

# CLV62x

Bar code scanner

**SICK**  
Sensor Intelligence.



---

**Described product**

CLV62x

**Manufacturer**

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

**Legal information**

This work is protected by copyright. Any rights derived from the copyright shall be reserved for SICK AG. Reproduction of this document or parts of this document is only permissible within the limits of the legal determination of Copyright Law. Any modification, abridgment or translation of this document is prohibited without the express written permission of SICK AG.

The trademarks stated in this document are the property of their respective owner.

© SICK AG. All rights reserved.

**Original document**

This document is an original document of SICK AG.



## Contents

<b>1</b>	<b>About this document.....</b>	<b>5</b>
1.1	Information on the operating instructions.....	5
1.2	Scope.....	5
1.3	Explanation of symbols.....	5
1.4	Further information.....	6
1.5	Customer service.....	6
<b>2</b>	<b>Safety information.....</b>	<b>7</b>
2.1	Intended use.....	7
2.2	Incorrect use.....	7
2.3	IP technology.....	7
2.4	Limitation of liability.....	7
2.5	Modifications and conversions.....	8
2.6	Requirements for skilled persons and operating personnel.....	8
2.7	Hazard warnings and operational safety.....	9
2.8	Switching off the device.....	11
2.9	Protection of the environment.....	11
2.10	Repairs.....	11
<b>3</b>	<b>Product description.....</b>	<b>12</b>
3.1	Product ID.....	12
3.2	Product characteristics.....	14
<b>4</b>	<b>Transport and storage.....</b>	<b>20</b>
4.1	Transport.....	20
4.2	Transport inspection.....	20
4.3	Storage.....	20
<b>5</b>	<b>Mounting.....</b>	<b>21</b>
5.1	Overview of mounting procedure.....	21
5.2	Scope of delivery.....	21
5.3	Preparation for mounting.....	21
5.4	Mounting location.....	22
5.5	Mounting the device.....	24
5.6	Mounting of external components.....	25
<b>6</b>	<b>Electrical installation.....</b>	<b>27</b>
6.1	Safety.....	27
6.2	Prerequisites for the safe operation of the device in a system.....	28
6.3	Wiring notes.....	31
6.4	Pin allocation of the connections.....	31
6.5	Connection diagrams.....	34
6.6	Wiring interfaces.....	36
<b>7</b>	<b>Commissioning.....</b>	<b>41</b>

7.1	Overview of the commissioning steps.....	41
7.2	SOPAS ET configuration software.....	41
7.3	Start the SOPAS ET configuration software and connect to the device	41
7.4	Initial commissioning.....	42
7.5	Adjust the device.....	42
7.6	Fine adjustment and further configuration.....	43
<b>8</b>	<b>Operation.....</b>	<b>45</b>
8.1	Operating and status indicators.....	45
8.2	Operating options.....	45
<b>9</b>	<b>Maintenance.....</b>	<b>46</b>
9.1	Maintenance.....	46
9.2	Cleaning.....	46
<b>10</b>	<b>Troubleshooting.....</b>	<b>49</b>
10.1	Overview of possible errors and faults.....	49
10.2	Detailed fault analysis.....	49
10.3	Status log.....	49
10.4	Replacing the device.....	50
10.5	Customer service.....	51
<b>11</b>	<b>Decommissioning.....</b>	<b>52</b>
11.1	Disposal.....	52
<b>12</b>	<b>Technical data.....</b>	<b>53</b>
12.1	Optical lens system.....	53
12.2	Performance.....	53
12.3	Interfaces.....	54
12.4	Mechanics/electronics.....	54
12.5	Ambient data.....	55
12.6	Dimensional drawings.....	56
12.7	Reading field diagrams.....	57
<b>13</b>	<b>Accessories.....</b>	<b>65</b>
<b>14</b>	<b>Annex.....</b>	<b>66</b>
14.1	Notes on PROFINET.....	66
14.2	EU declaration of conformity / Certificates.....	67
14.3	Certification in accordance with UL60950.....	67
14.4	Dimensional drawings.....	68
14.5	Abbreviations used.....	68

# 1 About this document

## 1.1 Information on the operating instructions

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

Prerequisites for safe work are:

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

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



### NOTE

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

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

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

## 1.2 Scope

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

These instructions apply to all available device variants of the device. More detailed information for the identification of the available device type see "Type code", page 12.

Available device variants are listed on the online product page.

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

## 1.3 Explanation of symbols

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



### DANGER

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



### WARNING

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

**CAUTION**

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

---

**NOTICE**

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

---

**NOTE**

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

---

### 1.4 Further information

**NOTE**

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

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

The following information is available for download there:

- Model-specific online data sheets for device variants, containing technical data, dimensional drawings, and reading field diagrams
  - EU declaration of conformity for the product family
  - Dimensional drawings and 3D CAD dimension models in various electronic formats
  - Reading field diagrams
  - These operating instructions are available in German and other languages.
  - Other publications related to the devices described here
  - Publications dealing with accessories
- 

#### 1.4.1 Supplementary documents

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

#### 1.4.2 Documents on request

Overview of command strings for the device.

### 1.5 Customer service

If you require any technical information, our customer service department will be happy to help. To find your representative, see the final page of this document.

---

**NOTE**

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

---

## 2 Safety information

### 2.1 Intended use

The device is an intelligent, opto-electronic SICK ID sensor and is used for automatic, fixed identification and decoding of bar codes on moving or stationary objects. The data content of the decoded bar codes is sent by the device to a higher-level control (PLC) for further coordinating processing.

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

### 2.2 Incorrect use

- The device does not constitute a safety-relevant device according to the EU Machinery Directive (2006/42/EC).
- The device must not be used in explosion-hazardous areas.
- The device must not be used in forklift applications in low temperature conditions.
- Any other use that is not described as intended use is prohibited.
- Any use of accessories not specifically approved by SICK AG is at your own risk.



#### **WARNING**

##### **Danger due to improper use!**

Any improper use can result in dangerous situations.

Therefore, observe the following information:

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

### 2.3 IP technology



#### **NOTE**

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

SICK always assumes the following prerequisites:

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

### 2.4 Limitation of liability

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

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

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

### 2.5 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 operating instructions state the following qualification requirements for the various areas of work:

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

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

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



## 2.7 Hazard warnings and operational safety

Please observe the safety notes and the warnings listed here and in other chapters of these operating instructions to reduce the possibility of risks to health and avoid dangerous situations.

### 2.7.1 Laser radiation

The device works with a red light laser diode in the wavelength 655 nm.



#### CAUTION

##### Optical radiation: Laser class 2

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

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.

#### Laser class

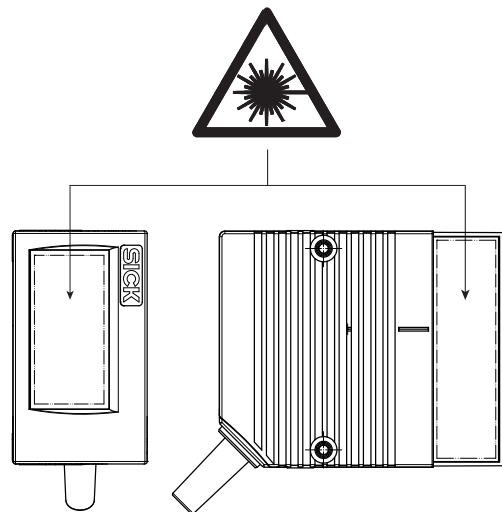


Figure 1: Laser output aperture in the different designs

The device complies with laser class 2. The entire reading window is a laser output aperture.



### NOTE

No maintenance is required to ensure compliance with laser class 2.

### Warning symbol on the device

The colored laser warning label is fitted in combination with the type label on the rear of the device.

In addition to other information, the type label of the device in use also contains the laser output data. This consists of: Laser output power (maximum/average), wavelength or wavelength range, and pulse time duration. The data is located on the lower section of the type label, [see "Type label", page 12](#).

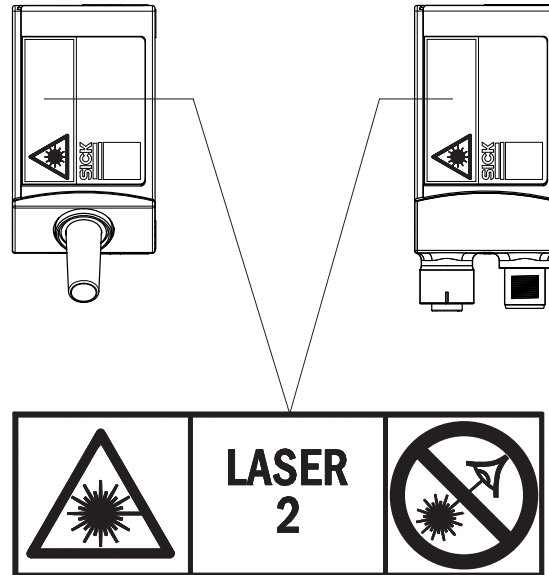


Figure 2: Position and contents of the laser warning label on the device

What the laser warning label means: Laser radiation – Never 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 the device is installed into a machine or paneling, the laser beam outlet opening must be suitably labeled. For this purpose, an additional warning label of the same type must be applied next to the outlet opening.

### Controlling the laser diode

When operating properly, 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 switch off the laser diode automatically in this type of object trigger control if **the pulse has stopped for too long** (e.g. the conveyor system has stopped). In this case, the current internal reading interval of the device remains open.

Irrespective of the selected configuration type, the laser timeout can be set as follows:

- Using the SOPAS ET configuration software, on the **Illumination Control** device page
- During GSD configuration with the “10\_Object Trigger Ctrl” module (Profinet/Profibus)

In the default setting, laser timeout is deactivated.

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

- In the “Percentage Evaluation” and “Auto Setup” operating modes (only used temporarily for configuration/diagnosis)
- In reading operation in the PSDI types “Auto pulse” (adjustable duty cycle) or “free.”

If timeout is activated, it will have no effect here.

## 2.8 Switching off the device

When switching off the device, at the most, the following data will be lost:

- Application-specific parameter sets that were only temporarily stored in the device
- Last reading result
- 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.

## 2.10 Repairs

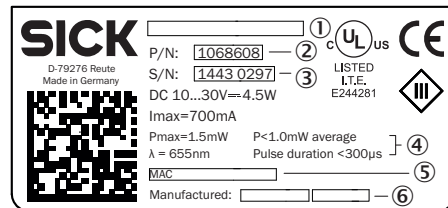
Repair work on the device may only be performed by qualified and authorized personnel from SICK AG. Interruptions or modifications to the device by the customer will invalidate any warranty claims against SICK AG.

## 3 Product description

### 3.1 Product ID

#### 3.1.1 Type label

The type label gives information for identification of the device. An existing UL certification can be found on the type label.



- ① Type designation
- ② Part number
- ③ Serial number
- ④ Laser output data, depending on type
- ⑤ MAC address, if Ethernet interface is available
- ⑥ Date of manufacture

#### 3.1.2 Type code

The devices of the CLV62x product family are arranged according to the following type code:

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	62: CLV62x
4	Working range	0: Mid range 1: Long range 2: Short range
5	Scanning method, reading window orientation <sup>1)</sup>	0: Line scanner, reading window on front 1: Raster scanner, reading window on front 2: Line scanner, reading window on side 3: Raster scanner, reading window on side
6	Electrical connections (design)	0: Cable 0.9 m with male connector, D-Sub-HD, 15-pin 1: Swivel connector, 12-pin (2 x M12 plug connector <sup>2)</sup> ) 3: Cable 2 m with male connector, D-Sub-HD, 15-pin 8: Swivel connector, 17-pin (2 x M12 plug connector <sup>3)</sup> )
7	Interfaces	0: RS-232, RS422/485, CAN, digital IOs <sup>4)</sup> 2: Ethernet, RS-232, RS-422/485, CAN, digital input <sup>5)</sup> 3: Ethernet, RS-232, RS-422/485, CAN, digital IOs <sup>4)</sup>

Position	Description	Characteristic
8	Front screen material	0: Glass 1: Plastic
9	Application (environment)	Without label: Protection class IP 65 S01: IP 69k in the special housing

- 1) Refers to the longitudinal axis of the device.
- 2) 1 x male connector, M12, 12-pin, A-coded and 1 x female connector, M12, 4-pin, D-coded.
- 3) 1 x male connector, M12, 17-pin, A-coded and 1 x female connector, M12, 4-pin, D-coded.
- 4) 2 x digital switching inputs and 2 x digital switching outputs.
- 5) 1 x digital switching input.

**NOTE**

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

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

**Designation of device variants**

- Device variants with serial data interfaces only (RS-232, RS422/485) are referred to as standard versions. They feature a connecting cable with male connector permanently connected to the housing.
- Device variants with serial data interfaces and additional Ethernet interface are referred to as Ethernet versions. They feature a connector on the housing.
- Both versions also feature a CAN interface and the appropriate number of digital switching inputs and outputs depending on the design of the electrical connection.

