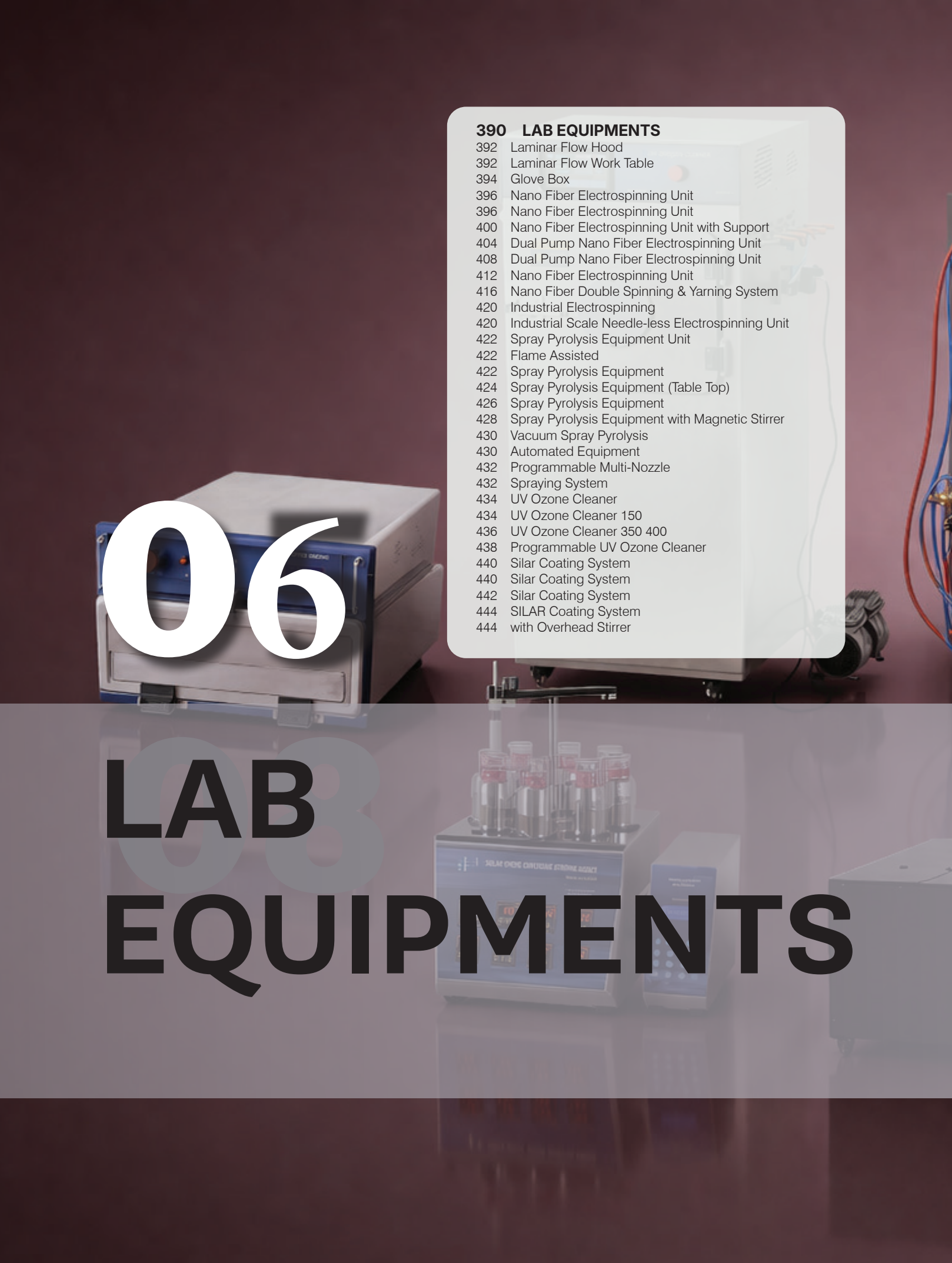




LAB EQUIPMENT

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LAB EQUIPMENTS

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489 Mini Sample Heater
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 491 Independently Controlled
 491 4 Channel Peristaltic Pump
 492 Other Equipment
 492 UV Curing Lamp
 493 Doctor Blade Thin Film Applicator
 494 Load Cell Display Unit
 494 Magnetic Detection Probe
 495 Lock-in Amplifier
 495 Vacuum Oven and Ion Exchanger
 496 Thermocycler
 497 UV Laser Writing System for Photolithography
 498 Ion Exchanger
 498 Desktop Dispensing Unit
 499 Universal Testing Machine
 500 Electrochemical Discharge
 500 Machining System
 501 Discharge Rate Measurement System
 502 4 Tesla Electromagnet - Magnet Lab
 504 PC based water cooled electromagnet



Laminar Flow Hood

Provide clean controlled environment for sensitive processes

Ensure optimal conditions for precision work and experiments

Minimize particle contamination during manufacturing operations



Laminar Flow Work Table

LMHH-TT Series

Laminar flow work tables are essential tools in various industries, particularly in fields where a clean and controlled environment is crucial for sensitive processes such as research, manufacturing, and experimentation. These tables provide a controlled airflow environment that minimizes particle contamination, ensuring optimal conditions for precision work, delicate experiments, and manufacturing processes. Among the range of laminar flow work tables developed by our company, we offer three distinct types, each tailored to specific applications:

Model No	Work table type	Mounting holes	Size of table
	Horizontal Flow Work Table with Optical Breadboard	M6 mounting holes on 25mm grid	1200 x 600 mm
	Horizontal Laminar Flow Unit	Nil	1200 x 600 mm

1. Horizontal Flow Work Table with Optical Breadboard

This type of laminar flow work table combines the benefits of laminar airflow with the stability and versatility of an optical breadboard. The horizontal flow design ensures a uniform airflow across the work surface, minimizing the risk of particle contamination. The inclusion of an optical breadboard expands the utility of the table, allowing users to mount and align optical components with precision. This makes it particularly suitable for applications such as optical experiments, laser systems development, and photonics research where stability and cleanliness are paramount.

2. Horizontal Laminar Flow Unit

Our horizontal laminar flow unit offers a clean and controlled environment for a wide range of applications. With a horizontal airflow pattern, this unit provides a laminar flow of air across the work surface, effectively removing contaminants and ensuring a particle-free environment. This type of laminar flow work table is ideal for tasks requiring a clean workspace, such as electronics assembly, medical device manufacturing, and pharmaceutical compounding. Its versatile design makes it adaptable to various work environments, providing a reliable solution for maintaining cleanliness and precision in diverse applications.



LAB EQUIPMENTS
For Research & Manufacturing

Glove Box

A glovebox (or glove box) is a sealed container that is designed to allow one to manipulate objects where a separate atmosphere is desired. Built into the sides of the glovebox are gloves arranged in such a way that the user can place their hands into the gloves and perform tasks inside the box without breaking containment. Part or all of the box is usually transparent to allow the user to see what is being manipulated. Two types of gloveboxes exist. The first allows a person to work with hazardous substances, such as radioactive materials or infectious disease agents, and the second allows manipulation of substances that must be contained within a very high purity inert atmosphere, such as argon or nitrogen. It is also possible to use a glovebox for manipulation of items in a vacuum chamber

The Cleaver Scientific Combi Box combines the benefit of UV sterilisation with the fully sealed and enclosed area of a glove box. Four 15W UV-C bulbs may be timer controlled for up to 30 minutes, or indefinitely, to decontaminate equipment and the work surface before and after use.

A side panel with safety interlock switches immediately disconnects the UV source to facilitate easy placement and removal of samples and packages, while a 15W white light bulb illuminates the entire work surface to provide excellent visibility. Two hermetically sealed non-UV transparent gloves afford the user total manoeuvrability and dexterity when handling equipment, samples and packages within the contained environment of the glove box, plus additional protection when working under the UV source.



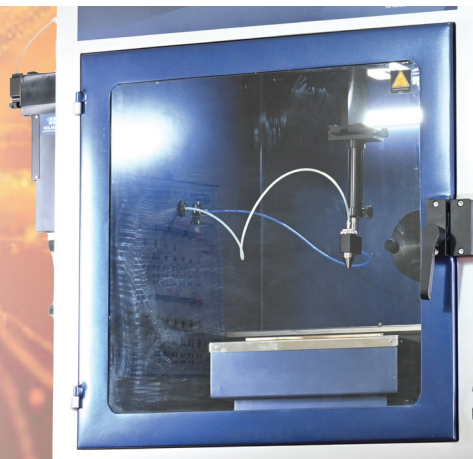
Glovebox Enclosure	Material	Stainless steel (SS304), powder-coated exterior
	Window	10 mm thick tempered glass/acrylic, anti-static coating
	Chamber Size	Main: 1200 × 750 × 900 mm (W × D × H)
	Glove Ports	2 ports (standard), 8" diameter with butyl gloves
	Leak Rate	≤ 0.05 vol% per hour
	Lighting	Internal LED illumination
	Pressure Control	Automatic over/under-pressure protection with adjustable relief valves
	Vacuum Gauge	Digital pressure display (mbar, Torr)
	Airlock / Antechamber	Cylindrical, 300 mm dia × 400 mm depth, with independent vacuum pump line and purge valves
Atmosphere Control Unit	Gas Type	Nitrogen / Argon (selectable)
	Purification System	Regenerable O ₂ and H ₂ O removal (down to <1 ppm)
	Gas Circulation	Closed loop, brushless blower, inert-gas safe
	Regeneration	Fully automated with purge gas or forming gas
	H ₂ O and O ₂ Sensors	Integrated digital display, <1 ppm detection limit
Integrated Spin Coater	Control Interface	Touch screen controller with safety alarms
	Spin Speed	200 – 8000 rpm (±1 rpm accuracy)
	Substrate Size	Up to 2 inch (custom holders available)
	Speed Control	Digital programmable interface (USB / RS232)
	Operation	Foot switch or software-controlled inside glovebox
	Vacuum Chuck	Integrated with built-in diaphragm vacuum pump
Optional Accessories	Bowl Material	Chemically resistant polymer (anti-solvent proof)
	Hot Plate (GLBX compatible)	In-chamber annealing of perovskite films, up to 200°C
	UV Ozone Cleaner	Pre-treatment of substrates (optional port required)
	Solar Simulator Port	For connecting external AM 1.5 solar simulator
	Glovebox-compatible Microscope	For alignment, inspection of micro-structures
	Storage Rack / Desiccator Unit	For sealed sample storage in inert atmosphere
	Solvent Purification Module	For safe handling of chlorobenzene, DMF, DMSO etc.
Power & Utilities	Purge & Safety Valves Kit	Extra purge connections for external devices
	Requirement Specification	
	Power Supply	230V ±10%, 50 Hz, Single phase
	Compressed Gas Inlet	6 mm OD for N ₂ / Ar
	Vacuum Connection	KF16 port for pump connection
	This glovebox setup is optimized for:	
	Spin-coating of perovskite precursor layers	
	Thermal annealing in inert atmosphere	
	Low-moisture and oxygen-sensitive process steps	
	In-situ device testing and encapsulation	

Nano Fiber Electrospinning Unit

Produce nano and micro fibers for material research

Synthesize polymer nanofibers, carbon nanotubes, inorganic fibers

Ensure uniform fiber quality with horizontal spinning technology



Nano Fiber Electrospinning Unit

Floor Stand Unit

Model HO-NFES-040

Holmarc's HO-NFES-040 model electrospinning equipment is a complete unit for Nanofiber electrospinning. It is used to make nano and micro fibers ranging from 50nm to 5 microns in diameter. Many kind of polymers like Protein nanofibers, carbon nanotubes, inorganic nanofibers etc. can be synthesized using our nano fiber electrospinning unit. Our equipment uses horizontal spinning when compared to other equipments available in the market. This technology assures the quality of the spun fibers with no dip and uneven diameter. Its user friendly software, task oriented design, ease of operation and competitive pricing are certain features that place our equipment ahead of other products available in the market. Holmarc's HO-SPLF4 model syringe pump render a smooth and uninterrupted flow enabling uniform spinning. HMPKV30 model high voltage power supply delivers 0-30 KV output voltage range with a maximum current capacity of 0.5 mA. A stationary target, an vertically moving target and Rotating mandrels of six different diameters are supplied along with the unit. HO-FH-01 model fume hood provides an enclosed atmosphere with transparent side walls to monitor the electro spinning process. The inbuilt heater can raise the process temperature up to 45°C. A common electronic control unit is integrated within the hood. The hood also has features like exhaust fan, granite work surface and optional features like high bright halogen lighting, duct of custom dimension to be connected to an exhaust duct available onsite etc.



ELECTROSPINNING

Independently Controlled Dual Channel Syringe Pump

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.

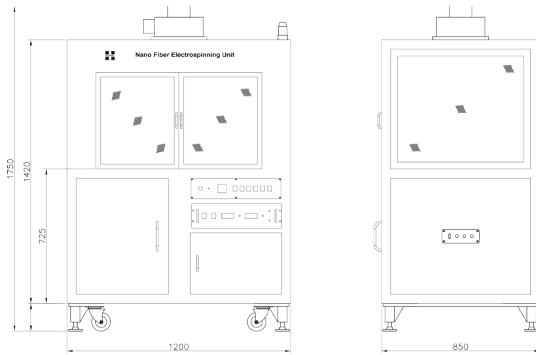


Rotating Mandrel

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration





High Voltage Power Supply

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stickv
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



Features

- Cabin Heating : Upto 45°C using 1000 watt coil heater
- The chamber is provided with Residual Charge Discharge Stick which is used for static removal.
- Safety switch provided to switch off H.V. Power supply when door is opened.
- LED cabin lighting and back light to view Needle tip and electro spin process.
- Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process.
- Emergency stop is provided on the control panel to stop the equipment where there is any emergency.
- Coaxial spinneret : Our Nano fiber electrospinning unit is equipped with Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber.
- Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marking the positions of syringe pump and target.
- User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating mandrel speed, Spin Duration, Syringe pump flow rate, vertical target movement etc.
- Rotating Mandrel targets of varying diameters, Stationary target and Reciprocating vertically moving target provided with the system.
- System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process.
- Built-in Arc Protection Circuit

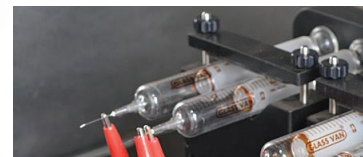
Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



Specifications



I. High Voltage Power Supply

HOLMARC HO-NFES-040 comes with HMPSKV30 model high voltage power supply. It has 0 - 30kV output voltage range with a maximum current capacity of 0.5mA. Output voltage and current can be set using front panel knobs and readout from the digital panel meters.

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



III. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



IV. Y Plate Collector & Stationary Target

This collector can be used as Stationary target or as Y plate collector. The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding.

Using a stationary target alone cannot attain a uniform density of fibers, as most of the fiber is collected around the point orthogonal to the syringe needle. Combined with X movement provided on the syringe pump, the Y translation stage on the target keeps the target move through a commanded motion profile. Depending on the motion profile, fibers get collected uniformly on the target. The motion profile can be created using a series of commands available in the software.



Specifications :

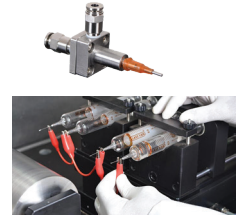
1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration

V. Spinneret**a. Needle Spinneret**

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.

**VI. Fume Hood**

HOLMARC's HO-FH-01 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite.

HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood.

The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.

**Specifications :**

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1200mm x 850mm x 1520 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

- a. Normal Glass Syringe
- b. Glass Syringe with tube connector
- c. Spare Needle
- d. Teflon Tube

**VIII. UV Curing Lamp (Optional)**

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Nano Fiber Electrospinning Unit with Support

Model : HO-NFES-040B

Holmarc's (HO-NFES-040B model) Electro-spinning equipment is a compact version for Nano fiber Electro spinning. A unique support structure made of steel pipes is provided along with the equipment which when screwed and fixed together can be used as a sturdy support for the Nano fiber electrospinning unit. It is used to make nano and micro fibers ranging from 50nm to 5 microns in diameter. Many kind of polymers like Protein nanofibers, carbon nanotubes, inorganic nanofibers etc. can be synthesized using our nano fiber electrospinning unit. Our equipment uses horizontal spinning when compared to other equipments available in the market. This technology assures the quality of the spun fibers with no dip and uneven diameter. It features user friendly and task oriented design. The ease of operation and competitive pricing places our equipment ahead of other products available in the market. Holmarc's HO-SPLF4 model syringe pump render a smooth and uninterrupted flow enabling uniform spinning. HMPSKV30 model high voltage power supply delivers 0-30 KV output voltage range with a maximum current capacity of 0.5 mA. A stationary target and Rotating mandrels of six different diameters are supplied along with the unit. HO-FH-02 model fume hood provides the compact unit an enclosed atmosphere with 3 transparent side walls to monitor the electro spinning process. The hood also has features like exhaust fan, granite work surface and optional features like high bright halogen lighting, duct of custom dimension to be connected to an exhaust duct available onsite etc as with the other model. This model uses a microprocessor based control unit that interfaces the operations of the syringe pump and Mandrel

Features

- Cabin Heating : Upto 45°C using 1000 watt coil heater
- The chamber is provided with Residual Charge Discharge Stick which is used for static removal.
- Safety switch provided to switch off H.V. Power supply when door is opened.
- LED cabin lighting and back light to view Needle tip and electro spin process.
- Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process.
- Emergency stop is provided on the control panel to stop the equipment where there is any emergency.
- Coaxial spinneret : Our Nano fiber electrospinning unit is equipped with Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber.
- Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marking the positions of syringe pump and target.
- User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating mandrel speed, Spin Duration, Syringe pump flow rate, vertical target movement etc.
- Rotating Mandrel targets of varying diameters, Stationary target and Reciprocating vertically moving target provided with the system.
- System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process.
- Built-in Arc Protection Circuit



Model HO-NFES-040

Independently Controlled Dual Channel Syringe Pump

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



Rotating Mandrel

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



High Voltage Power Supply

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



Nano Fiber Electrospinning Unit with Support

Model : HO-NFES-040B

Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



Specifications

I. High Voltage Power Supply

HOLMARC HO-NFES-040 comes with HMPSKV30 model high voltage power supply. It has 0 - 30kV output voltage range with a maximum current capacity of 0.5mA. Output voltage and current can be set using front panel knobs and readout from the digital panel meters.

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection

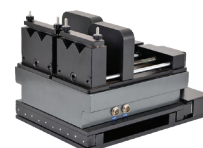


II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



III. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



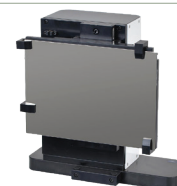
IV. Y Plate Collector & Stationary Target

This collector can be used as Stationary target or as Y plate collector. The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding.

Using a stationary target alone cannot attain a uniform density of fibers, as most of the fiber is collected around the point orthogonal to the syringe needle. Combined with X movement provided on the syringe pump, the Y translation stage on the target keeps the target move through a commanded motion profile. Depending on the motion profile, fibers get collected uniformly on the target. The motion profile can be created using a series of commands available in the software.

Specifications :

1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration



V. Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.

VI. Fume Hood

HOLMARC's HO-FH-02 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite. HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood. The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.



Specifications :

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1000mm x 800mm x 1672 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

a. Normal Glass Syringe

b. Glass Syringe with tube connector

c. Spare Needle

d. Teflon Tube



VIII. UV Curing Lamp (Optional)

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Dual Pump Nano Fiber Electrospinning Unit

Model : HO-NFES-043C

Holmarc's (HO-NFES-043C model) Electro-spinning equipment features two syringe pumps on both sides of the rotating collector drum.

The distance between the syringe and drum can be adjusted. The speed, direction, travel and dispensing rate can be changed on both syringe pumps. Using this technique helps the end user to increase the production rate of nano fibers as well as two different materials can be spun simultaneously.

It is used to make nano and micro fibers ranging from 50nm to 5 microns in diameter. Many kind of polymers like Protein nanofibers, carbon nanotubes, inorganic nanofibers etc. can be synthesized using our nano fiber electrospinning unit. Our equipment uses horizontal spinning when compared to other equipments available in the market. This technology assures the quality of the spun fibers with no dip and uneven diameter. Its user friendly software, task oriented design, ease of operation and competitive pricing are certain features that place our equipment ahead of other products available in the market.

Holmarc's HO-SPLF4 model syringe pump render a smooth and uninterrupted flow enabling uniform spinning. HMP5KV30 model high voltage power supply delivers 0-30 KV output voltage range with a maximum current capacity of 0.5 mA. A stationary target, an XY moving target and Rotating mandrels of six different diameters are supplied along with the unit.

HO-FH-03 model fume hood provides the compact unit an enclosed atmosphere with 3 transparent side walls to monitor the electro spinning process. The hood also has features like exhaust fan, granite work surface and optional features like high bright halogen lighting, duct of custom dimension to be connected to an exhaust duct available onsite etc as with the other model. This model uses a microprocessor based control unit that interfaces the operations of the syringe pump and Mandrel.

Features

Cabin Heating : Upto 45°C using 1000 watt coil heater

The chamber is provided with Residual Charge Discharge Stick which is used for static removal

Safety switch provided to switch off H.V. Power supply when door is opened

LED cabin lighting and back light to view Needle tip and electro spin process

Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process

Emergency stop is provided on the control panel to stop the equipment where there is any emergency

Coaxial spinneret: Our Nano fiber electrospinning unit equips Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber

Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marketing the positions of syringe pump and target

User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating mandrel speed, Spin Duration, Syringe pump flow rate, XY target movement etc.

Rotating Mandrel targets of varying diameters, Stationary target and Reciprocating XY target provided with the system

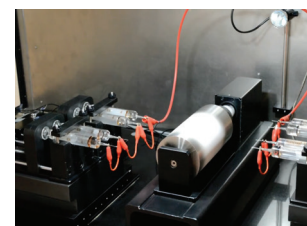
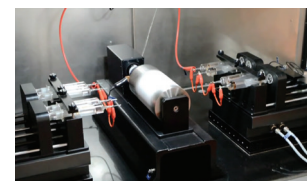
System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process

Built-in Arc Protection Circuit

Independently Controlled Dual Channel Syringe Pump

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.

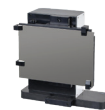


Rotating Mandrel



1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : $\pm 1\%$
6. PC based control with documentation of speed and duration

Y Plate Collector & Stationary Target



1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration

Accessories

a. Normal Glass Syringe



b. Glass Syringe with tube connector



c. Spare Needle



d. Teflon Tube



622 Kg

Spinneret

a. Needle Spinneret
The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret
The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



Watch now



Specifications

I. High Voltage Power Supply

HOLMARC HO-NFES-040 comes with HMPSKV30 model high voltage power supply. It has 0 - 30kV output voltage range with a maximum current capacity of 0.5mA. Output voltage and current can be set using front panel knobs and readout from the digital panel meters.

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



III. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

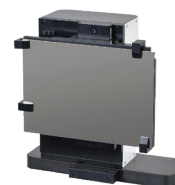
1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDCmotor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



IV. Y Plate Collector & Stationary Target

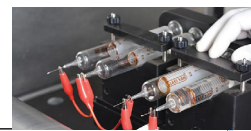
This collector can be used as Stationary target or as Y plate collector. The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding.

Using a stationary target alone cannot attain a uniform density of fibers, as most of the fiber is collected around the point orthogonal to the syringe needle. Combined with X movement provided on the syringe pump, the Y translation stage on the target keeps the target move through a commanded motion profile. Depending on the motion profile, fibers get collected uniformly on the target. The motion profile can be created using a series of commands available in the software.



Specifications :

1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration



V. Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



VI. Fume Hood

HOLMARC's HO-FH-03 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite.

HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood.



The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.

Specifications :

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1200mm x 850mm x 1520 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

a. Normal Glass Syringe



b. Glass Syringe with tube connector



c. Spare Needle



d. Teflon Tube

VIII. UV Curing Lamp (Optional)

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Dual Pump Nano Fiber Electrospinning Unit

with Humidity Control and Camera for Viewing Taylor Cone

Model : HO-NFES-043CH

This model has a humidity display unit in which the user can set the required humidity level. The humidity control unit activates the built-in humidifier or dehumidifier, depending on the user settings, to maintain the humidity level at the set value. It also features two digital cameras which captures the image of the Taylor cones at both the spinnerets. Holmarc's (HO-NFES-043CH model) Electro-spinning equipment features two syringe pumps on both sides of the rotating collector drum. The distance between the syringe and drum can be adjusted. The speed, direction, travel and dispensing rate can be changed on both syringe pumps. Using this technique helps the end user to increase the production rate of nano fibers as well as two different materials can be spun simultaneously. It is used to make nano and micro fibers ranging from 50nm to 5 microns in diameter. Many kind of polymers like Protein nanofibers, carbon nanotubes, inorganic nanofibers etc. can be synthesized using our nano fiber electrospinning unit. Our equipment uses horizontal spinning when compared to other equipments available in the market. This technology assures the quality of the spun fibers with no dip and uneven diameter. Its user friendly software, task oriented design, ease of operation and competitive pricing are certain features that place our equipment ahead of other products available in the market.

Holmarc's HO-SPLF4 model syringe pump render a smooth and uninterrupted flow enabling uniform spinning. HMPSKV30 model high voltage power supply delivers 0-30 KV output voltage range with a maximum current capacity of 0.5 mA. A stationary target, an XY moving target and Rotating mandrels of six different diameters are supplied along with the unit. HO-FH-03 model fume hood provides the compact unit an enclosed atmosphere with 3 transparent side walls to monitor the electro spinning process. The hood also has features like exhaust fan, granite work surface and optional features like high bright halogen lighting, duct of custom dimension to be connected to an exhaust duct available onsite etc as with the other model. This model uses a microprocessor based control unit that interfaces the operations of the syringe pump and Mandrel.

Features

Humidity controller with both humidification and dehumidification
Dual digital camera for viewing Taylor cone
Cabin Heating : Upto 45°C using 1000 watt coil heater
The chamber is provided with Residual Charge Discharge Stick which is used for static removal.
Safety switch provided to switch off H.V. Power supply when door is opened.
LED cabin lighting and back light to view Needle tip and electro spin process.
Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process.
Emergency stop is provided on the control panel to stop the equipment where there is any emergency.
Coaxial spinneret: Our Nano fiber electrospinning unit equips Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber.
Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marketing the positions of syringe pump and target. User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating mandrel speed, Spin Duration, Syringe pump flow rate, XY target movement etc.
Rotating Mandrel targets of varying diameters, Stationary target and Reciprocating XY target provided with the system.
System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process.
Built-in Arc Protection Circuit

Independently Controlled Dual Channel Syringe Pump

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



High Voltage Power Supply

Specifications :

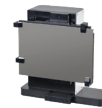
1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection

Rotating Mandrel



1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : $\pm 1\%$
6. PC based control with documentation of speed and duration

Y Plate Collector & Stationary Target



1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration



Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



UV Curing Lamp (Optional)



A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV. The controller is also provided with an ON/OFF Switch for the UV Lamp.



Specifications

I. High Voltage Power Supply

HOLMARC HO-NFES-040 comes with HMPSKV30 model high voltage power supply. It has 0 - 30kV output voltage range with a maximum current capacity of 0.5mA. Output voltage and current can be set using front panel knobs and readout from the digital panel meters.

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



III. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



IV. Y Plate Collector & Stationary Target

This collector can be used as Stationary target or as Y plate collector. The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding.

Using a stationary target alone cannot attain a uniform density of fibers, as most of the fiber is collected around the point orthogonal to the syringe needle. Combined with X movement provided on the syringe pump, the Y translation stage on the target keeps the target move through a commanded motion profile. Depending on the motion profile, fibers get collected uniformly on the target. The motion profile can be created using a series of commands available in the software.

1. Plate Dimension 250 x 175 x 3mm
2. Travel : 150mm
3. Plate Material : Stainless Steel
4. Grounding Facility : Available
5. Programmable Y motion profile to control the nano fiber deposition characteristics
6. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration



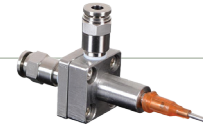
V. Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



VI. Fume Hood

HOLMARC's HO-FH-03 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite.

HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood.

The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.



Specifications :

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1200mm x 850mm x 1520 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

a. Normal Glass Syringe



b. Glass Syringe with tube connector



c. Spare Needle



d. Teflon Tube

VIII. UV Curing Lamp (Optional)

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Nano Fiber Electrospinning Unit

with Horizontal & Vertical Spinning 30KV and 40 KV

30KV Model HO-NFES-043

40KV Model HO-NFES-045

Holmarc's (HO-NFES-043 model) Electro-spinning equipment is a compact version for Nano fiber Electro spinning. Motorized XY movement provided for the needle tip. The needle tip can be arranged in horizontal or vertical fashion for spinning. Collector bowl for liquid targets is also provided along with the system. It is used to make nano and micro fibers ranging from 50nm to 5 microns in diameter. Many kind of polymers like Protein nanofibers, carbon nanotubes, inorganic nanofibers etc. can be synthesized using our nano fiber electrospinning unit. Our equipment uses horizontal spinning when compared to other equipments available in the market. This technology assures the quality of the spun fibers with no dip and uneven diameter. Its user friendly software, task oriented design, ease of operation and competitive pricing are certain features that place our equipment ahead of other products available in the market.

Holmarc's HO-SPLF4 model syringe pump render a smooth and uninterrupted flow enabling uniform spinning. HMPSKV30 model high voltage power supply delivers 0-30 KV output voltage range with a maximum current capacity of 0.5 mA. A stationary target, an XY moving target and Rotating mandrels of six different diameters are supplied along with the unit. HO-FH-04 model fume hood provides the compact unit an enclosed atmosphere with 3 transparent side walls to monitor the electro spinning process. The hood also has features like exhaust fan, granite work surface and optional features like high bright halogen lighting, duct of custom dimension to be connected to an exhaust duct available onsite etc as with the other model. This model uses a microprocessor based control unit that interfaces the operations of the syringe pump and Mandrel.



