Catalog

pOWER

power

Before using this actuator, please read carefully to understand this user's hand book, so that you can make full use of it through proper use and maintenance.

product overview

The 3810 L series linear travel electronic electric actuator is driven by the 200 single-phase alternating current power supply. Receiving the control signal (DC4~ 20mA or DC1~ 5V) from the regulator, it can not only provide almost all kinds of the transforming function that the valve itself requires but also valve's open degree signal function and manual function. So it is widely used in the industry sectors such as metallurgy, petrochemistry, light industry and environmental protection.

1 main features

1.1 The actuator is designed with servo system. (No necessity to equip servo amplifier). It can work only by connecting with the DC4~ 20mA signal (or DC1~ 5V signal) and the AC220V single-phase alternating current power supply. With the connector pin inside, conductor configuration is quite convenient and easy.

1.2 The key parts of the actuator-–controller-–adopts the most advances mixed integrated circuit and is cast after sealed with resin. With box-like exterior appearance and compact volume and high reliability.

1.3 The drive capacity's feedback inspection adopts high performance conductive potentiometer, resolution capacity <0.4%

1.4 With self-check function, the indicating lamp on the controller will give off indicative signal.

1.5 Set the signal-broken states by the state optional switches (whether the valve core is in the state of full-open full-close or self-locking)

1.6 Set the positive or negative movement by the state optional switches.

1.7 Set the input signals DC4~ 20mA or DC1~ 5V by the state optional switches.

1.8 Easy to adjust the work's null point(starting point) and travel (finishing point)

1.9 Self-lock the valve core once the power is off.

1.10 Rotated by the synchronous band to effectively reduce the noise.

1.11 With time delay function, the state self-locking can be realized when in its rated-loaded state.. When malfunction happens, it can start the protection function at once and then cancel the protection through negative movement.

2 main technological parameters

2.1 power supply

AC220±0% , 50HZ

2.2 power consumption (in rated load)

Model A actuator 30VA
Model B actuator 60VA
Model C actuator 140VA

2.3 input signal

DC4~ 20mA or DC1~ 5V

available power supply:240VAC(60HZ)

2.4 output signal

DC4~ 20mA (loaded resistance below 500)

2.5 control accuracy

basic tolerance: 1%, return error 1%, dead band range 1%

2.6 adjustment range of word travel

Null 25%

travel 20%~100%

2.7 external wiring

Shield cable should be used to transfer input and output signal. You are not allowed to use the same cable to supply the power and the signal.

	General type (S type) actuator	Explosion prevention type (X type) actuator
Power supply cable	3 cores S=1.5 mm^2	3 cores S=1.5 mm^2, outside diameter 9 ±1
Signal cable	4 cores S= 1.5 mm^2	4 cores S=1.5 mm^2, outside diameter 11±1
Cable inlet	2-P F (G 1 / 2)	Protection bushing available PF 3 / 4 (G 3 / 4)

2.8

Ambient condition	General type(S type) actuator	Explosion prevention type(X type) actuator
Ambient temperature	Without space heater - 10 ℃ ~ 60 ℃	-10℃~40℃
	With space heater - 35 ℃ ~ 60 ℃	
Relative humidity	Below 95 %	45% ~ 85%
Ambient gas	Non-corrosive gas	
Mechanical vibration	Below 1.5 g	

2.9 protection grade

IP65

2.10 explosive prevention grade

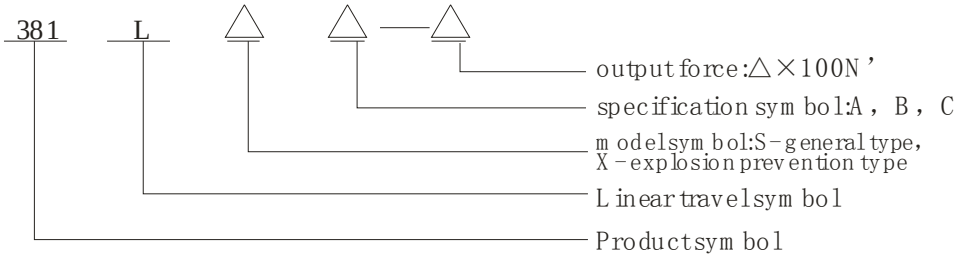
Exd II BT4.

2.11 overload protection

You can choose the function or not freely when you buy Actuator A or B, but the function must be equipped in the Actuator C.

