

GREATORK YKM/YKTM YK/YKT

Intelligent Electro-hydraulic Actuator

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TO SET UP AN INTERNATIONAL BASE OF
ACTUATOR MANUFACTURING.

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ABOUT US

Tefulong Group Co., Ltd.(Director of China Valve Association) is one of the largest intelligent electric actuator and electro-hydraulic actuator manufacturer in China with the brand name of GREATORK.

Tefulong Group Co., Ltd. established in 1987, covers an area of 40,000 square meters, and owns modern management style, first-class factory and advanced facilities. With more than 300 employees, Tefulong produces about 20,000pcs valve actuators per year. At present, actuators have been supplied into more than 20 countries of the world.

We have obtained many certificates for international market. We have approved by ISO14001, ISO9001, OHSAS18001 for company and CE, ATEX(Explosion proof), IP68(Submersible depth: 15m Duration 90 hours), GOST, Lloyd's Register of Shipping, Profibus certificate, etc. for products. OEM or ODM is acceptable for us.

Intelligent Electro-Hydraulic actuator is developed on the basic of advanced hydraulic actuator technology and intelligent control technology, suitable for applications like big thrust, fast response, high control accuracy and short delay.

We have a team of qualified, experienced and talented researchers & engineers from a wide variety of backgrounds in R&D centre. We are committed to keep efforts to ensure that our actuators are the simplest to operate and the highest reliable to work with.

Our mission is to provide the industry with high-quality and cost-effective electric actuators and maximize customer's value. We persist on continuous improvement and product innovation to keep our competitiveness.



ABOUT VISION

As valve & actuator industry is getting more and more complex, Tefulong Group will continue to design and manufacture more robust and reliable actuators.

Our Goal: To be the leader in world Intelligent Valve Actuator industry



Linear or Quarter Turn Electro-Hydraulic Actuator

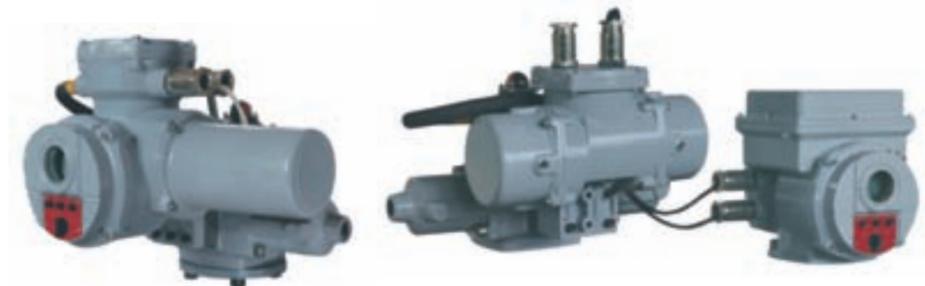
YK Linear Series

Actuator works in vertical or horizontal way which is suitable for gate valve, throughway valve, etc., thrust from 6KN to 600KN. It has integrated or separated type in structure, On-Off and Modulating type in control mode. On-Off is for simple open-close, and Modulating is for flow control and valve position adjustment.



YKT Series Quarter Turn Actuator

YKT series with 60Nm-120KNm output is suitable for quarter turn valves like ball valve, butterfly valve, plug valve and so on. It has integrated or separated type in structure, On-Off and Modulating type in control mode. On-Off is for simple open-close, and Modulating is for flow control and valve position adjustment.



Intelligent Electro-Hydraulic Actuator Feature



- ❑ Output torque (60Nm~120KNm) and thrust (6KN~600KN)
- ❑ Fast response speed(5Hz), high control accuracy(<0.1% of full stroke)
- ❑ Adopt advanced servo controller and servo motor
- ❑ Adopt advanced hydraulic pump
- ❑ Adopt screw rotary cylinder which is with small size and high torque feature
- ❑ Non-intrusive design, infrared setting and configuration
- ❑ Friendly Human Machine Interface, which can display position, pressure, diagnosis and error
- ❑ Detailed data and log function
- ❑ Relief valve and pressure sensor can provide over pressure double protection
- ❑ Open/close valve within 1 second when failure
- ❑ Open/close/stay put when power failure
- ❑ Zero leakage, less maintenance, high reliability



YKM Series Modulating Type Linear Actuator Parameter

Voltage: 220VAC, 380VAC, 440VAC
 .Frequency: 50Hz, 60Hz
 Temperature: -20°C~70°C (option for -45°C~70°C)
 Hydraulic oil: Standard, 10 cst hydraulic oil (option for low temperature: 20 cst silicone oil)
 Stroke length: 0~500mm
 Stroke speed: 0.8mm/s~50mm/s
 Dead band: can be adjusted from 0.05% to 5.0%
 Position accuracy: < 0.1% of full stroke
 Linearity: < 0.1% of full stroke
 Response frequency: 5Hz
 Repeat accuracy: 0.1%
 Life: Full stroke for 1 million times
 Noise: <75dB(A class sound level)
 Control mode: 4-20mA analog quantity
 Feedback: Dry contact and analog quantity
 Structure: Integrated (Option for separated structure)
 Enclosure Protection: IP67 IP68
 Explosion proof class: EExdIIBT4 EExdIICT4
 Function safety approval: SIL2

