

# **MPI TS2000-SE** 200 mm Automated Probe System

## For accurate and reliable DC/CV, RF and mmW measurements

### FEATURES / BENEFITS

#### Designed for Variety of On-Wafer Applications

- Device Modeling - DC-IV / DC-CV / Pulse-IV
- RF and mmW - RF Setup from 26 GHz to 110 GHz & beyond
- Failure Analysis - Probe card / Internode Probing
- Wafer Level Reliability - Hot / Cold / Long-term test

#### MPI ShieldEnvironment™ for Accurate Measurements

- Designed for Advanced EMI / RFI / Light-Tight Shielding
- fA low-leakage capabilities
- Ready for temperature range -60 °C to 300 °C

#### Ergonomic Design and Options

- Front and advanced automated single wafer side loading capability with easy pre-alignment for automated routines
- Vertical Control Environment (VCE™) with observation of the probing area from the side for safe operation
- Integrated active vibration isolation
- Completely integrated prober control for faster, safer and convenient system and test operation
- The Safety Test Management (STM™) option to load/unload wafers at any chuck temperatures and auto dew point control



### SPECIFICATIONS

#### Chuck XY Stage (Programmable)

Travel range	210 x 300 mm (8.27 x 11.81 in)
Resolution	0.5 µm
Accuracy	< 2.0 µm
Repeatability	< 2.0 µm
XY stage drive	High resolution stepper motor with linear encoder feedback system
Speed*	4-Speed XY chuck stage adjustable speed movement Slowest: 10 µm / sec   Fastest: 50 mm / sec

#### Chuck Z Stage (Programmable)

Travel range	50 mm (2 in)
Resolution	0.2 µm
Accuracy	< 2.0 µm
Repeatability	< 1.0 µm
Z stage drive	High resolution stepper motor with integrated pin drive system for easy wafer loading
Speed*	3-Speed Z chuck stage adjustable speed movement Slowest: 10 µm / sec   Fastest: 20 mm / sec

\*The speed is instantaneous speed, not average speed. There is accelerate and decelerate time when moving.

## SPECIFICATIONS

### Chuck Theta Stage (Programmable)

Travel range	$\pm 6.0^\circ$
Resolution	0.0004°
Accuracy	< 2.0 $\mu\text{m}$ (measured at the edge of the 200 mm chuck)
Repeatability	< 1.0 $\mu\text{m}$
Theta stage drive	High resolution stepper motor with linear encoder feedback system

### Video Camera (Vertical Control Environment™)

Sensor type	1/1.8" mono CCD
Sensor size	7.07 mm x 5.3 mm
Camera pixels	3 MP
Resolution	2048 x 1536 pixels

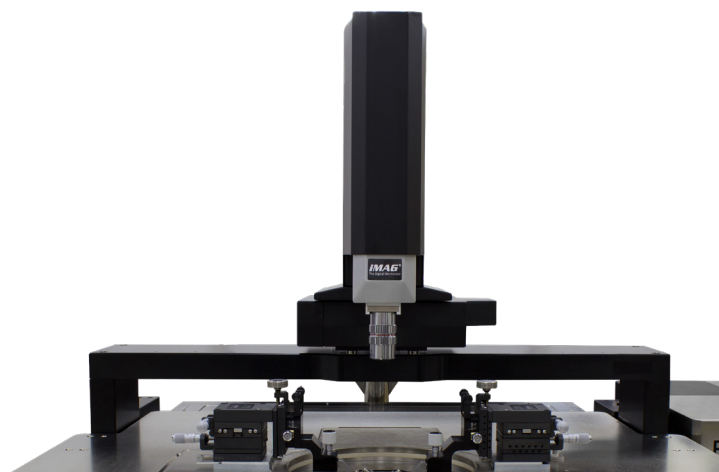
### Wafer Alignment Camera

Sensor type	1/1.8" color CCD
Sensor size	7.07 mm x 5.3 mm
Camera pixels	3 MP
Resolution	2048 x 1536 pixels

## MICROSCOPE MOVEMENT

	XYZ Programmable	XY manual, Z programmable	XYZ manual
XY - Travel range*	50 x 50 mm	50 x 50 mm	50 x 50 mm / 80 x 80 mm
Resolution	1 $\mu\text{m}$ (0.04 mils)	< 5 $\mu\text{m}$ (0.2 mils)	< 5 $\mu\text{m}$ (0.2 mils)
Repeatability	< 2 $\mu\text{m}$ (0.08 mils)	N/A	N/A
Accuracy	< 5 $\mu\text{m}$ (0.2 mils)	N/A	N/A
Z - Travel range	140 mm	140 mm	140 mm, pneumatic
Resolution	0.05 $\mu\text{m}$ (0.002 mils)	0.05 $\mu\text{m}$ (0.002 mils)	N/A
Repeatability	< 2 $\mu\text{m}$ (0.08 mils)	< 2 $\mu\text{m}$ (0.08 mils)	< 2 $\mu\text{m}$ (0.08 mils)
Accuracy	< 4 $\mu\text{m}$ (0.16 mils)	< 4 $\mu\text{m}$ (0.16 mils)	N/A

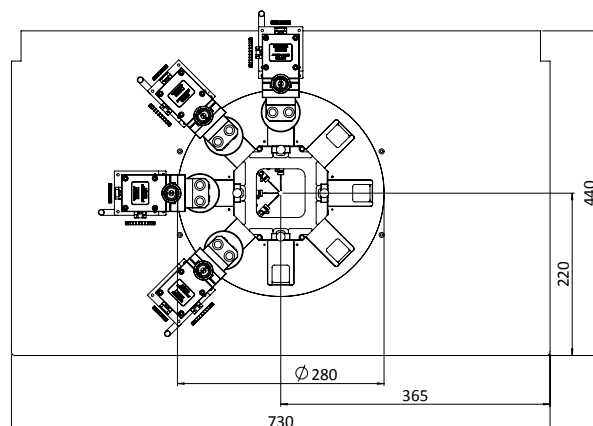
\*In case of ShieldEnvironment™ X x Y: 25 mm x 25 mm



