

Signatone CM-460 150 mm Semi-Automatic Probe System

For reliable and accurate DC/CV-IV, High Power and RF Test Measurements

❖ FEATURES / BENEFITS

Designed for a Variety of On-Wafer Analytical and Semi-Production Applications

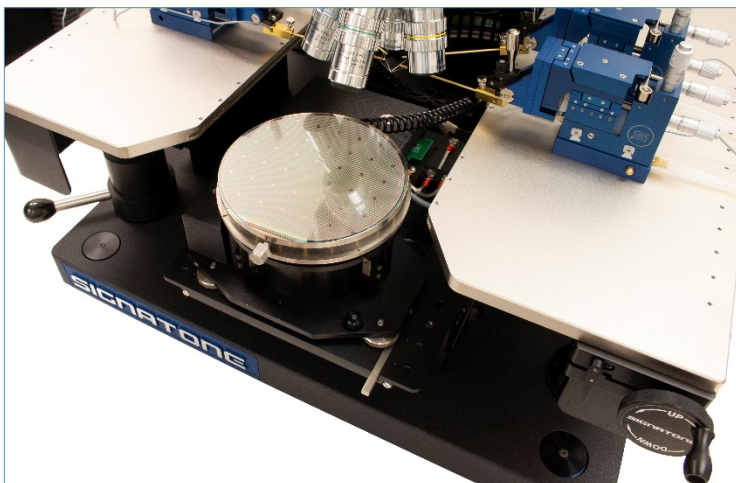
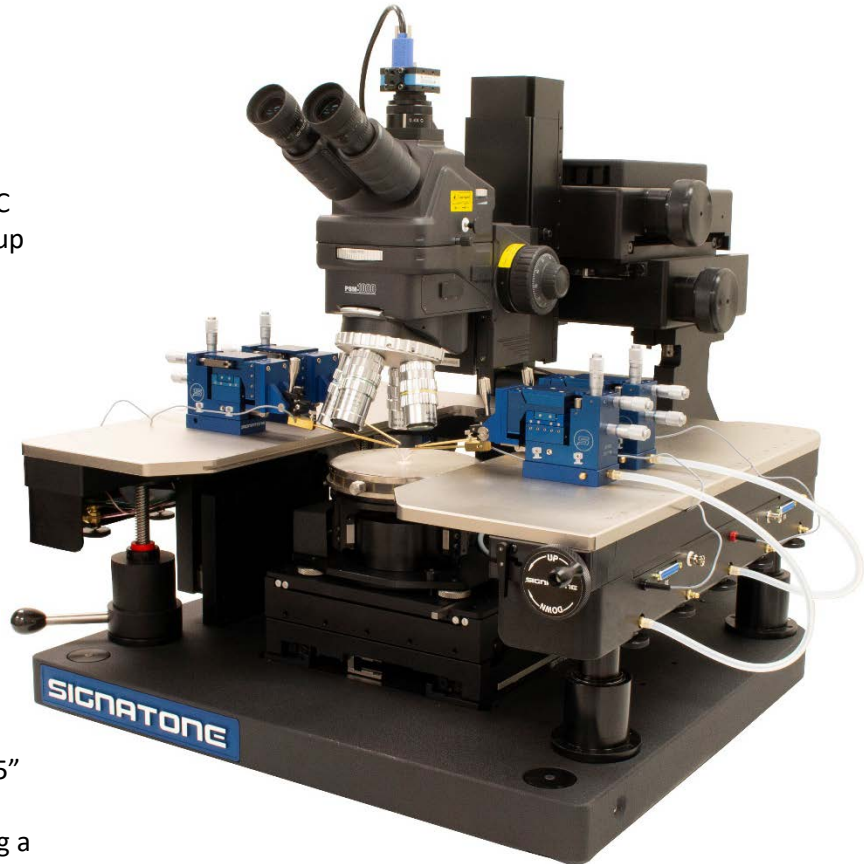
- DC, CV/IV, pulsed –IV applications
- High Power Application up to 12KV /600A
- IC Design / test verification Ambient, +300°C
- RF applications up to 110GHz 2 & 4 port setup
- mmW 110GHz -1.5THz 2-Port

Product Versatility

- Designed for full or partial wafer probing
- Roll-Out stage for ease of wafer loading
- Active Vibration Isolation table (optional)
- Ambient, Hot (+25°C to +300°C) configurations

Options and Configurations

- Standard Platen Supports up to 10x DC MicroPositioners or 2x RF + 4 DC and/or 4.5" wide probe card
- Available in multiple configurations including a variety of chuck options, DC/RF/High Power positioners, Computer Aided Probes, microscopes, camera's, Dark Box's, lasers for various applications



❖ ROLL - OUT STAGE

- Roll-Out Stage designed for easy Loading and Unloading of Wafer Samples and single ICs
- Excellent for use with probe cards and multi probe/complex setups
- Allows easy access to AUX -chucks (optional)
- Lock and Un-Lock position indicator
- Presentation 75mm / 65%
- Easy access to vacuum-zone selector knob

❖ **SPECIFICATIONS**

Chuck XY Stage (Programmable)

Travel range	152.4 mm x 152.4 mm (6 x 6 in)
Resolution	0.5 µm
Accuracy	± 2.0 µm*
XY stage drive	Closed-loop high precision linear motor
Speed	Variable Speed XY chuck stage control
Max. movement speed	200 mm / sec.

Chuck Z Stage (Programmable)

Travel range	6 mm (0.25 in)
Resolution	0.25 µm
Accuracy	± 2.0 µm
Repeatability	± 1.0 µm
Z stage drive	Closed-loop micro stepper motor
Speed	Variable Mode and Speed selection
Max. movement speed	15 mm / sec.

