

# ACTIVE VIBRATION ISOLATION SYSTEM TS-C30

## Instruction Manual



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*Vibration Isolation Technology made in Switzerland*



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## **Thank you...**

...for your purchase of the **TS-C30 active vibration isolation system**. This system has been designed specifically with performance and ease of use in mind. As with all Table Stable 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-C 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 1.2 Hz, increasing rapidly to at least 40dB beyond about 10Hz.

All the control circuitry is built into the unit. Power consumption is less than 2.5W. The unit has a universal input and may be connected to any AC power point from 100 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-C30** 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 External Power Supply 12VDC
- 1 Power Cable
- 1 Hex Key 3mm
- 1 Plastic shim 2mm for height checking
- 1 Manual

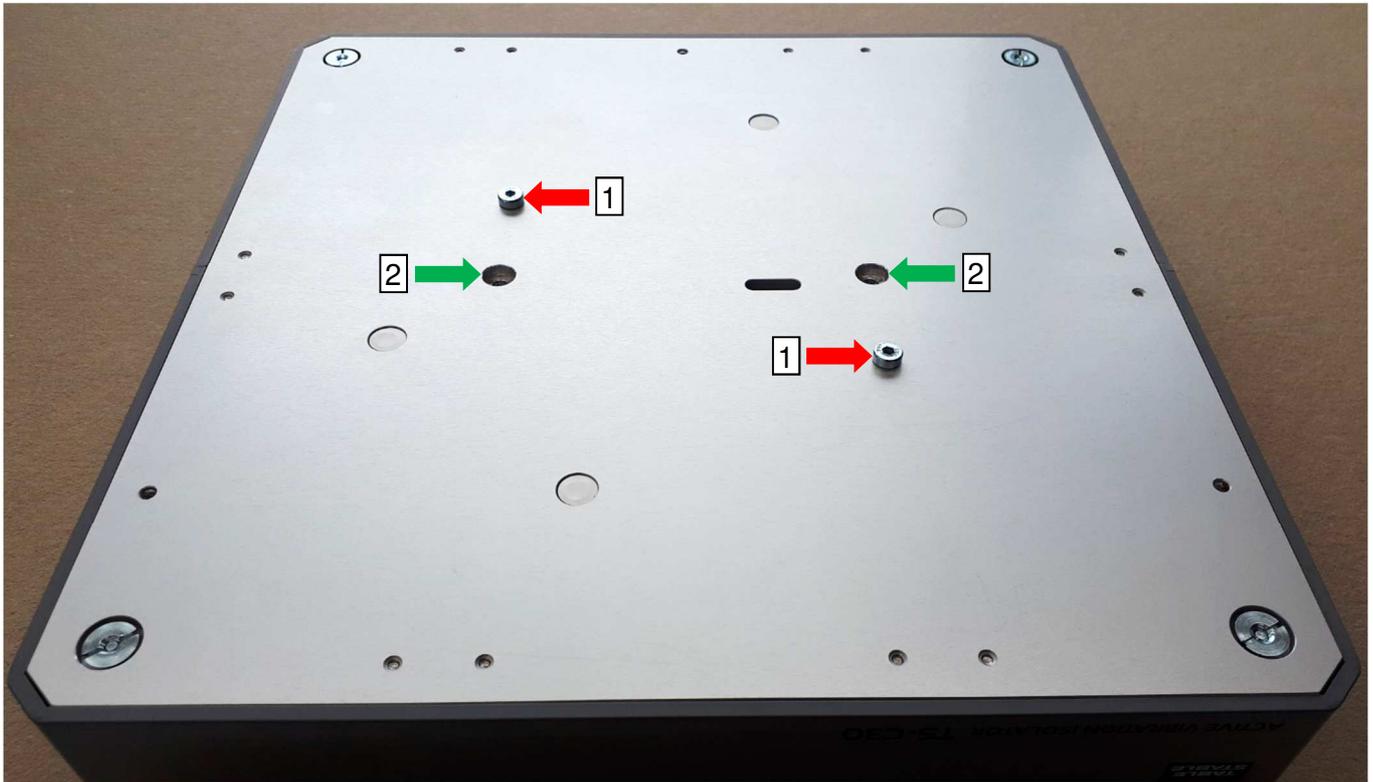
## Unlock / lock system



### IMPORTANT

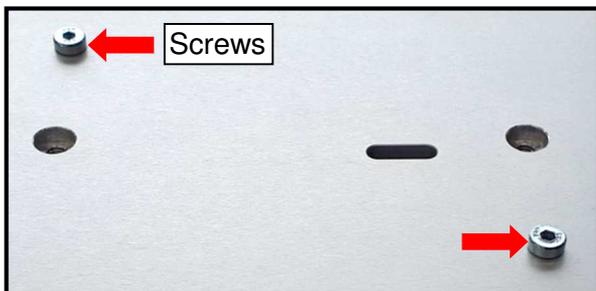
For shipping the system has been locked to prevent damage.  
Before the system is ready to use you have to unlock as follows:

- Lay the system upside down on a soft cloth.

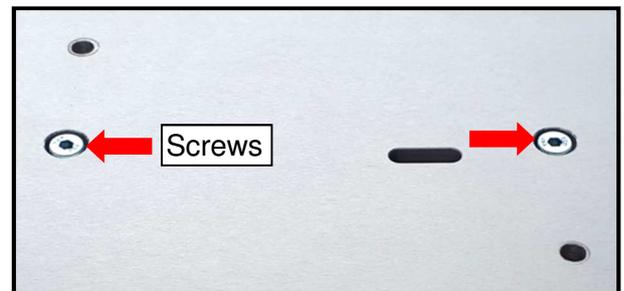


- Undo the marked screws (1) and remove
- Turn the screws into hole (2) to keep for further transportation (do not tighten too hard)

System locked



System unlocked



**In order to prevent damage during shipping it is essential to lock the system!  
Lock the system for further transportation by putting in the screws into hole (1)**

## **System setup**

Sometimes equipment can get very cold during shipping. We recommend that if the system is cold you allow 2-3 hours for it to reach room temperature before connecting the power, otherwise a malfunction may arise due to condensation.

