

Optimal for Heavy-Load / Floor Seismic  
Isolation during Long-Period Ground Motion

## Seismic Isolation Module Model TGS

To help ensure business continuity  
when earthquakes strike



450-mm square

new



500-mm square



600-mm square

new

# Seismic isolation for individual server computers floor of your operations center:optimal protection

**Our distinguished mechanism handles even  
“LONG PERIOD GROUND MOTION”  
expected during a major earthquake.**

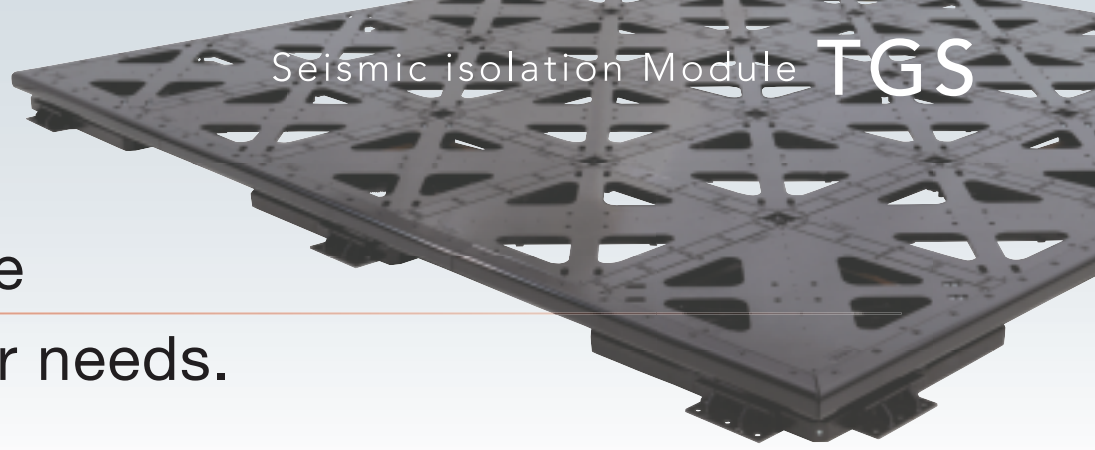
**Movement during an earthquake could comprise of “short-period ground motion”<sup>\*1</sup> with a period of 2 seconds or less, or slow “long-period ground motion”<sup>\*2</sup> with a period of tens of seconds.**

**The Nankai megathrust fault along the coast of Japan is at high risk of experiencing these “long-period ground motion” earthquakes. High-rises and other large-structure buildings would be susceptible to sympathetic vibration, and conventional seismic isolation measures would not be effective.**

**THK addresses this by combining its LM Guide (linear motion guide), proven in industrial machinery such as machine tools and semiconductor manufacturing equipment, with damping technology, to develop the [Seismic Isolation Module Model TGS](#), an original mechanism capable of handling long-period ground motion. With thorough preparation, we offer peace of mind of the entire floor.**

<sup>\*1</sup> Observed in areas near the center of the earthquake, such as during the Great Hanshin Earthquake (Kobe), the Niigata Chuetsu Earthquake, and the Great East Japan Earthquake (Tohoku).

<sup>\*2</sup> Reaches distances far from the center of the earthquake, observed during the Great East Japan Earthquake as far away as Tokyo and Osaka.

