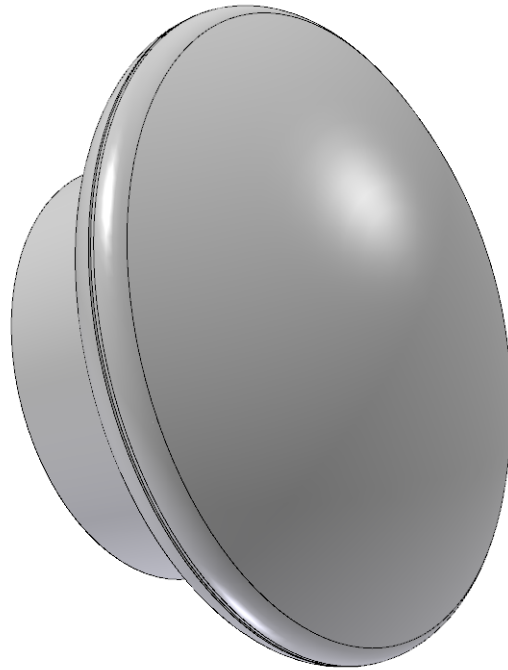




## **AL-512-00-902 IP-EnOcean-Bridge PoE V1**

### **Ethernet to EnOcean Interface – EnoDisc®**

**EnOcean 902 MHz**

**Part no. 12395**

Version 1.12, valid since FW/HW 2.0 / 1.0

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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## Table of Contents

|       |                                                                               |    |
|-------|-------------------------------------------------------------------------------|----|
| 1     | Validity of this documentation .....                                          | 5  |
| 2     | Intended use .....                                                            | 5  |
| 3     | Disposal .....                                                                | 5  |
| 4     | Device description .....                                                      | 5  |
| 4.1   | Functionality .....                                                           | 5  |
| 4.2   | External product interface .....                                              | 6  |
| 4.3   | Observe intended use .....                                                    | 6  |
| 4.4   | Observe statutory provisions for operating frequency range .....              | 6  |
| 4.5   | Non-conduction mounting surface .....                                         | 6  |
| 5     | Technical data .....                                                          | 7  |
| 5.1   | Communication / EnOcean wireless interface .....                              | 7  |
| 5.2   | Communication / Ethernet interface .....                                      | 7  |
| 5.3   | User interfaces .....                                                         | 7  |
| 5.4   | Housing / connection technology .....                                         | 7  |
| 5.5   | Power supply .....                                                            | 7  |
| 5.6   | Environmental conditions .....                                                | 8  |
| 5.7   | Dimensions and weight .....                                                   | 8  |
| 5.8   | Approvals .....                                                               | 8  |
| 5.9   | Standards and guidelines .....                                                | 8  |
| 6     | Functional description in detail .....                                        | 9  |
| 6.1   | Receiving and transmitting of EnOcean data, and transfer in ESP3 format ..... | 9  |
| 7     | The EnoDisc® webserver .....                                                  | 10 |
| 7.1   | “Home” / EnoDisc device info page .....                                       | 10 |
| 7.2   | “EnOcean” / EnOcean data monitor .....                                        | 10 |
| 7.3   | “Repeater” / EnOcean repeater configuration .....                             | 11 |
| 7.3.1 | Repeater / Mode .....                                                         | 11 |
| 7.3.2 | Repeater / Action .....                                                       | 12 |
| 7.3.3 | Repeater / Criterium .....                                                    | 13 |
| 7.3.4 | Repeater / Criterium value .....                                              | 13 |

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|       |                                                           |    |
|-------|-----------------------------------------------------------|----|
| 7.3.5 | Add or remove rules for the repeater .....                | 15 |
| 7.4   | “Setup” / Ethernet and EnOcean interface properties ..... | 16 |
| 7.4.1 | Password .....                                            | 16 |
| 7.4.2 | Device properties .....                                   | 17 |
| 7.5   | Supported EEP's (EnOcean Equipment Profiles) .....        | 23 |
| 7.5.1 | Transmit / TX and Receive / RX .....                      | 23 |
| 8     | Installation and maintenance / service .....              | 24 |
| 9     | Device labels .....                                       | 27 |
| 10    | FCC (United States) Regulatory Statement .....            | 28 |
| 11    | ISED Regulatory Statement .....                           | 28 |
| 12    | Dimensions / drawings .....                               | 30 |
| 13    | Ordering information .....                                | 31 |
| 14    | Revision history .....                                    | 32 |

## 1 Validity of this documentation

This documentation is only applicable to the product

**AL-512-00-902 IP-EnOcean-Bridge PoE V1 / EnoDisc®**

and is only applicable starting from products with FW/HW Version 2.0/1.0.

The device must only be installed and operated according to the instructions in this document.

## 2 Intended use

The **AL-512-00-902 IP-EnOcean-Bridge PoE V1 / EnoDisc®** must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

## 3 Disposal



Electrical and electronic equipment may not be disposed of with household waste. This also applies to products without this symbol.

Electrical and electronic equipment contain materials and substances that can be harmful to the environment and health. Electrical and electronic equipment must be disposed of properly after use.

Note only for EU: WEEE 2012/19/EU applies throughout Europe. Directives and laws may vary nationally.

## 4 Device description

### 4.1 Functionality

The **AL-512-00-902 IP-EnOcean-Bridge PoE V1 (EnoDisc®)** is used to interface sensors and actuators with EnOcean® wireless interface to an Ethernet based automation system.

The integrated radio interface (EnOcean) receives data like room temperature, humidity or presence detection from sensors and can send data to actuators.

At the same time, data is transferred to / from an automation system via the integrated Ethernet interface.

The standardized protocol used by the communication layer is the ESP3 format (EnOcean Serial Protocol Version 3). The EnoDisc does not interpret data.

The EnoDisc is supplied via PoE (Power Over Ethernet).

## 4.2 External product interface

The external product interface consists of the following items:

- LSA-connector for Ethernet cable when opened
- Flat-ribbon connector to controller board
- Service-LED (green) when opened

Once the EnoDisc is mounted and the housing is closed, there is no visible or touchable user interface.

## 4.3 Observe intended use

The **AL-512-00-902 IP-EnOcean-Bridge PoE V1 / EnoDisc®** must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

## 4.4 Observe statutory provisions for operating frequency range.

The **AL-512-00-902 IP-EnOcean-Bridge PoE V1 / EnoDisc®** must only be operated in compliance with the country-specific provisions regarding operation of radio equipment.

## 4.5 Non-conduction mounting surface

A non-conductive mounting surface is necessary.

Ensure the **AL-512-00-902 IP-EnOcean-Bridge PoE V1 / EnoDisc®** is mounted on a non-conductive surface. If it is not, performance may be adversely affected.

## 5 Technical data

### 5.1 Communication / EnOcean wireless interface

|                                     |                  |
|-------------------------------------|------------------|
| Type                                | EnOcean          |
| Number                              | 1                |
| Transmit / receive center frequency | 902.875 MHz      |
| Maximum transmission power          | +94 dB $\mu$ V/m |

Table 1: Technical data / Wireless communication EnOcean

### 5.2 Communication / Ethernet interface

|                                       |                         |
|---------------------------------------|-------------------------|
| Type                                  | Ethernet, 10/100 Mbit   |
| Number                                | 1                       |
| Galvanically isolation Ethernet / PoE | Ethernet: Yes / PoE: No |

Table 2: Technical data / communication

### 5.3 User interfaces

|                |                                                             |
|----------------|-------------------------------------------------------------|
| Service button | -                                                           |
| Service LED    | Green, inside the housing, to show link and activity status |

Table 3: Technical data / user interfaces

### 5.4 Housing / connection technology

|                       |                                     |
|-----------------------|-------------------------------------|
| Connection technology | LSA                                 |
| Housing               | Plastic, ABS, grey / white RAL 9002 |

Table 4: Technical data / housing

### 5.5 Power supply

|                      |                        |
|----------------------|------------------------|
| Power supply voltage | PoE (nom. 48 V DC)     |
| Power consumption    | Typ. 0.7 W, max. 1.0 W |

Table 5: Technical data / power supply

## 5.6 Environmental conditions

|                  |                                        |
|------------------|----------------------------------------|
| Operating temp.  | 0° .. +45 °C                           |
| Storage temp.    | -20° ..+70 °C                          |
| Rel. humidity    | 10..95 % rel. humidity, non condensing |
| Protection class | IP20                                   |

Table 6: Technical data / environmental conditions

## 5.7 Dimensions and weight

|            |                                 |
|------------|---------------------------------|
| Weight     | 95 g                            |
| Dimensions | Diameter: 110 mm, Height: 58 mm |

Table 7: Technical data / dimensions and weight

## 5.8 Approvals

|                |        |
|----------------|--------|
| FCC Rule parts | 15.249 |
|----------------|--------|

