

nanoPVD-ST15A

Multi-technique sputtering and evaporation tool for research-grade deposition



Key features:

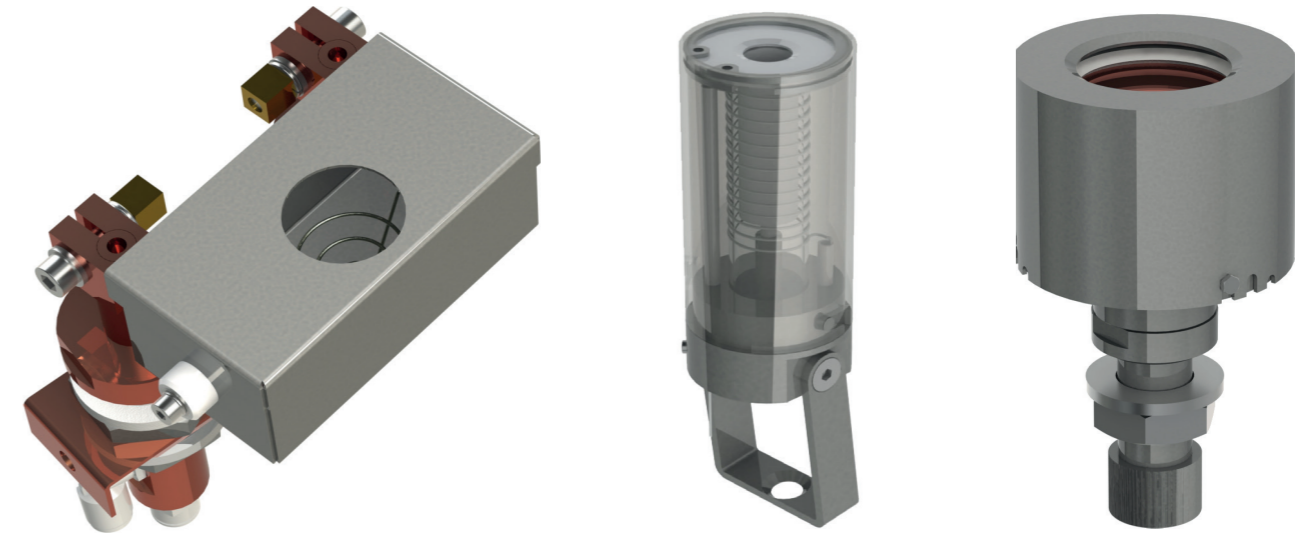
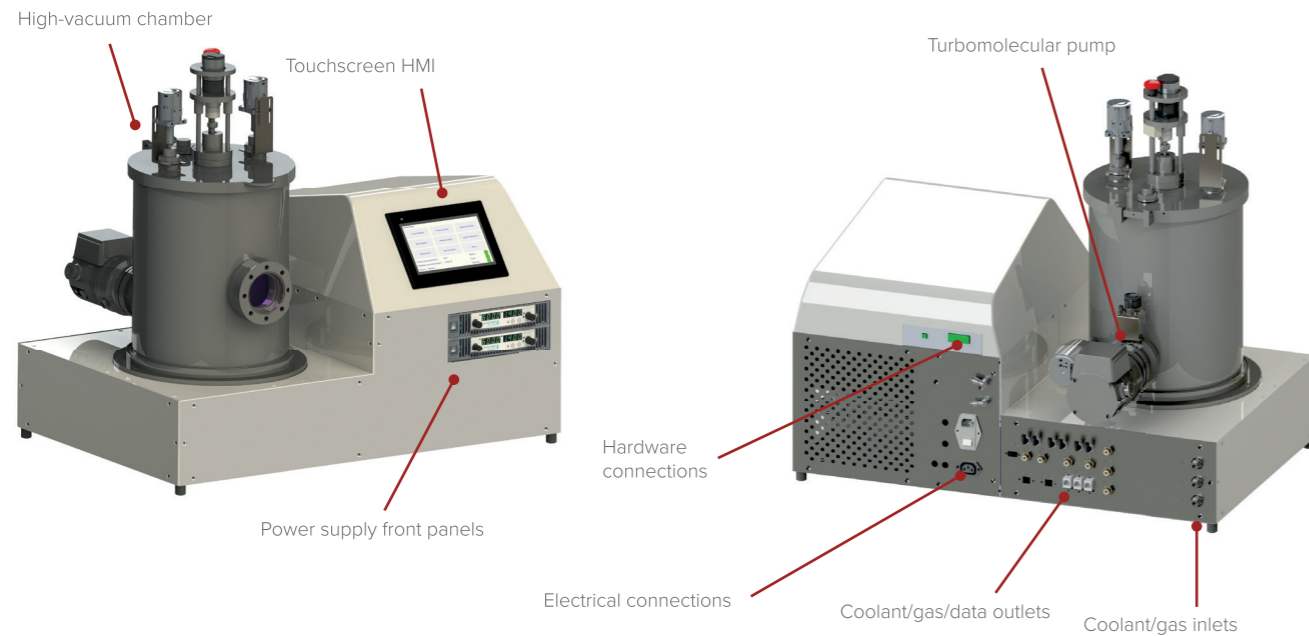
- Benchtop configuration
- Magnetron sputtering, thermal evaporation, and low-temperature evaporation
- Deposition of metals, organics, and dielectrics
- Flexible source arrangement
- Up to 3 MFC-controlled process gases
- Automatic pressure control option
- Fully automatic operation via touchscreen HMI
- Up to 4" diameter substrates
- Sample heating option
- Base pressures $<5 \times 10^{-7}$ mbar
- Define/save multiple process recipes
- Equipped for easy servicing
- Comprehensive safety features
- Cleanroom compatible
- Proven performance

