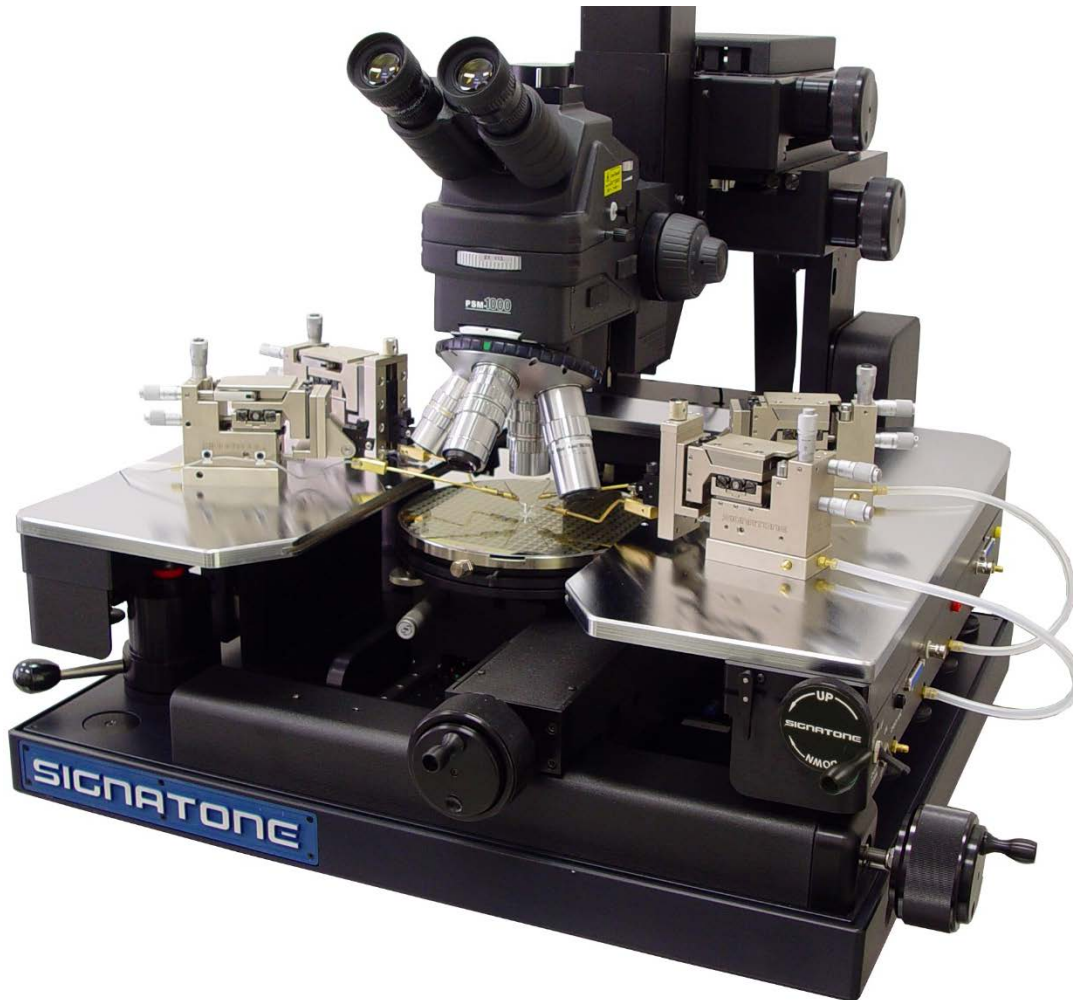


Signatone CM-210 200mm High Precision Manual Probe System
For Reliable and Accurate DC, CV/IV, High Power and RF Test Measurements



