MOVE SOLUTIONS

DATASHEET
GATEWAY SHM

MONITORING PACKAGE

Move Solutions, for monitoring the structural stability of a structure, recommends the use of **DECK sensors** capable of reading the amplitude of dynamic oscillation. Through the use of this sensor it is possible to continuously monitor the modal parameters of the structure and verify their stability over time. It is also possible to keep the amplitude of the dynamic deformation under control. The monitoring package also includes **Accelerometers** for modal study, **Inclinometers** for static monitoring and **Strain gauges** for monitoring cracks and openings. It is also possible to monitor the water pressure and many other parameters of the surrounding areas through the **Communication Node** with multiple inputs (analog or digital).

With the use of this sensor package it is possible to highlight any seismic vibrations and monitor the risk.

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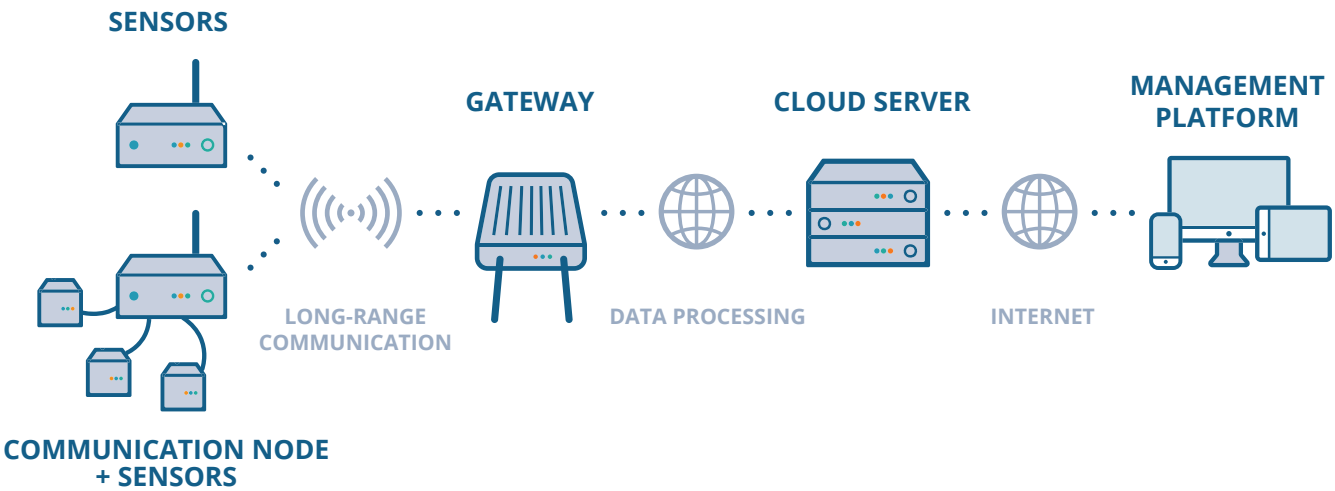
HOW IT WORKS

Move Solutions includes both a complete package of wireless devices and a software suite for data visualization and sensor management.

Once the wireless 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, great savings on installation materials
- Consequent labor savings
- Risk reduction and high reliability

FEATURES
• High precision
• Data analysis with advanced algorithms
• Ease of use
• High autonomy and reliability
• Long range communication
• Modular system
• Complete management and customization
• Minimum maintenance required
• Robust design

MEASUREMENTS TAKEN
• Dynamic oscillation amplitude monitoring
• Modal analysis of the structure
• Vibrational study of the structure
• Analysis of the amplitude of the dynamic deformation
• Static monitoring of the inclination of the structure
• Monitoring of openings and cracks
• Water pressure monitoring
• Highlighting of seismic vibrations

SENSORS

GATEWAY   **CLOUD SERVER**   **MANAGEMENT PLATFORM**

LONG-RANGE COMMUNICATION   **DATA PROCESSING**   **INTERNET**

COMMUNICATION NODE + SENSORS

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GATEWAY SHM DEVICE

The SHM Gateway is a control unit for receiving and sending data with which, thanks to the wide-range communication protocol LoRaWAN, it is possible to manage and communicate with dozens of devices and sensors at the same time.

This device, first of all, receives the information transmitted by the multiple sensors installed via LoRaWAN. Then, using Cellular connectivity, it forwards this data to the online servers.

The device is Outdoor IP67 and is powered by PoE; optionally it can be battery-powered, with a solar panel. The SHM Gateway is equipped with LoRa, LTE, GPS and Wi-Fi high gain antennas. Thanks to the double LTE antenna it is possible to obtain greater cellular coverage. The device also implements a Wi-Fi hotspot and an integrated GPS for very precise synchronization and for the geolocation of the product. It is very easy to configure thanks to the automatic APN and the included PoE adapter.
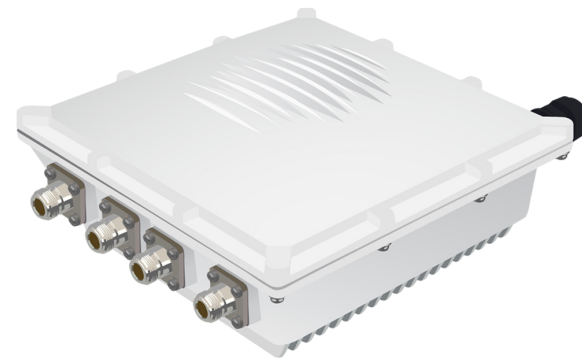
QUICK USE GUIDE

Before being able to receive and transmit data, the Gateway device must first of all be configured, powered and installed correctly.

