



TL-01

Entry-level Electrospinning System

Electrospinning for Education

Teaching, introductory research and process validation

SHENZHEN TONGLI TECH CO LTD.



Technical Specifications



TL-01 Entry-level Electrospinning System

Item	Specification
High-voltage supply	+30 - 50 kV, 0 - 1 mA
Syringe pump	Dual-channel, high-voltage-insulated syringe pump
Flow rate range	0.02 - 99.9 mL/h
Minimum flow setting	0.01 mL/h
Collectors	Rotating drum, mandrel, alignment collector and flat plate
Drum speed	1 - 5000 rpm (accuracy: ± 1 rpm)
Spinnerets	Single-needle, V-type, coaxial, side-by-side and low-volume
Microcapillary needles	1 - 45 μm (standard: 1 μm)
Spinneret motion	1 - 40 mm/s, 400 mm travel
Temperature control	Ambient to 60 ° C

Item	Specification
Humidity control	30 - 80% RH
Safety features	Door interlock, emergency stop, static elimination and multipoint grounding
Process observation	Direct, real-time visual observation throughout electrospinning
Controls	Imported touchscreen and control panel
Exhaust	Built-in exhaust, 75 m ³ /h, external duct connection
Enclosure	Navy blue metal housing with tempered-glass windows on two sides
Dimensions	800 × 620 × 970 mm
Power requirements	AC 220 V, 50 Hz, 1 kW
Warranty	3 years

Electrospinning Chamber

Viewing windows on two sides for direct process observation

Metal Enclosure and Viewing Windows

Quality sheet-metal enclosure in black or navy blue. Clear, corrosion-resistant tempered glass and a grounded chassis.

Touchscreen Control and Exhaust

Touchscreen control with adjustable exhaust airflow. Built-in fan with provision for an external exhaust duct.

Direct Process Observation

Observe electrospinning directly without a high-speed camera.

Environmental Connections

Protective gas inlet and dehumidifier connection port.



High-voltage Power Supply

Compact design with high stability and precision

+30 - 50 kV

Continuous, linear output voltage adjustment

Local control and remote PC control and monitoring

Overvoltage, overcurrent, arc and short-circuit protection

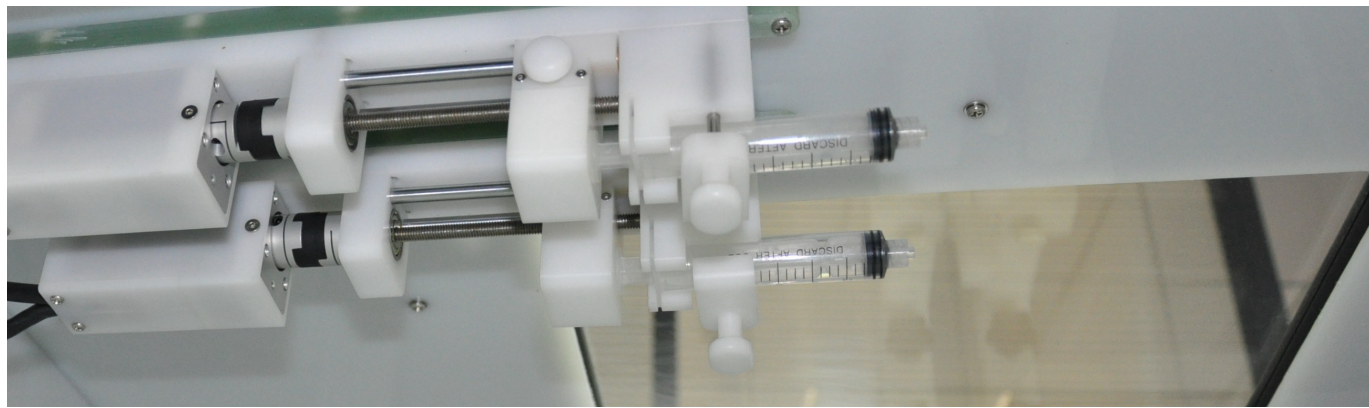
Metal enclosure for effective electrical shielding

Start/stop control, low EMI and high noise immunity



Dual-channel Syringe Pump

Independent plunger speeds for different liquid delivery requirements



High-voltage Insulation

Electrical insulation withstands high electrostatic voltages for a long service life.

