

InspectorP621

2D vision

SICK
Sensor Intelligence.



Described product

InspectorP621

Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

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Original document

This document is an original document of SICK AG.



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1 About this document

1.1 Information on the operating instructions

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

Prerequisites for safe work are:

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

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



NOTE

Read these operating instructions carefully before starting any work on the device, in order to familiarize yourself with the device and its functions.

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

These operating instructions do not provide information on operating the machine or system in which the device is integrated. For information about this, refer to the operating instructions of the specific machine.

1.2 Scope

These operating instructions serve to incorporate the device into a customer system. Instructions are given by stages for all actions required.

These operating instructions apply to all available device types of the product. To obtain more detailed information on identifying your device type, see "", page 13.

Available device types are listed on the online product page:

- www.sick.com/InspectorP62x

A number of device types are used as examples for commissioning and based on the default parameter settings for the relevant device.

1.3 Explanation of symbols

Warnings and important information in this document are labeled with symbols. The warnings are introduced by signal words that indicate the extent of the danger. These warnings must be observed at all times and care must be taken to avoid accidents, personal injury, and material damage.



DANGER

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



WARNING

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

**CAUTION**

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

**NOTICE**

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

**NOTE**

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

1.4 Further information

**NOTE**

Further documentation for the device can be found on the online product page at:

- www.sick.com/InspectorP62x

There, additional information has been provided depending on the product, such as:

- Model-specific online data sheets for device variants, containing technical data, dimensional drawing, and specification diagrams
 - EU declarations of conformity for the product family
 - Dimensional drawings and 3D CAD dimension models in various electronic formats
 - This documentation, in English and German and other languages if applicable
 - Other publications related to the devices described here
 - Publications dealing with accessories
-

2 Safety information

2.1 Intended use

The InspectorP6xx is a programmable vision sensor for industrial use for tasks which require high-resolution images at long distances.

The device is programmed on a PC by using the development environment software SICK AppSpace. Depending on the application, a browser-based, graphical user interface (HMI) can be created, which provides opportunities defined by the application developer to influence an application at operator level. The device offers various interfaces for controlling, programming, and operating purposes, which can be activated as necessary via development environments, control systems (programmable logic controllers), or applications. However, configuration, programming, and control requires various technical skills, depending on how the device is connected and used.

The devices are primarily designed for use in industrial and logistics areas, and they meet the requirements for industrial ruggedness, interfaces and data processing. They are not safety components as per the Machinery Directive 2006/42/EC. They are not intended and not permitted to be used in areas with explosive atmospheres, in corrosive environments, or in extreme ambient conditions.

2.1.1 Operating restrictions

**NOTICE**

Radio interference may occur when the device is used in residential areas!

- Only use the device in industrial environments (EN 61000-6-4).

2.1.2 Conditions for specified enclosure rating

To ensure compliance with the specified IP65 enclosure rating of the device during operation, the following requirements must be met: If these requirements are not met, the device does not fulfill any specified enclosure rating.

- The cables plugged into the two electrical M12 connections are screwed tight.
- Any electrical M12 connections that are not being used (Ethernet connection) must be sealed with protective plugs that are screwed tight (as in the delivery condition).
- The black cover (flap) on the rear of the device must be flush with the device and screwed tight.

**NOTICE**

Operate the device with open black cover only for a short time for the following tasks as required:

- Inserting or removing the optional memory card

During this time, protect the device against moisture and dust.

2.2 Improper use

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

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
- The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.

- The device must not be operated in the temperature range below 0 °C.
 - Any use of accessories not specifically approved by SICK AG is at your own risk.
-



WARNING

Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Device should be used only in accordance with its intended use.
 - All information in these operating instructions must be strictly observed.
-

2.3 IP technology



NOTE

SICK uses standard IP technology in its products. The emphasis is placed on availability of products and services.

SICK always assumes the following prerequisites:

- The customer ensures the integrity and confidentiality of the data and rights affected by its own use of the aforementioned products.
 - In all cases, the customer implements the appropriate security measures, such as network separation, firewalls, virus protection, and patch management.
-

2.4 Limitation of liability

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

- Failing to observe the operating instructions
- Incorrect use
- Use by untrained personnel
- Unauthorized conversions
- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

With special variants, where optional extras have been ordered, or owing to the latest technical changes, the actual scope of delivery may vary from the features and illustrations shown here.

2.4.1 Programmable product

For programmable products, the respective programmer is responsible for his/her programming performance and the resulting working principle of the product.

The liability and warranty of SICK AG is limited to the product specification (functionality and any programming interfaces) according to the agreed conditions.

Therefore, SICK AG is not liable, among other things, for damages that are caused by programming of the customer or third parties.

2.5 Modifications and conversions



NOTICE

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

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

2.5.1 Exception: temporarily opening the cover on the device



NOTICE

The user may open the housing only in order to obtain temporary access to the slot for the optional memory card. For this purpose, the corresponding black cover (flap) at the top of the device at the rear can be opened temporarily.

In open state, the device does not conform to a specified enclosure rating. The device must be protected appropriately against moisture and dust.

- ▶ Operate the device only for a short time without closed cover.

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

2.6 General cybersecurity notice

Protection against cybersecurity threats requires a comprehensive and holistic cybersecurity concept that must be continuously monitored and maintained. Such a concept consists of organizational, technical, process-related, electronic and physical defense levels and sets up appropriate measures for the different types of risk. SICK's products and solutions must be regarded as an integral part of this concept.

Information on Cybersecurity can be found at: www.sick.com/psirt.

2.7 Requirements for skilled persons and operating personnel



WARNING

Risk of injury due to insufficient training.

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

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

This product documentation refers to the following qualification requirements for the various activities associated with the device:

- **Instructed personnel** have been briefed by the operator about the tasks assigned to them and about potential dangers arising from improper action.
- **Skilled personnel** have the specialist training, skills, and experience, as well as knowledge of the relevant regulations, to be able to perform tasks delegated to them and to detect and avoid any potential dangers independently.
- **Electricians** have the specialist training, skills, and experience, as well as knowledge of the relevant standards and provisions to be able to carry out work on electrical systems and to detect and avoid any potential dangers independently. In Germany, electricians must meet the specifications of the BGV A3 Work Safety Regulations (e.g. Master Electrician). Other relevant regulations applicable in other countries must be observed.

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> ■ Basic practical technical training ■ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	<ul style="list-style-type: none"> ■ Practical electrical training ■ Knowledge of current electrical safety regulations ■ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	<ul style="list-style-type: none"> ■ Basic knowledge of the Windows™ operating system in use ■ Basic knowledge of the design and setup of the described connections and interfaces ■ Basic knowledge of data transmission ■ Knowledge of the programming of image-processing systems and network components
Operation of the device for the particular application	<ul style="list-style-type: none"> ■ Knowledge of the operation and control of the devices in their particular application ■ Knowledge of the software and hardware environment for the particular application

2.8 Operational safety and particular hazards

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

Illumination LEDs

The product is fitted with LEDs of risk group 0 or 1 for object illumination, depending on type.

- The accessible radiation from LEDs of risk group 0 does not pose a risk to human eyes or skin.
- The accessible radiation from LEDs of risk group 1 poses a slight risk to human eyes.



CAUTION

Warning! Optical radiation: LED risk group 1

The LEDs may pose a danger to the eyes and skin in the event of incorrect use.

- Protect the eyes and skin against radiation.
- Use suitable eye protection.
- Use protective measures such as a screen to shield the radiation.
- Do not open the housing. Opening the housing will not switch off the light source. Opening the housing may increase the level of risk.
- Comply with the current national regulations on photobiological security of lamps and lamp systems.

Aiming laser

**CAUTION****Optical radiation: Laser class 1**

The accessible radiation does not pose a danger when viewed directly for up to 100 seconds. It may pose a danger to the eyes and skin in the event of incorrect use.

- Do not open the housing. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

**CAUTION****Hazardous radiation.**

If any operating or adjusting devices other than those specified here are used or other methods are employed, this can lead to dangerous exposure to radiation. Damage to the eyes is possible.

- If the product is operated in conjunction with external illumination systems, the risks described here may be exceeded. This must be taken into consideration by users on a case-by-case basis.
- Do not look into the light source when it is switched on.
- Comply with the latest version of the applicable regulations on photobiological safety of lamps and lamp systems as well as on laser protection.

For both radiation types:

It is not possible to entirely rule out temporary disorienting optical effects, particularly in conditions of dim lighting. Disorienting optical effects may come in the form of daz-zle, flash blindness, afterimages, photosensitive epilepsy , depending on parameteriza-tion), or impairment of color vision, for example.

**CAUTION****Risk of injury due to hot device surface!**

- When performing work directly on the product (e.g. cleaning, disassembly), switch off the device if necessary and allow it to cool down.

**WARNING****Electrical voltage!**

Electrical voltage can cause severe injury or death.

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

**WARNING****Risk of injury and damage caused by potential equalization currents!**

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

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

3 Product description

3.1 Product ID

3.1.1 Type label

The type label gives information for identification of the device.

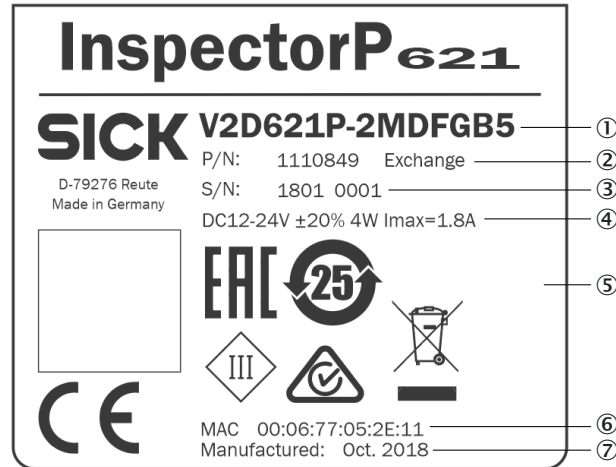


Figure 1: Structure of the type label

- ① Type designation according to type code
- ② Part number
- ③ Serial number
- ④ Supply voltage, power consumption and maximum current consumption
- ⑤ Certificates and symbols
- ⑥ MAC address (placeholder)
- ⑦ Production date

3.1.2 Type code

The devices of the InspectorP621 product family are arranged according to the following type code:

V2D6xyz-abcdefg

V	2	D	6	x	y	z	-	a	b	c	d	e	f	g
1	2	3	4	5	6	7		8	9	10	11	12	13	14

Position	Description
1 ... 5	Product family V2D62 InspectorP62x
4 ... 6	Image sensor resolution 1: 1.3 Mpx (1280 px x 1024 px)
7	Function P: Programmable
8	Generation 2: 2nd generation
9	Image sensor type M: Monochrome

Position	Description
10	Integrated illumination unit ¹⁾ / aiming laser S: red left, blue right / aiming laser D: left IR ²⁾ , right IR ²⁾ / aiming laser
11	Parameter set F: Full Feature Set for variant InspectorP621
12	Focal length B: 9.6 mm F: 17, 1 mm G: 17, 1 mm with visible block filter
13	Connectivity package B: Ethernet, serial, CAN, I/O, USB, memory card slot
14	IP Protection class 5: IP 65

1) Front view

2) IR = Infrared light



NOTE

Not all combinations are possible according to the type code. The available device variants can be found online at:

- www.sick.com/InspectorP62x

3.2 Scope of delivery

The delivery of the device includes the following components:

Table 2: Scope of delivery

No. of units	Component	Comment
1	Device in the version ordered	Without bracket and optional connecting cables.
1	Printed safety notes, multilingual	Brief information and general safety notes.
2	Sliding nut, 5.5 mm deep, with M5 threaded fixing hole	Alternative mounting option for the device instead of tapped blind hole. Use in pairs!

Associated components not contained in the delivery:

Table 3: Other components

Component	Comment
SOPAS ET configuration software	Available online at: • www.sick.com/SOPAS_ET
SICK AppStudio software	Available online at: • www.sick.com/SICK_AppStudio
SICK AppManager software	Available online at: • www.sick.com/SICK_AppManager

Component	Comment
This documentation, available in English and German, and in other languages if necessary	Available online at: <ul style="list-style-type: none"> • www.sick.com/InspectorP62x

Accessories

Accessories such as brackets and connecting cables is only delivered if the accessories have been ordered separately, see "Accessories", page 52.

3.3 Product characteristics

3.3.1 Device view

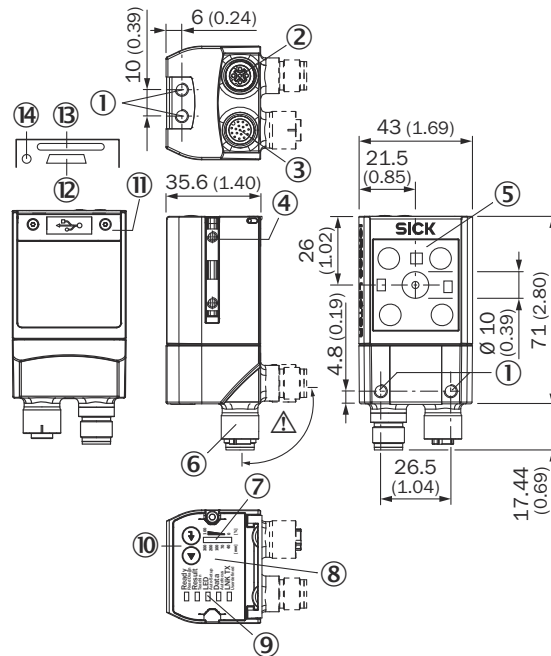


Figure 2: design and device dimensions, all dimensions in mm or inch

- ① M5 tapped blind hole, 5 mm deep (4 x), for mounting the device
- ② “Ethernet” connection (female connector, M12, 4-pin, D-coded)
- ③ “Power/Serial Data/CAN/I/O” connection (male connector, M12, 17-pin, A-coded)
- ④ Sliding nut M5, 5.5 mm deep (2 x), for an alternative method of mounting the device
- ⑤ Reading window with internal illumination LEDs (4 x)
- ⑥ Swivel connector (swivel range 180°)
- ⑦ Bar graph display
- ⑧ Beeper (under housing cover)
- ⑨ RGB LEDs for status indication (2 levels), 5 x
- ⑩ Function button (2 x)
- ⑪ Cover (flap) with fixing screw (Torx TX6, captive), 2 x
- ⑫ USB port (female connector, type Micro-B, 5-pin)
- ⑬ Slot for microSD memory card
- ⑭ Status display (LED) for microSD memory card



NOTICE

damage to the swivel connector from over-rotation!

- The swivel connector may be moved up to a maximum of 180° from end point to end point. Do not exceed the respective limit position.
- Carry out the rotational movement slowly.

3.3.1.1 Illumination unit

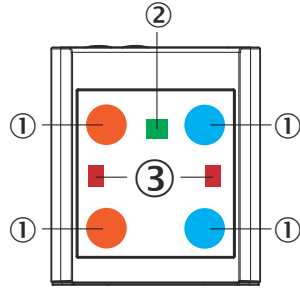


Figure 3: Illumination unit (integrated illumination unit)

- ① 4 LEDs (color: visible red light, visible blue light; position: 2 on the left, 2 on the right)
- ② Feedback-LED (color: visible green light)
- ③ Laser alignment aid (color: visible red light)



NOTE

To avoid being dazzled by the integrated illumination unit, do not look into the viewing window of the device.

3.3.2 Display and operating elements

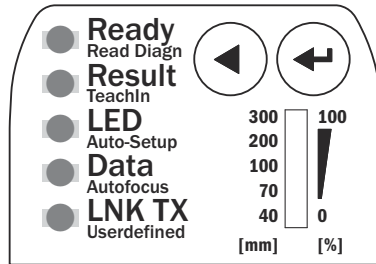


Figure 4: LED status displays, bar graph display and function keys on the top of the device

Status displays

Display	LED	API name ¹	Color	Status
Ready	Steady	-	green	Device is ready
	Steady	-	red	Hardware or software error
	Steady	-	yellow	Firmware or SensorApps are being installed on the device. Do not disconnect the power to the device.
	Flashing (about 1 Hz)	-	green/yellow	Profinet is configured, but no successful connection to a PLC is established. If there are additional errors related to the SensorApp, the LED flashes with red color.
Result	Programmable	RESULT_LED	red, green, blue, fuchsia, yellow, aqua, white	Function defined by user
Light (LED)	Programmable	LIGHT_LED	red, green, blue, fuchsia, yellow, aqua, white	Function defined by user
Function (Data)	Programmable	FUNCTION_LED	red, green, blue, fuchsia, yellow, aqua, white	Function defined by user
LNK TX	Flashing	-	green	The device is connected to a network
LED bar (0..9)	Programmable	BAR0_LED BAR1_LED BAR2_LED BAR3_LED BAR4_LED BAR5_LED BAR6_LED BAR7_LED BAR8_LED BAR9_LED	green	Function for each LED defined by user

¹ For programmable LEDs only

Status display of the microSD memory card

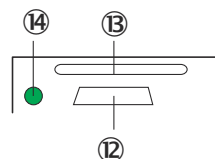


Figure 5: Display under flap on rear of device

- ⑫ USB interface
- ⑬ Slot for microSD memory card
- ⑭ Display for microSD memory card

Table 4: Status display of the microSD memory card

Display	LED	Color	Status
MicroSD	Lights up	Green	The device writes data to the correctly installed memory card. Read access to the card is not signaled.

3.3.3 Acoustic status indicator

The beeper (buzzer) is located under the cover on the top of the device, see "Device view", page 15. The API contains functionality for setting the beep duration, the pitch, the tone sequence and the volume level.

3.3.4 Memory card

The device has a card slot integrated in the housing. This slot accommodates a memory card in microSD format.



NOTE

The memory card is optional and is not included with the device scope of delivery. The device supports memory cards up to max 32 GB.

Only use types (industrial standard) approved by SICK to ensure reliable function of the memory card. You can find these as accessories online at:

- www.sick.com/InspectorP62x

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

Inserting the memory card in the device:



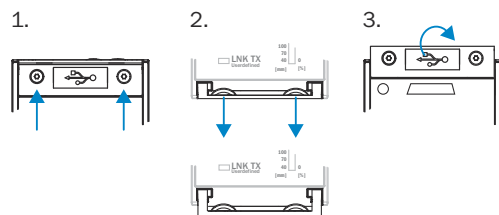
NOTICE

Risk of damage to the memory card!

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

Access to the card slot

The card slot for the memory card is located at the top of the device at the rear under the hinged cover.



1. Switch off the supply voltage to the device.
2. Undo the screws (Torx TX6, captive) on the hinged cover (in Figure: step 1) and open the cover as follows:
 - Carefully pull the upper edge of the flap away from the housing a little at the level of the hinges on the side (in Figure: step 2). Use both of the recesses on the inside of the flap to do this.
 - Fold the flap upwards starting from the bottom edge.
3. Making sure it is in the correct position, insert the memory card into the slot until it locks into place. When doing this, position the contacts so that they are facing to the rear and upwards, see the card symbol on the device.

4. Close the hinged cover again (in Figure: step 3). Make sure that the cover is completely flush with the housing.
5. Tighten the screws on the hinged cover again.
6. Switch on the supply voltage for the device.

Removing the memory card from the device:



NOTICE

Risk of damage to the memory card!

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

1. Switch off the supply voltage to the device.
2. Undo the screws on the hinged cover.
3. Making sure it is in the correct position, push the memory card into the slot until it is released. When doing this, position the contacts so that they are facing to the rear and upwards, see the card symbol on the device.
4. Remove the memory card.
5. Close the hinged cover again. Make sure that the cover is completely flush with the housing.
6. Tighten the screws on the hinged cover.
7. Switch on the supply voltage for the device.

3.4 SICK AppSpace

The InspectorP6xx product family is part of the SICK AppSpace ecosystem, which consists of software tools and programmable sensors or devices. See [figure 6](#) for an overview of SICK AppSpace.

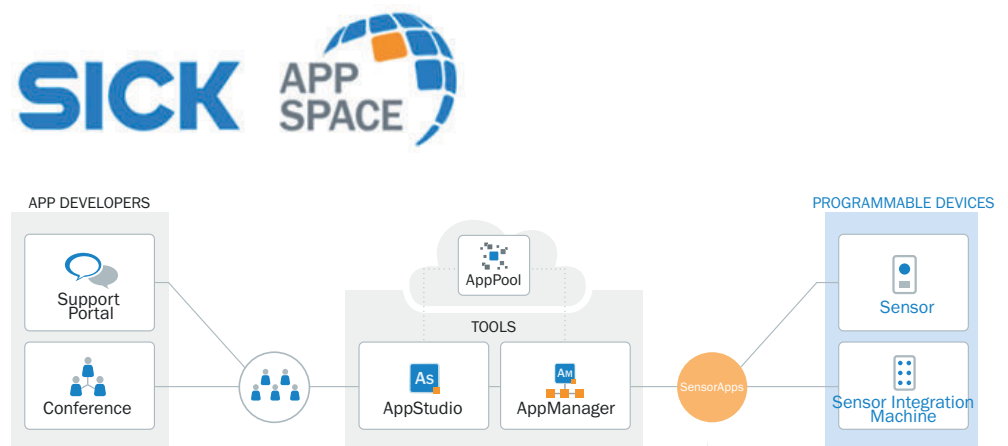


Figure 6: SICK AppSpace

SICK AppSpace includes the following components and resources:

- SICK AppManager: A software tool used for the installation and management of SensorApps and device firmware updates.
- SICK AppPool: A cloud-based repository for storing and sharing SensorApps. SICK AppPool can be accessed directly from SICK AppManager, SICK AppStudio and from the web.

- SICK AppStudio: A Software Deployment Kit (SDK) for developing SensorApps on programmable SICK devices. Its user interface for machine operators can be created individually as a web GUI.
- The SICK Support Portal (supportportal.sick.com) contains tutorials and instructions for programming the InspectorP6xx in SICK AppStudio.

For more information about downloading SensorApps and programming the device, see "[Commissioning](#)", page 40.

For more information about SICK AppSpace, see www.sick.com/SICK_AppSpace.

4 Transport and storage

4.1 Transport

For your own safety, please read and observe the following notes:



NOTICE

Damage to the product due to improper transport.

- The device must be packaged for transport with protection against shock and damp.
- Recommendation: Use the original packaging as it provides the best protection.
- Transport should be performed by trained specialist staff only.
- The utmost care and attention is required at all times during unloading and transportation on company premises.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before you start mounting.

4.2 Unpacking

- Before unpacking, it may be necessary to equalize the temperature to protect the device from condensation.
- Handle the device with care and protect it from mechanical damage.

4.3 Transport inspection

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

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



NOTE

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

4.4 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Electrical connections are provided with protective caps and plugs (as they are on delivery).
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- So that any residual damp can evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 49.
- Relative humidity: see "Technical data", page 49.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Mounting instructions

- Observe the technical data.
- Protect the sensor from direct sunlight.
- To prevent condensation, avoid exposing the sensor to rapid changes in temperature.
- The mounting site has to be designed for the weight of the device.

5.2 Preparation for mounting

5.2.1 Installation requirements

**NOTICE**

Radio interference may occur when the device is used in residential areas!

Only use the device in industrial environments (EN 61000-6-4).

- Typical space requirement: see "Field of view diagrams", page 23 and type-specific dimensional drawing.
- Comply with the technical data, such as the permitted ambient conditions for operation of the device, see "Technical data", page 49.
- Ensure good dissipation of excess heat from the device to the surroundings, in particular at higher ambient temperatures. Ensure that there is good heat transfer from the device, for example via the bracket to the mounting base, or ensure that the back of the device is a sufficient distance from the wall of a housing.
- The device must be mounted using the tapped blind holes provided for this purpose, or using the sliding nuts.
- Mount the device in a shock and vibration insulated manner.
- Make sure the device has a clear view of the objects to be scanned.

Auxiliary equipment required

- Mounting bracket with sufficient load-bearing capacity and suitable dimensions.
- Two or four M5 screws for mounting on a mounting device supplied by the customer. The screw length depends on the mounting base (wall thickness of the bracket). When using an optional SICK bracket, the screws for mounting are included with delivery.
- Tool and tape measure.

5.2.2 Mounting the device

The device is mounted using threaded mounting holes (M5) or sliding nuts.

The threaded mounting holes are located on the rear of the device.

The sliding nuts can each be inserted into a slot on the side of the housing.

SICK offers prefabricated brackets which are optimally suited for mounting the device in a wide range of applications (www.sick.com).

User-supplied brackets

A user-supplied bracket must meet the following requirements:

- Alignment of the device in the x and y axes can be adjusted
- The mounting device must be able to bear the weight of the device and connecting cables free of vibrations

- In mounting situations with strong vibrations, shock mounts may need to be provided
- Mounting options must be available for the 4 threaded mounting holes or the two sliding nuts

5.3 Mounting location

5.3.1 Working distance

The possible working distance is 70 mm to 2,000 mm, depending on the application and the device type. The working distance is measured starting from the housing edge.

The field of view is determined by the focus position, focal distance of the lens, and the working distance. The necessary working distance can be determined based on the field of view diagram (see "Field of view diagrams", page 23).

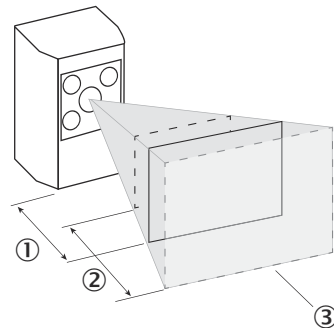


Figure 7: Field of view geometry

- ① Workspace
- ② Depth of field
- ③ Field of view

5.3.2 Mounting bracket and reflection prevention

In order to avoid reflections from the surfaces to be scanned, mount the device so that it is tilted from the perpendicular to the surface.

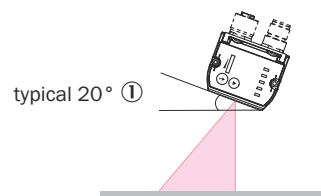


Figure 8: Mounting angle to use, depending on the application

- ① Typical angle 20°

Depending on the application, an angle of between 0° (bright field light) and 45° (dark field light) may be advisable.

5.3.3 Field of view diagrams

Take into account the following aspects in application design:

- Field of view geometry of the device and position of the field of view in the space in front of the device
- Possible angles at which the objects can occur with respect to the device
- For the planned working distance: resultant field of view length and width and approximate resolution

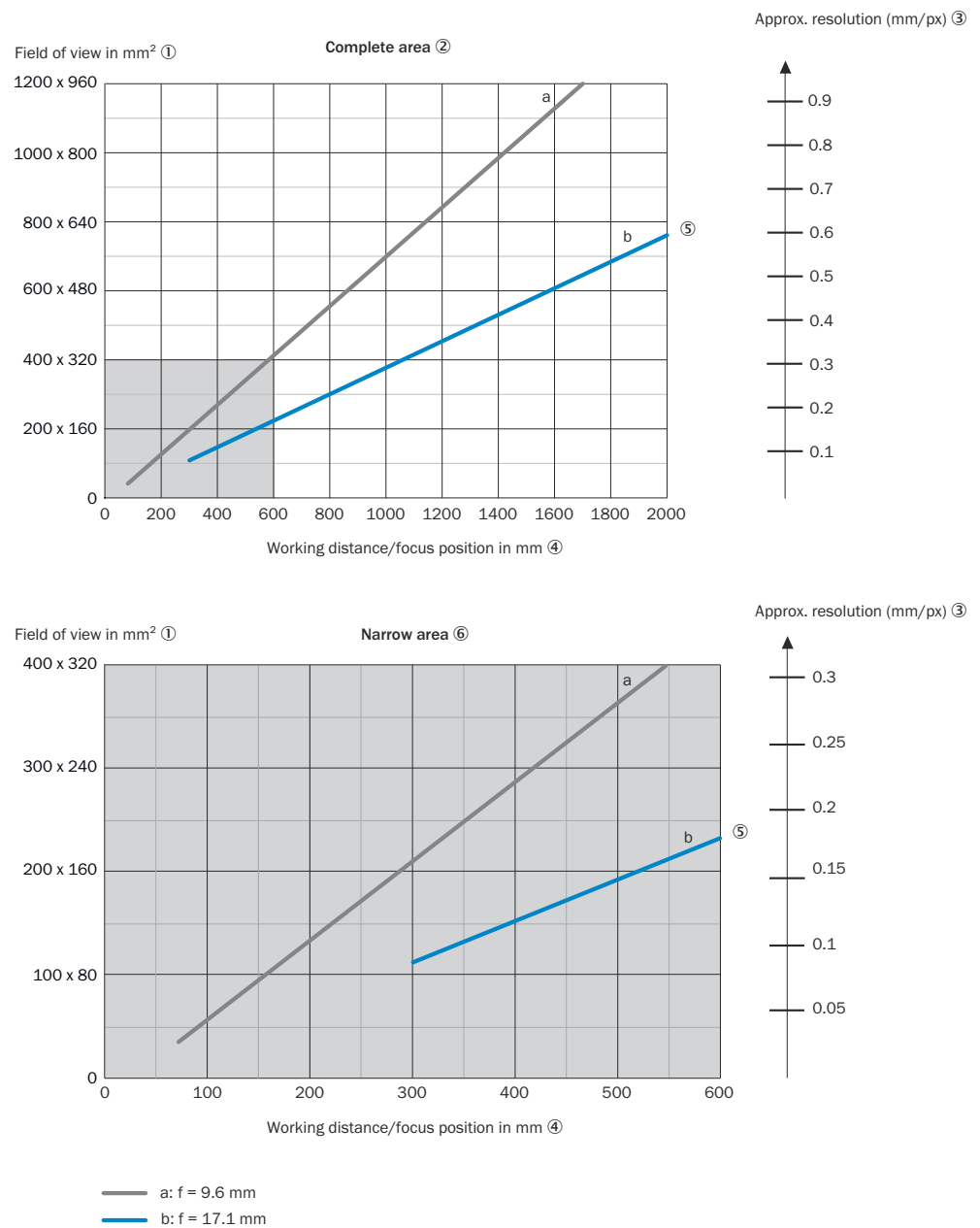


Figure 9: Field of view diagram for InspectorP621

- ① Field of view in mm²
- ② Complete area
- ③ Approximate resolution in mm/px
- ④ Working distance/Focus position in mm
- ⑤ Focal length of lens, here example for f = 17.1 mm
- ⑥ Narrow area

Interpretation aid for the field of view diagram

Using the diagram, you can determine the following data for each device type:

- The maximum working distance for a selected resolution
- The dimensions of the field of view that is available for this distance

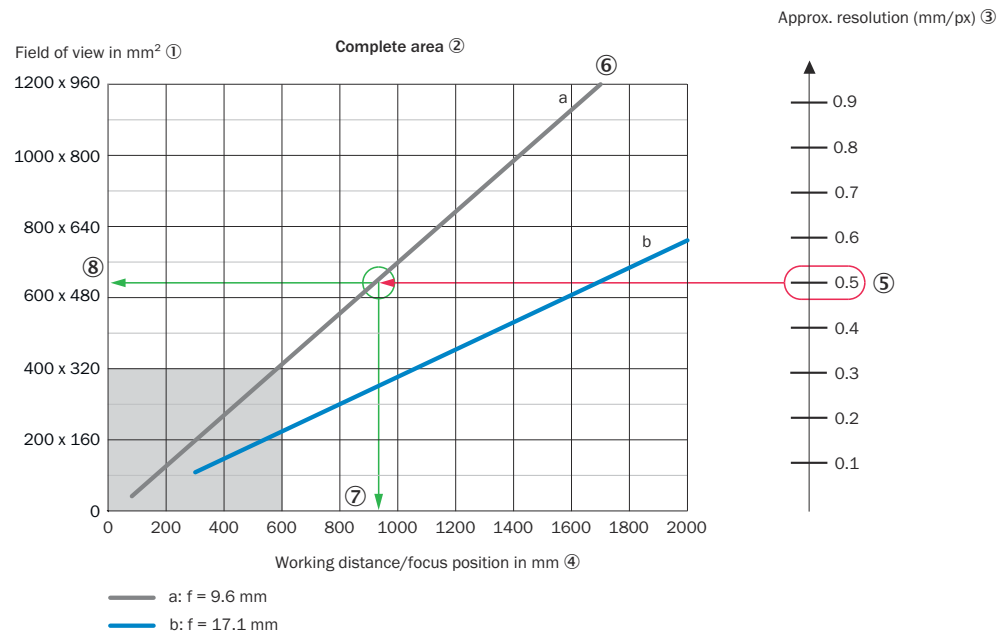


Figure 10: Interpretation aid for the field of view diagram

- ① Field of view in mm²
- ② Complete area
- ③ Approximate resolution in mm/px
- ④ Working distance/Focus position in mm
- ⑤ Selected resolution
- ⑥ Focal length of lens, here example for f = 9.6 mm
- ⑦ Reading off: resultant maximum working distance
- ⑧ Reading off: resultant field of view (mm x mm)

Given (in red):

- Resolution ⑤: approx. 0.5 mm/px
- Focal length of lens ⑥: 9.6 mm

Read off (in green):

- Maximum working distance ⑦: approx. 930 mm
- Field of view ⑧: approx. 640 mm x approx. 510 mm

Both axes of the diagrams must be interpreted linearly.

5.4 Mounting the device

Aligning the device with viewing window to object

Align the device taking into consideration the field of view (see "Field of view diagrams", page 23) and the application circumstances (see "Installation requirements", page 22).

Mounting the device

Perform one of the following steps:

- Mount the device on a customer-supplied mounting system using at least 2 M5 screws of a suitable length. Screw the screws no more than 5 mm into the tapped blind holes or sliding nuts of the device.
 - To do this, either use the tapped blind holes in the housing in pairs at the front or below or use the two M5 sliding nuts in the lateral slots.
- Attach the separately-ordered, optional SICK mounting system using the two sliding nuts on the device.

5.5 Mounting an external trigger sensor (optional)

If the device is triggered by an external trigger sensor, it is recommended to place the trigger sensor beyond the device (see [figure 11](#), left image).

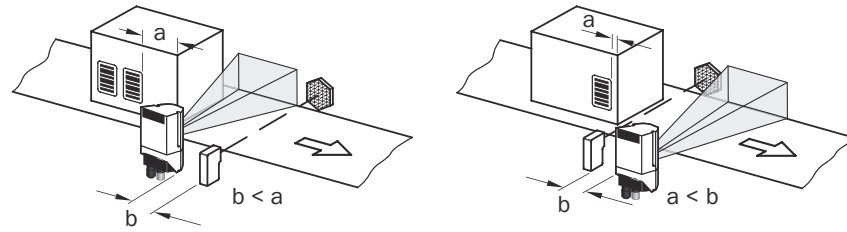


Figure 11: Mounting example for positioning an external trigger sensor for the read cycle

Place the trigger sensor so that the distance b between the trigger sensor and the device is smaller than the distance a between the device and the part of the object to be inspected. Adjust the mounting location of the external trigger sensor so that the correct part of the object is inspected when the object activates the trigger sensor (see [figure 11](#), left image).

The API contains functionality for delaying the external trigger signal. For SensorApps where this functionality is implemented, the sensor can delay the external trigger signal so that the mounting of the external trigger is more flexible (see [figure 11](#), right image).

6 Electrical installation

6.1 Safety

6.1.1 Notes on electrical installation



NOTICE

Hazard due to unsuitable voltage source!

- Note the supply voltage range
- The voltage source must meet the requirements of ES1 and PS2 or lower (EN62368-1), or SELV (EN60950-1).



NOTICE

Equipment damage or unpredictable operation due to working with live parts.

Working with live parts may result in unpredictable operation.

- Only carry out wiring work when the power is off.
- Only connect and disconnect electrical connections when the power is off.

- **The electrical installation must only be performed by electrically qualified personnel.**
- **Standard safety requirements must be observed when working on electrical systems.**
- Only switch on the supply voltage for the device when the connection tasks have been completed and the wiring has been thoroughly checked.
- Perform all connection work only at ambient temperatures above 0 °C.
- Only connect the device to the permitted supply voltage, see "Connecting the supply voltage", page 35.
- In the case of adapter cables with open end, make sure that bare wire ends do not touch (risk of short circuit when the supply voltage is switched on). Wires must be appropriately insulated from each other. This also applies to unused wires.
- Wire cross-sections in the supply cable from the user's power system must be designed in accordance with the applicable national standards.
- Wire cross-sections of the data and switching signal cables must also be designed in accordance with the applicable national standards.
- Circuits connected to the device must be designed as SELV circuits (SELV = Safety Extra Low Voltage). The supply voltage must satisfy the requirements of SELV in accordance with the currently applicable standards.
- Protect the device with a separate fuse at the start of the supply circuit.

Data cables



NOTE

Layout of data cables

- Use screened data cables with twisted-pair wires.
- Implement the screening design correctly and completely.
- To avoid interference, e.g. from switching power supplies, motors, clocked drives, and contactors, always use cables and layouts that are suitable for EMC.
- Do not lay cables over long distances in parallel with power supply cables and motor cables in cable channels.

Serial data transmission (RS-232, RS422/485)

- The possible cable length between the device and host computer depends on:

- the chosen physical version of the host interface
 - the data transmission rate set in the device
- For further information, see "Wiring data interfaces", page 36.

6.1.2 Note on the swivel connector



NOTICE

Damage to the connector from over-rotation!

The swivel connector has two opposite end positions.

- Do not rotate the connector from either of the two end positions by more than 180° in the opposite direction. Do not exceed the respective limit position.
- Carry out the rotational movement slowly.

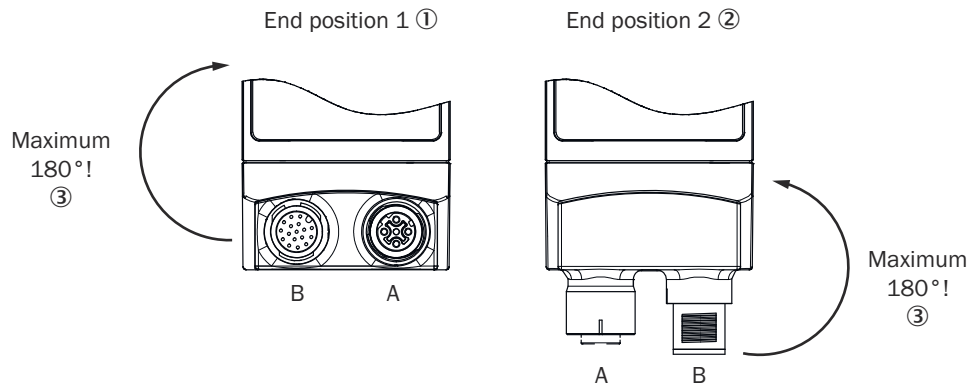


Figure 12: End positions of the swivel connector

- ① End position 1
- ② End position 2
- ③ Maximum 180°

6.1.3 Prerequisites for safe operation of the device



WARNING

Risk of injury and damage caused by electrical current!

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

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

Remedial measures

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

The device is connected to the peripheral devices (voltage supply, any local trigger sensor(s), system controller) via shielded cables. The cable shield – for the data cable, for example – rests against the metal housing of the device. The device can be grounded through the cable shield or through a blind tapped hole in the housing, for example.

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

This is achieved by complying with the following conditions:

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

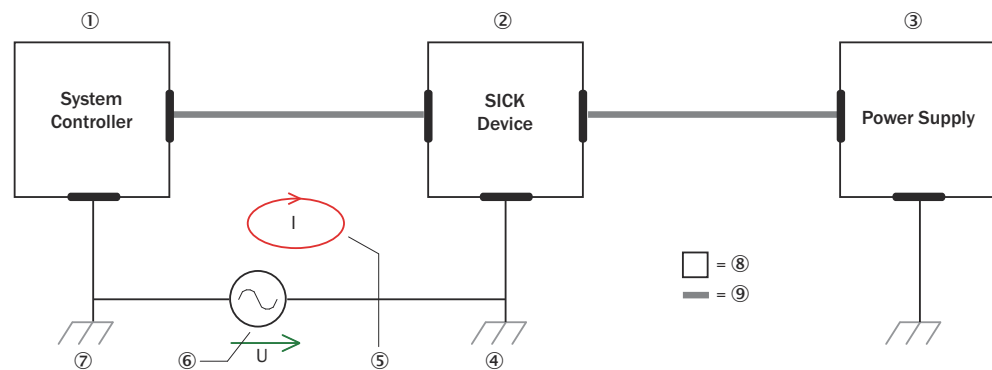


Figure 13: Example: Occurrence of equipotential bonding currents in the system configuration

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

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

Remedial measures

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



NOTICE

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

Measures for widely distributed system installations

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

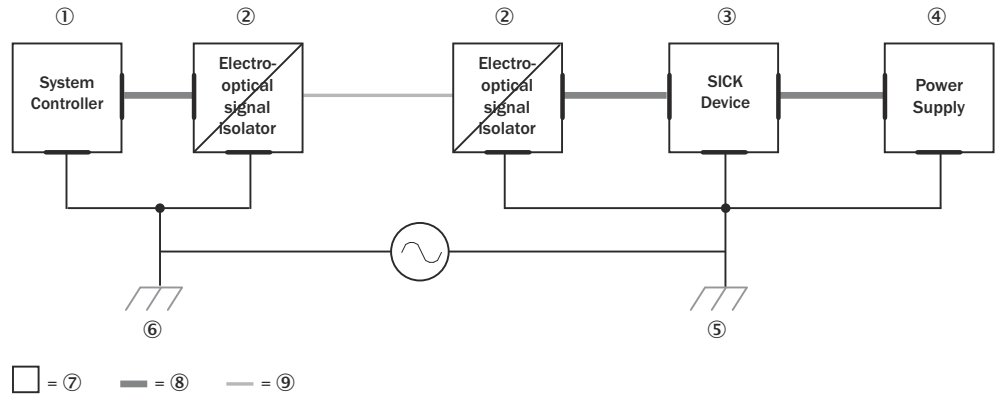


Figure 14: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

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

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

Measures for small system installations

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

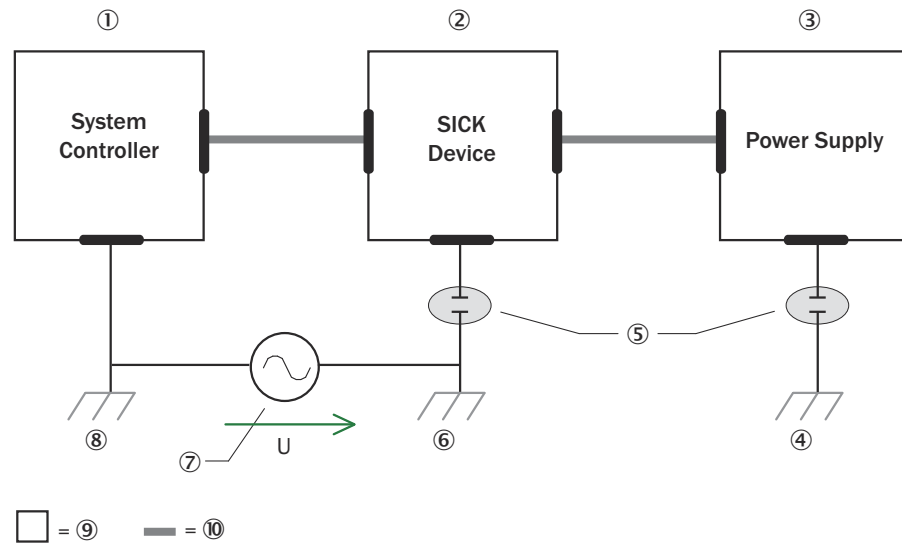


Figure 15: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

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

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



NOTICE

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

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

6.2 Wiring instructions



NOTE

Pre-assembled cables can be found online at:

- www.sick.com/InspectorP62x



NOTE

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

Information about pin, signal and wire color assignments can be found in the appendix, see "Signal assignment of cables with open cable end at one end", page 53.



NOTICE

Faults during operation and device or system defects!

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

The protection class stated in the technical data is achieved only with screwed plug connectors or protective caps.

Configure the circuits connected to the device as ES1 circuits or as SELV circuits (SELV = Safety Extra Low Voltage). The voltage source must meet the requirements of ES1 and PS2 (EN 62368-1) or SELV and LPS (EN 60950-1).

Protect the device with an external slow-blow fuse at the beginning of the supply cable.

Connect the connecting cables in a de-energized state. Do not switch on the supply voltage until installation is complete and all connection work on the device and controller has been finished.

Perform all connection work only at ambient temperatures above 0 °C.

Connect the device only to the permissible supply voltage, see "Connecting the supply voltage", page 35.

Wire cross-sections in the supply cable from the customer's power system must be implemented in accordance with the applicable standards.

In the case of open end cables, make sure that bare wire ends do not touch. Wires must be appropriately insulated from each other.

Wire cross-sections of the data and switching signal cables have to also be designed in accordance with the applicable national standards.

6.3 Connection diagrams

6.3.1 Connection principle for operation mode

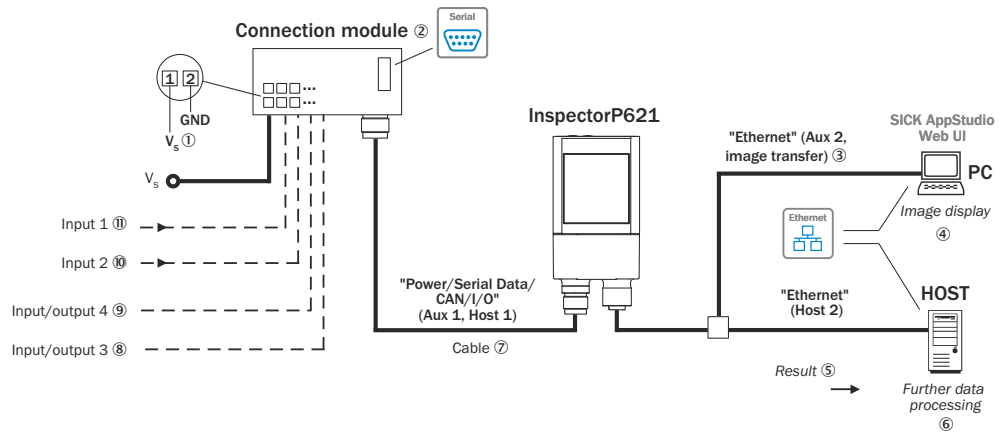


Figure 16: Connection block diagram

- ① Supply voltage V_s
- ② Connection module CDB650-204 or CDM420-0006
- ③ Ethernet-Aux port (image transmission)
- ④ Image display
- ⑤ Result
- ⑥ Further data processing

- ⑦ For CDB650-204: Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
For CDM420-0006: Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)
- ⑧ Digital input/output 3
- ⑨ Digital input/output 4
- ⑩ Digital input 2
- ⑪ Digital input 1, e.g., for connecting a trigger sensor

6.3.2 Example applications

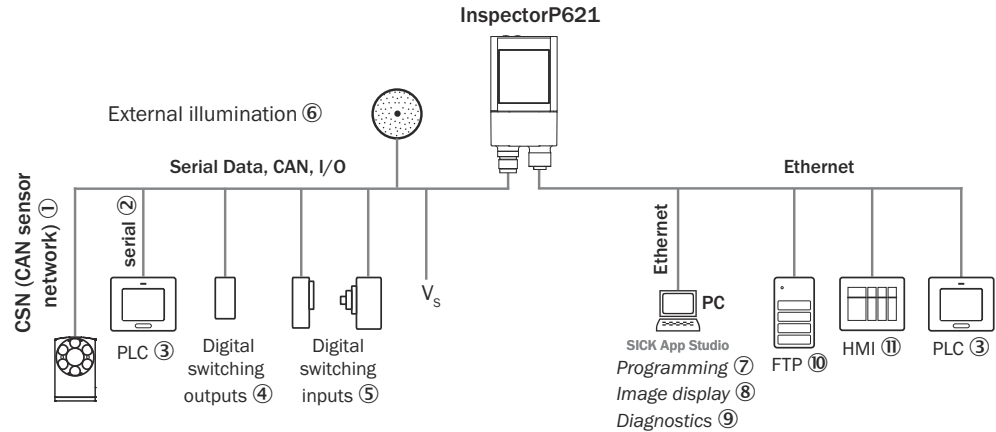


Figure 17: InspectorP621: connection options

- ① CSN (CAN sensor network)
- ② Serial
- ③ PLC (programmable logic controller)
- ④ Digital outputs, e.g. for signal lamps
- ⑤ Digital inputs e.g. for encoders, photoelectric sensors (trigger sensor)
- ⑥ External illumination unit, e. g. ICL
- ⑦ Programming
- ⑧ Image display
- ⑨ Diagnostics
- ⑩ FTP server (image storage)
- ⑪ HMI interface

6.4 Pin assignments of electrical connections

“Power/Serial data/CAN/I/O” connection

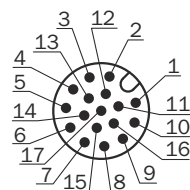


Figure 18: Male connector, M12, 17-pin, A-coded

Table 5: Pin assignment of the “Power/Serial data/CAN/I/O” connection

Pin	Signal	Function
1	GND	Ground

Pin	Signal	Function
2	V _S	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485), host	Host interface (sender+)
6	TD- (RS-422/485), host TxD (RS-232), host	Host interface (sender-)
7	TxD (RS-232), Aux	Aux interface (sender)
8	RxD (RS-232), Aux	Aux interface (receiver)
9	SensGND	Digital input ground
10	Sensor 1	Digital input 1
11	RD+ (RS-422/485), host	Host interface (receiver+)
12	RD- (RS-422/485), host RxD (RS-232), host	Host interface (receiver-)
13	IN/OUT 3	Digital input/Digital output 3 (configurable)
14	IN/OUT 4	Digital input/Digital output 4 (configurable)
15	Sensor 2	Digital input 2
16	IN/OUT 5	Digital input/Digital output 5 (configurable)
17	IN/OUT 6	Digital input/Digital output 6 (configurable)
-	-	Shield

“Ethernet” connection

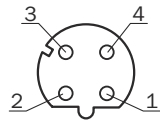


Figure 19: M12 female connector, 4-pin, D-coded

Table 6: Pin assignment of the “Ethernet” connection

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

6.5 Connecting the device

6.5.1 Using the optional connection modules CDB and CDM

Table 7: Possible combinations of device and connection modules

Connection on the device	Connection modules	Connection cable
Male connector, M12, 17-pin, A-coded	CDB650-204	Cable 1:1 ¹⁾
	CDM420-0006 ²⁾	Adapter cable ³⁾

1) Connection cable 1:1 (female connector, M12, 17-pin, A-coded / male connector, M12, 17-pin, A-coded).
 2) CDM420-0007: for connecting 2 devices.
 3) Adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin).

**NOTE****Connection module**

For detailed information about mounting and electrical installation, please refer to the operating instructions for the connection module in question. These are available online at.

- www.sick.com/CDB
- www.sick.com/CDM

6.5.2 Connecting the supply voltage

SELV in accordance with currently applicable standard EN 60950-1.

The power source for the device must be able to provide the following power outputs:

Table 8: Required supply voltage V_S

Supply voltage V_S	Power source: required power output ¹⁾
DC 12 V ... 24 V \pm 20%	Maximum 25 W

¹⁾ For device with 4 loaded digital outputs (each 100 mA).

Table 9: Typical current consumption depending on supply voltage

Designation		Supply voltage (V_S) in [DC V]			
		9.6 (12 V -20%)	12	24	28.8 (24 V +20%)
Current consumption, digital outputs unloaded	$I_{B\text{ RMS}}$ [A]	0.4	0.32	0.17	0.14
Power loss, digital outputs unloaded	P_{RMS} [W]	3.84	3.84	4.08	4.03
Maximum current consumption, digital outputs unloaded	$I_{B\text{ Peak}}^{\text{1)}$ [A]	1.05	0.90	0.45	0.35
Typical, all 4 digital outputs loaded (0.1 A per output)	$I_{B\text{ RMS }40\text{out}}$ [A]	0.8	0.72	0.57	0.54
Power loss, all 4 digital outputs loaded (0.1 A per output)	$P_{\text{Peak }40\text{out}}$ [W]	7.68	8.64	13.68	15.55

¹⁾ For design of the power supply unit, supply cable and fuse protection at the start of the line.

Protecting the supply cables

To ensure protection against short-circuits/overload in the customer's supply cables, the wire cross-sections used must be appropriately selected and protected.

The following standards must be observed in Germany:

- DIN VDE 0100 (part 430)
- DIN VDE 0298 (part 4) and/or DIN VDE 0891 (part 1)

Connection without connection module

With a supply voltage of DC 12 V to 24 V \pm 20%, protect the device with a separate fuse with value 2 A.

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

6.5.3 Wiring data interfaces

Wiring Ethernet interface

1. Connect the device to the Ethernet connection of the computer via the adapter cable.
2. Set up communication via the SICK AppManager software.



NOTE

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

Wiring the serial data interface

The maximum data transmission rate for the serial interface depends on the length of cable and on the type of interface. Observe the following recommendations:

Table 10: Data transmission rates and recommended max. cable lengths

Interface	Data transmission rate	Distance to the target computer (host)
RS-232	Up to 19.2 kBd	Max. 15 m
	38.4 kBd ... 57.6 kBd	Max. 5 m
	115.2 kBd ... 500 kBd	< 2 m
RS-422 ¹⁾	Up to 38.4 kBd	Max. 1,200 m
	38.4 kBd ... 57.6 kBd	Max. 500 m
	57.6 kBd ... 500 kBd	Max. 10 m

1) For RS-422-compatible cable and corresponding cable termination as per specification



NOTICE

Risk of damage to the internal interface modules!

If the serial data interfaces are wired incorrectly, then electronic components in the device could get damaged.

- Observe the information on wiring.
- Carefully check the wiring prior to switching on the device.

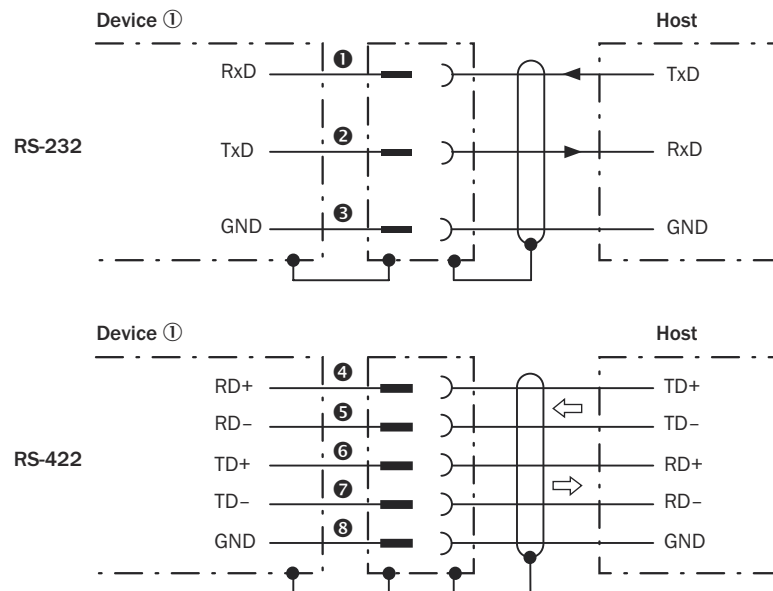


Figure 20: Wiring of the serial data interfaces RS-232 and RS-422

① Device

①...③ Pin assignment: see RS-232 pin assignment for the respective device

④...⑧ Pin assignment: see RS-422 pin assignment for the respective device



NOTE

Control the serial data interface in the device with the API functions. In order to activate the serial data interface, use an installed SensorApp which contains this function.

Wiring the data interfaces of the device via a connection module:

Connection module	Data interface	Reference
CDB650-204	RS-232	see "Wiring serial host interface RS-232 of the device in CDB650-204", page 57
	RS-422	see "Wiring serial host interface RS-422 of the device in CDB650-204", page 58
CDM420-0006	RS-232	see "Connecting serial host interface RS-232 of the device in CDM420-0006", page 66
	RS-422	see "Connecting serial host interface RS-422 of the device in CDM420-0006", page 66

Termination of the RS-422/485 data interface

Termination can be implemented in the connection module via switches.

Additional information on this can be found in the operating instructions for the relevant connection module.

6.5.4 Wiring the CAN interface



NOTE

Control the CAN interface in the device with the API functions. In order to activate the CAN interface, use an installed SensorApp which contains this function.

Wiring the CAN interface of the device via a connection module:

Connection modules	Interface	Reference
CDB650-204	CAN	see "Wiring the CAN interface in the CDB650-204", page 59
CDM420-0006	CAN	see "Wiring the CAN interface in the CDM420-0006", page 67

6.5.5 Wiring the digital inputs

Physical digital inputs on the device

The full complement of digital inputs is available at each of the following locations:

- Male connector of the device (M12, 17-pin, A-coded)
- Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)
- Open end of the adapter cable (female connector, M12, 17-pin, A-coded/open end)

Function assignment



NOTE

Control the digital inputs in the device with the API functions. In order to assign the digital inputs functions, use an installed SensorApp which contains this function.

6.5.6 Wiring the digital outputs

Physical digital outputs on the device

The full complement of digital outputs is available at each of the following locations:

- Male connector of the device (M12, 17-pin, A-coded)
- Open end of the adapter cable (female connector, M12, 17-pin, A-coded/open end)
- CDB650-204 connection module

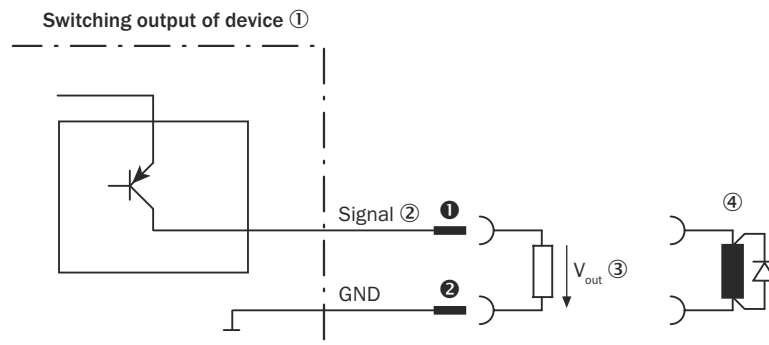


Figure 21: Wiring a digital output

- ①
- ② Output signal
- ③ Output voltage V_{out}
- ④ With inductive load: see note
- ①... ② For pin assignment, see respective device

Table 11: Characteristic data of the digital outputs

Switching behavior	PNP switching to supply voltage V_S Default: No function Logic: not inverted (active high)
Properties	<ul style="list-style-type: none"> • Short-circuit protected • Not electrically isolated from V_S ¹⁾
Electrical values	$0\text{ V} \leq V_{\text{out}} \text{ } ^{2)} \leq V_S$

1) Supply voltage.

2) Output voltage.

**NOTE**

Provide an arc-suppression switch at the digital output if inductive load is present.

- ▶ Attach a freewheeling diode directly to the load for this purpose.

**NOTE**

Capacitive loads on the digital outputs have an effect on the switch-on and switch-off behavior. A maximum capacitance of 100 nF is the limit value.

Function assignment**NOTE**

Control the digital outputs in the device with the API functions. In order to assign the digital output functions, use an installed SensorApp which contains this function.

7 Commissioning



NOTICE

Update the device firmware version before you start using the device. Always use the latest version, unless there is a specific need to use an older version. Download the latest version of the firmware from the SICK Support Portal (supportportal.sick.com) and install it using SICK AppManager.

InspectorP6xx is a programmable device. To use it, the following options are available:

- Using the default SensorApp Quality Inspection (see "[Default SensorApp: Quality Inspection](#)", page 41).
- Using other SensorApps that are available for the device (see "[Installing SensorApps](#)", page 41).
- Programming SensorApps for the device (see "[Programming the device](#)", page 42).

7.1 PC Software

SICK AppManager

The SICK AppManager software can be used for the following actions:

- Installing a SensorApp on a device.
- Reading and changing the device's IP address.
- Starting, stopping or deleting an installed SensorApp.
- Installing firmware updates.

Download SICK AppManager from www.sick.com/SICK_AppManager. To install SICK AppManager on the PC, open the installation (.exe) file and follow the instructions on the screen.

SICK AppStudio

The SICK AppStudio development environment is used to program the device and to perform diagnostics in case of faults.

The use of SICK AppStudio requires a valid license. A one-year license (art no 1610199) is available from www.sick.com/SICK_AppStudio. After purchasing the license, download the SICK AppStudio software from the SICK Support Portal, supportportal.sick.com.

After downloading SICK AppStudio, follow the on-screen instructions to complete the installation.

7.2 Network communication settings

To connect to the device from a PC, make sure that the network communication settings are correctly set up:

- The device must be connected to the PC via Ethernet.
- The PC must be on the same network as the device.
- The PC must not use the same IP address as the device. The device's default IP is 192.168.0.1.

Editing the device's IP address

To change the device's IP address using SICK AppManager:

1. Open SICK AppManager.
- ✓ All connected devices on the network are listed on the **Device search** tab.

2. Select the correct device in the list.
3. Click **Edit IP address**.
4. Enter the new IP address for the device.

7.3 Default SensorApp: Quality Inspection

The Quality Inspection SensorApp is pre-installed on the InspectorP6xx devices and is also available for download from SICK AppPool. The Quality Inspection SensorApp uses vision-based quality inspection to ensure that produced items have the exact qualities required regarding presence and measurements of details.

Opening the user interface

Quality Inspection is configured through a web-based graphical user interface. To open the user interface from a web browser:

1. Open a web browser window.
2. Type the IP address of the device. The default IP address is 192.168.0.1.

Using tools

Quality Inspection contains a selection of software tools for image analysis, result output, and communication. A help text for each tool is accessible directly from the GUI. The tools are also listed and described in the Quality Inspection Operating Instructions, art no 8025687.

Quality Inspection is based on SICK Nova, which allows the user to create and import additional tools. For a description of how to import a tool through SICK AppManager, see the Quality Inspection Operating Instructions. Information on SICK Nova tool development is available from the SICK Support Portal, supportportal.sick.com.

7.4 Installing SensorApps

7.4.1 Available SensorApps

The available SensorApps for the device can be downloaded from SICK AppPool (<http://apppool.cloud.sick.com/>). The use of SICK AppPool requires a SICK ID, which can be obtained at the login page at the link above.

The **Apps** tab on each device page on www.sick.com contains a list of available SensorApps for the device.

7.4.2 Installing or updating a SensorApp on the device

A SensorApp must be downloaded to the PC before installing it on the device. There are two different options for downloading a SensorApp:

- Online option: If the PC has Internet access when connected to the device, the SensorApp can be downloaded and installed directly from SICK AppPool as part of the installation procedure described below.
- Offline option: If the PC does not have Internet access when connected to the device, the SensorApp must be downloaded from the SICK AppPool to the PC via a web browser prior to the installation.

To install or update a SensorApp using SICK AppManager:

1. Connect the device to the PC via Ethernet.
2. On the PC, open SICK AppManager.
3. Under the **Device Search** tab in SICK AppManager, click **Scan** to search for available devices on the network.

4. In the list of available devices, select the device where you want to install the SensorApp.
 5. If the device tab (lower left pane) contains any active applications, right-click the applications and delete them.
 6. Online option: To download and install the SensorApp directly from the AppPool:
 - a) Click **Login to SICK ID** (below the **Utils** menu in SICK AppManager) to log in to SICK AppPool.
 - b) Click the **AppPool** tab.
 - c) Select a SensorApp in the list of available SensorApps.
 - d) Click **Download and install** to download the selected SensorApp to the PC and install it on the device.

Or:

Offline option: To install a downloaded SensorApp from the PC to the device:

 - a) Click the **Local Packages** tab in SICK AppManager.
 - b) Drag and drop the **SensorApp** into the file list.
 - c) Click **Install** to install the SensorApp on the device.
- ✓ The SensorApp is now installed and running on the device.

7.4.3 Opening the web user interface

To access the user interface for an installed SensorApp:

1. Open a Google Chrome web browser window.
2. Type the IP address of the device. The default IP address is 192.168.0.1.

7.5 Programming the device

7.5.1 Starting SICK AppStudio

Before starting SICK AppStudio:

- Make sure that the network communication settings are correct (see "[Network communication settings](#)", page 40).
- When starting SICK AppStudio for the first time, a license dialog opens. To be able to use the software, make sure to have a valid license available (see "[PC Software](#)", page 40).

7.5.2 Lua scripting

The embeddable scripting language Lua is used to create scripts in SICK AppStudio. See www.lua.org for more information about Lua.

7.5.3 Programming API

SICK AppSpace has a large application programming interface (API) which includes algorithms and functionality for hardware configuration, result processing, and result communication. The API consists of functional groups called crowns, where each crown contains functions and events related to a specific topic.

The complete API documentation for each InspectorP6xx firmware release is available in the SICK Support Portal, supportportal.sick.com.



NOTE

The API is directly accessible from SICK AppStudio. To access it, click a free place in a lua file and press Ctrl+Space to display a list of all accessible functions and commands for the device.

7.5.4 Tutorials and code samples

Tutorials and code samples for general and device-specific topics are available to help the user get started with the programming of the device:

- Tutorials are available from the SICK Support Portal: supportportal.sick.com/pages/appspace/documentation-and-more.
- Code samples are available from Gitlab: gitlab.com/sick-appspace/samples.

The above pages can be accessed directly from the **Help** menu in SICK AppStudio.

8 Maintenance

8.1 Maintenance plan

During operation, the device works maintenance-free.



NOTE

No maintenance is required to ensure compliance with the laser class.



NOTE

No maintenance is required to ensure compliance with the LED risk group.

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

Table 12: Maintenance plan

Maintenance work	Interval	To be carried out by
Clean housing and front screen	Cleaning interval depends on ambient conditions and climate.	Specialist
Check screw connections and plug connectors	Interval depends on the place of use, ambient conditions, or operational regulations. Recommended: At least every 6 months.	Specialist
Check that the unused connections are sealed with protective caps or plugs	Interval depends on ambient conditions and climate. Recommended: At least every 6 months.	Specialist

8.2 Cleaning

Cleaning includes the viewing window and the housing of the device.



NOTICE

Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

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

Cleaning the inspection window

Check the viewing window of the device for accumulated dirt at regular intervals. This is especially relevant in harsh operating environments (dust, abrasion, damp, fingerprints, etc.).

The inspection window lens must be kept clean and dry during operation.



NOTE

Static charging may cause dust particles to stick to the inspection window. This effect can be reduced by using an anti-static cleaning agent in combination with the SICK lens cloth (part no. 4003353) (can be obtained from www.sick.com).

The viewing window is made of plastic, see "Technical data", page 49.

**NOTICE****Damage to the inspection window.**

Reduced analysis performance due to scratches or streaks on the window.

- Clean the window only when wet.
- Use a mild cleaning agent that does not contain powder additives. Do not use aggressive cleaning agents, such as acetone, etc.
- Avoid any movements that could cause scratches or abrasions on the window.
- Only use cleaning agents suitable for the screen material.

Cleaning procedure:**CAUTION****Warning! Optical radiation: LED risk group 1**

The LEDs may pose a danger to the eyes and skin in the event of incorrect use.

- Protect the eyes and skin against radiation.
- Use suitable eye protection.
- Use protective measures such as a screen to shield the radiation.
- Do not open the housing. Opening the housing will not switch off the light source. Opening the housing may increase the level of risk.
- Comply with the current national regulations on photobiological security of lamps and lamp systems.

Aiming laser**CAUTION****Optical radiation: Laser class 1**

The accessible radiation does not pose a danger when viewed directly for up to 100 seconds. It may pose a danger to the eyes and skin in the event of incorrect use.

- Do not open the housing. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

For both radiation types:

It is not possible to entirely rule out temporary disorienting optical effects, particularly in conditions of dim lighting. Disorienting optical effects may come in the form of dizziness, flash blindness, afterimages, photosensitive epilepsy, (depending on parameterization), or impairment of color vision, for example.

**CAUTION****Hazardous radiation.**

If any operating or adjusting devices other than those specified here are used or other methods are employed, this can lead to dangerous exposure to radiation. Damage to the eyes is possible.

- If the product is operated in conjunction with external illumination systems, the risks described here may be exceeded. This must be taken into consideration by users on a case-by-case basis.
- Do not look into the light source when it is switched on.
- Comply with the latest version of the applicable regulations on photobiological safety of lamps and lamp systems as well as on laser protection.

- ▶ Switch off the device for the duration of the cleaning operation. If this is not possible, use suitable laser protection goggles. These must absorb radiation of the device's wavelength effectively.
- ▶ Clean the viewing window only with a clean, damp, lint-free cloth, and a mild anti-static lens cleaning fluid.



NOTICE

If the inspection window is scratched or damaged (cracked or broken), the lens must be replaced. Contact SICK Support to arrange this.

- If the inspection window is cracked or broken, take the device out of operation immediately for safety reasons and have it repaired by SICK.

Cleaning the housing

In order to ensure that heat is adequately dissipated from the device, the housing surface must be kept clean.

- ▶ Clear the build up of dust on the housing with a soft brush.

9 Troubleshooting

9.1 SICK service

If the fault cannot be rectified, the device may be defective.

The device may not be repaired by the user. Interference with or modification of the device will invalidate any warranty claims against SICK AG.

Rapid replacement of a device by the user is, however, possible.

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



NOTE

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

9.2 Repairs

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

9.3 Returns

- ▶ Do not dispatch devices to the SICK Service department without consultation.
- ▶ The device must be sent in the original packaging or an equivalent padded packaging.



NOTE

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

- Details of the contact person
 - Description of the application
 - Description of the fault that occurred
-

10 Decommissioning

10.1 Disposal

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



NOTICE

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

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

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

11 Technical data



NOTE

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

- www.sick.com/InspectorP62x

Please note: This documentation may contain further technical data.

11.1 Features

Type	Value
Task	Quality inspection Position determination Measuring, 2D Code reading ¹
Technology	2D snapshot, image analysis
Product category	Programmable, configurable
Pre-installed SensorApp	Quality Inspection, based on SensorApp framework SICK Nova that enables functional extensions via tool plug-ins and custom development
Toolkit	HALCON
Sensor	CMOS matrix sensor, grayscale values
Focus	Teach auto-focus
Working distance	Depending on type, "Field of view diagrams" , page 23
Integrated illumination unit	4 LEDs (2 on the left, 2 on the right) Light color combination, type-dependent, identifier see "Type code" , page 13: <ul style="list-style-type: none"> • Visible blue light ($\lambda = 470 \text{ nm} \pm 15 \text{ nm}$) • Visible red light ($\lambda = 617 \text{ nm} \pm 15 \text{ nm}$) • Invisible infrared light ($\lambda = 850 \text{ nm} \pm 25 \text{ nm}$)
Feedback LED (spot in field of view)	1 LED: Visible green light ($\lambda = 525 \text{ nm} \pm 15 \text{ nm}$)
Laser alignment aid (2 points in the field of view)	2 LEDs, can be deactivated: Visible red light ($\lambda = 630 \text{ nm} \dots 680 \text{ nm}$)
Light source	Illumination LEDs: visible red light ($\lambda = 617 \pm 15 \text{ nm}$), visible blue light ($\lambda = 470 \pm 15 \text{ nm}$) Feedback spot: visible green light ($\lambda = 525 \pm 15 \text{ nm}$) Aiming laser: visible red light ($\lambda = 630 \dots 680 \text{ nm}$)
LED class	Risk group 1 (IEC 62471:2006-07, EN 62471:2008-09)
Laser class	1, complies with 21 CFR 1040.10 except for the tolerance according to "Laser Notice No. 50" from June 24, 2007 (IEC 60825-1:2014)
Spectral range	Approx. 400 nm ... 900 nm
Lens	Integrated

¹ Not yet available in pre-installed Quality Inspection SensorApp.

11.2 Mechanics and electronics

Type	Value
Electrical connection	1 x M12, 17-pin male connector (serial, I/Os, voltage supply) 1 x M12, 4-pin female connector (Ethernet)
Supply voltage	DC 12 V ... 24 V, ± 20% Voltage source as per ES1 and PS2 or lower (EN62368-1), or as per SELV (EN60950-1)
Power consumption	Typ. 4 W
Enclosure rating	IP65
Weight	170 g
Housing material	Aluminum die cast
Window material	PMMA

11.3 Performance

Type	Value
Image sensor resolution	see "Type code", page 13
Scan/frame rate	50 Hz

11.4 Interfaces

Type	Value
Serial ¹	RS-232, RS-422 Data transmission rate: 300 Baud ... 115.2 kBaud
Ethernet	TCP/IP Function: FTP ¹ , HTTP Data transmission rate: 10/100 MBit/s
CAN ¹	Function: SICK CAN sensor network (master/slave)
EtherNet/IP	Data transmission rate: 10/100 MBit/s
EtherCAT® ¹	Type of fieldbus integration: Optional over external fieldbus module CDF600
PROFINET	Function: PROFINET Single Port, PROFINET Dual Port (optional via external connection module CDF600-2) Data transmission rate: 10/100 MBit/s
PROFIBUS DP ¹	Type of fieldbus integration: Optional over external fieldbus module CDF600-2
Operator interfaces	Web server
Configuration software	Web GUI (SensorApp configuration), SICK AppStudio (programming)
Data storage and retrieval	Image and data logging via microSD memory card Image and data logging via external FTP ¹
Output current	≤ 100 mA
Maximum encoder frequency	300 Hz
Operating elements	2 buttons ¹
Optical indicators	16 LEDs (5 x status display, 10 x LED bar graph, 1 green/red feedback spot)

Type	Value
Acoustic indicators	Beeper ¹

¹ Not yet available in pre-installed Quality Inspection SensorApp

11.5 Ambient data

Type	Value
Shock load	EN 60068-2-27: 2009-05
Vibration load	EN 60068-2-6: 2008-02
Ambient operating temperature	0 °C ... +50 °C ¹
Storage temperature	-20 °C ... +70 °C ¹

¹ Permissible relative humidity: 0% ... 90%, non-condensing

12 Accessories



NOTE

Accessories and where applicable mounting information can be found online at:

- www.sick.com/InspectorP62x
-

13 Annex

13.1 EU declaration of conformity / Certificates

The EU declaration of conformity and other certificates can be downloaded from the Internet at:

- www.sick.com/InspectorP62x

13.2 Signal assignment of cables with open cable end at one end

13.2.1 “Power/SerialData/CAN/I/O” connection to customer-specific connection equipment or control cabinet

Adapter cable suitable for drag chain

Part no. 2070425 (3 m), part no. 2070426 (5 m), part no. 2070427 (10 m), shielded, suitable for drag chain, suitable for 2 A

Ambient temperature range:

For mobile installation: $-25\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$, for fixed installation: $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$

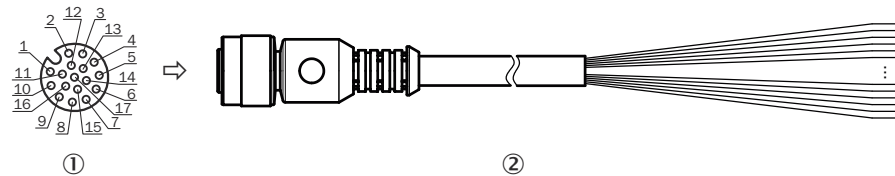


Figure 22: Adapter cable, e.g. part no. 2070425 (3 m)

- ① Female connector, M12, 17-pin, A-coded (view from front)
- ② Illustration may differ

Table 13: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	GND	Ground	Blue
2	V _S	Supply voltage	Brown
3	CAN L	CAN bus (IN/OUT)	Green
4	CAN H	CAN bus (IN/OUT)	White
5	TD+ (RS-422/485), host	Host interface (sender+)	Pink
6	TD- (RS-422/485), host TxD (RS-232), host	Host interface (sender-)	Yellow
7	TxD (RS-232), Aux	AUX interface (sender)	Black
8	RxD (RS-232), Aux	AUX interface (receiver)	Gray
9	SensGND	Digital input ground	White-black
10	Sensor 1	Digital input 1	Violet
11	RD+ (RS-422/485), host	Host interface (receiver+)	Gray-pink
12	RD- (RS-422/485), host RxD (RS-232), host	Host interface (receiver-)	Red-blue
13	Result 1	Digital output 1	White-green
14	Result 2	Digital output 2	Brown-green
15	Sensor 2	Digital input 2	White-yellow

Pin	Signal	Function	Wire color
16	N. c.	-	Yellow-brown
17	N. c.	-	White-gray

13.2.2 “Power/SerialData/CAN/I/O” connection to customer-specific connection equipment or control cabinet

Adapter cable suitable for drag chain, deep-freeze compatible

Part no. 2075220 (5 m), shielded, suitable for drag chain, deep-freeze compatible, suitable for 2 A

Permitted currents for ambient temperature +40 °C:

- Contact 1 (blue) and contact 2 (brown): 2 A
- All other contacts: 1.5 A

Ambient temperature range:

For mobile installation: -25 °C to +80 °C, for fixed installation: -40 °C to +85 °C

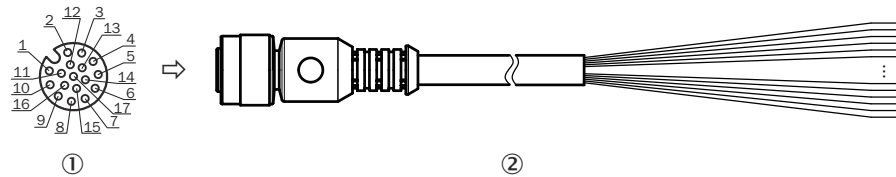


Figure 23: Adapter cable, part no. 2075220 (5 m)

- ① Female connector, M12, 17-pin, A-coded (view from front)
- ② Illustration may differ

13.2.3 Host interface RS-232 via CDB/CDM connection module to host (PC)

Adapter cable

Part no. 2020319 (3 m), unshielded

Ambient temperature range:

For mobile installation: -5 °C to +90 °C, for fixed installation: -30 °C to +90 °C

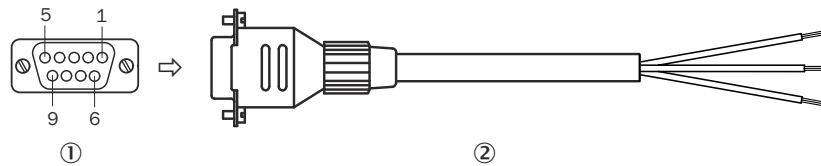


Figure 24: Adapter cable, part no. 2020319 (3 m)

- ① Female connector, D-Sub, 9-pin (view from front)
- ② Illustration may differ

Table 14: Signal assignment of adapter cable with open end

Pin	Signal at PC	Function	Wire color
1	-	-	-
2	RxD (RS-232), host	Host interface (receiver)	Brown ¹⁾
3	TxD (RS-232), host	Host interface (sender)	Blue ²⁾

Pin	Signal at PC	Function	Wire color
4	-	-	-
5	GND	Ground	Black
6 ... 9	-	-	-

- 1) Connect to the terminal "TxD Host" in the CDB/CDM connection module
- 2) Connect to the terminal "RxD Host" in the CDB/CDM connection module

13.3 Connection diagrams of connection module CDB650-204

13.3.1 Connection of the device to CDB650-204

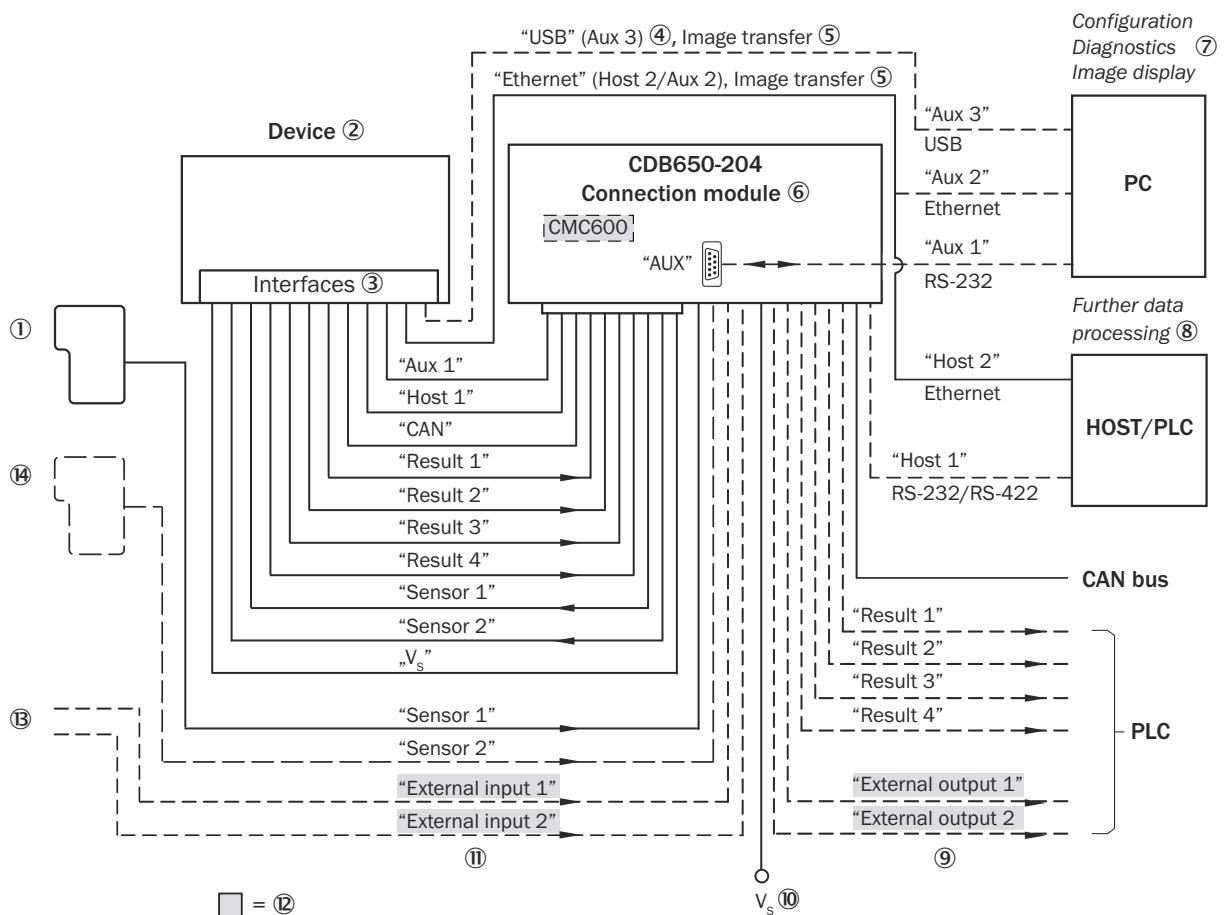


Figure 25: Connection of the device to peripherals via CDB650-204 (overview)

- ① External trigger sensor
- ② Device
- ③ Interfaces
- ④ USB interface (not supported)
- ⑤ Image transmission
- ⑥ Connection modules
- ⑦ Configuration, diagnostics or image display
- ⑧ Data further processing
- ⑨ External digital outputs (not supported)
- ⑩ Supply voltage V_s
- ⑪ External digital inputs (not supported)

- ⑫ Optional CMC600 parameter cloning module to use the external digital inputs and outputs of the device (not supported).

13.3.2 Wiring overview of the CDB650-204

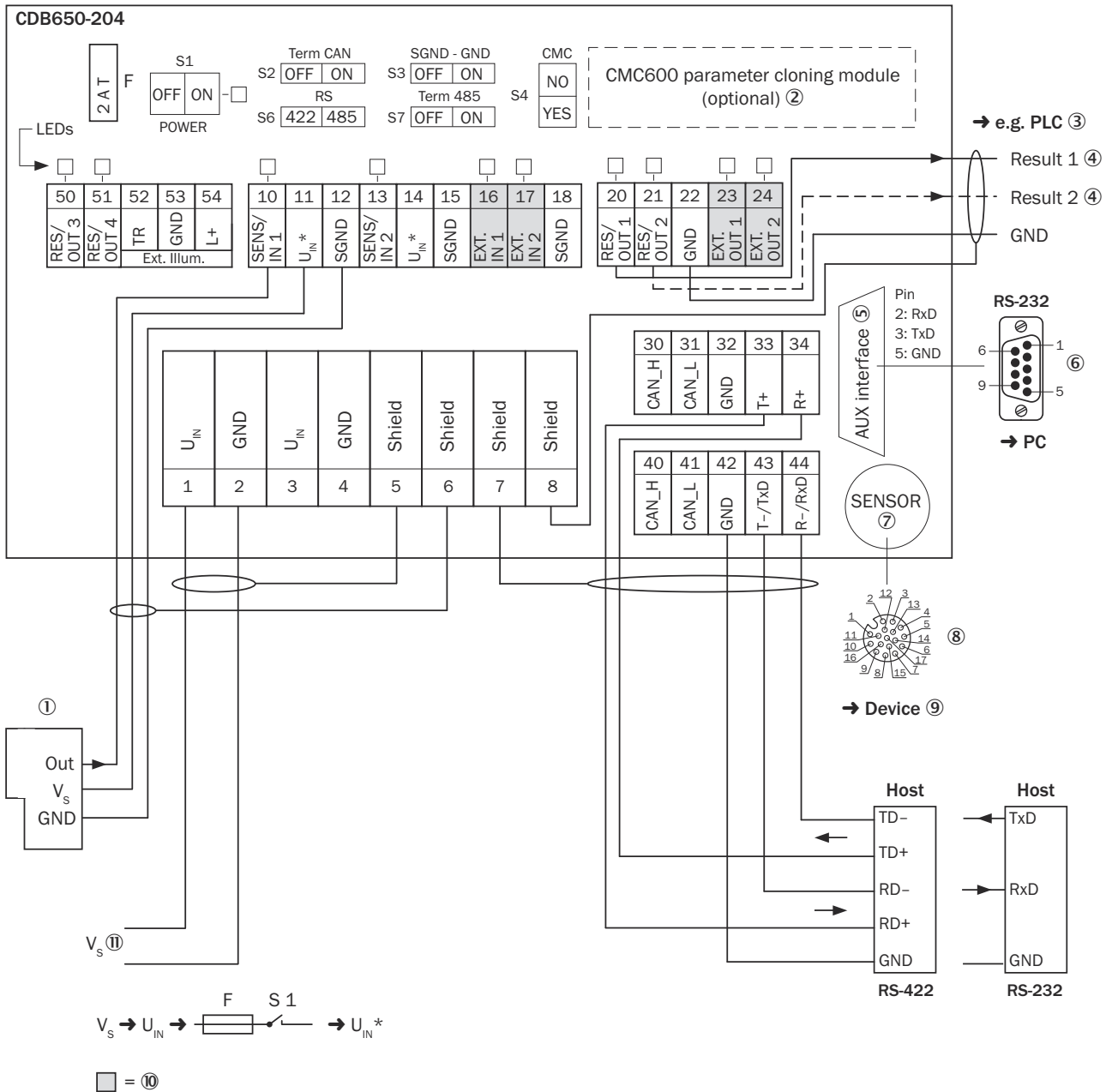


Figure 26: Connection of device and peripherals to the CDB650-204 connection module (overview)

- ① External trigger sensor
- ② CMC600 parameter cloning module (not supported)
- ③ e.g. PLC (programmable logic controller)
- ④ Name of the digital output
- ⑤ Auxiliary interface "Aux"
- ⑥ Male connector, D-Sub, 9-pin

- ⑦ SENSOR = Device
- ⑧ Female connector, M12, 17-pin, A-coded
- ⑨ Device to be connected
- ⑩ Additional external digital inputs and outputs of the device (not supported).
- ⑪ Supply voltage V_s

13.3.3 Connecting supply voltage for the device in CDB650-204

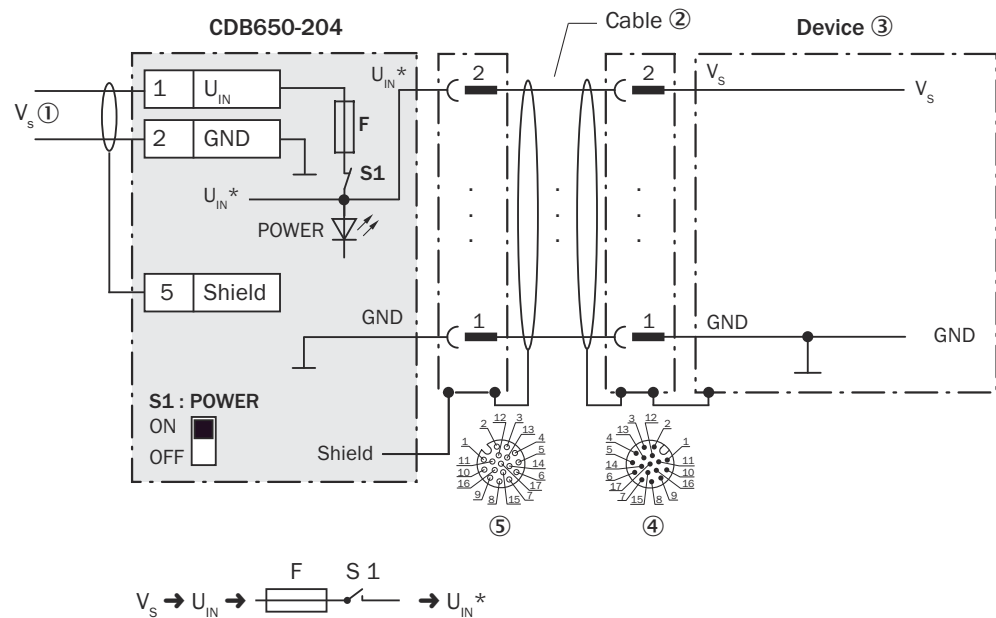


Figure 27: Connecting supply voltage for the device in CDB650-204 connection module

- ① Supply voltage V_s
- ② Connection cable 1:1 (male connector, M12, 17-pin, A-coded / female connector, M12, 17-pin, A-coded)
- ③ Device
- ④ Device: male connector, M12, 17-pin, A-coded
- ⑤ Connection module: female connector, M12, 17-pin, A-coded

Function of switch S1

Table 15: Switch S1: Power

Switch setting	Function
ON	Supply voltage U_{IN} connected to CDB650-204 and device via fuse and switch S1 as a supply voltage U_{IN}^* . Supply voltage U_{IN}^* can be additionally tapped at terminals 11 and 14.
OFF	CDB650-204 and device disconnected from supply voltage. Recommended setting for all connection work.

13.3.4 Wiring serial host interface RS-232 of the device in CDB650-204

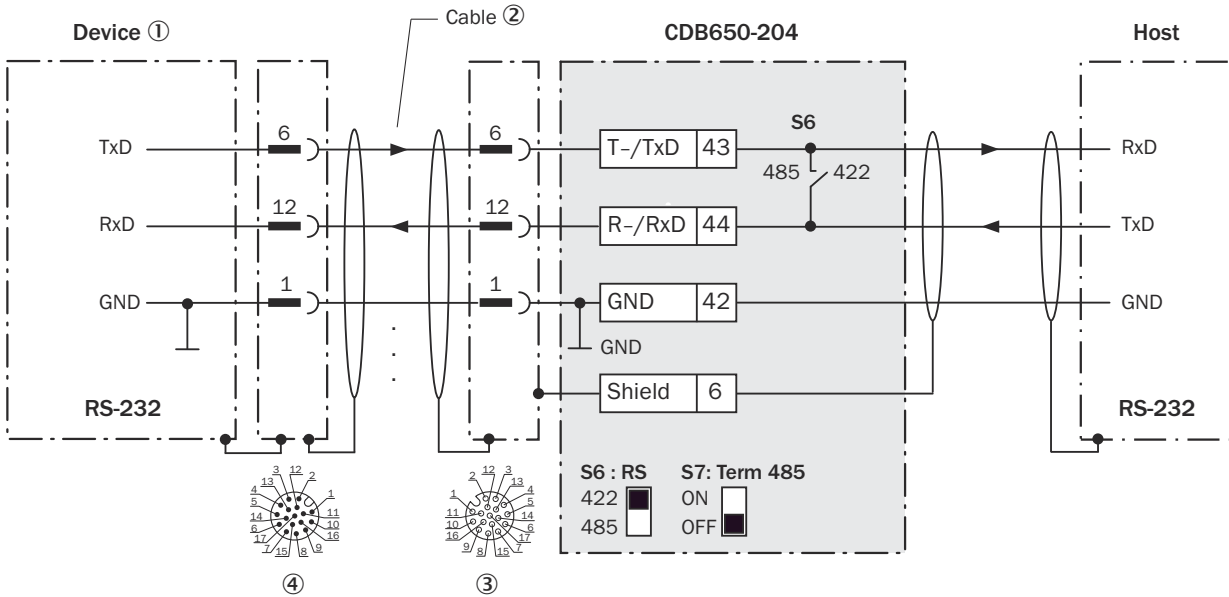


Figure 28: Wiring data interface RS-232 of the device in the connection module CDB650-204

- ① Device
- ② Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
- ③ Connection module: female connector, M12, 17-pin, A-coded
- ④ Device: male connector, M12, 17-pin, A-coded



NOTE

Control the RS-232 data interface in the device with the API functions. In order to activate the RS-232 data interface, use an installed SensorApp which contains this function.

13.3.5 Wiring serial host interface RS-422 of the device in CDB650-204

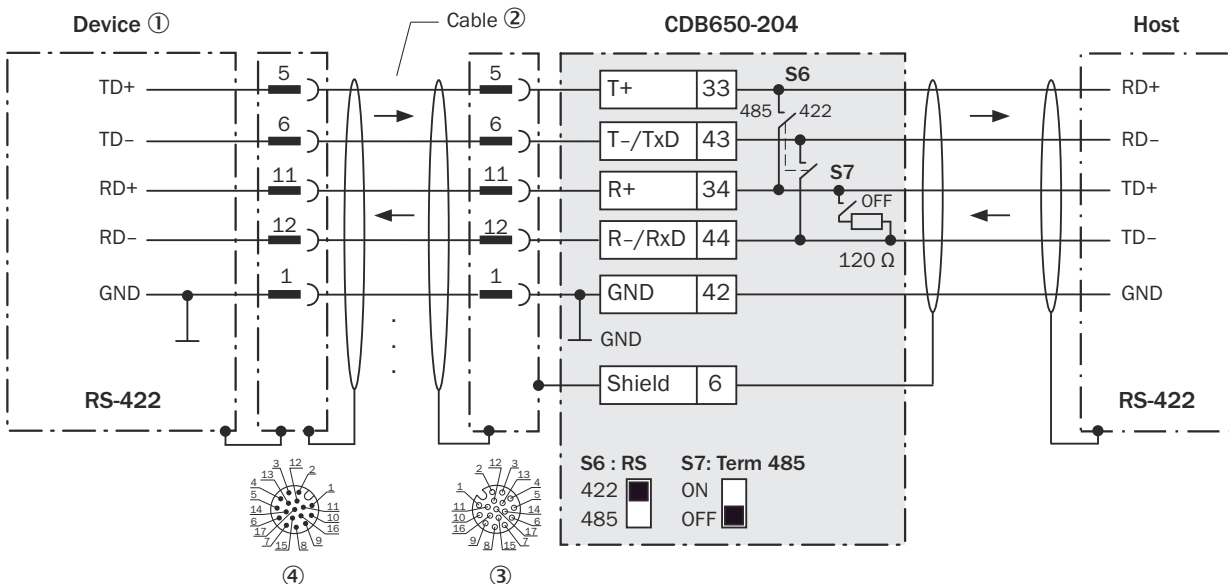


Figure 29: Wiring data interface RS-422 of the device in the connection module CDB650-204

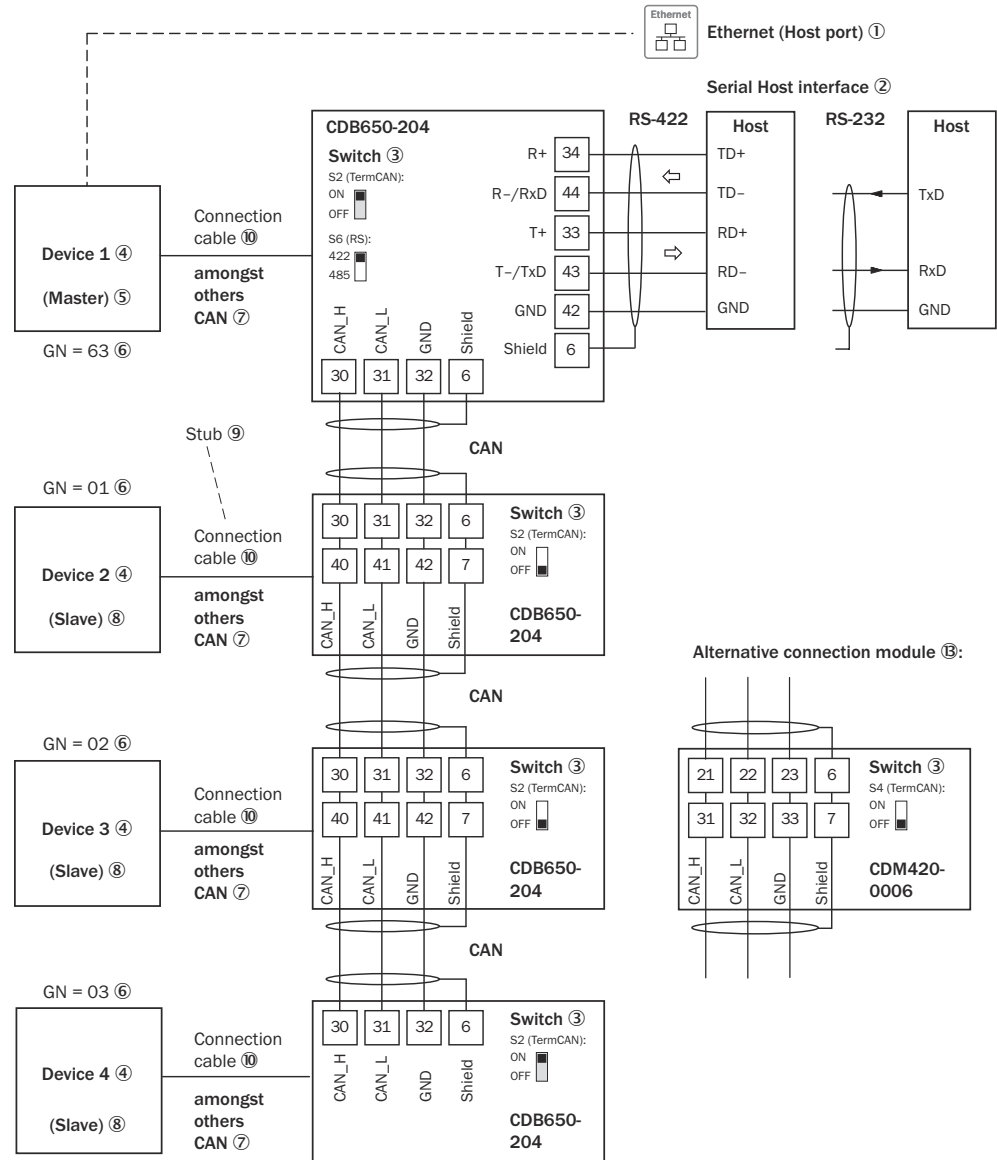
- ① Device
- ② Connection cable 1:1 (female connector, M12, 17-pin, A-coded / male connector, M12, 17-pin, A-coded)
- ③ Connection module: female connector, M12, 17-pin, A-coded
- ④ Device: male connector, M12, 17-pin, A-coded

**NOTE**

User of the RS-422 data interface:

- Control the RS-422 data interface in the device with the API functions. In order to activate the RS-422 data interface, use an installed SensorApp which contains this function.
-

13.3.6 Wiring the CAN interface in the CDB650-204



GN = Device number ⑪
 (max. 32 participants) ⑫

Figure 30: Wire the CAN interface of the device in the CDB650-204 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, are disregarded here!

- ① Ethernet (host port)
- ② Serial host interface
- ③ Switch
- ④ Device
- ⑤ Master
- ⑥ Device number
- ⑦ CAN etc.
- ⑧ Slave
- ⑨ Branch line
- ⑩ Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
- ⑪ Device number (GN)
- ⑫ Maximum 32 users

⑬ Example of alternative connection module

CDM420-0006

CDM420-0006: An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the device



NOTE

Control the CAN data interface in the device with the API functions. In order to activate the CAN data interface, use an installed SensorApp which contains this function.

13.3.7 Wiring digital inputs of the device in the CDB650-204

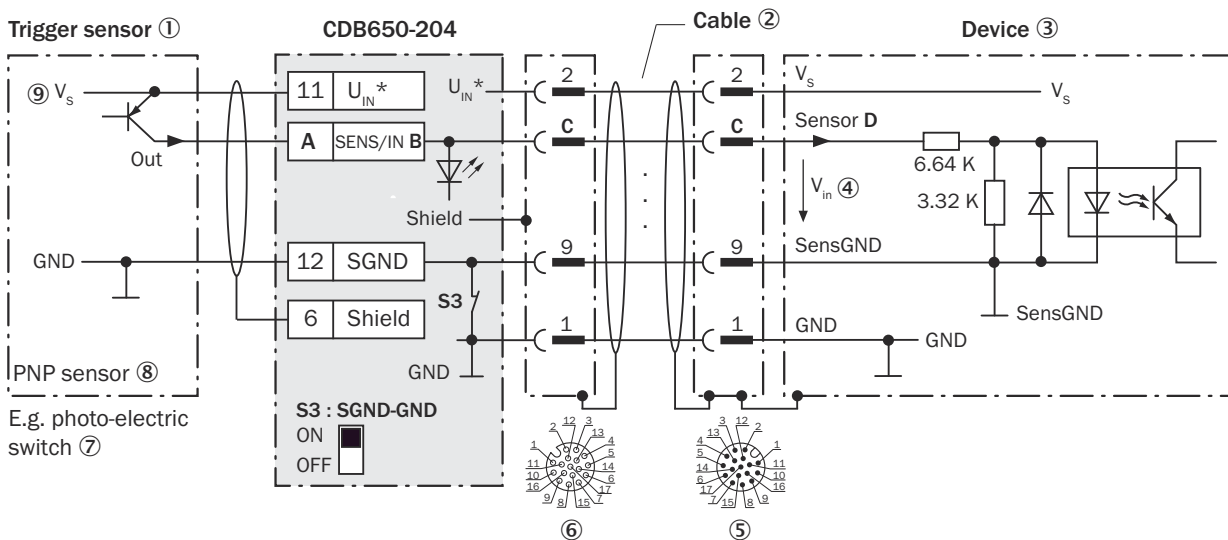


Figure 31: Trigger sensor supplied with power by connection module CDB650-204

- ① Trigger sensor
- ② Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
- ③ Device
- ④ Input voltage V_{in}
- ⑤ Device: male connector, M12, 17-pin, A-coded
- ⑥ Connection module: female connector, M12, 17-pin, A-coded
- ⑦ e.g. photoelectric sensor
- ⑧ PNP sensor
- ⑨ Supply voltage V_s

13.3.8 Wiring digital outputs of the device in the CDB650-204

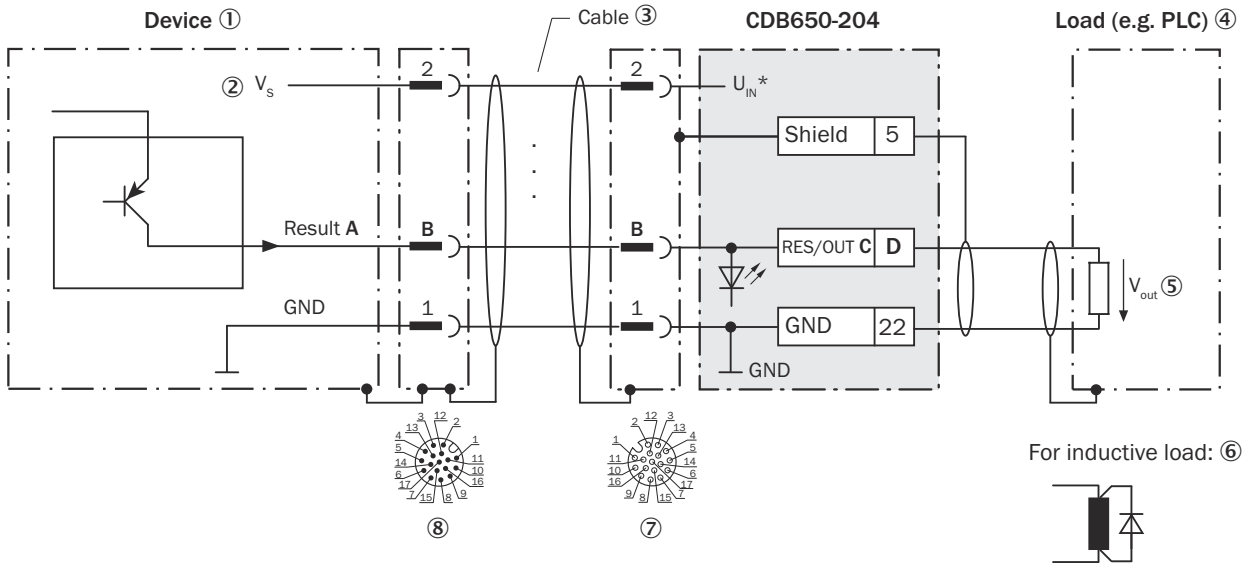


Figure 32: Wire digital outputs "IN/OUT 3" to "IN/OUT 6" of the device in the CDB650-204 connection module

- ① Device
- ② Supply voltage V_s
- ③ Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
- ④ Load (e.g. PLC)
- ⑤ Output voltage V_{out}
- ⑥ With inductive load: see note
- ⑦ Connection module: female connector, M12, 17-pin, A-coded
- ⑧ Device: male connector, M12, 17-pin, A-coded

Table 16: Assignment of placeholders to the digital outputs

Device		CDB650-204	
Output A	Pin B	Signal C	Terminal D
IN/OUT 3	13	RES/OUT 1	20
IN/OUT 4	14	RES/OUT 2	21
IN/OUT 5	16	RES/OUT 3	50
IN/OUT 6	17	RES/OUT 4	51

13.4 Connection diagrams of connection module CDM420-0006

13.4.1 Connection of the device to CDM420-0006

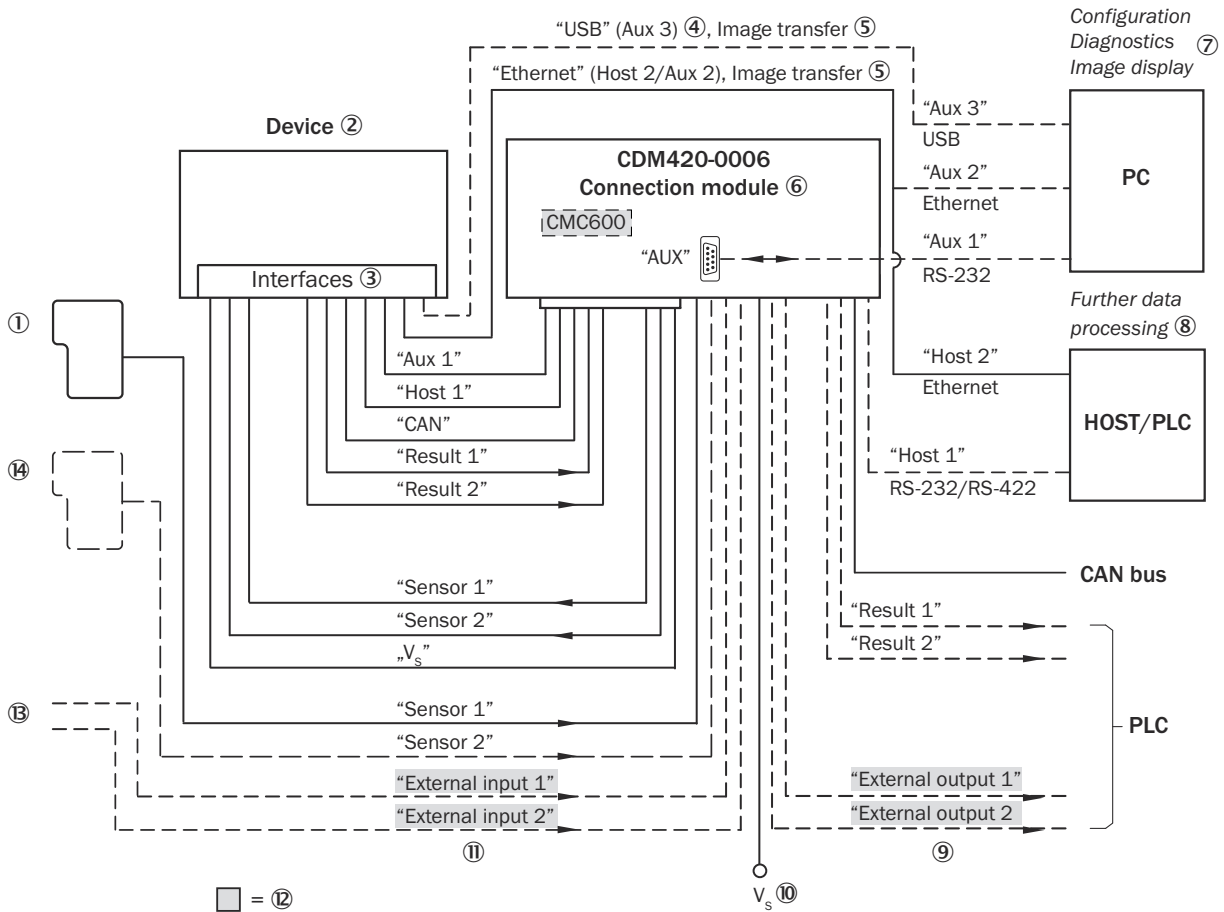


Figure 33: Connection of the device to peripherals via CDM420-0006 (overview)

- ① External trigger sensor
- ② Device
- ③ Interfaces
- ④ USB interface (not supported)
- ⑤ Image transmission
- ⑥ Connection modules
- ⑦ Configuration, diagnostics or image display
- ⑧ Data further processing
- ⑨ External digital outputs (not supported)
- ⑩ Supply voltage V_s
- ⑪ External digital inputs (not supported)
- ⑫ Optional CMC600 parameter cloning module to use the external digital inputs and outputs of the device (not supported).

13.4.2 Wiring overview of the CDM420-0006

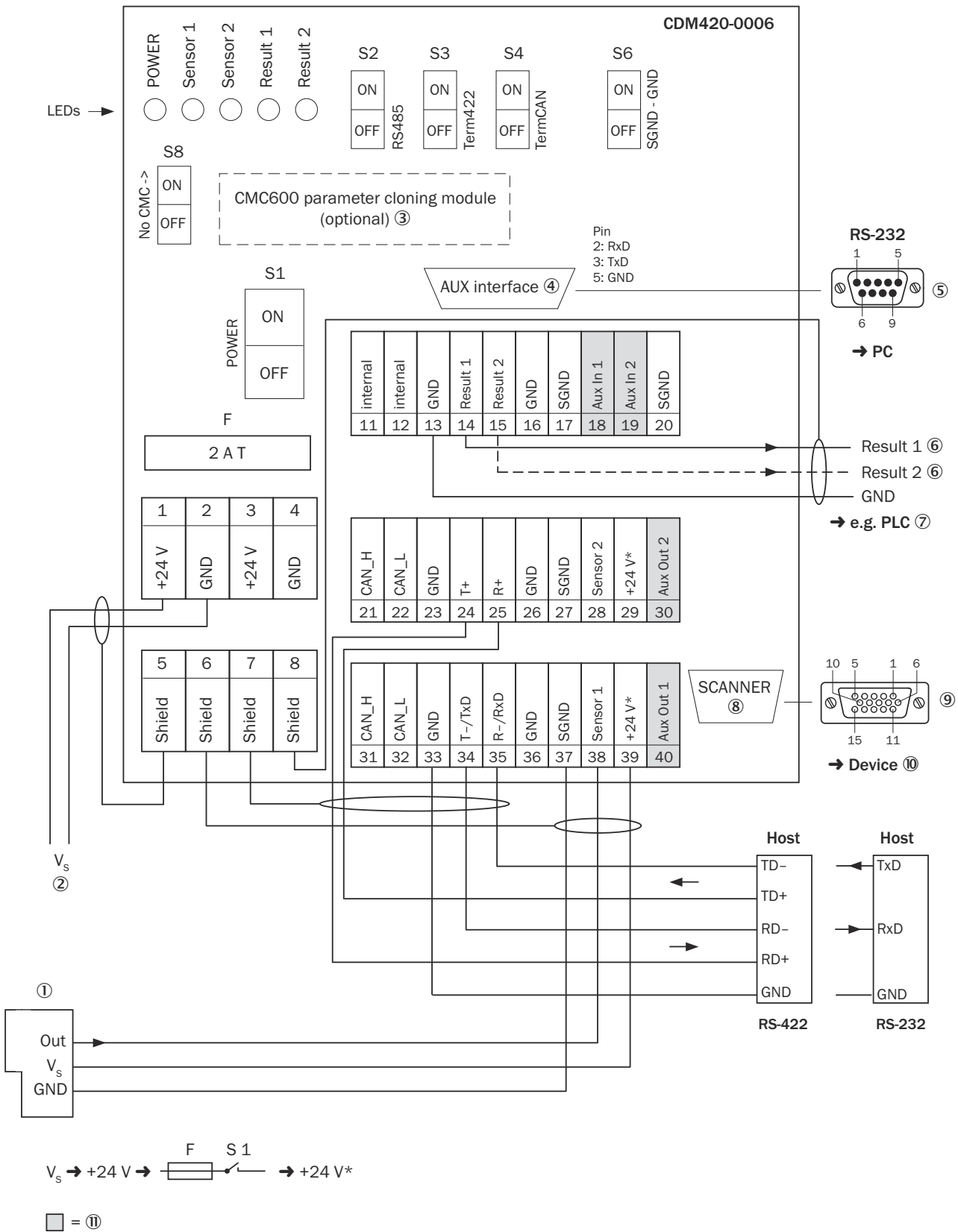


Figure 34: Overview: connection of device and peripherals to the CDM420-0006 connection module

- ① External trigger sensor
- ② Supply voltage V_s

- ③ CMC600 parameter cloning module (not supported)
- ④ Auxiliary interface “Aux”
- ⑤ Male connector, D-Sub, 9-pin
- ⑥ Name of the digital output
- ⑦ e.g. PLC (programmable logic controller)
- ⑧ SCANNER = Device
- ⑨ Female connector, D-Sub-HD, 15-pin
- ⑩ Device to be connected
- ⑪ External digital inputs and outputs of the device (not supported).

13.4.3 Connecting supply voltage for the device in CDM420-0006

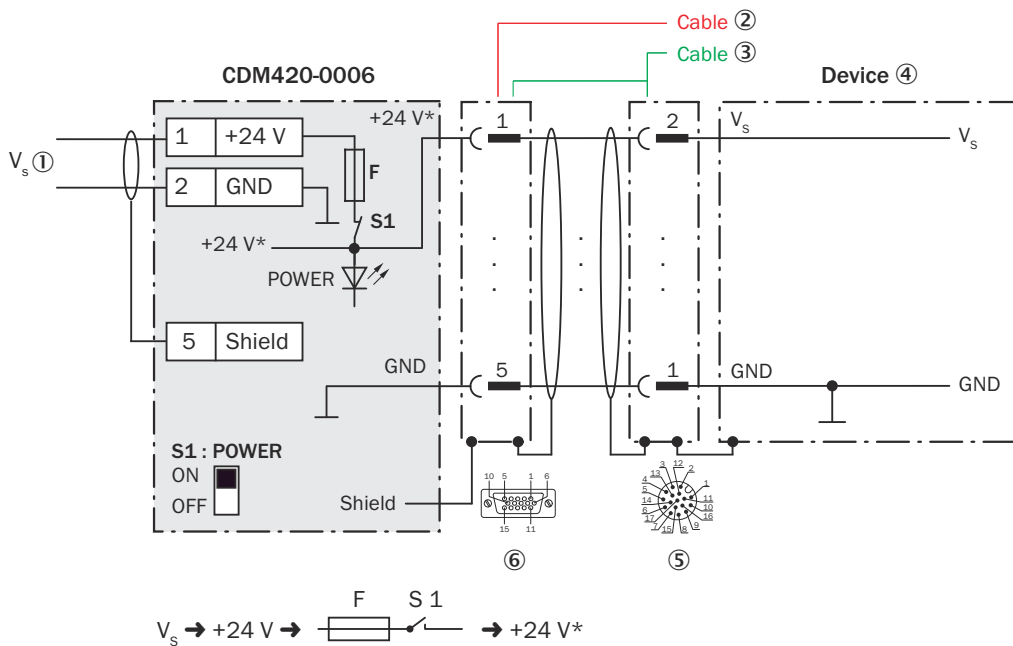


Figure 35: Connecting supply voltage for the device in CDM420-0006 connection module

- ① Supply voltage V_s
- ② Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
- ③ Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
- ④ Device
- ⑤ Male connector, M12, 17-pin, A-coded
- ⑥ Connection module: female connector, D-Sub-HD, 15-pin

Function of switch S1

Table 17: Switch S1: Power

Switch setting	Function
ON	Supply voltage +24 V connected to CDM420-0006 and device via fuse as +24 V* supply voltage. Supply voltage +24 V* can be additionally tapped at terminals 29 and 39.

Switch setting	Function
OFF	CDM420-0006 and device disconnected from supply voltage. Recommended setting for all connection work.

13.4.4 Connecting serial host interface RS-232 of the device in CDM420-0006

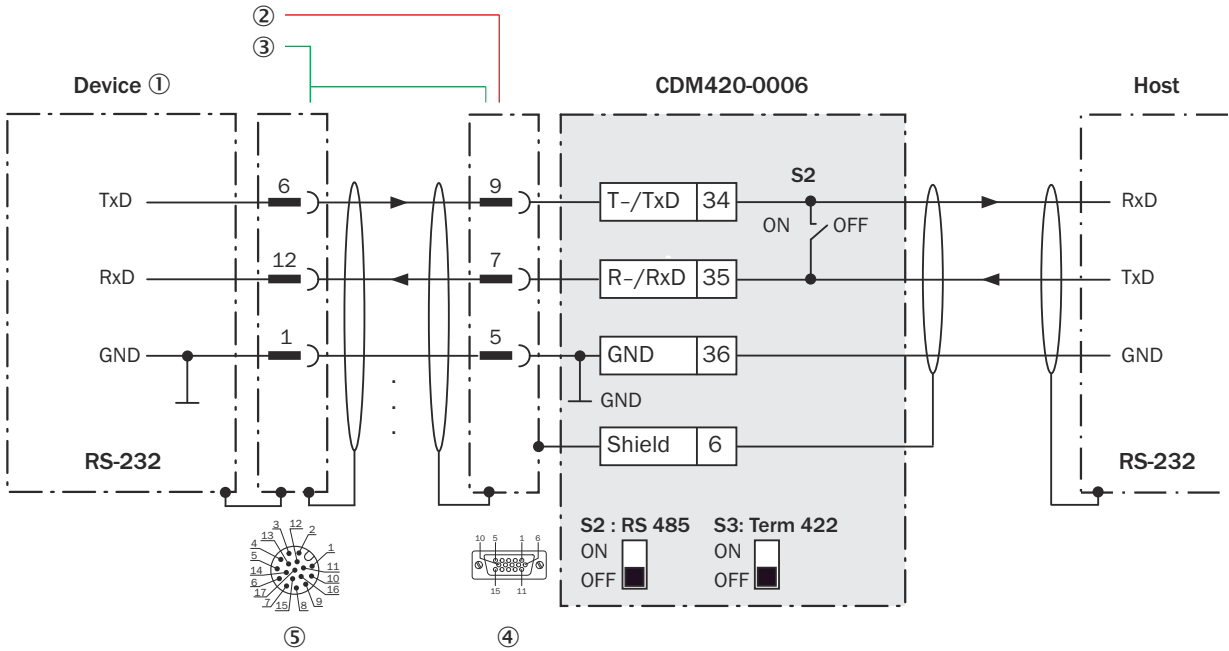


Figure 36: Wiring data interface RS-232 of the device in the connection module CDM420-0006

- ① Device
- ② Connecting cable for 15-pin male connector (not available)
- ③ Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
- ④ Connection module: female connector, D-Sub-HD, 15-pin
- ⑤ Male connector, M12, 17-pin, A-coded



NOTE

Control the RS-232 data interface in the device with the API functions. In order to activate the RS-232 data interface, use an installed SensorApp which contains this function.

13.4.5 Connecting serial host interface RS-422 of the device in CDM420-0006

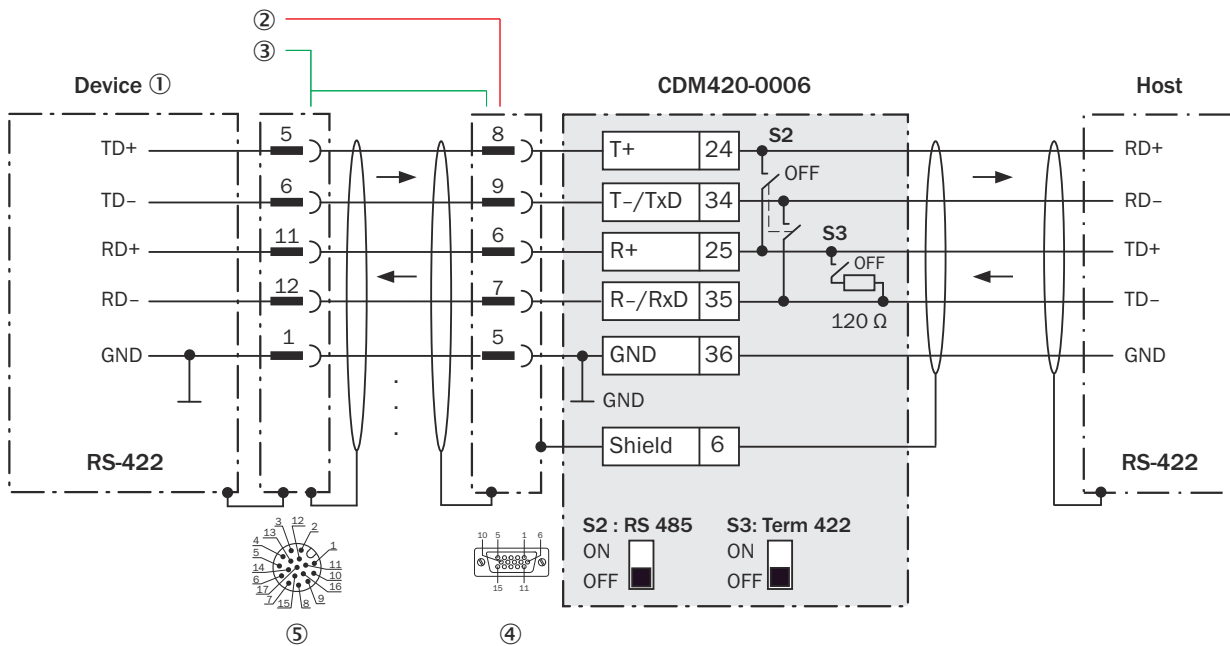


Figure 37: Connecting data interface RS-422 of the device in the connection module CDM420-0006

- ① Device
- ② Connecting cable for 15-pin male connector (not available)
- ③ Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
- ④ Connection module: female connector, D-Sub-HD, 15-pin
- ⑤ Male connector, M12, 17-pin, A-coded

Function of switch S3

Table 18: Switch S3: Term 422

Switch setting	Function
ON	Terminates the RS-422 receiver in the device to improve the noise ratio on the line.
OFF	No termination

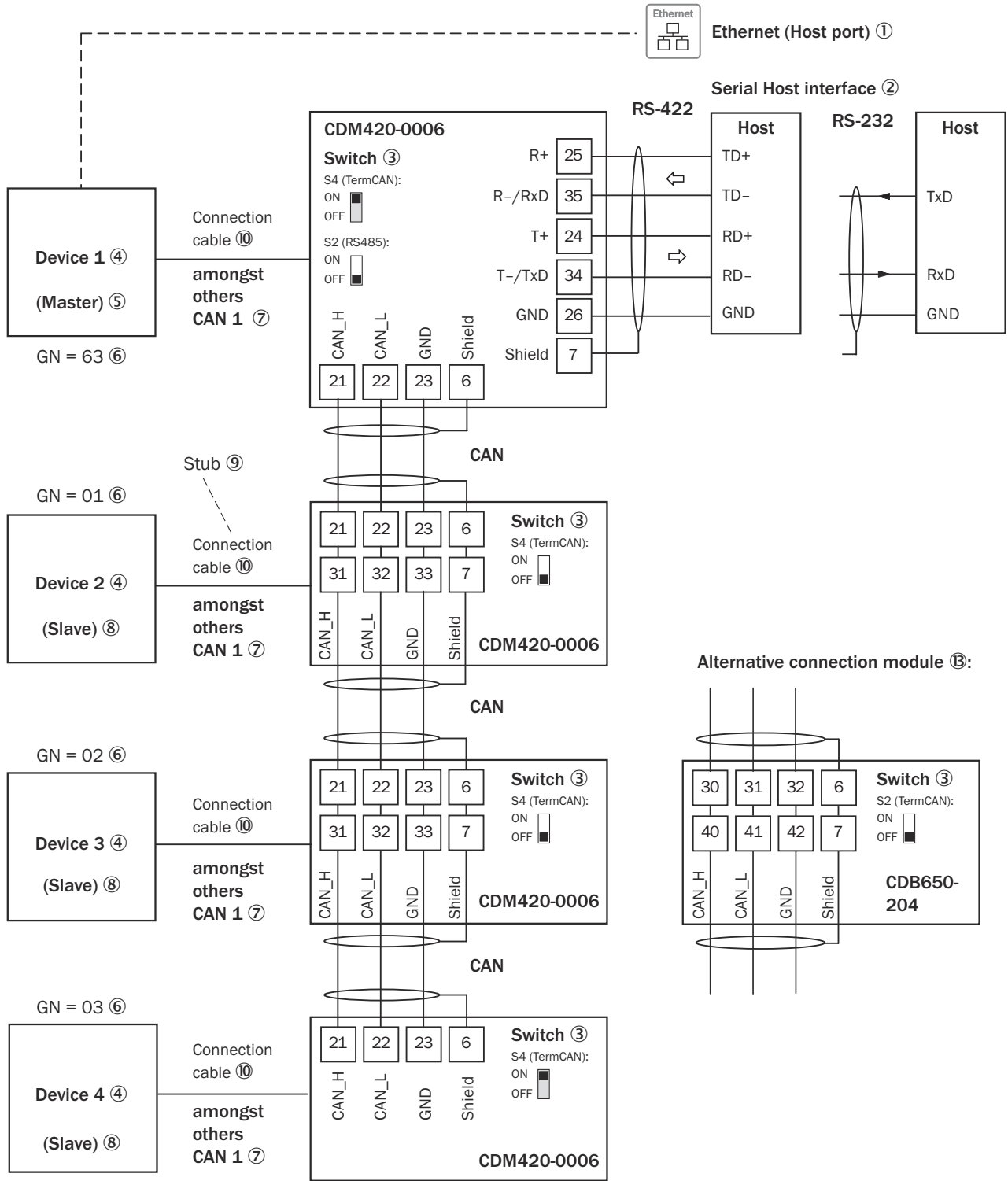


NOTE

User of the RS-422 data interface:

- Control the RS-422 data interface in the device with the API functions. In order to activate the RS-422 data interface, use an installed SensorApp which contains this function.

13.4.6 Wiring the CAN interface in the CDM420-0006



GN = Device number ⑪
 (max. 32 participants) ⑫

Figure 38: Wire the CAN interface of the device in the CDM420-0006 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

- ① Ethernet (host port)
- ② Serial host interface
- ③ Switch

- ④ Device
- ⑤ Master
- ⑥ Device number
- ⑦ CAN etc.
- ⑧ Slave
- ⑨ Branch line
- ⑩ Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)
- ⑪ Device number (GN)
- ⑫ Maximum 32 users
- ⑬ Example of alternative connection module

CDB650-204

A connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded) is required to connect the device



NOTE

Control the CAN data interface in the device with the API functions. In order to activate the CAN data interface, use an installed SensorApp which contains this function.

13.4.7 Wiring digital inputs of the device in the CDM420-0006

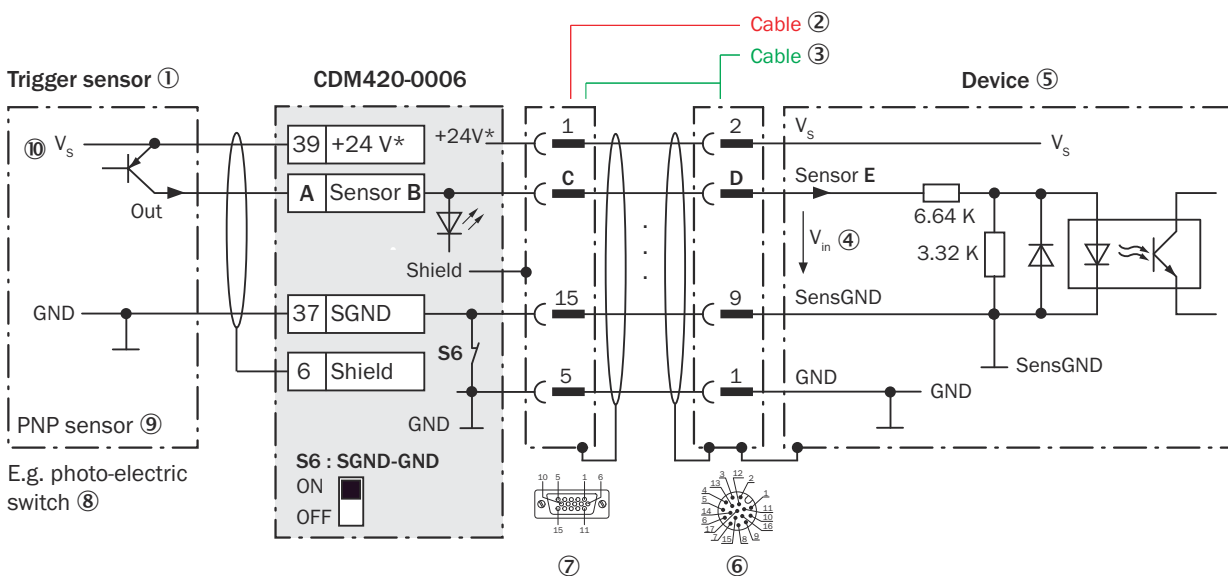


Figure 39: Trigger sensor supplied with power by connection module CDM420-0006

- ① Trigger sensor
- ② Connecting cable for 15-pin male connector (not available)
- ③ Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
- ④ Input voltage V_{in}
- ⑤ Device
- ⑥ Male connector, M12, 17-pin, A-coded
- ⑦ Connection module: female connector, D-Sub-HD, 15-pin
- ⑧ e.g. photoelectric sensor
- ⑨ PNP sensor
- ⑩ Supply voltage V_s

Table 19: Assignment of placeholders to the digital inputs

CDM420-0006			Device	
Terminal A	Signal B	Pin C	Pin D	Sensor E
38	Sensor 1	14	10	1
28	Sensor 2	4	15	2

Function of switch S6

Table 20: Switch S6: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor connected with GND of CDM420-0006 and GND of the device
OFF	Trigger sensor connected potential-free at CDM420-0006 and device. Common, isolated reference potential of all digital inputs is SGND.

Characteristic data of the digital inputs

Table 21: Characteristic data of the digital inputs "Sensor 1" and "Sensor 2"

Type	Switching
Switching behavior	Power to the input starts the assigned function, e.g. start analysis. Default setting in the device: logic not inverted (active high), debounce time 10 ms
Properties	<ul style="list-style-type: none"> • Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	Low: $V_{in}^{1)} \leq 2 \text{ V}$; $I_{in}^{2)} \leq 0.3 \text{ mA}$ High: $6 \text{ V} \leq V_{in} \leq 30 \text{ V}$; $0.7 \text{ mA} \leq I_{in} \leq 5 \text{ mA}$

1) Input Voltage

2) Input current



NOTE

Control the digital inputs in the device with the API functions. In order to assign the digital inputs functions, use an installed SensorApp which contains this function.

13.4.8 Wiring digital outputs of the device in the CDM420-0006

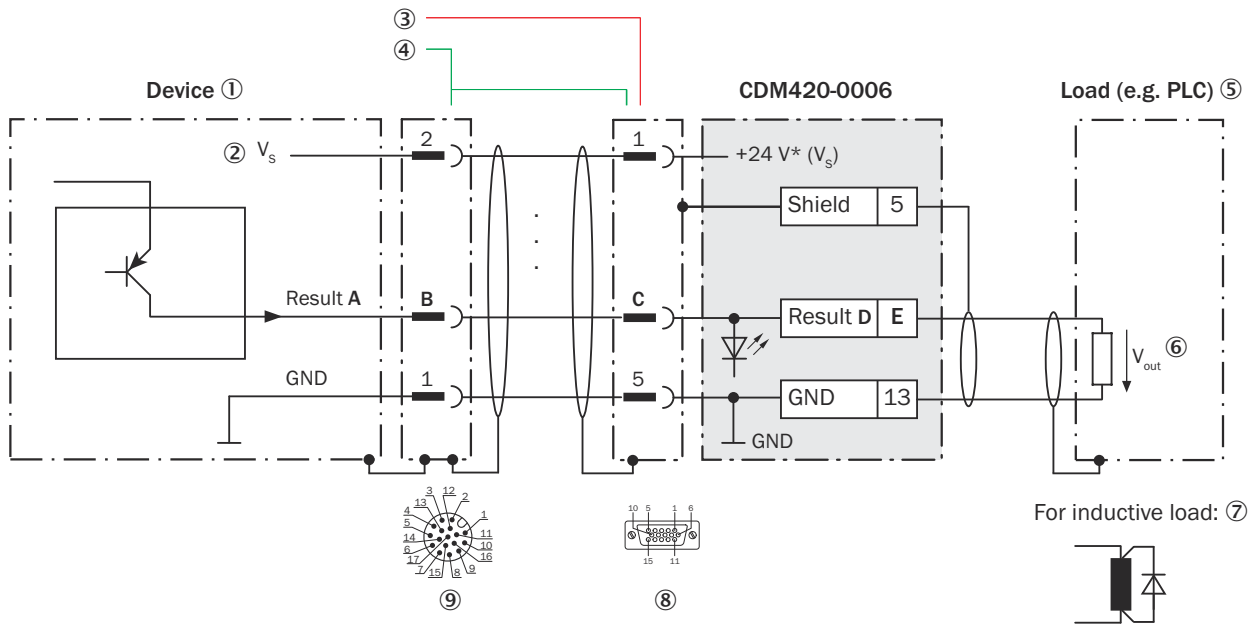


Figure 40: Wire digital outputs "IN/OUT 3" and "IN/OUT 4" of the device in the CDM420-0006 connection module

NOTE
The two digital outputs "IN/OUT 5" and "IN/OUT 6" are not available in the device in the CDM420-0006.

- ① Device
- ② Supply voltage V_s
- ③ Connecting cable for 15-pin male connector (not available)
- ④ Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)
- ⑤ Load (e.g. PLC)
- ⑥ Output voltage V_{out}
- ⑦ With inductive load: see note
- ⑧ Connection module: female connector, D-Sub-HD, 15-pin
- ⑨ Male connector, M12, 17-pin, A-coded

Inductive load

- NOTE**
Provide an arc-suppression switch at the digital output if inductive load is present.
- Attach a freewheeling diode directly to the load for this purpose.

Table 22: Assignment of placeholders to the digital outputs

Device		CDM420-0006		
Output A	Pin B	Pin C	Signal D	Terminal E
IN/OUT 3	13	12	Result 1	14
IN/OUT 4	14	13	Result 2	15

Characteristic data of the digital outputs

Table 23: Characteristic data of "IN/OUT 3" and "IN/OUT 4" digital outputs

Type	Switching

Switching behavior	PNP switching to supply voltage V_S Default settings in the device: no function, logic: not inverted (active high)
Properties	<ul style="list-style-type: none"> • Short-circuit protected + temperature protected • Not electrically isolated from the supply voltage V_S
Electrical values	$0 \text{ V} \leq V_{\text{out}}^{1)} \leq V_S$ $(V_S - 1.5 \text{ V}) \leq V_{\text{out}} \leq V_S$ at $I_{\text{out}}^{2)} \leq 100 \text{ mA}$

1) Output voltage.

2) Output current.



NOTE

Control the digital outputs in the device with the API functions. In order to assign the digital output functions, use an installed SensorApp which contains this function.

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14 Abbreviations used

Table 24: Abbreviations used

CAN	Controlled Area Network. Field bus protocol based on the CAN bus
CDB	Connection Device Basic
CDF	Connection Device Fieldbus
CDM	Connection Device Modular
CE	Communauté Européenne. European Community
CMC	Connection Module Cloning
CMD	Connection Module Display
CMF	Connection Module Fieldbus
CMP	Connection Module Power
CoLa-A	Command Language ASCII (SICK-specific protocol)
CSN	CAN Sensor Network (SICK-specific protocol)
DNS	Domain Name Server
ESD	ElectroStatic Discharge Electrostatic discharge
EMC	Electromagnetic Compatibility
GSD	General Station Description (for PROFIBUS/ PROFINET)
HTML	Hyper Text Markup Language
I	Input
LED	Light Emitting Diode. Light emitting diode
LPS	Limited Power Supply
MAC	Medium Access Control
MTBF	Mean Time Between Failures
MTTF	Mean Time To Failure
MTTR	Mean Time To Repair
O	Output
OCR	Optical Character Recognition
OCV	Optical Character Verification
PDF	Portable Document Format
SD	Secure Digital
SOPAS ET	SICK Open Portal for Application and Systems Engineering Tool (PC software for Windows for device configuration)
SDD	SOPAS Device Description (device description file)
SELV	Safety Extra Low Voltage
PLC	Programmable Logic Controller
TCP/IP	Transmission Control Protocol/Internet Protocol
UL	Underwriters Laboratories
USB	Universal Serial Bus

Australia

Phone +61 (3) 9457 0600
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Austria

Phone +43 (0) 2236 62288-0
E-Mail office@sick.at

Belgium/Luxembourg

Phone +32 (0) 2 466 55 66
E-Mail info@sick.be

Brazil

Phone +55 11 3215-4900
E-Mail comercial@sick.com.br

Canada

Phone +1 905.771.1444
E-Mail cs.canada@sick.com

Czech Republic

Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

Chile

Phone +56 (2) 2274 7430
E-Mail chile@sick.com

China

Phone +86 20 2882 3600
E-Mail info.china@sick.net.cn

Denmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Finland

Phone +358-9-25 15 800
E-Mail sick@sick.fi

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Germany

Phone +49 (0) 2 11 53 01
E-Mail info@sick.de

Hong Kong

Phone +852 2153 6300
E-Mail ghk@sick.com.hk

Hungary

Phone +36 1 371 2680
E-Mail ertekesites@sick.hu

India

Phone +91-22-6119 8900
E-Mail info@sick-india.com

Israel

Phone +972-4-6881000
E-Mail info@sick-sensors.com

Italy

Phone +39 02 27 43 41
E-Mail info@sick.it

Japan

Phone +81 3 5309 2112
E-Mail support@sick.jp

Malaysia

Phone +603-8080 7425
E-Mail enquiry.my@sick.com

Mexico

Phone +52 (472) 748 9451
E-Mail mario.garcia@sick.com

Netherlands

Phone +31 (0) 30 229 25 44
E-Mail info@sick.nl

New Zealand

Phone +64 9 415 0459
0800 222 278 – tollfree
E-Mail sales@sick.co.nz

Norway

Phone +47 67 81 50 00
E-Mail sick@sick.no

Poland

Phone +48 22 539 41 00
E-Mail info@sick.pl

Romania

Phone +40 356-17 11 20
E-Mail office@sick.ro

Russia

Phone +7 495 283 09 90
E-Mail info@sick.ru

Singapore

Phone +65 6744 3732
E-Mail sales.gsg@sick.com

Slovakia

Phone +421 482 901 201
E-Mail mail@sick-sk.sk

Slovenia

Phone +386 591 78849
E-Mail office@sick.si

South Africa

Phone +27 (0)11 472 3733
E-Mail info@sickautomation.co.za

South Korea

Phone +82 2 786 6321
E-Mail info@sickkorea.net

Spain

Phone +34 93 480 31 00
E-Mail info@sick.es

Sweden

Phone +46 10 110 10 00
E-Mail info@sick.se

Switzerland

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Taiwan

Phone +886-2-2375-6288
E-Mail sales@sick.com.tw

Thailand

Phone +66 2 645 0009
E-Mail marcom.th@sick.com

Turkey

Phone +90 (216) 528 50 00
E-Mail info@sick.com.tr

United Arab Emirates

Phone +971 (0) 4 88 65 878
E-Mail info@sick.ae

United Kingdom

Phone +44 (0)17278 31121
E-Mail info@sick.co.uk

USA

Phone +1 800.325.7425
E-Mail info@sick.com

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Phone +65 6744 3732
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Further locations at www.sick.com