e– Spinning Machines

Electrospinning/Electrospray system

(eS- robot ®)

NanoNC
NanoNC Co., Ltd. is a company specializing in nanotechnology-enabled systems, particularly focusing on the development and production of electrospinning/electrospray lab systems based on customer's requirement within Korea. NanoNC Co., Ltd.’s product portfolio includes electrospinning/spray systems and various nozzles for fabricating nano-structures such as nanofibers and nanoparticles.

NanoNC Co., Ltd. also conducts research and development in various fields:

a) multi-nozzle for mass production of nanofiber-based membrane,
b) a dual nozzle for producing core–shell nanofiber/particle,
c) tools such as collector for producing a functional porous membrane composed of nanofiber for cell culture, and
d) a ultra-precision nozzle for thin-layer coating by electrospray technology in various bio fields.

NanoNC Co., Ltd. is also moving towards the process development of electrospinning/electrospray systems for mass-production with multi-nozzles.

NanoNC Co., Ltd. is ultimately aiming for a global enterprise specializing in the field of electrospinning/spray system for the fabrication of nano-structures by providing various nozzle and device for the fabrication of electrospun-nanofiber web and ultra-atomization spray system for coating thin layer.
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ESR200RD, machine 1 (ESR200RDH)</th>
<th>ESR200R2, machine 2 (ESR200R2H, ESR200PR2)</th>
<th>ESR200R2D, machine 3</th>
<th>ESR200R2V, machine 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HV generator (30kV/60kV) (positive)</strong></td>
<td>30kV or 60kV</td>
<td>30kV or 60kV</td>
<td>30kV or 60kV</td>
<td>30kV or 60kV and (-)30kV</td>
</tr>
<tr>
<td><strong>Axis Robot</strong></td>
<td>X-robot(1-robot) stroke:300mm or 400mm</td>
<td>X-,Y-robot(2-robot) stroke:300mm or 400mm</td>
<td>X-,Y-robot(2-robot) stroke:300mm or 400mm</td>
<td>X-,Y-robot(2-robot) stroke:300mm or 400mm</td>
</tr>
<tr>
<td><strong>LM Slider</strong></td>
<td>Stroke stroke:150mm or 400mm</td>
<td>Stroke stroke:150mm or 400mm</td>
<td>Stroke stroke:150mm or 400mm</td>
<td>Stroke stroke:150mm or 400mm</td>
</tr>
<tr>
<td><strong>Angle Controller</strong></td>
<td>0~90°</td>
<td>NIL</td>
<td>0~90°</td>
<td>0~90°</td>
</tr>
<tr>
<td><strong>Metering Pump (Syringe Pump)</strong></td>
<td>min.0.01ul/min Single pump</td>
<td>min.0.01ul/min Single pump</td>
<td>min.0.01ul/min Dual pump</td>
<td>min.0.01ul/min Single pump</td>
</tr>
<tr>
<td><strong>Flat Collector</strong></td>
<td>NIL</td>
<td>400mmx400mm or 500mmx500mm</td>
<td>400mmx400mm or 500mmx500mm</td>
<td>400mmx400mm or 500mmx500mm</td>
</tr>
<tr>
<td><strong>Drum Collector</strong></td>
<td>φ90XW200mm (size A4)</td>
<td>NIL</td>
<td>φ90XW200mm (size A4)</td>
<td>NIL</td>
</tr>
<tr>
<td><strong>Etc. (modified model)</strong></td>
<td>-touch screen -heating drum collector (model:ESR200RDH) -(option) negative HV generator</td>
<td>-touch screen -heating collector (model:ESR200R2H) -(option) negative HV generator</td>
<td>-touch screen -heating collector (model:ESR200R2H) -(option) negative HV generator</td>
<td>-touch screen -heating collector (model:ESR200R2V) -(option) negative HV generator</td>
</tr>
<tr>
<td><strong>Case(mm)</strong></td>
<td>950(W)x850~750(D)x1,150(H)</td>
<td>950(W)x850~750(D)x1,150(H)</td>
<td>950(W)x850~750(D)x1,150(H)</td>
<td>1,200(W)x650~750(D)x1,150(H)</td>
</tr>
<tr>
<td><strong>Feature</strong></td>
<td>-fabrication on roll -specific size -uniform thickness</td>
<td>-fabrication on flat plate -specific size -uniform thickness</td>
<td>-fabrication on roll (or flat plate) -specific size -uniform thickness</td>
<td>-vertical flat collector -(+)/(-)HV generator -thick web preparation (intensified collection)</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Summary of Electrospinning/Electrospray Machines (II)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ESR200PR2D, machine 5 (ESR200P2R3D)</th>
<th>ESR200B, machine 6 (ESR200P2B)</th>
<th>ESD300(D), machine7 (ESD200(D), ESD400(D))</th>
<th>ESB200, machine 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HV generator</strong> (30kV/60kV) (positive)</td>
<td>30kV or 60kV and (-)30kV</td>
<td>30kV or 60kV</td>
<td>30kV</td>
<td>30kV</td>
</tr>
<tr>
<td><strong>Axis Robot</strong></td>
<td>X-X-robot(2-robot) -stroke:300mm or 400mm</td>
<td>NIL</td>
<td>- 3(2)-axis desktop robot -stroke:300mm or 400mm -loader/servo motor</td>
<td>-Linear &amp; rotational driving system -stroke:80mm</td>
</tr>
<tr>
