



User 's manual

HZ-11
Modular Electrospinning Device

Safety Precautions

- This device generates high-voltage static electricity. In order to ensure personal and operation safety, the high-voltage output area shall keep sufficient redundant safety distance from people and surrounding instruments to avoid damage caused by touching high voltage;
 - Children, patients with heart and brain diseases and people who can't clearly express their wishes should not use this instrument, otherwise it will cause accidents or affect their health;
 - Do not spray into eyes;
 - The operator shall not wear various wearable electronic devices, such as electronic watches, Bluetooth headsets, smart hands, etc., otherwise the devices may be damaged;
 - The instrument should be used in a clean, dry and well ventilated environment. Do not operate in a humid and narrow sealed space.
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- **Do not use near the following medical electronic instruments or household electronic therapeutic instruments:**
 - Implantable medical electronic instruments such as cardiac pacemaker
 - Life sustaining medical electronic instruments such as artificial heart and lung
 - ECG, dripper and other wearable medical electronic instruments(otherwise, it may lead to wrong action of electronic instruments, causing accidents or physical discomfort)

Introduction

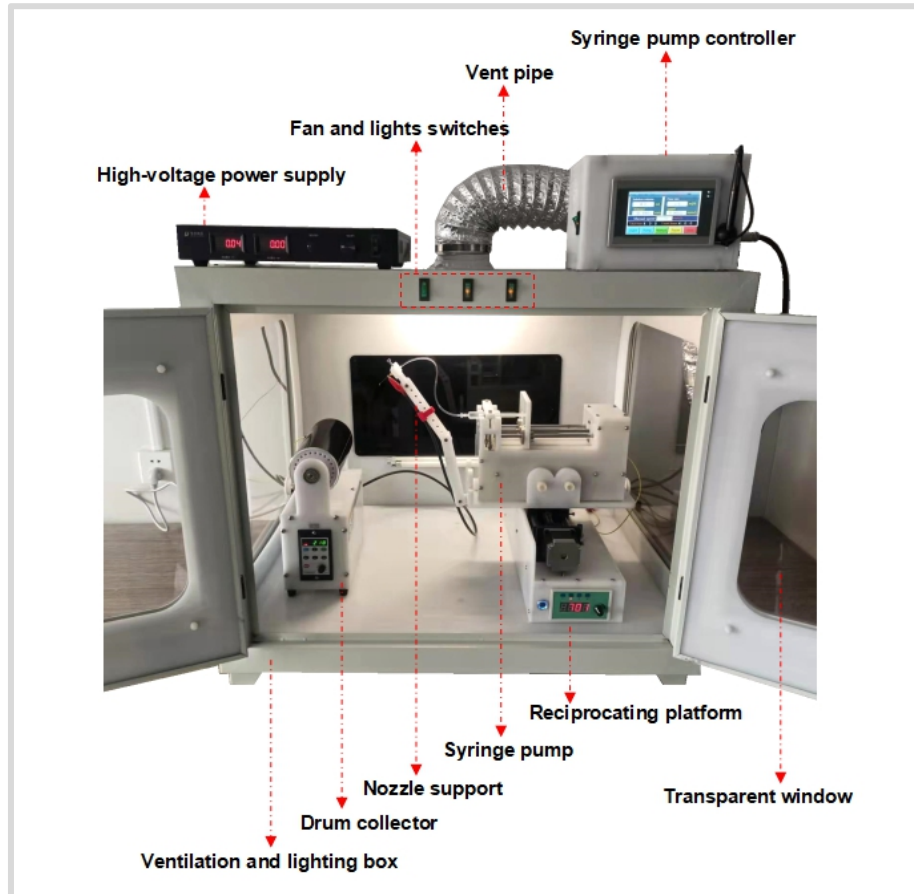
Name of each component



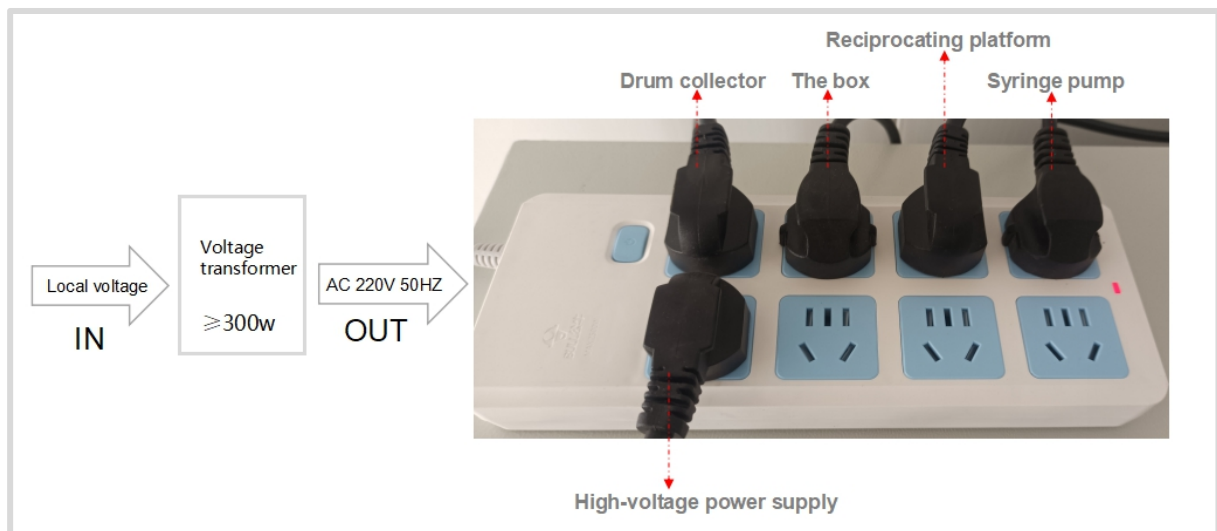
Ventilation and lighting box		<ol style="list-style-type: none"> 1. Sheet metal shell with corrosion-resistant lining 2. Functions of exhaust and lighting 3. Three side windows
High-voltage power supply		<ol style="list-style-type: none"> 1. Positive voltage range: 0-30kV 2. Over current protection and short circuit protection 3. Accuracy: 0.01kV
Drum collector		<ol style="list-style-type: none"> 1. Speed range: 100-3000RPM; Accuracy: 1RPM 2. Diameter: 89mm; Length:200mm 3. Release film protection.
Flat plate collector		<ol style="list-style-type: none"> 1. Size:200mm × 200mm 2. Release film protection
Reciprocating platform		<ol style="list-style-type: none"> 1. Reciprocating speed: 0-1000mm/min (Automatic) 2. Reciprocating distance: 0-20cm (Manual)
Syringe pump		See the operating instructions of syringe pump for details
Cleaning rod		<ol style="list-style-type: none"> 1. Insulation and high voltage resistant material 2. Used to clean the nozzle tip solidification during Electrospinning(ES) process

