

CONSIDER PEOPLE AS A BOAT
CONSIDER SERIOUSNESS AS HER HELM
CONSIDER WISDOM AS HER SAIL



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Note: The company reserves the right to modify the technical parameters
of the product without prior notice



THEOBORN AUTO-CONTROL

BNE Series Explosion-proof Electric Actuator



Zhejiang Theoborn Auto-control Valves Co.,Ltd

www.theoborn.com



COMPANY PROFILE

Zhejiang Theoborn Auto-Control Valves Co., Ltd. is dedicated to manufacture pneumatic actuators, electric actuators. Our products fundamentally transform the complex traditional usage of valves, incorporating high technology with the control process of valves, greatly improving the efficient usage of valves, largely diminishing the controlling cost, and obtaining considerable profits for enterprises.

THEOBORN company is located in Wenzhou City which possesses a long history of manufacturing valves and pumps. Inspired by our experience of manufacturing valves and pumps, supported by exquisite manufacturing technique, and enveloped with the special innovative consciousness and serious spirit. Theoborn endeavors to culminate the wisdom, aspires to make the best products, and desires to benefit human beings.

Theoborn people believe that we should consider people as a boat, consider wisdom as her helm and consider seriousness as her sail. Theoborn believes that professional technology, along with the sincere service, will obtain customers' hearts, win customers' credits, and move customers.



BNE

BNE Series Explosion-proof Electric Actuator



Power & Energy
• Electricity/Transportation
• Petroleum/Chemical
• New energy



Industry & Machinery
• Mining/Building Materials
• Water/Purification
• Artificial intelligence



Buildings & homes
• Office building
• Public environment
• Infrastructure



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BNE Series Explosion-proof Electric Actuator

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Explosion-proof realization

GB3836 series standards specify different types of explosion-proof types and related design, manufacturing, inspection and testing standards. The explosion-proof type of BNE series electric actuator mechanism is "Flameproof type" (Exd).

(1) Flameproof type (Exd)

The actuator allows an explosion to occur inside the equipment, and the flameproof surface of the shell is designed to prevent the internal spark or the explosion carrier from contacting the outside world. The suitable flameproof surface clearance and sufficient length of the flameproof surface ensure product safety. At the same time, the strong shell can withstand the high pressure generated by the internal explosion without being damaged. BNE explosion-proof series actuator in the motor cavity, electrical component cavity and designed and manufactured according to the flameproof standard of the line cavity.

(2) explosion-proof rating

The explosion-proof grade of BNE explosion-proof electric actuator is: ExdIICT4Gb

Ex-Explosion-proof identification

d-explosion-proof type, expressed as "flameproof type";

II-Device category, indicating electrical equipment for explosive gas environments other than coal mines;

C - Explosion level, which determines the dimensions (length and clearance) of each flameproof joint of the actuator;

T4 - temperature group, indicating that the maximum surface temperature of the actuator is allowed to be 135 °C;

Gb - Indicates the protection level of the device.

(3) explosion-proof structure

The structure of BNE series explosion-proof products conforms to the relevant provisions of GB3836.1-201《Explosive environment Part 1: General requirements for equipment》and GB3836.2-2010《Explosive environment Part 2: Equipment protected by flameproof housing "d"》standard, and adopts the flameproof structure of the whole machine.

BNE explosion-proof electric actuator instructions

Please read the instructions before using. Before installation and usage, pls confirm as below:

a. Packing and documents;

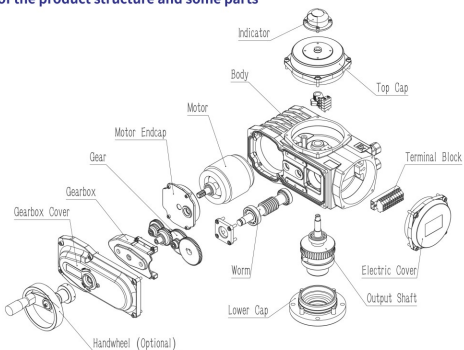
① product list ② test report ③ wiring diagram;

b. Inspection report; Nameplate: Electrical wiring diagram is consistent with purchasing order;

c. Before the end of setting Limit switch. Do not make the actuator be in full-open or full-closed;

d. After Completing of electrical wiring, to deal with cable interface in seal method.

