

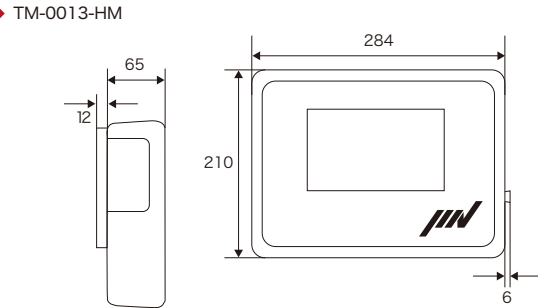
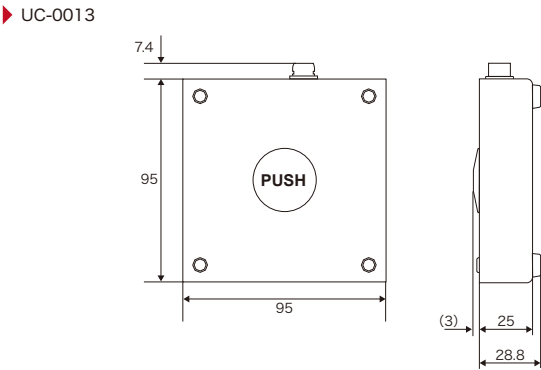
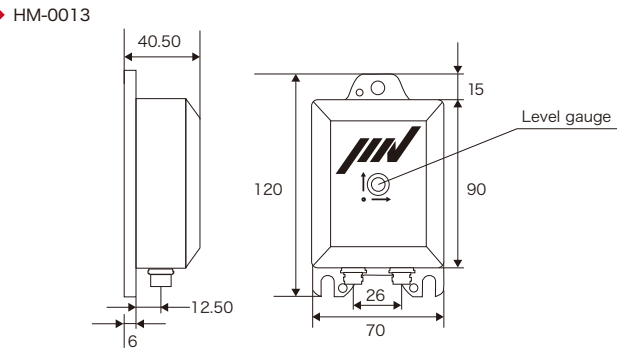
Specification			
▶ HM-0013			
Item	High precision mode	High frequency mode	Note
Measurement axis	3 axis (X,Y,Z)		—
Measurement range (full scale)	±2000 Gal	±6000 Gal	Each axis
Frequency range	~100 Hz		Sensor only 1000 Hz
Acceleration accuracy	±0.5 %FS (±0.1 %FS)	±5.0 %FS (±1.0 %FS)	Standard (special)
Sensor noise density (rms)	XY : 0.0001g / √Hz level / Z : 0.0002 g / √Hz level	XY : 0.0003 g / √Hz level / Z : 0.0005 g / √Hz level	0.1 Hz~100 Hz (Less than 0.00004 g / √Hz between 1 Hz to 100 Hz)
A/D resolution	24 Bit		ΔΣ type
Power supply	DC12 V±20 %		—
Structure	IP67		—
Communication	RS485 (Modbus)		Convertible in option
Time accuracy	5.0 ppm		Accurate with 13 seconds per month
Ambient temperature	-10~+60 °C		—
Size (Mass)	90×70×40 mm (Approx. 400 g)		Excluding connectors etc.
Function	Temperature correction		—
	Temperature output		Near temperature of sensor module
	Daisy chain connection		—
	Sensor self check		Sensor condition confirmation

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

▶ UC-0013		
Item	Specification	Note
PC connection interface	microUSB connector	USB2.0
DC IN power voltage	DC4.5 V~9 V	Designated AC adapter AC100 V / 240 V
Power supply	12 V / 250 mA	AC adapter in connection
	12 V / 80 mA	USB bus power in operation
Contact	1a 1ch	60 V / 2.5 A
Top button	External trigger pin interlocking	-
Sensor switch	Power ON / OFF for connecting HM	-
Ambient temperature	-10 ~ +60 °C	-
Size (Mass)	95×95×28.8 mm	Excluding connectors etc.
Function	Approx. 230 g	-

▶ TM-0013-HM		
Item	Specification	Note
Screen	7 inch touch panel	Resistive touch panel
LAN / Ethernet	100BASE-TX / 10BASE-T	AUTO-MDIX
USB	USB2.0 (Host) × 2	-
Media	SD card slot × 1	-
Screen output	HDMI connector	As for monitor, further discussion needed.
Contact	1a 8ch	60 V / 2.5 A
Power supply	DC24 V	Designated AC adapter AC100 V / 240 V
Ambient temperature	0~ +40 °C	-
Size (Mass)	284×210×65 mm	Excluding connectors etc.
Function	Approx. 2500 g	Only main unit

External dimensions (Unit:mm)



# IMV CORPORATION

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<https://we-are-imv.com/en/>

\*Product specifications and appearances are subject to change without notice.



