MPI TS200-SE | 200 mm Manual Probe System with ShielDEnvironment™ For accurate and reliable DC/CV, RF and mmW measurements

FEATURES / BENEFITS

Universal Use

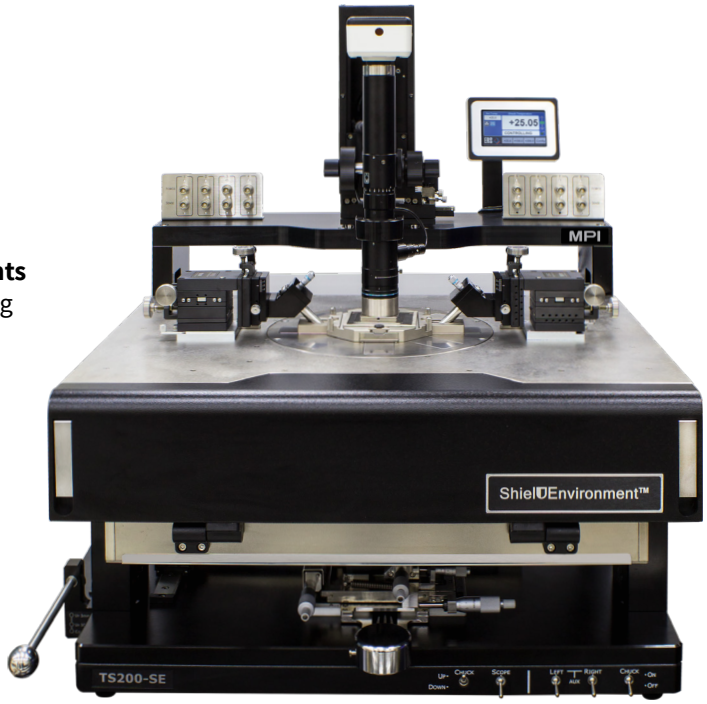
- Designed for wide variety of applications such as Device Characterization and Modeling, RF and mmW Wafer Level Reliability, and Failure Analysis

MPI ShielDEnvironment™ for Accurate Measurements

- Design for Advanced EMI / RFI / Light-Tight Shielding
- FemtoAmp low-leakage capabilities
- Integrated active vibration isolation
- Ready for temperature range -60 °C to 300 °C

Ergonomic Design and Options

- Unique puck controlled air bearing stage for quick single-handed operation
- Available with various chuck options and wide range of accessories such as DC/RF/mmW MicroPositioners, microscopes and ShielDEnvironment™ provide excellent support for various application requirements



SPECIFICATIONS

Chuck XY Stage (Standard)

Travel range	225 x 260 mm (8.9 x 10.2 in)
Fine-travel range	25 x 25 mm fine micrometer control
Fine-travel resolution	< 1.0 µm (0.04 mils) @ 500 µm/rev
Planarity	< 10 µm
Theta travel (standard)	360°
Theta travel (fine)	± 5.0°
Theta resolution	7.5 x 10^{-3} gradient
Movement	Puck controlled air bearing stage

Chuck Z Stage

Travel range	5 mm (0.2 in)
Fine-travel resolution	< 1.0 µm (0.04 mils) @ 500 µm/rev
Load stroke	20 mm, pneumatically

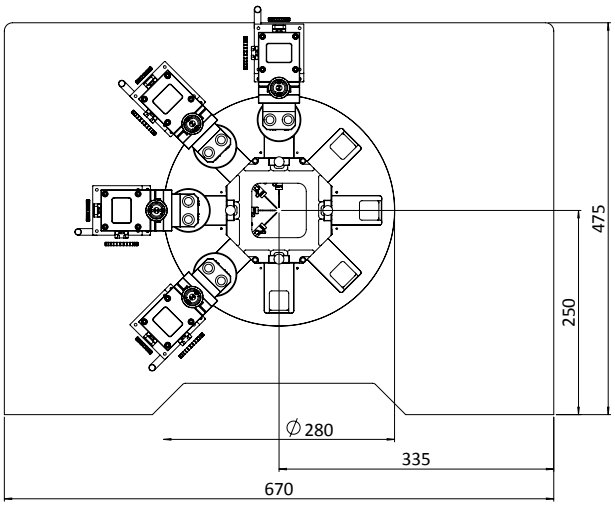
Manual Microscope Stage (Linear)