Table 8: Technical data / tests and approvals

## 5.9 Standards and guidelines

|                         |                                                                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC / electrical safety | EN/IEC 61000-4-2<br>EN/IEC 61000-4-3<br>EN/IEC 61000-4-4<br>EN/IEC 61000-4-5<br>EN/IEC 61000-4-6<br>EN 55032 :2012/AC :2013<br>EN 62368-1:2014 + AC:2015 |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 9: Technical data / standards and guidelines

## 6 Functional description in detail

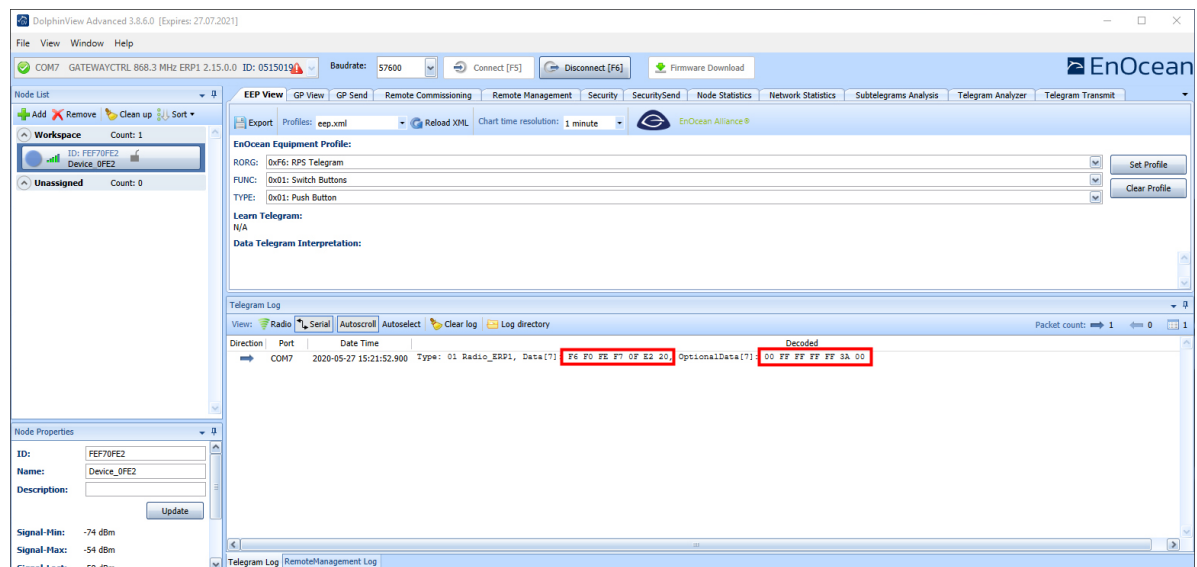
### 6.1 Receiving and transmitting of EnOcean data, and transfer in ESP3 format

EnOcean data will be received and transmitted by the EnOcean transceiver and an integrated PCB antenna. Once connected to the EnoDisc via Ethernet TCP on port 8424, data will be sent by / can be received by the EnoDisc®.

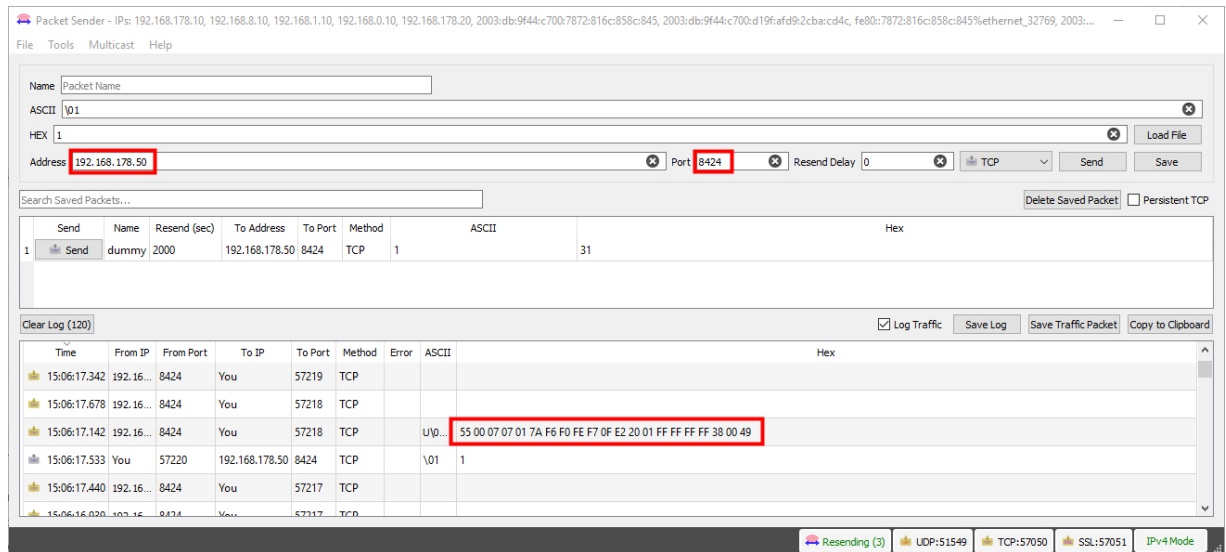
**Note:**

The Ethernet connection will be closed after 10 seconds without any data transfer.

As an example, the following picture shows data received via EnOcean, using the software tool Dolphin View.



Same data will be transferred by Ethernet.



## 7 The EnoDisc® webserver

To support system installation and maintenance, the EnoDisc provides an integrated Webserver. The available functions are described below.

### 7.1 “Home” / EnoDisc device info page

On this page, the main properties of the EnoDisc are shown (Read only, can not be changed):

- Free text / device name
- Serial number / part nr.
- EURID
- BaseID
- Airtime
- HW- and SW-version
- IP address, subnet mask, gateway
- MAC
- Status DALI bus power supply voltage
- Runtime since last reset
- Sensitivity of the EnOcean receiver

### 7.2 “EnOcean” / EnOcean data monitor

EnOcean data received and send by the EnoDisc can be analyzed by the EnOcean monitor on this page. For each message, following data are recorded in a new line:

- Consecutive number of messages in the list
- Direction (receive / transmit)
- EnOcean-ID
- RORG
- Data
- Optional data
- Repeater level
- RSSI [dbm]
- Target address
- Time elapsed since last message
- Time stamp

### 7.3 “Repeater” / EnOcean repeater configuration

The EnoDisc allows to activate an EnOcean repeater (selective) if needed. By default, the repeater is disabled.

Using the drop-down list, the repeater function can be activated in different modes.

Available options are as follows:

#### 7.3.1 Repeater / Mode

|                           |                                                                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level 1</b>            | Any EnOcean telegram that has not been repeated before will be repeated / send again by the EnoDisc.                                                               |
| <b>Level 1 OR Filter</b>  | This mode is a selective repeater mode which allows to define which kind of message should be repeated by the Level 1 repeater. More than one rule can be defined. |
| <b>Level 1 AND Filter</b> | This mode is a selective repeater mode which allows to define which kind of message should be repeated by the Level 1 repeater. More than one rule can be defined. |
| <b>Level 2</b>            | Any EnOcean telegram that has not been already repeated by another level 2 repeater before will be send again by the EnoDisc.                                      |
| <b>Level 2 OR Filter</b>  | This mode is a selective repeater mode which allows to define which kind of message should be repeated. More than one rule can be defined.                         |
| <b>Level 2 AND Filter</b> | This mode is a selective repeater mode which allows to define which kind of message should be repeated. More than one rule can be defined.                         |

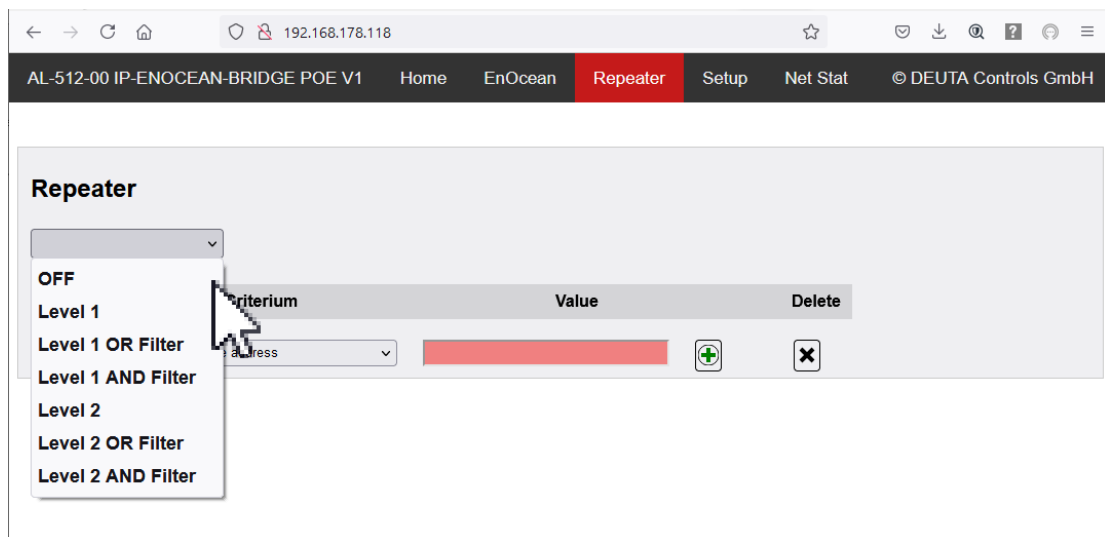


Figure 1: Repeater mode selection

### 7.3.2 Repeater / Action

If an “OR” or an “AND” filter mode is selected (Level 1 or Level 2), you can define if the rule will force (“Repeat”) or explicitly avoid (“Do not repeat”) to repeat the selected telegram type.

