MPI TS150-HP | 150 mm Manual Probe System

For accurate High Power measurements up to 10 kV, 600 A

FEATURES / BENEFITS

Universal Use

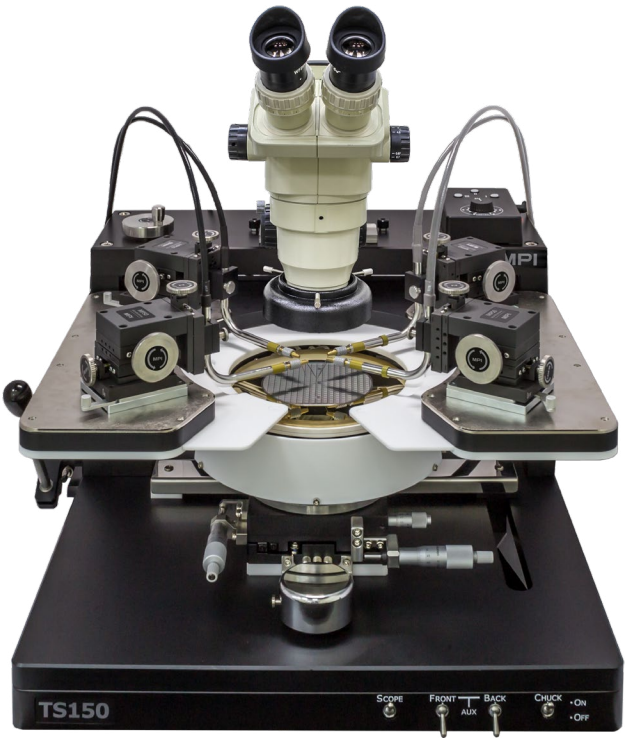
- Designed specifically for high power device measurement and wide variety of applications such as Device Characterization and Modeling, Wafer Level Reliability, Failure Analysis, IC Engineering, and MEMS

Ergonomic and Safe Design

- Unique puck controlled air bearing stage for quick single-handed operation
- Rigid platen accommodates up to 10 high voltage or 4 high current positioners
- EMI shielded DarkBox and platen ArcShield™ for safe high voltage applications
- Highly repeatable platen lift design with three discrete positions for contact, separation, and loading

Upgradability

- Available with various instrument connection options and chuck options and wide range of accessories such as MicroPositioners and microscopes to support various application requirements



SPECIFICATIONS

Chuck XY Stage (Standard)	
Total travel range	180 x 230 mm (7.1 x 9.1 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

Optional XY Stage for TS150-ES	
Planarity	< 10 µm (0.4 mils)
Theta travel (standard)	Free movement up to 360°
Movement	Easy puck controlled air bearing stage for TS150-ES
Fine adjustment	N/A

Manual Microscope Stage (Air Bearing)

Movement range	25 x 25 mm (1 x 1 in)
Resolution	N/A
Scope lift	Manual, tilt-back
Movement	Air bearing control, fixed by vacuum

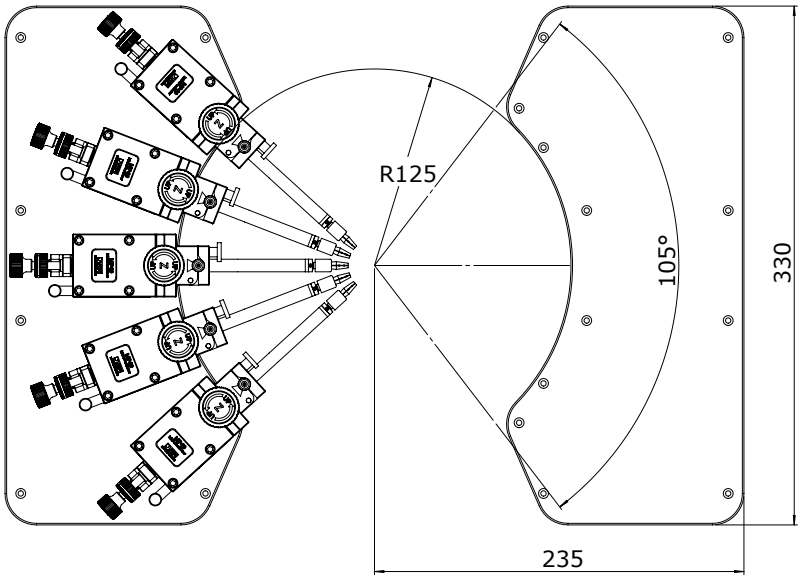
Manual Microscope Stage (Linear)