3 product model and specification

3.1 notification for product specification

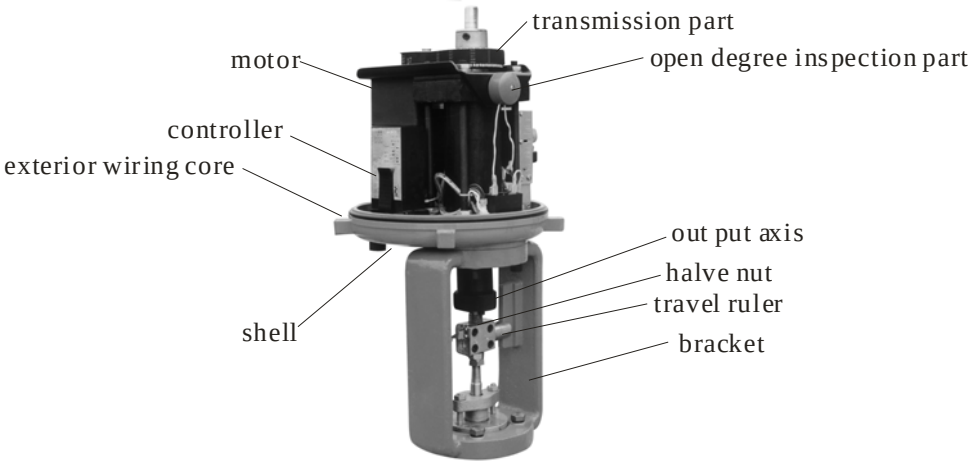


3.2 Our company's actuators series (shown in Table 1) Table 1

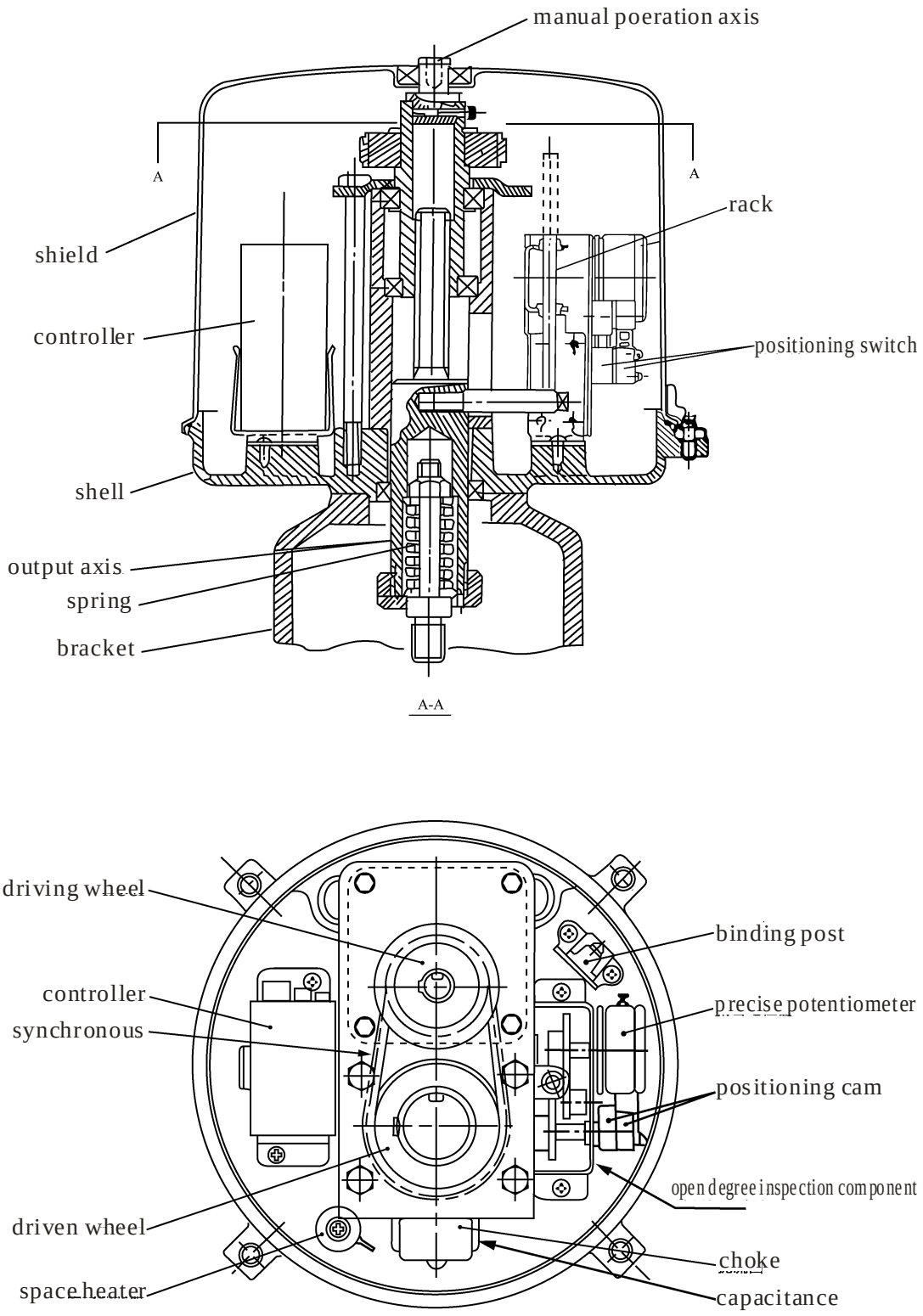
Model	Output force (N.M)	Work velocity (mm/s)	Maximum travel (mm)
381LSA-08 381LXA-08	800	4.2	30
381LSA-20 381LXA-20	2000	2.1	
381LSB-30 381LXB-30	3000	3.5	60
381LSB-50 381LXB-50	5000	1.7	
381LSC-65 381LXC-65	6500	2.8	100
381LSC-99 381LXC-99	10000	2.0	
381LSC-160 381LXC-160	16000	1.0	
381LSC-260 381LXC-260	26000		

4structure and principle

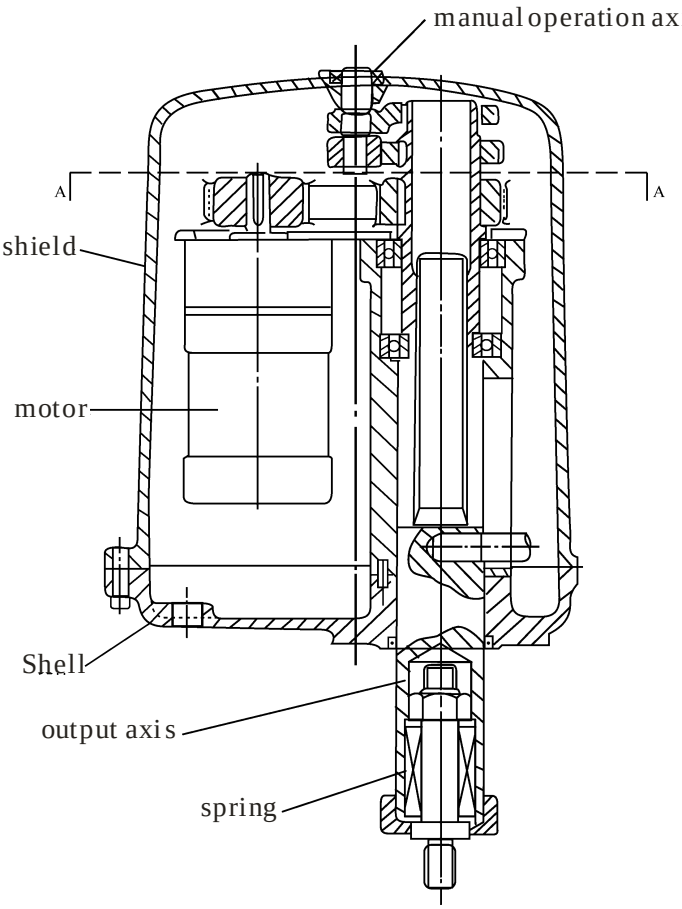
the 3810L series corner travel electronic electric actuator's appearance and structure areillustrated as Graph1, Graph2, Graph3, Graph4,Graph5.