❖ FEATURES / BENEFITS

Standard Features

- Ultra-stable 50mm thick Al base
- Fast and Fine control of DUT X-Y Knobs
- Three - Point Chuck planarization
- Micrometer Driven Chuck Theta-Rotation
- Selectable Pin-Hole Vacuum Zones
- Continuous Platen Lift (CVL) for ease of probe and DUT exchange.
- Fine Platen Lift with lock for DUT/probe setup
- Large Platen (Steel or Aluminum available*)
- Ultras Stable Linear Microscope Stage

Designed for a Variety of On-Wafer Analytical Measurement Applications

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

Product Versatility

- Designed for full or partial wafer probing
- Ultra-Stable solid base for sub- μ probing
- Variable Probe, Chuck, and Microscope configuration.
- Upgradable to motorized - Joy Stick or Semi-Automatic /step & repeat control
- Active Vibration Isolation table (optional)
- Hot Chuck System +300°C (optional)

❖ SPECIFICATIONS

Chuck XY Stage (Manual)

| | |
|------------------------------|--|
| Travel range | 205 mm x 205 mm (8.07 x 8.07 in) |
| Travel Resolution (standard) | 14 µm Per Degree of Knob Rotation |
| Travel Resolution (Fine) | 1.5 µm Per Degree of Knob Rotation |
| Drive Mechanism | Precision Leadscrew – Carriage and Rails |

Chuck Z Stage (Pneumatic)

| | |
|---------------|--------------------------|
| Travel range | 2.5 mm (0.01 in) |
| Repeatability | ± 1.0 µm |
| Z Stage Drive | Pneumatic Precision Lift |

Chuck To Platen (Manual Adjust)

| | |
|-------------------------|----------------|
| Separation (Quick Lift) | 3.175mm (1/8") |
| Separation (Fine Lift) | 38.1mm (1.5") |

Chuck Theta Stage (Manual)

| | |
|-------------------|---|
| Travel range | ± 11° (22°) |
| Resolution | 0.01mm Per Degree of Knob Rotation |
| Accuracy | < 1.0 µm (measured at the edge of the 200 mm chuck) |
| Repeatability | < 1.5 µm |
| Theta Stage Drive | High Resolution Micrometer |

Roll Out / Loading Stage * (optional for use with probe card adapter and RF probes)

| | |
|----------------------|--|
| Travel range | 195mm |
| Presentation | 190mm (view or access to the sample chuck for load/unload) |
| Return repeatability | < 1µm |

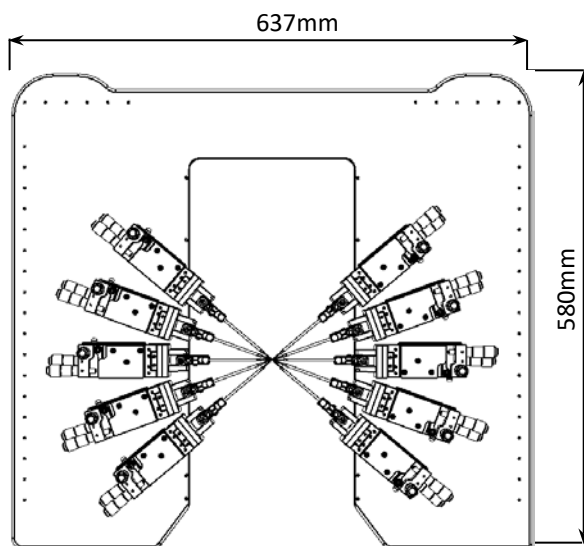
Manual Microscope Stage (linear)

| | |
|----------------|--|
| Movement range | 50mm X 50mm (2"x2") |
| Resolution | < 2µm (2 x 10 ⁻⁴ mils) |
| Scope lift | 101 mm (4") Vertical Pneumatic (Manual Knob- optional) |

