

Operation Manual
NTE Series Electric Actuator
NTE-03/05/10/20/40/60/100/200/400/600



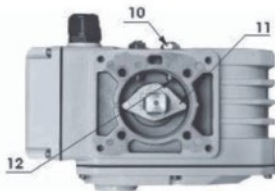
Index

Description	Page
Part list	1
Dimension and Technical Data(NTE-03/05)	2
Dimension and Technical Data(NTE-10)	3
Dimension and Technical Data(NTE-20)	4
Dimension and Technical Data(NTE-40/60)	5
Dimension and Technical Data(NTE-100/200)	6
Dimension and Technical Data(NTE-400/600)	7
Technical Data of Modulating Type(Type E)	8
The Various of Control Function	9-10
Installation Requirement	11
The Assembly with Valve	12
Commissioning of on/off Type	13
Commissioning of Modulating Type	14-16
Maintenance	17

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Actuators & Valves

Part List

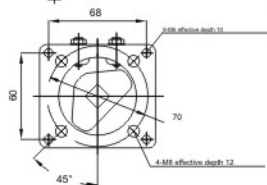
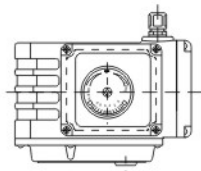
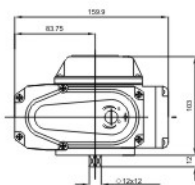
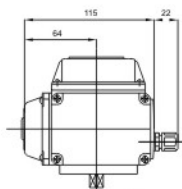


1	Cover (Driving Gear Unit)	2	Cover (Electric Parts)	3	Cover (Terminal Box)	4	Manual Override
5	Label	6	Cable Gland	7	Driving Shaft	8	Housing
9	Position Indicator	10	Stroke Nut	11	Stroke Cam	12	Stroke Bolt
13	Worm Shaft	14	Driving Gear Unit	15	Potentiometer Gear	16	Mounting Plate of Potentiometer
17	Spring	18	Potentiometer	19	Indicator	20	Travel Stop
21	Micro Switch	22	Indication Shaft	23	Indicator Gear	24	Indicator

Remark: S(Shut) means close direction, O(Open) means open direction.

Dimension and Technical Data (NTE-03/05)

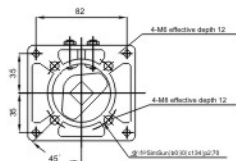
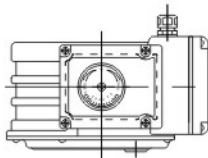
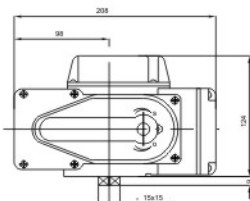
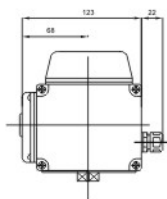
Model	03/05				
Power	24VDC	24VAC	110VAC	220VAC	380VAC
Power Consumption	10W				
Rated Current	2A	2.2A	0.48A	0.24A	0.15A
Output Torque	30Nm	50Nm	15Nm/30Nm/50Nm		
Operation Speed	6S	10S	10S/20S/30S		
Control Function	Type A/B/B1/C/D/E/F				
Weight - (Kg)	2.2kg				
Insulation Resistance	100MΩ/300VDC		100MΩ/500VDC		
Withstand Voltage	500VAC/1Min		1500VAC/1Min		
Enclosure Rating	IP67				
Mounting Direction	360° at all direction				
Ambient Temp.	-25°C~+60°C				
Electric Conduit	M20*1.5				
Option Accessories	Space Heater				



Connection size of direct installation	
Inner Square	□ 9x9 □ 11x11 □ 14x14
Flang	F03 F05 F05 F07
Stem	Height ≤ 19mm Height ≤ 32mm

Dimension and Technical Data (NTE-10)