<td><strong>LM Slider</strong></td>
<td>Stroke 150mm, X2EA</td>
<td>Stroke 150mm</td>
<td>Stroke 150mm</td>
<td>Stroke 150mm</td>
</tr>
<tr>
<td><strong>Angle Controller</strong></td>
<td>0~90°, X2EA</td>
<td>NIL</td>
<td>(option)0~90°</td>
<td>0~90°</td>
</tr>
<tr>
<td><strong>Metering Pump (Syringe Pump)</strong></td>
<td>min.0.01ul/min Single pump, X2EA</td>
<td>min.0.01ul/min Single pump</td>
<td>EP100(min.0.01ul/min)</td>
<td>EP100(min.0.01ul/min)</td>
</tr>
<tr>
<td><strong>Flat Collector</strong></td>
<td>NIL 400mmx400mm or 500mmx500mm</td>
<td>Bath collector 400mmx400mm or 500mmx500mm</td>
<td>200mmx200mm</td>
<td></td>
</tr>
<tr>
<td><strong>Drum Collector</strong></td>
<td>Φ90XW300mm</td>
<td>NIL</td>
<td>(option)Φ90XW200mm(size A4)</td>
<td>Φ90XW200mm</td>
</tr>
<tr>
<td><strong>Etc. (modified model)</strong></td>
<td>-.touch screen -.heating drum collector (model:ESR200RDH) -.option positive HV generator</td>
<td>-.touch screen -.dual pump (model:ESR200P2B) -.option negative HV generator</td>
<td>-.stepping motor(ESDR200) size:200mmX200mm</td>
<td>-.only Linear &amp; rotational driving system (model:ESB100)</td>
</tr>
<tr>
<td><strong>Case(mm)</strong></td>
<td>1,200(W)X650(D)X1,150(H)</td>
<td>850(W)X650(D)X1,150(H)</td>
<td>950(W)X650(D)X1,150(H)</td>
<td>850(W)X650(D)X1,150(H)</td>
</tr>
<tr>
<td><strong>Feature</strong></td>
<td>-fabrication on roll -2-solution composite -specific size -uniform thickness</td>
<td>-fabrication of fine particle in bath</td>
<td>-spray coating on substrate</td>
<td>-stent coating -bio electrospinning -spray coating (ex.implant)</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Summary of Electrospinning/Electrospray Machines (III)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ESR100, machine 9 (ESR100H)</th>
<th>ESR100D, machine 10 (ESR100HD)</th>
<th>ESP200, machine 12 (ESP100)</th>
<th>ESP200D, machine 13 (ESP100D)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HV generator</strong></td>
<td>30kV or 60kV</td>
<td>30kV or 60kV</td>
<td>30kV or 60kV</td>
<td>30kV or 60kV</td>
</tr>
<tr>
<td>(30kV/60kV) (positive)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Axis Robot</strong></td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td><strong>LM Slider</strong></td>
<td>Stroke 150mm</td>
<td>Stroke 150mm</td>
<td>Stroke 150mm</td>
<td>Stroke 150mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- nozzle adapter</td>
<td>- nozzle adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- angle control: 0~90°</td>
<td></td>
</tr>
<tr>
<td><strong>Angle Controller</strong></td>
<td>NIL</td>
<td>0~90°</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td><strong>Metering Pump</strong></td>
<td>EP100(min. 0.01ul/min)</td>
<td>EP100(min. 0.01ul/min)</td>
<td>KDS200(min. 0.001ul/min)</td>
<td>KDS200(min. 0.001ul/min)</td>
</tr>
<tr>
<td>(Syringe Pump)</td>
<td>Single pump/loader</td>
<td>Single pump/loader</td>
<td>(KDS100(min. 0.1ul/min))</td>
<td>(KDS100(min. 0.1ul/min))</td>
</tr>
<tr>
<td><strong>Flat Collector</strong></td>
<td>300mmx300mm</td>
<td>NIL</td>
<td>300mmx300mm</td>
<td>300mmx300mm</td>
</tr>
<tr>
<td><strong>Drum Collector</strong></td>
<td>NIL</td>
<td>Φ90XW200mm rpm:200<del>2,700 or 30</del>500, (option) rod collector Φ 1, 2, 3, 5, (option) disk collector</td>
<td>NIL</td>
<td>Φ90XW200mm rpm:200<del>2,700 or 30</del>500, (option) rod collector Φ 1, 2, 3, 5, (option) disk collector</td>
</tr>
<tr>
<td><strong>Etc. (modified model)</strong></td>
<td>- heating flat collector (ESR100H)</td>
<td>- vertical flat collector (ESR100D)</td>
<td>- syringe pump: KDS100 (model: ESP100)</td>
<td>- syringe pump: KDS100 (model: ESP100D)</td>
</tr>
<tr>
<td><strong>Case (mm)</strong></td>
<td>700(W)X650(D)X1,000(H)</td>
<td>850(W)X650(D)X1,000(H)</td>
<td>700(W)X650(D)X800(H)</td>
<td>850(W)X650(D)X800(H)</td>
</tr>
<tr>
<td><strong>Feature</strong></td>
<td>- fabricating on flat plate</td>
<td>- fabricating on flat plate</td>
<td>- fabricating on flat plate</td>
<td>- fabricating on flat plate</td>
</tr>
<tr>
<td></td>
<td>- no moving collector</td>
<td>- no moving collector</td>
<td>- no moving collector</td>
<td>- no moving collector</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Machine 1
- Model: ESR200RD
  ● H.V. generator: 30kV/60kV(option)
  ● 1-axis robot: ball screw, servo motor, 160mm/s
    (working distance (max): 200mm/300mm/400mm(option))
  ● Syringe pump: min 0.01μl/min
  ● Drum collector: 5~2,800rpm, servo motor
  ● Spinning direction angle control: 0~90°
  ● No tubing: minimum dead volume

