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**CRANE[®] INTELLIGENT
ELECTRIC ACTUATOR**
SERIES CKD

CRANE[®]

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CKD Series Electric Actuators

Intelligent products with world-class quality, advanced technology and powerful functionality. Included is improved SOC technology, large screen LCD displays, digital sensing, automatic follow-up controls, and Fieldbus diagnostics. These devices are placed in double-sealed waterproof shells with the highest grade of protection, IP68. Electronic spacing, electronic limiting torque, and other technologies are adopted to ensure the accuracy of valve operation. The magnetic switch and infrared/ Bluetooth remote control technology allow the user to operate without opening the electric cabinet, thereby ensuring safe use in high-risk environments. The phase synchronization technology is adopted to ensure the safe and convenient installation and connection of the actuator, without considering the phase sequence. With multiple control modes such as bus mastering, analog continuous regulation control, and switch (pulse) quantity control, the actuators can be applied in simple position control occasions. The CKD series electric actuators are also explosion-proof products. With a wide range of specifications and broader suitability of control modes, we can provide customers with a complete set of actuators with optimized configuration according to different requirements in the control system.



Features and Benefits

Convenient Remote Parameter Setting Function

Before putting into use, as long as the special infrared setter is aligned with the actuator, the user can work parameter settings, parameter inspection, and status query without opening the shell. This not only simplifies the setting procedure, but also enhances the safe operation of the equipment, especially in those places that have strict anti-explosion requirements.

Rich Online Display Function

The built-in liquid crystal display technology is adopted to display the torque, valve switch status, normal valve opening, spacing setting and other working status of the actuator. It can also provide important fault information when actuator failure occurs, thereby helping the user to eliminate faults quickly. Meanwhile, it is equipped with three high-brightness LEDs of different colors, which can indicate the valve position, and allow the user to clearly understand the status of the actuator even in a dark environment.

Perfect Self-diagnosis and Protection Function

The actuator can diagnose the motor overload, overheating, overcurrent, the status of power supply online, and can automatically identify the phase sequence of three-phase power supply, thus preventing reverse misoperation due to wiring changes. In case of emergency, the actuator can keep the position or run the preset safe position. In addition, the actuator can accurately measure the output torque, protect the valve during operation, and prevent the valve from jamming. If the valve becomes stuck and there is no action within the preset time after the start signal is sent, the control circuit will cut off the power supply of the motor to prevent the motor from overheating, and an alarm signal will be sent.

Strong Field Adaptability

Actuator internals are protected with a waterproof, dust-proof, and air tight double-sealed shell rated to the highest level of protection, IP68. At the project installation and commissioning stage, even if the terminal cover of the actuator is opened for a long period of time, dust and moisture will be prevented from entering the internal cavity of the actuator due to the protection of the secondary seal the terminal plate and the internal cavity. In this way, the motor and control circuit will be protected from erosion. Reliability is also improved due to the interfaces between the internal and external signals which promote photoelectric isolation and provide surge protection. The internal control circuit can be divided into different functionality blocks which helps facilitate easy maintenance.