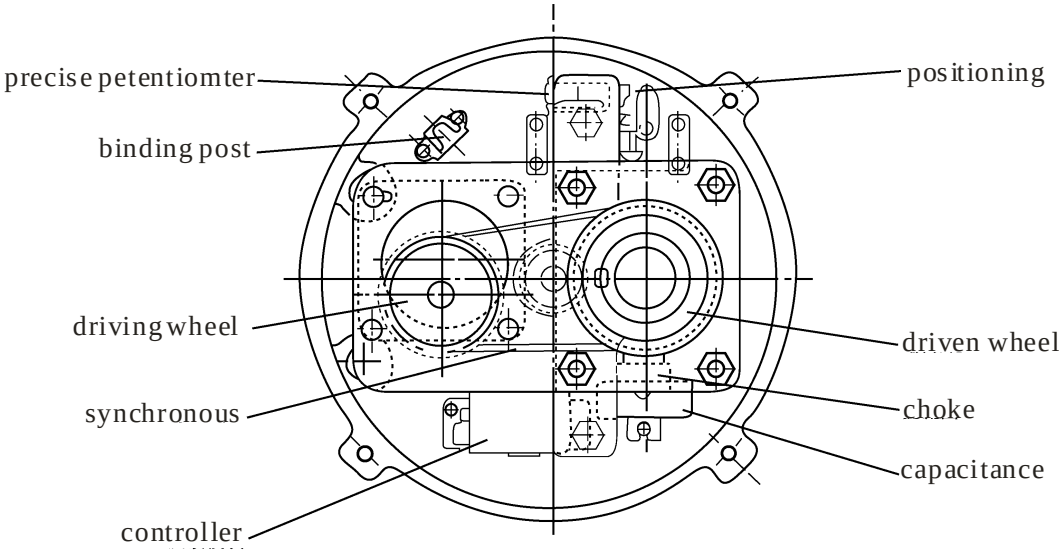
Graph 1 external appearance of the actuator