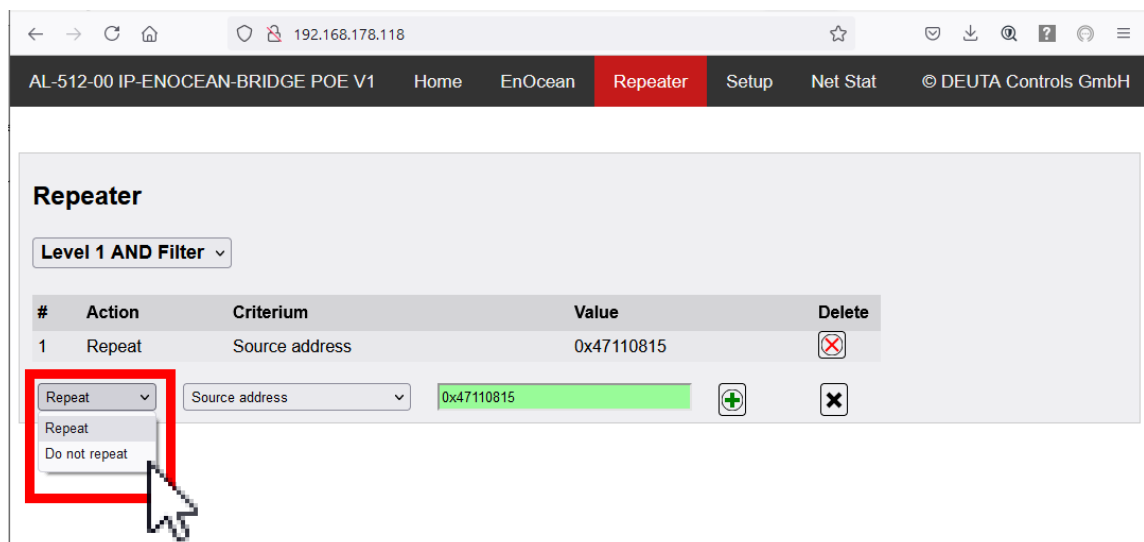


Figure 2: Repeater mode selection / Action force or block

### 7.3.3 Repeater / Criterium

Any repeater rule can be defined based on the properties of a received EnOcean message. The possible options are as follows:

|                                      |                                                                          |
|--------------------------------------|--------------------------------------------------------------------------|
| <b>Source address</b>                | Only messages from this source address (EURID) will be repeated.         |
| <b>Telegram type</b>                 | Only messages of the selected message type will be repeated.             |
| <b>Minimum signal strength (dBm)</b> | Messages must have at least the selected signal strength to be repeated. |
| <b>Destination address</b>           | Only messages with this target address (EURID) will be repeated.         |

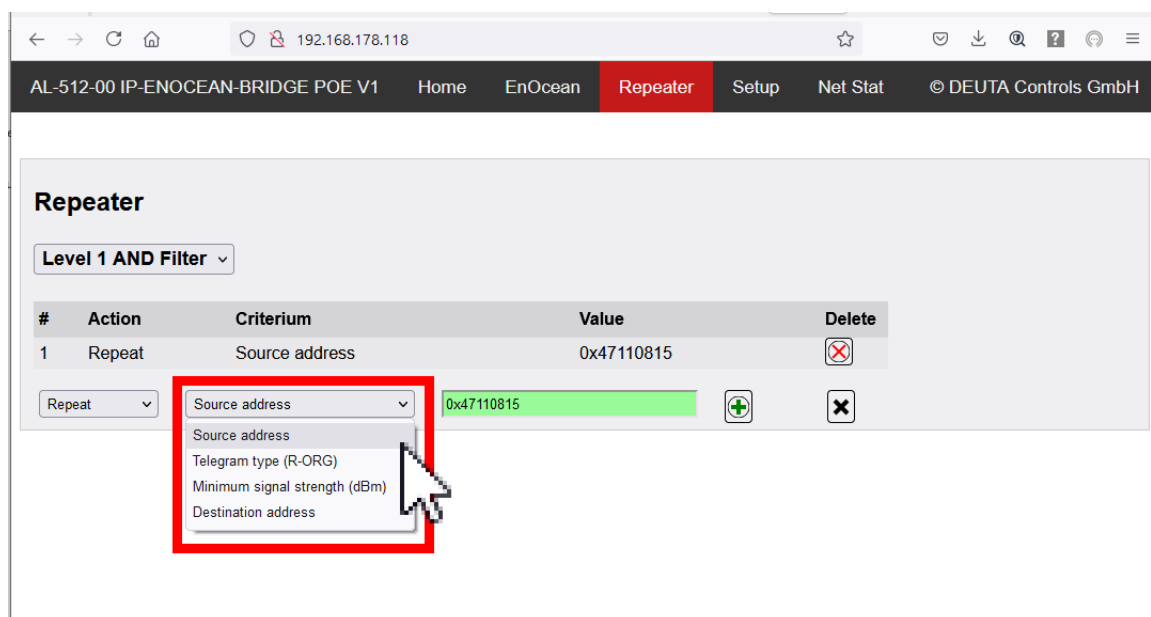


Figure 3: Repeater / Criterium

### 7.3.4 Repeater / Criterium value

Depending on the selected criterium, a value has to be selected / entered:

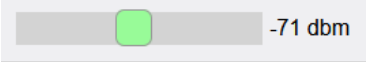
| Criterium                     | Value                                                                                                                        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Destination address           | EURID in HEX (0xxxxxxxxx)                                                                                                    |
| Telegram type                 | <div> RPS (F6)<br/> 4BS (A5)<br/> 1BS (D5)<br/> VLD (D2)<br/> MSC (D1)<br/> SIG (D0)<br/> UTE (D4) </div>                    |
| Minimum signal strength (dBm) | -90 .. -50 dBm, selected by the slider<br> |
| Source address                | EURID in HEX (0xxxxxxxxx)                                                                                                    |

