



CleanBench™ Aktiv Everstill™ Technology *Active Vibration Cancellation Lab Table*

User Guide



CE

96-44439-01 Rev A
10/24/18



Warnings



Power Supply (included)

The AC voltage requirement is 90-260 VAC, 50-60 Hz.



Power Cord (applicable cable included)

The main power cord has 0.75mm (18 AWG) wire and includes a PE ground.



US AC power cord is UL / CSA certified



Euro AC power cord is VDE certified



UK AC power cord is VDE certified



Ventilation

TMC recommends that system be installed in an unrestricted air circulation environment.

Operating Temperature

If system is exposed to a 30°F (15°C) temperature variation, then ensure system power is turned OFF and wait at least 3 hours before applying power to the system.

System Usage

The system internal controller and its components are only to be used for its intended purposes as described in this manual. Any other usage could jeopardize operator safety and possibly void the warranty.

Certifications



Complies with European Union requirements



Compliant with Restriction of Hazardous Substances

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1 Introduction

The CleanBench™ Aktiv with Everstill™ technology is a two-stage vibration isolation table.

The first stage: The active stage which senses and cancels vibration originating from the floor by incorporating TMC's proven serial architecture originally developed for STACIS™.

The second stage: Consists of the well proven Gimbal Piston® isolators. The two-stage active/passive approach allows the system to isolate highly sensitive instrumentation from both low and high frequency vibration in all six degrees of freedom. The combination of low frequency active vibration cancellation and higher frequency passive cancellation make for a unique and powerful combination.

Design concept: CleanBench™ Aktiv is designed to support benchtop sized optical and scanning probe microscopes, AFMs, optical profilers and other sensitive instruments. It is intended to support those customers who have the most challenging and sensitive instruments with respect to floor vibration. CleanBench™ Aktiv reduces floor vibration across the critical frequency range of 2 to 30 Hz by an order of magnitude (10X) compared to TMC's standard CleanBench with Gimbal Piston® isolators.

Everstill™ technology: The highly advanced patented Everstill™ technology delivers best-in-class vibration cancellation starting at 0.7 Hz.

Installation: TMC's CleanBench™ Aktiv is easy to install. The only input requirements are from a standard AC power outlet and 80 psi of compressed air. Once the hook up of the facility requirements is completed, simply push the power ON/OFF button to initiate automatic leveling/height adjustments of the Gimbal Piston® isolators. The floating height of the isolators and the system is fully operational. No special tuning of the system is required.

Key Feature Highlights

- Superior low frequency performance
 - Starts to isolate at 0.7 Hz
 - Significant vibration cancellations in the critical 1-10 Hz range
- Accommodates a wide range of instrument weights
 - CleanBench™ Aktiv can support a range of 0 to 580 lbs. on it's top platform.
- Saturation and oscillation control
 - CleanBench™ Aktiv automatically senses very large disturbances and automatically responds to ensure optimal performance under these adverse conditions.

An example of this is a person leaning on the highly sensitive isolated platform or bumping into the support frame

- Patented active vibration cancellation technology paired with passive isolation two stages of vibration isolation. Active and passive cancellation working together for ultra-precision instruments.
- Advanced vibration sensor technology
Incorporates geophone type velocity sensors for sub-1 Hz performance
Better low frequency sensitivity than accelerometers
- Active stage of isolation evolved from STACIS™ serial architecture
TMC's vibration control technology proven on long time STACIS™ technology

Easy to install and operate

- Shipping crate includes a built in hinged ramp for system easy roll off
- CleanBench™ Aktiv has integrated retractable casters
- Manually adjustable leveling of top platform
- Wrench included for raising and lowering casters
- Wrench included for removing shipping brackets
- Universal electrical input for use worldwide
- Single ON/OFF push button
- The system performs self-diagnostics at start-up

2 Unpacking & Moving System



CAUTION!
System weighs approximately 450 lbs. (204 kg)

Figure 2-1 Shipping crate delivery

Shipping Crate Content

<p>CleanBench™ Aktiv</p> 	<p>Applicable Power Cord</p> 	<p>Air Line 15 feet of ¼" air line</p> 
<p>Installation Operation Guide</p> 	<p>Unpacking Brief</p> 	<p>Tool Included</p> 

Table 2-1 Crate content

Tools required

- Hand and eye protection
- Metal shears to cut the metal banding
- Pry tool to remove metal clips along edges of crate
- Screw driver to remove top crate panel

Unpacking Instructions

Ensure that your wearing hand and eye protection gear

Step 1 Cut and remove the 5 metal bands around the crate using metal shears.

