OPERATING INSTRUCTIONS

CLV69x

Bar code scanner

SICK
Sensor Intelligence.

Described product

CLV69x

Manufacturer

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

Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Information on the operating instructions

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

Prerequisites for safe work are:

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

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

NOTE
Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The 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 13.

Available device variants are listed on the online product page.

- www.sick.com/CLV69x

1.3 Explanation of symbols

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

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

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

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

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

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

1.4 Further information

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

- www.sick.com/CLV69x

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

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

Documents on request

Overview of command strings for the device.

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

2 Safety information

2.1 Intended use

The 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.

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

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

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

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

2.2 Improper use

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

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

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

SICK always assumes the following prerequisites:

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

2.4 Limitation of liability

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

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions
- 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.

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

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

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	■ Basic practical technical training ■ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	■ Practical electrical training ■ Knowledge of current electrical safety regulations ■ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	■ Basic knowledge of the Windows™ operating system in use ■ Basic knowledge of the design and setup of the described connections and interfaces ■ Basic knowledge of data transmission ■ Basic knowledge of bar code technology
Operation of the device for the particular application	■ Knowledge of the operation and control of the devices in their particular application ■ Knowledge of the software and hardware environment for the particular application

2.7 Operational safety and particular hazards

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

WARNING
Electrical voltage!

Electrical voltage can cause severe injury or death.

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

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

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

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

2.7.1 Laser radiation

The device works with a red light laser diode in the wavelength 660 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 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

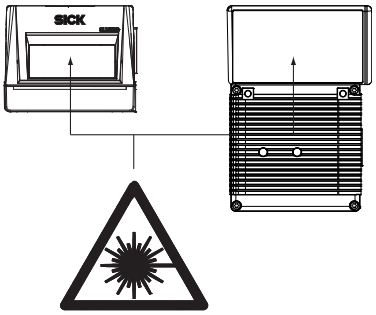


Figure 1: Laser output aperture in the different designs

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 13.

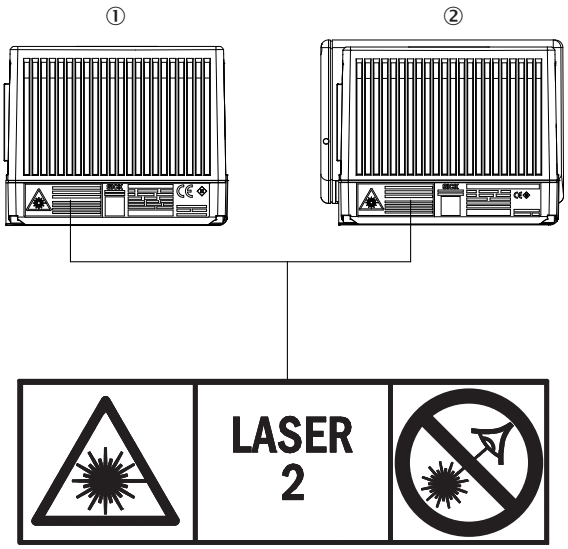


Figure 2: Example of a laser warning symbol on the device

① Line scanner

② Line scanner with oscillating mirror

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.

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

- Using the SOPAS ET configuration software, on the **Illumination Control** device page
- During GSD 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 the timeout is activated, it will have no effect in this case.

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.

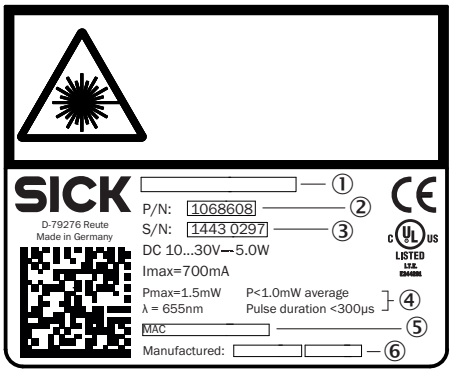


Figure 3: Type label design for the device, illustration may differ from actual type label

① Type designation
② Part number
③ Serial number
④ Laser output data
⑤ MAC address
⑥ Date of manufacture

3.1.2 Type code

The devices of the CLV69x product subfamily are classified according to the following type code:

CLVxyz-abcd

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

Table 2: Type code

Position	Description	Characteristic
1	Code reader	V-principle
2 – 3	Product family	69: CLV69x
4	Resolution	0: Standard density 1: Low density 2: High density
5	Scanning method, reading window orientation [1)]	0: Line scanner, reading window on front 1: Line scanner with oscillating mirror, reading window on side
6	Electrical connection	0: 60-pin system connection [2)] 9: Special connection
7	Front screen material	0: Glass 1: Plastic

Position	Description	Characteristic
8	Application (ambient temperature)	0: 0 °C ... +40 °C (without heating) 1: –35 °C ... +35 °C (integrated heating)

1) Refers to the longitudinal axis of the device.
2) For available interfaces, see the respective cloning plug (accessories).

NOTE

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

- www.sick.com/CLV69x

3.2 Product characteristics

3.2.1 Device view

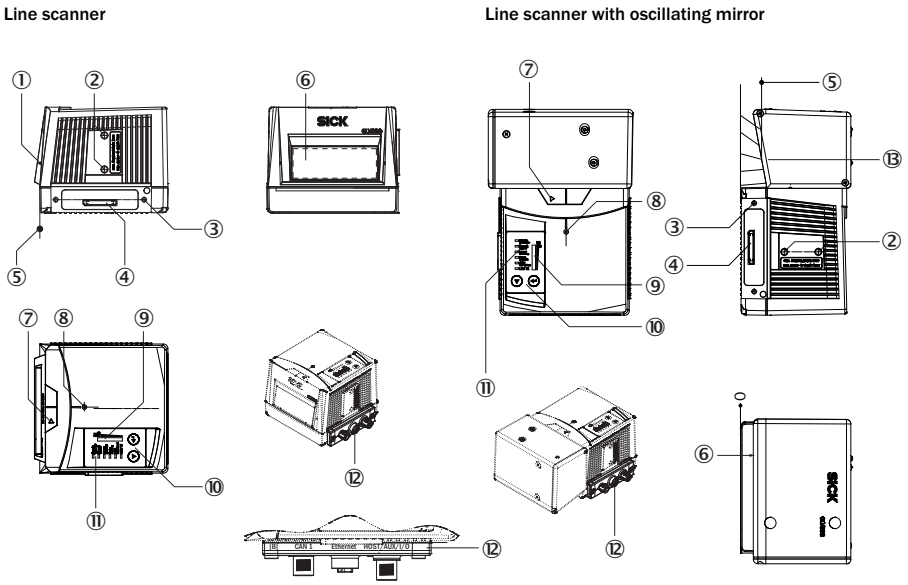


Figure 4: Line scanner and line scanner with oscillating mirror

❶ Line scanner
❷ Line scanner with oscillating mirror
① Mark for light emission level
② M6 tapped blind hole, 7 mm deep (2 x), for mounting the device
③ Threaded mounting holes M4, 10 mm deep (2 x), for mounting the cloning plug
④ 60-pin male connector for connecting a cloning plug
⑤ Reference point for reading distance (housing edge) from device to object
⑥ Reading window
⑦ Mark for the direction of rotation of the mirror wheel and counting direction of the read diagnostics date RA (Reading Angle)
⑧ Internal impact point: rotation point of the variable direction light beam
⑨ Bar graph
⑩ Function button (2 x)
⑪ LED status display (6 x)
⑫ Example of mounted cloning plug
⑬ Vertical to the device longitudinal axis for oscillating mirror

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	• Rugged, compact metal housing, CE marking • Laser Class 2, laser switches off if the output power is exceeded • Automatic self-test on system start • Diagnostic tools for system setup and (remote) system monitoring • Configurable output of reading diagnostic data in two reading results formats • Operating data polling, in case of error, issue of error code if required • Test string function (heartbeat) can be activated to signal that the device is ready for operation • Password-protected configuration mode via SOPAS ET • Future-oriented by firmware update (FLASH PROM) via data interface • Future-oriented SOPAS ET configuration software • Low power consumption • Additional supply voltage range • Optional parameter cloning with external CMC600 parameter memory module in the CDB/CDM connection module
Convenient operation/ configuration	• Configuration via configuration software SOPAS ET (online/offline) or commands • Configuration depending on the model via GSD configuration (via CDF600-2xx) • Status displays via LEDs • Auto setup of the optical reading properties • Two pushbuttons on the device to call up preset functions without connecting a computer • Buzzer, which can be switched off, to confirm the device function • Application and network setup assistant
Read operation modes	• Start/stop operation (one bar code bearing object per read pulse) • Tracking operation
Read cycle	• Pulse sources for start: switching inputs, data interface (command), auto pulse, free, CAN • Pulse sources for stop: read pulse source, switching inputs, data interface (command), timer, condition
Bar code evaluation	• All current 1D bar code types • Max. number of bar codes: 50 per reading interval • Separation of identical codes of the same code type using the read angle
Data processing	• Influencing the output of the reading data by event-dependent evaluation conditions • Influencing the output string by filtering and output sorting
Data communication	• Host interface: two data output formats can be configured, can be switched to various physical interfaces, parallel operation possible • Aux interface: fixed data output format, can be switched to various physical interfaces

3.2.3 Operating principle

The device consists of a laser scanner (laser diode and optics), an electronics unit with integrated decoder and various data interfaces (type-dependent) to industrial bus systems. The use of various focusing settings, resolutions, scan processes, bus systems, mounting options and optics enables use in most industrial applications. Interfaces to

external timers, such as photoelectric sensors or incremental encoders, enable reading pulses independent of the control. The 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).

Line scanner with oscillating mirror

The oscillating mirror also moves the scan line vertically to the scan direction from the resting position to both sides with a low oscillation frequency. This means that the device can also scan larger areas for bar codes.

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 from the bar code is recorded, processed, and decoded. External sensors deliver information about the read cycle and conveyor speed (increment) to control this process. The read results are output to the device 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

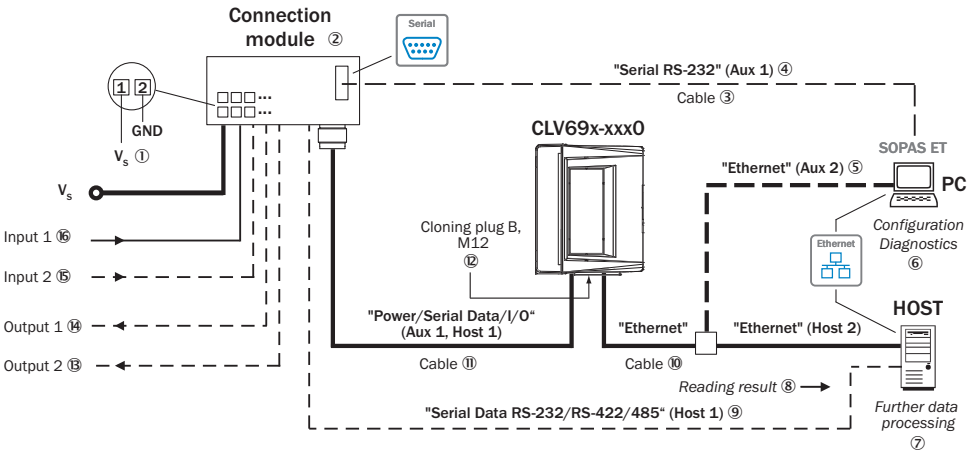


Figure 5: Facilities for connecting for devices without/with heating to connection module CDB650-204 or CDM420-0006

① Supply voltage V_S (V_S = U_V)

② Connection module (optional) CDB650-204 or CDM420-0006

③ Null modem cable (female connector, D-Sub, 9-pin/female connector, D-Sub, 9-pin), crossed TxD and RxD

④ Serial RS-232, alternative to Ethernet AUX port

⑤ Ethernet AUX port, alternative to Serial RS-232

⑥ Configuration or diagnostics

⑦ Data further processing

⑧ Read result (configurable output format 1 or 2)

⑨ Serial data host, alternative to Ethernet host port

⑩ Adapter cable (male connector, M12, 4-pin, D-coded/male connector, RJ-45, 8-pin)

⑪ For CDB650-204: Connection cable 1:1 (female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded)

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

⑫ Cloning connector B, M12 (part no. 2062452)

⑬ Digital switching output 2, e.g. for connecting an LED

⑭ Digital switching output 1, e.g. for connecting an LED

⑮ Digital switching input 2, e.g., for connecting an incremental encoder

⑯ Digital switching input 1, e.g., for connecting a read cycle sensor

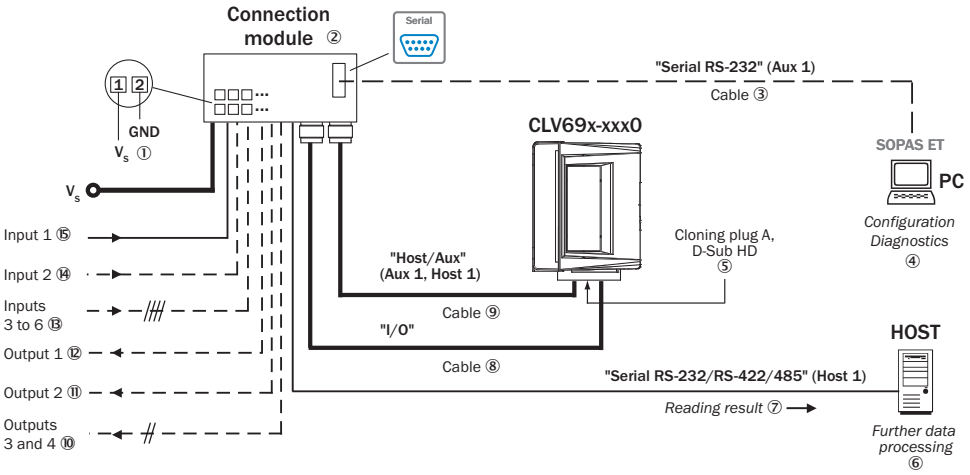


Figure 6: Facilities for connecting for devices without/with integrated heating to connection module CDM490-0001 when replacing a predecessor CLV49x

① Supply voltage V_S (V_S = U_V)

② Connection module (optional): CDM490-0001

③ Null modem cable (female connector, D-Sub, 9-pin/female connector, D-Sub, 9-pin), crossed TxD and RxD

④ Configuration or diagnostics

⑤ Cloning connector A, D-Sub HD (part number 2062450)

⑥ Data further processing

⑦ Read result (configurable output format 1 or 2)

⑧ Connection cable 1:1 (male connector, D-Sub-HD, 15-pin/female connector, D-Sub-HD, 15-pin)

⑨ Connection cable 1:1 (female connector, D-Sub-HD, 15-pin/male connector, D-Sub-HD, 15-pin)

⑩ Digital switching outputs 3 and 4, e.g. for connecting an LED

⑪ Digital switching output 2, e.g. for connecting an LED

⑫ Digital switching output 1, e.g. for connecting an LED

⑬ Digital switching inputs 3 to 6

⑭ Digital switching input 2, e.g., for connecting an incremental encoder

⑮ Digital switching input 1, e.g., for connecting a read cycle sensor

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.

The auto focus function allows the device to conduct the distance detection for the object without help from external sensors and to set the focus position independently. In order to do this, the device measures the distance from the object in its field of vision, uses this to create a distance profile internally and positions the focus on the object.

The auto focus function works in the “Difference to background” mode. The device is taught the distance profile of the background of its vision area without an object. Then the device focuses on the object, which it detects by establishing the difference from the background. The application is carried out e.g. with free vision of the object with restriction from structures which permanently protrude into the read level. Only one object with bar code(s) is in the reading field for each read cycle.

The distance profile of the background that is created can be displayed in the SOPAS ET configuration software. The definition of the auto focus area is carried out by selecting the aperture angle, the auto focus area and for line scanners with oscillating mirror also by limiting the oscillation amplitude (the angle of deflection). It is possible to specify, among other things, the park position (preferred position) of the focus position, from which refocusing is carried out for each reading, for the device and a temporal and/or spatial delay time (timeout/hysteresis).

The focus position to be set via measurement can also have an additional offset applied if necessary. This means that the depth of field, which runs radially in the direction of the scan line and is caused by the V-principle of light beam deflection, can be optimized for the object.

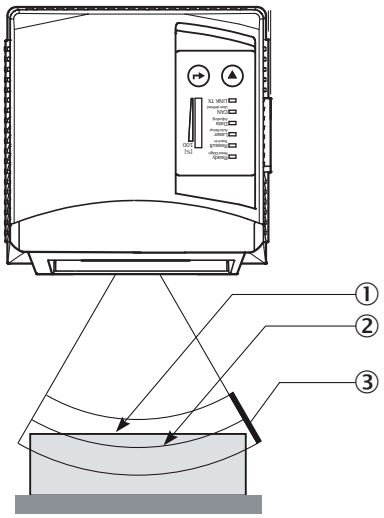


Figure 7: Auto-focus

① Measured distance

② Optimized focus position: measured distance plus offset for maximum

③ Depth of field (DOF)

NOTE
The auto focus function can be configured with the SOPAS-ET configuration software: project tree, CLV6xx, parameters, read configuration, focus control, options tab, auto focus parameters

3.2.3.3 Switchable focus position

As an alternative to the auto focus function, the focus position can also be changed dynamically and therefore cover a big read area.

A maximum of eight read areas can be defined internally as distance configuration for this purpose and can be approached by the optics in any order in read mode.

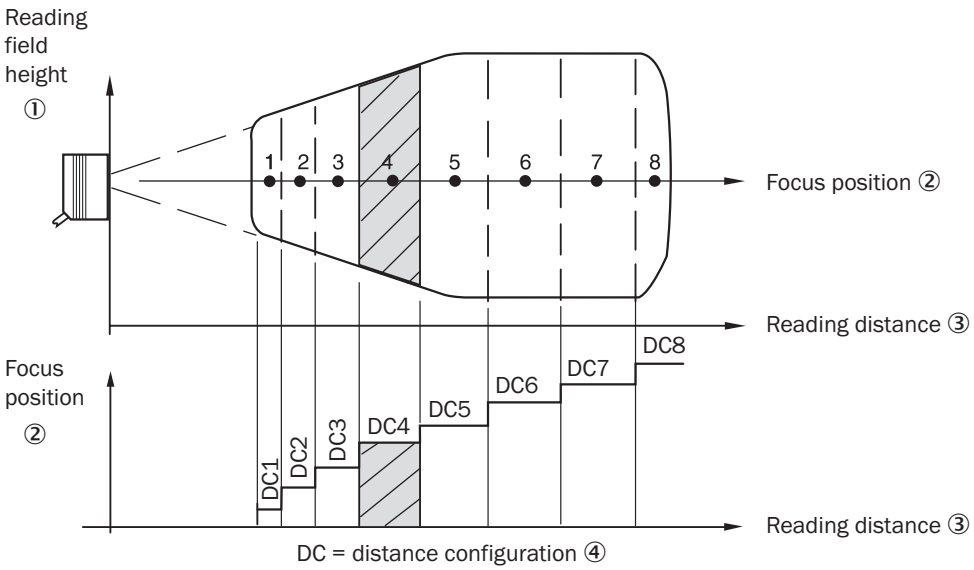


Figure 8: Focus switching - dividing the total read area into distance configurations

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

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

Trigger sources for switching are:

- Signal at switching input e.g. “sensor 2” for the max. 2-stage switching
- Command to the host interface or the integrated timer (e.g. for search run) for the max. 8-level switching
- Oscillating mirror dead centers of the double-sided deflection for line scanner with oscillating mirror

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

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

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

3.2.3.4 Oscillating mirror control

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

In addition to the “Park” (fixed, adjustable position of the scan line) or the continuous oscillation (irrespective of the read cycle), optimized function processes related to the read cycle are also possible in the controlled operation of oscillating mirror:

- N times vibrations at an adjustable start position within the read cycle
- One-Shot: single deflection (approach and return) per read cycle from an adjustable start position

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

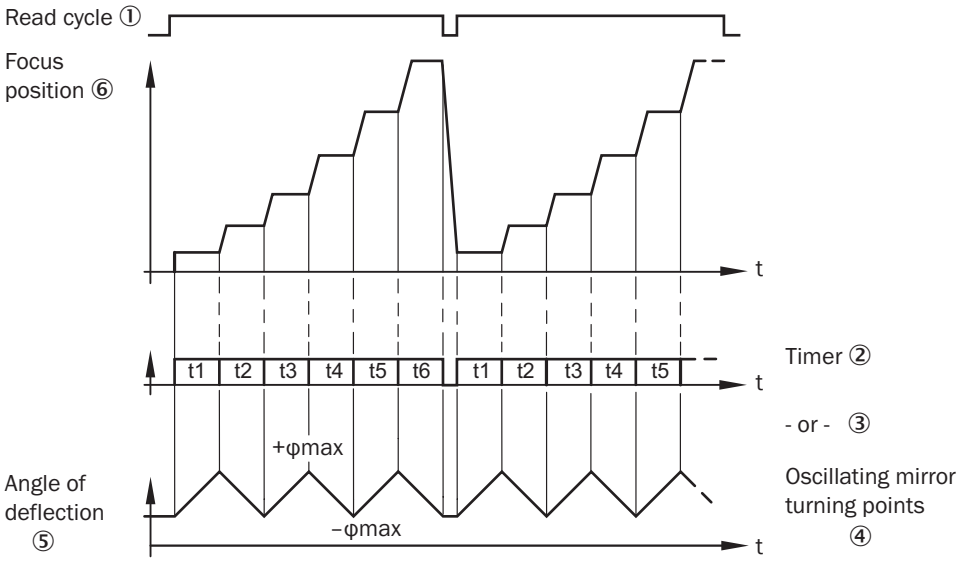


Figure 9: Oscillating mirror - example for focus position control during the search run, here with 6 focus positions

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

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

3.2.3.5 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.

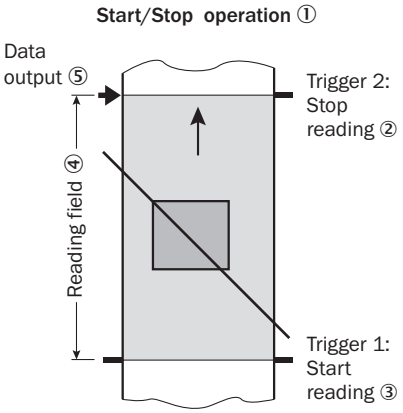


Figure 10: Start/stop operating mode of the device in stand-alone operation

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

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

3.2.3.6 Tracking operation

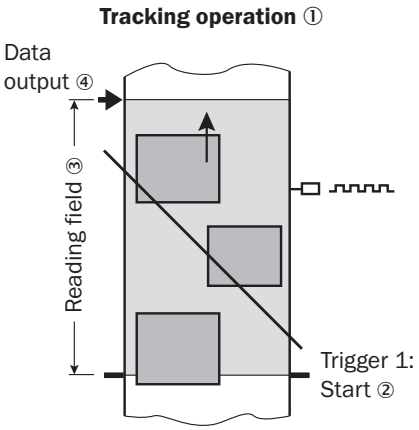


Figure 11: Tracking operating mode of the device in stand-alone operation

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

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

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

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

Jittering when the conveyor technology is starting up or in the event of slowing down when there is a high load with lots of objects to convey is therefore also recorded. An internal pulse generator in the device alternatively allows for operation at a conveyor speed that is always constant.

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

The issuing of the read result for an object is carried out after the rear edge of the object passes the object release point. The reading process can alternatively be started with a command string via the data interface.

3.2.4 Scope of delivery

The delivery of the device includes the following components:

Table 4: CLV69x: scope of delivery

No. of units	Component	Notes
1	Device in the version ordered	Without bracket
1	Attachment kit (plastic plate with screws)	Included with delivery for device variants with integrated heating (CLV69x-xxx**1**). Used to thermally decouple the device from a bracket.
1	Multilingual safety notes in a printed document	Informs about the requirements for safe use of the product.

The following are also required and must be ordered separately:

Table 5: CLV69x: additionally required scope of delivery

No. of units	Component	Notes
1	Cloning plug in the version ordered	Mandatory for operation of device. Type-dependent M12 connections sealed with protective plugs and caps.
	Cold-resistant connecting cable	For use of the device below 0 °C. Required for device variants with integrated heating (CLV69x-xxx**1**).

Associated components not contained in the delivery:

Table 6: CLV69x: scope of delivery, other components

Component	Notes
SOPAS ET configuration software and device description file (*.sdd file for SOPAS ET) for the CLV69x	Available online at: • www.sick.com/SOPAS_ET
CLV69x operating instructions as PDF in English, German and French. Other languages also available online where applicable.	Available online at: • www.sick.com/CLV69x

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.
- Electrical connections are provided with protective caps and plugs (as they are on delivery).
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- So that any residual damp can evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 107.
- Relative humidity: see "Technical data", page 107.
- 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

NOTICE

Special procedures are required during the mounting, installation and commissioning of devices with integrated heating!

Observe the applicable notes; see "Mounting device", page 25, see "Notes on the electrical installation", page 35 and see "Connecting the supply voltage", page 55.

- 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 Preparation for mounting

5.2.1 Mounting requirements

NOTICE

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

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

Space requirements

- Typical space requirement for device, see type-specific dimensional drawing and reading field diagram.
- The device requires a direct, unimpeded line of sight to the codes being read.
- The path between the read barcode and the device's reading window for the light reflected from the bar code must be dimensioned sufficiently, i.e. there must be a corridor with at least the same height as the reading window along the entire light path.

Environmental influences

- 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 107.
- To prevent the formation of condensation, avoid exposing the device to rapid changes in temperature.
- Protect the device from direct sunlight. The prevents additional external heating and potential optical dazzle of the device.

Mounting

- The device must only be mounted using the pairs of blind tapped holes provided for this purpose.
- Mount the device in a shock and vibration insulated manner.

Equipment required

- Mounting device (bracket) with sufficient load-bearing capacity and suitable dimensions for the device.
- 2 M6 screws – the maximum screw-in depth in the device is 7 mm from the housing surface

NOTE
The screws are for mounting the device on mounting equipment (bracket) 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 in the scope of delivery for the bracket.

- Tool and tape measure

5.2.2 Mounting device

The device is mounted on the bracket using two M6 blind hole threads that are in pairs on the narrow side of the device, see "Dimensional drawings", page 152.

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:

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.

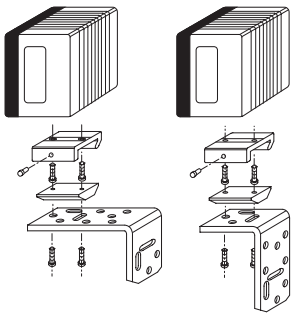


Figure 12: Example of mounting a CLV69x with a quick clamping device and a mounting bracket

Devices with heating

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 M6 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 7 mm from the housing surface.

Addition for heated device variants

The scope of delivery for the heated devices includes an attachment kit for the thermal decoupled mounting.

When preparing for mounting, the plastic plate of the attachment kit must be mounted between the bracket and the device housing.

NOTE

The supplied counter-sunk screws replace the screws from mounting kit 1.

The supplied cylinder head screws replace the screws from mounting kit 2 or 3.

5.3 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 α (see figure 13, page 26).
- Angle alignment of the device
- Avoidance of surface reflections
- Count direction of the reading angle (position of the bar code along the scan line)

5.3.1 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 scanner or line scanner with oscillating mirror).

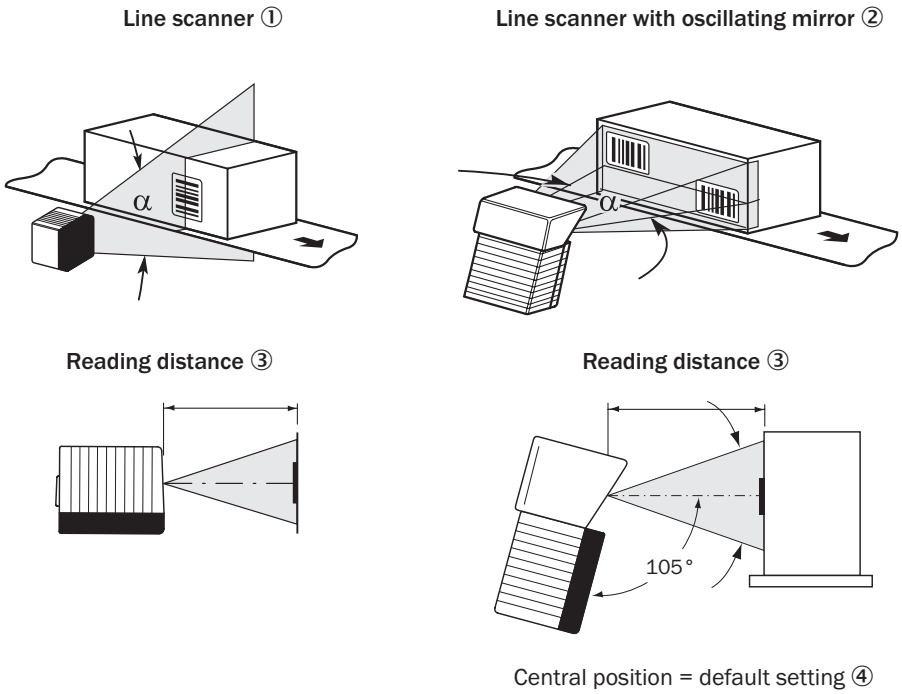


Figure 13: Allocation of the scan line to the bar code and conveyor direction

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

5.3.2 Reading distance to the bar code and aperture angle α

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

In the specification diagrams, the height of the reading field dependent on the reading distance is shown for differing resolutions (module widths), "Technical data", page 107.

5.3.3 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 27.

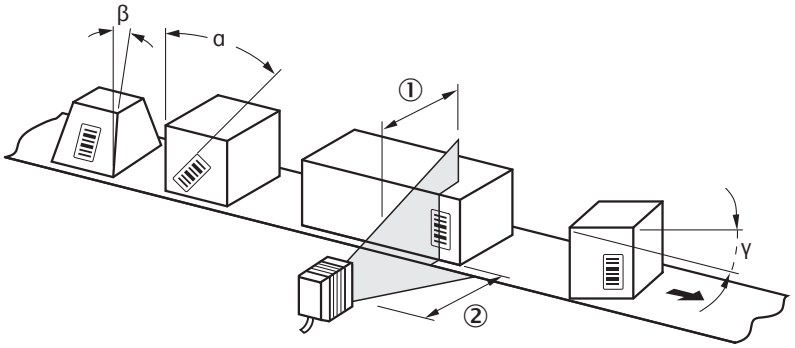


Figure 14: Line scanner: Read angle occurring between scanning line and bar code

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 7: Permitted read angle between scanning line and bar code

Angle	Limit Value
Tilt α	Max. 45°
Pitch β	Max. 45°
Skew γ	Max. 45°

5.3.4 Avoidance of surface reflections

If the light of the scan line(s) hits 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.

NOTE

Optimum results are achieved when the scan line tilts approx. 15° from the vertical.

In devices with an oscillating mirror, these values relate to the central position of the scan field.

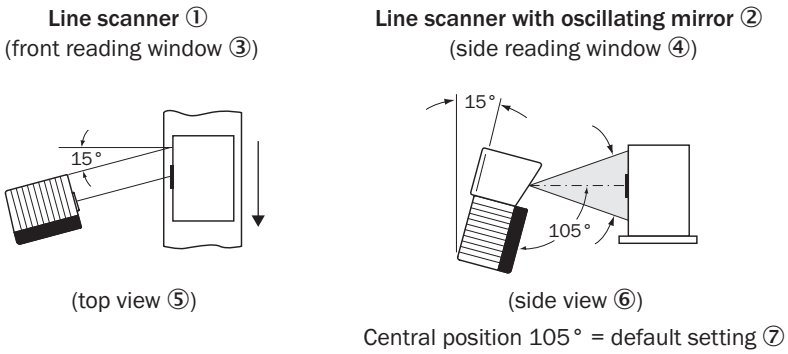


Figure 15: Avoiding surface reflections: Angle between light emitted and bar code (tilting away from vertical)

① Line scanner
② Line scanner with oscillating mirror
③ Reading window on front
④ Reading window on side
⑤ Supervision
⑥ Side view
⑦ Middle position 105° = default

5.3.5 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 outputted as an RA (reading angle) value.
- In addition, in the device with oscillating mirror, the angle of deflection of the scan line under which the device detects the bar code on the red scan line can be released as the CA (code angle) value.

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

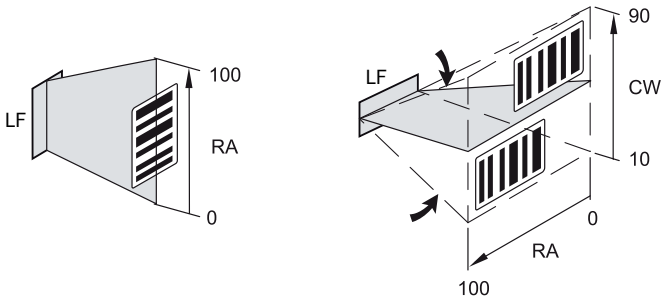


Figure 16: Example for count direction and RA/CA value determination in a line scanner (left) and a line scanner with oscillating mirror (right)

LF Reading window
CA Code angle
RA Reading angle

5.4 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 24.
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 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.
   - In a device with oscillating mirror, the wide side panel (rear of the oscillating mirror) is almost parallel to the bar code surface.
   - During reading, note the reading angle that occurs see "Angle alignment of the device", page 27.
   - 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 28.
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 96.

5.5 Mounting with shock mounts (optional)

In application areas with heavy vibrations or subjected to shocks caused by oscillations, jolting or abrupt changes in movement (e.g. when mounting onto a manned forklift truck), mounting must be carried out using shock mounts. Suitable shock mounts are available as accessories.

Corresponding mounting holder with integrated vibration/shock absorption can be found e.g. In the product catalog under:

- www.sick.com/CLV69x

During mounting of a bracket with shock mount, it must be ensured that the holding plate/the mounting bracket is screwed directly to the device and the shock attenuation is applied as close as possible to the device. The shock mounts must always be mounted horizontally over the scanner in order to achieve an optimum shock absorption.

Figure 17: Mounting holder with vibration absorber

During mounting of an oscillating mirror device, the mounting bracket with integrated vibration/shock attenuation is not mounted horizontally above the scanner, but vertically to the side on the device.

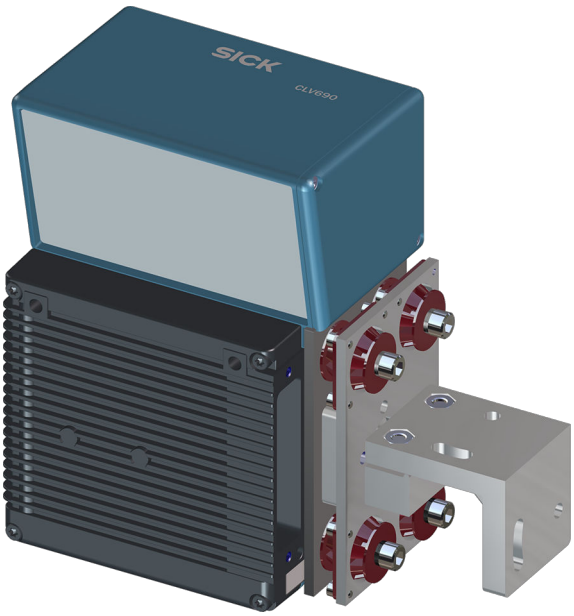


Figure 18: Shock mount with ball joint mounting on oscillating mirror device

NOTICE

Device damage due to improper mounting!

In order to prevent damage during mounting and subsequent operation of the device, the following points must be observed:

- Use screws of suitable length.
- Take a working distance of at least 25 mm in all axial directions of the device into consideration see figure 19, page 31. This applies in particular to inclined installation.
- Set the length of the feed lines according to the travel in order to ensure strain relief.

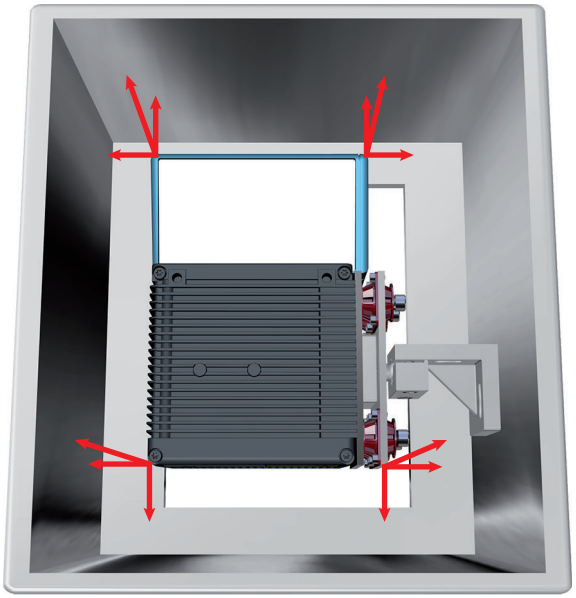


Figure 19: Mounting with mounting holder - taking the working distance into consideration

Permissible installation variants

NOTICE

Device damage due to incorrect installation position!

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

- Perform only one of the three listed mounting variants.

Three installation variants are permitted:

1 Mounting of line scanner (horizontal reading line), mounting holder with integrated vibration/shock absorption.

Figure 20: Mounting with mounting holder, line scanner, horizontal reading line

2 Mounting of line scanner (vertical reading line), ball joint holder and mounting holder with integrated vibration/shock absorption.

Figure 21: Mounting with mounting holder, line scanner, vertical reading line

3 Mounting of oscillating mirror scanner (horizontal reading line), ball joint holder and mounting holder with integrated vibration/shock absorption.

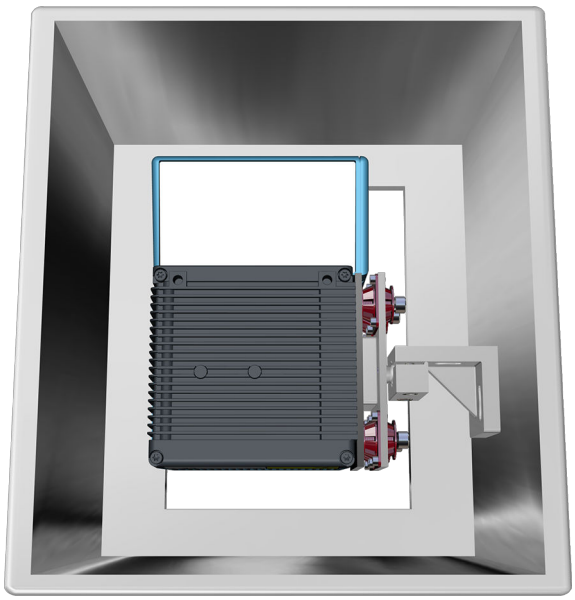


Figure 22: Mounting with mounting holder, oscillating mirror scanner, horizontal reading line

NOTICE

To prevent damage during the later operation of the device, the following points absolutely must be observed:

- The traveled foundation is in good condition (e.g., free of large expansion joints and potholes).
- In case of a mounting of the vibration absorber by the customer, threadlocker must be applied to the mounting screws to prevent loosening. LOCTITE 268 is recommended.
- Appropriate operating behavior when lowering the forks in forklift applications (e.g., no operation with lowered forks, soft pick-up of the load).
- We recommend using a soft-drop system.

NOTICE

Device damage due to a lack of maintenance!

Mounting holders with integrated vibration/shock absorption are subject to wear in case of stronger loads and must therefore be periodically assessed and maintained. The exchange interval depends on vibrations and shock effects (application-specific).

5.6 Mounting 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 SOPAS ET configuration software accesses the AUX interface (RS-232; 57.6 kBd) of the device via the connection module, the connection module should not be attached 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 relevant 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 wide range of photoelectric sensors as well as accessories (brackets, connecting cables) can be found at www.sick.com.

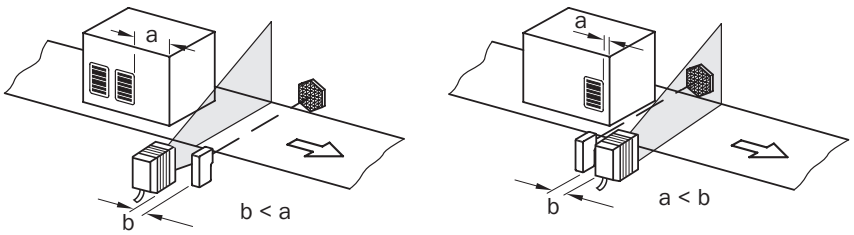


Figure 23: Bar code at the end or start of the piece goods

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 required for the tracking function .

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

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

6 Electrical installation

6.1 Safety

6.1.1 Notes on the electrical installation

- **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).
- Only operate the device with LPS (limited power source) as per IEC 60950-1 or NEC Class 2 power supply unit.
- Circuits connected to the device must be designed as SELV circuits (SELV = Safety Extra Low Voltage).
- Protect the device with a separate fuse (type-specific max. 2 A (unheated) or 4 A (heated)) 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.

Additional information on devices with heating

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

- Use cables suitable for the environmental conditions. In case of doubt, consult SICK Service.
- Restricted supply voltage range: 21.6 V DC ... 28.8 V DC
- Connection work only within the temperature range 0 °C ... +40 °C
- Only operate in idle state (no mounting or connection work).

6.2 Prerequisites for safe operation of the device

WARNING
Risk of injury and damage caused by electrical current!

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

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

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

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

This is achieved by complying with the following conditions:

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

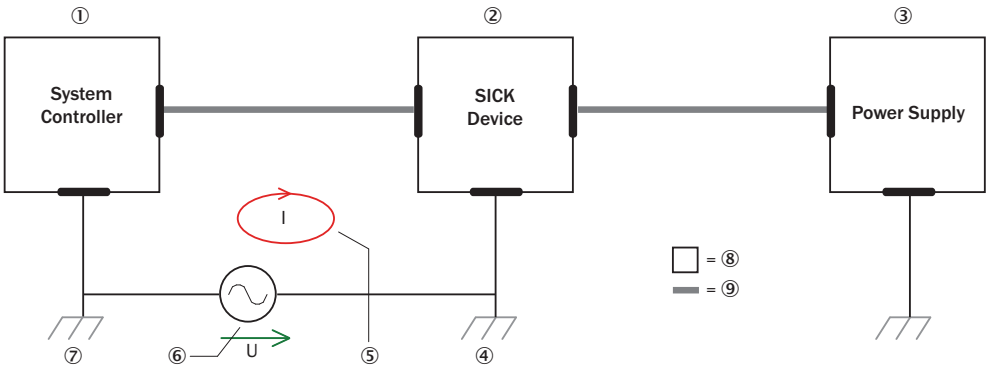


Figure 24: Example: Occurrence of equipotential bonding currents in the system configuration

① System controller
② Device
③ Voltage supply
④ Grounding point 2
⑤ Closed current loop with equalizing currents via cable shield

⑥ Ground potential difference
⑦ Grounding point 1
⑧ Metal housing
⑨ Shielded electrical cable

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

Remedial measures

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

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

Measures for widely distributed system installations

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

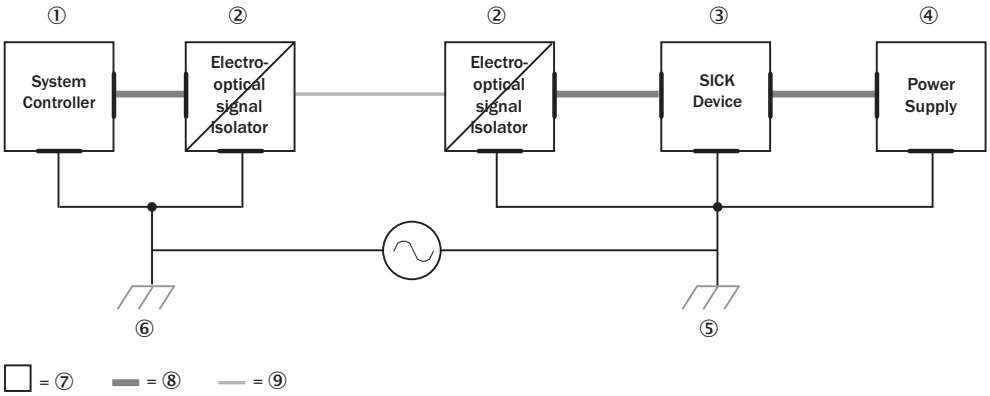


Figure 25: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

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

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

Measures for small system installations

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

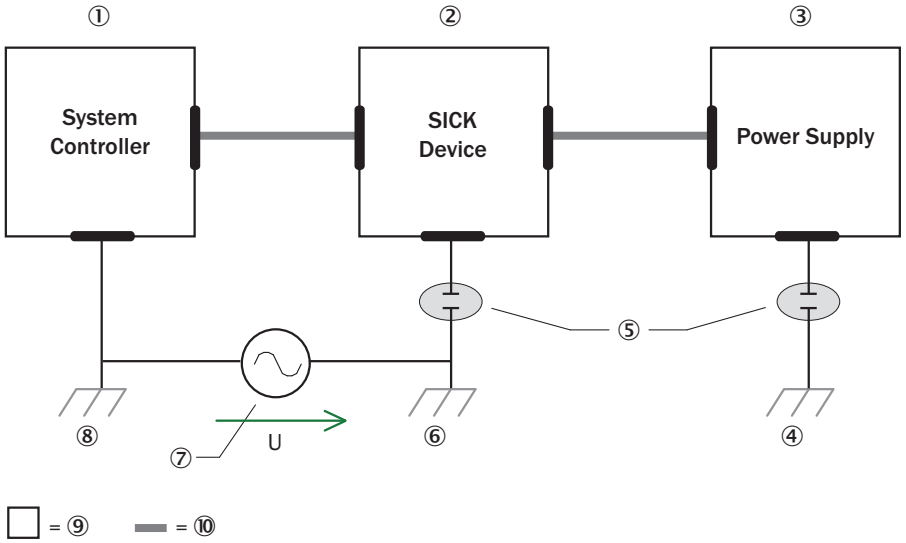


Figure 26: Example: Prevention of equipotential bonding currents in the system configuration by the insulated mounting of the device

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

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

NOTICE

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

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

6.3 Wiring 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/CLV69x

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

6.4 Pin allocation of the connections

6.4.1 Overview of the pin allocation for the cloning plug

NOTE
The allocation of the connections to the cloning plugs is available online under www.sick.com. Information of the respective product can be found in the technical data.

