拟量运用滤波算法,进一步增强抗干扰能力;
- 兼容485通讯;
- 智能化的程度高低,主要还是取决于软件如何采集数据,如何运算,如何反馈。基本的故障我们都会报出故障代码;
- 通过对扭矩的采集,使用的频率,同时对阀门的使用状态也进行了监测与报警;
- 远程功能授权,在我公司技术人员不到现场的情况下,输入现场需要增加的功能代码,就可以开放此功能。

- In the aspect of anti-interference, filtering algorithm is used to further enhance the anti-interference ability;
- Compatible with 485 communication;
- The degree of intelligence mainly depends on how the software collects data, how to calculate and how to feedback. We will report the fault code for basic faults;
- Through the collection of torque, the frequency of use, at the same time, the use status of the valve is also monitored and alarmed;
- Remote function authorization: when our company's technical personnel are not on site, the function can be opened by inputting the function code that needs to be added on site.





## 7. 数码界面显示 Interface display

数码界面可在最低-50°C的环境下操作多语言设定、状态和诊断显示背光技术能提供极佳的对比度。

The multi-language setting, status and diagnostic can be operated and displayed on the interface under -50°C. Backlighting technology can be visible.



## 8. 多选择的控制 Multiple control choice

执行器可以选择远程数字量、模拟量或fieldbus modbus及Hart等总线进行远程控制。可以选配就地手动泵操作。或者蓝牙、红外线链接控制器设定。以及通过面板按钮直接设定操作。

Remote I/O module, remote analog, Fieldbus Modbus and Hart etc are available for control choice; It can be operated and programmed by the connecting of controller with bluetooth and infrared, or operated directly via panel button. Manual pump is optional for operation choice.



## 9. 系统检测 System Monitoring

配置压力传感器以检测内部产生的液压。以保证在压力下降至要求水平时，气动电机/泵来保持内部液压。配置温度传感器检测油温和环境温度。

System monitoring with a pressure sensor to monitor the internal oil pressure. The motor or pump will start to keep the stability of internal oil pressure once the pressure is down to the setted pressure. With a temperature sensor to monitor the temperature of oil and environment.



## 10. 阀位 Valve position

配置一个非接触式光电编码器，用于长期检测执行器的位置，4~20mA信号输出，并配置一套阀位极限信号安全开关。

Valve position with a non-contact hall effect sensor to monitor actuator position for a long period. That is output 4~20mA signal. It is also equipped one set of limit signal safety switch of valve position.



## 11. 电源 Power supply

内部标配了一个超级电容，当主电源失效时，配置和数据记录参数储存在记忆芯片中，数据最长可保持两周时间。数据记录器有能力检测执行器运行到失电安全位置的動作。

Super capacitor is the standard configuration. The data logging paramcters will be saved in the memory chip up to two weeks When the main power fails, the data logger is able to detect the action of the actuator running to a safe location of the power off.



## 12. 工程能力 Engineering capability

在快速成型过程中的校验过程中，不断删除系统中不确定的错误因素，使产品性能更加稳定。

样机经过多次震动实验和冲击试验，不断优化产品设计结构，延长产品使用寿命。

成品后，还原最初的操作条件，观察各零部件间的相互作用。通过各部件间的摩擦因数的大小（磨损程度），采用高性能材料，同时优化产品结构，以达到增加产品寿命的目的

In the verification process of the rapid prototyping process, the uncertain error factors in the system are continuously deleted to make the product performance more stable.

After repeated vibration and impact tests, the prototype continuously optimizes the product design structure and increase the service life.

After the finished product, restore the original operating conditions and observe the interaction between the components. According to the size of the friction coefficient (wear degree) between the components, high-performance materials are used to optimize the product structure, so as to increase the product life.

