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## MCF-LW12TERWP Operating Manual

### Important safety information



Read this manual before attempting to install the device! Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer will not be held responsible for any loss or damage resulting from not following the instructions of this operating manual.

- Do not dismantle or modify in any way.  
The device is not intended to be used as a reference sensor, and enginko Srl will not be held liable for any damage which may result from inaccurate readings.
- Avoid mechanical stress
- Do not use any detergent or alcohol to clean the device.

### Disposal information for users



Pursuant to and in accordance with Article 14 of the Directive 2012/19/EU of the European Parliament on waste electrical and electronic equipment (WEEE), and pursuant to and in accordance with Article 20 of the Directive 2013/56/EU of the European Parliament on batteries and accumulators and waste batteries.

The barred symbol of the rubbish bin shown on the equipment indicates that, at the end of its useful life, the product must be collected separately from other waste.

Please note that the lithium batteries must be removed from the equipment before it is given as waste and disposed separately. To remove the batteries refer to the specifications in the user manual. For additional information and how to carry out disposal, please contact the certified disposal service providers.

## 1. Description

The MCF-LW12TERWP is a IP67 battery powered sensor that reads temperature, humidity and pressure and sends collected data over the LoRaWAN® network. Ideally suited for a wide range of applications such as weather stations, urban monitoring, air quality, industrial, environmental or farming projects.



## 2. Overview

### 2.1 Technical data

- CPU Cortex M0+
- EEPROM 32Kb
- Flash 64k
- Encryption AES 128 bit
- Class A LoRaWAN® 1.0.2 stack EU868, AS923, AU915, US915
- Temperature -30 ÷ 70°C (0 ÷ 65°C ±1.0°C)
- Humidity 0% to 100% will following error @25°C: Pressure 300....1100hPa (±1hPa)
  - From 0% to 20% ±5%
  - From 20% to 80% ±3%
  - From 80% to 100% ±5%

- Battery powered with 5 years of life (according radio propagation effectiveness and 10 min reading period)
- NFC for IoT node setup, FW upgrade and data reading
- Wall or pole mounting
- Storage temperature range  $-30^{\circ}\text{C} \div +80^{\circ}\text{C}$
- Working temperature range  $-30^{\circ}\text{C} \div +70^{\circ}\text{C}$
- Dimensions: 150x150x40mm
- Protection class IP67

## 2.2 Installation

To ensure correct operation and reliable and consistent measurements, install the MCF-LW12TERWP sensor away from direct sunlight and rain.

The device must be placed where the LoRaWAN® signal coverage is good (SF = 7 optimal, SF = 12 weak). The sensor can be installed on the wall or pole using the included accessories.

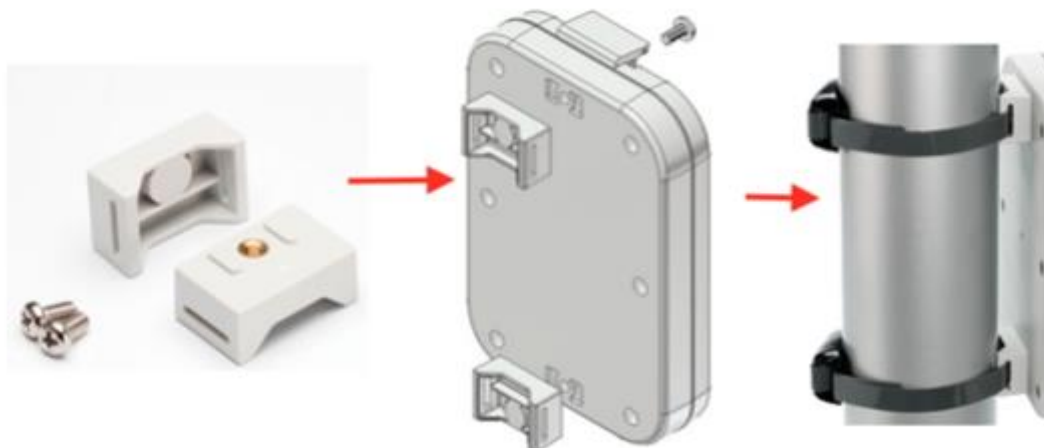
### 2.2.1 Wall mount

For mounting onto the wall open the blind lid:



### 2.2.2 Pole mount

For installation on poles, pillars or posts use the included bracket and fasteners:



## 2.3 Configuration

To deploy the sensor, download the latest **LoRa Tool** Android App to setup LoRaWAN® credentials and other preferences :



Always validate your settings by reading the NFC data after the sensor has restarted.

**Configuration can be done only via NFC.**

**No USB port available for the user.**

## 2.4 Power ON/OFF

The sensor is shipped completely off to prevent battery consumption during storage. It is therefore necessary to carry out a first power-on prior to commissioning.

Move the NFC antenna of the mobile (the exact position varies depending on the model of the smartphone) to the sensor antenna, in the area shown in the figure:



In case of long period inactivity, if necessary, is possible to shut-off again the sensor to prevent battery consumption, via downlink or with LoRa Tool App:



## **2.5 Battery**

This sensor contains lithium battery, which must be disposed of separately.

