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eibPort EnOcean Dokumentation

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1 INTRODUCTION

By request, **eibPort** can be delivered not only with a KNX-interface, but also with an EnOcean port. EnOcean is a radio system, which doesn't need any batteries, while doing „energy harvesting“. So this system is low-maintenance and dependable. Because of these characteristics, an EnOcean application is very flexible, reducing costs at the same time and offers the ideal solution for refittings.

eibPort acts as a gateway to the ethernet and enables communication between KNX and EnOcean. In this way, advantages out of both worlds could be joined in one unit, like for example: the simple refitting of window sensors in a KNX facility or for example the connection of a KNX weather station to an EnOcean system.

1.1 TECHNICAL DETAILS OF THE ENOCEAN INTERFACE

EnOcean (868 Mhz):	
Power consumption (<i>eibPort</i> complete):	<5VA
Operating frequency:	868,3 Mhz
Reach:	300m in free-field / 30 m indoor
(depends of construction material)	
Input objects :	Any number
Output objects:	128
External antenna:	2,50m cable, magnetic foot and SMA plug.

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FUNCTIONAL PRINCIPLE OF ENOCEAN

An EnOcean radio network consists of sensors and actuators. Sensors use the environmental energy to send conforming radio signal. So that one actuator could read and react to the signals of a sensor, the sensor has to be trained to corresponding actuator. In this process, so called EnOcean profiles will be determined, in which way sensor data has to be interpreted. So it will be necessary, that sensor and actuator are using the same EnOcean (EEP) profile.

Which profile will be used by one actuator, sometimes only can be figured out with the help of its manufacturer.

Device categories / sensors

EnOcean distinguishes in its sensor technology between three categories of equipment. The category gives simultaneous information about the kind of EnOcean signals and what the receiver has to expect.

- Switch module: A module which sends out a radio signal after user interaction. This are switches, rockers, position and key card switches and window handles.
- 1 Byte sensor: A sensor which is sending out information of 1 byte size.
- 4 Byte sensor: A sensor, which is sending out information of 4 byte size.

Actuators

Actuators will perform their controlling on the basis of sensor signals. Therefore sensors and actuators has to be adapted to each other. In most of actuators, EnOcean profile can't be altered, why many actuators will only work with a sensor from the same manufacturer. In case of using *eibPort*, it will be necessary to know, which EnOcean profile has to be emulated to address the actuator correctly. Which profile the actuator will require, perhaps has to be asked from the manufacturer.

EnOcean Profiles (EEP)

EnOcean profiles (EnOcean Equipment Profile - EEP) define the unit's category, function and specification. A profile also gives precise evidence about the kind of equipment and in what form the sensor will transmit its data. In *eibPort* configuration, KNX parameters automatically will be adapted to selected profiles. Profiles will be composed of 3 numbers, separated by a hyphen: XX-XX-XX.

In doing so, different placements will carry following significance:

ORG-FUNC-TYPE

- ORG specifies which kind of messages building the base of communication (see also „Device categories/sensors“)
- FUNC defines the device categorie, for example: a switch or a temperature sensor.
- TYPE determines the exact specifications of the device functions.

Transmitter ID (Trans. ID)

This is a unique address, which will exist singulary. By the help of this address, sending devices could be identified.

Learning telegramm / LRN Telegramm

Means a special telegram which exists for teaching in the sensor data into the actuator. For the actuator, it will be necessary to know, from which hardware address sensor data will arrive. Two kind of learning telegrams exist:

- *Learning telegram with data:* Although telegram is marked as a learning telegram, it even contains normal user information from the sensor. Due to the placed LRN bit, actuator will memorize the hardware address on which the actuator has to listened in future. This is the most often used learning telegram.
- *Learning telegram with teach-in Data:* In this learning telegram, actuator will get information about the profile, devicetype and device ID. This kind of telegram will be used least.



3 ENOCEAN CONFIGURATION IN EIBPORT

Because *eibPort* is a gateway out of the KNX-world, the device internally works with so called group addresses, the logical addressing method in KNX. To connect EnOcean signals, which *eibPort* will receive or send, with visualisation or jobs, *eibPort* has to use KNX group addresses. Further information you will find in chapter „*KNX addressing*“ further down.