Features

Cabin Heating : Upto 45°C using 1000 watt coil heater

The chamber is provided with Residual Charge Discharge Stick which is used for static removal.

Safety switch provided to switch off H.V. Power supply when door is opened.

LED cabin lighting and back light to view Needle tip and electro spin process.

Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process.

Emergency stop is provided on the control panel to stop the equipment where there is any emergency.

Coaxial spinneret: Our Nano fiber electrospinning unit equips Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber.

Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marketing the positions of syringe pump and target.

User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating mandrel speed, Spin Duration, Syringe pump flow rate, XY target movement etc.

Rotating Mandrel targets of varying diameters, Stationary target and Reciprocating XY target provided with the system.

System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process.

Built-in Arc Protection Circuit

Rotating Mandrel

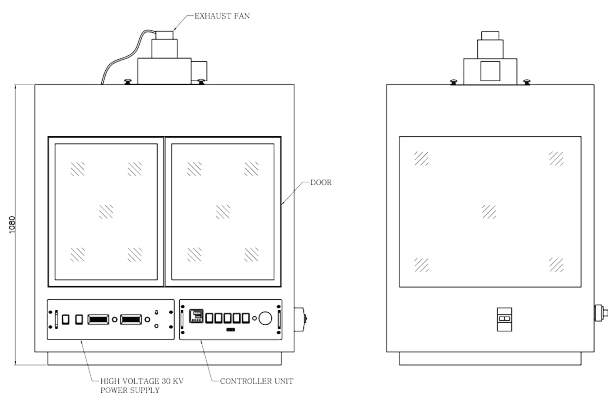
1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDCmotor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration

Stationary Target



1. Plate Dimension 200 x 200, 200 x 100, 100 x 100, 75 x 75 mm
2. Plate Material : Stainless Steel
3. Grounding Facility : Available





Independently Controlled Dual Channel Syringe Pump



Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.

High Voltage Power Supply



Specifications :

1. 0 - 40kV Single Output, 0.4mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection.

Specifications

I. High Voltage Power Supply

HOLMARC HO-NFES-043 comes with HMPSKV30 model high voltage power supply. It has 0 - 30kV output voltage range with a maximum current capacity of 0.5mA. Output voltage and current can be set using front panel knobs and readout from the digital panel meters.

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection

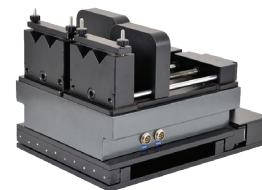


II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.



III. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



IV. Stationary Target

This collector can be used as Stationary target.

The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding.

Specifications :

1. Plate Dimension 200 x 200, 200 x 100, 100 x 100, 75 x 75 mm
2. Plate Material : Stainless Steel
3. Grounding Facility : Available



V. Spinneret

a. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.



b. Co axial Spinneret

The Coaxial spinneret provides simultaneous flow of two different solutions. This helps to produce Hollow nanofibers and Core / Sheath nanofibers.



VI. Fume Hood

HOLMARC's HO-FH-02 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite.

HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood.

The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.



Specifications :

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1000mm x 800mm x 1672 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

a. Normal Glass Syringe

b. Glass Syringe with tube connector

c. Spare Needle

d. Teflon Tube



VIII. UV Curing Lamp (Optional)

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Nano Fiber Double Spinning & Yarning System

Model: HO-NFES-SYS

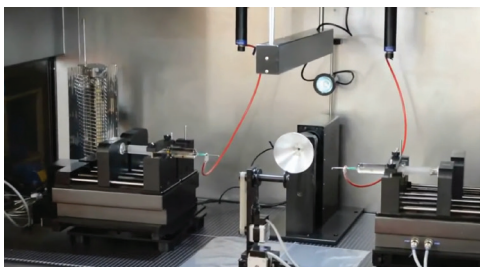
Nano Fiber Double Spinning & Yarning System is known as one of the most efficient, convenient methods to produce fibers of a nanometric scale. These nanometric fibers reveal several remarkable characteristics such as a large surface area to the volume ratio, high porosity, flexibility in surface functionality, and superior mechanical performance. Nanofibers are utilized in a wide variety of applications such as filtration and multifunctional membranes, medical usages, and military systems due to their outstanding properties.

Holmarc's Nano Fiber Double Spinning & Yarning System comprises of a bipolar high voltage supply and a set of collectors for different applications. The instrument also equips with a unique rotary collector through which user will be able to spin the fiber into threads and collect it in spools. The diameter of the fiber depends on various parameters but mainly flow rate. In order to make fiber in to yarn, two syringe pumps, one with positively charged spinneret and the other with negatively charged spinneret, are targeted to a funnel shaped collector from where fiber yarns are formed and rolled into spool. The equipment is controlled by a software compatible with Windows OS. The parameters like solution flow rate, rotating speed of the funnel or mandrel collector, duration of electrospinning, horizontal and vertical speeds of the spool etc can be controller using this software.

Features

- Cabin Heating : Upto 45°C using 1000 watt coil heater
- The chamber is provided with Residual Charge Discharge Stick which is used for static removal.
- Safety switch provided to switch off H.V. Power supply when door is opened.
- LED cabin lighting and back light to view Needle tip and electro spin process.
- Exhaust fan is provided for solvent vaporization. It is also used for cooling down the equipment after spin process.
- Emergency stop is provided on the control panel to stop the equipment where there is any emergency.
- Graduation scale provided on the granite surface in X & Y direction which helps the end-user to achieve repetitive results by marketing the positions of syringe pumps, target and rim rotator.
- User friendly software enables PC interfacing that helps the regulation and control of various features like Rotating speed of the funnel or mandrel collector, Spin Duration, horizontal and vertical speeds of the spool, Syringe pump flow rate, etc.
- Rotating Mandrel targets of varying diameters, Stationary target, Reciprocating XY target, metal funnel collector and rim rotator provided with the system.
- Coaxial spinneret : Our Nano fiber electrospinning unit equips Coaxial spinneret which helps to produce Hollow nanofibers and Core / Sheath nanofibers. This technology can also be used to combine different characteristics of each polymer into one fiber.
- System hood has features like Exhaust fan, halogen lighting and transparent door for monitoring electrospinning process.
- Built-in Arc Protection Circuit

Inside view



Independently Controlled Dual Channel Syringe Pump

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.
6. Manual height adjustment platform to vary the pump height according to the target height.



High Voltage Power Supply

Specifications :

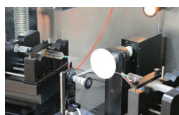
1. +/-15kV Dual Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



Metal Funnel Collector

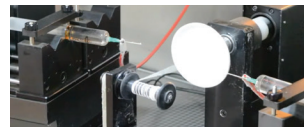
Specifications :

1. Rotating speed : 300 to 4000 rpm
2. Material : Aluminium
3. Diameter : 100mm



Yard Spool

1. Material : Acetal resin
2. Rotating speed : 1 to 100 rpm
3. Linear reciprocating movement : 50 mm



Rotating Mandrel

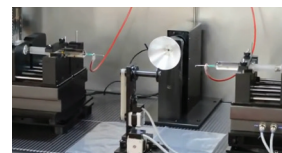
1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : $\pm 1\%$
6. PC based control with documentation of speed and duration

1080 mm



Spinneret

- a. Needle Spinneret
The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.



Specifications

I. High Voltage Power Supply

HOLMARC HO-NFES-SYS comes with HMPSKV30 model high voltage power supply. Output voltage and current can be set using front panel knobs and readout from the digital panel meters..

Specifications :

1. 0 - 30kV Single Output, 0.5mA max Current
2. Digital Voltmeter and Current meter
3. Static Removal Device - Shorting Stick
4. Constant current / Constant Voltage mode of operation
5. Built-in ARC Circuit Protection



II. Independently Controlled Dual Channel Syringe Pump

HOLMARC'S HO-SPLF4 model syringe pump provides independent control of two dual channel syringe pumps. The speed and flow rate can be changed on both to achieve custom fabrications of fibers. The Syringe pump also can be moved to and fro in X axis. The maximum travel distance is 200mm. The movement is controlled via PC. It can operate with standard off-the-shelf syringes made of plastic, glass or stainless steel. The microprocessor based control circuit can render a flow rate of 16 μ l/hr to 630 ml/hr (with 5ml Syringe). The syringe diameter, spin duration or the target volume can be set by the user through the ElectroSpinner software interface.

Specifications :

1. To dispense from standard disposable or glass syringes from 2.5 to 60ml
2. Syringe holder made of insulating material to work under high voltage conditions
3. Motor control through microcontroller to control and indicate flow rate
4. Four syringe dispensing system
5. PC based control with documentation of parameters like syringe diameter, flow rate, spray duration etc.
6. Manual height adjustment platform to vary the pump height according to the target height.



III. Metal Funnel Collector

Metal funnel collector is a funnel shaped rotating mandrel where fiber yarns are formed and rolled into spool. A thin film web of nanofiber is first formed on a metal funnel collector and is drawn initially to a 3D cone shape. With the rotation of funnel collector, a twisted nanofiber yarn is drawn from the vertex of the cone.

Specifications :

1. Rotating speed : 300 to 4000 rpm
2. Material : Aluminium
3. Diameter : 100mm



IV. Yarn Spool

Yarn Spool is compact and modular motorized positioner for rolling the nanofiber yarn into spool. Stepper motor is used as electrical actuator. Yarn Spool is XY axis configurable.

Specifications :

1. Material : Acetal resin
2. Rotating speed : 1 to 100 rpm
3. Linear reciprocating movement : 50 mm

V. Rotating Mandrel

Rotating mandrels which comes with the electrospinning unit can be used as a target to get an aligned continuous mesh of nanofiber. It has a speed range of 300rpm to 4000rpm suitable for electrospinning. Grounding of the mandrel to the HV power supply is attained through a carbon brush contact. The rotating mandrel has a speed stability of +/- 1%. Holmarc's HO-RM-01 is a high speed rotating mandrel assembly which works with Holmarc HO-MN series mandrels of 2mm to 100mm diameter and is of 200mm length. No. of mandrels supplied are 100mm, 75mm, 50mm, 25mm, 15mm, 12mm, 6mm, 4mm, 2mm.

Specifications :

1. Stainless steel drums of different sizes
2. Rotational Speed : 300 - 4000 rpm
3. Grounding facility : Available
4. Actuator : Microprocessor controlled BLDC motor with hall sensor feedback
5. Speed stability : +/- 1%
6. PC based control with documentation of speed and duration



VI. Y Plate Collector & Stationary Target

This collector can be used as Stationary target or as Y plate collector. The stationary target which acts as a collector of electro spun nanofibers, is made of stainless steel plate such that it can be held vertically on a table top. It also has connector for grounding. Using a stationary target alone cannot attain a uniform density of fibers, as most of the fiber is collected around the point orthogonal to the syringe needle. Combined with X movement provided on the syringe pump, the Y translation stage on the target keeps the target move through a commanded motion profile. Depending on the motion profile, fibers get collected uniformly on the target. The motion profile can be created using a series of commands available in the software.

Specifications :

1. Plate Dimension 250 x 175 x 3mm
2. Plate Material : Stainless Steel
3. Grounding Facility : Available
4. Programmable Y motion profile to control the nano fiber deposition characteristics
5. PC based motion control with documentation of parameters like speed, traverse, motion profile and duration

VII. Needle Spinneret

The Flat tipped metal needles are provided for the easy flow of the nano fibers. The high voltage is connected to the tip of the needle using metal clips.

VI. Fume Hood

HOLMARC's HO-FH-03 model fume hood provides an enclosed atmosphere for electrospinning. An enclosed chamber is necessary to protect the user from pollutant air caused by solvent evaporation during the process. It comes with an exhaust fan attached or optionally with a duct of custom dimension so that it can be connected to an exhaust duct available onsite.

HOLMARC's Fume Hood also has an option for in-built heater capable to provide a temperature up to 45°C. An independent PID controller ensures precise control of temperature. A common electronic control unit for all the devices in the electrospinning system is integrated within the hood.



The fume Hood has transparent side walls and front door shield made of float glass. This ensures good visibility of the process. High intensity light from the optional halogen lamp illuminates the nanofibers being spun on its way to the target. The table top is made of granite which makes the cleaning process easy.

Specifications :

1. Standalone unit with in-built power supply and wiring for the heater, lighting and exhaust
2. Transparent glass windows on three sides for easily monitoring the electrospinning process
3. Foot print: 1000mm x 800mm x 1672 mm
4. Construction Material: Stainless Steel, Aluminium & Glass
5. Epoxy coated for electrical insulation
6. Ambient to 40°C temperature control
7. Exhaust fan ventilation at the top of the hood which can be connected to an exhaust outlet available at the customer facility.

VII. Accessories

- a. Normal Glass Syringe
- b. Glass Syringe with tube connector
- c. Spare Needle
- d. Teflon Tube



VIII. UV Curing Lamp (Optional)

A special 10W 254nm UV light can be added on top of the rotating collector drum which helps to cure the spun fibers. It can be switched on during the operation or when fiber spun is completed on the collector drum. As the UV light is harmful for our skin and eye, the glass surfaces of the chamber is protected with special coatings to reflect maximum UV.

The controller is also provided with an ON/OFF Switch for the UV Lamp.



Industrial Electrosinning



Industrial Scale Needle-less Electrosinning Unit

Model : INE1000 FibSpinner

The INE1000 FibSpinner is a high-capacity, needle-less electrosinning unit engineered for industrial-scale nanofiber production. Designed with a bottom-up spinning approach, the unit enables the uniform coating of nanofibers on substrates up to 1000 mm wide using a roll-to-roll mechanism.

Unlike traditional needle-based systems, the INE1000 employs three stainless steel thin-slit spinneret rods to facilitate needle-less electrosinning, significantly reducing clogging, maintenance, and downtime. Each spinneret is fed by an independently controlled peristaltic pump system, offering precise control of flow rate and uniform fiber distribution.

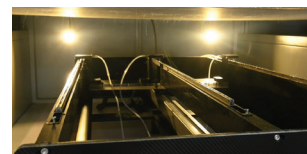
The system is controlled via a 12" touchscreen interface, allowing operators to configure process parameters, save/load recipes, and monitor system status in real-time. Integrated safety features, including high-voltage interlocks, emergency stop, and overcurrent protection, ensure user safety and equipment integrity.

This platform supports a wide range of polymer viscosities and is ideal for research, prototyping, and commercial-scale nanofiber production applications in sectors like biomedical engineering, filtration, protective textiles, and energy storage.

Spinning Type : Bottom up Spinning

PUMP SYSTEM

Three independent peristaltic pump units Tubing	Individually connected to each spinneret. Silicone tube of 2.4 mm ID, 5.6 mm OD
Flow Rate	0.01- 40 ml/min
Flow Rate Precision	0.01 ml/h
Tank Capacity	Tank 2 L



Feeding Area :

Needle-less Spinnerets	3 thin-slit rods
Spinneret MOC	Stainless Steel
Solution Feeding System	Adjustable speed, feeding rate and waiting time.
Adjustable speed, feeding rate and waiting time.	
Electrode Length	1000 mm Slit
Slit Dimensions	2 mm Depth, 4 mm Width

ROLL TO ROLL SYSTEM

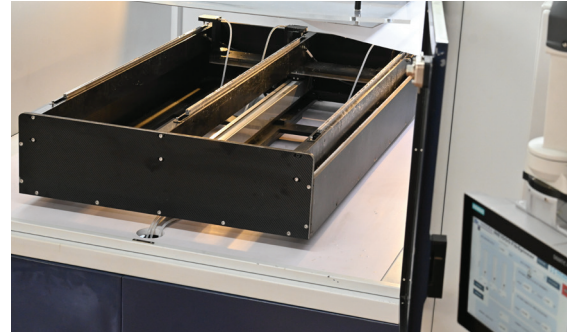
Maximum width of the substrate fabric	1000 mm
Substrate Winding Speed	0.1 m/min - 25.0 m/min
Effective Coating Width	1000 mm
Max Roll Diameter	600 mm
Air compressor included for tightening roll shaft	

HIGH VOLTAGE POWER SUPPLY

Voltage Range	
Spinneret	0 to 60 kV
Collector	0 to -40 kV
Voltage Precision	0.1 kV
Maximum Current	2 mA

USER INTERFACE

- 12" Touch screen control panel
- Easy to use GUI
- Recipe save and load functions
- Control of process parameters



SPINNING DISTANCE:

Distance between Rods and Collector	150 - 300 mm
Distance Adjustment Precision	1 mm

SAFETY FUNCTION :

- HV supply cut off on door open event
- Emergency stop button
- HV Warning Light
- Electrically Isolated & Grounded
- Over Current Protection

CONSTRUCTION

Chassis	Epoxy Painted Sheet Metal
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POWER SUPPLY REQUIREMENTS

Power	230 VAC @ 18 A, 4200 W Max.
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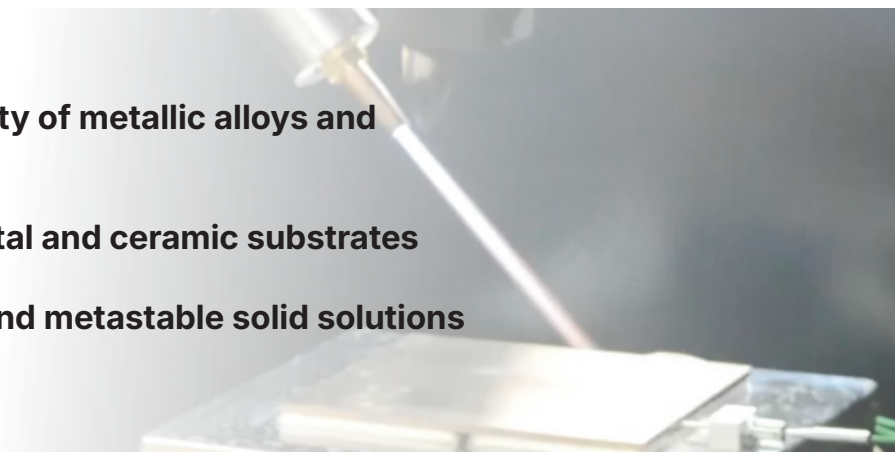


Spray Pyrolysis Equipment Unit

Improve surface quality of metallic alloys and ceramics

Deposit oxides on metal and ceramic substrates

Produce Al_2O_3 , ZnO, and metastable solid solutions



Flame Assisted Spray Pyrolysis Equipment

Model: HO-TH-04FA

Holmarc's Flame Assisted Spray Pyrolysis Equipment Model : HO-TH-04FA has been developed for research in surface quality improvement of metallic alloys and ceramics. In this technique, solution is sprayed on to a heated substrate through an oxygen-acetylene flame. The equipment is fitted with accessories required for controlling the flame during the process. The solution is sprayed using a positive displacement pump and compressed air through a mixing chamber and nozzle. The substrate is placed on a hot plate, temperature of which can be set at the desired level through a dedicated controller. The hot plate is mounted on a motorized XY platform to move the substrates during the coating process in the required sequence so that uniform coating is achieved. Flow rate of the solution and motion sequence of the substrate are controlled through a personal computer. The flame is initiated and set at the required intensity level manually using the control accessories fitted with the equipment. As the solution is sprayed with the help of compressed air, the equipment can be used for spray pyrolysis without flame as well. Combination of pyrolysis thin films with and without flame can also be produced on the same substrates in successive operations. The chemical reactants are selected such that products other than the desired compound are volatile at the temperature of deposition. The process is generally useful for the deposition of oxides on to metal and ceramic substrates and particularly suitable for the deposition of Al_2O_3 , ZnO and metastable solid solutions of ZnO-MgO and $\text{ZrO}_2\text{-Y}_2\text{O}_3$ on amorphous silica and Nickel based super alloys such as Nimonic-90.

Specifications

Actuator	Stepper motor
Dispensing unit capacity	50ml & 250ml
Dispensing rate	1 - 10ml / min.
Sprayer	
Drive speed X axis (min-max)	5 - 20mm / sec
Drive speed Y axis (min-max)	2 - 12mm / sec
Sprayer traverse	X - Y 100mm max.
Substrate base plate	
Dimension	150 x 150mm
Max. temperature	500° C
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)



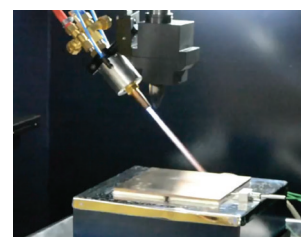
What it is

Spray pyrolysis is a process in which a thin film is deposited by atomizing and spraying a solution on a heated surface, where the constituent reacts to form a chemical compound. In flame assisted spray pyrolysis, this spray is heated by a flame produced by an oxy-acetylene gas mixture, before being deposited on to the substrate.

Sprayer

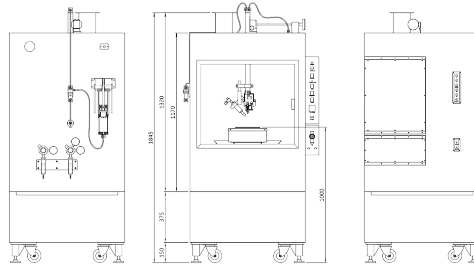
Specifications

Drive speed X axis (min-max) :
5 - 20mm / sec
Drive speed Y axis (min-max) :
2 - 12mm / sec
Sprayer traverse X - Y 100mm max.



Substrate base plate

Specifications
 Dimension 150 x 150mm
 Max. temperature 500° C
 Power input: 230V, 50Hz
 Serial port (RS 232)



Factors affecting bonding and subsequent build up of the coating :

- Cleanliness
- Surface area
- Surface topography or profile
- Temperature (thermal energy)
- Time (reaction rates, cooling rates etc.)
- Speed
- Physical & chemical properties
- Physical & chemical reactions



Glass Container

Glass container holds the solution to be sprayed during the coating process. Containers of two volumes (250ml & 50ml) are available as standard accessories.



Nylon Tube

This tube carries the solution from the glass dispenser to the spray head. Nylon is resistant to most of the chemicals which has applications in spray pyrolysis.



492 Kg



Spray Pyrolysis Equipment (Table Top)

Model: HO-TH-04BT

HOLMARC's Spray Pyrolysis Equipment (Table Top) Model: HO-TH-04 BT is more compact and sleek model that does not take too much space in your laboratory. It can be placed in any available platform. Even though Smaller in size it performs all the functions and operations of the standard model.

Holmarc's Spray Pyrolysis System has been designed for research laboratories in thin films, especially for solar cell development. The system automates various fatigue and error creating processes involved in the technique when performed manually. Moreover, ergonomically designed chamber provides clean and healthy atmosphere suitable for modern lab conditions.

Parameters like dispensing rate of the solution and speed of spray head movement which are difficult to control manually are controlled precisely by PC based automation. A positive displacement pump controlled by stepper motor and microprocessor is used to dispense solution as per requirement. The spray head movement is also controlled by stepper motor driven linear stages in X and Y direction. The temperature of the substrate heater plate is controlled independently through a dedicated controller.

Spray pyrolysis is a process in which a thin film is deposited by spraying a solution on a heated surface, where the constituent react to form a chemical compound. The chemical reactants are selected such that the products other than the desired compound are volatile at the temperature of deposition. The process is particularly useful for the deposition of oxides and has long been a production method for applying a transparent electrical conductor of Tin oxide (SnO₂) or Stannic oxide to glass.

Specifications



Actuator	Stepper motor
Dispensing unit capacity	50ml & 250ml
Dispensing rate	1 - 10ml / min.

Sprayer	
Drive speed X axis (min-max)	10 - 800mm / sec
Drive speed Y axis (min-max)	1 - 12mm / sec
Sprayer traverse	X - Y 200mm max.

Substrate base plate	
Dimension	150 x 150mm
Max. temperature	500° C
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)

Substrate base plate

Specifications

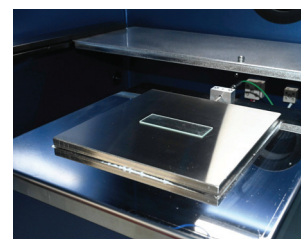
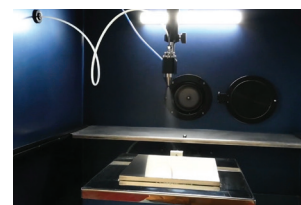
Dimension 150 x 150mm
Max. temperature 500° C
Power input: 230V, 50Hz
Serial port (RS 232)

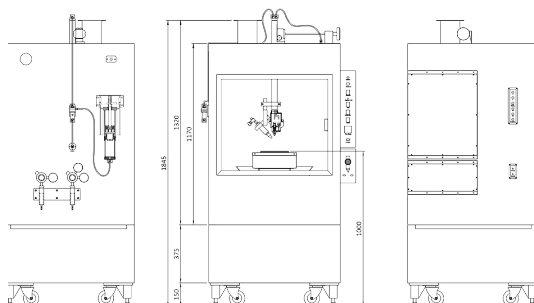


Sprayer

Specifications

Drive speed X axis (min-max) :
10 - 800mm / sec
Drive speed Y axis (min-max) :
1 - 12mm / sec
Sprayer traverse :
X - Y 200mm max.





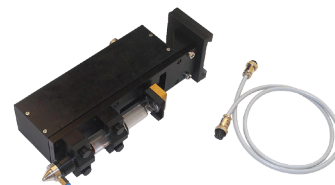
Factors affecting bonding and subsequent build up of the coating :

- Cleanliness
- Surface area
- Surface topography or profile
- Temperature (thermal energy)
- Time (reaction rates, cooling rates etc.)
- Speed
- Physical & chemical properties
- Physical & chemical reactions



Ultrasonic Spray Head (Optional Accessory)

The standard spray head which uses a compressed air atomization nozzle can be replaced with the ultrasonic spray head which uses an ultrasonic atomizer nozzle. It breaks the solution by vibrating its nozzle at an ultrasonic frequency (Typically 40 kHz), producing a fine spray of droplets of 50 micron average size.



Syringe Pump (Optional Accessory)

Syringe pump is preferable to the glass dispenser for solutions which should be sprayed at lower flow rates ($< 1 \text{ ml / min}$). It works with very low volume of solution as the syringe is directly connected to the spray nozzle, avoiding the use of lengthy tubes which should be filled first before the solution can reach the nozzle.

Spray Pyrolysis Equipment

Model: HO-TH-04

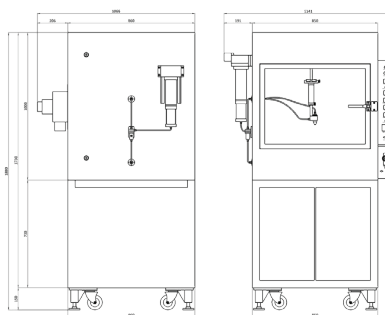
Larger Model : HO-TH-04A

Holmarc's Spray Pyrolysis system has been designed for research laboratories in thin films, especially for solar cell development. The system automates various fatigue and error creating processes involved in the technique when performed manually. Moreover, ergonomically designed chamber provides clean and healthy atmosphere suitable for modern lab conditions.

Parameters like dispensing rate of the solution and speed of spray head movement which are difficult to control manually are controlled precisely by PC based automation. A positive displacement pump controlled by stepper motor and microprocessor is used to dispense solution as per requirement. The spray head movement is also controlled by stepper motor driven linear stages in X and Y direction. The temperature of the substrate heater plate is controlled independently through a dedicated controller. A computer with windows OS can be used to control the operations through serial port. Our dedicated software for spray pyrolysis system can as well be used for documenting the relevant parameters used for sample preparation like temperature, air pressure, duration, etc. Spray pyrolysis is a process in which a thin film is deposited by spraying a solution on a heated surface, where the constituent react to form a chemical compound. The chemical reactants are selected such that the products other than the desired compound are volatile at the temperature of deposition. The process is particularly useful for the deposition of oxides and has long been a production method for applying a transparent electrical conductor of Tin oxide (SnO₂) or Stannic oxide to glass.

Factors affecting bonding and subsequent build up of the coating :

- Cleanliness
- Surface area
- Surface topography or profile
- Temperature (thermal energy)
- Time (reaction rates, cooling rates etc.)
- Speed
- Physical & chemical properties
- Physical & chemical reactions



Specifications

(Larger Version)

Model	HO-TH-04	HO-TH-04A
Actuator	Stepper motor	Stepper motor
Dispensing unit capacity	50ml & 250ml	50ml & 250ml
Dispensing rate	1 - 10ml / min.	1 - 10ml / min.
Sprayer		
Drive speed X axis (min-max)	10 - 800mm / sec	10 - 800mm / sec
Drive speed Y axis (min-max)	1 - 12mm / sec	1 - 12mm / sec
Sprayer traverse	X - Y 200mm max.	X - Y 250mm max.
Substrate base plate		
Dimension	150 x 150mm	250 x 250mm
Max. temperature	500° C	500° C
Power input	230V, 50Hz	230V, 50Hz
PC connectivity	Serial port (RS 232)	Serial port (RS 232)

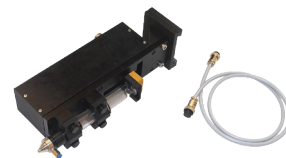
Ultrasonic Spray Head (Optional Accessory)

The standard spray head which uses a compressed air atomization nozzle can be replaced with the ultrasonic spray head which uses an ultrasonic atomizer nozzle. It breaks the solution by vibrating its nozzle at an ultrasonic frequency (Typically 40 kHz), producing a fine spray of droplets of 50 micron average size.



Syringe Pump (Optional Accessory)

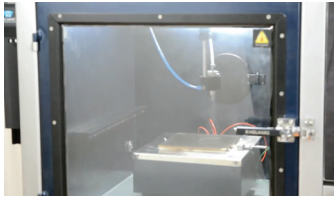
Syringe pump is preferable to the glass dispenser for solutions which should be sprayed at lower flow rates (<1ml / min). It works with very low volume of solution as the syringe is directly connected to the spray nozzle, avoiding the use of lengthy tubes which should be filled first before the solution can reach the nozzle.



