

# RFU61x PoE

RFID read/write device (UHF)

**SICK**  
Sensor Intelligence.



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### Described product

RFU610-106xx

### Manufacturer

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### Legal information

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### Original document

This document is an original document of SICK AG.

### Declarations of conformity and certificates

Due to the country-specific approvals for the device in the form of country variants, the respective conformities are type-dependent.

For the current device see:

- Technical Information RFU61x Regulatory Compliance Information

A printed copy of the Technical Information is enclosed with the device at the time of delivery.



### NOTE

You will find the Technical Information RFU61x Regulatory Compliance Information, declarations of conformity and certificates on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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The type designation of your product (e.g. device) can be found on the type label.

If the device is installed in a difficult to access part of the plant, note the device type, and the part number and serial number of the device.



UL certificate valid for tested USA country variants, see type label of the present device.

## Contents

<b>1</b>	<b>About this document.....</b>	<b>5</b>
1.1	Information on the operating instructions.....	5
1.2	Related applicable documents.....	5
1.3	Scope.....	5
1.4	Explanation of symbols.....	6
1.5	Further information.....	7
<b>2</b>	<b>Safety information.....</b>	<b>8</b>
2.1	Intended use.....	8
2.2	Improper use.....	10
2.3	Cybersecurity.....	10
2.4	Limitation of liability.....	11
2.5	Modifications and conversions.....	11
2.6	Requirements for skilled persons and operating personnel.....	11
2.7	Operational safety and specific hazards.....	12
<b>3</b>	<b>Product description.....</b>	<b>14</b>
3.1	Product ID.....	14
3.2	Product characteristics.....	16
<b>4</b>	<b>Transport and storage.....</b>	<b>24</b>
4.1	Transport.....	24
4.2	Unpacking.....	24
4.3	Transport inspection.....	24
4.4	Storage.....	24
<b>5</b>	<b>Mounting.....</b>	<b>25</b>
5.1	Overview of mounting procedure.....	25
5.2	Preparing for assembly.....	25
5.3	Mounting location.....	28
5.4	Mounting the device.....	28
5.5	Mounting external components.....	30
<b>6</b>	<b>Electrical installation.....</b>	<b>31</b>
6.1	Safety.....	31
6.2	Wiring instructions.....	35
6.3	Overview of all interfaces and connection options.....	35
6.4	Pin assignments of electrical connections.....	39
6.5	Instructions for electrical installation when the ambient temperature can fall below 0 °C.....	41
6.6	Connecting the supply voltage.....	42
6.7	Wiring the digital input.....	43
6.8	Wiring the data interface.....	45
<b>7</b>	<b>Commissioning.....</b>	<b>46</b>

7.1	Installation steps.....	46
7.2	Overview of the Commissioning Steps.....	47
7.3	SOPAS ET configuration software.....	48
7.4	Quickstart with default settings.....	49
7.5	Information on initial commissioning.....	52
<b>8</b>	<b>Operation.....</b>	<b>55</b>
8.1	Operating and status indicators.....	55
<b>9</b>	<b>Maintenance.....</b>	<b>61</b>
9.1	Maintenance plan.....	61
9.2	Cleaning.....	61
<b>10</b>	<b>Troubleshooting.....</b>	<b>62</b>
10.1	Overview of Potential Errors and Faults.....	62
10.2	Detailed fault analysis.....	62
10.3	Status log.....	63
10.4	SICK service.....	63
10.5	Repairs.....	63
10.6	Returns.....	63
10.7	Replacing the device.....	64
<b>11</b>	<b>Decommissioning.....</b>	<b>66</b>
11.1	Disposal.....	66
<b>12</b>	<b>Technical data.....</b>	<b>67</b>
12.1	Features.....	67
12.2	Interfaces.....	68
12.3	Mechanics and electronics.....	69
12.4	Ambient data.....	69
12.5	Working range diagram.....	70
12.6	Dimensional drawing.....	70
<b>13</b>	<b>Accessories.....</b>	<b>71</b>
<b>14</b>	<b>Annex.....</b>	<b>72</b>
14.1	Declarations of conformity and certificates.....	72
14.2	UL conformity.....	72
14.3	Dimensional drawings (electronic).....	72
14.4	Signal assignment of cables with open cable end at one end.....	72
14.5	Copyright notices.....	74
14.6	Abbreviations used.....	74

# 1 About this document

## 1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied.
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.



### NOTE

Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The operating instructions are an integral part of the product. Store the instructions in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the device is integrated. Information on this can be found in the operating instructions for the machine or system.

## 1.2 Related applicable documents

Document	Title	Part number	Source
Notes	Safety Notes	8024992	Printed version is enclosed with the device at delivery
Technical Information	RFU61x Regulatory Compliance Information	8026890	<a href="http://www.sick.com/8026890">www.sick.com/8026890</a>
Technical Information	RFU Parameter Description	8023085	<a href="http://www.sick.com/8023085">www.sick.com/8023085</a>

## 1.3 Scope

### Documentation concept

The documentation concept for the device includes the following publications:

- Safety Notes (part no. 8024992)
- Technical Information RFU61x Regulatory Compliance Information (part no. 8026890)
- RFU61x PoE operating instructions
- RFU parameter description

The publications are valid for all available product types (country variants of the device).

More detailed information for identification of the available device type see "[Type code](#)", [page 15](#). The type designation of your device can be found on the type label.

**NOTE**

You will find the Technical Information RFU61x Compliance Information, the RFU61x PoE operating instructions as well as the declarations of conformity and certificates on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

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**Function of the publications:**

The **Safety Notes** provide information about:

- Safe handling of the device
- Online access to the operating instructions and other documentation

The **Technical Information RFU61x Regulatory Compliance Information** lists:

- Regionally-approved country variants of the RFU61x PoE (RFU610-106xx) and the RFU61x IO-Link (RFU610-107xx), xx = region assignment
  - Existing radio equipment approvals and conformities
  - Any country-specific operating conditions for the devices that need to be observed
- 

**NOTE**

A printed copy of the Safety Notes and the Technical Information RFU61x Regulatory Compliance Information are enclosed with the device.

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**RFU61x PoE operating instructions**

- The purpose of the operating instructions is to enable you to integrate the device into a customer system and to achieve initial read results with transponders.
- The operating instructions provide step-by-step instructions for all tasks associated with installing and operating the device.
- The operating instructions describe the commissioning process for an application with a single device.
- Commissioning is based on the default setting of the device parameters. A simple use case is the reading of a single transponder on an object.
- In the operating instructions, the RFU61x PoE RFID read/write device is referred to simplified as “device”.
- If variants need to be differentiated in regard to their region assignment, the relevant device name RFU610-106xx is specified (xx = region assignment).
- The terms “transponder” and “tag” for the electronic data media are interchangeable. The term “transponder” is used in these instructions.
- Functions specific to special devices are, where necessary, described in additional documents.

## 1.4 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.

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**DANGER**

... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.

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**WARNING**

... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.

**CAUTION**

... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.

**NOTICE**

... indicates a potentially harmful situation, which may lead to material damage if not prevented.

**NOTE**

... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

## 1.5 Further information

More information can be found on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

The following information is available depending on the product:

- Data sheets
- This document in all available language versions
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Other publications
- Software
- Accessories

For **RFU61x PoE** :

- Technical Information RFU61x Regulatory Compliance Information
- RFU parameter description.  
The parameter description helps when configuring applications using the SOPAS ET configuration software.

## 2 Safety information

### 2.1 Intended use

The RFU61x PoE RFID read/write device is a compact, intelligent ID sensor in the RFU6xx (UHF) product family. Version (working range): Short Range

The stationary device automatically identifies wireless-based data cards (transponders) on stationary and moving objects. The device supports data card management.

The RFU610 base unit processes the data of all standard passive transponders in accordance with ISO/IEC 18000-63 and EPCglobal UHF C1G2 in the regional UHF carrier frequency range.

The device contains an (internal) antenna integrated into the housing.

Intelligent process logic enables processing as a stand-alone solution. Network operation is possible for coordinating trouble-free readings of devices at close proximity to one another, but without a coordinating summary of the reading results. The device sends the read results to a higher-level computer (e.g. PLC) via its host interface. The computer coordinates further processing of the data in the process.

The device receives corresponding commands for data card management (write, read, etc.) via its host interface.

The device allows operation within a wide ambient temperature range. Details [see "Ambient data", page 69](#) in the technical data

The device is primarily designed for use in industrial and logistics areas. The device meets the applicable requirements for industrial robustness, interfaces and data processing.

Country variants of the device refer to the radio-technical region assignment, see Technical Information RFU61x Regulatory Compliance Information.



#### NOTE

The USB interface of the device is used in industrial environments only as a service interface for temporary use (e.g. for configuration, troubleshooting). Use as a host interface while the system is in operation is not supported.

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Intended use of the device also includes compliance with all information in:

- Safety Notes
- Technical Information RFU61x Regulatory Compliance Information
- RFU61x PoE operating instructions

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies in particular to use of the product that does not conform to its intended purpose and is not described in this documentation.

#### 2.1.1 Operational restrictions

The region assignment of the device is configured for the specific type when delivered and cannot be changed. This enables the device to be operated in the approved region without interfering with national protected frequencies (e.g., mobile communications).

Operating the same device in another region for which there is no approval is prohibited.

A region consists either of a group of countries or one country.



**NOTE**

The device approval was granted for a specific region. The region assignment cannot be changed.

- Use the device only in the region and country for which the device is approved.
- Observe country-specific operating conditions for the device, see Technical Information RFU61x Regulatory Compliance Information.
- When reselling the device, inform the buyer of the fixed region assignment.
- When passing the device on to third parties, also include the Safety Notes, the Technical Information RFU61x Regulatory Compliance Information and the RFU61x PoE operating instructions.
- A printed copy of the Safety Notes and the Technical Information Regulatory Compliance Information are enclosed with the device.

**NOTE**

You will find the Technical Information RFU61x Regulatory Compliance Information, the RFU61x PoE operating instructions as well as the declarations of conformity and certificates on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

### 2.1.2 Regulatory notes

See Technical Information RFU61x Regulatory Compliance Information (part no. 8026890).

### 2.1.3 Conditions for specified enclosure rating

To ensure compliance with the specified IP67 enclosure rating of the device during operation, the following requirements must be met: If these requirements are not met, the device does not fulfill any specified enclosure rating.

- The shared side cover of the USB interface and the card slot must be placed on and screwed tight to the device. Recommended tightening torque for the cover screws: 30 Ncm ± 5 Ncm.
- The heads of the connecting cables plugged into the M12 and M8 electrical connections must be screwed tight.
- Any unused M12 and M8 connections must be fitted with tightly screwed protective elements, e.g., protective caps (as delivered). The protective elements are hand-tightened.

The same also applies to the EMC requirement (ESD) according to CE.

**NOTICE**

The type label on the lower side of the device contains a pressure equalizing membrane attached in the middle. If the type label is damaged or removed, the leak tightness of the device can no longer be guaranteed.

Positions of the individual elements see "[Device view](#)", page 16

### 2.1.3.1 Exception: temporarily opening the cover on the device



#### NOTICE

##### Risk of damage to the product when the cover is open

When the cover is open, the device does not conform to a specified enclosure rating. If necessary, only operate the device for a short time with an open cover for the activities listed in the following: During this time, protect the device against moisture and dust.

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##### Temporarily open the cover for the following activities:

- Insert or remove the optional storage medium (SD card)
- Temporary use of the USB interface as a service interface

For this purpose, open the corresponding side cover on the device. After completing this task, close the cover again.

For further warranty provisions, see the General Terms and Conditions of SICK AG, e.g. on the delivery note of the device.

## 2.2 Improper use

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
  - The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.
  - Any use of accessories not specifically approved by SICK AG is at your own risk.
- 



#### WARNING

##### Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Product should be used only in accordance with its intended use.
  - All information in the documentation must be strictly observed.
  - Shut down the product immediately in case of damage.
- 

## 2.3 Cybersecurity

### Overview

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive cybersecurity concept. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at [www.sick.com/psirt](http://www.sick.com/psirt), e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

## 2.4 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair
- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories



### NOTE

The product is a programmable device. The respective programmer is therefore responsible for his/her programming work and the resultant operation of the device. The liability and warranty of SICK AG is limited to the device specification (hardware functionality and any programming interfaces) according to the agreed conditions. SICK AG will therefore not be liable, among other things, for any damages resulting from the programming of the product by the customer or third parties.

## 2.5 Modifications and conversions



### NOTICE

Modifications and conversions to the device may result in unforeseeable dangers.

Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.

## 2.6 Requirements for skilled persons and operating personnel



### WARNING

**Risk of injury due to insufficient training.**

Improper handling of the device may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

The following qualifications are required for various activities:

*Table 1: Activities and technical requirements*

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> <li>■ Basic practical technical training</li> <li>■ Knowledge of the current safety regulations in the workplace</li> </ul>
Electrical installation, device replacement	<ul style="list-style-type: none"> <li>■ Practical electrical training</li> <li>■ Knowledge of current electrical safety regulations</li> <li>■ Knowledge of the operation and control of the devices in their particular application</li> </ul>

Activities	Qualification
Commissioning, configuration	<ul style="list-style-type: none"> <li>■ Basic knowledge of the computer operating system used</li> <li>■ Basic knowledge of the design and setup of the described connections and interfaces</li> <li>■ Basic knowledge of data transmission</li> <li>■ Basic knowledge of RFID technology (identification with radio-based data cards)</li> <li>■ Kenntnisse in der Programmierung von Geräten</li> <li>■ Knowledge of the programming of devices</li> </ul>
Operation of the device for the particular application	<ul style="list-style-type: none"> <li>■ Knowledge of the operation and control of the devices in their particular application</li> <li>■ Knowledge of the software and hardware environment for the particular application</li> </ul>

### 2.7 Operational safety and specific hazards

Please observe the safety notes and the warnings listed here and in other sections of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.



#### WARNING

##### Electrical voltage!

Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- The power supply must be disconnected when attaching and detaching electrical connections.
- The product must only be connected to a voltage supply as set out in the requirements in the operating instructions.
- National and regional regulations must be complied with.
- Safety requirements relating to work on electrical systems must be complied with.



#### WARNING

##### Risk of injury and damage caused by potential equalization currents!

Improper grounding can lead to dangerous equipotential bonding currents, which may in turn lead to dangerous voltages on metallic surfaces, such as the housing. Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- Follow the notes in the operating instructions.
- Install the grounding for the product and the system in accordance with national and regional regulations.



#### WARNING

##### Risk of injury due to damage to the device!

For reasons of safety, if a device shows visible signs of damage do not put it into operation, or take it out of operation immediately.

**Possible damage (depending on the device type):**

- Housing: cracking, splitting or fracture
- Electrical connections (male connector or female connector): cracks or detachment from the housing

**WARNING****Health hazard as a result of high-frequency electromagnetic radiation!**

Exposure of the human body to electromagnetic radiation must be limited. To do so, the device must have a minimum distance between its source of radiation (integrated antenna) and your body.

- For region-specific information on the required minimum distance as well as approval-compliant operation of the device, see Technical Information RFU61x Regulatory Compliance Information (part no. 8026890).

A printed copy of the document is enclosed with the device.

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**NOTE**

The Technical Information RFU61x Regulatory Compliance Information can be found on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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## 3 Product description

### 3.1 Product ID

#### 3.1.1 Type label

The type label specifies, amongst other things:

- Information for identifying the device type
- Technical data
- Region-specific information on approvals and, if applicable, fulfilled conformities

The device displays the type label in two different sizes:

- A large type label is located on the bottom of the device. The label contains a pressure equalization membrane in the center. The type label may be permanently covered depending on how the device is mounted.
- A small type label with technical data identical to the large type label is also located on the right side of the device.

Position on the device see "Device view", page 16.