MCF-LW12TERWP is provided with a Li-SOCI2 battery pack:

**Code      Description**

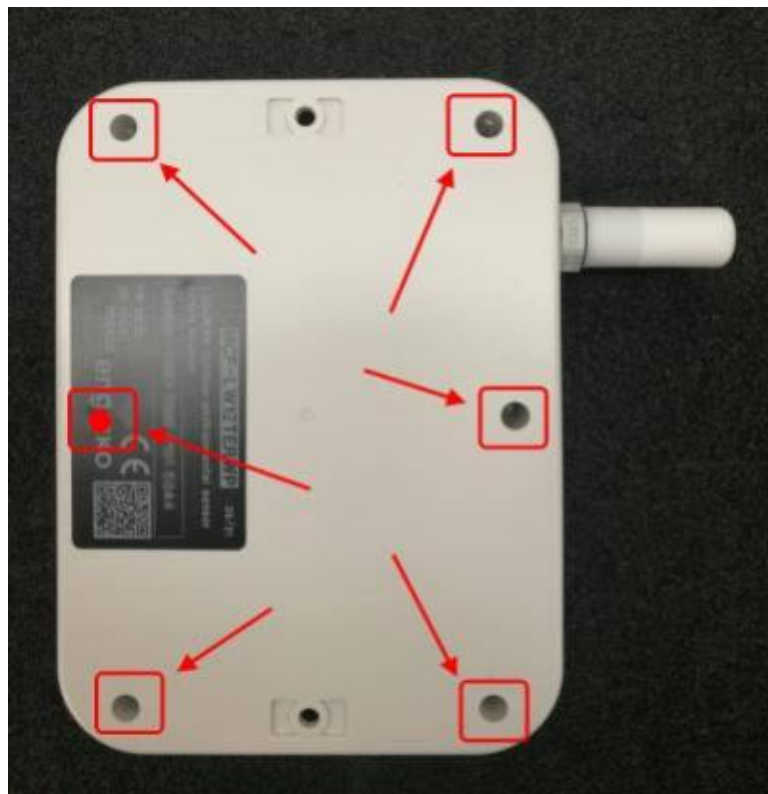
MCF-1S4PE 14400mAh battery pack. This is the estimated battery life (in **years**) in the worst conditions:

**10min reading 15min reading 30min reading**

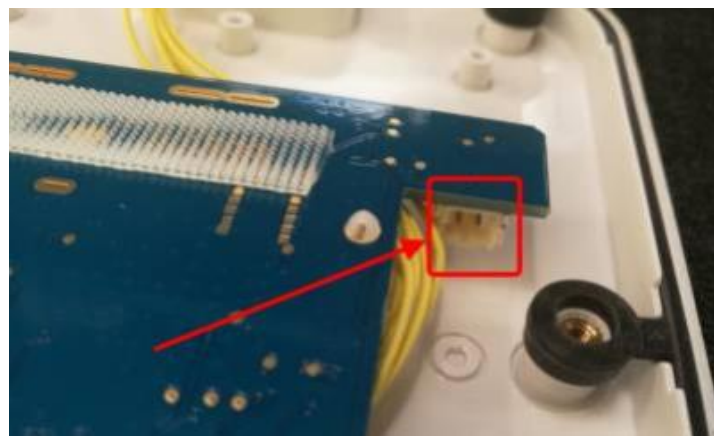
<b>SF12</b>	7	10	> 10
<b>SF7</b>	> 10	> 10	> 10

**2.5.1 Battery replacement**

- remove the 6 screws and the back panel of the sensor:



detach the batteries from the electronic board (batteries are secured with dual locking tape) and disconnect from the connector:

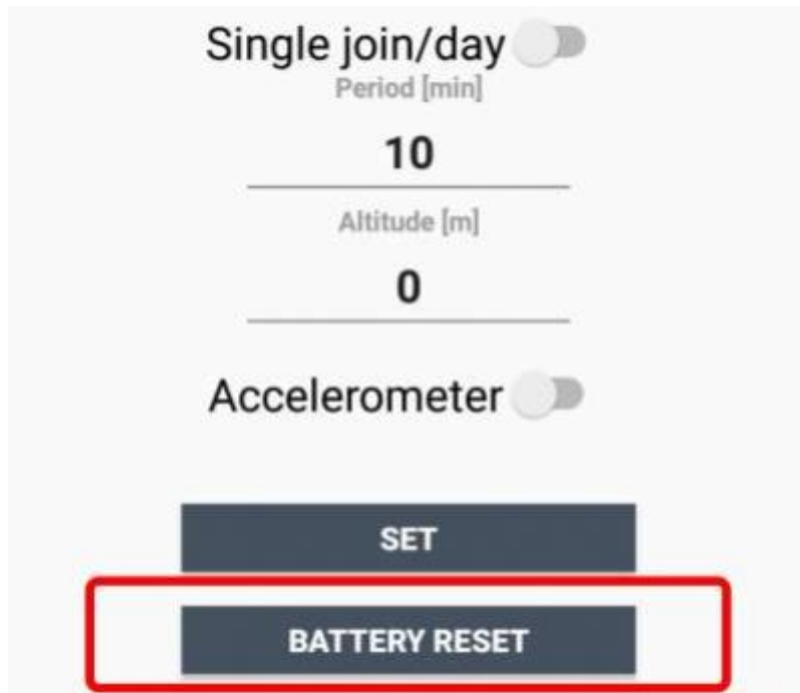


Connect the new batteries and put them in place (replace the tape if needed):

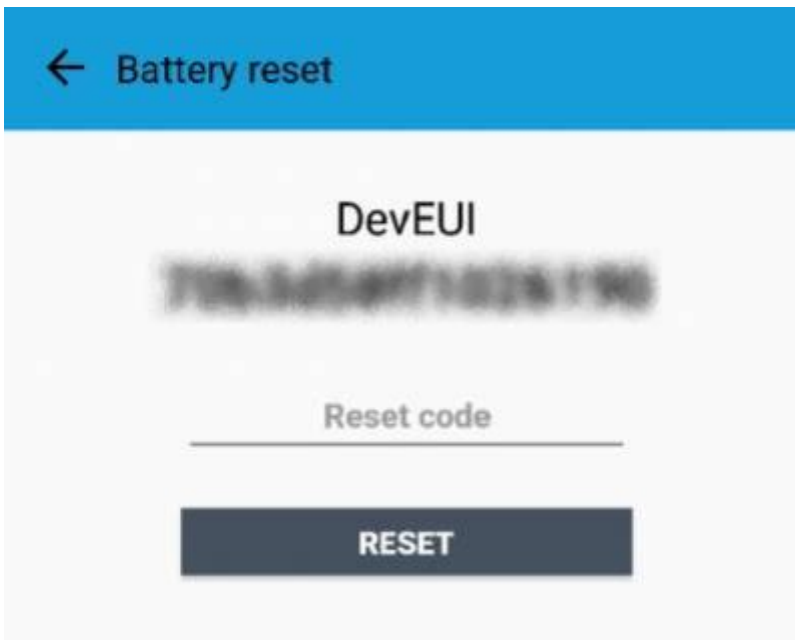


Place the rear panel and screws paying attention to the wires.

