PLV50

100 mm Manual Vacuum Probe System

DATA SHEET

The PLV50 is the most cost-effective and simple, yet highly-precise probing solution for wafers and substrates up to 100 mm in a vacuum environment. Specially designed for laboratory requirements, it provides a wide range of measurements, including I-V, C-V and RF, and can be used for probing under high vacuum less than 10^{-5} mbar. Application flexibility is ensured for DC and RF measurements, MEMS and opto-engineering tests. RF tests are supported by a wide range of probes, calibration substrates and other accessories as well as WinCal XE™ calibration software. The unique LRRM, LRM+, NIST-style TRL and hybrid calibration methods are available with the WinCal XE calibration software.

The PLV50 is equipped with a stable vibration isolating frame. The high-vacuum chamber with a hinged topside lid and an optical window made of quartz glass contains flanges for vacuum-tight mechanical feedthrough drives. Thus the chuck and up to six vacuum-type positioners can be easily operated from outside via cardan shaft. The high-vacuum pumping system consists of a Turbo-Molecular drag Pump (TMP), a diaphragm forepump, and a full-range vacuum gauge. Optional pressure regulation is available.

The chuck stage and chuck are located inside the vacuum chamber. The probe platen is designed to mount up to six vacuum-type positioners on magnetic feet. Both DC and RF positioners can be used. A high-resolution video microscope is mounted above the view-port.

The PLV50 can be customized with a number of instruments, including various video microscopes and optical motion analysis tools, such as Polytec's MSA systems. Specially designed thermal chucks with electrical and coolant bulk feedthrough are available for the use under vacuum conditions. The PLV50 supports a wide temperature range from -60°C to 300°C.

FEATURES / BENEFITS

Flexibility	Ideal for a wide range of applications such as RF, FA, DWC, MEMS and optoelectronic tests A stable platen mounted with up to six positioners Optional thermal chuck and pressure regulation Probing with an open chamber lid possible under atmospheric condition
Stability	Solid station frame Built-in vibration-isolation solution for superior vibration attenuation Precise probe positioning with short and stable probe arms of positioners in a vacuum chamber
Ease of use	Ergonomic and straightforward design for comfortable and easy operation Simple microscope operation Quick and ergonomic change of DUT through hinged topside lid

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SPECIFICATIONS*

Note: For physical dimensions and facility requirements, refer to the PLV50 Facility Planning Guide.

Chuck Stage	
Travel range	50 mm x 50 mm, optional 80 mm x 80 mm and 100 mm x 100 mm
Resolution	5 µm
Manipulation	Linear, from outside the chamber via rotary feed thru drives
Probe Platen	
Platen space	Universal platen for up to six VCP110 positioners
Z contact / separation	About 250 µm
Manipulation	From outside the chamber
Microscope	
Travel	Swivel mechanism for moving the microscope in a safe rest position for chamber opening
Focus	Manual drive
Type	Video zoom microscope
Zoom	7x
Magnification	0.38x to 2.6x
Resolution	721 lp/mm to 240 lp/mm
Field of view	12.8 mm x 17.1 mm to 1.8 mm x 2.4 mm
Chuck	
Standard Chuck	No temperature control, holds carrier for fixing single chips, wafer fragments and full wafer up to 150 mm
Thermal Chuck	
Minimum temperature	-60°C, -40°C, 25°C
Maximum temperature	200°C, 300°C
Vacuum Chamber	
Size	Approximately ø 600 mm x 300 mm (H)
Material	Stainless steel
Loading	Hinged top side lid, made of aluminum, fast lock mechanism
View port	Central, top side, made of ø 90 mm quarts glass, 6 mm thickness, ø 75 mm clear opening, minimum objective working distance 75 mm
Feedthrough	
Chamber wall:	• 6x DN50 ISO-KF flange for rotary feedthrough drives to operate VCP110 probe positioners from outside • 2x DN50 ISO-KF flange for rotary feedthrough drives for operating chuck XY stage from outside • 1x DN50 ISO-KF flange for rotary feedthrough drive for operating platen contact/separation drive from outside • 2x DN50 ISO-KF flange for measurement feedthroughs • 1x DN25 ISO-KF flange with safety valve • 1x DN10 ISO-KF flange for venting valve, manually operated
Chamber bottom plate:	• 1x DN100 ISO-K flange for measurement feedthroughs • 1x DN63 ISO-K flange for turbo-molecular drag pump • 2x DN40 ISO-KF flange (1x for optional thermal chuck, 1x spare) • 1x DN25 ISO-KF flange for vacuum gauge • 1x DN16 ISO-KF flange (spare) • 6x WDE105 feedthrough (1x for optional thermal chuck, 5x spare) • 1x D28 opening (spare)
Purging	Manual operated inlet valve to fill the vacuum chamber with inert gas (N2)