## 13. 紧急状态设置

### Emergency setting

- 可以设定在外部断电等紧急情况时, 执行器自动驱动阀门至关闭、打开或者保持状态可选;
  - 自诊断和故障报警;
  - 阀位设定后如发生位移;
  - 系统自动补偿至设定位置并报警;
  - 系统设定参数超值会自动报警;
  - 故障位开记录和查看。
- It can be set that in case of emergency, such as external power failure, the actuator can automatically drive the valve to close, open or hold state;
  - Self diagnosis and fault alarm;
  - If there is displacement after the valve position is set;
  - The system automatically compensates to the set position and gives an alarm;
  - The system will automatically alarm if the parameter exceeds the value;
  - Record and view the failure position.






## 14. 产品型号

### Model Specification

型号示意方式: HE-RSNF-01- 80FO-HM- EX-110V

<p><b>HE</b> ● 产品型号 Product Model 智能型电液联动执行器 Intelligent Electro-hydraulic actuator</p>		
<p><b>R</b> ● 电液结构 Electro-hydraulic R角行程 Rotary actuator Z直行程 Linear actuator</p>		
<p><b>S</b> ● 作用形式 Acting Type S:弹簧复位 Spring Return A:蓄能器 Accumulator</p>		
<p>● <b>NF</b> 控制方式 Control type NF 开关型 RL 调节型</p>		
<p><b>01</b> ● 箱体规格代码:01~08 Body Size Code:01~08</p>		
<p><b>80</b> ● 油缸规格( mm ) :80~ 300 Cylinder Size(mm)80-300</p>	<p><b>FO</b> 气源故障位置 Air Failure Position FO:故障开 Fail to open FC:故障关 Fail to close FL:故障保位 Fail to lock</p>	
<p><b>HM</b> ● 附件 Accessories SM:机械手动 Mechanical Manual HM:液压手动 Hydraulic Manual</p>	<p><b>EX</b> 防爆规格 Anti-Explosion Exd IIB/CT4 IP67</p>	
<p><b>110V</b> ● 电压 Voltage 110V AC 220V AC 380V AC</p>		

