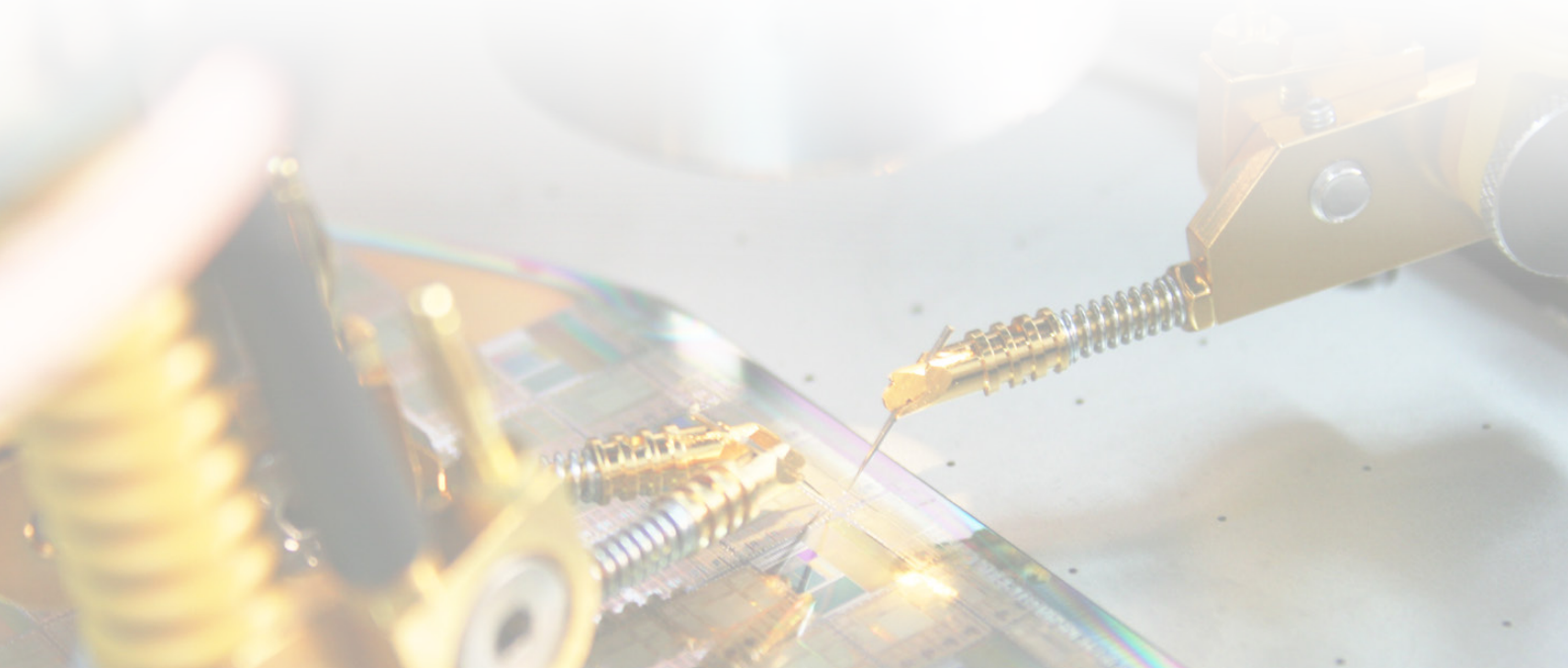




ANALYTICAL PROBER S200FA-HV

HIGH VOLTAGE
SEMI-AUTOMATIC



KEY FEATURES

Microscope with optional camera

Stable microscope bridge mount, choice of high power and stereo optics available

Microscope mount

programmable and manual options available

Large area platen

Suitable for mounting up to 8 manipulators

Wide range of chucks

Thermal and non-thermal chucks for high voltage applications

LabMaster™ FA software

Simple to integrate with LabVIEW™ software and other standard industry platforms

Microaccess

Allows probes and optics to be inserted to maintain controlled probing conditions