## 3.2 Product characteristics

### 3.2.1 Device view

CLV62x, Ethernet version

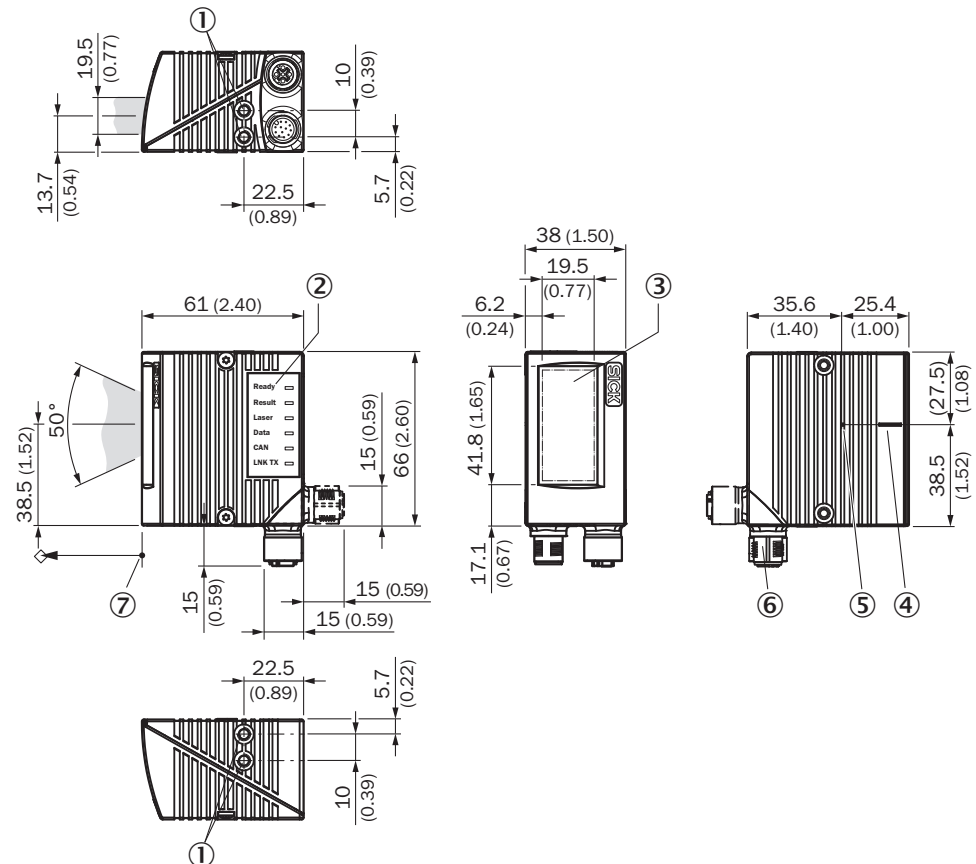


Figure 3: CLV62x: Structure and device dimensions with front reading window and connector (in mm or inch)

- ① M5 blind tapped holes, 5 mm deep (2 x), for mounting the device
- ② LED (6 x), status indicator
- ③ Reading window, front orientation
- ④ Central position of the deflected laser beam in the V-shaped aperture angle
- ⑤ Internal impact point: Rotation point of the variable direction laser beam
- ⑥ Swivel connector (male connector, M12, 12 or 17-pin, A-coded and female connector, M12, 4-pin, D-coded)
- ⑦ Reference point for reading distance (housing edge) from device to object

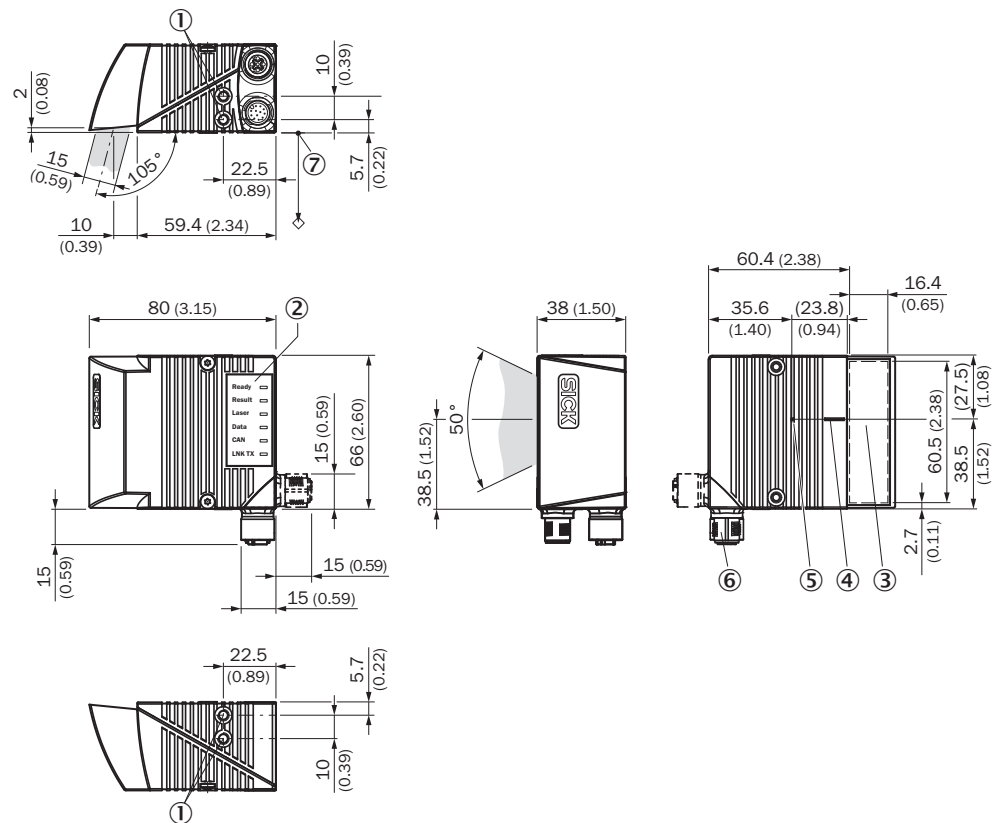


Figure 4: CLV62x: Structure and device dimensions with side reading window and connector (in mm or inch)

- ① M5 blind tapped holes, 5 mm deep (2 x), for mounting the device
- ② LED (6 x), status indicator
- ③ Reading window, side orientation
- ④ Central position of the deflected laser beam in the V-shaped aperture angle
- ⑤ Internal impact point: Rotation point of the variable direction laser beam
- ⑥ Swivel connector (male connector, M12, 12 or 17-pin, A-coded and female connector, M12, 4-pin, D-coded)
- ⑦ Reference point for reading distance (housing edge) from device to object



#### NOTE

For views and dimensions of the devices with connecting cable (standard version), see "Dimensional drawings", page 56.

#### 3.2.2 Product features and functions (overview)

Table 3: Overview of product features and functions of the device

Product feature/function	Characteristic
Safety and ease of use	<ul style="list-style-type: none"> <li>• Rugged, compact metal housing, CE marking</li> <li>• Laser Class 2, laser switches off if the output power is exceeded</li> <li>• Automatic self-test on system start</li> <li>• Diagnostic tools for system setup and (remote) system monitoring</li> <li>• Configurable output of reading diagnostic data in two reading results formats</li> <li>• Operating data polling, in case of error, issue of error code if required</li> <li>• Test string function (heartbeat) can be activated to signal that the device is ready for operation</li> <li>• Password-protected configuration mode via SOPAS ET</li> <li>• Future-oriented by firmware update (FLASH PROM) via data interface</li> <li>• Future-oriented SOPAS ET configuration software</li> <li>• Low power consumption</li> <li>• Additional supply voltage range</li> <li>• Optional parameter cloning with external CMC600 parameter memory module in the CDB/CDM connection module</li> </ul>
Convenient operation/configuration	<ul style="list-style-type: none"> <li>• Configuration (online/offline) via SOPAS ET configuration software</li> <li>• Configuration via GSD configuration (via CDF600-2xx or with Ethernet version device,)</li> <li>• Status displays via LEDs</li> <li>• Auto setup of the optical reading properties</li> <li>• Profile programming with bar codes, generated and printed via SOPAS ET</li> <li>• Buzzer, which can be switched off, to confirm the device function</li> </ul>
Read operation modes	<ul style="list-style-type: none"> <li>• Start/stop operation (one bar code bearing object per read pulse)</li> </ul>
Read cycle	<ul style="list-style-type: none"> <li>• Pulse sources for start: switching inputs, data interface (command), auto pulse, free, CAN</li> <li>• Pulse sources for stop: read pulse source, switching inputs, data interface (command), timer, condition</li> </ul>
Bar code evaluation	<ul style="list-style-type: none"> <li>• All current 1D bar code types</li> <li>• Max. number of bar codes: 50 per reading interval</li> <li>• Separation of identical codes of the same code type using the read angle</li> </ul>
Data processing	<ul style="list-style-type: none"> <li>• Influencing the output of the reading data by event-dependent evaluation conditions</li> <li>• Influencing the output string by filtering and output sorting</li> </ul>
Data communication	<ul style="list-style-type: none"> <li>• Host interface: two data output formats can be configured, can be switched to various physical interfaces, parallel operation possible</li> <li>• Aux interface: fixed data output format, can be switched to various physical interfaces</li> </ul>

#### 3.2.3 Operating principle

The device consists of a laser scanner (laser diode and optics), an electronics unit with integrated decoder and 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 reading results are provided for further processing by the data interfaces.

In principle, the codes can be recorded on any side on still or moving objects in a conveyor system (single-side reading).

By combining several devices, it is possible to record several sides in one passage (multi-side reading).

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

When designed as a raster scanner, the device generates eight scan lines which are offset parallel to each other.

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 light pattern reflected by the bar code is recorded, processed and decoded. To control this process, external sensors provide information about the reading pulse and the conveyor speed (increment). The read results are released to the device's data interfaces and forwarded to a host/PC.

Detailed wiring of the device and the connections to the host/PC and the external sensors are described in chapter [Electrical installation](#).

### Block diagrams

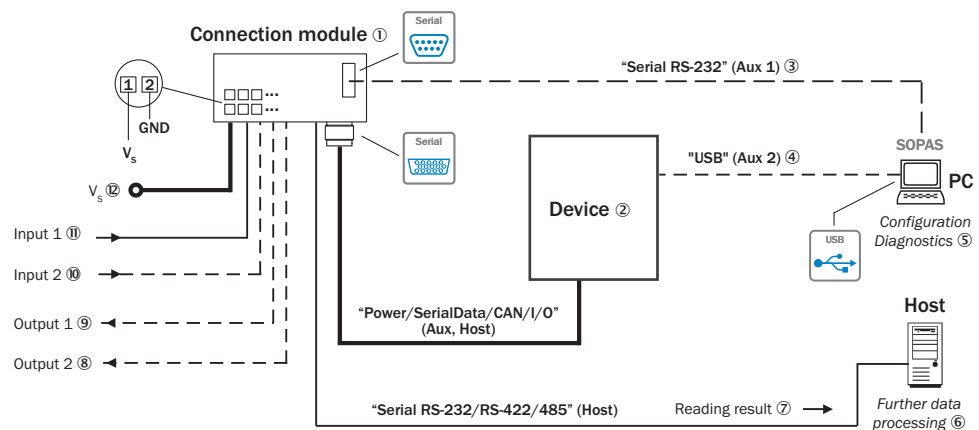


Figure 5: Facilities for connecting CLV62x, standard version

- ① Connection module
- ② Device
- ③ Alternative to USB
- ④ Alternative to Serial RS-232 (USB not required for CLV62x)
- ⑤ Configuration or diagnostics
- ⑥ Further data processing
- ⑦ Read result
- ⑧ Digital switching output 2, e.g., for connecting an LED
- ⑨ Digital switching output 1, e.g., for connecting an LED
- ⑩ Digital switching input 2, e.g., for connecting an incremental encoder
- ⑪ Digital switching input 1, e.g., for connecting a read cycle sensor
- ⑫ Supply voltage  $V_s$

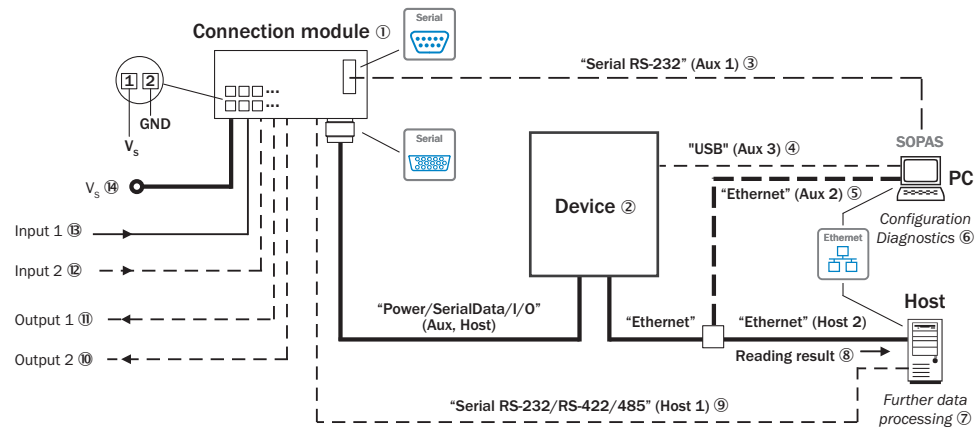


Figure 6: Facilities for connecting CLV62x, Ethernet version

- ① Connection module
- ② Device
- ③ Alternative to USB or Ethernet AUX port
- ④ Alternative to Serial RS-232 or Ethernet AUX port (USB not required for CLV62x)
- ⑤ Alternative to Serial RS-232 or USB
- ⑥ Configuration or diagnostics
- ⑦ Further data processing
- ⑧ Read result
- ⑨ Alternative to Ethernet host port
- ⑩ Digital switching output 2, e.g., for connecting an LED
- ⑪ Digital switching output 1, e.g., for connecting an LED
- ⑫ Digital switching input 2, e.g., for connecting an incremental encoder
- ⑬ Digital switching input 1, e.g., for connecting a read cycle sensor
- ⑭ Supply voltage  $V_s$

#### 3.2.3.1 Object trigger control

The device needs a suitable external signal (trigger source) as notification of an object being in the reading field to start an object-related read process. As standard, the start signal is issued via an external read cycle sensor (e.g. photoelectric sensor). As soon as an object has passed the reading cycle sensor, a time window ("reading interval") is opened in the device for the reading process.

Alternatively, a command triggers the read process via a data interface or the SICK SENSOR network. In auto pulse mode, the device internally generates the reading gate itself with an adjustable clock ratio.

The read cycle can be terminated in various ways. In the event of external triggering, this is carried out via the read cycle source or a command, or internally via a timer or an evaluation condition that needs to be met.



#### NOTE

The SOPAS-ET configuration software can be used to configure the trigger source:

#### 3.2.3.2 Reading operation mode

In "start/stop" operation, there is only ever one object in the reading field during the reading process, i.e., all read codes can be clearly assigned to the object. As standard, starting and stopping of the reading process are controlled by one or two read cycle sensor(s) at the start and end of the reading field.

In this case, 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.

The output of the read results is either carried out at the end of the read cycle (the rear edge of the object has left the end of the reading field) or even during the read cycle if certain configurable conditions are met.

#### Start/stop operation

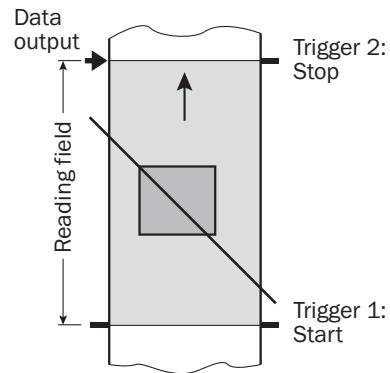


Figure 7: Start/stop operating mode of the device in stand-alone operation



#### NOTE

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

Alternatively, configuration can be done via GSD file (Ethernet version/PROFINET).