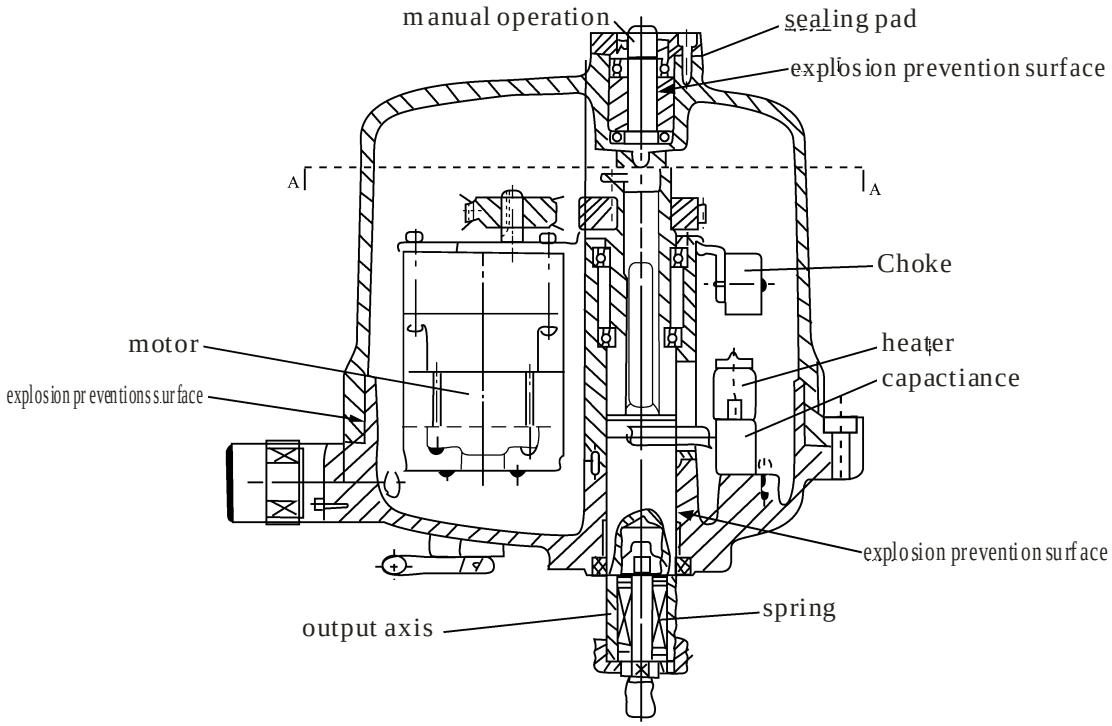
Graph 2 381LSA、381LSB type actuator



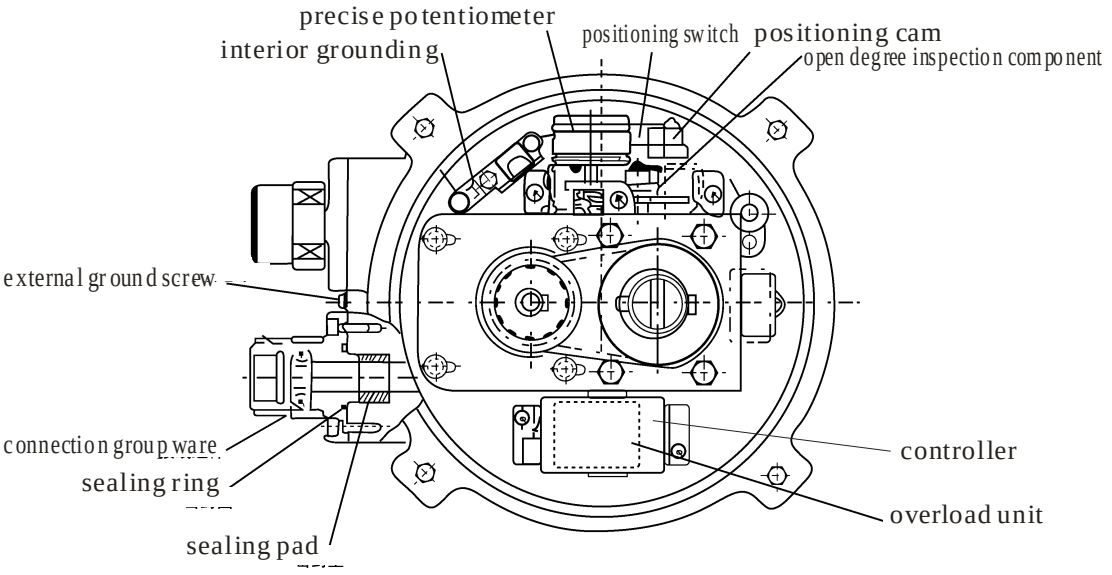
A-A



Graph 3 381LSC type actuator



A-A



Graph 4 381LXA、381LXB type actuator

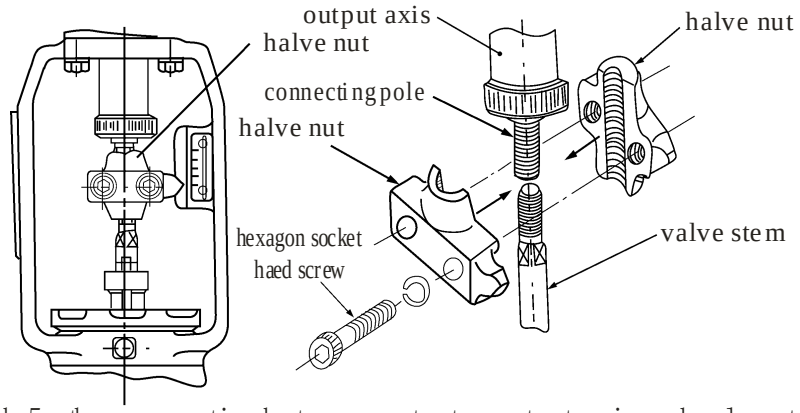
The actuator includes the following parts:

4.1 controller: receiving the DC4~ 20mA or DC1~ 5V signal from the regulator, it can control the actuator to work under the scheduled mode.

4.2 transmission mechanism: transfer the revolving movement of the motor into the to-and-fro corner (0-90°) movement of the dynamic output axis so as to realize the adjusting function of the adjusting valve's switch.

4.3 open degree inspection mechanism: feed back the corner movement displacement of the output axis (the open degree of the valve core,ie0-90°) to the potentiometer through gear construction. Then the potentiometer will transform the displacement into electric signal and re-feed back to the controller. When the input signal from the regulator is equal to the open degree signal from the valve core, the motor will stop working.

4.4 combination mechanism : combine the actuator and the controlled valve with line connection and connect the actuator's output axis and valve stem with halve nut. The pointer on the halve nut and the ruler on the bracket can show you the displacement of the output axis(or valve stem).(shown in Graph 5)

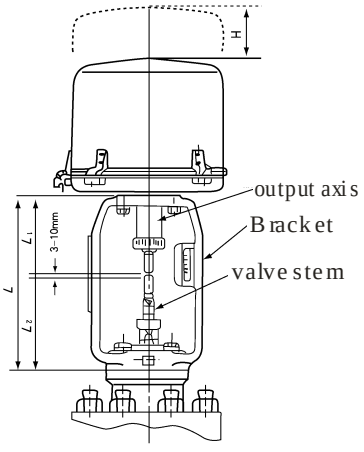


Graph 5 the connection between actuator output axis and valve stem

4.5 manual operation mechanism: this actuator can also provide the manual operation mechanism, which can complete the adjusting valve's open, close and adjusting functions when the power is off.

5 Installation

5.1 Because you need to disassemble the shield when you are doing the job of conductor configuration, adjusting and maintenance of the actuator, please leave enough space (shown in Figure6) in the top of the actuator. The needed space dimensions are shown in Table 2



Graph 6

Table 2

Actuator's model	H (mm)
381LSA	≥205
381LXA	≥230
381LSB	≥260
381LXB	≥280
381LSC	≥370
381LXC	≥430

5.2 Please install actuator as upright as possible instead of installing it up side down, so as to avoid the difficulty in maintaining it.

5.3 When connecting the output axis and valve stem with halve nut after the actuator is combined with the adjusting valve through bracket, please leave 3~10mm clearance between the lower part of the output axis and upper part of the valve stem.(shown in Graph 6)

5.4 In order to prevent water enter from the fuse's mouth in the conductor configuration, please never carry construction on rainy days. After conductor configuration, adjustment, inspection and maintenance, please fasten the shield.