Machine 2
- Model: ESR200R2
  ● H.V. generator: 30kV/60kV(option)
  ● 2-axis robot: ball screw, servo motor, 160mm/s
    (working distance (max): 200mm/300mm/400mm(option))
  ● Syringe pump: min 0.01μl/min, dual syringe pump (option)
  ● Flat collector: stroke 300mm/400mm(option)
  ● No tubing: minimum dead volume
  ● (option) heating collector: ~180℃, ~250℃, ~350℃
  ● (option) dual concentric nozzle for ultra–atomization: 22G-30G/23G-32G

Machine 3
- Model: ESR200R2D
  ● H.V. generator: 30kV/60kV(option)
  ● 2-axis robot: ball screw, servo motor, 160mm/s
    (working distance (max): 200mm/300mm/400mm(option))
  ● Dual syringe pump: min 0.01μl/min
  ● Drum collector: 5~2,800rpm, servo motor
  ● Flat collector: stroke 300mm/400mm(option)
  ● Spinning direction angle control: 0~90°
  ● No tubing: minimum dead volume

- Model: ESR200R2H

- Model: ESR200R2DH
Electrospinning

Machine 4

- Model: ESR200R2V
- H.V. generator: (+/-) 30kV/60kV (option)
- 2-axis robot: ball screw, servo motor, 160mm/s
- Syringe pump: min 0.01μl/min
- Flat collector: vertical type 300mm/400mm (option)
- No tubing: minimum dead volume
- (option) Heating collector: ~180°C

