



Product Guide and Custom Configurations

TL-400V

Vertical Electrospinning Platform with Multiple HV Power Supplies

400 mm Drum Collector

Multiple HV supplies and configurable process modules

SHENZHEN TONGLI TECH CO LTD.



Vertical Platform with Modular Process Options

Integrated HV supplies, independent fluid feeding and motion control, with modular customization

400 mm

Drum Collector Length

Combine feeding systems, spinnerets, collectors and process modules to suit your materials and research objectives.

The number and polarity of power supplies and additional process modules are specified for each project.

Integrated Vertical Cabinet

The spinning chamber, fluid feeding system, HV supplies and control interface are integrated into one platform.

Multiple HV Power Supplies

Configure 3 positive HV supplies, or 2 positive and 1 negative HV supply. Additional supplies are available.

High-Voltage Power Supply Options

Select the number and polarity of supplies for the spinneret arrangement and process.

Option	HV supply combination	Application / configuration
3 positive supplies	3 positive HV power supplies	Multiple spinneret groups operated at positive high voltage
2 positive + 1 negative	2 positive HV supplies + 1 negative HV supply	Combined positive / negative HV operation and conjugate electrospinning
Additional supplies	Additional positive or negative supplies as required	Customized for spinneret layout and control requirements

Voltage rating, connected components and control mode for each supply are defined by the process configuration.

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Representative HV power supply

Polarity depends on the selected supply. The configuration list defines the actual output range.

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High-Voltage Output and Protection

Multiple HV supplies with stable output and protective functions

01 Configurable HV Polarity

Positive and negative supplies are available in 30-50 kV ratings. Polarity and range are selected per process.

02 Output Stability

Voltage monitoring and automatic compensation help maintain consistent process conditions.

03 Power Supply Protection

Overvoltage, overcurrent, arc and short-circuit protection.



Representative touchscreen. Interface varies with configuration.

Touchscreen and Centralized Control

Centralized settings for HV output, fluid feeding and motion

01 10-inch Touchscreen

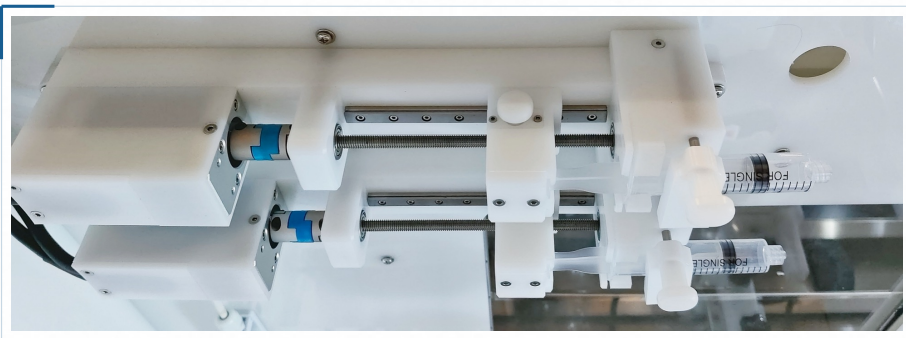
Physical shortcut buttons simplify operation and parameter adjustment.

02 Coordinated Component Control

Centralized control of HV supplies, syringe pumps, spinneret motion and collector rotation.

03 Process Parameter Management

Operating parameters can be recorded for reproducibility. Recipe sequencing and data export can be customized.



Representative six-channel servo-driven syringe pump

Multichannel Servo-driven Fluid Feeding System

Independent feeding for multicomponent and high-viscosity materials

01 Six Independently Controlled Channels

Six-channel servo-driven syringe pump with independently adjustable plunger speed for each channel.

02 Servo Drive and HV Insulation

High-precision, high-thrust servo drive with high-voltage insulation.

03 Expandable Channel Count

Upgrade to 8-10 feeding channels, with internal or external syringe pumps to suit the process.

Temperature, Humidity and Airflow

Coordinated
dehumidification, heating
and exhaust for process
environment control.

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Module	Specification / function	Availability
Dehumidification	Approx. 30% RH with standard dehumidifier	Standard
Enhanced dehumidification	Humidity down to 20% RH	Optional
Mist-free humidification	Evaporative humidification, 50-80% RH	Optional
Dust-free heating	Ambient to 45°C, adjustable heating power	Standard
Air intake and exhaust	Optimized airflow distribution within the chamber	Specified per system configuration

Performance depends on site conditions and process load. Humidification and enhanced dehumidification are optional.

Spinneret Options

Select by feeding method, fiber architecture and spinneret count.

