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H1000 Series
High Performance
Thermal Chuck System





Micromanipulator
Analytical Probing for Professionals

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The H1000 Thermal System

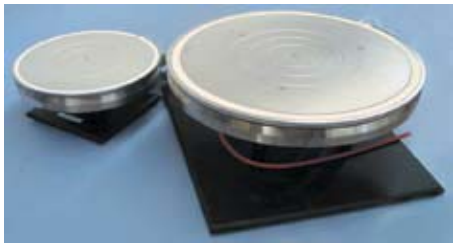
has been specifically designed for use with probe stations and features:

- Super Low Noise Performance
- Superior Temperature Uniformity
- High Isolation
- Low Capacitance
- Fast Cycling Times
- Modular Configurations
- Wide Temperature Range (-65 °C to +400 °C 4",6",8") (-55 °C to +300 °C 12")

Patented High Performance Chucks

Micromanipulator's low leakage (triaxial) chucks feature a patented surface/guard design. With this unique design, the electrical "guard" of the chuck surface is integrated into the surface itself. The benefit to you is:

- No separate, raised guard to make loading a wafer more difficult
- Lowest leakage and noise levels of any chuck in the industry
- Low chuck capacitance

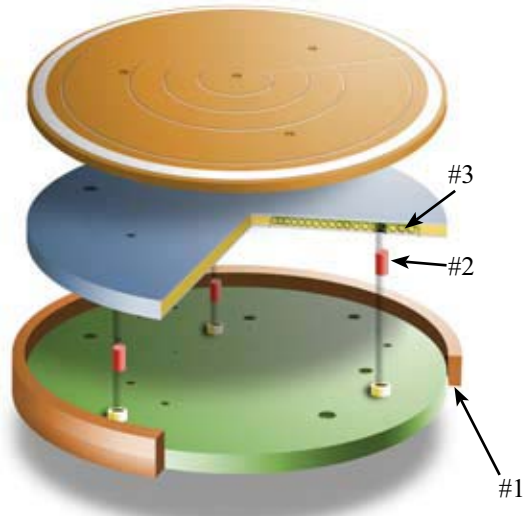


8" (200mm) and 12" (300mm) Thermal Chucks

Design Concept, a System of Components

The H1000 series of thermal chucks was designed from 50 years of probing experience. The result is a thermal chuck SYSTEM that integrates into the probing environment to provide not only simple thermal control, but also maintains the accuracy and functionality of the probing station itself. This approach is evident in features such as:

- **External Cooling Shield (#1).** Presents a cool surface around and under the chuck to minimize burns and prevent transfer of the chuck heat to the probe station stage drive. Maintains positioning accuracy, repeatability and enhances the reliability of the stage drive itself in both the manual and programmable systems.
- **Plumbing Service Module.** External to the thermal chuck controller, this module routes the flow of coolant outside of the main controller rack. Removes the danger of coolant leaks on sensitive equipment in a rack mounted controller.
- **Quick Disconnects.** Hoses carrying cooling fluid feature self-sealing quick disconnects to prevent fluid leakage (and its associated inconvenience) when disconnecting the chuck.
- **Kinematic Mounting (#2).** Places the hot chuck thermal surface on a dynamic mount that actually minimizes vertical expansion into the probes or probe card.
- **Cast-in Heating and Cooling Elements (#3).** Provides for rapid temperature cycling as well as the best temperature uniformity in the industry.
- **PID Control.** Provides only the power needed to maintain temperature for quieter operation and better test results.



Configurations to Match Your Application

Configure the thermal chuck system to fit your needs including choices of:

- Hot only (ambient to +400°C or +300°C)
- Hot and Cold (as low as -65°C or -55ºC)
- DC driven (low noise)
- AC driven (economical)
- Coaxial chucks (4", 6", 8", 12")
- Triaxial chucks (4", 6", 8", 12")
- Modular design allows system upgrades

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pcTC™ Thermal Chuck Control Software (Optional)

Micromanipulator's pcTC™ Thermal Chuck Control program is a Microsoft Windows™ based, user friendly, graphic interface program. This program controls a variety of thermal chuck systems including those produced by Micromanipulator. The program features common function icons and adjustable windows for easy set up of heat, soak and cool programs as well as event notification to other concurrently running programs.