## PROBE PLATEN

### Specifications

Material	Nickel plated steel
Chuck to ShieldGuard height	min. 5 mm
Feature	Integrated Air-Cool platen control for thermal stability of MicroPositioners
Max. No of MicroPositioners	8x DC or 4x DC + 2x RF or 2x DC + 4x RF or 4x DC + 4x RF Setup



Optional MPI MP50 MicroPositioners are shown with the drawing

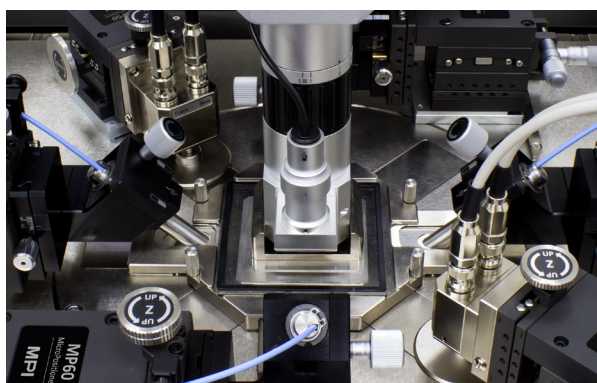
## ShieldEnvironment™

MPI ShieldEnvironment™ is a high performance local environmental chamber providing excellent EMI- and light-tight shielded test environment for ultra-low noise, low capacitance measurements. MPI ShieldEnvironment™ allows up to 4-port RF or up to 8-ports DC/Kelvin or a combination of those configurations. MPI ShieldCap™ provides easy reconfiguration of measurement setup as well as EMI/noise shielding - which make great difference in simplifying day to day operations.

### ShieldEnvironment™ Electrical Specifications\*

EMI shielding	> 30 dB (typical) @ 1 kHz to 20 GHz
Light attenuation	≥ 130 dB
Spectral noise floor	≤ -180 dBVrms/rtHz (≤ 1 MHz)
System AC noise	≤ 5 mVp-p (≤ 1 GHz)

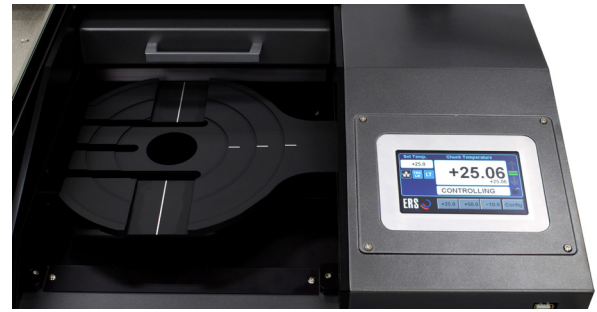
\*Including 4 MicroPositioners.



## KEY FEATURES

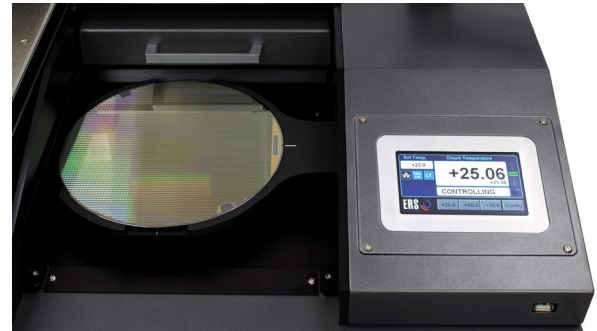
### Automated Single Wafer Loader

Convenient wafer loading with easy pre-alignment for automated routines. Loading or unloading of 100, 150 or 200 mm wafer is straight forward and intuitive.



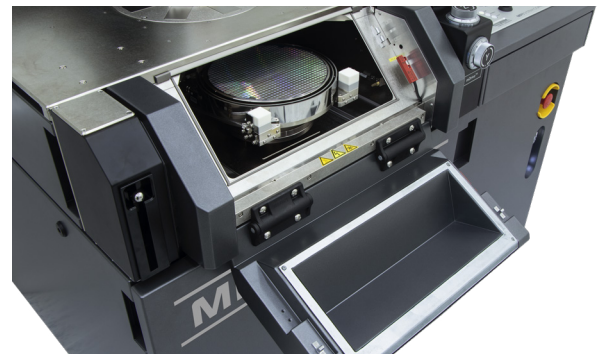
### Wafer Hot Swap

The automated single wafer loader and the Safety Test Management (STM™) provide a unique capability to load/unload wafers at any chuck temperature. Cooling down or heating up to ambient is not required anymore for loading or unloading the wafer.



### Manual Wafer Loading

Loading or unloading of wafer up to 200 mm or substrates is straight forward and intuitive. The unique MPI chuck design allows easy single ICs or wafer fragments loading in the front. Furthermore MPI SmartVacuum™ technology automatically recognizes the wafer size or the single Die and protects the wafer in case of power interruptions or inexperienced operators from releasing the vacuum inside the ShieldEnvironment™. No roll-out stage guaranties highest mechanical stability and short tube length for faster cool down time. Easy access to the AUX chucks for handling of calibration substrates, cleaning or contact check pads.



### Integrated Active Vibration Isolation

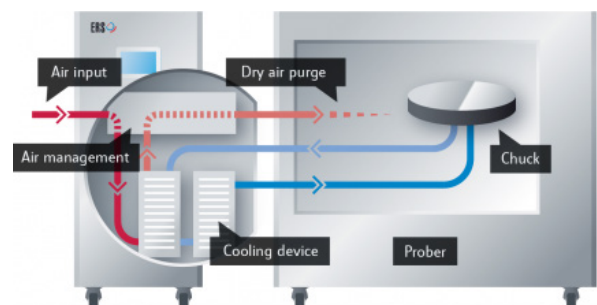
Highly effective vibration insulation with automatic level controlled air-spring damping system.