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Spinneret type	Primary application	System requirements
Single-needle / low-volume	Conventional electrospinning and low-volume trials	Standard needles or direct syringe connection
Coaxial / triaxial	Core-shell and multilayer composite fibers	2 / 3 independent feeding channels
V-shaped / conjugate	Multiple spinnerets and bipolar HV processes	Matching number and polarity of HV supplies
Islands-in-the-sea / side-by-side	Special cross-sections and bicomponent structures	Independent multichannel feeding
Linear / annular / array	Expanded spinneret count and layout	Optional fluid distributor and holders
Heated / gas-assisted	Thermal assistance, melt electrowriting and electroblowing	Optional process modules

Spinneret models and quantities follow the configuration list. Dedicated insulating holders are provided.

Standard and Low-volume Spinnerets

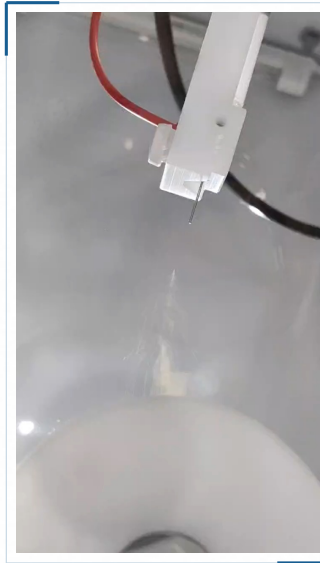
For conventional electrospinning and small-volume experiments.

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01

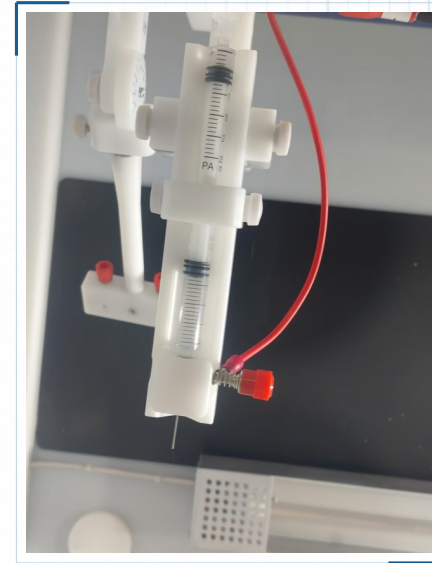
Single-needle Spinneret



Compatible with standard metal needles and a dedicated insulating holder. Includes 100 stainless-steel needles in assorted sizes.

02

Low-volume Spinneret



Direct syringe-to-needle connection minimizes tubing losses. Trials require only 0.5 mL of solution. Includes 2 low-volume spinnerets.

Additional low-volume spinnerets are available. Spinning angle and tip-to-collector distance are adjustable.

Coaxial and Triaxial Spinnerets

Independent feeds for core-shell and multilayer fibers.

01

Coaxial Spinneret

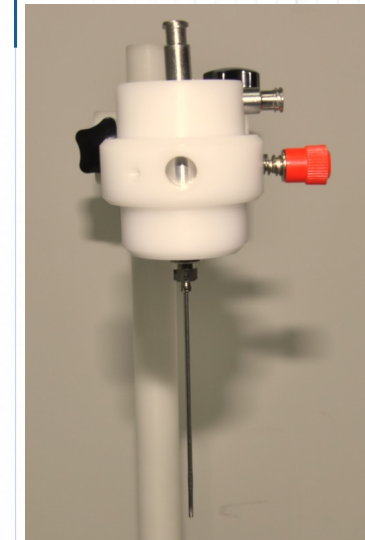


Two syringe pump channels independently feed the core and shell. Includes 5 needle sets in different sizes, with interchangeable inner and outer needles.

Coaxial spinnerets can support gas-assisted operation. Connections depend on the selected process configuration.

02

Triaxial Spinneret



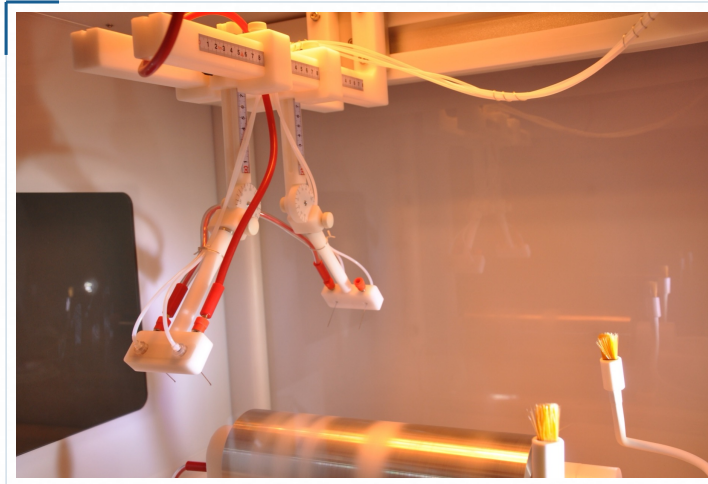
Three syringe pump channels feed the inner, middle and outer components. Includes 5 needle sets in different sizes for multilayer fiber research.