Table 8: Overview of cloning plugs and connection options

Brief designation	Part no.	Label [1]	Connection type	Interfaces	Connection module Bus connection module System controller
D-Sub	2062450	A	D-Sub	Power, Serial Data, I/O, CAN 1, CAN 2	CDM490-0001
I/O Ethernet	2062452	B	M12	Power, Serial Data, I/O, Ethernet, CAN 1	CDB650-204 CDM420-0006 CDM420-0007 CDM420-0108 CDF600-2100 CDF600-2103 CDF600-2200 CDF600-2201
CAN IN/OUT	2062453	C	M12	Power, Serial Aux, CAN 1	MSC800 [2]
CAN redundant	2062454	D	M12	Power, Serial Aux, CAN 1, CAN 2	MSC800 [2]
CAN IN/OUT, Ethernet	2074708	E	M12	Power, Ethernet, CAN 1	MSC800 [2]
CAN redundant, Ethernet	2074710	F	M12	Power, Ethernet, CAN 1, CAN 2	MSC800 [2]

1) Printed on the cloning plug. See “Cloning plugs”.
2) Modular system controller.

Table 9: Pin assignments for the connections of every cloning plug

Cloning plug					
D-Sub	**I/O Ethernet**	**CAN IN/OUT**	**CAN redundant**	**CAN IN/OUT, Ethernet**	**CAN redundant, Ethernet**
Part no. 2062450	**Part no. 2062452**	**Part no. 2062453**	**Part no. 2062454**	**Part no. 2074708**	**Part no. 2074710**
Label A	**Label B**	**Label C**	**Label D**	**Label E**	**Label F**
2 x D-Sub HD	**3 x M12**	**3 x M12**	**3 x M12**	**3 x M12**	**3 x M12**
Sensor 1 (sensor [3]) [1]	Sensor 1 [1]	-	-	-	-
Sensor 2 (IN 0 [3]) [1]	Sensor 2 [1]	-	-	-	-
Sensor 3 (IN 1 [3]) [1]	-	-	-	-	-
Sensor 4 (IN 2 [3]) [1]	-	Sensor 4 (IN 2 [3]) [1]	Sensor 4 (IN 2 [3]) [1]	-	-
Sensor 5 (IN 3 [3]) [1]	-	-	-	-	-
Sensor 6 (IN 4 [3]) [1]	-	-	-	-	-
Result 1 [2]	Result 1 [2]	-	-	-	-
Result 2 [2]	Result 2 [2]	-	-	-	-
Result 3 [2]	Result 3 [2] [4]	-	-	-	-
Result 4 [2]	Result 4 [2] [4]	-	-	-	-

Cloning plug					
D-Sub	**I/O Ethernet**	**CAN IN/OUT**	**CAN redundant**	**CAN IN/OUT, Ethernet**	**CAN redundant, Ethernet**
Part no. 2062450	**Part no. 2062452**	**Part no. 2062453**	**Part no. 2062454**	**Part no. 2074708**	**Part no. 2074710**
Label A	**Label B**	**Label C**	**Label D**	**Label E**	**Label F**
2 x D-Sub HD	**3 x M12**	**3 x M12**	**3 x M12**	**3 x M12**	**3 x M12**
Serial AUX	Serial AUX	Serial AUX	Serial AUX	-	-
Serial Host	Serial Host	-	-	-	-
CAN 1	CAN 1	CAN 1	CAN 1	CAN 1	CAN 1
CAN 2	-	-	CAN 2	-	CAN 2
-	Ethernet	-	-	Ethernet	Ethernet
-	-	24 VDC out [5]	24 VDC out [5]	-	-

1) Switching input
2) Switching output
3) Signal assignment for CLV480/490 / CLX490
4) Signals are not available on the D-Sub-HD, male connector, 15-pin of all adapter cables.
5) For the supply of an external fan, max. current output of? A

Possible combinations: cloning plug on connection modules:

Cloning plug	Connection modules	Connecting cables
Variant B (Ethernet) Part no. 2062452	CDB650-204	**Device without heating:** Female connector, M12, 17-pin, A-coded/ male connector, M12, 17-pin, A-coded **Device with heating:** Cable 1: female connector, M12, 17-pin, A-coded/male connector, M12, 17-pin, A-coded Cable 2: female connector, M12, 5-pin, A-coded/open end
	CDM420-0006	**Device without heating:** Female connector, M12, 17-pin, A-coded/ male connector, D-Sub-HD, 15-pin **Device with heating:** Cable 1: female connector, M12, 17-pin, A-coded/male connector, D-Sub-HD, 15-pin Cable 2: female connector, M12, 5-pin, A-coded/open end
Variant A (D-Sub) Part no. 2062450	CDM490-0001	**Device without heating:** Cable 1: female connector, D-Sub-HD, 15-pin/male connector, D-Sub-HD, 15-pin Cable 2: male connector, D-Sub-HD, 15-pin/ female connector, D-Sub-HD, 15-pin **Device with heating:** Cable 1: female connector, D-Sub-HD, 15-pin/male connector, D-Sub-HD, 15-pin Cable 2: ???

6.4.1.1 Cloning plug A (D-Sub HD): Power, Serial Data, I/O, CAN 1/2

Structure

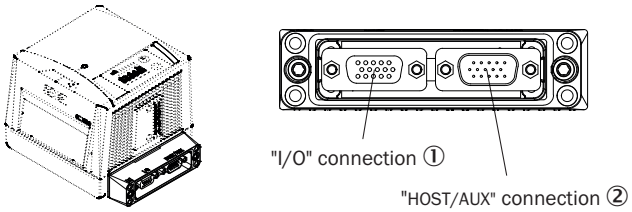


Figure 27: View of cloning plug A (D-Sub), part no. 2062450

① "I/O" connection

② "Host/AUX" connection

a) "I/O" connection

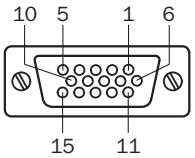


Figure 28: Female connector, D-Sub-HD, 15-pin

Table 10: Cloning plug A (D-Sub): pin assignment for "I/O" connection

Pin	Signal	Function
1	U_V [1]	Supply voltage, input current max. 1 A
2	Sensor 3 (IN 1 [2])	Digital switching input 3
3	Sensor 1 (sensor [2])	Digital switching input 1
4	Result 1	Digital switching output 1
5	GND [3]	Ground
6	Sensor 2 (IN 0 [2])	Digital switching input 2
7	Sensor 4 (IN 2 [2])	Digital switching input 4
8	Result 2	Digital switching output 2
9	SensGND	Switching input ground
10	Result 3	Digital switching output 3
11	Sensor 5 (IN 3 [2])	Digital switching input 5
12	Sensor 6 (IN 4 [2])	Digital switching input 6
13	–	Reserved [4]
14	–	Reserved [4]
15	Result 4	Digital switching output 4

1) Pin 1, male connector with pin 1, female connector connected
2) Pin assignment for CLV480/490 / CLX490
3) Pin 5, male connector with pin 5, female connector connected
4) Do not use!

b) "Host/AUX" connection

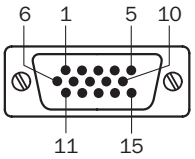


Figure 29: Male connector, D-Sub-HD, 15-pin

Table 11: Cloning plug A (D-Sub): pin assignment for "Host/AUX" connection

Pin	Signal	Function
1	U_V [1]	Supply voltage, output current max. 1 A
2	RxD (RS-232), AUX	Aux interface (receiver)
3	TxD (RS-232), Aux	Aux interface (sender)
4	Term (RS-422/485), Host	Termination of RS-422/485
5	GND [2]	Ground
6	RD+ (RS-422/485), host	Host interface (receiver+)
7	RD– (RS-422/485), host RxD (RS-232), host	Host interface (receiver–)
8	TD+ (RS-422/485), host	Host interface (sender+)
9	TD– (RS-422/485), host TxD (RS-232), host	Host interface (sender-)
10	CAN1_H	CAN bus 1 High (IN/OUT)
11	–	Reserved [3]
12	CAN2_H	CAN bus 2 High (IN/OUT)
13	CAN2_L	CAN bus 2 Low (IN/OUT)
14	CAN_GND	Ground of CAN bus
15	CAN1_L	CAN bus 1 Low (IN/OUT)

1) Pin 1, male connector with pin 1, female connector connected
2) Pin 5, male connector with pin 5, female connector connected
3) Do not use!

Dimensional drawings

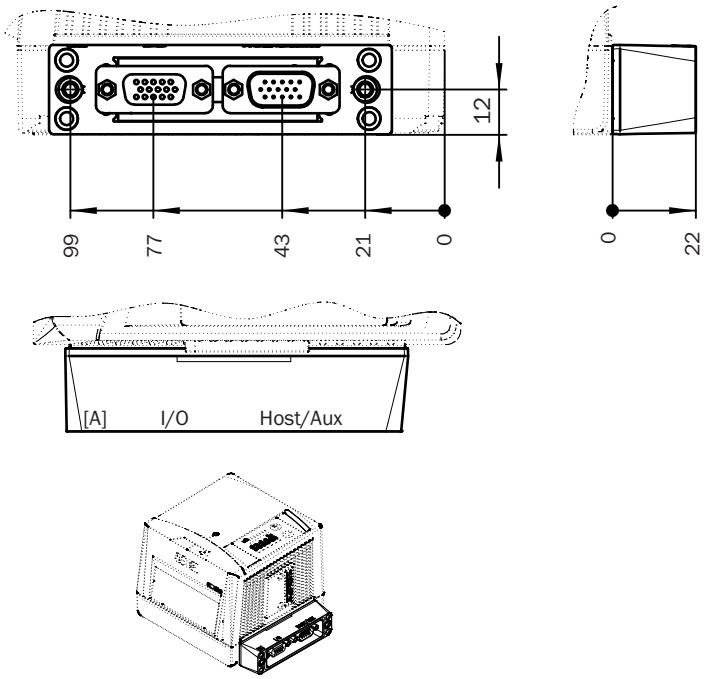


Figure 30: Dimensions of cloning plug A (D-Sub), all dimensions in mm

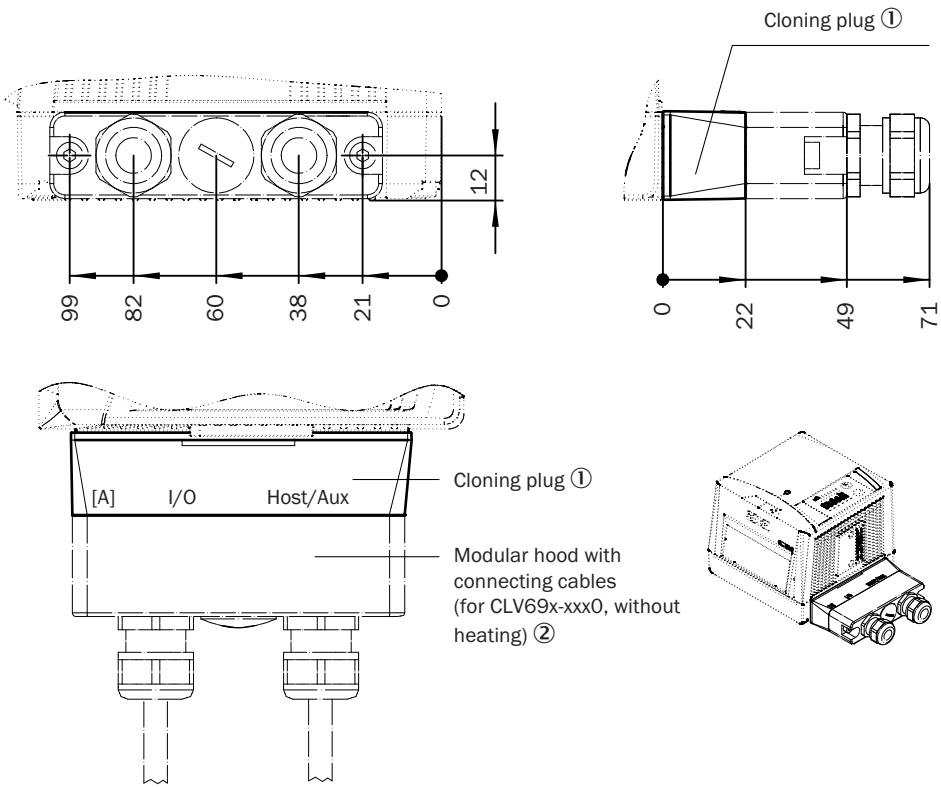


Figure 31: Dimensions of cloning plug A (D-Sub), with the hood of a connecting cable. All dimensions in mm.

① Cloning plug

② Hood with connecting cables (for CLV69x-xxx0, without heating)

6.4.1.2 Cloning plug B (M12): Power, Ethernet, Serial Data, I/O, CAN 1

Structure

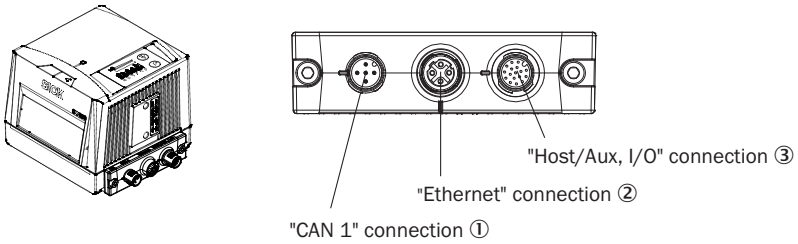


Figure 32: View of cloning plug B (M12), part no. 2062452

① Connection “CAN 1”
② “Ethernet” connection
③ “Host/AUX, I/O” connection

a) “CAN 1” connection

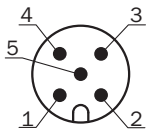


Figure 33: Male connector, M12, 5-pin, A-coded

Table 12: Cloning plug B (M12), pin assignment of “CAN 1” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V [1) 2)]	Supply voltage, input current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

1) CLV69x-xxx0 (without heating): both contacts suitable for the connection of the supply voltage.
2) CLV69x-xxx1 (with heating): only this contact suitable for the connection of the supply voltage.

b) “Ethernet” connection

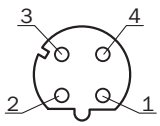


Figure 34: Female connector, M12, 4-pin, D-coded

Table 13: Cloning plug B (M12), pin assignment of “Ethernet” connection

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

c) “Host/AUX, I/O” connection

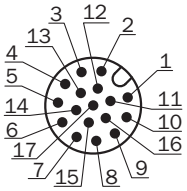


Figure 35: Male connector, M12, 17-pin, A-coded

Table 14: Cloning plug B (M12), pin assignment for “Host/AUX, I/O” connection

Pin	Signal	Function
1	GND	Ground
2	U_V [1]	Supply voltage, input current max. 1.5 A
3	CAN1_L	CAN bus 1 Low (IN/OUT)
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	TD+ (RS-422/485), host	Host interface (sender+)
6	TD– (RS-422/485), host TxD (RS-232), host	Host interface (sender-)
7	TxD (RS-232), Aux	Aux interface (sender)
8	RxD (RS-232), AUX	Aux interface (receiver)
9	SensGND	Switching input ground
10	Sensor 1	Digital switching input 1
11	RD+ (RS-422/485), host	Host interface (receiver+)
12	RD– (RS-422/485), host RxD (RS-232), host	Host interface (receiver–)
13	Result 1	Digital switching output 1
14	Result 2	Digital switching output 2
15	Sensor 2	Digital switching input 2
16	Result 3	Digital switching output 3
17	Result 4	Digital switching output 4

1) CLV69x-xxx0 (without heating): both contacts suitable for the connection of the supply voltage.

Dimensional drawing

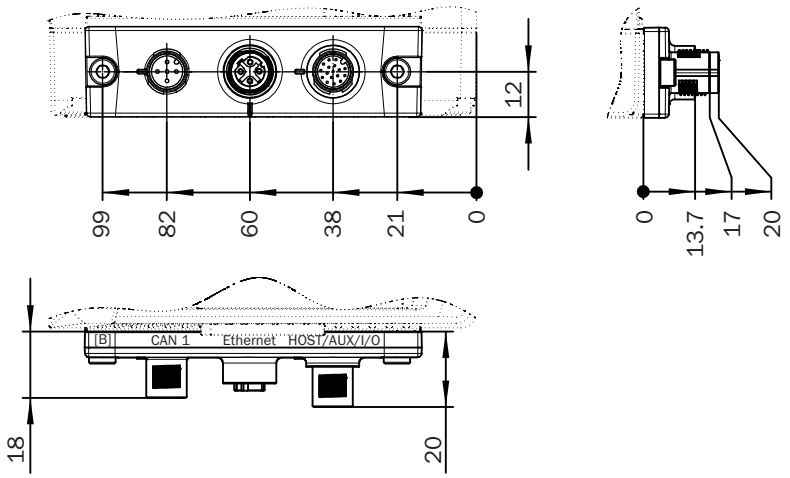


Figure 36: Dimensions of cloning plug B (M12), all dimensions in mm

6.4.1.3 Cloning plug C (M12): Power, Serial Aux, I/O, CAN 1

Structure

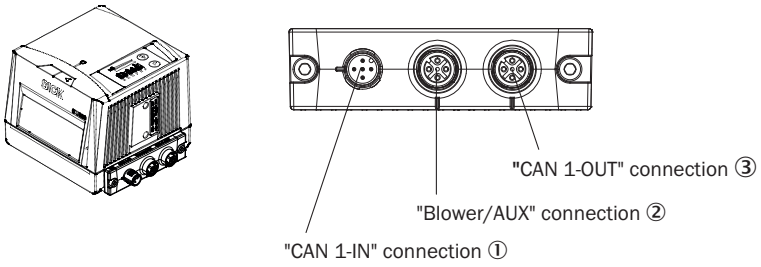


Figure 37: View of cloning plug C (M12), part no. 2062453

① "CAN 1-IN" connection
② "Blower/AUX" connection
③ "CAN 1-OUT" connection

a) "CAN 1-IN" connection

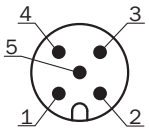


Figure 38: Male connector, M12, 5-pin, A-coded

Table 15: Cloning plug C (M12), pin assignment for "CAN 1-IN" connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V	Supply voltage, input current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

b) "Blower/AUX" connection

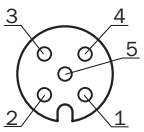


Figure 39: Female connector, M12, 5-pin, A-coded

Table 16: Cloning plug C (M12), pin assignment of "Blower/AUX" connection

Pin	Signal	Function
1	RxD (RS-232), AUX	Receiver
2	U_V OUT	Supply voltage, output current max. 4 A
3	TxD (RS-232), Aux	Sender
4	GND	Ground
5	Sensor 4 (IN 2 [1)])	Digital switching input 4

[1)] Pin assignment for CLV480/490 / CLX490.

c) "CAN 1-OUT" connection

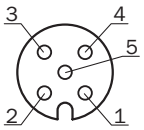


Figure 40: Female connector, M12, 5-pin, A-coded

Table 17: Cloning plug C (M12), pin assignment for “CAN 1-OUT” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V	Supply voltage, output current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

Dimensional drawing

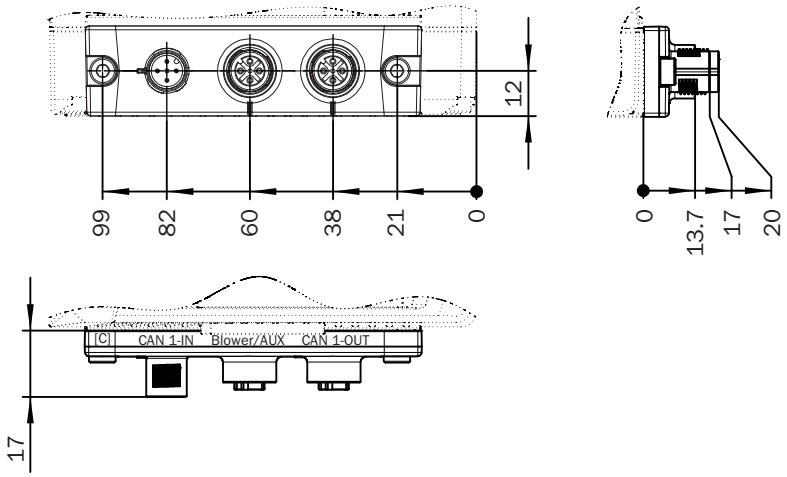


Figure 41: Dimensions of cloning plug C (M12), all dimensions in mm

6.4.1.4 Cloning plug D (M12): Power, Serial Aux, I/O, CAN 1/2

Structure

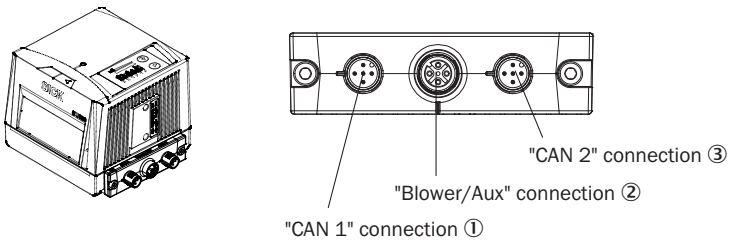


Figure 42: View of cloning plug D (M12), part no. 2062454

① Connection “CAN 1”

② “Blower/AUX” connection

③ “CAN 2” connection

a) “CAN 1” connection

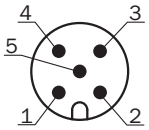


Figure 43: Male connector, M12, 5-pin, A-coded

Table 18: Cloning plug D (M12), pin assignment of “CAN 1” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V 1	Supply voltage 1, input current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

b) “Blower/AUX” connection

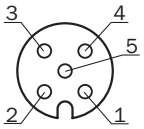


Figure 44: Female connector, M12, 5-pin, A-coded

Table 19: Cloning plug D (M12), pin assignment of "Blower/AUX" connection

Pin	Signal	Function
1	RxD (RS-232), AUX	Receiver
2	U_V OUT fan	Supply voltage for fan, max. output current = 2 x LPS
3	TxD (RS-232), Aux	Sender
4	GND	Ground
5	Sensor 4 (IN [1)])	Digital switching input 4

[1)] Pin assignment for CLV480/490 / CLX490

c) “CAN 2” connection

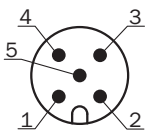


Figure 45: Male connector, M12, 5-pin, A-coded

Table 20: Cloning plug D (M12), pin assignment of “CAN 2” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V 2	Supply voltage 2, input current max. 4 A
3	GND	Ground
4	CAN2_H	CAN bus 2 High (IN/OUT)
5	CAN2_L	CAN bus 2 Low (IN/OUT)

Dimensional drawing

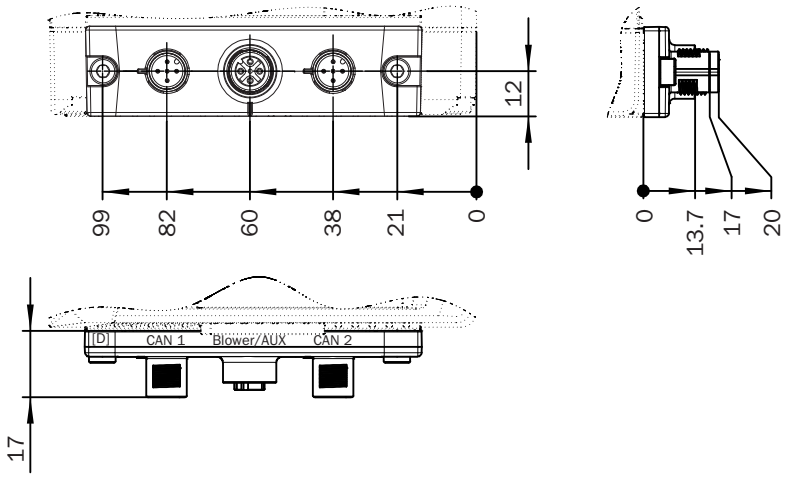


Figure 46: Dimensions of cloning plug D (M12), all dimensions in mm

6.4.1.5 Cloning plug E (M12): Power, Ethernet, CAN 1

Structure

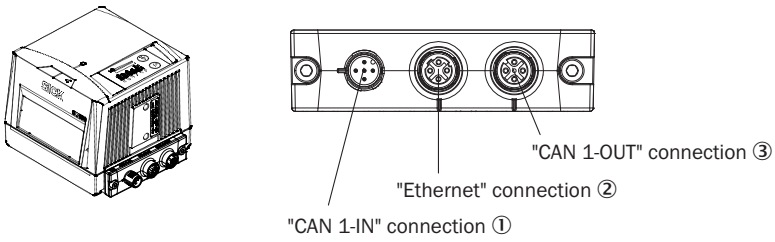


Figure 47: View of cloning plug E (M12), part no. 2074708

① "CAN 1-IN" connection
② "Ethernet" connection
③ "CAN 1-OUT" connection

a) "CAN 1-IN" connection

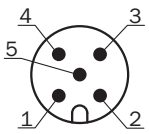


Figure 48: Male connector, M12, 5-pin, A-coded

Table 21: Cloning plug E (M12), pin assignment for "CAN 1-IN" connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V	Supply voltage, input current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

b) “Ethernet” connection

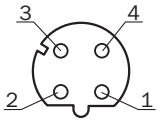


Figure 49: Female connector, M12, 4-pin, D-coded

Table 22: Cloning plug E (M12), pin assignment of “Ethernet” connection

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

c) "CAN 1-OUT" connection

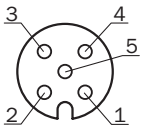


Figure 50: Female connector, M12, 5-pin, A-coded

Table 23: Cloning plug E (M12), pin assignment for "CAN 1-OUT" connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V	Supply voltage 2, output current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

Dimensional drawing

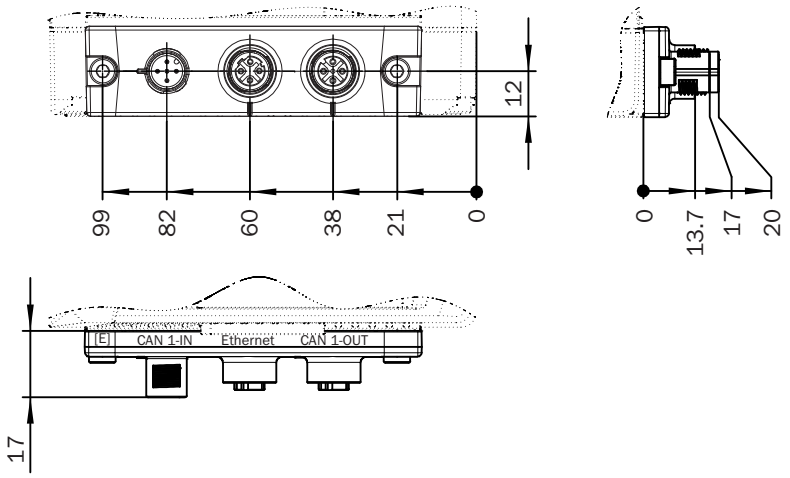


Figure 51: Dimensions of cloning plug E (M12), all dimensions in mm

6.4.1.6 Cloning plug F (M12): Power, CAN 1, Ethernet, CAN 2

Structure

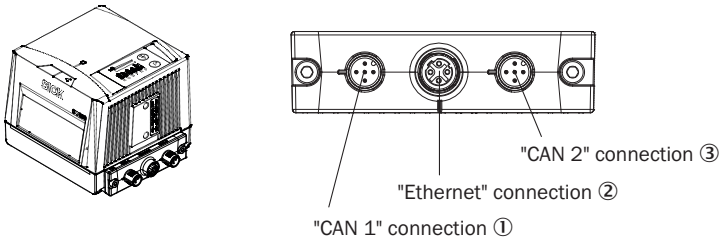


Figure 52: View of cloning plug F (M12), part no. 2074710

① Connection “CAN 1”
② “Ethernet” connection
③ “CAN 2” connection

a) “CAN 1” connection

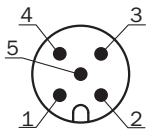


Figure 53: Male connector, M12, 5-pin, A-coded

Table 24: Cloning plug F (M12), pin assignment of “CAN 1” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V 1	Supply voltage 1, input current max. 4 A
3	GND	Ground
4	CAN1_H	CAN bus 1 High (IN/OUT)
5	CAN1_L	CAN bus 1 Low (IN/OUT)

b) “Ethernet” connection

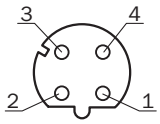


Figure 54: Female connector, M12, 4-pin, D-coded

Table 25: Cloning plug F (M12), pin assignment of “Ethernet” connection

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

c) “CAN 2” connection

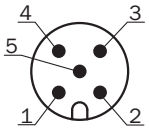


Figure 55: Male connector, M12, 5-pin, A-coded

Table 26: Cloning plug F (M12), pin assignment of “CAN 2” connection

Pin	Signal	Function
1	Shield	Shielding
2	U_V 2	Supply voltage 2, input current max. 4 A
3	GND	Ground
4	CAN2_H	CAN bus 2 High (IN/OUT)
5	CAN2_L	CAN bus 2 Low (IN/OUT)

Dimensional drawing

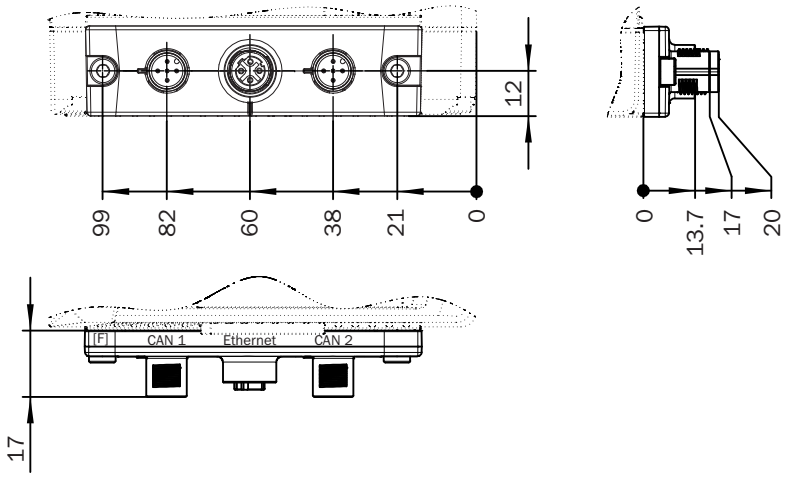


Figure 56: Dimensions of cloning plug F (M12), all dimensions in mm

6.5 Connection diagrams

CDB650-204 connection module

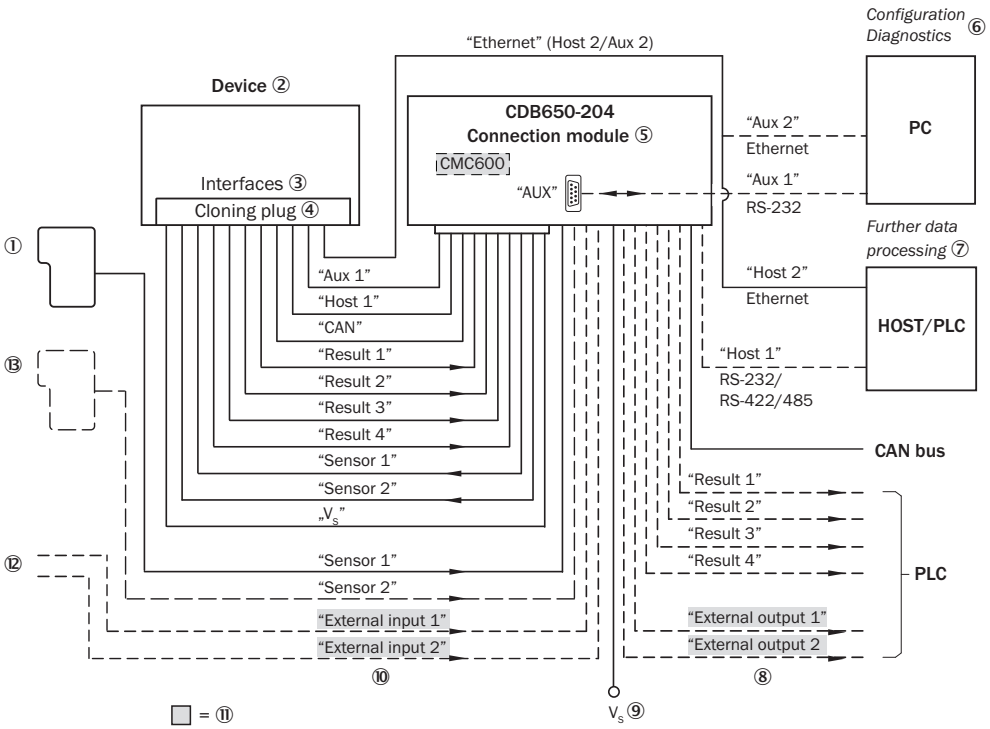


Figure 57: Connection of the device to the CDB650-204 connection module

① Trigger sensor for start/stop read cycle (for example a photoelectric retro-reflective sensor)
② Device: CLV69x-xxx0 (without heating) or CLV69x-xxx1 (with heating)
③ Interfaces
④ Cloning plug B (part no. 2062452)
⑤ Connection modules
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital switching outputs
⑨ Supply voltage V_S (V_S = U_V)
⑩ External digital switching inputs
⑪ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital switching inputs and outputs of the device (highlighted in gray)
⑫ Other functions
⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

CDM420-0006 connection module

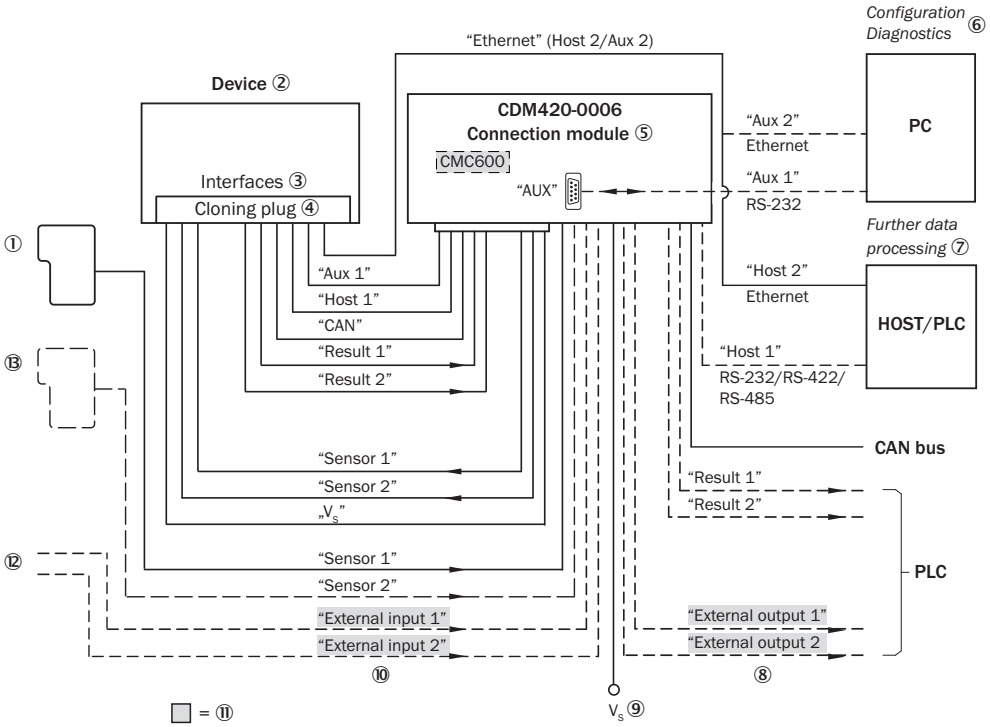


Figure 58: Connection of the device to the CDM420-0006 connection module

① Trigger sensor for start/stop read cycle (for example a photoelectric retro-reflective sensor)
② Device: CLV69x-xxx0 (without heating) or CLV69x-xxx1 (with heating)
③ Interfaces
④ Cloning plug B (part no. 2062452)
⑤ Connection modules
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital switching outputs
⑨ Supply voltage V_S (V_S = U_V)
⑩ External digital switching inputs
⑪ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital switching inputs and outputs of the device (highlighted in gray)
⑫ Other functions
⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

CDM490-0001 connection module

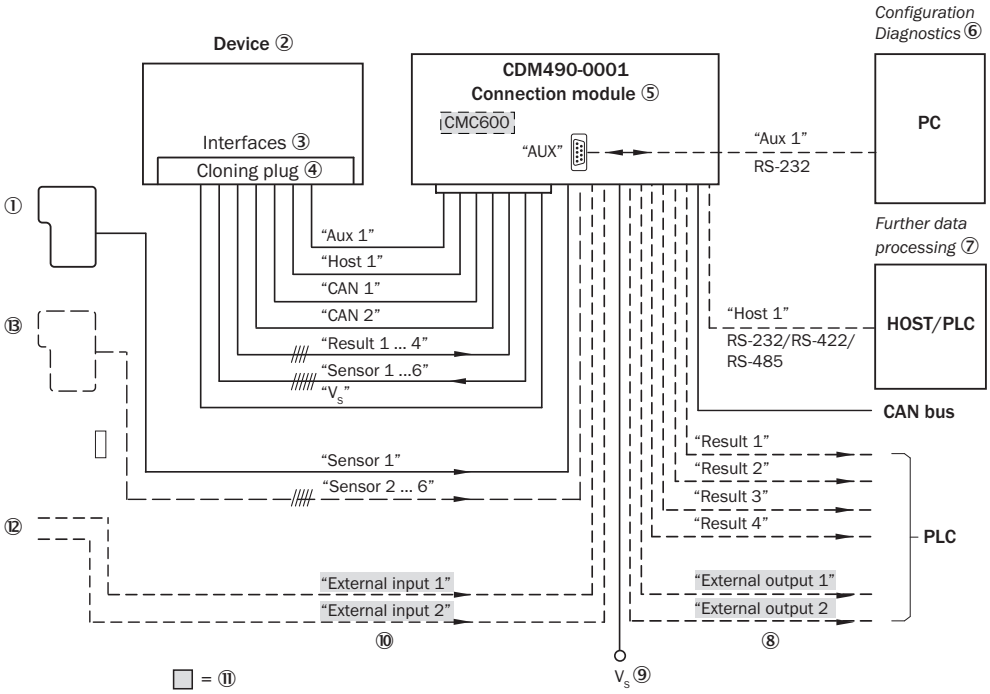


Figure 59: Connection of the device to the CDM490-0001 connection module

① Trigger sensor for start/stop read cycle (for example a photoelectric retro-reflective sensor)
② Device: CLV69x-xxx0 (without heating) or CLV69x-xxx1 (with heating)
③ Interfaces
④ Cloning plug A (part no. 2062450)
⑤ Connection modules
⑥ Configuration or diagnostics
⑦ Data further processing
⑧ External digital switching outputs
⑨ Supply voltage V_S ($V_S = U_V$)
⑩ External digital switching inputs
⑪ The optional CMC600 parameter cloning module is required in order to be able to use the additional external digital switching inputs and outputs of the device (highlighted in gray)
⑫ Other functions
⑬ Application-dependent alternative stop reading cycle (e.g. photoelectric sensor) or travel increment (incremental encoder)

6.6 Wiring interfaces

6.6.1 Connecting the supply voltage

Connecting supply voltage to devices without heating

NOTICE

Devices with integrated heating may only be connected to the supply voltage via the 5-pin M12 male connector "CAN 1" of the cloning plug.

In order to do this, the steps for the commissioning of devices with integrated heating must be followed.

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

- Supply voltage DC 24 V ± 20% (stabilized safety extra low voltage SELV as per currently valid standards)
- The electricity source must be able to release 144 W power or a maximum of 6 A for a short time. The switching on current of the device is a maximum of 5.5 A for 1 to 2 ms (depending on the length of the supply cable).
- Additional 0.5 W output power when using the optional CMC600 parameter memory module in the corresponding connection modules
- Increased inrush current when starting the device can lead to a fall in the supply voltage (24 V). Increased inrush currents over a period of maximum 10 ms can be to up to 20 times of the current when the device is in a stable state. If the supply voltage falls below a certain point, problems can occur when starting or booting the device. To prevent this, we recommend using the following power supply units:
  - PULS PISA11.CLASS2
  - Murrelektronik MICO 2.4
  - Devices with corresponding specification

Connecting supply voltage to devices with integrated heating

NOTICE
When connecting the supply voltage, no further external components may be connected to the cloning plug (e.g. fan, PC using serial interface).

- Supply voltage DC 21.6 V ... 28.8 V
- The electricity source must be able to release 144 W power or a maximum of 6 A for a short time. The switching on current of the device is a maximum of 5.5 A for 1 to 2 ms (depending on the length of the supply cable).
- Additional 0.5 W output power when using the optional CMC600 parameter memory module in the corresponding connection modules

1. Connect supply voltage to the 5-pin M12 male connector “CAN 1” on the cloning plug with a suitable cable [SV = red (1), GND = blue (2), shield = gray].
2. Switch on the supply voltage and check the device start-up: device in operation? (Status LEDs illuminate; mirror wheel activates.) A successfully passed test will confirm that the supply line is connected correctly, and the GND wire in particular.
3. Connect connection cables to external components (e.g. fan, PC via serial interface, Ethernet) on the cloning plug.

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

Wiring the serial data 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 27: 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 [1]	Up to 38.4 kBd 38.4 kBd ... 57.6 kBd	Max. 1200 m Max. 500 m

1) For RS-422/485-suitable cable and corresponding cable termination as per specification

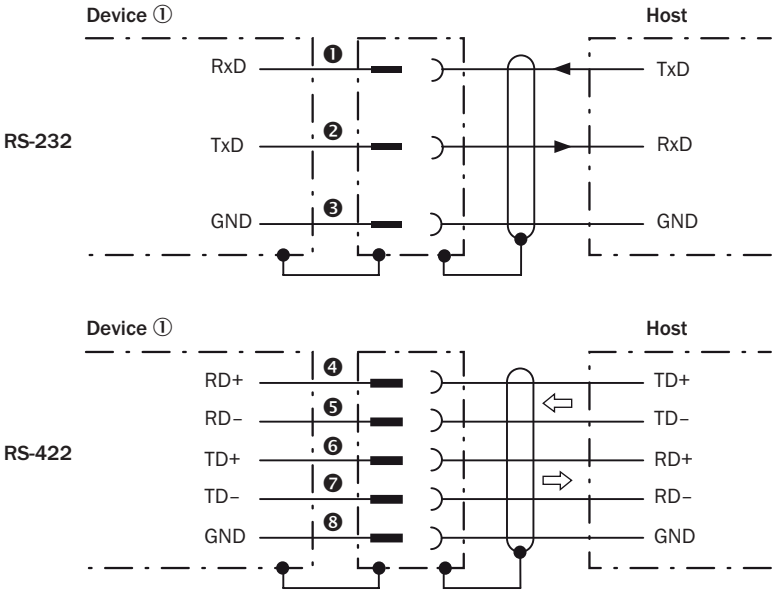


Figure 60: Internal circuitry for RS-232 and RS-485 data interfaces

① Device
❶...❸ Pin assignment: See RS-232 pin assignment for the respective device
❹...❽ Pin assignment: See RS-422 pin assignment for the respective device

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 39.