The name of the product structure and some parts



Product overview

BNE series explosion-proof electric actuator is used to control 0-270° rotary valve, such as butterfly valve, ball valve, throttle, baffle valves, plug valves, etc. Widely used in petroleum, chemical industry, water treatment, ship, paper, power stations, heating supply, building automation, light industry etc. 380V/220V/110V AC power supply for driving power supply, 4-20 mA current signal, or 0-10 VDC voltage signal to be control signal, can make the valve movement to the required position, realize automation control. Maximum output torque is 1500 N.m

Model designation

BNE-005-30-P-M/H 220VAC

Working power supply (24VDC/110VAC/220VAC/380VAC)

Optional function (M-clutch manual; H- Dehumidifying heater)

Action mode: P indicates 110/220VAC basic regulation (S, R, P, DC, DR, DP, PL, T)

S: 110/220 VAC Standard ON/OFF type

R: 110/220 VAC ON/OFF type with pentimetime

P: 110/220 VAC Modulating type

DC: DC Standard ON/OFF type

DR: DC ON/OFF type with potentiometer

DP: DC Modulating type

PL: Control type (with field control)

T: 380VAC ON/OFF type

Operating time

Specification and model (BNE005-150)

BNE is series number of THEOBORN explosion-proof electric actuator

Construction features

- Housing
Aluminum alloy housing, polyester powder coated, strong corrosion resistance, protection class is IP66.
- Motor
Squirrel-cage motor, small size, large torque, low inertia, insulation class is F, built-in overheat protection switch, can prevent the motor from overheating.
- Manual operation
Safe and reliable handle design is very easy for manual operation. But make sure the power is "OFF" before manual operation. When the handle is free, put it in the socket beside the body for keeping.
- Dome indicator
The sight mirror indicates clearly, and the observation is more intuitive and convenient.
- Dryer
Dryer is used to control the temperature and avoid actuator internal moisture condensation caused by temperature or weather changes. To keep the electric elements dry.
- Seal
Good seals. Standard product protection grade is IP66, and optional IP67.
- Limit switch
Mechanical and electronic double position limit. Mechanical limit screw is adjustable, safe and reliable; Electronic limit switch controlled by cam mechanism, easy adjusting the cam can set position accurately and conveniently, and is not affected by excess hand operation.
- Self-locking
The high precision worm and gear mechanism has high effectively transfer and output large torque. And it's self-locking function, prevent reverse. transmission part is stable and reliable, no need more grease.
- Anti-off bolt
When remove the cover, the bolt attached to the shell, will not fall off.
- Installation
The bottom connection is according to ISO 5211/DIN 3337. Can be installed in both vertical and horizontal installation.
- Circuit
Control circuit conforms to single or three-phase power supply standard, circuit layout is reasonable, compact terminals can effectively satisfy a variety of additional functional requirements.

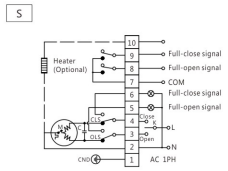
Circuit diagram


Fig 1 110/220 VAC Standard ON/OFF type

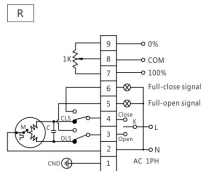


Fig 2 110/220 VAC ON/OFF type with potentiometer

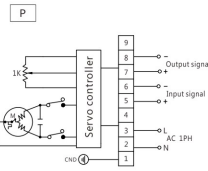


Fig 3 110/220 VAC Modulating type

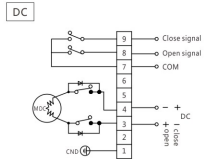


Fig 4 DC Standard ON/OFF type

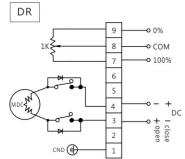


Fig 5 DC ON/OFF type with potentiometer

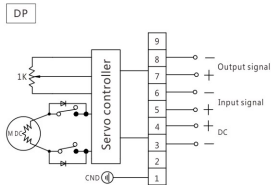


Fig 6 DC Modulating type

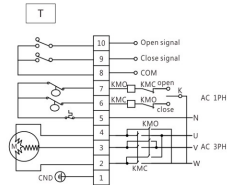


Fig 7 380VAC ON/OFF type

Note: The circuit diagram of the control type (with field control) is referred to the module manual.