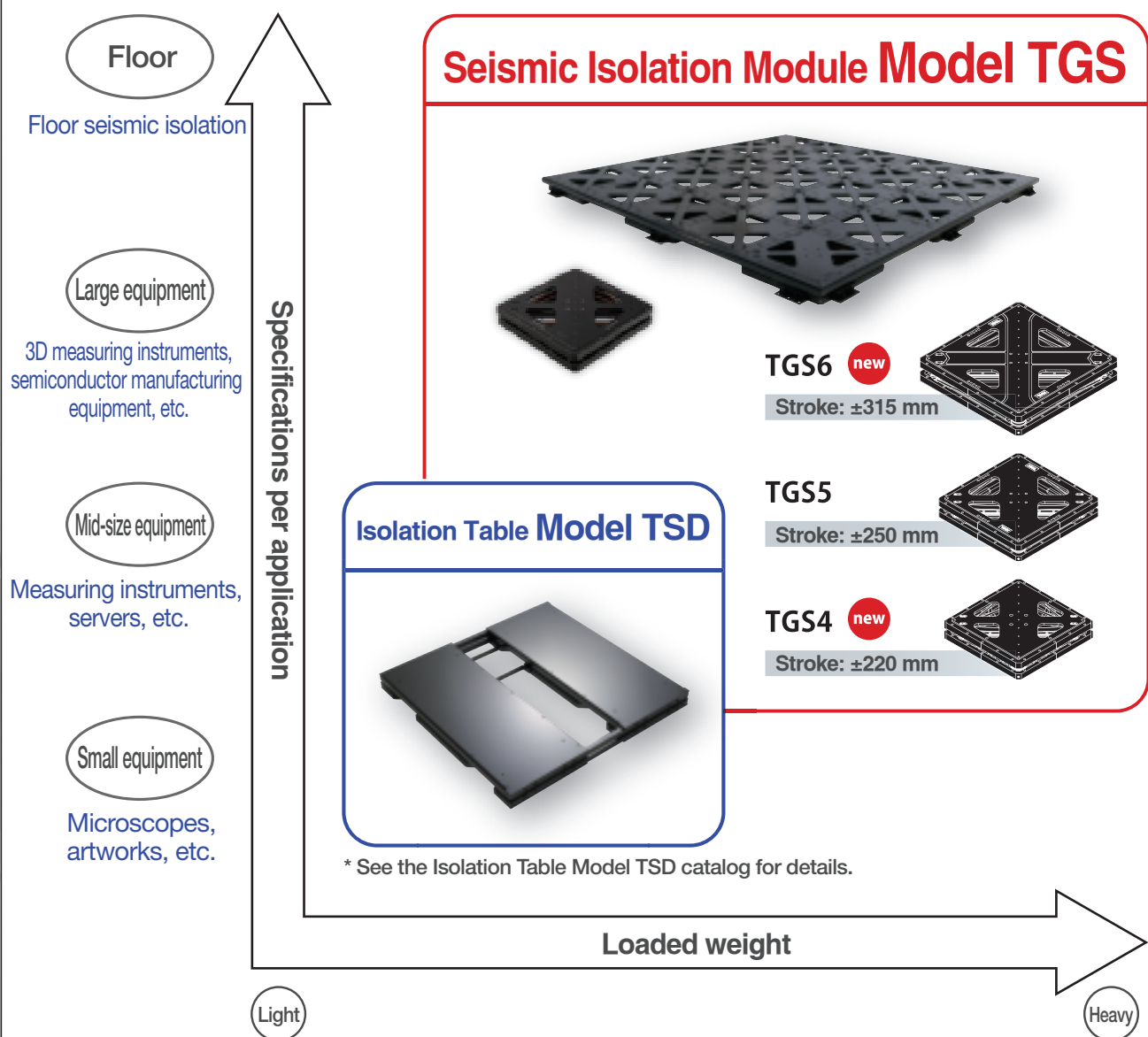


or for the entire  
tailored to your needs.

## ☒ Ample variations of seismic isolation devices

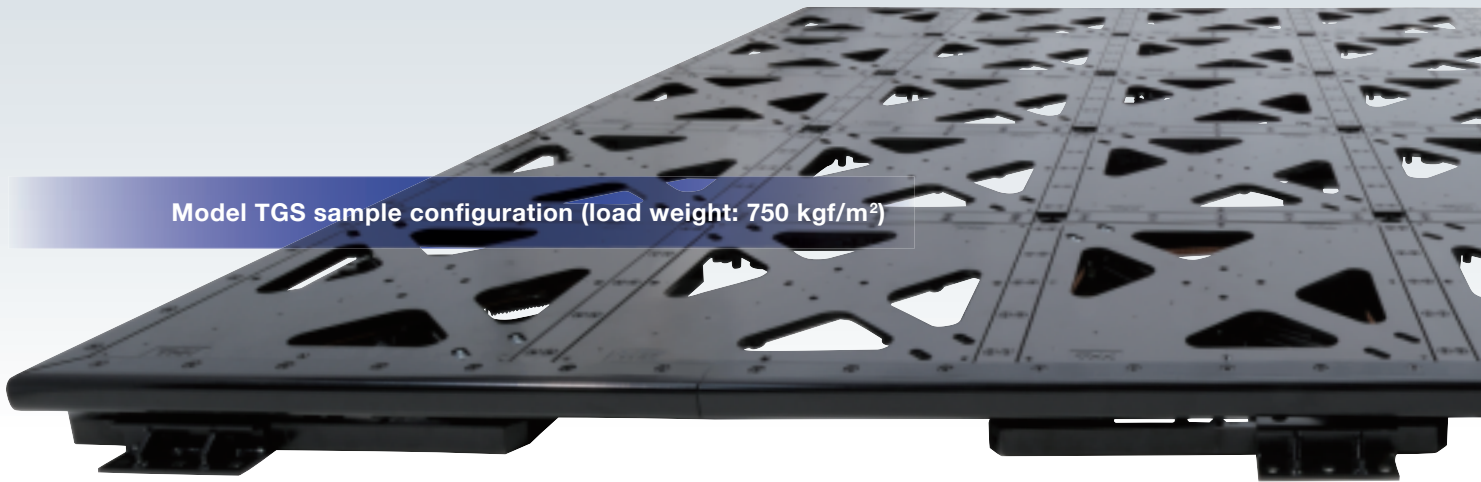
We have a varied lineup of seismic isolation devices in different sizes. Choose the optimal device based on the period that would be expected for the building structure, the application (equipment located on the floor), and where installed.

[Guidelines for Selecting THK Seismic Isolation Device]





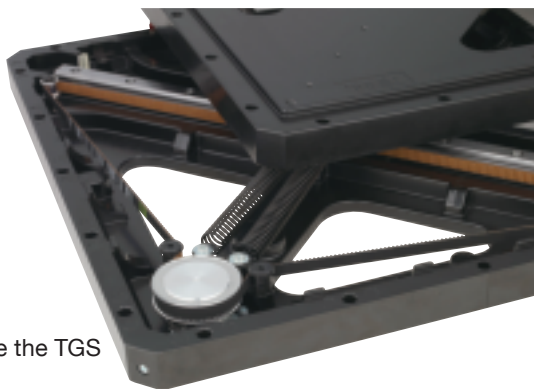
Model TGS sample configuration (load weight: 750 kgf/m<sup>2</sup>)



## Seismic Isolation Module Model TGS Features

### Seismic isolation in a compact package

The TGS provides the support, recovery, and damping functions required for effective seismic isolation, delivered in a compact module.

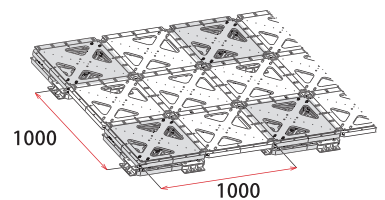


Inside the TGS

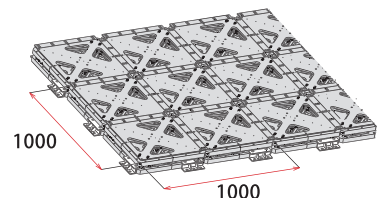
### Handles heavy loads and pulling force

Thanks to the use of LM Guides, TGS modules not only accommodate heavy loads but also resist floating when pulling force is applied. Each module can bear an evenly distributed load of up to 750 kgf, enabling this model to accommodate evenly distributed heavy loads up to 3,000 kgf per square meter. (When dealing with a more concentrated load, please consult THK.)

