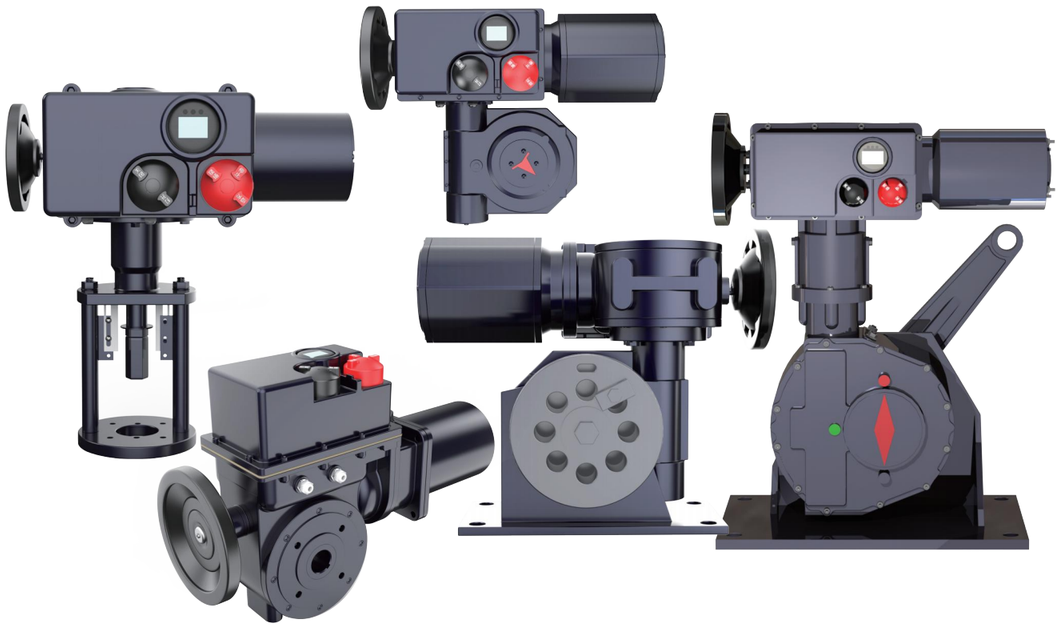
TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

SD SERIES ELECTRIC ACTUATOR



ENGINEERING CREATIVE SOLUTIONS FOR FLUID SYSTEMS

INTRODUCTION

• SD quarter-turn electric actuators are suitable for butterfly valves, ball valves, damper butterfly valves, plug valves etc, which are required to turn 90°.
SKD multi-turn electric actuators are suitable for gate valves, globe valves, diaphragm valves etc, which are required to turn 360°.
SD linear-turn electric actuators are suitable for single seat, double seat control valve, sleeve control valve etc..
These actuators are featured by compact structure, small volume, beautiful appearance, stable performance, high efficiency, high reliability, high protection capability 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 SD series of electric actuators, which are compact, rugged, reliable and can be fully integrated into complex control systems.

SD electric actuator has the following features:
• Compact and robust construction, lightweight.
• Wide range of torque variation (Multi-turn: 1200-16000Nm Quarter-turn: 100-3000Nm Linear-turn:3000-10000N).
• 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.
• 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.

PRODUCT STRUCTURE

01 [Local operation]

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.

02 [LCD interface]

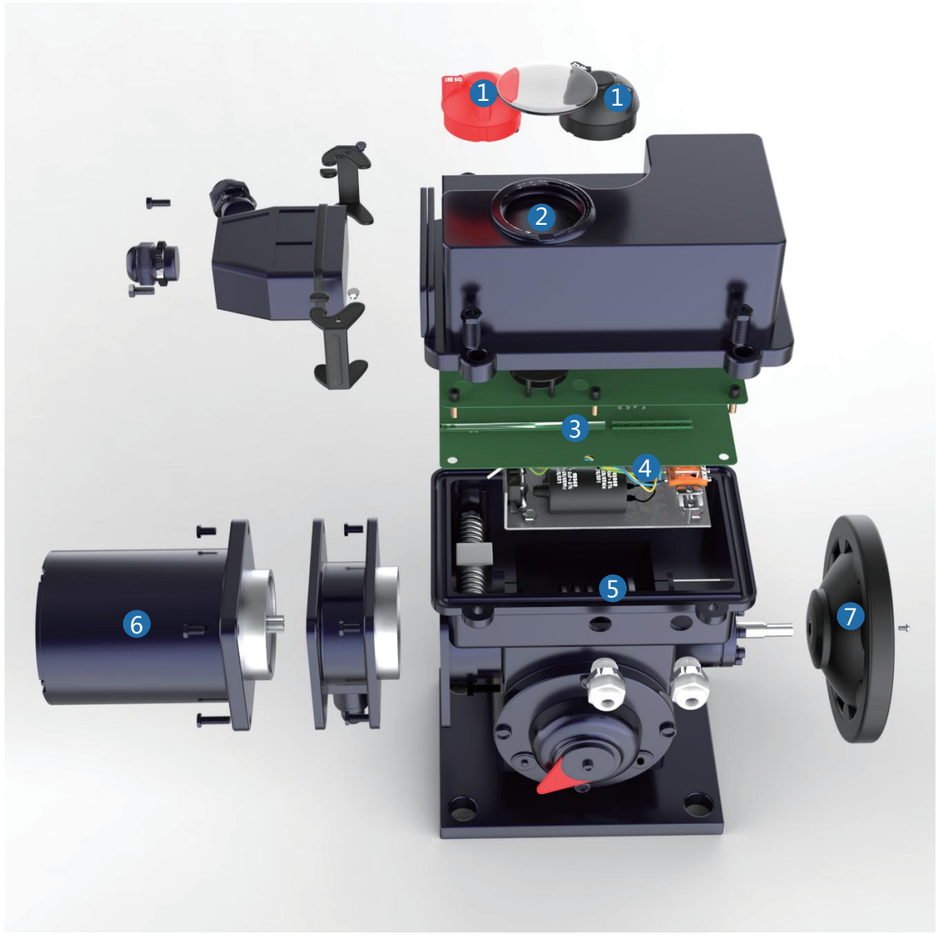
The LCD interface is designed in terms of the visual and operational habits of users and displays torque, valve opening, limit setting and failure alarm information in the form of text and graph.