### 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 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.

#### 4.3 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- So that any residual damp can evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: [see "Technical data", page 53](#).
- Relative humidity: [see "Technical data", page 53](#).
- 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

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



#### WARNING

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

For reasons of safety, a device which is visibly damaged must not be operated or must be immediately taken out of operation. Damage includes, for example:

- Housing: Cracked or broken
- Reading window lens: Cracked or broken
- Device with connector: Over-rotation of the connector, cracks, or being torn from the housing
- Device with fixed cable: Damage to the cable outlet or cable itself

### 5.2 Scope of delivery

The delivery of the device includes the following components:

Table 4: Scope of delivery

Item	Component	Comments
1	Device	Depending on version
1	Printed safety note	–

### 5.3 Preparation for mounting

#### 5.3.1 Mounting requirements

- Typical space requirement for device: See type-specific dimensional drawing and reading field diagram.
- Comply with technical data, such as the permitted ambient conditions for operation of the device (e.g., temperature range, EMC interference emissions, ground potential), see ["Technical data", page 53](#).
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- Protect the device from direct sunlight.
- Device must only be mounted using the pairs of threaded mounting holes provided for this purpose.
- Shock and vibration-free mounting.

##### Equipment required

- Mounting device (bracket) with sufficient load-bearing capacity and suitable dimensions for the device.
- 2 M5 screws. The maximum screw in depth in the device is 5 mm from the housing surface



### NOTE

The screws are used for mounting the device on a mounting device supplied by the user. Screw length is dependent on the mounting base (wall thickness of the bracket). When using an optional SICK bracket, the screws for mounting the device are included with delivery.

- Tool and tape measure

### 5.3.2 Mounting device

The device is mounted on the bracket using at least two M5 blind hole threads that are in pairs on both of the narrow sides of the device, see "Device view", page 14.

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/CLV62x](http://www.sick.com/CLV62x)

Example: The design of the bracket with adapter plate supports many different installation variants, for example, as well as the alignment of the device in two axes.

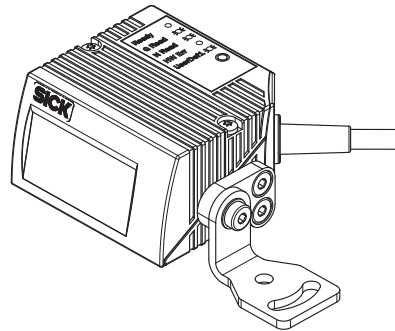


Figure 8: Example device installation with mounting bracket and adapter plate

### User-supplied brackets

The brackets should meet the following requirements:

- Stable mounting device
  - Alignment of the device in the x and y axes can be adjusted.
  - The mounting device must be able to bear the weight of the device and connecting cables without shock.
- Two or three M5 screws for mounting the device
  - 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.

### 5.4 Mounting location

When selecting the mounting location, the following factors are significant:

- ▶ Basic allocation of the scan line to the bar code
- ▶ Reading distance to the bar code and aperture angle  $\alpha$
- ▶ Angle alignment of the device
- ▶ Avoidance of surface reflections
- ▶ Count direction of the reading angle (position of the bar code along the scan line)

### 5.4.1 Basic allocation 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 version of the device (line or raster scanner).

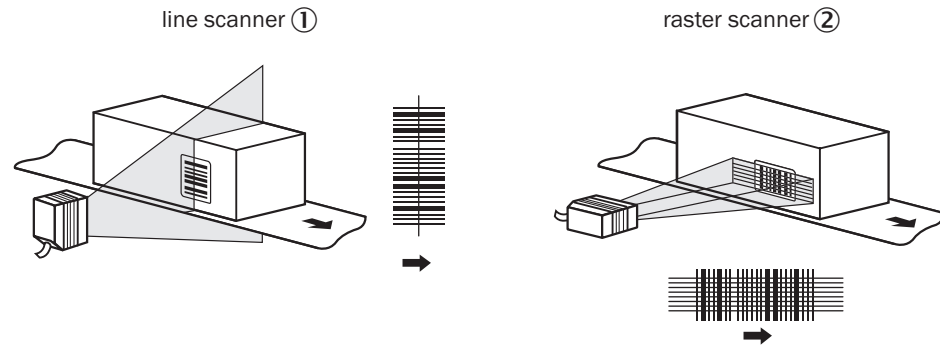


Figure 9: Allocation of scanning line(s) to bar code and conveyor direction

- ① Line scanner
- ② Raster scanner

### 5.4.2 Angle alignment of the device

The optimum alignment of the device is achieved when the scan line crosses the stripes of the bar code as close to a right angle as possible (tilt and inclination). Possible reading angles that can arise between scan line and bar code at all three levels in the area must be taken into account.

In order to prevent surface reflections, the angle of rotation must be approx. 15° out of plumb to the bar code, see ["Avoidance of surface reflections"](#), page 24.

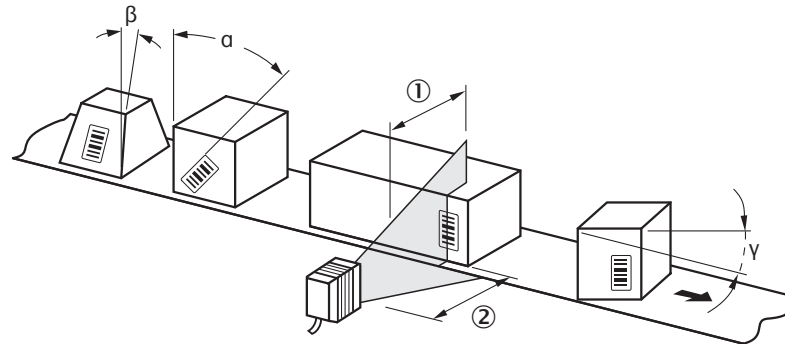


Figure 10: Line scanner: Read angle occurring between scanning line and bar code

- ① Depth of field
- ② Reading distance



#### NOTE

The specified maximum values can only be reached in optimum conditions. The actual maximum depends on module width, code type, print contrast, ambient light, distance and scanning frequency.

Table 5: Permitted read angle between scanning line and bar code

Angle	Limit Value
Tilt $\alpha$	Max. 30°
Pitch $\beta$	Max. 45°
Skew $\gamma$	Max. 45°

## 5.4.3 Avoidance of surface reflections

If the light of the scan line(s) hit(s) the surface of the bar code precisely vertically, this may cause interference when the light reflected back is received. To prevent this effect, the device must be mounted so that the light emitted is tilted relative to the vertical.

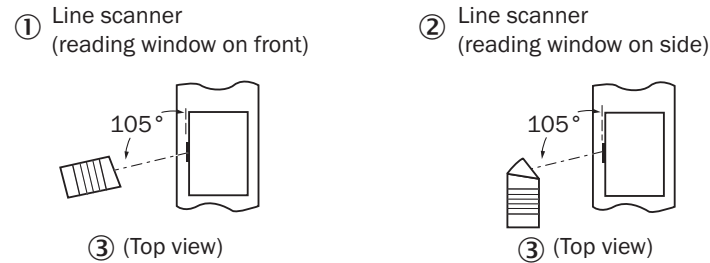


Figure 11: Avoiding surface reflections on the example line scanner: Angle between light emitted and bar code (tilting away from vertical)

- ① Line scanner (reading window on front)
- ② Line scanner (reading window on side)
- ③ Supervision

## 5.4.4 Count direction of the reading angle and the code angle

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

At the same time, the location-specific reading diagnostics data are determined for each of them.

- The reading angle, starting from the reading window, at which the device detects the bar code center on the red scanning line of the deflected scanning beam, can be output as an RA (reading angle) value.

By determining the RA value, identical bar codes (code type, code length, and data content) can be separated, and the bar code data can be assigned due to its position on the object.

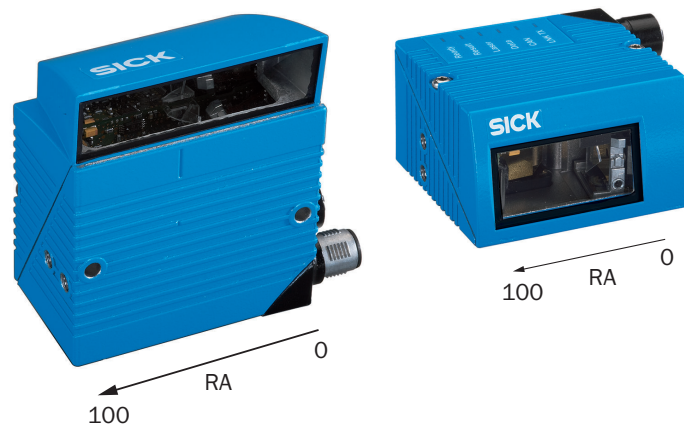


Figure 12: Example for the counting direction and RA value determination

## 5.5 Mounting the device



**Mounting the device:****NOTICE****Risk of damaging the device!**

Observe the maximum screw-in depth of the blind hole thread. Longer screws than specified damage the device.

- Use screws of suitable length.

1. Prepare the base for mounting the bracket of the device, [see "Preparation for mounting", page 21](#).
2. Place the object with the bar code in the view of the device in the position where the reading is to take place (conveyor static).
3. Align the device with the bar code by eye. When doing so, be aware of the following:
  - For a device with the reading window at the front, ensure that the rear side with the laser warning label points in the direction of the observer and is aligned as near as possible to being parallel to the bar code surface.
  - For a device with the reading window at the side, ensure that the side panel with the LEDs points in the direction of the observer and is aligned almost parallel to the bar code surface.
  - During reading, note the reading angle that occurs [see "Angle alignment of the device", page 23](#).
  - If the position of the bar code within the scanning line is relevant for the evaluation, bear in mind the count direction of the code position [see "Count direction of the reading angle and the code angle", page 24](#).
4. Mount the device bracket onto the base.
5. Screw screws through the bracket into the blind hole threads of the device and slightly tighten.
6. Configure the device, [see "Adjust the device", page 42](#).

## 5.6 Mounting of external components

### 5.6.1 Mounting the connection module

If the device activation is carried out via a connection module, then this must be mounted near to the device.

**NOTE**

If the PC with the configuration software SOPAS ET accesses the AUX interface (RS-232; 57.6 kBd) of the device via the connection module, then the connection module must be installed no more than a 3 m length of cable 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**

Detailed information on mounting and electrical installation can be found in the operating instructions for the connection module.

### 5.6.2 Mount external read cycle sensor

If the device is triggered via an external read cycle sensor (photoelectric retro-reflective sensor), then the sensor must be mounted in the vicinity of the device.



## NOTE

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

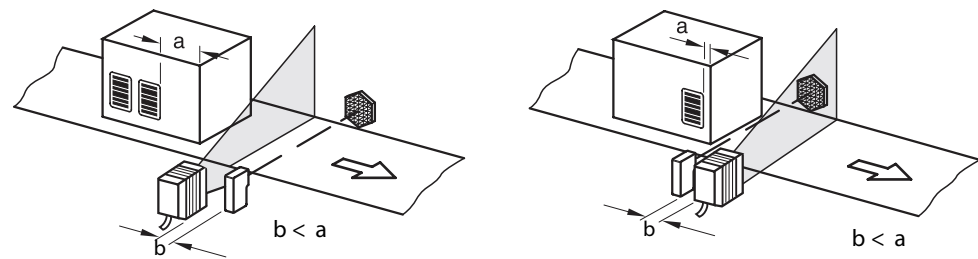


Figure 13: Bar code at the end or start of the piece goods

The mounting location of the device is dependent on the distance  $a$  from the bar code to the front object edge. Depending on the application, the device must be mounted so that bar codes on objects of different sizes can be read in full during the time window for evaluation (reading interval).

### 5.6.3 Mounting incremental encoder

An incremental encoder is needed during the separation of bar codes of the same code type and with identical contents.

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

1. Mount suitable incremental encoders in the vicinity of the device.  
Optimally, the incremental encoder is mounted against the running direction of the conveying line in front of the device.
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

- **The electrical installation must only be performed by electrically qualified personnel.**
- **Standard safety requirements must be met 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 extension cables with open ends, ensure that bare wire ends do not come into contact with each other (risk of short-circuit when supply voltage is switched on!). Wires must be appropriately insulated from each other.
- Wire cross-sections in the supply cable from the customer's power system must be selected in accordance with the applicable standards. When this is being done in Germany, observe the following standards: DIN VDE 0100 (Part 430) and DIN VDE 0298 (Part 4) and/or DIN VDE 0891 (Part 1).
- Circuits connected to the device must be designed as SELV circuits (SELV = Safety Extra Low Voltage).
- Protect the device with a separate fuse of max. 2 A at the start of the supply circuit.



#### NOTE

##### Layout of data cables

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

The specified IP enclosure rating for the device is only achieved under the following conditions:

- The cables plugged into the connections are screwed tight.
- Any electrical M12 connections that are not being used must be fitted with tightly-fastened protective caps or plugs (as in the delivery condition), depending on the type.
- Any other possible coverings must be closed and lie flush on the device.

In the event of non-compliance, the IP enclosure rating will not apply for the device.

#### 6.1.2 Note on the swivel connector



#### NOTICE

##### Damage to the connector unit from over tightening!

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.



### 6.2 Prerequisites for the safe operation of the device in a system

---



#### 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:

- Metal housings are vulnerable to dangerous currents
- 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.
- ▶ Ensure that the ground potential is the same at all grounding points.
- ▶ If the cable insulation is damaged, disconnect the voltage supply immediately and have the damage repaired.
- ▶ Where local conditions are unfavorable and therefore do not meet conditions for a safe grounding method (same ground potential at all grounding points), take measures in accordance with the following formats.

---

The device is designed and tested for electrical safety in accordance with EN 60950-1. It is connected to the peripheral devices (voltage supply, any local clock reading pulse sensor(s), PLC) via shielded cables. The cable shield – for the data cable, for example – rests against the metal housing of the device. The device can either be grounded through the cable shield or through one of the threaded mounting holes.

