

Cascade Microtech, Inc.

SPECIFICATION SHEET



The only solution
for fine-pitch probing
with vertical probe cards
on 3D stacked DUT

PA300PS 3D

300 mm Semi-automatic Probe System

The PA300PS 3D is the world's first probe station for wafer-level electrical probing of 3D stacked structures. Many different engineering and monitoring tests after wafer production, as well as before the next stacking steps or final packaging can be addressed with this flexible tool.

The PA300PS 3D is the world's only engineering probe system for fine-pitch probing of pads down to $25\ \mu\text{m} \times 25\ \mu\text{m}$. To achieve this, the improved Z-theta chuck stage assembly provides micrometer resolution in combination with increased thermal and mechanical stability for highest accuracy, lowest drift and maximum stiffness at high probe forces with the unique Z-axis wedge design. Moreover, the innovative MicroAlign™ technology ensures the most accurate probe-to-pad alignment of vertical probe cards inside the EMI/RFI-shielded environment - the only solution of this kind in the engineering world. The unique four camera system along with an easy-to-use software package integrated into the ProberBench™ Operating Environment automates the probe-to-pad alignment procedure. The entire process, led by an intuitive software wizard, takes less than five minutes.

The PA300PS 3D employs the powerful ProbeShield® technology for a fully electromagnetically shielded, ultra low-noise, light-tight environment. This enables accurate low-noise measurements in atto amps and femto farads range. QuietMode™ technology safely removes all motor power during critical measurements and is complemented by ProtecDrive™, which electrically shields all motors to provide ideal conditions for even the most sensitive applications such as AC noise sensitive measurements, such as $1/f$ noise and PLL on wafer level.

The jointly developed thermal chuck system provides the highest planarity and temperature changing speeds on the market for maximum test efficiency and perfect system planarity in combination with the adjustable probe card levelling. The Automated Thermal Management™ (ATM) ensures a frost-free environment for probing down to -60°C even when the two top chambers have been opened for fine positioning. Dry air surrounding the chuck gives you full access to the ProbeHeads™ and wafer surface during cold operation without compromising positioning accuracy. Additionally, ATM minimizes thermal distortion and provides safe working conditions with chuck temperatures up to 300°C .

Increased demands on positioning accuracy during tests at different temperatures are met by the unique ReAlign™ function. It automatically re-aligns the tips of the probe card to the pads after a change in temperature thus compensating for any thermal drift during the test cycle. This enables unique unattended testing at different temperatures for automated generation of parametric and reliability data.

The patented ContactView™ feature gives the operator a side view of the substrate and tips for convenient probe card setup and visual contact detection even with high density vertical probe cards or single probe tips. The unique ContactView, in combination with the iVista™ microscope, are providing permanently optimum visualization of all ongoing tasks in all 3 dimensions for maximum operations safety and effectivity.

FEATURES AND BENEFITS

Probing on 3D IC small targets	The only solution for fine pitch probing on pads down to 25 µm
	MicroAlign technology for automated handling of vertical probe cards
	New Z axis designed for 40 kg load with minimal deflection
	Various engineering and monitoring tests before and after 3D stacking processes now possible
Test cell productivity	Automated Thermal Management for minimizing thermal expansions at different temperatures up to 300°C
	Unattended testing at multiple temperatures with ReAlign for automated generation of parametric and reliability data
	Thermal chuck transmission time and planarity best on the market
Accuracy	Unsurpassed Z control accuracy for automated probing on small targets
	Perfect tool for aA and fF range measurements
	Excellent shielding effectiveness for accurate AC sensitive measurements, such as RTS, 1/f and PLL
Easy and safe operation	ContactView and ProbeHorizon™ – save consumable costs and make vertical probe cards visible
	Easy to operate ProberBench Operating Environment
	Joystick controller with color display for full prober control

SPECIFICATIONS*

General Features

Substrate sizes	Single chips to 300 mm wafers
Temperature range	-60° C to 300° C
Automated temperature test	ReAlign, Automated Thermal Management

Chuck Stage

X-Y Movement	Closed-loop, DC servo with linear encoder feedback
Travel	505 mm x 305 mm
Resolution	0.5 µm
Repeatability	< 1 µm
Accuracy	< 2 µm
Planarity	< 5 µm
Maximum speed	50 mm/sec.
Z Movement	DC servo with rotary encoder feedback
Travel	12 mm
Resolution	0.25 µm
Repeatability	< 1 µm
Theta Movement	DC servo with rotary encoder feedback
Travel	7.5°
Resolution	0.0001°

Programmable Microscope Movement

	Closed-loop, DC servo with rotary encoder feedback
Travel	50 mm x 80 mm (iVista)
Resolution	0.25 µm
Access lift	130 mm motorized

Utilities

Vacuum	Less than 200 mbar abs
Dry air (depending on system configuration)	6 - 10 bar
	Dewpoint lower than -65° C
	Maximum flow rate 180 liters/min at SATP
Power	100/240 V, 50/60 Hz, maximum 1500 VA