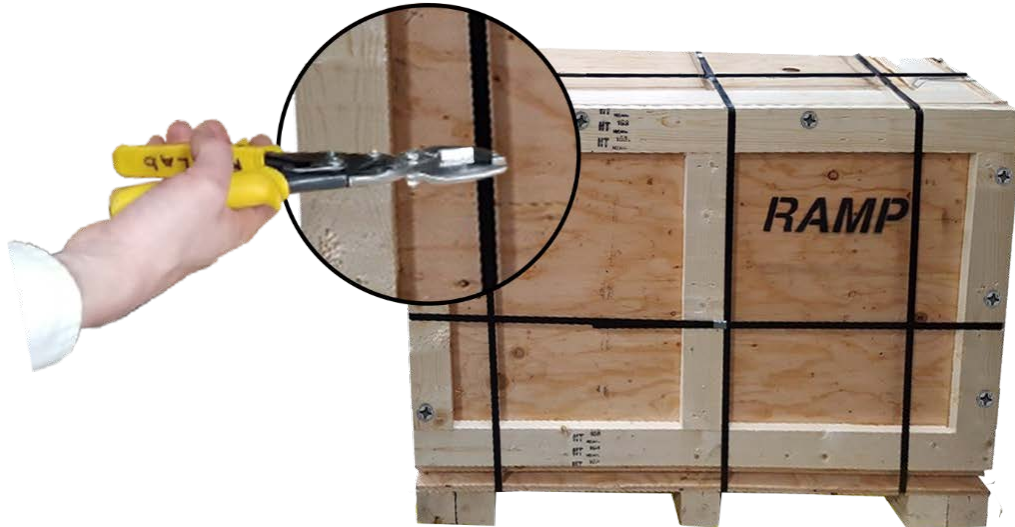


Figure 2-2 Remove banding straps

Step 2 Remove philips screws attaching RAMP panel to crate.



Figure 2-3 Remove ramp panel screws

- Step 3** Swing open hinged RAMP panel to the floor
- Lower RAMP panel hinged to the lower edge of crate platform
 - Swing open metal ramp.

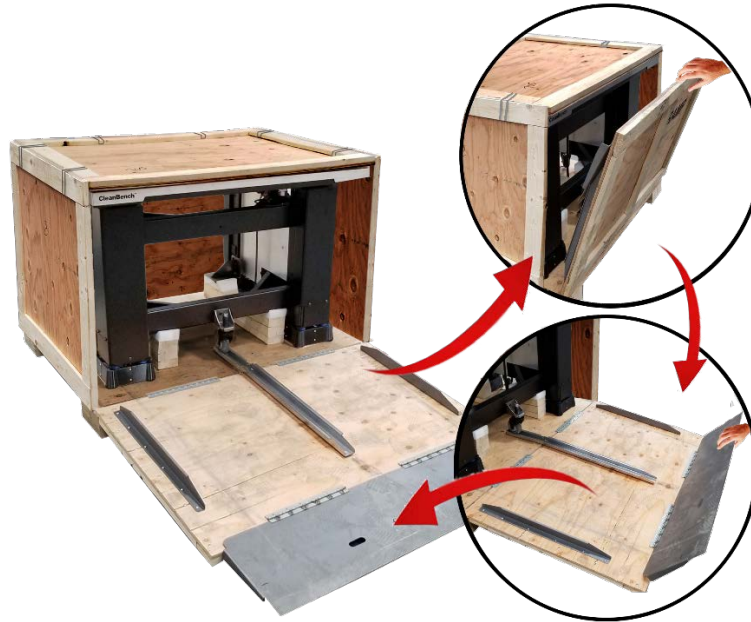


Figure 2-4 Lower ramp panel

- Step 4** Remove clips on crate three side panels



Once panels are removed, place panels in an area where they will not cause disruption with the remainder of the unpacking process.

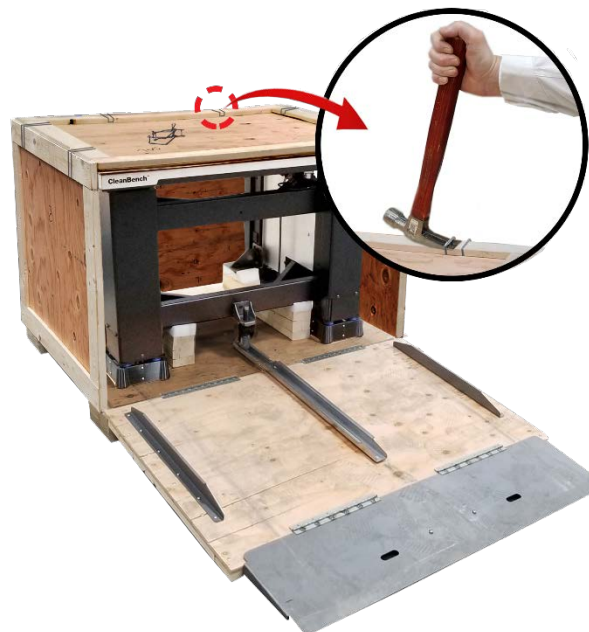


Figure 2-5 Remove crate panel clips

Step 5 Remove two metal bands securing CleanBench™ Aktiv to the base of the crate

Do not remove two metal bands that secures tabletop protective cover to the frame

