

**ENERGY EFFICIENCY** 



# SET UP GUIDE LORA / LORAWAN PRODUCTS

IG FR INSTALL-LORA-i



Guide for configuring and installating LoRa / LoRaWAN products

#### FOR MORE INFORMATION CONTACT US

+33 (0)5 56 35 97 47 :**TEL** contact@enless.fr :**EMAIL** 

www.enless-wireless.com



# PRODUCTS Covered

### AMBIENT TRANSMITTERS

- TX T&H AMB 600-021
- TX VOC / T&H AMB 600-022
- TX CO2 / VOC / T&H AMB 600-023

#### SMART METERING TRANSMITTERS

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

#### REPEATER

• RX REPEATER 600-301

### TEMPERATURE TRANSMITTERS

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

### ANALOGUE AND CONTACT TRANSMITTERS

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

### RECEIVERS

- RX MODBUS 500-302
- RX BACNET 500-312

# **SUMMARY**

### **PRODUCT DESCRIPTION**

AMBIENT TRANSMITTERS	4
TEMPERATURE TRANSMITTERS	
SMART METERING AND CONTACT TRANSMITTERS	5
ANALOGUE TRANSMITTER	5
RECEIVERS & REPEATER	6

### **TECHNICAL REMINDER REGARDING THE USE OF LORA/LORAWAN PRODUCT**

TECHNICAL REMINDER REGARDING THE USE OF LORA / LORAWAN PRODUCTS
---

### **USE IN LORA PROPRIETARY PRIVATE MODE**

LORA PROPRIETARY PRIVATE MODE	8
CONFIGURATION OF ETHERNET PARAMETERS ON YOUR PC	9
ACCESS TO THE IP CONFIGURATION SERVER	10
1. WITH THE MODBUS RECEIVER	
GETTING STARTED	11
DESCRIPTION OF THE MODBUS RECEIVER CONFIGURATION SERVER INTERFACE	
CONFIGURATION OF TRANSMITTERS	13
ACTIVATION OF TRANSMITTERS	14
CONFIRM RECEPTION OF TRANSMITTER INFORMATION	15
CONFIGURE YOUR RECEIVER AND VIEW THE MODBUS TABLE	16
RECEIVER INSTALLATION	17
2. WITH THE BACNET RECEIVER	
GETTING STARTED	18
DESCRIPTION OF THE BACNET RECEIVER CONFIGURATION SERVER INTERFACE	19
PRODUCT CONFIGURATION ON THE BACNET RECEIVER	20 to 22
EXAMPLES OF DISCOVER IN DEVICE MODE OR OBJECT MODE	23

### **USE IN LORAWAN MODE**

LORAWAN MODE	24
GETTING STARTED	25
USE OF LORAWAN TRANSMITTERS	26 to 28

### **APPENDICES (PAGE 29)**

SELECTION OF COMMUNICATION MODE LORA PROPRIETARY VS LORAWAN POSITIONING AND FIXING OF PRODUCTS	Appendix 1 Appendix 2
CONNECTING THE PRODUCTS	Appendices 3 to 5
REPEATER INSTALLATION	Appendix 6
CALIBRATION PROCEDURE FOR CO2 VOC TEMP HUM TRANSMITTERS	Appendix 7
OPERATING MODES AND BIBBS SUPORTED BY THE BACNET RECEIVER	
ADVANCED TRANSMITTER FUNCTIONALITIES	Appendix 10

# **PRODUCT DESCRIPTION**

#### AMBIENT **TRANSMITTERS**

#### Références

• TX T&H AMB 600-021 • TX VOC / T&H AMB 600-022 • TX CO2 / VOC / T&H AMB 600-023

#### Weight 125g

#### **Battery**

C type 3.6V Lithium (600-021 & 600-022) D type 3.6V Lithium (600-023)

#### **Transmission power** 25mW

ID DEVEUI (LoRaWAN) / LoRa ID (LoRa proprietary)







# **CASING CLOSED**

1) ID label 2) Hood closing screw 3) Closing tab for housing

# **CASING OPENED**

- 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 lights (L1, L2, L3)

#### **TEMPERATURE TRANSMITTERS**

#### **References**

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

Weight 196g

**Battery** D type 3.6V Lithium

**Transmission power** 25mW

ID DEVEUI (LoRaWAN) / LoRa ID (LoRa proprietary)





10

# **CASING CLOSED**

- 1) ID label
- 2) Loop for fixing collar
- 3) Hood closing screw
- 4) Hole for wall fixing
- 5) Antenna

### **CASING OPENED**

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

# **PRODUCT DESCRIPTION**

#### SMART METERING AND CONTACT TRANSMITTERS

#### References

- TX PULSE 600-036
- TX PULSE ATEX 600-037
- TX PULSE LED 600-038
- TX CONTACT 600-039

#### Weight 196a

1909

#### Battery

D type 3.6V Lithium D type 3.6V Lithium ATEX (600-037)

Transmission power 25mW

ID DEVEUI (LoRaWAN) / LoRa ID (LoRa proprietary)







# CASING CLOSED

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

### **CASING OPENED**

7) Switchable battery Replaceable batteries can be supplied by Enless Wireless (contact@enless.fr) Warning : There is a risk of explosion if the replacement battery is incor-

Warning : There is a risk of explosion if the replacement battery is incorrect, so please do not hesitate to contact us. Dispose of used batteries according to the instructions.

8) Connector for battery plug

9) Push button to test the sending of data frames10) Cable gland for meter and contact connection cables

11) LED lights (L1, L2, L3)

#### ANALOGUE TRANSMITTER

**Reference** • TX 4/20 mA 600-035

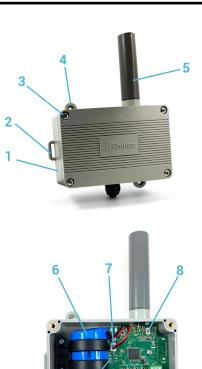
Weight 196g

**Battery** D type 3.6V Lithium

Transmission power 25mW

**ID** DEVEUI (LoRaWAN) / LoRa ID (LoRa proprietary)





Q

## CASING CLOSED

- 1) ID label
- 2) Loop for fixing collar
- 3) Hood closing screw
- 4) Hole for wall fixing
- 5) Antenna

### **CASING OPENED**

- 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 lights (L1, L2, L3)

# **PRODUCT DESCRIPTION**

#### RECEIVERS

#### References

- RX MODBUS 500-302
- RX BACNET 500-312

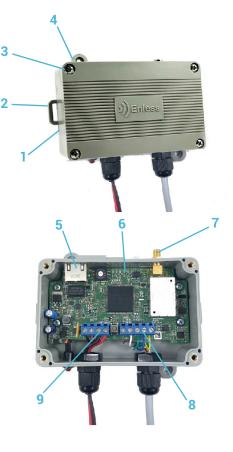
Weight 196q

**Power supply** from 7.5 to 24Vdc

**Serial number** 8 numbers under the barcode

**ID** DEVEUI (LoRaWAN) / LoRa ID (LoRa proprietary)





### **CASING CLOSED**

- 1) ID label
- 2) Loop for fixing collar
- 3) Hood closing screw
- 4) Hole for wall fixing

### **CASING OPENED**

5) Ethernet connector for access to embedded IP server and communication via Modbus IP or BACnet IP

- 6) LED lights (A,B,C,D,E,F)
- 7) SMA connector for antenna
- 8) Communication cable terminal block (RS232/ RS485)
- 9) Power supply terminal block

#### REPEATER

Reference • RX REPEATER 600-301

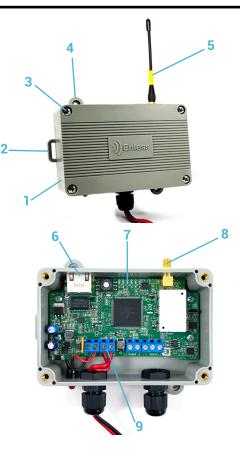
Weight 196g

**Power supply** from 7.5 to 24Vdc

Transmission power 25mW

**ID** 8 numbers under the barcode





### CASING CLOSED

- ID label
   Loop for fixing collar
   Hood closing screw
   Hole for wall fixing
- 5) Antenna

### **CASING OPENED**

- 6) Ethernet cable (only for firmware update)
- 7) LED lights (A,B,C,D,E,F)
- 8) SMA connector for antenna
- 9) Power supply cable gland

# TECHNICAL REMINDER REGARDING THE USE OF LoRa PROPRIETARY/ LoRaWAN PRODUCTS



Our transmitters integrate both LoRa private proprietary Enless and LoRaWAN modes.

