Step 1

Power the TX IO (7.5 à 24VDC)

Open the TX IO case by unscrewing the 4 screws on the cover then supply your receiver externally (between 7.5 to 24VDC).
Detail of the TX IO power supply .

Step 2

Validate the TX IO LEDs 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

Validation of TX IO activation from the receiver server

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

In the NETWORK tab, the TX IO frames that you have just powered must be sent at the periodicity that has been configured. This tab allows you to validate the correct reception of the TX IO frames.

D2D mode

In D2D mode, the TX IO communicates with LoRa Enless sensors (4 maximum) and controls its outputs according to the alarm thresholds configured on the sensors

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 D2D operating mode from the **CONFIG TX IO** 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

Declaration and configuration of sensor alarm thresholds

In the CONFIG D2D tab, you must declare the sensors you want to pair to the TX IO. The procedure is the same as when you declare sensors on a receiver

> Configuring alarm thresholds is done from the advanced options

Relay configuration

In the CONFIG TX IO tab, the relays can be associated with the alarm thresholds of the sensors that we have just configured.

To do this, for each relay select:

- The LoRa ID of the configured sensor

- 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 type of alarm to trigger a relay.

Activation of sensors

The activation of the sensors is done in the same way when pairing the sensors to the receiver.

Validation of reception of sensor information

In the STATUS tab , in the Transmitter Network section, the frames from the sensors 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 sensor frames. We recommend using this page as an on-site audit tool, to validate that RSSI levels for receiving probes are good.

Click Save to save your configuration.

Viewing output status

In the **STATUS** tab in the Outputs section 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.

INSTALLATION TX MODBUS

Installation procedure

Find out how to install the TX Modbus 600-041

Sections

Reminder

Configuration

Activation of TX Modbus

Checking

Reminder

Rappel concernant l'utilisation du TX MODBUS 600-041

The TX Modbus allows reading/writing in 60 Modbus registers.

These registers can be distributed across a maximum of 10 Modbus slaves.

> As a reminder, the TX Modbus will communicate with an RX Modbus Enless, in proprietary LoRa mode.

Radio architecture with a TX MODBUS

Configuration

Configure the slaves that the TX MODBUS must read from the receiver server

Declaration and configuration of TX MODBUS

Go to the receiver configuration server . On the receiver configuration server, the Config TX tab allows the declaration and configuration of the TX MODBUS which will be paired with the receiver. To configure your TX MODBUS, click on the button **+Add Sensor**. A new window appears.

