

Installation guide

LoRa proprietary

Installation help guide

Learn how to configure products in proprietary LoRa mode

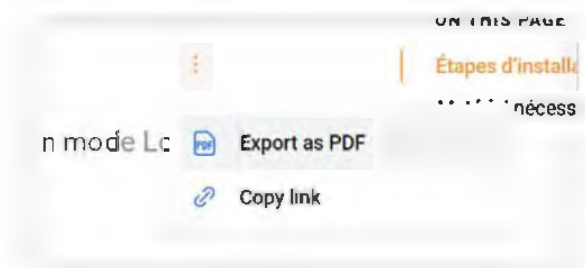
Whether for use with a Modbus receiver or with a BACnet receiver , the product configuration principle is identical. You will find on the left of this document the details of the steps to follow.

 We recommend following the setup steps one by one.

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 proprietary LoRa

Reminder regarding proprietary LoRa mode

Proprietary LoRa architecture

In proprietary LoRa, the sensors communicate with an Enless receiver (Modbus or BACnet). The receiver stores the sensor data and makes it available to a PLC/BMS.



With the Modbus receiver

RX MODBUS 500-302

Enless sensors send their information to the receiver. The latter stores the data received in a Modbus Table. It is then connected to the BMS via Modbus TCP/IP or RTU.

With the BACnet receiver

RX BACNET 500-312

Enless sensors send their information to the receiver. The latter converts the data into BACnet objects. It is then connected to the BMS via BACnet IP or MSTP.

- i One receiver can manage up to 50 Enless sensors

Differences between LoRaWAN and Enless proprietary LoRa

LoRaWAN vs LoRa proprietary : what differences ?



- i If you wish to use the sensors in LoRaWAN mode, please refer to the LoRaWAN mode installation help guide.

Installation steps

Installation Steps and required materials

Installation steps

A white 'IP' text inside a dark blue circle, which is centered on a larger blue rectangular background with faint white curved lines.

IP Configuration

Configure the PC's IP settings to be able to access the receiver's configuration server.



Server access

Preparation of the receiver (antenna, power supply) before accessing the configuration server.



Configuring sensors

Declaration and configuration of the sensors you wish to pair with the receiver.



Activation of sensors

Powering the sensors so that they pair with the receiver and recover their configuration parameters.



Data reception

Validating that the sensors communicate correctly with the receiver and that the RSSI is good.



Installation of devices

Installation of devices on site following our best practices.



Receiver settings

Configuration of receiver communication parameters before connecting to the BMS



Connection to PLC

Guide to connecting and wiring your receiver to the PLC/BMS.

- i The TX IO 600-040 and TX MODBUS 600-041 have specific installation procedures. Please refer to the summary for installation procedures for these products.

Necessary material



PC with ethernet port

Use an ethernet/USB adapter if your PC does not have an ethernet port



Long range antenna for the receiver

Use the Enless Long Range Antenna
Ref: ANT REN SMA LR 1000-008



Power supply for the receiver

Power the receiver with 7.5 to 24VDC.
Enless 12V power supply available
Ref: POWER 1000-002



Screwdriver

1x Phillips screwdriver
1x flat screwdriver (ø 2.5mm)