Table 10: Repeater criterium

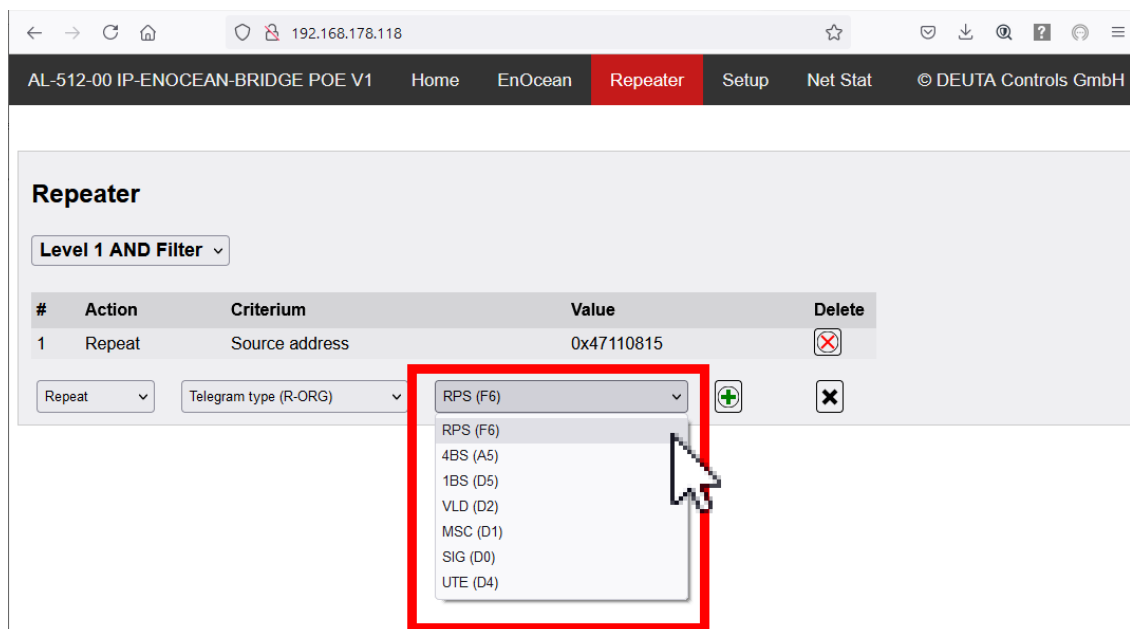


Figure 4: Repeater / Value dropdown for telegram type

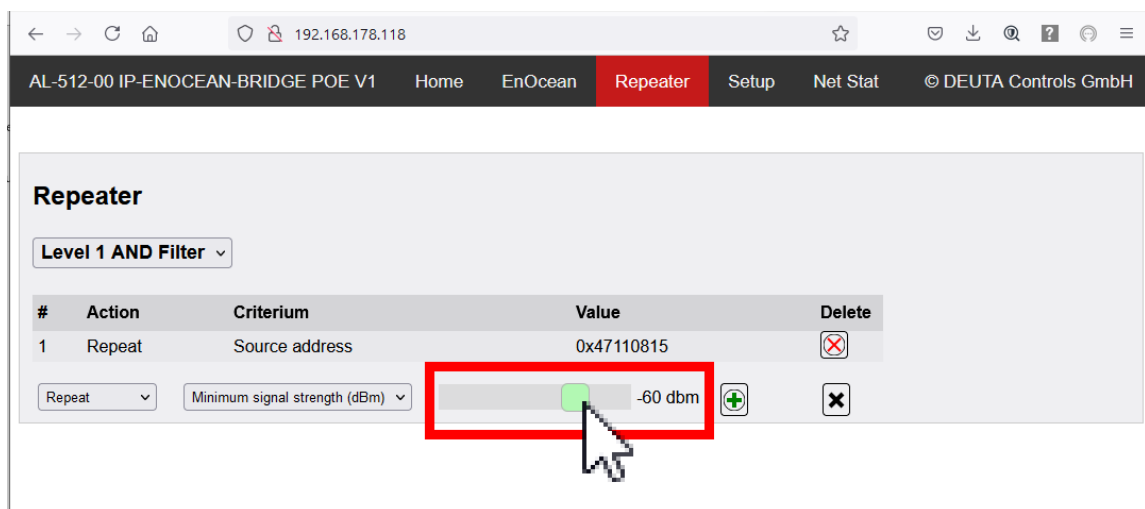


Figure 5: Repeater criterium value signal strength

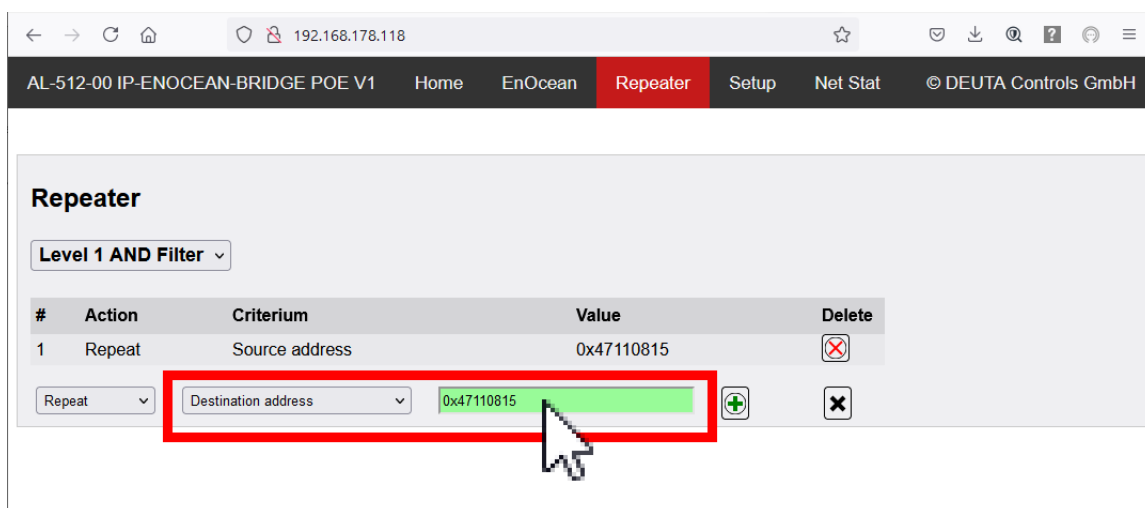
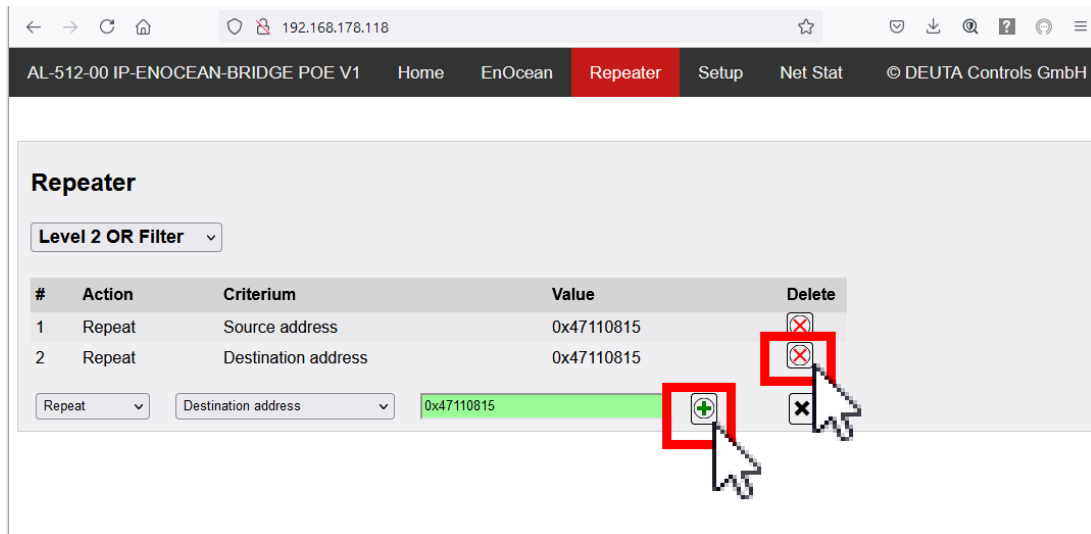


Figure 6: Repeater criterium value source / destination address

### 7.3.5 Add or remove rules for the repeater

Using the “+” and “-” buttons, you can add or remove rules from the list.



## 7.4 “Setup” / Ethernet and EnOcean interface properties

### 7.4.1 Password

The page is password protected, to avoid any unwanted change of the device parameters. The password is dynamic, and is based on the system time

The password is defined as follows:

System time of the PC = hh:mm

Password to enter = mm:hh

**Note:** The colon is part of the password and must be entered.

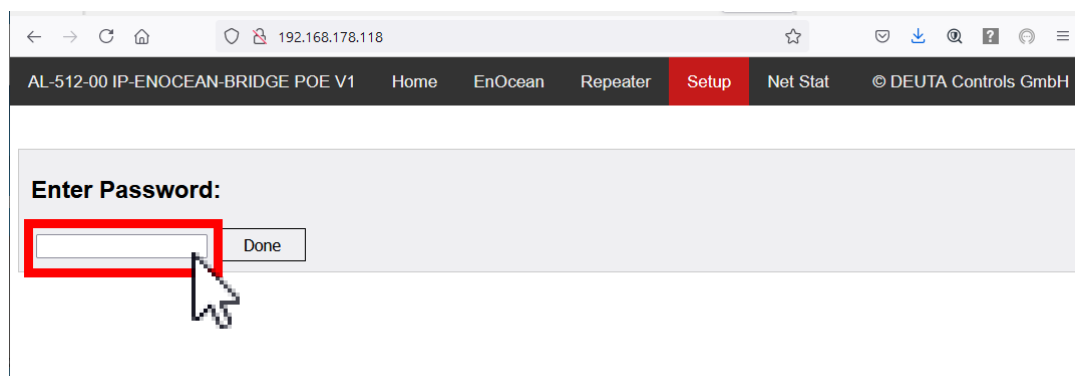
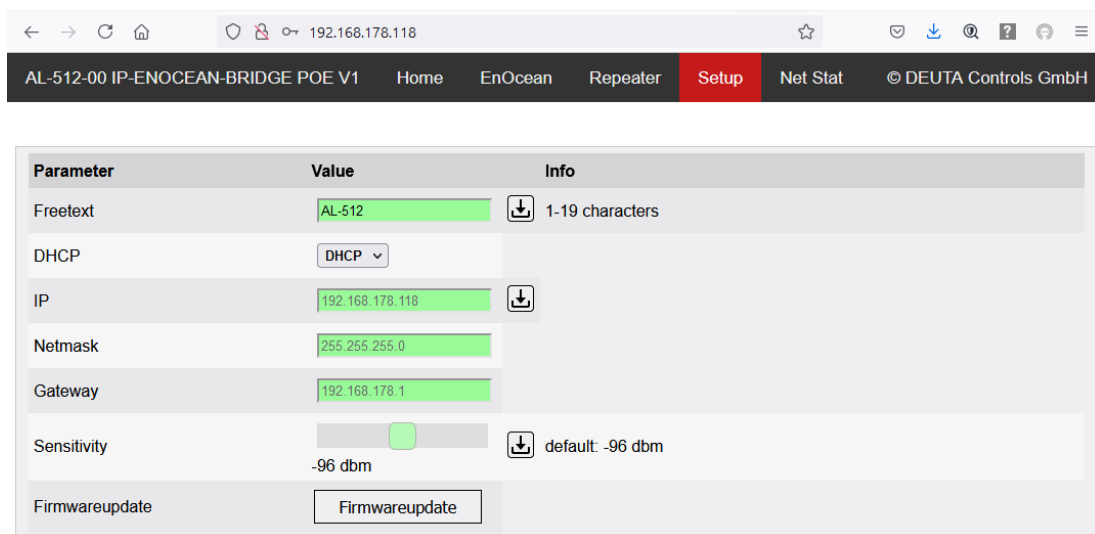