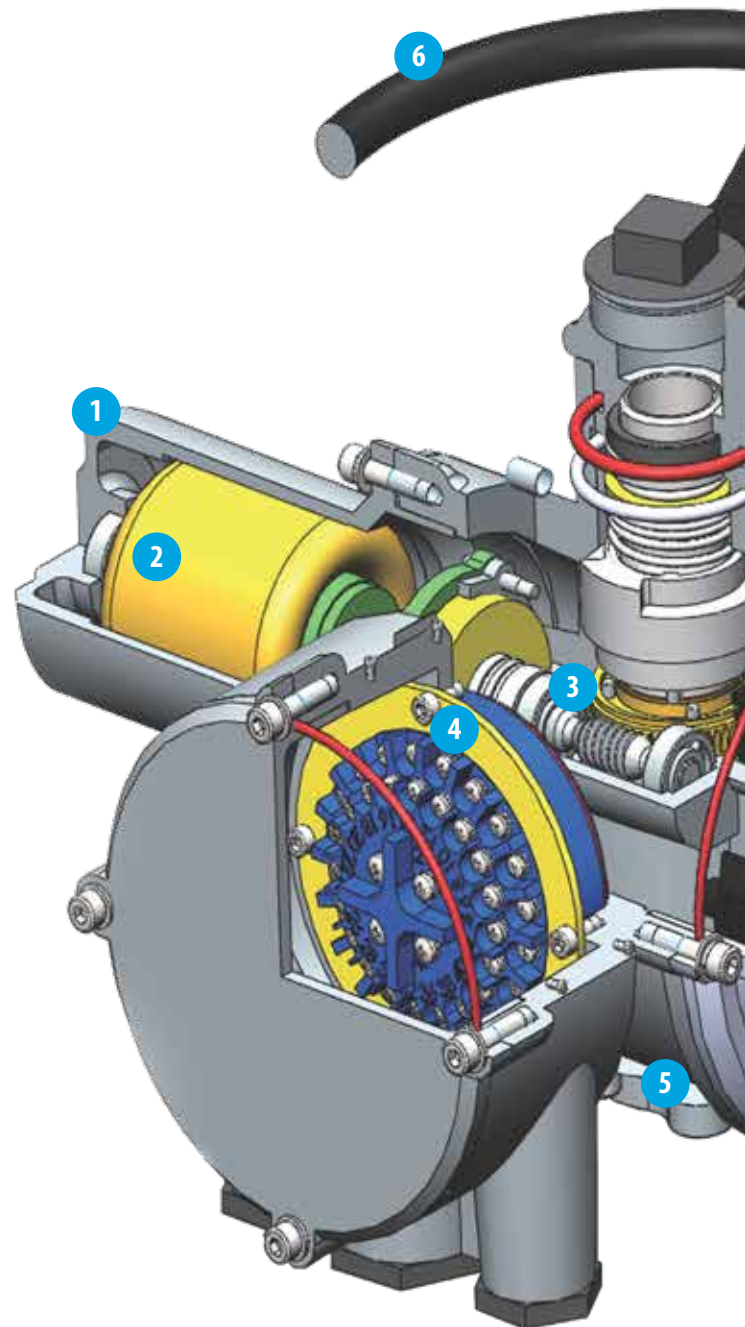
Advanced Control Functions

Advanced computer technology, SOC technology, digital sensing technology and automatic follow-up control technology are adopted, which greatly improve the response quality and control accuracy of the actuator.



Design Details

- 1 The high-quality aluminum alloy shell is lightweight and coated with a layer of protective materials that adapt to any harsh environment. Other types of coatings are also available depending on customer needs.
- 2 The low inertia and high torque motor is able to quickly reach the peak torque value after start-up. In a non-excited state, there is almost no overrun. A temperature switch is embedded into the motor coil to promote optimum heat capacity. In addition, the motor shaft and worm gear are independent to facilitate rapid replacement.
- 3 The worm gear transmission chain utilizes a simple design and impact structure that promotes constant efficiency. No brake is required due to the mechanical self-locking function. The transmission is also filled with long-lasting lubricating oil that provides longevity without needed maintenance.
- 4 The double-sealing design provides an air-tight sunflower terminal box which is separated from the control room. Even if the junction box cover is opened, isolation between the inside and outside of the actuator can be ensured. This effectively prevents moisture, dust, and harmful gases from entering the inside of the actuator and fully protects the internal components.
- 5 The lubricated thrust seat is designed to improve service life and facilitate easy dismantling. The actuator can be removed without changing the valve position. The simple and detachable drive shaft sleeve can be processed according to the valve stem, in order to facilitate the connection with the valve.
- 6 Reliable emergency manual operation can be provided in case of power failure.