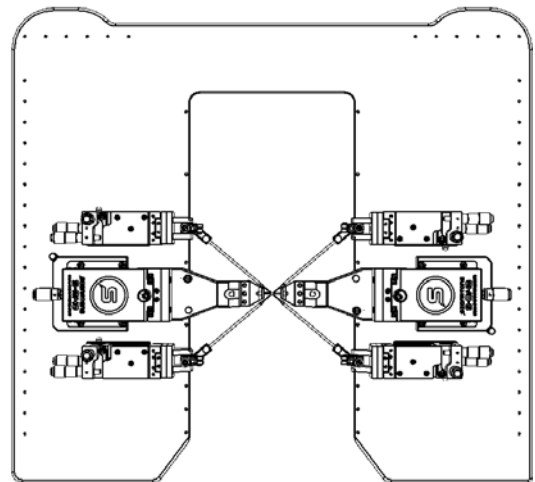
❖ PROBE PLATEN

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/HV or 2x RF + 4 x DC or 4x RF + 2x DC or 2x CAP + 4x DC |
| Quick Platen Lift Control (CVL) | Continuous Variable Lift (0 to 3.175 mm) |
| Contact Repeatability | < 1 μ m (0.04 mils) by Manual Control |
| RF MicroPositioner mounting | Magnetic or Bolt Down |
| DC MicroPositioner mounting | Magnetic or Vacuum |
| Thermal Isolation (Optional) | Platen Temp = +15 °C to +40°C /chuck @ -60 °C to +300°C |



Sample4: Probe Configured with 10 DC Probes



Sample2: Probe Configured with 2 RF + 4 DC Probes

❖ ONE PLATEN x 4 BENFITS

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- liquid cooled platen)



Platen “Quick Lift”



Platen “Fine Adjust” and “Position Lock”

❖ **NON-THERMAL CHUCKS**

Standard Wafer Chuck

| | |
|--|---|
| Connectivity | Coax BNC (m) |
| Diameter | 203 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, 168mm |
| Vacuum actuation | Selector Knob allows individual activation of vacuum zones |
| Supported DUT sizes | 25mm, 75mm, 100mm, 150mm, 200mm |
| Surface planarity | ±6.5μ |
| Rigidity | <3μ / 10N at edge of the chuck (N = pressure measured in Newtons) |

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 | 203 mm |
| Material | Gold Plated Brass |
| Chuck surface | Independent Vacuum zones with vacuum rings |
| Vacuum hole pattern sections(diameter) | 0mm, 65mm, 112mm, 162mm |
| Vacuum actuation | Multi-Zone Adjustable Control |
| Supported DUT sizes | 3mm, 75mm, 125mm, 200mm |
| Surface planarity | ± 5 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: for use with RF applications) |
| Quantity | 1-2 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

| | 200mm Standard Hot | 200mm Hot/ Triax | 200mm 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 < 28 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 | Pin hole |
| Vacuum Zone (DUT Size) | 50, 100, 150, 200mm | 2, 50, 100, 150, 200mm | 2, 50, 100, 150, 200mm |

*All data is relevant for chucks in ECO mode

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 |
| 2XRC-89HL | 559 x 610 x 915 | 135 | 297 | 3700 |

