

## Operating Instructions:

active vibration isolation

halcyonics workstation vario series



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## 1. Introduction

Thank you for purchasing the halcyonics\_workstation\_vario system. By selecting the ws\_vario system, you have acquired top-of-the-line active vibration isolation equipment. We feel confident that our system will meet your expectations and provide the best possible performance for your specific application.

Please read the operating instructions carefully to set up the Workstation correctly.

We hope you enjoy working with your halcyonics\_workstation\_vario!

## 2. Unpacking the Workstation\_Vario System

After unpacking the system, please check whether the package contains all components.

Equipment supplied for the halcyonics\_workstation\_vario\_600/780/900 system:

- 1 ws\_vario
- 1 vario control unit
- 2 cables D-sub 15 pin (2x male/female)
- 2 cables D-sub 25 pin (1x male/male, 1x female/female)
- 1 power cord
- 1 set of instructions

## 3. Symbols used in these instructions



Warning symbol



Important note



Action that the user is required to take

## 4. Safety Instructions and Warnings

Please read through the following safety instructions and warnings carefully before using this equipment.

### General Warnings

Do not operate the system in a potentially explosive or humid environment. Do not switch on the system if there is any visible damage or if you think it might be damaged. In this case, turn off the power immediately and notify our distributor in your area or contact Accurion's headquarters in Germany directly.

### Electrical Safety

This system may be operated only on AC grounded power. Do not interrupt the protective grounding conductor under any circumstances. If you plan to use a power cable other than the standard power cord supplied with this equipment, first check that the protective grounding conductor is connected.

Before starting to operate this equipment, check the voltage rating to be sure that it matches your local voltage. For further information, please refer to the specifications on page 14.

Finish the set up and installation before attempting to plug it into an electrical outlet. Never open the equipment housing. Only authorized and qualified personnel may service or repair the equipment. The device must be connected to an easily accessible supply socket so that in the event of a malfunction, the supply plug can be removed quickly.

### Mechanical Safety

Be sure that the workstation is installed on a rigid floor.



*Please note that you need to activate the transport/relocation locking mode before you transport or move the equipment! For further instructions, please refer to the section "Transport Locking Mode" on page 7.*

### Intended Use

The system is suited to isolate various measurement equipment from building vibration and other disturbing influences. Every other use is not permitted.



*Never use the isolation system in mobile environments or outside the specified environmental and operational requirements, see page 14.*

### DIN and European Standards, European Council Directives

WS\_Vario\_600/780/900 systems conform to the requirements currently valid for electrical safety according to EC Directive 2014/35/EU and for electromagnetic compatibility according to EC Directive 2014/30/EU. This equipment has been tested and found to comply with the following standards EN 61010-1:2010.

## 5. Getting Started and Operation

### Setting Up the Equipment

To obtain best performance from the Workstation\_Vario, set it up on a stable, rigid flat surface. For optimal operating results, the planarity of the support surface should be 0.5 mm. Carpet or other soft floor coverings should be removed.

To set up your vibration isolation equipment, select a place with a vibration level that is as low as possible. Vibration generated at this place should not exceed velocities of 500  $\mu\text{m/s}$ .



*Operating the system at low temperatures may cause malfunctioning. If the equipment is brought from a cold environment into a relatively warmer one, we recommend that you wait approx. 2 – 3 hours before plugging it into AC power and switching on the power.*



#### Start-up

- Set up the system on a suitable surface as described above.
- Align the workstation with a water level, using a jaw wrench - size 24 to adjust the feet.
- Make sure that all 4 frame feet stand on the ground.
- After the workstation is balanced, lock the counternuts by using the jaw wrench.
- Connect the D-sub cables to the connectors at the back of the control unit.
- Use the power cord supplied to connect the control unit of the system into the power socket to your local power.
- Center your application on the working surface.
- Turn on the power switch on the control panel of the system.
- Press the Load Adjust button for automatic load adjustment (see page 6)
- Set the switch for active isolation to on, blue LED is on (see page 7)

