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SIL ISO CE

FRY·弗瑞亚
Electric Actuator

FREYA ELECTRIC ACTUATOR
For Industrial Valve Automation

TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

BRIEF INTRODUCTION

Founded in 2014, Freya specializes in fluid control products and services such as valves, actuators, electric valve actuators, and electric valves. It focuses on the process industry and has long been committed to providing services to process industries such as power, steel, building materials, and water treatment to provide professional fluid control solutions. Based on the actual working conditions, through necessary on-site surveying and technical explanations, we provide customers with safe, economical and environmentally friendly selection and design, supply in strict accordance with contract requirements and guide installation and debugging, and hand over for use if standards are met. Thanks to the trust of the vast number of users, through long-term and large-scale on-site services, and the effective accumulation of technical experience, the company has an accurate understanding of the real needs and pain points of users and the market, as well as expectations for equipment manufacturers.

The company based on its own patent R & D and production of intelligent electric actuators, reliable, durable, easy to use, cost-effective and guaranteed service. Being close to users, providing full-process services, cover-all services, repair and maintenance value-added services, and escorting users' production are our differentiating advantages. Freya intelligent electric actuator and electric valve actuator provide a two-year warranty and lifetime free after-sales service after installation and commissioning. Technical quality and commercial credit are the two foundations on which the company relies to survive and drive the development of the company. Users feel reassured, worry-free and happy, which are the only criteria to evaluate the effectiveness of our work and demonstrate the value of our existence.

APPLICATIONS

Aisa

Africa

Middle East

South America

COMPANY HONORS

INTRODUCTION

Purification and distribution of drinking water as well as treatment and purification of sewage are prerequisites for the development of basic industries. Supply security is crucial for the modern water industry. Pipeline automation requires various types of valves. FRY-Q actuators are widely used in the construction of water systems to operate dams and sluices. The product is a quarter-turn actuator with a high corrosion resistance level that ensures a long service life and low maintenance costs.

PETROLEUM AND PETROCHEMICAL

· Pipeline
· Refinery
· Pump Station
· Platform
· Tank Farm

Petroleum and petrochemicals are important basic energy sources for industry. Their extraction, processing and distribution require quite complex techniques and processes. The petroleum and petrochemical industry implements very strict regulations and standards, and FRY-Q meets various market requirements such as access permits and explosion-proof certification. FRY-Q actuators' excellent level and applicability under various harsh conditions can meet the needs of the petroleum and petrochemical industry.

POWER

· Conventional Power Plant (Natural Gas, Oil, Coal)
· District Heating
· Hydropower
· Geothermal Power
· Combined Cycle
· Biogas Power
· Solar Power

The power plant contains multiple systems such as water and steam circuits, exhaust gas purification, boilers, etc. The control system requires that the control process can be monitored in the control room. Electric actuators are installed on valves to control the water and steam flow in the entire pipeline system. FRY-Q actuators can provide various valve automation interfaces adapted to the power plant control system. In power industry applications, FRYM actuators meet the applicability of any installation location requirements in terms of power supply, vibration and temperature range.

GENERAL INDUSTRY

· Conventional Power Plant (Natural Gas, Oil, Coal)
· District Heating
· Hydropower
· Geothermal Power
· Combined Cycle
· Biogas Power
· Solar Power

Any process automation requires pipes and valves. FRY-Q electric actuators can provide customized solutions for various industrial application requirements.

FRY-Q ELECTRIC VALVE ACTUATOR

• FRY-Q type electric valve actuators are suitable for butterfly valves, ball valves etc, which are required to turn 90°. These actuators are featured by small size, light weight, high efficiency, high reliability, high protection capability, low noise and so on. Both operation at site and remote controlling can be carried out. So they have been applied in petroleum and chemical industries, power plant, water treatment and paper-making industries.

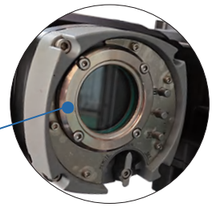
• Freya controls designs, produces and provides high-quality actuators and services related to valve automation.

• With our many years of experience in the field of automation, we have launched the Q series of electric actuators, which are compact, rugged, reliable and can be fully integrated into complex control systems.

• We are always ready to provide you with our FRY-Q series actuators and accessories as well as quality services.

Main features of FRY-Q series electric valve actuators

• Compact and robust construction, lightweight.
• Wide range of torque variation (From min 50Nm to max 5000Nm).
• Hard anodized aluminum housing inside and outside with external high temperature paint coating for use against severe industrial environment.
• Enclosure uses radial seals & O-rings that provide protection to waterproof IP67 and optional watertight IP68.
• ISO5211 standard.
• Removable drive bushing for easy machining and mounting.
• Self-locking provided by double worm gearing (no brake required).
• It automatically identifies and corrects phases. Automatic phase failure protection protects equipment safety.
• Reliable mechanical torque sensing system providing safe operation in overload condition.
• Large size window and indicator provides better position indication from a distance.
• Number of local position control options to provide easy commissioning and field operation.
• Digitalized control components.