DSS Business Division  
MES Business Division  
IMV Advanced Technology Research Laboratory  
Sales Division  
Quality Assurance Department  
Personnel General Affairs Department



CN/14640E Osaka Site

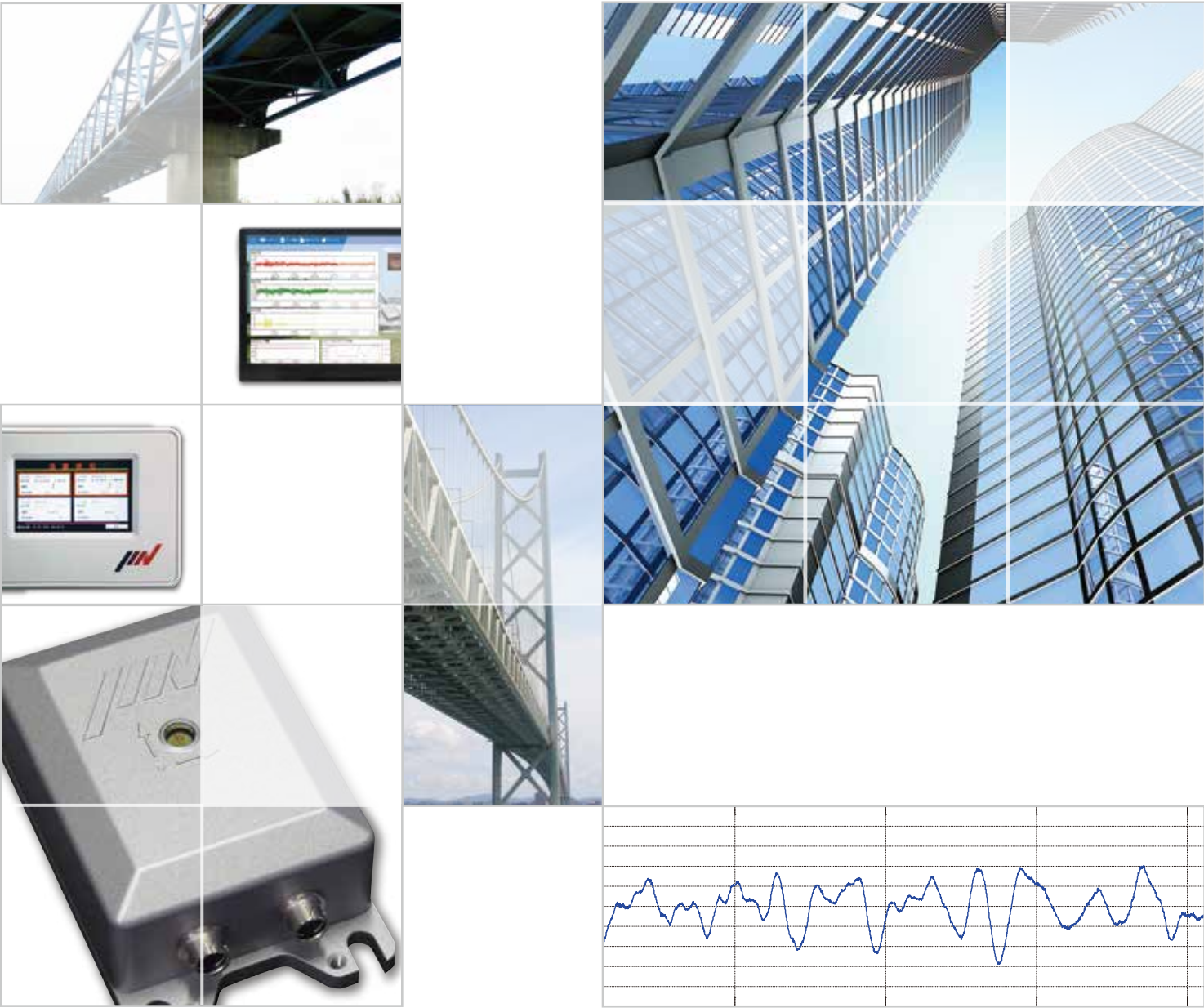
June, 2025  
Cat.No.2506-②01HME\_E.SK



SHM-Series

# Long Period Vibration Monitoring System

HM-0013



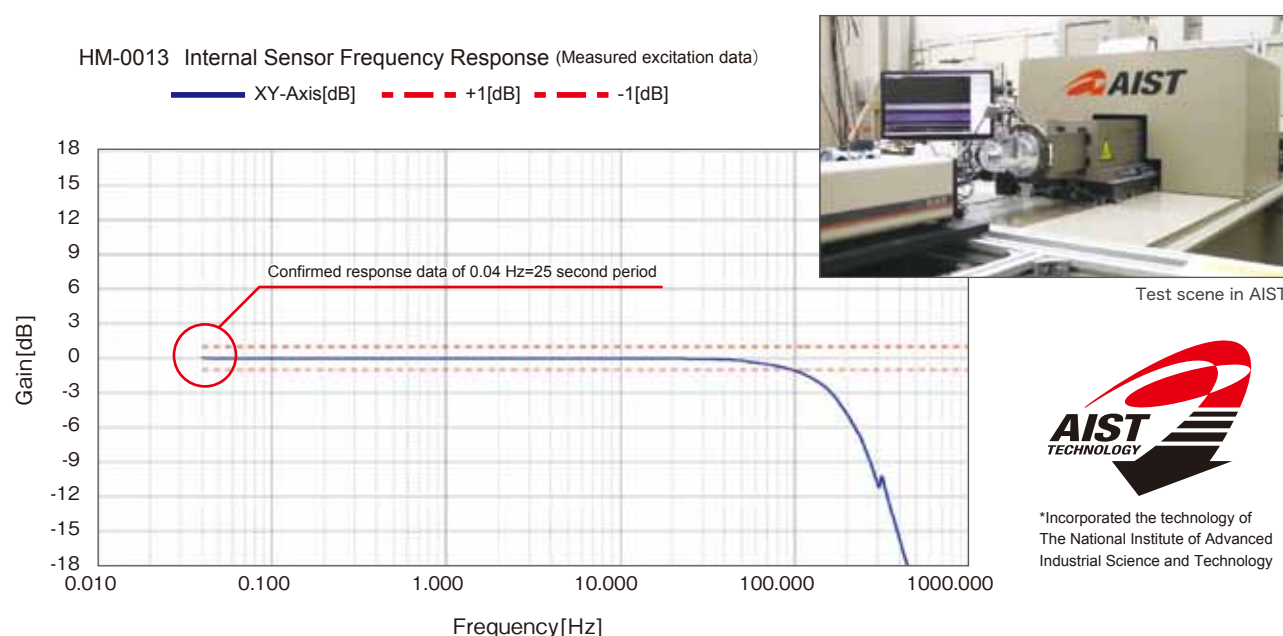
More familiar with Structure Health Monitoring