❖ **ERS HIGH POWER THERMAL CHUCKS**

Specifications of ERS/ SIGNATONE Technology HV 200mm Chucks

| | | |
|--|--|--|
| Temperature Range | 25 °C to 200 °C | 25 °C to 300 °C |
| Connectivity | Kelvin Triax (M),3kV or 10 kV Coaxial | Kelvin Triax (M),3kV or 10 kV Coaxial |
| Temperature control method | Cooling air / Resistance heater | Cooling air / Resistance heater |
| Coolant | Air (user supplied) | Air (user supplied) |
| Smallest temperature selection step | 0.1 °C | 0.1 °C |
| Chuck temperature display resolution | 0.01 °C | 0.01 °C |
| External touchscreen display (optional) | Yes | Yes |
| Temperature stability | ±0.08 °C | ±0.08 °C |
| Temperature accuracy | ±0.1 °C | ±0.1 °C |
| Control method | Low noise DC/PID | Low noise DC/PID |
| Interfaces | RS232C | RS232C |
| Chuck surface plating | Gold plated with pinhole surface | Gold plated with pinhole surface |
| Temperature sensor | Pt100 1/3DIN 4-line wired | Pt100 1/3DIN 4-line wired |
| Temperature uniformity | < ±0.5 °C at ≤ 200 °C | < ±0.5 °C at ≤ 300 °C |
| Surface flatness and base parallelism | < ±10 µm | < ±10 µm |
| Heating and Cooling Rates* | 25 to 200°C <30min 200 to 25°C <30min | 25 to 300°C <35min 300 to 25°C <35min |
| Leakage @ 3000V Kelvin Triax (M) | | |
| 25°C | 5pA | 5pA |
| 200 °C | 10pA | 10pA |
| 300°C | -- | 15pA |
| Leakage @ 10kV Coax UHV/SHV(M) | | |
| 25°C | 6nA | 6nA |
| 200 °C | 6nA | 6nA |
| 300°C | -- | 6nA |
| Maximum voltage between chuck top and GND | 10 kV DC | 10 kV DC |

*All data is relevant for chucks in ECO mode

System Controller / Chiller Dimensions and Power / Air Consumption

| System type | W x D x H (mm) | Weight (kg) | Power cons. (VA) | max. Air flow (l/min) |
|--------------|-----------------|-------------|------------------|-----------------------|
| 25 to 200 °C | 300 x 360 x 135 | 12 | 1300 | 220 |
| 25 to 300 °C | 300 x 360 x 135 | 12 | 1300 | 220 |

*All data is relevant for chucks in ECO mode

❖ 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 high 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



CAP-946M

❖ **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

❖ **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

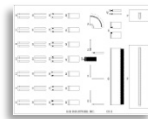
*All leakage tests conducted in an enclosed environment with Keithley 4200, or equivalent, in sampling mode with 10 PLC, auto-ranging. 0.25s interval

❖ 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

❖ **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

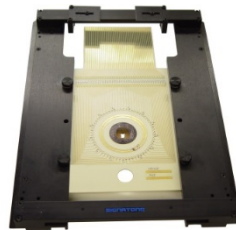
Door and Panel interlock options are typically used for High Voltage and High Temperature safety



PSDB-CM

Probe Card Adapter (S-4710)

For use with 4.5" wide probe cards



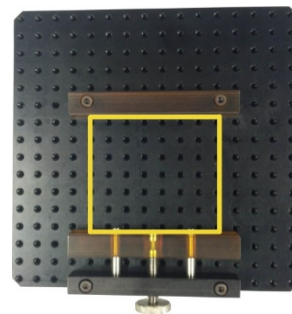
S-4710

CM-BMVC

Board Mount Vice Chuck

The CheckMate Series probe stations supports the 200mm x 200mm 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)



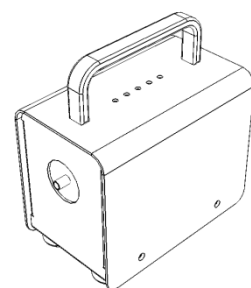
CM-BMVC

M-VAC

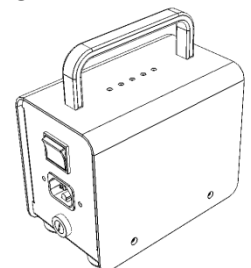
AC Linear Piston – (Small) Quiet Vacuum Pump

