

# MPS150

## 150 mm Manual Probe System



### DATA SHEET

The MPS150 is a very cost-effective and simple, yet highly-precise manual probe system for wafers and substrates up to 150 mm. It supports a wide variety of applications such as C-V/I-V, RF, mm-Wave and sub-THz measurements, device and wafer characterization tests (DWC), failure analysis (FA), submicron probing, MEMS, optoelectronic engineering tests and more. Its stable platen is designed to accommodate up to sixteen positioners, providing a function similar to a probe card for special wafer-level reliability (WLR) applications.

The MPS150 probe system provides a solid, compact and modular platform with integrated vibration-isolation solution and a unique pull-out chuck stage. The station can accommodate application-specific high-planarity-isolated chucks. The height of the solid platen can be adjusted up to 40 mm, allowing quick and easy setup of the system to accommodate any application. The highly-repeatable contact separation of 200  $\mu\text{m}$  ensures excellent contact performance. In addition to the precision platen movement, the chuck provides precise wafer height alignment up to 10 mm and chuck stroke up to 3 mm. In addition, the rigid microscope bridge enhances contact stability and contact performance.

The modular design of the MPS150 allows you to mount a microscope of your choice, enabling you to upgrade the system from the simplest probing platform with a manual microscope to a highly-sophisticated probing platform with a programmable microscope, or to a wafer-level MEMS test system by simply adding a non-contact vibration analyzer.

### FEATURES / BENEFITS

Flexibility	<p>Ideal for a wide range of applications such as RF, mm-Wave and sub-THz characterization, FA, DWC, MEMS, optoelectronic tests and WLR</p> <p>A stable platen mounted with up to sixteen positioners provides a function similar to a probe card</p> <p>A variety of accessories are available such as laser cutters, platens and chucks for RF, mm-Wave and sub-THz testing</p>
Stability	<p>Solid station frame</p> <p>Built-in vibration-isolation solution for superior vibration attenuation</p> <p>Rigid microscope bridge</p>
Ease of use	<p>Ergonomic and straightforward design for comfortable and easy operation</p> <p>Low-profile design</p> <p>Simple microscope operation</p> <p>Quick and ergonomic change of DUT through pull-out stage</p>

## MECHANICAL PERFORMANCE

### Chuck Stage

Travel	155 mm x 155 mm (6 in. x 6 in.)
Resolution	5 $\mu\text{m}$
Planarity over 150 mm (6 inch)	< 10 $\mu\text{m}$
Load stroke, Y axis	90 mm
Z height adjustment range	10 mm
Z contact / separation / load stroke	0-3 mm adjustable
Theta travel (standard)	360°
Theta travel (fine)	$\pm 8^\circ$
Theta resolution	$7.5 \times 10^{-3}$ gradient

### Manual Microscope Stage (On Bridge)

Travel range	50 mm x 50 mm (2 in. x 2 in.) / 150 mm x 100 mm (6 in. x 4 in.)
Resolution	$\leq 5 \mu\text{m}$ (0.2 mils)
Scope lift	Manual, tilt-back or linear pneumatic

### Programmable Microscope Stage \*

Travel range	50 mm x 50 mm (2 in. x 2 in.)
Resolution	0.25 $\mu\text{m}$ (0.01 mils)
Scope lift	Programmable 130 mm

\* ProberBench™ electronics for manual systems (P/N 157-137) required

## PHYSICAL DIMENSIONS

### Station Platform, with Bridge \*

Station dimensions	490 mm (W) x 490 mm (D) x 480 mm (H) (19 inch x 19 inch x 19 inch)
Weight	~60 kg (132 lb.)

\* Station accessories such as cameras and laser cutters may increase the total height to 900 mm (35.4 inch)

## PLATEN SYSTEM

### Platen

Platen space (typical)	Universal platen: space for up to four DPP2xx/DPP3xx/DPP4xx/RPP210 or up to twelve DPP105 positioners Universal platen with optional probe card adapter: space for up to eight DPP2xx/DPP3xx/DPP4xx/RPP210 or up to sixteen DPP105 positioners MMW platen: space for up to four RPP305 or two LAP positioners
Z-Height adjustment range	Maximum 40 mm (depending on configuration)
Minimum platen-to-chuck height	16 mm (universal platen)
Separation lift	200 $\mu\text{m}$
Separation repeatability	< 1 $\mu\text{m}$
Vertical rigidity / force	5 $\mu\text{m}$ / 10 N (0.2 mils / 2.2 lb.)
Accessory mounting options	Universal platen: magnetic, vacuum RF-platen: bolt-down, magnetic

## PHYSICAL DIMENSIONS

### Standard Wafer Chuck

Diameter	150 mm
Material	Stainless steel
DUT sizes supported	Shards or wafers 25 mm (1 in.) through 150 mm (6 in.)
Vacuum ring diameter	Universal: 4 mm, 7 mm, 22 mm, 42 mm, 66 mm, 88 mm, 110 mm, 132 mm Standard: 22 mm, 42 mm, 66 mm, 88 mm, 110 mm, 132 mm
Vacuum ring actuation	Universal: all connected in meander, center hole 1.5 mm diameter Standard: mechanically selected, center hole 1.0 mm diameter
Chuck surface	Planar with centric-engraved vacuum grooves
Surface planarity	$\leq \pm 3 \mu\text{m}$
Rigidity	$< 15 \mu\text{m} / 10 \text{N} @ \text{edge}$

