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Model TP03500 Series ThermoChuck® Systems

WORLDWIDE LEADER IN LOCALIZED THERMAL TEST SOLUTIONS SINCE 1970

Wafer testing at high and low temperatures from -65° to +300°C with high mechanical stability, high thermal capacity and repeatability

High Precision Thermal Wafer Testing

Description

The TP03500 Series ThermoChuck System is a revolutionary high performance platform providing exceptional flatness, parallelism, mechanical and thermal stability over a wide temperature range for the high precision testing of wafers at the wafer probing station. The chuck design is based on new, patented[1] technologies from Temptronic Corporation.

The TP03500 System consists of a low noise controller, a temperature controlled vacuum chuck assembly and your choice of cooling options. Available in diameters of 200mm (8 inch) or 300 mm (12 inches), the TP03500 ThermoChuck accommodates a variety of wafer sizes. All ThermoChucks have the ability to shut off outer vacuum rings for better "hold down" of smaller wafers. The chuck surface is electrically isolated and plated (gold, nickel, anodized or other) for your application.

Optional mechanical interface kits and prober-dedicated chuck configurations are available to adapt the ThermoChuck assembly to most probing stations. ThermoChuck Systems may be interfaced to wafer probing stations, laser trimmers or inspection stations.

For device characterization and analytical measurements on wafers and hybrids when the objective is to maintain probe contact during temperature excursions, Temptronic offers the Constant Height ThermoChuck. Designed utilizing Temptronic patented technology, the Constant Height ThermoChuck maintains growth as low as 50 microns and flatness to 50 microns throughout the entire temperature range.



Model TP03500C ThermoChuck System provides a temperature range of +15° to +300°C

Temperature Range

	200mm	300mm
TP03500A	-65° to +200°C	-65° to +200°C
TP03500C	+15° to +300°C	+15°C to +300°C
TP03500D	+20° to +200°/300°C	+20° to +200/300°/400°C
TP03500E	ambient to +200°/300°C	ambient to +200°/300°/400°C

Modular Design

The modular design of the TP03500 System enables the user to select a controller, chuck, chuck surface and chiller to meet specific application requirements. To expand the System's capabilities, the TP03500 may be enhanced with...

- A ThermoChuck of a different diameter or higher temperature.
- Interchangeable ThermoChuck surfaces.
- One of a number of chiller options (each having its unique capabilities and temperature range).
- Upgrades to the controller to accommodate a wider temperature range.

With a multitude of TP03500 system and chuck configurations available, this system fulfills a variety of thermal wafer probing requirements, from standard and high probe load testing to low leakage measurements, probing of high power wafers, cold probing and more.

Computer Interface

The TP03500 System is provided with **IEEE-488 and RS232** remote interfaces as standard features. This feature permits computer control of all user-settable parameters, including set temperatures, "At Temperature" Windows, ramp and soak times, number of cycles and the **"Inhibit Power"** command, which is used to limit electrical noise when making sensitive measurements.

Options and Accessories

Controlled Environment Enclosure (CEE)

Recommended for ThermoChuck operation at temperatures below the dewpoint, the CEE provides a dry, clean test environment. Optional light tight and EMI Shielded configurations are also available. Consult the factory.

TP03500 Series

Key Features

The TP03500 System's patented design with exceptional mechanical and thermal stability assures accuracy and precision, fulfilling the increasing requirements of standard and high sensitivity thermal wafer and hybrid probing.

The high precision TP03500 System meets and exceeds most thermal and mechanical requirements for a full range of thermal wafer test APPLICATIONS, including

- **Low leakage, low capacitance (femtoamp level) wafer measurements**
- **High power wafer probing**
- **High probe load testing**
- **High and low temperature probing**

- For true and accurate probe contact across the entire ThermoChuck surface, the TP03500 ThermoChuck's high mechanical stiffness assures that temperature is achieved with **extremely low deflection** (<5 microns at 50 kg.).

- The ***Constant Height ThermoChuck*** limits growth to less than 50 micron over the -65° to +300°C temperature range, including during transition between temperatures, ***a first in the industry.***

- Maintaining micron-level surface flatness and parallelism **at temperatures to +400°C,** enhances thermal test integrity.

- For testing highly sensitive **wafers up to 300mm** in diameter, the ThermoChuck's high electrical shielding and low noise controller keeps electrical noise to a minimum.

- For wafer measurements requiring ***high surface isolation***, Co-axial and Tri-axial ThermoChucks are available.

