



All about seismometers

The role of seismometers and basic knowledge about earthquakes



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*The specifications and design are subject to change without notice.



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Chapter 01 About earthquakes

1 Unit of earthquake

Frequency

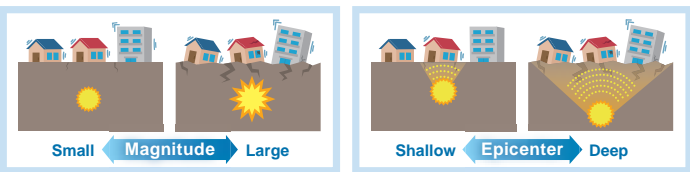
Frequency is the number of vibrations that occur per second (unit: Hz). In general, earthquakes are dominated by **waves of several tens of Hz or less**, with vertical waves having a higher frequency than horizontal waves.

Acceleration

The unit used to express earthquake acceleration is Gal. $980 \text{ Gal} = 980 \text{ cm/s}^2 \approx 1 \text{ G}$
Waveforms exceeding 1000 Gal were recorded in both the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake, which shows that an acceleration of more than 1 G due to gravity occurred.

Magnitude

Magnitude is a measure of **the size of the earthquake itself** at the epicenter. Generally, the deeper the epicenter and the greater the magnitude, the wider the area that the shaking will reach.



Seismic intensity

Seismic intensity is an index that indicates the degree (strength) of shaking at the observation point. It is calculated based on the acceleration waveform, so even if the maximum acceleration is the same, the value will vary depending on the duration of the earthquake and the vibration frequency included.

Seismic Intensity Scale

The Japan Meteorological Agency has set up a scale of 10, from 0 to 4, 5-weak, 5-strong, 6-weak, 6-strong, and 7. [\[See below\]](#)

Seismic Intensity Scale	People's experience and behaviour
0	People do not feel the shaking, but they are recorded by seismographs.
1	Some people who stay quiet indoors may feel the shaking slightly.
2	Most people who stay quiet indoors will feel the shaking, and some who are sleeping will be awakened.
3	Most people who are indoors feel the shaking. Some people who are walking around feel the shaking. Most people who are sleeping wake up.
4	Most people are startled, walking feel the shaking and sleeping wake up.
5-weak	Most people feel scared and want to hold on to things.
5-strong	Most people find it difficult to move around, such as having difficulty walking without holding on to something.
6-weak	Standing becomes difficult
6-strong, 7	People cannot stand and have to crawl to move. People are tossed about by the shaking, unable to move, and sometimes even blown away.

2 About SI values

What is SI value?

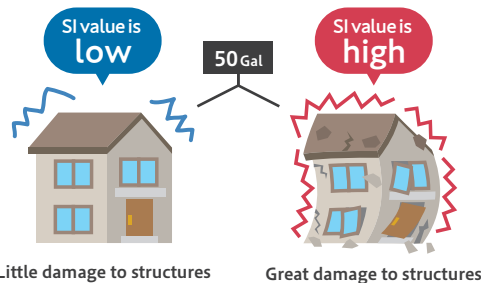
A numerical value indicates **the degree of damage that would occur to a typical building** due to an earthquake. It is an indicator of the magnitude of an earthquake. It is introduced into city **gas sensors** and **railway** earthquake detection systems to determine the extent of damage to buildings immediately after an earthquake occurs.

Why is SI value?