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

This is achieved 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

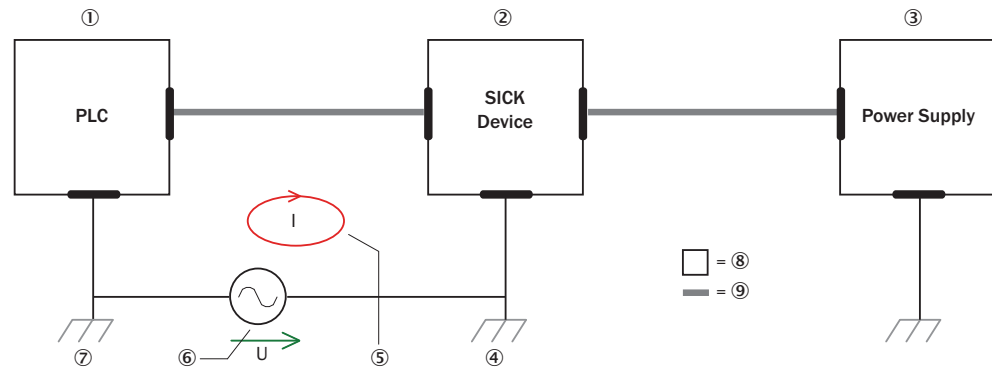


Figure 14: Example: Occurrence of equipotential bonding currents in the system configuration

- ① PLC (programmable logic 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 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 while at the same time complying with all the requirements of EN 60950-1.

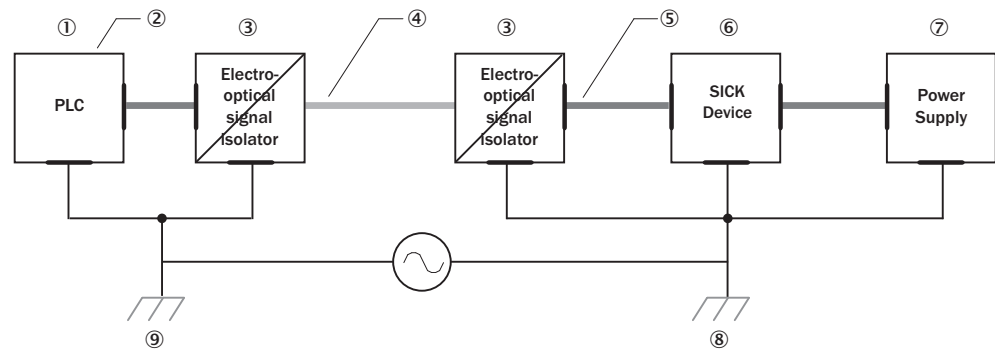


Figure 15: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

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

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 of peripheral devices may be a sufficient solution.

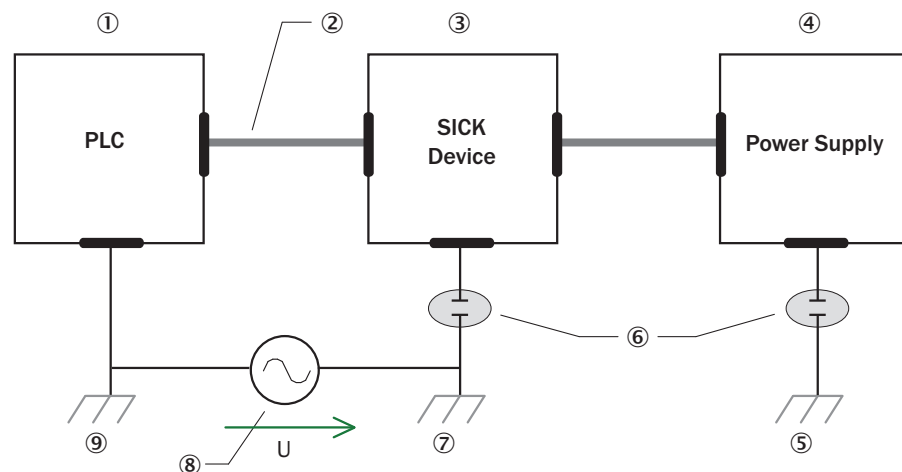


Figure 16: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

- ① PLC (programmable logic controller)
- ② Shielded electrical cable
- ③ Device
- ④ Voltage supply
- ⑤ Grounding point 3
- ⑥ Insulated mounting

- ⑦ Grounding point 2
- ⑧ Grounding potential difference
- ⑨ Grounding point 1

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 notes



#### NOTICE

##### Faults due to incorrect wiring.

Incorrect wiring may result in operational faults.

- For data transmission, use only screened cables with twisted-pair wires.
- Follow the wiring notes precisely.



#### NOTE

Preassembled cables can be found online at:

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

All electrical connections of the device are configured as M12 round connectors or as a cable with D-Sub-HD male connector. The IP 65 enclosure rating is only achieved with screwed plug connectors or cover caps.

## 6.4 Pin allocation of the connections

### Device connections with cable and male connector (standard version)

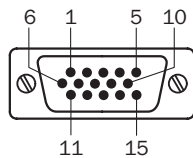


Figure 17: Male connector, D-Sub-HD, 15-pin

Table 6: Standard version: Pin assignment on 15-pin D-Sub-HD male cable connector

Pin	Signal	Function
1	V <sub>S</sub>	Supply voltage
2	RxD (AUX)	AUX interface (receiver)
3	TxD (AUX)	AUX interface (sender)
4	Sensor 2	Digital switching input (function adjustable, e.g. external reading cycle)
5	GND	Ground
6	RD+ (RS-422/485)	Host interface (receiver)

Pin	Signal	Function
7	RD- (RS-422/485); RxD (RS-232)	Host interface (receiver)
8	TD+ (RS-422/485)	Host interface (sender)
9	TD- (RS-422/485); TxD (RS-232)	Host interface (sender)
10	CAN H	CAN bus (IN/OUT)
11	CAN L	CAN bus (IN/OUT)
12	Result 1	Digital switching output, function can be set
13	Result 2	Digital switching output, function can be set
14	Sensor 1	Digital switching input for external reading cycle
15	SensGND	Common ground for switching inputs
-	-	Screen

#### Device connections with connector (Ethernet version)

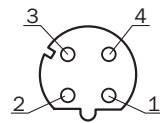


Figure 18: Female connector, M12, 4-pin, D-coding

Table 7: Ethernet version: Pin assignment on the 4-pin M12 female connector

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

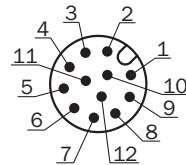


Figure 19: Male connector, M12, 12-pin, A-coding

Table 8: Ethernet version: Pin assignment on 12-pin M12 male connector

Pin	Signal	Function
1	GND	Ground
2	V <sub>S</sub>	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485)	Host interface (sender)
6	TD- (RS-422/485); TxD (RS-232)	Host interface (sender)
7	TxD (AUX)	AUX interface (sender)
8	RxD (AUX)	AUX interface (receiver)
9	SensGND	Sensor 1 switching input ground



Pin	Signal	Function
10	Sensor 1	Digital switching input (external reading cycle)
11	RD+ (RS-422/485)	Host interface (receiver)
12	RD- (RS-422/485); RxD (RS-232)	Host interface (receiver)
-	-	Screen

The “Sensor 2”, “Result 1”, and “Result 2” connections are only available on the device with cable and male connector (standard version) as well as for the Ethernet version (M12, 12-pin, A-coded) via the CDB620 connection module with the CMC600 parameter memory module.

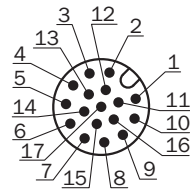


Figure 20: Male connector, M12, 17-pin, A-coding

Table 9: Ethernet version: Pin assignment on 17-pin M12 male connector

Pin	Signal	Function
1	GND	Ground
2	V <sub>S</sub>	Supply voltage
3	CAN L	CAN bus (IN/OUT)
4	CAN H	CAN bus (IN/OUT)
5	TD+ (RS-422/485)	Host interface (sender)
6	TD- (RS-422/485); TxD (RS-232)	Host interface (sender)
7	TxD (AUX)	AUX interface (sender)
8	RxD (AUX)	AUX interface (receiver)
9	SensGND	Sensor 1 switching input ground
10	Sensor 1	Digital switching input (external reading cycle)
11	RD+ (RS-422/485)	Host interface (receiver)
12	RD- (RS-422/485); RxD (RS-232)	Host interface (receiver)
13	Result 1	Digital switching output, function can be set
14	Result 2	Digital switching output, function can be set
15	Sensor 2	Digital switching input (external reading cycle)
16	-	-
17	-	-

## 6.5 Connection diagrams

### Standard version, 15-pin male connector

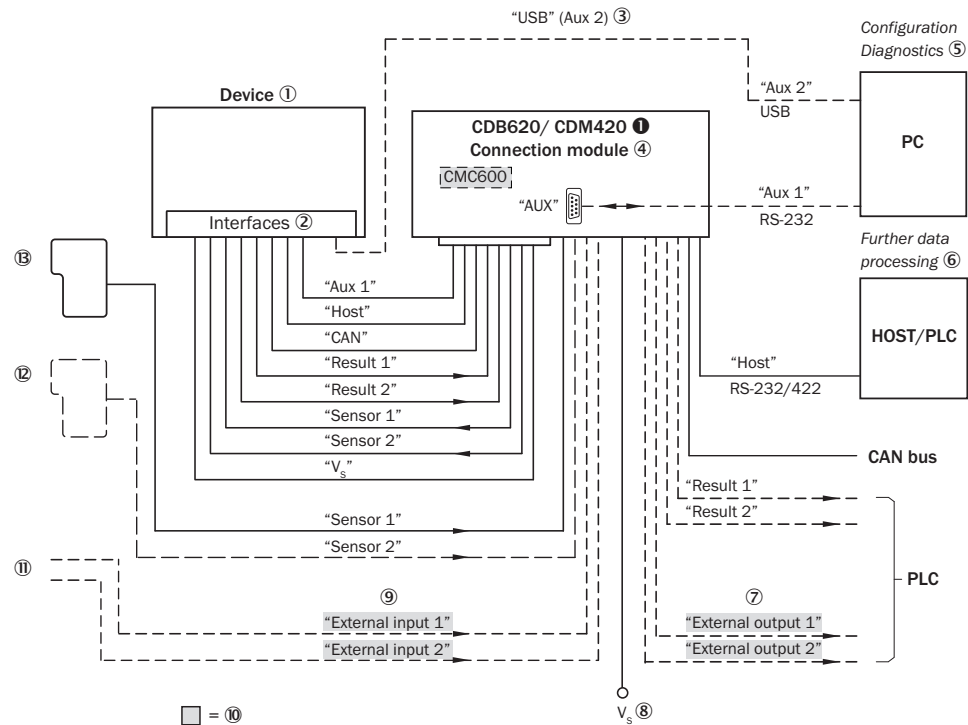


Figure 21: Standard version: Electrical connections on the bar code scanner with connecting cable, 15-pin male connector, D-Sub-HD

- 1 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 switching outputs
- 8 Supply voltage  $V_s$
- 9 External switching inputs
- 10 CMC600 parameter memory module is required to be able to use the additional external switching 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 version, 12-pin male connector

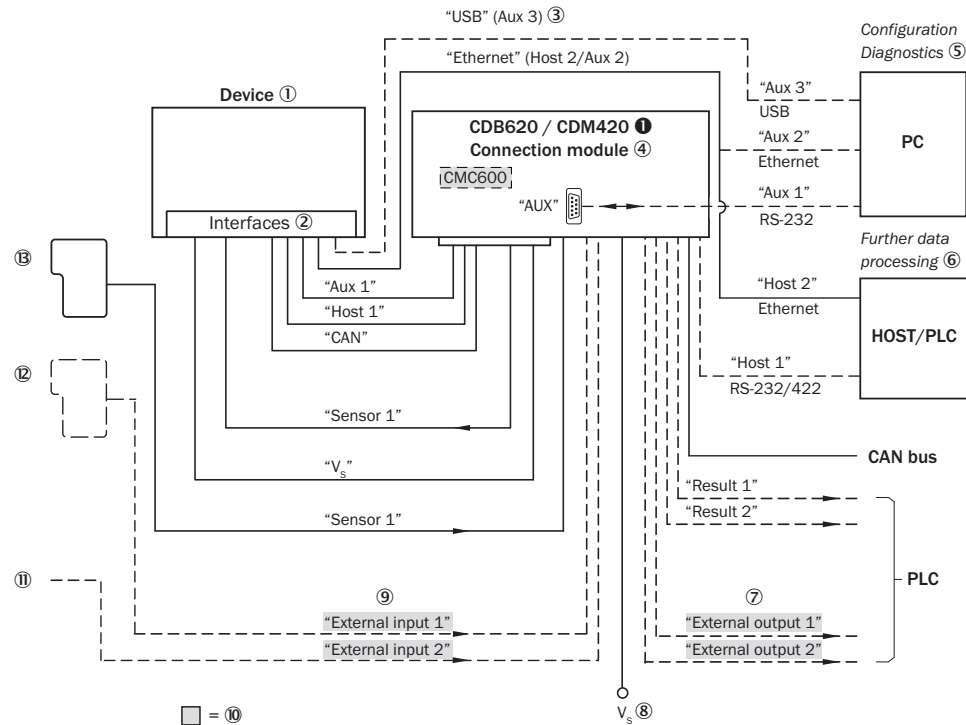


Figure 22: Ethernet version: Electrical connections on the bar code scanner with connector, 12-pin male connector, M12

- ① 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 switching outputs
- ⑧ Supply voltage  $V_s$
- ⑨ External switching inputs
- ⑩ CMC600 parameter memory module is required to be able to use the additional external switching 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 version, 17-pin male connector

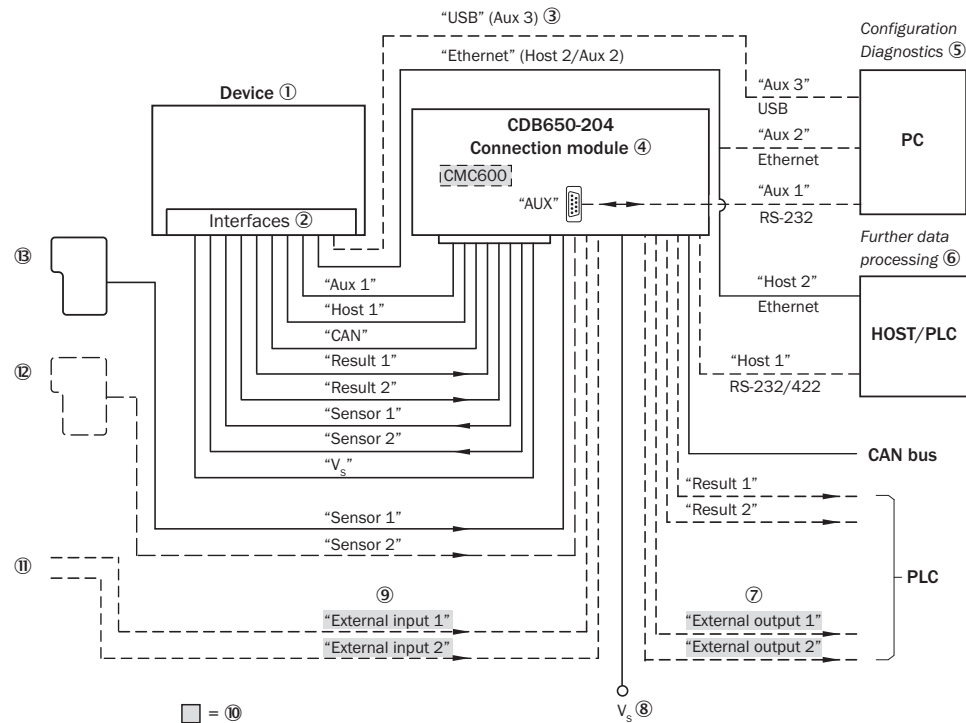


Figure 23: Ethernet version: Electrical connections on the bar code scanner with connector, 17-pin male connector, M12

- ① Device
- ② Interfaces
- ③ USB not required for CLV62x
- ④ Connection module
- ⑤ Configuration or diagnostics
- ⑥ Further data processing
- ⑦ External switching outputs
- ⑧ Supply voltage  $V_S$
- ⑨ External switching inputs
- ⑩ CMC600 parameter memory module is required to be able to use the additional external switching 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)

## 6.6 Wiring interfaces

### 6.6.1 Connecting the supply voltage

The device must be connected to a power supply unit with the following properties:

- Supply voltage DC 10 V ... 30 V (stabilized safety extra low voltage SELV as per currently valid standards)
- Electricity source with at least 10 W power
- Additional 0.5 W output power when using the optional CMC600 parameter memory module in the corresponding connection modules

### Protecting the supply cables

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

The following standards must be observed in Germany:

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

The infeed of the supply voltage is carried out using a SICK connection module or the customer's voltage supply.

