OPERATING INSTRUCTIONS

CLV63x, CLV64x, CLV65x

Fixed mount bar code scanner

SICK
Sensor Intelligence.

Described product

CLV63x

CLV64x

CLV65x

Manufacturer

SICK AG
Erwin-Sick-Str. 1
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Germany

Legal information

Original document

This document is an original document of SICK AG.

UL certification type-dependent, only for devices in IP65 standard housing

KC certification type-dependent, for this device see:
www.sick.com/CLV63x
www.sick.com/CLV65x

Contents

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. Information on this can be found in the operating instructions for the machine or system.

1.2 Scope

The documentation concept for the device includes the following publications:

- Safety Notes
- Operating instructions
- Technical information "CLV62x, CLV63x and CLV64x in IP69K protective housing"

Functions of publications:

The Safety Notes provide information about:
- Safe handling of the device
- Online access to the operating instructions and other documentation

The Safety Notes are printed and enclosed with the device at the time of delivery.

Operating instructions
- These operating instructions serve to incorporate the device into a customer system.
- The operating instructions provide step-by-step instructions for all necessary activities.

You can download the operating instructions as a PDF from one of the product pages on the Internet:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

The operating instructions are valid for all available variants of the devices. More detailed information on the identification of the present device type, see "Type code", page 20.

Available device variants are listed on the product pages on the Internet.

Technical information "CLV62x, CLV63x and CLV64x in IP69K protective housing"

- The information describes the detailed procedure for mounting and electrical connection of the device variants in the protective housing in addition to the operating instructions. The information also contains the technical data for these device variants.

You also download the Technical Information from the product page on the Internet.

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

Enclosure ratings

The devices are available with two housing enclosure ratings depending on the type:

- **IP65 standard housing:** All devices of the CLV63x, CLV64x and CLV65x product families. Optionally type-dependent with external heating, for operation at low ambient temperatures. Depending on the type, the three line scanner, raster scanner or line scanner with oscillating mirror sensor types are available. Focus control: Fixed focus (CLV63x), switchable dynamic focus (CLV64x) and auto focus (CLV65x). The devices can be delivered as an Ethernet variant or as a serial variant.
- **IP69K protective housing:** The devices of the CLV63x and CLV64x product families, for use in harsh operating environments. Depending on the type, the three sensor types are also available. Focus control: Fixed focus (CLV63x) as well as switchable, dynamic focus (CLV64x). The devices can only be delivered as Ethernet variants.

Presentation of the main differences of the devices in the standard housing and protective housing see "Device variants", page 28.

NOTE

Orientation help for these operating instructions

In the other informative sections or sections with directions for action, this sequence of housing variants is used:

- IP65 standard housing
- IP65 standard housing with external heating
- IP69K protective housing

In each category, the connection variants, if any, are listed and described as follows:

- Ethernet variant
- Serial variant

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/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

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
- Declarations of conformity and certificates of 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
- Function blocks for commonly used controllers (PLC)
- GSD device definition files for fieldbus gateways
- EPLAN-Makros

2 Safety information

2.1 Intended use

The devices of the CLV63x, CLV64x and CLV65x product families are intelligent, opto-electronic ID sensors. The devices are used for automatic, stationary identification and decoding of bar codes on moving or stationary objects. The devices transmit the data content of the decoded bar codes to a higher-level control (PLC) for coordinating further processing.

The devices are primarily designed for use in industrial and logistics areas. The devices meet the requirements for industrial robustness, interfaces, and data processing.

NOTE
The bar codes being read must conform to at least quality level C in accordance with ISO/IEC 15416.

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies 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

To ensure compliance with the 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.

Devices in IP65 standard housing (with or without external heating):

Ethernet variant:

- The heads of the cables plugged into the two contacted M12 connections must be screwed on tightly.
- When the M12 female connector of the device is not in use, it is closed with a tightly fastened protective element, e.g. a protective cap (as in the delivery state).
- Devices with heating: The connecting cable of the heating (open end) is wired via a cable entry in the CDB620 or CDM420 connection module.
- The black cover, which is fitted over the corner on the side, is closed. The cover is flush against the device.

Serial variant:

- The head of the connecting cable (D-Sub male connector) of the device is tightly fastened to the contacted female connector.
- If an extension cable is used, a corresponding rubber seal (SICK accessory) must be fitted between the two D-Sub plug connectors. The plug connectors must be screwed together tightly. You can find a suitable IP65 rubber seal online at:
  - www.sick.com/CLV63x
  - www.sick.com/CLV64x
  - www.sick.com/CLV65x
- Devices with heating: The connecting cable of the heating (open end) is wired via a cable entry in the CDB620 or CDM420 connection module.
- The black cover, which is fitted over the corner on the side, is closed. The cover is flush against the device.

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

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

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

- Insert or remove optional memory card.

Devices in IP69K protective housing (CLV63x, CLV64x):

NOTE
For conditions for complying with the enclosure rating, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

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

2.1.1.1 Exception: temporarily opening the cover on the device

Devices in IP65 standard housing

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

In open state, the device does not conform to a specified enclosure rating.

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

Temporarily open the cover for the following activities:

- Insert or remove the optional storage medium (SD card)

For this purpose, open the corresponding black rubber cover fitted at the side over the corner on the device.

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

2.2 Improper use

Any use that goes beyond the areas specified below is considered improper use. This applies to use outside the technical specifications and the specifications for intended use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.

Devices variants in IP65 standard housing:

- The devices must not be used in explosion-hazardous or corrosive areas or under extreme ambient conditions.
- Only the device variants with heating (CLV63x/64x-xxxx**F0**) may be operated in the ambient temperature range below 0 °C.
- The device variants with heating must not be used in forklift applications in low temperature conditions.

- The device variants with heating are not suitable for mounting with vibration dampers in deep freeze applications.
- The device variants with oscillating mirror are not suitable for mounting with vibration dampers.

Device variants in IP69K protective housing (CLV63x and CLV64x):

- The devices must not be used in explosion-hazardous areas.
- The devices must not be operated in the ambient temperature range below 0 °C.
- The device variants with oscillating mirror are not suitable for mounting with vibration dampers.
- The protective housing of the factory-installed bar code scanner must not be opened.

Accessories:

- The use of accessories not 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 Cybersecurity

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive and holistic cybersecurity concept. A suitable concept comprises organizational, technical, procedural, electronic, and physical levels of defense and provides suitable measures for different types of risks. SICK's products and solutions must be viewed as a component of this concept.

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

2.3.1 Configuration with profile programming

NOTE

The device can be configured for the specific application using the convenient "Profile programming" function. This involves presenting the device with a set of printed configuration bar codes. The bar codes can be created using the SOPAS ET configuration software.

The “Profile programming” function is activated in the default factory settings. After successfully configuring the device, deactivate this function using SOPAS ET to avoid any undesired configuration changes and exclude the resultant risks.

The configuration of this function and further documentation can be found on the Internet after logging on at: supportportal.sick.com/profile-programming-clv

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

2.5 Modifications and conversions

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

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

2.6 Requirements for skilled persons and operating personnel

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

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

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	▪ 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 computer operating system used ▪ Basic knowledge of the design and setup of the described connections and interfaces ▪ Basic knowledge of data transmission ▪ Basic knowledge of bar code technology
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 sections of this production documentation to reduce the possibility of risks to health and avoid dangerous situations.

CAUTION
Optical radiation: Class 2 Laser Product

The human eye is not at risk when briefly exposed to the radiation for up to 0.25 seconds. Exposure to the laser beam for longer periods of time may cause damage to the retina. The laser radiation is harmless to human skin.

- Do not look into the laser beam intentionally.
- Never point the laser beam at people's eyes.
- If it is not possible to avoid looking directly into the laser beam, e.g., during commissioning and maintenance work, suitable eye protection must be worn.
- Avoid laser beam reflections caused by reflective surfaces. Be particularly careful during mounting and alignment work.
- 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.

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.

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.

2.7.1 Laser radiation

Laser class

The device corresponds to laser class 2.

NOTE
No maintenance is required to ensure compliance with Laser Class 2.

Wavelength

The device uses a red light laser diode. The wavelength range is between 655 nm (CLV63x and CLV64x) and 658 nm (CLV65x).

Laser activity display

Devices in IP65 standard housing:

When the laser diode is switched on, the “Laser” LED on the device lights up.

Devices in IP69K protective housing:

NOTE

Optical displays as well as control elements (pushbuttons) are not accessible on the device.

Laser output aperture

The entire viewing window is a laser output aperture.

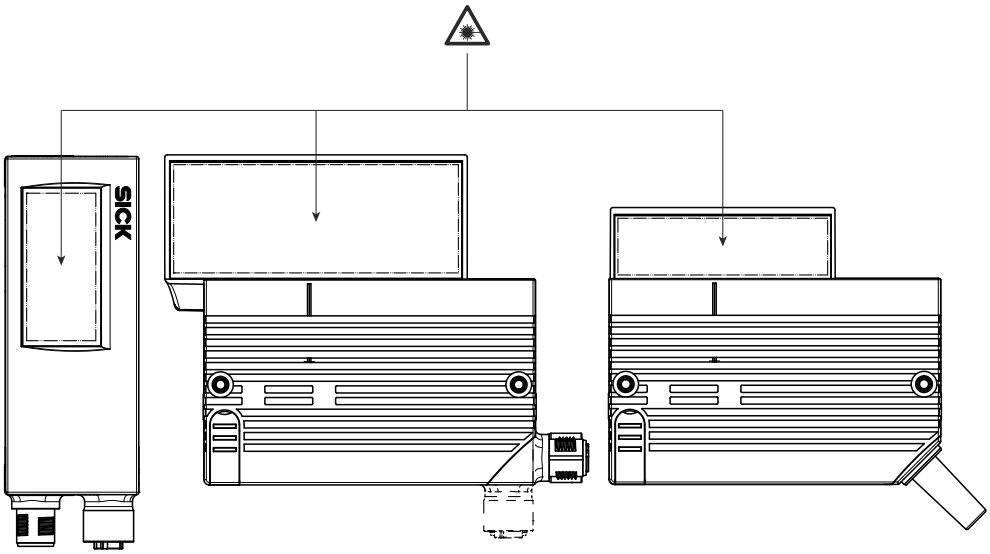


Figure 1: IP65 standard housing: Laser output aperture in the various designs of the device, optional heating not shown here

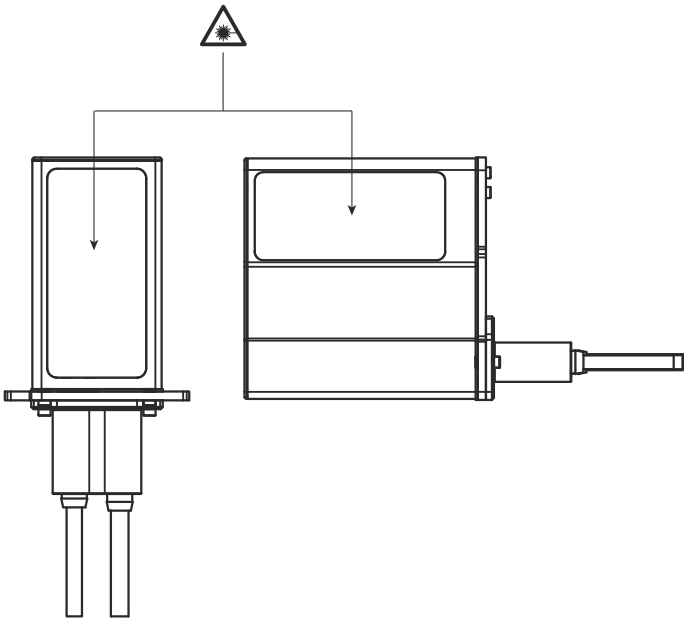


Figure 2: IP69K protective housing: Laser output aperture for both the CLV63x and CLV64x models

Warning symbol on the device

Devices in IP65 standard housing:

The colored laser warning label is affixed to the rear of the device combined with the type label.

Devices in IP69K protective housing:

The laser warning label is lasered onto the protective housing. The type label is glued to the underside of the housing of the connections.

Laser output data

In addition to other information, the type label of the device in use also contains the laser output data.

The laser power data consists of:

- Laser output power (maximum and average)
- Wavelength or wavelength range
- Pulse duration

The laser power data is located in the lower part of the type label, as an example see "Type label", page 18.

If the device is installed inaccessibly, see "Features", page 96 in the technical data.

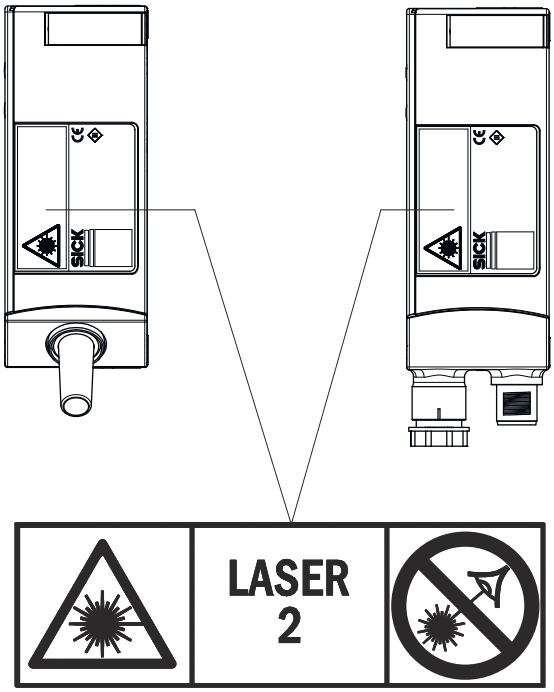


Figure 3: IP65 standard housing: Position and content of the laser warning label on the device, shown here without optional heating

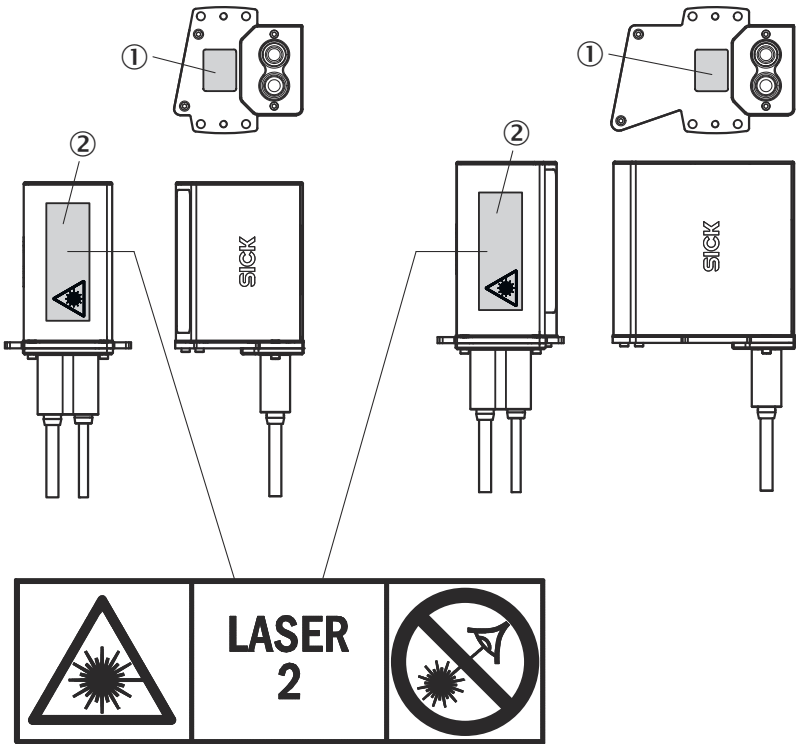


Figure 4: IP69K protective housing: Position and content of the laser warning label on the device

① Type label

② Laserwarnschild

Meaning of the laser warning label: Laser radiation. Do not look into the light beam. Laser class 2.

NOTE
Additional laser warning label

If the laser warning label applied to the device is concealed when installed into a machine or paneling, the laser beam output aperture must be suitably labeled. For this purpose, an additional warning label of the same type must be applied next to the output aperture.

Controlling the laser diode

During operational use, the device only switches the laser diode on if there is an object in the reading area, or if a reading is required (cyclic reading operation).

A laser timeout can automatically switch off the laser diode in this type of object trigger control if **the pulse has been active for too long**, e.g. when the conveyor system is at a standstill. In this case, the current internal reading interval of the device remains open.

Depending on the selected parameterization type, the laser timeout can be set as follows:

- Using the SOPAS ET configuration software, on the **Illumination Control** device page
- During GSD parameterization with the “10_Object Trigger Ctrl” module (PROFINET or PROFIBUS)

In the default setting, the laser timeout is deactivated.

The laser diode is permanently or repeatedly switched on in the following device statuses:

- In reading operation in the PSDI types “Auto pulse” (adjustable duty cycle) or “Free”
- In the operating modes “Percentage evaluation” and “Auto setup”. Use these operating modes only temporarily for configuration or diagnostics.

If the timeout is activated, it will have no effect in this case.

2.8 Switching off the device

When the device is switched off, a maximum of the following data is lost in the device:

- A modified, application-specific parameter set that is only temporarily located in the working memory of the device and is not yet permanently stored in the device as a new valid configuration data set.
- Last reading result
- State of the daily operating hours counter

2.9 Protection of the environment

During construction of the device, attention was paid to achieving the smallest environmental impact possible. Apart from the housing, the device contains no materials using silicon.

3 Product description

3.1 Product ID

3.1.1 Type label

The type label is combined with the laser warning label on the device. The type label contains information for identifying the device as well as conformity marks and test marks. If necessary, information is moved to an additional label for space reasons.

If the device in the standard housing has been UL certified, this can be found on the type label.

Devices in IP65 standard housing (with or without heating):

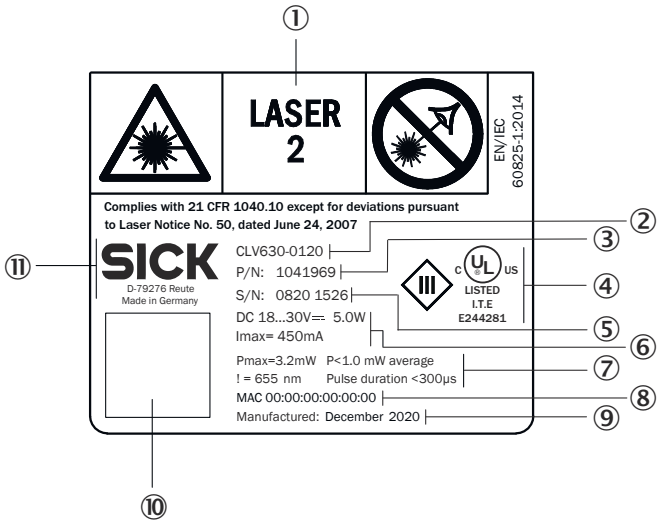


Figure 5: CLV63x, CLV64x and CLV65x: Example of type label for CLV630-0120 (serial variant). For devices in IP65 standard housing. Electrical values shown here for devices without heating. Figure may differ.

① Laser warning label
② Type designation according to type code
③ Part number
④ Conformity mark and certification mark
⑤ Serial number
⑥ Supply voltage, power consumption, maximum current consumption
⑦ Laser power data: Maximum power, average power, wavelength, pulse duration
⑧ MAC address, only for Ethernet variants
⑨ Production date
⑩ Data Matrix code with product data: Part number, production date, serial number For Ethernet variants additionally: MAC address for device, MAC address for Ethernet port (not shown on type label)
⑪ Manufacturer and production site

Devices in IP69K protective housing:

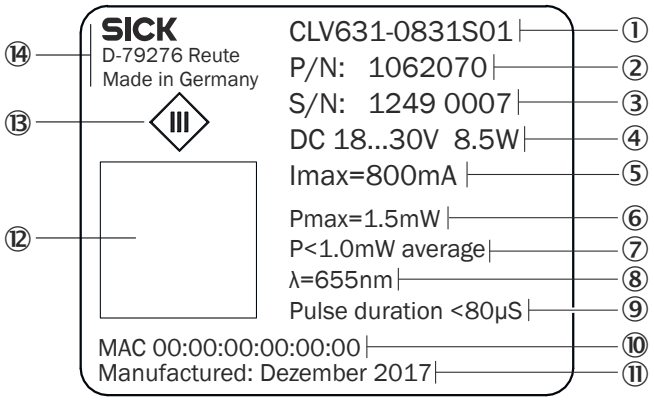


Figure 6: CLV63x and CLV64x: Example for type label of CLV631-0831S01 (Ethernet variant). For devices in IP69K protective housing. Figure may differ.

① Type designation according to type code
② Part number
③ Serial number
④ Supply voltage and power consumption
⑤ Maximum current consumption
⑥ Maximum laser output
⑦ Average laser output
⑧ Laser wavelength
⑨ Laser pulse duration
⑩ MAC address (only for Ethernet variant)
⑪ Production date
⑫ Data Matrix code with product data: Part number, production date, serial number, MAC address for device, MAC address for Ethernet port (not shown on type label)
⑬ Symbol for protection class III
⑭ Manufacturer and production site

Position of the type label on the device:

- IP65 standard housing: The combination type label with laser warning label is located on the rear of the device.
- IP69K protective housing: The type label is located on the underside of the device near the connections. The laser warning label is lasered on the rear of the device.

Additional label

In addition to the type label, the additional label also displays other conformity marks and test marks.

Figure 7: CLV63x, CLV64x and CLV65x in IP65 standard housing: Additional label

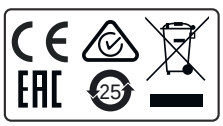


Figure 8: CLV63x and CLV64x in IP69K protective housing: Additional label

Position of the additional label on the device:

- IP65 standard housing: The additional label is attached to the right side of the device (device viewed from the rear).
- IP69K protective housing: The additional label is located on the underside of the device next to the type label.

3.1.2 Type code

The devices of the CLV63x, CLV64x and CLV65x product families are arranged according to the following type code:

CLVxyz-abcde

CLV	x	y	z	–	a	b	c	d	e
1	2	3	4		5	6	7	8	9

Table 2: Type code

Position	Description	Characteristic
1	Code reader	V-principle
2 - 3	Product family	63: CLV63x 64: CLV64x 65: CLV65x
4	CLV63x: Working range CLV64x: Resolution CLV65x: Resolution	**CLV63x:** 0: Long range 1: Mid range 2: Short range **CLV64x:** 0: Standard density 2: High density **CLV65x:** 0: Standard density 1: Depth of field optimized for 0.5 mm
5	Reading method, orientation of viewing window [1]	0: Line scanner, viewing window on front side 1: Raster scanner, viewing window on front side 2: Line scanner, viewing window on the side 3: Raster scanner, viewing window on the side 6: Line scanner with oscillating mirror, viewing window on the side
6	Electrical connections (design)	**Serial variant:** 0: Cable 0.9 m with male connector, D-Sub-HD, 15-pin 3: Cable 2 m with male connector, D-Sub-HD, 15-pin **Ethernet variant:** 1: Swivel connector, 12-pin with 2 M12 plug connections [2] 8: Swivel connector, 17-pin with 2 M12 plug connections [3]
7	Interfaces	0: RS-232, RS422/485, CAN, digital inputs and digital outputs 2: Ethernet, RS-232, RS422/485, CAN, digital input 3: Ethernet, RS-232, RS422/485, CAN, digital inputs and digital outputs
8	Window material of the viewing window	0: Glass 1: Plastic

Position	Description	Characteristic
9	Ambient operating temperature	Without marking: Standard (0 °C ... + 40 °C) F0: Extended (-35 °C ... +40 °C, with external heating [4]))
	Enclosure rating	Without marking: IP65 in standard housing S01: IP69k in protective housing
	Light spot	Without marking: Circular S01: Oval (CLV6xx-xxx1S01)

1) Refers to the longitudinal axis of the device.
2) 1 male connector, M12, 12-pin, A-coded and 1 female connector, M12, 4-pin, D-coded.
3) 1 male connector, M12, 17-pin, A-coded and 1 female connector, M12, 4-pin, D-coded.
4) The heating is mounted on the outside of the housing.

NOTE
Not all combinations based on type code are possible.

The available device variants can be found online at:
- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

3.1.3 Scope of delivery

Devices in IP65 standard housing

The delivery of the device includes the following components:

Table 3: CLV63x to CLV65x: Scope of delivery

No. of units	Component	Notes
1	Device in the version ordered	**Delivery state in IP65 standard housing with or without heating:** a) Ethernet variant: • The M12 female connector is closed with a tightly screwed-on protective element, e.g. a protective cap • The black rubber cover fitted at the side over the corner must be flush with the device. • Without connecting cables b) Serial variant: • Device with permanently connected connecting cable • The black rubber cover fitted at the side over the corner must be flush with the device. c) Devices with heating: • Additional heating mounted externally on the device [1] with 3-pin, open connecting cable, 2 m All devices: • Without bracket • Without fixing screws
1	Printed Safety Notes (safety information), multilingual	The document contains: • Information on safe handling of the device • Note for online access to the operating instructions and other documentation

1) The optional heating is assembled and tested at the factory to order. The heating together with the device forms a solid unit. Installation on site by the customer is not possible.

Not included with delivery of the device and must be ordered separately:

Ethernet variant in IP65 standard housing without heating:

- Suitable cables for the connection of the supply voltage/Serial Data/I/O as well as for the access to Ethernet

Ethernet variant in IP65 protective housing with heating:

- Suitable, cold-resistant cables for connection of the supply voltage /Serial Data/ I/O and for access to the Ethernet

Devices in IP65 standard housing with heating

Not included with delivery of the device and must be ordered separately:

Table 4: CLV63x to CLV65x with heating: Additional scope of delivery required per device

No. of units	Component	Notes
1	Bracket, part number 2050705 or 2058082	Recommended thermal insulating bow-shaped brackets, including fixing screws for the device.
2	Cold-resistant SICK connecting cables, see here: o www.sick.com/CLV63x o www.sick.com/CLV64x o www.sick.com/CLV65x	**Ethernet variant:** For use of the device below 0 °C. Connecting the device to the voltage supply and Ethernet.
When using the CDM420-0001 connection module:		
1	Connection circuit board part no. 2055071	Additional board for a device with heating for safe wiring in the CDM420-0001 connection module. The scope of delivery includes: • 1 fuse 3 A • 2 connection cables • 2 spacer sleeves • 2 fixing screws
When using the CDB620-001 connection module:		
1	Terminal part no. 6041383	Single-pole terminal, required for safe wiring of the device with heating in the CDB620-001 connection module. To be provided separately by the customer: Fuse 3 A in the control cabinet

Devices in IP69K protective housing

Ethernet variants of the CLV63x and of the CLV640 are available as devices in a protective housing.

NOTE

For scope of delivery, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479

The following associated components are not included with delivery of the device. The components are available on the Internet.

Table 5: Scope of delivery: Other components for device in IP69K protective housing

Component	Note
"Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing" as PDF in the following languages: English, German. Other languages may be available.	For devices with an IP69K protective housing. The document provides information about the electrical connection and attaching the protective double bushing to the protective housing. Available online at: • www.sick.com/CLV62x

Other required components for all device variants:

The following associated components are not included with delivery of the device. The components are available on the Internet.

Table 6: CLV63x to CLV65x, all variants: Scope of delivery, other components

Component	Notes
SOPAS ET configuration software and device description file (*.sdd file for SOPAS ET) for the CLV63x, CLV64x or CLV65x	Available online at: • www.sick.com/SOPAS_ET
Joint CLV63x to CLV65x operating instructions as PDF Available in the following language versions: English, German and French. Other languages may be available.	Provides information about mounting, electrical installation and technical data for the device. Available online at: • www.sick.com/CLV63x • www.sick.com/CLV64x • www.sick.com/CLV65x
If required: Function blocks for communication between the device and a programmable controller (PLC) from various manufacturers.	
If required: GSD device description files for SICK fieldbus gateways	

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.

3.2 Product characteristics

3.2.1 Device view

To meet the conditions of different reading tasks and space conditions at the installation site, the devices of the CLV63x, CLV64x and CLV65x product families offer three different sensor types depending on the type. Two optional orientations of the viewing window are available.

- Line scanner with front or side viewing window
- Raster scanner with frontal or side viewing window
- Line scanner with oscillating mirror, side viewing window

For connection of the devices to different data interfaces, the **devices in the IP65 standard housing** offer two connection variants each in all three sensor types:

- Ethernet variant with M12 (swivel) connector
- Serial variant with D-Sub male connector

For use in different operating environments (temperature, application, enclosure rating); a protective housing is available in addition to the standard housing, depending on the type.

The **devices in the IP69K protective housing** offer a connection variant: Ethernet variant

Overview of the designs:

Housing type	Enclosure rating	Connection options	Orientation of viewing window	Devices	Ambient operating temperature
Standard housing	IP65	Ethernet variant	Front or side	CLV63x CLV64x CLV65x	0 °C ... +40 °C
		Serial variant			
Standard housing with external heating	IP65	Ethernet variant	Front or side	CLV63x CLV65x	–35 °C ... +35 °C
		Serial variant			
				CLV64x	On request
Protective housing	IP69K	Ethernet variant	Front or side	CLV63x CLV64x	0 °C ... +40 °C

Device variants in IP65 standard housing

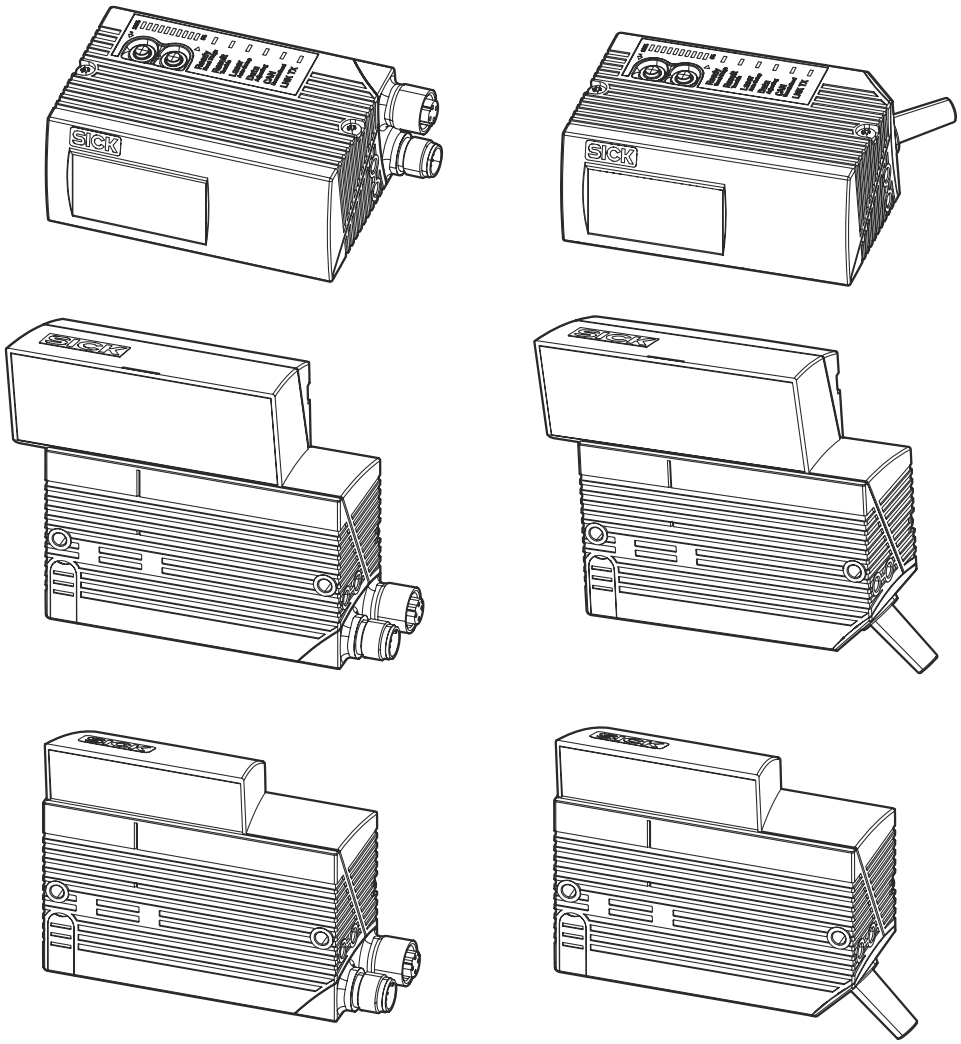


Figure 9: Device variants without heating (from top to bottom): Housing shape with front viewing window, with oscillating mirror and side viewing window, and with only side viewing window. All types with swivel connector (Ethernet variant, shown on left) or with cable connection (serial variant, shown on right).

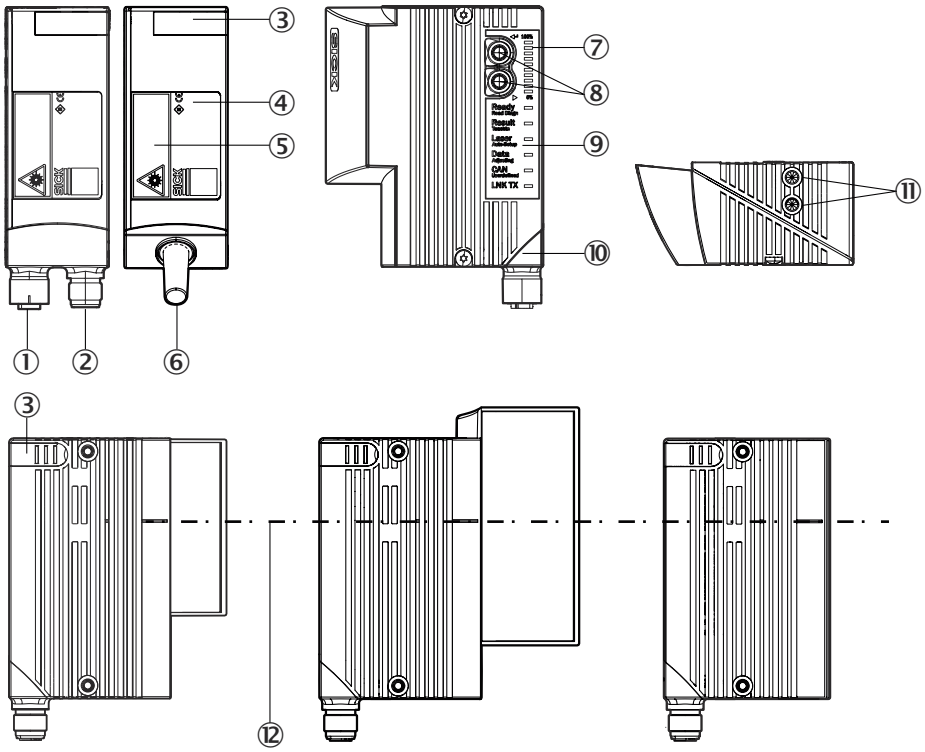


Figure 10: Device variants CLV63x to CLV65x without heating: Overview of components

① Ethernet variant: Female connector, M12, 4-pin, D-coded (Ethernet)
② Ethernet variant: Male connector, M12, 12-pin or 17-pin, A-coded
③ Cover for MicroSD card slot
④ Type label
⑤ Laserwarnschild
⑥ Serial variant: Cable with male connector, D-Sub-HD, 15-pin
⑦ Bar graph
⑧ Pushbuttons for function selection or function activation
⑨ LEDs for indicating the status
⑩ Ethernet variant: Swivel connector
⑪ Tapped blind hole M5 (5 mm deep) for mounting (4x)
⑫ Central position of the deflected laser beam in the V-shaped aperture angle

Devices in IP65 standard housing with external heating

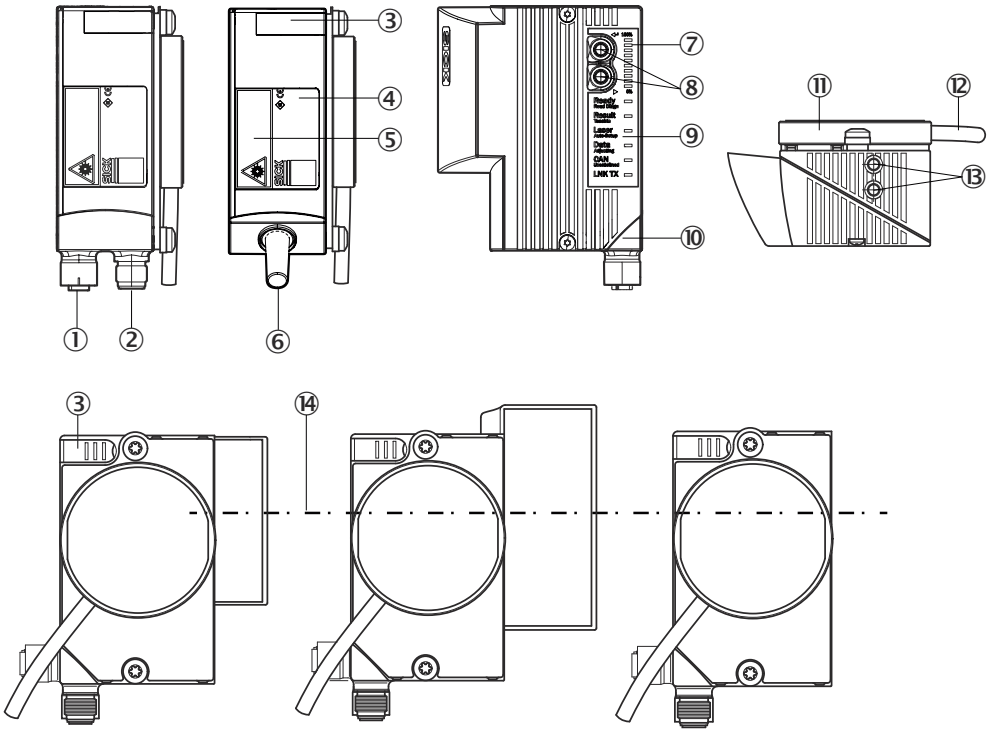


Figure 11: Device variants CLV63x to CLV65x with heating: Overview of components

① Female connector, M12, 4-pin, D-coded (Ethernet)
② Male connector, M12, 12-pin or 17-pin, A-coded
③ Cover for MicroSD card slot
④ Type label
⑤ Laserwarnschild
⑥ Cable with male connector, D-Sub-HD, 15-pin
⑦ Bar graph
⑧ Pushbuttons for function selection or function activation
⑨ LEDs for indicating the status
⑩ Swivel connector
⑪ External heating
⑫ Connecting cable of external heating
⑬ Tapped blind hole M5 (5 mm deep) for mounting (4x)
⑭ Central position of the deflected laser beam in the V-shaped aperture angle

Devices in IP69K protective housing, front viewing window

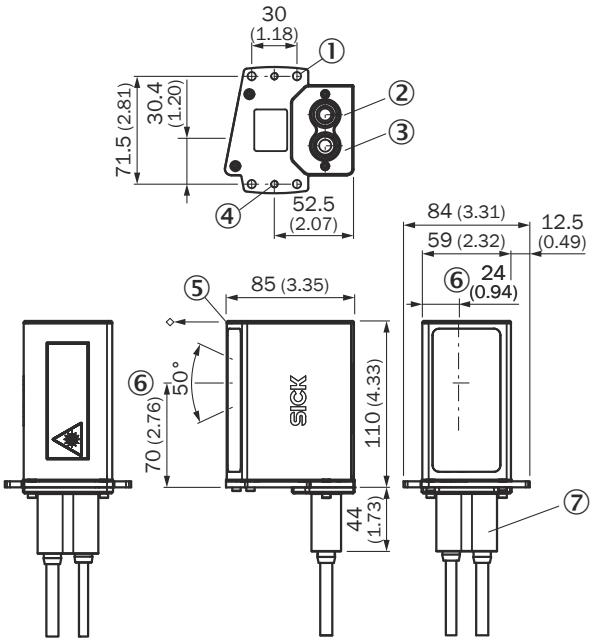


Figure 12: CLV63x/CLV64x: Ethernet variant in IP69K protective housing, with front viewing window and two M12 connections. structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing holes, Ø 5.5 mm (4 x)

② "Ethernet" connection (female connector, M12, 4-pin, D-coded)

③ "Power / Serial Data / CAN / I/O" connection (male connector, M12, 17-pin, A-coded)

④ Threaded hole, M5 (2 x)

⑤ Reference point of the reading distance (from housing edge to object)

⑥ Position of the light emission (center position of the deflected laser beam)

⑦ Protective double bushing for the electrical connections

CLV63x or CLV64x with oscillating mirror in the IP69K protective housing, side viewing window

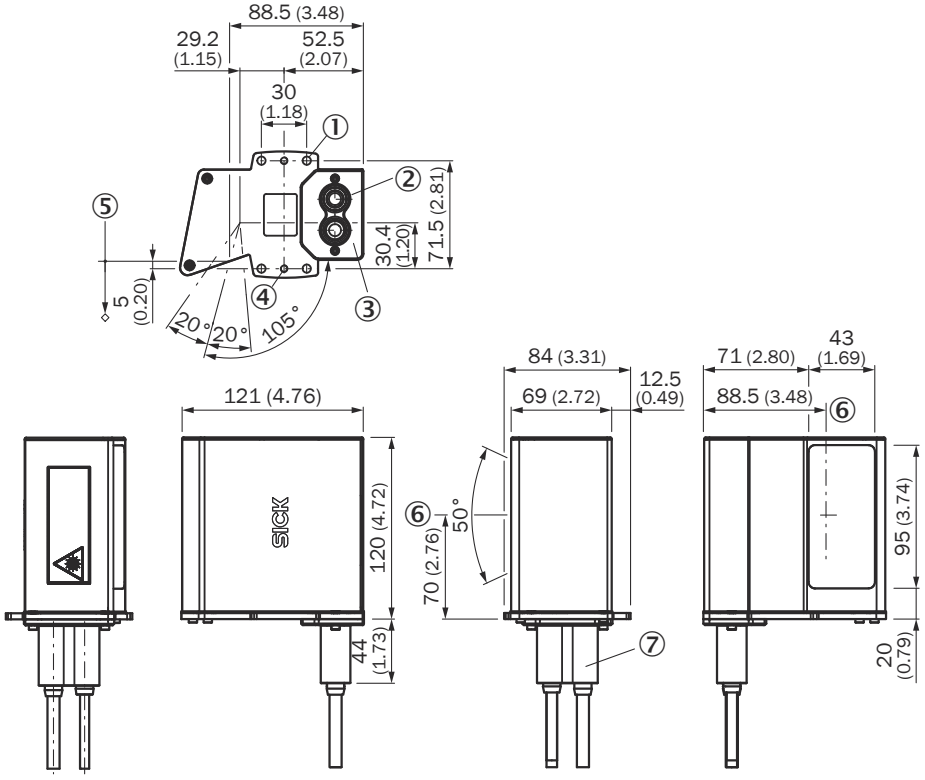


Figure 13: CLV63x/CLV64x: Ethernet variant in IP69K protective housing, with oscillating mirror (side viewing window) and two M12 connections. structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing holes, Ø 5.5 mm (4 x)
② "Ethernet" connection (female connector, M12, 4-pin, D-coded)
③ "Power / Serial Data / CAN / I/O" connection (male connector, M12, 17-pin, A-coded)
④ Threaded hole, M5 (2 x)
⑤ Reference point of the reading distance (housing edge to the object)
⑥ Position of the light emission (center position of the deflected laser beam)
⑦ Protective double bushing for the electrical connections

3.2.2 Device variants

The CLV63x and CLV64x product families each consist of 4 series:

- Ethernet variant, 12-pin, IP65 standard housing
- Ethernet variant, 17-pin, IP65 standard housing
- Serial variant, 15-pin, IP65 standard housing
- Ethernet variant, 17-pin, IP69K protective housing

The CLV65x product family consists of 3 series each:

- Ethernet variant, 12-pin, IP65 standard housing
- Ethernet variant, 17-pin, IP65 standard housing
- Serial variant, 15-pin, IP65 standard housing

The variant lines differ, amongst other things, in regard to the following features relating to the housing:

Table 7: Differences between the variant lines

Feature	Ethernet variant			Serial variant
Housing	**Standard housing [1]**		**Protective housing [2], stainless steel**	**Standard housing [1]**
Purpose	Data output via Ethernet to host			Data output via RS-232 / RS422/485 to host
Enclosure rating	IP65		IP69K	IP65
Scanning methods	Line scanning or raster scanning, depending on type			
Sensor type	Line scanner, raster scanner or line scanner with oscillating mirror			
Orientation of the viewing window	• Front or • Side or • Side with oscillating mirror		• On the front • Side with oscillating mirror	• Front or • Side or • Side with oscillating mirror
Window material of the viewing window	• Glass or • Plastic (not CLV65x)		• Plastic	• Glass or • Plastic
Reading ranges (working range) and resolution	• Short Range (CLV632) • Mid Range (CLV620) • Long Range (CLV630) • Standard density (CLV640) • High density (CLV642) • Standard density (CLV650) • Depth of field optimized for 0.5 mm resolution (CLV651)		• Short Range (CLV632) • Mid Range (CLV620) • Long Range (CLV630) • Standard density (CLV640) • High density (CLV642)	• Short Range (CLV632) • Mid Range (CLV620) • Long Range (CLV630) • Standard density (CLV640) • High density (CLV642) • Standard density (CLV650) • Depth of field optimized for 0.5 mm resolution (CLV651)
Focus	• Fixed focus (CLV63x) • Dynamic focus adjustment (CLV64x) • Auto focus or dynamic focus adjustment (CLV65x)		• Fixed focus (CLV63x) • Dynamic focus adjustment (CLV64x)	• Fixed focus (CLV63x) • Dynamic focus adjustment (CLV64x) • Auto focus or dynamic focus adjustment (CLV65x)
Scanning frequency	• 400 Hz ... 1,200 Hz (CLV63x, CLV64x) • 600 Hz ... 1,000 Hz (CLV65x)		• 400 Hz ... 1,200 Hz (CLV63x, CLV64x)	• 400 Hz ... 1,200 Hz (CLV63x, CLV64x) • 600 Hz ... 1,000 Hz (CLV65x)
Operating buttons	2		Omitted	2
Optical displays	6 and 1 bar graph		Omitted	6 and 1 bar graph
Connection type	Swivel connector		1 male connector, 1 female connector	Cable with D-Sub HD male connector
Electrical Interfaces	• Power • Ethernet (Host, AUX) • RS-232 (Host, AUX) • RS-422/845 (host) • CAN • 1 digital input	• Power • RS-232 (Host, AUX) • RS-422/845 (host) • CAN • 2 digital inputs • 2 digital outputs	• Power • RS-232 (Host, AUX) • RS-422/845 (host) • CAN • 2 digital inputs • 2 digital outputs	• Power • RS-232 (Host, AUX) • RS-422/845 (host) • CAN • 2 digital inputs • 2 digital outputs

Feature	Ethernet variant			Serial variant
Housing	**Standard housing [1]**		**Protective housing [2], stainless steel**	**Standard housing [1]**
Type of electrical connections	• 1 male connector, M12, 12-pin, A-coded • 1 female connector, M12, 4-pin, D-coded	• 1 male connector, M12, 17-pin [3], A-coded • 1 female connector, M12, 4-pin, D-coded	• 1 male connector, M12, 17-pin, A-coded • 1 female connector, M12, 4-pin, D-coded	1 male connector, D-Sub HD, 15-pin
Supply voltage	• 18 V DC... 30 V DC • 24 V DC ± 10% (with heater)		• 18 V DC... 30 V DC	• 18 V DC... 30 V DC • 24 V DC ± 10% (with heater)
Power consumption [4]	• CLV63x: typ. 5 W (line or raster scanner) • CLV64x: typ. 5.5 W (line or raster scanner) • CLV65x; typ. 8.5 W (line scanner), typ. 9.5 W (line scanner with oscillating mirror) • Maximum 40 W (max. 2.4 A) with heating			
Heater (external)	Optional		–	Optional
Laser warning label	Stuck on		Lasered on	Stuck on
Ambient operating temperature	• 0 °C ... +40 °C • –35 °C ... +35 °C (devices with heater)			
Storage temperature	• –20 °C ... +70 °C • –35 °C ... +35 °C (devices with heater)			
Dimensions for device with front viewing window	• 61 mm x 96 mm x 38 mm (no heater) • 61 mm x 96 mm x 50 mm (with heater)		• 85 mm x 84 mm x 154 mm	• 61 mm x 96 mm x 38 mm (without heater) • 61 mm x 96 mm x 50 mm (with heater)
Dimensions for device with side viewing window [5]	• 80 mm x 96 mm x 38 mm (without heater) • 80 mm x 96 mm x 50 mm (with heater)		–	• 80 mm x 96 mm x 38 mm (without heater) • 80 mm x 96 mm x 50 mm (with heater)
Dimensions for device with side viewing window and oscillating mirror [5]	• 95 mm x 96 mm x 38 mm (without heater) • 95 mm x 96 mm x 50 mm (with heater)		• 121 mm x 84 mm x 154 mm	• 95 mm x 96 mm x 38 mm (without heater) • 95 mm x 96 mm x 50 mm (with heater)

1) Aluminum
2) Not applicable for CLV65x.
3) Available on request.
4) With digital outputs loaded.
5) Ethernet variant: without protruding connections on the connector.

3.2.3 Product features and functions (overview)

Table 8: Overview of product features and functions of the device

Product feature/function	Characteristic
Safety and ease of use	• Rugged, compact IP65 metal housing, CE marking (Europe) • Optional: IP65 housing with heating for cold storage applications • Optional: Type-dependent IP69K protective housing for harsh ambient conditions (not CLV65x) • Laser Class 2, laser switches off if the output power is exceeded • Automatic self-test on system start • Diagnostic tools for system setup and (remote) system monitoring • Configurable output of reading diagnostic data in two reading results formats • Operating data polling, in case of error, issue of error code if required • Activatable test string function (heartbeat) to signal that the device is ready for operation • Password-protected configuration mode via SOPAS ET • Future-oriented SOPAS ET configuration software • Low power consumption • Wide supply voltage range (devices without heating) • Optional parameter cloning: o Using memory card in the device o Using external CMC600 parameter cloning module in the CDB/CDM connection module
Convenient operation and configuration	• Configuration via SOPAS ET configuration software (online/offline) or commands • Type-dependent configuration via GSD parameterization (via CDF600-2xxxx or using Ethernet variant) • LED status indicators [1)] • Auto setup of the optical reading properties • Profile programming with bar codes, generated and printed via SOPAS ET • Two pushbuttons on the device for executing preset functions without connecting a computer [1)] • Deactivatable acoustic signaling device for confirming device functioning [1)]
Reading Operation Mode	• Start/stop operation (one bar-code bearing object per reading pulse) • Tracking operation (CLV65x-x8300A)
Read cycle	• Pulse sources for start: Digital inputs, data interface (command), auto pulse, free-running, CAN • Pulse sources for stop: Read cycle source, digital inputs, data interface (command), timer, condition
Bar code evaluation	• All current 1D bar code types • Max. number of bar codes: 50 per reading interval • Separation of identical codes of the same code type by read angle
Data processing	• Output of read data configurable through event-dependent evaluation conditions • Influencing the output string by filtering and output sorting
Data communication	• Host interface: Two data output formats can be configured for the reading result, can be switched to various physical interfaces, parallel operation possible • AUX interface: Fixed data output format that can be switched for various physical interfaces

1) Not available for devices in the IP69K protective housing.

2) E. g., non-IO-Link capable photoelectric sensor for local, object-specific triggering.

3.2.4 Operating principle

The device consists of a laser scanner (laser diode and optics), an electronics unit with integrated decoder and various data interfaces (type-dependent) to industrial bus systems. The use of various focusing settings, resolutions, scan processes, bus systems, mounting options and optics enables use in most industrial applications. Interfaces to external timers, such as photoelectric sensors or incremental encoders, enable reading pulses independent of the control. The device makes the read results available for further processing via its data interfaces.

The device basically detects the codes on any side on an object (single side reading). The objects can be at rest or moved in a conveyor system.

By combining several devices , multiple sides of an object can be recorded in one passage (multi-side reading).

To capture the codes, the device generates a scan line (line scanner).

In the raster scanner version, the device generates eight scan lines. The lines are offset parallel to each other.

Line scanner with oscillating mirror

The oscillating mirror also deflects the scan line perpendicular to the scan direction to both sides, starting from the rest position in the center position. The movement runs at a low oscillation frequency. This enables the device to scan larger areas for bar codes.

NOTE
When the device starts up, the oscillating mirror can lead to increased noise.

The length of the scan line which can be used for evaluation (reading field height) depends on the reading distance as a result of the V-shaped light emission.

The device picks up the light patterns reflected from the bar code. In the process, the device converts the patterns into electrical signals that are processed and decoded. External sensors deliver information about the read cycle and conveyor speed (increment) to control this process. The device outputs the read results to its data interfaces, for forwarding to a coordinating host or computer.

For the detailed wiring of the device and the connections to the host or computer and to the external sensors, see see "Electrical installation", page 54.

Devices with heating

NOTE
Additional components are required for wiring via connection modules.

Components:

- CDB620 connection module: Additional terminal (see "Connecting the supply voltage", page 68)
- CDM420 connection module: Additional circuit board (see "Connecting devices with heating to connection modules", page 65)

Block diagrams

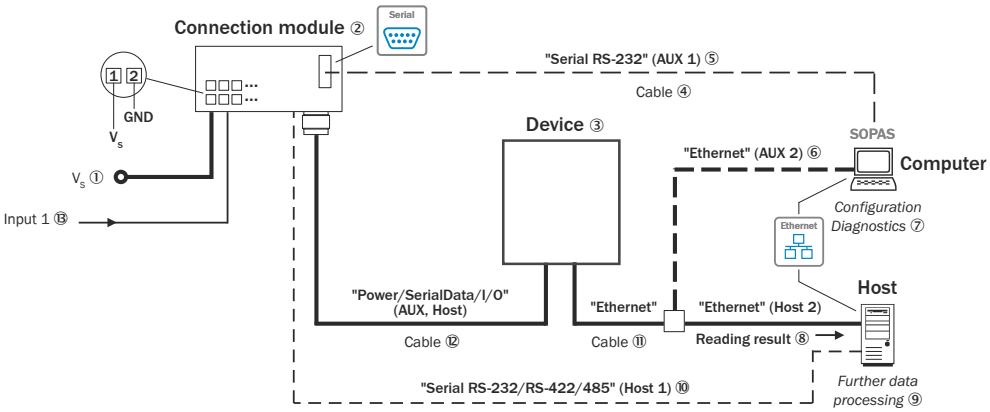


Figure 14: Connection options for CLV63x to CLV65x, Ethernet variant (male connector, M12, 12-pin, A-coded)

① Supply voltage V_S

② Connection module (optional, CDB620 here as example)

③ Device

④ Null modem cable (female connector, D-Sub, 9-pin/female connector, D-Sub, 9-pin), crossed TxD and RxD

⑤ Alternative to Ethernet AUX port

⑥ Alternative to serial AUX

⑦ Configuration or diagnostics

⑧ Read result

⑨ Data further processing

⑩ Alternative to Ethernet host port

⑪ Adapter cable (male connector, M12, 4-pin, D-coded/male connector, RJ-45, 8-pin)

⑫ Adapter cable (female connector, M12, 12-pin, A-coded/male connector, D-Sub-HD, 15-pin)

⑬ Digital input 1, e.g. for connecting a read cycle sensor

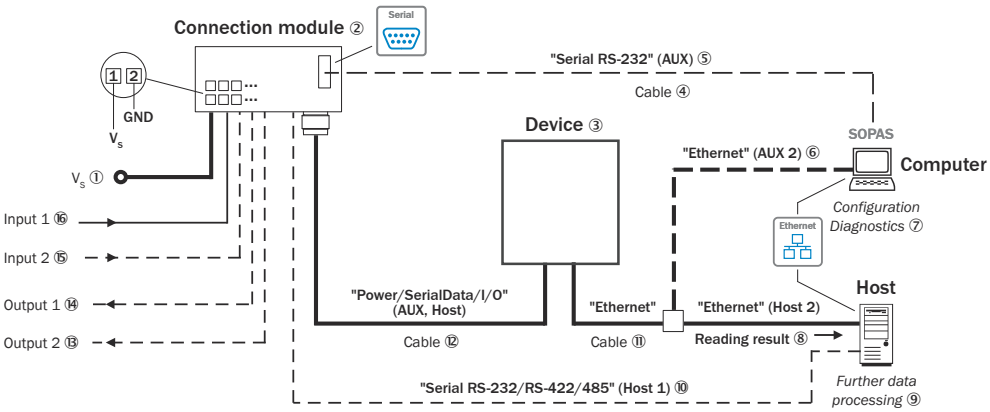


Figure 15: Connection options for CLV63x to CLV65x, Ethernet variant (male connector, M12, 17-pin, A-coded)

① Supply voltage V_S

② Connection module (optional, CDB650-204 required here)

③ Device

④ Null modem cable (female connector, D-Sub, 9-pin/female connector, D-Sub, 9-pin), crossed TxD and RxD

⑤ Alternative to Ethernet AUX port

⑥ Alternative to serial AUX
⑦ Configuration or diagnostics
⑧ Read result
⑨ Data further processing
⑩ Alternative to Ethernet host port
⑪ Adapter cable (male connector, M12, 4-pin, D-coded/male connector, RJ-45, 8-pin)
⑫ Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)
⑬ Digital output 2, e.g. for connecting an LED
⑭ Digital output 1, e.g. for connecting an LED
⑮ Digital input 2, e.g. for connecting an incremental encoder
⑯ Digital input 1, e.g. for connecting a read cycle sensor

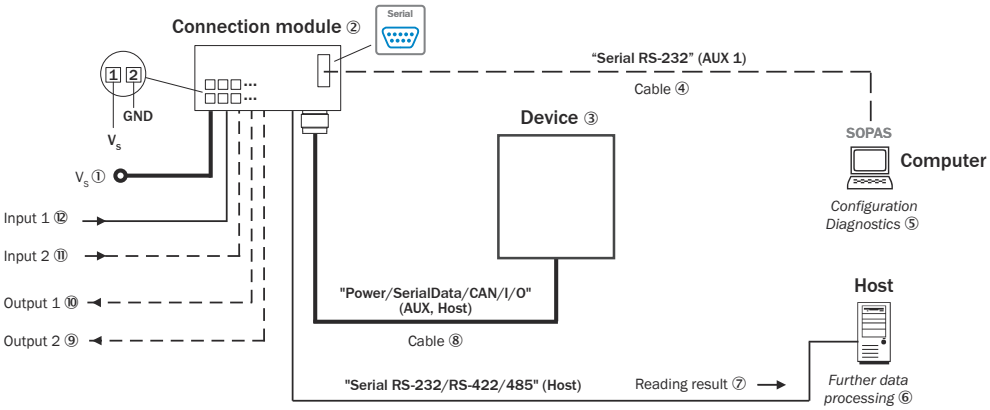


Figure 16: CLV63x to CLV65x facilities for connecting, serial variant

① Supply voltage V_S
② Connection module (optional, CDB620 here as example)
③ Device
④ Null modem cable (female connector, D-Sub, 9-pin/female connector, D-Sub, 9-pin), crossed TxD and RxD
⑤ Configuration or diagnostics
⑥ Data further processing
⑦ Read result
⑧ Serial variant: Device cable with male connector, D-Sub-HD, 15-pin
⑨ Digital output 2, e.g. for connecting an LED
⑩ Digital output 1, e.g. for connecting an LED
⑪ Digital input 2, e.g. for connecting an incremental encoder
⑫ Digital input 1, e.g. for connecting a read cycle sensor

3.2.4.1 Object trigger control

To start an object-related read operation, the device requires a suitable signal (trigger source) for reporting an object in the reading field. The start signal is provided by an external read cycle sensor (e.g. photoelectric sensor) as standard. As soon as an object has passed the read cycle sensor, the device opens a time window (“reading interval") for the reading process.

Alternatively, a command via a data interface or the SICK SENSOR network starts the reading process. In Auto pulse mode, the device internally generates the reading interval itself with an adjustable clock ratio.

The read cycle can be ended in several ways. For example, external triggering by the read cycle source or a command, or internally by a timer or a evaluation condition to be fulfilled.

NOTE
The SOPAS ET configuration software can be used to configure the trigger source.

3.2.4.1.1 Reading operation mode

In start/stop mode, there is always only one object in the reading field during the reading process. This allows all read codes to be uniquely assigned to the object. As standard, starting and stopping of the reading process are controlled by one or two read cycle sensors at the start and end of the reading field.

The distance between the read cycle sensors determines the size of the reading field. The reading process can alternatively be controlled with command strings via the data interface.

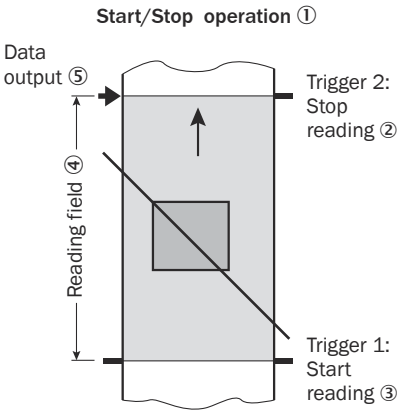


Figure 17: Start/Stop operating mode of the device in stand-alone operation

① Start/stop operation
② Trigger 2: Stop reading
③ Trigger 1: Start reading
④ Reading field
⑤ Data output

NOTE
The SOPAS ET configuration software can be used to configure the reading operation mode.

Alternatively, the configuration can also be done via GSD file (Ethernet variant/PROFINET).

3.2.4.1.2 Tracking operation (CLV65x-x8300A in IP65 standard housing only)

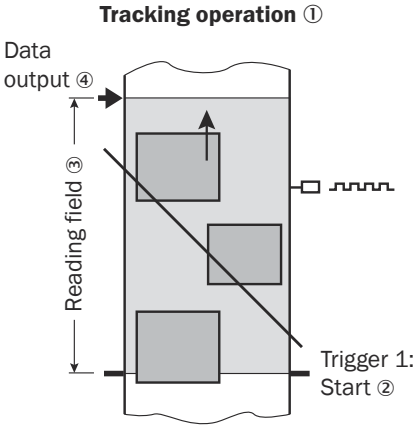


Figure 18: Tracking operating mode of the device in stand-alone operation

① Tracking operation
② Trigger 1: Start reading
③ Reading field
④ Data output

For the internal tracking operation of the device, there are a maximum of 10 objects behind each other in the reading field at the same time during the reading process.

By default, the start of the reading process is controlled by a read cycle sensor at the start of the reading field. The specified object release point defines the end of the reading field. This also defines the size of the resulting reading field.

In order to be able to track the transport of the objects in the reading field, a regular clock is required. The clock pulse is generated by an external incremental encoder, which constantly supplies one pulse to the device for at least every 1 mm movement in the conveying direction. This provides a clear temporal representation within the device of the path between the read cycle sensor and object release point.

The device also detects any fluctuations in transport speed when starting up the conveyor technology or in the event of slowing down (high load with lots of objects to convey). Alternatively, an internal clock in the device enables operation at a constant conveying speed at all times.

A gap of at least 50 mm is necessary for clear separation of successive objects.

The device outputs the read result for an object when the trailing edge of the object has passed the object release point. The reading process can alternatively be started with a command string via the data interface.

3.2.4.2 Autofocus function

The autofocus function enables the device to detect the distance of the object without the help of external sensors and to independently adjust the focus position. To do so, the device measures the distance of the object in its field of view, creates a distance profile from this internally, and positions the focus on the object.

The autofocus function works in “Difference to background” mode. The device first learns the distance profile of the background in its unobstructed field of view. To do so, there must be no objects located in the field of view. Then the device focuses on the object, which the device detects by its difference to the background. This feature is used, for example, when there is a clear view of the object, however this view is restricted by structures that constantly protrude into the reading plane. Only one object with bar code(s) is in the reading field per read cycle.

The SOPAS ET configuration software can display the distance profile that was created for the background.

The desired autofocus area is set as follows:

- Select the aperture angle and the autofocus area
- Device with oscillating mirror: also select the oscillation amplitude (the angle of deflection).

The following parameters, among others, can be specified for the device:

- The park position (preferred position) of the focus position, from which the device refocuses at each reading
- A temporal and/or localized delay (timeout or hysteresis)

If required, an additional offset can be applied to the focus position set by measurement. This optimizes the radial depth of field for the object. The V principle of beam deflection causes the radial gradient in the direction of the scan line.

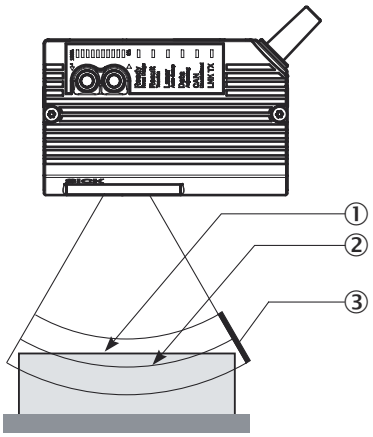


Figure 19: Distance measurement of the device in the IP65 standard housing: Optimizing the depth of field on the object

① Measured distance

② Optimized focus position: measured distance plus offset for maximum

③ Depth of field (DOF)

NOTE

Configuration of the autofocus function using the SOPAS ET configuration software: Project tree, CLV6xx, parameters, read configuration, focus control, Options tab, autofocus parameters

3.2.4.3 Switchable focus position

As an alternative to the autofocus function (CLV65x only), the focus position can also be changed dynamically to cover a large reading range.

For this purpose, a maximum of eight reading ranges can be defined internally as a distance configuration and, during reading operation, moved to by the optics in any order.

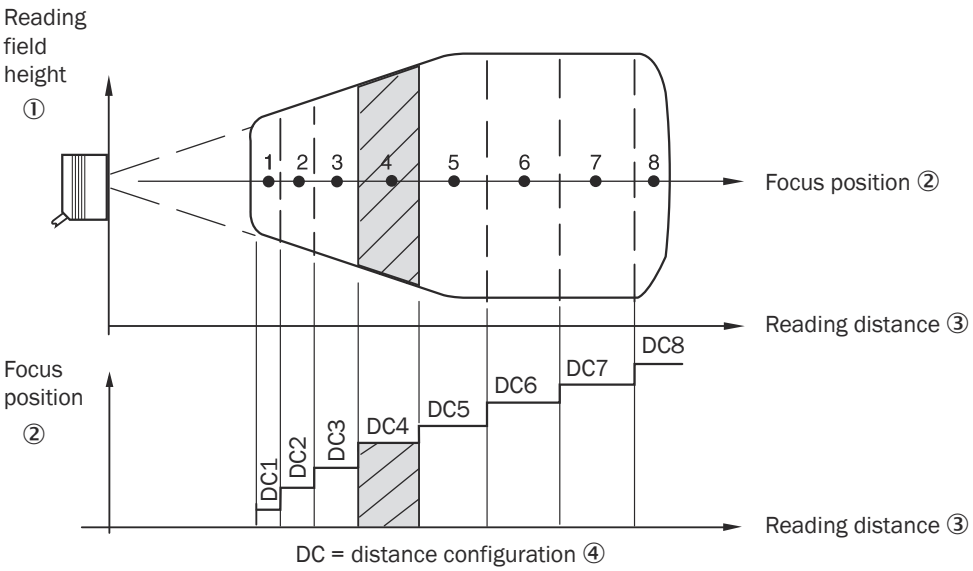


Figure 20: Focus switching: Division of the total reading range into distance configurations

① Reading field height
② Focus position
③ Reading distance
④ Distance configuration

The switching of the focus is carried out by the changing object distance (e.g. during reading from the top: object height detection).

Trigger sources for switching are:

- Signal at digital input, e.g., “Sensor 2”, for maximum 2-stage switching
- Command to the host interface or the integrated timer (e.g. for search run) for the maximum 8-step switchover
- Oscillating mirror reversal points of the bilateral deflections for the line scanner with oscillating mirror

The distance configurations are assigned to the switching order via a programmable assignment table.

NOTE
The SOPAS-ET configuration software can be used to configure the focus position:

- Project tree, CLV6xx, parameters, read configuration
- Project tree, CLV6xx, parameters, read configuration, oscillating mirror
- Project tree, CLV6xx, parameters, read configuration, focus control

3.2.4.4 Oscillating mirror control

In the case of a line scanner with oscillating mirror, the position of the scan line is affected by the configuration of the oscillating mirror.

In addition to “parking” (fixed, adjustable position of the scan line) or continuous oscillation, optimized functional sequences, related to the read cycle, are also possible by controlled operation of the oscillating mirror:

- N-fold oscillation around an adjustable start position within the read cycle
- One-Shot: single deflection (approach and return) per read cycle from an adjustable start position

In each oscillation mode, the deflection width can be set (amplitude) independently for each of the deflection directions. Within the selected cycle duration of the entire vibration process, the deflection speeds can be set in relation to each other for both deflection directions.

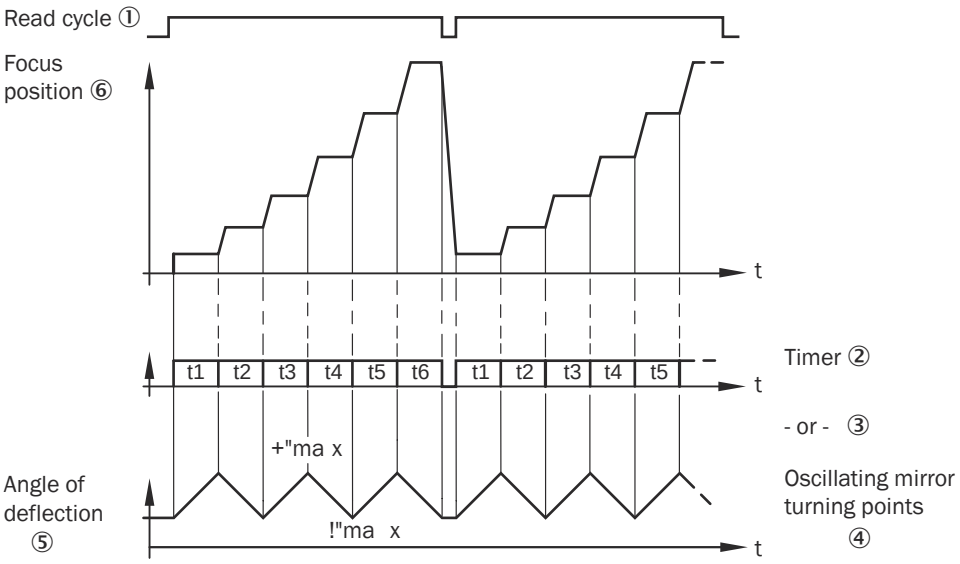


Figure 21: Oscillating mirror: Example for focus position control in a search run, here with 6 focus positions

① Read cycle
② Timer
③ - or -
④ Oscillating mirror reversal points
⑤ Angle of deflection
⑥ Focus position

NOTE

The SOPAS-ET configuration software can be used to configure the vibration behavior and the position of the oscillating mirror.

Support Portal

NOTE

In the SICK Support Portal (supportportal.sick.com, registration required) you will find, besides useful service and support information for your product, further detailed information on the available accessories and their use.

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.

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.
- To allow any residual dampness to evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 96.

- Relative humidity: see "Technical data", page 96.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Overview of mounting procedure

NOTE
Special procedures are required for the mounting, installation and commissioning of devices with heating.

Observe the corresponding instructions see "Mounting device", page 43, see "Notes on the electrical installation", page 54 and see "Connecting the supply voltage", page 68.

- Selecting and preparing the mounting location.
- Mounting the device.
- Connect serial variant to combined data and supply cable. Connect Ethernet variant to isolated data cable and supply cable.
- Align the device towards object with bar code.
- Adjust the device.

NOTICE
Danger due to damage to the device
For reasons of safety, if a device shows visible signs of damage do not put it into operation. Immediately take a device that is in operation out of operation.

Damage includes, depending on the type of device, for example the following:
- Viewing window pane: Cracked or broken
- Housing: Cracked or broken
- Violation of the cable outlet on the housing or the cable itself
- Overtightening of the male connector unit, tearing or breakage of the housing
- Moisture penetration in the device

5.2 Preparing for mounting

5.2.1 Mounting requirements

Space requirements

- For typical space requirements for the device: See type-specific dimensional drawing and reading field diagram.
- The device requires a direct, unimpeded line of sight to the codes being read.
- Make sure path between the bar code and the viewing window of the device is of sufficient size. The light reflected from the bar code must be able to reach the viewing window without interference. This means that there must be a free corridor along the entire light path. The height of the corridor must be at least equal to the height of the viewing window.

Environmental influences

- Comply with technical data, e.g. permissible ambient conditions for operating the device (temperature range, EMC interference emission, ground potential), see "Technical data", page 96.
- To prevent the formation of condensation, avoid exposing the device to rapid changes in temperature.
- Devices without heating: To avoid additional external heating of the device during operation or optical device dazzle, protect the device from direct or indirect sunlight.
- Devices with heating: To prevent optical device dazzle, protect the device against direct and indirect sunlight.

Enclosure rating

- For further information, see "Conditions for specified enclosure rating", page 9

Mounting

IP65 standard housing:

- The device must only be mounted using the pairs of blind tapped holes provided for this purpose.

IP69K protective housing:

- The device must be mounted using the two blind tapped holes provided or with at least two of the four fixing holes.

NOTE
For more detailed information on mounting and electrical installation of the devices, see “Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing”, part no. 8021479.

General:

- Mount the device in a shock and vibration insulated manner.

Equipment required

- Mounting device (bracket) with sufficient load-bearing capacity and suitable dimensions for the device.
- IP65 standard housing: 2 M5 screws – the maximum screw-in depth in the device is 5 mm from the housing surface.
- Tool and tape measure

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

NOTE
The scope of delivery of a SICK bracket already includes the right screws for mounting the device to the bracket.

5.2.2 Mounting device

The device is mounted as follows, depending on the type of housing:

IP65 standard housing without or with heating:

- The device is mounted to the bracket via at least two M5 tapped blind holes. The blind tapped holes are located in pairs on both of the narrow sides of the device, see "Device view", page 23.

IP69K protective housing:

- The device is attached to the bracket via M5 tapped blind holes or fixing holes. The two tapped blind holes and four fixing holes are located in the base plate of the device, symmetrically divided on the two narrow sides, see "Device view", page 23.

SICK brackets

The device can be installed using optional SICK brackets or customer-specific brackets.

SICK offers prefabricated brackets which are optimally suited for the mounting of the device in a wide range of applications. See:

- **www.sick.com/CLV63x**
- **www.sick.com/CLV64x**
- **www.sick.com/CLV65x**

Example: The design of the bow-shaped mounting bracket can, for example, support a variety of mounting variants and the alignment of the device in two axes.

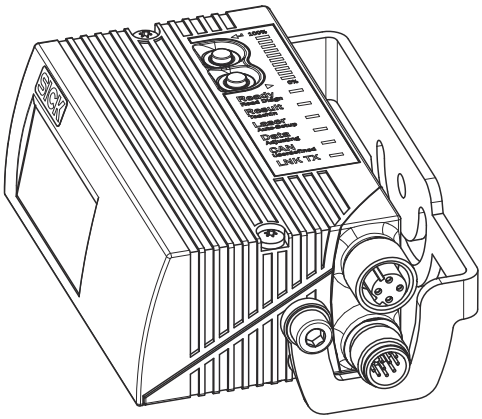


Figure 22: Mounting example of a device (IP65 standard housing) with bow-shaped mounting bracket. Illustration may differ from actual device.

Devices in IP65 standard housing with heating

NOTE
In devices with heating, use special mounting brackets for thermal decoupling.

Suitable mounting brackets are available as accessories (part no. 2050705 and 2058082). Use the plastic insulating washers for thermal insulation of the device against the bracket. These insulating washers are included with the mounting brackets for thermal decoupling.

You will find corresponding mounting brackets under:

- www.sick.com/CLV63x
- www.sick.com/CLV65x

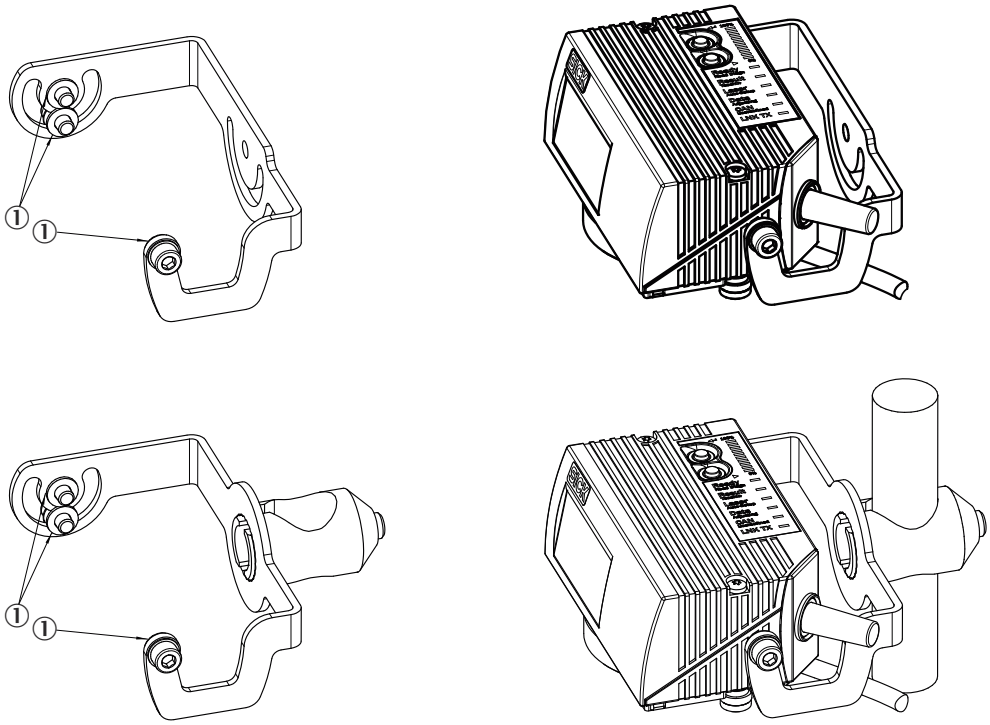


Figure 23: Mounting examples for device with heating: Mounting via bow-shaped mounting bracket (SICK accessories). Illustration of the device may differ.

① Plastic insulation panes

User-supplied brackets

Bracket requirements:

- Stable mounting device
  - Orientation of the device changeable in the x- and y-axis
  - The mounting device must be able to bear the weight of the device and connecting cables without shock.
  - Devices with heating: Thermal decoupling of the housing from the bracket
- Depending on the device, at least two M5 screws for mounting the device
- Devices with heating: Use three plastic insulating washers for heat decoupling with respect to the mounting bracket (bow-shaped).
  - The screw length depends on the wall thickness of the mounting device.
  - The maximum screw in-depth in the device is 5 mm from the housing surface.