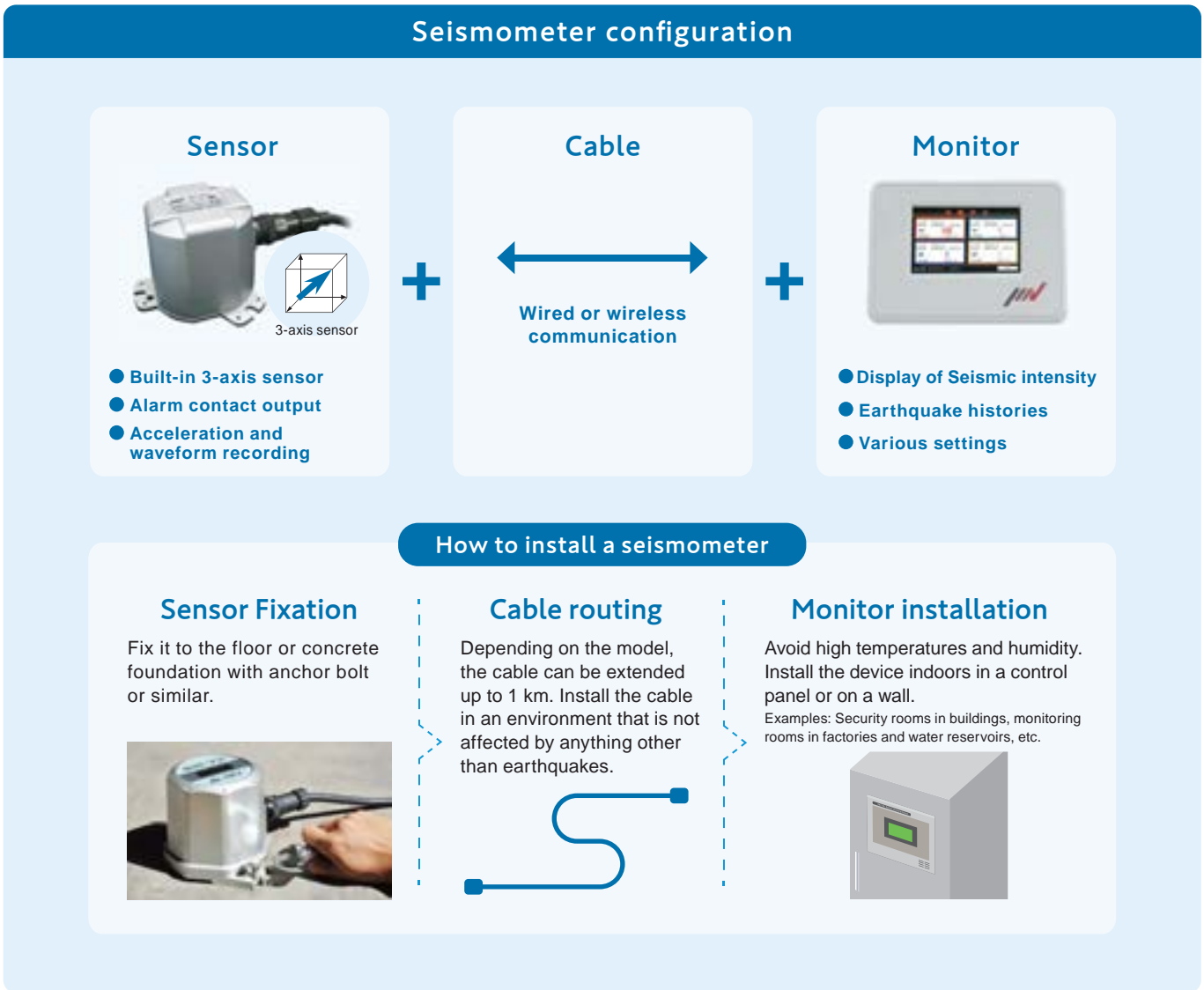
Houses, buildings, factories, etc. are at high risk of being damaged by continuous shaking with their own specific rhythm. The SI value is a numerical representation of this rhythm, and the higher the SI value, the greater the damage to buildings will generally be.

