



Installation guide for



Version DTM85_a

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Products covered



Ambient transmitters

- TX T&H AMB 600-021
- TX CO2 / VOC / T&H AMB 600-023



Rugged temperature transmitters

- TX TEMP INS 600-031
- TX TEMP CONT1 600-032
- TX TEMP CONT2 600-232
- TX T&H 600-034



Smart metering transmitters

- TX PULSE 600-036
- TX PULSE ATEX 600-037
- TX PULSE LED 600-038



Industrial transmitters

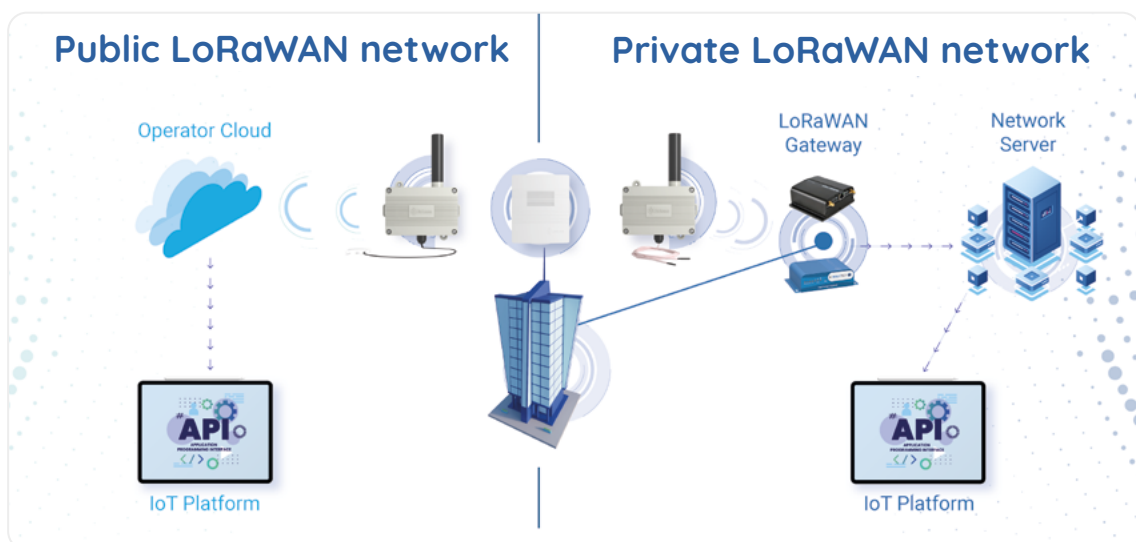
- TX 4/20mA 600-035
- TX CONTACT 600-039

Information concerning the LoRaWAN protocol

LoRaWAN technology is bidirectional and allows:

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

When using the LoRaWAN mode, the transmitters can send their data to a public LoRaWAN network or dialogue with a LoRaWAN gateway using a private network.



Enless sensors can also be used in the proprietary LoRa mode and dialogue with an Enless receiver. Please consult the proprietary LoRa mode installation guide for more details.



Information on Enless transmitters

- LoRaWAN class: **Class A**
- Frequency used: **868MHz**
- LoRaWAN version: **V1.0.2revB**
- Activation: **OTAA**

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 (Spreading Factor):

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 LinkADRRReq from the gateway, requesting it to use a different SF parameter.



Need Help?

Scan the QR code to access our Help Desk.

This is where you can find answers to the most frequently asked technical questions.

Installing the products

Installation steps

Declaring and installing transmitters

- ✓ Declaring transmitters on the LoRaWAN network
- ✓ Activating the transmitters
- ✓ Checking the transmitter LED indicators
- ✓ Configuring downlinks
- ✓ Checking data feedback
- ✓ Positioning and attaching transmitters

Integration tools for Enless transmitters

- ✓ Frame decoding file
- ✓ JavaScript Codecs

Equipment needed



Enless
transmitters

(If used in public mode)



Subscription
LoRaWAN operator

(if used in private mode)



Gateway
LoRaWAN



Crosshead
screwdriver

Declaring and installing sensors



Declaring transmitters on the LoRaWAN network

Our transmitters use the OTAA (Over The Air Activation) activation mode.

For the OTAA activation, our sensors have LoRaWAN keys:

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

These activation keys are provided in three possible ways:


- ✓ On the labels affixed to the back of each transmitter
- ✓ By using the QR codes affixed to each transmitter
- ✓ On the csv Excel file for each equipment order.
Contact our sales administration service: adv@enless.fr



Activating the transmitters

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.