## 6.6.2 Wiring data interfaces

### Wiring Ethernet interface

1. Connect the device to the Ethernet connection of the PC via the adapter cable.
2. Set up communication via SOPAS ET configuration software.



#### NOTE

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

### Wiring the serial data interfaces

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

Table 10: Data transmission rates

Interface type	Data transmission rate	Distance to the target computer (host)
RS-232	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-422/485 <sup>1)</sup>	Up to 38.4 kBd 38.4 kBd ... 57.6 kBd	Max. 1200 m Max. 500 m

<sup>1)</sup> 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.

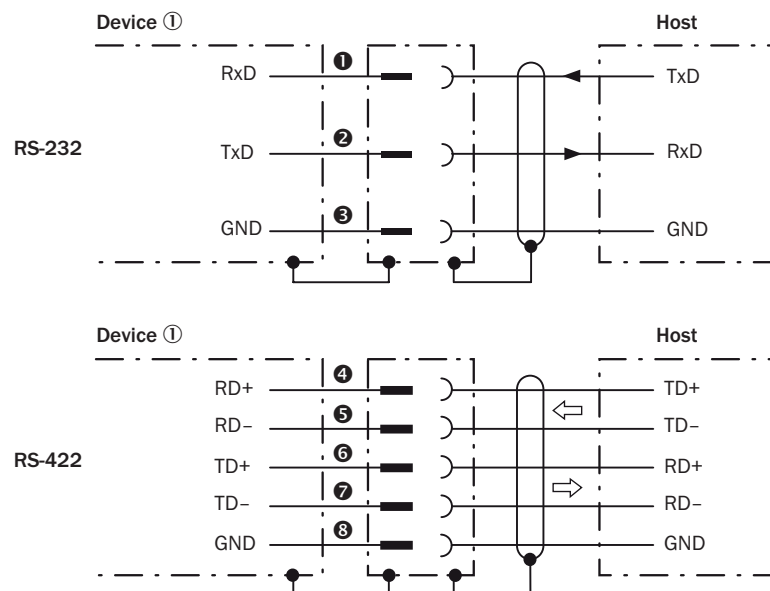


Figure 24: Internal circuitry for RS-232 and RS-485 data interfaces

① Device

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

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

#### Termination of the RS-422 data interface

Termination of the data interface can be implemented in the connection module via switches.

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

### 6.6.3 Wiring the CAN interface

If the wiring of the CAN interface is carried out via a connection module, then the relevant operating instructions of the module used must be followed.

### 6.6.4 Wiring digital switching inputs

#### Physical switching inputs on the device

The physical switching inputs can be used for starting and/or ending the reading pulse or for feeding an incremental signal.

Depending on the device, there are different number of switching inputs available on the connections, see ["Pin allocation of the connections", page 31](#).

Table 11: Characteristic data for the switching inputs

<b>Switching behavior</b>	Power at the input starts the internal reading interval of the device (default: active high, debounce: max. 30 ms (standard))
<b>Properties</b>	Opto-decoupled Reverse polarity protected
<b>Electrical values</b>	The electrical values are identical for all switching inputs. Low: $ V_{in}  \leq 2 \text{ V}$ ; $ I_{in}  \leq 0.3 \text{ mA}$ High: $6 \text{ V} \leq  V_{in}  \leq 32 \text{ V}$ ; $0.7 \text{ mA} \leq  I_{in}  \leq 5 \text{ mA}$

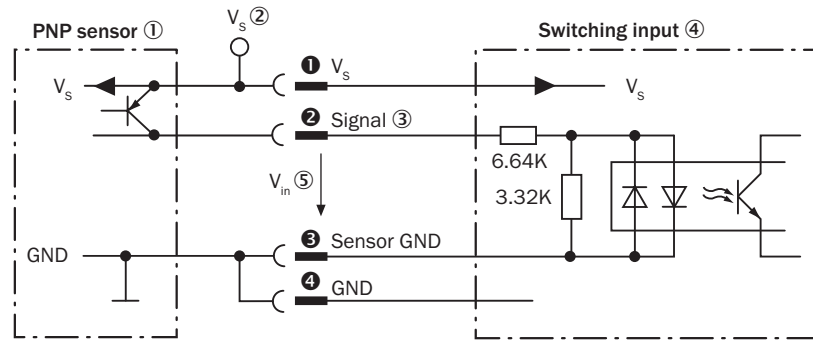


Figure 25: Wiring of a switching input with external PNP sensor

- ① PNP sensor
- ② Supply voltage  $V_s$
- ③ Input signal
- ④ Switching input ("Sensor 1" or "Sensor 2")
- ⑤ Input voltage  $V_{in}$
- ①...④ For pin assignment, see respective device

**Extension: additional logical switching inputs in the device in the case of physical "external" switching inputs on the optional connection module**

Thanks to the optional CMC600 parameter memory module, the two external switching inputs "External input 1" and "External input 2" on the relevant terminals in the connection module are additionally available.



**NOTE**

These two external switching inputs are not suitable for time-critical applications.

If the wiring of the inputs is carried out via a connection module, then the relevant operating instructions for the module must be followed.

## 6.6.5 Wiring digital switching outputs

### Physical switching outputs on the device

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

Depending on the device, there are different numbers of switching outputs available on the connections, see "Pin allocation of the connections", page 31.

<b>Switching behavior</b>	PNP switching to supply voltage $V_s$
<b>Properties</b>	Short-circuit protected Temperature protected Not electrically isolated from $V_s$
<b>Electrical values</b>	The electrical values are identical for all switching outputs. $0\text{ V} \leq V_{out} \leq V_s$ $(V_s - 1.5\text{ V}) \leq V_{out} \leq V_s$ at $I_{out} \leq 100\text{ mA}$

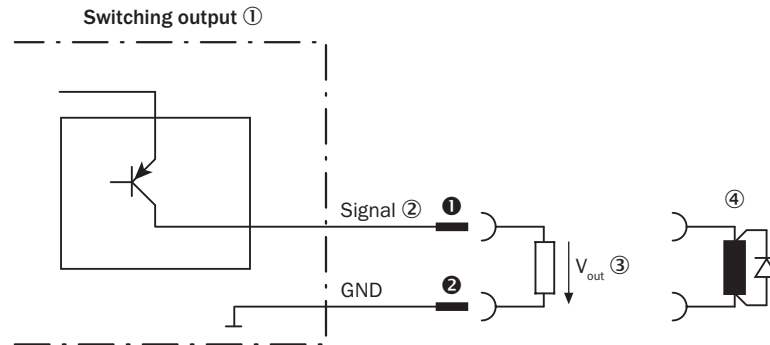


Figure 26: Wiring of a switching output

- ① Switching output ("Result 1" or "Result 2")
  - ② Output signal
  - ③ Output voltage  $V_{out}$
  - ④ With an inductive load: Sweep-out circuit – attach a freewheeling diode directly to the load.
- ①...② For pin assignment, see respective device

**Extension: additional logical switching outputs in the device in the case of physical "external" switching outputs on the optional connection module**

Thanks to the optional CMC600 parameter memory module, the two additional switching outputs "External output 1" and "External output 2" on the terminals in the connection module are additionally available.



**NOTE**

These two external switching outputs are not suitable for time-critical applications.

If the wiring of the outputs is carried out via a connection module, then the relevant operating instructions for the module must be followed.



**NOTE**

Capacitive loads on the switching outputs have an effect on the switch-on and switch-off behavior. The maximum capacity of 100 nF is a limit value.

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



## 7 Commissioning

### 7.1 Overview of the commissioning steps

- Commissioning of the device with factory default
- Installing the SOPAS ET configuration software
- Connection of the device to PC/notebook with the SOPAS ET configuration 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 PC.

#### 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 ET configuration 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 configuration software SOPAS ET, the current system prerequisites for the PC, and the instructions for downloading can be found online at:

► [www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET)

1. Start the PC and download the current version from [www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET).
2. If installation does not start automatically, launch setup.exe from the download directory.
3. Follow the operating instructions to complete the installation.

### 7.3 Start the SOPAS ET configuration software and connect to the device

1. Electrically connect a device data interface with a PC that can connect to the Internet.
2. In accordance with the instructions, download and install the latest version of the SOPAS ET configuration software, as well as the current device description file (\*.sdd) for the device.  
In this case, select the "Complete" option as proposed by the installation wizard. Administrator rights may be required on the PC to install the software.
3. Start the "SOPAS ET" program after completing the installation.  
Path: Start > Programs > SICK > SOPAS ET Engineering Tool > SOPAS.

4. Establish a connection between SOPAS ET and the device with the wizard that has already launched automatically.  
In order to do this, select the device from the devices available depending on the connected communication interface, e.g. Ethernet (default Ethernet address: IP address: 192.168.0.1, subnet mask: 255.255.255.0, baud rate: 57600 with serial connection).
- ✓ SOPAS ET establishes communication with the device and loads the associated device description file. The device project tree opens.

## 7.4 Initial commissioning

The device is adjusted to the reading situation on site using the SOPAS ET configuration software. The starting point for this is the default factory settings, which can be adjusted to optimize the device. In order to do this, the SOPAS ET configuration software is used to create an application-specific parameter set, which can be loaded permanently into the device and saved and archived as a project file (Sopas file with configuration data) on the PC.

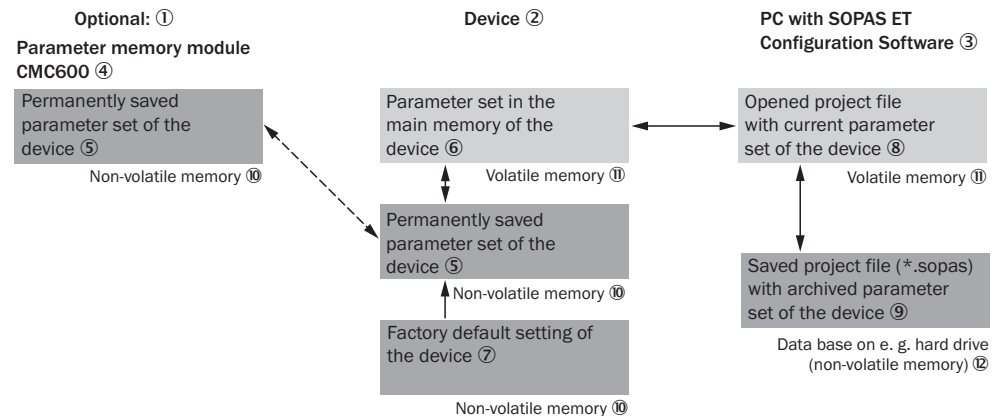


Figure 27: Saving the parameter set and configuration with SOPAS ET

- ① Optional
- ② Device
- ③ PC with SOPAS ET configuration software
- ④ CMC600 parameter memory module
- ⑤ Permanently saved device parameter set
- ⑥ Parameter set in the working memory of the device
- ⑦ Factory-set defaults for the device
- ⑧ Opened project file with current device parameter set
- ⑨ Saved project file with archived device parameter set
- ⑩ Nonvolatile memory
- ⑪ Volatile memory
- ⑫ Database on the hard drive, for example (nonvolatile memory)

## 7.5 Adjust the device

For complete adjustment of the device, the electrical installation must be complete and the device must have been commissioned.

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, arrange the device as close to being plane-parallel to the object surface as possible.

4. Manually place objects with bar codes one after the other into the reading range of the device, [see "Technical data", page 53](#).
5. Check the reading result with the SOPAS ET configuration software.
6. When doing so, place objects at different positions (angles) in the reading field and ensure that the limit values for the permitted reading angles are not exceeded, [see "Angle alignment of the device", page 23](#).
7. Align the device so that the good read rate is between 70% and 100%.
8. Tighten the screws on the device.

## 7.6 Fine adjustment and further configuration



### NOTE

The other settings and the fine adjustment depend on the relevant application situation.

#### User level, parameter download to the device

The user is automatically logged into the device in the “Authorized customer” level and can change parameters which are immediately transmitted to the device (default setting).

#### Configuration via “Quickstart”

The “Quickstart” tab offers an overview of the most important parameters and enables quick evaluation of code content. Functions such as evaluation window, percentage evaluation, code configuration, and adjusting tool are available via the Quickstart.

#### Application wizard

The application wizard (“Wand” icon) supports device configuration both as a stand-alone device and as a master or as a 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

The 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 in each case and evaluates the reading quality. The device continuously emits read results every 2 s via the AUX interface, together with the read diagnostic data. A timer starts when percentage evaluation is called. If a manual abort is not carried out, the device automatically returns to read mode after 5 min.

#### Adjusting Tool

The “Adjusting Tool” 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.