Movement range	50 x 50 mm (2 x 2 in)
Resolution	< 5 µm (0.2 mils)
Scope lift	Manual, tilt-back or vertical (depending on microscope type)
Movement	Independently controlled X and Y movement with locking screws

PROBE PLATEN

Specifications

Material	Nickel plated steel
Dimension	See drawing
Chuck to ShielDGuard height	Min. 5 mm
Max. No of MicroPositioners	8 DC or 4 DC + 2 RF or 2 DC + 4 RF
Platen lift control	3 positions - contact (0), separation (300 µm), and loading (3 mm)
Separation repeatability	< 1 µm (0.04 mils) by “automated“ control
RF MicroPositioner mounting	Magnetic with guided rail
DC MicroPositioner mounting	Magnetic
300 °C thermal isolation	Depending on chuck configuration



Universal probe platen design for up to 8 DC MicroPositioners

ShielDEnvironment™

MPI ShielDEnvironment™ is a high performance local environmental chamber providing excellent EMI- and light-tight shielded test environment for ultra-low noise, low capacitance measurements.
MPI ShielDEnvironment™ allows up to 4-port RF or up to 8-ports DC/Kelvin or a combination of those configurations. MPI ShielDCap™ provides easy reconfiguration of measurement setup as well as EMI/noise shielding - which make great difference in simplifying day to day operations.

ShielDEnvironment™ Electrical Specifications

EMI shielding	> 30 dB (typical) @ 1 kHz to 1 MHz
Light attenuation	≥ 130 dB
Spectral noise floor	≤ -180 dBVrms/rtHz (≤ 1 MHz)
System AC noise	≤ 5 mVp-p (≤ 1 GHz)

DC PROBES - SELECTION GUIDE

	Coax Probe (PA-C)	Triax Probe (PA-T)	Kelvin Probe (PA-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	< 0.8 pA	< +/- 20fA	< +/- 10fA
Connectivity	SMB	Standard Triax	SSMC
Connectivity type	Single Coaxial	Single low noise Triaxial	Force/Sense low noise Triaxial
Characteristics impedance	50 Ohms	50 Ohms	50 Ohms
Residual capacitance	< 95 fF	< 95 fF	< 95 fF
Probe holder material	Brass	Brass	Brass (Fully Guarded to the Tips)
Probe tips material	Tungsten	Tungsten	Tungsten
Probe tips sizes	0.5 µm – 25 µm	0.5 µm – 25 µm	0.5 µm – 5 µm
Minimum pad size	25 µm x 25 µm	25 µm x 25 µm	25 µm x 25 µm

NON-THERMAL CHUCKS

Standard Wafer Chuck

Connectivity	Coax BNC (f)
Diameter	210 mm
Material	Stainless steel
Chuck surface	Planar with centric engraved vacuum grooves
Vacuum grooves sections(diameter)	3, 27, 45, 69, 93, 117, 141, 164, 194 mm
Vacuum actuation	Multizone control - All connected in meander shape, center hole in 3 mm diameter
Supported DUT sizes	Single DUTs down to 4 x 4 mm size or wafers 50 mm (2 in) thru 200 mm (8 in)*
Surface planarity	≤± 5 µm
Rigidity	< 15 µm / 10 N @edge

**Single DUT testing requires higher vacuum conditions dependent upon testing application.*

RF Wafer Chuck (Triaxial)

Connectivity	Kelvin Triax (f)
Diameter	210 mm with 2 integrated AUX areas
Material	Nickel plated aluminum (flat with 0.5 mm holes)
Chuck surface	Planar with 0.5 mm diameter holes in centric sections
Vacuum holes sections (diameter)	3, 27, 45, 69, 93, 117, 141, 164, 194 mm
Vacuum actuation	Manual switch between Center (4 holes), 100, 150, 200 mm (4, 6, 8 in)
Supported DUT sizes	Single DUTs down to 4 x 4 mm size or wafers 100 mm (4 in) thru 200 mm (8 in)*
Surface planarity	≤± 5 µm
Rigidity	< 15 µm / 10 N @edge