*Data, design and specification depend on individual process conditions and can vary according to equipment configurations. Not all specifications may be valid simultaneously.

ACCESSORIES

Carrier	
Wafer carrier	50 mm, 100 mm, 150 mm
Universal carrier	Small dies, wafer fragments, up to 75 mm wafer
Positioner	
Type	VCP110 high vacuum type probe positioner
Travel range	X, Y and Z = 12 mm linear
Fixation	Magnetic
Manipulation	From outside the chamber via rotary feed thru drives
Measurement Setup	
Probe arms, cabling and	Triax, advanced coax, and high frequency measurement feed thru
Triax chuck add-on	For low-noise I-V and C-V measurements
High Vacuum System	
Minimum pressure	< 1 x 10^{-5} mbar
Maximum pressure	Atmosphere
Pump type	Turbo and diaphragm
Vacuum gauge	Full range
Pressure control system	Optional, up-stream controlled
TV System	
USB	Digital camera connection to computer
HDMI	Digital camera connection to monitor
Microscope Upgrade	
Movement	Upgrade from default boom stand to high resolution XY microscope movement
Microscope	Upgrade from default video zoom microscope to high-magnification compound microscope
View-port	
Customized window	For applications where the standard window does not meet the requirements, other windows available with different window material, AR coating, working distance and diameter.