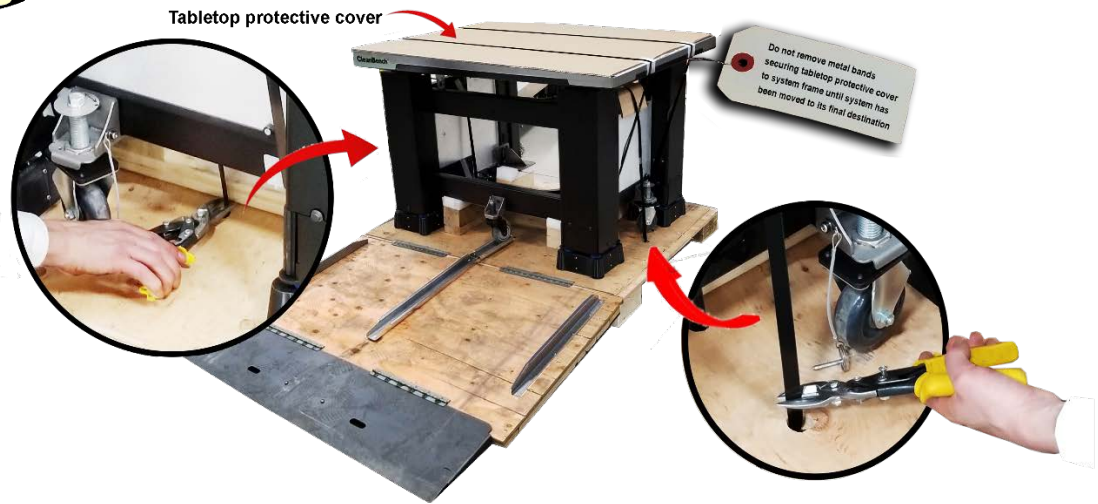


Figure 2-6 Remove metal bands securing system to crate

Step 6 Lower two casters attached to each side of the frame to raise system off the base of the crate.

- Rotate casters so the arrow located near the adjustable hex is pointing toward the center caster track.
- Insert locking pin attached to the caster assembly via a cable lanyard to prevent casters from rotating on retractable threaded rod.

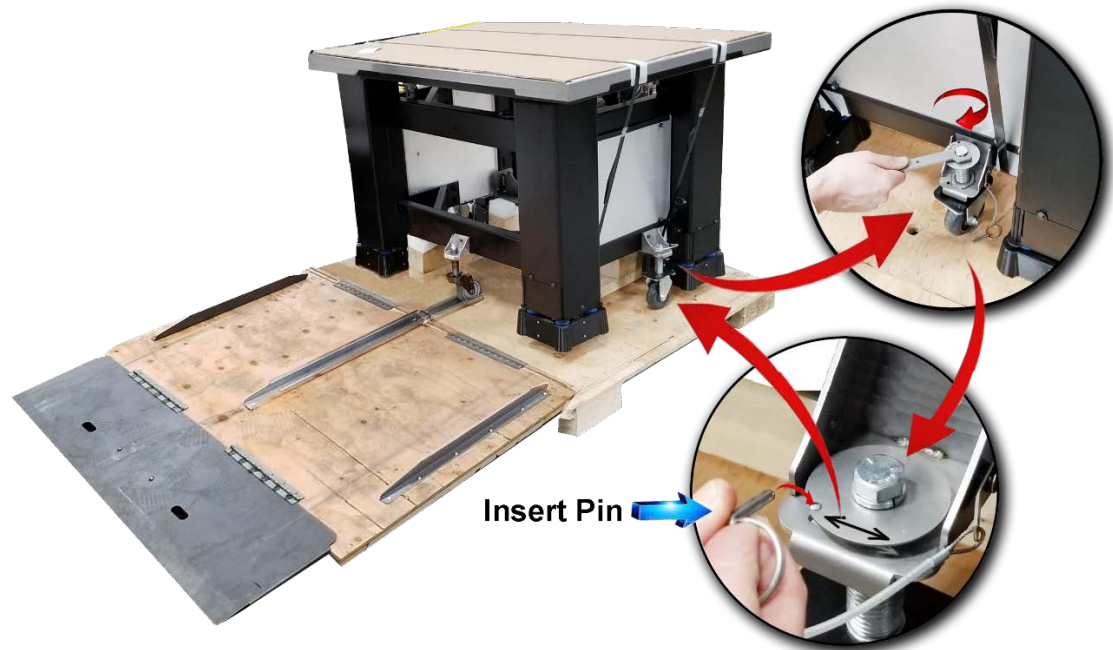


Figure 2-7 Lower two side casters

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Step 7 Lower center caster wheel onto ramp's metal track using supplied wrench



Ensure swivel caster is lowered into the ramp's center track to allow system to roll forward down the ramp

