



safematic

Provider of  
high-vacuum  
coating systems



make it visible

**CCU-010** COMPACT COATING UNIT

# Safematic CCU-010 coater family:

- High performance sputtering, carbon coating and plasma treatment
- Patented carbon spooling – up to 50 carbon coatings without user intervention
- Unique plug-and-go sputter and carbon coating modules
- Class-leading vacuum performance and fast pump down times
- Compact, reliable and easy to service
- Dual-position film thickness monitor to accommodate different specimen sizes
- Actively cooled sputter head ensures coating quality and allows long run-times



Specifications	CCU-010 HV	CCU-010 LV
Dimensions (L x W x H)	58 x 36 x 35 (59)cm *	Same
Weight (incl. coating unit)	32kg	25kg (without pump)
Electrical	100 to 240VAC; 50 / 60Hz, 400W	Same
Noise level	maximum 40dB(A)	n.a. ***
Vacuum chamber	Ø 120mm glass cylinder (borosilicate) **	Same
Implosion guard	Plastic splinter shield around the chamber, with safety detection	Same
Vacuum system	Integrated, oil-free turbomolecular and membrane pumps	External rotary vane or scroll pump
Ultimate vacuum	<2 x 10 <sup>-6</sup> mbar	n.a. ***
Vacuum measurement	Pirani and cold cathode gauges	Pirani gauge
Rotary pump connection	Not required	DN 25 ISO-KF flange
Display	115 x 86mm TFT graphical display	Same
Specimen stage	Ø 80mm, height adjustment 30 to 90mm, tilt 0 to 45°. Optional planetary and rotary stages.	Same
Film thickness measurement	Dual-position FTM (centre & edge position)	Same
Gas connections	Ø 6mm plug-connection each for process-, etch- and venting gas	Same
PC remote connection	USB 2.0 type B socket	Same

\* 59 cm maximum height with opened coating head

\*\* Compatible to DN 100 ISO-K flanges

\*\*\* Depending on external roughing pump



# compact, modular and intelligent

## A smart modular device

The CCU-010 is a compact, fully automatic sputter coater and/or carbon coater that is very simple to use. Due to the unique plug-in concept the device is easily configurable for sputtering or vaporising by simply changing the process head. Prior and / or after the coating a plasma treatment can be applied. The modular design makes it easy to avoid cross contamination between metal and carbon deposition. The CCU-010 has a static specimen stage with height adjustment and tilt included. It can be fitted with an optional variable speed rotation stage or a rotary planetary stage, each with options for holding different specimen and stub types. With all specimen stages film thickness monitoring is included as standard.



## Clever vacuum design

The CCU-010 coating unit is available in two versions. While the **CCU-010 LV** fine vacuum base is designed for routine high quality sputtering and carbon coating for SEM and EDX, the **CCU-010 HV** high-vacuum system covers the highest-level SEM, TEM and thin film application. The modular concept makes it easy to convert the unit from a fine vacuum unit into a high-vacuum unit later on. The thoroughly design relating to materials, surfaces and profiles results in extraordinarily short process times. Two additional standard vacuum flanges allow connecting third party devices.

## Easy start-up and servicing

Unpack, connect and start! The plug-and-play concept allows you to start up the device by yourself. You only need to connect the power supply and process gas. With the integrated USB service interface, a service technician can run a quick error analysis on site or remotely via an Internet connection. The modular set-up allows a straight-forward replacement of defective components.