IMV CORPORATION



IMV CORPORATION

## Feature 1 High precision long period vibration measurement capability

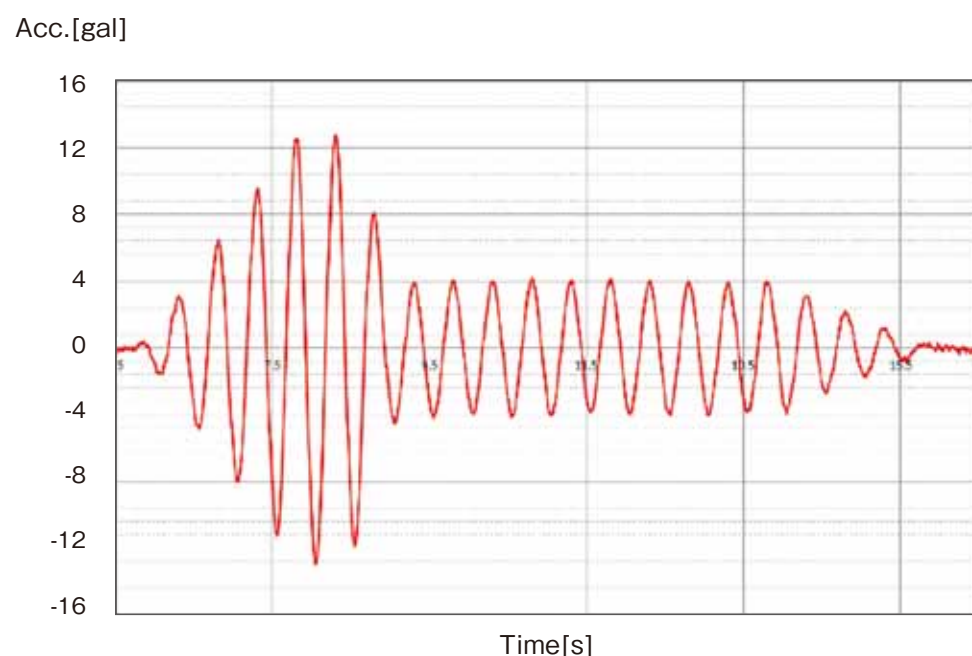


Operation verification at low frequency 0.04 by AIST\* has proven that HM-0013 can detect the long-ground motion accurately.

\*AIST: National Institute of Advanced Industrial Science and Technology.

## Feature 2 High precision micro motion measurement capability

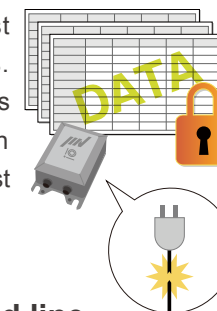
Because micro vibration up to 0.1 gal is measurable, it is also used for evaluation of floor vibration in addition to seismic monitoring.



## Feature 3 Versatile monitoring functions

### •Data loss recovery for power failure

Recording for seismic motion must survive even power failure occurs. To meet this need, HM-0013 carries the memory with no limitation on writing frequency which won't be lost in power failure.



### •Synchronization designated line

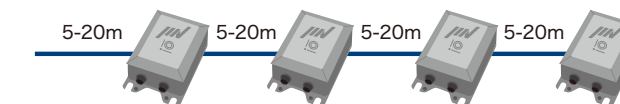
Synchronization in multi-point measurement is very important and HM-0013 is designed for those analysis is easily carried out. Complete synchronization is possible since the each unit secures designated line for synchronization. Synchronization for all measured data is secured with simultaneous AD conversion in each axis.

### •Host loss recovery function

After the condition is set and the measurement starts, even the connection to the host is shut down, single unit of HM-0013 continues the normal operation as long as the power is secured.

### •RS485 Modbus communication

In case of HM-0013 connected in series, power is provided by the host, up to 4 pcs connection within total 80 m is possible. By using power junction box between connections, it can extend the cable length and increase the number of connecting units. If the hardware owned by user supports Modbus communication, it can customize the system construction with provided data map by IMV.



### •Self-check function

Operation check from HM-0013 internal sensor or output function. For example, it checks if the unit is correctly operated from remote place once in a day.

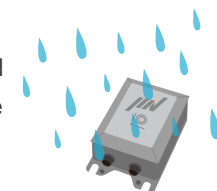
### •Narrow dedicated cable

Can be operated with external dimension  $\phi 5$  cable. Easy installation with smaller limitation (connector  $\phi 13$ )

## Feature 4 Function to reduce installation work

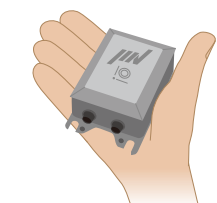
### •Protection grade IP67

It is designed with a waterproof and dustproof protection and can be used outside safely.



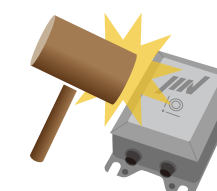
### •Compact

Size has been significantly scaled down compared to a servo type acceleration sensor which had been generally used as a low frequency vibration measurement. Flexibility at installation site is improved.



### •Impact resistance 1000G

Having the high level impact resistance. The robust structure drastically reduce break accident in installation construction.



### •CE marking

High security and noise resistance has passed Europe standard.



Therefore,

**HM-0013 is very suitable for high level structure health monitoring!**

**Volume efficiency realised  
unprecedented low cost!!**



## System composition

### ●Smart display unit TM-0013-HM

HM-0013 units are connected up to four units and those high spec sensors can be operated with 7 inch touch panel. It carries a waveform measurement function with time reservation or a seismic measurement function, corresponding to mailing notification by Ethernet. (See page 6)

### ●USB converter UC-0013

The device to convert to USB connector for connecting HM-0013 to PC or designated gateway GW-0013. It has alarm relay / external trigger switch forcing HM-0013 to record the data.