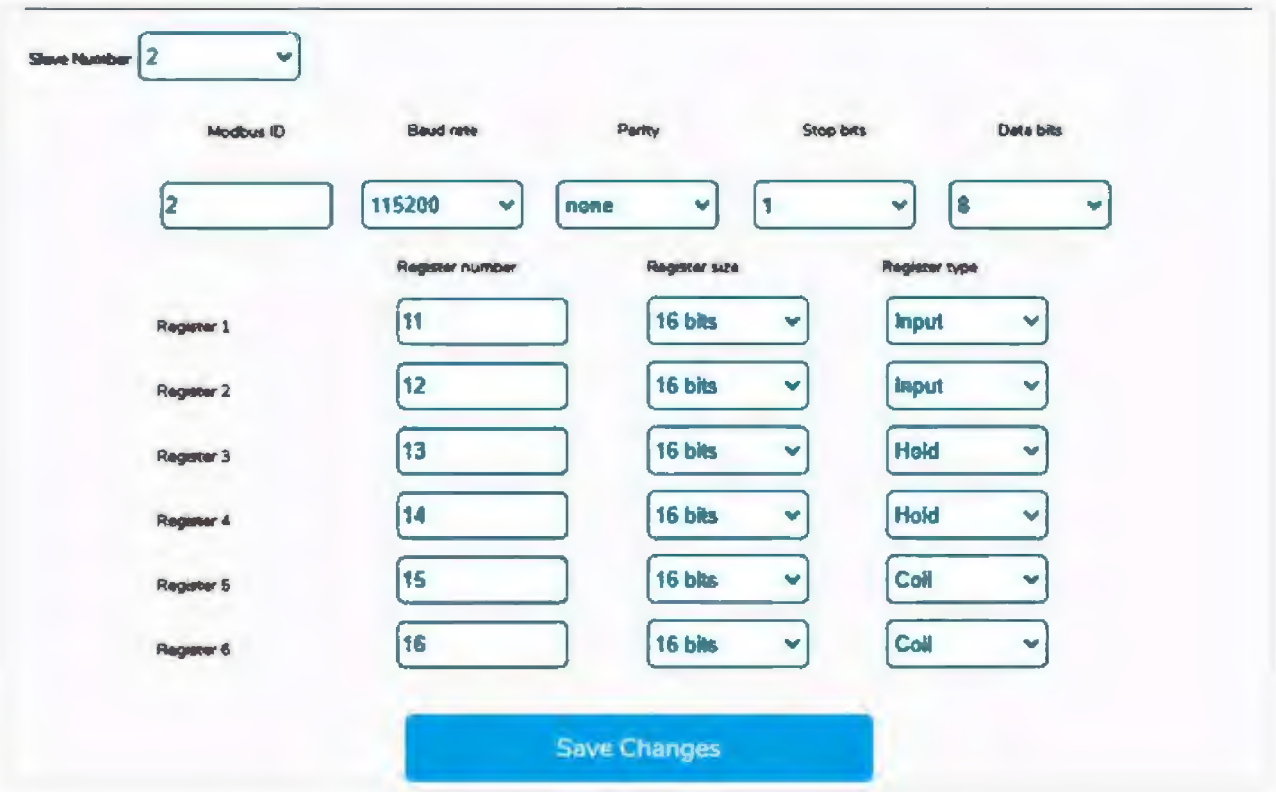
Below is the list of fields to configure:

Field	
Type TX	Choose the transmitter type

Field	
Location	Indicate the transmitter location
LoRa ID	Enter the LoRa ID (provided on the transmitter label)
Periodicity	Choose the transmission periodicity
+ Advanced	Click the +Advanced button to configure the registers to read/write on the slave
Slave number	Select a slave number between 1 and 10
Modbus ID	Enter a Modbus ID for the slave (from 1 to 254)
Baud rate, Data and stop bits, Parity	Communication settings
Configuration of registers	Provide the addresses of the registers to read/write on the slave (maximum

When you click Save, a message appears

If you wish to declare other slaves on this same TX MODBUS , you can click **OK** and continue editing by indicating a new slave number.



Once your configuration is complete, you can click Save Changes, then Cancel to finish and exit.

> The RX MODBUS 500-302 receiver supports up to 50 transmitters. Each slave configured on a MODBUS TX is equivalent to a transmitter in the receiver's Modbus table.
>
> It is possible to configure several slaves with the same Modbus ID in order to read or write in more than 6 registers on this slave. For more details, please see this article.

Activation of TX MODBUS

Preparation of TX Modbus

Step 1

Power the TX Modbus (7.5 to 24VDC)

Open the TX Modbus case by unscrewing the 4 cover screws then externally power your TX Modbus (between 7.5 to 24VDC). Details of the TX Modbus power supply

Step 2

Validate the TX Modbus LEDs behavior

When you power it, the TX Modbus tries to communicate with the receiver. You can refer to the TX Modbus LEDs to learn more about the installation status. Description of LEDs here

! To avoid any problems please maintain 1A 12V on the TX Modbus power terminal block

Validation of TX Modbus activation from the receiver server

In the **CONFIG TX** tab , refresh your browser page. A green validation dot should appear in front of the TX Modbus slaves 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 dots do not appear.

In the "NETWORK" tab, the frames containing the contents of the slave registers read by the Modbus TX 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 Modbus TX frames

We recommend using this page as an on-site audit tool, to validate that RSSI levels for receiving frames are good

Viewing the Modbus table

Click on the "MODBUS" tab. When you select a slave 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" button.

Writing to the Modbus table

It is possible to write to the Modbus table registers for each slave.

> ! Writing can only be done on "Hold" or "Coil" type registers.

> i You can check if the slave registers have been read and written by consulting this article: [Proprietary mode] Verification of reading/writing of TX Modbus registers

Checking

This step allows you to validate the configuration of the registers and the values of the slave registers from the Modbus TX server.