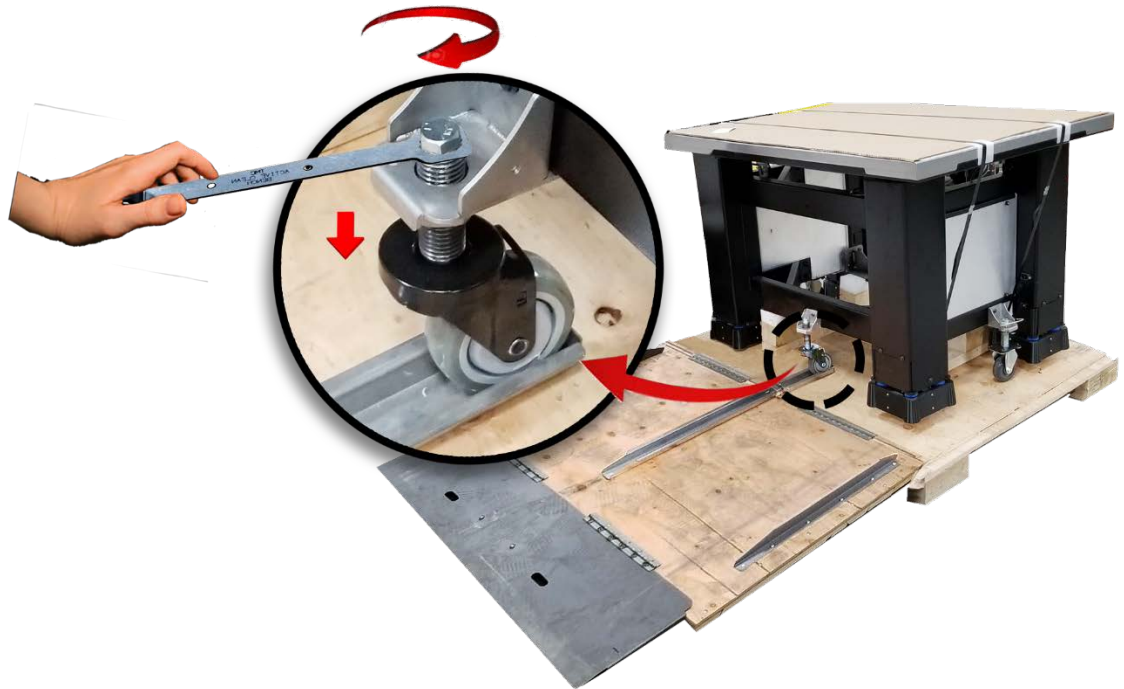


Figure 2-8 Lower center caster

Step 8 Using two people, carefully roll system down the ramp onto the floor.



Figure 2-9 Roll system off platform

- Step 9** Remove two metal shipping brackets from the two front legs of the frame using supplied wrench.

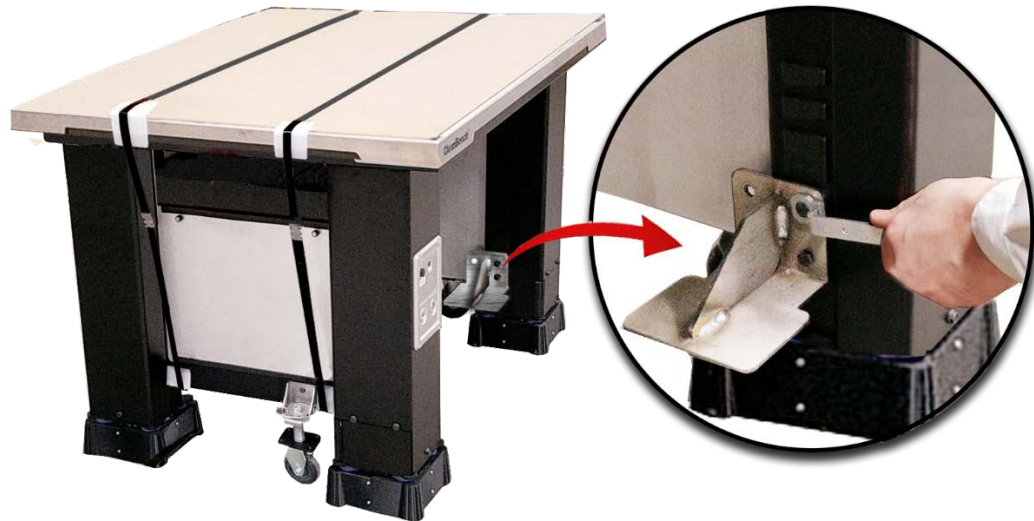


Figure 2-10 Remove two metal shipping brackets

- Step 10** Cut and remove two metal bands that secures protective top cover to frame using cutting shears. Remove and discard protective cover.



Figure 2-11 Remove protective top metal bands

Moving System

Moving system normally requires a minimum pathway of **48 inches (1219 mm)** wide or greater with casters locked in position as system was uncrated. The casters can be adjusted to allow passing through narrow pathways with a minimum width of **35.5 inches (902 mm)**.

- **48 inches (1219 mm)** Minimum space allowed for moving system with casters oriented and locked in forward position as system was uncrated.
- **35.5 inches (902 mm)** Minimum space allowed when casters are unlocked and rotated 90 degrees in direction of forward movement. Casters cannot be locked in this position. Before continuing to move system forward through 48 inch pathways or greater, casters must first be repositioned and locked back in their original position.

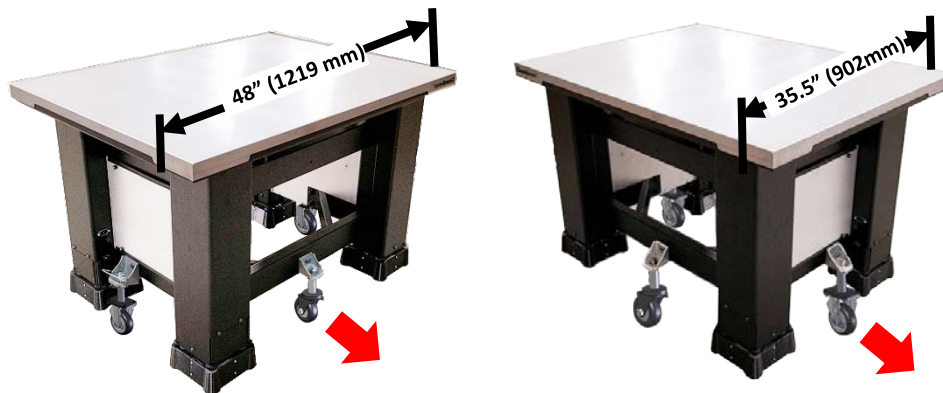


Figure 2-12 Minimum pathways space for moving system

- Step 1** **48 inches;** If pathway ahead is 48 inches or greater, then move system to final destination; otherwise skip to Step 3.
- Step 2** Lower system to the floor by raising all three casters.
- Remove locking pin on two side swivel casters
 - Raise all three casters using wrench supplied by TMC