Installation instructions

1. Place each module according to the figure below.

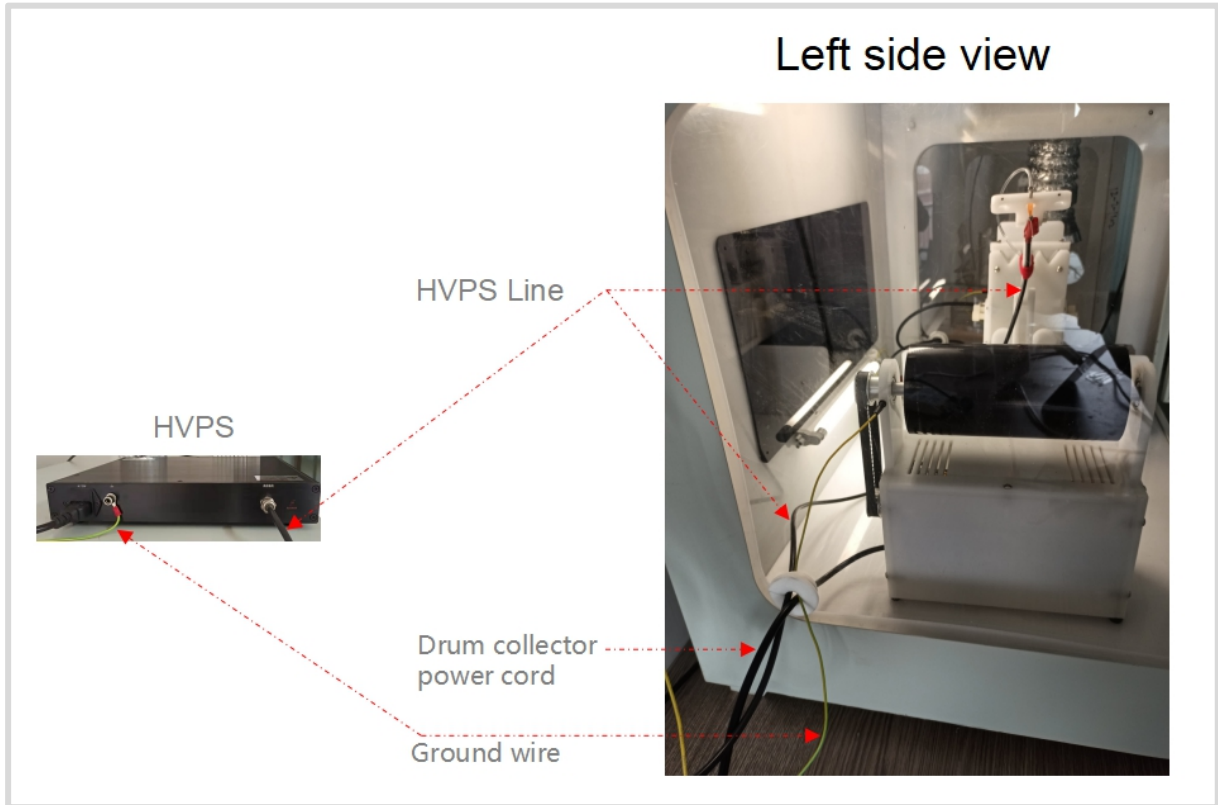


2. A suitable Voltage transformer ($\geq 300\text{w}$) is needed to convert the voltage of different countries into 220V (China voltage standard). The power plugs of each module are connected to the main power socket.

