IntesisBox®
USB-ENO v.1.0.0
USB-ENO-C v.1.0.0

USB EnOcean gateway and repeater

User's Manual
r0 eng

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Gateway for integration of any EnOcean device in your USB enabled EnOcean compatible Controller or PC Software

2 models are available for this gateway, with the following Order Codes:

**USB-ENO**  
EnOcean communication frequency: 868 MHz  
**USB-ENO-C**  
EnOcean communication frequency: 315 MHz
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1. Presentation

Integration of any EnOcean device in your USB enabled EnOcean compatible Controller or PC Software

IntesisBox® USB-ENO / C gateways allow supervision and bidirectional control of any EnOcean device from PC systems such as SCADAs as well as any configuration and monitoring USB enabled systems.

1.1. Main Features:

- Bidirectional: Supervision and Control.
- Unlimited transmitters supported.
- Up to 128 actuators.
- ESP2 and ESP3 communication compatible.
- Compatible with remote management telegrams
- 1 & 2 level repeater functionality available.
- USB Powered. No external power supply needed.
- Plug and Play (virtual COM port).
- Suitable look for home applications.
- Small dimensions.
1.2. Typical application

In Figure 1.1 it is shown a typical integration example using the USB-ENO / C to control and/or supervise IntesisBox® EnOcean AC Interfaces and many other devices.
2. Connection and placement

2.1. Connection

1. Plug the gateway to the USB port of the computer or control system.

2. The red USB LED (Figure 3.1) will turn on. Once the device has been recognized a virtual COM port is going to be generated and the LED will turn off.

3. To communicate with the gateway use this port.

2.2. Communication settings

The IntesisBox® USB-ENO / C can be configured to work with both ESP2 and ESP3. Detailed description of these protocols can be found in the EnOcean documentation. The following table is a summary of their properties and differences.

<table>
<thead>
<tr>
<th>Description</th>
<th>ESP 2.0</th>
<th>ESP 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. number of data types</td>
<td>7</td>
<td>255</td>
</tr>
<tr>
<td>Max. size of transferred data [bytes]</td>
<td>28</td>
<td>65535</td>
</tr>
<tr>
<td>Data verification</td>
<td>Checksum</td>
<td>CRC8</td>
</tr>
<tr>
<td>Communication speed [baud]</td>
<td>9600</td>
<td>57600</td>
</tr>
</tbody>
</table>

Table 2.1 ESP2 and ESP3 main properties

2.3. Placement

The coverage distance (see Table 2.2) of the signal emitted by the USB-ENO-/ C, or by any other EnOcean device, is determined by the room geometry and where they are placed. As an example, long narrow corridors with wide walls are an adverse situation. People or other obstacles can reduce the coverage distance too. Is therefore advice to always think in the worst possible scenario to decide the placement of the device to ensure a good stability in the radio system.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Coverage distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line-of-sight connections</td>
<td>typically 30 m range in corridors</td>
</tr>
<tr>
<td></td>
<td>up to 100 m in halls</td>
</tr>
<tr>
<td>Plasterboard walls / dry wood</td>
<td>typically 30 m range, through 5 walls</td>
</tr>
<tr>
<td>Brick walls / aerated concrete</td>
<td>typically 20 m range, through 3 walls</td>
</tr>
<tr>
<td>Ferroconcrete walls / ceilings</td>
<td>typically 10 m range, through 1 ceiling</td>
</tr>
</tbody>
</table>

Table 2.2 Device coverage distance

2.2.1 Screening zones

It is important not to place the device in a place where the airwaves must go through a metallic object as they create a screening zone where the receivers are not going to be able to receive the EnOcean telegrams. This situation is shown in Figure 2.1a.
The situation of one of the receivers doesn’t allow it to receive the transceiver telegrams. To solve this situation the use or a repeater outside the screening zone (Figure 2.1b) is recommended. The telegrams will be retransmitted from there to the receiver.

2.2.2 Penetration Angle

This is the angle in which the airwaves reach a certain object they need to go through. The transmission to the other side of the object would be better as this angle gets closer to 90 °, being this the best transmission situation.

In Figure 2.2a it is shown a receiver in a situation where the penetration angle is too close to 0°. The solution to that problem can be seen in Figure 2.2b using a repeater in a different position.