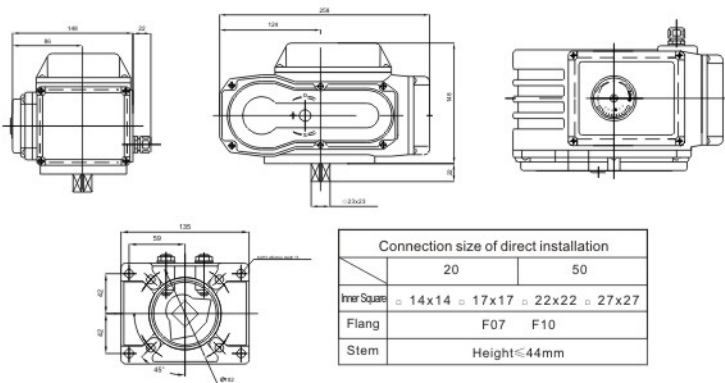
Model	10				
Power	24VDC	24VAC	110VAC	220VAC	380VAC
Power Consumption	23W				
Rated Current	2.4A	3A	0.64A	0.32A	0.19A
Output Torque	100Nm	50Nm/60Nm/100Nm			
Operation Speed	10S	13S/15S/20S/30S			
Control Function	Type A/B/B1/C/D/E/F				
Weight - (Kg)	4kg				
Insulation Resistance	100MΩ/300VDC	100MΩ/500VDC			
Withstand Voltage	500VAC/1Min	1500VAC/1Min			
Enclosure Rating	IP67				
Mounting Direction	360° at all direction				
Ambient Temp.	-25°C~+60°C				
Electric Conduit	M20*1.5				
Option Accessories	Space Heater				



Connection size of direct installation	
Inner Square	□ 11x11 □ 14x14 □ 17x17
Flang	F05 F07
Stem	Height ≤ 32mm

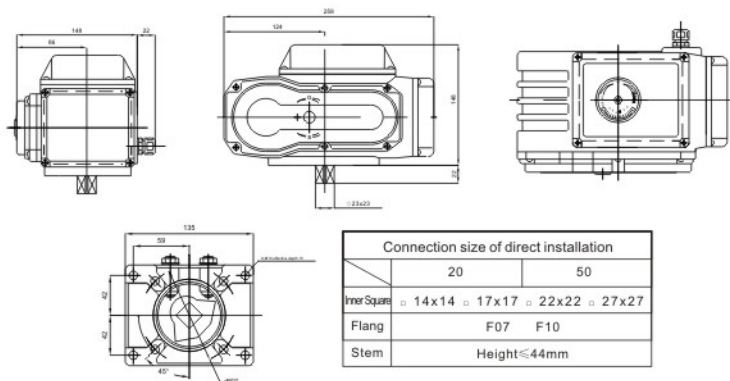
Dimension and Technical Data (NTE-20)

Model	20				
Power	24VDC	24VAC	110VAC	220VAC	380VAC
Power Consumption	40W				
Rated Current	8.5A	5A	0.9A	0.48A	0.25A
Output Torque	200Nm	80Nm/100Nm/150Nm/200Nm			
Operation Speed	10S	9S/15S/20S/30S/60S			
Control Function	Type A/B/B1/C/D/E/F				
Weight - (Kg)	7kg				
Insulation Resistance	100MΩ/300VDC	100MΩ/500VDC			
Withstand Voltage	500VAC/1Min	1500VAC/1Min			
Enclosure Rating	IP67				
Mounting Direction	360° at all direction				
Ambient Temp.	-25°C~+60°C				
Electric Conduit	M20*1.5				
Option Accessories	Space Heater				



Dimension and Technical Data (NTE-40/60)

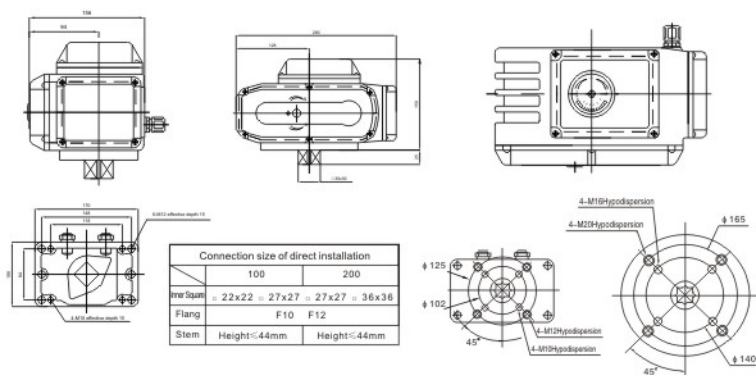
Model	40				60			
Power	24VAC	110VAC	220VAC	380VAC	24VAC	110VAC	220VAC	380VAC
Power Consumption	90W				95W			
Rated Current	8.5A	2A	0.92A	0.45A	9A	2.5A	0.97A	0.5A
Output Torque	150Nm/250Nm/400Nm/600Nm							
Operation Speed	9S/15S/30S/60S							
Control Function	Type A/B/B1/C/D/E/F							
Weight - (Kg)	7.8kg							
Insulation Resistance	100MΩ/500VDC							
Withstand Voltage	1500VAC/1Min							
Enclosure Rating	IP67							
Mounting Direction	360° at all direction							
Ambient Temp.	-25°C~+60°C							
Electric Conduit	M20*1.5							
Option Accessories	Space Heater							