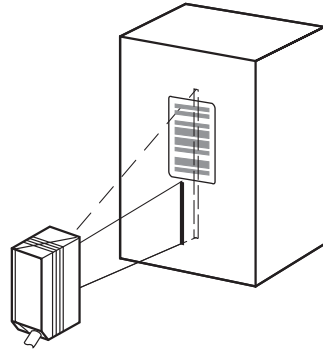


Figure 28: Appearance of the scan line in “Adjusting Mode”

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 set other decoder properties (Device Tree > Parameters > Code Configuration).

### Scanning frequency

You can set the scanning frequency in the range from 400 Hz to 1200 Hz (Device Tree > Parameters > Reading Configuration).

### Ethernet interface

Use the “Ethernet” page to make adaptations to the IP address and the subnet mask (Device tree > Parameters > Network/Interfaces/IOs > Ethernet).

### Object trigger control

If the device is to be operated with an additional read pulse sensor, for example, a photoelectric sensor on the “Sensor 1” switching input, select the setting “Sensor 1” (Device tree > Parameters > Object trigger control).

Test and, if necessary, modify the specified settings when operating the system under real conditions.

## 8 Operation

### 8.1 Operating and status indicators

#### 8.1.1 Optical indications on the operating elements



Figure 29: LED status indicator

Indicator	LED	Color	Status
Ready	●	Green	Lights up constantly after switching on and completion of successful self-test Device ready to read Goes out when downloading or uploading configuration data
	●	Red	Hardware error
Result	●	Green	Successful reading
Laser	●	Green	Laser on
Data	●	Green	Data output via host interface
CAN	◐	Yellow	Data transfer via CAN interface
LNK TX	●	Green	Physical Ethernet connection

● = illuminated, ◐ = 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: Protection of the parameter set as a configuration file on the PC in SOPAS ET. Access to the device via AUX interface (USB or Ethernet).
- 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 by the PROFINET controller via PROFINET using the GSD configuration. Protection of the parameter set as a configuration file in the PROFINET controller. Each time the PROFINET is restarted, the device is reconfigured.

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

In normal operation, the device operates fully automatically.

## 9 Maintenance

### 9.1 Maintenance

During operation, the device works maintenance-free.

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



#### NOTE

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

Table 12: Maintenance schedule

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

### 9.2 Cleaning

#### 9.2.1 Cleaning



#### NOTICE

##### Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

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

#### Cleaning the reading window

At regular intervals, check the reading window and the housing of the device for accumulated dirt. This is especially relevant in harsh operating environments (dust, abrasion, damp, fingerprints, etc.).

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



#### NOTICE

##### Damage to the reading window.

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

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

The type of screen material used in the reading window can be found on the type label (see "Type code", page 12).

**NOTE**

Static charge causes dust particles to adhere to the reading window. This effect can be avoided by using an anti-static cleaning agent in combination with the SICK lens cloth (can be obtained from [www.sick.com](http://www.sick.com)).

**Cleaning procedure:****CAUTION****Optical radiation: Laser class 2**

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 will not switch off the laser. 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, use suitable laser protection goggles. These must absorb radiation of the device's wavelength effectively.
  - ▶ Glass lens: Remove dust from the inspection window using a soft, clean brush. If necessary, also clean the inspection window with a clean, damp, lint-free cloth, and a mild anti-static lens cleaning fluid.
  - ▶ Plastic lens: Clean the inspection 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 optical surfaces**

Depending on how the reading station is equipped, additional local sensors may have other surfaces with an optical effect installed (e.g., photoelectric sensor for an external reading pulse). 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.

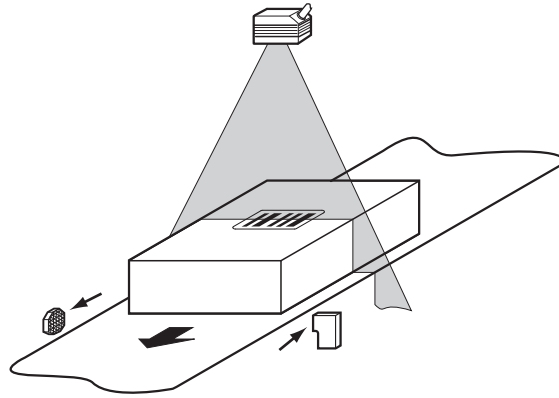


Figure 30: Cleaning the external optical sensors (read pulse encoder)



## 10 Troubleshooting

### 10.1 Overview of possible errors and faults

Table 13: Errors and faults

Situation	Error/fault
Mounting	<ul style="list-style-type: none"> <li>Device poorly aligned to the object with bar codes (e.g. dazzle).</li> </ul>
Electrical installation	<ul style="list-style-type: none"> <li>Data interfaces of the device incorrectly wired.</li> </ul>
Configuration	<ul style="list-style-type: none"> <li>Functions not adapted to local conditions, e.g. parameters for the data interface not set correctly.</li> <li>Device limits not observed, e.g. reading distance, aperture angle.</li> <li>Reading pulse trigger source not selected correctly.</li> </ul>
Operation	<ul style="list-style-type: none"> <li>Read pulse control incorrect and/or not suitable for the object.</li> <li>Device faults (hardware/software).</li> </ul>

### 10.2 Detailed fault analysis

#### 10.2.1 LEDs on the device

The statuses that can be read from the device LEDs on the device housing (see ["Operating and status indicators", page 45](#)) include:

- Operational readiness
- Hardware error
- Reading result status (Good Read or No Read) or status of a selected event
- Data traffic via host or CAN interface
- Connection status of the device with PROFINET
- Firmware download status

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

#### 10.2.2 System information

The device outputs any occurring faults in different ways. Fault output is staggered, allowing for an increasingly detailed level of analysis:

- Communication errors can occur when transmitting telegrams to the device. The device then returns a fault code.
- For faults that occur during reading, the device writes fault codes in the status log (see ["Status log", page 49](#)).

### 10.3 Status log



#### NOTE

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

The device distinguishes between four types of fault:

- Information
- Warning
- Fault
- Critical fault

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

### 10.3.1 Displaying the Status Log

To display the status log, the SOPAS ET configuration software must be connected with the device online.

1. Connect the SOPAS ET configuration software to the device.
2. Open CLV61X in the project tree: **SERVICE > SYSTEM STATUS > Register card SYSTEM INFORMATION.**

## 10.4 Replacing the device

Faulty or damaged devices must be dismantled and replaced with new or repaired devices of the same type.

### 10.4.1 Disassembling the device

1. Switch off the supply voltage to the device.
2. Detach all connecting cables from the device.
3. Remove the device from the bracket. When doing so, mark the position and alignment of the device on the bracket or surroundings.

### 10.4.2 Returns

- Do not dispatch devices to the SICK Service department without consultation.



#### 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
- 

### 10.4.3 Replacing the device

1. Align and mount the new or repaired device (see "Mounting", page 21). When doing so, note the previously applied markings on the bracket or surroundings (see "Replacing the device", page 50).
2. Reinstall the connecting cables to the device.
3. Switch on the supply voltage for the device. The device starts with the default setting.
4. Depending on the selected configuration type, proceed as follows:
  - Local configuration via CMC600 parameter memory module in the CDB620/CDM420 connection module: If an optional CMC600 is installed, the exchanged device automatically adopts the saved parameter set from the CMC600 into its permanent memory.
  - Local configuration via SOPAS ET: Download the configuration previously stored on the PC as part of the safety concept to the device (in series or via Ethernet, depending on the type) and permanently store it in the device.
  - Central configuration via GSD configuration: On restarting the PROFINET, the PROFINET controller configures the device automatically.

If the automatic PN name allocation for the device has been configured and activated in the PROFINET controller, the parameter set of the new replacement device must be at the **default** setting (as in the delivery condition of a new device), or at least the PN name must be empty. The device then receives the PN names required automatically when switched on.

## 10.5 Customer service

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

The device cannot be repaired by the user in order to restore functionality after a failure. Interrupting or modifying the device will invalidate any warranty claims against SICK AG.

However, rapid replacement of a device by the user is possible, see ["Replacing the device", page 50](#).

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



### NOTE

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

---

### 11 Decommissioning

#### 11.1 Disposal

Any device which can no longer be used must be disposed of in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.



---

#### **NOTICE**

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

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

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

## 12 Technical data



### NOTE

The relevant online data sheet for your product can be downloaded, saved, and printed, including technical data, dimensions, and connection diagrams:

► [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

### 12.1 Optical lens system

Table 14: Technical data for optics

	CLV620	CLV621	CLV622
<b>Working range</b>	Mid range	Long range	Short range
<b>Scanning method</b>	Line or raster scanner <sup>1)</sup> , identifier <a href="#">see "Type code", page 12</a>		
<b>Reading window orientation</b>	On the front or to the side (light emission at 105° relative to the longitudinal axis of the device), identifier <a href="#">see "Type code", page 12</a>		
<b>Aperture angle</b>	≤ 50°		
<b>Scan/Decoder frequency</b>	400 Hz ... 1,200 Hz		
<b>Resolution</b>	0.2 mm ... 1.0 mm	0.35 mm ... 1.0 mm	0.15 mm ... 0.5 mm
<b>Focus</b>	Fixed focus		
<b>Light source</b>	Laser diode, visible red light (λ = 655 nm)		
<b>MTTF (laser diode)</b>	40,000 h at 25 °C		
<b>Laser class</b>	Class 2 in accordance with EN/IEC 60825-1:2014 (identical to EN/IEC 60825-1:2007). Complies with 21 CFR 1040.10 except for tolerances according to Laser Notice no. 50 of June 24, 2007 and its following versions.		
<b>Laser power (maximum/average)</b>	1.5 mW / < 1.0 mW	3.2 mW / < 1.0 mW	1.5 mW / < 1.0 mW
<b>Laser pulse duration</b>	< 300 µs		

<sup>1)</sup> Grid height approx. 15 mm at a reading distance of 200 mm

### 12.2 Performance

Table 15: Technical data for performance

<b>Bar code types</b>	Code 39, Code 128, Code 93, Codabar, GS1-128 / EAN 128, UPC / GTIN / EAN, 2/5 Interleaved, Pharmacode, GS1 DataBar, Telepen, MSI/Plessey
<b>Print ratio</b>	2:1 ... 3:1
<b>No. of codes per scan</b>	1 ... 20 (standard decoder) 1 ... 6 (SMART decoder)
<b>No. of codes per reading interval <sup>1)</sup></b>	1 ... 50 (auto-discriminating)
<b>No. of characters per code/reading interval</b>	Max. 50 characters/max. 5,000 characters across all bar codes per reading interval, 500 characters for multiplexer function (CAN)
<b>Number of multiple readings</b>	1 ... 99

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

## 12.3 Interfaces

Table 16: Technical data for interfaces

<b>Serial (RS-232, RS-422/-485)</b>	<b>Function:</b> Host, AUX (RS-232 only) <b>Data transmission rate:</b> 2.4 kBd ... 115.2 kBd, AUX: 57.6 kBd (RS-232)
<b>Ethernet</b>	Ethernet version only <b>Function:</b> Host, AUX <b>Data transmission rate:</b> 10/100 Mbit/s, half/full duplex <b>Protocol:</b> TCP/IP, Ethernet/IP, PROFINET Single Port
<b>CAN</b>	<b>Function:</b> SICK CAN sensor network (master/slave, multiplexer/server) <b>Data transmission rate:</b> 20 kbit/s ... 1 Mbit/s <b>Protocol:</b> CSN (SICK CAN sensor network), CANopen
<b>PROFINET</b>	PROFINET Dual Port optional over external fieldbus module CDF600-2
<b>EtherCAT®</b>	Optional over external fieldbus module CDF600
<b>PROFIBUS DP</b>	Optional over external fieldbus module CDF600-2
<b>DeviceNet</b>	Optional over external connection module CDM420 + CMF fieldbus module
<b>Digital switching inputs</b>	<b>Standard version:</b> 2 ("Sensor 1", "Sensor 2"), 2 additional inputs via CMC600 in the CDB620 / CDB650 / CDM420 connection module <b>Ethernet version:</b> M12 male connector, 12-pin: 1 ("Sensor 1"), 2 additional inputs via CMC600 in the CDB620 / CDM420 connection module. M12 male connector, 17-pin: 2 ("Sensor 1", "Sensor 2"), 2 additional inputs via CMC600 in the CDB650 connection module. Opto-decoupled, $V_{in}$ = max. 32 V, reverse polarity protected, can be wired via PNP output, adjustable debouncing 0 ... 10,000 ms
<b>Digital switching outputs</b>	<b>Standard version:</b> 2 ("Result 1", "Result 2"), 2 additional outputs via CMC600 in the CDB620 / CDB650 / CDM420 connection module <b>Ethernet version:</b> M12 male connector, 12-pin: no output, 2 outputs via CMC600 in the CDB620 / CDM420 connection module M12 male connector, 17-pin: 2 ("Result 1", "Result 2"), 2 additional outputs via CMC600 in the CDB650 connection module. PNP, $I_{out}$ = max. 100 mA, short-circuit protected, pulse duration adjustable (static, 10 ... 10,000 ms)
<b>Reading pulse</b>	Pulse source for start: "Sensor 1" and/or "Sensor 2" switching inputs; command (data interface), auto pulse, CAN Pulse sources for stop: "Sensor 1", "Sensor 2" reading cycle source, command, timer, condition (e.g., Good Read)
<b>Optical indicators</b>	6 LEDs
<b>Acoustic indicator</b>	Beeper, can be switched off, can be allocated function for event status indication
<b>Configuration</b>	SOPAS ET configuration software, profile programming with bar codes, command language, GSD configuration

## 12.4 Mechanics/electronics

Table 17: Technical data for mechanics/electronics

<b>Electrical connection</b>	Standard version: Cable 0.9 m with male connector, D-Sub-HD, 15-pin Ethernet version: Swivel connector with 2 M12 round connectors (male connector, 12-pin or 17-pin, A-coded + 4-pin female connector, D-coded)
<b>Supply voltage <math>V_s</math></b>	10 V DC ... 30 V DC, LPS or NEC Class 2, reverse polarity protected
<b>Power consumption</b>	Max. 4.5 W with loaded switching outputs
<b>Housing</b>	Aluminum die cast

<b>Housing color</b>	Light blue (RAL 5012)
<b>Reading window material</b>	Glass or plastic lens, identifier see <a href="#">"Type code", page 12</a>
<b>Weight</b>	Standard version: 225 g with connecting cable (reading window on front), 250 g (reading window on side) Ethernet version: 205 g without connecting cables (reading window on front), 230 g (reading window on side)
<b>Safety</b>	EN 60950-1
<b>Electrical protection class</b>	III (EN 60950-1: 2011-01)
<b>Enclosure rating</b>	IP 65, according to EN 60529 (1991-10); A1 (2002-02)

