

spin **split**



eSpin

laboratory electrospinning systems

User Manual I: Technical specification

(Rev 1.6)

Revision

Revision number	Certified by	Changes	Date
1.0	Ferenc Ender	Initial	August 2017
1.1	Ferenc Ender	Minor changes	August 2017
1.2	Ferenc Ender	Minor changes	August 2017
1.3	Ferenc Ender	Added cubic chamber	May 2018
1.4	Ferenc Ender	Added netPump	June 2018
1.5	Ferenc Ender	Finalization before product launch	July 2018
1.6	Ferenc Ender	Update data upon product updates	May 2019

Scope of this Document

This document presents the technical data of Spinsplit eSpin Cube and Tube Instruments.

Overview

Spinsplit eSpin Cube and Tube laboratory electrospinning systems are versatile platforms for electrospinning and electrospraying in laboratory environment.

The Instruments consists of the following Units:

- eSpin Power Supply Unit
- eSpin Cube or Tube electrospinning chamber
- Spinsplit netPump-L relative precision syringe pumps

The following sections describe the above units and technical specifications accordingly.

eSpin Power Supply Unit

Features

- Full programmable standalone high voltage electrospinning power supply up to 40 kV¹
- **Remote control function** – remotely control the Power Supply operation and adjust settings with Spinsplit iLab system and SpinStudio software²
- **Sensors interface** – acquire temperature and humidity data from the chamber²
- **Fine voltage manipulation** – adjust voltage in two stages with Coarse and Fine knobs. Use the Fine knob to stabilize the Tailor-cone with ease.
- **Manual voltage limit** – set maximal voltage to protect samples from unintentional overvoltage
- **Safety functions**
 - Delay on high voltage activation
 - Interlock function (interrupts high voltage when the door is opened)

¹ Depends on the Power Supply type

² Depends on the Power Supply configuration

Technical specifications

Parameter	Value			Units
	Min	Typ	Max	
High Voltage Power Supply Unit (HVPSU)				
Output voltage	5	-	40	kV
Output current	0		0.375 ³	mA
Voltage adjust resolution	-	12	-	V
Fine Voltage Adjust range		10		kV
Voltage display resolution		40		V
Voltage Limit adjust ¹	0	-	20/30/40	kV
Environmental				
Temperature	15	20	25	°C
Humidity	15	-	85	% RH
Altitude	0	-	2000	m
Usage	Indoor use only			

eSpin Cube Electrospinning Chamber

Features

- Cubic electrospinning chamber with adjustable emitter position
- Interchangeable anodized alumina collector plate
- Chamber wetted materials:
 - Emitter holder: PE-500
 - Collector holder: PE-500
 - Collector: anodized alumina
 - Base plate: PE-1000
 - Walls: ABS
 - Frame: anodized alumina
 - Door: acrylic glass
- Safety door with interlock function

Options/extensions

- GigE camera
- Internal lighting
- Co-axial emitter interface
- Temperature and humidity sensors

³ At full load, 40 kV

Technical specifications

Parameter	Value			Units
	Min	Typ	Max	
Electrospinning chamber				
Outer dimensions (each side)		45		cm
Emitter position adjust ⁴	5	-	30	cm
Collector plate size		180x180		mm ²
GigE camera – Monochrome CCD camera				
Network bandwidth	100	1000	-	MBps
Resolution		1.3		megapixel
Lens – CS mount, manual focus and iris, aperture F1.4				
Focal length	5	-	50	mm

⁴ Depends on the emitter stage configuration. Shortest distance of emitter-holder from the collector is 8 cm

eSpin Tube Electrospinning Chamber

Features

- Cylinder electrospinning chamber with adjustable emitter position
- Interchangeable anodized alumina collector plate
- Chamber wetted materials:
 - Emitter holder: PE-500
 - Collector holder: PE-500
 - Collector: anodized alumina
 - Base plate: PE-500
 - Walls: Plexiglas
- Interlock function disables high voltage when the chamber is opened
- Epoxy shell can be removed, washed and replaced

Technical specifications

Parameter	Value			Units
	Min	Typ	Max	
Electrospinning chamber				
Chamber diameter		25		cm
Chamber height		50		cm
Emitter position adjust ⁵	5	-	30	cm
Collector plate size		490		cm ²

⁵ Depends on the emitter stage configuration. Shortest distance of emitter-holder from the collector is 8 cm

Pumping modules

Features

- Linear syringe pump with universal clamp for disposable syringes
- The module can be controlled remotely via TCP/IP connection.
- Two or more modules can be connected through a chain link which enables synchronized operations for the pumps, for instance synchronous dispensing.