Here, we explain the differences between these two communication protocols.



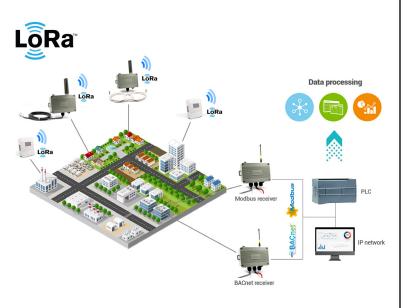
Select the communication mode using the jumper supplied and located on the electronic card of the transmitters. See Appendix #1

# LoRa 100% Enless proprietary private mode

The transmitters communicate with a receiver (either Modbus or BACnet).

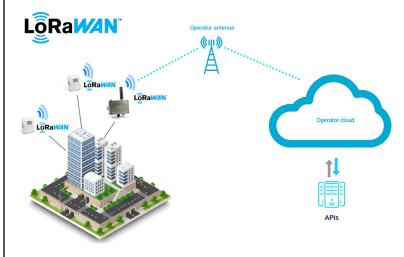
When used with the Modbus receiver, the transmitters send their information to the receiver. The receiver collects the information from the transmitters in its Modbus table. It is then connected to a PLC via Modbus RTU RS232 / RS485 or to an IP network.

When used with the BACnet receiver, the receiver can be connected to the BACnet network or to the PLC in several modes (BACnet IP / BACnet MSTP).



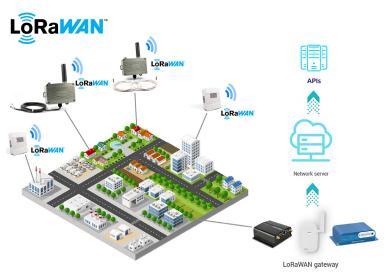
# LoRaWAN operated and private modes

<u>Operated mode</u>: The transmitters are positioned in an area covered by a LoRaWAN operator's network. They are provided with a subscription from that operator. They send their information directly to the operator's cloud.



<u>Private mode :</u> The transmitters communicate to a LoRaWAN gateway based on the principle of a private network. The LoRaWAN gateway usually pushes information to a server.

NB : Enless Wireless does not supply the LoRaWAN gateway.





# CONFIGURATION OF ETHERNET PARAMETERS ON YOUR PC



On your PC, enter the IP address of the configuration server.

#### Access path :

Settings/ Network and internet/ Ethernet/ Change adapter options/ Ethernet/ Properties/ Internet Protocol version 4 (TCP/Ipv4) Use the following IP address:

C Paramètres	-
	Rechercher un paramètre ,0
Système Affichage, son, notifications,	Peripheriques         Till/phone         Bisebooth imprimentes, souris         Till/phone         Bisebooth imprimentes, souris         Bisebooth
Personnalisation Ambre-plan, écran de verrouilane, couleurs	Applications Instructionality for the functionality         Comptes Contensities designed - mail. type, travity (limpting)         Provide a limpting Contensities designed - mail. type, travity (limpting)         Provide a limpting         Provide a limpting
verrouillage, couleurs	Forciconalisés facultatives transitional familie transitional resources and a spectrum transities and a spectrum transities and transities transitional families transitional families transitional families and transitional fami
🕅 Jeux	Cytions degenomie Naturative. Voye contaste dend     Automative.     Confidentiallé Redevicer ans fotass.     Confidentiallé     Confi
Xbox Game Bar, captures, Mode Jeu	Narroteur, loupe, contraste Rechercher met fichiers, Emplocement, caméra, Bevé autoritations microphone
Mise à jour et sécurité	
Mise à jour et sécurité Windows Update, récupération, sauvegarde	
← Paramètres	- • ×
Accueil	État
Rechercher un paramètre	Statut du réseau
Réseau et Internet	
🕏 État	
	Livebox-3208 Rifeau public
∉ Wi-Fi	Vous êtes connecté à Internet Si vous disposez d'un forfait de données limitées, vous pouvez
🖅 Ethernet	Vous ettes Connecte à Internet Si vous disposez d'un forfait de données limitées, vous pouvez configure ce réseau en tant que connesion limitée ou modifier d'autres propriétés.
🕾 Accès à distance	Wi-Fi (Livebox-82b8) 25.84 Go Depuis ces 30 derniers jours
*8° VPN	Propriétés Consommation des données
r∯> Mode Avion	
8p8 Point d'accès sans fil mobile	Afficher les réseaux disponibles Affichez les options de connexion qui vous entourent.
Proxy	
- ,	Paramètres réseau avancés
	Modifier les options d'adaptateur Affichez les cartes réseau et modifiez les paramètres de connexion.
	Centre Réseau et partage Décidez des contenus que vous souhaitez partager sur les réseaux auquiels vous vous connectez.
	Résolution des problèmes réseau
-	
laramétres	×
Aaramétres	
Accueil	Ethernet
Rechercher un paramètre	Ethernet Non connecté
Réseau et Internet	Non connecté
9 État	
	Paramètres associés Modifier les options d'adaptateur
≪ Wi-Fi	Modifier les options d'adaptateur Modifier les options de partage avancées
Ethernet	Centre Réseau et partage
C Accès à distance	Pare-feu Windows
8° VPN	
™ Mode Avion	Aide du web
۹٥ Point d'accès sans fil mobile	Résolution des problèmes de connexion réseau
Proxy	P Obtenir de l'aide
- /	Coverna de radie     Zonner des commentaires

Manuel	~
Pv4	
Activé	
Adresse IP	
192.168.77.2	
Longueur du préfixe de	
24	e sous-reseau
24	
Passerelle	
192.168.77.1	
DNS préféré	
Autre DNS	
IPv6	

Enter the parameters below :

IP address : 192.168.77.2

Default gateway: 192.168.77.1

Once these parameters have been entered, the configuration IP server is accessible from your browser.

# ACCESS TO THE IP CONFIGURATION SERVER

(For Modbus and BACnet receivers)



### **Externally power the receiver**

It is imperative that you supply external power to your receiver during the configuration phase.

Power supply is possible from 7.5 to 24V.

We recommend that you use our 12V power box (Ref.: POWER 1000-002).

Connect your power supply to the receiver's POWER terminal.

- · Black wire connected to 0V terminal
- Red wire connected to V+ terminal

## **Connect the receiver to the PC**

The receiver is supplied without a RJ45 Ethernet cable.

You will need a RJ45 cable to continue the product installation.

Connect the RJ45 cable to your receiver port and also to the Ethernet jack on your PC.



# Validate the operation of the receiver LEDs

#### LEDs inside the casing :

LA Flash The receiver receives a message.	
---	--

- **LB** Flash The receiver transmits a message.
- **LC ON** The receiver is properly powered.

#### LEDs outside the casing :

External LED flashes every minute	The receiver is fully operational.
Ethernet LED Flashes	The receiver connects to the Ethernet network.
Ethernet LED Flashes	The receiver sends information to the Ethernet network.

### **Connect the long-range antenna to the receiver**

Remember to connect the long-range antenna (Ref : ANT REN SMA LR 868MHz 1000-008) to the receiver SMA connector.

# Access to the IP configuration server

From your browser, enter the following address : **192.168.77.77** 

Access the IP server interface.



Ra™

# USE IN LORA PRIVA MODE WITH THE MODBUS RECEIVER

### **Getting started**

Before starting the configuration of LoRa devices, you will need to check that your computer recognises the receiver configuration IP server address.

The configuration of Ethernet parameters is explained on page 9.

It is from this server that you will configure the products.