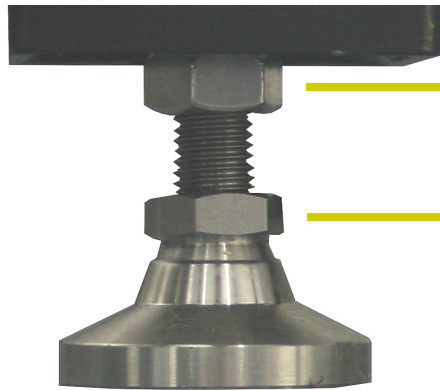


station

Alignment of the Work-



Jaw wrench - size 24



Counternut

Height adjustment nut

### Connection of the sub-D cables



Rear panel of the Vario control unit

### VarioControl - External Control Unit



- 1 - UP Button
- 2 - DOWN Button
- 3 - OK Button
- 4 - Power Switch
- 5 - Setting Display
- 6 - Signal Display

Front panel



## Switching on the Equipment



Use the power switch on the control panel to turn on the WS\_Vario.



The system starts after displaying a welcome message and the software version on the menu display.

If you turn on the system for the first time, the factory settings are loaded. Automatic load adjustment and active isolation are deactivated as default settings. The next time you switch on the equipment, it will load the settings last used.

## Automatic Load Adjustment

The top plate of the workstation is supported by steel springs that are integrated in the isolation elements. These springs carry the load placed on top. For the initial installation or after load changes these springs have to be pre-stressed according to the weight of the setup. This is done by electric motors via an electronic circuit. This procedure is called „automatic load adjustment“. The objective of the load adjustment is to elastically support the top plate by the springs.

After you centered your application on top of the workstation, please activate the load adjustment to set the preconditions for the active vibration isolation.

## Transportation Lock

During transportation the Workstation\_Vario always has to be locked! In the lock mode a rigid mechanical contact between the top and the bottom of the system prevents the sensitive components from damage. To lock the system, change the load adjustment setting to “locked” and the four steel springs will be automatically pre-stressed up to the maximum.



*Once all four limit stops have been reached, the message “Mechanics are locked” appears in the “signal display”. Check the lock mode by pushing the top of the system gently. Before switching off the power, be sure to wait until the transport locking procedure has been completed!*

## Using the Load Adjustment Mode - UP Button



Press the “UP” button **1** to turn on the automatic load adjustment. The system will start to adjust to the load on the table top, which will take a few seconds. During this time the active Isolation mode is automatically interrupted.

By using the „UP“ button, the load adjustment can be controlled without using the menu navigation. The following modes of the load adjustment are available:

- Off** The load adjustment mode is disabled.
- On** The load adjustment mode is enabled. Load changes will cause an automatic readjustment.
- Locked** The system is locked for transport.



## Using the Active Vibration Isolation Mode - DOWN Button



Press the “DOWN” button **2** to turn on the active vibration isolation.

The following modes are available:

**Off** Active vibration isolation is switched off.

**On** Active vibration isolation is switched on.

**Pause** Active vibration isolation is temporary switched off by the internal controller



## 6. Navigation Menu and Functions

The control unit offers two digital displays. The left display is the menu display to change the settings and for the menu navigation. It is possible to make all important settings using the buttons “UP” **1**, “DOWN” **2** and “OK” **3**. The right signal display is used to obtain additional information on current vibration levels. You can visualize sensor and actuator signals as well as hall sensor signals of the automatic load adjustment as a bar graph.



The menu navigation allows you to make additional setting changes.

- Press the “OK” button **3** to select the list of menu settings.
- Use the “UP” **1** or “DOWN” **2** button to scroll up or down the menu; press “OK” **3** to select an entry.
- Select the required setting by using the “UP” **1** or “DOWN” **2** button and press “OK”
- If you do not wish to make any further changes, use the “UP” **1** or “DOWN” **2** button to select the entry “8. Close menu”.
- Confirm this setting by pressing the “OK” **3** button and quit by pressing “OK” **3** again.



If you do not press any button for one minute, the system will automatically return to the standard display.