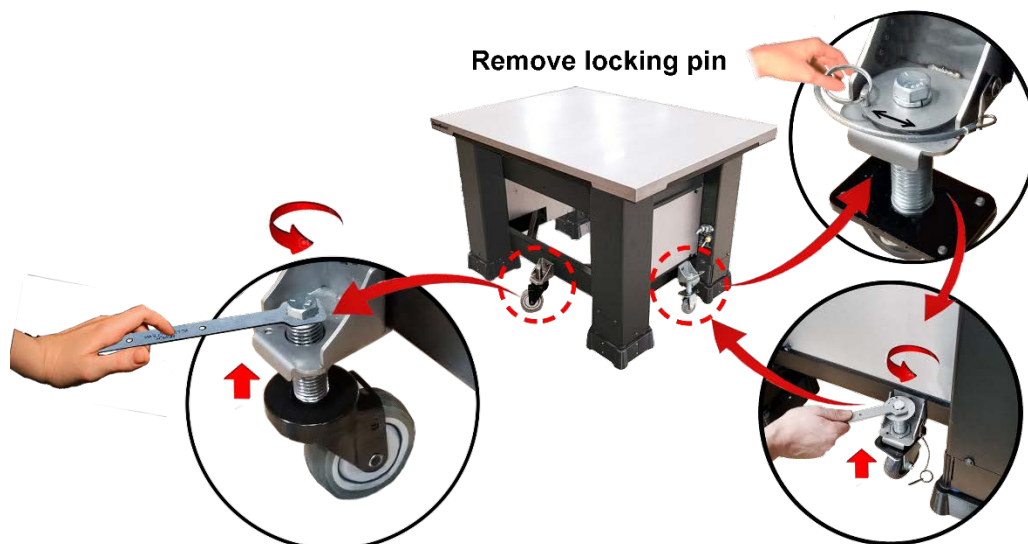


Figure 2-13 Raise all three casters

- Step 3 35.5 inches;** If pathway ahead is less than 48 inches and a minimum of 35.5 inches, then casters need to be adjusted for narrow pathway
- Rotate system so narrow end is pointing toward narrow pathway
 - Remove locking pin on two side swivel casters
 - Rotate two side casters 90 degrees so they are pointing in forward direction using wrench supplied by TMC



Figure 2-14 Rotate side casters 90 degrees toward narrow pathway

- Step 4 48 inches** If you intend to continue moving system through a wider pathway with a minimum width of 48 inches; then the two non-swivel side casters first need to be rotated back into their locked position.
- Rotate system so wide end is pointing forward
 - Rotate two side casters 90 degrees to align locking pin hole using wrench supplied by TMC. Insert pins to lock casters from rotating.
 - Proceed to final destination

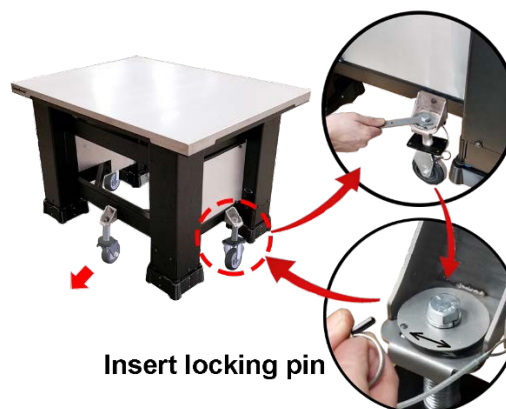


Figure 2-15 Rotate side casters back to locking position

- Step 5** Lower system to the floor by raising all three casters.
- Remove locking pin on two side swivel casters
 - Raise all three casters using wrench supplied by TMC