Dimension and Technical Data (NTE-100/200)

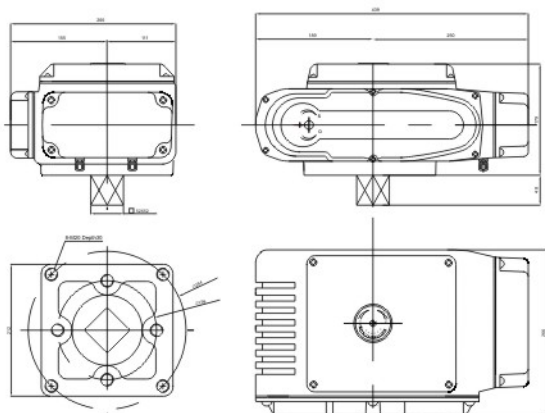
Model	100				200			
Power	24VAC	110VAC	220VAC	380VAC	24VAC	110VAC	220VAC	380VAC
Power Consumption	100W							
Rated Current	9A	2.2A	1.2A	0.48A	9A	2.2A	1.2A	0.48A
Output Torque	800Nm/1000Nm				2000Nm			
Operation Speed	9S/15S/30S/60S							
Control Function	Type A/B/B1/C/D/E/F							
Weight - (Kg)	11.2kg				11.8kg			
Insulation Resistance	100MΩ/500VDC							
Withstand Voltage	1500VAC/1Min							
Enclosure Rating	IP67							
Mounting Direction	360° at all direction							
Ambient Temp.	-25°C~+60°C							
Electric Conduit	M20*1.5							
Option Accessories	Space Heater							

6



Dimension and Technical Data (NTE-400/600)

Model	400			600		
Power	110VAC	220VAC	380VAC	110VAC	220VAC	380VAC
Power Consumption	200W					
Rated Current	4.1A	2.1A	0.9A	4.1A	2.1A	0.9A
Output Torque	4000Nm			6000Nm		
Operation Speed	100S			150S		
Control Function	Type A/B/B1/C/D/E/F					
Weight - (Kg)	31kg			32kg		
Insulation Resistance	100MΩ/500VDC					
Withstand Voltage	1500VAC/1Min					
Enclosure Rating	IP67					
Mounting Direction	360° at all direction					
Ambient Temp.	-25°C~+60°C					
Electric Conduit	M20*1.5					
Option Accessories	Space Heater					



Technical Data of Modulating Type (Type E)

Model	03/05	10	20	40	60	100	200	400	600
Power	24VDC/24VAC/110VAC/220VAC/380VAC; 50Hz/60								
Power Consumption	10W	23W	40W	90W	95W	100W	100W	200W	200W
Rated Current(220VAC)	0.24A	0.32A	0.48A	0.92A	0.97A	1.2A	1.2A	2.1A	2.1A
Output Torque	30/50Nm	100Nm	200Nm	400Nm	600Nm	1000Nm	2000Nm	4000Nm	6000Nm
Operation Speed	30S	30S	30S	30S	30S	50S	100S	100S	100S
Rotary Angle	0 ~ 360°	0 ~ 90°							
Input Signal	4 ~ 20mA, 1 ~ 5VDC, 0 ~ 10VDC								
Output Signal	4 ~ 20Ma								
Precision Grade	1%								
Weight - (Kg)	2.2kg	4kg	7kg	7.8kg	7.8kg	11.2kg	11.8kg	32kg	32.5kg
Insulation Resistance	100MΩ/300VDC			100MΩ/500VDC					
Withstand Voltage	500VAC/1Min			1500VAC/1Min					
Enclosure Rating	IP67								
Mounting Direction	360° at all direction								
Material(Body)	Die-casting Aluminum Alloy								
Electric Conduit	M20*1.5								

