

MINILAB 026

Flexible, modular systems for high-quality physical vapour deposition



Key Features:

- Modular design
- 'Clam-shell' or bell-jar chambers
- Turbomolecular pumping systems
- Base pressures $< 5 \times 10^{-7}$ mbar
- Thermal evaporation
- Low-temperature evaporation (LTE)
- Magnetron sputtering
- Metals, dielectrics and organics deposition
- Up to 6" diameter substrates
- Touchscreen HMI for system control
- Equipped for easy servicing
- Comprehensive safety features
- Cleanroom compatible
- Proven performance
- Glovebox-compatible

MiniLab Systems — Overview:

MiniLab systems from Moorfield provide superior coating performance, with the flexibility and modularity of design to address a huge range of customer requirements. The MiniLab range consists of several platforms. Each platform is generally associated with a specific vacuum chamber size. While all chambers are built to the same standards,

and allow for high-vacuum operation, larger chambers allow for more techniques and flexibility than their smaller counterparts. In addition to thin-film deposition, MiniLab systems can also be fitted with complementary techniques such as ion beam sources, etching components, and annealing stages.

MiniLab 026 Platform:

MiniLab 026 systems are ultra-compact floor-standing vacuum systems for metal, dielectric and/or organics thin-film deposition. The MiniLab 026 is also glovebox-compatible and is the only system in the

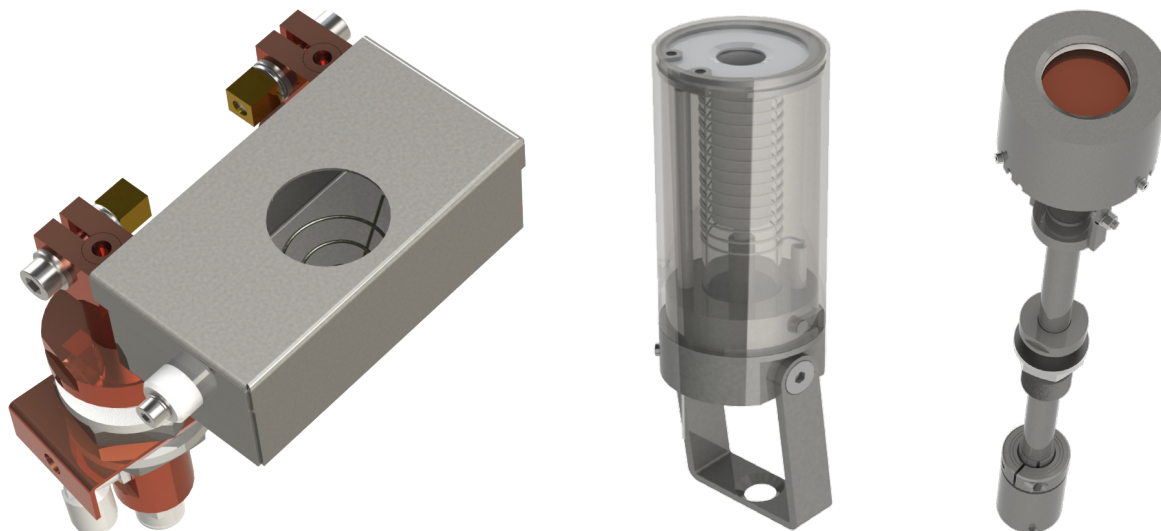
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MiniLab range that can be easily retrofitted to an existing setup. A turbomolecular pumping system is standard, for high-vacuum base pressures of better than 5×10^{-7} mbar.

Configuration and Options:

The MiniLab 026 base configuration includes a turbomolecular pump positioned on an ISO100 port at the rear of the vacuum chamber. The base of the vacuum chamber sits, as a well, into the supporting frame. The chamber lid can be either a stainless-steel top-hat style lid (i.e., for a 'clam-shell' type chamber arrangement), or a bell-jar — similar to the Edwards E306.