YK Series On-Off Type Linear Actuator Parameter

Voltage: 220VAC, 380VAC, 440VAC
 .Frequency: 50Hz, 60Hz
 Temperature: -20°C~70°C (option for -45°C~70°C)
 Hydraulic oil: Standard, 10 cst hydraulic oil (option for low temperature: 20 cst silicone oil)
 Stroke length: 0~500mm
 Stroke speed: 0.8mm/s~50mm/s
 Response frequency: 5Hz
 Life: full stroke for 0.5 million times
 Noise: <75dB(A class sound level)
 Control mode: switching value 24~220VDC or 24~220VAC
 Feedback: Dry contact
 Structure: Integrated (Option for separated structure)
 Enclosure Protection: IP67 IP68
 Explosion proof class: EExdIIBT4 EExdIICT4
 Function safety approval: SIL2

YKTM Series Modulating Type Quarter Turn Actuator Parameter

Voltage: 220VAC, 380VAC, 440VAC
 Frequency: 50Hz, 60Hz
 Temperature: -20°C~70°C (option for -45°C~70°C)
 Hydraulic oil: Standard, 10 cst hydraulic oil (option for low temperature: 20 cst silicone oil)
 Stroke speed (90°full stroke time) : 0.55s~180s
 Dead band: can be adjusted from 0.05% to 5.0%
 Position accuracy: < 0.1% of full stroke
 Linearity: < 0.1% of full stroke
 Response frequency: 5Hz
 Repeat accuracy : 0.1%
 Life: Full stroke for 1 million times
 Noise: <75dB(A class sound level)
 Control mode: 4-20mA analog quantity
 Feedback: Dry contact and analog quantity
 Structure: Integrated (Option for separated structure)
 Enclosure Protection: IP67 IP68
 Explosion proof class: EExdIIBT4 EExdIICT4
 Function safety approval: SIL2

YKT Series On-Off Type Quarter Turn Actuator Parameter

Voltage: 220VAC, 380VAC, 440VAC
 Frequency: 50Hz, 60Hz
 Temperature: -20°C~70°C (optional for -45°C~70°C)
 hydraulic oil: Standard: 10 cst hydraulic oil (option for low temperature: 20 cst silicone oil)
 Stroke speed (90°full stroke time) : 0.55s~180s
 Position accuracy: < 0.1% of full stroke
 Response frequency: 5Hz
 Life: Full stroke for 0.5 million times
 Noise: <75dB(A class sound level)
 Control mode: switching value 24~220VDC or 24~220VAC
 Feedback: Dry contact
 Structure: Integrated (Option for separated structure)
 Water tight: IP67 IP68
 Explosion proof class: EExdIIBT4 EExdIICT4
 Function safety approval: SIL2

Note: Both On-Off type and modulating type can add Fieldbus function.



Intelligent Electro-Hydraulic Actuator Functions

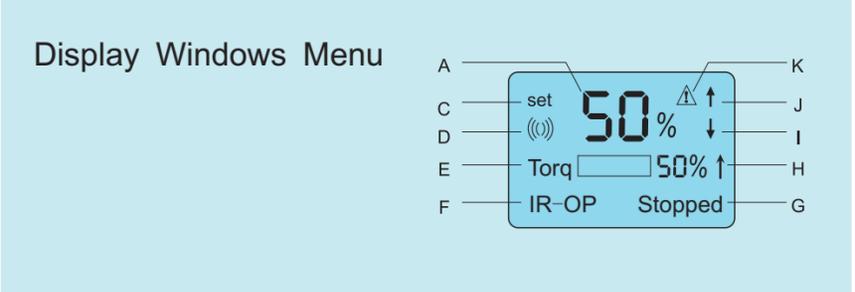
Non-Intrusive Design

The actuator adopt non-intrusive design, all commission can be accomplished by an infrared setting tool without removing any cover. Consequently, the internal electrical control parts can be protected from the site pollution, to ensure a stable and reliable operation of electronic components. The design of local control button discards traditional moving shafts penetrating the control enclosure, and adopts hall magnetic sensor technology, to make the product more reliable and durable.



Display Window

GREATORK actuator adopts advanced high-brightness dot-matrix LCD display window, which can display clear and intuitive Chinese or English menu. User can easily set various parameters by text display window without reading manual. When actuator fails, user can understand failure reason and possible solution by checking detailed diagnose menu.