5.5 When you install the actuator of explosive prevention type, please strictly abide by the stipulations of Security Regulations in Dangerous Places of the People's Republic of China.

a) the specific interior and exterior ground wire of the actuator should be connected to the ground firmly and reliably.

b) cut off the power supply before opening the shield for maintenance.

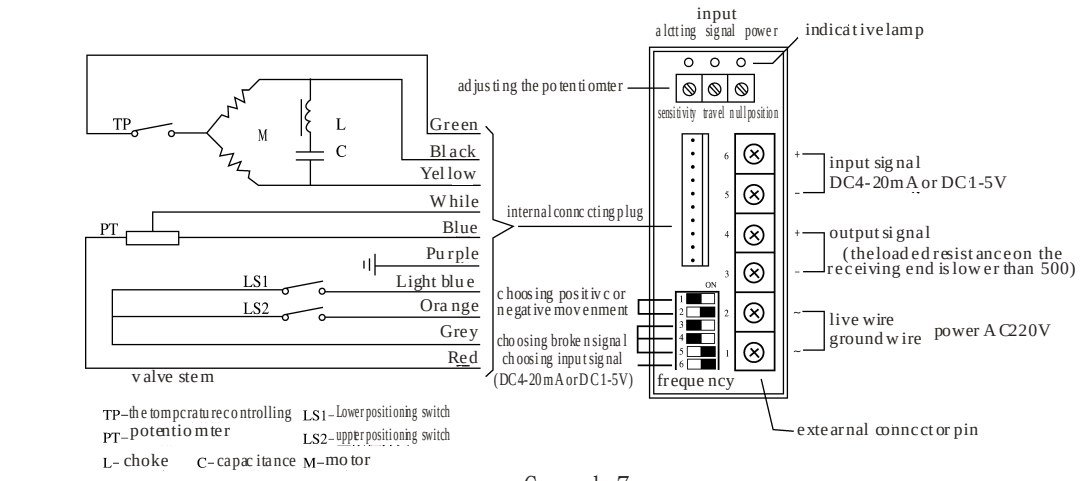
c) the clearance of the connection dots and electrical current interval should be more than 8mm.

d) please inspect the sealed ring's aging problem regularly, f the ring is aged, please replace it with the same specification in time.

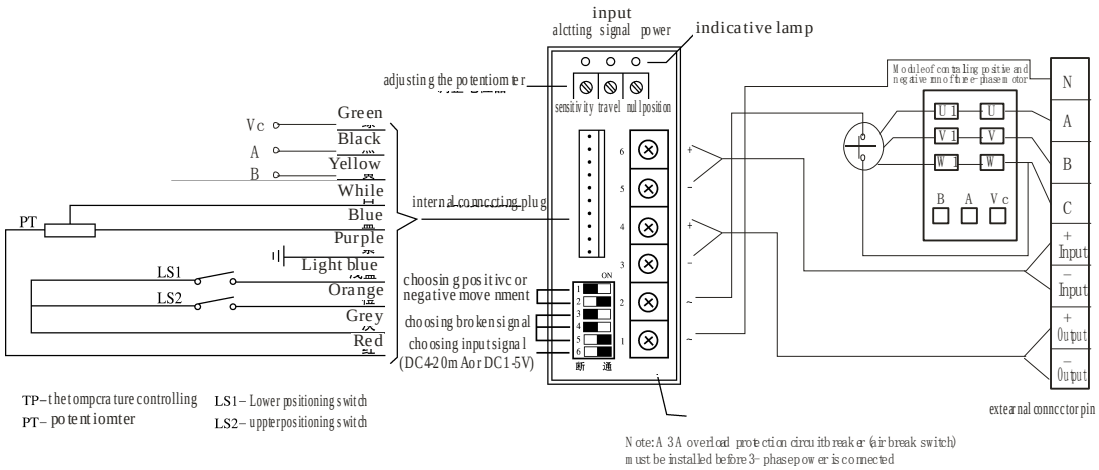
e) the shell should be kept clean and its surface's highest temperature should never surpass 130℃

6 adjustment

No matter the actuator leaves the factory as a single machine or combined with the adjusting valve, it has already be adjusted, however, onsidering the violent vibration and crush in the transit and installation, please confirm whether the actuator can work properly. If there exists some deviation, please readjust it according the following steps. (shown in Graph 7)



Graph 7



6.1 conductor configuration

a) loosen the fixing screw in the shield, then dissemble the shield uprightly.

b) Please refer to the sketch map on the side of the controller to connect the exterior wiring with the connector pin on the actuator.

6.2 Setting the state switches

There are six state switches on the controller

The state of the positive or negative movement is set by Switch ① and Switch ②.

The state of signal-broken movement is set by Switch ③,Switch ④, and Switch ⑤.

The state of input signal is set by Switch ⑥.

a) Setting the input signal state

- When the input signal reaches DC4~ 20mA, turn the Switch ⑥ rightward to ON
- When the input signal reaches DC1~ 5V, turn the Switch ⑥ leftward to OFF.

※ In Graph 7, Switch ⑥ is set to ON with the input signal DC4~ 20mA

b) Setting the signal-broken movement state

Full-open state: turn Switch ③ rightward to ON, turn Switch ④&⑤ leftward to OFF.

(When the input signal is broken, the output axis of the actuator will stop until it involes anticlockwise to the top limitation position, and the valve core will in the full-open position.)

Full-close state: turn Switch ④ rightward to ON, turn Switch ③&⑤ leftward to OFF.

(When the input signal is broken, the output axis of the actuator will stop until it involves clockwise to the bottom limitation position, and the valve core will in the full-close position.

Remaining state: turn Switch ⑤ rightward to ON, turn Switch ③&④ leftward to OFF.

(When the input signal is broken, the output axis of the actuator will stop involving and the valve core will remain in the former position

* In Graph 7, Switch ②,Switch ③ and Switch ⑤ are set to the remaining state.

c) Setting the positive and negative movement state

Positive movement state: turn Switch ①rightward to ON, turn Switch ② leftward to OFF.