GuardMaster™

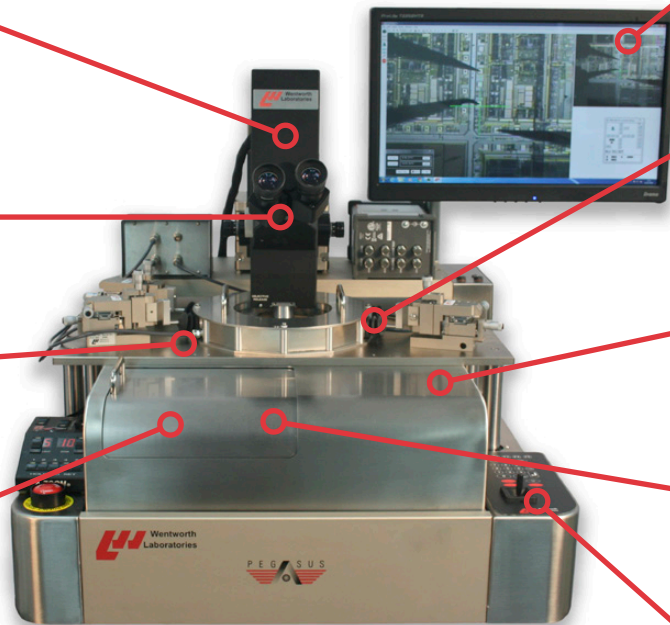
For EMC shielding and safe and accurate HV probing at temperatures from -60°C to +400°C

Chuck load/unload access

Extended stage for easy wafer loading

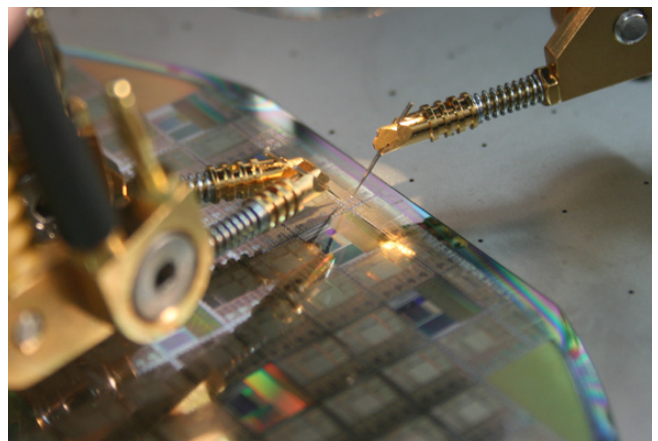
Joystick/keypad

For simple and intuitive system operation



IDEAL FOR TESTING POWER DEVICES

- ✓ High current probing for DC and pulsed
- ✓ Kelvin sense measurements (source & chuck)
- ✓ Low CRes reverse side contact (drain/source)
- ✓ Suitable for handling thin wafers
- ✓ Low leakage/high voltage
- ✓ Safety for high current/high voltage measurements



HIGH VOLTAGE PROBING

The S200FA-HV semi-automatic wafer prober addresses today's power semiconductor test challenges by delivering accurate low contact resistance measurements even at high voltages.

HIGH POWER

Wentworth's Pegasus™ S200FA-HV prober is ideally suited for testing power devices and can be easily integrated with a wide range of tester instruments.

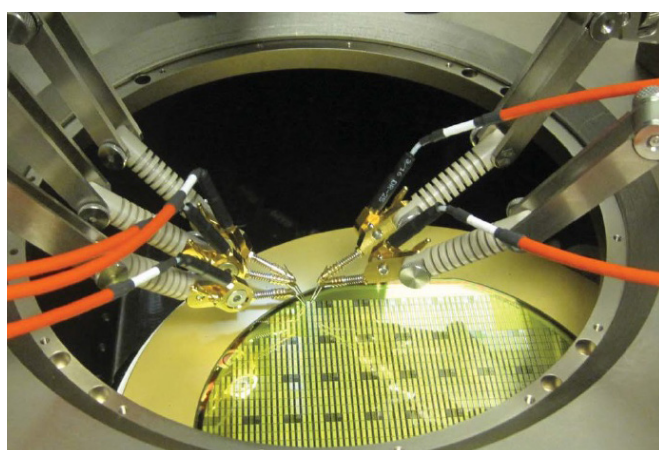
The S200FA-HV platform provides a flexible on-wafer probing solution focused on high-power semiconductor characterization.

Thanks to Kelvin chuck solutions, the S200FA-HV achieves low contact resistance measurements in the milliohm range even at high currents.

High current probes and probe cards (up to 200 A pulsed) handle and distribute high current loads. Dedicated HV and HC probes reduce probe and device destruction at high voltages/currents by preventing arcing at the tip.