Control Function and Wiring Diagram

	<p>Type A: Standard Type</p> <p>Output Signal: 2×SPST(NO) with line power switch</p>
	<p>Type B: 2 × SPST(NO)</p> <p>Output Signal: 1×SPST (NO) micro-switch each at open & close position.</p>
	<p>Type B1: 2 × SPDT(NO/NC)</p> <p>Output Signal: 1×SPDT (NO/NC) micro-switch each at open & close position.</p>
	<p>Type C: Potentiometer</p> <p>Output Signal: 0~500Ω or 0~1000Ω</p>

Control Function and Wiring Diagram

	<p>Type E: Modulating Control</p> <p>Input Signal: 4~20mAC or 1~5VDC</p> <p>Output Signal: 4~20mADC</p>
	<p>Type F: R/I Converter</p> <p>Output Signal: 4~20mADC</p>
	<p>DC Motor with 2 x SPST(NO)</p> <p>Output Signal: 1xSPST (NO) micro-switch each at open & close position.</p>
	<p>3 Phase, 380/415/440VAC Motor with 2 x SPST(NO)</p> <p>Output Signal: 1xSPST(NO) micro-switch each at open & close position.</p>

1. Installation Requirement

- ◆ NTE electric actuators can be used in indoor and outdoor
- ◆ To keep away from fire and explode environment.
- ◆ The maintenance space is required for wiring and manual operation
- ◆ The ambient temperature within -25°C ~ $+60^{\circ}\text{C}$

2. The requirement for process temperature

- ◆ The process temperature by way of the valve transmit the temperature to the electric actuator.
- ◆ The mounting bracket and coupling can reduce the process temperature to the electric actuator.
- ◆ The mounting bracket and coupling is required when the process temperature over 60°C .

3. The requirement for electric conduit and wiring.

- ◆ To follow the figure 1 when the electric conduit is required.
- a) The O.D. of electric conduit is $\varnothing 9\sim\varnothing 11$
- b) The tape seal is required for the water-proof requirement.
- c) The elevation of NTE electric actuator must higher than electric conduit, To prevent condensated water flow into NTE electric actuator.

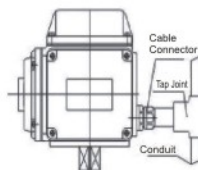


Fig.1

- ◆ The O.D. of cable is $\varnothing 9\sim\varnothing 11$,

Please refer Fig. 2, The O.D. of cable is smaller than $\varnothing 9\text{mm}$ is not allowed.

otherwise, The water maybe flow into NTE electric actuator and damage the internal parts.

- ◆ The shield cable is required, also keep away from power cable.

4. Power Supply

- ◆ The power supply as the following specification:

AC220V $\pm 10\%$ 50/60Hz

AC110V $\pm 10\%$ 50/60Hz

AC380V $\pm 10\%$ 50/60Hz

DC24V $\pm 10\%$

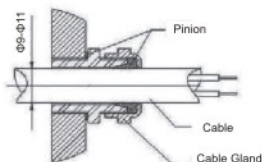


Fig.2

5. The selection of power fuse:

Model	AC380V	AC220V	AC110V	AC24V	DC24V
NTE-03/05	2A	2A	3A	5A	5A
NTE-10	2A	3A	5A	7A	7A
NTE-20/40/60	3A/5A	5A/7A	7A/10A	10A/11A	15A
NTE-100/200	5A	7A	10A	20A	N/A
NTE-400/600	7A	10A	15A	N/A	N/A

The assembly onto valve

1. The assembly (Fig. 3)

- ◆ Manual operate the valve and keep the valve at close position.
 - ◆ Fix the bracket onto valves
 - ◆ One side of coupling fix on the valve stem.
 - ◆ Using the crank handle, operate NTE electric actuator at close position (The position indicator at shut position), insert the coupling on the actuator output shaft.
 - ◆ Tight the bracket between NTE electric actuator and valve
 - ◆ Using the crank handle and operate NTE electric actuator, ensure that it works well, checking the valve whether can normally open and normally closed,
- Notice: Don't over-force, otherwise the NTE actuator will over stroke and destroyed.