03 [Over-torque protection function]

The product uses professionally designed torque measurement system so as to guarantee the overload protection of equipment. Users can set up the protection values for over-torque at closing and opening directions in terms of specific conditions. When the actual torque borne by the actuator reaches or exceeds the established protection value, the actuator will immediately stop the motor and emit failure alarm.

04 [System integration function]

Using few electronic components and avoiding complex wiring improves the reliability of electronic control of electric actuators.



05 [Absolute coding technology]

The absolute encoder replaces the stroke switch and automatically sets the stroke without a micro switch.

06 [Motor]

The motor used in the actuator is a special motor with high starting torque, low rotational inertia, small starting current, and good servo characteristics. The motor is allowed to start frequently, generally 1,200 times per hour.

07 [Manual operation]

The manual/electric reversion handle can be operated at any time safely. At the same time of pressing down the handle with proper force, turn the hand wheel slowly so as to drive the internal clutch. The clutch can be automatically segregated when the electric motor is power on and is locked up.

08 [Phase sequence protection]

By using phase synchronization technology, users needn't consider the phase sequence of three-phase altemating current when installing wire connection of actuator. It can guarantee the correct power supply phase sequence for three-phase electric motor and enable the actuator to operate correctively in terms of commands all the time during operation process.

09 Self-diagnosis and fault alarm

STANDARD SPECIFICATION

Protection grade	Standard IP67 Special IP68
Power supply	Three-phase AC380V---460V 50/60Hz Single-phase: AC110V-AC220V DC24V AC24V 50/60Hz
Duty cycle(on-off)	S2-15 minutes
Duty cycle(modulating)	S4, 25%
Control methods	Local control/DCS/FCS(Fieldbus Control System)
Motor protection	Overheating/Overload and short circuit/Instantaneous reverse/Electronic brake protection
Torque protection	Mechanical torque/Electronic torque protection
Jam protection	Build-in overheat protection
Travel angle	0-90°
Return difference	≤1%
Basic error limit	±1%
Dead zone setting	≤1%
Ambient temperature	Standard: -20～+60℃ Optional: -40～+70℃
Ambient humidity	95%RH max (Non-condensing)
External coating	High temperature paint
Explosion-proof grade	ExdI, ExdIb II BT4, ExdIb II CT4 (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 RTU, Profidbus DP, Hart, FF, DeviceNe(optional)
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 B: Fault signal C: Valve position signal (DC4-20mA, DC1-5V, DC0-10V) D: Remote control signal

OPTIONS AVAILABLE

Mechanical

Symbol	Description	Remark
EX	Explosion proof (Ex d II B T4)	Approved by ATEX
WT	Watertight (IP67), temporary submersible	
ALS	Auxiliary limit switches	
ATS	Auxiliary torque switches	
EXT	Extended travel angle	
SV	Variation in torque and operating speed	Please consult before ordering

Remote monitoring and control

PK	Potentiometer kit (output signal: 0 – 1 KΩ) High resolution potentiometer and precisely machined gearing are directly engaged with drive shaft to feedback Continuous position of valve
CT	Current transmitter (output signal: 4-20mA)
Signal Confguration	Remote position controller (input and output signal) Input: 4-20mA, 0-10VDC, 2-10VDC, 1-5VDC, 0-5VDC Output: 4-20mA Option: 0-10VDC, 2-10VDC, 1-5VDC, 0-5VDC Auto-calibration Reverse operating direction