Maximum load: 750kgf/m<sup>2</sup>  
1 Bearing module,  
3 Linking modules



Maximum load: 3000 kgf/m<sup>2</sup>  
4 Bearing modules



[TGS5]

See page 5 for details on these two types of TGS modules.

### Countless possible configurations

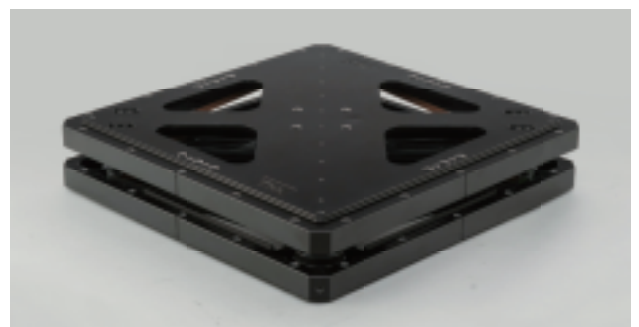
TGS modules can be configured to accommodate loads of almost any shape or form. The smallest possible configuration, two modules on each side an unlimited number of modules can be connected.



Modules in a 2 × 9 arrangement

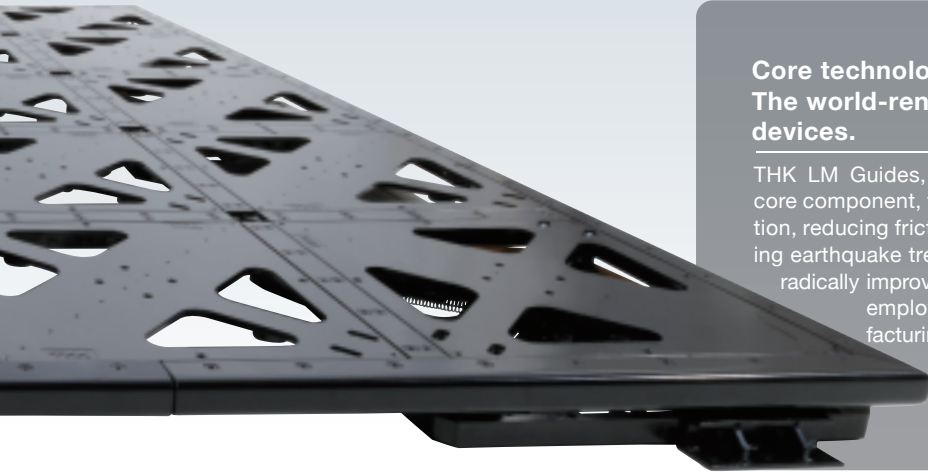
### Easy to install

The TGS arrives fully assembled and ready to set up. The compact size and lightweight construction of the modules makes them easy to configure and install.



Product as shipped





## Core technology: The world-renowned LM Guide in industrial devices.

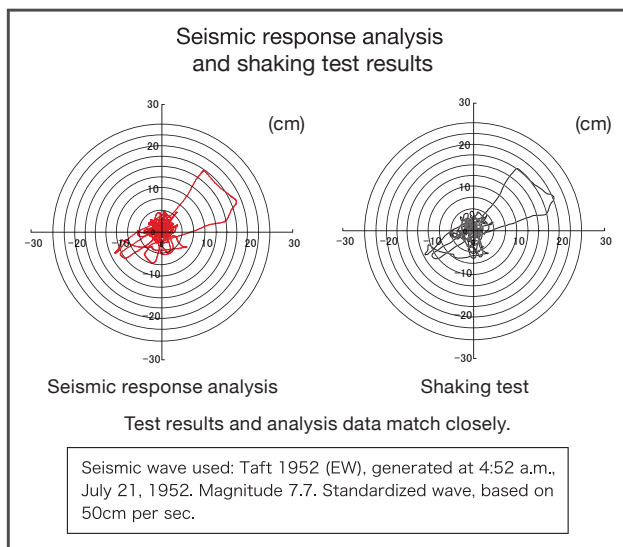
LM Guides



THK LM Guides, the Seismic Isolation Module's core component, turn linear motion into rolling motion, reducing friction resistance and deftly deflecting earthquake tremors. Since its introduction in 1972, the LM Guide has radically improved the capabilities of mechatronics devices and is now employed around the world as the de facto standard for manufacturing equipment and machine tools.

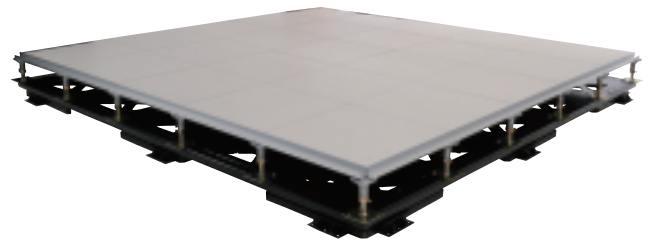
## Optimal seismic isolation

Seismic response analysis, which takes into account factors such as setup location, load weight, and anticipated seismic vibrations, makes it possible to deliver optimal seismic isolation with the TGS.