### ***Optimum support surface***

To obtain the optimum performance from the system it must be supported on a surface which is as rigid as possible. The best possible performance is obtained with the system sitting directly on the floor. However for most applications this will not be practical, and some support structure will be required to bring the system to a convenient operating height. Most simple table structures will be rigid enough vertically, but will leave much to be desired horizontally. The addition of diagonal struts between the table legs can improve the situation dramatically.

It is good to bear in mind that any support structure will follow the building vibrations exactly up to some certain cut off frequency at which point the structure goes into resonance and amplifies the vibration amplitudes. A typical structure may have its lowest horizontal resonance frequencies around 40-60 Hz.

It is an unfortunate fact of life that the amplitudes of the vertical vibrations of the building (dominantly bending modes of the floor) are largest in the centre of the floor, where for convenience most experiments are situated!

Since the system is quite small, a possible location may be on a shelf attached to a building pillar. Good braces will be required to support the shelf. This location has the advantage that the vertical vibrations of the building will be very much reduced.

### ***Test of support surface***

Although the systems will operate on virtually any support surface, a soft support structure resonantly amplifies certain building vibration frequencies and these will therefore be less effectively isolated.

You can obtain an idea for the suitability of your support structure by observing the diagnostic signal while pushing on the support. The isolation should be disabled for this test. If the support is rigid the signals should hardly respond to a push on the support in any direction. Now try tapping the support to excite its internal resonances. Generally the support will react more strongly to a horizontal tap than to a vertical one. A very resonant support will show long lived resonances and the isolation will be seriously affected at these frequencies. A better support will show well damped resonances.