Machine 5

- Model: ESR200PR2D
- 2-solution composite electrospinning
- H.V. generator: (+/-) 30kV/60kV (option)
- 1-axis robot: X2ea, ball screw, servo motor
- Syringe pump: min 0.01μl/min
- Drum collector: 5~2,800rpm, servo motor
- No tubing: minimum dead volume

Machine 6

- Model: ESR200PR3D
- Model: ESR200P2B

- Model: ESR200B
- H.V. generator: 30kV/60kV (option)
- Syringe pump: min 0.01μl/min
- Bath collector: for particle / nanofiber fabrication
  - CW/CCW repetition stirring during particle preparation
- Spray nozzle for the fabrication of nano/microparticle
  : 22G-30G (ID 0.15mm) / 23G-32G (ID 0.10mm)
Machine 7

- Model: ESD300(D)/ESD400(D)
  ●H.V. generator: 30kV/60kV (option)
  ●3(2)-axis robotic system: ball screw, servo motor, loader
  ●Syringe pump: min 0.01 μl/min
  ●(option) Drum collector: 5~2,800rpm, servo motor
  ●1-solution, (option) 2-solution spinning
  ●No tubing: minimum dead volume

Machine 8

- Model: ESB200
  ●Stent coating / electrospinning on drum, disk and rod collector
  ●H.V. generator: 30kV
  ●Syringe pump: min 0.01 μl/min
  ●Linear & rotating motion system: servo motor
    (working distance (max): 80mm)
  ●No tubing: minimum dead volume
  ●(option) dual concentric nozzle for ultra-atomization:
    22G-30G (ID 0.15mm) / 23G-32G (ID 0.10mm)

- Model: ESB100
  ●Stent coating only
Electrospinning / Electrospray Machines

### Machine 9

- Model: ESR100
  - H.V. generator: 30kV/60kV (option)
  - Syringe pump: min 0.01 μl/min, EP100 (loader type)
  - Flat collector: stroke 300mm
  - (option) X-Y moving collector: stroke 150mm (manual type)
  - (option) Heating collector: ~180°C, ~250°C, ~350°C
  - No tubing: minimum dead volume

- Model: ESR100H
  - Heating collector

### Machine 10

- Model: ESR100D
  - H.V. generator: 30kV/60kV (option)
  - Syringe pump: min 0.01 μl/min, EP100 (loader type)
  - Spinning direction angle control: 0~90°
  - Drum collector: 30~500 rpm / 200~2,700rpm (option)
  - No tubing: minimum dead volume

Flat collector (vertical type)
- **Model: ESR100R2-V**
  - H.V. generator: 30kV/60kV(option)
  - Syringe pump: min 0.001 μl/min, EP100 (loader type)
  - Small case : setting inside hood
  - Flat collector :stroke ~200mm, 2-axis driving system
  - (option) Drum collector (option)
  - Electrospin vision system

- **Model: ESP200 / ESP100**
  - H.V. generator: 30kV/60kV(option)
  - Syringe pump:
    - flow rate: min 0.001 μl/min (KDS200)
    - min 0.01 μl/min (KDS100)
  - Syringe No. : 2ea (ESP200) / 1ea (ESP100)
  - Flat collector : horizontal/vertical type (option)
  - Tubing / Nozzle adapter
  - (option) X-Y table : manual/auto control

- **Model: ESP200D/ESP100D**
  - H.V. generator: 30kV/60kV(option)
  - Syringe pump:
    - flow rate: min 0.001 μl/min (KDS200)
    - min 0.01 μl/min (KDS100)
  - Syringe No. : 2ea (ESP200) / 1ea (ESP100)
  - Drum collector: 30~500rpm / 200-2,700rpm (option)
  - Spinning direction: vertical/horizontal
  - Tubing / Nozzle adapter
Various Equipment

Desktop Robotic Electrospinning/Electrospray System

- Model : ESDR300/ESDR400
  ●2(3)-axis robotic system
  ●(300mm x 300mm/ 400mm x 400mm)
  ●servo motor
  ●(option) Syringe pump (EP100)
  ●(option) HV generator

- Model : ESDR200
  ●2(3)-axis robotic system
  ●(200mm x 200mm)
  ●stepping motor
  ●(option) Syringe pump (EP100)
  ●(option) HV generator

- Model : ESDR200H
  ●High speed 2-axis robotic system
  ●(200mm x 200mm, speed 500mm/s)
  ●linear servo motor
  ●(option) Syringe pump (EP100)
  ●(option) HV generator

