Autonomy of batteries

Battery autonomy based on transmission periodicities

Battery autonomy is given by the file below:

103KB Battery_autonomy.pdf
pdf

! Product storage before use = 6 months maximum

Battery replacement

Below is a table showing the battery reference to use for each sensor.

Type	Battery C	Battery D	Battery D	Battery
Sensor	1000-028 (ER26500)	1000-029 (ER34615)	1000-030 (ER34615)	1000-0 (ER346
TX T&H AMB 600-021/600-121	X			
TX CO2 VOC T&H AMB 600-023/600-123			X	
TX TEMP INS 600-031/600-131				X
TX TEMP CONT1 600-032/600-132				X
TX TEMP CONT2 600-232/600-332				X
TX T&H EXT 600-034/600-134				X
TX 4/20 600-035/600-135				X

Type	Battery C	Battery D	Battery D	Battery
TX PULSE 600-036/600-136				X
TX PULSE ATEX 600-037		X		
TX PULSE LED 600-038/600-138				X
TX CONTACT 600-039/600-139				X

⚠ Risk of explosion if sensor batteries are replaced with an incorrect reference.

Battery replacement procedure

Ambient sensors

1. Disconnect the Molex connector of the used battery from the PCB connector
2. Remove the used battery from its slot
3. Insert the new battery in the slot
4. Reconnect the new battery Molex connector to the PCB connector
5. The sensor restarts.

Rugged sensors

1. Disconnect the used battery Molex connector from the PCB connector

2. Unscrew the screws on the battery clip
3. Remove the battery clip
4. Remove the used battery from its slot
5. Insert the new battery in the slot
6. Replace the battery clip
7. Secure the battery clip with the two screws provided
8. Reconnect the new battery Molex connector to the PCB connector
9. The sensor restarts.

! Do not throw the battery into the fire.

Do not short-circuit the battery.

Do not crush the battery.

CE declaration

DT 39 - CE DECLARATION OF CONFORMITY.pdf
111KB pdf

Contact

Enless Wireless

6 bis, rue du Temple
33000 Bordeaux
FRANCE

Installation guide LoRaWAN

Installation help guide

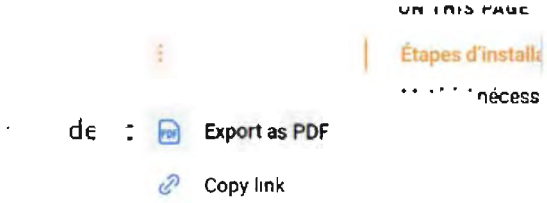
Learn how to configure products in LoRaWAN mode

This document details the installation procedure for Enless sensors in LoRaWAN mode

Good practices

1. Export the document to PDF

We know that when you work on site you do not always have access to the internet. For your on-site installations we recommend that you export this installation guide in pdf format. To do this please click on the three action buttons on the top right corner of this page, then click on Export to PDF.



2. Do some testing!

If this is your first time using Enless products, we recommend carrying out a test setup/installation in your office before moving on to the final on-site installation. This will no longer be necessary once you are familiar with the installation procedure.

About LoRaWAN

Reminder regarding LoRaWAN mode

LoRaWAN technology is bidirectional, and allows:

- Transmission of frames from the sensor to a network (uplinks)
- Transmission of information from the network to the sensor (downlink)
- End-to-end encryption of data exchanged (AES128)

When used in LoRaWAN mode, the sensors can send their data to a public (operator) or private LoRaWAN (gateway) network.

LoRaWAN architecture

Installation steps

Steps for installing Enless sensors in LoRaWAN mode

Installation steps

Sensors' provisioning

Declaration of sensors on the LoRaWAN network

Activation of sensors

Powering the sensors so that they communicate with the LoRaWAN network

Validation of the LED behavior

Validation of the sensor LED behavior

Configuration of downlinks

Creation and sending of configuration downlinks

Validation of data reception

Validation that the sensors communicate correctly with the LoRaWAN network

Positioning and fixing the sensors

Installation of sensors on site following our best practices.