The procedure for accessing the TX MODBUS configuration server is identical to that of the receiver. The default address for accessing the TX MODBUS server is **192.168.77.77** .

The **SLAVE SETUP** tab of the TX Modbus server will show you how slave reading has been configured from the receiver.

The **SLAVE STATUS** tab will show you the data read by the TX MODBUS on the slaves. You can confirm the reporting of the same data and register values as in the Modbus table of the receiver.

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
- TX IO 600-040
- TX MODBUS 600-041
- RX MODBUS 500-302
- RX BACNET 500-312
- RX REPEATER 600-301

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

TX MODBUS 600-141

RX MODBUS 500-502

RX BACNET 500-512

RX REPEATER 600-501

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
- The ANT-REN-SMA LR 915 MHz 1000-101 used with LoRa receivers, repeater, TX MODBUS should be installed indoor only.

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 cloth.

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.

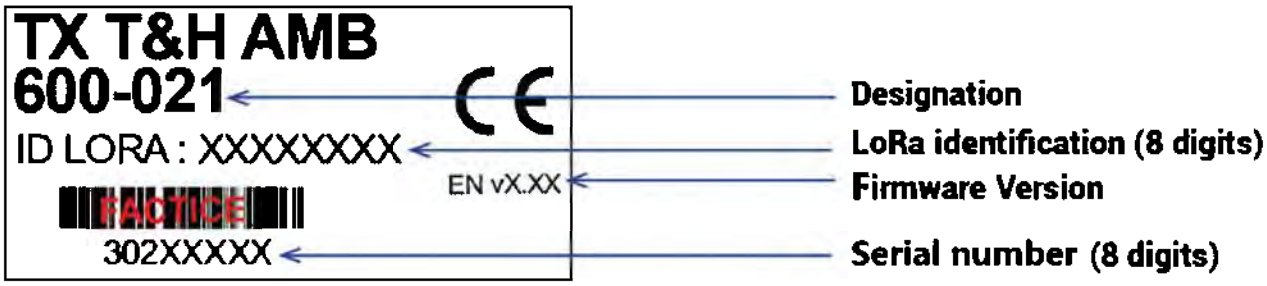
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate 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

LED behavior

The description of the LED behavior for Enless products is given below

Sensors

LEDs behavior of sensors

TX IO 600-040

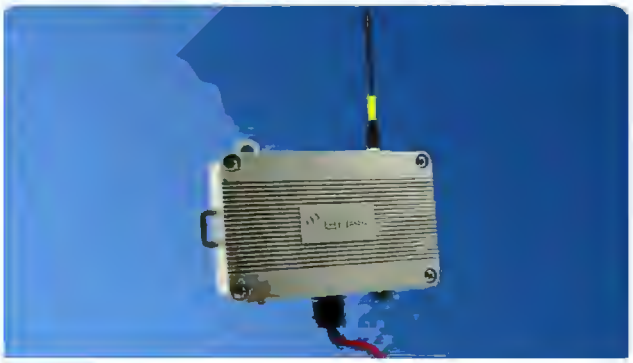
LEDs behavior of TX IO

TX MODBUS 600-041

LEDs behavior of TX MODBUS

Receivers

LEDs behavior of Modbus et BACnet receivers



Repeater

LEDs behavior of the repeater

Sensors

LEDs behavior of Enless sensors

Phase 1 : Starting the sensor and communicating with the receiver

LED	Behavior
L1	Flash every 5s
L2	Flash when the sensor sends a message
L3	Flash when the receiver responds

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

LED	Behavior
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.