## Broad versatility

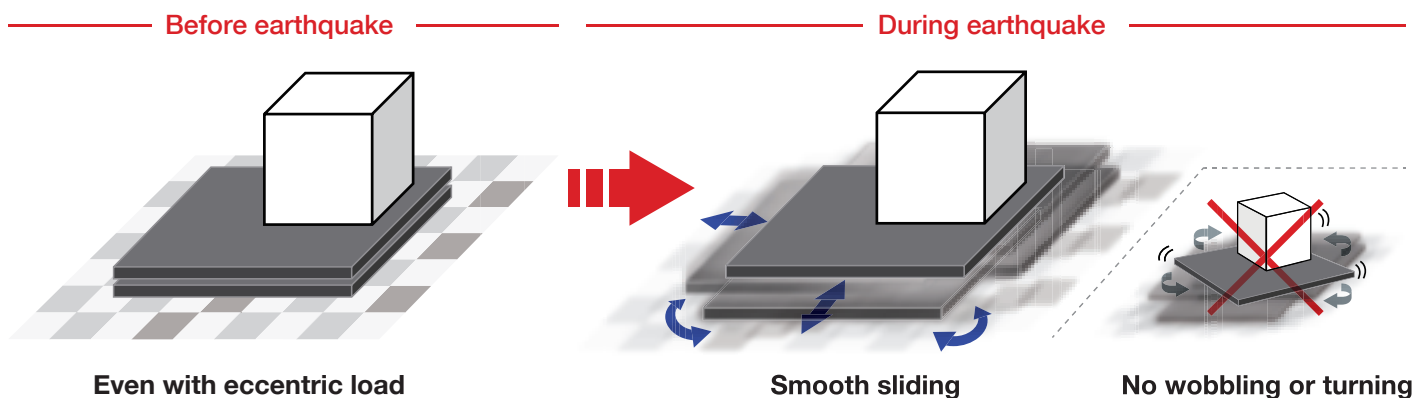
The dimensions of TGS modules making it easy to provide seismic isolation for flooring in server rooms, operation centers, and other locations housing vital equipment. Their low 100 to 112 mm height makes them suitable for use in older buildings with lower ceilings.



Seismic Isolation Modules installed under flooring

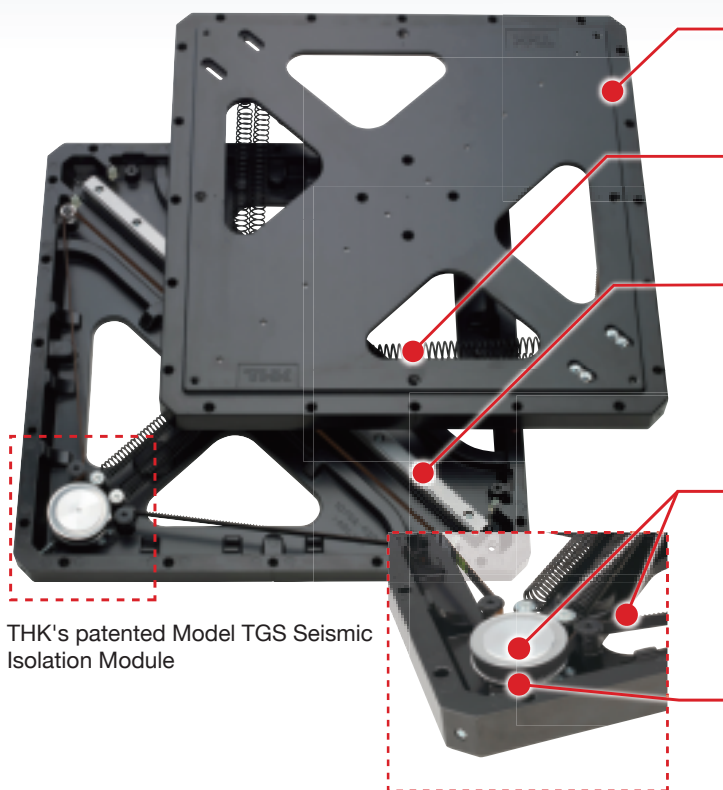
## Even smooth motion

The high rigidity of the surface connections, together with the use of LM guides to control movement, ensure there will be virtually no wobbling and only smooth horizontal motion.



# Seismic Isolation Module Model TGS Technical Data

## ☒ Structure



THK's patented Model TGS Seismic Isolation Module

### Frame

Made of lightweight die-cast aluminum.

### Tension spring

Returns the frame to its original position after any shifts from seismic vibrations.

### LM Guide

Installing the LM guides in a cross shape allows smooth motion in all horizontal directions, matching the motion of an earthquake.

### Pulley, timing belt

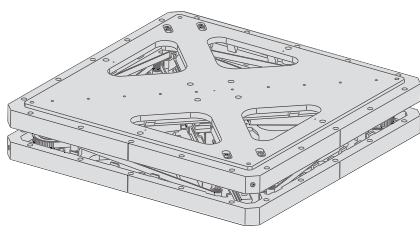
The movement of the module is converted into rotation of the pulley by means of the timing belt.

### Disk damper

Incorporated in the pulley is the disk damper, which dampens the rotation of pulley, and in turn, the movement of the module.

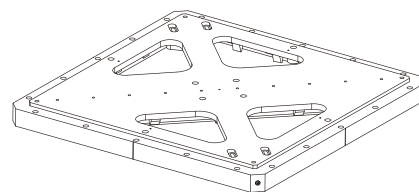
## ☒ Module Types

### Bearing module



- Load supporting unit
- Recovery and damping functions can be adjusted to suit location and amount of weight

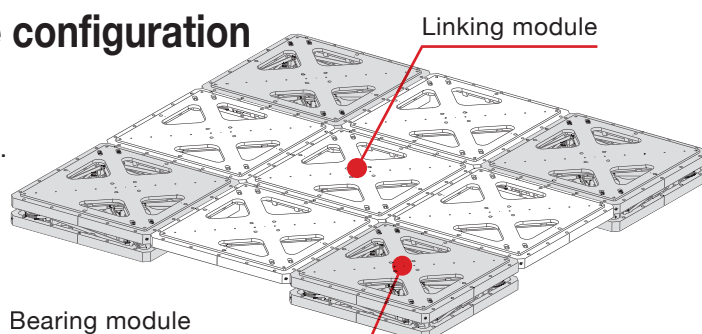
### Linking module



- Connects bearing modules

## ☒ Module Sample configuration

Easy to connect. Surface structure ensures high rigidity.