Chuck Theta Stage (Programmable)

Travel range	± 9° (18°)
Resolution	0.000035°
Accuracy	< 1.0 µm (measured at the edge of the chuck)
Repeatability	< 1.5 µm
Theta stage drive	High resolution stepper motor, rotary encoder feedback system

Roll Out / Loading Stage

Travel range	75mm
Presentation	100mm /65%
Return repeatability	< 1µm

Motorized Microscope Stage (linear)

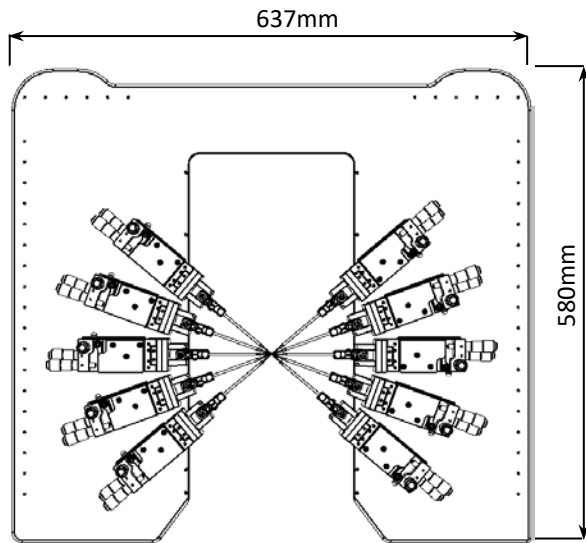
Movement range	50mm X 50mm (2"x2")
Resolution	0.02µm (20 Nano meters)
Scope lift	101 mm (4") Vertical Pneumatic (Motorized- optional)
Scope lift motorized (optional)	50mm motorized + 50 mm pneumatic / combination = 101mm (4")

*All data relevant for use with Precision package

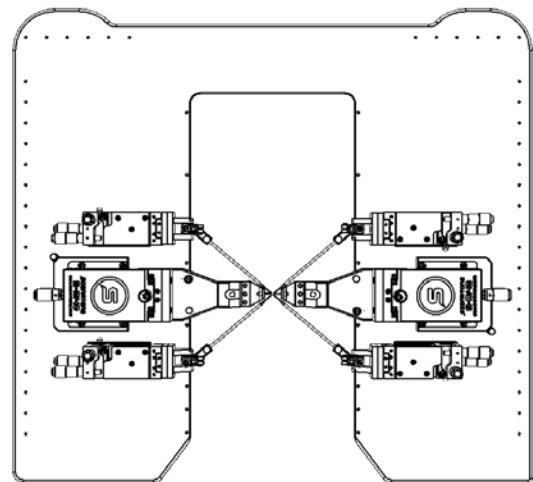
❖ **PROBE PLATEN**

Specifications

Material	Nickel Plated Steel (Al optional)
Dimension	L = 580mm x W = 637mm x H = 12.7mm (See drawing)
Chuck to Thermal Shield Separation	Min. 2 mm (Variable Separation with Fine Platen Adjust)
Max. No of Micro Positioners	10x DC or 4x RF + 2x DC or 2x RF + 4 x DC or 4x RF + 4x DC
Quick Platen Lift Control (CVL)	Continuous Variable Lift (0 to 3.175 mm)
Contact Repeatability	< 1 µm (0.04 mils) by Manual Control
DC MicroPositioner mounting	Magnetic or Vacuum
RF MicroPositioner mounting	Magnetic or Bolt Down
Thermal Isolation (Optional)	Platen Temp = +15 °C to +40°C /chuck @ +300°C



Sample 4: Probe Configured with 10 DC Probes



Sample 2: Probe Configured with 2 RF + 4 DC Probes

❖ **ONE PLATEN x 4 BENEFITS**

Signatone Multi Benefit Ergonomically Correct Platen Adjust and Features:

- “Quick Lift” with CVL for easy probe to pad separation and alignment
- “Fine Adjust” for Probe card and variable Chucks and DUT thickness setup
- “Position Lock” allows for secure “lock” of user defined platen height setup
- “Thermal Isolation” maintains a safe temperature of probes and platen surface while chuck is at extreme temperatures (optional)



Platen “Quick Lift”



Platen “Fine Adjust” and
“Position Lock”

❖ **SYSTEM CONTROLS**

The S1080 thermal chuck controller features touch screen commands, triple safety circuits, and 0.1° resolution.

ProbeMaster software features thermal control from the probe station.

Hardware accessories including keyboards and mouse can be easily integrated into the table's instrumentation rack providing greater ease of use, ergonomics, and minimizing the overall system dimensions. System and thermal controllers may also be integrated.

