

E-Fiber

Modular electrospinning/electrospraying platform



EF200 - Electrospinning/electrospraying system with Filtration Unit

EF200 is an electrospinning/electrospraying complete plug & play solution for research and development applications and for users who require a modular upgradeable setup, with an embedded certified filtration unit for exhaust solvent and vapor.

EF200 is a fully-customisable electrospinning/electrospraying platform consisting of injection stages and application-specific collectors (static or movable), for laboratory-scale manufacturing of polymeric nanofibrous matrices.

EF200 is equipped with a TUV certified fume-hood with an active carbon filtered system (customizable for specific solvents and chemical agents), that allows users to have a real Desktop system, with no need to connect the extraction to any exhaust or filtration system.

This device provides a powerful and highly versatile technique for the creation of various fibrous architectures with controlled fiber diameter and orientation. Its technology minimizes influence on the electrospinning process.

E-Fiber EF200 offers various technological solutions to accurately control each process guaranteeing batch-to-batch reproducibility and precise control of fiber parameters such as diameter, orientation and texture.

Its enclosure with sealed chamber and filtration unit, has 2 independent safety doors, 1 for normal operations, 1 for hood operations. EF200 is the perfect solution for the most demanding R&D applications.

The equipment is user-friendly and safe thanks to the automatic safety devices that protects the operator during operations.

E-Fiber EF200 is a real Desktop system (easily movable, doesn't require any external connections) includes:

- cabinet with filtration unit
- high voltage power supply 0-30 kV or 0-40kV
- control system with touch screen
- programmable 1-channel syringe pump
- manual distance adjusting up to 300 mm
- multispinneret support up to 3 needles
- 200x200mm flat plate collector
- camera system
- disposable kit

Disposable kit includes 2 stainless steel spinnerets of 2 different diameters, 100 syringes, tygon/ptfe tubing (7.5m), polypropylene male and female luer connectors (15+15).



Each EF200 is equipped with a digital microscope, with embedded visualization on the touch screen, allowing the user an easy and immediate control over the process parameters, the needle tip and the formation of the Taylor cone.



Accessories and upgrade

E-Fiber can be equipped and upgraded with a variety of accessories to extend and best fit user requirements and applications.

COLLECTOR SYSTEM

EFA010 - Interchangeable size rotating collector

Rotating collector used to electrospin cylindrical or big planar structures with oriented and non-oriented fibers (depending on rotation speed). This version can house cylindrical collectors (mandrels) with different diameters and lengths and, because it is highly flexible and versatile, it is ideal for research applications. Entirely made with insulating materials, in order to avoid interferences with the electrical field and electrospinning process. Electronic feedback for a precise control over speed rotation, in order to grant highly reproducible batch-to-batch conditions. Supplied with 5 collectors of different diameters.

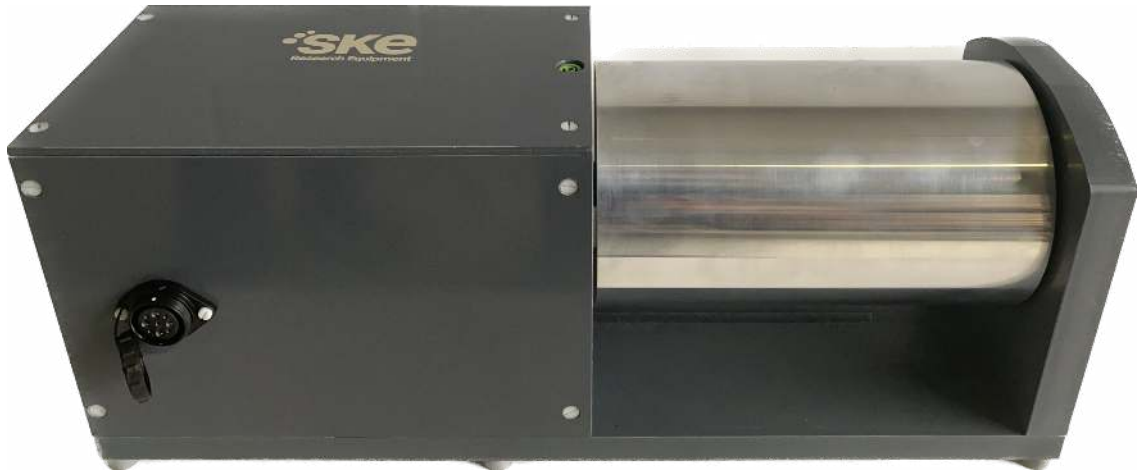
Standard parameters : adjustable speed between 50-1200 rpm, collectors up to 250mm length and 100mm diameter.