Information concerning the sensors

More information about Enless sensors and their behavior

LoRaWAN class : class A
Frequency used: 868MHz
LoRaWAN version : V1.0.2revB
Activation : OTAA
Activation keys : DEVEUI, APPEUI, APPKEY

Managing Join requests and the ADR

Join requests

- When powered up, the transmitters perform a JOIN request.
- After 24Hr, they send a LinkCheckReq message that needs to be confirmed with a LinkCheckAck. And so on every 24 hours. When the LinkCheckReq has been confirmed with a LinkCheckAck, the transmitter will not send another JOIN request.
- If the LinkCheckReq message does not receive a LinkCheckAck response, further LinkCheckReq messages will be sent. If 6x LinkCheckReq messages do not receive a response, the transmitter will then initiate a new JOIN procedure.

ADR (Adaptive Data Rate)

When the transmitter initiates a JOIN request for the first time, the Spreading Factor is fixed at SF12 and BW125. The transmitter will not change its SF unless it receives a LinkADRReq from the gateway, requesting it to use a different SF parameter

Installation

Sensors' provisioning

Declare sensors on your LoRaWAN network

LoRaWAN Enless sensors use OTAA (Over The Air Activation) activation mode.

For their OTAA activation, Enless sensors have LoRaWAN keys:

- **DEVEUI** : Transmitter identifier
- **APPEUI** : Global application identifier
- **APPKEY** : Transmitter application key

These activation keys are made available in three possible ways:

1 - On the labels on the back of the sensors

2 - By scanning the QR codes of the sensors

3 - In CSV format

> The activation keys for your LoRaWAN Enless sensors can be provided in .csv format by our Sales Administration department.
>
> Please contact adv@enless.fr

Activation of sensors

Power the sensors so they pair with the LoRaWAN network.

Once the transmitters have been declared using the keys on the cloud or the gateway, the LoRaWAN transmitters must be powered up to dialogue with the network.

> Verify that the transmitters are in LoRaWAN mode. Validate that the jumper of each transmitter is correctly positioned on a single pin and that it is in LoRaWAN mode (see appendix). If this is not the case, please position the jumper correctly before proceeding with product activation.

Step 1 : Open the sensor housing

Open the boxes of the sensors that you have just declared and that you wish to activate.

Step 2 : Power the sensors

Power the first transmitter (of your choice) by connecting the Molex connector.

Step 3 : Validate the sensor LED behavior

The behavior of sensor LEDs is described in the appendix

Configuration of downlinks

Using downlinks to configure sensors

What is a Downlink ?

Downlinks allow information to be sent to sensors from the LoRaWAN network. This allows the configuration of the transmitters (transmission frequency, alarm thresholds, etc.). The downlink goes from the gateway or the antenna to the sensor.

iAn uplink is a frame that goes from the sensor to the LoRaWAN gateway or antenna.

The Enless sensors listen for downlinks after each uplink is sent. If you configure a downlink from the cloud or the gateway, the transmitter should retrieve it immediately after sending an uplink frame and change its settings accordingly.

To edit your configuration downlinks, we provide you with the following file:

Excel file

Decoding uplinks Generation of downlinks

Downlinks are to be sent on **port 1.**

Validation of data reception

Validate that messages are correctly received on the LoRaWAN network

Before moving on to the installation and fixing of the products, we invite you to validate from the cloud or the gateway that the sensor frames are received, and at the correct frequency.

If necessary, a push button to force the sending of test frames is available on the electronic card of each transmitter.

Installation of sensors

Position and secure the sensors in their final locations

Once you have validated that the sensors are paired and communicating with the LoRaWAN network, you can proceed to their installation.

Positioning

The correct positioning of sensors is very important and significantly influences the quality of radio wave propagation. If your sensor is poorly positioned, you will reduce the radio coverage distance. To maximize transmitter performance, please follow the points described below:

- Position the sensors **as high as possible**
- We recommend positioning the transmitters at a **minimum height of 1.50m**
- Make sure **the transmitter antenna is always pointing upwards**

Fixation

The sensors are fixed using wall mounting lugs. These lugs are intended for fixing by screw. The lugs of the room sensors (white boxes) are located inside the

sensors. For rugged sensors (grey housings), you can also use the mounting collar passages on the sides of the housing.

