OPERATING INSTRUCTIONS

RFH620

RFID WRITE/READ DEVICE (HF)

SICK
Sensor Intelligence.

Software Versions

Software/Tool	Function	Version
RFH620 write/read device	SICK firmware	From v 1.00
Device Description RFH620	Device-specific software module for SOPAS-ET configuration software	From v 1.00
SOPAS-ET	Configuration software	From v 3.00

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Figures and Tables

Abbreviations used

AM	**A**mplitude **M**odulation
CAN	**C**ontrolled **A**rea **N**etwork. Field bus protocol on the basis of the CAN bus
CDB	**C**onnection **D**evice **B**asic
CDM	**C**onnection **D**evice **M**odular
CMC	**C**onnection **M**odule **C**loning
CMD	**C**onnection **M**odule **D**isplay
CMF	**C**onnection **M**odule **F**ield bus
CMP	**C**onnection **M**odule **P**ower
DSFID	**D**ata **S**torage **F**ormat **ID**entifier
DSP	**D**igital **S**ignal **P**rocessor
EOF	**E**nd **O**f **F**rame
ETX	**E**nd **O**f **T**ext
FCC	**F**ederal **C**ommunications **C**ommission
HTML	**H**yper **T**ext **M**arkup **L**anguage (page description language in the internet)
I	**I**nput
IC	**I**ntegrated **C**ircuit
ID	**ID**entification
IP	**I**nternet **P**rotocol
ISO/IEC	**I**nternational **O**rganisation for **S**tandardisation / **I**nternational **E**lectrotechnical **C**ommission
ITF	**I**nterrogator **T**alks **F**irst
LED	**L**ight **E**mitting **D**iode. Light emitting diode
LSB	**L**east **S**ignificant **B**it
MAC	**M**edium **A**ccess **C**ontrol
MSB	**M**ost **S**ignificant **B**it
MTTF	**M**ean **T**ime **T**o **F**ailure
MTTR	**M**ean **T**ime **T**o **R**epair
O	**O**utput
PC	**P**ersonal **C**omputer
PID	**P**rocess **ID**
PROM	**P**rogrammable **R**ead **O**nly **M**emory. Programmable read only memory
RAM	**R**andom **A**ccess **M**emory. Random access memory
RF	**R**adio **F**requency
RFID	**R**adio **F**requency **ID**entification
ROM	**R**ead **O**nly **M**emory. Read only memory (non-volatile)
RSSI	**R**eceived **S**ignal **S**trength **I**ndication
RTF	**R**ich **T**ext **F**ormat (standardised document format with format description)
SD	**S**ecure **D**igital
SOF	**S**tart **O**f **F**rame
SOPAS-ET	**S**ICK **O**pen **P**ortal for **A**pplication and **S**ystems **E**ngineering **T**ool (PC software for Windows for configuring the RFH620)
PLC	**P**rogammable **L**ogic **C**ontroller
STX	**S**tart **O**f **T**ext

TCP/IP	**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol
TID	**T**ag **ID**entifier
UID	**U**nique **ID**entification code

Tables

Figures

1 Notes on this document

1.1 Purpose of this document

This document provides instructions for technical staff on the installation and operation of the RFID write/read device of series RFH620 in the following versions:

- Serial version (with cable and D-sub connector)
- Ethernet version (with connector unit)

A summary of all device versions is shown in *chapter 4.1 Device versions, page 19*.

This document contains information for:

- Installation
- Electrical installation
- Commissioning and configuration
- Maintenance and replacement of the RFID write/read device
- Troubleshooting

A step-by-step approach is taken for all tasks.

Important To simplify, the RFID RFH620 write/read device is described in these operating instructions as RFH620.

The description "transponder" and "tag" are interchangeable. The description "transponder" is used in these instructions.

1.2 Target group

The target group of this document is persons assigned the following tasks:

Tasks	Target group
Installation, electrical installation, maintenance, device replacement	Qualified staff, e.g., service technicians and factory electricians
Commissioning and configuration	Trained staff, e.g., technicians or engineers

Tab. 1-1: Target group of this document

1.3 Depth of information

This document contains all the information required for the installation, electrical installation and commissioning of the RFH620 at the installation location.

Configuration of the RFH620 for **application-specific reading conditions** and the commissioning is carried out using the SOPAS-ET configuration software on a Windows™ PC. The SOPAS-ET configuration software contains an online help system to facilitate configuration.

Important Further information about the design of the RFH620 as well as the RFID technology is available at SICK AG, Auto Ident division. On the Internet at **www.sick.com**.

1.4 Used symbols

To gain easier access, some information in this documentation is emphasised as follows:

NOTICE

Notice!

Notice indicates a potential risk of damage or impair on the functionality of the RFH620 or other devices.

➢ Carefully read and follow the notice details!

⚠ WARNING

Warning notice!

A warning notice indicates real or potential danger. This should protect you against accidents.

The safety symbol next to the warning notice indicates why there is a risk of accident, e. g., due to electricity. The warning levels (DANGER, WARNING, CAUTION) indicate the seriousness of the risk.

➢ Carefully read and follow the warning notices!

Reference Italic script denotes a reference to further information.

Important This important note informs you about specific features.

Explanation An explanation provides background knowledge of technical nature.

Recommendation A recommendation helps you to carry out tasks correctly.

TIP A tip explains setting options in the SOPAS-ET configuration software.

PROJECT This type of script denotes a term in the user interface in the SOPAS-ET configuration software.

A symbol indicates a button in the user interface of the SOPAS-ET configuration software.

➢ There is a procedure which needs to be carried out. This symbol indicates standard operating procedures, which contain only one operational step or operational steps in warning notices that do not have to be followed in any particular order. Operational instructions comprising several steps are denoted using consecutive numbers.

This symbol denotes a section, in which the operation steps with the SOPAS-ET configuration software are described.

This symbol indicates supplementary technical documentation.

2 For your safety

This chapter deals with your safety and that of the system operator.

➢ Read this chapter carefully **before** using the RFH620.

2.1 Authorised users

For correct and safe functioning, the RFH620 must be installed, operated and maintained by sufficiently qualified staff.

Important **Repairs to the RFH620 should only be carried out by qualified and authorised SICK AG service staff.**

➢ The operating instructions should be made available to the end user.

➢ The end user should be briefed and urged to read the operating instructions by the technicians.

The following qualifications are required for different activities:

Tasks	Qualification
Installation, maintenance	• Practical technical training • Knowledge of current health and safety regulations at the workplace • Basic knowledge of HF technology
Electrical installation, device replacement	• Practical electrical training • Knowledge of current electrical safety regulations • Knowledge of start-up and operation of the device in each operational area (e. g. conveyor system) • Basic knowledge of HF technology
Start-up and configuration	• Basic knowledge of the Windows operating system in use • Basic knowledge of designing and setting up (addressing) Ethernet connections for connecting the RFH620 to the Ethernet • Basic knowledge of working with an HTML browser (e. g. Internet Explorer) for using the online help • Basic knowledge of data transfer • Basic knowledge of RFID technology • Basic knowledge of HF technology
Operation of the device in each operational area	• Knowledge of start-up and operation of the device in each operational area (e. g. conveyor system) • Knowledge of the software and hardware environment in each operational area (e. g. conveyor system)

Tab. 2-1: Required qualification for commissioning the RFH620

2.2 Intended use

The RFH620 is an ISO/IEC-15693 compatible transponder writer/read device for the close-up range (operating range of up to 160 mm), e. g., in a conveyor system.

The intended use of the RFH620 results from the following description of the function:

- The RFH620 is installed in a holder in a reading station.
- The RFH620 transfers the reading data via the host interface to a superordinate host computer for further processing.
- The RFH620 is configured/operated using the SOPAS-ET configuration software that runs on a standard client PC provided by the customer. In this connection, communication takes place via RS-232 or Ethernet.
- The RFH620 controls (locally), e. g., switches in the conveyor system via the digital switching outputs.

Important Any warranty claims against SICK AG shall be deemed invalid in case changes are made to the RFH620, e. g., opening the housing, this includes modifications during installation and electrical installation or changes to the SICK software.

➢ The RFH620 is only to be operated in ambient air temperature limit.

2.2.1 CE authorisation

The RFH620 fulfils the requirements of CE authorisation.

2.2.2 FCC authorisation

The RFH620 is in accordance with part 15 of FCC guidelines.

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

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

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

2.3 General safety precautions and protection measures

➢ Read the general safety precautions thoroughly and observe them during all operations on the RFH620. Also observe the warning notices in each chapter of this document before the standard operating procedures.

Electrical installation work

WARNING

Risk of injuries due to electrical current!

The optional power supply module CMP400/CMP490 is connected to the power supply (100 V ... 250 V AC/50 Hz ... 60 Hz) in the connection module CDM420.

➢ Observe current safety regulations when working with electrical equipment.

Important

➢ Electrical installation must be performed by qualified staff only.

➢ Connect or release current linkages only under de-energised conditions.

➢ Wire cross sections and their correct shields have to be selected and implemented according to valid engineering standards.

2.4 Quick stop and quick restart

The RFH620 can be switched on or off using the main switch for connection modules CDB620 or CDM420 respectively.

2.4.1 Switching off the RFH620

➢ Switch off the power supply to the RFH620 (via the connection module)

- or -

Unplug the 15-pole D-Sub-HD male connector of the RFH620´s connection cable from the connection module.

When the RFH620 is switched off, the following data are lost:

- Application-specific parameter sets in the RFH620 that were only saved **temporarily** in the device
- The last reading result of the RFH620
- Daily operating hours counter of the RFH620

2.4.2 Switching the RFH620 back on

➢ Switch the power supply to the RFH620 (via the connection module) back on

- or -

Re-connect the 15-pole D-Sub-HD male connector of the RFH620´s connection cable to the connection module.

The RFH620 starts up using the most recent **permanently** saved configuration. The daily operating hours counter is reset.

2.5 Environmental information

The RFH620 has been constructed with minimum environmental pollution in mind. Excluding the housing, the RFH620 does not contain any materials made of silicone.

2.5.1 Energy requirement

The RFH620 consumes the following energy:

- Typical 5 W in 10 V ... 30 V DC (in unwired switching outputs)

2.5.2 Dispose of the device after decommissioning

Currently, SICK AG will not accept the return of any devices which can no longer be operated or repaired.

➢ Irreparable devices must be disposed of in an environmentally friendly manner and in accordance with valid country-specific waste disposal guidelines.

The design of the RFH620 allows for its separation as recyclable secondary raw materials and hazardous waste (electronic scrap).

3 Quick-Start

3.1 Preparing the RFH620 for the quick start

The RFH620 can be operated quickly and easily using the supplied SOPAS-ET configuration software.

Among others, the software offers the following options:

- Fast connection with the RFH620
- Easy access to the transponder data and display of the reading results on **two** clear register tabs of the configuration software

System requirements for using the SOPAS-ET configuration software

See *chapter 7.2.2 System requirements for the SOPAS-ET configuration software, page 51*

Additional accessories required (not in the scope of delivery)

- Connection module CDB620 or CDM420
- For the Ethernet version of the RFH620: Connection cable for data and function interfaces (see ordering information on the product page at the Internet under: **www.sick.com/rfh6xx**)
- 3-wire RS-232 data cable (null modem cable), no. 2014054 for the connection of the PC with the connection module

  - or -

  To connect an Ethernet version of the RFH620 to the PC's Ethernet interface

  (For corresponding cable, see information on the product page at the Internet under: **www.sick.com/rfh6xx**)

Establish an electric connection to the RFH620

1. Connect the RFH620 to connection module CDB620/CDM420.
2. Switch on the power supply for CDB620/CDM420.
3. Switch on the PC for the configuration and install and start the supplied SOPAS-ET configuration software.
4. Connect the PC to the RFH620.

   To achieve this, connect the PC using a 3-wire RS-232 data cable (null modem cable) to the "Aux“ connection in CDB620/CDM420.

   - or -

   In Ethernet version, connect the PC to the RFH620's Ethernet interface.

For detailed instructions, see *chapter 5 Installation, page 31* and *chapter 6 Electrical installation, page 35*.

3.2 Establishing connection with the RFH620

➢ Communicate with the RFH620 according to the selected data interface (RS-232 or Ethernet) (see *chapter 7.3 Establishing communication with the RFH620, page 53*).

TIP To establish a connection quickly and easily via the Ethernet, the SOPAS-ET configuration software has a DEVICE SEARCH function.

3.3 Performing the reading

An inventory of all transponders within the reading range of the RFH620 is determined via the register tab QUICKSTART of the SOPAS-ET configuration software:

PROJECT TREE, RFH620, register tab QUICKSTART

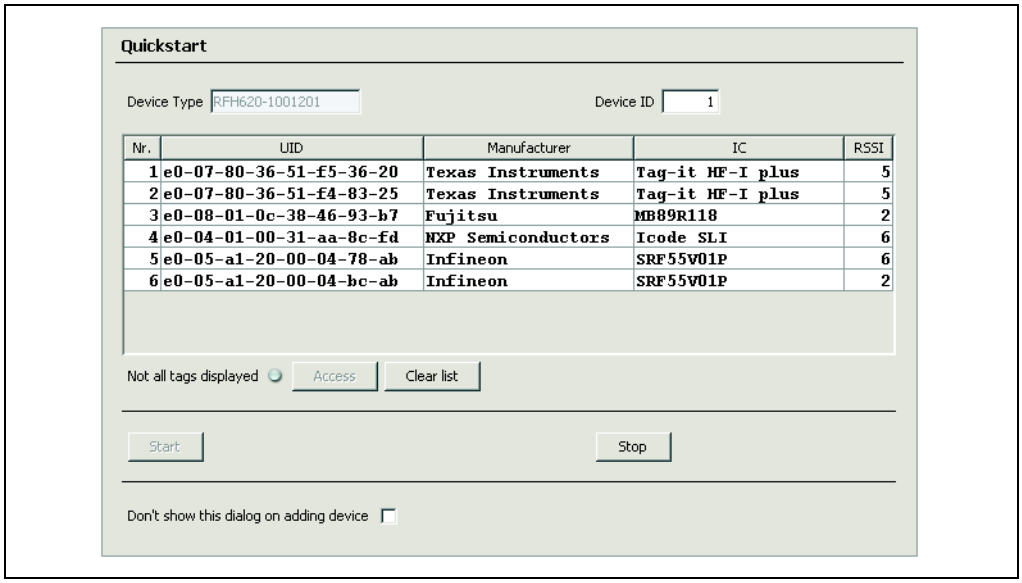


Fig. 3-1: Register tab Quickstart

Determining the transponder inventory

1. Ensure that the relevant transponder types on the register tab TAG PROZESSING are activated:
   PROJECT TREE, RFH620, PARAMETERS, READING CONFIGURATION, PERFORMANCE OPTIMIZATION

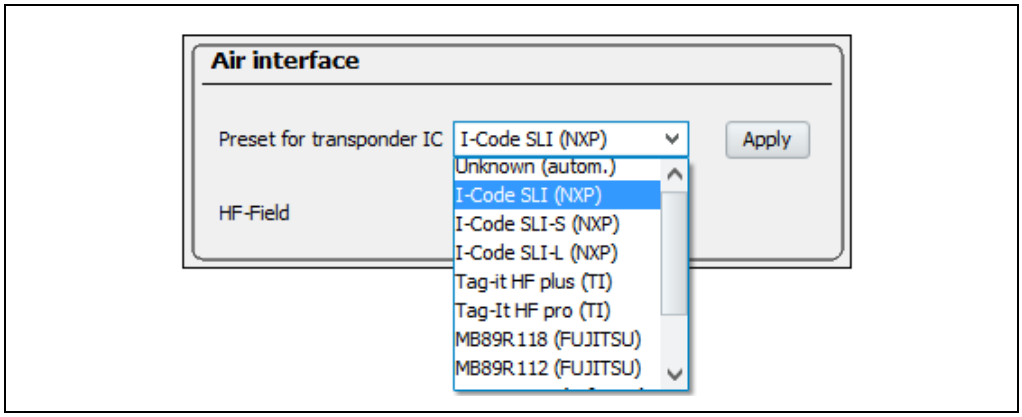


Fig. 3-2: Advanced settings on the Performance Optimization register tab

2. Carry out test reading with transponder.
   To this end, hold the transponder in the reading area of the RFH620 and trigger the reading by clicking on START.
   The unique ID, manufacturer and IC type of the detected transponder are registered.
   The signal-to-noise ratio (RSSI: Received Signal Strength Indication) is displayed in the display field RSSI respectively.
3. In order to end the reading process, click on STOP.

Optimising the reading conditions

If no transponder is displayed or if you wish to increase the RSSI value, the reading can be repeated by taking the following measures:

1. Correct or optimise the parameter values, where necessary, via the SOPAS-ET configuration software.
2. In order to optimise the RSSI value, reduce the distance between the RFH620 and the transponder.

Reading/writing the user data of the transponder

The user data of a transponder can be read/written via the register tab TAG ACCESS of the SOPAS-ET configuration software:

Important When accessing, the transponder must be located in the reading area of the RFH620.

➢ Select a transponder from the list on the register tab QUICKSTART and click on ACCESS.

The register tab TAG ACCESS opens.

The user data of the transponder are read and displayed.

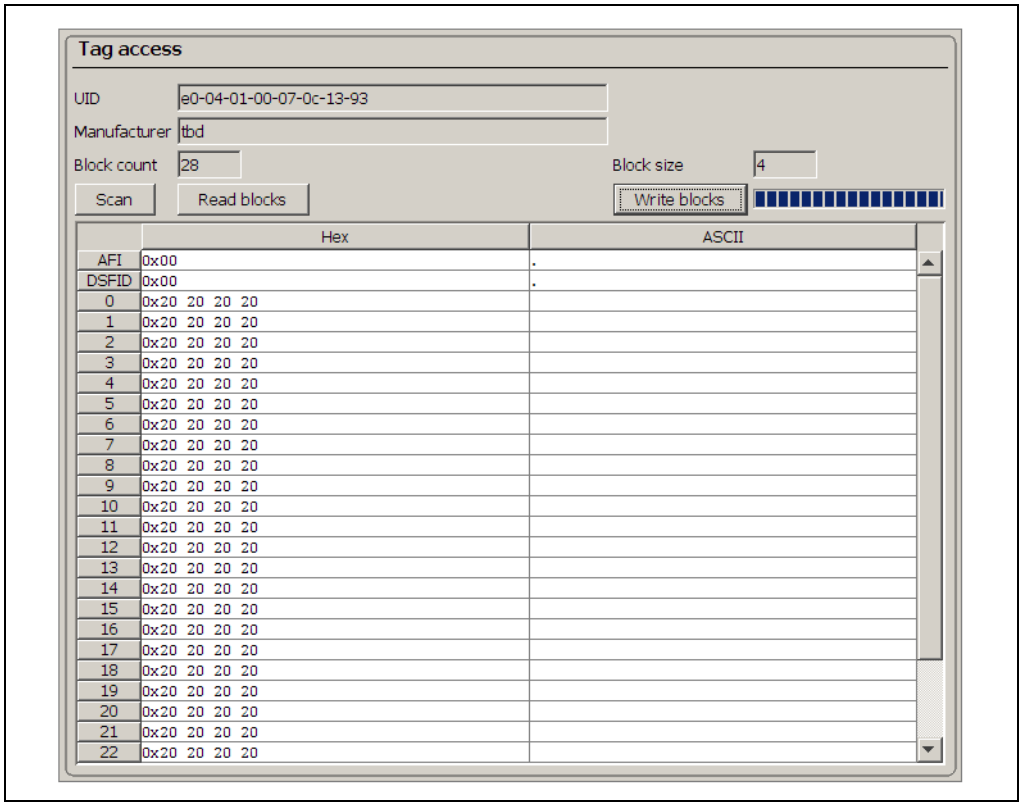


Fig. 3-3: Register tab Tag access

➢ In order to change the user data of the transponder, overwrite corresponding values block by block and transmit them to the transponder by clicking on BLOC WRITING.

4 Product description

This chapter describes the design, the features and the functions of the RFH620.

➢ For installation, electrical installation and start-up assistance as well as for the application-specific configuration of the RFH620 using the SOPAS-ET configuration software, please read this chapter **prior** to carrying out any of the tasks.

4.1 Device versions

Among others, the RFH620 is available in the following versions:

Order no.	Type	Version	Connection (design)
1044838	RFH620-1000001	Serial version	Cable with male connector
1044839	RFH620-1001201	Ethernet version	Connector unit on the device

Tab. 4-1: Variants of the RFH620

Important The following are available depending on the connection (design):

- **Serial version (cable with male connector)**
  - RS-232, RS-422/485, CAN, two digital switching inputs, two digital switching outputs, power supply
- **Ethernet version (revolving connector unit)**
  - Connector 1: Ethernet
  - Connector 2: RS-232, RS-422/485, CAN, one digital switching input, power supply

4.2 Mounting and mode of operation of the RFH620

The RFH620 is an ISO/IEC-15693 compatible transponder writing/reading device with integrated antenna for the close-up range. All the components are located in a housing suitable for the industry. Depending on the version, the electric connection of the RFH620 takes place via a cable with a connector or a revolving connector unit with two connections.

The RFH620 is an intelligent sensor for automatic and non-contact detection of RFID transponders. In principle, the transponder can be detected on any location of still or moving objects in a conveyor system. The reading range expands through the combination of many devices.

4.2.1 Serial version: Device view of RFH620

1 Blind hole thread M6 for fastening
2 Cover for Micro-SD card slot
3 Type plate
4 LEDs for status indicator
5 Antenna
6 Cable with D-Sub male connector
7 Button for function selection/activation
8 Micro SD memory card (optional)

Fig. 4-1: Serial version: Device view of the RFH620-1000001

4.2.2 Ethernet version: Device view of RFH620

1 Blind hole thread M6 for fastening
2 Cover for Micro-SD card slot
3 Type plate
4 LEDs for status indicator
5 Antenna
6 Revolving connector unit
7 Button for function selection/activation
8 Micro SD memory card (optional)
9 4-pole M12 female connector (Ethernet connection)
bl 12-pole M12 male connector

Fig. 4-2: Ethernet version: Device view of RFH620-1001201

4.3 Scope of delivery

Delivery of the RFH620 includes the following components:

Piece	Components	Comment
1	RFID write/read device	RFH620 depending on version
1	Notes on device with electrical connection diagrams as primary information	Included in the device packaging of the RFH620

Tab. 4-2: RFH620‘s scope of delivery

Important The Micro-SD memory card is not included in the scope of delivery.
For save operation of the Micro-SD memory card, use only SICK approved memory card.

An overview of in-stock installation accessories, connection modules, cables and connectors, transponder as well as memory media is available on the product page at the Internet under:
www.sick.com/rfh6xx

4.4 System requirements

General system requirements are derived from the RFH620's technical data (see *chapter 10 Technical data, page 63*).

The requirements and conditions for *Installation*, *Electrical installation* as well as *Commissioning and configuration* are summarised in the respective chapters.

4.5 Product features and functions (overview)

RFH620	• 13.56 MHz ISO/IEC-15693 compatible RFID writing/reading device • Compact, industry-type design with integrated antenna • Connection technology for all current field bus and network concepts • Application-specific operation mode: Command, trigger and freewheel mode • EDP operating system with SOPAS operating software and additional script functionality • Far-ranging internal and external diagnosis functions (More information on request.)
Customer value	• Reliable identification • Effective safe investment • Easy integration • High functionality • Maintenance-free • Compatible SICK connection technology
User safety and convenience	• Robust, compact metal housing, CE mark, FCC authorisation • Automatic self-test on system start-up • Diagnosis tools for system setup and system (remote) monitoring • Configurable reading data display in two reading result formats • Operational data retrieval, error code display on request in case of errors • Test string function (heartbeat), capable of being activated, for signalling readiness for operation • Password-protected configuration mode • In addition, secured configured parameter values (cloning) on a Micro SD memory card (can be removed in the case of RFH620 replacement) • Future proof due to firmware update (flash PROM) via data interface • Future-proof SOPAS-ET configuration software • Low current consumption • Extended power supply range

Convenient operation/configuration	• Configuration (online/offline) using the SOPAS-ET configuration software (incl. help system) • 2 buttons on the device for calling up preset functions without connecting a PC • Status indicators via LEDs • Beeper, which can be switched off, to confirm device functioning
Reading pulse	• Pulse sources for start: switching inputs; data interface (command); automatic cycle; CAN • Pulse sources for stop: reading pulse source, switching inputs, command, timer, condition • Freewheel mode
RFID evaluation	• All current ISO/IEC-15693 compatible transponder
Data processing	• Manipulation of the output of the reading data via event-dependent evaluation conditions
Data communication	• Host interface: two configurable data output formats, switchable to different physical interfaces, parallel operation possible • Aux interface: fixed data output format, switchable to different physical interfaces, parallel operation possible
Electrical interfaces	• Host interface: RS-232, RS-422/485 (data format and protocol can be configured) and Ethernet or CAN • Aux interface: RS-232 (fixed data format, data transfer rate and protocol) and Ethernet • CAN interface for integration into the SICK-specific CAN-SENSOR network • Digital switching inputs – Serial version: two digital switching inputs for external reading pulse sensor(s), using optocoupler – Ethernet version: one digital switching input on the device • Digital switching outputs – Serial version: two digital switching outputs for signalling definable results in the reading process (reading result status) – Ethernet version: no digital switching output on the device
Connection technology (design)	• Serial version: Cable with 15-pole D-Sub-HD male connector • Ethernet version: revolving connector unit on the device with two M12 circular connectors • Optional connection module CDB620/CDM420 for connection to the host computer (stand-alone) and for integrating into the SICK-specific CAN-SENSOR network • Optional bus connection module CDF600 for PROFIBUS-DP

Tab. 4-3: Overview of the product features and functions of the RFH620

4.6 Functions of the RFH620

In order to control the read operation, external sensors deliver information via the reading pulse. The reading results are output to the RFH620´s data interfaces and are forwarded to a host/PC.

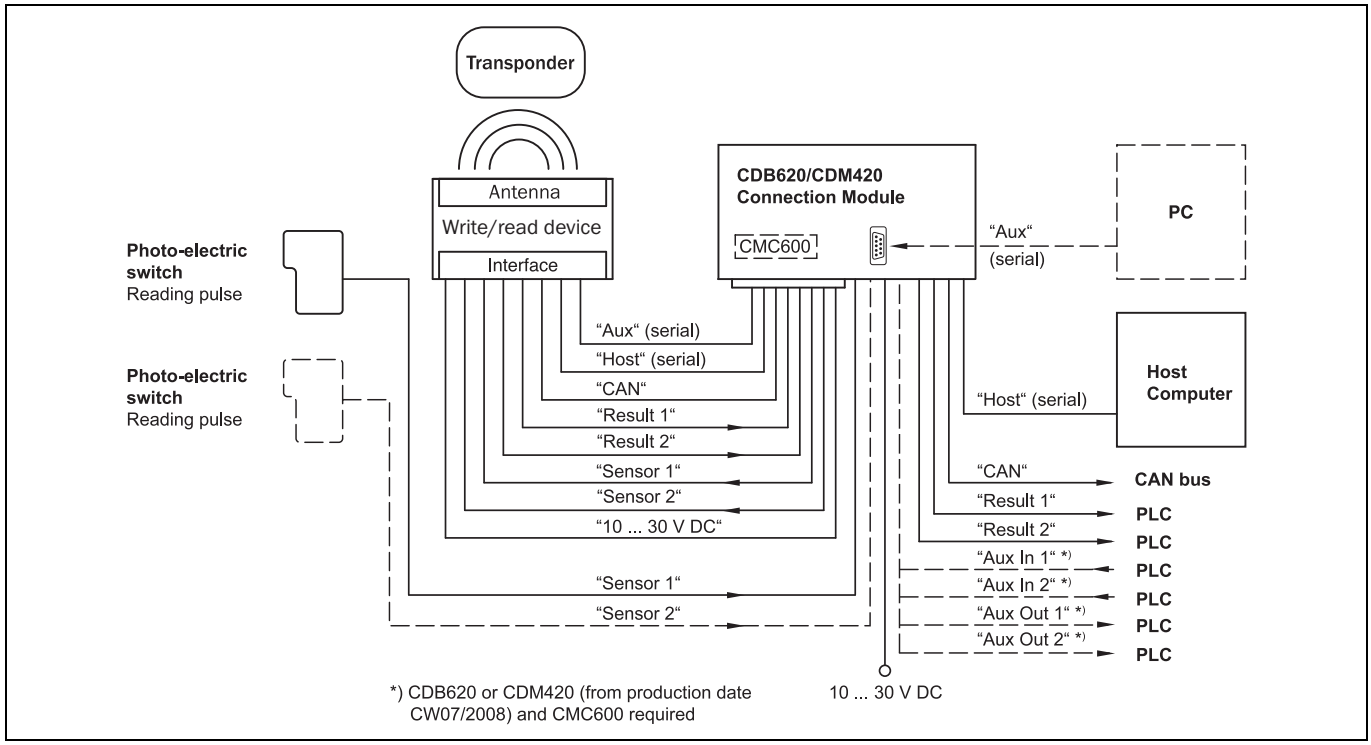


Fig. 4-3: Serial version: Electric connections to the RFH620 with connection cable

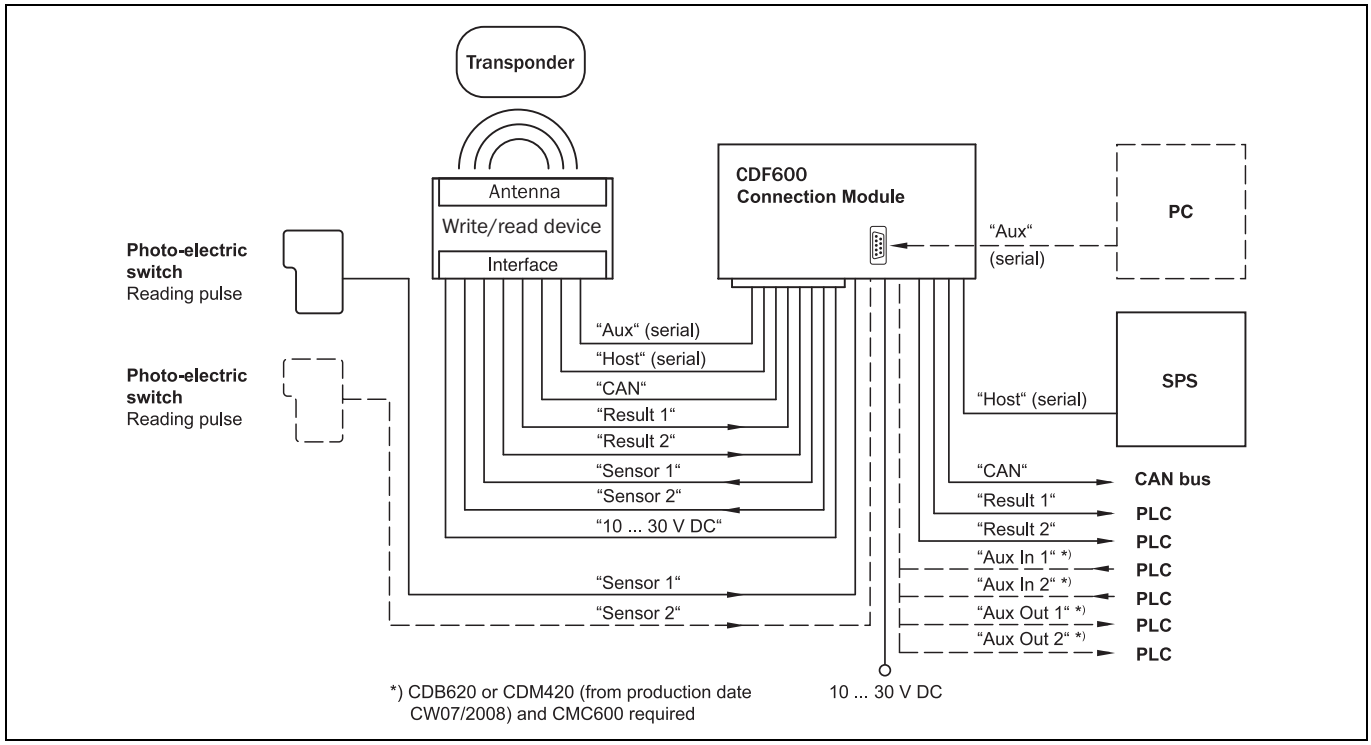


Fig. 4-4: Serial version: Electric connections to the RFH620 with connection cable by using a CDF600 bus connection module

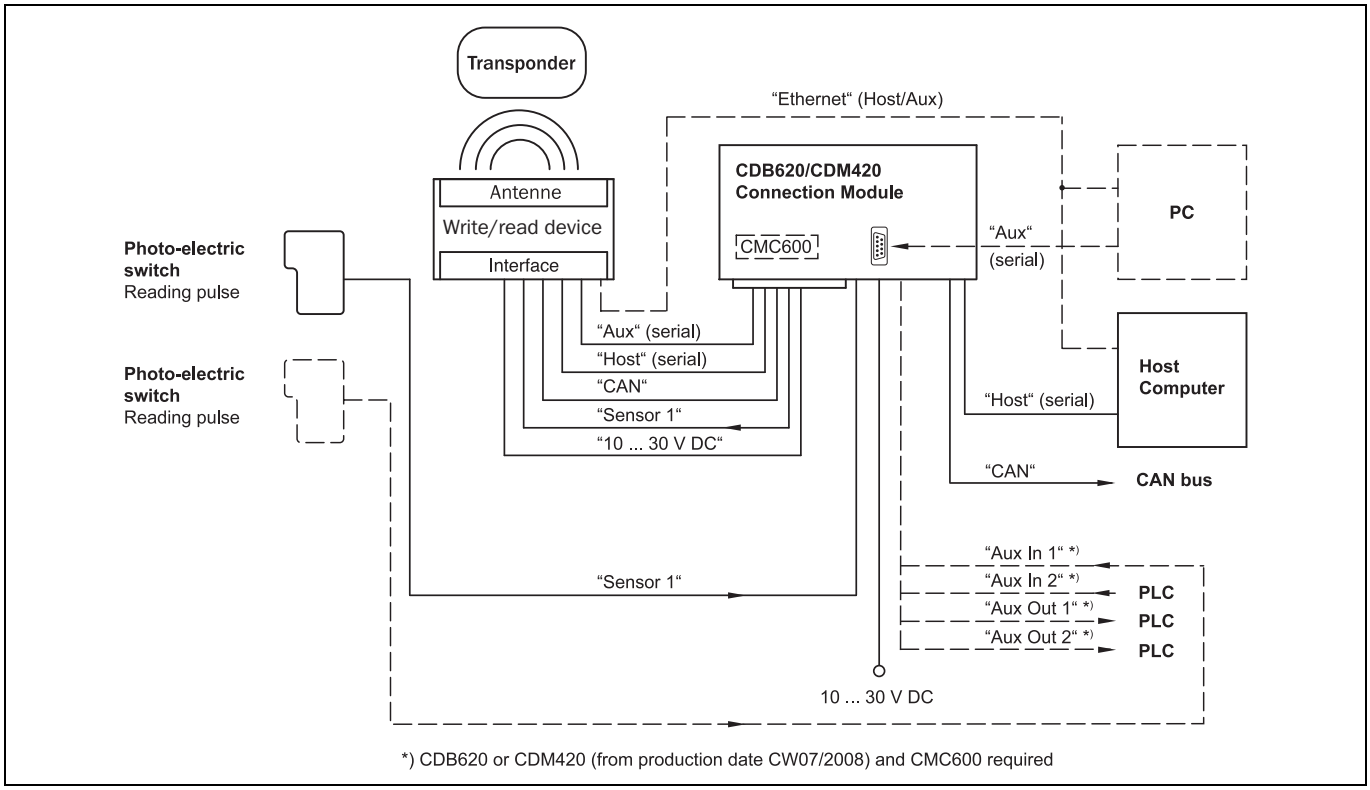


Fig. 4-5: Ethernet version: Electrical connections to the RFH620 with connector unit

The detailed wiring of the RFH620 and the connections to the host/PC and to the external sensors is described in *chapter 6 Electrical installation, page 35*.

Among other things, the following functions can be configured using the SOPAS-ET configuration software:

Function	Description	Configuration with SOPAS-ET
Object trigger control	In order to start an object-related reading process, the RFH620 requires an appropriate external signal (trigger source) for reporting an object in the reading area. As standard, the start signal is emitted via an external reading pulse sensor (e. g. photoelectric reflex switch). As soon as an object has passed the reading pulse sensor, a time window opens in the RFH620 ("reading gate") for the reading process. Alternatively, a command activates the reading process via a data interface or the CAN-SENSOR network. In Automatic Cycle mode, the actual RFH620 generates the reading gate internally with an adjustable mark-space ratio. The reading pulse can be ended in a number of ways: With external triggering by the reading pulse source or a command, internally by a timer or an evaluation condition to be met.	PROJECT TREE, RFH620, PARAMETER, OBJECT TRIGGER CONTROL

Function	Description	Configuration with SOPAS-ET
Data processing	The output time in the reading process, with regard to the reading pulse start, can be configured using the SOPAS-ET configuration software.	• PROJECT TREE, RFH620, PARAMETER, DATA PROCESSING, OUTPUT CONTROL • PROJECT TREE, RFH620, PARAMETER, DATA PROCESSING, EVALUATION CONDITIONS
Output format	The reading result is displayed via selectable physical interfaces. Two different output formats (telegrams) can be defined for this task, one format for "No Read" and one for the heartbeat (signalisation of readiness).	PROJECT TREE, RFH620, PARAMETER, DATA PROCESSING, OUTPUT FORMAT
Network / interfaces / IOs	All important interfaces for displaying the reading results are available on the RFH620. Several devices can be connected to each other via the CAN bus in the SICK-specific CAN-SENSOR network.	PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS register tab NETWORK OPTIONS
Data interfaces	Depending on the version, the following data interfaces are available on the RFH620: • Host interface (RS-232 or RS-422/485 and Ethernet host port): Preparation of the reading result for further processing by the host processor • Auxiliary interface (RS-232 and Ethernet aux port): Reading diagnosis or host interface monitoring • CAN: Networking of several devices	• PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS, SERIAL • PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS, ETHERNET • PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS, CAN
Digital inputs	For example, the external sensor for the object triggering (photoelectric reflex switch) can be connected to the digital switching inputs. **Important** The connection "sensor 2" is only available on the serial version of the RFH620. For the Ethernet version of the RFH620, this input is only available with the connection module CDB620/ CDM420 in combination with the parameter memory module CMC600.	PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS, DIGITAL INPUTS
Digital outputs	With certain events in the reading process (e. g. for unsuccessful reading "No Read"), two independent switch signals, which can be used to display the event status, can be generated at both digital outputs. **Important** The switching outputs "result 1" and "result 2" are only available on the serial version of the RFH620. For the Ethernet version of the RFH620, the two outputs are only available with the connection module CDB620/CDM420 in combination with the parameter memory module CMC600.	PROJECT TREE, RFH620, PARAMETER, NETWORK / INTERFACES / IOS, DIGITAL OUTPUTS

Tab. 4-4: Configurable functions of the RFH620

4.7 Control elements and indicators

4.7.1 User interface

The RFH620 is configured application-specifically using the SOPAS-ET configuration software (see *chapter 7.1 Overview of the start-up procedure, page 51*). For this purpose, the software runs on a PC, which must be connected to one of the two data interfaces (aux interface: Ethernet or RS-232, host interface: RS-232/RS-422/485 or Ethernet) of the RFH620.

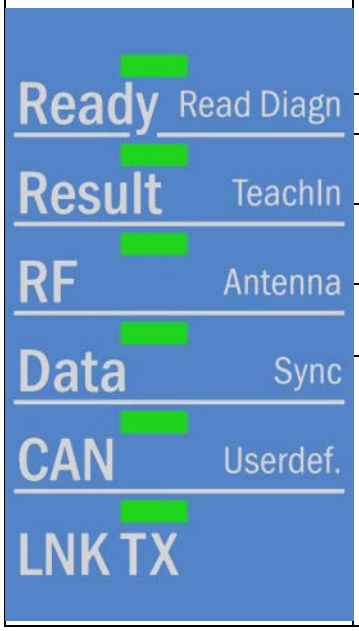
As an alternative to the SOPAS-ET configuration software, command strings are available, upon which the user interface of the SOPAS-ET configuration software is based (see *chapter 11.2 Configuring the RFH620 with command strings, page 67*).

In case of an error, start-up and diagnosis can be carried out via the SOPAS-ET configuration software. The RFH620 operates fully automated in normal operation.

4.7.2 LEDs on the RFH620's housing

The RFH620's housing has six LEDs that display the operating status, the RF activity, the status of the reading result as well as transfer to the RS-232/RS-422/485, CAN and Ethernet data interfaces.

In reading operation the LEDs indicate the following:

	LED	Colour	Denotation
	Ready	green	• Lights up constantly when system is ready • Goes out when parameter values are being uploaded from or downloaded to the RFH620 respectively
	Result	green	• Lights up after a successful read (Good Read, 100 ms)
	RF	green	• Lights up when the antenna field is switched on (depends on the reading pulse)
	Data	green	• Flickers during data transfer via the serial host interface (RxD)
		yellow	• Flickers during data transfer via the serial host interface (TxD)
	CAN	green	• Lights up when the CAN interface is switched on • Flickers during the data transfer via the CAN interface
	LNK TX	green	• Flickers during data transfer via the Ethernet interface
		yellow	• Lights up when the physical Ethernet connection is established

Tab. 4-5: LED indications

Important The "result" LED is coupled with none of the two digital switching outputs "result 1" or "result 2".

4.7.3 Buttons on the RFH620's housing

There are two yellow buttons on the RFH620´s housing in the LED area (see *chapter 4.2.1 Serial version: Device view of RFH620, page 20*). You can call up predefined functions via these buttons.

After changing to the button operating mode, you can select any one function by repeatedly pressing the step button (▶) respectively. The selected function is then activated and deactivated with the enter button (↵) respectively.

The selected function is shown via the corresponding LED below the buttons.

The functions "TeachIn", "Antenna", "Sync" und "Userdef." cannot be called up at the moment.

When using both of buttons, the display of the LEDs have different meanings other than in normal reading operation:

	LED	Colour	Function
	Read Diagn	green	Flashes slowly: the function "reading diagnosis" is selected Flashes swiftly: the function "reading diagnosis" is started
	TeachIn	green	(momentarily not available)
	Antenna	green	(momentarily not available)
	Sync	green	(momentarily not available)
	Userdef.	yellow	(momentarily not available)

Tab. 4-6: Meaning of the LEDs during activation of buttons

Use of the buttons

In order to use one of the possible function with the buttons, do as follows:

1. Press the enter button (↵) for approx. 3 seconds.
   The RFH620 stops the current reading operation, switches off the LEDs and changes to the button operating mode. The bar code scanner ignores all the other external reading pulses with immediate effect. No reading results are displayed via the host interface.
   The beeper confirms this process with an ascending melody.
   The "Read Diagn" function is pre-selected as first function (LED flashes slowly).
2. Press the enter button (↵) once to start the selected function.
   The LED flashes faster and the beeper confirms the start with two sounds.
3. Press the enter button (↵) again to stop the selected function.
   The LED flashes more slowly again and the beeper confirms the end with two sounds.
4. In order to return from the button operating mode to the reading operation, press the enter button (↵) again for approx. 3 seconds.
   The beeper confirms the change with a descending melody.
   The LED "Ready" lights up again.
   The RFH620 is ready for reading again and waits for a reading pulse.

Further behaviour of the RFH620 when operated by buttons

- Changing into button operating mode is only possible if no other user is logged onto the RFH620 for changing the parameters via the SOPAS-ET configuration software. If this is the case, however, the beeper gives a descending melody when trying to change into the button operating mode. Furthermore, the RFH620 remains in reading operation.
- In case a user logs onto the RFH620 in button operating mode, the RFH620 leaves the button operating mode and restarts the reading operation. The beeper confirms the change with a descending melody.
- If no function is started in button operating mode or if no button operation can be performed after using a function, the RFH620 automatically returns to the reading operation after 30 seconds. The beeper confirms the change with a descending melody.
- The RFH620 terminates an activated continuous function 5 minutes after start. It returns to reading operation automatically. The beeper confirms the change with a descending melody.
- You cannot switch off or turn down the beeper in button operating mode.

4.7.4 Parameter set on the Micro SD memory card (optional)

The RFH620 stores configured parameter values in its internal PROM as well as on the Micro SD memory card (cloning), provided that this card has been inserted into the RFH620. If the RFH620 needs to be replaced, the memory card enables easy and quick transfer of the parameter set to the new device (see *chapter 8.4 Replacing an RFH620, page 59*).

Important In order to avoid data loss, the Micro SD memory card may only be removed and inserted into the new device after the respective RFH620 has been switched off and de-energized. When inserting the memory card, make sure that the card's notches point to the direction of the two yellow keys.

The memory card is located behind a silver cover attached to the RFH620.

(Sample)

Fig. 4-6: Micro SD memory card for storing the parameter set

Important To maintain the enclosure rating IP 67, the cover has to be installed and screwed together tightly. Width across flats WAF 2.5.

As an alternative to the Micro SD memory card in the RFH620, the external, optional parameter memory module CMC600 in connection module CDB620/CDM420 may also be used for storing the parameter set. If both the Micro SD memory card and the parameter memory module CMC600 are available, the RFH620 loads the parameter set from CMC600.

5 Installation

5.1 Overview of installation sequence

This chapter describes the installation sequences for the RFH620 and its external components.

The typical installation sequences are listed below:

- Select the installation location for the RFH620
- Install the RFH620
- Install connection module CDB620 or CDM420
- Connect the RFH620 to connection module CDB620 or CDM420
- Install the reading pulse sensor for reading pulse triggering

Important **Do not open the RFH620's housing. If the device is opened, the SICK AG warranty shall not apply.**

5.2 Installation preparations

In general, the following requirements should be observe for the installation:

- Typical space requirement: application-specific
- More stable installation bracket with sufficient load capacity and measurements suited for the RFH620 (see *chapter 10.2 RFH620's dimensional drawings., page 65*)
- Shock absorbent and vibration free attachment

The following tools and resources are required for the installation:

- Two M6 bolts:
  The bolts serve for the installation of fastening bracket no. 2048551 to the base.
  The bolt length depends on the wall thickness of the base.
- Tool
- Tape measure (up to 1 m)

5.2.1 Components to be installed

For the installation, the following must be handy:

- RFH620

5.2.2 Accessories

The following accessories are not included in the delivery of the RFH620. If required, they have to be ordered separately and placed ready for installation:

- Mounting device, see next chapter
- Connection module CDB620 or CDM420
- Reading pulse sensor for external reading pulse triggering, e. g., photoelectric reflex switch/photoelectric proximity switch

5.2.3 Mounting device

The RFH620 is fixed using two blind hole taps (M6), which are located on each narrow side of the device (see *chapter 10.2 RFH620's dimensional drawings., page 65*) respectively.

The RFH620 is mounted using the optional SICK fastening bracket no. 2048551. The construction of the angle supports e. g. varied mounting options and the alignment of the RFH620 in two axes.

Fig. 5-1: Example: Fixing the RFH620 with bracket no. 2048551

Important **Always mount the bolts with washers.**

When fixing the RFH620 with bracket no. 2048551, pay attention to the following dimensions:

- Max. thread reach of the blind hole taps: 6.5 mm
- Plate thickness of the fastening bracket: 4.0 mm
- Thickness of the washers: 1.6 mm
- Length of bolt M6x12: 12.0 mm

The dimensioning of the SICK-holders shows *chapter 11.3 Dimensional drawing accessories, page 68*.

Alternatively, the user can provide a holder.

The holder should meet the following requirements:

- Stable mounting device
  - Adjustable alignment of the RFH620 in the x and y axis
  - The mounting device must be able to bear the weight of the RFH620 including its connection cable (depending on the device version) without vibrating.
- Two M6 bolts to fix the RFH620
  - The screw length depends on the thickness of the mounting device
  - Maximum thread reach in the RFH620 6.5 mm from the housing surface

5.3 Installation location

The following aspects are relevant for the selection of the installation location:

- Reading distance to the transponder
- Angle alignment of the RFH620

Furthermore, the distance between the RFH620 and the host computer and the distance to the connection module has to be taken into account (see *chapter 6.2 Electrical installation preparations, page 35* and *chapter 5.5.1 Installing connection module CDB620 or CDM420, page 33*).

5.4 Installation of the RFH620

NOTICE

Damage to the device!

The maximum thread reach of the two blind hole taps M6 is 6.5 mm. Longer bolts damage the device.

➢ Use bolts of a suitable length.

1. Prepare base for the installation of the RFH620 holder, see *chapter 5.2.3 Mounting device, page 31*.
2. Install the RFH620 holder on the base.
3. Screw M6 bolts through the holder and into the RFH620's blind hole taps and gently tighten them.

5.5 Installing external components

5.5.1 Installing connection module CDB620 or CDM420

Depending on the application, you can install either connection module CDB620 or CDM420. The installation process is the same for both modules.

Important If the PC with the SOPAS-ET configuration software accesses the RFH620´s auxiliary interface (RS-232; 57.6 kBd) via the connection module, the connection module should not be installed more than 3 m cable lengths away from the RFH620.

1. Install the connection module close to the RFH620.
2. Install the connection module in such a way that the opened device can be accessed at any time.

For detailed information about installation and electrical installation, see the operating instructions "Connection Module CDB620" (no. 8012119, German/English edition) and "Connection Module CDM420-0001" (no.8010004, German/English edition) respectively.

5.5.2 Installing the external reading pulse sensor

If the RFH620 is triggered by an external reading pulse sensor (photoelectric reflex switch), the sensor has to be installed close to the RFH620.

An overview about available photoelectric switches and photoelectric proximity switches as well as the associated accessories (brackets, connection cables) is availabe from the following product internet page: **www.sick.com/rfh6xx**

The installation location of the sensor depends on the distance of the transponder to the front edge of the object. Depending on the application, the sensor should be attached in such a way that transponders on different sized objects can be fully read during the evaluation (reading gate).

5.6 Dismantling the RFH620

Removal of the components is described in *chapter 8.4.1 Dismantling **the RFH620**, page 59*.

6 Electrical installation

6.1 Overview of installation sequence

Important Electrical installation must be performed by qualified staff only.

The following list provides an overview of a typical installation sequence:

- Connecting the RFH620 to connection module CDB620 or CDM420
- Wiring the RFH620's data and function interfaces
- Connecting the connection module to the supply voltage
- Connecting a PC for commissioning and configuration (RS-232 or Ethernet)

The actual installation work, which has to be carried out, depends on the respective system configuration and the version of the RFH620 (see *chapter 6.2 Electrical installation preparations, page 35*). Once electrical installation has been completed, the RFH620 is started up and configured (see *chapter 7 Commissioning and configuration, page 51*).

6.2 Electrical installation preparations

The following general requirements should be observed for the electrical installation:

- Supply voltage 10 V ... 30 V, SELV in accordance with currently applicable EN 60950-1.
  The power supply must provide, at least, 6 W output power.
  Use a power supply unit providing safety extra low voltage (SELV).
  - using connection module CDB620/CDM420: Connection of the supply voltage via the terminals of the connection module

    - or -

    using free wiring by customer (without connection module CDB620/CDM420): Connection of supply voltage, e. g., via the cable no. 6034418 (15-pole D-Sub-HD female connector/open end)
- With external reading pulsing
  - Appropriate reading pulse sensor (start), e. g. photoelectric reflex switch:
    for registering an object in the reading area
  - Additional appropriate reading pulse sensor (stop), e.g., photoelectric reflex switch:
    for registering the end of pulse with extended external reading pulse
- Host computer with data interface RS-232, RS-422/485 or Ethernet: for further processing the reading data
- Connection cables: refer to the ordering information on the product page at the Internet under: **www.sick.com/rfh6xx**

Important The possible distance between the RFH620 and the host computer depends on the physical design of the selected host interface and the set data transfer rate.

The following tools are required for the electrical installation:

- Tool
- Digital measuring device (current/voltage measurement)

6.3 Electric connections and cables

6.3.1 Electric connections to the RFH620

Important Prerequisites for enclosure rating IP 67:

- The cover of the memory card (optional) has to be installed and screwed together tightly. Width across flats WAF 2.5.
- The connectors are to be firmly screwed to the electric connections of the Ethernet version in use.

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

Depending on the device version, the following electric connections are available on the RFH620:

Device version	Connection (design)	Interfaces	for connection to
RFH620-100**00**01	Cable with connector (D-Sub-HD, 15-pole, male connector)	• RS 232 • RS-422/485 • CAN • two digital inputs • two digital outputs • Power supply	e. g. connection module CDB620 or CDM420

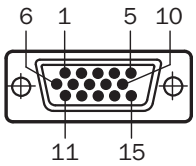
Tab. 6-1: Electric connections to the RFH620 with a fixed cable and connector (serial version)

Device version	Connection (design)	Interfaces	for connection to
RFH620-100**12**01	Connector 1 at the connector unit (M-12, 4-pole, female connector)	• Ethernet	Network provided by the client
	Connector 2 at the connector unit M-12, 12-pole, male connector	• RS 232 • RS-422/485 • CAN • one digital input • Power supply	e. g. connection module CDB620 or CDM420 or power supply unit with M-12 female connector (no. 2049552), (power supply only)

Tab. 6-2: Electric connections to the RFH620 with connector unit (Ethernet version)

Important Additional digital inputs and outputs are available at connection module CDB620/CDM420 (available from week 07/2008) in combination with the parameter memory module CMC600.

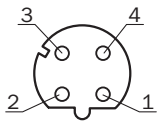
6.3.2 RFH620´s connections to the cable and connector (serial version)



Pin	Signal	Function
1	10 V ... 30 V DC	Supply voltage
2	RxD (Aux)	Aux interface (receiver)
3	TxD (Aux)	Aux interface (sender)
4	Sensor 2	Digital switching input (adjustable function, e. g. external reading pulse)
5	GND	Ground
6	RD+ (RS-422/485)	Host interface (receiver)
7	RD– (RS-422/485); RxD (RS-232)	Host interface (receiver)
8	TD+ (RS-422/485)	Host interface (sender)
9	TD– (RS-422/485); TxD (RS-232)	Host interface (sender)
10	CAN H	CAN bus (IN/OUT)
11	CAN L	CAN bus (IN/OUT)
12	Result 1	Digital switching output, adjustable function
13	Result 2	Digital switching output, adjustable function
14	Sensor 1	Digital switching input for external reading pulse
15	SensGND	Common ground for the switching inputs
–	–	Shield

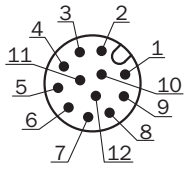
Tab. 6-3: Serial version: Pin assignment on the 15-pole D-Sub-HD male connector

6.3.3 RFH620´s connections to the connector unit (Ethernet version)



Pin	Signal	Function
1	TD+	Transmitter+
2	RD+	Receiver+
3	TD–	Transmitter–
4	RD–	Receiver–
–	–	Shield

Tab. 6-4: Ethernet version: Pin assignment to the 4-pole M12 female connector, D-coded



Pin	Signal	Function
1	GND	Ground
2	10 V ... 30 V DC	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485)	Host interface (sender)
6	TD– (RS-422/485); TxD (RS-232)	Host interface (sender)
7	TxD (Aux)	Aux interface (sender)
8	RxD (Aux)	Aux interface (receiver)
9	SensGND	Switching input sensor 1 ground
10	Sensor 1	Digital switching input (external reading pulse)
11	RD+ (RS-422/485)	Host interface (receiver)
12	RD– (RS-422/485); RxD (RS-232)	Host interface (receiver)
–	–	Shield

Tab. 6-5: Ethernet version: Pin assignment on the 12-pole M12 male connector, A-coded

Important The "sensor 2", "result 1" and "result 2" connections are only available on the RFH620 with a cable and connector (serial version) and for the Ethernet version via the CDB620/ CDM420 connection module in combination with the parameter memory module CMC600.

6.4 Prerequisites for the safe operation of the RFH620 in a system

The RFH620 is designed and tested for electrical safety according to EN 60950-1: 2006-04/A1: 2010-03/A11: 2009-03/A12: 2011-02. It is connected to the peripheral devices (power supply, clock reading pulse sensor(s), PLC, Host etc.) via shielded cables. The cable shield, for example, for the data cable rests against the metal housing of the RFH620. The device can either be grounded through the cable shield or through one of the blind hole threads.

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

This is achieved for instance by complying with the following conditions:

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

If these conditions are not met, e.g. on devices in a widely distributed system over several buildings, potential equalization currents may, due to different ground potentials, flow along the cable shields between the devices, which can lead to hazards.

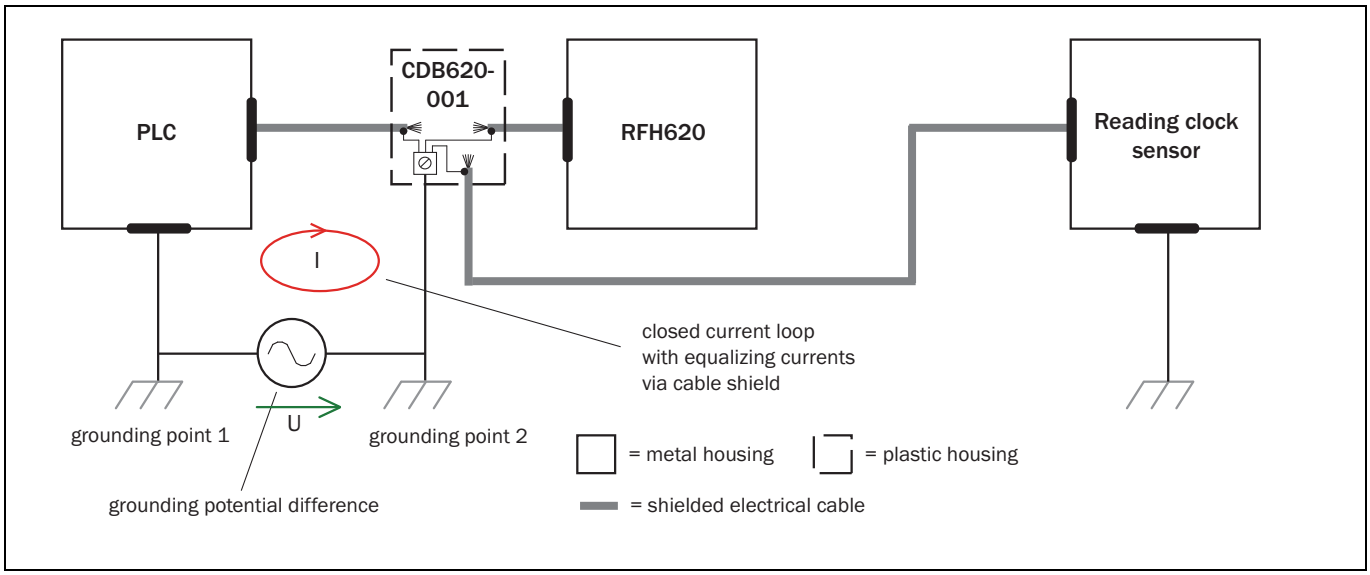


Fig. 6-1: Current carrying equipotential bonding

DANGER

Risk of injury/risk of damage via electrical current!

Incorrect grounding of the RFH620 can, due to equipotential bonding currents between the RFH620 and other grounded devices in the system, place the metal housing under a dangerous voltage, cause malfunction and destruction of devices as well as damage to the cable shielding through heating, and thus cause cable fires.

- Work on the electrical system must only be performed by qualified electricians.
- Ensure ground potential at all grounding points.
- In the event of damage to the cable insulation, immediately switch off the power supply and have the damage repaired.
- Where local conditions are unfavorable and thus do not meet conditions for a safe earthing method (same ground potential at all grounding points), take measures in accordance with the following explanations.

Remedial measures

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

Important We expressly advise against opening up the cable shields. Doing this means 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.

a) Measures for widely distributed system installations

On widely distributed system installations with correspondingly large potential differences, we recommend setting up local islands and connecting them using commercially available **electro-optical signal isolators**. This measure achieves a high degree of resistance to electromagnetic interference while at the same time complying with all the requirements of EN 60950-1.

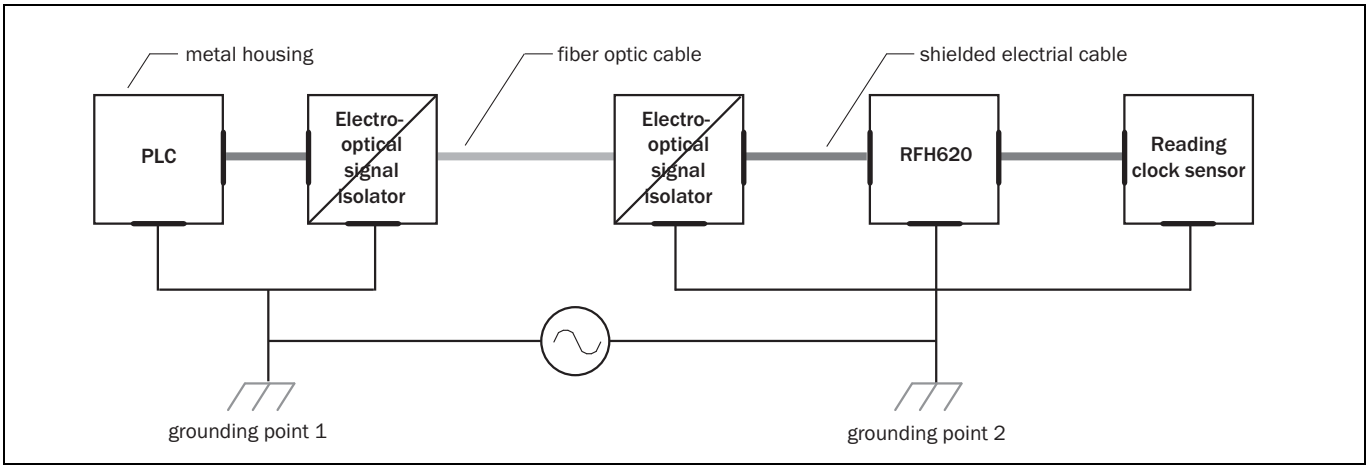


Fig. 6-2: Electro-optical signal isolatorsr

The ground loop is isolated by using the electro-optical signal isolator between the islands. Within the islands, a stable equipotential bonding prevents equalizing currents at the cable shields.

b) Measures for small system installations

For smaller installations with only slight potential differences, insulated installation of the RFH620 and of peripheral devices may be a sufficient solution.

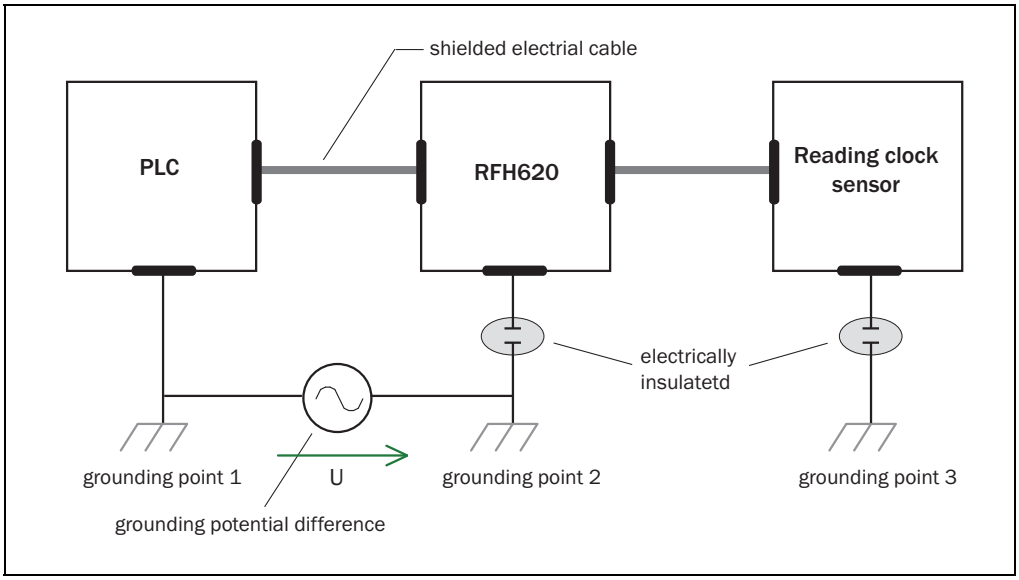


Abb. 6-3: Insulated installation

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

Important The power supply for the RFH620 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.

Special national regulations for Sweden and Norway

Varning och atjarder

Utrustning som ar kopplad till skyddsjord via jordat vagguttag och/eller via annan utrustning och samtidigt ar kopplad till kabel-TV nat kan i vissa fall medfora risk for brand. For att undvika detta skall vid anslutning av utrustningen till kabel-TV nat galvanisk isolator finnas mellan utrustningen och kabel-TV natet.

Advarsel og tiltaker

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr - og er tilkoplet et kabel - TV nett, kan forarsake brannfare.
For a unnga dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galanisk isolator mellom utstyret og kabel-TV nettet.

Corresponding English translation

Devices which are connected to the electrical system PE of the building via a mains connection or other devices with a connection to the PE, and which are connected to a cable distribution system with coaxial cables, can under certain circumstances cause a risk of fire. Connections to a cable distribution system must therefore be made such that electrical insulation is offered below a certain frequency range (galvanic separating link).

6.5 Performing electrical installation

Important To ensure secure fastening of the connected connectors and adherence to the enclosure rating, the knurled nuts/coupling rings of the M12 connectors have to be tightened or the cable connectors have to be secured.

1. Connect or release current linkages only under de-energised conditions.
2. All wire cross sections and their shields on customer side have to be selected and implemented according to valid engineering standards.

NOTICE

Damage to the connector unit on the RFH620 due to overwinding.

The connector unit on the RFH620 has two end positions.

- ➢ Never turn the connector unit, of one of the two end positions, more than 180° in one direction.
- ➢ Always rotate the connector unit in the direction of the type plate.

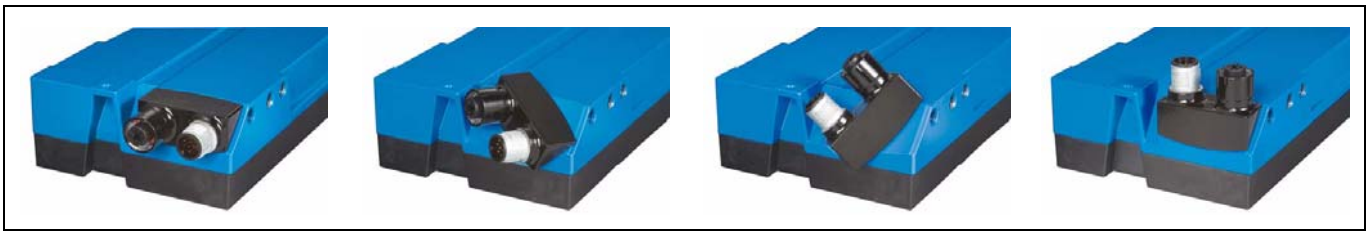


Fig. 6-4: Direction of rotation of the connector unit

6.5.1 Connecting the power supply for the RFH620

For the operation, the RFH620 requires a supply voltage of 10 V ... 30 V DC, SELV in accordance with currently applicable EN 60950-1.
The typical current consumption is 5 W (with unwired switching outputs).

Via the connection module CDB620 or CDM420, the RFH620 is supplied with 10 V ... 30 V DC. If the power supply module CMP400/CMP490 is used, the input voltage is 100 V ... 250 V AC/50 Hz ... 60 Hz on the module.

Connecting the supply voltage

Note on reverse polarity protected supply voltage for the RFH620

NOTICE

Risk of damage to the RFH620 due to possible short-circuit!

The supply voltage input for the RFH620 is designed with internal circuit protection to provide reverse polarity protection. The internal ground of the RFH620 has a direct galvanic connection to the metal housing of the RFH620 due to reasons relating to high frequency.

If the supply voltage has the incorrect polarity, this will not cause any damage provided that the RFH620 is not connected (by either other cables or its housing) to other peripheral devices that use the same grounding point.

If, however, the RFH620 has already established a connection to other devices linked to the same ground (e.g., chassis), reverse polarity of the RFH620's supply voltage can result in a short-circuit and damage to the RFH620.

When wiring the RFH620 using connection module CDB620 or CDM420, the RFH620's data and function interfaces are contacted to the connection module together with the power supply.

1. Ensure that the connection module's supply voltage has been switched off.
2. Serial version: connect the bar code scanner's 15-pole cable male connector to the connection module's 15-pole female connector and screw it tight.

   - or -

   Ethernet version: connect the RFH620's 12-pole male connector via a corresponding cable (e.g., no. 2042916) to the connection module's 15-pole female connector and screw it tight.

6.5.2 Wiring serial data interfaces

The maximum data transfer rate of the serial data interface depends on the cable length and the interface type.

Interface type	Transfer rate	Distance to the host
RS 232	up to 19,200 Bd	Max. 10 m
	38,400 Bd ... 57,600 Bd	Max. 3 m
	115,200 Bd	Max. 2 m
RS-422/485[1)]	max. 38,400 Bd	max. 1,200 m
	max. 115,200 Bd	max. 500 m
[1)]in corresponding line termination according to the specification		

Tab. 6-6: Recommended maximum cable lengths, depending on the selected data transfer rate

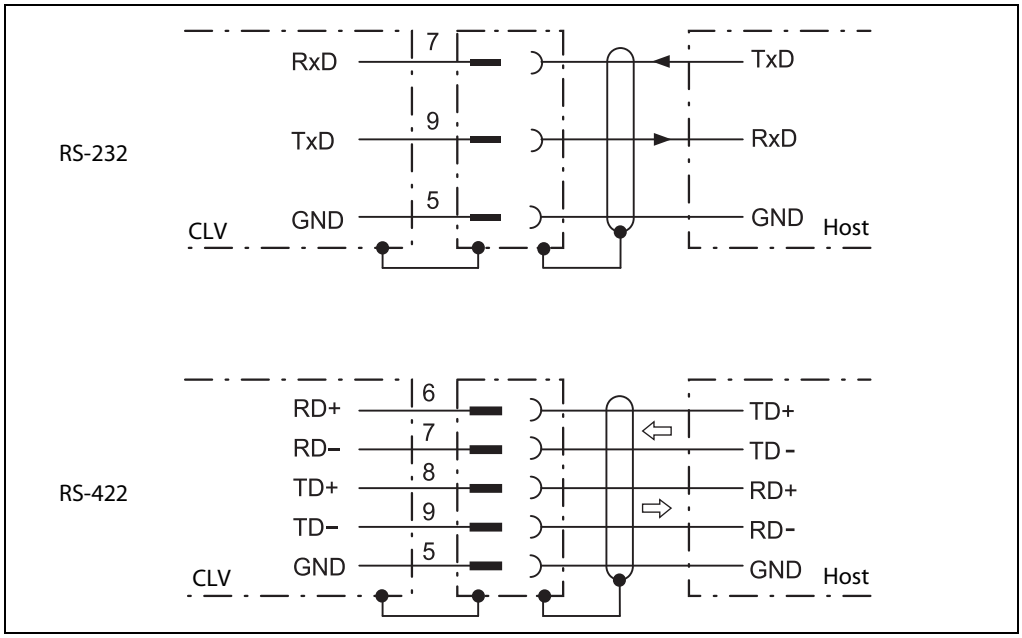


Fig. 6-5: Wiring the serial host data interfaces (RS-232 and RS-422 respectively) on the 15-pole D-Sub-HD male connector

Pin assignment for the serial auxiliary data interface on the 15-pole D-Sub-HD male connector:

- RxD = Pin 2
- TxD = Pin 3
- GND = Pin 5

NOTICE

Damage to the interface module!

Incorrect wiring of the serial data interfaces can damage electronic components in the RFH620.

➢ Observe information about wiring the serial data interface.

➢ Check the wiring carefully before switching on the RFH620.

1. Connect the RFH620's serial interface to the host using shielded cables in accordance with the EMC regulations.

   Adhere to the maximum cable lengths.

2. To prevent interference, do not lay cables parallel to power supply cables and motor lines over a longer distance, e. g., in cable channels.

Terminating the RS-422 data interface

Termination can be performed either in connection module CDB620 or CDM420. See operating instructions "Connection module CDB620" and "Connection module CDM420" respectively.

6.5.3 Wiring CAN interface

To wire and configure the RFH620's CAN interface for use in the CAN-SENSOR network, see the operating instructions "Using the CAN Interface" (no. 8009180, English edition).

6.5.4 Wiring the Ethernet interface

Aux and host interface communication can also be executed in parallel via the Ethernet interface.

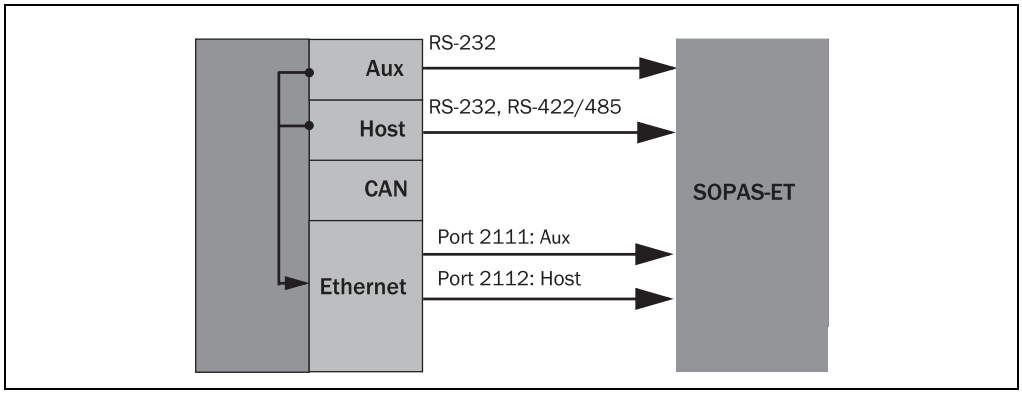


Fig. 6-6: Function of the Ethernet interface

Important The Ethernet interface of the RFH620 has an auto MDIX function. This automatically sets the speed and any cross connection that is required.

6.5.5 Wiring switching inputs

If the RFH620's reading process should be triggered by an external sensor, the reading pulse sensor is connected to the "**sensor 1**" switching input.

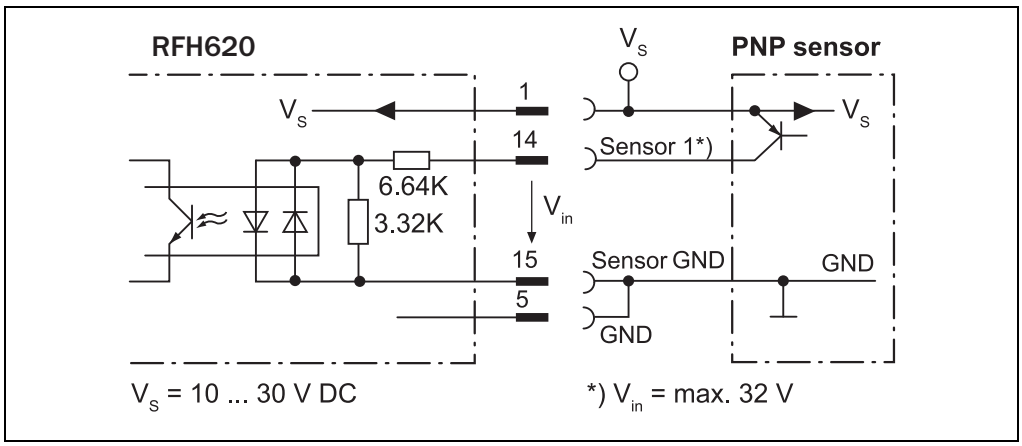


Fig. 6-7: Wiring "sensor 1" switching input on the 15-pole D-Sub-HD male connector

The "**sensor 2**" switching input has the following functions, among others:

Trigger source for

- Reading pulse generator for reading pulse end

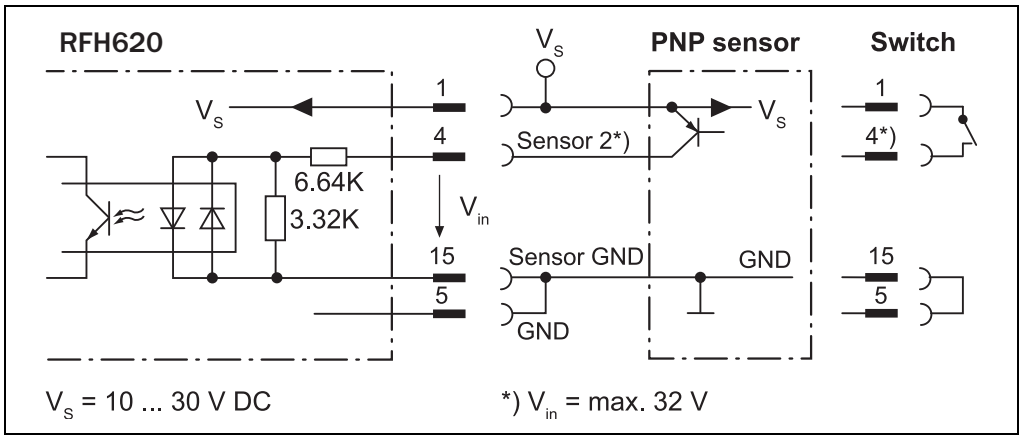


Fig. 6-8: Wiring "sensor 2" switching input on the 15-pole D-Sub-HD male connector

Important The ratings for "sensor 1" and "sensor 2" are identical.

Switching behaviour	Power fed to the input opens the internal reading gate of the RFH620. (Default setting: active high, debouncing: max. 30 ms (standard))
Features	– Optodecoupled, reverse polarity protected – Can be wired with the PNP output of a sensor – Switching input has no hysteresis
Electrical values	Low: $\|V_{in}\| \leq 2$ V; $\|I_{in}\| \leq 0.3$ mA High: 6 V $\leq \|V_{in}\| \leq 32$ V; 0.7 mA $\leq \|I_{in}\| \leq 5$ mA Signal threshold > 3.9 V

Tab. 6-7: Ratings for the switching inputs

➢ Connect switching inputs depending on application.

To wire the switching inputs using connection module CDB620 or CDM420, see operating instructions "Connection Module CDB620" (no. 8012119, German/English edition) and "Connection Module CDM420" (no. 8010004, German/English edition) respectively.

6.5.6 Wiring switching outputs

The two switching outputs "result 1" and "result 2" can be allocated various functions for outputting the result status independent of each other. If the assigned result occurs in the reading process, the corresponding switching output at the end of the reading pulse is live for the selected impulse duration.

Important The "result" LED is coupled with none of the two digital switching outputs "result 1" or "result 2".

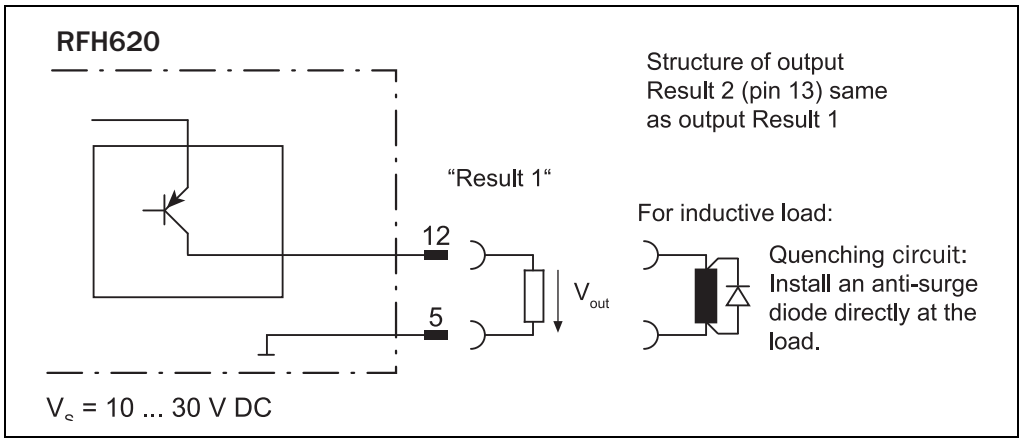


Fig. 6-9: Possible wiring of "result 1" switching output on the 15-pole D-Sub-HD male connector

Important The ratings of the two switching outputs are identical.

Switching behaviour	PNP switching against the distribution voltage U_V
Features	Short-circuit proof and temperature-protected, not galvanically separated from U_V
Electrical values	$0\ V \leq V_{out} \leq V_S$ $(V_S - 1.5\ V) \leq V_{out} \leq V_S$ in $I_{out} \leq 100\ mA$

Tab. 6-8: Ratings for the switching outputs

Important **Capacitance loads** on the switching output affect the switching behaviour. Threshold is a maximum capacitance of 100 nF. Exceeding this value can lead to unwanted pulsing behaviour of the output.

1. Connect switching outputs depending on application.
2. Wire the switching outputs with a load resistance to test the switching functions using a high-resistance digital voltmeter.

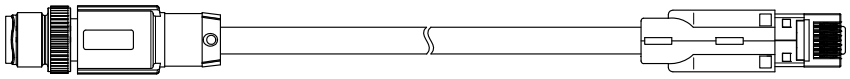
   Indication of incorrect voltages/switching statuses is avoided this way.

To wire the switching outputs using connection module CDB620 or CDM420, see the operating instructions "Connection Module CDB620" (no. 8012119, German/English edition) and "Connection Module CDM420" (no. 8010004, German/English edition) respectively.

6.6 Pin assignment and wire colours of the assembled cables

6.6.1 Pin assignment of the assembled cables

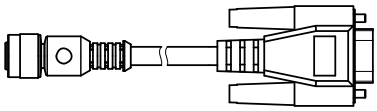
Cable no. 6034414, 6029630, 6034415, 6030928 (Ethernet version)



Pin (4-pole)	**Signal**	**Function**	**Pin** (6-pole)
1	TD+	Transmitter+	1
3	TD–	Transmitter–	2
2	RD+	Receiver+	3
	–	–	4
	–	–	5
4	RD–	Receiver–	6
–	–	Shield	–

Tab. 6-9: Pin assignment on the 4-pole M12 male connector and the 6-pole RJ45 male connector

Cable no. 2042916, 2041834, 2042914, 2042915 (Ethernet version)

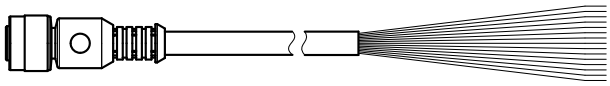


Pin (12-pole)	**Signal**	**Function**	**Pin** (15-pole)
2	10 V ... 30 V DC	Supply voltage	1
8	RxD (Aux)	Aux interface (receiver)	2
7	TxD (Aux)	Aux interface (sender)	3
–	–	–	4
1	GND	Ground	5
11	RD+ (RS-422/485)	Host interface (receiver)	6
12	RD– (RS-422/485); RxD (RS-232)	Host interface (receiver)	7
5	TD+ (RS-422/485)	Host interface (sender)	8
6	TD– (RS-422/485); TxD (RS-232)	Host interface (sender)	9
4	CAN H	CAN bus (IN/OUT)	10
3	CAN L	CAN bus (IN/OUT)	11
–	–	–	12
–	–	–	13
10	Sensor 1	Digital switching input for external reading pulse	14
9	SensGND	Common ground for the switching inputs	15
–	–	Shield	-

Tab. 6-10: Pin assignment on the 12-pole M12 female connector and the 15-pole D-Sub-HD male connector

6.6.2 Pin assignment and wire colours of the assembled cables with an open end

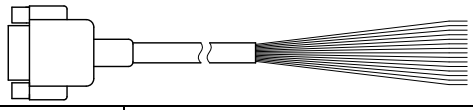
Cable no. 6034605 (Ethernet version)



Pin (12-pole)	**Signal**	**Function**	**Wire color**
1	GND	Ground	Brown
2	10 V ... 30 V DC	Supply voltage	Blue
3	CAN L	CAN bus (IN/OUT)	White
4	CAN H	CAN bus (IN/OUT)	Green
5	TD+ (RS-422/485)	Host interface (sender)	Pink
6	TD– (RS-422/485); TxD (RS-232)	Host interface (sender)	Yellow
7	TxD (Aux)	Aux interface (sender)	Black
8	RxD (Aux)	Aux interface (receiver)	Grey
9	SensGND	Common ground for the switching inputs	Red
10	Sensor 1	Digital switching input for external reading pulse	Violet
11	RD+ (RS-422/485)	Host interface (receiver)	Grey-pink
12	RD– (RS-422/485); RxD (RS-232)	Host interface (receiver)	Red-blue

Tab. 6-11: Pin assignment on the 12-pole M12 female connector and wire colours at the open end

Cable no. 6034418 (Serial version)



Pin (15-pole)	**Signal**	**Function**	**Wire colour**
1	10 V ... 30 V DC	Supply voltage	Red
2	RxD (Aux)	Aux interface (receiver)	Violet
3	TxD (Aux)	Aux interface (sender)	Yellow
4	Sensor 2	Digital switching input (adjustable function, e. g. external reading pulse)	Red-black
5	GND	Ground	Black
6	RD+ (RS-422/485)	Host interface (receiver)	Light blue
7	RD– (RS-422/485); RxD (RS-232)	Host interface (receiver)	Blue
8	TD+ (RS-422/485)	Host interface (sender)	Light grey-turquoise
9	TD– (RS-422/485); TxD (RS-232)	Host interface (sender)	Green
10	CAN H	CAN bus (IN/OUT)	Grey
11	CAN L	CAN bus (IN/OUT)	Pink
12	Result 1	Digital switching output, adjustable function	Brown
13	Result 2	Digital switching output, adjustable function	Orange
14	Sensor 1	Digital switching input for external reading pulse	White
15	SensGND	Common ground for the switching inputs	White-black

Tab. 6-12: Pin assignment on the 15-pole D-Sub-HD female connector and wire colours at the open end

7 Commissioning and configuration

Commissioning, adjustments as well as configuration and diagnosis are carried out with the SOPAS-ET configuration software. Among other things, two buttons on the device offer the possibility to call up a simple reading rate diagnosis (see *chapter 4.7.3 Buttons on the RFH620's housing, page 28*).

7.1 Overview of the start-up procedure

- Start up the RFH620 with the factory default settings
- Download and install version V3.x of the SOPAS ET configuration software (V3.xx) from the online product page at the Internet under: **www.sick.com/sopas**
- Connect the PC with the SOPAS-ET configuration software to the RFH620
- In order to optimise the functionality of the RFH620, adjust and configure the RFH620 if necessary
- Check the correct functioning of the RFH620 in reading operation

7.2 SOPAS-ET configuration software

The SOPAS-ET configuration software adjusts the RFH620 to the reading conditions on site. The configuration data can be saved and archived as a parameter set (project file) on the PC.

7.2.1 Functions of the SOPAS-ET configuration software for the RFH620 (overview)

The online help in the SOPAS-ET configuration software describes the general functions of the software and its operation: MENU, HELP, HELP F1

- Selection of the menu language
- Communication set-up with the RFH620
- Password-protected configuration for various operating levels
- Recording of data during the current mode (recording and analysing the data of certain memory areas of the RFH620 with the data recorder)
- Diagnosing the system

7.2.2 System requirements for the SOPAS-ET configuration software

PC system requirements:

- Recommendation: At least Pentium 1 GHz or higher, 1 GB RAM, Ethernet interface or serial data interface RS-232, mouse (recommended) and a colour monitor (recommended resolution at least 1,024 x 768 pixels)
- Operating system Windows XP, Windows Vista, Windows 7 (32 bit/64 bit) or Windows 8 (32 bit/64 bit)
- Free storage space on the hard drive: approx. 450 MB for SOPAS-ET (V. 3.00) configuration software
- HTML browser on the PC, e.g., Internet Explorer: For online help system for the SOPAS-ET configuration software

Connection cables: refer to the ordering information on the product page at the internet under: **www.sick.com/rfh6xx**.

7.2.3 Installing the SOPAS-ET configuration software

The second generation of SOPAS ET (version 2.38.3) can continue to be used, although support for it is no longer being provided. To receive updates or support, please use the latest version, i.e., the third generation of SOPAS ET (version 3.xx).

Download and installation of SOPAS-ET

The configuration software SOPAS ET, the current system prerequisites for the PC, and the instructions for downloading the software and the device description file(s) can be found at the Internet under: **www.sick.com/sopas**

Procedure for SOPAS V3.xx

1. Start PC.
2. Download and install version V3.x of the SOPAS ET configuration software from the online product page for the software by following the instructions provided there. Administrator rights may be required on the PC to install the software.
3. Start the “SOPAS ET” program option after completing the installation.
   Path: C:\Program Files (x86)\SICK\SOPAS ET\SopasET.exe
4. Install the device driver (SDD) of the RFH620 in the device catalog using the wizard (gear symbol). The *.ssd file can be obtained from the online repository if an Internet connection is present.
5. In the device search list, establish a connection between SOPAS ET and the RFH620 using the search settings. To do this, select the RFH6xx family of devices and select the default IP address 192.168.0.1 when connecting for the first time. The device is detected and can now be integrated into a project for configuration purposes.

7.2.4 Default setting for SOPAS-ET configuration software

Parameter	Value
User interface language	English (the software has to be restarted after changes)
Units of length	Metric
User group (operating level)	Maintenance
Download parameter for changes	Immediate, temporary (RFH620's RAM)
Upload parameter after online switching	Automatic
Window layout	3 (project tree, help, work area)
Serial communication	COM 1: 9,600 Bd/19,200 Bd, 8 data bits, 1 stop bit, no parity 1

Tab. 7-1: Default setting for the SOPAS-ET configuration software (excerpt)

7.3 Establishing communication with the RFH620

Prerequisite The TCP-IP protocol on the PC has to be active to enable communication via TCP-IP.

7.3.1 Connecting data interfaces

➢ Connect the PC and the RFH620 via one of the two data interfaces according to the chart.

via the data interface	Comment
ETHERNET (10/100 MBit/s)	Directly connect the PC (Ethernet interface) to the ETHERNET connection of the RFH620.
RS 232	Connect the PC (serial interface) to the AUX or HOST connection of the RFH620 using a suitable cable.

Tab. 7-2: Connection between PC with SOPAS-ET configuration software and the RFH620

7.3.2 Starting the SOPAS-ET configuration software and calling the scan assistants

1. Switch on the power supply to the RFH620.
   The RFH620 performs a self-test and is initialised.
2. Switch on the PC and start the SOPAS-ET configuration software.
   As standard, the SOPAS-ET configuration software opens the program window with an English program interface.
3. In order to change the language setting, click on CANCEL and change the language of the program interface to GERMAN/DEUTSCH via the menu TOOLS/OPTIONS.
4. Once the language setting has been changed, shut down the SOPAS-ET configuration software and restart it.
5. In the dialog window, select the option CREATE A NEW PROJECT and click on OK to confirm it.
6. In the main window under DEVICE SEARCH, click on SEARCH.

7.3.3 Configuring the Ethernet connection

TIP To establish a connection quickly and easily via Ethernet, the SOPAS-ET configuration software has a DEVICE SEARCH WIZARD in the menu TOOLS.

Manual configuration:

1. In the dialog window DEVICE SEARCH under INTERNET PROTOCOL/IP COMMUNICATION, select the check box for ENABLE IP COMMUNICATION.
2. Click on the button ADD.
3. Enter the IP address of the RFH620 in the dialog window and confirm it by pressing OK.
   The dialog window closes. A new entry appears in the list IP ADDRESS CONFIGURATION.
4. Click on OK to confirm settings.

7.3.4 Configuring the serial connection

1. In the dialog window DEVICE SEARCH under SERIAL PORT/STANDARD PROTOCOL, select the check box for ENABLE SERIAL COMMUNICATION.
2. Click on ADVANCED....
3. Under SELECT BAUD RATE(S), deactivate all the baud rates except 57.6 KBD.
4. Select the following PORT SETTINGS: 8 data bits, no parity, 1 stop bit.
5. Click on OK to confirm settings.

7.3.5 Carrying out a scan

1. In the dialog window DEVICE SEARCH, click on SEARCH.
2. Select the listed devices (RFH620) and confirm with ADD DEVICE.

   Connected devices are searched for via the connection. The SOPAS-ET configuration software inserts the devices found in the project tree and uploads the current parameter set (SYNC CHECK).
3. For the configuration of the devices, see *chapter 7.4.2 Configuring the RFH620, page 56*.

7.4 Initial commissioning

The SOPAS-ET configuration software adjusts the RFH620 to the reading conditions on site. Starting point for this is the factory default setting which can be adjusted to optimise the RFH620. The SOPAS-ET configuration software is used to create an application-specific parameter set, which can be loaded permanently into the RFH620 and saved/archived on the PC as a project file ("*.sopas" file with configuration data).

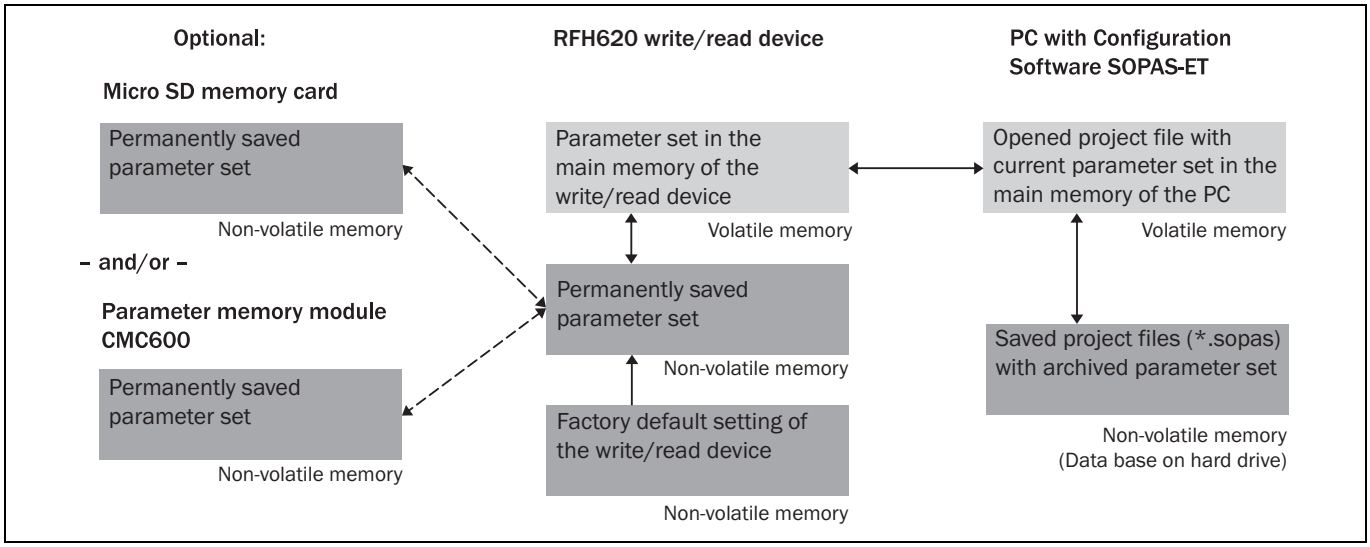


Fig. 7-1: Configuration with SOPAS-ET and storage of the parameter set

If the RFH620 is optionally connected to a Micro SD memory card (see *chapter 4.7.4 Parameter set on the Micro SD memory card (optional), page 29*) or connected to a CDB620/CDM420 connection module with parameter memory mode CMC600, the parameter set is saved permanently to the memory card, or to the CMC600 respectively, with every permanent storage of the parameter set in the RFH620.

After the RFH620 is restarted, it automatically transfers the parameter set from the memory card and the CMC600 to its permanent memory respectively. Thus, an RFH620 can, e. g., be exchanged without losing configuration data (see *chapter 8.4.2 Replacing the RFH620, page 60*). If a memory card and a CMC600 are available, the RFH620 will load the parameter set from the CMC600.

7.4.1 Overview of the start-up procedure

- Connect data interfaces of the PC and the RFH620
- Start the SOPAS-ET configuration software and create a new project file
- Configure the search assistant (activate PC communication)
- Establishing communication with the RFH620
- Accept current configuration of the RFH620 in the project tree
- Log on to the RFH620 as an "authorised client"
- Configure the RFH620 for use
- Load the optimised configuration into the RFH620 and save permanently
- Save the project file with the configuration data of the RFH620 on the PC

7.4.2 Configuring the RFH620

All configurable parameters for the RFH620 are grouped into a device description (ssd file) for the SOPAS-ET configuration software. The device description's project tree acts as a guideline for the configuration.

The function of each respective parameter is explained in a context-sensitive manner in an online help (F1 key). The valid value range and the default setting list the display window PARAMETER INFO (right mouse button, when the cursor is positioned over the parameter).

In order to configure a device via the SOPAS-ET configuration software, the respective operating level has to be selected in advance. After the start, the SOPAS-ET configuration software functions at the operating level "MAINTENANCE".

1. In the menu bar under TOOLS, select the command LOGIN TO DEVICE.
2. In the dialog window under USERLEVEL in the list box, select the entry AUTHORIZED CLIENT.
   If the parameter set is password-protected, enter the password "client" in PASSWORD.
   The password protection is activated/deactivated on the register tab PARAMETER.
3. Click on OK to confirm the dialog window.
   The previously greyed out parameters on the register tabs are now accessible.

7.4.3 Permanently load changed parameter sets into the device

Changed parameter values are immediately transferred to the RFH620's main memory (RAM) depending on the option ("Immediate download"). To ensure that the changes remain even after the RFH620 is restarted, the configuration has to be permanently saved in the RFH620's PROM.

➢ In order to load the current settings permanently in the RFH620, in the menu bar under RFH620, select the command PARAMETER/SAVE PERMANENT or click on  in the tool bar.

7.4.4 Save, display and print the current parameter set

When archiving a parameter set, it is recommended to not only save the project file on the PC but also to print out the contents of the file.

1. In order to save the current parameter set, select the menu item SAVE AS in the menu bar under PROJECT.
2. Enter a file name in the dialog window and confirm it by clicking on SAVE.

   The SOPAS-ET configuration software saves the current settings in a configuration file "*.sopas".
3. In order to print out the current parameter set, select the command PRINT/PRINT PREVIEW in the menu bar under PROJECT.

   The SOPAS-ET configuration software displays a preview of a table with a list of all the parameter values.
4. Click on  in the tool bar at the top of the dialog window.

   The dialog window PRINT for the printer configuration appears.
5. Edit setting accordingly and confirm with OK.

   The current project settings are printed as a table on several pages.

TIP To save the current parameter set as a PDF, in the menu bar under PROJECT select the command PRINT/SAVE AS PDF FILE.

7.5 Default setting

The values of the default setting are permanently saved in the RFH620 (non-volatile memory) and in the database of the SOPAS-ET configuration software in the device-specific ssd file (see *chapter 7.4 Initial commissioning, page 55*). A PC is not required to start up the RFH620 with the default setting.

7.5.1 Resetting the default setting in the RFH620

Prerequisite The SOPAS-ET configuration software is connected online to the RFH620.

Two default setting types can be called up via the SOPAS-ET configuration software:

- Complete default setting (LOAD DEFAULT SETTING) 
  SOPAS-ET resets all parameter values of the RFH620 to default. Settings, which have been previously made for the communication parameters of the Ethernet interfaces or serial data interfaces (e.g. Ethernet address), are overwritten. In the process, the connection(s) to the RFH620 disappear(s) as the case may be and must to be reconfigured.
- Application-specific default setting (LOAD APPLICATION DEFAULT SETTING) 
  SOPAS-ET resets the parameter values of the RFH620, but does not change the communication parameters. Settings, which have been previously made for the communication parameters of the Ethernet interfaces or serial data interfaces, are kept and the current connection(s) to the RFH620 remain(s) established.

1. In order to discard changes to the parameter set as described above, select the corresponding command in the menu bar under RFH620.
   The SOPAS-ET configuration software loads the default setting from the RFH620 and displays the parameter values in the register tabs. In the RFH620, the default setting will first be active in the temporary main memory only.
   The default setting can also be saved in the PC or printed (see *chapter 7.4.4 Save, display and print the current parameter set, page 57*).
2. In the menu bar under DEVICE, select the command LOGIN TO DEVICE.
3. In the dialog window under USERLEVEL in the list box, select the entry AUTHORISED CLIENT.
   If the parameter set is password-protected, enter the password "client" in PASSWORD.
4. Click on OK to confirm the dialog window.
5. In the menu bar under RFH620, select the command PARAMETER/SAVE PERMANENT.
   The SOPAS-ET configuration software transfers the default setting to the permanent parameter memory (PROM) of the RFH620.
   If the RFH620 is equipped with the Micro SD memory card or connected to a connection module CDB620/CDM420 with parameter memory module CMC600, the default setting will be permanently transferred to the parameter memory CMC600 and memory card respectively.

Important Once the default setting has been restored, password-protection is deactivated.

8 Maintenance

8.1 Maintenance during operation

It RFH620 operates maintenance-free in all variants.

Important **Do not open the RFH620's housing. If the device is opened, the SICK AG warranty shall not apply.**

8.2 Cleaning the housing

- ➢ Use a soft cloth to free the housing of dust.
- ➢ If necessary, also clean the LEDs on the housing.

8.3 Checking the incremental encoder

If an optional incremental encoder is used, the position of the friction wheel at the drive system should be checked at regular intervals.

- ➢ Ensure that the incremental encoder has direct and fixed contact with the drive system and that the friction wheel rotates without slipping.

8.4 Replacing an RFH620

Incorrect or damaged devices have to be removed and replaced with either new or repaired devices.

Important **Repairs to the RFH620 should only be carried out by qualified and authorised SICK AG service staff.**

8.4.1 Dismantling the RFH620

1. Switch off the power supply to the RFH620.
2. Disconnect all the connection cables of the RFH620.
3. Remove the RFH620 from the holder. In the process, mark the RFH620´s situation and alignment on the holder or environment.
4. If available, remove the Micro SD memory card (optional) with the stored parameter set from the faulty RFH620 (see *chapter 4.7.4 Parameter set on the Micro SD memory card (optional), page 29*). To do this, open the cover and slightly press on the memory card in order to unlock it.
5. Insert the memory card accordingly into the empty space of the new, turned-off RFH620 the right way round (the card's notches point to the two yellow keys) until it is locked.
6. Close the cover again.

8.4.2 Replacing the RFH620

1. Align and install the new or repaired RFH620 (see *chapter 5 Installation, page 31*). In the process, observe any marks made previously on the holder or the environment (*chapter 8.4.1 Dismantling **the RFH620**, page 59*).
2. Re-connect connection cables to the RFH620 (see *chapter 6 Electrical installation, page 35*).
3. Switch the power supply to the RFH620 back on.

   The RFH620 starts with the default setting.
4. If, as an option, a Micro SD memory card has been inserted into the RFH620 or a parameter memory module CMC600 into connection module CDB620/CDM420, the new RFH620 will automatically load the stored parameter set from the memory card or CMC600 into its permanent memory. If both a memory card and a CMC600 are available, the RFH620 will load the parameter set from the CMC600.

   - or -

   Without Micro SD memory card /parameter memory module CMC600: Connect to the RFH620 via the SOPAS-ET configuration software, transfer the configuration stored on the PC via download to the RFH620 and permanently store the configuration there.

9 Troubleshooting

This chapter describes how errors in the RFH620 can be recognised and eliminated.

9.1 Overview of errors and malfunctions which could occur

9.1.1 Error during the installation

- The RFH620 has been unsuitably aligned to objects with transponders (e. g. a shield)
- Reading pulse sensor has been positioned incorrectly (e.g. internal reading gate is opened too late or shut too early)

9.1.2 Error during the electrical installation

- Interfaces of the RFH620 were wired incorrectly

9.1.3 Error during configuration

- Functions have not been adjusted to the local conditions, e.g. parameters for the data interface are set incorrectly
- Device-related limits have not been considered, e.g. reading distance
- Trigger source for reading pulse selected incorrectly

9.1.4 Malfunctions during operation

- Start/Stop operation: External reading pulse is missing, more than one object is in the reading area
- Device error (hardware/software)

9.2 Detailed malfunction analysis

9.2.1 LEDs on the RFH620

Among other things, the following statuses can be read from the LEDs on the RFH620's housing (see *chapter 4.7.2 LEDs on the **RFH620**'s housing, page 27*):

- Ready
- Status of the reading result (result)
- Data traffic on the host, aux and CAN interface

The LEDs can display possible malfunctions or errors. Please refer to the system information for further details.

9.2.2 System information

The RFH620 displays errors in various ways. The error output is hierarchised and always allows a detailed analysis:

- Communication errors can occur while transferring telegrams to the RFH620. In this case, the RFH620 returns an error code.
- Error codes are written into a status protocol for errors which occur during a reading (see subsequent chapter).

9.3 Status protocol

Important The status protocol remains even after switching the RFH620 off and on again.

The RFH620 differentiates between four types of error:

- Information
- Warning
- Error
- Fatal error

The RFH620 only saves the last five entries for each of the error types.

9.3.1 Displaying the status protocol using the SOPAS-ET configuration software

In order to display the status protocol, the SOPAS-ET configuration software has to be online and connected to the RFH620.

1. Connect the SOPAS-ET configuration software with the device.
2. Open the project tree RFH620, SERVICE, SYSTEM STATUS, register tab SYSTEM INFORMATION.

9.4 SICK support

If an error cannot be eliminated, it is possible that the RFH620 is defective. The RFH620 cannot be repaired by the user, meaning that it is not possible to re-establish functions after a failure. However, the RFH620 can be rapidly replaced by the user (see *chapter 8.4 Replacing an RFH620, page 59* for this).

➢ If an error occurs which cannot be eliminated, please contact SICK service:

- In Germany: Technical hotline of SICK Vertriebs-GmbH
  - Tel. +49 211 5301-301
  - Fax. +49 211 5301-100
  - E-mail: info@sick.de
- International: your appropriate SICK branch office and SICK subsidiary respectively.
  - For telephone numbers and e-mail addresses, please see the back page of these operating instructions
  - For the postal address please visit **www.sick.com**.

➢ Only return devices after consultation with the SICK service.

Important **Repairs to the RFH620 should only be carried out by qualified and authorised SICK AG service staff.**

10 Technical data

10.1 RFH620 data sheet

Type	**RFH620-1000001 (Serial version)**	**RFH620-1001201 (Ethernet version)**
Product category	ISO/IEC-15693 compatible write/read device	
Carrier frequency	13.56 MHz	
Air interface protocol	ISO/IEC-15693, 18000-3 M1 („mandatory“ and „optional“ command set)	
HF transmitter power	200 mW	
Cruising range	Up to 160 mm (depending on the size of the transponder)	
Useable antenna surface area	125 mm x 75 mm	
Optical indicators	6 LEDs: Ready, result, HF, data, CAN, LNK TX	
Acoustic display	Beeper, which can be switched off, with function for result status display is available	
Reading pulsing	• Pulse sources for start: Switching inputs "sensor 1" and/or "sensor 2"; command; automatic cycle; CAN • Pulse sources for stop: Reading pulse source, "sensor 1", "sensor 2", command, timer, good read, condition • Freewheel	• Pulse sources for start: Switching inputs "sensor 1"; command; automatic cycle; CAN • Pulse sources for stop: Reading pulse source, "sensor 1", command, timer, good read, condition • Freewheel
"Host" data interfaces	Serial: RS-232 or RS-422/485 (0.3 kBd ... 500 kBd) Ethernet: TCP/IP (port 2112, half/full duplex, 10/100 MBit/s), IP (10/100 MBit/s) PROFINET I/O (single port, 10/100 MBit/s)	
Aux" data interface	Serial: RS-232 (57.6 kBd; 8 data bits, no parity, 1 stop bit); Ethernet (port 2111); fixed data output format	
Data interface "CAN"*	20 kBit/s ... 1 MBit/s, SICK CAN-SENSOR network (master, slave, multiplexer)	
Digital switching inputs	2 ("sensor 1", "sensor 2"), 2 additional inputs via CMC600 in CDB620	1 ("sensor 1"), 2 additional inputs via CMC600 in CDB620, optodecoupled, V_{in} = max. 32 V, reverse polarity protected, which can be wired with PNP output, configurable debouncing 0 ms ... 10,000 ms
Digital switching outputs	2 ("result 1", "result 2"), 2 additional outputs via CMC600 in CDB620 PNP, I_{out} = max. 100 mA, short circuit-proof, configurable impulse duration (static, 10 ... 1,000 ms)	No output, 2 outputs via CMC600 in CDB620
Electric connection	Cable (0.9 m) with 15-pole D-Sub-HD male connector	Revolving connector unit with 2 M12 circular connectors (12-pole male connector, 4-pole female connector)
Operating voltage/ Power consumption	10 V ... 30 V DC, SELV in accordance with currently applicable EN 60950-1 / typical 5 W (with unwired switching outputs)	
Housing	Die-cast aluminium	
Antenna cover material	PPS Plastic	
Safety	According to EN 60950-1	
Proctection class	III, according to EN 60950-1	
Enclosure rating	IP 67, according to EN 60529 (1991-10); A1 (2002-02)	
EMC tested	According to EN 301489-3	
Wireless authorisation	According to EN 300330-2 receiver class 3 / FCC part 15	
Vibration/shock test	According to EN 60068-2-6 (2008-02) / according to EN 60068-2-27 (2009-05)	
Weight	520 g with connecting cable	450 g without connecting cables

Type	RFH620-1000001 (Serial version)	RFH620-1001201 (Ethernet version)
Ambient temperature	Operation: –25 °C... +60 °C, storage: –25 °C... +70 °C	
Max. rel. humidity	90 %, non condensing	
Housing color	Light blue (according to RAL 5012)	

Tab. 10-1: Technical specifications of the RFH620

10.2 RFH620‘s dimensional drawings.

10.2.1 Dimensional drawing of RFH620-1000001

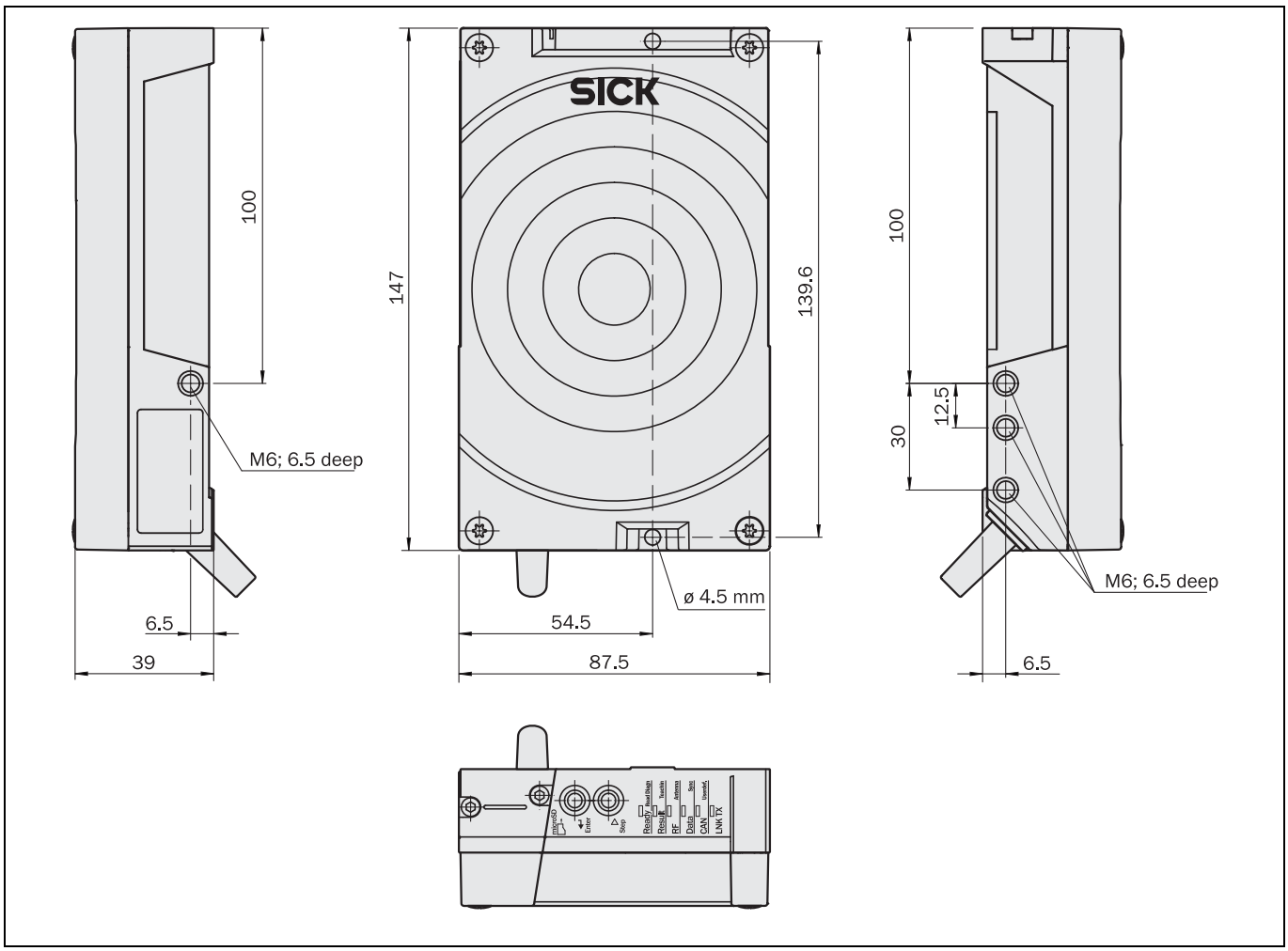


Fig. 10-1: Serial version: Dimensions of the RFH620-1000001

10.2.2 Dimensional drawing of RFH620-1001201

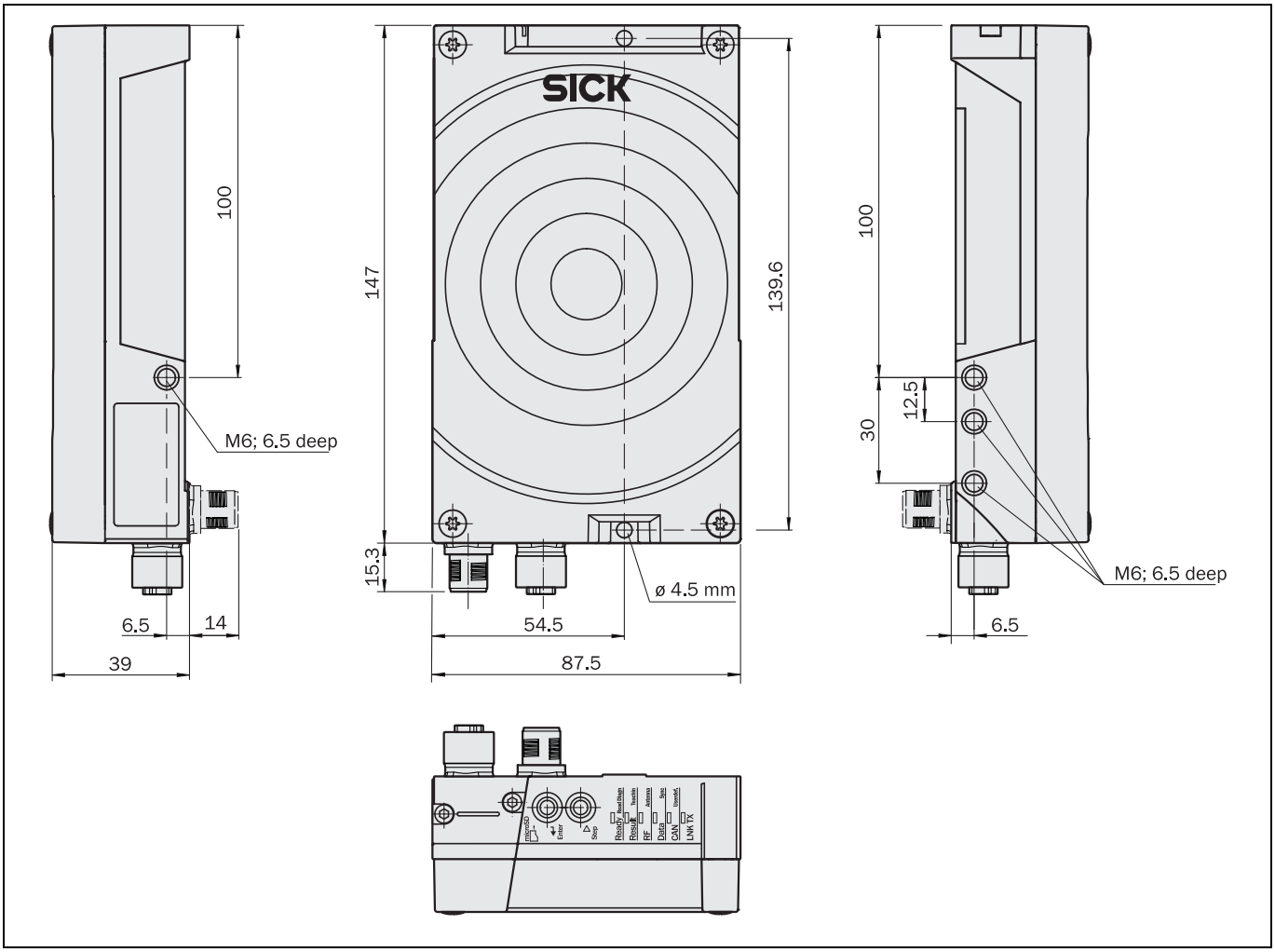


Fig. 10-2: Ethernet version: Dimensions of the RFH620-1001201

11 Appendix

11.1 Overview of the Appendixes

The appendix contains the following additional information:

- Configuration with command strings
- Dimensional drawings of the accessories
- Supplementary documentation (overview)
- Copy of EU Declaration of Conformity

11.2 Configuring the RFH620 with command strings

As an alternative to the SOPAS-ET configuration software, the RFH620 can also be configured and operated with command strings via all the data interfaces. The command strings can be displayed separately via the SOPAS-ET configuration software.

For this purpose, select the setting COMMAND on the register tab OBJECT TRIGGER CONTROL as Trigger source.

Important Both the command strings and the SOPAS-ET configuration software are based on command language which directly accesses the command interpreter of the RFH620. This command language must be used with care as the RFH620 executes sent commands immediately. Parameter values altered via commands are, at first, only active in the current parameter set in the working memory (RAM) of the RFH620. To save in the permanent memory, the altered parameter set must be copied into the PROM using a special command; this ensures that the alterations are not lost when the power supply is switched off.

Command strings for triggering the reading pulse:

- START: <STX>sMN mTCgateon<ETX>
- STOP: <STX>sMN mTCgateoff<ETX>

If the commands are entered via the terminal emulator of the SOPAS-ET configuration software, the two control characters <STX> and <ETX> are omitted.

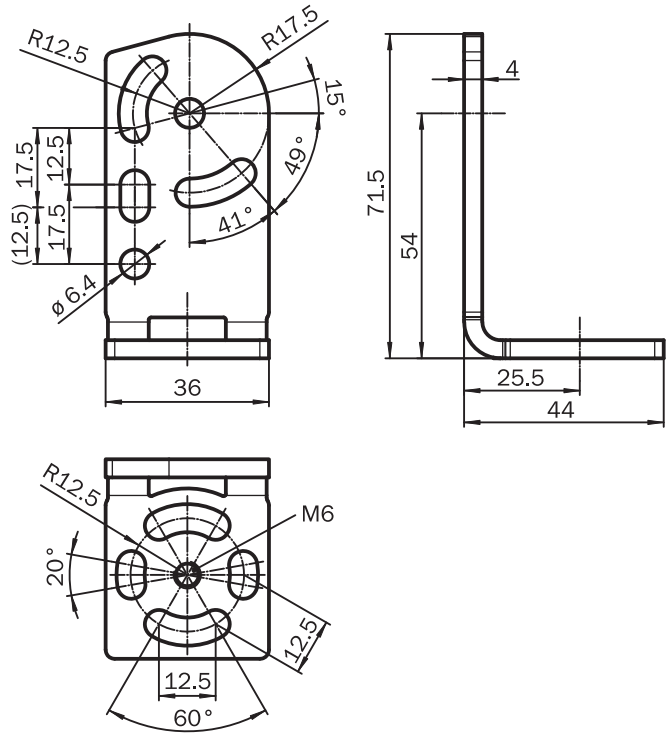
Connection to the RFH620 using the terminal emulator via the Ethernet:

1. Call up the terminal emulator via the menu TOOLS/TERMINAL of the SOPAS-ET configuration software and, in the terminal emulator, call up the connection assistant via the menu SET UP CONNECTIONS/CONNECTION.
2. Select the option USER-DEFINED CONNECTION in the connection assistant and confirm by pressing NEXT.
3. Select the option TCP/IP and confirm by pressing NEXT.
4. Select the option SHOW ONLY COLA TELEGRAMS.
5. Enter the RFH620's IP address in the relevant field and confirm by pressing NEXT.
6. In the selection list ADDRESSING MODE, select the setting NAME and confirm by pressing CONNECT.

   The connection with the RFH620 is established. The command strings can be transferred.

11.3 Dimensional drawing accessories

11.3.1 Dimensional drawing fixing bracket no. 2048551



Included to fix the RFH620 to the bracket:
2 x cylinder head screws M6 x 8 mm, with hexagon female connector, self-locking

Fig. 11-1: Dimensions of the fixing bracket no. 2048551

11.4 EU Declaration of Conformity

SICK AG hereby declares that the RFU620 radio equipment complies with the 2014/53/EU directive. The complete text of the EU declaration of conformity is available at the following web address: **www.sick.com/RFH6xx**.

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