**Single DUT testing requires higher vacuum conditions dependent upon testing application.*

Auxiliary Chuck

Quantity	2 AUX chucks
Position	Integrated to front side of main chuck
Substrate Size (W x L)	Max. 25 x 25 mm (1 x 1 in)
Material	Ceramic, RF absorbing material for accurate calibration
Surface planarity	≤± 5 µm
Vacuum control	Controlled independently, separate from chucks

Electrical Specification (Coax)

Operation voltage	In accordance with EC 61010, certificates for higher voltages available upon request
Maximum voltage between chuck top and GND	500 V DC
Isolation	> 2 GΩ

Electrical Specification (Triax)

	Standard Chuck (10 V)
Chuck isolation	> 100 GΩ
Force to guard	> 100 GΩ
Guard to shield	> 10 GΩ
Force to shield	> 50 GΩ

THERMAL CHUCKS

Specifications of MPI ERS Integrated Technology

Temperature Range	20 °C to 200 °C	20 °C to 200 °C	20 °C to 300 °C
Connectivity	Coax	Kelvin Triax	Kelvin Triax
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
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	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C	RS232C
Chuck surface plating	Nickel plated with pinhole surface	Nickel plated with pinhole surface	Nickel plated with pinhole surface
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ±0.5 °C	< ±0.5 °C	< ±0.5 °C at 20 to 200 °C < ±1.0 °C at > 200 °C
Surface flatness and base parallelism	< ±10 µm	< ±10 µm	< ±10 µm
Heating rates	20 to 200°C < 15mm	20 to 200 °C < 20 min	20 to 300 °C < 30 min
Cooling rates*	200 to 20 °C < 20 min	200 to 20 °C < 25 min	300 to 20 °C < 30 min
Electrical isolation - Coax BNC (f)	> 10 T Ω at 25 °C > 300 G Ω at 200 °C	N/A	N/A
Leakage @ 10 V - Kelvin Triax (f)	N/A	< 15 fA at 25 °C < 30 fA at 200 °C	< 15 fA at 25 °C < 50 fA at 300 °C
Capacitance	< 900 pF	N/A	N/A
Maximum voltage between chuck top and GND	500 V DC	500 V DC	500 V DC

**All data are relevant for chucks in ECO mode.*

FULL RANGE TRIAXIAL THERMAL CHUCKS

Specifications of MPI ERS Integrated Technology

Temperature Range	-10 °C to 200 °C/300 °C	-40 °C to 200 °C/300 °C	-60 °C to 200 °C/300 °C
Connectivity	Kelvin Triax	Kelvin Triax	Kelvin Triax
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
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	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C	RS232C
Chuck surface plating	Nickel plated with pinhole surface	Nickel plated with pinhole surface	Nickel plated with pinhole surface
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ±0.5 °C at -60 to 200 °C	< ±0.5 °C at -60 to 200 °C	< ±0.5 °C at -60 to 200 °C
Surface flatness and base parallelism	< ±10 µm	< ±10 µm	< ±10 µm
Electrical isolation Coax BNC (f)	N/A	N/A	N/A
Heating rates			
200°C	-10 to 25°C < 7 min	-40 to 25°C < 10 min	-60 to 25°C < 15 min
		25 to 200 °C < 20 min	
300°C	-10 to 25°C < 7 min	-40 to 25°C < 10 min	-60 to 25°C < 15 min
		25 to 300 °C < 30 min	
Cooling rates*			
200°C		200 to 25°C < 15 min	
	25 to -10°C < 15 min	25 to -40°C < 20 min	25 to -60°C < 30 min
300°C		300 to 25°C < 25 min	
	25 to -10°C < 15 min	25 to -40°C < 20 min	25 to -60°C < 30 min
Leakage @ 10 V Kelvin Triax (f)			
-60°C	--	--	< 30 fA
-40°C	--	< 30 fA	< 30 fA
-10°C	< 30 fA	< 30 fA	< 30 fA
25°C	< 15 fA	< 15 fA	< 15 fA
200°C	< 30 fA	< 30 fA	< 30 fA
300°C	< 50 fA	< 50 fA	< 50 fA
Capacitance	N/A	N/A	N/A
Maximum voltage between chuck top and GND	500 V DC	500 V DC	500 V DC

