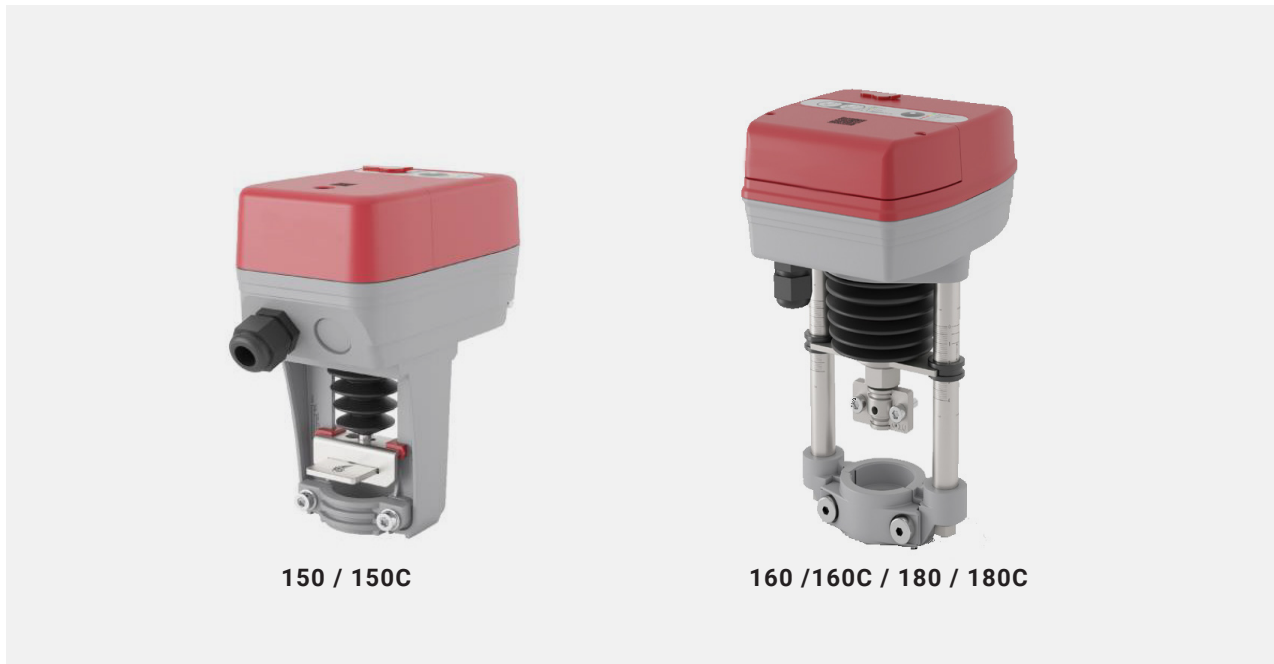


## 150, 150C, 160, 160C, 180 & 180C Series Electric Actuator



### Description

150/150C series...suitable for valve stroke  $\leq 20\text{mm}$ , nominal output force 500N.

160/160C series...suitable for valve stroke  $\leq 30\text{mm}$ , nominal output force 600N/1000N.

180/180C series...suitable for valve stroke  $\leq 50\text{mm}$ , nominal output force 1000N/3000N.

## Features Introduction

- 150-024-050
- 150C-024-050



### RS485 Remote Control

The actuator is equipped with RS485 communication interface. The valve can be remotely controlled by ModBus protocol.



### Supporting APP

The valve has a higher close-off differential pressure, while the leakage rate is no more than 0.02% of Qmax.



### Self Stroking Function

It can automatically measure the max. valve stroke without debugging.



### Manual Device

The actuator has the mechanical manual function for easy maintenance and debugging.



### Speed Adjustability

The speed can be switched through Dip switch.

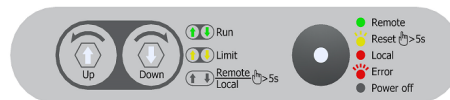


### Seamless Connection

It adopts the seamless connection structure. It can ensure there is no gap during the movement which let the actuator have a higher control precision. The structure is simple and convenient to operate without tools.

### Local Mode (Electric manual function)

The actuator has local control function which can control the valve opening and closing by the buttons on the plate.



### LED Indicating Light

There are LED indicating lights on the actuator cover which is convenient to observe the actuator running status.