Internal frequency: 2.5 Hz  
Automatic load leveling.



### Minimized CDA Consumption

With the ERS patented technology, using the chiller for purging the ShieldEnvironment™, the CDA consumption is reduced by as much as 50%. Nitrogen purging is still possible by using separate valve.



\* Picture is courteously provided by ERS.



### Thermal Chuck Operation

The thermal chuck can be operated by using the fully integrated touchscreen display, which is placed at a convenient location in front of the operator for fast operation and immediate feedback.



### Integrated Prober Control

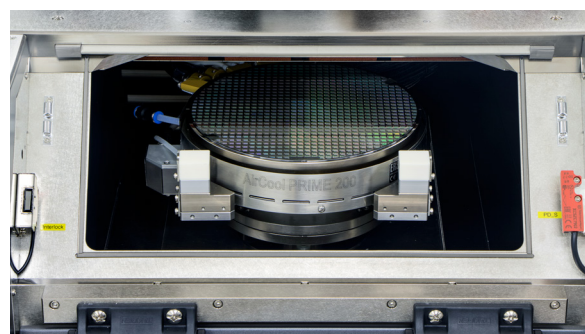
The hardware system controller is completely integrated into the probe system and designed to provide faster, safer and a more convenient probe system control and test operation. The keyboard and mouse are strategically located to control the software if necessary, as well as the Windows® based instrumentation.



## OPTIONAL FEATURES

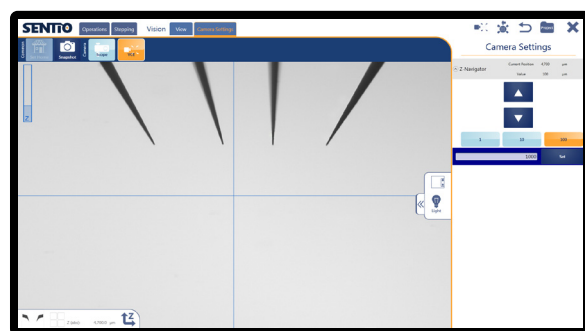
### Safety Test Management STM™

The STM™ system prevents opening of any doors during testing. Accidental opening of any system door during a negative chuck temperature is impossible on any event. Furthermore, an intelligent dew point control routine avoids moisture condensation during cold testing. The system automatically monitors the flow of CDA or Nitrogen. If the flow is interrupted or insufficient, the STM™ automatically turns the chuck into a safe mode by heating up the chuck as fast as possible to 60 °C.



### Vertical Control Environment™ (VCE™)

The VCE™ allows the probing area to be observed from the side for safe operation. It automatically detects the height of the tips and defines the position of the chuck contact. The wizard-guided setup procedure takes into account working with probe cards and DC or RF probes. It saves time during initial contacting and prevents damage to probes or pads, especially in the covered MPI ShieldEnvironment™.



### mDrive™

In addition to the standard joystick control, mDrive™ provides a truly intuitive, manual, one or two hands operation of all existing programmable stages, such as chuck, scope or MicroPositioners. X- and Y-axis fine control is available for the selected stage, where Z safety function requires additional enabling.

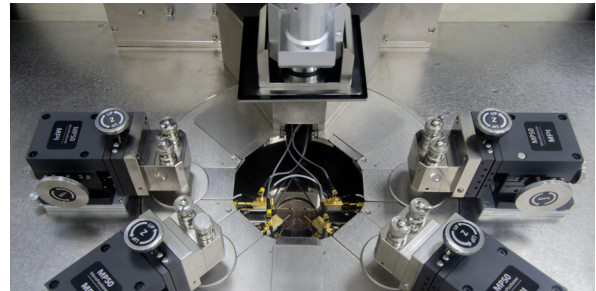
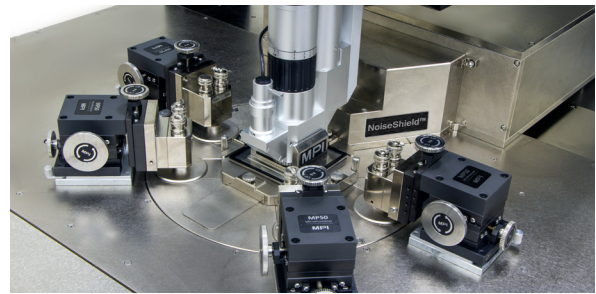


### NoiseShield™

MPI's exclusive NoiseShield™ offers in combination with MPI ShieldEnvironment™ for unsurpassed active EMI-Shielding of DUT and the measurement instrument (such as pre-amplifier unit). In addition, it provides all cables and connectors close to DUT.

The NoiseShield™ option provides shortest possible cable lengths to reduce parasitic capacitance and to maximize test system roll-off frequency. It reduces external magnetic field influences on the measurement results and makes the 1/f, RTN Setup more robust and test lab location less independent.

Low impedance cables (for DC or RF pad design), excellent low-impedance system's grounding and ferrite cores on the unique MPI Kelvin probes are part of the delivery in order to make the probe station completely "invisible" and the measurement results to reach the limit of the instrumentation.



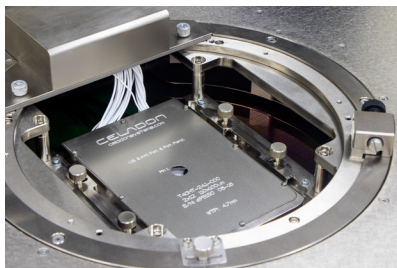
### Probe Hover Control PHC™

MPI Probe Hover Control PHC™ Allows easy manual control of probe contact and separation to wafer. Separation distance can accurately control with micrometer feedback for probe to wafer/pad positioning. Ease of use guarantees the safest operation by minimizing error during critical set-up and probe change operations.