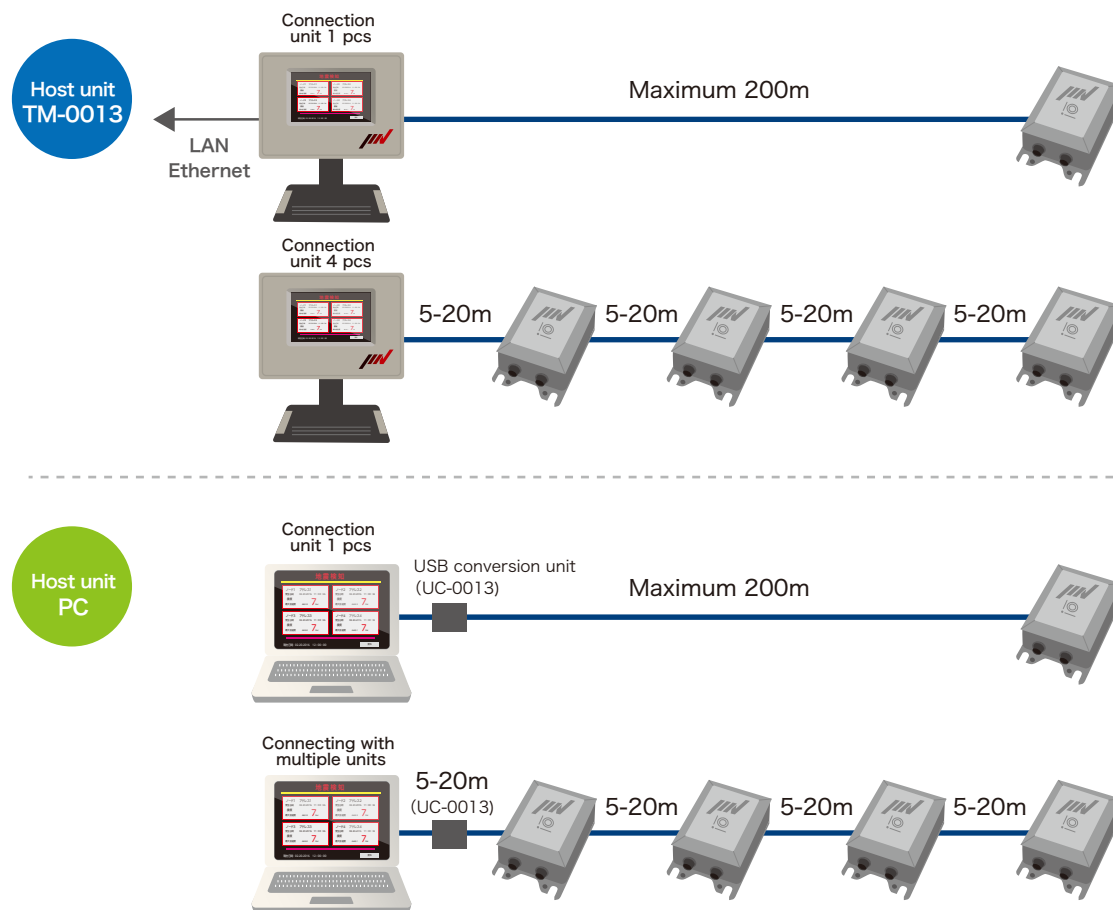
### ●Designated gateway GW-0013

It is a IoT unit capable of remote control and data collection. Measurement data can be viewed from any kind of terminal (PC or smartphone etc.) through internet connection browser by connecting to cloud server with 3G data communication or Ethernet.

### ●Power junction box RP-0013

Located at middle of connection, cable extension and unit addition is possible.