- With built-in overload protection to avoid damage.
- Error proofing wiring design to avoid PCB damage in case wrong connection of 24 VDC and signal.
- Isolated design of the mechanical drive and partial circuit.
- With 32 bit CPU and embedded operating system, SMT, electronic devices of primary brands.

**Features Introduction**

- 160-024-100
- 180-024-100
- 180-024-300
- 160C-024-100
- 180C-024-100
- 180C-024-300



**RS485 Remote Control**

The actuator is equipped with RS485 communication interface. The valve can be remotely controlled by ModBus protocol.



**Supporting APP**

Supporting APP is offered to control the valve opening, set and read a number of parameters.



**Self Stroking Function**

It can automatically measure the max. valve stroke without debugging.



**Manual Device**

It can automatically measure the max. valve stroke without debugging.



**Speed Adjustability**

The speed can be switched through Dip switch.  
 600/1000N/3000N: High speed 1s/mm, medium speed 2s/mm.  
 5000N: High speed 2s/mm, medium speed 4s/mm.

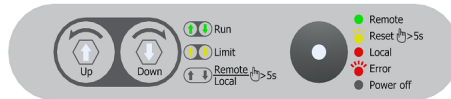


**Seamless Connection**

It adopts the seamless connection structure. It can ensure there is no gap during the movement which let the actuator have a higher control precision. The structure is simple and convenient to operate without tools.

**Local Mode  
(Electric manual function)**

The actuator has local control function which can control the valve opening and closing by the buttons on the plate.



**LED Indicating Light**

There are LED indicating lights on the actuator cover which is convenient to observe the actuator running status.

- With built-in overload protection to avoid damage.
- Error proofing wiring design to avoid PCB damage in case wrong connection of 24 VDC and signal.
- Isolated design of the mechanical drive and partial circuit.
- With 32 bit CPU and embedded operating system, SMT, electronic devices of primary brands.

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## Type Summary

### • 500N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
150C-024-050	Proportional	500N	20mm	24VAC 24VDC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
150-024-050	3-position	500N	20mm	24VAC 24VDC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
150-024-050-S2	3-position with 2 SPDT feedback	500N	20mm	24VAC 24VDC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
150-024-050-MB	RS485	500N	20mm	24VAC 24VDC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 1000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
160C-024-100	Proportional	1000N	30mm	24VAC 24VDC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
160-024-100	3-position	1000N	30mm	24VAC 24VDC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
160-024-100-S2	3-position with 2 SPDT feedback	1000N	30mm	24VAC 24VDC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
160-24-100-MB	RS485	1000N	30mm	24VAC 24VDC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 1000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
180C-024-100	Proportional	1000N	50mm	24VAC 24VDC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
180-024-100	3-position	1000N	50mm	24VAC 24VDC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
180-024-100-S2	3-position with 2 SPDT feedback	1000N	50mm	24VAC 24VDC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
180-24-100-MB	RS485	1000N	50mm	24VAC 24VDC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 3000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
180C-024-300	Proportional	3000N	50mm	24VAC 24VDC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
180-024-300	3-position	3000N	50mm	24VAC 24VDC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
180-024-300-S2	3-position with 2 SPDT feedback	3000N	50mm	24VAC 24VDC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
180-24-300-MB	RS485	3000N	50mm	24VAC 24VDC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

## Type Summary

### • 500N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
150C-230-050	Proportional	500N	20mm	110-230 VAC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
150-230-050	3-position	500N	20mm	110-230 VAC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
150-230-050-S2	3-position with 2 SPDT feedback	500N	20mm	110-230 VAC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
150-230-050-MB	RS485	500N	20mm	110-230 VAC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 1000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
160C-230-100	Proportional	1000N	30mm	110-230 VAC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
160-230-100	3-position	1000N	30mm	110-230 VAC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
160-230-100-S2	3-position with 2 SPDT feedback	1000N	30mm	110-230 VAC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
160-230-100-MB	RS485	1000N	30mm	110-230 VAC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 1000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
180C-230-100	Proportional	1000N	50mm	110-230 VAC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
180-230-100	3-position	1000N	50mm	110-230 VAC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
180-230-100-S2	3-position with 2 SPDT feedback	1000N	50mm	110-230 VAC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
180-230-100-MB	RS485	1000N	50mm	110-230 VAC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