Sprayer

Specifications

Drive speed X axis (min-max) :10 - 800mm / sec
 Drive speed Y axis (min-max) :1 - 12mm / sec
 Sprayer traverse: X - Y 250mm max.



Model HO-TH-04A

This is the latest model in Holmarc's line of Spray Pyrolysis Units. This model is the larger version of the standard model that provides expanded capacity and increased travel area for the spray head. This also provides a larger heating platform to spray coat substrates that are larger than standard application. This model uses a fresh new design that enables the user to carry out the spray coating process in a more convenient and efficient manner. This model can also be separated from the bottom shelf section for use as a table top unit. This unit also provides for Nitrogen purging of the enclosure.

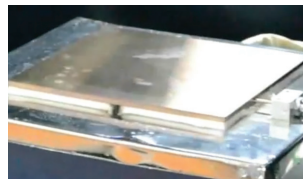
HO-TH-04



Weight (appx.)
280 Kg

Substrate base plate

Specifications
 Dimension 150 x 150mm
 Max. temperature 500° C
 Power input 230V, 50Hz
 PC connectivity Serial port (RS 232)



Substrate base plate Larger Version)

Specifications
 Dimension 250 x 250mm
 Max. temperature 500° C
 Power input 230V, 50Hz
 PC connectivity Serial port (RS 232)



Spray Pyrolysis Equipment with Magnetic Stirrer

Model: 25 HO TH 04 SP

Holmarc's Spray Pyrolysis system has been designed for research laboratories in thin films, especially for solar cell development. The system automates various fatigue and error creating processes involved in the technique when performed manually. Moreover, ergonomically designed chamber provides clean and healthy atmosphere suitable for modern lab conditions.

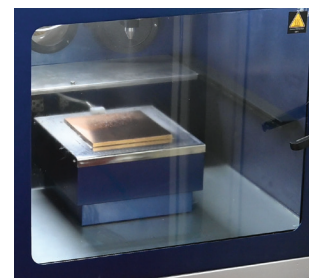
Parameters like dispensing rate of the solution and speed of spray head movement which are difficult to control manually are controlled precisely by PC based automation. A positive displacement pump controlled by stepper motor and microprocessor is used to dispense solution as per requirement. The spray head movement is also controlled by stepper motor driven linear stages in X and Y direction. The temperature of the substrate heater plate is controlled independently through a dedicated controller. A computer with windows OS can be used to control the operations through serial port. Our dedicated software for spray pyrolysis system can as well be used for documenting the relevant parameters used for sample preparation like temperature, air pressure, duration, etc. Spray pyrolysis is a process in which a thin film is deposited by spraying a solution on a heated surface, where the constituent react to form a chemical compound. The chemical reactants are selected such that the products other than the desired compound are volatile at the temperature of deposition. The process is particularly useful for the deposition of oxides and has long been a production method for applying a transparent electrical conductor of Tin oxide (SnO_2) or Stannic oxide to glass.

Specifications

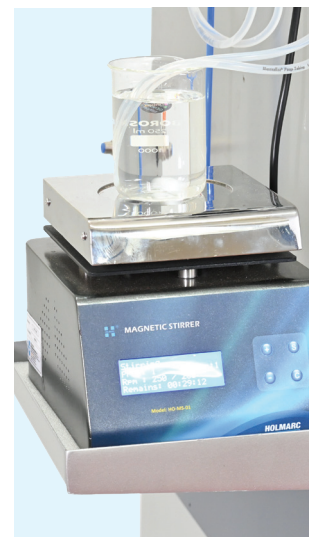
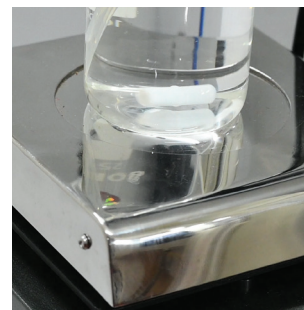
Sample dispensing rate	1 – 10 ml/min
Peristaltic pump dispenser	
Magnetic stirrer for continuous dispersion of particles in the solution	
Substrate plate (Hot plate) dimensions	150 × 150 mm
Sprayer traverse (XY direction)	200 mm
Actuator	Stepper motors
Temperature range	Ambient – 500 °C
PC connection	Serial port / USB
Y-axis drive speed	1 – 12 mm/sec
X-axis drive speed	5 – 800 mm/sec
Syringe pump nozzle for very low flow rates, eliminating long tubes	
Sample transport tube	Corrosion resistant Nylon tube
Ultrasonic spray head with 40 kHz frequency	
Movable frame with castor wheels for ease of working	
Emergency stop button	
Safety interlocks	
Power input	110/230 V, 50/60 Hz

Hot plate

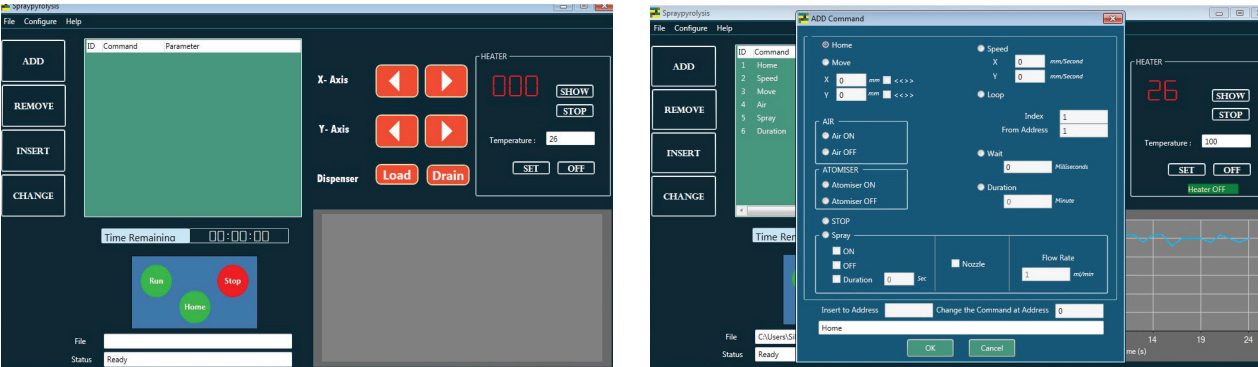
150x150mm



Magnetic stirrer

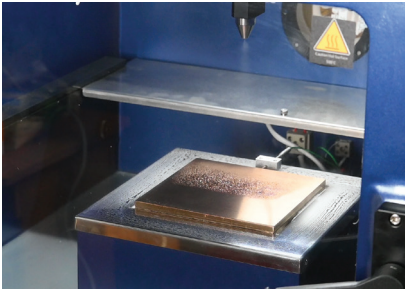


SOFTWARE



Sprayer

XY direction



Vacuum Spray Pyrolysis Automated Equipment

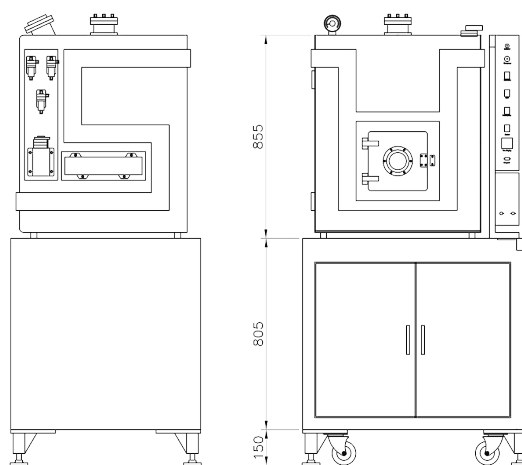
Model: HO-TH-VSP-500T

Holmarc's Vacuum Spray Pyrolysis (VSP) system has been designed for advanced research in thin films, especially for solar cell development. This model facilitates the spray pyrolysis to take place in an inert atmosphere using Nitrogen purging. This model comes with Tin bath heater instead of regular stainless steel hot plate. This provides uniform and stable heating to the substrate during the coating process. The system automates various fatigue and error creating processes involved in the technique when performed manually. Moreover, ergonomically designed chamber provides clean and healthy atmosphere suitable for modern lab conditions. In vacuum spray pyrolysis, material is heated in a vacuum in order to decrease its boiling point and avoid adverse chemical reactions. The energy required to bring the material to its boiling point is reduced and the process becomes more efficient. Use of materials with high melting point becomes possible. This opens up possibilities for the use of materials which could not have been used with the traditional spray pyrolysis process. The software interface is simple yet flexible enough to create programs for different types of processes like point spray, raster spray, intermittent spray with programmable time delay etc. The flow rate is precisely controlled through the software while the process temperature, which is independently controlled using a PID temperature controller, can be documented for future reference. The control parameters of a process can be saved and recalled for later use. The default PC interface is RS232C (Serial port). Optionally, USB to Serial converter is supplied to connect the equipment to the USB port of a PC or laptop. The equipment can be customized to have multiple dispensers which facilitates easy switching between different solutions.

Specifications



Coating Chamber - Chamber Size	700 x 700 x 800mm
Chamber Consists of , water cooling lines, nitrogen inlet port, overhead feed through, Illumination unit with a vacuum view port etc.	
Material construction	SS304
Vacuum Pump	Oil vacuum pump
Substrate Size	100 x 100mm
Operation	500 - 600 millibar
Inert Gas Operation	Nitrogen purging
Heater Size	150 x 150mm, temperature range up to 500°C
Dispensing System	Stepper motor controlled syringe pump
Dispensing unit capacity	50ml & 250ml
Dispensing rate	1 - 10ml / min.
Drive speed X axis (min-max)	10 - 800mm / sec
Drive speed Y axis (min-max)	1 - 12mm / sec



Coating Chamber

Specifications

Chamber Size
700 x 700 x 800mm
Outer Dimensions



Weight (appx.) - 551 Kg



Factors affecting bonding and subsequent build up of the coating :

- Cleanliness
- Surface area
- Surface topography or profile
- Temperature (thermal energy)
- Time (reaction rates, cooling rates etc.)
- Speed
- Physical & chemical properties
- Physical & chemical reactions

Features

- Vacuum Pump
- Nitrogen purging
- Masking for multi layer coating
- Hot plate for substrate heating

Programmable Multi-Nozzle Spraying System

Model: HO-TH-04C3

With Hot Plate Model : HO-TH-04C3H

Programmable Multi-Nozzle Spraying System automates the process of multilayer spraying by using a stepper motor controlled mechanism to move the spray head in the XY plane, a stepper motor controlled dispenser to achieve precise flow rate, a compressor with a pressure regulator, a stepper motor controller and a simple easy to use software which enables the user to document the coating parameters for later use

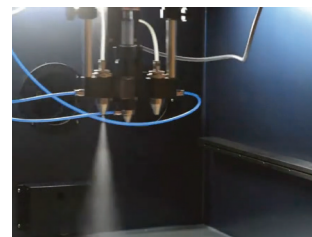
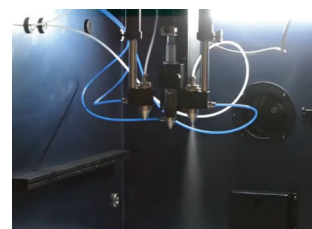
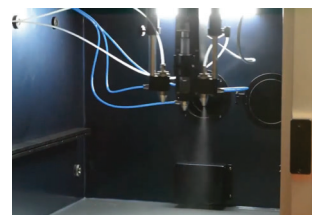
Specifications

	HO-TH-04C3	HO-TH-04C3H
Number of Syringe pump nozzle	1	1
Nozzle tip	Blunt end needle	Blunt end needle
Nozzle type	Compressed air assisted	Compressed air assisted
Optimum pressure range	8 psi to 12 psi	8 psi to 12 psi
Nozzle height adjustment	Manual	Manual
Height adjustment range	5 cm to 15 cm	5 cm to 15 cm
Number of precursor dispensers	3	3
Dispenser type	Microprocessor controlled piston movement	Microprocessor controlled piston movement
Piston Actuator	Stepper motor	Stepper motor
Dispensing Rate	1 ml/min – 10 ml/min	1 ml / min - 10 ml / min
Container capacity	50 ml & 250 ml	50 ml & 250 ml
Container material of construction	Glass and Nylon	Glass and Nylon
Sprayer movement in X & Y axis	Programmable	Programmable
X travel	1 mm to 150 mm	1 mm to 150 mm
Y travel	1 mm to 150 mm	1 mm to 150 mm
X speed	10 mm/s to 800 mm/s	10 mm/s to 800 mm/s
Y speed	2 mm/s to 12 mm/s	2 mm/s to 12 mm/s
XY sprayer actuator	Stepper motor	Stepper motor
Spray area	10 cm x 10 cm	10 cm x 10 cm
User interface	PC software	PC software
Software controllable parameters	X / Y travel, speed, dispensing rate, delay & coating duration	X / Y travel, speed, dispensing rate, delay & coating duration
XY spray duration	1 min to 60 min	1 min to 60 min
Stationary spray duration	1 sec to 240 sec	1 sec to 240 sec
Hot plate area		150 mm x 150 mm
Temperature range		Ambient to 500° C digital PID controller
PC interface	RS232C	RS232C
RS232C cable length	5 meter	5 meter
USB to serial converter	Available	Available
Compatible operating system	Windows XP / 7 / 8 / 10	Windows XP / 7 / 8 / 10
Compressor included	Yes	Yes
Pressure control	Built-in pressure regulator	Built-in pressure regulator
Power	1 hp	1 hp
Input supply voltage	230V 50Hz	230V 50Hz
Note : PC not in the scope of supply.		

Sprayer

Specifications

Number of precursor dispensers 3
 Sprayer movement in X & Y axis Programmable
 1 mm to 150 mm XYTravel
 2 mm/s to 12 mm/s Speed



Weight (appx.) -345 Kg

www.holmarc.com | sales@holmarc.com
 +91 920-719-7771 / (72 / 76)

Syringe Pump (Optional Accessories)

Syringe pump is preferable to the glass dispenser for solutions which should be sprayed at lower flow rates ($<1\text{ ml/min}$). It works with very low volume of solution as the syringe is directly connected to the spray nozzle, avoiding the use of lengthy tubes which should be filled first before the solution can reach the nozzle.



Model : HO-TH-04C3



Model : HO-TH-04C3H

This model comes with a hot plate of $150 \times 150\text{ mm}$ area and a maximum temperature of 500°C .



UV Ozone Cleaner

Manufacturing Quartz crystal resonators for clocks and frequency control which need ultra clean surfaces, Hermetic sealing of metals with non zero forces in ultra high vacuum, Manufacturing of goggles, cleaning of lenses, mirrors, solar panels, removal of photo resists, photo masks, silicon wafers etc.



UV Ozone Cleaner 150

Model: HO-TH-UVT150 , HO-TH-UVT250

Holmarc's UV Ozone Cleaner is a dedicated system to remove a variety of contaminants from surfaces of substrates samples. UV Ozone cleaning is a simple to use dry process which is highly effective method to clean surfaces. The cleaning effect is caused by irradiating the surface of a substrate with suitable lamps creating enough energy in the in the Ultra Violet spectrum range. It is photo-sensitized oxidation process by atomized Oxygen and high reactive Ozone. The UV radiation directly to the surface stimulates the reaction. Volatile hydrocarbon products are produced. The removal of hydrocarbons in nanometer thickness by oxidation results in ultra clean surfaces with significantly wettability. This is very important before thin film coating process of glass and ceramic surfaces.

Specifications

	HO-TH-UVT150	HO-TH-UVT250
UV lamp type	High Ozone UV Lamp	High Ozone UV Lamp
Number of lamps	5 nos.	6 nos.
Lamp power	4W each	4W each
UV wavelength	185 nm & 254 nm	185 nm & 254 nm
Max substrate size	150 mm x 150 mm	250 mm x 250 mm
Cleaning Duration	1 - 99 sec / min / hr	1 - 99 sec / min / hr
Construction	Stainless steel	Stainless steel
Sample feeding	Slide based	Slide based
Lamp to substrate distance	Adjustable between 8 mm and 44 mm	Adjustable between 17 mm and 56 mm
User interface	20 x 4 line alphanumeric LCD and 4 button keyboard	20 x 4 line alphanumeric LCD and 4 button keyboard
Displayed parameters	Tray temperature, Substrate temperature, Time remaining	Tray temperature, Substrate temperature, Time remaining
Set parameter	Cleaning duration	Cleaning duration
Tray temperature sensor	PT100	PT100
Substrate temperature sensor	Infrared thermometer (Non-contact type)	Infrared thermometer (Non-contact type)
Ventilation	Exhaust fan	Exhaust fan
Media (Oxygen) inlet	Pneumatic coupler	Pneumatic coupler
Safety interlock	UV lamp switched off automatically when the tray is opened	UV lamp switched off automatically when the tray is opened
Power input	230V, 50Hz	230V, 50Hz
Dimensions	400 x 536 x 215 mm (W x D x H)	



UV 150 Ozone Cleaner features very high ozone UV lamps which generate energy at 185 nanometers in addition to the low 254 nm line. It provides a tray of 176mm x 168 mm dimension for positioning samples under the UV light source. It comes with an exhaust port and inlet media for the circulation of gas in the tray. Emergency stop is also provided on the control panel to stop the equipment where there is any emergency.

UV Lamp

5 Nos
185 nm & 254 nm



Model: HO-TH-UVT150

Features

- Oxygen inlet port
- Ozone removal pump
- LCD display unit
- Sample temperature measurement feature
- Buzzer for indication completion of cleaning
- Locking feature for locking sample feeding tray to avoid opening during operation



Model: HO-TH-UVT250



UV Lamp

Substrate size

250mmx250mm



UV Ozone 250 Cleaner features very high ozone UV lamps which generate energy at 185 nanometers in addition to the low 254 nm line. It comes with an exhaust port and inlet media for the circulation of gas in the tray



UV Ozone Cleaner 350 400

Model: HO-TH-UVT350

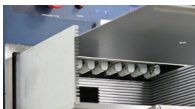
Holmarc's UV Ozone cleaner is designed to remove thin layer of contaminants from sample surfaces under both ambient temperature & in enhancement modes. It is basically a photosensitized oxidation method which uses dry process. The source-Low pressure Hg lamp produces UVC series spectra especially 184.9 & 253.7nm spectral lines acts creator & annihilator of ozone which also used for exciting organic molecules. Overall it have simple to use set up & procedure which gives best results after precleaning. Without any precleaning it gives best results to thick photo resists, pure carbon films & quartz substrates.

Specifications

	HO-TH-UVT350	HO-TH-UVT400
	 	 
UV lamp type	High Ozone UV Lamp	High Ozone UV Lamp
Number of lamps		
Lamp power		
UV wavelength	185 nm & 254 nm	185 nm & 254 nm
Max substrate size	350 mm x 350 mm	400 mm x 400 mm
Cleaning Duration	1 - 99 sec / min / hr	1 - 99 sec / min / hr
Construction	Stainless steel	Stainless steel
Sample feeding	Slide based	Slide based
Safety interlock		
Power input	230V, 50Hz	230V, 50Hz
Dimensions		

UV Lamp

185nm 254nm
High Ozone UV Lamp



Substrate size

350mmx350mm



HO-TH-UVT350

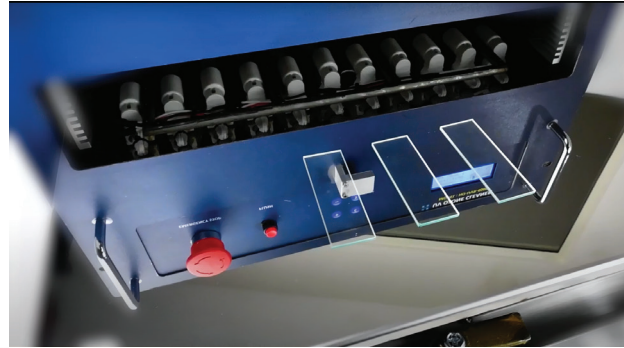
Model: HO-TH-UVT400

Safety Features

Holmarc's UV ozone cleaner arrives with well suited aluminum chamber which enclosed & blocks harmful UVC radiation from Hg source. A Flush push button close to red sign emergency stop Switch button helps to exhaust all remaining ozone & out gassing gases from tray chamber with the help of blower & additional hose. To avoid the darkening effect of metal sample surface we recommend short time period under UV ozone cleaner.

Features

- Oxygen inlet port
- Ozone removal pump
- LCD display unit
- Sample temperature measurement feature
- Buzzer for indication completion of cleaning
- Locking feature for locking sample feeding tray to avoid opening during operation
- Wattage : 88W (22 numbers of 4 W tubes in 400 mm x 400 mm size chamber)



Applications

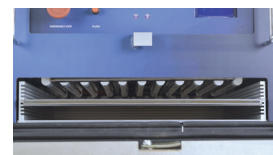
Substrate cleaning prior to thin film deposition, Manufacturing Quartz crystal resonators for clocks and frequency control which need ultra clean surfaces, Hermetic sealing of metals with non zero forces in ultra high vacuum, Manufacturing of goggles, cleaning of lenses, mirrors, solar panels, removal of photo resists, photo masks, silicon wafers etc.



Model: HO-TH-UVT400

UV Lamp

185nm 254nm
High Ozone UV Lamp



Programmable UV Ozone Cleaner

Model No. HO-UVT-300V

The UV Ozone Cleaner is an advanced surface treatment system designed for efficient cleaning and activation of various substrates using controlled ozone exposure. It integrates UV-ozone technology with closed-loop ozone control, ensuring precise, consistent, and safe operation. Ideal for research and industrial applications, this system enables removal of organic contaminants, surface modification, and improved adhesion in materials processing.



Specifications

Oxidizing agent	Ozone
UV Lamp Wavelength	185 nm & 254 nm
Ozone exposure	Automatically adjusted according to set level
Substrate Size	Maximum 400 mm diameter
Duration Input	Selectable from 1 s to 3600 s
Ozone Sensor	Included for closed-loop control
Closed Loop Control	Automatic control of ozone concentration
Ozone Detection Range	Up to 22000 ppb
Chamber Construction	Stainless steel
Sample Handling	Slide-based feeding with fixture mounting interface (as per user requirement), ozone removal pump, sample temperature measurement, and tray locking feature
Sample Rotation	In-situ rotation feature provided
Stand	Stainless steel stand
Sample positioning	Motorized vertical movement
Sample temperature measurement	Using non-contact thermometer
Chamber temperature measurement	Using PT100 temperature sensor
Exhaust pump	Included
Gas inlets	2 Nos
View port	Transparent glass window with sliding lid
Mobility	Castor wheels for easy movement
User interface	7 inch touchscreen display
Power Input	230V AC, 50 Hz



Silar Coating System

- Automated thin film deposition
- Programmable dipping and heating control
- Reduced operator fatigue and errors



Silar Coating System

Model: HO-TH-03 , HO-TH-03A,

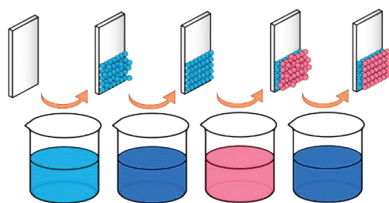
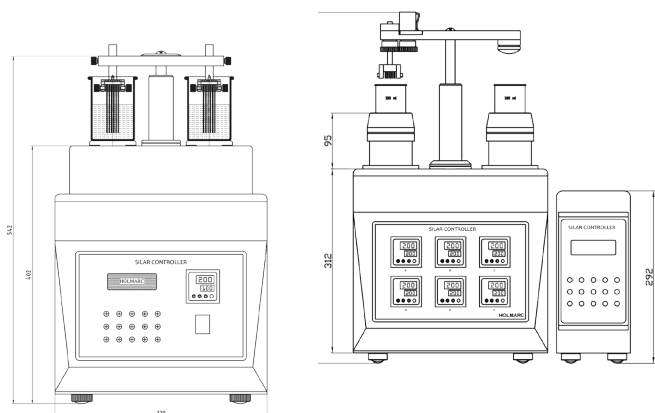
Holmarc’s SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In this system, thin film is deposited on glass substrate following a chemical technique called Successive Ion Layer Adsorption and Reaction (SILAR). The process involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case. In the automated unit, the operator need just to clamp the subtract into the holder and program the controller with required dip cycles and duration.

Specifications

		
		
	SILAR Coating System	with Stirrer
Model	HO-TH-03	HO-TH-03A
Actuator	Stepper motor	Stepper motor
Drive mechanism	Lead screw	Lead screw
Dip duration	0 - 99 sec / min / hours	0 - 99 sec / min / hours
Number of dips	1 - 999	1 - 999
Hot plate temperature	Ambient to 80°C	Ambient to 350°C
Stirrer speed	-	2 - 200 rpm
PC connectivity	Serial port (RS 232) / USB	Serial port (RS 232) ? USB
Stroke length	75 mm	75 mm
Drawing speed (Manual mode)	-	-
Drawing speed (PC mode)	-	-
Power input	230V, 50Hz	230V, 50Hz
No. of position for beakers	6	6
No. of samples could be loaded	5	5
No. of programs	5	5
Weight (appx.)	44 Kg	48 Kg

Successive Ion Layer Adsorption and Reaction (SILAR)

Model: HO-TH-03



This device can be customized as per requirement. Holmarc has developed models where a controlled heater is used for keeping the solution at specified temperature.

SILAR Coating System with Stirrer

Model: HO-TH-03A
(with Stirrer)

Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration.

This model: HO-TH-03A has a motorized substrate holder which can be used to stir the solution. By rotating the substrate along with the holder at desired speed, the solution can be kept stirred during the dipping process. The rotation speed is programmable from 2 - 200 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. Each hot plate can be set at different temperatures. The temperature can be set up to 350°C from ambient.

In this technique thin film is deposited on glass substrate following a chemical technique called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case.

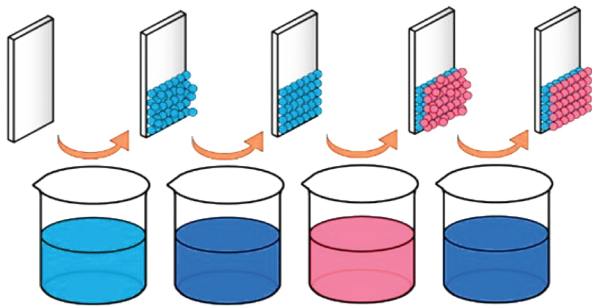


Silar Coating System

Model: HO-TH-03A8, HO-TH-03S

One of the newest solution method for the deposition of thin film is Successive Ionic Layer Adsorption and Reaction (SILAR) method, which is also known as modified version of chemical bath deposition. As it is a chemical method, a large number of varieties of substrates can be coated. Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration.

This model: HO-TH-03A8 has a motorized substrate holder which can be used to stir the solution. In this model eight beakers placed in a circular arrangement about the rotation axis of sample dipping arm. There will be heating plate for each of the beakers. Maximum diameter of hot plate surface on each of these 8 positions will be three inches. By rotating the substrate along with the holder at desired speed, the solution can be kept stirred during the dipping process. The rotation speed is programmable from 2 - 200 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. Each hot plate can be set at different temperatures. The temperature can be set up to 350°C from ambient.



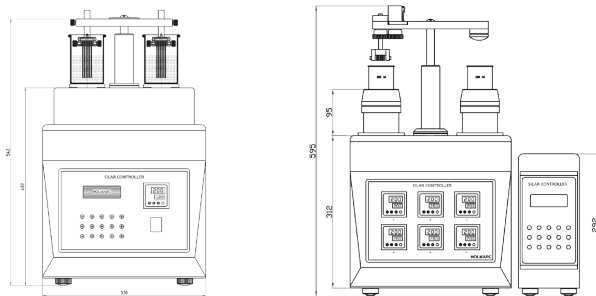
Specifications

Model	with Stirrer HO-TH-03A8	with Stirrer HO-TH-03S
		
Actuator	Stepper motor	Stepper motor
Drive mechanism	Lead screw	Lead screw
Dip duration	0 - 99 seconds / minutes / hours	0 - 99 seconds / minutes / hours
Number of dips	1 - 999	1 - 999
Hot plate temperature	Ambient - 350°C	Ambient to 80°C
Stirrer speed	Adjustable 0 - 200 rpm	Adjustable 2 rpm - 200 rpm
PC connectivity	Serial port (RS 232) / USB	Serial port (RS 232) / USB
Stroke length	75 mm	75 mm
Drawing speed (Manual mode)		200 micron / sec - 16mm / sec
Drawing speed (PC mode)		2 - 16000 micron / sec
Power input	230V, 50Hz	0
No. of position for beakers	8	6
No. of samples could be loaded	5	5
No. of programs	5	5
Weight (appx.)	76 Kg	55 Kg

SILAR Coating System with Stirrer

Model: HO-TH-03A8

This device can be customized as per requirement. Holmarc has developed models where a controlled heater is used for keeping the solution at specified temperature.



SILAR Coating System with Stirrer

Model: HO-TH-03S

Holmarc's SILAR Controller with Stirrer, Model: HO-TH-03S has a motorized substrate holder which can be used to stir the solution. By rotating the substrate along with the holder at desired speed, the solution can be kept stirred during the dipping process. The rotation speed is programmable from 2 - 200 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. There is a controlled heater, which is common for 6 beakers and the temperature can be set up to 80°C from ambient. The device is compact and complete with a footprint of 376 x 330 mm.

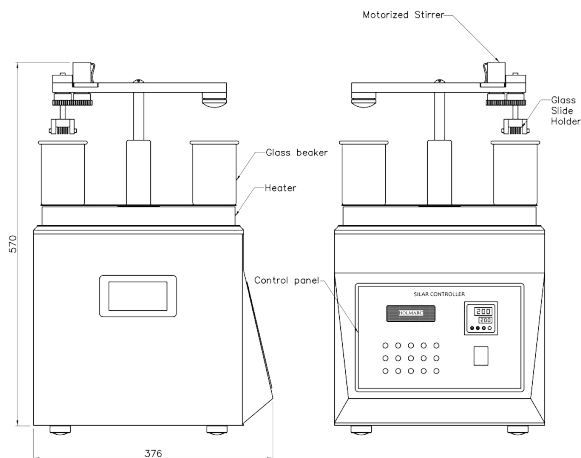
Holmarc's SILAR coating unit is an instrument with which a thin film is deposited on a glass substrate due to a chemical process called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and de-ionized water, temperature of both can vary from case to case. SILAR coating system has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which may last for hours. In our automated unit, all that an operator needs to do is just clamp the substrate on to the holder and program the controller with required parameters.



