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1. Introduction

The guide applies to the fork-type actuator of the spring reset of JFS. Please read this guide carefully before using it.

2. Description of function and structure

2.1 Description of function

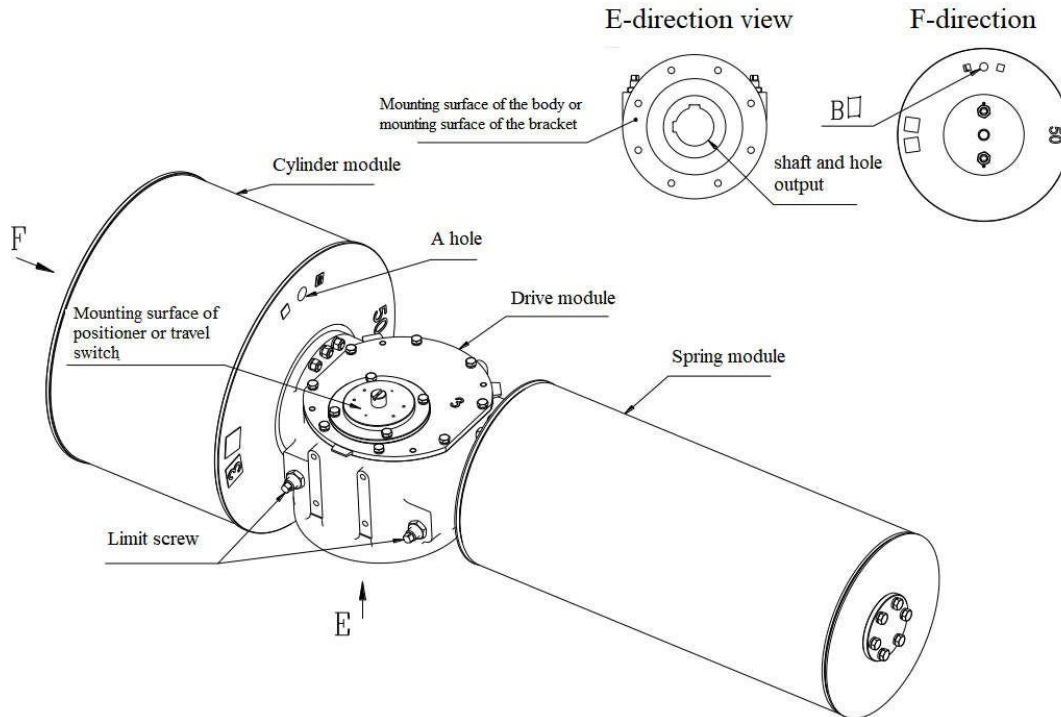


Figure 1 Actuator of the spring return of JFS Series

2.1.1 Torque output

The cylinder module is moved to one side by the air from Hole A (see Figure 1), which makes the shift fork in the drive module rotate, and at the same time compresses the spring in the other side spring module, so that the actuator outputs torque.

2.1.2 Spring reset

After the Inlet A losses the air, the spring is re-opened, making the fork in the driving module rotate to the initial position.

2.1.3 Travel limit

By rotating the limit screw (see Figure 1), the start and end positions of the fork can be adjusted when rotating, as a result of limit of the entire travel.

Details will be shown in 3.2.

Note: The limit range of this limit screw refers to $\pm 5^\circ$. If you need a larger one, you need to select the adjustable opening.

2.1.4 Adjustable opening

After the function works, the piston of the cylinder will be restricted by the adjustment of the screw to get the appropriate of the opening degree of the actuator.

Note: This function is optional. Please confirm whether it is available before selection.

2.1.5 Manual operation

If an actuator is equipped with a manual device, it will work normally by operating the manual mechanism in a air-lost state.

Details will be shown in 3.3

Note: This function is optional. Please confirm whether it is available before selection.