Table 28: Characteristic data for the switching inputs

Switching behavior	Power at the input starts the internal reading interval of the device (default: active high, debounce time: max. 10 ms)
Properties	Opto-decoupled Reverse polarity protected
Electrical values	The electrical values are identical for all switching inputs. Low: $\|V_{in}\| \leq 2$ V; $\|I_{in}\| \leq 0.3$ mA High: 6 V $\leq \|V_{in}\| \leq 32$ V; 0.7 mA $\leq \|I_{in}\| \leq 5$ mA

NOTE

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

- Min.: 0 ms
- Max.: 10,000 ms
- Default: 10 ms

In areas with strong electromagnetic radiation, debounce times of < 10 ms can cause undesired status changes to the switching input of the device (e.g. unintended initiation of the reading process).

In order to avoid undesired status changes, the following measures are recommended:

- Keep the length of cables from the signal source to the device as short as possible
- Reduced coupling to adjacent cables
- Shielding of influenced cables

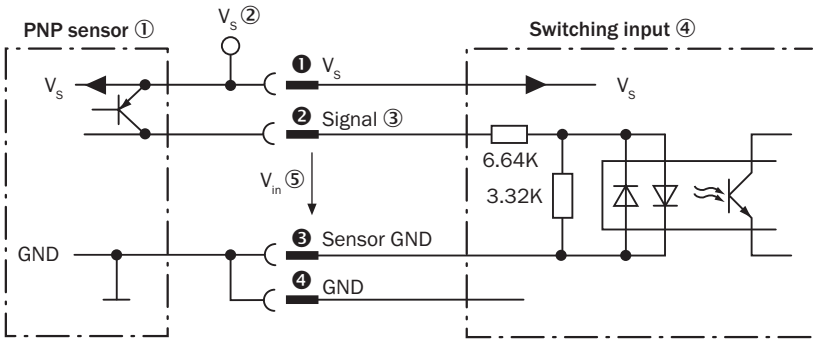


Figure 61: Wiring of a switching input with external PNP sensor

① PNP sensor

② Supply voltage $V_S = U_V$

③ Input signal

④ Switching input (“Sensor 1” or “Sensor 2”)

⑤ Input voltage V_{in}

❶...❹ 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, the respective operating instructions for the module are to be observed.

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 39.

Table 29: Characteristic data for the switching outputs

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

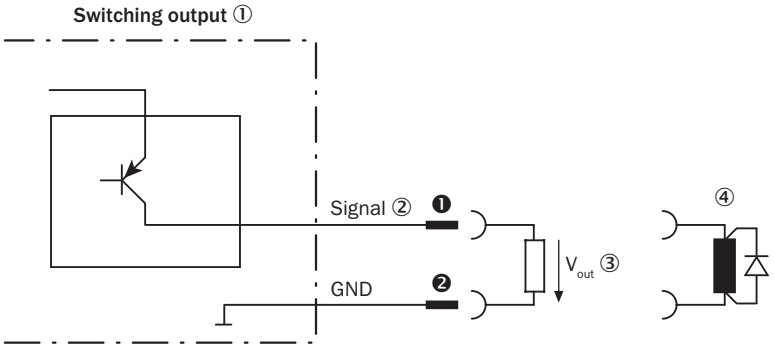


Figure 62: Wiring of a switching output

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.
❶...❷ 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.

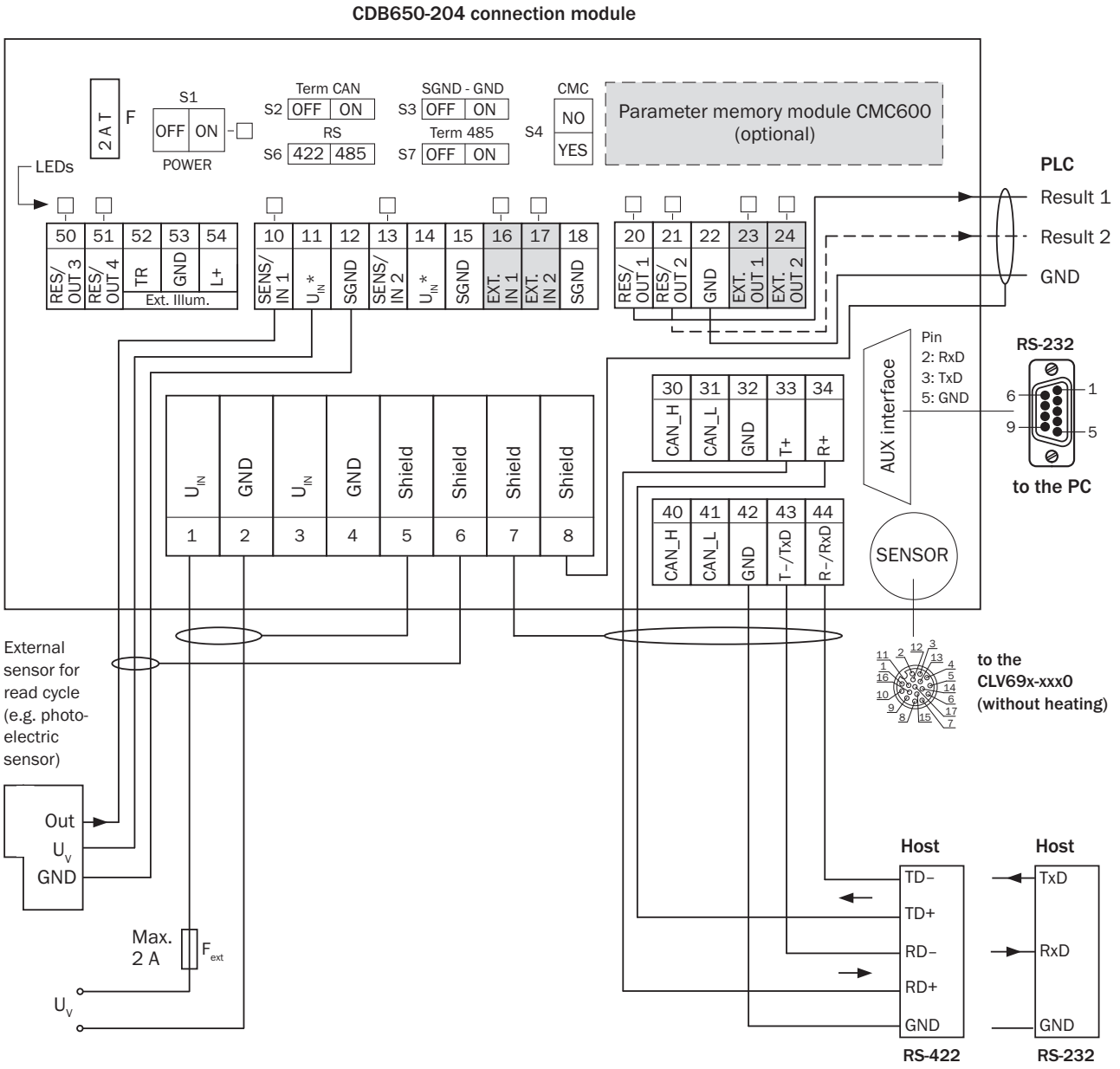
If the wiring of the outputs is carried out via a connection module, the respective operating instructions for the module are to be observed.

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.

6.7 Connection modules

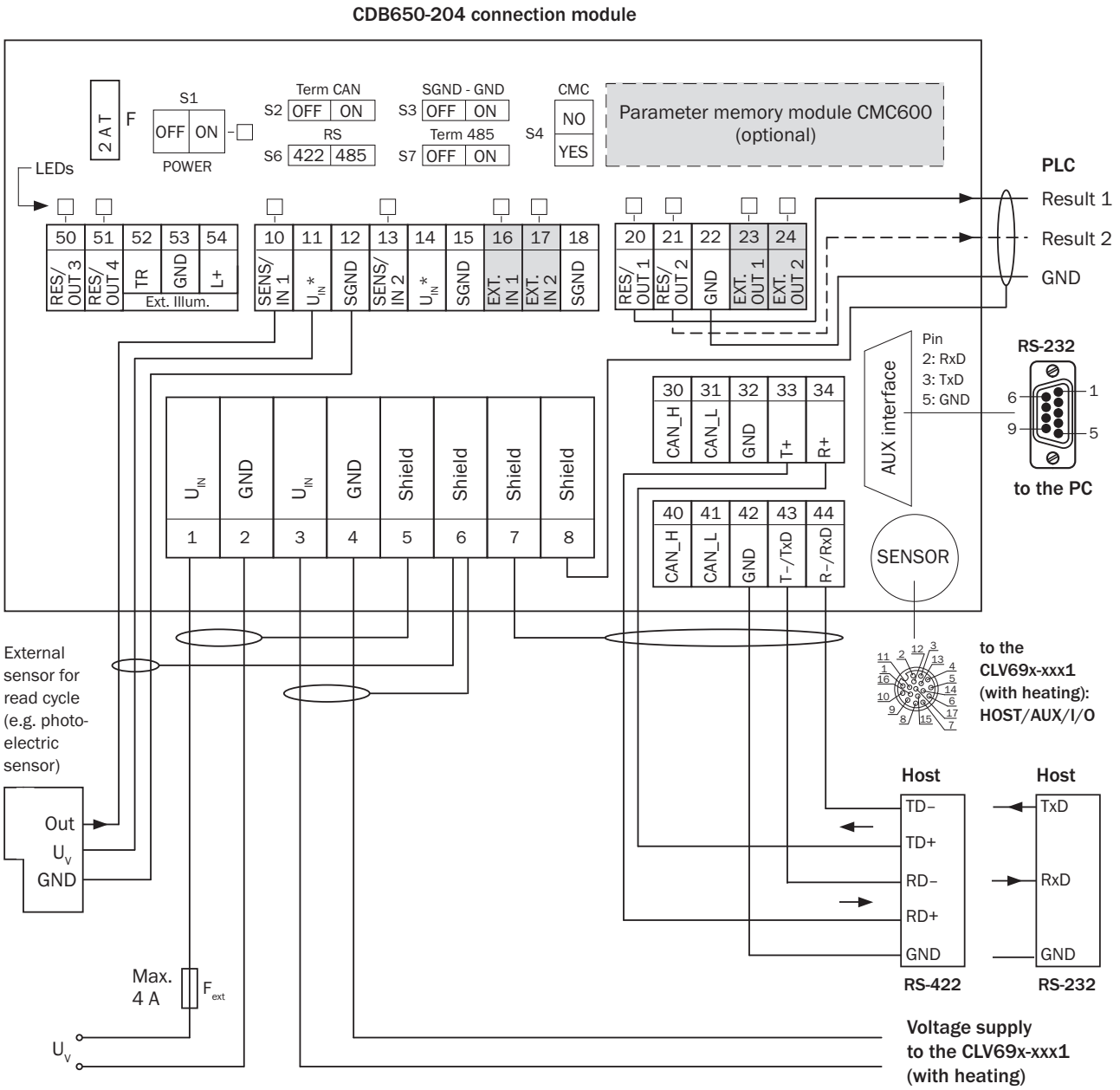
6.7.1 Using connection module CDB650-204



U_V = DC 18 V ... 30 V for CLV69x-xxx0 (without heating) at terminal U_{IN} =
U_{IN}* after switch S1, protected with internal fuse F

= For the additional use of the external switching inputs and outputs, the optional CMC600 parameter memory module is required.

Figure 63: Wiring overview (1 switching input used) for CLV69x-xxx0 (without heating)

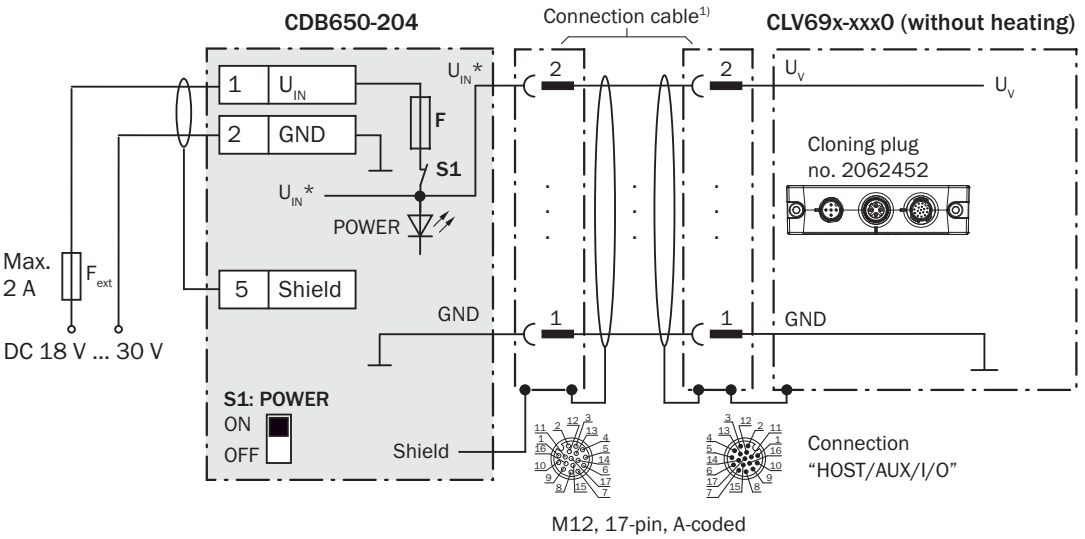


U_V = DC 21.6 V ... 28.8 V for CLV69x-xxx1 (with heating), protected by external fuse provided by user

= For the additional use of the external switching inputs and outputs, the optional CMC600 parameter memory module is required.

Figure 64: Wiring overview (1 switching input used) for CLV69x-xxx1 (with heating)

Wire supply voltage for CLV69x-xxx0 in the CDB650-204 connection module



U_V = DC 18 V ... 30 V at terminal U_{IN} =
U_{IN}* after switch S1, protected with internal fuse F

Switch S1:

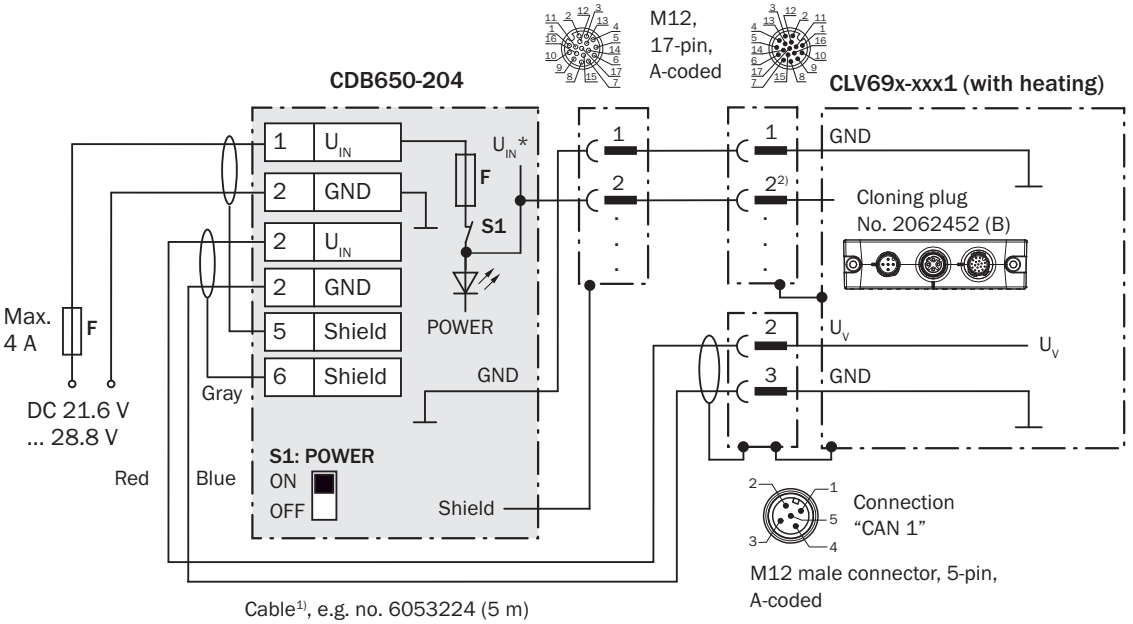
ON:
Supply voltage U_{IN} connected via fuse as U_{IN}* to CDB650-204 and CLV69x.
Voltage U_{IN}* can also be tapped at terminal 11 and 14.

OFF:
CDB650-204 and CLV69x separated from supply voltage.
Recommended setting for all connection work.

1) connection cable 1:1:
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

Figure 65: Wire supply voltage for CLV69x-xxx0 (without heating)

Wire supply voltage for CLV69x-xxx1 in the CDB650-204 connection module



Switch S1:

ON:
Supply voltage U_{IN} connected via fuse as U_{IN}* to CDB650-204 and CLV69x.
Voltage U_{IN}* can also be tapped at terminal 11 and 14.

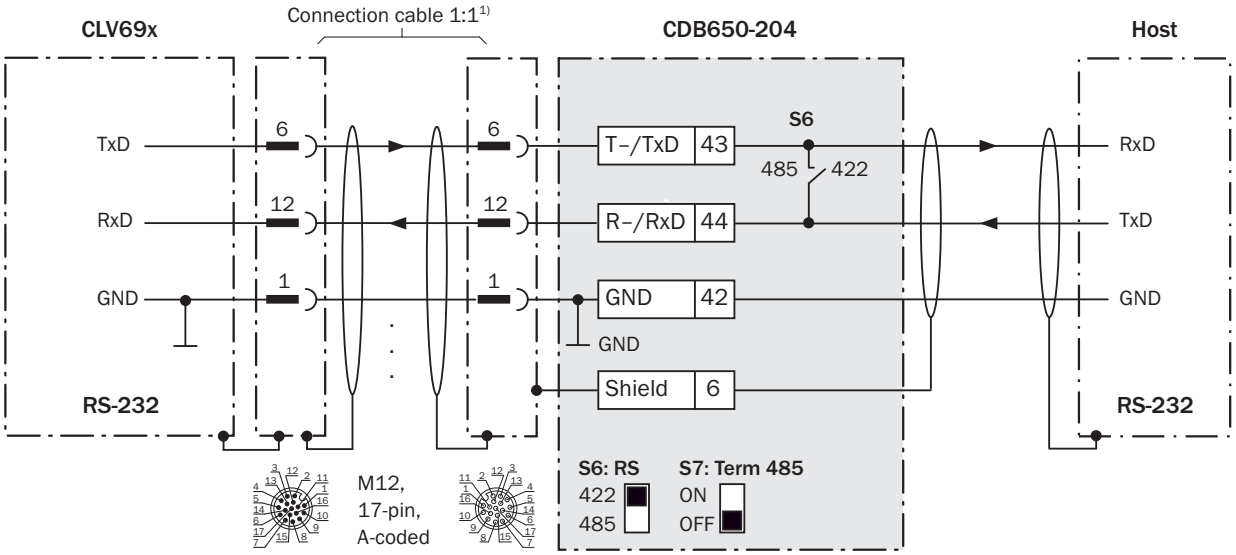
OFF:
CDB650-204 and CLV69x separated from supply voltage.
Recommended setting for all connection work.

1) Adapter cable:
No. 6053224 (5 m)
No. 6053225 (10 m)

2) Pin 2 in the CLV69x-xxx1 (with heating) not connected

Figure 66: Wire supply voltage for CLV69x-xxx1 (with heating)

Wire RS-232 data interface of the CLV69x in the CDB650-204 connection module



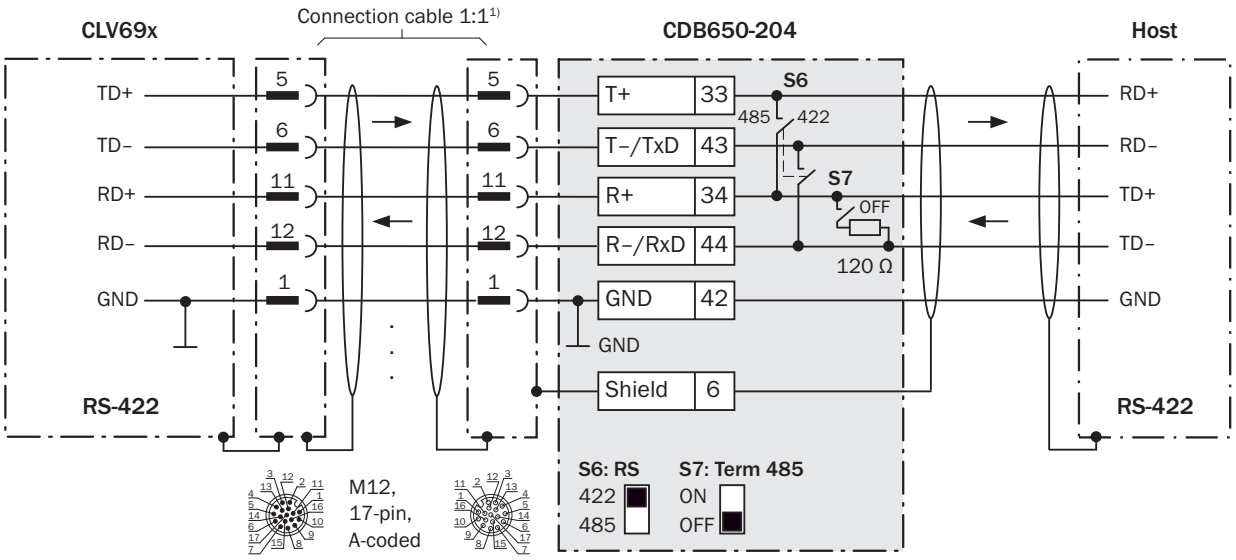
1) Dependent on type

For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

Figure 67: Wire serial host interface RS-232

Wire RS-422 data interface of the CLV69x in the CDB650-204 connection module



1) Dependent on type

For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

S7: Term 485
Set to ON, if termination of the RS-422 receiver in the CLV69x is needed to improve the interference distance on the cable.

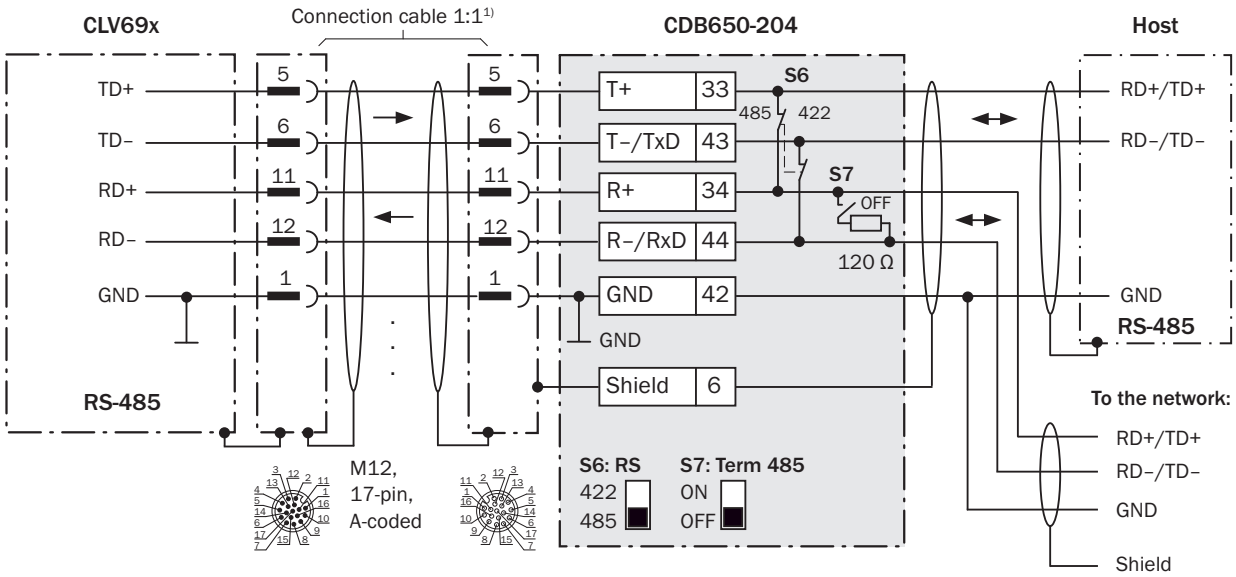
Figure 68: Wire serial host interface RS-422

NOTE

Use of the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 bus operation.

Wire RS-485 data interface of the CLV69x in the CDB650-204 connection module



1) Dependent on type

For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

S7: Term 485
Set to ON if CLV69x is at the end of the RS-485 bus cable.

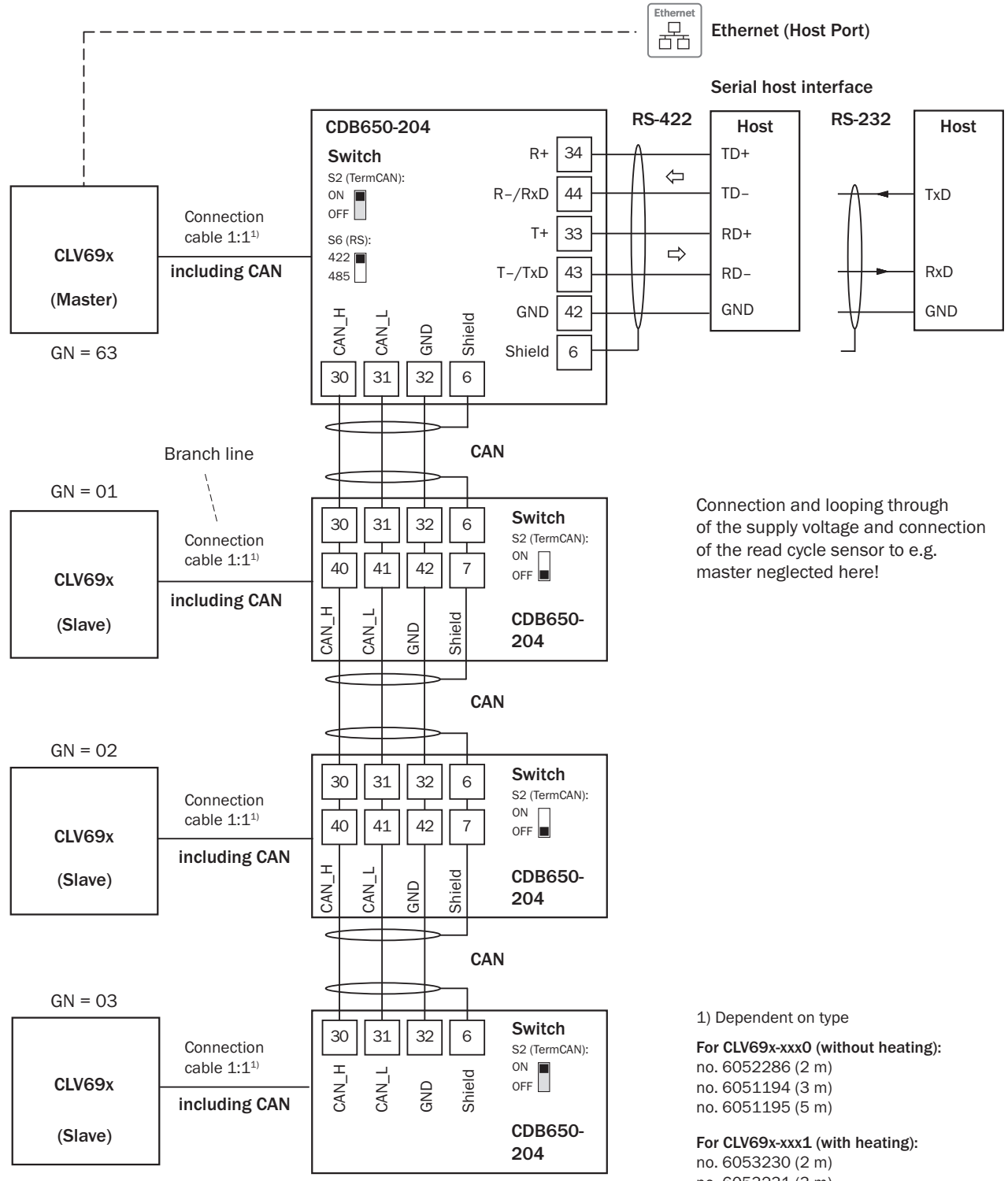
Figure 69: Wire serial host interface RS-485

NOTE

Use of the RS-485 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- This wiring is not permitted in the standard data output/protocol for the device. In case of doubt, contact SICK Service.

Wire CLV69x in the CDB650-204 connection module for SICK CAN SENSOR network



Connection and looping through of the supply voltage and connection of the read cycle sensor to e.g. master neglected here!

1) Dependent on type

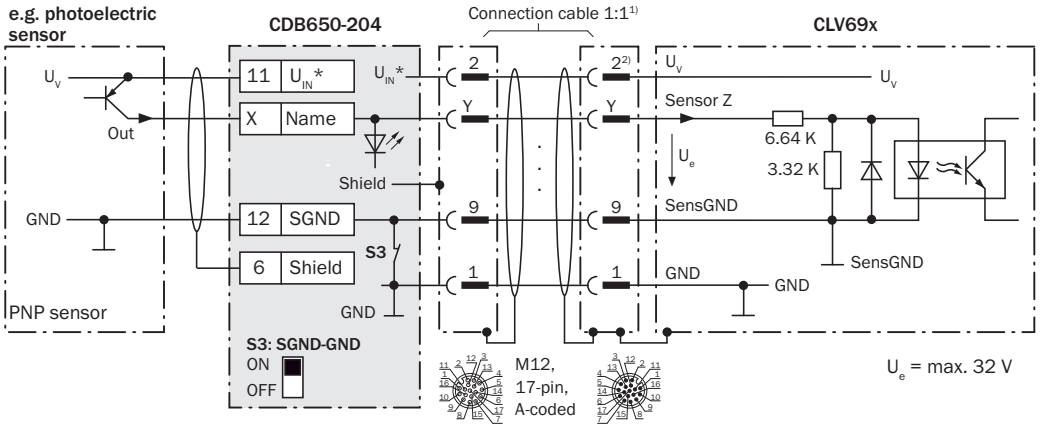
For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

Figure 70: Wiring the CAN interface

Wire switching inputs “Sensor 1 … 2” of the CLV69x in the CDB650-204 connection module

a) Sensor supplied via CDB650-204



CDB650-204			CLV69x	
Terminal X	Name	Pin Y	Pin Y	Sensor Z
10	SENS/IN 1	10	10	Sensor 1
13	SENS/IN 2	15	15	Sensor 2

Switch S3: SGND-GND

ON: GND of the switching inputs connected with GND of the CDB650-204/CLV69x.

OFF: Sensors on switching inputs of the CDB650-204/CLV69x connected volt-free.

Reference potential valid for all switching inputs “SENS/IN 1 … 2” and optionally “EXT. IN1 and 2”

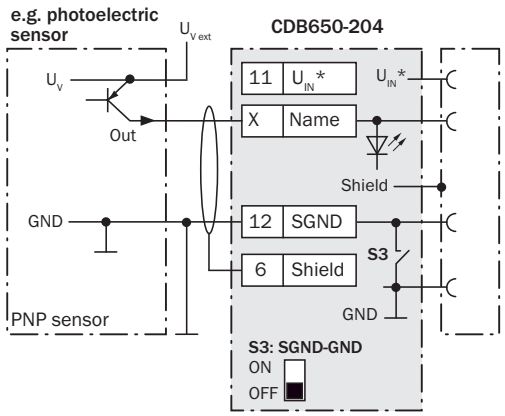
1) Dependent on type

For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

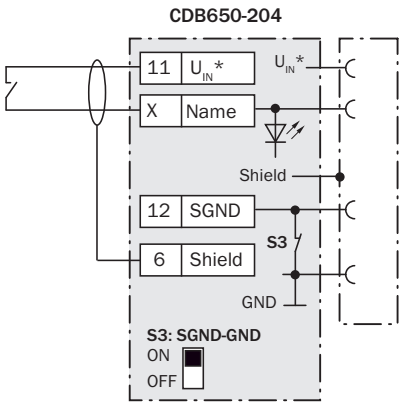
For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

2) Pin 2 in the CLV69x-xxx1 (with heating) not connected

b) Sensor connected volt-free and supplied externally



c) Switch supplied via CDB650-204



d) Diagram: switch connected volt-free and supplied externally

Connection of the switch as under b)

Functional allocation for switching inputs via SOPAS-ET configuration software.

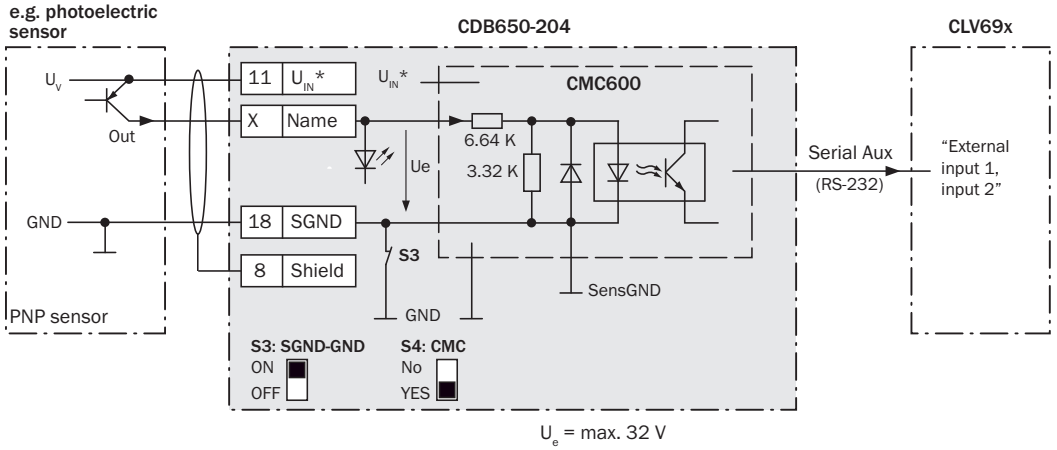
Specifications of the switching inputs “Sensor 1 and 2”

Logic	Current to input starts the assigned function, e.g. start read cycle. (Default CLV69x: logic active high, debounce 10 mm)
Properties	– Opto-decoupled, reverse-polarity protected – Can be wired with PNP output of a sensor – SensGND is the shared, insulated reference potential for all switching inputs
Electrical values	Low: $U_e \leq 2$ V; $I_e \leq 0.3$ mA High: 6 V ≤ $U_e \leq 32$ V; 0.7 mA ≤ $I_e \leq 5$ mA

Figure 71: Wiring switching inputs “Sensor 1 and 2”

Wire switching inputs “External input 1 and 2” of the CLV69x in the CDB650-204 connection module

a) Sensor supplied via CDB650-204



CDB650-204	
Terminal X	Name
16	EXT. IN 1
17	EXT. IN 2

Switch S3: SGND-GND

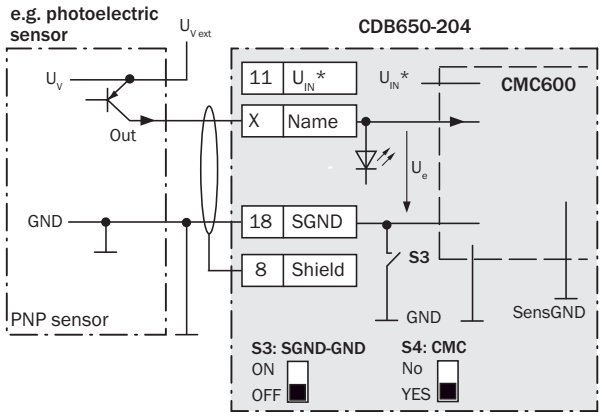
ON: GND of the switching inputs connected with GND of the CDB650-204/CMC600.

OFF: Sensors on switching inputs of the CDB650-204/CMC600 connected volt-free.

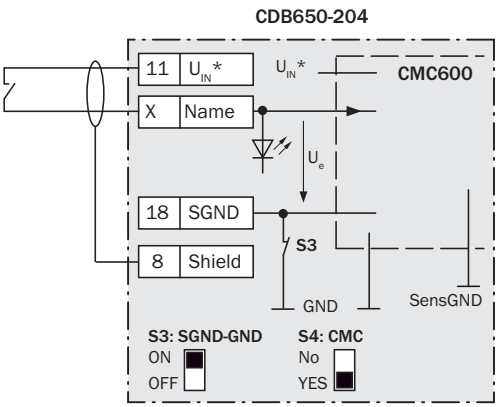
Reference potential valid for all switching inputs “SENS/IN 1 ... 2” and optionally “EXT. IN1 and 2”

The output states of the physical inputs “EXT. IN 1 and 2“ are transmitted by the CMC600 automatically in a software-controlled manner via the connecting cable to the serial Aux interface of the CLV69x. The CLV69x implements the status on its logical inputs “External input 1 and 2”.

b) Sensor connected volt-free and supplied externally



c) Switch supplied via CDB650-204



d) Switch connected volt-free and supplied externally

Connection of the switch as under b)

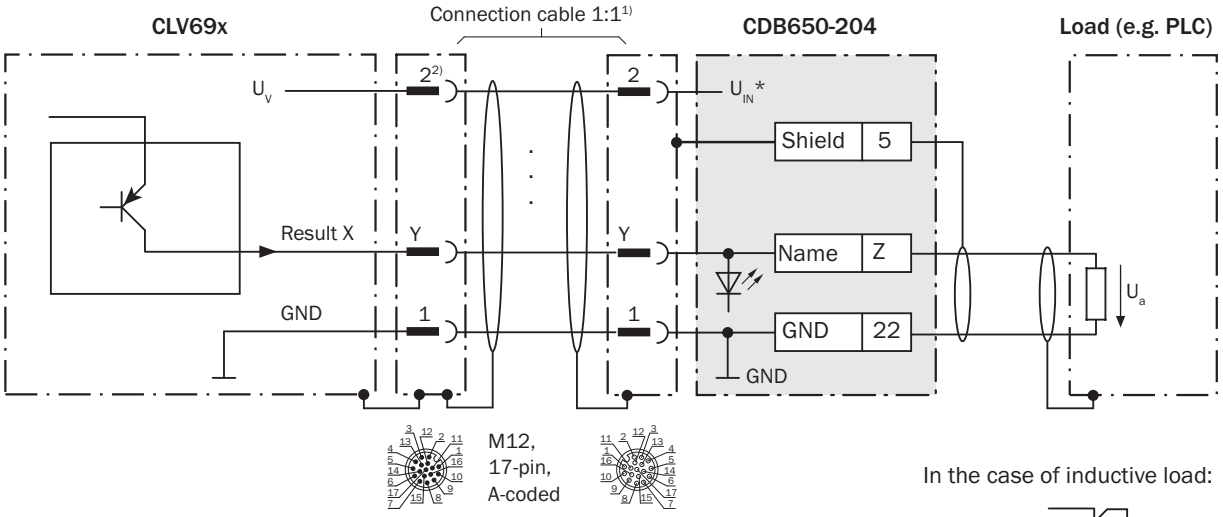
Functional allocation for switching inputs via SOPAS-ET configuration software.

Specifications of the switching inputs “Ext. input 1 and 2”

Logic	Current to input starts the assigned function, e.g. start read cycle. (Default CLV69x: logic active high, debounce 10 mm)
Properties	– Opto-decoupled, reverse-polarity protected – Can be wired with PNP output of a sensor – SensGND is the shared, insulated reference potential for all switching inputs
Electrical values	Low: $U_e \leq 2$ V; $I_e \leq 0.3$ mA High: 6 V ≤ $U_e \leq 32$ V; 0.7 mA ≤ $I_e \leq 5$ mA

Figure 72: Wiring switching inputs “External input 1 and 2”

Wire switching outputs “Result 1 … 4” of the CLV69x in the CDB650-204 connection module



CLV69x		CDB650-204		
Result X	Pin Y	Pin Y	Name	Terminal Z
Result 1	13	13	RES/OUT 1	20
Result 2	14	14	RES/OUT 2	21
Result 3	16	16	RES/OUT 3	50
Result 4	17	17	RES/OUT 4	51

In the case of inductive load:

Discharge wiring: apply free running diode directly to the load!

Specifications of the switching outputs “Result 1 … 4”

Logic	PNP switching to supply voltage U_V. CLV69x default: Result 1: Device Ready (static), logic: active high Result 2: Good Read, 100 mm, logic: active high Result 3: no function assigned Result 4: no function assigned
Properties	– Short-circuit protected + temperature protected – Not electrically isolated from U_V (+ 24 V*)
Electrical values	$0\ V \leq U_a \leq U_V$ Guaranteed: $(U_V - 1.6\ V) \leq U_a \leq U_V$ in the case of $I_a \leq 100$ mA

Functional allocation for switching outputs via SOPAS-ET configuration software.

1) Dependent on type

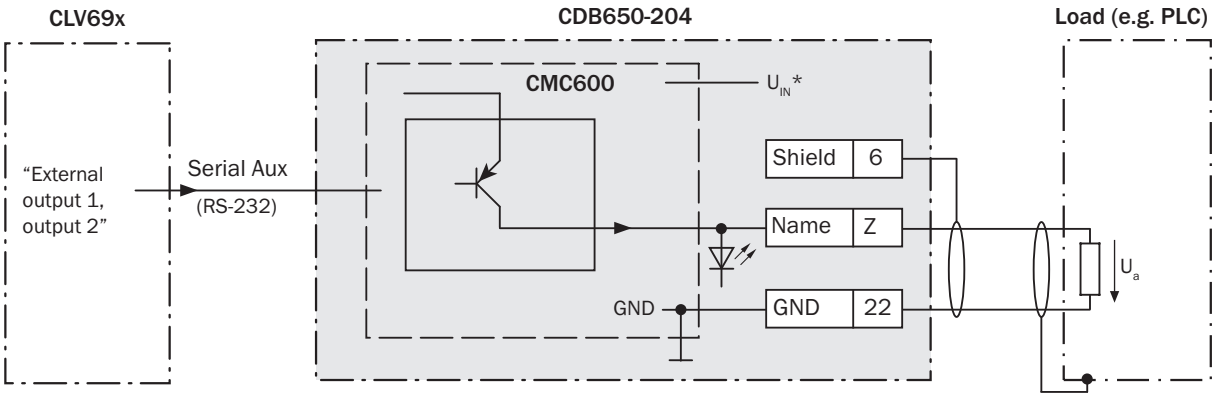
For CLV69x-xxx0 (without heating):
no. 6052286 (2 m)
no. 6051194 (3 m)
no. 6051195 (5 m)

For CLV69x-xxx1 (with heating):
no. 6053230 (2 m)
no. 6053231 (3 m)
no. 6053232 (5 m)

2) Pin 2 in the CLV69x-xxx1 (with heating) not connected

Figure 73: Wiring switching outputs “Result 1 to 4”

Wire switching outputs “External output 1 and 2” of the CLV69x on the CDB650-204 connection module



CLV69x	CDB650-204	
Output	Name	Terminal Z
External output 1	EXT. OUT 1	23
External output 2	EXT. OUT 2	24

In the case of inductive load:

Discharge wiring: apply free running diode directly to the load!