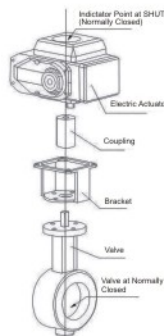


Fig.3

12

2. Notice

If the bracket & coupling is supplied by Customer

- ◆ Bracket, coupling should follow the requirement as design and machining by technician as (Fig. 4)
- ◆ The accuracy of the both stem of coupler must keep within tolerance for reducing gap of the transmission

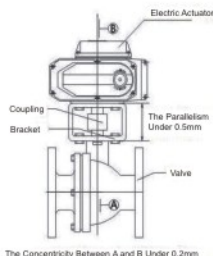


Fig.4

Commissioning of On/off Type

1. Setting of the electric position-limiting

- ◆ The manual operation is forbidden while energizing.

Loosen adjusting bolt until the electric position-limiting is done, to prevent the mechanically blocking.

- ◆ Using handle lever to drive valve at the close position, loosening bolt of the stroke stop and rotating it as counter-clockwise until touch micro-switch(Full Close), then stop rotate and fix the stroke stop.

- ◆ Making the valve at the open position, loosening bolt of the stroke stop and rotating it as clockwise until touch micro-switch (Full Open), then stop rotate and fix the stroke stop. (Please find following layout drawing of stroke stop and stroke switch-Fig. 5&Fig. 6)

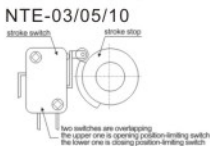


Fig. 5

NTE-20/40/60/100/200/400/600

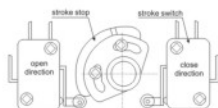


Fig. 6

2. Setting of the mechanical position-limiting (Fig. 7)

- ◆ Crank handle driving valve to closed position.

- ◆ Loosening the stroke nut on the right side and hexagonal bolt. Clockwise rotating the hexagonal bolt until touch the stroke cam, then rotate the bolt half-circle as counter-clockwise, making the normally closed backward 2.5° angle, fix the stroke nut.

- ◆ The same way to set the mechanical stop on the left side. When finish setting the micro switch, mechanical stop, should follow the (Fig. 8). under the abnormal circumstance, the limit switch cut off the power. If the limit switch malfunction, the mechanical stop will work. If the mechanical stop onward or overlap with micro-switch. The motor will not work at the full open & full closed; the motor will over-heat or burn out.

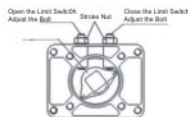


Fig. 7

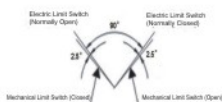


Fig. 8

3. Setting of potentiometer (Type C, Type E) (Fig. 9)

- ◆ The resistance value of potentiometer: 1KΩ, 5KΩ.

- ◆ Crank handle driving valve to closed position.

- ◆ Loosen screw of opening-gear and rotate opening gear

To adjust potentiometer. Using universal electric meter to measure resistance value between terminal 4 and 5, and make the resistance value Achieve 10Ω. Then tighten opening gear screw.

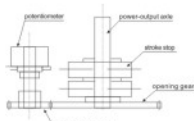
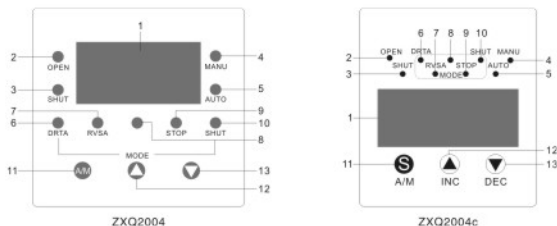


Fig. 9

Commissioning of Modulating Type

◆ Before setting the servo control module, operator should finish adjusting the electric and mechanical position-limiting.



	DATA	1	LED	Show actuator's opening value, inner temperature and other setting data.
STATE	2	OPEN	Actuator is opening.	
	3	SHUT	Actuator is closing.	
	4	MANU	Manual state	
	5	AUTO	Automation state	
	MODE	6	DRTA	Obverse-acting mode Output Signal: 4mA-Full position (NO); 20mA-Zero position (NC).
7		RVSA	Reverse-acting mode Output Signal: 4mA-Zero position (NO); 20mA-Full position (NC).	
8		OPEN	When input signal break off, actuator will open to full position.	
9		STOP	When input signal break off, actuator will close to zero position.	
10		SHUT	When input signal break off, actuator will stop at current position..	
KEY	11	A/M	Shift for Manual/auto; Enter/Change/Shift of different data.	
	12	▲	Increase the value	
	13	▼	Decrease the value	

Wiring Instructions

ZXQ2004 servo control module can be connected with electric actuator by a seven-line connector.