**All data are relevant for chucks in ECO mode.*

STANDARD ERS THERMAL CHUCKS

Specifications of ERS Technology

Temperature Range	-10 °C to 200 °C	-40 °C to 200 °C	-60 °C to 200 °C
Connectivity	SingleTriax	SingleTriax	SingleTriax
Temperature control method	Cooling air / Resistance heater	Cooling air / Resistance heater	Cooling air / Resistance heater
Coolant	Air (user supplied)	Air (user supplied)	Air (user supplied)
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	±0.08 °C	±0.08 °C	±0.08 °C
Temperature accuracy	0.1 °C	0.1 °C	0.1 °C
Control method	Low noise DC/PID	Low noise DC/PID	Low noise DC/PID
Interfaces	RS232C	RS232C	RS232C
Chuck surface plating	Nickel plated with vacuum groove lines	Nickel plated with vacuum groove lines	Nickel plated with vacuum groove lines
Temperature sensor	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired	Pt100 1/3DIN, 4-line wired
Temperature uniformity	< ±0.5 °C at -60 to 200 °C	< ±0.5 °C at -60 to 200 °C	< ±0.5 °C at -60 to 200 °C
Surface flatness and base parallelism	< ±10 µm	< ±10 µm	< ±10 µm
Electrical isolation - Coax BNC (f)	N/A	N/A	N/A
Heating rates			
25°C	-10 to 25°C < 5 min	-40 to 25°C < 8 min	-60 to 25°C < 12 min
200 °C		25 to 200 °C < 15 min	
Cooling rates*			
200°C		200 to 25°C < 12 min	
25 °C	25 to -10°C < 12 min	25 to -40°C < 18 min	25 to -60°C < 25 min
Isolation	> 10 TΩ at 25 °C > 2.5 TΩ at 200 °C > 2.5 TΩ at -10 °C	> 10 TΩ at 25 °C > 2.5 TΩ at 200 °C > 2.5 TΩ at -40 °C	> 10 TΩ at 25 °C > 2.5 TΩ at 200 °C > 2.5 TΩ at -60 °C
Capacitance	N/A	N/A	N/A
Maximum voltage between chuck top and GND	500 V DC	500 V DC	500 V DC

**All data are relevant for chucks in ECO mode.*

System Controller / Chiller Dimensions and Power / Air Consumption

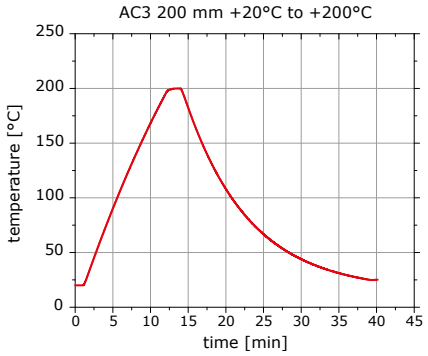
System type	W x D x H (mm)	Weight (kg)	Power cons. (VA)	max. Air flow*(l/min)
20 to 200 °C / 300 °C	300 x 360 x 135	12	700	200
-10 to 200 °C / 300 °C	420 x 300 x 520	45	1350	220
-40 to 200 °C / 300 °C	420 x 500 x 1020	140	2100	380
-60 to 200 °C / 300 °C	420 x 500 x 1020	140	2100	380

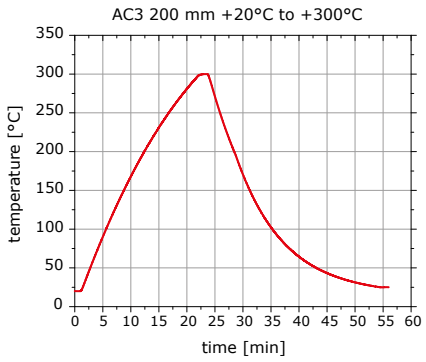
**All data are relevant for chucks in ECO mode.*