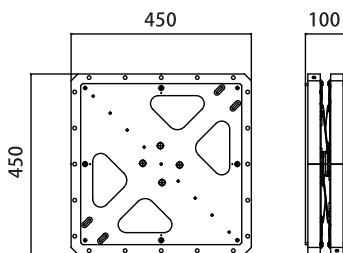
## ☒ Module dimensions

### TGS4

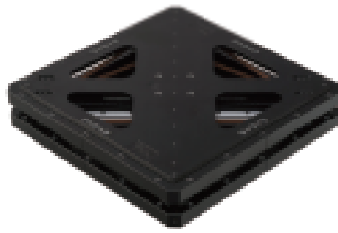


**new**

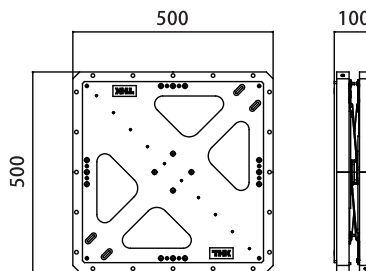
Stroke:  $\pm 220$  mm



### TGS5



Stroke:  $\pm 250$  mm

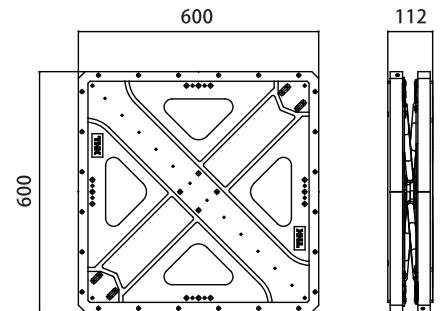


### TGS6

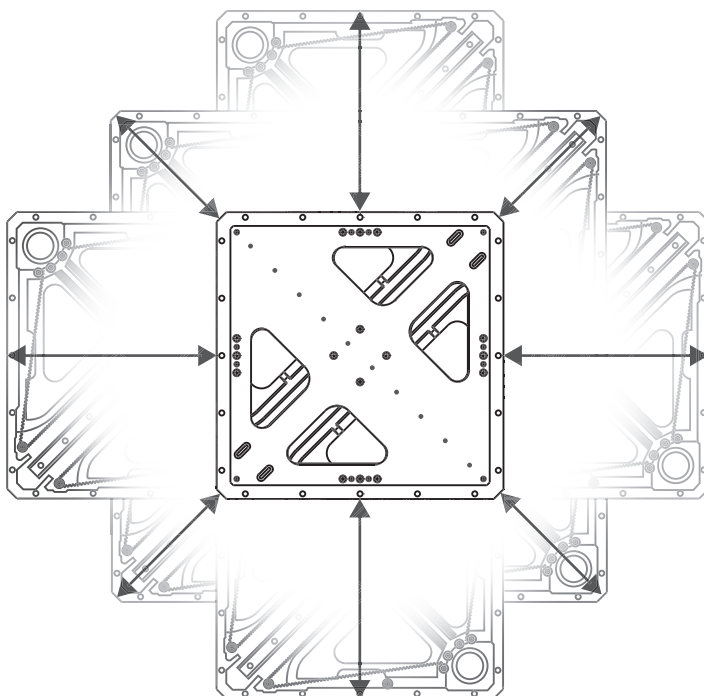


**new**

Stroke:  $\pm 315$  mm



## ☒ Range of motion



During an earthquake, TGS modules move in the range of motion shown below. It is therefore necessary to ensure enough space is available in the planned area of usage. Also, be sure not to leave any obstructions within the stroke range.

Direction	TGS4	TGS5	TGS6
45°	$\pm 220$ mm	$\pm 250$ mm	$\pm 315$ mm
0°, 90°	$\pm 311$ mm	$\pm 354$ mm	$\pm 445$ mm

\* Modules are designed with the stroke range in the 45° direction.