Spinning Machines without Case

- Model : DR300/DR400
  ●2(3)-axis robot

- Model : ES100
  ●HV30/EP100/Flat collector

- Model : ES100D
  ●HV30/EP100/DC90

Other Spinning Machines

- Rotary jet spinning machine
  (model : RS100)

- Wet spinning machine
  (model : WS100)
Roll-to-roll Electrospinning System

- Model: ES500RTR
  - Roll-to-roll System: Fabrication of Long-length Nanofiber Web
  - 2-axis robotic system
  - TCD (Tip-to-Collector Distance) Control/Nozzle Traverse
  - Injection (Infusion) Pump with Solution Tank above 1L
  - Multi-nozzle
  - HV generator (+/-)
**Syringe Pump for Electrospinning/Electrospray**

- **Syringe Pump for Electrospinning/Spray**  
  (Model : EP100)  
  - High Voltage Resistance: 30kV  
  - Flow rate: min 0.01μl/min ~ 100ml/min  
  - No Tubing  
  - Syringe No.: 1~4ea (changeable)  
  - Base Plate : PEEK or Teflon coated AL  
  - (option) Syringe Cover for HV protection : Teflon

- **Dual Syringe Pump (Model : EP100D)**  
  - Dual Syringe Pump : 2~3EA  
  - For Fabricating Core-Shell Structure

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**Syringe Pump for ESP**

- **Model : EP120**  
  (syringe No.: 2EA)
- **Model : EP140**  
  (syringe No.: 4EA)
- **Model : EP150M**

- **Multi –Syringe Pump Series**  
  (Syringe No.: 2~4EA)
Various Equipment

Syringe Pump for ESP

- Rotary syringe pump for rotation of syringe (Model: EP100R)

- Syringe pump for a syringe of 200cc (Model: EP200)

Syringe Pump Series

- KDS100
- KDS200
- KDS220
- High Pressure Syringe Pump

Equipment for ESP

- HV Power Supply (HV generator) (30kV/60kV) (Model: HV30 / HV60)

LM slider
Drum Collector

- Drum Collector (Ø90)  
  (Model: DC90)

- Rod Collector  
  (Model: WC15□)  
  (Ø1, 1.5, 2, 3, 5mm)

- Traverse Drum Collector  
  (Model: TDC90)

- Disk Collector

- Conveyer Collector

- X, Y-table & Heating Collector

- Heating Flat Collector

- Alignment Collector
Various Equipment

**Vision System**
- Vision System for electrospinning (EV200, Lens X1)
- Installation in ES machine
- Vision System for electrospinning (EV100)
- Stand type Vision System

**Dehumidifier System**
- Model : DH100K
  - Dehumidifier Kit
- Model : DH100
  - Dehumidifier 17L/day

**2-Axis Stage**
**Single Nozzle for Electrospinning/Electrospray**

- **Metal Nozzle**
  - 13G~32G (I.D 1.9~0.10mm)
- **Plastic Nozzle**
  - 13G ~ 34G (I.D 1.9~0.08mm)
- **Precision Nozzle**
  - ID 8, 15, 30um
  - materials : silica
- **Nozzle Adapter**
  - with positioning cap

**Dual Concentric Nozzle**

- **Core-Shell Structure**
  - 17G-23G (ID 0.33mm)
  - 18G-25G (ID 0.25mm)
  - 20G-27G (ID 0.20mm)

- **Ultra-atomization**
  - 21G-27G (ID 0.20mm)
  - 22G-30G (ID 0.15mm)
  - 23G-32G (ID 0.10mm)

**Triple Concentric Nozzle**

- **Conjugated Nozzle**
  - 13G-17G-23G (ID 0.33mm)
  - 14G-18G-25G (ID 0.25mm)
  - 15G-20G-27G (ID 0.20mm)
  - 15G-21G-27G (ID 0.20mm)
  - 16G-22G-30G (ID 0.15mm)
**Multi Nozzle I (Line type / Circle type)**
- Material: SUS
  - 5~6 hole
  - hole distance: min. 4mm~

**Multi Nozzle II**
- One body type
  - changeable type
  - Material: acetal
  - 5 hole
  - hole distance: min. 12mm
- Separated type
  - changeable type
  - Material: PEEK
  - 5 hole
  - hole distance: min. 12mm

