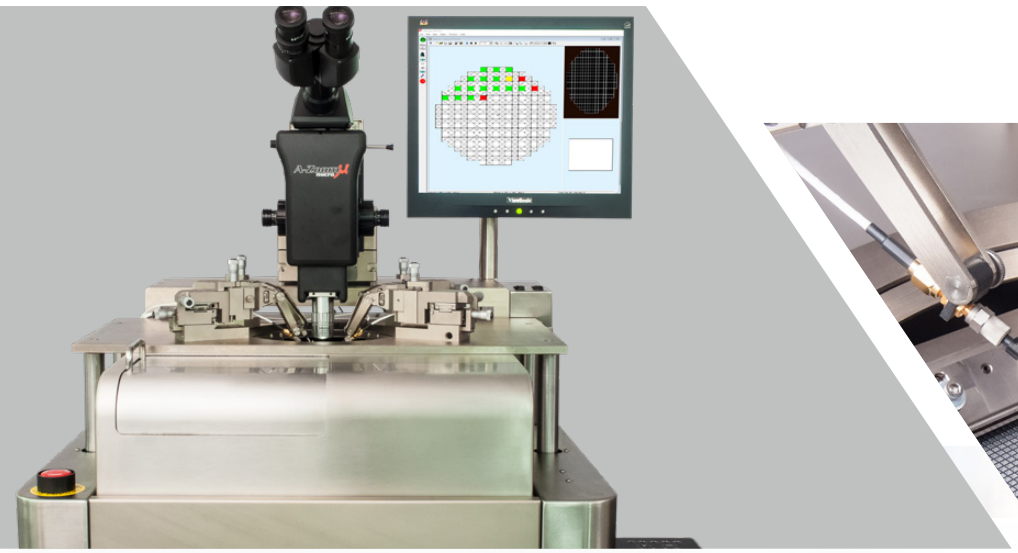
Wentworth Laboratories

SEMI-AUTOMATIC ANALYTICAL PROBERS:

PEGASUS™ S200FA, S300FA



PEGASUS

KEY FEATURES

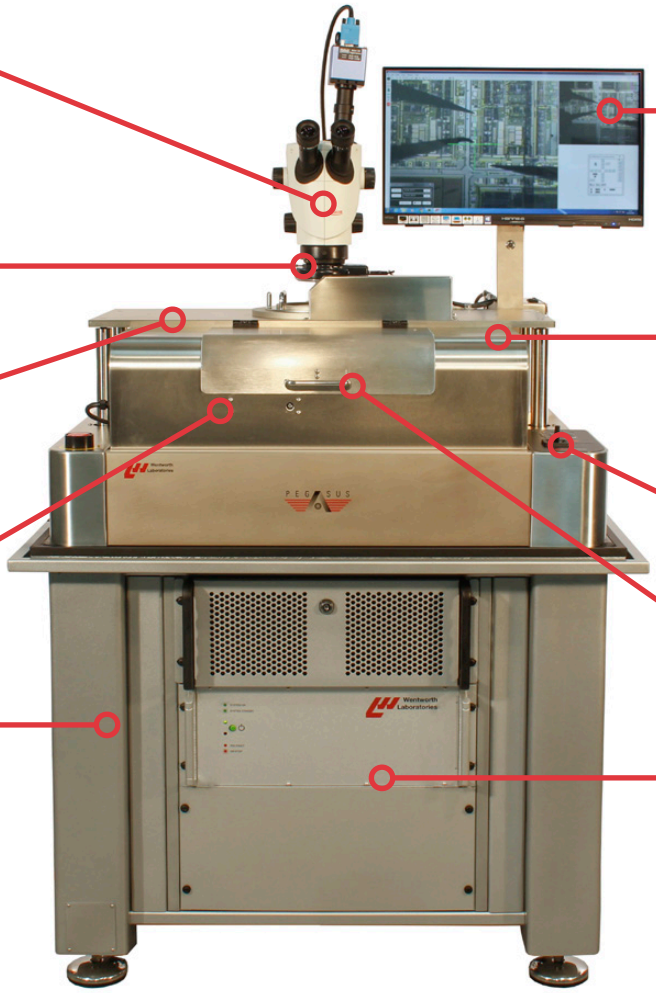
Microscope with optional camera
Stable microscope bridge mount, choice of high power and stereo optics available

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

Anti vibration table
For high performance vibration isolation



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

GuardMaster™
For EMC shielding and safe and accurate temperature probing from –65°C to +400°C