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Overview:

nanoPVD systems are compact and suitable for benchtop location — but not to be confused with microscopy-related products — and are derived from proven R&D thin-film system technology. They have been developed through extensive collaboration with leading academic groups.

The tools are optimised for ease of use, represent outstanding value for money and are ideal where available space and budgets are key considerations — without compromising on quality of results.



Deposition source types that can be fitted to the nanoPVD-ST15A: Standard thermal evaporation source for metals (left), low-temperature evaporation (LTE) source for organics (centre), magnetron sputtering source for metals and/or dielectrics (right).

Model nanoPVD-ST15A:

Model ST15A is a multi-technique system capable of magnetron sputtering, thermal evaporation, and low-temperature evaporation (LTE) techniques, with high-end design for repeatable deposition processes. At the heart of the system is a modular process chamber designed for easy disassembly for routine maintenance. At the rear of the vacuum chamber is a port for the pumping system, comprising a turbomolecular pump backed by either a rotary-vane or dry-scroll type pump.

Chamber access is via a hinged top lid. Opening the lid reveals the substrate stage, which can hold substrates up to 4"/100 mm diameter. The stage can also be fitted with a heater, for platen temperatures up to 500 °C, and substrate rotation up to 20 rpm.

Deposition techniques:

There are three types of sources which can be used with the system: 2" diameter magnetron sputtering sources (metals and dielectrics deposition), TE1 sources for thermal evaporation (metals), and LTE sources (organics). The chamber can hold up to 3 sources of up to two types, powered by up to 2 power supplies.

Magnetron sputtering: Sources are water-cooled and designed for accommodating industry-standard targets of 2" diameter and up

to 1/4" thickness. All sputtering target materials are supported, and targets with or without backing plates can be used. Magnetrons are powered by either DC or RF power supplies. *SputterSwitch* technology allows user-selection of supply-source routing, i.e., allowing multiple sources to be run from the same power supply.

Thermal evaporation: Moorfield TE1 sources are capable of accepting industry-standard basket, wire or boat material supports. They come with box shielding for enhanced efficiency of operation and restricted stray IR and cross-contamination.

Low-temperature evaporation: LTE sources offer control for temperatures ≤ 600 °C, ideal for working with low melting point materials such as organics. LTE sources can be fitted with alumina or quartz crucibles (2 CC internal volume; suggested 1 CC charge). the sources can be operated in temperature- or power-control modes.