Figure 7: Password protection

## 7.4.2 Device properties

On this page, user can edit the following wireless and wired interface parameters:

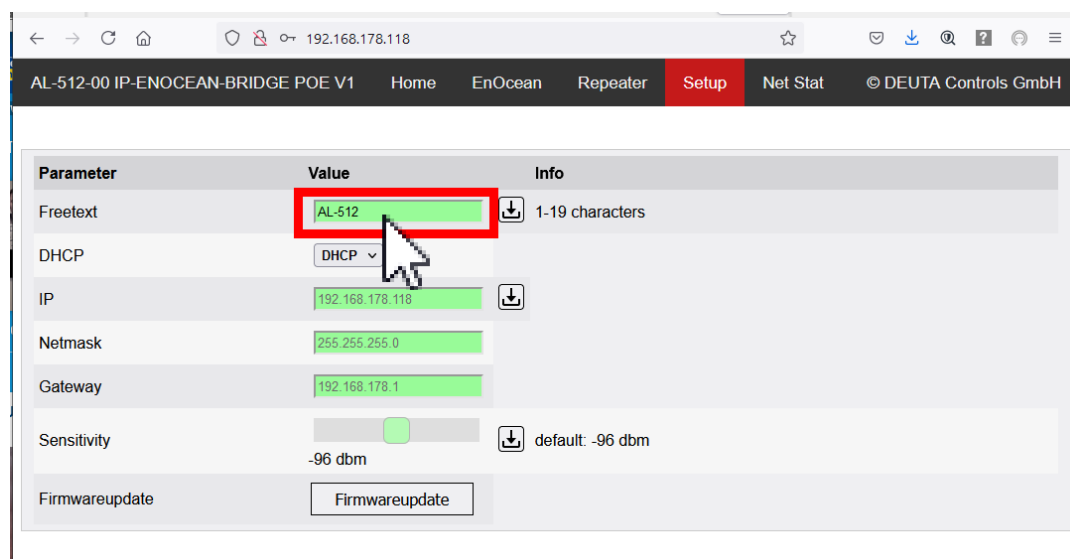
- Free text / device name
- DHCP or Static IP address
- IP address
- Subnet mask
- Gateway
- Sensitivity of EnOcean receiver: -90 .. -102 dbm (default: -96 dbm)



| Parameter      | Value           | Info             |
|----------------|-----------------|------------------|
| Freertext      | AL-512          | 1-19 characters  |
| DHCP           | DHCP            |                  |
| IP             | 192.168.178.118 |                  |
| Netmask        | 255.255.255.0   |                  |
| Gateway        | 192.168.178.1   |                  |
| Sensitivity    | -96 dbm         | default: -96 dbm |
| Firmwareupdate | Firmwareupdate  |                  |

### 7.4.2.1 Freertext

To identify the device, a free text can be entered (up to 19 characters).



| Parameter      | Value           | Info             |
|----------------|-----------------|------------------|
| Freertext      | AL-512          | 1-19 characters  |
| DHCP           | DHCP            |                  |
| IP             | 192.168.178.118 |                  |
| Netmask        | 255.255.255.0   |                  |
| Gateway        | 192.168.178.1   |                  |
| Sensitivity    | -96 dbm         | default: -96 dbm |
| Firmwareupdate | Firmwareupdate  |                  |

### 7.4.2.2 DHCP

The EnoDisc® supports DHCP or a static assigned address. Depending on the Drop down list selection, DHCP mode is activated or not.

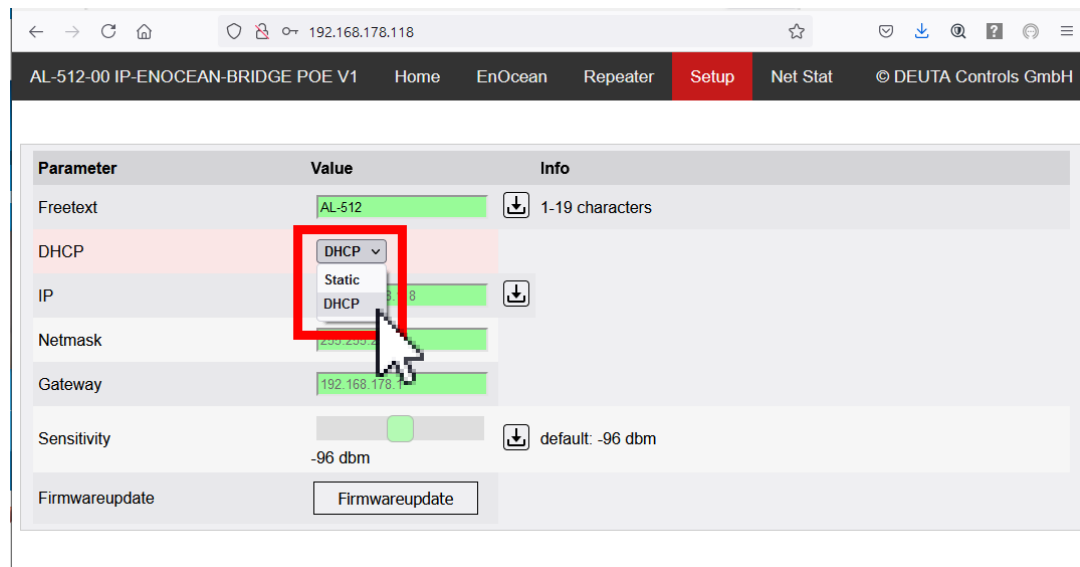


Figure 8: Select DHCP or static IP address

### 7.4.2.3 IP / Netmask / Gateway

When “Static” is selected in the drop down list, the static IP address, netmask and gateway address can be changed. To store, the according button has to be pressed once. All three parameters will be changed at the same time.

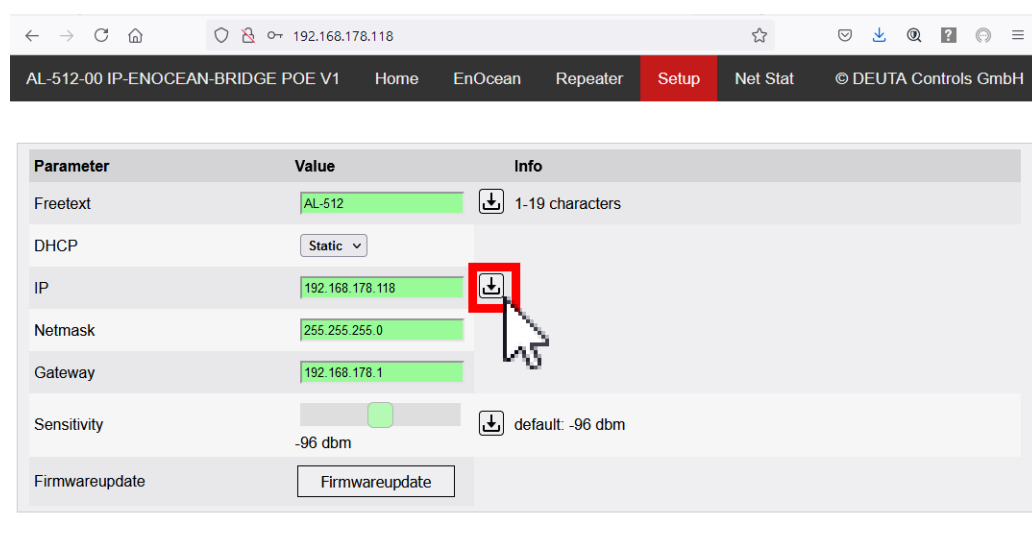


Figure 9: IP address selection / static or DHCP

#### 7.4.2.4 EnOcean receiver sensitivity

By default, a sensitivity of -96 dBm has been configured for the EnOcean receiver as the factory default. This provides the best performance in most of the applications. Sometimes, it might help to increase / decrease the sensitivity to optimize a single EnoDisc of a system depending on the surrounding environment

User can finetune the sensitivity in a range from -90 dBm (less sensitive) up to - 102 dBm (more sensitive).