Specifications of the switching outputs “External output 1 and 2”

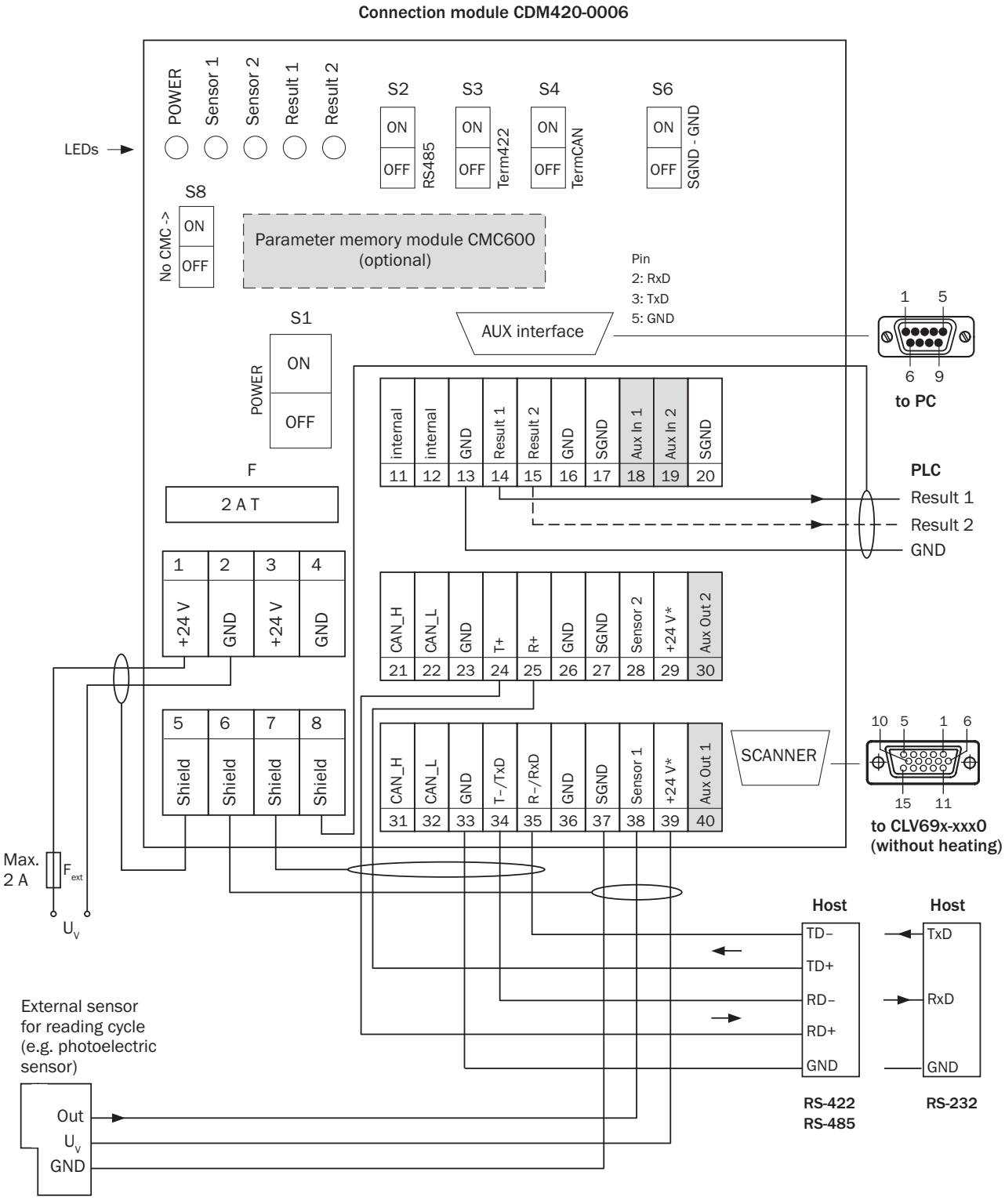
Logic	PNP switching to supply voltage U_{IN}* (default: no function, logic: not inverted [active high])
Properties	–Short-circuit protected + temperature protected – Not electrically isolated from U_{IN}*
Electrical values	0 V ≤ U_a ≤ U_{IN}* Guaranteed: (U_{IN}* −1.5 V) ≤ U_a ≤ U_{IN}* in the case of I_a ≤ 100 mA

Functional allocation for switching outputs via SOPAS-ET configuration software.

The CLV69x releases the output states of its logical outputs “External output 1 and 2” via its serial Aux interface.
Via the connecting cable, the CMC600 automatically accepts the statuses in a software-controlled manner and transfers them to its physical outputs “EXT. OUT 1 and 2“ in the CDB650-204.

Figure 74: Wiring switching outputs “External output 1 and 2”

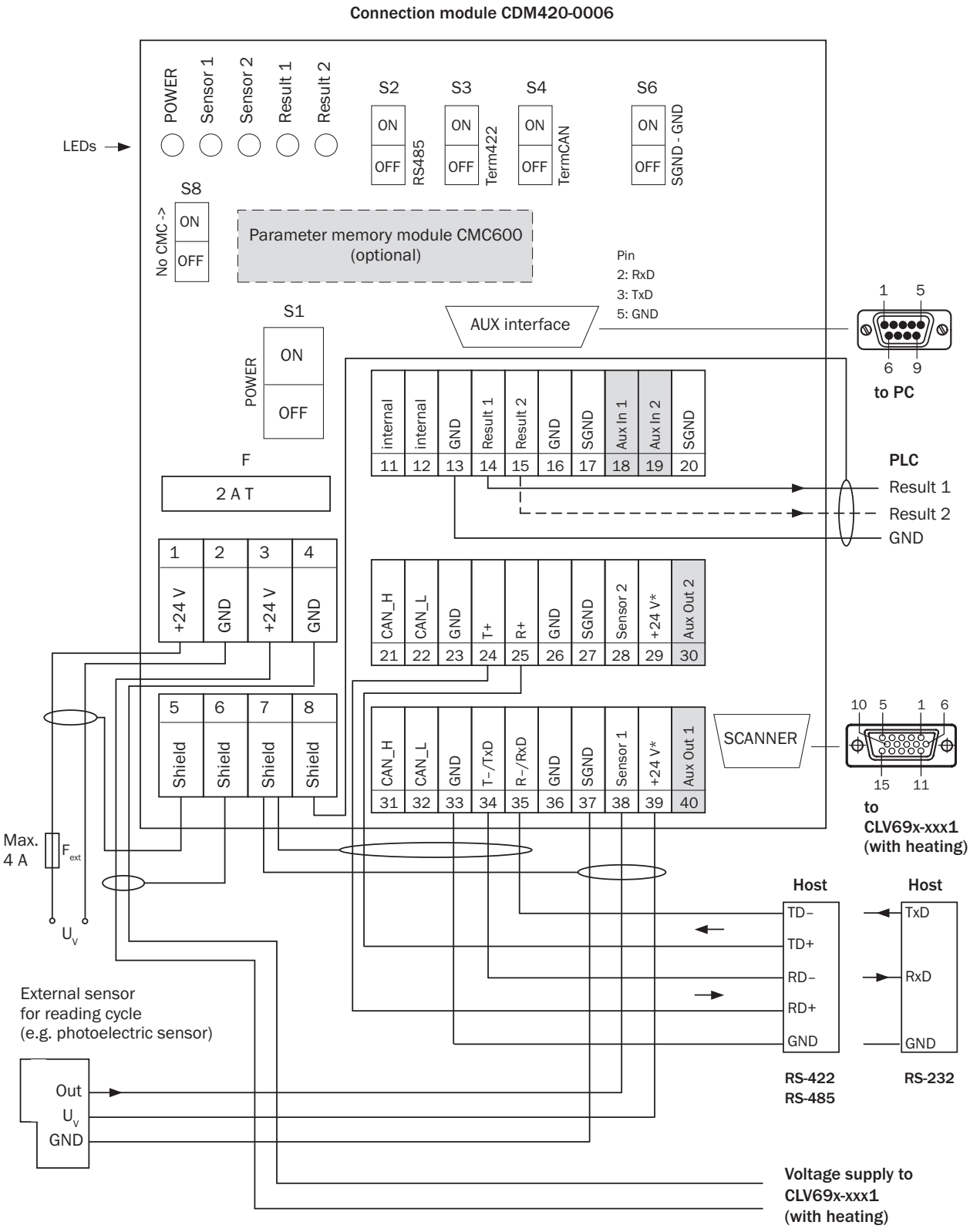
6.7.2 Using connection module CDM420-0006



U_V = DC 18 V ... 30 V for CLV69x-xxx0 (without heating) at terminal +24 V = +24 V* after switch S1, protected by internal fuse F

☐ = For additional use of external switching inputs and outputs, the optional CMC600 parameter memory module is required.

Figure 75: Wiring overview (1 switching input used) for CLV69x-xxx0 (without heating)

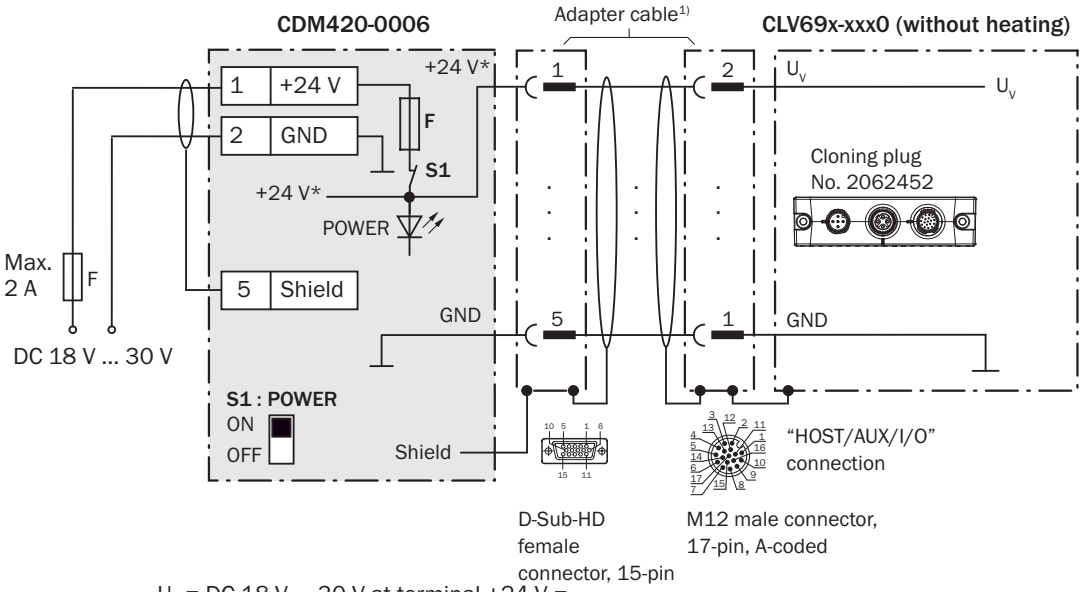


U_V = DC 21.6 V ... 28.8 V for CLV69x-xxx1 (with heating), protected by external fuse provided by user

☐ = For additional use of external switching inputs and outputs, the optional CMC600 parameter memory module is required.

Figure 76: Wiring overview (1 switching input used) for CLV69x-xxx1 (with heating)

Wire supply voltage for CLV69x-xxx0 in the CDM420-0006 connection module



U_V = DC 18 V ... 30 V at terminal +24 V =
U_V at terminal +24 V* after switch S1, protected by internal fuse F

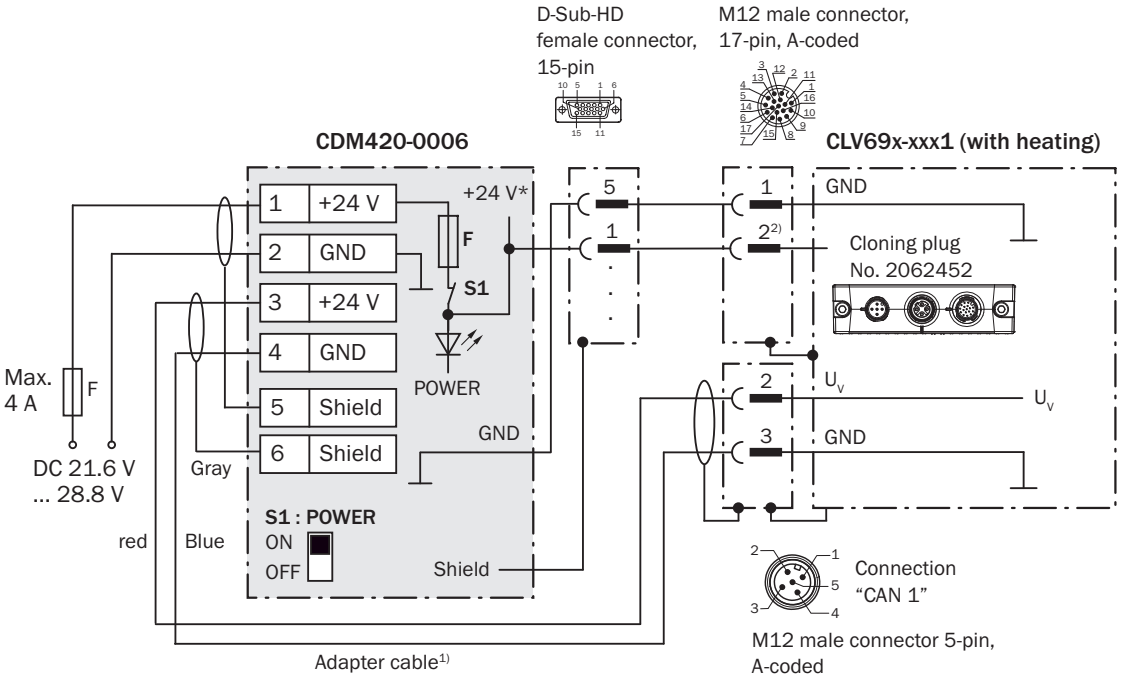
Switch S1:
ON:
supply voltage U_V (+24 V) switched via fuse as U_V (+24 V*) to CDM420-0006 and CLV69x.
U_V (+24 V*) can also be engaged at terminal 29 and 39.
OFF:
CDM420-0006 and CLV69x separated from supply voltage.
Recommended position for all connection types.

1) Adapter cable

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
no. 2055419 (2 m)
no. 2055420 (3 m)
No. 2055859 (5 m)

Figure 77: Wire supply voltage for CLV69x-xxx0 (without heating)

Wire supply voltage for CLV69x-xxx1 in the CDM420-0006 connection module



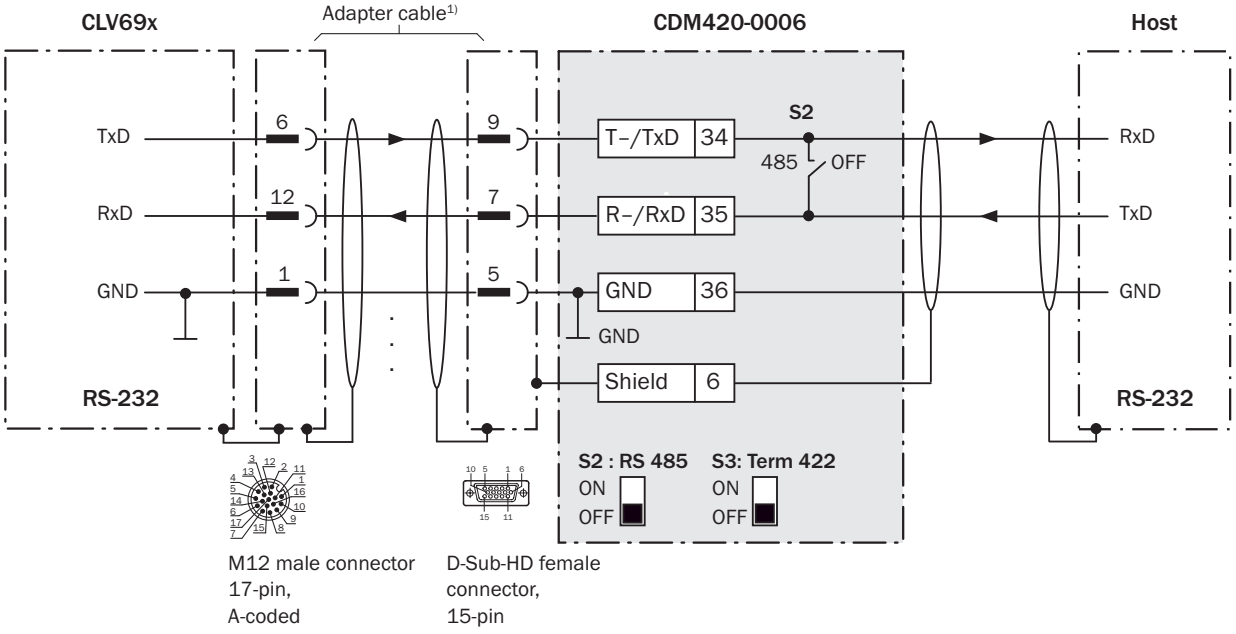
Switch S1:
ON:
supply voltage U_V (+24 V) switched via fuse as U_V (+24 V*) to CDM420-0006 and CLV69x.
U_V (+24 V*) can also be engaged at terminal 29 and 39.
OFF:
CDM420-0006 and CLV69x separated from supply voltage.
Recommended position for all connection types.

1) Adapter cable:
No. 6053224 (5 m)
No. 6053225 (10 m)

2) Pin 2 in CLV69x-xxx1 (with heating) not connected

Figure 78: Wire supply voltage for CLV69x-xxx1 (with heating)

Wire RS-232 data interface of the CLV69x in the CDM420-0006 connection module



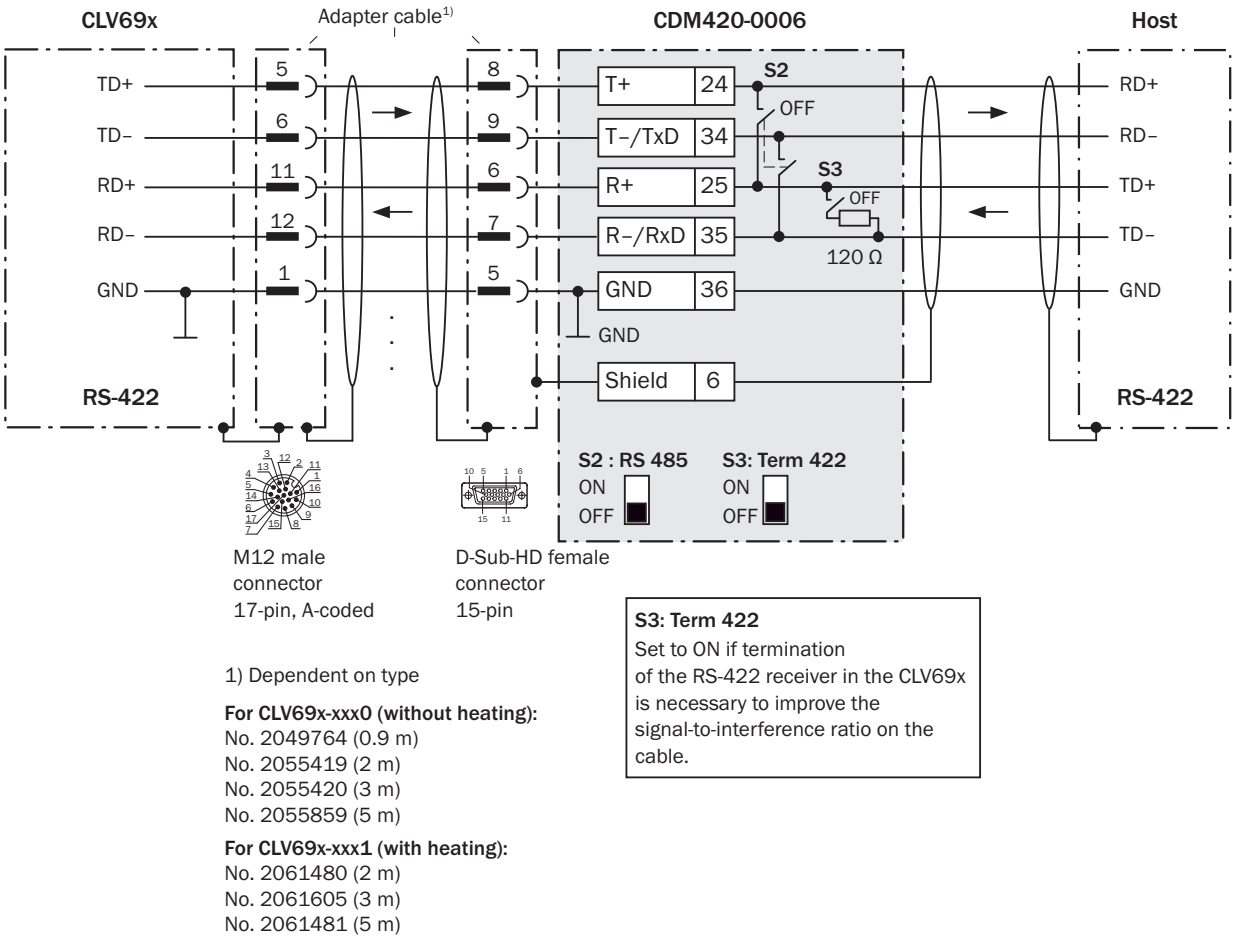
1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

Figure 79: Wire serial host interface RS-232

Wire RS-422 data interface of the CLV69x in the CDM420-0006 connection module



S3: Term 422
Set to ON if termination of the RS-422 receiver in the CLV69x is necessary to improve the signal-to-interference ratio on the cable.

1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

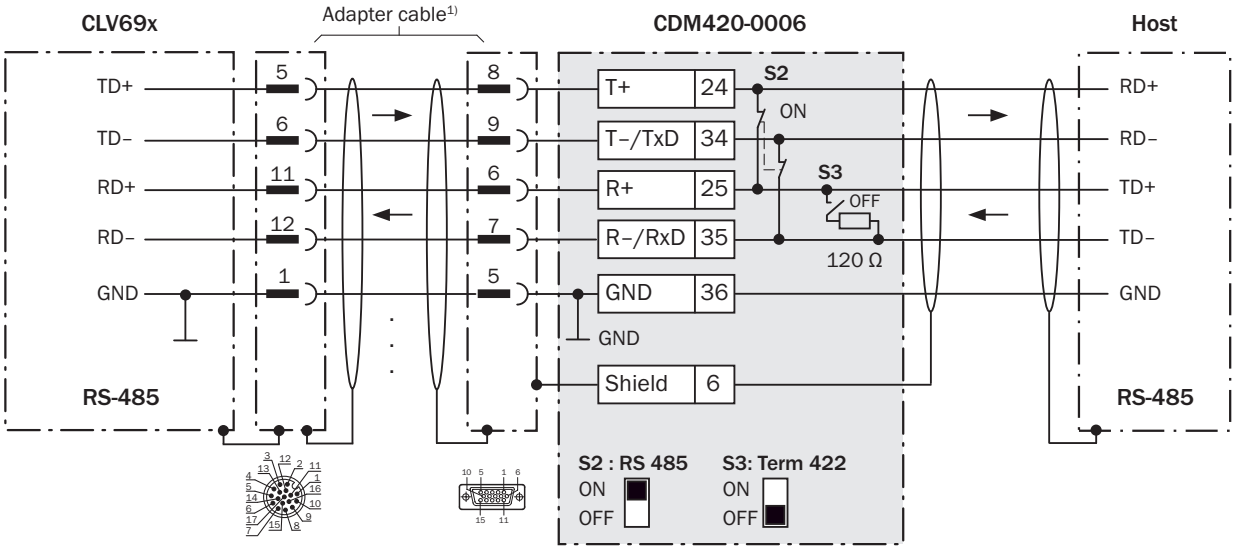
For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

Figure 80: Wire serial host interface RS-422

NOTE
Use of the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 bus operation.

Wire RS-485 data interface of the CLV69x in the CDM420-0006 connection module



M12 male connector, 17-pin, A-coded

D-Sub-HD female connector, 15-pin

S3: Term 422
Set to ON if the CLV69x is at the end of the RS-485 bus cable.

1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

Figure 81: Wire serial host interface RS-485

NOTE

Use of the RS-485 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- This wiring is not permitted in the standard data output/protocol for the device. In case of doubt, contact SICK Service.

Wire CLV69x in the CDM420-0006 connection module for SICK CAN SENSOR network

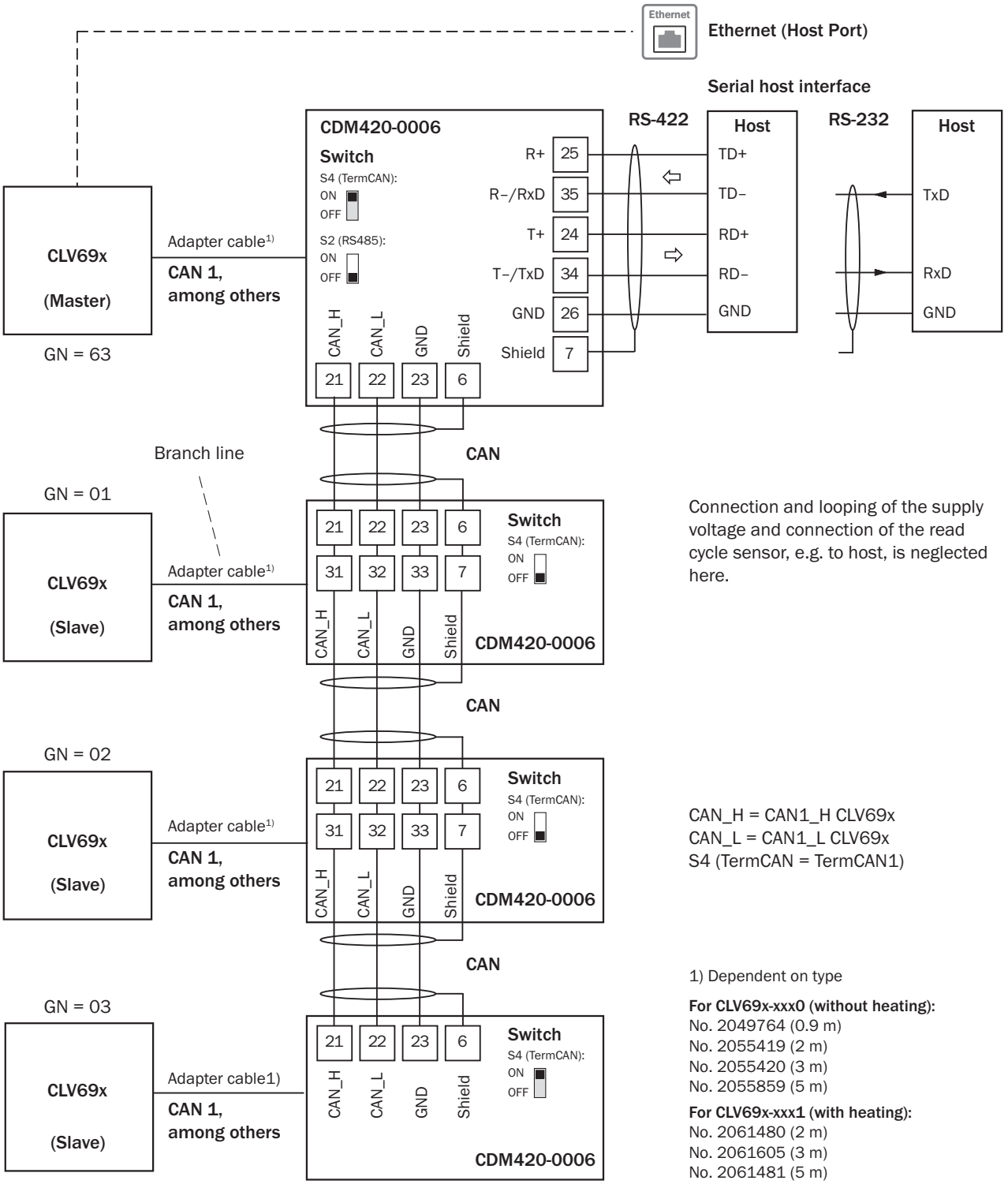


Figure 82: Wiring the CAN interface

Connection and looping of the supply voltage and connection of the read cycle sensor, e.g. to host, is neglected here.

CAN_H = CAN1_H CLV69x
CAN_L = CAN1_L CLV69x
S4 (TermCAN = TermCAN1)

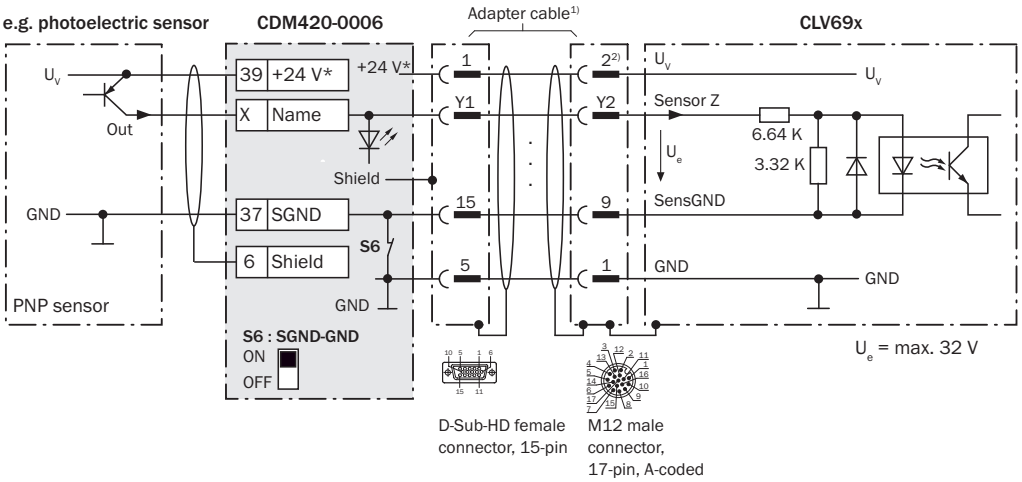
1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

Wire “Sensor 1 and 2” switching inputs of the CLV69x in the CDM420-0006 connection module

a) Sensor supplied by CDM420-0006



CDM420-0006			CLV69x	
Terminal X	Name	Pin Y1	Pin Y2	Sensor Z
38	Sensor 1	14	10	Sensor 1
28	Sensor 2	4	15	Sensor 2

Switch S6 : SGND-GND

ON: connect GND of the sensor to the GND of the CDM420-0006/CLV69x.

OFF: sensors connected volt-free to CDM420-0006/CLV69x.

Reference potential valid for all “Sensor 1 and 2” switching inputs and optionally “AUX In 1 and 2”

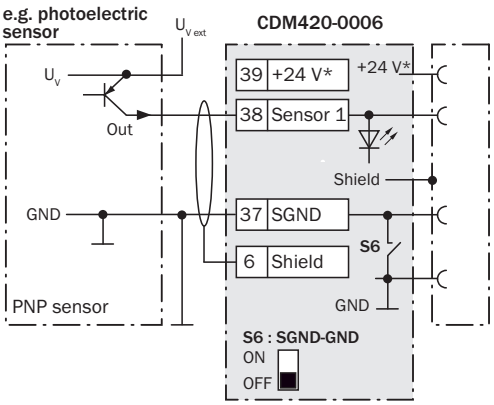
1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

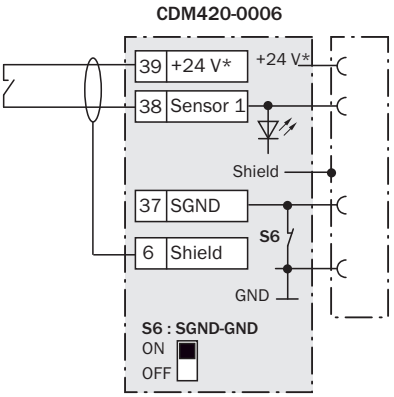
For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

2) Pin 2 in CLV69x-xxx1 (with heating) not connected

b) Sensor connected volt-free and externally supplied



a) Switch supplied by CDM420-0006



d) Switch connected volt-free and externally supplied

Connection of the switch as under b)

Functional assignment for switching inputs via SOPAS-ET configuration software

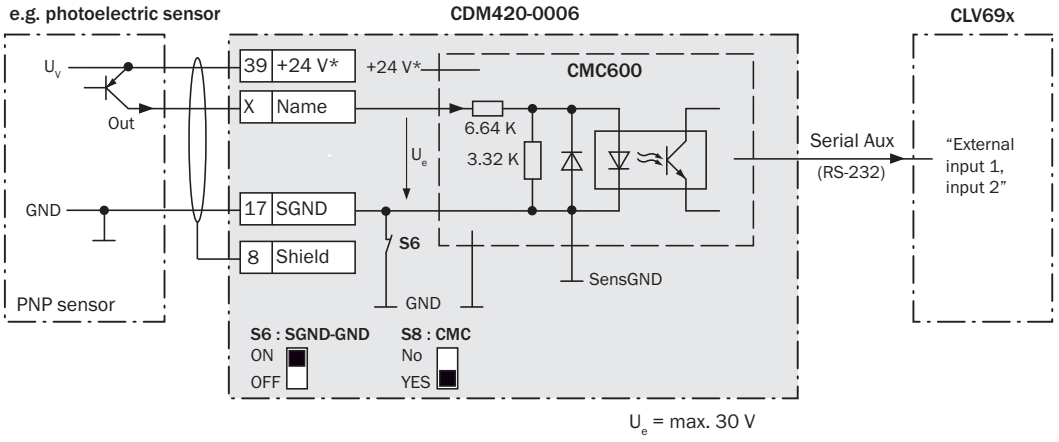
Characteristic data of the switching inputs “Sensor 1 and 2”

Switching behavior	Current at the input starts the assigned function, e.g. start reading cycle. (CLV69x default settings: logic active high, debouncing 10 mm)
Properties	– Opto-decoupled, reverse polarity protected – Can be wired with PNP output of a sensor – SensGND is the common insulated reference potential for all switching inputs
Electrical values	Low: $U_e \leq 2$ V; $I_e \leq 0.3$ mA High: $6 V \leq U_e \leq 32$ V; $0.7 mA \leq I_e \leq 5$ mA

Figure 83: Wiring switching inputs “Sensor 1 and 2”

Wire switching inputs “Ext. input 1 and 2” of the CLV69x on the CDM420-0006 connection module

a) Sensor supplied by CDM420-0006



CDM420-0006	
Terminal X	Name
18	Aux In 1
19	Aux In 2

Switch S6 : SGND

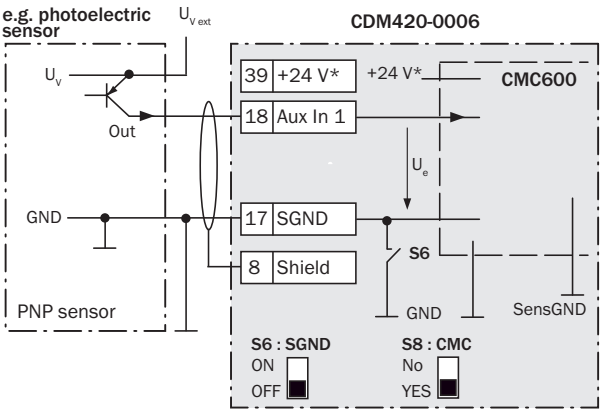
ON: connect GND of the switching inputs with the GND of the CDM420-0006/CMC600.

OFF: sensors connected volt-free to the switching inputs of the CDM420-0006/CMC600.

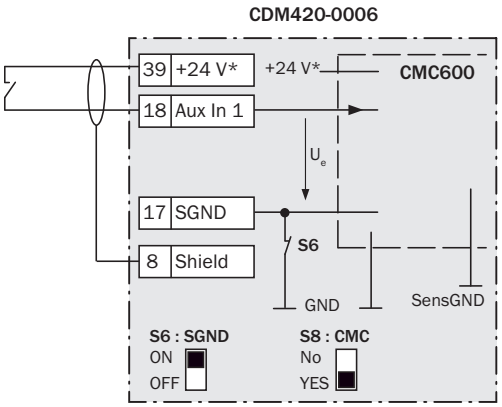
Reference potential valid for all “Sensor 1 and 2” switching inputs and optionally “AUX In 1 and 2”.

The CMC600 automatically transmits the output states of its physical “Aux In 1 and 2” inputs to the serial Aux interface of the CLV69x via the connecting cable using software.
The CLV69x translates the statuses to its logical “External input 1 and 2“ inputs.

b) Sensor connected volt-free and externally supplied



a) Switch supplied by CDM420-0006



d) Switch connected volt-free and externally supplied

Connection of the switch as under b)

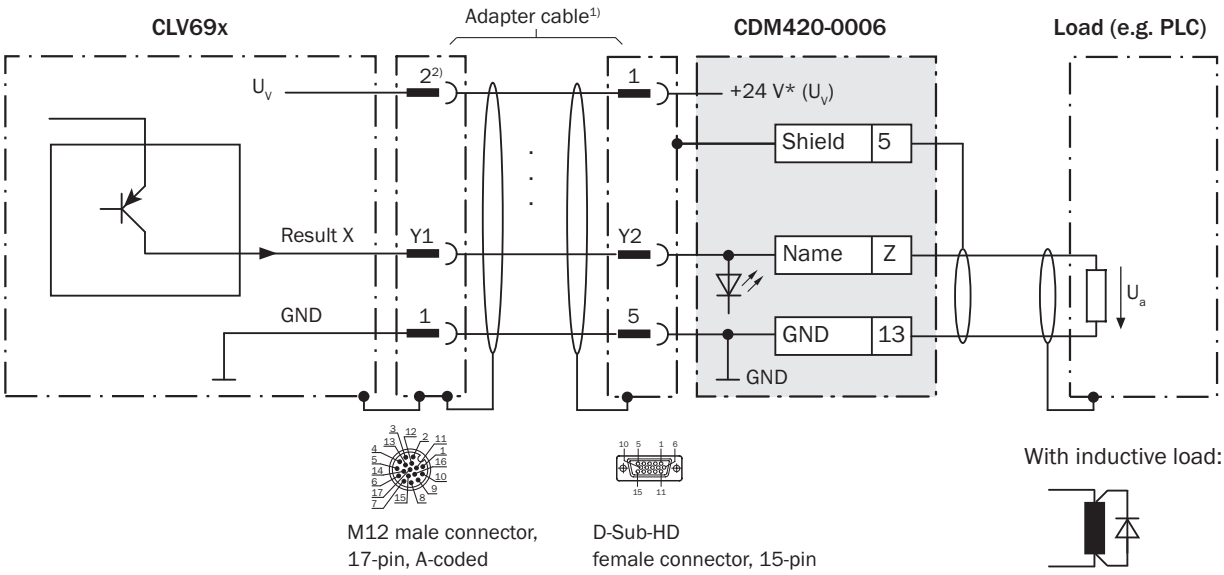
Functional assignment for switching inputs via SOPAS-ET configuration software

Characteristic data of switching inputs “Ext. input 1 and 2”

Switching behavior	Current at the input starts the assigned function, e.g. start reading cycle. (CLV69x default settings: logic active high, debouncing 10 mm)
Properties	– Opto-decoupled, reverse polarity protected – Can be wired with PNP output of a sensor – SensGND is the common insulated reference potential for all switching inputs
Electrical values	Low: $U_e \leq 2$ V; $I_e \leq 0.3$ mA High: 6 V ≤ U_e ≤ 30 V; 0.7 mA ≤ I_e ≤ 5 mA

Figure 84: Wiring switching inputs “External input 1 and 2”

Wire “Result 1 and 2” switching outputs of the CLV69x in the CDM420-0006 connection module



CLV69x		CDM420-0006		
Result X	Pin Y1	Pin Y2	Name	Terminal Z
Result 1	13	12	Result 1	14
Result 2	14	13	Result 2	15

Characteristic data of “Result 1 and 2” switching outputs

Switching behavior	PNP switching to supply voltage U_V CLV69x default settings: Result 1: device ready (static), logic: active high Result 2: good read, 100 mm, logic: active high
Properties	–Short-circuit protected + temperature protected –Not electrically isolated from supply voltage (+24 V*)
Electrical values	$0\ V \le U_a \le U_V$ Guaranteed: $(U_V - 1.6\ V) \le U_a \le U_V$ at $I_a \le 100$ mA

Functional assignment for switching outputs via SOPAS-ET configuration software!

Figure 85: Wiring switching outputs “Result 1 and 2”

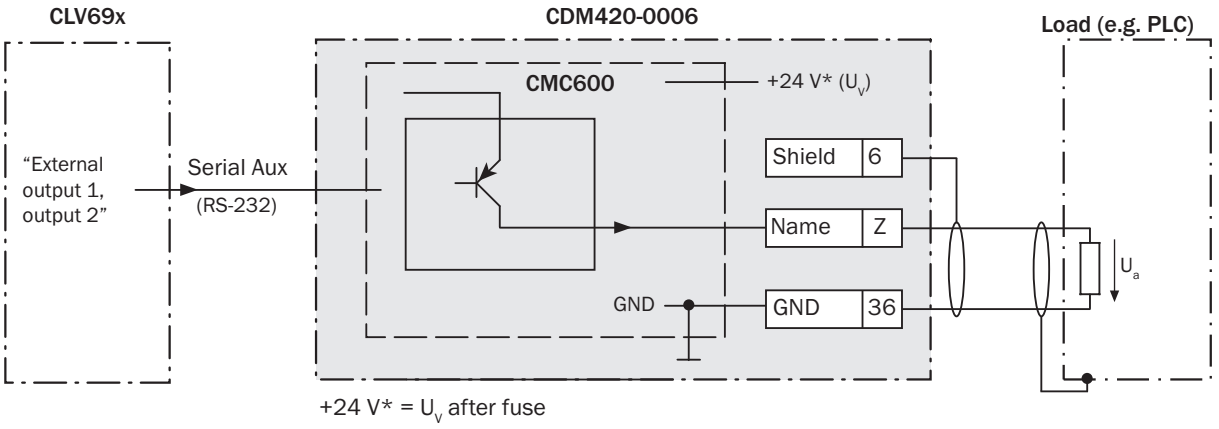
1) Dependent on type

For CLV69x-xxx0 (without heating):
No. 2049764 (0.9 m)
No. 2055419 (2 m)
No. 2055420 (3 m)
No. 2055859 (5 m)

For CLV69x-xxx1 (with heating):
No. 2061480 (2 m)
No. 2061605 (3 m)
No. 2061481 (5 m)

2) Pin 2 in CLV69x-xxx1 (with heating) not connected

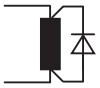
Wire switching outputs “Ext. output 1 and 2” of the CLV69x on the CDM420-0006 connection module



+24 V* = U_V after fuse

CLV69x	CDM420-0006	
Output	Name	Terminal Z
External output 1	Aux Out 1	40
External output 2	Aux Out 2	30

With inductive load:



Sweep-out circuit:
Attach a freewheeling diode directly to the load.

Characteristic data of “External output 1 and 2” switching outputs

Switching behavior	PNP switching to supply voltage U_V (Default settings: no function, logic: not inverted [active high])
Properties	–Short-circuit protected + temperature protected –Not electrically isolated from supply voltage (+24 V*)
Electrical values	$0\ V \leq U_a \leq U_V$ Guaranteed: $(U_V - 1.5\ V) \leq U_a \leq U_V$ at $I_a \leq 100$ mA

The CLV69x issues the output states of its “External output 1 and 2” logical outputs via its serial AUX interface.
Via the connecting cable, the CMC600 automatically adopts the statuses and translates them to its physical “AUX Out 1 and 2” outputs in the CDM420-0006 using software.