## Overview of Menu Settings

```
> Language:
+ English
  Deutsch
```

Use this entry to select English or German as general language. The default setting is "English".

```
> Load Adjustment:
  locked
+ off
  on
```

The default setting is "Off". If you select the "On" option, the Workstation will automatically move the isolated surface into the optimal position required for active vibration isolation. The entry "locked" is used to lock the workstation for transport.

```
> Isolation:
+ on
  off
```

This entry is used to turn "On" and "Off" the active vibration isolation.

```
> Signal Display::
+ ΣSen+ΣAct
  H-Sensors
  V-Sensors
  H-Actuators
> V-Actuators
  Hall
```

With this entry, the signals shown on the signal display are selected. The signal display is used to display signal values of sensors, actuators or hall sensors. This display is used to visualize signals without scaling. The default setting for the menu entry "signal display" is "ΣSen+ΣAct". For further details, please refer to page 10.

```
> Display:
+ logarithm
  linear
```

The selected values in the signal display can be either logarithmic or linear. The default setting is "logarithm".

```
> LA-Automatic:
  standard
  sensitive
+ off
```

With this entry the load adjustment automatic can be settled. The default setting is "off". Please also read page 11.

```
> LCD-Illumination:
  1min
  4min
+ cont.
```

The LCD-illumination can be settled here. It can be continuously illuminated or you can determine that it turns off after 1 or 4 minutes.

```
> Close Menu:
+ quit
```

This entry is used to exit the navigation menu.

1

2

3

## Signal Display

The signal display is used to display signal values of sensors, actuators or hall sensors. This display is used to visualize signals without scaling. You can choose and set the different options in the navigation menu. Available settings are:

- **“ $\Sigma$ Sen+ $\Sigma$ Act“** - displays the totals of all sensors and actuators in vertical or horizontal direction
- **“H-sensors”** - signal values of the horizontal sensors are shown in the display
- **“V-sensors”** - signal values of the vertical sensors are shown in the display
- **“H-actuators“** - signal values of the horizontal actuators are shown in the display
- **“V-actuators“** - signal values of the vertical actuators are shown in the display
- **“Hall”** - signal values of the Hall sensors are shown in the display, for this setting please select the linear display mode only

### Display for “ $\Sigma$ Sen+ $\Sigma$ Act“ Setting

- Column 1 shows the total signal values generated by the sensors for vertical detection.
- Column 2 shows the total signal values generated by the sensors for horizontal detection.
- Column 3 shows the control output signal of the actuators operating in the vertical axis.
- Column 4 shows the control output signal of the actuators operating in the horizontal axis.

### Display for “H-Sensors” Setting

- Column 1 shows the signal values of the front right horizontal sensor.
- Column 2 shows the signal values of the rear right horizontal sensor.
- Column 3 shows the signal values of the front left horizontal sensor.
- Column 4 shows the signal values of the rear left horizontal sensor.

### Display for “V-Sensors” Setting

- Column 1 shows the signal values of the front right vertical sensor.
- Column 2 shows the signal values of the rear right vertical sensor.
- Column 3 shows the signal values of the front left vertical sensor.
- Column 4 shows the signal values of the rear left vertical sensor.

### Display for “H-Actuators” Setting

- Column 1 shows the signal values of the front right horizontal actuator.
- Column 2 shows the signal values of the rear right horizontal actuator.
- Column 3 shows the signal values of the front left horizontal actuator.
- Column 4 shows the signal values of the rear left horizontal actuator.

### Display for “V-Actuators” Setting

- Column 1 shows the signal values of the front right vertical actuator.
- Column 2 shows the signal values of the rear right vertical actuator.
- Column 3 shows the signal values of the front left vertical actuator.
- Column 4 shows the signal values of the rear left vertical actuator.

### Display for “Hall” Setting

The signals of the hall sensors display the gap between top and base of the system. For a correct load adjustment with a centric load all gaps should be relatively equal.

- Column 1 shows the signal values of the front right Hall sensor.
- Column 2 shows the signal values of the rear right Hall sensor.
- Column 3 shows the signal values of the front left Hall sensor.
- Column 4 shows the signal values of the rear left Hall sensor.

## Load Adjustment Automatic Mode - LA-Automatic

When the setting “standard” or “sensitive” is active, the load-adjustment-automatic mode independently checks every 5 seconds whether the load placed on the system has changed. If it detects a change, the top part is automatically moved into the optimal position required for active vibration isolation and the system then automatically switches on.

In the delivery condition, the automatic load adjustment mode is switched off. This means that the system will not automatically check at intervals whether the load on the top plate has changed. This is to avoid the self-adjustment of the system. This way the motors of the load adjustment do not start to run at an unwanted time.