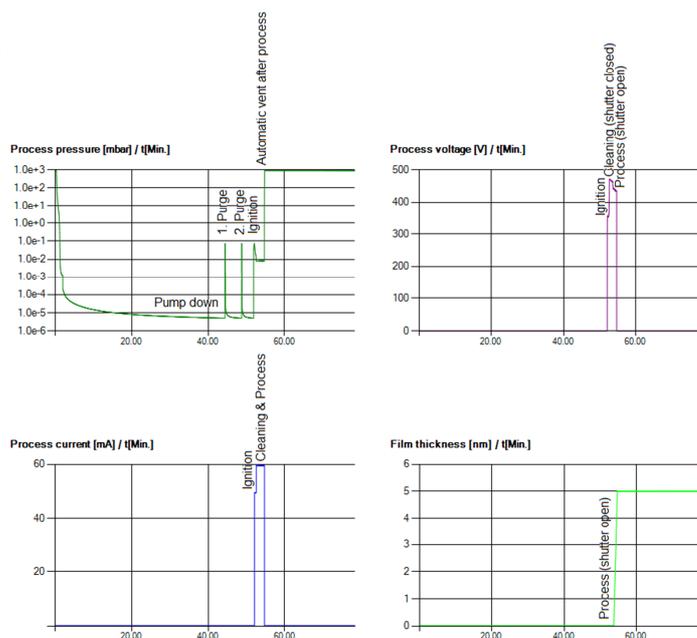
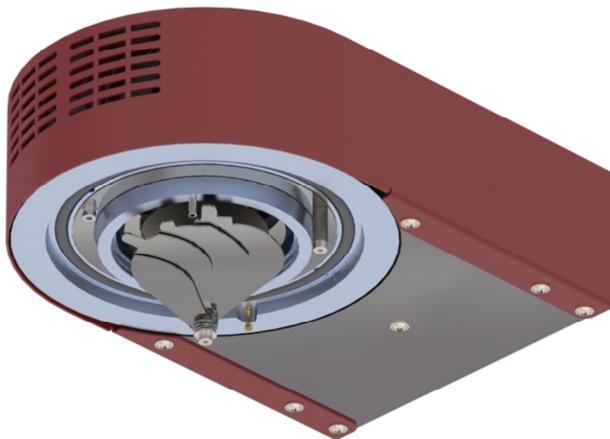
- Automatic valve control for two process gases and venting
- Speed-controlled rotary or planetary gear table as option, both for holding different specimen and stub types
- Intuitive user software with many useful features
- Easy creation of coating recipes, which guarantee reproducible results
- Diagrammed process data with Windows-based software **Coating LAB**
- You can keep the system under vacuum if it is switched-off or in case of power loss (if operated with oil-free pumps).
- Feature to vent the system automatically in case of power loss which prevents the system from getting contaminated by backing pump oil (if operated with oil-sealed pump)
- Simple plug-in electrical and pneumatic interface for connecting the coating head to the base unit allows swapping between the modules within seconds.
- The process head recognition automatically turns the display to the desired menu.
- Technology-leading Swiss quality



# SPUTTERING MODULES **SP-010 & SP-011**

Both sputtering modules plug into the CCU-010 LV and CCU-010 HV base units and are ready to go. Each head module contains all the key components for high quality sputter coating including magnetron, target, shutter, process pressure regulator, and power electronics system. In addition an innovative interface connects the electrical power, gas supply and signal transmission to the CCU-010 basic unit in seconds (push fit).

SP-010 and SP-011 sputtering modules have efficient active cooling, which allows continuous coating times up to 50 minutes – ideal for applications requiring thicker films. A wide range of sputter materials can be used for SEM, FIB and various thin film applications.