SPECIFICATIONS

Voltage	3 kV (triax), 10 kV (coax)
Current	200 Amps (pulsed)
Leakage	<1 pA (3 kV)



High power test

HV PROBE NOISE VS TEMPERATURE

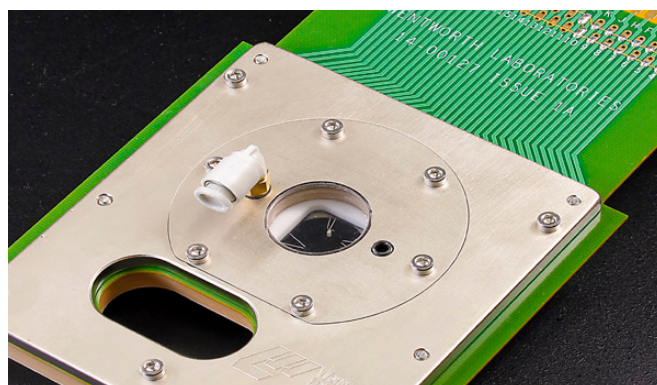
Temperature	Noise
+25°C	100 fA
+200°C	100 fA

HIGH VOLTAGE ACCESSORIES

The S200FA-HV analytical prober can be configured with either high voltage/high current (HV/HC) probe holders or use dedicated HV/HC current probe card solutions.

Wentworth's HV/HC probe cards use a special surface mount atmospheric chamber to protect against 'arcing' or 'flash over'.

Combined with high temperature probe card materials testing can be performed over a wide temperature range without the need to change the set up.



Custom high voltage/high current probe card

HV/THERMAL KELVIN WAFER CHUCKS SPECIFICATIONS

Temperature Stability	± 0.1°C
Temperature Accuracy	± 0.5°C
Isolation	>0.5 TOHM @ +25°C
Capacitance	1600 pF (coax), 200 pF (triax)
Max Voltage	10 kV @ chuck top
Leakage	<1 pA (3 kV)



High voltage thermal chuck

THE DESIGN

HIGH PRECISION

All Wentworth probers feature a robust chassis for mounting the prober stage.

The **XY stage** uses high precision motors with micro-stepping for greater accuracy. Ultra-high precision ball-screws reduce back lash and improve accuracy and repeatability.

The **Z stage** uses ultra-high precision multi-point lift ball-screws for superior linear rigidity. Additional multi-point linear bearings ensure increased torsional stiffness.

All stages are controlled by the **Pegasus™ Controller** consisting of the drive electronics, joystick, keypad and optional Windows user interface.

Interfacing is made easy with TTL, GPIB (IEEE488.2), RS232 and ethernet ports located on the back panel.

STAGE SPECIFICATION

Repeatability	5.0 µm
Accuracy	± 5.0 µm

The **Microscope Bridge** is designed for strength and can accommodate both a standard PMM (Programmable Microscope Mount) and multiple Z axes PMM. This means that test equipment such as thermal cameras, spectrometers, integrating spheres, laser cutters and light sources can be independently controlled via the prober joystick functions. This allows the operator to reposition the optics to enable direct device access from the top side.

EASE OF USE

The Pegasus™ S200FA-HV prober is designed with the operator in mind. Ergonomic controls make this one of the easiest prober platforms on the market today. Quick start up and simple menus allow users to be probing in minutes, whilst intuitive controls ensure that minimal training is required. The FA series probers can be used in 'local' or 'remote' mode. This flexibility allows the prober to be easily integrated with industry standard testers and data acquisition software, such as LabVIEW™.

Using either the stand alone joystick (with menu driven controls), or our windows based graphical interface **LabMaster™ FA**, this platform is an ideal choice for both universities and commercial users.

ROBUST MECHANICS

Using highest quality materials in its construction, the FA series probers provide an extremely stable platform for sub-micron probing and precision applications such as laser cutting.

At the same time, lightweight chucks and drive mechanics allow extremely fast probing with no loss of accuracy.

GUARDMASTER™ & MICROACCESS

The **GuardMaster™** enclosure surrounds the chuck and wafer stage, shielding it and the probes from both EMI and light. The microaccess top hat completes the EMI/ dark shielding allowing the probes and optics to be inserted into the probing environment while maintaining controlled probing conditions. Features include:

- ✓ Maintains environmental conditions while probing
- ✓ Provides access for microscope objectives maintaining X,Y & Z manoeuvrability
- ✓ Allows full control/access to probe manipulators
- ✓ Can be used with up to eight manipulators and/or interchangeable probe cards



Pegasus S200FA-HV GuardMaster™, Microaccess & Interlocks

ANALYTICAL FLEXIBILITY

Analytical flexibility is at the core of our products, paired with mechanical stability and accuracy. Our bespoke and standard tester solution packages are configured in an easy-to-use 'plug and play' set-up. Our **LabMaster™** software has the ability to communicate with both the tester and the prober's associated accessories, offering real-time data analysis and data acquisition.

