OPERATING INSTRUCTIONS

Lector63x Flex C-mount and S-mount

Image-based code readers

SICK
Sensor Intelligence.

Described product

Lector63x Flex C-mount

Lector63x Flex S-mount

Manufacturer

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Legal information

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 to familiarize yourself with the device and its functions before commencing any work.

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

These operating instructions do not provide information on 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 "Type code", page 14.

Available device types are listed on the online product page:

- www.sick.com/Lector63x

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. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.

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/Lector63x

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

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

NOTE
Important information about the integratable VI55I illumination unit can be found in the “VI55I ring illumination unit” technical information (part number: 8018486, www.sick.com/8018486).

Documents on request

Overview of command strings for the device.

Supplementary documents

Information about configuration of the device can be found in the online help function of the SOPAS ET configuration software.

2 Safety information

2.1 Intended use

The image-based code reader Lector63x is an intelligent SICK-4Dpro sensor.

The following device versions are available within the Lector63x Flex device variant line to suit different applications:

- **Complete devices** in different configurations as ready-to-use variants. The complete devices are equipped with a lens and an integrated illumination unit. The integrated illumination unit is located inside the optics protective hood.
- **Basic devices** (camera housing) as kit variants. The customer can freely configure the basic devices for his application. SICK offers a comprehensive range of optional accessories for this purpose. The complete devices are also based on these accessories.

NOTE
Complete devices and basic devices with accessories are referred to simply as “device” in the following sections.

The device is used for automated, stationary identification and decoding of codes on moving or stationary objects. The device reads all commonly used 1D codes (bar codes, stacked codes) and 2D codes (matrix codes). The device can be used either as a standalone solution or as part of a group in a CAN network. In read mode, the device transmits the read results via a host interface to a higher-level computer for further centralized processing.

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

NOTICE
Only the VI55I illumination units from SICK intended for integration in this application can be used as integratable illumination units.

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

2.1.1 Conditions for specified enclosure rating

The camera housing of the device does not have a specified enclosure rating. When mounted, the device achieves the specified IP67 enclosure rating. To ensure compliance with the specified IP67 enclosure rating of the device during operation, the following requirements must be met: If these requirements are not met, the device does not fulfill any specified enclosure rating.

- The cables plugged into the electrical M12 connections and M8 connections must be screwed tight.
- Any electrical M12 connections and M8 connections that are not being used must be sealed with a tightly-fastened protective cap (as in the delivery condition).
- The blue cover at the top of the device must be flush with the device and screwed tight.
- The optics protective hood must be screwed tightly onto the device.

NOTICE

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

- Type-dependent: inserting or removing the optional memory card

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

2.1.2 Using the USB interface

NOTE

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

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:

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

2.3 Internet protocol (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

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

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

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.

2.5 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 cover on the top of the device can be opened temporarily.

In open state, the device does not conform to a specified enclosure rating. The device should therefore be protected against moisture and dust during this time.

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

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

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

2.6 Requirements for skilled persons and operating personnel

WARNING
Risk of injury due to insufficient training.
Improper handling of the device may result in considerable personal injury and material damage.

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

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. The electrician must comply with the provisions of the locally applicable work safety regulation.

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	■ Basic practical technical training ■ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	■ Practical electrical training ■ Knowledge of current electrical safety regulations ■ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	■ 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 ■ Basic knowledge of 1D technology (bar code) or 2D technology (matrix code)
Operation of the device for the particular application	■ Knowledge of the operation and control of the devices in their particular application ■ Knowledge of the software and hardware environment for the particular application

2.7 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.

LED radiation of the integratable illumination unit

NOTICE
Only the VI55I illumination units from SICK intended for integration in this application can be used as integratable illumination units.

Risk group 1

- Color of the illumination: visible blue light (aperture angle: wide, medium), visible red light or visible white light
- Color of the feedback LED: visible red light and visible green light

CAUTION
Optical radiation: LED risk group 1, visible radiation, 400 nm to 780 nm

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

- Do not look into the light source intentionally.
- 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.

Risk group 2

- Color of the illumination: visible blue light (aperture angle: narrow)

CAUTION
Warning! Optical radiation: LED risk group 2, visible radiation, 400 nm to 780 nm

Potentially dangerous optical radiation. Can be damaging to the eyes.

- Do not look into the light source for extended periods of time.
- Never point the light source at people.
- Avoid any reflections on people from reflective surfaces. Be particularly careful during mounting and alignment work.
- 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.

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.

Laser alignment aid

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 – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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 dazzle, flash blindness, afterimages, photosensitive epilepsy, or impairment of color vision, for example.

DANGER
Risk of injury due to hot device surface.

The surface of the device can become hot during operation.

- Before performing work on the device (e.g. mounting, cleaning, disassembly), switch off the device and allow it to cool down.
- Ensure good dissipation of excess heat from the device to the surroundings.

WARNING
Electrical voltage!

Electrical voltage can cause severe injury or death.

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

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

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

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

2.8 Warning sign on the device

Devices and illumination units with LEDs in risk group RG 2 are provided with the following warning label.

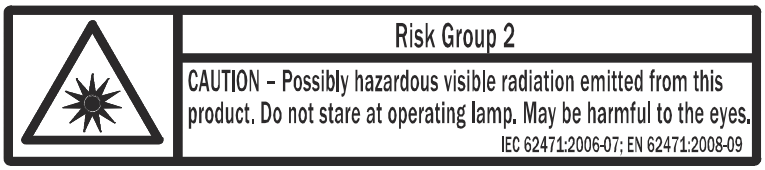


Figure 1: Risk Group 2: CAUTION - Possibly hazardous optical radiation emitted from this product. Do not look into the lamp during operation. This could damage your eyes. ICE 62471:2006-07; EN62471:2008-09

The warning label is located on the exterior of the housing of the devices. For the illumination units, the warning label is located on the outer ring.

The mounted optics protective hood covers the warning label on the illumination unit. The integrable illumination unit types in risk group RG 2 that are mounted by the user are therefore accompanied by an additional black and yellow warning label for optical radiation of risk group RG 2.

Attach the additional warning label in a well visible location on the outside of the optics protective hood of the device.

1. Affix the illumination unit to the device housing.
2. Manually adjust the focus and aperture of the lens and check these using the SOPAS ET configuration software.
3. Attach the protective optics cover and screw it tight.
4. Attach the warning label to the protective optics cover near the light outlet so that it is clearly visible.
5. If the device itself is, for example, integrated into a machine in such a way that the attached warning label is obscured, attach further clearly visible labels to the machine close to where the light is emitted.

3 Product description

3.1 Product ID

3.1.1 Type label

The type label gives information for identification of the device.

The UL certification is dependent on the type. Any existing UL certification can be found on the type label. The corresponding UL logo is then printed on the label.

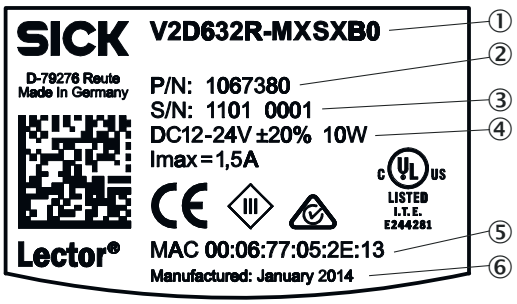


Figure 2: Structure of the type label on the device

① Type designation according to type code
② Part number
③ Serial number
④ Supply voltage, power consumption, current consumption
⑤ MAC address
⑥ Date of manufacture

3.1.2 Type code

The devices of the Lector63x product family are arranged according to the following type code:

V2D6xyz-abcdefg

V2D	6	x	y	z	-	a	b	c	d	e	f	g
1	2	3	4	5	6	7	8	9	10	11	12	13

Position	Description	Characteristic
1	Device name	V2D: Vision 2D matrix
2	Product family	6: 6xx
3	Platform / housing	3: Midrange Line
4	Resolution of the image sensor	1: 1.3 megapixels (1,280 px x 1,024 px) 2: 1.9 megapixels (1,600 px x 1,200 px)
5	Function	R: Read, standard decoder (1D, 2D) D: Read, standard decoder (1D, 2D), DPM decoder, OCR decoder
6	Separator	"-"
7	generation	"empty": 1. generation
8	Imager type/color	M: Monochrome (black-and-white)

Position	Description	Characteristic
9	Color and aperture angle of the integratable illumination unit	X: No illumination unit installed R: Red narrow L: Red wide M: Red medium W: White narrow I: White wide K: White medium B: Blue narrow N: Blue wide P: Blue medium A: Infrared narrow C: Infrared wide D: Infrared medium
10 - 11	Lens type and f-number	**C-mount lenses** CX: C-mount module, no lens **Variants with C-mount lens:** CA: 6 mm (f1.4 - 16) CB: 8 mm (f1.4 - 16) CD: 12 mm (f1.4 - 16) CE: 15 mm (f1.4 - 16) CF: 25 mm (f1.4 - 16) CG: 35 mm (f1.4 - 16) CH: 50 mm (f1.4 - 16) **Variants with compact C-mount lens:** MD: 12 mm (f8) ME: 16 mm (f8) MF: 25 mm (f8) MG: 35 mm (f8) MH: 50 mm (f8) **S-mount lenses** SX: S-mount module, no lens **Variants with S-mount lens:** SC: 9.6 mm (f8) SD: 12.5 mm (f8) SE: 17.5 mm (f8) SF: 25 mm (f8)
12	**Connection variants** [1]	B: Standalone: Power, Serial Data, CAN, I/O, Ethernet, USB [2]
13	**IP protection class, material of the optics protection hood front screen**	0: None (camera housing only) 8: IP67, plastic 22.7 mm (low) 4: IP67, plastic 37.7 mm (medium) 1: IP67, plastic 60.0 mm (high)

1) Information, see "Pin assignments of electrical connections", page 44.
2) Service interface, for temporary use only.

NOTE

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

- www.sick.com/Lector63x

3.2 Scope of delivery

Depending on the chosen device version, the scope of delivery of the device will include the following components:

Table 2: Scope of delivery

No. of units	Component	Comment
1	Type of device ordered (complete device or basic device)	**Complete device:** All required components have already been assembled at the factory (camera housing and optics accessories). The optics protection hood is provided with a device seal. **Basic device:** Camera housing and individual components for independent assembly. The light inlet is fitted with a round protective cap in the basic version. **All devices:** The M12 and M8 electrical connections are sealed with a tightly-fastened protective cap. Without holders and connecting cables.
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.
1	Hexagon key a/f 2	• S-mount lens: for manual actuation of the focus screw. • For opening and closing the cover on the top of the device (access to the microSD card slot and the focus screw).
2	Blue label (round, self-adhesive)	Protects the focus setting when using an S-mount lens. Adjustment is performed with the focus adjustment screw. After adjustment of the focus, the label can be stuck over the access opening for the screw on the top of the device. One label serves as a spare part.
1	SICK lens cloth	Is used for cleaning optical surfaces, e.g. the front screen in the optics protection hood.
1	Printed safety notes, multilingual	Brief information and general safety notes.

1) Order individual components separately as accessories. Depending on order, e.g. lens, integratable illumination unit VI55I, internal spacers, optics protection hood, etc.

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
This documentation, available in English, German and French, and in other languages if necessary	Available online at: • www.sick.com/Lector63x

NOTE

An overview of available complete devices and a detailed selection guide for the matching device components for the basic devices is provided on the online product page at:

- www.sick.com/Lector63x

Accessories

Accessories such as brackets and connecting cables is only delivered if the accessories have been ordered separately, see "Accessories", page 71.

3.3 Product characteristics

3.3.1 Device view

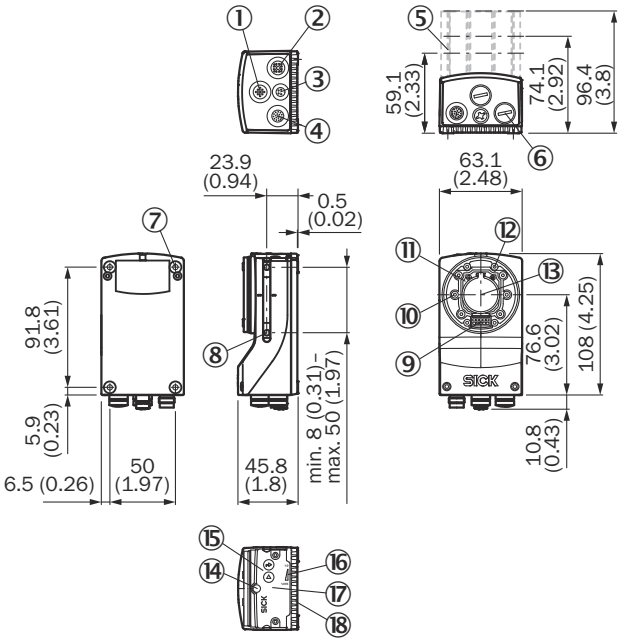


Figure 3: structure and device dimensions, unit: mm (inch), decimal separator: period

① "External light" connection (external illumination unit, female connector, M12, 4-pin, A-coded)

② "Ethernet" connection (Gigabit Ethernet, female connector, M12, 8-pin, X-coded)

③ "USB" connection (female connector, type M8, 4-pin), for temporary use as a service interface only

④ "Power/Serial Data/CAN/I/O" connection (male connector, M12, 17-pin, A-coded)

⑤ Optics protective hood (length: 22.7 mm, 37.7 mm or 60 mm)

⑥ 4 protective caps for sealing off the electrical connections as required for enclosure rating IP67 (delivery condition)

⑦ 4 tapped blind holes, M5, 5.5 mm deep for mounting the device

⑧ 2 sliding nuts, M5, 5.5 mm deep, as an alternative method of mounting the device

⑨ Connection for an integrable illumination unit (VI55I ring illumination unit)

⑩ 2 laser alignment aids

⑪ S-mount or C-mount optics module

⑫ 4 blind tapped holes, 2.5 mm for mounting the spacers for the integrable illumination (VI55I ring illumination unit)

⑬ Optical axis and center of the image sensor

⑭ Basic device: manual focus screw for an S-mount lens, accessible via the round opening in the housing cover. To secure the focus setting, cover the round opening with a self-adhesive label.

Complete device: The opening is already covered by a label.

⑮ 2 function keys

⑯ 5 bar graph LEDs

⑰ Hinged cover on the top side of the device, access to the microSD memory card and the manual focus screw (S-mount)

⑱ 5 status LEDs (2 levels)

3.3.1.1 Integrable illumination unit (optional)

For complete devices, the integrable illumination unit is already mounted. For basic devices, the user needs to order the integrable illumination unit (VI55I ring illumination unit) separately if required, and install it himself.

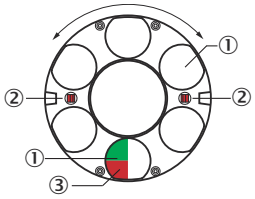


Figure 4: VI55I ring illumination unit (integrable illumination unit)

① 6 LEDs

② 2 openings for the two laser alignment aids for aligning the device, can be deactivated (color: visible red light)

③ 1 feedback LED for the VI55I ring illumination unit (color: visible green light, visible red light; green for example for Good Read, red for example for No Read).

NOTE

Set the display function of the feedback LED using the SOPAS ET configuration software. With the default device settings, the feedback LED briefly generates a green light spot within the field of view of the device after a successful read.

3.3.2 Display and control elements

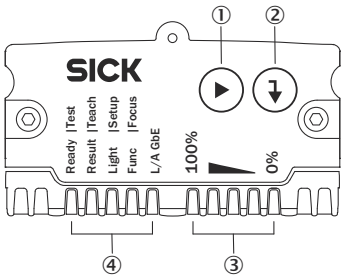


Figure 5: Status LEDs, bar graph display and function keys on the top of the device

① Arrow pushbutton

② Return pushbutton

③ Bar graph display

④ Status LEDs

Status indicators

Table 4: First display level

Display	LED	Color	Status
Ready	●	Green	Device ready for operation
	●	Red	Hardware or software error
Result	●	Green	Read operation successful
	●	Red	Read operation unsuccessful
Light	●	Green	Read mode: illumination on, internal reading interval open

● = illuminated; ✱ = flashing

Table 5: Second display level

Display	LED	Color	Status
Test	●	Blue	Test (reading diagnostics) selected
	✳	Blue	Test started
Teach	●	Blue	Teach-in selected (default: Match code)
	✳	Blue	Teach-in started
	●	Green	Teach-in successful
	●	Red	Teach-in unsuccessful (match code default setting: Unable to teach in any code)
Setup	●	Blue	Set-up selected
	✳	Blue	Set-up started
	●	Green	Set-up successfully quit
	●	Yellow	Set-up partially successful (in at least one of the 3 parameter modules)
	●	Red	Setup unsuccessful

● = illuminated; ✳ = flashing

Functions

Table 6: Function overview

Function	Description
Test (read diagnostics)	Percentage analysis: The device records a series of images and uses the current reading performance settings to decode them. With the 0 ... 100% bar graph, the device shows the read rate of the last 10% (90% to 100%). The bar graph display is activated in standard read mode.
Teach	When you teach in a match code, the device reads the code that is presented and saves the code permanently as a target code for future code comparisons during read mode. For Pharmacodes, the **Code type & code length** function must first be defined in SOPAS ET.
Setup	The device adjusts itself automatically to suit the lighting conditions, working distance, and quality of the code presented. The device permanently stores the acquired values as per the default setting.

PROFINET operation (single port)

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

*Table 7: Device status in the PROFINET network (first display level, **Ready** status LED)*

Ready LED		Device status	Remarks
Green components	Red components		
●	○	Device is ready for use.	

Ready LED		Device status	Remarks
Green components	Red components		
●	✳ Red components flash cyclically	The device status in the PROFINET network depends on the flashing frequency of the red LED components.	
	Flashes every 7 seconds	Network detection in the device is active.	After switching on, the device detects a PROFINET network and activates the PROFINET protocol. The duration of network detection can be configured in SOPAS ET (default: 3 minutes). Network detection can be deactivated in SOPAS ET.
	Flashes every 0.5 seconds	PROFINET is activated in the device. The device is not connected to the PLC or the device is not configured.	
✳	✳	PROFINET is activated in the device.	Prerequisite: the “Flashing” function was activated for the device in the configuration software of the PLC (device identification).

● = lights up; ✳ = flashes; ○ = does not light up

3.3.3 Memory card

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

NOTE

The microSD memory card is optional and not included in the scope of delivery of the device. 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/Lector63x

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

Functions

An inserted memory card serves as a local external storage medium for the device outside the internal device memory, see "Initial commissioning", page 57.

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

- **Cloning function: storage of the currently valid parameter set**
  Automated additional storage of the parameter set with the configuration data of the device on an external storage medium that is quickly accessible to the user. This takes place as part of the recommended backup concept for the parameter sets of the 4Dpro devices. The externally stored parameter set is also updated automatically each time the currently valid configuration data is permanently saved. For devices without a card slot, the optional CMC600 cloning module, installed in the CDB/CDM connection module, also offers the same external storage option in addition to other functions. The otherwise necessary connection of a computer to the device in order to manually save the parameter set is not required with this data backup method. The cloning function provides the means, for example in the event of a device fault, for a manual transfer of the currently valid parameter set to an exchange unit of the same type.
  Automated saving to the external storage medium is triggered by saving the parameter set in the device with the **Permanent** option, e.g., via the SOPAS ET configuration software.
- **Firmware download (update)**
  For information on prerequisites, and the procedure for downloading and updating the firmware, see the SICK Support Portal.
- Optional: Image is saved for a failed read (read result: No Read).
- For information on other available functions, see “Overview of SOPAS Parameters” in the online help of the device (part number: 8020322, www.sick.com/8020322).
- Other functions available on request.

When saving a parameter set for the first time, use an empty MicroSD memory card.

▶ Check and, if necessary, delete the contents of the current memory card on the computer.

Device access to the memory card

NOTE

The device does not directly signal access (read, write) to the memory card.

When saving the parameter set using the **Permanent** option, the **Ready** LED indicates when the save process has completed:

- When the device starts saving, the **Ready** LED goes out.
- When the device has finished saving, the **Ready** LED lights up green again.

NOTICE

Possible data loss!

If the memory card is removed or the supply voltage switched off when saving the parameter set in SOPAS ET, data may be lost.

▶ Do not remove the memory card or switch off the supply voltage while the parameter set is being permanently changed by saving it with the **Permanent** option in SOPAS ET.

▶ To safely remove the memory card during operation, select the **Remove SD card** option under **Analysis/SD card** in SOPAS ET. Then wait for the feedback from SOPAS ET.

Inserting the memory card in the device:

NOTICE
Risk of damage to the memory card!

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

Access to the card slot

The card slot for the memory card is located under the hinged cover on the top side of the device.

1. Switch off the supply voltage to the device.
2. Undo the screws (SW2 hexagon key) on the hinged cover and open the cover as follows:
   - Carefully pull the upper edge of the cover away from the housing a little at the level of the hinges on the side. Use both of the recesses on the inside of the cover to do this.
   - Fold the cover 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. 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.

Interpretation of the stored parameter set

Once it is switched on, the device automatically detects the presence of a memory card and, depending on the memory card's content, behaves as follows:

- If the memory card is empty or contains a parameter set that cannot be interpreted by the device, the device saves its currently valid internal parameter set to the memory card (provided there is sufficient storage space). The device then starts with its internal parameter set.
- If the memory card contains a parameter set that can be interpreted by the device, the device permanently overwrites the currently valid internal parameter set with this external parameter set. The device then starts with its new valid parameter set.
- The goal is for the internal parameter set and the parameter set saved externally to always be identical.

The highest-ranking parameter set is used by the device when operated in the PROFINET with the following sequence hierarchy:

1 After starting, the device loads the last permanently stored internal parameter set to its working memory.
2 The device then searches for a valid parameter set in the optional external memory card slot. If there is a positive search result, the device overwrites the existing parameter set in its working memory with this external parameter set.
3 If the PROFINET controller sends a parameter set via the PROFINET with central configuration of the bus users, the device again overwrites corresponding parameter values in its working memory. These changes are lost again when the device is switched off. The PROFINET controller must then again send the most recently valid parameter values each time the device is restarted (supply voltage is switched on).

Removing the memory card from the device:

NOTICE
Risk of damage to the memory card!

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

1. 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. 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.

3.3.4 Product features and functionality

The Lector63x Flex is available as a complete device and as a basic device. In the case of a complete device, the device is assembled by SICK. In the case of a basic device, the user assembles the device to suit his specific application using the following components: camera housing, lens, illumination unit, and optics protective hood. Depending on the configuration, it may also be possible to use spacers, illumination unit connectors, spacer rings, and filters. We recommend only using products from SICK as components.

The Lector63x is available in a range of variants with S-mount, C-mount and compact C-mount lenses. The S-mount variant is equipped with a fixed aperture and can also be used for short working distances if spacer rings are used. The image sharpness can be manually adjusted using the focus screw. The C-mount variant allows the focus and aperture settings to be manually adjusted directly on the lens. The compact C-mount variant comes with a fixed aperture and allows the focus to be manually adjusted on the lens.