Large type label:

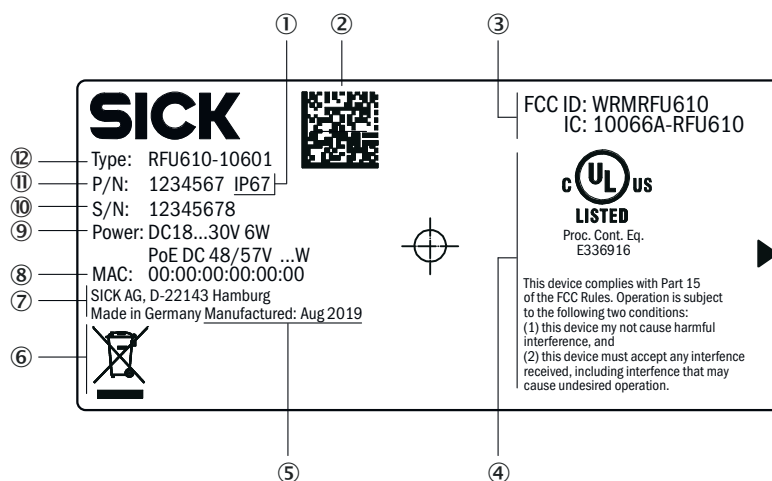


Figure 1: RFU610-106xx: Layout of the large type label of the FCC variant for USA with UL certification (example), see device for relevant data

- ① Enclosure rating
- ② 2D code (internal SICK code)
- ③ Approval-related details (region-specific)
- ④ Conformity mark and associated data, if applicable
- ⑤ Month and year of manufacture
- ⑥ Marking according to electrical equipment directives
- ⑦ Manufacturer and production site
- ⑧ MAC address (placeholder), device-specific
- ⑨ Supply voltage and power consumption for "Power and Ethernet" and "Power over Ethernet" connection types
- ⑩ Serial number
- ⑪ Part number
- ⑫ Device identification according to type code

Small type label:

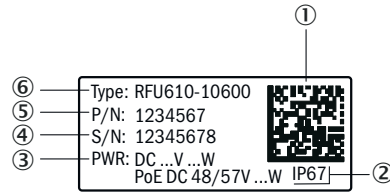


Figure 2: RFU610-106xx: Layout of the small type label (example), see device for relevant data

- ① 2D code (internal SICK code)
- ② Enclosure rating
- ③ Supply voltage and power consumption for “Power and Ethernet” and “Power over Ethernet (PoE)” connection types
- ④ Serial number
- ⑤ Part number
- ⑥ Device identification according to type code

### 3.1.2 Type code

The devices of the RFU6xx product family are arranged according to the following type code:

#### RFUxyz-abcde

R	F	U	x	y	z	-	a	b	c	d	e
1	2	3	4	5	6		7	8	9	10	11

Position	Description	Characteristic
1 ... 2	RF (Radio Frequency Identification)	-
3	Frequency band	U: Ultra High Frequency
4 ... 5	Read range (working range)	61: ≤0.5 m (Short Range) 62: ≤2 m (Mid Range) 63: ≤10 m (Long Range) 65: ≤10 m (Long Range)
6	Device type	0: Basic type(ISO/IEC 18000-63, EPCglobal UHF Class 1 Generation 2)
7	Integrated (internal) antenna	0: No integrated antenna 1: With integrated antenna, circularly polarized
8	Electrical connections for external antennas	0: No connection 3: 3 connections 4: 4 connections
9	Electrical connections	1: 1 male connector, M12, 17-pin, A-coded; 1 female connector, M12, 4-pin, D-coded 4: Cable 0.9 m with male connector, D-Sub-HD, 15-pin 5: 1 female connector, M12, 8-pin, X-coded 6: 1 male connector, M12, 4-pin, A-coded, 1 female connector, M8, 4-pin, coded, 1 female connector, M12, 8-pin, X-coded 7: 1 “IO-Link” male connector, M12, 4-pin, A-coded; 1 “Trigger” female connector, M8, 4-pin, coded

Position	Description	Characteristic
10 ... 11	Region-specific country radio equipment approval	xx: Country variant of the device Example 00: EU <sup>1)</sup> For approvals, see type-specific Technical Information RFU6xx Regulatory Compliance Information, which is printed and enclosed with the device. Alternatively, see the product page of the device online.

1) European Union.



#### NOTE

Not all combinations based on type code are possible. The available device variants can be found online on the product page of the device.

## 3.2 Product characteristics

### 3.2.1 Device view

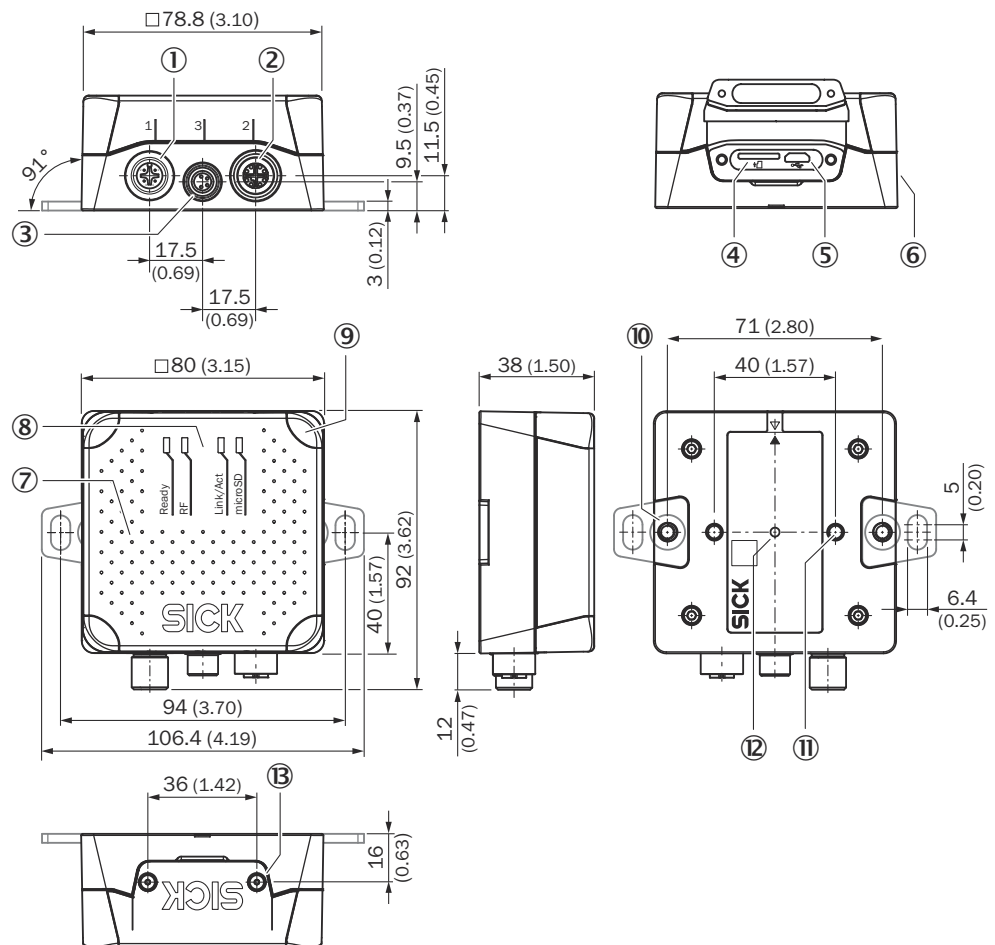


Figure 3: RFU610-106xx: Structure and dimensions, unit: mm (inch), decimal separator: period

- ① Connection 1: Power (male connector, M12, 4-pin, A-coded)
- ② Connection 2: PoE (female connector, M12, 8-pin, X-coded)
- ③ Connection 3: Trigger (female connector, M8, 4-pin, coded)
- ④ Card slot for the MicroSD memory card



- ⑤ “USB” connection (female connector, 5-pin, Micro B type). The USB interface is only for temporary use as a service interface.
- ⑥ Side type label
- ⑦ Optics cover with integrated antenna
- ⑧ 4 multi-colored LEDs (status)
- ⑨ 4 multi-colored LEDs (process feedback)
- ⑩ 2 M5 threaded mounting holes, 6 mm deep, for attaching the mounting straps
- ⑪ 2 M5 threaded mounting holes, 7 mm deep, for alternative mounting of the device
- ⑫ type label with integrated pressure compensation membrane
- ⑬ 2 screws (M2.5 hexagonal socket screws), captive, for side cover

### 3.2.2 Read range

The environment influences the UHF field of the integrated antenna, making it impossible to provide a “clear” demarcation of the sensing range of the reading field:

- Application-specific reflections can result in both overreaches and “holes” (destructive interferences).
- Other factors that can significantly impact the read range include:
  - Orientation of the transponder antenna relative to the antenna of the device
  - Transponder quality: The quality depends on the antenna gain, the integrated transponder chip and its sensitivity, the reflected energy.
  - Material of the carrier object (plastic, wood, metal)
  - Objects between the device and transponder that can affect the UHF field (items, liquids, people).

In addition to the read results, the device can also output diagnostic data. The diagnostic data (e.g., RSSI values) provide an indication of the read quality. This diagnostic data can be used to achieve optimum read results when setting up the system.

The radiation pattern for the device’s antenna was obtained in a reproducible environment for illustrative purposes. For this purpose, an anechoic chamber was used as a reflection-free room.

The diagram shows how the UHF field propagates in a reflection-free space. The diagram cannot be used to draw any conclusions on the likely sensing range of the reading field in a real on-site application.

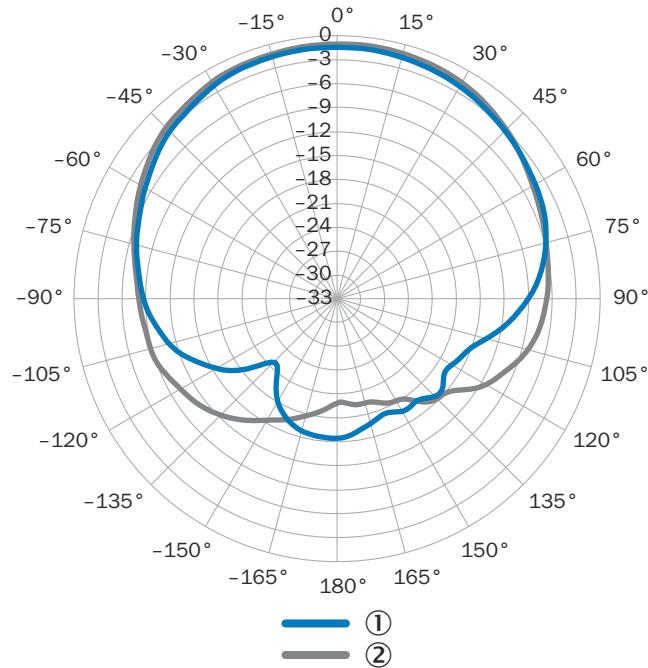


Figure 4: Radiation pattern of the integrated antenna of the RFU610-106xx (typical): Measured antenna gain in dBic at 866.5 MHz, LHCP (left-hand circularly polarized)

- ① Horizontal plane (azimuth)
- ② Vertical plane (elevation)



**NOTE**

The values given in the diagram are achieved with optimal alignment of the transponder relative to the antenna of the device, see "Mounting the device", page 28.

**3.2.3 Scope of delivery**

The delivery of the device includes the following components:

Table 2: RFU610-106xx: Scope of delivery

No. of units	Component	Notes
1	Device in the ordered country variant (xx = region assignment)	<b>Delivery state:</b> <ul style="list-style-type: none"> <li>• Depending on the type, the electrical connections are closed with screwed-on protective elements, e.g., protective caps.</li> <li>• The shared side cover for the USB interface and the card slot is closed and screwed tight.</li> <li>• Without connecting cables</li> </ul>
1	Mounting kit, consisting of <ul style="list-style-type: none"> <li>• 2 mounting straps</li> <li>• 2 countersunk head screws with hexagon socket, M5 x 8</li> </ul>	Fastening clamps, protruding after mounting for fastening the device from the front at both sides Alternatively for mounting from the rear: 2 x M5 threaded mounting holes on the rear of the device
1	Printed Safety Notes (safety information), multilingual	<b>The document contains:</b> <ul style="list-style-type: none"> <li>• Information on safe handling of the device</li> <li>• Note for online access to the operating instructions and other documentation</li> </ul>

No. of units	Component	Notes
1	Printed Technical Information RFU61x Regulatory Compliance Information, multilingual	<p>The document includes information on:</p> <ul style="list-style-type: none"> <li>Regions for which the device is approved in a country or group of countries</li> <li>Conformities fulfilled</li> <li>If applicable, country-specific operating conditions to be upheld when operating the device</li> </ul>

The following associated configuration and information components are not included in the delivery. The components are available online via the product page of the device or the configuration software.

Table 3: RFU610-106xx: Other associated components

Component	Notes
SOPAS ET configuration software and device description file (*.sdd-file) for the RFU61x PoE	<p>Available online at:</p> <ul style="list-style-type: none"> <li><a href="http://www.sick.com/SOPAS_ET">www.sick.com/SOPAS_ET</a></li> </ul>
RFU61x PoE operating instructions as PDF in English, French or German. Other languages may be available.	Available on the product page of the device
RFU parameter description as PDF in English and German.	

**Accessories**

The following accessories for constructing a complete RFID read/write station are not included in the scope of delivery of the device. If required, order accessories separately.

- Connecting cables
- Read cycle trigger sensor, e.g. photoelectric retro-reflective sensor for object-specific triggering
- UHF transponder
- Mounting accessories

The actual scope of delivery may differ for special designs, additional orders or due to the latest technical changes.

**3.2.4 Product features and functions (overview)**



**NOTE**

In addition to the existing operating instructions, the use of the RFU parameter description is recommended:

- This parameter description explains the UHF-RFID-specific parameters of all device variants of the RFU6xx product family up to and including the “Service” user level.
- The parameter description assists with setting up applications using the SOPAS ET configuration software.

The RFU parameter description is available in English (part no. 8023085) and German (part no. 8023084) as well as in other languages, if required.



**NOTE**

The RFU parameter description can be found on the product page.

The call is made via the SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

Table 4: RFU610-106xx: Overview of product features and functions of the device

Product feature/function	Characteristic
Safety and convenience for the customer	<ul style="list-style-type: none"> <li>• Industrial-grade, compact metal housing, CE marking (EU)</li> <li>• Automatic self-test at system start</li> <li>• Diagnostic tools for device setup and (remote) device monitoring</li> <li>• Configurable output of the read results including read diagnostics data in two output formats</li> <li>• Operating data request. In the event of an error: output of codified error messages on request</li> <li>• Activatable test string function (heartbeat) to signal that the device is ready for operation</li> <li>• Future-proof due to firmware update via data interface</li> <li>• Future-proof SOPAS ET configuration software with password-protected configuration mode</li> <li>• SICK AppSpace ready: The device already includes SensorApp for integrating it into existing communication networks</li> <li>• Wide supply voltage range. Supply via separate power source or PoE</li> <li>• Low power consumption</li> <li>• Wide ambient temperature range, details see "Ambient data", page 69 in the technical data</li> <li>• Parameter cloning (to back up the configuration data in the internal device memory):               <ul style="list-style-type: none"> <li>◦ Externally by inserting a microSD memory card <sup>1)</sup> into the device</li> </ul> </li> </ul>
Convenient operation and configuration	<ul style="list-style-type: none"> <li>• Configuration (online or offline) using SOPAS ET configuration software</li> <li>• Single Tag ID Wizard (assistant) to help with initial configuration</li> <li>• Configuration and starting of device functions via a web server (SOPASair) or command strings</li> <li>• Optional function blocks for easier integration of the device into PLC programs</li> <li>• PROFINET Single Port: Configuration via GSD parameterization</li> <li>• Application-specific programming possible using the SICK AppStudio development environment. You can find further information on the Internet at: <a href="http://www.sick.com/SICK_AppStudio">www.sick.com/SICK_AppStudio</a></li> <li>• Status and process feedback indicators via LEDs</li> </ul>
Reading Operation Mode	<ul style="list-style-type: none"> <li>• Start/stop operation: For reading one or more transponders during a read cycle</li> </ul>
Read cycle	<ul style="list-style-type: none"> <li>• Start and stop conditions of the read cycle can be configured in the object trigger control: digital input</li> </ul>
Radio interface(s)	<ul style="list-style-type: none"> <li>• Integrated antenna</li> </ul>
Transponder Processing	<ul style="list-style-type: none"> <li>• The RFU610-106xx base model supports all standard passive transponders compatible with ISO/IEC-18000-63 and EPCglobal UHF Class 1 Generation 2</li> <li>• Reading, writing, and multiple overwriting of the data on the transponders, depending on the application</li> <li>• Within a process chain, the device supplying the data is a partial component for the complete visualization of data</li> </ul>
Transponder management	<ul style="list-style-type: none"> <li>• Decoding of the UII in HEX, BIN and ASCII. Supports GS1-TDS and other industry-specific standards such as VDA55xx</li> </ul>
Data processing	<ul style="list-style-type: none"> <li>• Variable read data output based on event-dependent evaluation conditions</li> <li>• Influencing the output string by filtering and output sorting</li> <li>• Implementation of application-specific data output protocols using the SICK AppStudio development environment</li> </ul>

Product feature/function	Characteristic
Data communication	<p><b>Host interface</b></p> <ul style="list-style-type: none"> <li>• 2 configurable data output formats</li> <li>• The output is switchable to different physical or logical interfaces. Parallel operation is possible. The interface is used for data output to the processing computer.</li> </ul> <p><b>AUX interface</b></p> <ul style="list-style-type: none"> <li>• The output is switchable to different physical or logical interfaces. The interface is used for configuration and diagnostics of the device as well as transponder access.</li> </ul>
Electrical Interfaces	<ul style="list-style-type: none"> <li>• Host interface <ul style="list-style-type: none"> <li>◦ Ethernet (supported protocols include, amongst others, PROFINET single port).</li> </ul> </li> <li>• AUX interface <ul style="list-style-type: none"> <li>◦ Ethernet, USB <sup>2)</sup></li> </ul> </li> <li>• 1 digital input for external trigger sensor</li> <li>• Voltage supply (power or PoE)</li> </ul>
Connectivity (Design)	<ul style="list-style-type: none"> <li>• 2 M12 round connectors, 1 M8 round connector, 1 female connector (USB, type Micro-B) <sup>2)</sup></li> </ul>

1) Optional accessories.