V-shaped and Conjugate Spinnerets

Coordinate power supply polarity with spinneret arrangement.

01

V-shaped Spinneret Assembly



V-shaped assembly with 4-8 spinnerets. Angle and tip-to-collector distance are adjustable. Scale markings allow position recording.

Conjugate electrospinning requires a suitable negative high-voltage supply.

02

Conjugate Spinnerets



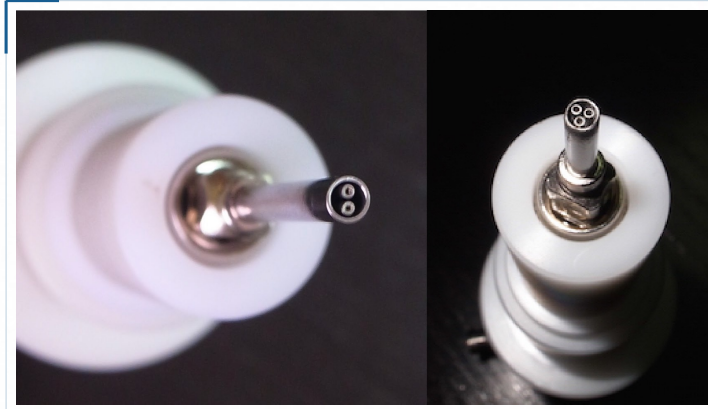
Two needle groups connect to positive and negative HV supplies for bicomponent composite membranes and nanofiber yarn research.

Islands-in-the-sea and Side-by-side Spinnerets

Independent component
feeds for different fiber
cross-sections.

01

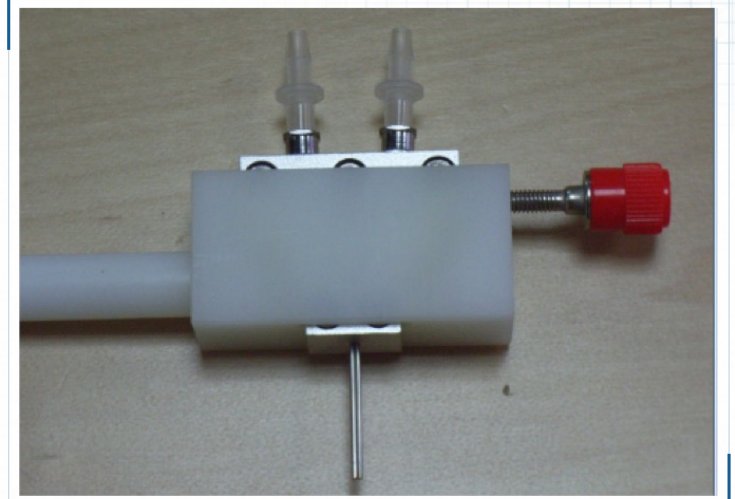
Multichannel Islands-in-the-sea Spinneret



Two- or three-channel configurations with
independent feeds for islands-in-the-sea and
cable-like multicomponent fibers.

02

Side-by-side Spinneret



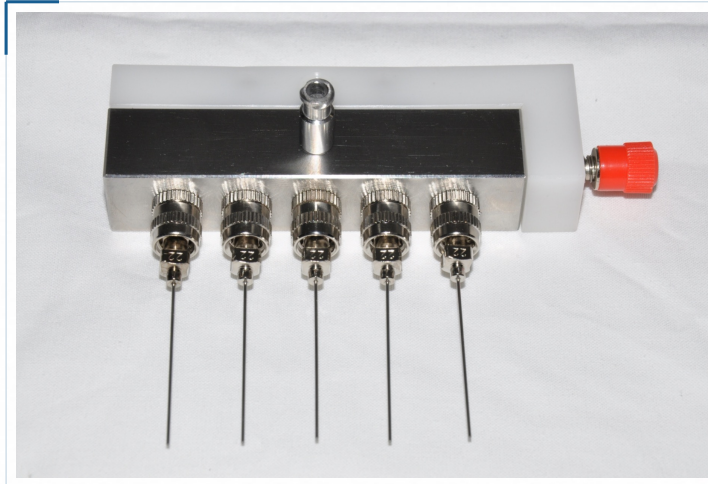
Dual-channel feeding with 5 needle sets in
different sizes, for bicomponent fibers and
varied fiber morphologies.