Design Details

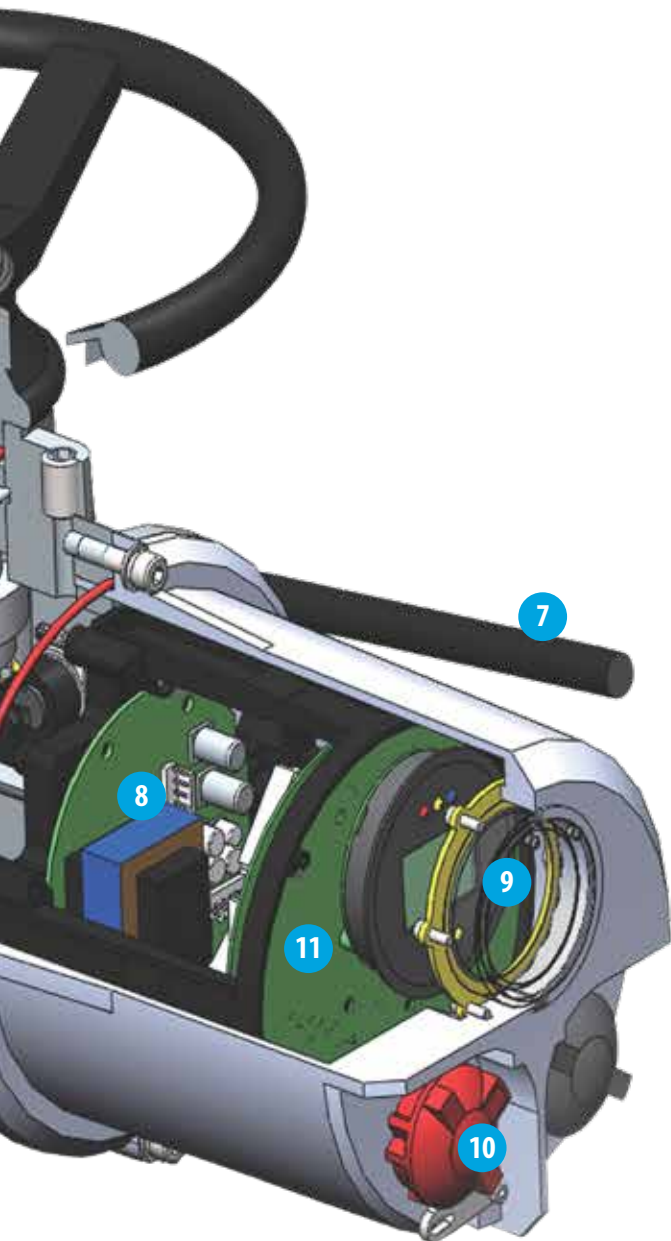
7 The manual / electric switchover handle can be operated safely at any time. While pressing the handle with appropriate force, you can slowly turn the hand wheel to put the internal clutch into gear. powered on, or in the electric, the clutch will disengage automatically.

8 The output torque measurement system is professionally designed and developed by electric energy measurement technologies. It is able to obtain accurate and repeatable measurements, and is independent from the changes in frequency, voltage, and temperature.

9 The control panel LCD can provide instantaneous status of the latest valve position. With an intuitive menu structure, it can provide calibration and diagnosis information such as torque curves, operation, operation and fault records, motor status, local information and hardware data, etc.

10 The "Open"/"Close" knobs, and padlocked "Local"/"Stop"/"Remote" knobs, use magnetic transmission devices to promote tight sealing and eliminate the issues caused by fragile reed switches. (This paragraph was a bit confusing so need to confirm this rewrite still makes sense).

11 The control unit consists of control, monitoring and protection modules. It utilizes snap cage installation structure, has shock-absorbing and buffering effects, and is pluggable, thereby ensuring rapid and correct disassembly and replacement.



Security

Phase-sequence Protection

With the adoption of phase synchronization technology, the user does not need to consider the phase sequence of three-phase AC when installing and wiring the actuator, and can ensure that the three-phase motor always has the correct power phase sequence. As a result, the actuator can always operate correctly according to the instructions during operation.

Motor Protection

When the three-phase motor runs in phase loss or overload, the current will rise rapidly, and the motor will overheat and burn out. CKD actuator always monitors the three-phase power supply and the operation status of the motor. The power supply of the motor shall be cut off immediately, and an alarm shall be sent to the LCD interface and remote control room under the following circumstances: the loss of one-phase or multi-phase power supply, motor overheating, motor overcurrent and motor overload.