3.1 ENOCEAN KONFIGURATION

To reach the corresponding configuration area in *eibPort*, the editor has to be opened. By menu item “*Extras*” > “*EnOcean configuration*” an according dialog will appear on the screen. Configuration window substantially consists of three areas:

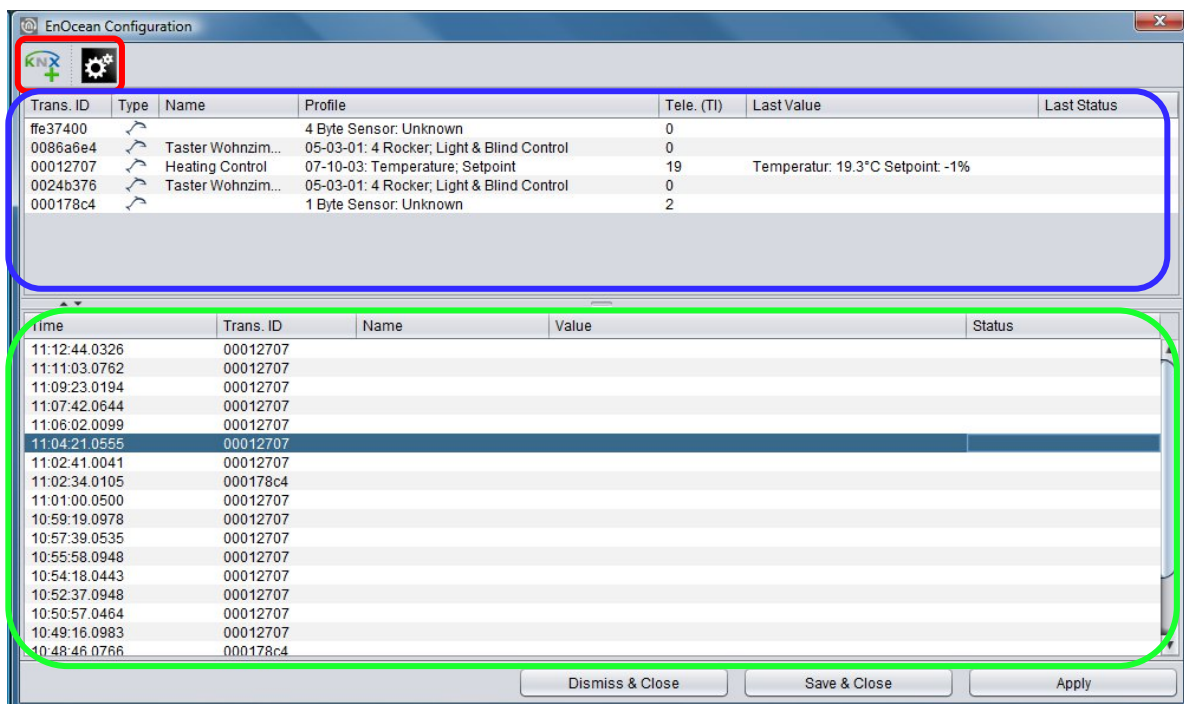


Figure 1: EnOcean configuration window

1. *Configuration menu*: Here are general settings of the EnOcean module are done as well as EnOcean devices can be emulated (red).
2. *Device overview*: All EnOcean devices will be displayed here, sorted by their device ID (Tran ID) (blue).
3. *Telegram overview*: All received EnOcean telegrams will be listed here, sorted by their arrival time (green).

At the bottom of configuration window, action buttons for saving or dismissing of your settings are available.

3.1.1 ENOCEAN SETTINGS

EnOcean settings show hardware parameters of the integrated EnOcean module (TCM 300 Transceiver). The following settings can be adjusted:

EnOcean Active

Enable or disable the integrated EnOcean Module.

Repeater

Repeater function will be used for repeating a received signal, to increase its range. Following settings are available:

- *Off*: Repeater function is switched off.
- *Level 1*: Telegram will be replicated only by one repeater.
- *Level 2*: Telegram will be replicated by two repeaters.

RX sensitivity

Please define, at which reception sensitivity EnOcean module should work. You can select between „low“ and „high“ .