*Active vibration isolation has to be manually switched on after the automatic load adjustment mode has been de-activated because the system no longer automatically switches on active vibration isolation.*



*During load adjustment of the WS\_Vario system, it is not possible to turn on the active isolation.*

## LCD-Illumination

Under menu entry “7. LCD-Illumination“, you can set how long the LCD displays, “Menu display“ and “Signal display“ remain backlit.

- If you select the option “1 min.“, the LCDs will remain backlit for one minute.
- If you select the option “4 min.“, the LCDs will remain backlit for four minutes.
- If you select the option “cont.“, the LCDs will remain continuously backlit.

The default for menu item “7. LCD-Illumination” is set to the option “1 min.” We recommend this setting to save energy and to minimize unwanted thermal heating.

## Overmodulation of the System

The Workstation systems are designed to compensate vibration amplitudes up to 500  $\mu\text{m/s}$ . If vibrations significantly exceed this level, the system changes to the stand-by mode, which is indicated by an error message in the menu display. After the overload excitation has stopped, the active isolation mode will automatically continue. Following a severe overload, the system may take up to 30 seconds to reach full active isolation but normally, only a few seconds are required.

- If there is an overmodulation by vertical vibrations, the message “Oscill. limit vertical” will appear.
- If an overmodulation is caused by horizontal vibrations, the display will show the message “Oscill. limit horizontal”.

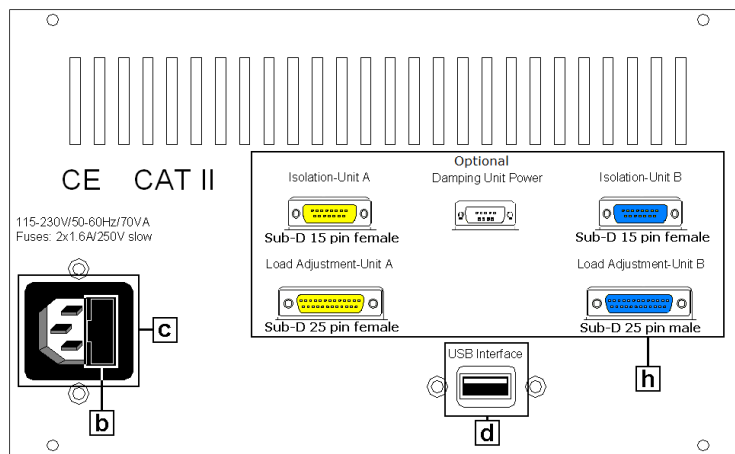


*The active vibration isolation is automatically switched off during overmodulation of the system. Once this interference has subsided, the system re-initializes and, after a few seconds, automatically resumes active vibration isolation. This procedure does not require any action from the user.*

## Changing the Visible Type Fuses

Before attempting to exchange the fuses, be sure that you have unplugged the system from the electrical outlet and that you have switched off the power. Use two 1.6 A/250 V visible type, time-lag (slow-blow) fuses for the Workstation\_Vario system. If you need to replace a fuse, be sure to use only fuses that have the specifications stated above. Never short-circuit a fuse.

The visible type fuses are located on the rear panel of the control unit underneath a cap **b** next to the power connector. On the left side of the cap **b** is a small groove. Pry out the cap so that it drops open, using a relatively small screwdriver for slotted-head screws. Then you can check the fuses and change them if necessary. Reposition the cap and push it back into the cavity.



Rear view of the Workstation\_Vario controller

## 7. Appendix

### Care and Maintenance

The halcyonics\_workstation\_vario system has been carefully designed and manufactured by Accurion. To maintain this equipment and the validity of your warranty, you should observe the following recommendations:

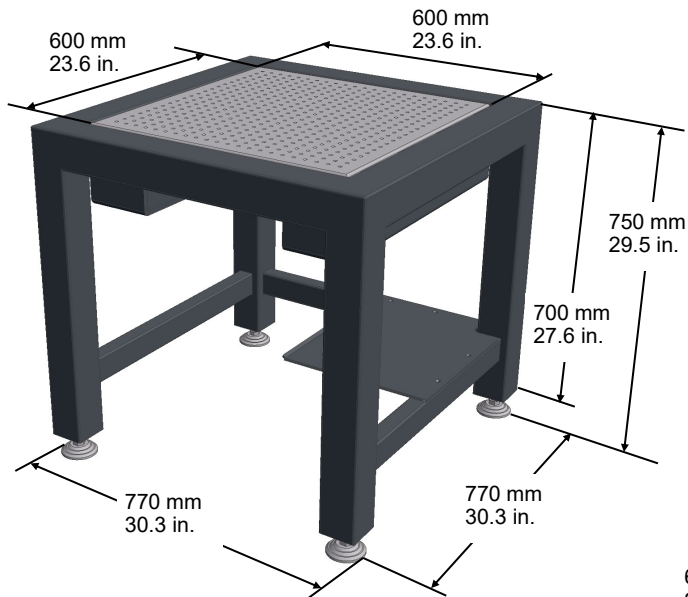
- Store the system in a dry place. Never expose it to rain, liquids or dampness. The minerals contained in these liquids may lead to short-circuits or corrosion of the electronic circuits.
- Where possible, avoid operating and storing the system in dirty or dusty environments as this may otherwise damage the electronic or mechanical components.
- Do not store the system in hot environments. Operating the system at high temperatures may compromise its performance and reduce its lifetime.
- Do not store the system in cold environments. When the temperature rises to normal room temperature, moisture condenses inside the system and causes a circuit failure. If you need to transport the system from a cold environment to a warmer one, wait approx. 2 – 3 hours before plugging it into AC power and switching on the power.
- Do not drop the system or shake it, and never expose it to impact or blows. Improper handling can damage the integrated electronics and mechanical components in the system.
- To clean, wipe off dust from the exterior surfaces of the system using a lint-free cloth. For cleaning, do not use any aggressive cleaning agents.

## Specifications

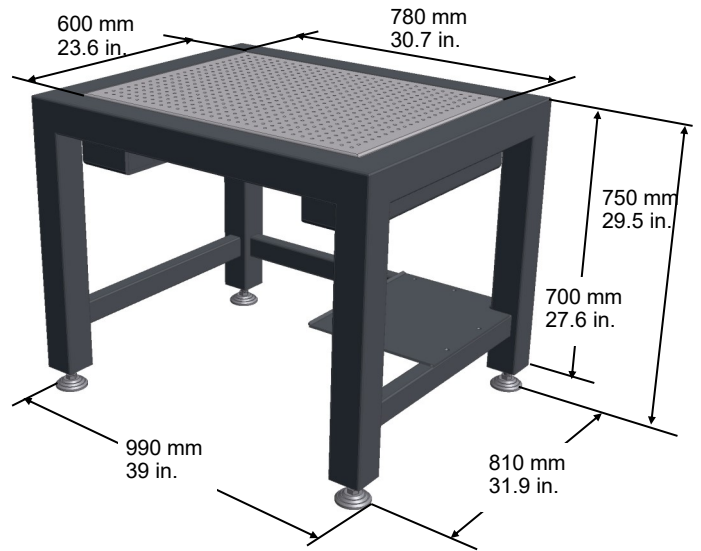
Available Standard Versions	
Workstation_Vario_600/780/900	
Option: M6/25	Active isolated surface with M6 tapped holes on a 25 mm pitch
Performance Specifications	
Isolation technology:	halcyonics_vario control technology based on piezoelectric type acceleration pickup, fast signal processing and electro-dynamic type force transducers
Control electronics:	Easy-to-navigate menu for all settings, second graphics display for vibration levels
Force directions:	Active compensation in all six degrees of freedom
Isolation performance:	> 5 Hz = 25 dB (94.4%); >10 Hz = 35 dB (98.2%)
Active bandwidth:	1 – 200 Hz*
Settling time:	300 ms**
Stroke of the actuator:	1000 µm
Max. correction forces:	Vertical ± 8 N; horizontal ± 4 N
Load capacity:	Workstation_Vario_600: 0 - 320kg (0 - 700lbs) Workstation_Vario_780: 0 - 310kg (0 - 680lbs) Workstation_Vario_900: 0 - 290kg (0 - 630lbs)
Other Specifications	
Dimensions:	See page 14
Weight:	Workstation_Vario_600: 120 kg (265 lbs) Workstation_Vario_780: 145 kg (315 lbs) Workstation_Vario_900: 175 kg (364 lbs)
Table top material:	Honeycomb breadboard with stainless steel surface (magnetical)
Top plate surface flatness:	± 0.1 mm (± 0.004") over complete surface
Repeatability of load adjustment:	60 µm
Environmental and Operational Requirements	
Electrical voltage:	100 - 250 V AC / 47 – 63 Hz
Power consumption:	40 - 55 W
Operating temperature:	10 – 40°C (50 – 104 F)
Operating humidity:	0 – 60%
Operating altitude:	< 2500 m (8100 ft)
Certification	
Electrical safety:	CE certificated according to the directive 2014/35/EU
EMC:	CE certificated according to the directive 2014/30/EU
<p>* Floating table top is supported by steel springs; low-pass characteristics of spring-mass combination dominates the dynamic behaviour above 200 Hz.</p> <p>** The settling time and maximum compensation level depend on several conditions, such as payload, frequency, load distribution and height of the payload. For that reason this value should be considered as an estimation.</p>	



