

# HERZAN

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Acoustic, Vibration, and  
EMI Isolation Specialists

## AVI-600 Series

### Overview

The AVI-600 platforms provide industry-leading active vibration isolation performance (starting at 0.5 Hz) for the precision research industry's largest instruments (e.g. TEMs). The AVI-600 platforms help users achieve more from their instruments by removing disruptive low-frequency vibration noise from affecting the quality of their measurement data. The AVI-600 platforms incorporate a low-profile and modular design, simplifying the installation process by not requiring lifting equipment for installation for a majority of instruments (including most SEMs).



*AVI-600M Isolators and AVI-600 Controller*

The AVI-600 is available in three standard sizes: **AVI-600S**, **AVI-600M**, and **AVI-600XL**.



**Internal Technology of the AVI Series:  
Piezoelectric Sensors & Actuators**

### Product Highlights

- Active Isolation from 1 to 200 Hz (*0.5 Hz with the LFS System*)
- Passive Isolation Beyond 200 Hz
- Isolates vibrations in all six degrees of freedom
- No low-frequency resonance
- Advanced piezoelectric sensors & actuators
- Internal feedback loop damps resonances
- Compact, modular form factor
- Easy to install, no persistent maintenance
- Minimal impact on the overall profile of the supported microscope
- Easy to customize for unique requirements
- And More!

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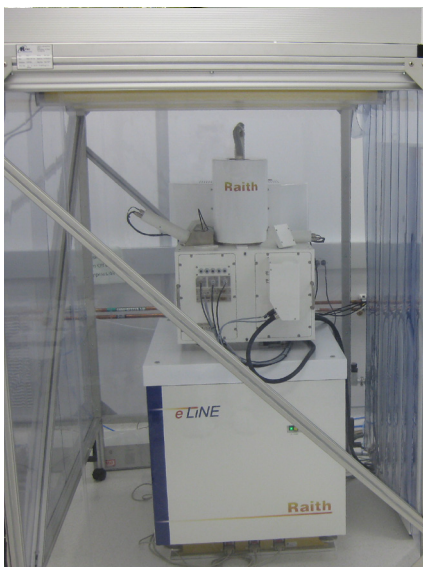
Custom AVI-600 Platform and Support Frame  
Supporting a FEI Krios TEM and Acoustic Enclosure

## Popular Applications

The AVI-600 platforms support a wide range of high-load microscopes and other research instruments sensitive to low-frequency vibration noise. The most common application for the AVI-600 platforms is **electron microscopy**, where they have supported both scanning electron microscopes and transmission electron microscopes with great success. End users and OEMs around the world find the low-profile nature of the AVI-600 platforms favorable versus competing solutions as it simplifies the installation process and removes the need for persistent maintenance.

In addition to SEMs and TEMs, the AVI-600 platforms often support:

- Ultra-High Vacuum Scanning Probe Microscopes (UHV-SPM)
- Lithography tools
- High precision metrology tools
- Spectrometry instruments
- And More!



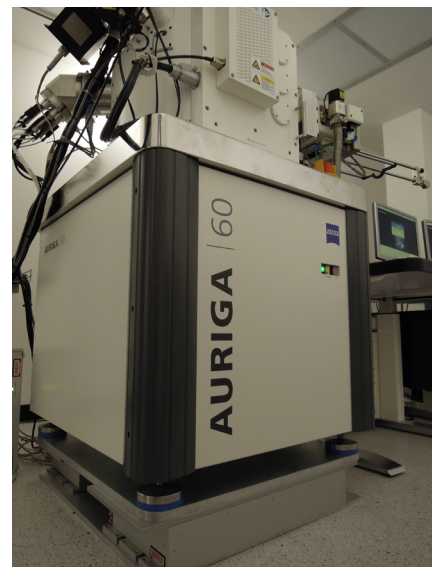
### AVI-600M Supporting A Raith eLine Tool

A variety of lithography tools, like the one depicted in the image above (Raith eLine), improve their nanofabrication processes by removing low-frequency vibration noise from the environment. A proven solution has been the AVI-600M, which helped this Raith user remove ambient Sub 2 Hz vibration noise from limiting techniques of the eLine nanofabrication tool.