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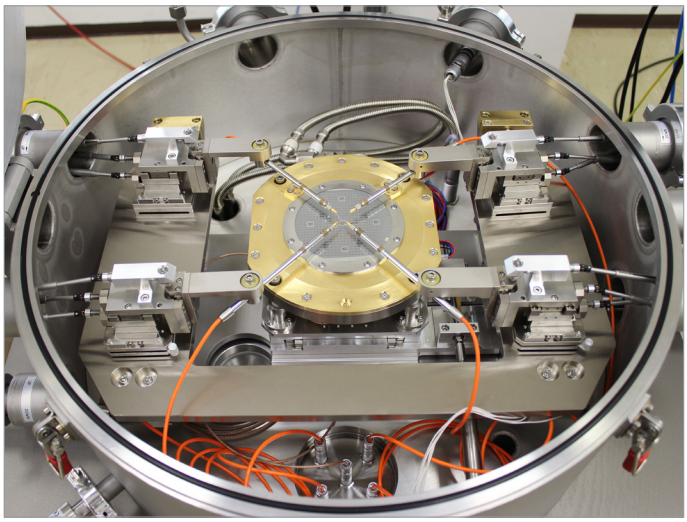
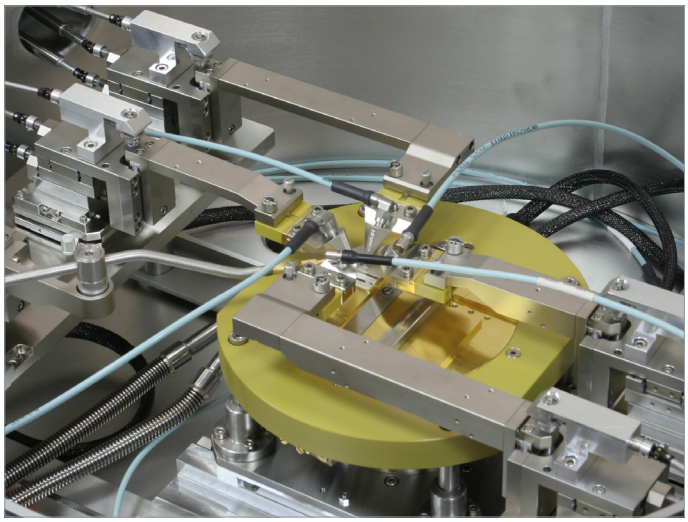
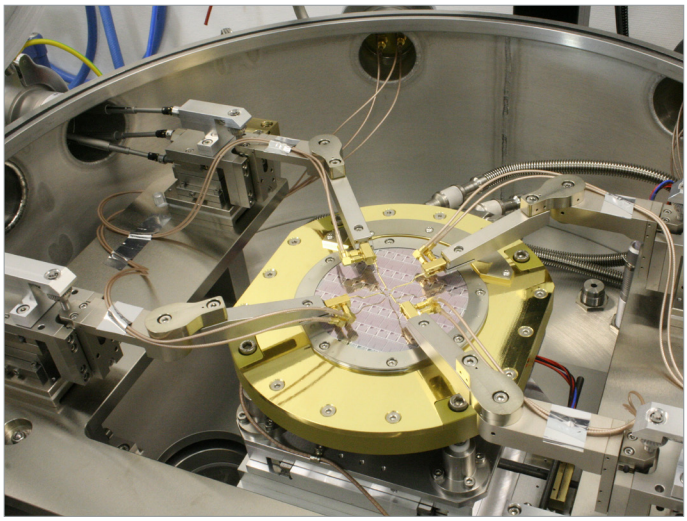


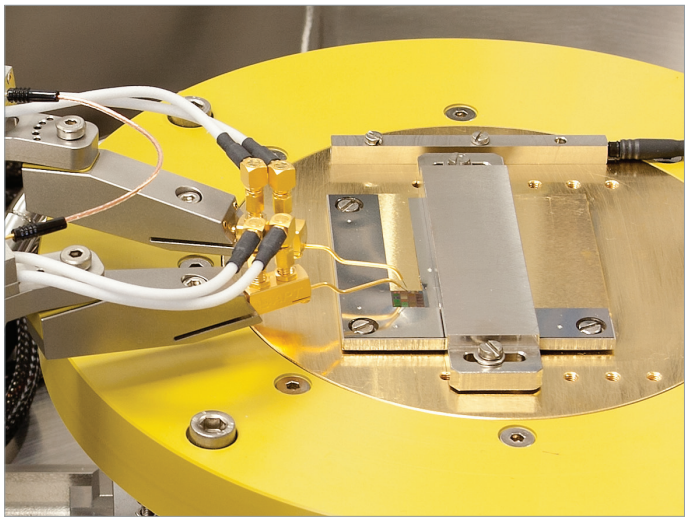
PLV50 with four DC triax probes.



PLV50 with four RF probes and one DC triax probe.



PLV50 with four advanced coax probes.



Universal carrier and two coax probes.

Optional high-resolution XY microscope movement (Left: working position. Right: tilted into parking position).

ORDERING INFORMATION

The offered packages include all required components for successful probing:

- PLV50 base system with a chuck movement of 100 mm
- High-vacuum pump station
- Substrate carrier for the required sample size
- Microscope with camera and monitor
- Positioner with probe tips and cabling

Part Number	Description
PLV50DC-QT	Manual Vacuum Probing Solution for DC Test includes 4 DC triax positioners, probe tips and cabling
PLV50RF-QT	Manual Vacuum Probing Solution for RF Test includes 2 RF positioners, Z-Probes and cabling

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 Sales for more details.

PLV50-DS-0815

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