EFA015 - High speed rotating collector

A motor-driven cylindrical collector, used for electrospinning cylindrical or big planar structures with oriented and non-oriented fibers: this model can reach very high rotation speed. Entirely made with insulating materials, in order to avoid interferences with the electrical field and electrospinning process. Electronic feedback for a precise control over speed rotation, in order to grant highly reproducible batch-to-batch conditions.

Standard Parameters : adjustable speed between 50-3000 rpm, collector 250mm length and 150mm diameter.

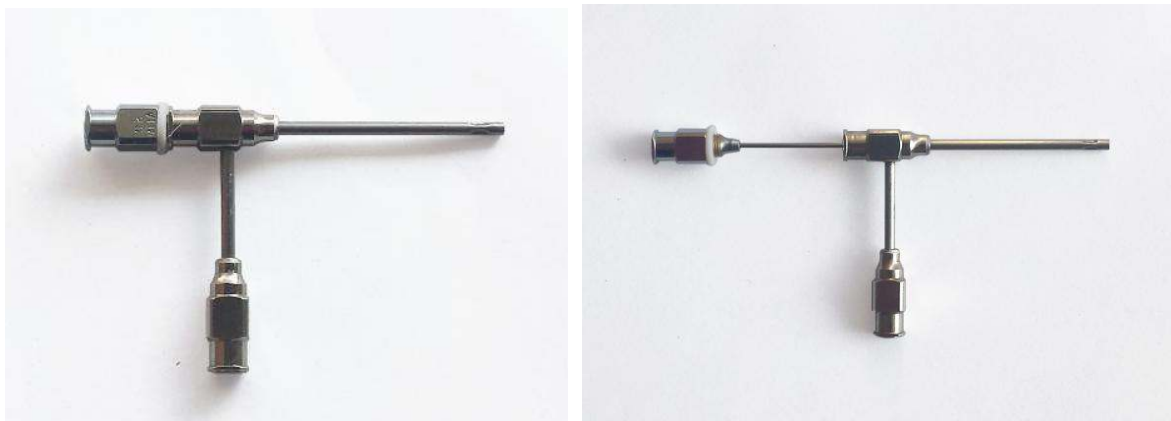


SPINNERET SYSTEM

EFA035 - Coaxial spinneret nozzle

Coaxial spinneret needle made of two coaxial needles, used to simultaneously electrospin up to two different polymers. This is generally used to create fibers whose core and shell are made of different materials. Ideal for research purposes. Detachable options for easy cleaning operations. Minimum dead volume.

Fully customizable and made according to customer specifications (need at least a dual channel syringe pump or 2 single channel syringe pumps).



EFA040 - Triaxial spinneret nozzle

Triaxial spinneret needle, made of three coaxial needles, used to simultaneously electrospin up to three different polymers. Generally used to create fibers with cores and shells made of different materials. Ideal for research purposes. Detachable options for easy cleaning operations. Minimum dead volume.

Fully customizable and made according to customer specifications. (need at least a six channel syringe pump).



EFA045 - Quadriaxial spinneret nozzle

Quadriaxial spinneret needle, made of four coaxial needles, used to simultaneously electrospin up to four different polymers. Generally used to create fibers with cores and shells made of different materials. Ideal for research purposes. Detachable options for easy cleaning operations. Minimum dead volume.

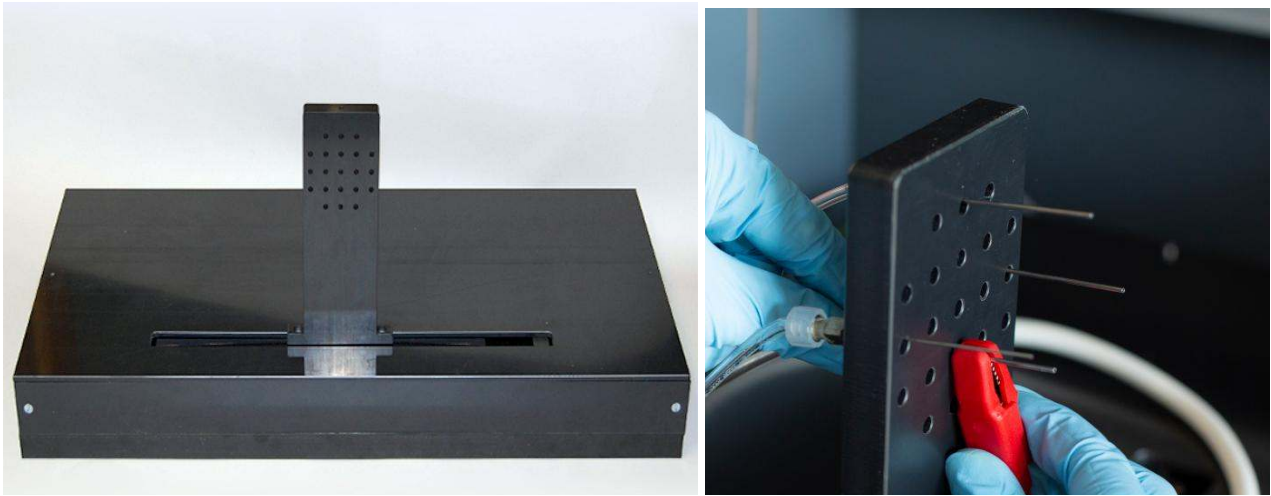
Fully customizable and made according to customer specifications. (need at least a six channel syringe pump).