The magnitude of the earthquake does not equal the extent of the damage

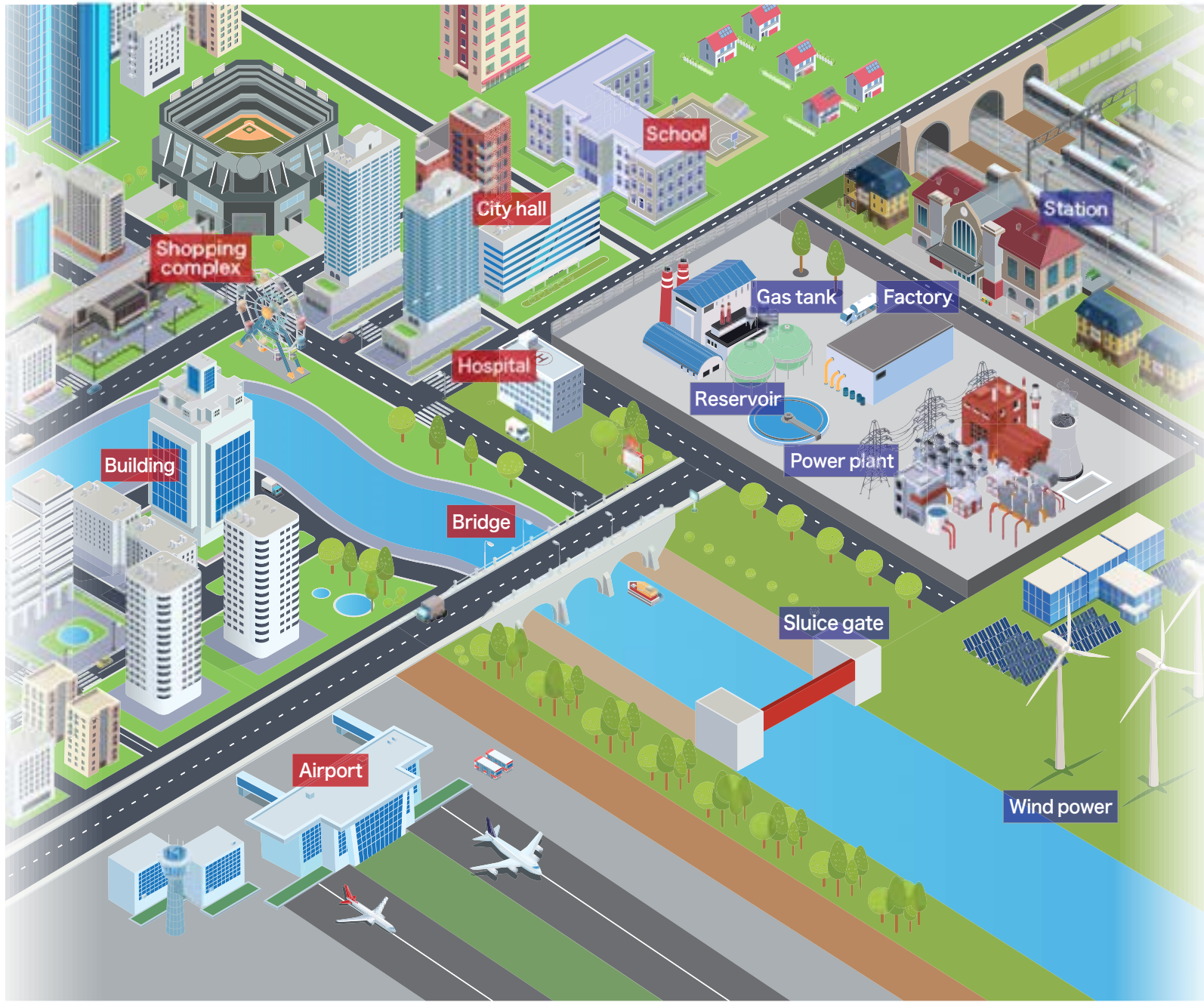
The SI value, which is an index tailored to the building, is effective