Functional assignment for switching outputs via SOPAS-ET configuration software

Figure 86: Wiring switching outputs “External output 1 and 2”

6.7.3 Using connection module CDM490-0001

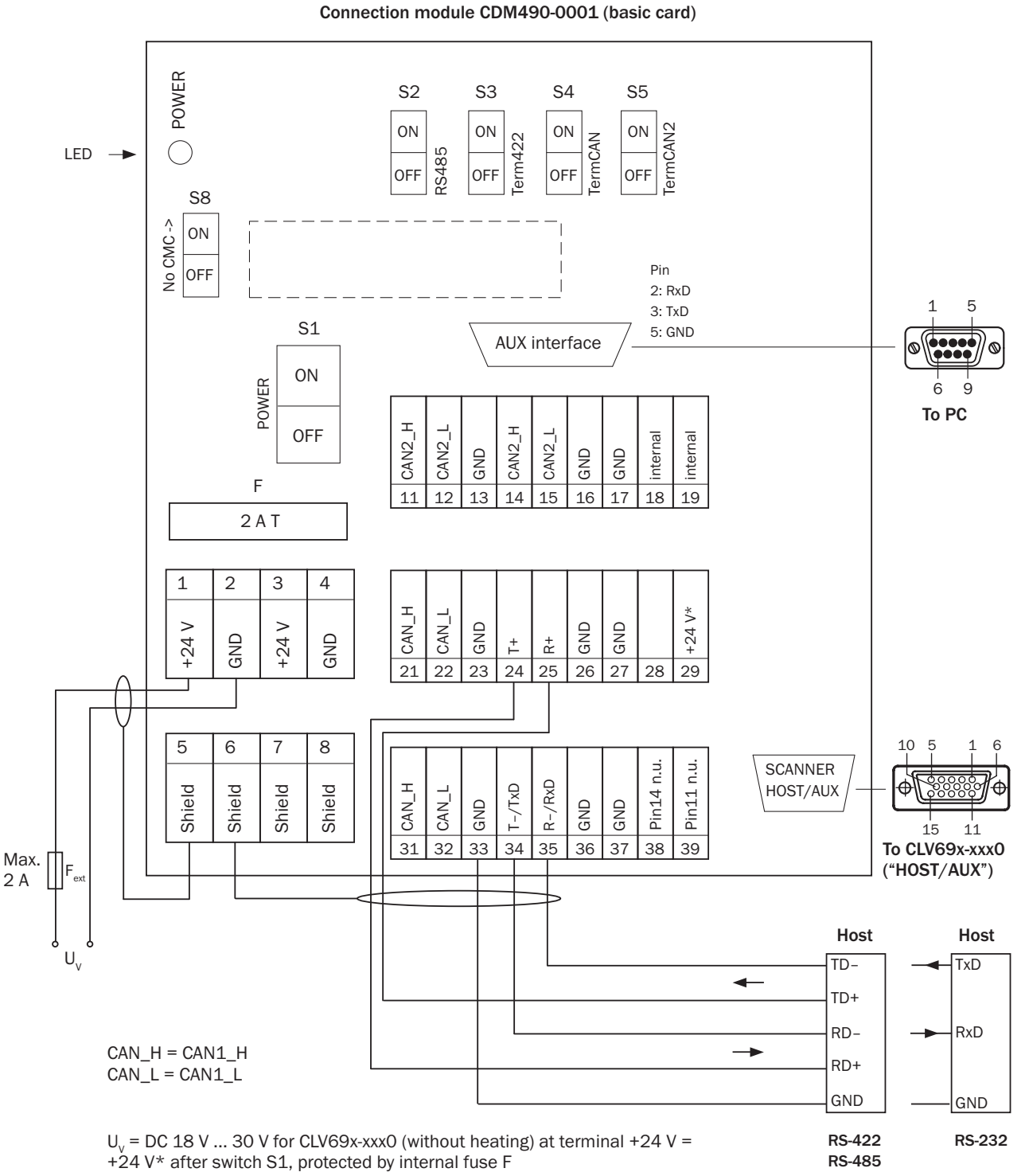
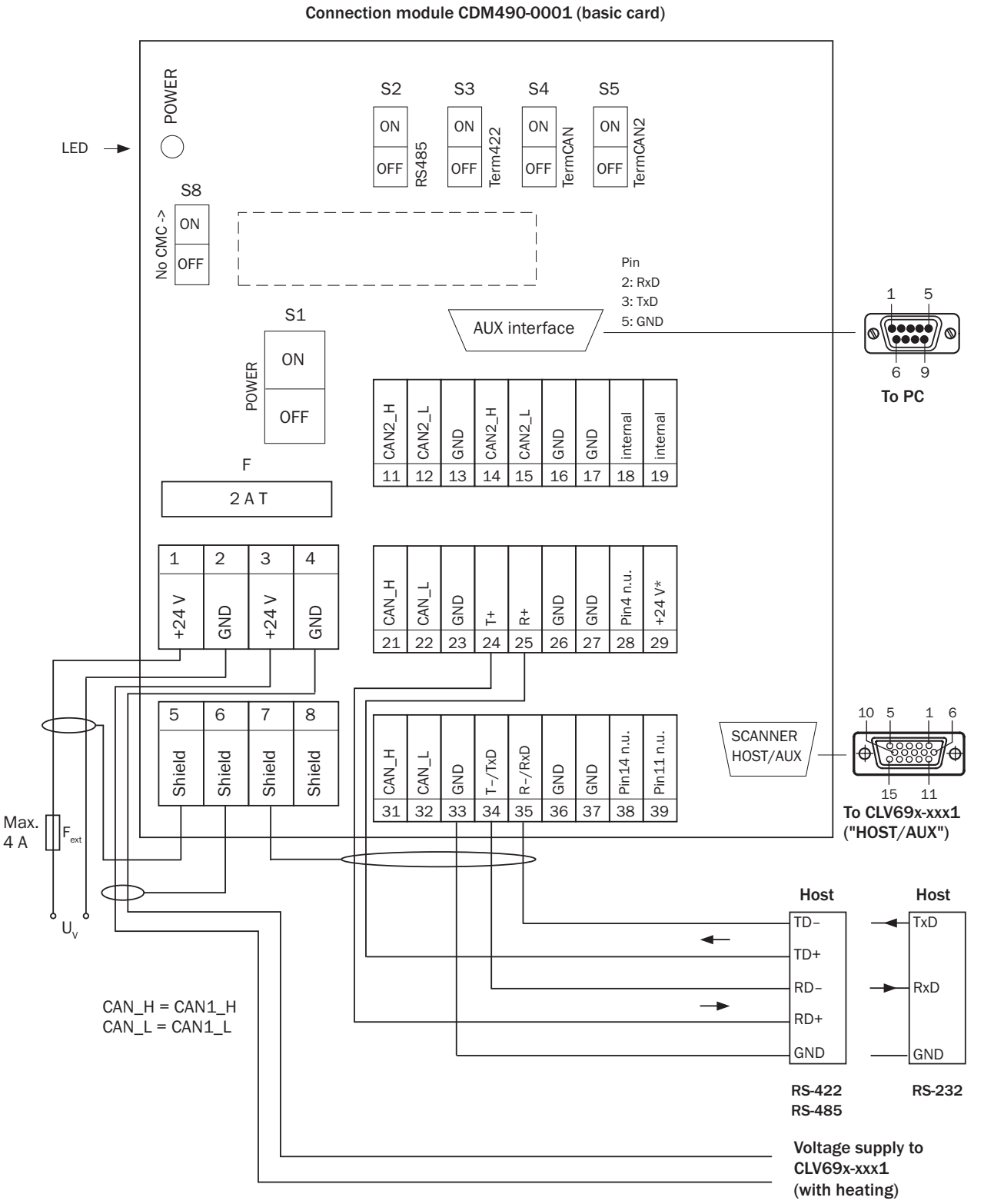


Figure 87: Wiring overview, part 1 (basic map below left), for CLV69x-xxx0 (without heating)



U_V = DC 21.6 V ... 28.8 V for CLV69x-xxx1 (with heating), protected by external fuse provided by user

Figure 88: Wiring overview, part 1 (basic map below left), for CLV69x-xxx1 (with heating)

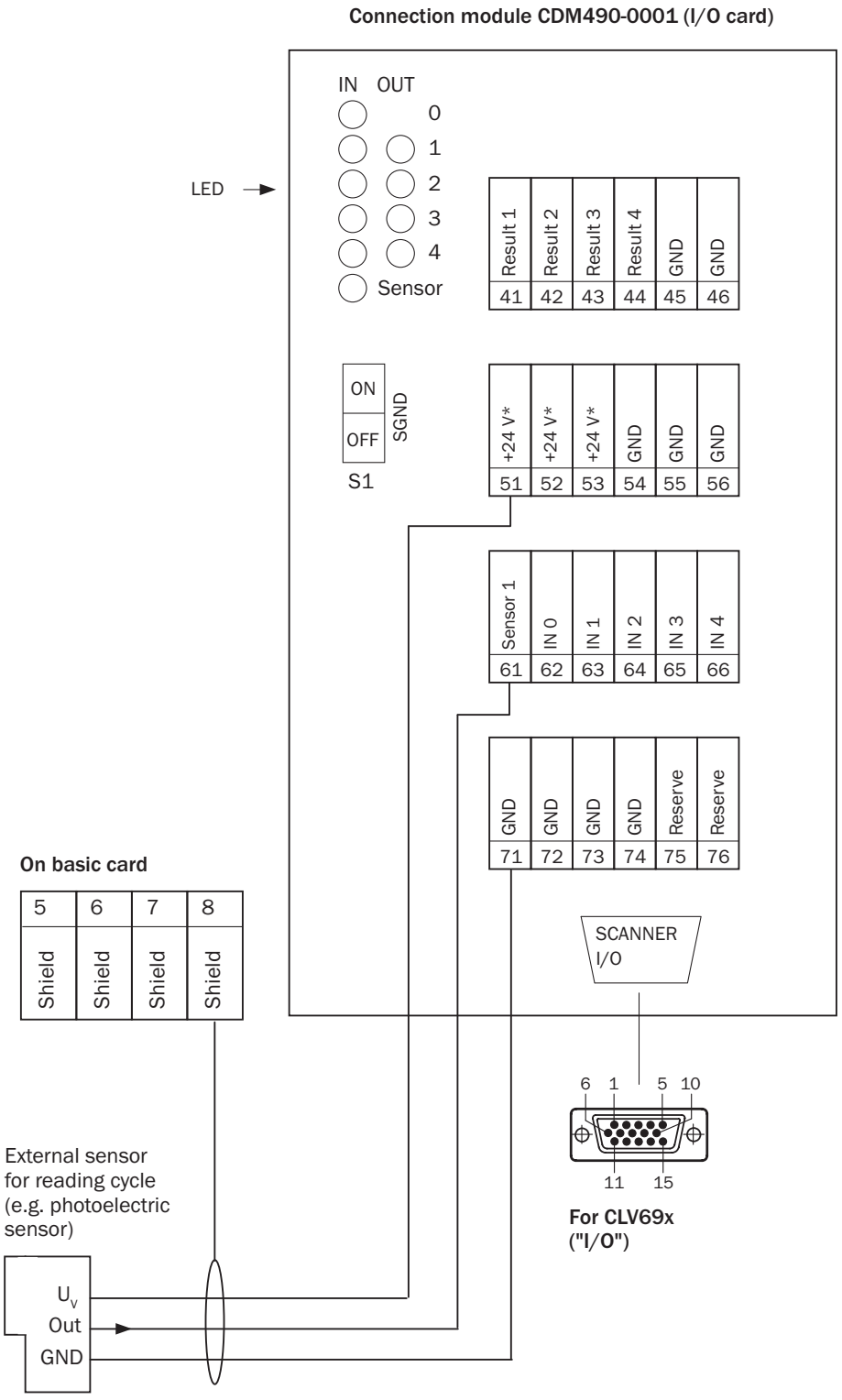
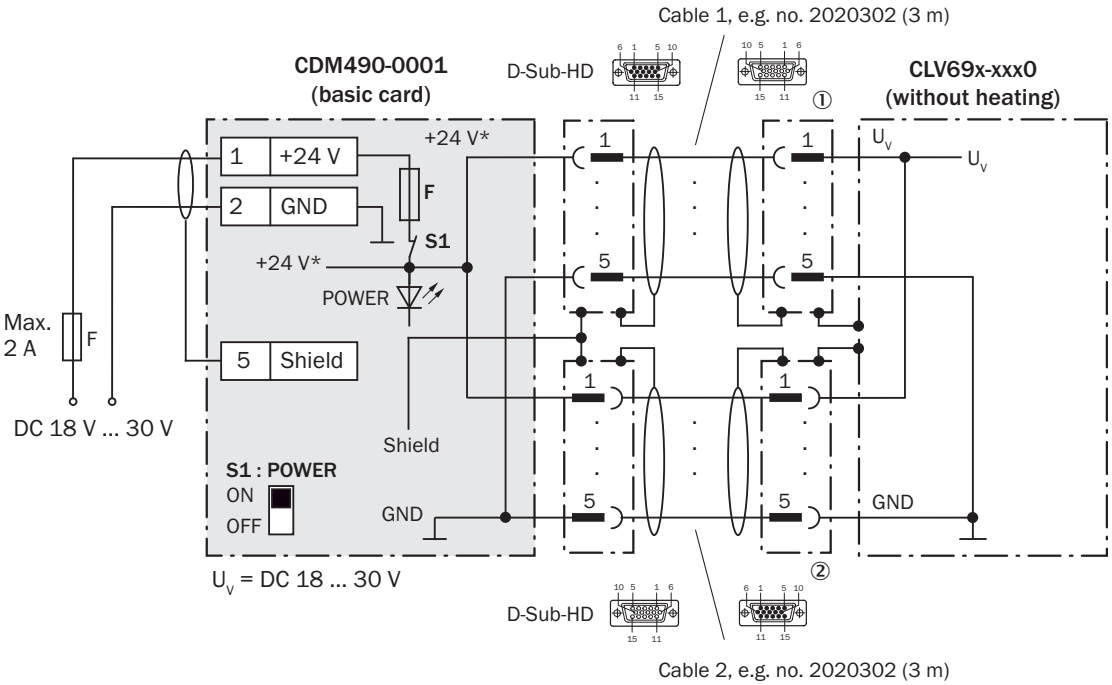


Figure 89: Wiring overview, part 2 (I/O map top right), 1 switching input used

Wire supply voltage for CLV69x-xxx0 in the CDM490-0001 connection module



+) If no switching inputs and outputs of the CLV69x are used, cable 2 does not have to be used

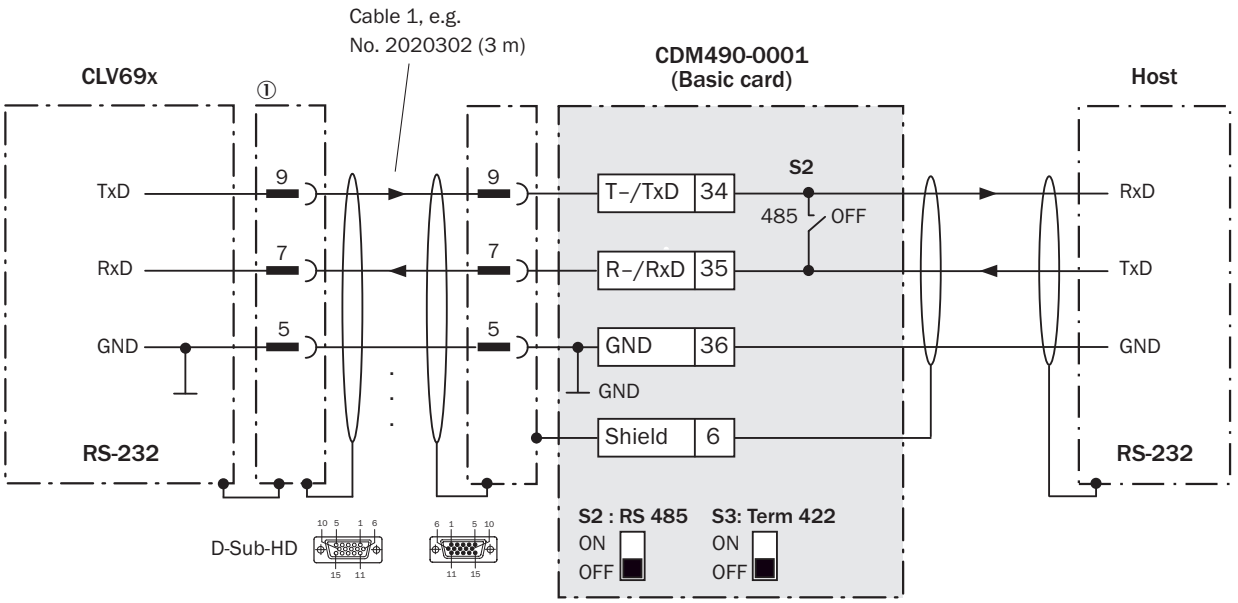
① "HOST/AUX/I/O" connection
② "I/O" connection

U_V = DC 18 V ... 30 V at terminal +24 V =
U_V at terminal +24 V* after switch S1, protected by internal fuse F

Switch S1:
ON:
supply voltage U_V (+24 V) switched via fuse as U_V (+24 V*) to CDM490-0001 and CLV69x.
U_V (+24 V*) can also be engaged on terminal 29 of the basic card as well as on terminal 51 ... 53 of the I/O card.
OFF:
CDM490-0001 and CLV69x separated from supply voltage.
Recommended position for all connection types.

Figure 90: Wire supply voltage for CLV69x-xxx0 (without heating)

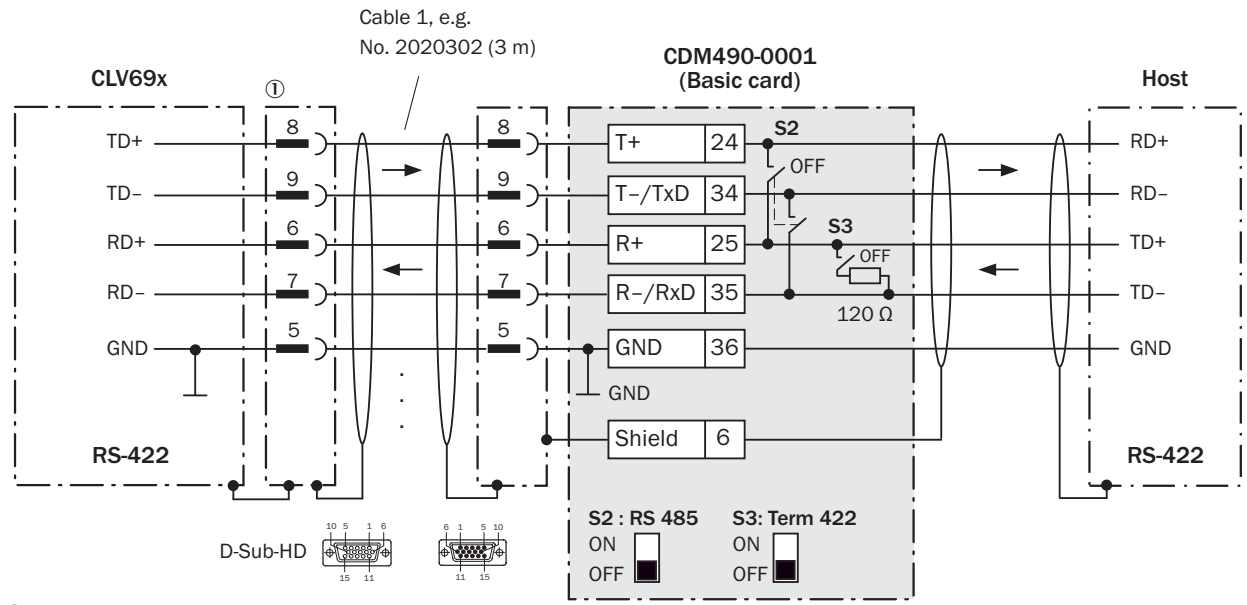
Wire RS-232 data interface of the CLV69x in the CDM490-0001 connection module



① "HOST/AUX/I/O" connection

Figure 91: Wire serial host interface RS-232

Wire RS-422 data interface of the CLV69x in the CDM490-0001 connection module



① "HOST/AUX/I/O" connection

S3: Term 422
Set to ON if termination of the RS-422 receiver in the CLV69x is necessary to improve the signal-to-interference ratio on the cable.

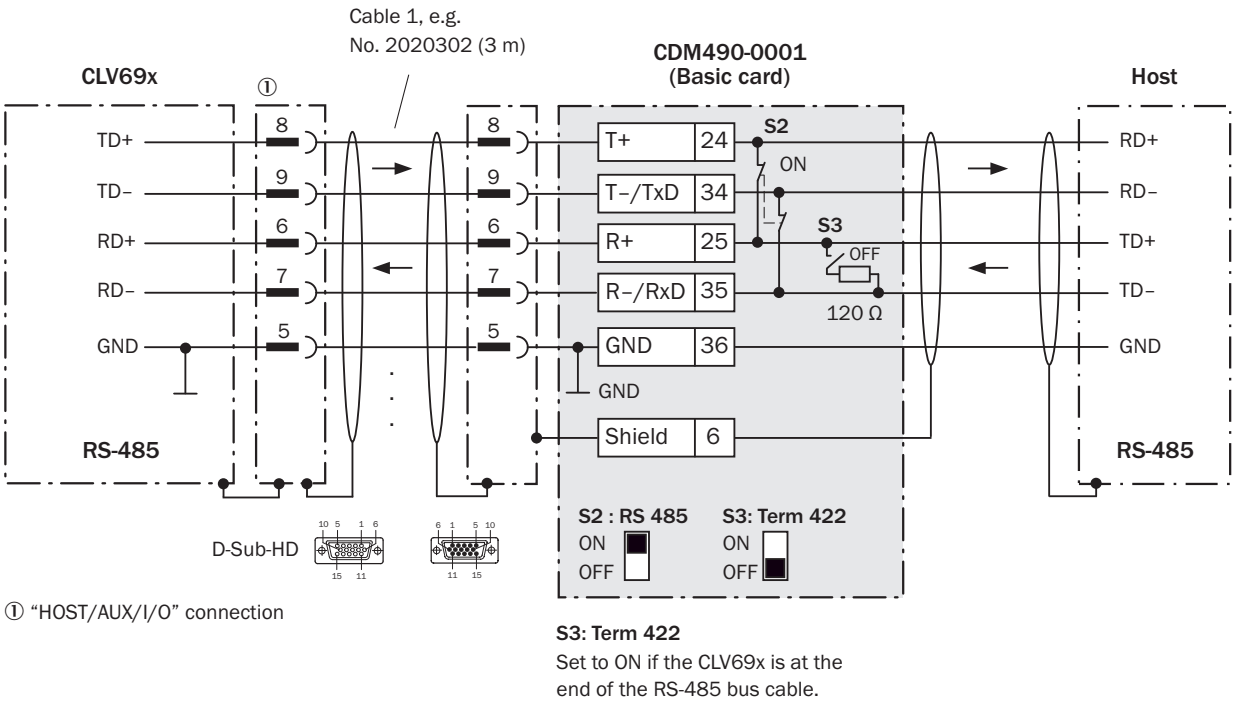
Figure 92: Wire serial host interface RS-422

NOTE

Use of the RS-422 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- The connection shown above is configured for operation of the host with permanently activated drivers (often described as “RS-422 operation”), i.e. not RS-485 bus operation.

Wire RS-485 data interface of the CLV69x in the CDM490-0001 connection module



① “HOST/AUX/I/O” connection

S3: Term 422

Set to ON if the CLV69x is at the end of the RS-485 bus cable.

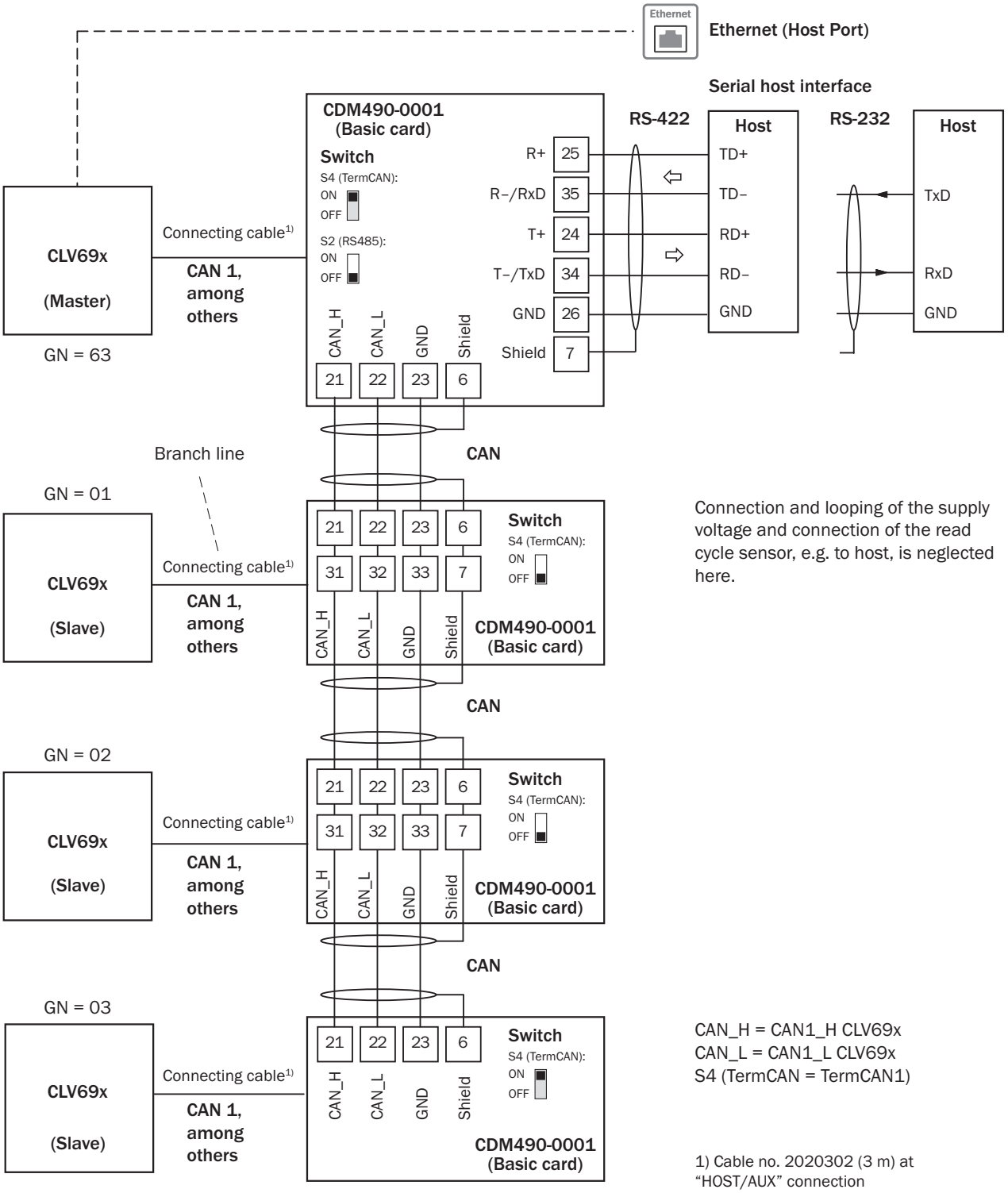
Figure 93: Wire serial host interface RS-485

NOTE

Use of the RS-485 data interface:

- The relevant interface drivers for the device comply with the standard for RS-422 and RS-485.
- This operating mode is only permitted if all connected devices use a corresponding RS-485 protocol.
- Activation of the interface in the device with the SOPAS ET configuration software (point-to-point).
- This wiring is not permitted in the standard data output/protocol for the device. In case of doubt, contact SICK Service.

Wire CLV69x in the CDM490-0001 connection module for SICK CAN SENSOR network



Connection and looping of the supply voltage and connection of the read cycle sensor, e.g. to host, is neglected here.

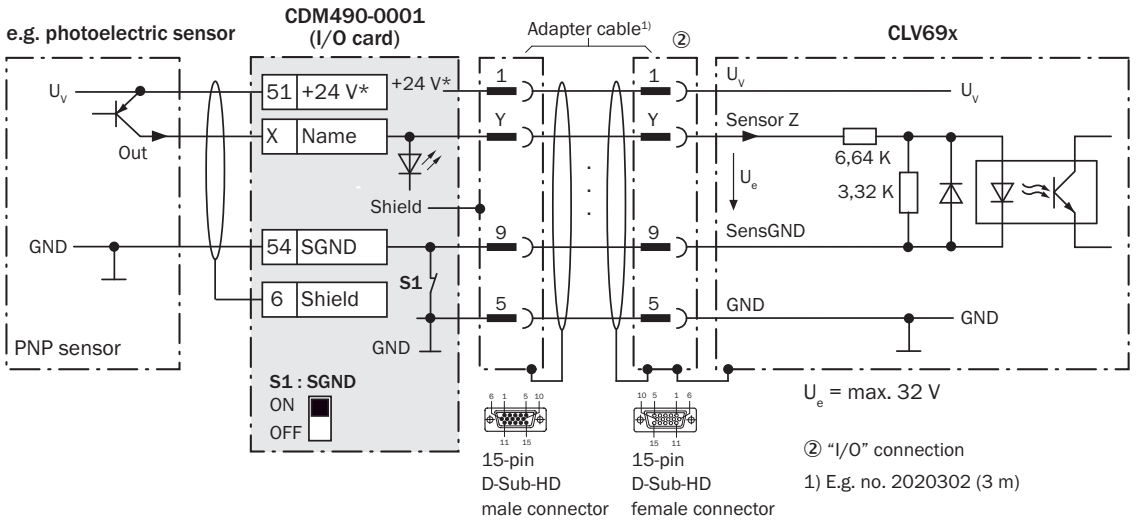
CAN_H = CAN1_H CLV69x
CAN_L = CAN1_L CLV69x
S4 (TermCAN = TermCAN1)

1) Cable no. 2020302 (3 m) at "HOST/AUX" connection

Figure 94: Wiring the CAN interface

Wire “Sensor 1 … 6” switching inputs of the CLV69x in the CDM490-0001 connection module

a) Schema: sensor supplied by CDM490-0001



CDM490-0001			CLV69x	
Terminal X	Name	Pin Y	Pin Y	Sensor Z
61	Sensor	3	3	Sensor 1
62	IN 0	6	6	Sensor 2
63	IN 1	2	2	Sensor 3
64	IN 2	7	7	Sensor 4
65	IN 3	11	11	Sensor 5
66	IN 4	12	12	Sensor 6

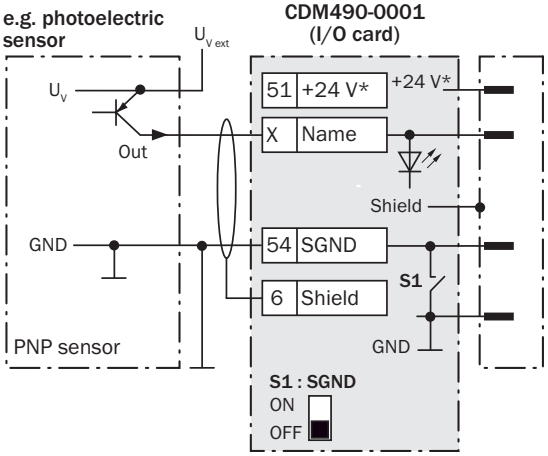
Switch S1: SGND

ON: connect GND of the switching inputs to the GND of the CDM490-0001/CLV69x.

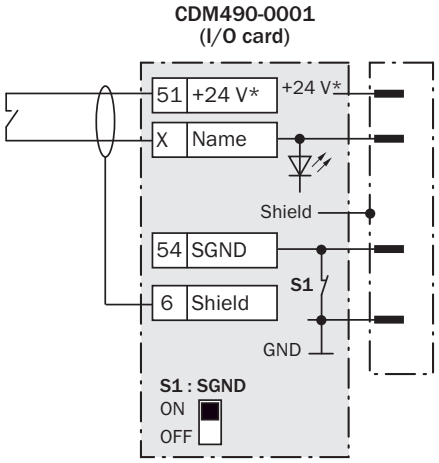
OFF: sensors connected volt-free to switching inputs on the CDM490-0001/CLV69x.

Reference potential valid for all “Sensor 1 … 6” switching inputs and optionally

b) Schema: sensor connected volt-free and externally supplied



a) Schema: switch supplied by CDM490-0001



d) Schema: switch connected volt-free and externally supplied

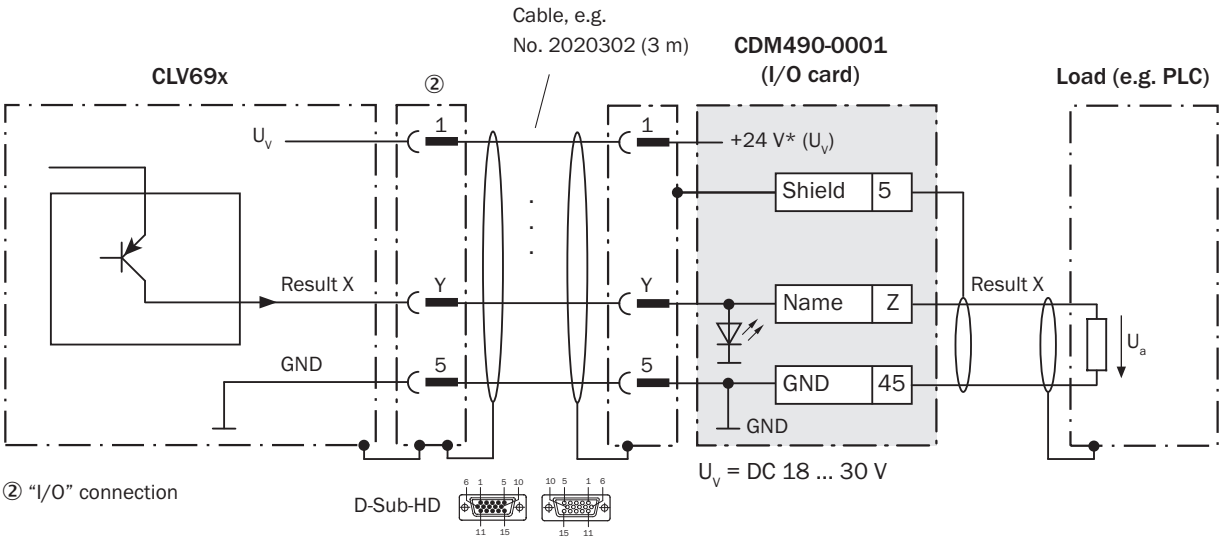
Connection of the switch as under b)

Characteristic data of the switching inputs “Sensor 1 … 6”

Switching behavior	Current at the input starts the assigned function, e.g. start reading cycle. (CLV69x default settings: logic active high, debouncing 10 mm)
Properties	– Opto-decoupled, reverse-polarity protected – Can be wired with PNP output of a sensor
Electrical values	Low: $U_e \leq 2$ V; $I_e \leq 0{,}3$ mA High: 6 V ≤ $U_e \leq 32$ V; 0,7 mA ≤ $I_e \leq 5$ mA

Figure 95: Wiring switching inputs “Sensor 1 to 6”

Wire “Result 1 … 4” switching outputs of the CLV69x in the CDM490-0001 connection module



CLV69x		CDM490-0001			
Result X	Pin Y	Pin Y	Name	Terminal Z	Result X
Result 1	4	4	Result 1	41	Result 1
Result 2	8	8	Result 2	42	Result 2
Result 3	10	10	Result 3	43	Result 3
Result 4	15	15	Result 4	44	Result 4

With inductive load:

Sweep-out circuit:
Attach a freewheeling diode directly to the load.

Characteristic data of “Result 1 … 4“ switching outputs

Switching behavior	PNP switching to supply voltage U_V (+24 V*). CLV69x default settings: Result 1: device ready (static), logic: active high Result 2: good read, 100 mm, logic: active high Result 3: no function assigned Result 4: no function assigned
Properties	– Short-circuit protected + temperature protected – Not electrically isolated from U_V (+24 V*)
Electrical values	$0 V \leq U_a \leq U_V$ Guaranteed: $(U_V - 1.6 V) \leq U_a \leq U_V$ at $I_a \leq 100$ mA

Figure 96: Wiring switching outputs “Result 1 to 4”

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

1. Start the PC and download the current version from 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 user adjusts the device to the reading situation on location using the SOPAS-ET configuration software. During this, the device is usually connected directly to the PC/ laptop (online method).

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

After testing the desired functionality in read mode, the parameter set created can be permanently saved on the device. The factory default settings cannot be overwritten and remain available at all times in case the device needs to be reset (see figure 97, page 96).

The device can only save **one** application-specifically created parameter set.

If the effects of various parameter variations need to be tested on the read mode, then they must be saved in a further parameter set under another file name on the PC/ laptop. Then download these parameter sets one after another for testing on the device without permanently saving them. Each download overwrites the previously transferred parameter set in the working memory. Only the last parameter set to be set is then finally saved on the device with the "Permanent" option.

NOTE

As part of a structured data security concept, it is recommended to save, and therefore archive, the current parameter set using a project file (Sopas file with configuration data) under a meaningful name on the PC.

External, optional parameter memory components outside of the device's internal parameter memory allow for direct parameter cloning. In case of defects, it is possible to exchange the device quickly without losing configuration data. The storage media are available for this, depending on the device, are microSD memory cards for the device or the parameter cloning module CMC600 for the connection module CDB and/or CDM.

Memory organization for parameter set

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

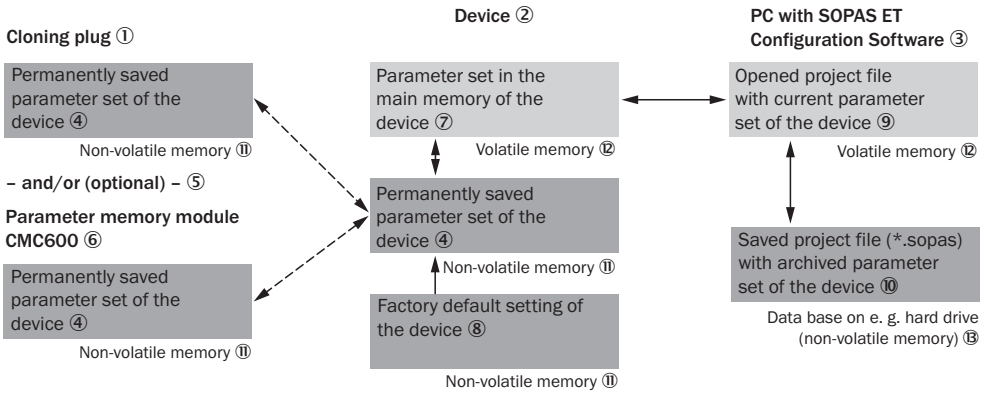


Figure 97: Configuration with SOPAS ET and saving the parameter set

① Cloning plug with external parameter memory
② Device
③ PC with SOPAS ET configuration software
④ Permanently saved device parameter set
⑤ and/or
⑥ CMC600 parameter cloning module, used here to expand the switching inputs and outputs
⑦ Parameter set in the working memory of the device
⑧ Factory-set defaults for the device
⑨ Opened project file with current device parameter set
⑩ Saved project file with archived device parameter set
⑪ Nonvolatile memory
⑫ Volatile memory
⑬ Database on the hard drive, for example (nonvolatile memory)

Saving behavior:

The device is equipped with a mandatory cloning plug and, where necessary, is connected to a CDB or CDM connection module with an optional CMC600 parameter cloning module:

- Each time the parameter set is saved in the device with the “Permanent” option, the parameter set is also permanently saved externally on the cloning plug or in the CMC600.

Supporting the exchange of a defective device without manually required reconfiguration

NOTE
Exchanging the device without losing the configuration data only makes sense if a defective device is replaced with an exchange unit **of the same type**.

The device also saves its configuration data in an external parameter memory of the cloning connector. Every time the device is restarted, it automatically loads the parameter set from the cloning plug into its permanent memory. If an optional CMC600 is also present in the CDB/CDM connection module, the exchange unit adopts the parameter set from the CMC600.

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 107.
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 27.
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).

Commissioning 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

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.

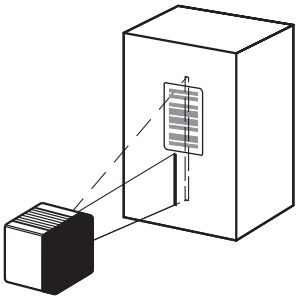


Figure 98: Appearance of the scan line in “Adjusting Mode”

This function is only available under adjustment mode in Quickstart in the “Authorized customer” 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).

Focus setting

In the factory default setting, the device works with auto focus. Alternatively, the device can be operated in the modes “Dynamic Focus” and “Fixed Focus” (Device tree > Parameters > Reading configuration > Focus control).

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 Optical displays and control elements

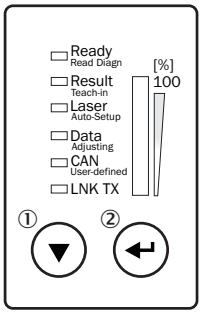


Figure 99: LED status indicator, bar graph and function keys

① Arrow pushbutton

② Return pushbutton

Table 30: Illumination behavior of the LED status display

Display	LED	Color	Status
Ready	Steadily lit	Green	Lights up constantly after switching on and completion of successful self-test The device is ready for reading
	Goes out	–	Download or upload of configuration data
	Steadily lit	Red	Hardware fault
Result	Lights up briefly	Green	Successful reading
Laser	Steadily lit	Green	Laser on
Data	Steadily lit	Green	Data output via host interface
CAN	Flashing	Green	Data transmission via CAN interface, status of the internal termination of the cloning plug: all existing terminations are not active, or not available (depending on the plug)
	Flashing	Blue	Data transmission via CAN interface, status of the internal termination of the cloning plug: all existing terminations are active
	Flashing	Violet	Data transmission via CAN interface, status of the internal termination of the cloning plug: not all existing terminations are active
LNK TX	Steadily lit	Green	Physical Ethernet connection
	Flashing	Green	Data traffic via Ethernet

Operating button and status displays on the second display level

The two pushbuttons ① and ② are used to call up device functions manually without using a PC. The second display level of the LEDs signals the selectable functions. Currently, “Read Diagn” (percentage evaluation) and “Adjusting” (adjusting tool) are available.

1. Press the return key for approx. 2 seconds. The device switches to operating mode of the pushbutton. “Ready” LED now lights up blue.
2. Press arrow key repeatedly to select the desired function (LED lights up blue).

3. Press the return key to confirm the selected function.
   The device executes the function and automatically returns to the read mode after 2 minutes.
4. To abort the function manually (cancel), press the Return key again and hold for 2 seconds.

Bar Graph 0 ... 100%

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

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 (via cloning plug, RS-232 or Ethernet depending on type).
- As an alternative to the SOPAS ET configuration software, command strings are available, upon which the operator interface of the configuration software is also based. These are also for the triggering of device functions (e.g. reading). Documents on the command strings can be obtained from SICK on request.

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 plan

During operation, the device works maintenance-free.

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

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

Table 31: Maintenance plan

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

9.2 Cleaning

9.2.1 Cleaning the device

At regular intervals (e.g. weekly), check the reading window and the housing of the device for contamination. 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
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

NOTICE
Damage to the Reading Window!
Reduced reading performance due to scratches or streaks on the reading window.

- Clean the reading 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 reading 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 13.

NOTE
Static charge causes dust particles to adhere to the reading window. This effect can be avoided by using an anti-static glass cleaner in combination with the SICK lens cloth (can be obtained from 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 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 reading window using a soft, clean brush. If necessary, also clean the reading window with a clean, damp, lint-free cloth, and a mild anti-static glass cleaning agent.
- ▶ Plastic lens: Clean the reading window only with a clean, damp, lint-free cloth, and a mild anti-static glass cleaning agent.

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

Cleaning the housing

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

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

9.2.2 Cleaning surfaces that have an optical effect

Depending on how the reading station is equipped, additional local sensors may have other surfaces with an optical effect installed (e.g. single-beam photoelectric safety switches for an external reading pulse). Contamination on these sensors can result in faulty switching behavior.

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

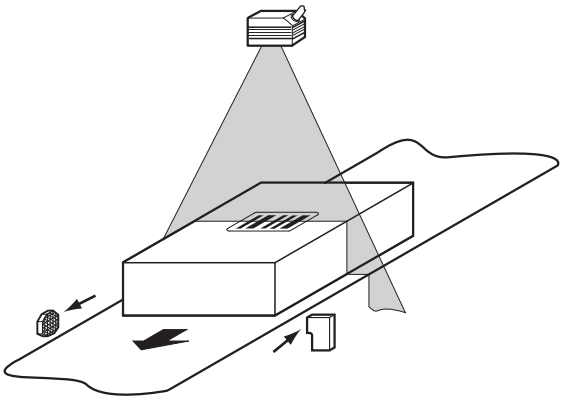


Figure 100: Cleaning the external optical sensors (read pulse encoder)

10 Troubleshooting

10.1 Overview of possible errors and faults

Table 32: Errors and faults

Situation	Error/fault
Mounting	■ Device poorly aligned to the object with the bar code (e.g. dazzle). ■ Read-cycle sensor incorrectly positioned (e.g., internal reading gate is opened too early or closed too late). ■ Incremental encoder incorrectly positioned.
Electrical installation	■ Data interfaces of the device incorrectly wired. ■ Voltage supply not sufficiently dimensioned or cables with too small a cross-section used.
Configuration	■ Functions not adapted to local conditions, e.g. parameters for the data interface not set correctly. ■ Device limits not observed, e.g. reading distance, aperture angle. ■ Read cycle trigger source not selected correctly.
Operation	■ Read cycle control incorrect and/or not suitable for the object. ■ Device faults (hardware/software).

10.2 Detailed fault analysis

10.2.1 LEDs on the device

The conditions that can be read from the device LEDs on the sensor housing (see "Optical displays and control elements", page 99) include:

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

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

10.2.2 System information

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

- Communication errors can occur when transmitting data to the device. The device then returns a fault code.
- For faults that occur during reading, the device writes fault codes in the status log (see "Status log", page 104).

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
- Error
- 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 CLV6xx in the project tree: Service > System Status > System Information tab.