Spinneret Arrays and Needle Cleaning

Configured for experimental throughput and solvent system.

01

Linear, Annular and Array Spinnerets



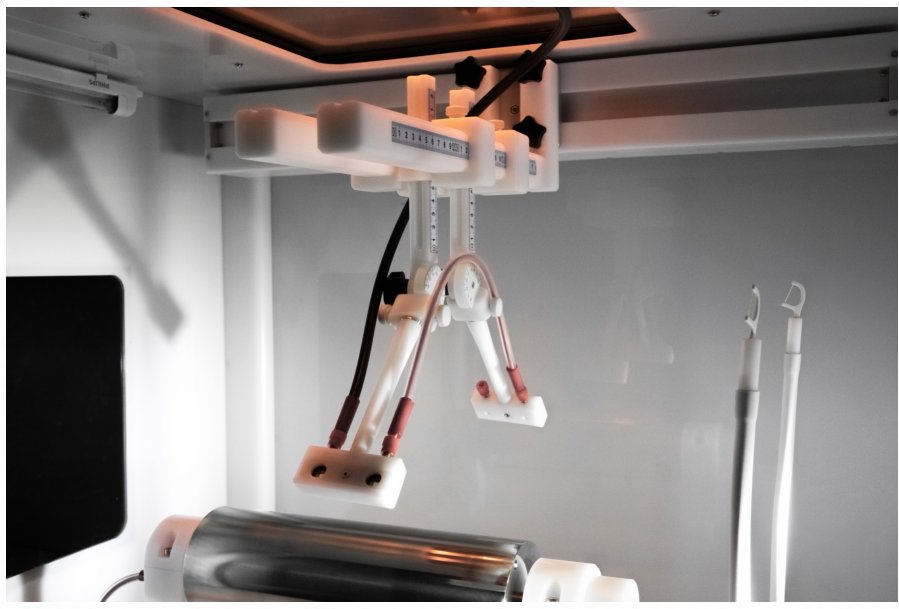
Optional one-inlet, N-outlet fluid distributor. Spinneret count, spacing and arrangement are selected as required.

02

Automatic In-process Needle Cleaning



Cleans needle tips during spinning at an adjustable frequency to reduce clogging caused by solvent evaporation.



Representative spinneret motion assembly

Spinneret Motion System

Reciprocating traverse along the drum collector axis

01 Motorized X-axis Traverse

X-axis travel: 500 mm.
Traverse speed: 1-40 mm/s.

02 Y- and Z-axis Position Adjustment

Manual adjustment with scale markings for recording and reproducing experimental positions.

03 Motion Control Expansion

Motion parameters are set on the touchscreen. Additional axes and toolpath control can be customized.

300-400 mm

Rotating Drum Collector

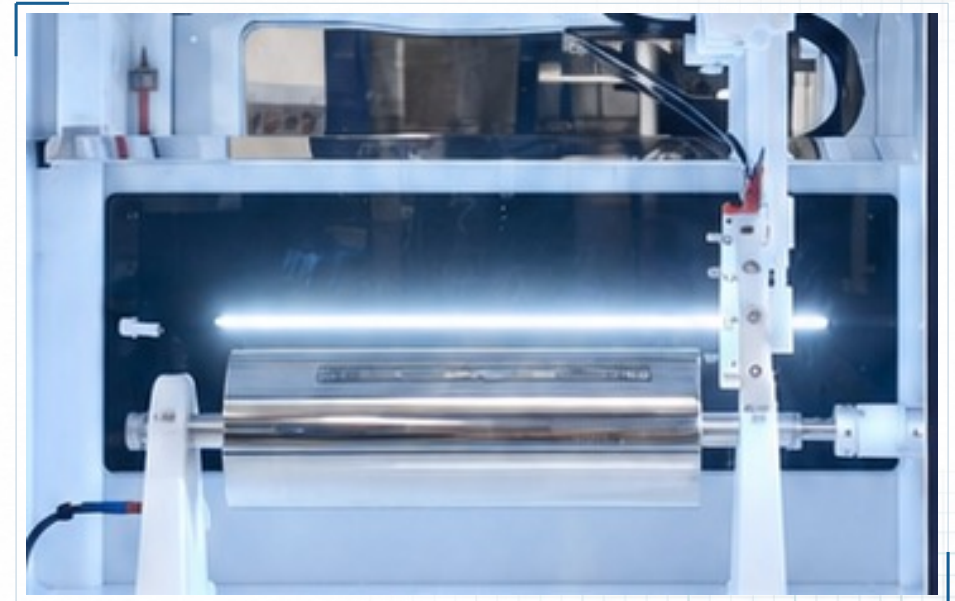
Collection of randomly oriented or aligned fiber membranes

300 mm drum: 1-5000 rpm

400 mm drum: 1-1000 rpm

Speed accuracy: ± 1 rpm

Adjustable rotation speed supports research on random and aligned nanofiber membranes.