**Figure 2.1** a) Screening zone b) solution with a repeater

**Figure 2.2** Penetration angle
2.2.3 Use of repeaters

In case of a poor radio reception, it may be helpful to use a repeater. EnOcean repeaters do not require any configuration, only a line-power supply is needed. A poor radio signal is received, refreshed and transmitted again, so nearly a double radio range can be achieved. Special EnOcean repeaters which can be switched to 2-level function allow two repeaters to be cascaded. The USB-ENO / C can be configured to work as one (see section 3 for details).
3. Configuration

In Figure 3.1 a schematic of the device can be seen. This is useful to follow the instruction in section 3.1.

![Device diagram]

Two different configuration modes can be used: Manual or by commands (either using ESP2 or ESP3). Each way of configuring the gateway has different capabilities that can be seen in Table 3.1:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ESP 2.0</th>
<th>ESP 3.0</th>
<th>Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE ID</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Repeater mode</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Protocol selection</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3.1 Configuration modes

3.1. Manual configuration

The manual configuration uses PB1 and ROT1 in Figure 3.1. Set the desired selector position in ROT1 (details in Table 3.2) and press the button PB1 during 5 seconds to execute the configuration order. Once the configuration is changed the CONF LED blinks as confirmation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ROT1 Selector position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeater mode</td>
<td>0</td>
<td>Repeater disabled (Default value)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1- Level repeater</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2- Level repeater</td>
</tr>
<tr>
<td>Protocol selection</td>
<td>A</td>
<td>ESP 3.0 (Default value)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>ESP 2.0</td>
</tr>
</tbody>
</table>

Table 3.2 Selector position and behavior
3.2. **Commands configuration**

The commands to execute the supported functionalities explained in Table 3.1 are listed in the following table:

<table>
<thead>
<tr>
<th>Operation</th>
<th>ESP2.0</th>
<th>ESP3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set BASE ID</td>
<td>SET_BASEID</td>
<td>CO_WR_IDBASE</td>
</tr>
<tr>
<td>Read BASE ID</td>
<td>RD_BASEID</td>
<td>CO_RD_IDBASE</td>
</tr>
<tr>
<td>Get firmware version</td>
<td>RD_SW_VER</td>
<td>CO_RD_VERSION</td>
</tr>
<tr>
<td>Set repeater functionality</td>
<td>---</td>
<td>CO_WR_REPEATER</td>
</tr>
<tr>
<td>Get repeater functionality status</td>
<td>---</td>
<td>CO_RD_REPEATER</td>
</tr>
</tbody>
</table>

**Table 3.3 Configuration commands**

More information about how to use this commands can be found in the documentation of communication protocols ESP2.0 and ESP3.0.

4. **Technical data and dimensions**

The main features of the devices USB-ENO / C are shown in Table 4.1. For further detail check the USB-ENO / C datasheet

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>71 x 71 x 27 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>60 g</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-25...85ºC</td>
</tr>
<tr>
<td>Stock Temperature</td>
<td>-40...85ºC</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>&lt;93% HR, non-condensing</td>
</tr>
<tr>
<td>Stock Humidity</td>
<td>&lt;93% HR, non-condensing</td>
</tr>
<tr>
<td>Power requirements</td>
<td>USB powered. USB limitations apply</td>
</tr>
<tr>
<td>EnOcean Frequencies</td>
<td><strong>USB-ENO</strong>: 868 MHz</td>
</tr>
<tr>
<td></td>
<td><strong>USB-ENO-C</strong>: 315 MHz</td>
</tr>
</tbody>
</table>

**Table 4.1 Technical data**
5. Regulations and standards

CE conformity:

R&TTE EU-direcative on Radio and Telecommunications Terminal Equipment

The general registration for the radio operation is valid for all EU countries as well as for Switzerland.

Standards:

UNE-EN 50491-3:2010
UNE-EN 60950-1:2007
UNE-EN 61000-6-2:2006
UNE-EN 61000-6-3:2007

FCC ID: SZV-STM300C
IC: 5731A-STM300C

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications made to this equipment not expressly approved by Intesis Software may void the FCC authorization to operate this equipment.