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



Front



Back

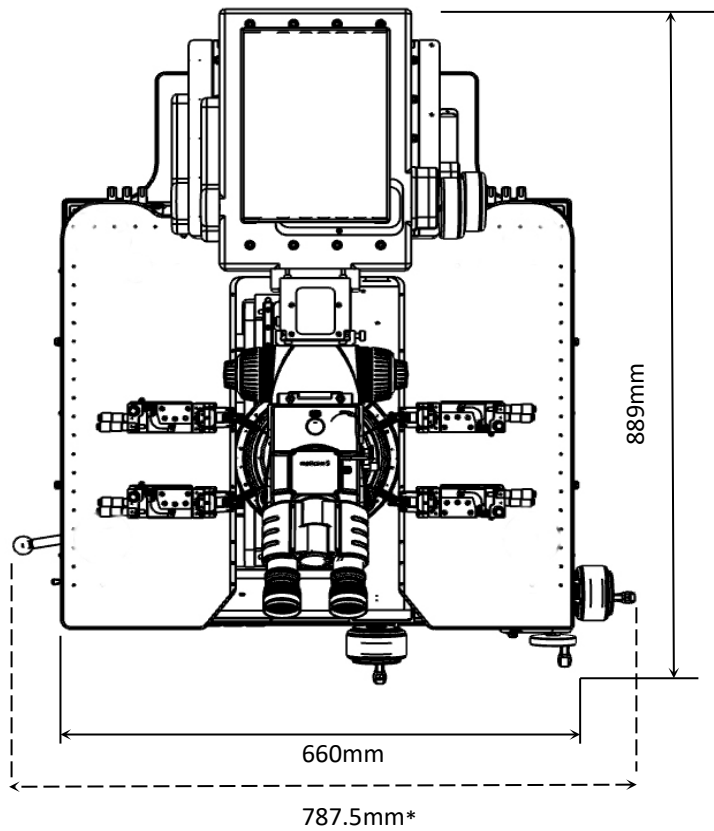
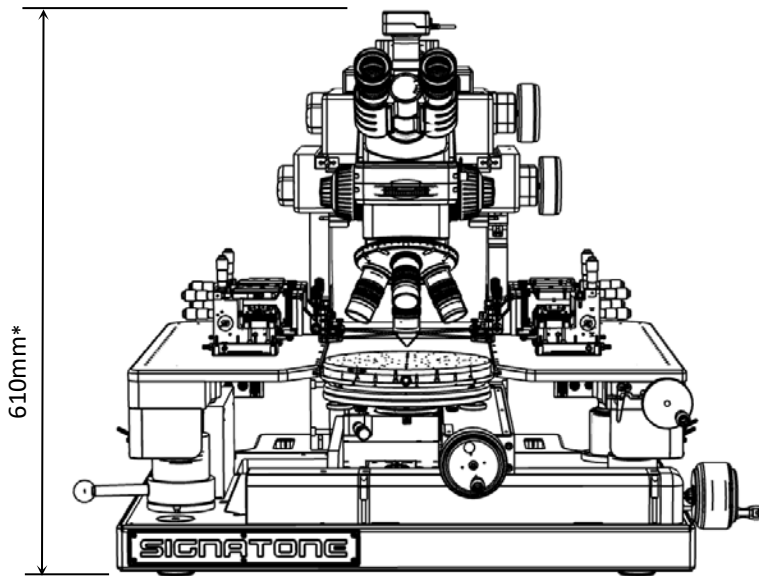
M-VAC

❖ **SYSTEM DIMENSIONS – TABLE OPTIONAL**

CM-210 / including microscope*

| | | |
|------------------------|------------------|-------------------|
| Dimensions (L x D x H) | 660x 889 x 610mm | (26" x 35" x 24") |
| Weight | 109kg | (240 lbs.) |