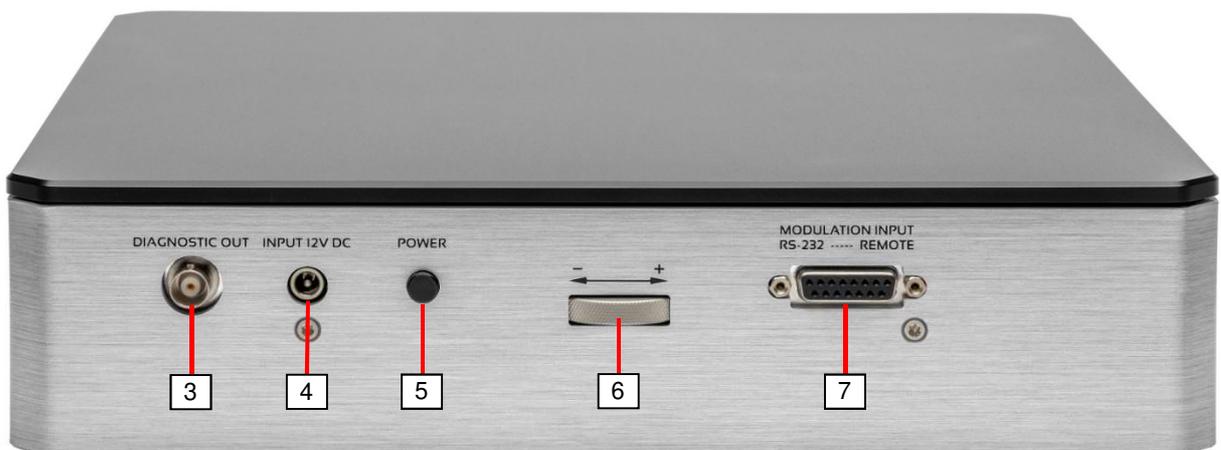
## Front- / rear panel

Front side



- 1) *Enable button*                      Push to switch the active isolation on and off
- 2) *Status LEDs*                      **POWER:**                      Shows the 12V DC Input voltage is present  
**ACTIVE:**                      Lights up when the active isolation is enabled  
**VIB. SIGNAL:**                      Shows present vibrations

Rear side



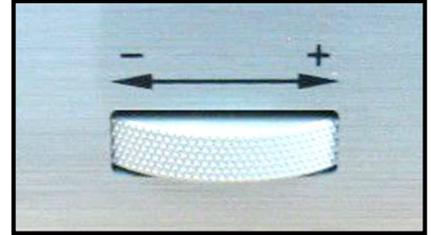
- 3) *Diagnostic Out*                      Shows the signals from all 8 accelerometers (see page 9 for details)
- 4) *Power Input socket*                      Connect the 12V DC power supply to this socket
- 5) *Power switch*                      Push to switch the power of the system on and off
- 6) *Load adjustment*                      Turn the left/right/rear side wheels for load compensation (page 8)
- 7) *Remote/Modulation*                      A remote or modulation control box can be connected to the D-Sub socket and allows you to switch the Isolation on and off externally or use the system as a shaker (page 11)

## Adjustment for load compensation

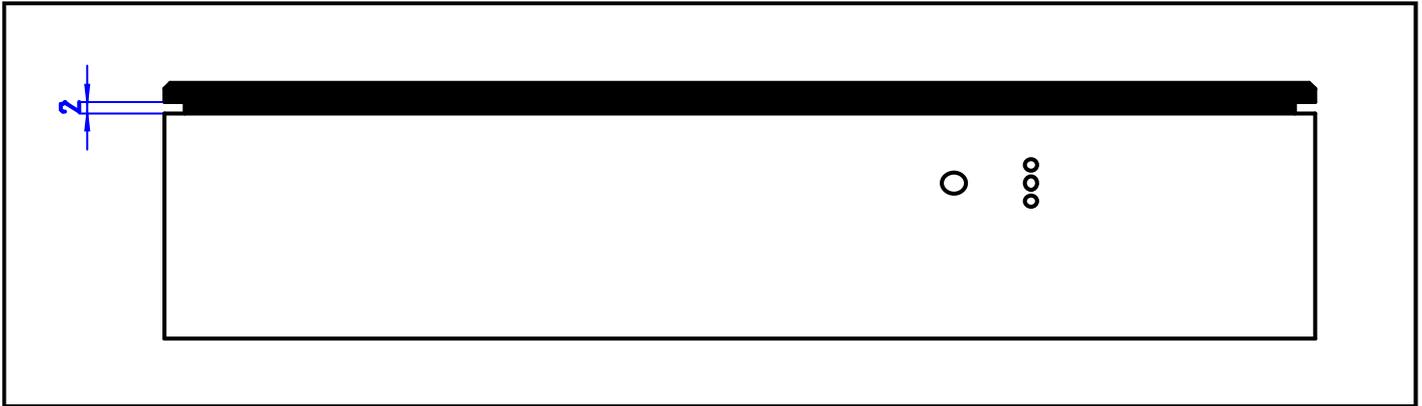
After unlocking the system lay the unit on a flat and rigid table or underground.