Servo Motor Drive

High precision and thrust for dispensing high-viscosity liquids.

Independent Channel Control

Set a different plunger speed for each of the two channels.

Process Data Logging

Touchscreen control with real-time parameter logging and data retrieval.

Touchscreen Control System

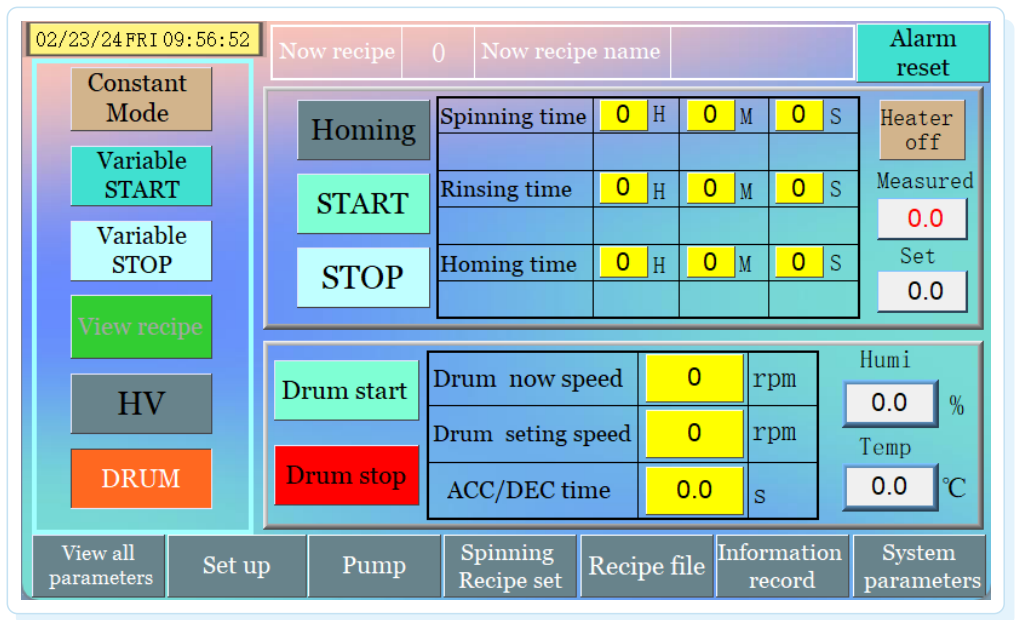
Centralized control of motion, liquid delivery and high voltage

Control spinneret and collector motion

Adjust syringe pump and high-voltage settings

Adjust component settings during operation and coordinate motion

Log and export all process parameters



The screenshot displays the Touchscreen Control System interface. At the top left, a date and time stamp reads "02/23/24 FRI 09:56:52". The interface is divided into several sections:

- Left Panel:** Contains a vertical stack of buttons: "Constant Mode" (brown), "Variable START" (teal), "Variable STOP" (light blue), "View recipe" (green), "HV" (grey), and "DRUM" (orange).
- Top Right:** Includes fields for "Now recipe" (0) and "Now recipe name", an "Alarm reset" button (teal), and a "Heater off" button (brown).
- Center:** Features a "Homing" button (grey), a "START" button (teal), and a "STOP" button (light blue). Below these are three rows of time settings: "Spinning time" (0 H, 0 M, 0 S), "Rinsing time" (0 H, 0 M, 0 S), and "Homing time" (0 H, 0 M, 0 S).
- Bottom Right:** Includes a "Drum start" button (teal), a "Drum stop" button (red), and a table of drum settings: "Drum now speed" (0 rpm), "Drum seting speed" (0 rpm), and "ACC/DEC time" (0.0 s). To the right of this table are "Humi" (0.0 %) and "Temp" (0.0 °C) displays.
- Bottom Bar:** A horizontal row of buttons: "View all parameters", "Set up", "Pump", "Spinning Recipe set", "Recipe file", "Information record", and "System parameters".