Valve Jam Protection

During the closing or start-up process, if the actuator does not perform the torque protection function within 3s-10s, the jammed valve shall be closed or opened with the maximum torque provided by the motor. If the valve cannot be closed or opened after this period of time, the system will cut off the power supply to the motor and give a fault alarm.





Torque Protection

The professionally designed torque measurement system is designed to ensure the overload protection of the equipment. The user can set different protection values of over-torque in the opening and closing directions according to the specific situation. When the actual torque borne by the actuator reaches or exceeds the preset protection value, the actuator will immediately stop the motor from rotating and send a fault alarm.

Electromagnetic Anti-interference Protection

All the input / output channels of the actuator adopt photoelectric isolation, which can withstand $\pm 2\text{kV}$ fast transient pulse group interference and 4kV electrostatic discharge impact. The signal end can withstand $6\text{kV}/3\text{kA}$ surge impact, and the power end can withstand $20\text{kV}/10\text{kA}$ surge impact, realizing the internal and external electrical separation of the actuator.

Hydraulic Shock / Surge Protection

In order to prevent hydraulic shock, water hammer effect or surge, it is necessary to extend the operation time of the valve. The start and stop time of independently adjustable pulse operation can be selected and operated on any part of the valve closing or valve opening stroke, so as to effectively reduce the operating speed of the valve.

Instantaneous Reverse Protection

When receiving the instantaneous reverse signal, the actuator will automatically delay for a period of time to prevent the impact load from causing unnecessary wear to the valve stem, valve seat and gear transmission part, and protect the valve and the actuator itself. The immobility time can be set by the user on the LCD interface through the configurative device ($0.1\text{s} \sim 9.9\text{s}$).

User interface

Modern actuators can adapt to special application needs by setting and collecting a large number of parameters.

The monitoring and diagnosis functions realize the acquisition of actuator status signal and operating parameters and signals.

For the CKD, with clear and intuitive user interface, it is more convenient to store and retrieve detailed data of the actuator. All parameter settings of the device can be realized through handheld infrared or Bluetooth configurative devices. The LCD interface is designed according to the user's vision and operating habits, and displays torque, valve opening, spacing setting, fault alarm and other information in the form of text and graphics.

Password Protection

Password protection is an important security feature, which can effectively prevent unauthorized users from modifying important equipment information.

1 LCD Interface

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

2 Indicator Light

As a visual signal, the indicator light is used to display the status information of the actuator. It also has strong penetrability in harsh environments. Even at night and long-distance observation, the LED indicator light is still clear and recognizable.

3 Infrared / Bluetooth Receiving Window

According to customer requirements, it can be freely programmed and configured through handheld infrared or Bluetooth configurative devices.

4 Control Mode Selection

The selector switch "Remote" - "Stop" - "Local" installed on the local operation device can be used to select remote operation (remote control), local operation (local control) or stop mode.



5 Local Electric Operation

The operation switch "On" - "Off" installed on the local operation device can be used to open or close the actuator locally.

Series Overview

CKD Series Multi-turn Electric Actuators

- Torque ranges from 40 to 3000 N.m
- Output speed ranges from 8 to 144 rpm
- IP68 standard configuration
- Suitable for switch type and regulating type
- With gear reducer, the torque can reach 50,000 N.m
- Suitable for gate valve, globe valve, etc.