TX IO

LEDs behavior of TX IO

Phase 1 : Installation

LED	Behavior	Meaning
L1	Always ON	Powered sensor
L2	ON	Installation failed
L3	ON	Successful installation but weak radio signal
L4	ON	Successful installation and good signal

TX Modbus

LEDs behavior of TX MODBUS

Phase 1 : Installation

LED	Behavior	Meaning
A	OFF	
B	OFF	
C	Flash every 5 seconds	
D	Flash when a message is sent	ON for 30 secs if installation successful but weak signal
E	Flash when a message is received	ON for 30 secs if installation successful
F	OFF during installation sequence	ON for 30 secs if installation fails

Phase 2 : Operation mode

LED	Signification
A	Flash when message is sent on Comms
B	Flash when a message is received on Comms
C	ON
D	Flash when message is sent over RF
E	Flash when message is received over RF
F	OFF

Modbus & BACnet receivers

Behavior of LEDs on Modbus & BACnet receivers

LEDs on the electronic card

LED	Behavior	Meaning
A	Flash	The receiver has received a message
B	Flash	The receiver has sent a message
C	ON	The receiver is correctly powered
D	Flash	Communication message transmitted
E	Flash	Communication message received
F	OFF	LED not used

LEDs outside the product

LED	Behavior	Meaning
Exterior red	Flash Every 1 minute	The receiver is in operation
Green Ethernet port	Flash	The receiver connects to the Ethernet network
Orange Ethernet port	Flash	The receiver sends information to the Ethernet network

Repeater

Behavior of the signal repeater LEDs

LEDs on the electronic card

LED	Comportement	Signification
A	Flash	The repeater has received a message
B	Flash	The repeater has transmitted a message
C	ON	The repeater is correctly powered

LEDs outside the product

LED	Behavior	Meaning
Exterior red	Flash Every 1 minute	The repeater is in operation

Communication mode

Proprietary LoRa vs LoRaWAN

This documentation describes the procedure for installing sensors in proprietary LoRa mode. Therefore, it is imperative that the sensors you use communicate in proprietary LoRa mode. The selection of the communication mode is done using a jumper present on the electronic card of each sensor.

Example below :

LoRaWAN Mode
Jumper positioned on a single pin

Proprietary LoRa mode
Jumper positioned on both pins

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

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

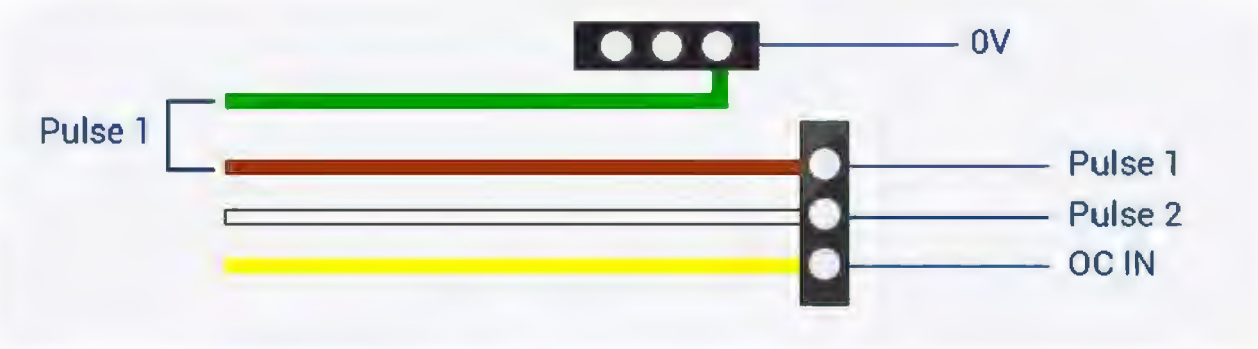
600-037 (ATEX)