Integrated control unit

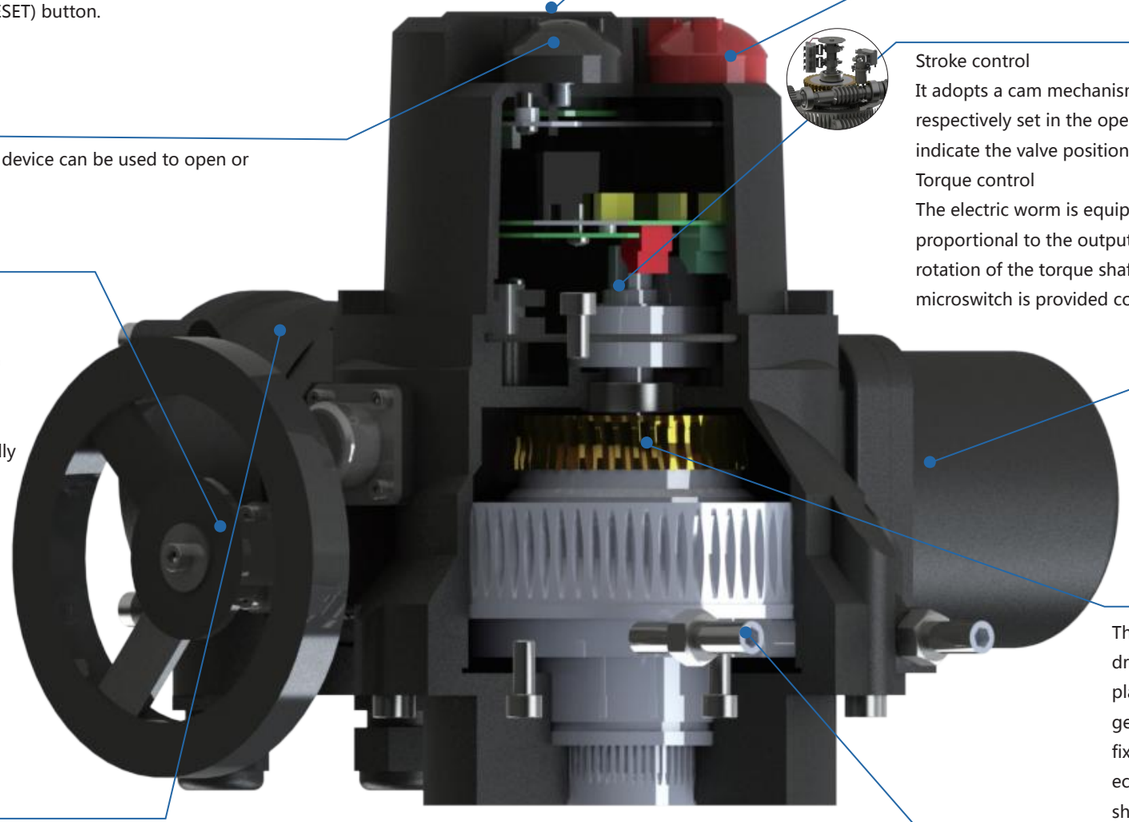
Non-sunk switch button is adopted to ensure complete waterproof function. The built-in circuit board has a reliable power isolation from external interference signals by optical isolation elements. If there is an over-torque switch induction, for the safety of the motor and valve, the actuator will refuse to be sensed by other sensors before the operator inputs the home position (RESET) button.

Local electric operation

The operating switch “Open” - “Close” installed on the local operating device can be used to open or close actuator locally.

Manual operation

When the handwheel is turned, the manual worm drives the outer gear of the fixed ring gear to rotate, and the inner gear of the fixed ring gear and the planetary gear form a fixed-axis gear train to drive the output shaft to rotate. Therefore the manual and electric operation conversion of the actuators is completed through the role conversion of the static ring gear. There is no clutch, and there is no need to switch the handle to achieve fully automatic switching.



Terminal box

The independent sealed terminal cavity can ensure the sealing integrity of the electrical part of the electric actuator when performing on-site wiring, and at the same time meet the product explosion-proof requirements.

LCD interface

The LCD interface can display text information, graphical elements and actuator characteristics.

Selection of control mode

The selective switch "Remote"-"Stop"-"Local" installed on the local operating device can be used to set up remote operation (remote control) or local operation (local control) or stop mode.