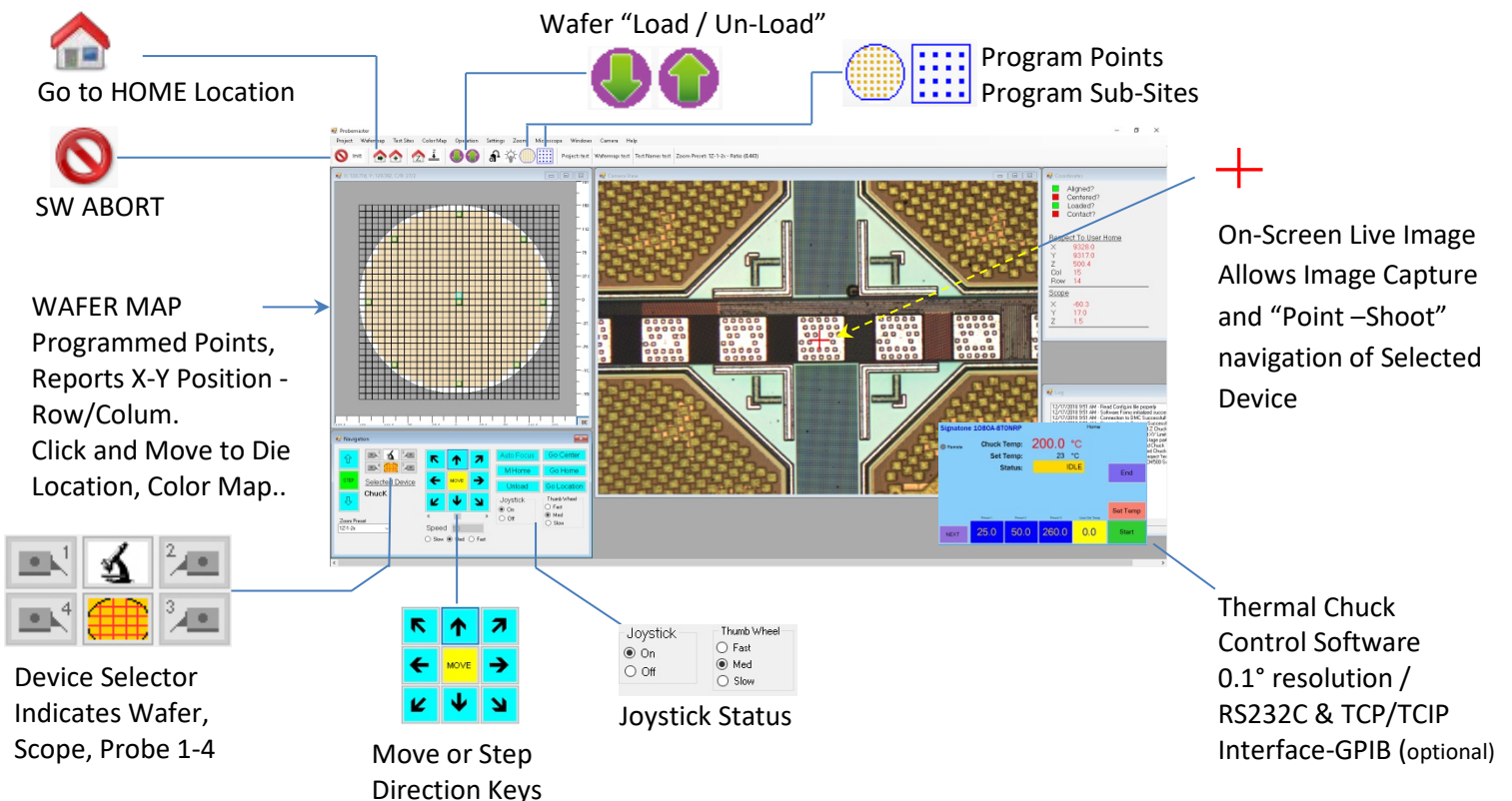
Industry proven precision Joy Stick/ thumbwheel combination, intuitive selector panel for DUT, Microscope, and 1-4 Computer Aided Probes (CAP).

LED indicator for active device, Multi-speed thumbwheels offer sub-micron positioning.



❖ **SYSTEM SOFTWARE**

Signatone's powerful navigation software **ProbeMaster** drives all Signatone semiautomatic probing systems. *ProbeMaster* simplifies navigation to a test site by using arrow keys, wafer graph or *point and shoot* on the live image. The optional vision control module includes *auto align*, *auto start*, *probe exact*, and *sure touch* features. Supports many popular interface protocols * [see supported software platforms](#)



❖ MICRO POSITIONER

Choose the Micro Positioner that's best for your application (more positioner configurations available)

The CheckMate Series probe stations include an Aluminum or Steel Platen for use with Vacuum or Magnetic based micro Positioners

- The **S-926** Series with 100 TPI rectilinear X-Y-Z motion, good for probing down to one micron, at a very competitive price
- The **SP-100** Series with 100 TPI linear X-Y-Z motion with in-line micrometer knobs for high precision probing one-micron features at high magnification – great for use with multi probe applications
- The **SP-150** Series with 100 TPI linear X-Y-Z motion with in-line micrometer knobs for ultra precision probing sub-micron features at high magnification – great for use with multi probe applications
- The **S-M40** Series RF Positioner with 50 TPI linear X-Y-Z motion with in-line precision knobs for quick and accurate positioning of RF probes – great for use with RF and Wedge probe applications DC-110GHz.
- The **S-M90** Series RF Positioner with 50 TPI linear X-Y-Z motion with precision knobs at 90° for quick and accurate positioning of RF probes – great for use with RF and Wedge probe applications DC-110GHz.
- The **CAP-946** Series Motorized Positioner with Software controlled X-Y Z 20nm resolution. Including 25mm X-Y travel (8mm "Z") Software, Joys Stick & Thumbwheel Control (excellent for use with Dark box or Gove box applications)



S-926PLM



SP-100PM



SP-150PM



S-M40-MMEW



S-M90-MMEW



❖ **DC PROBE –SELECTION GUIDE**

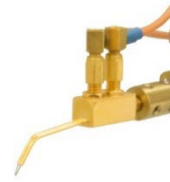
	Coax Probe (C)	Triax Probe (T)	Kelvin Probe (K)
Max voltage	500 V	500 V	500 V
Temperature range	-60 °C to 300 °C	-60 °C to 300 °C	-60 °C to 300 °C
Leakage current	< 50fA	< 20fA	< 20fA
Connectivity	BNC	Standard Triax	SSMC
Connectivity type	Single Coaxial	Single low noise Triaxial	Force/Sense Coax
Characteristics impedance	50 Ohms	50 Ohms	50 Ohms
Residual capacitance	< 80fF	< 80fF	< 80fF
Probe holder material	Brass	Brass	Brass
Probe tips material	Tungsten	Tungsten	Tungsten
Probe tips sizes	0.5 µm – 25 µm	0.5 µm – 25 µm	0.5 µm – 25 µm
Minimum pad size	25 µm x 25 µm	25 µm x 25 µm	25 µm x 25 µm



Coax Probe



Triax Probe



Coax Kelvin Probe

*All leakage tests conducted in an enclosed environment with Keithley 4200, or equivalent, in sampling mode with 10 PLC, auto-ranging. 0.25s interval