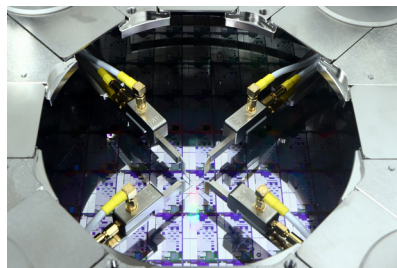


### Automated Test Over Multiple Temperatures ATMT™

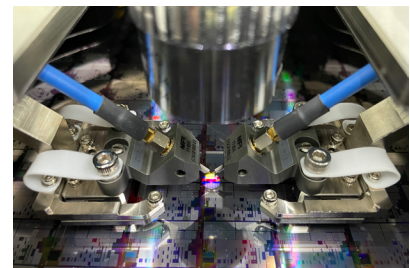
True to our mission of making complex probe station operation as intuitive as possible, minimizing training costs, and continuously focusing on reducing cost of test, MPI designed unique and cost-effective technologies, that enable Automated Test over Multiple Temperatures ATMT™. In combination with MPI's WaferWallet® or WaferWallet®MAX, Device Modeling and Wafer Level Reliability engineers will benefit from these features to generate significant more measurement data and will increase the entire Test Cell efficiency.



Celadon, high-performance, low-leakage probe cards



MPI Kelvin LTM high temperature probe arms



RF LTM probe arms, equipped with SmartCarrier™

#### ATMT™ DC

For DC over temperature measurements, Device Modeling and Wafer Level Reliability engineers are commonly using Celadon's, high temperature, low leakage probe cards. MPI and Celadon are finally offering leading edge, complete measurement solutions, enabling Automated Test over Multiple Temperatures ATMT™ DC at wide temperature range: -60...300°C.

For the case of a few measurements performed with MicroPositioners, MPI has developed thermally stable Kelvin LTM probes that allow Automated Test over Multiple Temperatures ATMT™ at -40 to 175°C.

#### ATMT™ RF

MPI's SmartCarrier™ uniquely combines different materials that automatically compensate for the lateral expansions of the RF probes and the wafer without the need for complex software or programmable MicroPositioners\*.

SENTIO®'s new patent-pending ContactSense™ image processing can determine the new contact positions on-the-fly with an accuracy of a few micrometers, completing MPI's Automated Test over Multiple Temperatures ATMT™ RF.

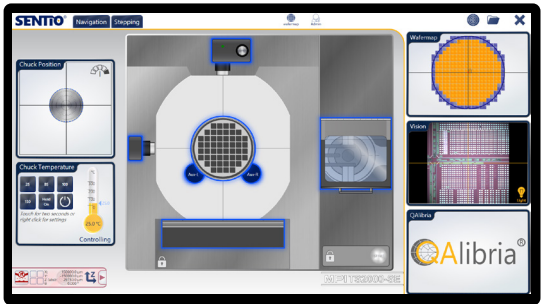
*\*One programmable MicroPositioner is recommended for automated RF calibration by using QAlibria®*



SOFTWARE SOLUTION

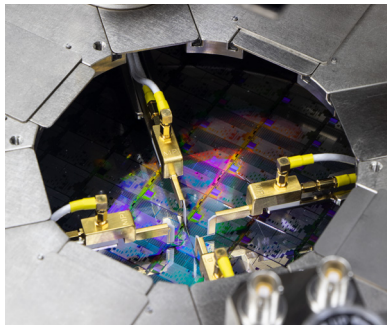
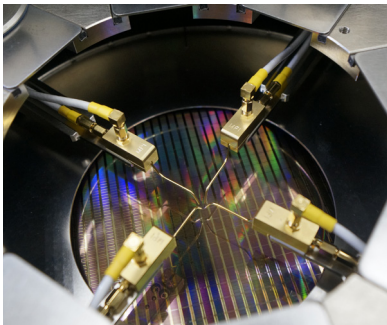
MPI’s automated engineering probe systems are controlled by the unique and revolutionary, multi-touch operation SENTIO® Software Suite: simple and intuitive operation saves significant training time. The scroll, zoom, and move commands mimic modern smart mobile devices and allows everyone to become an expert in just minutes. Switching between the active application and the other APPs is just a matter of a simple finger sweep.

By implementing intuitive multi-touch operation, QAlibria® provides crisp and clear guidance to the RF calibration process, minimizes configuration mistakes and helps to reach accurate calibration results the fastest. QAlibria® offers industry standard and advanced calibration methods. QAlibria® includes TOSM (SOLT), TMR, TMRR methods, and 4-port calibration capability additionally to the integration of NIST StatistiCal calibration packages providing easy access to the NIST multiline TRL metrology-level calibration and uncertain analysis.



TYPICAL CONFIGURATION WITH MPI KELVIN AND MPI KELVIN-HIGH TEMPERATRUE PROBES INSIDE ShieldEnvironment™

	Coax Probe	Triax Probe	Kelvin Probe	Kelvin HT Probe
Max voltage	500 V	500 V	500 V	500 V
Temperature range	-60 °C to 300 °C	-60 °C to 300 °C	-60 °C to 200 °C	-60 °C to 200 / 300 °C
Leakage current	< 0.8 pA	< ± 20fA	< ± 10fA	< ± 10fA / < ± 20fA
Connectivity	SMB / BNC	Standard Triax	Kelvin Triax	Kelvin Triax
Connectivity type	Single, Coaxial	Single, low noise Triaxial	Force / Sense, low noise Triaxial	
Characteristics impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Residual capacitance	< 95 fF	< 95 fF	< 95 fF	< 95 fF
Probe holder material	Au-plated Brass		Au-plated Bras (Guarded)	
Probe tip type	Variety of metal tips		Coaxial / Guarded	Guarded ceramic blades
Probe tips material	W, BeCu, Au-plated		W	WRe
Probe tips radius	0.5 µm – 25 µm	0.5 µm – 25 µm	0.5 µm – 5 µm	2 µm – 5 µm
Minimum pad size	25 µm x 25 µm	25 µm x 25 µm	30 µm x 30 µm	25 µm x 25 µm