Manual Set Up screen.

- **Manual Set Up:** Easy control of temperature set points in heat and cool modes. Simply enter the temperature desired, then activate the heat or cool cycle. Cycles may be stopped at any time.
- **Programming a Sequence:** Easy selection of the function icon, setting the parameters. Heat, Soak and Cool events may be programmed with external program event notification, and sequence files may be saved and recalled.
- **Notification:** Easy external program notification using either the common event check boxes or the flexible script editor.
- **Set Up Wizard:** Easy system configuration. Select the device, the communications interface, or Windows programs to be notified.

Computer Interface (Optional)

Systems may use the native RS-422 interface to both the heat controller/power supply and cooling system, or use the optional RS-232 or IEEE-488 interfaces.

H1000 Controllers

All H1000 controllers feature Proportional, Integral, Derivative (PID) control. This method of control uses these three operational modes to provide optimum performance in dampening system response (P), correction for drift between the set point and the actual process temperature (I), and anticipation of set point approach to reduce over and under shoot (D). The PID algorithms are tuned to provide maximum efficiency, cycle speed and control accuracy over the thermal chuck system temperature range. All H1000 controllers feature isolation relays to ensure electrically quiet operation when power is not demanded. All H1000 controllers provide state-of-the-art safety features.

DC Controller/Power Supply

The H1000 DC controller/power supply features a LINEAR DC power system with PID maximized ramp speed and accuracy. The DC power supply coupled with the high electrical isolation of a triaxial H1000 series hot chuck provides a thermal chuck system with noise levels as low as 1 fA. The DC power supply may also be used with a coaxial H1000 series hot chuck where electrical noise needs to be low but where the application does not demand the high performance of the triaxial system.

AC Controller/Power Supply

The H1000 AC controller/power supply features a "Zero Crossing" point to minimize noise spikes due to abrupt changes in the drive signal. The result is a very electrically quiet and efficient drive signal to the chuck. For applications where the chuck may be grounded, the AC power supply is electrically quiet enough for most applications.



DC controller for low noise.


AC controller

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H1000 Thermal Systems

Cooling Systems

Cooling systems provide fast cool down of the thermal chuck, a thermal shield to protect station mechanical and electrical parts, and temperature stability around ambient temperature. Temperature control is provided by the heat controller when in heat mode.

Cooling control modules operate in conjunction with the heating control modules to provide operation over the full system temperature range, and automatic purging of the chuck fluid.



C1000-V0-H (facility water)

The C1000-V0-H cooling system is an economical way to quickly cool the thermal chuck using water supplied by the user. The user supplied water is directed to an open drain.

Located external to the electronic control equipment, the Service Module (shown left) is designed to eliminate the danger of fluid leaks causing equipment damage. For more information, see the C1000-V0-H specification sheet A1011206.

C1000-HE (air)

The heat exchanger system (shown right) is a self-contained unit that eliminates the need for the user to supply cold water and drainage to cool the thermal chuck. For more information, see the C1000-HE specification sheet A1011207.





C1000-C-0 (0°C Chiller)

The zero degree cooling system provides chuck cooling capability down to 0°C. The zero degree chiller (shown left) is used in conjunction with the Cooling Control Module (shown on page 3) and the Service Module (shown above, top left) to control the thermal chuck temperature. The fluid from the chiller is used to cool the external cooling shield and thus permits stable temperature control. For more information, see the C1000-C-0 specification sheet A1011208.

HC1000 -65°C Controller/Power Supply + Chiller



The HC1000 System (shown right) is an integrated temperature control product which has the capability of controlling the temperature of the thermal chuck down to -65°C*. The HC1000 system incorporates the same heating technology that is used in the H1000 System and is available in either AC and DC configurations. A two-stage refrigeration system is used to provide a source of cooling fluid to control the thermal chuck temperature to -65°C*. For more information, see the HC1000 System specification sheet A1011209.

* -65ºC for 4"/6"/8" chucks and -55ºC for 300mm chucks.

A dry gas purge is highly recommended for low temperature operation. See specification sheet A1008765 for more information.

Specifications subject to change without notice.

A1010480 rev 5
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The Micromanipulator Co., Inc.

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Analytical Probing for Professionals

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