MODEL COMPILATION METHOD

FRY□□/□□□□□

- Special functions
  - P: With local operation
  - Ex: Explosion-proof
  - T: Special requirements: ultra-high and low temperatures, working voltage, size, travel, etc.
- Control method
  - N: Intelligent type, 4-20mA input
  - C: Bus type
- Installation method
  - H: foot-plate mounted
  - Z: direct mounted
- Speed
  - Travel time
- It represents the actuator voltage
  - K: Single-phase 220V.AC 50Hz
  - F: Three-phase 380V.AC 50Hz
- It represents actuator output torque (digit x 10)
- Electric actuator models: for example; FRYOA FRYAS FRYBS FRYA+RS FRYB+RS, etc.
- FRY series electric actuator

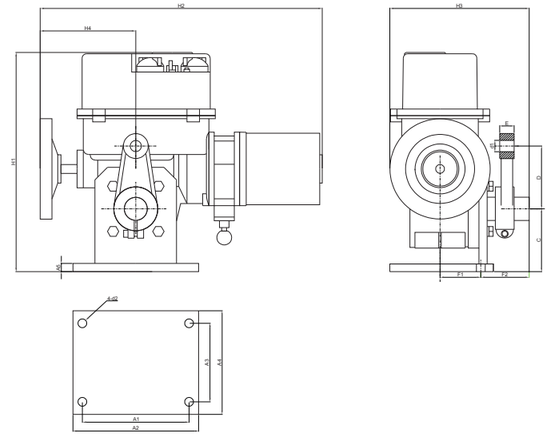
TECHNICAL PARAMETERS

B+RS quarter-turn electric actuator

Model	Output torque (Nm)	Travel time (s)	Direct mounted		Foot plate mounted	Motor data				Weight (KG)
			Flange	Shaft hole diameter (mm)	Spherical hinge model	Power supply	Rated power (KW)	Rated current (A)	Starting current (A)	
FRYOA-10	100	30	F07	φ20	SQJ-10	K/F	0.025	0.2	1	18
FRYOA-15	150	30	F07	φ20	SQJ-10	K/F	0.025	0.4	2	18
FRYAS-25	250	30	F10	φ28	SQJ-25	K/F	0.065	0.5	2.5	26
FRYBS-60	600	30	F14	φ35	SQJ-60	K/F	0.16	0.6	3	45
FRYA+RS100	1000	30	F12	φ45	SQJ-100	K/F	0.25	0.7	3.5	53
FRYB+RS160	1600	30	F14	φ60	SQJ-160	K/F	0.4	1.5	7.5	108
		40				K/F	0.25	0.7	3.5	
FRYB+RS250	2500	30	F16	φ70	SQJ-250	K/F	0.65	2.6	13	135
		40				K/F	0.4	1.1	5.5	
FRYB+RS400	4000	28	F16	φ70	SQJ-400	K/F	1	3.5	17.5	150
		40				K/F	0.65	2.6	13	
		65				K/F	0.4	1.1	5.5	
FRYB+RS600	6000	40	F16	φ75	SQJ-600	K/F	1	3.5	17.5	160
		65				K/F	0.65	2.6	13	
		105				K/F	0.4	1.1	5.5	
FRYB+RS800	8000	105	F25	φ75	SQJ-800	K/F	1	1.5	7.5	225
FRYB+RS1000	10000	130	F25	φ85	SQJ-1000	K/F				
FRYB+RS1200	12000	130	F25		SQJ-1200	K/F				
FRYB+RS1600	16000	130	F25	φ105	SQJ-1600	F	1.2	2.6	13	260
FRYB+RS2000	20000	150	F25	φ105	SQJ-2000	F				
FRYB+RS2600	26000	150	F25	φ105	SQJ-2600	F				
FRYB+RS3000	30000	150	F25	φ105	SQJ-3000	F				

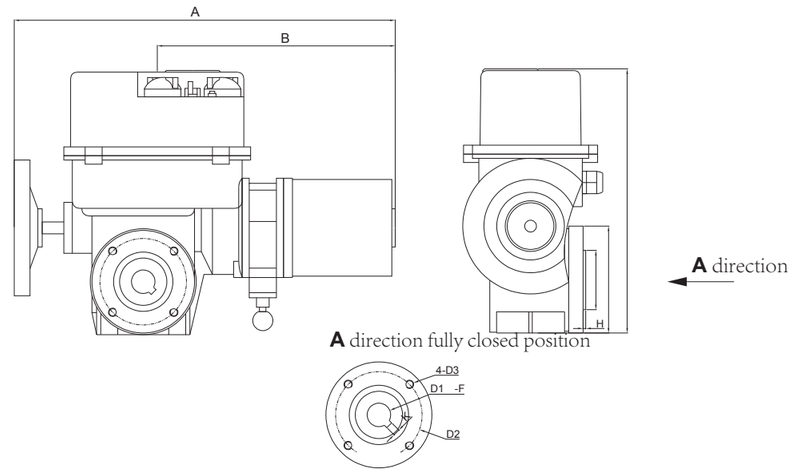
DIMENSIONS

AS-25, BS-60 foot-plate mounted electric actuator



Model	A1	A2	A3	A4	A5	C	D	E	F1	F2	H1	H2	H3	H4	d1	4-d2
FRYAS-25	170	200	125	165	14	100	100	22	79	69	351	495	248	211	18	4-φ14
FRYBS-60	240	280	150	180	18	134	160	25	89	64	430	581	262	228	20	4-φ17

