SF3-BRD Servo Tensioner Product Manual

☐SF3-100-BRD ☐SF3-100-BR ☐SF3-100D-BR
☐SF3-200-BRD ☐SF3-200-BR ☐SF3-200D-BR
☐SF3-300-BRD ☐SF3-300-BR ☐SF3-300D-BR

❶ Introduction and Specification

SF3-BRD series servo type tensioners are equipped with air cylinder and the tension wheel installed at the front side. The maximum winding speed reaches 20m/s. The inside air cylinder has attenuation function so that it can be connected with compressed air supply for greater tension during the specific winding process. By connecting, the air valve can be triggered though the solenoid valve to alter the angle of "swing arm" to switch between 2 tension steps and avoid breaking wires.
Otherwise, the tension can be controlled by "tension adjustment knobs" and the "swing arms knob".
Customers can select the suitable models according to the wire diameter and tension range. The specification and models as follows:

Model definition:

SF3 – 100 D –BRD

- SF3 – Series name
- 100 – Maximum output tension value
- D – with display
- BRD:
  - B: The tension wheel is installed at front. Without "B": Tension wheel is installed at side.
  - R: With tension attenuation function
  - D: With display and RS480 communication port

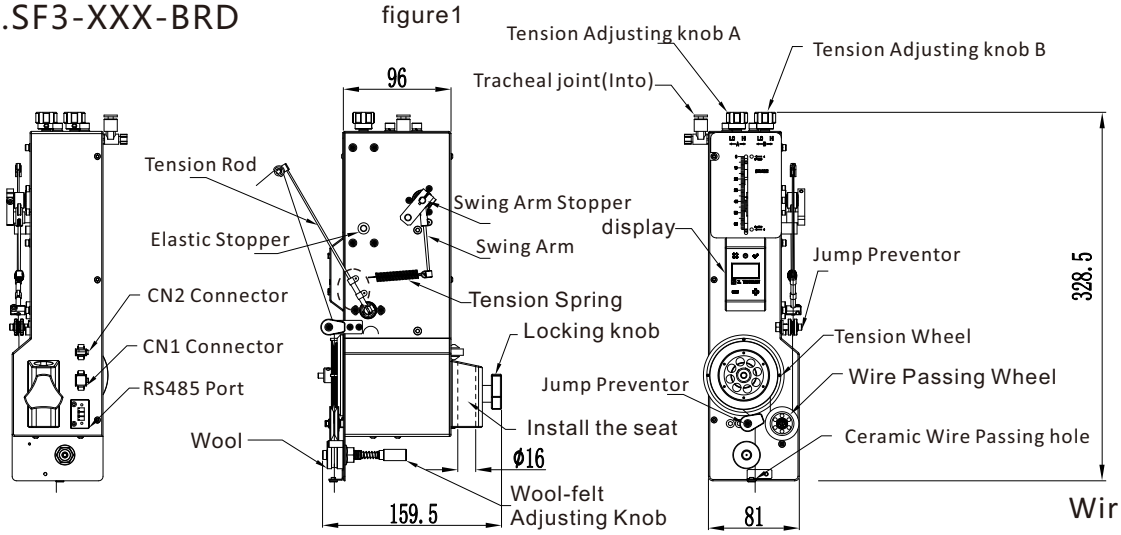
Selection reference table

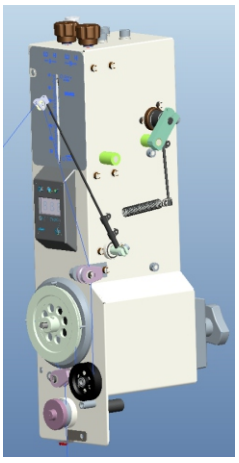
Model	Spring	Reference diameter (mm)	Tension range (g.f)	Tension rod	Standard set