Stroke control, torque control and opening indicating mechanism

Stroke control

It adopts a cam mechanism, the cam shaft is synchronized with the output shaft and two micro switches are respectively set in the opening and closing directions.The upper end of the cam shaft is equipped with a dial to indicate the valve position.

Torque control

The electric worm is equipped with a butterfly spring group, the axial movement of the electric worm is proportional to the output torque of the output shaft, and the movement of the worm is converted into the rotation of the torque shaft through the rack and pinion structure. A cam is installed on the torque shaft, and a microswitch is provided correspondingly in the direction of opening and closing.

Motor

The valve-specific motor that can be disassembled independently has the characteristics of high starting torque and small inertia. The squirrel cage induction motor with embedded thermostat. The built-in thermostat accurately detects the increased temperature to prevent form motor damaging.

Electric operation

The motor drives the electric worm through a first-stage spur gear pair, and the worm drives the eccentric shaft to rotate through the copper worm gear combined with it. A planetary gear is installed on the eccentric shaft. Because the outer teeth of the fixed ring gear and the manual worm are self-locking structures, the planetary gear cannot make the fixed ring gear rotate. The planetary gear, the inner teeth of the fixed ring gear and the eccentric shaft form a planetary gear train, which transmits the rotation of the eccentric shaft to the output shaft with a reductionratio of about 40:1, thereby driving the valve stem to rotate. This reduction gear structure has self-locking performance, when the motor stops, the valve will be locked in position.

Mechanical limit

There is an adjustable limit screw in each direction of opening and closing. A special sealing gasket is installed on the limit screw to ensure good sealing performance of this part.

STANDARD SPECIFICATIONS

Protection grade	Standard IP65/IP67 Special IP68
Power supply	Three-phase AC380V---460V 50/60Hz Single-phase: AC110V-AC220V DC24V AC24V 50/60Hz
Duty cycle(on-off)	Short 10 minutes (special order 30 minutes)
Duty cycle(modulating)	Short 10 minutes (special order 30 minutes)
Motor	Squirrel cage induction motor
Limit switches	2 each for open and close (SPDT 250VAC/16A rating)
Torque switches	1 each for open and close (SPDT 250VAC/16A rating)
Jam protection	Build-in overheat protection
Travel angle	90°
Position indicator	Continuous mechanical indicator with arrow
Self locking	Provided by double worm gearing (no brake)
Mechanical stopper	1 each for each travel end (open and close), external & adjustable
Ambient temperature	Standard: -20～+60℃ Optional: -40～+80℃
Ambient humidity	90%RH max (Non-condensing)
External coating	High temperature paint
Explosion-proof grade	ExdbIIBT4Gb (IECEx/ATEx)
Functions	LCD Chinese / English display window and local operation function Self phase sequence identifying and phase disconnection protection Infrared setting and control Fault self-diagnosis technology Modbus, Profidbus DP, Hart
Signal	A: Remote passive dry contact, signal short pulse (Inching). B: Remote passive dry contact, signal long pulse (hold). C: Active DC24V signal. D: Active AC220V signal. E: Remote DC4-20mA signal.
Feedback signal	A: Open, close, stop signals (passive dry contact). B: Fault signal (passive dry contact). C: Valve position signal (DC4-20mA, DC1-5V, DC0-10V) D: Remote control signal (passive dry contact)

TECHNICAL SPECIFICATIONS

INTELLIGENT SPECIFICATIONS

LCD screen unit	-Display the valve or damper's open position rate in "%". -Indicate the actuator's status by characters -Display operating modes and status, open/close rate, torque value, etc.
Sensor unit	Position sensing -High-resolution absolute encoder based on magnetic sensor - Previous position memory holds when the main power is cut off and without battery Torque sensing -Maximise life cycle for parts by the use of optical contactless resolver -Torque setting range on actuatoris 40%-100%.
Data Logging & Diagnostics	Display trend curve graph of operating characteristics of the actuator Frequency log of position limit & torque limit reached Indicate the current status of operation mode Easy to set and configure Intelligent Human-Machine Interface with supplied wireless connection.
Wireless Settings & Controls	No need to open up covers to set and modify position torque and others. Use remote control kit and intelligent devices for setting, controlling and self-diagnosing of actuator.