After the batteries replacement, internal counters need to be reset.



To perform the operation, you need a unique reset code that must be requested to enginko (please provide the DevEUI of the sensor when you ask for that code):

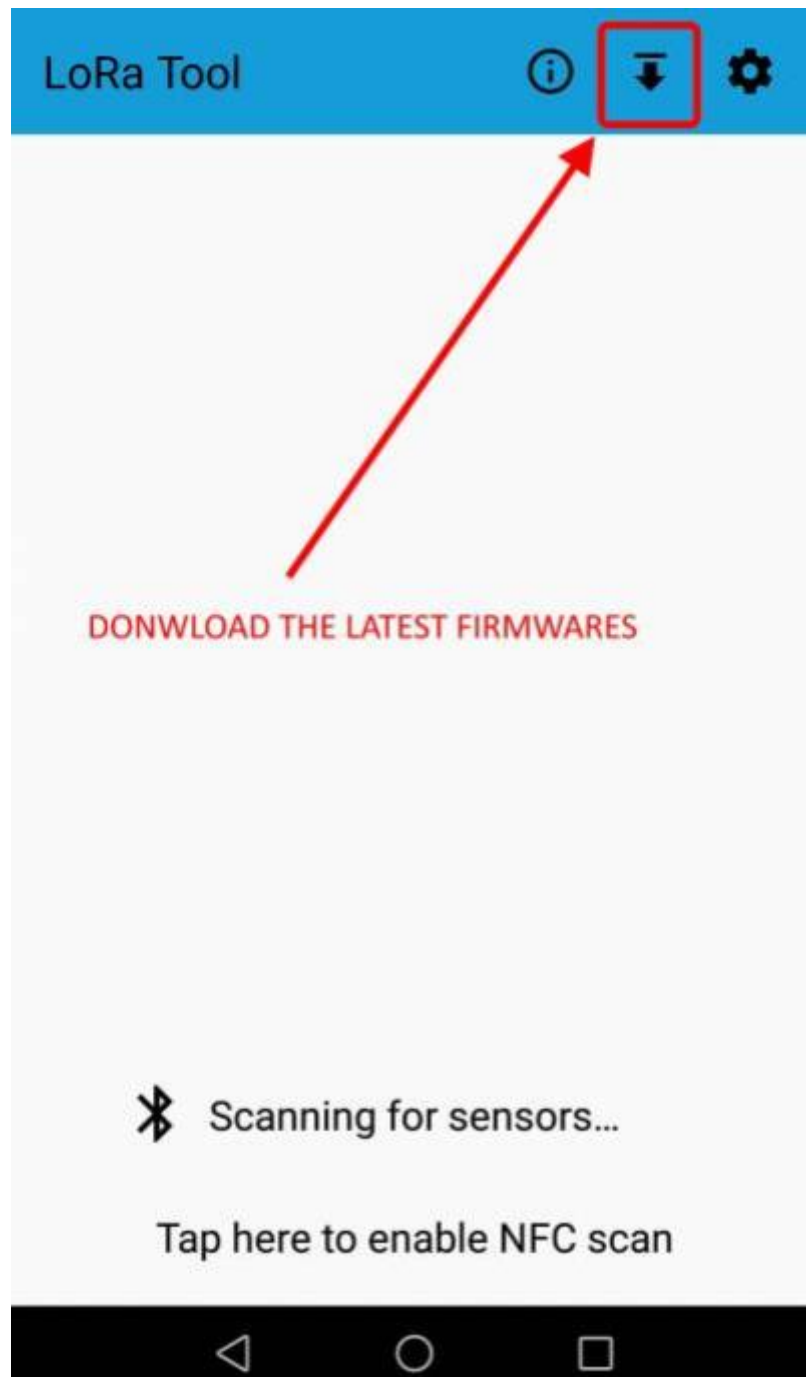


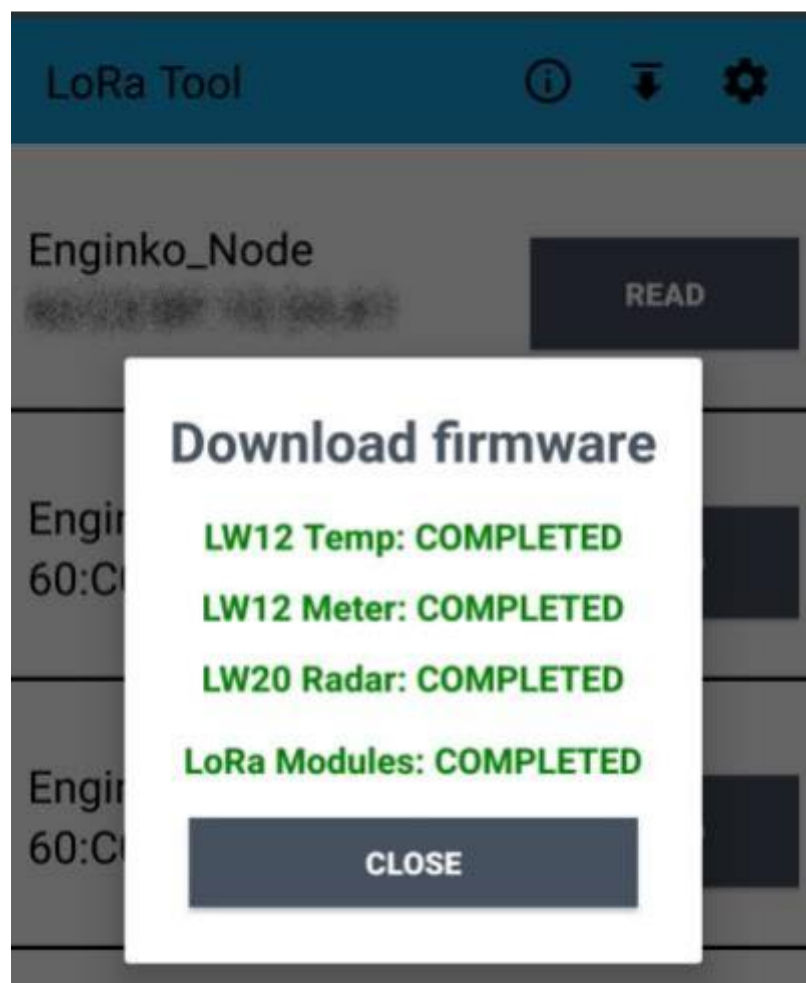
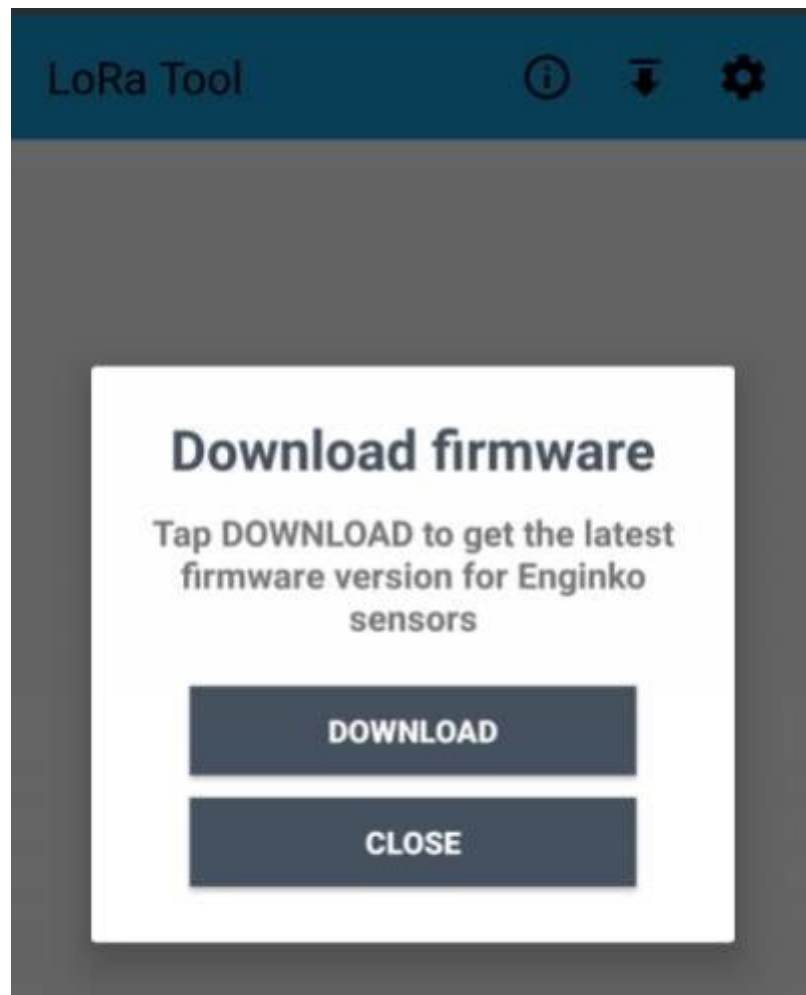
At the end of the procedure the battery level displays 100%.

## 2.6 Firmware update

Download the latest firmwares available on the smartphone with LoRaTool app:







Update the sensor with LoRaTool:



During the update, do not move the smartphone until the end message.

## 3. Measures

### 3.1 Period

Period is the interval (in minutes) between one measure and the next one. The sensor sends three measures for every transmission. Value can be between 10 and 65535 minutes (default: 10 minutes).

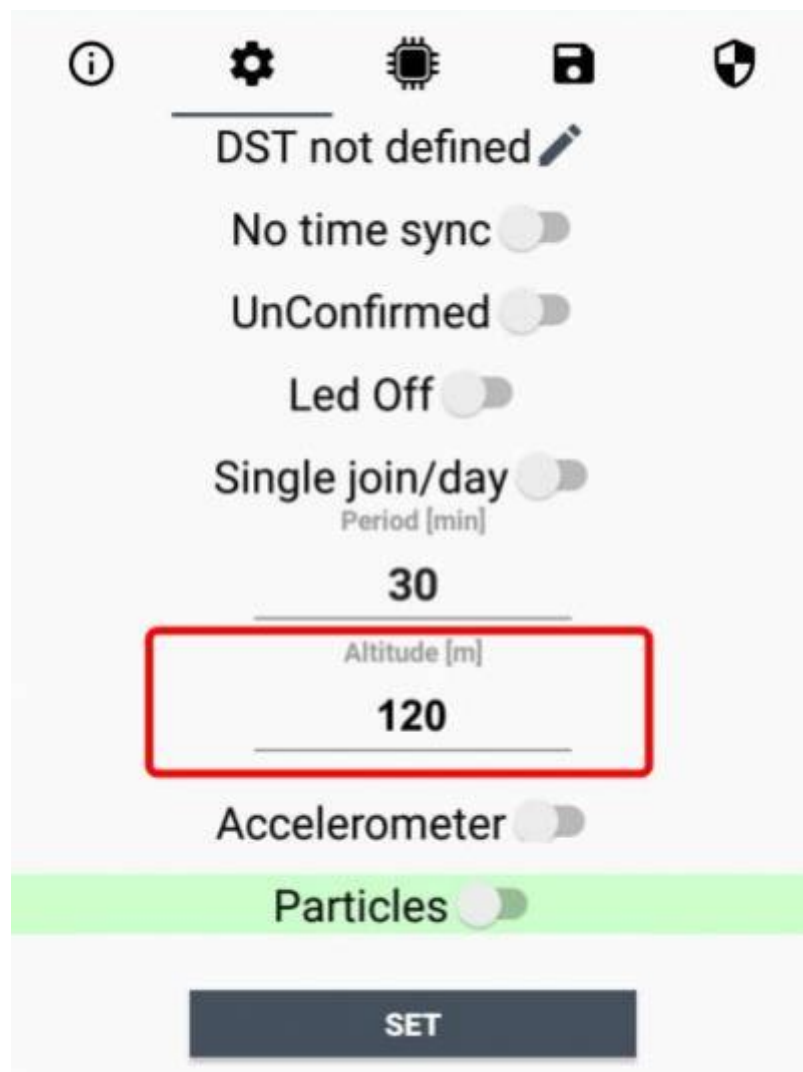
Period interval can be set with App or with downlink command.