The steps to be taken for the Gateway device to function correctly are:

1. **CONFIGURATION:**
   - Scegliere la tipologia di configurazione tra Cellular LTE oppure LAN e seguire la procedura descritta in *"Configurazione Gateway SHM"*.

2. **SCREWING OF THE ANTENNAS:**
   - Screw and connect correctly all the supplied antennas (LTE, GPS, Wi-Fi, LoRa) following the arrangement given by the labels.

3. **INSTALLATION ON THE STRUCTURE:**
   - Securely install the device on a wall or pole using the appropriate installation kit supplied, see *"Gateway SHM installation guide"*.

4. **SUPPLY:**
   - Connect the SHM Gateway to the electricity supply according to the type of configuration previously chosen. The power supply procedure may vary depending on the configuration chosen, see *"SHM Gateway Installation Guide"* and *"SHM Gateway Configuration"*.

Turn on the Gateway SHM device only when all 5 antennas (LTE, GPS, Wi-Fi, LoRa) are correctly connected.
After having satisfied these configuration, installation and powering steps, the SHM Gateway will be able to receive and forward data continuously to the online servers.

Verify, through the Cloud Move™ viewing and management platform, the correct functioning of the monitoring system just installed. From the moment the SHM Gateway is powered, a maximum wait of about 30 minutes is required before it is possible to view all the sensors online.

DOWNLOAD DOCUMENTATION
Visit the website at www.movesolutions.it to download additional documentation relating to technical specifications and / or information on the Move Solutions™ structural monitoring system.

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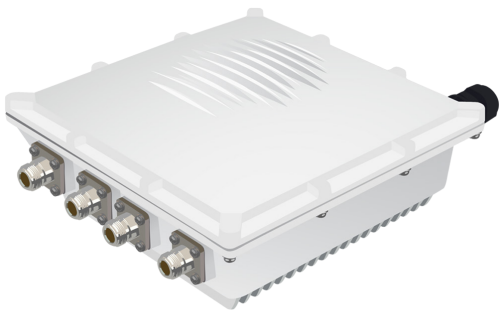Via Guglielmo Lippi Francesconi 1256/J
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GATEWAY SHM

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TECHNICAL SPECIFICATIONS

OPERATION	
Wi-Fi Feature:	• Frequency: 2.400-2.4835GHz(802.11b/g/n) • RX Sensitivity: -95dBm (Min) • TX Power: 20dBm (Max) • Operation Channels: 2.4GHz: 1-13
LoRa Features:	• Card: SX1301 Mini PCIe Card (connects maximum of two) • Channels: 8 Channels (Optional: 16 channels) • RX Sensitivity: -139dBm (Min) • TX Power: 27dBm (Max) • Frequency: EU433, CN470, EU868, US915 , AS923, AU915, KR920, IN865
Cellular Features:	• Supports Quectel EG95-E / EG95-NA(IoT/M2M-optimized LTE Cat 4 Module) • EG95 -E for EMEA Region￼ • LTE FDD: B1/B3/B7/B8/B20/B28A • WCDMA: B1/B8 • GSM/EDGE: B3/B8 EG95 -NA for North America Region • LTE FDD: B2/B4/B5/B12/B13 • WCDMA: B2/B4/B5
Power Supply:	PoE (IEEE 802.3af/at-Compliant) - 42~57VDC; Power Jack - 12V DC
Power Consumption:	12W (Typical)
ETH:	RJ45 (10/100Mbps)
Antenna:	5 N-Type Connectors
Ingress Protection:	IP67
Enclosure Material:	Aluminum

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Weight:	3.15kg
Dimension:	220 mm x 220 mm x 104 mm
Operating Temperature:	-30˚C to +55 ˚C
Storage Temperature:	-40˚C to +85 ˚C
Operating Humidity:	0% to 95% (non-condensing)
Storage Humidity:	0% to 95% (non-condensing)
Installation method:	Pole or Wall mounting
LoRa	
Operating Frequency:	• EU433, CN470, EU868, US915 • AS923, AU915, KR920, IN865
Transmit Power:	27dBm (Max)
Receiver Sensitivity:	-139dBm (Min)
OPERATION	
Wireless Standard	IEEE 802.11b/g/n
Operating Frequency	ISM band: 2.412~2.472(GHz)
Operation Channels	2.4GHz: 1-13
Transmit Power	802.11b • 1Mbps : 19dBm • 11Mbps : 19dBm 802.11g • 6Mbps : 18dBm • 54Mbps : 16dBm 802.11n (2.4G) • MCS0 (HT20) : 18dBm • MCS7 (HT20) : 16dBm • MCS0 (HT40) : 17dBm • MCS7 (HT40) :15dBm
Receiver Sensitivity (Typical)	802.11b • 1Mbps : -95dBm • 11Mbps : -88dBm 802.11g • 6Mbps : -90dBm • 54Mbps : -75dBm 802.11n (2.4G) • MCS0 (HT20) : -89dBm • MCS7(HT20) : -72dBm • MCS0(HT40) : -86dBm • MCS7(HT40) : -68dBm

*The wireless coverage of the device may vary depending on the scenario