5.3 Mounting location

Observe the following aspects when selecting the installation location:

- Basic assignment of the scan line to the bar code
- Reading distance to bar code and aperture angle α (see figure 24, page 46)
- Angular orientation of the device to the bar code
- Avoidance of surface reflections
- Counting direction of the reading angle (position of the bar code within the scan line)

5.3.1 Basic assignment of the scan line to the bar code

The basic allocation of the scan line to the bar code on the object depends on the sensor type of the device: Line scanner on the front or to the side, grid scanner or line scanner with oscillating mirror

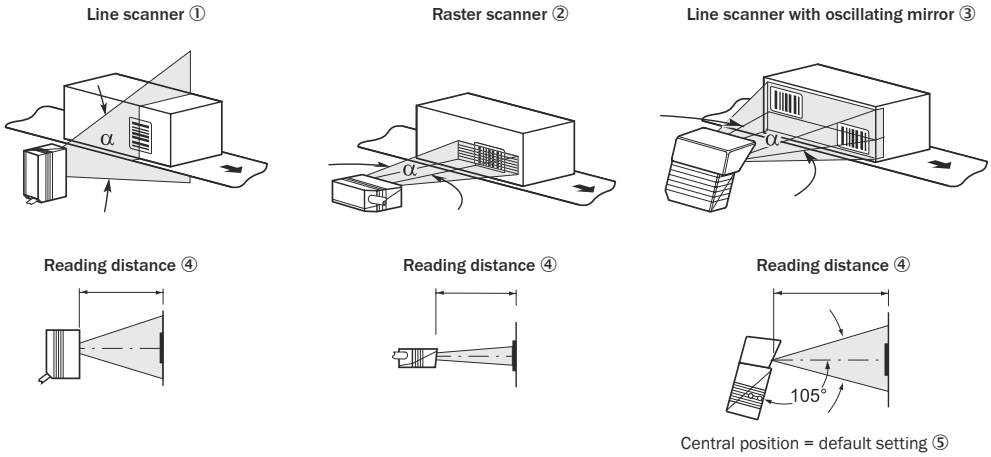


Figure 24: Allocation of scan line(s) to bar code and conveyor direction

① Line scanner
② Grid scanner
③ Line scanner with oscillating mirror
④ Reading distance
⑤ Middle position = default

5.3.2 Reading distance to the bar code and aperture angle α

The maximum distance from the viewing window of the device to the bar code may not exceed the limit values for the device. Because of the V-shaped deflection of the beams, the usable length of the scan line for evaluation (reading field height) depends on the reading distance.

The specification diagrams show the height of the reading field as a function of the reading distance at different resolutions (module widths), see "Technical data", page 96.

5.3.3 Angular orientation of the device

When the scan line sweeps across the bar code at nearly a right angle, the optimal alignment of the device has been achieved (azimuth and tilt). Possible reading angles that may occur between the scan line and the bar code must be taken into account. This applies to all three levels in the room.

To avoid surface reflections, select a rotation angle of approx. 15° from the perpendicular to the bar code, see "Avoiding surface reflections", page 47.

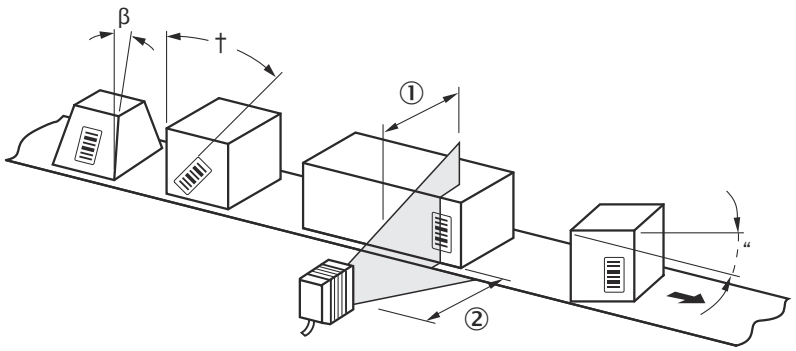


Figure 25: Line scanner: Occurring reading angle between scan line and bar code

① Depth of field
② Reading distance

Table 9: Permitted read angle between scan line and bar code

Angle	Limit Value	
Tilt α	CLV63x, CLV64x: max. 30°	CLV65x: max. 45°
Pitch β	Max. 45°	
Skew γ	Max. 45°	

NOTE

The specified maximum values can only be achieved if conditions are optimal. The actual maximum depends on module width, code type, print contrast, ambient light, distance and scanning frequency.

5.3.4 Avoiding surface reflections

If the light of the scan line(s) hits the surface of the bar code exactly perpendicular, disturbing reflections may occur.

To avoid this effect when receiving the backscattered light, mount the device so that the outgoing light is tilted relative to the perpendicular.

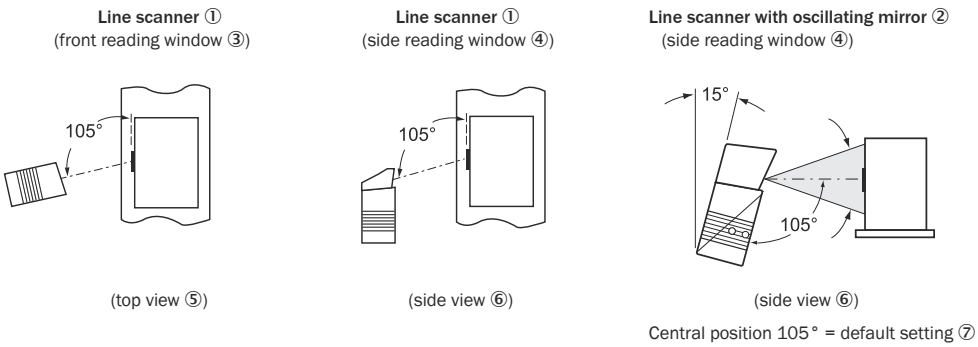


Figure 26: Avoiding surface reflections: Angle between light emitted and bar code (tilting away from vertical)

① Line scanner
② Line scanner with oscillating mirror
③ Front viewing window
④ Side viewing window
⑤ Supervision
⑥ Side view
⑦ Middle position 105° = default

NOTE

When the scan line is tilted approx. 15° from the perpendicular, optimum results are obtained.

With devices with oscillating mirror, these values refer to the center position of the scan field.

5.3.5 Counting direction of the reading angle and the code angle

The device can scan and decode several bar codes at each reading.

The device determines the location-specific read diagnostics data per bar code and optionally outputs these data in the read result:

Reading angle (RA value)

- This value specifies the angle at which the deflected scanning beam detects the bar code center with the red scan line in the scan plane. This value is within the aperture angle of the device.

A device with oscillating mirror optionally also outputs:

Code angle (CW value)

- This value specifies the angle of deflection of the oscillating mirror at which the deflected scanning beam detects the center of the bar code with the red scan line. The deflection is perpendicular to the scan plane.

Identical bar codes (code type, code length and data content) can be distinguished by determining the RA and CW values. This allows the bar code data to be assigned based on the position on the object.

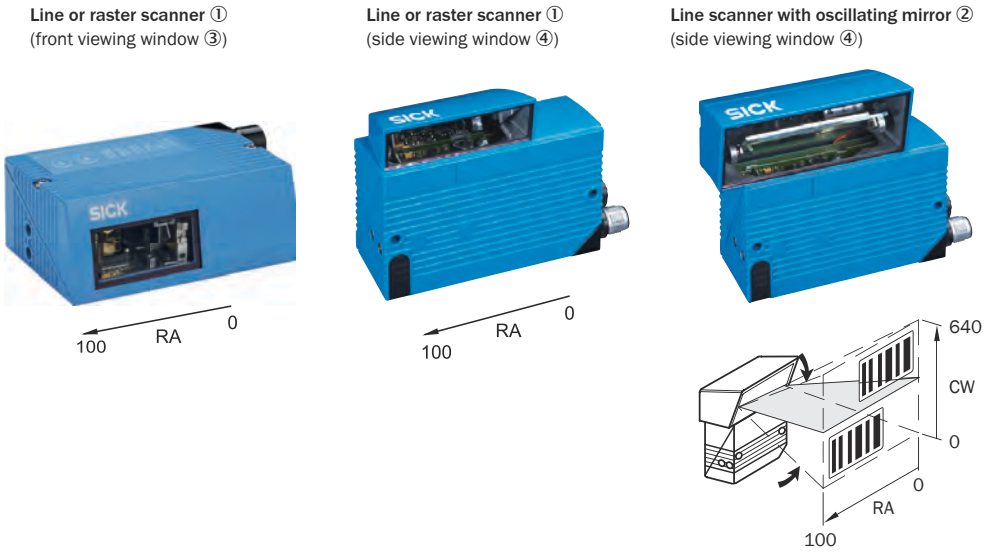


Figure 27: Counting direction: Reading angle RA in the scan plane and angle of deflection CW of the scan line

① Line or grid scanner
② Line scanner with oscillating mirror
③ Front viewing window
④ Side viewing window

Resolution of the reading diagnostic data:

- Reading angle α (aperture angle) in the scan plane: 1° = 2 RA (50° = 100 RA)
- Angle of deflection of the scan line transverse to the scan plane: 1° = 16 CW

5.4 Mounting device

Devices in IP65 standard housing

Device with heating:

NOTE

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

If the device is used outside, we recommend installing it into an suitable protective housing. This prevents contamination of the viewing window by rain, snow or dust. The housing also protects from wind.

NOTICE
Risk of damage to components

Do not move the following components when the ambient temperature is below 0 °C:

- Connecting cables
- Swivel connector on device (type-dependent)
- Configuration switch in the optional connection module

General:

NOTICE
Risk of damage to the device

the device will be damaged if the tightening torque of the mounting screws is too high or if the maximum screw-in depth of the blind hole threads is exceeded.

- ▶ Observe maximum tightening torque.
- ▶ Use suitable mounting screws for the blind hole threads of the device. Observe the maximum screw-in depth.

Maximum tightening torque: 2.5 Nm

Screw-in depth of the blind tapped holes see "Mechanics/Electronics", page 99 in the technical data.

1. Prepare the base for mounting the bracket of the device, see "Preparing for mounting", page 42.
2. Place the object with bar code at the intended reading point of the device in the viewing range of the device (no conveying movement).
3. Align device with the bar code by eye. When doing so, be aware of the following:
   - For devices with a front viewing window: The rear of the device with the laser warning label faces the viewer and is aligned approximately parallel to the bar code surface.
   - For devices with a side viewing window: The side panel with the LEDs faces the viewer and is aligned almost parallel to the bar code surface.
   - For a device with oscillating mirror: The back of the oscillating mirror is approximately parallel to the bar code surface.
   - During reading, note the reading angle that occurs see "Angular orientation of the device", page 46.
   - If the position of the bar code within the scan line is relevant for the evaluation, observe the counting direction of the code position, see "Counting direction of the reading angle and the code angle", page 47.
4. Mount the device bracket onto the base.
5. Screw suitable screws through the bracket into the blind tapped hole of the device. Tighten the screws lightly for the time being.
6. Adjust the device, see "Adjusting the device for operational use", page 81.
7. After adjustment, tighten the screws. Do not exceed the maximum tightening torque.

Devices in IP69K protective housing

NOTE

For more detailed information on mounting and electrical installation of the devices, see “Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing”, part no. 8021479.

5.5 Mounting with shock mounts (optional)

Devices in IP65 standard housing

In application areas with severe vibrations or shocks to the device, mount the device in conjunction with a suitable vibration damper. Faults are caused by vibrations, shakes or abrupt changes in directions, e.g., when the device is mounted on a manned forklift truck.

You can find suitable SICK mounting brackets with integrated vibration and shock damping (absorbing elements) on the product page at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

NOTICE

Device damage due to unsuitable devices!

Mounting with vibration dampers is not suitable for devices with an oscillating mirror.

▶ Mounting bracket with integrated vibration and shock damping for devices with a front viewing window only.

Figure 28: Device with mounting bracket (top bracket)

Figure 29: Device with mounting bracket (bottom bracket)

Permissible mounting variants

The following two mounting variants using the SICK mounting bracket part no. 2042799 with integrated vibration and shock damping are permissible for line scanners (horizontal scan line):

1. Horizontal mounting bracket mounted above the device (suspended device)

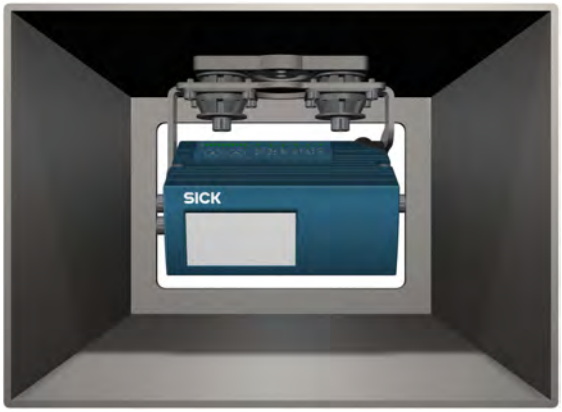


Figure 30: Mounting with top mounting bracket

2. Horizontal mounting bracket mounted below the device (standing device)

Figure 31: Mounting with bottom mounting bracket

NOTICE

Device damage due to incorrect installation position!

An incorrect installation position limits the absorption effect or amplifies the loads that occur.

▶ Implement only one of the two listed mounting variants.

Mounting the device

When mounting a bracket with vibration damper, observe the following points:

- Screw the mounting bracket directly onto the device.
- Attach the vibration damper as close to the device as possible.
- Fasten the device to the bracket with vibration dampers. Use at least two M3 tapped blind holes when doing so. The blind tapped holes are located in pairs on both of the narrow sides of the device, .see "Dimensional drawings", page 111
- Mounting the device is the same as mounting using mounting brackets, see "Mounting device", page 43.

NOTICE

Damage to device through improper mounting!

To avoid damage during mounting and subsequent operation of the device, observe the following:

- Mount the vibration damper horizontally above or below the device.
- Only use the screws provided.
- Allow a working distance of at least 25 mm in all axis directions of the device. This is particularly important when the device is installed at an angle.
- To ensure strain relief, select an appropriate length for the connecting cables based on the working distance.

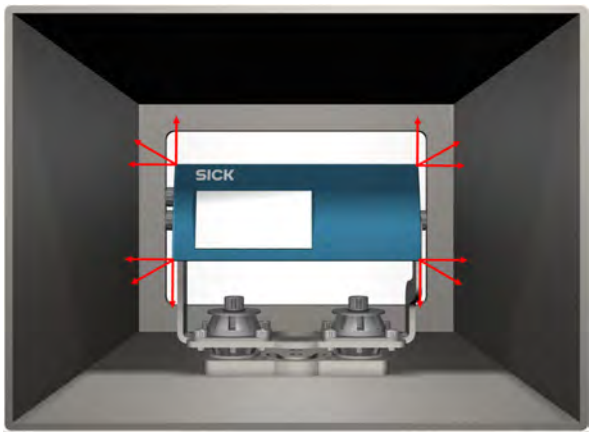


Figure 32: Mounting with mounting bracket: Taking into account the working distance.

Observe the following during operation:

NOTICE

To avoid damage to the device during operation, observe the following:

- The ground traveled upon is in good condition, e.g., free of large expansion joints and potholes.
- Recommendation for mounting of the vibration damper by the customer: To prevent the mounting screws from loosening, wet them with a thread-locking screw, preferably LOCTITE 268.
- Forklift truck applications: Ensure appropriate driving behavior when lowering the forks, e.g., do not drive with the fork lowered, gently lift the load
- Recommendation: Use a soft drop system.

NOTICE

Device damage due to lack of maintenance of the mounting brackets!

Mounting brackets with integrated vibration and shock absorption are subject to wear and tear under heavier loads. The mounting brackets must therefore be assessed and maintained on a regular basis. The exchange interval is application-specific and depends on the level of exposure to vibrations and shocks.

5.6 Mounting external components

5.6.1 Mounting the connection module

If a connection module is used for device control, mount the connection module close to the device.

NOTE

Observe the maximum cable length when connecting to the serial AUX interface.

If the computer with the SOPAS ET configuration software accesses the AUX interface (RS-232; 57.6 kBd) of the device via the connection module, do not mount the connection module further than a 3 m cable length from the device.

1. Mount the connection module in the vicinity of the device.
2. Mount the connection module in such a way that the open module can be accessed at all times.

NOTE

For detailed information on mounting and electrical installation, please refer to the respective operating instructions for the connection module.

5.6.2 Mounting external read cycle sensor

If an external read cycle sensor (e.g. photoelectric sensor) triggers the device, mount the sensor close to the device.

NOTE

A large selection of photoelectric sensors and accessories (brackets, connecting cables) can be found at www.sick.com.

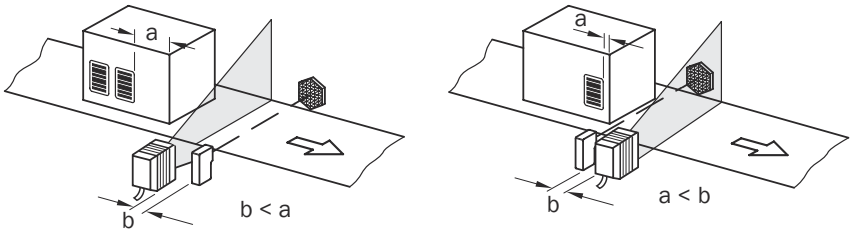


Figure 33: Bar code at the end or start of the piece goods

The mounting location of the device depends on distance “a” of the bar codes from the front object edge. Depending on the application, mount the device so that bar codes on objects of different sizes can be read completely during the evaluation time window (reading interval).

5.6.3 Mounting incremental encoder

CLV65x-x8300A: An incremental encoder is required to use the tracking function.

The incremental pulses must originate from the area of the conveying line on which the device is reading.

1. Mount a suitable incremental encoder in the vicinity of the device.
   Optimally, mount the incremental encoder in front of the device against the direction of travel of the conveying line.
2. Create direct and secure contact with the drive technology and ensure that friction wheel turns without slipping.

6 Electrical installation

6.1 Safety

6.1.1 Notes on the electrical installation

Devices in IP69K protective housing

NOTE
For more detailed information on mounting and electrical installation of the devices, see “Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing”, part no. 8021479.

All devices:

NOTICE
Equipment damage due to incorrect supply voltage!
An incorrect supply voltage may result in damage to the equipment.

- Only operate the device using a protected low voltage and safe electrical insulation as per protection class III.

NOTICE
Equipment damage or unpredictable operation due to working with live parts.
Working with live parts may result in unpredictable operation.

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

- **The electrical installation must only be performed by electrically qualified personnel.**
- **Standard safety requirements must be observed when working on electrical systems!**
- Only switch on the supply voltage for the device when the connection tasks have been completed and the wiring has been thoroughly checked.
- When using an extension cable with an open end, make sure that bare wire ends are not touching (risk of short-circuit when the supply voltage is switched on). Wires must be properly insulated from each other.
- Wire cross-sections in the supply cable from the user’s power system must be selected in accordance with the applicable standards. When this is done in Germany, observe the following standards: DIN VDE 0100 (Part 430) and DIN VDE 0298 (Part 4) or DIN VDE 0891 (Part 1).
- All circuits connected to the device must be designed as SELV circuits (EN 60950-1) or ES1 circuits (EN 62368-1).
- Protect the device with a separate fuse at the start of the supply circuit. Protect devices without heating with a maximum of 2 A, heatable devices with a maximum of 3 A .

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.

Enclosure rating

For further information, see "Conditions for specified enclosure rating", page 9

Additional information on devices with heating

When using heatable devices, you must also keep in mind the following points:

- Use cables suitable for the environmental conditions. In case of doubt, consult SICK Service.
- Supply voltage range restricted: 24 V DC ± 10 %
- Connection work only in the temperature range: 0 °C ... +40 °C
- When mounting, make sure that a thermal transition between the device and the environment is largely reduced. To do this, insert the decoupling material supplied with the device between the device and the bracket. If necessary, use appropriate brackets (optional accessories).
- The device must be in a non-operating state (no mounting or connection work).

6.1.2 Note on the swivel connector

NOTE
The swivel connector is type-dependent. The unit is not available on all models of the device.

NOTICE
Damage to the male connector unit due to overtightening
The connector unit on the device has two opposite end positions.

- Do not rotate the connector unit from either of the two end positions by more than 180°.
- Always rotate the connector unit in the direction of the display LEDs.

Figure 34: Swivel connector unit, rotation direction from end position to end position

6.2 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. For example, ensure low-impedance and current-carrying equipotential bonding.

The device is designed and tested for electrical safety in accordance with EN 62368-1.

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

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

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

This is achieved by complying with the following conditions:

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

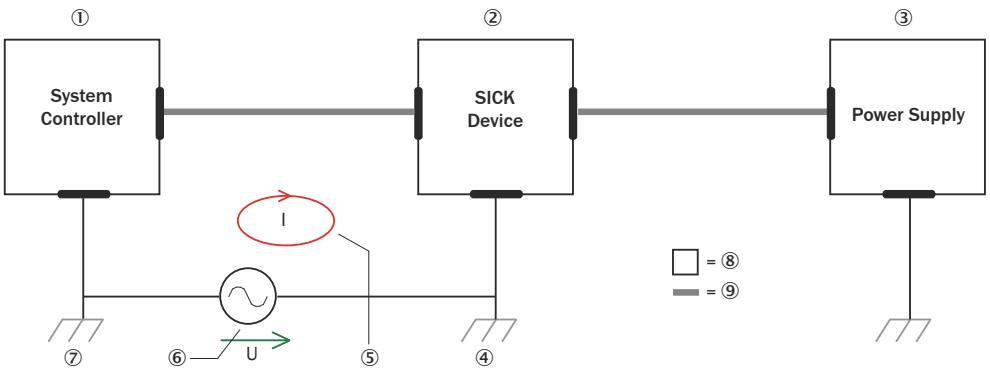


Figure 35: Example: Occurrence of equipotential bonding currents in the system configuration

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.

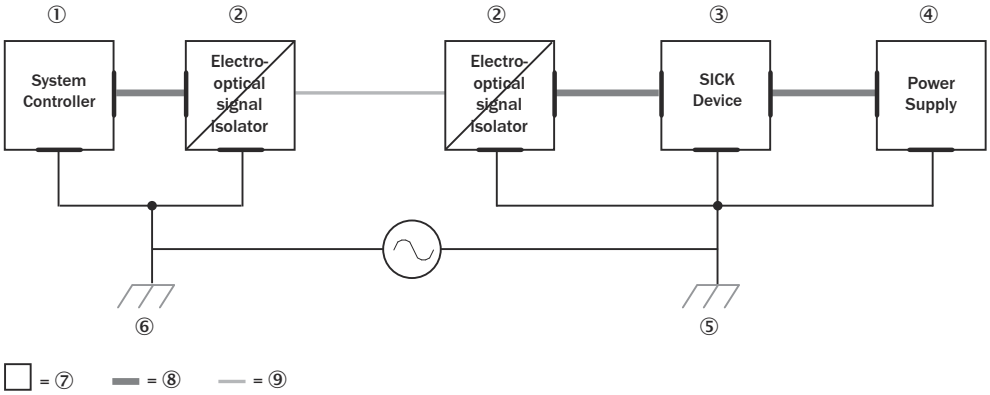


Figure 36: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

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.

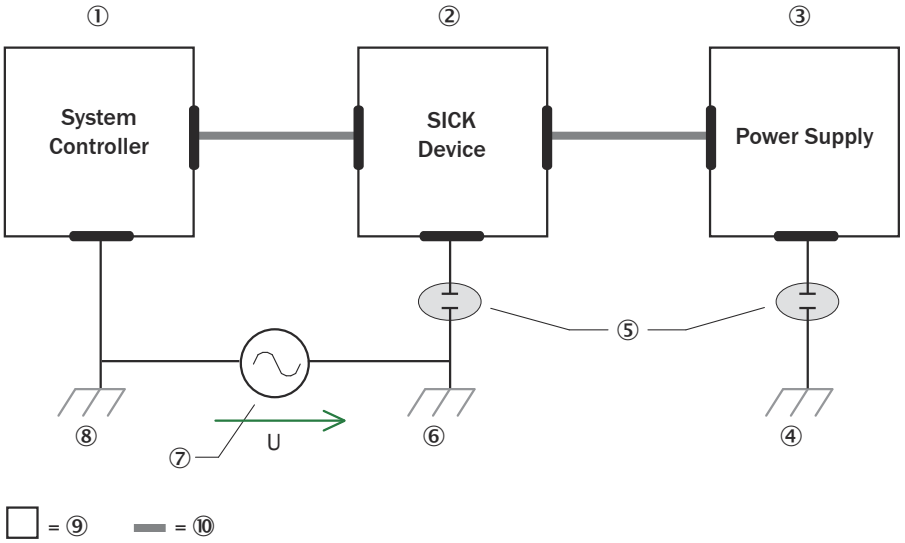


Figure 37: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

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.

6.3 Wiring instructions

NOTE

Pre-assembled cables can be found online at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

NOTE

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

Information about pin, signal and wire color assignments can be found in the appendix, see "Signal assignment of cables with open cable end at one end", page 102.

NOTICE

Faults during operation and device or system defects!

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

All electrical connections of the device are configured as M12 round connectors or as a cable with D-Sub male connector, depending on the type.

The enclosure rating stated in the technical data is achieved only with screwed plug connectors and protective elements on any unused M12 connections.

Shielding requirements

- To ensure a fault-free data transmission, an effective and comprehensive shielding solution must be implemented.
- Apply a cable shield at each end, i.e. in the control cabinet and at the device.
- The cable shield of the pre-assembled cables is routed via the knurled nut (M12 plug connector) or the housing (D-Sub plug connector) of the cable heads, depending on the device.
- After plugging in and fixing the cable heads, the screen is connected to the device housing over a large area.
- The cable shield in the control cabinet must be connected over a large surface to the ground potential on the potential equalization conductor.
- Take appropriate measures (e.g. earthing method) to prevent equipotential bonding currents from flowing through the cable shield.
- During installation, pay attention to the different cable groups. The cables are grouped into the following four groups according to their sensitivity to interference or radiated emissions:
  - Group 1: cables very sensitive to interference, such as analog measuring cables
  - Group 2: cables sensitive to interference, such as device cables, communication signals, bus signals
  - Group 3: cables that are a source of interference, such as control cables for inductive loads and motor brakes
  - Group 4: cables that are a powerful source of interference, such as output cables from frequency inverters, welding system power supplies, power cables
  - ▶ Cables in groups 1, 2 and 3, 4 must be crossed at right angles (see figure 38).
  - ▶ Route the cables in groups 1, 2 and 3, 4 in different cable channels or use metallic separators (see figure 39 and see figure 40). This applies particularly if cables of devices with a high level of radiated emission, such as frequency converters, are laid parallel to device cables.

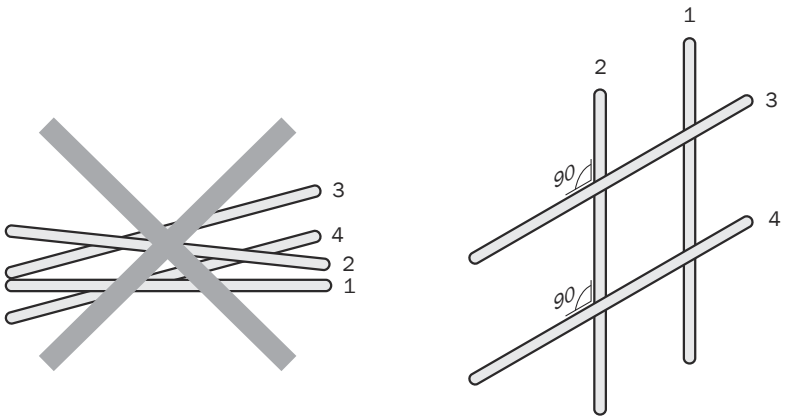


Figure 38: Cross cables at right angles

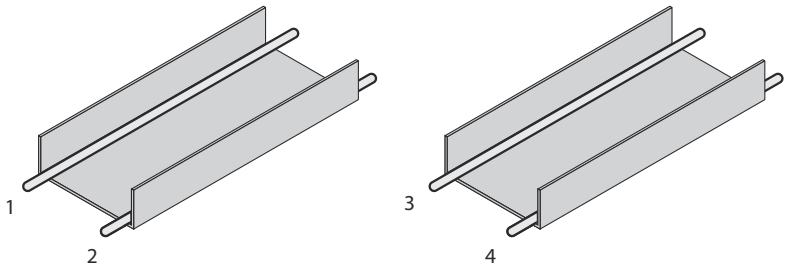


Figure 39: Ideal laying – Place cables in different cable channels

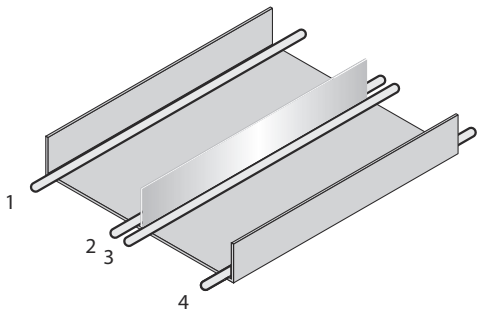


Figure 40: Alternative laying – Separate cables with metallic separators

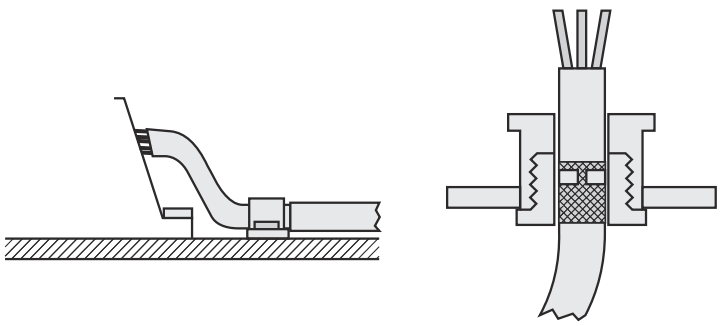


Figure 41: Shield connection in plastic housings

6.4 Pin assignments for electrical connections

6.4.1 Ethernet variant: Connections of the device with connector unit

Ethernet

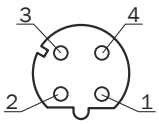


Figure 42: M12 female connector, 4-pin, D-coded

Table 10: Ethernet: Pin assignment of the female connector, M12, 4-pin, D-coded

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

Serial/CAN/I/O/Power: 12-pin connection variant

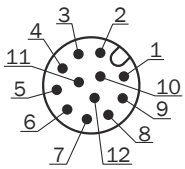


Figure 43: Male connector, M12, 12-pin, A-coded

Table 11: Ethernet variant: Pin assignment of the male connector, M12, 12-pin, A-coded

Pin	Signal	Function
1	GND	Ground
2	18 V DC ... 30 V DC	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485)	Host interface (sender+)
6	TD- (RS-422/485) or TxD (RS-232)	Host interface (sender-)
7	TxD (RS-232)	AUX interface (sender)
8	RxD (RS-232)	AUX interface (receiver)
9	SensGND	Common ground of the digital inputs
10	Sensor 1	Digital input 1 (external read cycle)
11	RD+ (RS-422/485)	Host interface (receiver+)
12	RD- (RS-422/485) or RxD (RS-232)	Host interface (receiver–)
-	–	Shielding

The “Sensor 2” digital input and “Result 1” and “Result 2” digital outputs are only available via the CDB620 / CDM connection module, in combination with the CMC600 parameter cloning module.

Serial/CAN/I/O/Power: 17-pin connection variant

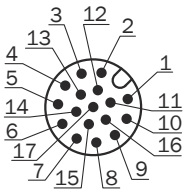


Figure 44: Male connector, M12, 17-pin, A-coded

Table 12: Ethernet variant: Pin assignment of the male connector, M12, 17-pin, A-coded

Pin	Signal	Function
1	GND	Ground
2	18 V DC ... 30 V DC	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485)	Host interface (sender+)
6	TD- (RS-422/485) or TxD (RS-232)	Host interface (sender-)
7	TxD (RS-232)	AUX interface (sender)
8	RxD (RS-232)	AUX interface (receiver)
9	SensGND	Common ground of the digital inputs
10	Sensor 1	Digital input 1 (configurable function, e.g. start external read cycle)
11	RD+ (RS-422/485)	Host interface (receiver+)
12	RD- (RS-422/485) or RxD (RS-232)	Host interface (receiver–)
13	Result 1	Digital output 1, configurable function
14	Result 2	Digital output 2, configurable function
15	Sensor 2	Digital input 2 (configurable function, e.g. stop external read cycle)
16	–	–
17	–	–

6.4.2 Serial variant: Connections of the device with cable

Device with cable and D-Sub male connector

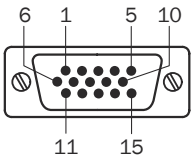


Figure 45: Male connector, D-Sub-HD, 15-pin

Table 13: Serial variant: Pin assignment of the male connector, D-Sub-HD, 15-pin

Pin	Signal	Function
1	18 V DC ... 30 V DC	Supply voltage
2	RxD (RS-232)	AUX interface (receiver)
3	TxD (RS-232)	AUX interface (sender)

Pin	Signal	Function
4	Sensor 2	Digital input 2 (configurable function, e.g. start external read cycle)
5	GND	Ground
6	RD+ (RS-422/485)	Host interface (receiver+)
7	RD- (RS-422/485) or RxD (RS-232)	Host interface (receiver–)
8	TD+ (RS-422/485)	Host interface (sender+)
9	TD- (RS-422/485) or TxD (RS-232)	Host interface (sender-)
10	CAN H	CAN bus (IN/OUT)
11	CAN L	CAN bus (IN/OUT)
12	Result 1	Digital output 1, configurable function
13	Result 2	Digital output 2, configurable function
14	Sensor 1	Digital input 1 (configurable function, e.g. stop external read cycle)
15	SensGND	Common ground of the digital inputs
–	–	Shielding

6.5 Connection diagrams

Ethernet variant (male connector, M12, 12-pin, A-coded)

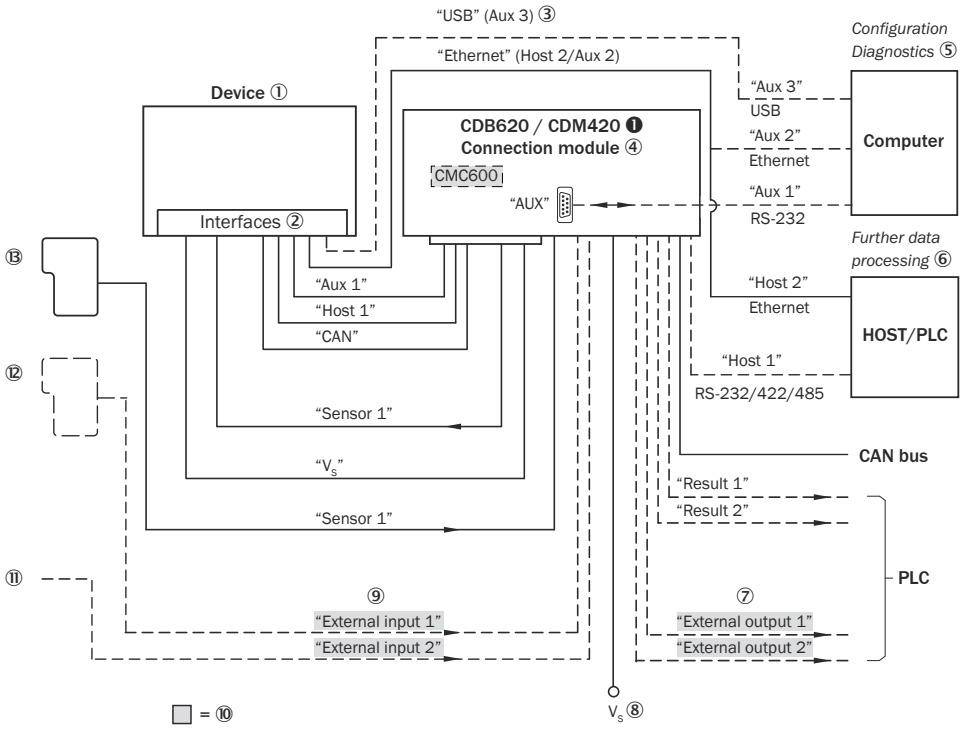


Figure 46: Ethernet variant: Electrical connections on the device with connector (male connector, M12, 12-pin, A-coded)

❶ Here CDM420-0001 or CDM420-0006
① Device
② Interfaces
③ USB not required for CLV62x
④ Connection module

⑤ Configuration or diagnostics
⑥ Further data processing
⑦ External digital outputs
⑧ Supply voltage V_S
⑨ External digital inputs
⑩ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray)
⑪ Other functions
⑫ Application-dependent alternative stop reading cycle (e.g., photoelectric sensor) or travel increment (incremental encoder)
⑬ Start/Stop reading sensor (e.g., photoelectric sensor)

Ethernet variant (male connector, M12, 17-pin, A-coded)

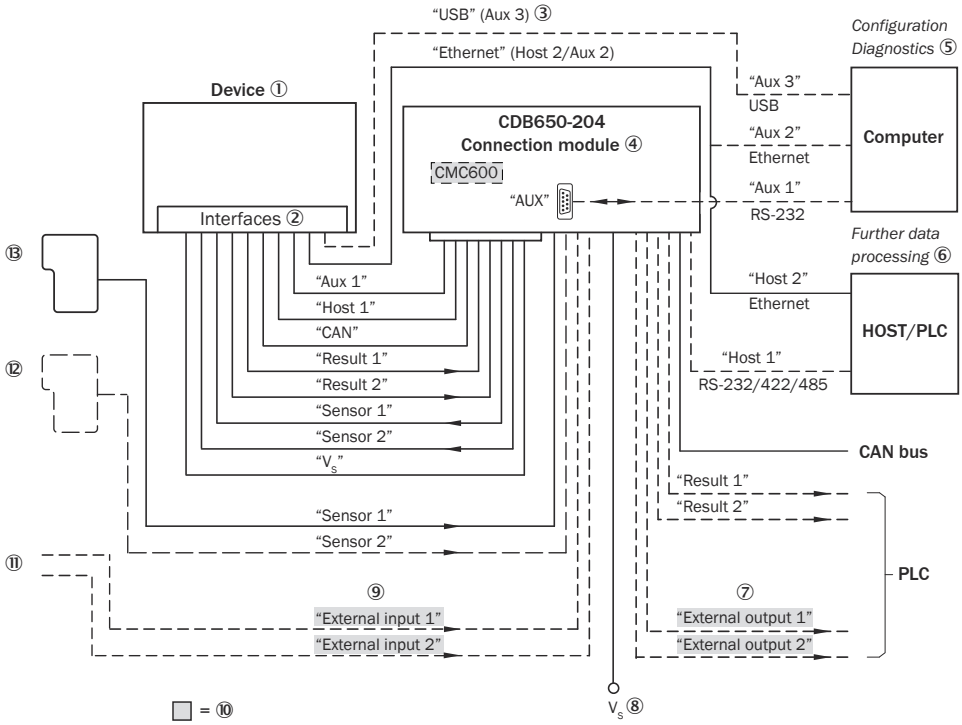


Figure 47: Ethernet variant: Electrical connections on the device with connector (male connector, M12, 17-pin, A-coded)

① Device
② Interfaces
③ USB not required for CLV62x
④ Connection module
⑤ Configuration or diagnostics
⑥ Further data processing
⑦ External digital outputs
⑧ Supply voltage V_S
⑨ External digital inputs
⑩ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray)
⑪ Other functions
⑫ Application-dependent alternative stop reading cycle (e.g., photoelectric sensor) or travel increment (incremental encoder)
⑬ Start/Stop reading sensor (e.g., photoelectric sensor)

Serial variant (male connector, D-Sub-HD, 15-pin)

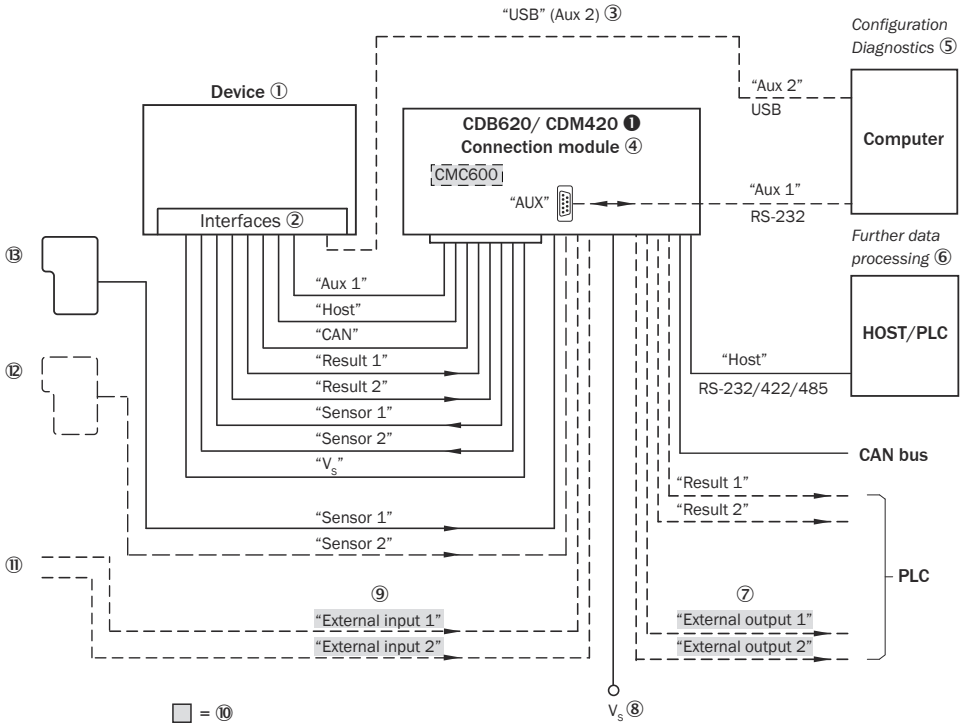


Figure 48: Serial variant: Electrical connections on the device with connecting cable (male connector, D-Sub-HD, 15-pin)

❶ Here CDM420-0001 or CDM420-0006
① Device
② Interfaces
③ USB not included for serial variant and CLV62x
④ Connection module
⑤ Configuration or diagnostics
⑥ Further data processing
⑦ External digital outputs
⑧ Supply voltage V_S
⑨ External digital inputs
⑩ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital inputs and outputs of the device (highlighted in gray)
⑪ Other functions
⑫ Application-dependent alternative stop reading cycle (e.g., photoelectric sensor) or travel increment (incremental encoder)
⑬ Start/Stop reading sensor (e.g., photoelectric sensor)

6.5.1 Connecting devices with heating to connection modules

General notes

- The voltage supply must be disconnected when attaching or detaching electrical connections.
- Do not do any connection work at temperatures under 0 °C!
- The wire cross section of the incoming supply cables to the connection module must be 0.75 mm².
- The required supply voltage at the connection module is DC 24 V ±10%.
- Due to voltage drops, long supply cables require a larger wire cross section in line with valid standards.

NOTE
The device loses its UL certification if the connecting cables are extended over 2 m.

Using connection module CDM420-0001

Connect the incoming/continuing supply cables in the CDM420-0001 to terminal block U_{IN} of the additional connection circuit board.

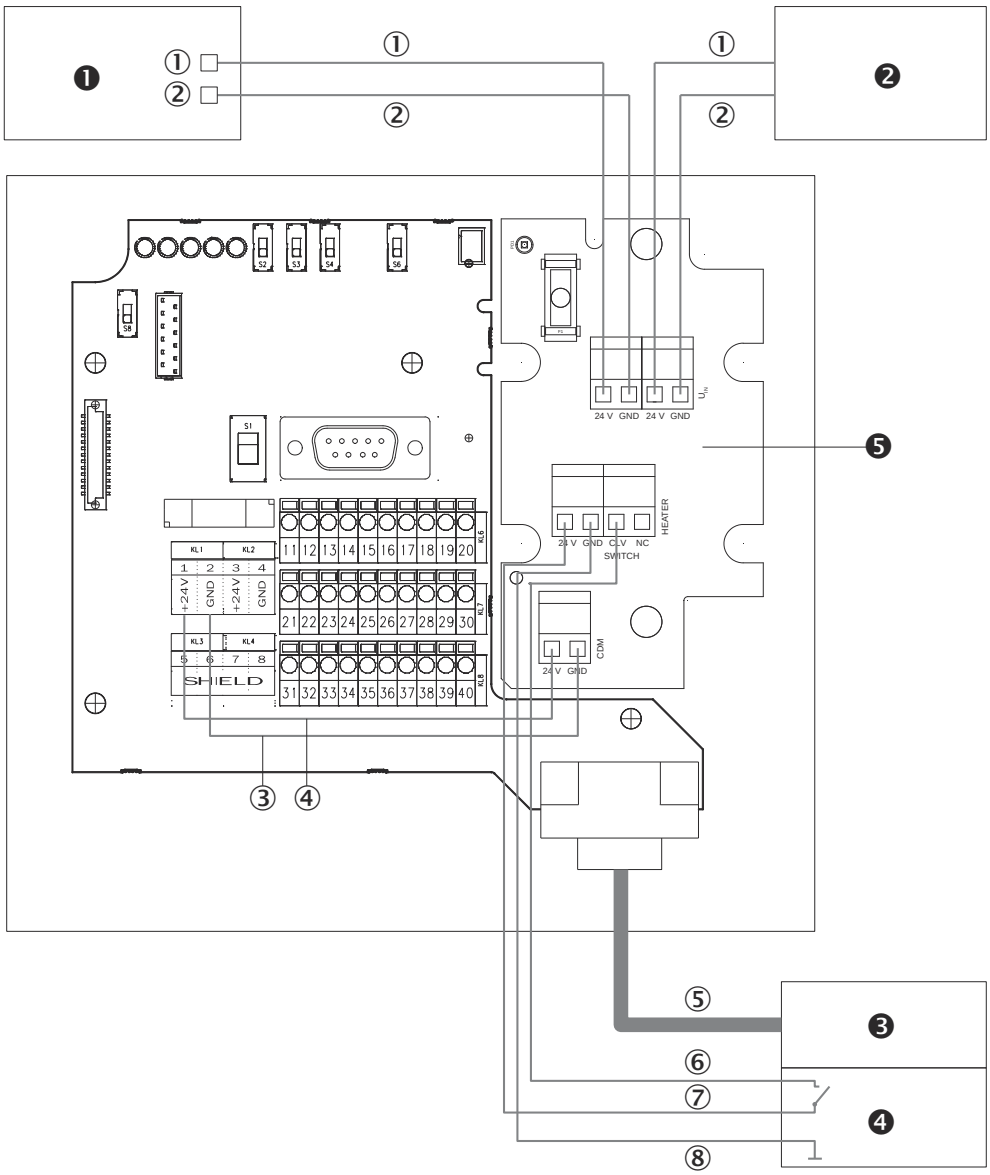


Figure 49: Supply voltage wiring for device and heating in CDM420-0001 connection module

① Supply voltage
② GND
③ GND (black)
④ Supply voltage (red)
⑤ 15-pin cable
⑥ CLV switch (brown)
⑦ Supply voltage (red)
⑧ GND (black)
❶ Control cabinet

❷ Other connection modules
❸ Device
❹ Heating
❺ Additional connection circuit board (part no. 2055071)

When connecting a device with heating to the CDM420-0001 connection module, a separate fuse protects the supply voltage leads for the heating. The fuse (3 A) is located on the additional connection circuit board.

The maximum permissible wire cross section on the screw terminals in the CDM420-0001 is 2.5 mm^2.

If the device with heating is not operated in UL compliant manner, the maximum permissible current to the screw terminals is 20 A in accordance with the specification of the terminals.

This enable parallel switching of several CDM420-0001 modules with connection devices with heating.

Using connection module CDB620-001

When connecting a device with heating to a CDB620-001 connection module, the customer must protect the supply voltage leads to the CDB620-001 using a 3 A fuse in the control cabinet.

Use a separate fuse for each connection module and device. Use the additional terminal (DC 24 V) and terminal 2 (GND) to connect the externally provided supply voltage in the CDB620-001. The supply voltage reaches terminal 3 (U_{IN}) via the heater switch.

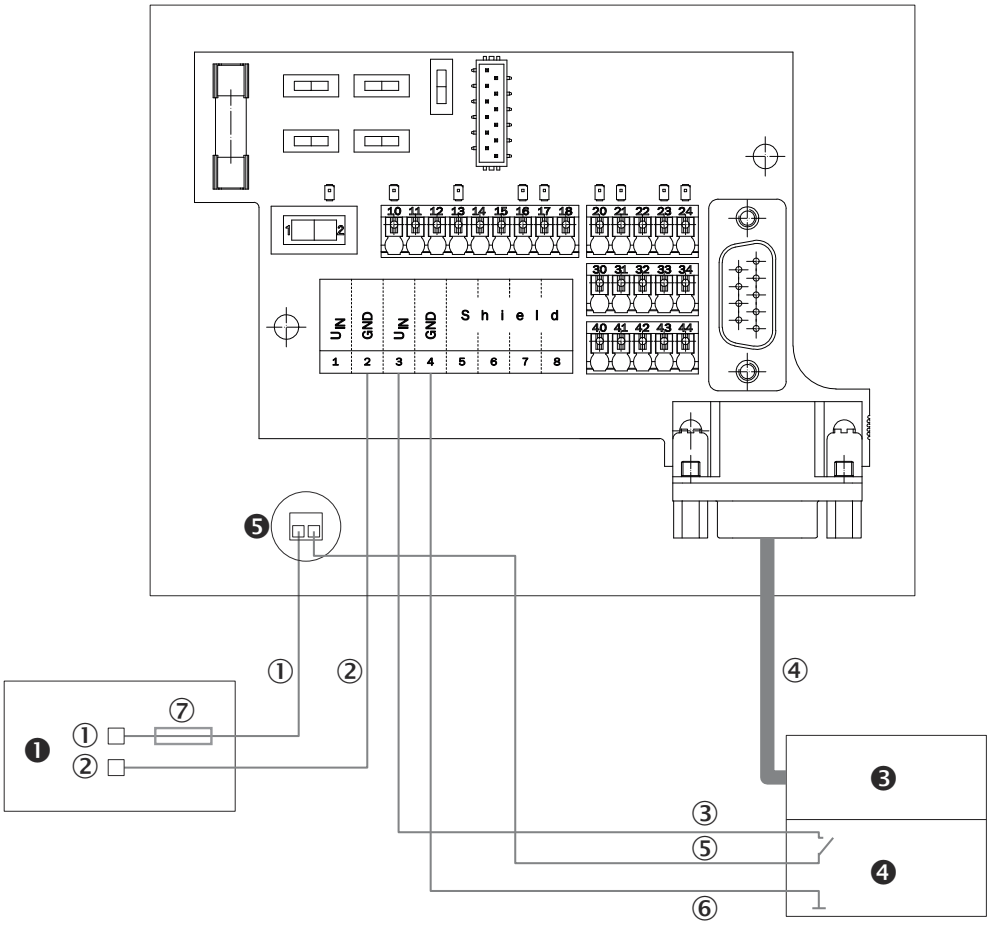


Figure 50: Supply voltage wiring for device and heating in CDB620-001 connection module

① Supply voltage
② GND
③ CLV switch (brown)
④ Cable, 15-wire
⑤ Supply voltage (red)
⑥ GND (black)
⑦ F (fuse)
❶ Control cabinet
❸ Device
❹ Heating
❺ Additional single-pin terminal (part no. 6041383)

6.6 Wiring interfaces

6.6.1 Connecting the supply voltage

Connecting supply voltage to devices without heating

Connect the device only to a power supply unit that has the following properties:

- Stabilized safety extra-low voltage SELV according to currently valid standards
- The voltage supply must meet the requirements of ES1 (EN 62368-1).
- Supply voltage 24 V DC ± 20 %

- Electricity source with at least 30 W power
- When using the optional CMC600 parameter cloning module in the connection module: Additional output power 0.5 W

Connecting supply voltage to devices with heating

NOTE

Connect devices with heating via a CDB620-001, CDM420-0001 or CDM420-0006 connection module.

Connect devices with heating and male connector, M12, 17-pin via a CDB650-204 connection module.

Observe the instructions for wiring the external heating in the connection module.

Connect the device via a connection module only to a power supply unit that has the following characteristics:

- Stabilized safety extra-low voltage SELV according to currently valid standards
- The voltage supply must meet the requirements of ES1 (EN 62368-1).
- Supply voltage 24 V DC ± 10 %
- Electricity source with at least 40 W power
- Additional 0.5 W output power when using the optional CMC600 parameter cloning module in the corresponding connection modules

Wiring with SICK connection module

Feeding supply voltage for the device via a connection module:

Connection modules	Interface	Reference
CDB620-001	Supply voltage	see "Connecting supply voltage for the device in CDB620-001", page 194
CDB650-204 [1]	Supply voltage	see "Connecting supply voltage for the device in CDB650-204", page 213
CDM420-0001	Supply voltage	see "Connecting supply voltage for the device in CDM420-0001", page 228
CDM420-0006	Supply voltage	see "Connecting supply voltage for the device in CDM420-0006", page 248

1) For CLV63x ... CLV65x with male connector, M12, 17-pin on the swivel connector.

NOTE

For further connection modules see

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

If the supply voltage is connected via a connection module, observe the respective operating instructions of the module.

Protecting the supply cables

To ensure protection against short-circuits/overload in the customer's supply cable, appropriately choose and protect the wire cross-sections used and at the beginning of the supply cable.

Observe the following standards in Germany:

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

Supply voltage directly via a SICK connection module or via customer-side supply voltage.

6.6.2 Wiring the data interface

Wiring the Ethernet interface (Ethernet variant)

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

NOTE

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

Wiring the serial data interface (serial variant)

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 14: Data transmission rates

Interface type	Data transmission rate	Distance to the target computer (host)
RS-232 (Host)	Up to 19.2 kBd 38.4 kBd ... 57.6 kBd 115.2 kBd ... 500 kBd	Max. 10 m Max. 3 m Max. 2 m
RS-232 (AUX)	57.6 kBd	Max. 3 m
RS-422/485 (Host) [1]	Up to 38.4 kBd 38.4 kBd ... 57.6 kBd	Max. 1,200 m Max. 500 m

[1] For RS-422/485-suitable 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.

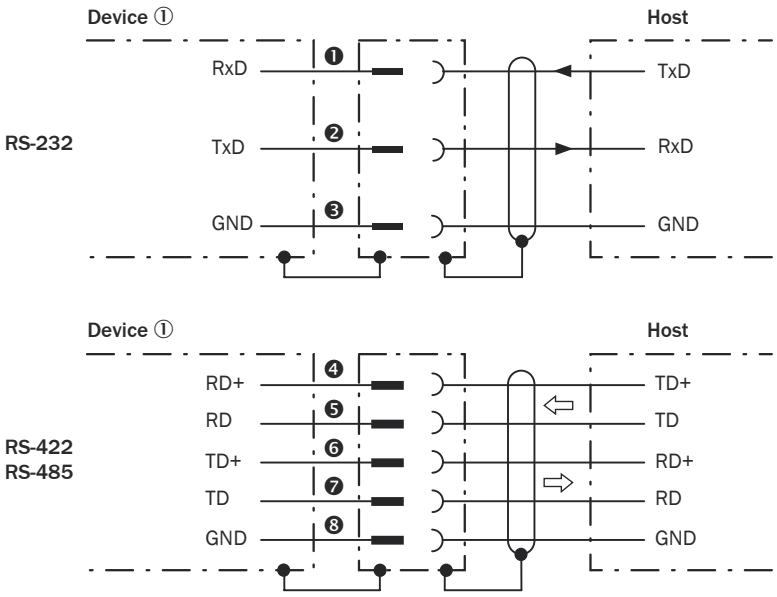


Figure 51: Internal circuitry for data interfaces: RS-232 and RS-422/485

① Device

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

❹...❽ Pin assignment: See RS-422/485 pin assignment for the respective device

Termination of the RS-422/485 data interface

The data interface can be terminated in the connection module via switches.

Additional information on this, specific to the connection module type, can be found in the appendix of this operating manual.

NOTE

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

Wiring the serial data interface of the device (host interface) via a connection module:

Connection modules	Data interface	Reference
CDB620-001	RS-232	see "Wiring serial host interface RS-232 of the device in the CDB620-001", page 195
	RS-422	see "Wiring serial host interface RS-422 of the device in the CDB620-001", page 197
	RS-485	see "Wiring the RS-485 serial host interface of the device in the CDB620-001", page 199
CDB650-204 [1)]	RS-232	see "Wiring serial host interface RS-232 of the device in CDB650-204", page 214
	RS-422	see "Wiring serial host interface RS-422 of the device in CDB650-204", page 214
	RS-485	see "Wiring serial host interface RS-485 of the device in CDB650-204", page 215

Connection modules	Data interface	Reference
CDM420-0001	RS-232	see "Wiring serial host interface RS-232 of the device in the CDM420-0001", page 229
	RS-422	see "Wiring serial host interface RS-422 of the device in the CDM420-0001", page 231
	RS-485	see "Wiring serial host interface RS-485 of the device in the CDM420-0001", page 233
CDM420-0006	RS-232	see "Wiring serial host interface RS-232 of the device in the CDM420-0006", page 249
	RS-422	see "Wiring serial host interface RS-422 of the device in the CDM420-0006", page 251
	RS-485	see "Wiring serial host interface RS-485 of the device in the CDM420-0006", page 253

1) For CLV63x ... CLV65x with male connector, M12, 17-pin, A-coded on the swivel connector.

NOTE

For further connection modules see

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

If the data interface is wired via a connection module, observe the respective operating instructions of the module.

6.6.3 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
CDB620-001	CAN	see "Wiring the CAN interface in the CDB620-001", page 200
CDM420-0001	CAN	see "Wiring the CAN interface of the device in the CDM420-0001", page 234
CDB650-204 1)	CAN	see "Wiring the CAN interface of the device in the CDB650-204", page 216
CDM420-0006	CAN	see "Wiring the CAN interface of the device in the CDM420-0006", page 254

1) For CLV63x ... CLV65x with male connector, M12, 17-pin, A-coded on the swivel connector.

NOTE

For further connection modules see

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

If the CAN interface is wired via a connection module, observe the respective operating instructions of the module.

6.6.4 Wiring the digital inputs

Digital inputs can be used, for example, to start and end the reading pulse or to feed in an increment signal.

Physical digital inputs on the device:

Physical digital inputs are available at the connections. The number of them varies depending on the device, see "Pin assignments for electrical connections", page 61.

Table 15: Characteristic data of the digital inputs

Type	Switching
Switching behavior	Power to the input starts the assigned function, e.g., start of the internal reading interval of the device. (Default: active high, debounce time 10 ms)
Properties	• Opto-decoupled, reverse polarity protected • Can be wired with PNP output of a trigger sensor • Adjustable debounce time
Electrical values	The electrical values are identical for all digital inputs. Low: $\lvert V_{in}{}^{1)} \rvert \leq 2$ V; $\lvert I_{in}{}^{2)} \rvert \leq 0.3$ mA High: 6 V $\leq \lvert V_{in} \rvert \leq 32$ V; 0.7 mA $\leq \lvert I_{in} \rvert \leq 5$ mA

1) Input voltage.
2) Input current.

The SOPAS ET configuration software can be used to configure the debounce time.

- Minimum: 0 ms
- Maximum: 10,000 ms
- Default: 10 ms

NOTE

Avoidance of uncontrolled state changes of the digital inputs

In environments with high electromagnetic pollution, insufficient debounce times can cause undesirable changes in the state of the digital inputs of the device. E.g.: Example of uncontrolled start of a read process with debounce times < 10 ms.

The following measures are recommended to prevent uncontrolled changes in condition:

- Keep the length of cables from the signal source to the device as short as possible.
- Reduce coupling to neighboring cables.
- Shield any affected lines.

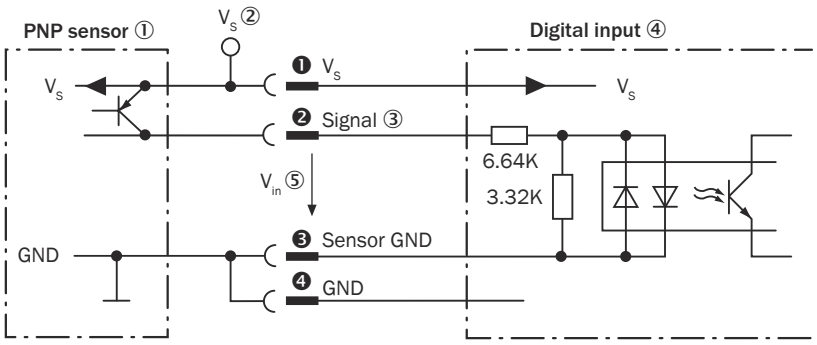


Figure 52: Wiring of a digital input on the device with external PNP sensor

① PNP sensor
② Supply voltage V_S
③ Input signal
④ Digital input
⑤ Input voltage V_{in}
❶...❹ For pin assignment, see respective device

External digital inputs in the CDB/CDM connection module (optional):

The optional CMC600 parameter cloning module provides two additional external digital inputs at the corresponding terminals in the connection module.

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

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

Function assignment

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

Wiring the digital inputs via a connection module:

Connection modules	Digital inputs	Reference
CDB620-001	“Sens 1” “Sens 2”	see "Wiring digital inputs of the device in the CDB620-001", page 202
	External input 1 (“In 1”) External input 2 (“In 2”)	see "Wiring the external digital inputs of the device in the CDB620-001", page 205
CDB650-204 [1)]	“SENS/IN 1” “SENS/IN 2”	see "Wiring digital inputs of the device in the CDB650-204", page 218
	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 220

Connection modules	Digital inputs	Reference
CMD420-0001	“Sensor 1” “Sensor 2“	see "Wiring digital inputs of the device in the CDM420-0001", page 236
	External input 1 (“Aux In 1”) External input 2 (“Aux In 2”)	see "Wiring the external digital inputs of the device in the CDM420-0001", page 239
CMD420-0006	“Sensor 1” “Sensor 2“	see "Wiring digital inputs of the device in the CDM420-0006", page 256
	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 259

1) For CLV63x ... CLV65x with male connector, M12, 17-pin, A-coded on the swivel connector.

NOTE

For further connection modules see

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

If the digital inputs are wired via a connection module, observe the respective operating instructions of the module.

6.6.5 Wiring the digital outputs

The digital outputs can be assigned, independently of each other, various functions for event status indication. If the allocated event occurs in the read process, then the corresponding digital output is live after the end of the reading pulse for the selected pulse duration.

Physical digital outputs on the device:

Physical digital outputs are available at the connections. The number of them varies depending on the device, see "Pin assignments for electrical connections", page 61.

Table 16: Characteristic data of the digital outputs

Type	Switching
Switching behavior	PNP switching against supply voltage V_S
Properties	Short-circuit protected Temperature protected Not electrically isolated from V_S
Electrical values	The electrical values are identical for all digital outputs. $0\ V \leq V_{out}$ [1] $\leq V_S$ (V_S [2] $-1.5\ V$) $\leq V_{out} \leq V_S$ at I_{out} [3] $\leq 100\ mA$

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

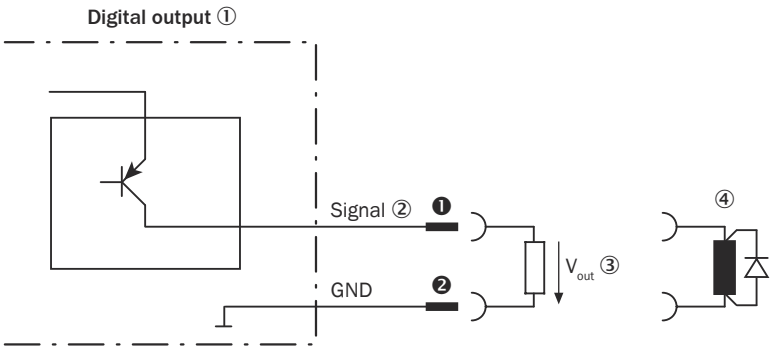


Figure 53: Wiring a digital output on the device

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

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. The limit value is a maximum capacitance of 100 nF.

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

1. Connect the digital outputs according to the application.
2. For the thorough check of the switching functions, use a high resistance digital voltmeter and wire the digital outputs with a load.
   This prevents the display of incorrect voltage values/output states.

External digital outputs in the CDB/CDM connection module (optional):

The optional CMC600 parameter cloning module provides two additional external digital outputs at the corresponding terminals in the connection module.

NOTE
The digital outputs are not 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.

Function assignment

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

Wiring the digital outputs via a connection module:

Connection modules	Digital outputs	Reference
CDB620-001	“Result 1” “Result 2”	see "Wiring digital outputs of the device in the CDB620-001", page 207
	External output 1 (“ Out 1”) External output 2 ("Out 2")	see "Wiring the external digital outputs of the device in the CDB620-001", page 209
CDB650-204 [1]	“RES/OUT 1” ”RES/OUT 2”	see "Wiring digital outputs of the device in the CDB650-204", page 222
	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 223
CMD420-0001	“Result 1” “Result 2”	see "Wiring digital outputs of the device in the CDM420-0001", page 241
	External output 1 (“Aux Out 1”) External output 2 (“Aux Out 2”)	see "Wiring the external digital outputs of the device in the CDM420-0001", page 243
CMD420-0006	“Result 1” “Result 2”	see "Wiring digital outputs of the device in the CDM420-0006", page 261
	External output 1 (“Aux In 1”) External output 2 (“Aux In 2”)	see "Wiring the external digital outputs of the device in the CDM420-0006", page 263

1) For CLV63x ... CLV65x with male connector, M12, 17-pin, A-coded on the swivel connector

NOTE

For further connection modules see

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

If the digital outputs are wired via a connection module, observe the respective operating instructions of the module.

7 Commissioning

7.1 Overview of the commissioning steps

- Commissioning of the device with factory default
- Installing the SOPAS ET configuration software
- Connecting the device to a computer using the SOPAS ETconfiguration software
- Adjustment and configuration of the device to optimize functionality
- Test of the device for correct functionality in read operation

7.2 SOPAS ET configuration software

The SOPAS-ET configuration software can be used to adapt the device to the reading situation on site. The configuration data is stored and archived as a parameter set (project file) on the computer.

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

The general functions of the software and its operation are described in the online help in the SOPAS ETconfiguration software:

- Choice of the menu language (German, English)
- Setting up communication with the device
- Password-protected configuration for different operating levels
- Recording of the data in continuous operation (recording and analyzing data of certain memory areas of the device with the data recorder)
- Diagnostics for the system

7.2.2 Installing SOPAS ET

NOTE

The SOPAS ETconfiguration software, the current system prerequisites for the computer, and the instructions for downloading can be found online at:

- www.sick.com/SOPAS_ET

1. Start computer. Download the latest version of the configuration software.
2. If the installation does not start automatically, run setup.exe from the download folder.
3. Follow the operating instructions to complete the installation.

7.2.3 Connecting SOPAS ET to the device

Administrator rights may be required on the PC to install the software.

1. Start the “SOPAS ET” program after completing the installation. Path: C:\Program Files (x86)\SICK\SOPAS ET\SopasET.exe or using the Windows search.
2. Install the device driver (SDD) in the device catalog using the wizard (gear symbol). The *.jar file can be obtained from the online repository if an Internet connection is present.
3. In the device search list, establish a connection between SOPAS ET and the device using the search settings. To do this, select the CLV6xx family of devices and select the default IP address 192.168.0.1 when connecting for the first time.

✓ The device is detected and can now be integrated into a project for configuration purposes.

7.3 Initial commissioning

Parameterization (configuration)

The user adjusts the device to the reading situation on site. To do so, the device is usually connected directly to the computer (online method). With the help of the SOPAS ET configuration software, the user selects suitable values per parameter from an assigned value range.

The starting point for adjustment during the initial commissioning is a copy of the device's factory default settings in the working memory with predefined parameter values. Each of the parameter values can be changed within the value range to optimize the device. The result using the SOPAS ET configuration software is the creation of an application-specific, new parameter set, initially only in the working memory of the device.

After testing the desired functionality, the user permanently stores in the device the configured parameter set for reading operation. The factory default settings cannot be overwritten. The default settings remain available at all times in case the device needs to be reset (see figure 54, page 80).

The device can permanently save **one** application-specific parameter set.

To test the effect on the reading operation of changing the parameter values, save each different configuration on the computer in a separate file. Then download the parameter sets one after the other to the device for testing, without saving them permanently. Each download overwrites the previously transferred parameter set in the working memory. The "Permanent" option only saves in the device the last parameter set configured for the application.

Manually saving the parameter set

NOTE

As part of a structured data backup concept, it is recommended to save the currently valid parameter set on the computer using a project file (SOPAS file) and thereby archive it. Use a meaningful name when doing so.

Automatically backing up the parameter set

NOTE

External, optional parameter memories allow direct, automated parameter cloning outside the internal parameter memory of the device. In case of defects, it is possible to exchange the device quickly without losing configuration data.

The following components are available as storage media for the device:

Devices in IP65 standard housing

- MicroSD memory card for the device
- CMC600 parameter cloning module for the CDB or CDM connection modules

Devices in IP69K protective housing

- CMC600 parameter cloning module for the CDB or CDM connection modules

Memory organization for parameter set

The diagram shows the memory management principle for the involved internal and external components:

Devices in the IP65 standard housing:

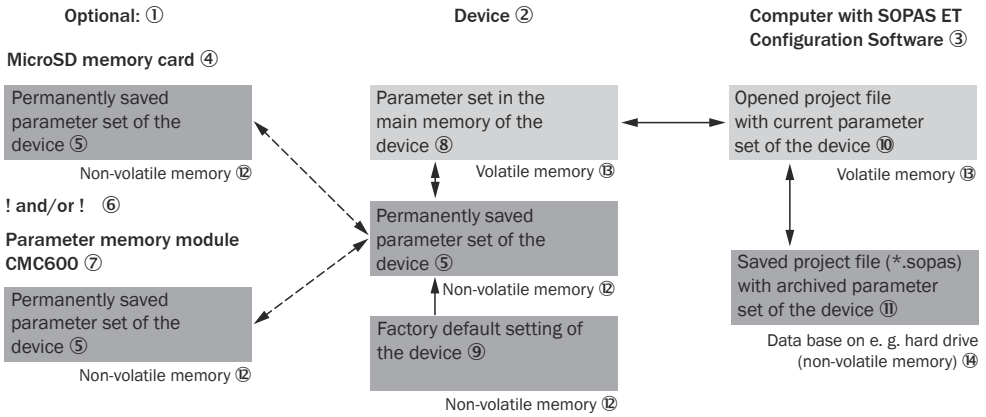


Figure 54: Configuration with SOPAS ET and saving the parameter set

Devices in the IP69K protective housing:

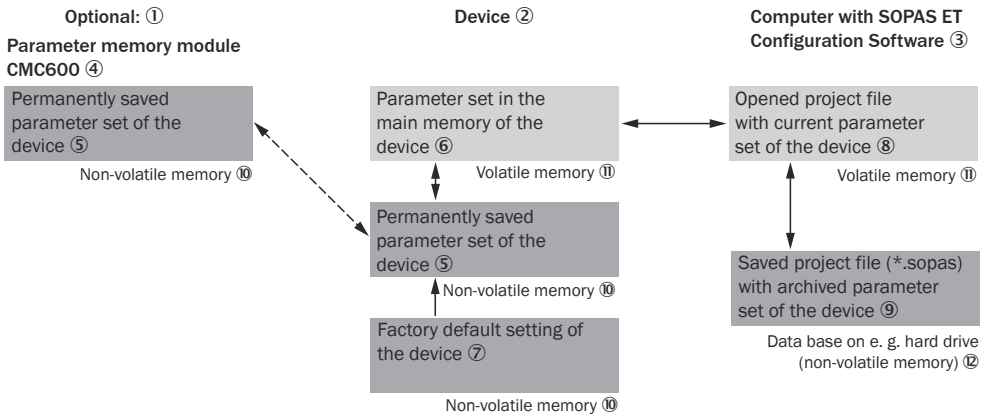


Figure 55: Configuration with SOPAS ET and saving the parameter set

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, for example, a hard drive (non-volatile memory)

Saving behavior using the “Permanent” saving option:

Devices in the IP65 standard housing:

The device is either equipped with a MicroSD memory card or connected to a CDB or CDM connection module. The connection module contains a CMC600 parameter cloning module: When the currently valid parameter set is saved in the device, this is also done on the memory card or externally in the CMC600.

Devices in the IP69K protective housing:

The device is connected to a CDB or CDM connection module. The connection module contains a CMC600 parameter cloning module: When the currently valid parameter set is saved in the device, this is also done externally in the CMC600.

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

The types approved by SICK can be found as accessories on the Internet at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

Defective device: Support for replacement with no manual reconfiguration required:

NOTE
The device replacement will only be successful if the defective device is replaced by an exchange unit of the **same type**. The defective device must have been operated with automated parameter cloning before the failure.

To replace a defective device with an exchange unit, a memory card must be present in the device. Alternatively, a CMC600 with the current parameter set in the connected connection module. If both a memory card and a CMC600 are present, the exchange unit adopts the parameter set from the CMC600.

Device with memory card

1 Remove the memory card from the defective device in a de-energized state.
2 Only use the memory card when the exchange unit's power is off.
3 Switch on the supply voltage for the replacement unit.
After startup, the device loads the parameter set from the memory card into its working memory. Also into its permanent internal parameter memory.

For more information, see "Device exchange with transmission of the current configuration data", page 93.

7.4 Adjusting the device for operational use

Before the final adjustment of the device, complete the electrical installation. Put the device into operation.

1. Loosen the bracket screws so that the device can be aligned.
2. Align the device so that the angle between the scanning line and the bar code stripes is almost 90°.
3. To prevent interference reflections, do not align the device so that it is plane parallel to the object surface.
4. Manually place objects with bar codes one after the other into the reading range of the device, see "Technical data", page 96.
5. Check the reading result with the SOPAS ET configuration software.
6. Place objects at different alignments (angles) in the reading field and ensure that the limit values for the permitted reading angles are not exceeded, see "Angular orientation of the device", page 46.
7. Align the device so that the good read rate is between 70% and 100%.
8. Tighten the screws on the device.

7.5 Fine adjustment and further configuration

NOTE
The additional settings and the fine adjustment depend on the respective application situation.

User level, downloading parameters to the device

The user is automatically logged on to the device in the “Authorized client” user level. This allows the user to change parameters, which are then immediately transferred to the device (default).

Commissioning via Quickstart

The Quickstart tab provides an overview of the most important parameters. The Quickstart can be used to quickly evaluate a code content. The Quickstart provides, amongst other things, functions such as evaluation window, percentage evaluation, code configuration and adjusting mode.

Application wizard

The application wizard (“Magic Wand” icon) assists with configuring the device. Either as standalone device, or as a master and slave for a master/slave combination based on the CAN bus.

Evaluation window

The evaluation window shows the code content, the object index, the code type, the code security, and the device number of the reading device.

Percentage evaluation

Percentage evaluation permanently assesses the quality of the reading. Bar codes are not assessed. Here, the bar codes must not be subjected to any conveying movement. The device performs 100 scans at a time to evaluate the reading quality. The device continuously outputs read results every 2 s via the AUX interface, together with the read diagnostics data. A timer starts when percentage evaluation is called. If no manual abort occurs, the device automatically returns to reading operation after 5 minutes.

Adjusting Tool

The “Adjusting mode” operating mode supports optimal placing of the center of the scan line on the object. To do this, the device hides half of the scan line.

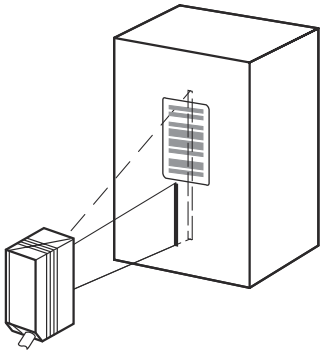


Figure 56: Appearance of the scan line in “Adjusting Mode”

This function is only available under “Analysis” in the “Service” user level.

Code configuration

In the factory default setting, the device decodes the following code types:

- Code 39
- 2/5 interleaved
- Code 128 family

You can activate further code types and configure advanced decoder properties (Device tree > Parameters > Code configuration).

Scanning frequency

You can set the scan frequency in the range from 400 Hz to 1,200 Hz (Device tree > Parameters > Read configuration).

Ethernet interface

Use the “Ethernet” page to adjust the IP address and the subnet mask: Device tree > Parameters > Network/Interfaces/IOs > Ethernet.

Object trigger control

Device with an additionally connected read cycle sensor (for example a photoelectric sensor at the “Sensor 1” digital input): select the “Sensor 1” setting (Device tree > Parameters > Object trigger control).

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

8 Operation

8.1 Operating and status indicators

8.1.1 Optical displays

Devices in IP65 standard housing

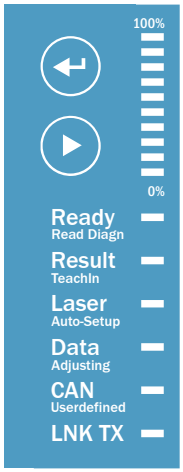


Figure 57: LEDs, bar graph display and operating keys on CLV63x, CLV64x, CLV65x

Table 17: Display behavior of the LEDs in the first display level

Display	Color	Behavior LED	Device status
Ready [1)]	–	○	Device without supply voltage
After switching on supply voltage:			
Ready	Green	●	Device ready for operation
	Red	●	Hardware fault
Read operation:			
Laser	Green	●	Laser switched on
Result	Green	●	LED lights up briefly. Reading successful (Good Read)
Data transmission at the serial host interface:			
Data	Yellow	●	Device is sending data (TX)
	Green	●	Device is receiving data (RX)
Data transmission at the CAN interface:			
CAN	Yellow	●	Data transfer via CAN interface
Data transmission at the Ethernet interface (CLV6xx-xYxxx, Y= 1 or 8):			
LNK TX	Yellow	●	Ethernet interface for data communication activated, but no physical connection
	Green	●	Physical Ethernet connection
PROFINET operation (single port):			
Ready	Green Red	● ✳	PROFINET operation (single port): See below for display behavior, section “PROFINET operation (single port)"
Parameter: Download to device or parameter upload from device			
Ready	–	○	LED goes out. Function is executed

Display	Color	Behavior LED	Device status
Firmware update: Download to device			
Ready	–	○	LED goes out. Function is executed
Firmware update: Completion			
Ready	Green	●	Firmware download: Successful Device again ready for operation

○ = LED off, ● = LED lit, ☼ = LED flashing.

1) Ready LED consists of green and red components.

NOTE

Second display level: Display behavior of the LEDs in combination with the two pushbuttons see "Devices in IP65 standard housing", page 86.

Bar graph 0% to 100%

In the “Percentage analysis” operating mode, the bar graph continuously shows the last recorded read rate in %. The percentage analysis is based on 100 readings. The bar graph display is deactivated in standard read mode.

PROFINET operation (single port):

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

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

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

Devices in IP69K protective housing

NOTE

Visual and audible indicators as well as control elements (pushbuttons) are not accessible on devices in the IP69K protective housing.

Devices in IP65 standard housing

Operating buttons and status displays in the second display level

The two yellow pushbuttons are used for manually calling up device functions without using a computer. The LEDs signal the selectable functions in the second display level.

1. Press the Return pushbutton for approx. 3 seconds . The device interrupts the current read mode, switches off all LEDs and the bar graph display and switches into button operating mode.
   The device now ignores all further external read cycles. The device does not output any read results via the host interface.
   The beeper confirms this process with an ascending melody. The “Read diagn” function, the first function, is preselected, the LED flashes slowly.
2. Press the arrow pushbutton repeatedly until the LED of the desired function flashes.
   The device runs through all possible functions step-by-step without executing them and then starts again from the beginning.
   The beeper confirms every step with a tone.
3. Press the return key to confirm the selected function.
   The LED flashes faster, the beeper confirms start with a double beep.
   The device executes the function. The device automatically returns to reading mode after 2 minutes.
   When the device has successfully read the presented bar code, the device automatically terminates the “Teach-in” function (for match code) as well as “Auto-Setup”. The “Ready” LED then flashes green three times, the beeper confirms this with an ascending melody.
4. To end (cancel) the function manually, press the Return pushbutton again for 3 seconds.
   The beeper confirms the change with a descending melody. The “Ready” LED lights up again.

✓ The device is ready for reading again. The device expects a read cycle.

NOTE

With the Auto-setup function, makes sure the bar code is at the maximum distance to be read from the device.