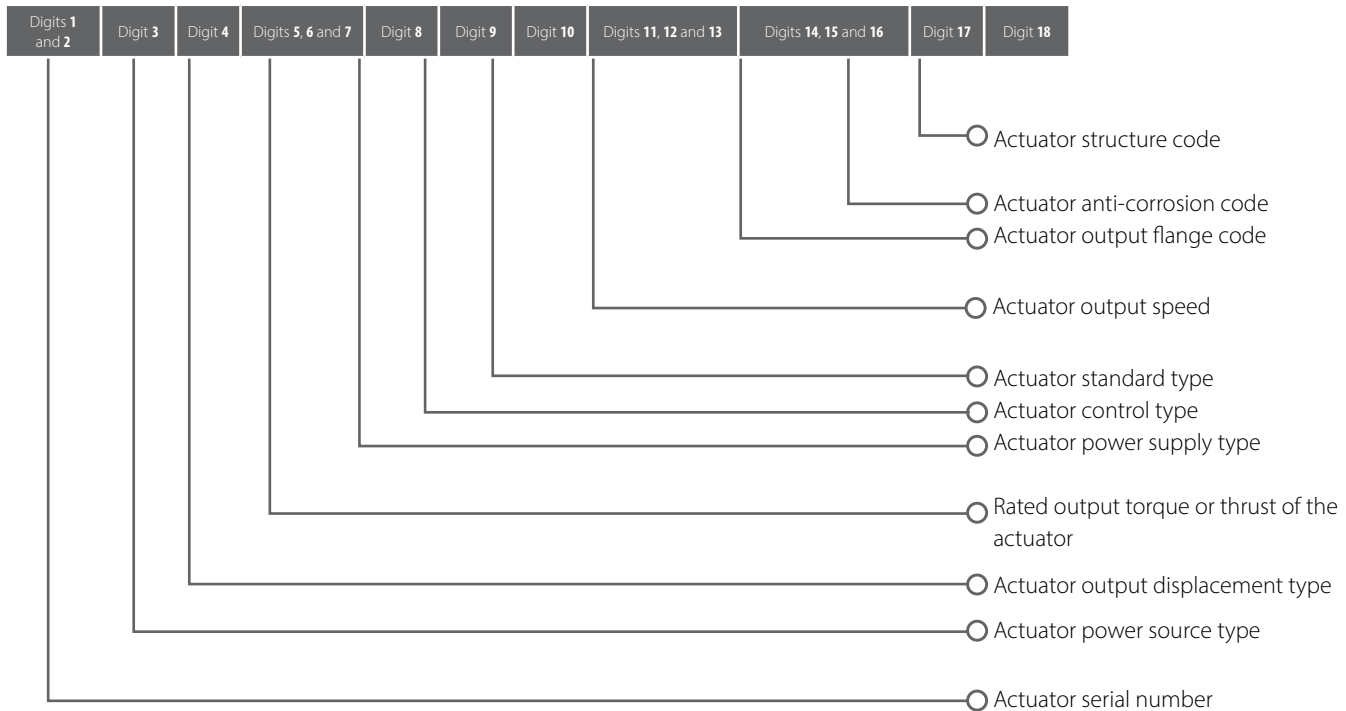
Performance Data Sheet of CKD Series Multi-turn Electric Actuators (380V 50Hz)

Actuator model No.	Rated torque (Nm)	Rotation speed (r/min)	Motor power (KW)	Rated Current (A)	Flange (ISO5210)
CKD4	40	24	0.1	1.1	F10
CKD10	100	24	0.25	2.5	
CKD16	100	48	0.5	3.5	
CKD25	230	36	0.83	3.3	F14
	200	48	1.0	3.6	
	160	96	1.6	4.5	
CKD60	600	24	1.5	5.7	F16
	450	48	2.25	7.6	
	300	96	3.0	8.4	
	250	144	3.76	9.2	
CKD100	900	36	3.4	13.5	F25
	850	48	4.0	14.5	
	750	72	4.8	15.0	
	650	96	6.0	16.0	
	500	144	7.5	17.5	

Model No. Description

Model No. Description

The model No. of CKD series intelligent electric actuators consists of up to 18 digits of numbers and letters without spaces in the middle.