### AVI-600S-4 Supporting A FEI Krios TEM

TEMs are some of the most advanced and complex precision measurement instruments in the world, often requiring dedicated buildings or rooms to their operation. When a dedicated room or building is not available, complete environmental control is required to ensure optimal use. In many cases, low-frequency vibration noise inhibits the measurement capabilities of the TEM, which is why the AVI-600 platforms are popular solutions for TEM users. In this image, a FEI Krios TEM and its acoustic enclosure are supported by a custom AVI-600 platform and raised floor.

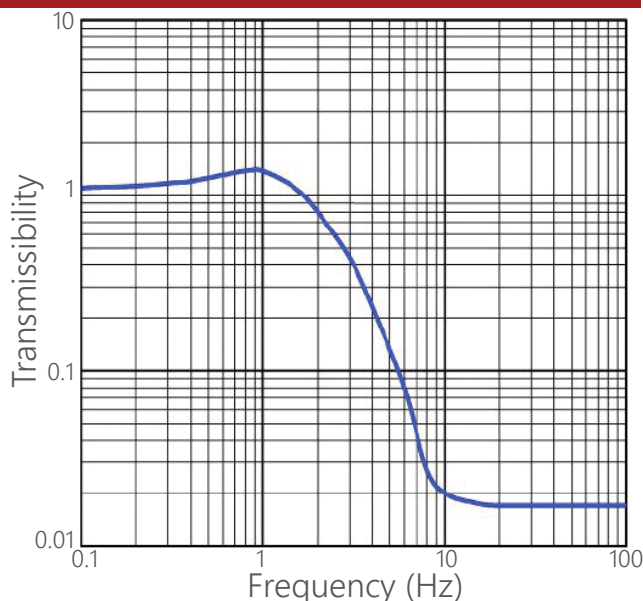


### AVI-600M Supporting A Carl Zeiss AURIGA FIB-SEM

Carl Zeiss scanning electron microscopes with focused-ion beam integration are often supported by the AVI-600 platforms as they make any environment suitable for operation no matter the ambient environmental noise. This image depicts the Carl Zeiss AURIGA 60 FIB-SEM being supported by the AVI-600M platform and a custom cut aluminum top plate.



## TRANSMISSIBILITY

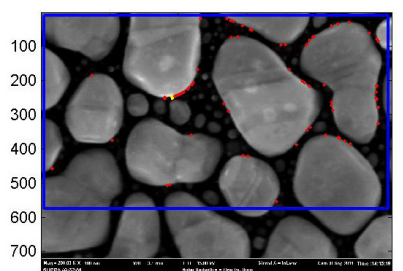


## Performance

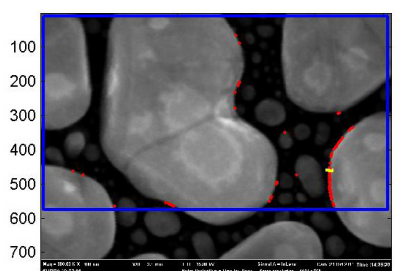
The transmissibility graph represents the vibration isolation performance of the AVI-600 Series over a frequency domain. The performance data is representative of all rotational modes of vibration (all six degrees of freedom) and should serve as a conservative estimate of performance customers can receive when pairing their instrument with an AVI-600 platform.

### Performance Upgrade - LFS System

The AVI-600 Series can improve its low-frequency vibration isolation performance by pairing it with the LFS System (Low Frequency Sensor). This upgrade enables the platform to isolate vibrations starting at 0.5 Hz and can be easily retrofitted for existing systems in the field. More details on the upgraded performance can be found below.



Without Vibration Isolation



With Active Vibration Isolation

## Performance Comparison Images

A researcher operating an SEM imaged a sample under two unique conditions: **without a vibration isolation system** and **with an AVI platform**. The resulting images demonstrate a significant improvement in image quality and overall measurement clarity when an AVI platform is used to support an SEM.

## PERFORMANCE HIGHLIGHTS

Product Series	Resonant Frequency	Isolation Starting At	Isolation % at 2.5 Hz	Isolation % at 5 Hz	Isolation % at 10 Hz	Max. Isolation %	Isolation Performance	Active Vibration Isolation Bandwidth
<b>AVI-600 Series</b>	None	1 Hz	90%	97%	99%	99.8% at 70 Hz	Greater than 40 dB	Up to 200 Hz
<b>AVI-600 Series with LFS System</b>	None	0.5 Hz	95%	99%	99.5%	99.8% at 20 Hz	Greater than 55 dB	Up to 200 Hz

### Note On the LFS System

The LFS System is an external feedforward sensor engineered to target low-frequency vibrations (0 - 50 Hz). The LFS System complements the AVI-600 Series by interfacing with the isolators directly, enabling the platform to delivery industry-leading low-frequency vibration isolation in all six degrees of freedom.