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

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

4.3 Transport inspection

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

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

NOTE

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

4.4 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Electrical connections are provided with a protective cap (as in the delivery condition).
- 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 67.

- Relative humidity: see "Technical data", page 67.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Mounting instructions

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

5.2 Overview of mounting procedure

The mounting of the device is divided into the following steps:

- Mount the device.
- Align the device with the object.
- Connect the device to interfaces and supply voltage.
- Adjust the device.

5.3 Preparation for mounting

5.3.1 Installation requirements

- Typical space requirement: see "Field of view diagrams", page 33 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 67.
- 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 codes.

Auxiliary equipment required

- Mounting system with sufficient load-bearing capacity and suitable dimensions.
- 4 or 2 M5 screws for mounting on a mounting system supplied by the customer. The screw length depends on the mounting base (wall thickness of the bracket). When using an optional SICK mounting system, the screws for mounting are included with delivery.
- Tool and tape measure.

5.3.2 Mounting systems

Mount the device on the mounting system by means of a minimum of two tapped blind 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 mounting systems that are optimally suited for mounting the device, see "Accessories", page 71.

Customer-supplied mounting system

A customer-supplied mounting system must meet the following requirements:

- The device can be aligned in the X- and Y-axes.
- The mounting system must be able to bear the weight of the device and connecting cables without shock.
- In mounting situations with strong vibrations, it may be necessary to provide shock mounts.
- Device mounting options using the four tapped blind holes or two sliding nuts must be provided.

5.4 Mounting the lens unit

NOTE

This mounting step is only required if the optics accessory or the “basic device” device type has been ordered.

You can find further information on pre-mounted devices on the Internet at: www.sick.com/Lector63x.

NOTICE

Risk of damage due to electrostatic discharge!

Electrostatic discharge from the human body may damage parts of the illumination unit or the camera housing.

The illumination variants for lenses with a focal length of 12 mm or 16 mm do not feature any plastic lenses in front of the LEDs in the round recesses.

- Take the necessary ESD precautions when assembling the device.
- Do not insert your fingers into the recesses.
- Do not touch the open contacts of the electrical connection for the illumination unit on the camera housing.

NOTE

Possible impairment of image quality!

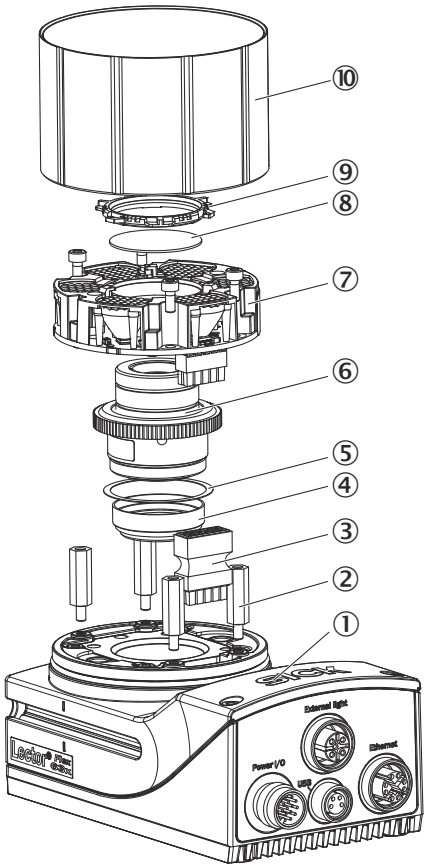
Dust and fingerprints on optical boundary surfaces can decrease the image quality and decoding performance of the device.

- ▶ Ensure a dust-free and dry environment when mounting components.
- ▶ Do not touch the image sensor (CMOS) in the light inlet opening of the device or the glass lenses at either end of the lens unit.

Auxiliary equipment required

- SW 2 hexagon key (included with delivery)
- SW 5 socket wrench, Recommendation: as a torque wrench for 65 Ncm

5.4.1 Assembling the basic device with compact C-mount lens



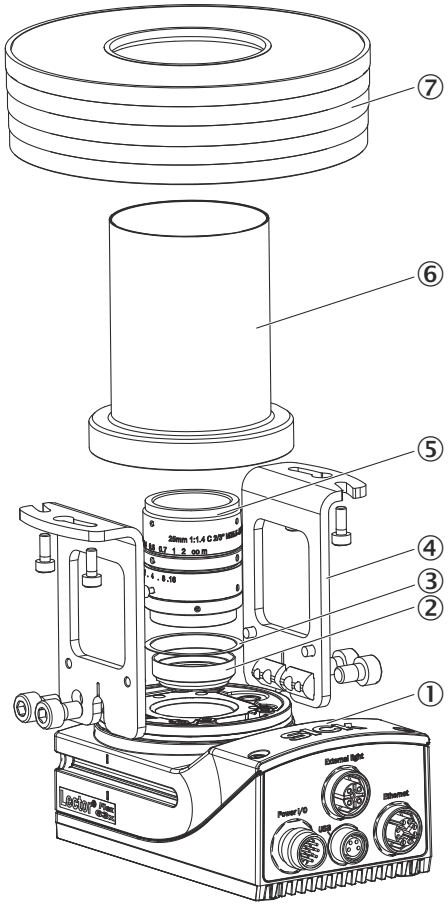
① Camera housing (basic device)
② Spacer for integrable illumination
③ Plug connector for illumination
④ Optical filter (optional)
⑤ Spacer disk (included with delivery of filter)
⑥ Compact C-mount lens
⑦ Integrable illumination unit
⑧ C-mount filter (optional), cannot be used with f = 15 mm lens (part number: 2080213)
⑨ Filter holder
⑩ Protective optics cover

1. Switch off the supply voltage to the device.
2. Place the camera housing on a nonslip base.
3. Remove the protective cap from the round light inlet.
4. Carefully insert the optional filter and spacer disk into the light inlet.
5. Screw the lens unit into the C-mount thread until it engages. This will also lock the optional filter in place at the same time.
6. Mount the 4 spacers. Maximum recommended torque: 65 Ncm.
7. Insert the illumination unit connector.
8. Mount the illumination unit using the 4 screws. Use the enclosed SW 2 hexagon key for this purpose.
9. If the required adjustments are not carried out immediately, mount the optics protective hood.

5.4.2 Assembling the basic device with C-mount lens and external ICL ring illumination unit

NOTE

The mounted external ICL ring lighting and the mounted optics protective hood for the lens need to be briefly removed again later to set the image sharpness and aperture on the lens.

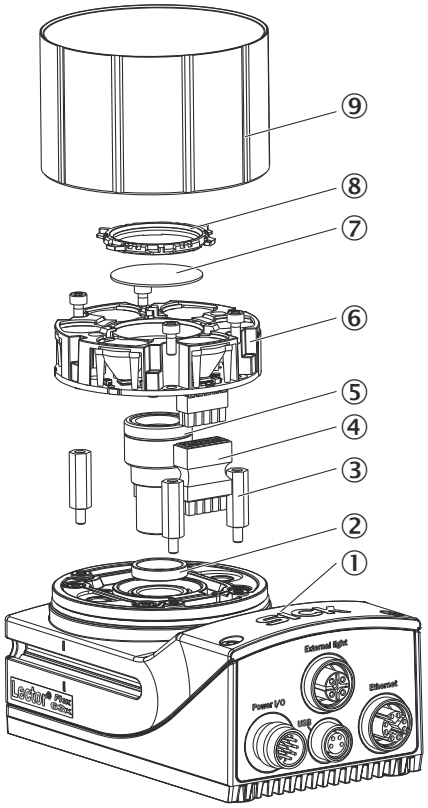


① Camera housing
② C-mount filter (optional)
③ Spacer disk (included with delivery of filter)
④ C-mount lens
⑤ Mounting bracket for the ICL ring lighting
⑥ Protective lens cover for ICL ring lighting
⑦ ICL ring lighting

1. Switch off the supply voltage to the device.
2. Place the camera housing on a nonslip base.
3. Remove the protective cap from the round light inlet.
4. Carefully insert the optional filter and spacer disk into the light inlet.
5. Carefully screw the C-mount lens into the C-mount thread until it engages. This will also lock the optional filter in place at the same time.
6. Mount the two mounting brackets for the ICL ring lighting on the sides of the camera housing.
7. If the required adjustments to the lens are not carried out immediately, mount the optics protective hood for the lens.

8. Mount the ICL ring lighting.
9. Connect the cable (female connector, M8, 4-pin/male connector, M12, 4-pin, A-coded) to the ICL ring lighting and the device.

5.4.3 Assembling the basic device with S-mount lens



① Camera housing
② Spacer ring (optional)
③ Spacer for integrable illumination
④ Plug connector for illumination
⑤ S-mount lens
⑥ Integrable illumination unit
⑦ Optical filter (optional)
⑧ Filter holder
⑨ Protective optics cover

1. Switch off the supply voltage to the device.
2. Place the housing on a nonslip base.
3. Remove the protective cap from the round light inlet.
4. Depending on the lens used and the desired working distance, one or more spacer rings may need to be mounted below the lens. The spacer rings are sold in packets (part number: 2066933 and 2081458). The recommended spacer rings to use depend on the working distance and the focal length of the lens, see table 8, page 31.
5. Screw in the lens unit until the limit stop is reached and the thicker part of the lens is inside the light inlet of the housing. If the lens is only screwed in as far as its thread, the lens is not tightly screwed into the housing.

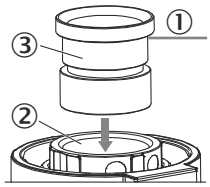


Figure 6: Screw in the S-mount lens

① Limit stop: Screw in the lens to the limit stop
② Light inlet
③ S-mount lens

6. If required, mount the spacer. Maximum recommended torque: 65 Ncm.
7. If required, plug the illumination unit connector into the housing.
8. Mount the illumination unit using the 4 screws. Use the enclosed SW 2 hexagon key for this purpose.
9. Mount the optional filter and filter holder.
10. Mount the protective optics cover.

Table 8: Spacer rings depending on the working distance

Working distance in mm	Spacer rings in mm (depending on the focal length of the lens)		
	9.6 mm	17.5 mm	25 mm
50 ... 65	- [1]	2.3 +3 [2]	- [3]
60 ... 95	- [1]	1.5 +2,3 [2]	- [3]
70 ... 90	- [1]	2,3	1.5 +1.5 +1.5 +3
80 ... 100	- [1]	2,3	1.5 +2.3 +3
90 ... 120	- [1]	1,5	2.3 +3
100 ... 130	- [1]	1,5	1.5 +3
110 ... 170	- [1]	1,5	1.5 +2.3
150 ... 210	- [1]	- [1]	3
> 210	- [1]	- [1]	- [1]

[1] No spacer rings required.
[2] This working distance requires longer spacers, a longer illumination unit connector (part number: 2079501), and a taller optics protective hood (part number: 2079127).
[3] Working distance not possible with this lens.

5.5 Mounting location

5.5.1 Working range

Depending on the device type, the working range is between 50 mm and 2,200 mm.

The field of view is determined by the focus position, the focal length of the lens, and the working distance. The necessary working distance can be determined from the field of view diagram, see "Field of view diagrams", page 33.

5.5.2 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.

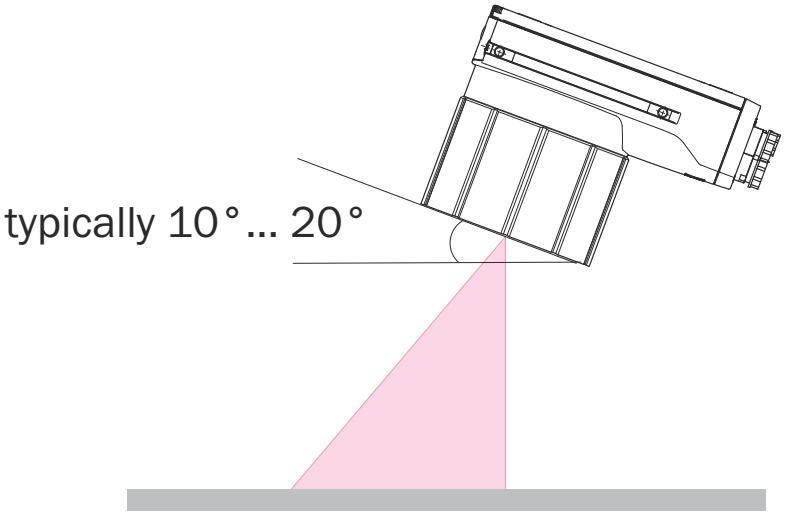


Figure 7: Mounting angle to use, depending on the application

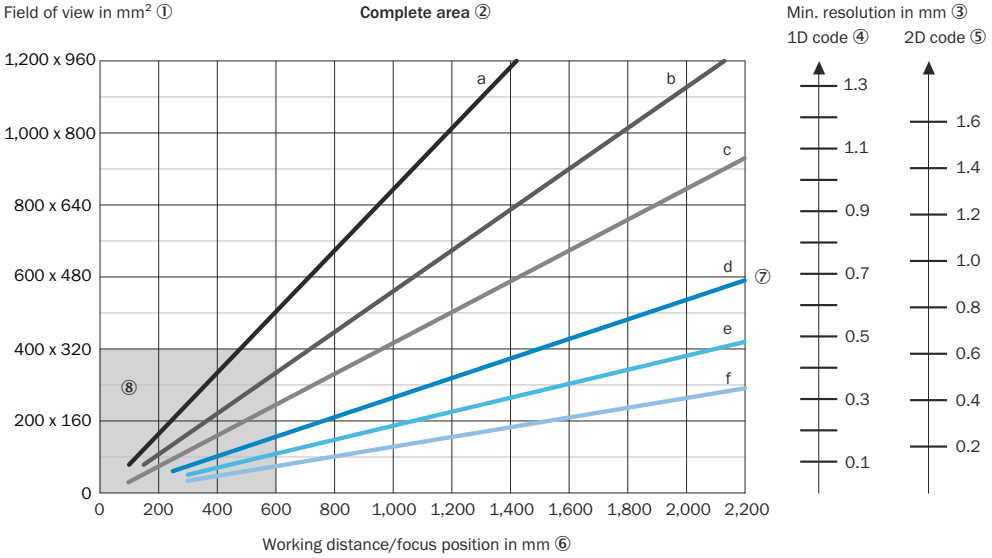
① Typical angle 10° ... 20°

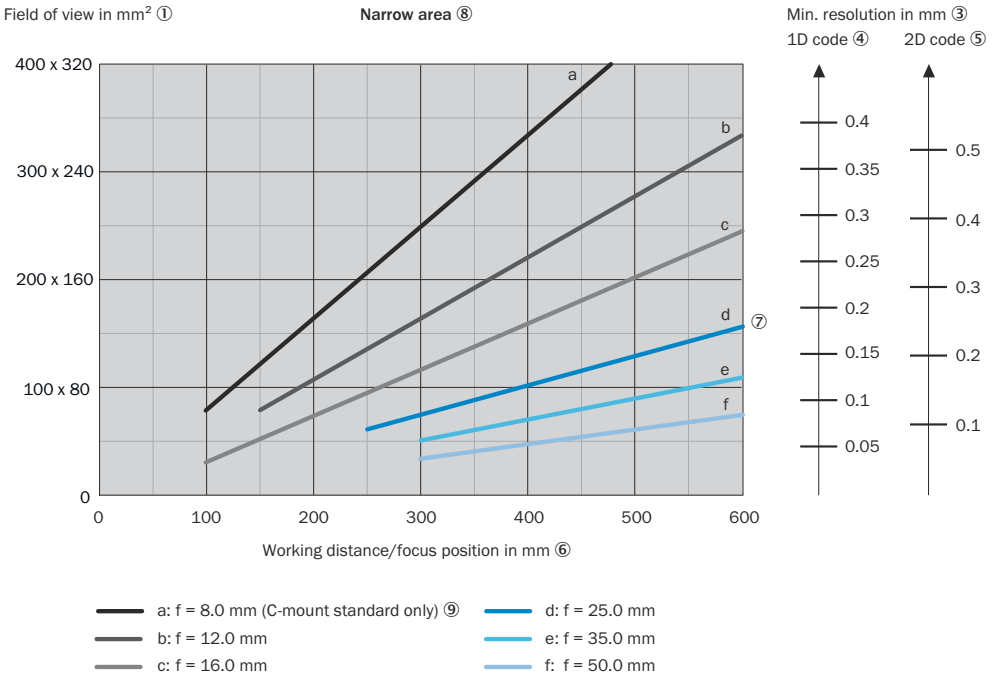
The typical value is between 10° and 20°.

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

5.5.3 Field of view diagrams

Lector631 C-mount

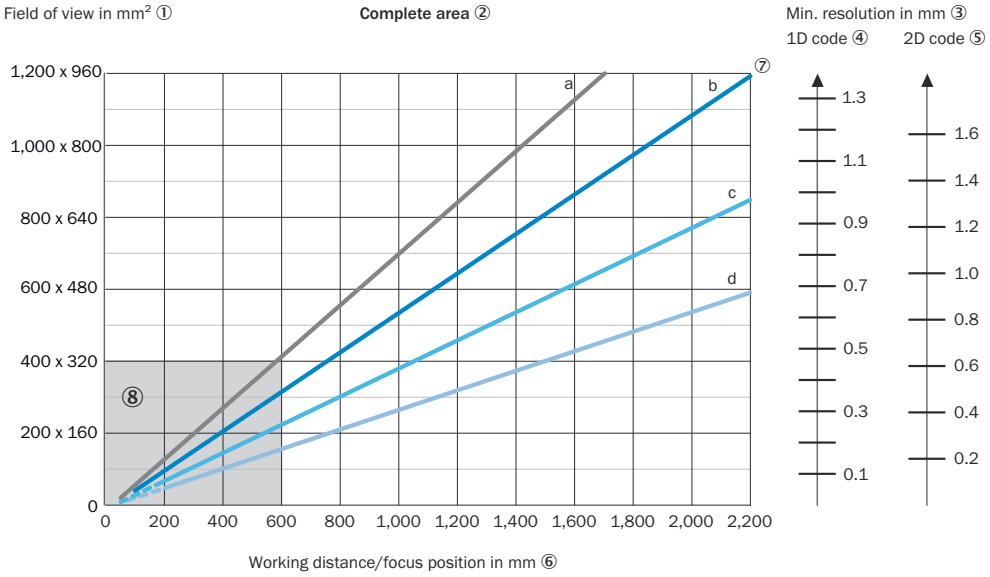


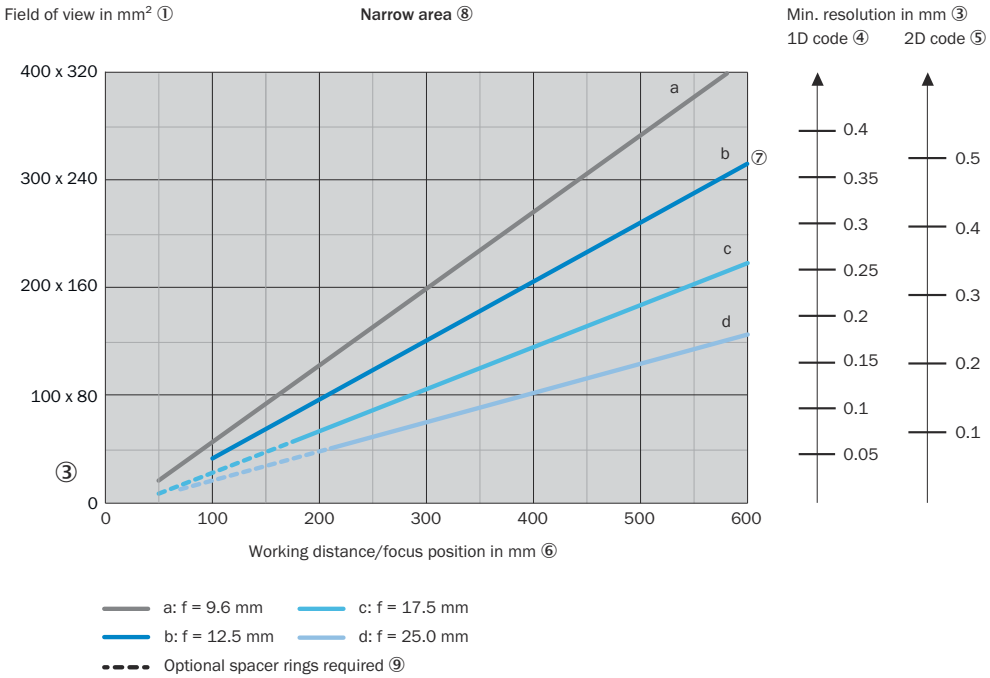


a: f = 8.0 mm (C-mount standard only) ⑨
b: f = 12.0 mm
c: f = 16.0 mm
d: f = 25.0 mm
e: f = 35.0 mm
f: f = 50.0 mm

① Field of view in mm²
② Overall range
③ Minimum resolution in mm
④ 1D code
⑤ 2D code
⑥ Working distance/Focus position in mm
⑦ Focal length of lens, here example for f = 25.0 mm
⑧ Near range
⑨ Standard C-mount only

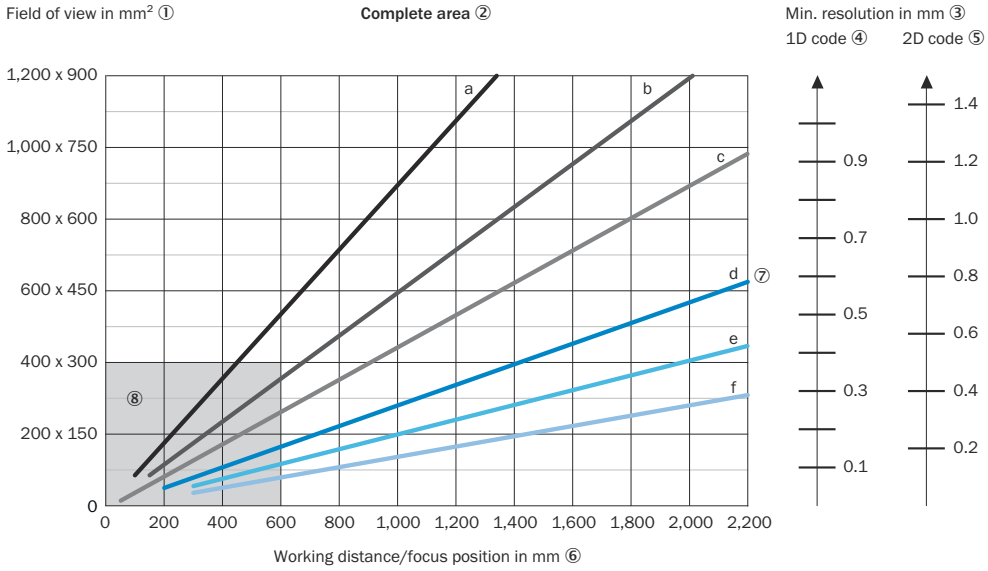
Lector631 S-mount

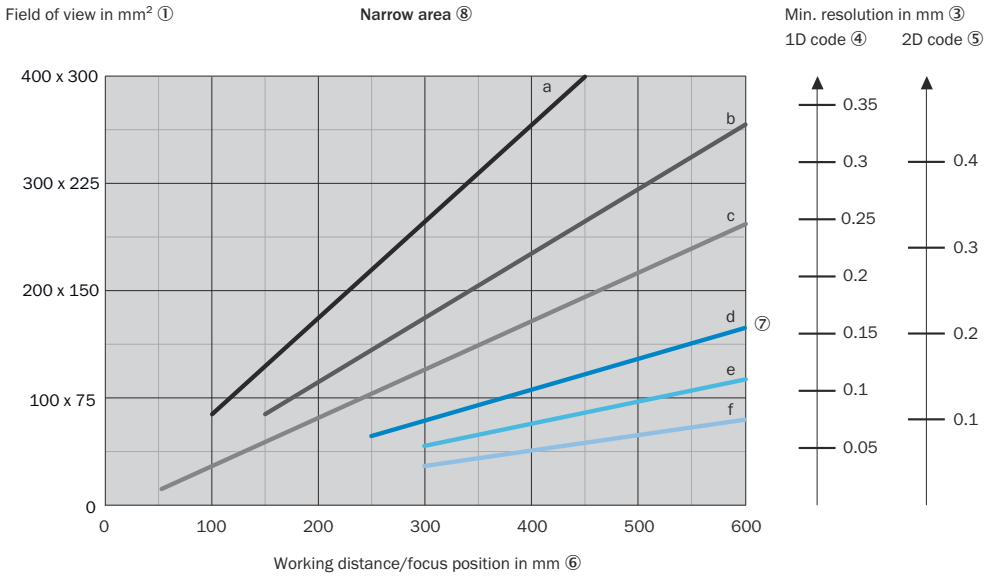




① Field of view in mm²
② Overall range
③ Minimum resolution in mm
④ 1D code
⑤ 2D code
⑥ Working distance/Focus position in mm
⑦ Focal length of lens, here example for f = 12.5 mm
⑧ Near range
⑨ Optional spacer ring required