Table 18: Display behavior of the LEDs in the second display level /meaning of the LEDs during action with pushbuttons

Function	Color	Behavior LED	Device status	Range of functions
Read diagn	Green	☼	LED flashes slowly: Reading diagnosis/percentage evaluation selected	In the “Percentage evaluation” operating mode, the bar graph display continuously shows the last determined read rate in %, in each case based on 100 readings.
		☼	LED flashes quickly: Reading diagnostics/percentage evaluation started	
Teach-in	Green	☼	LED flashes slowly: Teach-in matchcode selected	The device reads a match code which serves as a reference object for further readings.
		☼	LED flashes quickly: Teach-in matchcode started	

Function	Color	Behavior LED	Device status	Range of functions
Auto-Setup	Green	☼	LED flashes slowly: Auto-Setup selected	Sets the most important parameters of the device using a default bar code. Note: Present the reference bar code at the maximum reading distance. “Laser” LED differs from the function in read mode.
		☼	LED flashes quickly: Auto-Setup started	
Adjusting	Green	☼	LED flashes slowly: Adjusting (adjustment aid) selected	The scan line is halfway hidden. This allows the device to be better aligned to the center of the reference bar code.
		☼	LED flashes quickly: Adjusting (adjustment aid) started	
User-defined	–		Function not available	

○ = LED off, ● = LED lit, ☼ = LED flashing.

8.2 Operating options

The device can be configured according to application in the following manner:

- Locally at the device with the SOPAS ET configuration software. Backup of the parameter set as a configuration file on the computer using SOPAS ET. Access to the device via AUX interface (RS-232, or Ethernet depending on type).
- As an alternative to the SOPAS ET configuration software, command strings are available, upon which the operator interface of the configuration software is also based. These are also for the triggering of device functions (e.g. reading). Documents on the command strings can be obtained from SICK on request.
- Centrally through the PROFINET controller. This is carried out via PROFINET using GSD parameterization. Backup of the parameter set as a configuration file in the PROFINET controller. Each time PROFINET is restarted, the device is reconfigured.
- Profile programming by reading a set of printed configuration bar codes. The bar codes can be created using the SOPAS ET configuration software.

The SOPAS ET configuration software is used for device diagnostics in case of a fault.

The device operates fully automatically when operational.

9 Maintenance

9.1 Maintenance plan

During operation, the device works maintenance-free.

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

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

Table 19: 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 the mounting accessories and vibration dampers used.	Depends on the place of use, ambient conditions or operating requirements. Recommended: At least every 6 months.	Specialist
Check that all unused connections are sealed with protective caps.	Depends on ambient conditions and climate. Recommended: At least every 6 months.	Specialist

9.2 Cleaning

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

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.

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 20).

Cleaning procedure:

CAUTION
Optical radiation: Class 2 Laser Product
The human eye is not at risk when briefly exposed to the radiation for up to 0.25 seconds. Exposure to the laser beam for longer periods of time may cause damage to the retina. The laser radiation is harmless to human skin.

- Do not look into the laser beam intentionally.
- Never point the laser beam at people's eyes.
- If it is not possible to avoid looking directly into the laser beam, e.g., during commissioning and maintenance work, suitable eye protection must be worn.
- Avoid laser beam reflections caused by reflective surfaces. Be particularly careful during mounting and alignment work.
- Do not open the housing. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

- ▶ Switch off the device for the duration of the cleaning operation. If this is not possible, wear suitable laser safety 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.

Cleaning other, optically effective surfaces

Depending on the equipment of the reading station, additional local sensors with optically effective areas may be installed (e.g. photoelectric sensor for external read cycle). Contamination on these sensors can result in faulty switching behavior.

- To avoid faulty switching behavior, remove dirt from the optical surfaces of the external sensors.

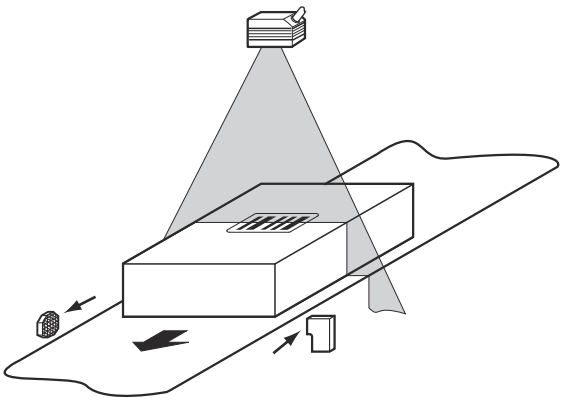


Figure 58: Cleaning the external optical sensors (read pulse encoder)

10 Troubleshooting

10.1 Overview of possible errors and faults

NOTICE

Danger due to damage to the device

For reasons of safety, if a device shows visible signs of damage do not put it into operation. Immediately take a device that is in operation out of operation.

Damage includes, depending on the type of device, for example the following:

- Viewing window pane: Cracked or broken
- Housing: Cracked or broken
- Violation of the cable outlet on the housing or the cable itself
- Overtightening of the male connector unit, tearing or breakage of the housing
- Moisture penetration in the device

Possible faults and corrective actions are described in the table below for troubleshooting.

Table 20: Errors and faults

Situation	Error or fault
Mounting	■ Device poorly aligned to objects with bar codes(e.g., dazzle) ■ Read cycle sensor incorrectly positioned, for example the internal reading interval is opened too early or closed too late. ■ Incremental encoder incorrectly positioned
Electrical installation	■ Data interfaces of the device wired incorrectly ■ Voltage supply not sufficiently dimensioned or cables with too small a cross-section used
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 read cycle not selected correctly
Operation	■ Control of the reading pulse not correct or not suitable for the object ■ Device faults (hardware/ software)

10.2 Detailed fault analysis

10.2.1 LEDs on the device

The following states, among others, can be read off on the device LEDs on the housing (see "Optical displays", page 84):

- Operational readiness (Ready)
- Reading result status (Good Read or No Read)
- Hardware fault
- Firmware download status
- Connection status of the device

The LED display can indicate possible errors or faults. Further information on this can be found in the “System Information” section.

10.2.2 System information

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

- Communication errors can occur while transmitting data to the device. The device then returns an error code.
- For errors that occur during reading, the device writes errors codes in the status log, see "Status log", page 92.

10.2.2.1 Status log

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

The device distinguishes between four types of fault:

- Information
- Warning
- Error
- Critical fault

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

10.2.2.1.1 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. Open CLV6xx in the project tree: Service > System status > System information tab

10.3 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.

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

However, it is possible to quickly replace a device with a stocked device of the same type, see "Device exchange with transmission of the current configuration data", page 93.

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

NOTE
Before calling, make a note of all type label data as well as the connection technology used to ensure faster assistance.

Type label

- Type designation
- Device serial number

10.4 Disassembly

Dismantling the device

1. Switch off the supply voltage to the device.
2. Disconnect all connecting cables on the device.
3. To replace the device, mark the position and orientation of the device on the bracket or surrounding area.

4. Remove the device from the bracket.
5. If available, remove the memory card (optional) with the saved parameter set from the defective device. To do this, carefully open the black rubber cover and press lightly on the memory card to unlock it.

10.5 Returns

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

NOTE

Optional memory card

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

NOTE

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

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

10.6 Device exchange with transmission of the current configuration data

NOTE

Backup concept with computer: If the parameter set of the defective device is saved, the parameter set can be transferred manually to the replacement device. For possible alternatives due to optional equipment, see the following section.

1. Check that the replacement device of the same type (repaired or new device) is de-energized.
2. Mount and align the replacement device (see "Mounting", page 42). When doing so, note the previously applied markings on the bracket or surroundings (see "Disassembly", page 92).
3. Depending on the type, contact the replacement device via its fixed connecting cable, or connect the connecting cables to the replacement device.
4. Switch on the supply voltage for the device. The device starts with its previous settings (new device: defaults).
5. Depending on the selected configuration type, proceed as follows:
   - Local, automated configuration via the memory card in the device. Alternatively, with a CMC600 parameter cloning module in the CDB/CDM connection module:
     - If an optional memory card is installed, the replacement device transfers the saved parameter set from the memory card into its permanent memory.
     - If an optional CMC600 is installed, the replacement device transfers the saved parameter set from the CMC600 into its permanent memory.
     - If both a memory card and a CMC600 are installed: The replacement device adopts the parameter set from the CMC600 into its permanent memory.

- Local, manual configuration via SOPAS ET: Transfer the configuration stored on the computer to the device via download (serially or via Ethernet, depending on the type). Permanently save the configuration in the device.
- Central configuration via GSD configuration: On restarting the PROFINET, the PROFINET controller configures the device automatically. Directly on the device via PROFINET Single Port or Dual Port via the CDF600-22xx bus connection module.

If automated PN name assignment for the device is configured and activated in the PROFINET controller, the following conditions apply:

- Central configuration: The entire permanently stored parameter set of the new device being installed must be set to **default** (same as the state of a new device upon delivery).
- Local configuration: At least the “PN Name” field in the device’s parameter set must be empty.

The device then automatically obtains the required PN names from the PROFINET controller when the supply voltage is switched on.

11 Decommissioning

11.1 Disposal

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

NOTICE

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

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

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

12 Technical data

NOTE

The relevant online 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/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

Please note: This documentation may contain further technical data.

12.1 Features

Devices in IP65 standard housing (with or without heating)

Table 21: Technical data features

	CLV63x	CLV64x	CLV65x
Work area	• CLV630 Long Range • CLV631 Mid Range • CLV632 Short Range	• CLV640 Standard Density • CLV642 High Density	• CLV650 Standard Density • CLV651 Low Density
Scanning methods	Line scan or raster scan [1], type-dependent		
Sensor type	Line scanner, raster scanner or line scanner with oscillating mirror, type-dependent, identifier see "Type code", page 20		Line scanner or line scanner with oscillating mirror, depending on type
Oscillating mirror functions	• Fixed (adjustable position), oscillating (variable or fixed amplitude), one-shot • Oscillation frequency / period: 0.5 Hz ... 6.25 Hz / 2,000 ms ... 160 ms • Angle of deflection: -20° ... +20° (adjustable using software)		
Orientation of viewing window	Frontal or side [2] [3], type-dependent, identifier see "Type code", page 20		
Aperture angle	Front: ≤ 50° Side: ≤ 51.5°	Front: ≤ 50° Side: ≤ 50°	
Optical focus	Fixed focus	Dynamic focus adjustment	Auto focus or dynamic focus adjustment
Code resolution	CLV630: 0.35 mm ... 1.0 mm CLV631: 0.25 mm ... 0.5 mm CLV632: 0.2 mm ... 0.5 mm	CLV640: 0.2 mm ... 1.0 mm CLV642: 0.15 mm ... 0.25 mm	CLV650: 0.25 mm ... 1.0 mm CLV651: 0.5 mm
Reading ranges	see "Reading field diagrams (working ranges)", page 124		
Scanning frequency	400 Hz ... 1,200 Hz		600 Hz ... 1,000 Hz
Light source	Laser diode, visible red light (λ = 655 nm)		Laser diode, visible red light (λ = 658 nm)
Light spot	Standard: Circular. Type-dependent: Oval, identifier see "Type code", page 20		Circular
MTTF (laser diode)	40,000 hours at 25 °C		
MTBF	100000 hours		

	CLV63x	CLV64x	CLV65x
Laser class	Class 2 according to EN/IEC 60825-1:2014. Identical laser class for issue EN/IEC 60825-1:2007. Conforms to 21 CFR 1040.10 except for deviations per Laser Notice No. 50 of June 24, 2007, and subsequent versions.		
Laser power	P = 3.2 mW maximum, P < 1.0 mW average		• CLV650: P = 7.0 mW maximum, P < 1.0 mW average • CLV651: P = 4.5 mW maximum, P < 1.0 mW average
Laser pulse duration	< 300 µs		< 80 µs

1) Front viewing window: 8 lines, grid height approx. 15 mm at reading distance 200 mm.
Side viewing window: 8 lines, grid height approx. 15 mm at reading distance 185 mm.
2) Side viewing window: Light emission at 105° relative to the longitudinal axis of the device.
3) see "Device view", page 23.

Device in IP69K protective housing

The Ethernet variant of the CLV63x and of the CLV640 is available as a device in a protective housing.

NOTE
For technical data, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

12.2 Performance

Devices in IP65 standard housing (with or without heating)

Table 22: Technical data for performance

	CLV63x	CLV64x	CLV65x
Readable code structures	1D codes		
Bar code types	Code 39, code 128, code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved, Pharmacode		
Print ratio	2:1 ... 3:1		
No. of codes per scan	1 ... 20 (standard decoder) 1 ... 6 (SMART decoder)		
Number of codes per reading interval [1]	1 ... 50 (auto-discriminating)		
No. of characters per reading interval	Max. 50 characters Maximum 5,000 characters across all bar codes per reading interval, 500 characters for multiplexer function (CAN)		
Number of multiple readings	1 ... 99		

1) Reading interval: The time window generated internally by the reading cycle for code detection and evaluation

NOTE
The bar codes being read must conform to at least quality level C in accordance with ISO/IEC 15416.

Devices in IP69K protective housing

The Ethernet variants of the CLV63x and of the CLV640 are available as devices in a protective housing.

NOTE
For technical data, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

12.3 Interfaces

Devices in IP65 standard housing (with or without heating)

Table 23: Technical data: Interfaces

	CLV63x	CLV64x	CLV65x
Ethernet	Only with Ethernet variant **Function:** Host, AUX **Data transmission rate:** 10/100 Mbit/s **Protocol:** TCP/IP, EtherNet/IP, PROFINET Single Port		
Serial (RS-232, RS-422/-485)	**Function:** Host, AUX (RS-232 only) **Data transmission rate:** 2.4 kBd ... 115.2 kBd, AUX: 57.6 kBd (RS-232)		
CAN bus	**Function:** SICK CAN sensor network (master/slave, multiplexer/server) **Data transmission rate:** 20 kbit/s ... 1 Mbit/s **Protocol:** CSN (SICK CAN sensor network), CANopen (CLV65x only)		
DeviceNet	Optional over external connection module CDM420 and CMF fieldbus module		
Digital inputs	Ethernet variant: • **M12 male connector, 12-pin:** 1 input (“Sensor 1”), optionally 2 additional, external inputs [1] • **M12 male connector, 17-pin:** 2 inputs (“Sensor 1”, “Sensor 2”), optional 2 additional, external inputs optional [2] Serial variant: • 2 inputs (“Sensor 1”, “Sensor 2”), optionally 2 additional, external 2 inputs [1] Opto-decoupled, V_{in} [3] = max. 32 V, reverse polarity protected, can be wired with PNP output, debounce time adjustable (0 ms ... 10,000 ms), default 10 ms		
Digital outputs	Ethernet variant: • **M12 male connector, 12-pin:** No output, optionally 2 external outputs [1] • **M12 male connector, 17-pin:** 2 outputs (“Result 1”, “Result 2”), optionally 2 additional, external outputs [2] Serial variant: • 2 outputs (“Result 1”, “Result 2”), optionally 2 additional, external outputs [1]		
	PNP, I_{out} [4] = max. 200 mA,	PNP, I_{out} [4] = max. 100 mA	
	Short-circuit protected, pulse duration adjustable (static, 10 ms ... 10,000 ms)		
Reading pulse	**Pulse sources for start:** Digital inputs “Sensor 1” and/or “Sensor 2”; Command; Auto pulse; CAN **Pulse sources for stop:** Read clock source, digital inputs “Sensor 1”, “Sensor 2”, Command, Timer, Good Read, Condition		
Optical displays	6 LEDs (Ready, Result, Laser, Data, CAN, LNK TX) Bar graph display to show the percentage read rate (10 LEDs)		

	CLV63x	CLV64x	CLV65x
Acoustic indicator	Beeper, can be switched off, can be assigned with function for result status display		
Control elements	2 pushbuttons (hardware)		
Service function	Backup of parameterization data (parameter cloning) to a location outside the device memory: • Optional micro SD card in the device or • External, optional CMC600 parameter cloning module in CDB or CDM connection module		
Configuration	SOPAS ET configuration software, profile programming with bar codes (can be deactivated), command language, GSD parameterization		

1) Via the optional CMC600 parameter cloning module in the CDB620 or CDM420 connection module.
2) Via the optional CMC600 parameter cloning module in the CDB650 or CDM420 connection module.
3) Input voltage.
4) Output current.

Devices in IP69K protective housing

The Ethernet variant of the CLV63x and of the CLV640 is available as a device in a protective housing.

NOTE
For technical data, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

12.4 Mechanics/Electronics

Devices in IP65 standard housing (with or without heating)

Table 24: Technical data mechanics/electrics

		CLV63x	CLV64x	CLV65x
Connection type	**Ethernet variant, 12-pin**	**Swivel connector with 2 round connectors:** • 1 male connector, M12, 12-pin, A-coded • 1 female connector, M12, 4-pin, D-coded		
	Ethernet variant, 17-pin	**Swivel connector with 2 round connectors:** • 1 male connector, M12, 17-pin, A-coded • 1 female connector, M12, 4-pin, D-coded		
	Serial variant	1 standard cable (0.9 m) with male connector, D-Sub-HD, 15-pin		
	Device with heating	Additionally one cable 2 m, open end, 3-wire, with ferrules		
Supply voltage V_S	**Without heating**	18 V DC ... 30 V DC, LPS or NEC Class 2, reverse polarity protected		
	With heating	24 V DC ± 10%, LPS or NEC Class 2, reverse polarity protected. Required fuse: 3 A		
Power consumption [1]	**Without heating**	Line or raster scanner: Typically 5 W at 24 V DC ± 10% Line scanner with oscillating mirror: Typically 6 W	Line or raster scanner: Typically 5.5 W at 24 V DC ± 10% Line scanner with oscillating mirror: Typically 6.5 W	Line scanner: Typically 8.5 W at 18 V DC ... 30 V DC Line scanner with oscillating mirror: Typically 9.5 W
	With heating	Maximum 40 W (max. 2.4 A)		
Switch-on delay	**Device with heating**	Approx. 40 minutes at -35 °C and 24 V DC		
Housing	**All types**	Aluminum die cast		
Housing color	**Without heating**	Light blue (RAL 5012), black (RAL 9005)		
	With heating	Light blue (RAL 5012), external heating black (RAL 9005)		

		CLV63x	CLV64x	CLV65x
Window material of the viewing window	**Without heating**	Glass [2]: CLV63x, CLV64x, CLV65x Optional: Plastic (polycarbonate) [2]: CLV63x, CLV64x		
	With heating	Glass [2]		
Threaded mounting hole		2 x 2 blind tapped hole M5, 5 mm deep Tightening torque for mounting screws: max. 2.5 Nm		
Cover for optional equipment		Plastic		
Laserwarnschild		In combination with the type label, glued on		
Safety		EN 62368-1: 2014-08		
Enclosure rating		IP65, according to EN 60529: 1991-10; A1: 2002-02		
Protection class		 (Class 3) For operation in SELV systems (EN 60950-1) or ES1 systems (EN 62368-1)		
Weight	**Front viewing window**	Ethernet variant 250 g, with heating 450 g [2] [3] Serial variant 320 g [4], with heating 520 g [2] [3] [4]		
	Side viewing window	Ethernet variant 250 g, with heating 450 g [2] [3] Serial variant 340 g, [4] with heating 540 g [2] [3] [4]		
	Oscillating mirror, viewing window on the side	Ethernet variant: 350 g, with heating 550 g [2] [3] Serial variant 420 g [4], with heating 620 g [2] [3] [4]		
Dimensions (L x W x H)	**Front viewing window**	Ethernet variant: 61 mm x 96 mm x 38 mm [5], with heating 61 mm x 96 mm x 50 mm [2] [5] Serial variant: 61 mm x 96 mm x 38 mm, with heating 61 mm x 96 mm x 50 mm [2]		
	Front viewing window, with polarizing filter	–		61 mm x 96 mm x 38 mm [4]
	Side viewing window	Ethernet variant: 80 mm x 96 mm x 38 mm [5], with heating 80 mm x 96 mm x 50 mm [2] [5] Serial variant: 80 mm x 96 mm x 38 mm, with heating 80 mm x 96 mm x 50 mm		
	Oscillating mirror, viewing window on the side	Ethernet variant: 95 mm x 107 mm x 41 mm, with heating 95 mm x 107 mm x 50 mm [5] Serial variant: 95 mm x 107 mm x 41 mm, with heating 95 mm x 107 mm x 50 mm		
Conformities		CE, UL [5]. For further conformities and certificates, see the product page on the Internet at: • www.sick.com/CLV63x • www.sick.com/CLV64x • www.sick.com/CLV65x		

1) For digital outputs without load.
2) Identifier see "Type code", page 20.
3) With glass viewing window.
4) Including connecting cable with male connector.
5) Swivel connector protrudes by 15 mm.
6) Only UL-certified if the type label contains the UL logo and the UL conditions are complied with during device operation. For information see see "UL conformity", page 109.

Devices in IP69K protective housing

The Ethernet variant of the CLV63x and of the CLV640 is available as a device in a protective housing.

NOTE
For technical data, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

12.5 Ambient data

Devices in IP65 standard housing (with or without heating)

Table 25: Technical data for ambient data

	CLV63x	CLV64x	CLV65x
Electromagnetic compatibility (EMC)	Radiated emission: According to EN 61000-6-3: 2007-01 Shock resistance: According to EN 61000-6-2: 2005-08		
Vibration resistance	EN 60068-2-6: 2008-02		
Shock resistance	EN 60068-2-27: 2009-05		
Ambient operating temperature	• Device without heating: 0 °C ... +40 °C • Device with heating: -5 °C ... +35 °C		
Storage temperature	–20 °C ... +70 °C		
Permissible relative humidity	0% ... 90%, non-condensing		
Ambient light immunity	2,000 lx, on bar code		
Bar code print contrast (PCS)	≥ 60 %		

Devices in IP69K protective housing

The Ethernet variant of the CLV63x and of the CLV640 is available as a device in a protective housing.

NOTE
For technical data, see "Technical Information CLV62x, CLV63x and CLV64x with IP69K Protective Housing", part no. 8021479.

13 Accessories

13.1 Additional accessories

A wide range of accessories such as brackets and cables for the various fields of applications of the device can be found at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

Required accessories for device variants with external heating

Thermally insulating bow-shaped mounting brackets:

- Part no. 2050705 or
- Part no. 2058082

Wiring aids for connection modules:

- CDB620-001 connection module:
  additional terminal part no. 2055071
- CDM420-0001 connection module:
  additional circuit board part no. 2055071

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

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

Adapter cable, straight female connector, open end

Part no. 2075219 (5 m), shielded, suitable for 2 A, suitable for drag chain, deep-freeze compatible

For CLV63x, Ethernet variant, M12, 12-pin, IP65 standard housing

For CLV64x, Ethernet variant, M12, 12-pin, IP65 standard housing

For CLV65x, Ethernet variant, M12, 12-pin, IP65 standard housing

Ambient temperature range:

For mobile installation: –25 °C to +40 °C, for fixed installation:: –35 °C to +40 °C

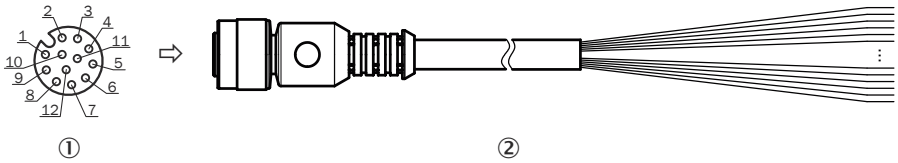


Figure 59: Adapter cable, part no. 2075219

① Female connector, M12, 12-pin, A-coded (front view)

② Illustration may differ

Table 26: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	GND	Ground	Brown
2	V_S	Supply voltage	Blue
3	CAN L	CAN bus (IN/OUT)	White
4	CAN H	CAN bus (IN/OUT)	Green

Pin	Signal	Function	Wire color
5	TD+ (RS-422/485), host	Host interface (sender+)	Pink
6	TD– (RS-422/485), host TxD (RS-232), host	Host interface (sender-)	Yellow
7	TxD (AUX)	AUX interface (sender)	Black
8	RxD (AUX)	AUX interface (receiver)	Gray
9	SensGND	Digital input ground	Red
10	Sensor 1	Digital input 1	Violet
11	RD+ (RS-422/485), host	Host interface (receiver+)	Gray-pink
12	RD– (RS-422/485), host RxD (RS-232), host	Host interface (receiver–)	Red-blue

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

Adapter cable, straight female connector, open end

Part no. 6034605 (5 m), shielded, UL

For CLV63x, Ethernet variant, M12, 12-pin

For CLV64x, Ethernet variant, M12, 12-pin

For CLV65x, Ethernet variant, M12, 12-pin

Ambient temperature range:

For fixed installation: –30 °C to +90 °C

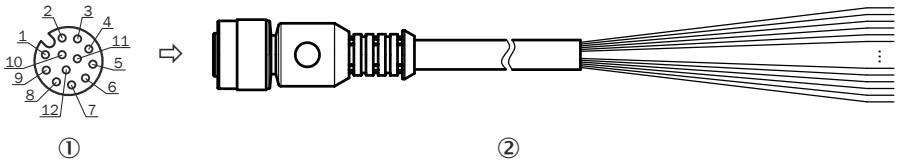


Figure 60: Adapter cable, part no. 6034605

① Female connector, M12, 12-pin, A-coded (front view)

② Illustration may differ

Table 27: Signal assignment of adapter cable with open end

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

Pin	Signal	Function	Wire color
12	RD– (RS-422/485), host RxD (RS-232), host	Host interface (receiver–)	Red-blue

13.2.3 "Power/SerialData/CAN/I/O" connection to customer-specific connection equipment or control cabinet

Adapter cable, straight female connector, open

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

For CLV63x, Ethernet variant, M12, 17-pin, standard housing IP65

For CLV64x, Ethernet variant, M12, 17-pin, standard housing IP65

For CLV65x, Ethernet variant, M12, 17-pin, standard housing IP65

Permitted currents for ambient temperature +40 °C:

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

Ambient temperature range:

For mobile installation: –25 °C to +40 °C, for fixed installation:: –35 °C to +40 °C

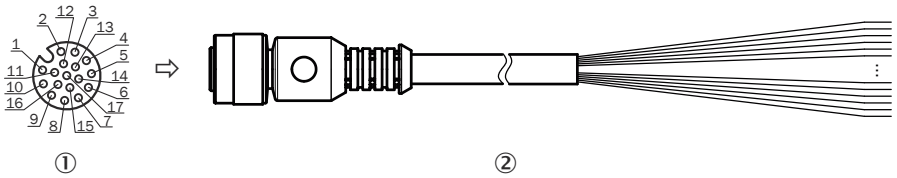


Figure 61: Adapter cable, part no. 2075220

① Female connector, M12, 17-pin, A-coded (view from front)

② Illustration may differ

② Illustration may differ

Table 28: Signal assignment of adapter cable with open end

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

Pin	Signal	Function	Wire color
16	Result 3	Digital input 3	Yellow-brown
17	N. c.	–	White-gray

13.2.4 "Power/SerialData/CAN/I/O" connection to customer-specific connection equipment or control cabinet

Adapter cable, straight female connector, open end

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

For CLV63x, Ethernet variant, M12, 17-pin, standard housing IP65 or protective housing IP69K

For CLV64x, Ethernet variant, M12, 17-pin, standard housing IP65 or protective housing IP69K

For CLV65x, Ethernet variant, M12, 17-pin, standard housing IP65

Ambient temperature range:

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

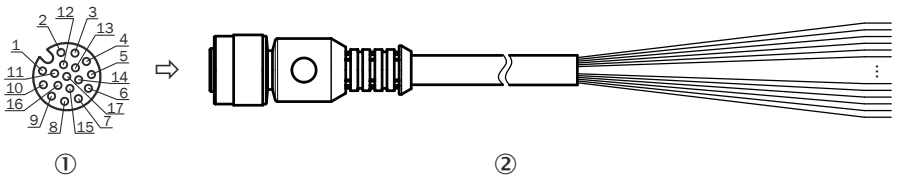


Figure 62: Adapter cable, e.g., part no. 2070425 (3 m)

① Female connector, M12, 17-pin, A-coded (view from front)

② Illustration may differ

② Illustration may differ

Table 29: Signal assignment of adapter cable with open end

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

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

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

Adapter cable, straight female connector, open end

Part no. 2043413 (2 m), shielded

For CLV63x, serial variant, standard housing IP65

For CLV64x, serial variant, standard housing IP65

For CLV65x, serial variant, standard housing IP65

Ambient temperature range:

For fixed installation: –25 °C to +40 °C

The shield braid of the cable has contact with the metal housing of the female connector.

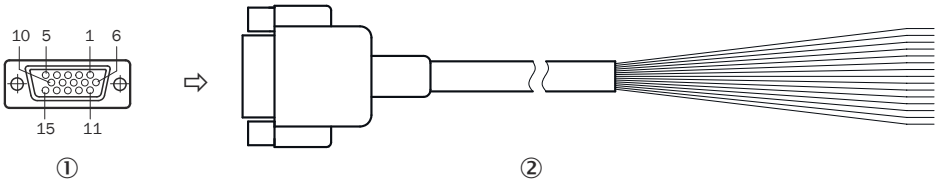


Figure 63: Adapter cable, part no. 2043413

① Female connector, D-Sub-HD, 15-pin (view from front)

② Illustration may differ

② Illustration may differ

Table 30: Signal assignment of adapter cable with open end

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

13.2.6 Host interface RS-232 via connection module CDB/CDM to host (computer)

Device	Connection module
CLV63x ... CLV65x serial variant	CDB620-001, CDM420-0001, -0004, -0006, -0007
CLV63x ... CLV65x Ethernet variant	CDB620-001, CDB650-204, CDM420-0001, -0004, -0006, -0007

Adapter cable, straight female connector, open end

Part no. 2020319 (3 m), unshielded

Ambient temperature range:

For fixed installation: –25 °C to +40 °C

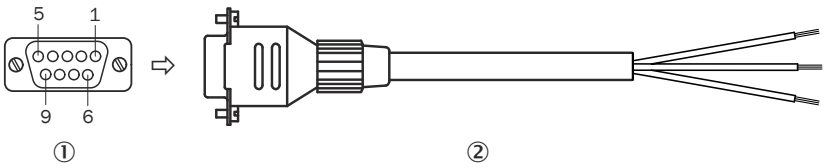


Figure 64: Adapter cable, part no. 2020319

① Female connector, D-Sub, 9-pin (front view)

② Illustration may differ

② Illustration may differ

Table 31: Signal assignment of adapter cable with open end

Pin	Signal at computer	Function	Wire color
1	–	–	–
2	RxD (RS-232), host	Host interface (receiver)	Brown [1]
3	TxD (RS-232), host	Host interface (sender)	Blue [2]
4	–	–	–
5	GND	Ground	Black
6 ... 9	–	–	–

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

13.2.7 Ethernet connection

Adapter cable, straight male connector, open end

Part no. 2106171 (2 m), part no. 2106172 (5 m), part no. 2106173 (10 m), suitable for drag chain, deep-freeze compatible

For CLV63x, Ethernet variant, M12, standard housing IP65

For CLV64x, Ethernet variant, M12, standard housing IP65

For CLV65x, Ethernet variant, M12, standard housing IP65

Ambient temperature range:

For fixed installation: –40 °C to +80 °C

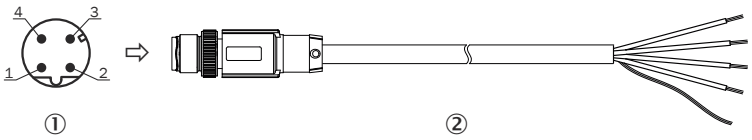


Figure 65: Adapter cable, e.g. part no. 2106171 (2 m)

① Male connector, M12, 4-pin, straight, D-coded (front view)
② Illustration may differ
② Illustration may differ

Table 32: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	TD+ (Ethernet)	Sender+	Yellow
2	RD+ (Ethernet)	Receiver+	White
3	TD– (Ethernet)	Sender–	Orange
4	RD– (Ethernet)	Receiver–	Blue

13.2.8 Ethernet connection

Adapter cable, angled male connector, open end

Part no. 2106174 (2 m), part no. 2106175 (5 m), part no. 2106176 (10 m), part no. 2106180 (25 m), shielded

For CLV63x, Ethernet variant, M12, standard housing IP65

For CLV64x, Ethernet variant, M12, standard housing IP65

For CLV65x, Ethernet variant, M12, standard housing IP65

Ambient temperature range:

For fixed installation: –40 °C to +80 °C

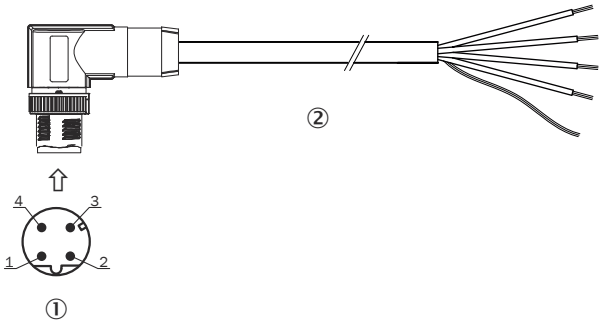


Figure 66: Adapter cable, e.g. part no. 2106174 (2 m)

① Male connector, M12, 4-pin, angled at 90°, D-coded (front view)
② Illustration may differ

Table 33: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	TD+ (Ethernet)	Sender+	Yellow
2	RD+ (Ethernet)	Receiver+	White
3	TD– (Ethernet)	Sender–	Orange
4	RD– (Ethernet)	Receiver–	Blue

14 Annex

14.1 Declarations of conformity and certificates

The declarations of conformity and certificates can be downloaded from the Internet at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

14.2 UL conformity

The UL certification is dependent on the type. Any existing UL certification can be found on the type label.

The devices in the CLV63x, CLV64x and CLV65x series in the IP65 standard housing are certified to UL60950-1. The UL file has the designation E244281-A6.

The devices must be supplied by LPS or Class 2 power supply units to ensure proper operation.

UL certification is only valid with corresponding device identification on the type label of the respective device; see see "Type label", page 18.

The IP65 enclosure rating of the devices is not checked by UL.

For additional information visit:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x
- Laser warnings and laser power, see "Operational safety and particular hazards", page 12 and see "Laser radiation", page 13

14.3 Notes on PROFINET

14.3.1 Basic information on PROFINET

SICK recommends familiarizing yourself with the basic information described in the planning guidelines and commissioning guidelines of the PI user organization (PROFIBUS & PROFINET International, homepage: www.profinet.com).

These guidelines can be found in the "Downloads" area at:

- www.profibus.com

14.3.2 General notes on PROFINET wiring

The wires of the signal cables must be wrapped in pairs (twisted pairs), and the cables must comply with at least CAT5 according to ISO/IEC 11801 Edition 2.0. Class D. The signal lines must also be shielded and grounded.

SICK recommends using components certified by PROFINET.

More detailed information can be found in the “PROFINET Cabling and Interconnection Technology” Installation Guide.

You can find the document in the “Downloads” area at:

- www.profibus.com

14.3.3 PROFINET Conformance Class

The device complies with PROFINET Conformance Class B (CC-B) and supports the properties defined within.

Further information on the PROFINET Conformance Classes can be found in the document of the PI user organization (PROFIBUS and PROFINET International).

You can find the document in the “Downloads” area at:

- www.profibus.com

14.3.4 General requirements on a switch suitable for PROFINET applications

For PROFINET Conformance Class B and C (CC-B / CC-C), use only a PROFINET-certified switch that can be configured as a PROFINET device.

For further information, refer to the commissioning guidelines of the PI “Installation Guideline PROFINET Part 2: Network Components”.

You can find the document in the “Downloads” area under:

- www.profibus.com

14.3.5 Notes on installing the SICK bar code scanner into a PROFINET network

For 1-port devices, these include:

- LLDP (neighborhood detection) [1)]
- I&M 0-4 (device identification) [1)]
- Device exchange by topology check [1)]
- 16 bit digital “status word” for reading gate result
- 16 bit digital “control word” for controlling the device via PLC
- Heartbeat (for checking communication)
- GSD file for configuring the device using modules via the PLC [1)]

For 2-port devices, these include:

- LLDP (neighborhood detection) [1)]
- I&M 0-4 (device identification) [1)]
- Device exchange by topology check [1)]
- MRP (ring redundancy) [1)]
- 16 bit digital “status word” for reading gate result
- 16 bit digital “control word” for controlling the sensor via PLC
- Heartbeat (for checking communication)
- GSD file for configuring the sensor using modules via the PLC [1)]

14.3.6 Behavior of the digital outputs of the bar code scanner with “Fieldbus input” reading cycle source

The digital outputs can be configured so that the outputs show information from other network nodes (e.g., external output 1=fieldbus input).

If the fieldbus is interrupted, these outputs are no longer updated. The outputs will then each retain the last value before the interruption.

After switching on the fieldbus (power-up), all digital outputs are set to their “passive” values.

1) Properties of the CC-B

Status of digital outputs with	output value behavior
IOPS = Bad	Retain the last value before cancellation
Connection lost	Retain the last value before cancellation
Switching on the PROFINET network	Values are initialized to “passive”

The reading cycle input can also be controlled by the fieldbus. When the fieldbus is interrupted, the reading cycle input is no longer updated. Reading results may then get lost since the reading cycle input retains its last value before the interruption.

After switching on the fieldbus (power-up), the reading cycle input is set to its “passive” value.

14.4 Dimensional drawings

14.4.1 Devices in IP65 standard housing without heating

14.4.1.1 Devices with connector unit (Ethernet variants)

Front viewing window

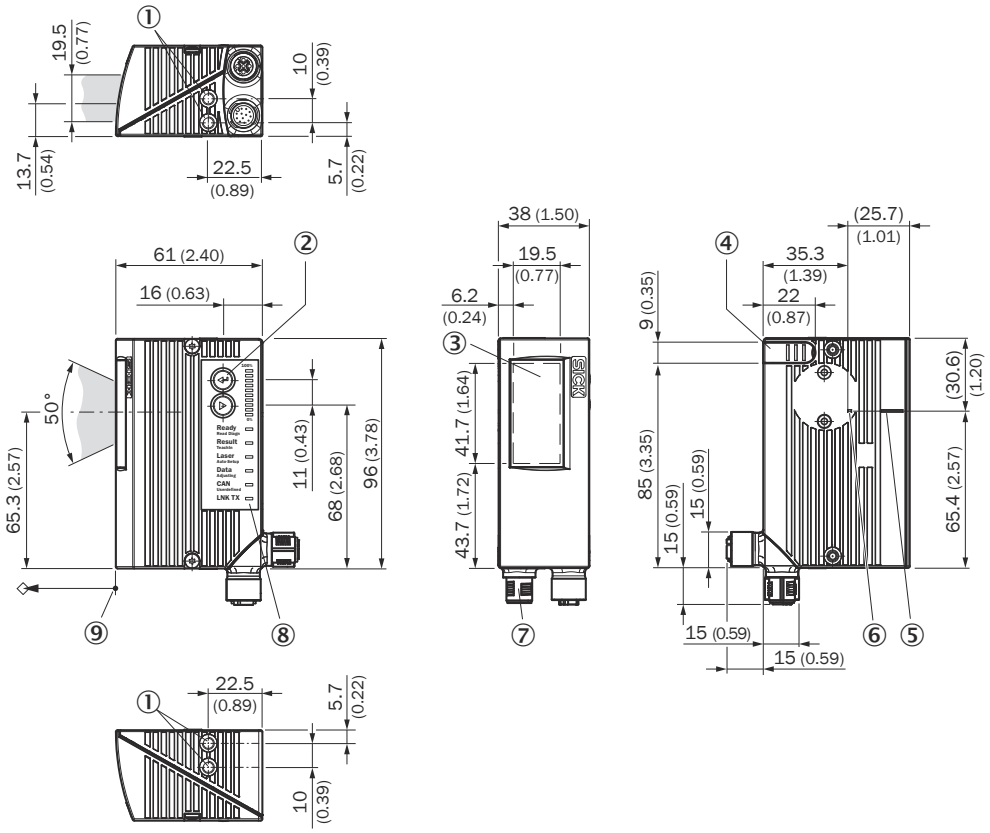


Figure 67: CLV63x to CLV65x: Ethernet variant in standard housing, with front viewing window and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle

⑥ Internal impact point: Rotation point of the variable direction laser beam

⑦ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑧ LED status indicator (6 x) and bar graph

⑨ Reference point of the reading distance (from housing edge to object)

Side viewing window

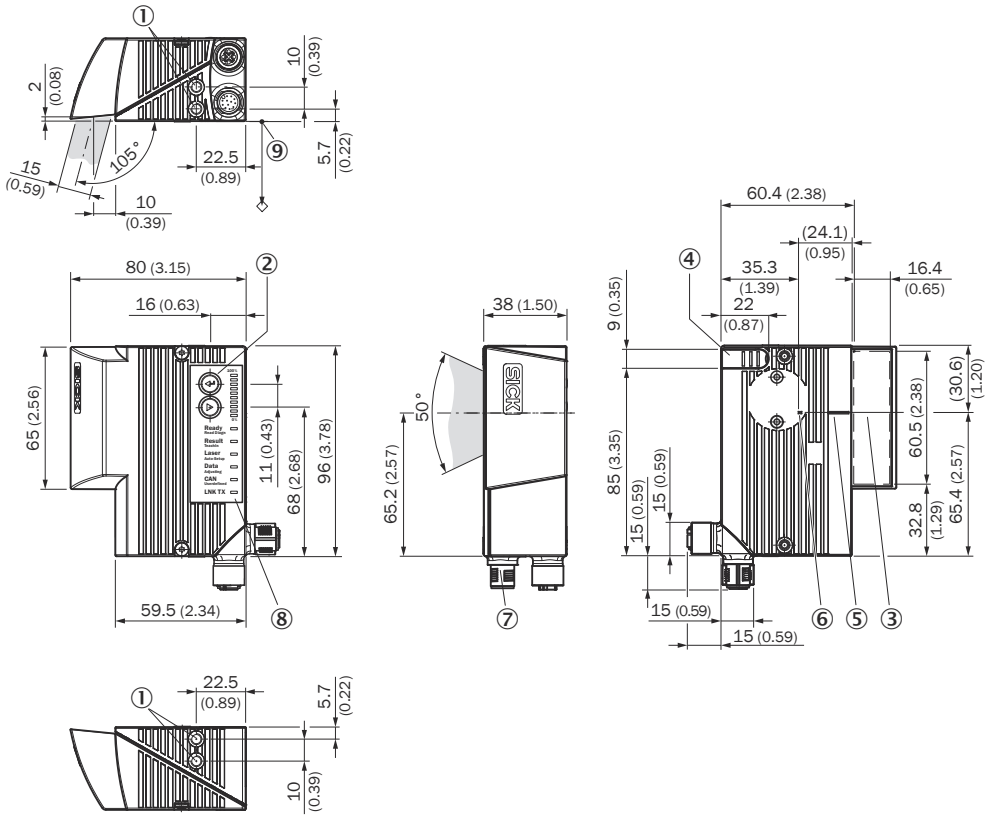


Figure 68: CLV63x to CLV65x: Ethernet variant in standard housing, with side viewing window and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle

⑥ Internal impact point: Rotation point of the variable direction laser beam

⑦ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑧ LED status indicator (6 x) and bar graph

⑨ Reference point of the reading distance (from housing edge to object)

Side viewing window, oscillating mirror

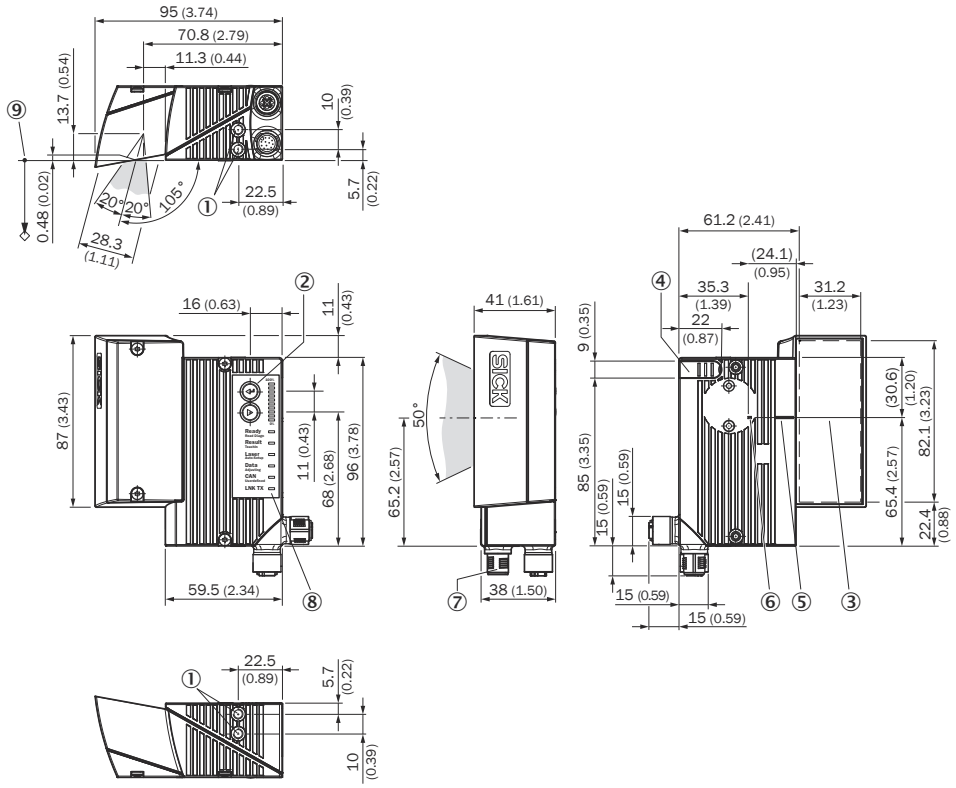


Figure 69: CLV63x to CLV65x: Ethernet variant in standard housing, with oscillating mirror (side viewing window) and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle

⑥ Internal impact point: Rotation point of the variable direction laser beam

⑦ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑧ LED status indicator (6 x) and bar graph

⑨ Reference point of the reading distance (from housing edge to object)

14.4.1.2 Devices with cable connection (serial variants)

Front viewing window

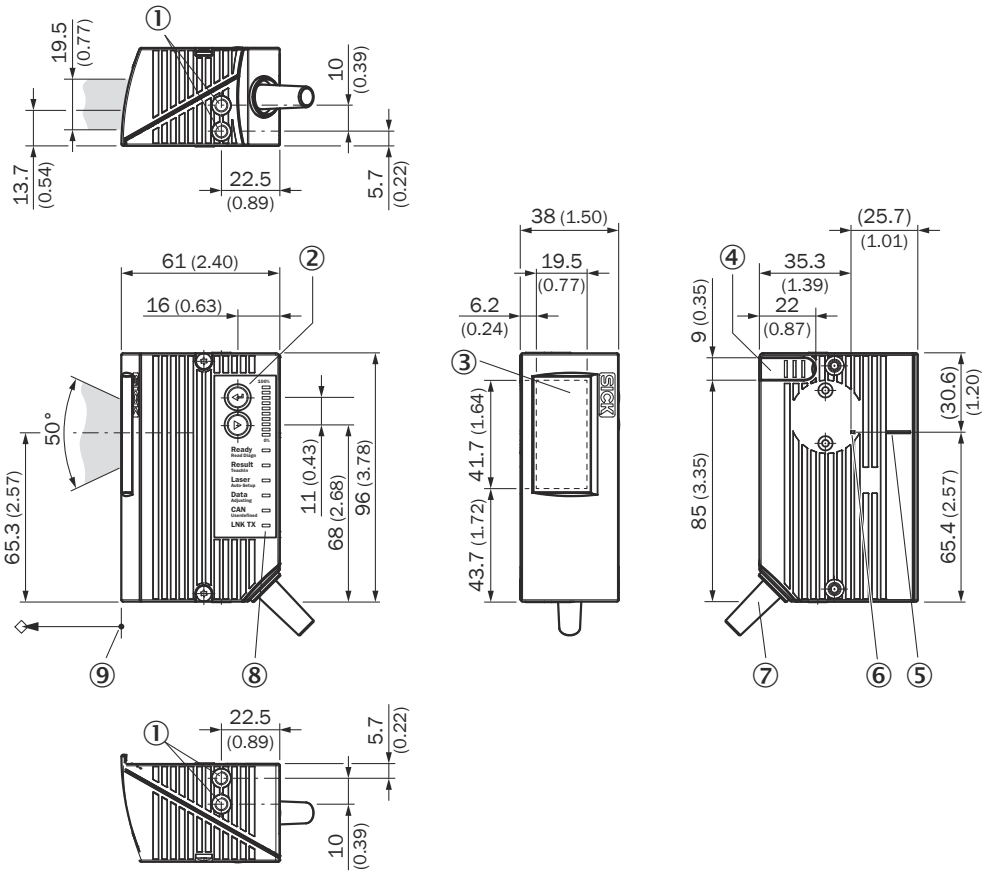


Figure 70: CLV63x to CLV65x: Serial variant in standard housing, with front viewing window and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle

⑥ Internal impact point: Rotation point of the variable direction laser beam

⑦ Cable connection, cable with male connector, D-Sub-HD, 15-pin

⑧ LED status indicator (6 x) and bar graph

⑨ Reference point of the reading distance (from housing edge to object)

Side viewing window

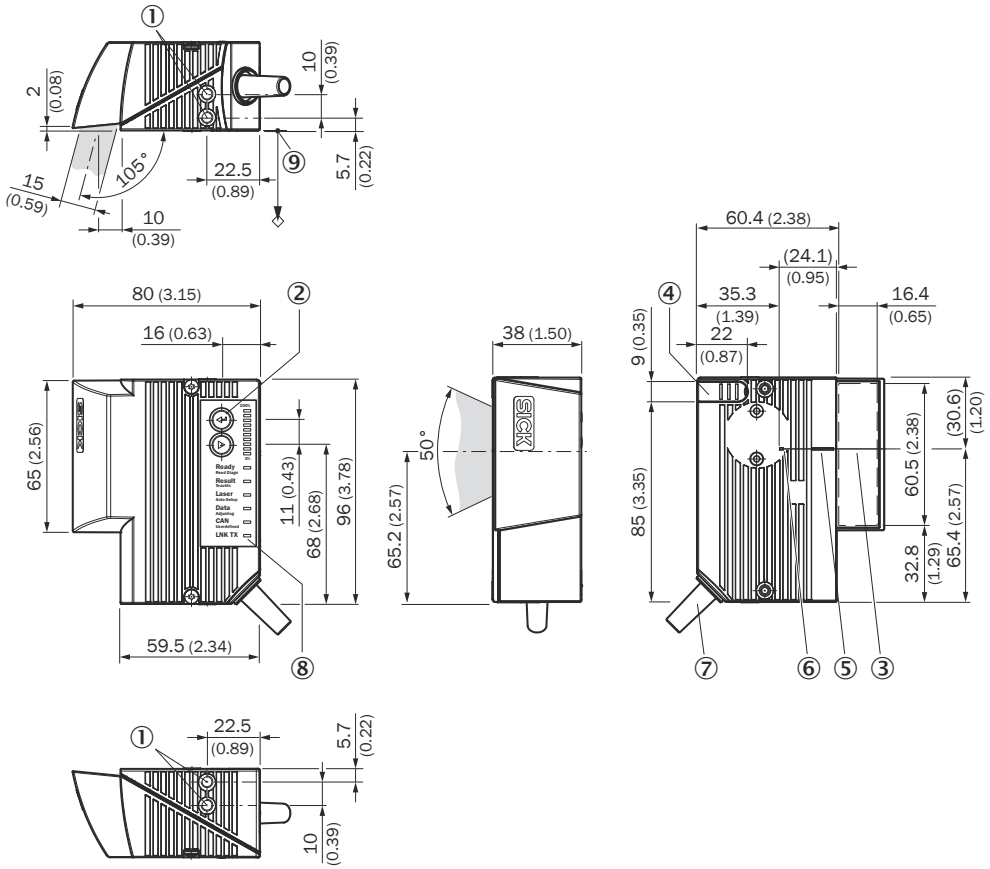


Figure 71: CLV63x to CLV65x: Serial variant in IP65 standard housing, with side viewing window and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle

⑥ Internal impact point: Rotation point of the variable direction laser beam

⑦ Cable connection, cable with male connector, D-Sub-HD, 15-pin

⑧ LED status indicator (6 x) and bar graph

⑨ Reference point of the reading distance (from housing edge to object)

Side viewing window, oscillating mirror

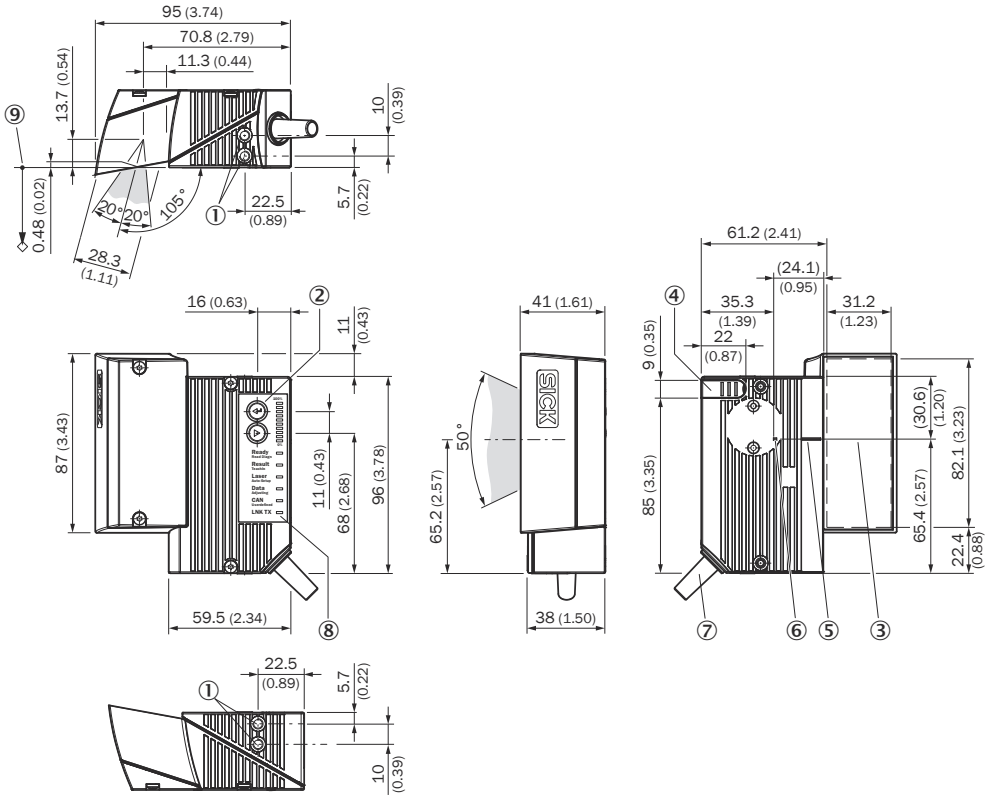


Figure 72: CLV63x to CLV65x: Serial variant in standard housing, with oscillating mirror (side viewing window) and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device.Tightening torque for screws: max. 2.5 Nm.
② Function button (2 x)
③ Viewing window
④ Memory card slot cover
⑤ Central position of the deflected laser beam in the V-shaped aperture angle
⑥ Internal impact point: Rotation point of the variable direction laser beam
⑦ Cable connection, 0.9 m cable with male connector, D-Sub-HD, 15-pin
⑧ LED status indicator (6 x) and bar graph
⑨ Reference point of the reading distance (from housing edge to object)

14.4.2 Devices in IP65 standard housing with heating

14.4.2.1 Devices with connector unit (Ethernet variants)

Front viewing window

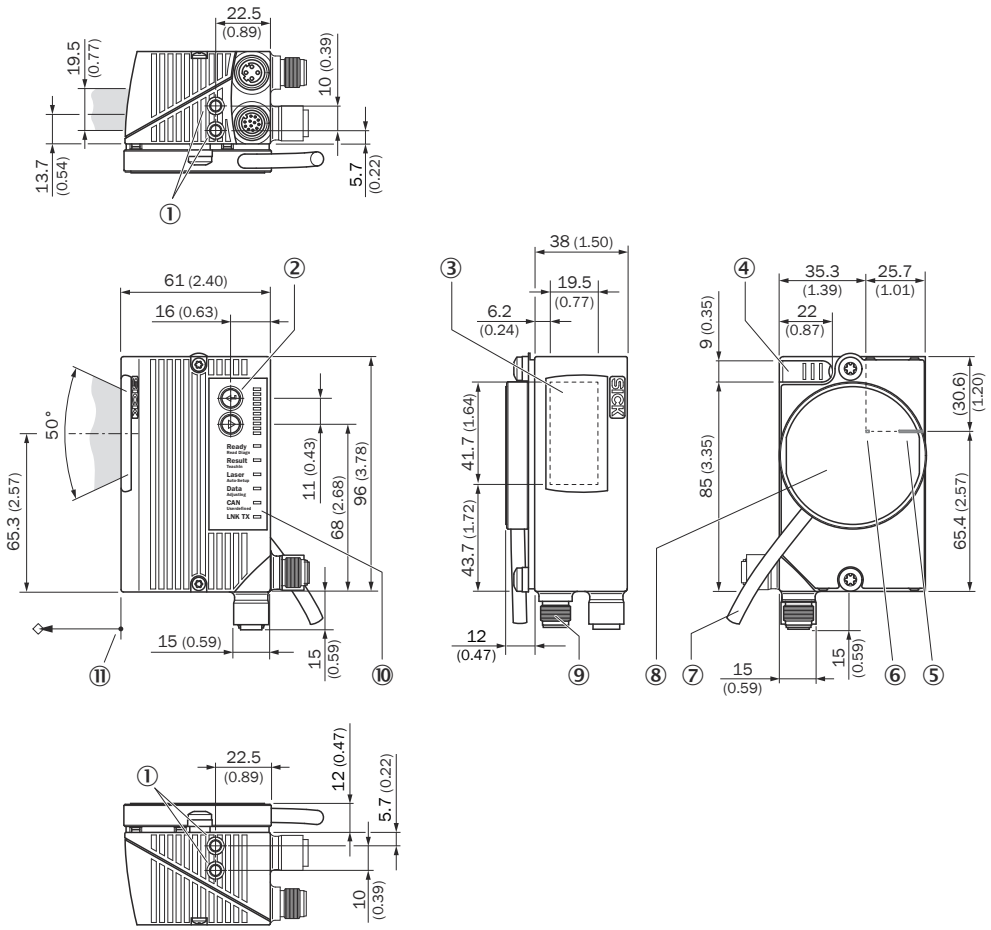


Figure 73: CLV63x to CLV65x: Ethernet variant in standard housing, with external heating, front viewing window and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heater cable connection with flying leads, 3-wire

⑧ Heating

⑨ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

Side viewing window

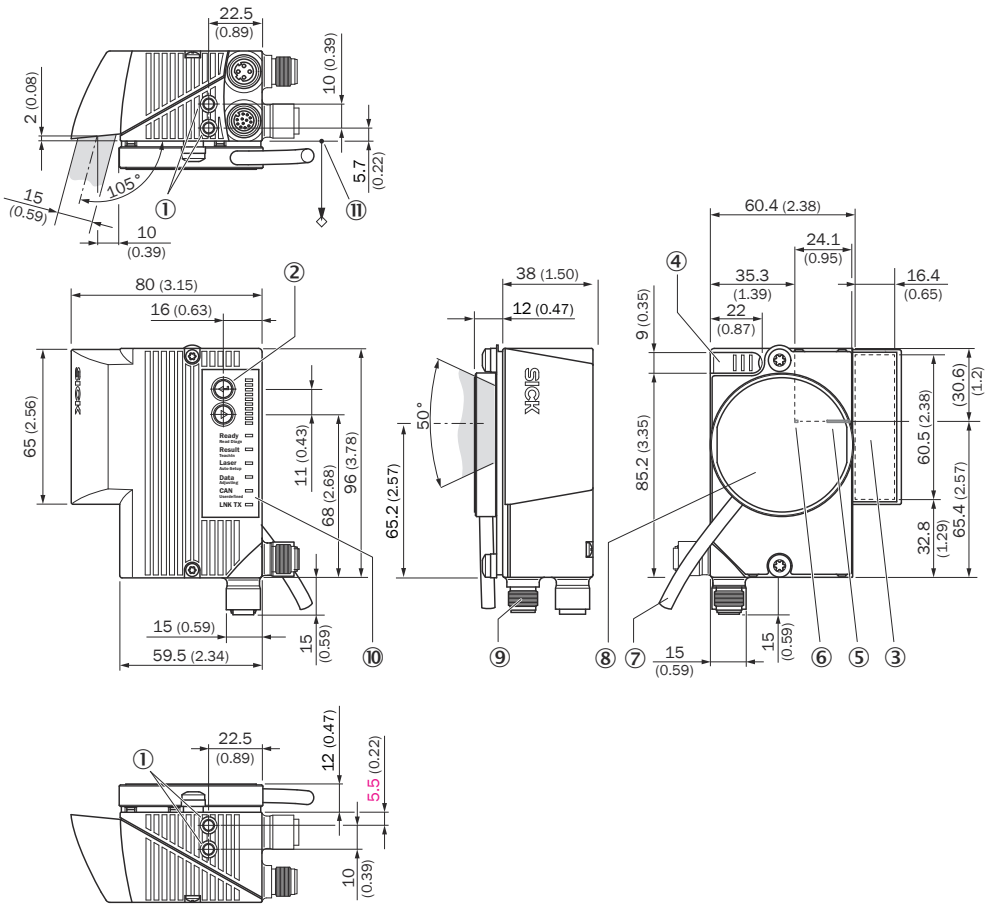


Figure 74: CLV63x to CLV65x: Ethernet variant in standard housing, with external heating, side viewing window and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heater cable connection with flying leads, 3-wire

⑧ Heating

⑨ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

Side viewing window, oscillating mirror

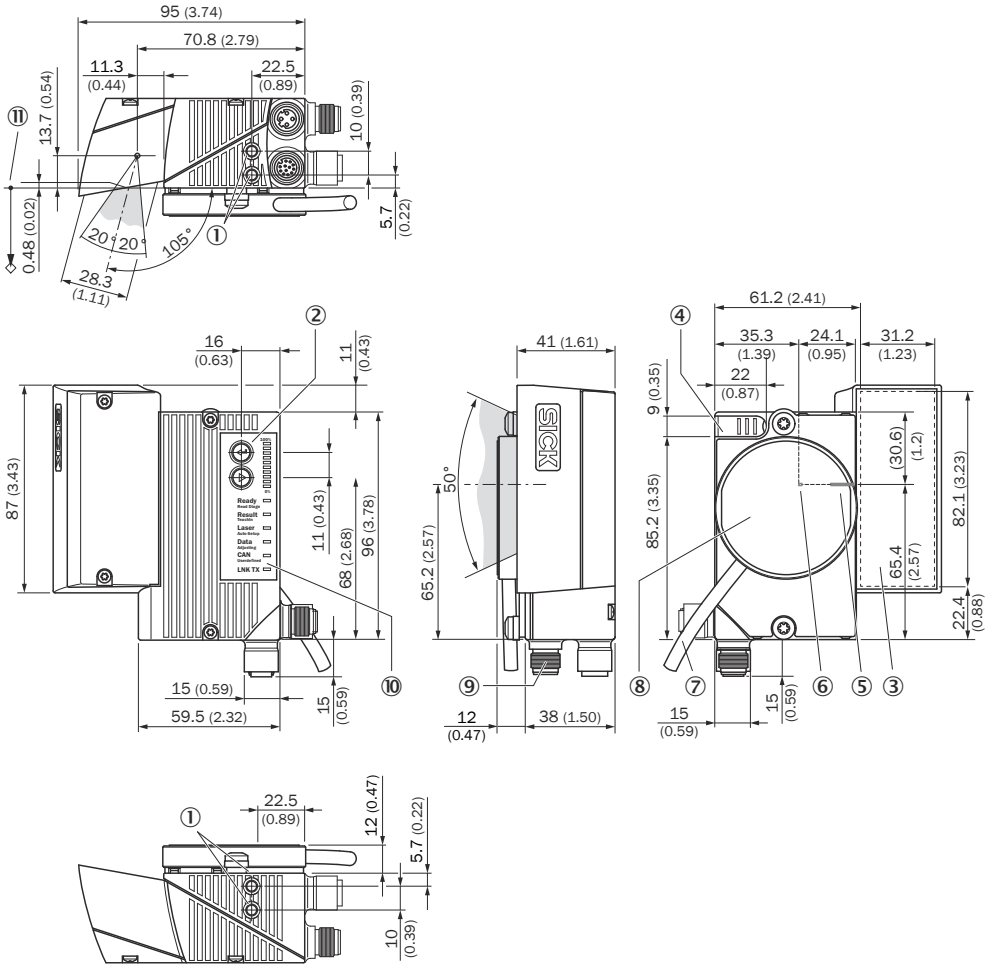


Figure 75: CLV63x to CLV65x: Ethernet variant in standard housing, with external heating, oscillating mirror (side viewing window) and swivel connector. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heater cable connection with flying leads, 3-wire

⑧ Heating

⑨ Swivel connector: 1 x male connector (M12, type-dependent 12-pin or 17-pin, A-coded), 1 x female connector (M12, 4-pin, D-coded)

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

14.4.2.2 Devices with cable connection (serial variants)

Front viewing window

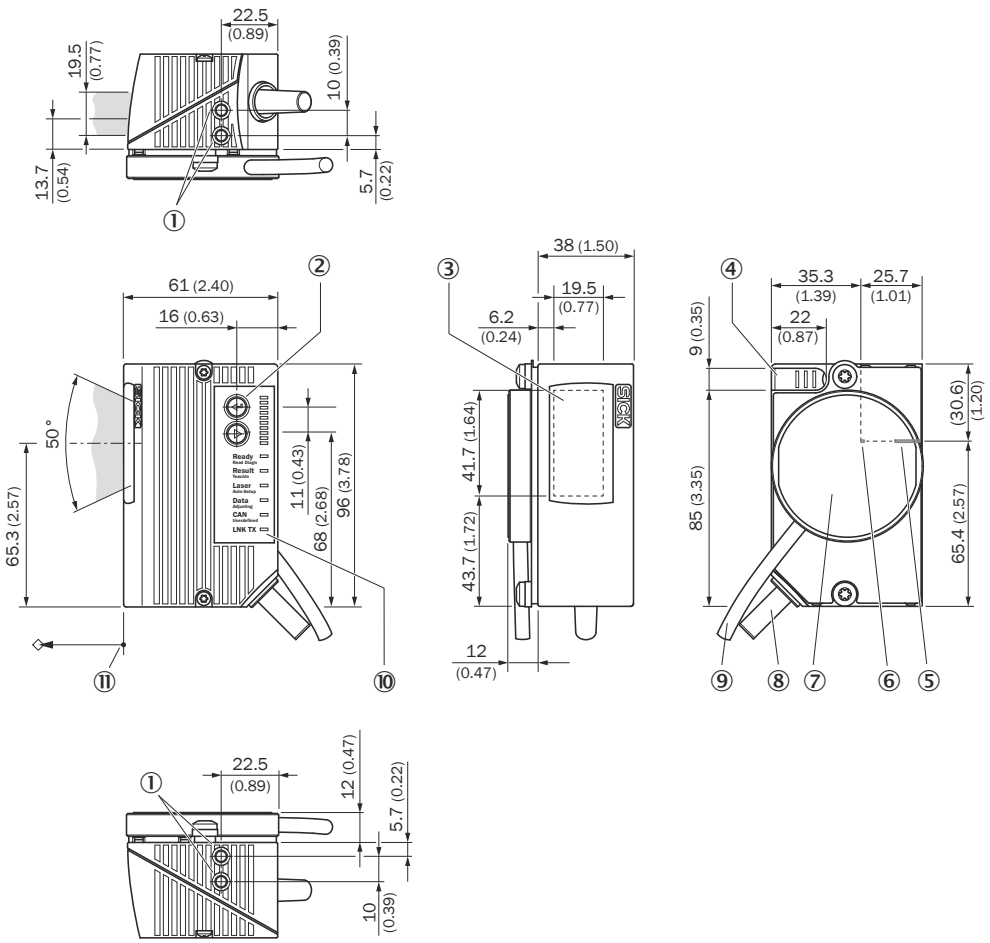


Figure 76: CLV63x to CLV65x: Serial variant in standard housing with external heating, front viewing window and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heating

⑧ Cable connection, 0.9 m cable with male connector, D-Sub-HD, 15-pin

⑨ Connecting cable for heater, with flying leads, 3-wire

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

Side viewing window

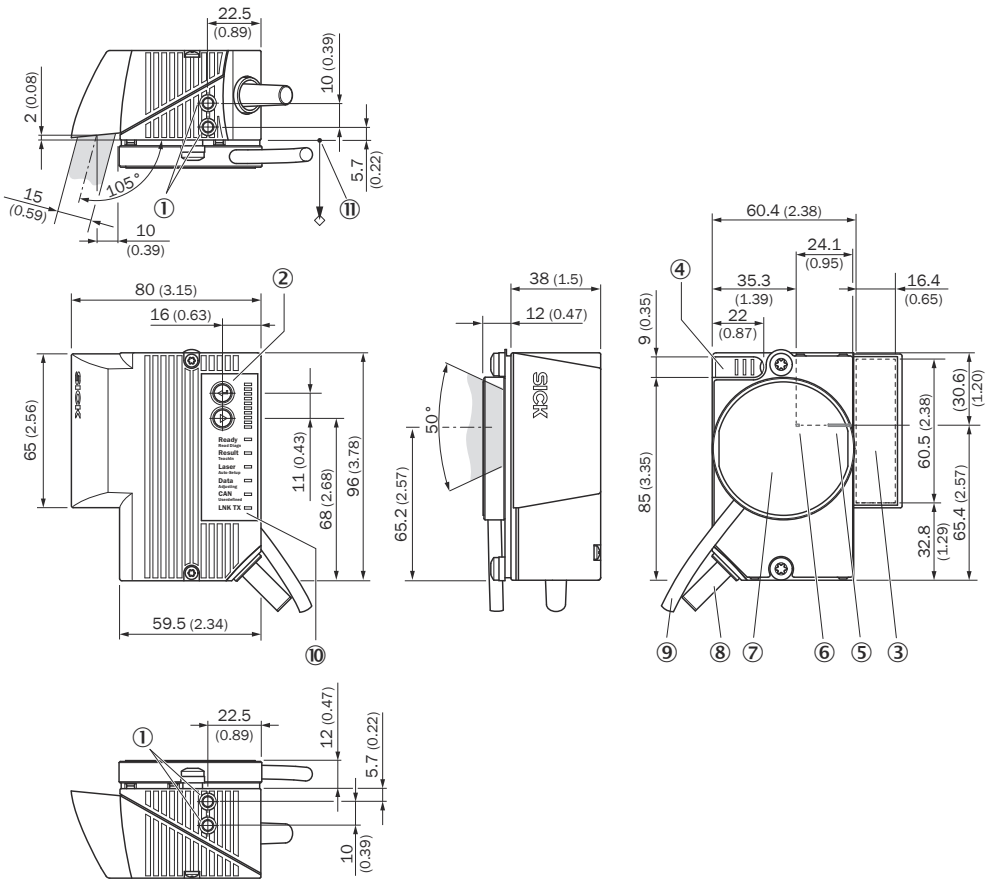


Figure 77: CLV63x to CLV65x: Serial variant in standard housing with external heating, side viewing window and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heating

⑧ Cable connection, cable with male connector, D-Sub-HD, 15-pin

⑨ Heater cable connection with flying leads, 3-wire

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

Side viewing window, oscillating mirror

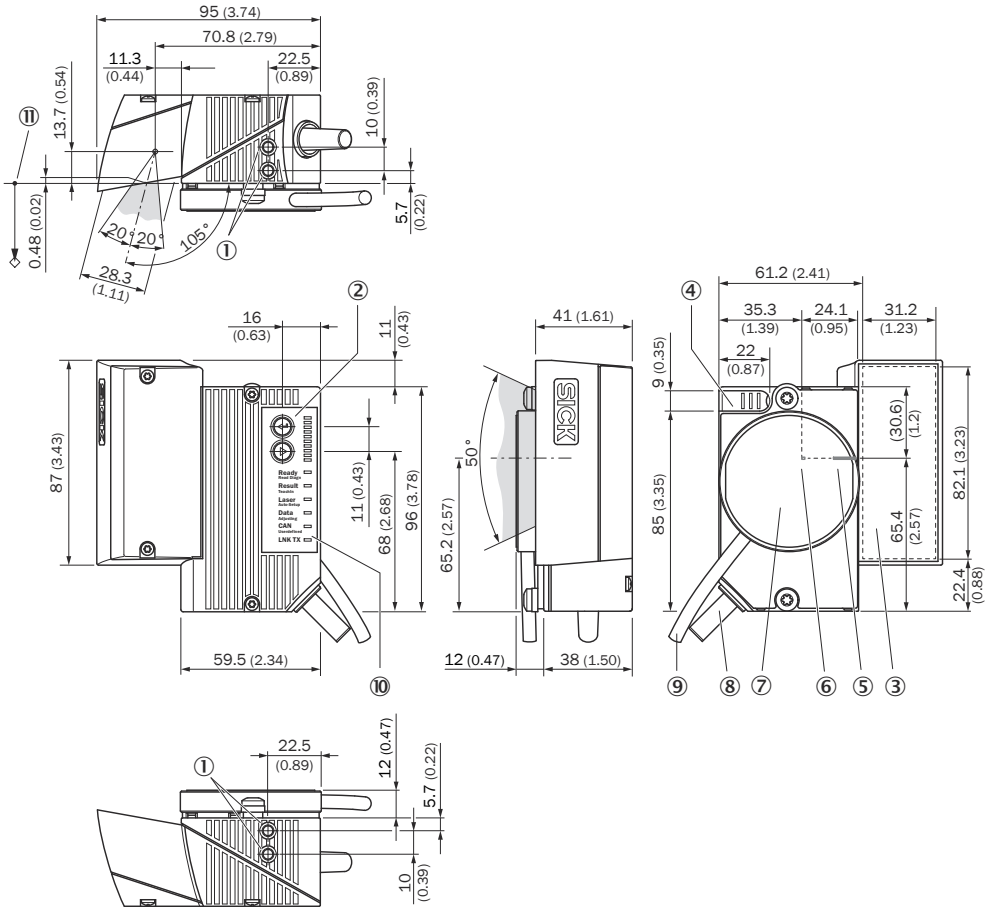


Figure 78: CLV63x to CLV65x: Serial variant in standard housing with external heating, oscillating mirror (side viewing window) and connecting cable. structure and device dimensions, unit: mm (inch), decimal separator: period

① M5 tapped blind hole, 5 mm deep (2 x), for mounting the device. Tightening torque for screws: max. 2.5 Nm.

② Function button (2 x)

③ Viewing window

④ Memory card slot cover

⑤ Central position of the deflected laser beam in the V-shaped aperture angle, mark concealed by the heater

⑥ Internal impact point: Rotation point of the variable direction laser beam, mark concealed by the heater

⑦ Heating

⑧ Cable connection, 0.9 m cable with male connector, D-Sub-HD, 15-pin

⑨ Heater cable connection with flying leads, 3-wire

⑩ LED status indicator (6 x) and bar graph

⑪ Reference point of the reading distance (from housing edge to object)

14.4.3 Devices in IP69K protective housing (Ethernet variants)

Front viewing window

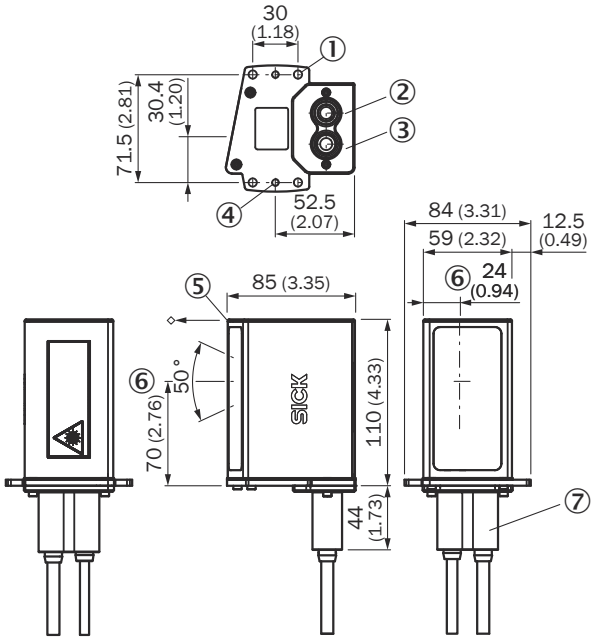


Figure 79: CLV62x/CLV63x/CLV64x: Ethernet variant in IP69K protective housing, with front viewing window and two M12 connections. structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing holes, Ø 5.5 mm (4 x)
② "Ethernet" connection (female connector, M12, 4-pin, D-coded)
③ "Power / Serial Data / CAN / I/O" connection (male connector, M12, 17-pin, A-coded)
④ Threaded hole, M5 (2 x)
⑤ Reference point of the reading distance (from housing edge to object)
⑥ Position of the light emission (center position of the deflected laser beam)
⑦ Protective double bushing for the electrical connections

Side viewing window, device with oscillating mirror

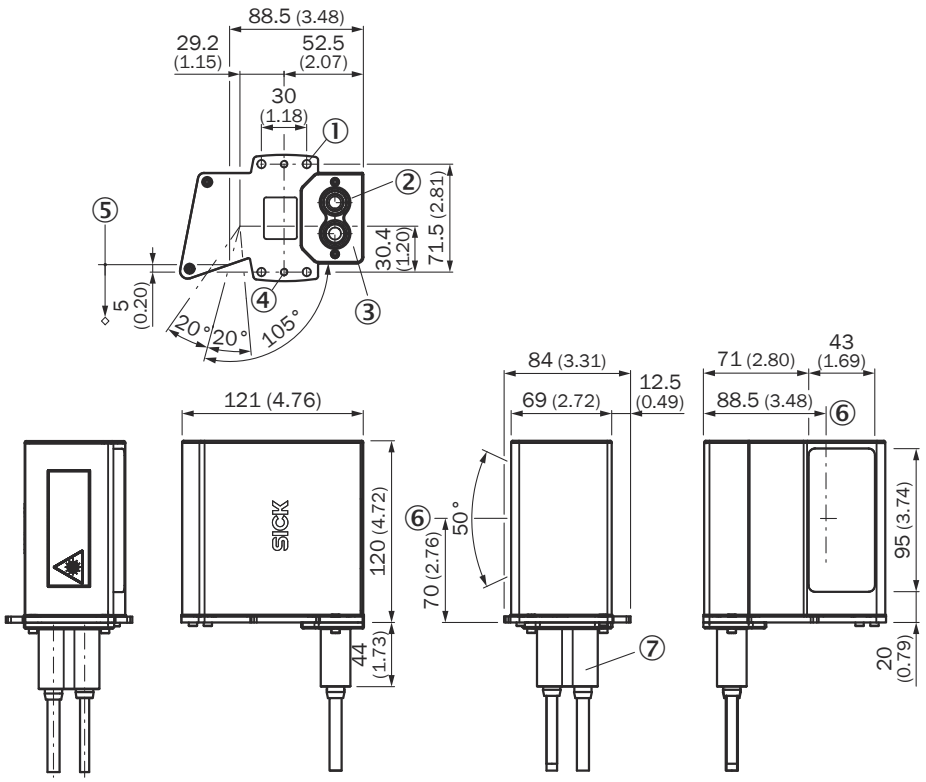


Figure 80: CLV63x / CLV64x: Ethernet variant in IP69K protective housing, with oscillating mirror (side viewing window) and two M12 connections. structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing holes, Ø 5.5 mm (4 x)
② "Ethernet" connection (female connector, M12, 4-pin, D-coded)
③ "Power / Serial Data / CAN / I/O" connection (male connector, M12, 17-pin, A-coded)
④ Threaded hole, M5 (2 x)
⑤ Reference point of the reading distance (housing edge to the object)
⑥ Position of the light emission (center position of the deflected laser beam)
⑦ Protective double bushing for the electrical connections

14.5 Dimensional drawings electronic formats

Current dimensional drawings and CAD data for your device in various electronic formats can be downloaded online:

- www.sick.com/CLV63x
- www.sick.com/CLV64x
- www.sick.com/CLV65x

14.6 Reading field diagrams (working ranges)

14.6.1 Reading conditions for specification diagrams

Properties	Value
Test code	Code 128
Resolution	See reading field diagrams in each case
Resolution	See reading field or depth of field diagrams in each case

Properties	Value
Scanning frequency	• CLV63x: See respective table in front of reading field diagrams as well as characteristic fields for scanning frequencies • CLV64x: See respective characteristic curve in depth-of-field diagrams • CLV65x: See table in front of the reading field diagram and characteristic curve in depth-of-field diagrams
Print ratio	2:1
Print contrast	> 90%
Tilt	±30°
Ambient light	< 2,000 lx
Good read rate	> 75%
Light spot	• Circular (CLV6xx-xxxx) • Optional oval (CLV63x-/CLV64x-xxxx**S01**), see note in caption of reading field diagrams
Window material of the viewing window	**IP65 standard housing without heating:** • Glass (CLV6xx-xxx**0**) • Optional plastic (CLV63x-/CLV64x-xxx**1** only), see note in the caption of the reading field diagrams **IP65 standard housing with heating:** • Glass (CLV6xx-xxx**0**F0) **IP69K protective housing:** • Plastic (CLV63x-/CLV640-x83**1**S01)
Filter	**IP65 standard housing:** • Without filter (CLV65x-0xx0) • Optionally with polarizing filter (CLV65x-0xx0**S01** only), see note in the caption of the reading field diagrams

NOTE

The reading distances are measured radially from the device.

