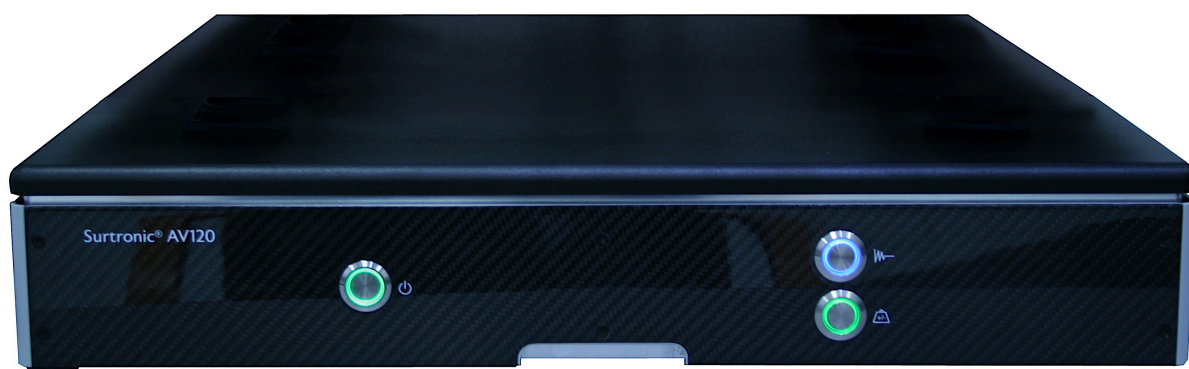


## Operating Instructions:

Surtronic AV150

active vibration isolation desktop unit



**K505-341**  
**Issue 1**

## Contents

<b>1 Introduction</b> .....	<b>3</b>
<b>2 Unpacking</b> .....	<b>3</b>
<b>3 Symbols used in these Instructions</b> .....	<b>3</b>
<b>4 Safety Information</b> .....	<b>3</b>
General Warnings.....	3
Electrical Safety.....	4
Mechanical Safety .....	4
<b>5 Getting Started and Operation</b> .....	<b>5</b>
Intended Use .....	5
Setting Up the System.....	5
Start-up .....	5
Automatic Load Adjustment and Transport Locking Mode .....	6
Using Active Vibration Isolation.....	7
Overmodulation of the system.....	8
<b>6 Appendix</b> .....	<b>9</b>
Care and Maintenance .....	9
Specifications .....	10
Transmissibility .....	11
Settling Time .....	11
Dynamic Stiffness .....	11

## 1. Introduction

Thank you for purchasing the Surtronic AV150 system. By selecting the Surtronic AV150 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 AV150 system correctly.

We hope you enjoy working with your Surtronic AV150!

## 2. Unpacking the AV150 System

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

Equipment supplied for the Surtronic AV150 system:

- 1 Surtronic AV150 system
- 1 power cord
- 1 power supply
- 1 Surtronic AV150 instruction manual

## 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 service representative in your area or contact Taylor Hobson's headquarters in UK 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. 100 – 240v AC (47Hz – 63 Hz) 130W

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.

## Mechanical Safety

Be sure that the equipment rests on a stable surface that can safely support the weight of this instrument.



*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 "Automatic Load Adjustment and Transport Locking Mode" on page 7.*

Press for 4 seconds!



## DIN and European Standards, European Council Directives

Surtronic AV150 systems conform to the requirements currently valid for electrical safety according to EC Directive 2006/95/EC and for electromagnetic compatibility according to EC Directive 2004/108/EC. This equipment has been tested and found to comply with the following standards:

EN 61010-1:2001 + Corrigendum: 2002 and

EN 61326-1:2006 including:

EN 61000-4-2:2009; EN 61000-4-3:2006+A1:2008;

EN 61000-4-4:2004; EN 61000-4-5:2006; EN 61000-4-6:2009; EN 61000-4-11:2004

EN 55011:2007+A2:2007, Class B, EN 61000-3-2:2006, EN 61000-3-3:2008



**Never use the system out of the specifications (see specifications: Environmental and Operational Requirements, page 9) otherwise warranty will be void.**

## 5. Getting Started and Operation

### Intended Use

The AV150 has been designed to isolate vibration sensitive measurement and instruments, e.g. Surtronic R100 Series instruments, from building vibration in laboratories.



*Do not use the AV150 in vehicles. For setting up and operate the AV150 and operation follow the next steps.*

### Setting Up the System

To obtain best performance from the Surtronic AV150, set it up on a stable, rigid flat surface. For optimal operating results, the planarity of the support surface should be 0.5 mm.

