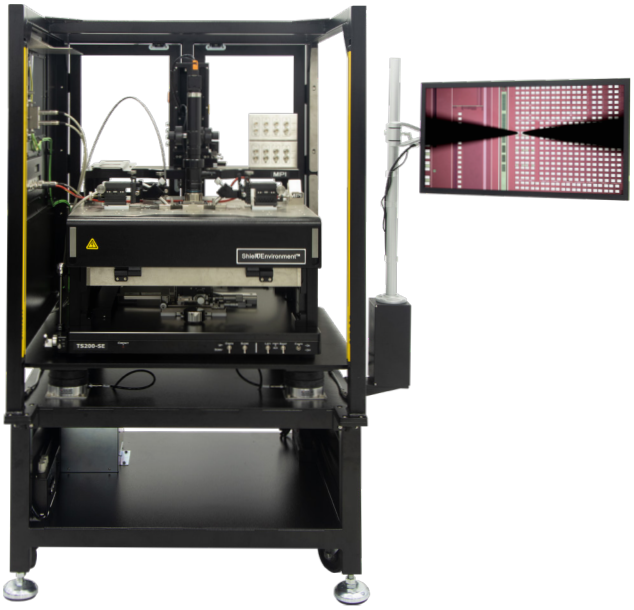
MPI TS200-HP | 200 mm Manual Probe System
For accurate and reliable High Power measurements

FEATURES / BENEFITS

Dedicated designed for High Voltage and High Current application

- On wafer high power device measurement up to 10kV/600A
- Gold plated chuck surface for minimum contact resistance and vacuum holes optimized for thin wafer handling down to 50 µm
- Taiko wafer chuck option
- Dedicated high voltage and high current probes
- Anti-arcing solutions



MPI ShielDEnvironment™ for Accurate Measurements

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

Ergonomic Design and Safety

- Unique puck controlled air bearing stage for quick single-handed operation
- Regulatory approved safety interlocked light curtain integrated with vibration isolation table to protect users
- Available with various chuck options and wide range of accessories such as MicroPositioners, microscopes

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

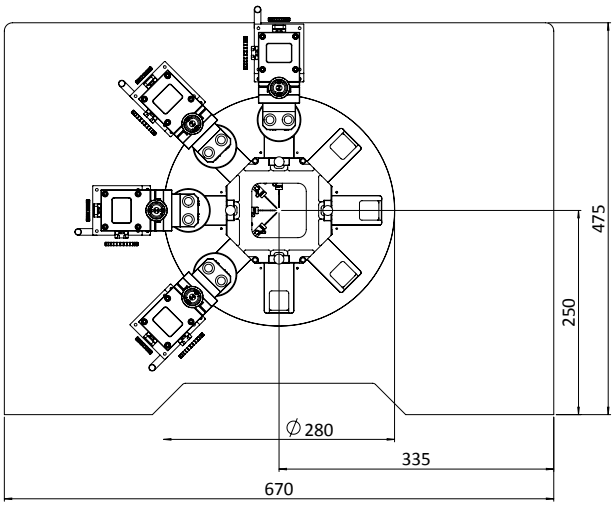
Manual Microscope Stage (Linear)

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

PROBE PLATEN

Specifications

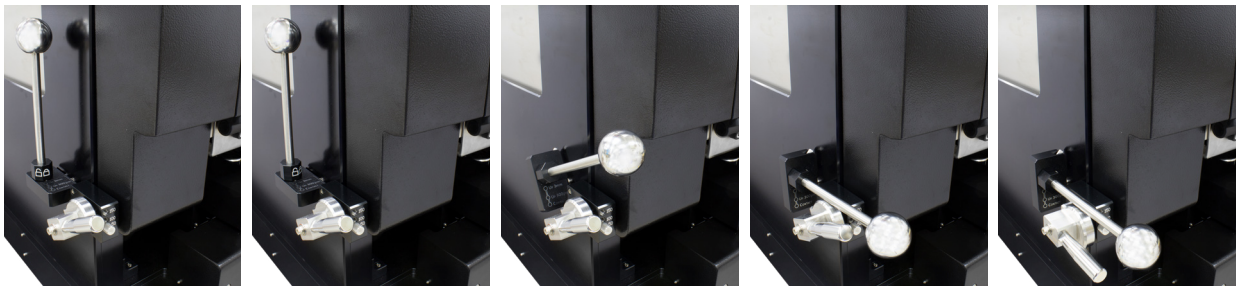
Material	Nickel plated steel
Dimension	See drawing
Chuck to ShielDGuard height	Min. 5 mm
Max. No of MicroPositioners	8x DC or 4x DC + 2x RF or 2x DC + 4x RF or 4x DC + 4x RF Setup
Platen lift control	3 positions - contact (0), separation (300 µm), and loading (3 mm)
Separation repeatability	< 1 µm (0.04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