MODEL COMPILATION METHOD

FRY – □ – □ □ □ – □ □

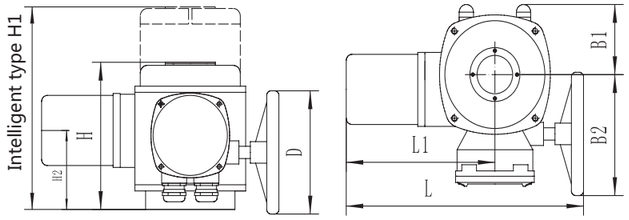
- Shell: W for standard type, B for explosion-proof type.
- Power supply: 1 for AC380V 50Hz, 2 for AC220V 50Hz. 3 for special power supply voltage (please contact us if you have special requirements).
- It represents actuator output torque (digit x 10)
- Electric actuator type
- FRY series electric actuator

Model	Torque (N·m)	Max. stem diameter (mm)	Manual ratio	Output speed (r/min)	AC380V		AC220V		Reference weight (KG)	
					Power (KW)	Current (A)	Power (KW)	Current (A)	Direct mounted	Foot-plate mounted
FRY-Q-005	50	19	60:1	0.5	0.045	0.35	0.06	0.7	8.5	16
FRY-Q-010	100	19	60:1	0.5	0.06	0.5	0.09	1.0	9	17
FRY-Q-015	100	28	90:1	0.5	0.06	0.5	0.09	1.0	17	25
FRY-Q-020	200	28	90:1	0.5	0.09	0.7	0.12	1.5	17	25
FRY-Q-030	300	28	90:1	0.5	0.12	0.8	0.15	2.0	17	25
FRY-Q-040	400	28	90:1	0.5	0.15	0.9	0.18	2.5	18	26
FRY-Q-060	600	38	87:1	0.5	0.18	1.0	0.25	3.0	25	41
FRY-Q-090	900	38	87:1	0.5	0.25	1.5	0.37	4.0	26	50
FRY-Q-120	1200	38	87:1	0.5	0.25	1.5	0.37	4.0	27	51
FRY-Q-180	1800	38	87:1	0.5	0.37	2.0	0.55	5.0	28	67
FRY-Q-300	3000	55	348:1	0.5	0.37	2.0	0.55	5.0	39	77
FRY-Q-400	4000	55	348:1	0.5	0.55	3.0	0.75	7.0	40	78
FRY-Q-500	5000	55	348:1	0.5	0.55	3.0	0.75	7.0	41	82

Note : 1. Under the rated voltage, the ratio of the jam current to the rated current of the motor is 7, and the tolerance is +20% of the guaranteed value

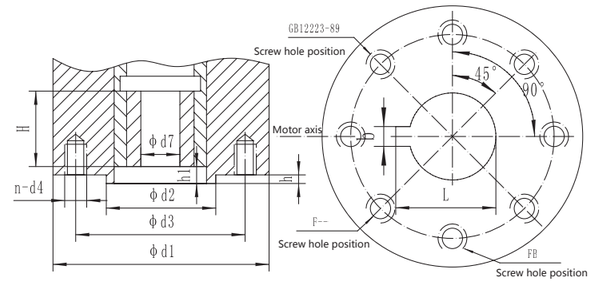
2. If there are special requirements, the company can provide other speeds: 0.25/1/2/3/4 (r/min), etc.

DIMENSIONS



Model	B1	B2	H	H1	H2	L	L1	D
FRY-Q-005/015	68	114	156	270	73	250	157	140
FRY-Q-020/040	91	157	191	273	103	332	208	160
FRY-Q-060/180	143	203	227	309	126	424	232	250
FRY-Q-300/800	143	203	291	373	190	424	232	250

CONNECTION DIMENSIONS



Model	Flange model		d1	d2	d3	n-d4	D7		H	h	h1
							Reserved	Max.			
FRY-Q-005		FB1	77		57	4-M6	12.7	12.7	35		
FRY-Q-010		FB1	77		57	4-M6	15.9	15.9	35		
	F05		65	35	50	4-M6	8	18	35	3	2
FRY-Q-015		FB2	92		70	4-M8	19	19	42		
FRY-Q-020	F07		90	55	70	4-M8	12	28	42	3	2
FRY-Q-030 FRY-Q-040		FB3	115		89	4-M12	22.2	22.2	42		
	F10		125	70	102	4-M10	12	28	42	3	2
FRY-Q-060		FB3	115		89	4-M12	28.6	28.6	50		
	F10		125	70	102	4-M10	15	38	50	3	2
FRY-Q-120		FB4	140		108	4-M12	31.7	31.7	50		
	F12		150	85	125	4-M12	15	38	50	3	2
FRY-Q-120 FRY-Q-180		FB5	197		159	4-M16	33.3	33.3	60		
	F14		175	100	140	4-M16	20	38	60	3	3
FRY-Q-180 FRY-Q-300 FRY-Q-500		FB5	197		159	4-M16	41.3	41.3	90		
	F16		210	130	165	4-M20	20	60	90	3	3