There is a six-line connecting row in module, in which the N.L. lines should be connected with 220VAC circuit (1-phase). Two terminals of input 4~20mA (1~5V) connect with control system; two terminals of output 4~20mA connect with feedback system.

Setting of servo control module

1. When energizing, the LED displays the actual opening value of valves. And this is at auto state.
2. Pressing A/M to change to manual state, and now to press ▲ (▼) to open (close) the electric actuator.
3. Under auto state, pressing ▲ can check the set opening value, the varying trend and stability of Input signal.
4. Under auto state, pressing ▼ can check internal temperature, the module would stop controlling the electric actuator when the temperature exceeds 70°C.
5. Under auto state, pressing A/M for 4 seconds, entering the setting data of following form.

DATA	INDECATION	DESCRIPTION	DEFAULT
U0	00X.0	X=1 The electric driving is allowed; X=0 The electric driving is not allowed;	1
	000.X	X=0 Changing precision is not allowed, Changing re-adjust time is allowed; X=1,2,3 Changing precision is allowed, Changing re-adjust time is not allowed	0
U1	00X.0	X=0 Positive action; X=1 Oppose action	1
	000.X	Failure State: X=0(Neglnction);X=1(FO);X=2(Stop);X=3(FC)	2
U2	XXX.X	Setting the output lower-limit value: $0 \leq U2 \leq 100$. Manual operation and calibrating(zero/full position) are not limited by this data.	0.0
U3	XXX.X	Setting the output upper-limit value: $0 \leq U2 \leq U3 \leq 100$. Manual operation and calibrating(zero/full position) are not limited by this data.	100.0
U4		Precision adjustment(X/100)	0.4
U5	00X.X XXX.X	Operation Code; U5=003.1 is for entering the calibrating pattern(U6/U7)	
U6	XXX.X	Calibration (Zero position); Pressing ▲ (▼) to operate, then pressing A/M to store when actuator achieve to given zero position.	
U7	XXX.X	Calibration (Zero position); Pressing ▲ (▼) to operate, then pressing A/M to store when actuator achieve to given full position.	

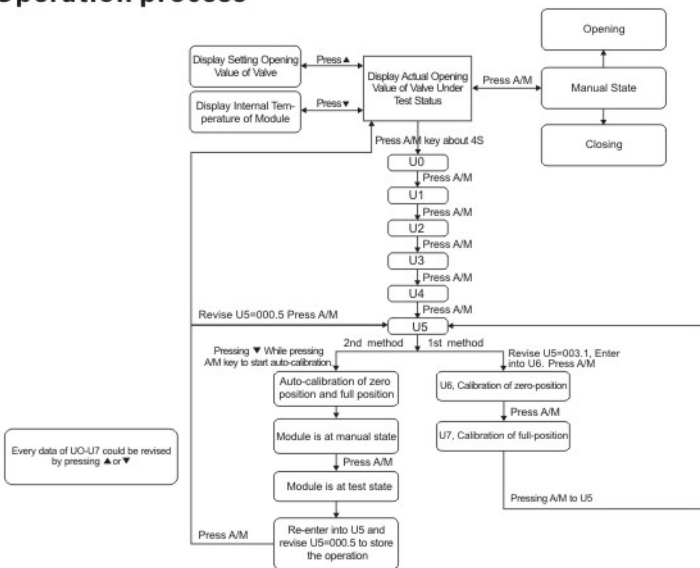
◆ All actuators are calibrated before ex-factory, user just needs to connect power supply, equipment of input signal/out signal. Then the actuator can be put into work without re-calibrating again. If must

calibrate, you also can use auto-calibrating as following method.

◆ Auto-Calibration: Enter into U5 and revise U5=003.1; Pressing both ▼ key and A/M key at the same time, and then release them to start auto calibrating. Now the module will calibrate zero position firstly and full position secondly. Finally, the module will be at manual state. Re-enter into U5 and revise U5=0.005(default), then press A/M key to store the calibrate result.

NOTES: If there is 10S leisure in process of revising data, it would return to test sate automatically.