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
Dimensions	See drawing
Chuck top to platen top	Min. 28 mm
Max. No of MicroPositioners	10 DC or 4 RF
Platen lift control	3 positions - contact (0), separation (300 µm), and loading (3 mm)
Platen Z-height movement	High resolution screw for fine control
Z-height adjustment range	Max. 20 mm (0.8 in)
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	Depends on chuck configuration

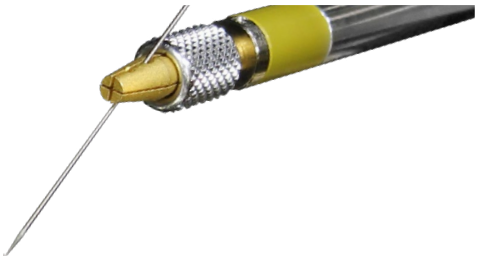


Universal probe platen design for up to 10 DC MicroPositioners

HIGH POWER PROBE ACCESSORIES

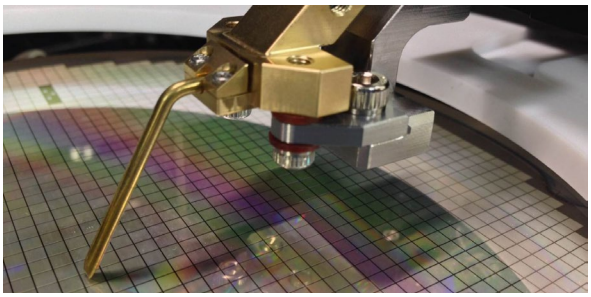
High Voltage Probe (HVP)

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

Connectivity 1	Coaxial: 10 kV (Banana), 5 kV (SHV)
Connectivity 2	MPI HV Kelvin Triax (f): 3 kV (Triaxial mode), 10 kV (Coaxial mode)
Diameter	160 mm
Material	Gold plated aluminum
Chuck surface	Planar with 0.5 mm diameter holes in centric sections
Vacuum holes selection (diameter)	3, 27, 45, 69, 93, 117, 141 mm
Vacuum actuation	Manual switch between Center (4 holes), 50, 100, 150 mm (2, 4, 6 in)
Supported DUT sizes	Single DUTs down to 4 x 4 mm size or wafers 50 mm (2 in) thru 150 mm (6 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)

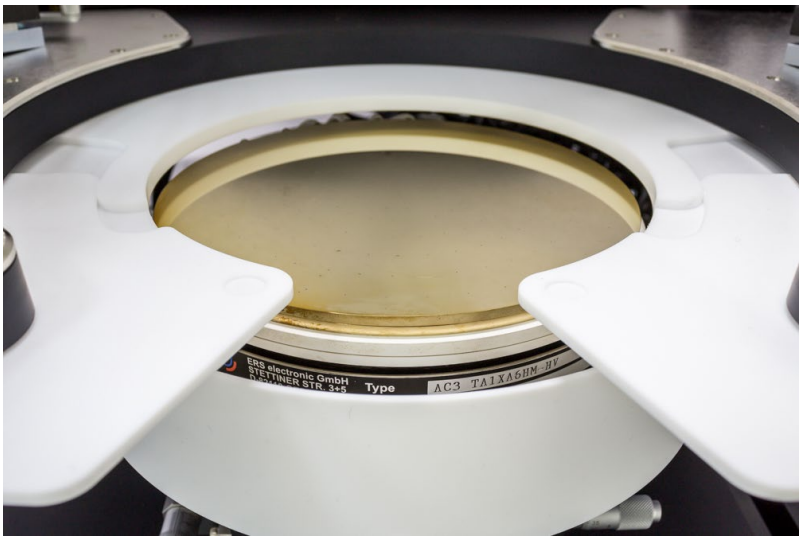
	Standard Chuck (10 V)	High Power Chuck (10 V)
Chuck isolation	> 100 GΩ	> 30 TΩ
Force to guard	> 100 GΩ	> 30 TΩ
Guard to shield	> 10 GΩ	> 500 GΩ
Force to shield	> 50 GΩ	> 100 GΩ