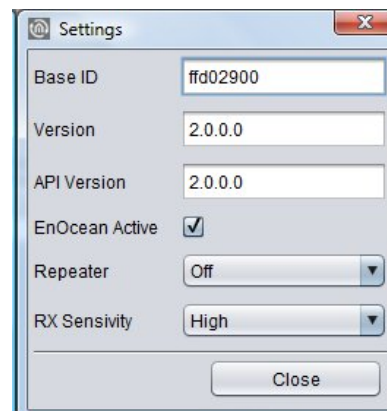


Figure 2: EnOcean preferences

3.1.2 TEACHING IN AN ENOCEAN DEVICE

All EnOcean devices in range which are sending something, will be displayed as well in the device overview as in the telegram overview. As mentioned above, EnOcean telegram has to be connected with a group address, to utilize it in *eibPort*. That is done by:

1. Please mark desired device in the overview.

Tip: In case you are not sure, which device carries which Trans ID, please activate desired device and have a look in the device overview, by which telegram counter will increase (column “telegrams”)

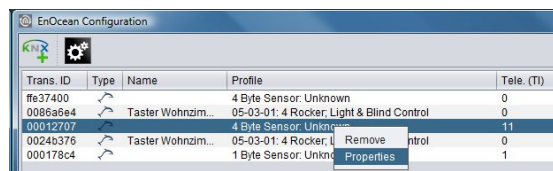


Figure 3: Calling up properties

2. If you have found out the desired device, please mark it with your mouse and push the right mouse button. In the context menu, you will be able to erase this device out of the list (so already applied devices will be removed again) or you can invoke its “*properties*”. Menu item “*properties*” can also be reached by a double click on the selected device.

3. The window “*EnOcean device configuration*” will be opened. With the help of this dialog, EnOcean devices will be taught in.

4. At first, please enter an explicit „*Device Name*“, which regard to its function. In subsequently input area, you will find following parameters:

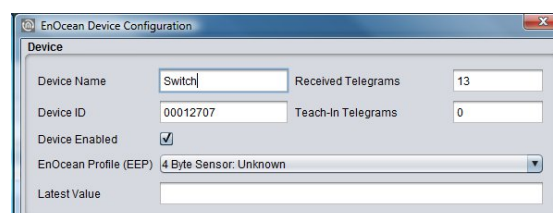


Figure 4: EnOcean Device configuration

- *Device ID*: That is the explicit identifying device address.
- *Received Telegrams*: This array is a counter how many EnOcean signals of this device was received.
- *Learning telegrams*: In case the device is sending Teach-in telegrams, you will be able to see their number here.
- *DeviceEnabled* : If you want to hold a device in your EnOcean configuration, but you don`'t want to use it at this time, you can switch it off for *eibPort* usage by this option.
- *EnOcean profile (EEP)*: The EnOcean devices will be defined by so called profiles. In doing so, already by one signal`s input the device category will be investigated and then a preselection



takes place. After that, you can choose out of the profiles, which are known by *eibPort*. As soon as one profile is chosen, corresponding KNX parameters will appear below.

- *Last value*: According the selected profile this array interprets the user data of the last radio signal from this user ID. If no profile is selected, raw data will be displayed.

5. Please select the corresponding profile of your EnOcean device. If you are not sure, which profile your device will „speak“, please contact the manufacturer of the device. After selecting the correct device profile, one or several input arrays will appear in area „parameters“

Depending on the different profiles, various parameters will be displayed. In case a switch (rocker) is chosen, you have the possibility to choose between different actions. (see chapter “*KNX parameters for EnOcean switches*“)

6. Now please fill in corresponding KNX group addresses in the entry array to get the EnOcean device and the KNX group addresses connected. Exact informations of KNX group addresses and their placing, you will find in chapter „*KNX addressing*“.

7. If the addresses are filled in like desired into the parameter array please close the “*EnOcean device configuration*”- window.

8. Please save your modifications by hitting the button „*Save and close*“ or „*accept*“ (EnOcean configuration will stay open) in the window „*EnOcean configuration*“.

As soon as this step is finished the entered KNX telegrams will be triggered by the EnOcean signals. To use addresses later on in an easier way, they should be entered in ESF-data with a unique description. (see chapter “*KNX addressing*“)

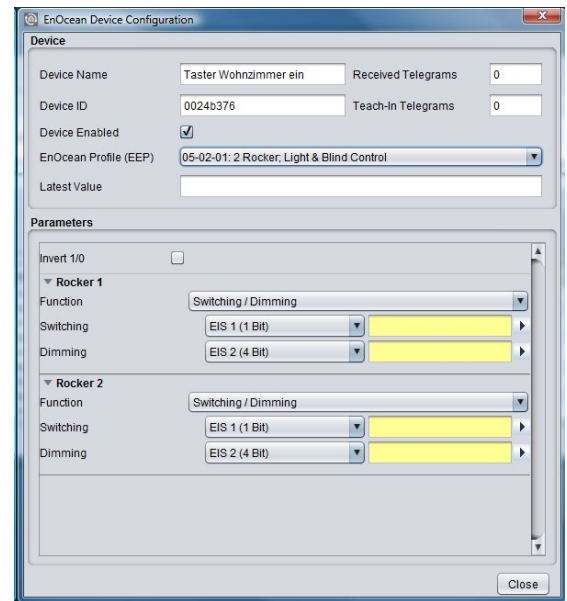


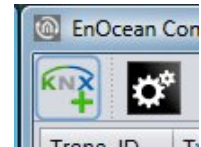
Figure 5: EnOcean Configuration for a sending device