SILAR Coating System with Overhead Stirrer

Model: HO-TH-03E

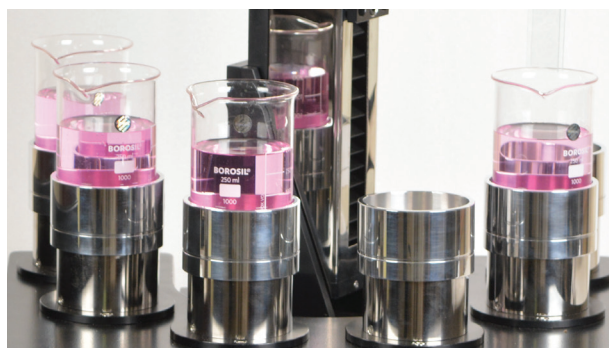
Holmarc's SILAR Controller with Overhead Stirrer, Model: HO-TH-03E has a motorized substrate holder which can be used to stir the solution. By rotating the substrate along with the holder at desired speed, the solution can be kept stirred during the dipping process. The rotation speed is programmable from 2 - 200 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. There is a controlled heater, which is common for 6 beakers and the temperature can be set up to 200°C from ambient. The device is compact and complete with a footprint of 376 x 330 mm. Holmarc's SILAR coating unit is an instrument with which a thin film is deposited on a glass substrate due to a chemical process called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and de-ionized water, temperature of both can vary from case to case. SILAR coating system has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which may last for hours. In our automated unit, all that an operator needs to do is just clamp the substrate on to the holder and program the controller with required parameters.

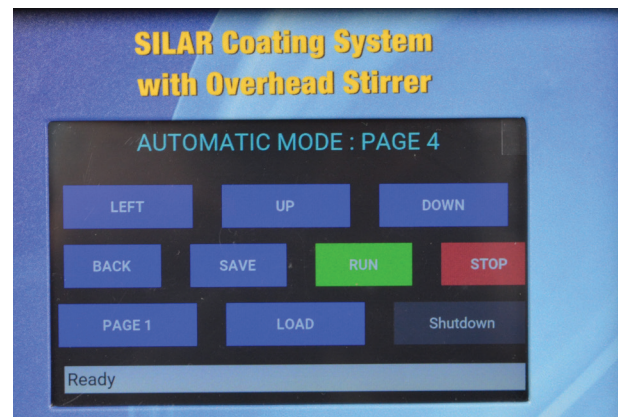
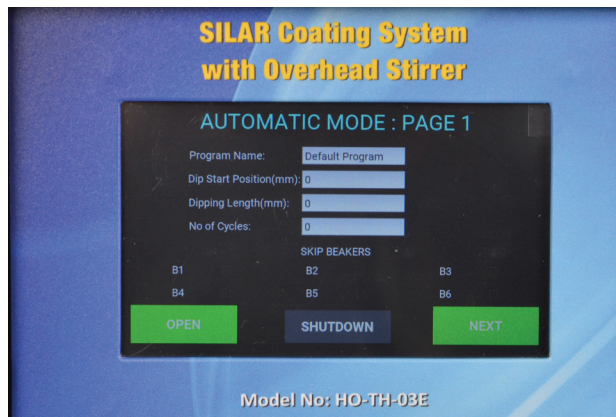


Specifications



Actuator	Stepper motor
Drive mechanism	Lead screw
Dip duration	0 - 99 seconds / minutes / hours
Number of dips	1 - 999
Hot plate temperature	Ambient to 200°C
Stirrer speed	Adjustable 2 rpm - 200 rpm
PC connectivity	Serial port (RS 232)
Stroke length	200 mm
Rotary speed	0 - 60 deg / sec
Drawing speed (Manual mode)	200 micron / sec - 16mm / sec
Drawing speed (PC mode)	2 - 16000 micron / sec
Stirrer speed	2 - 200 rpm
No. of position for beakers	6
No. of samples could be loaded	5
Temperature change from	Ambient to 200°C
Weight (appx.)	55 Kg





This device can be customized as per requirement. Holmarc has developed models where a controlled heater is used for keeping the solution at specified temperature.



SILAR Coating System with Magnetic Stirrer

Model: HO-TH-03B | HO-TH-03B1

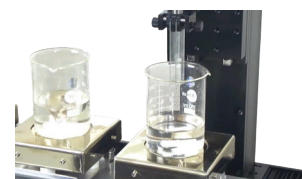
One of the contemporary method for the deposition of thin film is Successive Ionic Layer Adsorption and Reaction (SILAR) method, which is also known as modified version of chemical bath deposition. As it is a chemical method, a large varieties of substrates can be coated. Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration. In this technique thin film is deposited on glass substrate following a chemical technique called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and deionized water. The technique involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case.

Specifications

Model No	HO-TH-03B	HO-TH-03B1
Actuator	Stepper motor	Stepper motor
Drive mechanism	Lead screw	Lead screw
Dip duration	0 - 99 seconds / minutes / hours	0 - 99 seconds / minutes / hours
Number of dips	1 - 999	1 - 999
Hot plate temperature	Ambient to 200°C	Ambient to 200°C
Stirrer speed	0 - 999 rpm	0 - 999 rpm
PC connectivity	Serial port (RS 232)	Serial port (RS 232)
Stroke length	100 mm	100 mm
Power input	230V, 50Hz	230V, 50Hz
Weight (appx.)	130 Kg	130 Kg

Magnetic Stirrer

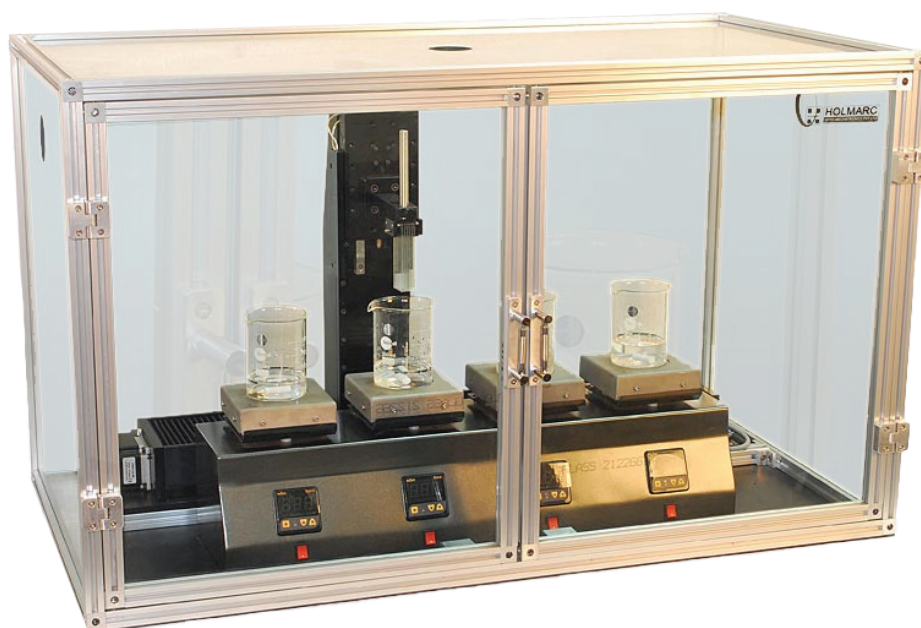
In this model 4 beakers can be used. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. The rotation speed is programmable from 0 - 10 degree/sec.



Other beaker
stirs while
dipping

As dipping
starts, stirring
stops

HO-TH-03B



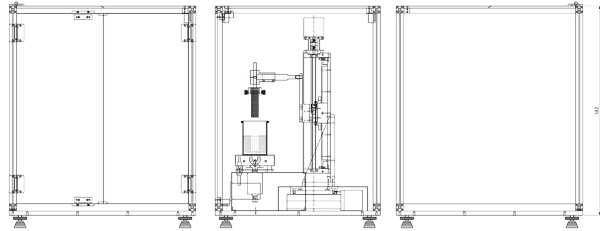
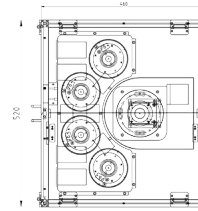
Silar Controller





Magnetic Stirrer

Model HO-TH-03B1 the solution containing beakers are kept on hot plates with magnetic stirrers. The rotation speed of the stirrers can be controlled from 0 - 999 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. Each hot plate can be set at different temperatures. The temperature can be set up to 200°C from ambient.



HO-TH-03B1



HO-TH-03B1

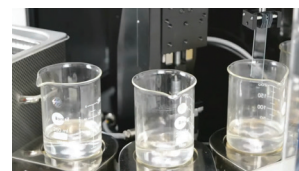
SILAR Coating System with Magnetic Stirrer & Ultrasonic Bath

Model: HO-TH-03C

Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration. In this technique thin film is deposited on glass substrate following a chemical technique called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case. This model has magnetic stirrers which can be used to stir the solution. The rotation speed can be controlled from 1 - 1000 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. Each hot plate can be set at different temperatures. The temperature can be set up to 200°C from ambient. There is a fifth stand in this model for keeping an ultrasonic bath.

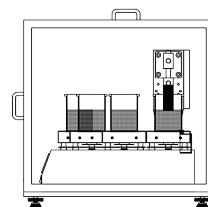
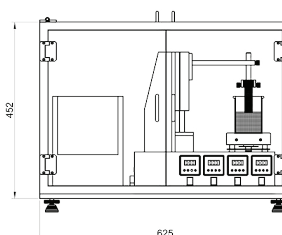
Dip Duration

0 - 99 seconds / minutes / hours



Specifications

Model No	HO-TH-03C
	Magnetic Stirrer & Ultrasonic Bath
Actuator	Stepper motor
Drive mechanism	Lead screw
Dip duration	0 - 99 seconds / minutes / hours
Number of dips	1 - 999
Hot plate temperature	Ambient to 200°C
Stirrer speed	0 - 999 rpm
PC connectivity	Serial port (RS 232)
Stroke length	75 mm
Power input	230V, 50Hz
Weight (appx.)	130 Kg
Air tight chamber	-

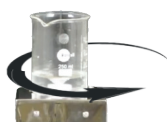
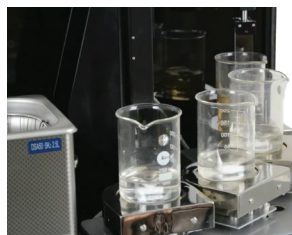


Hot plate temperature

Ambient to 200°C

Magnetic Stirrer

Ambient to 200°C 0 - 999 rpm



Ultrasonic Cleaner



130 Kg



SILAR Coating System with Magnetic Stirrer and Air-tight Chamber

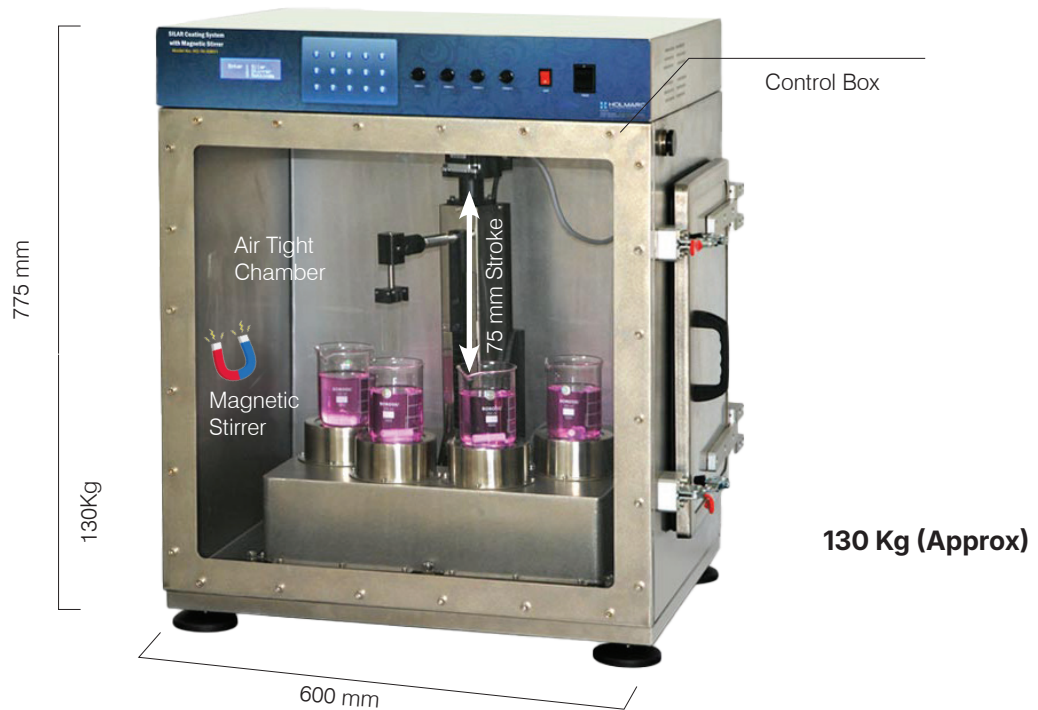
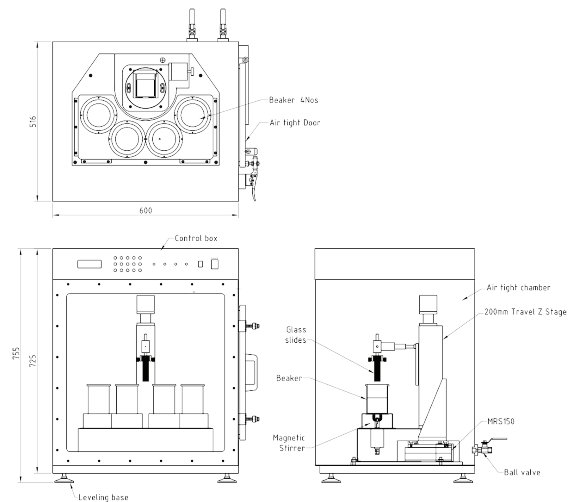
Model: HO-TH-03BV1

Holmarc's SILAR coating system with Magnetic stirrer and Air-tight Chamber (Model No: HO-TH-03BV1) features an air-tight chamber with a service window and an operating window. The unit provides inlet and outlet valves for inert gas purging. This helps to protect samples from moisture or oxygen exposure at the end of the coating process. It provides four separate platforms to place coating solutions each with magnetic stirrer. User can also control the speed of the magnetic stirrer for each beaker independently by using the knobs on the front panel of the controller.



Specifications

Model No	HO-TH-03BV1
	SILAR Coating System with Magnetic Stirrer and Air-tight Chamber
Actuator	Stepper motor
Drive mechanism	Lead screw
Dip duration	0 - 99 seconds / minutes / hours
Number of dips	1 - 999
Hot plate temperature	0 - 999 rpm
Stirrer speed	Serial port (RS 232)
PC connectivity	
Stroke length	75 mm
Power input	230V, 50Hz
Weight (appx.)	130
Air tight chamber	Available



We can provide client designed instruments on special order. For more detail, please contact us

SILAR Coating System for Large Substrate

Model: HO-TH-03F

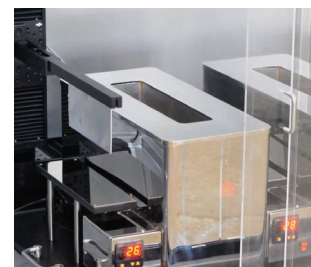
The SILAR Coating System for Large Substrate Model: HO-TH-03F by Holmarc is designed to automate the SILAR (Successive Ionic Layer Adsorption and Reaction) process for coating large substrates. This system ensures precise control over the dipping and rinsing cycles, reducing operator fatigue and minimizing errors associated with manual processes¹. Equipped with features like magnetic stirrers and temperature control, it provides consistent and high-quality coatings, making it an essential tool for advanced material science research and industrial applications

Specifications

Model No	HO-TH-03C
	 
Number of positions for beakers	4
Beaker dimensions (L x B x H)	240 x 40 x 140 mm (Not in the scope of supply)
Hot plates at beaker positions	2 and 4
Temperature range for the hot plate	Ambient to 150°C
Integrated temperature sensors	
Dedicated PID temperature controller for each hot plate	
Sample type	Rectangular glass plate (Not in the scope of supply)
Sample dimensions	240 x 140 x 2 mm
Sample weight	230 g
Actuator	Stepper motor
Drive mechanism	Lead screw
Dip duration	0 - 99 seconds / minutes / hours
Number of dip cycles	1 - 999
User interface	20 x 4 line LCD and push buttons
PC interface	RS232C / USB
Power input	230V 50Hz

Beaker Dimensions

240 x 40 x 140 mm (Not in the scope of supply)



Hot Plates

at beaker positions 2 and 4



This device can be customized as per requirement. Holmarc has developed models where a controlled heater is used for keeping the solution at specified temperature.

Sample Dimensions

240 x 140 x 2 mm
230 g Sample weight



Dip Duration

0 - 99 seconds / minutes / hours

Dip Cycles

1 - 999

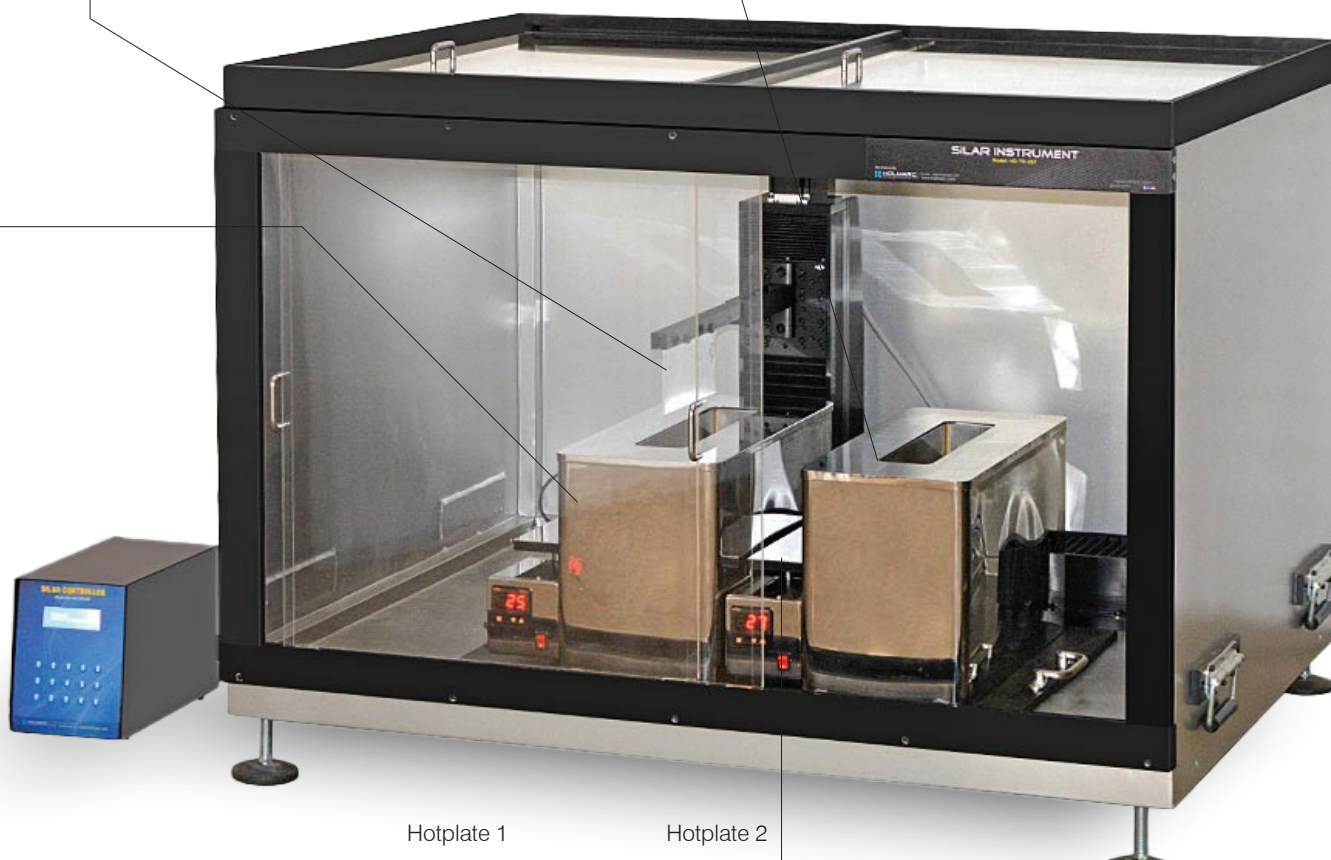
Beaker Positions



4



HO-TH-03F



Hotplate 1

Hotplate 2

SILAR Coating System without heater and Stirrer

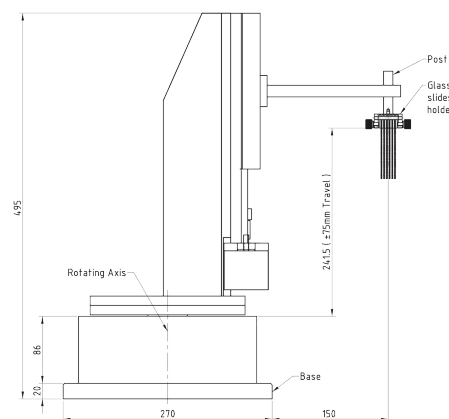
Model: HO-TH-03D, HO-TH-03D1

One of the contemporary method for the deposition of thin film is Successive Ionic Layer Adsorption and Reaction (SILAR) method, which is also known as modified version of chemical bath deposition. As it is a chemical method, a large varieties of substrates can be coated.

Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours. In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration.

In this model 4 beakers can be used. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. The rotation speed is programmable from 0 - 10 degree / sec. In this model there is no heater and stirrer. The process takes place at room temperature.

In this technique thin film is deposited on glass substrate following a chemical technique called successive ion layer adsorption and reaction (SILAR). The technique involves multiple dipping of the substrate in a given solution and deionized water. The technique involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case.



Specifications

	without heater and stirrer	without heater and stirrer
Model No	HO-TH-03D	HO-TH-03D1
		
Mode of Operation	Manual (LCD)	Manual (LCD)
Actuator	Stepper motor	Stepper motor
Drive mechanism	Lead screw	Lead screw
Dip duration	0 - 99 seconds / minutes / hours	0 - 99 seconds / minutes / hours
No. of dips	1 - 999	1 - 999
Power input	230V, 50Hz	230V, 50Hz
PC connectivity	Serial port (RS 232)	Serial port (RS 232)
Stroke length	75 mm	75 mm
No. of position for beakers	4	4
No. of samples could be loaded	5	5
Platform to keep beakers	Not required	Not required
Dip min / max speed	2 microns / sec - 9000 microns / sec	2 microns / sec - 9000 microns / sec
Retrieval min / max speed	2 microns / sec - 9000 microns / sec	2 microns / sec - 9000 microns / sec

Dip min / max speed

2 microns / sec - 9000
microns / sec

Retrieval min / max speed

2 microns / sec - 9000
microns / sec

This device can be customized as per requirement.
Holmarc has developed models where a controlled heater
is used for keeping the solution at specified temperature.

HO-TH-03D1**HO-TH-03D**

Dip Coating Unit

- **Accurate dip-coating thickness control**
- **Uniform coating via servo motor precision**
- **Programmable manual and PC operation**



Dip Coating Unit

Model: HO-TH-01

Holmarc's Dip Coating Unit has been designed in such a manner which minimizes the operator's effort. The variables like speed, duration, etc. are maintained accurately by computer control. Dip-coating process, includes five stages: immersion, start-up, deposition, evaporation and drainage. The coating thickness depends on various parameters like viscosity of the coating solution, immersion time, withdrawal speed, evaporation rate etc. Movements are achieved by a precision servo motor controlled linear stage. Adjustable stroke length and accurate speed control are the exceptional features of this model along with its capability of achieving a uniform coating. This is a compact, bench-top coating unit having structural rigidity and is free from vibrations. A microprocessor based system along with user friendly software takes care of accurate control throughout the process. Speed, traverse and idling duration can be programmed. Both manual mode and PC mode are possible in this equipment. In manual mode a user friendly front panel with keyboard and LCD display is provided to enter all the dipping and drying parameters where as in PC mode entire unit can be controlled by user friendly software. It can store up to 5 programs in manual mode, which are editable during the operation. The system is complete with its mechanics, electronics and software. Customization can be done in order to suit the developing needs of the user.

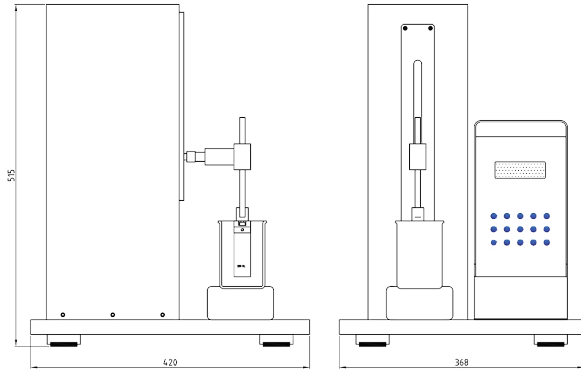
Specifications

Model No	HO-TH-01
Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Available
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)
Stroke length max.	100 mm
Maximum sample size	75 x 75 mm
Maximum load capacity	2 Kg
Drawing speed min.	18 micron / sec
Drawing speed max.	9000 micron / sec
Dimensions (appx.)	200 x 150 x 380 mm
Weight (appx.)	54 Kg

About Dip Coating

Dip coating can be defined as a coating process in which the substrate to be coated is dipped into a tank containing the coating solution and then withdrawn at a well-defined speed in order to obtain a uniform coating. Dip-coating process, includes five stages: immersion, start-up, deposition, evaporation and drainage. The coating thickness depends on various parameters like viscosity of the coating solution, immersion time, withdrawal speed, evaporation rate etc. Dip coating is an industrial coating process which can be used to manufacture bulk products such as coated fabrics and specialized coatings in the biomedical field. Dip coating is commonly used in academic research, where many chemical and nanomaterial engineering research projects use the dip coating technique to create thin film coatings.

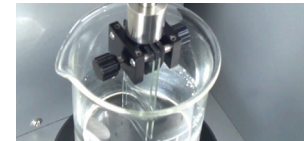




Custom Model HO-TH-01B I

Film formation in dipping is dependent on the viscosity of the fluid. The process is messy and can be highly hazardous. The viscosity of the fluid in a dip tank must remain practically constant if the deposited film quality is to remain high. Dip coating is well suited for high production coating of relatively simple shapes. Transfer efficiency is very high, all contact areas are coated, equipment requirements are low, and the process can be conveyORIZED and automated.

The product shown (HO-TH-01B) here has been developed for specific research applications. It can be customized to suit related research activities in thin film formation. We welcome customization queries. Dip coating is done by immersing a substrate into a tank containing the coating material, removing from the tank, and allowing it to drain. The coated piece can then be dried by force-drying or baking.



Control



Maximum load capacity

2 Kg

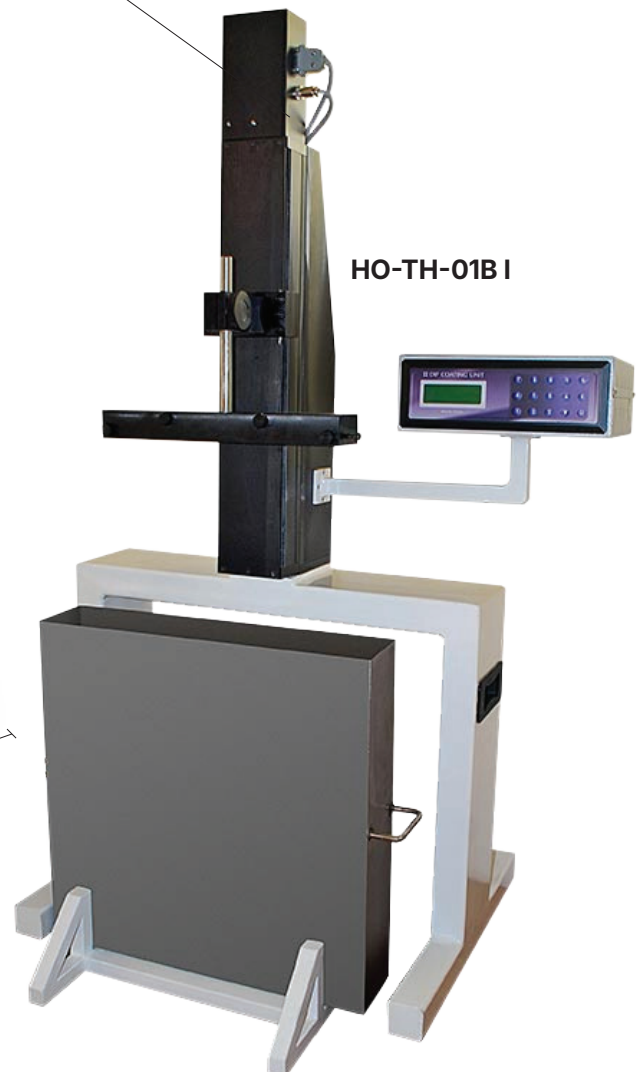
HO-TH-01



Weight (appx.) 54 Kg



HO-TH-01B I



Dip Coating Unit

Model: HO-TH-01BC

Holmarc's Dip Coating Unit has been designed in such a manner which minimizes the operator's effort. The variables like speed, duration, etc. are maintained accurately by computer control. Dip-coating process includes five stages: immersion, start-up, deposition, evaporation and drainage. The coating thickness depends on various parameters like viscosity of the coating solution, immersion time, withdrawal speed, evaporation rate etc.