SF3-100-BRD SF3-100-BR SF3-100D-BR	S2	Φ0.03-Φ0.06	5-20	SA2	Tension rod: SA2 /SA3 Tension spring: S2/S3/S4
	S3	Φ0.05-Φ0.09	15-50	SA3	
	S4	Φ0.08-Φ0.14	40-100	SA3	
SF3-200-BRD SF3-200-BR SF3-200D-BR	S2	Φ0.03-Φ0.06	5-20	SA2	Tension rod: SA2 /SA3 Tension spring: S2/S3/S4/S5
	S3	Φ0.05-Φ0.09	15-50	SA3	
	S4	Φ0.08-Φ0.14	40-100	SA3	
	S5	Φ0.12-Φ0.17	80-200	SA3	
SF3-300-BRD SF3-300-BR SF3-300D-BR	S2	Φ0.03-Φ0.06	5-20	SA3	Tension rod: SA3/SA4 Tension spring: S2/S3/S4/S5
	S3	Φ0.05-Φ0.09	15-50	SA3	
	S4	Φ0.08-Φ0.14	40-100	SA3	
	S5	Φ0.12-Φ0.22	80-300	SA4	

❷ Structure Diagram

1.SF3-XXX-BRD

figure1

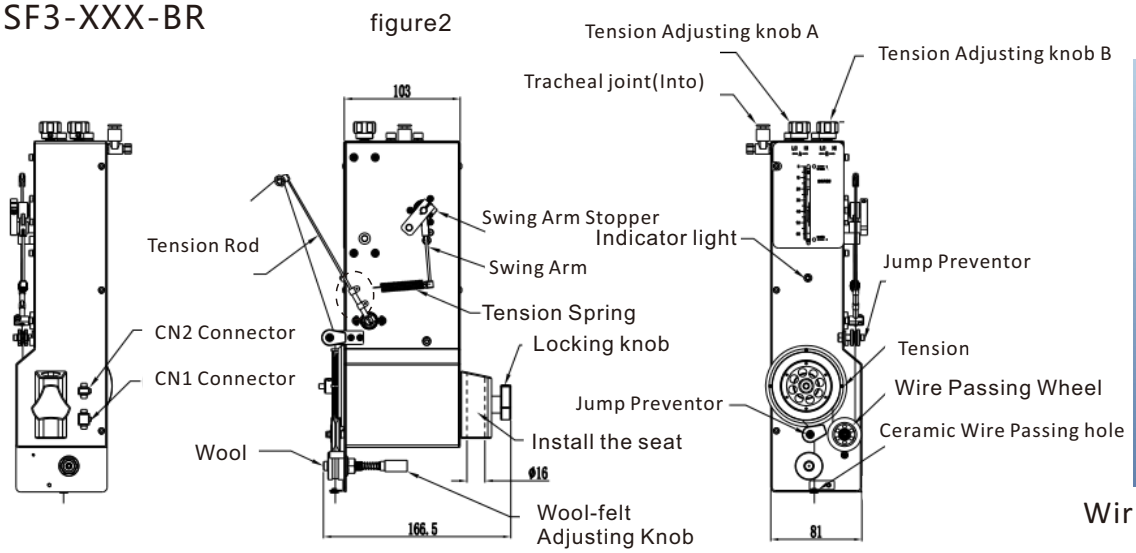


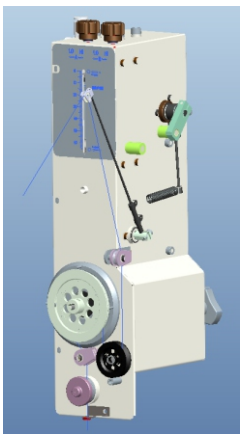


Wiring Direction Diagram

2.SF3-XXX-BR

figure2





Wiring Direction Diagram

Remark:1. There are two holes for spring hanging (circled with dotted line). The upper hole is used for usual application.
2. SF3-XXX-BRD : model with display and RS485 communication port, SF3-XXX-BR : model without display but with RS485 communication port, SF3-XXXD-BR : model without display or RS485 communication port

❸ Environmental conditions

1.Storage temperature range: -20℃-60℃ (Nonfreezing),Storage humidity range: 20%-80%RH,Working temperature: 13℃-40℃,Working humidity range: 20%-80%RH

2. Working environment: Well and rigid installation without vibration or corrosion. Well ventilation and avoid dust

3.Wiring or winding material Keep the wire or material away from oil, dust and impurity.