TX PULSE LED

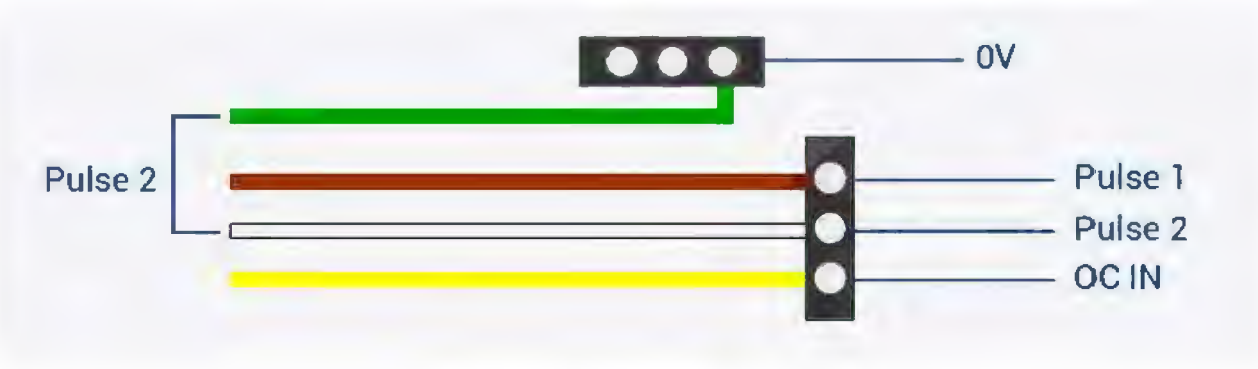
600-038

TX PULSE

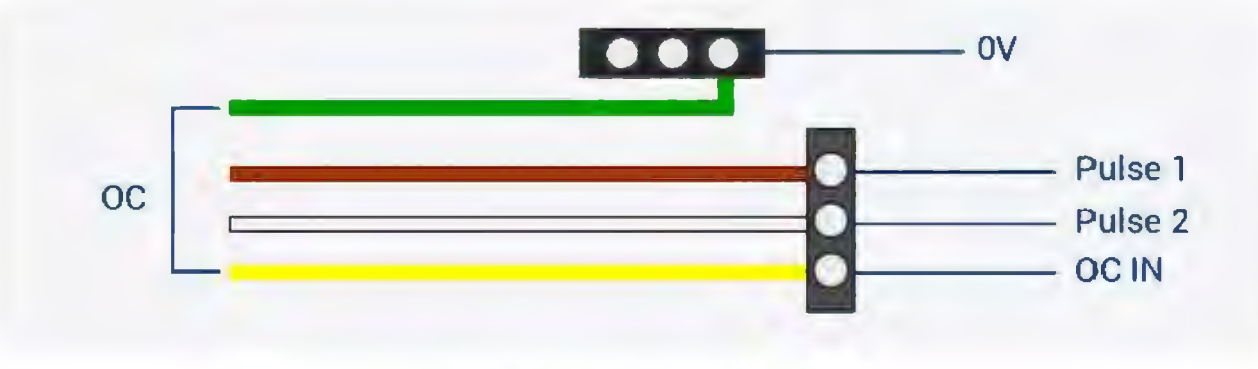
TX PULSE sensors can be wired in three ways:



Using Pulse 1 input (dry contact)



Using Pulse 2 input (dry contact)