THERMAL HIGH POWER CHUCKS

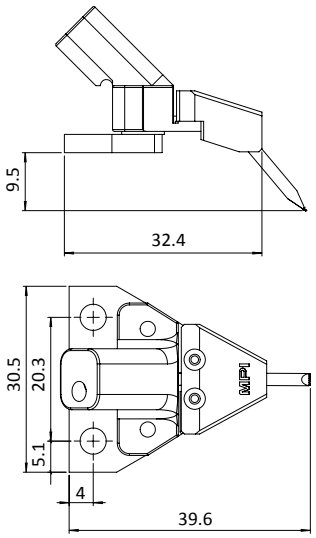
Specifications of MPI ERS Integrated Technology

	20 °C to 200 °C	20 °C to 300 °C
Connectivity	MPI HV Kelvin Triax (f): 3 kV (Triaxial mode), 10 kV (Coaxial mode)	MPI HV Kelvin Triax (f): 3 kV (Triaxial mode), 10 kV (Coaxial mode)
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 20 to 200 °C < ±1.0 °C at > 200 °C
Surface flatness and base parallelism	< ±10 µm	< ±10 µm
Heating and cooling rates*	20 to 200 °C < 20 min 200 to 20 °C < 20 min	20 to 300 °C < 25 min 300 to 20 °C < 25 min
Leakage @ 10 V - Kelvin Triax (f)	< 15 fA at 25 °C < 30 fA at 200 °C	< 15 fA at 25 °C < 50 fA at 300 °C
Leakage @ 3000 V	< 5 pA at 25 °C	< 15 pA at 300 °C
Leakage @ 10 kV - Coax BNC (f)	< 10 pA at 200 °C < 6 nA at 200 °C	< 6 nA at 300 °C
Maximum voltage between chuck top and GND	10 kV DC	10 kV DC

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

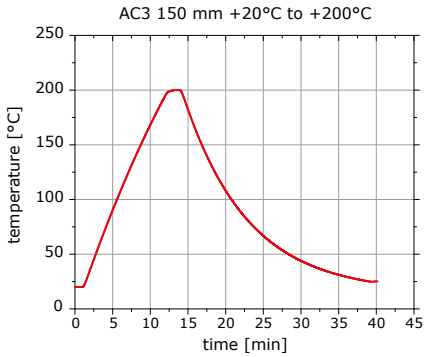


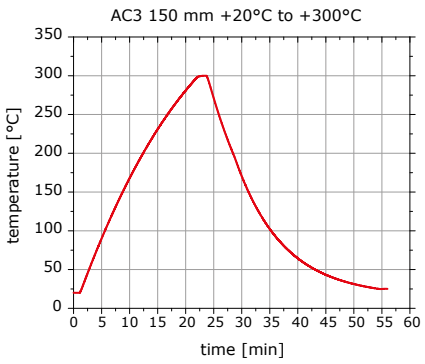
150 mm high power thermal chuck



High current probe dimensions

TYPICAL TRANSITION TIME





FACILITY REQUIREMENTS

Thermal Chuck 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

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 (Triaxial Chuck)	300 x 360 x 135	12	700	200
20 to 300 °C (Triaxial Chuck)	300 x 360 x 135	12	700	200

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

General Probe System

Power	100-240 V AC nominal; 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.*

REGULATORY COMPLIANCE

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

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)	470 x 505 x 635 mm (18.5 x 19.9 x 25.0 in)
Weight	~60 kg (132 lb.)