### • 3000N Actuator



Type	Type Description	Rating Force	Stroke	Operating Voltage	Control Signal	Feedback Signal	Running Time ( 50Hz )
180C-230-300	Proportional	3000N	50mm	110-230 VAC	0(2)~10VDC 0(4)~20mA	0(2)~10VDC 0(4)~20mA	high speed: 1s/mm medium speed: 2s/mm
180-230-300	3-position	3000N	50mm	110-230 VAC	3-position	-	high speed: 1s/mm medium speed: 2s/mm
180-230-300-S2	3-position with 2 SPDT feedback	3000N	50mm	110-230 VAC	3-position	2 SPDT feedback	high speed: 1s/mm medium speed: 2s/mm
180-230-300-MB	RS485	3000N	50mm	110-230 VAC	RS485	RS485	high speed: 1s/mm medium speed: 2s/mm

## DIP Switch Instruction

- **500N/1000N/3000N Actuator**

Switch	Function	Description	
S1-1	Starting of control / feedback signal	ON	4-20mA or 2-10VDC
		OFF	0-20mA or 0-10VDC
S1-2	Type of control signal	ON	current signal
		OFF	voltage signal
S1-3	Type of control signal	ON	voltage signal
		OFF	current signal
S1-4	Type of feed back signal	ON	current signal
		OFF	voltage signal
S1-5	Operating mode	ON	When the control signal increases, actuator shaft extends; When the control signal decreases, actuator shaft retracts.
		OFF	When the control signal increases, actuator shaft retracts;When the control signal decreases, actuator shaft extends.
S1-6	Losing control signal mode	ON	When lose control signal (voltage type or current type), actuator will provide a min. control signal internally.
		OFF	1) When lose control signal (voltage type),actuator will provide a max. control signal internally. 2) When lose control signal (current type),actuator will provide a min. control signal internally.
S1-7	Self-stroking mode	ON	Power on each time, self-stroking starts automatically.
		OFF	Self-stroking starts only when press the self-stroking button manually.
S1-8	Control type (when S1-9 is OFF)	ON	Floating
		OFF	Modulating
S1-9	Control mode	ON	RS485 interface control (Modbus protocol)
		OFF	Modulating and floating type
S1-10	Speed	ON	High
		OFF	Low

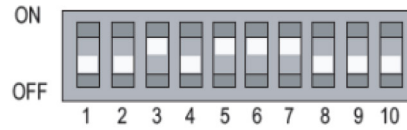
**Structure Characteristic**

• **Modulating type**

Control signal/feedback signal: 4~20mA



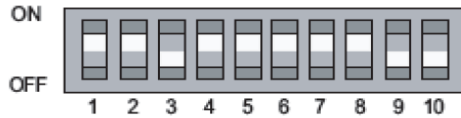
Control signal/feedback signal: 0~10VDC



When is modulating type, terminal B,O is power input, actuator can be controlled by connecting terminal O,E, as shown above, when equipped with our GRUNER series Globe Valve, DIP Switch S1-5 is DA mode:

Control signal at terminal O,E increasing: actuator shaft extends, valve stem retracts, valve tends to open.  
 Control signal at terminal O,E decreasing: actuator shaft retracts, valve stem extends, valve tends to close.  
 Control signal at terminal O,E has no changing, actuator shaft and valve stem stay in present position.  
 When voltage (or current) signal is disconnected, this is equivalent to input a min. control signal, actuator shaft retracts, valve closed.

• **Floating type**

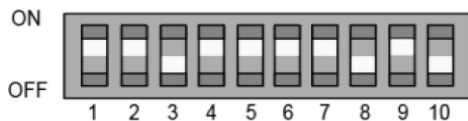


When Dip switch S1-8 is on, it is floating type. Terminal B,O is power input, control the actuator by the switch O,UP,DOWN:

O, UP connected: actuator shaft retracts, and valve stem extends  
 O, DOWN connected: actuator shaft extends, and valve stem retracts

**Notes:** Terminal E,Y doesn't work by this time!

• **RS485 Bus Communication**



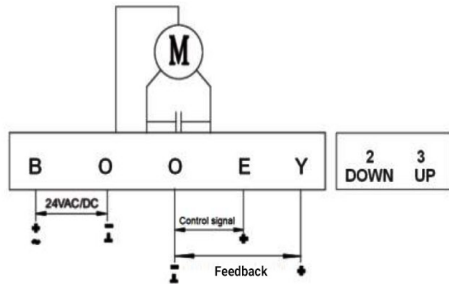
When Dip switch S1-9 is on, it is RS485 Bus communication type. Terminal B,O is power input, remote control by terminal 8,9: Actuator can be controlled remotely by RS485 bus communication, actuator supports ModBus protocol.

