**MPI TS3000-SE | 300 mm Automated Probe System**

For accurate and reliable IV, CV, pulsed-IV, 1/f and RF Measurements

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**FEATURES / BENEFITS**

*Designed for Variety of On-Wafer Applications*
- Device Modeling - DC-IV, DC-CV, Pulse-IV, ESD, 1/f
- RF and mmW - RF Setup from 26 GHz to 110 GHz & beyond
- Wafer Level Reliability - for accurate stress- and measure conditions
- Drivers for leading test executive software suits

*MPI ShieldEnviron™ for Accurate Measurements*
- Advanced EMI / RFI / Light-tight Shielding for best 1/f noise test results
- Ultra-low noise IV measurements down to fA level
- Programmable microscope movements for test automation and ease of use
- Wide temperature range -60 °C to 300 °C with unique configuration flexibility

*Ergonomic Design and Options*
- Easy wafer or single DUT loading from the front
- Integrated active vibration isolation
- Completely integrated prober control for faster, safer and convenient system and test operation
- The Safety Test Management (STM™) with automated dew point control
- Reduced footprint due to smart integration of the chiller
- Instrument shelf option for shorter RF cables providing the highest measurement dynamic

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**STAGE SPECIFICATIONS**

### Chuck XY Stage (Programmable)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel range</td>
<td>310 mm x 310 mm (12.2 x 12.2 in)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.5 µm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 2.0 µm (0.08 mils)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>± 1.0 µm</td>
</tr>
<tr>
<td>XY stage drive</td>
<td>Closed-loop high precision stepper motors</td>
</tr>
<tr>
<td>Speed*</td>
<td>Slowest: 10 µm / sec</td>
</tr>
</tbody>
</table>

### Chuck Z Stage (Programmable)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel range</td>
<td>30 mm (1.18 in)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.2 µm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 2.0 µm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>± 1.0 µm</td>
</tr>
<tr>
<td>Z stage drive</td>
<td>Closed-loop high precision stepper motor</td>
</tr>
<tr>
<td>Speed*</td>
<td>Slowest: 10 µm / sec</td>
</tr>
<tr>
<td>Guider</td>
<td>Precision ball bearings</td>
</tr>
</tbody>
</table>

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

**Chuck Theta Stage (Programmable)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel range</td>
<td>± 5.0°</td>
</tr>
<tr>
<td>Resolution, X-Y axis</td>
<td>1 µm (0.04 mils)</td>
</tr>
<tr>
<td>Accuracy, X-Y axis</td>
<td>≤ 2 µm (0.08 mils)</td>
</tr>
<tr>
<td>Repeatability, Z axis</td>
<td>≤ 2 µm (0.08 mils)</td>
</tr>
<tr>
<td>Accuracy, Z axis</td>
<td>≤ 4 µm (0.016 mils)</td>
</tr>
<tr>
<td>Theta stage drive</td>
<td>High resolution stepper motor with linear encoder feedback system</td>
</tr>
</tbody>
</table>

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

**XYZ Stage (Programmable)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel range (X x Y x Z)*</td>
<td>50 mm x 50 mm x 140 mm (2.0 in. x 2.0 in. x 5.5 in.)</td>
</tr>
<tr>
<td>Resolution, X-Y axis</td>
<td>≤ 2 µm (0.08 mils)</td>
</tr>
<tr>
<td>Accuracy, X-Y axis</td>
<td>≤ 2 µm (0.08 mils)</td>
</tr>
<tr>
<td>Resolution, Z axis</td>
<td>0.05 µm (0.002 mils)</td>
</tr>
<tr>
<td>Accuracy, Z axis</td>
<td>≤ 4 µm (0.016 mils)</td>
</tr>
</tbody>
</table>

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

**PROBE PLATEN**

**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Nickel plated steel</td>
</tr>
<tr>
<td>Chuck to platen height</td>
<td>50 ± 0.5 mm</td>
</tr>
<tr>
<td>Platen cooling</td>
<td>Fully integrated CDA cooling, by using the chiller CDA</td>
</tr>
<tr>
<td>Configuration</td>
<td>Probe card holder 4.5 x 7” and/or MicroPositioners</td>
</tr>
<tr>
<td>Max. No. of MicroPositioners</td>
<td>8x DC MicroPositioners or 4x DC + 4x RF MicroPositioner Setup</td>
</tr>
<tr>
<td>RF MicroPositioner mounting</td>
<td>Magnetic with guided rail</td>
</tr>
<tr>
<td>DC MicroPositioner mounting</td>
<td>Magnetic</td>
</tr>
</tbody>
</table>