* Can vary dependent on microscope selection

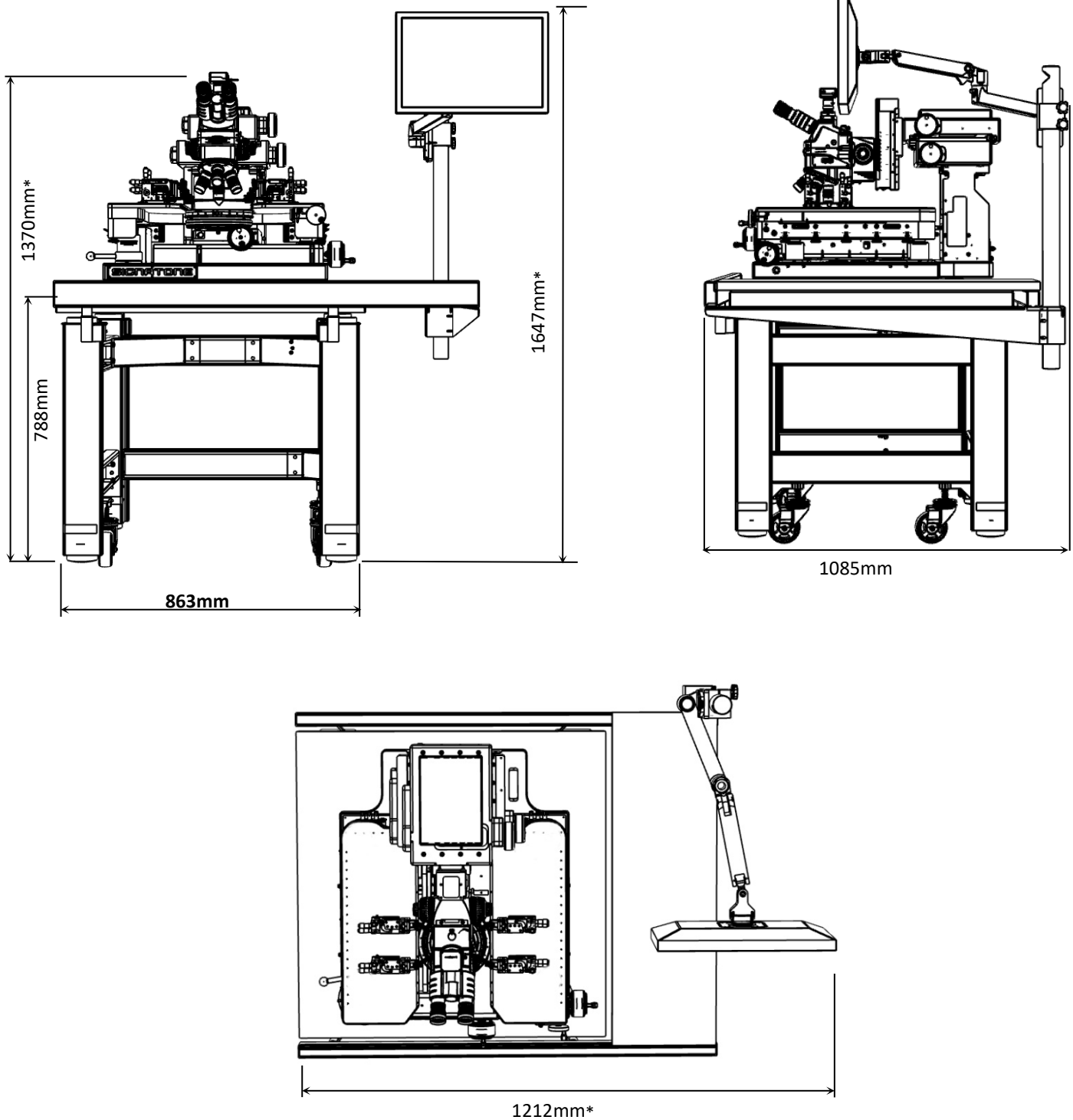


❖ **SYSTEM DIMENSIONS INCLUDING TABLE**

CM-210 / Vibration Isolation Table / Monitor Mount

| | | |
|------------------------|---------------------|-------------------------|
| Dimensions (L x D x H) | 863x 1085 x 1370 mm | (34 x 42.7 x 53.95 In) |
| Weight | 385 kg | (849 lbs.) |