2) The USB interface is only for temporary use as a service interface.

### 3.2.5 Memory card

The device offers a card slot integrated in the housing that accommodates a memory card in MicroSD format.



**NOTE**

The memory card is an optional accessory and is not included with delivery.



**NOTE**

Only use types approved by SICK to ensure reliable function of the memory card.



**NOTE**

Memory cards can be found on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

The memory card has no write protection that can be activated.

#### Memory functions

An inserted memory card serves as a local external storage medium for the device outside the internal device memory, [see "Information on initial commissioning", page 52](#).

The device can execute the following functions using the memory card:

- **Cloning function: storage of the currently valid parameter set**  
Additional storage of the internal parameter set (configuration data of the device) on an external storage medium. This takes place as part of the recommended backup concept for the parameter sets of the 4Dpro devices. The externally stored parameter set is also updated automatically each time the currently valid configuration data is permanently saved.

- This function is initiated by using the “save permanently” option to save the internal parameter set, e.g., via the SOPAS ET configuration software.
- The function is used, among other things, to conveniently transmit the parameter set to an exchange unit of the same type in the event of a fault.
- A memory card that can be plugged into the device serves as an optional, external medium.
- **Data logging: Recording of read diagnostic data**  
Continuous recording of read diagnostic data after initial manual start, e.g. via SOPAS ET. If the function is set permanently, the device continues recording after a restart.
- Other functions on request



### NOTE

Use an empty memory card to save a parameter set or read diagnostic data for the first time.

- ▶ To do this, check the contents of the current card on the computer using a card reader. Delete existing content if necessary.

---

### Indication of operational readiness

The “microSD” optical display shows the status of the memory card after installation of the card in the device. It lights up in different colors according to the status, [see "Optical status indicators on the display panel", page 55](#).



### NOTICE

#### Possible data loss

The color green (operational) indicates that the memory card is ready for use, not that the device has actually accessed the memory card by reading or writing.

Do not remove the memory card or switch off the supply voltage while one of the following functions with access to the memory card is running in the device using the SOPAS ET configuration software:

- Saving a new, current parameter set
- Data logging (read diagnostic data)
- Firmware update

---

### Inserting the memory card in the device:



### NOTICE

#### Risk of damage to the memory card

- ▶ To safely install the memory card, insert the card only when the device is in a **de-energized** state. To do this, disconnect the device from the supply voltage beforehand.

---

Ensure the IP67 enclosure rating of the device is maintained [see "Conditions for specified enclosure rating", page 9](#).

The card slot on the device is located under the cover foil on the side opposite the electrical connections.

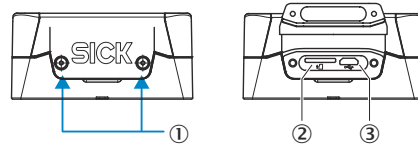


Figure 5: Card slot and “USB” port

- ① 2 screws, M2.5 hexagon socket
- ② Slot for MicroSD memory card
- ③ “USB” connection (female connector, 5-pin, Micro B type)

1. Switch off the supply voltage to the device.
2. Loosen both screws on the cover.
3. Carefully fold up the cover.
4. Making sure it is in the correct position, insert the memory card into the card slot until it locks into place. When doing so, orient the contacts so that they are facing towards the device and downwards as per the symbol on the device.
5. Screw the cover back on. Recommended tightening torque for the cover screws:  $30 \text{ Ncm} \pm 5 \text{ Ncm}$ .
6. Switch on the supply voltage for the device.

#### Interpretation of the stored parameter set

The device automatically detects that a memory card is present after switching it on. Depending on the content of the card, the device behaves as follows:

- If the memory card is empty or if does not contain a parameter set that can be interpreted by the device: the device saves its currently valid internal parameter set to the card (provided there is sufficient storage space) and starts with the internal parameter set.
- If the card contains a parameter set that can be interpreted by the device: The device overwrites the previously valid internal parameter set with this external parameter set.

The goal is for the internal parameter set and the parameter set saved externally to always be identical.

#### Removing the memory card from the device:

To safely remove the memory card while the device is running, deactivate the card using the SOPAS ET configuration software and release it for removal.



#### NOTICE

##### Risk of damage to the memory card

- ▶ To safely remove the memory card while the device is in operation:
  - In SOPAS ET under **Analysis/SD card**, run the **Remove SD card** command. Wait for feedback from SOPAS ET.
  - If this command is not accessible, the memory card can also be removed when there is no power to the device.

### 4 Transport and storage

#### 4.1 Transport



##### NOTICE

##### Damage due to improper transport!

- The product must be packaged with protection against shock and damp.
  - Recommendation: Use the original packaging.
  - Note the symbols on the packaging.
  - Do not remove packaging until immediately before you start mounting.
- 

#### 4.2 Unpacking

- To protect the device against condensation, allow it to equilibrate with the ambient temperature before unpacking if necessary.
- Handle the device with care and protect it from mechanical damage.
- To avoid ingress of dust and water, only remove the protective elements, e.g. protective caps of the electrical connections just before attaching the connecting cable.

#### 4.3 Transport inspection

Immediately upon receipt in Goods-in, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
  - Note the scope of damage on the transport documents or on the transport company's delivery note.
  - File a complaint.
- 



##### NOTE

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

---

#### 4.4 Storage

- Electrical connections are provided with a protective cap.
- Do not store outdoors.
- Store in a place protected from moisture and dust.
- Recommendation: Use the original packaging.
- To allow any residual dampness to evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: [see "Technical data", page 67](#).
- Relative humidity: [see "Technical data", page 67](#).
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.



## 5 Mounting

### 5.1 Overview of mounting procedure

The procedure for mounting the device is divided into the following steps:

1. Select a suitable mounting location for the device.  
**The mounting location and position depend on the following factors:**
  - Identification task
  - Working range of the device (see "Read range", page 17)
  - Transponder used
  - Environmental influences
2. Mount the device at the intended reading point.
3. Preliminarily align the device to the object with transponder. Make sure that there is a suitable distance to the object.
4. If required, mount the read-cycle sensor for object-specific triggering.

After the electrical installation is complete and while adjusting the device parameters to suit the application:

5. **Finely** align the device to the object and adjust it.
6. Test for successful reading and writing of the device in operational use of the application.

### 5.2 Preparing for assembly

#### 5.2.1 Installation requirements

##### Space requirements

For the typical space requirements, see the:

- Dimensional drawing of the device see "Device view", page 16 as well as shape and extent of the reading field, see "Read range", page 17.
- The device does not require any physical or visual contact with the transponders. However, align the device with the reading space.

##### Environmental influences

- Comply with technical data such as the permissible ambient conditions for operation (e.g., ambient temperature range), see "Ambient data", page 69 in the technical data.
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- To prevent additional external heating of the device, protect the device against direct and indirect sunlight.
- In order to avoid reflections of the UHF waves and any associated physical phenomena, make sure if possible that there are no metal surfaces on the side of the device in the direction of the transponder.

**Possible disturbances of the UHF field caused by reflections of the UHF waves are:**

- Overreaches
- "Holes" (destructive interferences)
- To avoid attenuation of the UHF field by absorption, exclude the following between device and transponder:
  - Electrically conductive material, e.g. liquids (water)
  - Persons or animals

### Enclosure rating

- For further information, see ["Conditions for specified enclosure rating"](#), page 9

### Mounting

- Fasten the device using the two enclosed fastening straps or the two M5 threaded mounting holes on the rear of the device. In each case create a stable 2-point fastening.
- Mount the device where they will not be exposed to shocks or vibration. In mounting situations with strong vibrations, it may be necessary to provide shock mounts.

### 5.2.2 Mounting instructions for ambient temperature range below 0 °C

The device can also be operated at low ambient temperatures. Details see ["Ambient data"](#), page 69 in the technical data.

For the electrical installation procedure see ["Instructions for electrical installation when the ambient temperature can fall below 0 °C"](#), page 41.



#### NOTE

Do not expose the device to strong air movement, e.g. a ventilation system. The device may otherwise not be able to provide the required heating power. If necessary, shield the device from air movement with suitable means.

---



#### NOTICE

If the ambient temperature is below 0 °C, please note:

- **Do not** move the connecting cables to the device.
- 

### 5.2.3 Auxiliary equipment required

- If the two fastening clamps of the enclosed mounting kit do not cover the mounting situation of the application, the customer must provide a suitable mounting device (bracket). The bracket requires sufficient load-bearing capacity, see ["Mechanics and electronics"](#), page 69 in the technical data and suitable dimensions for the device, see ["Device view"](#), page 16.
  - 2 M5 screws for mounting the device to a bracket if the supplied mounting straps are not used.
- 



#### NOTE

The screws are for mounting the device on mounting equipment supplied by the customer. The screw length required depends on the mounting base (wall thickness of the bracket).

When using an optional SICK bracket, screws of appropriate length for mounting the device on this bracket are included in the scope of delivery.

---



#### NOTICE

##### Possible damage to the device

Screws that are not suitable for the length of the threaded mounting holes can damage the device.

- M5 threaded mounting holes for mounting strap: Do not exceed the maximum screw-in depth of 6 mm
  - M5 threaded mounting hole for mounting from the rear: screw in screws to a maximum depth of 7 mm
- 
- Tool and tape measure

### 5.2.4 Mounting device

The device can be mounted using the 2 mounting straps (supplied mounting kit part no. 2105772) after attachment on the device from the front or rear. The associated 2 M5 threaded mounting holes for the fastening clamps are each located on the outside of the rear of the device, in the recess, see "Device view", page 16.

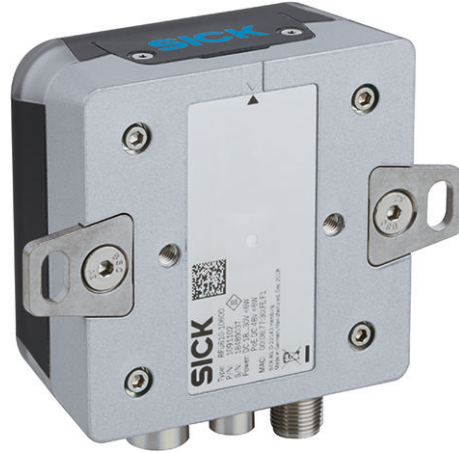


Figure 6: Back view of RFU610-106xx: Device with assembled mounting straps

Alternatively, fasten the device using the two internal M5 threaded mounting holes. The threaded mounting holes are also located on the rear of the device.

#### Further optional SICK brackets

The device can be mounted using one of the following brackets: optional SICK bracket, a combination of SICK brackets and elements, or a customer-specific bracket.

SICK offers prefabricated brackets which are suited for mounting the device in various applications.



#### NOTE

Mounting accessories can be found on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).



#### NOTE

Dimensional drawings for SICK brackets and, if applicable, mounting instructions can be found online at: [www.sick.com](http://www.sick.com)

- ▶ To do so, enter the 7-digit part number of the bracket in the search field.

#### Customer-supplied brackets

A supplied bracket must meet the following requirements:

- Stable mounting device
  - Orientation of the device changeable in the x- and y-axis
  - The mounting device must be able to bear the weight of the device, including connecting cables, in a shock-proof manner, see "Mechanics and electronics", page 69 in the technical data.
  - In mounting situations with strong vibrations, it may be necessary to provide shock mounts.

- For mounting the device according to the dimensional drawing: 2 suitable holes for M5 screws.

### 5.3 Mounting location

#### Installing a device at the mounting location

Observe the following aspects for the device when selecting the installation location:

- The spatial working range of the device's antenna in terms of the distance to objects, [see "Read range", page 17](#).
- Influence of the environment on the UHF field produced by the device, e.g.:
  - Metal surfaces located to the side of and in the vicinity of the device
  - Electrically conductive liquids between the antenna and transponder
  - Persons between the antenna and transponder

### 5.4 Mounting the device



#### WARNING

##### Risk of injury due to damage to the device!

For reasons of safety, if a device shows visible signs of damage do not put it into operation, or take it out of operation immediately.

Possible damage (depending on type):

- Housing: cracking, splitting or fracture
- Electrical connections (male connector or female connector): cracks or detachment from the housing



#### NOTICE

##### Risk of damage to the device

Observe the maximum screw-in depth of the blind tapped holes on the device. Longer screws than the specified screw-in depth damage the device.

- ▶ Use screws of suitable length.

Observe the maximum screw-in depth of the threaded mounting hole [see "Auxiliary equipment required", page 26](#)

#### Aligning the transponder to the antenna of the device

UHF transponders have dipole antennas and therefore preferential directions within the radiation field of the antenna of the device. The transmitting and receiving performance will be higher or lower depending on the orientation of the dipole antenna of the transponder to the axis perpendicular to the antenna surface. The read and write rate as well as the sensing range can therefore be subject to fluctuations.



#### NOTE

If the dipole antenna of the transponder is aligned along the axis perpendicular to the antenna surface, the device cannot read or write to the transponder.

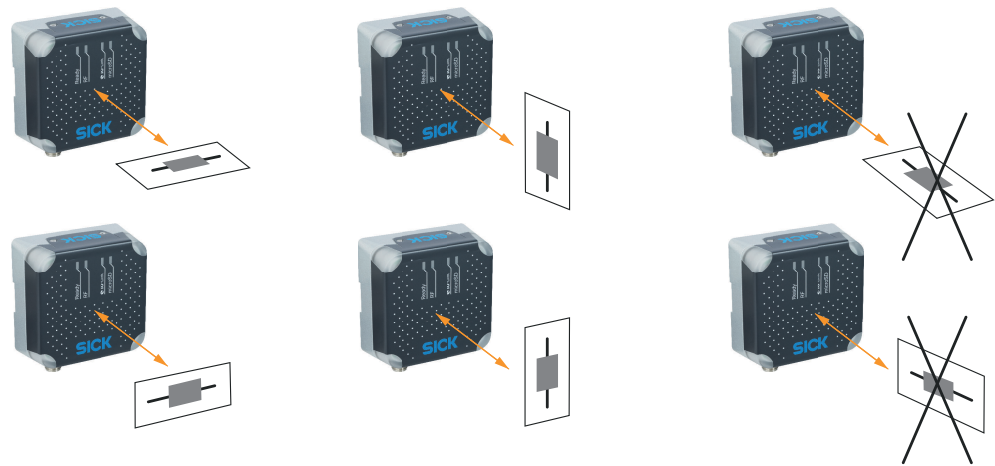


Figure 7: Alignment of the UHF transponder, optimized for good read and write capability

### Mounting and aligning the device :



#### NOTE

##### Avoid mutual interference when operating several devices

When the reading and writing ranges of several independently operated devices overlap, this can lead to mutual impairment of the system performance of the devices.

In order to avoid such constellations, the devices each offer Sync mode.

Sync Mode can be used to synchronize the read and write behavior of multiple devices. For this purpose, the devices are connected to one another via an Ethernet network. Sync mode then ensures that only one device at a time is communicating over the air interface for a read or write operation. A defined device coordinates up to seven subordinate devices.

1. Prepare the base for mounting the bracket of the device, see "[Preparing for assembly](#)", page 25.  
Recommendation: Depending on the application it may be possible to use one of the optional SICK brackets. If necessary, perhaps also in combination with other brackets
2. At the intended reading point, place an object with transponder within the working range of the device (static object only).
3. Mount the device bracket onto the base.
4. Screw the screws through the bracket into the blind tapped hole of the device. Slightly tighten screws.
5. Orient the front side of the device towards the object.
  - Ensure, where possible, that there are no large metal surfaces located in front of the device.
  - If this is unavoidable, do not mount the device in the same plane as the surface but rather maintain an angle of inclination of approx. 10°.

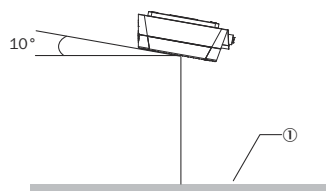


Figure 8: Selected angle of inclination of the device or external antennas when there is a large metal surface in front, e. g., 10°

① Metal surface

6. Tighten the screws.
- ✓ The device is approximately aligned with the object to be detected.
7. Check the general suitability of the alignment for objects of different sizes and varying positions of the transponder in operational use of the application.