2.2 Structure figure and materials of main component

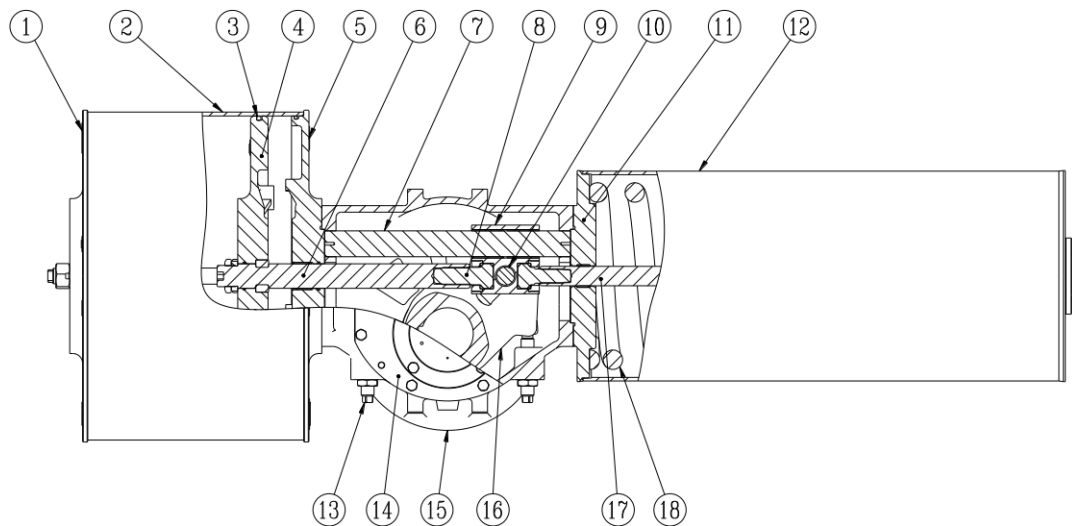


Figure 2 Structure figure of the actuator of the spring return of JFS

Table 1 Table of material of main parts

No.	Name	Material	No.	Name	Material
1	Cover of the outer cylinder	Spherical graphite iron	10	Drive pin	Alloy steel
2	Cylinder	Carbon steel	11	Cover of the spring	Carbon steel
3	Seal ring	Nitrile-butadiene rubber	12	Spring cylinder	Carbon steel
4	Piston	Spherical graphite iron	13	Limit screw	Stainless steel

5	Cover of the inner cylinder	Spherical graphite iron	14	Cover of the case	Spherical graphite iron
6	Rod of the piston	Alloy steel	15	Body of the case	Spherical graphite iron
7	Guide rod	Alloy steel	16	Fork	Spherical graphite iron
8	Transmission joint	Alloy steel	17	Rod of the spring	Alloy steel
9	Guide block	Spherical graphite iron	18	Spring	Alloy steel

3. Installation and use of the actuator

3.1 Installation of the actuator

3.1.1 Actuator lifting

Please lift the actuator according to the schematic diagram in Figure 3 during which it is necessary to maintain a constant speed without impact and at the same time, the rope should not be slack until the actuator is fixed.

Note: In order to ensure the safety, please select the appropriate rope according to the weight of the actuator. Details are shown in Table 2.