For all source types, replacing consumables (e.g., sputtering targets, boats and materials) is straightforward requiring minimal training and common tools. Maintenance, including cleaning, is also easy to perform.

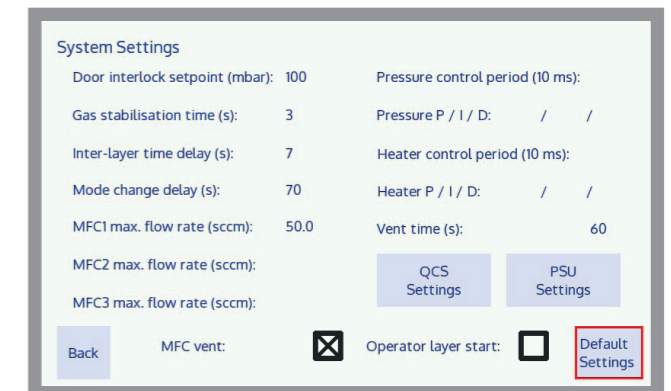
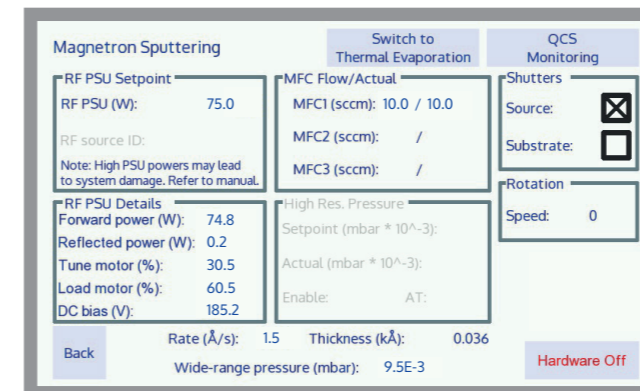
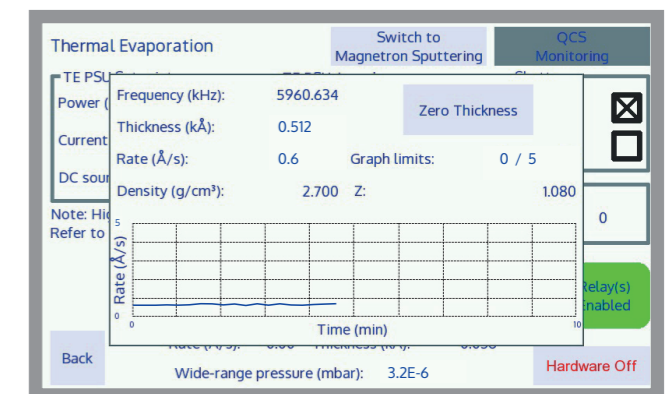
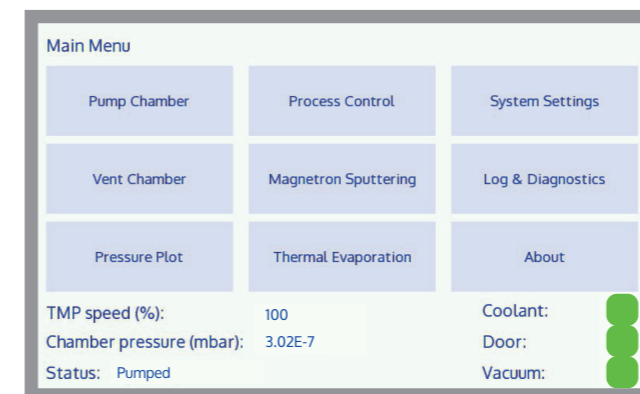
For any configuration, shielding is included for the purposes of minimising source cross-contamination. Optional quartz crystal sensor heads allow for rate and thickness monitoring.