Digits 1 and 2: Actuator serial number --All of them are represented by CK

Digit 3: Actuator power source type, D-electric type; Q-pneumatic type

Digit 4: Actuator output displacement type, there is no multi-turn; M straight stroke; J -angular stroke

Digits 5, 6 and 7: Rated output torque or thrust of the actuator, Torque: 1/10 Nm; Thrust: 1/1KN

(in accordance with three-phase power supply and 24r/min standard)

Digit 8: Actuator power supply type

D- single phase I- three phase

Digit 9: Actuator control type

A - customized

B - switch quantity control, analog quantity feedback

C - switch quantity control, switch quantity feedback

D - analog quantity control, analog quantity feedback

P-Prof ibusDP fieldbus (switch type+ Prof ibusDP bus and regulating type + Prof ibusDP bus)

M-Modbus protocol (switch type + Modbus and regulating type + Modbus)

H-HART fieldbus (regulating type + HART bus)

F-FF fieldbus

Model No. Description

N-Prof i net fieldbus

Digit 10: Actuator standard type: none;

B - Explosion-proof II B;

C - Explosion-proof II C;

S- Frequency conversion;

Q- Frequency conversion and explosion-proof;

Digits 11, 12 and 13: CKD Series: Actuator output speed (r/min) - 18, 24, 36, 48, 72, 96, 144, 192

CKDJ Series: Connecting flange code of the actuator: F07 ~ F60 (ISO5210), or No. 2 -7 flanges (JB2920)

Digits 14, 15 and 16: CKD Series: Digits 14, 15 and 16 jointly form the connecting flange code of the actuator, F07~F40 (ISO5210) or No. 2 -7 flanges (JB2920)

CKDJ Series: A: flange (direct connection type); Z: Ball winch (crank arm type)

Digit 17: Actuator anti-corrosion code: None - non-corrosive environment; F-corrosive environment: The actuator can be used in corrosive air with high humidity, high salinity and high pollutant concentration (such as seaside, cooling tower, chemical plant, etc.)

Digit 18: Actuator structure code: None- integral structure; T-separated structure: The circuit board and other control components are placed in an independent control box. The whole actuator consists of electric control box and connecting harness. It is mainly used in high-temperature environment and other occasions that require separate control.

Example 1: The switch-type intelligent multi-turn electric actuator adopts PROF I BUS, torque of 600Nm, three-phase power supply, explosion-proof materials (Class II B), output speed of 24 rpm, connecting flange F16. Its model No. is shown as follows: CKD60IPB24F16 or CKD601BB24-P (other codes such as flange number are not indicated);

Example 2: The regulating-type intelligent straight stroke electric actuator features Modbus, thrust of 25KN, three-phase power supply, explosion-proof materials (Class II C), output speed of 24 rpm, and connecting flange F14. Its model No. is shown as follows: CKDM25IMC24F14 or CKDM251DC24-M (other codes such as flange number are not indicated);

Example 3: The switch-type intelligent angular stroke electric actuator features output torque of 100Nm, three-phase power supply, analog feedback, and explosion-proof materials (Class II B). Its model No. is: CKDJ10IBBF07A

Performance Summary

Performance Data Sheet of CKD Combined Angular Stroke Electric Actuators (380V 50Hz)

Actuator model No.	Rated torque (Nm)	Rotation speed (r/min)	Travel time (s)	Gearbox-speed ratio	Opening diameter	Flange (ISO5211)
CKD10+JW80	1200	24	25	40	42	F14
CKD16+JW125	3360	24	44	70	60	F25
	2550	36	29	70	60	
	4200	48	44	140	60	
	3000	72	29	140	60	
CKD16+JW160	8000	36	92	221	72	F25
CKD25+JW160	10000	24	88	140	72	
	9600	36	58	140	72	
	8400	48	44	140	72	
	7560	72	29	140	72	
	10000	48	56	180	72	
CKD25+JW200	13500	24	113	180	100	F25/30
	13500	48	69	221	100	
	13500	96	44	280	100	
	16500	24	138	221	100	
	19500	36	117	280	100	
CKD60+JW250	21000	36	58	140	120	F25/30
	21000	96	35	221	120	
	23400	24	81	130	120	F30/35
	30000	36	86	205	120	
	27600	48	65	205	120	
CKD60+JW280	35000	24	128	205	120	F30/35
	35000	48	82	260	120	
	39000	36	108	260	160	F35/40
	43200	48	100	320	160	
	35000	96	60	384	160	
CKD60+JW315	45000	24	162	260	180	F35/40
	45000	72	80	384	180	
	45000	144	62	602	180	
	48000	36	133	320	180	
	51800	48	120	384	180	
CKD100+JW315	45000	72	42	202	180	F35/40
	50000	48	63	202	180	
	50000	96	41	260	180	