The system can be equipped with a wide variety of deposition techniques. These include thermal and low-temperature evaporation sources (for metals and organics), and magnetron sputtering sources (for metals and inorganics). Deposition sources are mounted on the chamber base-plate. Substrate stages are typically fitted at the top of the chamber, and can accommodate a range of substrate sizes up to 6" diameter. Substrate heating, rotation and z-shift are available. Examples of configurations for specific applications are listed below.



Above: Examples of deposition sources available for the MiniLab 026: Moorfield TE1 source for standard thermal evaporation (left), Moorfield LTE-1CC source for low-temperature evaporation (LTE; middle) and Moorfield *Flexi-Head* MAGNETRON source for magnetron sputtering (right).

Thermal evaporation: Up to 3 thermal evaporation sources. Moorfield TE1, TE2 or TE3 models available. Water-cooled power feedthroughs and boxed shielding for excellent vacuum maintenance and low contamination. Power supplies available for automatic, manual, sequential- and co-deposition.

Low-temperature evaporation (LTE): Up to 2 organics sources. Moorfield LTE-1CC, LTE-2CC and LTE-5CC models available. Alumina or quartz crucibles. Power supplies equipped for temperature and power control, in automatic and manual modes.

Magnetron sputtering: Moorfield MAGNETRON sources for 2" or 3" industry-standard targets (easy fitting/removal). RF, DC or pulsed DC power supplies, fully integrated with system touchscreen controller. Various gas and pressure control packages, including MFCs for process gas introduction. Throttle valve for protecting pumping system from gas loads.

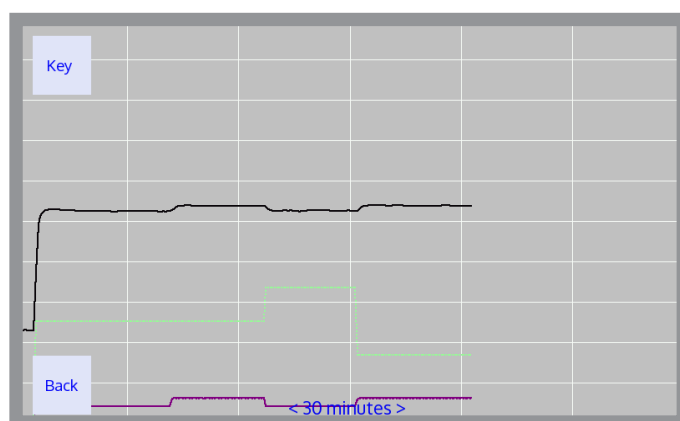
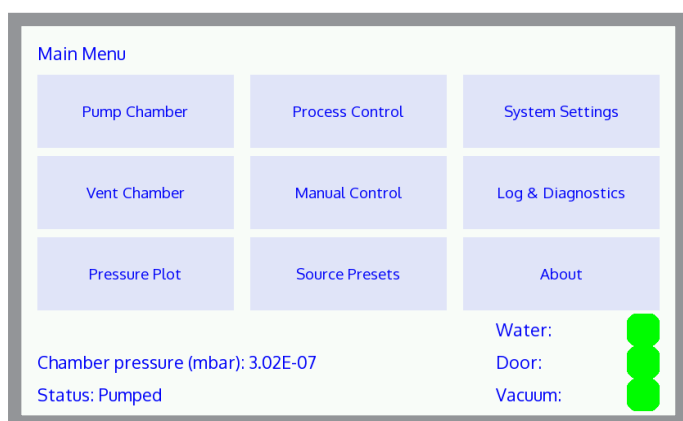
Multi-technique systems: Various combinations of all of the above can be included in MiniLab 026 systems.

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For all techniques, deposition rate monitoring (via quartz crystal sensor heads) together with thin-film monitors and controllers are available.

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 (note that manual control via electronics rack front panels is also possible, depending on exact system configuration). *IntelliNet* software allows for data-logging and diagnostics to a connected PC.



Above: Screenshots from the touchscreen HMI software through which MiniLab 026 general control is carried out.