Dehumidification and Climate Control

A gentle flow of dry air controls chamber humidity



Approx. 30% RH

Compact Compressor

Powerful dehumidification rapidly reduces chamber humidity.

Dry Air Supply

A gentle flow of dry air regulates humidity inside the chamber.

Lower Humidity Option

An upgraded dehumidifier (optional) reduces humidity to 20% RH.

Mist-free Humidifier

Optional accessory

50 - 80% RH

Evaporative Humidification

Uniform chamber humidity without mist deposits on the collector.

Silent Operation

Energy-efficient humidification with antibacterial protection.

Dimensions

214 × 214 × 545 mm



Infrared Heater

Heating and temperature control

Ambient to 60 ° C

Temperature Control

Infrared heating with precise temperature control.

Heating Performance

Rapid, uniform heating.



Versatile Spinneret Systems

Interchangeable spinnerets

Dedicated insulating mounts
Integrated spinneret motion control

Basic Experiments

Single-needle, microcapillary
and low-volume spinnerets

Composite Fibers

Coaxial and side-by-side
spinnerets

Multiple Needles

Optional linear, circular and
array configurations

Single-needle Spinneret

Compatible with standard metal needles

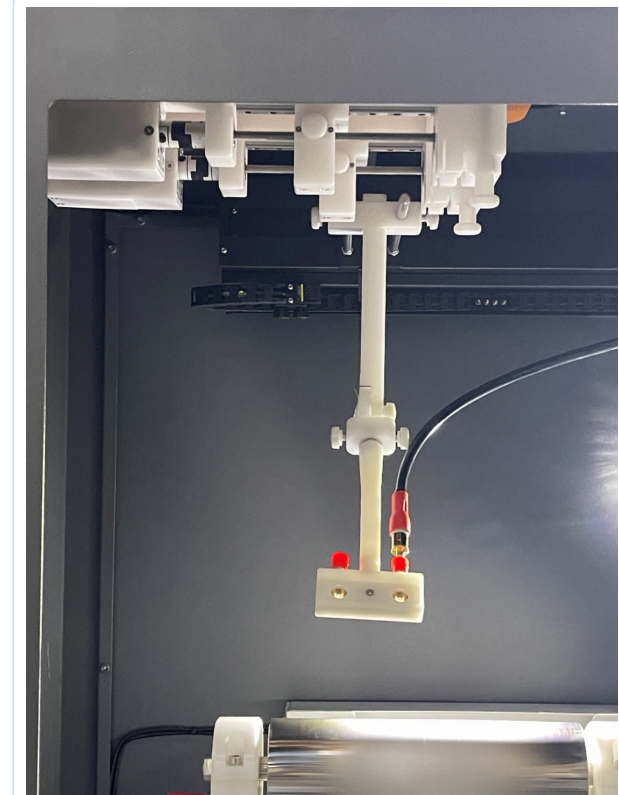
100 Needles

Stainless steel needles in assorted sizes

Accepts all standard metal needles

Dedicated spinneret holder included

Adjustable spinning angle and
tip-to-collector distance



Glass Microcapillary Needles

For ultrafine fiber fabrication and near-field direct writing

1 - 45 μm

Selectable Bore Diameter

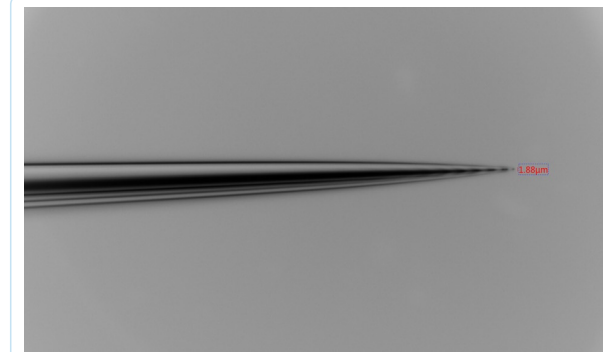
Hollow glass capillaries with an inner diameter down to 1 μm .