Lector632 C-mount

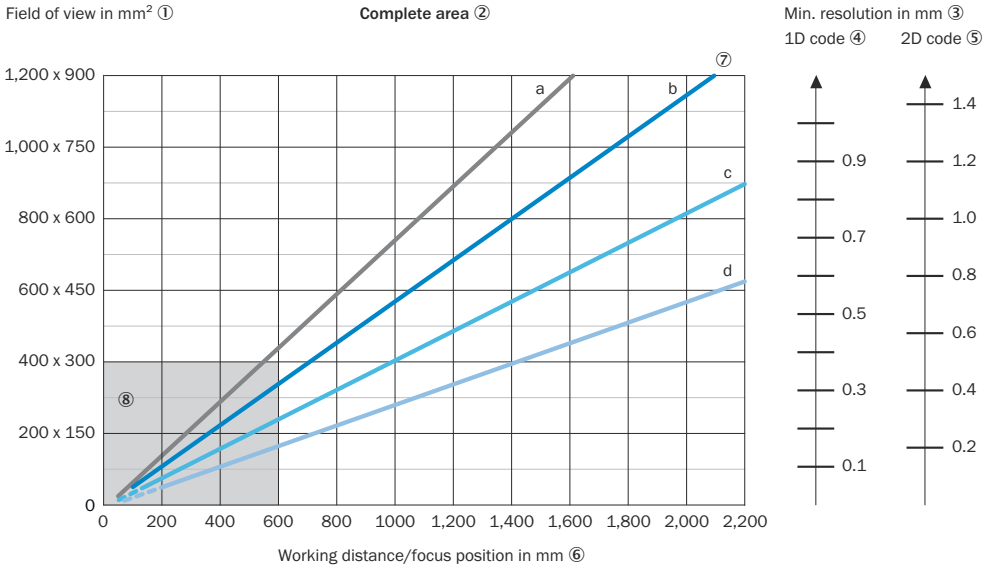


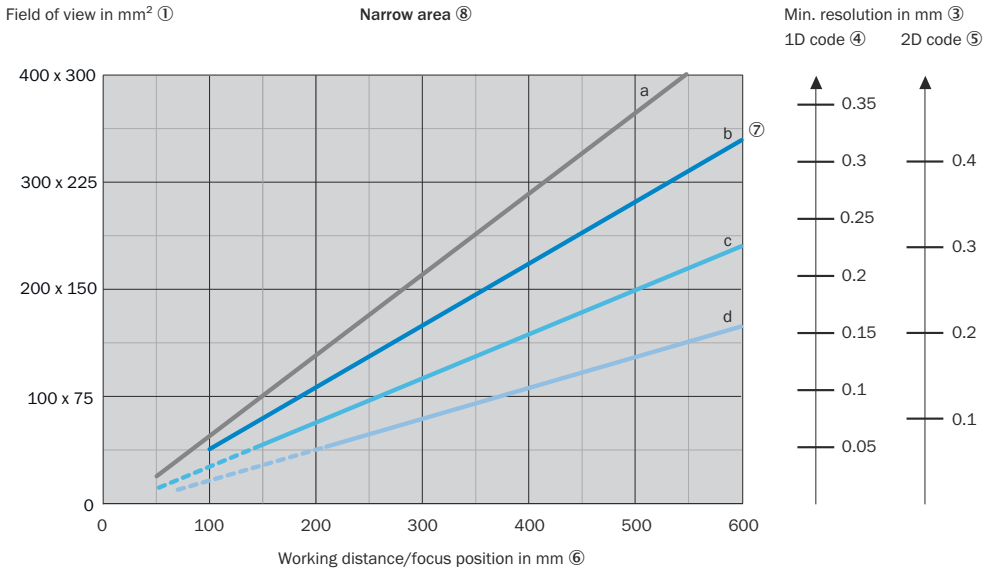


a: f = 8.0 mm (C-mount standard only) ⑨
b: f = 12.0 mm
c: f = 16.0 mm
d: f = 25.0 mm
e: f = 35.0 mm
f: f = 50.0 mm

① Field of view in mm²
② Overall range
③ Minimum resolution in mm
④ 1D code
⑤ 2D code
⑥ Working distance/Focus position in mm
⑦ Focal length of lens, here example for f = 25.0 mm
⑧ Near range
⑨ Standard C-mount only

Lector632 S-mount





a: f = 9.6 mm
b: f = 12.5 mm
c: f = 17.5 mm
d: f = 25.0 mm
Optional spacer rings required ⑨

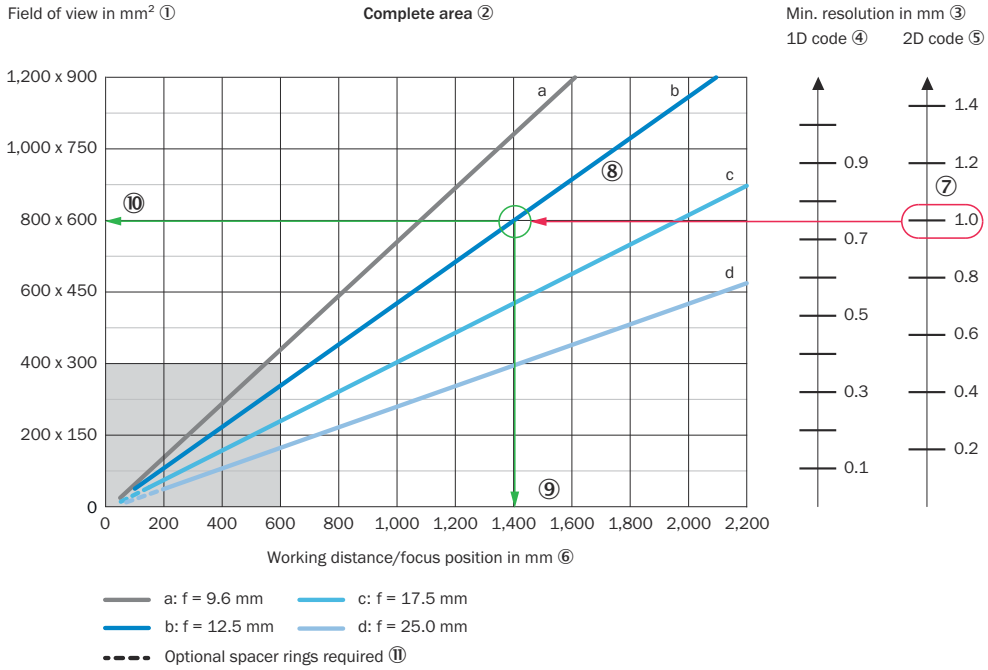
① Field of view in mm²
② Overall range
③ Minimum resolution in mm
④ 1D code
⑤ 2D code
⑥ Working distance/Focus position in mm
⑦ Focal length of lens, here example for f = 12.5 mm
⑧ Near range
⑨ Optional spacer ring required

Interpretation aid for the field of view diagrams

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

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

Example field of view diagram for Lector632 S-mount:



① Field of view in mm²
② Overall range
③ Minimum resolution in mm
④ 1D code
⑤ 2D code
⑥ Working distance/Focus position in mm
⑦ Selected code resolution
⑧ Focal length of lens, here example for f = 12.5 mm
⑨ Reading off: resultant maximum working distance
⑩ Reading off: resultant field of view (mm x mm)
⑪ Optional spacer ring required

Given (in red):

- Code resolution for 2D code ⑦: 1.0 mm
- Focal length of lens ⑧: 12.5 mm

Read off (in green):

- Maximum working distance ⑨: approx. 1,400 mm
- Field of view ⑩: approx. 800 mm x approx. 600 mm

Both axes of the diagrams must be interpreted linearly.

5.6 Mounting the device

Aligning the device with viewing window to object

Remember to consider the shape and alignment of the field of view in front of the device.

Figure 8: Resolution-dependent field of view geometries

① Device with image sensor 1.3 Mpx
② Device with image sensor 1.9 Mpx
③ Field of view

Align the device taking into consideration the field of view (see "Field of view diagrams", page 33) and the application circumstances (see "Installation requirements", page 26).

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 all 4 threaded mounting holes on the rear of the device or, alternatively, 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.

6 Electrical installation

6.1 Safety

6.1.1 Conditions for specified enclosure rating

The camera housing of the device does not have a specified enclosure rating. When mounted, the device achieves the specified IP67 enclosure rating. To ensure compliance with the specified IP67 enclosure rating of the device during operation, the following requirements must be met: If these requirements are not met, the device does not fulfill any specified enclosure rating.

- The cables plugged into the electrical M12 connections and M8 connections must be screwed tight.
- Any electrical M12 connections and M8 connections that are not being used must be sealed with a tightly-fastened protective cap (as in the delivery condition).
- The blue cover at the top of the device must be flush with the device and screwed tight.
- The optics protective hood must be screwed tightly onto the device.

NOTICE

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

- Type-dependent: inserting or removing the optional memory card

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

6.1.2 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

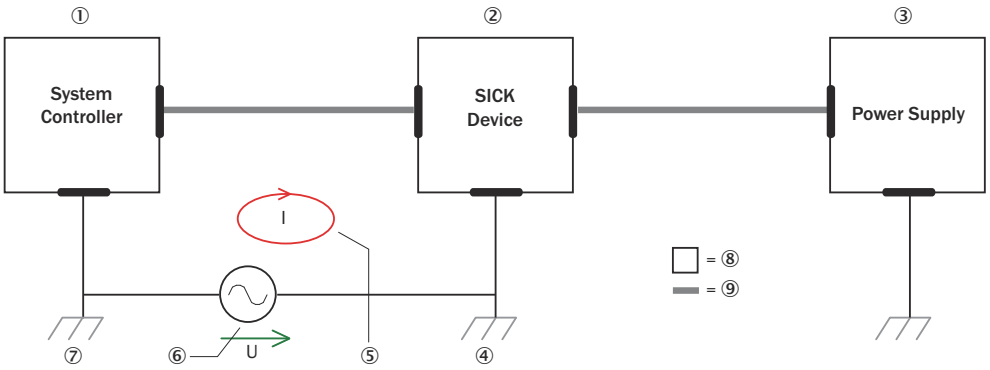


Figure 9: Example: Occurrence of equipotential bonding currents in the system configuration

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

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

Remedial measures

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

NOTICE

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

Measures for widely distributed system installations

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

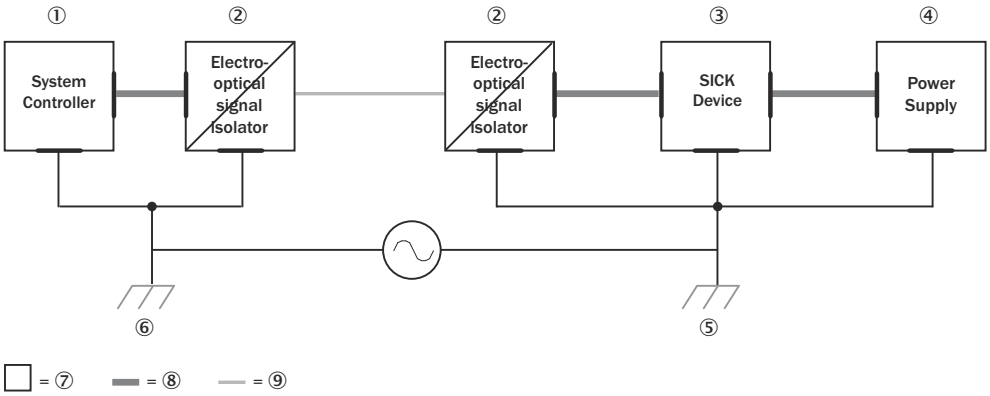


Figure 10: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

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

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

Measures for small system installations

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

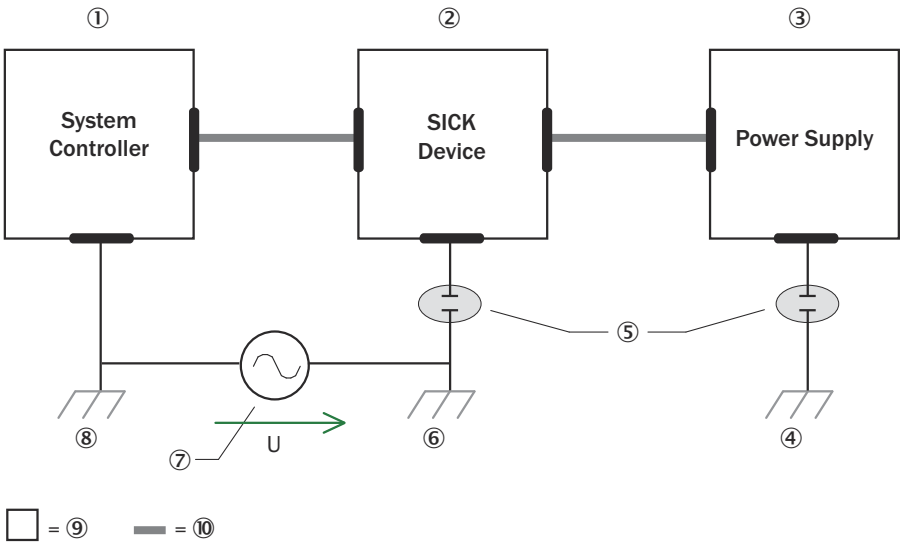


Figure 11: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

① System controller
② Device
③ Voltage supply

④ Grounding point 3
⑤ Insulated mounting
⑥ Grounding point 2
⑦ Ground potential difference
⑧ Grounding point 1
⑨ Metal housing
⑩ Shielded electrical cable

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

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

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

6.2 Wiring instructions

NOTE
Pre-assembled cables can be found online at:

- www.sick.com/Lector63x

NOTICE
Faults during operation and device or system defects!
Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

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. The required fuse rating is 2 A slow-blow.

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.

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.

6.2.1 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, always use EMC-compliant cables and layouts. This applies, for example, to cables for switched-mode power supplies, motors, clocked drives, and contactors.
- Do not lay cables over long distances in parallel with power supply cables and motor cables in cable channels.

Serial data transmission (RS-232, RS422)

- The possible length of cable between the device and host computer depends on the following factors:
  - The physical version of the host interface selected
  - The data transmission rate set in the device

  For further information, see "Wiring data interfaces", page 47.

6.3 Connection diagrams

6.3.1 Connection principle

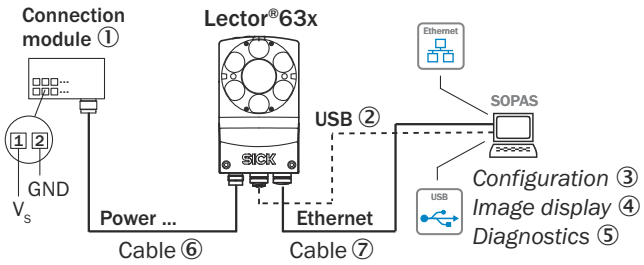


Figure 12: Connection block diagram

① Connection module CDB650-204 or CDM420-0006

② Alternative USB, adapter cable (male connector, M8, 4-pin/male connector, USB, type A)

③ Configuration

④ Image display

⑤ Diagnostics

⑥ CDB650-204: Cable 1:1 (male connector, M12, 17-pin, A-coded/female connector, M12, 17-pin, A-coded)

CDM420-0006: Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)

⑦ Adapter cable (male connector, M12, 8-pin, X-coded/male connector, RJ45, 8-pin)

6.3.2 Example applications

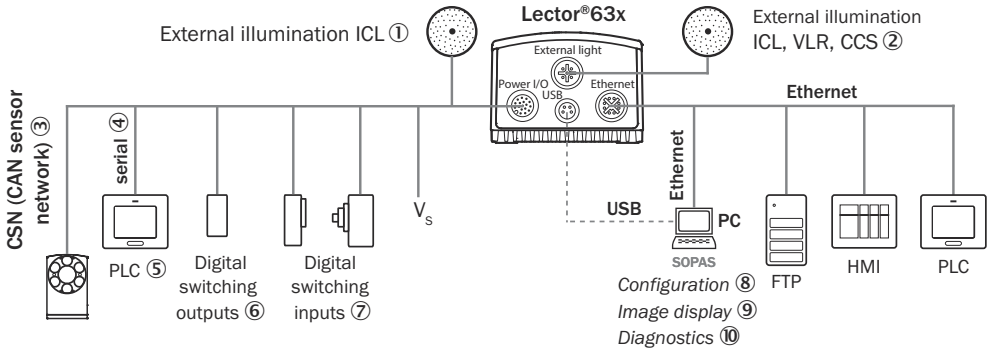
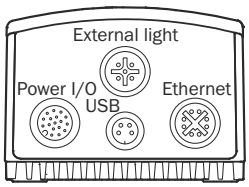
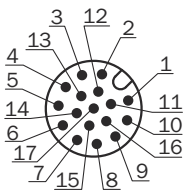
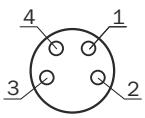
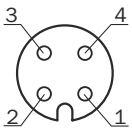
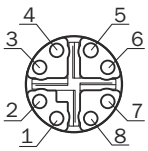


Figure 13: Facilities for connecting

① External ICL illumination
② External ICL, VRL, CCS illumination
③ CSN (CAN sensor network)
④ Serial
⑤ PLC (programmable logic controller)
⑥ Digital outputs, e.g. for signal lamps
⑦ Digital inputs e.g. for encoders, photoelectric sensors
⑧ Configuration
⑨ Image display
⑩ Diagnostics

6.4 Pin assignments of electrical connections

Layout overview	Power I/O (Power/SerialData/CAN/I/O)	USB	External illumination connection	Ethernet (Gigabit Ethernet)
				
	Male connector, M12, 17-pin, A-coded	Female connector, M8, 4-pin, coded	Female connector, M12, 4-pin, A-coded	Female connector, M12, 8-pin, X-coded
PIN	**Signal**	**Signal**	**Signal**	**Signal**
1	GND	DC +5 V	V_S [1] switchable output [2]	TRD0_P
2	V_S [1]	Data	Trigger output for external illumination unit U_V [1][2]	TRD0_N
3	CAN L	Data+	GND [2]	TRD1_P
4	CAN H	GND	–	TRD1_N
5	TD+ (RS-422), Host	–	–	TRD3_P
6	TD- (RS-422), Host TxD (RS-232), Host	–	–	TRD3_N
7	TxD (RS-232), Aux	–	–	TRD2_N
8	RxD (RS-232), Aux	–	–	TRD2_P
9	SensGND	–	–	–
10	Sensor 1, digital input	–	–	–
11	RD+ (RS-422), Host	–	–	–
12	RD- (RS-422), Host RxD (RS-232), Host	–	–	–

Layout overview	Power I/O (Power/SerialData/CAN/I/O)	USB	External illumination connection	Ethernet (Gigabit Ethernet)
13	Result 1, digital output	–	–	–
14	Result 2, digital output	–	–	–
15	Sensor 2, digital input	–	–	–
16	Result 3, digital output	–	–	–
17	Result 4, digital output	–	–	–

1) Supply voltage.
2) Pin assignment for external ICL ring lighting.
Pin assignment for VLR illumination unit:
- Pin 1: V_S triggered
- Pin 2: not assigned
- Pin 3: GND
- Pin 4: not assigned

The pins are assigned internally in the device by selecting the external ICL or VLR illumination using the SOPAS ET configuration software.

6.5 Connecting the device

6.5.1 Using the optional connection modules CDB and CDM

Table 9: 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

Voltage source in accordance with ES1 and PS2 (EN 62368-1) or SELV and LPS (EN 60950-1).

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

Table 10: Required supply voltage V_S

Supply voltage V_S	Power source: required power output [1]
DC 12 V ... 24 V ± 20%	Maximum 30 W

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

In the case of connection via the optional connection module CDB/CDM: additionally required output power 0.5 W when using the optional parameter cloning module CMC600 in the connection module.

Table 11: 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%)**
Max. supply current(2 A fuse)	$I_{RMS\ max}$ [1] [A]	1.5	1.5	1.5	1.5
Current consumption: device					
Current consumption, digital outputs unloaded, standby	$I_{B\ RMS}$ [A]	0.58	0.47	0.24	0.21
Current consumption, digital outputs unloaded, integrated illumination unit off	$I_{B\ RMS}$ [A]	0.86	0.68	0.35	0.30
Maximum current consumption, digital outputs unloaded, integrated illumination unit on	$I_{B\ peak}$ [2] [A]	1.09	0.90	0.45	0.36
Typical, all 4 digital outputs loaded (0.1 A per output)	$I_{B\ RMS\ 40ut}$ [A]	1.26	1.08	0.75	0.70
Power loss, integrated illumination unit on	P_{RMS} [W]	8.3	8.2	8.4	8.7
Maximum current consumption: external lighting via connection for external illumination unit on the device [3]					
Current consumption, digital outputs unloaded	$I_{B\ RMS\ max}$ [A]	0.64	0.65	0.65	0.65
All 4 digital outputs loaded (0.1 A per output)	$I_{B\ RMS\ max\ 4\ OUT}$ [A]	0.24	0.42	0.65	0.65

1) For supply cable rating and fuse at the start of the cable.
2) For power supply unit rating.
3) Illumination units with a higher current consumption are possible, however the peak currents may be significantly higher. Internal limiting of the output current to 0.65 A RMS by a cold conductor (PTC).