A	Valve position indication	G	Status indication
C	Setting status indication	H	Panel Set indication
D	Communication indication	I	Valve close indication
E	Torque indication	J	Valve open indication
F	Command indication	K	Alarm indication



Manual Pump

Bi-directional manual pump can get the special power source, through changing hydraulic oil into pressure oil by the action of plunger, it has distinctive features of high efficiency, stable performance, safe and reliable.



Control Panel Introduction

Status select switch: User can select **LOCAL/STOP/REMOTE** status by the switch.

Local control button: User can OPEN/CLOSE/STOP valve by these buttons.



Valve Position Detection

Linear actuator adopts high accuracy, long life, and high resolution linear position sensor which with 0.05% linearity and high accuracy($\leq 0.1\%$), while quarter-turn actuator adopts 12-bit absolute encoder. Moreover, for YK series electro-hydraulic actuator, advanced 24-bit optical absolute encoder can be optional.



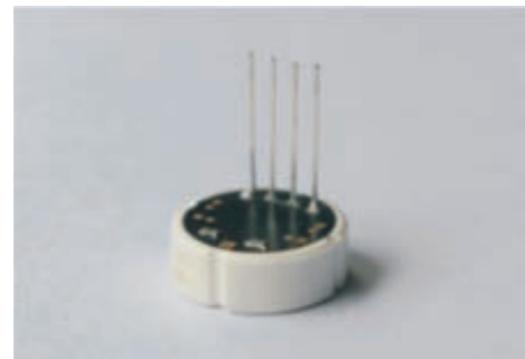
Advanced Servo Control System

Servo control system includes servo controller and servo motor, which has the characteristics of wide speed adjust scope, high positioning accuracy, quick-response, non-overshoot, low noise and high reliability. The speed regulating function of servo control system changes the flow of pump to realize adjustable speed.



Hydraulic Control Valve and Gear Pump

Gear pump, hydraulic control valve and power module mating system are used for the flow regulation and direction control of the entire system. System flow is not only to be controlled by pump flow, but also controlled by the open degree of flow matching valve spool. Hydraulic control valve is special designed by GREATORK. It is composed of valve body, floating spool, modular sealing material seat, spring, and plunger piston. Spool and valve seat is plane touched, cone-oriented, double-sealed, and no sliding fit requirements among the spool, valve body and valve seat. It has the features of bi-directional protection, good latching performance, easy processing, light weight, and small size. Gear pump adopts advanced bi-directional gear pump, which has high and stable pressure, high efficiency, low noise characteristics.



Ceramic Pressure Sensor

With ceramic pressure sensor, actuator can real-time precisely monitor the pressure of hydraulic cylinder. The system can get double over pressure protection by relief valve and pressure sensor.

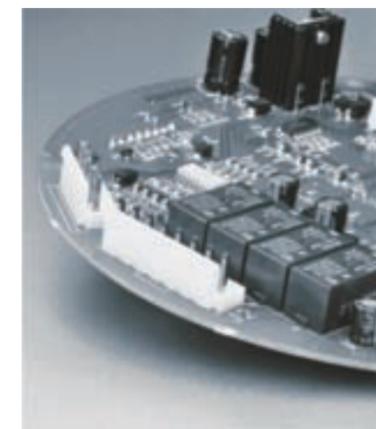
Energy accumulation module

The piston-type accumulator improves performance of hydraulic system. It can store pressure energy, absorb hydraulic impact, eliminate pump pulse and flow fluctuation. The accumulator is simple & compact structure, reliable, high efficiency and long service life. Accumulator technology uses power module to charge energy, so there is no need for separate stamping pump and relating piping.

Correspondence between quarter-turn actuator and accumulator

Item	Rated torque Nm	Min open time (S)	Accumulator volume (L)
1	700	2	2.5
2	1600	4	2.5
3	3000	8	6.3
4	5000	14	10.0
5	9000	23	20.0
6	17000	44	32.0

Note: When need linear electro-hydraulic actuator with accumulator, please contact us.



Indication and Monitoring Contacts

GREATORK Actuator has 4 sets (can be extended to 8) of indication contacts with dry contact output. (Nominal capacity is 5 A 250VAC or 5 A 30VDC). Every set of indication contacts can be set as normal open and normal close according to user's requirement. The user can select 29 kinds of the trigger conditions including full open, full close and protection alarm etc. All the functions of indication contacts can be set easily via setting tools. Apart from the 4 sets of indication contacts, actuator also has a monitoring contact which can indicate the effectiveness of actuator electrical devices. (Nominal capacity is 8 A 250VAC or 8 A 30VDC). The monitoring contacts can be triggered at any of the following conditions: Local/stop, motor over temperature, lost phase, stall, locked rotor, CPU over temperature, over torque, 24V control voltage error, torque sensor error and position error.