Put the load on top and adjust the load compensation by using the three wheels on the side to a gap of **2mm** between the housing and the top plate.

Turn the wheel in **+** direction to increase the load compensation  
Turn the wheel in **-** direction to decrease the load compensation



Use the 2mm plastic shim to check the gap between top plate and housing on each corner



**Check each corner for free movement of about 0.5mm by pushing and pulling the top plate gently up and down!  
After changing the load check each corner again for free movement!**

## Operating Instructions

Connect the power plug to the Input power socket on the rear side.

Switch on unit by pressing the power button on the rear side  
The "POWER" LED will light up and the "ACTIVE" LED starts to blink.

After about 30 seconds the "ACTIVE" LED will stay on and the system is now ready to use.

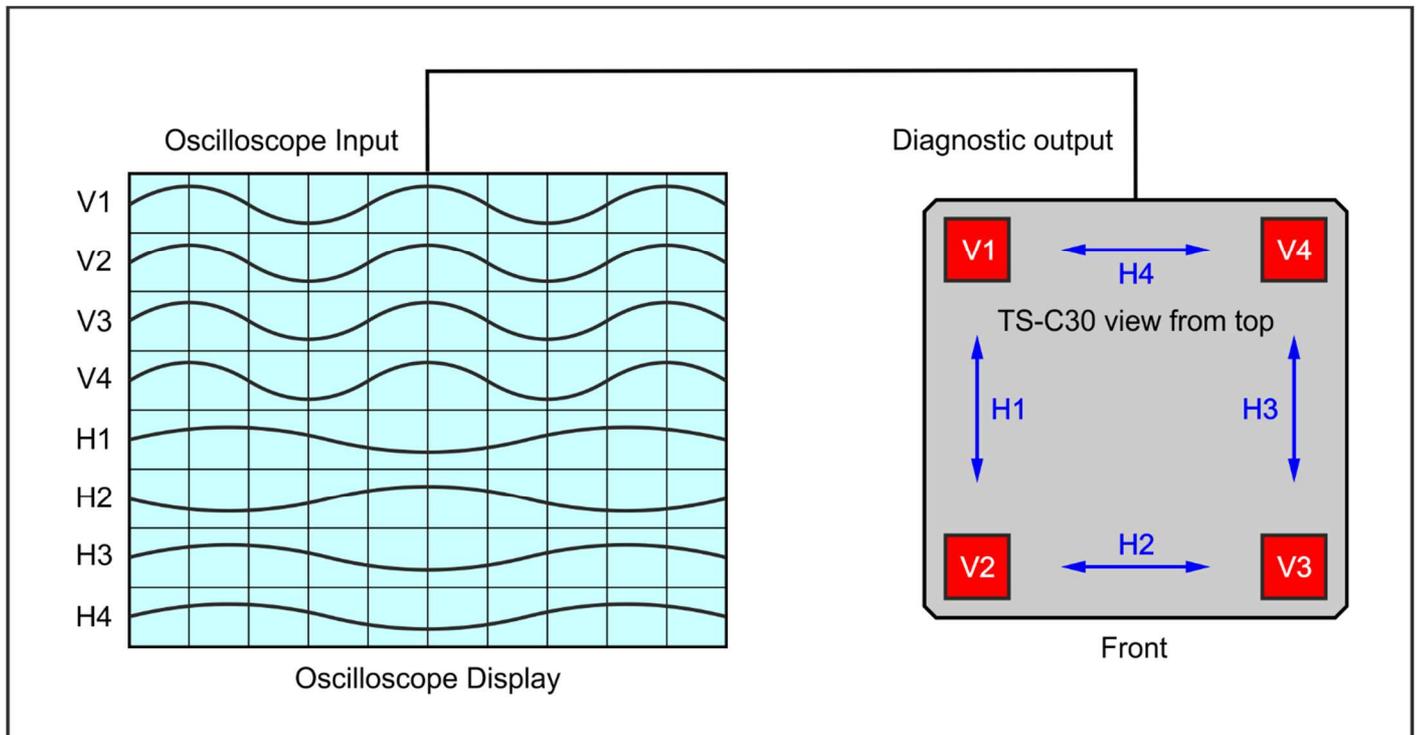
You can switch the active Isolation on and off by pressing the "ENABLE" button.