Typical MPI configuration with Kelvin Probes

## NON-THERMAL CHUCKS

### Standard Wafer Chuck

Connectivity	Coax BNC (f)
Diameter	210 mm
Material	Stainless steel
Chuck surface	Planar with centric engraved vacuum grooves
Vacuum grooves sections (diameter)	3, 27, 45, 69, 93, 117, 141, 164, 194 mm
Vacuum actuation	Multizone control - All connected in meander shape, center hole in 3 mm diameter
Supported DUT sizes	Single DUTs down to 5x5 mm size or wafers 50 mm (2 in) thru 200 mm (8 in)*
Surface planarity	$\leq \pm 5 \mu\text{m}^{**}$
Rigidity	$< 15 \mu\text{m} / 10 \text{ N @edge}$

\*Single DUT testing requires higher vacuum conditions dependent upon testing application.

\*\*By using SENTIO® topography

### RF Wafer Chuck

Connectivity	Kelvin Triax (f)
Diameter	210 mm with 2 integrated AUX areas
Material	Nickel plated aluminum (flat with 0.5 mm holes)
Chuck surface	Planar with 0.5 mm diameter holes in centric sections
Vacuum holes sections (diameter)	3, 27, 45, 69, 93, 117, 141, 164, 194 mm
SmartVacuum™ distribution	In center for 5x5 mm (4 holes), 100, 150, 200 mm (4, 6, 8 in)
Supported DUT sizes	Single DUTs down to 5x5 mm size or wafers 100 mm (4 in) thru 200 mm (8 in)*
Surface planarity	$\leq \pm 5 \mu\text{m}^{**}$
Rigidity	$< 15 \mu\text{m} / 10 \text{ N @edge}$

\*Single DUT testing requires higher vacuum conditions dependent upon testing application.

\*\*By using SENTIO® topography

### Auxiliary Chuck

Quantity	2 AUX chucks
Position	Integrated to front side of main chuck
Substrate size (W x L)	Max. 25 x 25 mm (1 x 1 in)
Material	Ceramic, RF absorbing material for accurate calibration
Surface planarity	$\leq \pm 5 \mu\text{m}$
Vacuum control	Controlled independently, separate from chucks

### Electrical Specification (Coax)

Operation voltage	In accordance with EC 61010, certificates for higher voltages available upon request
Maximum voltage between chuck top and GND	500 V DC
Isolation	$> 2 \text{ G}\Omega$

### Electrical Specification (Triax)

Chuck isolation	Standard Chuck (10 V)
Force to guard	$\geq 1 \text{ T}\Omega$
Guard to shield	$\geq 1 \text{ T}\Omega$
Force to shield	$\geq 5 \text{ T}\Omega$



## THERMAL CHUCKS

### Specifications of MPI ERS AirCool® Technology

	Ambient to 150/200 °C	20 °C to 150/200 °C	-40 °C to 150/200 °C
Connectivity	Coax BNC (f)	Coax BNC (f)	Coax BNC (f)
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
Smallest temperature selection step	0.1 °C	0.1 °C	0.1 °C
Chuck temperature display resolution	0.1 °C	0.1 °C	0.1 °C
External touchscreen display operation	N/A	N/A	N/A
Temperature stability	±0.5 °C	±0.5 °C	±0.5 °C
Temperature accuracy	±1 °C	±1 °C	±1 °C
Control method	DC/PID	DC/PID	DC/PID
Chuck pinhole surface plating: 200 °C	Nickel	Nickel	Nickel
SmartVacuum™ distribution	In center for 5x5 mm (4 holes), 100, 150, 200 mm (4, 6, 8 in)		
Temperature sensor	Pt100 1/3DIN	Pt100 1/3DIN	Pt100 1/3DIN
Temperature uniformity	< ±1 °C	< ±1 °C	< ±1 °C
Surface flatness and base parallelism	< ±15 µm	< ±15 µm	< ±15 µm
Max. Voltage between			
Force-to-GND	500 V DC	500 V DC	500 V DC
Heating rates*	35 to 150 °C < 12 min 35 to 200 °C < 18 min	20 to 150 °C < 12 min 20 to 200 °C < 23 min	-40 to 25 °C < 12 min 25 to 200 °C < 16 min
Cooling rates*	150 to 35 °C < 15 min 200 to 35 °C < 18 min	150 to 20 °C < 18 min 200 to 20 °C < 30 min	200 to 25 °C < 20 min 25 to -40 °C < 36 min
Leakage @ 10 V	N/A	N/A	N/A
Electrical isolation	> 0.5 T Ω at 25 °C	> 0.5 T Ω at 25 °C	> 0.5 T Ω at 25 °C
Capacitance	< 750 pF	< 750 pF	< 750 pF

\*Typical data for all chucks based on FPS requirements.