## 15. 智能型电液联动执行器选型表 Specification

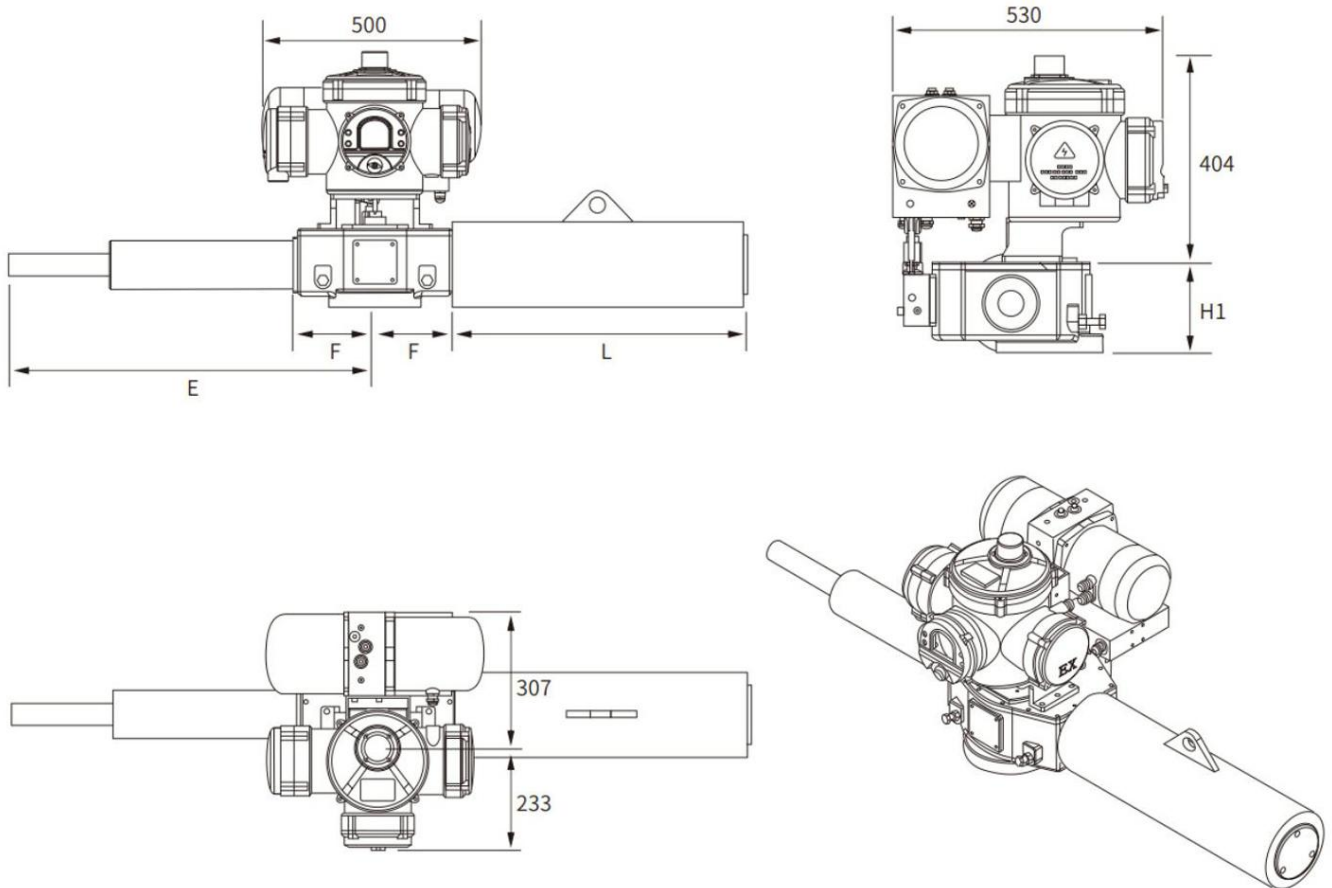
HE-NF/RL-D 双作用系列 Doubling Acting		通用 General		HE-NF/RL-S 双作用系列 Single Acting	
型号 Model	扭矩(Nm) Torque	功率(W) Power	时间(S) Time	型号 Model	扭矩(Nm) Torque
HE-NF-D01	600-5600	550	3.5-16	HE-NF-S01	600-2100
HE-NF-D02	~10000	750	≤22	HE-NF-S02	~4000
HE-NF-D03	~20000	750	≤40	HE-NF-S03	~8000
HE-NF-D04	~34000	1100	≤52	HE-NF-S04	~14000
HE-NF-D05	~58000	1100	≤73	HE-NF-S05	~23000
HE-NF-D06	~92000	1500	≤106	HE-NF-S06	~36000
HE-NF-D07	~193000	1500	≤228	HE-NF-S07	~75000

### 注意 Note

- 1、表中时间为油压方向时间。弹簧方向时间0.5~10秒，可以根据客户特殊要求设定；
- 2、宽泛的扭矩选择可以根据客户具体要求设定；
- 3、面板按钮的就地控制和非侵入式蓝牙控制让操作更方便；
- 4、4~20mA或1~5V模拟量，接受Fieldbus Modbus及Hart等总线进行远程控制；
- 5、防爆等级ExdIIBT4，防水等级IP66；
- 6、使用环境，常温型-20~70°C，低温型-40~60°C；
- 7、失电安全选择：FO：故障开 FC：故障关 FL：故障保位。

1. The time in the table is the oil pressure direction. The spring direction time is 0.5~10s, it is available to program upon the request;
2. The widely range of torque can be customized according to demand;
3. The local and non-invasive control of panel button makes the operation easier;
4. 4~20mA or 1~5V Analog quantity, accept the bus remote control of Fieldbus Modbus and Hart;
5. Anti-Explosion grade: ExdIIBT4, Waterproof Level: IP66;
6. Working Environment: Standard Temperature: -20°C~+70°C, Low Temperature: -40°C~+60°C;
7. Safety Selection of power loss: FO: Fail to Open FC: Fail to Close FL: Fail to Lock.