- The highly efficient cooling systems enable the convenient low temperature testing of a wafer or hybrid to as low as -65°C.

- For moisture-free cold testing, the Temptronic ***Controlled Environment Enclosure*** provides a moisture-free environment to -65°C.

- As with all ThermoChuck Systems, the TP03500 interfaces to all major manual, semi-automatic and automatic wafer probing stations, laser trimmers and inspection stations.

- **HCFC-Free and CFC-free**



Specifications

ThermoChuck® Platform

Low Temperature Capacity:	
	200 mm diameter chuck: -65°C
	300 mm diameter chuck: -65°C
High Temperature Capacity:	
	200 mm diameter chuck: +400°C
	300 mm diameter chuck: +300°C
Surface Flatness: to +200°C:	12.5 microns (200 mm)
	25 microns (300 mm)
@ +300°C:	25 microns
@ +400°C:	50 microns (200 mm chuck only)
Surface Parallelism:	20 microns at +200°C
	25 microns at +300°C
Temperature Uniformity:	
At temperatures to +200°C:	
	±0.5% of set temperature, or
	±0.5°C, whichever is greater
At temperatures > +200°C:	
	±1% of set temperature
High Thermal Resolution	0.1°C
Surface Isolation	10^9 ohms standard
	10^{14} ohms option available
Surface Capacitance at ambient: temperature:	
200 mm ThermoChuck:	
	<900 pf standard
	<600 pf option available
300 mm ThermoChuck:	
	<900 pf standard
	<500 pf option available
Deflection	<5 microns at 50 Kg

TP03500 Series

Specifications

System

Control method	DC Proportional, Integral, Derivative (PID)
Remote control	RS232, IEEE-488
Local control	Touch pad, vacuum flourescent display
Temperature accuracy	±0.5°C (when calibrated against NIST standard)
Temperature stability	±0.1°C
Temperature resolution	0.1°C
Ambient operating temperature	+10° to +30°C
Humidity operating range	0 to 90%, non-condensing
Overheat protection temperature	Redundant RTD
Temperature Display	0.1°C resolution
Audible Noise of System	62 dbA
Refrigerants:	**HCFC-free and CFC-free,** non-toxic, non-flammable
Industry Certifications:	Compliant with CE and ETL and conforms to the SEMI S2-93A safety

Facility Requirements

Power [2]

Controller (All systems): 230 V AC, 50/60 Hz,(190V/250V AC range), 20 amp

Chiller: TP03500A: 230 VAC, 50/60 Hz, 30 amp
TP03500C: 220 VAC, 60 Hz, 9 amp; 230 VAC, 50 Hz, 9 amp
TP03500D and TP03500E : Not applicable.

Air (CDA) Requirements [3]

Clean, Dry Air (CDA) = Air filtered to 5 micron particulate contamination oil content: <0.01 ppm by weight, filtered to 0.01 micron oil contaminant.

Contact factory for specification for required flow and pressure for specific applications.

Fluid: 1.5 liters (50.7 fl. oz.). For fluid type, contact factory.

Vacuum: 600 mm HG.

[2] System power configuration must be specified at the time of order.

[3] No compressed air is required for Model TP03500A System.

Weights and Dimensions

DIMENSIONS	**H**	**W**	**D**
Controller (for all models)	15 x	45 x	50 (cm.)
	6 x	18 x	20 (in.)

Cooler/Circulator

TP03500A	107 x 58.5 x 71 cm. (42 x 23 x 28 in.)
TP03500C	85.1 x 41.9 x 81.3 cm. (33.5 x 16.5 x 32 in.)
TP03500D (vortex unit)	4 x 10.2 x 21.5 cm. (1.6 x 4 x 8.5 in.)
TP03500E	not applicable

WEIGHT:

Complete System (standard), packed with accessories

TP03500A: 317 kg. (700 lb.) approximately
TP03500C: Check with factory
TP03500D: Check with factory
TP03500E: Check with factory

System (By module) :

- Chuck: Packed: 7.25 kg. (16 lbs.) approx.
  (Will vary with specific application; contact factory.)
- Controller: 18 kg. (40 lb.) approx.
  Packed: 21 kg. (46 lb.) approx.
- Cooler/Circulator (approximate):
  TP03500A: 193 kg. (425 lb.); Packed:275 kg. (605 lb.)
  TP03500C (optional cooler/circulator): 63 kg. (141 lb.)
  TP03500D: Check with factory
  TP03500E: Not applicable

ISO 9001 Certified

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