- ✓ Open the casing of the transmitters. Check that the jumper on the sensor's electronic board is in the LoRaWAN position. (See Appendices).
- ✓ Connect the transmitter battery.
- ✓ Check the transmitter LEDs (see the paragraph below).

 Do not power up a large number of transmitters at the same time in the same space, there is a risk of message collisions. We recommend that you activate the transmitters one after the other.




Checking the transmitter LED indicators

Transmitter power supply




L3, L2, L1 + WAN flash in succession

L2 Flashes when the transmitter sends a message

Transmitter installation status

	Success - strong signal	Success - weak signal	Failure
			ON (30s)
		ON (30s)	
	ON (30s)		

Normal operation:

		
Flashes every minute when an alarm is detected	Flashes when a frame is sent	Flashes every minute

Configuring downlinks

Downlinks make it possible to send information to the transmitters from the LoRaWAN network. This makes it possible to configure the transmitters (transmission periodicity, alarm thresholds, etc.). Enless transmitters listen for a downlink following each uplink. If you configure a downlink from the cloud or the gateway, the transmitter should immediately capture this after sending an uplink frame and then modify its parameters as a result.

Enless provides a file for its customers enabling:

- The generation of configuration downlinks
- The decoding of the uplink frames

This file is available through our Help Desk:

<https://enless-wireless.freshdesk.com/en/support/home>

Type "**payload**" in the search box.

Downlinks are sent on Port 1.



Need Help?

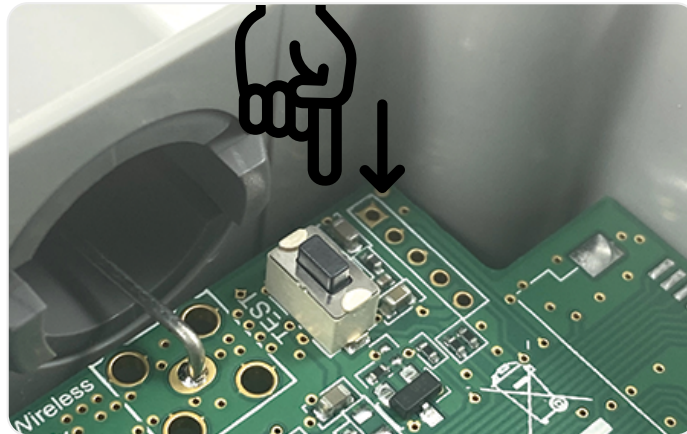
Scan the QR code to access our Help Desk.

This is where you can find answers to the most frequently asked technical questions.

✓ Checking the data feed

Before moving on to the installation and positioning of the products, we suggest you check from the cloud or the gateway that the frames from the sensors have been correctly received, and at the correct periodicity.

If required, there is a push button on the electronic board of each transmitter to force the sending of test frames.



Positioning and attaching the sensors

Positioning

Correctly positioning the sensors is very important and significantly impacts on the quality of the radio wave propagation. If your transmitter is incorrectly positioned, you limit the radio coverage distance.

To maximise the performance of the transmitter, follow the guidelines given below:



- Position the transmitters as high up as possible.
- We recommend that the transmitters are positioned at a height of at least 1.50m.
- Check that the transmitter's antenna is always pointing upwards.

Affixing

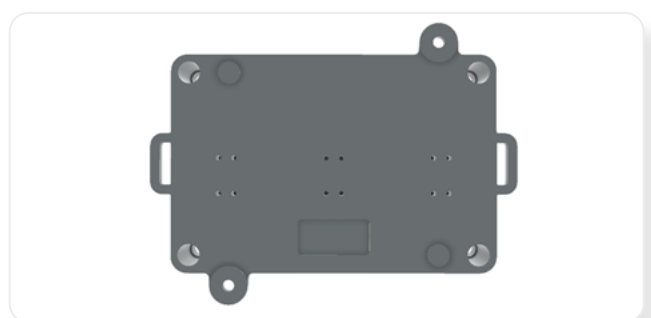
The transmitters are affixed using wall lugs. These are designed to be secured using screws. The ambient transmitter lugs (white casing) are inside the transmitters. For the hardened transmitters (grey casing), you can also use the securing clamps on the sides of the casing.

Ambient sensors



The transmitters are affixed using wall lugs. These are designed to be secured using screws and are on the inside of the transmitter..

Rugged sensors



The product can be attached using the clamps, the lugs and screws, or by means of a DIN rail.

Integration tools for Enless transmitters



Frame decoding file

This file is available through our Help Desk:

<https://enless-wireless.freshdesk.com/en/support/home>

Type **"payload"** in the search box.

JavaScript Codecs

This file is available through our Help Desk:

<https://enless-wireless.freshdesk.com/en/support/home>

Type **"Codecs"** in the search box.

