DATA SHEET

Semiautomatic Vacuum Probing System

- One system from R&D to production to meet your product testing requirements
- Easily customized to meet a variety of applications and budgets
- Ideal for MEMS, Sensors, Switches, Microbolometers, or any product that is vacuum-packaged.

FEATURES AND BENEFITS

High Vacuum – 10^{-4} torr

Unsurpassed Flexibility – built using our patented Probe System for Life (PS4L) Adaptive Architecture

Modular - all key modules are interchangeable and field upgradeable

Software – PILOT Command and Control Suite

Applications – Temperature, DC, C-V, I-V, High Frequency, Optoelectronics, MEMS stimulation and measurement

PROBE SYSTEM FOR LIFE

The Probe System for Life (PS4L) is designed based on SemiProbe's patented adaptive architecture. Unlike traditional probe systems, all PS4L foundation modules – bases, stages, chucks, microscope mounts, microscope movements, optics, manipulators and more - are interchangeable, making the PS4L the consummate solution for many different applications and budgets. This unique modular design enables customers to acquire test capabilities that precisely match their requirements. More important, as the environment or test conditions change, the PS4L can easily be field-upgraded to meet these new demands. With this design philosophy, PS4L customers realize substantial time and cost savings over traditional probe systems because they do not need to invest in a new platform when wafer size, levels of automation, or test requirements change.

VACUUM SYSTEM OVERVIEW

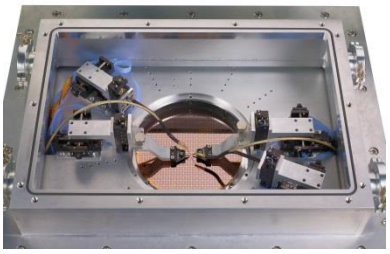
The semiautomatic probe system will test wafers or substrates up to 200 mm in a vacuum environment. Individual die and broken/partial wafers can also be tested. The system is built using our PS4L adaptive architecture. All key modules are interchangeable to provide unsurpassed flexibility. The system is ideal for research, laboratory or pilot production applications. The interchangeable modules makes it easy to convert to provide testing solutions for a variety of applications - DC, HF, OPTO, MEMS, Nanotechnology and more.

Built on a vibration isolation table, the chamber contains the wafer stage, the chuck system with carrier plate and manipulators. The motorized/programmable wafer stage provides up to 205 mm x 205 mm of X, Y movement and has motorized/programmable Z and theta stages. Several thermal chuck options are available to provide temperature ranges from -60°C to 300°C.

The probe system can be configured for individual manipulators or probe cards. Up to 4 motorized/programmable manipulators can be placed inside the chamber and operated remotely from outside the chamber. Several different size viewing ports, windows and flanges are available. The viewing ports and windows can be made from a variety of materials.

Several different types of optics are available to view the device and are typically complimented with a CCTV camera system. The optics mount to a variety of microscope mounts and movements. A common configuration is a bridge with a 50 x 50 mm X, Y microscope travel with a 50 mm pneumatic vertical lift. The bridge also accommodates other accessories including Laser Cutters, MEMS Motion Analyzers and IR Blackbodies.

The system is easily customized to meet a wide variety of applications and budgets. All modules are interchangeable and numerous accessories can be added as required. Several different types of vacuum pumps and controls are available to meet a variety of vacuum levels.



Platen surface shown with programmable manipulators for high frequency and DC testing

Gantry slides back for ease of chamber access. Gantry can be either manual or programmable

PILOT CONTROL SOFTWARE

Configuration and management of the system is controlled through the SemiProbe PILOT control software suite. Our software is designed similar to our hardware. Several different types of modules are available and customers only purchase what they need to purchase. New modules and capabilities are easily added in the field as required.

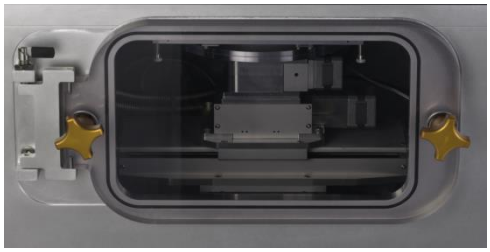
With its intuitive graphical user interface, PILOT is easy to set up, learn and use. All probing operations may be programmed and controlled through PILOT. The wafer map module quickly creates a specific wafer map for a wafer type and then saves and stores all test data and configuration data to the test wafer file. The data is easily transferred to other downstream equipment or available off-line for complete life cycle device monitoring.

PILOT software suite main screen display with Navigator and Wafer Map Modules, microscope and manipulator controls and integrated video display

VIEW AND LOADING PORTS

Based upon the application, view ports can be made of a variety of materials and sizes. Users may select from quartz, sapphire, germanium, Pyrex, or ZnSe on the top view port.

