SETUP GUIDE
Wireless M-Bus - 169MHz product range
ANALOG TRANSMITTERS
NECESSARY EQUIPMENT

To install Enless Wireless products, you need the following equipment:

- The Field Configuration Tool software (FCT). You can download it at this address: http://enless-wireless.com/en/support-enless.html
  Please refer to the FCT software installation guide to learn more about installation procedure.

- The transmitters you wish to install

- A modbus receiver (provided with USB cable)

- A long range antenna (Ref: ANT-REN-SMA HP 169)

- A cross-headed screwdriver
- A flat screwdriver (2mm)
DESCRIPTION

ANALOG TRANSMITTERS

References:
- TX 4/20 mA 400-008
- TX 0-5V 400-009
- TX 0-10V 400-010

Radio frequency: 169 MHz
Output power: 500mW
Default periodicity: displayed on the transmitter’s label
ID: 8 digits displayed under barcode

Closed cover

1) Identification label
2) Clamp collar bracket
3) Screws for opening / closing the lid
4) Bracket for wall mounting
5) Antenna

Open cover

6) Replaceable battery
7) Battery connector
8) LED indicators (L1, L2, L3)
9) Gland for external analog probe
Before starting you have to connect the sensor to the transmitter.

Open the transmitter’s enclosure, then connect the sensor to the transmitter’s terminal block.

Refer to the label inside the transmitter (under the terminal block).

**TX 4/20 mA**

The terminal block to use is Pin4/8 GND, pin5 - 4-20mA Input, pin9 - Sensor Power.

**TX 0-5 V**

The terminal block to use is Pin4/8 GND, pin5 - 0-5V Input, pin9 - Sensor Power.

**TX 0-10 V**

The terminal block to use is Pin4/8 GND, pin7 - 0-10V Input, pin9 - Sensor Power.

Once the sensor is connected to the transmitter, you can start the configuration.
PREPARING FOR INSTALLATION

We recommend to configure the products in local mode before installing them.

**PREPARE THE MODBUS RECEIVER**

- Open the Modbus receiver enclosure
- Position the switches the following way:
  - DIP 1: switches 5 and 6 ON, the others OFF
  - DIP 2: switches 1, 2 and 3 OFF
- Connect the antenna to the Modbus receiver
- Provide power supply to the Modbus receiver:
  - with power supply (Ref: POWER 1000-002)
  - or with 7.5 to 24 V power supply
- Connect the Modbus receiver to the PC (via USB)
- Make sure the LED indicators of the Modbus receiver are indicating correctly.

**START THE F.C.T SOFTWARE**

- Type username then click **OK**
- Click “**refresh list**” in the “COMxx” tab. The communication port will be displayed, select it.
- Click “**Connect to COM port**” A message in the dialog box will confirm that the COM port is well connected.

**PREPARE THE TRANSMITTERS**

- Open the transmitters’ enclosures.
- Make sure that the battery connector is not connected.
CREATE A CONFIGURATION FILE

CONFIGURE THE TRANSMITTERS
- You have to register the transmitters you wish to install. Click **Edit / View** on the corresponding family.
- A new window opens. Click this button to add a transmitter:

  ![Transmitter Configuration Window]

  - Fill in the different fields:
    - **Address**: The address is displayed on the transmitter’s label under barcode
    - **Tx Time**: Define periodicity (from 1 to 250 minutes)
    - **Retry**: 0 (default value) or 1
    - **Wake Time**: Define wake time (in seconds)

  - Click **OK** to add this transmitter to the configuration file.

CONFIGURE THE MODBUS RECEIVER
- Click **Edit / View** on the RX Modbus family.
- Fill in the Modbus receiver fields.

<table>
<thead>
<tr>
<th>Receiver ID</th>
<th>Modbus Address</th>
<th>Baud Rate</th>
<th>Parity</th>
<th>Stop Bits</th>
<th>Data Bits</th>
<th>Modbus Table 1</th>
<th>Modbus Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>20400353</td>
<td>1</td>
<td>19200</td>
<td>None</td>
<td>2</td>
<td>8</td>
<td>31000</td>
<td>32000</td>
</tr>
</tbody>
</table>

- **Receiver ID**: Address stated on the Modbus receiver’s label (8 digits displayed under barcode).
- **Modbus address**: Select between 1 an 254. The value 1 is given for information purposes.
- **Baud rate**: Possible values 2400 / 4800 / 9600 / 19200 and 38400 bps. The default value is 19200.
- **Parity**: None (default value) / Even / Odd
- **Stop bits**: 1 or 2
- **Data bits**: The only possible configuration value is 8
- **Modbus Table 1**: The transmitter values are registered in the MODBUS table number 1 as well as pulse for the TX ENERGY+PULSE. You have to confirm the value of the first register from which the values of transmitters are going to be saved. The value of this first register can be between 0000 and 64500. The value 31000 is given for information purposes.
- **Modbus Table 2**: The TX ENERGY + PULSE transmitter values (excepted pulse values registered in table 2) are registered in the table MODBUS number 2. You have to confirm the number of the first register from which the values of transmitters are going to be saved. The value of this first register can be between 0000 and 64500. The value 32000 is given for information purposes

- When you are finished with the Modbus receiver’s configuration, click **OK**.
INSTALLATION OF THE TRANSMITTERS

Once configured, the transmitters and the Modbus receiver should appear as **UNCONFIGURED** in the configuration file.

### ACTIVATE THE TRANSMITTERS

- Click **"Start configuration"**.
- Power the first transmitter by connecting its battery.

- L1, L2 and L3 blink in order. L1 blink every 2 seconds.
  The transmitter goes into installation mode. It tries to connect to the Modbus receiver for 1 minute maximum 1. If the LED indicators are not blinking, disconnect and reconnect the battery.