## 16. 产品结构图 Structure Diagram



## 17. 尺寸参考表 Dimension reference table

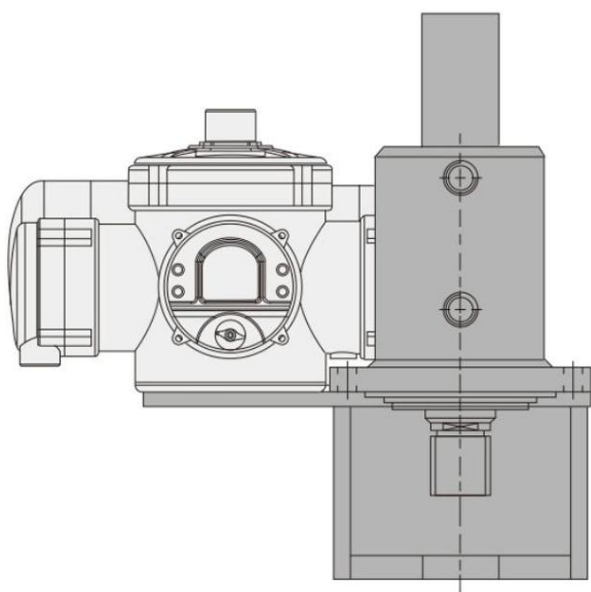
HE-D/HE-S	E	F	H1	L
02	375	175	190	570
03	470	210	205	870
04	560	265	240	980
05	660	310	300	1340
06	845	418	395	1675
07	1185	535	505	1740
08	1565	685	660	2250

注: 以上数据仅供参考,最终以双方确认图纸为准。

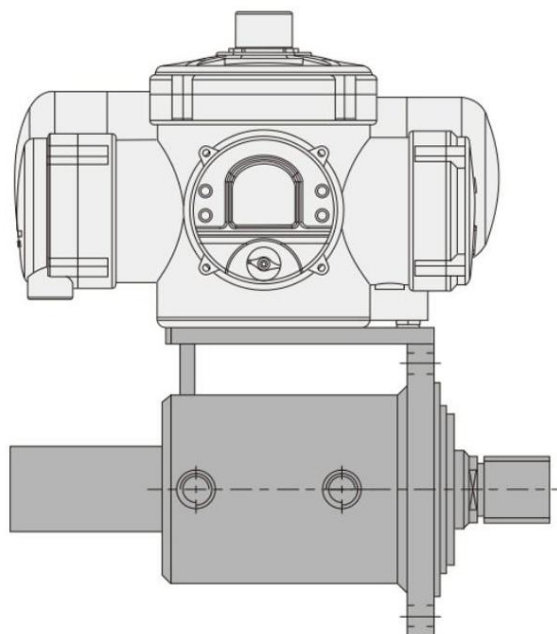
Note: Data is for reference only, the final object should be with customer's confirmation.

## 18 产品结构形式 Product structure

EHA-ZT 立式



EHA-ZT 卧式



注：推力、行程、安装方式根据客户具体要求设定。最终以双方确认图纸为准。

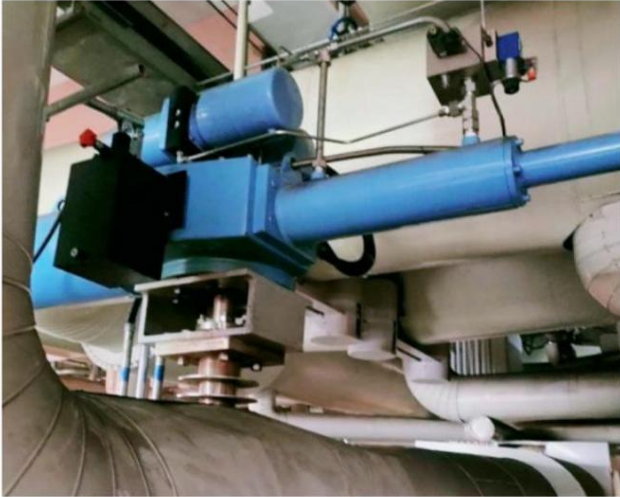
Note: Thrust, stroke and installation can be programmed upon request, the final object should be with customer confirmation.