**Notes:** Terminal O,E,Y,UP,DOWN doesn't work by this time!

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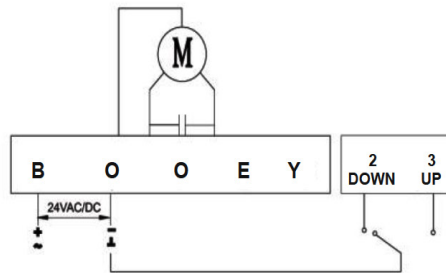
**Wiring diagram 500N**

- 150C-024-050



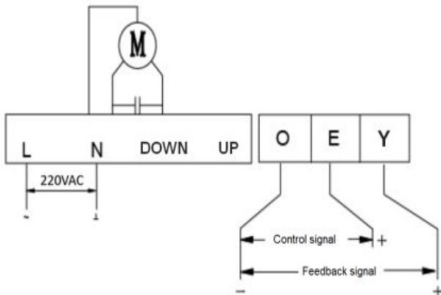
Modulating

- 150-024-050



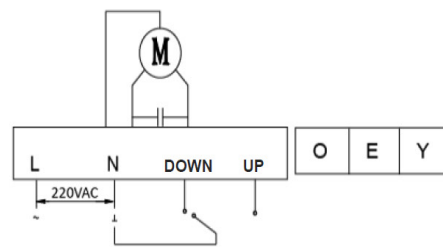
Floating

- 150C-230-050



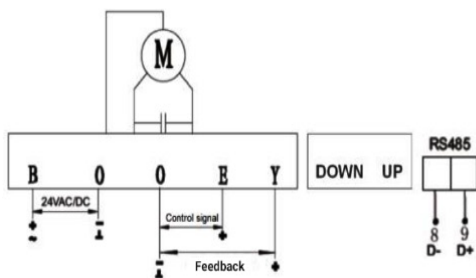
Modulating

- 150-230-050

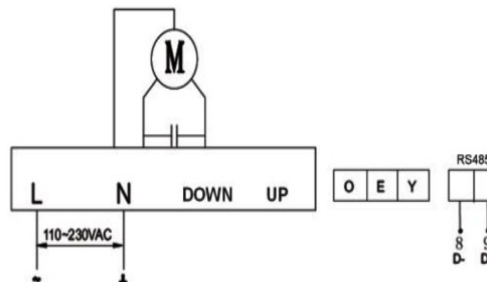


Floating

- 150C-024-050(-MB)



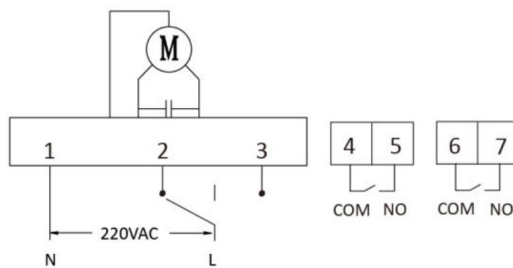
- 150C-024-050(-MB)



**Note:**

- 1) When wire the actuator of 24 with RS485, only connect terminals B,O and RS485;
- 1) When wire the actuator of 230 with RS485, only connect terminals L,N and RS485;

- 150-230-050-S2



**Notes:**

**Terminal 1,2 and 3 are power input:**

When terminal 1 and 2 power on, the actuator will run from 1 to 0.  
When terminal 1 and 3 power on, the actuator will run from 0 to 1.

**Terminal 4, 5, 6 and 7 are SPDT feedback :**

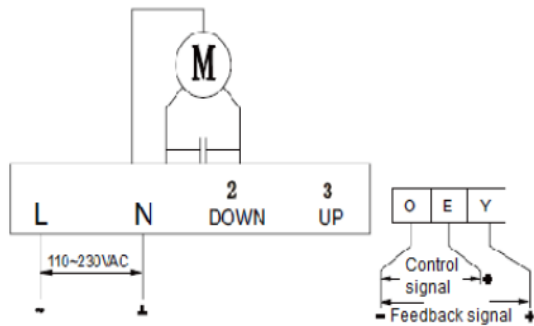
When the actuator runs to limiting position 0, terminal 4 and 5 will conduct and output dry contact feedback.  
When the actuator runs to limiting position 1, terminal 6 and 7 conduct and output dry contact feedback.