Suitable Fluids

For low-viscosity fluids.

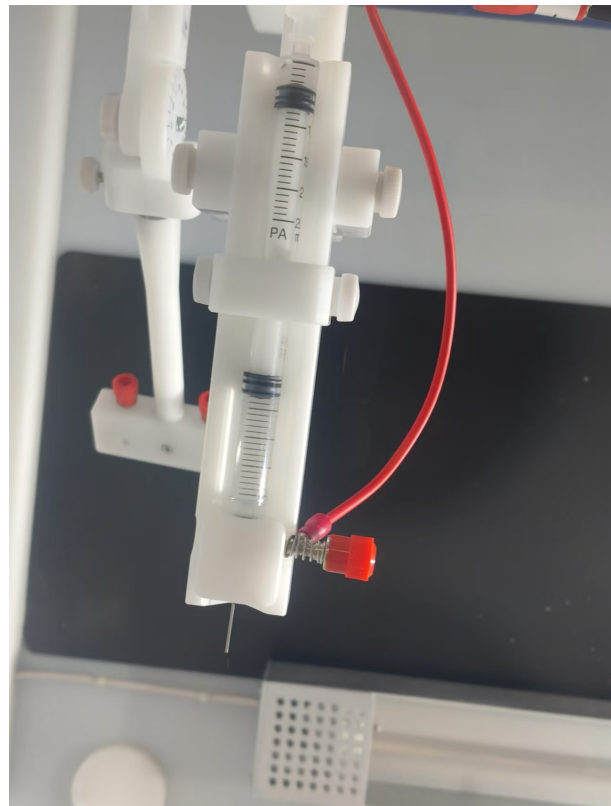
Applications

Fabrication of ultrafine fibers or near-field direct writing.



Low-volume Spinneret

Direct syringe-to-needle connection minimizes sample consumption



0.5 mL
of solution is sufficient for
electrospinning

No Connecting Tubing

Direct connection to the needle conserves expensive materials.

Optional Dual-spinneret Setup

Two low-volume spinnerets can operate simultaneously.

Coaxial Spinneret

For use with the dual-channel syringe pump

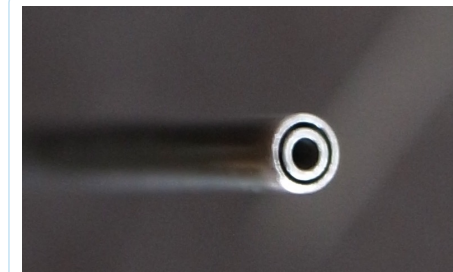
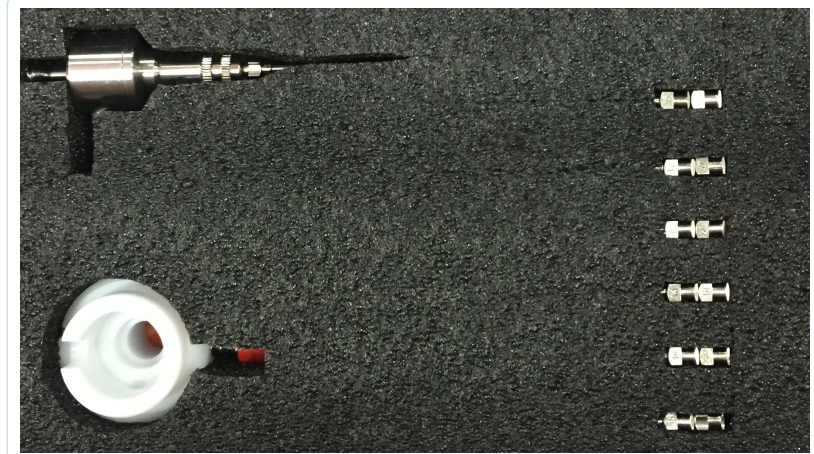
Five sets of inner and outer needles in different sizes