Use the slider to select the value, and then push the Store button.

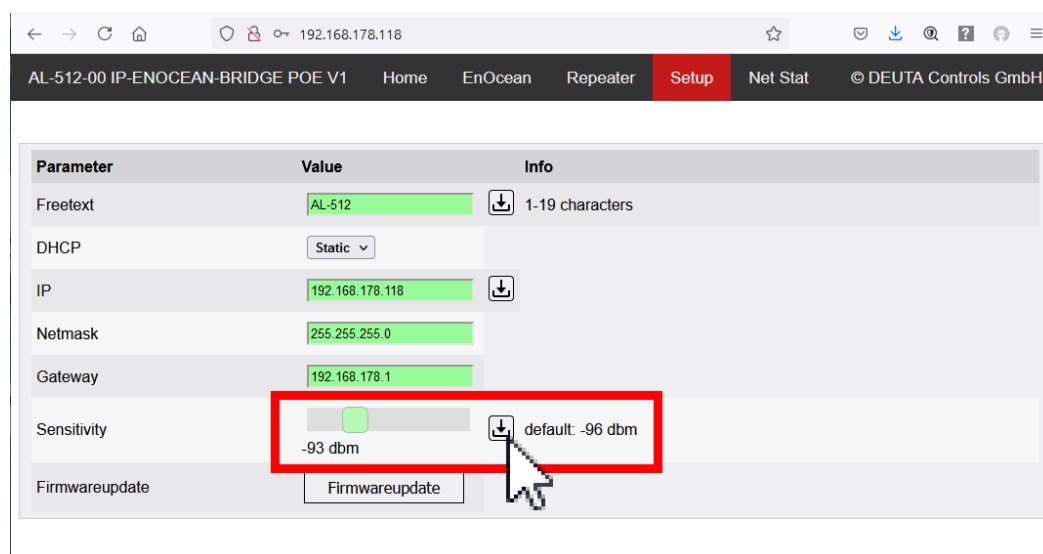


Figure 10: Set EnOcean receiver sensitivity

#### 7.4.2.5 EnoDisc Firmware update

Firmware of the device can be updated at any time via Ethernet. Push the button "Firmwareupdate" to start.

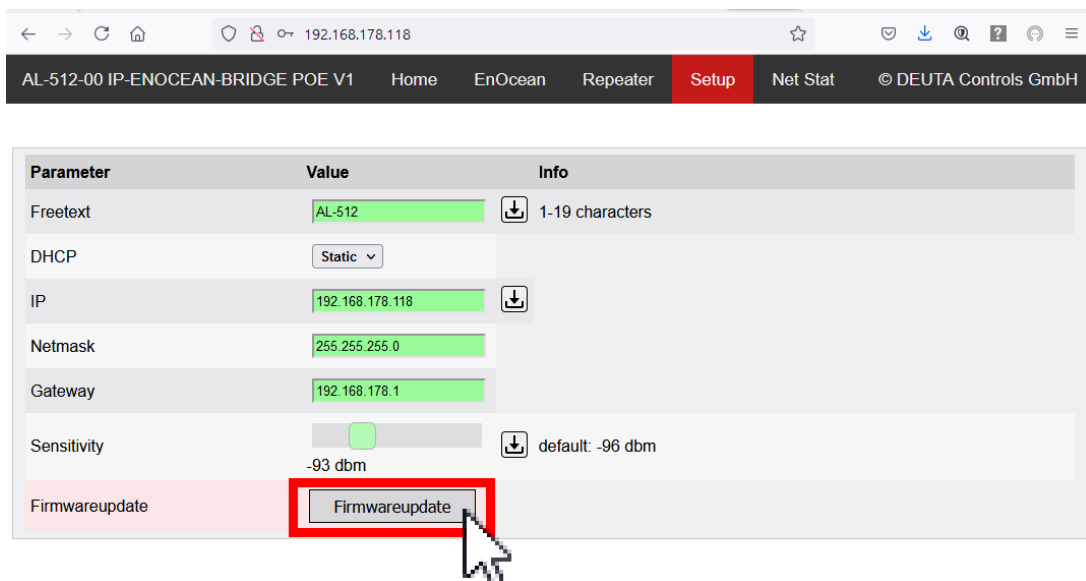


Figure 11: Start firmware update dialog / enter bootloader

After the button has been pushed, EnoDisc will enter into bootloader mode. Progress will be shown (0..100%).

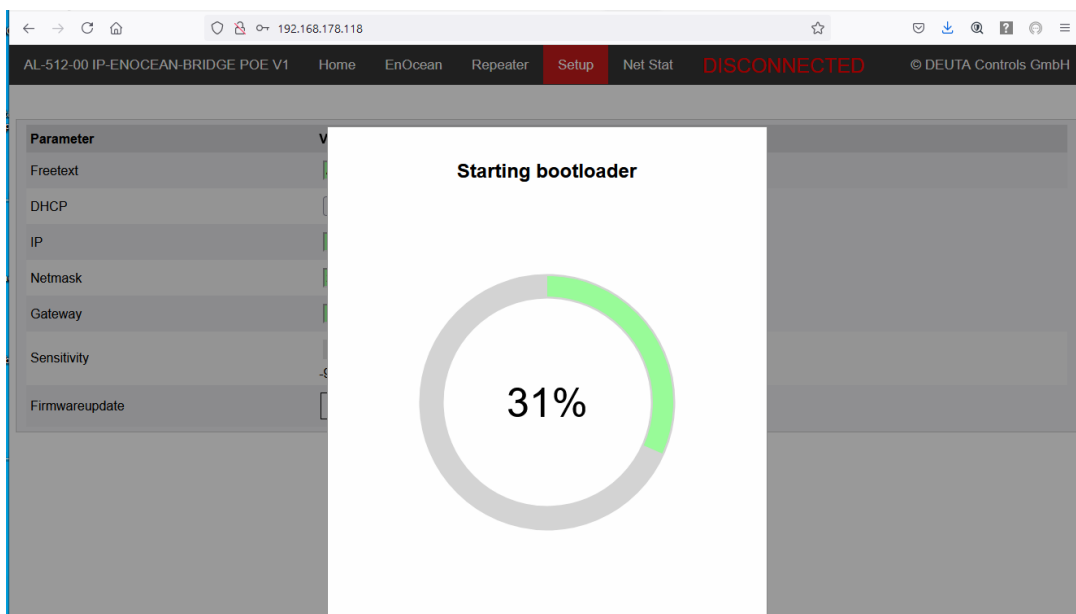


Figure 12: EnoDisc entering bootloader mode

When bootloader mode has been started, the page will show the actual properties, and also the actual firmware version.

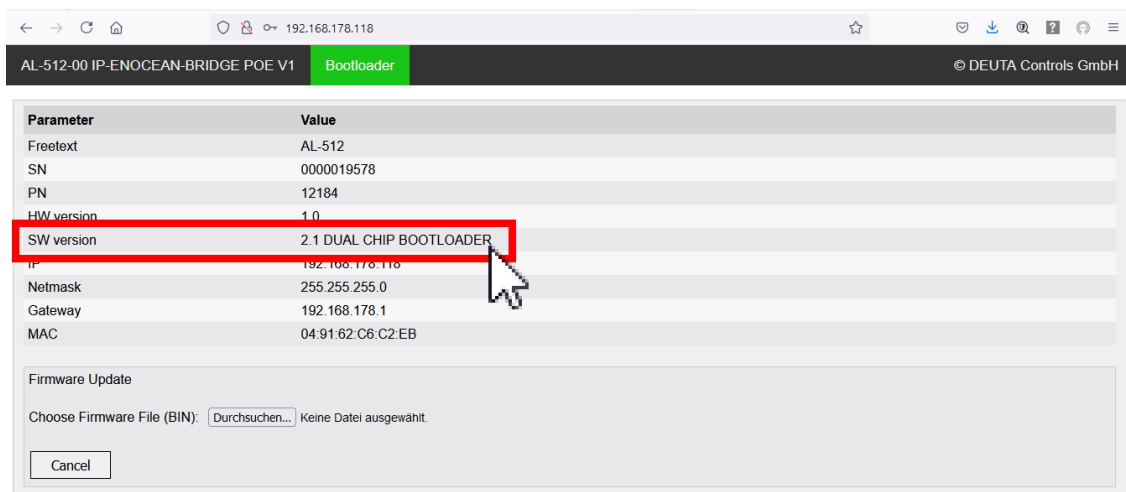


Figure 13: EnoDisc in bootloader mode

If a new firmware should be loaded, select the new bin-file from your PC, and push the button "Update". To exit from the bootloader, you can push "Cancel" at any time.