CLV63x and CLV64x in IP69K protective housing (CLV6xx-x831S01):

NOTE

Divergent reading field diagrams

The reading field diagrams of the devices in the IP69K protective housing differ from the devices in the IP65 standard housing as follows:

- In the position of the reading field in front of the device
- In the reduced depth of field of the entire reading field. The reduced depth of field here is not identical to the depth of field of the devices with IP65 standard housing and a **plastic** viewing window.

For further information on the reading field diagrams, see the “CLV62x, CLV63x and CLV64x Fixed mount bar code scanners in IP69K Protective Housing” technical information on the Internet at:

- www.sick.com/CLV63x
- www.sick.com/CLV64x

14.6.2 CLV63x: Overview of specification diagrams

IP65 standard housing

Resolution: Long Range

CLV63x type	Diagram	Sensor type	Viewing window (Material, alignment)	Light spot	See
CLV630-xxxx	Reading field for CLV630-Xxx0	Line scanner (X = 0) or raster scanner (X = 1)	Glass, at the front	Circular	page 127
	Reading field for CLV630-Xxx0S01	Line scanner (X = 0) or raster scanner (X = 1)	Plastic, at the front	Oval	page 128
	Reading field for CLV630-Xxx0	Line scanner (X = 2) or raster scanner (X = 3)	Glass, on the side	Circular	page 128
	Reading field for CLV630-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 129
	Reading field for CLV630-6xx0S01	Line scanner with oscillating mirror	Plastic, on the side	Oval	page 130
	Oscillating mirror deflection width for CLV630-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 131
	Scanning frequency characteristic curve for CLV630-xxxx	All sensor types	–	–	page 132

Resolution: Mid Range

CLV63x type	Diagram	Sensor type	Viewing window (Material, alignment)	Light spot	See
CLV631-xxxx	Reading field for CLV631-Xxx0	Line scanner (X = 0) or raster (X = 1)	Glass, at the front	Circular	page 133
	Reading field for CLV631-Xxx0	Line scanner (X = 2) or raster (X = 3)	Glass, on the side	Circular	page 134
	Reading field for CLV631-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 135
	Oscillating mirror deflection width for CLV631-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 136
	Scanning frequency characteristic curve for CLV631-xxxx	All sensor types	–	–	page 137

Resolution: Short Range

CLV63x type	Diagram	Sensor type	Viewing window (Material, alignment)	Light spot	See
CLV632-xxxx	Reading field for CLV632-Xxx0	Line scanner (X = 0) or raster (X = 1)	Glass, at the front	Circular	page 138
	Reading field for CLV632-Xxx0	Line scanner (X = 2) or raster (X = 3)	Glass, on the side	Circular	page 139
	Reading field for CLV632-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 140
	Oscillating mirror deflection width for CLV632-6xx0	Line scanner with oscillating mirror	Glass, on the side	Circular	page 141
	Scanning frequency characteristic curve for CLV632-xxxx	All sensor types	–	–	page 142

14.6.2.1 CLV630: Long Range

Line scanner or raster scanner

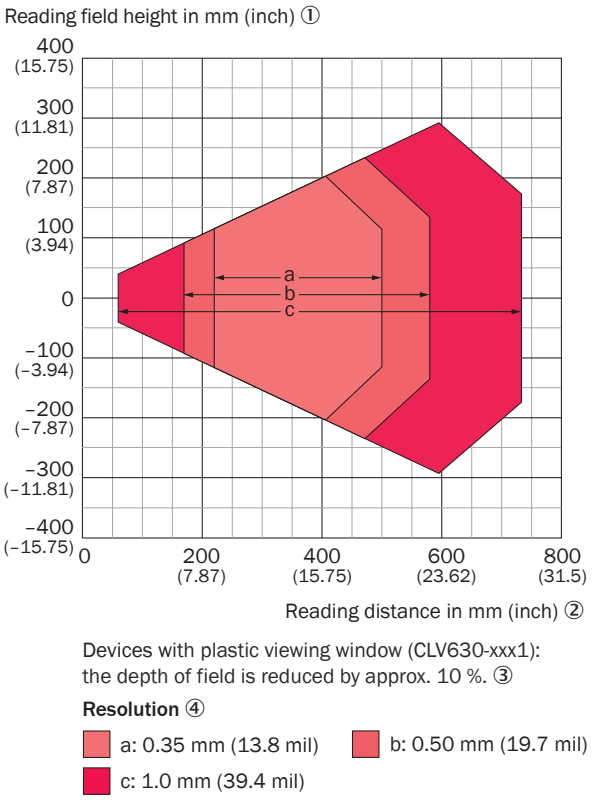


Figure 81: Reading field diagram for CLV630-Xxx0, long range, line scanner (X = 0) or raster scanner (X = 1), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV630-Xxx1): The depth of field is reduced by approx. 10%.

④ Solution

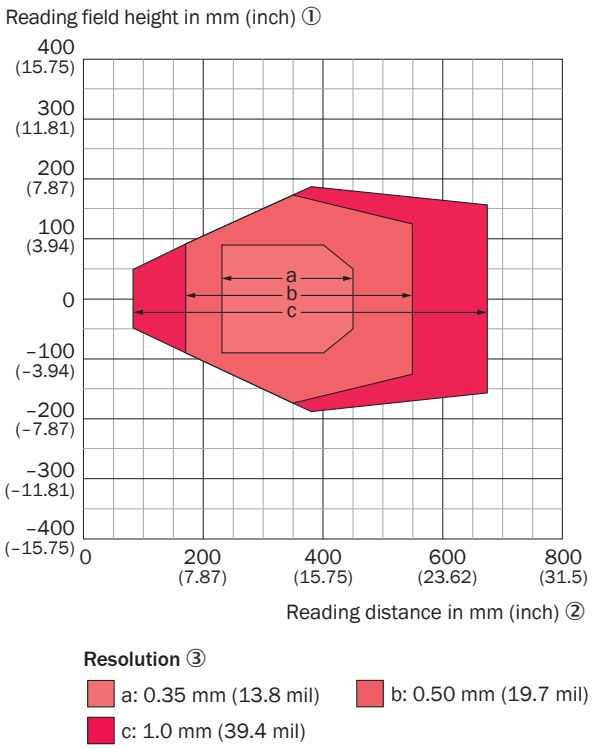


Figure 82: Reading field diagram for CLV630-Xxx1S01, long range, line scanner (X = 0) or raster scanner (X = 1), plastic viewing window, at the front, oval light spot

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Resolution

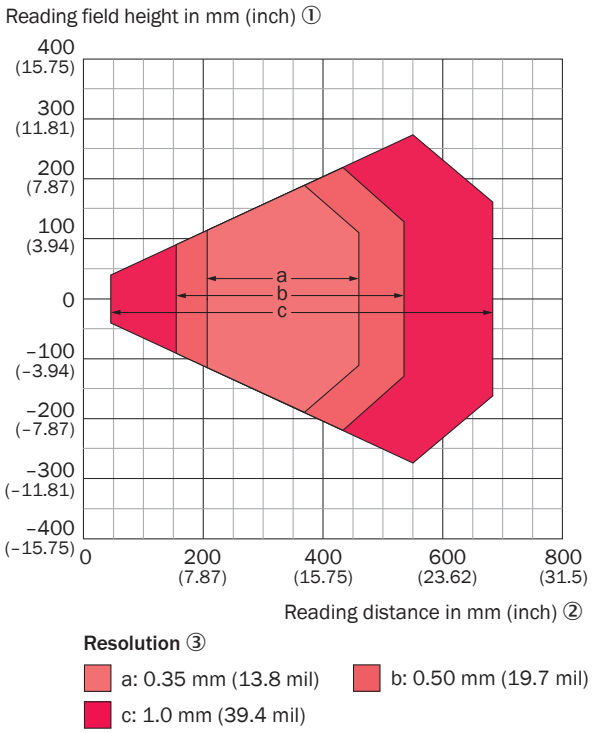


Figure 83: Reading field diagram for CLV630-Xxx0, long range, line scanner (X = 2) or raster scanner (X = 3), glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

Line scanner with oscillating mirror

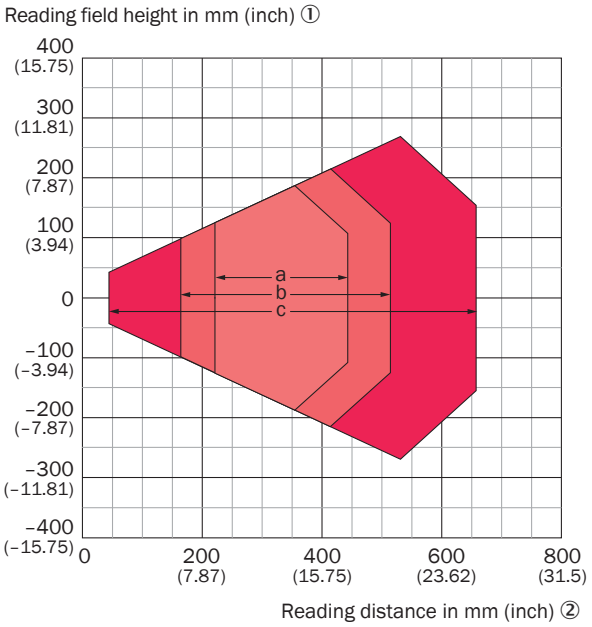


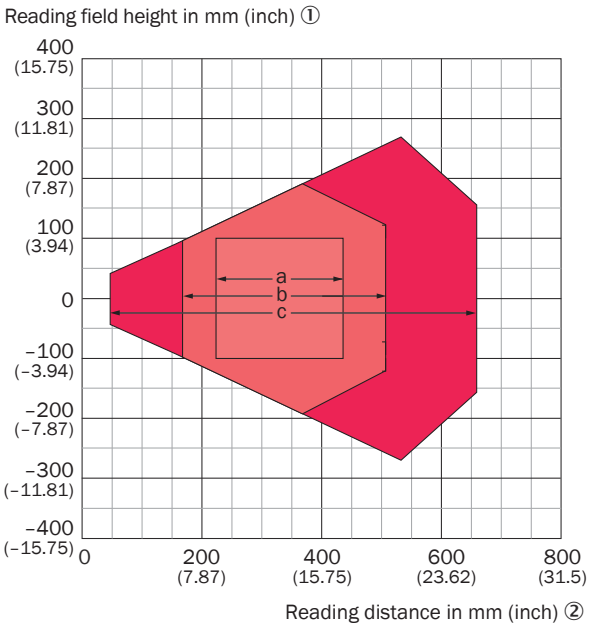
Figure 84: Reading field diagram for CLV630-6xx0, long range, line scanner with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV630-6xx1): The depth of field is reduced by approx. 10%.

④ Solution



Resolution ③

a: 0.35 mm (13.8 mil) b: 0.50 mm (19.7 mil)

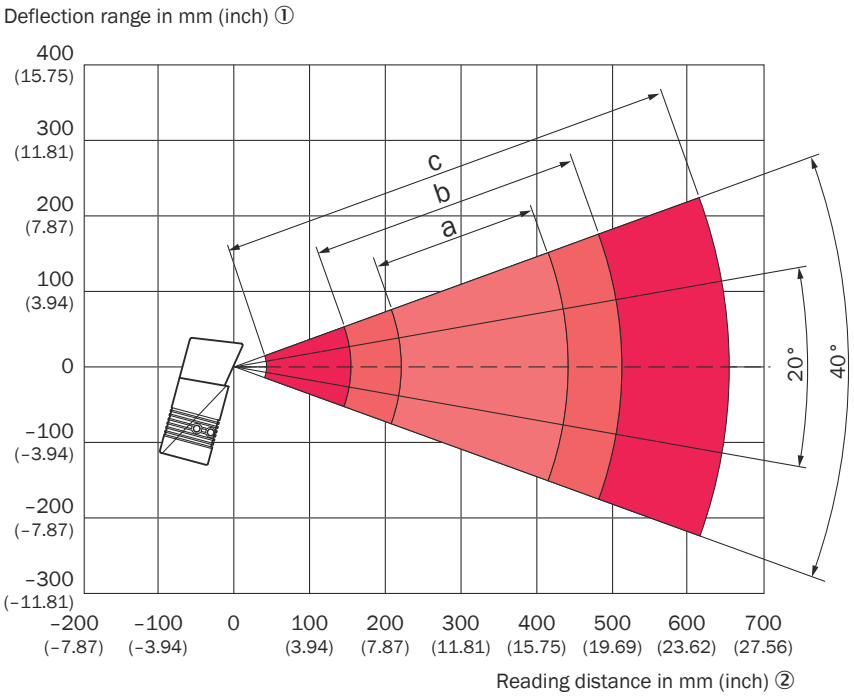
c: 1.0 mm (39.4 mil)

Figure 85: Reading field diagram for CLV630-6xx1S01, long range, line scanner with oscillating mirror, plastic viewing window, on the side, oval light spot

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution



Devices with plastic viewing window: the depth of field is reduced by approx. 10 %. ③

Resolution ④

- a: 0.35 mm (13.8 mil)
- b: 0.50 mm (19.7 mil)
- c: 1.0 mm (39.5 mil)

Figure 86: Oscillating mirror deflection width diagram for CLV630-6xx0, Long Range, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV630-6xx1): The depth of field is reduced by approx. 10%.

④ Solution

Scanning frequencies

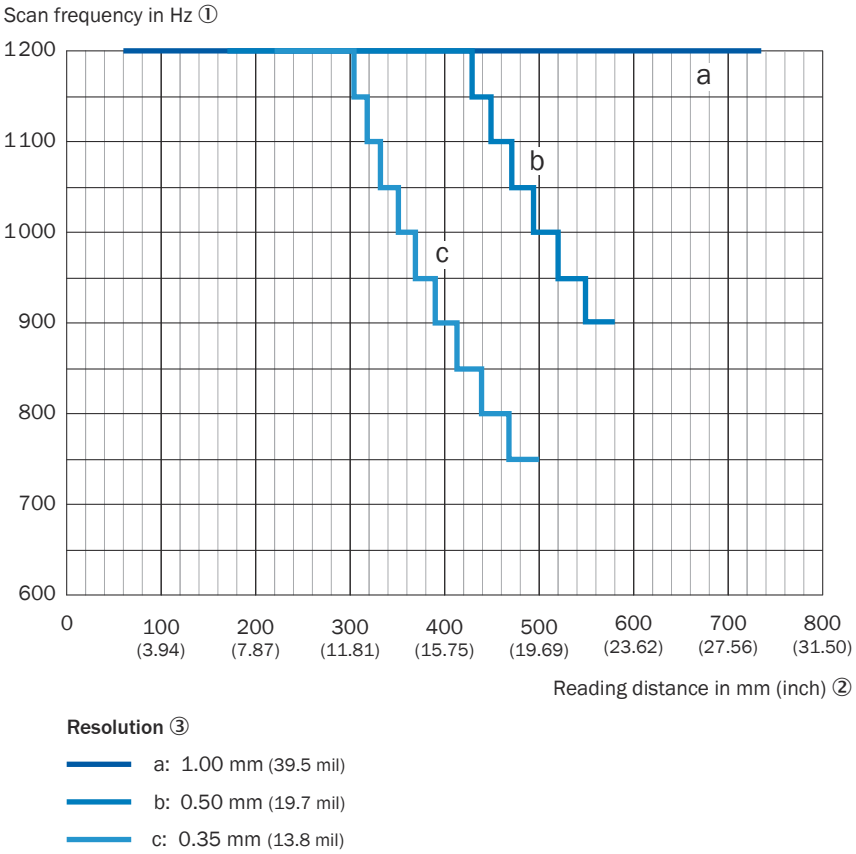


Figure 87: All sensor types: Scanning frequency characteristic curve field for CLV630-xxxx, Long Range, viewing window at the front

① Scanning frequency in Hz
② Reading distance in mm (inch)
③ Resolution

NOTE

Correction of reading distance for devices with side viewing window:

The values for the reading distance shift towards the viewing window at all scanning frequencies (the reading distance is reduced).

- Devices with side viewing window: Reduction by 16 mm in each case.
- Devices with oscillating mirror (side viewing window): Reduction by 19 mm in each case.

14.6.2.2 CLV631: Mid Range

Devices in standard housing

Line scanner or raster scanner

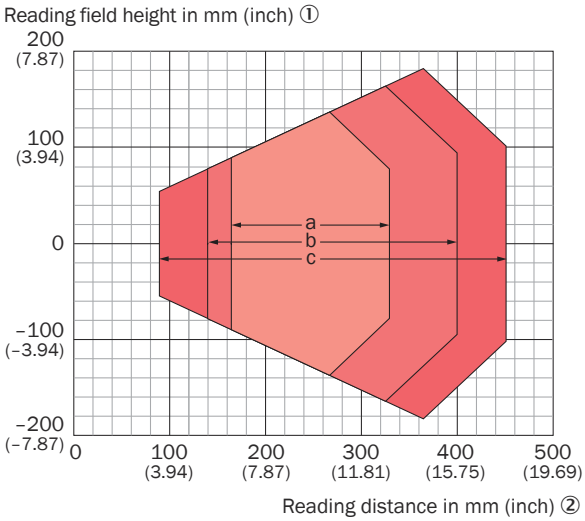


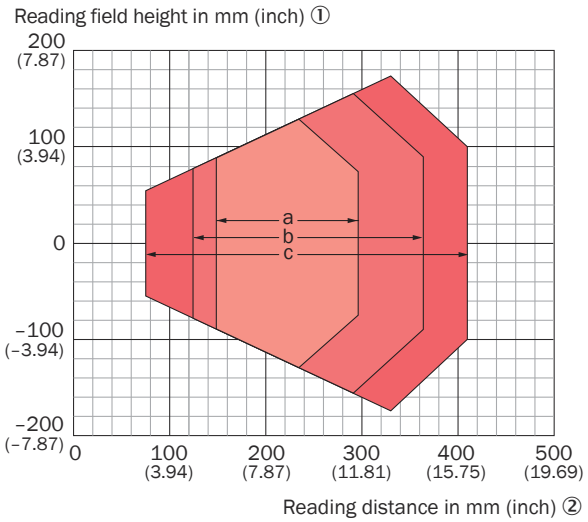
Figure 88: Reading field diagram for CLV631-Xxx0, mid range, line scanner (X = 0) or raster scanner (X = 1), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV631-xxx1): The depth of field is reduced by approx. 10%.

④ Solution



Devices with plastic viewing window (CLV631-xxx1): the depth of field is reduced by approx. 10 %. ③

Resolution ④

a: 0.25 mm (9.8 mil)

b: 0.35 mm (13.8 mil)

c: 0.50 mm (19.7 mil)

Figure 89: Reading field diagram for CLV631-Xxx0, mid range, line scanner (X = 2) or raster scanner (X = 3), glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV631-xxx1): The depth of field is reduced by approx. 10%.

④ Solution

Line scanner with oscillating mirror

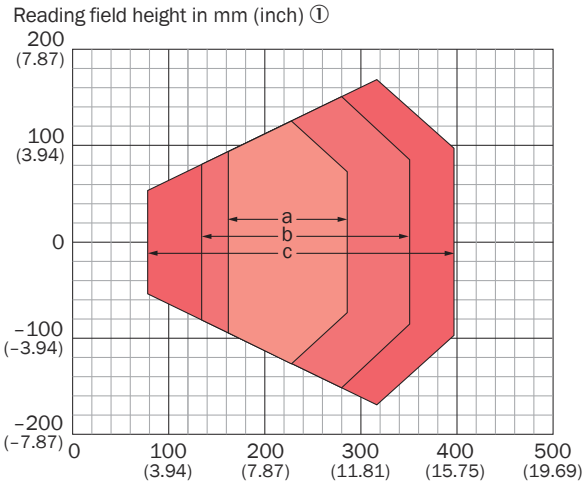


Figure 90: Reading field diagram for CLV631-6xx0, mid range, line scanner with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV631-6xx1): The depth of field is reduced by approx. 10%.

④ Solution

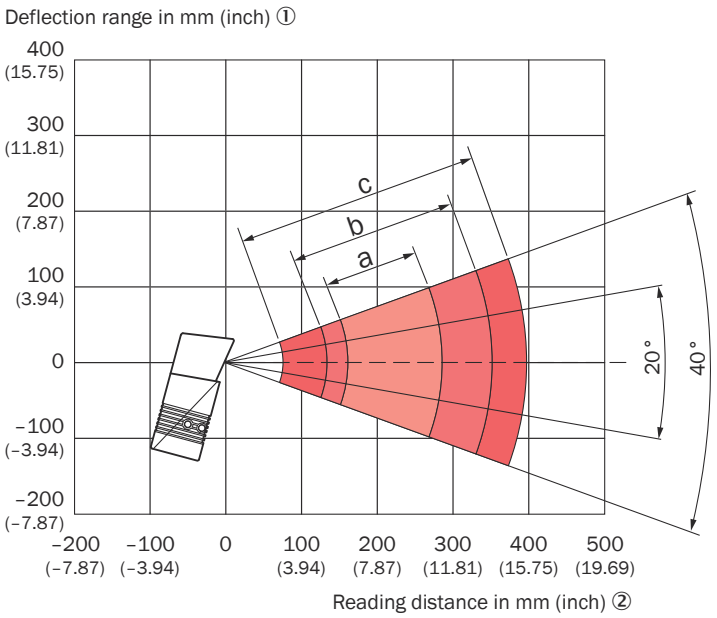


Figure 91: Oscillating mirror deflection width diagram for CLV631-6xx0, Mid Range, line scanner with oscillating mirror, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV631-6xx1): The depth of field is reduced by approx. 10%.

④ Resolution

Scanning frequencies

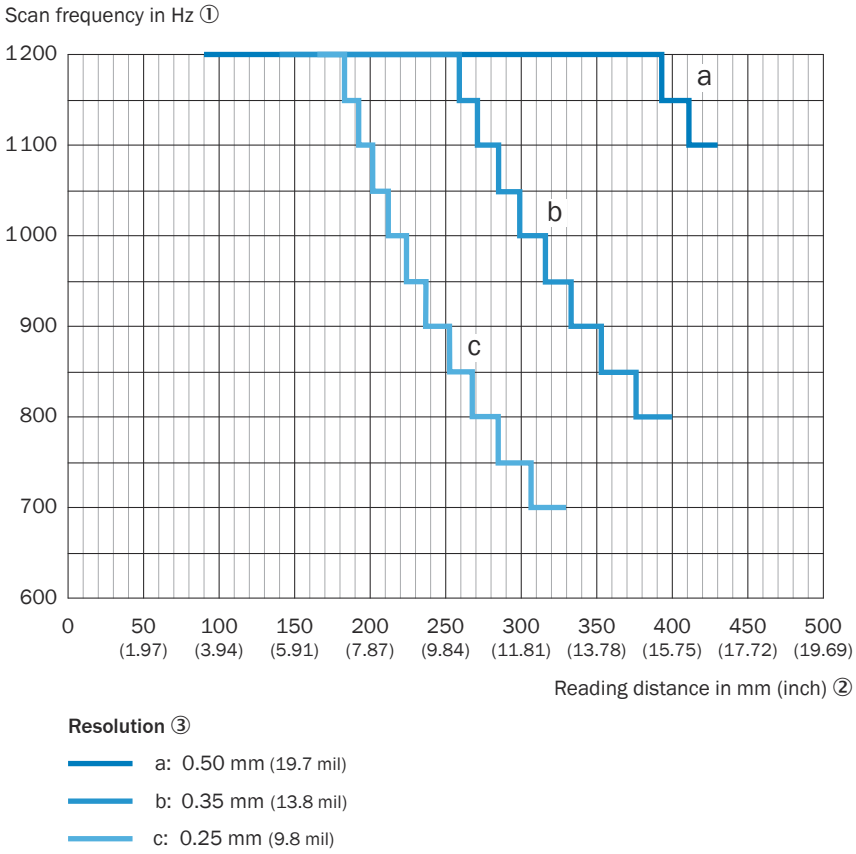


Figure 92: All sensor types:Scanning frequency characteristic curve field for CLV631-xxxx, Mid Range, viewing window at the front

① Scanning frequency in Hz
② Reading distance in mm (inch)
③ Resolution

NOTE

Correction of reading distance for devices with side viewing window:

The values for the reading distance shift towards the viewing window at all scanning frequencies (the reading distance is reduced).

- Devices with side viewing window: Reduction by 16 mm in each case.
- Devices with oscillating mirror (side viewing window): Reduction by 19 mm in each case.

14.6.2.3 CLV632: Short Range

Devices in standard housing

Line scanner or raster scanner

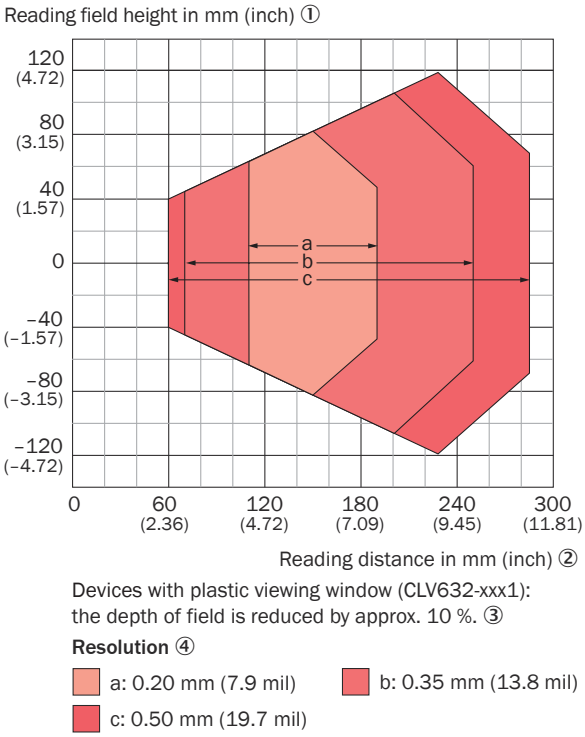


Figure 93: Reading field diagram for CLV632-Xxx0, short range, line scanner (X = 0) or raster scanner (X = 1), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV632-xxx1): The depth of field is reduced by approx. 10%

④ Solution

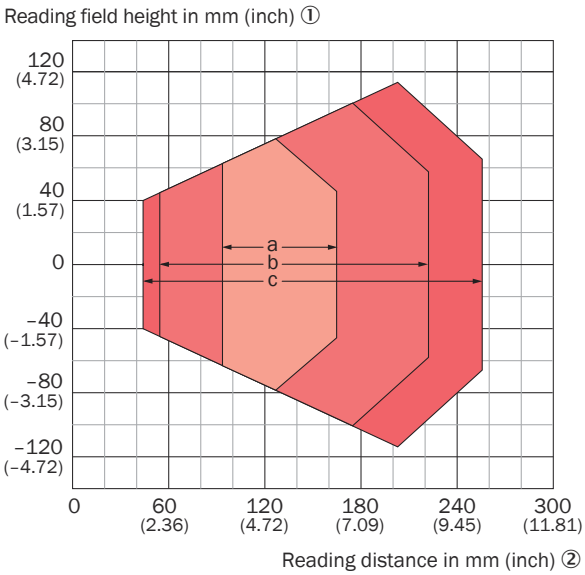


Figure 94: Reading field diagram for CLV632-Xxx0, short range, line scanner (X = 2) or raster scanner (X = 3), glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV632-xxx1): The depth of field is reduced by approx. 10%.

④ Solution

Line scanner with oscillating mirror

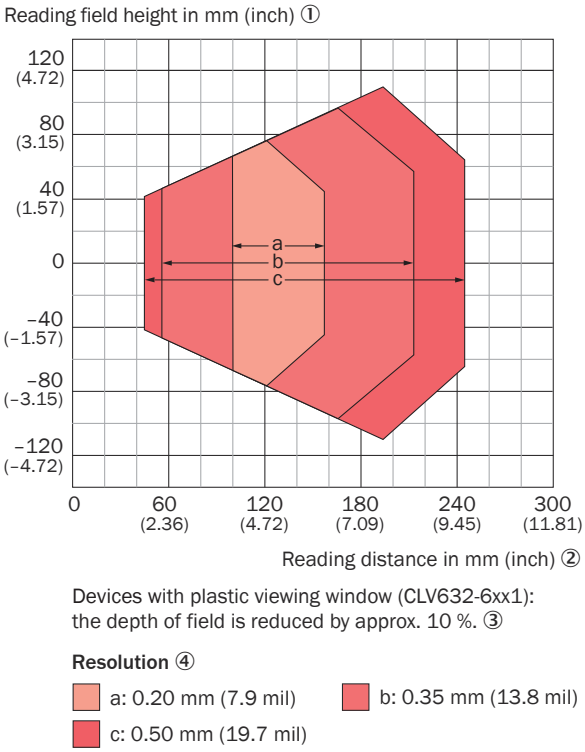


Figure 95: Reading field diagram for CLV632-6xx0, short range, line scanner with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV632-6xx1): The depth of field is reduced by approx. 10%.

④ Solution

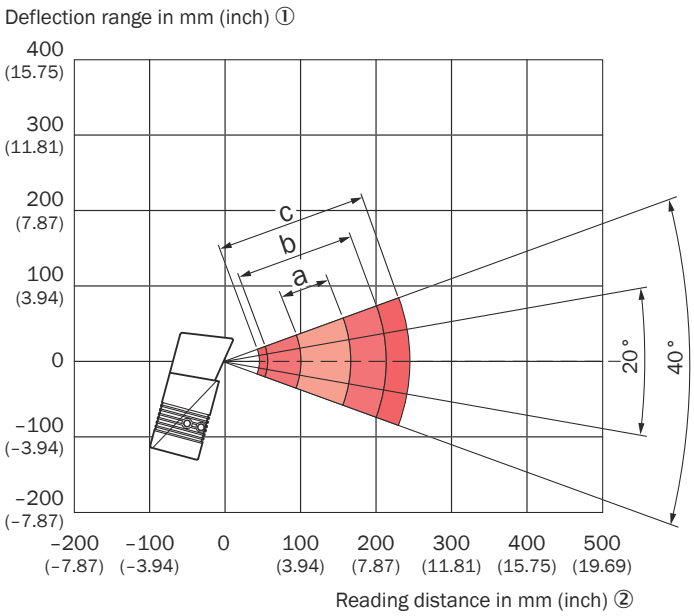


Figure 96: Oscillating mirror deflection width diagram for CLV632-6xx0, Short Range, Line scanner with oscillating mirror, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV632-6xx1): The depth of field is reduced by approx. 10%.

④ Resolution

Scanning frequencies

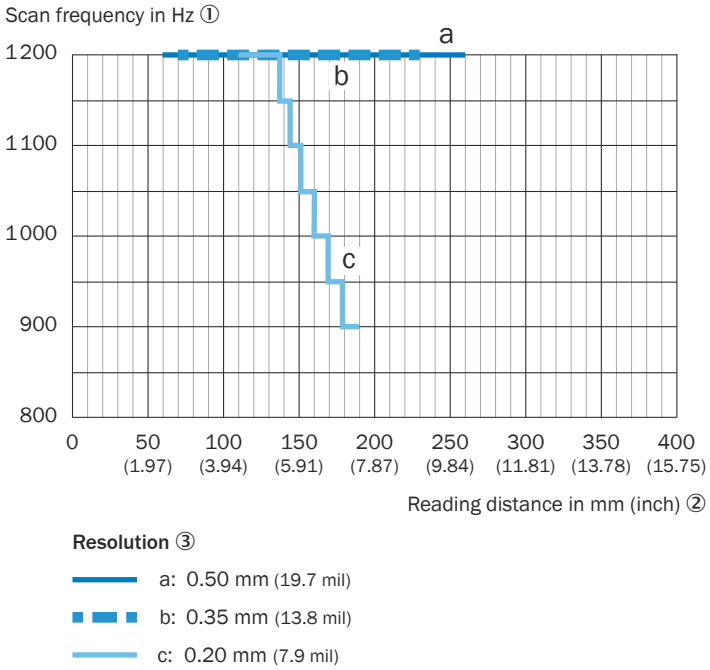


Figure 97: All sensor types: Scanning frequency characteristic curve field for CLV632-xxxx, Short Range, viewing window at the front

① Scanning frequency in Hz
② Reading distance in mm (inch)
③ Resolution

NOTE

Correction of reading distance for devices with side viewing window:

The values for the reading distance shift towards the viewing window at all scanning frequencies (the reading distance is reduced).

- Devices with side viewing window: Reduction by 16 mm in each case.
- Devices with oscillating mirror (side viewing window): Reduction by 19 mm in each case.

14.6.3 CLV64x: Overview of specification diagrams

CLV640: Reading field diagrams for standard resolutions

Diagram type	Resolution	Sensor type	Viewing window (Material, alignment)	Light spot	See
Standard devices:					
Reading field diagram for CLV640-Xxx0	0.20 mm to 1.00 mm	Line scanner (X = 0) or raster scanner (X = 1)	Glass, at the front	Circular	page 144
	0.20 mm to 1.00 mm	Line scanner (X = 2) or raster scanner (X = 3)	Glass, on the side	Circular	page 145
Reading field diagram for CLV640-6xx0	0.20 mm to 1.00 mm	Line scanner with oscillating mirror	Glass, on the side	Circular	page 146
Oscillating mirror deflection width for CLV640-6xx0	0.20 mm to 1.00 mm	Line scanner with oscillating mirror, focus position at 140 mm	Glass, on the side	Circular	page 147
Oscillating mirror deflection width for CLV640-6xx0	0.20 mm to 1.00 mm	Line scanner with oscillating mirror, focus position at 215 mm	Glass, on the side	Circular	page 148
Oscillating mirror deflection width for CLV640-6xx0	0.20 mm to 1.00 mm	Line scanner with oscillating mirror, focus position at 280 mm	Glass, on the side	Circular	page 149
Special devices:					

Diagram type	Resolution	Sensor type	Viewing window (Material, alignment)	Light spot	See
Reading field diagram for CLV640-3000S01	0.20 mm to 1.00 mm	Grid scanner	Plastic, on the side	Oval	page 145
Reading field diagram for CLV640-6120S01	0.20 mm to 1.00 mm	Line scanner with oscillating mirror	Plastic, on the side	Oval	page 146
Reading field diagram for CLV640-6121S01	0.20 mm to 1.00 mm	Line scanner with oscillating mirror	Plastic, on the side	Oval	page 146
Reading field diagram for CLV640-0831S01	0.20 mm to 1.00 mm	Line scanner, IP69K	Plastic, at the front	Circular	page 144
Reading field diagram for CLV640-6831S01	0.20 mm to 1.00 mm	Line scanner with oscillating mirror, IP69K	Plastic, on the side	Circular	page 146

CLV640: Depth of field ranges for standard resolutions

Diagram type	Resolution	Sensor type	Viewing window (Material, alignment)	Light spot	See
CLV640-Xxx0 depth of field ranges and scanning frequency characteristic curve	0.20 mm	Line scanner (X = 0) or raster scanner (X = 1)	Glass or plastic, at the front	Circular	page 153
	0.25 mm				page 154
	0.35 mm				page 155
	0.50 mm				page 156
	1.00 mm				page 157
CLV640-Xxx0 depth of field ranges and scanning frequency characteristic curve	0.20 mm	Line scanner (X = 2) or raster scanner (X =3)	Glass, on the side	Circular	page 158
	0.25 mm				page 159
	0.35 mm				page 160
	0.50 mm				page 161
	1.00 mm				page 162

CLV642: Reading field diagrams for high resolution

CLV642 type	Diagram	Sensor type	Viewing window (Material, alignment)	Light spot	See
CLV642-xxxx	Reading field diagram for CLV642-Xxx0	Line scanner (X = 0)	Glass, at the front	Circular	page 150
	Reading field diagram for CLV642-Xxx0	Line scanner (X = 2)	Glass, on the side	Circular	page 151

14.6.3.1 CLV640: Reading field diagrams for standard resolutions

Line scanner or raster scanner

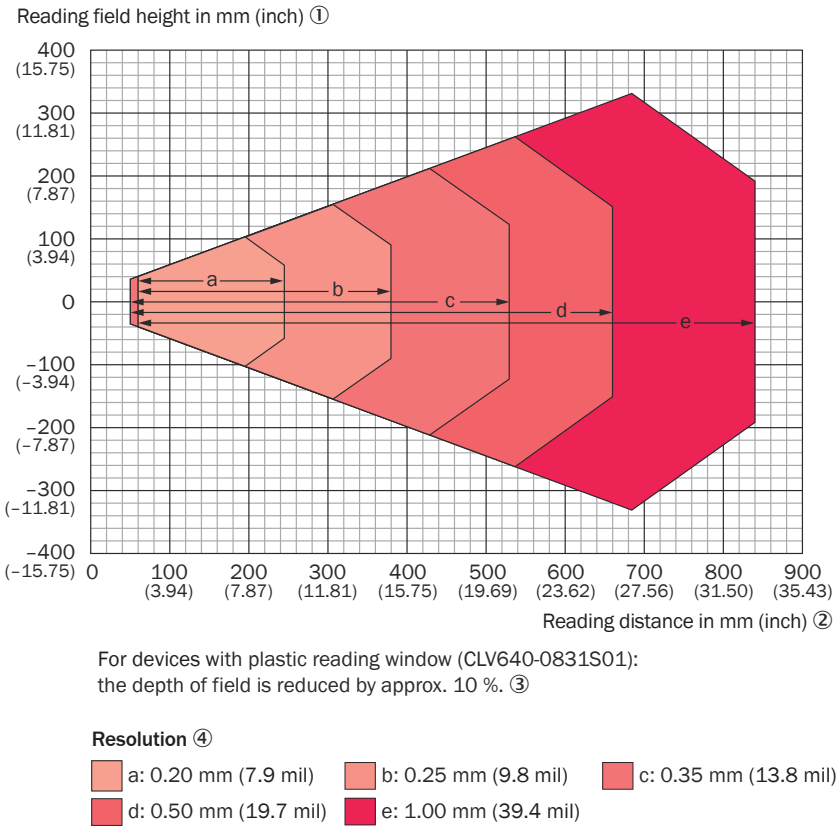


Figure 98: Reading field diagram for CLV640-Xxx0, standard resolution, line (X = 0) or raster (X = 1), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%.
Devices: CLV640-0831S01 in IP69K protective housing.

④ Resolution

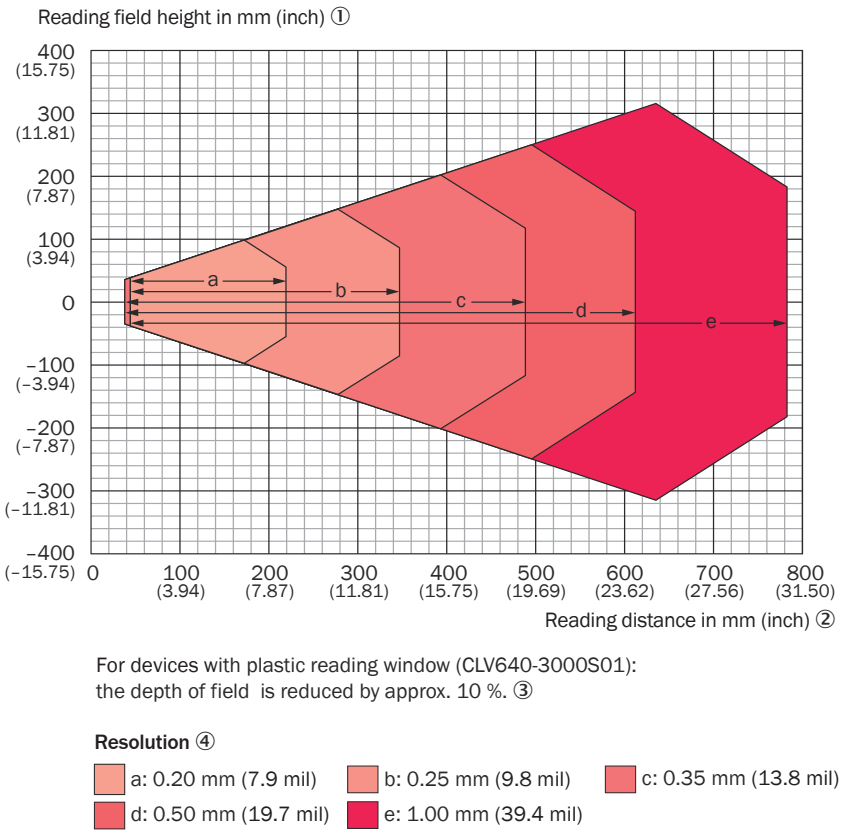


Figure 99: Reading field diagram for CLV640-Xxx0, standard resolution, line (X = 2) or raster (X = 3), glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-3000S01.

④ Resolution

Line scanner with oscillating mirror

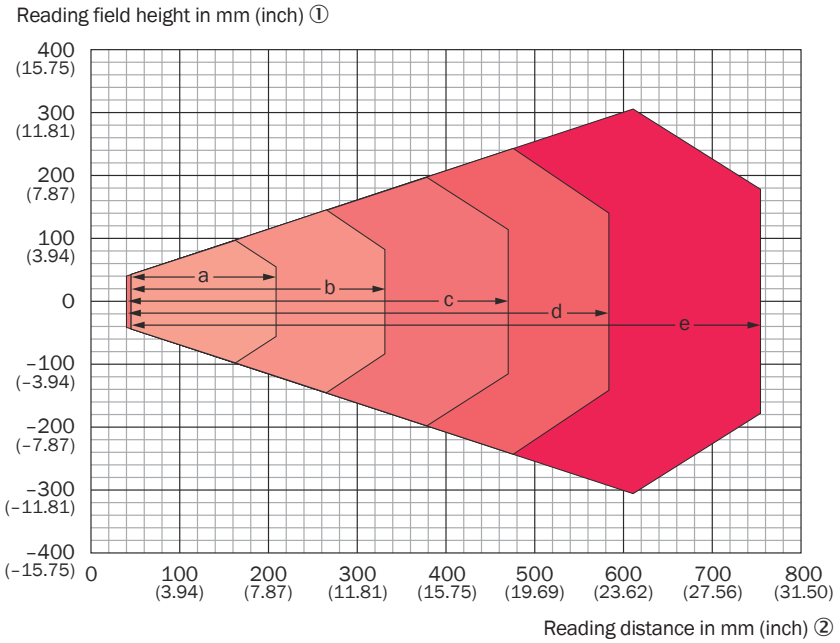


Figure 100: Reading field diagram for CLV640-6xx0, standard resolution, line with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

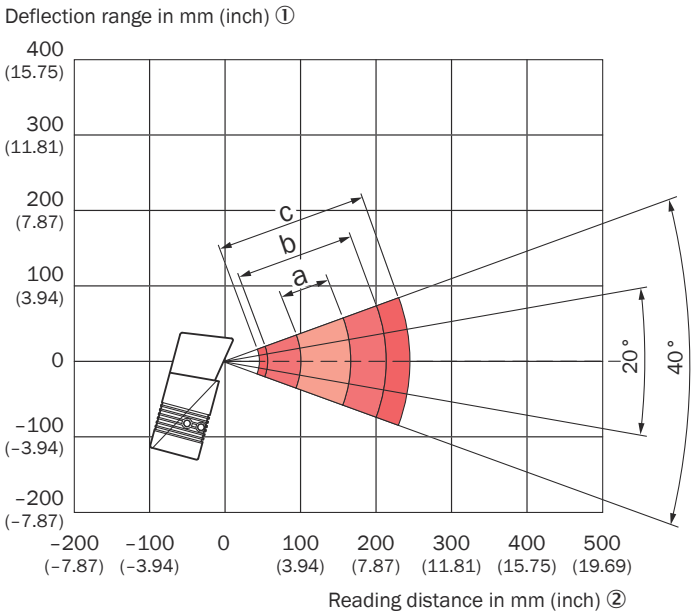
③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01.

④ Resolution

Oscillating mirror deflection widths

NOTE

The following oscillating mirror deflection width diagrams are exemplary for three focus positions.



Devices with plastic viewing window (CLV640-6xx1):
the depth of field is reduced by approx. 10 %. ③

Resolution ④

- a: 0.20 mm (7.9 mil)
- b: 0.35 mm (13.8 mil)
- c: 0.50 mm (19.7 mil)

Figure 101: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 140 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01.

④ Resolution

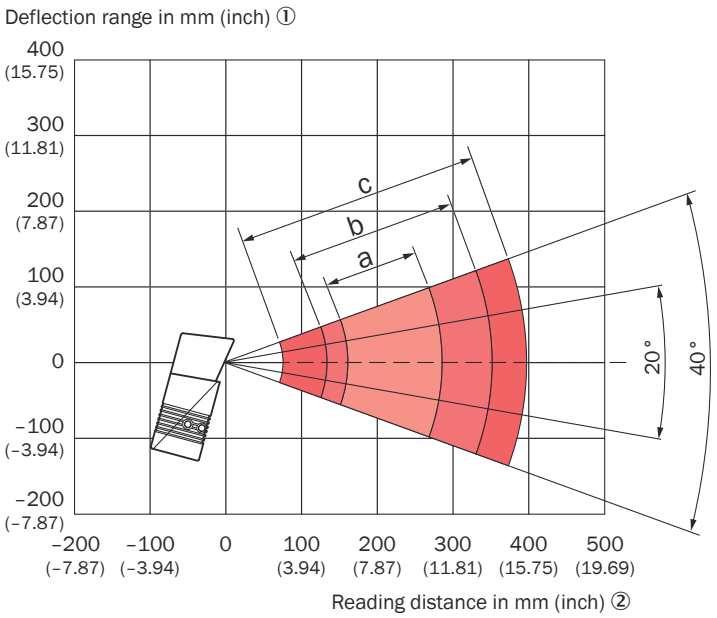


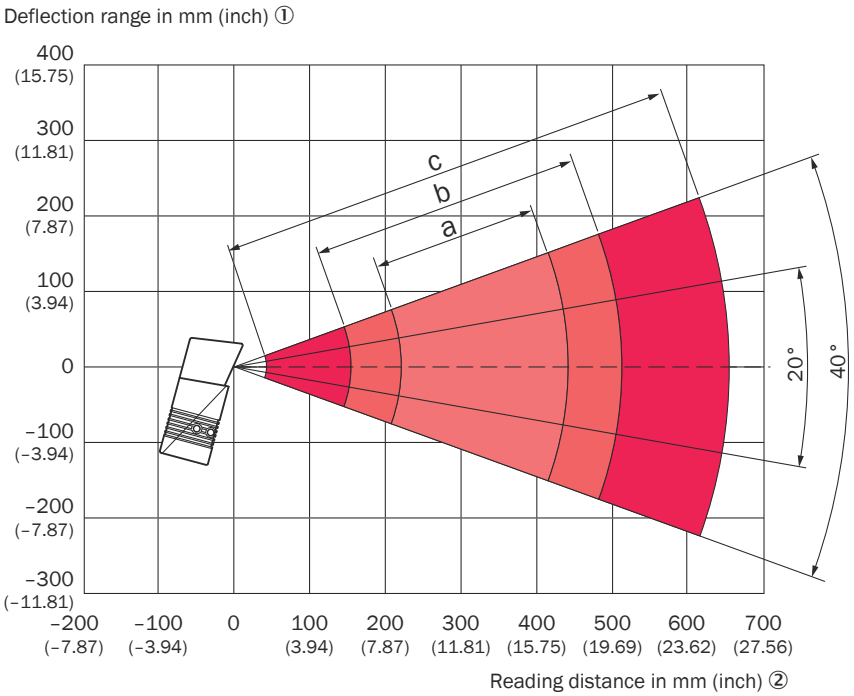
Figure 102: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 215 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01.

④ Resolution



Devices with plastic viewing window (CLV640-6xx1):
the depth of field is reduced by approx. 10 %. ③

Resolution ④

- a: 0.35 mm (13.8 mil)
- b: 0.50 mm (19.7 mil)
- c: 1.0 mm (39.5 mil)

Figure 103: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 280 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01.

④ Resolution

14.6.3.2 CLV642: Reading field diagrams for high resolutions

Line scanner or raster scanner

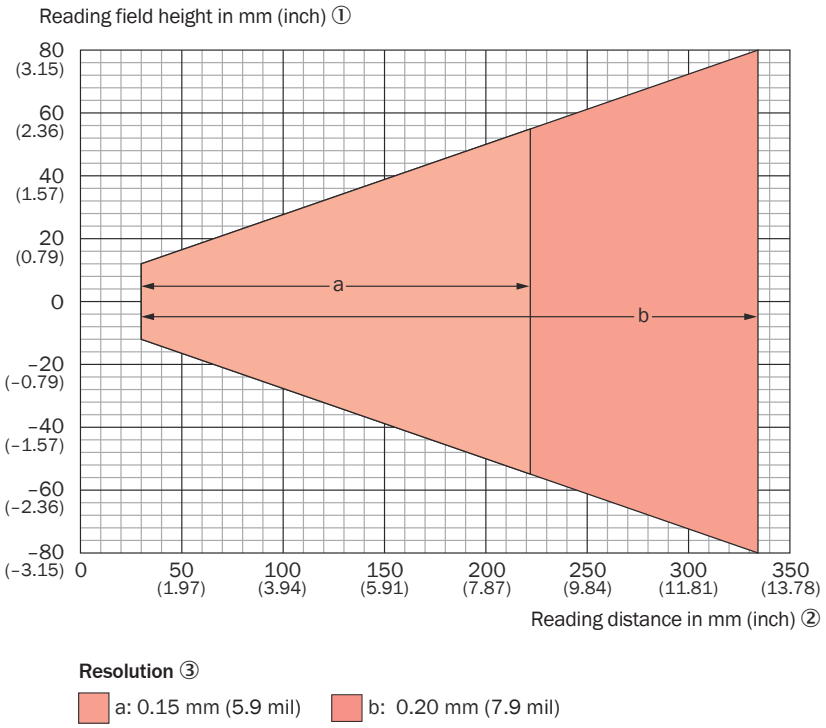


Figure 104: Reading field diagram for CLV642-Xxx0, high resolution, line (X = 0), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Resolution

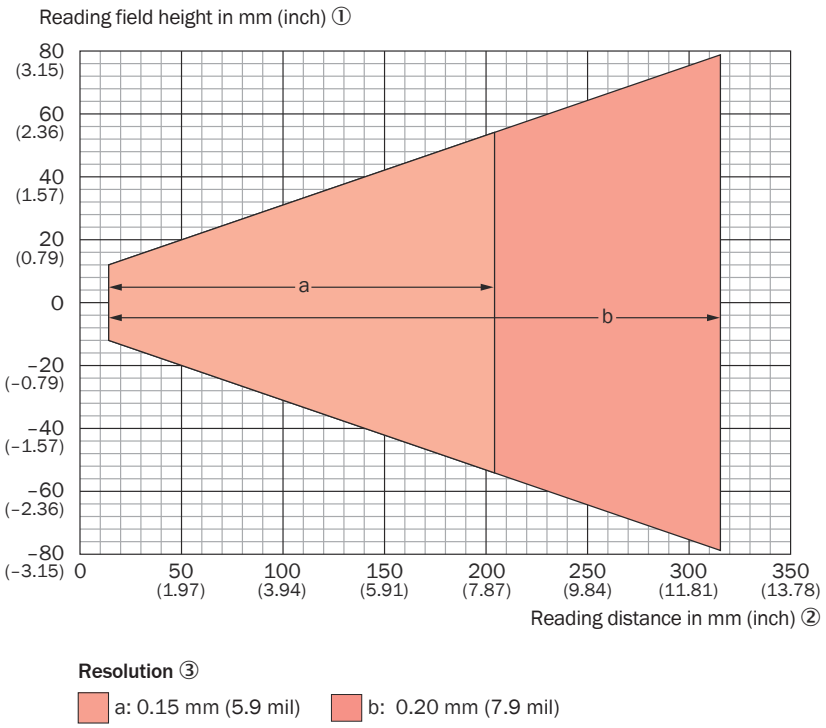


Figure 105: Reading field diagram for CLV642-Xxx0, High resolution, line (X = 2), glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Resolution

14.6.3.3 CLV640: Dynamic depth of field ranges

Device in standard housing

NOTE

In contrast to the red reading field diagrams, the black and white depth of field diagrams represent dynamic areas.

- The red reading field diagrams show the available reading fields along the reading distance over the entire resolution range for a fixed focus position at a fixed aperture angle.
- The black and white diagrams of the CLV640 show the resulting depths of field along the focus position for a dynamic focus position at one resolution and two different aperture angles.

Interpretation aid for the diagrams

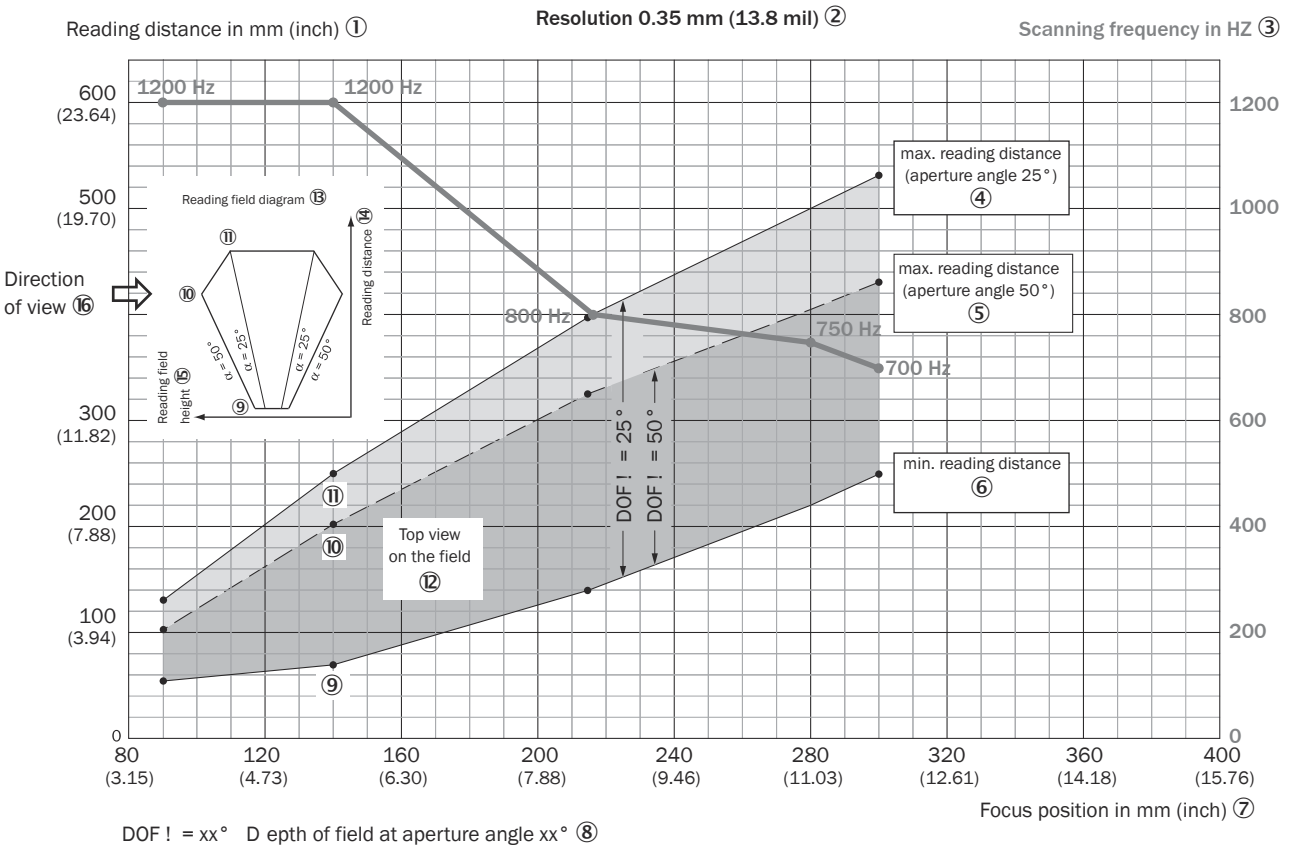


Figure 106: Meaning of the marks ⑨, ⑩ and ⑪ in the reading field diagram ⑬ in relation to the depth of field diagram

① Reading distance in mm (inch)
② Resolution 0.35 mm (13.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Reference, see small graphic in the figure
⑩ Reference, see small graphic in the figure
⑪ Reference, see small graphic in the figure
⑫ View of the reading field from above
⑬ Reading field diagram
⑭ Reading distance
⑮ Reading field height
⑯ Direction of view on the reading field diagram

Explanation of the small graphic in the depth of field diagram:

Top view on the depth of field diagram at one resolution and at any focus position ⑫: the marks ⑨, ⑩ and ⑪ can be transferred to the depth of field diagram.

Line scanner or raster scanner with front viewing window

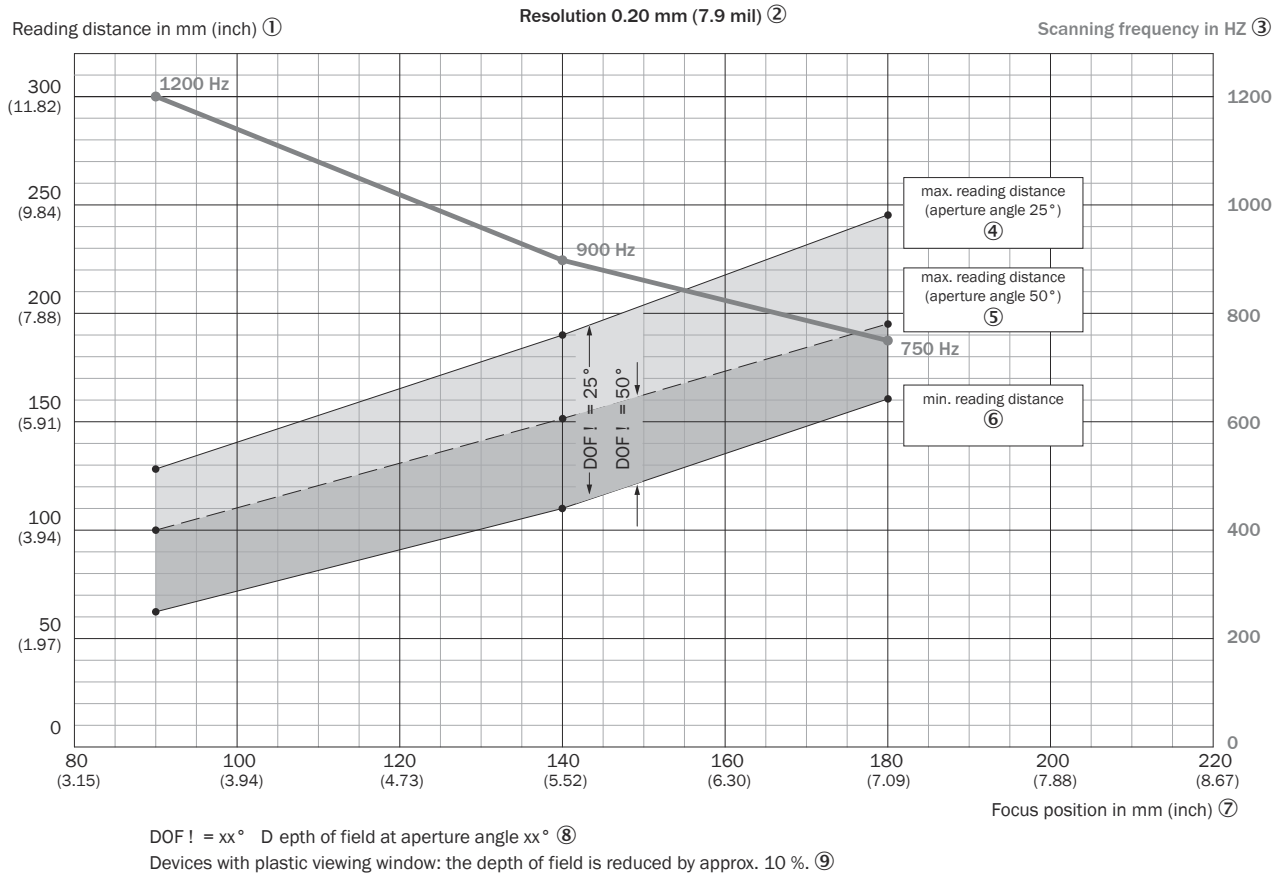


Figure 107: Depth of field ranges for CLV640-Xxx0, line (X = 0) or raster (X =1), 0.20 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.20 mm (7.9 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

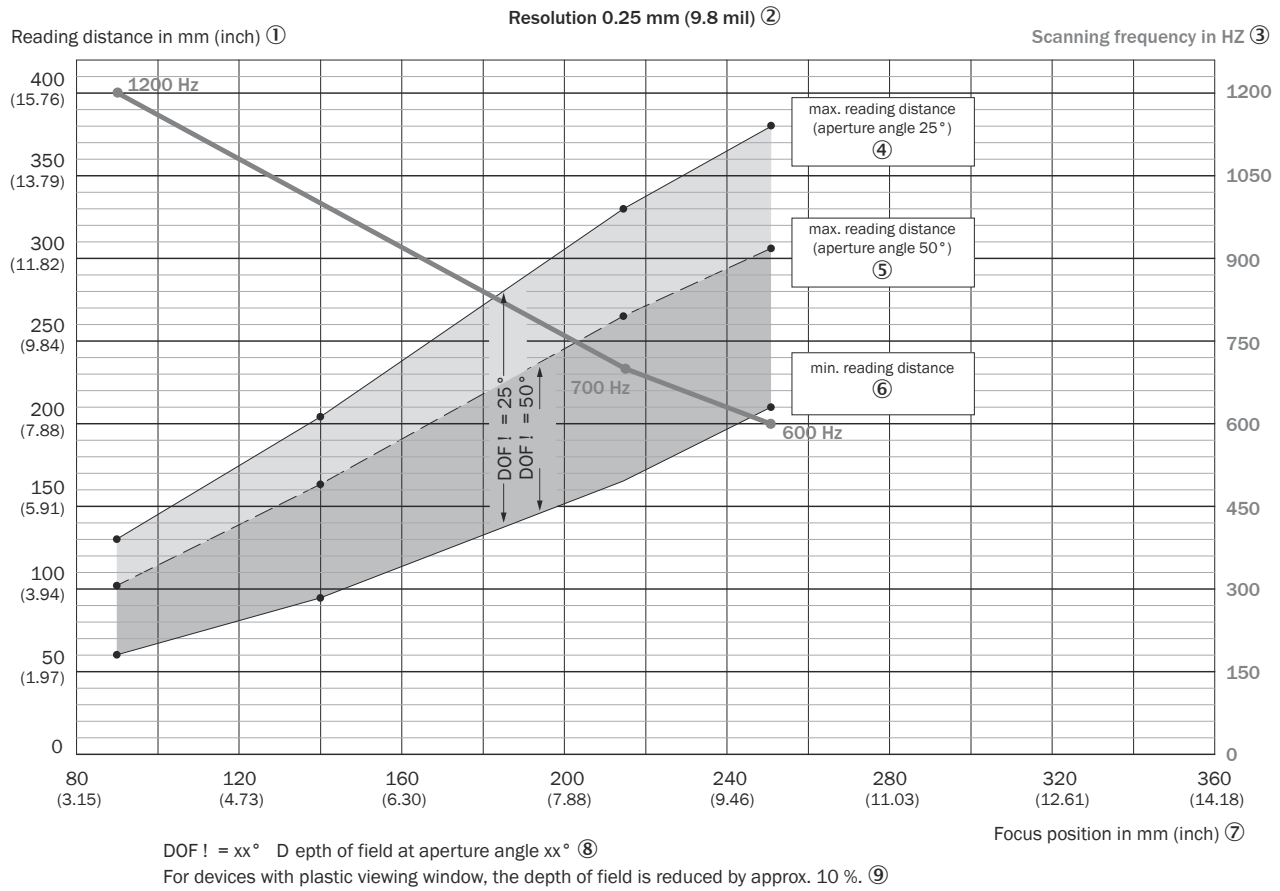


Figure 108: Depth of field ranges for CLV640-Xxx0, line (X = 0) or raster (X =1), 0.25 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.25 mm (9.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

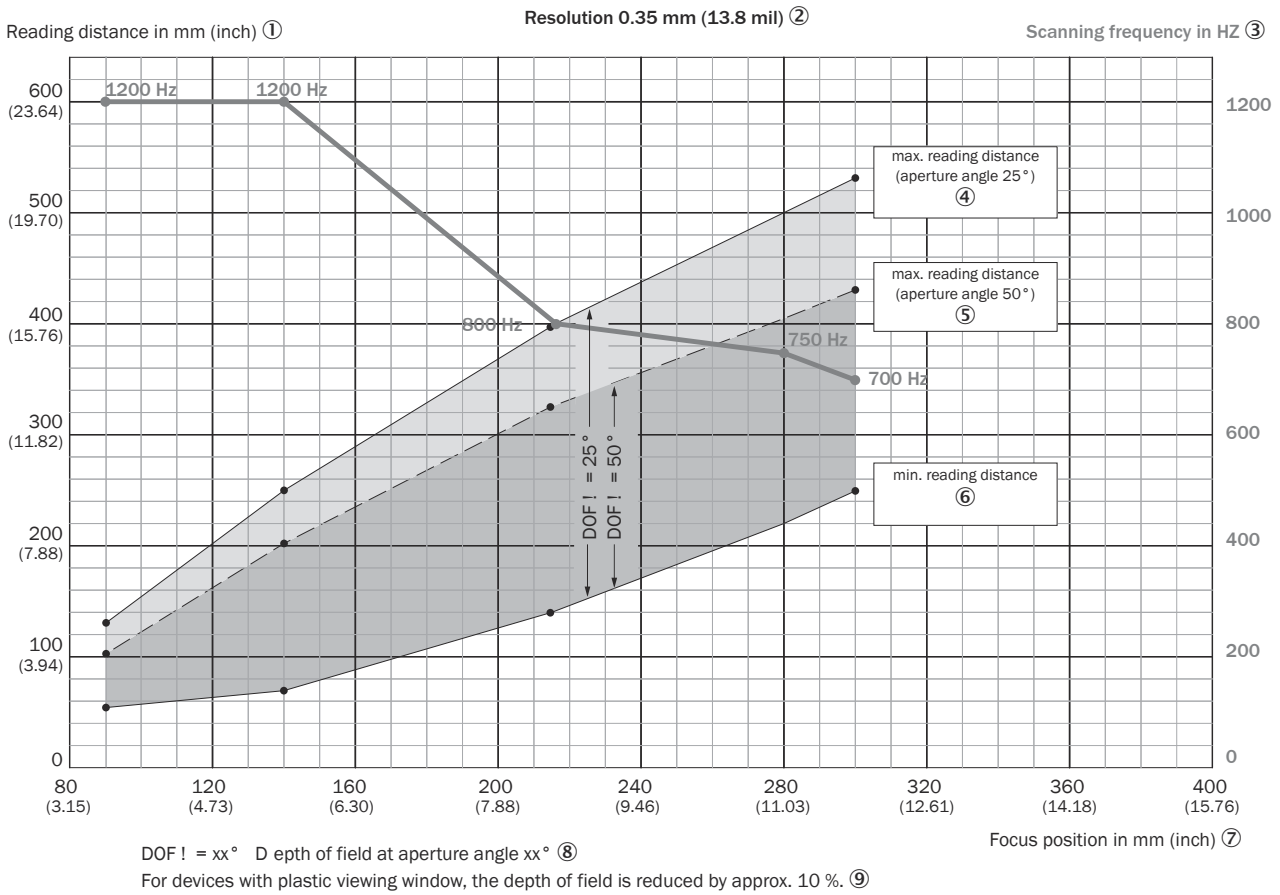


Figure 109: Depth of field ranges for CLV640-Xxx0, line (X = 0) or raster (X =1), 0.35 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.35 mm (13.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

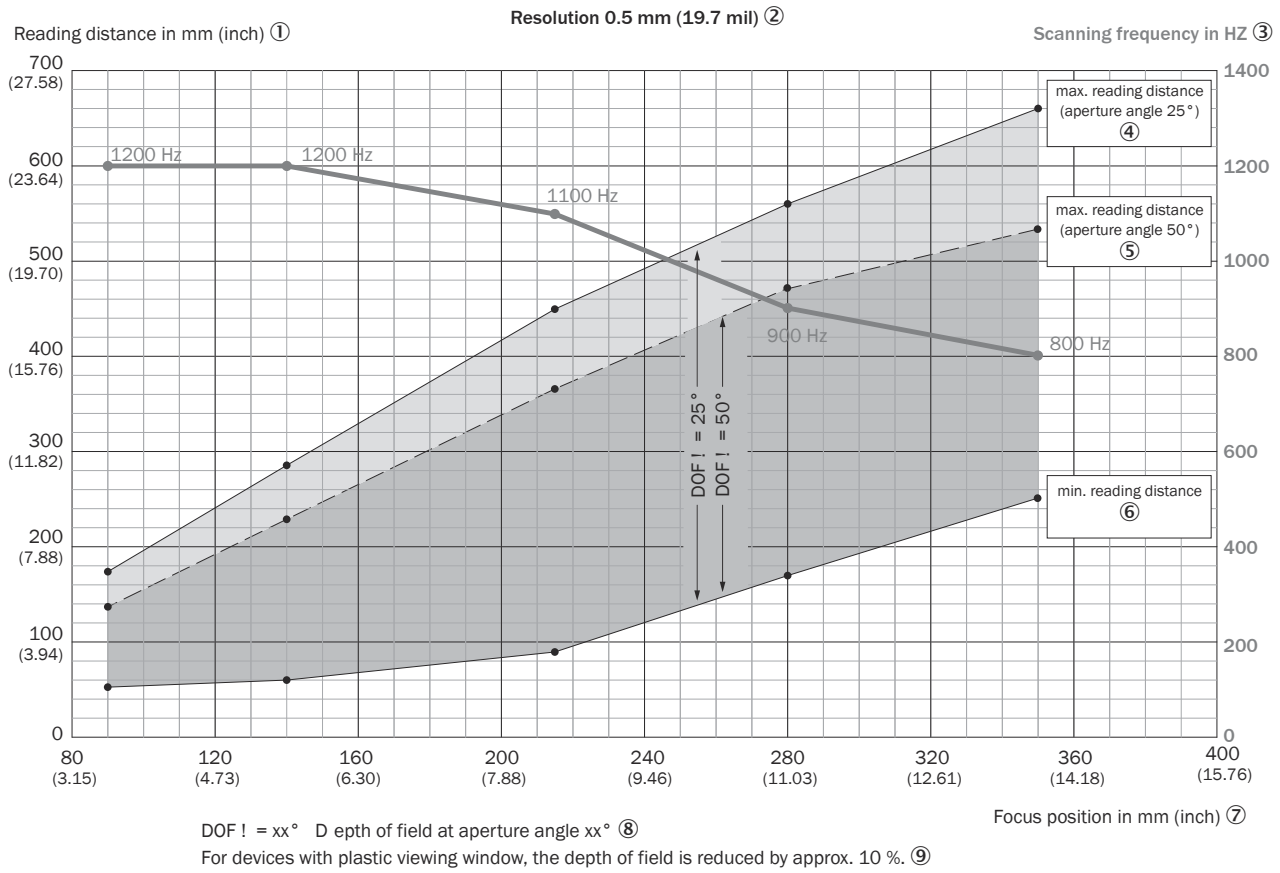


Figure 110: Depth of field ranges for CLV640-Xxx0, line (X = 0) or raster (X =1), 0.50 mm standard resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.50 mm (19.7 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

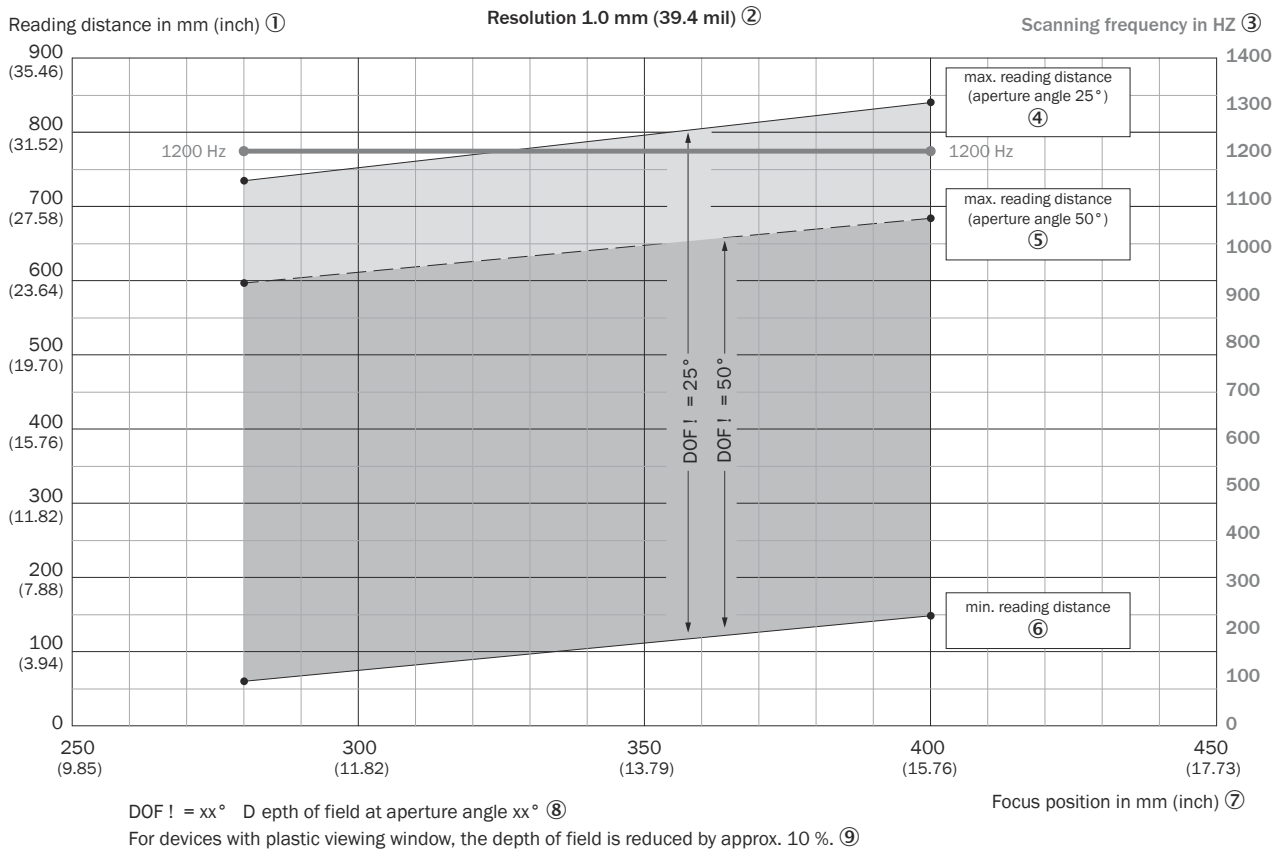


Figure 111: Depth of field ranges for CLV640-Xxx0, line (X = 0) or raster (X =1), 1.00 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 1.00 mm (39.4 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

Line scanner or raster scanner with side viewing window

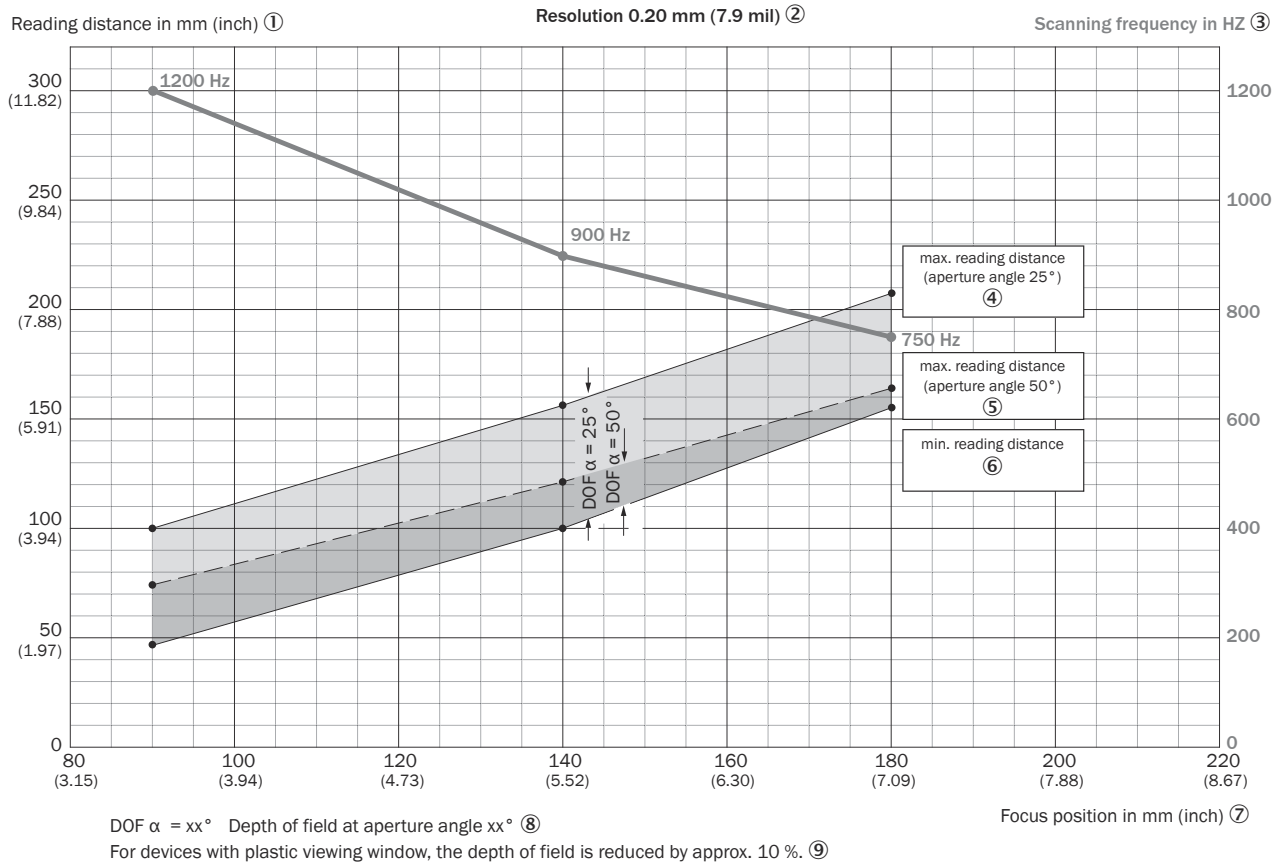
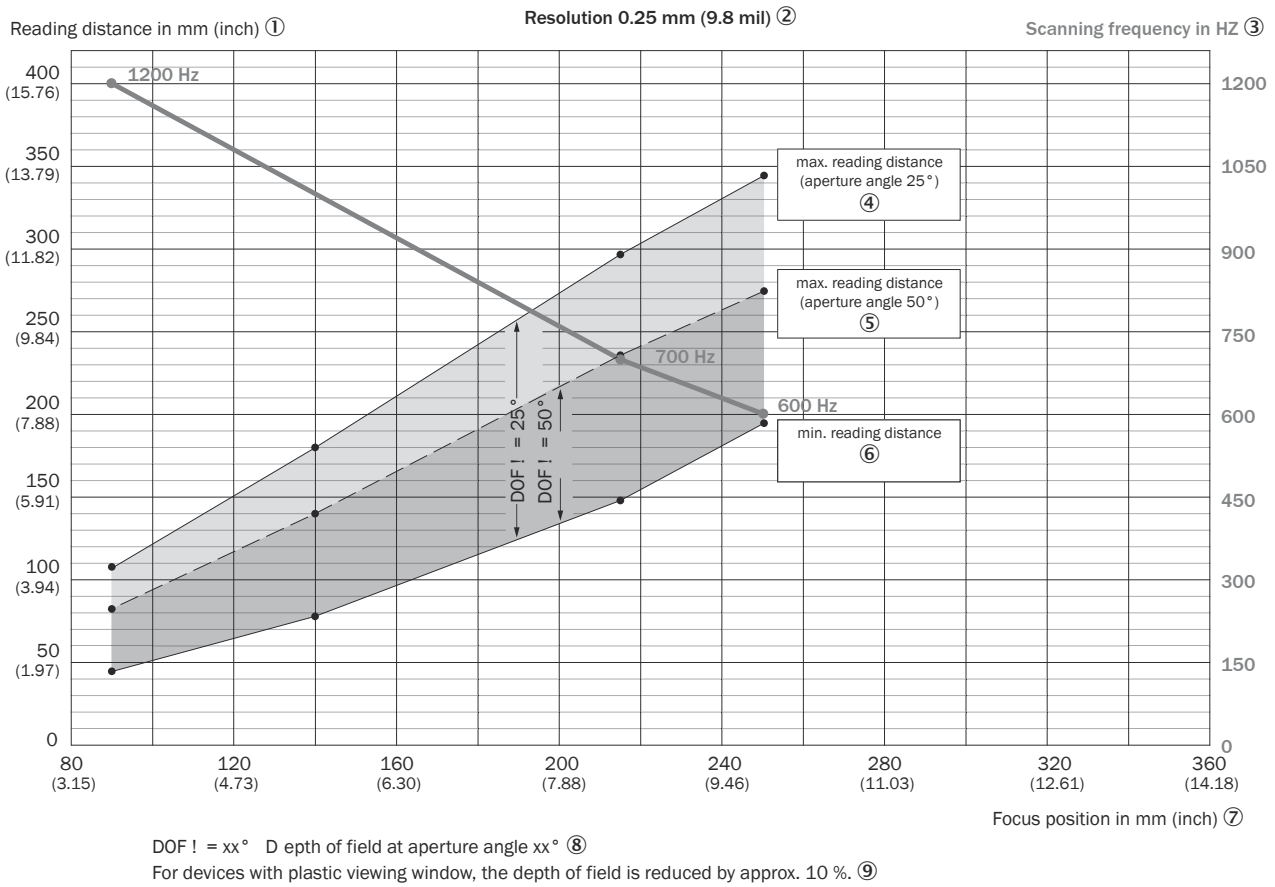


Figure 112: Depth of field ranges for CLV640-Xxx0, line (X = 2) or raster (X =3), 0.20 mm resolution, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.20 mm (7.9 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.



