

ACTIVE VIBRATION ISOLATION SYSTEM

TS-150LP / TS-140LP / TS-300LP

Instruction Manual



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Vibration Isolation Technology made in Switzerland



Table of Contents

<i>General</i>	4
<i>Notes on Equipment Safety</i>	5
<i>Safety Instructions</i>	5
<i>Cleaning the Outside of the System</i>	5
<i>Accessories</i>	5
<i>Optimum Support Surface</i>	7
<i>Test of Support Surface</i>	7
<i>System Setup</i>	7
<i>Front Panel and Display Overview</i>	8
<i>Function Menu</i>	10
<i>Isolation Mode</i>	11
<i>BNC Diagnostic Output</i>	11
<i>Locking System for Transport</i>	11
<i>Optional Accessories</i>	12
<i>Fuses</i>	12
<i>Specifications TS-150LP, TS-140LP, TS-300LP</i>	13
<i>Bottom Mounting Holes</i>	14
<i>Transmissibility</i>	15
<i>Service Order</i>	16
<i>Sales Offices</i>	16

Thank you...

...for your purchase of the **TS active vibration isolation system**. This system has been designed specifically with performance and ease of use in mind. As with all TableStable products, this system is made to the highest quality standards using precision electronics and mechanical components which should give you many years of trouble free use. Please read this instruction manual carefully before use to ensure you get the best out of your new isolation system.

General

The TS-series are compact dynamic antivibration systems, which offer isolation against all six translational and rotational vibration modes.

These moderately priced dynamic vibration isolation systems achieve in a very small volume better isolation than is possible with the biggest and most expensive passive systems. Inertial feedback using piezoelectric force motors provides not only isolation from building vibrations, but also isolation from vibration sources placed on the system itself. This means, for example, that a delicate microscope isolated by the system will remain at rest despite forces being applied via the operator's hands.

The inherent stiffness of the systems, some 200 - 500 times greater than that of a 1 Hz resonance passive isolator, imparts excellent directional and positional stability.

The characteristics of an active isolation system are typified by the virtual lack of any low frequency resonance, a resonance which plagues all passive isolation systems.

The systems have been designed to offer excellent isolation even at frequencies as low as 2-3Hz, where many buildings show large horizontal amplitudes due to oscillation about the vertical axis. Isolation begins at about 0.7 Hz, increasing rapidly to at least 40dB beyond about 10Hz.

These systems are extremely convenient to use. Load compensation (auto-levelling) is performed automatically on switching on the power. If the load is changed whilst the system is isolating, it automatically readjusts and then returns to the isolation mode. Furthermore, at the push of a button the system locks itself for shipping. Apart from a single adjustable foot to allow for unevenness in the support surface, there are no manual adjustments to be made.

All the control circuitry, including the power supply, is built into the unit. Power consumption is less than 10 W. The unit has a universal input and may be connected to any AC power point from 90 to 120VAC, or 200 to 240VAC

The design has been optimized to achieve best possible isolation for delicate instruments such as the Scanning Probe Microscopes (AFM, STM), Scanning Electron Microscopes, Interferometers and other high resolution instruments, allowing the ultimate performance to be achieved from these instruments. The tables have also proved to be extremely successful for supporting sensitive experiments, such as patch clamp, micro injection or the troughs for liquids used in measurements on Langmuir-Blodgett films.

Notes on Equipment Safety

The vibration isolation systems **TS-150**, **TS-140**, **TS-300** have been designed, manufactured and tested to conform to the safety regulations for measurement- and control-equipment DIN EN 61010-1:2001 (IEC 61010-1 second edition 2001-02) and satisfy the relevant requirements of EEC Directive 73/23. The systems conform to EEC Directive 89/336 (electro-magnetic compatibility).

Safety Instructions

- The system may only be plugged into a socket with separate ground. Do not disconnect this ground, either at the socket, or by using an ungrounded extension cable.
- Before switching on this apparatus make sure that it is connected to the correct mains voltage.
- Do not remove any cover or allow any metal objects to enter any openings in the unit.
- Do not disassemble or attempt to repair the system. This may result in electric shock or damage to the system.
- Disconnect from mains before removing any covers. Refer servicing to qualified personnel.
- Do not use in potentially explosive surroundings.
- Do not drill any holes into the top plate. This will damage the system.
- If you suspect the system to be in any way unsafe, unplug and prevent any possible accidental usage. Contact your nearest service centre.