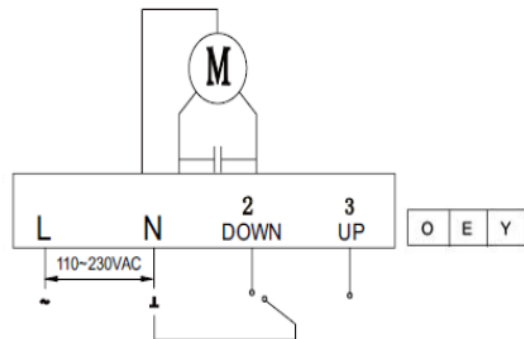
**Wiring diagram 500N/1000N/3000N**

- 160C-230-100
- 180C-230-100
- 180C-230-300

- 160-230-100
- 180-230-100
- 180-230-300



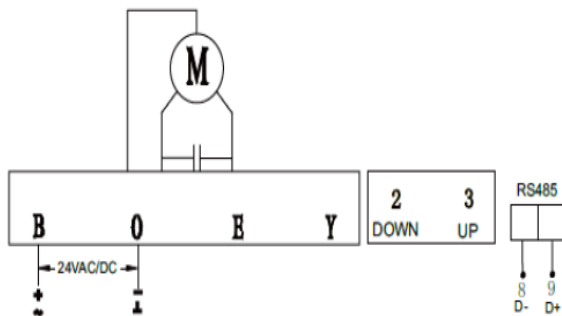
Modulating



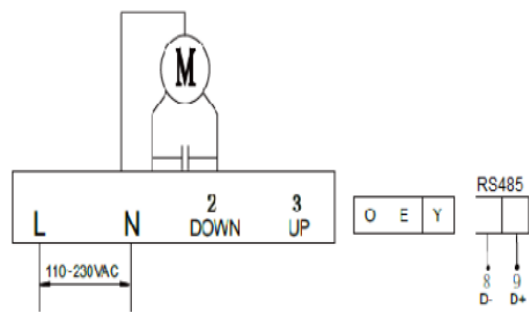
Floating

- 160C-024-100
- 180C-024-100
- 180C-024-300

- 160-024-100-MB
- 180-024-100-MB
- 180-024-300-MB



Modulating

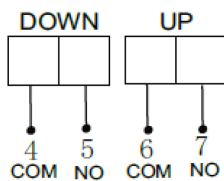


Floating

**Note:**

- 1) When wire the actuator of 24 with RS485, only connect terminals B,O and RS485;
- 2) When wire the actuator of 230 with RS485, only connect terminals L,N and RS485;

**500N / 1000N / 3000N...-S2...**

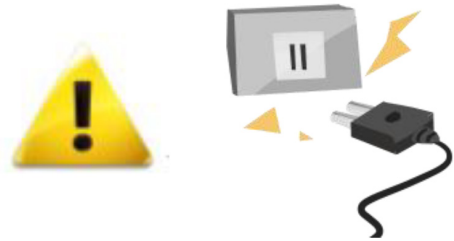


**Note:**

When -S2, terminal 4,5,6,7 are normally open contact, contact capacitance ≤30 VDC:  
 When the actuator runs to lower limit position, terminal 4,5 connect.  
 When the actuator runs to upper limit position, terminal 6,7 connect.

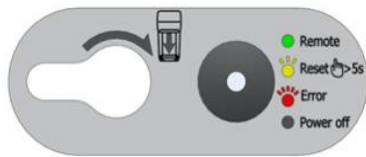
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### Wiring Instruction

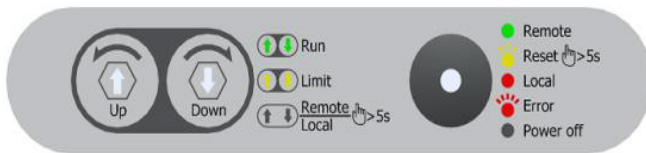


1. Please cut off power supply during wiring in order to ensure personal safety!
2. Carefully check the power voltage when wiring, wire according to the product parameter, if not, it may cause fire and endanger personal safety in severe case!
3. Open the cover when wiring, prohibit disassembling other spare parts!
4. After wiring, please install the cover to the original position to avoid electric shock!