Large Probe Platen supporting up to 8x DC or 4x DC + 4x RF MicroPositioners or standard 4.5” probe card holder
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 for testing with 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 - These all makes a great difference to conventional systems, especially in a day-to-day operation.

**ShielDEnvironment™ Electrical Specifications*  

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMI shielding</td>
<td>&gt; 30 dB (typical) @ 1 kHz to 1 MHz</td>
</tr>
<tr>
<td>Light attenuation</td>
<td>≥ 130 dB</td>
</tr>
<tr>
<td>Spectral noise floor</td>
<td>≤ -180 dBVrms/rtHz (≤ 1 MHz)</td>
</tr>
<tr>
<td>System AC noise</td>
<td>≤ 5 mVp-p (≤ 1 GHz)</td>
</tr>
</tbody>
</table>

*Including 4 MicroPositioners.

MPI NoiseShield™ Option for 1/f (Flicker) & RTN Measurements

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.
WAFTER LOADING

Loading or unloading of 150, 200 or 300 mm wafers or substrates is straightforward and intuitive. Special design of the chuck provides easy loading of a single IC of wafer fragments from the system front. SmartVacuum™ technology automatically recognizes size of the wafer on single IC. It also protects the wafer from unexpected release of vacuum due to inexperienced operation when the wafer is located in the IceFreeEnvironment™. Easy access to the AUX chucks serves for quick exchange of RF calibration substrates, probe cleaning and planarization accessories.

Probe Hover Control™

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 setup and probe change operations.

THERMAL CHILLER INTEGRATION

Minimized CDA Consumption
The CDA consumption is reduced by as much as 50% by purging IceFreeEnvironment™ with the reused cold air of the chiller. Additional automated valve enables purge by Nitrogen*. Additionally, recycled CDA cools the system probe platen and the probe card.

*ERS patented technology.
INTEGRATED CONTROLS

Thermal chuck touchscreen control display is an alternative way of interaction with the thermal system. Its ergonomic location supports an operator when keying commands and monitoring system status. The fully integrated intelligent hardware control panel is design for intuitive and safe system control and operation. All these significantly increase the speed and improve convenience of the system interaction work flow.

The keyboard and mouse are placed on the sliding tray right below the system control panel. Both can control test instrumentation, if required.

USB port is also in front of the system. It removes any hassles when exchanging data.

SOFTWARE SOLUTION

Unique and revolutionary multi-touch operation software SENTIO controls MPI automated engineering probe systems. Its simple and intuitive operation concept significantly saves operator training time. Scroll, Zoon, and Move functions mimic modern smart mobile device interface. Switching between applications is just a matter of a simple finger swipe.

SENTIO makes everyone the system operation expert in just minutes.

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

Typical MPI configuration with Kelvin Probes
## NON-THERMAL CHUCKS

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Triaxial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wafer Chuck</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connectivity</td>
<td>Coax BNC (f)</td>
<td>Kelvin Triax (f)</td>
</tr>
<tr>
<td>Diameter</td>
<td>310 mm with 2 integrated AUX areas</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Nickel plated aluminum (flat with 0.5 mm holes)</td>
<td></td>
</tr>
<tr>
<td>Chuck surface</td>
<td>Planar with 0.5 mm diameter holes in centric sections</td>
<td></td>
</tr>
<tr>
<td>Vacuum holes sections (diameter)</td>
<td>4, 24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, 288 mm</td>
<td></td>
</tr>
<tr>
<td>SmartVacuum™ distribution</td>
<td>In front for single DUT 4x4 mm (4 holes) and 75 mm (3 in) In center for 150, 200, 300 mm (6, 8, 12 in)</td>
<td></td>
</tr>
<tr>
<td>Surface planarity</td>
<td>≤± 5 µm**</td>
<td></td>
</tr>
<tr>
<td>Rigidity</td>
<td>&lt; 15 µm / 10 N @edge</td>
<td></td>
</tr>
</tbody>
</table>