EFA025 - Scanning motion spinneret

Linear Motion Spinneret System is used for superior uniformity in nanofibers or nanoparticles deposition during electrospinning process. Highly flexible and versatile, ideal for research applications, can house multiple spinneret needles in 21 different positions, both standard and coaxial.

The Linear Motion Spinneret System allows greater collector surface coverage, with optimal deposition uniformity. It is used to electrospin large planar formats (for example, A4 size or bigger) or long tubes. Ideal for scaling-up application.



ENVIRONMENTAL CONTROLLERS

EFA130 - Climate control unit - Full environmental control unit

E-Fiber EF100 system can be equipped with an external full control module, in order to control environmental parameters on your working area, with a real time monitoring. This module controls temperature and humidity of the air of the working area, and keeps it constant during your electrospinning session. You can directly manage your setpoint of °C and RH% on the control user interface.

Parameters :

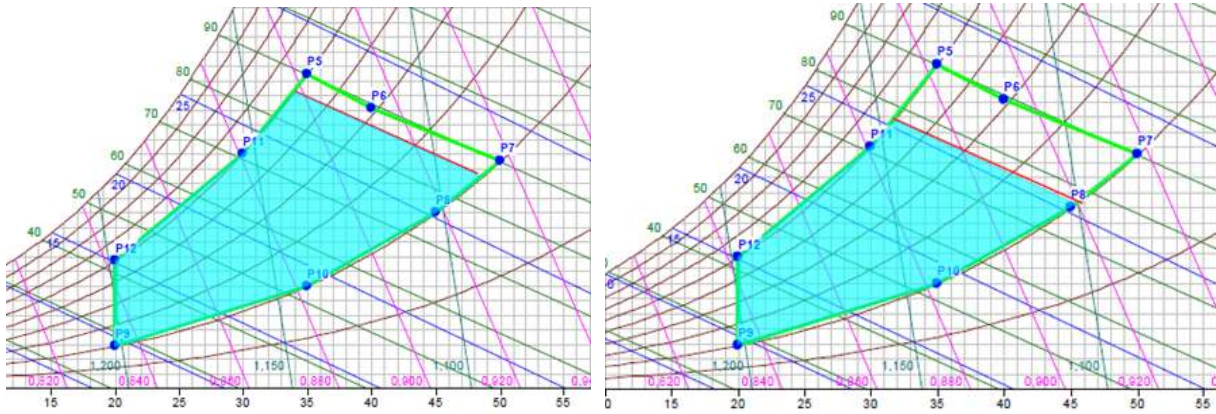
Setting Range: Tenv/+35°C – 20/60 % RH,

Working range: +18/+25°C – 40/80% RH,

Heating power: 3 kW, Dehumidification power: 2kW,

Air volume effective: 150 m3/h





EFA140 - Climate control unit - Heater

E-Fiber EF100 system can be equipped with an external heater module, in order to control environmental parameters on your working area, with a real time monitoring. This module can heat the air of the working area, and keeps it constant during your electrospinning session. Temperature is directly visualized on the control user interface. It is equipped with its own control panel, and eventually can be integrated in your E-Fiber also in a second time.

Parameters : PID controller of Temperature, heating of electrospinning area up to 40 °C.



EFA145 - Climate control unit - Humidity reduction

E-Fiber EF100 system can be equipped with an external humidity reduction module, in order to control environmental parameters on your working area, with a real time monitoring. This module dehumidifies the air of the working area, and keeps it constant during your electrospinning session. Humidity is directly visualized on the control user interface. It is equipped with its own control panel, and eventually can be integrated in your E-Fiber also at a later time.

Parameters : humidity reduction up to 20% RH, working range: 0 – 100% RH, Dehumidification performance 1.6 kg/h @ 60% RH.