❖ **High Voltage/High Current PROBE –SELECTION**

Model	High Voltage Probes			High Current Probe
	HVP-CX-3	HVP-TX-3	HVP-CX-10	HCP 100
Max Voltage	3 kV	3 kV	10 kV	500 V
Max Current	1 A DC/30 A Pulsed	120 mA DC	20 mA DC	10 A DC/100 A Pulsed
Temperature Range	-60 °C to 300 °C	-60 °C to 300 °C	-60 °C to 300 °C	-60 °C to 300 °C
Leakage Current	< 200 pA @ 3 kV, < 5 pA @ 10 V	< 1 pA @ 3 kV, < 100 fA @ 10 V	< 100 pA @ 10 kV	N/A
Connector Type	SHV	HV Triax	UHV Coax	HV Banana
Replaceable Tip	Yes	Yes	Yes	Yes
Probe Material	W	W	W	BeCu or W



HVP-CX-3



HVP-TX-3



HVP-CX-10



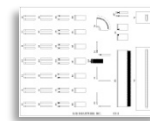
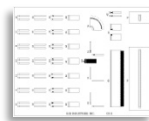
HCP-100

❖ RF PROBE –SELECTION GUIDE



Cable Interface

	SP-40A	SP-50A	SP-67A	SP-110H	SP-145
Frequency	DC-40GHz	DC-50GHz	DC-67GHz	DC-110GHz	DC-145GHz
Connector	2.92mm	2.4mm	1.85mm	1.0mm	0.8mm
Tip Configuration	GS/SG/GSG	GS/SG/GSG	GS/SG/GSG	GS/SG/GSG	GSG
Pitch Range	50μ - 2540μ	50μ - 1250μ	50μ - 1250μ	50μ - 1250μ	50μ - 200μ
Insertion Loss	<.8db	<1.0db	<1.1db	<1.5db	<1.75db
Return Loss	> 18db	>18db	>14db	>15db	>15db



Calibration Substrates

GSG	SP-CS-5	SP-CS-9	SP-CS-10	SP-CS-18
Pad Size	50μ X 50μ	100μ X 100μ	150μ X 150μ	300μ X 300μ
	100μ X 100μ			
	150μ X 150μ			
Pitch Range	75μ - 250μ	250μ - 600μ	600μ - 1250μ	1250μ - 2540μ

GS/SG	SP-CS-8	SP-CS-14	SP-CS-11	SP-CS-17
Pad Size	50μ X 50μ	100μ X 100μ	150μ X 150μ	300μ X 300μ
	100μ X 100μ			
	150μ X 150μ			
Pitch Range	50μ - 200μ	200μ - 400μ	400μ - 1250μ	750μ - 2540μ

GSG > 110GHz	SP-CS-15
Pad Size	25μ X 25μ
Pitch Range	40μ - 150μ (SOLT) 30μ - 150μ (LRM)



RF Cables

	RFC-40	RFC-50	RFC-67	RFC-110
Frequency Range	DC - 40GHz	DC - 50GHz	DC - 67GHz	DC - 110GHz
Length	4 Ft.	4 Ft.	3 Ft.	*
Connectors	2.92 M – 2.92 F	2.4 M – 2.4 F	1.85 M - 1.85 F	1.0 M - 1.0 F

* Contact Factory

❖ **NON-THERMAL CHUCKS**

Standard Wafer Chuck

Connectivity	Coax BNC (m)
Diameter	152.4 mm
Material	Nickel Plated Brass (gold optional)
Chuck surface	Zone selector knob with Peppered vacuum patterns
Vacuum hole pattern sections(diameter)	22mm, 50mm, 91mm, 135mm,
Vacuum actuation	Selector Knob allows individual activation of vacuum zones
Supported DUT sizes	25mm, 75mm, 100mm, 150mm
Surface planarity	±6.5μ
Rigidity	<3μ / 10N at edge of the chuck

Electrical Specification (Coax)

Operation voltage	Designed for operation at -200V to + 200VDC
Maximum voltage between chuck top and GND	500 V DC
Isolation	> 150 GΩ

Wafer Chuck (Triaxial)

Connectivity	Triax (m)
Diameter	152.4 mm
Material	Gold Plated Brass
Chuck surface	Independent Vacuum zones with vacuum rings
Vacuum hole pattern sections(diameter)	0mm, 65mm, 112mm
Vacuum actuation	Multi-Zone Adjustable Control
Supported DUT sizes	3mm, 75mm, 125mm, 150mm
Surface planarity	± 3 μm
Rigidity	<3μ / 10N near at edge of the chuck

Electrical Specification (Triax)

Chuck isolation	Measured @ 10V DC
Force to guard	> 2 TΩ
Guard to shield	> 7 TΩ
Force to shield	> 15 TΩ

Auxiliary Chuck - Optional

Quantity	2 AUX chucks
Position	Independently isolated (located on back left and right)
Substrate Size (L x W)	Max 25mm x 25mm (1"x 1")
Material	Ceramic, Ultem, or NI plated brass
Surface Planarity	≤± 5 μm
Vacuum Control	Controlled independently, separate from wafer chucks