BNE005 Overall dimensions and performance parameters

Model	BNE005			
Power supply	DC24V	AC24V	AC110V	AC220V AC380V
Motor power	20W		15W	
Rated current	1.8A	2A	0.5A	0.3A 0.1A
Standard time/torque	205/50Nm		305/50Nm	
Optional time/torque	255/80Nm 305/50Nm 155/30Nm 305/30Nm 305/80Nm			
Action type	S R P DC DR DP PL T			
Rotary Angle	0-90° for option			
Withstand voltage	DC24V/AC24V 500VDC 60S AC110V/AC220V/AC380V 1500VAC 60S			
Insulation resistance	DC24V/AC24V 100MΩ/250VDC AC110V/AC220V/AC380V 100MΩ/500VAC			
Protection class	IP66			
Electrical interface	Explosion-proof joint			
Protective device	(automatic recover type) thermal protector			
Limit switch	Electric work: close/open limit switch Manual work: mechanical limit			
Installation location	At any angle			
Working temperature	-20°C - 60°C			
Material of body	Aluminium alloy			
Optional function	Dehumidifying heater, clutch hand wheel			
Alternative model	BNE008			

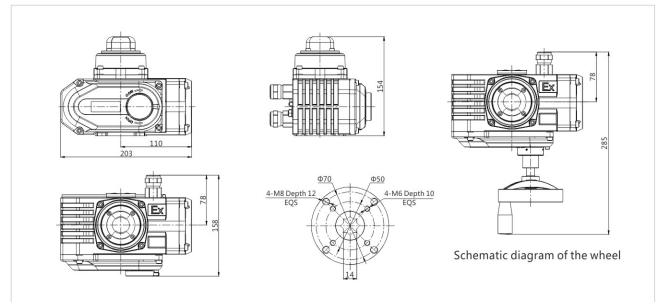


Fig 08

BNE010 Overall dimensions and performance parameters

Model	BNE010				
Power supply	DC24V	AC24V	AC110V	AC220V	AC380V
Motor power	25W		25W		
Rated current	2A	2.2A	0.6A	0.3A	0.2A
Standard time/torque	20S/100Nm		30S/100Nm		
Optional time/torque	15S/100Nm 30S/150Nm				
Action type	S R P DC DR DP PL T				
Rotary Angle	0-90° for option				
Withstand voltage	DC24V/AC24V/500VDC 60S AC110V/AC220V/AC380V 1500VAC 60S				
Insulation resistance	DC24V/AC24V 100MΩ/250VDC AC110V/AC220V/AC380V 100MΩ/500VAC				
Protection class	IP66				
Electrical interface	Explosion-proof joint				
Protective device	(automatic recover type) thermal protector				
Limit switch	Electric work: close/open limit switch Manual work: mechanical limit				
Installation location	At any angle				
Working temperature	-20°C - 60°C				
Material of body	Aluminium alloy				
Optional function	Dehumidifying heater, clutch hand wheel				
Alternative model	BNE015				


BNE020/040 Overall dimensions and performance parameters

Model	BNE020				BNE040		
Power supply	DC24V	AC110V	AC220V	AC380V	AC110V	AC220V	AC380V
Motor power	35W	40W	40W	40W	60W	60W	60W
Rated current	4.5A	0.8A	0.4A	0.2A	1A	0.5A	0.3A
Standard time/torque	20S/200Nm		40S/200Nm		40S/400Nm		
Optional time/torque	20S /200Nm 20S /400Nm						
Action type	S R P DC DR DP PL T						
Rotary Angle	0-90° for option						
Withstand voltage	DC24V 500VDC 60S AC110V/AC220V/AC380V 1500VAC 60S						
Insulation resistance	DC24V 100MΩ/250VDC AC110V/AC220V/AC380V 100MΩ/500VAC						
Protection class	IP66						
Electrical interface	Explosion-proof joint						
Protective device	(automatic recover type) thermal protector						
Limit switch	Electric work: close/open limit switch Manual work: mechanical limit						
Installation location	At any angle						
Working temperature	-20°C - 60°C						
Material of body	Aluminium alloy						
Optional function	Dehumidifying heater, clutch hand wheel						