Installation

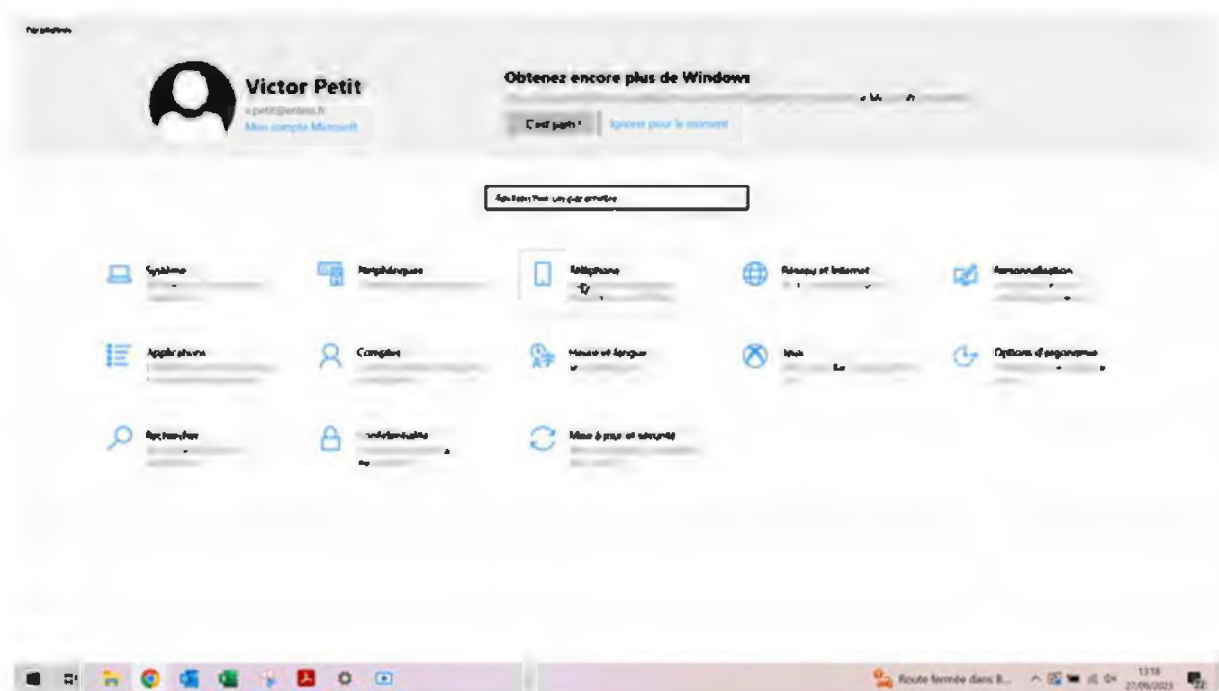
IP Configuration

Configure your PC's IP settings to access the receiver's configuration server

The configuration of the sensors will be done from the server embedded in the receiver. It will therefore be necessary for you to be able to access the configuration interface of your RX MODBUS or RX BACNET. The receiver configuration server is accessible at the address **192.168.77.77**

Configuring IP settings from your PC

On your PC, configure the IP settings so that the configuration server is accessible.



Example of IP settings

- IP address: 192.168.77.2
- Subnet prefix length: 24

- Default gateway: 192.168.77.1
- Preferred DNS: 8.8.8.8
- Subnet mask (if available): 255.255.255.0

Once these settings are configured, the configuration server IP should be accessible from your browser at 192.168.77.77 (please avoid use on Microsoft Edge and favor use on Google Chrome).

You can now move on to the next step.

 This configuration is also valid for access to the configuration servers of the **TX IO 600-040** and **TX MODBUS 600-041**.

Access to the server

Prepare your receiver and access the configuration server

Receiver preparation

- ✓ **Step 1 :** Connect an antenna to the receiver

First of all, don't forget to connect the long-range antenna (ref: ANT REN SMA LR 868MHz 1000-008) to the SMA connector of the receiver.



- ✓ **Step 2 :** Power the receiver (7.5 - 24VDC)

1. Open the receiver case by unscrewing the 4 cover screws.
2. Externally power your receiver (between 7.5 and 24VDC). If you use our 12V power supply, connect your power supply to the POWER terminal of the receiver.

- **Red wire** connected to the V+ terminal block
- **Black wire** connected to the 0V terminal block



The **LED C** should light up when your receiver is properly powered.

Consumption is normally less than 50mA at 12V. During the sensor installation phase, there may be peaks at 500mA. To avoid any problems please maintain 1A 12V on the power terminal block

✓ **Step 3 :** Connect the receiver via Ethernet to the PC

The receiver is supplied without RJ45 cable. You need to obtain an RJ45 cable to continue the installation. Connect the RJ45 cable to the port on your receiver and also to the Ethernet port on your PC.



If your PC does not have an Ethernet port, we invite you to use a USB / Ethernet adapter.

✓ **Step 4 :** Validate the receiver LED behavior

Once your receiver is powered and connected to your PC, you can validate the correct behavior of the product using its LEDs. [Description of LEDs here](#) .

Access to the receiver server

Once your receiver is powered and connected to your PC, you will be able to access its configuration server. From your browser, enter the address **192.168.77.77** to access the server.

Choose to use Google Chrome for access to the configuration server 

 If you want to change the receiver IP address, please see [this article](#).

Receiver update (optional)

Update your receiver to the latest available firmware version (optional)

We invite you to update your receiver to the latest available firmware version before proceeding to the following steps (optional).