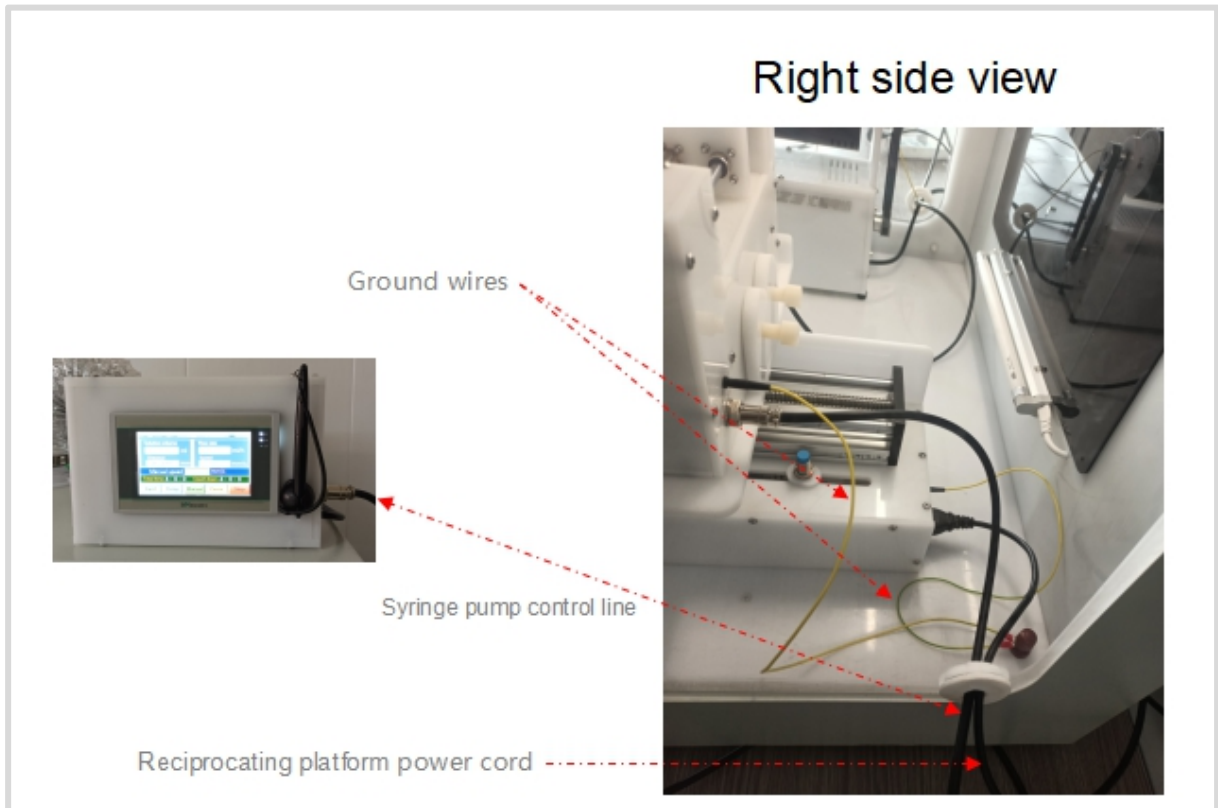


MG-H11 Modular Electrospinning Device

3. Wiring method: Left side view

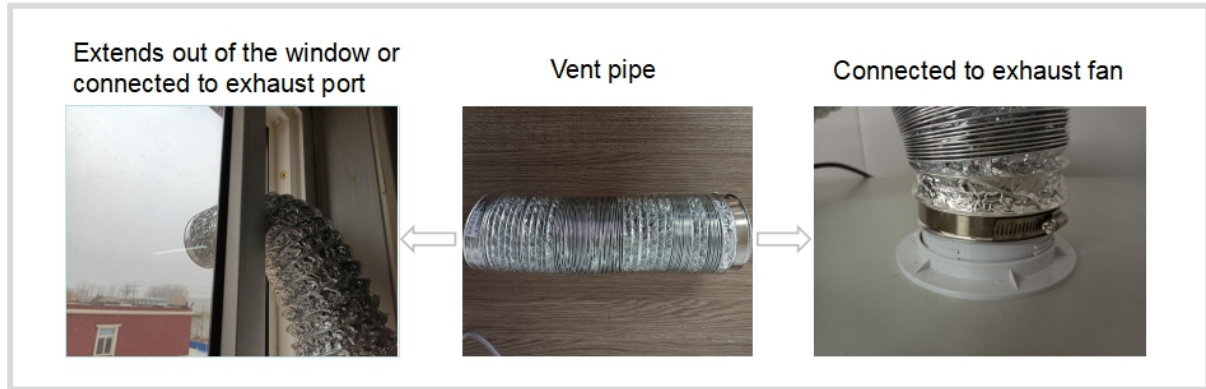


4. Wiring method: Right side view

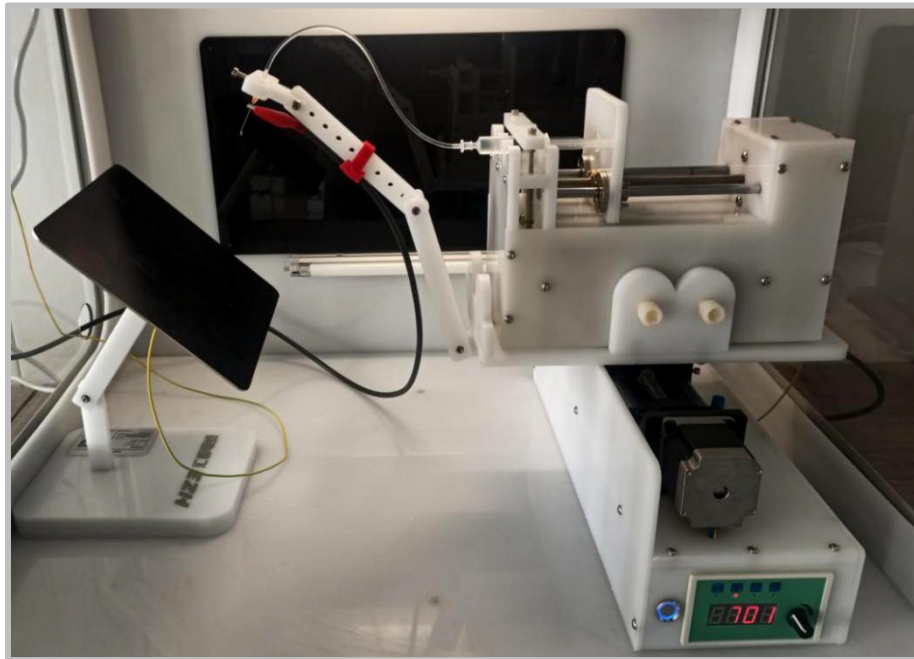