Drum collector length: 300-400 mm

Drum diameter: $\varnothing 100$ mm. Other dimensions and collector heating are available on request.

Aligned Fiber Collectors

Collection options for fiber ribbons and narrow membranes.

01

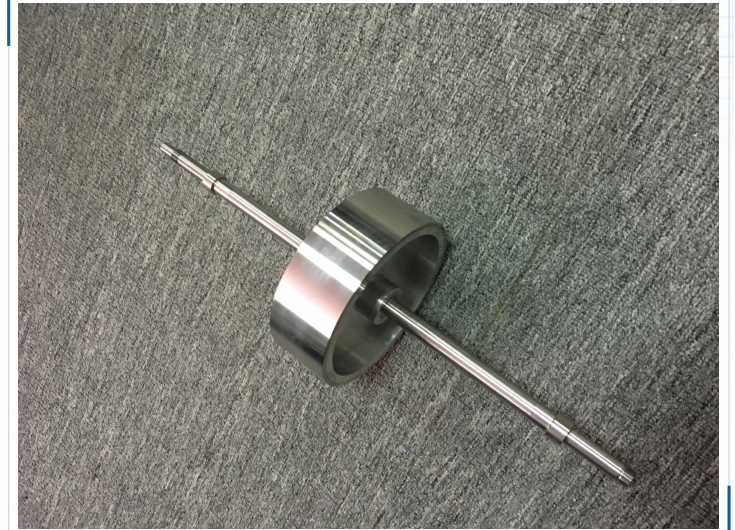
Rotating Disc Collector



Disc diameter: Ø140 mm, with selectable edge profiles. Speed: 1-5000 rpm. Accuracy: ± 1 rpm.

02

Highly Aligned Fiber Collector



Drum: Ø140 × 50 mm.
Speed: 1-5000 rpm. Accuracy: ± 1 rpm.
For narrow, highly aligned fiber membranes.

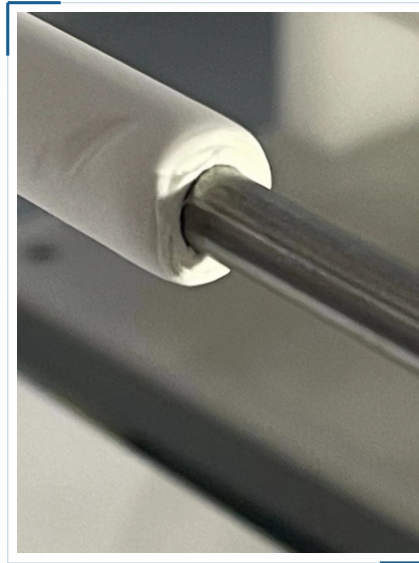
Select collectors by fiber alignment, membrane width and sample geometry. Custom dimensions are available.

Tubular and Parallel-Electrode Collectors

For hollow tubular structures and aligned fiber membranes.

01

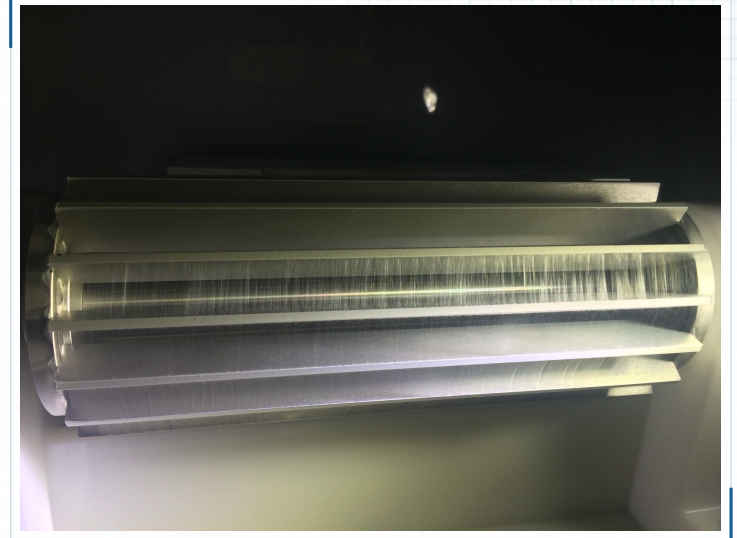
Mandrel Collector



Mandrel diameter: 1-30 mm.
Mandrel length: 400 mm.
For hollow tubular membranes, including vascular graft research.