### Indicating light



Reset	Status	Description
Green	Always	Normal mode
Orange	Flashing	Self-stroking
Red	Quick flashing	Alarming



Reset	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Flashing	Self-stroking
Red	Quick flashing	Alarming

UP	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Always	Reach upper limit position
Red	Flashing	Alarming

DOWN	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Always	Reach lower limit position
Red	Flashing	Alarming

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## Debugging Instruction

A. Connect actuator and valve body, wiring according to wiring diagram.

B. Automatic self-stroking (factory default setting): the actuator will repeat automatic self-stroking when power is on each time, the process is as follows:

- 1) The Reset yellow indicating light will keep flashing, actuator shaft extends to lower limit position firstly and then, it retracts to upper limit position, actuator will not be controlled by signal by this time.
- 2) Reset yellow light stop flashing, self-stroking stops. By then, actuator running direction can be controlled by control signal.
- 3) If the Reset red light is quickly flashing during the self-stroking, it means the self-stroking status is not correct and the actuator will start alarming. The actuator cannot match the valve's max. stroke.

Remarks: If you don't need automatic self-stroking function, you can set the 7th switch to OFF, it will change into manual self-stroking.

C. Manual self-stroking function: If self-stroking is need in a power-on state, press down the Reset button over 5 seconds, and then the actuator starts self-stroking. The phenomenon is the same as step B.

D. RS485 function:

RS485 adopts standard Modbus protocol, the following parameters can be set through supporting APP:

RS485 address: the default address is 1.

Band rate:2400/4800/9600(Default) /19200

Byte format: 8bit Data Bits, No Parity (Default)/odd check/even check, 1 stop bit

E. Cellphone supporting APP: Open the mobile APP client and close to the actuator scanning area. After connected, it can set the actuator parameters.

### Notes:

Current type actuator can't set signal division, please use the function after setting voltage type.

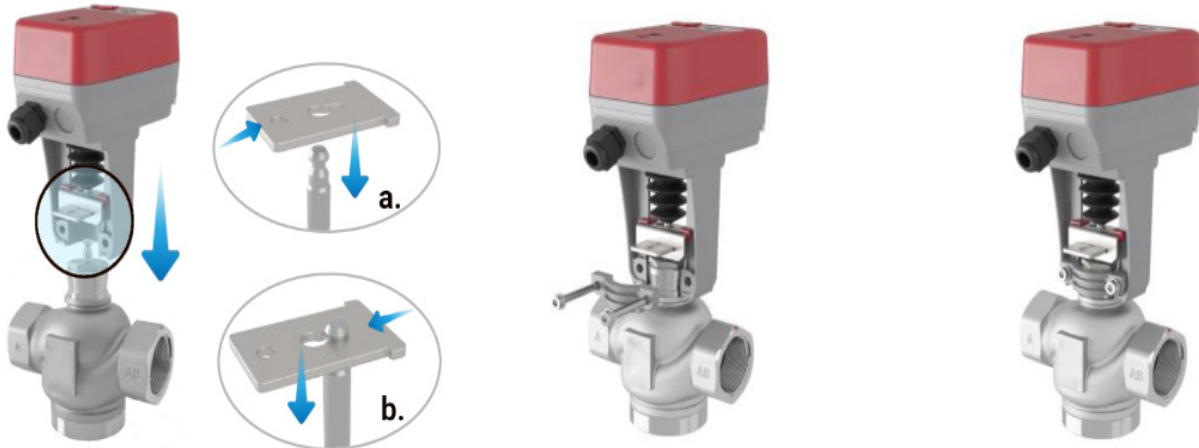
**Assembling Instruction**



**Warning!**

1. Prohibit installing outdoors to avoid PCB damage due to the condensation and water.
2. Rain cover(TRAIN-1) and heating belt(THOT-3) are necessary in case of outdoor installation.

**500N**



1. Loosen the slider under the actuator bottom with Allen wrench, then press the pallet in direction a as shown above and let the valve stem pass through the hole of the pallet, when the two connecting faces keep coinciding, loosen the pallet as show in b above, fix the stem in the slot.
2. Place the slot into the actuator, then tighten the screws.
3. This is how the valve and actuator should look after correct assembly.

**600N/1000N/3000N**



1. Loosen the slider and clip, then put the actuator on the valve body and keep the two connecting faces coinciding, fix the screws on the slit with Allen wrench.
2. Place the slot into the actuator, then tighten the screws.
3. This is how the valve and actuator should look after correct assembly.