Movements are achieved by a precision servo motor controlled linear stage. Adjustable stroke length and accurate speed control are the exceptional features of this model along with its capability of achieving a uniform coating. This is a compact, bench-top coating unit having structural rigidity and is free from vibrations.

A microprocessor based system along with user friendly software takes care of accurate control throughout the process. Speed, traverse and idling duration can be programmed. Both manual mode and PC mode are possible in this equipment. In manual mode a user friendly front panel with keyboard and LCD display is provided to enter all the dipping and drying parameters where as in PC mode entire unit can be controlled by user friendly software.

It can store up to 5 programs in manual mode, which are editable during the operation. The system is complete with its mechanics, electronics and software. Customization can be done in order to suit the developing needs of the user.

Specifications

Model	HO-TH-01BC
 	
Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Variable speed control
Stroke length max.	400 mm
Drawing speed min	2 micron / sec
Drawing speed max	16 mm / sec
Load capacity	5 Kg
Maximum substrate size	1 foot x 1 foot x 3 mm
Number of containers	3
Container size	Compatible with 1 x 1 foot, 6 x 4 inch & 10 x 3 inch substrates
User interface	20 x 4 line LCD & push buttons
Program memory	5 Programs (Unlimited in PC mode)
PC connectivity	Serial port (RS 232) & USB
Software	Windows software
Power input	230V / 50Hz

Container size

Compatible with 1 x 1 foot, 6 x 4 inch & 10 x 3 inch substrates



Control Unit

```

Prog:1      Page 1
Start Pos : 10 mm
Dip Length: 90 mm
Dip Speed : 9 mm/s
  
```

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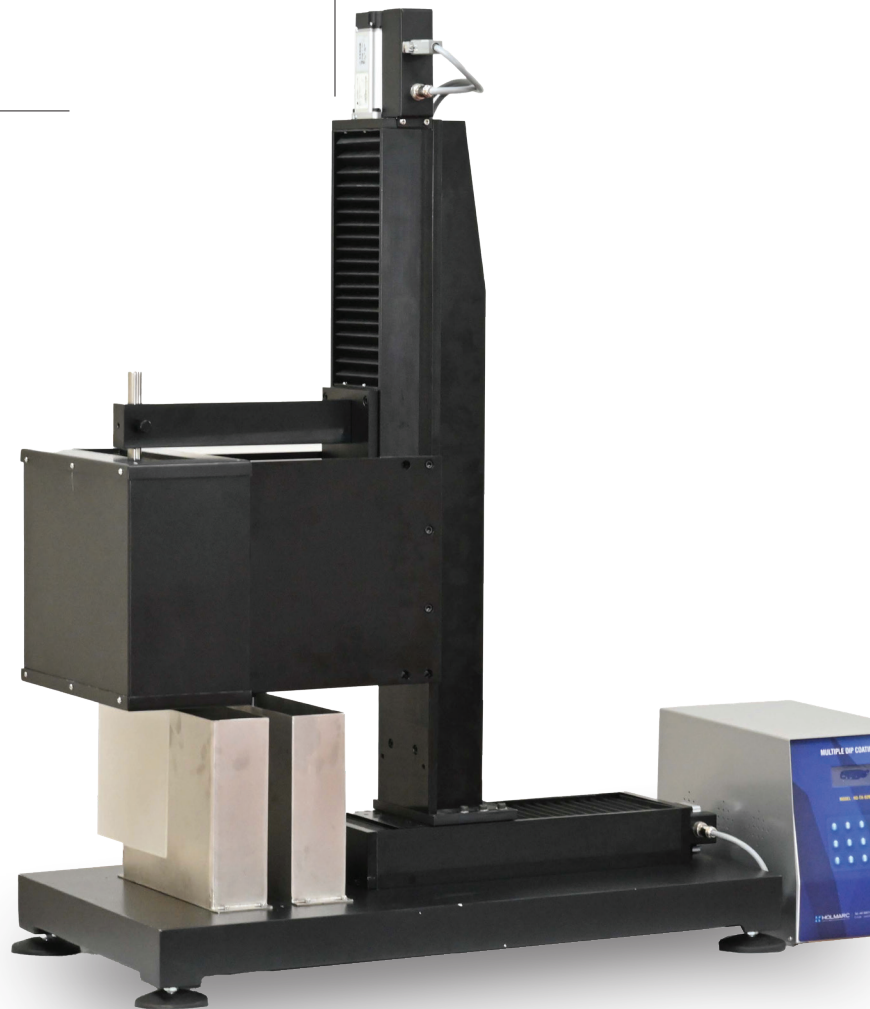
Running 002/005
  
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Max Substrate Size

1 foot x 1 foot x 3 mm

Customized Design for your needsConnect to sales@holmarc.com for
customized dip coating unit**Load Capacity**

5 Kg

Drawing speedMaximum 16 mm / sec
Minimum 2 micron / sec

Dip Coating Unit

Model: HO-TH-02MD

Holmarc's Multiple Dip Coater (Model No: HO-TH-02MD) comes with six beaker holders. The dip-coating solution beakers can be positioned in a circle about a rotating arm of the dip coater. Hence, it is possible to coat different solutions alternatively.

It has been designed to keep operator involvement as minimum as possible so that variables like speed, duration, etc. are maintained accurately by computer or microprocessor controller. Movements are achieved by a precision servo motor controlled stage.

Dip-coating process includes five stages: immersion, start-up, deposition, evaporation and drainage. In the dip coating method, the substrate is slowly dipped into and withdrawn from a tank containing the solution, with a uniform velocity, in order to obtain a uniform coating. This device allows multiple dipping of the substrate in different solutions.

A microprocessor based system along with user friendly software takes care of accurate control throughout the process. Speed, traverse and idling duration can be programmed. The system is complete with mechanics, substrate holder, electronics and software.

Specifications

Model	HO-TH-02MD
-------	------------



Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Available
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)
Stroke length max.	150 mm
Drawing speed	18 micron / sec - 9mm / sec
Dip duration	0 - 99 sec / min / hr
Max. no. of repetitive dips	1 - 999
Maximum load capacity	2 Kg

Container size

150mm Maximum



Drawing Speed

18 micron / sec - 9mm / sec



Dip Duration

0 - 99 sec / min / hr



Maximum Load Capacity

2 Kg

Dips

1-999 Number of Repetitive Dips



Control

```

Prog:  Page 1
Start Pos : 50 mm
Dip Length: 50 mm
Dip Spd B4: 9 mm/s
  
```



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Angle Dependent Dip Coating Unit

Model: HO-TH-ADDC1

Holmarc Angle Dependent Dip Coating unit enables nano layer coating of substrates by dipping them in beakers containing coating solution. The dipping angle can be varied from 0 to 45 degree depending upon the requirement. There are 4 beaker holder provided for coating 4 different substrates. The dipping speed, dip duration, withdrawal speed and dry duration can be varied for each beaker independently.

Basic principle of ADDC: The substrate is drawn out of the coating solution under a well defined angle of inclination. Both surfaces are coated simultaneously resulting in different film thickness on front and back side.

One of the advantage of ADDC is the reduced number of layers or coating steps to obtain the desired thin film properties.

Specifications

Model	HO-TH-ADDC1
 	
Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Available
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)
Stroke length max.	75 mm
Drawing speed min.	18 micron / sec
Drawing speed max.	9000 micron / sec
Dimensions (appx.)	570 x 300 x 475 mm
Program memory	8 Programs
Max. power consumption	800 Watts
Maximum load capacity	2 Kg

Stroke Length

75mm



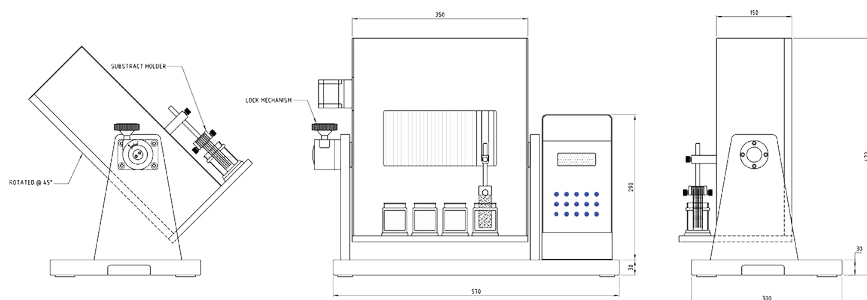
Tilt Angle



Dip



All Motorized with Control Electronics



Load Capacity

2 Kg

Drawing Speed18 micron / second minimum
9000 micron / second maximum**Control**

Prog: Page 1
Start Pos : 0 mm
Dip Length: 75 mm
Dip Spd B3: 9 mm/s



Dip Coating Unit

with Hot Chamber Model: HO-TH-02

with Infrared Dryer Model: HO-TH-02B

In Holmarc's Dip Coating Unit Model:HO-TH-02, the substrate is dipped in the solution and then withdrawn into a heating chamber. Temperature of the chamber can be controlled and fixed up to 75°C from ambient. All other features are same as that of Model: HO-TH-01.

The system has a user friendly front panel with key board and LCD display. It can as well be controlled through a computer. Dip duration, dip speed, baking duration, withdrawal speed etc. are programmable features. Servo motor is used as actuator for vibration free dipping and withdrawal.

The device is designed and manufactured as table top device with entire electronics and servo motor housed in a compact unit. A number of substrate can be held to the holder at the same time. Height of the substrate holder can be adjusted with respect to the level of the solution during the experiment.

Specifications

Dip Coating Unit with Hot Chamber		
Model	HO-TH-02	HO-TH-02B
		
Actuator	Servo motor	Servo motor
Drive mechanism	Lead screw	Lead screw
Speed control	6 step variable speed	Available
Power input	230V, 50Hz	230V, 50Hz
PC connectivity	Serial port (RS 232)	Serial port (RS 232)
Stroke length max.	150 mm	150 mm
Maximum sample size	75 x 50 mm	75 x 50 mm
Drawing speed min.	18 micron / sec	18 micron / sec
Drawing speed max.	9000 micron / sec	9000 micron / sec
Dimensions (appx.)	630 x 348 x 416 mm	630 x 368 x 420 mm
Program memory	5 Programs	8 Programs
Max. Temperature		200° Celsius
Max. Substrate size		75 mm x 25 mm
Maximum load capacity	2 Kg	2 Kg
Max. power consumption	460 Watts	
Weight (appx.)	45 Kg	45 Kg



**with Hot Chamber
Model: HO-TH-02**



IR Heater

An infrared heater is a body with a higher temperature which transfers energy to a body with a lower temperature through electromagnetic radiation. Infrared heaters can be operated in vacuum or atmosphere. Infrared heaters are usually classified by the wavelength bands of infrared emission.

HOLMARC's Dip coating unit with infrared dryer (HO-TH-02B), has a ceramic infrared heat system incorporated with it.

Infrared dryer for precise substrate heating

Ceramic infrared heat system

Ceramic infrared heating elements are used in a diverse range of industrial processes where long wave infrared radiation is required. Their useful wavelength range is 2 - 10 μm .

Ceramic Infrared heating elements emit energy with peak emission wavelengths between 3.3 to 5.7 microns. By design a coil heating element of Nickel-Chromium alloy is embedded in a glazed ceramic body, which gives protection against thermal shock and prevents attack by atmospheric oxygen.

The refractory material has a high emissivity value in the range of 0.96 which approaches the ideal black body conditions required for efficient radiation. As these heaters have high resistance to moisture laden air and corrosive atmosphere, they are ideal for solvent removal, moisture evaporation and use in other adverse conditions.



with Infrared Dryer Model: HO-TH-02B



Infrared Dryer Model

The outstanding feature of this model is the presence of an Infra-Red dryer in it. Inside the unit there is an infrared heater, which offers a maximum temperature of 200°C from ambient. After each dip, the Infrared heater helps in drying the substrate. It provides uniform heating to the substrate. The temperature is swiftly attained so that the time taken for the dipping process is greatly reduced. The coating thickness can be easily controlled by adjusting the withdrawal rate and the viscosity of the coating solution. Another advantage of this model is that it minimizes the energy consumption as the heater will be activated only after detecting the substrate and hence it can provide the substrate with accurate temperature. Dip coating unit with infrared dryer has both manual as well as PC mode. In manual mode a user friendly front panel with keyboard and LCD display is provided to enter all dipping and withdrawal parameters where as in PC mode entire unit can be controlled by user friendly software. It is also possible to save programs for future use.

HOLMARC's Dip Coating Unit with Infrared Dryer (HO-TH-02B) has been designed to keep operator involvement as minimum as possible so that variables like speed, duration, etc. are maintained accurately by microprocessor controller. Movements are achieved by a precision servo motor controlled linear stage that offers vibration and noise free operation. Moreover this model dip coaters are specially designed for lower volume applications. PID Controller is used for optimum heating of the substrate. Apart from other sensors that sense the temperature of the heating chamber as a whole, the infrared sensor gives feedback of the temperature attained by the substrate by monitoring its emissivity. Our Dip coating unit can provide controlled immersion and withdrawal speeds for the substrates at user defined temperature (Max. 200°C) which helps to have a uniform coating. The compact size and sophisticated design of the system make it ideal for research activities and in physics, chemistry and biotechnology labs. We hold expertise in designing and manufacturing custom models depending on the varying needs of the customer.

PC controllable & User friendly software

Dip Coating Unit

with Magnetic Stirrers & Air Tight Chamber

Model: HO-TH-03BC

Holmarc's Dip Coating Unit has been designed in such a manner which minimizes the operator's effort. The variables like speed, duration, etc. are maintained accurately by computer control. Dip-coating process, includes five stages: immersion, start-up, deposition, evaporation and drainage. The coating thickness depends on various parameters like viscosity of the coating solution, immersion time, withdrawal speed, evaporation rate etc.

Movements are achieved by precision servo motor controlled linear stages. Adjustable stroke length and accurate speed control are the exceptional features of this model along with its capability of achieving a uniform coating. This is a compact, bench-top coating unit having structural rigidity and is free from vibrations. A microprocessor based system along with user friendly software takes care of accurate control throughout the process. Speed, traverse and idling duration can be programmed. Both manual mode and PC mode are possible in this equipment. In manual mode a user friendly front panel with keyboard and LCD display is provided to enter all the dipping and drying parameters where as in PC mode entire unit can be controlled by user friendly software.

In the Model HO-TH-03BC the solution containing beakers are kept on hot plates with magnetic stirrers. The rotation speed of the stirrers can be controlled from 0 - 999 rpm. The dipping speed, dip duration, retrieval speed and dry duration can be set for each beaker. Each hot plate can be set at different temperatures. The temperature can be set up to 200°C from ambient. It can store up to 5 programs in manual mode, which are editable during the operation. The system is complete with its mechanics, electronics and software. Customization can be done in order to suit the developing needs of the user.

Specifications



Actuator	Servo motor
Drive mechanism	Ball screw
Dipping travel	300 mm
Horizontal travel	1100 mm
Dip duration	0 - 99 seconds / minutes / hours
Number of dips	1 - 999
Dip / Withdrawal speed	18 micron/s to 9 mm/s
Hot plate temperature	Ambient to 200°C
Hot plate diameter	70 mm
Maximum sample size	300 x 210 x 10 mm (Width x Height x Thickness)
Maximum load capacity	2 Kg
Stirrer speed	0 - 999 rpm
Stirrer capacity	250 ml
Stirrer plate dimensions	350 mm square plate with 70 mm hot plate at the center
PC connectivity	Serial port (RS 232) with USB to Serial adapter
Power input	230V/50Hz
Dimensions	2138 L x 628 x 1074 H (mm)
Construction	Stainless steel
2 side doors	Transparent front window
Chamber lamp, Leveling screws	

Horizontal Travel

300mm



Stirrer

0 - 999 rpm speed
250 ml Capacity



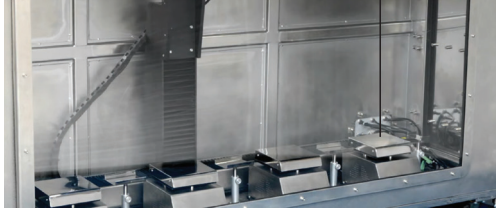
Chamber Lamps

Stainless Steel

Construction

Dips

1-999 Number of Dips
0-66 seconds / minutes / hours



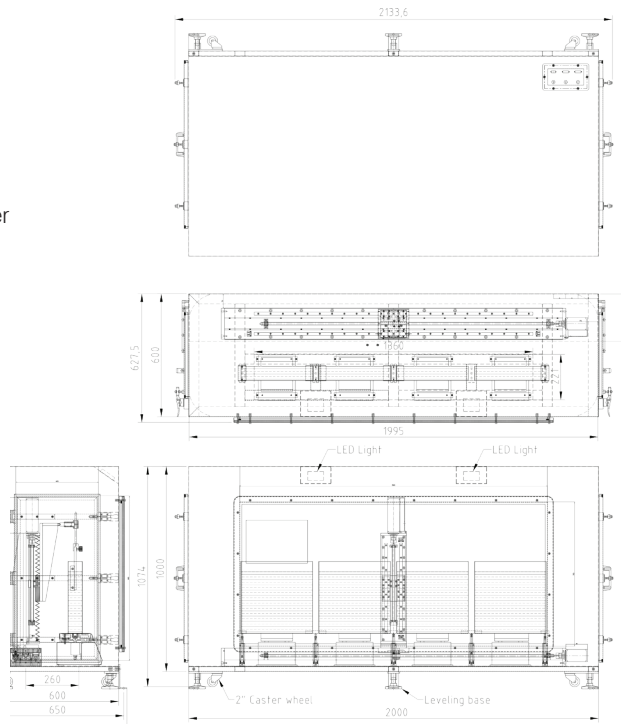
Load Capacity

2 Kg Maximum



Hot Plate

70mm Diameter



Dip Coating Unit

with Blue Light Curing

Model: HO-TH-02C

This model has a blue light (405 nm) LED flood curing chamber to cure the coating after the dip process. The curing light intensity can be programmed from 1% to 100 % in 1% increments. A wait time after the dip, and before the curing, can be programmed. The flood curing chamber is made to prevent light leaking out to the main chamber to protect light sensitive solutions from deterioration. Valves are provided to purge the curing chamber and the main chamber with inert gas. The LEDs are cooled by circulating water through their heat sink. An immersible pump is supplied along with the instrument for this purpose. Sample holders customized according to the sample dimensions, material and shape are available.

Holmarc's Dip Coating Unit has been designed in such a manner which minimizes the operator's effort. The variables like speed, duration, etc. are maintained accurately by computer control. Dip-coating process, includes five stages: immersion, start-up, deposition, evaporation and drainage. The coating thickness depends on various parameters like viscosity of the coating solution, immersion time, withdrawal speed, evaporation rate etc.

Movements are achieved by a precision servo motor controlled linear stage. Adjustable stroke length and accurate speed control are the exceptional features of this model along with its capability of achieving a uniform coating. This is a compact, bench-top coating unit having structural rigidity and is free from vibrations. A microprocessor based system along with user friendly software takes care of accurate control throughout the process. Speed, traverse and idling duration can be programmed. Both manual mode and PC mode are possible in this equipment. In manual mode a user friendly front panel with keyboard and LCD display is provided to enter all the dipping and drying parameters where as in PC mode entire unit can be controlled by user friendly software. It can store up to 5 programs in manual mode, which are editable during the operation. The system is complete with its mechanics, electronics and software. Customization can be done in order to suit the developing needs of the user.

Specifications

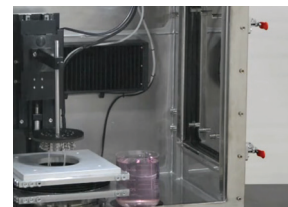
Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Available
Power input	230V, 50Hz
User interface	20 x 4 line LCD and 15 button keyboard (Optional touchscreen display)
PC connectivity	Serial port (RS 232) & USB
Stroke length max.	100 mm
Drawing speed min	18 micron / sec
Drawing speed max.	9000 micron / sec
Curing light wavelength	405 nm
Light source	LED
Light intensity range	1 - 100 %
Wait time (Dip / idle / curing)	0 - 99 sec / min / hour
Number of cycles	1 - 999
Inert gas inlets	Available
Maximum load capacity	2 Kg
Dimensions (appx.)	Sta
Weight (appx.)	85 Kg

Load Capacity

2 Kg

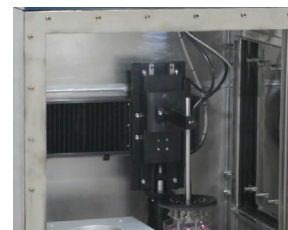
Blue Curing Light

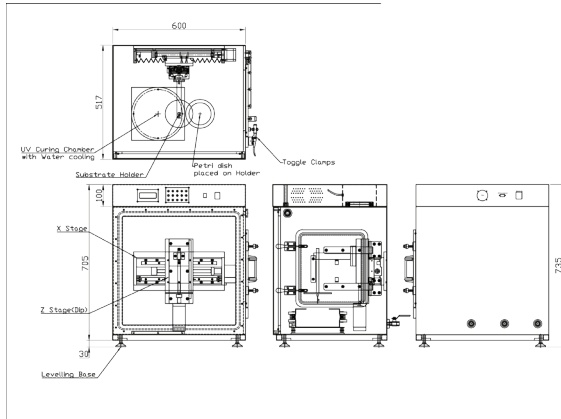
405 nm, LED



Stroke Length

100 mm





Long Travel Dip Coating Unit

Model: HO-TH-12T

Specifications

Actuator	Servo motor
Drive mechanism	Lead screw
Speed control	Available
Power input	230V / 110V 50 / 60Hz
User interface	User friendly key board and LCD display
Stroke length max.	1000 mm
Drawing speed min.	18 micron / sec
Drawing speed max.	9000 micron / sec
Dipping speed	min 30 to max 600 mm/minute
Withdrawal speed	min 30 to max 600 mm/minute
Load Capacity	10 Kg



85 Kg



See a Tutorial



Watch it in Action

Spin Coating Unit

- **Controlled thin film thickness adjustment**
- **Vacuum chuck for secure substrate holding**
- **Programmable spin coating parameters**



Spin Coating Unit

Model: HO-TH-05

Holmarc's Spin Coater, Model no: HO-TH-05 is a dedicated tabletop system to spin coat small substrates in research laboratories with well controlled spin process parameters. The high speed and duration range allows the user to achieve the desired thickness or thinness of the film. The spin head actuator is a precision DC servo motor, which requires less maintenance, with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head. The device has user friendly front panel having keyboard and LCD for programming the spin process. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel. As the program memory is non-volatile, the recorded parameters are not lost in case of any power failure. This model is equipped with a memory of 9 pre-set, editable programs, each having 9 steps. The device is compact and complete with electronics built into the unit within a footprint of 275 x 400 mm. All components in the device are corrosion protected to make it clean room compatible. The spin chamber is constructed in nylon with a diameter of 200mm. A transparent protective covering on top of the chamber makes spin coating a hassle free experience. Three sets of nylon anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 100 x 100 mm square. Solvent drainage and vacuum release facilities are also provided in this device. Holmarc can provide customized models as per requirement.

Optional Accessories

- Digital Pipette for dispensing of liquid into the substrate
- Stand is used for holding manual pipette
- Vacuum adaptor to fix Petri dishes of sizes ranging from 30 mm - 100 mm diameter
- Mechanical clips or locks to hold samples without vacuum

User Interface	24 x 4 Line Alpha-numeric LCD and 16 button keyboard
Actuator	Brushless DC servo motor
Program Memory	9 programs with 9 steps for each program
Speed Profile	Speed, Duration and acceleration
Spin Speed	60 - 9999 RPM
Speed Resolution	1 RPM
Speed Accuracy	+/- 1 %
Acceleration / Deceleration	10 - 2000 rpm / s (Ramp & dwell time can be indirectly set by entering acceleration)
Duration	1 - 99 sec / min / hr for each step
Sample Chucks	3 Nos. (25 mm, 32 mm & 45 mm)
Maximum Sample Diameter	100 mm
Minimum Sample Diameter	13 mm
Bowl Material	Polypropelene
Bowl Size	8 inches
Transparent lid with sample dispensing port	
Drainage hose	
Safety interlock to prevent spinning when the bowl is open	
Sample Holder	PTFE disk with silicon rubber O ring
Sample Mounting	Secured by vacuum holding
Vacuum Connector	8 mm dia Snap-in hose connector
N2 Purge Connector	
Vacuum pump On / Off and release Switch	
Dimension (mm)	400 (L) x 275 (W) x 350 (H)
AC Input	230 V
power consumption	260 W (with vacuum pump)

Vacuum pump Specs - Oil free

Max flow rate	45 lpm
Max vacuum	27 inches Hg
Mac Pressure	60 psig
Power	1/4 hp
Dimensions	300 x 130 x 200 mm



Spin Coating Unit with UV curing system

Model: HO-TH-05C

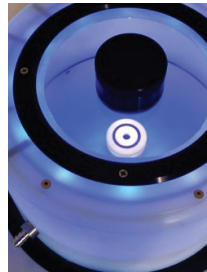
Holmarc's Spin Coating unit, Model no: HO-TH-05C has been designed with many additional features than that of Model: HO-TH-05.

In this model of spin coater, UV LED curing system is used whenever there is a need for curing and drying of coatings. It also provides gases purge facility for additional supply of gases inside the chamber. Vacuum Chucks provide flat, rigid surface for mounting substrates of different sizes and shapes. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head. In-built sample dispensing system (optional accessory) helps to supply volatile solution in milli liter volume. The syringe holder height can be adjusted and rotated freely along the support rod. All required safety measures are provided for high speed rotation and spillage. It also provides facility for drainage.

The system has a user friendly front panel with key board and LCD display. The programs are easy to set up with up to 9 steps per program. All other features are same as that of Model: HO-TH-05. Three sets of nylon anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 100 x 100 mm square.

UV Curing

UV light source	5 mm LED
Number of LEDs	12
Wavelength range	365 - 395 nm
Curing time	1 - 99 sec / min / hr
Automatic in-bowl curing immediately after the spin process	



Spin coating is one of the most common techniques used to deposit uniform thin films to flat substrates. It is used in a wide variety of industries and technology sectors. The advantage of spin coating is its ability to quickly and easily produce very uniform films, ranging from a few nanometers to a few microns in thickness. In this technique, a small amount of coating material is applied on the center of the substrate, which is either spinning at low speed or not spinning at all. The substrate is then rotated at high speed in order to spread the coating material by centrifugal force. Rotation is continued while the fluid spins off the edges of the substrate, until the desired thickness of the film is achieved. The applied solvent is usually volatile, and simultaneously evaporates. So, the higher the angular speed of spinning, the thinner the film. The thickness of the film also depends on the viscosity and concentration of the solution and the solvent.

Spincoating is ubiquitous in organic electronics, nanotechnology, semiconductor industries and other Industrial sectors.

User Interface	24 x 4 Line Alpha-numeric LCD and 16 button keyboard
Actuator	Brushless DC servo motor
Program Memory	9 programs with 9 steps for each program
Speed Profile	Speed, Duration and acceleration
Spin Speed	60 - 9999 RPM
Speed Resolution	1 RPM
Speed Accuracy	+/- 1 %
Acceleration / Deceleration	10 - 2000 rpm / s (Ramp & dwell time can be indirectly set by entering acceleration)
Duration	1 - 99 sec / min / hr for each step
Sample Chucks	3 Nos. (25 mm, 32 mm & 45 mm)
Maximum Sample Diameter	100 mm
Minimum Sample Diameter	13 mm
Bowl Material	Polypropelene
Bowl Size	8 inches
Transparent lid with sample dispensing port	
Drainage hose	
Safety interlock to prevent spinning when the bowl is open	
Sample Holder	PTFE disk with silicon rubber O ring
Sample Mounting	Secured by vacuum holding
Vacuum Connector	8 mm dia Snap-in hose connector
N2 Purge Connector	
Vacuum pump On / Off and release Switch	
Dimension (mm)	400 (L) x 275 (W) x 350 (H)
AC Input	230 V
Maximum power consumption	260 W (with vacuum pump)

Optional Accessories

- Vacuum adaptor to fix Petri dishes of sizes ranging from 30 mm - 100 mm diameter
- Mechanical clips or locks to hold samples without vacuum
- Digital Pipette for dispensing of liquid into the substrate
- Stand used for holding manual pipette



Spin Coating Unit with Integrated Syringe Pump

Model: HO-TH-05S

with Integrated 4 Channel Syringe Pump Model: HO-TH-05TS4

Holmarc's Spin Coating Unit with Integrated Syringe Pump, Model no: HO-TH-05S is a dedicated tabletop system to spin coat small substrates in research laboratories with well controlled spin process parameters. The high speed and duration range allows the user to achieve the desired thickness or thinness of the film. The spin head actuator is a precision DC servo motor, which requires less maintenance, with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head. HO-TH-05S has an integrated syringe pump to dispense precise volume of solution to the substrate automatically at the start of, or during, the spinning process. The pump is connected to the spinning bowl through Silicon tubing. The device has user friendly front panel having keyboard and LCD for programming the spin process. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel. As the program memory is non-volatile, the recorded parameters are not lost in case of any power failure. This model is equipped with a memory of 9 pre-set, editable programs, each having 9 steps. The device is compact and complete with electronics built into the unit within a footprint of 275 x 400 mm. All components in the device are corrosion protected to make it clean room compatible. The spin chamber is constructed in nylon with a diameter of 200mm. A transparent protective covering on top of the chamber makes spin coating a hassle free experience. Three sets of nylon anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 100 x 100 mm square. Solvent drainage and vacuum release facilities are also provided in this device. Holmarc can provide customized models as per requirement.

Applications

Spincoating is ubiquitous in organic electronics, nanotechnology, semiconductor industries and other Industrial sectors.

Spin coating is widely used in microfabrication of functional oxide layers on glass or single crystal substrates using sol-gel precursors, where it can be used to create uniform thin films with Nano scale thicknesses. It is used intensively in photolithography, to deposit layers of photoresist about 1 micrometer thick.