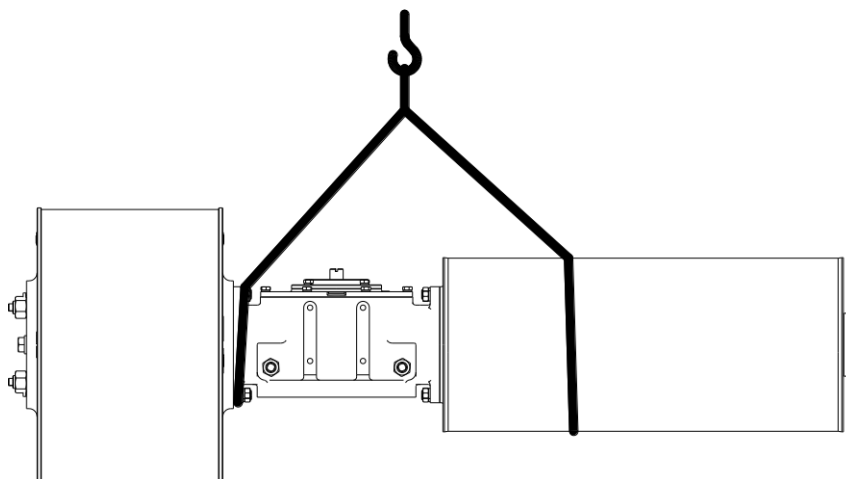


Figure 3 Schematic diagram of the actuator lifting

Table 2 Table of weight of JFS for reference

Model	Weight kg		Model	Weight kg
JFS1-200-SR	120		JFS5-500-SR	776
JFS1-250-SR	130		JFS5-600-SR	845
JFS1-300-SR	138		JFS5-700-SR	1025
JFS1-350-SR	146		JFS6-700-SR	1790
JFS2-300-SR	174		JFS6-800-SR	1902
JFS2-350-SR	182		JFS6-900-SR	2058
JFS2-400-SR	205		JFS7-800-SR	2470
JFS3-350-SR	251		JFS7-900-SR	2610
JFS3-400-SR	274		JFS7-1000-SR	2758
JFS3-500-SR	322			
JFS4-400-SR	450			
JFS4-500-SR	482			
JFS4-600-SR	550			

Note: The weight of manual devices is excluded.

3.1.2 Installation of the actuator

Connect the mounting surface of the actuator to the body (see the mounting surface in Figure 1). Make sure that the bolts used are not below grade 8.8 of the steel.

To ensure sufficient friction between the mounting surfaces, refer to Table 3 for the tightening torque of the bolt.

Table 3 the tightening torque of the bolt of the mounting surface of the actuator

Model	Torque Nm		Model	Torque Nm
JFS1	185		JFS5	1240
JFS2	360		JFS6	2170
JFS3	185		JFS7	2170
JFS4	360			

3.2 Actuator debug

After the actuator and valve (or other equipments) are installed, Intake A (see Figure 1) activates the actuator, and then the position of the valve will be adjusted by rotating the limit screw (see Figure 1).

Note: (1) In the operation of the actuator, it is necessary to keep the Hole B (see Figure 1) smooth.

(2) The actuator must not exceed the maximum allowable value in pressure (see the nameplate);

(3) If the actuator has a manual mechanism, make sure it is not involved (see 3.3 operation of manual mechanism).

3.3 Operation of manual mechanism

This function is optional. Please confirm whether it is available before selection.

At the same time, on the basis of the output torque of the actuator, there are a variety of manual mechanisms. Please confirm the type before operation.

3.3.1 Manual screw

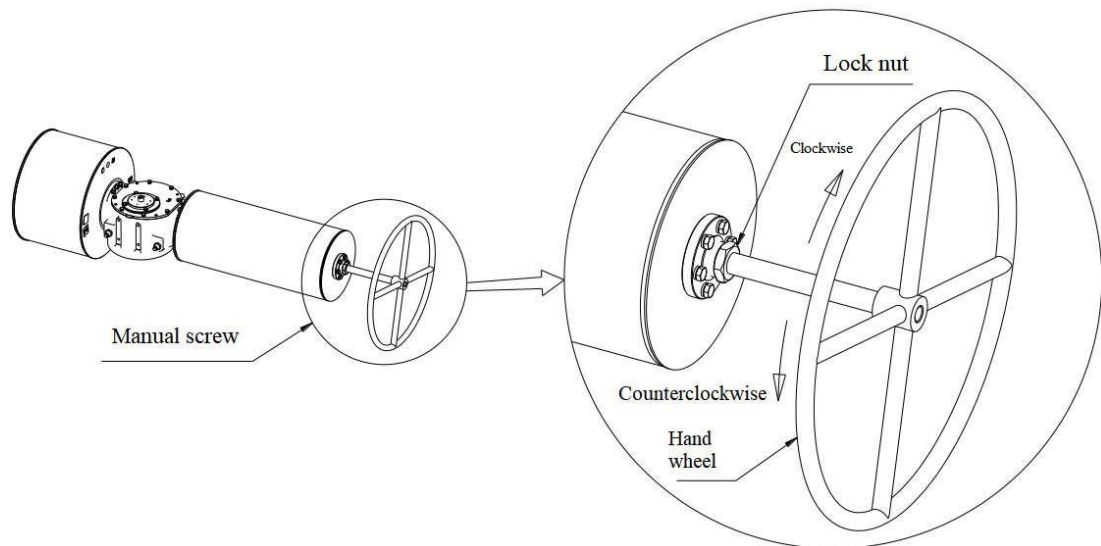


Figure 4 Manual screw

Note: please remember that the gas source has been cut off before operation!