Plunger: stepper motor driven lead screw plunger type syringe pump

Step loss detection: optical encoder

Position feedback: optical encoder

Wetted materials: disposable syringe, PEEK and FFPM (valve)

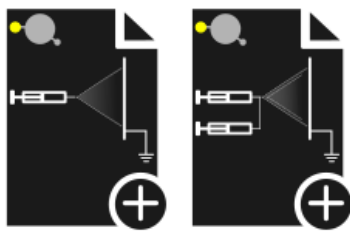
Compliance CE, ETL, UL, CSA, RoHS, FCC, IC

Parameter	Value			Units
	Min	Typ	Max	
Pump				
Plunger travel length			200	mm
Linear force	25			lbs
Precision		≤ 0.1 % CV		-
Accuracy		≤ 1 %		-
Abs. min. flow rate ^{1,3}	0.001			μL/hour
Abs. max. flow rate ^{2,3}			90	mL/min
Environmental				
Operating temperature	4	25	40	°C
Operating humidity	20	50	80	% RH

Control options

- **SpinStudio eSpin edition** software, allows the remote parameter control of electrospinning process such as polymer flow rates and voltage. Complex process sequences can be stored and evaluated on demand. SpinStudio features the simultaneous control of multiple eSpin instruments, handles camera image, acquires and analyses environmental data (e.g. temperature, humidity), stores and displays user settings on various platforms such as Windows, MacOS and Linux.
- **Remote control option** for the eSpin Power modules allows the remote operation and automated control of even multiple power supplies from SpinStudio.