#### ▶ Connection cable length



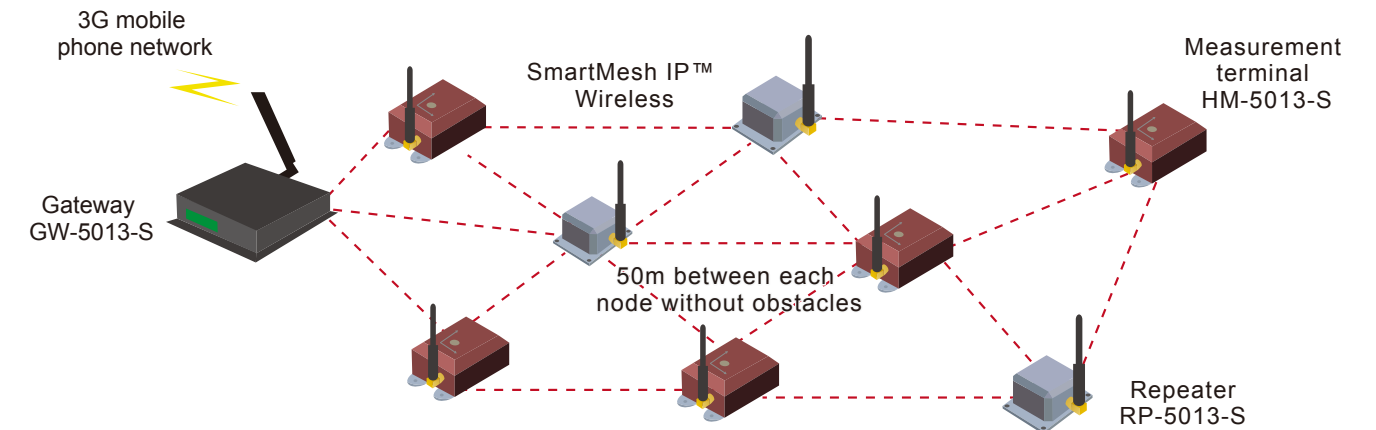
By using Power Junction Box RP-0013, technically speaking, there is no limitation for cable length. Please contact us for length and system quantity. When the number of unit increase, it may limit some part of functions.

## Wireless type

Under development

Linear technology SmartMesh IP™ Plan to implement wireless network

Under development HM-5013 M-Stone can build solid wireless network with SmartMesh IP™. The more the number of measurement point is increased, the farther connection is possible, the system composition is very flexible.



Composition image

\*SmartMesh is a registered trademark of Linear Technology Corporation.  
SmartMesh IP is a trademark of Linear Technology Corporation.  
The contents are subject to change without notice.

### ▶ Features

- Auto-configuring mesh network (automatic recognition of additional terminals)
- Automatic clock synchronization (1ms)
- High connection reliability by channel scan (resistible for intervention)
- With the radio repeaters, the signal can cover longer distances without degradation and wrap around the obstacles.
- Access from gateway to cloud server with 3G network or LAN cable
- During internet connection, clock correction of gateway side from NTP server
- Carrying Lithium-ion secondary batteries in the measurement terminals and radio repeaters.

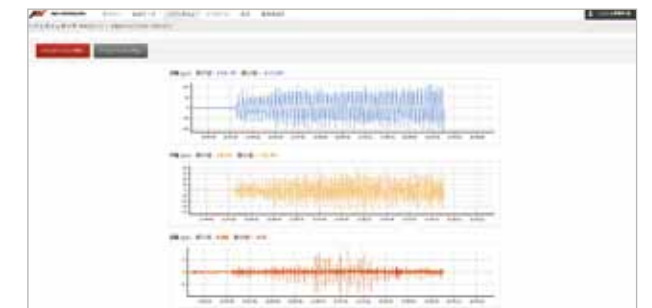
## Application system

### ●Ecomott Inc.

(<http://www.ecomott.co.jp/product/cloudloggerlte.html>)

- General purpose data logger for LET communication
- Cloud logger LTE DLX-400

Real time monitoring of not only alarm acquisition, but also waveform data of HM-0013 at distant place with LTE high speed communication.



### ●MORITANI & CO., LTD.

- Seismic isolation evaluation system

Package system to easily acquire alarm or waveform data by locating a number of HM-0013 unites in the building.



## Case Study

To regard concrete structures such as building or public and infrastructures such as bridges or tunnels as person, just like health diagnosis, measuring condition of those structures is called structure health monitoring. One of various diagnosis method, health monitoring with vibrometers has been paid attention to evaluate deterioration of aging buildings or bridges.