Cleaning the Outside of the System

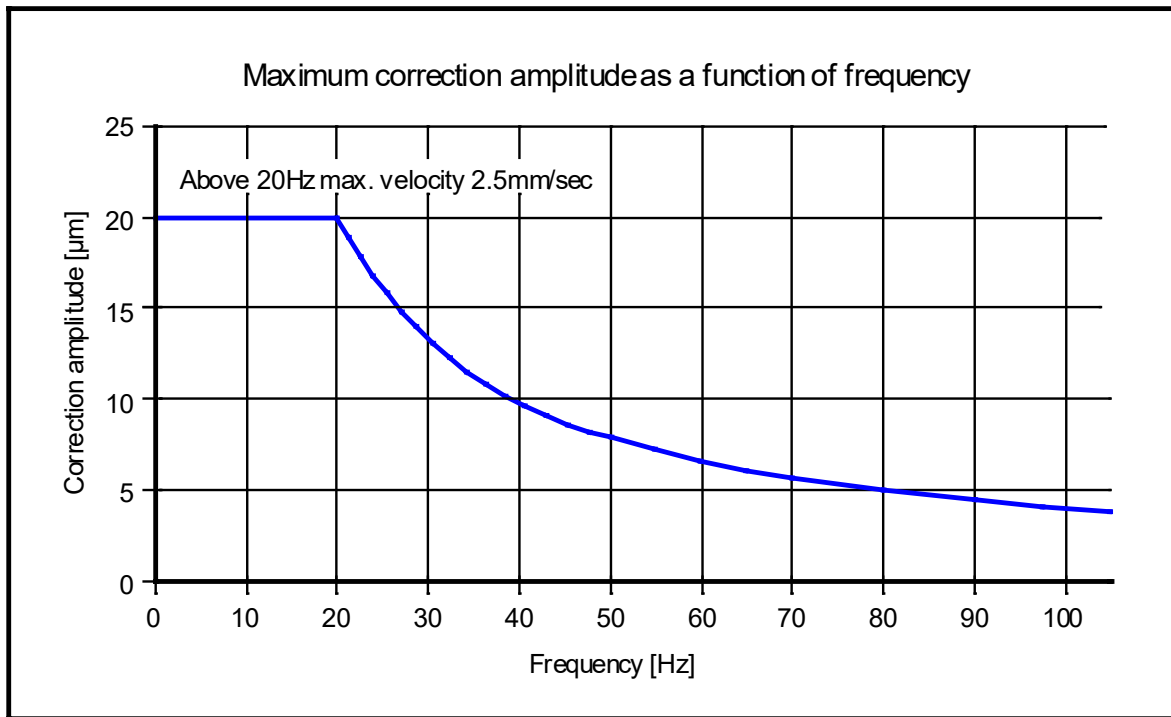
Use neutral detergents. Cleaning with solvents will damage the outside surface of the system. DO NOT use cleaning materials that contain ammonia. DO NOT use isopropyl alcohol to remove dirt from the control panel. It may crack the panel. DO NOT use flammable substances or any type of spray to clean the system.

Accessories

1 Power Cable
1 Manual

Correction Amplitude

The systems offer excellent isolation in the typical laboratory environment. The maximum vibration amplitude that can be compensated is frequency dependent, reflecting the fact that in typical environments the amplitudes decrease rapidly at higher frequencies. Up to 20Hz **amplitudes** of 20 μm can be compensated in all directions. At higher frequencies the maximum correction amplitude decreases inversely proportional to frequency (see diagram), corresponding to a maximum correction **velocity** of 2.5mm/s.



Note: At frequencies around 0.5Hz, even though there is no isolation at these frequencies, the system will be driven into saturation by amplitudes of around 10 μm . This will not normally be a problem unless you are working at the top of a very tall building.