02

Cage-type Parallel-Electrode Collector



Dimensions: Ø110 × 400 mm.
Speed: 1-150 rpm for fiber alignment at low rotational speeds.

Both mandrel and cage collectors have a collection length of 300 mm. Other dimensions can be customized.

Roll-to-Roll and Flat-Plate Collection

For flexible substrates
and rigid supports that
cannot be wound.

01

Roll-to-Roll Collector



Collection width: 250 mm.
Web speed: 1-40 mm/s.
Continuous collection of 50-100 m of fiber
membrane.

Continuous length depends on membrane thickness, substrate and winding conditions. Collection width can be customized.

02

Flat-Plate Collector

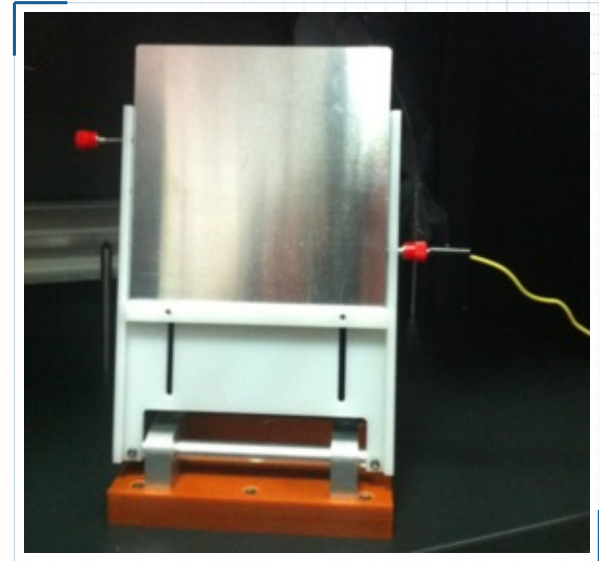


Plate: 150 × 150 mm, SS316.
Adjustable angle. Compatible with an X-Y
motion stage.

Multi-process Composite Fabrication

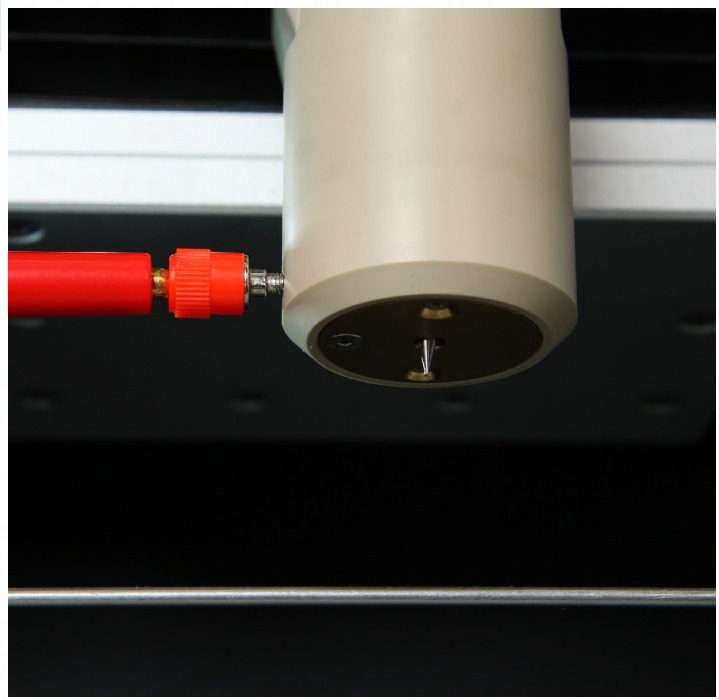
Combine electrospinning, ultrasonic spray coating and melt electrowriting as required.

Example step	Process module	Structural role
01 Base layer	Electrospinning	Forms the nanofiber substrate
02 Functional layer	Ultrasonic spray coating or melt electrowriting	Adds a coating or structural layer
03 Composite layer	Further electrospinning	Builds a multilayer composite

Modules operate independently or in a customized sequence for flat membranes, sheets and tubular composite structures.

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Illustrative custom process sequence. Spray-coating and direct-writing modules are project-specific options.



Representative heated spinneret assembly

Heated Spinneret and Melt Electrowriting

Optional modules for thermally assisted processing

01 Heating and Material Feeding

Temperature range: ambient to 150°C.
Uses a 5 mL glass syringe.

02 Positive HV Compatibility

Supports positive high voltage up to 25 kV. Configuration depends on the material and process.