If you set up the AV150 system on a table or bench frame, make sure that the table is distortion free and stiff. Although most tables and bench frames have sufficient resistance to vertical vibration, they are relatively sensitive with respect to horizontal vibration. This causes amplification of structure and airborne noise.

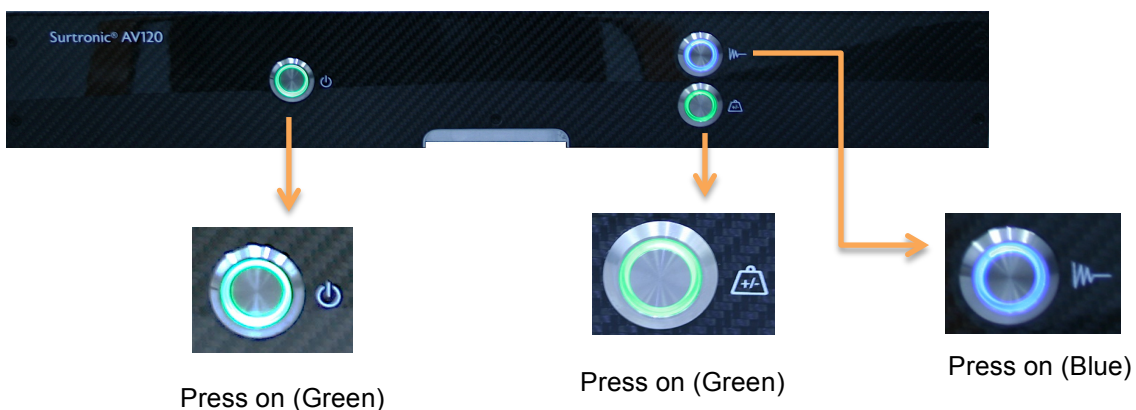
Therefore, to set up your vibration isolation equipment, select a place with a vibration level that is as low as possible. Vibration generated at this place should not exceed velocities of 500  $\mu\text{m/s}$ .



*Operating the system at low temperatures ( $<10^{\circ}\text{C}$ ) 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

1. Set up the system on a flat, stable surface at your work area.
2. Connect the external power supply to AC power (main supply) and to AV150.
3. Center your instrument on the top plate of the AV150 system.
4. Turn on the power switch on the front panel of the system, green LED is on.
5. Press the Load Adjust button for automatic load adjustment, green LED is on (p6)
6. Set the switch for active isolation to on, blue LED is on (p7)



## Automatic Load Adjustment and Transport Locking Mode

The top plate of the system is supported by four steel springs. 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.

The Surtronic AV150 systems have a combined automatic load adjustment and transport locking mode feature. Both functions are controlled using the "Load Adjust" button. The following modes can be selected depending on the number of times you press the button. The LEDs show the selected mode as follows:

### Automatic Load Adjustment

When you set up the system and press this button for the first time, the system will start the load adjustment.



**Press on (Green)**

The "load adjustment" mode (green LED) is used for automatic, load-dependent adjustment of the system. For initial adjustment and for changing the loading conditions, the green mode has to be selected. During the activation of the green LED, the system will check at intervals whether the load on the system has changed and will automatically move the top plate into the optimal position when necessary. If this automatic adjustment is not desired, please turn the Automatic Load Adjustment off. During load adjustment of the AV150 system, the active isolation is interrupted.

### Automatic Load Adjustment off



**Press off**

The "neutral" mode (LED off) is selected to deactivate the automatic load adjustment and 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. Once you switch on the system power for the first time, the AV150 system will be in the "neutral" mode. At this point, select the "load adjustment" mode. As soon as the stepper motors stop you can switch to "neutral" and the system is ready to operate.

## Transport lock



**Press and hold the button for 4 seconds!  
(to cancel please hold it for 4 seconds)**

During transportation the Surtronic AV150 system 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 the "transport locking mode" (red LED), and the four steel springs will be automatically pre-stressed up to the maximum.



The system may only be transported or moved in this condition!



To change the different modes, it is necessary to press and hold the button for some seconds.

## Using Active Vibration Isolation

Once you have started up the system, press the "isolation" button on the front panel to enable the active vibration isolation. Now the system initializes, the blue LED flashes during this process approx. 30 sec for the first time. Shortly afterwards, the blue LEDs will remain lit without flashing. This means that the vibration isolation is now active.



**Vibration Isolation Off  
Off (No LED)**



**Vibration Isolation Initialising  
Press on (Blue LED flashing)**



**Vibration Isolation Active  
Wait until blue flashing stop (Blue LED on)**

### Overmodulation of the System

The AV150 has been 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, indicated by a flashing blue "Isolation" LED. After the overload excitation is stopped, the isolation mode will automatically be turned on again. After a severe overload the system may take up to 30 seconds to reach full active isolation performance, but normally only a few seconds are required.