## **Requirements checklist**

- Transmitters and receiver to install
- Long range antenna for the receiver
- Cross head screwdriver
- RJ45 Ethernet cable

### **Installation steps**

# Configuring and installing the transmitters

On the IP server, declare your transmitters and apply their configuration settings. Power the transmitters and confirm that they have taken their configuration settings.

#### **Receiver configuration**

Set the receiver communication settings.

#### Validate the Modbus table

Vew the Modbus table registers in which the transmitters information appear.

#### **Connect your receiver**

Connect your receiver to the PLC in Modbus RS232 / RS485 or over IP.

# **DESCRIPTION OF THE MODBUS RECEIVER CONFIGURATION SERVER INTERFACE**



#### 01. « TX CONFIG » TAB

smitter Con	figuration				+ Add	Sens
0	<sub>Туре</sub> ТХ Т&Н АМВ 600-021	Location Bureau	LoRa ID 7	Periodicity 5 mins	1	Ĩ
0	Type TX PULSE ATEX 600-037	Location Bureau	LoRa ID 16	Periodicity 10 mins	1	1
0	Type TX VOC/T&H AMB 600-022	Location Bureau	LoRa ID 9	Periodicity 15 mins	1	
	-	port CSV Import CSV				

Tab for declaring and configuring the sensors that will be associated with the receiver. You can configure the following parameters:

#### 02. « RX CONFIG » TAB

)) Enless V M2M & loT Wirele	Vireless ess Expert	TX CONFIG	RX CONFIG	NETWORK	MODBUS	LoRa
General Ac	Imin					
Receiver config	uration					
Bits Per Second	9600		м	odbus ID	1	
Data Bits	8		S	tart Address	31000	
Stop Bits	1		] [	• RS232	•	RS485
Parity	None				Advanced Setting	gs
				SERIAL	•	MODBUS
				DHCP OF	F	DHCP ON

Receiver communication parameters configuration tab. Set the RTU or IP communication settings of your receiver.

- Periodicity of transmission
- Alarm thresholds

**03. « NETWORK » TAB** 

Remote configuration function

Enless M2M & IoT Wire	VIrele less Expert	ess	TX CONFIG	RX CC	INFIG	NETWOR	K M	ODBUS		Lo	ка
w Network									Clear Da	ta	ownload
Device Type La	ast Seen	Device ID	Location	Data 1	Data 2	Data 3	Data 4	Data 5	Signal Quality	RSSI	Battery
+ TX C02/VOC/T&H AMB 600-023	Just now	2022		22.5 °C	51.3 %	15 ppb	480 ppm	0000	al	-48 dBm	
TX T&H EXT 600-034	4 mins ago	1372		24.9 °C	47.0 %			0000	al	-34 dBm	
+ TX CO2/VOC/T&H AMB 600-023	7 mins ago	313		24.2 °C	50.0 %	113 ppb	679 ppm	0000	al	-37 dBm	
+ TX CO2/VOC/T&H AMB 600-023	2 mins ago	310		24.0 °C	50.0 %	93 ppb	858 ppm	0000	al	-40 dBm	

Tab for viewing the frames sent by the transmitters. You can evaluate the RSSI signal levels of your sensors and control the correct reception of the data.

#### 04. « MODBUS » TAB

))) Enless Wireless M2M & IoT Wireless Expert	TX CONF	FIG RX COI	NFIG NETWORK	MODBUS	LoRa
Click on transmitter below	MODBUS vie	ew			Download
7 - TX T&H AMB 600-021	Register n	Hex value	Dec value	Detail	s
16 - TX PULSE ATEX 600-037	31003	0000	0	Device II	н
9 - TX VOC/T&H AMB 600-022	31004	0007	7	Device ID	LO
	31005	0006	6	Tx Type 0 / V	ersion 6
	31006	0000	0	Statu:	;
	31007	0000	0	Alarm St	atus
	31008	00e9	233	Temperature	23.3 °C
	31009	0231	561	Humidity 5	6.1 %
	31010	0000	0		
	31011	0000	0		
	31012	0000	0		
	31013	0000	0		
	31014	0000	0		
	31015	0000	0		
	31016	0000	0		
	31017	0000	0		
	31018	0000	0		
	31019	0000	0		

Tab for viewing the Modbus table of the receiver. The registers to be addressed to collect information from our transmitters are displayed.

# **CONFIGURATION OF TRANSMITTERS**



You must declare the transmitters you want to pair to the receiver.

Go to the « TX CONFIG » tab

To declare a sensor, click the following button

+ Add Sensor

Fill in the configuration information.

	Add Sensor	× Choose the type of transmitter
Тх Туре	TX T&H AMB 600-021	Enter the transmitter location (eg : office)
Location		Enter the LoRa ID (available on the product
LoRa ID		label)
Periodicity	5 minutes	Choose the periodicity of data transmission
	+ Advanced	Bring up the additional options The advanced functionalities are explained in
	Save Changes	appendix #10 of this document
		Save settings button

Repeat for all sensors to be configured.

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

You can resume the configuration of a transmitter at any time or delete it using the following buttons highlighted in the red box.

nsmitter Co	onfiguration				+ Add Sensor
0	<sub>Туре</sub> ТХ Т&Н АМВ 600-021	Location Bureau	LoRa ID <b>7</b>	Periodicity 5 mins	1
9	TX PULSE ATEX 600-037	Location Bureau	LoRa ID 16	Periodicity 10 mins	1.1
9	TX VOC/T&H AMB 600-022	Location Bureau	LoRa ID 9	Periodicity 15 mins	× 1

The configuration phase is completed, we can now proceed to the transmitter activation.

# ACTIVATION OF TRANSMITTERS



# Check that the transmitters are in LoRa proprietary mode

Confirm that the jumper of each transmitter is properly positioned in LoRa proprietary mode on the electronic board (see Appendix #1).

If not, please position the jumpers correctly before proceeding with product

#### Activate the first transmitter (to be chosen)

Connect the battery of one of your transmitters and validate its LED set (see next paragraph).

# Validate the LED set of your transmitter

Step 1 : starting the transmitter

L1 L2 L3 flash successively

Step 2 : the transmitter tries to dialogue with the receiver

L1	L2	L3
Flashes every 5s	Flashes when the transmitter sends a message	Flashes when the receiver answers

#### Step 3 : installation status

	L1	L2	L3
Failure	ON during 30sec	OFF	OFF
Success Low signal	OFF	ON during 30sec	OFF
Success Good signal	OFF	OFF	ON during 30sec

#### Step 4 : regular mode

L1	L2	L3
Flashes every 1min when an alert threshold is exceeded	Flashes for each data frame sent	Flashes every 1min

Repeat for all other transmitters.

# Validate the activation of transmitters from the server

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

A validation pad should appear in front of the transmitters you have just activated (see screenshot below).

Wait a few moments and refresh your page again if the pad does not appear.

))	) <b>EI</b> M2	<b>Ness Wireless</b> M & IoT Wireless Expert	TX CONFIG RX CONFIG
Tra	ansmit	ter Configuration	
	0	Type TX T&H AMB 600	0-021
	0	Type TX PULSE ATEX 6	00-037
	0	Type TX VOC/T&H AMB	600-022
_			Export CSV Imp

# CONFIRM RECEPTION OF TRANSMITTERS INFORMATION



In the « **NETWORK** » tab, the frames of the transmitters that you have just supplied must appear according to the periodicity that has been configured.

This tab allows you to validate the correct reception of the frames of the transmitters.

w Network									Clear Data		Download
Device Type Li	ast Seen	Device ID	Location	Data 1	Data 2	Data 3	Data 4	Data 5	Signal Quality	RSSI	Battery
+ TX CO2/VOC/T&H AMB 600-023	Just now	2022		22.5 °C	51.3 %	15 ppb	480 ppm	0000	al	-48 dBm	
+ TX T&H EXT 600-034	4 mins ago	1372		24.9 °C	47.0 %			0000	al	-34 dBm	
+ TX CO2/VOC/T&H AMB 600-023	7 mins ago	313		24.2 °C	50.0 %	113 ppb	679 ppm	0000	al	-37 dBm	
+ TX CO2/VOC/T&H AMB 600-023	2 mins ago	310		24.0 °C	50.0 %	93 ppb	858 ppm	0000	al	-40 dBm	
+ TX PULSE ATEX 600- 037	1 min ago	1377		11	37	37	0000	0000	al	-32 dBm	

We recommend that you use this page as an on-site audit tool to validate that the RSSI signal levels for transmitter data reception are good.