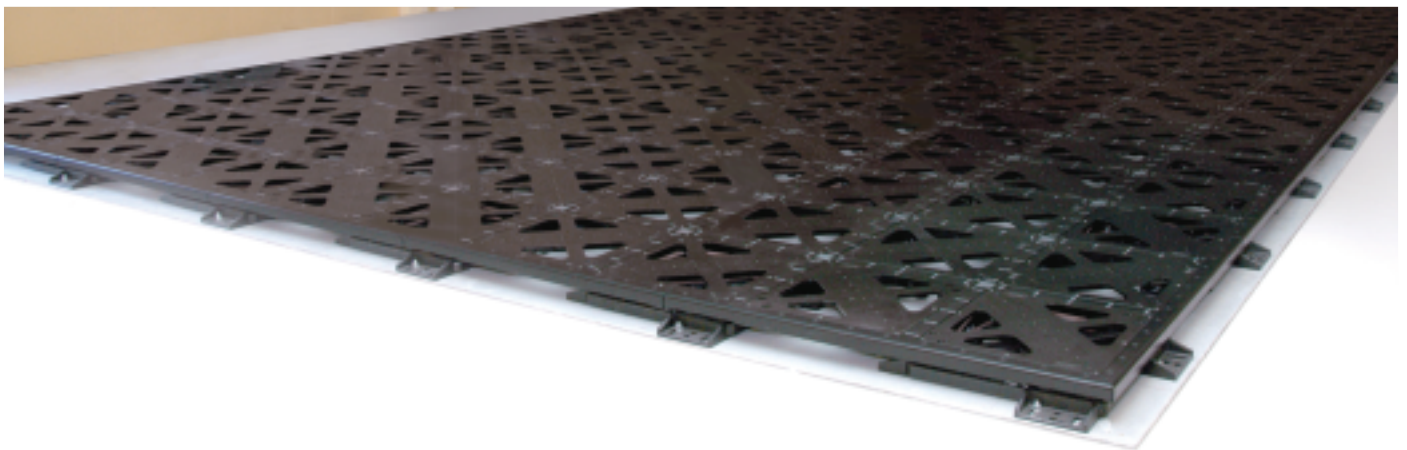


# Seismic isolation for the entire floor

## ☒ Data centers



After installation of servers

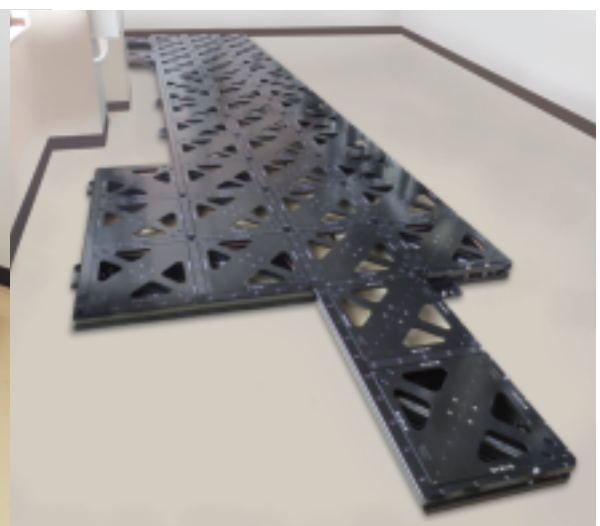


Before installation of servers

## ☒ Nuclear power research facilities

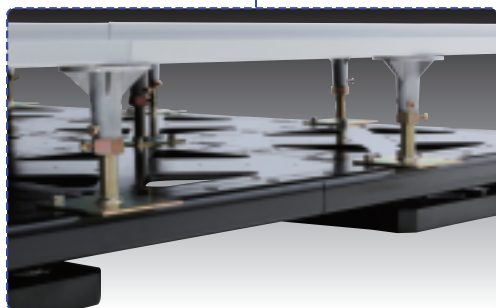
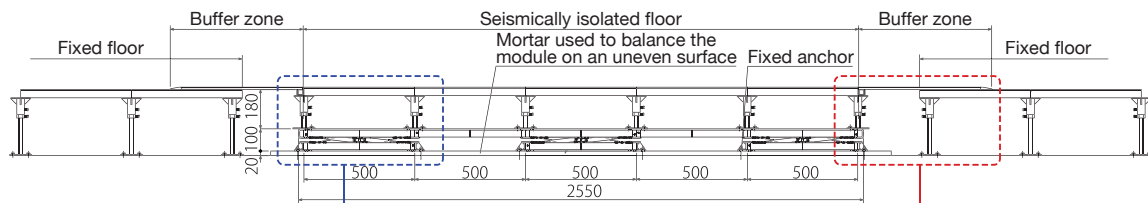
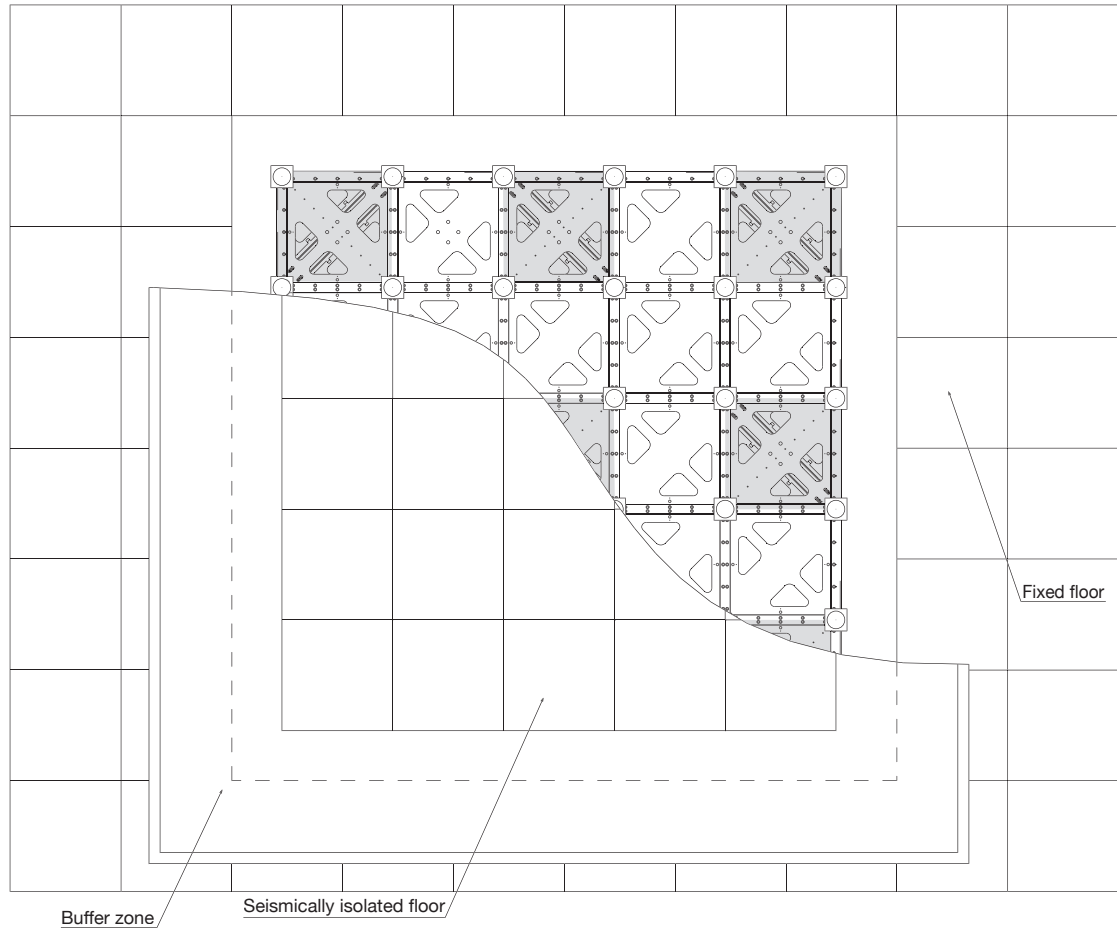


