



## STRUCTURE DYNAMIC MONITORING SENSOR

## DELIVERY

**Deck is an electronic device designed for dynamic monitoring of structures.**

Each sensor measures the **dynamic displacement** with great precision, allowing the analysis of the **dynamic behavior of the structure** to be done precisely and objectively.

Deck is designed to be completely **wireless**, with a quick and easy installation even on the most complex sites.



## APPLICATIONS

### 1. Dynamic monitoring of structures:

- Bridges
- Dams
- Metal structures
- Vertical structures
- Historical buildings
- Construction sites
- Any structure subject to stress or consumption by time

### 2. Buildings safety

### 3. Safety of bridges and overpasses

### 4. Sensing of displacement and temperature



*Esempio di Fissaggio a Muro  
con Piastra in acciaio (spessore 10 mm)*



## SPECIFICHE TECNICHE

|                                  |  |
|----------------------------------|--|
| <b>Acquisition of</b>            | <ul style="list-style-type: none"> <li>- Displacement</li> <li>- Temperature</li> </ul>  |
| <b>Displacement resolution</b>   | 0,01 mm  |
| <b>Shift accuracy</b>            | ±0,01 mm   |
| <b>Measurement of axis</b>       | of the Parallel axis to the gravity axis (Z) or perpendicular (X or Y)   |
| <b>Temperature resolution</b>    | 0,5°C  |
| <b>Sampling frequency</b>        | 100 Hz   |
| <b>Central Processing Unit</b>   | ARM Cortex M0 32 Bit   |
| <b>Classic Operation</b>         | <p>Threshold Mode:</p> <ul style="list-style-type: none"> <li>-Setting of an upper and lower attention span (displacement) threshold.</li> <li>-Recording of an event any time the oscillation (displacement) exceeds the set threshold.</li> <li>-40 seconds of acquisition by displacement (20 seconds prior to exceeding the threshold and 20 seconds thereafter).</li> <li>-Acquisition of the temperature at the exceeding of the threshold.</li> </ul> |
| <b>Waterproof Rating</b>         | IP67   |
| <b>Custom Operation Software</b> | <p>It is possible to request custom functionalities that the customer requires as necessary for his own activity (example: timed sampling etc.) Move SRL will evaluate the feasibility of each request.</p>  |



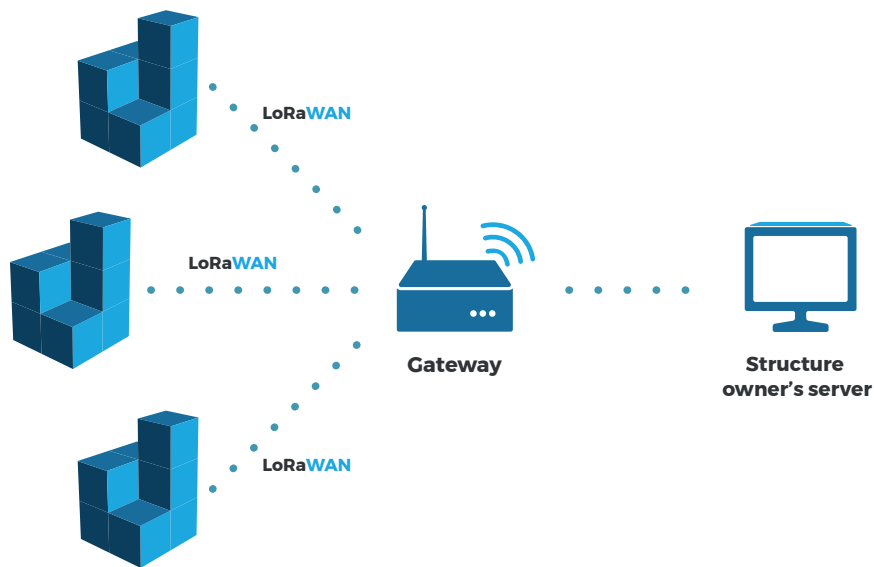
|                                 |   |
|---------------------------------|---|
| <b>Reliability</b>              | <p>Internal Watchdog (Inside the Microcontroller)</p> <p>External Watchdog (External to the Microcontroller)</p>  |
| <b>Technology Radio Channel</b> | <p><b>LoRa®</b> Technology (Class A, Class C):</p> <ul style="list-style-type: none"> <li>-Adaptive Data Rates (ADR)</li> <li>-Spreading Factors</li> <li>-Channel diversity</li> </ul> <p>Compatibility with LoRaWAN Gateway</p> <p>Bluetooth Low Energy</p> |
| <b>Radio Channel Frequency</b>  | <p>868 MHz (EU) – 125 KHz BW (LoRaWAN)</p> <p>2.4 Ghz (BLE)</p>   |
| <b>Transmission Power</b>       | <p>14 dBm<sup>1</sup> (LoRaWAN)</p> <p>3 dBm (BLE)</p>  |
| <b>Batteries</b>                | Four Thionyl Chloride Lithium Batteries (19Ah)  |
| <b>Autonomy</b>                 | 1 year and a half to 2 years <sup>2</sup>   |
| <b>Operating Temperature</b>    | From -40 ° C to + 85 ° C  |
| <b>Dimensions</b>               | <p>140 x 170 x 65 mm</p> <p>(200x200x80 mm with plate)</p>  |
| <b>Fixing Installation</b>      | <p>With plate – Ø 10mm plugs</p> <ul style="list-style-type: none"> <li>-Wall mounting</li> <li>-Ceiling mounting</li> <li>-Ground fixing</li> </ul>  |



## NETWORK SYSTEM

The information transmitted by the **multiple deck sensors** is collected first by a **Gateway** through the **LoRaWAN protocol** and subsequently sent to a **server and database system**.

Each structure is equipped with at least one gateway. The Gateway has an in-internet connection (LTE, 3G or GSM) with which it transmits the data to a set of servers that manage the LoRaWAN protocol and the data received from the sensors. Data is entered into a DB system to allow storage. The data can be analyzed through a Cloud platform provided by Move. If the customer uses a private platform for data analysis, the servers can be queried and extrapolated through a REST API service.



**The Cloud platform allows to view data anywhere and on any device, to constantly monitor the status of the structure.**

Through various graphs, it is possible to view the oscillation trends and put them mathematically in relation to each other. Furthermore, the software verifies every change of the structure over time, monitoring its degradation in months and years.