Side view ports are also available on request. The SemiProbe system also incorporates a large transparent front loading access port. This optically clear port enables users to observe probing operations in the closed chamber. All ports may be covered or closed during probing operation if desired.



Transparent access port provides ease of loading and in-process viewing

VACUUM PUMPS

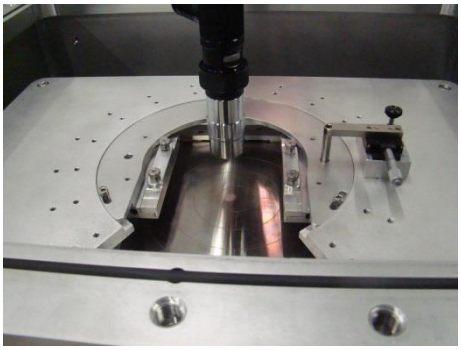
The semiautomatic vacuum probe utilizes a two stage pump system with roughing pump and a turbo molecular drag pump to hold the system at desired set pressure. The precision vacuum control options features a combination of upstream and downstream control for precise pressure control. Ideal for testing at controlled vacuum levels for product characterization, this precision control facilitates determining optimum vacuum level for 3D packaging. The system has been designed for long term operation at 10^{-4} torr. However, the system can be modified to meet your specific requirements.

CHUCKS

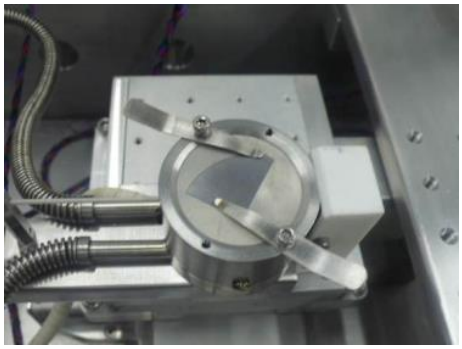
Chucks are available in a variety of sizes, shapes, materials and temperatures. A mechanical clamping system is used to hold the wafer or substrate in position for probing. The traditional method of holding wafers in position on a chuck does not work in a vacuum environment. Two carriers for each size are provided to facilitate wafer preparation while the other carrier is in the chamber.

Customized wafer carrier

Customized single device carrier



Fully Integrated Probe Card Holder



Ultra High Temperature (800° C) ceramic stage designed for testing wafer fragments

SPECIFICATIONS

Model Number		SA-4VP	SA-6VP	SA-8VP
Wafer/Substrate Size		100 mm	150 mm	200 mm
Wafer Chucks	Round or square - whole or partial wafers, die	up to 100 mm	up to 150 mm	up to 200 mm
Stage Travel (X,Y)	motorized/programmable	105 mm x 105 mm	155 mm x 155 mm	205 mm x 205 mm

Accuracy	+/- 2.5 µm
Resolution	0.1 µm
Repeatability	+/- 0.5 µm
Z Travel	15 mm
Z Resolution	1.0 µm
Z Repeatability	+/- 2.5 µm
Theta	+/- 10 degrees
Motors	DC stepper motors with encoders
Vacuum rating on stage	10^{-4} torr (System is designed for long term operation)
Signal and drive bulkheads	Coaxial, triaxial or 25 pin D connectors. Signal outputs maybe specified by the customer. All mounted on standard vacuum flanges for easy change.
Device Contact	Up to 6 manual manipulators or 4 motorized/programmable manipulators (Requires chamber top selection)
Probe Cards	Round or Rectangular – industry standard 4.5" x 12"
Chamber Tops	3 standard chamber tops – flat for probe card applications, medium top for manual manipulators and high top for programmable manipulator applications
Thermal Chucks	-60° C to 300° C
Optics /Microscope Mounts	Post, Bridge, Gantry, or Boom
Optics / Microscope Movements	50 x 50 mm (standard) – manual or motorized/programmable
Optics Z Travel	50 mm to 100 mm - Manual, Pneumatic or Motorized/Programmable
Optics / Microscopes	Stereozoom, Compound, Zoom Tube, AZoom
Zoom Range	2x to 40x depending on the microscope selected
Magnification	7x to 400x depending on microscope selected
View Ports	Quartz, ZnSw, Ge, Sapphire, Pyrex – others by special request
View Port Coatings	A variety of anti-reflective coatings are available
Precision Vacuum Control	MKS Instruments precision vacuum control provides vacuum level control from 100 torr to 1 mtorr
Vacuum Pumping System	Dual stage pumping system down to 10^{-6} torr
Pump Types	Choice of pumps depending on requirements – rotary vane, scroll, turbo molecular, or TPS compact (roughing and turbo molecular)
Accessories	Manipulators, probe arms, probe tips, probe card holder, CCTV systems, laser cutter, Polytech MSA-500 motion analyzer, IR blackbodies

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