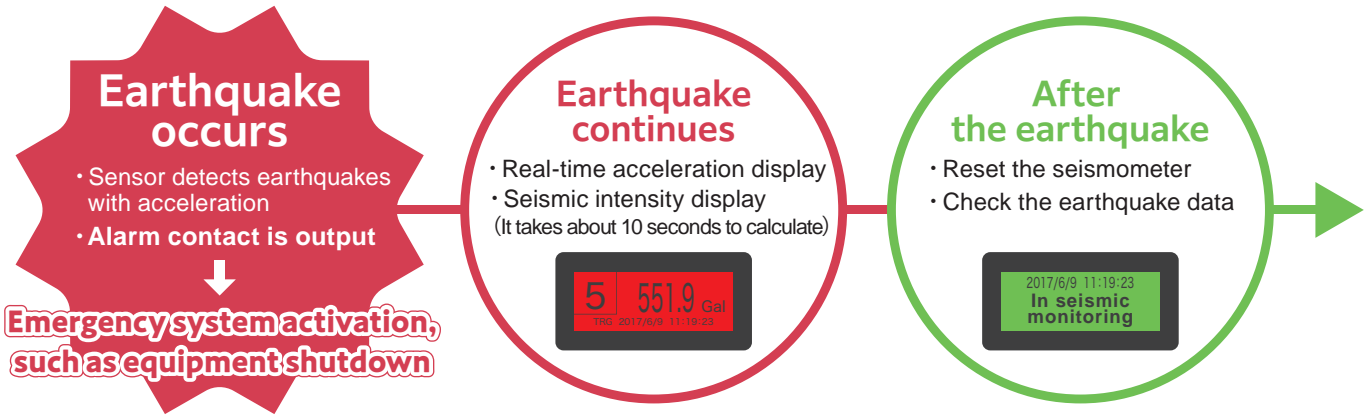
3 About Seismometers



1 Location of seismometers



What to do when an earthquake occurs



Seismometers are utilized in a variety of places.

Our seismometers are also installed at the “EXPO2025 Osaka, Kansai, Japan” site.

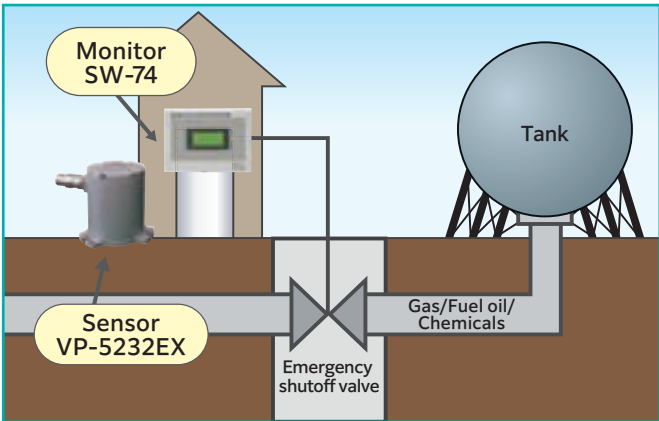
2 Role of seismometers

The biggest role of seismometers is to prevent secondary disaster.

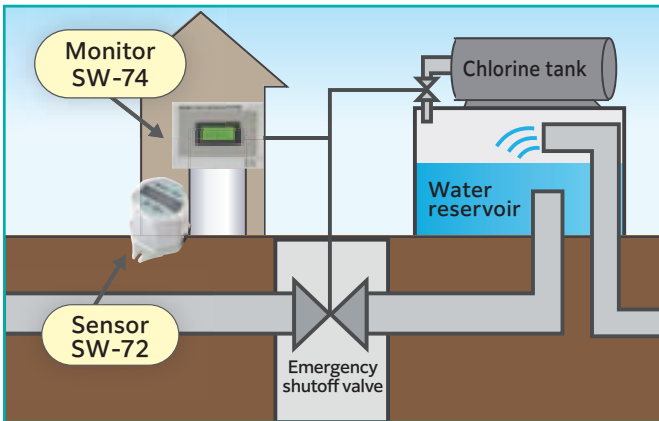
There is no guarantee that we will be able to take immediate action when an earthquake occurs. Seismometers can prevent further damage by triggering emergency actions on our behalf and informing us of danger.