## 12.5 Ambient data

Table 18: Technical data for ambient data

<b>EMC test</b>	Radiated emission: Acc. to EN 61000-6-3 (2007-01), electromagnetic immunity: Acc. to EN 61000-6-2 (2005-08)
<b>Vibration resistance</b>	EN 60068-2-6: 2008-02
<b>Shock resistance</b>	EN 60068-2-27: 2009-05
<b>Ambient operating temperature</b>	0 °C ... +40 °C
<b>Storage temperature</b>	-20 °C ... +70 °C
<b>Permissible relative humidity</b>	0% ... 90%, non-condensing
<b>Ambient light immunity</b>	2,000 lx, on bar code
<b>Bar code print contrast (PCS)</b>	≥ 60%

## 12.6 Dimensional drawings

CLV62x, standard version

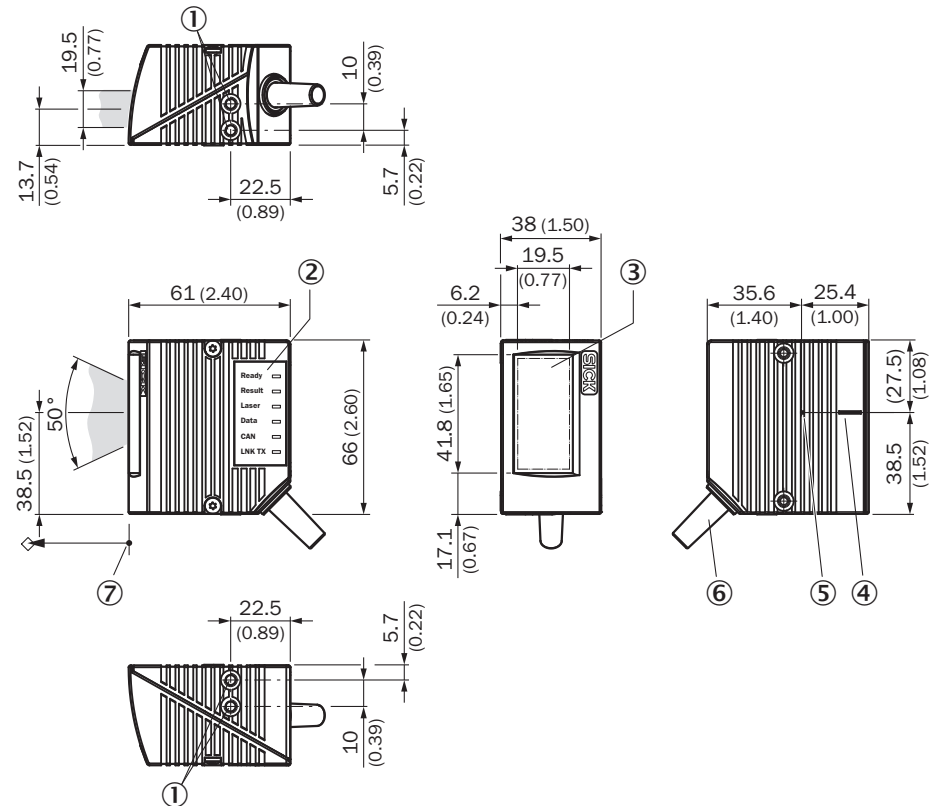


Figure 31: CLV62x: Structure and device dimensions with front reading window and connecting cable (in mm or inch)

- ① M5 blind tapped holes, 5 mm deep (2 x), for mounting the device
- ② LED (6 x), status indicator
- ③ Reading window, front orientation
- ④ Central position of the deflected laser beam in the V-shaped aperture angle
- ⑤ Internal impact point: Rotation point of the variable direction laser beam
- ⑥ Cable outlet, standard cable 0.9 m (+10%) with male connector, D-Sub-HD, 15-pin
- ⑦ Reference point for reading distance (housing edge) from device to object



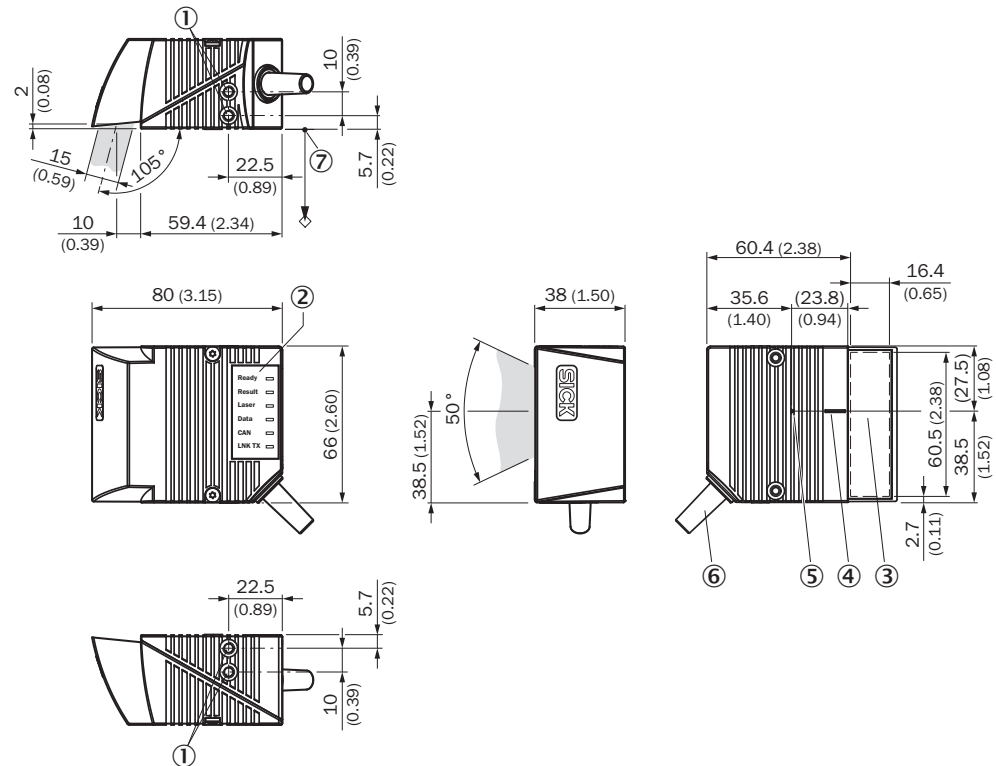


Figure 32: Structure and device dimensions with side reading window and connecting cable (in mm or inch)

- ① M5 blind tapped holes, 5 mm deep (2 x), for mounting the device
- ② LED (6 x), status indicator
- ③ Reading window, side orientation
- ④ Central position of the deflected laser beam in the V-shaped aperture angle
- ⑤ Internal impact point: Rotation point of the variable direction laser beam
- ⑥ Cable outlet, standard cable 0.9 m (+10%) with male connector, D-Sub-HD, 15-pin
- ⑦ Reference point for reading distance (housing edge) from device to object



#### NOTE

For view and dimensions of the devices with connector (Ethernet version) see "Device view", page 14.

## 12.7 Reading field diagrams

Table 19: Reading conditions for reading field diagrams

Characteristic	Value
Test code	Code 39/ITF
Print ratio	2:1
Print contrast	> 90%
Tilt	$\pm 10^\circ$
Ambient light	< 2,000 lx
Good read rate	> 75%

### 12.7.2 CLV620: mid range

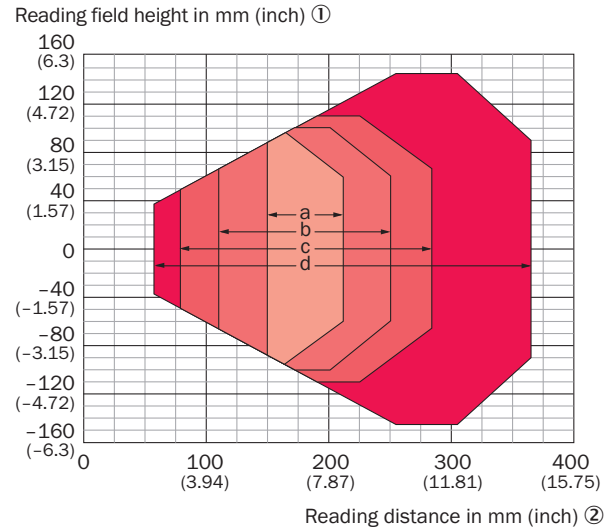


Figure 33: Reading field diagram CLV620, mid range, reading window on front

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ The depth of field is reduced by approx. 10% for devices with plastic lenses.
- ④ Resolution / scanning frequency

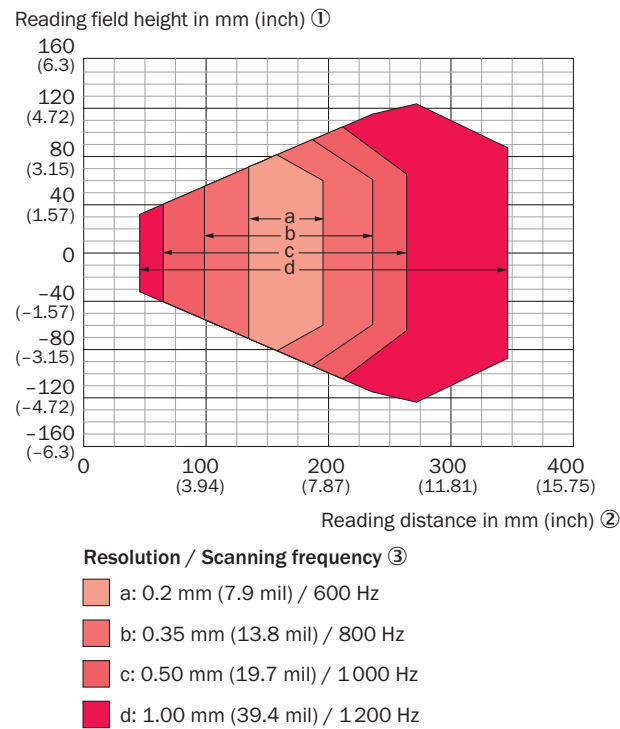


Figure 34: Reading field diagram CLV620, mid range, reading window on side

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ Resolution / scanning frequency

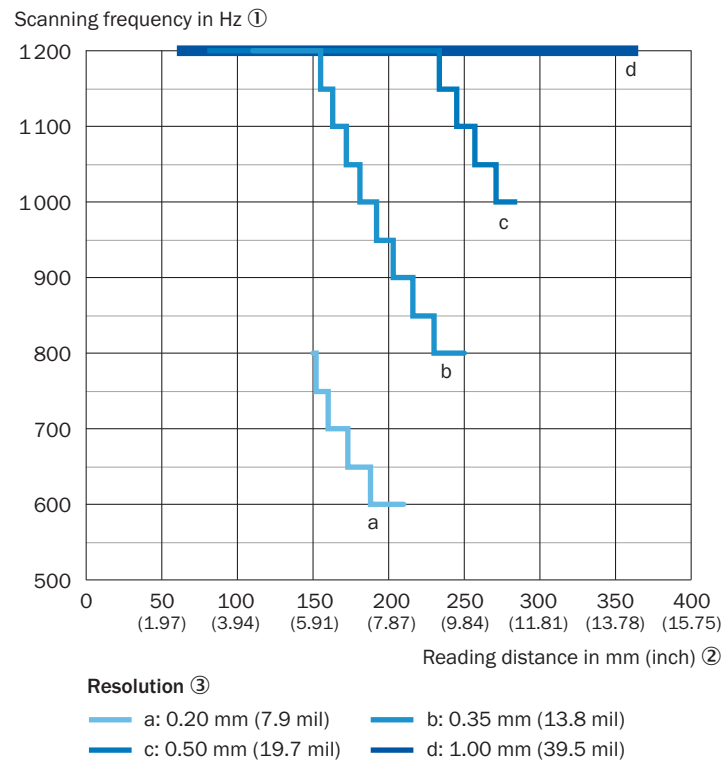


Figure 35: CLV620 characteristic curve field scanning frequency, mid range, reading window on front

- ① Scanning frequency in Hz

- ② Reading distance in mm (inch)
- ③ Resolution



### NOTICE

**Side reading window:** The values for the reading distance each shift by 16 mm towards the reading window for all scanning frequencies in the above diagram.

### 12.7.3 CLV621: Long range

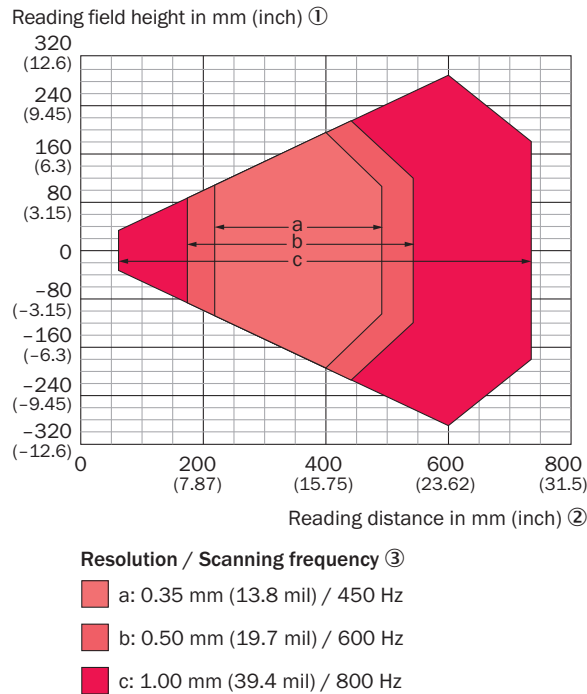
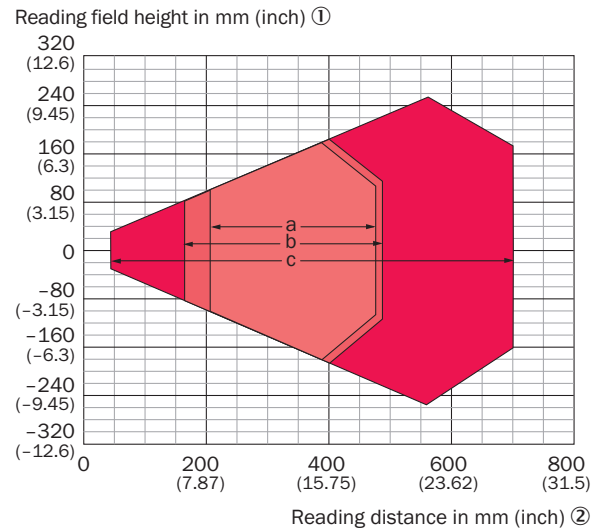


Figure 36: Reading field diagram CLV621, long range, reading window on front

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ Resolution / scanning frequency



**Resolution / Scanning Frequency ③**

- a: 0.35 mm (13.8 mil) / 450 Hz
- b: 0.50 mm (19.7 mil) / 600 Hz
- c: 1.00 mm (39.4 mil) / 800 Hz

*Figure 37: Reading field diagram CLV621, long range, reading window on side*

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ Resolution / scanning frequency

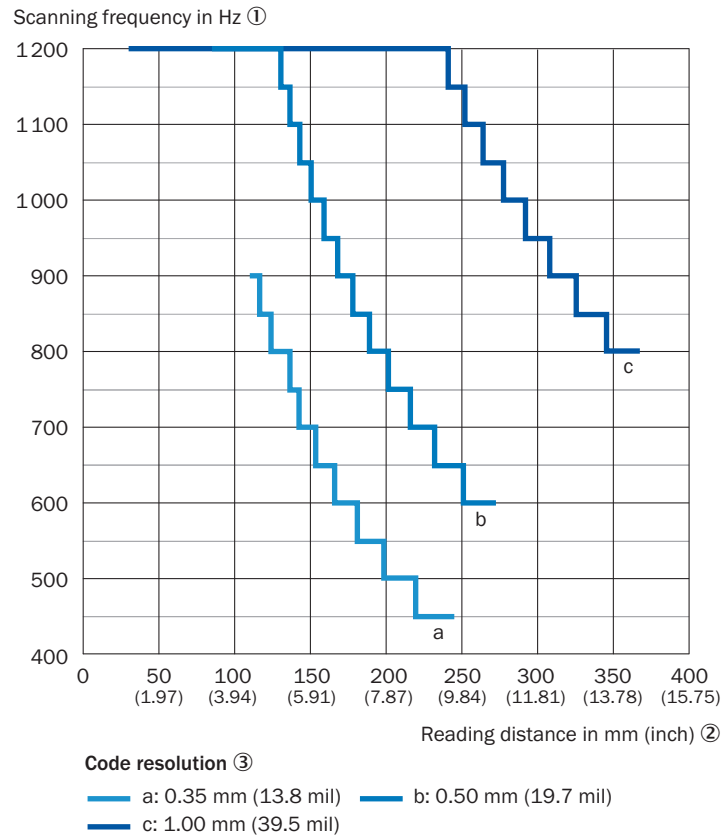


Figure 38: CLV621 characteristic curve field scanning frequency, long range, reading window on front

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



**NOTICE**

**Side reading window:** The values for the reading distance each shift by 16 mm towards the reading window for all scanning frequencies in the above diagram.

### 12.7.4 CLV622: Short range

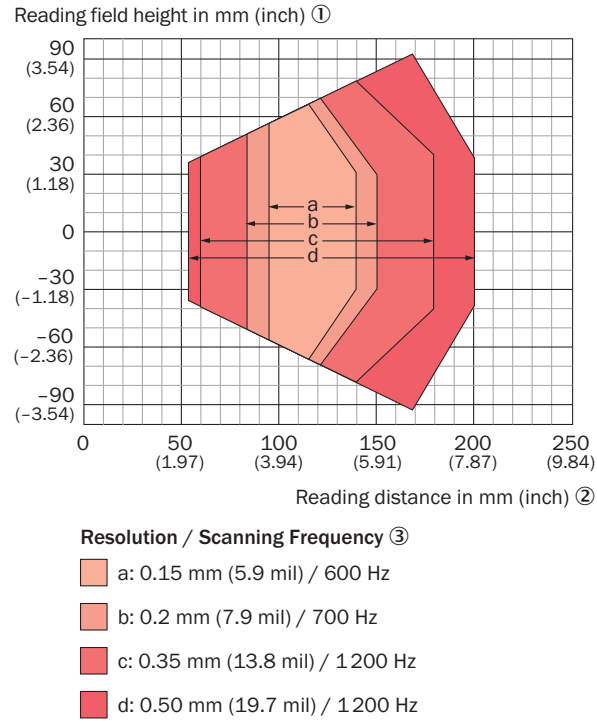


Figure 39: Reading field diagram CLV622, short range, reading window on front

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ Resolution / scanning frequency

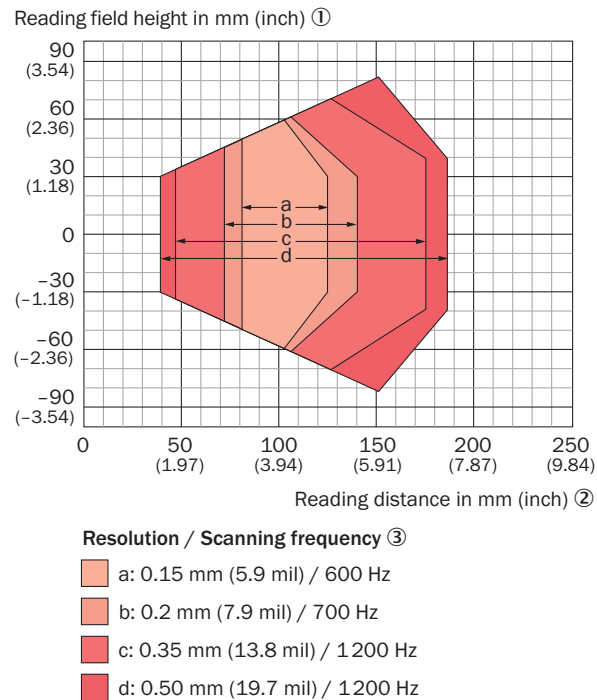


Figure 40: Reading field diagram CLV622, short range, reading window on side

- ① Reading field height in mm (inch)
- ② Reading distance in mm (inch)
- ③ Resolution / scanning frequency

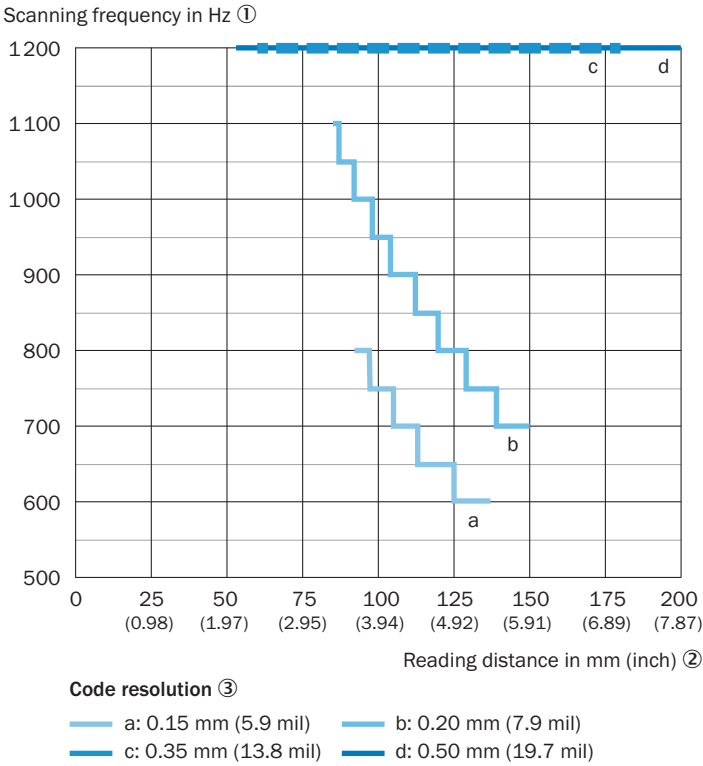


Figure 41: CLV622 characteristic curve field scanning frequency, short range, reading window on front

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



**NOTICE**

**Side reading window:** The values for the reading distance each shift by 16 mm towards the reading window for all scanning frequencies in the above diagram.



## 13 Accessories



---

**NOTE**

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

► [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

---

## 14 Annex

### 14.1 Notes on PROFINET

#### 14.1.1 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](http://www.profinet.com)).

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

- [www.profibus.com](http://www.profibus.com)

#### 14.1.2 General notes on PROFINET wiring

The signal lines must be wrapped in pairs (twisted pairs) and comply with at least CAT5 in line with 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](http://www.profibus.com)

#### 14.1.3 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](http://www.profibus.com)

#### 14.1.4 General requirements on a switch suitable for PROFINET applications

For PROFINET Conformance Class B and C (CC-B / CC-C), a PROFINET-certified switch which can be configured as a PROFINET device must be used.

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](http://www.profibus.com)

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

For 1-port devices, these include:

- LLDP (neighborhood detection) <sup>1)</sup>
- I&M 0-4 (device identification) <sup>1)</sup>
- Device exchange by topology check <sup>1)</sup>
- 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 <sup>1)</sup>

<sup>1)</sup> Properties of the CC-B

For 2-port devices, these include:

- LLDP (neighborhood detection) <sup>1)</sup>
- I&M 0-4 (device identification) <sup>1)</sup>
- Device exchange by topology check <sup>1)</sup>
- MRP (ring redundancy) <sup>1)</sup>
- 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 <sup>1)</sup>

#### 14.1.6 Behavior of the switching outputs of the bar code scanner with "Fieldbus input" reading cycle source

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

In the event that a fieldbus is interrupted, these outputs are no longer updated and keep the last value that existed before the interruption.

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

Status of digital outputs with	output value behavior
IOPS = Bad	Contain the last value before cancellation
Connection lost	Contain 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. If the fieldbus is interrupted, the reading cycle input is no longer updated. Reading results can get lost since the reading cycle input keeps the last value from before the interruption.

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

### 14.2 EU declaration of conformity / Certificates

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

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)
- [www.sick.com/MRS6000](http://www.sick.com/MRS6000)

### 14.3 Certification in accordance with UL60950



The devices of series CLV61x, CLV62x, CLV63x, CLV64x, CLV65x are certified in accordance with UL60950-1, the UL file has the designation E244281-A6. The devices must be supplied by LSP or Class 2 power supply units in order to ensure proper operation.

The certification is only valid with corresponding device identification on the type label of the respective bar code scanner, see "Product description", page 12.

- Laser power and laser warning notes, see "Laser radiation", page 9.
- Bar code scanner IP 65 enclosure rating not checked by UL.

## 14.4 Dimensional drawings

Current dimensional drawings for your respective device can be found at:

- [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

## 14.5 Abbreviations used

Table 20: Abbreviations used

<b>CAN</b>	Controlled Area Network. Field bus log based on the CAN bus
<b>CDB</b>	Connection Device Basic
<b>CDF</b>	Connection Device Fieldbus
<b>CDM</b>	Connection Device Modular
<b>CE</b>	Communauté Européenne. European Community
<b>CLV</b>	Code-Leser V-Prinzip [Code reader V principle]
<b>CMC</b>	Connection Module Cloning
<b>CMD</b>	Connection Module Display
<b>CMF</b>	Connection Module Fieldbus
<b>CMP</b>	Connection Module Power
<b>CA</b>	CodeAngle
<b>DOF</b>	Depth Of Field. Depth of field
<b>ESD</b>	Electro-Static Discharge. Electrostatic discharge
<b>GSD</b>	General Station Description (generic station description for PROFIBUS/PROFINET)
<b>HTML</b>	Hyper Text Markup Language (page description language on the Internet)
<b>I</b>	Input
<b>LED</b>	Light Emitting Diode. Light emitting diode
<b>LPS</b>	Limited Power Supply
<b>MAC</b>	Medium Access Control
<b>MTTF</b>	Mean Time To Failure
<b>MTTR</b>	Mean Time To Repair
<b>O</b>	Output
<b>PROM</b>	Programmable Read Only Memory. Programmable non-volatile memory
<b>RA</b>	Reading Angle
<b>RAM</b>	Random Access Memory. Direct-access volatile memory
<b>ROM</b>	Read Only Memory. Read-only memory (non-volatile)
<b>RTF</b>	Rich Text Format (standardized document format with format description)
<b>SD</b>	Secure Digital
<b>SMART</b>	SICK Modular Advanced Recognition Technology
<b>SOPAS-ET</b>	SICK Open Portal for Application and Systems Engineering Tool (PC software for Windows for the configuration of the device)
<b>PLC</b>	Programmable Logic Controller
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol



**Australia**

Phone +61 3 9457 0600  
1800 334 802 – tollfree  
E-Mail sales@sick.com.au

**Austria**

Phone +43 22 36 62 28 8-0  
E-Mail office@sick.at

**Belgium/Luxembourg**

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

**Brazil**

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

**Canada**

Phone +1 905 771 14 44  
E-Mail information@sick.com

**Czech Republic**

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

**Chile**

Phone +56 2 2274 7430  
E-Mail info@schadler.com

**China**

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

**Denmark**

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

**Finland**

Phone +358-9-2515 800  
E-Mail sick@sick.fi

**France**

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

**Germany**

Phone +49 211 5301-301  
E-Mail info@sick.de

**Hong Kong**

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

**Hungary**

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

**India**

Phone +91 22 4033 8333  
E-Mail info@sick-india.com

**Israel**

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

**Italy**

Phone +39 02 274341  
E-Mail info@sick.it

**Japan**

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

**Malaysia**

Phone +6 03 8080 7425  
E-Mail enquiry.my@sick.com

**Mexico**

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

**Netherlands**

Phone +31 30 2044 000  
E-Mail info@sick.nl

**New Zealand**

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

**Norway**

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

**Poland**

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

**Romania**

Phone +40 356 171 120  
E-Mail office@sick.ro

**Russia**

Phone +7 495 775 05 30  
E-Mail info@sick.ru

**Singapore**

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

**Slovakia**

Phone +421 482 901201  
E-Mail mail@sick-sk.sk

**Slovenia**

Phone +386 591 788 49  
E-Mail office@sick.si

**South Africa**

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

**South Korea**

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

**Spain**

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

**Sweden**

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

**Switzerland**

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

**Taiwan**

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

**Thailand**

Phone +66 2645 0009  
E-Mail Ronnie.Lim@sick.com

**Turkey**

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

**United Arab Emirates**

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

**United Kingdom**

Phone +44 1727 831121  
E-Mail info@sick.co.uk

**USA**

Phone +1 800 325 7425  
E-Mail info@sick.com

**Vietnam**

Phone +84 945452999  
E-Mail Ngo.Duy.Linh@sick.com

Further locations at [www.sick.com](http://www.sick.com)