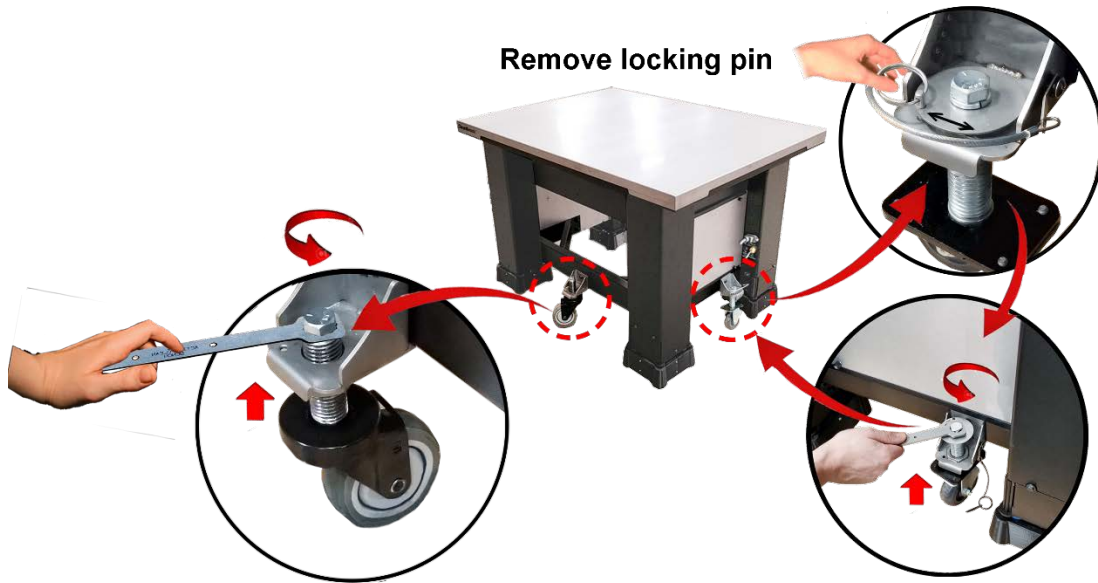


Figure 2-16 Raise all three casters

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3 Controls and Connections

Control Panel

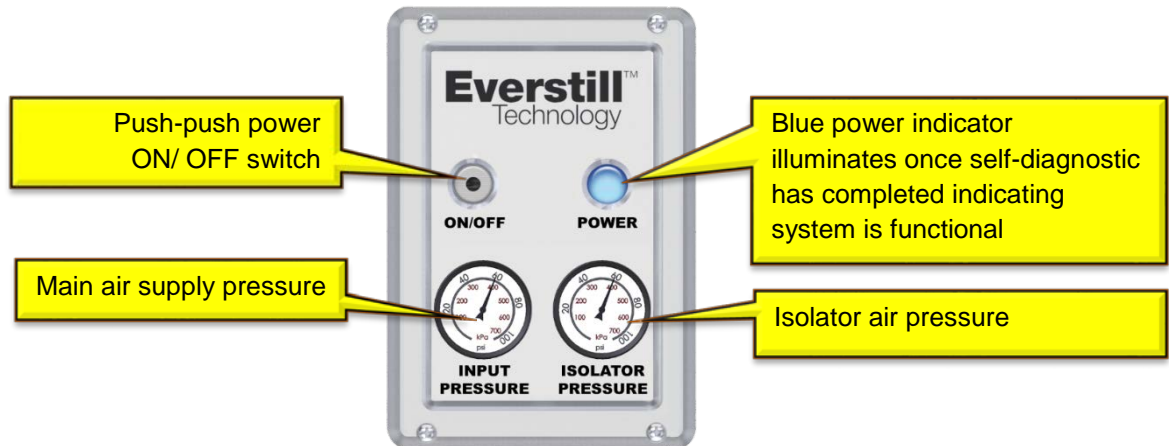


Figure 3-1 Control panel functions

Connections

- Step 1** Connect external AC power source to input power connector on rear connection panel
- Step 2** Connect 1/4-inch O.D. air-supply line to air input fitting.

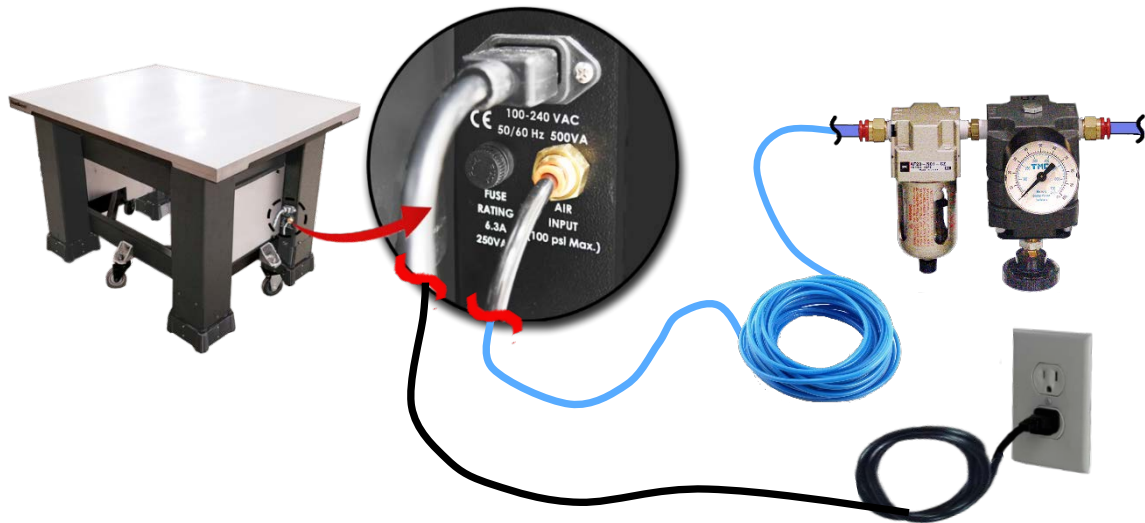


Figure 3-2 AC power and air supply connections

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4 System Setup



Note: System tabletop does not include a payload during first time initial setup procedure

- Step 1** Ensure power is OFF.
- Step 2** Turn on air and adjust facility input air pressure gauge to read 15 to 20 psi greater than the isolator pressure gauge. The maximum input air pressure must not exceed 100 psi.

System is designed to support 0 to 580 lb payload above the weight of the Tabletop platform.

- 0 lb payload – Isolator pressure is 12 psi each. Incoming pressure should be set at 27 psi or greater.
- 580 lb payload - Isolator pressure is 40 psi each if perfectly distributed.

This changes as the center of mass is moved from the center. It is expected that the pressure in any one isolator will not exceed 80 psi.

If an isolator reaches the max. 80 psi, then the input pressure should be 95 psi minimum.