### 5.5 Mounting external components

#### 5.5.1 Mounting the external read cycle trigger sensor

##### Conveying line

To detect objects with transponders, mount the trigger sensor in suitable proximity to the device . Attach the sensor in front of the device against the conveying direction.



##### NOTE

A large selection of photoelectric sensors and accessories (brackets, connecting cables) can be found online at: [www.sick.com](http://www.sick.com)

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## 6 Electrical installation

### 6.1 Safety

#### 6.1.1 Prerequisites for safe operation of the device



#### WARNING

#### Risk of injury and damage caused by electrical current!

As a result of equipotential bonding currents between the device and other grounded devices in the system, faulty grounding of the device can give rise to the following dangers and faults:

- Dangerous voltages are applied to the metal housings.
- Devices will behave incorrectly or be destroyed.
- Cable shielding will be damaged by overheating and cause cable fires.

#### Remedial measures

- Only skilled electricians should be permitted to carry out work on the electrical system.
- If the cable insulation is damaged, disconnect the voltage supply immediately and have the damage repaired.
- Ensure that the ground potential is the same at all grounding points.
- Where local conditions do not meet the requirements for a safe earthing method, take appropriate measures. For example, ensure low-impedance and current-carrying equipotential bonding.

The device is connected to the peripheral devices (any local trigger sensor(s), system controller) via shielded cables. The cable shield – for the data cable, for example – rests against the metal housing of the device.

The device can be grounded through the cable shield or through a blind tapped hole in the housing, for example.

If the peripheral devices have metal housings and the cable shields are also in contact with their housings, it is assumed that all devices involved in the installation have the **same ground potential**.

This is achieved by complying with the following conditions:

- Mounting the devices on conductive metal surfaces
- Correctly grounding the devices and metal surfaces in the system
- If necessary: low-impedance and current-carrying equipotential bonding between areas with different ground potentials

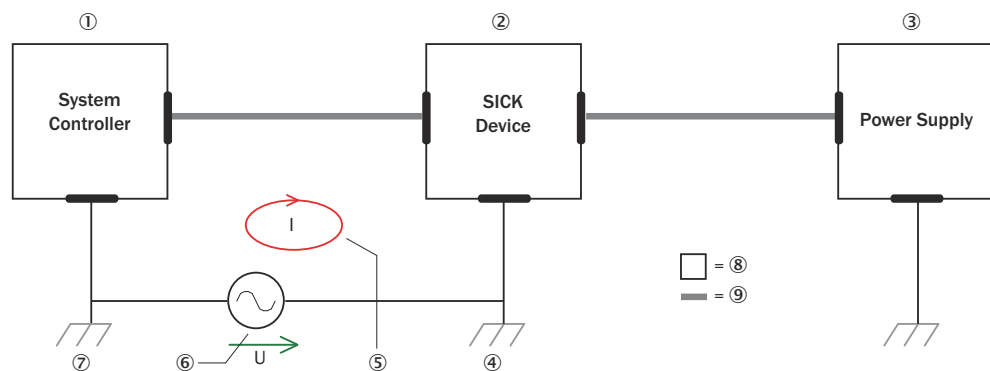


Figure 9: Example: Occurrence of equipotential bonding currents in the system configuration

① System controller

- ② Device
- ③ Voltage supply
- ④ Grounding point 2
- ⑤ Closed current loop with equalizing currents via cable shield
- ⑥ Ground potential difference
- ⑦ Grounding point 1
- ⑧ Metal housing
- ⑨ Shielded electrical cable

If these conditions are not fulfilled, equipotential bonding currents can flow along the cable shielding between the devices due to differing ground potentials and cause the hazards specified. This is, for example, possible in cases where there are devices within a widely distributed system covering several buildings.

**Remedial measures**

The most common solution to prevent equipotential bonding currents on cable shields is to ensure low-impedance and current-carrying equipotential bonding. If this equipotential bonding is not possible, the following solution approaches serve as a suggestion.



**NOTICE**

We expressly advise against opening up the cable shields. This would mean that the EMC limit values can no longer be complied with and that the safe operation of the device data interfaces can no longer be guaranteed.

**Measures for widely distributed system installations**

On widely distributed system installations with correspondingly large potential differences, the setting up of local islands and connecting them using commercially available **electro-optical signal isolators** is recommended. This measure achieves a high degree of resistance to electromagnetic interference.

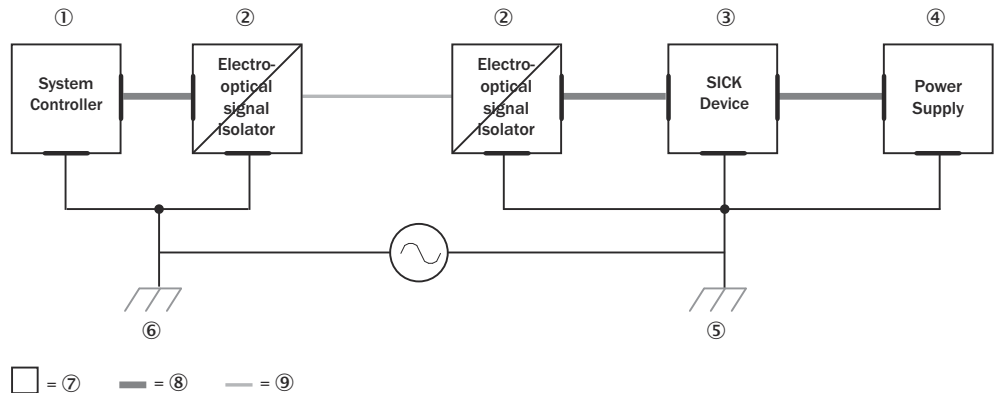


Figure 10: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

- ① System controller
- ② Electro-optical signal isolator
- ③ Device
- ④ Voltage supply
- ⑤ Grounding point 2
- ⑥ Grounding point 1
- ⑦ Metal housing
- ⑧ Shielded electrical cable
- ⑨ Optical fiber



The use of electro-optical signal isolators between the islands isolates the ground loop. Within the islands, a stable equipotential bonding prevents equalizing currents on the cable shields.

### Measures for small system installations

For smaller installations with only slight potential differences, insulated mounting of the device and peripheral devices may be an adequate solution.

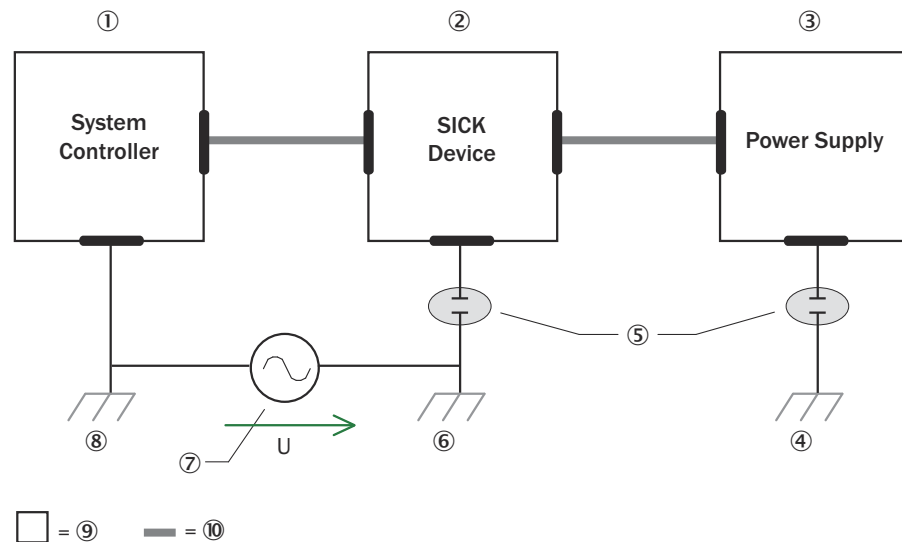


Figure 11: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

- ① System controller
- ② Device
- ③ Voltage supply
- ④ Grounding point 3
- ⑤ Insulated mounting
- ⑥ Grounding point 2
- ⑦ Ground potential difference
- ⑧ Grounding point 1
- ⑨ Metal housing
- ⑩ Shielded electrical cable

Even in the event of large differences in the ground potential, ground loops are effectively prevented. As a result, equalizing currents can no longer flow via the cable shields and metal housing.



#### NOTICE

The voltage supply for the device and the connected peripheral devices must also guarantee the required level of insulation.

Under certain circumstances, a tangible potential can develop between the insulated metal housings and the local ground potential.

## 6.1.2 Notes on electrical installation

### Connection work

- Standard safety requirements must be observed when working on electrical systems!
- Electrical installation must only be performed by electrically qualified personnel.
- Select all cables to suit the ambient temperature range at the installation site.

- Perform all connection work only at ambient temperatures above 0 °C.
- Electrical connections between the device and other devices may only be made or separated in a voltage-free state. Otherwise, there is a risk of damaging the devices.
- All circuits connected to the device must be designed as ES1 circuits.
- The wire cross-sections of the data cables and cables for digital inputs and digital outputs must comply with the applicable national standards.
- In the case of open end connecting cables, make sure that bare wire ends do not touch. Risk of short-circuit when the supply voltage is switched on! Wires must be properly insulated from each other. This also applies to unused wires.



### NOTE

For additional instructions on operating the device at ambient temperatures below 0 °C: [see "Prerequisites", page 41](#)

---

### Supply voltage

- Connect the device to the permissible supply voltage, [see "Supply voltage", page 42](#).
- The wire cross-sections of the customer-supplied power supply cable must be selected in accordance with the applicable national standards. In Germany, observe the following standards: DIN VDE 0100, part 430 and DIN VDE 0298, part 4 or DIN VDE 0891, part 1.
- Only switch on the supply voltage to the device after first:
  - Completing the connection work
  - Carefully checking the wiring work

### Data cables

---



### NOTE

#### Layout of data cables

- Use shielded data cables with twisted-pair wires.
  - The allowed cable length between the device and host computer depends on:
    - The chosen physical version of the host interface
    - The data transmission rate set in the deviceFor further information, [see "Wiring the data interface", page 45](#).
  - Implement the shielding design correctly and completely.
  - To avoid interference, always use EMC-compliant cables and layouts. This applies, for example, to cables for switched-mode power supplies, motors, clocked drives, and contactors.
  - Do not lay cables in parallel with voltage supply cables or motor cables in cable channels over longer distances.
- 

### Enclosure rating

For further information, [see "Conditions for specified enclosure rating", page 9](#).

---



### NOTICE

#### Risk of damage to the product when the cover is open

When the cover is open, the device does not conform to a specified enclosure rating.

If necessary, only operate the device for a short time with an open cover for the activities listed in the following: During this time, protect the device against moisture and dust.

---

Temporarily open the side cover for the following tasks:

- Inserting or removing the optional storage medium
- Temporary use of the USB interface as a service interface

## 6.2 Wiring instructions

**Pre-assembled cables:**



### NOTE

You will find recommended connecting cables and associated technical data on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

**Pre-assembled cables with open cable end at one end:**



### NOTE

For information on the pin, signal and wire color assignments for the RFU61x PoE device, see "[Signal assignment of cables with open cable end at one end](#)", page 72 in the appendix of these operating instructions.



### NOTICE

**Faults during operation and defects in the device or the system**

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

## 6.3 Overview of all interfaces and connection options



### NOTE

The numbering of the data interfaces (Host 1, AUX 1) in the following block diagrams is intended to provide a better overview. The numbering is not shown in configuration tools, e.g. in the SOPAS ET configuration software.



### NOTE

The USB interface of the device is used in industrial environments only as a service interface for temporary use (e.g. for configuration, troubleshooting). Permanent use in operational use of the system as a host interface is not intended.

### 6.3.1 RFU610-106xx (connection: Power over Ethernet)

#### Service operation

The following functions can be performed via one of the three data interfaces:

#### AUX 1, AUX 2 or Host 1

- Configuration
- Display of the read result of the detected transponders
- Transponder access: reading and writing data.
- Reading diagnostics as read result in fixed output format

For a detailed overview, see "[Use of the data interfaces](#)", page 38.

For the AUX interface, the AUX port of the Ethernet interface and, alternatively, the USB interface is illustrated here. The USB interface must only be used temporarily as a servicing interface.

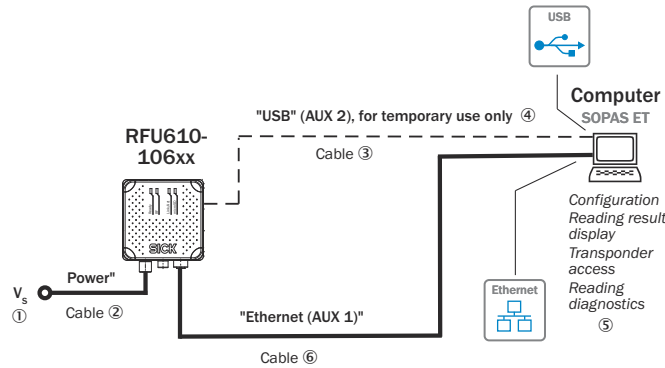


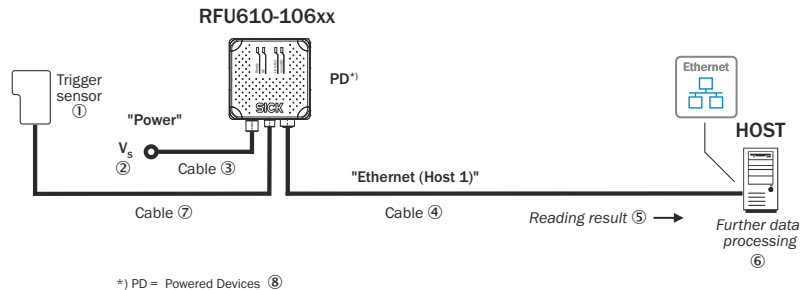
Figure 12: Block diagram RFU610-106xx (Power over Ethernet connection), e.g. display of read result

- ① Supply voltage  $V_s$
- ② Power adapter cable for connection 1 with female connector, M12, 4-pin, A-coded and flying leads, e.g. part no. 2095607
- ③ USB adapter cable with male connector, USB type Micro-B and male connector, USB type A.
- ④ USB, alternative to Ethernet AUX port. The USB interface must only be used temporarily as a servicing interface.
- ⑤ Configuration with SOPAS ET, prepared representation of the read result, transponder access or reading diagnostics
- ⑥ Ethernet adapter cable for connection 2 with male connector, M12, 8-pin, X-coded and male connector, RJ-45, 8-pin, e.g. part no. 6049728

**Read operation**

In operational use of the application, the device sends the read result to the further processing computer via the host interface. Select one of two configurable output formats for this purpose. The device can also output in parallel via the AUX interface: the same or the second output format.

For a detailed overview, see "Use of the data interfaces", page 38.