## 19. 技术参数对比表 Comparison table of technical parameters

序号 No.	类型 Type	电液联动 Electro-hydraulic Actuator
1	结构形式 Design	顶装智能一体化电液 Top mounted intelligent integrated electrohydraulic
2	控制方式 Control mode	智能直驱伺服电机 Intelligent direct drive servo motor
3	能耗 Energy consumption	低 Low
4	效率 Efficiency	85%~90%
5	制造成本 Manufacturing cost	低 Low
6	使用维护成本 Operation and maintenance cost	低 Low
7	模块化设计 Modular design	是 Yes
8	紧凑型结构 Compact structure	高
9	防爆 Explosion-proof	整体防爆
10	防护等级 Protection Grade	IP67
11	电源电压 Power Supply Voltage	110/220/380VAC 共用
12	远程功能授权 Remote Function Authorization	有 Yes
13	ESD 紧急切断 ESD emergency shutdown	选配 Optional
14	PST 部分行程测试 PST partial stroke test	标配 Standard configuration
15	破管检测 Tube break detection	选配 Optional
16	定位精度 Positioning accuracy	0.10%
17	重复精度 Repeatability accuracy	0.10%
18	死区 dead zone	0.1%~0.5%
19	模拟量控制信号 Analog control signal	4-20mA
20	无源开关型号 Passive switch model	有 Yes
21	RS-485通信 RS-485 communication	标配 Standard configuration
22	按钮 Button	非侵入式霍尔按键 Non intrusive hall button
23	远程/就地 Remote / local	是 Yes
24	内置备用电源 Built in standby power supply	是 Yes
25		
26	电机 Electric machinery	伺服电机 servo motor
27	集成电路设计 Integrated circuit design	是 Yes
28	微处理器 Microprocessor	ARM64位 Arm64 bit
29	设置参数 Setting parameters	是 Yes
30	按键显示屏 Key display	是 Yes
31	防浪涌保护器 Surge protection device	是 Yes
32	输入输出光耦隔离 Input output optocoupler isolation	全部隔离 All quarantined
33	软件抗干扰法 Software anti interference method	是 Yes
34	故障报警数量 Number of fault alarms	33路报警 33 way alarm
35	电机过流保护 Motor over current protection	是 Yes
36		
37	液压总成 Hydraulic assembly	液压总成模块 Hydraulic assembly module
38	液压泵 Hydraulic pump	高精双向齿轮泵 High precision bidirectional gear pump
39	泄荷装置 Unloading device	溢流阀 Relief valve
40	自带液压单元无需外接 With hydraulic unit without external connection	是 Yes
41	油路设计 Oil circuit design	闭环 closed loop
42	手动液压泵 Manual hydraulic pump	是 Yes
43	开关调速装置 Switch speed regulating device	是 Yes
44		
45	蓄能器 Accumulator	选配 Optional
46	断电阀位动作 Power off valve position action	保位/打开/关闭 Hold / open / close
47	压力检测 Pressure Test	2路 2ways
48	温度检测 Temperature Test	3路 3ways
49		
50	执行机构 Actuator	拨叉式液压缸 Hydraulic scotch yoke cylinder
51	作用形式 Action Type	弹簧/蓄能器 Spring / accumulator
52	行程调节和机械限位 Stroke adjustment and mechanical limit	是 Yes

## 应用案例 Applications



### 案例一 Case 1

案例为超临界高温高压使用工况,具体功能如下:

1. 实现功能为正常开,正常关;
2. 4-20mA调节功能;
3. 0.5秒ESD紧急关闭功能;
4. UPS电源断电保护功能;
5. 电磁阀冗余设计可实现在线更换功能。

The case is applied to over critical high temperature and high pressure working condition. The specific functions of the case are as follows:

1. The function is normally on and off;
2. 4-20mA signal;
3. 0.5 second ESD emergency shutdown;
4. UPS power failure protection;
5. The redundant design of solenoid valve can realize the function of online replacement.