Control of emergency shutoff valve Product: SW-74 series (details on P.8)

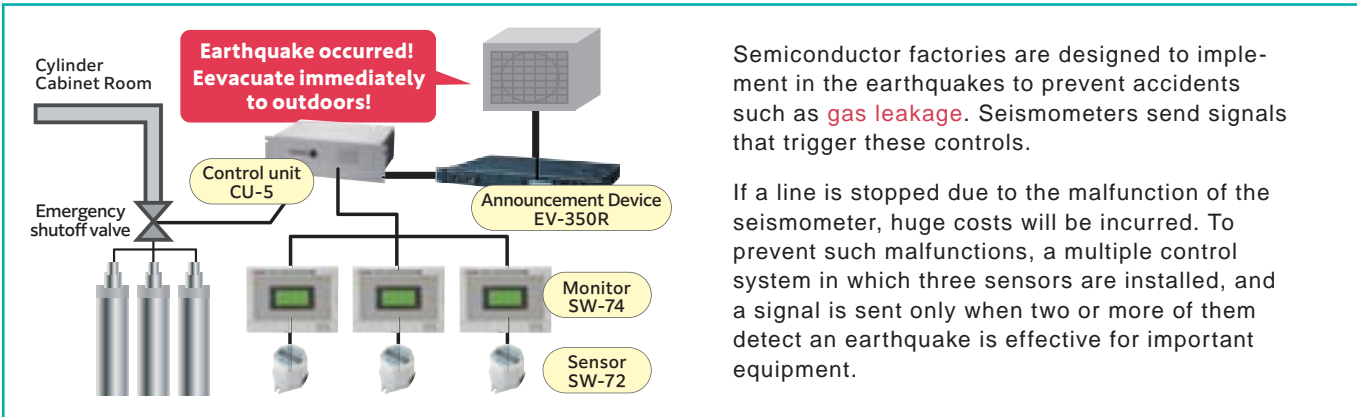
Installation example of oil and chemical plant



Example of water supply system

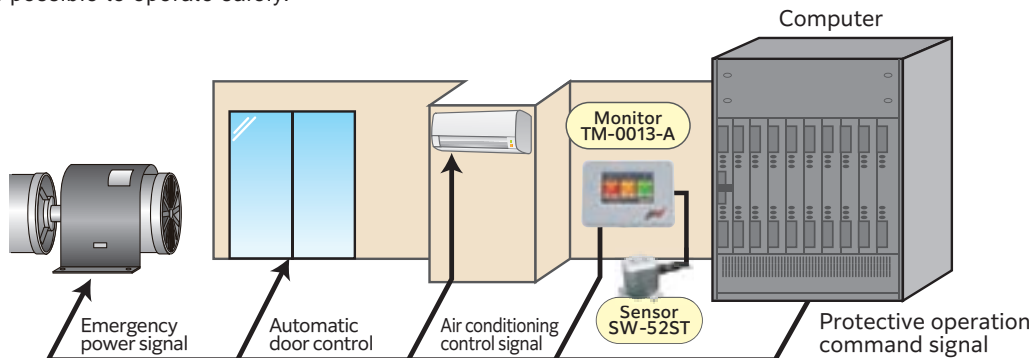


Installation example of semiconductor manufacturing equipment



Equipment Protection Product: TM-0013-A (Details in P.8)

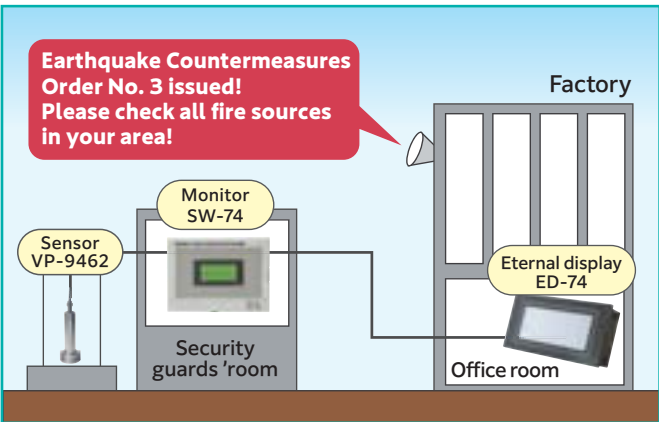
When a large earthquake occurs, emergency power supply equipment may also be damaged. By controlling operation with a seismometer, it is possible to operate safely.