**Specifications of MPI ERS AirCool® PRIME Technology**

	Ambient to 200/300 °C	20 °C to 200/300 °C	Ambient to 200/300 °C	20 °C to 200/300 °C
Chuck type	RF	RF	Ultra low noise	Ultra low noise
Connectivity	Kelvin Triax (f)	Kelvin Triax (f)	Kelvin Triax (f)	Kelvin Triax (f)
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)	Air (user supplied)
Smallest temperature selection step	0.1 °C	0.1 °C	0.1 °C	0.1 °C
Chuck temperature display resolution	0.01 °C	0.01 °C	0.01 °C	0.01 °C
External touchscreen display operation	Yes	Yes	Yes	Yes
Temperature stability	±0.08 °C	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	±0.1 °C	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Chuck pinhole surface plating: 200 °C / 300 °C	Nickel / Gold	Nickel / Gold	Nickel / Gold	Nickel / Gold
SmartVacuum™ distribution	In front for single DUT 5x5 mm (4 holes), In center for 150, 200 mm (6, 8 in)			
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C
Surface flatness and base parallelism	< ±12 µm	< ±12 µm	< ±12 µm	< ±12 µm
Max. Voltage between				
Force-to-GND	600 V DC	600 V DC	600 V DC	600 V DC
Force-to-Guard	100 V DC	100 V DC	600 V DC	600 V DC
Guard-to-GND	400 V DC	400 V DC	400 V DC	400 V DC
Heating rates*	35 to 200 °C < 16 min 35 to 300 °C < 20 min	20 to 200 °C < 15 min 20 to 300 °C < 22 min	35 to 200 °C < 18 min 35 to 300 °C < 26 min	20 to 200 °C < 16 min 20 to 300 °C < 28 min
Cooling rates*	200 to 35 °C < 23 min 300 to 35 °C < 31 min	200 to 20 °C < 27 min 300 to 20 °C < 32 min	200 to 35 °C < 24 min 300 to 35 °C < 32 min	200 to 20 °C < 35 min 300 to 20 °C < 34 min
Leakage @ 10 V	N/A	N/A	< 15 fA at 25 °C < 30 fA at 200 °C < 50 fA at 300 °C	< 15 fA at 25 °C < 30 fA at 200 °C < 50 fA at 300 °C
Electrical isolation	> 5 T Ω at 25 °C > 1 T Ω at 200 °C > 0.5 T Ω at 300 °C	> 5 T Ω at 25 °C > 1 T Ω at 200 °C > 0.5 T Ω at 300 °C	N/A	N/A
Capacitance				
Force-to-Guard	< 1600 pF	< 1600 pF	< 600 pF	< 600 pF
Guard-to-Shield	< 2000 pF	< 2000 pF	< 2000 pF	< 2000 pF

\*Typical data for all chucks based on FPS requirements.

**Specifications of MPI ERS AirCool® PRIME with Fusion Chiller Technology**

	-10 °C to 200/300 °C	-40 °C to 200/300 °C	-60 °C to 200/300 °C
Chuck type	RF	RF	RF
Connectivity	Kelvin Triax (f)	Kelvin Triax (f)	Kelvin Triax (f)
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
Smallest temperature selection step	0.1 °C	0.1 °C	0.1 °C
Chuck temperature display resolution	0.01 °C	0.01 °C	0.01 °C
External touchscreen display operation	Yes	Yes	Yes
Temperature stability	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noiseDC/PID
Interfaces	RS232C	RS232C	RS232C
Chuck pinhole surface plating: 200 °C / 300 °C	Nickel / Gold	Nickel / Gold	Nickel / Gold
SmartVacuum™ distribution	In front for single DUT 5x5 mm (4 holes), In center for 150, 200 mm (6, 8 in)		
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1 °C at > 200 °C
Surface flatness and base parallelism	< ±12 μm	< ±12 μm	< ±12 μm
Max. Voltage between			
Force-to-GND	600 V DC	600 V DC	600 V DC
Force-to-Guard	100 V DC	100 V DC	100 V DC
Guard-to-GND	400 V DC	400 V DC	400 V DC
Heating rates*			
25 °C	-10 to 25 °C < 2 min	-40 to 25 °C < 4 min	-60 to 25 °C < 5 min
200 °C	25 to 200 °C < 13 min	25 to 200 °C < 12 min	
300 °C	25 to 300 °C < 22 min	25 to 300 °C < 22 min	
Cooling rates*			
AC3 Mode	300 °C	300 to 25 °C < 11 min	300 to 25 °C < 12 min
	200 °C	200 to 25 °C < 6 min	200 to 25 °C < 8 min
	25 °C	25 to -10 °C < 5 min	25 to -40 °C < 10 min 25 to -60 °C < 16 min
TURBO Mode	300 °C	300 to 25 °C < 11 min	300 to 25 °C < 11 min
	200 °C	200 to 25 °C < 6 min	200 to 25 °C < 6 min
	25 °C	25 to -10 °C < 5 min	25 to -40 °C < 7 min 25 to -60 °C < 15 min
Leakage @ 10 V	N/A	N/A	N/A
Electrical isolation	> 5 T Ω at 25 °C or below > 1 T Ω at 200 °C, > 0.5 T Ω at 300 °C		
Capacitance			
Force-to-Guard	< 1600 pF	< 1600 pF	< 1600 pF
Guard-to-Shield	< 2000 pF	< 2000 pF	< 2000 pF

\*Typical data for all chucks based on FPS requirements.