See Figure 4 for the operation of manual screw. Please follow the steps carefully:

- 1) Loosen the lock nut
- 2) Turn the hand wheel to operate the manual screw. Please note: turn the hand wheel clockwise and the output shaft of the actuator moves clockwise Movement; turn the hand wheel counterclockwise, and the output shaft of the actuator moves counterclockwise.
- 3) Re-tighten the lock nut when the desired opening is obtained by the manual mechanism.

Note: When it is necessary to switch back to the pneumatic state, the screw must be manually existed, see Table 4.

Table 4

<u>Type of the actuator</u>	<u>Way of manual exit</u>
<u>Turn off the spring return of the actuator (FC)</u>	<u>Turn the hand wheel clockwise to completely withdraw the screw manually</u>
<u>Turn on the spring return of the actuator (FO)</u>	<u>Turn the hand wheel counterclockwise to completely withdraw the screw manually</u>

3.3.2 Manual bevel gear

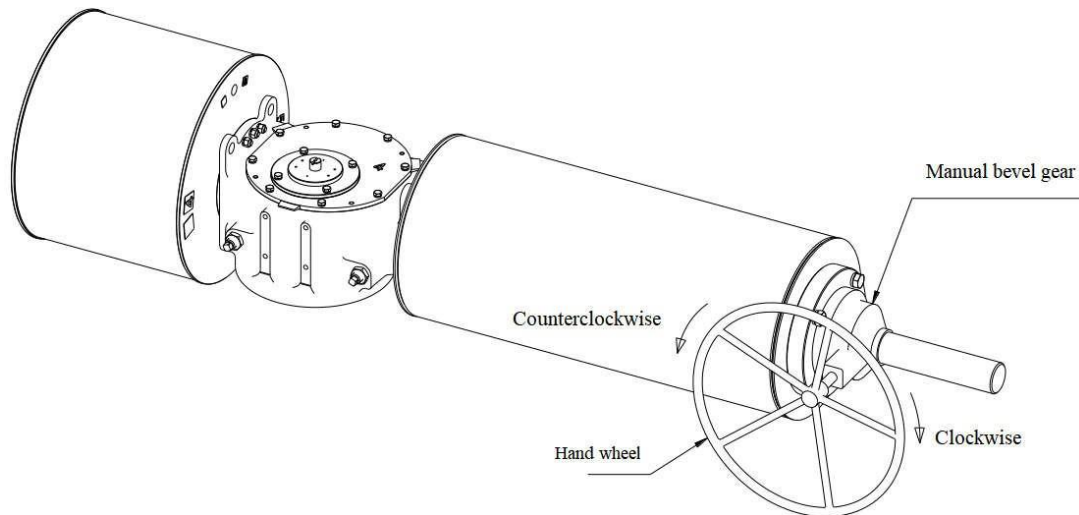


Figure 5 Manual bevel gear

Note: Please make sure the air supply has been cut off before operation!

The type of the manual bevel gear is shown in Figure 5.

Turn the hand wheel to operate the manual bevel gear. The relationship between the direction of rotation of the hand wheel and that of the output shaft of the actuator is shown in Table 5.

Table 5 Operation direction of hand wheel of the bevel gear

<u>Type of the actuator</u>	<u>Rotation direction of the hand wheel</u>	<u>Rotation direction of the output shaft of the actuator</u>
<u>Turn off the spring return of the actuator (FC)</u>	Clockwise	Clockwise
	Counterclockwise	Counterclockwise
<u>Turn on the spring return of the actuator (FO)</u>	Clockwise	Clockwise
	Counterclockwise	Counterclockwise

Note: When it is necessary to switch back to the pneumatic state, the screw must be manually existed, see Table 6.