Adjustable Foot



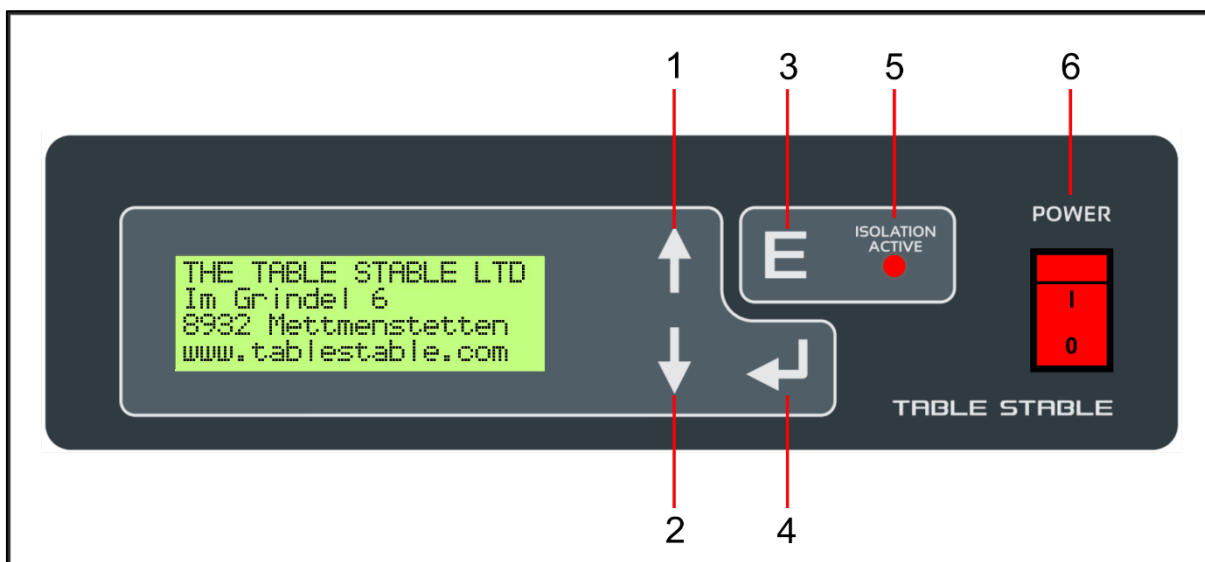
Important: make sure that the system is unlocked before adjusting the foot

Before proceeding check first that the system is sitting properly on the support surface.
The rear right foot is adjustable – turn until the system is sitting well balanced on all four feet.



Front Panel and Display Overview

TS Front panel



- | | | | |
|---|----------------------------|---|---------------------|
| 1 | Scroll up | 4 | Enter |
| 2 | Scroll down | 5 | Isolation Indicator |
| 3 | Enable / Disable Isolation | 6 | Power switch |

Display Overview

Push **↑** or **↓** to toggle between display pages:

```
***** TS-150 *****  
HEIGHT ADJUSTMENT
```

System is setting the correct height.

```
***** TS-150 *****  
HEIGHT ADJUST ERROR
```

System is unable to set the correct height.
The load may be badly distributed.

```
***** TS-150 *****  
ISOLATION DISABLED
```

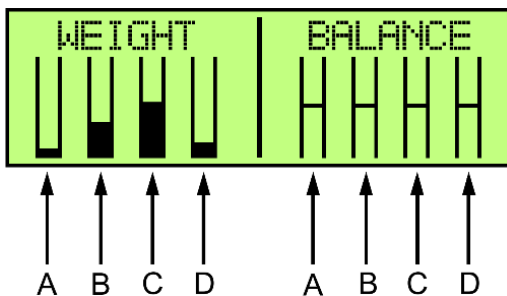
Isolation off, push **E** to activate isolation.

```
***** TS-150 *****  
ISOLATION ENABLED
```

System is isolating, push **E** to deactivate isolation.

```
SYSTEM UNLOCKED  
PUSH ↓ TO LOCK
```

Push **↓** to lock the system for transport.
System will automatically unlock when the power is switched on again.

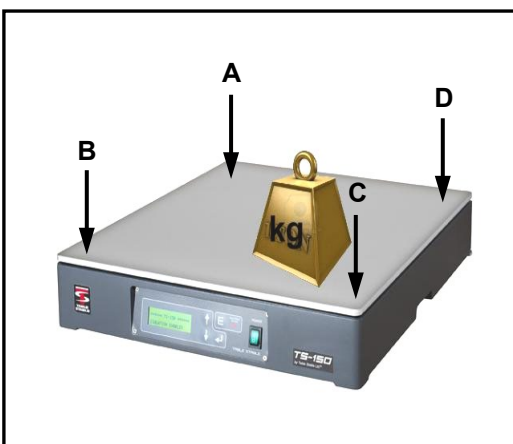


Weight

Shows the load on each corner. A flashing bar means an overload or bad load distribution, the system will not isolate.