DOF ! = xx° D epth of field at aperture angle xx° ⑧
For devices with plastic viewing window, the depth of field is reduced by approx. 10 %. ⑨

Figure 113: Depth of field ranges for CLV640-Xxx0, line (X = 2) or raster (X =3), 0.25 mm resolution, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.25 mm (9.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

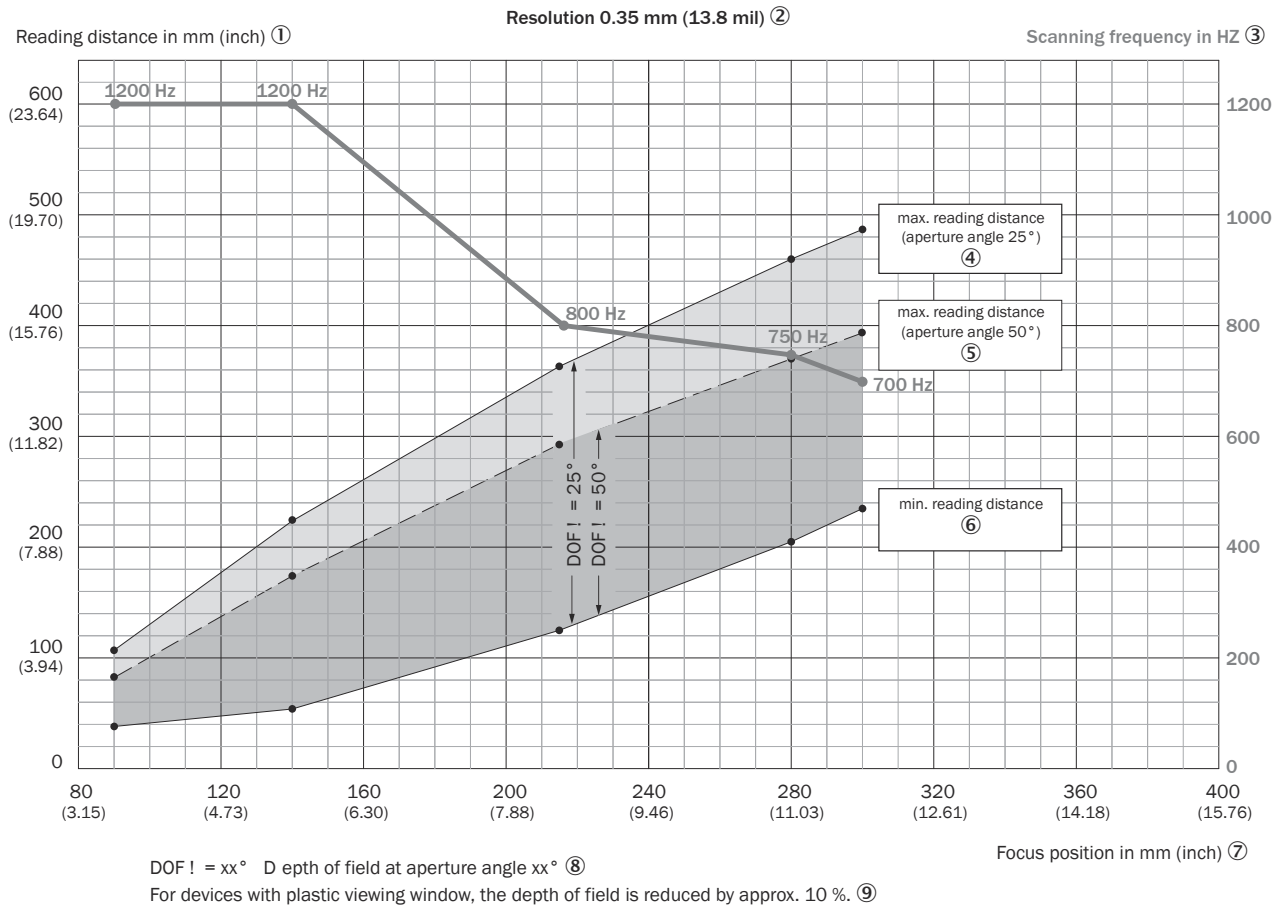


Figure 114: Depth of field ranges for CLV640-Xxx0, line (X = 2) or raster (X =3), 0.35 mm resolution, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.35 mm (13.7 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

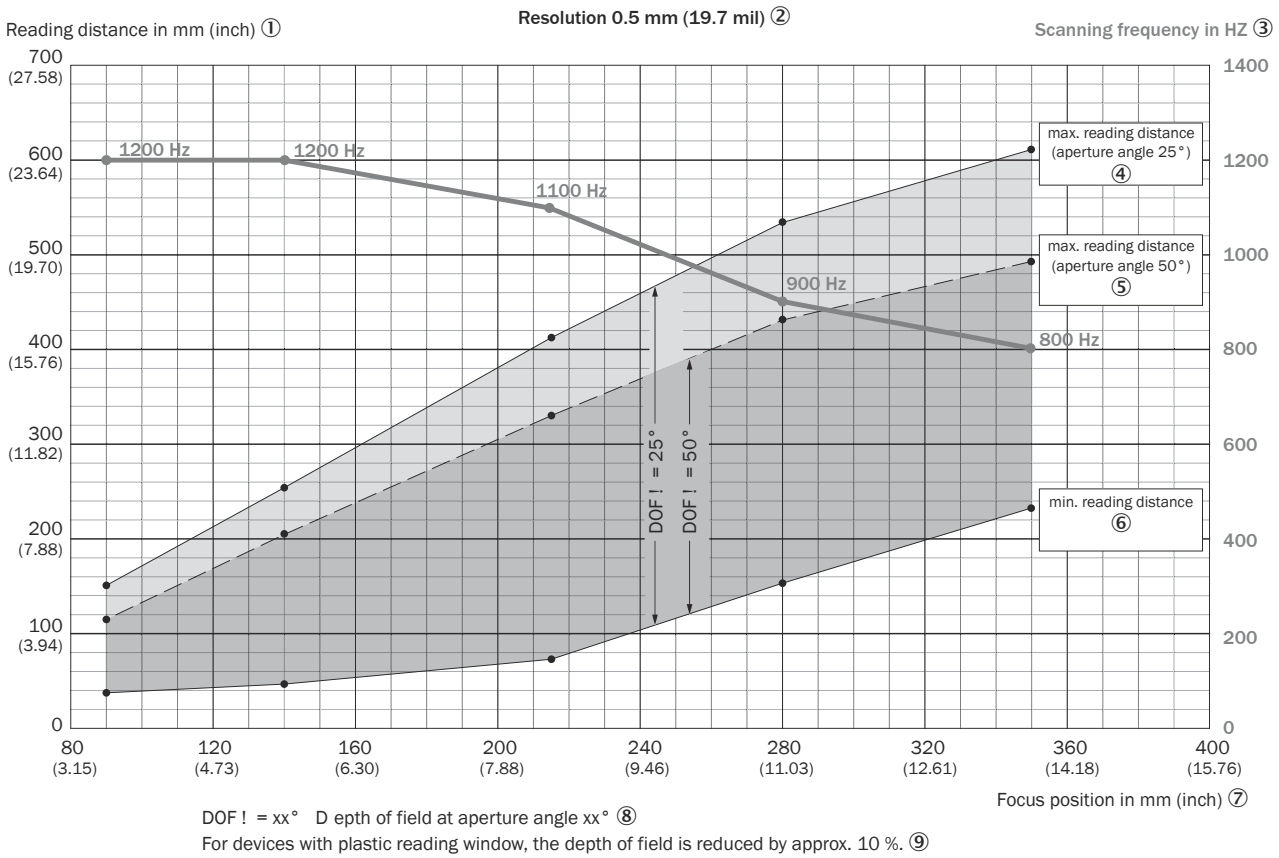


Figure 115: Depth of field ranges for CLV640-Xxx0, line (X = 2) or raster (X =3), 0.50 mm standard resolution, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.50 mm (19.7 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

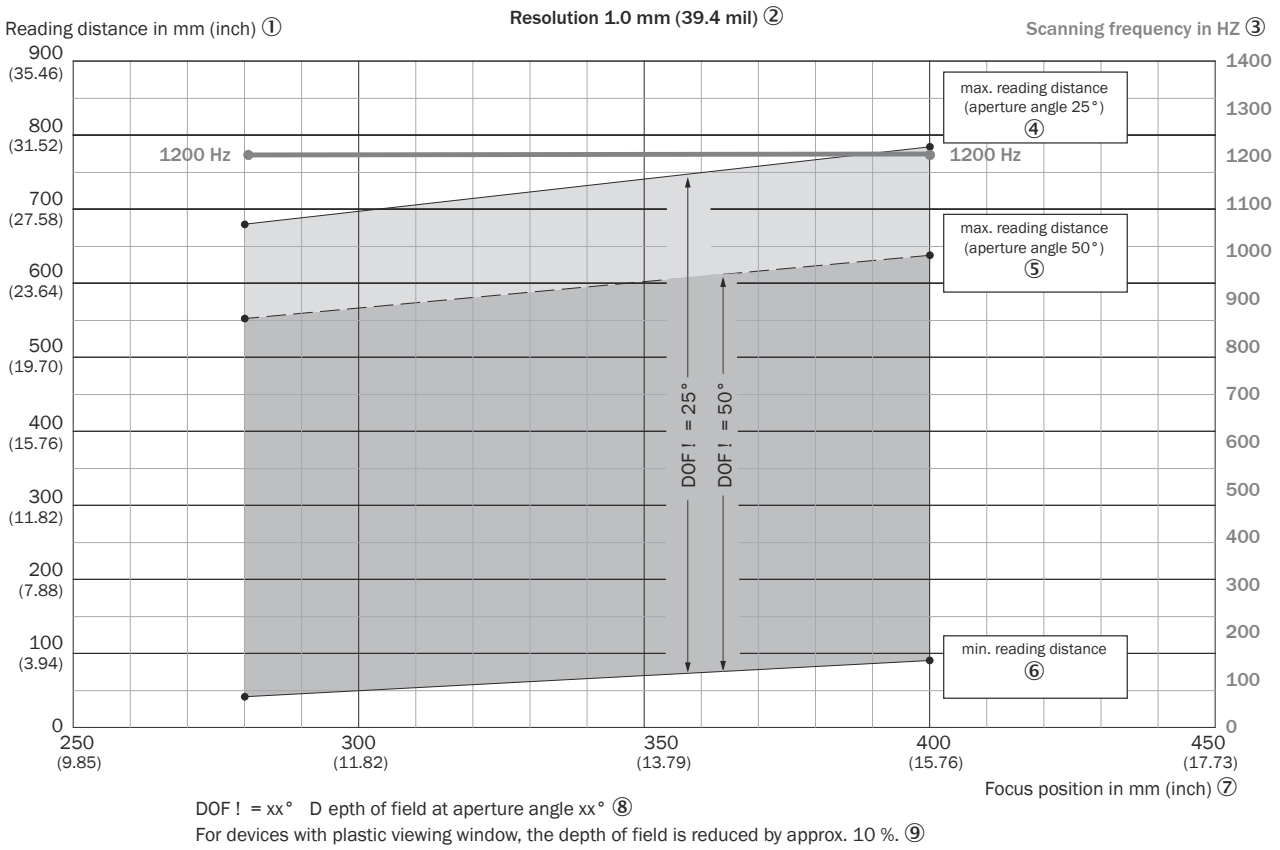


Figure 116: Depth of field ranges for CLV640-Xxx0, line (X = 2) or raster (X =3), 1.00 mm resolution, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 1.00 mm (39.4 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

Line scanner with oscillating mirror (side viewing window)

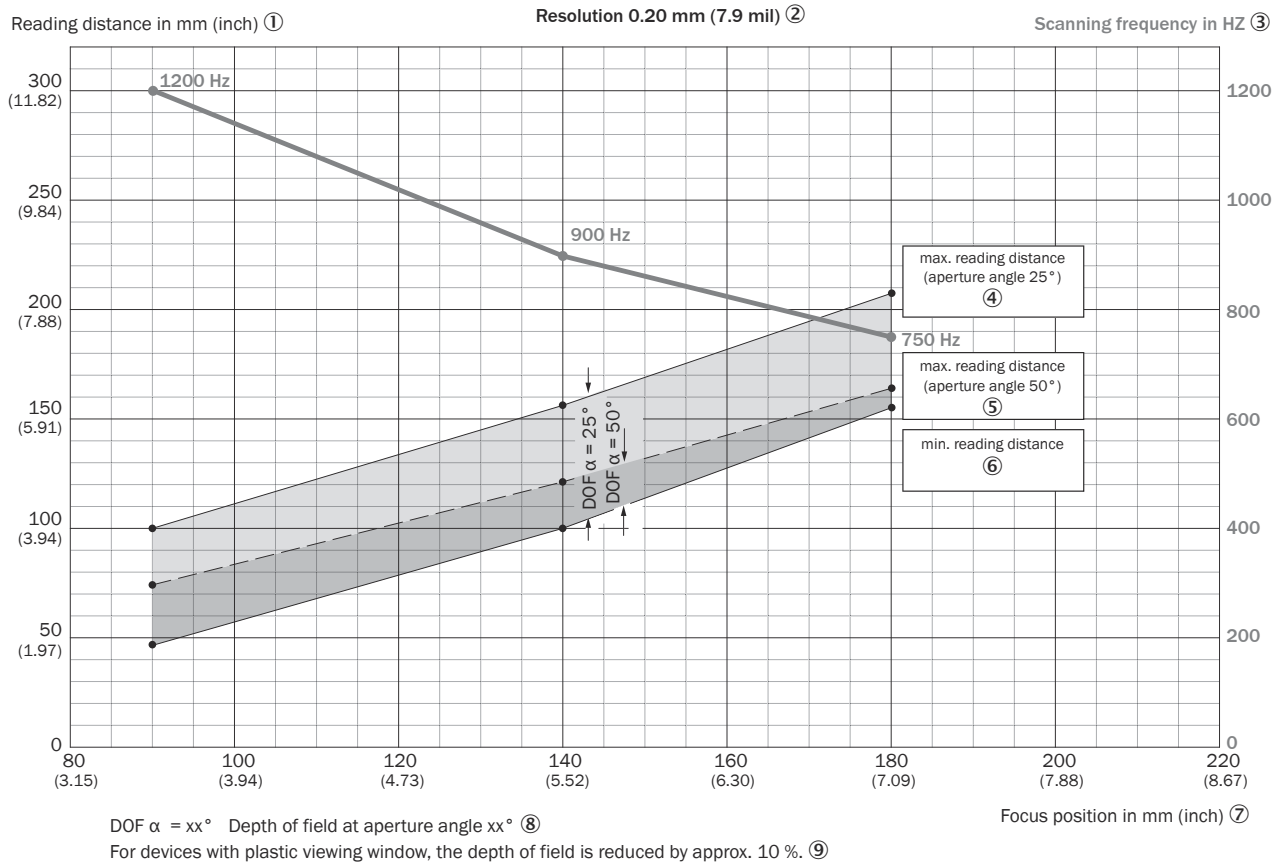


Figure 117: Depth of field ranges for CLV640-6xx0, 0.20 mm resolution, oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.20 mm (7.9 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-xxx1): The depth of field is reduced by approx. 10%.

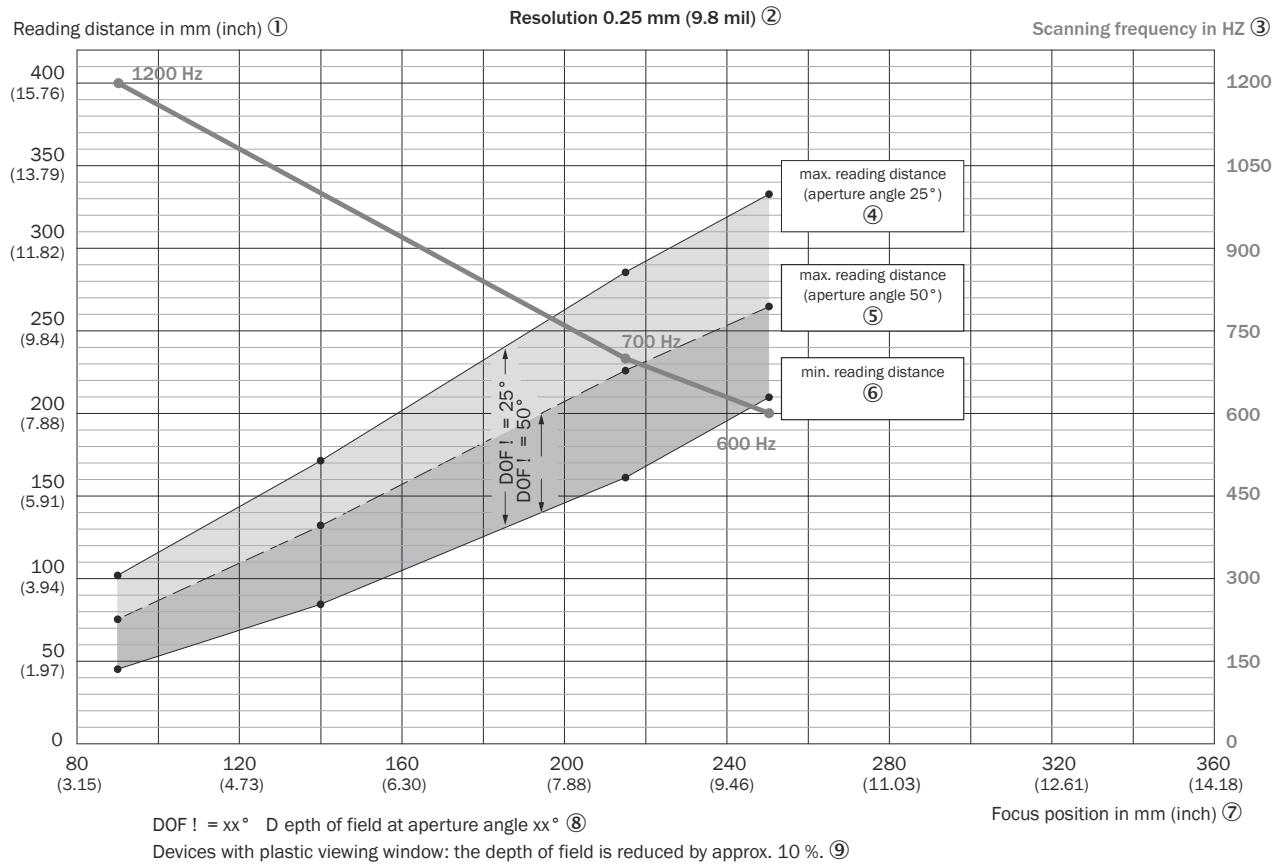
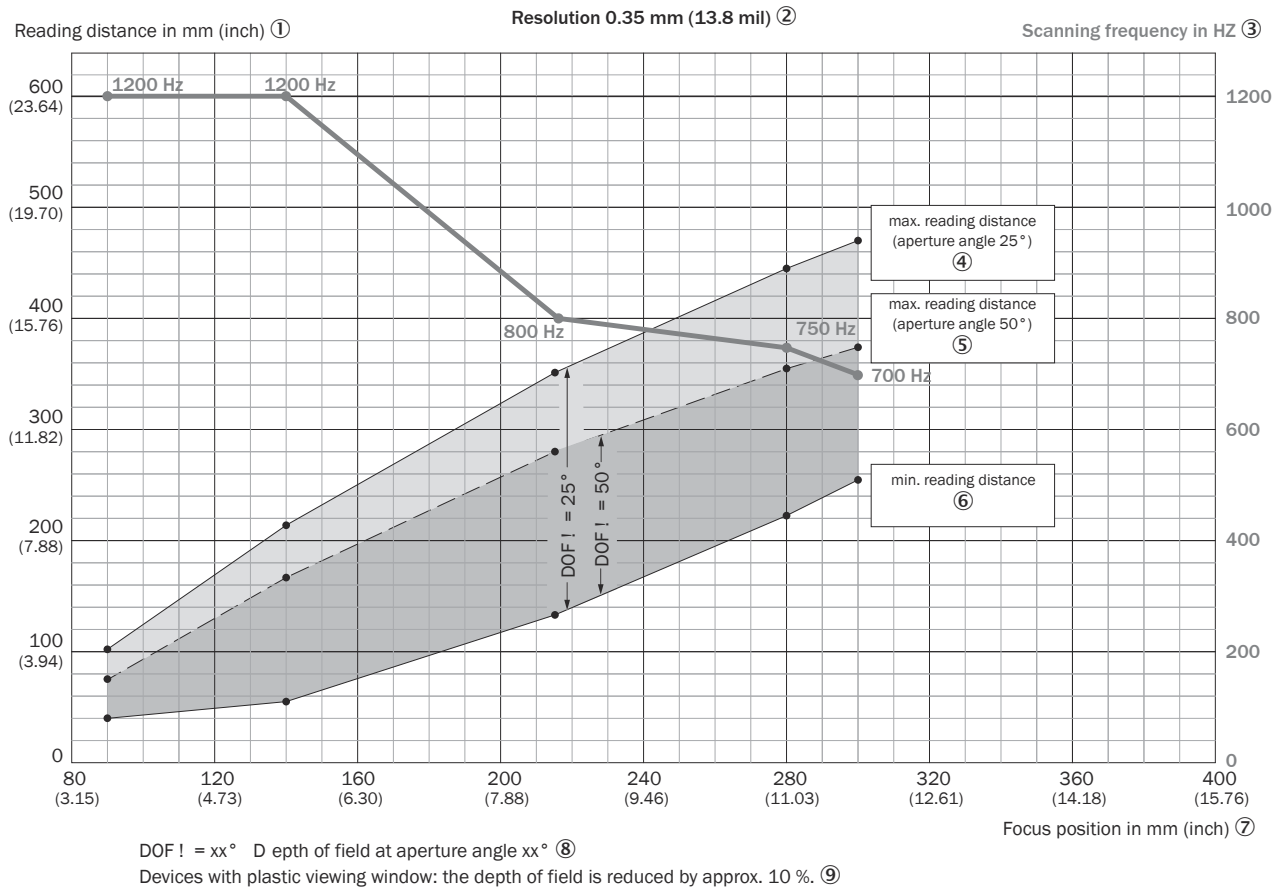


Figure 118: Depth of field ranges for CLV640-6xx0, 0.25 mm resolution, oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

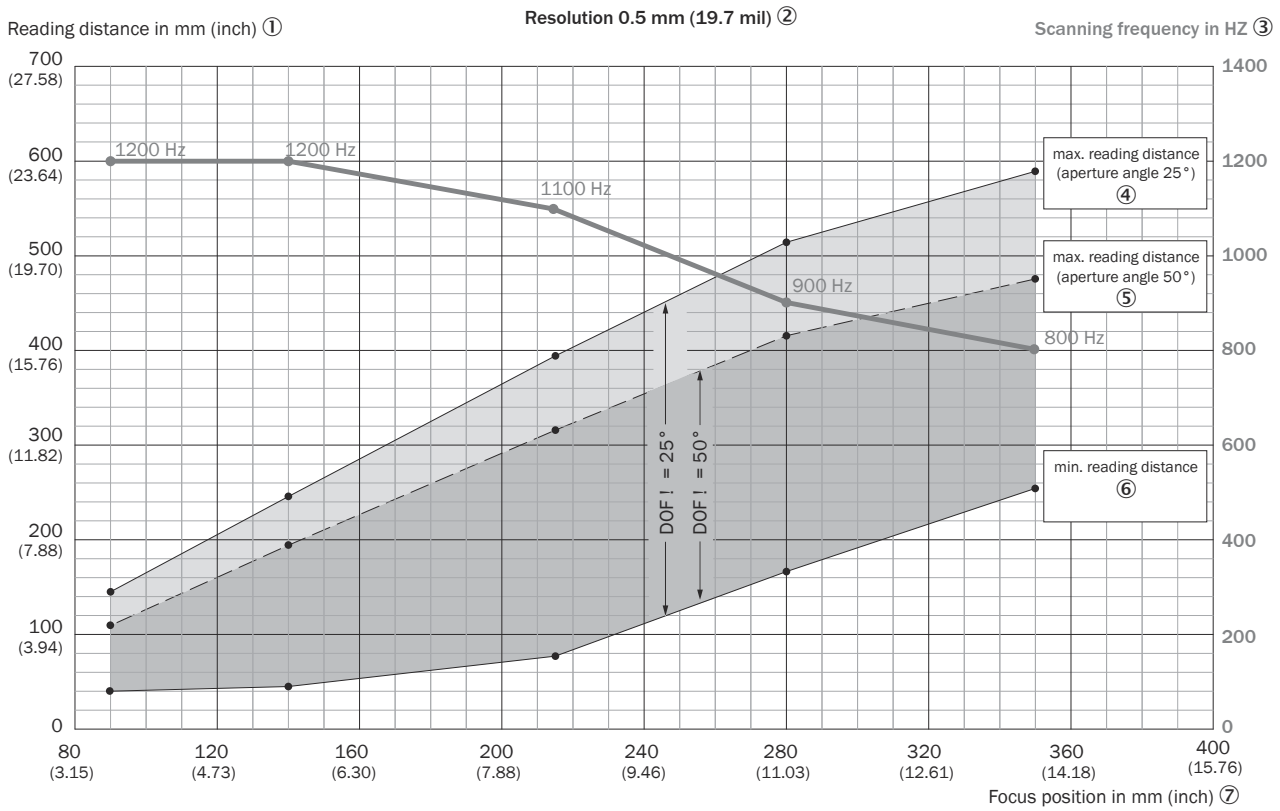
① Reading distance in mm (inch)
② Resolution 0.25 mm (9.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-6xx1): The depth of field is reduced by approx. 10%.



DOF ! = xx° D epth of field at aperture angle xx° ⑧
Devices with plastic viewing window: the depth of field is reduced by approx. 10 %. ⑨

Figure 119: Depth of field ranges for CLV640-6xx0, 0.35 mm resolution, oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.35 mm (13.8 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-6xx1): The depth of field is reduced by approx. 10%.



DOF ! = xx° D epth of field at aperture angle xx° ⑧
Devices with plastic viewing window: the depth of field is reduced by approx. 10 %. ⑨

Figure 120: Depth of field ranges for CLV640-6xx0, 0.5 mm resolution, oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 0.50 mm (19.7 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-6xx1): The depth of field is reduced by approx. 10%.

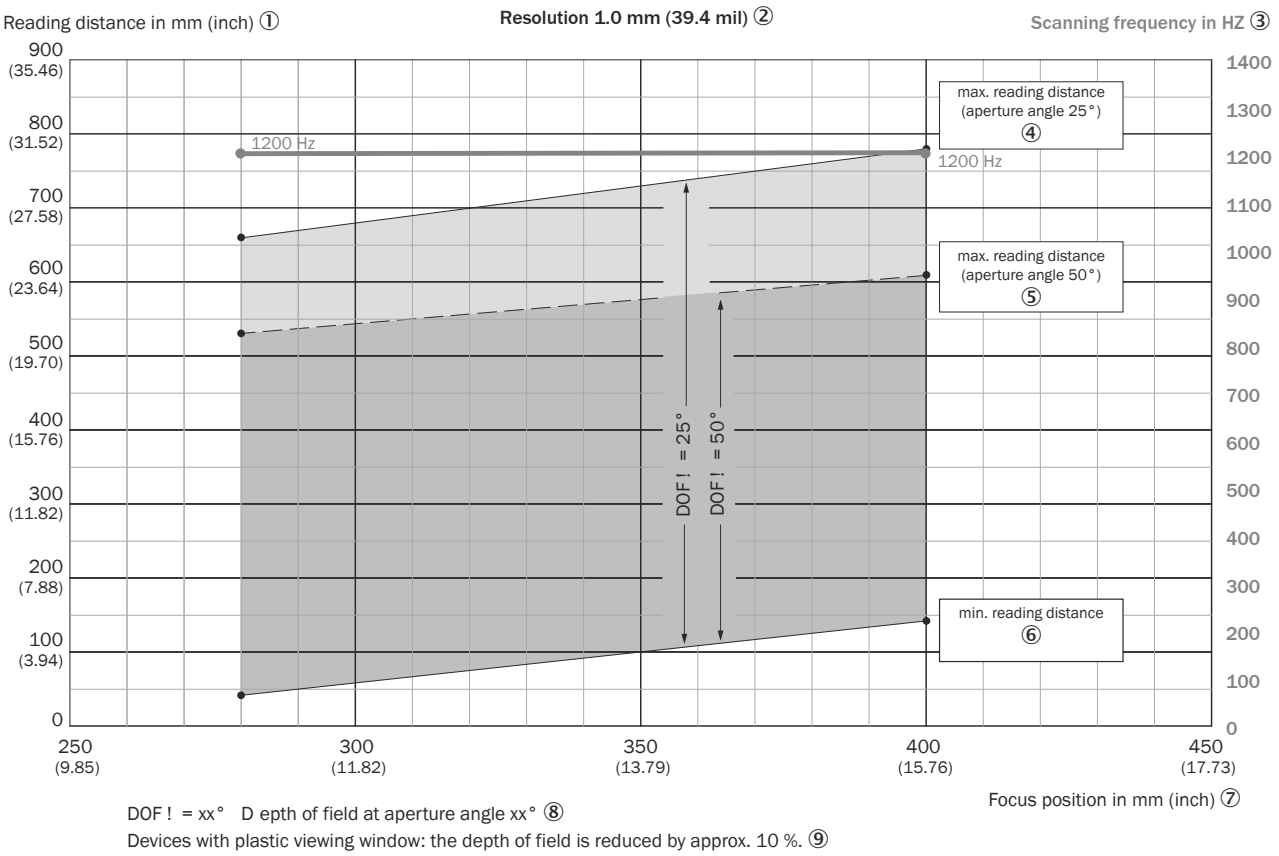


Figure 121: Depth of field ranges for CLV640-6xx0, 1.0 mm resolution, oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Resolution 1.00 mm (39.7 mil)
③ Scanning frequency in Hz
④ Maximum reading distance (25° aperture angle)
⑤ Maximum reading distance (50° aperture angle)
⑥ Minimum reading distance
⑦ Focus position in mm (inch)
⑧ Depth of field at aperture angle xx°
⑨ Devices with plastic viewing window (CLV640-6xx1): The depth of field is reduced by approx. 10%.

Oscillating mirror deflection widths

NOTE
The following oscillating mirror deflection width diagrams are exemplary for three focus positions.

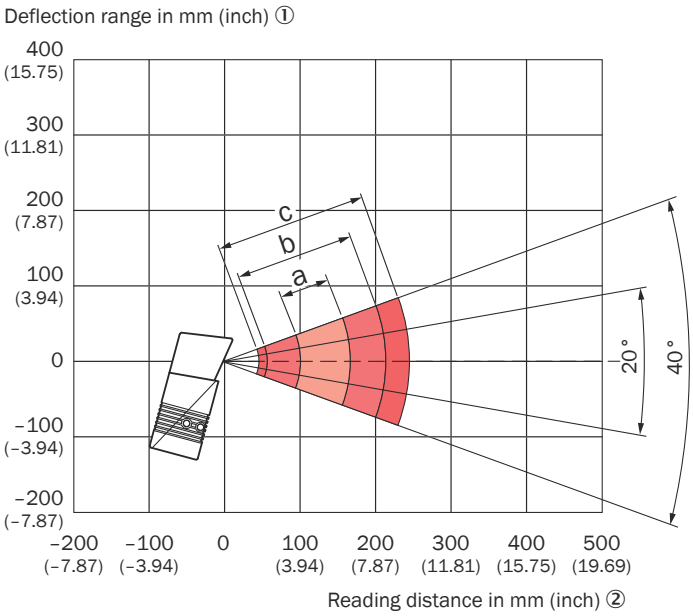


Figure 122: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 140 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window: The depth of field is reduced by approx. 10%. Devices: CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01.

④ Resolution

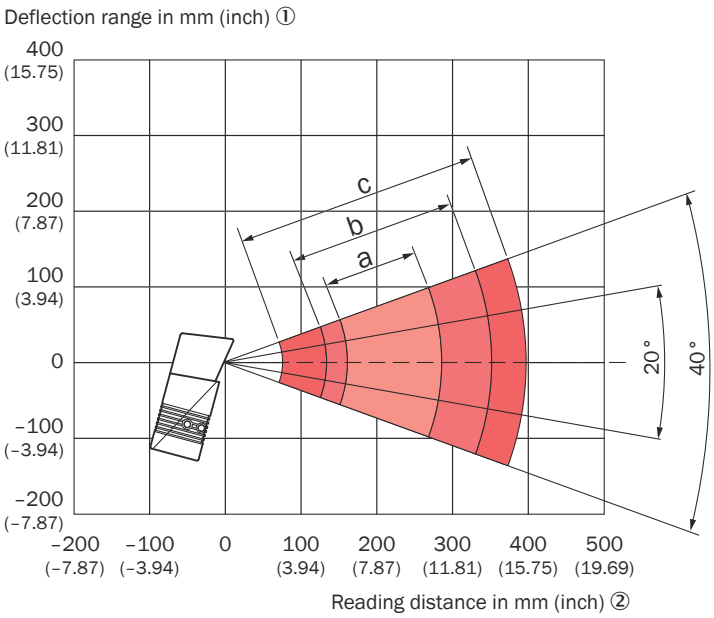


Figure 123: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 215 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01): The depth of field is reduced by approx. 10%.

④ Resolution

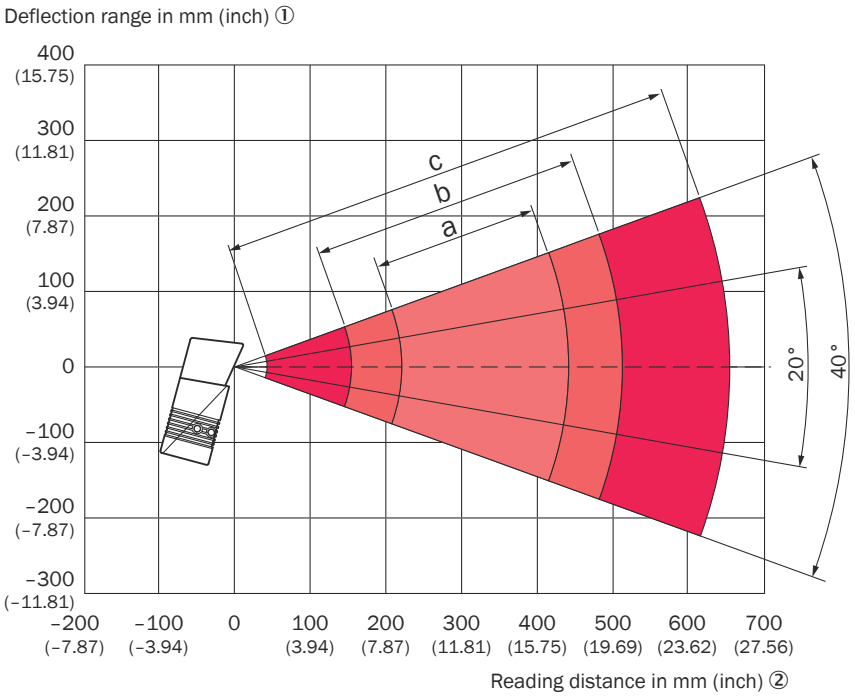


Figure 124: Oscillating mirror deflection width diagram for CLV640-6xx0, standard density, focus position 280 mm, glass viewing window

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Devices with plastic viewing window (CLV640-6120S01, CLV640-6831S01 in IP69K protective housing, CLV640-6121S01): The depth of field is reduced by approx. 10%.

④ Resolution

14.6.4 CLV65x: Overview of specification diagrams

Reading field diagrams for the CLV650-Xxx0, standard density

CLV65x type	Diagram	Scanning methods	Viewing window (material, alignment)	Filter	Page
CLV650-Xxxx	Reading field for CLV650-0xx0, standard density	Line (X = 0)	Glass, at the front	–	page 172
	Reading field for CLV650-0120S01, standard density	Line (X = 0)	Glass, at the front	Polarizing filter	page 172
	Reading field for CLV650-6xx0, standard density	Line with oscillating mirror (X = 6)	Glass, on the side	–	page 173
	Oscillating mirror deflection width for CLV650-6xx0, standard density	Line with oscillating mirror (X = 6)	Glass, on the side	–	page 173

Depth of field ranges of the CLV650-0xx0 line scanner, standard density

CLV65x type	Diagram	Resolution	Scanning methods	Viewing window (Material, alignment)	Light spot	Page
CLV650-Xxxx	Depth of field ranges for CLV650-0xx0 with scanning frequency characteristic curve, standard density	0.25 mm	Line (X = 0)	Glass, at the front	Circular	page 178
		0.35 mm				page 179
		0.50 mm				page 180
		1.00 mm				page 181

Depth of field ranges of the CLV650-6xx0 line scanner with oscillating mirror, standard density

CLV65x type	Diagram	Resolution	Scanning methods	Viewing window	Light spot	Page
CLV650-Xxxx	Depth of field ranges for CLV650-6xx0 with scanning frequency characteristic curve, standard density	0.25 mm	Line with oscillating mirror (X =6)	Glass, on the side	Circular	page 182
		0.35 mm				page 183
		0.50 mm				page 184
		1.00 mm				page 185

Reading field diagrams for the CLV651-Xxx0, 0.5 mm resolution

CLV65x type	Diagram	Scanning methods	Viewing window	Filter	Page
CLV651-Xxx0	Reading field for CLV651-Xxx0, standard density	Line (X = 0)	Glass, at the front	–	page 174
	Reading field for CLV651-Xxx0, standard density	Line with oscillating mirror (X = 6)	Glass, on the side	–	page 175
	Oscillating mirror deflection width for CLV651-Xxx0, standard density	Line with oscillating mirror (X = 6)	Glass, on the side	–	page 176

Depth of field ranges of the CLV651-0xx0 line scanner, 0.5 mm resolution

CLV65x type	Diagram	Resolution	Tilt angle	Scanning methods	Viewing window (Material, alignment)	Light spot	Page
CLV651-Xxx0	Depth of field ranges for CLV651-0xx0 with scanning frequency characteristic curve	0.50 mm	0°	Line (X = 0)	Glass, at the front	Circular	page 186
			45°				page 187

Depth of field ranges of the CLV651-6xx0 line scanner with oscillating mirror, 0.5 mm resolution

CLV65x type	Diagram	Resolution	Tilt angle	Scanning methods	Viewing window (Material, alignment)	Light spot	Page
CLV651-6xx0	Depth of field ranges for CLV651-6xx0 with scanning frequency characteristic curve	0.50 mm	0°	Line with oscillating mirror (X =6)	Glass, on the side	Circular	page 188
			45°				page 189

14.6.4.1 CLV650: Standard resolution

Devices in standard housing

Supplementary reading field conditions for CLV650-Xxx0 and CLV650-6xx0

Resolution	Focus position	Aperture angle
0.25 mm	200 mm to 500 mm (7.88 inch to 19.7 inch)	max. 45°
0.35 mm	200 mm to 905 mm (7.88 inch to 35.66 inch)	max. 50°
0.50 mm	200 mm to 980 mm (7.88 inch to 38.61 inch)	max. 50°
1.00 mm	200 mm to 1,200 mm (7.88 inch to 47.28 inch)	max. 50°

CLV650-Xxx0

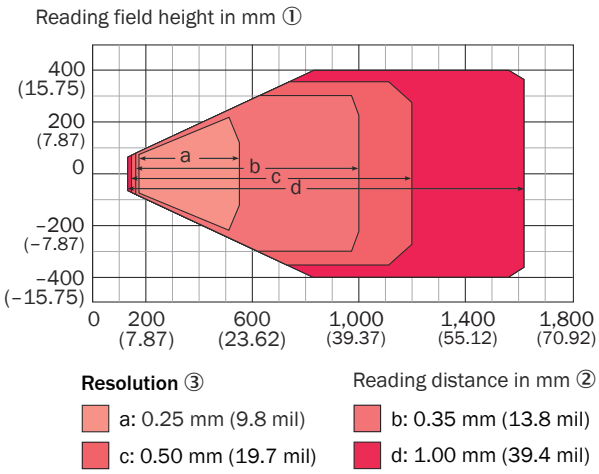


Figure 125: Reading field diagram for CLV650-Xxx0, standard density, line (X = 0), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

CLV650-0120S01

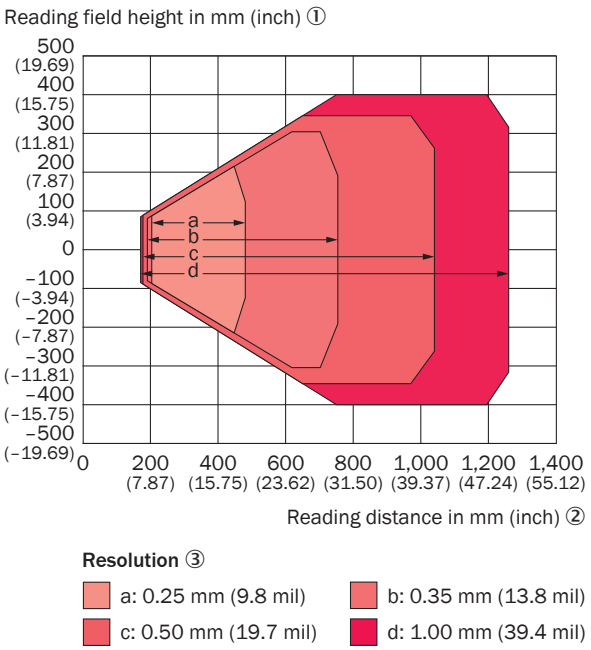


Figure 126: Reading field diagram for CLV650-0120S01, standard density, line, glass viewing window, at the front, with polarizing filter

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

CLV650-6xx0

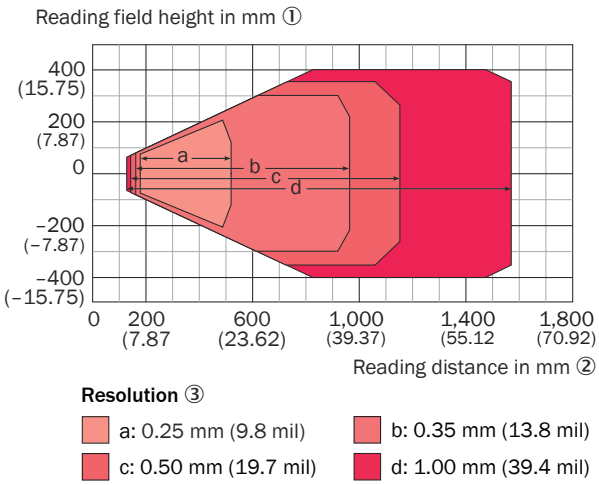


Figure 127: Reading field diagram for CLV650-6xx0, standard density, line with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

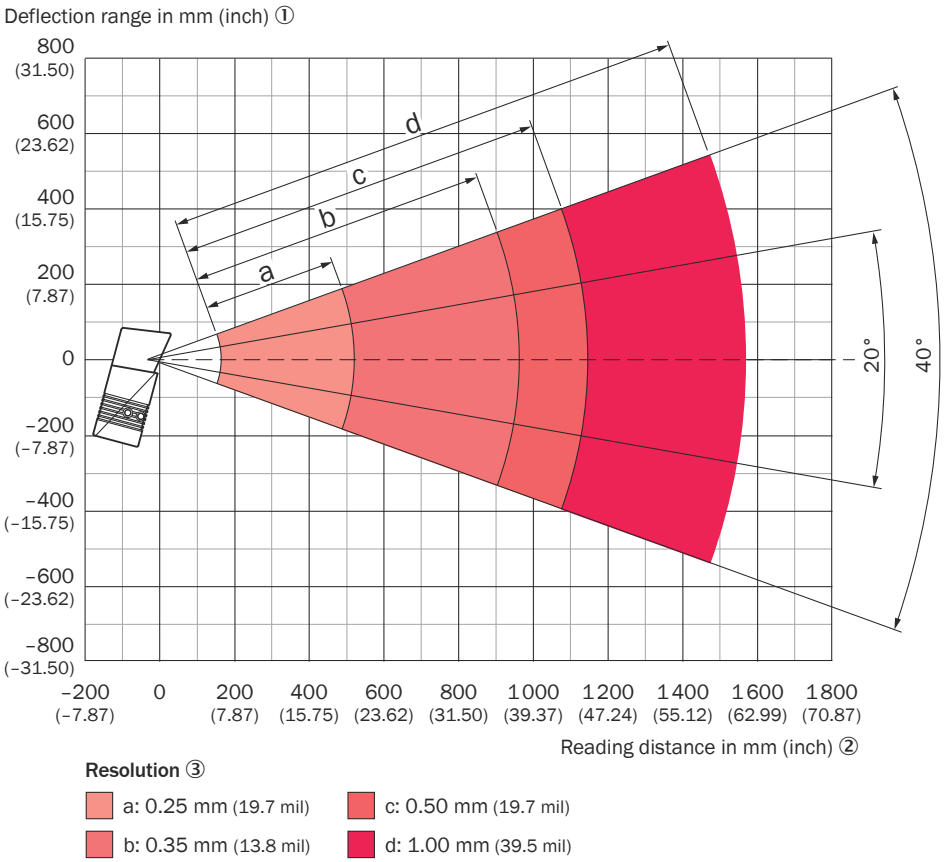


Figure 128: Oscillating mirror deflection width diagram for CLV650-6xx0, standard density, line with oscillating mirror, glass viewing window, on the side

① Deflection width in mm (inch)

② Reading distance in mm (inch)

③ Solution

14.6.4.2 CLV651: Low resolution

Supplementary reading field conditions:

Resolution	Focus position	Aperture angle
0.50 mm	250 mm to 650 mm (9.85 inch to 25.61 inch)	max. 55°

Line scanner

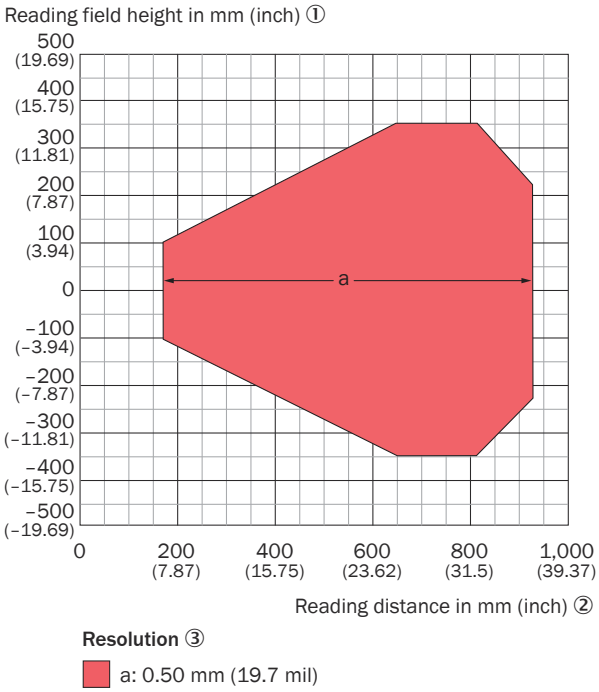


Figure 129: Reading field diagram for CLV651-Xxx0, low density, line (X = 0), glass viewing window, at the front

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

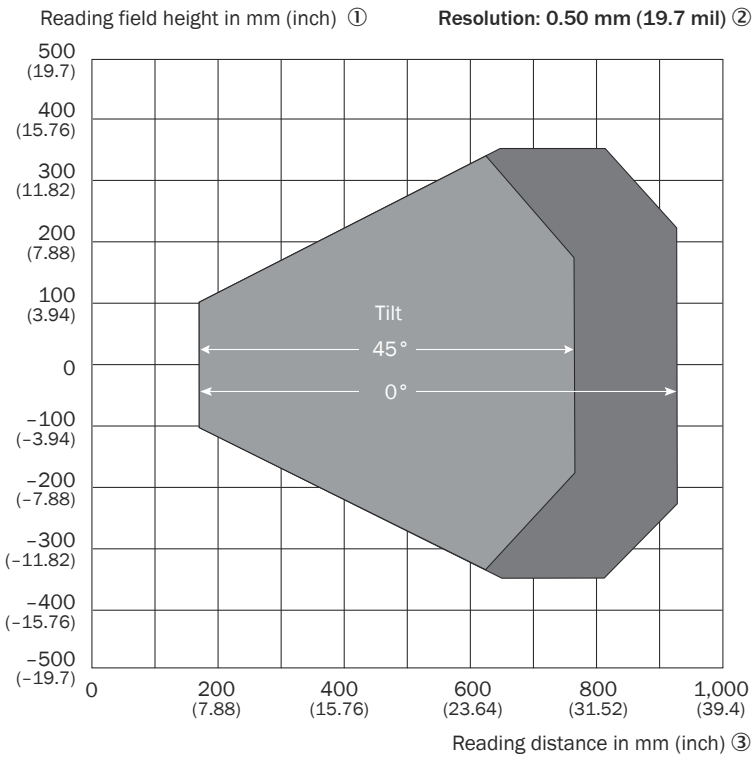


Figure 130: Reading field diagram for CLV651-Xxx0, low density, line (X = 0), glass viewing window, at the front, tilt angle 45 ° and 0 °

① Reading field height in mm (inch)

② Resolution: 0.50 mm (19.7 mil)

③ Reading distance in mm (inch)

Line scanner with oscillating mirror

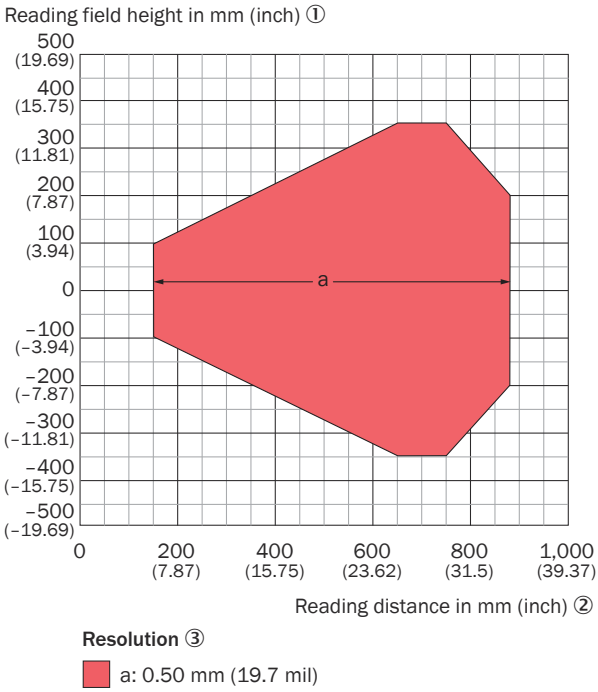


Figure 131: Reading field diagram for CLV651-6xx0, low density, line with oscillating mirror, glass viewing window, on the side

① Reading field height in mm (inch)

② Reading distance in mm (inch)

③ Solution

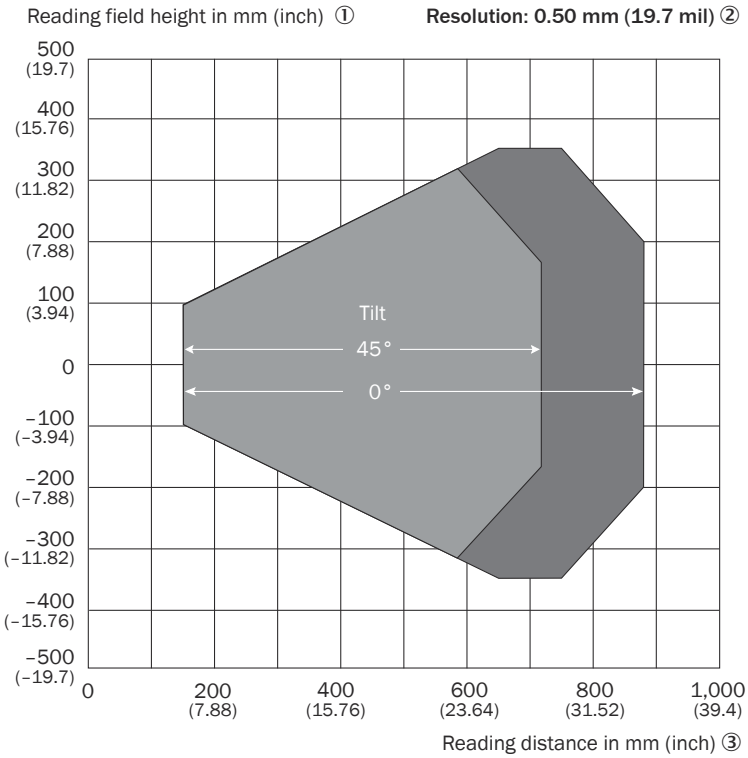


Figure 132: Reading field diagram for CLV651-6xx0, low density, line with oscillating mirror, glass viewing window, on the side, tilt angle 45 ° and 0 °

① Reading field height in mm (inch)

② Resolution: 0.50 mm (19.7 mil)

③ Reading distance in mm (inch)

14.6.4.3 CLV650 / CLV651: Dynamic depth of field ranges

NOTE

The red reading field diagrams depict fixed reading areas. The black and white depth of field diagrams that follow depict dynamic areas.

- The red reading field diagrams show the available reading fields for a fixed focus position, depending on the resolution. The reading fields extend along the reading distance. This is based on a fixed aperture angle of the device. The aperture angle determines the usable area within the scan line.
- The black and white diagrams of the CLV650 and CLV651 show the depth of field (DOF) available there along the reading distance for a selected focus position. The depth of field is shown here as a function of two different aperture angles. If a smaller aperture angle is used, this results in a larger depth of field range.

Interpretation aid for the CLV65x diagrams

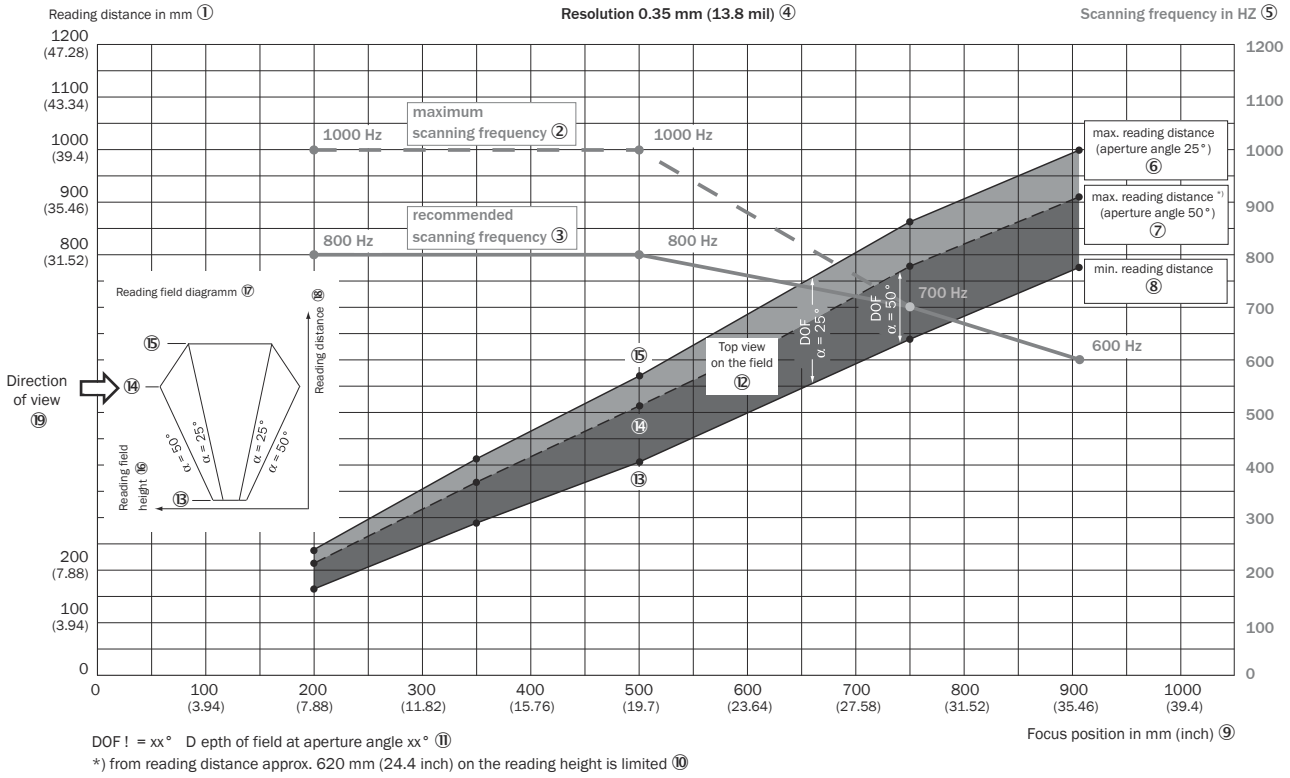


Figure 133: Meaning of the marks ⑬, ⑭ and ⑮ in the reading field diagram ⑰ in relation to the depth of field diagram

① Reading distance in mm (inch)

② Maximum scanning frequency

③ Recommended scanning frequency

④ Resolution 0.35 mm (13.8 mil)

⑤ Scanning frequency in Hz

⑥ Maximum reading distance (25° aperture angle)

⑦ Maximum reading distance (50° aperture angle)

⑧ Minimum reading distance

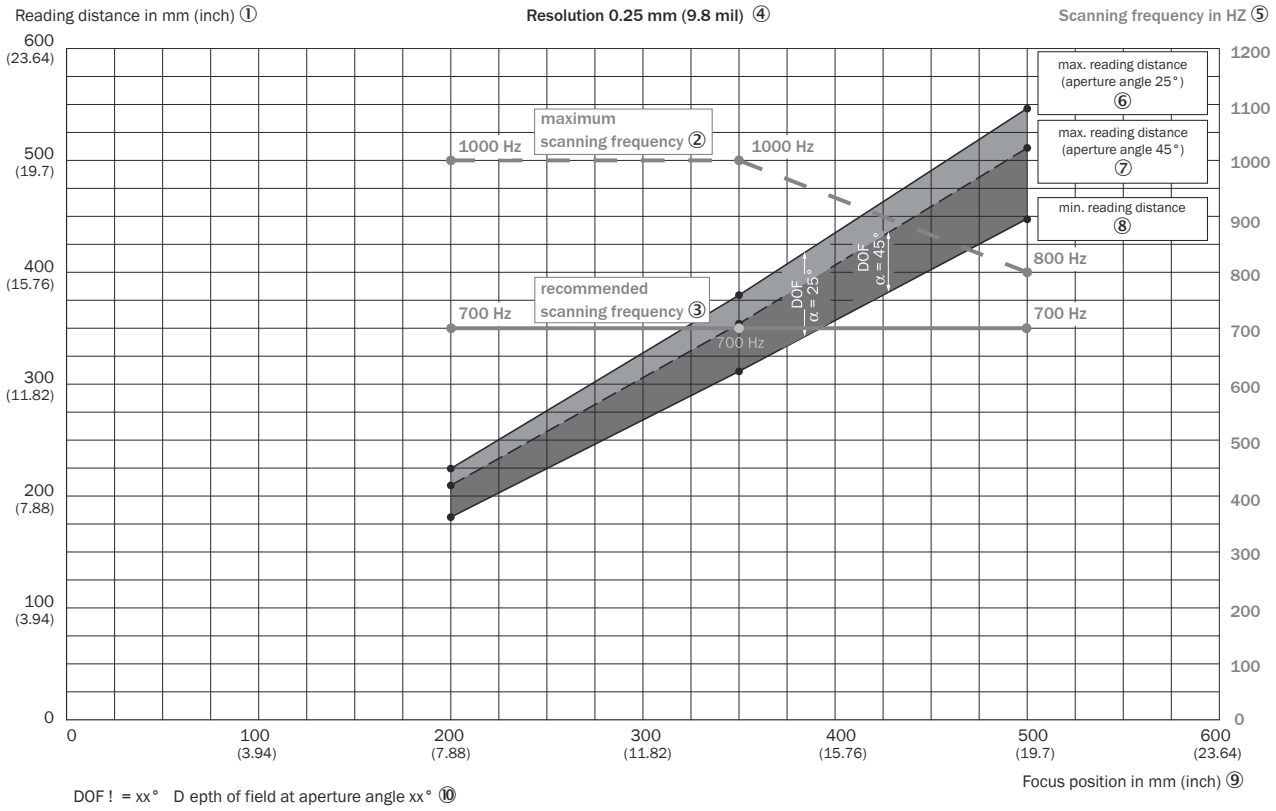
⑨ Focus position in mm (inch)

⑩ *) beyond a reading distance of approx. 620 mm (24.4 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°
⑫ View of the reading field from above
⑬ Reference, see small graphic on the left in the figure
⑭ Reference, see small graphic on the left in the figure
⑮ Reference, see small graphic on the left in the figure
⑯ Reading field height
⑰ Reading field diagram
⑱ Reading distance
⑲ Direction of view on the reading field diagram

Purpose of the small graphic in the depth of field diagram above:

Top view on the depth of field diagram at any focus position ⑫: The marks ⑬, ⑭ and ⑮ can be transferred to the depth of field diagram.

CLV650 line scanner with front viewing window

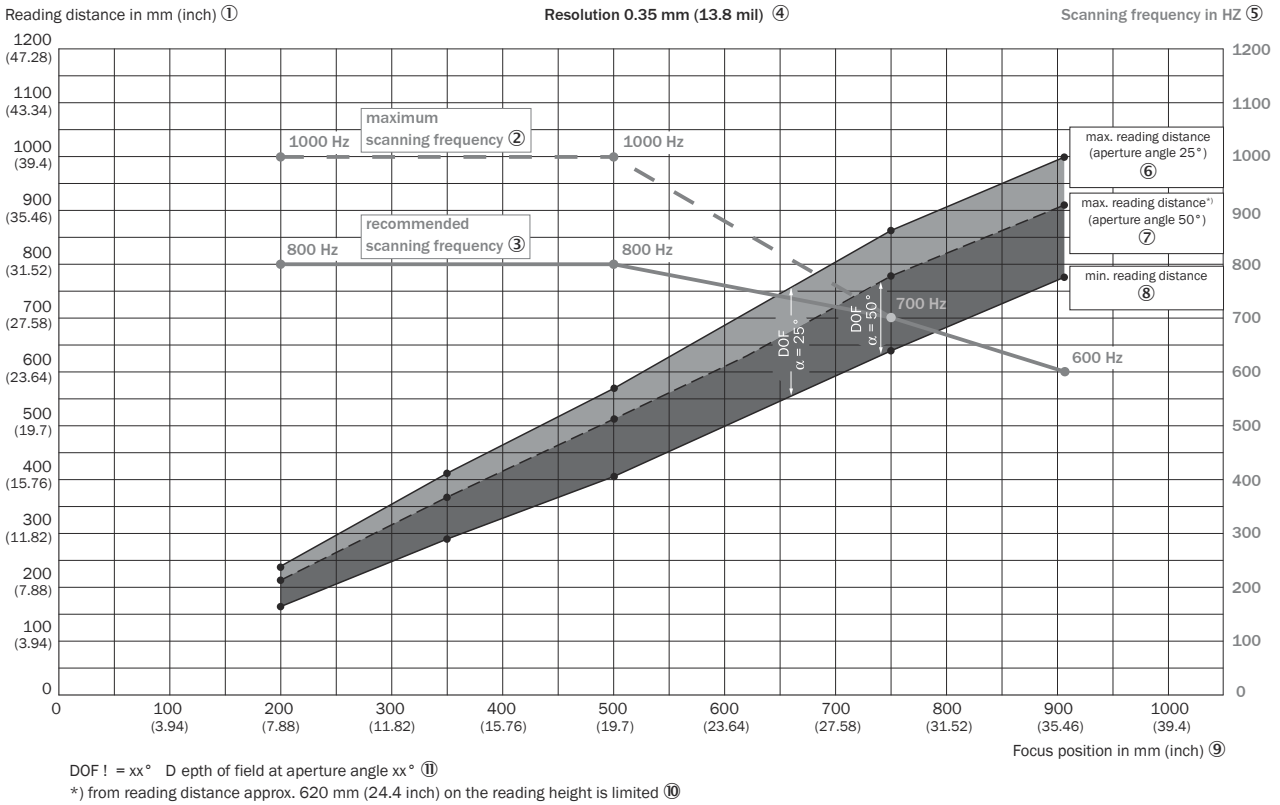


Depth of field ranges of the CLV650 line scanner with reading window: Resolution 0.25 mm (9.8 mil)

Figure 134: Depth of field ranges of the CLV650-1xx0, line scanner (line), 0.25 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.25 mm (9.8 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (45° aperture angle)

⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ Depth of field at aperture angle xx°

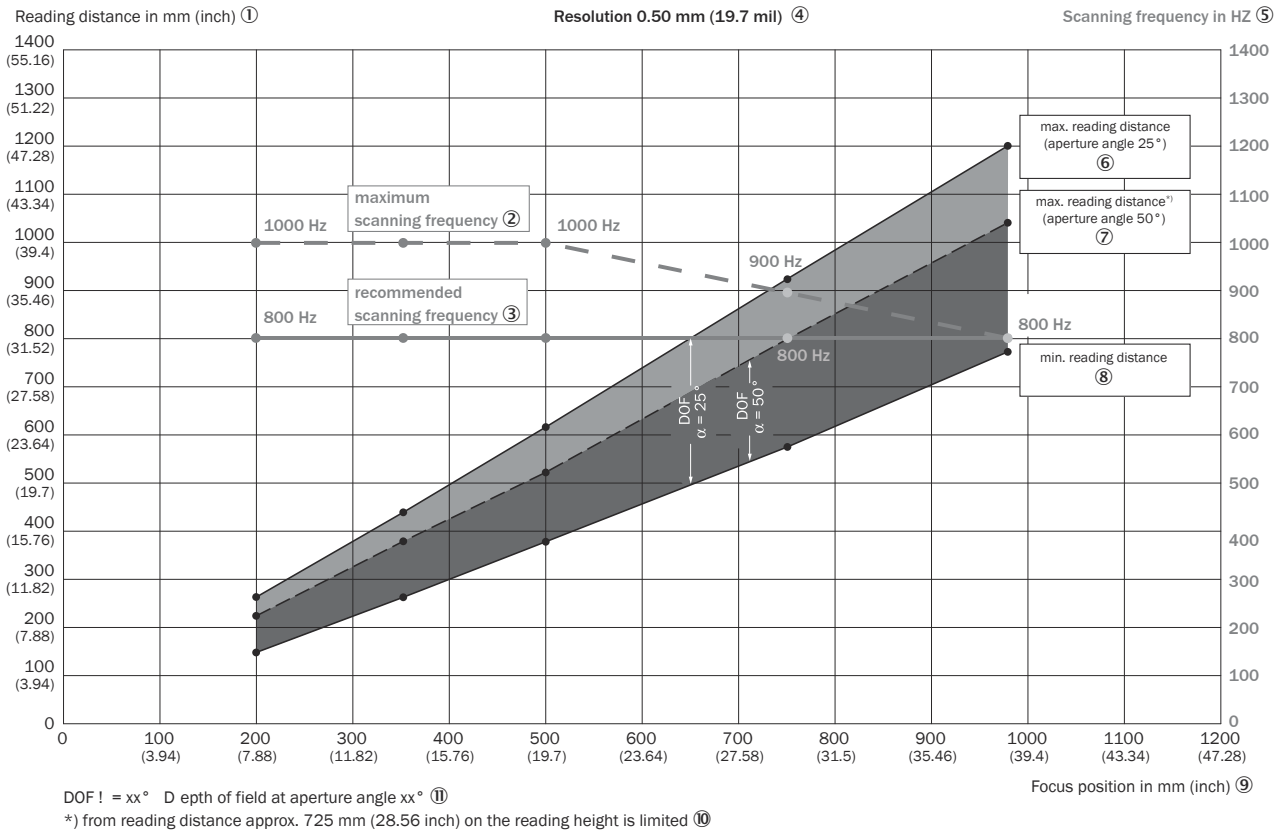


DOF ! = xx° D epth of field at aperture angle xx° ⑪
*) from reading distance approx. 620 mm (24.4 inch) on the reading height is limited ⑩

Depth of field ranges of the CLV650 line scanner with front reading window: Resolution 0.35 mm (13.8 mil)

Figure 135: Depth of field ranges of the CLV650-1xx0, line scanner (line), 0.35 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

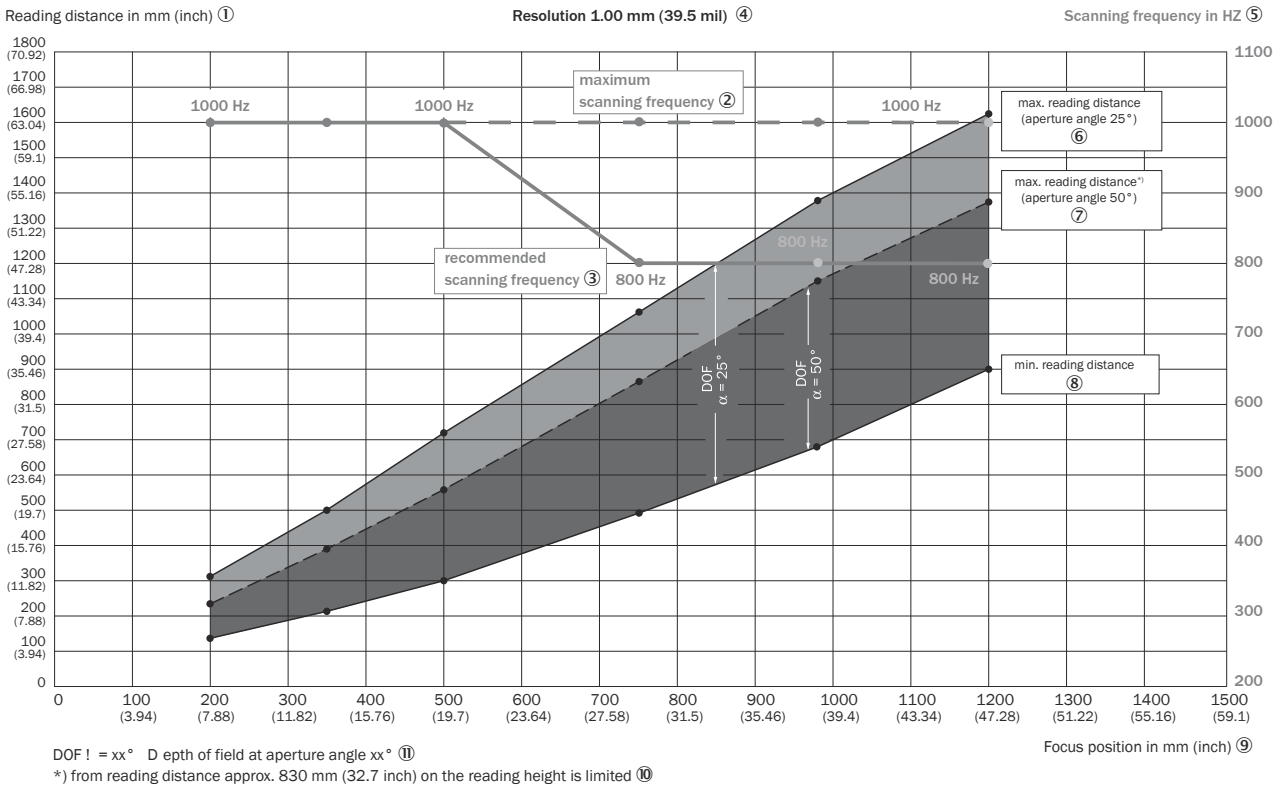
① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.35 mm (13.8 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 620 mm (24.4 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°



Depth of field ranges of the CLV650 line scanner with front reading window: Resolution 0.50 mm (19.7 mil)

Figure 136: Depth of field ranges of the CLV650-1xx0, line scanner (line), 0.50 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 725 mm (28.56 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°

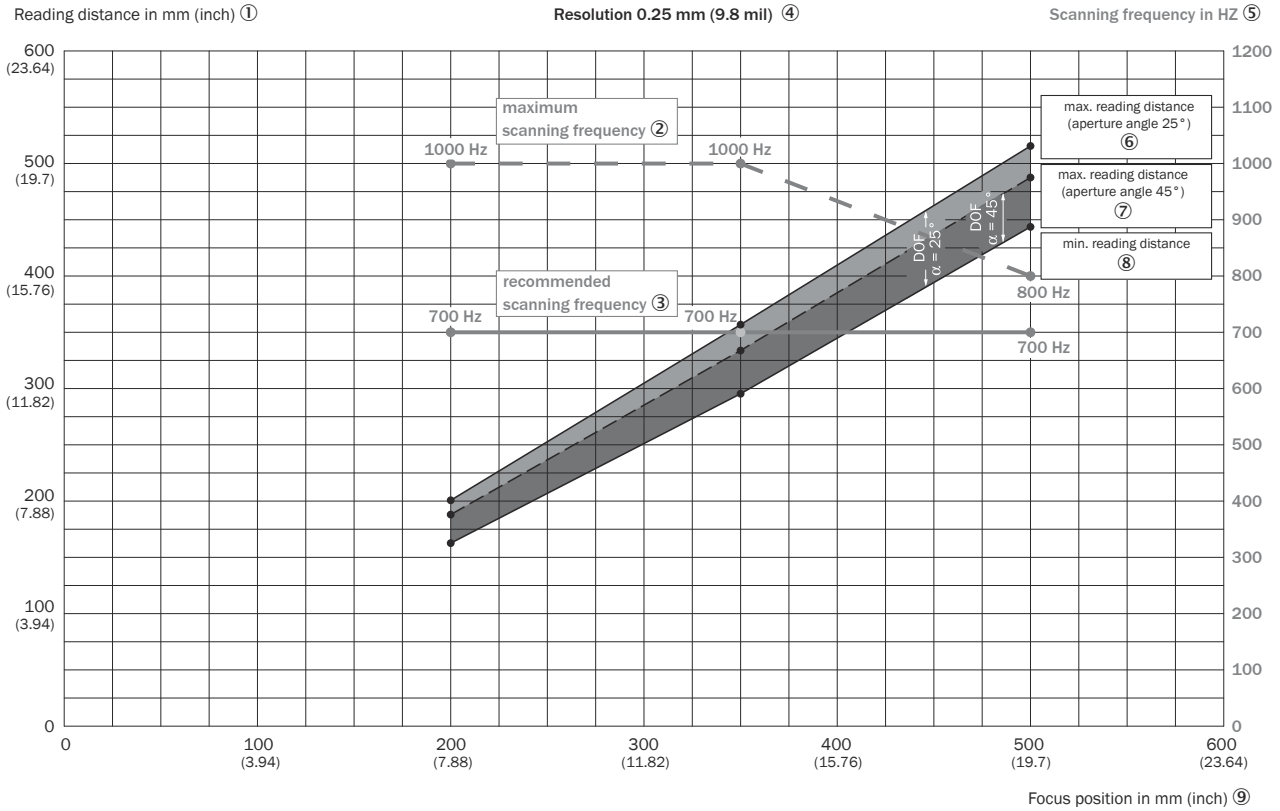


Depth of field ranges of the CLV650 line scanner with front reading window: Resolution 1.00 mm (39.5 mil)

Figure 137: Depth of field ranges of the CLV650-1xx0, line scanner (line), 1.00 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 1.00 mm (39.5 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 830 mm (32.7 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°