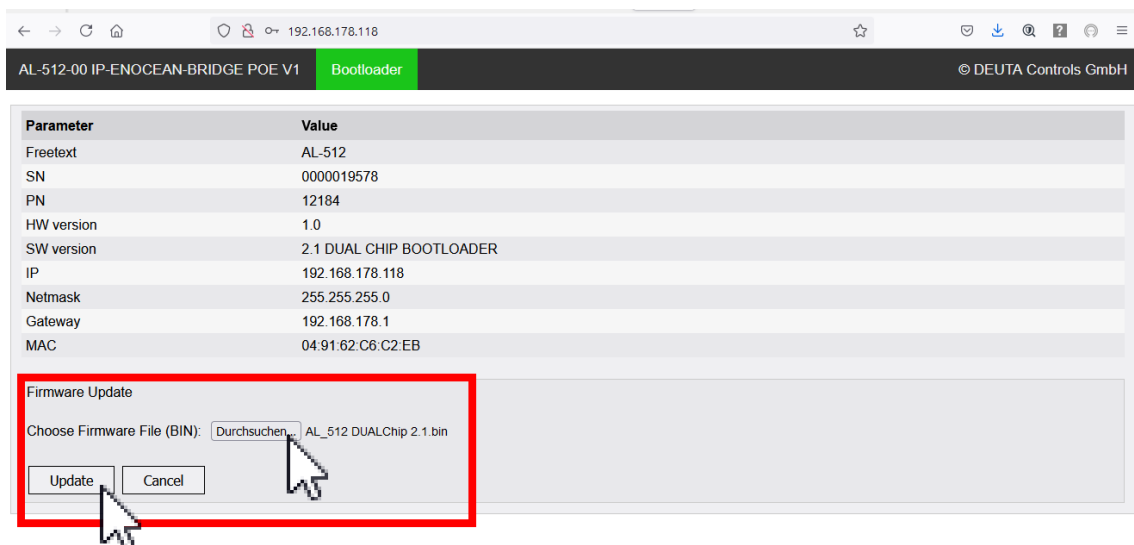


Figure 14: Start firmware update

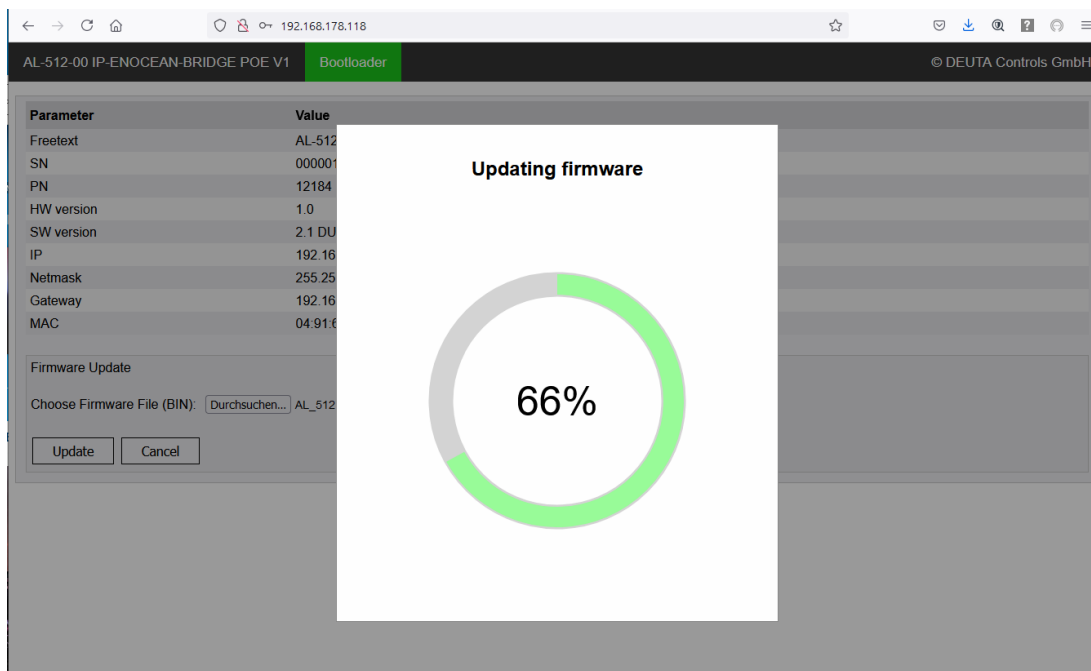


Figure 15: Firmware update in progress

When the firmware update has been processed correctly, the EnoDisc will start in normal mode automatically. You can check for the new SW version in the table shown on the page "Home".

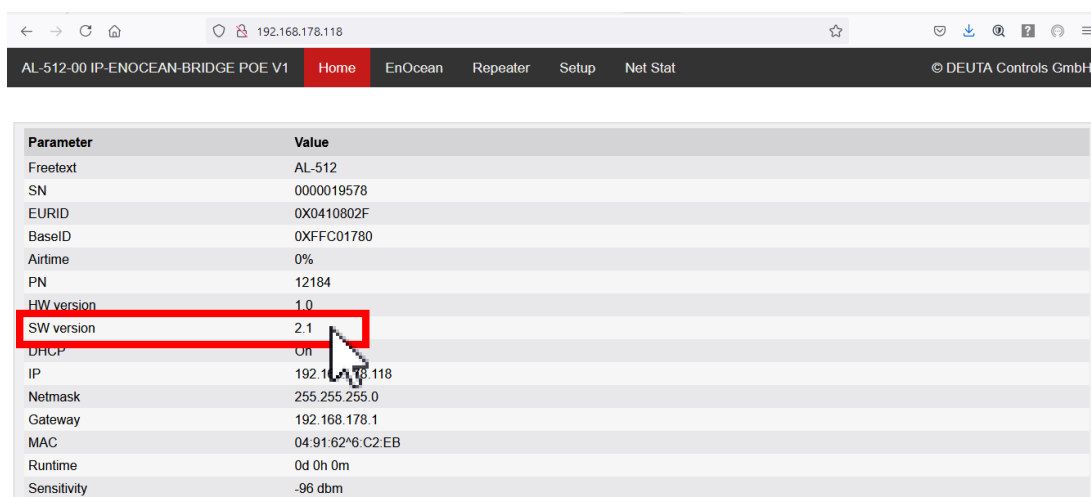


Figure 16: Firmware updated with success

## 7.4.2.6 Mailbox for EnOcean SmartAck devices

The EnoDisc supports the SmartAck mechanism as defined by the EnOcean specification.

## 7.5 Supported EEP's (EnOcean Equipment Profiles)

### 7.5.1 Transmit / TX and Receive / RX

The EnOcean wireless standard defines so called EnOcean Equipment Profiles (EEP). Each EnOcean based product sends and receives data according to at least one standardized data format. The EnoDisc transmits and receives data independent of the EEP, since contents of the messages are not interpreted.

As a result, the EnoDisc is in principle a transparent bi-directional gateway between EnOcean and Ethernet.

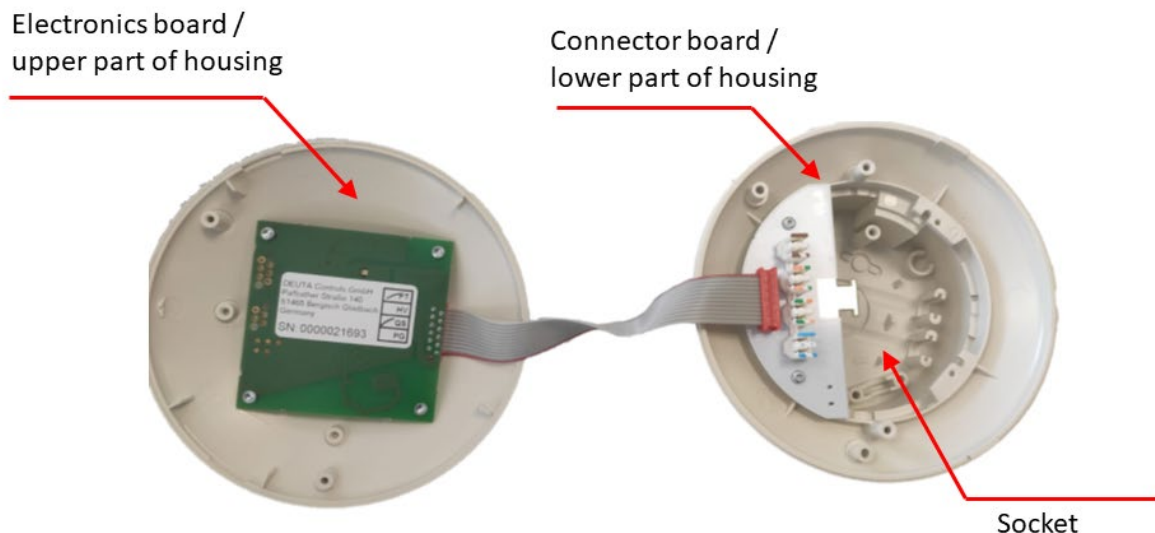
## 8 Installation and maintenance / service



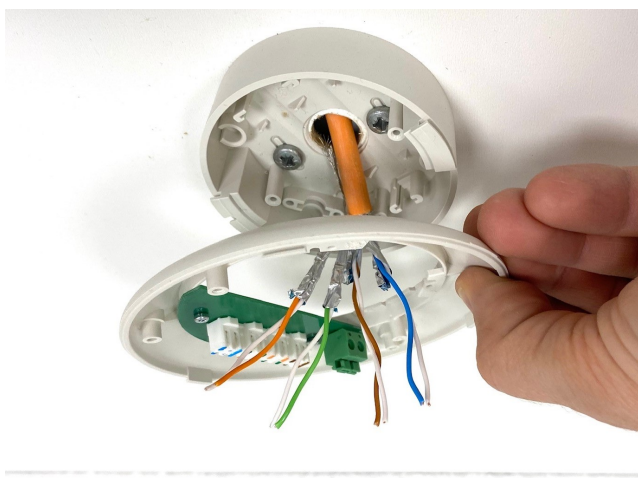
**Caution:** When opening the device, you have to take care of electrostatic discharge. Otherwise, electronics will be damaged.