Specifications

HO-TH-05S

HO-TH-05TS4

		
		
Actuator	Brushless DC moto	Brushless DC motor
Spinning speed	60 - 9999 rpm	60 - 9999 rpm
Substrate diameter	30 mm to 70 mm	30 mm to 70 mm
Power input	230V, 50Hz	110V / 220V / 230V, 50Hz / 60Hz
Read out	20 x 4 line LCD	20 x 4 line LCD
Spin chamber	Nylon	Nylon
Acceleration	5 - 2000 rpm / sec	5 - 2000 rpm / sec
Spinning Speed Accuracy	< 5%	< 5%
Programmable parameters	Speed , Acceleration, Dwell time and No. of step	Speed , Acceleration, Dwell time and No. of steps
Maximum no of steps	9	9
Program memory	9 programs (non - volatile)	9 programs (non - volatile)
Dimension	400mm Depth x 275mm W x 500mm H	400mm Depth x 275mm W x 500mm H
Weight (appx.)	34 Kg	46 Kg
Syringe pump dispenser	-	
Dispensing Volume	1 - 999 microliter or ml	1 - 999 microliter or ml
Flow rate	1 - 999 microliter / min or ml / min	1 - 999 microliter / min or ml / min
Duration	1 - 99 sec / min / hr	1 - 99 sec / min / hr
No of Channels	4	Automatic dispensing integrated with spin process

Optional Aecessories

- Digital Pipette for dispensing of liquid into the substrate
- Stand is used for holding manual pipette
- Vacuum adaptor to fix Petri dishes of sizes ranging from 30 mm - 100 mm diameter
- Mechanical clips or locks to hold samples without vacuum

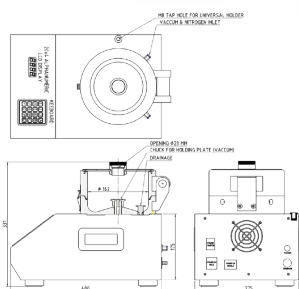
Features

- Chuck diameters : 14mm, 22 mm, 36 mm (Outer diameter of the O ring)
- Transparent Safety Lid over the Working Chamber
- Non-volatile Program Memory
- User friendly design
- Back Panel Power On / Off Switch
- Inlet and outlet for Inert Gas Purging, 6mm tubing



Watch Product Tutorial

HO-TH-05TS4



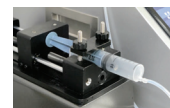
Nylon Chuck

14mm, 22 mm, 36 mm



4 Channel Syringe Pump

Automatic dispensing integrated with spin process at Dispensing Volume 1 - 999 microliter or ml

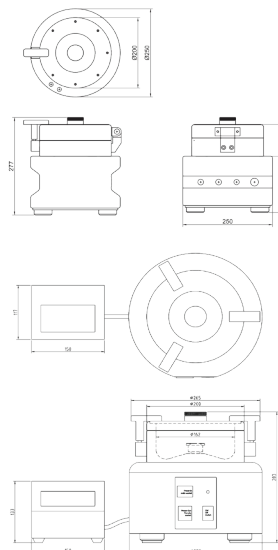


HO-TH-05S

Spin Coating Unit

Glove Box Compatible

Holmarc's Spin Coater compatible with glove box, Model no: HO-TH-05G is a dedicated system suitable for use inside glove box to spin coat small substrates in research laboratories with well controlled spin process parameters. This model offers separate controller which has user friendly front panel having keyboard and LCD for programming the spin process. The user can, hence operate the spin coater in the remote location. Start and Stop switches are provided near the spinning chamber to initiate the spinning process within glove box without removing user's hands from the gloves. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel of the controller. The spin head actuator is a precision DC servo motor with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head. Three sets of nylon anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 100 x 100 mm square. The nylon made spin chamber is compact within a footprint of 296 x 266 mm and easy to install into the glove box. A transparent cover on top of the chamber protects the surroundings by keeping the spin off solution inside. All components in the device are corrosion protected to make it clean glove box compatible.



Specifications	HO-TH-05G	HO-TH-05GV
User Interface	20 x 4 line alphanumeric LCD and 16 button keyboard	5 inch Touchscreen Display
Material of Construction	Epoxy coated mild steel cover with polypropylene bowl	Polypropelene (Full body, including spinner bowl) Glovebox compatible, Detachable display unit
Actuator	Brushless DC servo motor	Brushless DC servo motor
Program Memory	9 programs with 9 steps for each program	Infinite number of programs with 10 steps for each program
Speed Profile	Speed, Duration and acceleration	Speed, Duration and acceleration
Spin Speed	10 - 10000 RPM	60 - 9999 RPM
Speed Resolution	1 RPM	1 RPM
Speed Accuracy	+/- 1 %	1 RPM
Acceleration / Deceleration	5 - 2000 rpm / s (Ramp & dwell time can be indirectly set by entering acceleration)	10 - 2000 rpm/s (Ramp and dwell time can be indirectly set by entering acceleration)
Duration	1 - 10000 sec for each step	1 - 99 sec / min / hour for each step
Sample Chucks	3 Nos. (10 mm, 22 mm & 35 mm)	3 Nos. (25 mm, 32 mm & 45 mm)
Maximum Sample Diameter	100 mm	100 mm
Minimum Sample Diameter	10 mm	13 mm
Bowl Material	Polypropylene	Polypropylene
Bowl Size	8 inches	8 inches
Lid Type	Lid with transparent window and sample dispensing port	Transparent lid with sample dispensing port
Drainage hose	Included	Included
Safety Interlock	Safety interlock to prevent spinning when the bowl is open	Safety interlock to prevent spinning when the bowl is open
Sample Holder	PTFE disk with silicon rubber O ring	PTFE disk with silicon rubber O ring
Sample Mounting	Secured by vacuum holding	Secured by vacuum holding
Vacuum Connector	8 mm dia Snap-in hose connector	8 mm dia Snap-in hose connector N2 Purge Connector
Vacuum Pump Control	Vacuum pump On / Off and release Switch	Vacuum pump On / Off and release Switch
electrical feed connectors	1 (KF40 compatible)	Sold Separately
Spin Chamber Dimensions (mm)	250 x 277 (Dia x H)	250 x 277 (Dia x H)
Power Input (Factory set)	Power Input (Factory set)	230 V AC Input
Maximum power consumption	260 W (with vacuum pump)	260W (With vacuum pump)
Dimensions		274 mm diameter (No display unit), 277 mm Height
Main Body Dimensions		273 x 283 mm (Diameter x Height)
Display Unit Dimensions		150 x 117 x 133 mm (W x D x H)

Spin Coating Unit with Polypropylene body

Holmarc's Spin Coater, Model no: HO-TH-05GV is a dedicated tabletop system to spin coat small substrates in research laboratories with well controlled spin process parameters. The high speed and duration range allows the user to achieve the desired thickness or thinness of the film. The spin head actuator is a precision DC servo motor, which requires less maintenance, with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head.

The device has user friendly front panel having 5 inch touchscreen LCD for programming the spin process. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel. As the program memory is non-volatile, the recorded parameters are not lost in case of any power failure. This model is equipped with a memory for unlimited number of pre-set, editable programs, each having 10 steps.

Features

- Full Polypropylene body
- Glovebox compatible
- Chuck diameters : 14 mm, 22 mm, 36 mm (Outer diameter of the O ring)
- Transparent Safety Lid over the Working Chamber
- Unlimited Program Memory
- User friendly touchscreen interface
- Inlet and outlet for Inert Gas Purging, 6 mm tubing

HO-TH-05GV



Features

- Chuck diameters : 14mm, 22 mm, 36 mm (Outer diameter of the O ring)
- Transparent Safety Lid over the Working Chamber
- Non-volatile Program Memory
- User friendly design



HO-TH-05S



Vacuum Pump

Oil free	
Max flow rate	45 lpm
Max vacuum	27 inches Hg
Mac Pressure	60 psig
Power	1/4 hp
Dimensions	300 x 130 x 200 mm

Optional Accessories

- Vacuum adaptor to fix Petri dishes of sizes ranging from 30 mm - 100 mm diameter
- Mechanical clips or locks to hold samples without vacuum
- Digital Pipette for dispensing of liquid into the substrate
- Stand used for holding manual pipette

Spin Coating Unit

Larger version Model HO-TH-05LS

Holmarc's Spin Coater, Model: HO-TH-05LS, is a dedicated tabletop system to spin coat substrates up to 150 mm (6 inch) diameter, with well controlled spin process parameters in a research laboratory. The high speed and duration range allow the user to achieve the desired thickness or thinness of the film. The spin head actuator is a precision DC servo motor, which is maintenance free, with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head.

The device has user friendly front panel having keyboard and LCD for programming the spin process. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel. As the program memory is non-volatile, the recorded parameters are not lost in case of any power failure. This model is equipped with a memory of 9 pre-set, editable programs, each having 9 steps.

The device is compact and complete with electronics built into the unit within a footprint of 600 x 400 mm, excluding the vacuum pump. All components in the device are corrosion protected to make it clean room compatible. The spin chamber is constructed in nylon with an internal diameter of 245 mm. A transparent protective covering on top of the chamber makes spin coating a hassle free experience. Three sets of PTFE anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 150 x 150 mm square. Solvent drainage and vacuum release facilities are also provided in this device. Holmarc can provide customized models as per requirement.

Specifications

User Interface	20 x 4 line LCD
Actuator	Brushless DC servo motor
Program Memory	9 programs (non - volatile)
Speed Profile	Speed, Duration and Acceleration
Spin Speed	60 - 8000 RPM
Speed Resolution	1 RPM
Speed Accuracy	+/- 1 %
Acceleration / Deceleration	5 - 2000 rpm / s (Depending on the chuck size)
Duration	1 - 99 sec / min / hour for each step
Sample Chucks	5 Nos. (15 mm, 25 mm, 50 mm, 75mm & 100 mm)
Maximum Sample Diameter	150 mm
Minimum Sample Diameter	15 mm
Bowl Material	Polypropylene (PP)
Lid with transparent window and sample dispensing port	
Safety interlock to prevent spinning when the bowl is open	
Sample Holder	PTFE disk with silicon rubber O ring
Sample Mounting	Secured by vacuum holding
Vacuum Connector	8 mm dia Snap-in hose connector
Solvent drainage and vacuum release facilities	
Nitrogen / Inert Gas Inlet	
Vacuum pump On / Off and Release Switches	
Power Input (Factory set)	230V/50Hz or 110V/50Hz
Maximum Power Consumption	350W (With vacuum pump)
Dimensions	537 x 573 x 425 mm (W x D x H)

Applications

- Spincoating is ubiquitous in organic electronics, nanotechnology, semiconductor industries and other Industrial sectors.
- Spin coating is widely used in microfabrication of functional oxide layers on glass or single crystal substrates using sol-gel precursors, where it can be used to create uniform thin films with Nano scale thicknesses. It is used intensively in photolithography, to deposit layers of photoresist about 1 micrometer thick.

Features

- Chuck diameters : 15mm, 25 mm, 50 mm, 75mm & 100 mm
- Transparent Safety Lid over the Working Chamber
- Non-volatile Program Memory
- User friendly design
- Inlet and outlet for Inert Gas Purging, 6mm tubing



Speed

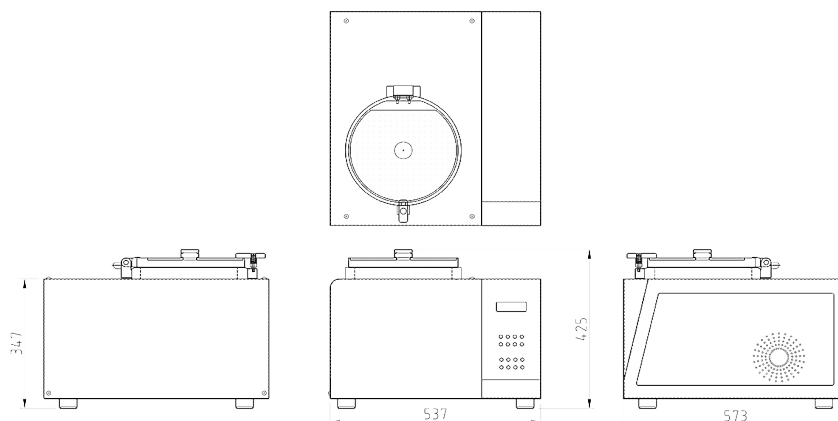
60 - 8000 RPM

**Acceleration /
Deceleration**

5 - 2000 rpm / s

Duration

1 - 99 sec / min / hour

**Transparent Safety Lid****HO-TH-05LS****Control**

Prog:1	Step:4
Speed	:4000 rpm
Accl/Decl	:400rpm/s
Duration	:15 sec

Sample Diameter

15-150mm(max)

Chuk

5 Nos.
15mm, 25 mm, 50
mm, 75mm & 100 mm



Bench Top Rubbing Machine

- **Liquid crystal molecule orientation**
- **Precise substrate height adjustment**
- **Programmable spindle speed control**



Bench Top Rubbing Machine

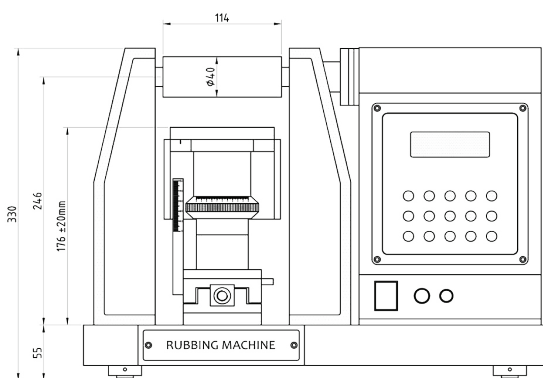
Model: HO-IAD-BTR-01

Rubbing Machine has been developed for LCD R & D Labs. The system is intended for tracing grooves on the polyimide to orient the liquid crystal molecules. The grooves are made using a special rubbing cloth having depth of a few Angstrom. The substrate is held by a vacuum chuck for which a vacuum pump is included and integrated with the system. Maximum size of glass substrate which can be loaded is 100 mm x 100mm. The substrate along with vacuum chuck is held on a rotation stage so that it can be rotated and positioned at any required angle from 0 to 180 degrees for various rubbing orientations.

The system has been developed as a standalone unit in which speed of the roller and speed of the substrate can be varied.

Rubbing machine is developed in technical collaboration with Professor Surajit Dhara, School of Physics, University of Hyderabad.

his personal website : www.surajitdhara.in



Programmable Features

- Movement range for the substrate
- Speed of movement (substrate stage)
- No. of repetitions / Duration of operation

HO-IAD-BTR-01

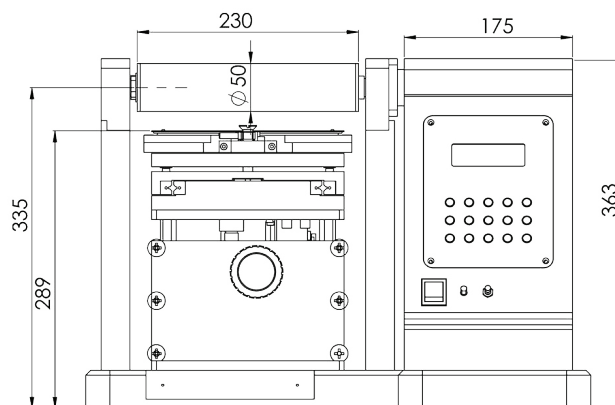


Substrate holder	a) Motorized linear stage for substrate movement	
	b) Actuated by stepper motor	
	c) Travel	80 mm
	d) Minimum speed	0.05 mm / sec
	Maximum speed	9 mm / sec
	e) Maximum size of movable substrate plate	100 mm x 100 mm
Rubbing wheel actuator	f) Substrate fixed on a rotation stage which can be rotated +/- 45 degree	
	Brushless DC motor with speed control	
	Maximum speed	3000 rpm
	Minimum speed	0 rpm
Display of speed on LCD screen		
Speed control of the spindle by a knob		
Input		
The System can be used in standalone model		
Substrate holding		
Vacuum pump		
Rubbing cloth		

Bench Top Rubbing Machine

Model: HO-IAD-BTR-02

Rubbing Machine has been developed for LCD R&D Labs. The system is intended for tracing grooves on the polyimide to orient the liquid crystal molecules. The grooves are made using a special rubbing cloth having depth of a few Angstrom. The substrate is held by a vacuum chuck for which a vacuum pump is included and integrated with the system. Maximum size of glass substrate which can be loaded in Model: HO-IAD-BTR-02 is 200mm diameter. The substrate along with vacuum chuck is held on a rotation stage so that it can be rotated and positioned at any required angle in the range of ± 45 degrees for various rubbing orientations. The system has been developed as a standalone unit in which speed of the spindle and speed of the substrate can be varied.



HO-IAD-BTR-02



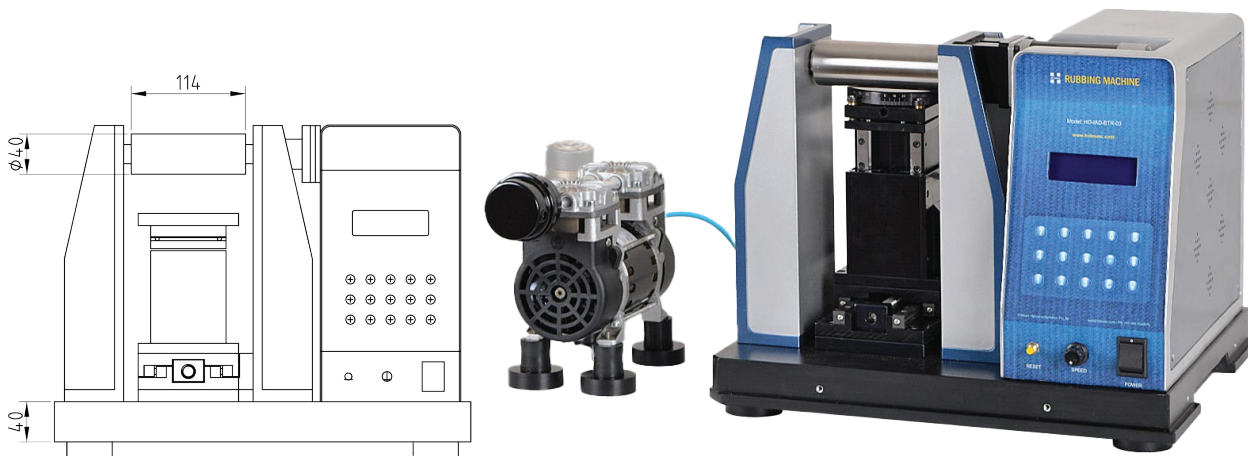
Substrate holder	a) Motorized linear stage for substrate movement
	b) Actuated by stepper motor
	c) Travel 300 mm
	d) Minimum speed 0.05 mm / sec
	Maximum speed 6 mm / sec
	e) Maximum size of movable substrate plate 200 mm Dia.
Rubbing wheel actuator	f) Substrate fixed on a rotation stage which can be rotated +/- 45 degree
	Brushless DC motor with speed control
	Maximum speed 3000 rpm
	Minimum speed 0 rpm
Display of speed on LCD screen	
Speed control of the spindle by a knob	
Input	230 VAC
The System can be used in standalone model	
Substrate holding	By vacuum (Vacuum pump included)
Vacuum pump	Oil free
Rubbing cloth	Velvet (Not included)

Bench Top Rubbing Machine

Model: HO-IAD-BTR-03

Holmarc Bench top rubbing machine is a compact dedicated machine specially designed for LCD and LCoS R&D Labs. The system is intended for tracing grooves on polyimide surface to orient the liquid crystal molecules. Rubbing Machine, HO-IAD-BTR-03 has been developed with additional features than that of models HO-IAD-BTR-01 & HO-IAD-BTR-02. In this model, the height of the substrate can be varied using a motorized vertical stage. A precise vertical height adjustment in the order of micrometers is possible. It is customized in such a way that, the horizontal stage will be motorized in up and down direction. It will move down when one roll is over and the stage comes back to its initial position for next roll. Hence, rubbing in single direction can be achieved. The substrate movement in linear or vertical is possible at a time.

The substrate along with vacuum chuck is held on a rotation stage so that it can be rotated and positioned at any required angle from ± 45 degrees for various rubbing orientations. The substrate can be held either by vacuum or can be mounted on to the additional plate provided with the machine using M4 screws. Maximum size of substrate which can be loaded is 100 mm x 100mm. The system has been developed as a standalone unit in which speed and direction of the spindle can be varied. The spindle speed can be controlled from 0 to 3000 rpm

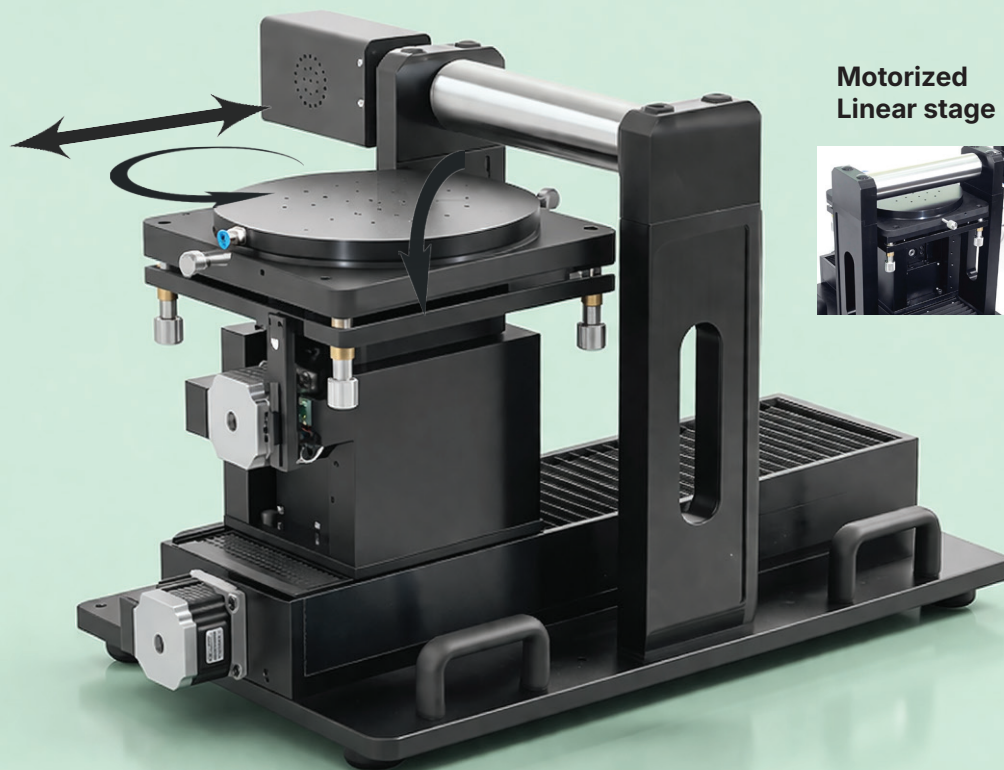


HO-IAD-BTR-03



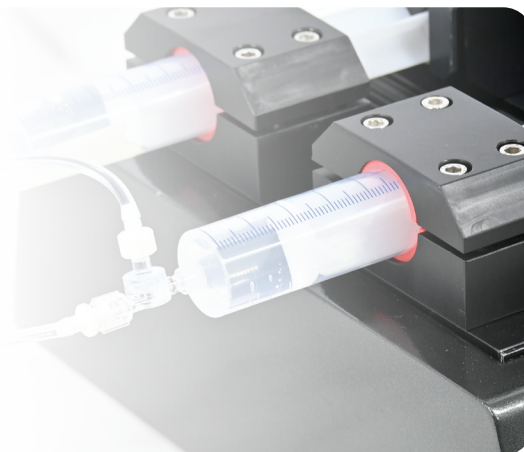
Power Input	230 V AC (110 V AC - optional)	
Linear Stage	a) Actuator	Stepper motor
	b) Travel	100 mm
	c) Speed control	0.05 - 10 mm / sec
Vertical Stage	a) Blank (+) dist	99 steps [1 step = 10 μ m]
	b) Blank (-) dist	99 mm
Spindle	a) Actuator	Brushless DC motor
	b) Speed control	0 - 3000 rpm
Substrate holding	By vacuum (Vacuum pump included)	
Vacuum pump type	Oil free	
Rubbing cloth	Velvet (Not included)	

MODEL HO-IAD-BTR-02M



Syringe Pump

- **Syringe pumps are widely used in medical field as well as in laboratory and research fields.**
- **Applications of syringe pumps includes electro spinning, electro spraying, micro dialysis, dispensing / dilution, organ / tissue perfusion and fluid circulation.**



A syringe pump is a device which can either infuse or withdraw liquid samples / fluids, at user defined flow rates and with selectable target volumes. Syringe pumps with simultaneous infusion and withdrawal with opposing syringes on a single drive, are also available.

- Syringe pumps are widely used in medical field as well as in laboratory and research fields.
- Applications of syringe pumps includes electro spinning, electro spraying, micro dialysis, dispensing / dilution, organ / tissue perfusion and fluid circulation.
- Syringe pumps are also useful in microfluidic applications, such as micro reactor design and testing, and in chemistry for slow incorporation of a fixed volume of fluid into a solution.

SPLF Series

Holmarc's SPLF series syringe pumps are versatile products ideal for precise dispensing of fluids in laboratory experiments, available at an economical price. Our bench-top Syringe Pump has been designed for safe and ultra-smooth fluid flow for lab applications and can be easily set up inside a standard fume cupboard. Holmarc manufactures syringe pumps in various models for single syringes, two syringes, four syringes and ten syringes. These pumps can operate with standard off the shelf syringes in plastic, glass and stainless steel. The dispensing rates / flow rates possible with this device are very wide in range and can vary from 15.63 μ l/hr to 36.2ml/min, depending on the size of syringe used. The unit has built in electronics with keyboard and display for programming the operational attributes to work in standalone mode. This series of pump shows all the pertinent, real-time information on the LCD display. The Information displayed includes flow rate and total time remaining. Computer interfacing is also possible whenever required with RS 232C serial integrated into the control electronics of the system. This model supports dispensing as well as withdrawal. Powerful drive motors and innovative design have been combined with software control to deliver ultra-smooth and steady flow rates. Apart from all these, this device can be customized as per requirement.

SPLF 2D Series

This model can accept two different size syringes which varies from 5 ml to 60 ml. Any type of syringes can be used in the unit including glass, plastic or stainless steel. This pump is ideal for more complex multi-step reactions and has multi-mode operation including infusion only or withdrawal only. A piston holder is provided in order to bring the piston back to home position. In our dual syringe model no: SPLF 2D, two syringes can operate independently with different flow parameters. This device can store up to 5 programs which can be reviewed or changed during operation. The front panel display allows the user to see all of the pump's operating parameters to ensure proper operation during the experiments. Syringe size and flow rate are easily displayed, as well as the time remaining.

SPLF SPLF H

In SPLF-H series pumps, temperature control of the syringe is possible. A glass syringe equipped with heating coil is provided along with this device. The temperature of the solution in the syringe is controllable up to 60°C from ambient. This heating option is available in various models with single syringe, two syringes, four syringes and ten syringes

Syringe	Standard off the shelf syringes, 5ml to 60 ml, any manufacturer
Flow rate range	15.63 μ l / hr to 36.2 ml / min
	Actual volume may vary depends on syringe size & manufacturer
Temp. control	60°C (in selected models)



High Pressure Syringe Pump

HO-SPLF-1-P60

(Syringe pump which can support 60 bar back pressure)

Independently Controlled High Pressure Four Channel Syringe Pump With Continuous Flow

Model HO-SPLF-4D-P60-C, HO-SPLF-2D-P60

This model can work with high back pressures up to 60 bar. It has four independent channels which can be operated simultaneously or sequentially at different flow rates. It also comes with two dual pump tubing kits which facilitates continuous flow of two different liquids from two reservoirs at different flow rates..



Model	HO-SPLF-2D-P60	HO-SPLF-4D-P60-C
Number of Syringe Holders	2	4
Maximum back pressure	60 bar	
Number of independently controlled channels		2
	Sequential flow mode	5 milliliter to 60 milliliter
		Continuous flow mode of operation
Syringe size	20 ml & 60 ml	
Drive mechanism	Microprocessor controlled stepper motor 1/16 microstepping, driving a leadscrew	Pusher advance per microstep (1/16 step)
Pusher advance per microstep (1/16 step)	0.3125 micron	0.3125 micron
Volume per microstep (1/16) with 20ml syringe	0.089 μ l	0.089 μ l
Max stepping rate	10000 step / sec	10000 step/sec
Min step rate	1 step / 6 secs	1 step / 6 secs
Linear Travel Rate		
Min	0.1875 mm / hr	0.1875 mm/hr
Max	18 cm / min	18 cm/min
Flowrate range	55 μ l/hr to 37 ml/min (20 ml syringe)	55 μ l/hr to 37 ml/min (20 ml syringe)
Nominal linear force	20 kg	80 kg
Maximum back pressure		60 bar
User interface	20 x 4 line LCD with numerical keypad & PC Software	20x4 line LCD with numerical keypad & PC Software
PC interface	RS232 (Serial Port)	RS232 (Serial Port)
Number of programs (Stand alone mode)	5 (Standalone mode)	5
Number of programs (PC mode)	Unlimited (PC mode)	Unlimited
Number of steps		5
Controllable parameters		
Flow rate	55 μ l/hr to 37 ml/min (20 ml syringe)	55 μ l/hr to 37 ml/min (20 ml syringe)
Syringe Diameter	10mm to 27mm	10mm to 27mm
Duration	1 second to 18 hours	1 second to 18 hours
Target Volume	0.1ml to 60ml	0.1 μ l to 60ml

Model No	Item	Temperature control (room temp.)	No: of Syringes
HO-SPLF 1	Single Syringe Pump	-	One
HO-SPLF 1H	Single Syringe Pump with temperature control	60° C	One
HO-SPLF 2	Dual Syringe Pump		Two
HO-SPLF 2H	Dual Syringe Pump with temperature control	60° C	Two
HO-SPLF 4	Four Syringe Pump		Four
HO-SPLF 4H	Four Syringe Pump with temperature control	60° C	Four
HO-SPLF 10	Ten Syringe Pump		Ten
HO-SPLF 10H	Ten Syringe Pump with temperature control	60° C	Ten
HO-SPLF 2D	Independently controlled Dual Syringe Pump		Two
HO-SPLF 2DH	Independently controlled Dual Syringe Pump with Temperature control	60° C	Two
HO-SPLF 4D	Independently controlled Four Syringe Pump		Four

Features :

- Smooth and continuous mode of operation
- Automatic dispensing of small volumes
- Better flow performance
- Easy to configure
- Vibration and noise free working
- Choice of unit selection for flow rate & Duration / Target volume
- RS-232 interface for computerizing
- Constant delivery of fluids
- Can accommodate Multi-size syringes
- Compatible with glass, plastic and SS syringes
- Front panel with keyboard and display for programming
- Non-volatile memory of all parameters and programming
- Unparalleled ease of use

In Built syringe table

Dispensing accuracy of +/- 1 %

Standard Minimum and Maximum Flow Rates

Flow rate will vary depending on the syringe size :

Syringe size	Diameter*	Minimum	Maximum
5 ml	10.3 mm	15.63 µl/hr	634 ml/hr
10 ml	14.57 mm	31.27 µl/hr	1270 ml/hr
20 ml	19.05 mm	53.45 µl/hr	2171 ml/hr
30 ml	21.59 mm	68.65 µl/hr	2789 ml/hr
50 ml	28.9 mm	123.0 µl/hr	4998 ml/hr
60 ml	26.6 mm	104.2 µl/hr	4234 ml/hr

Syringes from different manufacturers can have slightly different limits.