- If the transmitter is in the range of the receiver, several installation / configuration messages are displayed in the dialog box of the F.C.T software. The L1, L2 and L3 LED indicators combination is showing the success or failure of the installation. See below.

<table>
<thead>
<tr>
<th>Indication</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Period</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>Flashes</td>
<td>OFF</td>
<td>OFF</td>
<td>2s</td>
<td>Until timeout</td>
</tr>
<tr>
<td>Installation success</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>N/A</td>
<td>30s</td>
</tr>
<tr>
<td>Success but low RSSI</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>N/A</td>
<td>30s</td>
</tr>
<tr>
<td>Installation failure</td>
<td>OFF</td>
<td>Flashes</td>
<td>Flashes</td>
<td>1s</td>
<td>30s</td>
</tr>
<tr>
<td>Normal mode</td>
<td>Flashes</td>
<td>X</td>
<td>OFF</td>
<td>60s</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- The messages in the dialog box indicate the installation status of the transmitter.
- Once the installation success is confirmed, you can connect the battery of the next transmitter.
- When all the transmitters are installed, they appear as **CONFIGURED** in the configuration file. The Modbus receiver remains **UNCONFIGURED**.
- You can click **"Stop Configuration"**.
- We recommend that you save your configuration file. This file could later be helpful if you wish to add transmitters to this existing configuration without starting over the installation.

To save your configuration file, click **Export CSV**.
IN CASE OF INSTALLATION FAILURE

- Move the Modbus receiver’s antenna in order to optimize radio propagation
- Move the transmitter if you can and repeat the procedure
- If the problem remains you will have to install a repeater between the transmitters and the receiver.

POSITION THE TRANSMITTERS

- Set the transmitters at least 1.5 meter above the ground.
- Fix the transmitters on the wall using the wall mounting or clamp collar brackets.
- The transmitters must always be positioned with antenna upwards.

CHECK DATA RECEPTION

The data visualization is done from the F.C.T software.
To visualize the transmitters’ data, click “View Network”.

DEVICE TYPE: TX 4-20 / TX 0-5V / TX 0-10V
TIME: Date & time of data received from
DEVICE ID: Transmitter’s address
DATA 1 & 2: Data received by the receiver for data 1 and 2
RSSI: Radio signal strength (dBm) between the transmitters and the receiver
- from -10 to -50 dBm: excellent radio signal strength
- from -50 to -85 dBm: good radio signal strength
- from -85 dBm and lower: low radio signal strength
BATTERY: Level of battery
TRANSMITTERS’ PAIRING WITH MODBUS RECEIVER

- Click “Disconnect”.
- Unplug the USB cable from the PC.
- Disconnect the power supply of the receiver

- Position the switches as described below:
  DIP1: Switch 5 & 6 ON – Switch 1, 2, 3 & 4 OFF
  DIP2: Switch 1 & 3 OFF - Switch 2 ON

- Provide power supply to the receiver
- Reconnect the Modbus receiver to the PC (via USB).

- On the F.C.T software, click “Refresh list” then click “Connect”.
- A message in the dialog box will confirm that the receiver is well connected to COM port.
- Then, click “Start configuration”.
- Messages in the dialog box will confirm that the receiver’s installation is a success.

- Modbus receiver’s LED indicators also confirm the installation status.

**INSTALLATION SUCCESS**
L1 et L3 LED indicators will blink 5 times confirming the installation of the Modbus receiver. Then, L5 will remain ON

**INSTALLATION FAILURE**
L1, L3 & L5 LED indicators will blink 5 times confirming the failure of the Modbus receiver’s installation. Then, L5 will remain ON

The installation deadline is 1 minute. In case of failure, repeat the procedure.

- Once the installation success confirmed, the Modbus receiver appears as CONFIGURED in the configuration file.
You can click “Stop configuration” and disconnect the Modbus receiver from the PC.

**CONFIGURATION OF THE RECEIVER’S INTERFACE**

You have to configure the receiver’s interface in function of your communication mode.

**RS232 Modbus interface**
- DIP 1: 1 & 2 ON, the others OFF
- DIP 2: 1 & 3 OFF, 2 ON

**RS485 Modbus interface**
- DIP 1: 3 & 4 ON, the others OFF
- DIP 2: 1 & 2 OFF, 3 ON

**CONNECTION OF THE RECEIVER WITH THE PLC**

**RS232 connection**
- Wire labeled GND (Ground) connected to GND terminal block on the receiver.
- Wire labeled TX (Transmission) connected to RX terminal block on the receiver
- Wire labeled RX (Reception) connected to TX terminal block on the receiver

**RS485 connection**
- You need to provide the 2 wires cable
  - Wire 1: TX connected to TX/A terminal block on the receiver
  - Wire 2: RX connected to RX/B terminal block on the receiver

**POWER THE MODBUS RECEIVER**

The Modbus receivers can be powered:
- With main power from 7.5 to 24 V
- With 12 Volts power supply (Ref: POWER 1000-002)

In both cases wires will be connected to POWER terminal block of Modbus receiver.
- **Black** wire will be connected to GND
- **Red** wire will be connected to +VE
Please refer to the LED indicators combinations:

<table>
<thead>
<tr>
<th>Installation mode</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Flashes</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>Flashes</td>
<td>X</td>
<td></td>
<td>Flashes</td>
</tr>
<tr>
<td>Step 3</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>ON</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal mode</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data reception</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Flashes</td>
</tr>
<tr>
<td>Request from the PLC</td>
<td>Flashes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>1 sec</td>
</tr>
<tr>
<td>Response to the request</td>
<td>X</td>
<td>Flashes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The Modbus receiver is now installed. It will collect data from the paired transmitters.

For further information about Modbus communication, please download the Modbus table at the following address: