



ABC ELECTRIC ACTUATORS

Technical Data & User Manual



EAC

Manufactured according to international standards
 Excellent performance and reliability
 Competitive price
 Solutions to many industrial actuation requirements





1. OVERVIEW

ABC electric actuators are used for control valves with 0 – 270 degree turning and other similar products, including butterfly valves, ball valves, dampers, stop valves, plug valves, louver valves, among others, which are installed in petroleum, chemical, water treatment, shipping, paper making, power plant, heating, building automatic control, light industry and other applications. Actuators are available in 380V/220V/110V AC voltage, 4 – 20mA current signal or 0 – 10V DC voltage signal for moving the valve to the desired position for automatic control. The maximum output torque is up to 2,000N·M. Our actuators are explosion-proof certified.

2. FEATURES

2.1 ENCLOSURE

The enclosure is made of hard aluminum alloy with anodic oxidation treatment and polyester powder coating offering robust resistance against corrosion. Enclosures are available with IP65, and optional IP67 and explosion-proof type.

2.2 MOTOR

The motor is a totally-enclosed squirrel cage type designed with compact size, high torque, low inertia, insulation level F, and equipped with thermal switch to prevent motor damage due to overheating.

2.3 HAND WHEEL

The hand wheel is designed with safety, reliability, easiness of operation and compact size. When the motor is de-energized, move the clutch lever for manual operation. When the motor is energized, the clutch will automatically return to its position. ATTENTION: When the motor is de-energized, the electric actuator will remain at manual position.

2.4 INDICATOR

The indicator is mounted on the trunnion to facilitate observation of valve position. The indicator is designed with convex lens to prevent moisture build-up for convenient observation.

2.5 SPACE HEATER

The space heater is designed to control the temperature to prevent moisture condensation in the actuator due to temperature and weather variations, and keep the internal electrical components at a dry state.

2.6 LIMIT SWITCH

The limit switch comes with mechanical-electronic dual switch function. The mechanical limit screw is adjustable, safe and reliable. The electronic limit switch is controlled by a cam mechanism. The simple adjusting mechanism offers accurate and easy positioning without battery. The micro switch employs silver contactor.

2.7 TORQUE SWITCH

The torque switch offers overloading protection (not available on Q01-010). In the event of valve jamming with foreign matters, it will automatically cut off power supply to the motor to prevent potential damage of the valve and electric actuator. ATTENTION: The setting is done in the shop. User is advised not to temper with the setting.

2.8 LOCKING

The precision double worm and worm gear mechanism give increased torque and efficiency and low noise (50dB max.). It offers long service life and a self-locking function to prevent reverse turning. The transmission mechanism is stable and reliable. High-performance lubricant is charged in the shop. Lubricant replenishing is not necessary during operation.

2.9 ATTACHING BOLT

The bolts are attached to the enclosure and will not fall off while the enclosure is being dismantled. Material of construction for all external bolts is stainless steel.

2.10 MOUNTING

Bottom mounting dimensions are in line with international standard ISO5211. The driving shaft bushing can be removed and machined as needed, hence offering excellent adaptability. Available for vertical or horizontal mounting.



2.11 CONTROL WIRING

The control wirings are in line with single-phase or 3-phase power supply. The wiring is arranged in a compact manner. The wiring terminals are fit for various additional functions. Dry contact output is available for valve opening and closing to position. Bespoke manufacturing is available per customer request.

3. TECHNICAL DATA AND SPECIFICATION

3.1 TECHNICAL DATA

SIZE	MAX. OUTPUT TORQUE	90° ACTION TIME	MOTOR LEVEL F	RATED CURRENT (A), 50HZ				HAND WHEEL TURN	WEIGHT
				SINGLE-PHASE		THREE-PHASE			
	N·M	S	W	110V	220V	380V	440V	N	Kg
Q01-010	100	18	25	0.82	0.41	0.25	0.26	10	11
Q01-015	150	20	40	1.62	0.83	0.4	0.26	11	11
Q01-020	200	20	40	1.62	0.83	0.4	0.26	11	14
Q01-030	300	25	60	1.96	0.98	0.45	/	13.5	20
Q01-040	400	25	90	2.4	1.2	0.6	/	13.5	20
Q01-050	500	25	120	2.62	1.31	0.75	/	13.5	20
Q01-060	600	32	120	2.62	1.31	0.75	/	16.5	32
Q01-100	1000	32	200	3.58	1.79	1.2	/	16.5	32

3.2 STANDARD SPECIFICATION

Enclosure	Hose-proof IP65, IP67	
Motor power supply	Standard: 220V AC single-phase Optional: 110V AC single-phase, 380V/440V AC 3-phase, 50/60Hz, ±10% 24V DC / 110V DC / 220V DC	
Control power supply	110/220 AC 1-phase, 50/60Hz, ±10%	
Motor	Squirrel cage asynchronous motor	
Limit switch	Open/close, each with 1 SPDT, 250V AC 10A	
Additional limit switch	Open/close, each with 1 SPDT, 250V AC 10A	
Torque switch	Open/close, each with 1 SPDT, 250V AC 10A	Not available on VTQ-010
Stroke	90° ±10%	0° -270° optional
Thermal switch	Provided with thermal switch, open 110°C ±5°C / close 97°C ±5°C	
Indicator	Continuous position indication scale	
Manual operation	Mechanical clutch mechanism	
Locking mechanism	Worm, worm gear	
Mechanical limit	2 external adjusting bolts	
Space heater	30W (110/220V AC) against condensation	
Wiring port	2 PT 3/4"	
Ambient temperature	-30°C to +70°C	
Lubricant	Aluminum-based grease (EP type)	
Material of construction	Steel, alloy, aluminum bronze, polycarbonate	
Ambient humidity	Max. 90% RH	Non-condensable
Earthquake resistance	X Y Z 10g, 0.2 – 34Hz, 30min	
External coating	Dry powder, epoxy polyester, with excellent corrosion resistance.	



3.3OPTIONAL SPECIFICATION

1	Explosion-proof actuator (Exd II BT4)	Optional
2	Potentiometer (1k – 10k)	Optional
3	Proportional control unit (input, output 4 – 20mA DC)	Optional
4	Field control unit (process control open/stop/close selection switch)	Optional
5	120° , 180° , 270° turn	Optional
6	DC motor (24VDC)	Optional
7	Reverse electromagnetic control and transmission integrated motor starter	Optional
8	Additional torque switch (SPDT X 2 250V AC 10A)	Optional
9	Electric current position transmitter (output 4 -2 0mA DC)	Optional
10	High temperature resistant actuator (-10°C to +100°C)	Optional
11	Low temperature resistant actuator (-40°C to +70°C)	Optional
12	Low-speed actuator	Optional
13	Bus control unit	Optional

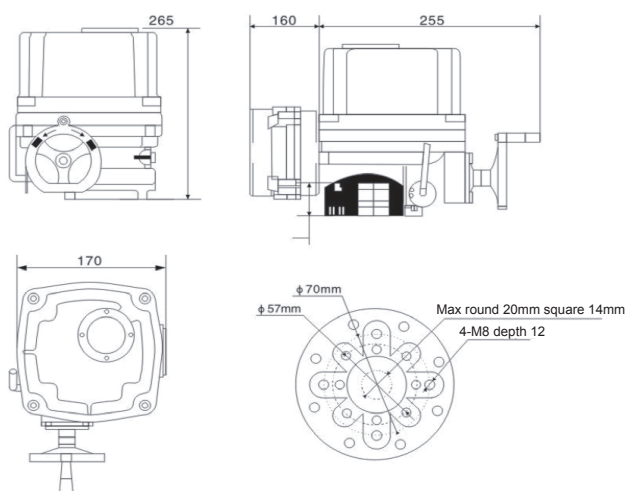
4.CONSTRUCTION

The electric actuator consists of the following main components:

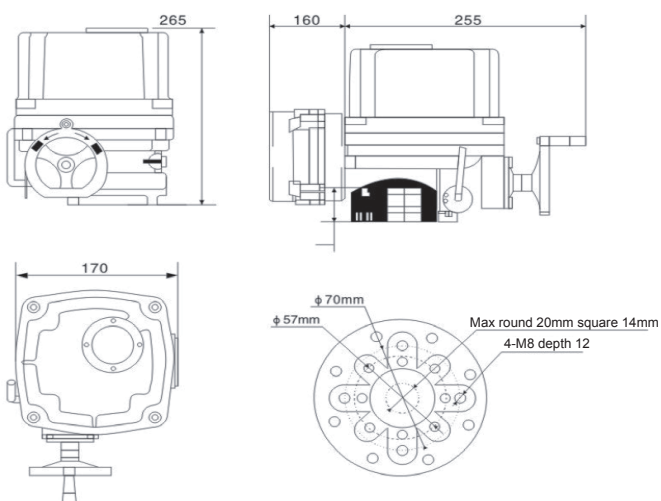
- Enclosure: Including enclosure and base;
- Driver: Totally-enclosed squirrel cage type motor;
- Transmission: Double worm and clutch;
- Proportional control: Separate from mechanical part, easy for testing;
- Torque switch and limit switch;
- Opening detection and feedback.

5.DIMENSIONS

5.1 Q01-010

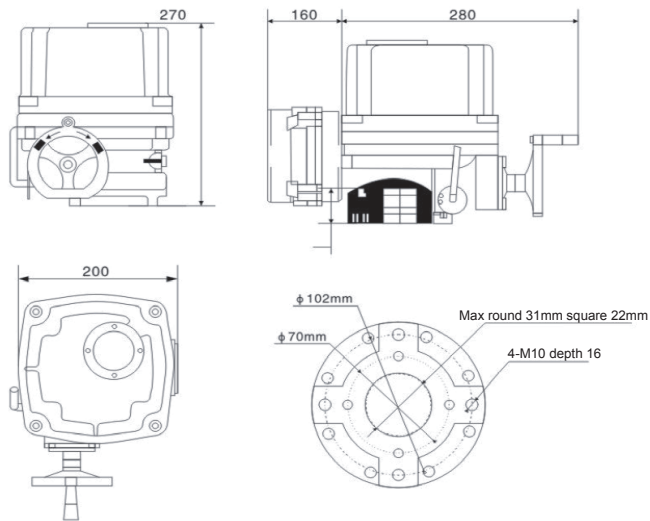


5.2 Q01-015

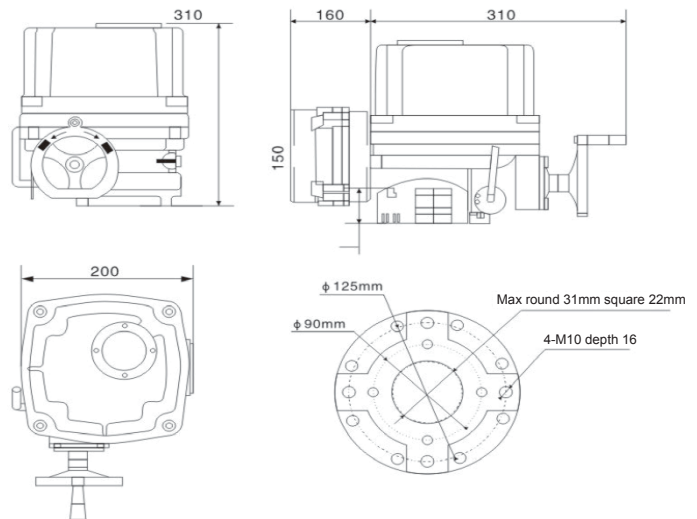




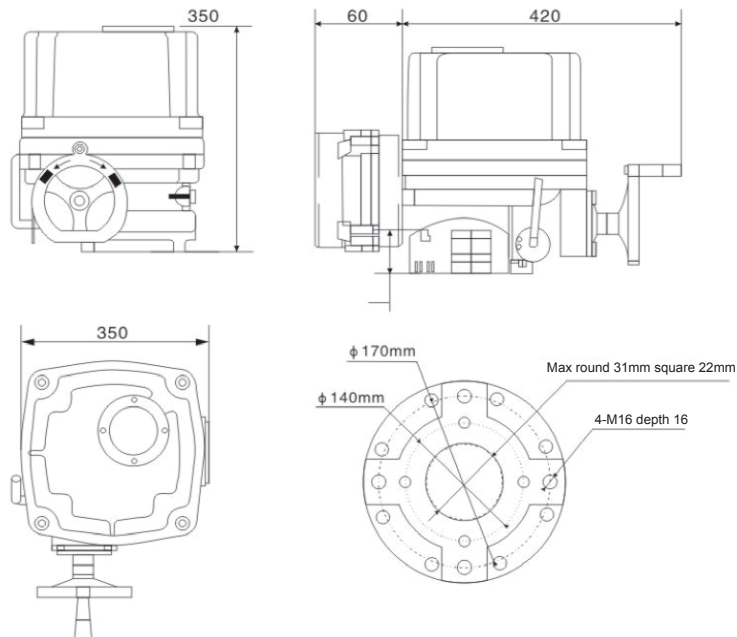
5.3 Q01-020



5.4 Q01-030 to 050



5.5 Q01-060 to 100



6. MOUNTING

6.1 ENVIRONMENT

6.1.1 Indoor

- For mounting in environment with explosive gas, explosion-proof actuator is required;
- For mounting in submerged or outdoor environment, please note us in advance;
- Space shall be reserved for wiring, manual operation and maintenance activities.

6.1.2 Outdoor

- To avoid rainwater and direction sunlight, protective

hood shall be installed; or select IP67 or above;

- Space shall be reserved for wiring, manual operation and maintenance activities.

6.1.3 Ambient Temperature

- Ambient temperature: -20°C to $+70^{\circ}\text{C}$;
- When ambient temperature is below 0°C , space heater is required inside.

6.1.4 Fluid Temperature

When used in the valve, the heat from the fluid may transfer to the actuator and increase the temperature; when the fluid is at high temperature, the bracket connecting to the valve need special treatment:

- Standard bracket: For fluid temperature below +65 °C , or no bracket;
- Medium temperature bracket: For fluid temperature above +100°C and below +180°C ;
- High temperature bracket: For fluid temperature above 180°C .

6.2 CONNECTION

6.2.1 The actuator bottom flange installation hole dimension is in line with ISO5211. In case of mismatch with valve installation dimension, redesign the bracket or adaptor plate.

6.2.2 The actuator is connected to the valve via the removable driving shaft bushing on the main shaft. The driving shaft bushing is solid in the shop. First, use a spanner to counter clock-wise turn and remove the two retaining screws, and then remove the driving shaft bushing with two jack screws.

Note: User may request bespoke design and manufacturing based on functional requirements of the driving shaft bushing. The shapes can be round shaft, square shaft or other types of formed shaft output. During manufacturing, ensure concentricity between the hole and the external circle.

6.2.3 Prior to mounting, make sure the actuator open and close directions are consistent with those of the valve.

6.2.4 Mount the bracket on the valve.

6.2.5 Turn the electric actuator to close position, use the coupling and screw to secure the valve core shaft and electrical actuator output shaft.

6.2.6 Place the electric actuator on the bracket, tighten the screws between the electric actuator and bracket.

6.2.7 Manually turn the valve to make sure it is normal and turn to full close position.

6.2.8 When turning the electric actuator with the hand wheel, make sure there is no eccentricity, deflection, the movement is stable, and there is no over-stroking!

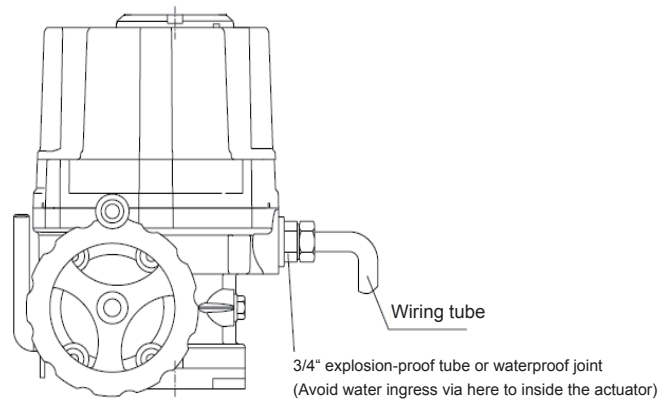
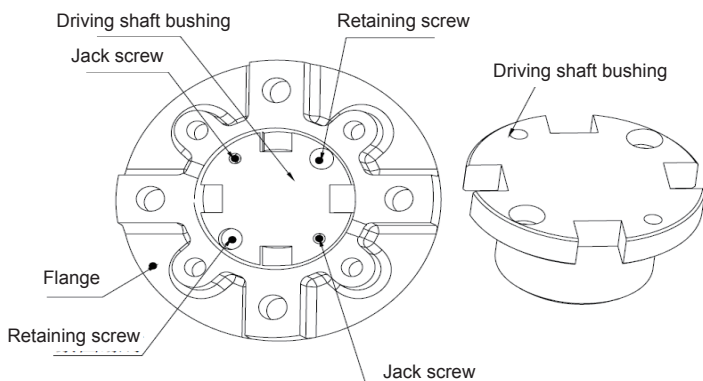