❖ **SIGNATONE THERMAL CHUCKS**

Typical Specifications of *Signatone* Thermal Technology

	150mm Standard Hot	150mm Hot/ Triax	150mm Hot/ 3kV Triax
Temperature Range	+25 °C to +300 °C	+25 °C to +200 °C	+25 °C to +200 °C
Connectivity	Coax (m)	Triax (m)	SHV Triax (m)
Temperature control method	Liquid Cooled / Resistance heater	Liquid Cooled / Resistance heater	Liquid Cooled / Resistance heater
Coolant	Water	Water	Water
Smallest temperature selection step	0.1 °C	0.1 °C	0.1 °C
Chuck temperature display resolution	0.01 °C	0.01 °C	0.01 °C
External touchscreen display operation	Yes	Yes	Yes
Temperature stability	±0.1 °C	±0.1 °C	±0.1 °C
Temperature accuracy	±0.5 °C	±0.5 °C	±0.5 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C	RS232C
Optional Interfaces	GP-IB	GP-IB	GP-IB
Chuck surface plating	Nickel	Gold	Gold
Temperature sensor	RTD	RTD	RTD
Temperature uniformity	±0.5 °C at ≤ 200 °C ±1.5 °C at > 200 °C	±0.5 °C at ≤ 100 °C ±2.5 °C at 200 °C	±0.5 °C at ≤ 100 °C ±3.5 °C at 200 °C
Surface flatness	< ±10 µm	< ±8 µm	< ±15µ
Electrical isolation - Coax BNC (m) / SHV Triax	150nA	> 5TΩ	> 5TΩ
Heating Rates	25°C to 300°C < 12 min	25°C to 200°C < 9 min	25°C to 200°C < 22 min
Cooling Rates	300°C to 25°C < 9min	200°C to 25°C < 8min	200°C to 25°C < 8min
Leakage @ 10 V Kelvin Triax	N/A	<25fA	<400fA
Residual Capacitance		<200fF	<1pF
Maximum voltage between chuck top and GND	500V	500V	3kV
3 Safety Circuits	Yes	Yes	Yes
Vacuum Pattern	Rings	Pin hole or Rings	Pin hole
Vacuum Zone (DUT Size)	2,50, 100, 150mm	2, 50, 100, 150mm	2, 50, 100, 150mm

System Controller / Dimensions / Weight / Power Consumption

System Model	W x D x H (mm)	Weight (kg)	Weight (Lbs.)	Power cons. (VA)
S-1080	432 x 483 x 267	20.4	45	2000
TC-II	355 x 711 x 610	50.8	112	1500

❖ **SYSTEM OPTIONS – ACCESSORIES**

Probe Station Dark Box (PSDB-CM)

Probe Station light tight, electrically shielded enclosure
Excellent for use in conjunction with the following:

- Low-Leakage measurements
- High-Power measurements
- Thermal measurements
- Light-Sensitive measurements

Door and Panel interlock options are typically used for High Voltage and High Temperature safety



PSDB-CM

Probe Card Adapter (S-4720)

For use with 4.5" wide probe cards
- Includes card rotation



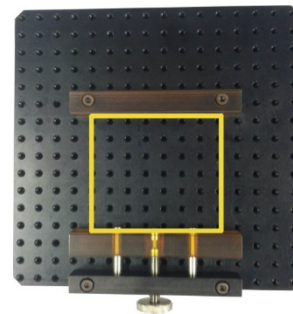
S-4720

CM-BMVC-6

Board Mount Vice Chuck

The CheckMate 460 Series probe station supports the 150mm x 150mm adjustable Vice chuck

- For clamping various size and shaped devices, packaged parts, PCB's, single chips, MEMS, BioMEMS or virtually anything you want to hold, view, and probe.
(VICE Clamps are non-conductive ULTEM)



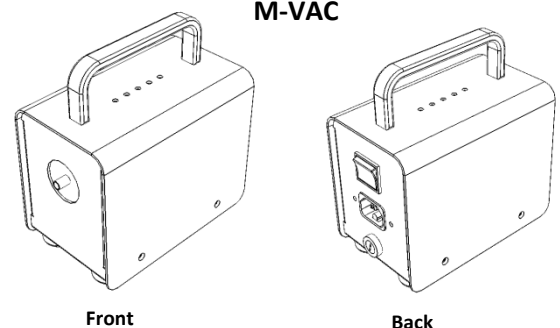
CM-BMVC-6

M-VAC

AC Linear Piston – (Small) Quiet Vacuum Pump

Supports vacuum hold-down of DUT and mounting of 1-10 Micro-positioners
(11 in. Hg @ 115VAC /428 mbar @ 230V AC)

- Includes Power Cord, On/Off Switch, 10' flexible vacuum tubing, 5Amp Fuse, Vibration dampening feet, Easy grip handle



M-VAC

Front

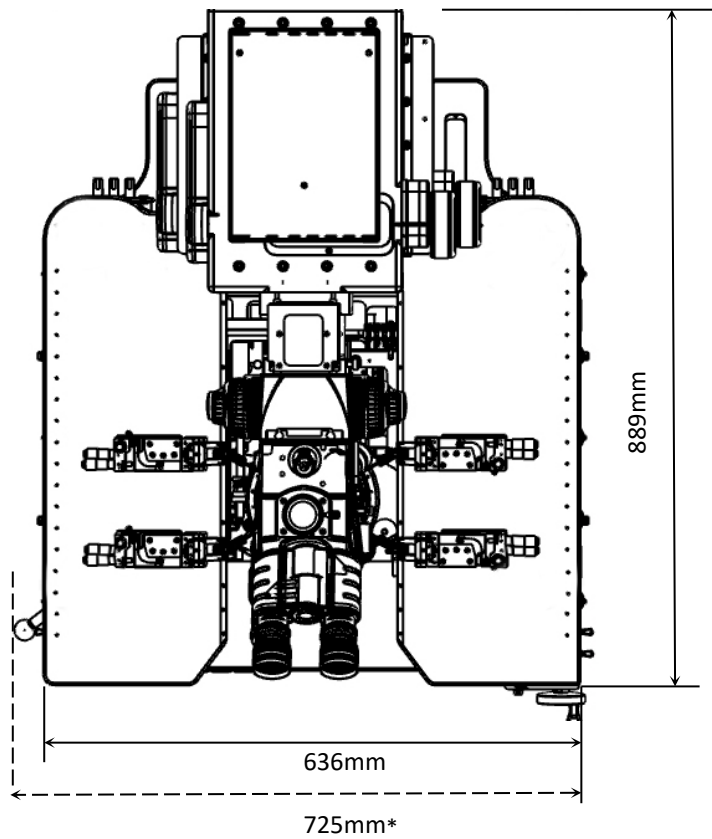
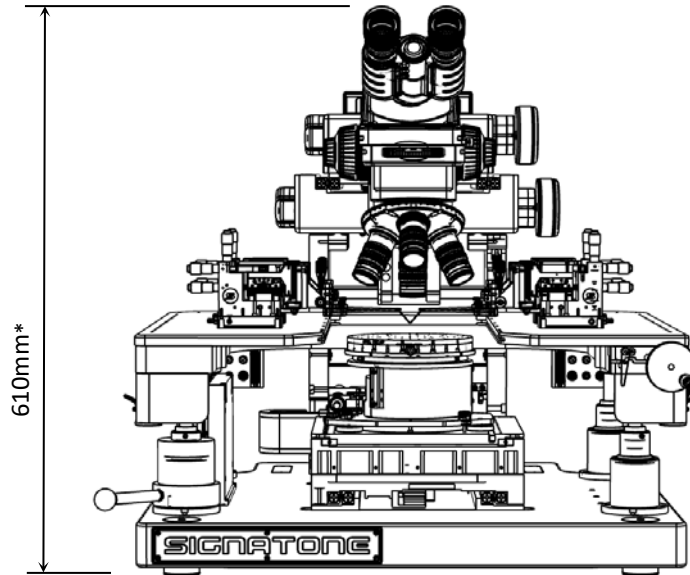
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❖ **SYSTEM DIMENSIONS – TABLE OPTIONAL**