DYNAMIC TESTING

The Pegasus™ FA series probers include advanced utilities which allow the experienced user to design sophisticated test routines. These test routines may then be re-used for automated testing, saving time and increasing productivity. A 'quiet mode' option removes power to all motors to reduce the noise floor.

FAILURE ANALYSIS

Failure analysis applications require mechanical versatility and adaptability to make multiple measurements. The S200FA-HV has been designed with these aspects in mind.

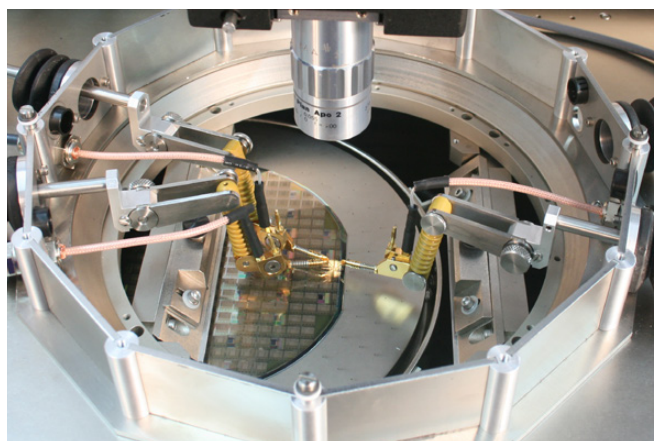
Our full range of failure analysis tools and options such as manipulator probe heads/needles, laser-ready optics and control/monitoring analysis software offer a wide choice of upgrade paths to ensure your system can grow with your testing requirements.

THERMAL CHARACTERIZATION

Our high performance thermal chuck solutions for device testing cover temperatures from -60°C to +400°C. To reduce thermal effects and keep the probing environment controlled, our propriety GuardMaster™ heating and cooling management system utilizes CDA or nitrogen.

OPTIONS

Temperature	Control
-30°C to +400°C	Active air cooled chuck system
-60°C to +300°C	Air cooled high end system combining very low and high temperatures within one chuck system
-60°C to +300°C	Liquid cooled for high power applications



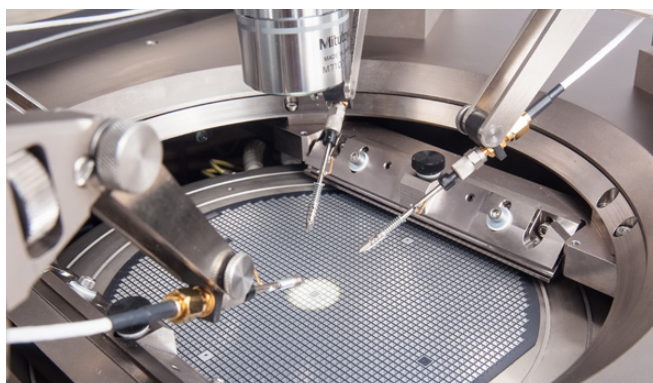
Pegasus™ S200FA with lower GuardMaster™ chamber

DC PARAMETRIC

Utilizing Wentworth replaceable Pegasus™ probes or DC cantilever probe cards, the S200FA-HV prober can provide an ideal platform for standard parametric testing. Tunable stage speeds and product enhancing accessories allow for fast probing and increased through-put, whilst chuck solutions enable probing of full wafers, shards, single chips and packaged devices.

SPECIFICATIONS

Frequency	DC > 100 Mhz
Breakdown Voltage	500 V
Leakage (depending on configuration)	Down to ± 10 fA (-65°C to +200°C) Down to ± 20 fA (+200°C to +400°C)