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 ± 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.

Connection with connection module

The supply voltage for the device is protected as follows in the connection modules in the circuit after switch S1:

Table 12: Protection of the supply voltage in the connection module

Connection modules	Supply voltage fuse protection	Reference
CDB650-204	2 A (slow-blow)	see "Connecting supply voltage for the device in CDB650-204", page 75
CDM420-0006	2 A (slow-blow)	see "Connecting supply voltage for the device in CDM420-0006", page 88

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 SOPAS ET configuration software.

NOTE

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

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 13: 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.

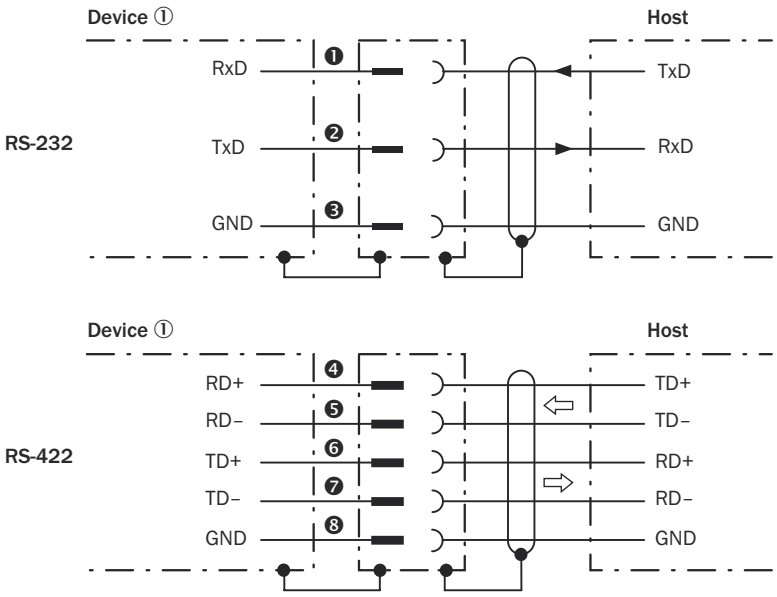


Figure 14: Wiring of the serial data interfaces RS-232 and RS-422

① Device

❶...❸ Pin assignment: see RS-232 pin assignment for the respective device

❹...❽ Pin assignment: see RS-422 pin assignment for the respective device

NOTE

Activate the serial data interface type in the device using a configuration tool, e.g. the SOPAS ET configuration software.

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 75
	RS-422	see "Wiring serial host interface RS-422 of the device in CDB650-204", page 76
CDM420-0006	RS-232	see "Connecting serial host interface RS-232 of the device in CDM420-0006", page 89
	RS-422	see "Connecting serial host interface RS-422 of the device in CDM420-0006", page 89

Termination of the RS-422 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

Activate the CAN data interface in the device with a configuration tool, e.g. the configuration software SOPAS ET.

Make further settings in the device corresponding to the function of the device in the system configuration.

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 77
CDM420-0006	CAN	see "Wiring the CAN interface in the CDM420-0006", page 90

6.5.5 Wiring the digital inputs

The two physical digital inputs “Sensor 1” and “Sensor 2” can be used, for example, for starting and/or ending the external read cycle or for feeding an incremental signal.

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)

Table 14: Characteristic data of the digital inputs “Sensor 1” and “Sensor 2”

Switching behavior	Power to the input starts the assigned function, e.g. start of the internal reading interval of the device. Default: active high Debouncing: 10 ms (standard)
Features	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	The electrical values are identical for all digital inputs of the device. Low: V_{in} [1] ≤ 2 V; I_{in} [2] ≤ 0.3 mA High: 6 V ≤ V_{in} ≤ 30 V; 0.7 mA ≤ I_{in} ≤ 5 mA

1) Input voltage.
2) Input current.

Function assignment

NOTE

Assign the functions for the digital inputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

Extension: additional logical digital inputs in the device for physical external digital inputs on the optional connection module

Thanks to the optional CMC600 parameter cloning module in combination with the CDB or CDM connection module, the two digital inputs “External input 1” and “External input 2” are additionally available at the relevant terminals of the connection module.

NOTE
The external digital inputs are software-controlled and therefore do not offer the same timing precision as physical digital inputs. The external digital inputs may not be suitable for time-critical applications.

For the electrical characteristic data of the two external digital inputs, see the respective connection diagrams for the connection modules in these operating instructions.

Wiring the digital inputs of the device via a connection module:

Connection modules	Digital inputs	Reference
CDB650-204	“SENS/IN 1” “SENS/IN 2”	see "Wiring digital inputs of the device in the CDB650-204", page 79
	External input 1 (“EXT. IN 1”) External input 2 (“EXT. IN 2”	see "Wiring the external digital inputs of the device in the CDB650-204", page 81
CDM420-0006	“Sensor 1” “Sensor 2“	see "Wiring digital inputs of the device in the CDM420-0006", page 92
	External input 1 (“Aux In 1”) External input 2 (“Aux In 2”)	see "Wiring the external digital inputs of the device in the CDM420-0006", page 94

6.5.6 Wiring the digital outputs

The physical digital outputs “Result 1” to “Result 4” or “Result 1” and “Result 2” are used to signal events in the read operation. Different functions can be assigned to them independently of each other for this purpose. If the assigned event occurs, then the corresponding digital output becomes live after the end of the read cycle for the selected pulse duration, for example (default).

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

The four digital outputs are available in the CDM420-0006 connection module but reduced to two outputs (“Result1“, “Result2“). Connect the device to the CDM420-0006 connection module using an adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin).

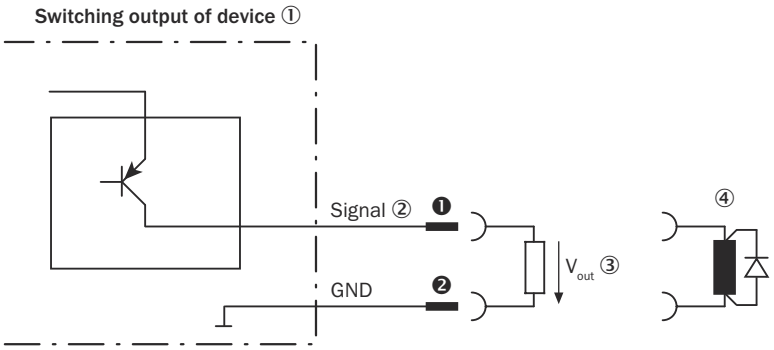


Figure 15: Wiring a digital output

① Digital output of the device (“Result 1” to “Result 4”)
② Output signal
③ Output voltage V_{out}
④ With inductive load: see note
❶... ❷ For pin assignment, see respective device

Table 15: Characteristic data of the digital outputs

Switching behavior	PNP switching to supply voltage V_S Default: No function Logic: not inverted (active high)
Properties	• Short-circuit protected • Not electrically isolated from V_S [1]
Electrical values	$0\ V \leq V_{out}$ [2] $\leq V_S$ $(V_S - 1.5\ V) \leq V_{out} \leq V_S$ at I_{out} [3] $\leq 100\ mA$

1) Supply voltage.
2) Output voltage.
3) Output current.

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
Assign the functions for the digital outputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

Extension: additional logical digital outputs in the device for physical external digital outputs on the optional connection module

Thanks to the optional CMC600 parameter cloning module in combination with the CDB or CDM connection module, the two digital outputs “External output 1” and “External output 2” are additionally available at the relevant terminals of the connection module.

NOTE
The external digital outputs are software-controlled and therefore do not offer the same timing precision as physical digital outputs. The external digital outputs may not be suitable for time-critical applications.

For the electrical characteristic data of the two external digital outputs, see the respective connection diagrams for the connection modules in these operating instructions.

Wiring the digital outputs of the device via a connection module:

Connection modules	Digital outputs	Reference
CDB650-204	"RES/OUT 1" "RES/OUT 2" "RES/OUT 3" "RES/OUT 4"	see "Wiring digital outputs of the device in the CDB650-204", page 83
	External output 1 (“EXT. OUT 1”) External output 2 (“EXT. OUT 2")	see "Wiring the external digital outputs of the device in the CDB650-204", page 84
CDM420-0006	"Result 1" “Result 2”	see "Wiring digital outputs of the device in the CDM420-0006", page 96
	External output 1 (“AUX Out 1”) External output 2 (“AUX Out 2”)	see "Wiring the external digital outputs of the device in the CDM420-0006", page 97

7 Commissioning

7.1 Configuring the device with SOPAS ET

Adaptation of the device parameters to the application as well as diagnostics in the event of malfunctions take place as default with the SOPAS ET configuration software. The device supports this process by displaying the images it has recorded in SOPAS ET (requirement SOPAS ET: at least Version 2.38).

NOTE
Image output takes place only via the Ethernet interface and the USB interface.

If the scan characteristics of the device have been adjusted using the function buttons rather than a computer, SOPAS ET is used to continue the configuration process (reading clock, result formats, output data interface, etc.).

Installing and starting the configuration software

1. Download and install the latest version of the SOPAS ET configuration software and the current device description files (*.sdd) from the online product page for the software by following the instructions provided there: www.sick.com/SOPAS_ET. In this case, select the **complete** option as suggested by the installation wizard. Administrator rights may be required on the computer to install the software.
2. Start program. Path: **Start** > **Programs** > **SICK** > **SOPAS EngineeringTool** > **SOPAS EngineeringTool**.
3. Establish a connection between the software and the device via Ethernet or USB.

✓ The connection wizard starts automatically.

4. The following IP addresses are configured by default on the device:
   - IP address P1: 192.168.0.1
   - Subnet mask: 255.255.255.0
5. Select the desired device from the available devices and add to the project by double-clicking.

✓ The device appears on the left side of the window.

6. To open the device window, double-click on the device on the left side of the window.
7. Select view of the user interface (available modes: **Standard**, **Extended**).

✓ SOPAS ET establishes communication with the device and loads the associated device description file for the device.

8. In the **Wizard** window, click on the **Code Reading** button.

✓ The **Initial Setup** window appears.

9. Position the code within the displayed region and following the instructions.

✓ The effects of any parameter changes are directly visible.

✓ The device will now continuously record images and automatically attempt to find the appropriate settings for the image and the decoder. If the read is successful, these settings can be saved directly.

Configuring the device manually

1. In the **Online Image** window, click the **Live** button.

✓ In **Live** mode, the device starts recording images consecutively and uses the current settings to decode them. The effects of any parameter changes are thus directly visible.

NOTE

The following functions are deactivated in **Live** mode:

- Digital inputs and outputs
- Data output via the host interface.

2. Align the device in the desired depth of field range with a medium-height object with a test code.
3. Click the **Camera & Illumination** configuration bar. Use the **Shutter timer** and **Brightness** sliders to adjust the image brightness so that the code is easy to see.
4. Only available in **Extended** mode: activate the sharpness diagnostic bar. To do this, go to the **Camera & Illumination** area and click the **Display sharpness** checkbox.

Variants with a compact C-mount lens: adjusting the brightness and sharpness

1. Remove the optics protective hood. To do this, turn the optics protective hood counter-clockwise as seen from the front, then detach and remove it, see "Assembling the basic device with compact C-mount lens", page 28.
2. Undo the locking screw on the focus ring of the lens.
3. Adjust the focus using the focus ring on the top side of the lens so that the online image shows a sharp, clear image of the test code with no distortion.

✓ The test code in the image comes into focus and the edges are clearly discernible.

✓ Available in **Extended** mode: The sharpness diagnostic bar is now at its maximum position.

4. If necessary, use the **Shutter time**, **Brightness** and **Contrast** sliders to optimize the brightness and contrast.
5. Use the lock nut fitting to fix the sharpness ring setting in place.
6. Attach the optics protective hood again and screw it tight.

Variant with C-mount lens and external ring illumination unit: adjusting the brightness and sharpness

1. If already fitted, remove the external ICL ring illumination unit. To do this, first remove the connecting cable at the ring illumination unit. Undo the ICL ring illumination unit at both mounting brackets and remove, see "Assembling the basic device with C-mount lens and external ICL ring illumination unit", page 29.
2. Remove the optics protective hood. To do this, turn the optics protective hood anti-clockwise as seen from the front then detach and remove it.
3. Mount and connect the external ICL ring illumination unit again.
4. Select and activate the fitted ICL ring illumination unit SOPAS ET:
   - Select the ICL illumination used. Path: SOPASET > **Camera & illumination** > **Illumination** > **External light connection**
   - Activate the **External illumination** digital output. Path: SOPAS ET > **Interfaces & digital outputs** > **Digital outputs** > **Output_Result 2**
5. Undo the locking screws on the aperture ring and focus ring of the lens.
6. Adjust the aperture using the aperture ring (top ring) on the lens to a low value (e.g., “2”).
7. Reduce the **Shutter time** and **Brightness** parameters in SOPAS ET until the test code is clearly visible in the image.
8. Adjust the focus using the focus ring (lower ring) on the top side of the lens so that the online image shows a sharp, clear image of the test code with no distortion.

✓ The test code in the image comes into focus and the edges are clearly discernible.

✓ Available in Extended mode: The sharpness diagnostic bar is now at its maximum position.

9. If necessary, use the **Shutter time**, **Brightness** and **Contrast** sliders to optimize the brightness and contrast.
10. Use the lock nut fitting to fix the sharpness ring setting in place.

11. Define a suitable aperture setting for the depth of field. In order to do this, check the settings with the test code. Adjust the aperture to a higher value (e.g., “8”). If a greater depth of field is required, select a value higher than “8”.

NOTE
The higher the aperture number the lower the image brightness. The image brightness can be increased in SOPAS ET using the **Brightness** slider. Increasing the image brightness will, however, reduce the image quality.

12. Use the lock nut fitting to fix the aperture ring setting in place.
13. Remove the external ICL ring illumination unit again and disconnect the connecting cable.
14. Attach the optics protective hood again and screw it tight.
15. Mount and connect the external ring illumination unit again.

Variants with an S-mount lens: adjusting the brightness and sharpness

1. Adjust the focus using the manual focus screw on the top side of the device so that the online image shows a sharp, clear image of the test code with no distortion. Use hexagon key a/f 2 for this purpose.

✓ The test code in the image comes into focus and the edges are clearly discernible.
✓ Available in Extended mode: The sharpness diagnostic bar is now at its maximum position.

2. If necessary, use the **Shutter time**, **Brightness** and **Contrast** sliders to optimize the brightness and contrast.
3. To avoid inadvertently changing the setting, lock the manual focus screw on the top side of the device.

Continuing configuration

1. Make settings for additional functions during planned operation such as codes, trigger, data processing, data interface, etc.
2. In the **Online Images** window, click the **Operation** button and test the settings in operational use.

Completing the configuration

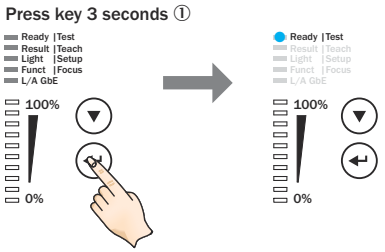
1. To permanently save the parameter set in the device: Click the  button.
2. To permanently save the parameter set on the PC: Click the  button.

7.2 Configuring the device via buttons without configuration software (SOPAS ET)

The two function buttons, the second display level of the status LEDs and the bar graph display are used to manually adjust the reading characteristics of the device with **Setup**.

NOTICE
Setup is not supported for a Pharmacode.

1. Start **Setup** mode.

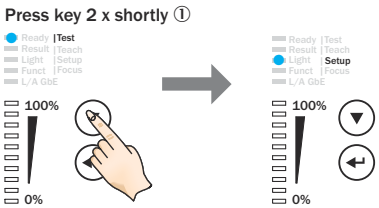


① Press the ↵ function button for 3 seconds.

2. Align the device with the code.

Figure 16: Test code

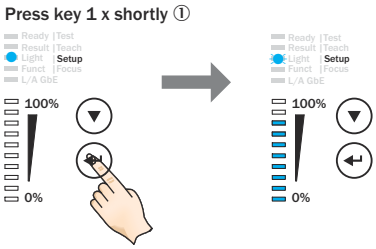
3. Select **Setup**.



① Press button ▼ twice briefly.

✓ The **Setup** LED lights up blue.

4. Start **Setup**.

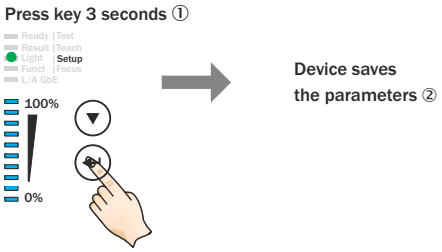


① Press the ↵ function button once briefly.

✓ The **Setup** LED flashes blue.
The device adjusts itself automatically to suit the lighting conditions, working distance, and quality of the code presented. According to the default setting, the device permanently stores the values determined for the two parameter modules (image, decoder) during this process, thereby overwriting the existing configuration.

NOTE
If the **Setup** LED lights up yellow or red, the read result is inadequate. If this is the case, check the alignment and distance of the device in relation to the code and repeat the procedure.

5. Wait until **Setup** has finished. The bar graph display shows the percentage progress of the **Setup** function. 100% means **Setup** has finished.
✓ The **Setup** LED indicates the result see "Display and control elements", page 18.
6. Exit **Setup** mode and save the parameters.



① Press the ↵ function button for 3 seconds

② Device permanently saves the parameters

✓ The existing configuration in the device is overwritten.

Alternatively, the device saves the parameters automatically if 5 minutes elapse without a pushbutton being pressed, and it returns to read mode.

7.3 Initial commissioning

The device is configured for the particular application situation on site using the SOPAS ET configuration software on a computer. The default factory settings of the device are the starting point for this. The default parameter values (configuration data) in the working memory of the device can be modified for optimization purposes. To do so, the user creates an application-specific parameter set using the SOPAS ET configuration software, or edits the parameter set later as required. The user then loads the current parameter set into the permanent parameter memory of the device.

Memory organization for parameter set

The following diagram shows the memory organization scheme for the internal and external components involved:

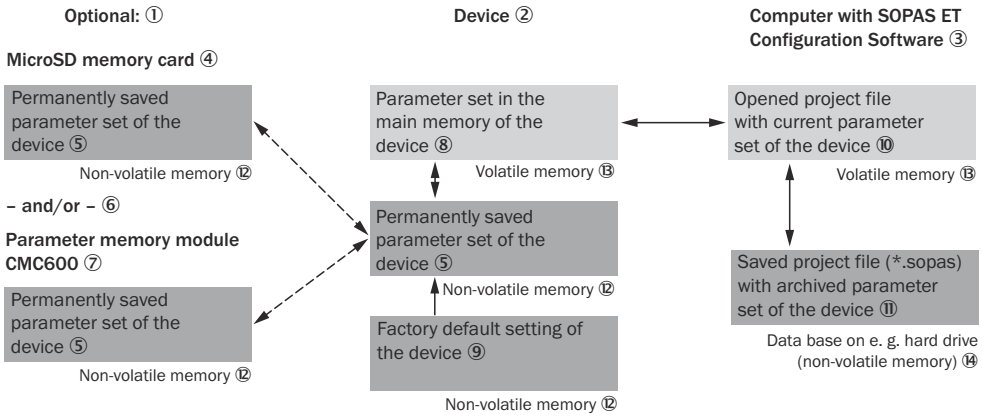


Figure 17: Configuration with SOPAS ET and saving the parameter set

① Optional
② Device
③ Computer with the SOPAS ET configuration software
④ MicroSD memory card
⑤ Permanently saved device parameter set
⑥ and/or
⑦ CMC600 parameter cloning module
⑧ Parameter set in the working memory of the device
⑨ Factory-set defaults for the device
⑩ Opened project file with current device parameter set

⑪ Saved project file with archived device parameter set
⑫ Nonvolatile memory
⑬ Volatile memory
⑭ Database on the hard drive, for example (nonvolatile memory)

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

External data backup: option 1

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

External data backup: option 2

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

Possible external storage media:
a) By inserting a microSD memory card with sufficient storage capacity into the device.
b) By connecting a CDB or CDM connection module to the device. The connection module is equipped with a CMC600 parameter cloning module.
c) By connecting the device to a CDF600 fieldbus module and operating it in proxy mode.
d) If necessary, by using a combination of a) plus b) or c)

NOTE
To ensure that the MicroSD memory card functions reliably, only use types approved by SICK.

You can find these as accessories online at:
- www.sick.com/Lector63x

Functionality

The user saves the current parameter set to the permanent parameter memory of the device using the **Permanent** option. In addition, the user manually saves the parameter set as a project file (sopas file with configuration data) on the computer.

The device then **automatically** also saves the parameter set to an external, permanent parameter memory.

Depending on the selected backup plan, the parameter set is saved either to a MicroSD memory card, in the CMC600, in the CDF600 or, when using one of the supported combinations, in both storage media (see above).

At each restart after being switched on, the device automatically loads the compatible parameter set from the external storage medium into its working memory and into its internal, permanent parameter memory. This enables a device, e.g. in the event of a device failure, to be quickly exchanged with a replacement device of the same type. The device replacement is achieved without any loss of configuration data, and without having to connect the computer to the SOPAS ET configuration software.

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 16: Maintenance plan

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

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 and tools.
- 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 viewing window. This effect can be avoided 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 type of material used for the inspection window can be found on the type label (see "Type code", page 14).

NOTICE
Damage to the inspection window.

Reduced read 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
Optical radiation: LED risk group 1, visible radiation, 400 nm to 780 nm

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

- Do not look into the light source intentionally.
- 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.

CAUTION
Warning! Optical radiation: LED risk group 2, visible radiation, 400 nm to 780 nm

Potentially dangerous optical radiation. Can be damaging to the eyes.

- Do not look into the light source for extended periods of time.
- Never point the light source at people.
- Avoid any reflections on people from reflective surfaces. Be particularly careful during mounting and alignment work.
- 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.

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.

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 – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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 dazzle, flash blindness, afterimages, photosensitive epilepsy, or impairment of color vision, for example.

- ▶ 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.
- ▶ Glass window: remove dust from the viewing window using a soft, clean brush. If necessary, also clean the viewing window with a clean, damp, lint-free cloth, and a mild anti-static lens cleaning fluid.
- ▶ Plastic window: 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 General faults, warnings, and errors

Possible faults and corrective actions are described in the table below for troubleshooting. For faults that cannot be resolved using the information below, please contact SICK Service. To find your agency, see the final page of this document.

Table 17: Other possible error sources

Situation	Error/fault
Mounting	■ Device poorly aligned to objects with codes (e.g. glare) ■ Trigger sensor for reading cycle incorrectly positioned (e.g. internal reading interval is opened too late or closed too early) ■ Incremental encoder (optional) incorrectly positioned
Electrical installation	■ Interfaces of the device incorrectly wired
Configuration	■ Functions not adapted to local conditions, e.g. parameters for the data interface not set correctly ■ Device limits not observed, e.g. reading distance, aperture angle ■ Trigger source for reading pulse not selected correctly
Operation	■ Start/stop operation: external read cycle missing, more than one object is in the reading field. ■ Device faults (hardware, software)

9.2 Detailed fault analysis

9.2.1 LEDs on the device

The conditions that can be read from the LED on the device housing (see "Display and control elements", page 18) include:

- Operational readiness (Ready)
- Status of the analysis result (pass or fail)
- Hardware fault
- Firmware download status
- Connection status of the device

The LED display can indicate any errors or faults with this. Further information for this can be found in the system information.