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**Manual Device Operation**

**500N**



**600N/1000N/3000N**



1. Shut off and prepare for manual operation.
2. Insert the Allen wrench into the manual hole on the top of the cover.
3. Turn the Allen wrench anticlockwise, the actuator shaft retracts; Turn it clockwise, the actuator shaft extends.
4. Manual operation is done, take out the wrench and cover tightly the red plug.

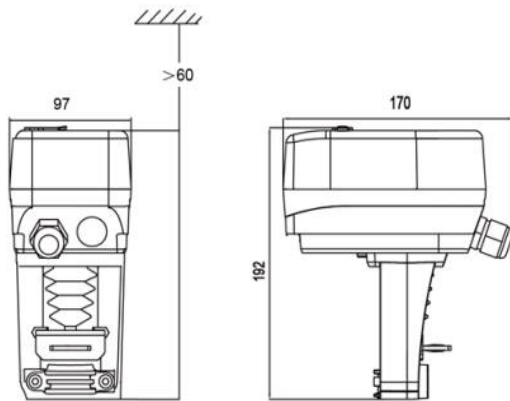
**Note:**



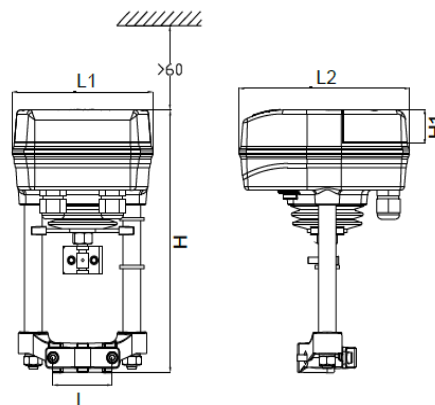
In the case of power off, the actuator needs self-stroking again after the manual operation is completed.  
 Manual self-stroking method: press the Reset button on the actuator cover over 5s, actuator will enter self-stroking!

**Dimension**

**500N**



**600N/1000N/3000N**



Type code	TW series	L mm	W mm	H mm
150-...050	500N	97	170	192
160-...100	1000N	143	173	255
180-...100	1000N	143	173	275
180-...300	3000N	143	193	285

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## Technical Parameters

• Operating Parameters	
Rated output power	500N / 1000N / 3000N
Operating Voltage 24 VAC /AC 230 VAC 500N/1000N/3000N/5000N	24VAC±15%,24VDC±15% 110VAC -220VAC ± 15%
Control sensibility	Modulating: 0.8% RS485: 0.3% (default setting)
Dead zone (only for modulating type)	2% (default setting)
Impedance (only for modulating type) voltage input impedance current input impedance	>100K <0.2K
Load requirements (only for modulating type) voltage output load requirement current output load requirement	>2K <0.5K (For 150 <0.4K)
Degree of protection	500: IP54 1000/1001/3000: IP65
Cable connector	PG13.5
Life time	100 thousand cycles

• Spare Parts Material	
Cover	500: PC 1000/1001/3000/5000: PC
Body	500: PC 1000/1001/3000/5000: Aluminum die casting
Bracket	500: PC 1000/1001/3000/5000: stainless steel
Seat	500: Aluminum die casting 1000/1001/3000/5000: Aluminum die casting

• Weight	
150	2.8 Kg
160	3.0 kg
180	3.8 kg

• Environment Parameter	
Running	
Ambient temperature	-25~+65°C
Ambient humidity	≤95% RH non-condensation
Storage	
Ambient temperature	-40~+65°C
Ambient humidity	≤95% RH non-condensation

• Certificate	
CE certificate	
EMC directive	2014/30/EU
Low Voltage Directive	2014/35/EU
Machinery directive	2006/42/EC
System Certification	
QMS	GB/T19001-2016 / ISO9001:2015
EMS	GB/T24001-2016 / ISO14001:2015
OHSAS	GB/T45001-2020 / ISO 45001:2018

## Hazardous Substances

Hazardous Substances						
Parts	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
<b>Metal</b>	x	○	○	○	○	○
<b>Rubber</b>	○	○	○	○	○	○
<b>PCB</b>	x	○	○	○	○	○
<b>Package</b>	○	○	○	○	○	○

This form is created in accordance with the SJ/T11364 standard.

○ : Indicates that the concentration of the hazardous substance contained in all the homogeneous materials of this part is below the limit requirement of the GB/T 26572.

x : Indicates that the concentration of the hazardous substance contained in all the homogeneous materials of this part is above the limit requirement of the GB/T 26572.