

# MOVE SOLUTIONS

## DATASHEET OF TRIAxIAL ACCELEROMETER



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## STRUCTURAL HEALTH MONITORING

### SYSTEM FOR MONITORING

Move Solutions for monitoring the stability of a structure recommends **DECK** sensors, devices capable of capturing the amplitude of dynamic oscillation. Thanks to the use of this sensor it is possible to continuously monitor the modal parameters of the structure and verify its stability over time. It is also possible to understand the amplitude of the dynamic deformation, or even any seismic vibrations and monitor the risk.

The Move monitoring system also includes **Accelerometers** for modal study, **Tiltmeters** for static monitoring and **Strain gauges** for monitoring cracks and openings. Using the **Communication Node** with multiple inputs (analog or digital) it is possible to monitor the water pressure and many other parameters of the surrounding areas.

All of our sensors use LoRaWAN: a long-range, low-power wireless communication technology used by IoT networks around the world.

#### FEATURES

- High precision
- Data analysis with advanced algorithms
- No wiring
- Long-range communication
- Modular system
- High autonomy
- Complete management and customization
- Minimum maintenance required
- Strong design

#### MEASUREMENTS

- Dynamic displacement amplitude monitoring
- Modal analysis of the structure
- Vibrational study of the structure
- Static monitoring of the inclination of the structure
- Analysis of the amplitude of the dynamic deformation
- Monitoring of cracks and openings
- Real-time water pressure monitoring
- Highlighting of seismic vibrations

Note: Specifications are subject to review and change without notice.



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## HOW IT WORKS

Move Solutions includes a complete package of wireless devices and a **Web Platform** for data visualization and sensor management.

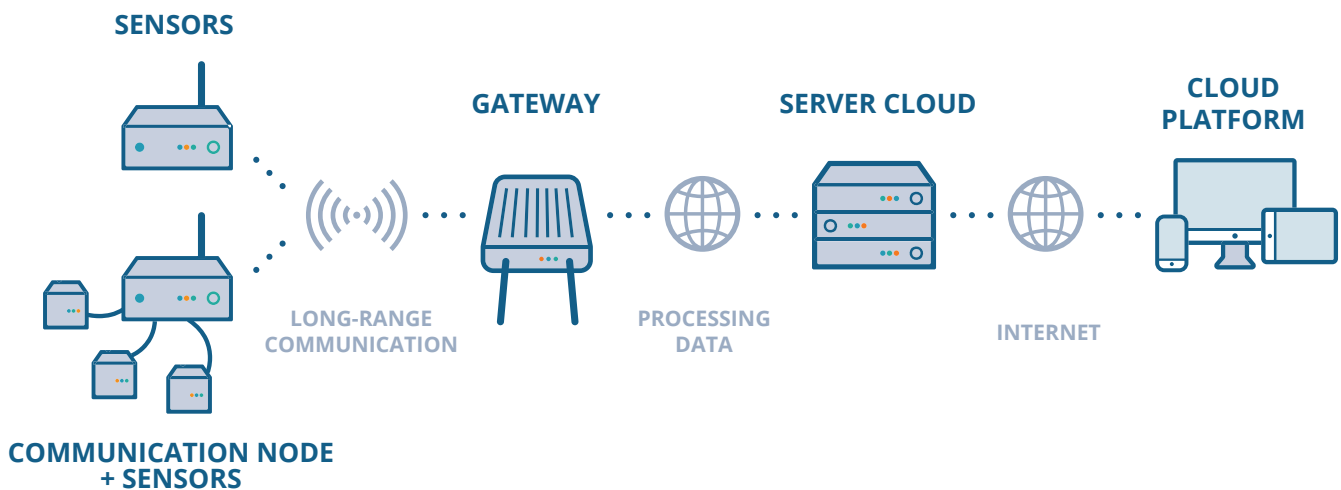
Once the sensors and system gateways are properly installed on site, they are ready to receive, store and send data.

You can view all this data in real time through a Web interface that allows users to remotely monitor the site or infrastructure. The user can set different parameters for each individual sensor, including sampling rates, resolution, alarm thresholds, activation and much more.

The Move Solutions monitoring system guarantees accuracy, safety and reliability and a significant reduction in overall monitoring costs.

### LOGISTICAL – ECONOMIC ADVANTAGES

- Remote monitoring of difficult to access structures
- Ease of installation and use of the system
- Data processing to optimize operations
- Easy addition of sensors to extend the monitored area
- Cost reduction through easy maintenance
- No wiring, saving on installation materials
- Consequent labor savings
- Risk reduction and high reliability



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# MOVE SOLUTIONS

## TRIAxIAL ACCELEROMETER

### TRIAxIAL ACCELEROMETER

The triaxial Accelerometer is able to measure the acceleration of the point where it is installed, which is essential for measuring the vibration frequencies and for carrying out a modal study of the structure.