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

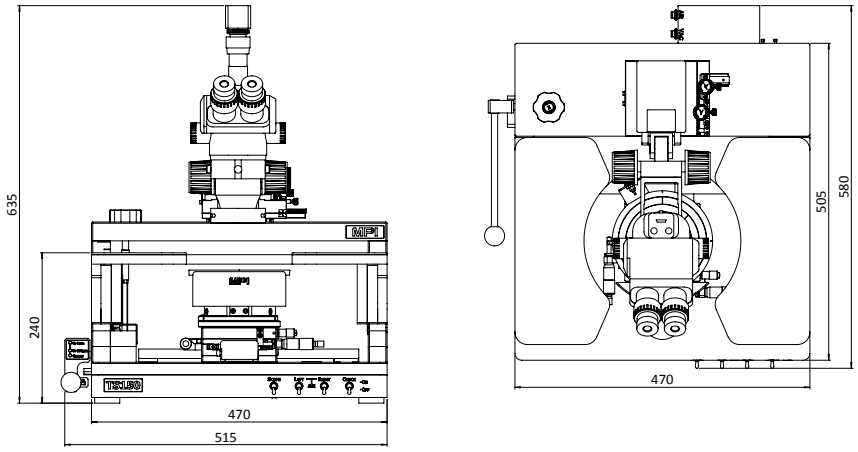
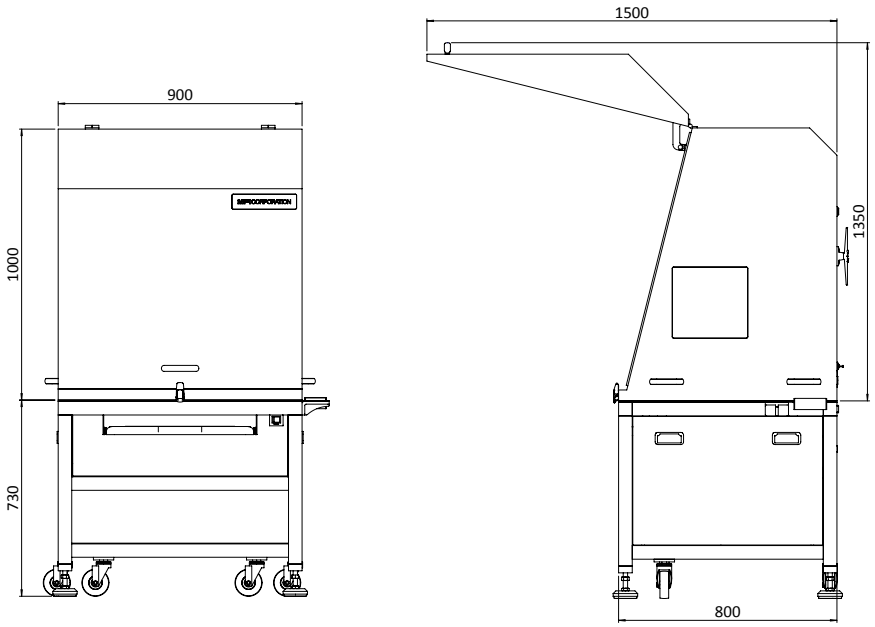


Table with DarkBox

Dimensions (W x D x H)	900 x 800 x 1730 mm (35.4 x 31.5 x 68.1 in)
Weight	~190 kg (418 lb.)



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www.mpi-corporation.com/ast/support/local-support-worldwide

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