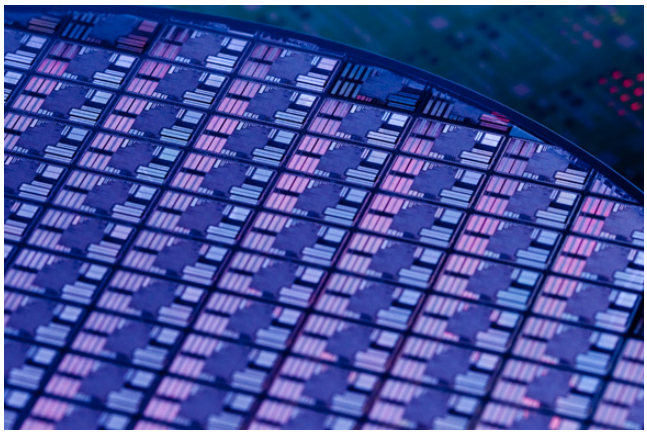
Joystick/keypad
For simple and intuitive system operation

Chuck load/unload access
Extended stage for easy wafer loading

Pegasus™ controller
Configurable for multi-axis applications

DESIGNED FOR A WIDE RANGE OF APPLICATIONS

- ✔ Failure analysis
- ✔ Design verification
- ✔ Parametric testing
- ✔ Ideal for MEMS, HV/HC, RF and mmWave testing



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 SPECIFICATIONS	
Repeatability	5.0 µm
Accuracy	± 5.0 µm

The **Microscope Bridge** is designed for strength. With standard PMM (Programmable Microscope Mount) as well as multiple Z axes PMM, test equipment such as thermal cameras, spectrometers, integrating spheres, laser cutters and light sources can be independently controlled via the prober joystick functions.

This feature allows the optics to be repositioned to enable direct device access from the top side.

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.

Lightweight chucks and drive mechanics allow extremely fast probing with no loss of accuracy.

EASE OF USE

The Pegasus™ S200FA and S300FA probers are 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 operator 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.

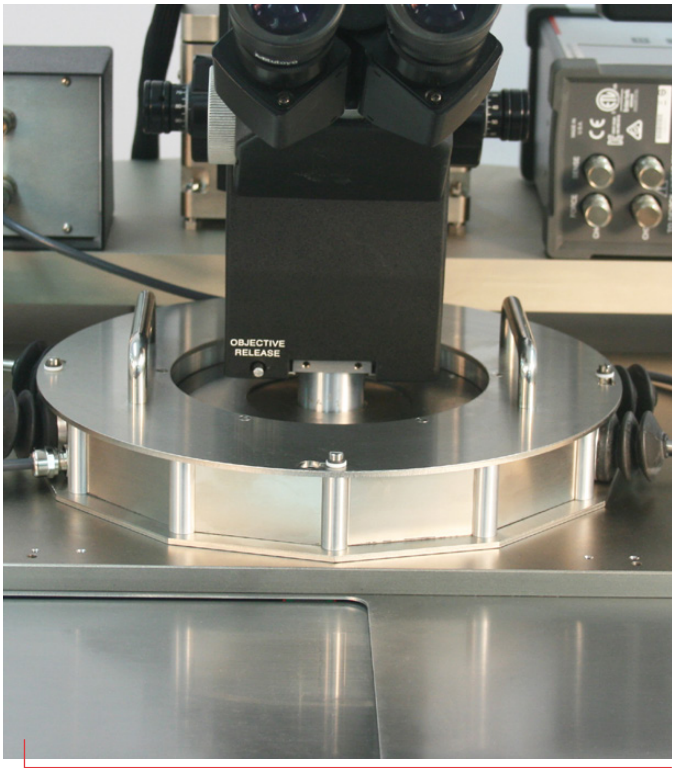
Pegasus™ S300FA semi-automatic probe station

CONFIGURABLE DESIGN

The Pegasus™ S200FA and S300FA can be configured for a variety of applications at affordable cost.

With over 50 years of experience serving the electronics industry, we can support even the most challenging application to be managed within standard lead times and budgets.

ANALYTICAL FLEXIBILITY



Pegasus™ S200FA with GuardMaster™ for low signal and low temperature probing

FAILURE ANALYSIS

Failure analysis applications require mechanical versatility and adaptability to make multiple measurements. The Pegasus™ S200FA and S300FA have 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