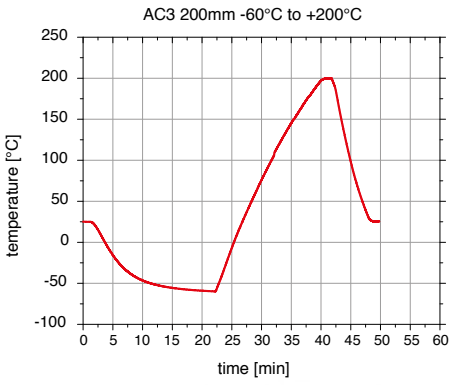
ERS AirCool® (patented) Controller Integrated Chiller -40°C / -60°C

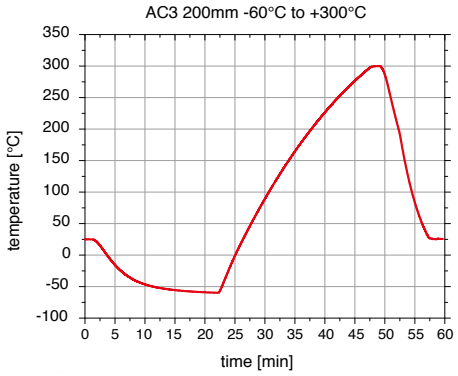
ERS AirCool® (patented) Controller Integrated Chiller -10°C

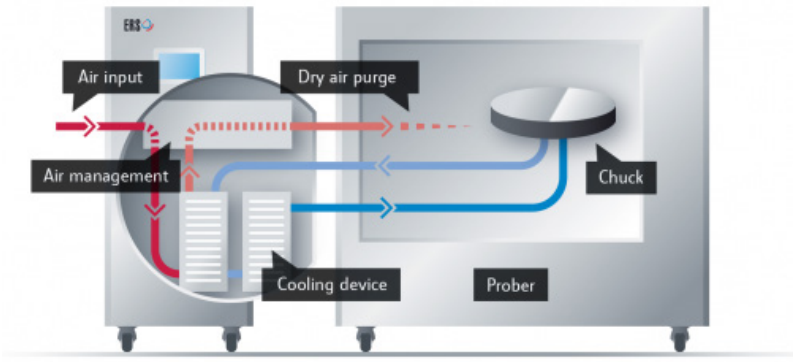
TYPICAL TRANSITION TIME











These chucks incorporate the ERS patented AC3 cooling technology and its air management system to purge the MPI ShielDEnvironment™ directly from “already used” air – reducing dry air consumption up to 30 to 50% as compared to other systems on the market.

FACILITY REQUIREMENTS

Thermal Chuck Electrical Supply

Electrical Supply	Hot only thermal chucks
Electrical primary connection	100 to 240 VAC auto switch
Frequency	50 Hz / 60 Hz
Compressed Air Supply	
Operating pressure	6.0 bar (0.6 MPa, 87 psi) at specified flow rate
CDA dew point	≤ 0 °C for hot chuck system (ambient to 300 °C) ≤ -45 °C for hot and cold chuck system (-60 °C to 300 °C)

General Probe System

Power	100-240 V AC 50/60 Hz for optical accessories* only
Vacuum	-0.5 bar (for single DUT) / -0.3 bar (for wafers)
Compressed air	6.0 bar

**e.g. microscope illumination, CCD cameras, monitors.*

WARRANTY

- Warranty*: 12 months
- Extended service contract: contact MPI Corporation for more information