### 3.2 Temperature

### 3.3 Pressure

#### 3.3.1 Altitude compensation

When the sensor is not installed at the sea level, the reading of barometric pressures at other elevations must be compensated. Set the right altitude value with LoRa Tool app:



Value can be from -300 to 3000 meters.

Altitude can also be set with downlink command.

### 3.4 Humidity

## 4 LoRaWAN network

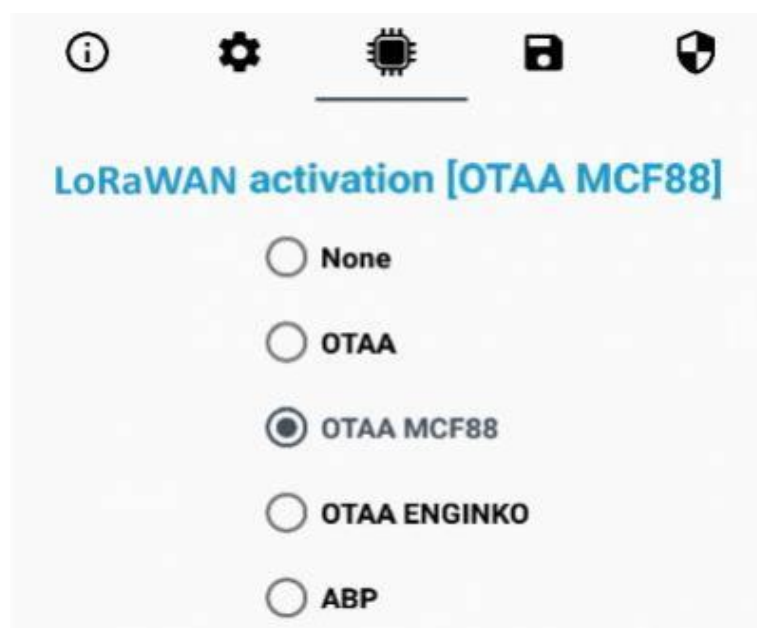
The sensor is compliant with LoRaWAN<sup>®</sup> **specification 1.0.2, regional 1.0.2b.**



## 4.1 Activation

The device supports the following activations on a LoRaWAN® network:

1. **NONE**: sensor not activated
2. **OTAA**: the JoinEUI and the AppKey not setted, must be written to the device;
3. **OTAA MCF88**: Over the air activation, fixed keys: JoinEUI = 904e915000000001, AppKey on request;
4. **OTAA ENGINKO**: Over the air activation, fixed keys: JoinEUI = 904e915000000001, AppKey on request;
5. **ABP**: requires writing to the device of NwkSkey, AppSkey, DevAddr.



The device exits factory activated with **NONE** mode. On request devices can be shipped already activated.

Note: in **OTAA** AppKey is write only, in reading the field will always be empty, even if set.

## 4.2 Other settings

### Network settings:

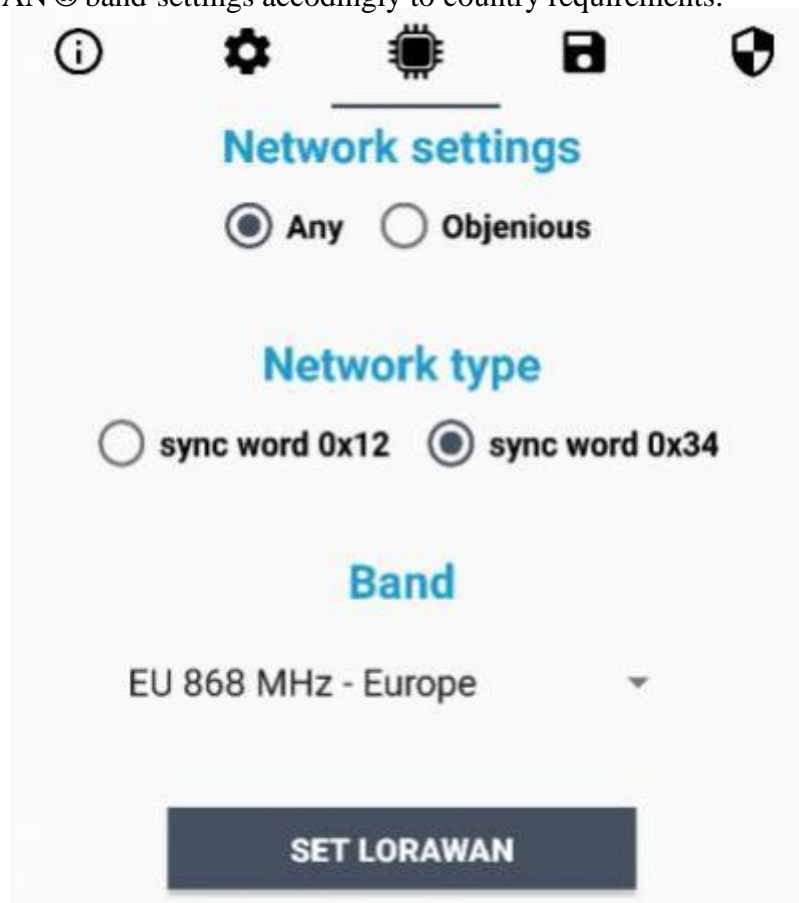
please keep “Any” settings. Change it only if Objenious network is used (default\_ any).