9.2.2 System information

The device outputs faults in different ways. Fault output is staggered and therefore allows for an increasingly detailed level of analysis:

- Communication errors can occur when transmitting data to the device. The device then returns a fault code.
- For faults that occur during reading, the device writes fault codes in the status log (see "Status log", page 62).

9.3 Status log

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

The device distinguishes between four types of faults:

- Information
- Warning
- error
- Critical fault

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

9.3.1 Displaying the status log

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

1. Connect the SOPAS ET configuration software to the device.
2. Opening the device in the project tree: **SERVICE** > **SYSTEM STATUS** > **SYSTEM INFORMATION** tab.

9.4 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 and serial number to ensure faster telephone processing.

9.5 Repairs

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

9.6 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

9.7 Replacing the device

Replacing a device with transfer of the current configuration data

The current configuration data of the device to be replaced can be transferred to a replacement device in several ways. The configuration data of the device is combined as a parameter set. The replacement device saves the parameter set to the permanent parameter memory.

Prerequisites:

- The replacement device is a device of the same type.
- The current configuration data of the device to be replaced is accessible in a storage medium outside the device.

The available options depend on the backup concept chosen by the user at the time of installation and configuration of the device to be replaced.

The first three methods are performed automatically by the device. The fourth method is operated manually by the user.

Available options for transferring the configuration data:

1 **Transfer of the current configuration data using the optional microSD memory card removed from the device to be replaced.**
Prerequisite:
If there is sufficient memory capacity on the microSD memory card, the configuration data from the last save operation in the device with the **Permanent** option was automatically saved on the memory card.
It is not necessary to connect a computer with the SOPAS ET configuration software for transfer to the replacement device.

2 **Transfer of the current configuration data using the optional CMC600 parameter cloning module in the optional CDB or CDM connection module.**
Prerequisite:
The device to be replaced was continuously operated connected to the connection module. If the optional microSD memory card and CMC600 parameter cloning module are present, the configuration data in the parameter cloning module has higher priority.
It is not necessary to connect a computer with the SOPAS ET configuration software for transfer to the replacement device.

3 **Transfer of the current configuration data using the parameter memory in the optional CDF600 bus connection module.**
Prerequisite:
The device to be replaced was continuously operated in proxy mode connected to the bus connection module. If the optional microSD memory card and bus connection module are present, the configuration data in the bus connection module has higher priority.
It is not necessary to connect a computer with the SOPAS ET configuration software for transfer to the replacement device.

4 **Transfer of the current configuration data by means of a download from the computer.**
Prerequisite:
The configuration data of the device was saved on the computer. This took place on completion of configuration of the device that is now to be replaced with the SOPAS ET configuration software after confirmation by the user.

NOTE
For further information see "Initial commissioning", page 57.

Removing the device to be replaced:

CAUTION
Risk of injury due to hot device surface.

The surface of the device can become hot during operation.

- Before commencing disassembly, switch off the device and allow it to cool down as necessary.

NOTICE
Risk of damage to the memory card!

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

1. Switch off the supply voltage to the device that is to be replaced.
2. Mark the position and alignment of the device on the bracket or surroundings.
3. Disconnect and remove all connecting cables of the device.
4. Detach the device and remove from the bracket.
5. Backed-up configuration data: if an optional memory card was installed in the device, remove the microSD memory card with the backed-up parameter set. The memory card is located behind the cover on the top side of the device.

Putting the replacement device into operation:

1. Backed-up configuration data: install the optional microSD memory card from the device that is to be replaced in the replacement device of the same type.
2. Mount and align the replacement device (see "Mounting", page 26). When doing so, note the previously applied markings on the bracket or surroundings.
3. Reconnect the connecting cables of the replacement device (see "Electrical installation", page 39).
4. Switch on the supply voltage for the replacement device.

✓ The replacement device starts with the default setting and searches for external storage medium with a valid parameter set. Depending on the success of the search, the replacement device proceeds as follows:

- If the replacement device detects a memory card or the CM600 parameter cloning module, the replacement device transfers the valid parameter set from this storage medium to its permanent memory and operates in accordance with its configuration data.
- If the replacement device does not detect any external storage media, the replacement device will start with its last permanently stored parameter set. In the case of devices that have not been used before, this corresponds to the factory default setting.

5. Establish a connection with the replacement device using the SOPAS ET configuration software.
6. Download the configuration data of the device to be replaced, which have been stored on the computer as part of a data backup plan, to the replacement device and permanently store them there.

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 national 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/Lector63x

Please note: This documentation may contain further technical data.

11.1 Features

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Focus	Compact C-mount lens: • Fixed aperture • Manual sharpness adjustment (focus) on the lens C-mount lens: • Manual sharpness and aperture setting on the lens S-mount lens: • Fixed aperture • Short working distances can be achieved using spacer rings • Manual sharpness adjustment via focus screw on the top side of the device
Sensor	For identifier, see see "Type code", page 14
Sensor resolution	For identifier, see see "Type code", page 14
Integratable illumination unit	Optional, e.g. with variants of the integrable VI55I ring illumination unit 6 LEDs, type-dependent combination of light colors: • Visible white light (T = 6,000 K ± 500 K) • Visible blue light (λ = 455 nm ± 20 nm) • Visible red light (λ = 620 nm ± 30 nm)
Feedback LED (spot in field of view)	Optional, e.g. with variants of the integrable VI55I ring illumination unit 1 LED, switchable using the configuration software: • Visible green light (λ = 525 nm ± 15 nm), RG 1 • Visible red light (λ = 630 nm ± 20 nm), RG 1
LED risk group (VI55I ring illumination unit)	**Variants of the integratable VI55I ring illumination unit (risk group RG 1)** • Type “visible white light + feedback LED” (part number: 2078428, 2078430, 2078431) • Type “visible red light + feedback LED” (part number: 2098649, 2098650, 2084247) • Type “visible blue light - medium + feedback LED” (part number: 2083814) • Type “visible blue light - wide + feedback LED” (part number: 2083813) Risk group RG 1 (low risk) according to IEC 62471-1: 2006-07/ EN 62471-1: 2008-09. Radiance: • L_B: < 10 x 10^3 W/(m^2sr) within 100 s; at a distance of ≥ 200 mm • L_R: < 7 x 10^5 W/(m^2sr) within 10 s; at a distance of ≥ 200 mm
	Variants of the integratable VI55I ring illumination unit (risk group RG 2) • Type “visible blue light - narrow + feedback LED” (part number: 2083812) Risk group 2 (moderate risk) according to IEC 62471-1: 2006-07/EN 62471-1: 2008-09 due to exposure to blue light. Radiance: • L_B [1]: < 10 x 10^3 W/(m^2sr) within 50 s (RG 2); at a distance of ≥ 200 mm • L_R [2]: < 7 x 10^5 W/(m^2sr) within 10 s (RG 1); at a distance of ≥ 200 mm Risk RG 1 (low risk) corresponding to L_B < 10 x 10^3 W/(m^2sr) within 100 s for distances > 1 m.

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Laser alignment aid	2 LEDs, can be deactivated: Visible red light (λ = 630 nm ... 680 nm)
Laser class	**Laser alignment aid:** Class 1 in accordance with EN/IEC 60825-1:2014 (identical to EN/IEC 60825-1:2007). Corresponds to 21 CFR 1040.10 except for tolerances according to Laser Notice 50 from June 24, 2007 and subsequent versions. P < 0.39 mW
Scanning frequency	1.3 Mpx: ≤ 50 Hz 1.9 Mpx: ≤ 50 Hz
Code resolution	≥ 0.1 mm, depending on lens
Working range	Depending on type, see "Field of view diagrams", page 33
Lens	For identifier, see see "Type code", page 14 • Can be replaced, see “LECTOR series image-based code reader” product information (part number: 8016252, www.sick.com/8016252) • Complete device: lens mounted by SICK • Basic device: lens mounted by the user

1) L_B= Hazard from blue light.
2) L_R= Hazard to the retina of the eye due to heating.

11.2 Mechanics and electronics

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Electrical connection	1 male connector, M12, 17-pin, A-coded (serial, CAN, I/O, voltage supply) 1 female connector, M12, 8-pin, X-coded (Ethernet, 1 GBit/s) 1 female connector, M8, 4-pin, coded (USB) 1 female connector, M12, 4-pin, A-coded (control of external illumination unit)
Supply voltage V_S	Voltage source in accordance with ES1 and PS2 (EN 62368-1) or SELV and LPS (EN 60950-1). DC 12 V ... 24 V ± 20%
Power consumption	Operation: 10 W ± 20% typical
Current consumption	Max. 1.5 A for a typical load of 100 mA on each of the 4 digital outputs
Housing material	Die cast aluminum, plastic
Housing color	Light blue (RAL 5012), black
Viewing window material	Glass or plastic (PMMA), 2 mm thick, with scratch-proof coating: see "Type code", page 14
Hinged cover (top side of device)	Material: Plastic Function: For temporary access to the memory card slot and the manual focus screw (S-mount) Hinged [2], screws (SW2 hexagon key), captive
Enclosure rating	For identifier, see see "Type code", page 14 (EN 60529, EN 60529/A2)
Protection class	III
Electrical safety	EN 62368-1
Weight	430 g, without lens and connecting cables
Dimensions (L x W x H)	08 mm x 63.1 mm x 45.8 mm [3]

1) For digital outputs without load.
2) When the cover is open, the device no longer conforms with the specified enclosure rating.
3) see "Device view", page 17.

11.3 Performance

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Readable code structures	1D, Stacked, 2D, DPM, OCR/OCV
1D code types (bar code)	GS1-128 / EAN 128, UPC/GTIN/EAN, 2/5 Interleaved, Pharmacode, GS1 DataBar, Code 39, Code 128, Codabar, Code 32, Code 93
Postal codes	Postnet, Planet, USPS 4SCB, Australia Post, Dutch KIX Post, Royal Mail, Swedish Post
2D code types	Data Matrix ECC200, GS1 Data Matrix, MaxiCode, QR-Code
Stacked code types	PDF417
Code qualification	Based on ISO/IEC 16022, ISO/IEC 15415, ISO/IEC 18004
OCR/OCV fonts	Trainable fonts

11.4 Interfaces

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Serial RS-232/422	Function: host 1 (data output of the read result) Data transmission rate: 300 Bd ... 115.2 kBd
Serial RS-232	Function: AUX 1 (Service) [1] Data transmission rate: 57.6 kBd
USB 2.0	Function: AUX 3 (Service) [1]
CAN	Protocol: SICK CAN Sensor Network CSN (Master/Slave, Multiplexer/Server) Function: host (data output of the read result) Data transmission rate: 50 kBit/s ... 500 kBit/s Bus length: maximum 30 m (depending on the data transmission rate)
Ethernet	Protocols: • TCP/IP • EtherNet/IP™ Functions • host 2 (data output of the read result) • AUX 2 (Service) [1] • FTP (image transfer) Data transmission rate: 10/100/1,000 MBit/s MAC address (device-specific), see type label
PROFIBUS	Function: host (RS-232, data output of the read result) Type of fieldbus integration: optionally over external CDF600-21xx fieldbus module [3] to bus (RS-485) Function blocks for various PLC manufacturers are available online at: www.sick.com/Lector63x
PROFINET (line topology)	Function: host (RS-232, data output of read result), PROFINET Single Port, PROFINET Dual Port Type of fieldbus integration: PROFINET Single Port, PROFINET Dual Port optionally via external CDF600-22xx fieldbus module [3] to bus (Ethernet) Function blocks for various PLC manufacturers are available online at: www.sick.com/Lector63x
Digital inputs	Type: 2 physical, switching (“Sensor 1”, “Sensor 2”) Optional 2 additional external logical inputs (software-controlled) via the CMC600 [3] parameter cloning module in the CDB650-204 [3] or CDM420-0006 [3] connection module V_{in} [4]= max. 32 V, I_{in} [5]= max. 5 mA Opto-decoupled, reverse polarity protected, adjustable debounce time
Configurable inputs	Encode input, external trigger

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Digital outputs	Type: 4 physical, switching (“Result1”, “Result2”, “Result3”, “Result4”) When using the CDB420: 2 physical, switching (“Result1”, “Result2”) Optional 2 additional external logical outputs (software-controlled) via optional CMC600 module in the CDB650-204 or CDM420-0006 connection module V_{out} = V_S[8] – 1.5 V, I_{out}[9] ≤ 100 mA Short-circuit protected, not electrically isolated from the supply voltage
Configurable outputs	Read confirmation, external illumination control, freely configurable output condition, “Device Ready”
Reading pulse	Digital inputs, free, serial interface, Ethernet, CAN, auto pulse, presentation mode
Optical indicators	5 status LEDs on the top side of the housing 5 bar graph LEDs on the top side of the housing 1 feedback LED for the integratable VI55I ring illumination unit (green or red, switchable display behavior), as a light spot on the code
Acoustic indicator	1 beeper (buzzer), can be deactivated Function for event notification with adjustable volume
Operating elements	2 buttons (select, start, stop functions)
Operator interfaces	Web server
Configuration tools (parameterization)	SOPAS ET configuration software, web server, CoLa commands (telegrams), fieldbus controller (PLC) with additional support by SICK function blocks, function buttons
MicroSD memory card	Micro SD memory card (flash card) max. 32 GB, optional
Data storage and retrieval	image and data storage via microSD memory card and external FTP
Maximum encoder frequency	1 kHz
External illumination control	Via digital output (max. 24 V trigger) or external illumination connection

1) For example: Configuration, diagnosis, transponder access or display of the read result.
2) Data interface only for temporary use (service).
3) Optional accessories.
4) Input voltage.
5) Input current.
6) For example using the SOPAS ET configuration software.
7) Output voltage.
8) Supply voltage.
9) Output current.

11.5 Ambient data

Type	Lector63x Flex (V2D63xx-Mxxxxx)
Electromagnetic compatibility (EMC)	Electromagnetic immunity: EN 61000-6-2: 2005-08-01 Radiated emission: EN 61000-6-3: 2007-01-01 + EN 61000-6-3 / A1: 2011-03-01
Vibration resistance	According to EN 60068-2-6: 2008-02
Shock resistance	In accordance with EN 60068-2-27: 2009-05
Ambient operating temperature	0 °C ... +50 °C [1]
Storage temperature	–20 °C ... +70 °C
Permissible relative humidity	0% ... 90%, non-condensing
Ambient light immunity	2,000 lx on code

1) Observe the notes regarding adequate dissipation of heat loss: see "Installation requirements", page 26.

12 Accessories

NOTE

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

- www.sick.com/Lector63x

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/Lector63x

13.2 Dimensional drawings (electronic)

Current dimensional drawings in various electronic formats can be downloaded online:

- www.sick.com/Lector63x

13.3 Connection diagrams of connection module CDB650-204

13.3.1 Connection of the device to CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

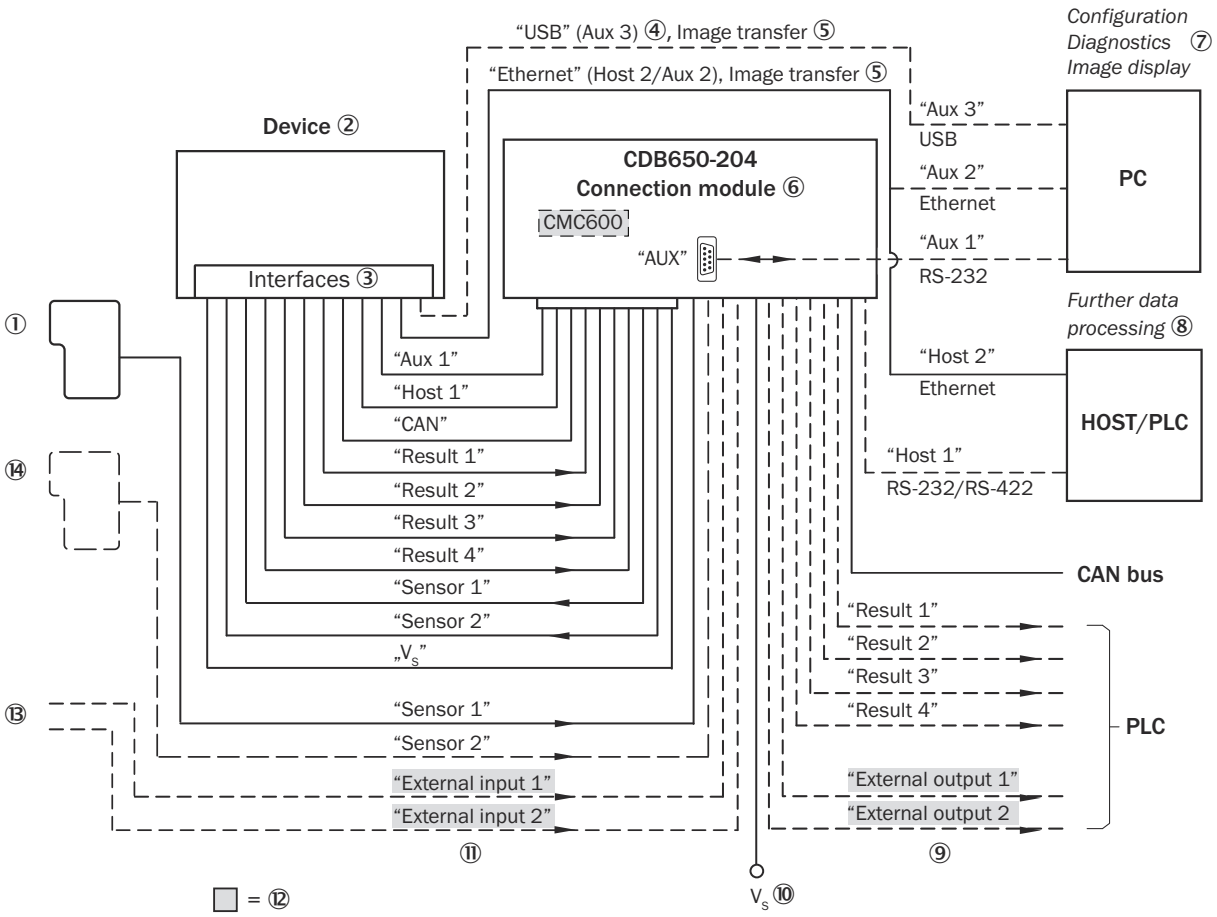


Figure 18: Connection of the device to peripherals via CDB650-204 (overview)

① External trigger sensor, e.g. for read cycle generation
② Device
③ Interfaces
④ USB interface only for temporary use (service)
⑤ Image transmission

⑥ Connection modules
⑦ Configuration, diagnostics or image display
⑧ Data further processing
⑨ External digital outputs
⑩ Supply voltage V_S
⑪ External digital inputs
⑫ The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑬ Other functions
⑭ Application-dependent alternative stop trigger (e.g. photoelectric sensor) or travel increment (incremental encoder)

13.3.2 Wiring overview of the CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S), 1 digital input used

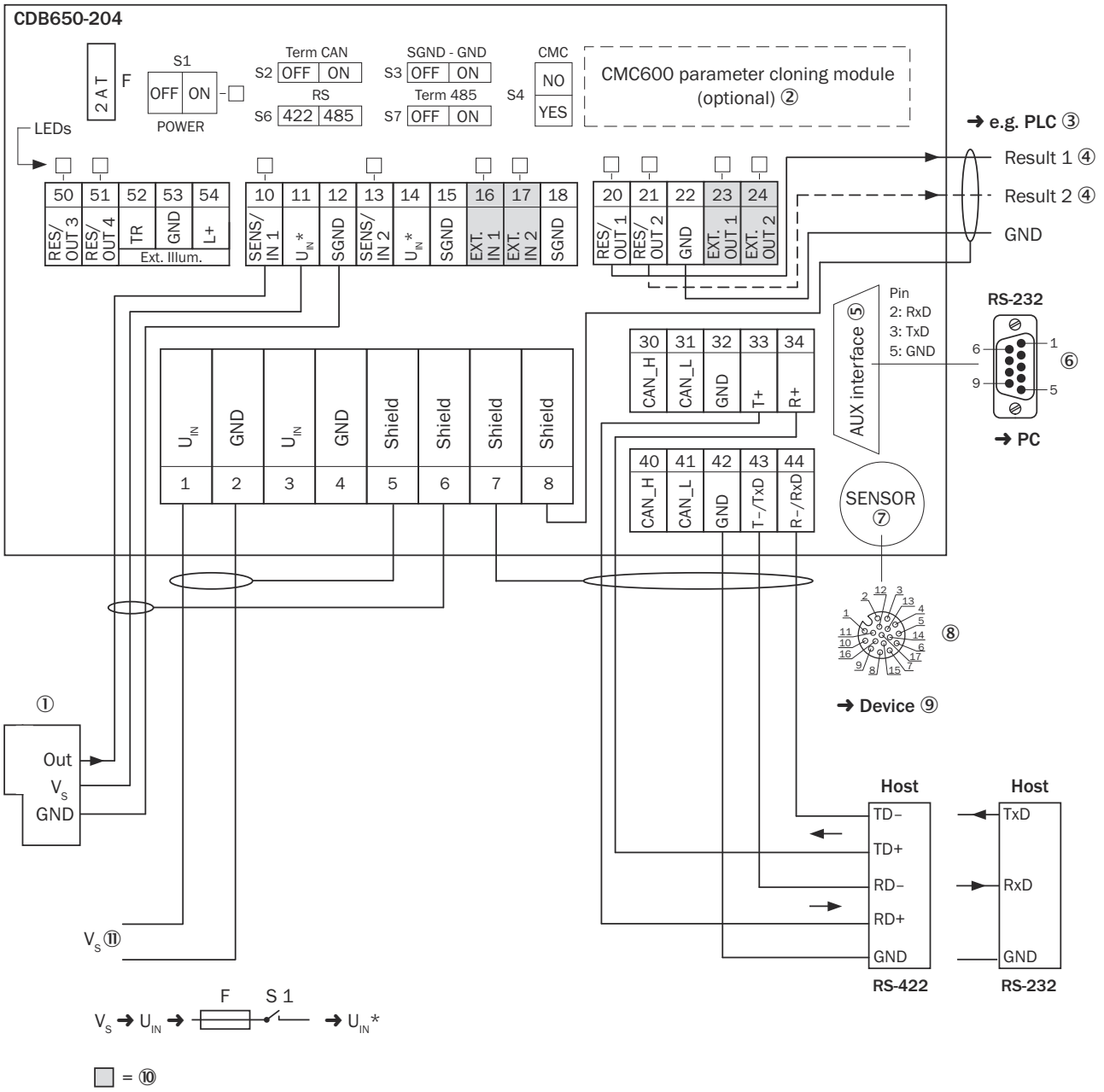


Figure 19: Connection of device and peripherals to the CDB650-204 connection module (overview)