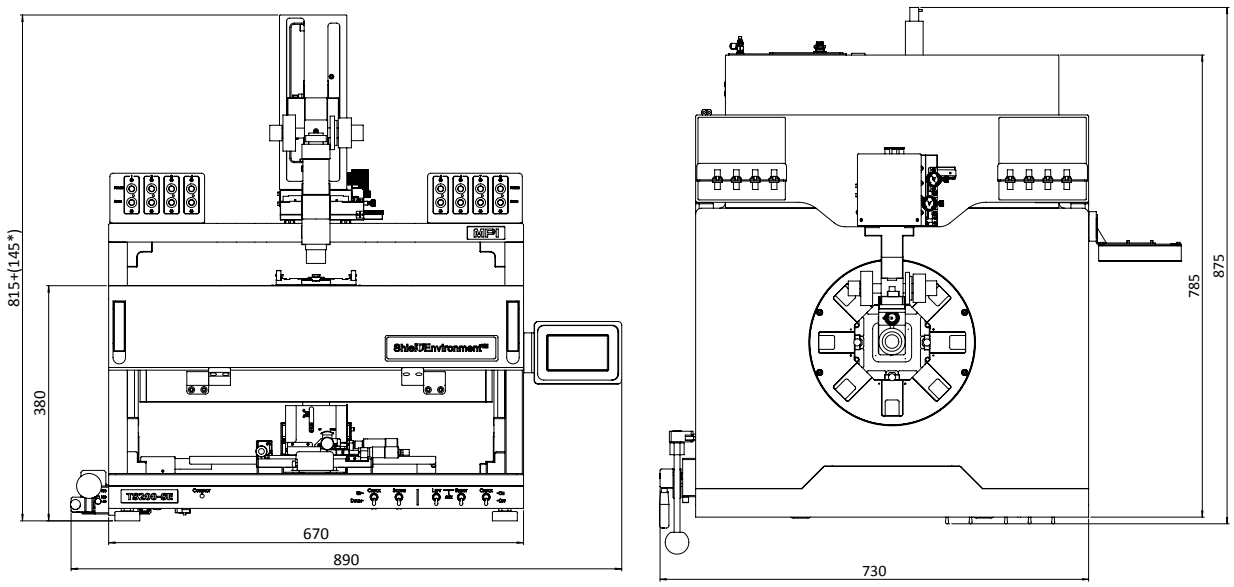
**See MPI Corporation's Terms and Conditions of Sale for more details.*

PHYSICAL DIMENSIONS

Station Platform with Bridge*

Dimensions (W x D x H)	670 x 785 x 815 mm (26.4 x 30.9 x 32.1 in)
Weight	~150 kg (330.7 lb.)

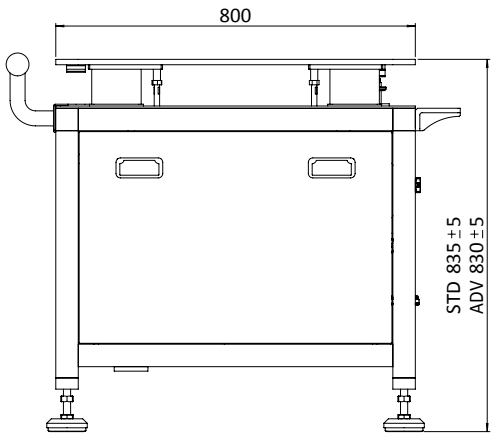
**Station accessories, such as different microscopes, cameras, or laser cutters, may change the total height.*

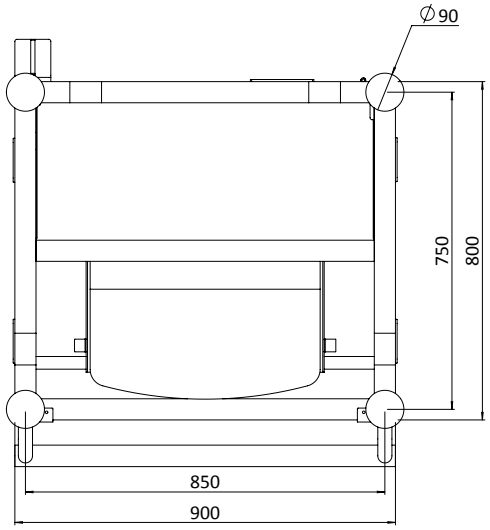


**Can vary depends on monitor/chiller position.*

Vibration Isolation Table

	Standard	Advanced
Dimensions (W x D x H)	900 x 800 x 835 mm (35.4 x 31.5 x 32.9 in)	900 x 800 x 830 mm (35.4 x 31.5 x 32.7 in)
Feature	Adjustable air damping system	Automatic load leveling
Keyboard / Mouse Tray Included	Yes	
Front protection bar	Yes	
Castors Included	Yes	
Shelves Included	Upper and Lower	
Accessories accepted	Monitor Stand(s) and Instrument Shelf	
Weight	Approx. 210 kg (463 lb.)	Approx. 210 kg (463 lb.)





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