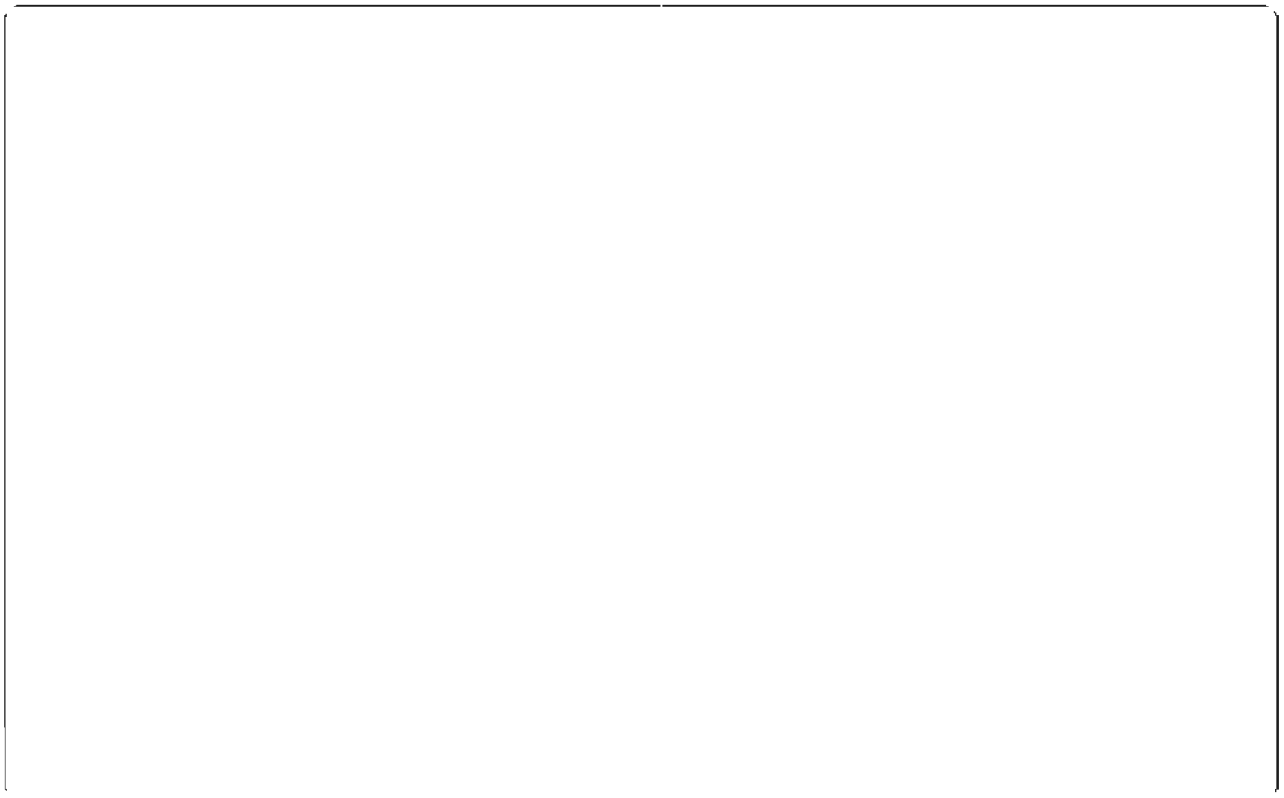
Using the OC (open collector) input

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

Viewfinder attachment

Locate the flashing diode on the meter and stick the viewfinder aiming the diode through the hole.

Locking the reader

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

Fixation

Use the black screw to tighten the optical head to the viewfinder

Checking

Validate the correct positioning of the optical read head before powering the sensor

Consumption calculation

ℹ 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.

Repeater installation

RX REPEATER 600-301

One or more sensors remain out of range of the receiver: you will have to install a repeater. **The repeater requires no configuration.**

Position your repeater

We recommend positioning your repeater halfway between the transmitters and the Modbus receiver. The repeater comes with a 1/4 wave antenna but you can also use a long range antenna to maximize the performance of the repeater. You can chain several repeaters together.

Power your repeater

Once positioned, power the repeater. The repeater can be powered either:

- By a 12V power charger Ref: POWER 1000-002 (recommended)
- By a main power supply of 7.5 to 24V

> Current characteristic for powering the repeater at 12Vdc: 1A max. Use only CE certified 12V power supply

In both cases, the wires will be connected to the POWER terminal block of the repeater:

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

Meaning of the repeater LEDs

The repeater LED behavior is documented here

> On the configuration server, frames passing through a repeater indicate (R) next to the RSSI signal value.

RESET factory settings

RESET procedure to factory settings of products

Only products with a configuration server can be reset to factory settings. Reset procedure no. 1 is valid for the following products, procedure no. 2 only applies to the TX IO 600-040.

Below are the RESET procedures:

<details open>
<summary>RESET procedure n°1</summary>

1. Power down the receiver
2. Set the rotary switch to position D
3. Power up the receiver and wait for **at least 45s**
4. Power down the receiver
5. Set the rotary switch back to position 0
6. Re-power the receiver and connect it in Ethernet to the PC
7. Check that the Ethernet settings on the PC are as follows:

   IP address: 192.168.77.2
   Subnet prefix length: 24
   Gateway: 192.168.77.1
   Preferred DNS: 8.8.8.8

8. Access the server from your browser at 192.168.77.77

</details>

<details open>
<summary>RESET procedure n°2 (TX IO)</summary>

1. Press the push button until LEDs L1 and L2 light up (15s)
2. Release the push button and wait **at least 45 seconds**
3. Restart the product electrically (turn off the power, then re-power)
4. Access the server from your browser at the address 192.168.77.77

</details>