Performance Summary

Performance Data Sheet of CKD Combined Angular Stroke Electric Actuators (380V 50Hz)

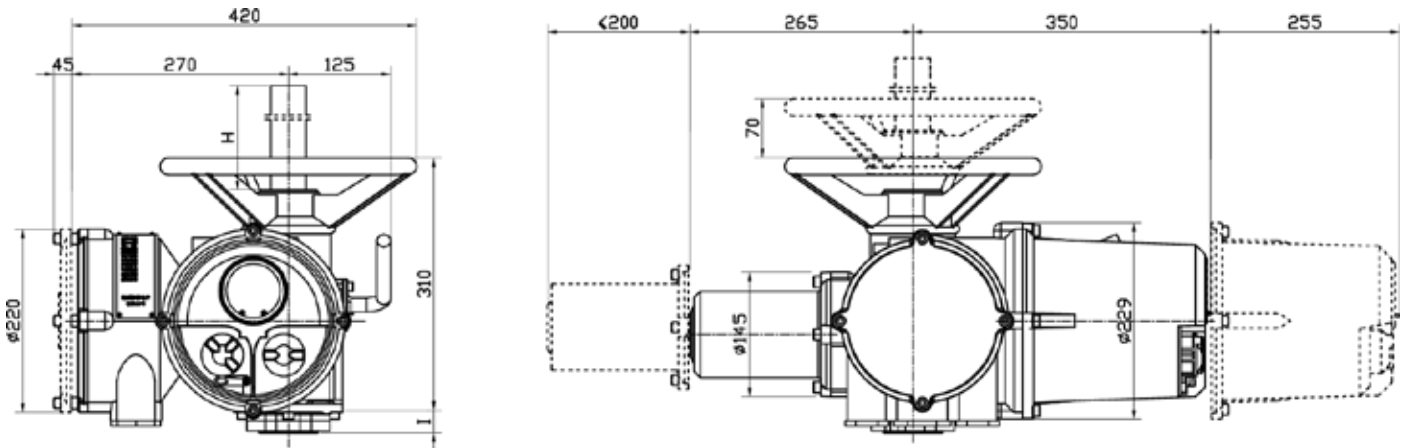
Actuator model No.	Rated torque (Nm)	Rotation speed (r/min)	Travel time (s)	Gearbox-speed ratio	Opening diameter	Flange (ISO5211)
CKD100+JW400	55000	36	84	202	180	F35/40
	58000	72	54	260	180	
	60000	24	126	202	180	
	65000	48	81	260	180	
CKD100+JW450	72600	36	112	269	180	F40
	76500	72	71	340	180	
	80000	24	168	269	180	
	83000	96	66	425	180	
	85000	48	106	340	180	
	90000	36	142	340	180	
CKD100+JW500	102000	24	215	340	180	F40
	108000	48	135	425	180	
	115000	36	178	425	180	
	115000	72	106	510	180	
	125000	24	266	425	180	
	125000	48	160	510	180	
	132000	96	106	680	180	
CKD100+JW550	152000	24	320	510	220	F48
	152000	48	190	595	220	
	152000	72	145	680	220	
	160000	36	250	595	220	
	160000	144	115	1063	220	
	165000	72	155	740	220	
	165000	96	135	850	220	
CKD100+JW600	175000	48	215	680	220	F48
	185000	36	285	680	220	
	185000	144	130	1254	220	
	192000	72	180	850	220	
	192000	96	155	986	220	
	200000	36	310	740	220	
	205000	96	170	1063	220	
	205000	144	145	1360	220	

Performance Summary

Performance Data Sheet of CKD Combined Angular Stroke Electric Actuators (380V 50Hz)