## Diagnostic output

The rear panel BNC socket gives a multiplexed output showing the signals from all 8 accelerometers. **V1-V4** are the vertical axes, **H1-H4** are the horizontal axes.

To view this signal on an oscilloscope, set the time base to **20ms** and the sensitivity to **0.2V**.

On using the system for the first time it is strongly recommended that you observe this signal, with the isolation switch both ON and OFF – it gives a good impression of how well the system is operating.



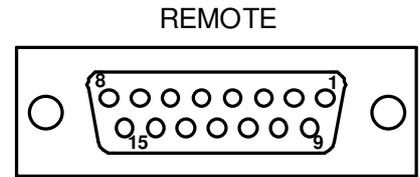
**Note:** The signals are for diagnostic purposes only and are not calibrated.

## D-Sub 15 remote / modulation socket

The rear D-Sub 15 socket can be used for optional remote control or modulation Input.

### Pin-Layout:

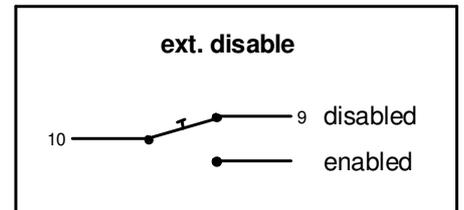
- 1 Modulation Axis 8
- 2 RXD
- 3 TXD
- 4 -7.5V
- 5 GND
- 6 Modulation Axis 2
- 7 Modulation Axis 4
- 8 Modulation Axis 6
- 9 +7.5V
- 10 ext. disable
- 11 ext. disable Indicator
- 12 Modulation Axis 7
- 13 Modulation Axis 1
- 14 Modulation Axis 3
- 15 Modulation Axis 5



### External switching:

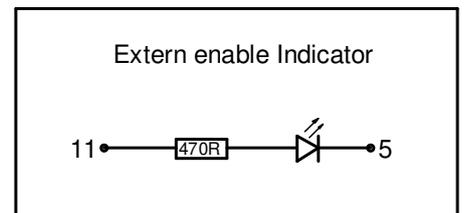
This offers a DISABLE function. The system must first be enabled via the front panel. Subsequently the system may be disabled by joining pin 10 to pin 9.

When pin 10 is floating the system will be enabled again.



### External Indicator:

An LED with a 470Ω resistor in series may be connected between pin 11 and pin 5 to give an indication when the system is enabled.

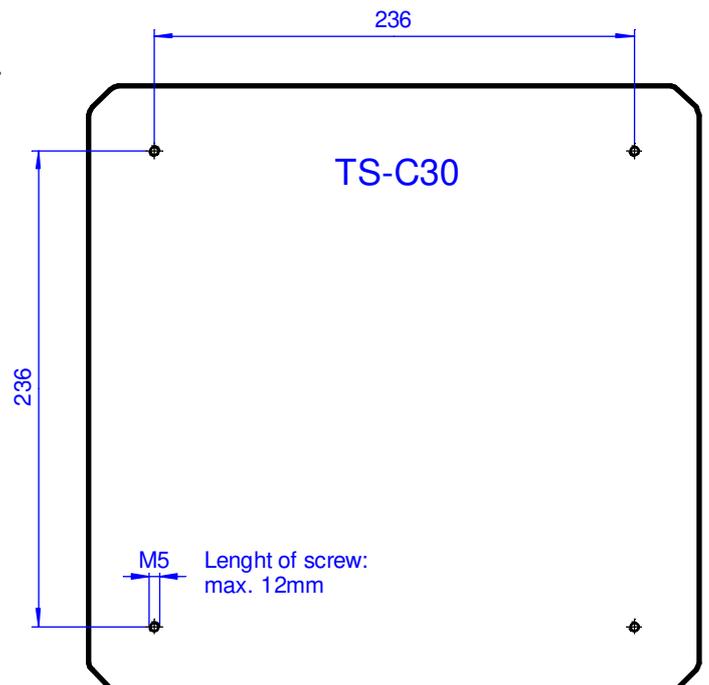


## Bottom mounting holes

The systems has **four threads on the bottom side** which allows you to screw it onto a table or bench.



Before you attach the system you have to make sure it is sitting properly. Do not tighten the screws to hard!