Ambient sensors

The sensors are fixed using wall mounting lugs. These lugs are intended for screw fixing and are located inside the sensors

Rugged sensors

The product can be fixed using clamps, lugs for screws, or on a DIN rail using mountings sold separately (ref. 1000-005).

Frame decoding

How to decode and integrate data frames from Enless sensors?

Integration tools

We provide our customers with the following files for decoding and integration of our LoRaWAN sensors:

JavaScript codecs

JavaScript codecs for integrating Enless sensor data frames

https://enless-wireless.freshdesk.com/en/support/solutions/articles/101000396459-lorawan-javascript-codecs

Excel file to help with decoding

Description of the structure of data frames and downlink generator

https://enless-wireless.freshdesk.com/en/support/solutions/articles/101000394755-lorawan-data-frames-decoding-and-downlink-generator

Appendices

Applicability

This guide is applicable to devices listed below.

EU868 Range

- TX T&H AMB 600-021
- TX CO2/VOC/T&H AMB 600-023
- TX TEMP INS 600-031
- TX TEMP CONT1 600-032
- TX TEMP CONT2 600-232
- TX T&H EXT 600-034
- TX 4/20 mA 600-035
- TX PULSE 600-036
- TX PULSE ATEX 600-037
- TX PULSE LED 600-038
- TX CONTACT 600-039

US915 Range

- TX T&H AMB 600-121
- TX CO2/VOC/T&H AMB 600-123
- TX TEMP INS 600-131
- TX TEMP CONT1 600-132
- TX TEMP CONT2 600-332
- TX T&H EXT 600-134
- TX 4/20 mA 600-135
- TX PULSE 600-136
- TX PULSE LED 600-138
- TX CONTACT 600-139

Safety

Safety recommendations

- The safety of Enless products can only be guaranteed if they are used for their intended purpose. They must only be serviced by qualified persons

- Risk of explosion if sensor batteries are replaced with an incorrect reference. Please refer to the appendix for replacing sensor batteries.
- The sensors must be installed in an adequately ventilated environments to ensure there is no danger of internal overheating. They must not be covered with things such as newspapers, cloth, curtains, etc
- Sensors must never be exposed to high temperature sources (E.g.: attached to heating equipment, etc.)
- Do not place the sensors near objects that generate flames (E.g.: candles, blowpipes, etc.)
- The sensors must not be exposed to aggressive chemical agents or solvents that may damage plastic or corrode metal parts

Reminder relating to the use of the TX PULSE ATEX 600-037 transmitter

As required by the ATEX 1999/92/EC Directive, only persons trained for working in hazardous areas are authorised to install the TX PULSE ATEX 600-037 transmitter. The TX PULSE ATEX 600-037 transmitter must not be modified in any way

Special conditions for safe operation

When used with a gas meter, the output wires of the TX PULSE ATEX 600-037 transmitter must be connected to certified intrinsically safe equipment. This

combination must be compatible with the Uo, Io, Po, Co, Lo intrinsic safety regulations specified on the label attached to the transmitter.

Certification

The TX PULSE ATEX 600-037 transmitter is ATEX certified:

II 1 G

Ex ia IIC T3 Ga

LCIE 14 ATEX 3013 X

-20°C ≤ Tamb ≤ +55°C

Battery: 3,6 V Ramway ER34615 only.

Uo:3,9 V ; Io : 11,47 mA ; Po : 11,18 mW ; Co : 617 µF : Lo : 270 mH.

Battery

The TX PULSE ATEX 600-037 transmitter is delivered with a RAMWAY ER34615 model battery. Only the RAMWAY ER34615 battery can be used with the TX PULSE ATEX 600-037 transmitter. These batteries can be obtained from Enless Wireless - 45 ter avenue de Verdun 33520, Bruges (France). Telephone: 05 56 35 97 47 – email: contact@enless.fr

WARNING - POTENTIAL RISK OF STATIC DISCHARGE

The TX PULSE ATEX 600-037 transmitter must only be cleaned using a damp clothe.