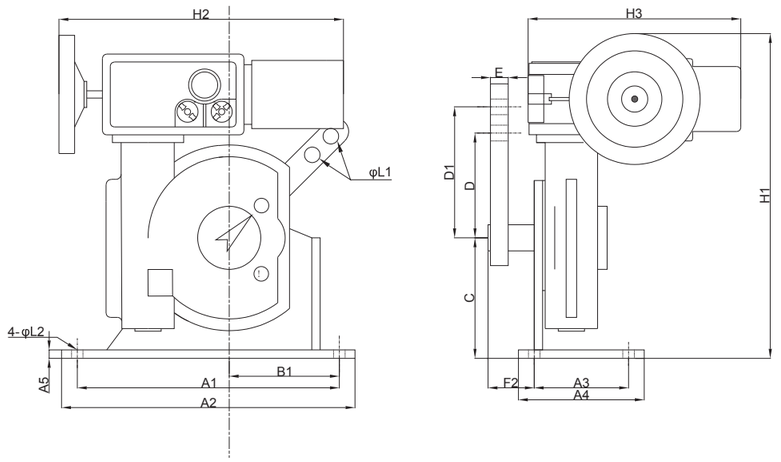
AS-25, BS-60 direct mounted electric actuator



Model	A	B	C	D1-F	D2	4-D3	K	D4	D5	H
FRYAS-25	493	284	325	φ28-Depth 40	102	4-M10	8	70	125	3
FRYBS-60	605	396	425	φ35-Depth 70	140	4-M16	10	100	210	4

CONNECTION DIMENSIONS

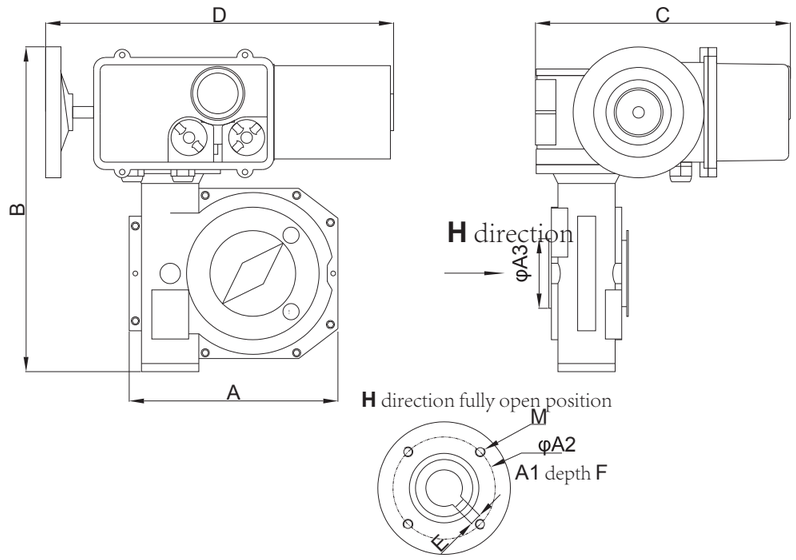
B+RS foot-plate mounted electric actuator



Model	A1	A2	A3	A4	A5	B1	C	D1/D	E	F2	H1	H2	H3	φL1	φL2
FRYA+RS100	240	280	150	190	12	120	170	200/250	28	68	450	510	380	20	17
FRYB+RS160	375	435	175	235	14	195	170	200/250	30	90	517	580	380	20	22
FRYB+RS250	500	560	180	240	16	210	230	200/250	34	88	602	600	380	30	22
FRYB+RS400	500	560	180	240	16	210	230	200/250	34	88	602	650	380	30	22
FRYB+RS600	480	540	260	320	16	200	267	350	36	128	700	650	380	36	22
FRYB+RS800	575	650	330	400	20	210	300	400	40	158	800	650	380	40	32
FRYB+RS1000	575	650	330	400	20	210	300	400	40	158	800	650	380	40	32
FRYB+RS1200	575	650	330	400	20	210	300	400	40	158	800	650	380	40	32
FRYB+RS1600	575	650	330	400	20	210	300	400	40	158	800	650	380	40	32
FRYB+RS2500	680	750	330	400	25	325	400	450	50	158	1230	650	380	50	32
FRYB+RS3000	820	900	370	450	25	360	425	500	50	140	1130	650	380	50	32