Below are the latest firmware files available and the update procedure.

Update Procedure

Receiver update procedure

Firmware files

RX MODBUS 500-302



Enless_LoRaModRx_EN412_V2.01.8874_NA_NA_NA_0.upg

RX BACNET 500-312



331KB

Enless_LoRaBacRx_EN413_V2.02.8890_NA_NA_NA_0.upg

- Please be sure to use the correct type of firmware file to update your receiver or you may damage your product. The RX MODBUS firmware is not compatible with an RX BACNET, and vice versa.

Configuring sensors

Declare and configure sensors from the CONFIG TX tab

- ! If you wish to configure a TX IO 600-040 or a TX MODBUS 600-041 , please refer to the specific installation procedure for these products (see left menu).

- i Only those receivers with firmware version X.X.8864 and above can manage 50 sensors. Previous versions can manage 40 sensors.

Video Example

Configuration settings

As shown in the above video, once we have accessed the configuration server, the declaration of sensors is done from the tab **CONFIG TX** by clicking on the button

+Add Sensor.

Below are the details of the configuration parameters:

Field	Meaning
 Type TX	Choose the sensor type
 Location	Indicate the location of the sensor (e.g. office)
 LoRa ID	Enter the LoRa ID (provided on the sensor label).
 Periodicity	Choose the transmission periodicity. The transmission periodicity directly influences the battery autonomy of the products.
 + Advanced	Show advanced settings.

Repeat for all sensors to configure.

The list of sensors you have declared is displayed on the CONFIG TX page.

Editing the configuration

You can resume the configuration of a sensor at any time or delete it using the edit or delete buttons.

- i We recommend exporting your configuration file in CSV format to preserve your configuration.

Activation of sensors

Power the sensors so they pair with the receiver.

Step 1 : Open the sensor housing

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



- i Check that the sensors are in proprietary LoRa mode. Validate that the jumper of each sensor is correctly positioned on the two pins and that it is in proprietary LoRa mode (see appendix). If this is not the case, please position the jumper correctly before proceeding to activate the products.

Step 2 : Power the sensors

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

Monitor the sensor [LED behavior](#).

A **LED L2** fixed will confirm that the sensor is correctly paired to the receiver.

Repeat for all sensors to activate.

Step 3 : Validate sensor activation from the server

In the **CONFIG TX** tab, refresh the page in your browser.

A validation sticker should appear in front of the sensor(s) you have just activated. A red dot means that the configuration is being recovered. Do not hesitate to wait a few moments and refresh your page if the green dots do not appear.



Data reception

Validate that messages are correctly received from the NETWORK tab.

The sensor frames that you have just activated should go up in the **NETWORK** tab at the periodicity that has been configured. This tab allows you to validate the correct reception of sensor frames.

We recommend using this page as an on-site audit tool, to validate that the [RSSI levels](#) for receiving sensors are good.

Validation of data reception

Use of the push button

Position the transmitters where they will be installed on site. We invite you to use the push button located on the electronic boards of the sensors to force the sending of test frames.

The **LED L2** flashes when you press the push button. This means that a frame has been sent by the transmitter. You should see in the NETWORK tab that the test frame has been received correctly.



RSSI analysis

Strong signal 😊

Up to -105 dBm

☆☆☆☆☆

Medium signal 😐

from -106 to -112 dBm

☆☆☆☆

Weak Signal 😞

beyond -112 dBm

☆☆

i In case of weak RSSI, we recommend installing a **signal repeater**. To learn more about **signal repeater installation**, please visit [this page](#) .

Installation of devices

Position and secure the devices in their final locations

Once you have paired the sensors to the receiver and validated that they are communicating correctly with the receiver, you can move on to installing them.

Positioning of sensors

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 and receivers (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 and receivers

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

Receiver settings

Configure the communication parameters of your receiver from the CONFIG RX tab

Once the configuration and activation of the sensors is complete, the last phase consists of determining the communication parameters of the receiver before connecting it to the BMS.

The configuration options will therefore be different depending on the type of receiver you are using (Modbus or BACnet). Choose the receiver you want to configure below.



Communication settings

RX MODBUS 500-302



Communication settings

RX BACNET 500-312

Modbus receiver communication parameters

Configure the Modbus receiver communication parameters from the CONFIG RX tab

Configuring Modbus parameters

Configuration of the Modbus receiver parameters is done from the CONFIG RX tab

Field	Meaning
 Baud rate, Data and stop bits, Parity	Match the receiver's communication settings with those of your controller.
 Modbus ID	Modbus ID of the receiver.
 1st register	Register number from which the sensor information will be incremented in the Modbus table.