Table 6

<u>Type of the actuator</u>	<u>Way of manual exit</u>
<u>Turn off the spring return of the actuator (FC)</u>	<u>Turn the hand wheel clockwise to completely withdraw the screw manually</u>
<u>Turn on the spring return of the actuator (FO)</u>	

4. Disassembly and installation of the actuator

4.1 Weight of the actuator

Table 5 Weight of the modulus for reference

Name	Weight Kg	Name	Weight Kg
JFS1 Drive module	32	200 cylinder module	26
JFS2 Drive module	45	250 cylinder module	36
JFS3 Drive module	75	300 cylinder module	44
JFS4 Drive module	113	350 cylinder module	52
JFS5 Drive module	234	400 cylinder module	75
JFS6 Drive module	425	500 cylinder module	123
JFS7 Drive module	670	600 cylinder module	190
JFS1 Spring module	62	700 cylinder module	392
JFS2 Spring module	85	800 cylinder module	500
JFS3 Spring module	124	900 cylinder module	637
JFS4 Spring module	246	1000 cylinder module	788
JFS5 Spring module	420		
JFS6 Spring module	995		
JFS7 Spring module	1300		

4.2 Disassembly of the cylinder

Note: Before disassembly, please follow the steps

1) Since the module is heavy, please prepare the necessary lifting equipment in advance (refer to Table 5 Weight of the module).

2) Whether removing the spring module or the cylinder module, it must be certain that the spring is fully open. See step 1.)2).3) in 4.2.1

3) When the actuator works, please evaluate whether the module disassembly will do harm to the corresponding equipment.

4.2.1 Disassembly of the spring

Please follow the steps below to complete the removal:

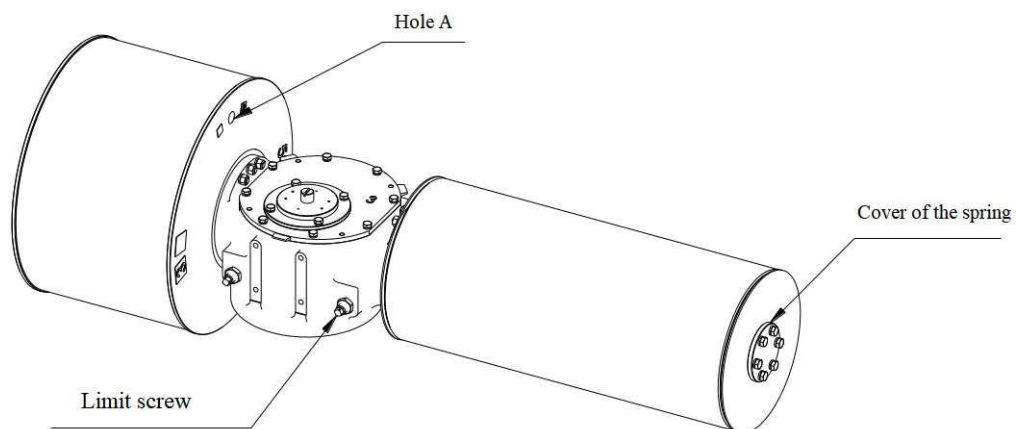


Figure 6

- 1) Venting from Inlet A to rotate the actuator at a certain angle;
- 2) Completely withdraw the limit screw near the side of the spring module;
- 3) Zero the air pressure from Hole A to make the spring fully open;

1) Unscrew the fixing screw of the cover of the spring and open it.

Note: Do not lose or damage the seal O-ring of the cover.

- 5) Use the special tools provided by the factory to extend into the spring module and insert into the end of the spring rod, see Figure 7;

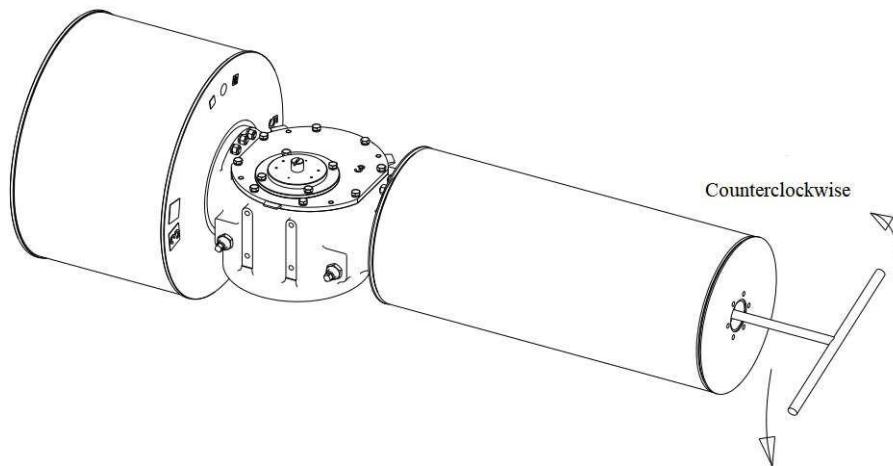


Figure 7

- 6) Rotate the special tool counterclockwise in the direction shown in Figure 7 to completely disengage the spring rod from the transmission joint. Refer to Table 6 for the number of rotations;

Table 6 Number of rotations of the spring rod

Name	Number of rotation		Name	Number of rotation
JFS1	19		JFS5	27
JFS2	19		JFS6	32
JFS3	25		JFS7	40
JFS4	22			

- 7) Take the necessary lifting measures for the spring module, refer to Figure 8.

Unscrew the nut between the spring module and the drive module and remove the spring module.

Note: Do not lose or damage the seal O-ring between modules.

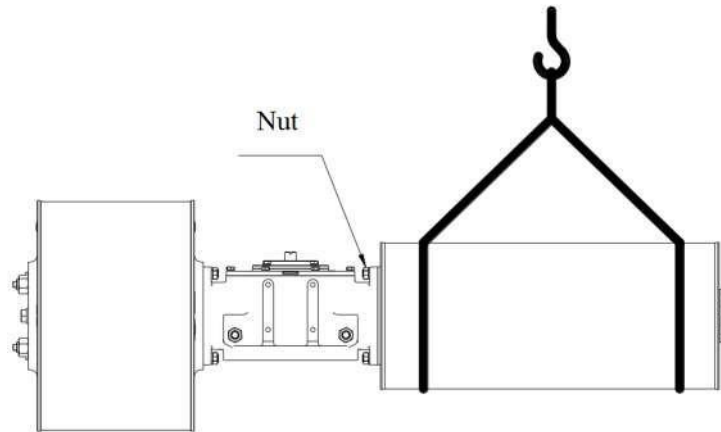


Figure 8

4.2.2 Disassembly of the cylinder

Note: (1) If the spring module is not removed, you must first perform step 1), 2), 3) in 4.2.1 to fully open the spring;

(2) Turn off the air supply;

Please follow the steps:

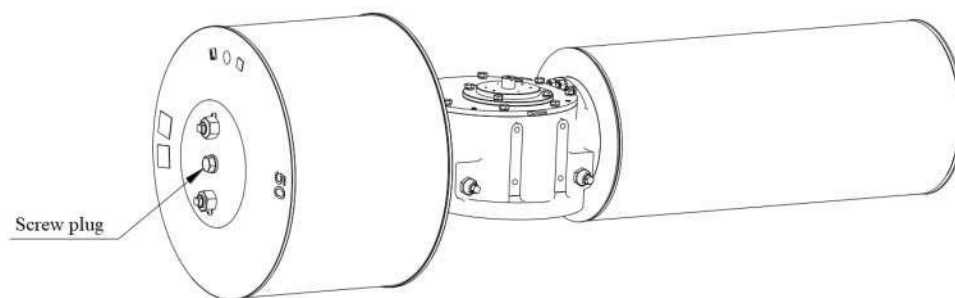


Figure 9

1) Unscrew the screw plug on the cover of the outer cylinder (see Figure 9);

Note: Do not lose or damage the seal O-ring of the plug.