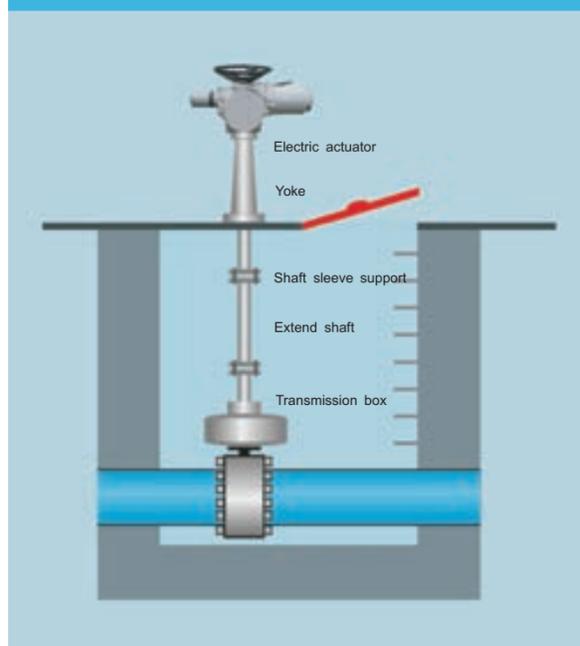
Intelligent Electro-Hydraulic actuator installation

When pipe line is under ground, GREATORK actuator can be separated installed, please find picture below, it has no need of extend shaft, separate the control box and driving part, helpful to save space, simplify installation procedure, reduce installation cost and time.

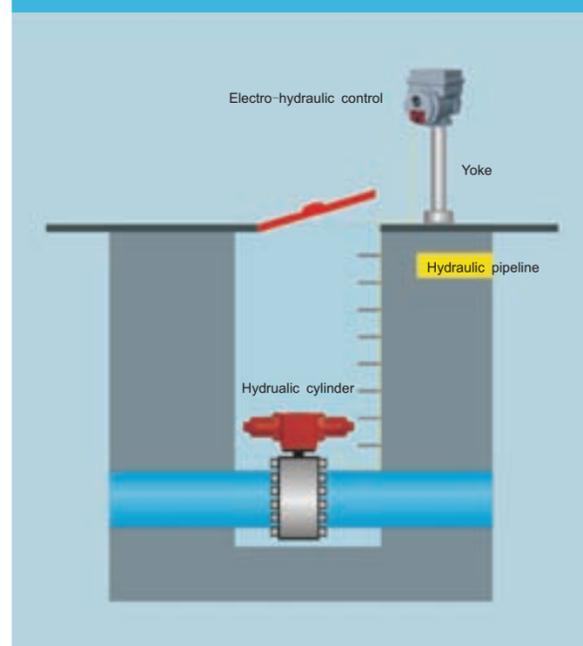
Installation advantage

- No need of gearbox
- No need of extend shaft
- No need of shaft sleeve support
- Easy for position change or upgrade
- Reduce valve chamber space

Electric actuator installation type

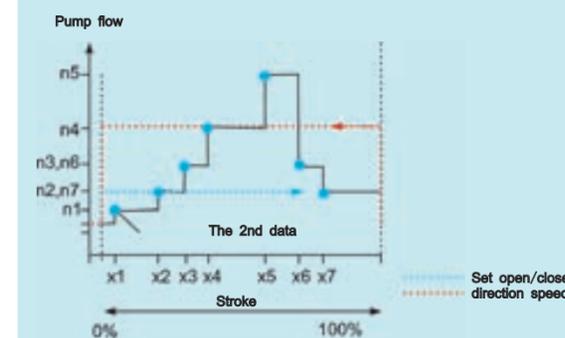


Electro-Hydraulic actuator installation type

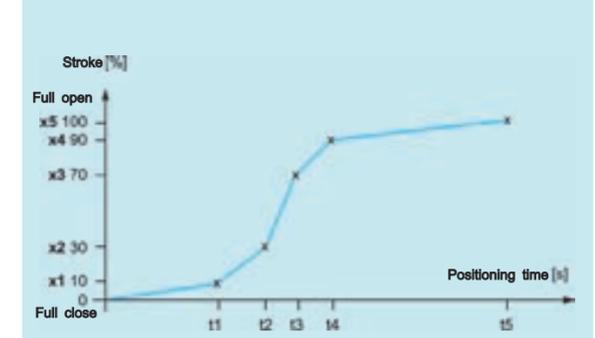


Features of Intelligent Electro-Hydraulic Actuator

Speed Curve



Adjustable Positioning Time



Speed Curve

User can insert many speed points in full stroke, to form speed characteristic curve. Stroke / speed insert point either can be set by local buttons, or infra-red setting tool, or set by the YK-Monitor software. Interval "stroke/speed" insert point enable valve move running more smoothly.