Note: *This is a reference diameter used to calculate the flow rate. The specific diameter should be entered for your syringe type.

Manual Micro Syringe Pump

Model No: HO-MM-SP-01 / HO-MM-SP-02

Manual micro syringe pump is a convenient instrument for controlled dispensing or withdrawal of fluids. It provides economical method for any application requiring injecting / withdrawing a calibrated volume under manual control. It can be employed in applications like chromatography, micro injections etc.

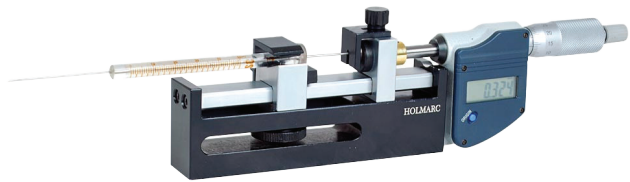
- For injecting and withdrawing precise fluid volumes
- Compatible with glass, plastic or stainless steel syringes
- Micrometer driven mechanism
- Delivers precise fluid volumes

Two models are available. One with graduated micrometer having 10micron resolution and the other with digital micrometer having one micron resolution. Digital micrometer provides convenient digital readings in microns. The resolution of the injection volume depends on the syringe used and resolution of micrometer.

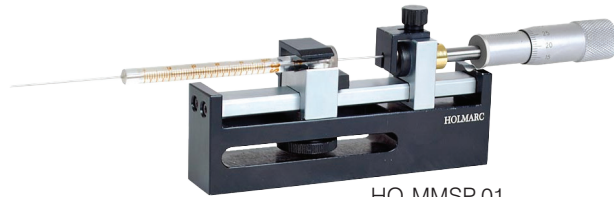


Two models are available. One with graduated micrometer having 10micron resolution and the other with digital micrometer having one micron resolution. Digital micrometer provides convenient digital readings in microns. The resolution of the injection volume depends on the syringe used and resolution of micrometer.

Model No	HO-MMSP-01	HO-MMSP-02
Micrometer drive range	25 mm	25 mm
Linear resolution	10 μ	01 μ
Volume Resolution		
10 μ l syringe	0.0018 μ l / div	0.0018 μ l / div
25 μ l syringe	0.00416 μ l / div	0.00416 μ l / div
50 μ l syringe	0.012 μ l / div	0.012 μ l / div
100 μ l syringe	0.0167 μ l / div	0.0167 μ l / div
250 μ l syringe	0.0417 μ l / div	0.0417 μ l / div
500 μ l syringe	0.0833 μ l / div	0.0833 μ l / div



HO-MMSP-02



HO-MMSP-01

Electrospinning Syringe Pump

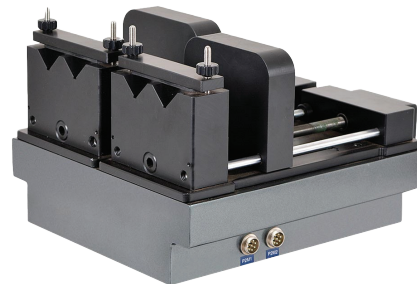
Syringe pump provided for Nano fiber electrospinning unit can withstand high voltages. This is possible due to the non conducting material used for its construction. They isolate the syringe pump inner electronic circuits from the high voltage external environment. Nano fiber electrospinning Syringe pump can withstand voltages as high as 30KV.

Holmarc's SPLF-ES series syringe pumps are versatile and cost effective products for precise dispensing of fluids in laboratory experiments. The pump can operate with standard off the shelf syringes in plastic, glass and stainless steel. The dispensing rates / flow rates possible with the device are very wide in range and can vary from 2.8 micro-l/hr to 19ml/min.

The unit has built in electronics with keyboard and display for programming the operational attributes to work in standalone mode. Computer interfacing is also possible when ever required with RS 232C serial in tegrated into the control electronics of the system.

Holmarc manufactures syringe pumps in various models for single syringes, two syringes, four syringes and ten syringes as described in the chart below. In our dual syringe model no: SPLF-ES 2D, two syringes can operate independently with different flow parameters.

Model	Item	No: of Syringes
HO-SPLF-ES 1	Single Syringe Pump	One
HO-SPLF-ES 2	Dual Syringe Pump	Two
HO-SPLF-ES 4	Four Syringe Pump	Four
HO-SPLF-ES 10	Ten Syringe Pump	Ten
HO-SPLF-ES 2D	Independently controlled Dual Syringe Pump	Two
HO-SPLF-ES 4D	Independently controlled Dual Syringe Pump	2 Sets



Syringe pump with height adjustment

HO-SPLF-1VM

This syringe pump comes with a motorized translation stage, for applications where pump has to be moved in a linear axis. The angle bracket provided can be used for mounding the stage vertically on an optical table. The height can be adjusted using the software, in a range of 300 mm.

The syringe pump is a single channel model with temperature control. Holmarc can supply other models of syringe pumps also in this configuration.



Basic Specifications	Single channel syringe pump with height & temperature control	
	Number of Syringe Holders	1 No.
	Syringe temperature control range	Ambient to 80 Degree Celsius
	Syringe size	5 ml to 60 ml
	Drive mechanism	Microprocessor controlled stepper motor 1 / 16 microstepping, driving a lead screw
	Pusher advance per micro step	0.3125 micron (1/16 step)
	Maximum step rate	10000 step / sec
	Minimum step rate	1 step / 6 secs
	Linear Travel Rate Min.	0.1875 mm / hr
	Linear Travel Rate Max.	18 cm / min
	Nominal linear force	20 kg
	Illumination Diameter	50 mm
	User interface	PC software
	PC software	Unlimited
	Number of steps	5
Controllable parameters	Flow rate (10 ml syringe)	32 μ l / hr to 20 ml / min
	Syringe Diameter	10 mm to 27 mm
	Duration	1 second to 18 hours
	Target Volume (10 ml syringe)	1 μ l to 10ml
	Pump height	0 to 300 mm (At 1 mm resolution)
Syringe specifications (Quantity - 2 Nos.)	Volume	10 ml
	Material	Glass
		Luer tip (Luer slip)
		Needle dimensions (2 types of needles are supplied)
		a) ID 0.51 mm, OD 0.82 mm - 1 No b) ID: 1.36 mm, OD: 1.65 mm - 1 No.

Notes:

1. The syringe pump is directly mounted on to the vertical stage, pointing downwards.
2. The needle is connected directly to the syringe without tubing.
3. The size of the needles may or may not be suitable to produce the droplets of required size.
4. No front panel or LCD interface. Only PC software interface is available.

Motorized vertical stage for mounting the syringe pump

	Model	RCMTS-125-300
	Travel	300 mm
	Position setting through PC software	
	Maximum speed	16 mm / sec
	Positioning accuracy	20 micron
	Angle bracket for mounting the vertical stage to the base plate	
	Base plate dimensions	500 x 500 mm
	Base plate material	Aluminium

Motorized Translation Stages



RCMTS-125 series stages are designed to carry heavy loads, yet to move and position precisely. Recirculating type ball bearing linear ways are used as guides. Drive is provided by a combination of ball screw and stepper motor



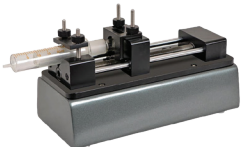
Single Channel OEM Syringe Pump

Model: HO-SPLF-1DC

This model will not work from a 230V wall socket. DC power supply of 24V 4A is required.

This model does not have a front panel interface. PC, PLC or an external circuit with RS232 interface is required for operation.



	Basic Specefications			
	Number of Syringe Holders	1		
	Syringe size	5 ml to 60 ml		
	Drive mechanism	Microprocessor controlled stepper motor 1/16 microstepping, driving a leadscrew		
	Pusher advance per microstep (1/16 step)	0.3125 micron		
	Volume per microstep (1/16) with 20ml syringe	0.089 μ l		
	Max stepping rate	10000 step/sec		
	Min step rate	1 step / 6 secs		
	Linear Travel Rate	Min - 0.1875 mm / hr, Max - 18 cm / min		
	Flowrate range	55 μ l / hr to 37 ml / min (20 ml syringe)		
	Nominal linear force	20 Kg		
	PC interface	RS232 (Serial Port)		
	Power input	24V DC / 4A		
Software features				
	Compatible with	Windows 7 / 8 / 10 / 11		
	Number of programs	Unlimited		
	Number of steps	5 Steps		
Controllable parameters	Flow rate	55 μ l / hr to 37 ml / min (20 ml syringe)		
	Syringe Diameter	10mm to 27mm		
	Duration	1 second to 18 hours		
	Target Volume	0.1 μ l to 60ml		
	Programmable with RS232C commands using user developed software			
	Standard Minimum and Maximum Flow Rates			
	size	Diameter	Min	Max
	5 ml	10.3 mm	15.63 μ l / hr	634 ml / hr
	10 ml	14.57 mm	31.27 μ l / hr	1270 ml / hr
	20 ml	19.05 mm	53.45 μ l / hr	2171 ml / hr
	30 ml	21.59 mm	68.65 μ l / hr	2789 ml / hr
	50 ml	21.59 mm	123.0 μ l / hr	4998 ml / hr
	60 ml	26.6 mm	104.2 μ l / hr	4234 ml / hr

Syringes from different manufacturers can have slightly different limits.

Note: * This is a reference diameter used to calculate the flow rate. The specific diameter should be entered for your syringe type.

10 Syringe

Model: HO-SPLF-10



Hot Plates and Magnetic Stirrer

- **Spray pyrolysis experiments**
- **Semiconductor wafer inspection**
- **Surface annealing processes**



Digital Magnetic Stirrer

Model: HO-MS-01

Holmarc's Digital Magnetic Stirrer is a state of the art device that provides an extra degree of precision for your applications in research and other activities. A magnetic stirrer is a laboratory device that employs a rotating magnetic field to cause a stir bar immersed in a liquid to spin very quickly, thus stirring it. It is an essential tool for research labs.

Holmarc' Digital Magnetic Stirrer combines stylish design and functionality in a compact device. Its user friendly keyboard and LCD display can be used to input required programs and parameters. The unit boasts inbuilt software with capabilities of storing multiple programs. The microprocessor controlled unit makes for smooth and silent operation. We can input the required speeds on the digital consol and view instantaneous changes on the display. Speeds up to 1500 rpm are possible in this manner.



Specifications	Capacity (Water)	1 Litre
	Speed range	200 - 1500 rpm
	Speed stability	+/- 2 rpm
	3 stirring bars of different sizes	
	User interface	20 x 4 line alphanumeric LCD & 4 button keyboard
	Real time display of speed	
	9 program non-volatile memory	
	9 steps for each program	
	Different values for speed & duration for each step	
	Operating ambient temperature	5 - 40°C
	Input voltage	230V 50Hz
Customized Stirring Systems	On request we can provide temperature control unit and multiple point stirrers having different stirring positions,individual dimensions and stirring point distances. All of our products can be customized for your special needs. Customization is our business, our competence and our passion	
Multiple Point Stirrers	Multiple Point Stirrers are available designed for chemical, biotechnology and medical applications of all kinds. All of our stirrers are developed for the hard daily lab use and uncompromising continuous operation.	
Features	Compact and User friendly device, Fully digital console with LCD and keyboard Microprocessor controlled operation, Maximum rpm of 1500, Multiple programs with multiple steps with independent durations	



Digital Magnetic Stirrer with Hot Plate

Model: HO-MS-02

Holmarc Digital Magnetic Stirrer with hot plate combines stylish design and functionality in a compact device. Its user friendly keyboard and LCD display can be used to input required programs and parameters. The unit boasts inbuilt software with capabilities of storing multiple programs. The microprocessor controlled unit makes for smooth and silent operation. We can input the required speeds on the digital console and view instantaneous changes on the display. Speeds up to 1500 rpm are possible in this manner. This model also incorporates heating platform for place the beaker. It comes with accurate heating control and temperatures up to 200°C.

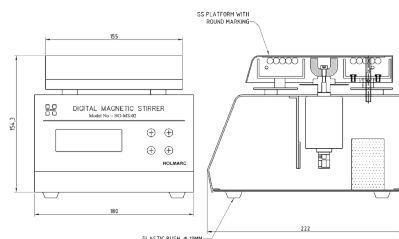
Holmarc's Digital Magnetic Stirrer is a state of the art device that provides an extra degree of precision for your applications in research and other activities.

A magnetic stirrer is a laboratory device that employs a rotating magnetic field to cause a stir bar immersed in a liquid to spin very quickly, thus stirring it. It is an essential tool for research labs.



Specifications 	Capacity (Water)	1 Litre
	Speed range	200 - 1500 rpm
	Speed stability	+/- 2 rpm
	Temperature range	Ambient temperature to 200°C
	Heating rate (1 liter Water)	12°C / min
	Temperature sensor	PT 100
	Temperature control	Microprocessor based PID control
	Temperature control accuracy	+/- 1°C
	Connection for external temperature sensor (Optional)	K type Thermocouple
	Hot plate material	Stainless steel
	3 stirring bars of different sizes	
	User interface	20 x 4 line alphanumeric LCD & 4 button keyboard
	Real time display of speed & temperature	
	9 program non-volatile memory	
	9 steps for each program	
	Different values for speed, temperature & duration for each step	
	Operating ambient temperature	5 - 40°C
	Input voltage	230V 50Hz
	Dimensions	180 x 155 x 222 mm (W x H x D)
Customized Stirring Systems	On request we can provide temperature control unit and multiple point stirrers having different stirring positions, individual dimensions and stirring point distances. All of our products can be customized for your special needs. Customization is our business, our competence and our passion	
Multiple Point Stirrers	Multiple Point Stirrers are available designed for chemical, biotechnology and medical applications of all kinds. All of our stirrers are developed for the hard daily lab use and uncompromising continuous operation.	
Features	• Compact and User friendly device • Fully digital console with LCD and keyboard • Microprocessor controlled operation • Maximum rpm of 1500 • Multiple programs with multiple steps with independent durations • Heating platform - 200°C (different models are available)	

Drawings



Hot Plate

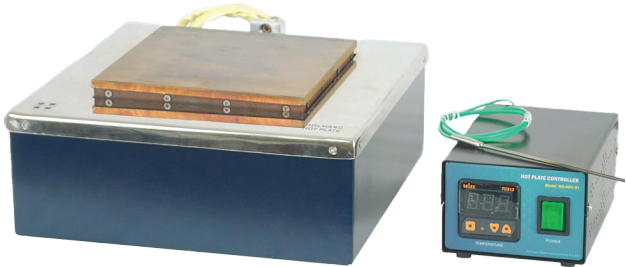
Model: HO-HPC-01, 02

Holmarc's HO-HPC-01, 02series hot plate is a versatile instrument equipped with high uniformity heaters controlled with an accurate digital thermostat to assure even heating across the entire surface of the hot plate. The controller, which is placed remotely (can be placed within 1 meter from plate) facilitates microprocessor-controlled feedback which maintains consistent, repeatable temperature settings which is ideal for repetitive procedures.

The heating surface is made of high quality Stainless steel (316 L grade) which is machined smooth and flat and it contains Nichrome heating coil. The hot plate surface is resistant to spillage and corrosion. Our hot plate features an operating temperature up to 500°C from ambient with good uniformity across the plate surface. K type thermocouple temperature sensor is included in the Hot plate for accurate temperature measurements.

Holmarc's HO-HPC-01, 02 series hot plates are portable, tabletop models and areavailable in two plate dimensions: 250 x 250 mm & 150 x 150 mm. Depending on the region of use, two power options are also available for the Hotplate; 110 V & 220V AC.

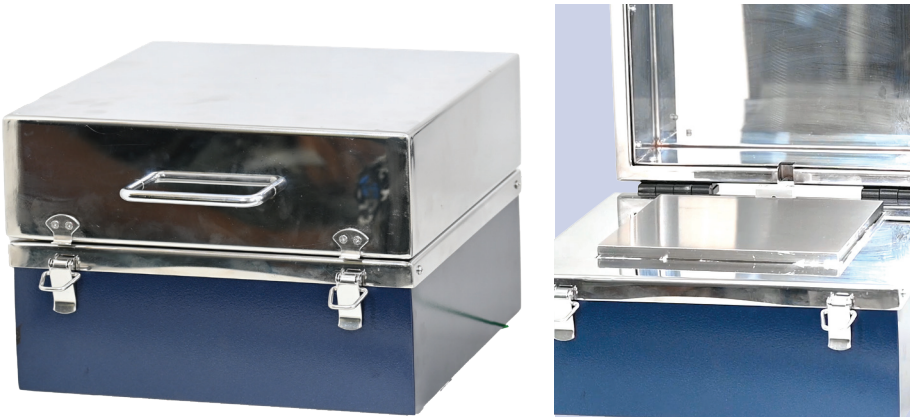
Hot plate find application in the field of spraypyrolysis, in electronics industry, probing, characterization inspection and failure analysis of semiconductor wafers and chips, surface annealing, metal disposition, baking and in chemical laboratories.



Model No	HO-HPC-01	HO-HPC-02
Temperature range	Ambient to 500°C	Ambient to 500°C
Controller	PID temperature controller with solid state relay	
Sensor	K type Thermocouple (Built-in, with the controller)	
Hot plate material	Stainless Steel	Stainless Steel
Hot plate dimensions	150 x 150mm	250 x 250mm
Overall dimensions	325 x 285 x 164mm (without the controller	425 x 385 x 115mm (without the controller)

Stainless Steel cover (Optional)

Optional Stainless Steel cover for reduced heat loss, faster temperature rise, more uniform heating across the sample volume and slower evaporation for liquid samples.



Hot Plate with XYZ Positioner

Model: HO-HPX-01

Holmarc's HO-HPX-01 hot plate comes with micrometer driven position control in X, Y and Z axes. It also has manual inclination control. It is a versatile instrument equipped with high uniformity heater controlled with an accurate digital thermostat to assure even heating across the entire surface of the hot plate.

The heating surface is made of high quality Stainless steel (316 L grade) which is machined smooth and flat and it contains Nichrome heating coil. The hot plate surface is resistant to spillage and corrosion. Our hot plate features an operating temperature up to 200°C from ambient with good uniformity across the plate surface. PT100 temperature sensor is included in the Hot plate for accurate temperature measurements.

Depending on the region of use, two power options are also available for the Hotplate; 110 V & 220V AC.

Hot plate find application in electronics industry, probing, characterization inspection and failure analysis of semiconductor wafers and chips, surface annealing, metal disposition, baking and in chemical laboratories.



Specifications	Inclination	+/- 60 Degree
	X Travel	25 mm
	Y Travel	25 mm
	Z Travel	25 mm
	Drive	Micrometer
	Temperature range	Ambient to 200°C
	Controller	PID temperature controller with solid state relay
	Sensor	PT100 temperature sensor
	Hot plate material	Stainless Steel
	Hot plate dimensions	77 x 55 mm
	Overall dimensions	320 x 295 x 380 mm (without the controller)

controller



The controller, which is placed remotely (can be placed within 1 meter from plate) facilitates microprocessor-controlled feedback which maintains consistent, repeatable temperature settings which is ideal for repetitive procedures.

Mini Sample Heater

Model: HO-HET Series

It is a resistive heating system consists of separate, easily exchangeable resistive heaters which are loaded on a heater holder with power contacts and thermocouple. Samples are clamped onto the heater using special adaptor. It can be used with confocal laser Raman, Micro thermal imaging camera system etc. Special holders can be provided on request.

Model No	HO-HET-2048	HO-HET-RT20
Temperature range	200 to 480°C	RT to 200°C
Power	200W Max	50W Max
Sample size	5 x 5 mm Max.	5 x 5 mm Max.
Sample fixation	Clamping	Clamping
Temperature readout	Thermocouple	Thermocouple
Input Voltage	230 V / 50 Hz	230 V / 50 Hz
Temperature control electronics include PID controller and power sup		

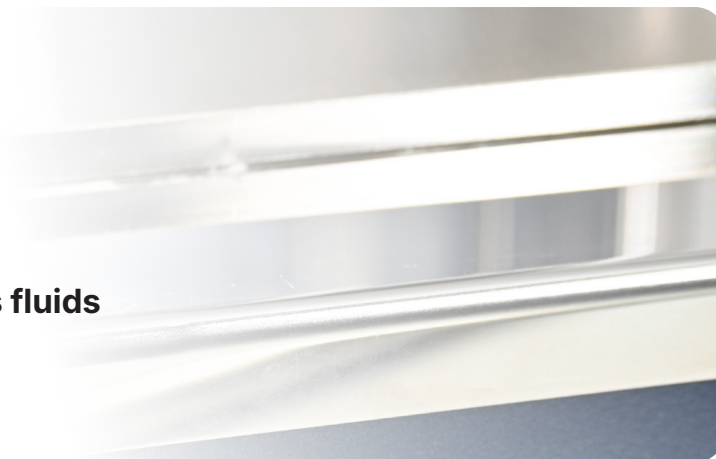


Peristaltic Pump

Dispensing and filling liquids

Accurate dosing and sampling

Transferring corrosive or viscous fluids



Model: HO-LS-PP Series

Holmarc offers wide range of peristaltic pumps for dispensing, filling, dosing, sampling and transferring applications. The advantage of using peristaltic pump is that no contamination will occur to the fluid or to the pump. To use a different fluid, all you need to do is to change the tubing used to pump the fluid. The flow rate will be accurate and there will not be any reverse flow or back flow. Our equipment is ideal to use with corrosive or viscous liquids. Instant start or stop and reverse facility are available in our standard model.

Peristaltic pump from Holmarc are driven by heavy duty stepper motors along with the micro stepping drives. Drive and control electronics are assembled in compact housing along with the pump mechanism.

Front panel of the device is provided with the LCD and keyboard for programming the flow parameters. Replacement mechanism for flow tube is made as user friendly as possible. The device is handy compact and portable and work silently. Holmarc peristaltic pumps are inexpensive to maintain and are easy to install and operate. Peristaltic pumps do not contaminate fluids as none of the pump components comes in contact with the fluids other than the tube. Holmarc's peristaltic pumps are inexpensive to maintain and are easy to install and operate.

Specifications



Model	HO-LS-PP-01
Flow rates	0.5 to 5 ml / min
Flow factor	0.01 to 9.99
Accuracy	+/- 2
Speed	0.2 to 5 rpm
Motor	Stepper Motor
Remote	Stop / Start
Power supply	220 - 240v 50/60 Hz supply
User Interface	20 x 4 Line LCD & 4 Keys Keyboard
Tubing	Platinum cured Silicone tubing
Tube length	50 cm (Longer tube can be purchased at additional cost)

Multi channel peristaltic pump

Model	Item
HO-LS-PP-01	Single channel
HO-LS-PP-02	Two channel
HO-LS-PP-04	Four channel
HO-LS-PP-06	Six channel

Peristaltic pump employs a contamination - free pumping mechanism. The pumps can be effectively used for many biological research activities. It can pump abrasive, highly corrosive, viscous, high density liquids. We can customize the design as per required flow rate, number of channels, tube diameters etc.. The peristaltic pump is characterized by a special combination of fluid handling mechanism and design flexibility for multichannel applications. It is sometimes important in research laboratories and production plants to move several fluid channels simultaneously. Controlling multiple channels together can be a must for many applications. Varying the speed of the motor will at once vary the flow in all channels.



Independently Controlled 4 Channel Peristaltic Pump

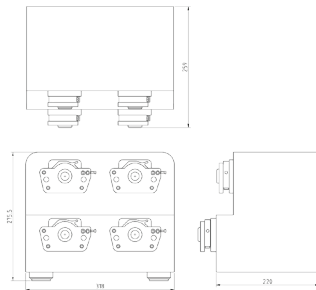
Model: HO-LS-PP-M01

Holmarc offers wide range of peristaltic pumps for dispensing, filling, dosing, sampling and transferring applications. The advantage of using peristaltic pump is that no contamination will occur to the fluid or to the pump. To use a different fluid, all you need to do is to change the tubing used to pump the fluid. The flow rate will be accurate and there will not be any reverse flow or back flow. Our equipment is ideal to use with corrosive or viscous liquids. Instant start or stop and reverse facility are available in our standard model.

Peristaltic pump from Holmarc are driven by heavy duty stepper motors along with the micro stepping drives. Drive and control electronics are assembled in compact housing along with the pump mechanism. Front panel of the device is provided with the LCD and keyboard for programming the flow parameters. Replacement mechanism for flow tube is made as user friendly as possible. The device is handy compact and portable and work silently. Holmarc peristaltic pumps are inexpensive to maintain and are easy to install and operate. Peristaltic pumps do not contaminate fluids as none of the pump components comes in contact with the fluids other than the tube. Holmarc's peristaltic pumps are inexpensive to maintain and are easy to install and operate. Each pump can run in any sequence with delay in between. And this sequence can be repeated multiple times

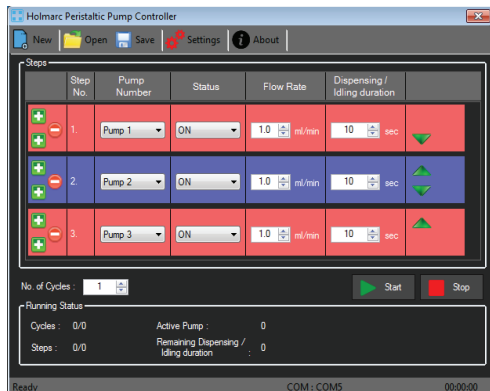


Specifications



Flow rates	0.5 to 5 ml / min
Flow rate resolution	0.1 ml / min
Flow factor	0.01 to 9.99
Accuracy	+/- 2 %
Speed	0.2 to 5 rpm
Motor	Stepper Motor
Power supply	220 - 240v 50/60 Hz supply
User Interface	PC Mode
Tubing	Platinum cured Silicone tubing
Tube length	50 cm (Longer tube can be purchased at additional cost)
Dimensions	318 x 259 x 275 mm (W x D x H)

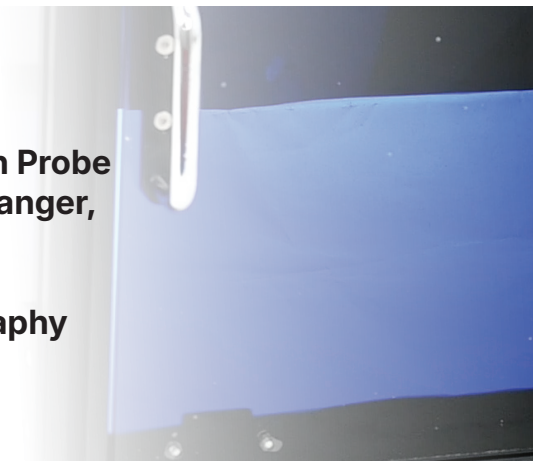
Features



- Single slit
- Contamination free pumping
- No reverse flow or back flow
- Accurate and repeatable flow rate
- Instant start or stop facility
- Complete isolation of pumped fluid
- Ergonomic design, Ease to use
- Almost maintenance free
- Clear, easily read LCD illuminated display
- Stepper Motor used for driving the system

Other Equipment

- **UV Curing Lamp**
- **Doctor Blade Thin Film Applicator**
- **Load Cell Display Unit, Magnetic Detection Probe**
- **Lock-in Amplifier, Thermocycler, Ion Exchanger,**
- **Universal Testing Machine**
- **Vacuum Oven and Ion Exchanger**
- **UV Laser Writing System for Photolithography**
- **4 Tesla Electromagnet - Magnet Lab**



UV Curing Lamp

Model: HO-UVLS-365

The HO-UVLS-365 UV Curing Lamp is a compact, efficient, and reliable UV LED curing solution designed for laboratory, industrial, and R&D applications. Operating at a 365 nm wavelength, it is ideal for curing UV-sensitive adhesives, coatings, inks, and resins that require precise and uniform UV exposure. Equipped with three high-efficiency UV LEDs, each rated at 2.4 W electrical power, the lamp delivers stable and consistent UV output while maintaining low heat generation and long operational life. The LED-based design ensures instant ON/OFF operation, energy efficiency, and minimal maintenance compared to traditional UV lamps.