CM-460 / including microscope*

Dimensions (L x D x H)	636 x 889 x 610mm	(25" x 35" x 24")
Weight	109kg	(240 lbs.)

* Can vary dependent on microscope selection

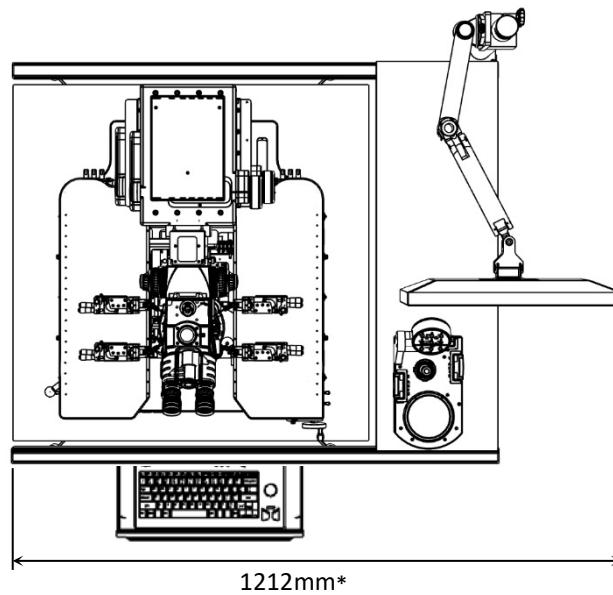
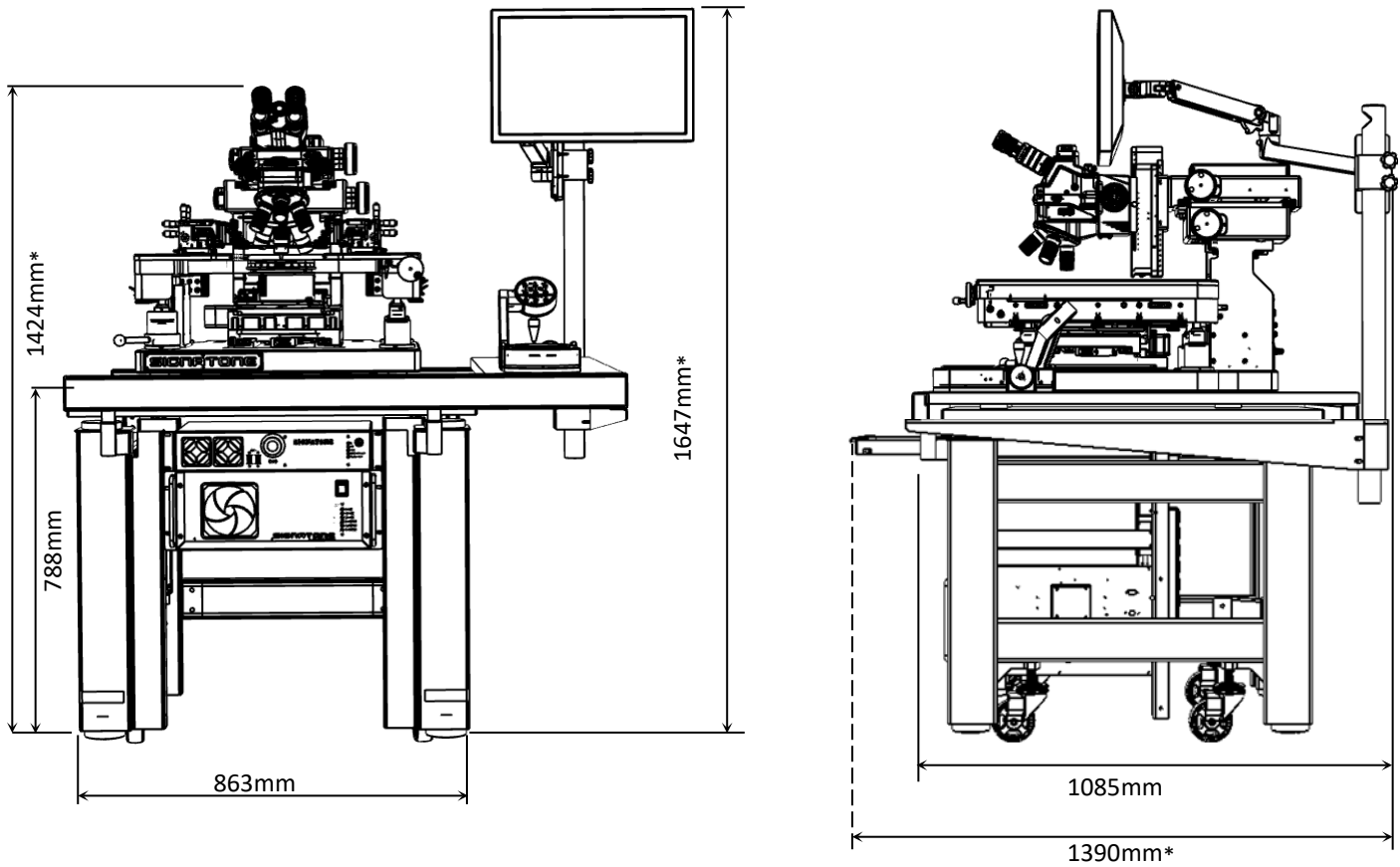