After floor installation

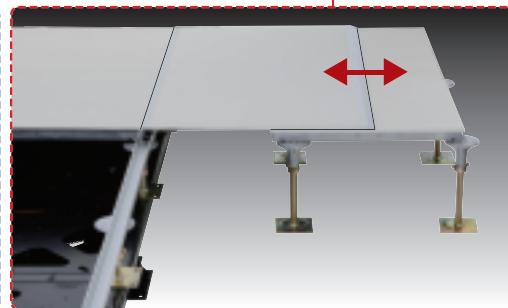


Before floor installation

## ☒ Raised floor



Wiring space



Buffer zone

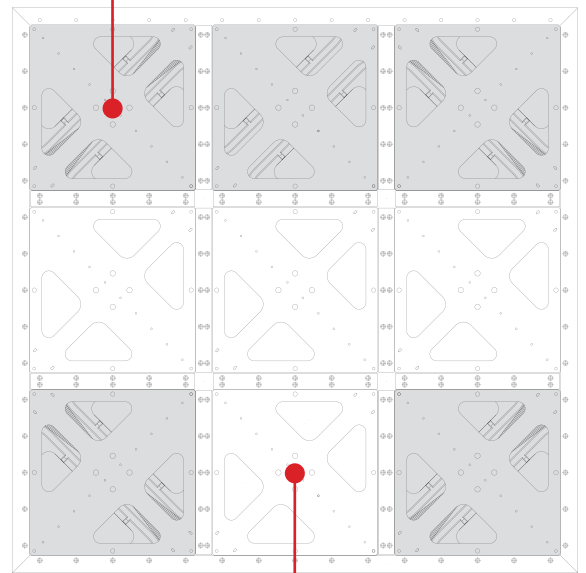
# Seismic isolation by equipment size

## ☒ 3D measuring instrument



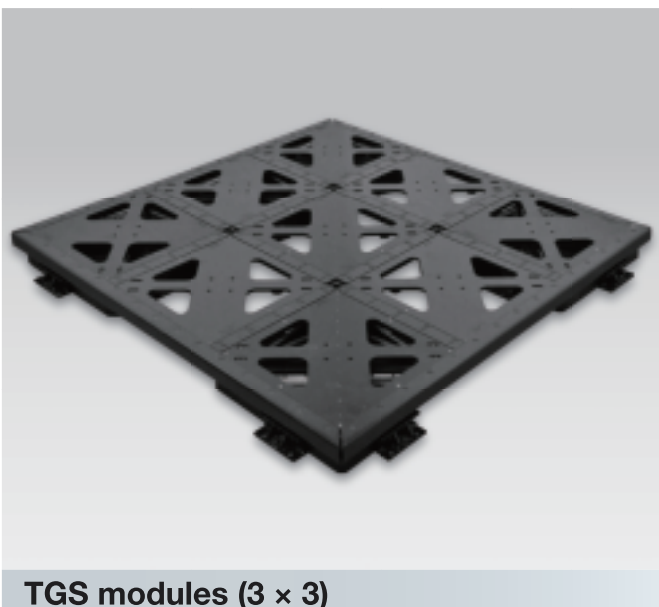
3D measuring instrument  
(Tokyo Seimitsu / Carl Zeiss)

Bearing module

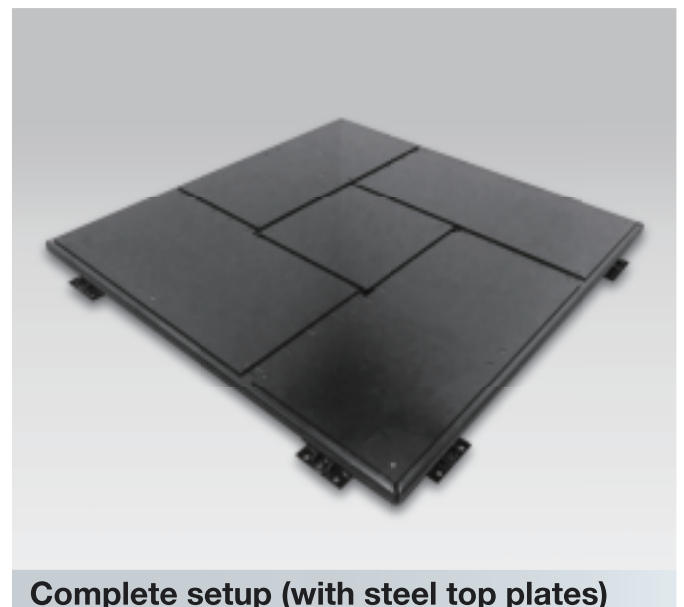


Linking module

TGS module configuration



TGS modules (3 × 3)



Complete setup (with steel top plates)