**Multi Nozzle III**
- Changeable type, 10 hole
  - Material: PEEK
  - hole distance: min. 12mm
- Changeable type, 10 hole
  - Material: PEEK
  - hole distance: min. 12mm
- Changeable type, 45 hole
  - Material: PEEK
  - hole distance: min. 12mm

**Nano NC**
- Changeable type, 10 hole
  - Material: PEEK
  - hole distance: min. 12mm

**Nano NC**
- Fixed type, 20 hole
  - Material: acetal or PEEK
  - hole distance: min. 4mm

**Nano NC**
- Fixed type, 50 hole
  - Material: teflon
  - hole distance: min. 4mm
Heating Nozzle for Electrospinning

- Heating Nozzle for ESP - at elevated temp
  :(oil circulation)
- Oil Circulator
  - 230°C
- Heating Nozzle Setting

Other Concentric Nozzle

- Tri-axial Nozzle
- Tetra-axial Nozzle
- Atomizing Spray Nozzle
  - I.D 0.36mm

Nozzle Size

- 13G(ID 1.90mm, OD 2.40mm)
- 14G(ID 1.60mm, OD 2.10mm)
- 15G(ID 1.40mm, OD 1.80mm)
- 16G(ID 1.26mm, OD 1.65mm)
- 17G(ID 1.07mm, OD 1.47mm)
- 18G(ID 0.86mm, OD 1.26mm)
- 19G(ID 0.67mm, OD 1.07mm)
- 20G(ID 0.60mm, OD 0.90mm)
- 21G(ID 0.50mm, OD 0.80mm)
- 22G(ID 0.40mm, OD 0.70mm)
- 23G(ID 0.33mm, OD 0.63mm)
- 24G(ID 0.31mm, OD 0.56mm)
- 25G(ID 0.26mm, OD 0.50mm)
- 26G(ID 0.21mm, OD 0.45mm)
- 27G(ID 0.20mm, OD 0.40mm)
- 30G(ID 0.15mm, OD 0.32mm)
- 31G(ID 0.13mm, OD 0.26mm)
- 32G(ID 0.10mm, OD 0.23mm)
- 34G(ID 0.08mm, OD 0.24mm)
Accessories

- Plastic Syringe (PP) (1, 2, 5, 10, 20, 50cc)
- Gastight Syringe (30ul~100ml)
- Tubing, (Female-Male)
  - PE / ID 2.0mm
  - PTFE / ID 0.8mm
- Tubing, 10m
  - PE / ID 2.0mm
  - PTFE / ID 0.8mm
- Fitting (female – male) 1/16”
- Fitting (female, 3/32”)
- T Connector
- Male Luerlock Plug
- Male-Female Plug
- Elbow Tube Fitting / Reduction Fitting
  - Tube ID : 1/8” (3.2mm) - 3/32” (2.4mm)
  - Tube ID : 1/16” (1.6mm) - 3/32” (2.4mm)
- Female Luer Plug
- Syringe Cover for HV Protection
- Cleaning Wire
- SUS sheet, 1m(L)X0.3m(W)X80um(T) (on collector)
Electrospinning Vision System (Model: EV200)

Vision system for viewing electrospinning/electrospray

- Electrospinning/Electrospray Process Monitoring at Nozzle Tip
- Taylor Cone Monitoring/Dropping Monitoring
- Model: EV200L (lens X1)

Electrospin Vision System (Model: EV200)

- Interface: USB 3.0
- Lens: mag 1.0x (X45 on 15.6” Monitor)
- FOV: 6.47mm x 4.84mm
- Working Distance (WD): 110mm
- Articulated Holder/2-axis stage
- Spot LED lamp 3W/ Controller
- (option): Notebook

single electrospinning  coaxial electrospinning
eS-robot ® System

eS-robot ® system is a laboratory electrospinning/electrospray equipment that can be used to fabricate nanostructure such as nanoparticle or nanofiber by transforming an organic or inorganic solution into a ultra-fine mists or lines by the application of a very high voltage.

eS-robot system is also used as coating machines for coating synthetic polymers (PVDF, PAN, Nylon, PVA), bio-polymers (collagen, PLGA, etc.), and solutions (TiO2 sol, CNT sol, conductive sol, water-repellent PTFE sol) on a matrix surface in various fields.