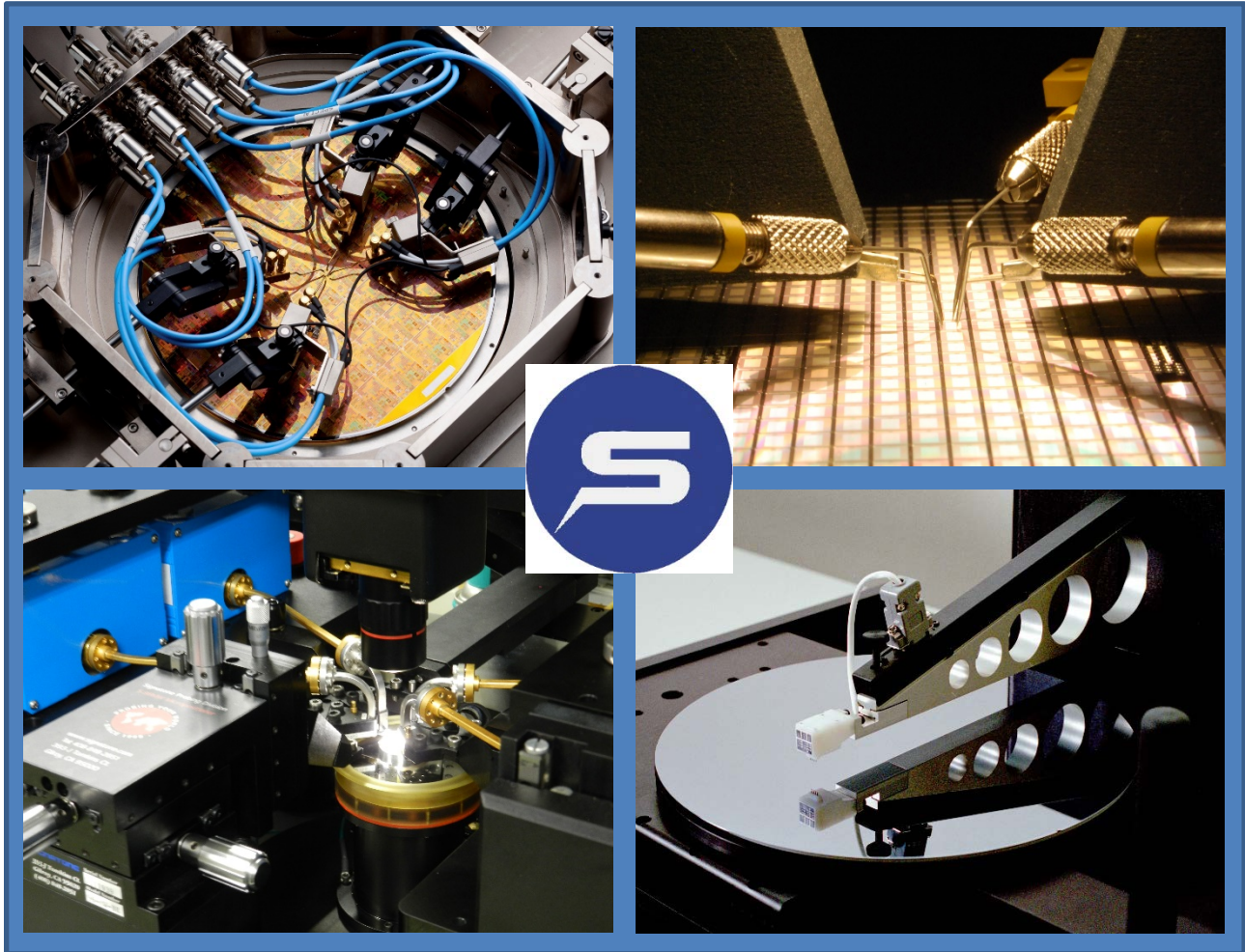
* Can vary dependent on monitor, Microscope selection and position



❖ **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.



- North America: Sales.NA@signatone.com
- Europe: Sales.Europe@signatone.com
- Asia: Sales.Asia@signatone.com