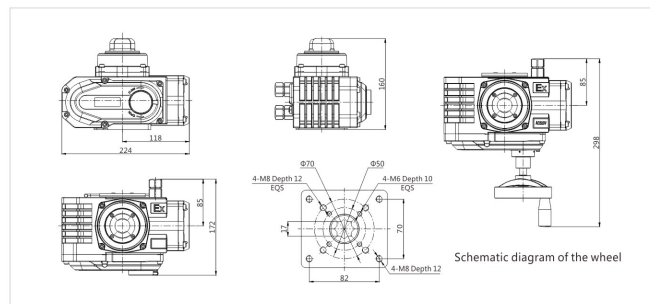


Fig 09

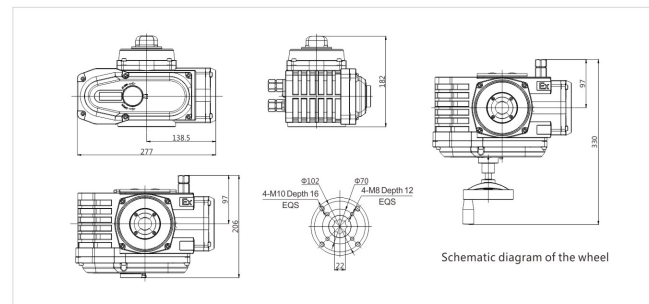


Fig 10

BNE060/100/150 Overall dimensions and performance parameters

Model	BNE060				BNE100				BNE150					
Power supply	DC24V	AC110V	AC220V	AC380V	AC110V	AC220V	AC380V	AC110V	AC220V	AC380V				
Motor power	70W	90W	90W	90W	120W	120W	120W	140W	140W	140W				
Rated current	7A	2.2A	1.1A	0.3A	2.4A	1.2A	0.4A	2.6A	1.3A	0.4A				
Standard time/ torque	20S/ 400Nm 30S/ 600Nm				40S/1000Nm				55S/1500Nm					
Action type	S R P DC DR DP PL T													
Rotary Angle	0-90° for option													
Withstand voltage	DC24V 500VDC 60S AC110V/AC220V/AC380V 1500VAC 60S													
Insulation resistance	DC24V 100MΩ/250VDC AC110V/AC220V/AC380V 100MΩ/500VAC													
Protection class	IP66													
Electrical interface	Explosion-proof joint													
Protective device	(automatic recover type) thermal protector													
Limit switch	Electric work: close/open limit switch Manual work: mechanical limit													
Installation location	At any angle													
Working temperature	-20°C - 60°C													
Material of body	Aluminium alloy													
Optional function	Dehumidifying heater, clutch hand wheel													

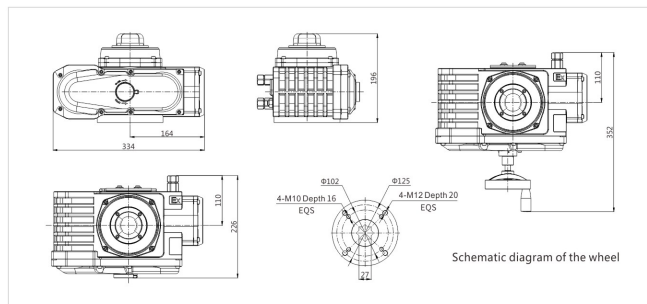


Fig 11

Schematic diagram of the wheel

Installation and adjusting
1 Installation environment requirements

- 1) The types or categories of explosive media around the places of the devices must be in conformity to the explosion-proof regulation of this product.
- 2) Installed in a water flooded and outdoor please explain in advance.
- 3) Please reserve wiring, maintenance space such as for manual operation.
- 4) In order to avoid the rain, direct sunlight, need to install the protection cover, or chooses IP67 protection level.
- 5) Basic installation direction to keep the window to the top, the vertical pipeline actuators installation, cable interface to the ground.