### Network type:

LoRa syncword can be setted as “private”(0x12) instead “public” (0x34), but the NS must be setted accordingly(default: public).

### Band:

select the right LoRaWAN® band settings accodngly to country requirements.



The screenshot shows a mobile application interface for configuring LoRaWAN settings. At the top, there are five icons: an information icon, a gear, a microchip, a save icon, and a shield. Below these icons, the title 'Network settings' is displayed in blue. Underneath, there are two radio button options: 'Any' (which is selected) and 'Objenious'. The next section is titled 'Network type' in blue, with two radio button options: 'sync word 0x12' and 'sync word 0x34' (which is selected). The third section is titled 'Band' in blue, with a dropdown menu currently showing 'EU 868 MHz - Europe'. At the bottom of the screen, there is a dark blue button with the text 'SET LORAWAN' in white.

### DST:

set to change DST (default: none).

### No time sync:

set to disable time synchronization request (default: enabled).



Normally sensor asks for a time sync at every power on (uplink starting with 01) or, if enabled, once a week.

If not handled in the right way can cause a unnecessary battery consumption (battery life < 2 years).

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Please check chapter 2.1 **DATA FRAME FORMAT**

### UnConfirmed:

set for unconfirmed uplinks (default: confirmed uplink).

**Single join/day:**

set for to allow only one join per day (default: multiple join allowed).

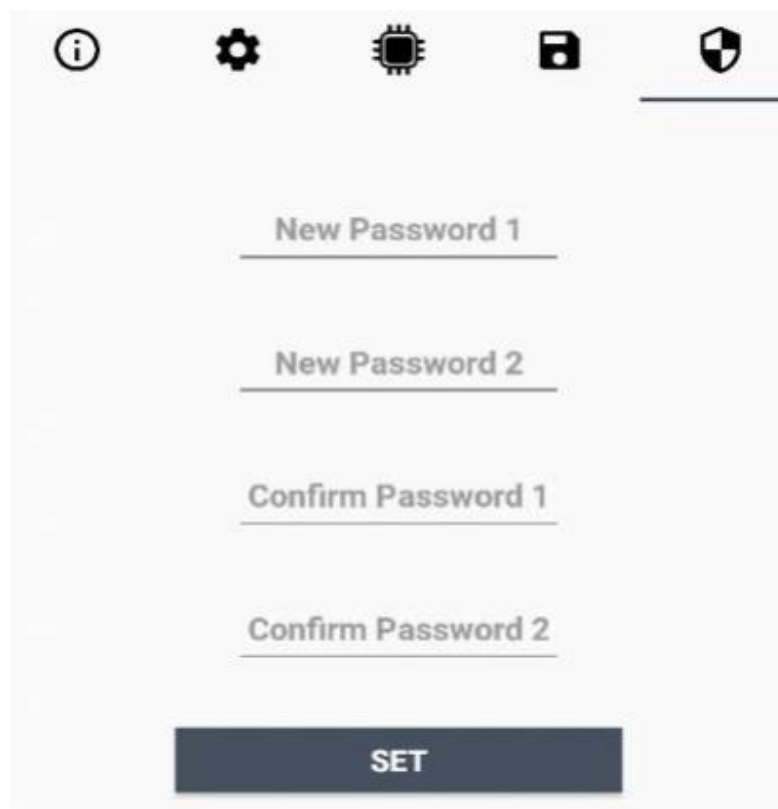
## 5 Passwords

The device can be protected by passwords, to avoid unauthorized persons to read data or modify parameters.

As default passwords are equal to 0.

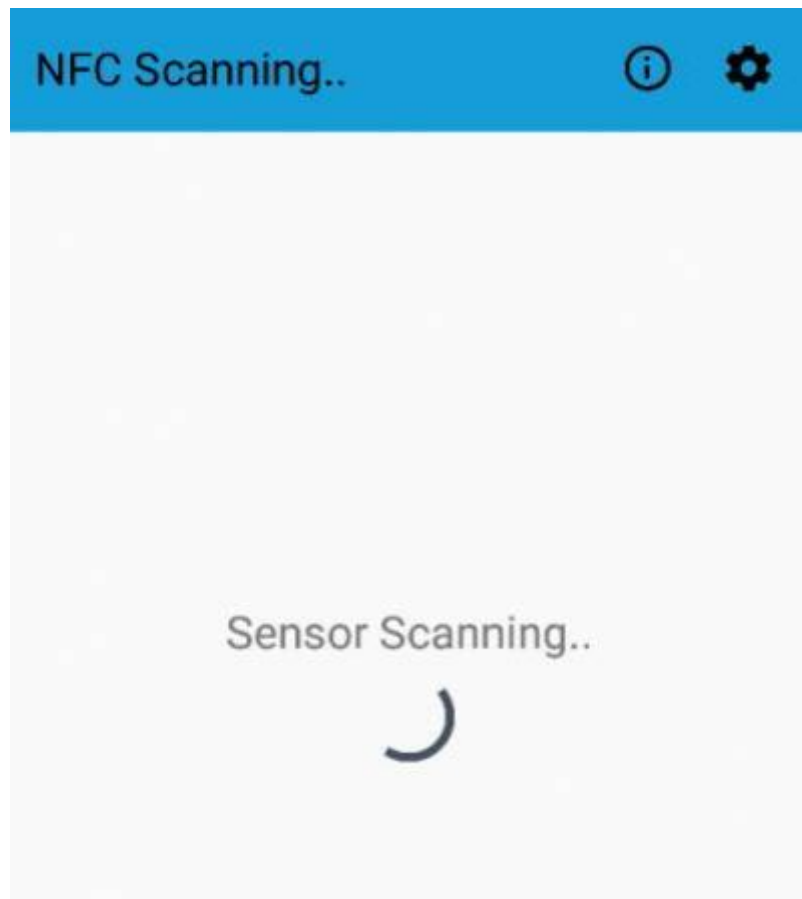
Allowed values range from 0 to 999999999 (only numbers).