Along with the increase of input signal, the output axis will involve clockwise (to close the valve core), and along with the decrease of input signal, the output axis will involve anticlockwise (to open the valve core)

Negative movement state: turn Switch ②rightward to ON, turn Switch①leftward to OFF.

Along with the increase of input signal, the output axis will involve anticlockwise (to open the valve core), and along with the decrease of input signal, the output axis will involve clockwise (to close the valve core)

* In Graph 7, Switch ①,Switch ② are set to the negative movement state.

For more specific Switches' states setting, please refer to Table 3.

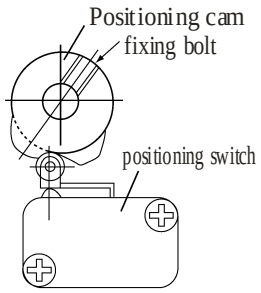
Setting State / Switches	Positive/negative movement		Signal-broken choosing			Input signal	
	Positive	negative	Full-open	Full-close	remaining	1 -5V	4-20mA
Switch 1	ON	OFF					
Switch 2	OFF	ON					
Switch 3			ON	OFF	OFF		
Switch 4			OFF	ON	OFF		
Switch 5			OFF	OFF	ON		
Switch 6						OFF	ON

6.3 Null adjustment and corner adjustment

(shown in Figure7), please first carry on the null adjustment, that is, adjusting it when the output axis is on the limitation position of the cloclwise(the valve core is close), and then carry on the corner adjustment, that is adjusting it when the output axis is on the limitation position of anticlockwise(valve core is open). This is because the null adjustment will change the axis's clockwise involving position while the corner adjustment will not change the “null position”.Turn the “null” adjusting potentiometer clockwise, the output axis will involve anticlockwise, and vice versa. Turn the “travel” adjusting potentiometer clockwise, the corner will increase, and vice versa.

6.4 Adjustment of the output axis limitation position

If the limitation position of the output axis is not properly adjusted, (the positioning switch will touch on too earlier), the corner adjustment will be influenced. So before making the corner adjustment to the output axis, please loosen the fixing screw in the positioning cam first to postpone the positioning switch's movement. (Shown in Graph 8)



Graph 8

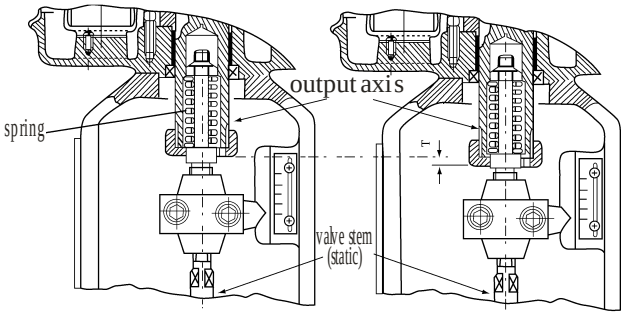
A) adjusting the output axis's limitation position for ascending.

When the state switch is set as "positive movement state", (that is, along with the decrease of the input signal, the output axis will move upward), decrease the input signal gradually until the input signal is in the range from 3.7mA---3.95mA, then adjust and fasten the exterior positioning cam. Touch on the positioning switch, the output axis will stop moving upward.

When the state switch is set as "negative movement state", (that is, along with the increase of the input signal, the output axis will move upward), increase the input signal gradually until the input signal is in the range from 3.7mA---3.95mA, then adjust and fasten the exterior positioning cam. Touch on the positioning switch, the output axis will stop moving upward.

b) adjusting the output axis's limitation position for ascending.

When the state switch is set as "positive movement state", (that is, along with the increase of the input signal, the output axis will move downward), increase the input signal gradually until it reaches among 20mA. Please first make sure the valve stem is static, this is, the valve core is closed. Then continue to increase the input signal gradually to compress the spring in the input axis. When the axis descends about T=1mm (shown in Graph 9), adjust and fasten the exterior positioningcam. Touch on the positioning switch, the output axis will stop moving downward. Thus make sure when T=1, the actuator reaches its rates output force.



Graph 9

When the state switch is set as "negative movement state", (that is, along with the decrease of the input signal, the output axis will move downward), decrease the input signal gradually until it reaches 4mA. Please firsrt make sure the valve stem is static, that is, the valve core is closed. Then cintinue to decrease the input, signal gradually to compress the spring in the input axis. When the axis descends about T=1mm (shown in Group 9), adjust and fasten the exterior positioning cam. Touch on the positioning switch, the oupput axis will stop moving downward. Thus make sure when T=1mm, the actuator reaches its rates output force.

* If the valve stem moves on when the input signal reaches 20mA or 4mA,please loosen the halve nut to readjust the distance between the part of the output axis and the lower part of the valve stem.(increase the distance)

* If the valve stem stops moving when the valve is below 20mA or above 4mA,please lossen as well as loosen the halve nut to readjust the distance between the upper part of the output axis and the lower part of the valve stem.(decrease the distance)

6.5Method for adjusting the positioning cam

Cut off the power supply, turn slowly the positioning cam with its fixing screw already loosened to compress the positioning switch. When the positioning switch is sure to be touched on, (the positioning switch will crack), fasten the positioning cam with fixing screw. Getting through the power supply, moving the cam repeatedly until the upper and lower limitation position of the output axis meet the requirement.