Position the transmitters where they will be installed on site.

You have the option to force sending test frames via the push button on the electronic boards of the transmitters (see below).



LED L2 (orange) flashes when you push the button. This confirms a frame has successfully been sent from the transmitter. By controlling the RSSI signal levels, you can determine if repeaters need to be installed.



**Up to -105 dBm** Good signal



From -106 to -112 dBm Signal ok



Above -112 dBm Low signal -(installation of a repeater required)

The procedure for installing repeaters is explained in Appendix #6.

# Positioning and connections for the sensors

Please refer to the Appendices for more details on installing our sensors:

- Positioning and attaching the equipment
- Sensor connections
- Calibrating the CO2 sensor

# CONFIGURE YOUR RECEIVER AND VIEW THE MODBUS TABLE

### Set up your receiver

Go to the « RX CONFIG » tab and fill in the receiver configuration parameters.

The receiver can communicate in Modbus IP and Modbus RTU RS232 / RS485 simultaneously. The communication in Modbus IP is continuously activated. The configuration settings below are mainly related to RTU communication. For IP settings, please click on the advanced settings button.

)) Enless Wireless LoRa TX CONFIG RX CONFIG NETWORK MODBUS Modbus ID of the receiver General Admin First register from which the information Receiver configuration of the transmitters will increase in the Modbus table Bits Per Second Modbus ID Data Bits Choose the receiver communication Stop Bits • RS485 interface: Parity - RS232 SERIAL • MODBUS - RS485 DHCP OFF DHCP ON IP settings for communication in Modbus IP. Match the receiver communication parameters with those of your PLC.

# View the Modbus table

M2M & IoT Wireless Expert					Ŭ.
ck on transmitter below	MODBUS vie	ew			Download
7 - TX T&H AMB 600-021	Register n	Hex value	Dec value	Details	
16 - TX PULSE ATEX 600-037	31003	0000	0	Device ID HI	
9 - TX VOC/T&H AMB 600-022	31004	0007	7	Device ID LO	
)	31005	0006	6	Tx Type 0 / Version 6	
	31006	0000	0	Status	
	31007	0000	0	Alarm Status	
	31008	00e9	233	Temperature 23.3 °C	
	31009	0231	561	Humidity 56.1 %	
	31010	0000	0		
	31011	0000	0		
	31012	0000	0		
	31013	0000	0		
	31014	0000	0		
	31015	0000	0		
	31016	0000	0		
	31017	0000	0		
	31018	0000	0		
	31019	0000	0		
	31020	0021	33	Transmission Counter 33	
	31021	ffd5	-43	Received RSSI value -43 dBm	
	31022	501c	20508	20508 minutes since last readin	a

#### Click on the « MODBUS » tab.

When you select a transmitter on the left side of the screen, the registers in which its information appears are displayed in the Modbus Table.

You can save this Modbus table with the following button « **Download** »



# **RECEIVER INSTALLATION**



The configuration is complete.

You can disconnect your receiver from its power supply and from the Ethernet port of the PC.

# **Connection of the receiver**

#### **RS232 RTU connection to the PLC**

Receiver terminal block	Description	Connection to the PLC
Tx	Transmission output	Rx
Rx	Reception input	Tx
GND	GND signal	GND signal

#### **RS485 RTU connection to the PLC**

Receiver terminal block	Description	Connection to the PLC
A	RS485 - A	RS485 - A
В	RS485 - B	RS485 - B
GND	GND signal	GND signal

#### **IP connection**

Connect the receiver over IP via the Ethernet connector.



\* Only receivers with a firmware version later than or equal to **V1.01.07** have an Modbus IP interface (check the label on the receiver)

### Power supply to the receiver

The Modbus receiver can be powered either : • by an Enless 12V power supply Ref : POWER 1000-002 - <u>Recommended</u>

• by a 7.5 to 24V main power supply.

Electrical power characteristic for 12Vdc receiver power supply : 1A max Use only CE certified 12V power supply.

In both cases, the wires will be connected to the POWER terminal block of the Modbus receiver.

- Black wire connected to OV terminal
- Red wire connected to V+ terminal

# LED combinations of the receiver

Please refer to the LED combinations of the Modbus receiver.

LEDs inside the casing :

- **LA Flash** The receiver got a message.
- **LB Flash** The receiver transmitted a message.
- **LC ON** The receiver is properly powered.
- **LD Flash** Communication message transmitted.
- **LE Flash** Communication message received.
- **LF OFF** Functionality not defined.

#### LEDs outside the casing :

**External LED** The receiver is fully **flashes every minute** operational.

The Modbus receiver is operational. It receives data from all the transmitters associated with it.



# USE IN LORA PRIVATE

# WITH THE BACNET RECEIVER

#### The BACnet receiver meets the B-ASC profile.

The BACnet receiver can be used in 4 different modes:

- 1. BACnet over IP
- 2. BACnet MSTP
- 3. BACnet MSTP with BBMD

Both BACnet IP and BACnet MSTP

The different possible modes of use and the BiBBs supported by the BACnet receiver are documented in Appendices #8 and #9.

### **Getting started**

You must access the BACnet receiver configuration IP server in order to select the receiver operating mode (see above).

Access to the configuration server is explained on pages 9 and 10 of this document.

### **Requirements checklist**

Transmitters and receiver to install



🗸 Long range antenna for the receiver



Cross-headed screwdriver



#### Setting the discover mode

From the receiver configuration interface, you will be able to select the discover mode of the receiver (Device mode or Object mode).

- In Device mode, only the transmitters that you have paired with the receiver will display their BACnet objects during the discover
- In Object mode, all BACnet objects that may be contained in the receiver will be displayed during the discover

#### **Communication protocol setup**

Also from the configuration interface of the receiver you have to determine the communication protocol of the BACnet receiver:

- IP only
- MSTP only
- IP and MSTP simultaneously
- MSTP with BBMD

#### **Configuring the transmitters**

The transmitters can be configured from the TX CONFIG page of the receiver server.

Once the sensors have been declared and powered, you can validate from the configuration server that the data has been received.

# DESCRIPTION OF THE BACNET RECEIVER CONFIGURATION SERVER INTERFACE

Nach Loop (m)         Image: Second seco	BACnet receiv	er configuration		
Canada         D         N         HUT	Bits Per Second	M00	· Device Mode	• 06247444
No Bits         1 </td <td>Ownities</td> <td></td> <td></td> <td></td>	Ownities			
Party Tore • 0x07 000 • 0x07 000 P Address 100 000/777	The Sta			
P Address 312 2465/277	Parity			

#### 01. « TX CONFIG » TAB

TX PULSE ATEX 600-037         Office         6071         5 m           Type         Location         LoRa ID         Perior				mitter Configuration
	Periodicity 5 mins			
	Periodicity 15 mins	LoRa ID 6070		Tx CO2/VOC/T&H AMB 600-023
Export CSV Import CSV			SV Import CSV	

Tab for declaring and configuring the sensors that will be associated with the receiver. You can configure the following parameters:

- Periodicity of transmission
- Alarm thresholds
- Remote configuration function

#### 02. « RX CONFIG » TAB

DEnless W M2M & IoT Wireles		TX CONFIG	RX CONFIG	NETWORK		LOR
General Ad	min					
BACnet receiver	r configuration					
Bits Per Second	9600		•	Device Mo	ode	Object Mode
Data Bits	8		~	Select your commun	ication protoco	
Stop Bits	1		~	MSTP		MSTP + BBMD     IP + MSTP
Parity	None		J	DHCP OF		DHCP ON

Receiver communication parameters configuration tab. For MSTP use you can configure the communication settings of the receiver. The configuration of IP settings is also available.