Operation process



Wrong Code List

Wrong Code	Description
E-01	The control signal is suspend or below 0.3 mA.
E-03	The signal feedback line or open/close line between module and actuator are connected contrarily; operation mistake
E-05	Input or output signal are unstable; Precision is too high.
E-06	Blocking occurred when actuator is closing.
E-07	Blocking occurred when actuator is opening.
E-08	The temperature is higher than 70℃.

Use and Maintenance

- ◆The manual operation is forbidden during electrification!
- ◆Each product has pass completely-test and checkout by QC workers before ex-factory.
- ◆Please confirm the actuator is correctly installed with valves.
- ◆Manually test-run.

Unload electric cover, rotating the handle lever as counter-clockwise. The valve's opening value would be reduced; When valve is at full close position, please observe whether the stroke switch works ; then continue rotating to check whether mechanical stop touches adjust bolt.

If rotating the handle lever as clockwise, please take the same method to check.

◆Electric test-run

Unload wiring cover and correctly connect wiring according to circuit drawing on cover. Electrifying for test-run, please check whether the actuator works well.

◆Maintenance

There is no need to lubricate because we use durable molybdenum lubricating grease.

Please check if there is something wrong when electric actuator seldom work or no work.

NUTORK[®]

Actuators & Valves

NUTORK CORP., manufactures a wide range of pneumatic actuators, electric actuators and the accessories of pneumatic actuator (limit switchbox, solenoid valve, manual override ---etc.) for quarter turn valves

Nutork Corp. supply the following product range:

	NK series rack & pinion type (CE-ATEX certified and PED compliant) 14 models, the output torque from 9Nm(80in.lbs) to 3.920Nm(34,660in.lbs) at 6 bar air supply. ISO5211/DIN3337 for valve connection. VDI/VDE 3845(Namur) standard connection for solenoid valve and shaft top end(limit switchbox or E/P positioner). +1-5 degree stroke adjustment. 25-30um standard hard anodized treatment on actuator body and over 120um epoxy coated on end caps which meet ASTM B117 qualification(salt spread test over 1,000 hours and no corrosion). PTFE, Polyester, Nickel, Ceramic and Epoxy coated are available on request.
	NSF series scotch yoke type pneumatic and hydraulic actuators (CE-ATEX certified and PED compliant) The output torque from 1,660Nm(14,690in.lbs) to 226,200Nm (2,001,870in.lbs) at 6 bar air supply. Anti-corrosion painting on outer body and cylinder as standard. VDI/VDE 3845(Namur) standard connection for shaft top end(limit switchbox or E/P positioner). +/-10 degree stroke adjustment. ISO5211 standard for valve connection. PTFE coated on inner cylinder surface. Hydraulic manual override is available for big size actuator.
	NTE series electric actuator, CE approval 10 models and the output torque from 18Nm(159in.lbs) to 2,000Nm(17,700in.lbs), compact design, die-casting aluminum alloy housing, alloy steel with heat treatment gear driving unit, integral wormgear & drive shaft, 30% duty rating, detachable crank handle, ISO5211(option), IP68 enclosure.
	NTE-02L Quarter Turn Electric Actuator Output torque 25Nm(222in.lbs), operation time 10Sec; voltage 24VAC, 110VAC & 220VAC for option, ABS housing, 30% duty rating, IP65 enclosure.
	NTQ electric actuator, CE approval(IP67 & EExdIIBT4 enclosure) 11 models, the output torque from 60Nm(885in.lbs) to 2,500Nm(22,125in.lbs), de-clutchable manual override, 2xSPDT each for open & close, torque switch: 1xSPDT each for open & close. space heater, self-lock, IP67 & EExdIIBT4 enclosure.
	The fully range accessories(Limit Switchbox, Solenoid Valve, Declutchable Manual Override, Air Filter regulator, E/P Positioner ---etc).
	Dual Plate Check Valve: Retainerless Type Metal Seat Valve Size: DN40-DN1000/150LB DN40-DN600/ 300LB DN40-DN300/ 600LB-2500LB Full Liner Rubber seat Valve Size: DN40-DN2000/ 125-150LB

As we continue to grow and become a major supplier to the industry. NUTORK CORP. will add the necessary people, inventory and new product to set us apart from the rest of the pack!

NUTORK Corp.

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