\*) PD = Powered Devices (8)

Figure 13: Block diagram RFU610-106xx (Power over Ethernet connection): read operation

- ① Trigger sensor for external read cycle, e.g. GL6 (part no. 1059241)
- ② Supply voltage  $V_s$
- ③ Power adapter cable for connection 1 with female connector, M12, 4-pin, A-coded and flying leads, e.g. part no. 2095607
- ④ Ethernet adapter cable for connection 2 with male connector, M12, 8-pin, X-coded and male connector, RJ-45, 8-pin, e.g. part no. 6049728
- ⑤ Read result (configurable output format 1 or 2)
- ⑥ Data further processing



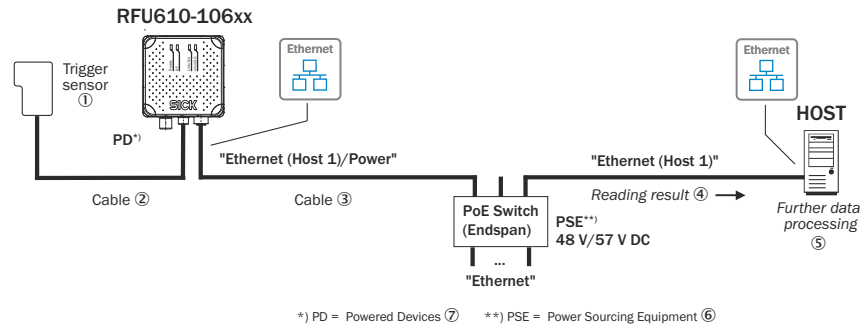


Figure 15: Block diagram RFU610-106xx (PoE connection): read operation

- ① Trigger sensor for external read cycle, e.g. GL6 (part no. 1059241)
- ② Trigger connecting cable with male connector, M8, 4-pin, coded and male connector, M8, 4-pin, coded, e.g. part no. 2096347
- ③ Ethernet adapter cable with male connector, M12, 8-pin, X-coded and male connector, RJ-45, 8-pin, e.g. part no. 6049728
- ④ Read result (configurable output format 1 or 2)
- ⑤ Data further processing
- ⑥ PSE = Energy source
- ⑦ PD = Energy consumer

### 6.3.3 Use of the data interfaces

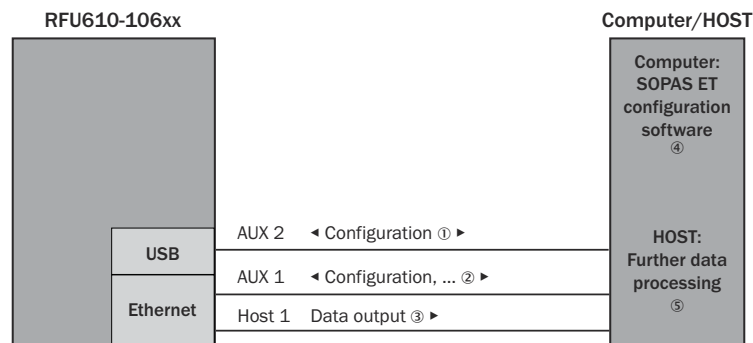


Figure 16: Data interfaces of the RFU610-106xx and their preferred uses

- ① Service operation: Configuration with SOPAS ET. The USB interface must only be used temporarily as a servicing interface
- ② Service operation: Configuration with SOPAS ET, processed read result display, transponder access or reading diagnostics
- ③ Read operation: Data output of the read result (configurable output format 1 or 2)
- ④ SOPAS ET configuration software
- ⑤ Data further processing

Table 5: RFU610-106xx: Functions relating to data interfaces

Possible interface →	Host 1	AUX 1	AUX 2
Assignable function	Ethernet	Ethernet	USB <sup>1)</sup>
↓			
Read result output (configurable format 1 or 2)	●	●	
Reading diagnostics (fixed output format)		●	
With SOPAS ET: Configuration, representation of the read results in the Quickstart display window, transponder access	○	○	○

Possible interface →	Host 1	AUX 1	AUX 2
Configuration with commands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> 2)
Configuration using web server	<input type="radio"/>	<input type="radio"/>	
● = Output of the same function via the interfaces possible at the same time ○ = Access only makes sense via one of the interfaces (risk of collision!)			

1) The USB interface must only be used temporarily as a servicing interface.

2) Enter the command using the terminal in SOPAS ET (version 3.3.0 or higher). Alternatively, use a different USB-capable terminal program.



#### NOTE

- Each interface can only execute one of several selectable functions.

The logical AUX interface of the device can operate the AUX port of the Ethernet interface, and the USB interface in parallel.

The logical host interface of the device operates the host port of the Ethernet interface.

Data output using a command string: Data output only occurs at the data interface on which the request was received.

## 6.4 Pin assignments of electrical connections

### 6.4.1 Connection: power and Ethernet

#### 6.4.1.1 Connection 1: "Power"

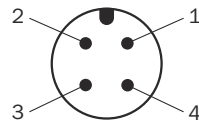


Figure 17: M12 male connector, 4-pin, A-coded

Table 6: Pin assignment of the "Power" connection

Pin	Signal	Function
1	V <sub>s</sub>	Supply voltage
2	N.c.	-
3	GND_ext	Primary ground
4	N.c.	-

#### 6.4.1.2 Connection 2: "Ethernet"

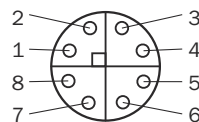


Figure 18: Female connector, M12, 8-pin, X-coded

Table 7: Pin assignment of the "Ethernet" connection

Pin	Signal	Function
1	TD+	Sender+
2	TD-	Sender-
3	RD+	Receiver+

Pin	Signal	Function
4	RD-	Receiver-
5	PoE-	Supply voltage-
6	PoE-	Supply voltage-
7	PoE+	Supply voltage+
8	PoE+	Supply voltage+

6.4.2 Connection: Power over Ethernet

6.4.2.1 Connection 2: “PoE”

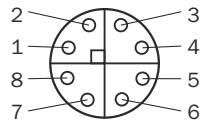


Figure 19: Female connector, M12, 8-pin, X-coded

Table 8: Pin assignment of the “PoE” connection

Pin	Signal	Function
1	TD+	Sender+
2	TD-	Sender-
3	RD+	Receiver+
4	RD-	Receiver-
5	PoE-	Supply voltage-
6	PoE-	Supply voltage-
7	PoE+	Supply voltage+
8	PoE+	Supply voltage+

6.4.3 Connection of external trigger sensor

6.4.3.1 Connection 3: “Trigger”

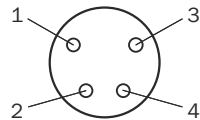


Figure 20: Female connector, M8, 4-pin, coded

Table 9: Pin assignment of the “Trigger” connection

Pin	Signal	Function
1	$V_{S \text{ trigger}}$	Supply voltage for external trigger sensor, provided by the device
2	N.c.	-
3	GND	Functional ground
4	Sensor 1	Digital input



## 6.5 Instructions for electrical installation when the ambient temperature can fall below 0 °C



### NOTE

For mounting instructions, see ["Mounting instructions for ambient temperature range below 0 °C"](#), page 26

All device variants can also be operated at low ambient temperatures. Details see ["Ambient data"](#), page 69 in the technical data.

### 6.5.1 Prerequisites

- Required supply voltage: see ["Supply voltage"](#), page 42
- Use SICK standard cables for the specified ambient temperature range.



### NOTE

You will find the technical data for the cables on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

- Do not operate the device at ambient temperatures below 0 °C when mounting or connection work is being carried out.
- Perform all connection work only in the ambient temperature range 0 °C to +50 °C. Secure the connecting cables.
- The shared side cover of the USB interface and card slot must be screwed tight to the device.
- All cables connected to the device must be clamped. Any unused M12 and M8 connections must be fitted with a screw-on protective element, e.g., a protective cap, as delivered. The protective element is hand-tightened.
- When operating the device at the lower limit of the permissible ambient temperature range (see ["Technical data"](#), page 67), do not expose the device to strong air flows (e.g. ventilation system, wind).

### 6.5.2 Behavior of the device when switched on

After application of the supply voltage and successful initialization, the device can be addressed using the SOPAS ET configuration software.

Table 10: Behavior of the device when switched on at low temperatures

Housing internal temperature	Behavior
Below -25 °C	"Ready" LED continuously flashes orange. Device is not operational because -25 °C is below the specified minimum limit value.
-25 °C ... -20 °C	"Ready" LED continuously flashes green (warm-up phase). Device is not operational (communication channel still disabled) until the internal temperature has increased to -20 °C as a result of the heat generated by the electronics. Duration approx. 2 minutes
From -20 °C	"Ready" LED lights up green. The device has started regular operation.

1) For Firmware Version V2.02

Once the supply voltage has been applied, the device uses integrated temperature sensors to measure its internal temperature. This is performed by the device while booting.

## 6.6 Connecting the supply voltage

### 6.6.1 Note on the supply voltage of the device



**NOTICE**

**Risk of damage to the device due to reverse polarity of the supply voltage!**

Reversing the polarity of the supply voltage may, under certain circumstances, damage the device due to short circuit currents!

The supply voltage input for the RFID device is designed with internal circuit protection to provide reverse polarity protection. For this purpose, there is a blocking diode in the current path of the positive pole (see figure).

The negative pole of the supply voltage (primary ground, GND\_ext) is electrically isolated from the functional ground (GND). The functional earth has a direct galvanic connection to the metal housing of the device for RF-related technical reasons.

Depending on the mounting location of the RFID device and the reference potential of the supply voltage, a reversal of the polarity of the applied supply voltage can lead to the following situation:

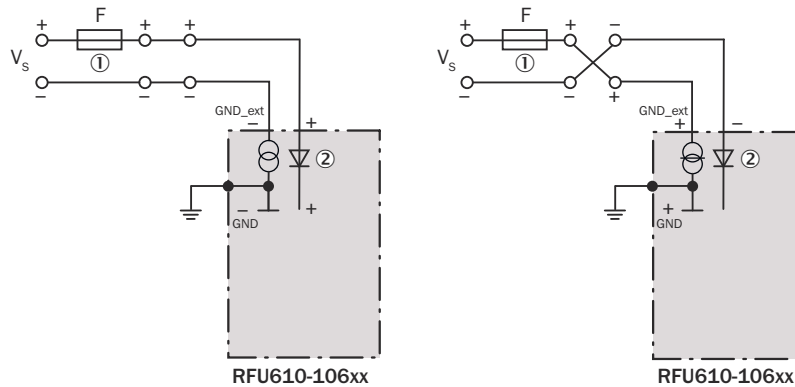


Figure 21: Reversal of the polarity of the supply voltage: no effect on the RFID device (see requirements)

- ① Fuse
- ② Blocking diode

The housing of the RFID device is connected to functional earth.

If the polarity of the supply voltage is reversed, the blocking diode blocks the negative voltage on the positive pole of the RFID device.

### 6.6.2 Supply voltage

The voltage source must meet the requirements of ES1 (EN 62368-1).



**NOTE**

**UL-certified devices** (see type label) require a supply voltage according to ES1, EN 62368-1, NEC protection class 2 (UL1310).

The power source must be able to provide the following power outputs when the device is operating at maximum transmitting power:

Table 11: RFU610-106xx: Required supply voltage  $V_S$

Device	Supply voltage $V_S$	Ambient operating temperature	Power source: required power output
RFU610-106xx	18 V ... 30 V DC	-25 °C ... +50 °C	At least 6 W
	48 V / 57 V DC according to PoE technology		

### Power supply options

The device offers two voltage supply options:

1. Power and Ethernet: 18 V DC ... 30 V DC
  - Connection 1: power
  - Connection 2: Ethernet
2. Power over Ethernet (PoE): 48 V / 57 V DC according to PoE technology
  - Connection 1: not assigned
  - Connection 2: PoE

Both variants can be used simultaneously. Recommendation: Select only one variant.

Table 12: Using connection variants at the same time: behavior of the device

Initial situation	Change	Effect
Voltage supply power via connection 1	Additionally PoE connected to connection 2	No effect on the device status
Voltage supply PoE via connection 2	Additionally power connected to connection 1	No effect on the device status Voltage supply now via power at connection 1 (dominant)
Voltage supply power via connection 1 (dominant) and PoE via connection 2	Connecting power to connection 1 is isolated.	Device restarts. Voltage supply now via PoE at connection 2



### NOTE

The voltage supply via a power supply unit must be capable of buffering a brief power failure of 20 ms.

### Protecting the supply cables

To ensure protection against short-circuits and overload in the customer-supplied cables, the wire cross-sections used must be selected and protected in accordance with national regulations.

The following standards must be observed in Germany:

- DIN VDE 0100 (Part 430)
- DIN VDE 0298 (Part 4) or DIN VDE 0891 (Part 1)

When the device is supplied via the “Power” connection, it is necessary to protect the 18 V to 30 V DC supply voltage. To do so, use a separate 0.8 A slow-blow fuse.

- ▶ Install the fuse in the supply circuit at the start of the supply cable.

## 6.7 Wiring the digital input

The digital input “Sensor 1” can be used, for example, to start and terminate the read cycle by an external trigger sensor.

**a) Supplying the trigger sensor through the device**

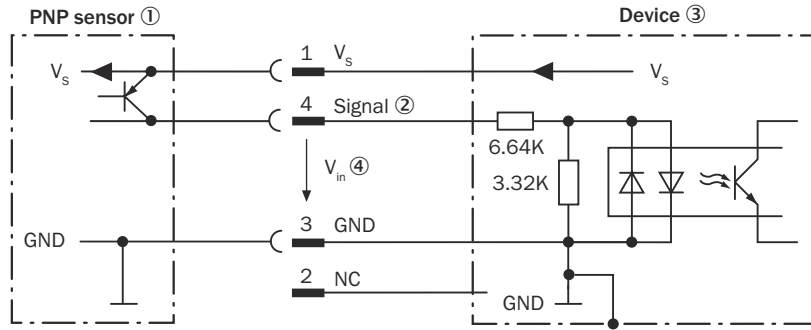


Figure 22: Wiring of digital input “Sensor 1”, supply of trigger sensor by the device

- ① Trigger sensor (PNP sensor)
- ② “Sensor 1” input signal
- ③ Device
- ④ Input voltage  $V_{in}$

**b) Supplying the trigger sensor with external voltage**

The supply voltage of the device and the supply voltage of the trigger sensor must have the same ground.



**NOTICE**

In case of external voltage supply of the trigger sensor, the connecting cable part no. 2096347 is not suitable for connecting the trigger sensor to the device.

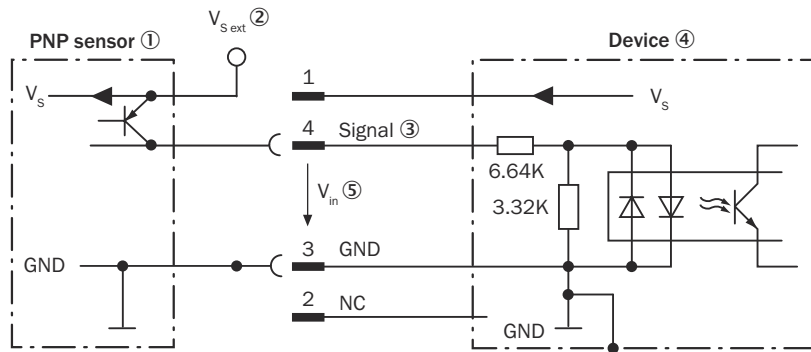


Figure 23: Wiring of digital input “Trigger”, supply of trigger sensor by external voltage

- ① Trigger sensor (PNP sensor)
- ② External voltage  $V_{S\ ext}$  for supplying the trigger sensor
- ③ “Sensor 1” input signal
- ④ Device
- ⑤ Input voltage  $V_{in}$

Table 13: Characteristics of “Sensor 1” digital input

<b>Type</b>	Switching
<b>Switching behavior</b>	Power to the input starts the assigned function, e.g. start of the internal reading gate of the device. Default: active high, debounce: 10 ms (default)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Can be wired with PNP output of a trigger sensor</li> </ul>

<b>Electrical values</b>	Low: $V_{in}^{1)} \leq 2 \text{ V}$ ; $I_{in}^{2)} \leq 0.3 \text{ mA}$ High: $6 \text{ V} \leq V_{in} \leq 32 \text{ V}$ ; $0.7 \text{ mA} \leq I_{in} \leq 5 \text{ mA}$
--------------------------	---

- 1) Input voltage.  
2) Input current.

## 6.8 Wiring the data interface

### Wiring the Internet interface

1. Connect the device to the Ethernet interface of the computer via an adapter cable.
2. Set up communication via SOPAS ET configuration software.



#### NOTE

The Ethernet interface of the device has an Auto-MDIX function. This automatically adjusts the transmission speed as well as any necessary crossover connections.

## 7 Commissioning

### 7.1 Installation steps

#### 7.1.1 Wiring the device for Quickstart



#### NOTE

The numbering of the data interfaces (Host 1, AUX 1) in the following block diagrams is intended to provide a better overview. The numbering is not shown in configuration tools, e.g. in the SOPAS ET configuration software.

#### Connection type: power and Ethernet

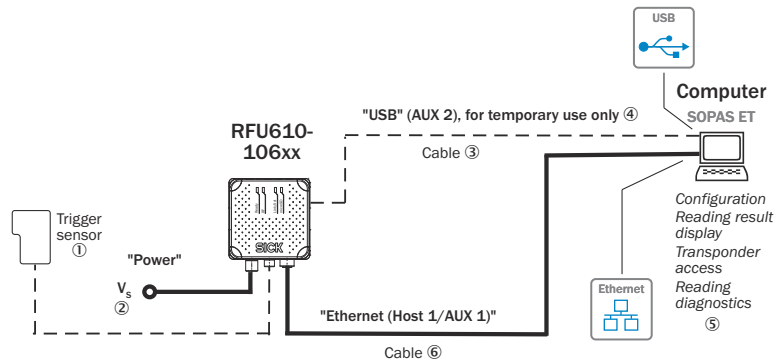


Figure 24: Electrical connection block diagram for the RFU610-106xx (Power over Ethernet): commissioning

- ① Trigger sensor for external read cycle (optional)
- ② Supply voltage  $V_s$
- ③ Adapter cable with male connector, USB, type Micro-B and male connector, USB, type A
- ④ USB, alternative to Ethernet AUX port. The USB interface is only for temporary use as a service interface.
- ⑤ Configuration with SOPAS ET, prepared representation of the read result, transponder access or reading diagnostics
- ⑥ Adapter cable with male connector, M12, 8-pin, X-coded and male connector, RJ-45, 8-pin

#### Procedure:

1. Connect the communication interface (e.g., Ethernet, connection 2) of the device directly to the computer using a suitable cable ⑥.
2. Connect connection 1 ("Power") to the voltage source using a suitable cable.