Glovebox Compatibility:

The MiniLab 026 is compatible with gloveboxes of various manufacturers, and can be easily retrofitted to existing setups. For this, a suitable hole is created in the glovebox floor for accepting the bottom part of the chamber. A hermetic seal is created. The chamber lid is fitted with easy-to-use, ergonomic handles for straightforward operation through gloveports. A microswitch ensures the chamber is fully closed before pumping routines are initiated. The system's touchscreen HMI is fitted to the glovebox frame. We also supply complete glovebox-PVD packages; please contact us for details.

Technical Specification:

Chamber: 305 mm ID stainless-steel front-loading chamber, 350 mm height. Hinged upper part and lid. Upper part can be replaced with a glass bell jar. Base-plate and lid fitted with ports for in-chamber hardware. Viton o-ring seals.

Safety interlocks: Water and vacuum levels. Door microswitch for glovebox-integrated units.

Pumping group: Water-cooled Edwards or Leybold turbomolecular pumps. Edwards rotary or dry scroll-type backing pumps.

Pressure measurement: Wide-range gauge (Edwards or Inficon) and optional capacitance manometers for high-resolution measurement.

Substrate stages: Stainless steel, aluminium or copper with threaded holes for substrate attachment. Up to 6" diameter substrates. Optional rotation, heating and z-shift modules.

Deposition sources: Various types depending on requirements (see above). Separate brochures available for all Moorfield source types.

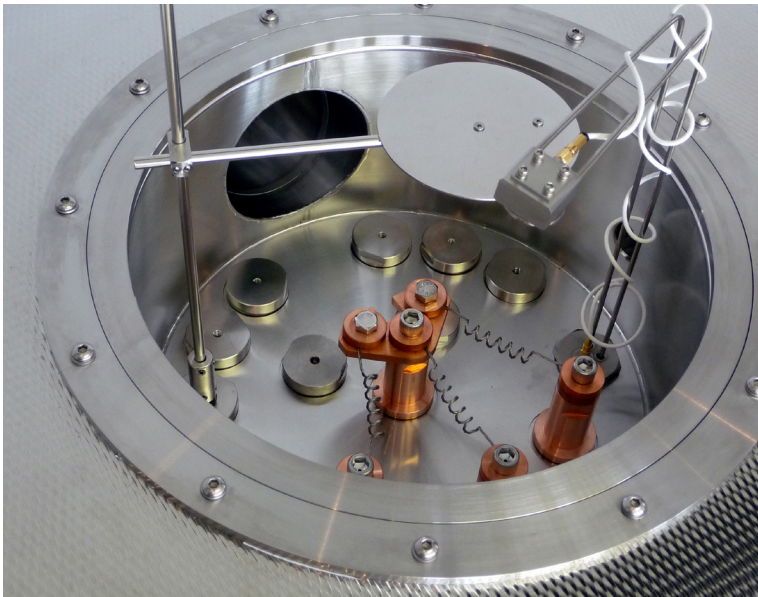
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Power supplies: Various types depending on integrated techniques. All power supplies fully integrated within system electronics rack.

System control: Industrial-grade, high-stability PLC electronics core. Designed for safe operation and reliable vacuum integrity.

Weight: Approximately 100–200 kg; dependant on configuration.

Size: 1050 mm (height) × 590 mm (depth) × 590 mm (width); dependant on configuration.



Above: Lower part of MiniLab 026 chamber fitted with TE3 thermal evaporation source, shutter and quartz crystal sensor head. Right: MiniLab 026 system with optional bell-jar chamber.



System Requirements—Basic Configuration:

- Process gases: 25 psi supplies, 99.99% purity or better
- Service gas: Dry compressed air nitrogen or argon, 60–80 psi supply
- Vent gas: N₂, 0.5 bar
- Power: Single-phase 230 V, 50 Hz, 13 A
- Chilled water: 18–20 °C, 3 L/min, pressure < 4 bar
- Exhaust extraction

Applications:

- Fundamental research
- Education
- Product R&D

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