❖ **SYSTEM DIMENSIONS INCLUDING TABLE**

CM-460 / Vibration Isolation Table /Monitor and Keyboard Mount

Dimensions (L x D x H)	863x 1085 x 1424 mm	(34 x 42.7 x 56 In)
Weight	450 kg	(995 lbs.)

* Can vary dependent on monitor, keyboard (roll out drawer) position and Microscope selection

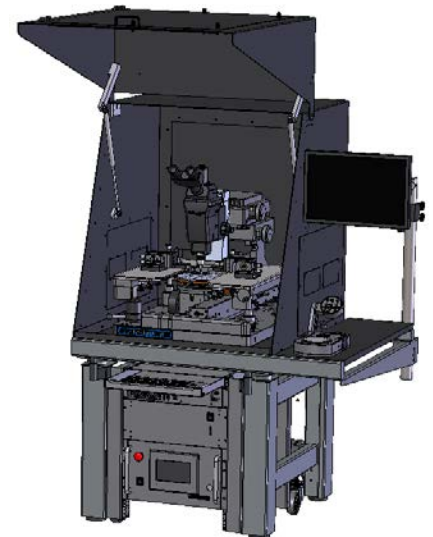
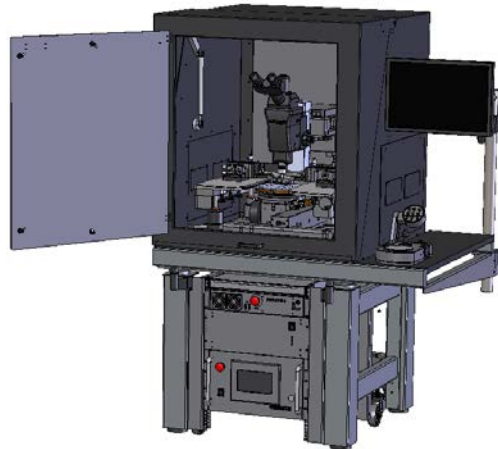
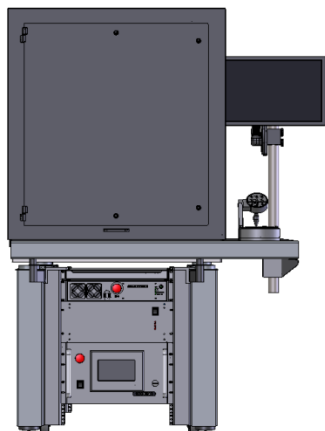
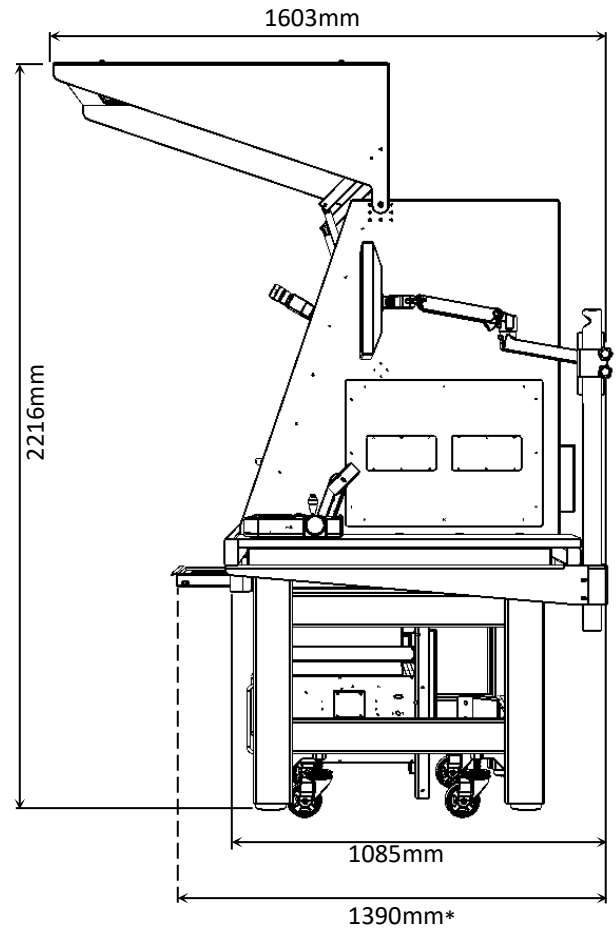
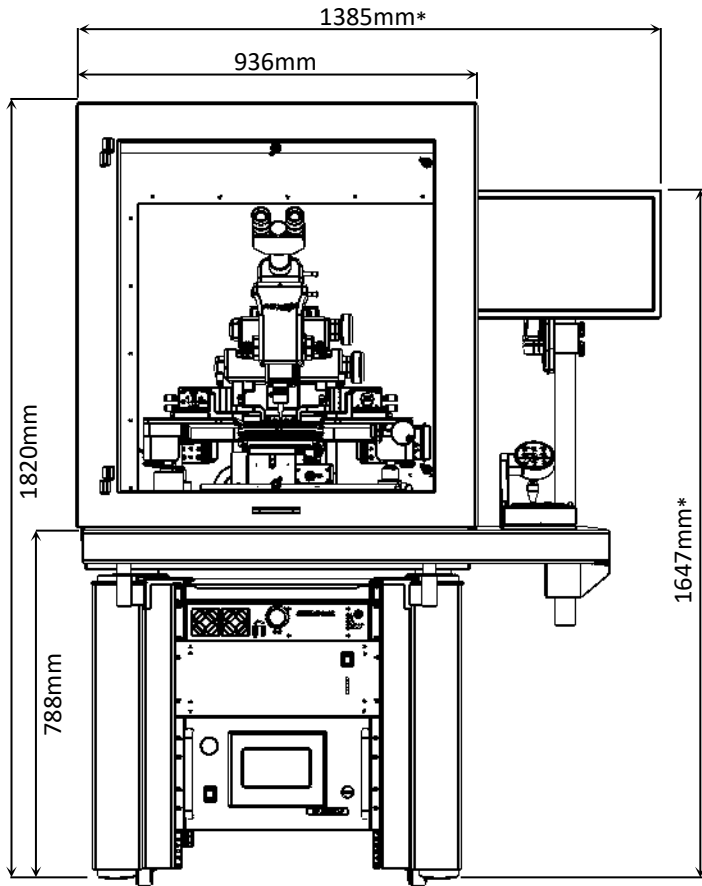