With the use of Accelerometer devices it is possible to highlight any seismic vibrations and monitor its risk. With the interface of the Web Platform, it is possible to synchronize the acquisitions of each sensor, an optimal feature for dynamic load tests. All sensors also record temperature, are battery powered and use the LoRaWAN wireless communication protocol.

### ACCELEROMETER OUTPUT

The Accelerometer acquires 10 seconds of data for each stress on the structure whenever the activation threshold - previously set on the Web Platform - is exceeded. The measured acceleration values are expressed in mg.

The acquisition methods can be set by the user through the Web Platform provided with the Move Solutions™ monitoring system. It is possible to take advantage of an operating mode with programmed acquisition, with a fixed frequency set by the user, lasting 180 seconds. The device also acquires temperature data.



### DOWNLOAD DOCUMENTATION

Visit the website at [www.movesolutions.it](http://www.movesolutions.it) to download further documentation relating to technical specifications and/or information on the Move Solutions™ structural monitoring system.

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## QUICK GUIDE TO USE

The triaxial Accelerometer device is “plug and play”; by screwing the special antenna on the cover, the device will immediately start to detect and try to send data to the Gateway device. To ensure correct operation the Accelerometer sensor must be correctly oriented and installed, following these specific steps:

### 1. ORIENTATION:

- The three axes shown on the orientation label, placed on the sensor cover, must be aligned as the axes of interest of the structure.
- The Accelerometer device can be rotated freely on the structure.

### 2. INSTALLATION ON THE STRUCTURE:

- Agree with the supplier company on the correct place of installation on the structure of the Accelerometer device.
- Firmly install the Accelerometer on the wall, ceiling or floor using the special plate and screws/wall plugs supplied. It is possible to rotate the plate relative to the device.
- To install multiple Accelerometers on the same structure, use the same orientation convention, i.e. with the axes shown on the label of each specific device oriented in the same way.
- Install all sensors on the structure before powering and turning on the Gateway device.

### 3. SCREWING THE ANTENNA:

- Before activating the Gateway, screw the LoRaWAN 868 Mhz antenna onto the device cover.

After meeting these orientation and installation requirements, the Accelerometer device will be able to detect and send data to the Gateway without interference or data alteration.

Verify, via the Web Platform, the correct functioning of the sensor just installed. From the moment the Gateway is powered up, and therefore from the actual start-up and activation moment, a maximum waiting of about an hour is required before it is possible to correctly view all the sensors online.

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## ACCELEROMETER



The accelerometer measures the acceleration and temperature of the exact point where it is installed in relation to the structure. It is possible to measure the vibration frequencies and carry out a modal study of the structure. All accelerometers can be perfectly synchronised with each other, perfect for dynamic load tests. Battery power supply and LoRaWAN wireless transmission.

The acquisition modes can be set by the user via the web interface provided in the service.

## TECHNICAL SPECIFICATIONS

### OPERATION

#### Threshold Operation

Record of an event for each oscillation that exceeds the activation threshold set by the user. For each event: acquisition of acceleration for 10 seconds after exceeding the threshold. Acquisition of the temperature at each event.

#### Operation with programmed acquisitions

Acquisition of an event with a fixed frequency set by the user (every 1, 2, 6, 12, 24 hours). For each event: acquisition of acceleration for 3 minutes. All sensors can be synchronized with each other. Acquisition of the temperature at each event.

#### Custom Operation Software

It is possible to request custom features that the client deems necessary for their business.

#### Sample Rate

4 KHz (reduced to 50 Hz with decimation)

### MEASUREMENT

#### Technology

MEMS technology - Triaxial

#### Acquisition of

- Acceleration  
- Temperature

#### Resolution

14bit (250µg, 500µg, 1mg)

#### Accuracy

±250µg

#### Range

± 32mg, ± 64mg, ± 128mg

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<b>Cross Axis Sensitivity</b>	1%
<b>Noise Density</b>	25 µg/√Hz
<b>RADIO</b>	
<b>Radio channel</b>	LoraWan communication protocol
<b>Radio channel frequency</b>	ISM 868Mhz
<b>Link coverage</b>	1km (line of sight with the Gateway)*
<b>GENERAL DATA</b>	
<b>Waterproof Rating</b>	IP67
<b>Battery</b>	1 lithium battery type "D" 19Ah 3.6V
<b>Operating temperatures</b>	-40°C/+85°C
<b>Dimensions</b>	75 x 80 x 57 mm
<b>Weight</b>	1.1 Kg
<b>Case material</b>	Alloy GD-ALSi12
<b>Corrosion resistance</b>	>1000 hours in salt spray
<b>INSTALLATION</b>	
<b>Method</b>	Two-point mounting using screws and plugs (Ø6mm, L:30mm)
<b>Site</b>	- Fixing on wall, on ceiling or ground
<b>BATTERY AUTONOMY</b>	
<b>Sample rate</b>	<b>Estimated autonomy</b>
Every 6 hours	2 years*

\* Wireless coverage of the device may vary depending on the scenario

\* Battery life may shorten when operating in extreme temperatures.

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