DIMENSIONS

B+RS direct mounted electric actuator



Model	Flange	A	B	C	D	E keyway	Depth F	φA1	φA2	φA3	M	φA4
FRYA+RS100	F12	265	408	275	520	14JS9	50	φ45E8	φ125	φ85	4XM12	160
FRYB+RS160	F14	290	372	361	612	18JS9	80	φ60E8	φ140	φ100	4XM16	175
FRYB+RS250	F16	395	491	361	612	20JS9	80	φ70E8	φ165	φ130	4XM20	250
FRYB+RS400	F16	440	491	361	612	20JS9	80	φ70E8	φ165	φ130	4XM20	250
FRYB+RS600	F16	340	750	360	600	20JS9	105	φ75E8	φ165	φ130	4XM20	200
FRYB+RS800	F25	395	750	400	600	20JS9	145	φ75E8	φ254	φ200	8XM16	300

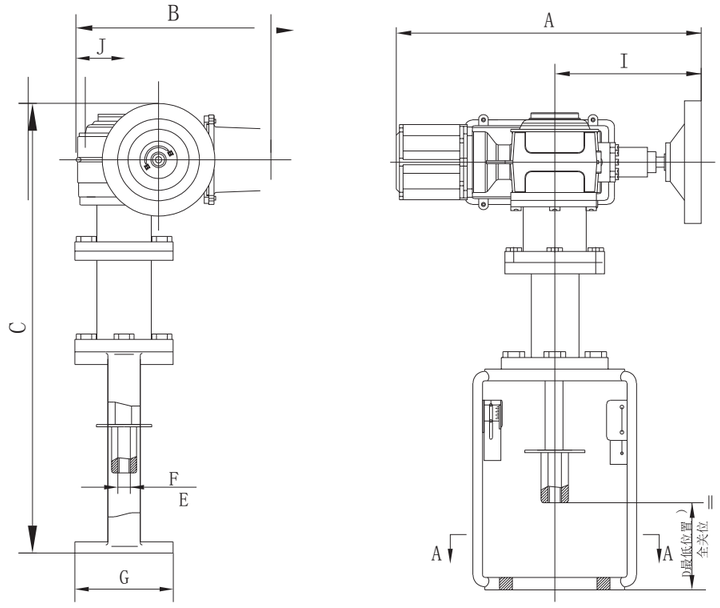
TECHNICAL PARAMETERS

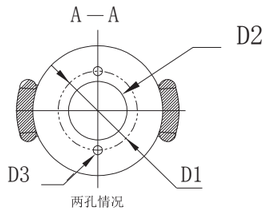
A+Z linear-turn electric actuator

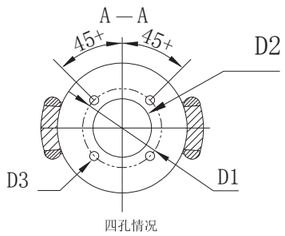
Model specifications	Rated thrust (N)	Rated travel (mm)	Rated speed (mm/s)	Motor data				
				Power supply	Rated power (KW)	Rated current (A)	Starting current (A)	Weight (Kg)
FRYA+Z30	3000	10	1.2	K/F	0.025	0.3	1.5	33
		16	1.2					
			1.8					
		25	1.2					
			1.8					
FRYA+Z40	4000	10	1.2	K/F	0.04	0.4	2	35
		16	1.2					
			1.8					
		25	1.2					
			1.8					
FRYA+Z64	6400	10	1.2	K/F	0.065	0.5	2.5	38
		16	1.2					
			1.8					
		25	1.2					
			1.8					
		40	1.2					
			1.8					
		60	1.2					
			1.8					
		100	1.2					
			1.8					
FRYA+Z100	10000	25	1.2	K/F	0.1	0.6	3	40
			1.8					
		40	1.2					
			1.8					
		60	1.2					
			1.8					
		100	1.2					
			1.8					
FRYA+Z160	16000	40	1.2	K/F	0.16	0.7	3.5	45
			1.8					
		60	1.2					
			1.8					
		100	1.2					
			1.8					
FRYA+Z250	25000	60	1.2	K/F	0.25	1.1	5.5	60
			1.8					
		100	1.2					
			1.8					