2 Ambient temperature, medium temperature

- 1) The ambient temperature is in the range of -30°C-60°C.
- 2) When the ambient temperature is below zero, install a dehumidifier in the machine.
- 3) When the working medium is high temperature, the bracket connected with the valve plays a role in reducing heat conduction.
- 4) When the working medium temperature is below 60°C, please choose standard support.
- 5) When the working medium temperature is above 60°C, please choose high temperature bracket.

3 Valve connection

- 1) Manually turn the valve, confirm that there is no abnormal situation, and turn to the fully closed position, and fix the support on the valve.
- 2) Place the electric actuator on the support and screw it on gently with bolts and nuts.
- 3) Turn the electric actuator to the closed position, and fix the valve core shaft and the electric actuator output shaft with the coupling and screw.
- 4) Use the handle to turn the electric actuator, the movement is smooth, be careful not to cross the set limit switch limit.

Note:
When installing, make sure that the switch of the actuator is consistent with the switch of the valve. The flange at the bottom of the actuator meets the ISO5211 standard, and if the valve connected to it also meets this standard. It can be easily connected; if this standard is not met, an additional bracket connection is required.

4 Adjustment
1) Adjustment of Stroke limit

Turn the handwheel to move the actuator to the position where the valve is fully closed. Then, loosen the limit CAM tightening nut with a wrench, turn the limit CAM (yellow open, red close) to adjust it to just press the lower limit switch, and hear the 'click' sound for 2 times and then tighten the limit CAM, adjust the full close position, and set the full open position in the same way. (As shown in Figure 12)

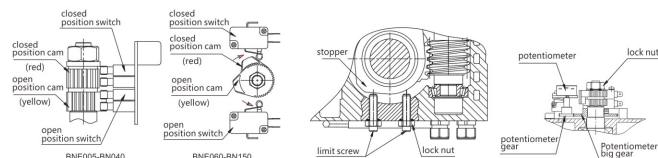


Fig 12

Fig 13

Fig 14

2) Adjustment of mechanical limit

Loosen nut mechanical limit and then make sure the actuator move to the full-closed position. Rotate limiting nuts, then stop rotate when it comes across the fan-shaped gear inside and then screw out two circles and screw the nuts at last. (Shown in Figure 13)

3) Adjustment of potentiometer

Potentiometer is output as a feedback signal in the actuator, with three output pins, the middle pin is the output, and the left and right sides are the power supply (note: the resistor should not have a resistance value of zero and jump phenomenon). Use the handle to turn the valve to the fully open position. Use a multimeter to measure the operation of the limit switch. Adjust the pin resistance on the terminal to the range of 35Ω-60Ω. If it is not correct, it can be adjusted by turning the potentiometer transmission gear. (As shown in Figure 14)

5 Test Operation

1) Manual Operation

Cut power off before making manual operation. Insert the manual handle into the hexagonal hole underneath the rubber cap.

Note: Opening to Full-open and full-closed position, after the limit switch turns half circle, it will come across mechanical block. If rotate excessively, it would result the damage of other parts, so it should be avoided excessive force.

2) Power operation

Before making power operation:

*Confirm that the indication on the position meter and the valve opening are matching each other.

*Confirm that the circuits are properly wired, also that the unit operates in correct direction with external switches.

1) Check the wiring diagram, power supply, input/output signal correctly.

2) Don't change the internal wiring.

3) Please check the rotating direction if the power supply is three-phase.

4) Make sure the actuator be in the on/off position, turn on the power and input the open signal.

5) If the actuator runs to the open direction, it means the wiring is correct.

6) If not, it must be changed 2 wiring lines of the 3 wiring line.

6 Maintenance & lubrication

1) The product uses special molybdenum base grease, so there is no need to add oil;

2) Regular rotation: When the valve does not work for a long time, the machine can be driven regularly to check for abnormalities;

3) For control type (with field control) structions, please refer to the actuator control module manual (technical document attachment).



Explosion-Proof
Basic Modulating Type



Explosion-Proof
Modulating Type (with local control)



Explosion-Proof
ON-OFF Type



Explosion-Proof Modulating Type
(with local control and handwheel)