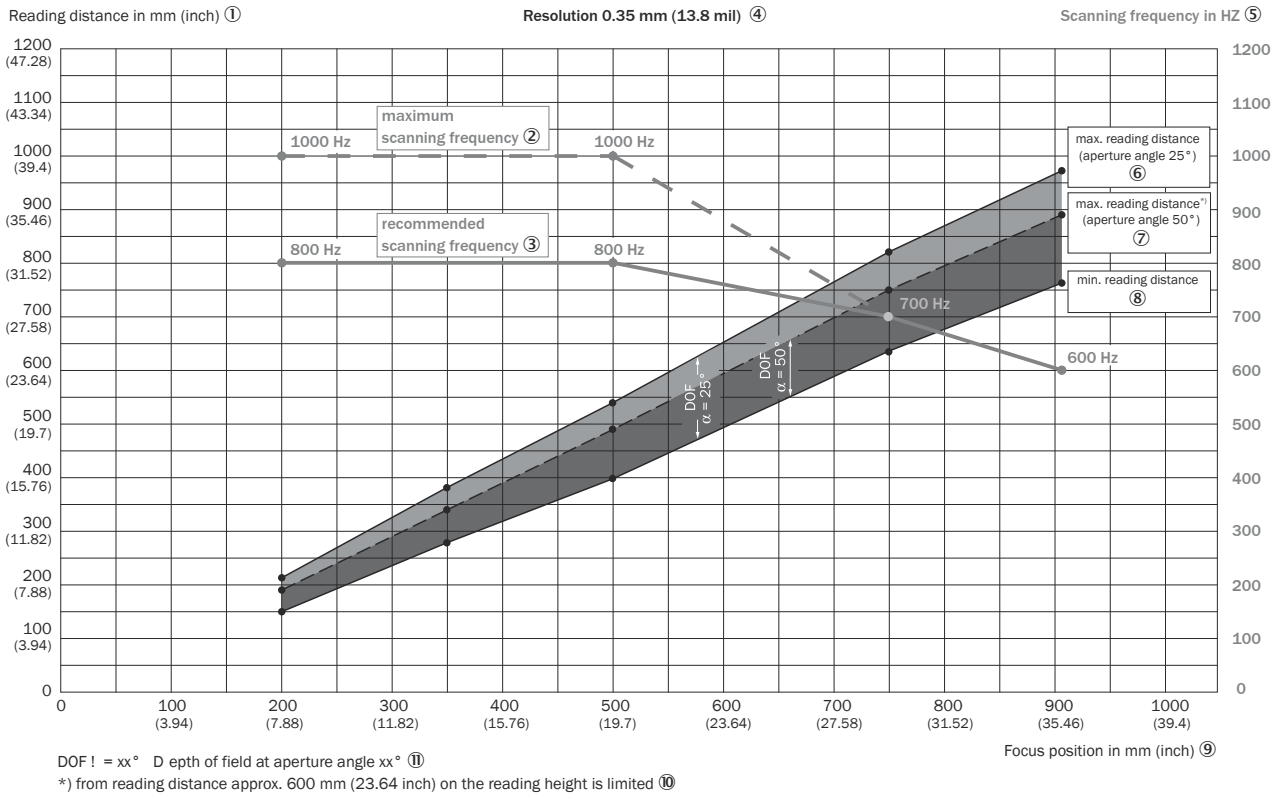
CLV650 line scanner with oscillating mirror and side viewing window



Depth of field ranges of the CLV650 line scanner with oscillating mirror (side reading window: Resolution 0.25 mm (9.8 mil); aperture angle 25°/45°

Figure 138: Depth of field ranges of the CLV650-6xx0, 0.25 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

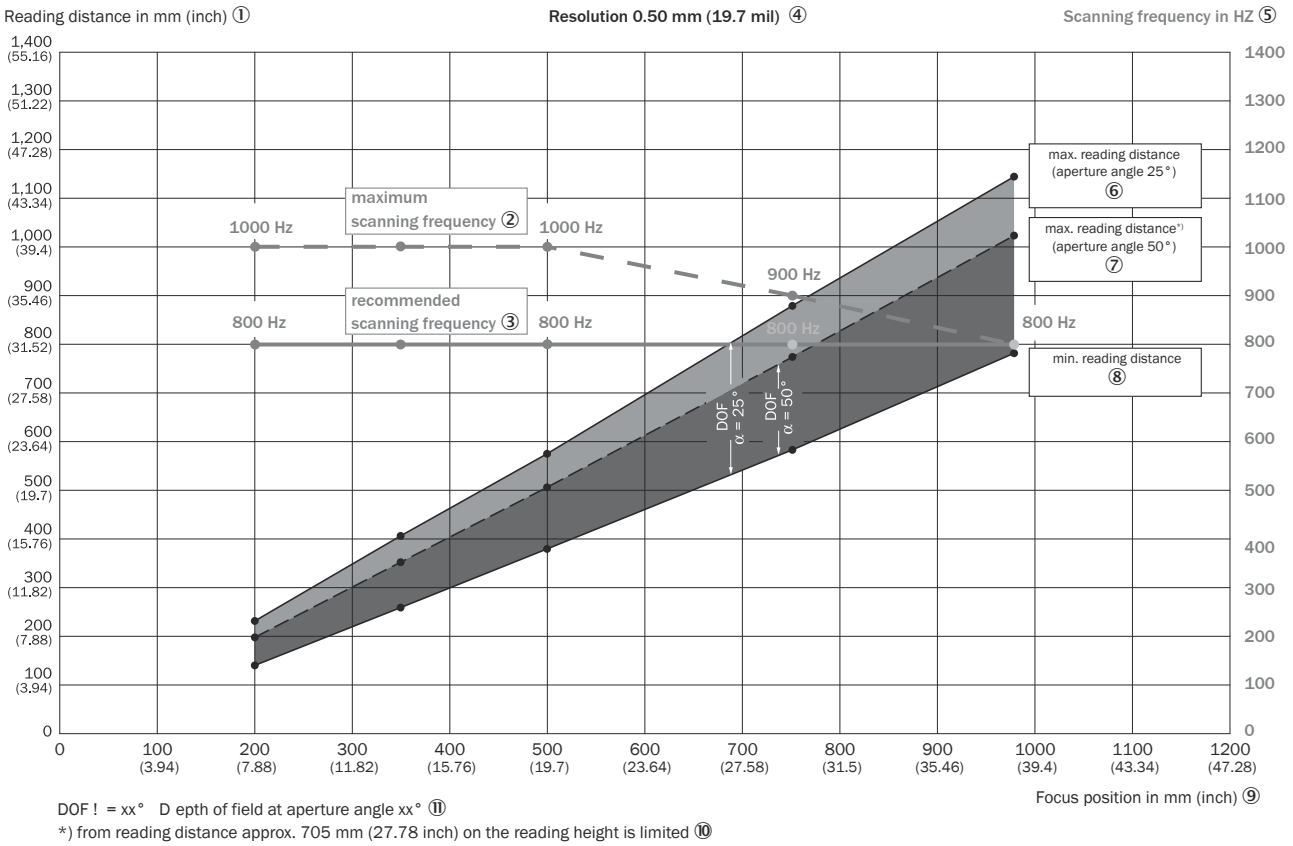
① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.25 mm (9.8 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (45° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ Depth of field at aperture angle xx°



Depth of field ranges of the CLV650 line scanner with oscillating mirror: Resolution 0.35 mm (13.8 mil)

Figure 139: Depth of field ranges of the CLV650-6xx0, 0.35 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

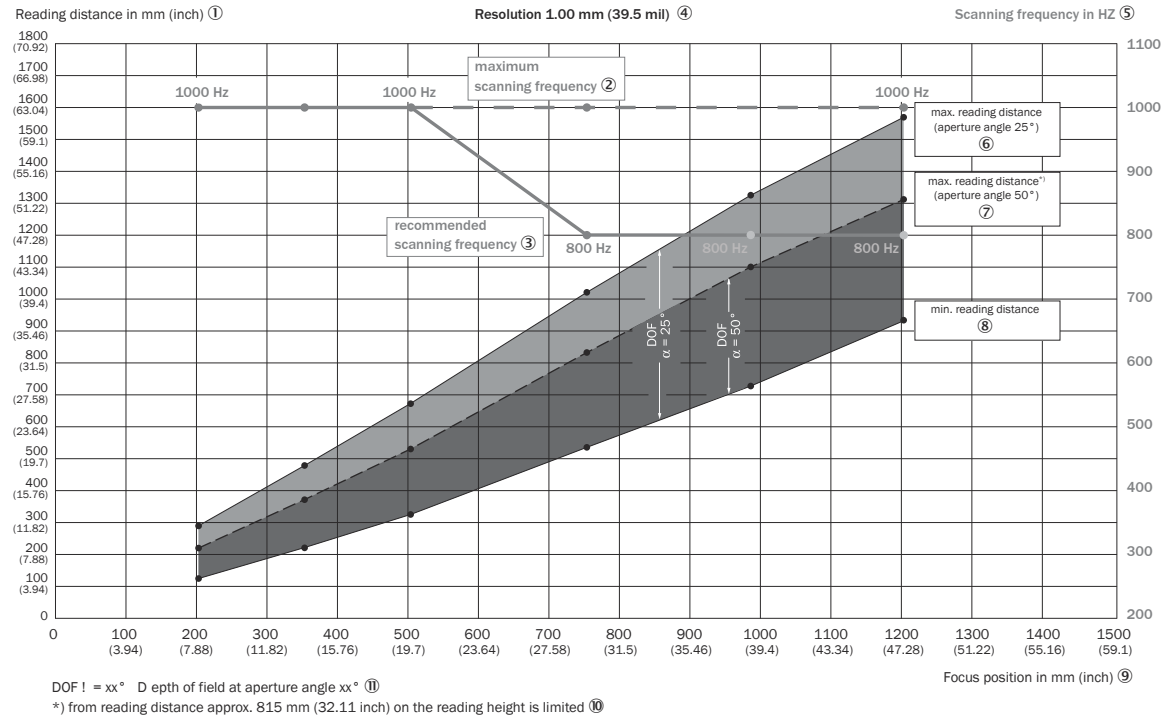
① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.35 mm (13.8 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 600 mm (23.64 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°



Depth of field ranges of the CLV650 line scanner with oscillating mirror: Resolution 0.50 mm (19.7 mil)

Figure 140: Depth of field ranges of the CLV650-6xx0, 0.50 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 705 mm (27.78 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°

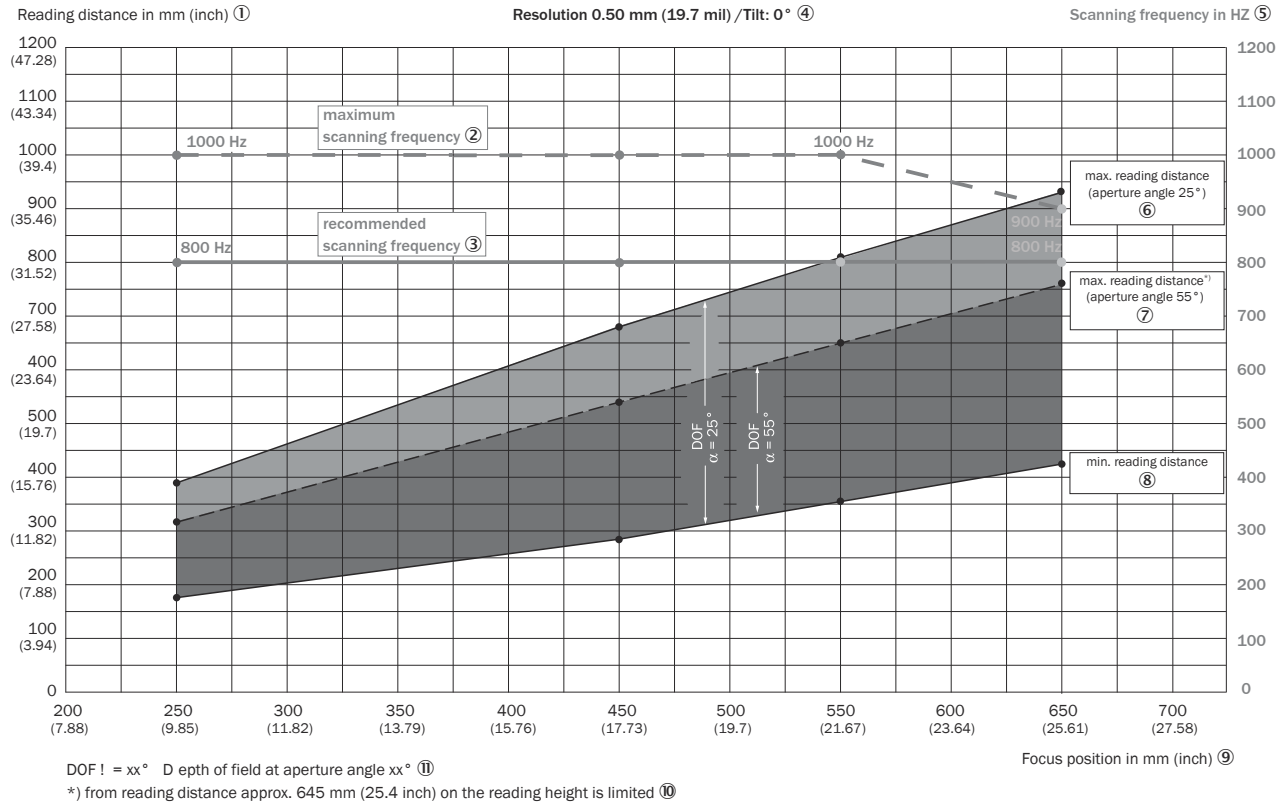


Depth of field ranges of the CLV650 line scanner with oscillating mirror: Resolution 1.00 mm (39.5 mil)

Figure 141: Depth of field ranges of the CLV650-6xx0, 1.00 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of focus position and aperture angle

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 1.00 mm (39.5 mil)
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (50° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 815 mm (32.11 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°

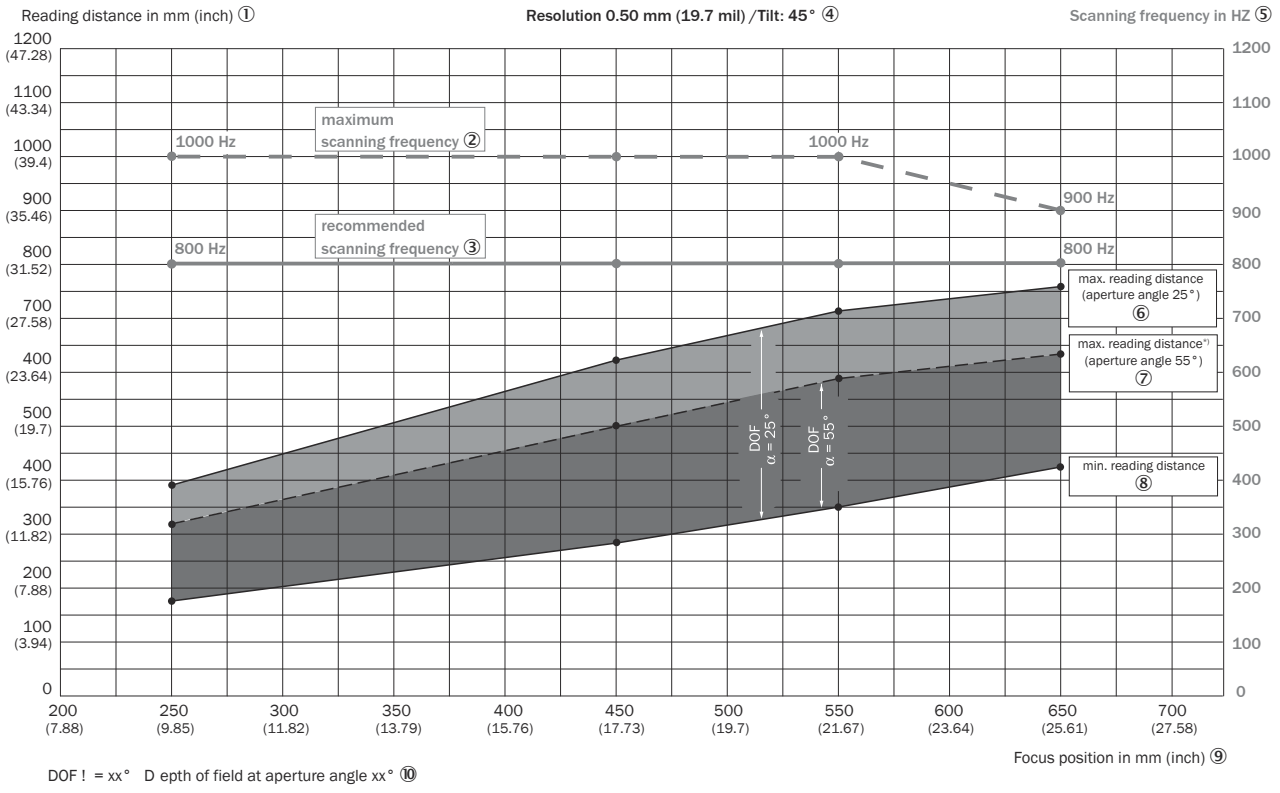
CLV651 line scanner with front viewing window



Depth of field ranges of the CLV651 line scanner with front reading window: Resolution 0.5 mm (19.7 mil); inclination angle 0°; aperture angle 25°/55°

Figure 142: Depth of field ranges of the CLV651-1xx0, line scanner (line), 0.50 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of the focus position and aperture angle. Tilt angle 0°, aperture angle 25° or 55°

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil) / tilt 0°
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (55° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 645 mm (25.4 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°

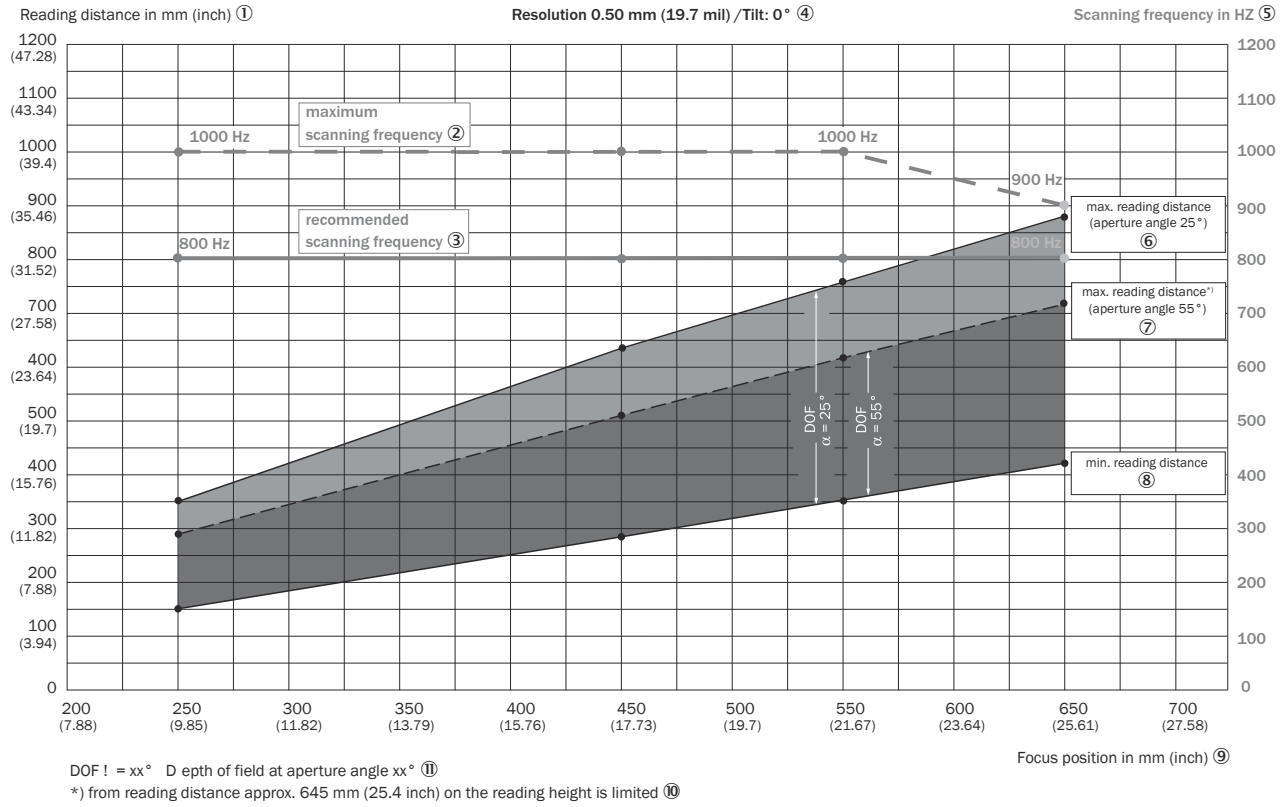


Depth of field ranges of the CLV651 line scanner with front reading window: Resolution 0.5 mm (19.7 mil); inclination angle 45°; aperture angle 25°/55°

Figure 143: Depth of field ranges of the CLV651-1xx0, line scanner (line), 0.50 mm resolution, glass viewing window, at the front. Minimum and maximum reading distance as a function of the focus position and aperture angle. Tilt angle 45°, aperture angle 25° or 55°

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil) / Tilt 45°
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (55° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ Depth of field at aperture angle xx°

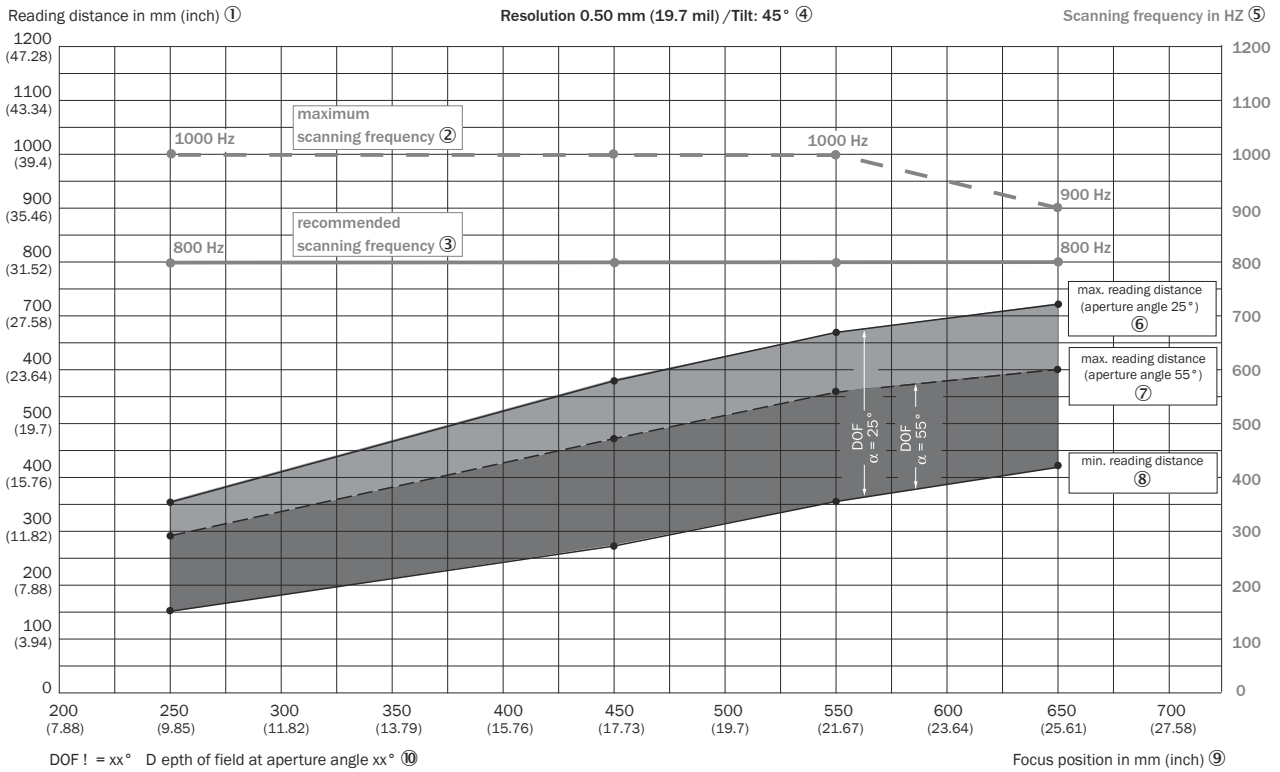
CLV651 line scanner with oscillating mirror and side viewing window



Depth of field ranges of the CLV651 line scanner with oscillating mirror (side reading window: Resolution 0.5 mm (19.7 mil); inclination angle 0°; aperture angle 25°/55°

Figure 144: Depth of field ranges of the CLV651-6xx0, 0.50 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of the focus position and aperture angle. Tilt angle 0°, aperture angle 25° or 55°

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil) / tilt 0°
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (55° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ *) beyond a reading distance of approx. 645 mm (25.4 inch), the reading field height is restricted
⑪ Depth of field at aperture angle xx°



Depth of field ranges of the CLV651 line scanner with oscillating mirror (side reading window: Resolution 0.5 mm (19.7 mil); inclination angle 45°; aperture angle 25°/55°

Figure 145: Depth of field ranges of the CLV651-6xx0, 0.50 mm resolution, line with oscillating mirror, glass viewing window, on the side. Minimum and maximum reading distance as a function of the focus position and aperture angle. Tilt angle 45°, aperture angle 25° or 55°

① Reading distance in mm (inch)
② Maximum scanning frequency
③ Recommended scanning frequency
④ Resolution 0.50 mm (19.7 mil) / Tilt 45°
⑤ Scanning frequency in Hz
⑥ Maximum reading distance (25° aperture angle)
⑦ Maximum reading distance (55° aperture angle)
⑧ Minimum reading distance
⑨ Focus position in mm (inch)
⑩ Depth of field at aperture angle xx°

14.6.5 Reading field diagrams for the devices in the IP69K protective housing

The reading fields of the CLV63x and CLV64x in the IP69K protective housing differ from the devices in the IP65 standard housing as follows:

- **Position in front of the device**: The distance between the reading field and the edge of the housing is smaller for the devices in the IP69K protective housing than for the devices in the standard housing. The reason for this is the longer light path in the IP69K protective housing.
- **Depth of field**: For the devices in the IP69K protective housing, the depth of field is reduced by approx. 10%. This is due to a reduction in the reading fields at all module widths by 5% on both sides. The reason is the plastic viewing window.

For the devices in the IP69K protective housing, the distance between the viewing window and the edge of the housing is reduced as follows:

- Fixed mount bar code scanner with front viewing window: 10.7 mm
- Fixed mount bar code scanner with oscillating mirror and side viewing window: 11.16 mm

This is the reduction in distance relative to the viewing window (glass) of a device in the IP65 standard housing.

Example: Reading fields of the CLV631 with front viewing window

The following table compares by way of example: the reading fields of two comparable fixed mount bar code scanners with a front viewing window.

Table 34: CLV631 reading fields with front viewing window

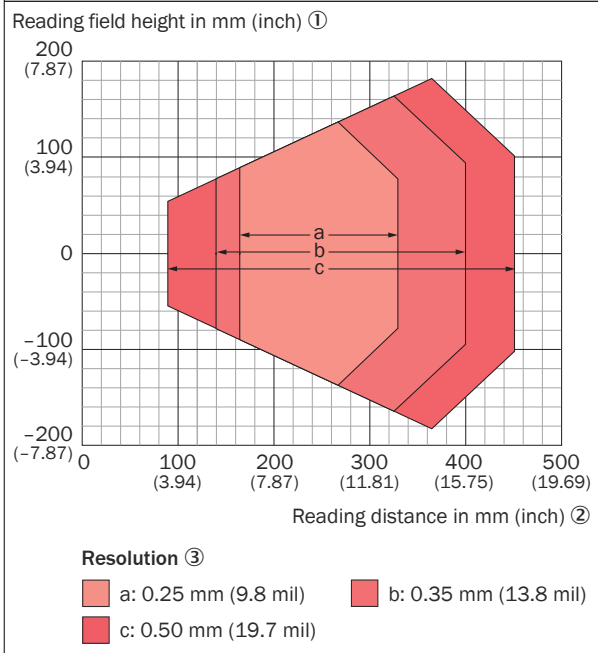
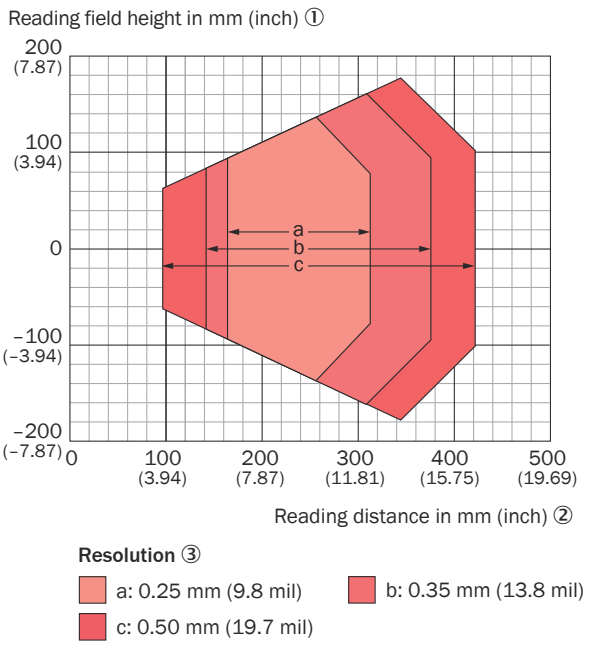
CLV631 in standard housing	CLV631 in IP69K protective housing
	

Figure 146: Reading field diagram of CLV631-0120, front viewing window (glass)

① Reading field height in mm (inch)
② Reading distance in mm (inch)
③ Resolution

Figure 147: Reading field diagram of CLV631-0831S01, front viewing window (plastic)

① Reading field height in mm (inch)
② Reading distance in mm (inch)
③ Resolution

Example: Reading fields of CLV631 with oscillating mirror and side viewing window

The following table compares by way of example: the reading fields of two comparable fixed mount bar code scanners with oscillating mirror and side viewing window.

Table 35: Reading fields of CLV631 with oscillating mirror and side viewing window

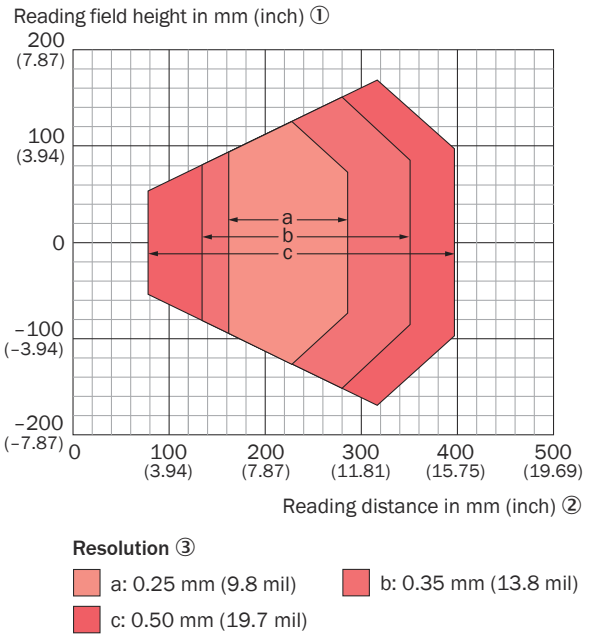
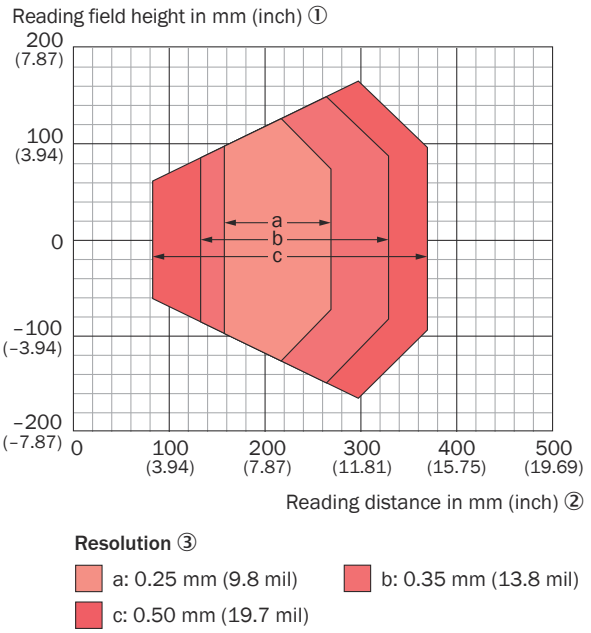
CLV631 in IP65 standard housing	CLV631 in IP69K protective housing
	

Figure 148: Reading field diagram of CLV631-6120, oscillating mirror and side viewing window (glass)

Figure 149: Reading field diagram of CLV631-6831S01, oscillating mirror and side viewing window (plastic)

① Reading field height in mm (inch)
② Reading distance in mm (inch)
③ Resolution

Display of reading field diagrams in SOPAS ET

The SOPAS ET configuration software only displays the reading field diagrams of the bar code scanners in the standard housing. The diagrams therefore do not realistically depict the restricted and shifted reading ranges of the bar code scanners in the IP69K protective housing.

NOTE

As a rule of thumb: The depth of field is reduced by approx. 10% for devices with a plastic viewing window.

14.7 Connection diagrams of connection module CDB620-001

14.7.1 Connection of the device to CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8).

Device = CLV65x-xYxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

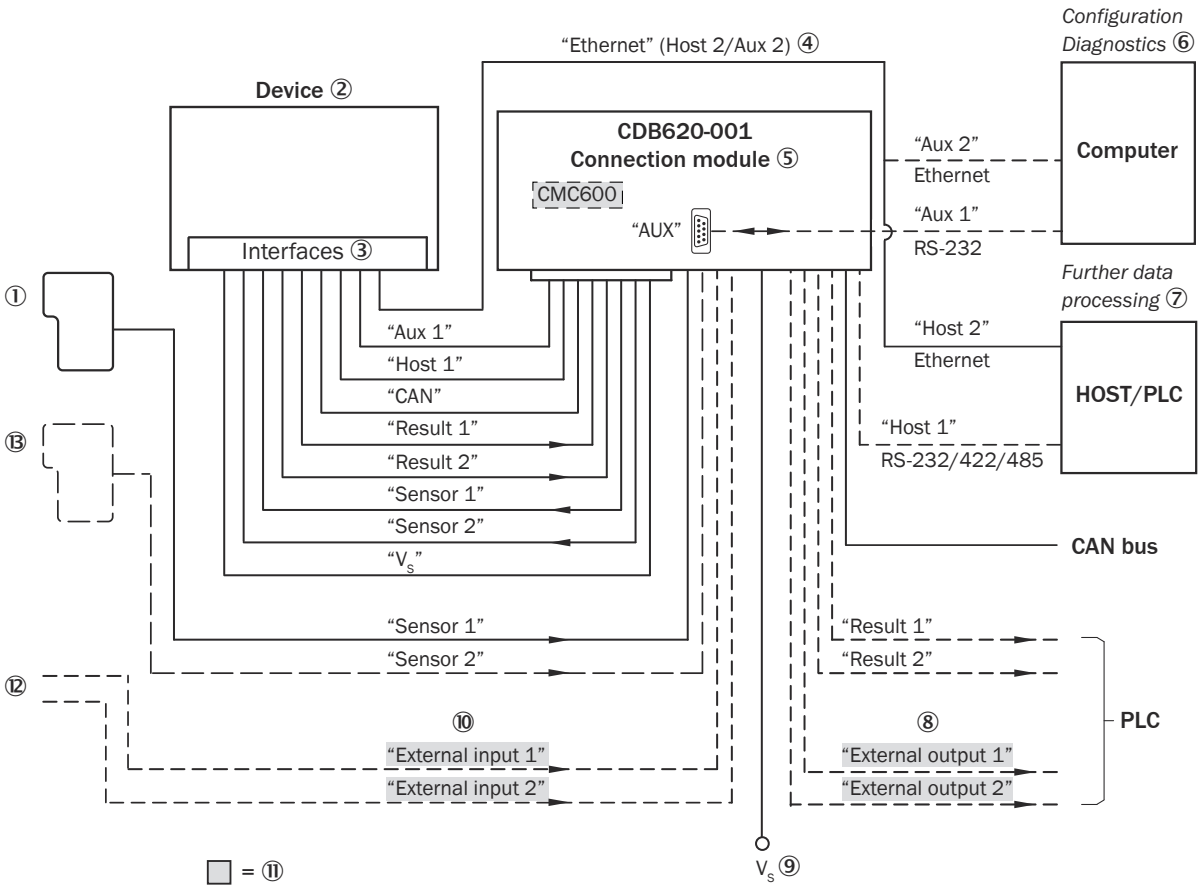


Figure 150: Connection of the device to peripherals via CDB620-001 (overview)

① External trigger sensor, e.g., for read cycle generation
② Device
③ Interfaces
④ Ethernet, omitted for CLV63x / 64x / 65x-x0xxx (serial variant).
⑤ Connection module
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital outputs
⑨ Supply voltage V_S
⑩ External digital inputs
⑪ The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑫ Other functions
⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

14.7.2 Wiring overview of the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used

Device =CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device =CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used

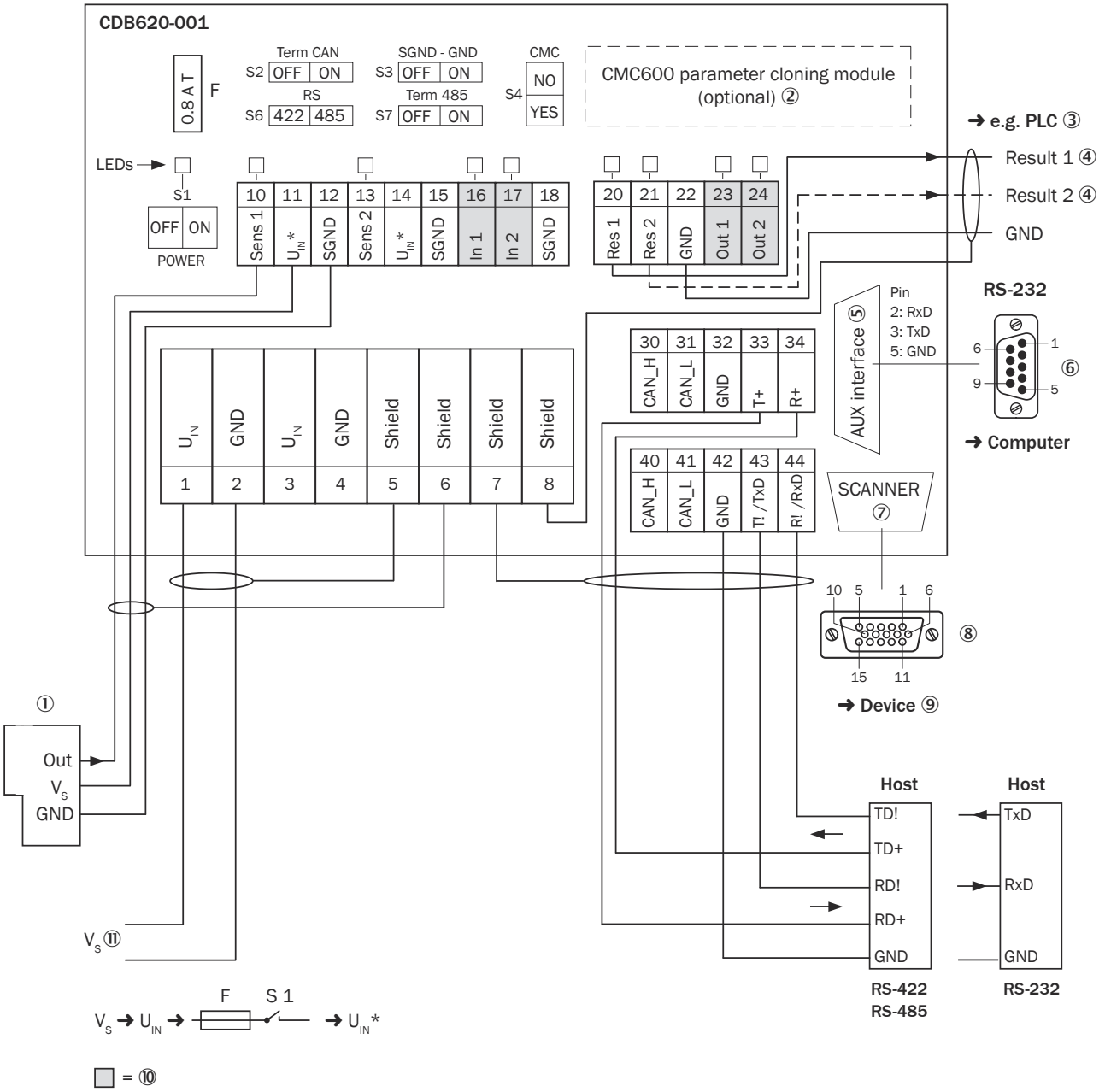


Figure 151: Overview: connection of device (without heating) and peripherals to the CDB620-001 connection module.

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 SCANNER = Device
⑧ Female connector, D-Sub-HD, 15-pin
⑨ Device to be connected
⑩ The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑪ Supply voltage V_S

14.7.3 Connecting supply voltage for the device in CDB620-001

Device:

- **CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)**
- **CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating**
- **CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)**
- **CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)**
- **CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating**

NOTE

For devices with external heating, connect both components in the connection module to the supply voltage.

Connection diagram see "Connecting devices with heating to connection modules", page 65.

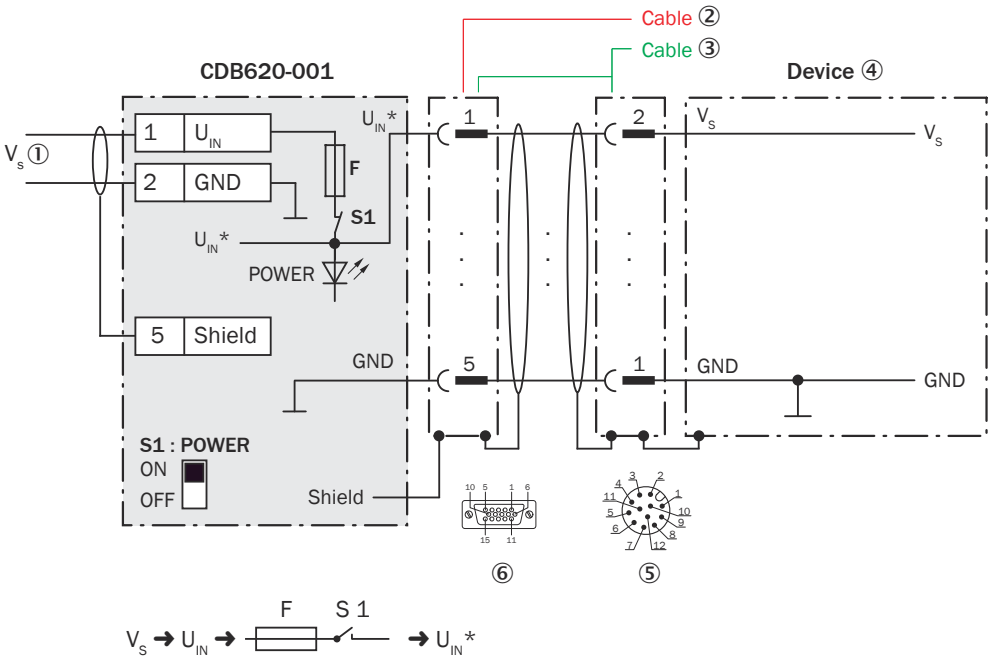


Figure 152: Connecting supply voltage for the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

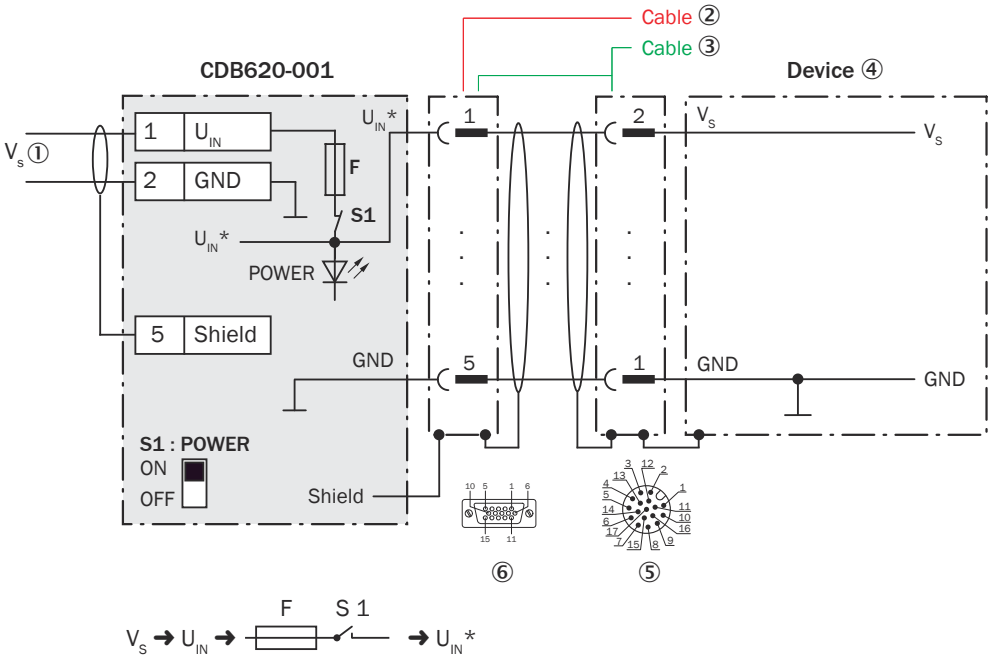


Figure 153: Connecting supply voltage for the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Supply voltage V_S

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Device

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

⑥ Connection module: female connector, D-Sub-HD, 15-pin

Function of switch S1

Table 36: Switch S1: Power

Switch setting	Function
ON	Supply voltage U_{IN} connected to CDB620-001 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	CDB620-001 and device disconnected from supply voltage Recommended setting for all connection work

14.7.4 Wiring serial host interface RS-232 of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

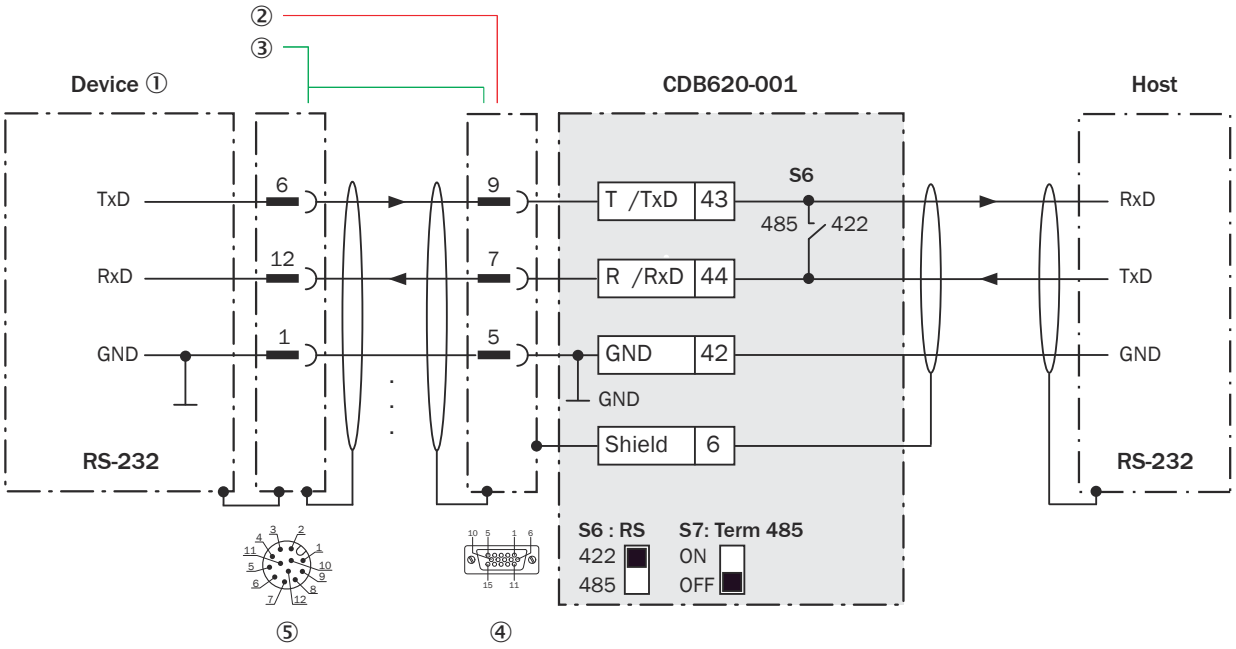


Figure 154: Wiring data interface RS-232 of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

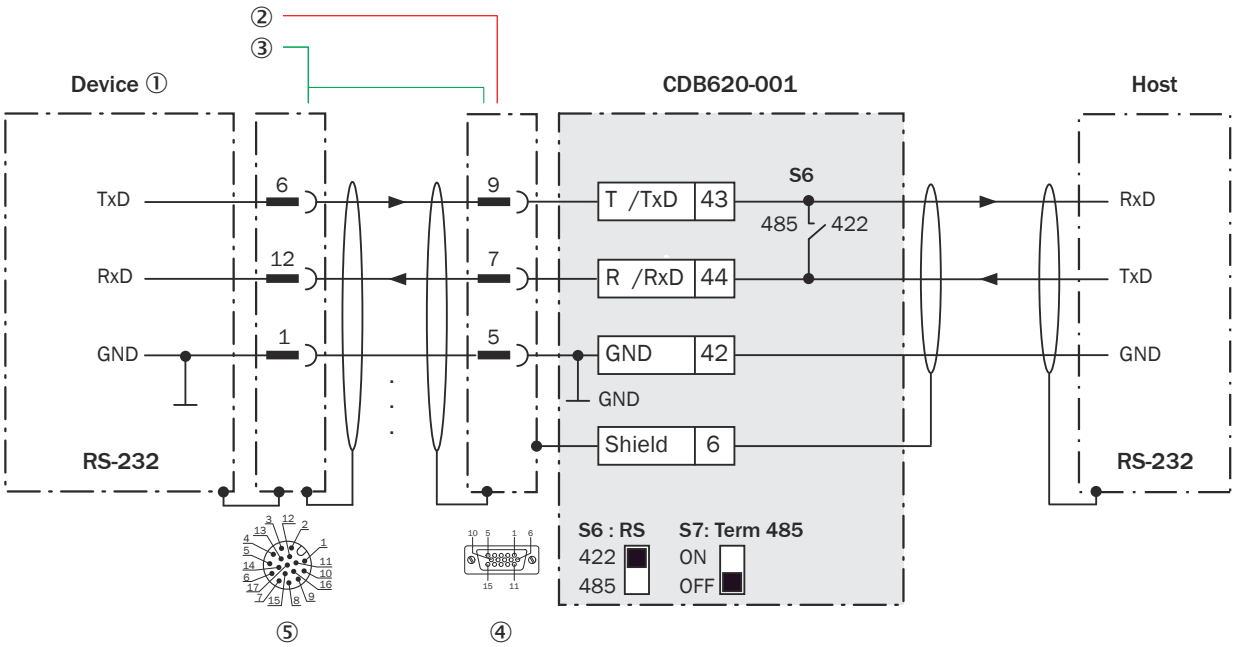


Figure 155: Wiring data interface RS-232 of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): 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.

14.7.5 Wiring serial host interface RS-422 of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8).

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating)

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

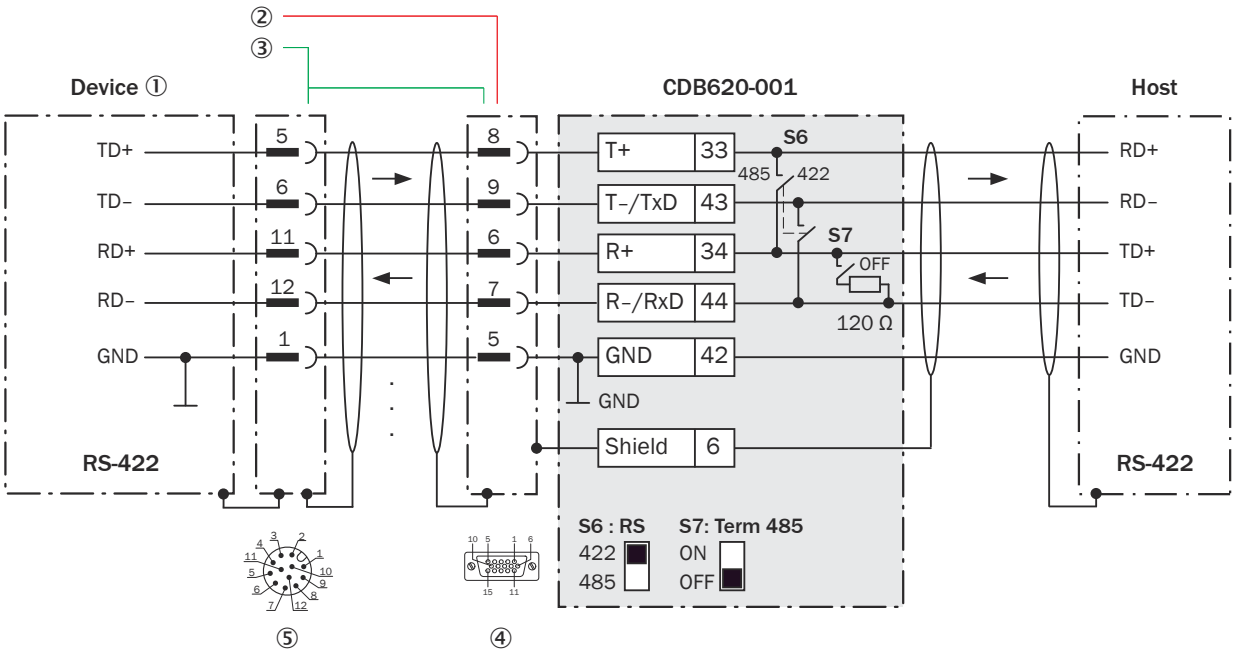


Figure 156: Wiring data interface RS-422 of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

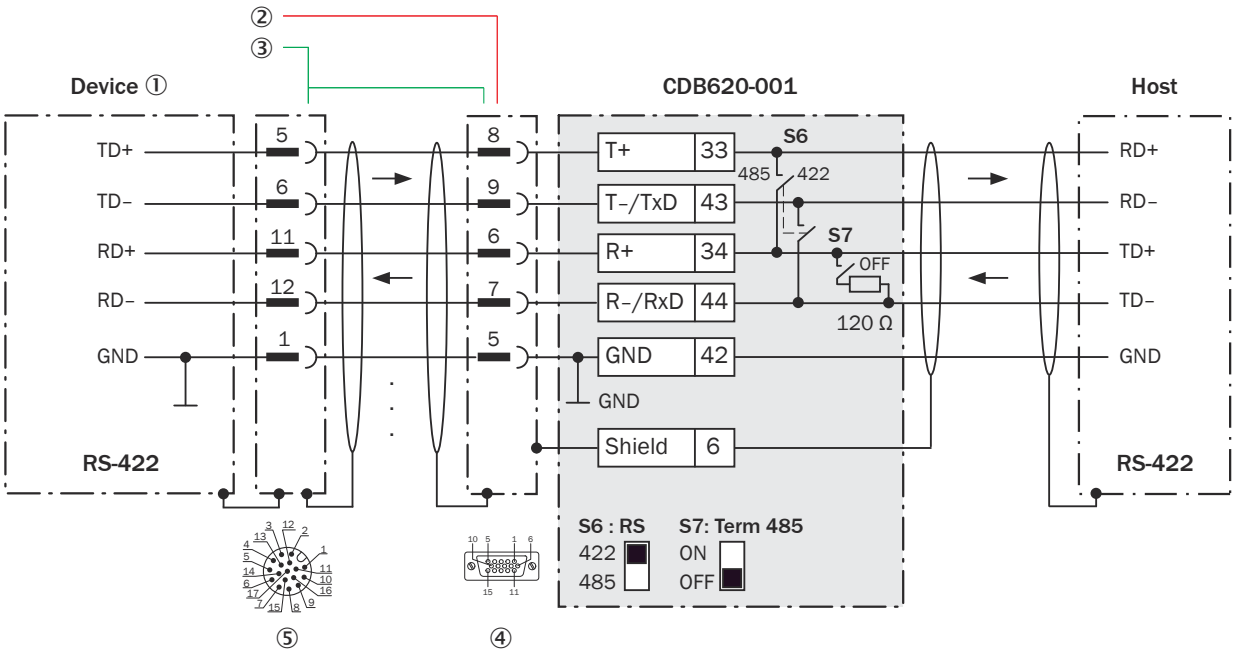


Figure 157: Wiring data interface RS-422 of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S7

Table 37: 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

Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. the configuration software SOPAS ET.

The following requirements or restrictions apply when using the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard in accordance with RS-422 and RS-485.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 operation.

14.7.6 Wiring the RS-485 serial host interface of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heater

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

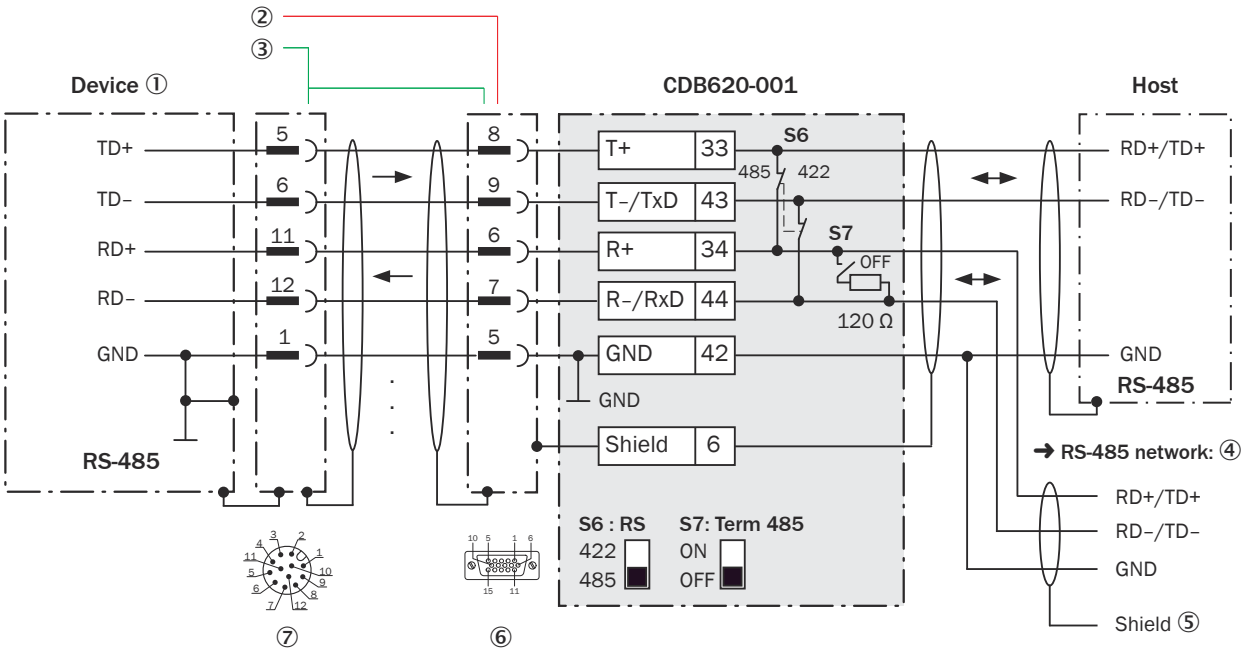


Figure 158: Wiring data interface RS-485 of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

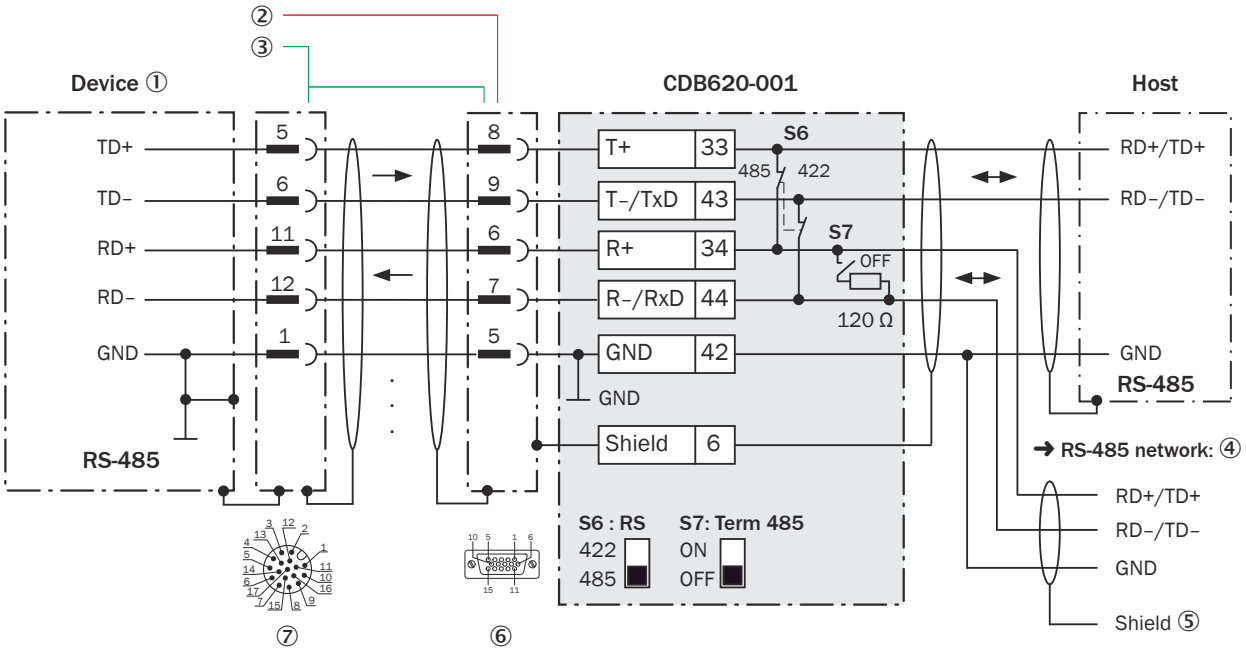


Figure 159: Wiring the RS-485 data interface of the device in the CDB620-001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ RS-485 network

⑤ Shielding

⑥ Connection module: female connector, D-Sub-HD, 15-pin

⑦ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S7

Table 38: Switch S7: Term 485

Switch setting	Function
ON	Terminates the device. Required if the device is located at the end of the RS-485 bus cable.
OFF	No termination

NOTE

Activate the RS-485 data interface (“Bus” option) in the device using a configuration tool, e.g., the SOPAS ET configuration software.

The following requirements or restrictions apply when using the RS-485 data interface:

- The relevant interface drivers for the device comply with the RS-422 and RS-485standard.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- This configuration is not permitted when using the standard data output and protocol of the device. In case of doubt, contact SICK Service.

14.7.7 Wiring the CAN interface in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

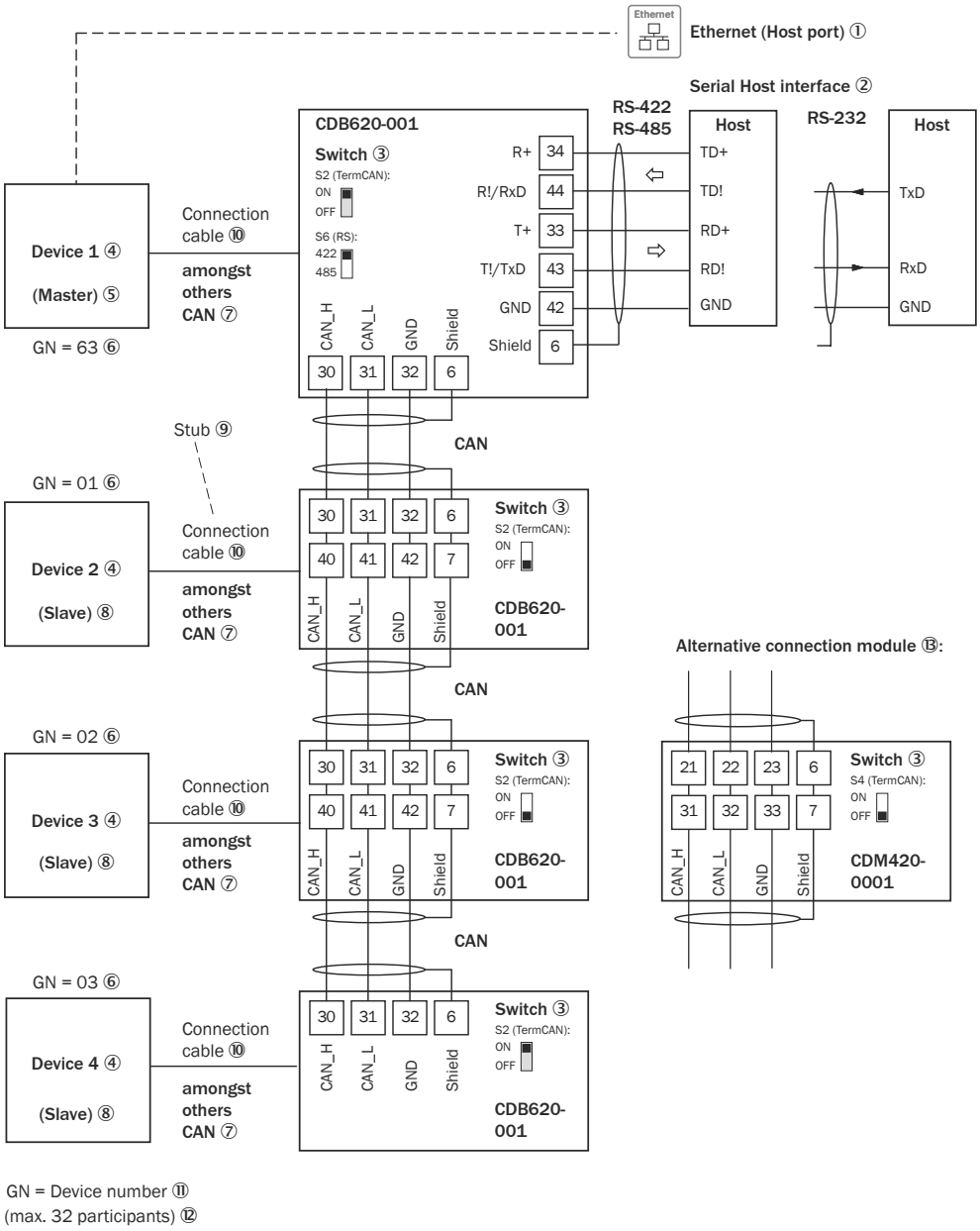


Figure 160: Wire the CAN interface of the device in the CDB620-001 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

① Only CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1 or 8): 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 CLV63x-/CLV64x-/CLV65x-x0xxx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)

⑪ Device number (GN)

⑫ Maximum 32 users

⑬ Example of alternative connection module:

Alternative connection module for CLV63x, CLV64x or CLV65x (Ethernet variant, Y = 1 or 8): CDM420-0001 or CDM420-0006. CDB650-204 only for CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8)

CDM420-0001 or CDM420-0006: An adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1).

CDM420-0001 or CDM420-0006: An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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 CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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.

14.7.8 Wiring digital inputs of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

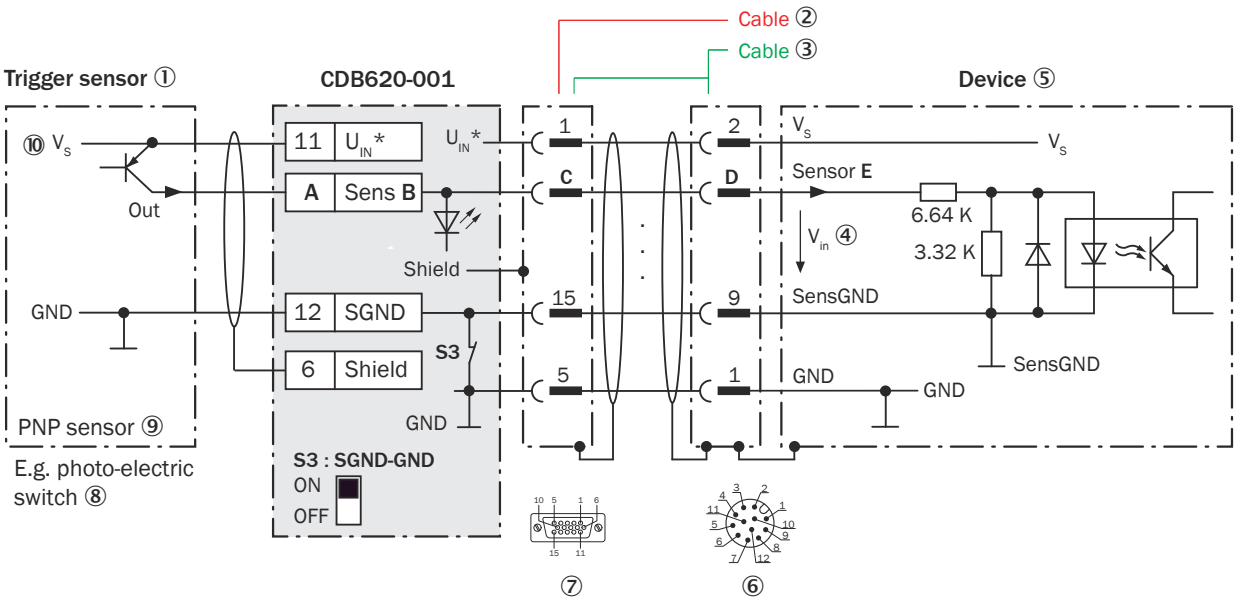


Figure 161: Trigger sensor supplied with power by connection module CDB620-001, Ethernet variant with male connector, M12, 12-pin, A-coded

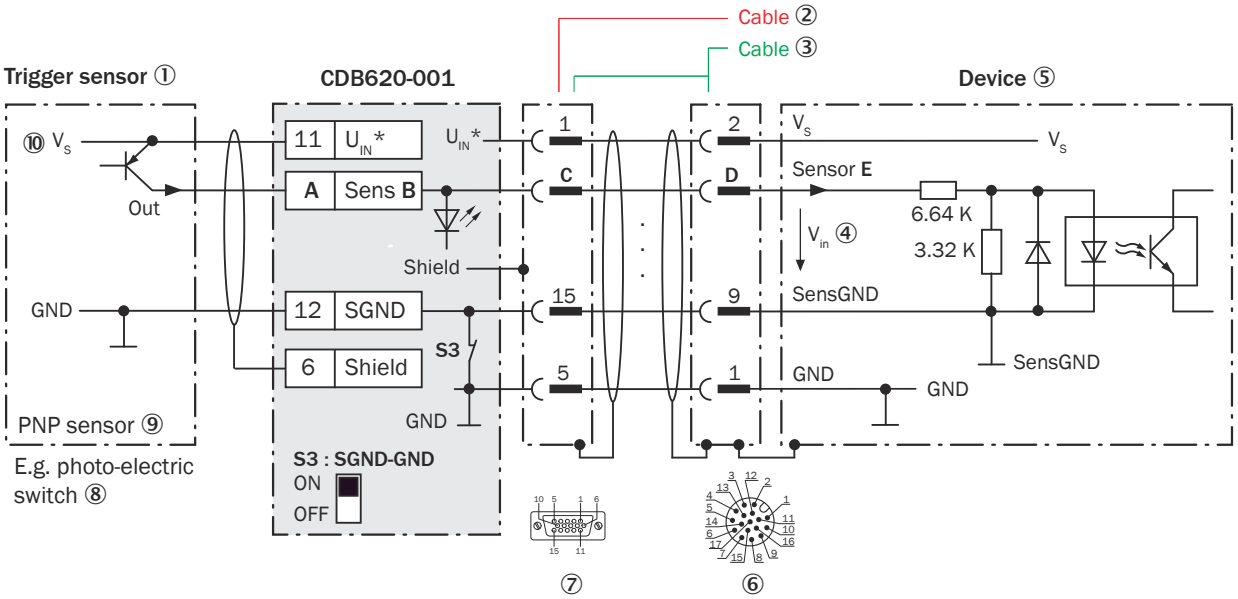


Figure 162: Trigger sensor supplied with power by connection module CDB620-001, Ethernet variant with male connector, M12, 17-pin, A-coded

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

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Input voltage V_{in}

⑤ Device

⑥ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

⑦ Connection module: female connector, D-Sub-HD, 15-pin
⑧ E.g. photoelectric sensor
⑨ PNP sensor
⑩ Supply voltage V_S

NOTE
Reduction of digital inputs due to limited number of contacts in the connector plug of the device.

CLV63x/CLV64x/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The “Sensor 2” digital output is not available.

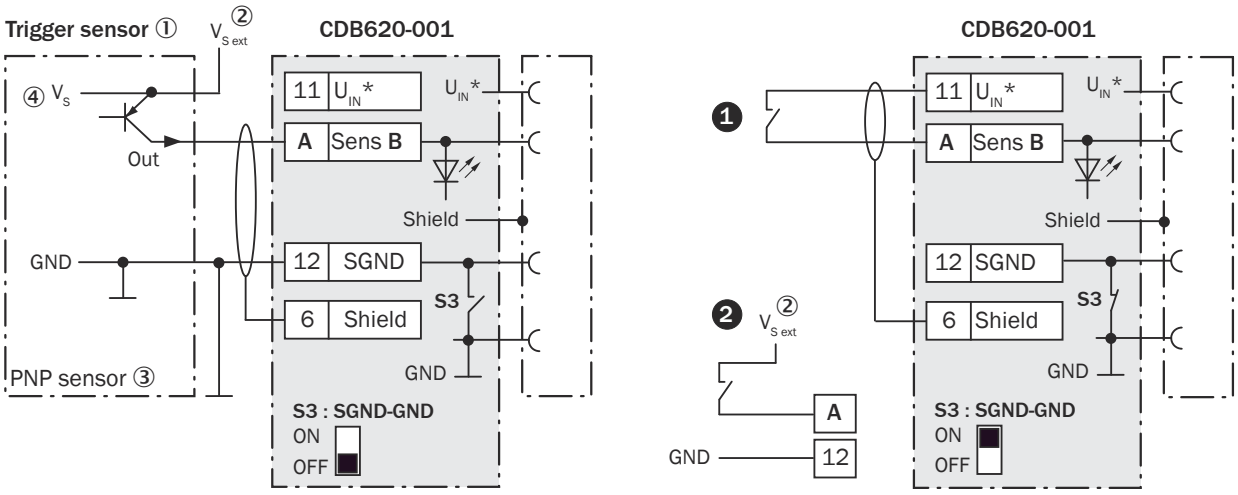


Figure 163: Left: Trigger sensor connected potential-free and supplied with power externally. Right: alternative switch, ❶ supplied with power by connection module CDB620-001 or ❷ connected volt-free and supplied with power externally. Now select switch setting S3 as shown in the left figure.

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 39: Assignment of placeholders to the digital inputs

CDB620-001			Device	
Terminal A	**Signal B**	**Pin C**	**Pin D**	**Sensor E**
10	Sens 1	14	10	1
13	Sens 2	4	15	2

Function of switch S3

Table 40: Switch S3: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor is connected with GND of CDB620-001 and GND of the device
OFF	Trigger sensor is connected volt-free at CDB620-001 and the device. Common, isolated reference potential of all digital inputs is SGND.

Characteristic data of the digital inputs

Table 41: 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.

14.7.9 Wiring the external digital inputs of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

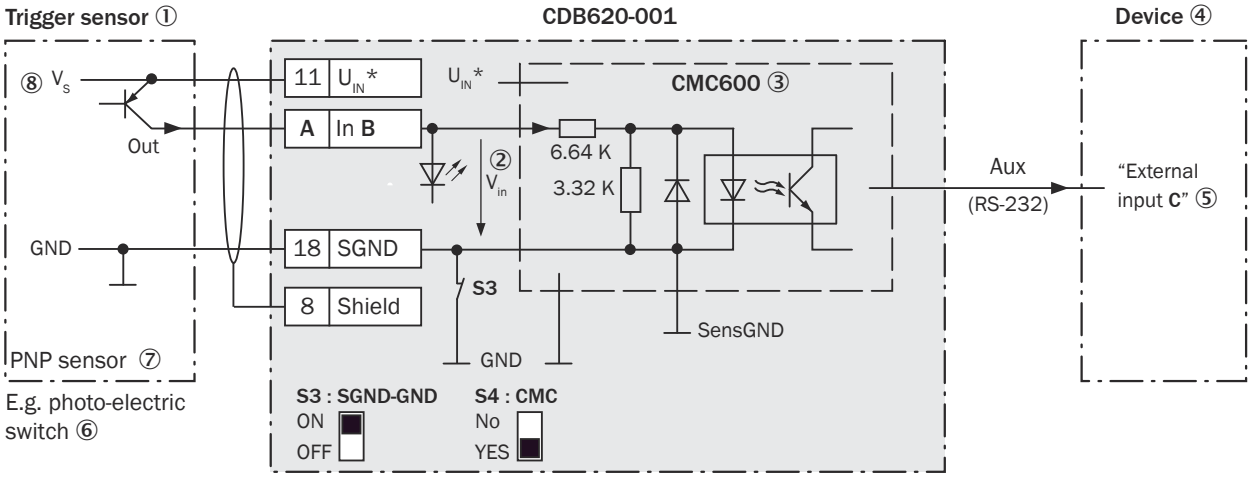


Figure 164: Trigger sensor supplied with power by connection module CDB620-001

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 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

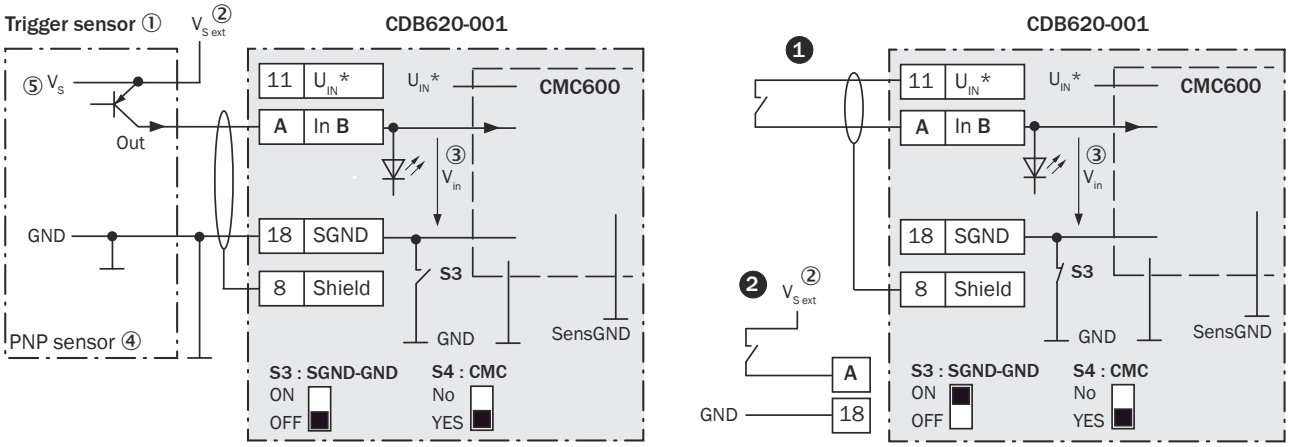


Figure 165: Left: Trigger sensor connected potential-free and supplied with power externally. Right: alternative switch, ❶ supplied with power by connection module CDB620-001 or ❷ connected volt-free and supplied with power externally. Now select switch setting S3 as shown in the left figure.