DIMENSIONS

A+Z linear-turn electric actuator







DIMENSIONS

A+Z linear-turn electric actuator

Model specifications	Rated thrust (N)	Rated travel (MM)	Dimensions and connection dimensions of linear-turn (unit mm)												
			A	B	C	D	D1	D2	D3	E	F	G	H	I	J
FRYA+Z30/K(F)1210	3000	10	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z30/K(F)1216	3000	16	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z30/K(F)1225	3000	25	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z40/K(F)1210	4000	10	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z40/K(F)1216	4000	16	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z40/K(F)1225	4000	25	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1210	6400	10	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1216	6400	16	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1816	6400	16	426	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1225	6400	25	420	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1825	6400	25	426	375	442	72	φ80	φ60	2-φ10	25	M8x1.25	φ110	18	174	62
FRYA+Z64/K(F)1240	6400	40	420	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z64/K(F)1840	6400	40	426	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z64/K(F)1260	6400	60	420	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	18	174	62
FRYA+Z64/K(F)1860	6400	60	426	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	18	174	62
FRYA+Z100/K(F)1225	10000	25	426	375	442	72	φ80	φ60	2-φ10	25	M12x1.25	φ110	18	174	62
FRYA+Z100/K(F)1825	10000	25	442	375	442	72	φ80	φ60	2-φ10	25	M12x1.25	φ110	18	174	62
FRYA+Z100/K(F)1240	10000	40	426	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z100/K(F)1840	10000	40	442	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z100/K(F)1260	10000	60	426	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	20	174	62
FRYA+Z100/K(F)1860	10000	60	442	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	20	174	62
FRYA+Z100/K(F)1200	10000	100	459	375	648	115	φ135	φ100	4-φ14	25	M12x1.25	φ170	22	174	62
FRYA+Z100/K(F)1800	10000	100	459	375	648	115	φ135	φ100	4-φ14	25	M12x1.25	φ170	22	174	62
FRYA+Z160/K(F)1240	16000	40	459	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z160/K(F)1840	16000	40	459	375	532	105	φ105	φ80	4-φ12	25	M12x1.25	φ140	18	174	62
FRYA+Z160/K(F)1260	16000	60	459	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	20	174	62
FRYA+Z160/K(F)1860	16000	60	459	375	560	115	φ118	φ95	4-φ12	25	M12x1.25	φ150	20	174	62
FRYA+Z160/K(F)1200	16000	100	459	375	648	115	φ135	φ100	4-φ14	25	M12x1.25	φ170	22	174	62
FRYA+Z160/K(F)1800	16000	100	459	375	648	115	φ135	φ100	4-φ14	25	M12x1.25	φ170	22	174	62
FRYA+Z250/K(F)1260	25000	60	484	375	538	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z250/K(F)1860	25000	60	484	375	538	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z250/K(F)1200	25000	100	484	375	538	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106
FRYA+Z250/K(F)1800	25000	100	484	375	538	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106
FRYA+Z400/K(F)1260	40000	60	517	375	570	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z400/K(F)1860	40000	60	517	375	570	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z400/K(F)1200	40000	100	517	375	570	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106
FRYA+Z400/K(F)1800	40000	100	517	375	570	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106
FRYA+Z640/K(F)1260	64000	60	532	375	570	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z640/K(F)1860	64000	60	532	375	570	115	φ118	φ95	4-φ14	35	M12x1.25	φ150	20	210	106
FRYA+Z640/K(F)1200	64000	100	532	375	570	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106
FRYA+Z640/K(F)1800	64000	100	532	375	570	115	φ135	φ100	4-φ18	35	M12x1.25	φ170	22	210	106