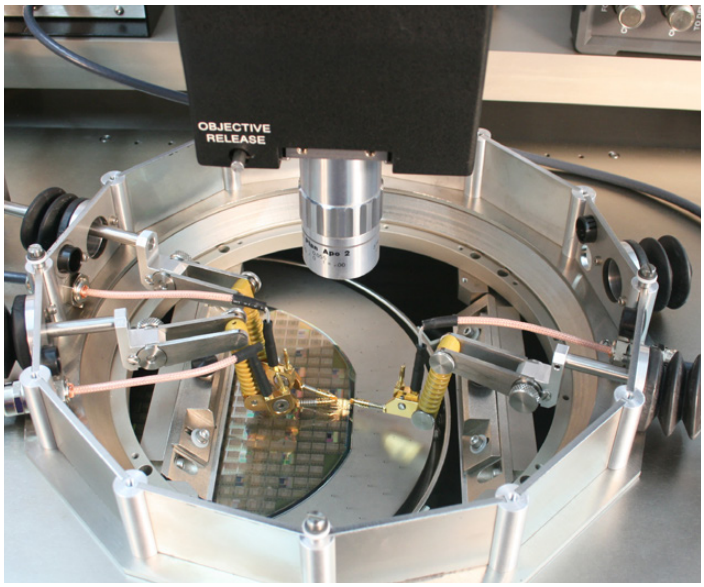
Our high performance thermal chuck solutions for device testing cover temperatures from -60°C to +400°C. To reduce thermal effects and keep the probing environment controlled, our propriety GuardMaster™ heating and cooling management system is an integral part of GuardMaster™, utilizing CDA or nitrogen.

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

Analytical flexibility, as well as mechanical stability and accuracy, is at the core of our products. Different measurements require different test methods and cabling solutions. Therefore, our bespoke and standard tester solution packages are configured in an easy-to-use 'plug and play' set-up. Our LabMaster™ FA 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 floor noise.



Pegasus™ S200FA with lower GuardMaster™ chamber

USER INTERFACE

LABMASTER™ CONTROL & MONITORING SOFTWARE

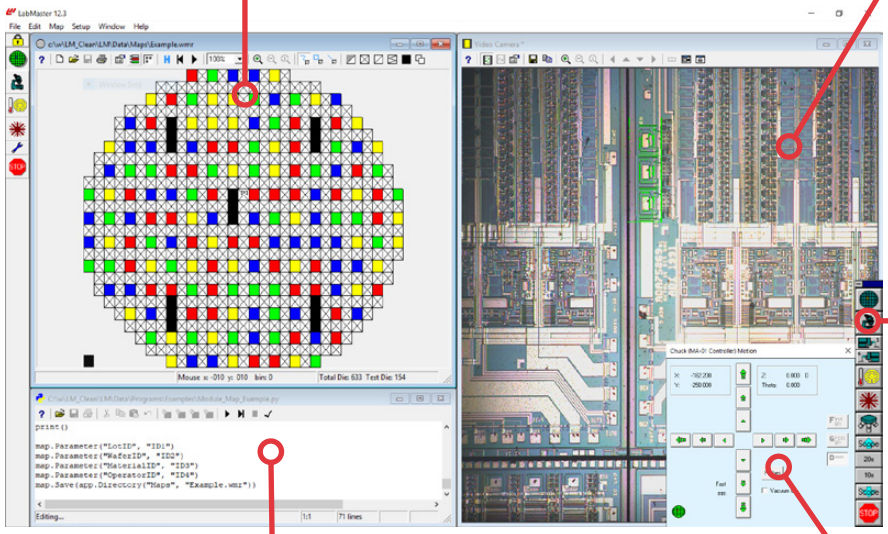
LabMaster™ FA is a simple-to-use Windows based graphical interface which allows real-time, fully integrated monitoring and control. It integrates with LabVIEW™ and other industry standard platforms and controls the Pegasus™ prober via either an RS232 interface or a GPIB (IEEE488.2) interface using the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

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

Used to control the motion of the prober'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 prober the distance specified by the index step values entered using the probers setup dialogue box. Slow, medium and fast velocity function buttons allow easy navigation between different areas on the wafer.

OFFLINE TOOLS

The Wentworth Labs **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.

LEADING EDGE APPLICATIONS

DC PARAMETRIC

Utilizing Wentworth's replaceable Pegasus™ probes or DC cantilever probe cards, the Pegasus™ S200FA and S300FA probers are an ideal platform for 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 > +200°C Down to ± 20 fA +200°C > +400°C

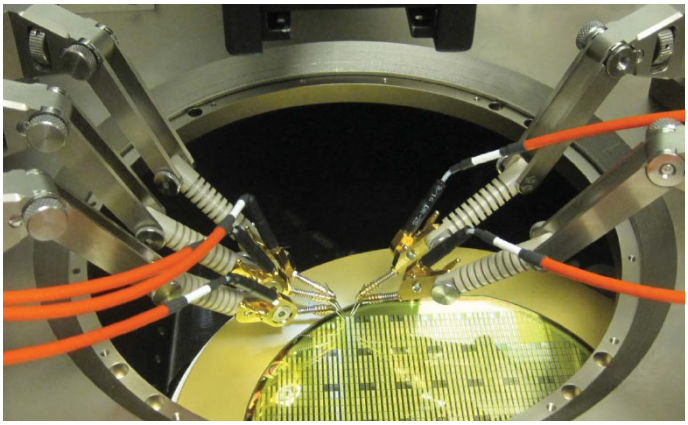
Analytical DC Test

HIGH POWER

A high power configuration addresses today's power semi-conductor test challenges with low contact resistance measurements requiring accuracy at high voltages. Kelvin chucks and backside probing solutions allow contact resistance measurements in the milliohm range.