① External trigger sensor, e.g. for read cycle generation
② CMC600 parameter cloning module (optional)
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 The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑪ Supply voltage V_S

13.3.3 Connecting supply voltage for the device in CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

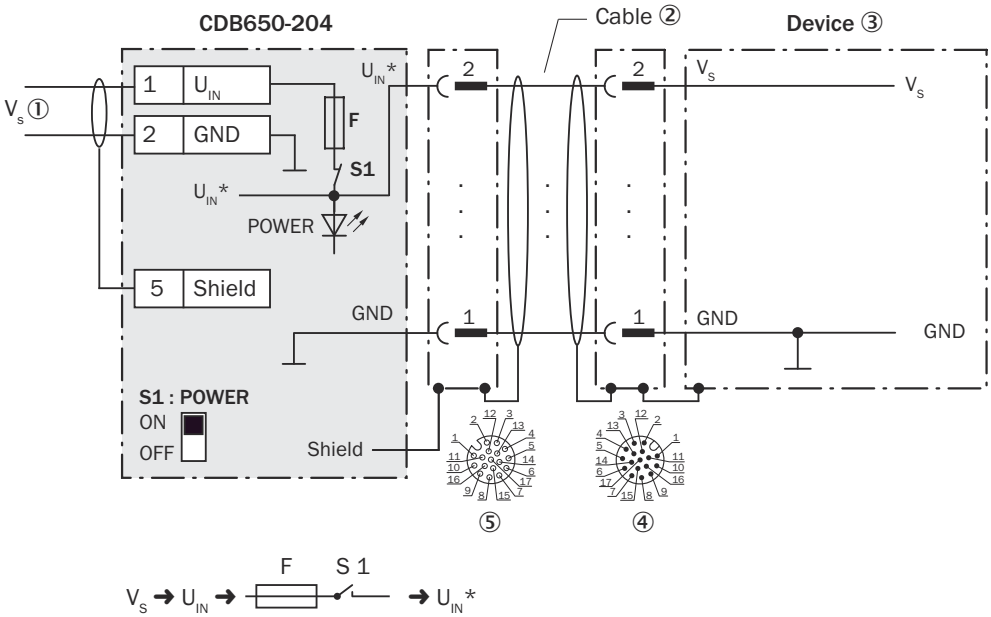


Figure 20: Connecting supply voltage for the device in CDB650-204 connection module

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 18: 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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

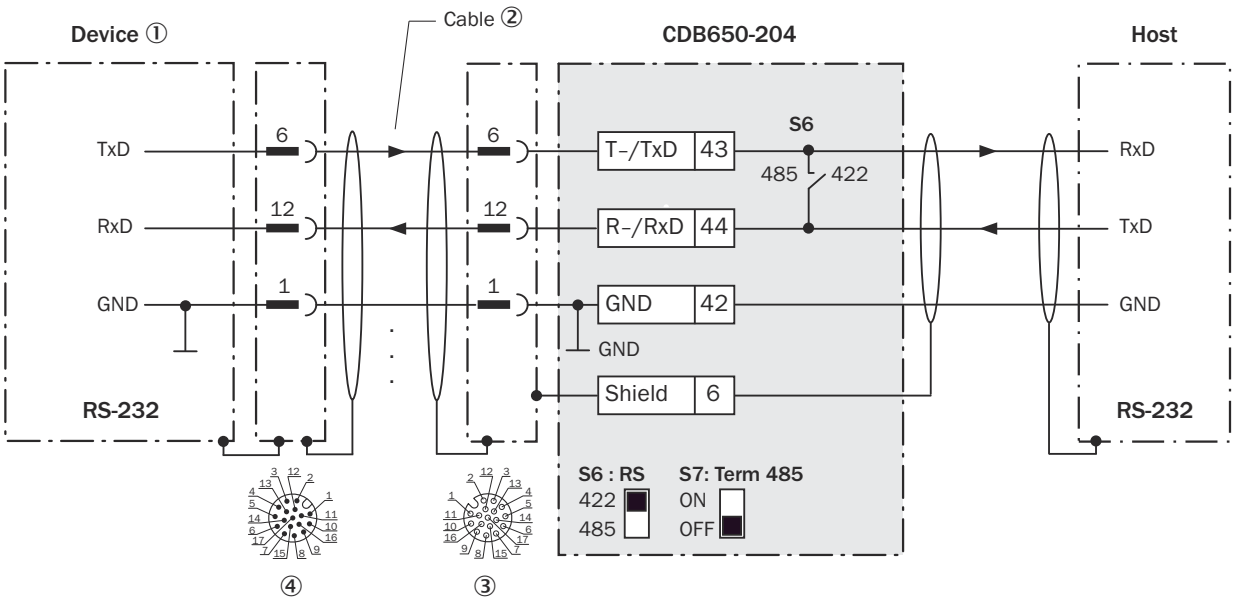


Figure 21: Wiring data interface RS-232 of the device in the connection module CDB650-204

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
Activate the RS-232 data interface in the device with a configuration tool, e.g. the configuration software SOPAS ET.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

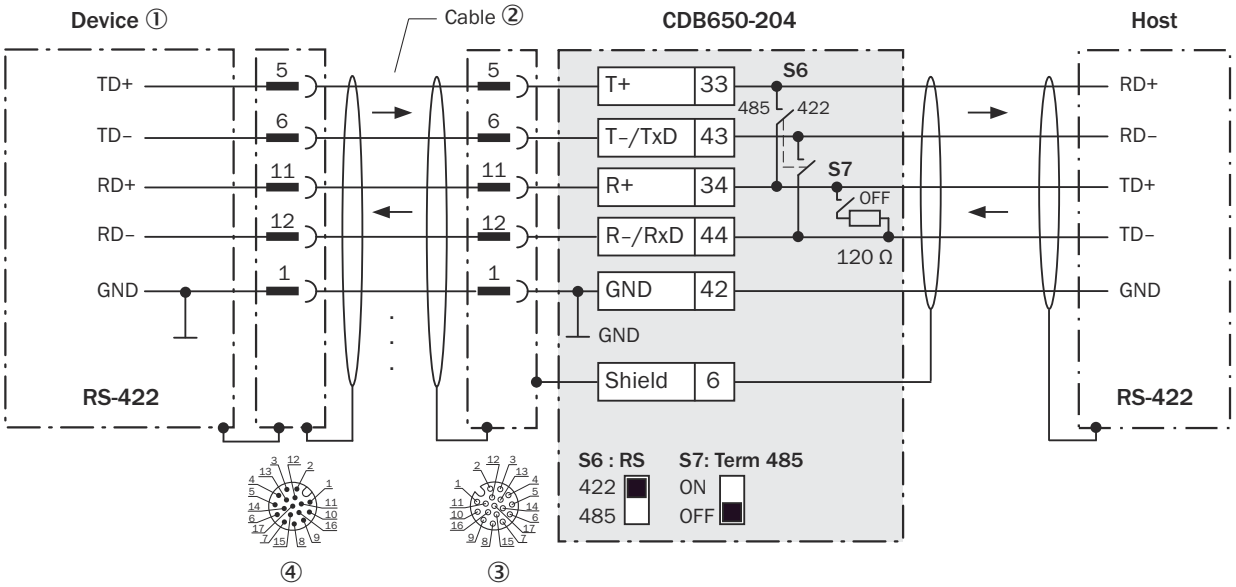


Figure 22: Wiring data interface RS-422 of the device in the connection module CDB650-204

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

Function of switch S7

Table 19: Switch S7: Term 485

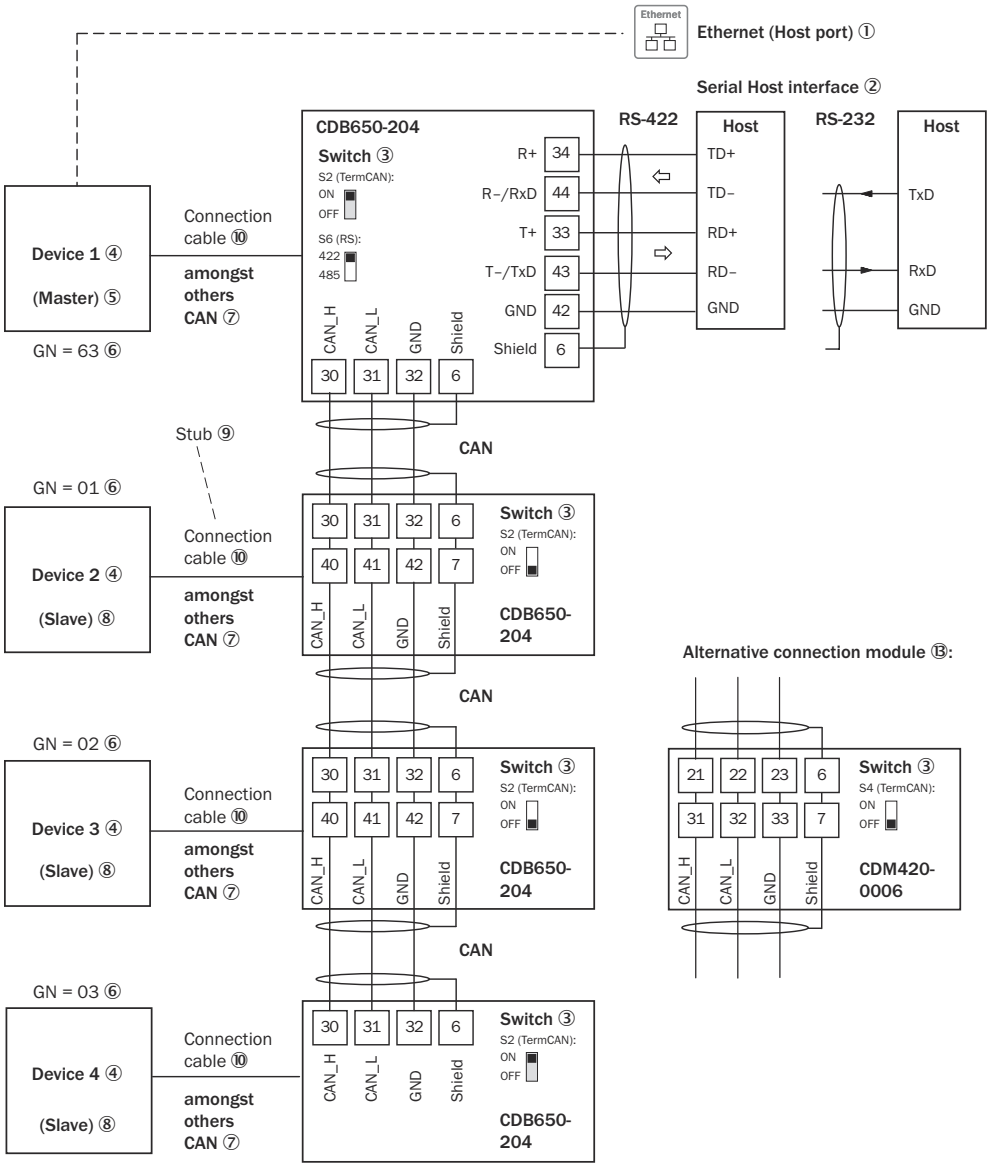
Switch setting	Function
ON	Terminates the RS-422 receiver in the device to improve the noise ratio on the line.
OFF	No termination

NOTE
User of the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard in accordance with RS-422.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”).
- Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. the configuration software SOPAS ET.

13.3.6 Wiring the CAN interface in the CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)



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

Figure 23: 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, for example, are disregarded here!

① Lector63x = V2D63xx-xxxxYx (Y = A, B or S): 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 Lector63x = V2D63xx-xxxxYx (Y = A, B or S): 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

Alternative connection module for Lector63x = V2D63xx-xxxxYx (Y = A, B or S): 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 Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

NOTE

Activate the CAN data interface in the device with a configuration tool, e.g. the configuration software SOPAS ET.

Make further settings in the device corresponding to the function of the device in the system configuration.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

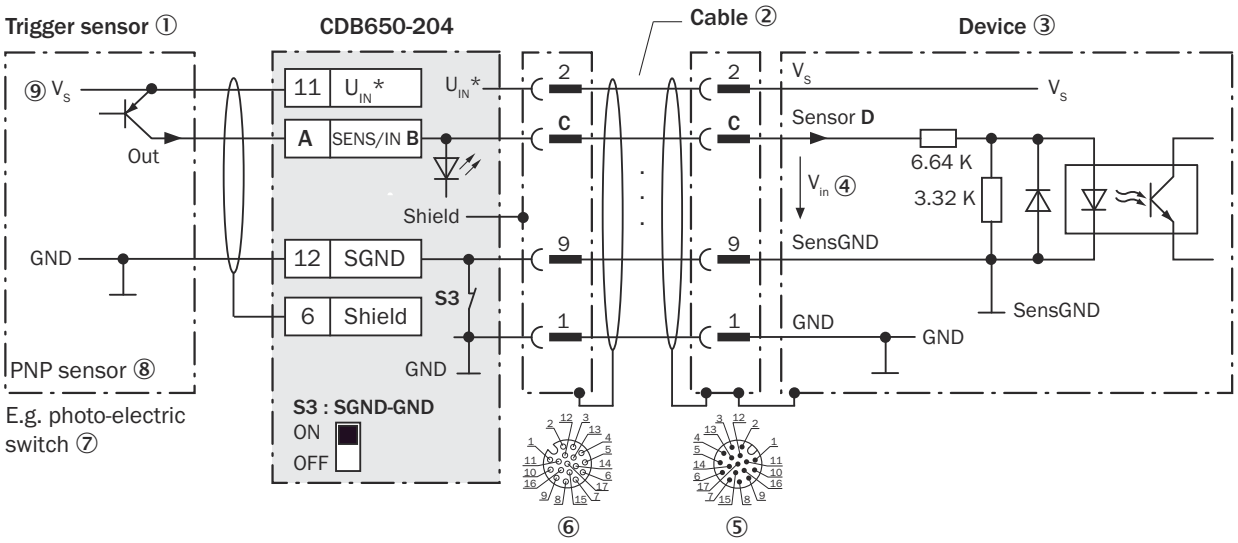


Figure 24: Trigger sensor supplied with power by connection module CDB650-204

① Trigger sensor, e.g. for read cycle generation
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

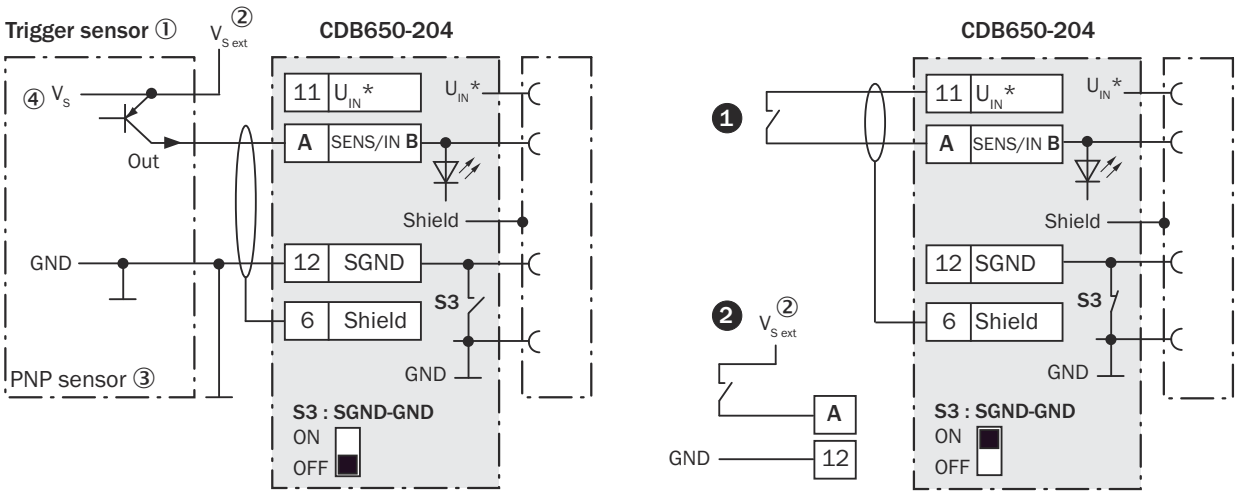


Figure 25: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDB650-204 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

① Trigger sensor, e.g. for read cycle generation
② External supply voltage $V_{S\ ext}$
③ PNP sensor
④ Supply voltage V_S

Table 20: Assignment of placeholders to the digital inputs

CDB650-204			Device
Terminal A	**Signal B**	**Pin C**	**Sensor D**
10	SENS/IN 1	10	1
13	SENS/IN 2	15	2

Function of switch S3

Table 21: Switch S3: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor connected with GND of CDB650-204 and GND of the device
OFF	Trigger sensor connected potential-free at CDB650-204 and device. Common, isolated reference potential of all digital inputs is SGND.

Characteristic data of the digital inputs

Table 22: 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 read cycle. Default setting in the device: logic not inverted (active high), debounce time 10 ms
Properties	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	Low: V_{in} [1] ≤ 2 V; I_{in} [2] ≤ 0.3 mA High: 6 V ≤ V_{in} ≤ 30 V; 0.7 mA ≤ I_{in} ≤ 5 mA

1) Input voltage.
2) Input current.

NOTE
Assign the functions for the digital inputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

13.3.8 Wiring the external digital inputs of the device in the CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

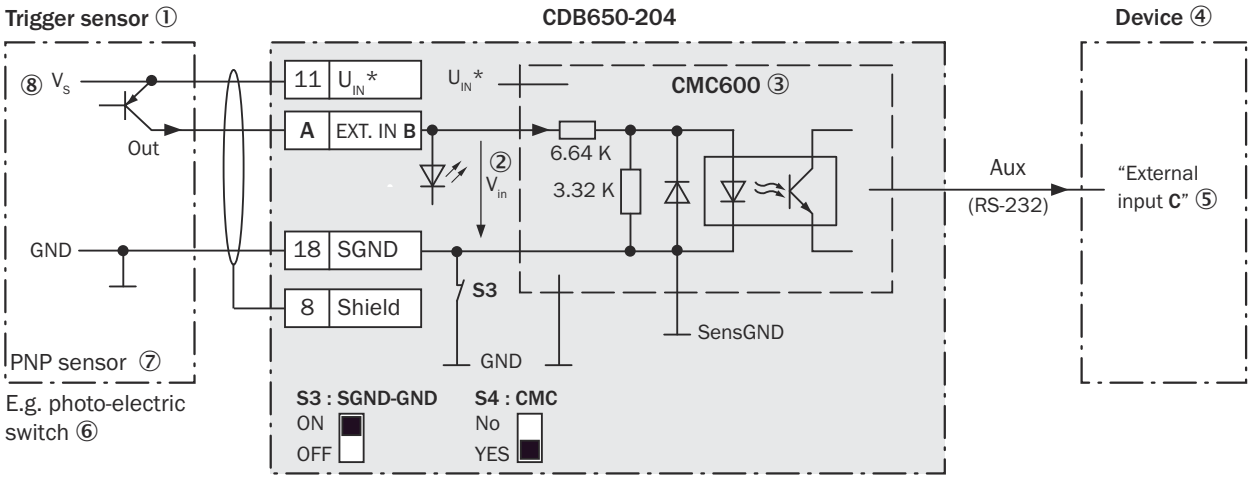


Figure 26: Trigger sensor supplied with power by connection module CDB650-204

① Trigger sensor, e.g. for read cycle generation
② Input voltage V_{in}
③ The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device
④ Device
⑤ Logical "External input" in the device
⑥ e.g. photoelectric sensor
⑦ PNP sensor
⑧ Supply voltage V_S

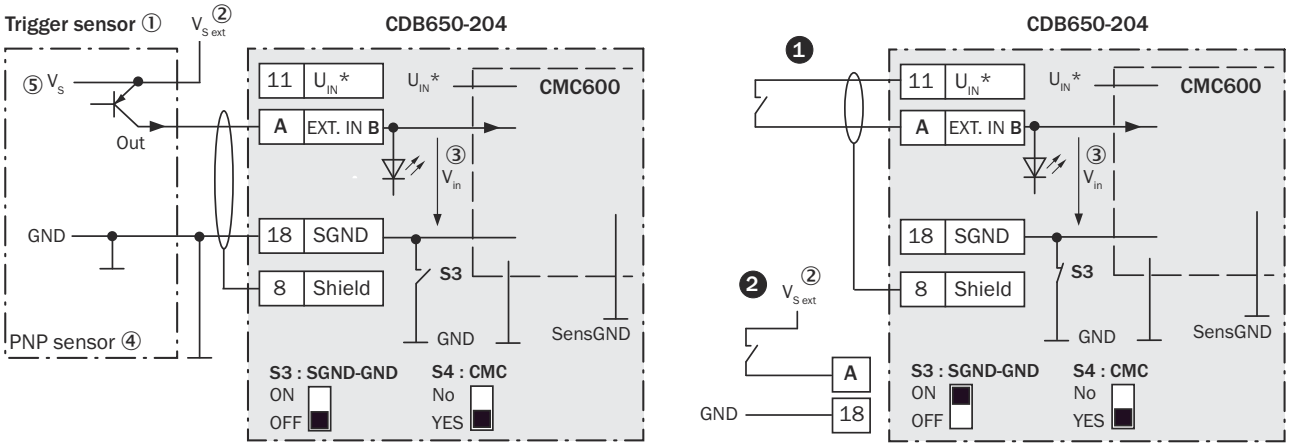


Figure 27: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDB650-204 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

① Trigger sensor, e.g. for read cycle generation
② External supply voltage $V_{S\ ext}$
③ Input voltage V_{in}
④ PNP sensor
⑤ Supply voltage V_S

Table 23: Assignment of placeholders to the external digital inputs

CDB650-204 (physical inputs)		Device (logical inputs)
Terminal A	**Signal B**	**External input C**
16	EXT. IN 1	1
17	EXT. IN 2	2

Function of switch S3

Table 24: Switch S3: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor connected with GND of CDB650-204 and CMC600.
OFF	Trigger sensor connected potential-free at CDB650-204 and CMC600. Common, isolated reference potential of all digital inputs is SGND.

Functional principle of the external digital inputs

The optional CMC600 parameter cloning module in combination with the CDB or CDM connection module offers two additional physical digital inputs for the device. The inputs are available at the respective terminals of the connection module. To distinguish them from the physical digital inputs directly on the device, these addition inputs via the CMC600 are designated as “external inputs”.

NOTE
The CMC600 transmits the switching signals of the external digital inputs as statuses to the local inputs of the device via its serial data interface.

The digital inputs are not suitable for time-critical applications.

Characteristic data of the digital inputs

Table 25: Characteristic data of the digital inputs “External input 1” and “External input 2”

Type	Switching
Switching behavior	Power to the input starts the assigned function, e.g. start read cycle. Default setting in the device: logic not inverted (active high), debounce time 10 ms
Properties	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	Low: V_{in} [1] ≤ 2 V; I_{in} [2] ≤ 0.3 mA High: 6 V ≤ V_{in} ≤ 30 V; 0.7 mA ≤ I_{in} ≤ 5 mA

1) Input voltage.
2) Input current.