**Specifications of MPI ERS AirCool® PRIME with Fusion Chiller Technology**

	-10 °C to 200/300 °C	-40 °C to 200/300 °C	-60 °C to 200/300 °C
Chuck type	Ultra low noise	Ultra low noise	Ultra low noise
Connectivity	Kelvin Triax (f)	Kelvin Triax (f)	Kelvin Triax (f)
Temperature control method	Cooling air / Resistance heater		
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
Smallest temperature selection step	0.1 °C	0.1 °C	0.1 °C
Chuck temperature display resolution	0.01 °C	0.01 °C	0.01 °C
External touchscreen display operation	Yes	Yes	Yes
Temperature stability	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C	RS232C
Chuck pinhole surface plating: 200°C / 300°C	Nickel / Gold	Nickel / Gold	Nickel / Gold
SmartVacuum™ distribution	In front for single DUT 5x5 mm (4 holes), In center for 150, 200 mm (6, 8 in)		
Temperature sensor	Pt100 1/3DIN, 4-line wired		
Temperature uniformity	< ±0.5 °C at ≤ 200 °C, < ±1 °C at > 200 °C		
Surface flatness and base parallelism	< ±12 μm	< ±12 μm	< ±12 μm
Max. Voltage between			
Force-to-GND	600 V DC	600 V DC	600 V DC
Force-to-Guard	600 V DC	600 V DC	600 V DC
Guard-to-GND	400 V DC	400 V DC	400 V DC
Heating rates*			
25 °C	-10 to 25 °C < 3 min	-40 to 25 °C < 4 min	-60 to 25 °C < 5 min
200 °C		25 to 200 °C < 15 min	
300 °C	25 to 300 °C < 26 min	25 to 300 °C < 26 min	25 to 300 °C < 26 min
Cooling rates*			
AC3 Mode	300 °C	300 to 25 °C < 12 min	300 to 25 °C < 14 min
	200 °C	200 to 25 °C < 8 min	200 to 25 °C < 10 min
	25 °C	25 to -10 °C < 6 min	25 to -40 °C < 12 min
			25 to -60 °C < 26 min
TURBO Mode	300 °C	300 to 25 °C < 12 min	300 to 25 °C < 12 min
	200 °C	200 to 25 °C < 8 min	200 to 25 °C < 8 min
	25 °C	25 to -10 °C < 6 min	25 to -40 °C < 10 min
			25 to -60 °C < 17 min
Leakage @ 10 V			
-10, -40 or -60 °C	< 30 fA	< 30 fA	< 30 fA
25 °C	< 15 fA	< 15 fA	< 15 fA
200 °C	< 30 fA	< 30 fA	< 30 fA
300 °C	< 50 fA	< 50 fA	< 50 fA
Capacitance			
Force-to-Guard	< 600 pF	< 600 pF	< 600 pF
Guard-to-Shield	< 2000 pF	< 2000 pF	< 2000 pF

\*Typical data for all chucks based on FPS requirements.



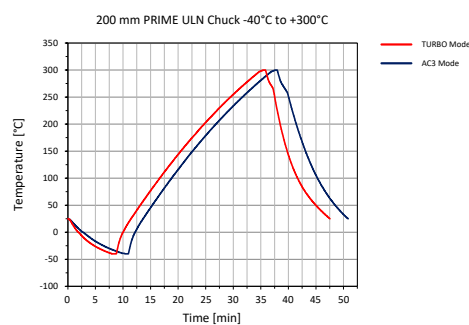
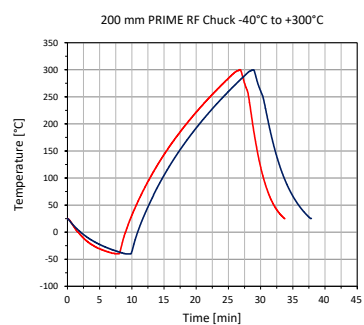
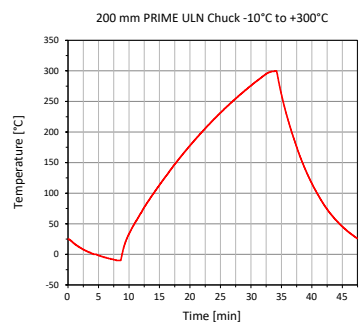
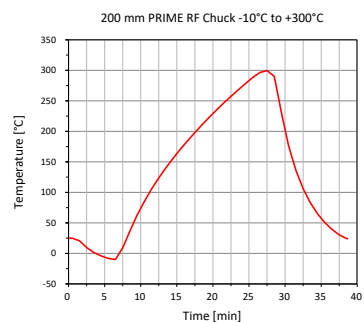
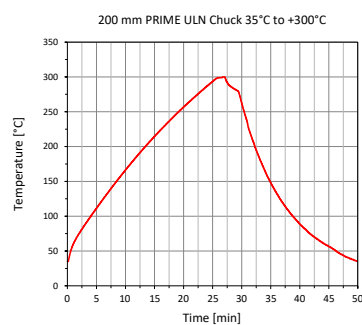
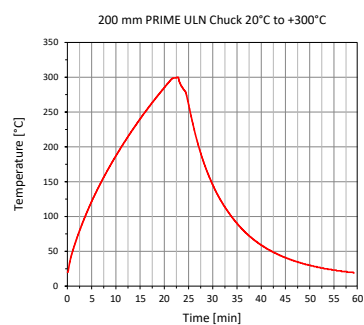
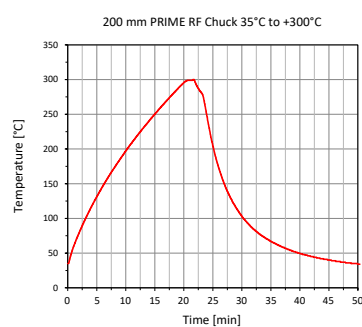
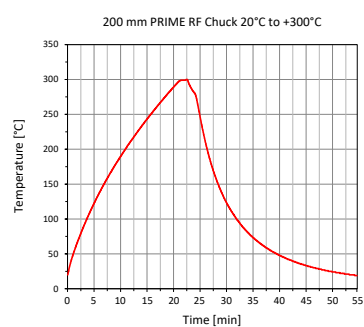
ERS AirCool® Fusion\*, Controller Integrated  
Chiller -40 °C / -60 °C



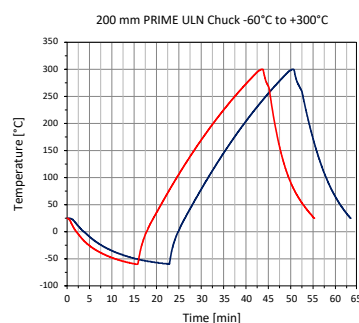
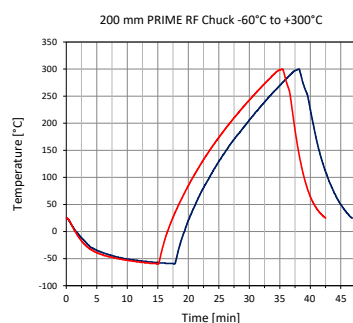
ERS AirCool® Fusion\*, Controller Integrated  
Chiller -10 °C