To change the passwords, set the new values with the LoRa Tool App:

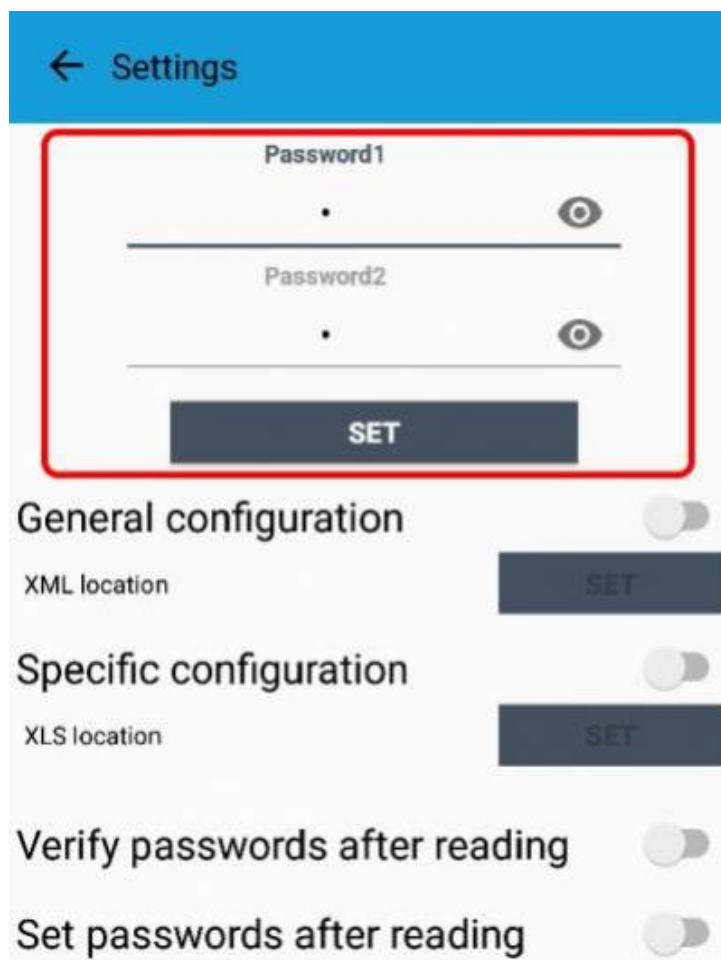


The screenshot shows the password configuration interface of the LoRa Tool App. At the top, there is a navigation bar with five icons: an information icon (i), a gear icon, a microchip icon, a save icon, and a shield icon. Below the navigation bar, there are four input fields for passwords, each with a label and a horizontal line for text entry: "New Password 1", "New Password 2", "Confirm Password 1", and "Confirm Password 2". At the bottom of the screen, there is a dark blue button with the text "SET" in white capital letters.

Once the passwords are setted, to gain access from LoRa Tool to the sensor, open the App:



and set the right values before reading from the device:



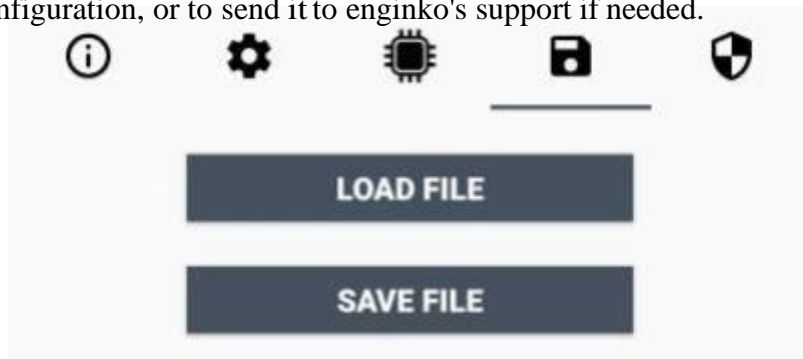


To bring back the sensor to factory default and reset the passwords, a reset code must be requested to enginko (please provide the DevEUI of the sensor when you ask for that code).

## 6 Configuration file

With LoRa Tool App is possible to configure the device using an XML file, instead to manually adjust the parameters (for details about the file format please ask to enginko). This is very useful especially in case of multiple devices configuration.

With "Save" button an XML file with the actual configuration of the sensor will be generated. This is useful to store or clone the configuration, or to send it to enginko's support if needed.



### 6.1 Multi devices configuration

With LoRa Tool App is possible to configure many devices in an easy way.

For multi-configuration is needed at least one XML file with the parameters to set.

Settings on this file will be applied to all the sensors.