Adjustable Positioning Time

For large flow rate fluid, gas or loose material control loop, only the system with special valve and actuator can realize good flow control, GREATORK Electro-Hydraulic integrated actuator optimizes flow control by function of adjust speed in various stroke zone throughout full stroke.

Perfect Protection Function

- Temperature protection
- Phase Lost protection
- Stall protection
- Locked rotor protection
- CPU overtemperature protection
- Pressure protection
- Intelligent valve jammed protection
- Valve error protection

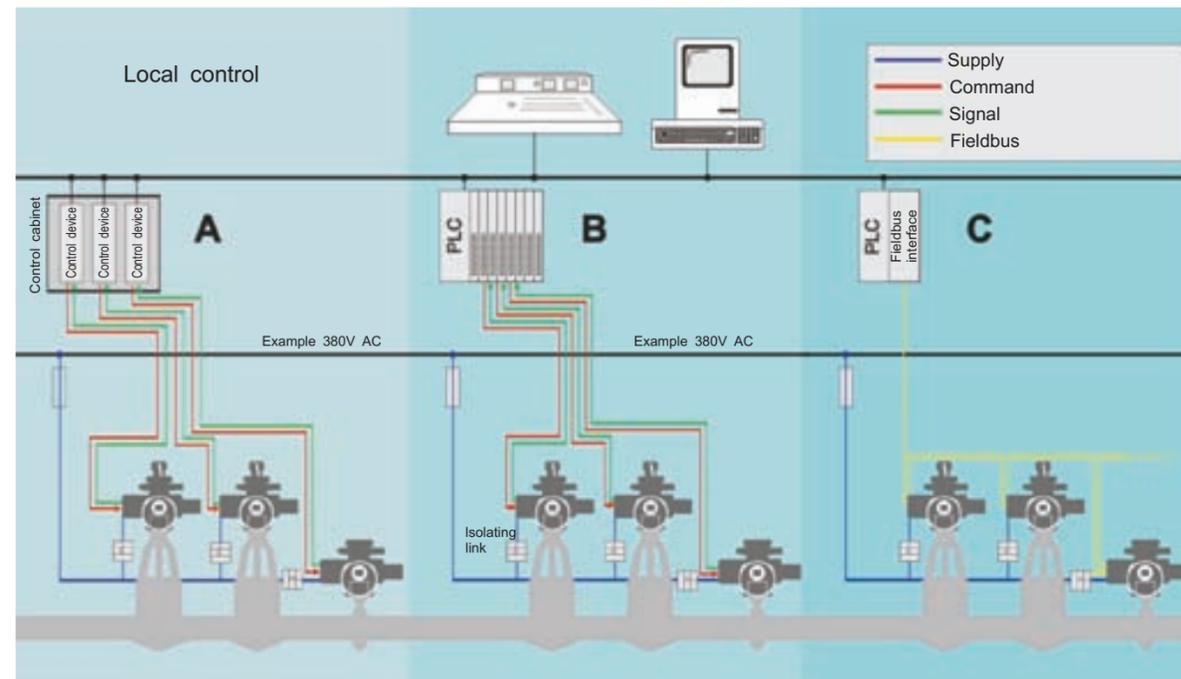
Application:

The main application is to prevent "water hammer" effect. When a sudden power cut or pump stops working, there will be water hammer in oil or water pipe, or gap pipe. Considerable impact will produce enormous damage on the valves and pumps system. Our controller makes the valves operate with different speed in different stroke zone to reduce the impact of water hammer.

Benefits:

- a. The valve runs to the required position within set time.
- b. Parameter values use familiar units (percentage), no need of conversion, convenient and intuitive.
- c. Can get very low speed.

Control Unit



A External switch value control

- (1) Remote open, close, stop control.
- (2) Control signal can be internal 24VDC, or external 24VDC ~ 220VDC or external 24VAC to 220VAC.
- (3) Feedback signal uses dry contact, 4 to 8 power lost maintain relays and a monitoring relay. Analog feedback signal is optional.

B Analog control

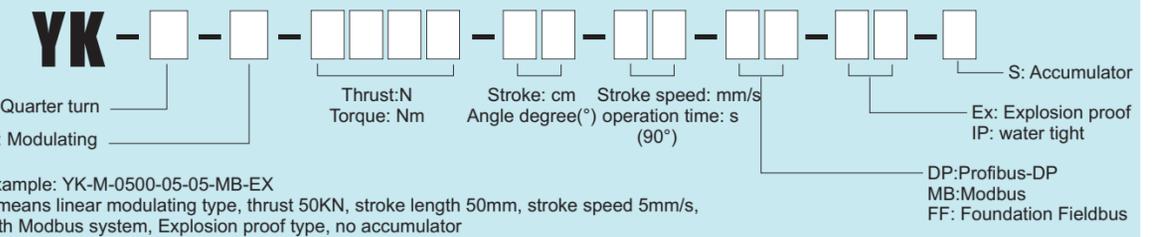
The valve can be automatically positioned proportionally according a simulated current or voltage signal. Controller convert proportional signal into valve position signal, compare with the current valve position, and drive actuators according to the difference between the valve position signal and the current valve position.