MG-H11 Modular Electrospinning Device

5. Install vent pipe



6. Flat plate collector is used to collect a small amount of fiber membrane samples.



Operation steps

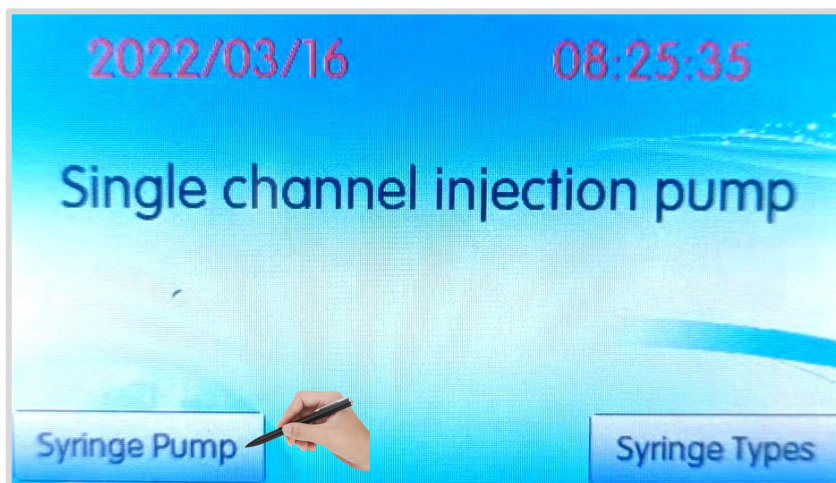
1. Power on. Turn on the two lights and exhaust fan.