Analytical DC test

USER INTERFACE

LABMASTER™ CONTROL & MONITORING SOFTWARE

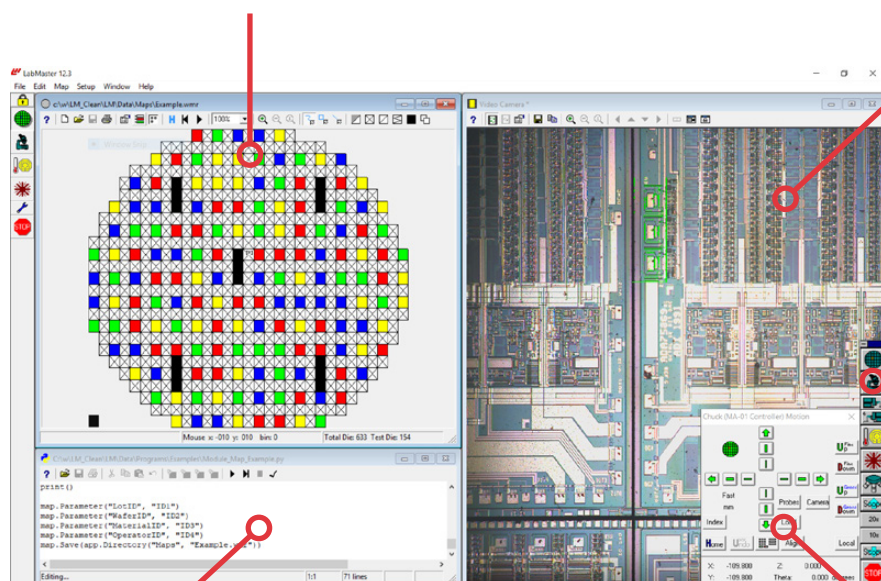
LabMaster™ FA is a simple-to-use Windows based graphical interface which allows real-time, fully integrated monitoring and control. It integrates with LabVIEW™ and other industry standard platforms and controls the Pegasus™ probe via either an RS232 interface or a GPIB (IEEE488.2) interface using the National Instruments PCI-GPIB board.

Wafer Map Window

Powerful failure analysis tool used for device navigation and positioning, as well as for displaying and storing die-binning information. Using the Wafer Map window, enables the user to quickly position the chuck to any die on the wafer. Wafer maps can be stored locally at the probe and saved as a simple text file (SINF - comma separated value), for easy transfer import/export.

Video Window

Displays real-time video from the camera attached to the microscope by using an overlay video board. Any image shown in the LabMaster™ video window can be saved to disk in a variety of image formats, or copied to the Windows clipboard for pasting into other Windows applications.



Device Toolbar

Contains the device buttons for controlling external devices such as the probe platform, programmable microscope mount (PMM), submicron automated manipulators (SAMs), thermal chucks, lasers and microscope auto zoom functions. The hardware setup dialogue box is used to add or remove devices from the toolbar. It can also be used to modify a device's hardware setup parameters.

Text Editor Window

Can be used to create, edit and run REXX and Python programs. Multiple edit windows can be open at any one time, allowing you to cut and paste text from one window to another. The edit window toolbar contains buttons for frequently used functions such as Open, Save, Run, Stop and Syntax Check.

Pegasus™ Motion Control Window

Can be used to control the motion of the probe's chuck, SAMs and the PMM. All can be controlled individually, and, in addition, the SAM and PMM can be moved together for in-die probing. The arrow buttons are used to index the probe the distance specified by the index step values entered using the probe's setup dialogue box. Slow, medium and fast velocity function buttons allow easy navigation between different areas on the wafer.

OFFLINE TOOLS

Wentworth Laboratories' **Wafer Map Editor** is an offline editor/viewer for LabMaster™ compatible wafer map files and wafer map file templates. It allows for wafer map templates to be created and modified prior to being used for wafer testing. Wafer results files can also be viewed in this application and used to generate further template files.

OPTIONS & ACCESSORIES

MICROSCOPE MOUNTS

Type	Travel X/Y	Travel Z	Resolution	Drive	Recommended Microscope	Application
Manual stereozoom (MMM)	50x50 mm	50 mm*	0.9 µm	High precision lead screws	Binocular or trinocular stereozoom microscope	General probing, pad sizes down to 50 µm x 50 µm
Manual high powered (MMM)	50x50 mm	75 mm quicklift + 50 mm**	0.9 µm	High precision lead screws	Compound high mag objective microscope	Small geometry pad or line probing down to 1-2 µm
Programmable (PMM)	50x50 mm	100 mm + 50 mm**	0.1 µm	Stepper motors	Compound high mag objective microscope	Small geometry pad or line probing down to 1-2 µm

*achieved through standard stereozoom focus arm

** when using heavy duty focus block

MICROSCOPES

Microscope Type	Models Available	Application
Stereo zoom	Wentworth	Pad probing and internal features down to 5.0 µm
High magnification	Mitutoyo FS-70 Series	Offers the most flexibility and options for features down to 0.5 µm
Without eyepieces	A-Zoom Micro	Use with CCD or video systems