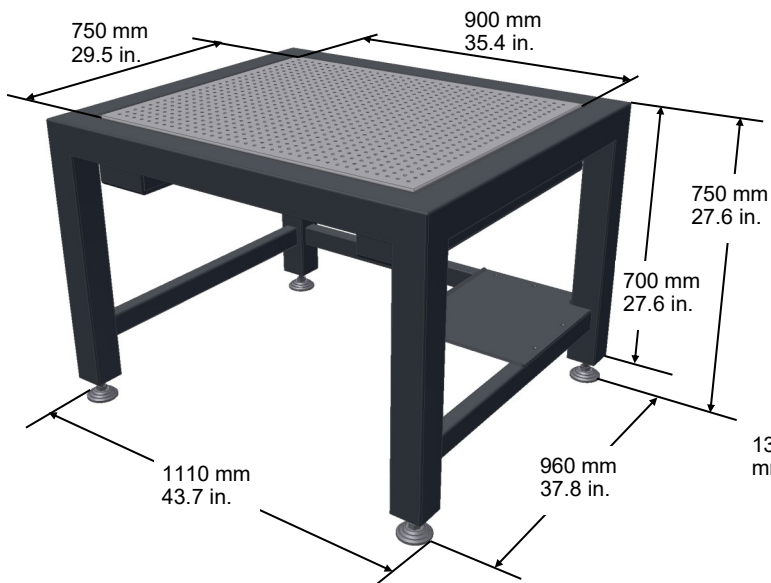
## Dimensions of the Workstation\_Vario System