#### 03. « NETWORK » TAB

) Enless M2M & loT Wire	Wirele eless Expert	SS	TX CONFIG	RX CO	NFIG	NETWORI	<			Lo	Ra
/iew Network									Clear Dat		Download
Device Type	Last Seen	Device ID	Location	Data 1	Data 2	Data 3	Data 4	Data 5	Signal Quality	RSSI	Battery
1 + TX PULSE ATEX 600- 037	2 mins ago	6071	Bureau	0	0	0	0000	0000	al	-37 dBm	
+ TX PULSE 600-036	2 mins ago	1369		30	13	7	0000	0000	at	-47 dBm	
+ TX PULSE LED 600- 038	2 mins ago	1367		0	0	297	0000	0000	al	-36 dBm	-

Tab for viewing the frames sent by the transmitters. You can evaluate the RSSI signal levels of your sensors and control the correct reception of the data.

# PRODUCT CONFIGURATION ON THE BACNET RECEIVER

As mentioned earlier, the receiver can be used in two discover modes:

- In Device mode, only the transmitters that you have paired with the receiver will display their BACnet objects during the discover
- In Object mode, all BACnet objects that may be contained in the receiver will be displayed during the discover

On the following pages we will show you how the receiver works in these two modes.

# Determine the Discover mode and the communication protocol of the receiver

Select your communication protocol -						
Bits Per Second     9800       Data Bits     8       Abar Bits     8       Stop Bits     1       Parity     None       None     0       DHCP OFF     0	neral A	dmin				
Jata Bits     B       Arap Bits     1       Parity     None       Varity     None       Varity     Image: Comparison of the comparis	BACnet receive	er configuration				
Data Bits         B         V           Stop Bits         1         V           *artiy         None         V           IP Address         192-168.77.77           Subnet Mask         255.255.255.0           Gateway         00.00	Bits Per Second	9600	~	Device M	ode	Object Mode
ktop Bits         1         •	Data Bits	8	J	Select your commu	nication proto	col:-
Image: stand				MSTP		MSTP + BBMD
DHCP OFF     @ DHCP ON     P Address     192.168.77.77     Subnet Mask     255.255.255.0     Gateway     0.0.0	top Bits	1	<u> </u>	• IP		IP + MSTP
Subnet Mask         255.255.2           Gateway         0.0.0	Parity	None	~	DHCP OF	F	DHCP ON
Gateway			I	P Address	192.168.7	7.77
			s	ubnet Mask	255.255.2	55.0
UDP Port 47808			c	Sateway	0.0.0	
			ι	JDP Port	47808	

These parameters are configured from the « **RX CONFIG** » interface of the server. As a reminder, access to the configuration server is explained on **pages 9 and 10** of this do-

Select the desired configuration settings and save the changes.

When switching from **Device mode** to **Object mode** (or the other way around), please click on the REBOOT button in the ADMIN tab of the RX CONFIG page for the change to take effect.

# Configuration of the transmitters on the configuration server

You must declare the transmitters you wish to pair with the receiver. Select the « **TX CONFIG** » tab. To declare a sensor, click on the button Fill in the configuration information.

+ Add Sensor

	Add Sensor	×	Choose the type of sensor
Тх Туре	TX T&H AMB 600-021		Indicate the location of the sensor (e.g. office)
Location LoRa ID			Fill in the LoRa ID (provided on the transmitter label)
Periodicity	5 minutes		Choose the periodicity of transmission
	+ Advanced Save Changes		<b>Bring up the additional options</b> The advanced functionalities are explained in appendix #10 of this document
			Save settings button

#### Repeat for all sensors to be configured.

The configuration phase is complete, we can move on to activating the transmitters.

# PRODUCT CONFIGURATION ON THE BACNET RECEIVER



## Sensor power supply

# Check that the transmitters are in LoRa mode

Confirm that the jumper of each transmitter is properly positioned in LoRa mode on the electronic board (see appendix #1). If not, please position the jumpers correctly before proceeding to product activation.

# Activate the first transmitter (to be chosen)

Connect the battery of one of your transmitters and validate its LED set (see next paragraph).

#### Validate the LED set of your transmitter

#### Step 1 : starting the transmitter

L1 L2 L3 flashes successively

# Step 2 : the transmitter tries to dialogue with the receiver

L1	L2	L3
Flashes every 5s	Flashes when the transmitter sends a message	Flashes when the receiver answers

#### Step 3 : installation status

	LI	L2	L3
Failure	ON during 30sec	OFF	OFF
Success Low signal	OFF	ON during 30sec	OFF
Success Good signal	OFF	OFF	ON during 30sec

#### Step 4 : regular mode

LI	L2	L3
Flashes every 1min when an alert threshold is exceeded	Flashes for each data frame sent	Flashes every 1min

Repeat for all other transmitters.

# Validate the activation of transmitters from the server

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

A validation pad should appear in front of the transmitters you have just activated (see screenshot below).

Wait a few moments and refresh your page again if the pad does not appear.

)) Er M21	Ness Wireless M & IoT Wireless Expert	TX CONFIG
Transmit	er Configuration	
0	Type TX PULSE ATE	
•	<sub>Туре</sub> TX CO2/VOC/T&H	
		Export C
_		_

# PRODUCT CONFIGURATION ON THE BACNET RECEIVER



# Validate the data reception of the transmitters

In the « **NETWORK** » tab, the frames of the transmitters that you have just supplied must appear according to the periodicity that has been configured.

This tab allows you to validate the correct reception of the frames of the transmitters.

ew Network									Clear Dat		ownload
Device Type	Last Seen	Device ID	Location	Data 1	Data 2	Data 3	Data 4	Data 5	Signal Quality	RSSI	Battery
+ TX PULSE ATEX 600- 037	2 mins ago	6071	Bureau	0	0	0	0000	0000	all	-37 dBm	
+ TX PULSE 600-036	2 mins ago	1369		30	13	7	0000	0000	al	-47 dBm	
+ TX PULSE LED 600- 038	2 mins ago	1367		0	0	297	0000	0000	al	-36 dBm	
+ TX TEMP CONT 1 600-032	1 min ago	1365		22.3 °C				0000	al	-47 dBm	
+ TX T&H EXT 600-034	1 min ago	1372		24.3 °C	44.9 %			0000	al	-37 dBm	

We recommend that you use this page as an on-site audit tool to validate that the RSSI signal levels for transmitter data reception are good.

Position the transmitters where they will be installed on site.

You have the option to force sending test frames via the push button on the electronic boards of the transmitters (see below).



LED L2 (orange) flashes when you push the button. This confirms a frame has successfully been sent from the transmitter. By controlling the RSSI signal levels, you can determine if repeaters need to be installed.



**Up to -105 dBm** Good signal



From -106 to -112 dBm Signal ok



Above -112 dBm Low signal -(installation of a repeater required)

The procedure for installing repeaters is explained in Appendix #6.

# Positioning and connections for the sensors

Refer to the Appendices for more details on installing our sensors:

- Positioning and attaching the equipment
- Sensor connections
- Calibrating the CO2 sensor

# **EXAMPLES OF DISCOVER IN DEVICE MODE OR OBJECT MODE**

Once you have completed the configuration of the receiver and it is connected to your BACnet network according to the chosen communication protocol, you can initiate the discovery of BACnet objects.

Below is an example of the feedback from BACnet objects depending on the selected mode.