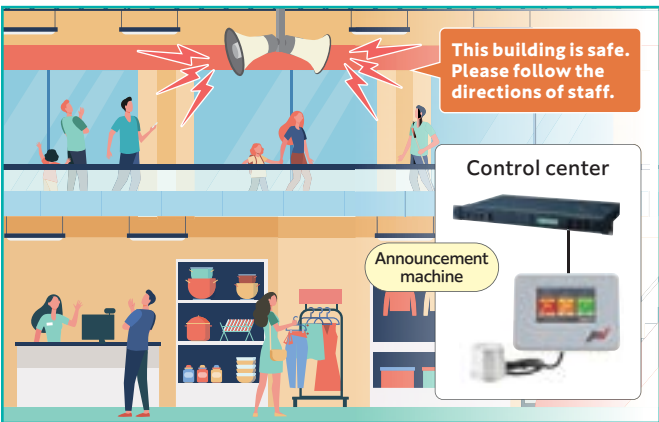
Evacuation guidance and safety assurance Product: TM-0013-A (Details P.8)

It can be linked to an announcement device within the premises to encourage evacuation. It also can be set to output signals in stages depending on the size of the detected earthquake.

Example of use of the factory evacuation system



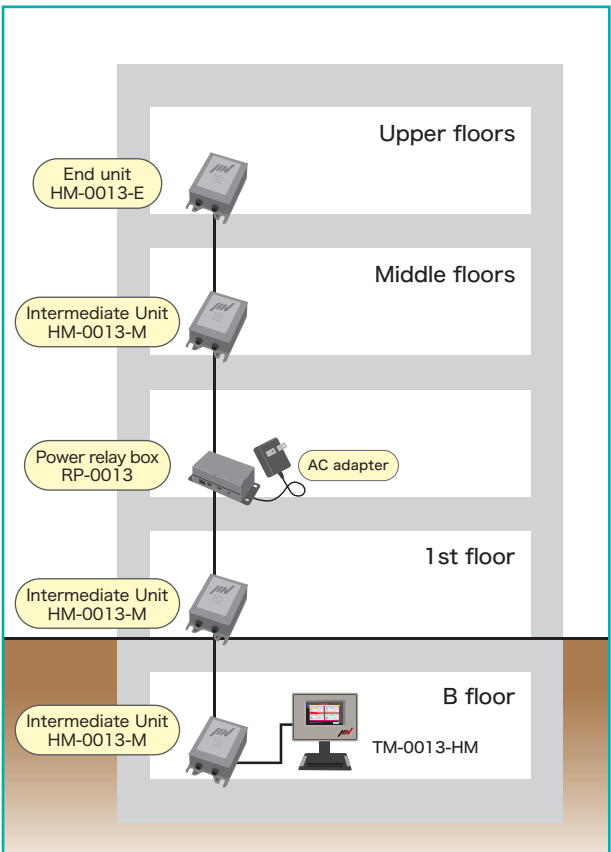
Example of use in a shopping mall



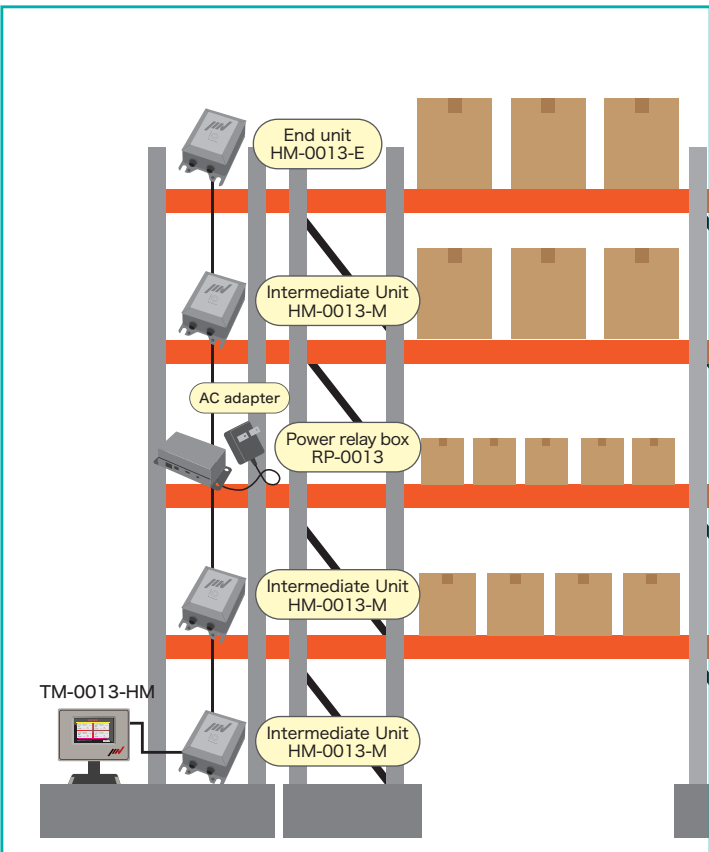
Earthquake recording Product: HM-0013 (details on p.8)

Even with the same earthquake, the size of acceleration varies depending on the floor. By installing sensors on each floor and recording each shaking, the data can be used to improve earthquake resistance measures.

Building



Automated Warehouse



1 Compare products

Comparison by purpose

To control the system when an earthquake occurs.

SW-74/72

Simple functions, and ideal for first-time users

SW-7033

Built-in capacitive sensor makes it even more affordable.

TM-0013-A/SW-52ST

Up to 3 units can be connected simultaneously and suitable for explosion-proof areas.

To monitor the vibrations of buildings and facilities.

TM-0013-HM & HM-0013

Small sensors are ideal for installation in multiple locations on upper and lower floors of a building. Data can also be viewed on the cloud.

HM-5013

Wireless type

To grasp the damage caused by the earthquake.

SW-5033

By specializing in earthquake measurement, we have achieved cost reduction and miniaturization.

SW-74SI/72R

Alarm can be set up to 10 levels. SI values are also supported.