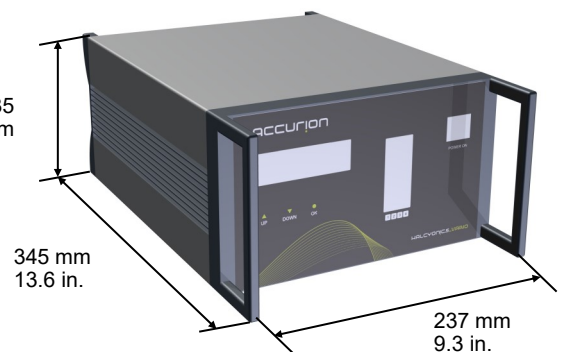
Workstation\_Vario 600



Workstation\_Vario 780

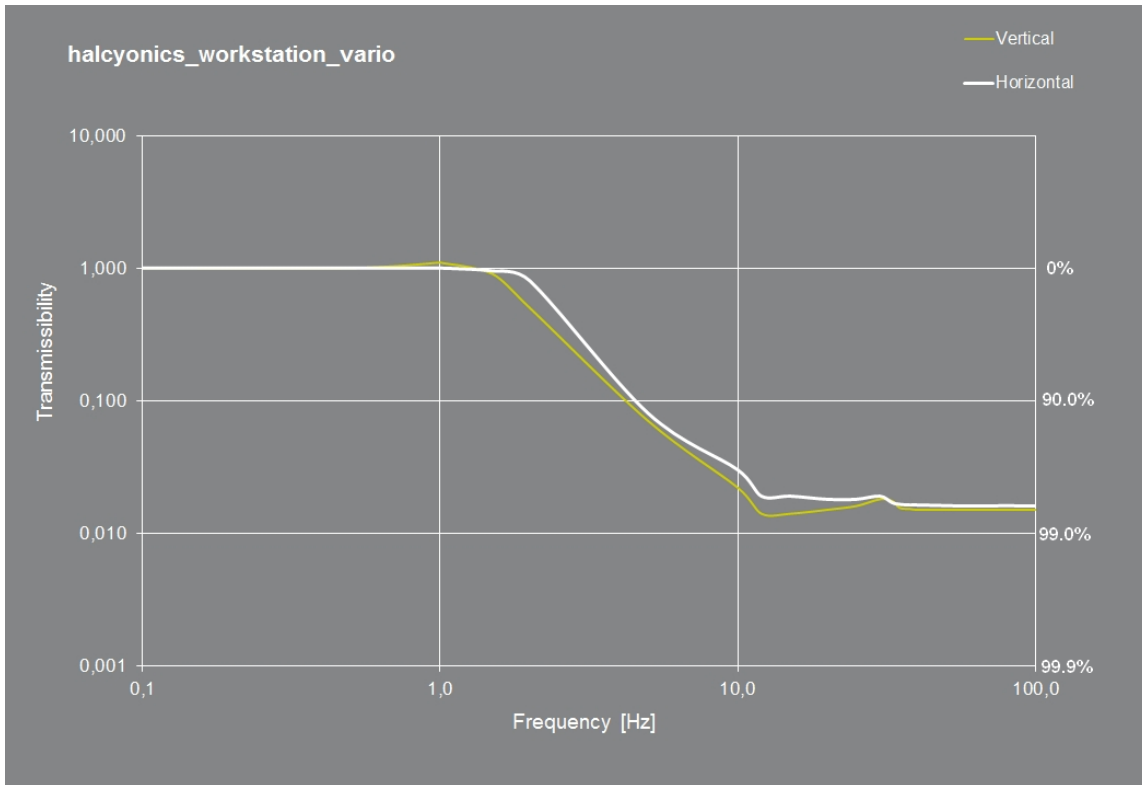


Workstation\_Vario\_900



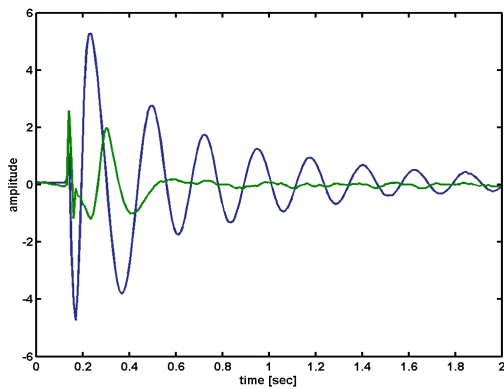
Vario\_Controller

## Transmissibility of the Workstation\_Vario System



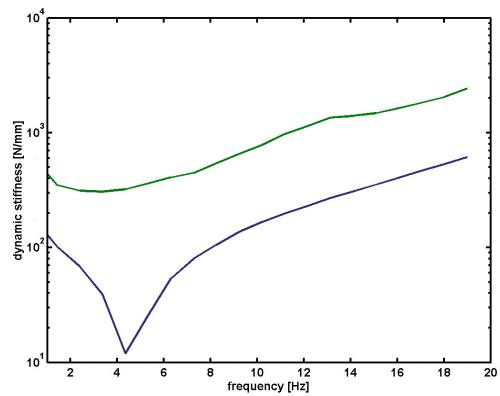
Transmission graph of Workstation\_Vario - measured at a velocity of 100  $\mu\text{m/s}$ , with a payload of 50 kg (110 lbs).

## Settling Time



Settling time of a Workstation\_Vario system (green) compared to a conventional air-damped vibration isolation system (blue), made by one of the major manufacturers of optical tables and vibration isolated laboratory desks.

## Dynamic Stiffness



Dynamic isolator stiffness (green) of Accurion's WS\_Vario system compared to a commercially available passive air-damped isolation system (blue). Due to their higher dynamic stiffness, Accurion's systems are less sensitive to direct forces affecting the isolation system.

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