### **Device mode**

Only the BACnet objects of the sensors previously declared on the configuration server are returned.

hier Vue ?	<b>Q</b> 0 <b>\</b>		
Favoris			
	Nom	Туре	Instance Valeur Unités Description
	EN-TX #1	Equipement	1000001
Alarmes	Device ID	Valeur analogique	0
Abonnements COV	Device type	Valeur analogique	1
Equipement	Firmware version	Valeur analogique	2
Tendance	Battery level	Valeur analogique	3
Valeur analogique	Transmission counter	Valeur analogique	4
4 🥹 EN-TX #1	RSSI	Valeur analogique	5
<ul> <li>Alarmes</li> <li>Abonnements COV</li> </ul>	Time since last reading	Valeur analogique	6
Abonnements COV	Reserved	Valeur analogique	7
	Transmission period	Valeur analogique	8
P a convertisseur de pulsation	Time window upgrade enabled	Valeur analogique	9
P a childe unulogique	High input 1 alarm level	Valeur analogique	10
	Low input 1 alarm level	Valeur analogique	11
	Flow time input 1	Valeur analogique	12
	Leak threshold input 1	Valeur analogique	13
	High input 2 alarm level	Valeur analogique	14
	Low input 2 alarm level	Valeur analogique	15
	Flow time input 2	Valeur analogique	16
	Leak threshold input 2	Valeur analogique	17
b. D. Mitsus and a factors.	High input 3 alarm level	Valeur analogique	18
	Low input 3 alarm level	Valeur analogique	19

In blue BACnet objects related to the receiver In green BACnet objects related to two sensors previously declared on the configuration server

## **Object mode**

All BACnet objects that can be contained in the receiver are displayed.

📔 - 💽 - 🔍 🔗			
Favoris			
Réseau local Nom		Type	Instance Valeur Unités Description
EN-LBR_1000000 EN-L	BR_1000000	Equipement	100000
Alarmes     Bits p	per second	Valeur analogique	0
Abonnements COV Data	bits	Valeur analogique	1
A Accumulateur Stop			2
<ul> <li>Accumulator input 1 #1</li> <li>Parity</li> </ul>		Valeur analogique	3
<ul> <li>Accumulator input 1 #10</li> <li>Team</li> </ul>	flog 0		0
<ul> <li>Accumulator input 1 #11</li> </ul>	ilog 1	Tendance	1
<ul> <li>Accumulator input 1 #12</li> </ul>		Valeur analogique	100
<ul> <li>Accumulator input 1 #15</li> </ul>		Valeur analogique	1001
<ul> <li>Accompact input i #14</li> </ul>		Valeur analogique	1002
<ul> <li>Accumulator input 1 #15</li> </ul>		Valeur analogique	1003
· · · · · · · · · · · · · · · · · · ·			1004
Accumulator input 1 #17     Accumulator input 1 #18     RSSI			1005
			1006
		Valeur analogique	
			1007
Terra Interna			1008
		Valeur analogique	1009
		Valeur analogique	1010
			1011
High			1012
LOW	temperature 2 alarm level #1		1013
Accumulator input 1 #26     Accumulator input 1 #27	relative humidity alarm level #	Valeur analogique	1014
Accumulator input 1 #27     Low	relative humidity alarm level #1	Valeur analogique	1015
Accumulator input 1 #28     High     Accumulator input 1 #29	VOC alarm level #1	Valeur analogique	1016
Accumulator input 1 #29     Accumulator input 1 #3     High	VOC alarm level #1	Valeur analogique	1017





RaWAN<sup>®</sup>

# ORAWAN MODE

### **Getting started**

Before you start using our transmitters in LoRaWAN mode, you must first have positioned the jumper (supplied with each product) on the electronic board of your transmitters.

See Appendix #1 for explanations.

### **Requirements checklist**

- Subscriptions and cloud access from a LoRaWAN operator (if used in operated mode)
- LoRaWAN gateway (if use in private mode)

Keys (DEV EUI, APP EUI, APP KEY) displayed on each transmitter label

### As a reminder

The multiplicity of modes of use of our LoRaWAN transmitters (either in operator cloud mode or in private mode via gateways) makes it difficult to set up a standard installation procedure.

LoRaWAN sensor activation methods are specific to each LoRaWAN operator or gateway manufacturer. The installation of our sensors cannot therefore be standardised.

On the following pages, we will document the elements that will be necessary for you to declare and configure our transmitters, either in operated mode or in private mode.

Please refer to the procedures of the gateway operators or manufacturers for activating LoRaWAN transmitters on their hardware.

# USE OF LORAWAN TRANSMITTERS



# **Declaration of the LoRaWAN** transmitters

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

This mode uses a JOIN phase before being able to transmit on the LoRaWAN network.

For OTAA activation, we provide the codes below :

**DEVEUI : Transmitter ID** 

**APPEUI : Global application ID** 

**APPKEY : Transmitter Application Key** 

These activation keys are available on the labels on the back of each transmitter but also by flashing the QR codes pasted on each transmitter.

# Reminder on the LoRaWAN protocol

LoRaWAN technology is bi-directional and enables :

• Transmission of sensor frames to network (uplink)

• Transmission of information from the network to the sensor (downlink)

Our transmitters are operating under **Class A LoRaWAN**.

Class A allows transmitters to receive network information (downlink) by opening a listening window after each rising frame (uplink).

# **Activation of the transmitters**

Once reported on a cloud or gateway, LoRaWAN transmitters must be powered to start communicating with the network.

- 1) Open the transmitter casing
- 2) Connect the transmitter battery
- 3) Validate the transmitter LED set (see table on next page)

# USE OF LORAWAN TRANSMITTERS



# Validate the LED set of the transmitter

**Transmitter Power Supply** 

L3, L2, L1 + WAN flashing successively

#### Installation of the transmitter

	LI	L2	L3
	OFF	Flashes when the transmitter sends a message	OFF
Failure	ON during 30sec	OFF	OFF
Success Low signal	OFF	ON during 30sec	OFF
Success Good signal	OFF	OFF	ON during 30sec

#### Standard communication mode

L1	L2	L3
Flashes every	Flashes when	Flashes
1m when an alarm	a data frame	every
is detected	is sent	1m



If the transmitter does not communicate, check that the jumper on the electronic board is in the LoRaWAN position. (See appendix #1)

# Behaviour of LoRaWAN transmitters

1) When they are powered, the transmitters send a **JOIN \***.

2) After 24 hours, they send a LinkCheckReq message which should be confirmed by a LinkCheckAck. And so on every 24 hours.

As long as the LinkCheckReq are confirmed by a LinkCheckAck, the transmitter will not send a new JOIN.

3) If the LinkCheckReq message does not receive a LinkCheckAck response, then new LinkCheckReq will be sent in the process.

If 6x LinkCheckReq does not get a response, then the transmitter initiates a new JOIN procedure.

**\*JOIN**: This is a network access phase LoRaWAN network that allows the network parameters to be dynamically renewed between the end-device and the LoRa Server.

# USE OF LORAWAN TRANSMITTERS



# **Decoding the uplinks**

Once the sensor is declared and powered, the first data frames (uplinks) begin to arrive on the Cloud or gateway.

In order to interpret the raw frames sent by our transmitters, we can provide you with either :

- Documentation to help you decode our LoRaWAN frames
- Decoding CODECs in JSON format

These elements are available, upon request, from our technical support department. Do not hesitate to ask us.

support@enless.fr / +33 (0)5 56 35 97 47

# **Downlinks configuration**

Downlinks are used to send information to the transmitters from the LoRaWAN network. This allows the configuration of the transmitters (frequency of transmission, retransmission of data, alarm thresholds, etc.).

As explained before, our transmitters listen a downlink after sending each rising frame (uplink).

If you configure a downlink from the cloud or gateway, the transmitter should retrieve it immediately after sending an uplink and change its settings accordingly.

The documentation to help decode our LoRaWAN frames mentioned above also includes a configuration downlink generator.

Do not hesitate to contact our support team to obtain this documentation.

#### support@enless.fr / +33 (0)5 56 35 97 47

The configuration downlinks are to be sent on Port #1

# Validation of the information reception

Before moving to the final installation of the products, we recommend you validate :

#### The quality of data reception on the cloud or on your gateway.

You have the option to force sending test frames via the push button on the electronic boards of the transmitters (see below).



LED L2 (orange) flashes when you press the push button. This confirms a frame has successfully been sent from the transmitter.



Our LoRaWAN transmitters have Duty Cycle constraints. Do not press the push button more than once every 5 minutes.

Also confirm that the configuration parameters have been successfully retrieved by the transmitter and that it is transmitting at the correct frequency.

# Product positioning and connection

The positioning and connection of our products are explained in our appendices.