Connection type: Power over Ethernet

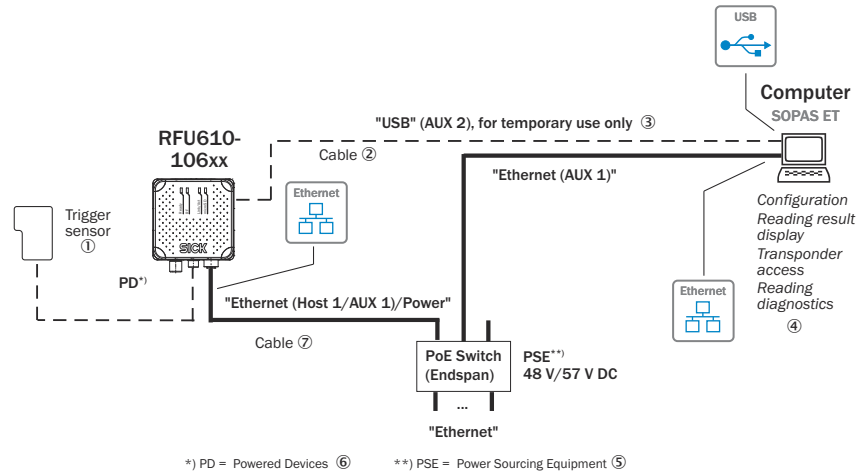


Figure 25: Electrical connection block diagram RFU610-106xx (Power over Ethernet): commissioning

- ① Trigger sensor for external read cycle (optional)
- ② Adapter cable with male connector, USB, type Micro-B and male connector, USB, type A
- ③ USB, alternative to Ethernet AUX port. The USB interface is only for temporary use as a service interface.
- ④ Configuration with SOPAS ET, prepared representation of the read result, transponder access or reading diagnostics
- ⑤ PSE = Energy source
- ⑥ PD = Energy consumer
- ⑦ Adapter cable with male connector, M12, 8-pin, X-coded and male connector, RJ-45, 8-pin

**Procedure:**

- ▶ Connect the PoE communication interface (connection 2) of the device to the PoE switch using a suitable adapter cable ⑦.

**General for both connection types**

1. If necessary, connect the trigger sensor for an external read cycle, such as a photoelectric sensor, to connection 3 ("Trigger").  
The device offers the "Quickstart" operating mode for demonstrating its operating principle. In this mode, the device automatically triggers a cyclic reading. The operating mode can, for example, be started and terminated using the SOPAS ET configuration software.



**NOTE**

The "Quickstart" function is not intended to be used during normal operation.

- ▶ For operational use, select a read cycle using the object trigger control in SOPAS ET.

2. Switch on the supply voltage for the device, see "Supply voltage", page 42.
- ✓ After successful initialization, the "Ready" LED illuminates green.
3. Switch on computer. Start Windows.

**7.2 Overview of the Commissioning Steps**

The device is configured using a configuration tool. During initial commissioning, this is normally done use the SOPAS ET configuration software.

Other configuration tools are also available, for example a web server or command strings, depending on the task. For more information, see ["Operating options and configuration tools", page 58](#).

### Procedure

- Install the SOPAS ET configuration software and the required device description file on a computer
- Electrically connect the device to the computer
- Commission the device with the help of the "Quickstart" function in SOPAS ET. Use the factory defaults as the basis for this.
- Perform a manual fine adjustment and configuration of the device to optimize the functionality for the specific situation on site (reading and writing)
- Test the device for correct functioning in operational use.

## 7.3 SOPAS ET configuration software

The SOPAS ET configuration software is normally used to adapt the device to the reading situation on site. The optimized configuration data are then permanently saved to the device using the "permanent" option. The data can also be stored on the computer as a parameter set (project file) for archiving purposes.

The device can also permanently access the parameter set from an optional external storage medium. This makes it easier to replace the device if necessary.

A MicroSD memory card is available for this device. For more information, see ["Information on initial commissioning", page 52](#).

### 7.3.1 Functions of the SOPAS ET configuration software (overview)

---



#### NOTE

The manual for the SOPAS ET configuration software describes the general functions in the program as well as the user interface.

- Selecting the menu language
- Setting up communication with the device
- Password-protected configuration for different operating levels
- ...

---

The SOPAS ET configuration software provides the following functions, amongst others, relating to the device:

- Quickstart function with continuous read cycle triggering to demonstrate the transponder recognition and data display
- Access to the transponder content (reading and writing)
- Management of device apps
- Assistant for targeted configuration of the transponder read operation (Single Tag ID Wizard)
- Recording of device and communication data during operational use via the diagnostics log file output
- System diagnostics

### 7.3.2 Installing SOPAS ET and the device description file

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#### NOTE

Depending on the situation on site, administrator rights may be required on the computer to install the software. The computer must provide a functioning Internet connection.

---



The SOPAS ET configuration software, the current system prerequisites for installing the software on the computer, and downloading instructions can be found online at: [www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET)

1. Connect one of the data interfaces of the device to the computer.  
Recommended: Ethernet interface or USB interface
2. Switch on the supply voltage for the device.
3. Start computer.
4. Download and install the following components as per the instructions on the product page of the software:
  - a) Current version of the SOPAS ET configuration software.  
In this case, select the "Complete" option as suggested by the installation wizard.
  - b) Required current device description file (\*.sdd) for the device
5. If the installation of the configuration software does not start automatically, run setup.exe in the download folder.
6. Follow the operating instructions to complete the installation.

### 7.3.3 Connecting the SOPAS ET configuration software to the device

1. Start the "SOPAS ET" program option after completing the installation.  
Path: Start > Programs > SICK > SOPAS ET Engineering Tool > SOPAS.  
By default, the software automatically searches for connected devices via the Ethernet, USB, and RS-232 interfaces.
2. Establish a connection between SOPAS ET and the device using the automatically launched wizard. Access via the Ethernet interface.  
To do so, select the relevant device in the list of available devices (default Ethernet address: IP address: 192.168.0.1, subnet mask: 255.255.255.0).
- ✓ SOPAS ET establishes communication with the device and loads the associated device description file. The **Quickstart** tab opens.

## 7.4 Quickstart with default settings

The purpose of the **Quickstart** function in the SOPAS ET configuration software is to make it simple and easy to obtain first transponder read results using the device. In this operating mode, the device displays all compatible transponders in its detection range based on the current device settings. During initial commissioning, this occurs using the default parameter settings for the device.



### NOTE

The "Quickstart" function is not intended to be used during normal operation.

- ▶ For operational use, select a read cycle using the object trigger control in SOPAS ET.

To use Quickstart, all mounting and electrical installation work must be complete (see the relevant sections in these operating instructions).

### 7.4.1 Detecting a transponder in Quickstart mode



### NOTE

The individual transponders must have a different UII/EPC so the device can identify multiple UHF transponders.

1. Bring one or more standards-compliant UHF transponders into the working range of the integrated antenna of the device.
2. Click the **Start** button on the **Quickstart** tab of SOPAS ET. SOPAS ET continuously generates an automatic read cycle and lists the identified transponders one after another in the Quickstart window.

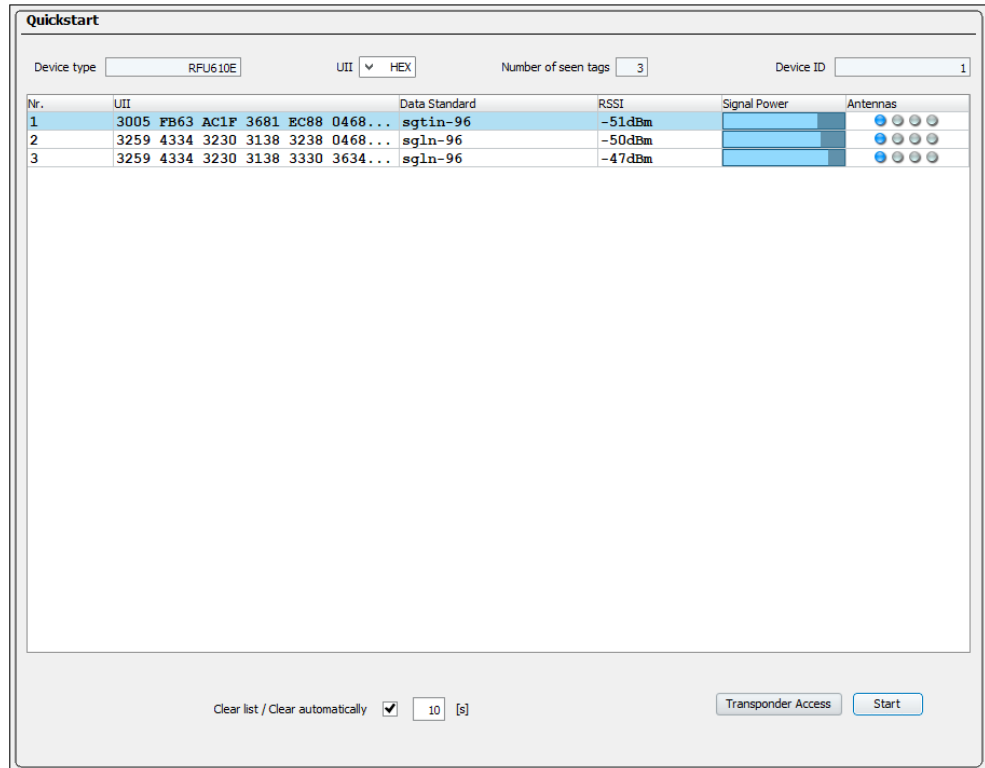


Figure 26: SOPAS ET display of the detected transponders in the Quickstart window

**Feedback about transponder detection in the UHF field**

In Quickstart mode, the default lighting behavior of the process feedback LEDs indicates whether a UHF field is present and whether the device has detected transponders.

The process feedback LEDs are located in the four corners of the antenna cover and light up blue in this case.

Choose between two brightness levels in SOPAS ET to adjust the brightness of the process feedback LEDs.

Table 14: Process feedback LEDs

LED status	Status
Lit up (permanently)	UHF field available, no transponder in the field
Flashing slowly (f = 1.25 Hz)	1 transponder in field
Flashing quickly (f = 2.5 Hz)	2 transponders in the field
Flashing faster (f = 5 Hz)	More than 2 transponders in field



These include amongst others:

- antenna configuration, performance optimization, data pre-processing, transponder processing
  - Object trigger control (e.g. via digital input “Sensor 1”), data processing and data output
  - Data output interface(s), function of the digital input, and use of an optional memory card if applicable
2. Set the transmitting power for the integrated (internal) antenna using sliders on the **Antenna Configuration** tab.
- The maximum permissible transmitting power for the integrated antenna is region-dependent, see Technical Information RFU61x Regulatory Compliance Information.
  - Transmitting power default: 10 dBm (10 mW)

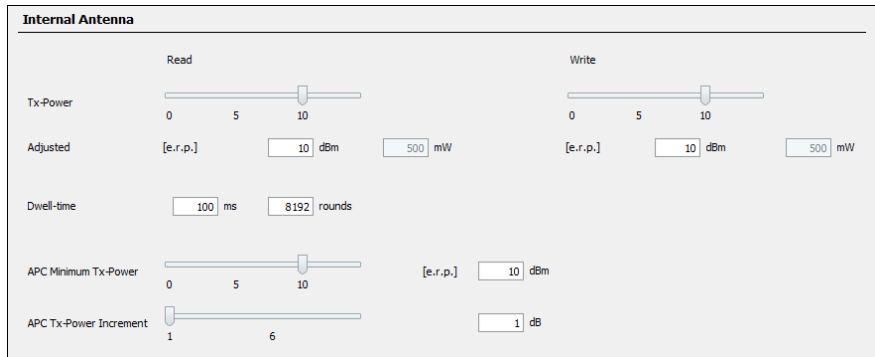



Figure 28: SOPAS ET: Example setting for the integrated antenna of the RFU61x

3. Test the configured settings during operational use of the system. Modify the settings if necessary.

#### 7.4.4 Completing the configuration

- ▶ Permanently save the entire configuration once it has been successfully tested:
  - Parameter set in the device: Click the button .
  - Configuration file on the computer: Click the buttons **Device > Export SDV file**.

### 7.5 Information on initial commissioning

The SOPAS ET configuration software on the computer is used to adapt the device to the particular application on site. The default factory settings of the device are the starting point for this. The default settings can also be accessed again after parameterization has been completed.

The parameter values (configuration data) in the working memory of the device can be modified to optimize the functionality of the device. This is done by creating an application-specific, further modifiable parameter set using SOPAS ET. The parameter set with the current configuration data is then loaded into the permanent parameter memory of the device.



**NOTE**

Recommendation: As part of a data backup plan, also save the current parameter set outside the device memory. This makes it easier, if necessary (device failure, etc.), to restore, to a replacement device of the same type, the current parameter set used to date.

### Memory organization for parameter set

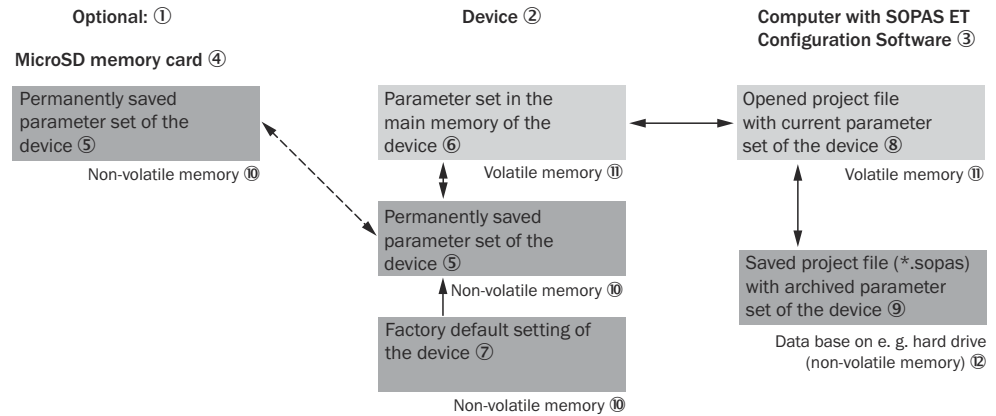


Figure 29: RFU610-106xx: Configuration and saving of the parameter set using SOPAS ET

- ① Optional
- ② Device
- ③ Computer with SOPAS ET configuration software
- ④ MicroSD memory card
- ⑤ Permanently saved device parameter set
- ⑥ Parameter set in the working memory of the device
- ⑦ Factory-set defaults for the device
- ⑧ Opened project file with current device parameter set
- ⑨ Saved project file (\*.sopas) with archived device parameter set
- ⑩ Nonvolatile memory
- ⑪ Volatile memory
- ⑫ Data base on the hard drive (non-volatile memory)

#### External data backup: option 1

To back up the configuration data outside the device memory, **manually** save the current parameter set to the computer as a project file (sopas file). This is the generally recommended procedure.

#### External data backup: option 2

The prerequisite for **automatically** backing up the current parameter set data outside the device memory is to have an additional external storage medium. The device can optionally be permanently connected to an external parameter memory for this purpose.

This can be achieved in the following way:

- By inserting a microSD memory card with sufficient storage capacity into the device.

#### Operating principle

Save the current parameter set to the permanent parameter memory of the device using the “permanent” option. The device then automatically also saves the parameter set to an external, permanent parameter memory.

#### Depending on the memory module used:

- To the memory card

At each restart after being switched on, the device loads the compatible parameter set from the external storage medium into its working memory and into its internal, permanent parameter memory.

At each restart after being switched on, the device loads the compatible parameter set from the external storage medium into its:

- Random Access Memory
- Internal, permanent parameter memory.

The parameter set is loaded either from a memory card or, depending on the configuration, from the CMC600 or CDF600.

At each restart after being switched on, the device loads the compatible parameter set from the external storage medium into its working memory and into its internal, permanent parameter memory.

In the event of device failure, for example, this approach enables the device to be quickly and easily replaced with another device of the same type provided the above prerequisites have been met. This is achieved without any loss of configuration data, and without having to connect the computer to the SOPAS ET configuration software.

### Memory card

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#### NOTE

Only use types approved by SICK to ensure reliable function of the memory card.