### RF Wafer Chuck

Diameter	150 mm with two additional AUX chucks
Material	Stainless steel with HF/OPTO surface (flat with 0.7 mm holes)
DUT sizes supported	Main: single DUTs down to 3 mm x 5 mm size or wafers 25 mm (1 inch) through 200 mm (8 inch) AUX: up to 18 mm x 26 mm (1 in. x 0.7 inch) each
Vacuum hole sections (diameter)	22 mm, 42 mm, 66 mm, 88 mm, 110 mm, 132 mm (four holes in center with 2.5 mm x 4.3 mm distance)
Vacuum hole actuation	Mechanically selected
Chuck surface	Planar with 0.7mm diameter holes in centric sections
Surface planarity	$\leq \pm 3 \mu\text{m}$
Rigidity	$< 15 \mu\text{m} / 10\text{N} @ \text{edge}$

### TRIAx Wafer Chuck

Diameter	150 mm with three additional AUX chucks (two with vacuum fixation)
Material	Stainless steel
DUT sizes supported	Main: wafers 50 mm through 150 mm AUX: up to 18 mm x 26 mm (1 inch x 0.7 inch) each
Vacuum hole sections (diameter)	50 mm, 100 mm, 150 mm (2 inch, 4 inch, 6 inch)
Vacuum hole actuation	3x vacuum switch unit
Chuck surface	Planar with 0.4 mm diameter holes in centric sections
Surface planarity	$\leq \pm 5 \mu\text{m}$

## NON-THERMAL CHUCKS

Note: Results measured with non-thermal chuck at standard probing height (10,000  $\mu\text{m}$ ) with chuck in a dry environment. Moisture in the chuck may degrade performance.

### Standard Chuck Performance (Non Triax)

Operation voltage	Standard: in accordance with EC 61010, certificates for higher voltages available upon request
Isolation*	$> 2 \text{G}\Omega$

### System Electrical Performance (Triaxial Setup)

Chuck isolation	$> 100 \text{G}\Omega$
Probe leakage**	$\leq 500 \text{fA}$ (typical)
Probe capacitance***	50 fF -80 fF (typical)

\* Factory test with multimeter with maximum 2 G $\Omega$  range

\*\*Verified with DCP-150K probes and four 2 m SSMC triaxial cables. Test condition: force 10 V on each SMU; integration time - long; limit range - fixed 10 pA; measure current. Cascade Microtech has no influence on the surrounding equipment which might induce distracting peaks. Leakage current levels depend on surrounding atmosphere and are valid for low humidity cases.

\*\*\* Typically for triax arm setup (1 kHz frequency, maximum 3 m cable). Achievable measurement capacitance resolutions depend mainly on the equipment used and the measurement frequency used.

## THERMAL CHUCKS

Note: Results measured with thermal chuck at standard probing height with chuck in a dry environment. Moisture in the chuck may degrade performance.

Temperature range	30°C to 300°C
Temperature resolution	0.1°C
Temperature accuracy	± 0.1°C
Chuck diameter	150 mm nominal
Thermal uniformity	≤ 0.5°C @ 25°C, ≤ 2°C @ 200°C
Flatness / parallelism	≤ 30 µm (0.12 mils) over full temperature range, ≤ 10 µm at ambient
Isolation	1x10 <sup>11</sup> Ω @ 25°C, 1x10 <sup>10</sup> Ω @ 200°C
Interface	RS232 or IEEE488

## FACILITY REQUIREMENTS

Power	100-240 VAC, 47-63 Hz, 500 VA (without thermal chuck)
Vacuum	-0.8 bar
Compressed air	4 bar

For thermal chuck requirements, see ERS AirCool3 Facility Planning Guide.

## ORDERING INFORMATION

### MPS150-based Application-dedicated Pre-configured Packages

Part Number	Description
EPS150COAX	150 mm manual probing solution for DC parametric test
EPS150TRIAX	150 mm manual probing solution for low-noise measurements
EPS150RF	150 mm manual probing solution for RF applications
EPS150MMW	150 mm manual probing solution for mmW, THz and load pull applications
EPS150FA	150 mm manual probing solution for failure analysis
EPS150TESLA	150 mm manual probing solution for high-power device characterization*

\*See EPS150TESLA data sheet for details.

## REGULATORY COMPLIANCE

Certification	CE
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## WARRANTY

Warranty*	Fifteen months from date of delivery or twelve months from date of installation
Service contracts	Single and multi-year programs available to suit your needs

\*See Cascade Microtech's Terms and Conditions of Sale for more details.

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Data subject to change without notice

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**Cascade Microtech, Inc.**  
**Corporate Headquarters**  
toll free: +1-800-550-3279  
phone: +1-503-601-1000  
email: [cmi\\_sales@cmicro.com](mailto:cmi_sales@cmicro.com)

**Germany**  
phone: +49-89-9090195-0  
email: [cmg\\_sales@cmicro.com](mailto:cmg_sales@cmicro.com)

**Japan**  
phone: +81-3-5615-5150  
email: [cmj\\_sales@cmicro.com](mailto:cmj_sales@cmicro.com)

**China**  
phone: +86-21-3330-3188  
email: [cmc\\_sales@cmicro.com](mailto:cmc_sales@cmicro.com)

**Singapore**  
phone: +65-6873-7482  
email: [cms\\_sales@cmicro.com](mailto:cms_sales@cmicro.com)

**Taiwan**  
phone: +886-3-5722810  
email: [cmt\\_sales@cmicro.com](mailto:cmt_sales@cmicro.com)