# APPENDICES.

## Selection of communication mode LoRa vs LoRaWAN

#### **Appendix 1**

- LoRa mode
- LoRaWAN mode

## Positioning and fixing products

#### Appendix 2

- Positioning of transmitters
- Fixing the transmitters

### **Product connection**

#### Appendices 3 to 5

- Connecting pulse transmitters to pulse counters
- PULSE LED transmitter connection and installation
- Connect the 4/20 mA probe to the analogue transmitter
- Connect the digital input transmitter to the contact interfaces

### **Repeater installation**

Appendix 6

## **Calibration CO2**

Appendix 7

### **BACnet receiver**

#### Appendices 8 to 9

- Operating modes of the BACnet receiver
- BiBBS supported by the BACnet receiver

# SELECTION OF COMMUNICATION MODE LORA PROPRIETARY VS LORAWAN

Each transmitter can communicate either in LoRa proprietary mode or in LoRaWAN mode (see page 7). Mode selection is made via a jumper installed on the transmitter PCB.

## LoRaWAN mode

Jumper positioned on a single pin.



NB : The jumper is supplied with every transmitter.

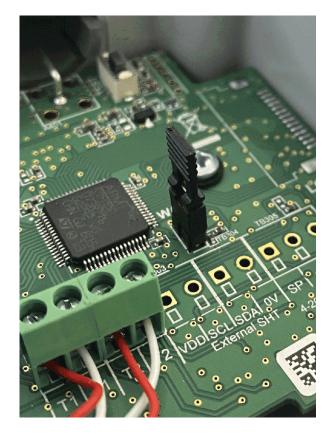
It is imperative that you change the jumper position to select the communication mode (LoRa or LoRaWAN) when the transmitter is de-energised.



The jumper positions are reversed for transmitter versions prior to **ENV 1.01.05** (Check the label on the transmitters).

# LoRa proprietary mode

Jumper positioned on the two pins.



# POSITIONING AND FIXING PRODUCTS

## Positioning

The correct positioning of transmitters is very important and has a significant influence on the quality of transmission of radio waves. If your transmitter is incorrectly positioned you will reduce the radio coverage distance.

To maximise the transmitters' performance, please follow the instructions described below:



Ensure that the transmitter antenna is always up

**Position the transmitters as high as possible** We recommend positioning the transmitters at least 1.50m high

# Fixing

The transmitters are fixed using the wall fixing lugs.

These lugs are provided for fixing with screws.

The lugs of the ambient transmitters are inside the transmitters.

For rugged transmitters you can also use the clamp collar loop on the side of the case.





# CONNECTION OF THE TX PULSE TO THE METERS

#### Reminder concerning the use of the transmitter TX PULSE ATEX 600-037

According to ATEX Directive 1999/92/EC, only workers trained to work in risk areas are allowed to install the transmitter TX PULSE ATEX 600-037. No changes can be made to the transmitter TX PULSE ATEX 600-037.

#### Special conditions for safe use

In the case of an installation with a gas meter, the output wires of the transmitter TX PULSE ATEX 600-037 must be connected to certified intrinsic safety equipment. This combination must be compatible with the intrinsic safety rules Uo, Io, Po, Co, Lo specified on the label on the transmitter.

#### Certifications

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

 $\bigotimes_{i=1}^{M}$  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 transmitter TX PULSE ATEX 600-037 comes with a RAMWAY ER34615 battery. Only this model of RAMWAY ER34615 battery can be used with the transmitter TX PULSE ATEX 600-037. These batteries are available from Enless Wireless – 45 ter avenue de Verdu 33520 Bruges (France). Phone : +33 (0)5 56 37 97 47 – email : contact@enless.fr

#### WARNING - POTENTIAL ELECTROSTATIC CHARGE HAZARD

The transmitter TX PULSE ATEX 600-037 should only be cleaned with a damp cloth.

The PULSE transmitters are supplied with 4 wires and have 2 pulse inputs that can be used at the same time. Several combinations are possible.



#### Compatibility with the meters

- Dry contact interface (50 mseconds minimum / 10 Hz max)
- Transistor interface, open collector

### **Connection to the pulse meter**

Input 1 : Dry contact	Input 2 : Dry contact	Input 3 : open collector
Green wire + brown wire	Green wire + white wire	Green wire + yellow wire

# **CONNECTION AND INSTALLATION OF PULSE LED TRANSMITTER**

# $\bigcirc$

# **1 KNOW YOUR METER**



#### Indicator light

Find the flashing diode on the meter. The optical reader is positioned on this diode. The optical reader can only interpret LED flashes with **a minimum flash duration of 3ms and a maximum of 100ms.** 

#### Parameters

If it is a tariff meter higher than 36 kVA, it is necessary to know the transformation ratio of your meter. Use the buttons next to the digital display to read the value corresponding to the TC ratio (parameter n°6 or n°16 or n°64)

# **2** SETTING UP THE SENSOR



#### Fixing the viewfinder

Clean the meter around the flashing diode. Affix the viewfinder by pointing the diode through the hole (the viewfinder is supplied with an adhesive).



#### Locking the reader

Clip the reader into the viewfinder and 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

The pulse optical reader records 1 pulse every 5 flashes.

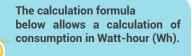
Calculation method = (A x 5) x B x C x D

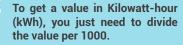
A : Number of pulses

**B** : Pulse weight Example : 0.1W/pulse. In this case, indicate 0.1 for B value in the below calculation.

**C** : TC ratio – Current transformation ratio In general 1 for residential meters. Can be another value for industrial meters (check this parameter on the meter's settings).

D : TT ratio – Tension transformation ratio
 In general 1 for residential meters.
 Can be another value for industrial meter (check this parameter on the meter's settings).





# **CONNECTION OF THE ANALOGUE PROBE 4/20 MA AND CONNECTION OF THE CONTACT TRANSMITTER**

### Connection of the analogue probe 4/20 mA to the analogue transmitter

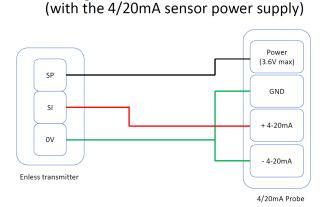
When installing analogue transmitters, you must first connect the 4/20mA sensor to the transmitter. Open the transmitter casing, you will connect the analogue sensor to the transmitter terminal. Refer to the label inside the transmitter under the terminal block for connection.

## **Connecting the probe**

Transmitter terminal block	Description	Connection from / to the probe
SP	Power (+V)	Use SP and 0V to power the probe
SI	4/20mA (+l)	Use SI and 0V for loop 4/20 mA
0V	Common 0-V	

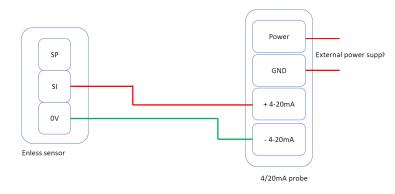
Once the probe is connected to the transmitter, you can start configuring the transmitter.

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



Cabling for the LoRa 4-20mA transmitter

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



### Connection of the digital input transmitter to the contact interfaces

The CONTACT transmitters are supplied with 4 wires and have **2 inputs that can be used at the same time**. Several combinations are possible.

# **Connection to the contact interfaces**

Input 1 : Dry contact Green wire + brown wire Input 2 : Dry contact Green wire + white wire Input 3 : open collector Green wire + yellow wire

# **INSTALLATION OF THE REPEATER 600-301**

If one or more transmitters remain out of range of the Modbus receiver, you will need to install a repeater.

#### The reapeter does not need to be configured !

## **Position your repeater**

We recommend that you position your repeater halfway between the transmitters and the receiver. Preferably use a long-range antenna and install as high as possible. You have the option to chain several repeaters together.

### **Power your repeater**

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

- Via 12V Power Charger Ref: POWER 1000-002 Recommended
- Via 7.5 to 24V main power supply

#### Electrical power characteristic for the 12Vdc power supply : 1A max Use only CE certified 12V power supply

In both cases, the wires will be connected to the repeater POWER terminal : • Black wire connected to OV terminal • Red wire connected to V+ terminal

## **Interpret the LED sets**

LEDs inside the casing :

- **LA Flash** The repeater received a message.
- **LB Flash** The repeater transmitted a message.
- **LC ON** The repeater is properly powered.