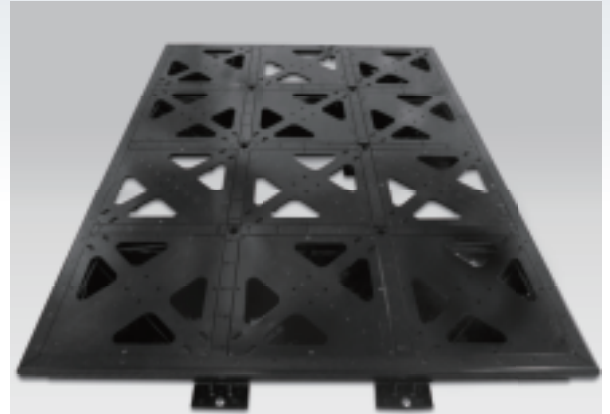


## ☒ Semiconductor manufacturing equipment

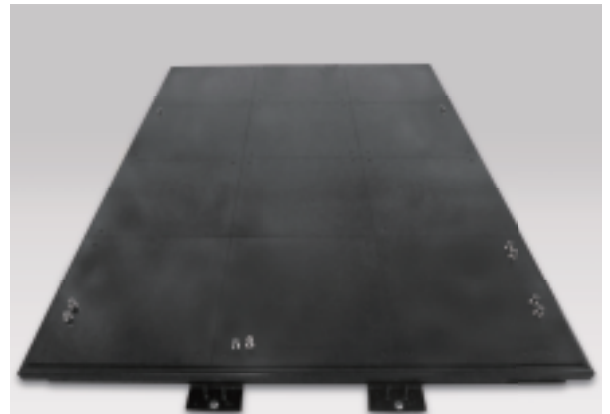


TGS modules

Semiconductor manufacturing device  
Weight: 2 metric tons

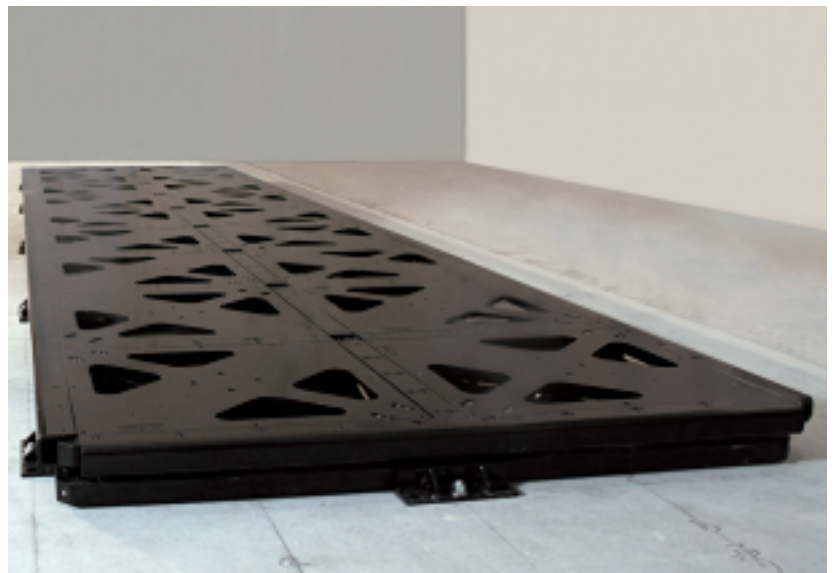


TGS modules (3 × 4)



Complete setup (with steel top plates)

## ☒ Server



TGS modules (2 × 9)

# THK Seismic Isolation Module Model TGS

## Safety precautions

### Use of Seismic Isolation Modules

- Please read the instruction manual carefully before using the Seismic Isolation Module.
- Do not dismantle or attempt to modify the Seismic Isolation Module. Any such action could cause the product to malfunction.
- Seismic Isolation Modules are designed for indoor use only.

### Setup

- To prevent the possibility of injury during an earthquake, make sure there are no objects within the product's range of motion (the maximum displacement stated in the catalog) and that all personnel stay clear as well.
- To ensure proper performance, make sure the load is within the weight range stated in the catalog. Do not load the product with any object that has a high center of gravity or that would topple if pushed.
- For proper seismic isolation, the product must be placed on a level, even surface; placement on a slanted or uneven surface could cause misalignment, undue strain or irregular movement. When dealing with slanted or uneven surfaces, please obtain professional assistance or consult your local distributor.

### In the event of an earthquake

- If a seismic tremor occurs, move away from Seismic Isolation Modules immediately to prevent any possibility of injury through accidental contact with a moving module.
- If an earthquake of intensity-level 6 or greater (on the Japanese scale) occurs, review the post-setup checklist in the instruction manual following the earthquake and follow the directions provided.

## Warranty

- (1) This product is designed to attenuate horizontal seismic motion; it is not intended to be effective against vertical seismic motion. This product will reduce the effect of tremors on an object loaded onto it, but there is no guarantee that the object will not move or topple.
- (2) In the event of seismic motion stronger than this product is designed to absorb, the modules can be expected to strike the stopper, exerting an impact on any object atop the modules.

### Warranty period

The warranty period is one year from the date of delivery.

### Scope of warranty

This warranty covers repairs to or replacement of a Seismic Isolation Module. It does not cover accidental damage, loss of business profits, interruption of business activities, loss or alteration of data, or the like, arising from the use of this product or due to the product being out of service.

### Disclaimer

THK is not liable for any Seismic Isolation Module malfunction arising from any of the following:

- Tsunami, lightning, flooding, fire, or another such accident or disaster.
- Damage to or collapse of a building due to an earthquake.
- Damage caused by the actions of a third party, intentional or unintentional misuse of the product by the customer, or use of the product under abnormal conditions.
- Loading of an object that is not within the load weight range stated in the product specifications.
- Seismic input exceeding the product capacity stated in the specifications or input exceeding the maximum displacement stated in the specifications.
- Damage to an object located within range of maximum displacement or caused by the presence of an object that obstructs the product's movement.
- Loading of an object that does not conform to the stated restrictions concerning loads.
- Placement or setup of a Seismic Isolation Module other than in conformity with the instructions for correct placement and setup set forth in the instruction manual.

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