### 案例二 Case 2

案例应用于高压气体放空阀,此阀控制部分和执行部分是分体式安装。

1. 实现功能为正常开,正常关功能;
2. ESD紧急打开功能;
3. 4-20mA调节功能,调节过程中全行程时间为3秒;
4. 断电打开功能;
5. 485通讯功能。

The case is applied to the electro-hydraulic control valve of steam turbine in power plant, the executive part and control part are installed separately;

1. The function is normal open and normal close;
2. ESD emergency opening;
3. 4-20mA signal, the whole stroke time is 3 seconds in the adjustment process;
4. Power off and on;
5. 485 communication function.



### 案例三 Case 3

案例应用于钢厂的TRT装置,阀门口径DN2600功能如下:

1. 实现功能为快开快关,慢开慢关功能;
2. ESD 0.5秒达到95%关闭,5秒5%缓冲关闭;
3. 阀门实现游动功能;
4. 断电打开功能;
5. 开关速度调节功能。

The case is applied to TRT device of steel plant. The functions of valve DN2600 are as follows:

1. Fast opening and fast closing, slow opening and slow closing;
2. ESD for 95% off in 0.5 seconds and 5% buffered off in 5 seconds;
3. The valve realizes the swimming function;
4. Power off and on;
5. Switch speed is adjustable.



#### 案例四 Case 4

案例为煤化工行业主管路紧急切断阀, 因为此阀门一直是常开状态, 仅在遇到火灾的情况下才会紧急关闭。因此电液执行器是最佳选择。

1. 实现功能为正常开, 正常关;
2. PST部分行程测试功能;
3. ESD紧急关闭功能;
4. 断电复位功能;
5. 电磁阀冗余设计可实现在线更换。

The case is for emergency shut-off valve in the main pipeline of coal chemical industry, because the valve is normally open, it can only be closed in case of fire. So the electro-hydraulic actuator is the best choice.

1. Normally on and off;
2. PST test (partial stroke test);
3. ESD emergency shutdown;
4. Power off reset;
5. The redundant design of solenoid valve can realize online replacement.



#### 案例五 Case 5

案例应用于石油化工电液控制阀, 主要用于现场的就地操作, 根据现场阀门开度需求手动调节。电动执行器速度太慢, 气动执行器在此使用工况下无法实现保位功能, 故选用电液执行器。

1. 实现功能为正常开, 正常关功能;
2. 远程4~20mA调节功能, 就地手动开度调节;
3. 停止运行时锁止功能。

The case is applied to petrochemical electro-hydraulic control valve, which is mainly used for on-site operation, and can be manually adjusted according to the valve opening demand. The speed of the electric actuator is too slow, and the pneumatic actuator can not achieve the position keeping function under this working condition, so the electro-hydraulic actuator is selected.

1. The function is normal open and normal close;
2. Remote 4~20mA adjustment function, local manual opening adjustment;
3. Locking function when stopping operation,



#### 案例六 Case 6

案例应用于熄焦塔, 阀门口径DN800功能如下:

1. 实现功能为快开快关功能;
2. 调节功能;
3. 高频动作;
4. 控制精度0.1%;
5. 在工作环境比较恶劣的情况下使用。

The case is applied to the coke quenching tower. The functions of valve DN800 are as follows:

1. Fast opening and fast closing;
2. Adjustment function;
3. High frequency action;
4. The control accuracy is 0.1%;
5. It can be used in harsh working environment.

# 深圳市厚隆科技有限公司

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