APPENDICES



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.
- There is a risk of an explosion if the sensor batteries are replaced with incorrect reference replacements. Please refer to **Appendix page 26** for details on replacing the 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 37 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.

Description of the products

Ambient transmitters

Product references

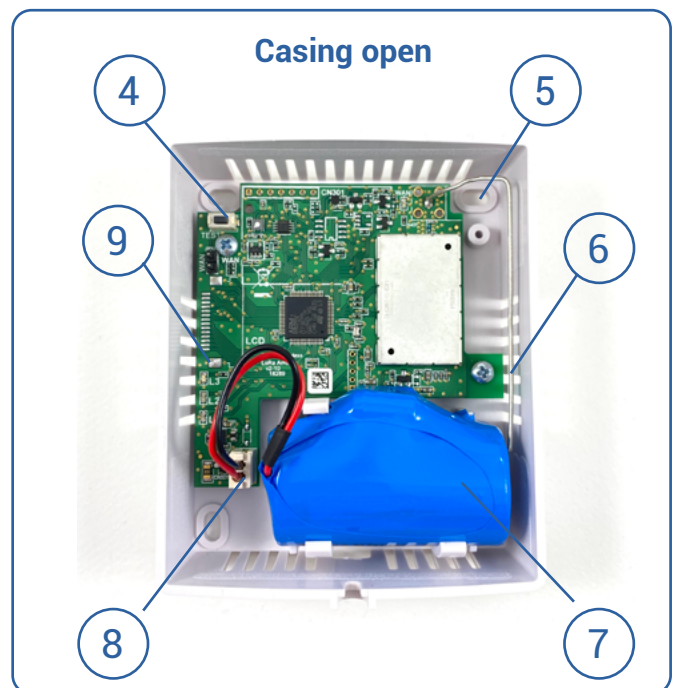
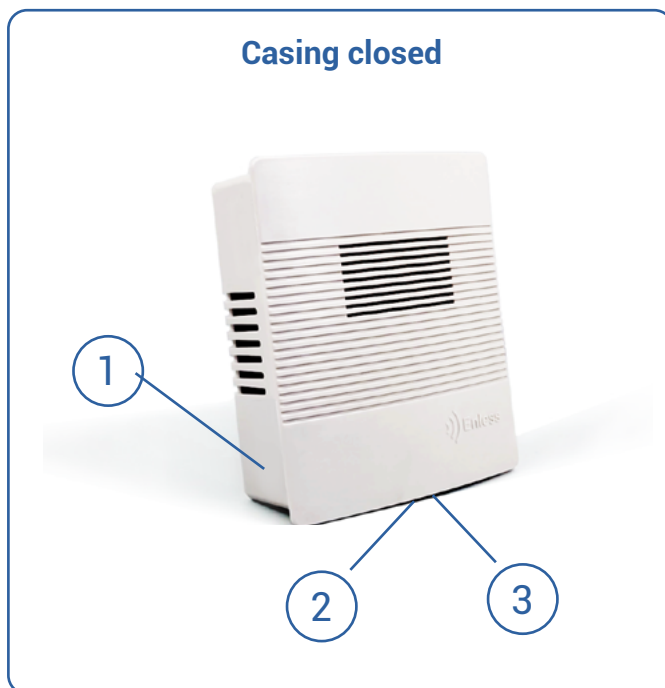
TX T&H AMB 600-021
TX CO2/VOC/T&H AMB 600-023

Applications

Measuring Comfort &
Indoor Air Quality

Identification

LoRa ID (on the sensor label)



1. ID label
2. Cover closing screw
3. Closing tab for casing

4. Push button to test the sending of data frames
5. Hole for wall fixing
6. Antenna
7. Replaceable battery
8. Connector for battery plug
9. LED indicator lights (L1, L2, L3)