03 Motion and Collector Integration

Can be combined with a motion stage for melt electrowriting and heated electrospinning of small solution volumes.

The heated spinneret is optional. Temperature and voltage limits depend on the selected module.



Representative X-Y motion stage

The X-Y stage is optional. The deposition area depends on the collector and motion configuration.

X-Y Motion Stage

Motion capability for planar deposition and toolpath control

01 Toolpath Setup

Supports CAD files and programmed input. Includes a handheld controller and separate control unit.

02 Motion Specifications

Travel: 200×200 mm. Speed: 0-30 mm/s.
Positioning repeatability: $<50 \mu\text{m}$.

03 Customization

Travel range and motion configuration can be tailored to the deposition area and toolpath.

Nanofiber Yarns and 3D Fibrous Mats

Dedicated modules for expanded fiber architectures.

01

Nanofiber Yarn Module



Produces nanofiber yarns with or without a core. Supports research on nanofiber coatings over core filaments.

02

Thick 3D Nanofiber Mats



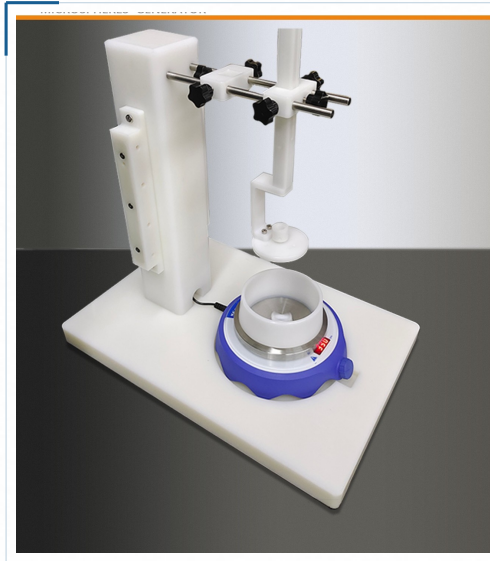
Dedicated collection accessories produce thick, three-dimensional fibrous mats for lofted structures and multilayer deposition.

Water-Bath Collection and Electroblowing

Select process modules
for the target structure.

01

Nanoparticle Preparation Module



Collects microspheres, short fibers and other structures in a water bath. Includes a stirrer, insulating base, dedicated spinneret and auxiliary electrode.

02

Electroblowing Module



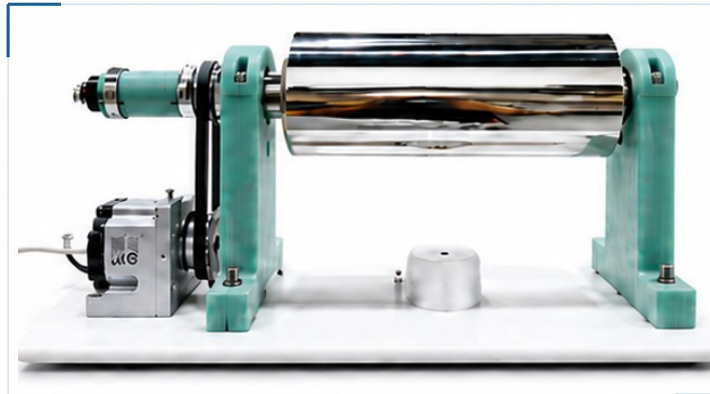
Combines gas flow and an electric field to stretch the jet, for research on fiber membranes, lofted mats and cotton-like fiber structures.

Collector Heating and In-line UV Curing

For thermally assisted processing and photocurable materials.

01

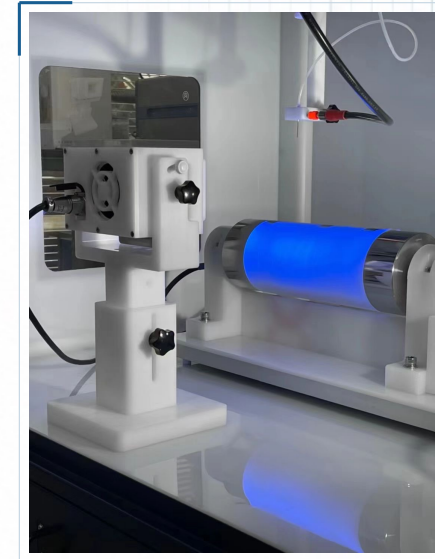
Heated Rotating Collectors



Mandrel heating: up to approx. 60°C.
Drum heating: up to approx. 140°C.
Independent heating control.

02

In-line UV Curing



Peak wavelength: 365 nm, with forced-air cooling. Supports in-line UV curing during electrospinning.