- Step 3** Adjust two leveling valves to ensure the floating height of each isolator is between 0.28" to 0.375". Measure between the top ring to the bottom of the load disc

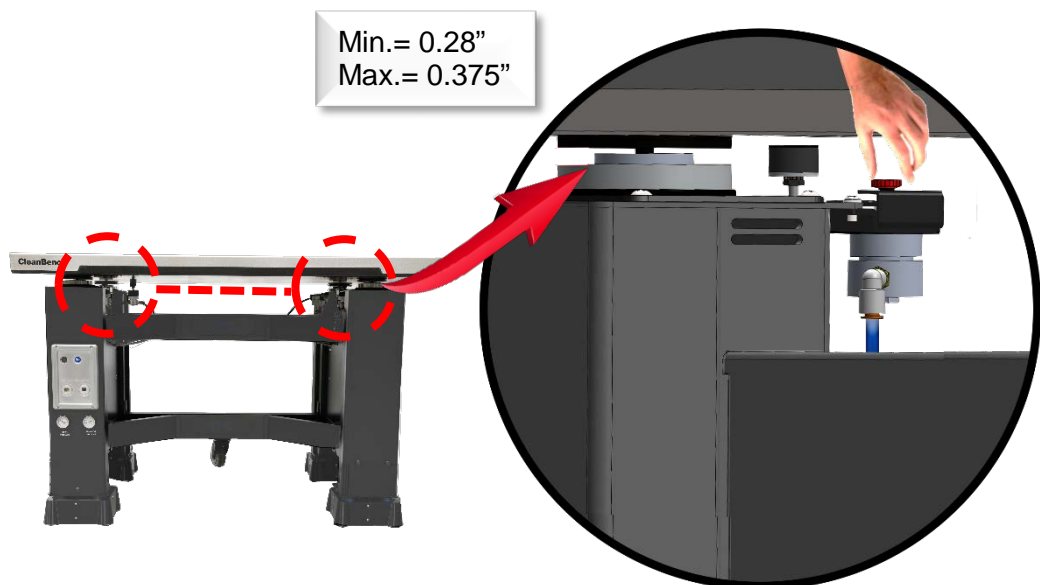


Figure 4-1 Valve level adjust

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5 Operation

Step 1 Ensure power is OFF.

Step 2 Place and center payload on the tabletop platform.

The center of mass of any device(s) should be well centered on the CleanBench™ Aktiv top platform. This is particularly important for payload weighing over 400 lbs (180 kg)



Payload capacity: 0 – 580 lbs (0 – 263kg)

Step 3 Turn on air and adjust facility input air pressure gauge to read 15 to 20 psi greater than the isolator pressure gauge. The maximum input air pressure must not exceed 100 psi



System is designed to support 0 to 580 lb payload above the weight of the Tabletop platform.

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If an isolator reaches the max. 80 psi, then the input pressure should be 95 psi minimum

Step 4 Turn power ON by pressing ON/OFF button on control panel

- System first performs a self-diagnostic for about 10 seconds or less
- Blue power indicator on the control panel illuminates indicating system is operational.

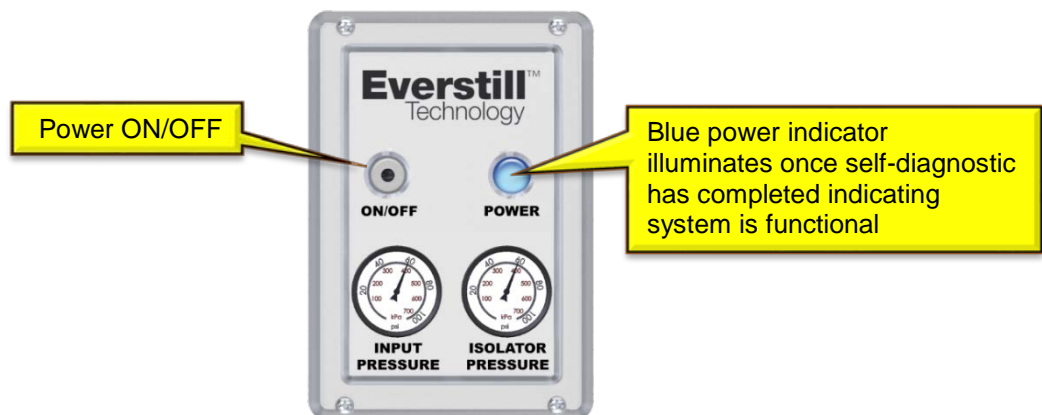


Figure 5-1 Control panel operation

Troubleshooting Tips

- 1) If blue indicator light fails to illuminate, then review the following
 - Review supplied power
 - Check the fuse,
 - Cycle power switch OFF and ON again
 - There is a 10 second delay or less before blue indicator illuminates as the system performs it's self-diagnostics.
- 2) Verify the that the Gimbal Piston air isolators are floating properly, and that the platform is level.
- 3) Verify the incoming pressure gauge is reading a minimum of 15 psi greater than the isolator pressure gauge, and no more than 100 psi.

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6 Specifications

Vibration cancellation type	Active & Passive
Schematic architecture.....	Serial type active (actuator in series with isolator spring)
Vibration sensors.....	Geophone type velocity sensors (voltage proportional to velocity)
Leveling.....	3-point contact on each Frame leg to floor / manual adjust for platform
Payload capacity.....	0 – 580 lbs. (0 – 263 kg)
Isolation performance	2 – 7 dB @ 1.0 Hz, >22 dB above 2.5 Hz
Active vibration cancellation bandwidth.....	0.7 Hz to 100 Hz
Passive vibration cancellation bandwidth.....	up to 1000 Hz
System dimensions (W x L x H)	35.4" x 47.25" x 31.7" (900 mm x 1200 mm x 805 mm)
Weight	approx. 455 lbs. (206 kg)
Power requirements.....	90–260 VAC, 50/60 Hz
Transportation.....	ISTA Series 3 Tested Crate
Power wattage.....	150 watts average, 400 watts max