❹ Installation and commissioning

1.Installation

Step 1. Insert the installation base into the fixing rod and tighten it by fasten handle.

Step 2. Loosen the fastening nut on fixing base of tension arm and insert tension arm into rotating shaft(see figure3), and then tighten the nut. The end of tension arm has to be inserted at the same level with the exit of rotating axis (see dotted line in figure 3

Step 3.: Choose the appropriate tension arm and tension spring according to the range of wire diameter and tension value. The higher of tension applied, the thicker of tension arm is required. (Please refer to the form in part 1). Hang one side of the spring in the hole of "swing arm", and another side in hanger hole of tension arm.

Step 4.:Connect the CN1 connector to power cable while CN2 connector to signal cable (see figure 4)Caution: The maximum current for each tensioner is 2A For multiple control of tensioners, the rating power or current is decided by the number of tensioners (or axis of winders) with below reference:

1-2 tensioners (or axis) : 96W-4A 3-4 tensioners (or axis) : 192W-8A

Step 5. Air pipe adapter is Φ4㎜ (Air pipe is prepared by users)

Connect the air pipe to the adapter of tensioner and another end to the air valve controlled adapter

The end of tension arm has to be inserted at the same level with the exit of rotating axis

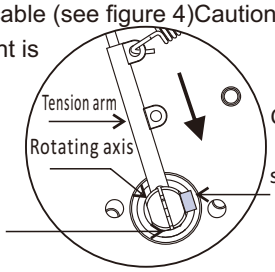


figure3

Caution:Insert the tension arm only when the fixing screw is placed at the right hand side as the figure shown or tension will not be operated

2.Commissioning

Step 1. Switch on the tensioner without wiring. If the tension value shown is not "zero", long pressed "X" button for over 5 seconds to set zero.Route the wire refers to the fig2 and use the wool clamp knob to adjust the tightness to the wire. Generally, the tightness should be ~5 to 10% of safety tension value of the wire.

Step 2. The indicator LED lights up after switching on the tensioner. The motor rotates when the running wire moves the tension arm to certain position. Then the indicator LED lights off. The tension wheel and thus feeds the wire actively and vibrates slightly with the tension changing.。

Remarks:To connect the input signal,connect S1 with +24V and com with -24,the upper /lower limit alarm becomes vaild.The alarm signal(Output signal port)circuit will be closed if the tension value is out of the limit set.

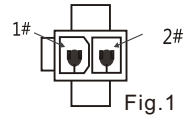


Fig.1

Fig.1：1#-0V（Yellow-ve）
2#-24VDC（Red+ve）

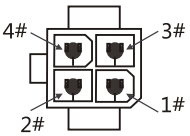


Fig.2

Fig.2：
1#（P1）-Alarm signal(Black+ve)
2#（P2）-Alarmsignal(White-ve)
3#（S1）-Signalinput(Brown+ve)
4#（COM）-Signalinput(Blue-ve)