Interchangeable inner and outer needles

Precision needles ensure concentric alignment

Extended needles enable a low onset voltage

Also suitable for gas-assisted electrospinning



Side-by-side Spinneret

Independent liquid delivery through two channels

Bicomponent Fibers

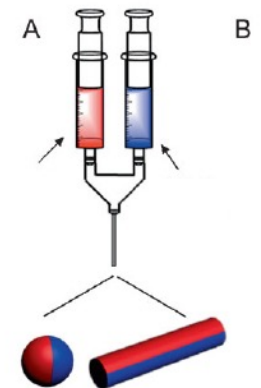
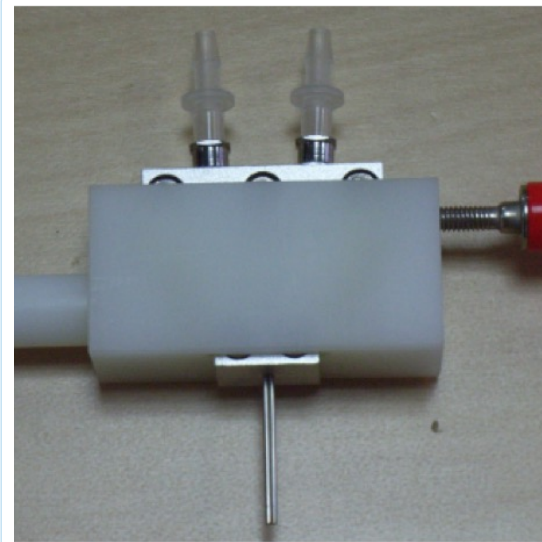
Two independently controlled channels produce bicomponent fiber membranes.

Needle Sets

Five sets of needles in different sizes included.

Standard Needle Compatibility

Accepts all standard needle sizes.