2. Extract the ES solution by a syringe (10ml for example), connect the luer connector, liquid guide tube and needle, and install it on the syringe pump, as shown in the figure. The red HVPS clip clamps the nozzle.

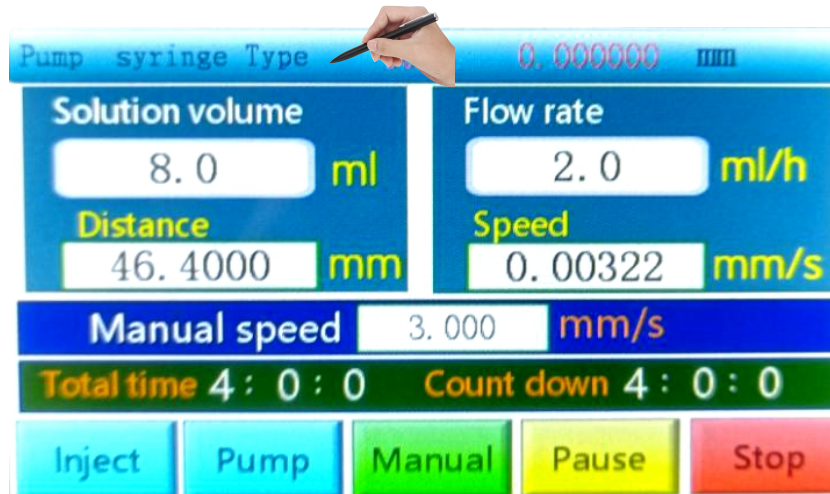


3. Power the syringe pump and click the “Syringe Pump” button by the stylus.



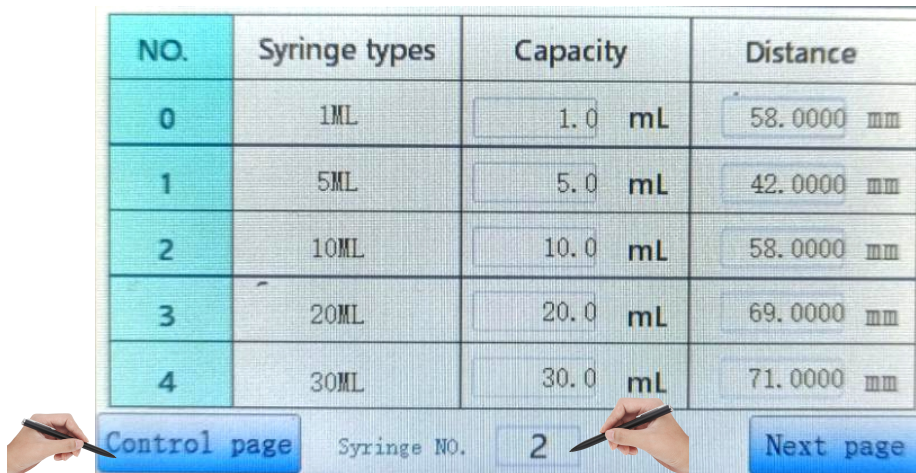
4. Click the “ Pump Syringe Type” button.

MG-H11 Modular Electrospinning Device

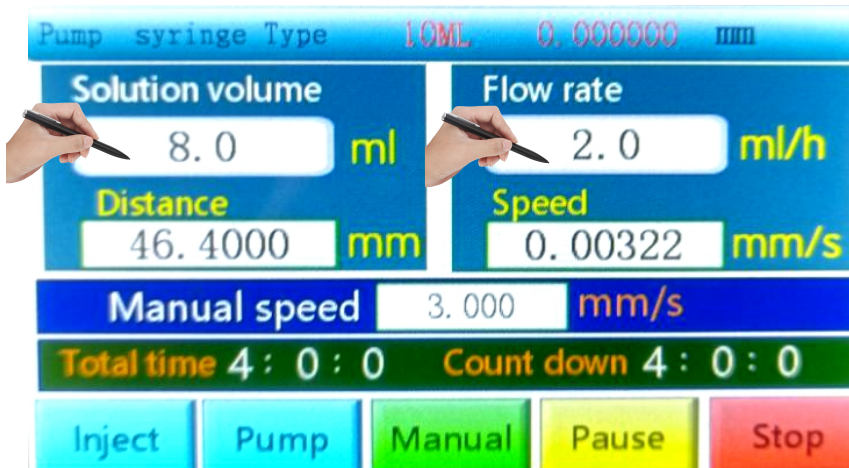


5. Click the input box of "Syringe NO." . Input "2" which is corresponding to 10ml syringe.

Click the "Control page"