LFS-3 Sensor



## Technical Specifications

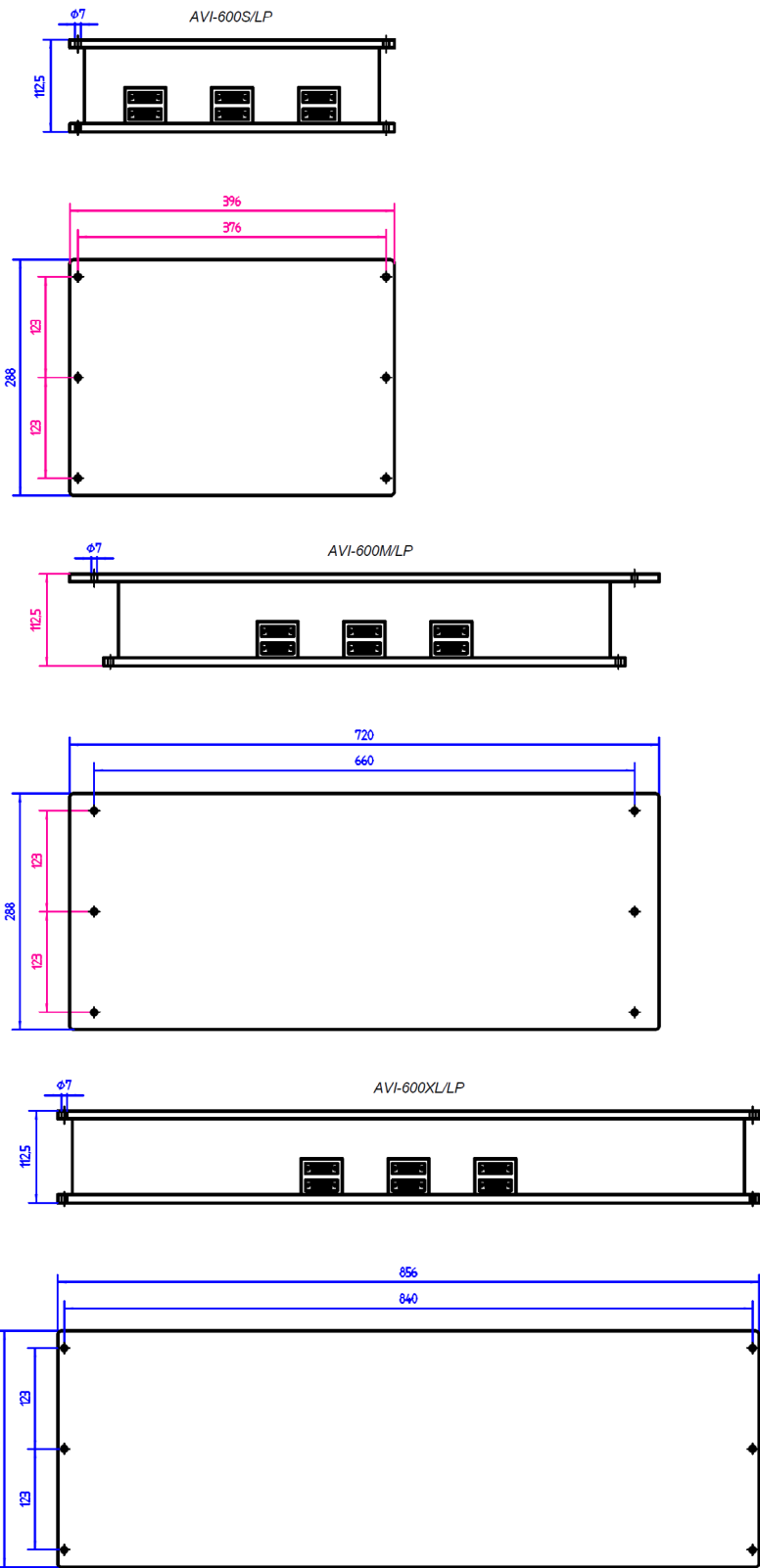
SPECIFICATION		AVI-600S	AVI-600M	AVI-600XL
Dimensions (W x D x H) <small>(Single Isolator Dimensions)</small>	<i>Imperial</i>	11.3 x 15.6 x 4.4 inches	11.3 x 28.3 x 4.4 inches	11.3 x 33.7 x 4.4 inches
	<i>Metric</i>	288 x 396 x 112.5 mm	288 x 720 x 112.5 mm	288 x 856 x 112.5 mm
Load Capacity <small>(Two Isolator Platform)</small>	<i>Imperial</i>	2,100 Lbs	3,000 Lbs	3,000 Lbs
	<i>Metric</i>	954.5 Kgs	1,363 Kgs	1,363 Kgs
System Weight <small>(Two Isolator Platform)</small>	<i>Imperial</i>	132 Lbs	160 Lbs	160 Lbs
	<i>Metric</i>	60 Kgs	72.7 Kgs	72.7 Kgs
Isolation Technology		Piezoelectric sensors, actuators, and control electronics		
Force Directions		Active vibration isolation in all six degrees of freedom		
Required Floor Flatness		2 millimeters per meter		
Isolation Characteristics		Dynamic 1 Hz to 200 Hz, Passive beyond 200 Hz		
Transmissibility		See transmission curve and product highlights section for more details. Above 10 Hz transmissibility <0.017 decreasing rapidly		
Correction Forces		Maximum 12N horizontally, 24N vertically		
System Noise		Less than 50nG/√Hz from 0.1 - 200Hz in any direction		
Static Compliance		Approx. 1µm/N vertically, 2µm/N horizontally		