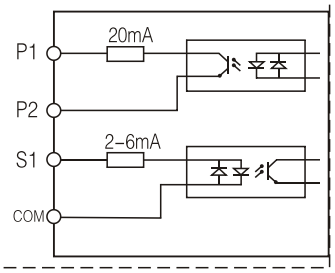
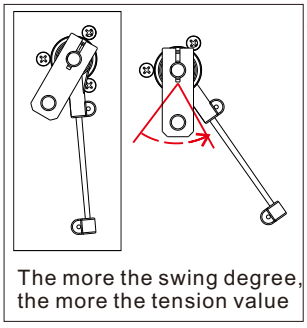


figure4

Step 3.Without supplying air to the cylinder, the tension is controlled by adjusting the "swing arm bottom limit knob" to tune the angle of "swing arm stopper" to change the working length of tension spring.A clockwise turning of knob decrease the tension value, while anticlockwise turning to increase it.With connecting the air pressure supply, tension can be controlled through the air valve of winding machine to adjust the swing arm. The swing arm moves to anticlockwise position as the figure shown to switch between two steps of tension values (The swing arm bottom limit knob's control is invalid at this working mode).The swing degree of swing arm is related to the "swing arm upper limit knob". A clockwise turning of knob decrease the swing degree, as well as the tension value while anticlockwise turning to increase it.B-A scale difference must be greater than 20, otherwise the boom can not swing(see figure6).



The more the swing degree, the more the tension value

figure5

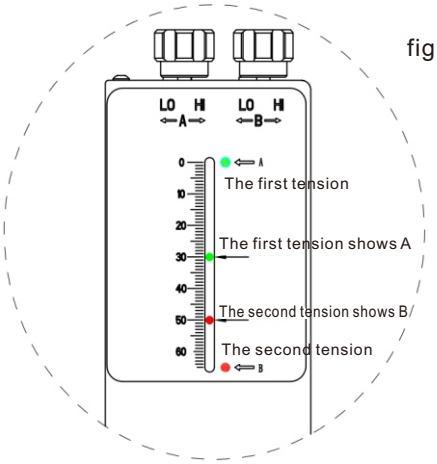


figure6

Special note: B-A scale difference must be greater than 20,otherwise the boom can not swing

❺ Button operation menu

There are four function buttons, with the below definition:

1、√: To confirm or select;

2、X: To exit;

3、+: Pages rolling or value increases (Continuous / fast adjust by long pressed)

4、−: Pages rolling or value decreases (Continuous / fast adjust by long pressed

❻ Interface menu

Operation mode 0.0m/s 10g	Short press √ to switch to "wiring mode" under the operation interface. The tension value and running speed can be monitored under this interface
0RPM 0.0m 10g	Long press "-" button to display the motor speed and wire length. Back to operation interface with long press "-" button.
Parameter 1 setting Diameter: 49.00mm Wire length: 0.000m	Long press √ to switch to "parameter 1 setting" under operation interface to revise the diameter value. The wiring speed and length accuracy can be adjusted too. Press "+" to enter "parameter 2 setting" or "X" back to the operation interface.
Parameter 2 setting Tension Upper Limit: 240g Tension Bottom Limit:-100g	Press √ to set tension upper or bottom limit under this interface. Indicator will flash and output alarm signal if the running tension value exceeds the set limit value. Save and press "+" to enter the "parameter 3 setting".
Parameter 3 setting Wire diameter : 0.06mm Wire breaking tension: -100g	Press √ to set the wire diameter and the wire breaking tension value (The tensioner determines there is a breaking wire if the tension value is lower than it). Save and press "+" to enter the "parameter 4 setting".
Parameter 4 setting Signal output: Always open Communication address: 1	Press √ to set the signal output status (For alarm signal, either always closed or always open) and the communication address. Save and press "+" to enter the "parameter 5 setting".
Parameter 5 setting Signal output: Single	Press √ to change the signal output time. "Single" means the alarm signal ends once the status resumed. "1 min" means the alarm signal output will extend 1 more min after the status back to normal. Different time period can be set. The alarm signal function is invalid if the input signal is not detected. Remarks: Please contact our colleagues for RS485 communication port and protocol manual.