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#### NOTE

Memory cards can be found on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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## 8 Operation

### 8.1 Operating and status indicators

#### 8.1.1 Optical status indicators on the display panel

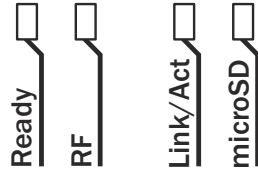


Table 15: RFU610-106xx: Function of the status displays

Display	Color	Behavior LED	Device status
Ready	-	○	Device without supply voltage
<b>After switching on supply voltage:</b>			
Ready <sup>1)</sup>	Orange	● <sup>2)</sup>	The device is not ready for use: The internal temperature of the device is below -25 °C.
	Green	● <sup>2)</sup>	Warm-up phase of the device: The internal temperature of the device is between -25 °C and -20 °C. The device starts normal operation after approx. 1 minute.
<b>Normal operation:</b>			
Ready	Green	●	The device is ready for use.
	Red	●	The device is not ready for use: Hardware error
RF	Green	●	The UHF field is switched on.
	Red	●	Interference: Integrated antenna or RF part
<b>Data transmission at the Ethernet interface:</b>			
Link/Act	Green	●	Device physically connected to Ethernet
<b>PROFINET operation with single port:</b>			
Ready	Green	●	The LED flashes cyclically, alternating 4 times red, 1 time green. <ul style="list-style-type: none"> <li>The device attempts to establish a connection to a PLC (IO controller)</li> <li>- or -</li> <li>During operation: The connection between the device and the PLC (IO controller) is interrupted, either logically or electrically.</li> </ul> For display behavior and device status, see the following table "PROFINET operation (single port)".
	Red	●	
<b>Memory card:</b>			

Display	Color	Behavior LED	Device status
microSD	-	○	Memory card not inserted
	Green	●	The memory card is inserted and ready for operation. <ul style="list-style-type: none"> <li>In this state, the device can either write data to the memory card or read data on the card.</li> <li>If the LED lights up, however, this does not indicate that the device is actually accessing the memory card.</li> </ul>
	Red	●	The memory card is inserted. However, the device cannot read data on the memory card. <p>Possible causes:</p> <ul style="list-style-type: none"> <li>The memory card does not contain any data</li> <li>The content is not readable</li> <li>The memory card is defective</li> </ul>

○ = LED off, ● = LED is lit, ● with a dot = LED flashes

- 1) Ready LED consists of green, yellow and red components.
- 2) Flash frequency 1 Hz.

**PROFINET operation (single port):**

The Ready status LED signals the device status in the PROFINET network.

Ready LED		Device status	Remarks
Green components	Red components		
●	○	Device is ready for use.	
●	● with a dot Flashes every 0.5 seconds.	PROFINET is activated in the device. The device is not connected to the PROFINET IO controller (PLC) or the device is not configured.	To not use PROFINET, deactivate PROFINET. In the default configuration of the device, automatic PROFINET network detection is activated. This detects during startup whether the device is in a PROFINET environment and activates PROFINET automatically. To prevent this, deactivate PROFINET network detection or set the device name different to the default. To apply the changed settings, permanently save the changes and restart the device.
● with a dot	● with a dot	The flashing function is activated via the configuration software.	The red and green components of the LED flash alternately. Prerequisite: PROFINET is activated in the device.

● = lights up; ● with a dot = flashes; ○ = does not light up

**8.1.2 Optical “process feedback” status indicator**

The “Process Feedback” status display operates with four LEDs. The LEDs are located in the corners of the antenna cover, see "Device view", page 16. The LEDs operate synchronously when displaying the status.



The behavior of the indicator (color, brightness, activation condition) can be configured. To adjust the brightness of the process feedback LEDs, select one of the two brightness levels using SOPAS ET.

The following activation conditions can be selected:

- Successful process of transponder handling. The process consists of: triggering and subsequent reading, if applicable also writing of transponder data.
- External SOPAS ET command, script
- A pre-defined or application-defined evaluation condition has occurred



#### NOTE

Select the activation condition and brightness using a configuration tool, for example SOPAS ET configuration software. The display can be deactivated.

#### Operating mode: Quickstart

This operating mode for detecting transponders in the UHF field is intended for demonstration purposes and for getting familiar with the operation of the device. In this mode, the device automatically generates continuous read cycles. Contrary to normal read operation (object-related read cycle triggering), the status indicator provides continuous feedback on the success of the transponder detection.

Table 16: Function of the "process feedback" status indicator in Quickstart mode

Color	Behavior	Status
Blue	Lights up at half brightness	UHF field available, no transponder in the field
Blue	Flashes at full brightness: Flashing slowly (f = 1.25 Hz)	1 transponder in field
	Flashing quickly (f = 2.5 Hz)	2 transponders in field
	Flashing faster (f = 5 Hz)	More than 2 transponders in field

The color of the indicator, and the brightness of the status indicator in Quickstart mode cannot be modified.



#### NOTE

The "Quickstart" function is not intended to be used during normal operation.

- For operational use, select a read cycle using the object trigger control in SOPAS ET.

#### Operating mode: Read mode

Table 17: Function of the "process feedback" status indicator in read mode

Color	Behavior	Status
Blue	Lights up for the duration of the in-progress reading interval	Read operation was started by an external or internal trigger source, device has started an internal reading interval (event)
Green	Lights up briefly	Device has ended the internal reading interval. Transponder detected and optionally selected condition(s) met -> Good Read (event)
Red	Lights up briefly	Device has ended the internal reading interval. Transponder not detected or optionally selected condition(s) not met -> No Read (event)

## 8.1.3 Operating options and configuration tools

**NOTE**

In addition to the existing operating instructions, the use of the RFU parameter description is recommended:

- This parameter description explains the UHF-RFID-specific parameters of all device variants of the RFU6xx product family up to and including the “Service” user level.
- The parameter description assists with setting up applications using the SOPAS ET configuration software.

The parameter description is available in English (part no. 8023085) and German (part no. 8023084) as well as other languages if required.

**NOTE**

The parameter description can be found on the product page.

The call is made via the **SICK Product ID: `pid.sick.com/{P/N}/{S/N}`**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

The device can be operated and configured in the following 5 ways for specific tasks:

**1. SOPAS ET configuration software**

- Standard configuration tool for the device
- The configuration software and appropriate device description file are installed on a computer. These are available online at: [www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET)
- Password-protected configuration at four different operating levels (user levels):

Level	User levels	Note
1	Operator	No entry of password required, no configuration possible
2	Maintenance personnel	Entry of password required
3	Authorized client	
4	Service	

**NOTE**

The two user levels “Run” and “Maintenance” are only password protected if the “Parameterization is password-protected” parameter in SOPAS ET is activated.

By default, logging into the device accesses the “Authorized client” user level. This requires the entry of a password.

- Type-dependent access to the device using the configuration software via:
  - Local data interface on the device
  - Ethernet network
- Backup of the parameter set to a location outside the device memory:
  - Manually to a configuration file on the computer
  - Semi-automatically to an optional MicroSD memory card
- Access to the device via the AUX or host interface
- Organization of the device constellation into projects
- The configuration software is used for device diagnostics in case of a fault.
- The configuration software supports firmware updates for the device

## 2. Integrated SOPASair web server

- No installation of configuration software required, an Internet-capable HTML browser is sufficient. Access to the device by entering an IP address
- No administrator rights required, no firewall restrictions.
- Web server runs directly on the device being contacted (embedded in the firmware).
- Access only via the Ethernet interface and by entering the IP address of the device
- Access locally on the device or via the network
- Used to configure a stand-alone device.
- Password-protected configuration at four different operating levels. Naming of the user levels, in English only here:

Level	User levels	Note
1	Run	No entry of password required, no configuration possible
2	Maintenance	Entry of password required
3	AuthorizedClient	
4	Service	

- Has limited functionality compared to the SOPAS ET configuration software. The functionality of the web server depends on the firmware version of the device.

## 3. Command strings (telegrams)

- Command strings (CoLa) are used to configure device parameters and trigger device functions (e.g. reading).
- Command strings can be entered in telegram style at one of the available data interfaces (AUX or host interface) of the device. The telegram response of the device to the command is always sent to the interface on which the telegram was received. In contrast to this, the read result data can be outputted to all data interfaces except for the USB interface.
- The communication between the SOPAS ET configuration software and the device can be monitored and recorded via the terminal emulator in SOPAS ET. Commands can also be sent to the device. For more details on using the terminal, see the SOPAS ET manual.
- Documents listing and describing the available commands strings can be obtained from SICK on request.



### NOTICE

Both the command strings and the SOPAS ET configuration software are based on a command language. The command language directly accesses the command interpreter of the device. The command language must therefore be used with care, as the commands received by the device are executed immediately.

Parameter values modified by means of commands are initially only active in the current parameter set in the volatile working memory of the device. To permanently save the modified parameter set, it needs to be copied to the non-volatile parameter memory using the relevant command. This ensures the changes are not lost when the supply voltage to the device is switched off.

**Any changes to the parameter values in the device made using command strings will only appear in the SOPAS ET configuration software after the following actions:**

- An upload of the current parameter set from the device, or
- A synchronization between the device and SOPAS ET

### 4. Control software of a PLC controller

- The controller of a fieldbus (e.g. PLC) configures the device. For a PROFINET controller, for example, this is done via PROFINET by means of GSD parameterization. Backup of the parameter set as a configuration file in the PROFINET controller. The controller reconfigures the device at every PROFINET restart.
- Integrating the device into the most important fieldbus systems is made simpler with SICK function blocks for the relevant bus controller.



#### NOTE

You will find SICK function blocks for various types of PLC from different manufacturers on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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- The function blocks are based on command strings (CoLa).

### 5. SICK AppStudio development environment

- Used, for example, to implement application-specific data output protocols for the device. Based on functionalities already pre-installed in the programmable device.
- The app programmed using SICK AppStudio is loaded onto the device as a sensor app.
- More information is available online at: [www.sick.com/SICK\\_AppStudio](http://www.sick.com/SICK_AppStudio)

## 9 Maintenance

### 9.1 Maintenance plan

During operation, the device works maintenance-free.

Depending on the assignment location, the following preventive maintenance tasks may be required for the device at regular intervals:

Table 18: Maintenance plan

Maintenance work	Interval	To be carried out by
Check device and connecting cables for damage at regular intervals.	Depends on ambient conditions and climate.	Specialist
Clean front of the device and external antennas, e.g. to remove metal dust.	Depends on ambient conditions and climate.	Specialist
Check the screw connections and plug connectors.	Depends on the place of use, ambient conditions or operating requirements. Recommended: At least every 6 months.	Specialist
Check that all unused connections are sealed with protective caps.	Depends on ambient conditions and climate. Recommended: At least every 6 months.	Specialist

### 9.2 Cleaning



#### NOTICE

#### Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
- Never use sharp objects for cleaning.

- ▶ If it is dirty (e.g., metal dust), clean the front of the device carefully using a soft, damp cloth (with a mild cleaning agent) in order to achieve the full read and write speed.
- ▶ The device must be cleaned regularly from the outside to guarantee heat dissipation and therefore operation. Particular attention must be paid to ensure that the cooling ribs and, if present, the fan are free from dust and dirt. Use a dry cloth or an industrial vacuum cleaner for cleaning. Do not use cleaning agents.

## 10 Troubleshooting

### 10.1 Overview of Potential Errors and Faults



#### WARNING

#### Risk of injury due to damage to the device!

For reasons of safety, if a device shows visible signs of damage do not put it into operation, or take it out of operation immediately.

Possible damage (depending on type):

- Housing: cracking, splitting or fracture
- Electrical connections (male connector or female connector): cracks or detachment from the housing

Table 19: Errors and faults

Situation	Error/ fault
Mounting	<ul style="list-style-type: none"> <li>■ Device poorly aligned to the objects with transponders (e.g. faults due to metal surfaces located next to the device)</li> <li>■ Damping materials between the device and transponders, e.g. liquids</li> <li>■ Trigger sensor for read cycle generation positioned incorrectly. Possible cause: e.g., internal reading gate in the device is opened too late or closed too early.</li> </ul>
Electrical installation	<ul style="list-style-type: none"> <li>■ Supply voltage too low or incorrect polarity</li> <li>■ Data interfaces of the device wired incorrectly</li> <li>■ Digital inputs or digital outputs incorrectly wired</li> </ul>
Configuration	<ul style="list-style-type: none"> <li>■ Functions not adapted to local conditions, e.g., parameters for the data interface not set correctly</li> <li>■ Device limits not observed, e.g. working range of the antenna</li> </ul>
Operation	<ul style="list-style-type: none"> <li>■ Ambient temperature too low or high</li> <li>■ Read pulse control not suitably configured for the object(s) in the working range.</li> <li>■ Device faults (hardware/ software)</li> </ul>

### 10.2 Detailed fault analysis

#### 10.2.1 LEDs on the device

The status displays of the device can indicate possible faults or errors, see ["Optical status indicators on the display panel"](#), page 55.

#### 10.2.2 System information

The device reports any errors that occur in a number of ways. The error output is hierarchical. This hierarchical structure allows for an increasingly detailed level of analysis:

- Communication errors can occur when transmitting telegrams (e.g. commands) to a data interface of the device. The device then returns a fault code on the same data interface.
- For errors that occur during reading, the device writes error codes in the status log (see ["Status log"](#), page 63).

## 10.3 Status log



### NOTE

The status log is retained even after switching the device off and on again.

The device distinguishes between four types of faults:

- Information
- Warning
- Fault
- Critical fault

The device saves only the last five entries for each fault type.

### 10.3.1 Displaying the Status Log

To display the status log, connect the SOPAS ET configuration software with the device online.

1. Connect the SOPAS ET configuration software to the device.
2. In the RFU6xx project tree open: Service > System Status

## 10.4 SICK service

If an error cannot be rectified, the device may be defective.

The device cannot be repaired by the customer. Interrupting or modifying the device will invalidate any warranty claims against SICK AG.

Fast replacement of a device by the customer is, however, possible.

- ▶ If a fault cannot be rectified, contact the SICK Service department. To find your agency, see the final page of this document.



### NOTE

Before calling, make a note of all type label data such as type designation and serial number to ensure faster assistance.

## 10.5 Repairs

Repair work on the device may only be performed by qualified and authorized personnel from SICK AG. Interruptions or modifications to the device by the customer will invalidate any warranty claims against SICK AG.

## 10.6 Returns

- ▶ Only send in devices after consulting with SICK Service.
- ▶ The device must be sent in the original packaging or an equivalent padded packaging.



### NOTE

#### Optional memory card

- Check whether there is a memory card in the card slot of the device. If yes, remove the memory card from the faulty device in **de-energized state**.
- Do not send in the memory card!



**NOTE**

To enable efficient processing and allow us to determine the cause quickly, please include the following when making a return:

- Details of the contact person
- Description of the application
- Description of the fault that occurred
- If available: configuration data (sdv file)

## 10.7 Replacing the device

### 10.7.1 Reusing the current configuration data

The configuration data of the device is combined as a parameter set. The replacement device saves the parameter set to the permanent parameter memory.

**Prerequisites:**

- The replacement device is a device of the same type.
- Device to be replaced: The current configuration data can be accessed from a storage medium outside the device memory.

The available options depend on the backup plan chosen by the customer back at the time of installation, and the configuration of the device now needing to be replaced.

The configuration data of the device to be replaced can be transferred to a replacement device in two ways.

No.	Method	Prerequisite	Note
1	Transfer of the configuration data using the optional memory card removed from the device to be replaced	The device automatically transferred the configuration data to the memory card in the device. This occurred at the last permanent save using the "permanent" option.	It is not necessary to connect a computer with the SOPAS ET configuration software for transfer to the replacement device.
2	Transfer of the configuration data by means of a download from the computer	The configuration data of the device to be replaced were saved on the computer. This took place on completion of configuration of the device using the SOPAS ET configuration software.	

The first method is performed semi-automatically by the device depending on the setup. The second method is performed manually.



**NOTE**

For further information see ["Information on initial commissioning", page 52](#)

### 10.7.2 Removing the device to be replaced



**NOTICE**

**Risk of damage to the memory card**

- ▶ To avoid damaging the microSD memory card, make sure the device is **de-energized** when you insert or remove the card. For this purpose, disconnect the device from the supply voltage.

1. Mark the position and alignment of the device on the bracket or surroundings.
2. Disconnect and remove all connecting cables from the device.



3. Detach device. Remove from the bracket.
4. Saved configuration data: If an optional memory card is installed in the device, remove the memory card with the saved parameter set. The memory card is located behind the side cover, [see "Device view", page 16](#).