Balance

Shows the centre of the height adjustment. Under normal circumstances the bars should be approximately in the middle. A flashing bar means the system is not balanced and will not isolate.



Example:

Load is sitting towards the right front corner.
Display shows bar "C" higher than the others.

Optional Accessories

Remote control box

A remote control box can be connected to the D-Sub socket on the rear and allows you to switch the Isolation on and off externally.



Modulation Input box

A modulation-box in combination with a sine wave generator allows an excitation signal to be applied to the TS-Isolation System so that the system may be used as a shaker in any direction. The modulation is applied to the isolated TS system so that external vibrations are avoided.

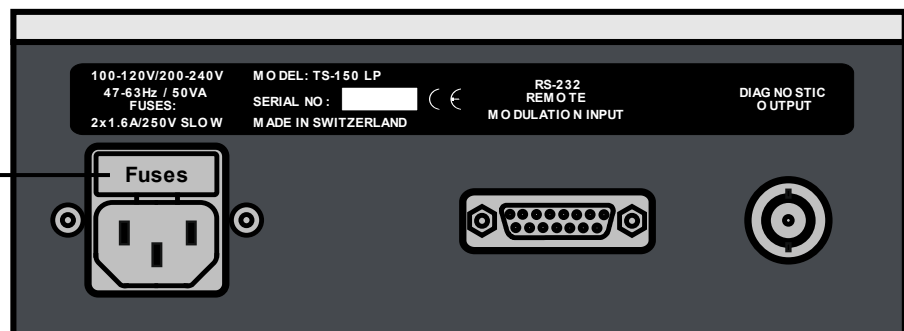
Different excitation directions (vertical, X, Y) can be selected by the mode switch.



Fuses

The fuses are located in the rear panel power socket. Do not attempt to change a fuse without first unplugging the power cable. Only replace a fuse with the correct type. **Never try to bypass a fuse.**

Fuses:
2×1.6A/250V slow



Specifications TS-150LP, TS-140LP, TS-300LP

	TS-150LP	TS-140LP	TS-140LP ⁺⁴⁰	TS-300LP	TS-300LP LT
Load capacity (Load in centre)	0-150kg 0-330.7lbs	0-140kg 0-308.6lbs	60-180kg 133-396lbs	0-300kg 0-661.4lbs	0-120kg 0-264.5lbs
Size	400×450mm 15.7×17.7"	500×600mm 19.7×23.6"	500×600mm 19.7×23.6"	600×800mm 23.6×31.5"	600×800mm 23.6×31.5"
Height	78.5mm 3.1"	84mm 3.3"	84mm 3.3"	120mm 4.72"	120mm 4.72"
Weight	17.5kg 38.6lbs	28.5kg 62.8lbs	28.5kg 62.8lbs	53kg 116.8lbs	53kg 116.8lbs
Isolation technology	Highly sensitive piezoelectric sensors in combination with fast and low power consumption force-motors				
Correction directions	Active Isolation against all six translational and rotational vibration modes				
Isolation	Dynamic 0.7 Hz to 200 Hz, mainly passive at higher frequencies although for good stability the feedback is active to at least 2 kHz				
Transmissibility	See attached curves on page 14 above ~10 Hz transmissibility <0.01 (-40dB)				
Correction Forces	±8N vertical, ±4N horizontal				
System Noise	Less than 20ng/√Hz from 0.1-200Hz in any direction				
Table Top	Damped aluminium sandwich construction. Also available with tapped M6 on 25mm or 1/4-20×1" UNC centres, or customized made of aluminium or ferromagnetic steel				
Input Voltage	90 – 120V AC, 47 – 63 Hz 200 – 240V AC, 47 – 63 Hz				
Power Consumption	max. 10W when isolating, max. 20W during load adjustment				
Safety class	1				
Fuses	2×1.6A/250V slow located in the power socket on the rear side of the unit				
Protection class	IP 20				
Temperature range	5° - 40°C 41°-104°F				
Relative humidity	10 – 90% (5° – 30°C / 41°-86°F) 10 – 60% (30° – 40°C/ 86°-104°F)				
Application	Indoor				
Altitude	up to 2000m (6500ft)				