10.4 SICK Support

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

The device must not be repaired by the user. Interrupting or modifying the device will invalidate any warranty claims against SICK AG.

Rapid replacement of a device by the user is however possible, see "Disassembly and disposal", page 106.

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

NOTE

Before calling, make a note of all type label data such as type designation, serial number of the device and the connectivity used to ensure faster assistance.

11 Decommissioning

11.1 Disassembly and disposal

Dismantling the device

1. Switch off the supply voltage to the device.
2. Detach all connecting cables from the device.
3. If the device is being replaced, mark its position and alignment on the bracket or surroundings.
4. Remove the device from the bracket.
5. Unscrew the screws for the cloning plug and remove the cloning plug.
6. Apply protective covering to the cloning plug.

Disposing of the device

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. As they are categorized as electronic waste, the device must never be disposed of with household waste.

11.2 Returns

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

NOTE

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

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

12 Technical data

NOTE

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

- www.sick.com/CLV69x

These operating instructions provides additional technical data if required.

12.1 Optics

		CLV690-0xxx/ 1xxx Standard Density	CLV691-0xxx/ 1xxx Low Density	CLV692-0xxx/ 1xxx High Density
Focus	**Standard:**	Auto focus		
	Alternatively:	Dynamic focus setting of fixed focus		
FocusTrigger-Source		Data interface / switching inputs		
No. of distance configurations		≤ 8		
Focus adjustment time		≤ 20 ms		
Light source		Laser LED, visible red light (660 nm)		
MTBF		100,000 h		
Laser class		Class 2 according to EN/IEC 60825-1: 2014 Identical laser class for issue EN/IEC 60825-1:2007 Complies with 21 CFR 1040.10 except for tolerances according to Laser Notice no. 50, dated June 24, 2007.		
Aperture angle	**Reading window on front:**	≤ 60°		
	Lateral reading window (oscillating mirror):	≤ 50°		
Scanning frequency		400 Hz ... 1,200 Hz		
Code resolution		0.25 mm ... 1.0 mm	0.35 mm ... 1.2 mm	0.17 mm ... 0.4 mm
Reading distance		500 mm ... 2,100 mm [1]	500 mm ... 2,200 mm [1]	400 mm ... 1,600 mm [1]
Oscillating mirror functions		Fixed (adjustable position), oscillating (variable or fixed amplitude), one-shot		
	Oscillation frequency:	0.5 Hz ... 4 Hz		
	Angle of deflection:	–20° ... 20° (adjustable using software)		

[1] For details, see "Reading field diagrams", page 110.

12.2 Performance

	CLV690-0xxx/1xxxx Standard Density	CLV691-0xxx/1xxx Low Density	CLV692-0xxx/1xxx High Density
Bar code types	2/5 Interleaved, Codabar, Code 128, Code 39, Code 93, GS1-128/EAN 128, UPC/GT IN/EAN		
Print ratio	2:1 ... 3:1		
Bar code print contrast (PCS)	≥ 60%		
Ambient light immunity	2000 lx, on bar code		
No. of codes per scan	1 ... 20 (standard decoder) 1 ... 6 (SMART decoder)		
No. of codes per reading interval	1 ... 50 (auto-discriminating)		
No. of characters per reading interval	5000		
No. of multiple readings	1 ... 100		

12.3 Interfaces

		CLV690-0xxx/ 1xxx Standard Density	CLV691-0xxx/ 1xxx Low Density	CLV692-0xxx/ 1xxx High Density
Serial (RS-232, RS-422/-485)		With cloning plug, part no. 2062450 (A), 2062452 (B): Host, AUX With cloning plug, part no. 2062453 (C) and 2062454 (D): AUX		
	Function:	Host (RS-232, RS-422/-485), AUX (RS-232)		
	Data transmission rate:	Host: 300 Bd ... 500 kBd, AUX: 57.6 kBd (RS-232)		
Ethernet		Only with cloning plug, part no. 2062452 (B), 2074708 (E) and 2074710 (F)		
	Function:	Host, AUX		
	Data transmission rate:	10/100 Mbit/s		
	Protocols:	TCP/IP, Ethernet/IP, PROFINET Single Port or PROFINET DualPort (optionally via external fieldbus module CDF600-22xx)		
CAN bus	**Function:**	SICK CAN sensor network (master/slave, multiplexer/ server)		
	Data transmission rate:	20 kbit/s ... 1 Mbit/s		
	Protocol:	CSN (SICK CAN sensor network)		
PROFIBUS		Optional via external fieldbus module CDF600-21xx		
DeviceNet		Optional via external connection module (CDM420-CMF4xx)		

		CLV690-0xxx/ 1xxx Standard Density	CLV691-0xxx/ 1xxx Low Density	CLV692-0xxx/ 1xxx High Density
Digital switching inputs[1)]		Cloning plug A (part no. 2062450): 6 x Cloning plug B (part no. 2062452): 2 x U_e = max. 30 V; I_e = max. 5 mA Optically decoupled, reverse polarity protected, debounce time adjustable in device		
Digital switching outputs [1)]		Cloning plug A (part no. 2062450): 4 x Cloning plug B (part no. 2062452): 4 x $U_a = U_V$ – 1.6 V, $I_a \leq$ 100 mA (typical) Short-circuit protected, temperature protected, not electrically isolated from the supply voltage		
Reading pulse	**Start**:	Switching input (type-dependent), fieldbus input (type-dependent), command, auto-pulse, CAN (type-dependent), free-running		
	Stop:	Reading pulse source, switching input (type-dependent), command, timer, event (e.g., Good Read)		
Optical displays		6 x LED (Ready, Result, Laser, Data, CAN, LNK TX) Bar graph display for display of percentage read rate (10 x LED)		
Operating elements		2 buttons		
Parameter memory		Contained in cloning plug. Alternatively also via an optional CMC600 parameter cloning module in the CDM/CDB connection module		
Configuration software		SOPAS ET		

1) For details, see table 9, page 39.

12.4 Mechanics/electronics

		CLV690-0xxx/ 1xxx Standard Density	CLV691-0xxx/ 1xxx Low Density	CLV692-0xxx/ 1xxx High Density
Electrical connection		60-pin system connection for connecting a cloning plug		
Supply voltage	**Device without heating (CLV69x-xxx0):**	18 V DC ... 30 V DC (type-dependent), LPS or NEC Class 2, SELV according to currently valid EN 60950-1, reverse polarity protected		
	Device with heating (CLV69x-xxx1):	21.6 V DC ... 28.8 V DC (type-dependent), LPS or NEC Class 2, SELV according to currently valid EN 60950-1, reverse polarity protected		
Power consumption (with unloaded outputs)	**Device without heating (CLV69x-xxx0)**	I_{max} = 1 A: • Line scanner: typically 15 W • Line scanner with oscillating mirror: typically 17 W		
	Device with heating (CLV69x-xxx1)	I_{max} = 4 A: • Line scanner: typically 78 W • Line scanner with oscillating mirror: typically 80 W		
Housing		Aluminum die cast		
Reading window		Glass (CLV69x-xx**0**x), optionally polycarbonate (CLV69x-xx**1**x)		
Housing color		Light blue (RAL 5012)		

		CLV690-0xxx/ 1xxx Standard Density	CLV691-0xxx/ 1xxx Low Density	CLV692-0xxx/ 1xxx High Density
Electrical safety		According to UL 60950-1 certification (EN 60950-1: 2006-04 / A11: 2009-03 / 1: 2010-03 / A12: 2011:02)		
Weight	**Line scanner:**	1.5 kg		
	Line scanner with oscillating mirror:	2.2 kg		
Dimensions (L x W x H)	**Line scanner:**	117 mm x 117 mm x 94 mm		
	Line scanner with oscillating mirror:	182 mm x 128 mm x 97 mm		
Enclosure rating		IP 65		

12.5 Ambient data

	CLV690-0xxx/1xxx Standard Density	CLV691-0xxx/1xxx Low Density	CLV692-0xxx/1xxx High Density
Interference emission	EN 61000-6-4: 2007-01/A1: 2011-02		
Immunity to electrical noise	EN 61000-6-2: 2005-08		
Vibration resistance	EN 60068-2-6: 2008-02		
Shock resistance	EN 60068-2-27: 2009-05		
Ambient operating temperature	Device without heating (CLV69x-xxx**0**): 0 °C ... +40 °C Device with heating (CLV69x-xxx**1**): –35 °C ... +35 °C		
Storage temperature	-20 C ... +70 °C		
Permissible relative humidity	0% ... 90%, non-condensing		

12.6 Reading field diagrams

12.6.1 Reading field conditions

Test code	Code 128
Print contrast	> 90%
Tilt	±45°
Ambient light	< 2,000 lx
Good read rate	> 75%

NOTE
Min. and max. reading distances are measured radially from the device.

12.6.2 Overview of reading field diagrams

Scanning procedure: line scanner

CLV69x-Type	Resolution	Diagram	Page
CLV690-0xxx	Standard Density	Reading field height/resolution over reading distance	page 112
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 40°	page 113
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 56°	page 114
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 40°	page 116
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 56°	page 117
		Scanning frequency characteristic curve	page 118
CLV691-0xxx	Low Density	Reading field height/tilt over reading distance for resolution 0.50 mm	page 127
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 40°	page 128
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 60°	page 129
		Scanning frequency characteristic curve	page 130
CLV692-0xxx	High Density	Reading field height/resolution over reading distance	page 133
		Min. and max. reading distance (DOF) for resolution 0.25 mm/aperture angle 40°	page 134
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 40°	page 135
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 56°	page 137
		Scanning frequency characteristic curve	page 138

Scanning procedure: line scanner with oscillating mirror

CLV69x-Type	Resolution	Diagram	Page
CLV690-1xxx	Standard Density	Reading field height/resolution over reading distance	page 119
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 40°	page 120
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 50°	page 121
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 40°	page 122
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 50°	page 124
		Scanning frequency characteristic curve	page 125
		Deflection width	page 126
CLV691-1xxx	Low Density	Reading field height/tilt over reading distance for resolution 0.50 mm	page 131
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 40°	page 128
		Min. and max. reading distance (DOF) for resolution 0.50 mm/aperture angle 60°	page 129
		Scanning frequency characteristic curve	page 132
		Deflection width	page 132
CLV692-1xxx	High Density	Reading field height/resolution over reading distance	page 139
		Min. and max. reading distance (DOF) for resolution 0.25 mm/aperture angle 40°	page 140
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 40°	page 141
		Min. and max. reading distance (DOF) for resolution 0.35 mm/aperture angle 50°	page 143
		Scanning frequency characteristic curve	page 144
		Deflection width	page 145

12.6.3 Standard Density: reading performance data, line scanner

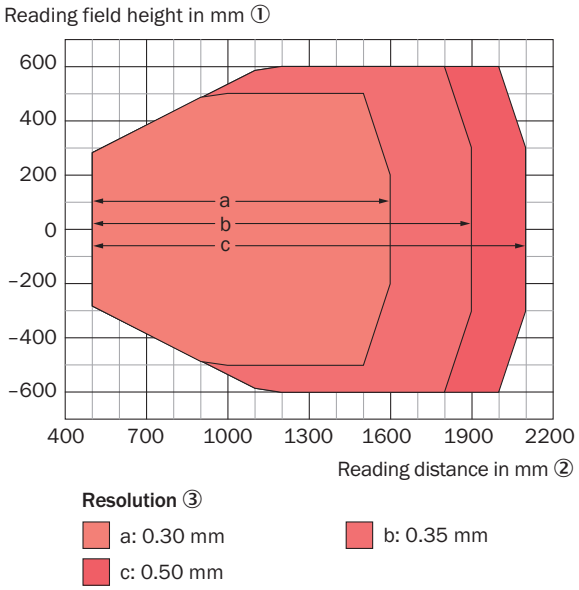


Figure 101: CLV690-0xxx (Standard Density): reading field height depending on the reading distance and resolution

① Reading field height in mm

② Reading distance in mm

③ Resolution

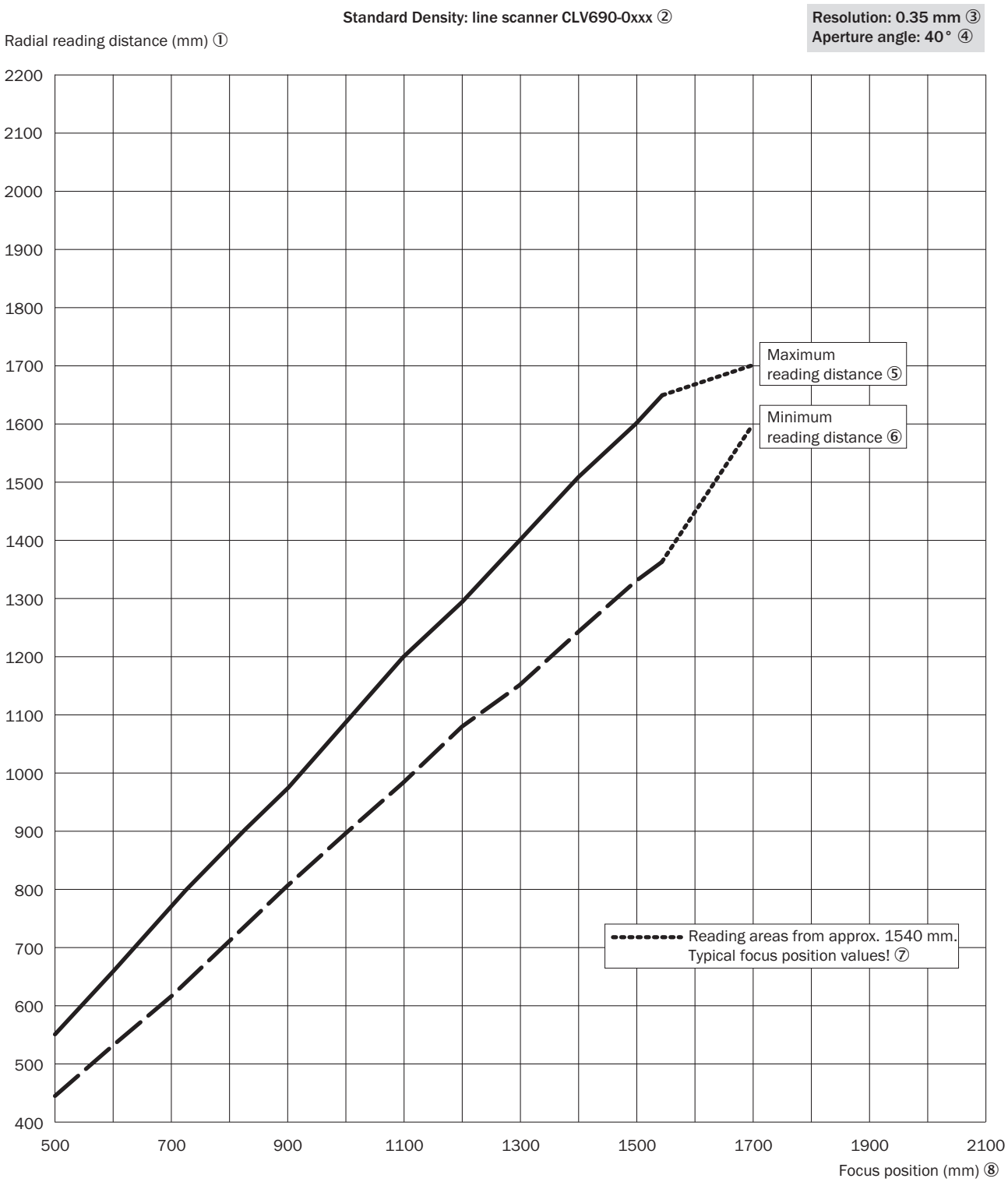


Figure 102: CLV690-0xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 40°

① Radial reading distance (mm)
② Standard Density: line scanner CLV690-0xxx
③ Resolution: 0.35 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Reading ranges from approx. 1,540 mm focus position - typical values!

⑧ Focus position (mm)

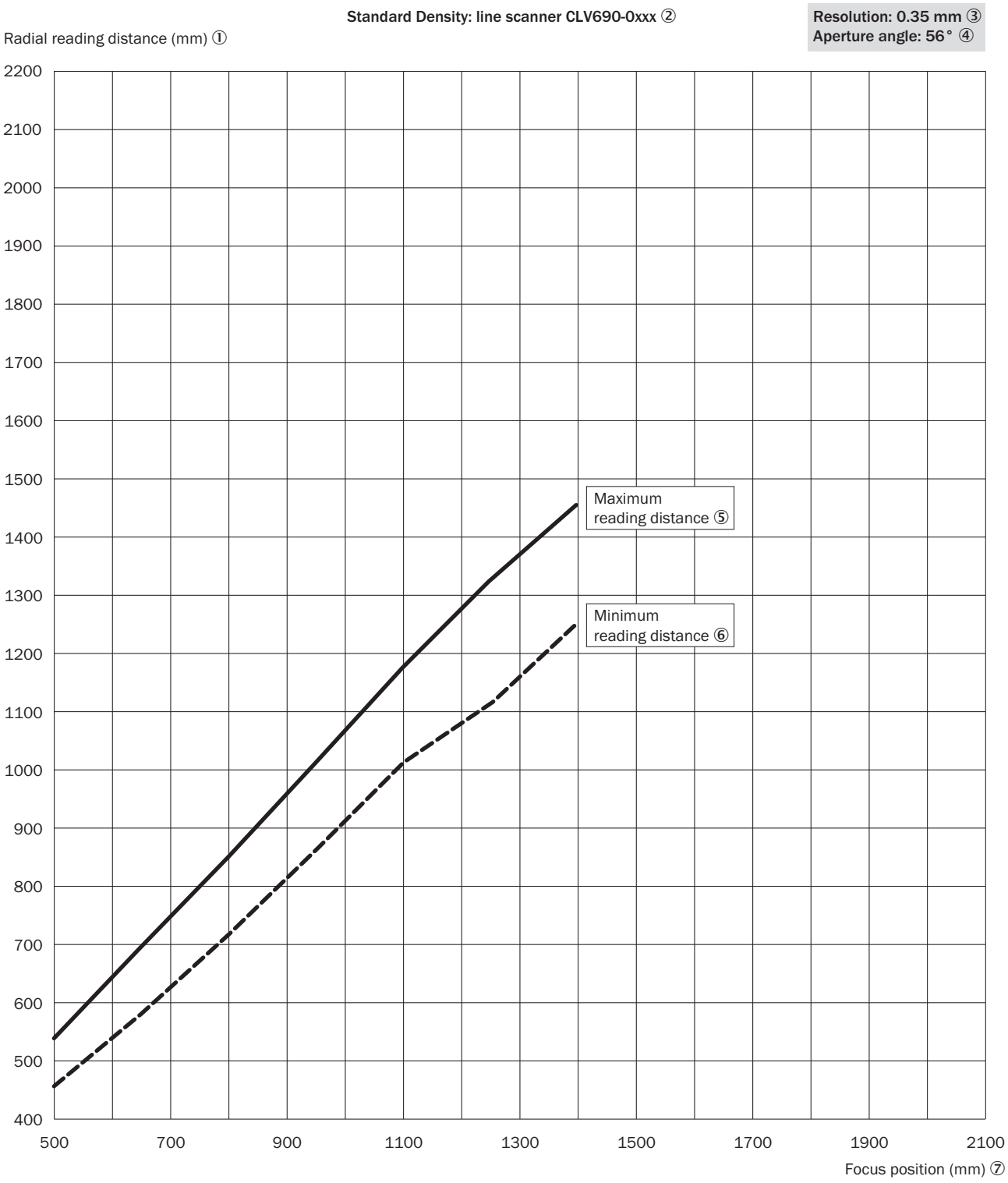


Figure 103: CLV690-0xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 56°

① Radial reading distance (mm)

② Standard Density: line scanner CLV690-0xxx

③ Resolution: 0.35 mm
④ Aperture angle: 56°
⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Focus position (mm)

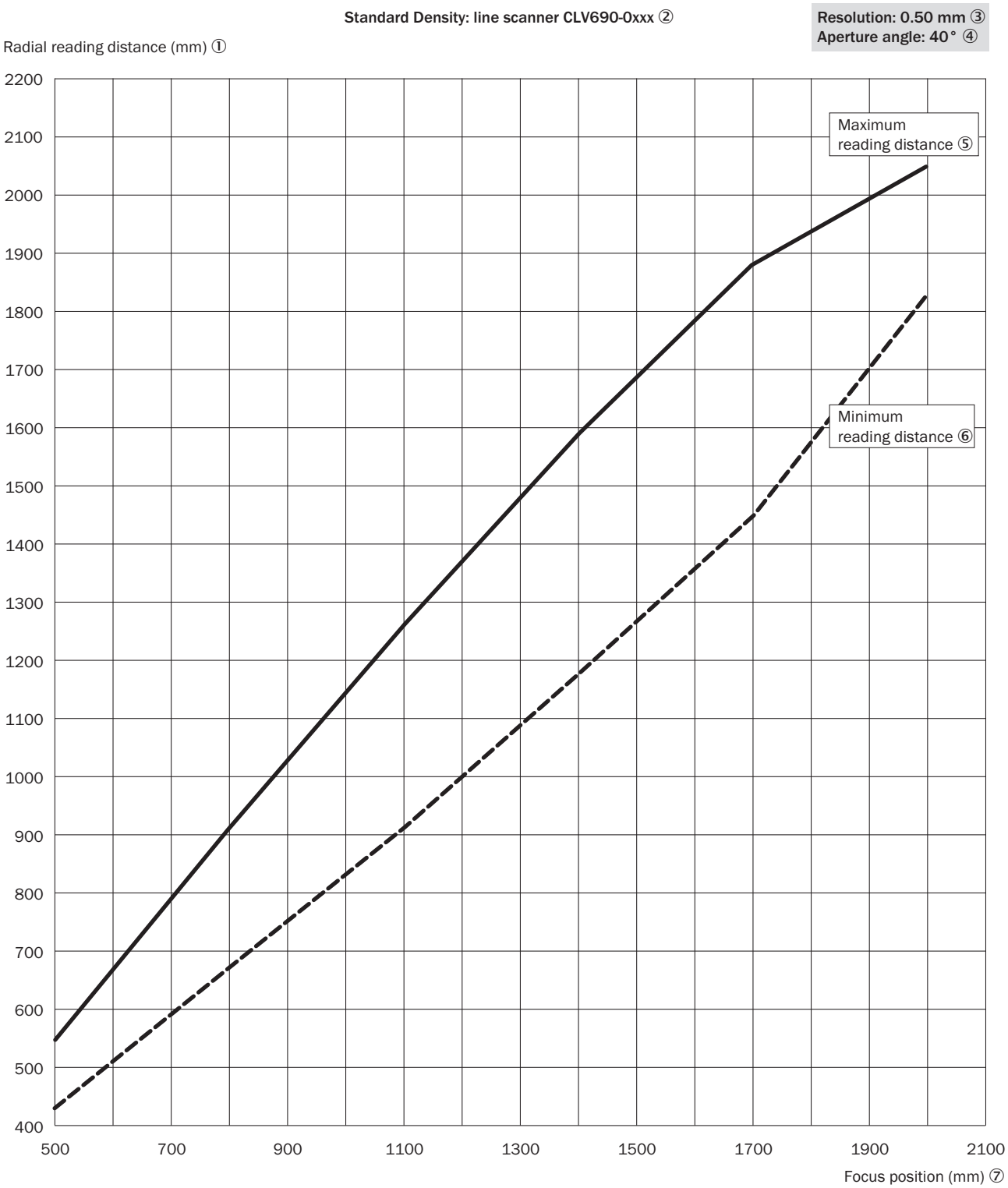


Figure 104: CLV690-0xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.50 mm and aperture angle of α = 40°

① Radial reading distance (mm)
② Standard Density: line scanner CLV690-0xxx
③ Resolution: 0.50 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Focus position (mm)

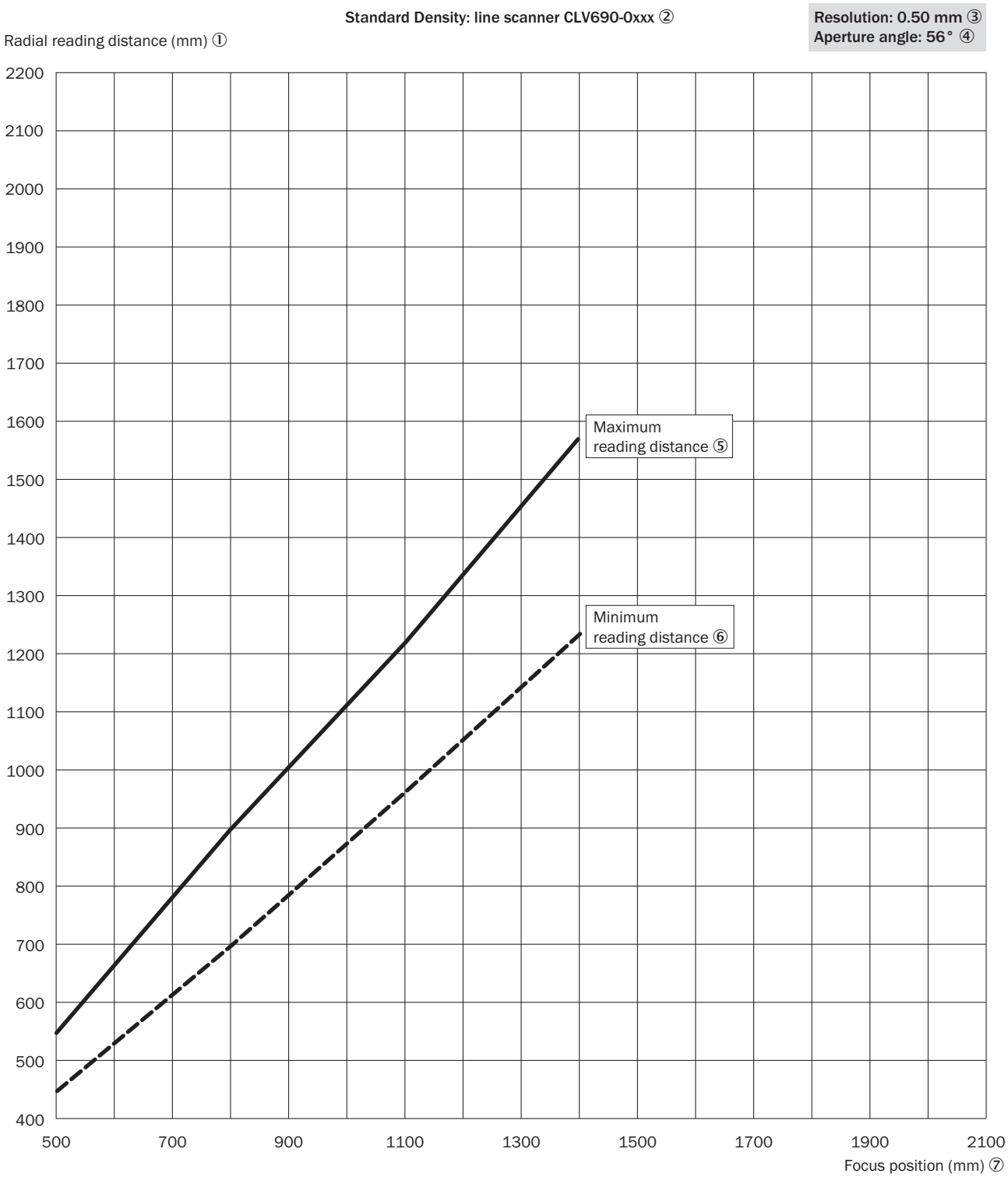


Figure 105: CLV690-0xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.50 mm and aperture angle of α = 56°

① Radial reading distance (mm)
② Standard Density: line scanner CLV690-0xxx
③ Resolution: 0.50 mm
④ Aperture angle: 56°

⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Focus position (mm)

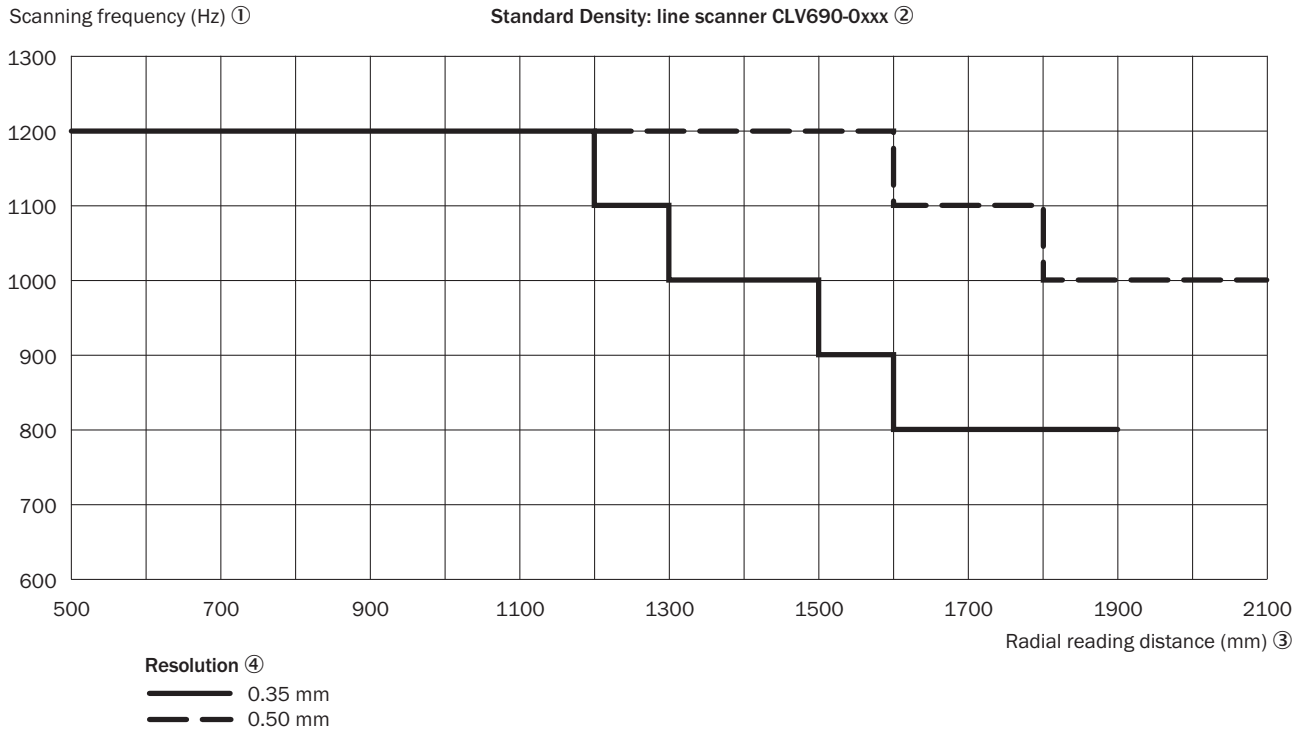


Figure 106: CLV690-0xxx (Standard Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)
② Standard resolution: line scanner CLV690-0xxx
③ Radial reading distance (mm)
④ Resolution

12.6.4 Standard Density: reading performance data, line scanner with oscillating mirror

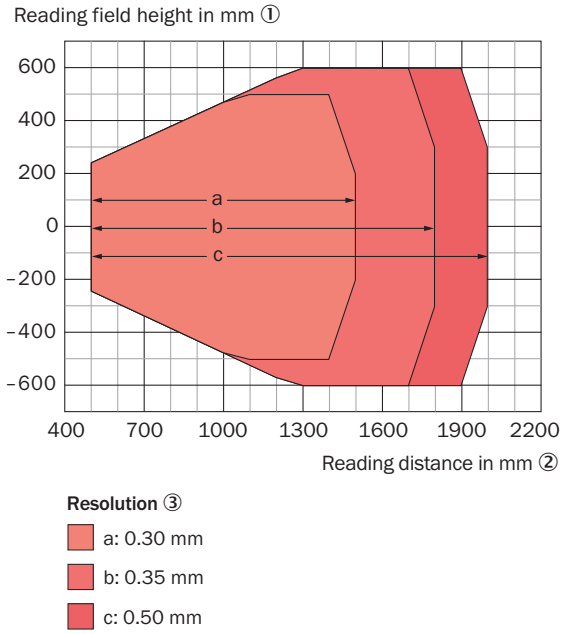


Figure 107: CLV690-1xxx (Standard Density): reading field height depending on the reading distance and resolution

① Reading field height in mm

② Reading distance in mm

③ Resolution

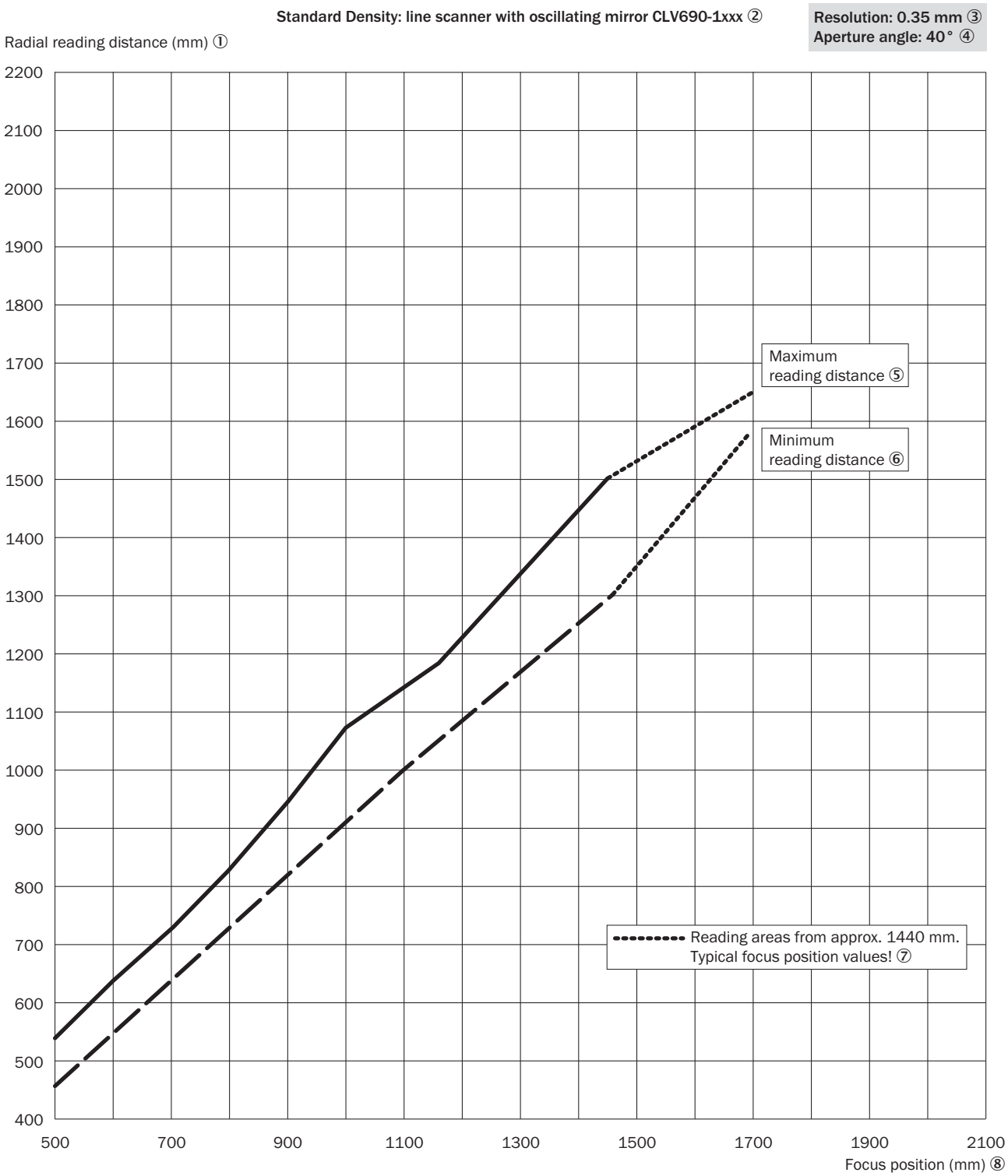


Figure 108: CLV690-1xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 40°

① Radial reading distance (mm)
② Standard Density: line scanner with oscillating mirror CLV690-1xxx
③ Resolution: 0.35 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Reading ranges from approx. 1,440 mm focus position - typical values!

⑧ Focus position (mm)

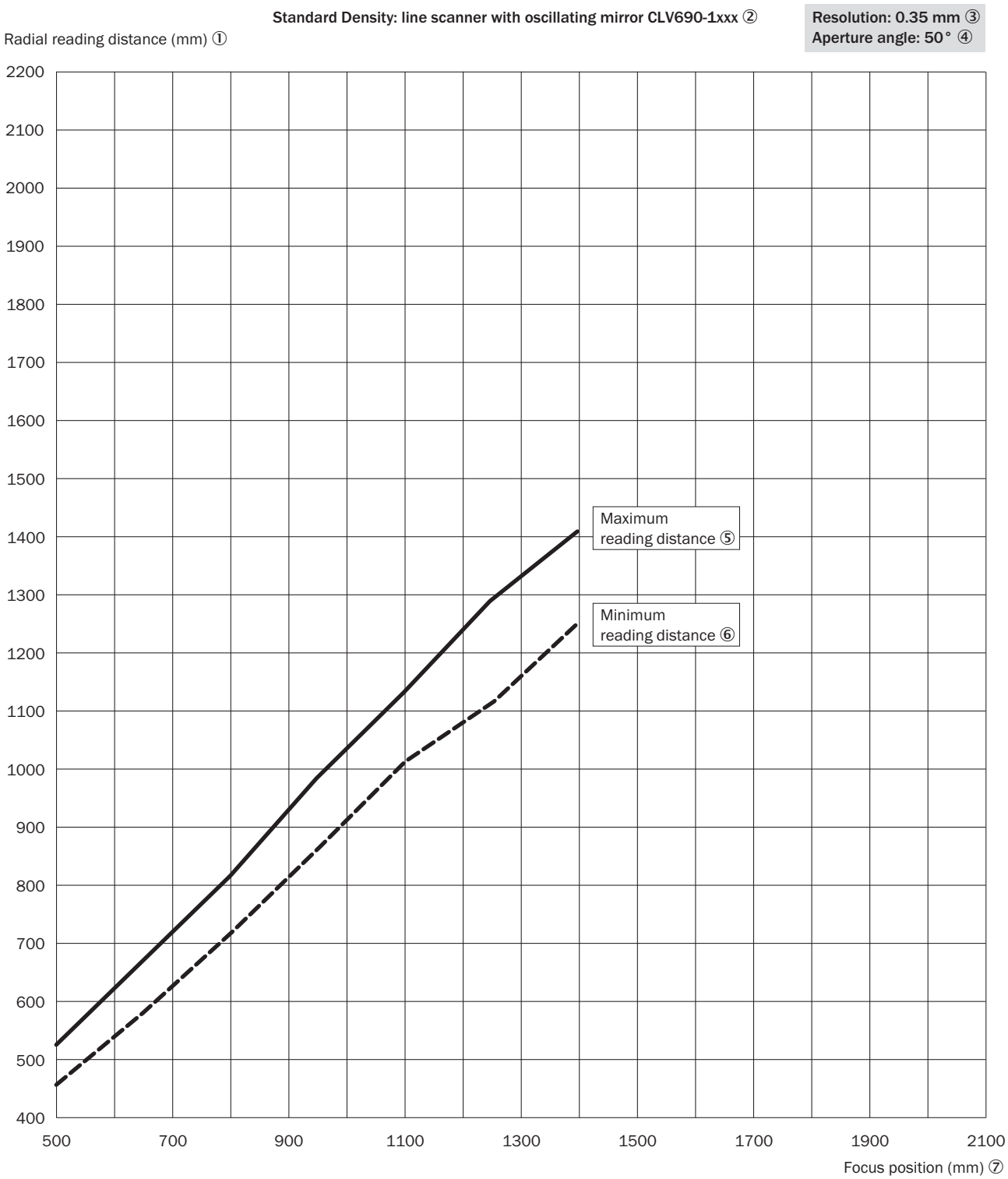


Figure 109: CLV690-1xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 50°

① Radial reading distance (mm)

② Standard Density: line scanner with oscillating mirror CLV690-1xxx

③ Resolution: 0.35 mm

④ Aperture angle: 50°
⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Focus position (mm)

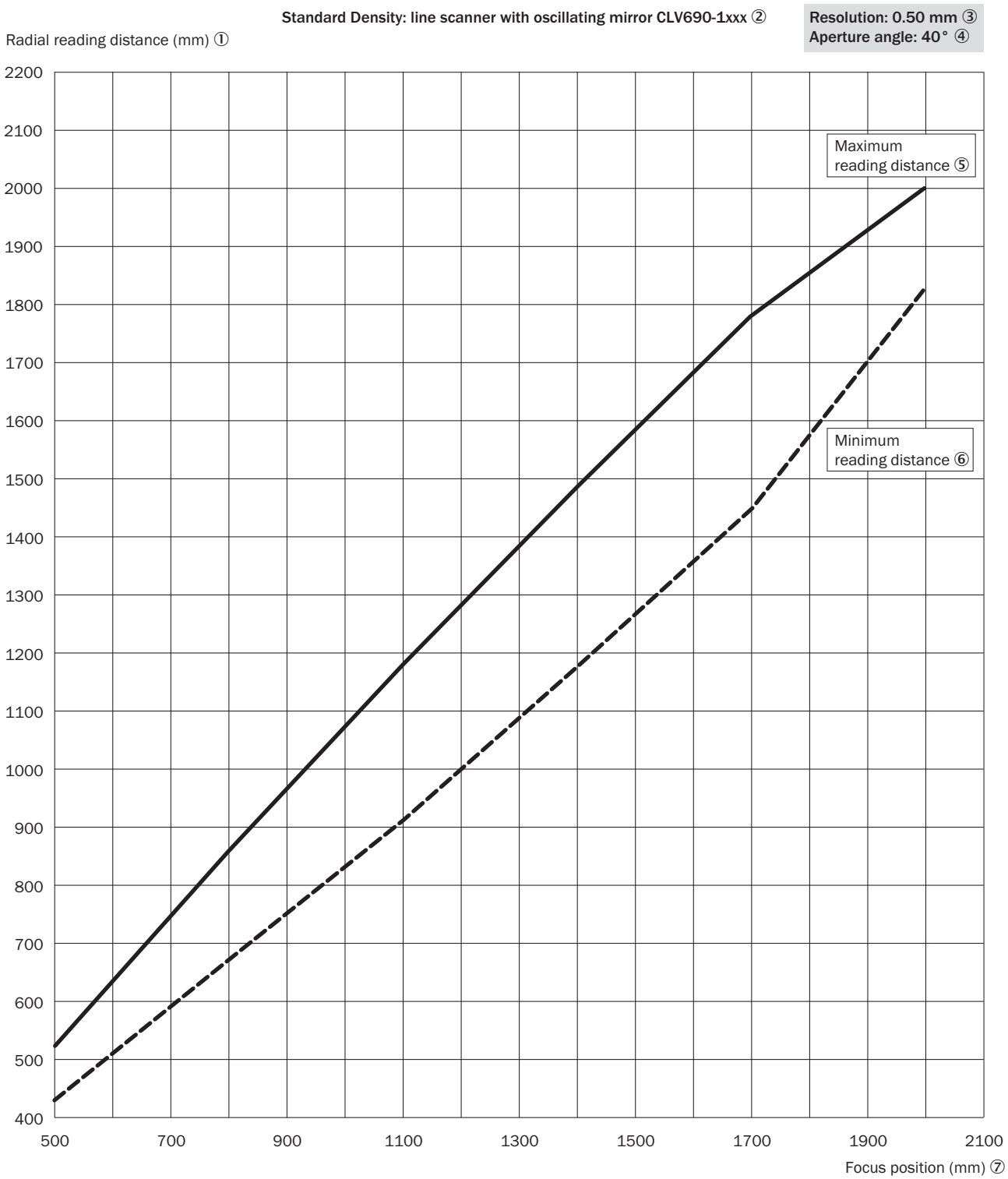


Figure 110: CLV690-1xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.50 mm and aperture angle of α = 40°

① Radial reading distance (mm)

② Standard Density: line scanner with oscillating mirror CLV690-1xxx
③ Resolution: 0.50 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Focus position (mm)