### 10.7.3 Putting the replacement device into operation

1. Backed-up configuration data: take the optional memory card from the device being replaced and install it in the replacement device of the same type.
2. Mount and align the replacement device ([see "Mounting", page 25](#)). When doing so, note the previously applied markings on the bracket or surroundings.
3. Reconnect the connecting cables to the replacement device ([see "Electrical installation", page 31](#)).
4. Switch on the supply voltage for the replacement device.  
The device starts up with the default setting. The device then searches for external storage media with a valid parameter set. If the device detects storage media with a valid parameter set, the device does the following:
  - Only memory card in the device:  
The replacement device loads the parameter set located on the memory card.The replacement device loads the parameter set into its permanent memory. The device now operates using the configuration data.
5. If the replacement device does not detect any external storage medium, the device starts with its last permanently stored parameter set. In the case of devices that have not been used before, this corresponds to the factory default setting.
  - ▶ Establish a connection with the replacement device using the SOPAS ET configuration software.
  - ▶ Transfer the configuration data of the device to be replaced, which was previously saved to the computer, by downloading it to the replacement device and permanently storing it there.

### 11 Decommissioning

#### 11.1 Disposal

If a device can no longer be used, dispose of it in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.



#### **NOTICE**

**Danger to the environment due to improper disposal of the device.**

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

- Always observe the national regulations on environmental protection.
  - Separate the recyclable materials by type and place them in recycling containers.
-

## 12 Technical data



### NOTE

The relevant online product page for your product, including technical data, dimensional drawing, and connection diagrams, can be downloaded, saved, and printed from the Internet.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

Please note: This documentation may contain further technical data.

### 12.1 Features

Table 20: Technical data RFU610-106xx: Features

	RFU610-106xx
<b>Version (working range)</b>	Short Range
<b>Product category</b>	RFID read/write device (UHF) with integrated antenna
<b>Radio equipment approval (regional assignment)</b>	Depending on type (country variants), see Technical Information RFU61x Regulatory Compliance Information <sup>1)</sup>
<b>Frequency band</b>	
<b>Transmitting power</b>	
<b>RFID standard (air interface)</b>	ISO/IEC 18000-63, EPCglobal UHF Class 1 Generation 2 Labeling in type code: RFU6x0-xxxxx
<b>Modulation</b>	PR-ASK
<b>Read range</b>	Typically 0.5 m <sup>2)</sup>
<b>Antenna</b>	<b>Integrated antenna</b> <ul style="list-style-type: none"> <li>• Transmitting power: Adjustable</li> <li>• Polarization: circular (LHCP <sup>3)</sup>)</li> <li>• Axis behavior: typically 2 dB (ETSI), 3 dB (FCC)</li> <li>• Aperture angle: 110°</li> <li>• Front-to-back ratio: Typically &gt; 5 dB</li> </ul>
<b>Service functions</b>	Automatic saving of parameter data (parameter cloning) outside the device memory: <ul style="list-style-type: none"> <li>• Using insertable microSD memory card <sup>4)</sup> in the device</li> </ul>
<b>Clock</b>	Via network time protocol (NTP), no internal clock
<b>Conformities</b>	Certificates are type-dependent (country variants), see: <ul style="list-style-type: none"> <li>• Technical Information RFU61x Regulatory Compliance Information <sup>1)</sup></li> </ul> UL: RFU610-10601 (USA and Canada) <sup>5)</sup>

<sup>1)</sup> A printed copy of the document is enclosed with the device.

<sup>2)</sup> The read range depends on the transponder used and the ambient conditions.

<sup>3)</sup> LHCP (Left-Hand Circular Polarization) = left-hand circular polarized.

<sup>4)</sup> Optional accessories.

<sup>5)</sup> UL-certified if the type label contains the UL logo and the UL conditions are met during device operation. For further information, see "UL conformity", page 72.

**NOTE**

You will find the Technical Information RFU61x Regulatory Compliance Information on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

## 12.2 Interfaces

Table 21: Technical data for RFU610-106xx: Interfaces

	RFU610-106xx
<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• Protocols: TCP/IP, OPC UA (Companion Spec V1.0, from firmware V2.20)</li> <li>• uFunction: Host (data output of the read result)</li> <li>• Function: AUX (service) <sup>1)</sup></li> <li>• Data transmission rate 10/100 Mbit/s</li> <li>• Services: DHCP, NTP, HTTP/HTTPS</li> </ul>
<b>PROFINET</b>	<ul style="list-style-type: none"> <li>• Protocol: PROFINET</li> <li>• Function: Host (data output of read result), PROFINET Single Port <sup>2)</sup></li> <li>• Data transmission rate 10/100 Mbit/s</li> </ul>
<b>EtherNet/IP™</b>	<ul style="list-style-type: none"> <li>• Protocol: EtherNet/IP™</li> <li>• Function: Host (data output of the read result)</li> <li>• Data transmission rate 10/100 Mbit/s</li> </ul>
<b>USB 2.0</b> <sup>3)</sup>	<ul style="list-style-type: none"> <li>• Function: AUX (service) <sup>1)</sup></li> </ul>
<b>Digital input</b>	<ul style="list-style-type: none"> <li>• Design: Physical, switching</li> <li>• <math>V_{in}</math> <sup>4)</sup> = max. 30 V, <math>I_{in}</math> <sup>5)</sup> = max. 5 mA. <math>V_{S\ Trigger}</math> <sup>6)</sup> = <math>V_S</math>, <math>I_{S\ Trigger}</math> <sup>7)</sup> = max. 40 mA</li> <li>• Debounce time: Adjustable <sup>8)</sup></li> <li>• A corresponding trigger sensor (e.g. GL6) can be connected directly</li> </ul>
<b>Optical displays</b>	<ul style="list-style-type: none"> <li>• 4 RGB LEDs (status indicator) at top of front</li> <li>• 4 RGB LEDs (process feedback) in the four corners of the antenna cover. Display function with predefined color assignment, adjustable <sup>8)</sup>.</li> </ul>
<b>Configuration</b>	SOPAS ET configuration software, CoLa commands (telegrams), web server, fieldbus controller (PLC) with additional support by SICK function blocks
<b>Programming</b>	Application-specific programming with the SICK AppStudio <sup>9)</sup> development environment. You can find further information on the Internet at: <a href="https://www.sick.com/SICK_AppStudio">www.sick.com/SICK_AppStudio</a>

1) Service: e.g. configuration, diagnosis, transponder access or prepared representation of the read result.

2) Function blocks for PLC types from different manufacturers are available.

3) The USB interface is only for temporary use as a service interface.

4) Input voltage.

5) Input current.

6) Supply voltage for external trigger sensor.

7) Supply current for external trigger sensor.

8) For example using the SOPAS ET configuration software.

9) This functionality can be unlocked with the SDK6U SD card. Available online at: [www.sick.com](https://www.sick.com).



**NOTE**

You will find SICK function blocks for various types of PLC from different manufacturers on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

## 12.3 Mechanics and electronics

Table 22: Technical data for RFU610-106xx: Mechanics and electrics

	RFU610-106xx
Connection type	Power and Ethernet or PoE <ul style="list-style-type: none"> <li>• Connection 1: Male connector, M12, 4-pin, A-coded</li> <li>• Connection 2: Female connector, M12, 8-pin, X-coded</li> <li>• Connection 3: Female connector, M8, 4-pin, coded</li> <li>• USB interface: Female connector, 5-pin, type Micro-B <sup>1)</sup></li> <li>• Card slot for the MicroSD memory card</li> </ul>
Supply voltage V <sub>S</sub>	ES1 according to EN 62368-1, NEC protection class 2 (UL1310) <ul style="list-style-type: none"> <li>• Power and Ethernet: 18 V ... 30 V DC</li> <li>• PoE: 48 V / 57 V DC according to PoE technology</li> </ul>
Power consumption	<ul style="list-style-type: none"> <li>• Operation: Typically 6 W <sup>2)</sup></li> <li>• Standby: 3 W typical</li> </ul>
Housing	Aluminum die cast, plastic (PPS)
Housing color	Black, silver
Side cover	<ul style="list-style-type: none"> <li>• Plastic foil, cover can be opened for temporary access to the USB interface and card slot</li> <li>• Recommended tightening torque for the cover screws: 30 Ncm ± 5 Ncm</li> </ul>
Protective elements	For unused electrical connections Tightening torque: Hand tightened
MTBF	22 years <sup>3)</sup>
Enclosure rating	IP67 (EN 60529:1991-10/A2:2000-02)
Protection class	III (EN 61140:2006-08)
Safety	EN 62368-1:2014-08
Weight	Approx. 313 g
Dimensions (L x W x H)	92 mm x 80 mm x 38 mm <sup>4)</sup>

1) Behind side cover.

2) At full transmitting power.

3) Continuous operation at an ambient operating temperature of +50 °C.

4) With any protruding connection or fastening elements, see "Device view", page 16.

## 12.4 Ambient data

Table 23: Technical data for RFU610-106xx: Ambient data

	RFU610-106xx
Electromagnetic compatibility (EMC)	EN 301489-1 V2.1.1 (2017) EN 301489-3 V1.6.1 (2013)
Vibration resistance	IEC 60068-2-6:2007(10 Hz ... 150 Hz / 5 g sine) IEC 60068-2-64: 2008(10 Hz ... 500 Hz / 3.5 g RMS)
Shock resistance	IEC 60068-2-27:2008 (30 g / 6 ms / 12 shocks per axis/half sine and 25 g / 6 ms / 200 shocks per axis/half sine)

	RFU610-106xx
Ambient temperature	<ul style="list-style-type: none"><li>• Operation: -25 °C ... +50 °C</li><li>• Storage <sup>1)</sup>: -40 °C ... +70 °C</li></ul>
Permissible relative humidity	0% ... 90%, non-condensing

<sup>1)</sup> Storage conditions [see "Storage", page 24.](#)

### 12.5 Working range diagram

[see "Read range", page 17.](#)

### 12.6 Dimensional drawing

Dimensions [see "Device view", page 16.](#)

## 13 Accessories



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**NOTE**

On the product page you will find accessories and, if applicable, related installation information for your product.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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## 14 Annex

### 14.1 Declarations of conformity and certificates

You can download declarations of conformity and certificates via the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

### 14.2 UL conformity



Several devices (country variants for USA) in the RFU6xx product family are certified to UL 61010-1; the UL file number is E336916.

The certification is only valid for specific type descriptions on the type label of the respective device, see "Type label", page 14.

Device type RFU610: see "Features", page 67 in the technical data.

UL-certified devices require a supply voltage according to ES1, EN 62368-1, NEC protection class 2 (UL1310).

The IP67 enclosure rating of the device is not checked by UL.

### 14.3 Dimensional drawings (electronic)



#### NOTE

You will find dimensional drawings in various electronic formats on the product page.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

### 14.4 Signal assignment of cables with open cable end at one end

#### 14.4.1 "Power" connection to customer-specific connection equipment or control cabinet

##### Adapter cable

Part no. 2095607 (2 m), part no. 2095608 (5 m), part no. 2095609 (10 m), female connector, straight, M12, 4-wire, A-coded, unshielded, suitable for drag chain, deep-freeze compatible

For RFU61x PoE, Power over Ethernet, "Power" connection (male connector, M12, 4-pin, A-coded)

Ambient temperature range:

For mobile installation: -25 °C to +80 °C, for fixed installation: -40 °C to +80 °C



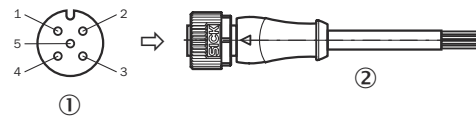


Figure 30: Adapter cable, part no. 2095607 (2 m), part no. 2095608 (5 m), part no. 2095609 (10 m) with one flying lead

- ① Female connector, straight, M12, 5-pin, A-coded (view from front)
- ② Illustration may differ

Table 24: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	V <sub>S</sub>	Supply voltage	Brown
2	Reserved	(Do not use.)	White
3	GND_ext	Primary ground	Blue
4	Reserved	(Do not use.)	Black
5	N.c.	Not connected	–

### Adapter cable

Part no. 2095766 (2 m), part no. 2095767 (5 m), part no. 2095768 (10 m), female connector, angled, M12, 4-wire, A-coded, unshielded, suitable for drag chain, deep-freeze compatible

For RFU61x PoE, Power over Ethernet, “Power” connection (male connector, M12, 4-pin, A-coded)

Ambient temperature range:

For mobile installation: –25 °C to +80 °C, for fixed installation: –40 °C to +80 °C

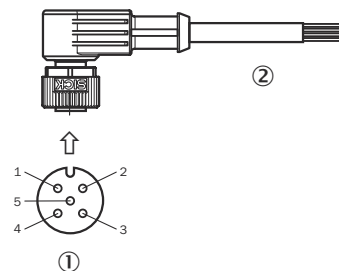


Figure 31: Adapter cable, part no. 2095766 (2 m), part no. 2095767 (5 m), part no. 2095768 (10 m) with one flying lead

- ① Female connector, 90° angle, M12, 5-pin, A-coded (front view)
- ② Figure may differ.

Table 25: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	V <sub>S</sub>	Supply voltage	Brown
2	Reserved	(Do not use.)	White
3	GND_ext	Primary ground	Blue
4	Reserved	(Do not use.)	Black
5	N.c.	Not connected	–

## 14.5 Copyright notices

### Open source programs

SICK uses open-source software in the device. This software is licensed by the rights holders using the following licenses among others: the free licenses GNU General Public License (GPL Version2, GPL Version3) and GNU Lesser General Public License (LGPL), the MIT license, zLib license, and the licenses derived from the BSD license.

This program is provided for general use, but WITHOUT ANY WARRANTY OF ANY KIND. This warranty disclaimer also extends to the implicit assurance of marketability or suitability of the program for a particular purpose. More details can be found in the GNU General Public License.

For complete license texts, see [www.sick.com/licensetexts](http://www.sick.com/licensetexts)

Printed copies of the license texts are also available on request.

## 14.6 Abbreviations used

### General

<b>CE</b>	Communauté Européenne. European Community
<b>CoLa-A</b>	Command Language ASCII (SICK-specific protocol)
<b>DNS</b>	Domain Name Server
<b>ES1</b>	Electrical Energy Source Class 1 (Class 1 electrical energy source)
<b>ESD</b>	Electro-Static-Discharge. Electrostatic discharge
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EMC</b>	Electromagnetic Compatibility
<b>ERP</b>	Effective Radiated Power. Effective radiant power
<b>EIRP</b>	Equivalent Isotropic Radiated Power. Equivalent isotropic radiated power
<b>FCC</b>	Federal Communications Commission
<b>GSD</b>	General Station Description (Generic station description for PROFIBUS/PROFINET)
<b>HTML</b>	Hyper Text Markup Language (Page description language used in the Internet)
<b>I</b>	Input (Input)
<b>I<sub>in</sub></b>	Input current
<b>I<sub>out</sub></b>	Output current
<b>I<sub>s Trigger</sub></b>	Supply current for external trigger sensor
<b>LED</b>	Light Emitting Diode. Light-emitting diode
<b>LHCP</b>	Left hand circular polarized. Left-hand circularly polarized
<b>LPS</b>	Limited Power Supply
<b>MAC</b>	Medium Access Control
<b>MTBF</b>	Mean Time Between Failures
<b>MTTF</b>	Mean Time To Failure
<b>MTRR</b>	Mean Time To Repair
<b>O</b>	Output
<b>PD</b>	Powered Devices. Energy consumer
<b>PDF</b>	Portable Document Format
<b>PoE</b>	Power over Ethernet. Voltage supply via Ethernet
<b>PSE</b>	Power Sourcing Equipment. Power source when using PoE

<b>RFID</b>	<b>Radio Frequency Identification</b>
<b>RTF</b>	<b>Rich Text Format</b> (Standard document format with format descriptions)
<b>RFU</b>	<b>Radio Frequency Ultra high frequency</b>
<b>SD</b>	<b>Secure Digital</b>
<b>SOPAS ET</b>	<b>SICK Open Portal for Application and Systems Engineering Tool.</b> SICK software for computer (Windows) for device configuration.
<b>SDD</b>	<b>SOPAS Device Description</b> (Device description file, driver for SICK SOPAS ET software)
<b>PLC</b>	<b>Programmable Logic Controller</b>
<b>TCP/IP</b>	<b>Transmission Control Protocol/Internet Protocol</b>
<b>TID</b>	<b>Tag Identifier</b> (Transponder Identification Number. Unique, unchangeable number from the IC manufacturer.
<b>UHF</b>	<b>Ultrahighfrequency</b>
<b>UII</b>	<b>Unique Item Identifier.</b> Used to identify the transponder (can be changed individually).
<b>UL</b>	<b>Underwriters Laboratories</b>
<b>USB</b>	<b>Universal Serial Bus</b>
<b>VESA</b>	<b>Video Electronics Standards Association</b>
$V_{in}$	Input Voltage
$V_{out}$	Output voltage
$V_S$	Supply voltage
$V_{S\ ext}$	External supply voltage
$V_{S\ Trigger}$	Supply voltage for external trigger sensor

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