## 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.

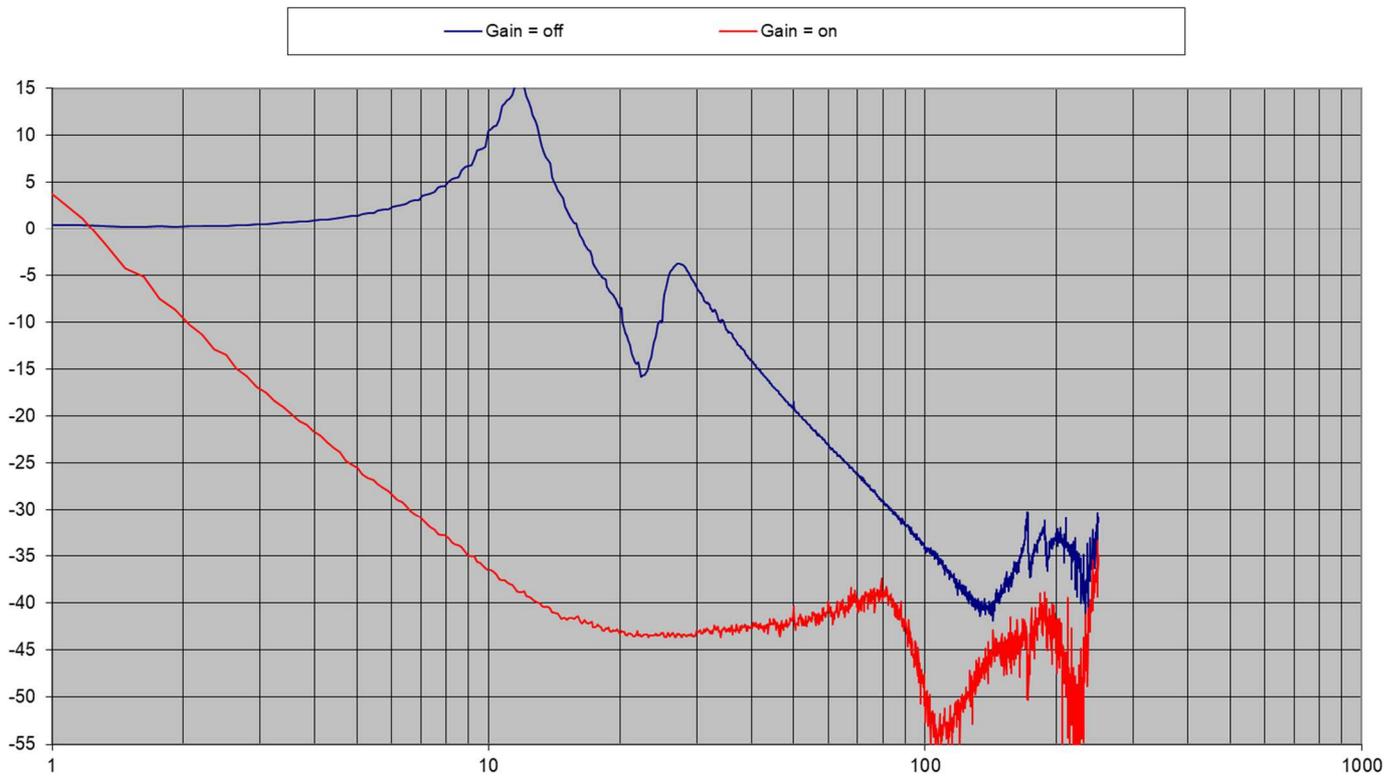


## Specifications

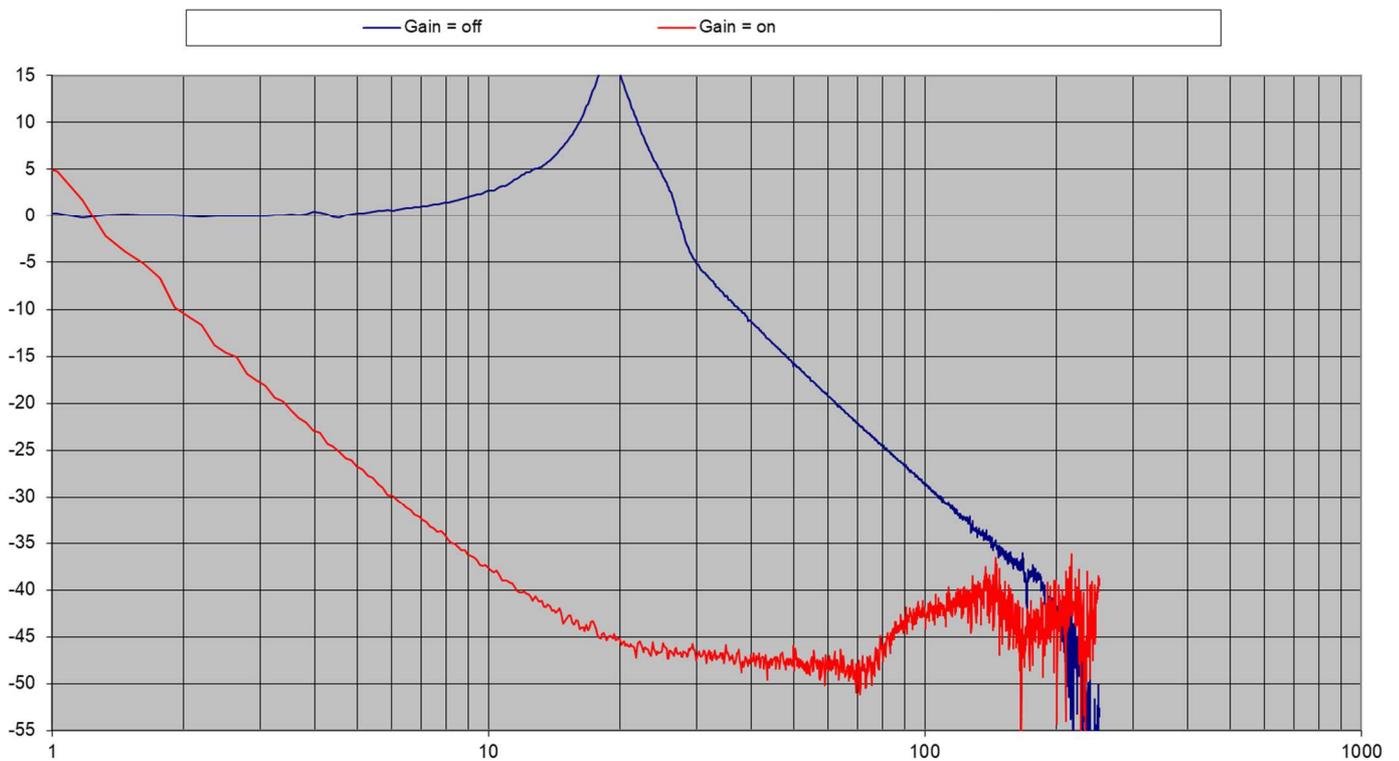
Load capacity:	40kg (Load in centre) 88.18lbs
Size:	300×300×70mm (L×W×H) 11.8×11.8×2.75"
Weight:	9.2kg 20.3lbs
Isolation technology:	Highly sensitive piezoelectric sensors in combination with fast and low power consumption force-motors
Correction directions:	Active Isolation against all six translational and rotational vibration modes
Isolation:	Dynamic 1.2 Hz to 300 Hz, mainly passive at higher frequencies, although for good stability the feedback is active to at least 5 kHz
Transmissibility:	See curves on page 13 above ~10 Hz transmissibility <0.01 (-40dB)
Correction Forces:	±8N vertical, ±4N horizontal
System Noise:	Less than 20ng/√Hz from 0.1 – 300Hz in any direction
Table Top:	Solid aluminium plate
Input Voltage:	12V, with AC/DC converter 100–240VAC, 50–60 Hz or customised Input voltage:
Power Consumption:	max. 2.5W
Safety class:	1
Protection class:	IP20
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)

Technical details of the data, design and illustrations provided in this manual are subject to change without notice.

## TS-C30 / Horizontal / load: 10kg



## TS-C30 / Vertical / load: 10kg



## Service order

If you suspect that a fault has developed in your isolation system, please fill in the service order form and send by fax/email to the address below. Our service department will contact you by return. If it proves to be necessary to return the system for repair, you will be issued with an **RMA number** which should then appear on all shipping documents. You also can download the service order sheet from our website: [www.tablestable.com](http://www.tablestable.com)

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