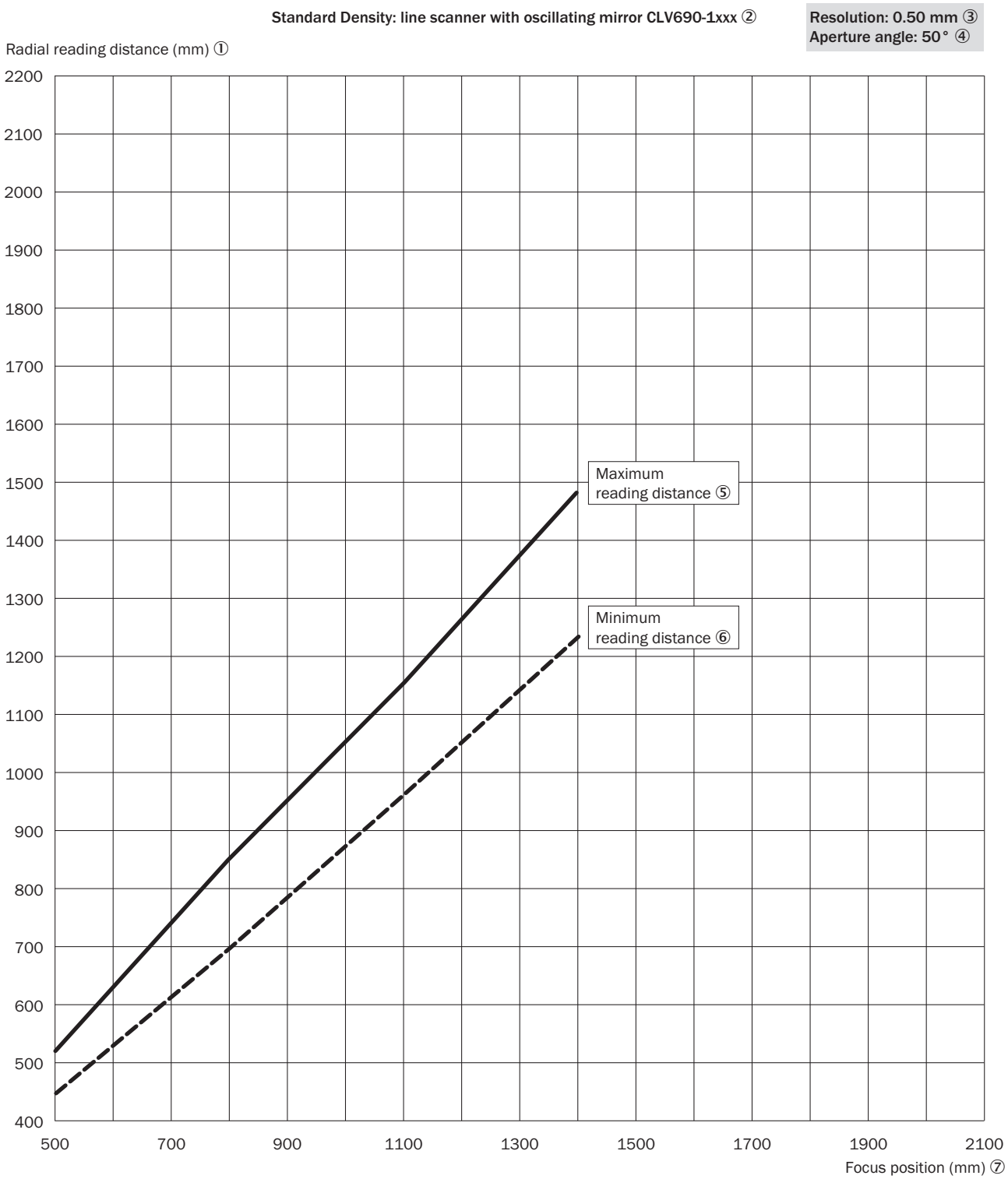


Figure 111: CLV690-1xxx (Standard Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.50 mm and aperture angle of α = 50°

① Radial reading distance (mm)
② Standard Density: line scanner with oscillating mirror CLV690-1xxx
③ Resolution: 0.50 mm
④ Aperture angle: 50°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Focus position (mm)

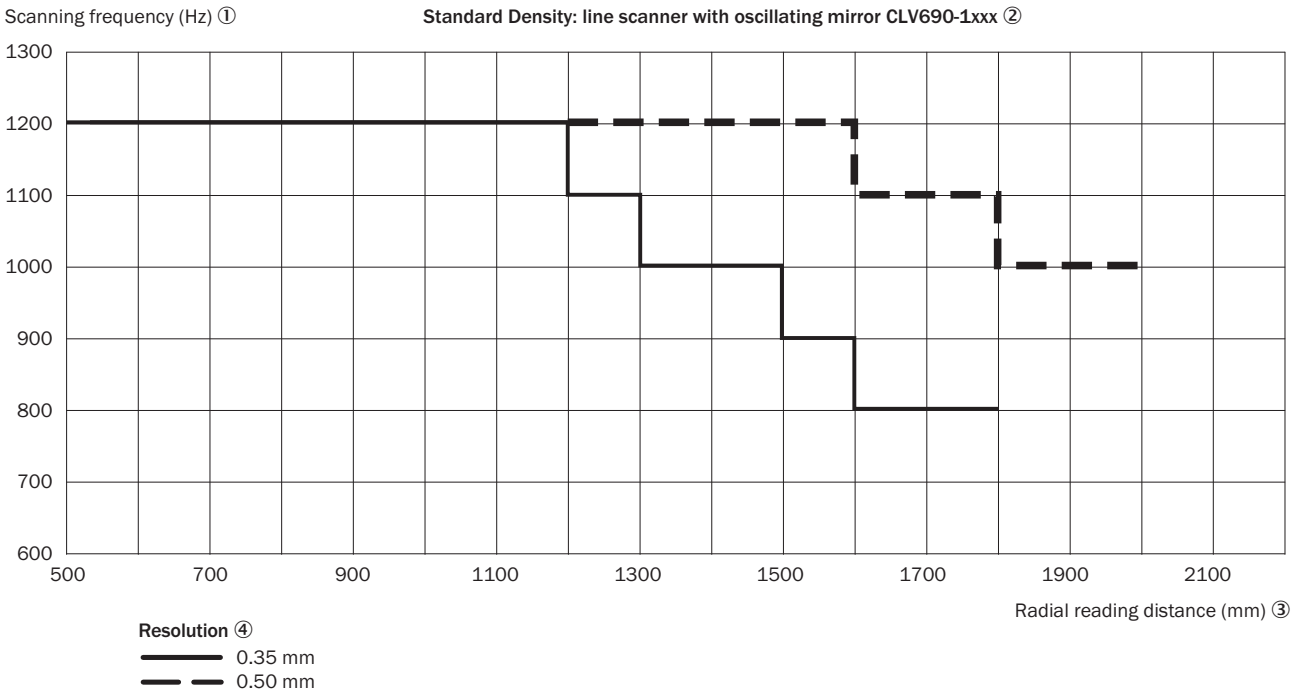


Figure 112: CLV690-1xxx (Standard Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)

② Standard resolution: line scanner with oscillating mirror CLV690-1xxx

③ Radial reading distance (mm)

④ Resolution

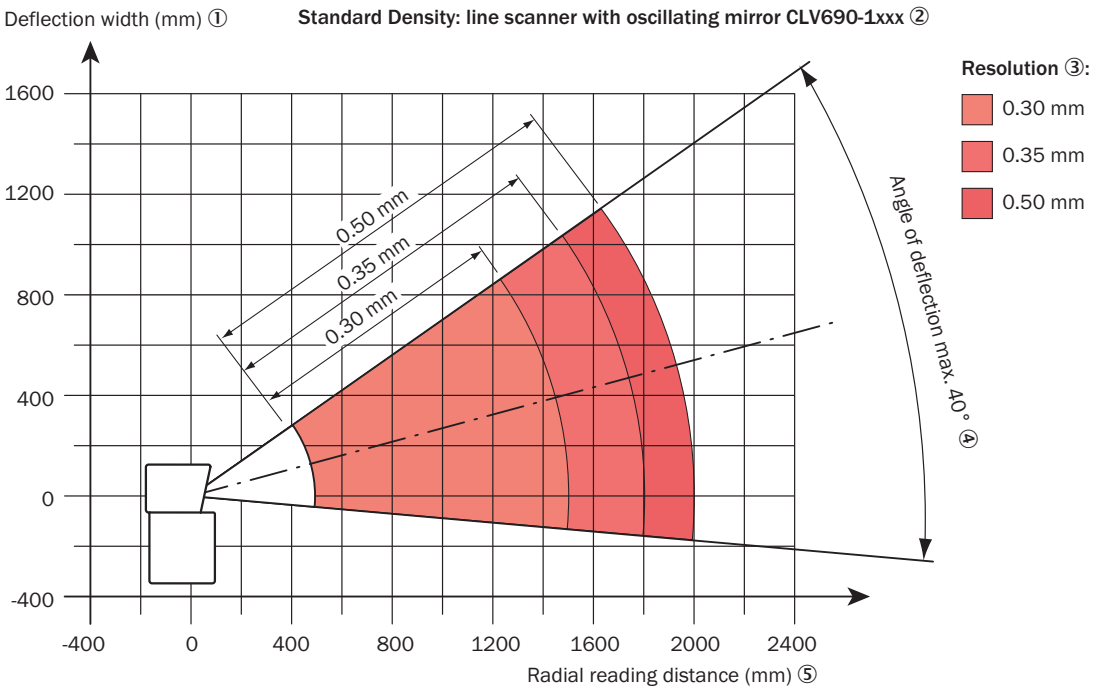


Figure 113: CLV690-1xxx (Standard Density): deflection width depending on the radial reading distance, angle of deflection and resolution

① Deflection width (mm)
② Standard Density: line scanner with oscillating mirror CLV690-1xxx
③ Resolution
④ Angle of deflection max. 40°
⑤ Radial reading distance (mm)

12.6.5 Low Density: reading output data of line scanner

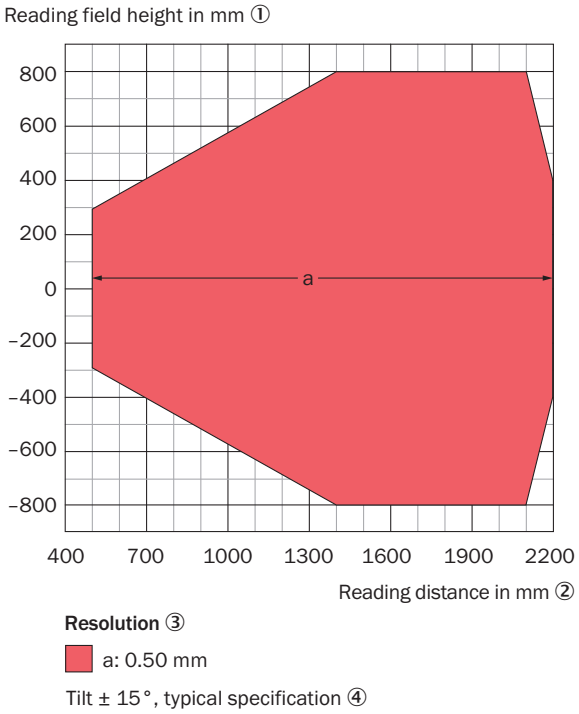


Figure 114: CLV691-0xxx (Low Density): reading field height depending on the reading distance and tilt at a resolution of 0.5 mm

① Reading field height in mm
② Reading distance in mm
③ Resolution
④ Tilt ± 15°, typical specification

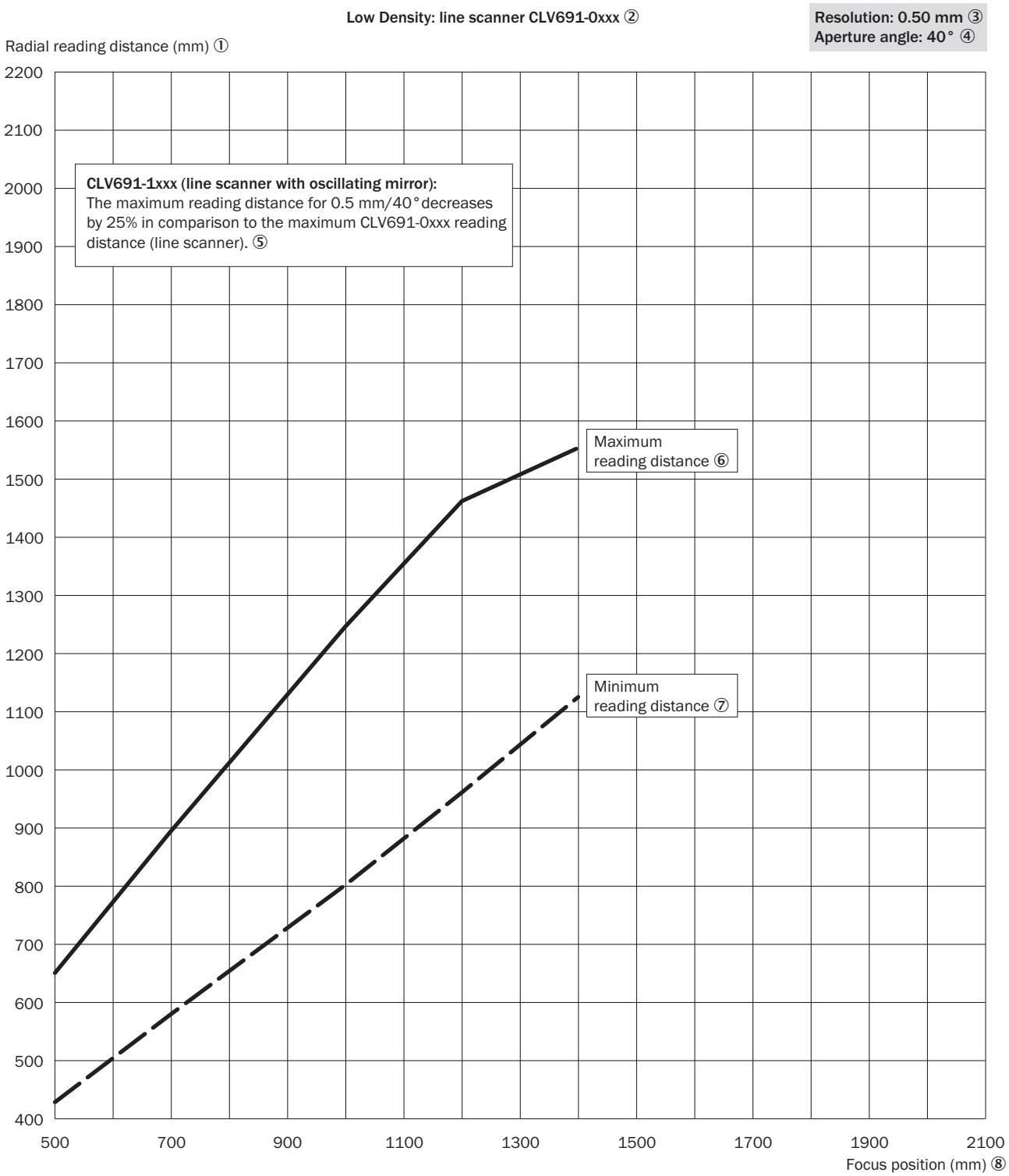


Figure 115: CLV691-0xxx (Low Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.5 mm and aperture angle of α = 40°

① Radial reading distance (mm)

② Low Density: line scanner CLV691-0xxx

③ Resolution: 0.50 mm

④ Aperture angle: 40°

⑤ CLV691-1xxx (line scanner with oscillating mirror): the maximum reading distance for 0.5 mm/40° reduces by 25% in comparison with the maximum reading distance of CLV691-0xxx (line scanner).

⑥ Maximum reading distance
⑦ Minimum reading distance
⑧ Focus position (mm)

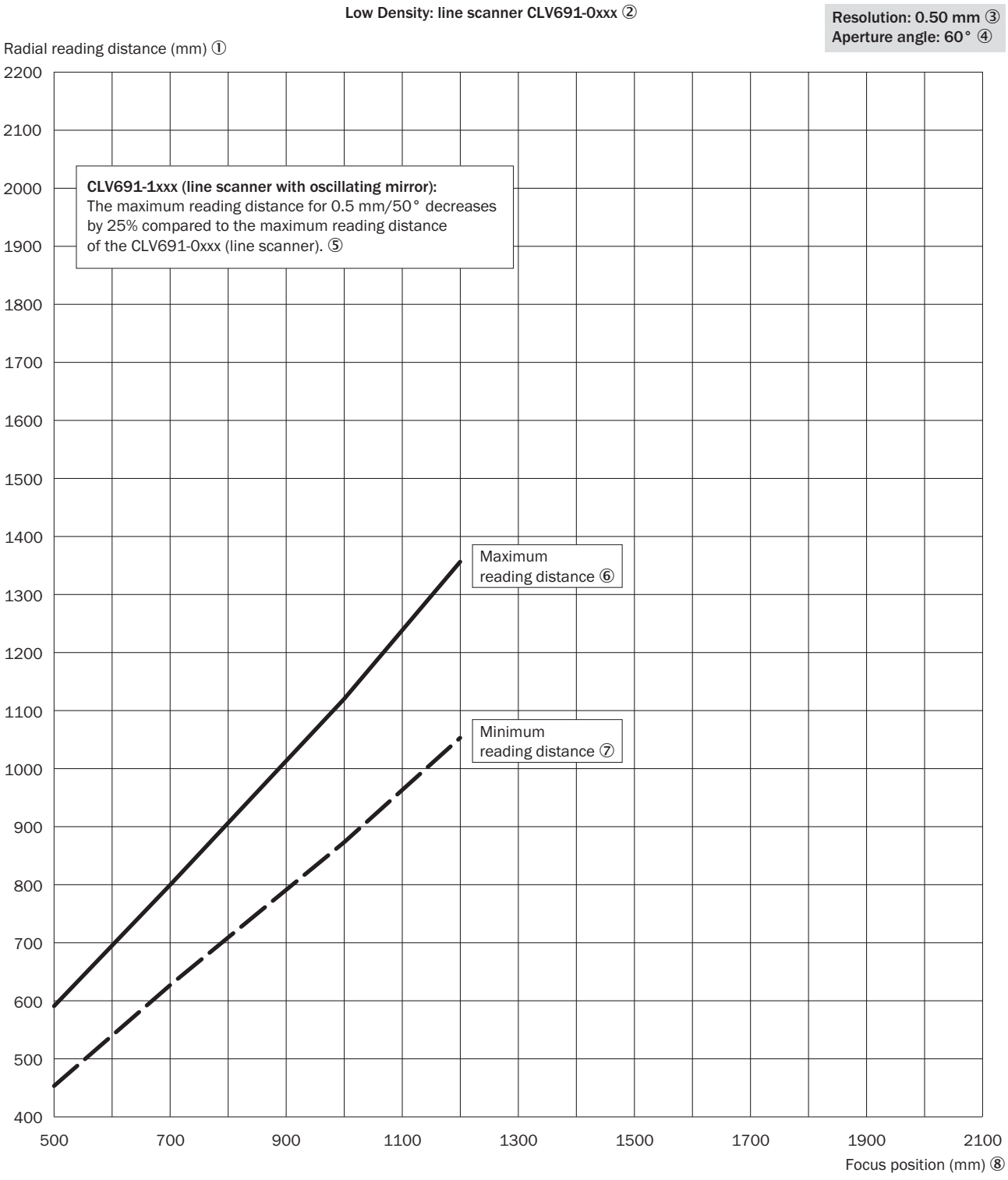


Figure 116: CLV691-0xxx (Low Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.5 mm and aperture angle of α = 60°

① Radial reading distance (mm)
② Low Density: line scanner CLV691-0xxx

③ Resolution: 0.50 mm

④ Aperture angle: 60°

⑤ CLV691-1xxx (line scanner with oscillating mirror): the maximum reading distance for 0.5 mm/50° reduces by 25% in comparison with the maximum reading distance of CLV691-0xxx (line scanner).

⑥ Maximum reading distance

⑦ Minimum reading distance

⑧ Focus position (mm)

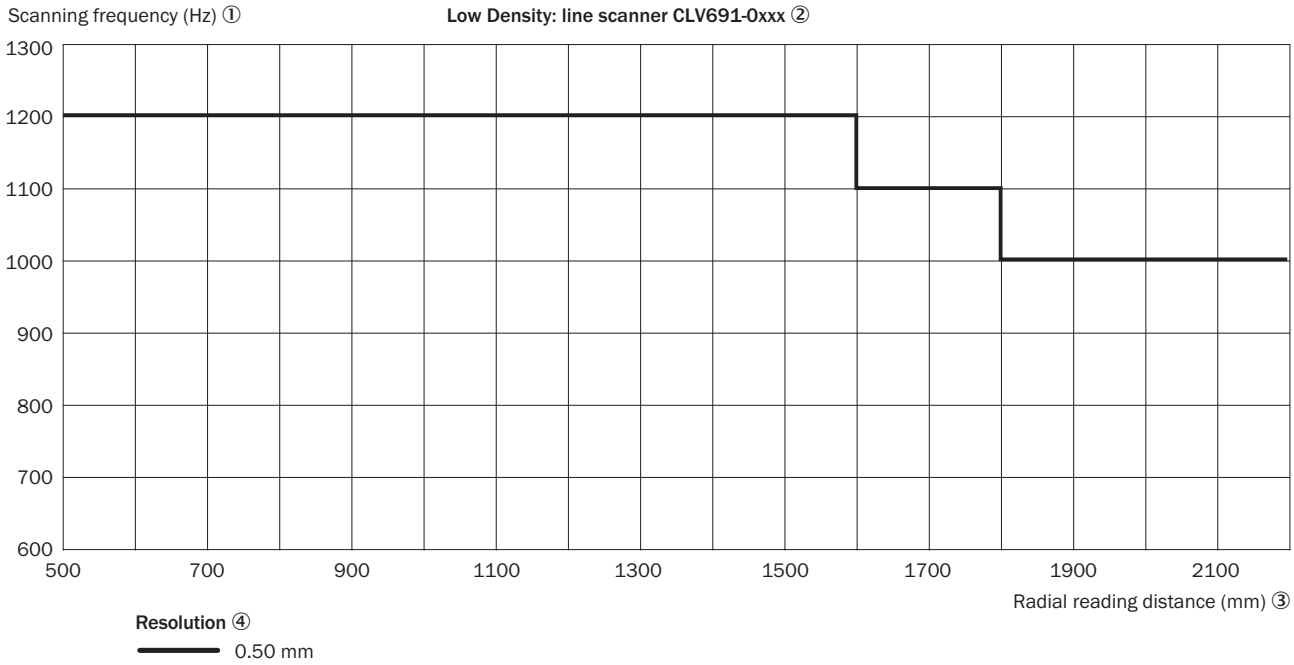


Figure 117: CLV691-0xxx (Low Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)

② Low Density: line scanner with oscillating mirror CLV690-1xxx

③ Radial reading distance (mm)

④ Resolution

12.6.6 Low Density: reading performance data, line scanner with oscillating mirror

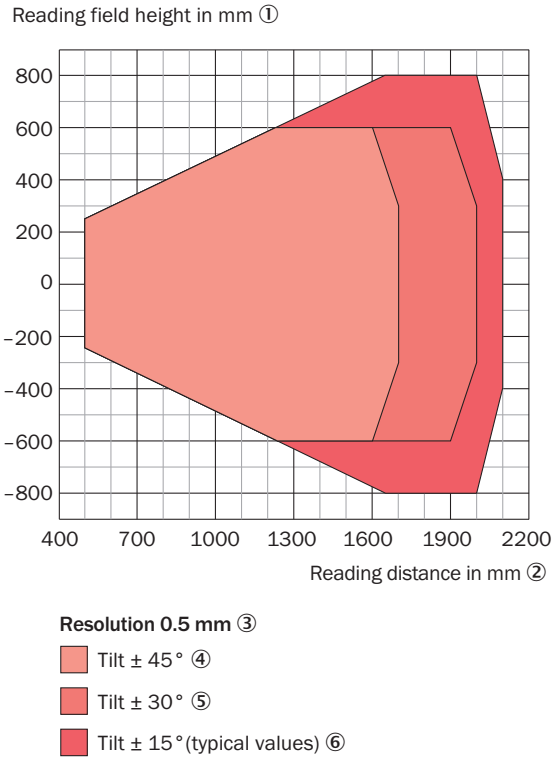


Figure 118: CLV691-1xxx (Low Density): reading field height depending on the reading distance and tilt at a resolution of 0.5 mm

① Reading field height in mm
② Reading distance in mm
③ Resolution
④ Tilt ± 45°
⑤ Tilt ± 30°
⑥ Tilt ± 15° (typical values)

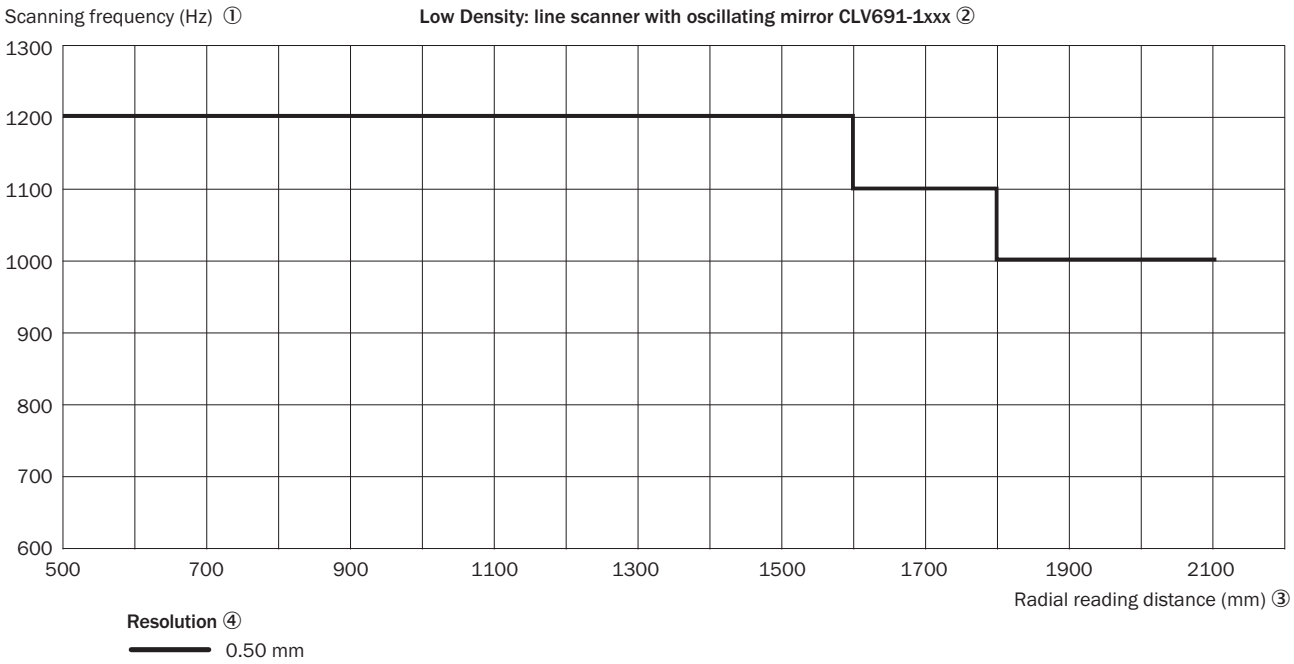


Figure 119: CLV691-1xxx (Low Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)
② Low Density: line scanner with oscillating mirror CLV691-1xxx
③ Radial reading distance (mm)
④ Resolution

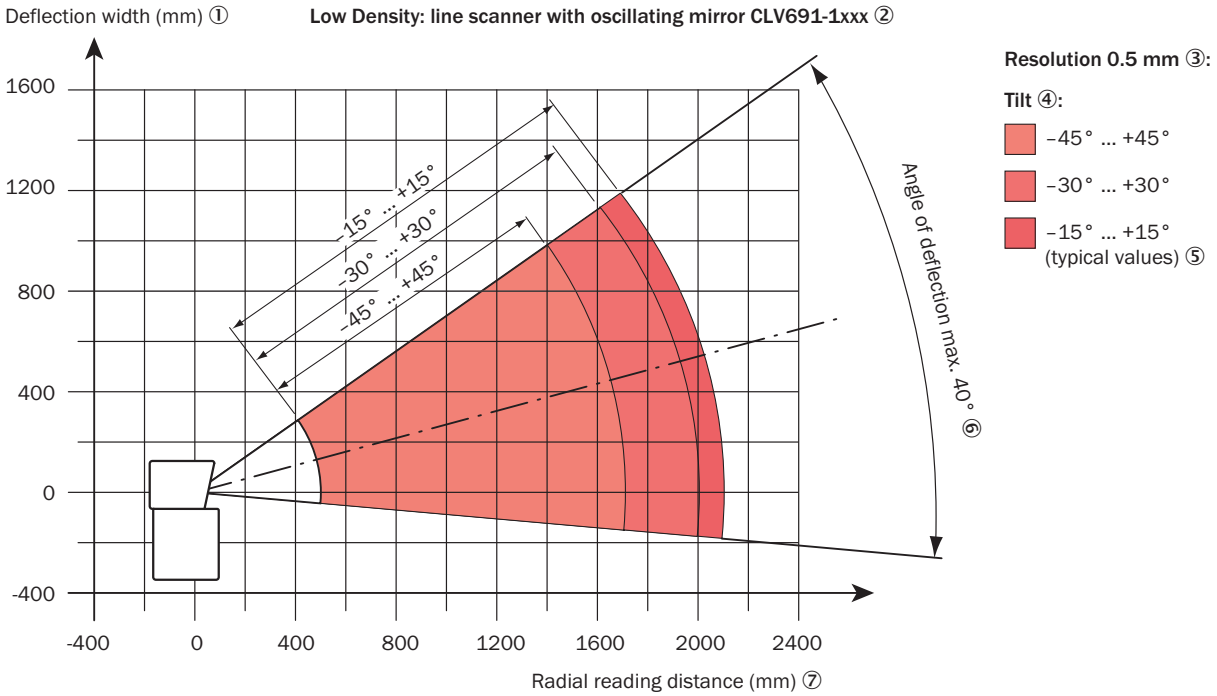


Figure 120: CLV691-1xxx (Low Density): deflection width depending on the reading distance, angle of deflection and tilt at a resolution of 0.5 mm

① Deflection width (mm)
② Low Density: line scanner with oscillating mirror CLV691-1xxx
③ Resolution: 0.5 mm

④ Tilt
⑤ (Typical values)
⑥ Angle of deflection max. 40°
⑦ Radial reading distance (mm)

12.6.7 High Density: reading performance data, line scanner

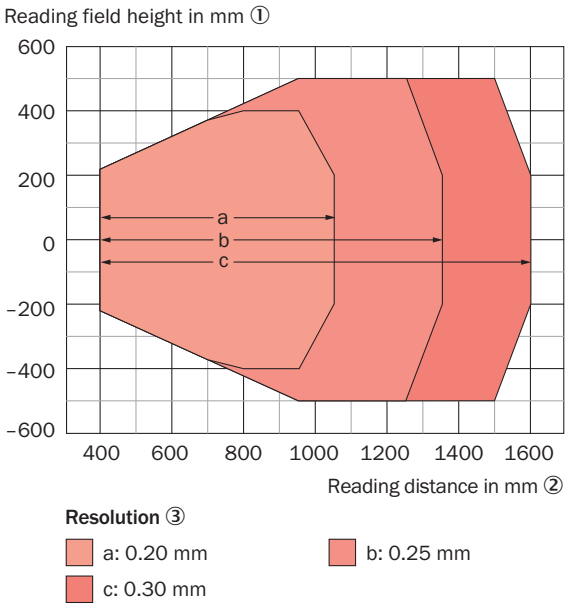


Figure 121: CLV692-0xxx (High Density): reading field height depending on the reading distance and resolution

① Reading field height in mm
② Reading distance in mm
③ Resolution

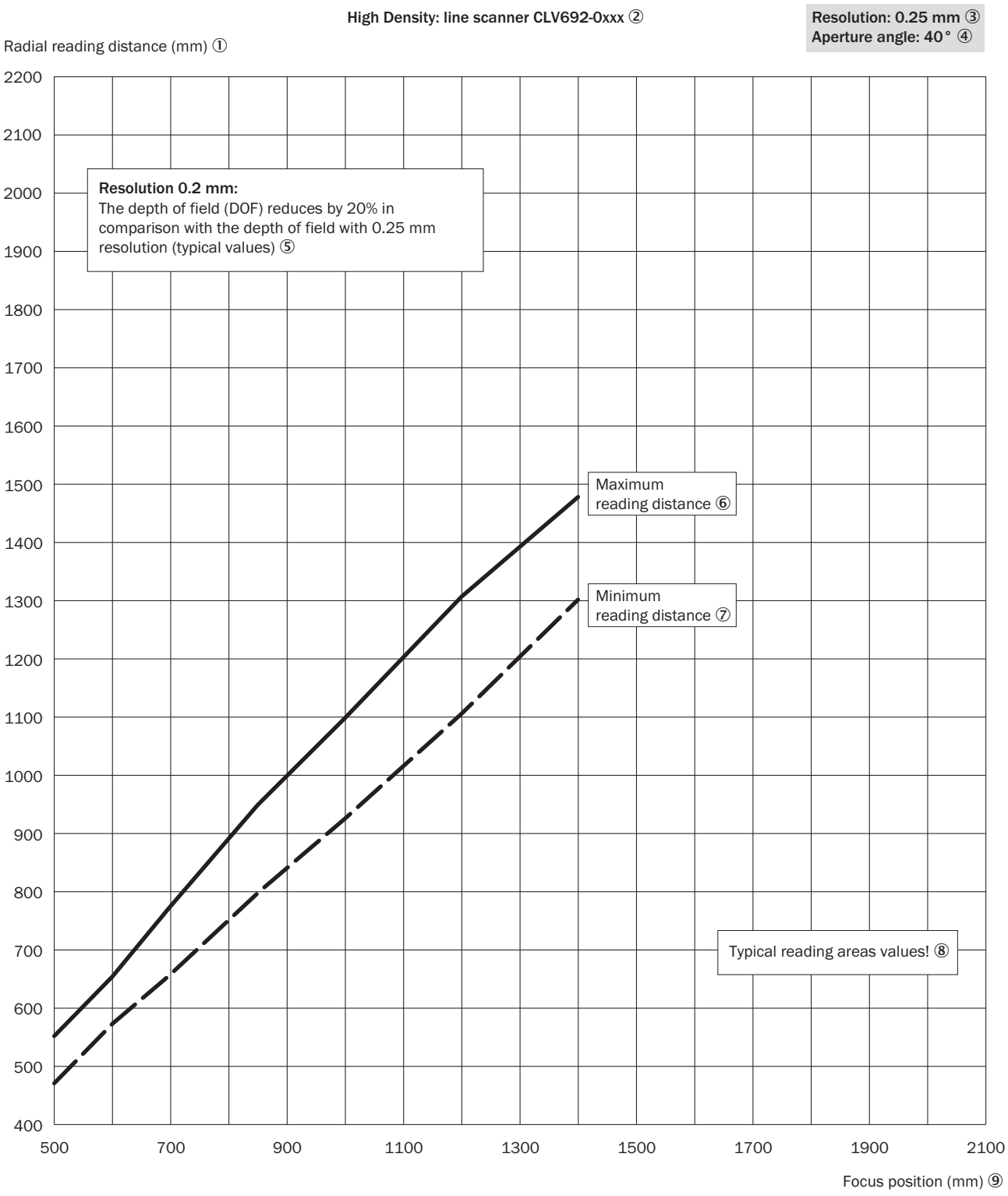


Figure 122: CLV692-0xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.25 mm and aperture angle of α = 40°

① Radial reading distance (mm)

② High Density: line scanner CLV692-0xxx

③ Resolution: 0.25 mm

④ Aperture angle: 40°

⑤ Resolution 0.2 mm: the depth of field (DOF) reduces by 20% in comparison with the depth of field at a resolution of 0.25 mm (typical values).

⑥ Maximum reading distance
⑦ Minimum reading distance
⑧ Reading ranges - typical values!
⑨ Focus position (mm)

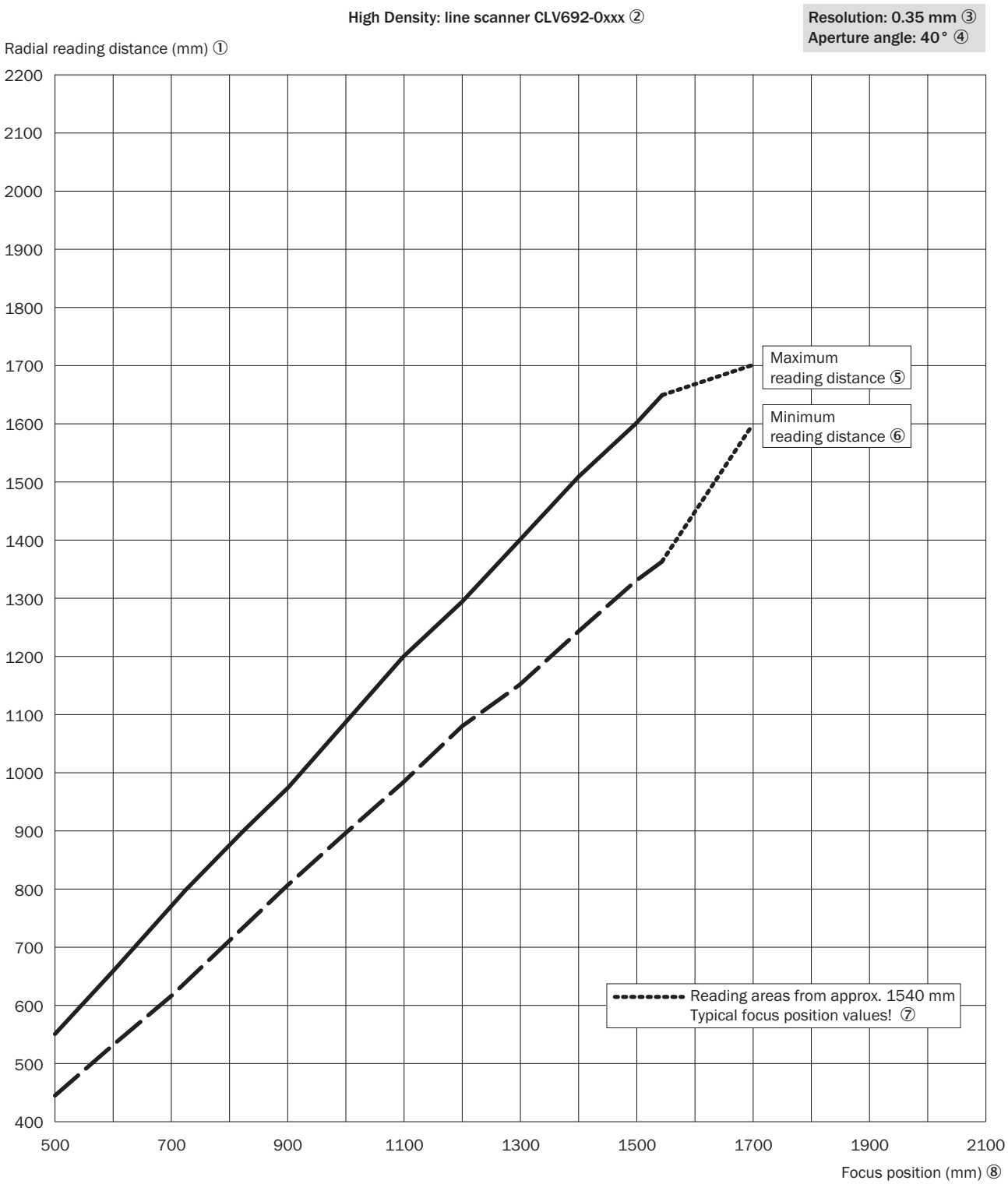


Figure 123: CLV692-0xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 40°

① Radial reading distance (mm)

② High Density: line scanner CLV692-0xxx
③ Resolution: 0.35 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Reading ranges from approx. 1,540 mm focus position - typical values!
⑧ Focus position (mm)

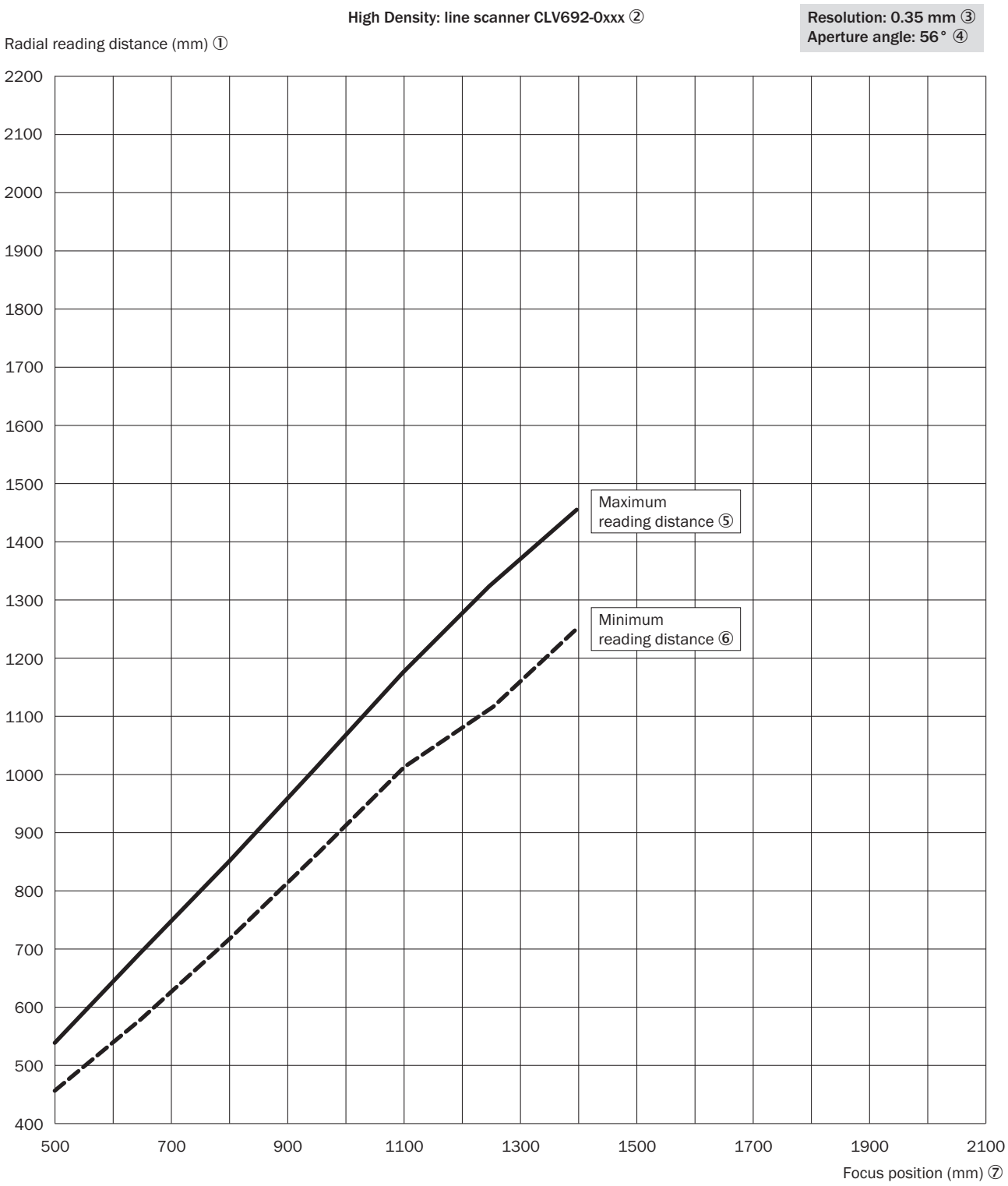


Figure 124: CLV692-0xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 56°

① Radial reading distance (mm)
② High Density: line scanner CLV692-0xxx
③ Resolution: 0.35 mm
④ Aperture angle: 56°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Focus position (mm)