SPECIFICATION	AVI-600 CONTROLLER
Safety Class	1
Power Consumption	Typically 27W
Input Voltage	90-125VAC / 200-250VAC, 50-60Hz
Fuses	2 x 1.6A/250V slow. Located in the power socket on the rear side of the controller.
Overload Indication	16 LEDs indicate overload condition in input stage.
Monitor Signal	A multiplexed signal for display on oscilloscope shows vibration levels with and without isolation.



# Product Drawings

Individual Isolator Dimensions (Values In Millimeters)





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## Popular Upgrades

The design of the AVI-600 Series enables the platform to integrate seamlessly with a variety of upgrades that improve the user experience and overall effectiveness of the platform. These upgrades relate to improvements in performance, form factor, operation, and more.



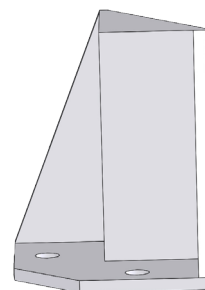
### LFS-3 System

The LFS-3 System is a low-frequency performance upgrade for the AVI-600 Series, enabling the platform to isolate vibrations at 0.5 Hz and beyond. The LFS-3 System is a dedicated feedforward sensor with internal temperature stability, providing absolute reliability and unparalleled low-frequency vibration isolation performance.



### Support Frames

Support frames are often used in labs where a sub-floor is present or in a cleanroom environment has an excavated area in preparation for a new instrument. Herzan specifically designs and engineers support frames to ensure the AVI-600 platforms and supported instrumentation are of equal height to the raised lab floor.



### Earthquake Restraints

Earthquake restraints are a standard requirement when installing many large-scale instruments (i.e. SEMs/TEMs). The AVI-600 Series has a standard solution for earthquake restraints that integrates seamlessly with the floor in the room and the tool on top of the platform.



### Exciter Box

The Exciter Box transforms the AVI-600 Series into a shaker system (in X, Y, and Z), making the platform a multi-faceted tool for researchers needing to introduce vibrations at exact frequencies and amplitudes. No separate power supply is required, but a sin wave generator will be needed for operation.



### Rack Mount Controllers

The AVI-600 Series can include rack mount controllers to save space in the lab when dedicated racks are available. The rack mount controller is designed in a 1U configuration, which is the most compact and common style for servers.



### External Load Capacity

External load bearing springs extend the relevance of any AVI-600 Series platform when a customer's instrument closely exceeds the standard load capacity or when the load is abnormally distributed. Each load bearing spring provides 40 Kg / 88 Lbs of additional load capacity.



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