High current probes and probe cards (up to 100 A) handle and distribute excessive 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)



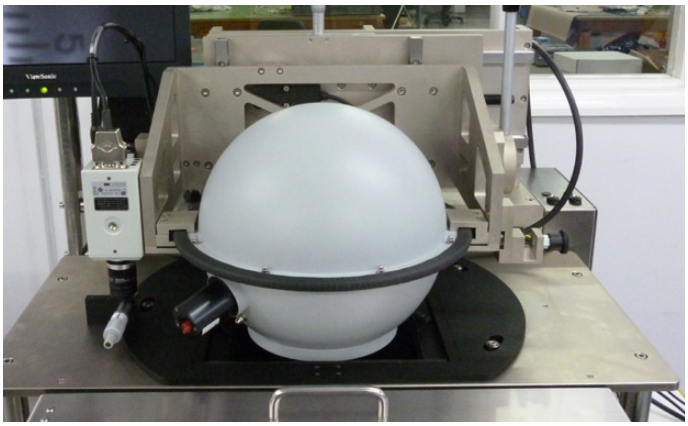
High Power Test

OPTO ELECTRONICS

Our FA series probers can be specifically designed for production and analytical probing of semiconductor light-LEDs, laser diodes and optical MEMS devices.

Chuck solutions allow handling of full wafers, shards, single chips and packaged parts. The set-up can accommodate spectrometer probes, fibre optics, integrating spheres, glass chucks, thermal imaging cameras and more.

SPECIFICATIONS	
Speed	Up to 20 die/sec (70,000/hr)
Reverse emission	Glass chuck, DSP, back side
Controllable contact force	Pegasus™ probe (open loop to prober Z stage)



Opto Electronics Test

OPTIONS & ACCESSORIES

MICROSCOPE MOUNTS

Type	Travel XY	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 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, Leica	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/º / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
PVX500-100 (vacuum or magnetic)	100 TPI / 0.7 µm/º / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
PVX500-200 (vacuum or magnetic)	200 TPI / 0.4 µm/º / X = ± 5 mm, Y = ± 5 mm, Z = >5 mm
CAP (programmable)	0.1 µm/º / 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
GPIB (IEEE488.2)	8-bit parallel multi-master interface bus
Ethernet	48-bit MAC address

ACCESSORIES

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

SPECIFICATIONS

PEGASUS™ S200FA/S300FA SEMI-AUTOMATIC PROBE STATIONS

	Pegasus™ S200FA	Pegasus™ S300FA
Chuck stage		
X-Y stage		
Precision ball-screws & stepper motors		
Travel	210 x 314 mm	310 x 400 mm
Resolution	0.312 µm	0.312 µm
Repeatability	± 4.0 µm	± 4.0 µm
Accuracy	± 5.0 µm	± 5.0 µm
Planarity	8.0 µm	8.0 µm
Maximum speed	100 mm/sec	100 mm/sec
Z stage		
Precision ball-screws & stepper motors		
Travel	11 mm	11 mm
Resolution	0.156 µm	0.156 µm
Repeatability	± 1.0 µm	± 1.0 µm
Theta stage		
Travel	± 8.0°	± 8.0°
Resolution	0.0001°	0.0001°
Programmable microscope mount		
Stepper motors		
Travel	50 x 50 x 100 mm	50 x 50 x 100 mm
Resolution	0.15 µm	0.15 µm
Repeatability	± 1.0 µm	± 1.0 µm
Accuracy	± 2.5 µm	± 2.5 µm

	Pegasus™ S200FA	Pegasus™ S300FA
Probe platform		
Drive type	Stepper motors	Stepper motors
Z travel	18 mm	18 mm
Material	Nickel plated steel	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 select 600V A	
Vacuum	0.5 cfm @20" Hg (min)	
Compressed air	4 bar min	
Dimensions (w x d x h)		
Prober (excl. optics)	840 x 842 x 610 mm	880 x 875 x 610 mm
Controller	450 x 480 x 180 mm (17.5 x 19.5 x 7")	
Shielding		
Light	> 120 db	
EMI	> 20 db 0.05 - 0.5 Ghz, 30 db 0.5 - 3Ghz	
Weight		
Prober	155 kg	190 kg
Controller	13 kg	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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