The system features a protective enclosure for safe operation and a built-in power supply, allowing simple plug-and-play use with standard 230 V, 50 Hz AC mains. The exposure area of 200 × 200 mm makes it suitable for curing medium-sized samples uniformly. For enhanced process control, the lamp offers: Adjustable distance between the UV source and the sample, enabling optimization of curing intensity Front-panel intensity control knob, allowing easy adjustment of UV output to match material and process requirements With its robust construction, user-friendly controls, and precise UV performance, the HO-UVLS-365 is a dependable solution for controlled UV curing applications in laboratories, workshops, and small-scale production environments.



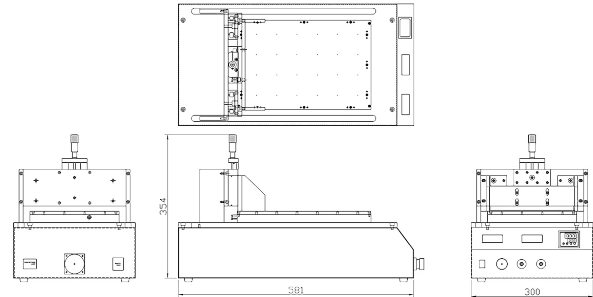
Type	LED
Number of LEDs	3
LED Electrical Power	2.4W each
Maximum optical power	6 mW/cm2
Built-in power supply	
Protective enclosure	
Area of exposure	200x200 mm
Adjustable distance between the source and the sample	
Intensity adjustable using front panel knob	
Power input	230V 50Hz

Doctor Blade Thin Film Applicator

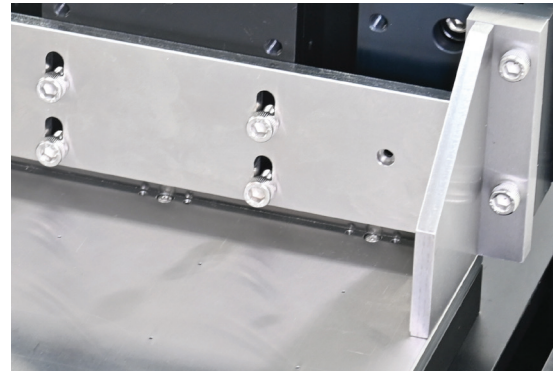
Model: HO-DB-01

Doctor blade thin film applicator is a tool and a technique used to apply a thin, uniform layer of liquid or slurry material onto a substrate. It's a relatively simple yet versatile method widely employed in various laboratory and industrial settings for creating coatings and thin films.

It has a stainless steel hot plate with vacuum holding to place the substrate. The temperature is set using a digital PID controller on the front panel. The thickness of the film is set by adjusting the distance between the substrate and the doctor blade using a micrometer. The slurry can be poured on to the substrate and the blade is moved horizontally, at the press of a button, using a built-in motorized translation stage. The speed and travel are set using front panel knobs and these values are displayed using LED displays.



Coating area	290 x 210 mm
Speed	0 - 16 mm/s
Blade gap	0.01 to 5 mm
Gap adjustment	Micrometer
Linear movement	Motorized
Base material	SS-304
Blade material	SS-304
Vacuum chuck to hold the substrate	
Vacuum pump included	
Heater temperature range	Ambient to 100 Degree Celsius
Speed control	Through front panel knob
Speed display	7 segment LED
Travel control	Through front panel knob
Travel display	7 segment LED
Power supply input	230V 50Hz
Maximum power consumption	50W (Without heater) / 800W (With heater) / 1600W (With heater and vacuum pump)



Load Cell Display Unit

Model: HO-LDU Series

The load cell display unit is a precise instrument made to accurately measure and display weight. For a number of industrial and scientific applications, it ensures accurate weight readings by converting mechanical weight into electrical signals. We have two different models, HO-LDU-20N and HO-LDU-5KN.

A 230V power supply and a crisp two-line, 16-character LCD display are features of both models. Strain gauge technology is used in these units. The load cell slightly deforms when force is applied, and this change is converted into an electrical signal that enables precise measurements. They are perfect for uses in material handling, logistics, manufacturing, and quality control where precise weight measurements are essential for effectiveness and security.

Specifications HO-LDU-20N HO-LDU-5KN



Specifications	HO-LDU-20N	HO-LDU-5KN
Display	Digital display of force	Digital display of force
Maximum measurable force	20 N	5000 N
Fine resolution	0.1 N	1 N
Maximum error	+/- 2 %	+/- 2 %
Calibration	Factory calibrated	Factory calibrated
Mounting	Can be mounted onto a beam using a built-in hook	Can be mounted onto a beam using a built-in hook
Load mounting	Provision to mount a hook which carries the load	Provision to mount a hook which carries the load



Magnetic Detection Probe

Model: HO-UGM-01

Holmarc Magnetic Detection Probe model HO-UGM-01 is used for the measurement of magnetic field up to 20 Tesla. It has digital display along with a software interface to plot time vs magnetic field values. It can also measure alternating magnetic fields up to 10 Hz.

Display Units	Gauss (G), Tesla (T) and Oersted (Oe)
Display Resolution	up to 3 and 1/2 digits
Frequency Response	DC to 10 Hz
Probe features	Probe zero
Reading rate	up to 30 rdg./s
DC measurement range	1 G to 20 KG with accuracy of $\pm 2\%$ of reading value
AC measurement range	1 G to 200 G with accuracy of $\pm 2\%$ of reading value
Probe compatibility	Compatible to the supplied unit only
PC Interface	PC Interface
Windows software with time Vs magnetic field plot	



Lock-in Amplifier

Model: HO-LIA-02

A lock in measurement extracts signals in a defined frequency band around the reference frequency, efficiently rejecting all other frequency components. A lock in amplifier performs multiplication of its input with a reference signal. The ideal lock-in amplifier will detect only the part of the input signal having the same frequency and phase as of the reference signal. Holmarc Lock-in amplifier model HO-LIA-02 provides a cost-effective solution to perform lock-in measurements in a variety of applications. It accepts modulated signal and the reference signal and provides amplified output of the input signal component which matches with the frequency and phase of the reference signal. The input coupling mode, input gain, time constant, phase shift and the output gain can be controlled using front panel knobs and switches.



Input	High or low impedance differential or single ended via front panel BNC
Sensitivity	3 μ V to 1 V
Frequency	10 Hz to 100 kHz
Maximum input voltage	$\pm$ 13 V
Reference input voltage range	0 to +5V
Gain Accuracy	1 %
Gain Stability	200 ppm / °C
Dynamic Reserve	60 dB
Time Constant	100 μ s to 30 s
Phase Control	90° steps + fine shift in range 0° - 100°
Phase Drift	0.1° / °C
Power input	230V/50 Hz or 110V/60Hz



Vacuum Oven and Ion Exchanger

Vacuum Oven Model: HO-VO-01

Vacuum oven has application in various settings such as laboratory research, engineering, and industry. The fundamental principle involves the creation of a vacuum to lower chamber pressure below water vapor pressure, inducing the boiling of substances that are both hygroscopic and heat-sensitive. This low-pressure environment not only facilitates drying but also minimizes oxidation. Trays containing materials for drying are positioned within the oven, and pressure reduction is achieved through a rotary vane vacuum pump. The oven door is securely sealed and linked to the vacuum pump for pressure reduction. Precise and uniform temperature control is maintained by a microprocessor based controller with a digital display. A dual-layer tempered glass door enables transparent observation.



Chamber Size	300 x 300 x 300 mm
Temperature range	50 to 250 Degree Celsius
Vacuum gauge	-760 mm of Hg
Input Voltage	230V AC
Microprocessor based digital temperature controller	
Stainless steel inner chamber	
Powder coated Mild Steel outer enclosure	
Glass wool insulation to minimize heat loss	
Heavy gauge extruded Aluminium frame	
Toughened glass window	
Vacuum On / Off valve	
Rotary Vacuum Pump Included	



Thermocycler

Model: HO-THC-01

Thermocycler is a device used to test and study the degradation of materials which are subjected to continuous cycling between hot and cold temperatures during their service life. It can also be used for hot and cold treatment of materials. It simulates artificial aging due to cyclical temperature changes. Exposure time, temperatures and cycle count can be set as per the user requirements.

During operation, an open specimen basket is alternately immersed in a bath of warm liquid followed by a bath of cold liquid. A very high rate of temperature change is achieved with this thermal-cycle design, and this gives a particularly realistic simulation of the temperature changes in the oral cavity for dental applications.

Holmarc Thermocycler Model HO-THC-01 comes with stainless steel hot and cold water baths which can be maintained at temperatures between 5 degree Celsius and 60 degree Celsius. The sample material is carried in a stainless steel basket which is immersed in hot and cold baths using a pivoting arm driven by a stepper motor. The temperatures, immersion time and the number of cycles are controlled by the microcontroller based electronic control unit (ECU), which accepts the user input through a 20x4 line alphanumeric LCD and front panel push buttons.

Specifications	HO-THC-01
	
Warm bath temperature	Ambient to 60°C
Cold bath temperature	5°C to Ambient
Exposure time of the specimen basket	adjustable per bath from 0 to 999 seconds
Number of cycles	1 - 300000
Automatic start-up function	After a power failure, the trial is automatically continued when the power is restored (Useful for long trials which are not permanently supervised)
Maximum specimen mass	1 Kg
Specimen basket size	10 x 10cm and 14 x 14cm



UV Laser Writing System for Photolithography



Model: HO-LWS-PUV-T

Holmarc's UV Laser Writing System is a direct writing photolithography system used to create micro geometric features on a substrate coated with photoresist layer. This mask-less system is equipped with an intensity adjustable fiber coupled 405nm laser and a servo motor driven high precision XY stage with CNC software for writing complex patterns. A quadruple motorized turret with different objectives is provided for creating different spot size at the focus point. A 3MP camera with Yellow LED illumination is provided for focusing the sample for best feature size. A user friendly software is provided for initial setting of the sample substrate and a CNC software is provided for writing the patterns from dxf drawing files.



Laser	405nm fiber coupled laser
Focusing mode	Microscope objective based
Spot diameter	<10um (depends on the objective magnification)
Intensity	3mW at the sample position
Focusing	Motorized, software controls

Motorized XY-Theta sample stage

XY travel	100 mm x 100 mm
XY resolution	1 um
Unidirectional repeatability	3 um

Positioning accuracy	5 um
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Microscope objectives

1. Infinity Plan achromatic 60X objective	
N A 0.75, Working distance 1.22 mm	
2. Infinity Plan achromatic 100X objective	
N A 0.85, Working distance 0.4 mm	

Fiber Coupled Laser

405nm

Motorized Stage

XY-Theta sample stage
100 mm x 100 mm XY Travel

Ion Exchanger

Model: HO-TH-06

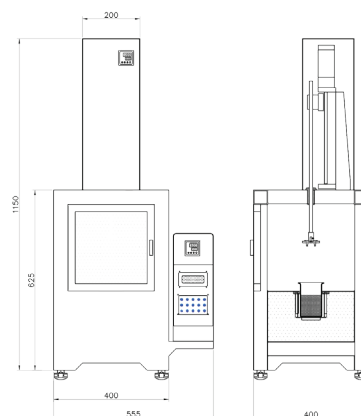
Holmarc's Ion exchanger, is a dedicated device for forming thin films by dipping the substrate in melt kept in hot chamber. Temperature of the heater can be controlled and fixed up to 400°C from ambient. Speed, duration, etc. are maintained accurately by computer control. Movements are achieved by a precision servo / stepper motor controlled linear stage.

The system has a user friendly front panel with key board and LCD display. It can as well be controlled through a computer. Dip duration, dip speed, withdrawal speed etc. are programmable features.

Servo motor (Optional) is used as actuator for vibration free dipping and withdrawal. The device is designed and manufactured as table top device with entire electronics and servo motor housed in a compact unit. Height of the substrate holder can be adjusted with respect to the level of the solution during the experiment.

Specifications

Actuator	Stepper motor (Servo - Optional)
Drive mechanism	Precision rolled ball screw
Speed control	Available
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)
Stroke length max.	150 mm
Drawing speed min.	2 micron / sec
Drawing speed max	9000 micron / sec



Desktop Dispensing Unit

Model: HO-LSDDU-A3

Holmarc manufactures desktop dispensers for automated dispensing of fluids to well plates/ test tube arrays. Our standard model HO-LS-DDU-A3 is a three axes system which has a dispensing area of 300 mm x 300 mm. The system operates through a personal computer. Various dispensing attributes are programmable through the computer.

Operating Range	X Axis / 300 mm Y Axis / 320 mm Z Axis / 100 mm
Repeatability	± 0.01 mm per axis
Resolution	X Y & Z axis 0.01 mm
Drive system	Stepping motor
External interface	RS 232 C - one channel for pc
Dispense area	300 x 320 mm
Resolution	20 microns
Drive system	Stepper motors
Computer interface	Rs 232 C

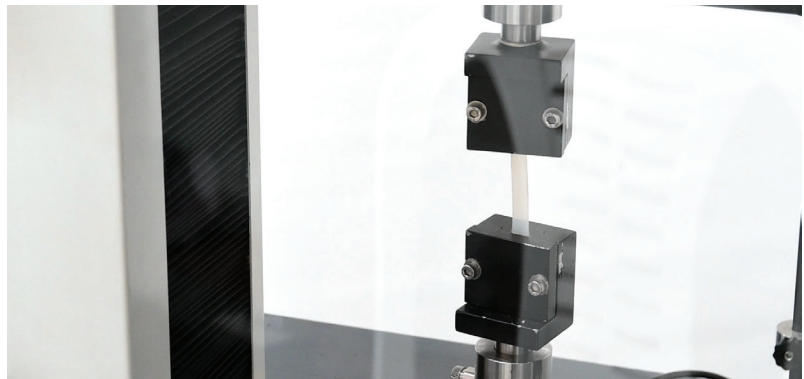


Universal Testing Machine

Model: HO-TH-06



Load Capacity	10 kN
Measurement	Tensile, Compression and Flexure
Sample types	Plastic, Rubber and Polymers
Device control	Touch screen
Data acquisition	PC interface (For Windows) - RS232C / USB
Display Method	Digital display
Power Requirements	Supply voltage fluctuations within $\pm 10\%$ of the set value
Power Requirements	Single phase 230 V AC, 50 Hz 1.2 kVA
Sampling Speed	100 Hz max.
Positional Accuracy	$\pm 0.1\%$ indicated value or ± 0.01 mm, whichever is larger
Position Detection	Optical encoder
Measurement Method	
Effective Test Width	425mm



Accessories

Load cell (with CAL cable), Power cable (2.5 m), turning rod, cable clamps, instruction manual

Standard Functions

- Automatic test force/stress control (Autotuning)
- Automatic strain control (Autotuning)
- Test force auto-zeroing
- Test force calibration
- Break detection, auto-return
- Load cell overload detection
- Touch-load detection function
- Test force display, stress display, stroke display, position display

Crosshead specifications

Table Distance	1200mm
Speed Accuracy	± 0.1 mm/s
Max. Return Speed	1500mm/min
Speed Range	0.001 to 1000 mm/min (Stepless)

Measurement Accuracy

Within $\pm 1\%$ indicated test force (at 1/500 to 1/1 load cell rating)

Conforms to EN 10002-2 Grade 1, ISO 7500-1 Class 1, BS 1610 Class 1, and ASTM E4, HS B7721 Class 1. *1

Loading Method

Direct high-precision constant speed strain control method via ball-screw drive

Operating Environment

Temperature 5 °C to 40 °C; Humidity: 20% to 80% (no condensation)

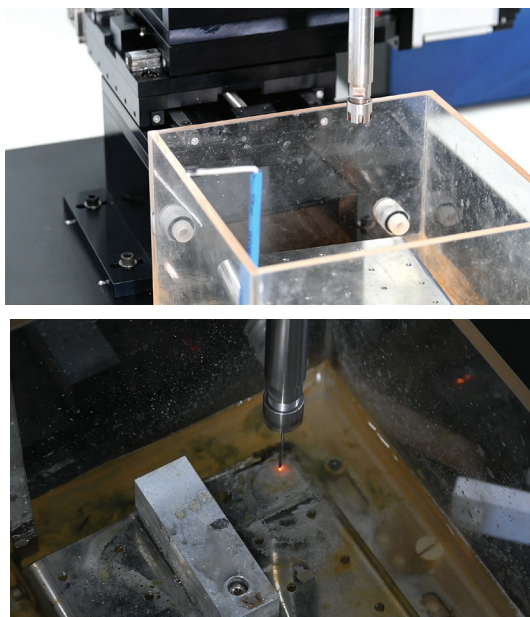
Floor vibrations

frequency 10 Hz max., amplitude 5 μ m max.

Electrochemical Discharge Machining System

Model: HO-ECDM-01

The Electrochemical Discharge Machining (ECDM) is a non-conducting machining process which combines the features of Electric Discharge Machining (EDM) and Electrochemical Machining (ECM). The material is removed by thermal melting and chemical dissolution. Both conductive and non-conductive materials can be machined. The discharge occurs between the positively polarized tool electrode and the negatively polarized auxiliary electrode immersed in an electrolyte bath along with the work piece. The system consists of an XYZ stage with CNC controller, a rotating tool holder with carbon brush contact for supplying the electric potential to the tool, an additional Z stage for continuously adjusting the gap between the tool and the work piece, a tank for keeping the electrolyte and the work piece and a 300V power supply to produce the discharge



Software

Third party CNC software for XYZ movement and spindle start / stop control Holmarc software for power supply, gap control and spindle rotation settings USB connectivity

Input voltage	230V 50 Hz
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Travel

100mm x 100mm x 100mm

Motorized

AC Servo Motor





Basic Specifications	Motorized XYZ Stage with base plate and vertical column	
	Motor Type	AC servo motors
	Three axis CNC Controller and Software	
	Additional Z stage for gap control	
	Platform size of the XY stage	450 X 450 mm
	Travel	100 x 100 x 100 mm (XYZ)
	Resolution	1 μ m in each axis
	Position accuracy	5 μ m in each axis
	Speed	0.01 to 8 mm/s in all axes
	XY stage mounted on the machine base plate	
	Z stage mounted on the vertical column	
	Acrylic tank on the XY stage for carrying work piece and electrolyte	
Spindle	Spindle motor with 3mm collet	
	Rotation speed	10 - 2000 rpm
	Selectable direction of rotation	
	Oscillatory rotation	
300V DC Power Supply	Output voltage	0 - 300V (Variable using front panel knob)
	Microprocessor controlled pulsed mode of operation	
	Software controlled pulse width	
	On time	1 - 999 ms
	Off time	1 - 999 ms
	On time + Off time	1000 ms Maximum

Discharge Rate Measurement System



Model: HO-DRM-01

Holmarc Discharge Rate Measuring System Model HO-DRM-01 is a device used to measure the discharge rate of a liquid from a source, by collecting the liquid inside a jar placed on a weighing scale connected to PC. The software records the weight of the liquid in the jar at a rate of two measurements per second, for a duration specified by the user. The measured values are plotted as the change of weight against time. If the user enters the density of the liquid, the plotted curve can be converted to change of volume or flow rate against time.

Specifications

Measured parameters	Weight (g), Volume (ml) & Flow rate (ml/s)
Capacity	5 liter or 5 kg
Measurement frequency	2 measurements per second
Duration	10 minutes (Customizable)
PC interface	RS232 or USB
Power input	230V 50Hz
User friendly Windows software	



4 Tesla Electromagnet - Magnet Lab

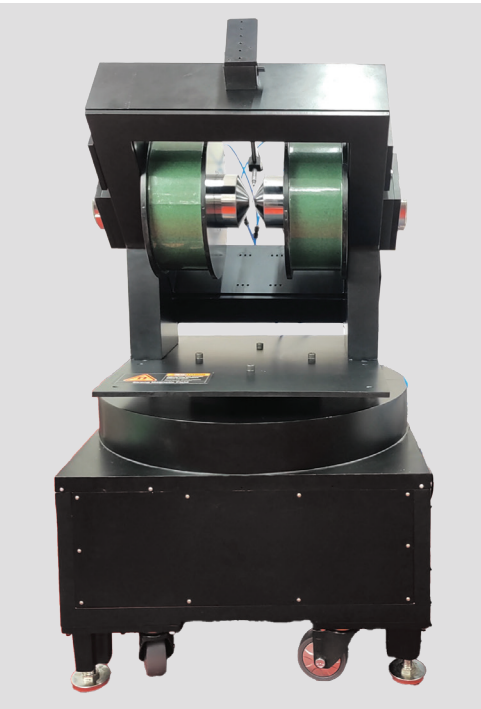
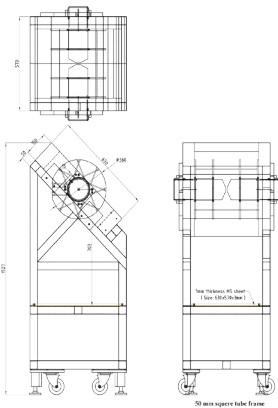
Model: HO-EM7000S

EM7000S is a HOLMARC New Magnet LAB range high magnetic field PC controlled Dipole Electromagnet that can provide fields above 3.5 Tesla @ 5 mm field gap. Designed to meet industrial, educational, and research needs of very high, uniform field strengths in a wide range of air gaps. The HOLMARC Magnet LAB range dipole electromagnet systems are intended to work based on automated PC controlled operations.

The EM7000S comes with a standard set of 125mm diameter poles that tapered into a 25mm. optimize maximum field but several pole options are available. HOLMARC can also design custom poles that achieve a specific performance. Poles are interchangeable and are available with an axial access bore.

- PC controlled programmable operation
- Water Cooled Coils for excellent field stability
- Fully Adjustable Pole Gap
- Easily removable / replaceable Pole pieces
- Flat, Faraday, & Custom Pole Pieces option
- On-Axis Bores in Magnet Pole Piece for Beam / Target Experiments
- Mount Kits for Magnetometer Probes and Other Probes

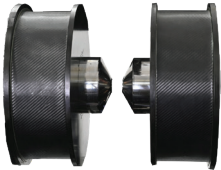
POLE GAP (mm)	Magnetic Field (Gauss)
HO-EM7000S	
5	33700
10	28600
15	24020
20	20700
25	17660
30	15300
35	13360
40	11800
45	10320
50	9260
55	8420



Rotating base (Accessory)

Rotating Base	A detachable rotating base with mounting screws to mount the heavy electromagnet
Rotating Base	360 - degree rotation
Resolution	0.1 degree
Control	Both manual and stepper motor controlled rotation
Stepper motor controller	A stepper motor controller will be provided for computer control of the rotation stage
Ports for remote control	USB port will be available for remote control and monitoring
Software and interface	LabView drivers and PC software
Cables and Accessories	Power and interface cables

Electromagnet	Magnetic Field	3.3 T @ 5 mm pole gap
	Electromagnet Height	650 mm
	Electromagnet Depth	610 mm
	Electromagnet Width	420 mm
	Electromagnet Frame size	610 mm x 420 mm x 650 mm
	Pole Piece Diameter	125 mm
	Pole Gap Adjustments	50 mm Independently Variable Poles
	Spool Diameter	430 mm
	Frame Material	Cast Iron Profile
	Optical Height	325 mm
	Total Weight including Frame	325 kg
	Frame Wheel	Yes
	Frame	The frame will be compatible for use along with a rotation base. The frame will be attachable (or detachable) with suitable screws on a rotation base.
	Pole Pieces	2 Nos., easily removable / replaceable Pole pieces
		One Flat pole piece with 120 mm Tapered pole piece
	Coil Separation (Coil Gap)	160 mm
	Airgap (Pole gap)	Continuously adjustable from 0 to 100 mm or higher
	Yoke Construction	Single-yoke electromagnet
	Yoke Material	Soft Iron high permeability alloy
	Mounting	Mounted on a Metal Profile stand
	Cooling	Water-cooled for continuous operation for more than 4 hours
	Maximum Magnetic Field Intensity	5000 Gauss for an air gap (Pole gap) of 55 mm with a flat pole
	Uniformity	Magnetic Field will be uniform over 5 cm ³
	Stability of magnetic field	< 0.005 %
Bipolar power supply	Power supply design	Quad system constant current power supply
	Input requirement	220 VAC, 50 Hz, single phase
	Output	Constant current Bipolar with continuous variation through zero
	Output voltage	70V Max.
	Output current	4 Amps Continuously Variable
	Resolution	0.1 Amps
	Stability	0.005 % up to ≥ 8 hrs
	Over temperature protection	Coil-over temperature protection
	Power failure protection	Sudden power failure protection
	Protection	MCB and fuses in the input
	Remote Monitoring	Remote Monitoring
	External programming	The power supply will be able to be controlled and monitored via USB interface. Output Polarity and current value will be controllable remotely via external programming.
	Software and interface	LabVIEW driver or software will be provided for computer control.
	Cables and Accessories	All necessary power and interface cables and accessories
	Power supply size	550 mm x 550 mm x 1210 mm
	Weight	125 kg
Hall probe / monitor	Input requirement	220 VAC, 50 Hz, single phase
	Magnetic Field Range	Up to 4 Tesla
	Resolution	1.0 gauss
	Display	6 digits LED
	Size	Portable
	Hall probe	Transverse probe rectangular with fixtures
	Ports for remote control	USB port
	Software and interface	LabView drivers and PC software
Water cooling (Chiller)	Input requirement	220 VAC, 50 Hz, single phase
	Water tubing and fitting	Standard 6mm Tube
	Water circulation	Motor Pump based
	Water flow rate	7.6 L / min or higher
	Water inlet temperature	10°C to 15°C



PC based water cooled electromagnet

Model: HO-EM5000S

Holmarc's model HO-EM-5000S based electromagnet comes with water cooling with a built-in chiller unit for continuous duty operation. It has two modes of operation - constant current mode and constant field mode. The constant current mode sets a user specified current in the coils, while the constant field mode maintains the user specified field strength by measuring the same with a hall probe and adjusting the coil current continuously in closed loop. The In As hall probe comes with a post and post holder making it easy to position at the desired position between or near the poles.

The pole gap can be adjusted up to 50 mm manually and the field strength can be calibrated against different pole gaps. The coil temperature is continuously measured to detect over heating. The unit is connected to PC through a serial port or a USB port. The easy to use Windows software facilitates flexible operation. The field strength and the coil current can be controlled through the software.

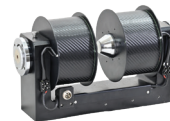


Features

- Constant magnetic field operation
- Built-in Gauss meter with hall sensor
- Gauss Probe Holder with Mount
- PC interface with USB connectivity
- Software control & display of magnetic field strength
- Adjustable pole gap
- Calibration feature for field strength according to pole gap
- Water cooled electromagnet
- Chiller unit included
- Coil temperature display to decide whether the chiller needs to be turned on

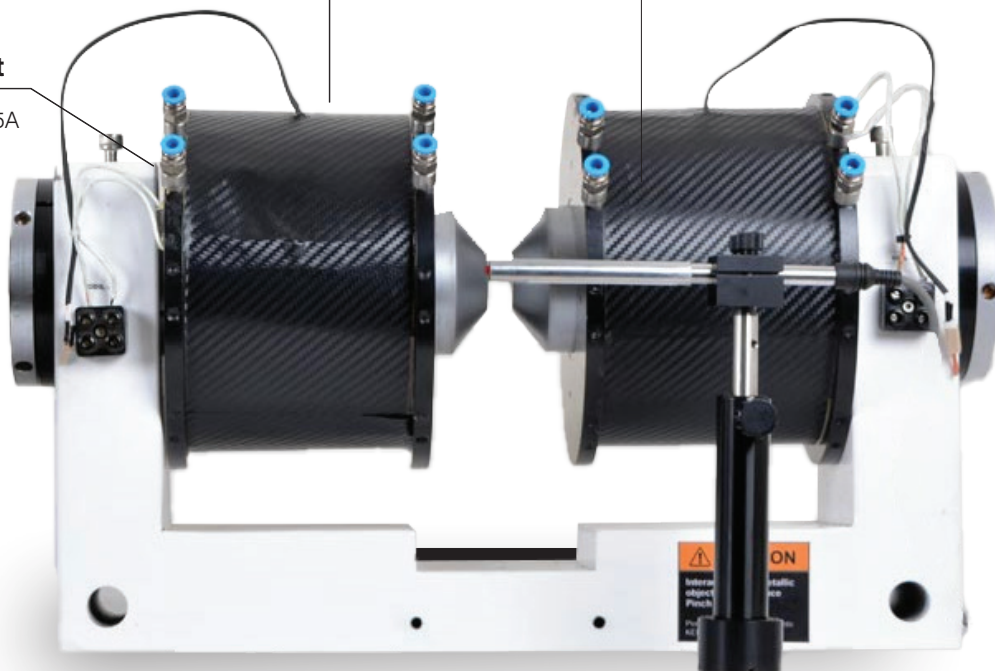
Magnetic field strength

1.6T to +1.6T (At 10 mm pole gap)



Coil Current

-3.5A to +3.5A



WATER COOLER



CONSTANT CURRENT POWER SUPPLY

Specifications



Magnetic field strength	-1.6T to +1.6T (At 10 mm pole gap)
Coil current	-3.5A to +3.5A
Operating mode	Constant field & Constant current modes
Transducer	Hall probe - In As
Field measurement resolution	1 mT
Accuracy	+/- 0.5 %
Hall probe height	100mm to 150mm adjustable
Hall probe mount	Post and post holder made of anodized Aluminium alloy
Current display	3 1/2 digit, 7 segment LED
Current display resolution	0.01 A
PC interface	USB or RS232
Software displayed parameters	Field strength & current
Pole gap	0 to 50mm adjustable
Cooling	Water cooled with built-in chiller unit
Coil temperature sensor	PT100
Coil temperature display	7 segment LED with over temperature cut-off
Input power	230V, 50Hz

POLE GAP (mm)	Magnetic Field (Gauss)
5	25100
10	16961
15	11482
20	8706
25	7024
30	5894
35	5082
40	4469
45	3990
50	3606
55	3290



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