2) Use the special tools provided by the factory to extend into the cylinder module and insert into the end of the piston rod, as shown in Figure 10;

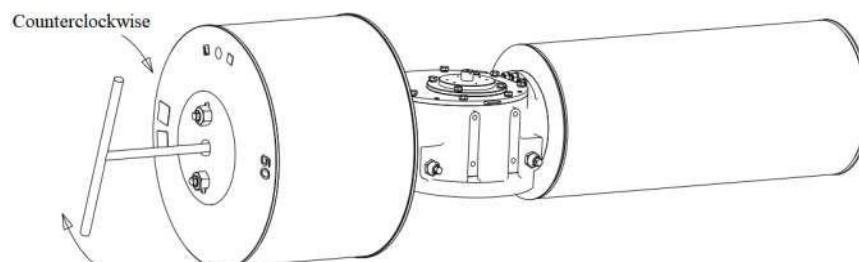


Figure 10

3) Rotate the special tool counterclockwise in the direction shown in Figure 10 to completely disengage the piston rod and the transmission joint. Refer to Table 7 for the number of rotations;

Table 7 Number of rotations of the piston rod

Model	Number of rotations		Model	Number of rotations
200 Cylinder module	19		600 Cylinder module	27
250 Cylinder module	19		700 Cylinder module	32
300 Cylinder module	19		800 Cylinder module	32
350 Cylinder module	19		900 Cylinder module	40
400 Cylinder module	25		1000 Cylinder module	40
500 Cylinder module	22			

4) At Hole A of the cylinder (see Figure 1), the air pressure is applied to move the piston to the outermost side;

5) Perform the necessary lifting measures for the cylinder module, refer to Figure 11.

Unscrew the nut between the cylinder module and the drive module and remove the cylinder module.

Note: Do not lose or damage the seal O-ring of the plug.

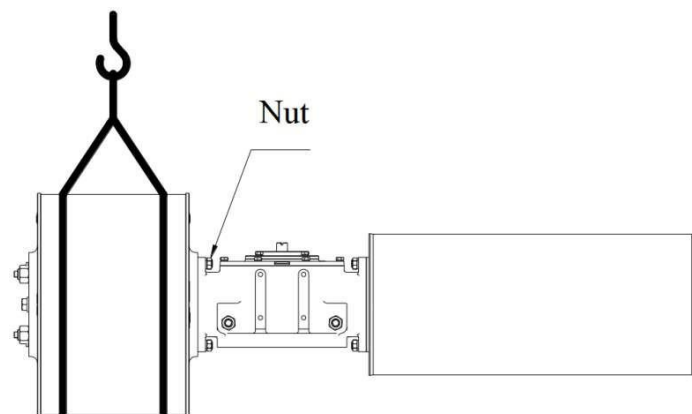


Figure 11

4.3 Installation of module

Note: Before installation, please note:

1) Due to the heavy weight of the module, please prepare the necessary lifting equipment in advance (refer to Table 5 Weight of module).

2) When the actuator works, please evaluate whether the installation will do harm to the corresponding equipment.

4.3.1 Installation of the spring

Please follow the steps:

1) Lift the cylinder module (including the O-ring between the modules) to the mounting surface of the drive module (as shown in Figure 11), and tighten the nut;

Note: Make sure the O-rings between the modules are properly installed;

2) Slowly make the air into Hole B of the cylinder (see Figure 1) to move the gas piston forward, so that the piston rod and the transmission joint are pre-fitted;

3) unscrew the screw plug on the outer cylinder (see Figure 9)

Note: Do not lose or damage the seal O-ring of the plug.