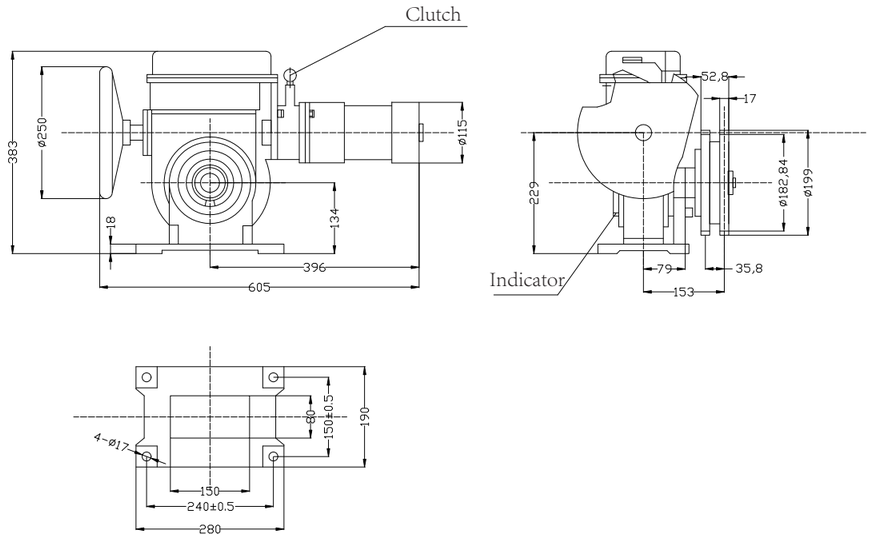
TECHNICAL PARAMETERS

SKD multi-turn electric actuator

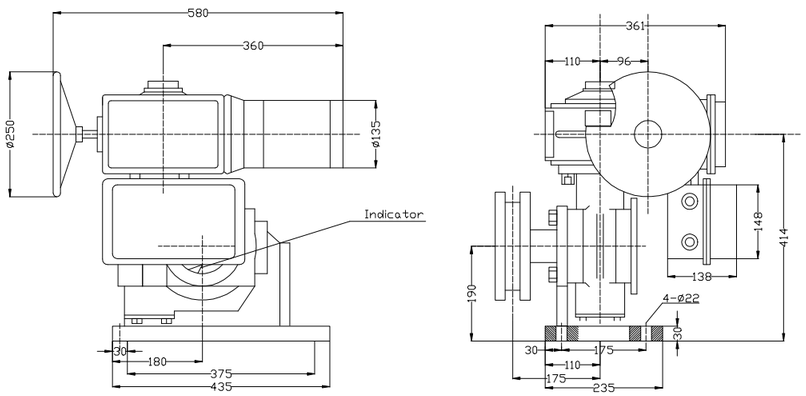
Model	Output torque (Nm)	Output angle	Output speed (r/min)	Number of effective coils (r)	Motor data				Weight (Kg)
					Power supply	Rated power (KW)	Rated current (A)	Starting current (A)	
FRYSKD-120	1200	540°-2520°	0.6	1.5-7	K/F	0.25	1.1	5.5	100
FRYSKD-160	1600	540°-2520°	0.6	1.5-7	K/F	0.25	1.1	5.5	105
FRYSKD-250	2500	720°-1800°	0.5	2-5	K/F	0.4	1.5	7.5	102
FRYSKD-400	4000	720°-1800°	0.5	2-5	K/F	0.65	2.6	13	178
FRYSKD-600	6000	540°-1440°	0.4	1.5-4	K/F	0.65	2.6	13	186
FRYSKD-800	8000	540°-1440°	0.4	1.5-4	K/F	0.65	2.6	13	186
FRYSKD-1000	10000	540°-1440°	0.5	2-4	K/F	1	3.8	20	280
FRYSKD-1200	12000	720°-1440°	0.5	2-4	K/F	1.5	4	20	300
FRYSKD-1600	16000	720°-1440°	0.5	2-4	K/F	1.5	4	20	300

DIMENSIONS

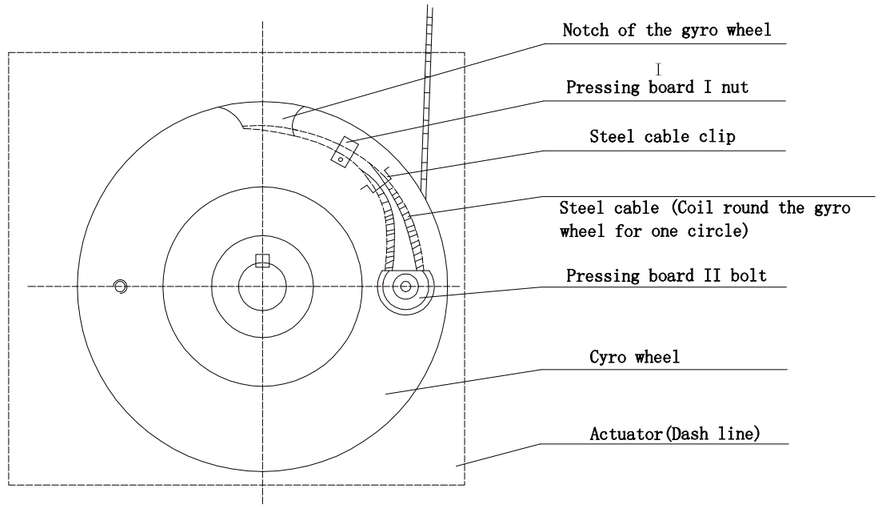
SKD60/F336 electric actuator dimensions



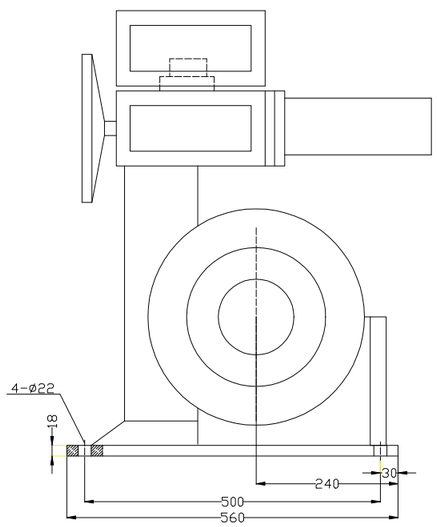
SKD120/F06 SKD120/F12 electric actuator dimensions