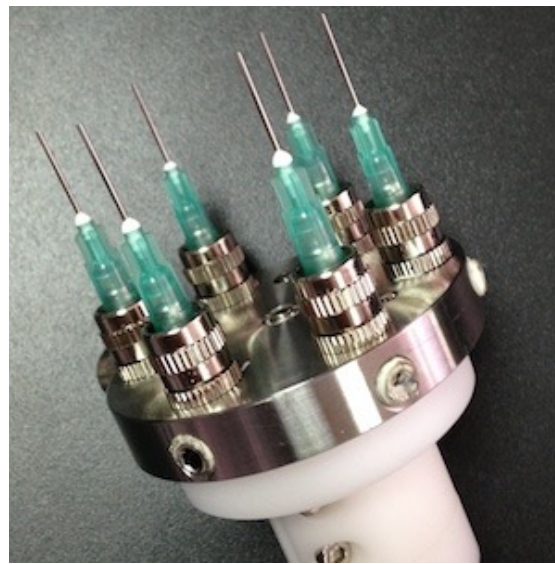


Linear, Circular and Array Spinnerets

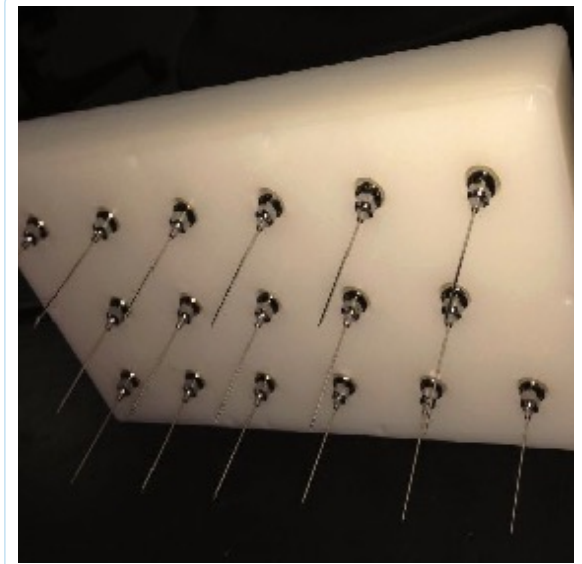
Optional accessories



Linear Needle Array



Circular Needle Array



Multi-needle Array

One inlet, multiple outlets for higher throughput

Spinneret Motion System

Reciprocating travel along the drum axis improves membrane uniformity

X-axis motion	Motorized reciprocating travel
Travel range	400 mm
Scan speed	1 - 40 mm/s
Y- and Z-axis motion	Manual positioning with graduated scales

Set and adjust motion parameters via the touchscreen. Data are available for review.



Nanofiber Collection Systems

Flat membranes, tubular structures and aligned fibers

Choose the collector to suit the membrane geometry and substrate

Rotating Collectors

Uniform deposition of flat and tubular nanofiber membranes. Drum, disc, high-alignment and mandrel options.

Flat Plate Collector

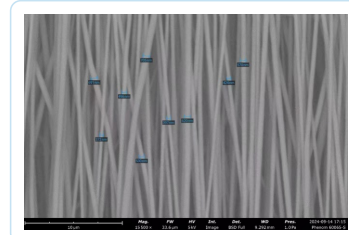
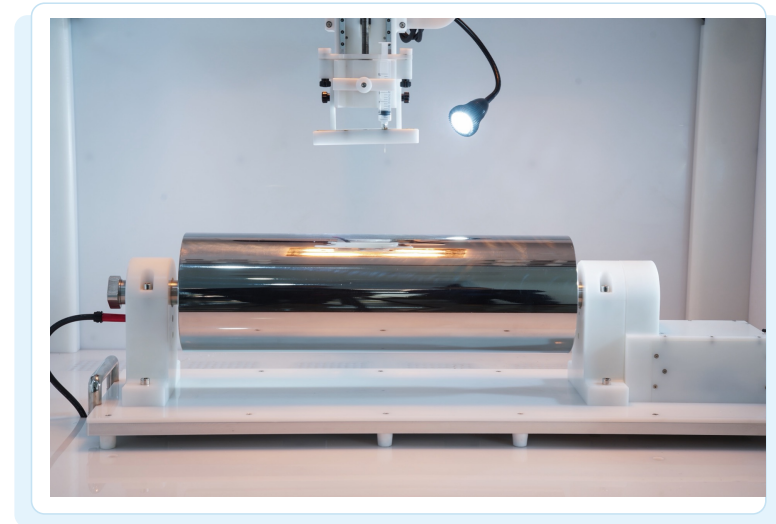
Adjustable angle for quick experiments on substrates that cannot wrap around a drum.

Rotating Drum Collector

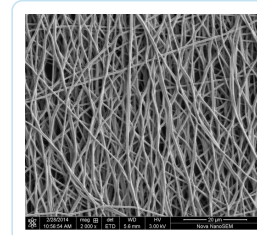
Collect random or aligned fiber membranes, with high-speed rotation promoting alignment

Rotational speed	1 - 5000 rpm
Speed accuracy	± 1 rpm
Drum dimensions	300 mm long, 100 mm diameter
Unrolled membrane size	300 × 314 mm