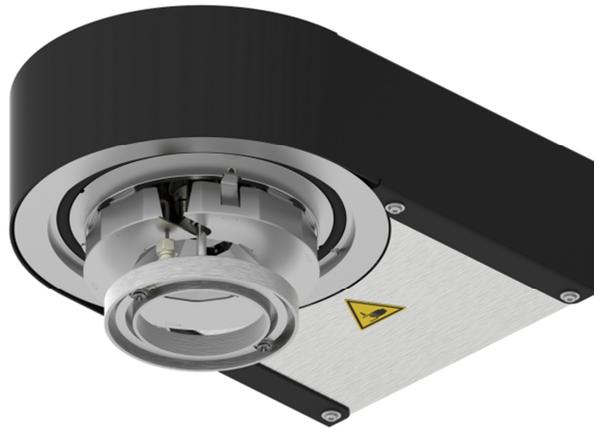
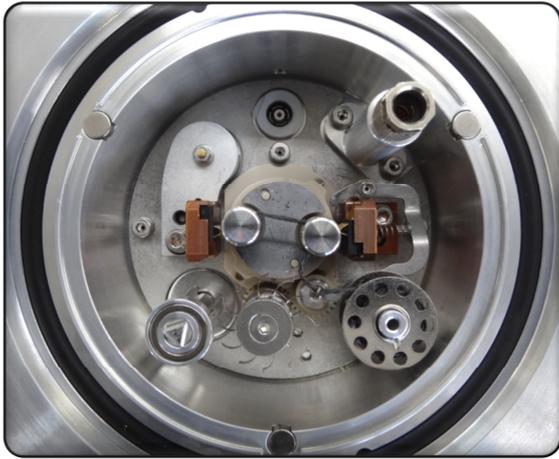


The magnetron of the SP-010 sputter head is designed for optimised target usage. This makes it to the perfect tool for fine grained noble metal films in electron microscopy. For the smallest grain size coating, the turbo pumped CCU-010 HV base unit is required.

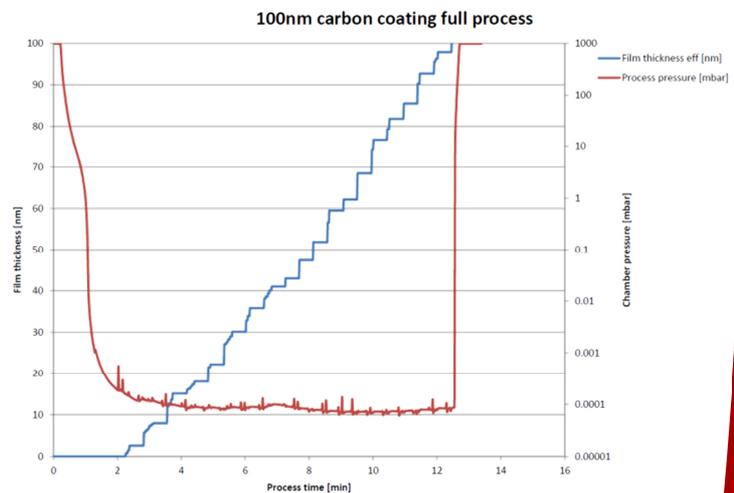
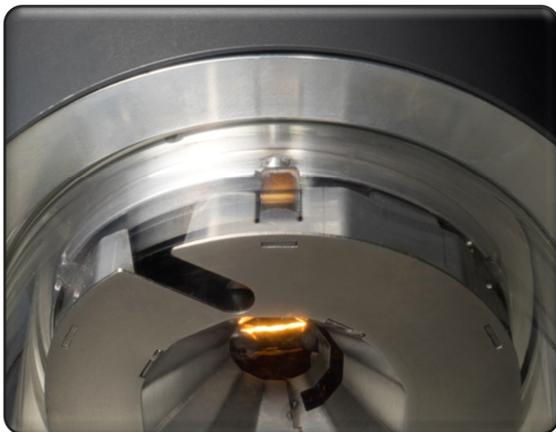
The magnetron of the SP-011 sputter unit is designed for high power sputtering and for a broad range of coating materials. This head is recommended for thin film applications requiring higher coating rates and thicker films than standard EM applications. The SP-011 in combination with the CCU-010 HV covers challenging applications such as coating of DLC, ITO or ferromagnetic sputter material.