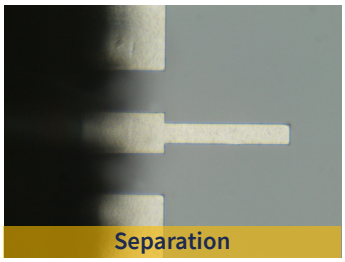


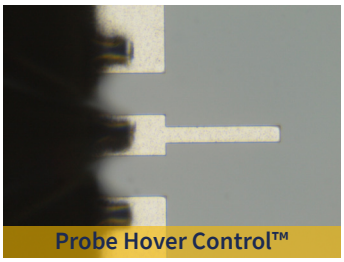
Universal probe platen design for up to 8 DC MicroPositioners

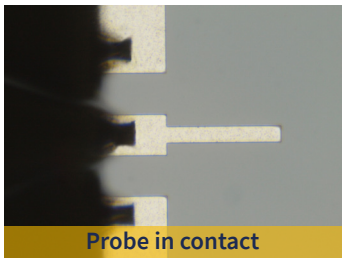
PLATEN LIFT WITH Probe Hover Control™

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

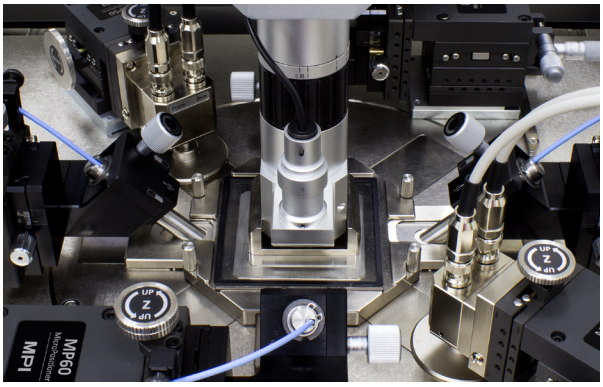
ShielDEnvironment™

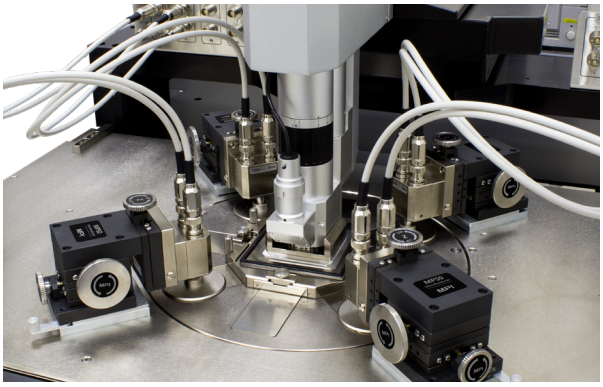
MPI ShielDEnvironment™ is a high performance local environmental chamber providing excellent EMI- and light-tight shielded test environment for ultra-low noise, low capacitance measurements.
MPI ShielDEnvironment™ allows up to 4-port RF or up to 8-ports DC/Kelvin or a combination of those configurations. 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.*





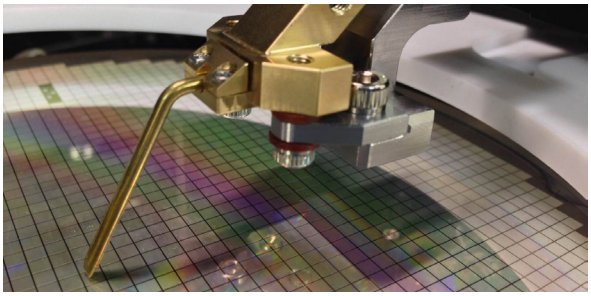
HIGH POWER PROBE ACCESSORIES

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.

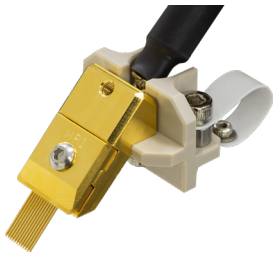
High Current Probe (HCP)

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	5-25 µm (customizable)
Connector type	Keysight HV, Keithley HV, SHV, BNC, Banana, M HV
Air pressure requirement	CDA up to 8 bar

NON-THERMAL HIGH POWER CHUCKS

High Power Chucks

	200 mm
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 selection (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 4 x 4 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.*

Electrical Specification (Coax)

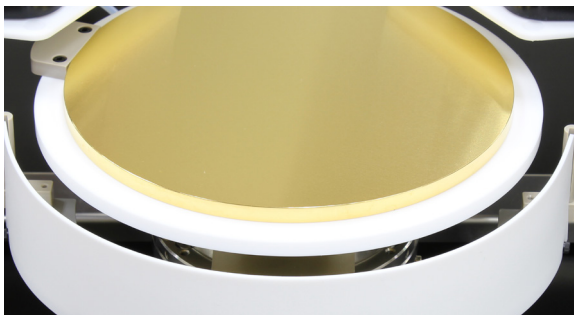
Operation voltage	In accordance with EC 61010, certificates for higher voltages available upon request
Isolation	> 2 GΩ

Electrical Specification (Triax)

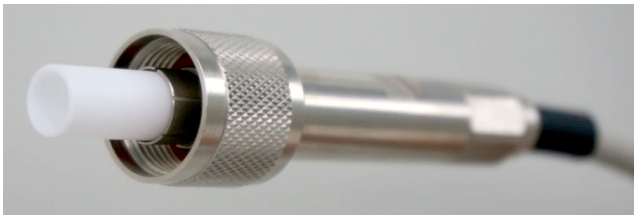
	Standard Chuck (10 V)	High Power Chuck (10 V)
Chuck isolation	> 100 GΩ	> 30 TΩ
Force to guard	> 100 GΩ	> 30 TΩ
Guard to shield	> 10 GΩ	> 500 GΩ
Force to shield	> 50 GΩ	> 100 GΩ

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

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 < 30 min	20 to 300 °C < 40 min
Cooling rates*	200 to 20 °C < 30 min	300 to 20 °C < 40 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 < 10 min	-40 to 25°C < 15 min	-60 to 25°C < 20 min
		25 to 200 °C < 30 min	
300°C	-10 to 25°C < 10 min	-40 to 25°C < 15 min	-60 to 25°C < 20 min
		25 to 300 °C < 40 min	
Cooling rates*			
200°C		200 to 25°C < 25 min	
	25 to -10°C < 18 min	25 to -40°C < 25 min	25 to -60°C < 35 min
300°C		300 to 25°C < 30 min	
	25 to -10°C < 18 min	25 to -40°C < 25 min	25 to -60°C < 35 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

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

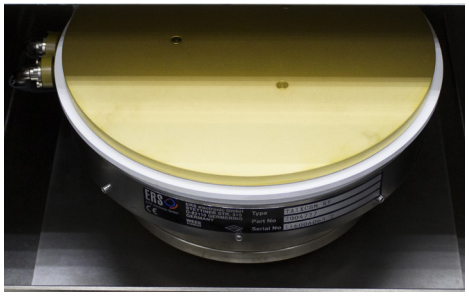
Thermal Controller Dimensions / Power and Air Consumption

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

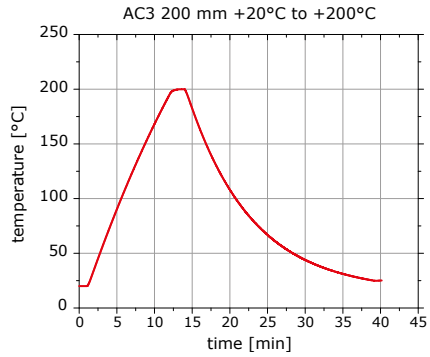
ERS AirCool® (patented) Controller Integrated Chiller -10°C

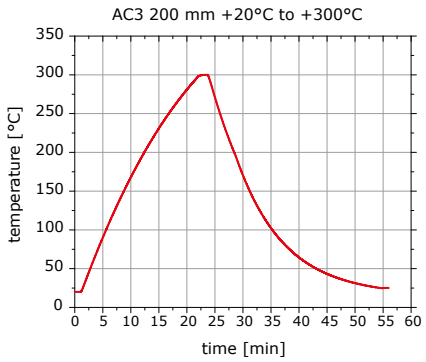
Chiller -40°C / -60°C

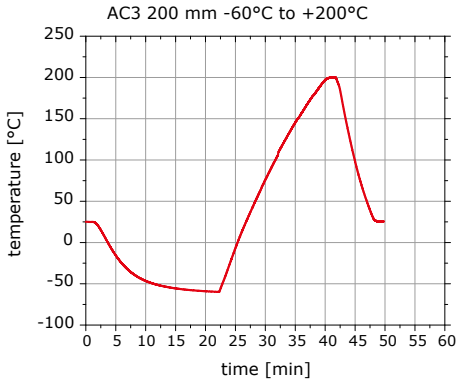
SAFETY TEST MANAGEMENT STM™ OPTION

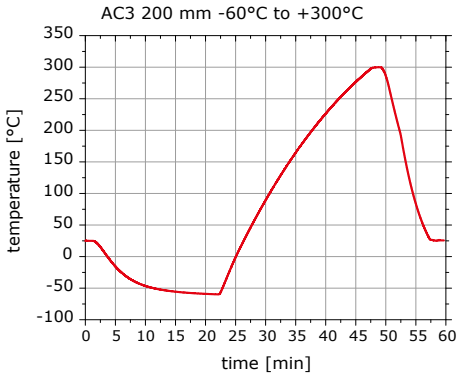
The STM™ system prevents opening of any doors during testing. Accidental opening of any system door during a negative chuck temperature is impossible on any event. Furthermore, an intelligent dew point control routine avoids moisture condensation during cold testing. The system automatically monitors 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.

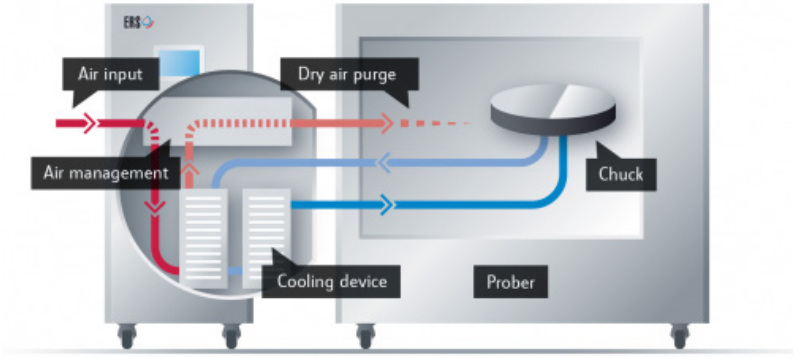
TYPICAL TRANSITION TIME











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	6.0 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

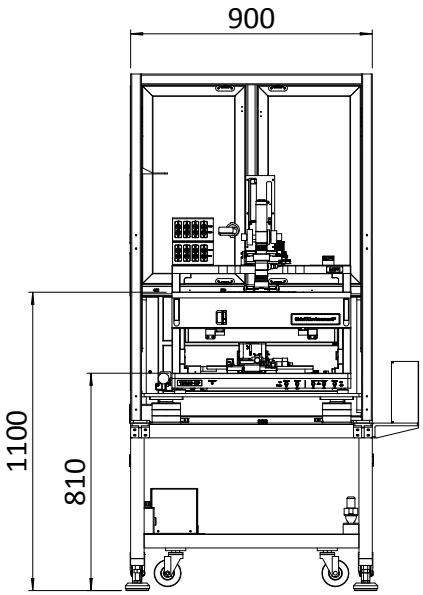
**See MPI Corporation's Terms and Conditions of Sale for more details.*

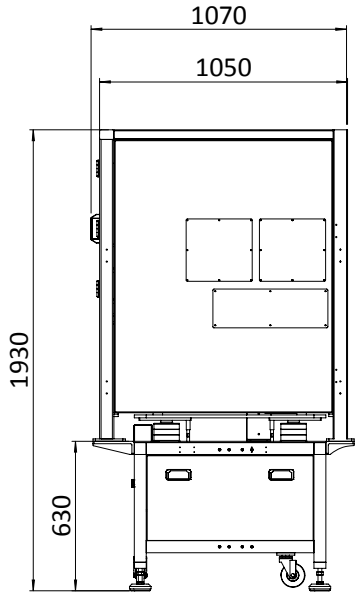
PHYSICAL DIMENSIONS

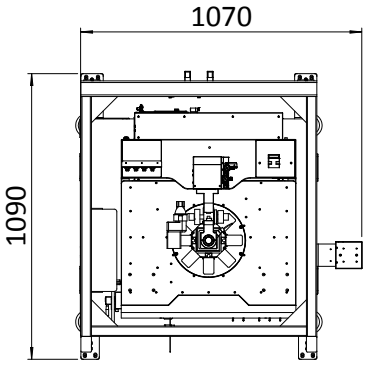
Station Platform with Bridge and Vibration Isolation Table and Light Curtain*

Dimensions (W x D x H)	900 x 1050 x 1930 mm (35.4 x 41.3 x 76.0 in)
Weight	~500 kg (1102.3 lb.)

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







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MPI Global Presence