Adjust rotational speed to control fiber alignment



Aligned Fibers



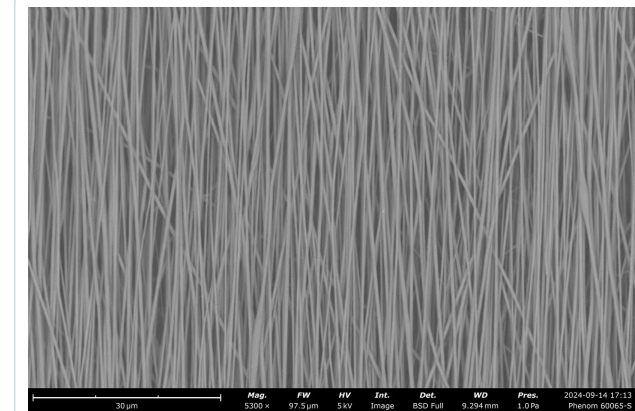
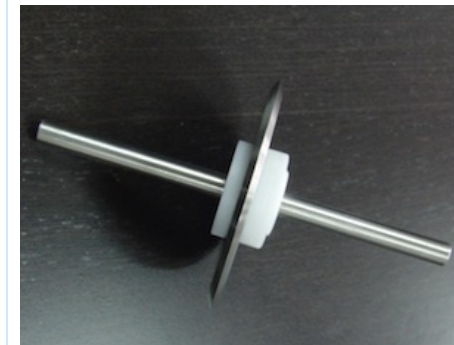
Random Fibers

Rotating Disc Collector

Collect highly aligned nanofiber ribbons along the disc edge

Rotational speed	1 - 5000 rpm, ± 1 rpm
Disc diameter	140 mm
Edge profile	Sharp / flat
Unrolled ribbon length	439 mm

The sharp edge collects a circumferential nanofiber ribbon, providing the highest alignment among the collectors shown.



High-alignment Rotating Collector

High-speed rotation produces narrow membranes of highly aligned fibers

Rotational speed	1 - 5000 rpm
Speed accuracy	± 1 rpm
Drum dimensions	140 mm diameter, 50 mm long
Unrolled membrane size	439 × 50 mm



Rotating Mandrel Collector

For hollow tubular membranes

Mandrel Dimensions

Any diameter from 1 - 30 mm
Length: 300 mm

Tubular Membranes

Hollow tubes in various sizes,
including vascular graft scaffolds.

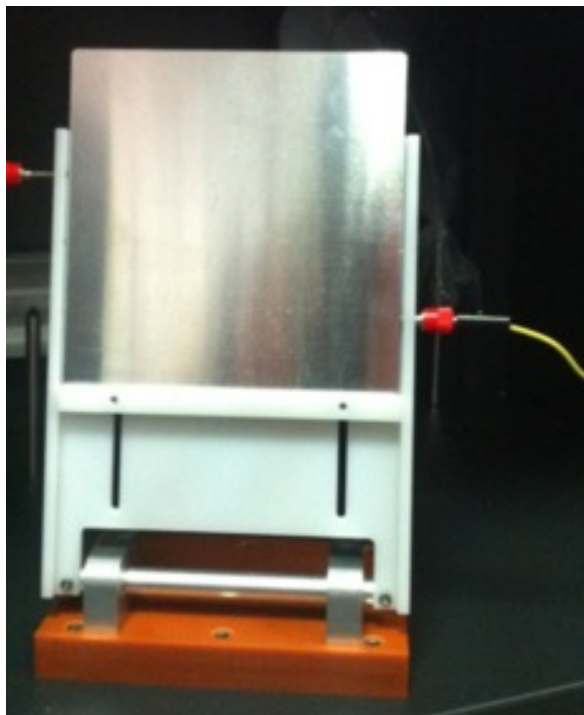
Nanofiber Diameter

100 nm - 1 μ m



Flat Plate Collector

For quick experiments on substrates that cannot wrap around a drum



Collector Plate

10 × 10 cm, 316 stainless steel.

Adjustable Angle

Set the collection angle to suit the experiment.

Optional Configuration

X - Y motion stage.

Safety Features

Emergency stop, door interlock and multipoint grounding



Emergency Stop

Accessible button for rapid shutdown in an emergency.