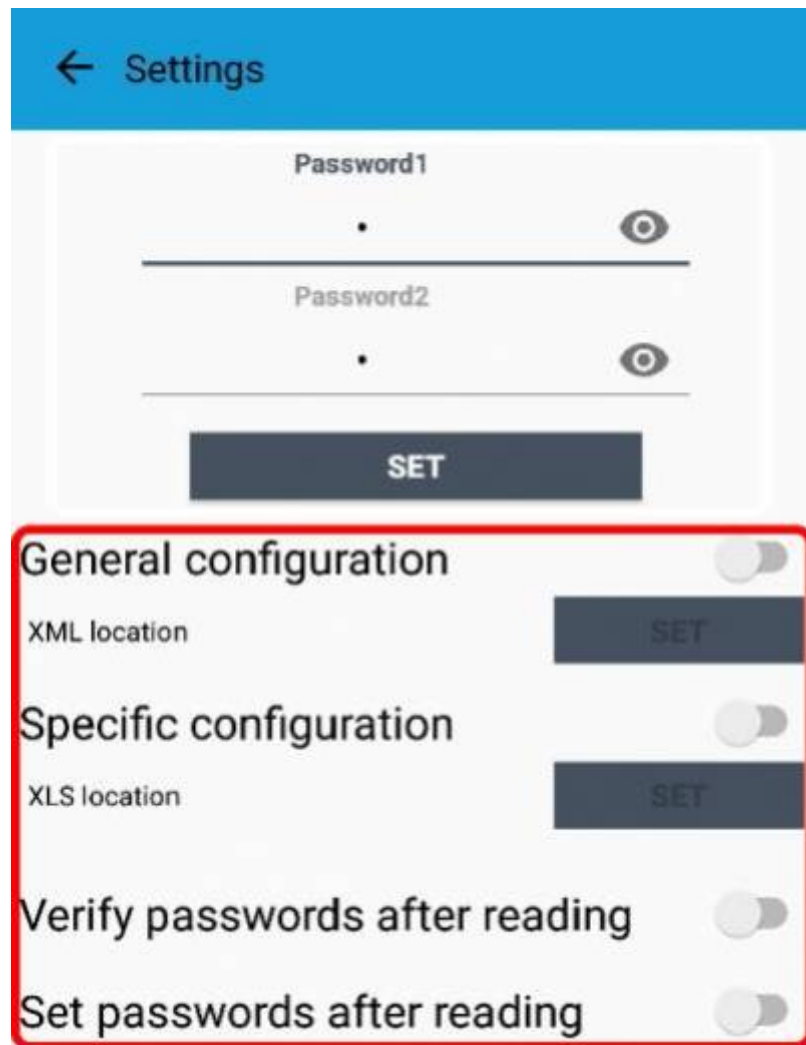
With an additional XLS file is possible to load different LoRa configuration parameters (Activation Type, AppKey, AppEUI, NetKey, DevAddress, Band, Private option) for each sensor, based on DevEUI.

When the sensor is approached, if one parameter is different from files, the APP will ask you if you want to overwrite.

XLS is prevailing on the XML, so if both files are enabled, if the DevEUI of the device matches one of the DevEUIs in the XLS file, LoRa parameters will be setted from this one..

These configuration can be done in the in the Settings:

- Enable or disable the use of the general configuration by file;
- Enable or disable the use of the specific configuration by file;
- Verify the passwords;  
Writing the passwords.

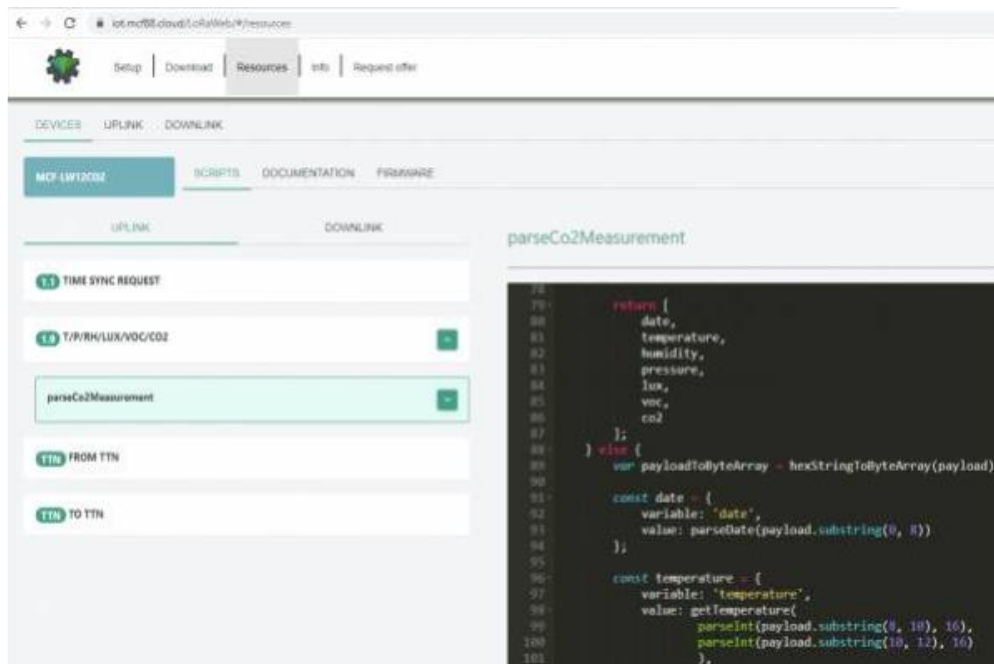


For details on files format please ask to enginko.

## 7 LoRaWEB Tool

enginko provides, upon free registration, **LoRaWEB** online tool, where for each sensor it is possible to find documentation, javascript examples for parsing, downlink generator and uplink decoder:





## 8 Payload

For payload descriptions, uplinks and downlinks format and available commands please refer to this [document](#).

## 9 Ordering code

Code	Description
MCF-LW12TERWP	enginko LoRaWAN® outdoor environmental sensor EU863-870
MCF-LW12TERWP-AS	enginko LoRaWAN® outdoor environmental sensor AS920-925
MCF-LW12TERWP-US	enginko LoRaWAN® outdoor environmental sensor US902-928
MCF-LW12TERWP-AU	enginko LoRaWAN® outdoor environmental sensor AU915-928

## 10 Declaration of conformity

Hereby, enginko Srl declares that MCF-LW12TERWP complies with the essential requirements and other relevant provisions of Directive 2014/53/EU.

## 11 Contacts

**enginko Srl**

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