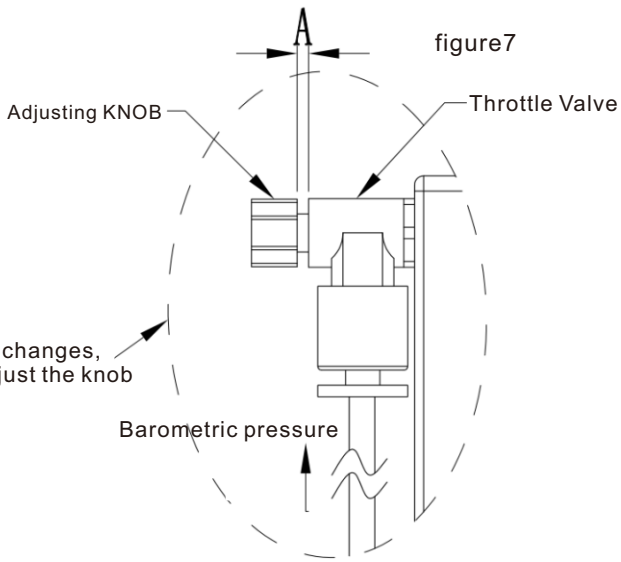
❼ Cautions

1.Do not touch or try to stop the tension arms and the wiring wheels or rolls.
2.Install the tensioner properly to prevent the falling of tensioner to cause damage. Avoid over the running speed limit 20 meters / second. The starting speed of winding machine under 1 meter / second is preferable.
3.Ensure the enameled wires go through the wire jumping preventer and the wire wheels properly and all the wheels are rotating smoothly.
4. Keep away from oil contamination to the tension pulley, or it will affect the tensioner running well. Use the cotton thread with absolute alcohol to clean it by pulling back and forth of the"O" shape part, if the oil contamination exists
5. Over limit application or improper model using is prohibited. Repair or components disassembly can only be done in factory.
6. .Clean the parts where wires passing through, especially for the waxed enameled wires are used. Periodically replace the wool-felt clips to keep the tension constant and avoid slipping.Otherwise, it will shorten the life of tensioner.
7. Ensure the electrical terminals are connected correctly before switching on the tensioner.
8.Do not directly touch the tension sensor wheel with hands to avoid the damage of sensor which will affect the accuracy of tension value measured.
9. The air valve should be set in slightly open and gradually increase after air supply is connected until the required tension reached(see figure7). Avoid over supplying air pressure to the tensioner or the life will be reduced. Suggested air pressure below 0.6Mpa.The maximum rotation stroke of the throttle valve is 4mm

Barometric position control table

Barometric pressureMpa	A（mm）
0.2	2.3
0.3	1.6
0.4	1.3
0.5	1.2

figure7



Note: the maximum rotation stroke of the throttle valve is 4mm

❽ Maintenance

1. Periodically clean the tensioner, wool-felt clip, tension wheel, ceramic eyelet, wire rollers according to the usage situation. Replace the wool-felt if necessary to ensure the tensioner works properly.

❾ Troubleshoot

NO.	Failure	Solution:
1	Enameled wires got stuck in the tension wheel to cause the rotation stop.	Unscrew the fixing screw to take out the tension wheel and clean the impurities inside
2	Tension pulley slips while operating	1.Change the wool felt if it is caused by oil or impurities on it. 2.Use the cotton thread with absolute alcohol, and then pull back and forth to clean the tension Pulley
3	The tension rod does not bounce back to normal position after a sudden halt of tensioner (Tension rod does not stick back to the elastic stopper)	1.Replace the tension spring if it is distorted or broken 2. Left tune the “Anti-tension adjusting knob” to increase the tension until the tension rod resumed to the normal position.

Welcome to buy our products,when you open the package,please check the following:

NO.	ITEMS	QUANTITY	unit	REMARKS
1	Servo Tensioner	1	PC	Standard configuration
2	Tension rod	2	PC	Standard configuration
3	Tension spring	See the table below		
4	Fixed handle	1	PC	Standard configuration
5	baize	2	PC	Standard configuration
6	The power cord	1	PC	Standard configuration
7	Product instruction Manual	1	PC	Standard configuration
8	485 communication line	1	PC	optional: Yes No