C Fieldbus control (optional)

Electro-Hydraulic actuator uses bus communication technology, can reduce installation costs. All actuator commands & signals (control side) input and output of main control unit transmit through 2-wire cable or optical fiber, no need of output / input board and joint control cabinet ,it will help to save space. Available bus protocol for Electro-hydraulic actuator is Modbus, Profibus and Foundation Fieldbus.

Model System



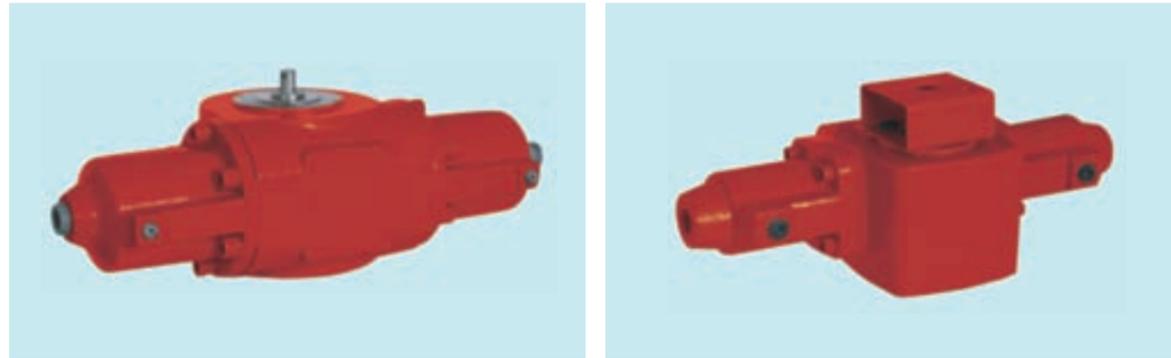
Linear Oil Cylinder Linear actuator technical parameter



Thrust (kN)	Stroke Speed			
	Module A (Rated speed mm/s)	Module B (Rated speed mm/s)	Module C (Rated speed mm/s)	Module D (Rated speed mm/s)
6	12	39	112	163
10	10	28	77	126
14	6	17	50	75
21	4	11	32	48
50	1.5	4	12	18
65	NO	2.5	5	10
90	NO	1.5	3	6
130	NO	1	2	4
180	NO	NO	1.8	3.6
230	NO	NO	NO	2.5
280	NO	NO	NO	2.2
350	NO	NO	NO	1.8
400	NO	NO	NO	1.6

Note: Linear standard stroke range (20mm, 50mm, 100mm, 150mm, 200mm, 280mm, 400mm, 560mm) , other special stroke or over 400KN thrust can be made under user's requirement, please contact us.

Quarter Turn Oil Cylinder



Quarter-turn actuator technical parameter

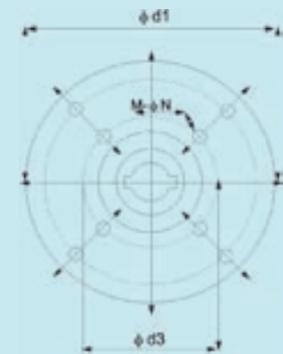
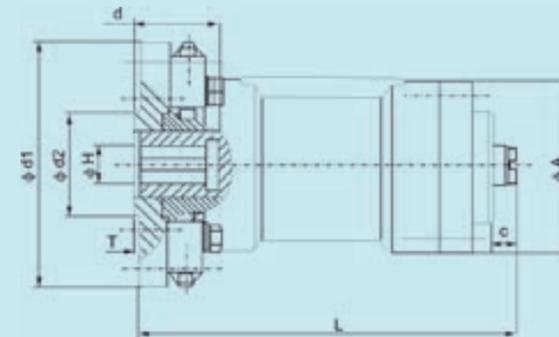
Output Torque (N.m)	Stroke Speed			
	A module (Operation time s)	B module (Operation time s)	C module (Operation time s)	D module (Operation time s)
60	1.8	NO	NO	NO
100	3	NO	NO	NO
300	9	1.5	NO	NO
500	12	3	NO	NO
800	15	5	1.8	NO
1400	26	9.5	3	NO
2500	47	16	5.5	NO
4400	NO	28	9.5	6.5
8300	NO	54	18	12
14500	NO	94	31	20.8
20500	NO	NO	43.5	29
29000	NO	NO	63	42
40000	NO	NO	87	57.5
50000	NO	NO	105	72

Note: A,B,C,D module is with different combination of motor, Electro-Hydraulic control system. When torque higher than 50KNm, please contact us.

Mechanical Dimension

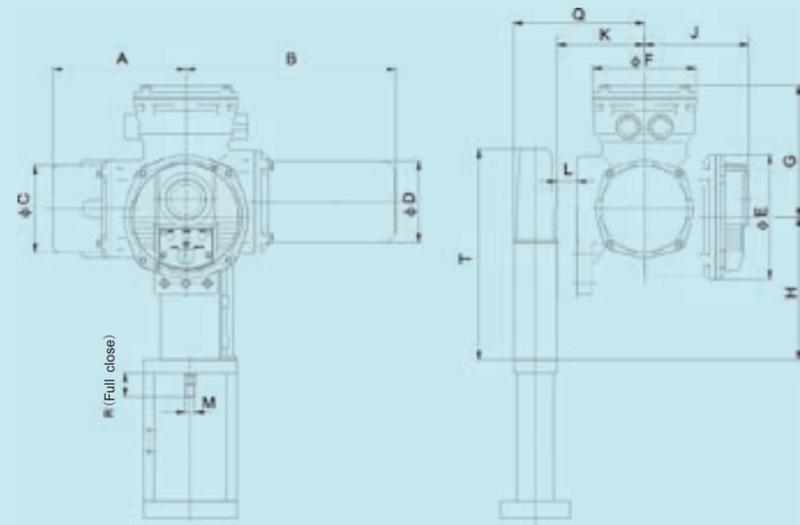
Screw Swinging Cylinder (Quarter Turn) Outline And Installation Dimensions

- Advantages: The world's latest double helix technology
- Working oil pressure: maximum 210Bar
- Rotation angle: 90 °
- Connection standard: ISO 5211
- Operating mode: double acting, single acting
- Output torque: 100 ~ 120KNm

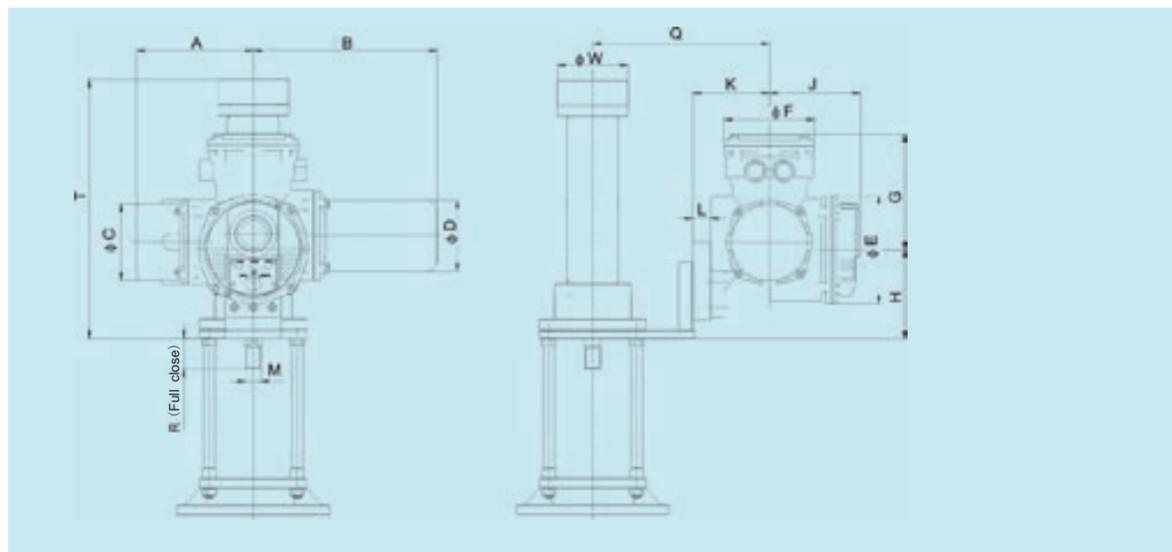


Model	1	2	3	4	5	6	7	8	9	10
Output torque(Nm)	400	850	1500	2500	5000	7000	10000	16000	22000	32000
Weight(kg)	10	16	25	32	85	116	150	205	354	552
A (mm)	100	115	150	160	180	200	230	250	265	320
L (mm)	202	218	251	260	317	366	433	460	501	288
J (mm)	10	10	10	10	10	10	10	10	10	10
D1 (mm)	125	125	150	175	210	210	300	350	350	415
D2 (mm)	70	70	85	100	130	130	200	230	230	260
D3 (mm)	102	102	125	140	165	165	254	298	298	356
M (mm)	4	4	4	4	4	4	8	8	8	8
N (mm)	10	10	12	16	20	20	16	20	20	20
T (mm)	3	3	4	4	5	5	6	6	8	8
H-MAX (mm)	25	30	35	42	60	72	85	95	100	120
Hd (mm)	45	45	60	75	90	90	120	120	150	150

Linear Electro-Hydraulic Control System Outline And Mounting Dimension



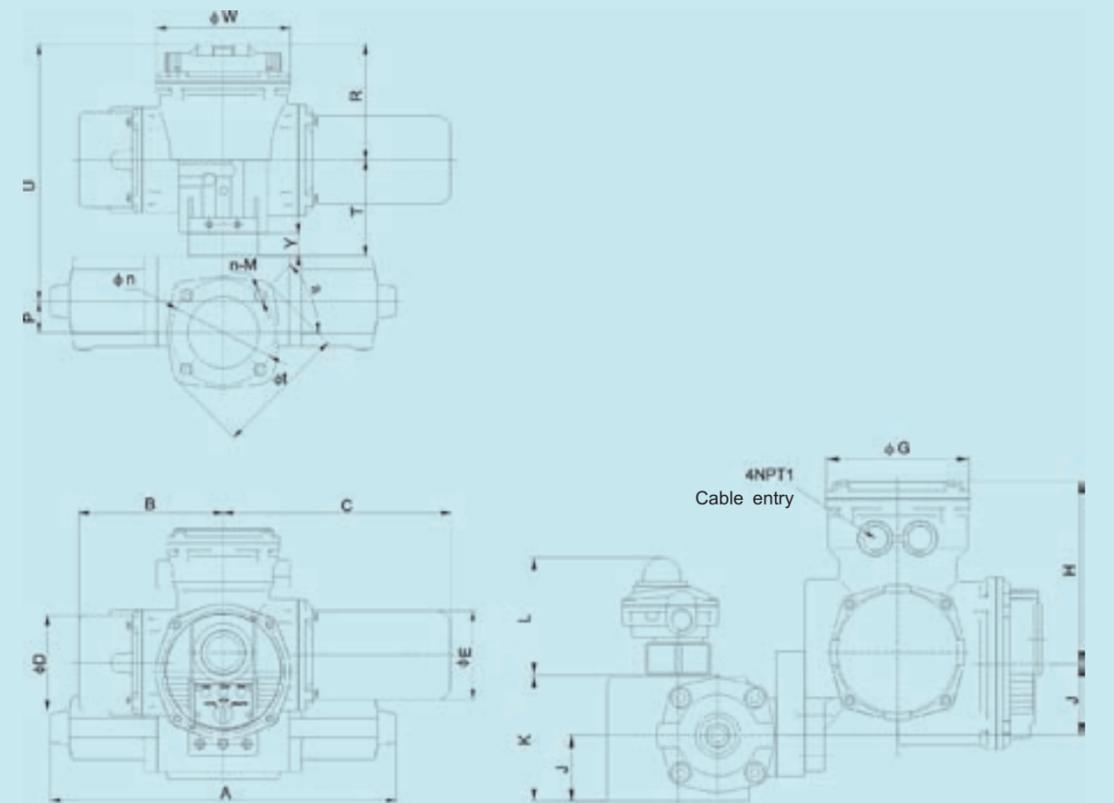
Item	A	B	C	D	E	F	G	H	J	K	L	R	T	Q	M
1	228	360	150	140	212	177	225	216	182	150	35	34	310	216	M12x1.25
2	228	360	150	140	212	177	225	244	182	150	35	41	360	225	M16x1.5
3	228	360	150	140	212	177	225	262	182	150	35	54	404	234	M20x1.5



Item	A	B	C	D	E	F	G	H	J	K	L	W	R	T	M
4	228	360	150	140	212	177	225	174	182	150	35	118	65	212+	M24x2
5	228	360	150	140	212	177	225	174	182	150	35	138	60	232+	M30x2
6	228	360	150	140	212	177	225	174	182	150	35	166	104	255+	M48x2

Note: The item marked with "+" should add stroke length on the original dimension

Quarter Turn Electro-Hydraulic Control System Outline And Mounting Dimension



Item	A	B	C	D	E	F	G	H	J	K	L	W	R	T	Y	U	P	I	N	^a	n-M
1	398	228	360	150	140	177	88	225	63	112	145	212	182	150	35	380	33	150	125	45°	4-M12
2	472	228	360	150	140	177	88	225	77	138	145	212	182	150	35	392	41	175	140	45°	4-M16
3	546	228	360	150	140	177	88	225	93	166	145	212	182	150	35	404	49	210	165	45°	4-M20
4	622	228	360	150	140	177	88	225	105	200	145	212	182	150	35	417	56	210	165	45°	4-M20
5	830	228	360	150	140	177	88	225	129	248	145	212	182	150	35	439	61	300	254	22.5°	8-M16
6	1088	228	360	150	140	177	88	225	150	285	145	212	182	150	35	454	91	350	298	22.5°	8-M20
7	1500	228	360	150	140	177	88	225	210	350	145	212	182	150	35	480	110	415	356	22.5°	8-M30