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



## 6. Appendix

### Care and Maintenance

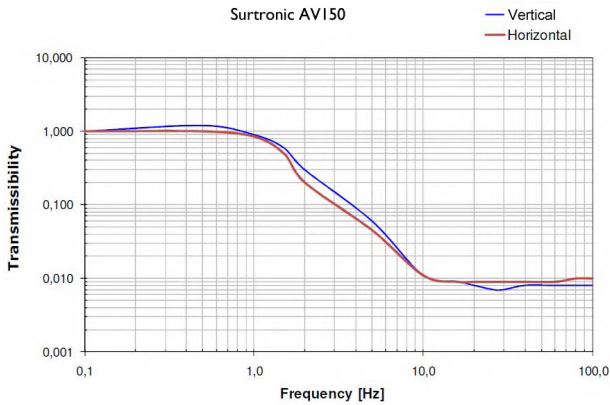
The AV150 system has been carefully designed and manufactured. To maintain this equipment and the validity of your warranty, you should observe the following recommendations:

- 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 >40°C 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

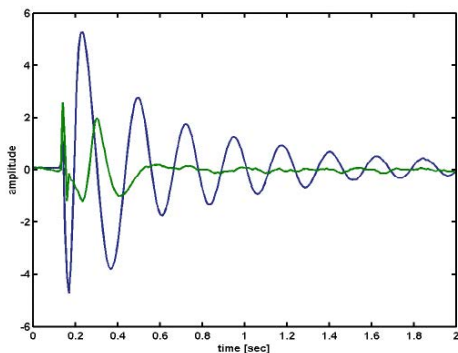
<b>Available Standard Versions</b>	
Surtronic AV150	
<b>Performance Specifications</b>	
Isolation technology	Control technology based on piezoelectric type acceleration pickup, fast signal processing and electro-dynamic type force transducers.
Force directions	Active compensation in all six degrees of freedom
Isolation performance	> 5 Hz = 25 dB (94.4%); >10 Hz = 40 dB (99.0%)
Active bandwidth	0.6 - 200Hz*
Settling time	300ms**
Max. correction forces	Vertical $\pm$ 8 N; horizontal $\pm$ 4 N
Load capacity	0 - 120kg (0 - 265lbs)
<b>Other Specifications</b>	
Dimensions	500 x 400 x 90 mm
Weight	Surtronic AV150: 20 kg (44 lbs)
Table top material	Surtronic AV150: powder coated aluminium
Top plate surface flatness	Surtronic AV150: $\pm$ 0.10 mm over complete surface
Max. compensation level	500 $\mu$ m/s at 6 Hz and with a load of 60 kg (132 lbs)**
Repeatability of load adjustment	120 $\mu$ m
<b>Environmental and Operational Requirements</b>	
Electrical voltage	100 - 240 V AC (47 - 63 Hz )
Fuse (inside AV150)	250V / F3, 15A(Fuse may be changed by authorized service staff only!)
Power consumption	130W
Operating temperature	10 - 40°C (50 - 104 F)
Operating humidity	0 - 60%
Operating altitude	< 2500 m (8100 ft)
Operating condition	Use in non-mobile laboratories only
<p>* Floating table top is supported by steel springs; low-pass characteristics of spring-mass combination dominates the dynamic behavior 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 typical.</p>	

## Transmissibility



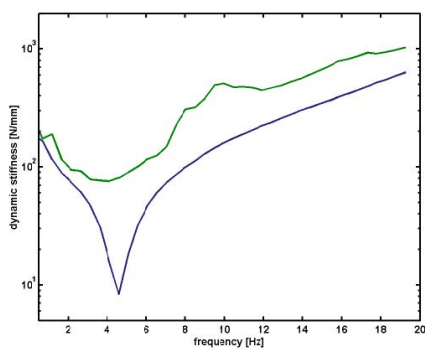
Transmission graph AV150, measured at a velocity of 100  $\mu\text{m/s}$  with a payload of 20 kg (44lbs)

## Settling Time



Settling time of a Surtronic AV150 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 Surtronic AV150 system compared to a commercially available passive air-damped isolation system (blue). Due to their higher dynamic stiffness, The AV150 system is less sensitive to direct forces affecting the isolation system.

## Serving a global market

Taylor Hobson is world renowned as a manufacturer of precision measuring instruments used for inspection in research and production facilities. Our equipment performs at nanometric levels of resolution and accuracy.

To complement our precision manufacturing capability we also offer a host of metrology support services to provide our customers with complete solutions to their measuring needs and total confidence in their results.

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