Actuator model No.	Rated torque (Nm)	Rotation speed (r/mini)	Travel time (s)	Gearbox-speed ratio	Opening diameter	Weight (KG)	Flange (ISO5210)
CKD100+JW650	215000	48	270	850	220	1790	F48/ F60
	225000	96	180	1156	220	1790	
	230000	36	355	850	220	1790	
	240000	72	225	1063	220	1790	
	250000	48	310	986	220	1790	
	250000	72	245	1156	220	1790	
	250000	96	200	1254	220	1790	
CKD100+JW700	270000	48	335	1063	220	1790	F48/ F60
	282000	72	265	1254	220	1790	
	300000	72	280	1360	220	1790	
	300000	144	215	2040	220	1790	

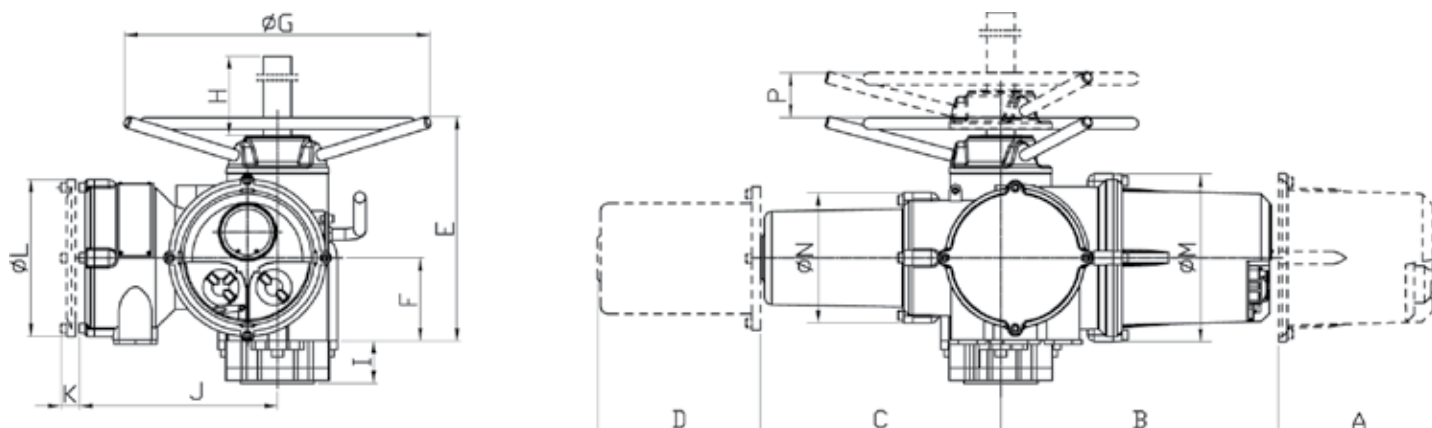
Outline Dimension Drawing of CKD Series Multi-turn Electric Actuator (CKD4-CKD16)



Model No.	Standard	Flange No.	I	H (calculated according to valve stem length)
CKD4-CKD16	GB/T 12222 ISO 5210	F10	Torque type 40	120.250.500
			Thrust type 55	120.250.500
	JB2920	2	70	120.250.500

Electric Actuator Contour and Connection Dimensions

Overall Dimensions of CKD Series Multi-turn Electric Actuator (CKD25-CKD100)



Model No.	A	B	C	D	E	F	P	J	K	L	M	N	G
CKD25	255	385	340	240	315	120	60	280	45	214	229	178	440
CKD40-CKD60	255	400	360	260	365	125	60	300	45	214	229	196	800
CKD100	255	430	445	300	450	150	85	350	45	214	229	196	730

Model No.	Standard	Flange No.	I	H (calculated according to valve stem length)
CKD25	ISO 5210	F14	Torque type 60	120.250.500
		2	Thrust type 80	
		3	75	
CKD40-CKD60	ISO 5210	F16	Torque type 60	120.250.500
		3	Thrust type 80	
		4	70	
CKD100	ISO 5210	F25	Torque type 60	120.250.500
		4	Thrust type 80	
		5	130	
			130	



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