Description of the products

Temperature transmitters

Product references

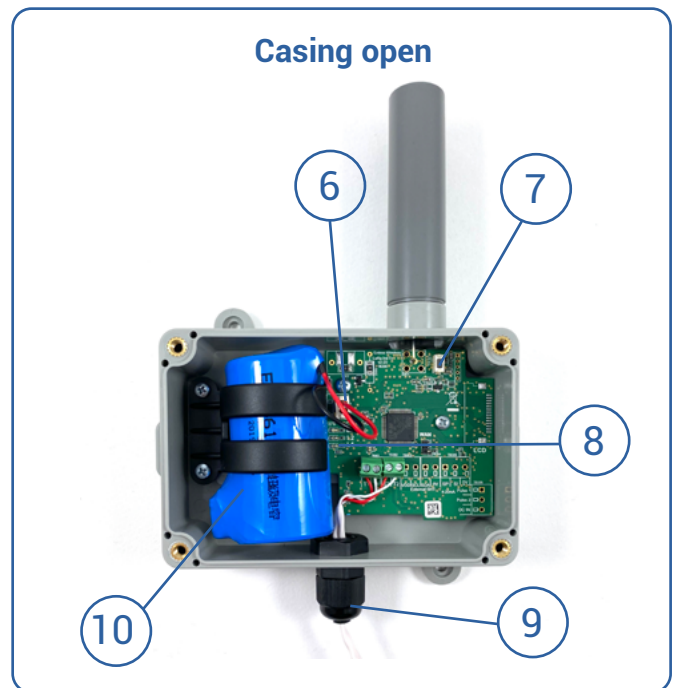
TX TEMP INS 600-031
TX TEMP CONT1 600-032
TX TEMP CONT2 600-232
TX T&H EXT 600-034

Applications

Temperature measurements in outdoor or industrial environments

Identification

LoRa ID (on the sensor label)



1. ID label
2. Loop for fixing collar
3. Cover closing screw
4. Hole for wall fixing
5. Antenna

6. Connector for battery plug
7. Push button to test the sending of data frames
8. LED indicator lights (L1, L2, L3)
9. Cable gland for contact and external probes (contact or temperature humidity)
10. Replaceable battery

Description of the products

Remote meter reading transmitters

Product references

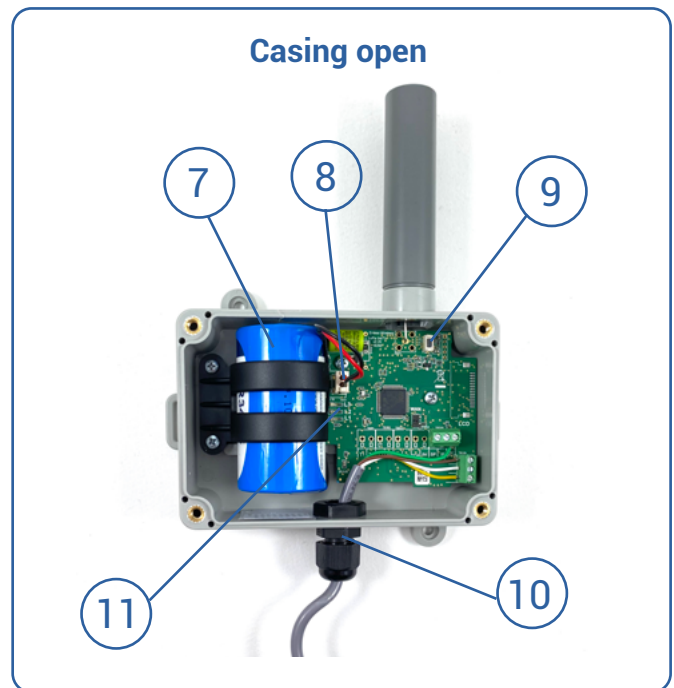
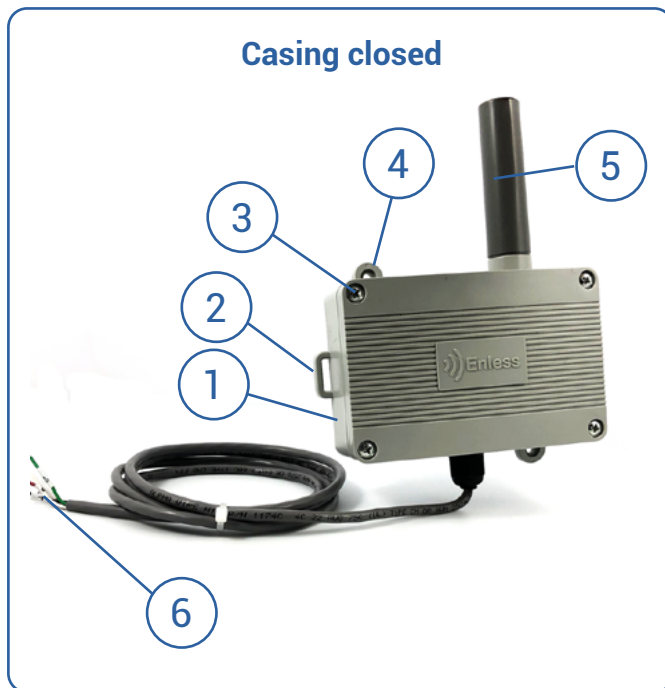
TX PULSE 600-036
TX PULSE ATEX 600-037
TX PULSE LED 600-038

Applications

Smart meter reading
(water, Electricity, gas,
etc.)