LED outside the casing :

**External LED** Repeater is working fine. **flashes every minute** 





# CALIBRATION PROCEDURE FOR CO2 VOC TEMP HUM TRANSMITTERS



So you can be certain that the ppm values returned by our CO2 VOC TEMP HUM 600-023 transmitters are consistent, they can be manually recalibrated.

To guarantee the best possible calibration, we recommend that the equipment is calibrated in "fresh air" mode. The calibration process for the transmitters takes just 3 minutes. Please follow the procedure described below:



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 will be calibrated is fresh.





The LEDs will stop blinking when the calibration has been completed.

You can now take the transmitter and install it in its final position.

# 2

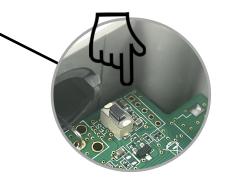
Hold down the button located on the transmitter circuit board for 15 seconds. Do not release the button until the L1 L2 L3 LEDs come on. This indicates that the calibration process is active.



We recommend pressing the push button with a screwdriver or pen to avoid damaging the CO2 sensor with your finger!

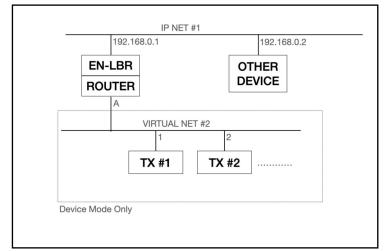
# 3

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

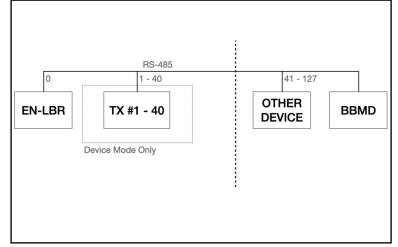


# **BACNET RECEIVER OPERATING MODES**

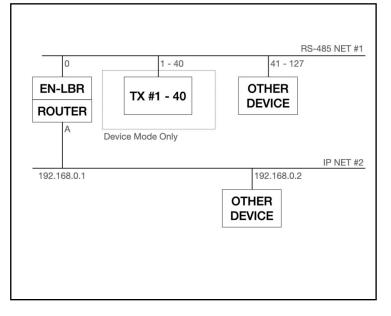
# **BACnet IP seulement**



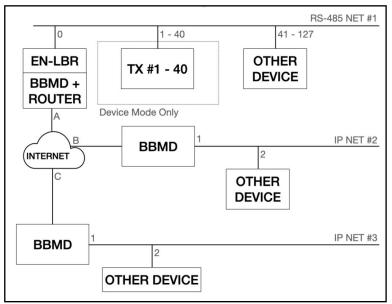
### **BACnet/MSTP**



# **BACnet/IP and BACnet/MSTP**



## **BACnet/MSTP + BBMD**



# **BIBBS SUPPORTED BY THE BACNET RECEIVER**

The BACnet receiver meets the B-ASC profile.

	Bacnet Operator Work Station	Bacnet Building Controllers	BACnet Advanced Application Controller	BACnet Application Specific Controller	BACnet Smart Acuator	BACnet Smart Sensor
	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
Data Sharing	DS-RP-A,B DS-RPM-A DS-WP-A DS-WPM-A	DS-RP-A,B DS-RPM-A,B DS-WP-A,B DS-WPM-B DS-COVU-A,B	DS-RP-B DS-RPM-B DS-WP-B DS-WPM-B	DS-RP-B DS-WP-B	DS-RP-B DS-WP-B	DS-RP-B
Alarm, Event Management	AE-N-A AE-ACK-A AE-INFO-A AE-ESUM-A	AE-N-B AE-ACK-B AE-INFO-B AE-ESUM-B	AE-N-B AE-ACK-B AE-INFO-B			
Scheduling	SCHD-A	SCHED-E-B	SCHED-I-B			
Trending	T-VMT-A T-ATR-A	T-VMT-I-B T-ATR-B				
Device & Network Management	DM-DDB-A,B DM-DDB-B DM-DCC-A DM-TS-A DM-UTC-A DM-UTC-A DM-RD-A DM-BR-A NM-CE-A	DM-DDB-A,B DM-DDB-B DM-DCC-B DM-TS-B DM-RD-B DM-RD-B DM-BR-B NM-CE-A	DM-DDB-B DM-DOB-B DM-DCC-B DM-TS-B DM-RD-B	DM-DDB-B DM-DOB-B DM-DCC-B	DM-DDB-B DM-DOB-B	DM-DDB-B DM-DOB-B

\* in Green: the supported BiBBs

\* in Red: the unsupported BiBBS

# ADVANCED TRANSMITTER FUNCTIONALITIES

The advanced functionalities are displayed when you click the button + Advanced on the Add Sensor window.

Two types of advanced functionalities are available.

	Add Sensor	
Тх Туре	TX CO2/VOC/T&H AMB 600-023 ~	
Location		
LoRa ID		A remote reconfiguration function
Periodicity	15 minutes v	(see explanation below)
	- Advanced	
TWU Period (mins)	Off	Alarm thresholds when thresholds
High Temp (°C) Max 125.0	Low Temp (°C) Min 0.0	are exceeded (see explanation below)
High Hum (%) Max 100	Low Hum (%) Min 0.0	
High VOC (ppb) Max 4000	Low VOC (ppb) Min 0	
High CO2 (ppm) Max 4000	Low CO2 (ppm) Min 0	
	Save Changes	

#### New remote configuration

When you activate this function, every 24 hours the transmitter will ask the receiver if a new configuration is available. If you have changed the configuration of the transmitter in question from the Modbus table of the receiver, then the transmitter will take its new periodicity without you having to reset the sensor manually after 24 hours.

It is possible to (re)configure the transmitters from the Modbus table of the receiver. If you would like to know more about the procedure for configuring sensors from the Modbus table, please contact our support team <a href="mailto:support@enless.fr">support@enless.fr</a>

#### Alarm thresholds

For each type of transmitter different alarm thresholds are available. If you do not want to use this feature, do not fill in the fields for the alarm thresholds. Otherwise, fill in the fields with the high/low values of the selected thresholds. If the threshold is exceeded, the status byte in the Modbus table will indicate an alarm. (see Modbus table document).

#### )) Enless Wireless

#### DECLARATION UE DE CONFORMITE EU DECLARATION OF CONFORMITY



We Enless Wireless 45 ter avenue de Verdun 33520 Bruges France

#### Declare under our sole responsibility that the product

Designation: Product Name(s) & References Radio transmitters TX PULSE HP ATEX 400-006 TX PULSE ATEX 800-010 TX PULSE ATEX SIGFOX 300-010 TX PULSE ATEX SIGFOX HP 100-010 TX PULSE HP ATEX 400-007 TX PULSE ATEX SIGFOX HP 100-017 TX PULSE ATEX 600-037

Attestation

#### LCIE 14 ATEX 3013 X

Notifiée par le LCIE 33 avenue du Général Leclerc - 92260 Fontenay aux Roses (France) Numéro LCIE: 0081

To which this declaration relates satisfy the provision of **2014/34/UE** of the European parliament and the council of 29 March 2014

> is in conformity with the following standard(s) or other normative document(s)

• EN IEC 60079-0 : 2018, EN60079-11 : 2012

The marking is:

⟨€x⟩ II 1 G Ex ia IIC T3 Ga

> Fulfill the directives & standards

- 2014/53/UE April 2014
- 2014/30/UE February 2014
- RoHS 2011/65/EU of 1 July 2011
- EN300 220-1&2 V3.1.1 (2017-02)
- EN301 489-1 V2.2.0 (2017)/ EN 301 489-3 V2.1.1 (2017)
- EN 60950-1: 2006 + Am11:2009 + Am1:2010 + Am12 2011 + A2: 2013
- EN 62479 :2010

Date: 23/06/2021 Version 6.0 Bruno Petit (Gérant)