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 42: Assignment of placeholders to the digital inputs

CDB620-001 (physical inputs)		Device (logical inputs)
Terminal A	**Signal B**	**External input C**
16	In 1	1
17	In 2	2

Function of switch S3

Table 43: Switch S3: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor is connected with GND of CDB620-001 and CMC600
OFF	Trigger sensor is connected volt-free at the CDB620-001 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 44: 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 digital inputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

14.7.10 Wiring digital outputs of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

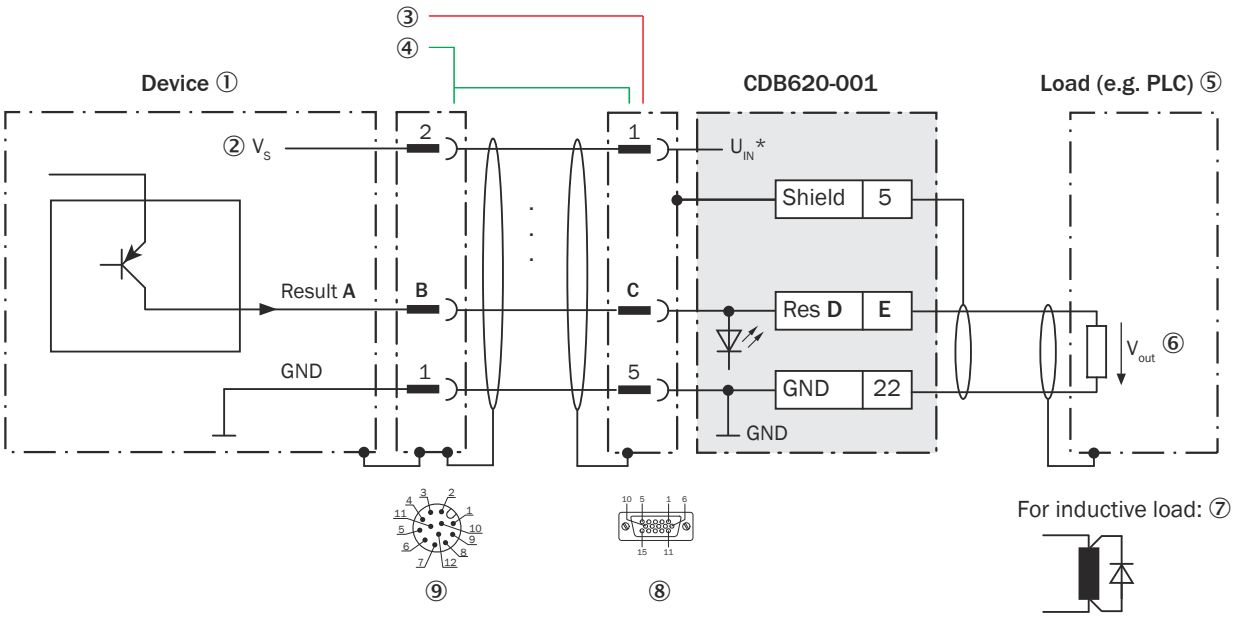


Figure 166: Wiring the digital outputs “Result 1” and “Result 2” of the device in the connection module CDB620-001, Ethernet variant with male connector, M12, 12-pin, A-coded

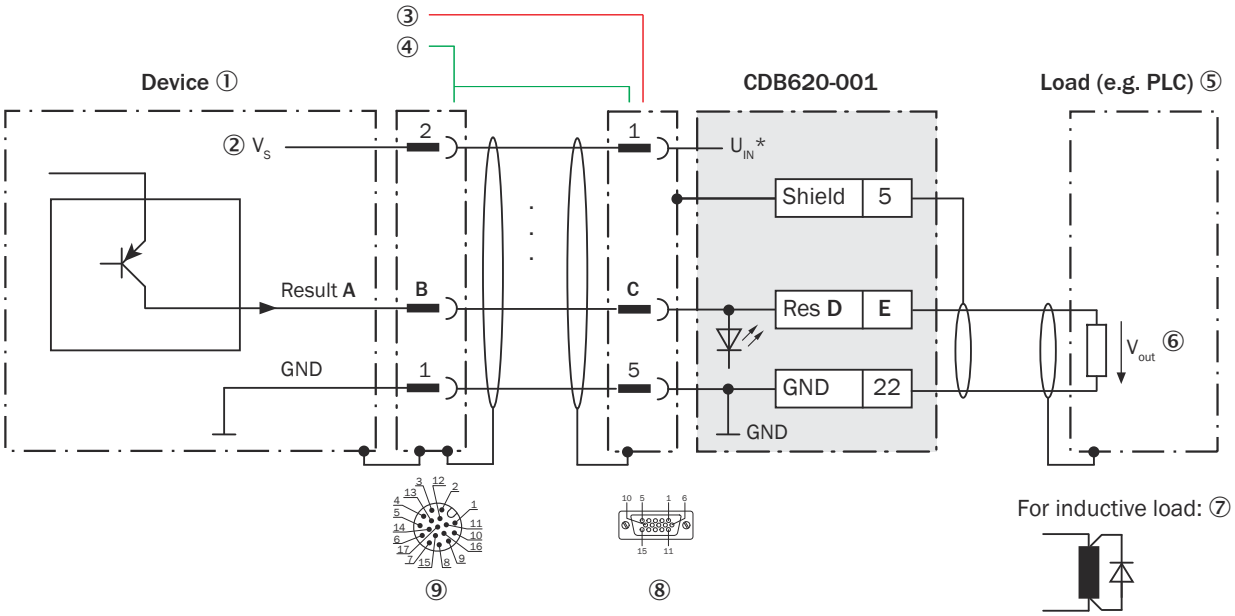


Figure 167: Wiring the "Result 1" and "Result 2" digital outputs of the device in the connection module CDB620-001, Ethernet variant with male connector, M12, 17-pin, A-coded.

① Device

② Supply voltage V_S

③ CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

④ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)

⑤ Load (e.g. PLC)

⑥ Output voltage V_{out}

⑦ With inductive load: see note

⑧ Connection module: female connector, D-Sub-HD, 15-pin

⑨ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

NOTE

Digital output are omitted due to limited number of contacts in the connector plug of the device.

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The two "Result 1" and "Result 2" digital outputs are not available.

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 45: Assignment of placeholders to the digital outputs

Device		CDB620-001		
Output A	**Pin B**	**Pin C**	**Signal D**	**Terminal E**
Result 1	13	12	Res 1	20
Result 2	14	13	Res 2	21

Characteristic data of the digital outputs

Table 46: Characteristic data of the digital outputs “Result 1” and “Result 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 and temperature protected • Not electrically isolated from the supply voltage V_S
Electrical values	$0\ V \leq V_{out}$ [1] $\leq V_S$ $(V_S - 1.5\ V) \leq V_{out} \leq V_S$ bei I_{out} [2] $\leq 100\ mA$

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.

14.7.11 Wiring the external digital outputs of the device in the CDB620-001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

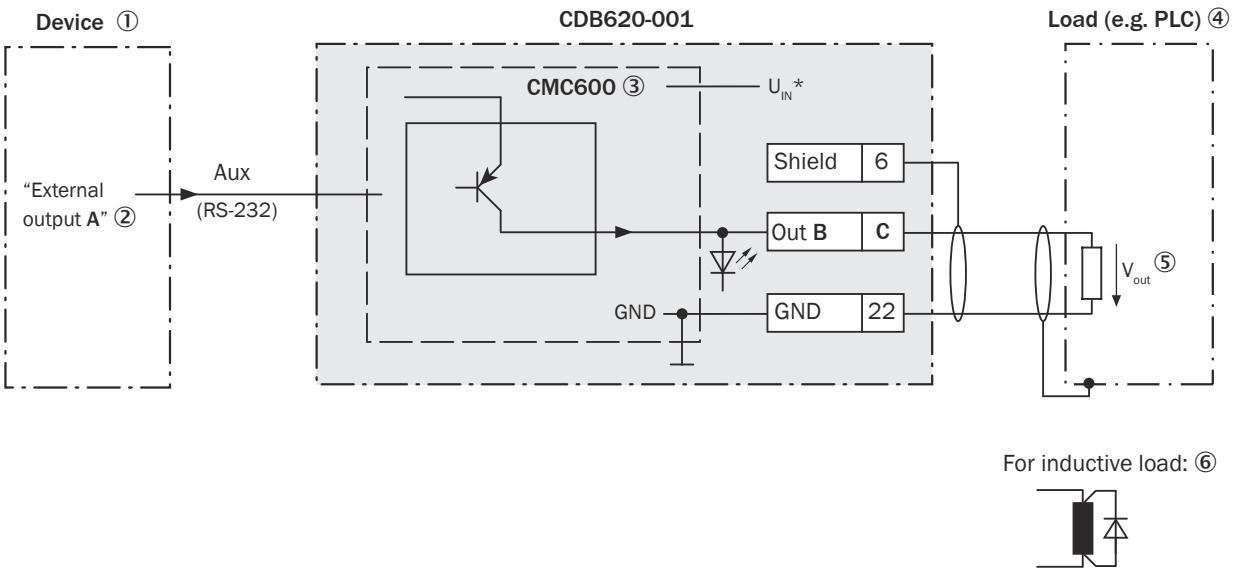


Figure 168: Wiring “Out 1” and “Out 2” external digital outputs of the device in the connection module CDB620-001.

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 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 47: Assignment of placeholders to the digital outputs

Device (logical output)	CDB620-001 (physical output)	
External output A	**Signal B**	**Terminal C**
1	Out 1	23
2	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 48: 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 and 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

14.8 Connection diagrams of connection module CDB650-204

14.8.1 Connection of the device to CDB650-204

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

Also devices with heating (CLV63x-/CLV64x-/CLV65x-x8xxxF0)

Also devices in protective housing IP69K (CLV63x-/CLV64x-x8xxxS01)

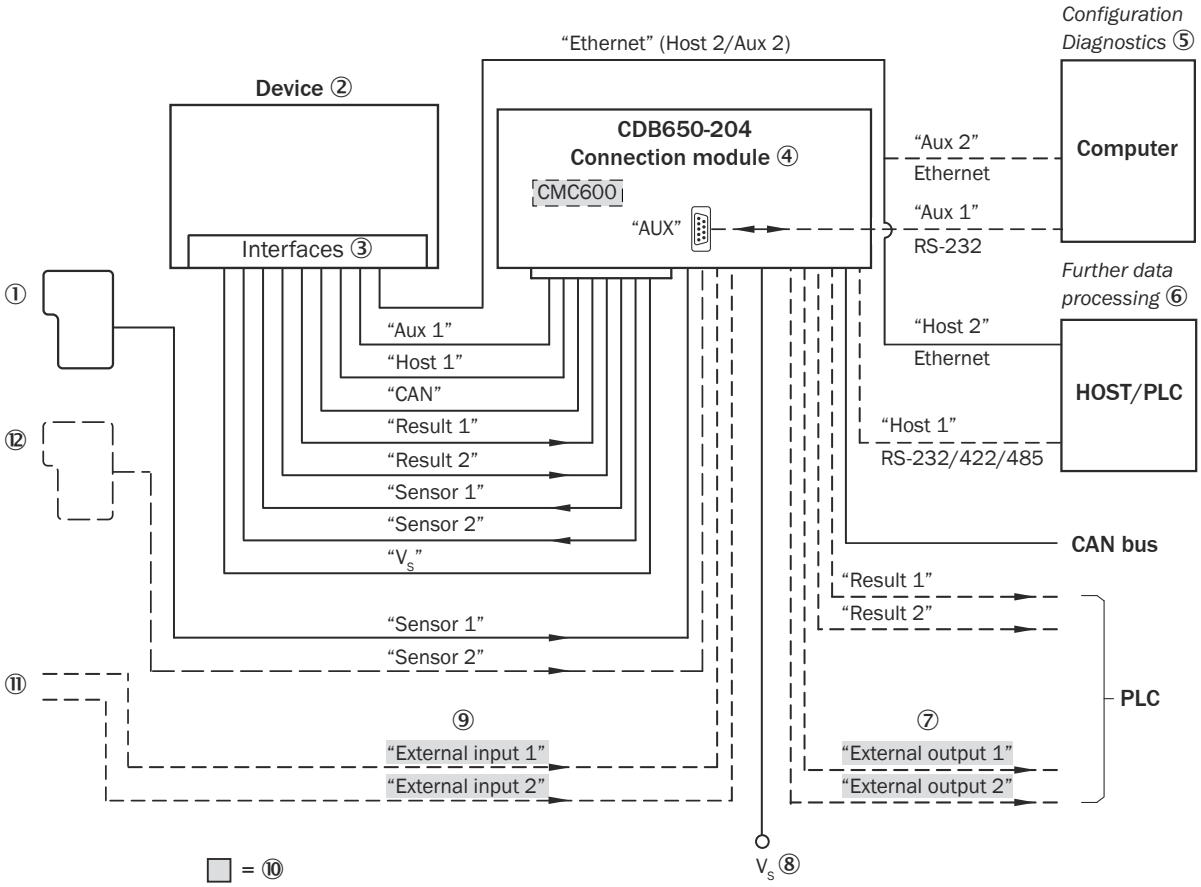


Figure 169: Connection of the device to peripherals via CDB650-204 (overview)

① External trigger sensor, e.g. for read cycle generation
② Device
③ Interfaces
④ Connection module
⑤ Configuration or diagnostics
⑥ Data further processing
⑦ External digital outputs
⑧ Supply voltage V_S
⑨ External digital inputs
⑩ The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑪ Other functions
⑫ Can also be used as an alternative stop reading cycle (e.g., photoelectric sensor) or travel increment (incremental encoder), depending on the application

14.8.2 Wiring overview of the CDB650-204

Device = CLV63x-x8xxx (Ethernet variant), 1 digital input used

Device = CLV64x-x8xxx (Ethernet variant), 1 digital input used

Device = CLV65x-x8xxx (Ethernet variant), 1 digital input used

Also devices with heating (CLV63x-/CLV64x-/CLV65x-x8xxxF0), 1 digital input used

Also devices in protective housing IP69K (CLV63x-/CLV64x-x8xxxS01), 1 digital input used

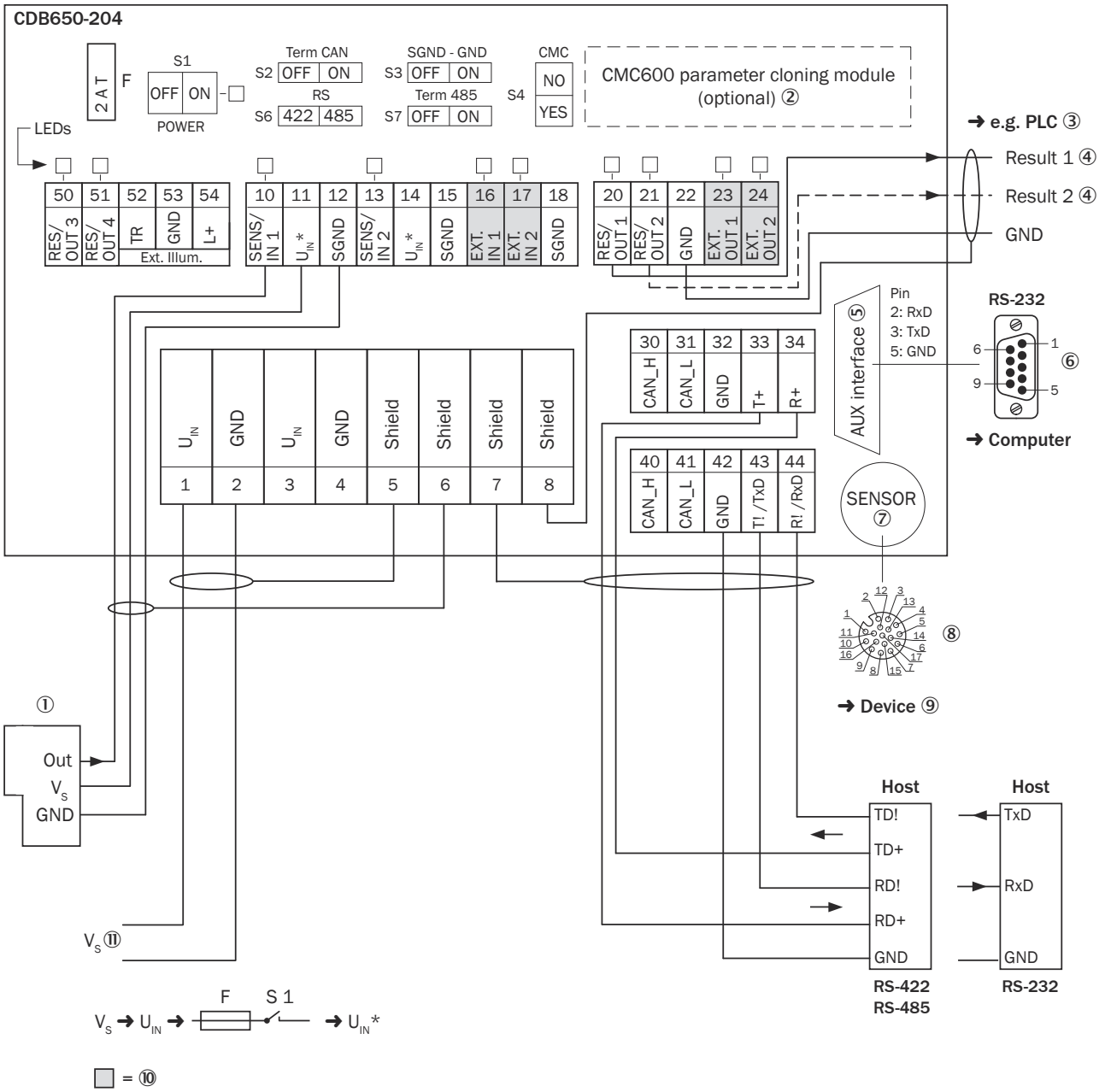


Figure 170: Overview: connection of device and peripherals to the CDB650-204 connection module

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 use the additional external digital inputs and outputs of the device (highlighted in gray).
⑪ Supply voltage V_S

14.8.3 Connecting supply voltage for the device in CDB650-204

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

Also devices with heating (CLV63x-/CLV64x-/CLV65x-x8xxxF0)

Also devices in protective housing IP69K (CLV63x-/CLV64x-x8xxxS01)

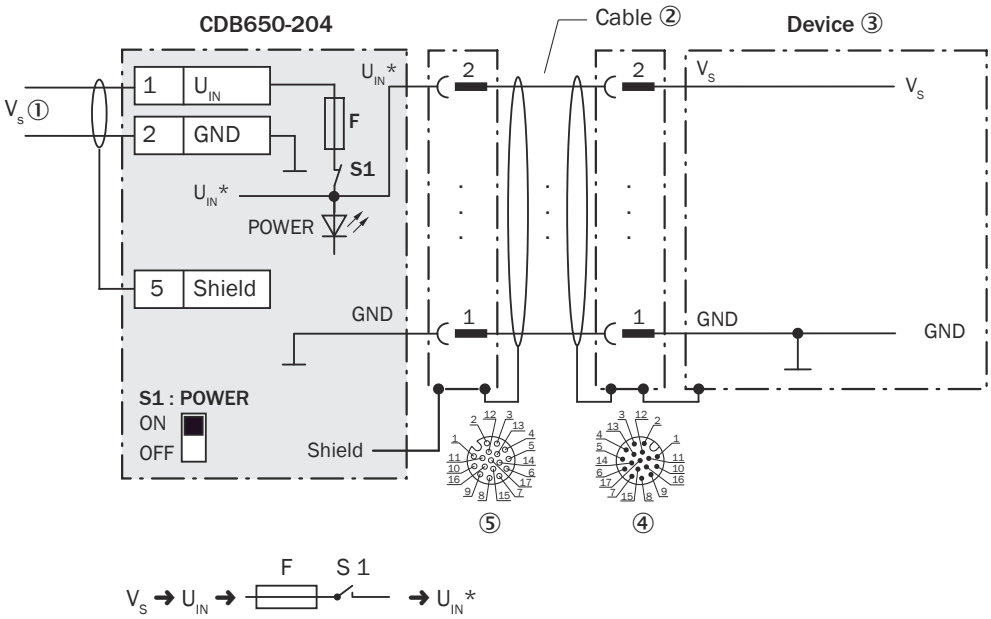


Figure 171: Connecting supply voltage for the device in CDB650-204 connection module.

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 49: 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.

Switch setting	Function
OFF	CDB650-204 and device disconnected from supply voltage Recommended setting for all connection work

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

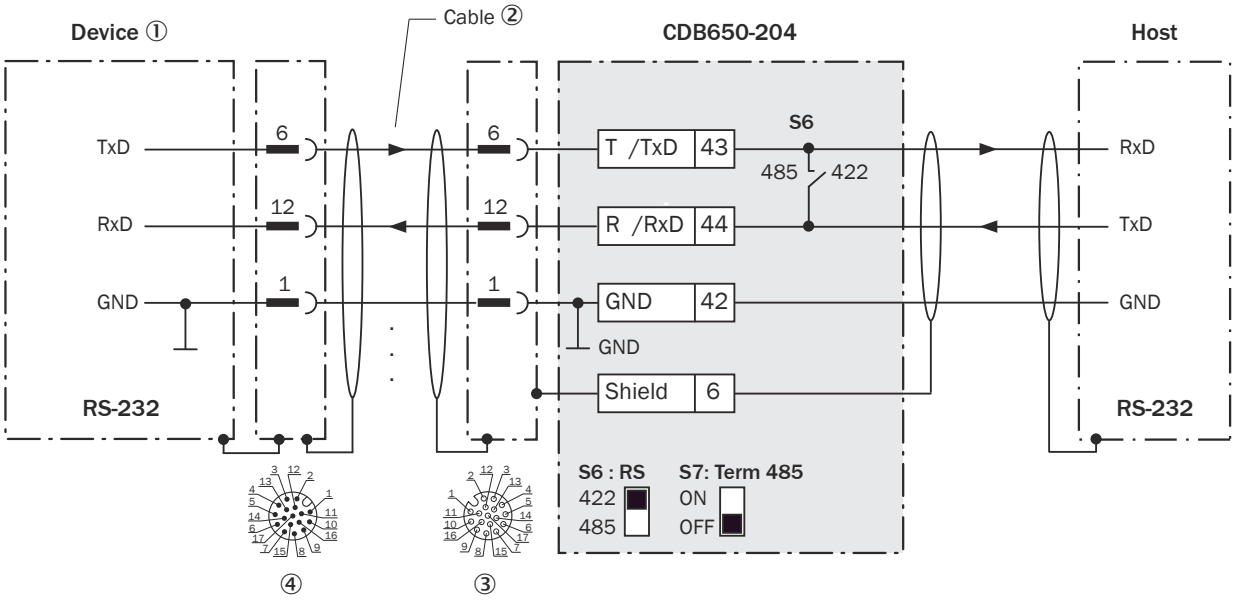


Figure 172: Wiring data interface RS-232 of the device in the connection module CDB650-204

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.

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

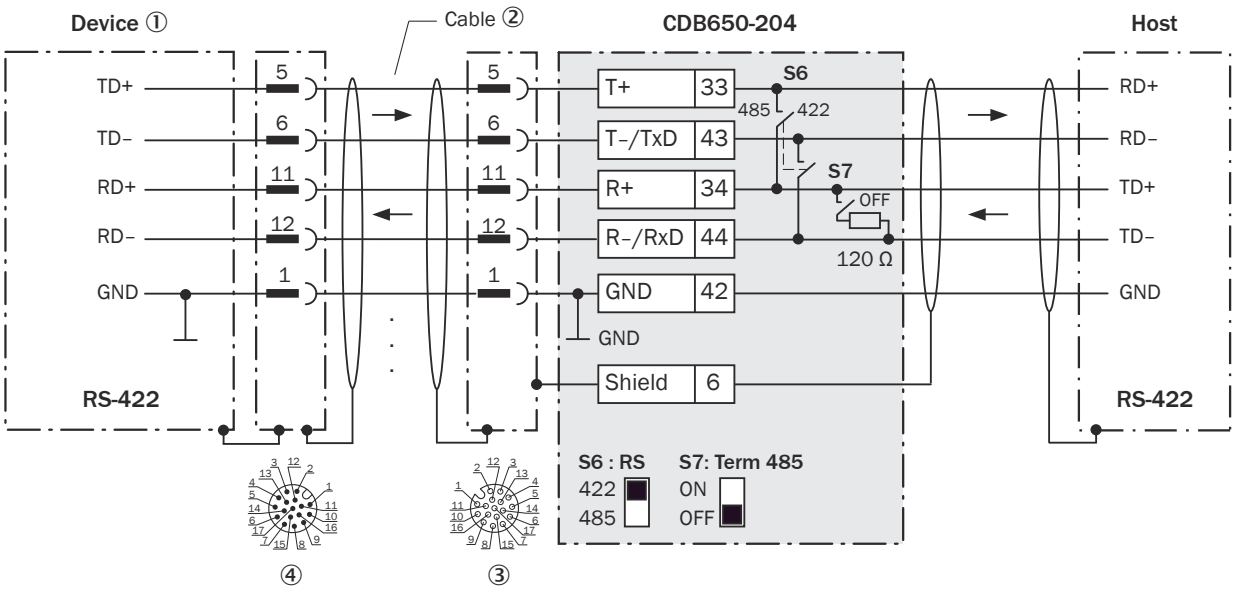


Figure 173: Wiring data interface RS-422 of the device in the connection module CDB650-204

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 50: 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 and RS-485.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 operation.
- Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. configuration software SOPAS ET.

14.8.6 Wiring serial host interface RS-485 of the device in CDB650-204

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

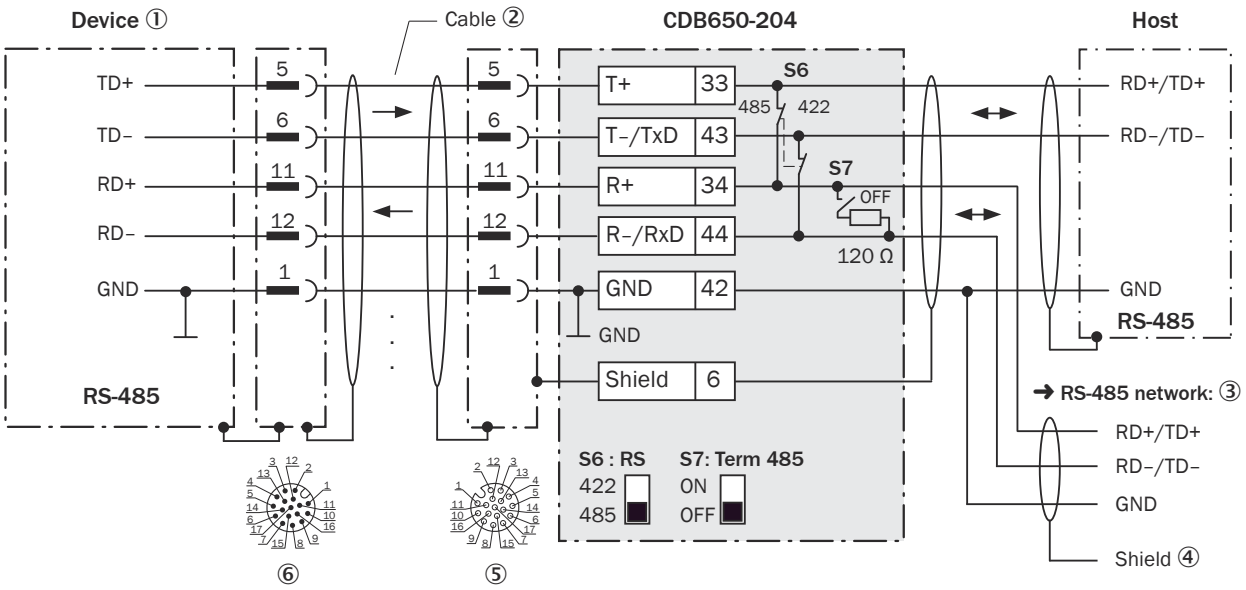


Figure 174: Wiring data interface RS-485 of the device in connection module CDB650-204.

① Device
② Connection cable 1:1 (female connector, M12, 17-pin, A-coded / male connector, M12, 17-pin, A-coded)
③ RS-485 network
④ Shielding
⑤ Connection module: female connector, M12, 17-pin, A-coded
⑥ Device: male connector, M12, 17-pin, A-coded

Function of switch S7

Table 51: Switch S7: Term 485

Switch setting	Function
ON	Terminates the device. Required if the device is located at the end of the RS-485 bus cable.
OFF	No termination

NOTE

User of the RS-485 data interface:

- The relevant interface drivers for the device comply with the standard in accordance with RS-422 and RS-485.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- This configuration is not permitted when using the standard data output and protocol of the device. In case of doubt, contact SICK Service.
- Activate the RS-485 data interface (“Bus” option) in the device using a configuration tool, e.g. the SOPAS ET configuration software.

14.8.7 Wiring the CAN interface of the device in the CDB650-204

Device:

- **CLV63x-x8xxx (Ethernet variant), 1 digital input used**
- **CLV63x-x8xxx (Ethernet variant) with heating, 1 digital input used**
- **CLV64x-x8xxx (Ethernet variant), 1 digital input used**

- **CLV65x-x8xxx (Ethernet variant), 1 digital input used**
- **CLV65x-xYxxxF0 (Ethernet variant) with heating, 1 digital input used**

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

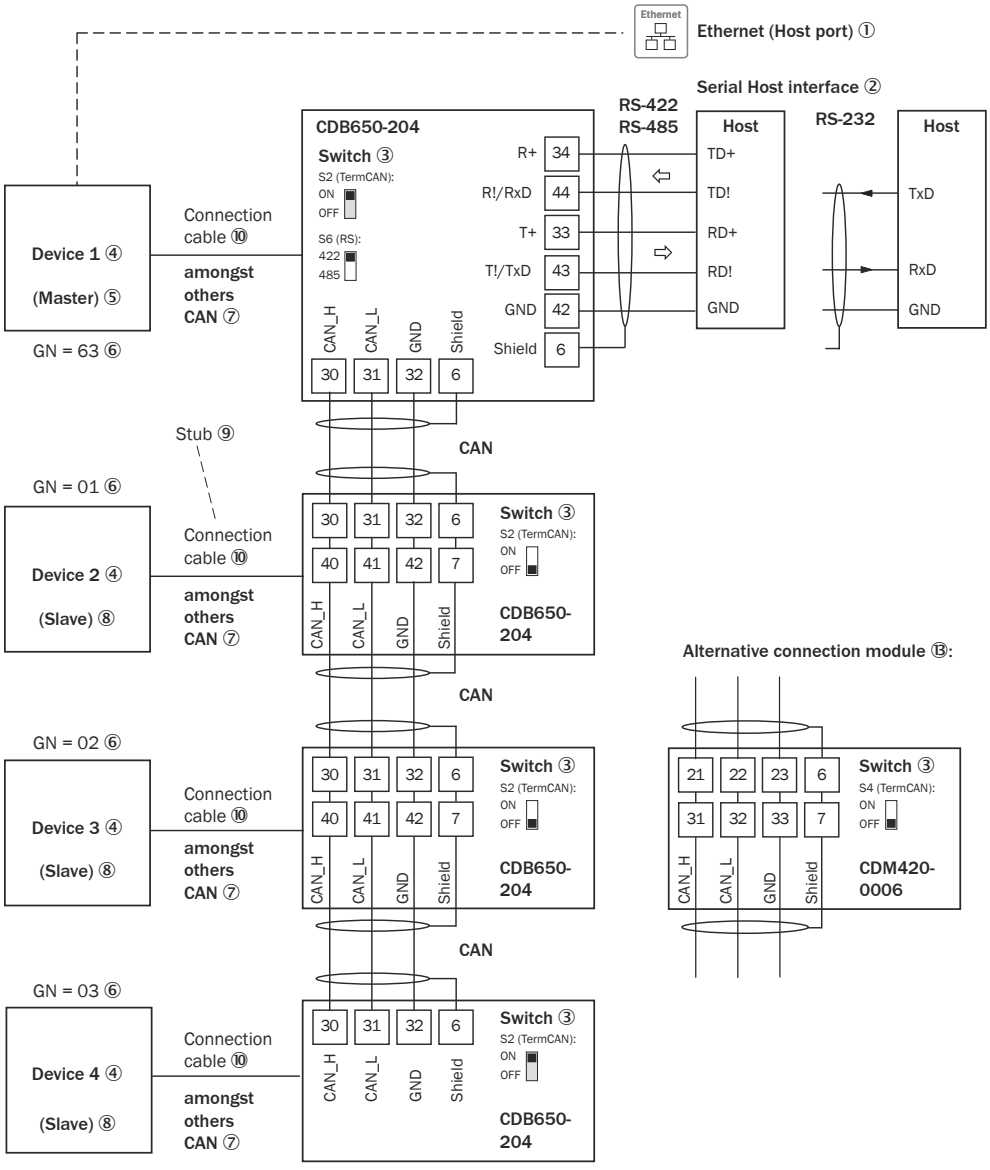


Figure 175: Wire the CAN interface of the device in the CDB650-204 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

① Only CLV63x-/CLV64x-/CLV65x-x8xxx (Ethernet variant): 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 CLV63x-/CLV64x-/CLV65x-x8xxx (Ethernet variant): 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 CLV63x-/CLV64x-/CLV65x (Ethernet variant): CDB620, CDM420-0001 or CDM420-0006

An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-x8xxx (Ethernet variant).

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.

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

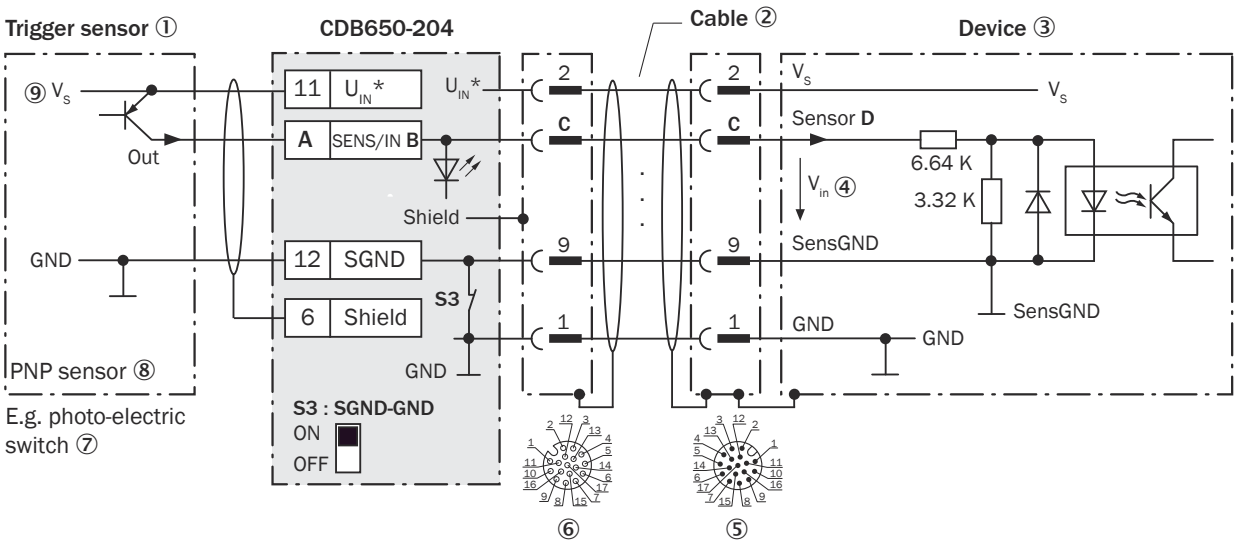


Figure 176: Trigger sensor supplied with power by connection module CDB650-204

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

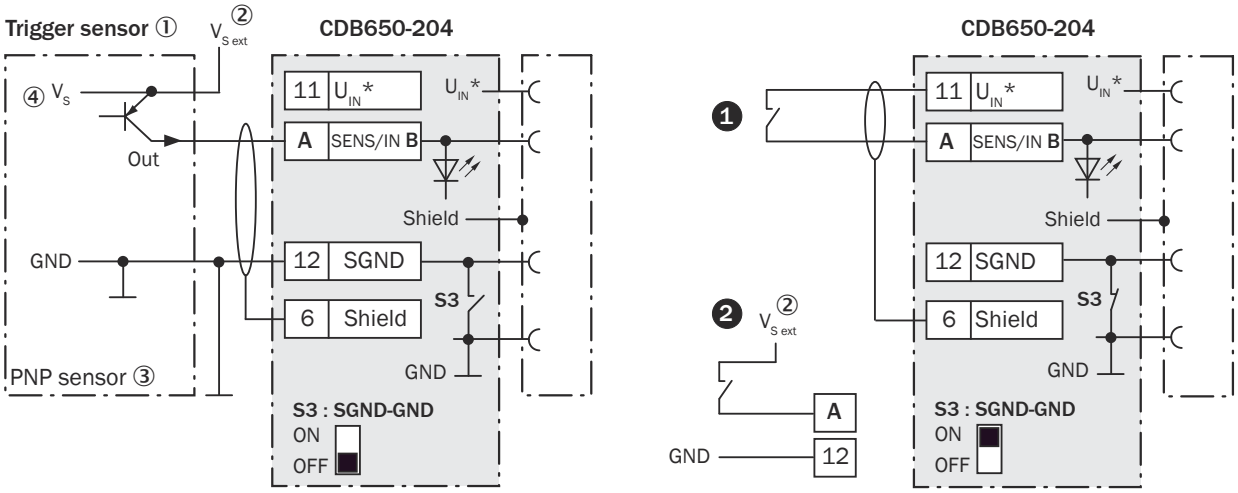


Figure 177: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDB650-204 or ❷ connected potential-free and supplied with power externally. Now select switch setting S3 as shown in the left figure.

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 52: 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 53: Switch S3: SGND-GND

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

Characteristic data of the digital inputs

Table 54: 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.

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

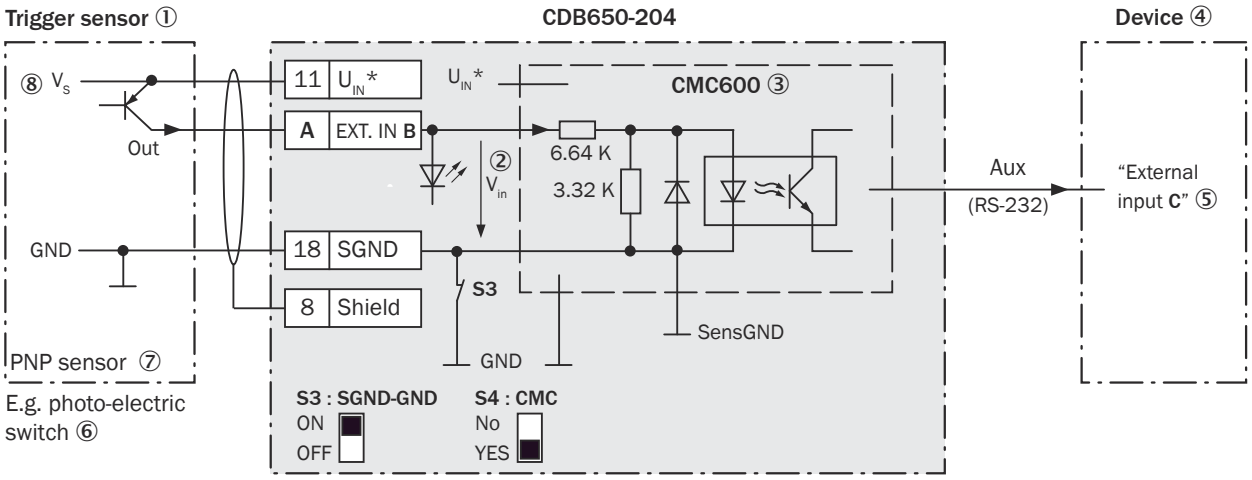


Figure 178: Trigger sensor supplied with power by connection module CDB650-204

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 use the additional external digital inputs and digital 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

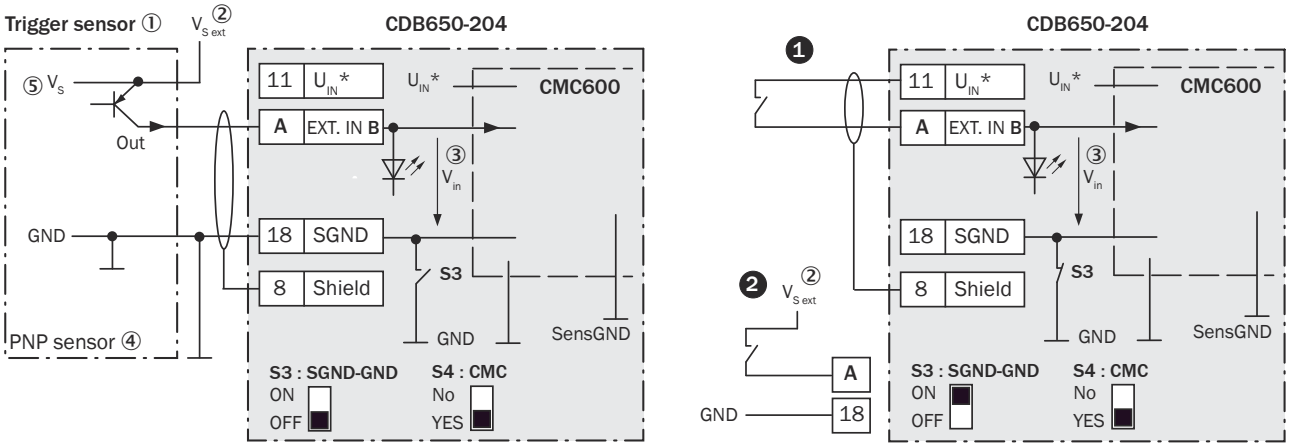


Figure 179: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDB650-204 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

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 55: 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 56: 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 volt-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”.

Characteristic data of the digital inputs

Table 57: 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.

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

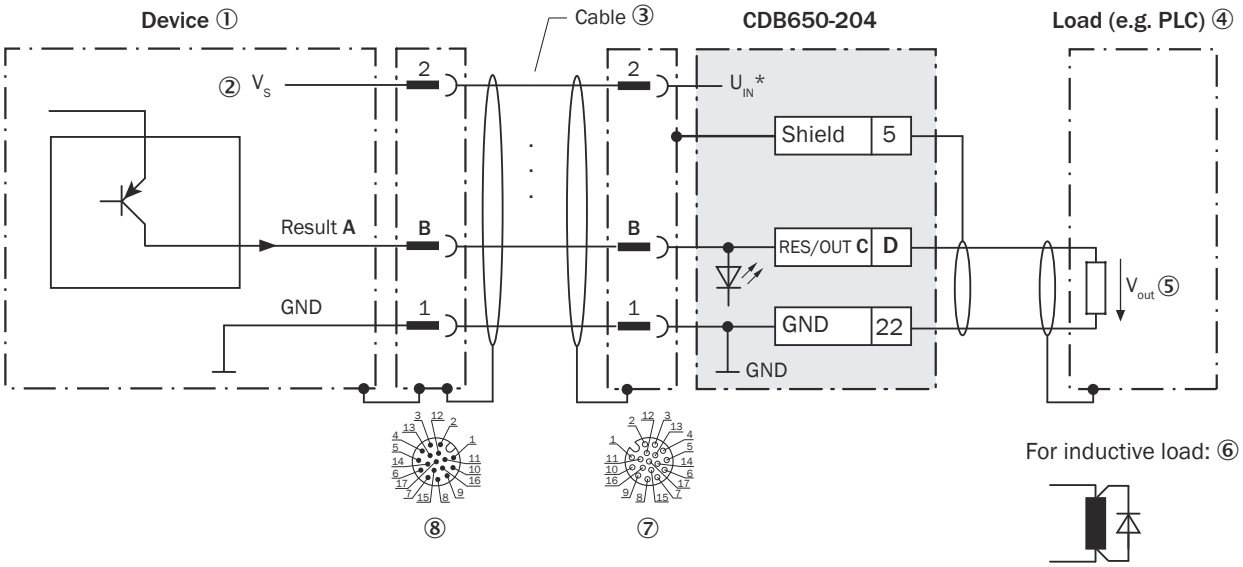


Figure 180: Wiring the digital outputs "Result 1" and "Result 2" of the device in the connection module CDB650-204

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 58: 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

Characteristic data of the digital outputs

Table 59: Characteristic data of the digital outputs "Result 1" and "Result 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 and temperature protected • Not electrically isolated from the supply voltage 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

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

Device = CLV63x-x8xxx (Ethernet variant)

Device = CLV64x-x8xxx (Ethernet variant)

Device = CLV65x-x8xxx (Ethernet variant)

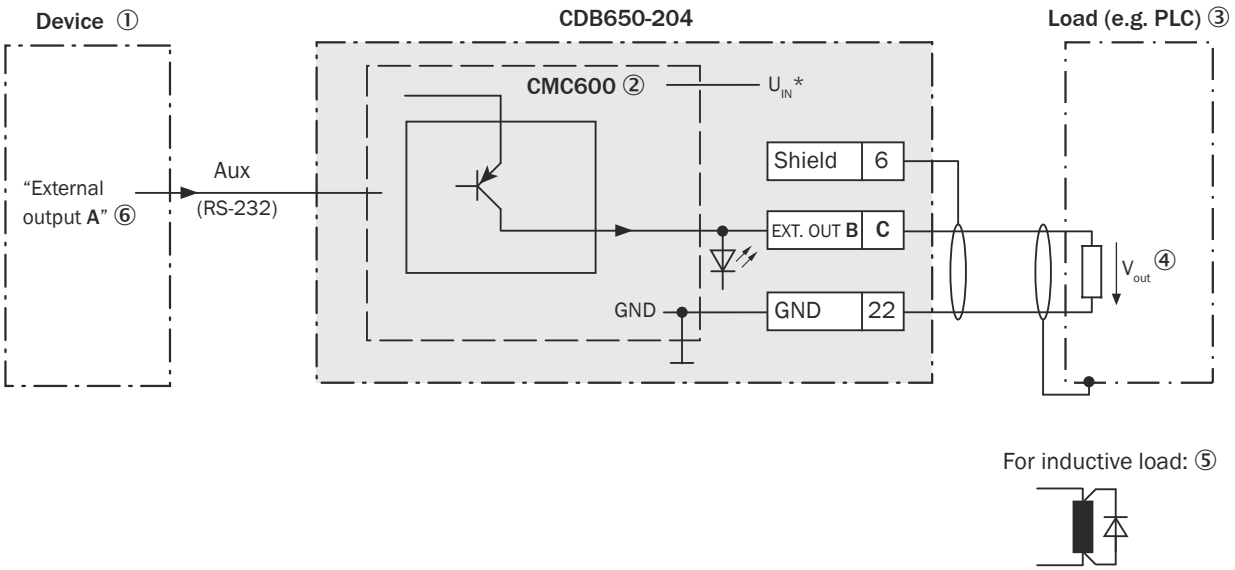


Figure 181: Wiring external "External output 1" and "External output 2" digital outputs of the device in the CDB650-204 connection module.

① Device

② The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and digital 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 60: 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 61: 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 and 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.

14.9 Connection diagrams of connection module CDM420-0001

14.9.1 Connection of the device to CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

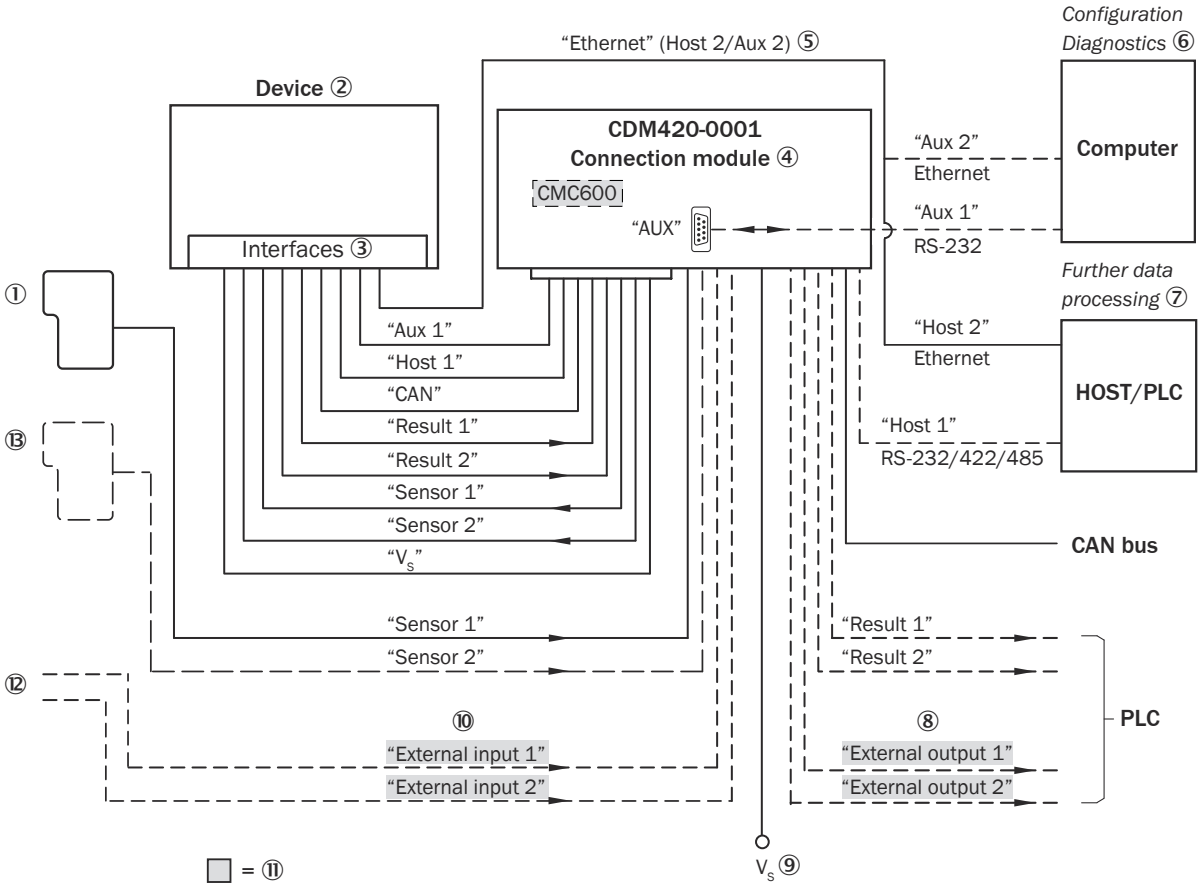


Figure 182: Connection of the device to peripherals via CDM420-0001 (overview)

① External trigger sensor, e.g. for read cycle generation
② Device
③ Interfaces
④ Connection module
⑤ Ethernet, omitted for CLV63x / 64x / 65x-x0xxx (serial variant).
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital outputs
⑨ Supply voltage V_S
⑩ External digital inputs
⑪ The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑫ Other functions

⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

14.9.2 Wiring overview of the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used.

Device =CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used.

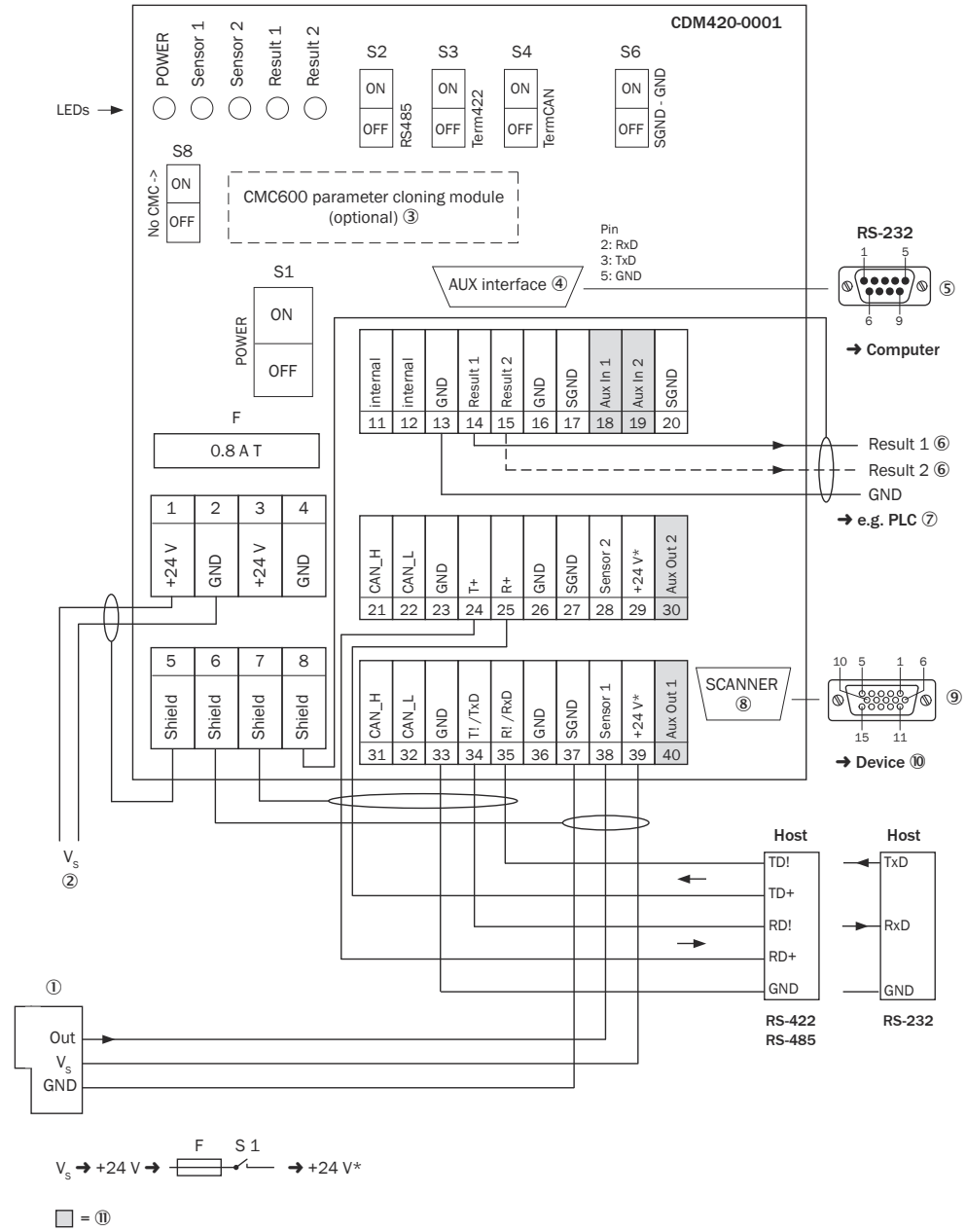


Figure 183: Overview: connection of device (without heating) and peripherals to the CDM420-0001 connection module

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 use the additional external digital inputs and outputs of the device (highlighted in gray).

14.9.3 Connecting supply voltage for the device in CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

NOTE
For devices with external heating, connect both components in the connection module to the supply voltage.

Connection diagram see "Connecting devices with heating to connection modules", page 65.

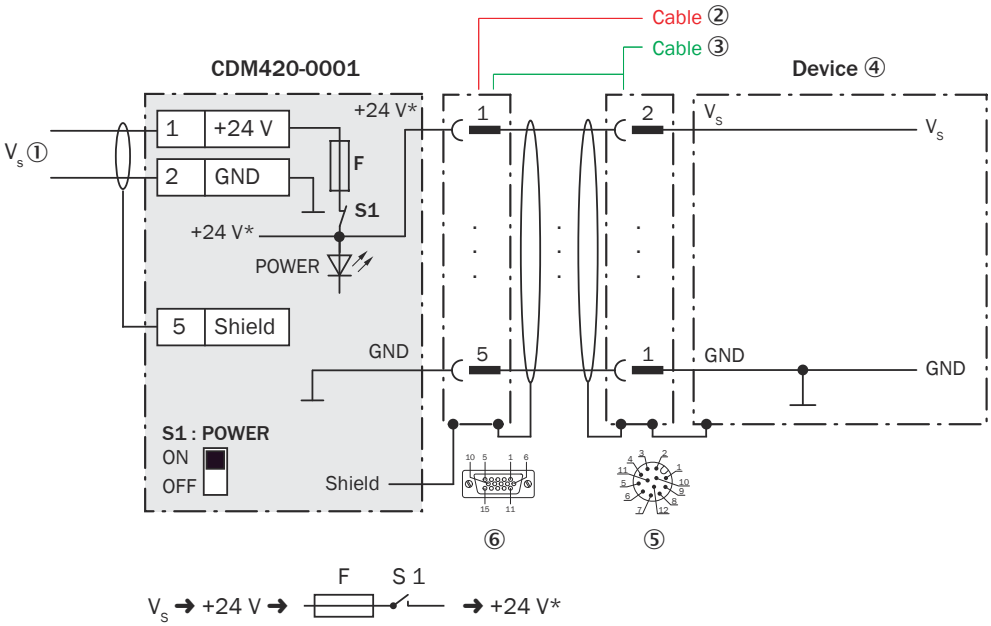


Figure 184: Connecting supply voltage for the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

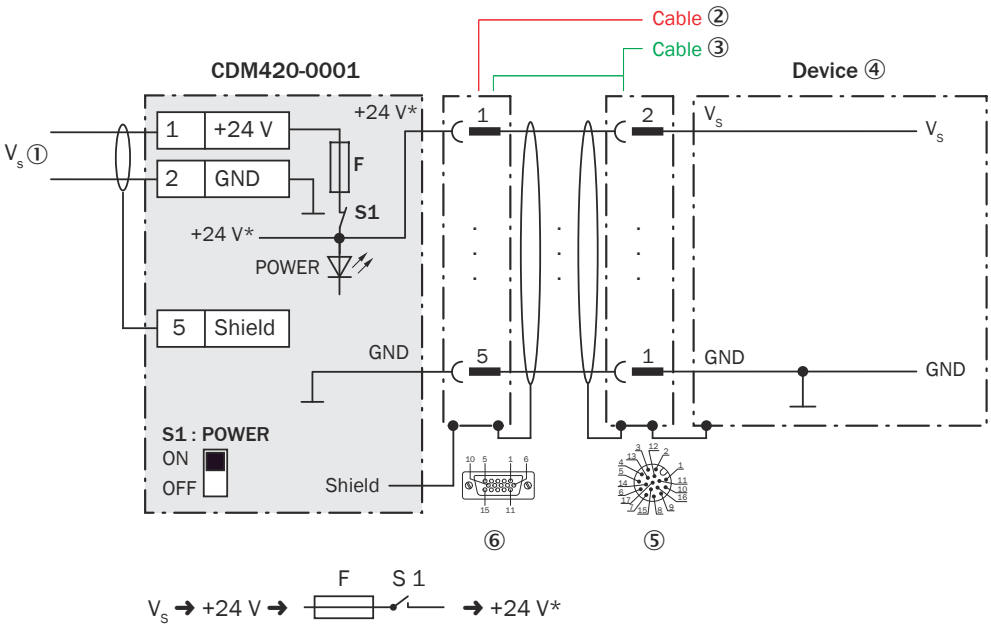


Figure 185: Connecting supply voltage for the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Supply voltage V_S

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Device

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

⑥ Connection module: female connector, D-Sub-HD, 15-pin

Function of switch S1

Table 62: Switch S1: Power

Switch setting	Function
ON	Supply voltage +24 V connected to CDM420-0001 and device via fuse and switch S1 as supply voltage +24 V* Supply voltage +24 V* can be additionally tapped at terminals 29 and 39
OFF	CDM420-0001 and device disconnected from supply voltage Recommended setting for all connection work

14.9.4 Wiring serial host interface RS-232 of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

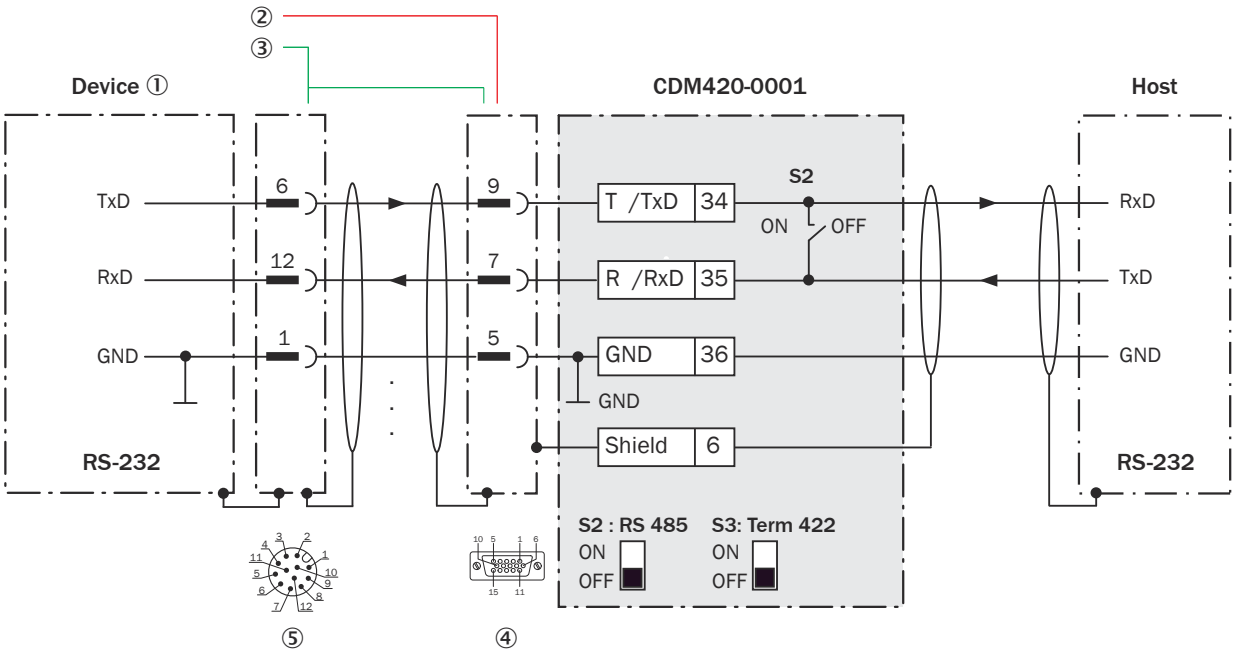


Figure 186: Wiring data interface RS-232 of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

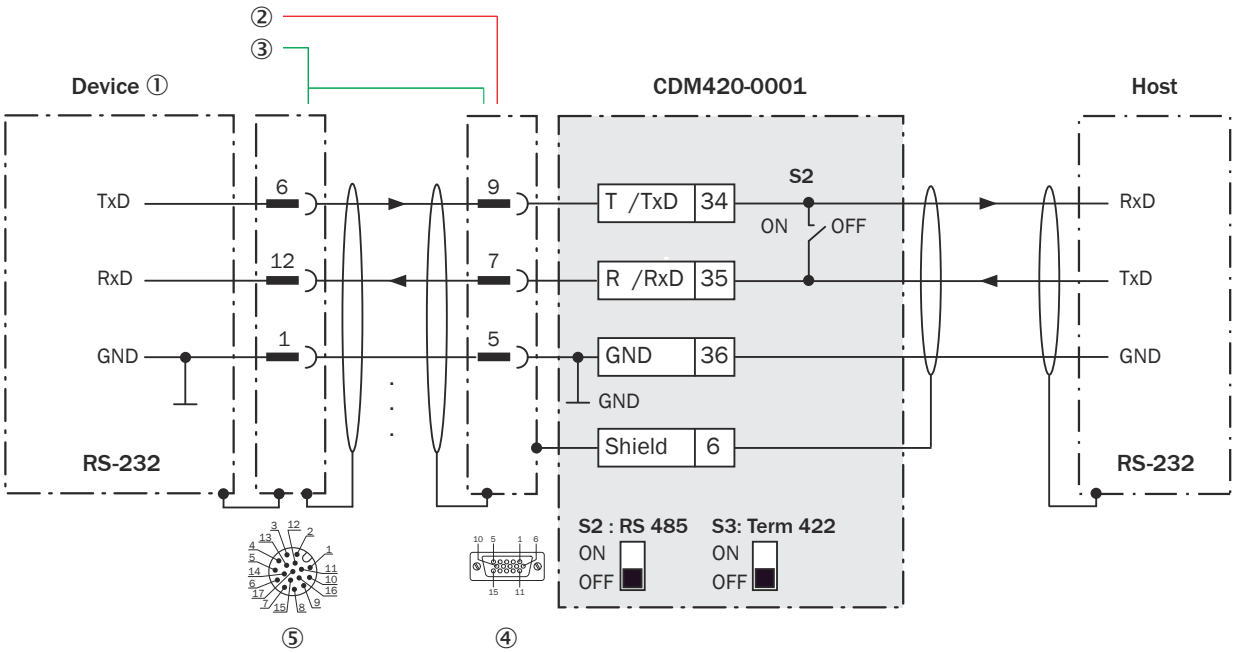


Figure 187: Wiring data interface RS-232 of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): 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.

14.9.5 Wiring serial host interface RS-422 of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

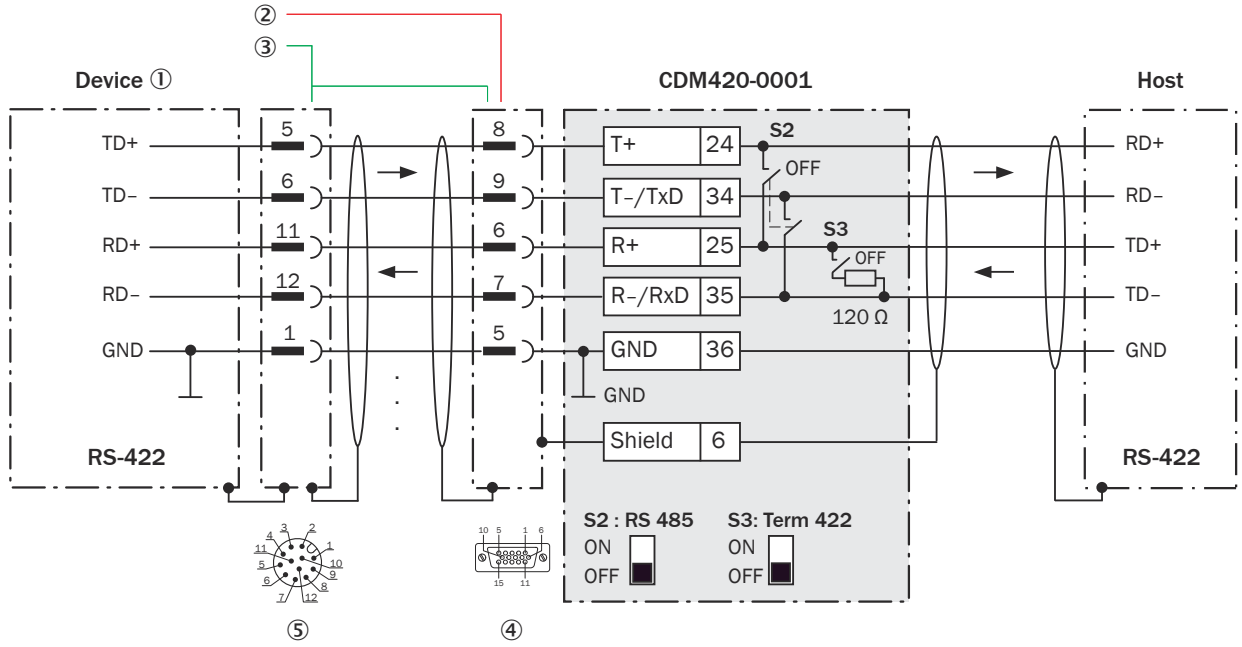


Figure 188: Wiring data interface RS-422 of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

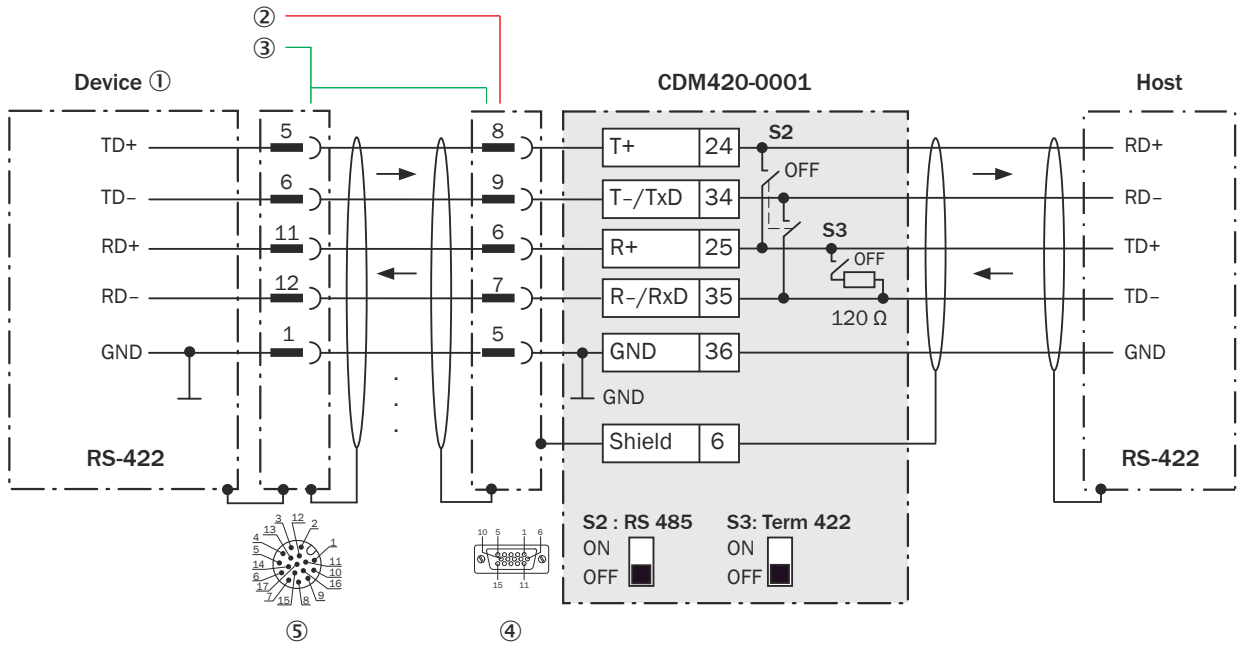


Figure 189: Wiring data interface RS-422 of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S3

Table 63: 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

Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. the configuration software SOPAS ET.

The following requirements or restrictions apply when using the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard in accordance with RS-422 and RS-485.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 operation.

14.9.6 Wiring serial host interface RS-485 of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heater

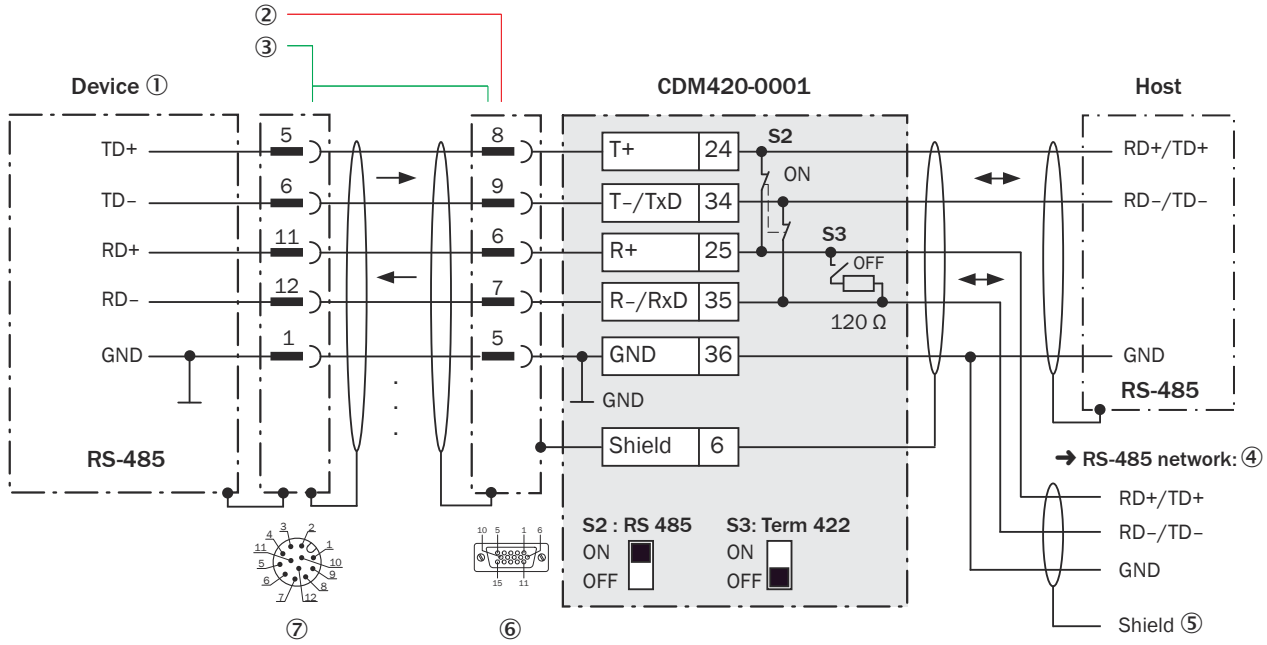


Figure 190: Wiring data interface RS-485 of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

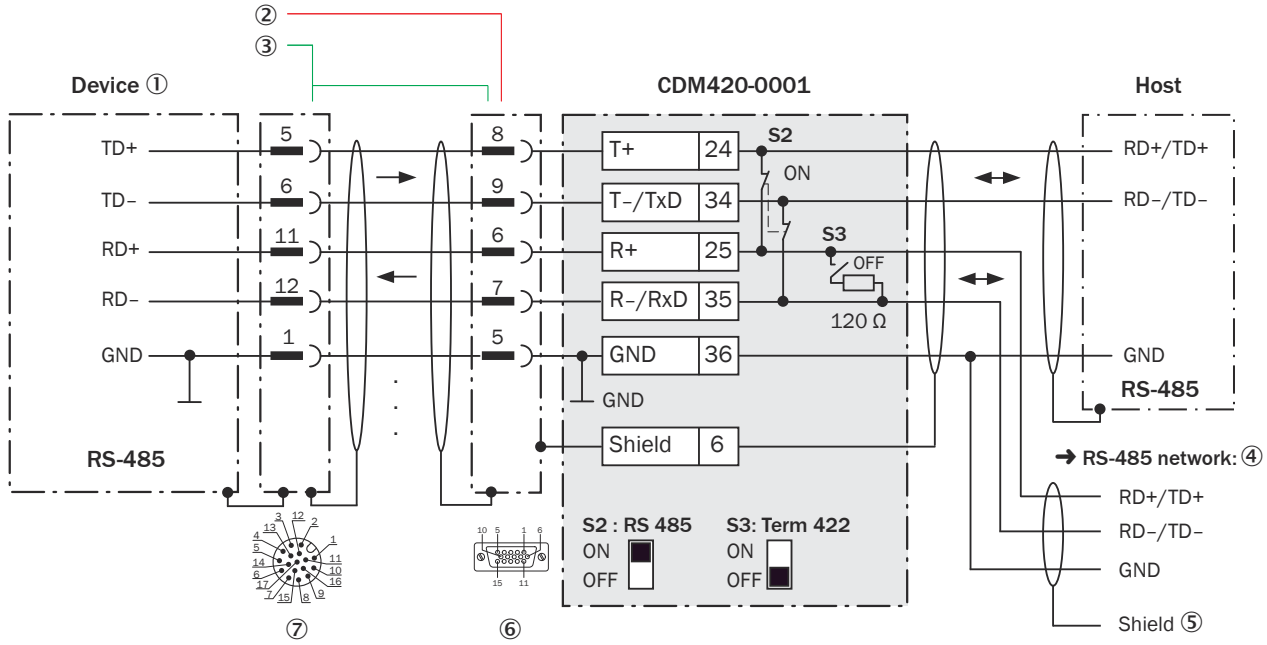


Figure 191: Wiring the RS-485 data interface of the device in the CDM420-0001 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ RS-485 network

⑤ Shielding

⑥ Connection module: female connector, D-Sub-HD, 15-pin

⑦ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S3

Table 64: Switch S3: Term 422

Switch setting	Function
ON	Terminates the device. Required if the device is located at the end of the RS-485 bus cable.
OFF	No termination

NOTE

Activate the RS-485 data interface (“Bus” option) in the device using a configuration tool, e.g., the SOPAS ET configuration software.

The following requirements or restrictions apply when using the RS-485 data interface:

- The relevant interface drivers for the device comply with the RS-422 and RS-485standard.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- This configuration is not permitted when using the standard data output and protocol of the device. In case of doubt, contact SICK Service.

14.9.7 Wiring the CAN interface of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8).

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating.

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8).

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

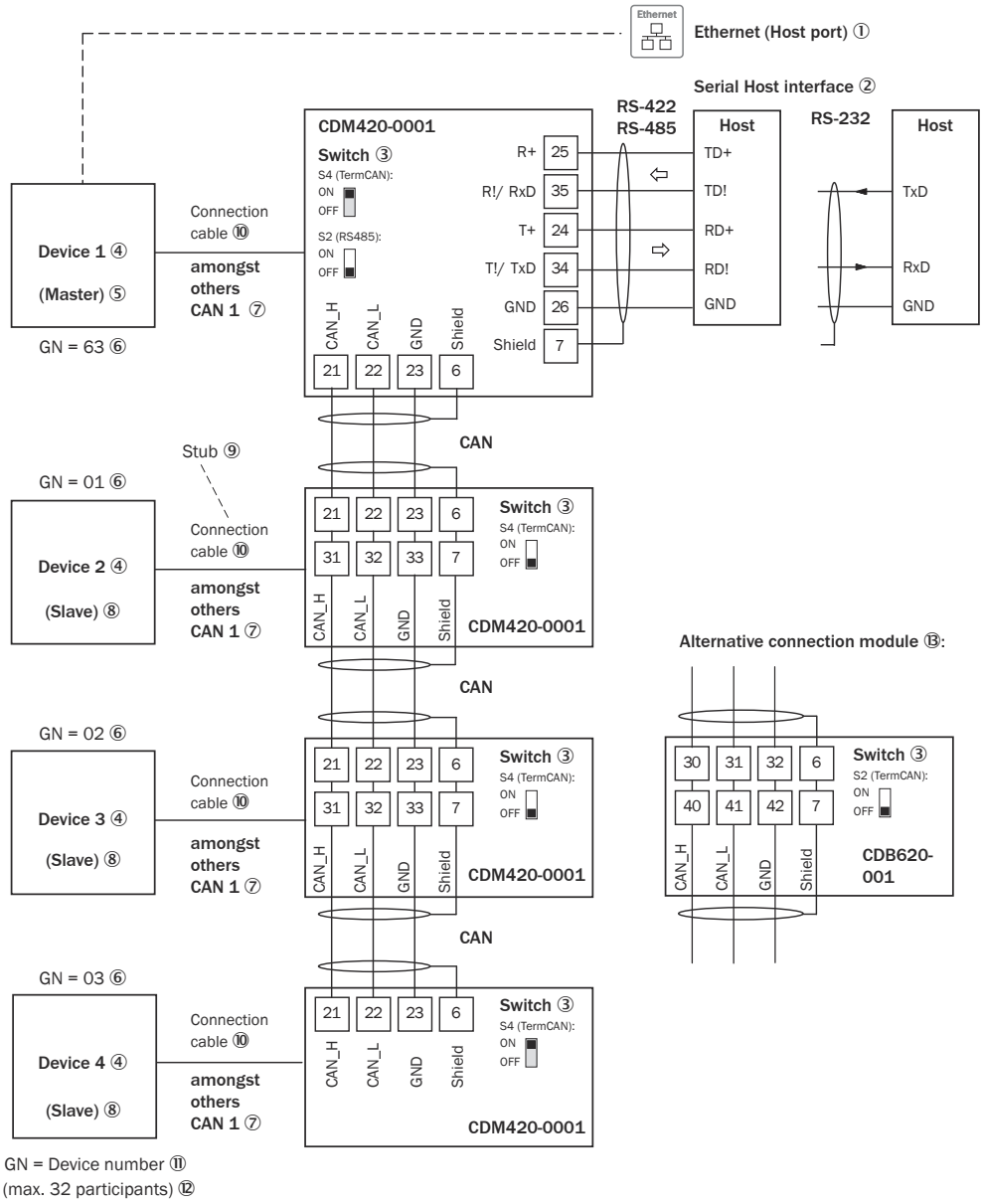


Figure 192: Wire the CAN interface of the device in the CDM420-0001 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

① Only CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1 or 8): 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 CLV63x-/CLV64x-/CLV65x-x0xxx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)

⑪ Device number (GN)

⑫ Maximum 32 users

⑬ Example of alternative connection module:

Alternative connection module for CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1 or 8): CDB620 or CDM420-0006. CDB650-204 only for CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8)

CDB620 or CDM420-0006: An adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1).