Identification

LoRa ID (on the sensor
label)



1. ID label
2. Loop for fixing collar
3. Cover closing screw
4. Hole for wall fixing
5. Antenna
6. Meter connection cable / contact cable

7. Replaceable battery
The ATEX battery for the TX PULSE HP ATEX 600-037 is available from Enless Wireless (contact@enless.fr)*
8. Connector for battery plug
9. Push button to test the sending of data frames
10. Cable gland for connection cables (meter or contact)
11. LED indicator lights (L1, L2, L3)

* Important: There is a risk of explosion if the replacement battery is not the correct type. Used batteries must be disposed of as instructed

Description of the products

Industrial transmitters

Product references

TX 4/20mA 600-035

Application

Reading analogue signals
4/20mA

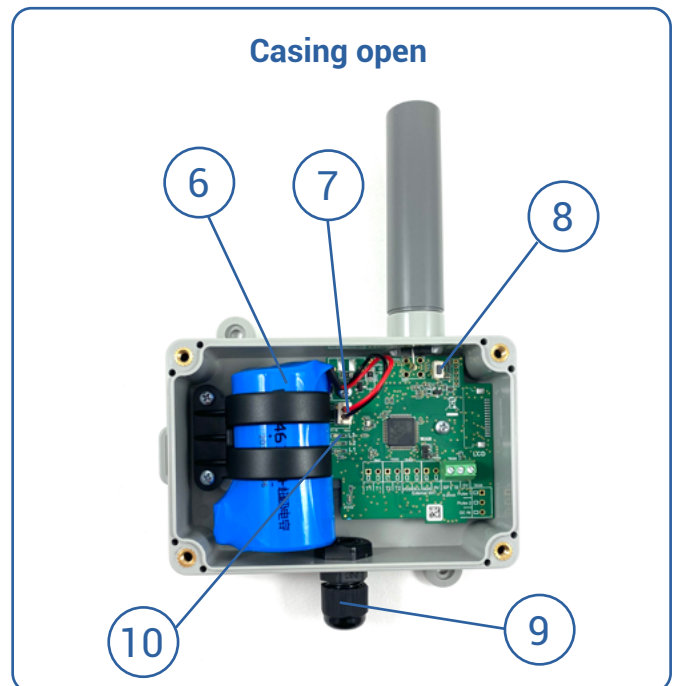
Identification

LoRa ID (on the sensor label)

Casing closed



Casing open



1. ID label
2. Loop for fixing collar
3. Cover closing screw
4. Hole for wall fixing
5. Antenna

6. Replaceable battery
7. Connector for battery plug
8. Push button to test the sending of data frames
9. Cable gland for analogue probe 4/20mA
10. LED indicator lights (L1, L2, L3)

Description of the products

Industrial transmitters

Product references

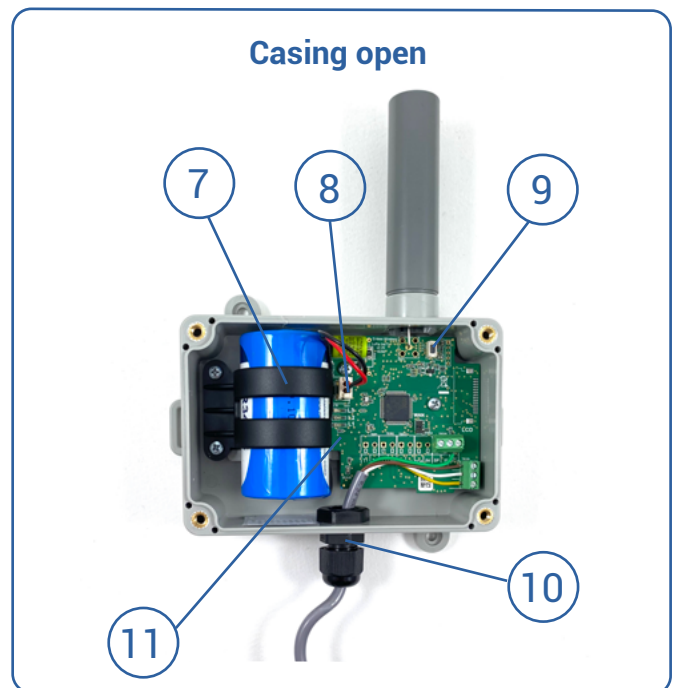
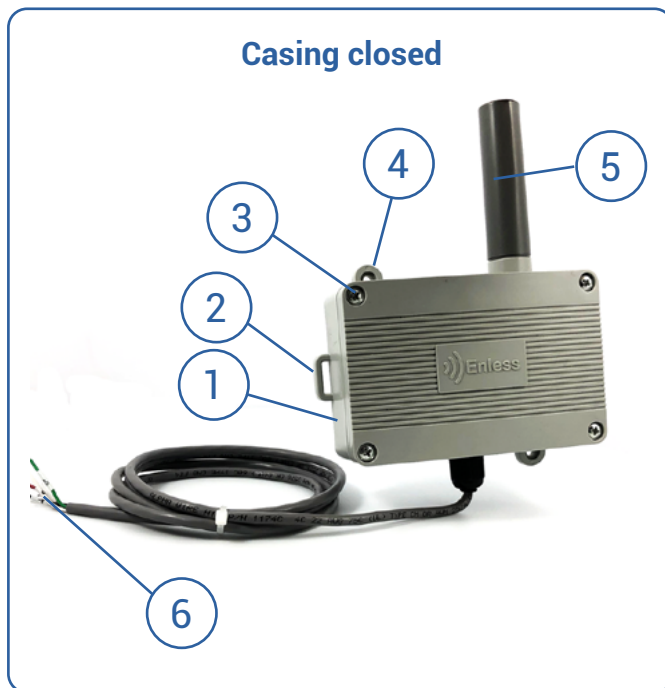
TX CONTACT 600-039

Application

Detecting changes of state
(ON/OFF)

Identification

LoRa ID (on the sensor label)



1. ID label
2. Loop for fixing collar
3. Cover closing screw
4. Hole for wall fixing
5. Antenna
6. Connecting cable for the ON-OR-OFF interface (dry contact)

7. Replaceable battery
8. Connector for battery plug
9. Push button to test the sending of data frames
10. Cable gland for connection cables (meter or contact)
11. LED indicator lights (L1, L2, L3)

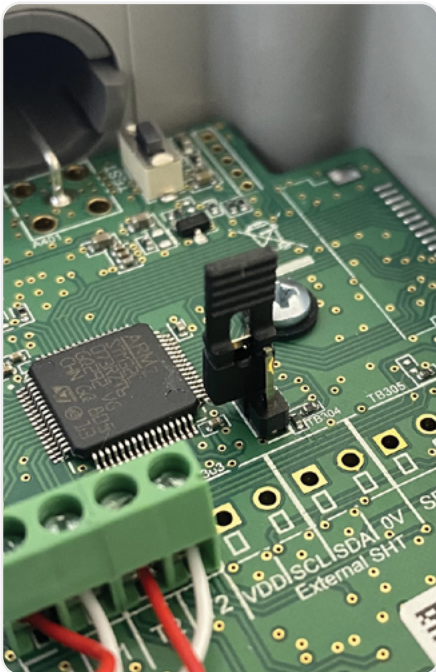
Selecting the communication mode (proprietary LoRa or LoRaWAN)

This document describes 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:

LoRaWAN mode

Jumper positioned on a single pin.



Proprietary LoRa mode

Jumper positioned on the two pins.



The transmitter must be powered down before you change the position of the jumper.

If you want to use our products in the Proprietary LoRa mode, please refer to the Proprietary LoRa mode sensor installation guide.



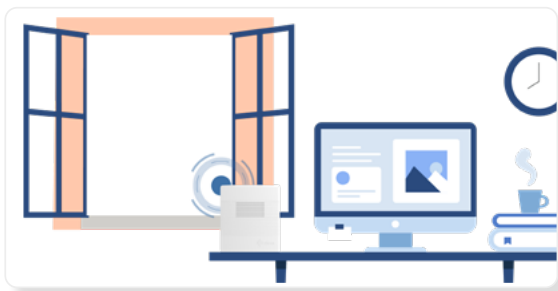
Calibrating the CO2 transmitters (TX 600-023)

Our TX CO2 COV T&H AMB 600-023 sensors are delivered pre-calibrated.

You can recalibrate these manually on a fresh-air basis if you observe a divergence in the CO2 values over time.

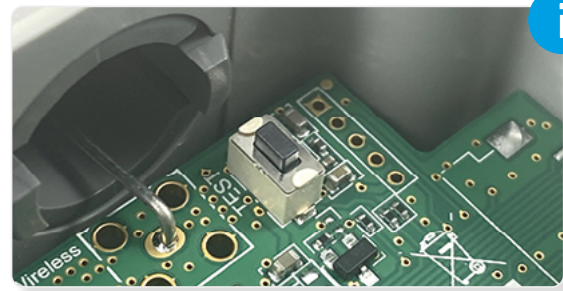
To guarantee the best possible calibration, we recommend that the equipment is calibrated following the procedure described below:

1



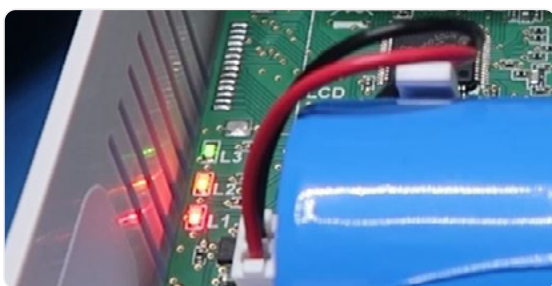
With the transmitter powered up, place it on a table near a window, with the window open to ensure that the air in which the transmitter is being calibrated is fresh.

2



Hold down the push button located on the transmitter's electronic card for 15 seconds. Do not release the button until the L1, L2, L3 LEDs come on. This indicates that the calibration process is active.

3



Move away from the transmitter and allow the calibration to complete. This process takes around 3 minutes.

4



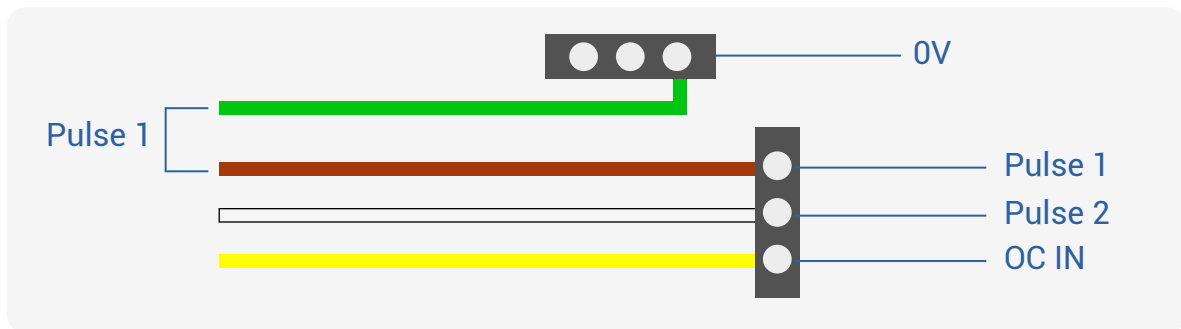
When the LEDs have stopped flashing, this means that the calibration has been completed. You can now take the transmitter and install it in its intended position.

We recommend pressing on the push button using a screwdriver or a pen to make sure you do not damage the CO2 sensor with your finger!

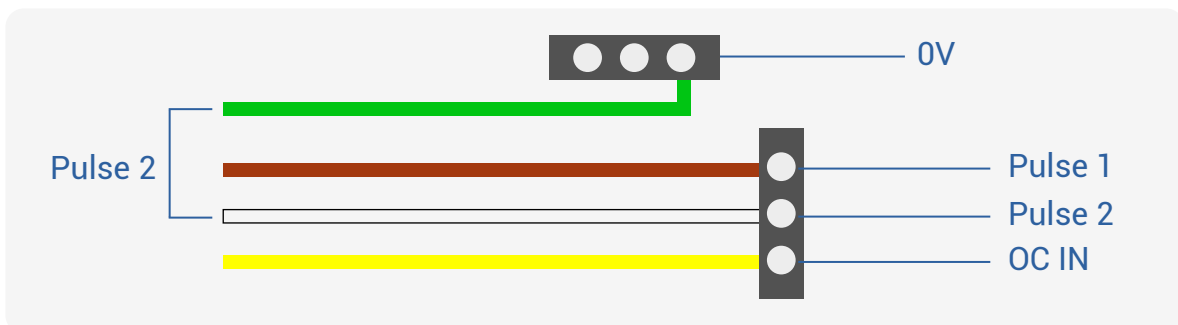
Connecting the TX PULSE to the pulse meters

The pulse transmitters can be wired in one of three ways:

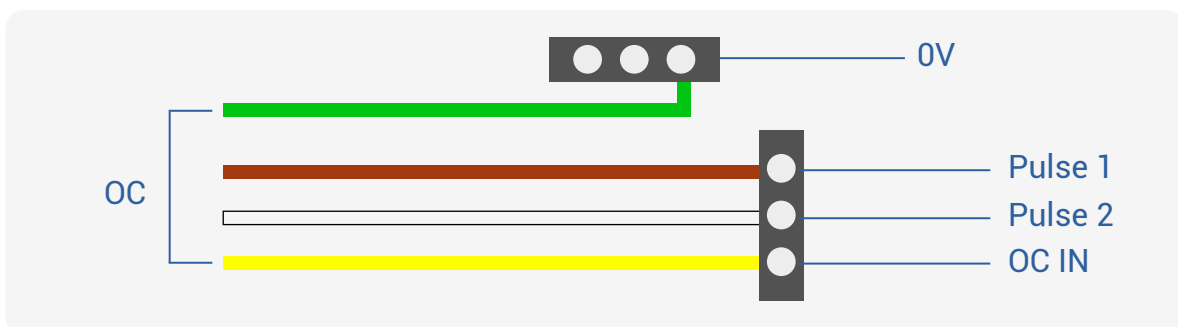
Using the Pulse 1 input (dry contact):



Using the Pulse 2 input (dry contact):



Using the OC input (open collector):



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

Pulse duration = **50ms minimum**

Pulse frequency = **10Hz maximum**

Connecting the TX PULSE LED to the electricity meter

1. Understanding your meter



Indicator lights

Find the flashing diode counter. This is where the optical reader will be placed. The head of the optical reader is only able to detect LED flashes with a minimum length of 3ms and a maximum of 100ms.

Parameters

If it is a tariff meter greater than 36 kVA, you need to find the transformation ratio of your meter. Use the buttons beside the digital display to read the value corresponding to the TC ratio (parameter 6, 16 or 64).

2. Installing the sensor



Attaching the viewfinder

Clean the meter around the flashing diode.

Affix the viewfinder with the diode visible through the hole (the viewfinder is supplied with an adhesive).

Locking the reader

Clip the reader into the viewfinder. Exert equal force across the entire surface of the sensor.

Checking

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

3. Consumption calculation (next page)

3. Consumption calculation

The pulse optical reader records 1 pulse every 5 flashes.

$$\text{Calculation formula} = (A \times 5) \times B \times C \times D$$

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.

Connecting your 4/20mA probe to the TX 4/20 600-035 transmitter

When installing analogue transmitters, you must first connect the 4/20mA sensor to the transmitter.

Open the transmitter casing and connect the analogue sensor to the transmitter terminal. Refer to the label inside the transmitter under the terminal block for the connection.

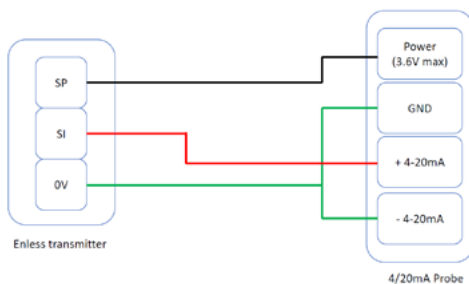
Connecting the probe

Transmitter Terminal	Description	Connecting to the PLC
SP	Power (+V)	Use SP and 0V to power the probe
SI	4/20mA (+I)	Use SP and 0V to power the probe
0V	Common 0-V	

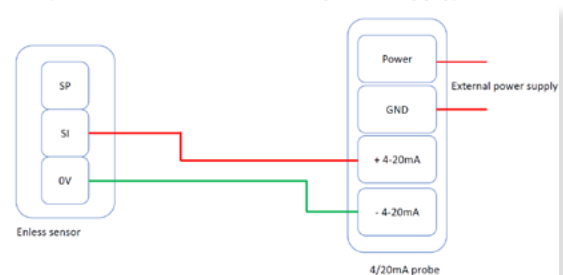
Once the probe is connected to the transmitter, you can start configuring the transmitter.

Cabling for the 4/20mA sensor to the TX 4/20mA 600-035 transmitter


Cabling for the LoRa 4-20mA transmitter (with the 4/20mA sensor power supply)



Cabling for the LoRa 4-20mA transmitter (without the 4/20mA sensor power supply)



Replacing the batteries

	C battery with Molex connector	D battery with Molex connector
	BAT C 1000-028	BAT D 1000-029
TX T&H AMB 600-021	X	
TX CO2 VOC T&H 600-023		X
TX TEMP INS 600-031		X
TX TEMP CONT1 600-032		X
TX TEMP CONT2 600-232		X
TX T&H EXT 600-034		X
TX PULSE 600-036		X
TX PULSE ATEX 600-037		X
TX PULSE LED 600-038		X
TX CONTACT 600-039		X
TX 4/20mA 600-035		X

Frequently Asked Questions



Answers to the most frequently asked questions can be found on our help Desk site:

<https://enless-wireless.freshdesk.com/en/support/home>

Type your question in the Help Desk search box. There are more than **150 FAQ articles to help you** – you will almost certainly find the answer to your question here.

Scan the QR code to access our Help Desk.