eSpin Edition



New electrospinning project

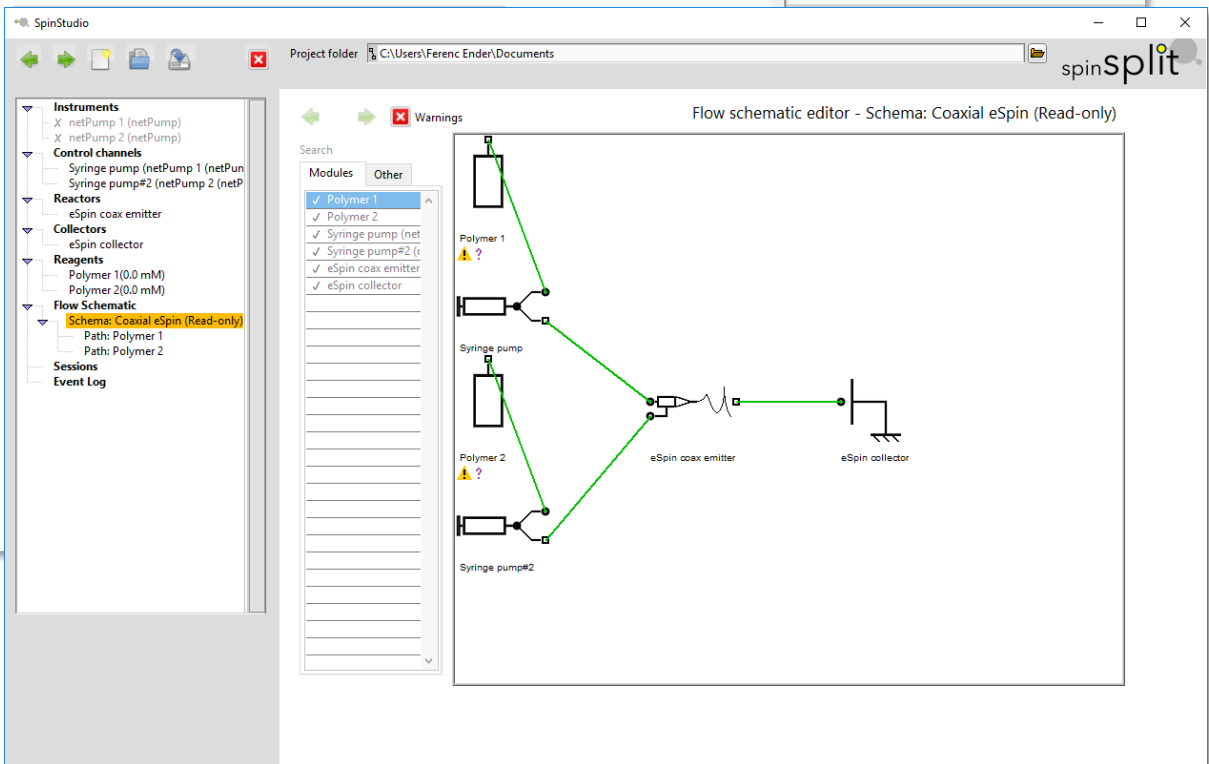
New coaxial electrospinning project



Browse for projects

Load Recent Project

user_g_test2.sproj

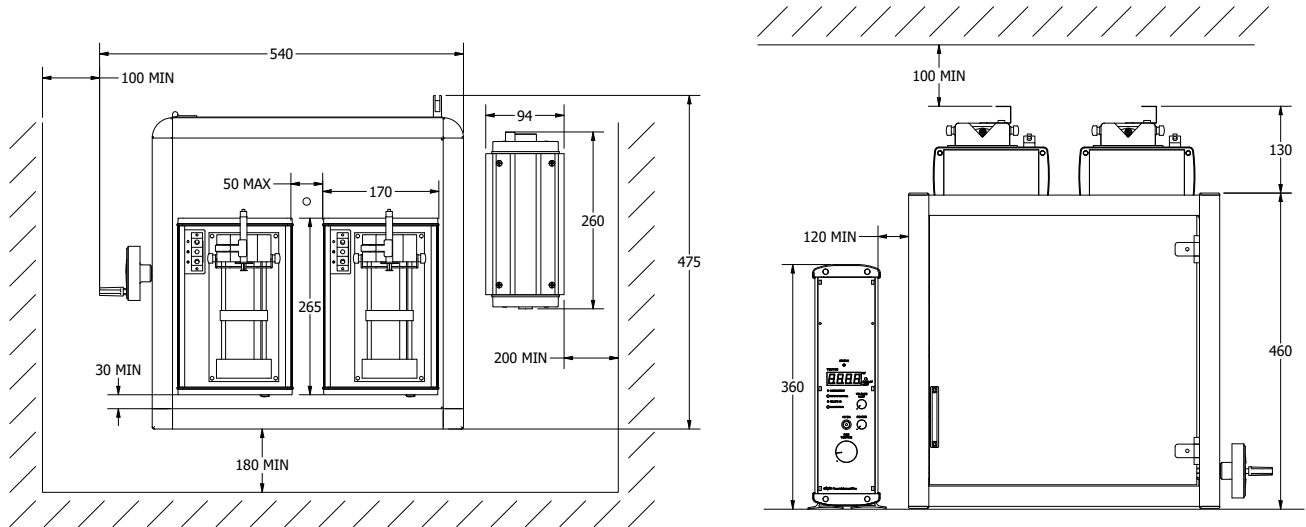


The screenshot displays the SpinStudio software interface. The main window is titled "Flow schematic editor - Schema: Coaxial eSpin (Read-only)". The interface includes a left-hand sidebar with a tree view of project components, including Instruments, Control channels, Reactors, Collectors, Reagents, and Flow Schematic. The Flow Schematic section is expanded, showing a "Schema: Coaxial eSpin (Read-only)" with a path for Polymer 1 and Polymer 2. The main workspace shows a flow schematic diagram with components like Syringe pump, Polymer 1, Polymer 2, Syringe pump#2, eSpin coax emitter, and eSpin collector. A search panel on the left lists modules and other components, with a "Warnings" section above it.

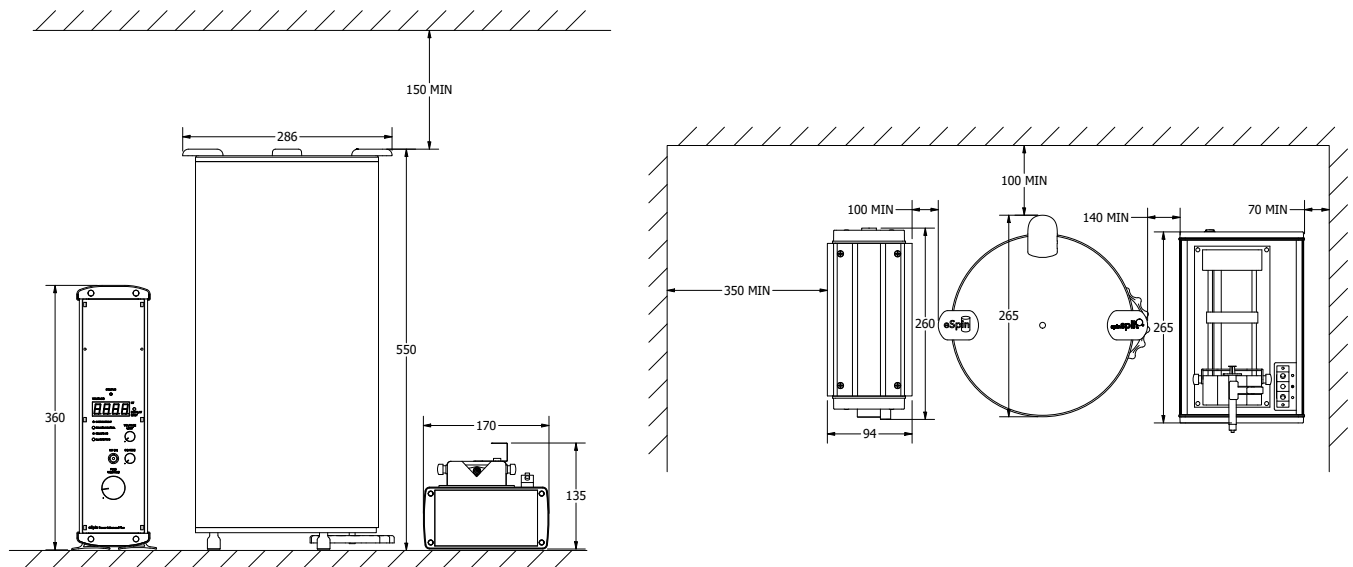
Size drawing

All sizes are in millimeters (mm) if not otherwise noted.

eSpin Cube



eSpin Tube



Custom options

SpinSplit offers customized flow systems on user request. Please contact SpinSplit to discuss your application.

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