MPI TS200-SE | 200 mm Manual Probe System with ShielDEnvironment™ For accurate and reliable DC/CV, High Power, RF and mmW measurements

FEATURES / BENEFITS

Universal Use

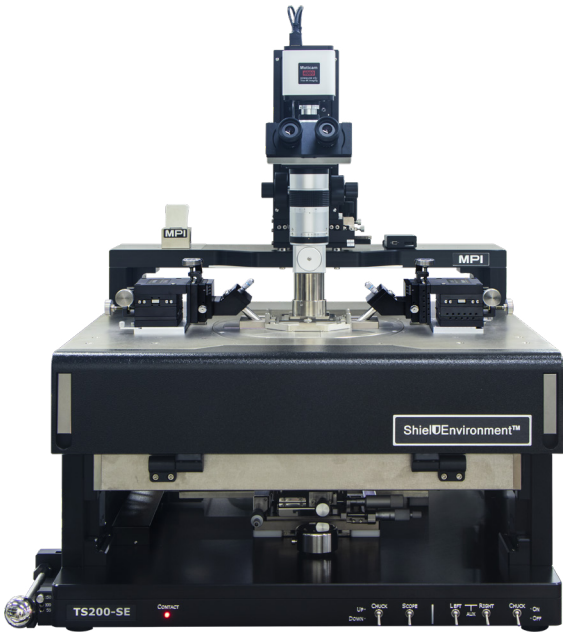
- Designed for wide variety of applications such as Device Characterization, High Power and Modeling, RF and mmW Wafer Level Reliability, and Failure Analysis

MPI ShielDEnvironment™ for Accurate Measurements

- Design for Advanced EMI / RFI / Light-Tight Shielding
- FemtoAmp low-leakage capabilities
- Integrated vibration isolation
- Ready for temperature range -60 °C to 300 °C

Ergonomic Design and Options

- Unique puck controlled air bearing stage for quick single-handed operation
- Available with various chuck options and wide range of accessories such as DC/RF/mmW MicroPositioners, microscopes and ShielDEnvironment™ provide excellent support for various application requirements



SPECIFICATIONS

Chuck XY Stage (Standard)

Travel range	225 x 260 mm (8.9 x 10.2 in)
Fine-travel range	25 x 25 mm fine micrometer control
Fine-travel resolution	< 1.0 µm (0.04 mils) @ 500 µm/rev
Planarity	< 10 µm
Theta travel (standard)	360°
Theta travel (fine)	± 5.0°
Theta resolution	7.5 x 10^{-3} gradient
Movement	Puck controlled air bearing stage

Chuck Z Stage

Travel range	5 mm (0.2 in)
Fine-travel resolution	< 1.0 µm (0.04 mils) @ 500 µm/rev
Load stroke	20 mm, pneumatically

Manual Microscope Stage (Linear)

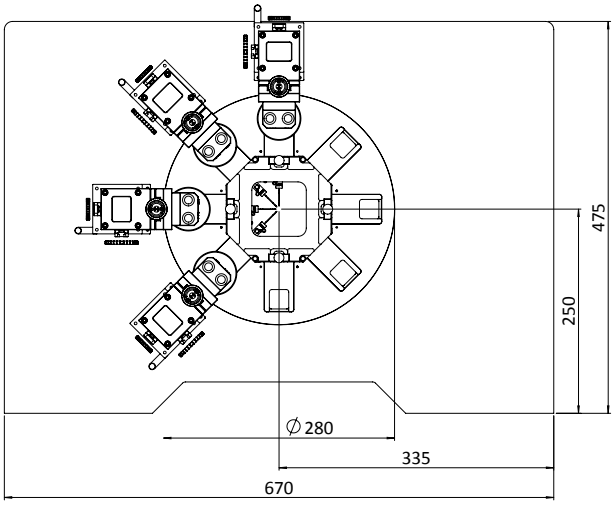
Movement range*	50 x 50 mm (2 x 2 in)
Resolution	< 5 µm (0.2 mils)
Scope lift	Manual, tilt-back or vertical (depending on microscope type)
Movement	Independently controlled X and Y movement with locking screws