4) Insert the special tool provided by the factory into the cylinder module and insert it into the end of the piston rod, as shown in Figure 12;

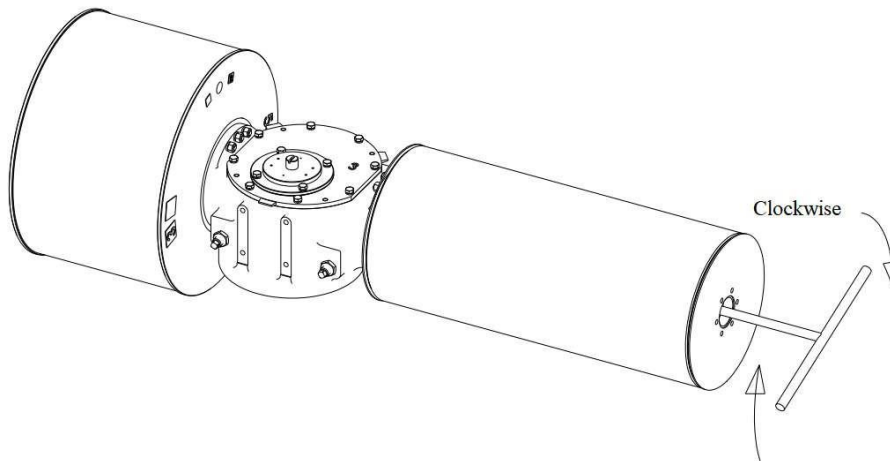


Figure 12

6) Rotate the special tool clockwise in the direction shown in Figure 12 to combine the piston rod with the transmission joint. Refer to Table 8 for the torque;

Table 8 Tightening torque of the piston rod

Model	Torque Nm		Model	Torque Nm
200 Cylinder module	90		600 Cylinder module	300
250 Cylinder module	90		700 Cylinder module	360
300 Cylinder module	90		800 Cylinder module	360
350 Cylinder module	90		900 Cylinder module	450
400 Cylinder module	130		1000 Cylinder module	450
500 Cylinder module	230			

7) Re-install the screw plug and the O-ring onto the outer cylinder;

4.3.2 Installation of the cylinder

Note: (1) Please make sure that the cylinder module is connected to the drive module, otherwise the installation will fail.

(2) Turn off the air supply of the cylinder module.

Please follow the steps:

1) Lift the spring module (including the O-ring between the modules) to the mounting surface of

the drive module (as shown in Figure 8), and tighten the nut;

Note: Make sure the O-rings between the modules are properly installed;

2) unscrew the fixing screw of the cover of the spring and open it

Note: Do not lose or damage the seal O-ring of the cover.

1) Insert the end of the spring rod with the special tool provided by the factory and push it forward to the bottom, then slowly ventilate Hole B of the cylinder (see Figure 1) to move the piston toward the side of the spring module until the special tool is extended to the outside and stop the ventilation;

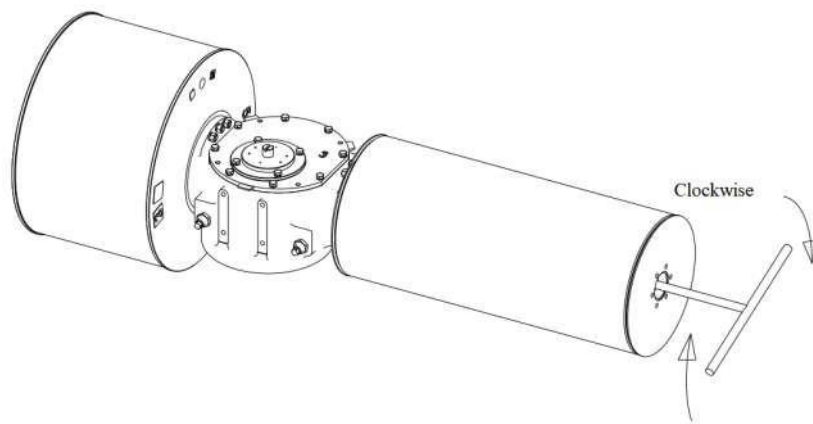


Figure 13

4) Rotate the special tool clockwise in the direction shown in Figure 13 to combine the spring rod with the transmission joint. Refer to Table 9 for the torque;

Table 9 Tightening torque of the piston rod

Model	Torque Nm		Model	Torque Nm
JFS1 Spring module	90		JFS5 Spring module	300
JFS2 Spring module	90		JFS6 Spring module	360
JFS3 Spring module	130		JFS7 Spring module	450
JFS4 Spring module	230			

5) Re-install the cover and the O-ring onto the spring module;