Technical data	SP-010 & SP-011	CT-010	GD-010 (with CT-010)
Dimensions (L x W x H)	25 x 16 x 8cm	25 x 16 x 8cm	25 x 16 x 11cm
Weight	3.1kg	2.6kg	2.7kg
Coating material	Targets Ø54mm with thickness up to 3mm	Filament or yarn on a spool, up to 2m	not relevant
Electrical and gas connections	DSUB	Same	Same
Process voltage	up to -900VDC	24VDC	up to 1000VDC
Process current	10 to 100mA	10 to 20A	10 to 30mA
Process power	up to 45W	up to 450W	up to 30W
Process gas	Argon	not required	Argon, air, other
Process termination	0.1 to 500nm / 0.5 to 990s	0.1 to 500nm / 0.5 to 990s	0.5 to 990s

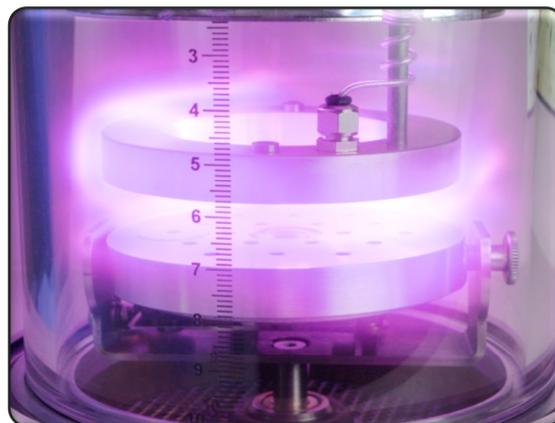
# CT-010 CARBON THREAD EVAPORATION MODULE



This compact plug-in carbon evaporation module sets new standards in carbon coating. This head plugs into the CCU-010 LV and the CCU-010 HV base units and is immediately ready to go. Applications include SEM, TEM and any other process requiring high quality carbon films. The CT-010 uses a patented, unique and technology-leading carbon fibre spooling system. This allows up to 50 coatings to be carried out without the need to change the carbon source. Once a section of carbon fibre has been evaporated a new section is automatically advanced and the spent fibre drops into a convenient catchment tray. In addition to ease of use the automatic spooling system allows practically any thickness of carbon film to be controllably deposited in one process cycle. Easy selectable coating modes perform safe coatings from gentle evaporation for thin films on temperature sensitive samples to short time carbon coating with high power for thick layers in FIB applications. The Intelligent power control in combination with pulsed evaporation, degassing behind an automated shutter and film thickness monitoring provides accurate layer thickness and avoids any sparking which might cause inhomogeneity on the surface.



The optional GD-010 glow discharge system can quickly be installed for surface treatment by air, argon or by other dedicated gas plasma. For example, it is possible to make carbon films hydrophilic. This is greatly simplified because the carbon coating and glow discharge treatment can be done sequentially – without the inconvenience of having to “break” vacuum conditions and exchange process heads. This unit installed into CT-010 is compatible with all sample stages.



## HEAD STORAGE BOX **HS-010**

The HS-010 vacuum storage box allows you to keep a second coating head for your CCU-010 Compact Coating Unit, an additional planetary or rotary stage and the full range of sputtering targets and carbon thread always clean and under vacuum. An integrated pump line attachable to the basic unit pumps down the storage box to vacuum using the available pumping system of the CCU-010. Alternatively one can easily connect an external vacuum pump instead. A comfortable manual lock and vent valve allows the independent pump and vent control of the storage box. The additional standard vacuum chamber helps to completely separate the carbon coating from metal deposition which effectively avoids cross contamination.