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

PROBE PLATEN

Specifications

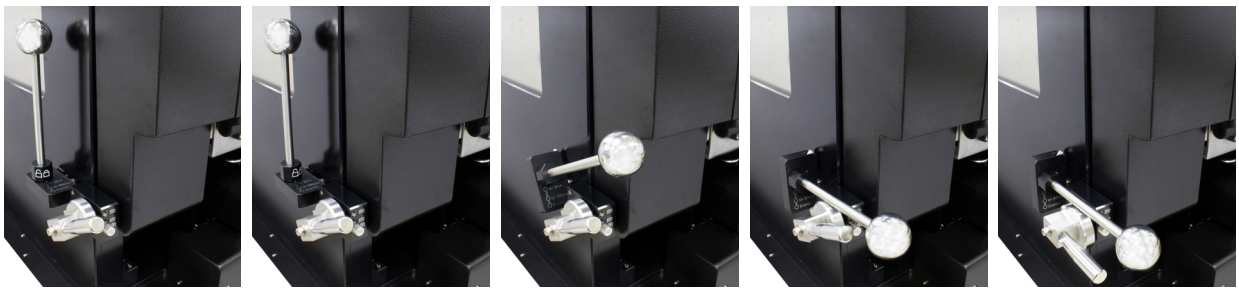
Material	Nickel plated steel
Dimension	See drawing
Chuck to ShielDGuard height	Min. 5 mm
Max. No of MicroPositioners	8x DC or 4x DC + 2x RF or 2x DC + 4x RF or 4x DC + 4x RF Setup
Platen lift control	3 positions - contact (0), separation (300 µm), and loading (3 mm)
Separation repeatability	< 1 µm (0.04 mils) by “automated“ control
RF MicroPositioner mounting	Magnetic with guided rail
DC MicroPositioner mounting	Magnetic
300 °C thermal isolation	Depending on chuck configuration

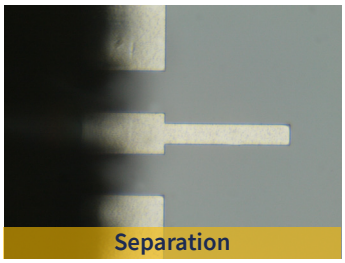


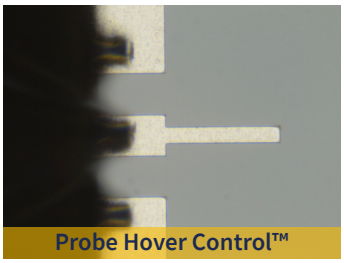
Universal probe platen design for up to 8 DC MicroPositioners

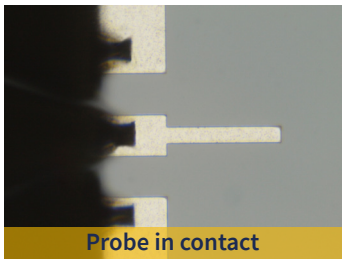
PLATEN LIFT WITH Probe Hover Control™

MPI Probe Hover Control™ comes with hover heights (50, 100 or 150 µm) for easy and convenient probe to pad alignment.




Separation


Probe Hover Control™


Probe in contact

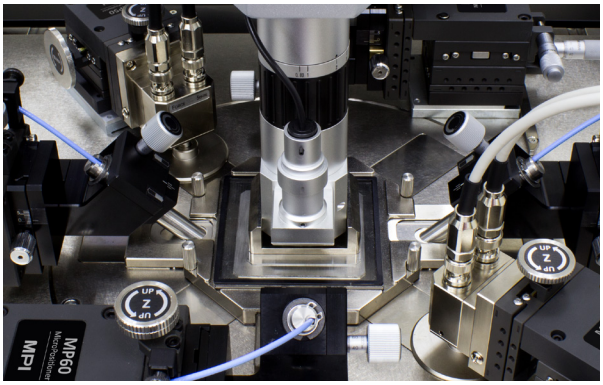
ShielDEnvironment™

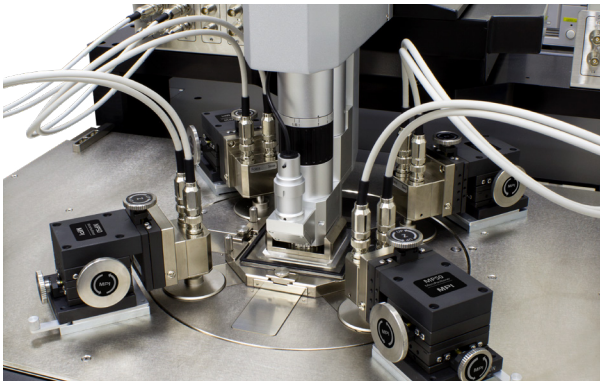
MPI ShielDEnvironment™ is a high performance local environmental chamber providing excellent EMI- and light-tight shielded test environment for ultra-low noise, low capacitance measurements.
MPI ShielDEnvironment™ allows up to 4-port RF or up to 8-ports DC/Kelvin or a combination of those configurations. 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 1 MHz
Light attenuation	≥ 130 dB
Spectral noise floor	≤ -180 dBVrms/rtHz (≤ 1 MHz)
System AC noise	≤ 5 mVp-p (≤ 1 GHz)

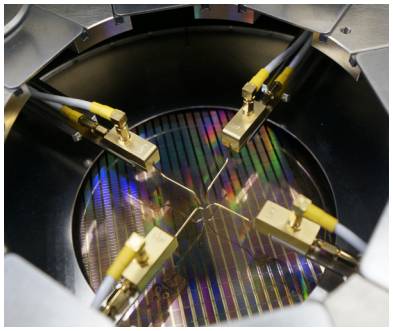
**Including 4 MicroPositioners.*

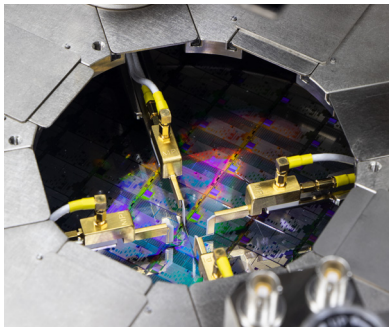




TYPICAL CONFIGURATION WITH MPI KELVIN AND MPI KELVIN-HIGH TEMPERATRUE PROBES INSIDE ShielDEnvironment™

	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 Trixial	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

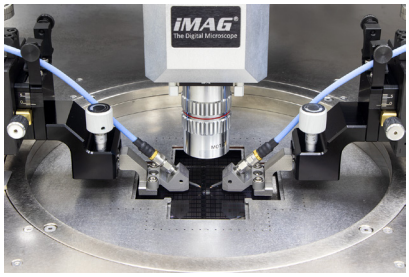


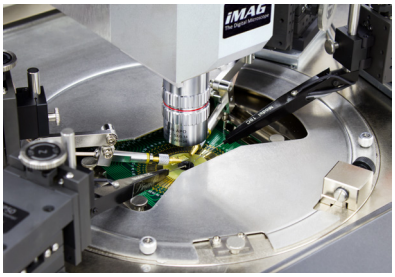


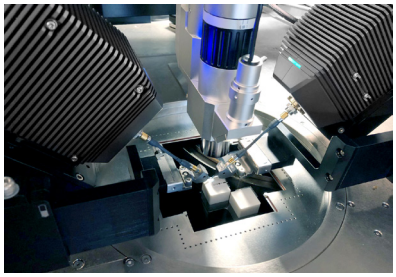
Typical MPI configuration with Kelvin Probes

TS200-IFE WITH IceFreeEnvironment™

As an alternative to the ShieDEnvironment™, MPI IceFreeEnvironment™ provides unique capability to perform measurements with probe cards and MicroPositioners simultaneously, especially at negative temperatures down to -60 °C.
Internal node probing with active/passive high impedance probes is very convenient.
The optimized design with minimal tip drop for highest dynamic range and gamma of mmWave and Load Pull measurements make the system an ideal choice for RF/mmW applications on 200 mm wafers.





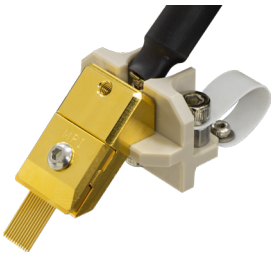


HIGH POWER PROBE ACCESSORIES

High Voltage Probe (HVP)
Low leakage probes specially designed to withstand high voltage up to 10 kV (coaxial) and 3 kV (triaxial). Choice of various connectors options such as Keysight Triax/UHV, Keithley Triax/UHV, SHV or Banana.

High Current Probe (HCP)
High performance probes specially designed for on wafer measurement of high current up to 200 A (pulse). MPI multi-fingers high current probes are single piece consturction to efficiently handle high current and provide low contact resistance.

Ultra High Power Probe (UHP)
Designed for Ultra high voltage and current on wafer measurement up to 10 kV/600 A (pulse). MPI replaceable multi-fingers probes tips and probe arms are design for low contact resistance for ultra-high current measurement and to support ultra-high voltage of up to 10 KV, without having to change probes for high voltage and current application.



HIGH POWER PROBES - SELECTION GUIDE

	High current probes			High voltage probes		
	3 fingers	5 fingers	7 fingers	PA-HVT	PA-HVC	PA-HVC-10KV
Max current	40 A	65 A	100 A	2 A	2 A	2 A
Max voltage	500 V	500 V	500 V	3,000 V	5,000 V	10,000 V
Residual resistance (Typical)	≤ 5 mΩ	≤ 3 mΩ	≤ 1 mΩ	--	--	--
Leakage @ max. V	--	--	--	≤ 1 pA	≤ 600 pA	> 35 TΩ
Connector options	Banana[3] plug or BNC[4]			HV triaxial[2]	SHV	10 KV UHV or banana[3] plug
Replaceable tip	Yes	Yes	Yes	Yes	Yes	Yes
Probe pitch[1]	350 µm (Std)	350 µm (Std)	350 µm (Std)	Single needle	Single needle	Single needle

[1]Configurable
[2]Keysight or Keithley
[3]Banana: 100 A max, 1 ms max PW, 1% max PLC
[4]BNC: 40 A max, 1 ms max PW, 1% Max PLC

ULTRA HIGH POWER PROBES - SELECTION GUIDE

	1 finger	4 fingers	6 fingers	8 fingers	12 fingers
Max current*	20 A	80 A	120 A	160 A	250 A
Max voltage	10 KV	10 KV	10 KV	10 KV	10 KV
Residual resistance (Typical)	≤ 5 mΩ	≤ 3 mΩ	≤ 1 mΩ	≤ 1 mΩ	≤ 1 mΩ
Connector options	Banana	Banana	Banana	Banana	Banana
Replaceable tip	Yes	Yes	Yes	Yes	Yes
Probe tip width	250 µm	250 µm	250 µm	250 µm	250 µm
Probe pitch	--	650 µm	650 µm	650 µm	650 µm

**1 ms Max PW, 0.4% max PLC*

HIGH POWER PROBE CARDS

Max current	250 A
Max voltage	10 KV
Max pressure	8 bar
Max chamber diameter	25 mm
Max probe pin needles	20
Probe pin needle diameter	100 µm
Connector type	Keysight HV, Keithley HV, SHV, BNC, Banana, M HV
Air pressure requirement	CDA up to 8 bar

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 5 x 5 mm size or wafers 50 mm (2 in) thru 200 mm (8 in)*
Surface planarity	≤± 5 µm**
Rigidity	< 15 µm / 10 N @edge

**Single DUT testing requires higher vacuum conditions dependent upon testing application.*
***By using SENTIO® topography*

RF Wafer Chuck (Triaxial)

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
Vacuum actuation	Manual switch between Center (4 holes), 100, 150, 200 mm (4, 6, 8 in)
Supported DUT sizes	Single DUTs down to 5 x 5 mm size or wafers 100 mm (4 in) thru 200 mm (8 in)*
Surface planarity	≤± 5 µm**
Rigidity	< 15 µm / 10 N @edge

**Single DUT testing requires higher vacuum conditions dependent upon testing application.*
***By using SENTIO® topography*

High Power Chucks

Connectivity 1	10 kV Coaxial (Banana or SHV)
Connectivity 2	Kelvin Triax (f), 3 kV or 10 kV Coaxial
Diameter	210 mm with 2 integrated AUX areas
Material	Gold plated aluminum (flat with 100 µm 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
Vacuum actuation	Manual switch between Center (4 holes), 100, 150, 200 mm (4, 6, 8 in)
Supported DUT sizes	Single DUTs down to 5 x 5 mm size or wafers 100 mm (4 in) thru 200 mm (8 in)*
Surface planarity	≤± 5 µm
Rigidity	< 15 µm / 10 N @edge

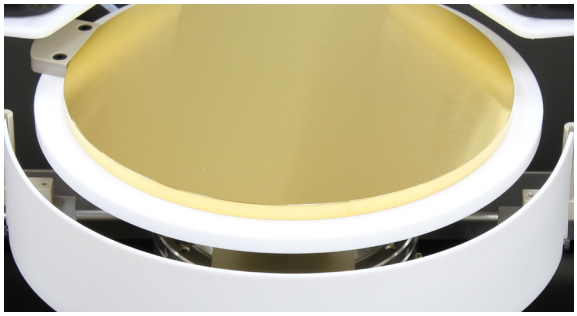
**Single DUT testing requires higher vacuum conditions dependent upon testing application.*

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	≤± 5 µm
Vacuum control	Controlled independently, separate from chucks

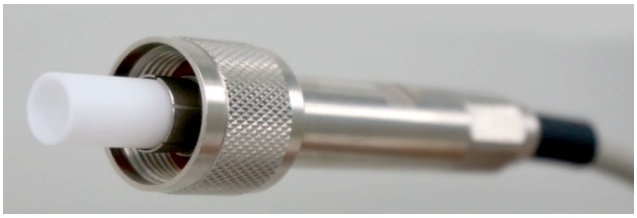
Electrical Specification (Coax)	
Operation voltage	In accordance with EC 61010, certificates for higher voltages available upon request
Maximum voltage between chuck top and GND	500 V DC
Isolation	> 2 GΩ

Electrical Specification (RF - Triax)	
Chuck isolation	Standard Chuck (10 V)
Force to guard	≥ 1 TΩ
Guard to shield	≥ 1 TΩ
Force to shield	≥ 5 TΩ

Electrical Specification (High Power - Triax)	
Chuck isolation	> 30 TΩ
Force to guard	> 30 TΩ
Guard to shield	> 500 GΩ
Force to shield	> 100 GΩ



MPI Non-thermal Triaxial High Power Chuck with gold plated surface for low contact resistance



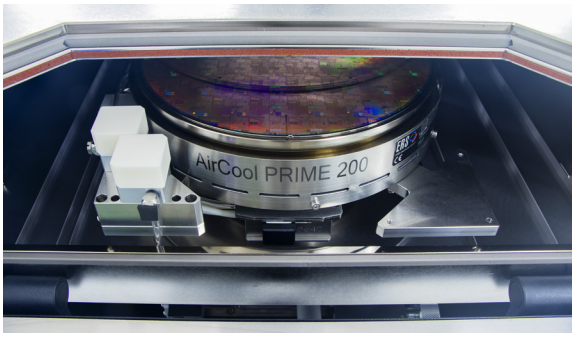
MPI 10 kV Triaxial Connector used for Kelvin chuck connection

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
Vacuum 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) and 75 mm (3 in) 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) and 75 mm (3 in) 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	
	AC3 Mode 200 °C	200 to 25 °C < 6 min	200 to 25 °C < 8 min	
	AC3 Mode 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	
	TURBO Mode 200 °C	200 to 25 °C < 6 min	200 to 25 °C < 6 min	
	TURBO Mode 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	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 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) and 75 mm (3 in) 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		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.*

HIGH POWER THERMAL CHUCKS

Specifications of MPI ERS Integrated Technology

Temperature Range	20 to 200 °C	20 to 300 °C
Connectivity	Kelvin Triax (f), 3 kV or 10 kV Coaxial	Kelvin Triax (f), 3 kV or 10 kV Coaxial
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)
Smallest temperature selection step	0.1 °C	0.1 °C
Chuck temperature display resolution	0.01 °C	0.01 °C
External touchscreen display operation	Yes	Yes
Temperature stability	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C
Chuck surface plating	Gold plated with pinhole surface	Gold plated with pinhole surface
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ± 0.5 °C	< ±0.5 °C at ≤ 200 °C < ±1.0 °C at > 200 °C
Surface flatness and base parallelism	< ±10 µm	< ±10 µm at ≤ 200 °C < ±15 µm at > 200 °C
Heating rates	20 to 200 °C < 31 min	20 to 300 °C < 39 min
Cooling rates*	200 to 20 °C < 57 min	300 to 20 °C < 55 min
Maximum voltage between chuck top and GND	10 kV DC	10 kV DC
Leakage @ 10 V Kelvin Triax (f)		
-60 °C, -40 °C and -10 °C	--	--
25 °C	< 15 fA	< 15 fA
200 °C	< 30 fA	< 30 fA
300 °C	--	< 50 fA
Leakage @ 3000 V Kelvin Triax (f)		
-60 °C, -40 °C and -10 °C	--	--
25 °C	< 5 pA	< 5 pA
200 °C	< 10 pA	< 10 pA
300 °C	--	< 15 pA
Leakage @ 10 kV Coax UHV/SHV (f)		
-60 °C, -40 °C and -10 °C	--	--
25 °C	< 6 nA	< 6 nA
200 °C	< 6 nA	< 6 nA
300 °C	--	< 6 nA

** All data are relevant for chucks in ECO mode.*

Specifications of MPI ERS Integrated Technology

Temperature Range		-10 to 200 °C/300 °C	-40 to 200 °C/300 °C	-60 to 200 °C/300 °C
Connectivity		Kelvin Triax (f), 3 kV or 10 kV Coaxial	Kelvin Triax (f), 3 kV or 10 kV Coaxial	Kelvin Triax (f), 3 kV or 10 kV Coaxial
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	0.1 °C	0.1 °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 surface plating		Gold plated with pinhole surface	Gold plated with pinhole surface	Gold plated with pinhole surface
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 < ±1.0 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1.0 °C at > 200 °C	< ±0.5 °C at ≤ 200 °C < ±1.0 °C at > 200 °C
Surface flatness and base parallelism		< ±10 µm at ≤ 200 °C < ±15 µm at > 200 °C	< ±10 µm at ≤ 200 °C < ±15 µm at > 200 °C	< ±10 µm at ≤ 200 °C < ±15 µm at > 200 °C
Maximum voltage between chuck top and GND		10 kV DC	10 kV DC	10 kV DC
Heating rates				
200 °C		-10 to 25 °C < 3 min	-40 to 25 °C < 7 min	-60 to 25 °C < 8 min
			25 to 200 °C < 20 min	
300 °C		-10 to 25 °C < 3 min	-40 to 25 °C < 7 min	-60 to 25 °C < 8 min
			25 to 300 °C < 36 min	
Cooling rates*				
AC3 Mode	300 °C	300 to 25 °C < 17 min	300 to 25 °C < 17 min	
	200 °C	200 to 25 °C < 14 min	200 to 25 °C < 15 min	
	25 °C	25 to -10 °C < 12 min	25 to -40 °C < 13 min	25 to -60 °C < 25 min
TURBO Mode	300 °C	300 to 25 °C < 17 min	300 to 25 °C < 16 min	
	200 °C	200 to 25 °C < 14 min	200 to 25 °C < 13 min	
	25 °C	25 to -10 °C < 12 min	25 to -40 °C < 13 min	25 to -60 °C < 25 min
Leakage @ 10 V Kelvin Triax (f)				
-60 °C, -40 °C and -10 °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
Leakage @ 3000 V Kelvin Triax (f)				
-60 °C, -40 °C and -10 °C		< 10 pA	< 10 pA	< 10 pA
25 °C		< 5 pA	< 5 pA	< 5 pA
200 °C		< 10 pA	< 10 pA	< 10 pA
300 °C		< 15 pA	< 15 pA	< 15 pA

Leakage @ 10 kV Coax UHV/SHV (f)

-60 °C, -40 °C and -10 °C	--	--	--
25 °C	< 6 nA	< 6 nA	< 6 nA
200 °C	< 6 nA	< 6 nA	< 6 nA
300 °C	< 6 nA	< 6 nA	< 6 nA

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

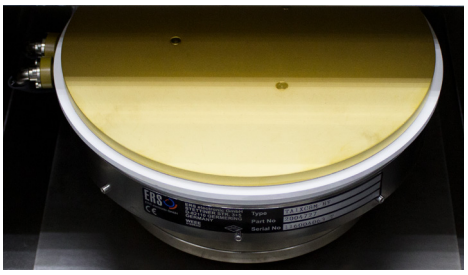
Thermal Controller Dimensions / Power and Air Consumption

System type	W x D x H (mm)	Weight (kg)	Power cons. (VA)	max. Air flow* (l/min)
20 to 200 °C / 300 °C	300 x 360 x 135	12	700	200

System Controller / Chiller Dimensions and Power / Air Consumption

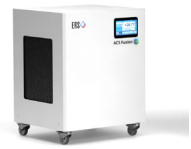
System type	W x D x H (mm)	Weight (kg)	Power cons. (VA)	max. Air flow*(l/min)
20 to 200 °C / 300 °C	300 x 360 x 140	12	1000	200
-10 to 200 °C / 300 °C	420 x 355 x 450	50	1650	250
-40 to 200 °C / 300 °C	420 x 500 x 1020	140	2400	400
-60 to 200 °C / 300 °C	420 x 500 x 1020	140	2400	400

**All data are relevant for chucks in ECO mode.*



ERS High Power Thermal Chuck

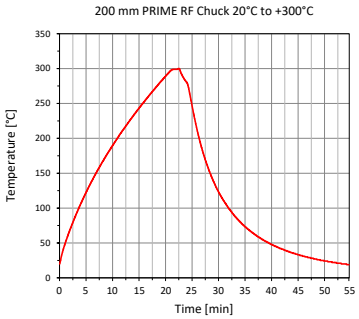
ERS AirCool® Fusion*, Controller Integrated Chiller -40 °C / -60 °C

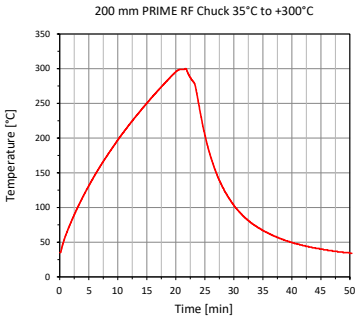


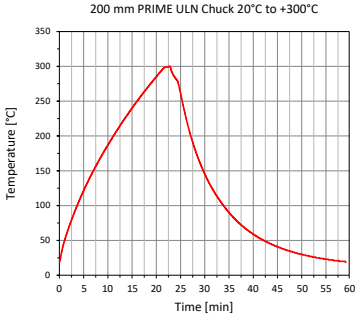
ERS AirCool® Fusion*, Controller Integrated Chiller -10 °C

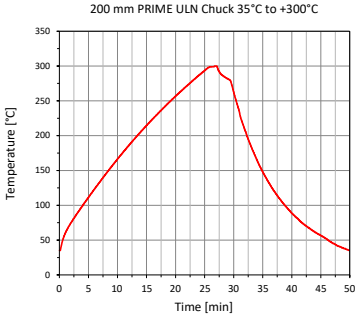
**ERS electronic GmbH patented solution*

TYPICAL TRANSITION TIME

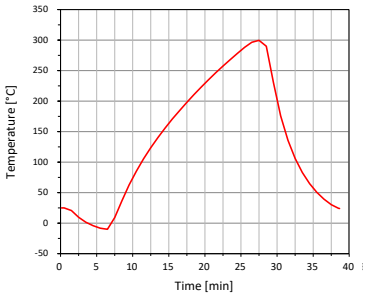




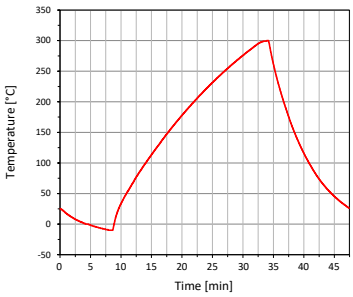




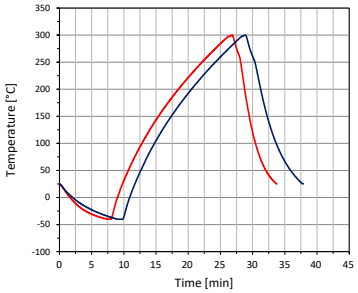
200 mm PRIME RF Chuck -10°C to +300°C



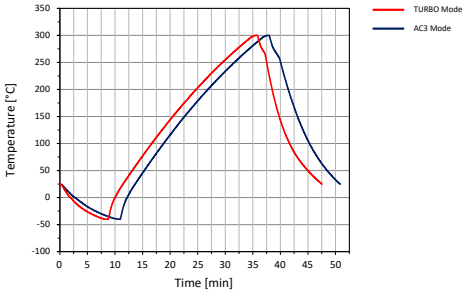
200 mm PRIME ULN Chuck -10°C to +300°C



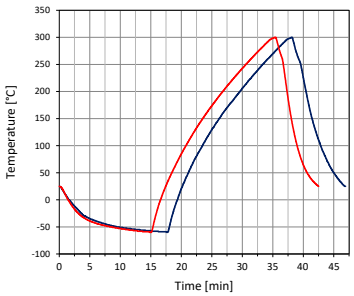
200 mm PRIME RF Chuck -40°C to +300°C



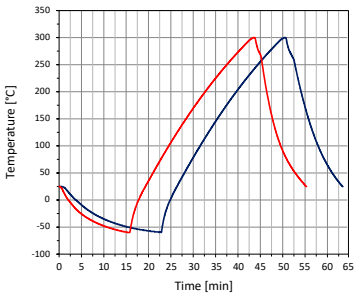
200 mm PRIME ULN Chuck -40°C to +300°C



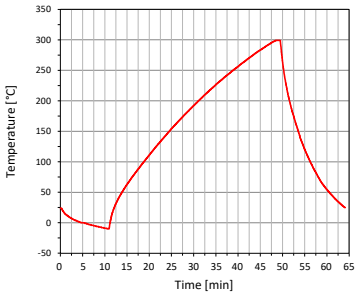
200 mm PRIME RF Chuck -60°C to +300°C

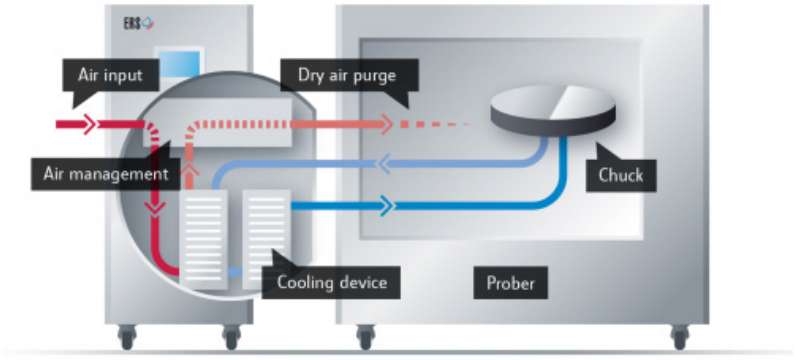


200 mm PRIME ULN Chuck -60°C to +300°C



200 mm PRIME High-Power Chuck -10°C to +300°C





These chucks incorporate the ERS patented AC3 cooling technology and its air management system to purge the MPI ShielDEnvironment™ directly from “already used” air – reducing dry air consumption up to 30 to 50% as compared to other systems on the market.

FACILITY REQUIREMENTS

Thermal Chuck Electrical Supply

Electrical Supply	
Electrical primary connection	100 to 240 VAC auto switch
Frequency	50 Hz / 60 Hz
Compressed Air Supply	
Operating pressure	6.0 bar (0.6 MPa, 87 psi) at specified flow rate
CDA dew point	≤ 0 °C for hot chuck system (ambient to 300 °C) ≤ -45 °C for hot and cold chuck system (-60 °C to 300 °C)
General Probe System	
Power	100-240 V AC 50/60 Hz for optical accessories* only
Vacuum	-0.5 bar (for single DUT) / -0.3 bar (for wafers)
Compressed air	4 ~ 7 bar

**e.g. microscope illumination, CCD cameras, monitors.*

INSTRUMENT CONNECTION PACKAGE

TS2000-HP can be configured with instrument connection package. The packages consists of necessary high voltage/high current probes and cabling accessories for optimal connection to the test instruments.

Keysight B1505A

Seven MP40 MicroPositioners
Two RF probe arms for MP40
Five universal DC adapters
Two High-current probes
Three High-voltage (Coax) probe arms
Two High-voltage probe arms with Keysight HV Triax connector
Box of High-current multi-finger probe tips (5 tips)
Box of probe tips needle (25 tips)
High Power connection panel for Dark Box
Three High power chuck connection cables (Keysight Triax, SHV and BNC)
High Power chuck shorting and floating plugs

Keithley 2600-PCT-XB

Five MP40 MicroPositioners
Two RF probe arms for MP40
Three universal DC adapters
Two High-current probes
Three High-voltage probe arms with Keithley HV Triax connector
Box of High-current multi-finger probe tips (5 tips)
Box of probe tips needle (25 tips)
High Power connection panel for Dark Box
Three High power chuck connection cables (Keithley Triax, SHV and BNC)
High Power chuck shorting and floating plugs

REGULATORY COMPLIANCE

- CE certified. TÜV compliance tested according to EN 61010, ISO 12100, and SEMI S2

WARRANTY

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

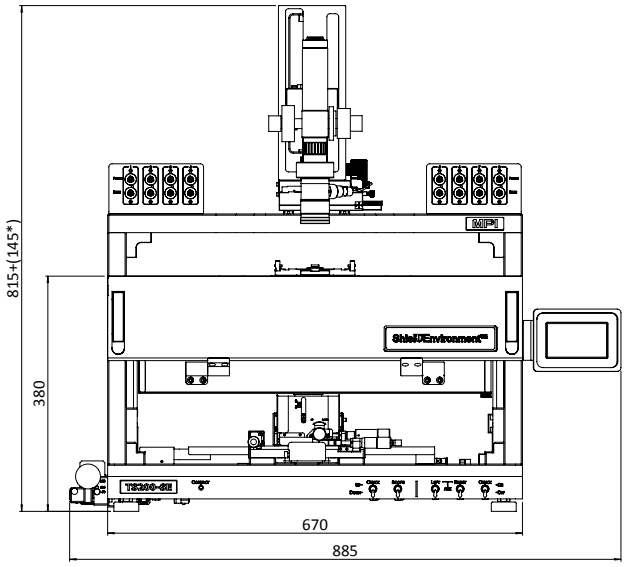
**See MPI Corporation's Terms and Conditions of Sale for more details.*

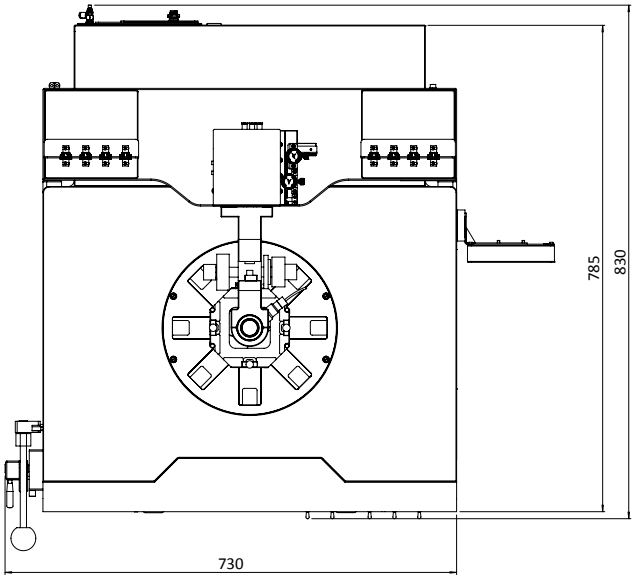
PHYSICAL DIMENSIONS

Station Platform with Bridge*

Dimensions (W x D x H)	670 x 785 x 815 mm (26.4 x 30.9 x 32.1 in)
Weight	~150 kg (330.7 lb.)

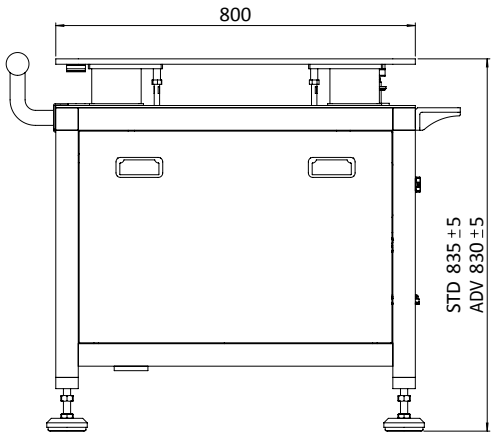
**Station accessories, such as different microscopes, cameras, or laser cutters, may change the total height.*

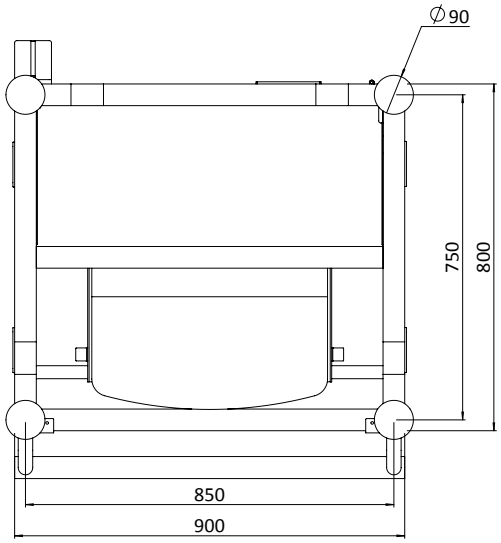




Vibration Isolation Table

	Standard	Advanced
Dimensions (W x D x H)	900 x 800 x 835 mm (35.4 x 31.5 x 32.9 in)	900 x 800 x 830 mm (35.4 x 31.5 x 32.7 in)
Feature	Adjustable air damping system	Automatic load leveling
Keyboard / Mouse Tray Included	Yes	
Front protection bar	Yes	
Castors Included	Yes	
Shelves Included	Upper and Lower	
Accessories accepted	Monitor Stand(s) and Instrument Shelf	
Weight	Approx. 210 kg (463 lb.)	Approx. 210 kg (463 lb.)





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

MPI Global Presence