NOTE
Assign the functions for the external digital inputs in the device using a configuration tool, e.g., the SOPAS ET configuration software.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

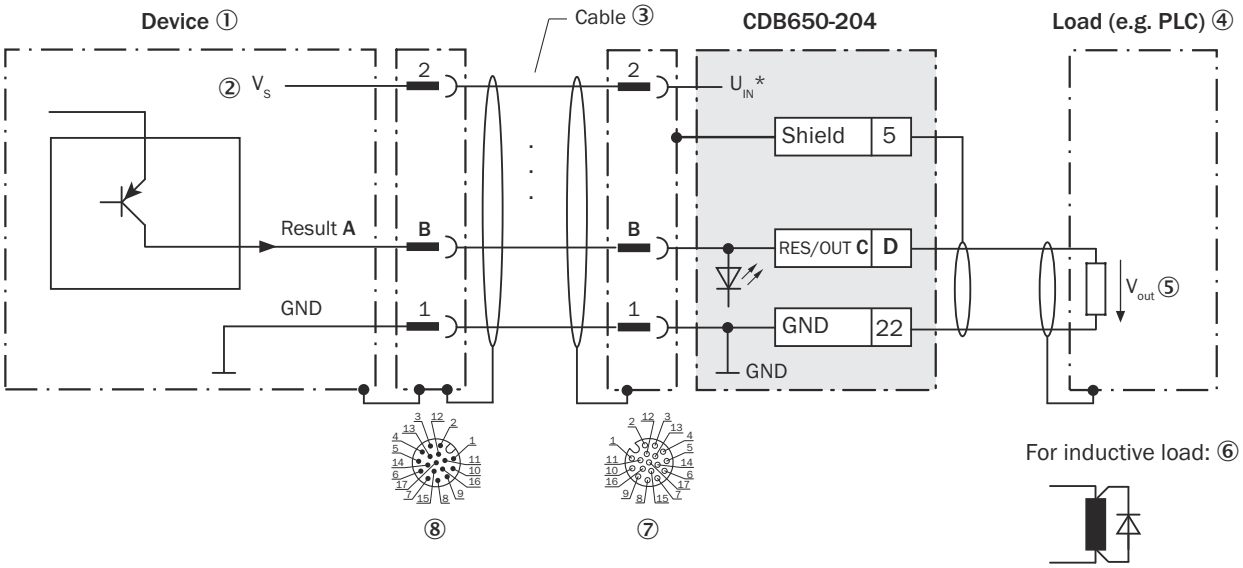


Figure 28: Wiring the digital outputs "Result 1" to "Result 4" of the device in the connection module CDB650-204

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

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 26: Assignment of placeholders to the digital outputs

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

Characteristic data of the digital outputs

Table 27: Characteristic data of the digital outputs "Result 1" to "Result 4"

Type	Switching

Switching behavior	PNP switching to supply voltage V_S Default settings in the device: no function, logic: not inverted (active high)
Properties	• Short-circuit protected + temperature protected • Not electrically isolated from V_S
Electrical values	0 V ≤ V_{out} [1] ≤ V_S (V_S −1.5 V) ≤ V_{out} ≤ V_S at I_{out} [2] ≤ 100 mA

1) Output voltage.
2) Output current.

NOTE
Assign the functions for the digital outputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

13.3.10 Wiring the external digital outputs of the device in the CDB650-204

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

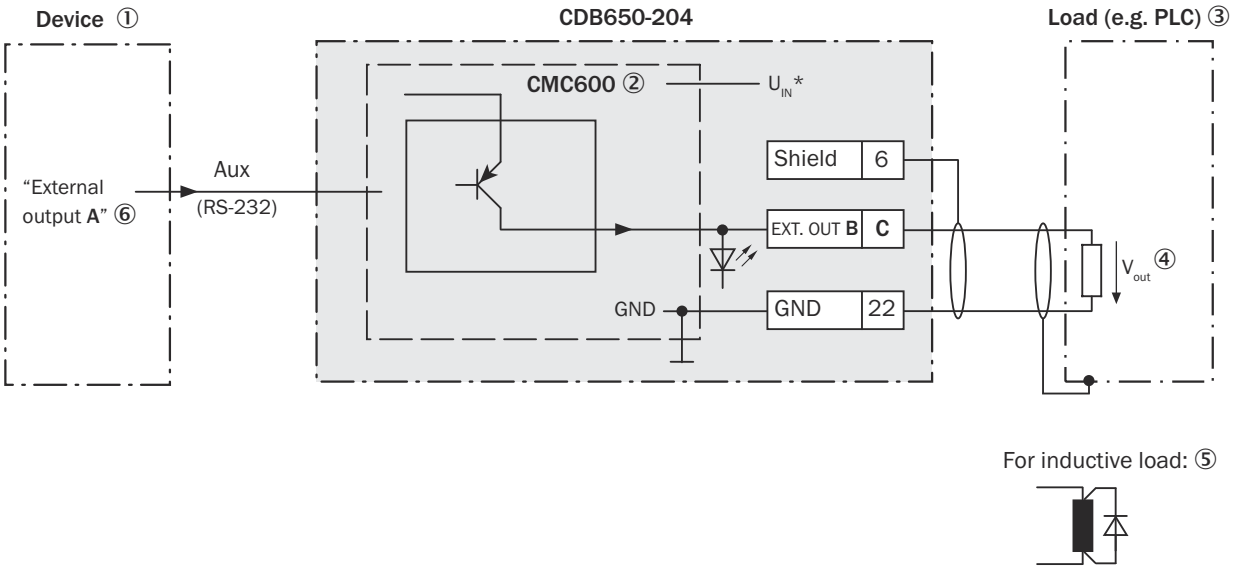


Figure 29: Wiring external digital outputs "External output 1" and "External output 2" of the device in the CDB650-204 connection module

① Device
② The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device
③ Load (e.g. PLC)
④ Output voltage V_{out}
⑤ With inductive load: see note
⑥ Logical "External output" in the device

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 28: Assignment of placeholders to the digital outputs

Device (logical output)	CDB650-204 (physical output)	
External output A	**Signal B**	**Terminal C**
1	EXT. OUT 1	23
2	EXT. OUT 2	24

Functional principle of the external digital outputs

The optional CMC600 parameter cloning module in combination with the CDB or CDM connection module offers two additional digital outputs for the device. The outputs are available at the respective terminals of the connection module. To distinguish them from the physical digital outputs directly on the device, these addition outputs via the CMC600 are designated as “external outputs”.

NOTE

The device transmits the statuses of its logical outputs to the CMC600 via its serial data interface. The CMC600 converts the statuses into switching signals on its physical digital outputs.

The digital outputs are not suitable for time-critical applications.

Characteristic data of the digital outputs

Table 29: Characteristic data of the digital outputs “External output 1” and “External output 2”

Type	Switching
Switching behavior	PNP switching to supply voltage V_S Default settings in the device: no function, logic: not inverted (active high)
Properties	• Short-circuit protected + temperature protected • Not electrically isolated from the supply voltage V_S
Electrical values	$0\ V \le V_{out}$ [1] $\le V_S$ $(V_S - 1.5\ V) \le V_{out} \le V_S$ at I_{out} [2] $\le 100\ mA$

1) Output voltage.
2) Output current.

NOTE

Assign the functions for the external digital outputs in the device using a configuration tool, e.g., the SOPAS ET configuration software.

13.4 Connection diagrams of connection module CDM420-0006

13.4.1 Connection of the device to CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

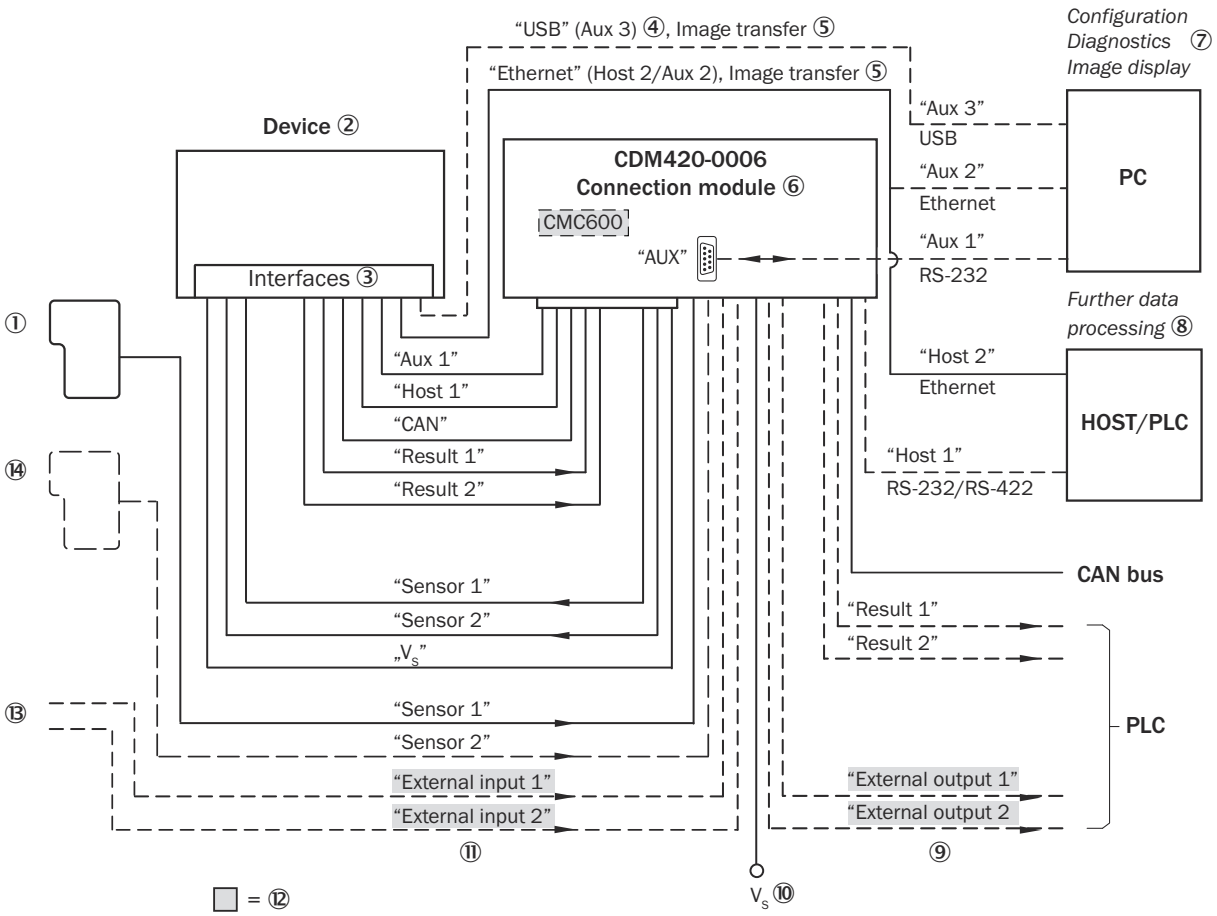


Figure 30: Connection of the device (Ethernet variant) to peripherals via CDM420-0006 (overview)

① External trigger sensor, e.g. for read cycle generation
② Device
③ Interfaces
④ USB interface only for temporary use (service)
⑤ Image transmission
⑥ Connection module
⑦ Configuration, diagnostics or image display
⑧ Data further processing
⑨ External digital outputs (switching)
⑩ Supply voltage V_S
⑪ External digital inputs (switching)
⑫ The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray)
⑬ Other functions
⑭ Application-dependent alternative stop trigger (e.g. photoelectric sensor) or travel increment (incremental encoder)

13.4.2 Wiring overview of the CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

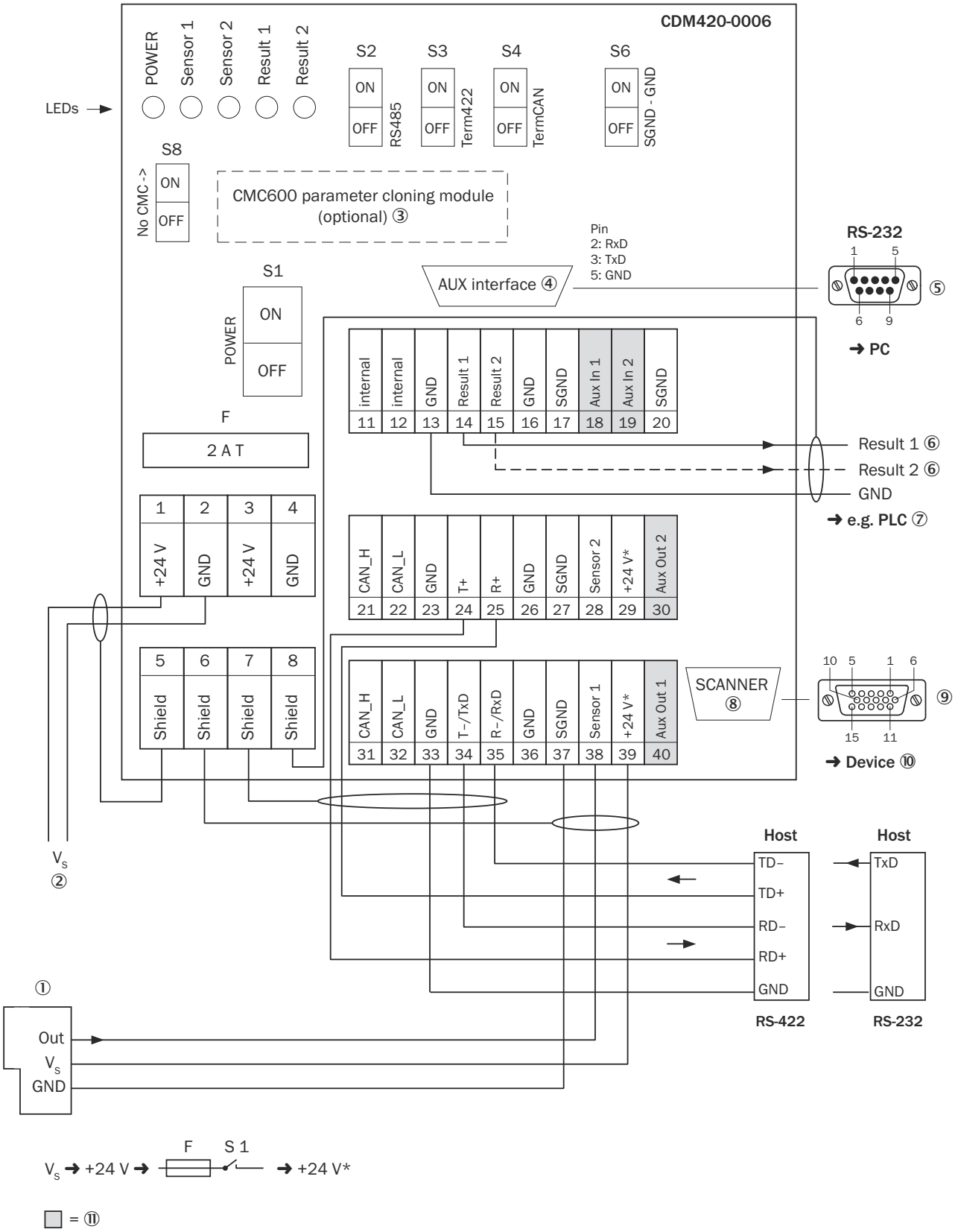


Figure 31: Overview: connection of device and peripherals to the CDM420-0006 connection module

① External trigger sensor, e.g. for read cycle generation

② Supply voltage V_S

③ CMC600 parameter cloning module (optional)
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 The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray)

13.4.3 Connecting supply voltage for the device in CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

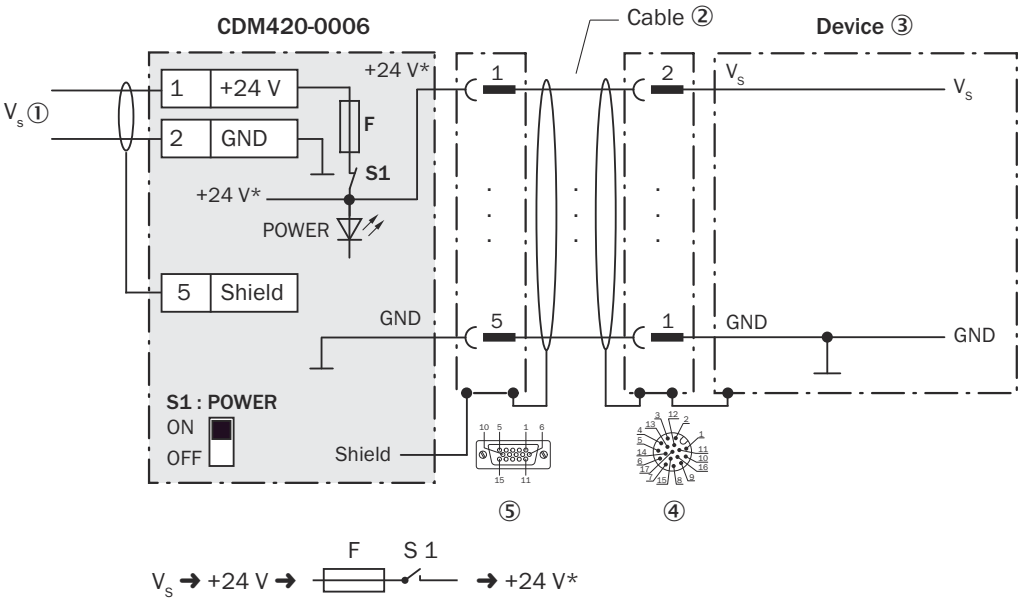


Figure 32: Connecting supply voltage for the device in CDM420-0006 connection module

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

Function of switch S1

Table 30: 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.
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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

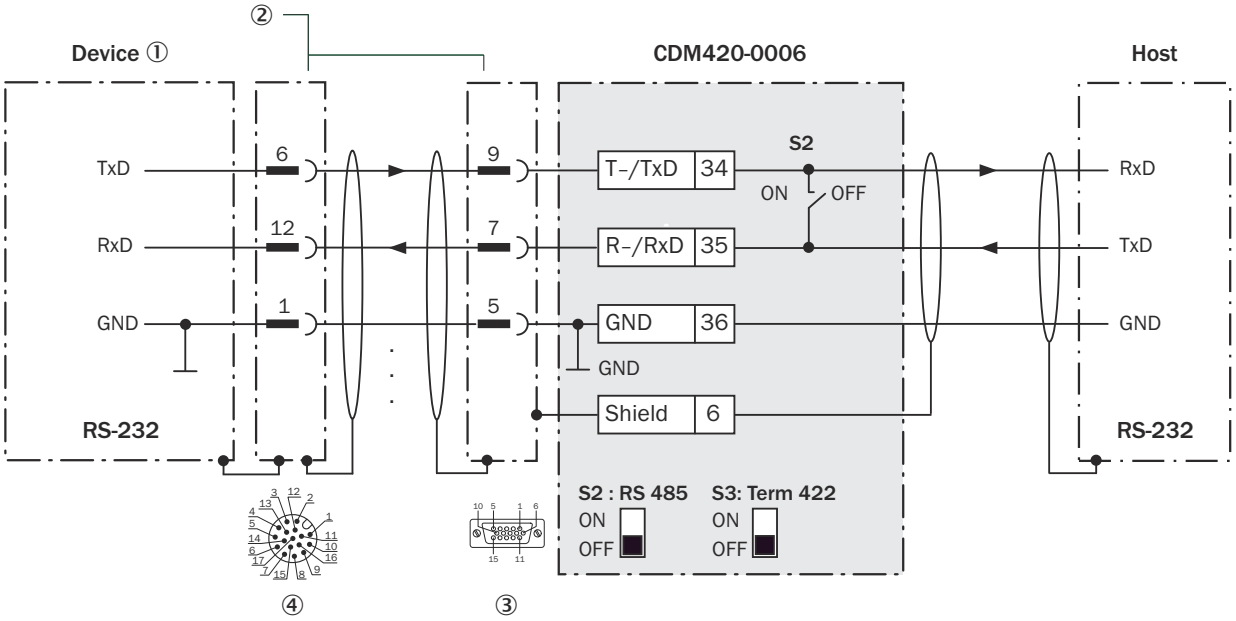


Figure 33: Connecting data interface RS-232 of the device in the connection module CDM420-0006

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

NOTE
Activate the RS-232 data interface in the device with a configuration tool, e.g. the configuration software SOPAS ET.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

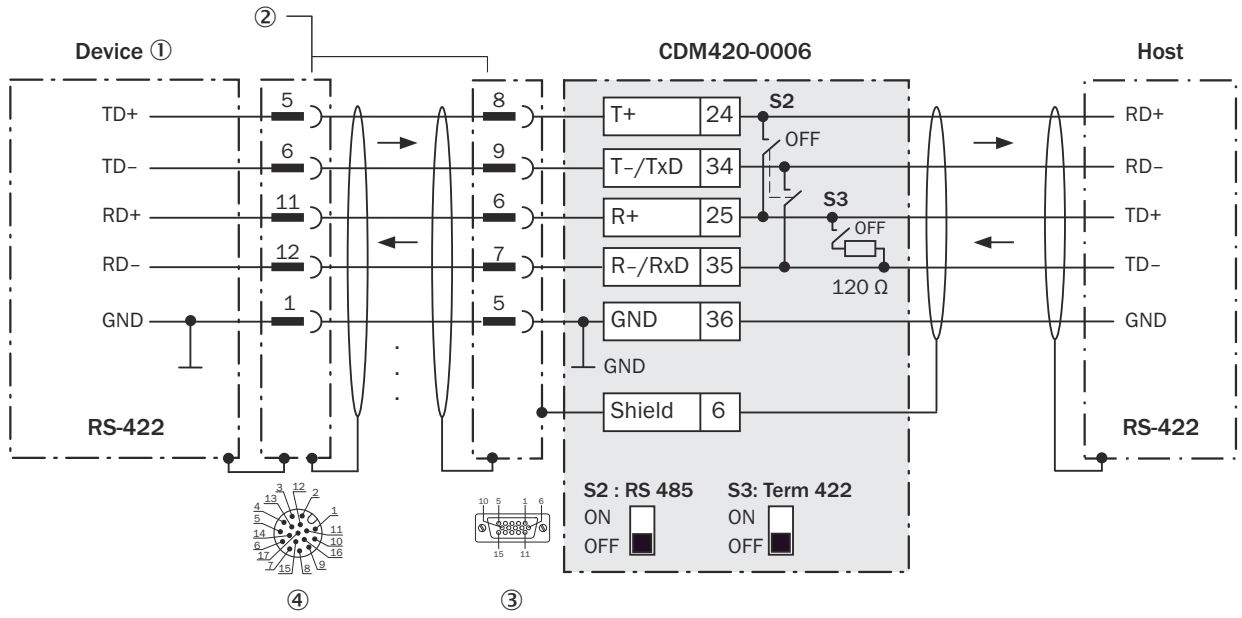


Figure 34: Connecting data interface RS-422 of the device in the connection module CDM420-0006

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

Function of switch S3

Table 31: 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:

- The relevant interface driver for the device complies with the standard in accordance with RS-422.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”).
- Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. the configuration software SOPAS ET.