* Specification

<table>
<thead>
<tr>
<th>Components</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-voltage power supply</td>
<td>- voltage : ~30kV(or 60kV), current : ~ 2mA</td>
</tr>
<tr>
<td>Syringe pump</td>
<td>- flow rate: nl/min, μl/min and ml/h</td>
</tr>
<tr>
<td></td>
<td>- syringe size : 1ml ~ 50ml (normal size: 10ml)</td>
</tr>
<tr>
<td></td>
<td>- min. 0.01μl/min at a syringe of vol.10μl</td>
</tr>
<tr>
<td></td>
<td>- max. ~100ml/h at syringe with a volume of 100ml</td>
</tr>
<tr>
<td>X-Y robot system (2-axis/1-axis)</td>
<td>- moving stroke : ~ 400mm, servo motor 100W</td>
</tr>
<tr>
<td>Drum collector/flat collector</td>
<td>- Ø90 x W200, servo motor, rpm 5~2,800</td>
</tr>
<tr>
<td>(option) rod collector</td>
<td>(microporous membrane and aligned nanofiber)</td>
</tr>
<tr>
<td></td>
<td>(option)</td>
</tr>
<tr>
<td></td>
<td>- flat collector size : ~ 400mmX ~400mm</td>
</tr>
<tr>
<td></td>
<td>- rod collector: Ø 1~5xL200mm(for bio-nanofiber-based tubing)</td>
</tr>
<tr>
<td>Nozzle</td>
<td>- single nozzle : 17G ~ 32G</td>
</tr>
<tr>
<td></td>
<td>(inner diameter of tip, Ø0.1 ~ 0.5mm) (option)</td>
</tr>
<tr>
<td></td>
<td>- (option) multi-nozzle : 5Hole, changeable single-nozzle</td>
</tr>
<tr>
<td></td>
<td>- (option) dual concentric nozzle: 17G<del>23G (or 18G</del>25G/22G~30G)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>- 850<del>950 mm (W) x 650mm (D) x 900</del>1,150mm (H)</td>
</tr>
<tr>
<td>Weight</td>
<td>- approx. 130kg ~ 180kg</td>
</tr>
<tr>
<td>Spinning/spray direction</td>
<td>- horizontally or vertically</td>
</tr>
<tr>
<td>Operation, etc.</td>
<td>- touch screen operation, syringe</td>
</tr>
<tr>
<td></td>
<td>- accessories: syringe (plastic, glass), lamp, ventilation fan, nozzle</td>
</tr>
</tbody>
</table>

* Applications

Biomedical, bioengineering & biopolymer applications, nanofiber fabrication, thin-layer coating, microporous membrane, etc.
**Bio Electrospinning/Electrospray system (stent coating)**

Model: ESB 200, eS-bio ®

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### *Specification*

<table>
<thead>
<tr>
<th>Components</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-voltage power supply</td>
<td>- voltage: ~30kV, current: ~1mA</td>
</tr>
</tbody>
</table>
| Syringe pump                | - flow rate: nl/min, µl/min and ml/h  
  - syringe size: ~10ml  
  - min. 0.01 µl/min |
| Driving system              | - linear & rotating system: servo motor  
  - moving stroke: ~ 80mm  
  - rotating speed: rpm 1~100  
  - jig for supporting stent |
| Single nozzle               | - 27G ~ 32G |
| Spray nozzle                | - dual concentric nozzle  
  : 23G ~ 32G/22G ~ 30G/ 21G ~ 27G  
  - air-injection |
| Collector                   | - drum / disk / rod, changeable |
| Dimensions                  | - 650 ~ 830mm(W) x 500mm (D) x 1,000mm (H) |
| Weight                      | - approx. 100kg |
| Spray direction             | - free-angle control |
| Operation, etc.             | - touch screen operation  
  - syringe (plastic, glass)  
  - lamp, ventilation fan |
• Main Products: Electrospinning/Electrospray System

- electrospinning system
- electrospray system
- thin-layer spray coating system
- stent coating
- robotic system
- precision fluid metering pump(syringe pump)
- HV power supply (HV generator)
- collector: drum / disk / wire(rod) / conveyer
- nozzle: multi-nozzle/dual concentric nozzle/ultra-atomization nozzle/heating nozzle

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