Gas & pressure control:

For sputtering, the tool can be configured with up to 3 mass-flow controllers (MFCs). Standard configuration is for Ar only, but O₂ and N₂ lines are also available for reactive sputtering. During sputtering, a throttle valve restricts conduction between the chamber and pumping system, protecting the latter from high gas loads. Pressure control is upstream through MFC flow rates, but can also be carried out automatically via a PID feedback loop in response to defined pressure setpoints and high-resolution measurements.

Control system:

The unit is fitted with high-stability, industrial-grade PLC electronics. User operation is via a 7" touchscreen HMI mounted on the front panel. Powerful but easy-to-use software allows for system setup and operation via a menu-driven interface. Users are able to edit, save and load multiple recipes rapidly. Recipes and live data can be logged to a connected PC.

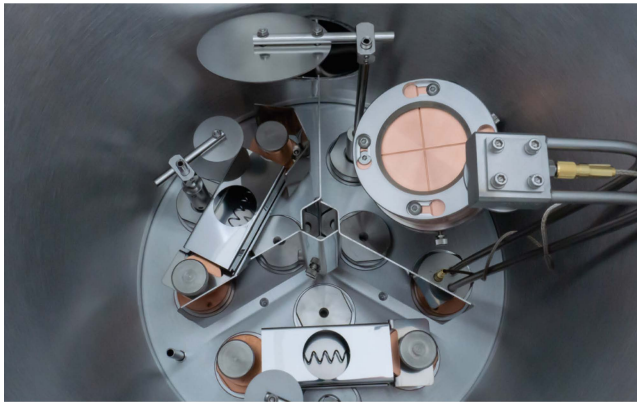


Screenshots from the touchscreen HMI software through which all user operation of the nanoPVD-ST15A is carried out. Functionality includes recipe definition/saving, process running and monitoring, pump/vent routine control, diagnostics and system configuration.

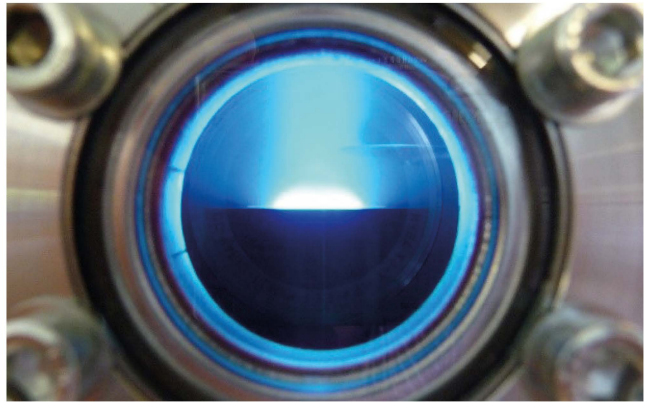
Options:

The standard configuration for the nanoPVD-ST15A includes the base system. To obtain a working tool, it is necessary to select at least one source of any type (maximum of 3 sources of up to two types) and at least one power supply (maximum of two including mixed types). Beyond sources and power supplies, a variety of options allow the unit to be configured per specific budgets and applications:

- Dry backing pump
- Fast chamber vent
- Chamber *SafeSeal*
- Substrate rotation
- Substrate Z-shift
- Source and/or substrate shutters
- 500 °C substrate heating
- Co-deposition
- *SputterSwitch* technology
- Up to 3 MFCs
- High-resolution automatic pressure control
- Quartz crystal sensor heads



Interior of a nanoPVD-ST15A process chamber equipped with two thermal evaporation sources for metals and a magnetron sputtering source for dielectrics.



A magnetron sputtering source operating inside the nanoPVD-ST15A process chamber.

System requirements: (standard configuration)

- Process gases: 25 psi supplies, 99.99% purity or better
- Service gas: Dry compressed air, nitrogen or argon,
- 60–80 psi supply
- Power: Single-phase 230 V, 50 Hz, 10 A
- Chilled water: 18–20 °C, 1 L/min, pressure < 2 bar
- Exhaust extraction

Applications:

- Fundamental research
- Education
- Product R&D

All images/descriptions in this brochure are indicative only; final appearance and design subject to your exact configuration.

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