Field	Meaning
 RS232 / RS485	Determine the receiver's communication interface when you want to communicate via Modbus RTU: RS232 or RS485
 Advanced settings	IP parameters for Modbus TCP/IP communication

Viewing the Modbus table

Once the receiver configuration is complete, you can click on the **MODBUS tab** to access the receiver table. When you select a transmitter on the left of the screen, the registers in which its information is stored are displayed in the Modbus Table. You can save this Modbus table with the ["Export CSV»](#)

Modbus table Excel file

The Excel file detailing the receiver's Modbus table is available below.



63KB

EN-LoRa Modbus Register Map Rev 10_01-.xlsx

- i We recommend that the Modbus request frequency on our Modbus receivers falls no lower than 5 seconds between each request.**

BACnet receiver communication parameters

Configure the BACnet receiver communication parameters from the CONFIG RX tab

- i If you want to configure a Modbus receiver, go to the [Modbus receiver communication settings](#) page .

Configuring BACnet settings

The configuration of the BACnet receiver parameters is done from the CONFIG RX tab

Field

 Baud rate, Data and stop bits, Parity

Meaning

Match the receiver's communication parameters with those of your PLC (valid for BACnet MSTP communication).

Field	Meaning
 Device mode	Each sensor paired to the receiver will appear as a BACnet device on the network during discover. Only objects from sensors paired to the receiver will be accessible after the <u>discover</u> .
 Object mode	The receiver will display any BACnet objects it may contain during <u>discover</u> .
 Protocole	Select the desired communication protocol: • MSTP • IP • MSTP + BBMD • IP+ MSTP
 DHCP	You can enable (or not) DHCP






Connecting the receiver to the PLC or the BMS

Connect your receiver to the PLC / BMS

Congratulations, the configuration part is complete! 🎉



You can now connect the receiver to the PLC / BMS.

Below are the details of the receiver wiring.

Wiring the RX MODBUS 500-302 Modbus



Use the RJ45 Ethernet port on the receiver to connect via TCP/IP

[Wiring details](#)



[Wiring details](#)

Wiring the RX BACNET 500-312



IP

Use the RJ45 Ethernet port on the receiver to connect via IP



MSTP

[Wiring details](#)

INSTALLATION TX IO

Installation procedure

Find out how to install the TX IO 600-040

Sections

Reminder

Reminder on the use of TX IO and the different control possibilities.

**Remote
control**

Installing the TX IO in remote control mode.

**Local
control**

Installing the TX IO in local control mode.

D2D

Installing the TX IO in D2D mode.

Reminder

Rappel concernant les possibilités d'utilisation du TX IO 600-040

The TX IO offers Enless integrators different control possibilities. As a reminder, the TX IO has 2 contact-dry inputs and 4 controllable relay outputs. It can be used in 3 distinct modes which will be configurable from the server embedded in the transmitter.

By default, the TX IO is delivered ready to be used in remote control mode.



Remote control mode

The TX IO outputs are controlled by commands from the receiver. The TX IO also reports the status of its inputs to the receiver. In remote control mode, the TX IO behaves like any other Enless transmitter (sending periodic messages) while having the possibility of receiving commands from the receiver to control its 4 relay outputs.



Local control mode

The TX IO controls its relay outputs according to the status of its inputs. It can send reporting messages to the receiver. The TX IO can be configured to synchronize inputs to relay outputs with a configurable delay (to ensure that the relay does not instantaneously match if there is a momentary change in the input state).



D2D (Device To Device) mode

The TX IO communicates with LoRa Enless sensors (4 maximum) and controls its outputs according to the alarm thresholds configured on the sensors.

- i To change the mode of use of the TX IO, please access its configuration server (same procedure as for accessing the receiver server).

Remote control mode

Control of relay outputs on receiver commands

Step 1 : Configuring TX IO from the RX server

The configuration of the TX IO will be done from the receiver server with which the TX IO will communicate.

Below are the steps for configuring the TX IO.

- ✓ Access the receiver configuration server

The procedure for accessing the receiver configuration server is detailed in the following sections:

- [IP Configuration](#)
- [Server access](#)

- ✓ Configure TX IO

The TX IO declaration procedure is the same as for other transmitters.