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

**By using SENTIO® topography

<table>
<thead>
<tr>
<th></th>
<th>Triaxial RF Wafer Chuck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity</td>
<td>Kelvin Triax (f)</td>
</tr>
<tr>
<td>Diameter</td>
<td>310 mm with 2 integrated AUX chucks</td>
</tr>
<tr>
<td>Material</td>
<td>Nickel plated aluminum (flat with 0.5 mm holes)</td>
</tr>
<tr>
<td>Chuck surface</td>
<td>Planar with 0.5 mm diameter holes in centric sections</td>
</tr>
<tr>
<td>Vacuum holes sections (diameter)</td>
<td>4, 24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, 288 mm</td>
</tr>
<tr>
<td>SmartVacuum™ distribution</td>
<td>In front for single DUT 4x4 mm (4 holes) and 75 mm (3 in) In center for 150, 200, 300 mm (6, 8, 12 in)</td>
</tr>
<tr>
<td>Surface planarity</td>
<td>≤± 5 µm**</td>
</tr>
<tr>
<td>Rigidity</td>
<td>&lt; 15 µm / 10 N @edge</td>
</tr>
</tbody>
</table>

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

**By using SENTIO® topography

<table>
<thead>
<tr>
<th></th>
<th>Auxiliary Chuck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>2 AUX chucks</td>
</tr>
<tr>
<td>Position</td>
<td>Integrated to front side of main chuck</td>
</tr>
<tr>
<td>Substrate size (W x L)</td>
<td>Max. 25 x 25 mm (1 x 1 in)</td>
</tr>
<tr>
<td>Material</td>
<td>Ceramic, RF absorbing material for accurate calibration</td>
</tr>
<tr>
<td>Surface planarity</td>
<td>≤± 5 µm</td>
</tr>
<tr>
<td>Vacuum control</td>
<td>Controlled independently, separate from chucks</td>
</tr>
</tbody>
</table>

### Electrical Specification (Coax)

<table>
<thead>
<tr>
<th></th>
<th>In accordance with EC 61010, certificates for higher voltages available upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation voltage</td>
<td>In accordance with EC 61010, certificates for higher voltages available upon request</td>
</tr>
<tr>
<td>Maximum voltage between chuck top and GND</td>
<td>500 V DC</td>
</tr>
<tr>
<td>Isolation</td>
<td>&gt; 2 GΩ</td>
</tr>
</tbody>
</table>

### Electrical Specification (Triax)

<table>
<thead>
<tr>
<th></th>
<th>At 10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force-to-Guard</td>
<td>&gt; 5 T Ohm</td>
</tr>
<tr>
<td>Guard-to-Shield</td>
<td>&gt; 1 T Ohm</td>
</tr>
<tr>
<td>Force-to-Shield</td>
<td>&gt; 5 T Ohm</td>
</tr>
</tbody>
</table>
### Specifications of MPI ERS AirCool® PRIME Technology

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Ambient to 200/300 °C</th>
<th>20 °C to 200/300 °C</th>
<th>Ambient to 200/300 °C</th>
<th>20 °C to 200/300 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chuck type</strong></td>
<td>RF</td>
<td>RF</td>
<td>Ultra low noise</td>
<td>Ultra low noise</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
</tr>
<tr>
<td><strong>Temperature control method</strong></td>
<td>Cooling air / Resistance heater</td>
<td>Cooling air / Resistance heater</td>
<td>Cooling air / Resistance heater</td>
<td>Cooling air / Resistance heater</td>
</tr>
<tr>
<td><strong>Coolant</strong></td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
</tr>
<tr>
<td><strong>Smallest temperature selection step</strong></td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td><strong>Chuck temperature display resolution</strong></td>
<td>0.01 °C</td>
<td>0.01 °C</td>
<td>0.01 °C</td>
<td>0.01 °C</td>
</tr>
<tr>
<td><strong>External touchscreen display operation</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Temperature stability</strong></td>
<td>±0.5 °C</td>
<td>±0.05 °C</td>
<td>±0.05 °C</td>
<td>±0.05 °C</td>
</tr>
<tr>
<td><strong>Temperature accuracy</strong></td>
<td>±0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
</tr>
<tr>
<td><strong>Chuck pinhole surface plating: 200°C / 300°C</strong></td>
<td>Nickel / Gold</td>
<td>Nickel / Gold</td>
<td>Nickel / Gold</td>
<td>Nickel / Gold</td>
</tr>
<tr>
<td><strong>SmartVacuum™ distribution</strong></td>
<td>In front for single DUT 4x4 mm (4 holes) and 75 mm (3 in)</td>
<td>In center for 150, 200, 300 mm (6, 8, 12 in)</td>
<td>In center for 150, 200, 300 mm (6, 8, 12 in)</td>
<td>In center for 150, 200, 300 mm (6, 8, 12 in)</td>
</tr>
<tr>
<td><strong>Temperature sensor</strong></td>
<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
</tr>
<tr>
<td><strong>Temperature uniformity</strong></td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±1 °C at &gt; 200 °C</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±1 °C at &gt; 200 °C</td>
</tr>
<tr>
<td><strong>Surface flatness and base parallelism</strong></td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
</tr>
<tr>
<td><strong>Max. Voltage between</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Force-to-GND</strong></td>
<td>600 V DC</td>
<td>600 V DC</td>
<td>600 V DC</td>
<td>600 V DC</td>
</tr>
<tr>
<td><strong>Force-to-Guard</strong></td>
<td>100 V DC</td>
<td>100 V DC</td>
<td>600 V DC</td>
<td>600 V DC</td>
</tr>
<tr>
<td><strong>Heating rates</strong></td>
<td>35 to 200 °C ≤ 15 min</td>
<td>20 to 200 °C ≤ 18 min</td>
<td>35 to 200 °C ≤ 18 min</td>
<td>20 to 200 °C ≤ 20 min</td>
</tr>
<tr>
<td></td>
<td>35 to 300 °C ≤ 25 min</td>
<td>20 to 300 °C ≤ 28 min</td>
<td>35 to 300 °C ≤ 28 min</td>
<td>20 to 300 °C ≤ 30 min</td>
</tr>
<tr>
<td><strong>Cooling rates</strong></td>
<td>200 to 35 °C ≤ 28 min</td>
<td>200 to 20 °C ≤ 38 min</td>
<td>200 to 35 °C ≤ 32 min</td>
<td>200 to 20 °C ≤ 40 min</td>
</tr>
<tr>
<td></td>
<td>300 to 35 °C ≤ 35 min</td>
<td>300 to 20 °C ≤ 38 min</td>
<td>300 to 35 °C ≤ 38 min</td>
<td>300 to 20 °C ≤ 40 min</td>
</tr>
<tr>
<td><strong>Leakage @ 10 V</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>&lt; 15 fA at 25 °C</td>
<td>&lt; 15 fA at 25 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 30 fA at 200 °C</td>
<td>&lt; 30 fA at 200 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 50 fA at 300 °C</td>
<td>&lt; 50 fA at 300 °C</td>
</tr>
<tr>
<td><strong>Electrical isolation</strong></td>
<td>&gt; 5 T Ω at 25 °C</td>
<td>&gt; 5 T Ω at 25 °C</td>
<td>&gt; 5 T Ω at 25 °C</td>
<td>&gt; 5 T Ω at 25 °C</td>
</tr>
<tr>
<td></td>
<td>&gt; 1 T Ω at 200 °C</td>
<td>&gt; 1 T Ω at 200 °C</td>
<td>&gt; 1 T Ω at 200 °C</td>
<td>&gt; 1 T Ω at 200 °C</td>
</tr>
<tr>
<td></td>
<td>&gt; 0.5 T Ω at 300 °C</td>
<td>&gt; 0.5 T Ω at 300 °C</td>
<td>&gt; 0.5 T Ω at 300 °C</td>
<td>&gt; 0.5 T Ω at 300 °C</td>
</tr>
<tr>
<td><strong>Capacitance</strong></td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Force-to-Guard</strong></td>
<td>&lt; 1600 pF</td>
<td>&lt; 1600 pF</td>
<td>&lt; 600 pF</td>
<td>&lt; 600 pF</td>
</tr>
</tbody>
</table>

*All data are relevant for chucks in ECO mode.*
Specifications of MPI ERS AirCool® PRIME Technology

<table>
<thead>
<tr>
<th>Parameter</th>
<th>-10 °C to 200/300 °C</th>
<th>-40 °C to 200/300 °C</th>
<th>-60 °C to 200/300 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuck type</td>
<td>Ultra low noise</td>
<td>Ultra low noise</td>
<td>Ultra low noise</td>
</tr>
<tr>
<td>Connectivity</td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
</tr>
<tr>
<td>Temperature control method</td>
<td>Cooling air / Resistance heater</td>
<td>Cooling air / Resistance heater</td>
<td>Cooling air / Resistance heater</td>
</tr>
<tr>
<td>Coolant</td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
</tr>
<tr>
<td>Smallest temperature selection step</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td>Chuck temperature display resolution</td>
<td>0.01 °C</td>
<td>0.01 °C</td>
<td>0.01 °C</td>
</tr>
<tr>
<td>External touchscreen display operation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>±0.08 °C</td>
<td>±0.08 °C</td>
<td>±0.08 °C</td>
</tr>
<tr>
<td>Temperature accuracy</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td>Control method</td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
</tr>
<tr>
<td>Interfaces</td>
<td>RS232C</td>
<td>RS232C</td>
<td>RS232C</td>
</tr>
<tr>
<td>Chuck pinhole surface plating: 200°C / 300°C</td>
<td>Nickel / Gold</td>
<td>Nickel / Gold</td>
<td>Nickel / Gold</td>
</tr>
<tr>
<td>SmartVacuum™ distribution</td>
<td>In front for single DUT 4x4 mm (4 holes) and 75 mm (3 in)</td>
<td>In center for 150, 200, 300 mm (6, 8, 12 in)</td>
<td></td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
</tr>
<tr>
<td>Temperature uniformity</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
</tr>
<tr>
<td>Surface flatness and base parallelism</td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
</tr>
<tr>
<td>Max. Voltage between</td>
<td>Force-to-GND</td>
<td>600 V DC</td>
<td>600 V DC</td>
</tr>
<tr>
<td></td>
<td>Force-to-Guard</td>
<td>600 V DC</td>
<td>600 V DC</td>
</tr>
<tr>
<td>Heating rates</td>
<td>25 °C</td>
<td>-10 to 25 °C &lt; 10 min</td>
<td>-40 to 25 °C &lt; 12 min</td>
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<tr>
<td></td>
<td>200 °C</td>
<td>25 to 200 °C &lt; 20 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 °C</td>
<td>25 to 300 °C &lt; 35 min</td>
<td></td>
</tr>
<tr>
<td>Cooling rates*</td>
<td>300 °C</td>
<td>300 to 25 °C &lt; 38 min</td>
<td>300 to 25 °C &lt; 35 min</td>
</tr>
<tr>
<td></td>
<td>200 °C</td>
<td>200 to 25 °C &lt; 30 min</td>
<td>200 to 25 °C &lt; 25 min</td>
</tr>
<tr>
<td></td>
<td>25 °C</td>
<td>25 to -10 °C &lt; 30 min</td>
<td>25 to -40 °C &lt; 65 min</td>
</tr>
<tr>
<td>Leakage @ 10 V</td>
<td>-10, -40 or -60 °C</td>
<td>&lt; 30 fA</td>
<td>&lt; 30 fA</td>
</tr>
<tr>
<td></td>
<td>25 °C</td>
<td>&lt; 15 fA</td>
<td>&lt; 15 fA</td>
</tr>
<tr>
<td></td>
<td>200 °C</td>
<td>&lt; 30 fA</td>
<td>&lt; 30 fA</td>
</tr>
<tr>
<td></td>
<td>300 °C</td>
<td>&lt; 50 fA</td>
<td>&lt; 50 fA</td>
</tr>
<tr>
<td>Capacitance</td>
<td>Force-to-Guard</td>
<td>&lt; 600 pF</td>
<td>&lt; 600 pF</td>
</tr>
<tr>
<td></td>
<td>Guard-to-Shield</td>
<td>&lt; 2000 pF</td>
<td>&lt; 2000 pF</td>
</tr>
</tbody>
</table>

* All data are relevant for chucks in ECO mode.
### Specifications of MPI ERS AirCool® PRIME Technology

<table>
<thead>
<tr>
<th>Feature</th>
<th>-10 °C to 200/300 °C</th>
<th>-40 °C to 200/300 °C</th>
<th>-60 °C to 200/300 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chuck type</strong></td>
<td>RF</td>
<td>RF</td>
<td>RF</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
<td>Kelvin Triax (f)</td>
</tr>
<tr>
<td><strong>Temperature control method</strong></td>
<td>Cooling air /</td>
<td>Cooling air /</td>
<td>Cooling air /</td>
</tr>
<tr>
<td></td>
<td>Resistance heater</td>
<td>Resistance heater</td>
<td>Resistance heater</td>
</tr>
<tr>
<td><strong>Coolant</strong></td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
<td>Air (user supplied)</td>
</tr>
<tr>
<td><strong>Smallest temperature selection step</strong></td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td><strong>Chuck temperature display resolution</strong></td>
<td>0.01 °C</td>
<td>0.01 °C</td>
<td>0.01 °C</td>
</tr>
<tr>
<td><strong>External touchscreen display operation</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Temperature stability</strong></td>
<td>±0.08 °C</td>
<td>±0.08 °C</td>
<td>±0.08 °C</td>
</tr>
<tr>
<td><strong>Temperature accuracy</strong></td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Low noise DC/PID</td>
<td>Low noise DC/PID</td>
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<td>RS232C</td>
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</tr>
<tr>
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<td>In center for 150, 200, 300 mm (6, 8, 12 in)</td>
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<tr>
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<td>Pt100 1/3DIN, 4-line wired</td>
<td>Pt100 1/3DIN, 4-line wired</td>
</tr>
<tr>
<td><strong>Temperature uniformity</strong></td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
<td>&lt; ±0.5 °C at ≤ 200 °C</td>
</tr>
<tr>
<td></td>
<td>&lt; ±1 °C at &gt; 200 °C</td>
<td>&lt; ±1 °C at &gt; 200 °C</td>
<td>&lt; ±1 °C at &gt; 200 °C</td>
</tr>
<tr>
<td><strong>Surface flatness and base parallelism</strong></td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
<td>&lt; ±12 µm</td>
</tr>
<tr>
<td><strong>Max. Voltage between</strong></td>
<td>Force-to-GND 600 V DC</td>
<td>Force-to-Guard 100 V DC</td>
<td>Force-to-Guard 100 V DC</td>
</tr>
<tr>
<td><strong>Heating rates</strong></td>
<td>25 °C</td>
<td>200 °C</td>
<td>300 °C</td>
</tr>
<tr>
<td></td>
<td>-10 to 25 °C &lt; 8 min</td>
<td>25 to 200 °C &lt; 18 min</td>
<td>25 to 300 °C &lt; 30 min</td>
</tr>
<tr>
<td><strong>Cooling rates</strong></td>
<td>300 °C</td>
<td>200 °C</td>
<td>25 °C</td>
</tr>
<tr>
<td></td>
<td>300 to 25 °C &lt; 35 min</td>
<td>200 to 25 °C &lt; 28 min</td>
<td>25 to -10 °C &lt; 28 min</td>
</tr>
<tr>
<td></td>
<td>300 to 25 °C &lt; 32 min</td>
<td>200 to 25 °C &lt; 22 min</td>
<td>25 to -40 °C &lt; 55 min</td>
</tr>
<tr>
<td></td>
<td>25 to -60 °C &lt; 40 min</td>
<td>25 to -60 °C &lt; 40 min</td>
<td></td>
</tr>
<tr>
<td><strong>Leakage @ 10 V</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Electrical isolation</strong></td>
<td>&gt; 5 T Ω at 25 °C or below</td>
<td>&gt; 1 T Ω at 200 °C</td>
<td>&gt; 0.5 T Ω at 300 °C</td>
</tr>
<tr>
<td><strong>Capacitance</strong></td>
<td>Force-to-Guard &lt; 1600 pF</td>
<td>Force-to-Guard &lt; 1600 pF</td>
<td>Force-to-Guard &lt; 1600 pF</td>
</tr>
<tr>
<td></td>
<td>Guard-to-Shield &lt; 2000 pF</td>
<td>Guard-to-Shield &lt; 2000 pF</td>
<td>Guard-to-Shield &lt; 2000 pF</td>
</tr>
</tbody>
</table>

*All data are relevant for chucks in ECO mode.*
### System Controller / Chiller Dimensions and Power / Air Consumption

<table>
<thead>
<tr>
<th>System Type</th>
<th>W x D x H (mm)</th>
<th>Weight (kg)</th>
<th>Power cons. (VA)</th>
<th>max. Air flow* (l/min)</th>
<th>CDA dew Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient</td>
<td>300 x 360 x 135</td>
<td>12</td>
<td>1200</td>
<td>400</td>
<td>≤ 0 °C</td>
</tr>
<tr>
<td>-20°C, -10°C to 200 / 300 °C</td>
<td>300 x 360 x 135</td>
<td>12</td>
<td>1200</td>
<td>400</td>
<td>≤ -30 °C</td>
</tr>
<tr>
<td>-40 to 200 / 300 °C</td>
<td>420 x 300 x 520</td>
<td>45</td>
<td>1200</td>
<td>400</td>
<td>≤ -40 °C</td>
</tr>
<tr>
<td>-60 to 200 / 300 °C</td>
<td>420 x 500 x 1020</td>
<td>140</td>
<td>2400</td>
<td>450</td>
<td>≤ -40 °C</td>
</tr>
</tbody>
</table>

**Electrical primary connection**: 100 to 240 VAC auto switch

**Electrical frequency**: 50 Hz / 60 Hz

**Compressed air supply**: 6.0 bar (0.8 MPa, 87 psi)

---

### High Temperature Uniformity Option*

<table>
<thead>
<tr>
<th>HTU Option</th>
<th>-60 °C</th>
<th>-50 °C</th>
<th>-35 °C</th>
<th>0 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typical</td>
<td>max</td>
<td>typical</td>
<td>max</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.015</td>
<td>±0.05</td>
<td>±0.015</td>
<td>±0.05</td>
</tr>
<tr>
<td>Uniformity</td>
<td>±0.4</td>
<td>±0.5</td>
<td>±0.4</td>
<td>±0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HTU Option</th>
<th>35 °C</th>
<th>50 °C</th>
<th>70 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typical</td>
<td>max</td>
<td>typical</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.02</td>
<td>±0.05</td>
<td>±0.02</td>
</tr>
<tr>
<td>Uniformity</td>
<td>±0.08</td>
<td>±0.1</td>
<td>±0.08</td>
</tr>
</tbody>
</table>

---

*Only for RF thermal chucks.

---

**THERMAL CHUCKS DIMENSIONS**

ERS AirCool® (patented) Controller

**Integrated Chiller -60°C**

ERS AirCool® (patented) Controller

**Integrated Chiller -40°C**

ERS and MPI's joint product AirCool® PRIME Chuck won "Electronics Industry Awards 2018" in the category, “Test, Measurement and Inspection Product of the year”.
TYPICAL TRANSITION TIME

SYSTEM CONTROLLER SPECIFICATIONS

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

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>100-240 V AC nominal ; 50/60 Hz</td>
</tr>
<tr>
<td>Vacuum</td>
<td>-0.9 bar</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6.0 bar</td>
</tr>
</tbody>
</table>

REGULATORY COMPLIANCE

3rd party, TÜV tested according to
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

**TS3000-SE**

| System dimensions (W x D x H) | 1400 x 1115 x 1000 / 1550 mm (55.1 x 43.9 x 39.4 / 61.0 in) |
| Weight                        | 830 kg |

*Can increase depends on operator manual adjustment or interaction.*

Direct contact:
- Asia region: ast-asia@mpi-corporation.com
- EMEA region: ast-europe@mpi-corporation.com
- America region: ast-americas@mpi-corporation.com

MPI global presence: for your local support, please find the right contact here:
- www.mpi-corporation.com/ast/support/local-support-worldwide