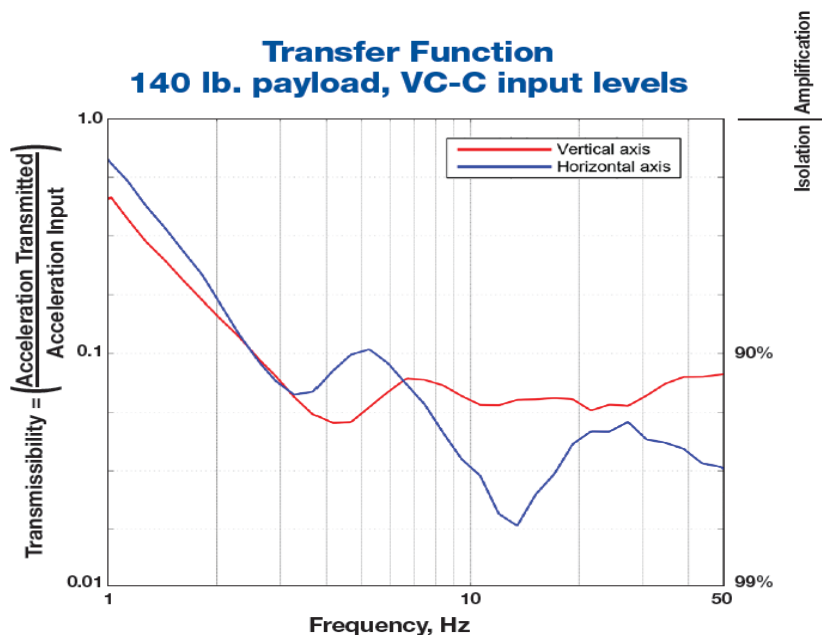


Figure 6-1 Transfer Function Graph



Note: Above data was taken with low-amplitude, micron level vibration as the excitation. Actual performance may vary and is dependent on the vibration input levels and the payload.
 System Horizontal Resonant Frequency = 5.2 Hz
 System Vertical Resonant Frequency = 7.1 Hz

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7 Dimensional Drawing

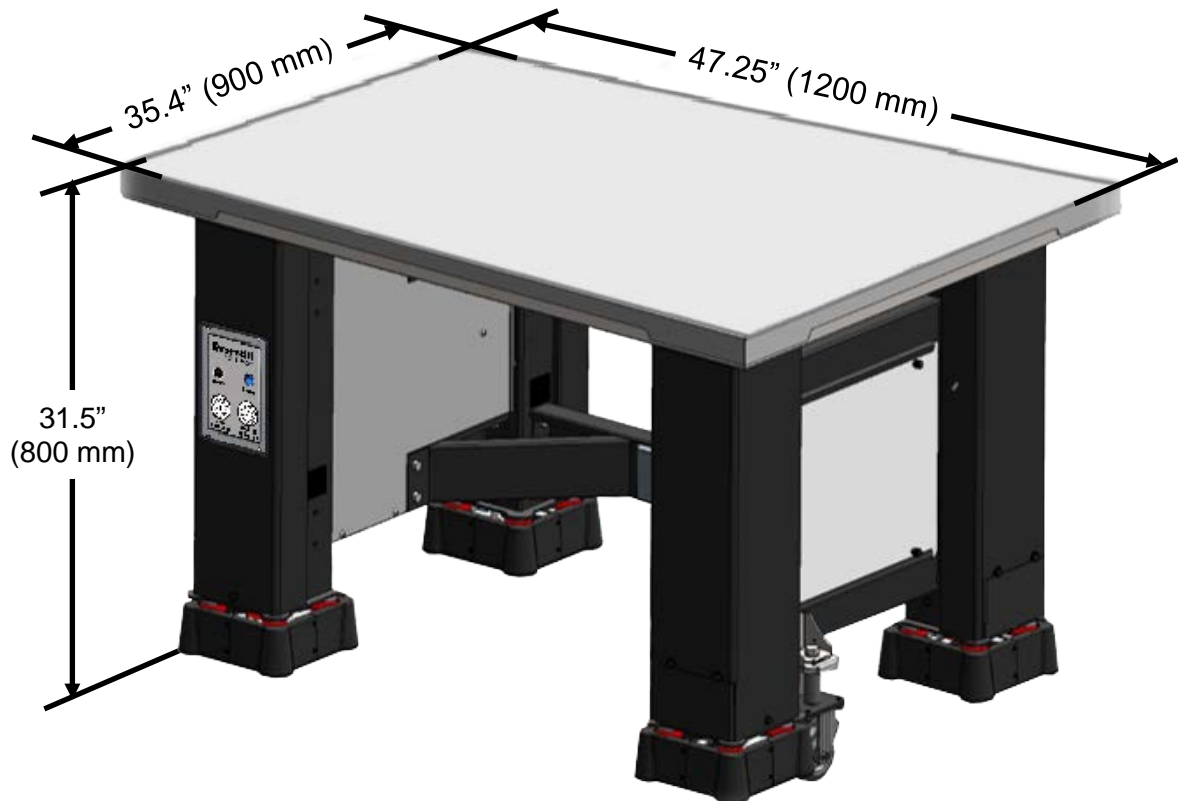


Figure 7-1 CleanBench™ Aktiv Dimensional Drawing



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