Additional Process Accessories

Expand the system for target sample morphologies and experimental workflows.

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Accessory	Application	Specification / configuration
Glass microcapillary needles	Microfluidic feeding, ultrafine fibers and near-field direct writing	Needle inner diameter: 1-45 μm
Microfilament collector	Fiber coating on fine filaments	Filament diameter: 10-1000 μm
Orthogonal fiber array module	Uniaxial or orthogonal fiber arrays and multilayer deposition	Dedicated spinneret and rotating twin-disc collector
Rotating flat-plate collector	Rotating collection with customized plate angle	1–5000 rpm
Ionizing blower	Static neutralization and auxiliary airflow control	Specified for the process

Accessory compatibility, quantities and scope of supply are defined in the project specification.

Safety and Protective Functions

Coordinated protection for the HV supplies and complete system



01 Emergency Stop

Rapid shutdown in an emergency.

Multipoint grounding is provided for the cabinet, HV supplies, syringe pumps and collectors.



02 Door Interlock

Disables high-voltage output when the door opens.



03 Automatic HV Protection

Automatic protection against overvoltage, overcurrent and other faults.

Customization Scope

Configure the system for the material, target structure and process objectives.

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System area	Configurable options	Key requirements
HV supplies	Quantity, polarity combination and voltage rating	Spinneret groups and electric-field arrangement
Fluid feeding	Channels, internal / external pumps and spinneret compatibility	Material components and feeding method
Spinnerets and motion	Spinneret type, quantity, arrangement and travel	Spinning path and deposition area
Collection system	Drum, mandrel, flat plate, roll-to-roll and heating	Target sample geometry and dimensions
Process and control	Spray coating, direct writing, recipe sequencing and data logging	Process sequence and data requirements

Extensions are evaluated per project and documented in the technical specification and configuration list.

Typical Configurations

Configure by research task. The detailed equipment list can be further tailored.

Configuration	Typical components	Research applications
Multiple-spinneret electrospinning	3 positive HV supplies + multichannel feeding + 400 mm drum	Multiple-material and multiple-spinneret membrane research
Positive / negative HV	2 positive + 1 negative HV supply + conjugate spinnerets or suitable collector	Conjugate electrospinning and composite structures
Combined processes	Multiple HV supplies + customized feeding + coating / direct-writing / motion modules	Functional coatings and multilayer materials

Additional power supplies and functional modules can be integrated as project requirements expand.

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Core Specifications

4 independent feeding channels,
400 mm traverse,
multiple HV supply options.

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Item	TL-400V specifications / configuration
System format	Vertical cabinet
HV supply combination	3 positive, or 2 positive + 1 negative. Additional supplies available.
HV supply rating	Positive / negative, 30-50 kV ratings. Each supply configured as required.
Control system	10-inch touchscreen + physical shortcut buttons
Fluid feeding	4-channel servo-driven syringe pump. 6-8 channels optional.
Spinneret X-axis motion	Travel: 400 mm. Traverse speed: 1-40 mm/s.
Environmental control	Ambient to 45°C. Standard dehumidification to approx. 30% RH.

Collector and Module Specifications

400 mm drum length.
Accessory specifications depend on the selected configuration.

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Item	Specification	Notes
Main drum collector	Length: 400 mm. Diameter: Ø100 mm. Speed: 1-1000 rpm. Accuracy: ±1 rpm.	Custom dimensions available
High-speed drum	Length: 300 mm. Diameter: Ø100 mm. Speed: 1-5000 rpm. Accuracy: ±1 rpm.	Adjustable rotation speed
Mandrel collector	Diameter: 1-30 mm. Length: 400 mm.	Custom dimensions available
Flat-plate collector	150 × 150 mm, SS316	As selected
X-Y motion stage	Travel: 200 × 200 mm. Speed: 0-30 mm/s.	Optional, customizable
Heated spinneret	Ambient to 150°C. Positive HV: ≤25 kV.	Optional module

Deposition area depends on the collection method and motion travel. Overall dimensions follow the custom configuration.

Installation and Delivery

Finalize the system configuration for the laboratory site conditions

01	Dimensions and Layout	Cabinet dimensions, door-opening clearance and module locations depend on the selected HV supplies and process components.
02	Site Requirements	Confirm electrical supply, protective grounding, exhaust connections and space for environmental control modules.
03	Specification and Supply List	Confirm spinnerets, HV supplies, feeding channels and collectors. Document optional and customized items in the technical specification.
04	Maintenance and Support	Three-year warranty and lifetime maintenance support. Service scope is defined in the contract.



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Vertical Electrospinning Platform with Multiple HV Power Supplies

Process configurations tailored to your materials
and research objectives



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