6.6 Adjusting the sensitivity(the sensitivity potentiometer)

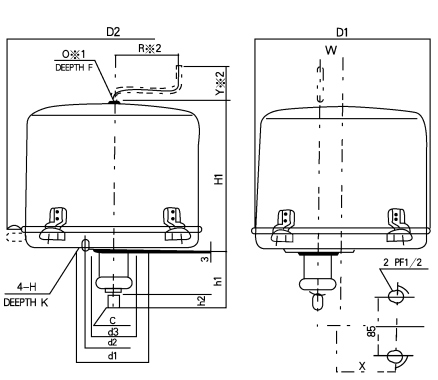
The sensitivity of the potentiometer has already be adjusted by rule when leaving factory, however, when vibration happens in the overall adjustment on the spot or the loop surges itself, please readjust the sensitivity. Please adjust the sensitivity potentiometer according to Figure 7. Turn it clockwise, the sensitivity will increase, vice versa.

7 overall dimension

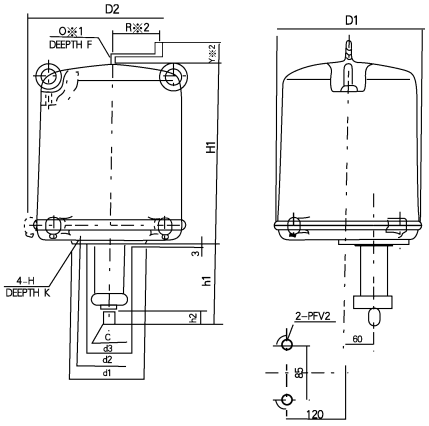
Overall dimension is illustrated as Graph 10, Graph 11, and listed in Table 4

Note: ※ 1. the subtense width of the hexagon socket head screw

※ 2. the needed dimension for manual operation



Graph 10 381LSA、381LSB type



Graph 11 381LSC type

Table 4

mode	D1	D2	H1	h1	h2	d1	d2	d3	C	K	M	W	Y ※2	Q ※1	F	R ※2	X	weight kg
381LSA	Ø225	Ø260	200	78	18	Ø90	Ø70	Ø55	M14 ×1.5	15	M8	28	87	6	12	80	75	7.5
381LXA	Ø240	Ø280	283															14.5
381LSB	Ø255	Ø290	280	125	31	Ø125	Ø102	Ø70	M18 ×1.5	18	M10	45	90	8	15	100	91	13.8
381LXB	Ø270	Ø310	293															25.0
381LSC	Ø310	Ø360	415	175	31	Ø150	Ø125	Ø85	M22 ×1.5	24	M12		90	8	15	160	120	48
381LXC	Ø350	Ø390	450															

8. The self-contained bracket

All sorts of self-contained brackets are fully listed in Table 5,each actuator can have two or three coordinating brackets. It can be connected with general adjusting value whose dimensions have been stipulated by China thoroughly. However, when selecting the actuator, you still need to verify whether the output force of the selected actuator can meet the need to open and close the adjusting valve.

Table 5

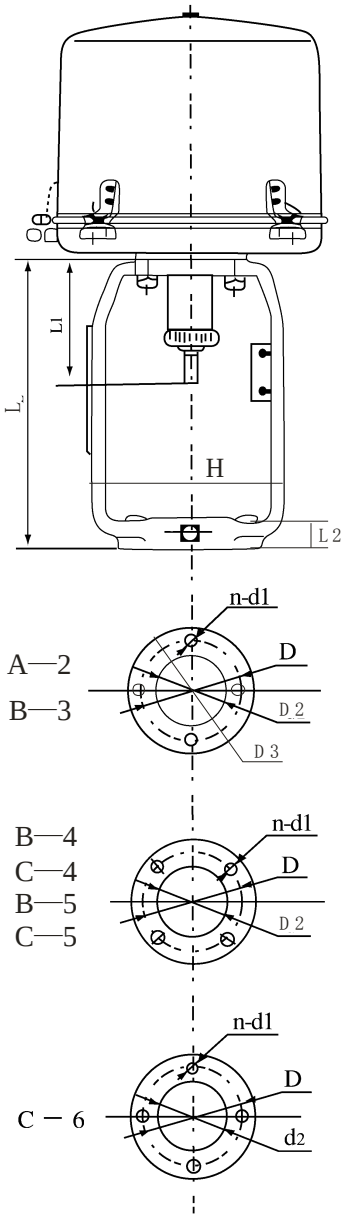
Mode1	Coordinate dadjusting valves	Bracket code name
381L SA-08 381L XA-08	20	A-2
381L SA-20 381L XA-20	20 ~ 50	A-2
381L SB-30	25 ~ 50	B-3
381L XB-30	65 ~ 100	B-4
381L SB-50 381L XB-50	25 ~ 50	B-3
	65 ~ 100	B-4
	125 ~150	B-5
381L SC-65 381L XC-65	65 ~ 100	C-4
	125 ~200	C-5
381L SC-99 381L XC-99	125 ~200	C-5
	250 ~300	C-6
381LSC-160 381LXC-160	125 ~200	C-5
381LSC-260 381LXC-260	250 ~300	C-6

The connection dimensions of the bracket and the adjusting valve is illustrated as Graph 12 and listed in Table 6.

Bracket code name	L	L1	D	n-d1	D2	H	D3	L2
A-2	173	78	Ø80	2-Ø10	Ø60	130	100	21
B-3	215	125	Ø80	2-Ø10	Ø60	157	125	22
B-4	255	125	Ø105	4-Ø12	Ø80	175	135	25
B-5	267	125	Ø118	4-Ø14	Ø95	177	155	25
C-4	285	175	Ø105	4-Ø12	Ø80	205	155	27
C-5	310	175	Ø118	4-Ø14	Ø95	210	155	27
C-6	345	175	Ø130	4-Ø18	Ø100	220	175	27

Reference dimensions (same national wide) Table 7

Adjusting valve DN	L	Valve stem screw thread
20,25,32,40,50	95	M8
65,80,100	135	M12×1.25
125,150,200	140	M16×1.5
250,300	170	M20×1.5