### Purpose

#### Understand the scour of bridge pier (Japan MLIT, SIP project)

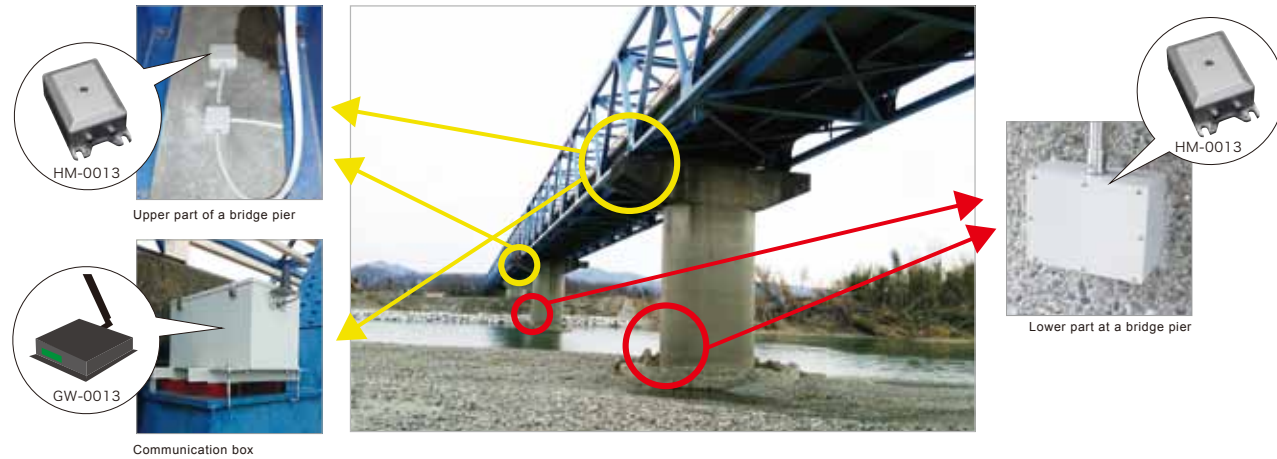
Joint study with Prof. Kawai from Osaka City University to conduct health monitoring of bridge. It is adopted as one of them in SIP (strategic innovation creation program) by Ministry of Land, Infrastructure, Transport and Tourism

### Research content

To measure vibration or inclination of a bridge pier, understand the condition of score at lower part of foundation work.  
\*Scouring can be defined as a process due to which the particles of the soil or rock around the periphery of the abutment or pier of the highway bridge spanning over a water body, gets eroded. It may cause overturning of bridge pier or dike break, so need to be monitored by an inspector when it is big rain.

#### Measurement scene

Vibration monitoring at Yoshino river in Shikoku area



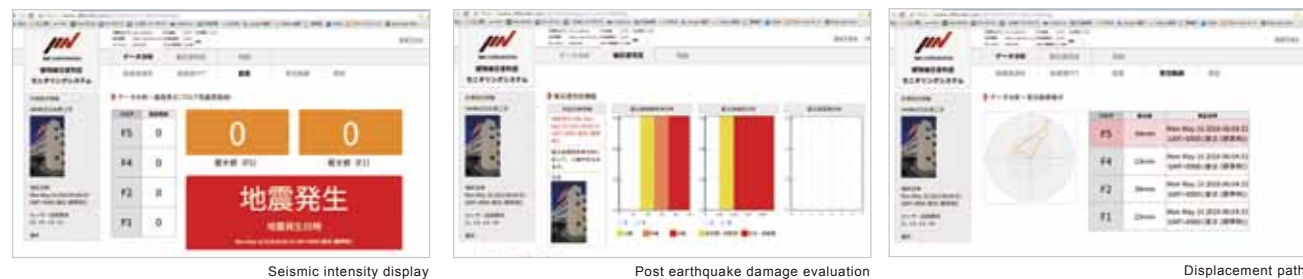
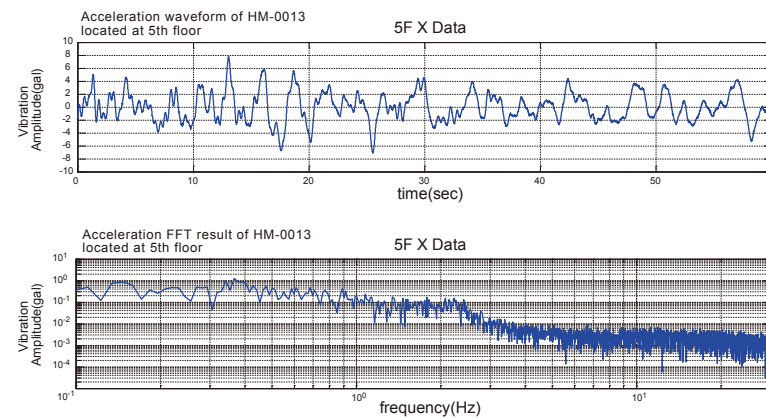
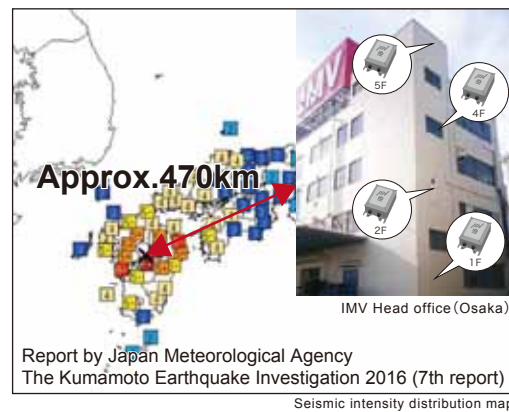
This study is conducted by "SIP infrastructure management and technology" Council for Science, Technology and Innovation.