Legal information for 915MHz devices

This device complies with part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

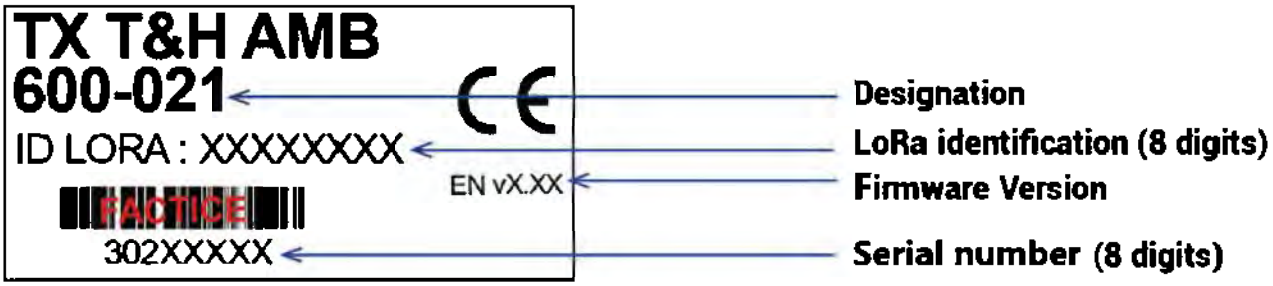
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAN ICES-003(B) / NMB-003(B)

Labels

Labels description



Label example

Communication mode

LoRaWAN vs LoRa proprietary

This document described the procedure for installing sensors in LoRaWAN mode. The sensors you use must therefore communicate in the LoRaWAN mode.

The communication mode is selected by means of a jumper on the electronic board in each sensor. See example below

Example below :

LoRaWAN mode
Jumper positioned on a single pin.

Proprietary LoRa mode
Jumper positioned on the two pins.

ℹ The mode change will only be taken into account if the jumper switching is carried out when the sensor is depowered.

Validation of LED behavior

LED behavior of Enless sensors

Phase 1 : Starting the sensor

LED	Behavior
L1 L2 L3 + WAN	Flash successively
L2	Flash when sensor sends a message

Phase 2 : Installation status

Installation status	Behavior of L1	Behavior of L2	Behavior of L3
	L1	L2	L3
Success strong signal	OFF	OFF	ON **(30s)**
Success weak signal	OFF	ON **(30s)**	OFF
Installation failed	ON **(30s)**	OFF	OFF

Phase 3 : Operation

LED	Behavior
L1	Flash every 1 minute in the event of an alarm
L2	Flash on each frame send
L3	Flash every 1 minute

Do not power the sensors simultaneously. Power them one by one and wait for the previous one to be correctly activated before powering the next one.

CO2 sensor calibration

TX CO2 COV T&H AMB 600-023

The TX CO2 VOC T&H AMB 600-023 sensors are delivered pre-calibrated.

You can re-calibrate them manually on a "fresh-air" basis if you notice a shift in the CO2 values measured over time. To ensure the best possible calibration, we recommend that you calibrate the products by following the procedure below:

1. When the sensor is powered, position it on a table near a window, the window must be open so that the air in which the transmitter will calibrate is healthy.

2. Press the push button located on the transmitter electronic board for 15 seconds. Only release the pressure when LEDs L1, L2, L3 light up. This means that the calibration process has been activated.

3. Walk away from the sensor and let the calibration take place. The process takes approximately 3 minutes.

4. When the LEDs stop flashing, this means that the calibration is complete. You can take the sensor and install it in its final location.

We recommend that you press the push button using a screwdriver or pen so as not to damage the CO2 sensor with your finger.