Fig. 13

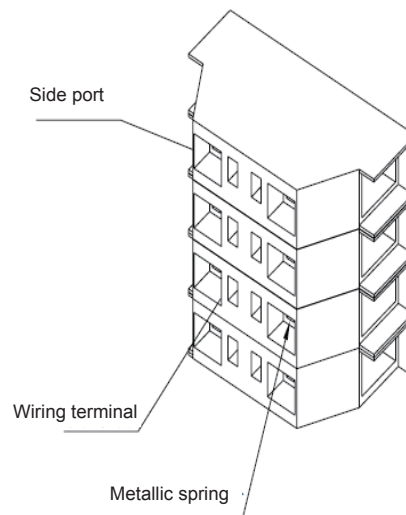


Fig. 14

ATTENTION: The coupling should minimize backlash.

6.3 POWER WIRING (Fig. 13, Fig. 14)

6.3.1 Remove the aluminum cap for access of external cables. Use explosion-proof joints with external thread 3/4" or explosion-proof cable tube.

6.3.2 If the cable joint can not match with the actuator, it may compromise the sealing level in the actuator or incur water ingress which may lead to actuator damage.

6.3.3 When wiring tube is used, sufficient waterproof measures shall be taken.

6.3.4 Dismantle the external cover of the enclosure. Use a screw driver to slightly press down the metallic spring in the small hole on the wiring terminal, and in the meantime insert the wire into the side port, disengage the screw driver.



7. CALIBRATION

7.1 STROKE LIMIT (FIG. 17)

Manually close the valve to position, disengage the close direction limit cam, make adjustment till it presses exactly down to the position to close the limit switch, and then secure the limit cam. In this way the position for the electronic limit at full close is set for the actuator. The position at full open can be set similarly.

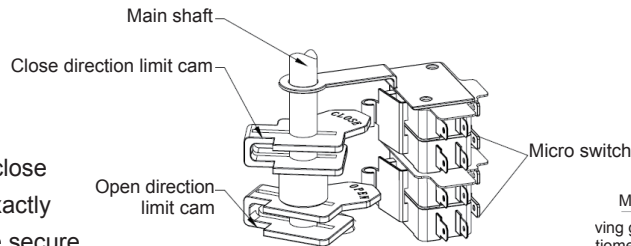


Fig. 17

7.2 POTENTIOMETER (FIG. 18)

The potentiometer provides feedback signal output in the actuator. Three output terminals are provided, in which pin ② is connected to the wiper of the potentiometer (see Fig. 18). Pin ① is connected to the end where the resistance between the wiper is decreasing when the actuator is in the opening operation. Pin ③ is connected to the end where the resistance between the wiper is decreasing when the actuator is in the closing operation. (ATTENTION: The potentiometer shall avoid resistance zero-crossing or jumping.)

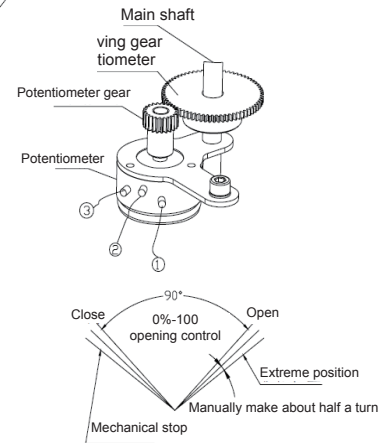


Fig. 18

8. RUNNING TEST

8.1 MANUAL OPERATION

Cut off power supply before manual operation. Turn the hand wheel for a full turn, while turn the clutch lever to the right till the clutch is engaged, continue to turn the hand wheel to reduce the opening (observe through the sight glass).

ATTENTION:

Half a turn beyond the action of limit switch at full close and full open positions of the opening scale will hit the mechanical stop. Excessive turning may cause damage of other parts. Avoid excessive force.

8.2 ELECTRIC OPERATION

- Prior to electric operation, use the manual operation method to check consistency between the opening scale and valve opening (full open, full close);
- Check wiring and make sure it is correct. Use external switch to check opening and closing actions;
- Verify above states before proceeding with electric operation.

● ATTENTION:

- Check wiring diagram, power supply, input/output signals and make sure they are correct;
- Do NOT temper with internal wiring.

Attention for AC380V switch type

- Manually switch the actuator to semi-open / -close positions, supply power and input open signal.
- If the actuator moves to the opening position, it means the wiring is correct.
- If the actuator moves to the opposite direction, swap two of the three power wires.

NOTE: For any questions or special specifications, please contact our Technical Department.

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