*\*ERS electronic GmbH patented solution*

## TYPICAL TRANSITION TIME



— TURBO Mode  
— AC3 Mode



## SYSTEM CONTROLLER SPECIFICATIONS

CPU	Intel® Core™ i7-7700, 3.6 GHz, 8M Cache, 14nm, 65W TDP, LGA1151(4C/8T)
RAM	DDR4 2400 MHz 16 GB x 1
64 bit operating system	Windows 10 Professional (English)
Power	460 W
Storage	SSD 500 GB
LAN	One internal and one external TCP/IP ports
USB Ports	Internal (on PC) x3, external x1
GPIB interface	Optional

## SUPPORTED SOFTWARE PLATFORMS

Drivers	WaferPro / IC-CAP & EasyEXPERT from Keysight, BSIMPro & NoisePro from ProPlus, ACS from Keithley
Emulation mode	Available for various prober control software*

\* Please contact your local support for more details.

## FACILITY REQUIREMENTS

### General Probe System

Power	100-240 V AC nominal ; 50/60 Hz
Vacuum	-0.9 bar
Compressed air	6.0 bar

## REGULATORY COMPLIANCE

3rd party, TÜV tested according to

- IEC 61010-1: 2010 + Am1:2016; EN 61010-1: 2010; IEC/EN 61010-2-010: 2014; IEC/EN 61010-2-081: 2015; EN ISO 12100: 2010; UL 61010-1: 2012/R: 2016-04; UL 61010-2-010: 2015; CAN/CSA-C22.2 No. 61010-1: 2012/U2: 2016-04; CAN/CSA-C22.2 No. 61010-2-010:2015

and certified for CE and US/Canada (NRTL), SEMI S2 and S8.

Copies of certificates are available on request

## WARRANTY

- Warranty\*: 12 months
- Extended service contract: contact MPI Corporation for more information

\*See MPI Corporation's Terms and Conditions of Sale for more details.

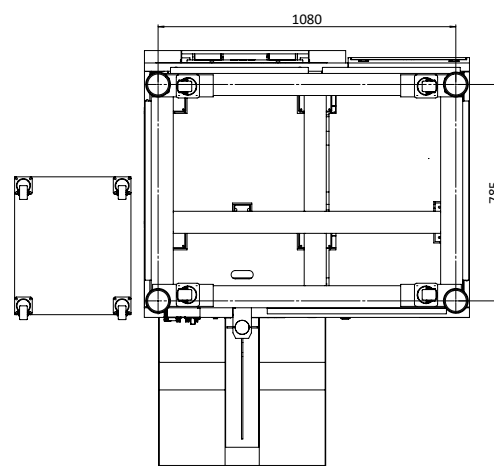
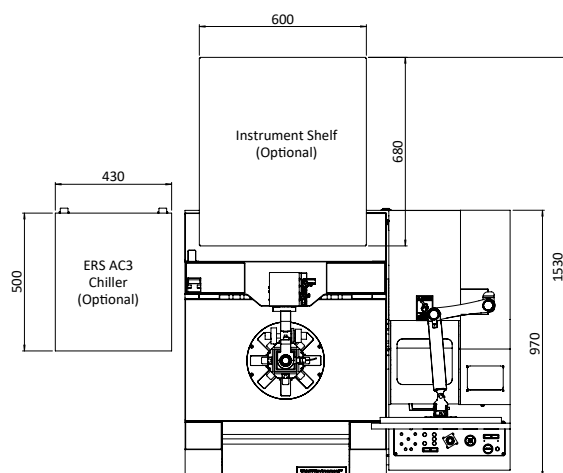
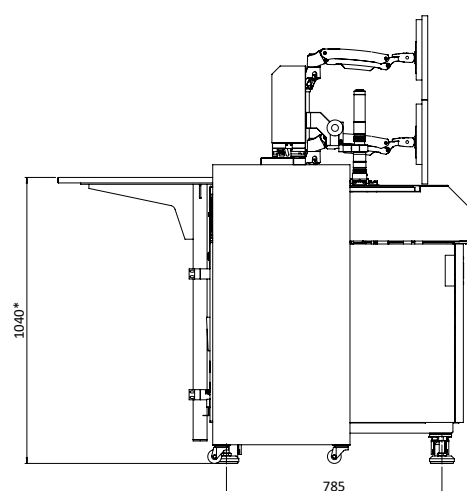
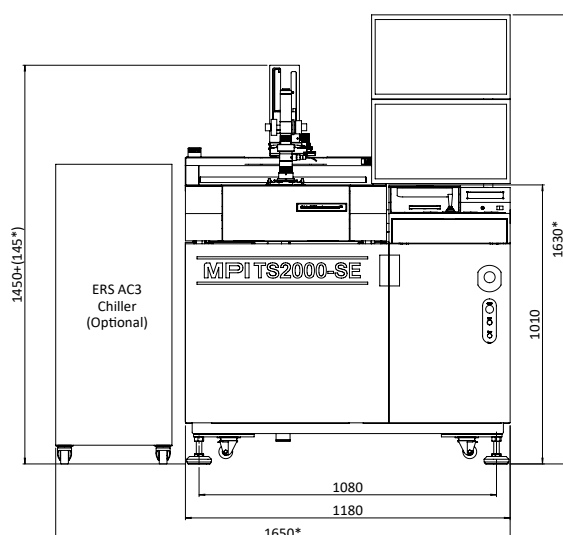


## PHYSICAL DIMENSIONS

### Specifications

System Dimensions (W x D x H)	1180 x 970 x 1450 mm (46.5 x 38.2 x 57.1 in)
Weight	650 kg (includes anti-vibration table and system accessories)

\*Can vary depends on monitor/chiller position.



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### MPI Global Presence