Comparison by function

Monitor multiple locations simultaneously

TM-0013-A/SW-52ST

Up to three devices can be connected and monitored simultaneously on one monitor.

Wireless communication

HM-5013

It can be installed without complicated wiring, and data can also be sent to the cloud.

Explosion-proof area compatible

TM-0013-A/SW-52EX

Improvements to conventional sensors have made explosion-proof sensors more affordable. Up to three units can be connected.

Comparison by cost

Low

High

SW-5033

HM-0013

SW-7033

SW-74/72

TM-0013-HM

TM-0013-A /SW-52ST

*The above prices are based on the list price.

*The prices may vary depending on the number of sensors connected, cable length, and other specifications.

2 Product lineup

For more detailed product information and other product information, please visit our website.

SW-74 series

Standard model for a simple-to-use

Easy operation

The touch panel allows you to quickly check earthquake data in case of an emergency. Alarm and other settings can also be set from the screen.

Alarm setting screen

High visibility display

The importance of the information is displayed by the color of the backlight, so it can be recognized from a distance.

Earthquake occurs

Earthquake monitoring

Check the earthquake

TM-0013-A

Multi-function model

Explosion-proof sensor is also available

This model includes the SW-52EX sensor, which is suitable for explosion-proof areas.

SW-52ST

SW-52EX

Simultaneous monitoring of three locations

One monitor can connect three sensors and operate them on a single screen.