### Purpose

#### Health monitoring of building structure

### Research content

Kumamoto great earthquake occurred in April 16th, 2016 was detected at IMV headquarter building. Taking advantage of high performance of HM-0013, the function which can smoothly evaluate postearthquake damage is now developed.



This measurement is carried with Osaka city innovation creation support subsidy. Development of structure monitoring system <http://www.city.osaka.lg.jp/keizaisenryaku/page/0000316420.html>

Joint research Tokyo Denki University Executive vice president Mr. Satoshi Fujita  
Nara Women's University Faculty of Human Life and Environment Mr. Atsuo Takino

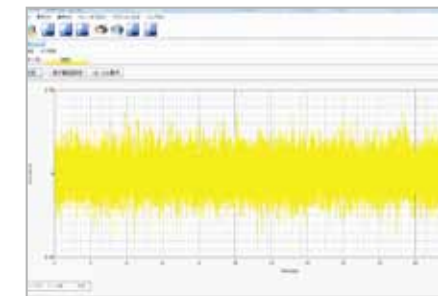
## Application products

To meet the demand for the customer who wish to measure constant micro motion at the site or curious about evaluation measurement of low frequency, we provide easier and more user-friendly product with the same sensor module is applied.



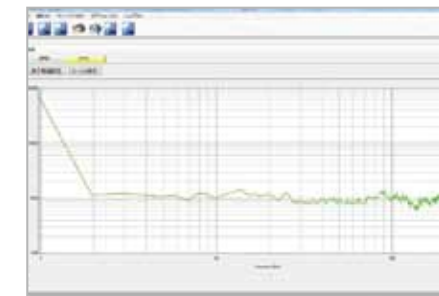
#### Vibration analysis application display image

##### Waveform display



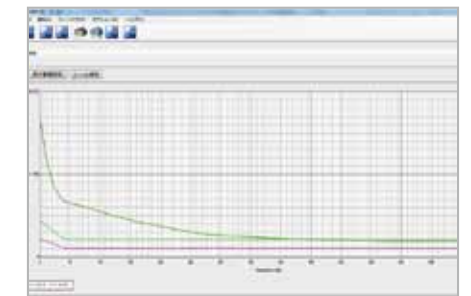
Velocity and displacement waveform is also convertible in addition to recorded acceleration waveform.

##### FFT



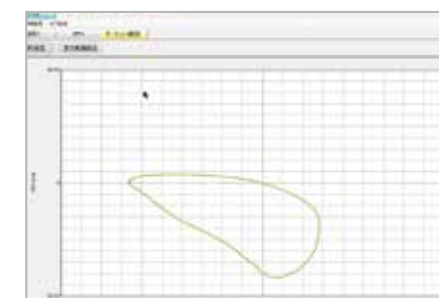
FFT analysis is possible with only minimum settings.

##### 1/3 Octave analysis



Can compare VC curve which is an evaluation standard for floor vibration. (Larger than VC-C is only target due to sensor accuracy)

##### Lissajous



It is 2 axis tracking, useful for evaluation for the bridge pole and vibration direction considered judgement.

##### Tripartite



All of frequency, displacement, velocity and acceleration can be viewed in a single chart based on FFT result.

#### Vibration switch (for low speed rotation machine)

We can provide the purpose customized seismoscope with the sensor built-in.

Ex. : long-period seismoscope, P/S waveform seismoscope, vibration switch for low speed rotation machine



#### Sensor module

If embedded module is required, further negotiation is possible. Please contact us.