Wiring to meters

Connecting smart metering sensors to meters

TX Pulse

600-036

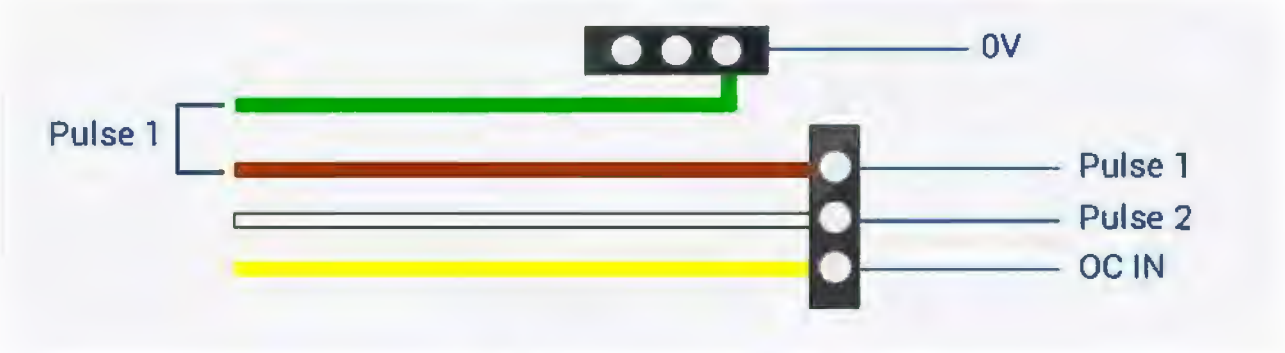
600-037

TX Pulse LED

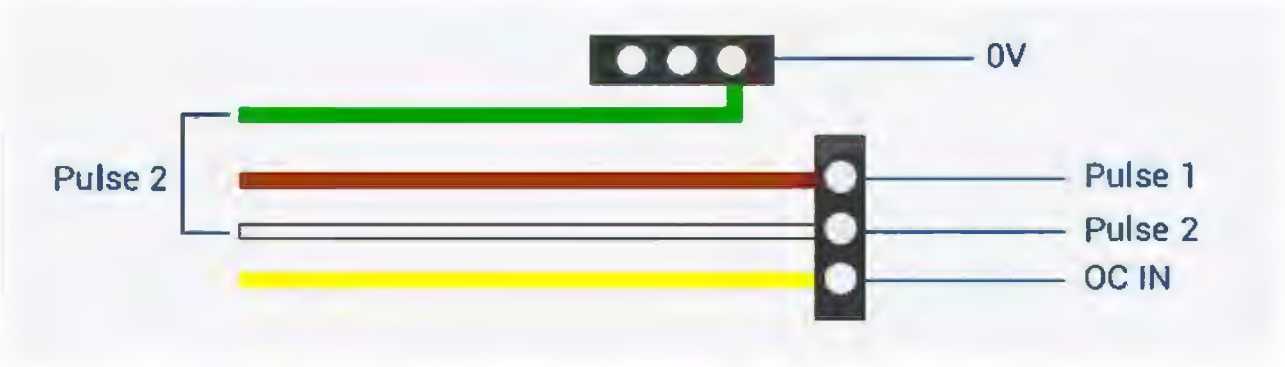
600-038

TX PULSE

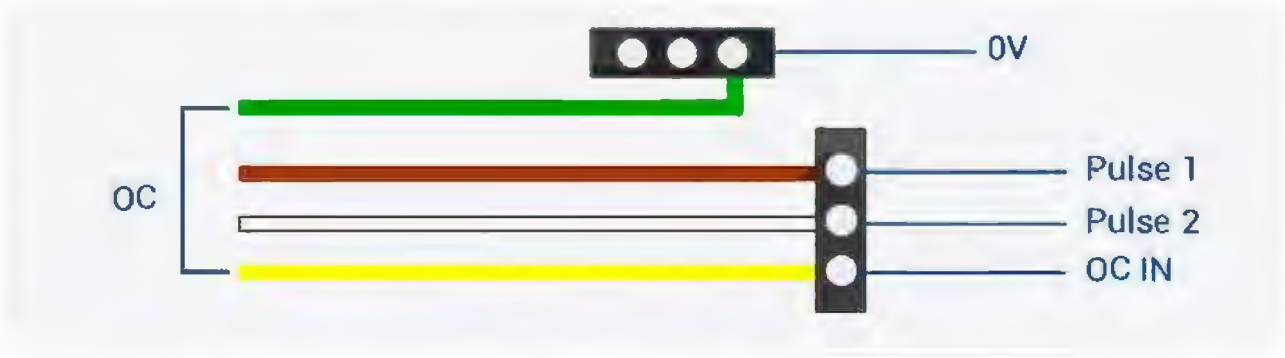
TX PULSE sensors can be wired in three ways:



Using Pulse 1 input (dry contact)



Using Pulse 2 input (dry contact)



Using the OC (open collector) input

The TX PULSE 600-036 and TX PULSE ATEX 600-037 sensors are compatible with meters with pulse outputs in dry contact or open collector.