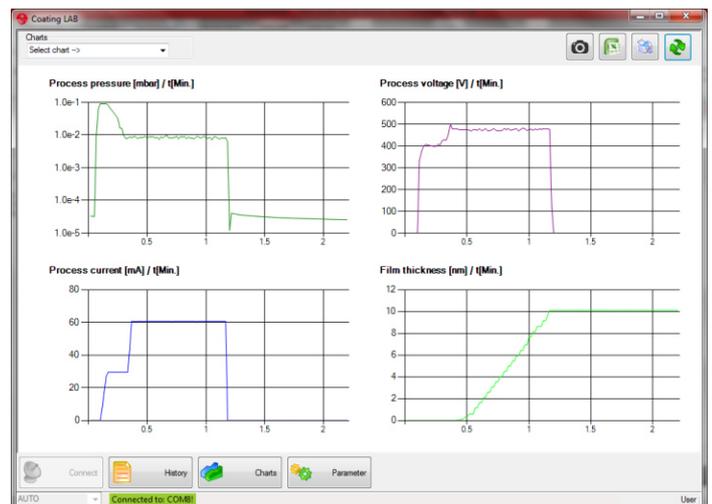


## ETCHING UNIT **ET-010**

For specimen pre-treatment or after-treatment combined with a coating process the Etching-Unit allows to apply plasma to the substrates. With this accessory one can select Argon, extra etching gas or environmental air either as process gas. This allows cleaning of the samples prior to a coating and increasing the adhesion of thin films. Additionally it would be possible to modify the surface properties of a coated sample by a plasma treatment after the coating. With air plasma it is possible to turn a thin carbon layer from hydrophobic to hydrophilic for example. The adjustable process pressure ranges from 2E-1mbar to 1mbar with a selectable plasma current from 10 to 50mA.

## COATING-LAB

Process data, including graphical information, can be viewed using the PC-based Coating-LAB software. Data includes pressure, current, voltage, coating rate, coating thickness and coating rate as real-time curves. Comfortable software upgrades and parameter settings complete this smart tool.



# SAMPLE STAGES FOR VARIOUS PURPOSES



The CCU-010 is supplied with an 80mm diameter specimen stage which is plugged onto a height adjustable and tiltable stage support. This static standard stage can easily be replaced by dedicated specimen stages (option). The ST-010 slide stage carries two 26 x 76mm (25 x 75mm respectively) microscope slides or one 52 x 76mm (50 x 75mm respectively) slide either. Due to the dual-position film thickness monitor the quartz sensor is operational for both arrangements. The rotary stage RS-010 improves the thickness uniformity on flat surfaces and the planetary drive stage PS-006 in combination with sample tilt allows uniform coating on fissured, corrugated, jugged or very spherical samples.

	Standard stage (included)	ST-010 Slides stage (option)	RS-010 Rotary stage (option)	PS-006 Planetary stage (option)
Blank stage with FTM sensor in center position				
Fitted with DN13mm SEM stubs		 76 x 26mm slides		
Fitted with DN 25mm SEM stubs		 76 x 52mm slide		
Blank stage with FTM sensor in edge position			Rotary accessory which turns the planetary stage into a rotary stage.	
Stages at maximum height and maximum tilt				

Technical data	Standard	Etching	ST-010	RS-010	PS-006
Dimension	Ø 80mm	Ø 80mm	Ø 100mm	Ø 80mm	Ø 80mm Ø 95mm ****
Quartz position	Centre/edge	Centre/edge	Centre/edge	Centre	Centre
Ø 13mm stubs	18	17	n.a.	20	6
Ø 25.4mm stubs	6	5	n.a.	5	6
Plate rotation	n.a.	n.a.	n.a.	2 to 20rpm	2 to 20rpm
Planet rotation	n.a.	n.a.	n.a.	n.a.	6.5 to 65rpm
Voltage	n.a.	0 to -500VDC	n.a.	n.a.	n.a.

\*\*\*\* With rotary accessory



## THE COMPANY

Safematic GmbH manufactures technology-leading carbon and sputter coaters in Switzerland's Rhine Valley, a region renowned for expertise in vacuum and coating technology. Key members of the safematic R&D team have years of experience in EM and thin film coating. Building on this expertise and knowledge safematic engineers have designed key components into each coating head, thus optimizing instrument performance whilst minimizing downtime and improving ease of servicing.

## Swiss made

### Your coating solution

Apart from our standard products, we also offer customised extensions and options.

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