MANIPULATORS

Type	TPI / Resolution / Travel
PVX400 (vacuum or magnetic)	50 TPI / 1.2 µm/° / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
PVX500-100 (vacuum or magnetic)	100 TPI / 0.7 µm/° / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
PVX500-200 (vacuum or magnetic)	200 TPI / 0.4 µm/° / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
SAM (programmable)	0.1 µm/° / X = 30 mm, Y = 30 mm, Z = 30 mm

COMMUNICATION INTERFACES

Type	Vendors
TTL	(2) 15-way D plugs each providing (4) TTL signal outputs & (8) TTL inputs
RS232	Serial 9-pin D connector
GPIO (IEEE488.2)	8-bit parallel multi-master interface bus
Ethernet	48-bit MAC address

ACCESSORIES

Probes: Triaxial, coaxial, low impedance, Kelvin, high power	LabMaster™ Control and monitoring graphical user interface
Probe tips: Tungsten, tungsten-carbide, Be Cu, gold plated	Pattern recognition: Automatic die detection and probe-to-pad alignment
Probe cards: Ceramic blade, epoxy cantilever, custom solutions	Automatic 2-point align: Provides system automation and fast device set-up routine
Probe card holders: 4.5" and 6" low profile probe card holder (PCH)	Packaged device holders: Held down by vacuum on chuck surface
Programmable Computer Controlled Manipulators: For sub-micron and in-die probing	Chuck solutions: Standard, high voltage, gold plated, waffle tray, single devices, interchangeable, glass, ceramic, double sided, Kelvin
Manual Manipulator (PVX): Magnetic and vacuum options	Thermal chucks: Heating, cooling, fast ramp/cool times
Laser cutter: Laser ablation, depassivating, cutting and trimming	Triaxial chucks: For reduced leakage and capacitance measurements
Camera & monitors: To contact bond pads or take images	Chuck discharge: Safety feature for HV probing
GuardMaster™: Combined light-tight and EMC shielded enclosure with safety locks for HV probing	Pin Hole chucks: Designed for thin wafers <150 µm thick. Definable vacuum patterns and single device holders
Dark boxes : External open dark boxes with cable patch panels	Supplies: Vacuum pumps and air compressors
Anti vibration tables: Robust anti vibration design for dampening external vibrations	Interface panels: Coax BNC, triax BNC, SHV, HV triax, D-SUB, SSMA, SMB, banana
Quiet Mode: Removes power to all motors to reduce the noise floor	

SPECIFICATIONS

PEGASUS™ S200FA-HV SEMI-AUTOMATIC PROBE STATION

Pegasus™ S200FA-HV	
Chuck Stage	
X-Y Stage	
Precision ball-screws & stepper motors	
Travel	210 mm x 314 mm
Resolution	0.312 µm
Repeatability	± 4.0 µm
Accuracy	± 5.0 µm
Planarity	8.0 µm
Maximum speed	100 mm/sec
Z Stage	
Precision ball-screws & stepper motors	
Travel	11 mm
Resolution	0.156 µm
Repeatability	± 1.0 µm
Theta Stage	
Travel	± 8.0°
Resolution	0.0001°
Programmable Microscope Mount	
Stepper Motors	
Travel	50 x 50 x 100 mm
Resolution	0.15 µm
Repeatability	± 1.0 µm
Accuracy	± 2.5 µm

Pegasus™ S200FA-HV	
Probe Platform	
Drive type	Stepper motors
Z Travel	18 mm
Material	Nickel plated steel
Graphical User Interface	
Windows 7, 8.1 and 10	
Communication Interfaces	
PC	TTL, RS232, GPIB (IEEE488.2), ETHERNET
Utilities	
Power	100-240 VAC, 50/60 Hz, auto select, 600 VA
Vacuum	0.5 cfm @20" Hg (min)
Compressed air	4 bar min
Dimensions (w x d x h)	
Prober (excludes optics)	840 x 842 x 610 mm
Controller	450 x 480 x 180 mm (17.5 x 19.5 x 7.2)
Shielding	
Light	> 120 db
EMI	> 20 db (0.05 - 0.5 GHz), 30 db (0.5 - 3GHz)
Weight	
Prober	155 kg
Controller	13 kg

ABOUT WENTWORTH LABORATORIES

With over 50 years experience in wafer probing technology, our solutions are the number one choice for many leading-edge wafer test applications across the globe.

With the support of a world-wide network of representatives, we enable our customers to fulfil even the most challenging wafer probing goals, maximizing their productivity and reducing costs.

We look forward to discussing your wafer probing requirements.

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