3.1.3 EMULATING ENOCEAN DEVICES

eibPort is containing an EnOcean transceiver module, which enables it not only to receive EnOcean signals, but also to send them out. To do that, **eibPort** emulates an EnOcean device. With the help of a configuration interface you can determine which device the **eibPort** should emulate on which KNX telegram.

To apply a new emulated device.

To apply a new device, please click on the KNX logo in the configuration menu (*“Editor” > “Extras” > “EnOcean configuration”*). A new window will open, which is called *“New emulated device”*.



In upper half of the window, you will be asked for selecting a hardware address. This address will be unique and you can enter up to 128 different ones. If a device was already applied before, name of the unit appears highlighted red in the ID list.

Select of device category

Depending on which actuator has to be controlled in EnOcean, the correct device category has to be chosen. In addition to that, you can preset directly the matching profile, below the respective category. By confirming with *“ok”*, settings will be taken over and the window *„EnOcean Device Configuration“* will open.

Defining which device should be emulated („EnOcean Device Configuration“)

The device which was applied in such way at first has to get one unique name. Furthermore the following parameters will

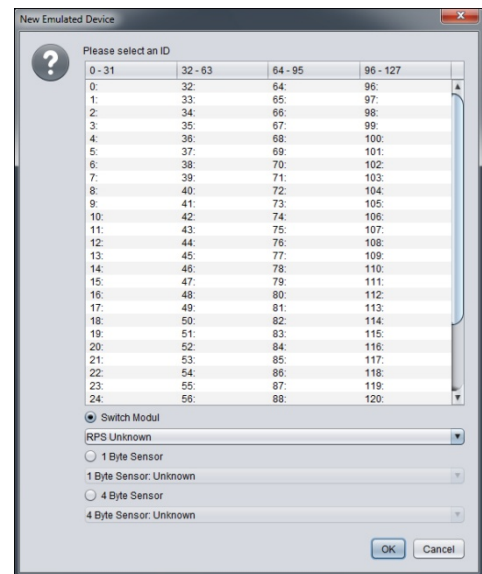


Figure 6: Emulating EnOcean Device

be presented (also see chapter *„Exampel: emulating temperature sensor“*):

- *Device ID*: This is the definite hardware adress, which you have selected before. You can't change it at this place.
- *Received telegrams.*: Displays the number of already received telegrams of this hardware address. In case of an emulated device, this number should be normally „0“.
- *Teach-in telegrams*: Shows the number of „Teach-in telegrams“, which were already be sent by this hardware adress.
- *Device enabled*: If you like to hold this device in your EnOcean configuration furthermore, but not hold in use for this moment, you can disable it for **eibPort** application by this option.
- *EnOcean Profile (EEP)*: Here you can select the profiles, which the emulated device should use. Profile settings depend on the actuator, by which **eibPort** should communicate. If profil settings are not known, the actuator`s manufacturer can give more informations.
- *Last value*: According to the selected profile this array interprets the user data of the last telegram or will display it only.

After all settings are done as desired it is to be continued with the associated KNX parameters in the lower part of the window. These parameters will be set according to their profiles and will trigger a KNX telegram by receiving one on the EnOcean part. Because nearly every EnOcean telegram needs another KNX parameter, and because it will not be possible to list them all here, an example of heat controlling will follow now:



3.1.3.1 EXAMPLE: EMULATING TEMPERATUR SENSOR

Profile

The profile „07-10-03: Temperature; Setpoint“ is selected.

Parameters

According to this profile, following parameters exists:

- *Setpoint Offset*: Please adjust here the actuator`s Setpoint Offset. Predefined is 20°C.
- *Setpoint Range*: Please enter the degrees in celsius, by which it is allowed to modify the setpoint. Predefined is 3 degree celsius.
- *Temperature*: Please enter here the group address, which will transmit the current temperature value (data type EIS 5)
- *Setpoint*: Please enter the group address, for modifying the absolute setpoint value. (data type EIS 5)
- *Sending Learn Telegram*: If corresponding actuator will be in teach-in mode, emulated sensor could be taught in by this actuator. **eibPort** only uses the simple kind of teach-in telegrams (see chapter „*Function principle of EnOcean*“).

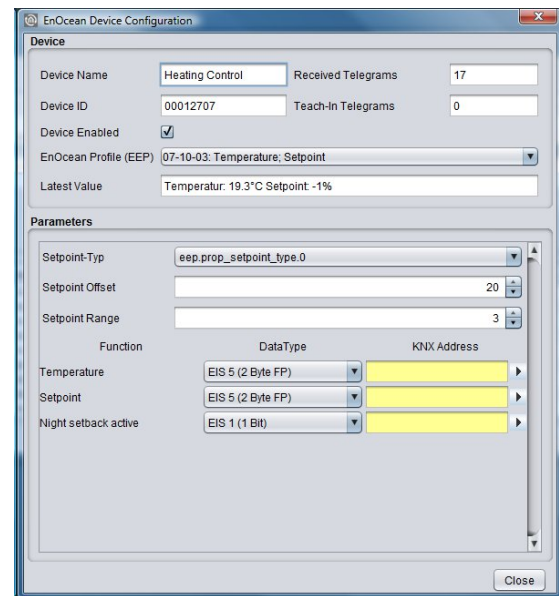


Figure 7: EnOcean device parameter receiving

If all parameters will be set as desired, please close the window “*EnOcean configuration*” and store your settings with the button “*Store and close*” or “*Accept*”.

4 KNX ADDRESSING

The KNX group address is a 16 bit address, which are not used entirely. Description can take place in a 2- or 3-digit way, in doing so, you can speak about:

3-digit:

MG= main group / CG= central group / SG= sub group
MG / CG / SG

2- digit:

MG= main group / SG= sub group
MG / SG

Address range overall is from 0/0/0 to 31/7/255 (in 3-digit notation), whereas range up to 15/7/255 will be called as the real address space and the address range from 16/0/0 to 31/7/255 are signified as a virtual address space. Virtual address space serves as to realize internal connections, without wasting real address space and bus load. An internal connection could be applied between two jobs or between the visualization and the jobs for example.

4.1 USING REAL GROUP ADDRESSES

Real group address should generally be used only, if a telegram will be required on KNX bus and if a corresponding subscriber will exist in the KNX system. If you ignore that, more telegram traffic will be created as necessary. Because an address, to which no subscriber exists, won't get an „Acknowledge“ in the KNX-Bus and will be repeated three times. In extreme cases this could cause malfunction of the bus system.

4.2 ESF FILE

The subscribers of a KNX bus system will be programmed exclusively by the software ETS. Address information of the “*ETS project*” could be exported in the form of an “*ESF file*”. This file could be imported into the **eibPort** then. The user then is able to access to this information from every address array in the eibPort. This simplifies significantly placing and admistration of addresses.



4.2.1 THE ESF DIALOG

The dialogue window, which displays the ESF file, will open by one click on the arrow symbol behind every address input array or by menu item „Extras“ > „ESF Upload & data administration“.

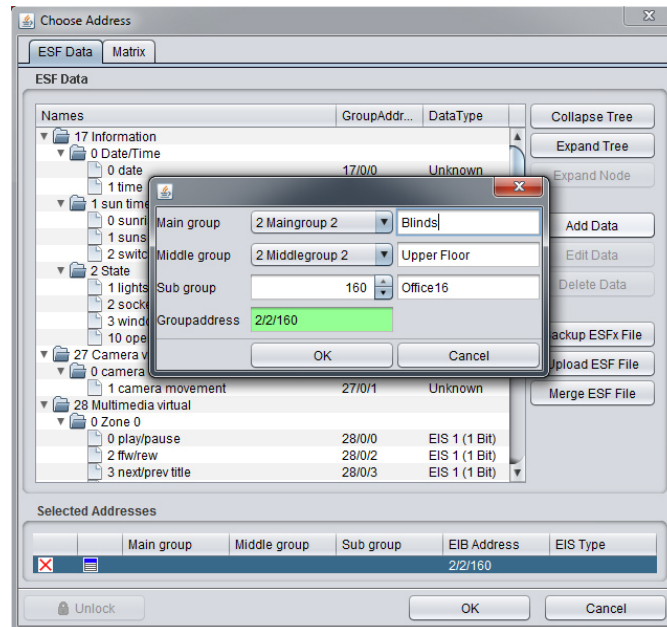
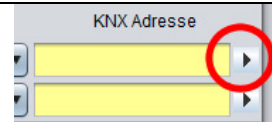


Figure 8: ESF Dialogue

Creating a new address

If an address was entered in the input array, it will be assumed automatically into the „Selected addresses“ array of the dialog. In case you want to add this address to your address file, it will be enough to mark it and to hit the „Add data“ button on the right side. Then a second window will be opened, in which you are able to customize the identifiers of the group address. With the „ok“ button the input will be confirmed and stored.