Power Protection

Automatic shutdown under overvoltage or overcurrent conditions.



Door Interlock

Opening the chamber door automatically switches off high voltage.

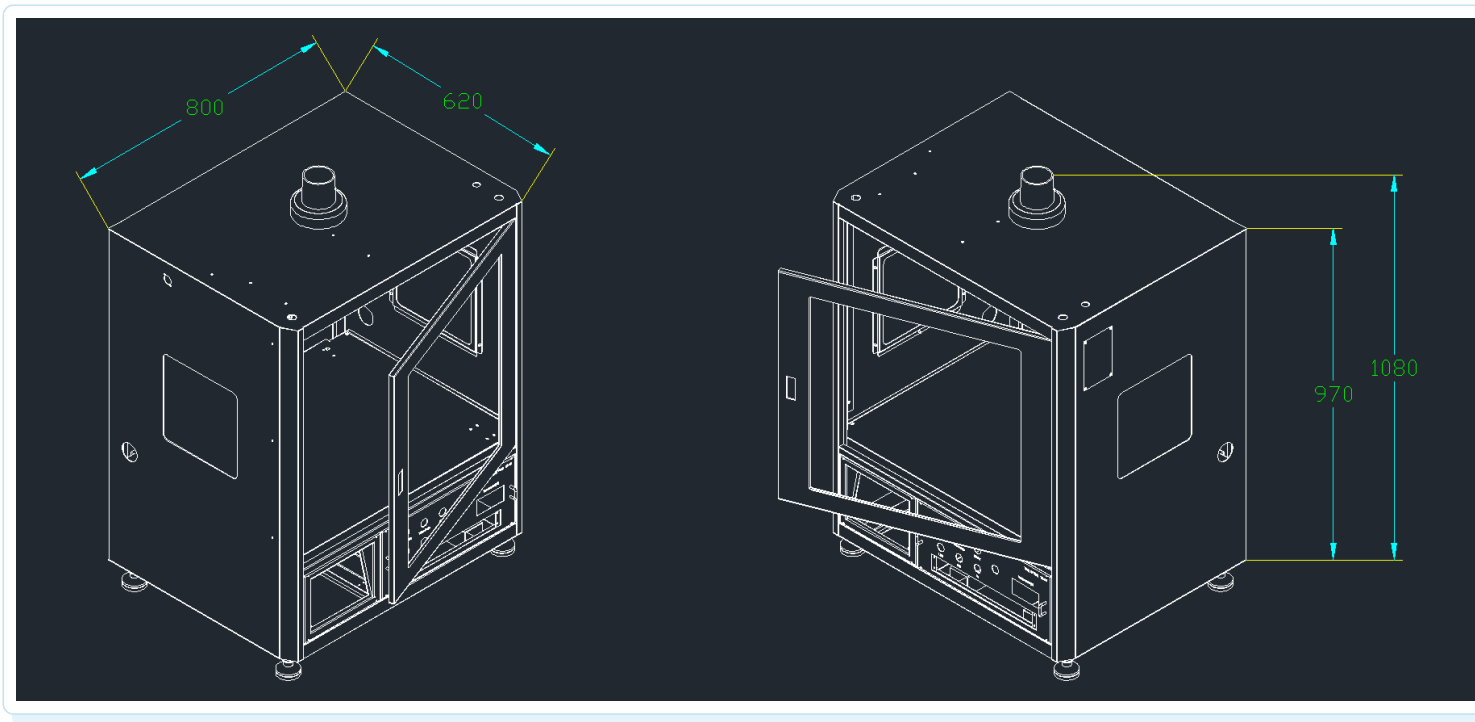


Grounding

Grounded chamber, power supply, syringe pump and collector.

System Dimensions

Chamber dimensions for installation planning



800 × 620 × 970 mm

Height incl. top exhaust outlet:
1080 mm



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Electrospinning in the Classroom

Materials Discovery through Practice

Electrospinning for Education

Teaching, introductory research and process validation

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