Pulse duration = 50ms minimum
Pulse frequency = 10Hz maximum

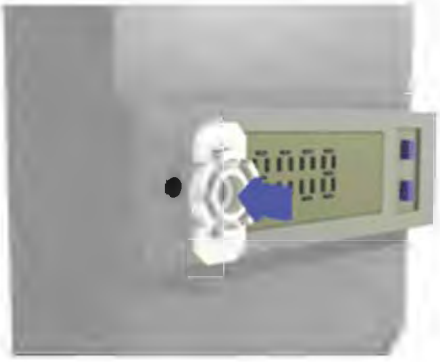
TX PULSE LED

Installing the optical read head on the meter

Installing the optical read head

Indicator light

Locate the flashing diode on the meter. It is on this diode that the optical reader will be positioned. The optical read head can only interpret LED flashes with a flashing duration of 3ms minimum and 100ms maximum.



Viewfinder attachment

Clean the meter around the flashing diode. Glue the viewfinder by aiming the diode through the hole (the viewfinder has adhesive)

Drive lock

Clip the reader into the viewfinder. Exert a uniform force over the entire surface of the sensor.

Checking

Once you power your transmitter, the red LED will light up periodically for 20 seconds, then the green LED will take over.

Consumption calculation

The pulse optical reader records 1 pulse every 5 flashes.

Calculation formula = **(A x 5) x B x C x D**

A = Number of pulses measured

B = Pulse weight
Blue tariff: 0.1W/pulse. In this case, enter 0.1 for B value in the calculation below. Other tariffs: Shown on the meter's interface (label or screen)

C = TC ratio (Current transformation) Blue tariff: 1

Yellow tariff: 20, 40 or 100 (shown on the meter's interface)

D = TT ratio (Tension transformer)

Blue tariff: 1

Yellow tariff: 1
Green tariff: Shown on the meter's interface.

The calculation formula above is a calculation of consumption in Watt-hour (Wh). To get a value in Kilowatt-hour (kWh), you just need to divide the value by 1,000

4/20mA probe wiring

Raccordement de votre sonde 4/20mA au transmetteur TX 4-20 600-035

The TX 4/20 600-035 transmitter is delivered without analog probe.

To connect your 4/20mA probe to the 600-035 sensor, open the sensor housing and refer to the label located inside the transmitter under the terminal block for connection.

! Powering your 4/20mA probe by the sensor is only possible if your probe can be powered with less than 3V.

Autonomy of batteries

Battery autonomy based on transmission periodicities

Battery autonomy is given by the file below:

103KB Battery_autonomy.pdf
pdf

Product storage before use = 6 months maximum

Battery replacement

Below is a table showing the battery reference to use for each sensor.

Type	Battery C	Battery D	Battery D	Battery
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TX CO2 VOC T&H AMB 600-023/600-123			X	
TX TEMP INS 600-031/600-131				X
TX TEMP CONT1 600-032/600-132				X
TX TEMP CONT2 600-232/600-332				X
TX T&H EXT 600-034/600-134				X
TX 4/20 600-035/600-135				X

Type	Battery C	Battery D	Battery D	Battery
TX PULSE 600-036/600-136				X
TX PULSE ATEX 600-037		X		
TX PULSE LED 600-038/600-138				X
TX CONTACT 600-039/600-139				X

⚠ Risk of explosion if sensor batteries are replaced with an incorrect reference.

Battery replacement procedure

Ambient sensors

1. Disconnect the Molex connector of the used battery from the PCB connector
2. Remove the used battery from its slot
3. Insert the new battery in the slot
4. Reconnect the new battery Molex connector to the PCB connector
5. The sensor restarts.

Rugged sensors

1. Disconnect the used battery Molex connector from the PCB connector

2. Unscrew the screws on the battery clip
3. Remove the battery clip
4. Remove the used battery from its slot
5. Insert the new battery in the slot
6. Replace the battery clip
7. Secure the battery clip with the two screws provided
8. Reconnect the new battery Molex connector to the PCB connector
9. The sensor restarts.

! Do not throw the battery into the fire.

Do not short-circuit the battery.

Do not crush the battery.

CE declaration

104KB

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pdf

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6 bis, rue du Temple
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