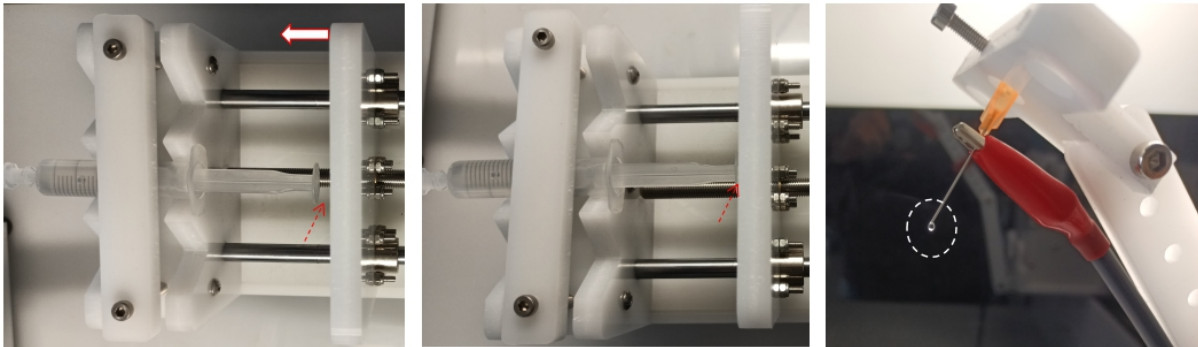
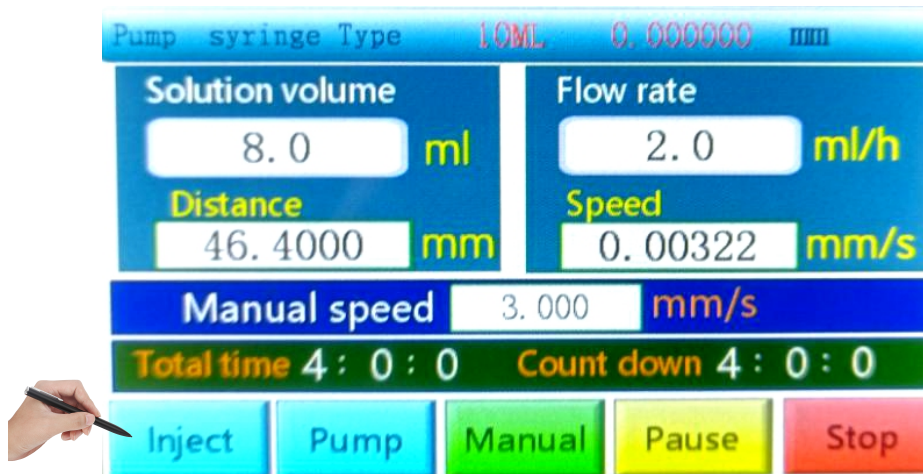
6. Set the solution volume of 8ml and the flow rate of 2ml / h . (Set this two parameters according to actual needs)



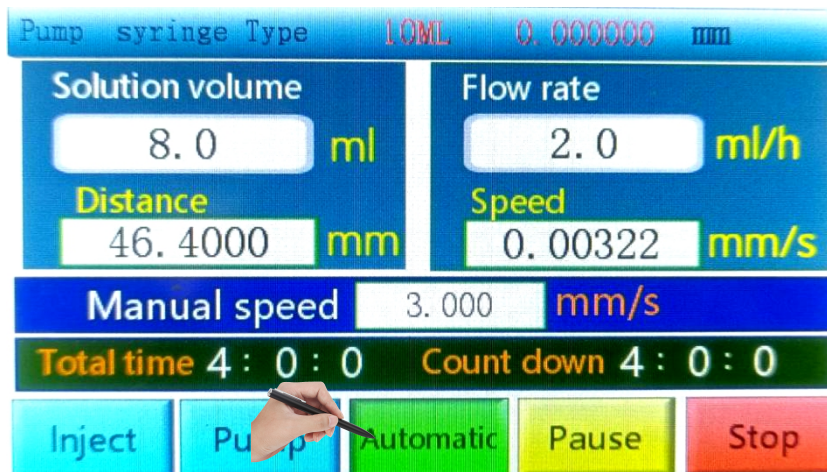
MG-H11 Modular Electrospinning Device

7. Long press the Inject button, the syringe pump baffle begins to move forward quickly.

Stop pressing immediately after the solution flows out of the nozzle.

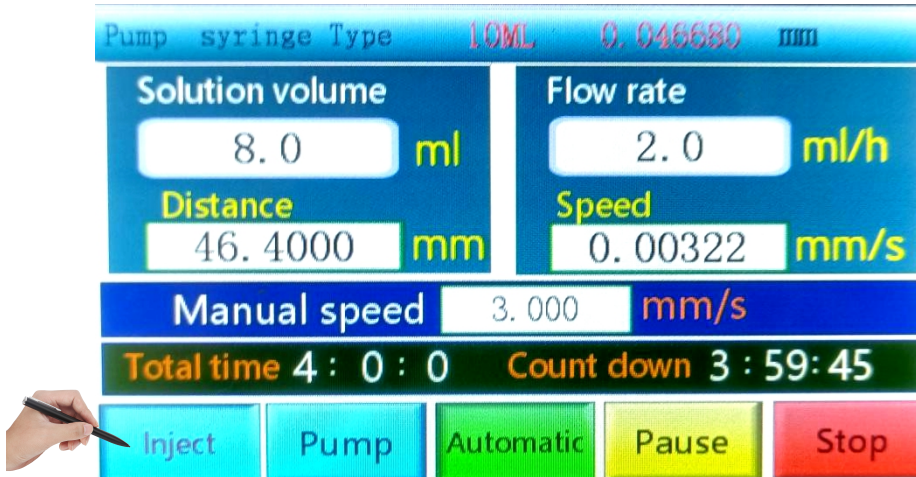


8. Click the Manual button to enter the Automatic mode.

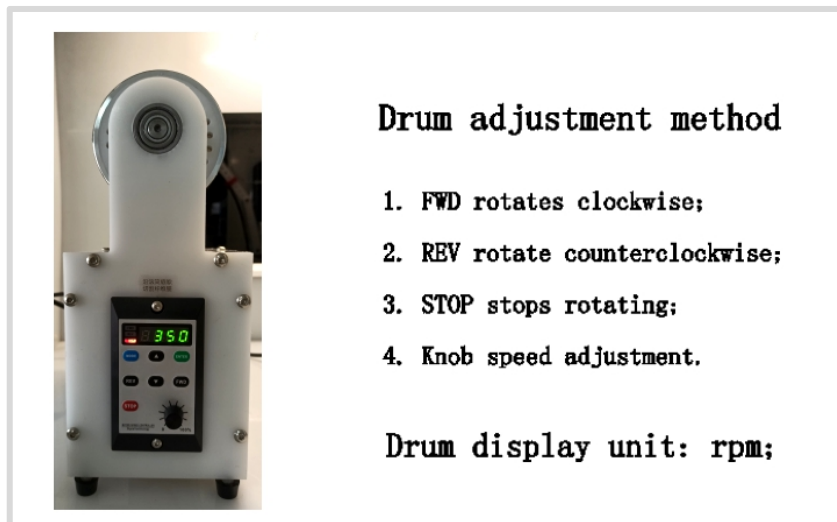


9. Click the Inject button, the syringe pump starts to inject automatically, and the countdown runs. The solution flows out evenly from the nozzle tip.

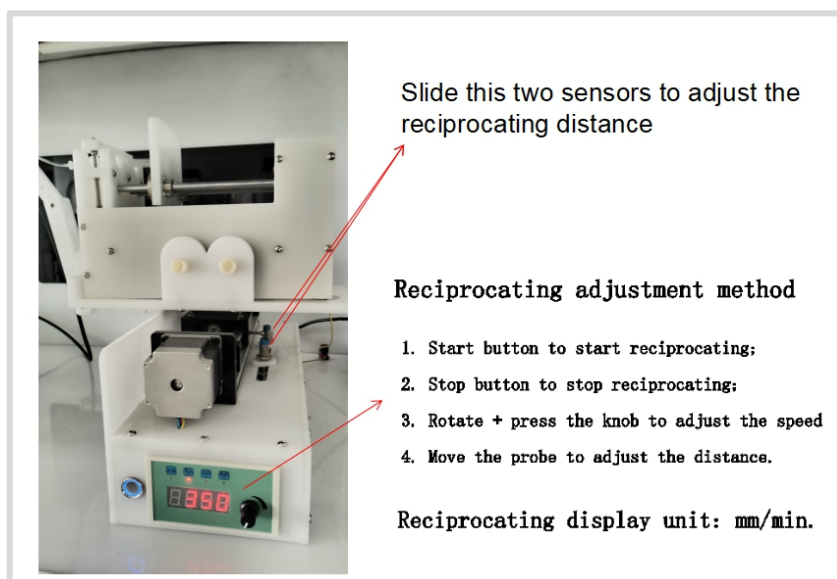
MG-H11 Modular Electrospinning Device



10. Turn on the drum collector and set the speed to 350rpm.

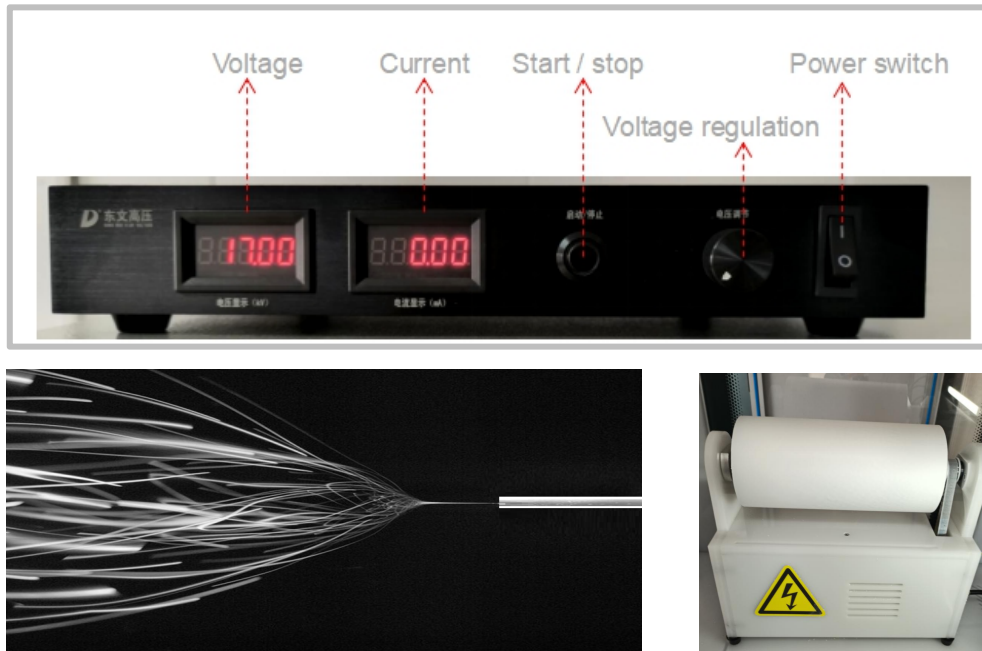


11. Turn on the Reciprocating platform and set the speed to 350mm/min, the reciprocating distance to 5cm.

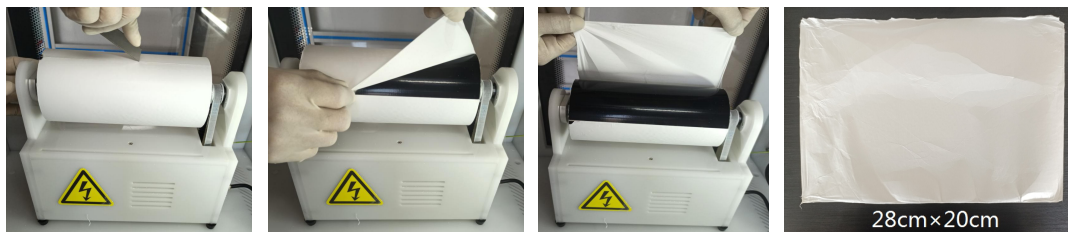


MG-H11 Modular Electrospinning Device

12. Turn on the HVPS. Press the Start/stop button, regulate the voltage to 17kV. A jet is generated from the nozzle tip and the ES nano-fibers begin to deposit on the drum collector.



13. After spinning, stop the syringe pump first. Regulate the voltage to 0kV when the jet disappears and press the Start/Stop button to stop the HVPS. Then stop the drum and reciprocating platform in turn. Cut the ES nanofiber film along the gap on the drum surface by a knife.



Other precautions

- Do not modify, disassemble or repair integrated equipment;
- Do not place it where children can reach;
- The device needs to be far away from other electronic equipment;
- In order to prevent electric shock, the operator should keep a distance of more than 10 cm from the spinneret, and the human body should not directly touch the spinneret of the device;
- The area where the instrument is placed must be far away from fire, flammable and explosive materials;
- Recommended environment: temperature: 15°C-35°C, humidity: 25%-75%;
- Clean the equipment shell in time after the operation to prevent the solution from corroding the shell

HZ-11 Modular Electrospinning Device