❖ **SYSTEM DIMENSIONS INCLUDING DARK BOX**

CM-460/PSDB/Vibration Isolation Table/Monitor and Keyboard Mount

Dimensions (L x D x H)	936 x 1085 x 1820 mm	(36.85 x 42.7 x 71.7 In)
Weight	510 kg	(1125 lbs.)

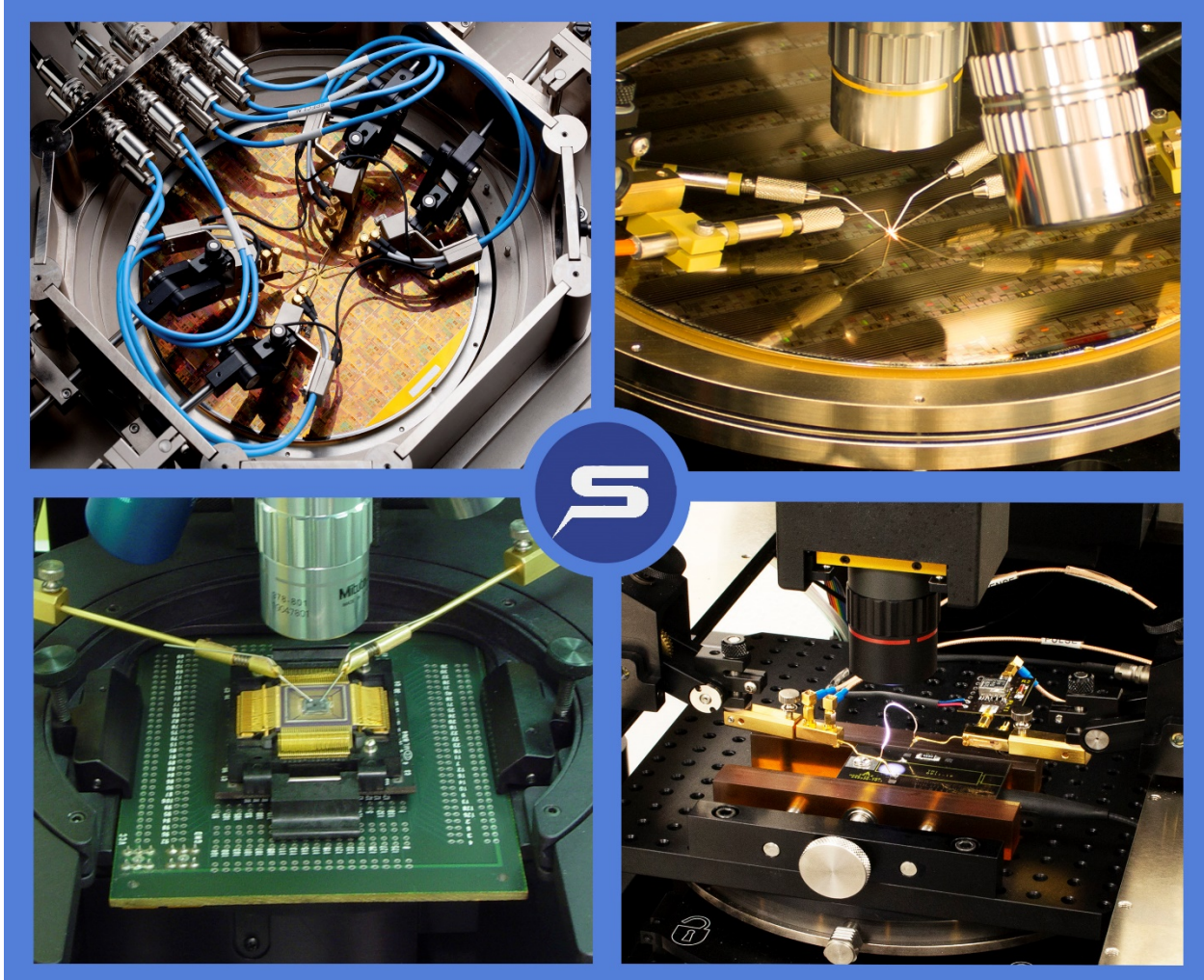
* Can vary dependent on monitor, keyboard, and dark-box door position



❖ **WARRANTY**

- Standard Warranty 12 months *
- For Extended Warranty and Service Contracts : Contact Signatone Corp. for more information

* See Signatone Corporate Terms and Conditions of Sale for further details.



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