The following picture shows the parts of an EnoDisc:

- Socket
- Connector board / lower part of housing
- Controller board / upper part of housing

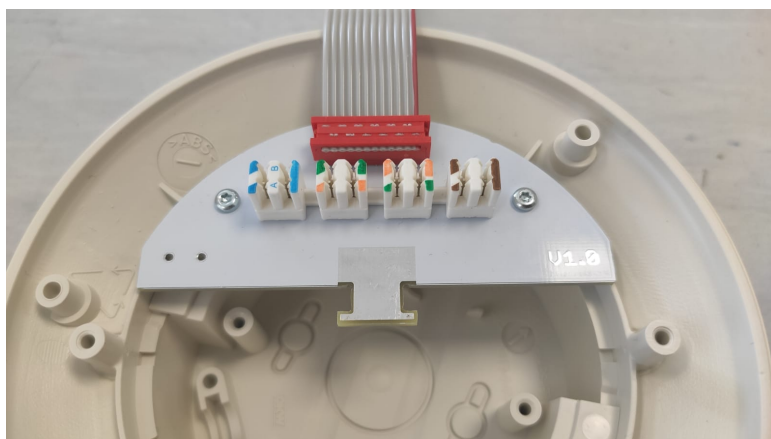


To mount the EnoDisc to the ceiling, you have to mount the socket first. Use two screws as needed for the material of the ceiling. Check if you should drill a hole for the Ethernet cable in advance, as shown in the following picture.

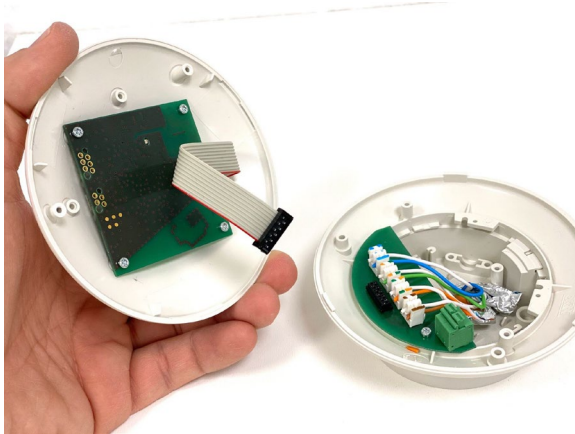


Dismantle the Ethernet cable as required. Start to mount the interface with the LSA connector board. Connect / mount the two housings with a rotation of approx. 10°.

Use an LSA tool to setup the electrical connection. Take care to connect cable according to the colours as marked on the connector.



Connect the controller board of the EnoDisc® with the Connector board.



Close the housing.



## 9 Device labels

The following labels are placed on the housing of the AL-512-00-902 IP-EnOcean-Bridge PoE V1:

FCC ID: 2AZTH-AL-512-00-902

HVIN: 1.0

PMN: AL-512-00-902

IC: 27242-51200902

FVIN: 2.0

48 V DC / PoE



RoHS

AL-512-00-902 IP-ENOCEAN-BRIDGE POE / LSA / EnoDisc / PN: 12395

Made in Germany

**MAC-Address:**

**00:00:00:00:00:00**

**SN: 0000026177**

## 10 FCC (United States) Regulatory Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note:**

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

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## 11 ISED Regulatory Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

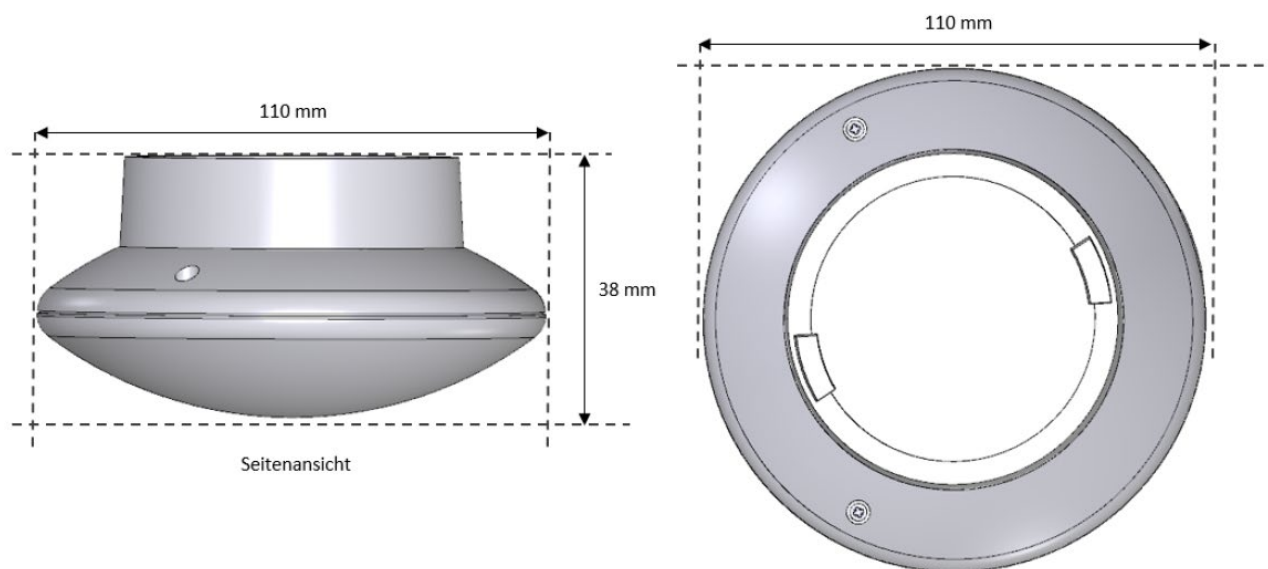
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## 12 Dimensions / drawings

Diameter: 110 mm; Height: approx. 38 mm when mounted



## 13 Ordering information

| Part name                                         | Part nr. | Description                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AL-512-00-902<br/>IP-EnOcean-Bridge PoE V1</b> | 12395    | Bidirectional bridge between EnOcean and Ethernet TCP; power supply by PoE; communication via ESP3 (EnOcean Serial Protocol 3); EnOcean 902 MHz; on-wall housing, three part; colour: white; weight: 95 g, operating temp.: 0°C - 45°C storage temp.: -20°C - 70°C, humidity: 5 - 90% RH, non-condensing; connector: LSA IDC connector; |

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## List of tables

|                                                                |    |
|----------------------------------------------------------------|----|
| Table 1: Technical data / Wireless communication EnOcean ..... | 7  |
| Table 2: Technical data / communication .....                  | 7  |
| Table 3: Technical data / user interfaces .....                | 7  |
| Table 4: Technical data / housing .....                        | 7  |
| Table 5: Technical data / power supply .....                   | 7  |
| Table 6: Technical data / environmental conditions .....       | 8  |
| Table 7: Technical data / dimensions and weight .....          | 8  |
| Table 8: Technical data / tests and approvals.....             | 8  |
| Table 9: Technical data / standards and guidelines .....       | 8  |
| Table 10: Repeater criterium .....                             | 14 |

## 14 Revision history

| Version | Author | Reviewer       | Date       | Major changes                                                                           |
|---------|--------|----------------|------------|-----------------------------------------------------------------------------------------|
| 1.0     | Lehzen | -              | 18.06.2021 | Initial release                                                                         |
| 1.1     | Lehzen | Pohl / Kurzawa | 18.06.2021 | Release candidate for FCC approval                                                      |
| 1.11    | Lehzen | Pohl / Kurzawa | 01.07.2021 | Corrected device label, HVIN / FVIN swapped                                             |
| 1.12    | Lehzen | Pohl / Kurzawa | 14.07.2021 | Corrected max. transmission power, removed FCC / IC logos from label, added 11 for ISED |

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