CDB620 or CDM420-0006: An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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 CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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.

14.9.8 Wiring digital inputs of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

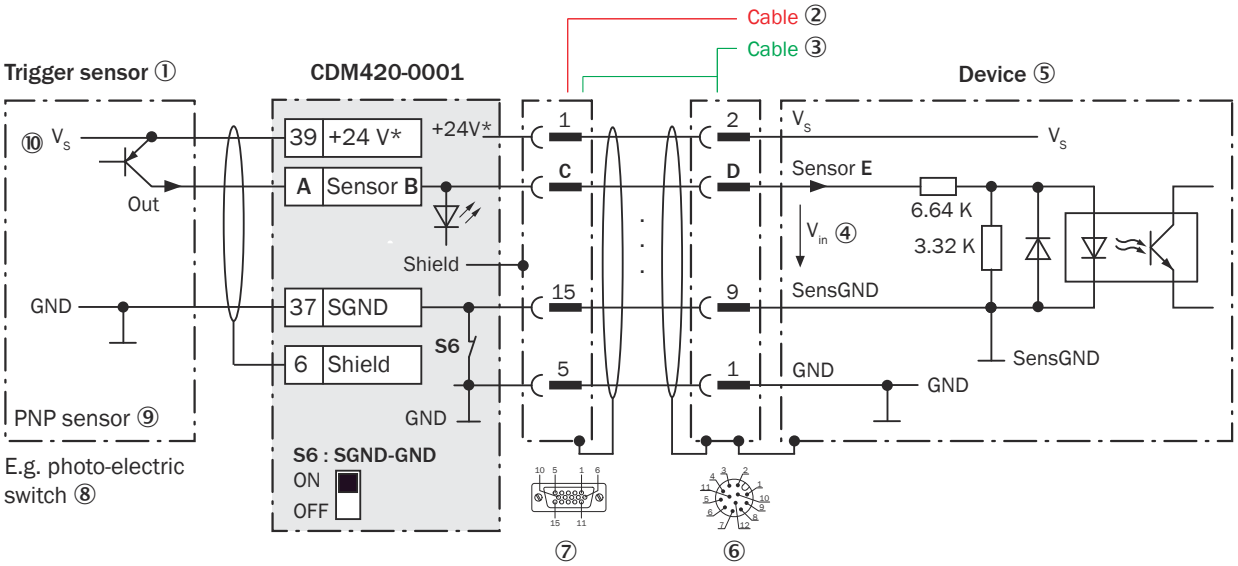


Figure 193: Trigger sensor supplied with power by connection module CDM420-0001, Ethernet variant with male connector, M12, 12-pin, A-coded

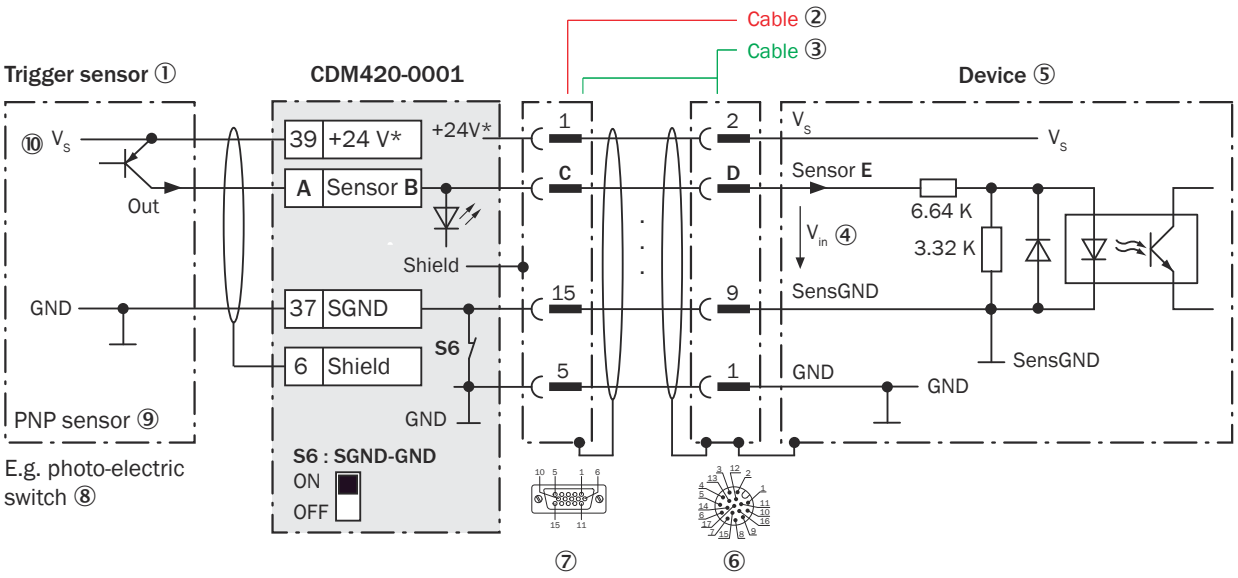


Figure 194: Trigger sensor supplied with power by connection module CDM420-0001, Ethernet variant with male connector, M12, 17-pin, A-coded

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

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Input voltage V_{in}

⑤ Device

⑥ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

⑦ Connection module: female connector, D-Sub-HD, 15-pin

⑧ E.g. photoelectric sensor

⑨ PNP sensor

⑩ Supply voltage V_S

NOTE

Reduction of digital inputs due to limited number of contacts in the connector plug of the device.

CLV63x/CLV64x/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The “Sensor 2” digital output is not available.

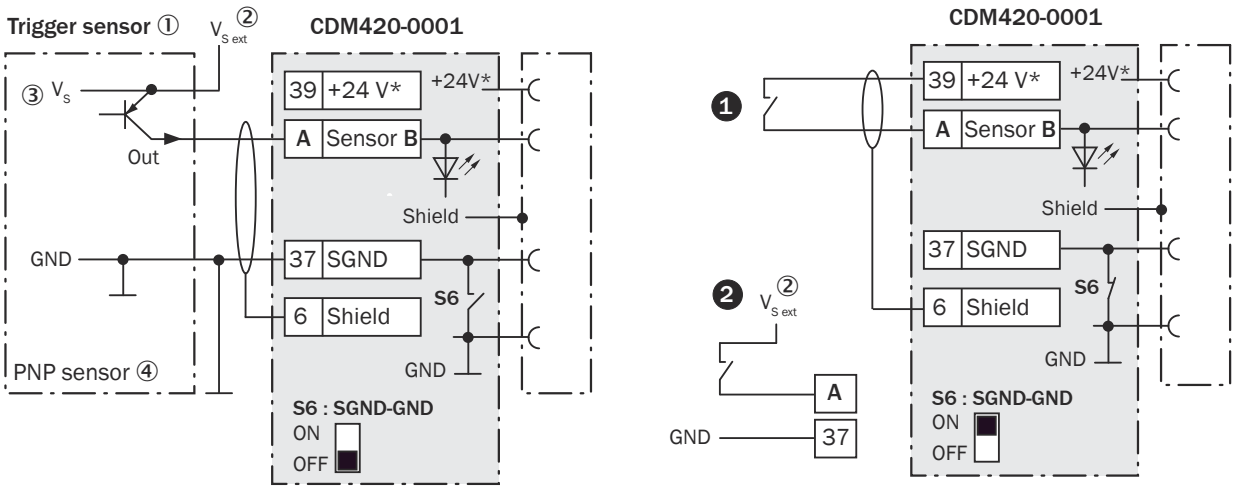


Figure 195: Left: Trigger sensor connected potential-free and supplied with power externally. Right: alternative switch, ❶ supplied with power by connection module CDM420-0001 or ❷ connected volt-free and supplied with power externally. Now select switch setting S6 as shown in the left figure.

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 65: Assignment of placeholders to the digital inputs

CDM420-0001			Device	
Terminal A	**Signal B**	**Pin C**	**Pin D**	**Sensor E**
38	Sensor 1	14	10	1
39	Sensor 2	4	15	2

Function of switch S6

Table 66: Switch S6: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor is connected with GND of CDM420-0001 and GND of the device
OFF	Trigger sensor is connected volt-free at CDM420-0001 and the device. Common, isolated reference potential of all digital inputs is SGND.

Characteristic data of the digital inputs

Table 67: 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.

14.9.9 Wiring the external digital inputs of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

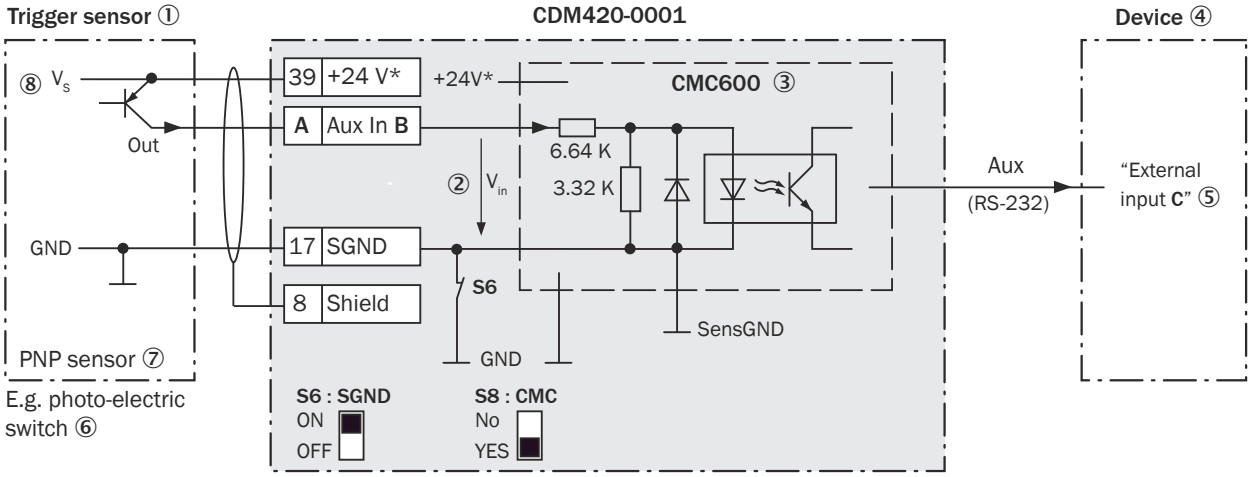


Figure 196: Trigger sensor supplied with power by connection module CDM420-0001

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 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

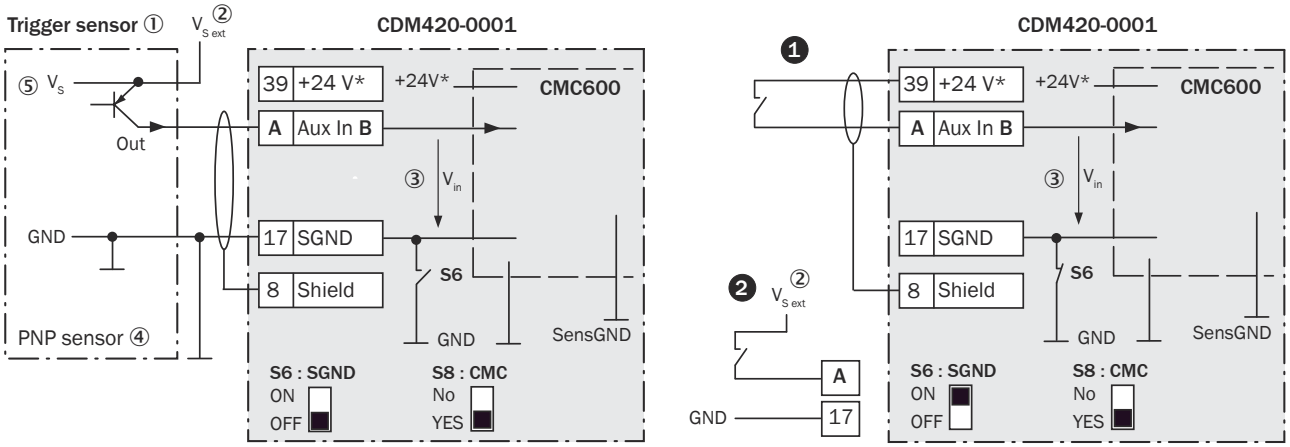


Figure 197: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDM420-0001 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

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 68: Assignment of placeholders to the digital inputs

CDM420-0001		Device
Terminal A	**Signal B**	**External input C**
18	Aux In 1	1
19	Aux In 2	2

Function of switch S6

Table 69: Switch S6: SGND - GND

Switch setting	Function
ON	GND of the trigger sensor connected with GND of CDM420-0001 and CMC600
OFF	Trigger sensor connected volt-free at CDM420-0001 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 70: 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 digital inputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

14.9.10 Wiring digital outputs of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

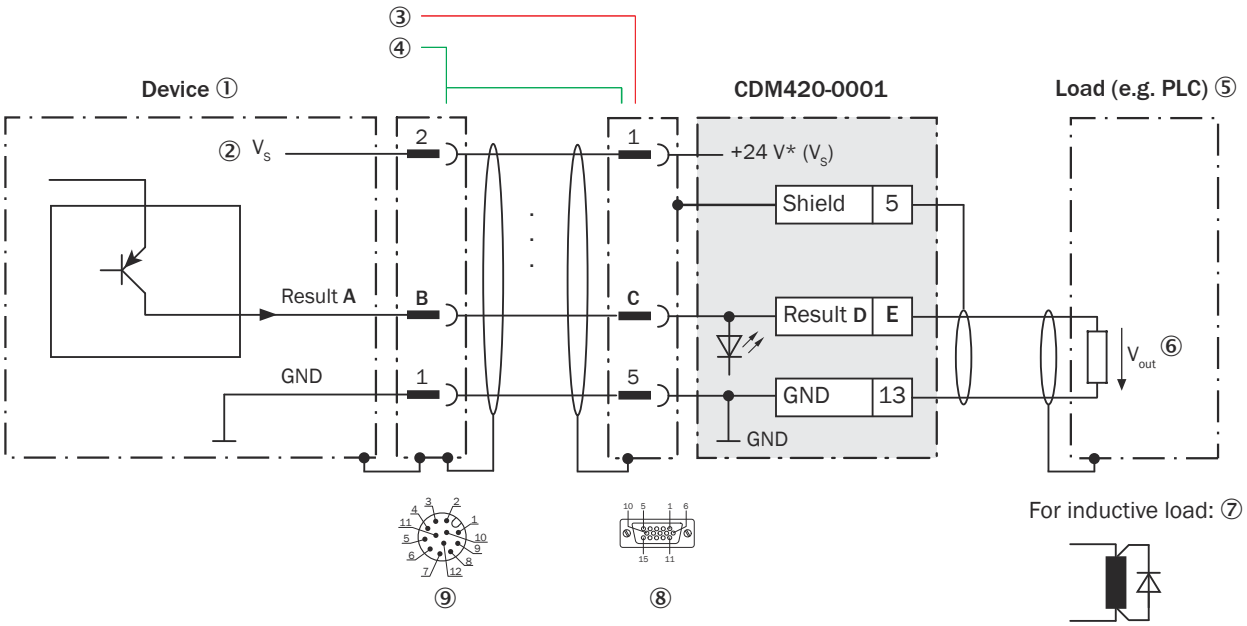


Figure 198: Wiring the digital outputs “Result 1” and “Result 2” of the device in the connection module CDM420-0001, Ethernet variant with male connector, M12, 12-pin, A-coded

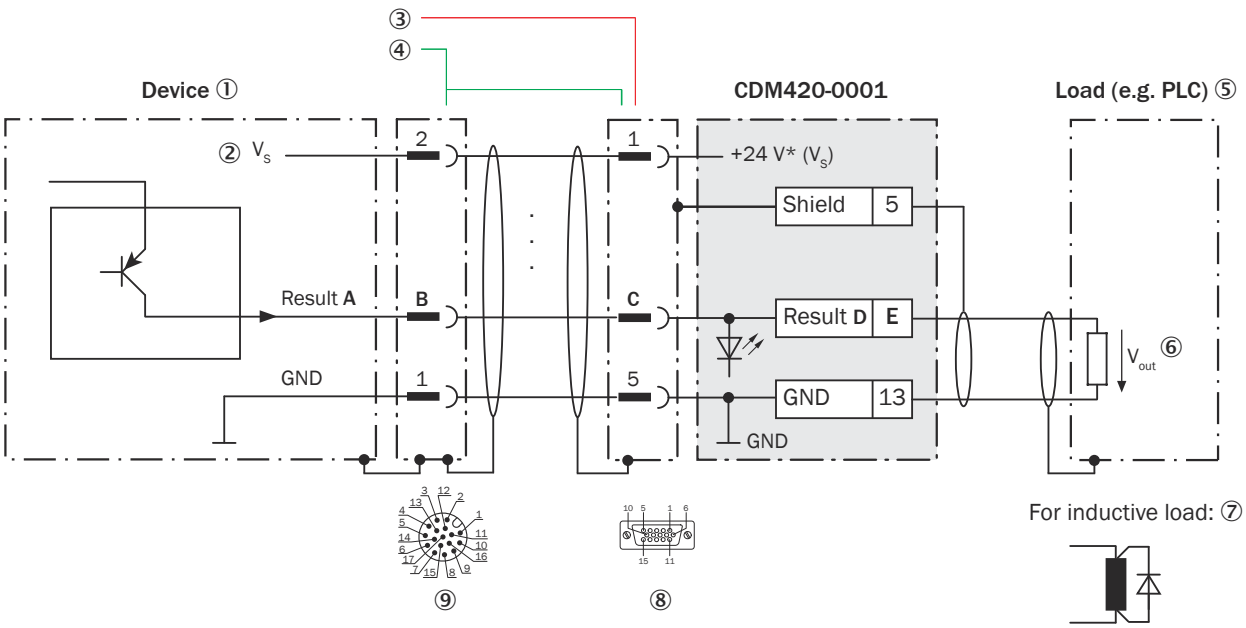


Figure 199: Wiring the "Result 1" and "Result 2" digital outputs of the device in the connection module CDM420-0001, Ethernet variant with male connector, M12, 17-pin, A-coded.

① Device
② Supply voltage V_S
③ CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)
④ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)
⑤ Load (e.g. PLC)
⑥ Output voltage V_{out}
⑦ With inductive load: see note
⑧ Connection module: female connector, D-Sub-HD, 15-pin
⑨ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

NOTE
Digital output are omitted due to limited number of contacts in the connector plug of the device.

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The two "Result 1" and "Result 2" digital outputs are not available.

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 71: Assignment of placeholders to the digital outputs

Device		CDM420-0001		
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 72: Characteristic data of the digital outputs "Result 1" and "Result 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 and temperature protected • Not electrically isolated from the supply voltage 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

14.9.11 Wiring the external digital outputs of the device in the CDM420-0001

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

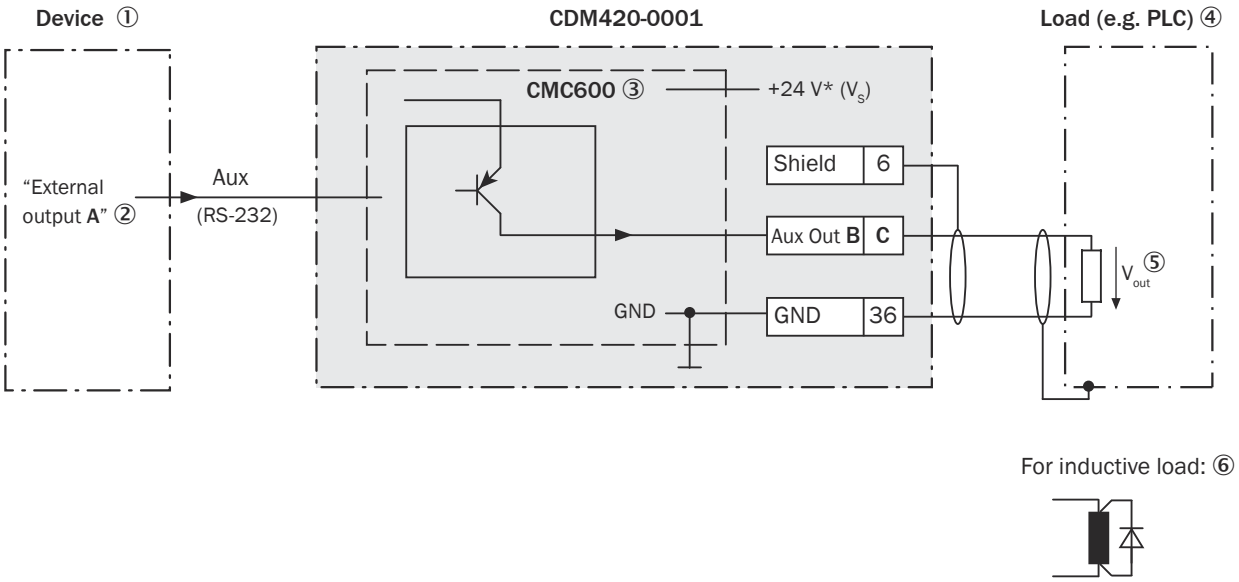


Figure 200: Wiring external digital outputs "Aux Out 1" and "Aux Out 2" of the device in the connection module CDM420-0001.

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 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 73: Assignment of placeholders to the external digital outputs

Device	CDM420-0001	
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 74: 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 and temperature protected • Not electrically isolated from the supply voltage 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

14.10 Connection diagrams of connection module CDM420-0006

14.10.1 Connection of the device to CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

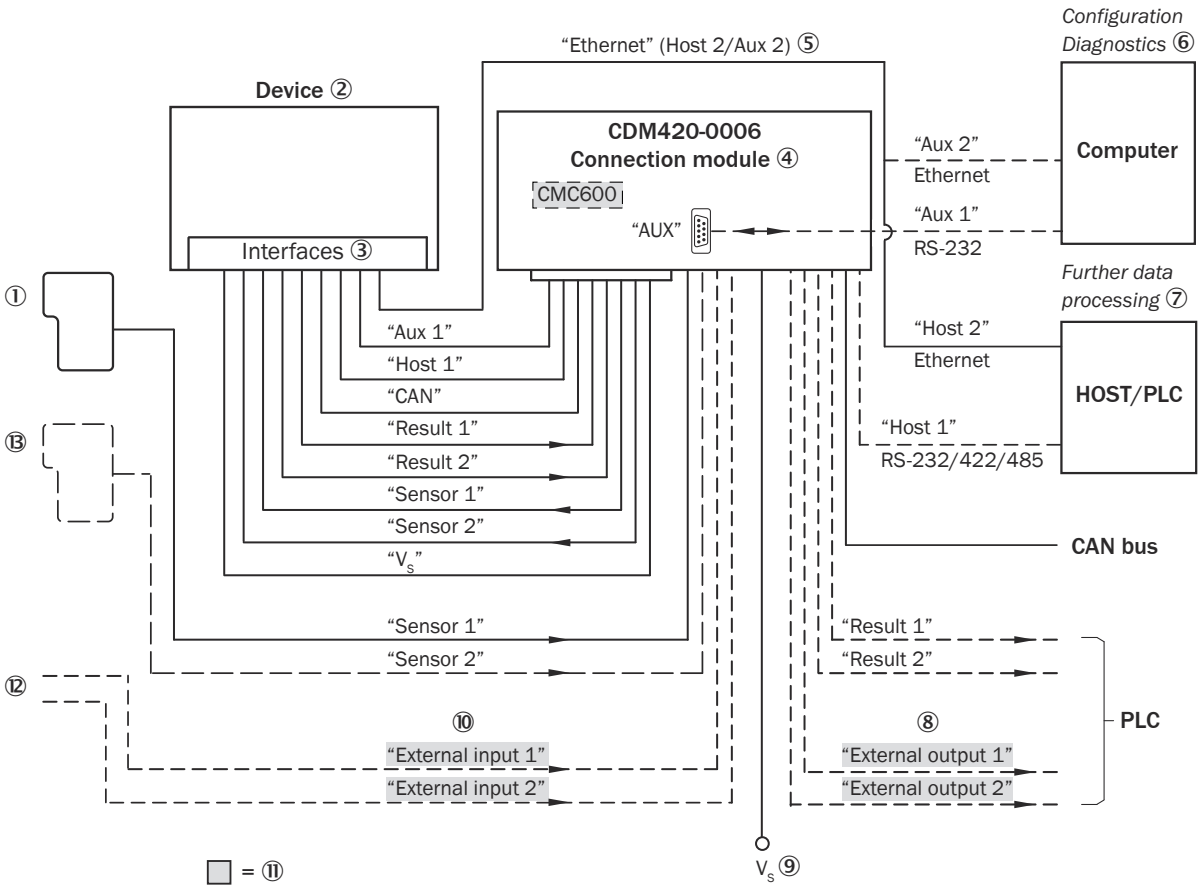


Figure 201: Connection of the device to peripherals via CDM420-0006 (overview)

① External trigger sensor, e.g. for read cycle generation
② Device
③ Interfaces
④ Connection module
⑤ Ethernet, omitted for CLV63x / 64x / 65x-x0xxx (serial variant).
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital outputs (switching)
⑨ Supply voltage V_S
⑩ External digital inputs (switching)
⑪ The optional CMC600 parameter cloning module is required in the connection module in order to use the additional external digital inputs and outputs of the device (highlighted in gray).
⑫ Other functions
⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

14.10.2 Wiring overview of the CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8), 1 digital input used

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating, 1 digital input used

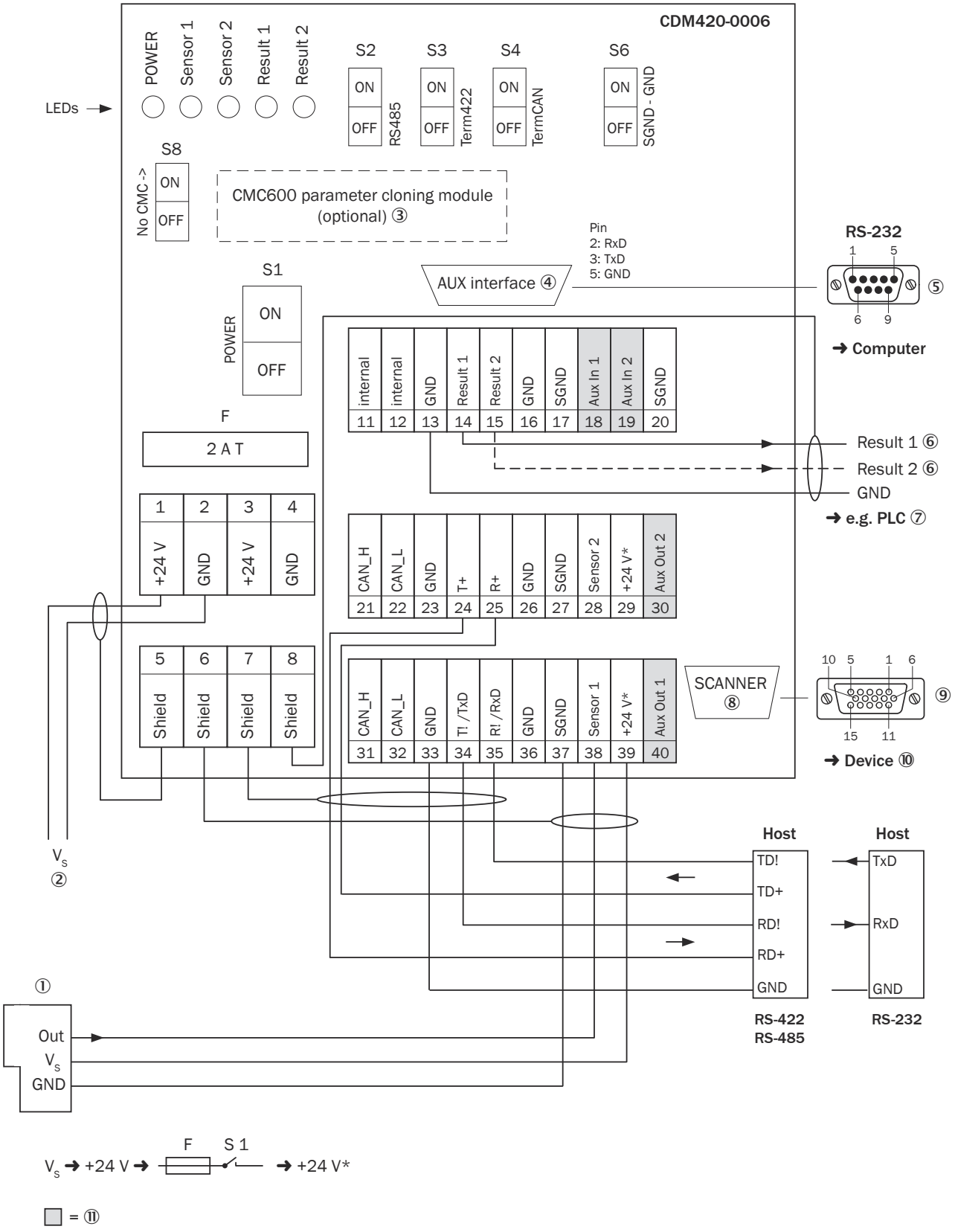


Figure 202: Overview: connection of device (without heating) and peripherals to the CDM420-0006 connection module

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 use the additional external digital inputs and outputs of the device (highlighted in gray).

14.10.3 Connecting supply voltage for the device in CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

NOTE
For devices with external heating, connect both components in the connection module to the supply voltage.

Connection diagram see "Connecting devices with heating to connection modules", page 65.

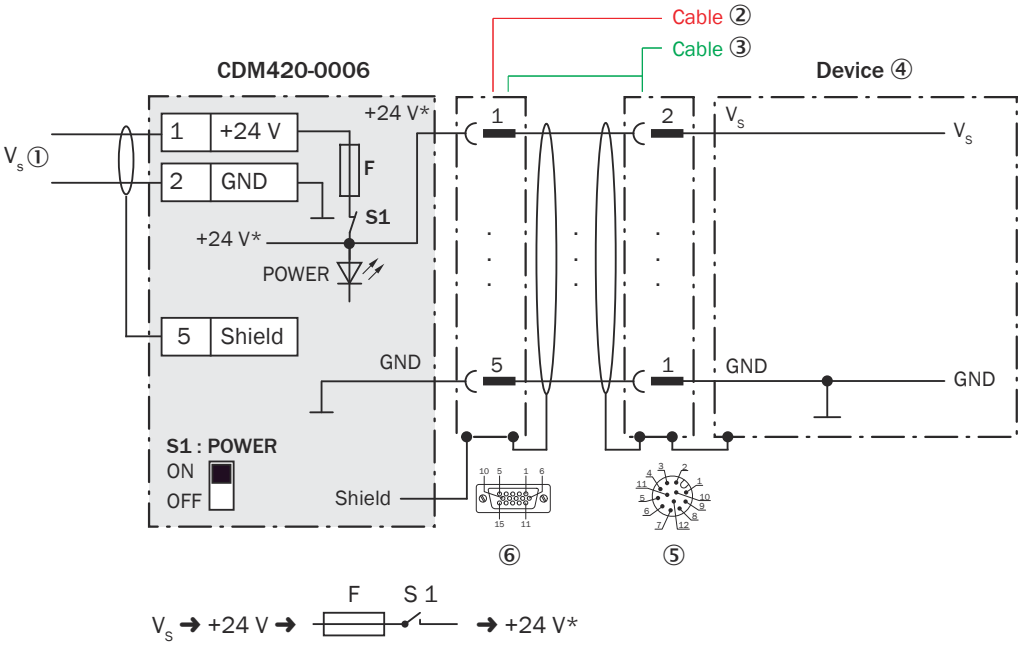


Figure 203: Connecting supply voltage for the device (without heater) in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

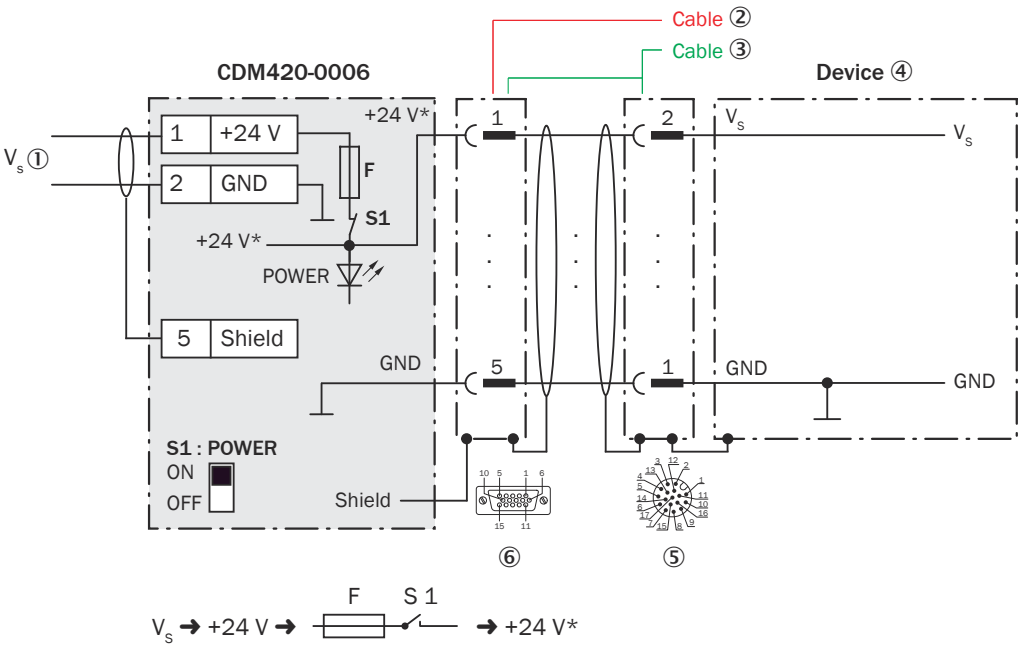


Figure 204: Connecting supply voltage for the device (without heater) in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Supply voltage V_S

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Device

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

⑥ Connection module: female connector, D-Sub-HD, 15-pin

Function of switch S1

Table 75: 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

14.10.4 Wiring serial host interface RS-232 of the device in the CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

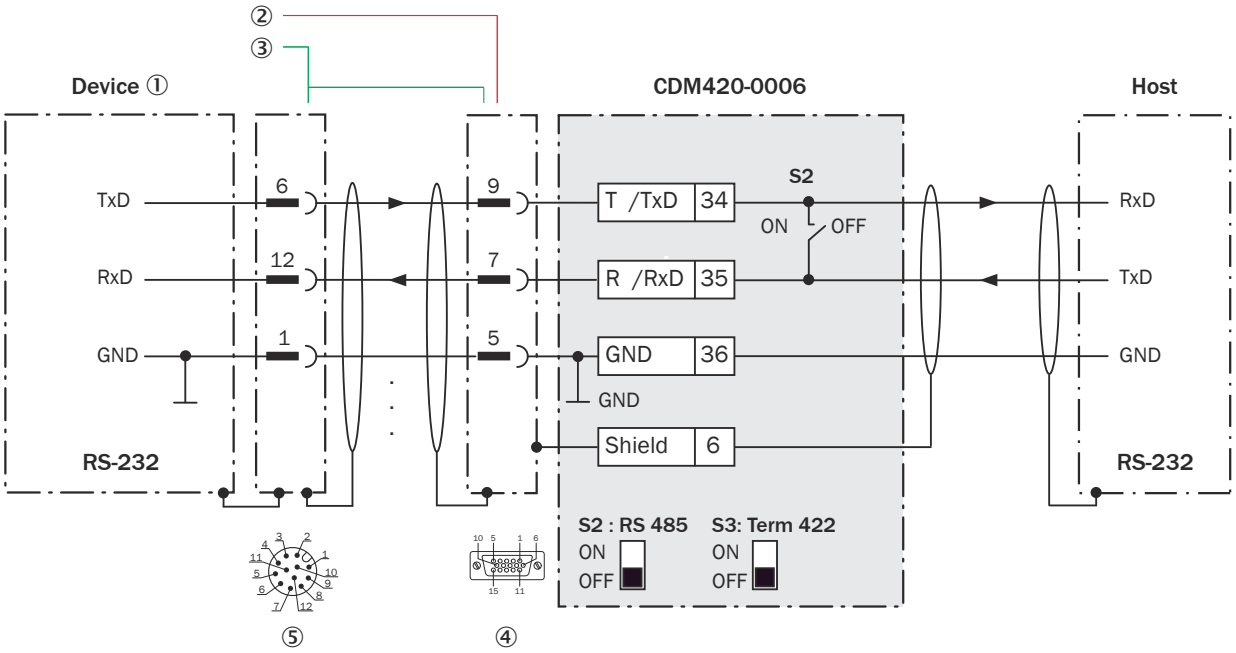


Figure 205: Wiring data interface RS-232 of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

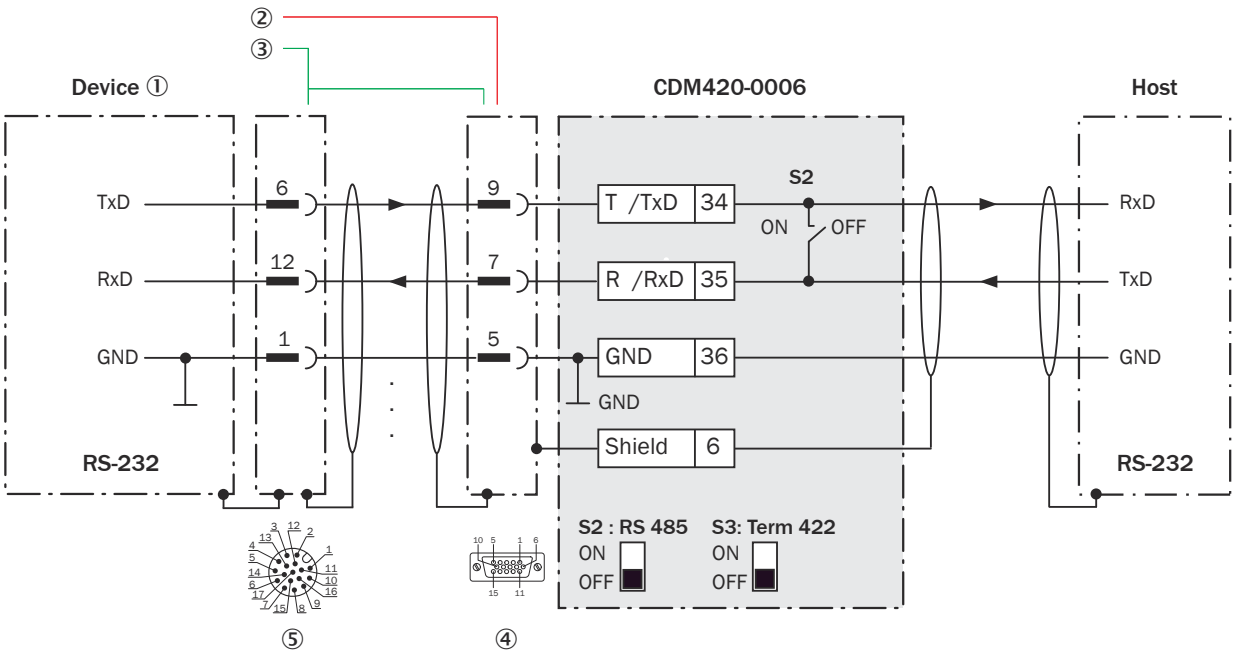


Figure 206: Wiring data interface RS-232 of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): 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.

14.10.5 Wiring serial host interface RS-422 of the device in the CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

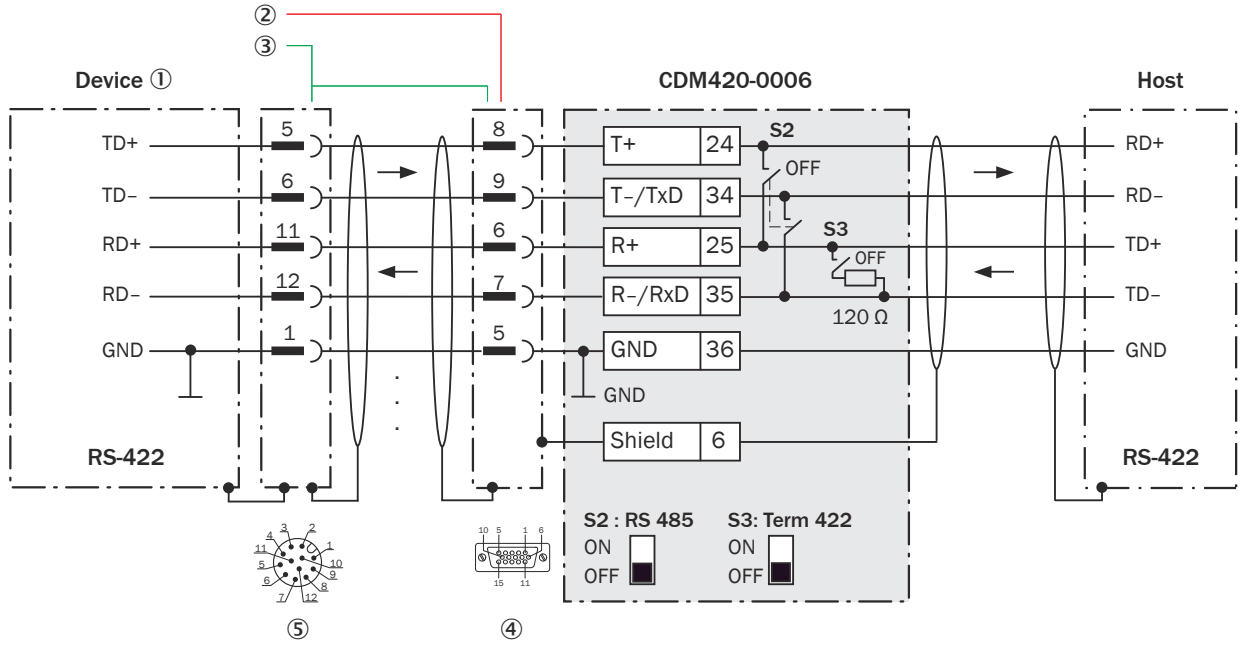


Figure 207: Wiring data interface RS-422 of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded

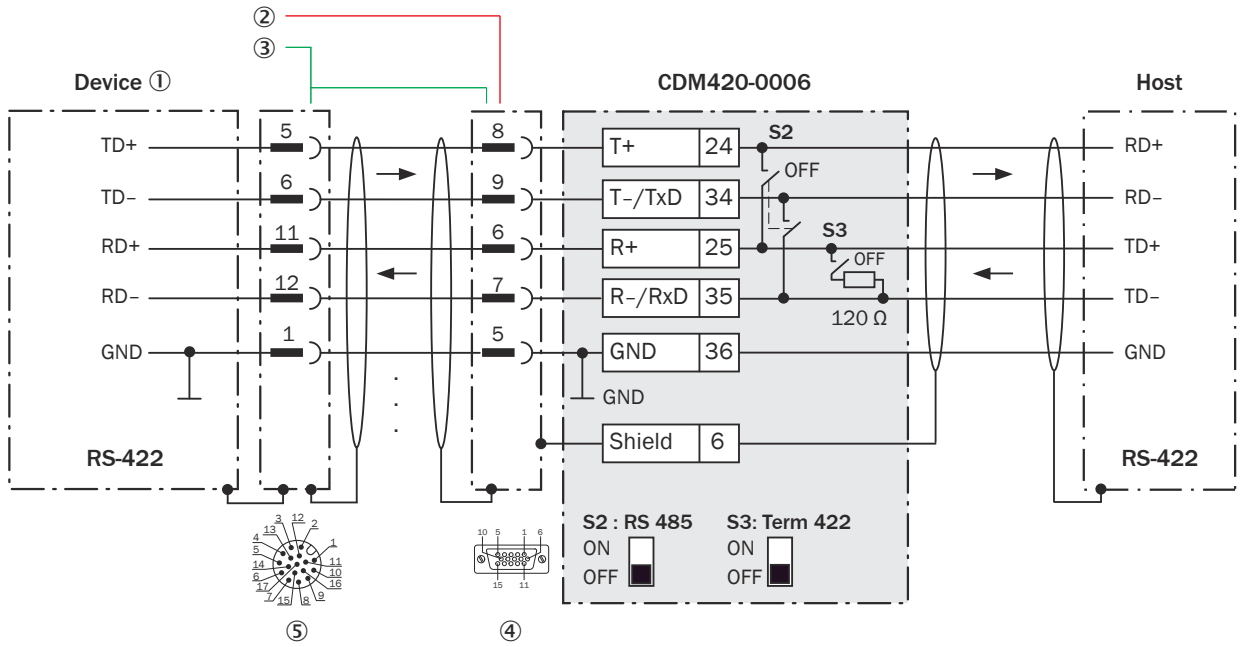


Figure 208: Wiring data interface RS-422 of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Connection module: female connector, D-Sub-HD, 15-pin

⑤ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S3

Table 76: 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

Activate the RS-422 data interface (“Point-to-Point” option) in the device with a configuration tool, e.g. the configuration software SOPAS ET.

The requirements and restrictions apply when using the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard in accordance with RS-422 and RS-485.
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 operation.

14.10.6 Wiring serial host interface RS-485 of the device in the CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

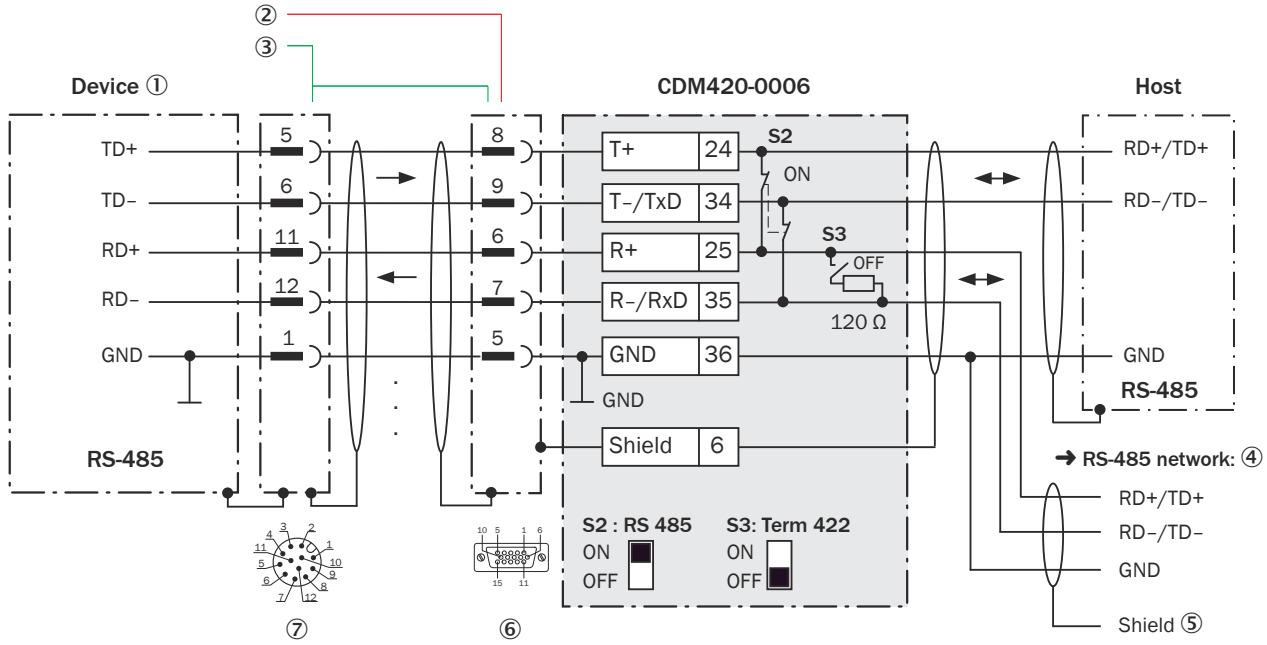


Figure 209: Wiring the RS-485 data interface of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 12-pin, A-coded.

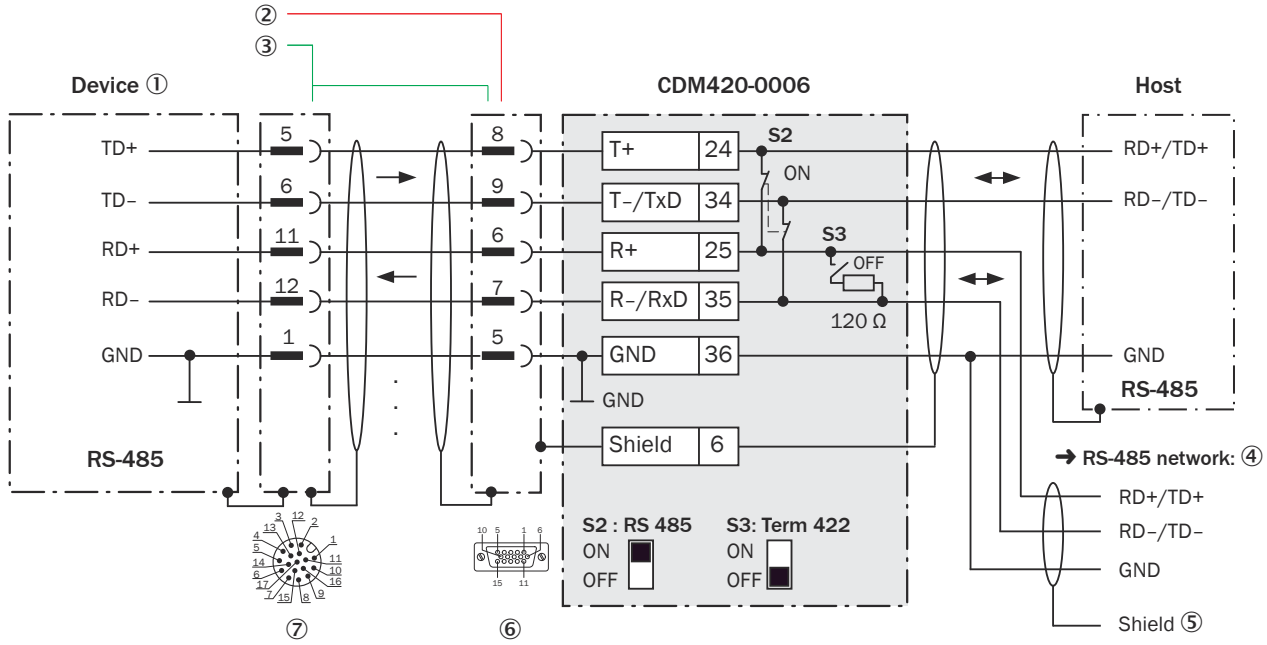


Figure 210: Wiring the RS-485 data interface of the device in the CDM420-0006 connection module, Ethernet variant with male connector, M12, 17-pin, A-coded.

① Device

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ RS-485 network

⑤ Shielding

⑥ Connection module: female connector, D-Sub-HD, 15-pin

⑦ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

Function of switch S3

Table 77: Switch S3: Term 422

Switch setting	Function
ON	Terminates the device. Required if the device is located at the end of the RS-485 bus cable.
OFF	No termination

NOTE

Activate the RS-485 data interface (“Bus” option) in the device using a configuration tool, e.g., the SOPAS ET configuration software.

The following requirements or restrictions apply when using the RS-485 data interface:

- The relevant interface drivers for the device comply with the RS-422 and RS-485standard.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- This configuration is not permitted when using the standard data output and protocol of the device. In case of doubt, contact SICK Service.

14.10.7 Wiring the CAN interface of the device in the CDM420-0006

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

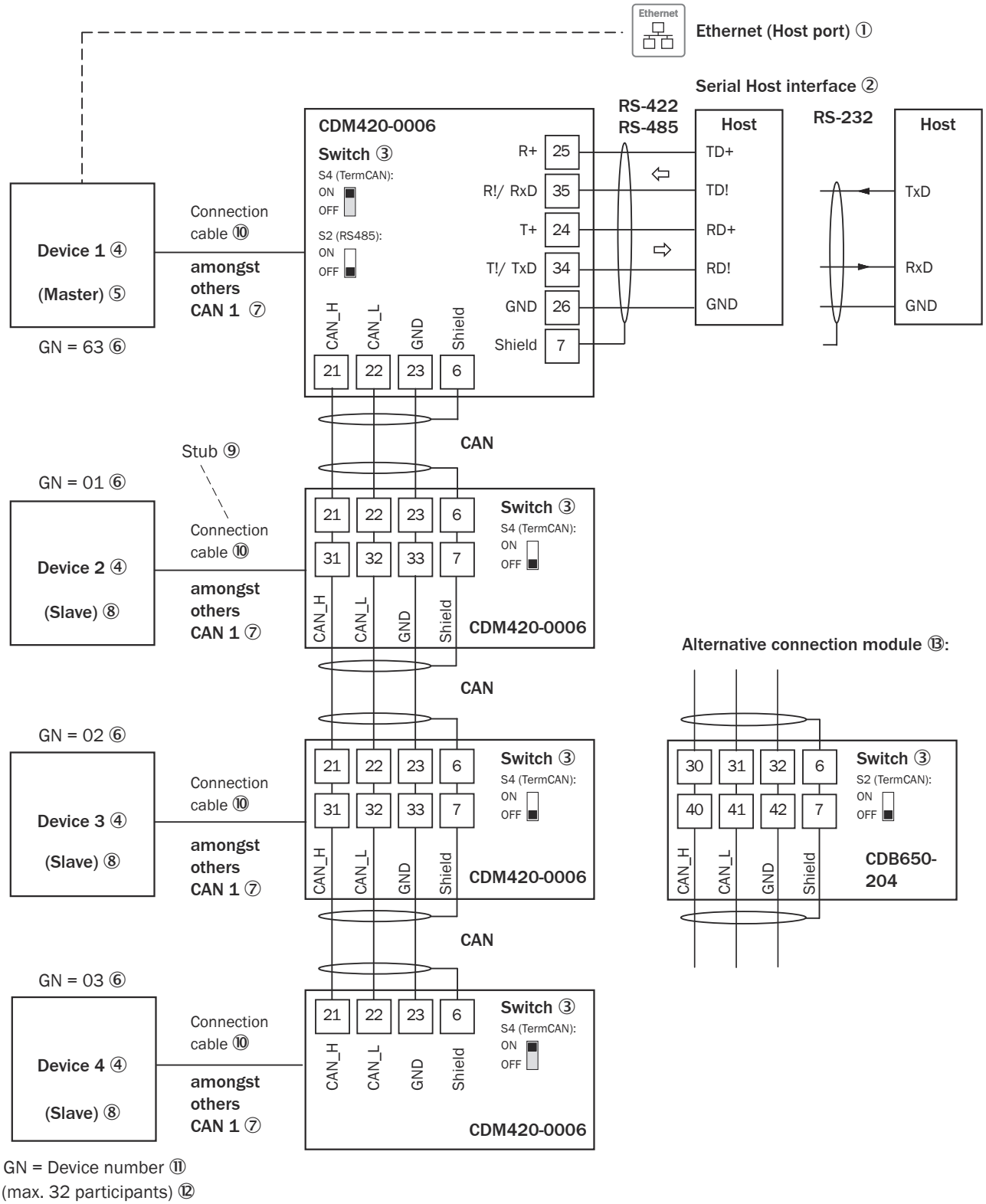


Figure 211: Wire the CAN interface of the device in the CDM420-0006 connection module. Connection and looping through of the supply voltage and connection of a trigger sensor for read cycle generation at the master, for example, are disregarded here!

① Only CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1 or 8): 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 CLV63x-/CLV64x-/CLV65x-x0xxx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)

⑪ Device number (GN)
⑫ Maximum 32 users
⑬ Example of alternative connection module:

Alternative connection module for CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1): CDB620, CDM420-0001 or CDB650-204

CDB620 or CDM420-0001: An adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1).

CDB620 or CDM420-0001: An adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin) is required to connect the CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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 CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 8).

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.

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

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

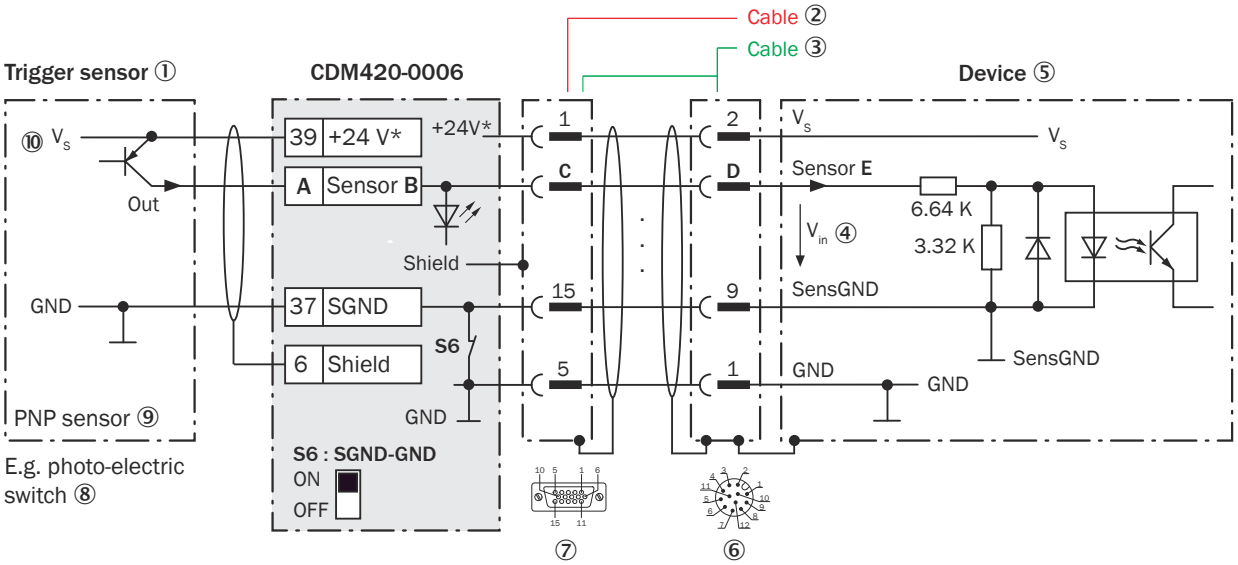


Figure 212: Trigger sensor supplied with power by connection module CDM420-0006, Ethernet variant with male connector, M12, 12-pin, A-coded

NOTE

Reduction of digital inputs due to limited number of contacts in the connector plug of the device.

CLV63x/CLV64x/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The “Sensor 2” digital output is not available.

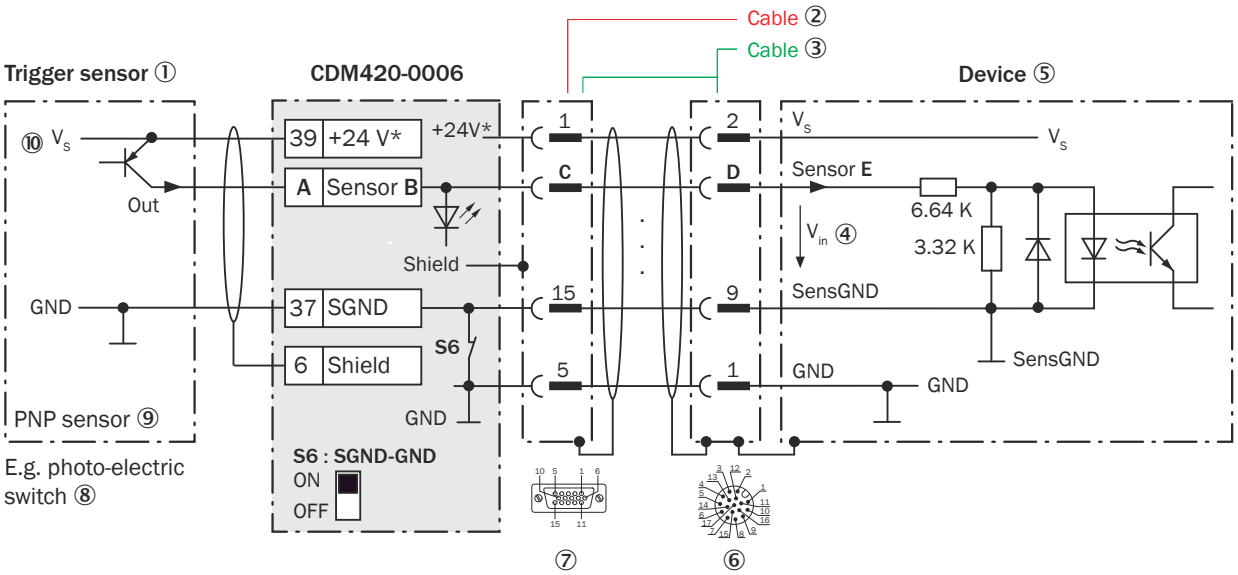


Figure 213: Trigger sensor supplied with power by connection module CDM420-0006, Ethernet variant with male connector, M12, 17-pin, A-coded

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

② CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

③ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin/ female connector, M12, 12-pin, A-coded)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (male connector, D-Sub-HD, 15-pin / female connector, M12, 17-pin, A-coded)

④ Input voltage V_{in}

⑤ Device
⑥ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded
CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded
⑦ Connection module: female connector, D-Sub-HD, 15-pin
⑧ E.g. photoelectric sensor
⑨ PNP sensor
⑩ Supply voltage V_S

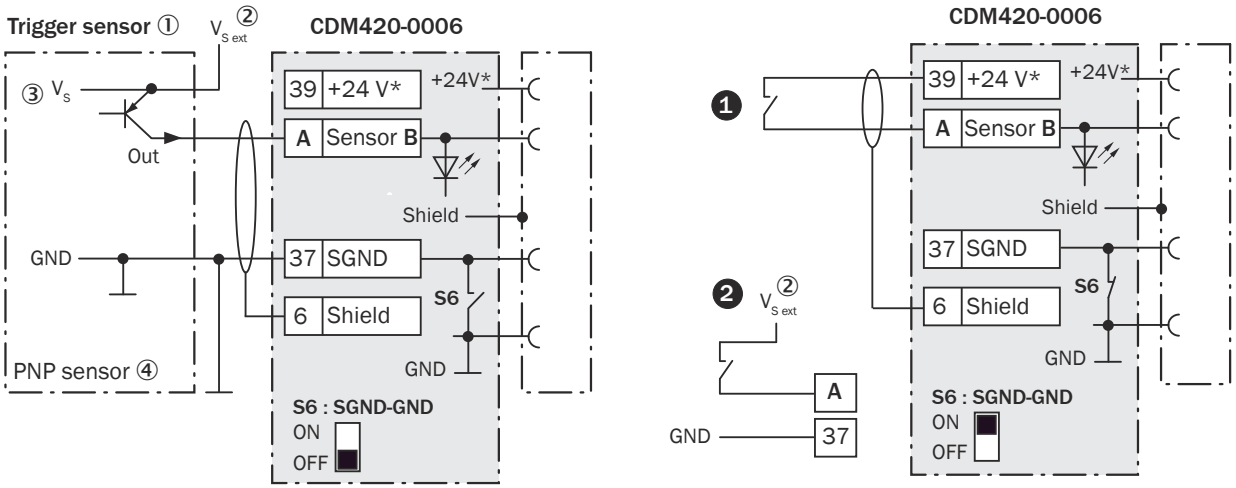


Figure 214: Left: Trigger sensor connected potential-free and supplied with power externally. Right: alternative switch, ❶ supplied with power by connection module CDM420-0006 or ❷ connected volt-free and supplied with power externally. Now select switch setting S6 as shown in the left figure.

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

Table 78: 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 79: Switch S6: SGND - GND

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

Characteristic data of the digital inputs

Table 80: 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.

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

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

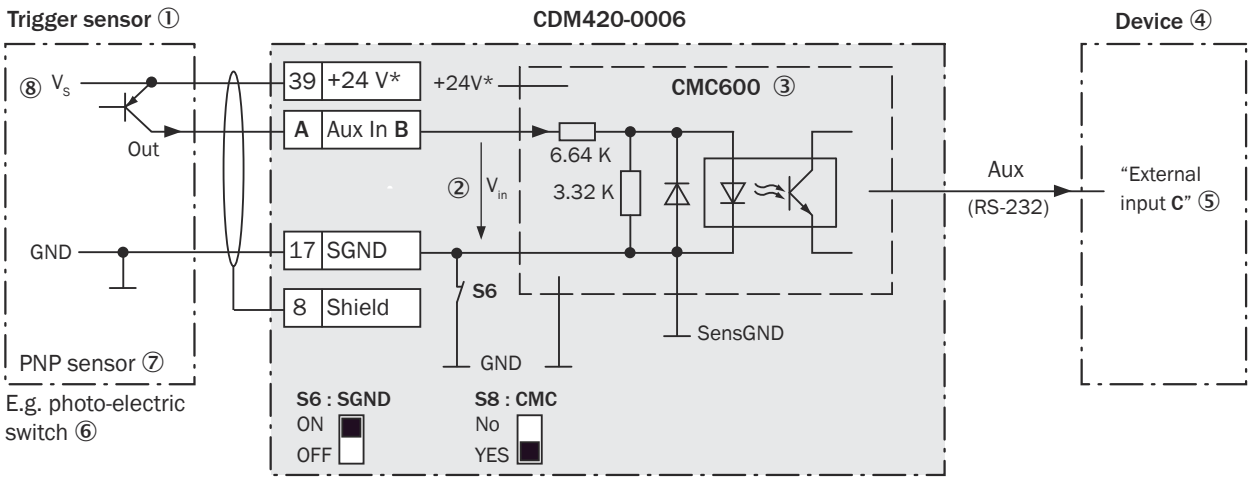


Figure 215: Trigger sensor supplied with power by connection module CDM420-0006.

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 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

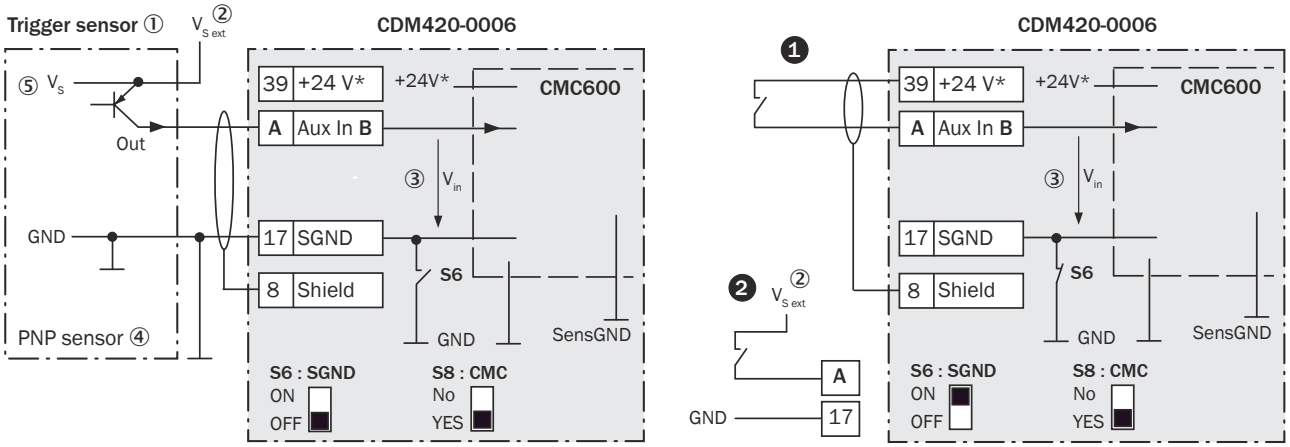


Figure 216: Left: Trigger sensor connected potential-free and supplied with power externally. Right: Alternatively switch, ❶ supplied with power by connection module CDM420-0006 or ❷ connected potential-free and supplied with power externally. Switch setting S3 then as in left figure.

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 81: 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 82: 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 volt-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 83: 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 digital inputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

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

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

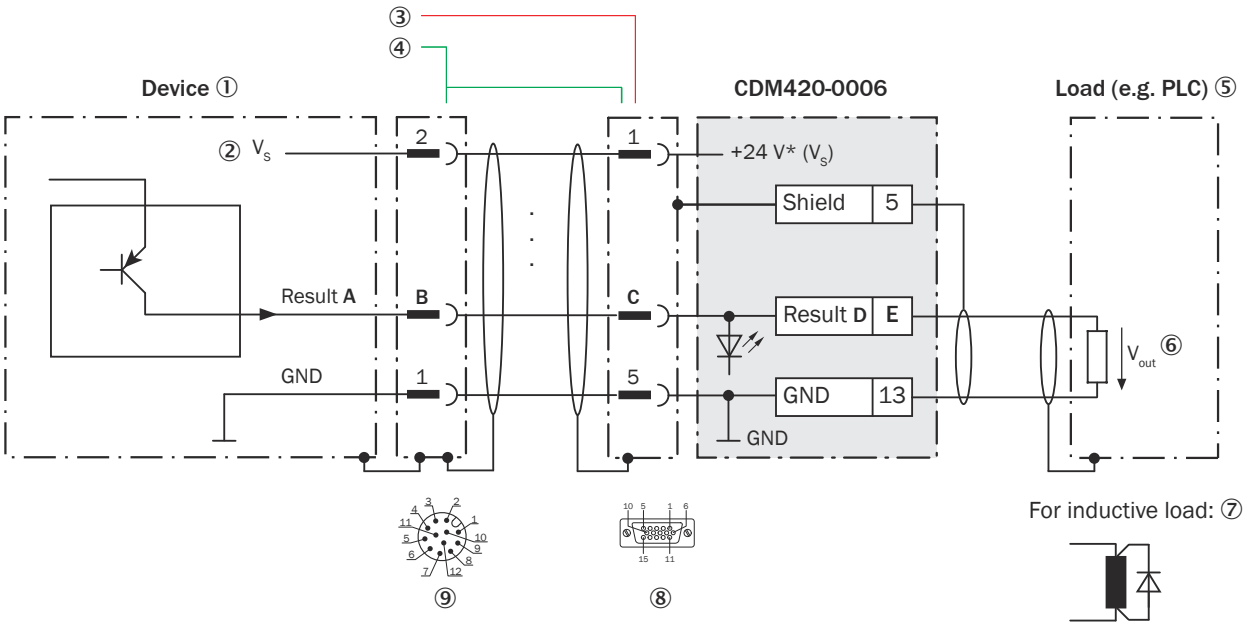


Figure 217: Wiring the “Result 1” and “Result 2” digital outputs of the device in the connection module CDM420-0006, Ethernet variant with male connector, M12, 12-pin, A-coded.

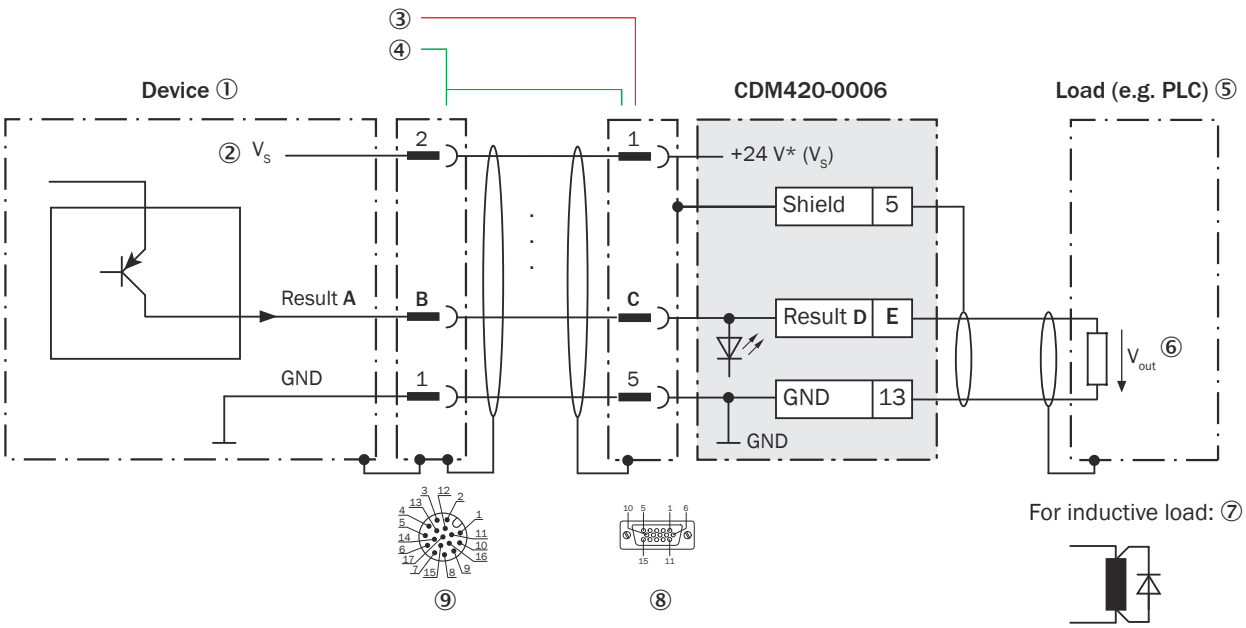


Figure 218: Wiring the digital outputs "Result 1" and "Result 2" of the device in the connection module CDM420-0006, Ethernet variant with male connector, M12, 17-pin, A-coded

① Device

② Supply voltage V_S

③ CLV63x-/CLV64x-/CLV65x-x0xx (serial variant): connecting cable permanently connected with the device (male connector, D-Sub-HD, 15-pin)

④ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): adapter cable (female connector, M12, 12-pin, A-coded / male connector, D-Sub-HD, 15-pin)

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): adapter cable (female connector, M12, 17-pin, A-coded / male connector, D-Sub-HD, 15-pin)

⑤ Load (e.g. PLC)

⑥ Output voltage V_{out}

⑦ With inductive load: see note

⑧ Connection module: female connector, D-Sub-HD, 15-pin

⑨ CLV63x-/CLV64x-/CLV65x-x1xx (Ethernet variant): male connector, M12, 12-pin, A-coded

CLV63x-/CLV64x-/CLV65x-x8xx (Ethernet variant): male connector, M12, 17-pin, A-coded

NOTE

Digital output are omitted due to limited number of contacts in the connector plug of the device.

CLV63x-/CLV64x-/CLV65x-xYxxx (Ethernet variant, Y = 1) with male connector, M12, 12-pin, A-coded: The two "Result 1" and "Result 2" digital outputs are not available.

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 84: 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 85: Characteristic data of the "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 and temperature protected • Not electrically isolated from the supply voltage 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

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

Device = CLV63x-x0xxx (serial variant), CLV63x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV63x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

Device = CLV64x-x0xxx (serial variant), CLV64x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-x0xxx (serial variant), CLV65x-xYxxx (Ethernet variant, Y = 1 or 8)

Device = CLV65x-xYxxxF0 (serial variant, Y=0 or Ethernet variant, Y = 1 or 8) with heating

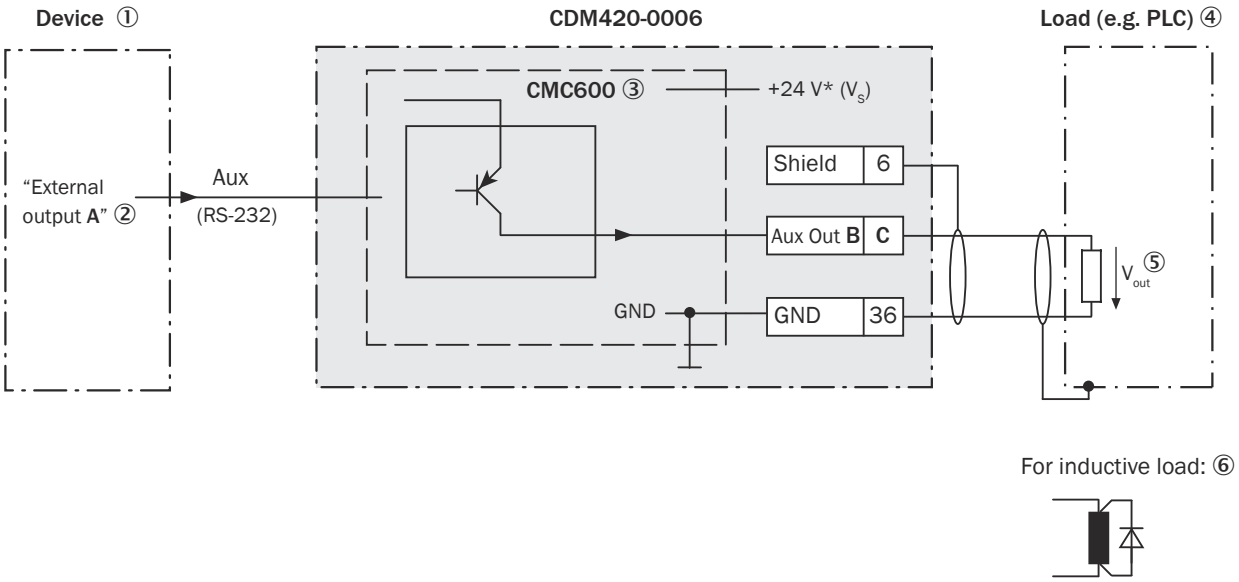


Figure 219: Wiring "Aux Out 1" and "Aux Out 2" external digital outputs of the device in the connection module CDM420-0006.

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 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 86: Assignment of placeholders to the external 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 87: 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 and 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 digital outputs in the device using a configuration tool, e.g., the configuration software SOPAS ET.

15 Abbreviations used

Table 88: Abbreviations used

CAN	**C**ontrolled **A**rea **N**etwork. Field bus protocol based on the CAN bus
CDB	**C**onnection **D**evice **B**asic
CDF	**C**onnection **D**evice **F**ieldbus
CDM	**C**onnection **D**evice **M**odular
CE	**C**ommunauté **E**uropéenne. European Community
CLV	**C**ode-**L**eser **V**-Prinzip [Code reader V principle]
CMC	**C**onnection **M**odule **C**loning
CMD	**C**onnection **M**odule **D**isplay
CMF	**C**onnection **M**odule **F**ieldbus
CMP	**C**onnection **M**odule **P**ower
CA	**C**ode**A**ngle
DOF	**D**epth **O**f **F**ield. Depth of field
ES	**E**lectrical **s**ource. Electrical power source.
ESD	**E**lectro-**S**tatic **D**ischarge. Electrostatic discharge
GSD	**G**eneral **S**tation **D**escription (generic station description for PROFIBUS/PROFINET)
HTML	**H**yper **T**ext **M**arkup **L**anguage (page description language on the Internet)
I	**I**nput
I_{in}	Input current
I_{out}	Output current
LED	**L**ight **E**mitting **D**iode. Light emitting diode
LPS	**L**imited **P**ower **S**upply
MAC	**M**edium **A**ccess **C**ontrol
MTBF	**M**ean **T**ime **B**etween **F**ailure
MTTF	**M**ean **T**ime **T**o **F**ailure
MTTR	**M**ean **T**ime **T**o **R**epair
O	**O**utput
PCS	**P**rinted **C**ontrast **S**ignal
PLC	**P**rogrammable **L**ogic **C**ontroller
PROM	**P**rogrammable **R**ead **O**nly **M**emory. Programmable non-volatile memory
RA	**R**eading **A**ngle
RAM	**R**andom **A**ccess **M**emory. Direct-access volatile memory
ROM	**R**ead **O**nly **M**emory. Read-only memory (non-volatile)
RTF	**R**ich **T**ext **F**ormat (standardized document format with format description)
SD	**S**ecure **D**igital
SDD	**S**OPAS **D**evice **D**escription (device description file, driver for SICK SOPAS ET software)
SMART	**S**ICK **M**odular **A**dvanced **R**ecognition **T**echnology
SOPAS ET	**S**ICK **O**pen **P**ortal for **A**pplication and **S**ystems **E**ngeneering **T**ool (computer software for Windows for device configuration)
PLC	**P**rogammable **L**ogic **C**ontroller
SELV	Safety Extra Low Voltage

TCP/IP	**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol
V_{in}	Input voltage
V_{out}	Output voltage
V_S	Supply voltage
$V_{S\ ext}$	External supply voltage

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