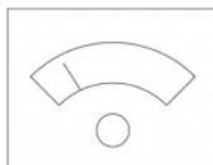


EQUIPMENT UPGRADES

EFA170 Negative High Voltage (dual polarity configuration)

All SKE E-Fiber models can be upgraded with a second High Voltage Power Supply, with Negative potential. The HV generator can be integrated within the equipment. The Negative HV Power Supply increase the efficiency of the electrospinning/spraying system, and allows to have a more versatile device and focusing more effectively the electrospinning jet on the collector.

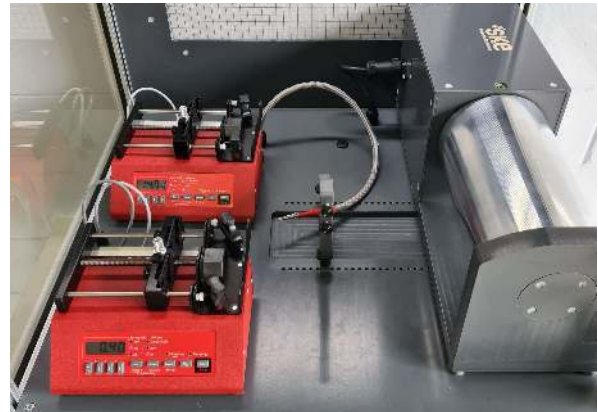
Dual High-Voltage Source
Negative potential



EFA185 - EFA190 - EFA195 - Multi Channel Syringe pump

Replaces the standard supplied syringe pump or add a second pump, useful for electrospinning of high quantity of solution through multiple syringes, big target collectors, or coaxial and triaxial spinneret.

Available with 1, 2 and 6 channels



EFA310 - Vertical setup

The Vertical Electrospinning set-up allows user to configure an electrospinning bottom-up setup modifying the standard horizontal approach. This set-up allows to electrospin/spray with vertical direction, from bottom to top, in order to avoid any dropping of solution on the electrospun products. The distance between spinneret and collector can be varied by sliding the spinneret support.



EFA340 - Near Field Electrospinning/Electrowriting

The Near Field Electrospinning / Electrowriting system is a special accessory for E-Fiber EF100/EF300, designed for combining the electrospinning/electrospraying technology with 3D printing capabilities. The system includes an XY stage with a spinneret support, with an easy interface with E-Fiber equipment. Near-field electrospinning (NFES) is a micro-additive manufacturing technique that uses electric fields to continuously print micro- and nanofibers onto moving collectors.



EFA350 - Disposable kit

The disposable kit includes:

- 2 stainless steel nozzles of different diameters
- 100 syringes
- tygon/ptfe tubing (7.5m)
- polypropylene male and female luer connectors (15+15).



TECHNICAL DATA

General Information

Dimensions	Approx. 800 mm x 700 mm x 1300 mm (W x D x H)
Weight	Approx. 50 kg (standard equipment)
Cable Length	AC power supply 1.5 meters
User interface	Touch Screen with User Interface
Emergency Button	Yes
Safety switch (interlock)	Yes, two (1 for each door)
Main power	110-220 Vac ~ 50/60Hz

High-voltage power supply

Voltage *	Single High Voltage power supply 0÷40kV or (higher voltage on request)
Polarity *	Positive (default) Negative can be customized on request (dual polarity on request)
Power *	40W for high voltage power supply (higher power on request)
Current *	1 mA max
Arc and Short-circuit protection	Yes
Safety Interlock	Yes
Voltage Accuracy	± 2%
Voltage Stability	0,01% per 8h
Regulatory Approvals	Compliant to 2004/108/EC EMC Directive Compliant to 2006/95/EC Low Voltage Directive

* Fully customizable features

Syringe pump

Channels	1
Syringe	up to 60 mL
Infusion rates	from 0.73µL/hr (1mL syringe) to 1500mL/hr (60mL syringe)
Dispensing accuracy	+/- 1.00 %

Collector

Shape	square
Size	200[W] x 200 [D] mm
Material	stainless steel
Spinning Distance	50 ÷ 300 mm

Spinneret

Spinneret type	Single spinneret
Spinneret range size*	30G up to 10G
Length*	50 mm
Material	stainless steel

* Fully customizable features

Safety

Interlock system	On door opening, Safe/Normal mode
Emergency button switch	Mushroom red button
Fume extraction connection	NOT NEEDED
Filtering unit	TUV certified fume-hood with active carbon filter Maximum filtered volume 300 m ³ /h
In Force legislations	LVD 2014/35/UE 2006/42/CE

ORDERING DETAILS

Product code	EF200
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