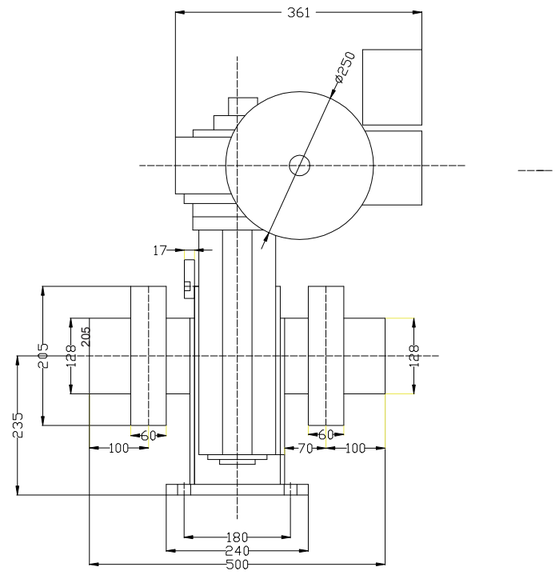
The steel cable intallation drawing



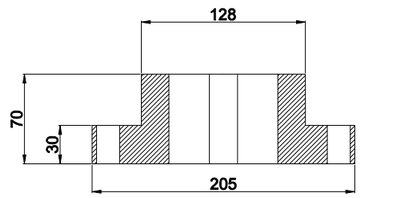
SKD-250/FDZ electric actuator dimensions

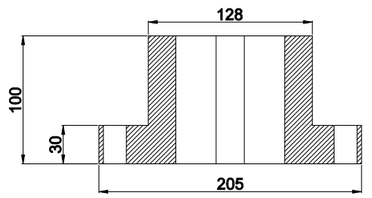


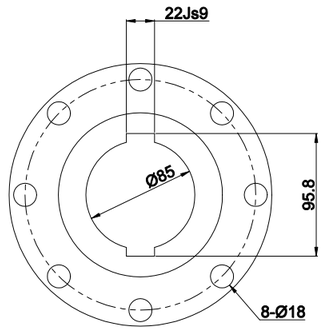
Actuator body coupling

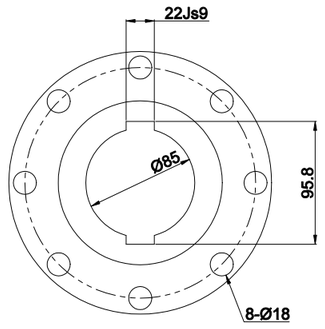


Actuator external coupling

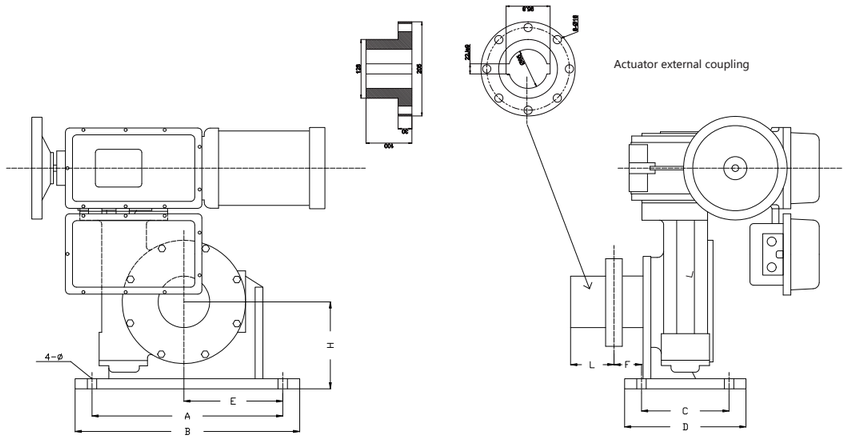




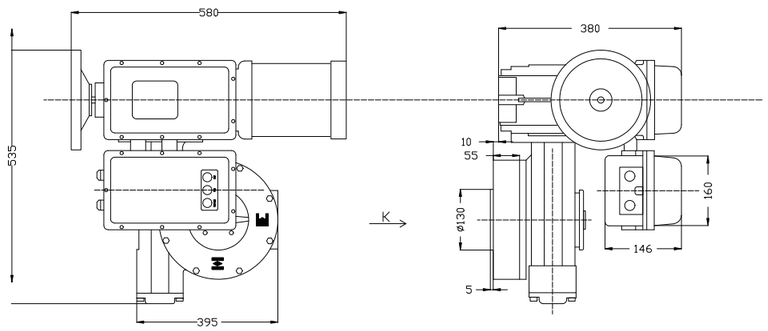




SKD250/FYZ~SKD1200/FTY electric actuator dimensions



SKD250/FYZ electric actuator dimensions



Model	A	B	C	D	E	F	L	H	4-φ
FRYSKD250FYT	500	560	180	240	240	70	100	235	22
FRYSKD400FYT	500	560	180	240	240	70	100	235	22
FRYSKD600FYT	500	560	180	240	240	70	100	235	22
FRYSKD800FYT	500	560	180	240	240	70	100	235	22
FRYSKD1000FYT	500	560	180	240	240	70	100	235	22
FRYSKD1200FYT	500	560	180	240	240	70	100	235	22

WIRING DIAGRAM