TM-0013-HM

Small and inexpensive sensor ideal for building monitoring

For monitoring and analysis of building status

Acceleration waveforms can be checked and FFT analysis can be performed. It is possible to monitor the building status during normal times as well as after an earthquake.

Contains up to 5,000 entries

Wireless version available for cloud data transfer!

SW-5033 Three S Seismometer

For network of regional disaster risk reduction. Reduced costs by limiting functions

Compact size

Significantly smaller in size than conventional seismometer sensors. Allowing greater freedom in installation location.

90 mm

70 mm

Protection rating IP67

It has waterproof and dustproof structure, so you can use it outdoors.

Shock resistance: 1000G

This product has extremely high shock resistance, significantly reducing the burden on transportation and installation.

The ISO standard for the introduction of seismometer systems was published as ISO37174 in February 2024. As a manufacturer of seismometers, we are working to make our products compliant with this standard so that we can contribute to reducing earthquake damage and preventing secondary damage.

Standard details

ISO37174 classifies seismometer systems that are widely utilized for disaster risk reduction purposes in Japan into categories A to J and subcategory +L according to their purpose. The standard aims to ensure that seismometer systems suited to each purpose are properly implemented in society and utilized for as many disaster risk reduction purposes as possible.



Prepared by the Ministry of Economy, Trade and Industry as part of the "FY2021 and 2022 Industrial Standardization Promotion Project Commissioned Cost Strategic International Standardization Acceleration Project Industrial Infrastructure Field International Standardization Development Activities International Standardization for Disaster Prevention Utilizing Smart Community Infrastructure"

1. Product Warranty

Our products undergo rigorous in-house inspections, but in the unlikely event of a malfunction, please confirm the symptoms and contact our sales office.

Warranty period

The product warranty period is one or two years after delivery to the designated location. (This varies depending on the product, so please contact us for more information.)

Warranty Coverage

- (1) If a malfunction occurs during the warranty period for which we are responsible, we will repair it free of charge. However, in the following cases: It will be excluded from the scope of the warranty.
 - 1) Failure or damage caused by improper handling by the customer, such as dropping or impact during transportation or movement.
 - 2) Failure or damage caused by natural disasters such as fire, earthquake, flood, lightning strike, and abnormal voltage.
 - 3) Failure or damage caused by equipment connected to the product.
 - 4) When the customer disassembles, repairs, or modifies the product.
- (2) The scope of the warranty is limited to (1) above and does not include secondary damage to the customer caused by the failure of our products (damage to equipment, loss of business opportunities, lost profits, etc.) Any damage is not covered by the warranty.

2. Product maintenance

- Maintenance on site (availability varies depending on region)
 - Contents of maintenance
 - Check the function of each part individually by inputting equivalent power
 - Calibrate the sensitivity and check the correct function of the entire system by exciting the vibration pickup with a test device
 - Replacement and maintenance of consumables.
 - Submission of reports and performance reports *A separate estimate will be provided for repairs and replacement of consumables.
- Maintenance on IMV (inspection will be carried out at our factory)
 - Contents of inspection
 - Maintenance/adjustment/operation check/ comprehensive vibration calibration
 - Submission of report and performance report *A separate estimate will be provided in the event of repairs or replacement of consumables.
 - Required number of days
 - Approximately 10 days after receipt by the factory *It may vary depending on the case.

Examples of maintenance and inspection

Maintenance period	Maintenance contents	Replacement parts
Time of delivery	System operation check	—
1 to 2 years	Regular inspection (on-IMV)	Uninterruptible Battery
6 to 7 years	Regular inspection (on-IMV)	Button battery/Display
10 ~	Regular inspection (on-IMV)	—

*Replacement parts vary depending on the model.
*We recommend replacing the product after 10 years.

Contact/Shipping Address

IMV Corporation Engineering Service Department
(Vibration Measuring System)
870 Hizure, Midori-ku, Sagami-hara-shi, Kanagawa, 252-0185, Japan
TEL : 042-687-2431 / FAX : 042-687-2430

Equipment for maintenance (PA05&PET03H)