13.4.6 Wiring the CAN interface in the CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

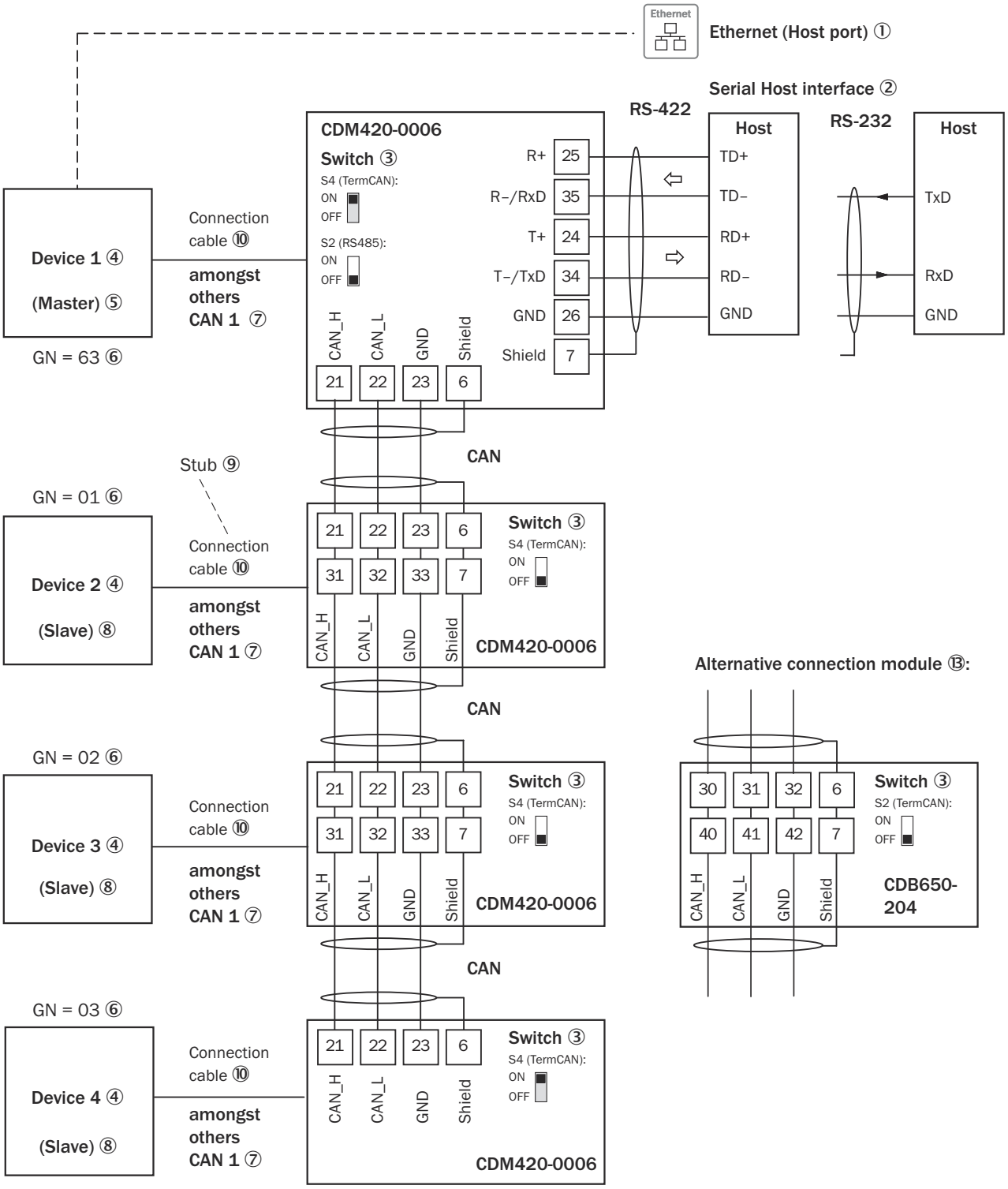


Figure 35: Wire the CAN interface of the device in the CDM420-0006 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

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 An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the device
⑪ Device number (GN)
⑫ Maximum 32 users
⑬ 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
Activate the CAN data interface in the device with a configuration tool, e.g. the configuration software SOPAS ET.

Make further settings in the device corresponding to the function of the device in the system configuration.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

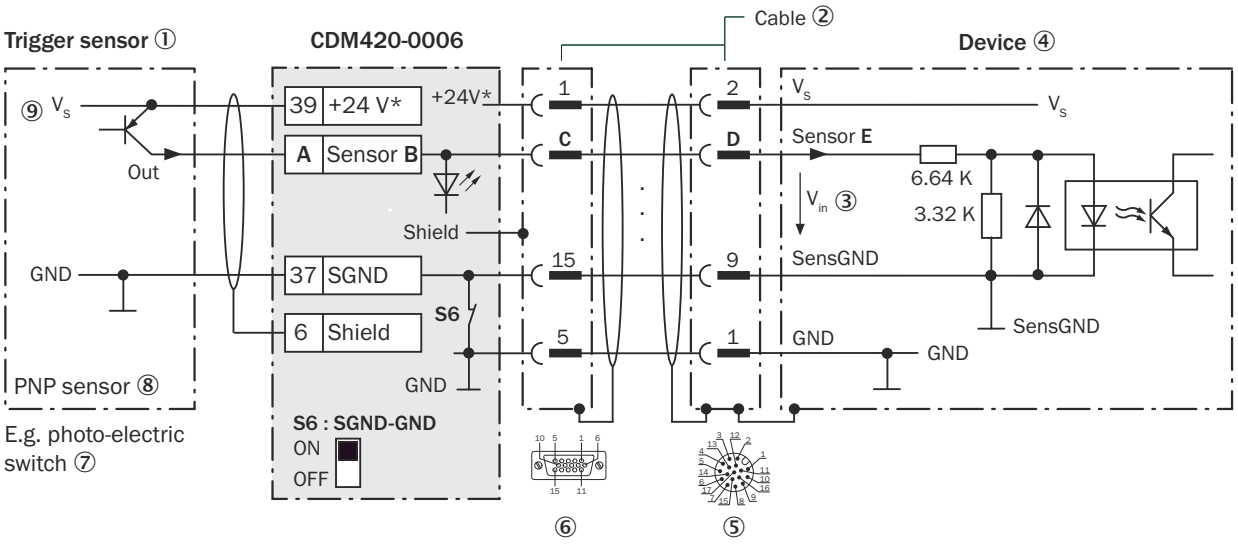


Figure 36: Trigger sensor supplied with power by connection module CDM420-0006

① Trigger sensor, e.g. for read cycle generation
② Adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)
③ Input voltage V_{in}
④ Device
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

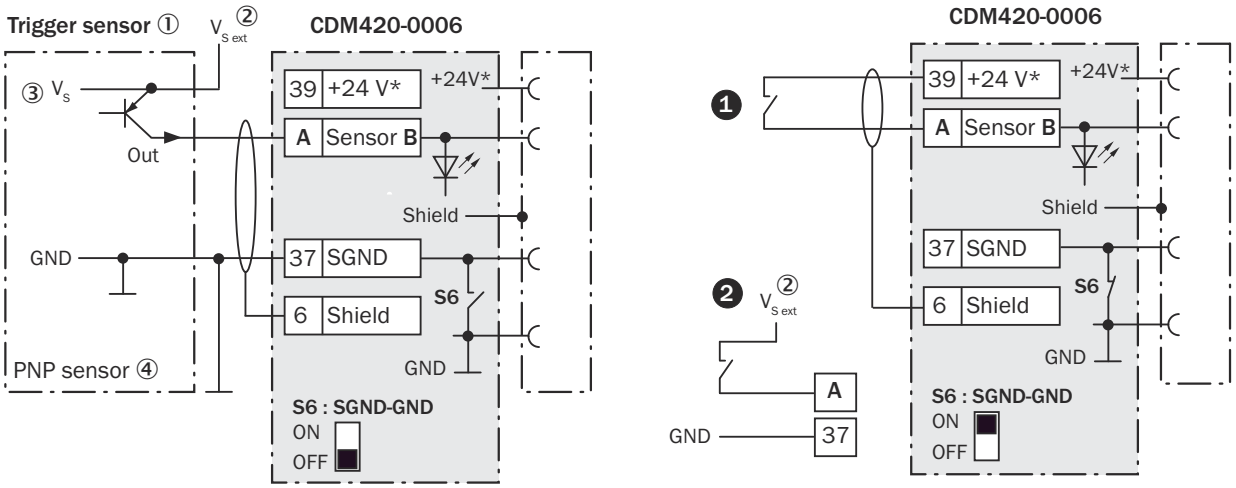


Figure 37: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDM420-0006 or ❷ connected potential-free and supplied with power externally. Switch setting S6 then as in left figure.

① Trigger sensor, e.g. for read cycle generation
② External supply voltage $V_{S\ ext}$
③ PNP sensor
④ Supply voltage V_S

Table 32: 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 33: 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 34: 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 read cycle. Default setting in the device: logic not inverted (active high), debounce time 10 ms
Properties	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	Low: V_{in} [1] ≤ 2 V; I_{in} [2] ≤ 0.3 mA High: 6 V ≤ V_{in} ≤ 30 V; 0.7 mA ≤ I_{in} ≤ 5 mA

1) Input Voltage
2) Input current

NOTE
Assign the functions for the digital inputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

13.4.8 Wiring the external digital inputs of the device in the CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

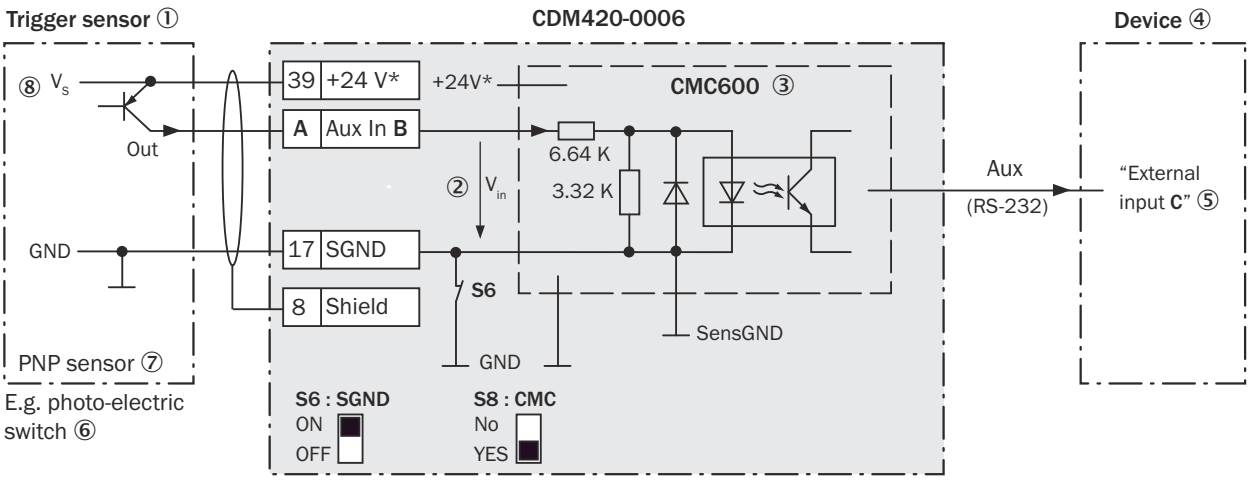


Figure 38: Trigger sensor supplied with power by connection module CDM420-0006

① Trigger sensor, e.g. for read cycle generation
② Input voltage V_{in}
③ The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device
④ Device
⑤ Logical "External input" in the device
⑥ e.g. photoelectric sensor
⑦ PNP sensor
⑧ Supply voltage V_S

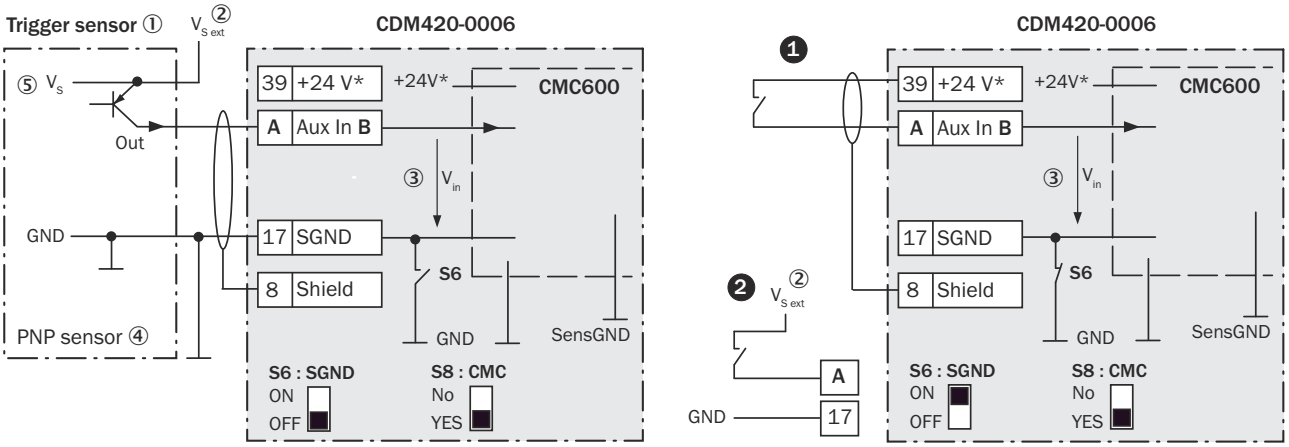


Figure 39: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDM420-0006 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

① Trigger sensor, e.g. for read cycle generation
② External supply voltage $V_{S\ ext}$
③ Input voltage V_{in}
④ PNP sensor
⑤ Supply voltage V_S

Table 35: Assignment of placeholders to the digital inputs

CDM420-0006		Device
Terminal A	**Signal B**	**External input C**
18	Aux In 1	1
19	Aux In 2	2

Function of switch S6

Table 36: Switch S6: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor connected with GND of CDM420-0006 and CMC600
OFF	Trigger sensor connected potential-free at CDM420-0006 and CMC600. Common, isolated reference potential of all digital inputs is SGND.

Functional principle of the external digital inputs

The optional CMC600 parameter cloning module in combination with the CDB or CDM connection module offers two additional physical digital inputs for the device. The inputs are available at the respective terminals of the connection module. To distinguish them from the physical digital inputs directly on the device, these addition inputs via the CMC600 are designated as “external inputs”.

NOTE
The CMC600 transmits the switching signals of the external digital inputs as statuses to the local inputs of the device via its serial data interface.

The digital inputs are not suitable for time-critical applications.

Characteristic data of the digital inputs

Table 37: Characteristic data of the digital inputs “External input 1” and “External input 2”

Type	Switching
Switching behavior	Power to the input starts the assigned function, e.g. start read cycle. Default setting in the device: logic not inverted (active high), debounce time 10 ms
Properties	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor
Electrical values	Low: V_{in} [1] ≤ 2 V; I_{in} [2] ≤ 0.3 mA High: 6 V ≤ V_{in} ≤ 30 V; 0.7 mA ≤ I_{in} ≤ 5 mA

1) Input Voltage
2) Input current

NOTE
Assign the functions for the external digital inputs in the device using a configuration tool, e.g., the SOPAS ET configuration software.

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

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

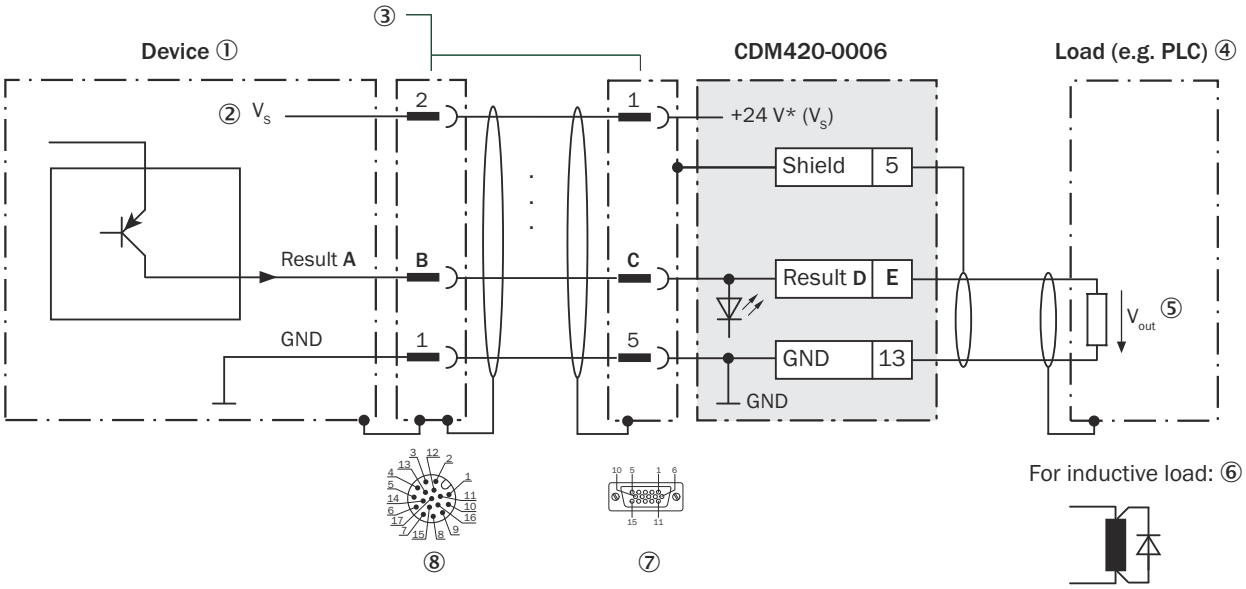


Figure 40: Wiring the digital outputs “Result 1” and “Result 2” of the device in the connection module CDM420-0006

NOTE

The two digital outputs “Result 3” and “Result 4” are not available in the CDM420-0006.

① Device
② Supply voltage V_S
③ Adapter cable (female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin)
④ Load (e.g. PLC)
⑤ Output voltage V_{out}
⑥ With inductive load: see note
⑦ Connection module: female connector, D-Sub-HD, 15-pin
⑧ Device: 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 38: Assignment of placeholders to the digital outputs

Device		CDM420-0006		
Output A	**Pin B**	**Pin C**	**Signal D**	**Terminal E**
Result 1	13	12	Result 1	14
Result 2	14	13	Result 2	15

Characteristic data of the digital outputs

Table 39: Characteristic data of "Result 1" and "Result 2" 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	• Short-circuit protected + temperature protected • Not electrically isolated from the supply voltage V_S
Electrical values	0 V ≤ V_{out} [1] ≤ V_S (V_S −1.5 V) ≤ V_{out} ≤ V_S at I_{out} [2] ≤ 100 mA

1) Output voltage.
2) Output current.

NOTE
Assign the functions for the digital outputs in the device using a configuration tool, e.g. the configuration software SOPAS ET.

13.4.10 Wiring the external digital outputs of the device in the CDM420-0006

Device = Lector63x = V2D63xx-xxxxYx (Y = A, B or S)

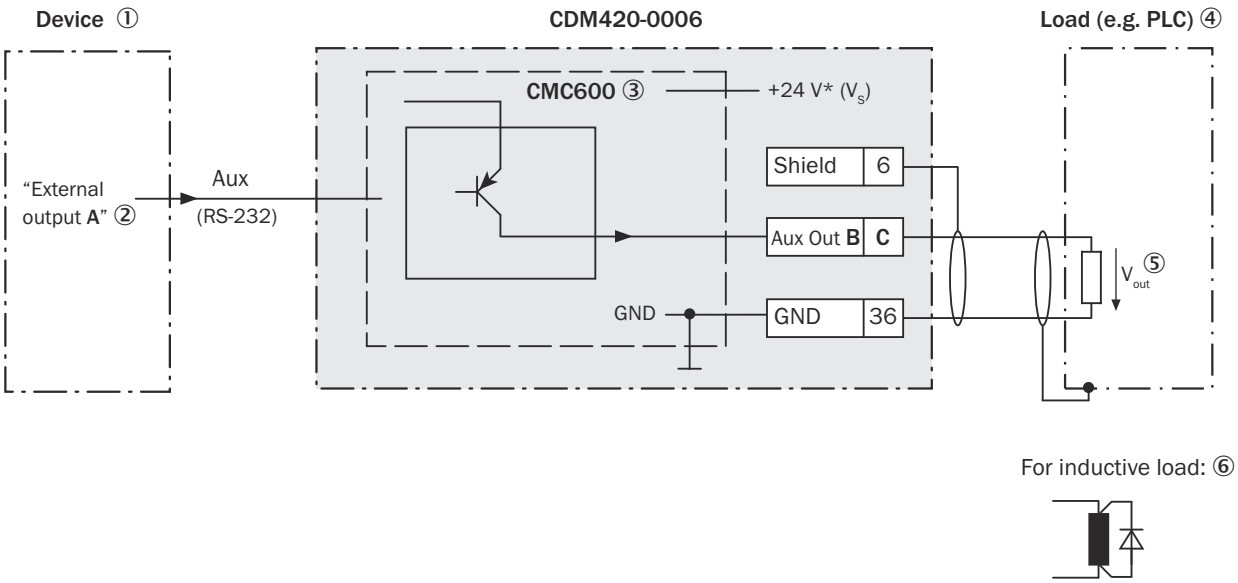


Figure 41: Wiring external digital outputs "Aux Out 1" and "Aux Out 2" of the device in the connection module CDM420-0006

① Device
② Logical "External output" in the device
③ The optional CMC600 parameter cloning module is required in the connection module in order to be able to use the additional external digital inputs and outputs of the device
④ Load (e.g. PLC)
⑤ Output voltage V_{out}
⑥ With inductive load: see note

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 40: Assignment of placeholders to the digital outputs

Device	CDM420-0006	
External output A	**Signal B**	**Terminal C**
1	Aux Out 1	40
2	Aux Out 2	30

Functional principle of the external digital outputs

The optional CMC600 parameter cloning module in combination with the CDB or CDM connection module offers two additional digital outputs for the device. The outputs are available at the respective terminals of the connection module. To distinguish them from the physical digital outputs directly on the device, these addition outputs via the CMC600 are designated as “external outputs”.

NOTE

The device transmits the statuses of its logical outputs to the CMC600 via its serial data interface. The CMC600 converts the statuses into switching signals on its physical digital outputs.

The digital outputs are not suitable for time-critical applications.

Characteristic data of the digital outputs

Table 41: Characteristic data of the digital outputs “External output 1” and “External output 2”

Type	Switching
Switching behavior	PNP switching to supply voltage V_S Default settings in the device: no function, logic: not inverted (active high)
Properties	• Short-circuit protected + temperature protected • Not electrically isolated from V_S
Electrical values	$0\ V \leq V_{out}$ [1] $\leq V_S$ $(V_S - 1.5\ V) \leq V_{out} \leq V_S$ at I_{out} [2] $\leq 100\ mA$

1) Output voltage
2) Output current

NOTE

Assign the functions for the external digital outputs in the device using a configuration tool, e.g., the SOPAS ET configuration software.

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