Graph 12 the boltbore's dimention for the conneting bracketand valve

9 malfunction and settlement

Specific malfunction	Cause for the malfunction	Settlement
No action, the lamp doesn't light	no power supply	Connect with power supply
No action, the lamp lights The input signal lamp doesn't light	No input signal The positive pole and negative pole is wrongly inter-converted	Inspect and correct it Inspect and correct it
The motor can not start up, the lamp lights, the input signal lamp also light	Voltage is not accordant or too low Error in the input signal Heat protection (high temperature or frequent use or the capacitor is pierced The wire in the motor is broken Poor contact in the plugs of motor, capacitance and potentiometer	Inspect the voltage and correct it Correct the input signal switches Reduce the surrounding temperature and using frequency Change sensitivity or capacitance Replace wires or connect them correctly Connect the plugs correctly
Motor surges and is over heated	Interference exists in the input signal The sensitivity is too sensitive Ill conductor configuration in the potentiometer	Inspect the input signal to get rid of the interference Regulate the sensitivity potentiometer to decrease sensitivity Inspect and correct it
No feedback signal in the valve	Poor contact in the feedback signal lines or the wire is broken	Inspect the feedback signal line
Feedback signal is too big or smal	improper installation in the potentiometer Null adjustment and travel regulation is improper	Inspect the potentiometer's installation Readjust the null and travel potentiometer
The motor cannot stop though the switch has reached the limitation position	Improper regulation in the upper and lower positioning cams Fault in positioning switches Ill conductor configuration in the positioning switches	Readjust the positioning cam Replace positioning switch Connect the positioning switch's wires correctly
The movement of the actuator is stepping or crawling	The moving timing for the actuator is not correct	Inspect and correct it
The motor is over heated, and automatically stop stopping in its running	Over-loaded protection stirs because of over loading Heat protection Null adjustment and travel regulation is improper	Inspect the adjusting valve and cancel over-loaded condition Cancel over-loaded condition or reduce the surrounding temperature Readjust the null and travel potentiometer If it is still laborious by manual, please dissemble the valve Loosening the cover
The controlling sensitivity and the motor's output torque decrease	The voltage of the motor is not sufficient, The voltage of the power supply is too low or not accordant	Inspect the voltage and correct it
Laborious by manual	The feeding cover is too tightly screwed Some accidents happen inside and outside the valve	Loosening the cover Disassemble the cover for inspection

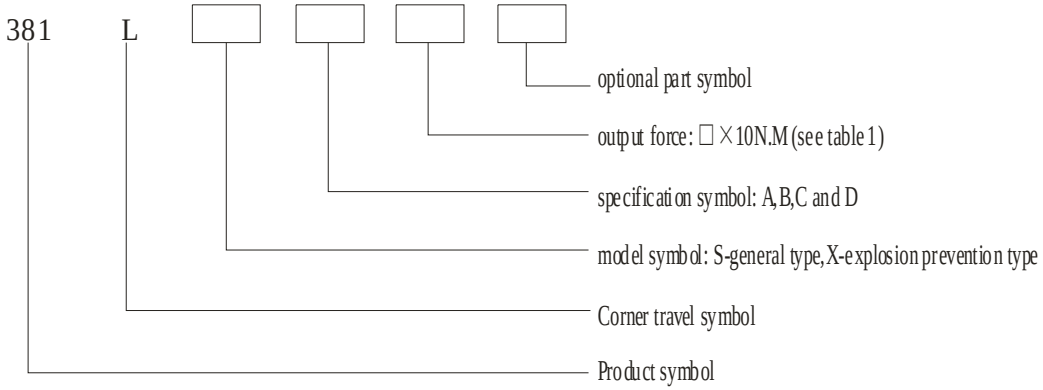
10 ordering notice

Please give the detailed product you need: the product symbol, specification, output power, bracket's code names diameter of the adjusting valve and also with or without the protection equipment.

Special brackets are available according to customers' demands.

Please write out clearly the following requirements

(1) basic product model



(2) the bracket symbol, or the diameter and travel of the adjusting valve Special brackets are available according to customers' demands.

(3) With or without the space heater(V)

(4) With or without over-loaded protection equipment(S)

11 notice for secure usage

Please read this user's manual carefully before using the actuator. Please pay much attention to the place with sigh "△".

△ **Power supply**

• Before getting through the power, please make sure whether the voltage of the power supply is in accordance with the voltage stipulated in the nameplate of this actuator.

• The wiring should hold enough capacity to meet the need for the rated current and the starting up current, otherwise, the wiring is easily burned.

Connect wires correctly according to the wiring diagram

• Fix ground wire to the actuator

• Before connecting the power supply lines and the signal lines, please first cut off power supply to avoid electric shock.

• Make sure the wires are not compressed while buttoning up the shield

※ When you adopt to install Explosive Prevention Type, please strictly abide by the specific stipulations of the Security Regulations in Dangerous Places of The People's Republic of China: The interior and exterior ground wires of the actuator should be connected to the ground firmly and reliably. Cut off power supply before opening the cover for maintenance. The least clearance between connector pins, the electrical current intervals and should be 8mm. Inspect the sealed ring's aging problem regularly. If the ring is aged, please replace it in time. Please contact out manufacture or our company for new components to replace the old ones. It is unwise to use the parts from other manufactures. The shell should be kept clean and its surface temperature should never surpass 130℃.

△ **Others**

• Please don't uncover the shield in rainy days if the actuator is installed in the open air. Never dampen or even frost the inner of the actuator.

• Once the inner is dampened, please cut off the power supply at once and re-get through the power supply after full drying the actuator.

• Never touch the motor's surface when it is running, otherwise your hand will be scalded.

• This actuator is forbidden to operate in nude mode, otherwise some machinery will be engulfed and creepage may happen to cause danger.

• Cut off the power supply before replacing the parts.

• Cut off the power supply and inspect the actuator or contact with our company when smoke, peculiar smell or peculiar noises happen.