

### Introduction

Micromanipulator's H1000 Series Thermal Chuck System is an integrated system to maximize your options. Choose a Thermal Chuck *and* a Temperature Control System (operate either an AC *or* DC Heat Controller). Next choose desired heat exchanger (cooling to ambient *or* rapid cooling of the thermal chuck below the cool setpoint). Then choose the Cooling Option (either above ambient with user-supplied cooling water *or* rapid cool down to 0 degrees C). This specification sheet features the AC and DC Heat Controllers. The Heat Controller is the primary building block when configuring an H1000 thermal system.

The Model H1000-DC1 and H1000-AC1 Heat Controllers provide temperature control of the H1000 series thermal chucks at temperatures above ambient. The Heat Controller is the primary building block when configuring an H1000 thermal chuck system to meet your requirements.

### Features

- Employs *Proportional, Integral, Derivative* (PID) control which has been optimized to provide precise temperature control, while virtually eliminating temperature overshoot at controlled temperatures above 100° C.
- AC Heat Controller controls power with a zero-crossing detector in conjunction with burst firing to eliminate 60Hz harmonic noise while controlling power to output to the thermal chuck.
- DC Heat Controller includes a linear DC power supply which supplies more than 1000 VA with less than 25mv ripple at 100 volt output.
- Each of the AC and DC Heat Controllers supply enough power to ramp a triaxial 8" (200mm) thermal chuck rapidly and with precise control. <sup>[1]</sup>
- Internal circuitry in both the AC and DC controllers provides safe over-temperature protection.
- The DC Heat Controller has both a Heat Controller and a DC Power Supply rack mounted in a cabinet.
- The H1000-AC1 Heat Controller is enclosed for bench top use or can be rack mounted with an optional rack mount kit.
- Optional 19" (48cm) rack mount kit is available. Requires 10.5" 16.67cm) rack space in a 25" (63.5cm) deep cabinet.
- All versions with H1000 ambient to 400 degree thermal chucks include ambient cooling option with heat exchanger.
- Can be configured with 0 degree C chiller option *or* with -65 degree C chiller option for H1000 thermal chuck configurations.
- The AC and DC Heat Controllers allow entry of up to 10 temperature calibration data offset points to cause the H1000 display to match the measured temperature of the chuck surface.
- Both heat controllers include a built-in RS-422 interface. RS-232 and IEEE-488 interfaces are available as options.
- Optional temperature control software enables programmable sequencing of heat, cool and soak cycle.

### Specifications

#### Performance

- Accuracy without calibration:  $\pm 0.8^{\circ}$  C of the temperature measured by the RTD sensor in the thermal chuck.
- Accuracy with calibration:  $\pm 0.5^{\circ}$  C of the temperature measured at the chuck surface with an external measurement device.
- Stability (Resolution of 0.1° C):
  - $\pm 0.3^{\circ}$  C at temperature above 50° C
  - $\pm 1.0^{\circ}$  C at temperatures within 5° C of ambient, using the 0° C cooling option
- Typical ramp rate from 25° to 400° C: <sup>[1]</sup>
  - 6" (150mm) coaxial chuck: <11 minutes.
  - 8" (200mm) triaxial chuck: <15 minutes.

<sup>[1]</sup> To within 0.5° C of setpoint.



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