Using already assigned addresses

At the same time, this dialog allows you to use already assigned addresses. For this purpose, you simply open the address tree at the corresponding place and mark the desired address (double click). After that, this address appears in menu item „Selected addresses“. As soon as you confirm this selection with „ok“, the address will be stored automatically in this field.

4.2.2 OBJECT STRUCTUR

eibPort emulates the structure of EIB`s communication objects. That means, that you can assign up to 5 group addresses to every object. So, allocation of the group addresses, for example of an actuator channel, can directly be emulated. The *eibPort* will always be informed about the actuator`s (not group address) state and complex working with acknowledgements can remain undone. This proceeding simplifies creating of logical connections, because every input object can be allocated up to 5 group addresses.

Syntax

After the first group address the following have to be put in brackets and have to be separated by commas.

Example: 2/12(2/13,2/14,2/15,2/16)

This syntax will automatically be created, if several addresses will be selected over ESF-dialog.



5 KNX-PARAMETER FOR ENOCEAN SWITCH

To represent the functions of the different EnOcean devices in the KNX system, nearly every profile possesses its own KNX parameters. Because there are too many pre-stored EnOcean profiles, it would be too complex to list all KNX parameters. For this reason, here is one example of the profile "05-02-01: 2 Rocker; Light & Blind control".

Basically there is the difference, if the switch will be emulated by *eibPort* or the *eibPort* will work as a receiver (actuator) and so it will be controlled by EnOcean radio signals.

5.1 EIBPORT AS A RECEIVER (ACTUATOR)

This switch sensor contains either two or one rocker and transmits their states within one radio signal. To connect this radio signal with KNX, several functions are possible:

- *Switching / Dimming:* The EnOcean switch sensor could be used as a switch or as a dimmer. In this process a long keypress will be interpreted as a dim command.
- *Push button:* By keypress an EIS 1 telegram with value 1 will be sent. By releasing, a telegram with value 0 will be transmitted. You can confirm one address for every position (1 and 0).
- *Toggle Button:* By keypress, the state will only alter once; either „1“ or „0“ will be sent.
- *Jalousie Control:* One address for „Move“ and one address for „Step“ order (EIS 1) will be entered.



Figure 9: KNX parameter receiving mode

In addition you are able to invert the KNX output. In this case the current output „1“ will change to „0“ and reverse.

5.2 EIBPORT EMULATES ENOCEAN PUSH BUTTON

If the profile named above will be emulated by the *eibPort*, the parameter array looks differently. The *Toggle Button* is missing, because this function can't be realized in EnOcean. But roughly you will find the same configuration mask as in chapter „*eibPort as receiver (actuator)*“.

Functions

- *Switching/dimming*: There will be one switching and one dimming address for each rocker. Information about, if it was switched or dimmed will be sent in KNX by different group addresses.
- *Push button*: At the push button exists one address for value „0“ and one for value „1“. By detecting the input object, the corresponding EnOcean signal will be transmitted.
- *Jalousie Control*: Blind control consists of two EIS 1 objects. One is for the „move“(1) and the other one for the „step“ order (0).

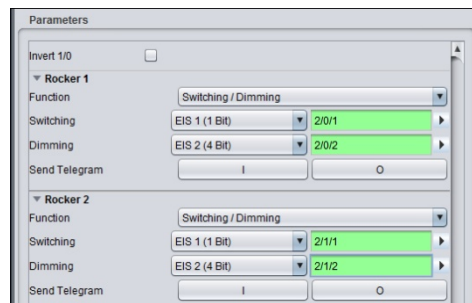


Figure 10: EnOcean Device – Sending parameters

Send Telegram

With this buttons the emulated device is taught into the desired actuator. These two buttons simulate respective rocker, directly out of the EnOcean configuration. So it is not needed to link the group address in this setting just for having a test for its function.

Invert

The EnOcean output values will be inverted. „1“ inverts to „0“ and reverse.