Please visit the section [Configuring sensors](#)

Step 2 : TX IO Activation

Once declared on the receiver server and configured, you will need to activate the TX IO to pair it with the receiver. Below are the steps for activating the TX IO.

- ✓ Power the TX IO (7.5 - 24VDC)

-

- Open the TX IO case by unscrewing the 4 cover screws.
- Externally power your TX IO (between 7.5 and 24VDC). If you use our 12V power supply, connect your power supply to the POWER terminal of the receiver.
 - **Red wire** connected to the V+ terminal block
 - **Black wire** connected to the 0V terminal block

- ✓ Validate the TX IO LED behavior

Once your TX IO is powered and connected to your PC, you can validate the correct behavior of the product using its LEDs. [LEDs behavior](#)

Step 3 : Validation of TX IO activation

Validate that the TX IO communicates with the receiver.

- ✓ From CONFIG TX tab

In the **CONFIG TX** tab, refresh the page in your browser. A validation sticker should appear in front of the TX IO that you have just activated.



A red dot means that the configuration is being recovered. Do not hesitate to wait a few moments and refresh your page if the green dot does not appear.

- ✓ From Network tab

In the **NETWORK** tab, the TX IO frames that you have just activated must be sent at the periodicity that has been configured. This tab allows you

to validate the correct reception of the TX IO frames.



Step 4 : Relay control

✓ From a RX MODBUS 500-302

The relays are controlled by writing to the **Status** registers of the relays from the Modbus table. For example, you can activate relay 1 by changing the value of the corresponding status register (0 = OFF / 1 = ON).

✓ From a RX BACNET 500-312

Relays are controlled by writing to the Relay Status objects. For example, you can activate relay 1 by changing the value of the corresponding status object (0 = OFF / 1 = ON).

⚠ The minimum delay between sending two commands to the TX IO is 2 seconds. If you send a second command before this 2 second delay, it will not be taken into account by the TX IO.

i To decode the status of the TX IO inputs from the receiver's Modbus table, please refer to [this article](#).

Optional step: Displaying the status of inputs/outputs

[The procedure](#) for accessing the TX IO configuration server is identical to that of the receiver. The default address for accessing the TX IO server is 192.168.77.77 (please avoid use on Microsoft Edge and favor use on Google Chrome).

In the STATUS tab you can see the status display of the digital inputs and the counts since power-up. At the bottom of the tab you can see the relay status display ON or OFF and the number of times the status has been switched from the TX IO power supply.

You can test the relay status by clicking the Toggle Relay button. The relay activates for one second.

Local control mode

Control of relay outputs based on TX IO input status

TX IO power supply

Open the TX IO case by unscrewing the 4 cover screws.

Externally power your TX IO (between 7.5 and 24VDC). If you use our 12V power supply, connect your power supply to the POWER terminal of the receiver.

- **Red wire** connected to the V+ terminal block
- **Black wire** connected to the 0V terminal block

Access to the TX IO configuration server

[The procedure](#) for accessing the TX IO configuration server is identical to that of the receiver. The default address for accessing the TX IO server is 192.168.77.77 (please avoid use on Microsoft Edge and favor use on Google Chrome).

Selecting local control mode

Select the Local Control operating mode from the *TX IO config* tab . Once selected, restart your TX IO so that the mode change is taken into account using the Reboot button from the TX IO server Admin tab.

Configuring TX IO parameters from its server

In the CONFIG TX IO tab , configure your relays by selecting for each relay:

- Input: input 1 or input 2
- The relay mode: normally closed or normally open

Normally closed : corresponds to a closed rest state. When the status is 0, the relay is closed. When the status is 1, the relay is open.

Normally open : corresponds to an open rest state. When the status is 0, the relay is open. When the status is 1, the relay is closed.

- The delay: 1 sec, 5 sec, 10 sec, 30 sec, 60 sec or 120 sec.

! Click Save to save your configuration.

Viewing the status of inputs and outputs

In the STATUS tab you can see the status display of the digital inputs and relays, as well as the number of status changes since power-up. You can test the status of the relays by clicking on the Toggle Relay button. The selected relay activates for one second. The TX IO is now configured, you can power it off.

Declaration and configuration of TX IO from the receiver server

[The procedure](#) declaration of the TX IO is the same as for other transmitters.

Activation of TX IO