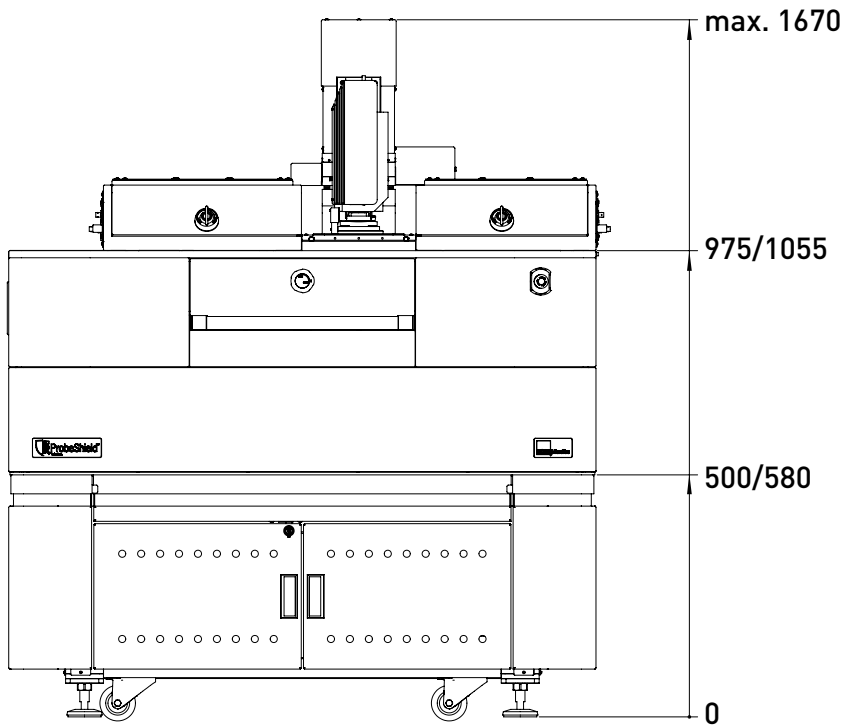
*Data, design and specification depend on individual process conditions and can vary according to equipment configurations.
Not all specifications may be valid simultaneously.

PHYSICAL DIMENSIONS

Weight

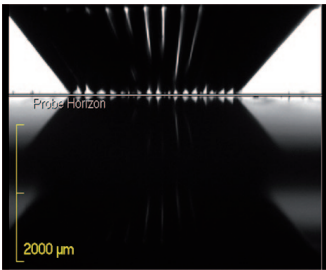
Maximum 1200 kg (depending on system configuration)

Dimensions (mm)

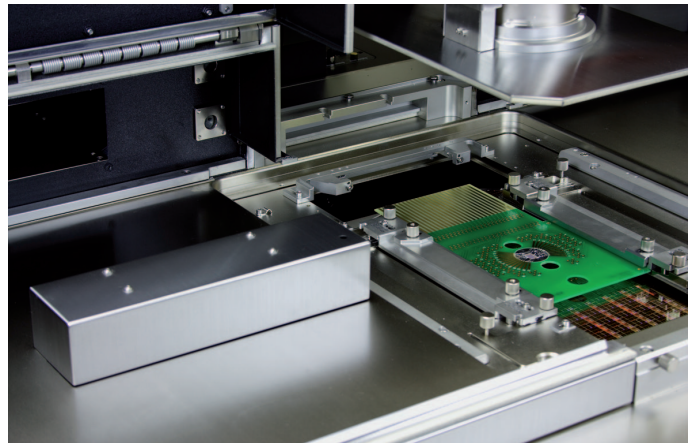
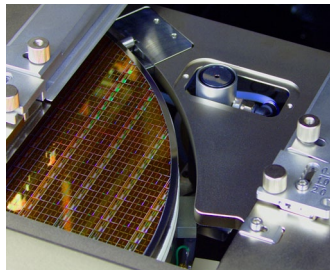


Working height less than 1 m (3.2 ft) for excellent ergonomics.

APPLICATIONS



Patented ContactView and bottom-up-viewing camera used for probe-to-pad alignment of vertical probe cards in the PA300PS 3D.



Off-axis camera for MicroAlign technology and the integrated probe card adapter.

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Data subject to change without notice

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Cascade Microtech, Inc.
toll free: +1-800-550-3279
phone: +1-503-601-1000
email: cmi_sales@cmicro.com

Cascade Microtech GmbH
phone: +49-811-60005-0
email: cmg_sales@cmicro.com

Cascade Microtech Japan
phone: +81-3-5615-5150
email: cmj_sales@cmicro.com

Cascade Microtech Shanghai
phone: +86-21-3330-3188
email: cmc_sales@cmicro.com

Cascade Microtech Singapore
phone: +65-6873-7482
email: cms_sales@cmicro.com

Cascade Microtech Taiwan
phone: +886-3-5722810
email: cmt_sales@cmicro.com

www.cascademicrotech.com