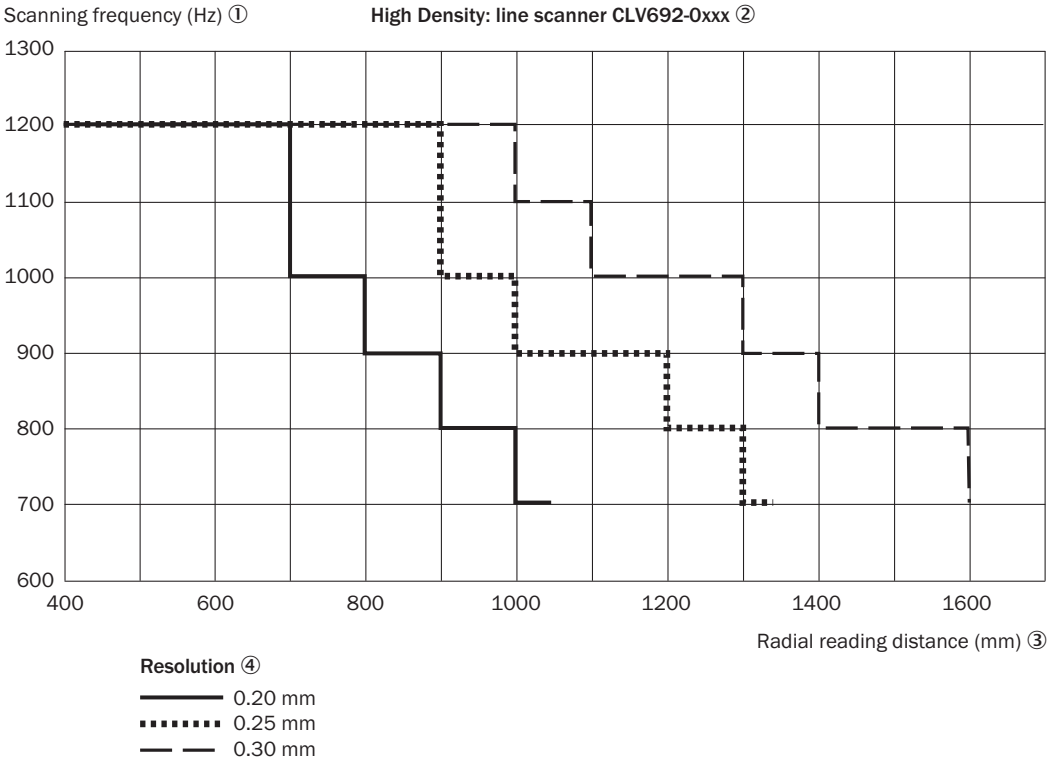


Figure 125: CLV692-0xxx (High Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)
② High Density: line scanner CLV692-0xxx
③ Radial reading distance (mm)
④ Resolution

12.6.8 High Density: reading performance data, line scanner with oscillating mirror

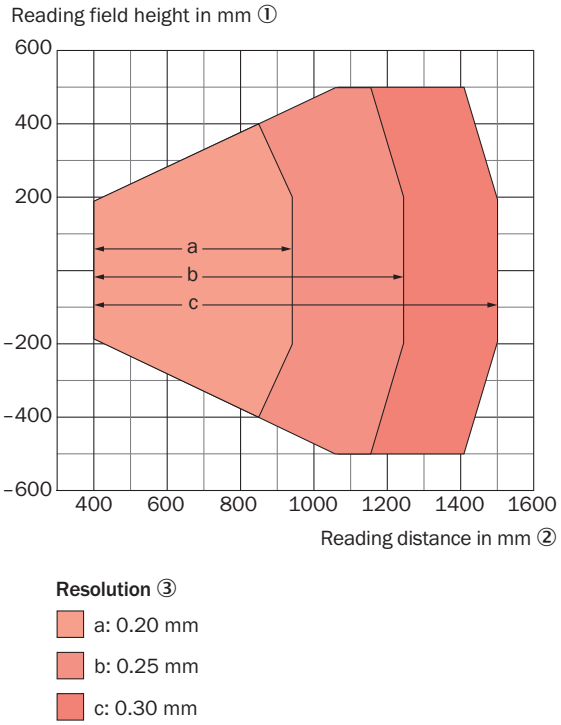


Figure 126: CLV692-1xxx (High Density): reading field height depending on the reading distance and resolution

① Reading field height in mm
② Reading distance in mm
③ Resolution

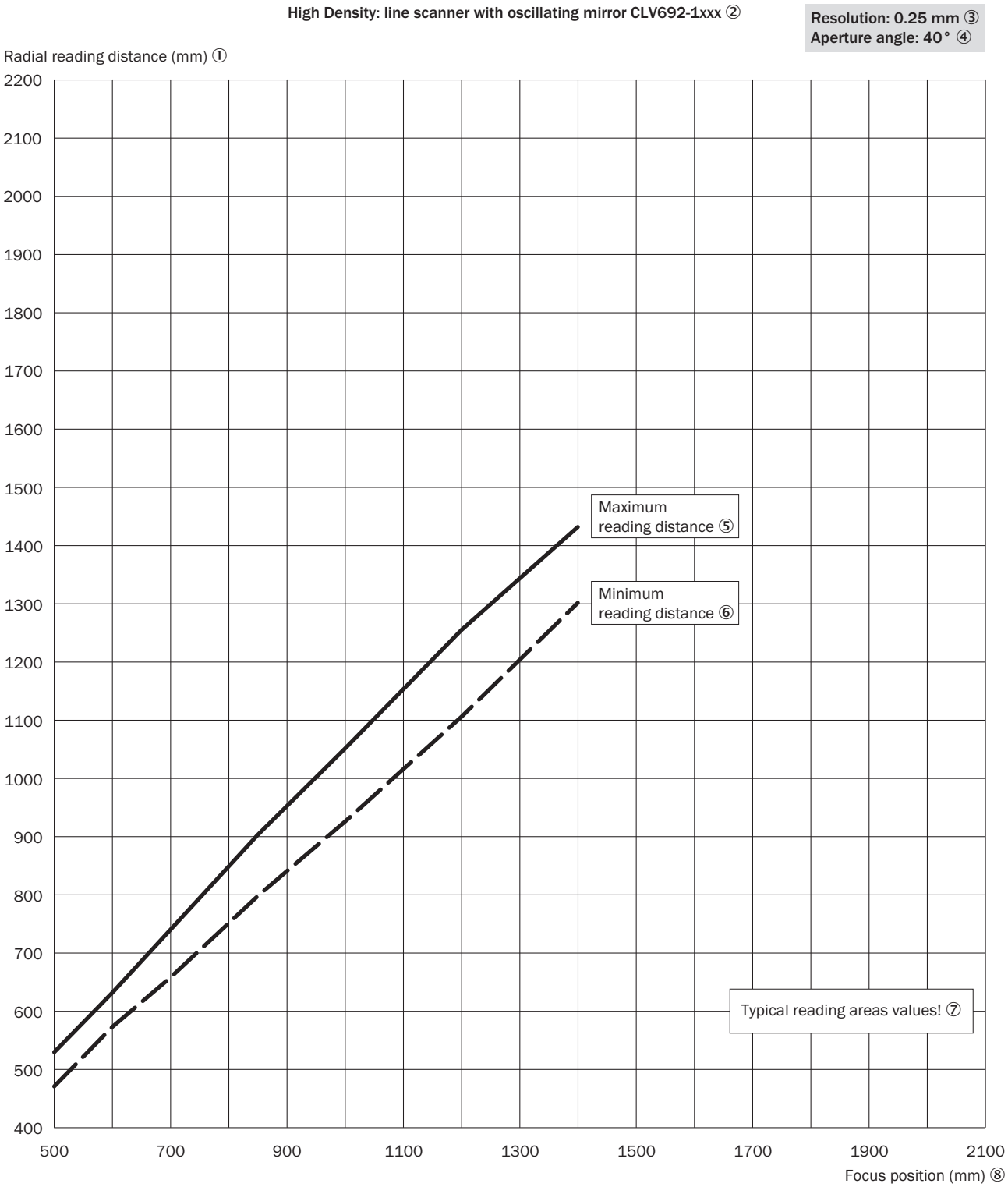


Figure 127: CLV692-1xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.25 mm and aperture angle of α = 40°

① Radial reading distance (mm)
② High Density: line scanner with oscillating mirror CLV692-1xxx
③ Resolution: 0.25 mm
④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Reading ranges - typical values!

⑧ Focus position (mm)

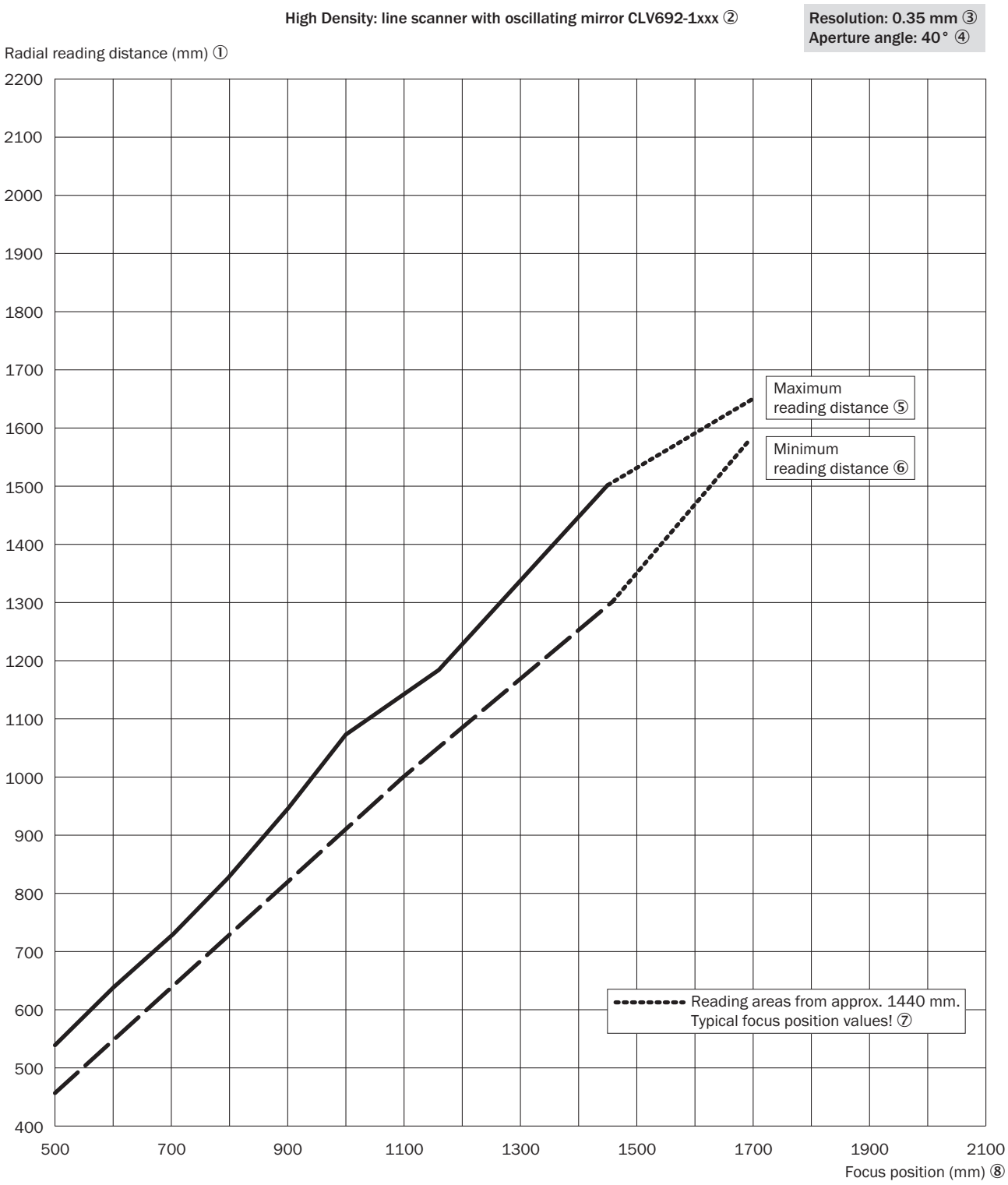


Figure 128: CLV692-1xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 40°

① Radial reading distance (mm)

② High Density: line scanner with oscillating mirror CLV692-1xxx

③ Resolution: 0.35 mm

④ Aperture angle: 40°
⑤ Maximum reading distance
⑥ Minimum reading distance
⑦ Reading ranges from approx. 1,440 mm focus position - typical values!
⑧ Focus position (mm)

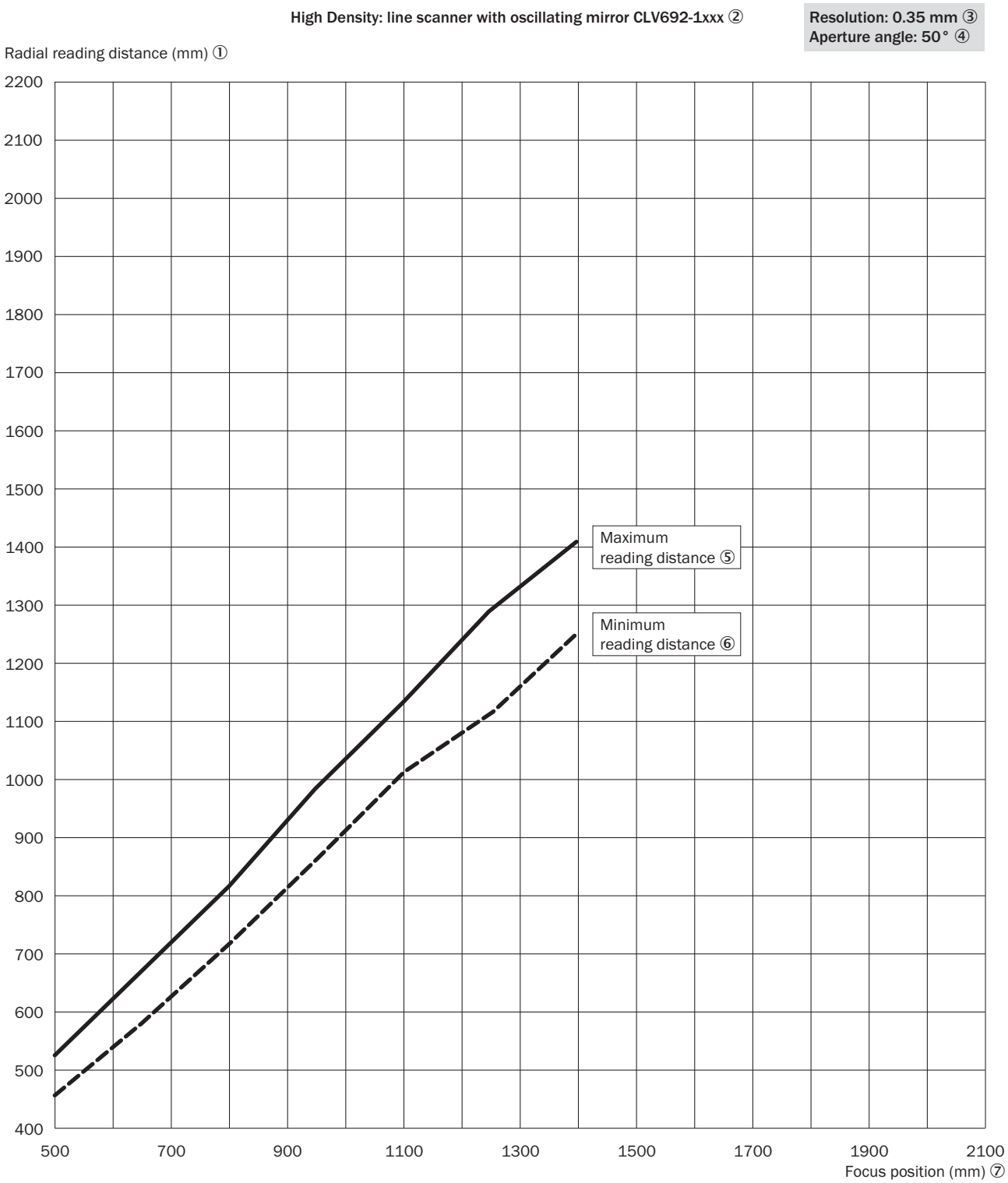


Figure 129: CLV692-1xxx (High Density): min. and max. radial reading distance depending on the focus position at a resolution of 0.35 mm and aperture angle of α = 50°

① Radial reading distance (mm)
② High Density: line scanner with oscillating mirror CLV692-1xxx
③ Resolution: 0.35 mm
④ Aperture angle: 50°
⑤ Maximum reading distance
⑥ Minimum reading distance

⑦ Focus position (mm)

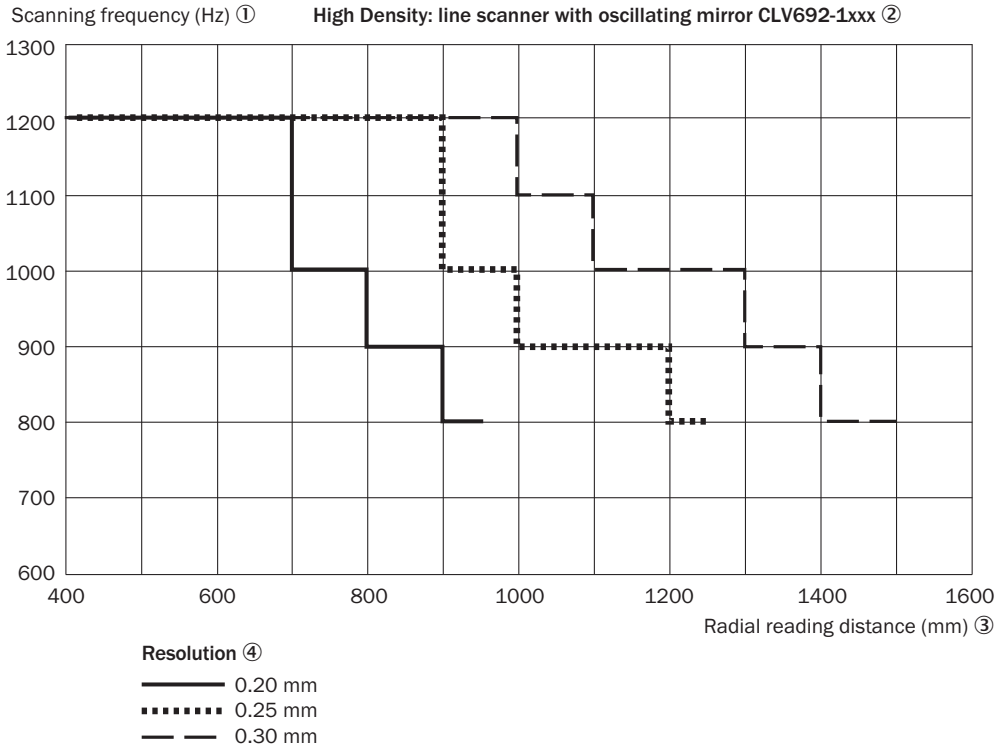


Figure 130: CLV692-1xxx (High Density): characteristic curve field scanning frequency depending on the radial reading distance and resolution

① Scanning frequency (Hz)

② High Density: line scanner with oscillating mirror CLV692-1xxx

③ Radial reading distance (mm)

④ Resolution

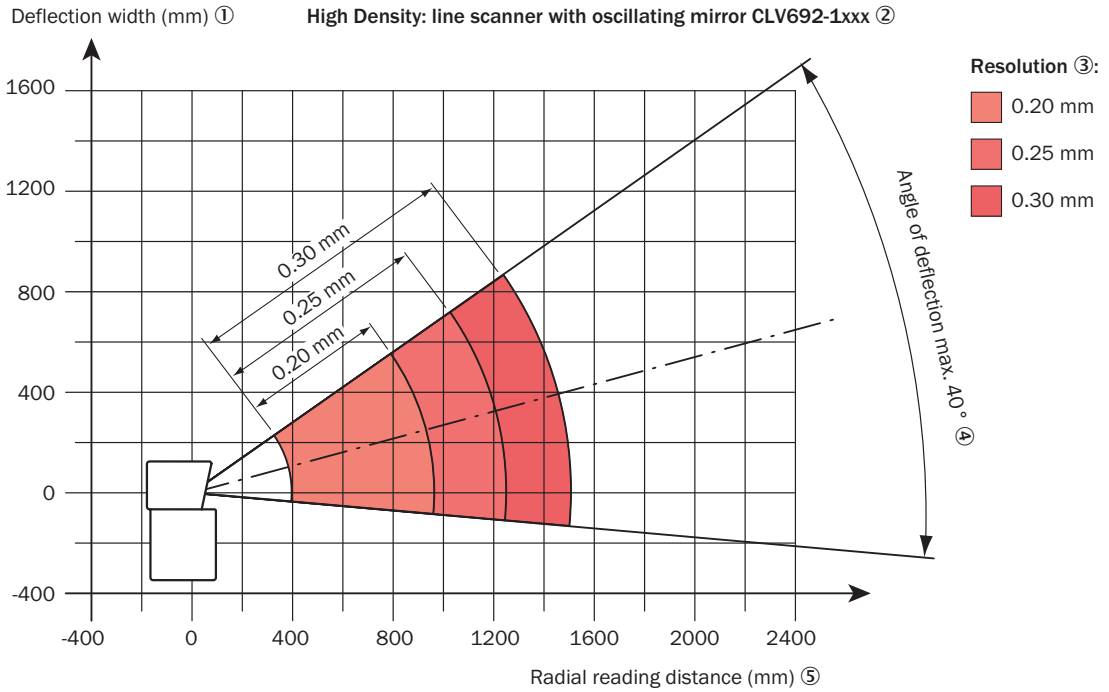


Figure 131: CLV692-1xxx (High Density): deflection width depending on the radial reading distance, angle of deflection and resolution

① Deflection width (mm)
② High Density: line scanner with oscillating mirror CLV692-1xxx
③ Resolution
④ Angle of deflection max. 40°
⑤ Radial reading distance (mm)

13 Accessories

NOTE

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

- www.sick.com/CLV69x

14 Annex

14.1 EU declaration of conformity / Certificates

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

- www.sick.com/CLV69x

14.2 Certification in accordance with UL60950

The devices in the CLV69x series are certified to UL60950-1. The devices must be supplied by LPS or Class 2 power supply units in order to ensure UL-compliant operation.

The use of the following cloning plugs is covered by the UL certification: B (part no. 2062452), C (part no. 2062453), E (part no. 2074708), F (part no. 2074710).

UL certification is only valid with corresponding device identification on the type label of the respective device; see see "Type label", page 13.

- Laser power and laser warning notes, see "Operational safety and particular hazards", page 9.
- IP65 enclosure rating of the devices not checked by UL.

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

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

Adapter cable suitable for drag chain

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

For CLV69x-xxx0 (without heating), with cloning plug part no. 2062452 (B)

Ambient temperature range:

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

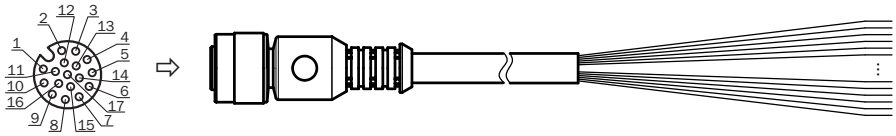


Figure 132: Adapter cable, e.g. part no. 2070425 (3 m)

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

② Illustration may differ

Table 33: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	GND	Ground	Blue

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

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

Adapter cable suitable for drag chain, deep-freeze compatible

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

For CLV69x-xxx0 (without heating), with cloning plug part no. 2062452 (B)

Permitted currents for ambient temperature +40 °C:

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

Ambient temperature range:

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

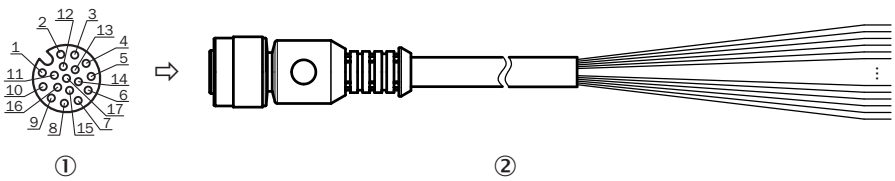


Figure 133: Adapter cable, part no. 2075220 (5 m)

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

② Illustration may differ

Table 34: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	GND	Ground	Blue
2	V_S	Supply voltage	Brown

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

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

Adapter cable, Ecolab

Part no. 2081094 (2 m), shielded, Ecolab, suitable for 2 A

For CLV69x-xxx0 (without heating), with cloning plug part no. 2062452 (B): “Host/Aux, I/O” connection

Ambient temperature range:

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

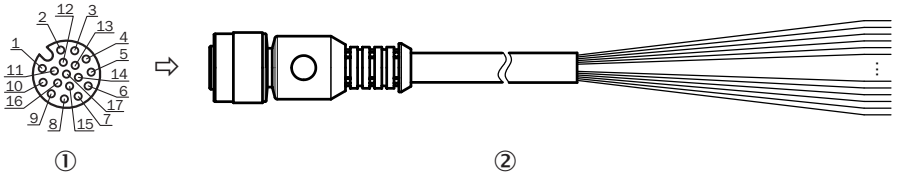


Figure 134: Adapter cable, e.g. part no. 2081094 (2 m)

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

② Illustration may differ

Table 35: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	GND	Ground	Blue
2	V_S	Supply voltage	Brown
3	CAN L	CAN bus (IN/OUT)	Green
4	CAN H	CAN bus (IN/OUT)	White
5	TD+ (RS-422/485), host	Host interface (sender+)	Pink

Pin	Signal	Function	Wire color
6	TD– (RS-422/485), host TxD (RS-232), host	Host interface (sender-)	Yellow
7	TxD (RS-232), Aux	Aux interface (sender)	Black
8	RxD (RS-232), AUX	Aux interface (receiver+)	Gray
9	SensGND	Switching input ground	White-black
10	Sensor 1	Digital switching input 1	Violet
11	RD+ (RS-422/485), host	Host interface (receiver)	Gray-pink
12	RD– (RS-422/485), host RxD (RS-232), host	Host interface (receiver–)	Red-blue
13	Result 1	Digital switching output 1	White-green
14	Result 2	Digital switching output 2	Brown-green
15	Sensor 2	Digital switching input 2	White-yellow
16	N. c.	–	Yellow-brown
17	N. c.	–	White-gray

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

Device	Connection module
CLV69x	CDB650-204, CDM420-0006, -0007, CDM490-0001

Adapter cable

Part no. 2020319 (3 m), unshielded

Ambient temperature range:

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

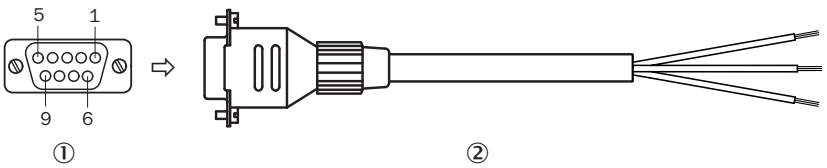


Figure 135: Adapter cable, part no. 2020319 (3 m)

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

② Illustration may differ

Table 36: Signal assignment of adapter cable with open end

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

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

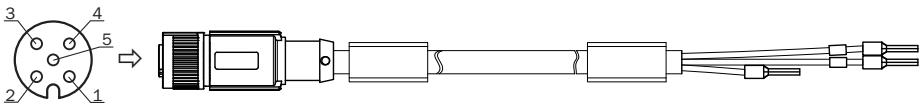
2) Connect to the terminal “RxD Host” in the CDB/CDM connection module

Adapter cable V24-only for CLV69x with heating (CLV69x-xxx1)

Part no. 2095608 (5 m), unshielded, suitable for drag chain, deep-freeze compatible

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

Ambient temperature range:



① ②

Figure 136: Adapter cable, e.g., part no. 6053224 (5 m)

① Female connector, M12, 5-pin, A-coded (view from front)

② Illustration may differ

Table 37: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color / characters
1	–	Shield	Gray
2	V_S	Supply voltage	Red +
3	GND	Ground	Blue –
4	–	–	–
5	–	–	–

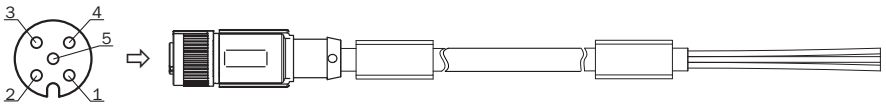
Adapter cable CAN-only for CLV69x

Part no. 6053720 (5 m), part no. 6053721 (10 m), shielded, deep-freeze compatible

For cloning plug part no. 2062453 (C) and part no. 2024708 (E): connection “CAN 1 OUT”

Ambient temperature range:

For mobile installation: –20 °C to +30 °C, for fixed installation: –40 °C to +80 °C



① ②

Figure 137: Adapter cable, e.g., part no. 6053720 (5 m)

① Female connector, M12, 5-pin, A-coded (view from front)

② Illustration may differ

Table 38: Signal assignment of adapter cable with open end

Pin	Signal	Function	Wire color
1	–	Shield	–
2	–	–	–
3	–	–	–
4	CAN_H	CAN bus	White
5	CAN_L	CAN bus	Blue

14.4 Calculating code length of a bar code

The code length of a bar code corresponds to the number of useful characters in the printed image including the check digit (if available).

In order to decode a code, the code length must be specified via the SOPAS ET configuration software. Depending on the code type of a bar code, the code length can be calculated by counting the bars and gaps using the relevant formula from the table below:

1. Determine bar code type and count bars or wide elements (bars and gaps) incl. start and stop character according to the information in the table below.
2. Calculate bar code length using the relevant formula.
3. Enter the result using the SOPAS ET configuration software, as shown in column 4 of the table.

Table 39: Support table for calculating the code length of a bar code

Bar code type	Counting	Calculation of the bar code length[1)2)]	Entry in the SOPAS ET configuration software
Code 39	Number of bars	l_{Code} = (number - 10)/5	Calculated code length
2/5 interleaved	Number of wide elements (bars and gaps)	l_{Code} = (number - 1)/2	Calculated code length
EAN	Not applicable	13 characters (normal version)	Activate 13-digits
		8 characters (short version)	Activate 8-digits
UPC	Not applicable	12 characters (UPC A, normal version)	Activate version A
		6 characters (UPC E, short version)	Activate version E
Codabar	Number of bars	l_{Code} = (number - 8)/4	Calculated code length
Code 128 (character set A)	Number of bars	l_{Code} = (number - 10)/3	Calculated code length
EAN 128	Number of bars	l_{Code} = (number - 10)/3	Calculated code length
Pharmacode	Number of bars	Number	Number = code length

1) Check digit optional in code 39, 2/5 interleaved, Codabar Check digit according to specification always integrated in the bar code printing for EAN, UPC, Code 128, Code 93, EAN 128 (is suppressed automatically when the device reading result is issued)

2) Apart from a few exceptions, each printed character corresponds to an ASCII character that needs to be decoded.
In the case of Code 39 extended, Code 93, Code 128 and EAN 128, the number of characters in the device data string may be bigger than the number of characters in the printed image, because this consists of several character sets.

14.5 Dimensional drawings

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

- www.sick.com/CLV69x

14.6 Glossary

For other terms, see also the online help for the SOPAS-ET configuration software.

Bar code

Field of dark bars and light gaps arranged in parallel (elements), which can be depicted according to a specific regulation (specification) on the medium (background) using various printing procedures. An appropriate number and combination of machine-readable bars and gaps results in an (alpha)numeric character which can be read by the user. As the entire coded information, bordered by start and stop characters, is completely available in one dimension, and is also usually recorded in lines, these bar codes are referred to as linear codes. The various code types differ in terms of the stock of characters that can be coded, the structure (number of elements per line, number of characters, start/stop characters, mark of conformity), the information depth, and the print

tolerances. The length of the code bars and gaps is not significant for the information content. However, longer code bars and gaps can be interpreted more easily with the reading device.

Aspect ratio

The ratio of code height (bar length) to code length (number of characters) in bar codes.

AUX interface

Logical auxiliary data interface of the device with fixed data output format, physically connected to RS-232 (AUX) and Ethernet (port 2111). It is always possible to gain access to the device for configuration via this data interface using the PC and the SOPAS-ET configuration software. The data interface is also used for diagnostics (issue of read diagnosis data or monitoring of the data traffic on the host interface). The following applies for the physical RS-232 interface: fixed data format, data transmission rate 57.6 kBd. The data output to the PC via RS-232 can be switched off, and in this case existing communication of the AUX interface via the Ethernet interface (Port 2111) remains active without change.

User interface

Windows-oriented input interface in the SOPAS-ET configuration software for configuration of the device.

CAN interface

Physical data interface. Used for building a fast SICK-specific CAN SENSOR network with different functions (e.g., multiplexer, master/slave). Access to the device is possible for configuration via the CAN interface (network) with the aid of the SOPAS ET configuration software in remote mode.

Code geometry

Length and height dimensions of the code.

Decoder, decoding

Assessment routine, dependent on the code type, for the reconstruction of the read code in electronic form, in order to decrypt the data content from the code.

Data output string

Structured data telegram of the read result in two independent data output formats, which prepares the device from its database for issuing. The output formats can be issued via the host interface, optionally to the physical data interfaces RS-232/ RS-422/485, Ethernet or CAN. The structure of the output formats is flexible (sequence of the code segments and elements, linking with event conditions, filter, sorter, etc.) and can be adjusted, within wide limits, to the application-specific requirements.

Download

Process of transmitting parameter values, using the SOPAS ET configuration software, from the PC to the connected device.

In the “Online” communication mode, in the case of the “Immediate Download” option (default), SOPAS ET always temporarily transfers parameter values that have just been modified to the working memory (RAM) of the device in the background. With this option, the current parameter values in the device are constantly synchronized with the modifications made in the user interface.

With the “Download on demand” option, however, the adjustment is carried out manually and is the user's responsibility. If non-synchronized statuses occur for individual parameter values between SOPAS ET and the connected device, then SOPAS ET marks these parameters with a blue border. By right-clicking in the context menu, the modified parameter value of a tab (transfer parameters to the device) can be manually transferred to the device when needed. Via the communication menu, it is possible to transfer either only modified parameter values (download amended parameter to the device) or all parameter values of the device (download all parameters to the device).

Only when the save option “permanent” (CLV6xx menu) is used will the parameter values that have previously only been temporarily changed in the device be saved permanently. The transferable parameter values depend on the current user level in SOPAS ET.

Result status output

Adjustable function of the two independent switching outputs “Result 1” and “Result 2” in the standard version. Signals either the status of the read result (e.g., Good Read) or the fulfillment of an event-dependent assessment condition which can be defined for the read process (e.g., Match1). The outputs can also be switched off individually or both together. The Ethernet version does not provide any switching outputs at its plug connectors. However, the function of two switching inputs is still accessible via the CDB620 connection module in combination with the CMC600 parameter memory module.

The “Result” LED is not linked to either of the switching outputs. It exclusively displays the status “Good Read” for approx. 100 ms when the reading result is issued via the data interfaces.

Ethernet interface

Physical data interface with transmission rate 10/100 MBit/s and TCP/IP protocol. The Ethernet interface can be used alternatively and also in parallel to the physical RS-232, RS-422/485 interfaces.

Port 2112 (host interface) used for the issue of the reading result and port 2111 (AUX interface) among other things for the output of reading diagnostic data and monitoring the data traffic on the host interface. The device can be configured via both ports. If the data output of the AUX interface is suppressed via RS-232, then existing communication via Ethernet remains active. This applies in the same way for the host interface, but in this case the data output via Ethernet can be suppressed separately.

Error messages

Messages in coded form with which the device displays a diagnosed error. The device differentiates between four error types: information, warning, error, severe error. The error messages can be displayed in the SOPAS ET configuration software in the system information tab.

No Read

The defined assessment condition(s) was (were) not met in the reading event during the last read cycle.

No Read format

Special, configurable output format for no reads in the data output string as a replacement for the output formats for reading where the assessment conditions are met. In the default, the device issues the string “No Read”, bordered by STX and EXT, as the no read format.

Focus position

Distance of the focus of the lens in front of the reading window. Using the device optics, the distance determines a depth of field (DOF) in which the code can be detected. The depth of field area depends on the resolution.

Functional interfaces

Digital switching inputs and outputs of the device.

Default

The factory default of all parameter values of the device is saved in its fixed memory and can be restored again at any time when the device is connected via the CLV6xx menu in the working memory of the device. This means that all changes in an application-specific configuration are discarded, if they have not been permanently saved in SOPAS ET after the query. It is possible that the data connection to the device itself will also be lost.

The application-specific default, on the other hand, allows all parameter values apart from the communication parameters to be reset to the factory default. This means that the existing communication with the device is retained.

Good Read

The defined assessment condition(s) was (were) successfully met in the reading event during the last read cycle.

Host interface

Logical main data interface of the device with two independent data output formats, which can be configured. Among other things, this is used for outputting the read result in the form of a telegram to the host/PLC. Can be physically switched on RS-232/RS-422/485, and Ethernet (port 2112) or CAN. Works together with the SICK-specific CAN SENSOR network as a gateway. Provides different transfer protocols (apart from for CAN).

Access to the device is also possible for configuration and diagnosis via the host interface with the aid of the SOPAS ET configuration software. In the default, the data transmission rate is 57.6 kBd. The data output via RS-232/RS-422/485 can be switched off, and in this case an existing data output of the host interface via Ethernet remains active without change. However, it can also be suppressed separately.

Command strings, commands

User interface to the device as an alternative to the SOPAS ET configuration software. The command strings form a clearly structured command language for the online modification of the parameter value set in the device. Accesses the command interpreter of the device directly. Used by the host for programming work as needed. The SOPAS ET configuration software is based on the command strings.

Configuration file

Project file of the SOPAS ET configuration software, in which either only one complete parameter value set of a device is saved or, if several devices are combined for a project, a complete parameter set is saved for each device for archiving on the PC. The project file can be printed out in table form, transferred to the clipboard, and provided as a PDF.

Reading range (DOF)

Depth of field on both sides around the focus of the lens in the reading level. The size of the area depends on the resolution and the reading distance.

Read diagnosis data

Data related to a code, object, or device, which the device deduces directly from the read event. Among other things, the data allows for assessment of the quality of the reading and for conclusions to be made about the read event.

Reading result

Electronic representation and output of the data contents of the read bar codes together with read diagnosis data in a data output string at the defined output time.

Read cycle

Clock on the device for triggering of the internal reading interval in the device, carried out on an object-specific basis via an external trigger source such as, e.g., a photoelectric retro-reflective sensor on a switching input or a command string via a data interface. In the event of internal “Auto cycle” trigger source, the device generates the read cycle itself.

Reading interval

Time window in which the device switches on the scan line and attempts to identify valid bar codes from the read information. Depending on the selected output mode of the read result, the reading interval may be shorter than the read cycle applied from outside.

Reading angle (RA value)

Starting from the reading window, the reading angle on the red scan line of the deflected scanning beam under which the middle of a bar code is detected. Is detected by the device for each scan and used e.g. for the separation of bar codes with identical data contents. For the decoding, the active evaluation area along the scan line can be restricted by specifying the minimum and maximum RA value on an application-specific basis.

Line scanner

Scanner which deflects its focused laser beam very quickly using a polygon mirror wheel with mirrors parallel to the axis. This means that it creates a light point in the reading level, which repeatedly runs on a straight line and is visible to the human eye as a “static” scan line due to the relative inertia.

Line scanner with oscillating mirror

Line scanner which additionally deflects its laser beam at right angles to the scan direction using an oscillating mirror on both sides of a central position. This means that the device can also scan larger areas and room contents for bar codes. In this case, in addition to the simple deflection with maximum oscillation amplitudes, adjustable functional processes of the oscillating mirror are also possible.

Master/slave configuration

Special arrangement and switching connection of several devices to a read station (e.g., multi-side reading) with the aid of the CAN interface. Using the master, the connection to the host functions like a single device.

Multiple reading

Optional number of readings which must provide identical internal reading results for one and the same bar code before the device issues the reading result.

Aperture angle α

Angle, within the limits of which the device (via the optics) can detect codes. In front of the reading window a V-shaped area is formed in a radial manner at right angles to the conveyor direction (reading from above), and the code to be read must be in this area.

Parameter value set

Data set, which is used to initialize and activate the implemented functions in the device. This is transmitted from the device to the SOPAS ET configuration software or vice versa using an upload (only all parameter values) or download.

Grid scanner

Scanner which deflects its focused laser beam very quickly using a polygon mirror wheel with mirrors tilted against each other around the axis. This means that it creates a quickly moving light point in the reading level in several rows one above the other. The light point repeatedly moves in a straight line on each row. Several “static” scan lines are visible to the human eye across all rows due to the relative inertia.

Send time

Output time of the reading result in relation to the start of the read cycle and the assessment conditions that are met.

SMART620 decoder

Specially developed decoder for reading bar codes with poor or contaminated printing.

SOPAS ET

PC configuration software, can be run under Windows 2000, XP and Vista. Is used for online communication with the device in the dialog (configuration, display of reading results, diagnosis) and the prepared offline configuration of stand-alone devices or the combination of the same/different SOPAS-ET-enabled SICK devices in one project. Via upload and download, the parameter values are exchanged with the devices in a device-specific manner.

SOPAS ET Help

Online help, which supports the use of the SOPAS ET configuration software. The functions of the device parameters are explained in the help. Runs in an HTML browser, e.g., “Internet Explorer”, and can be called up from the SOPAS ET configuration software.

Saving in the device

The parameter set with the application-specific parameter values can be saved temporarily or permanently in the device. In the case of temporary saving, the parameter set is only contained in the volatile working memory (RAM) and is lost when the supply voltage is switched off. In the case of permanent saving, the parameter set is also transferred to the non-volatile memory of the device and is retained as the current data set after switching off. The default is saved independently of this in a fixed, read-only memory (ROM).

Start/stop operation

In this read operating mode, there is only one object in the reading zone, the reading field per read cycle. As standard, two external sensors or command strings control the start and end of the read cycle on the device (stand-alone device). In this case, the reading field length is determined by the distance of the two read cycle sensors for starting (start of reading field) and stopping (end of reading field) the read cycle. The minimum read distance between two objects must always be larger than the reading field length.

In the event of joint use with other devices in the master/slave connection (e.g. 2-side reading), the device acting as the slave receives its cycle signals from another device (master). The networking between the devices is carried out via the CAN interface, the output of the read result of the master via its RS-232/RS-422/485 interface and/or the Ethernet interface.

Upload

Process for the transmission of all parameter values from the working memory of the connected device to the PC in the SOPAS ET configuration software for display and modification. Is carried out when connecting the device and successfully establishing communication after the scan process following a confirmed query in order to achieve synchronization between the user interface and the device. If necessary, can be triggered manually in the communication menu (upload all parameters from the device). The parameter values must be displayed in the tabs in order to be able to modify the current parameter value set.

14.7 Abbreviations used

Table 40: Abbreviations used

CAN	**C**ontrolled **A**rea **N**etwork. Field bus log based on the CAN bus
CDB	**C**onnection **D**evice **B**asic
CDF	**C**onnection **D**evice **F**ieldbus
CDM	**C**onnection **D**evice **M**odular
CE	**C**ommunauté **E**uropéenne. European Community
CLV	**C**ode-**L**eser **V**-Prinzip [Code reader V principle]
CMC	**C**onnection **M**odule **C**loning
CMD	**C**onnection **M**odule **D**isplay
CMF	**C**onnection **M**odule **F**ieldbus
CMP	**C**onnection **M**odule **P**ower
CA	**C**ode**A**ngle
DOF	**D**epth **O**f **F**ield. Depth of field
ESD	**E**lectro-**S**tatic **D**ischarge. Electrostatic discharge
GSD	**G**eneral **S**tation **D**escription (generic station description for PROFIBUS/ PROFINET)
HTML	**H**yper **T**ext **M**arkup **L**anguage (page description language on the Internet)
I	**I**nput
LED	**L**ight **E**mitting **D**iode. Light emitting diode
LPS	**L**imited **P**ower **S**upply
MAC	**M**edium **A**ccess **C**ontrol
MTTF	**M**ean **T**ime **T**o **F**ailure
MTTR	**M**ean **T**ime **T**o **R**epair

O	**O**utput
PCS	**P**rinted **C**ontrast **S**ignal
PROM	**P**rogrammable **R**ead **O**nly **M**emory. Programmable non-volatile memory
RA	**R**eading **A**ngle
RAM	**R**andom **A**ccess **M**emory. Direct-access volatile memory
ROM	**R**ead **O**nly **M**emory. Read-only memory (non-volatile)
RTF	**R**ich **T**ext **F**ormat (standardized document format with format description)
SD	**S**ecure **D**igital
SMART	**S**ICK **M**odular **A**dvanced **R**ecognition **T**echnology
SOPAS ET	**S**ICK **O**pen **P**ortal for **A**pplication and **S**ystems **E**ngeneering **T**ool (PC software for Windows for the configuration of the device)
PLC	**P**rogammable **L**ogic **C**ontroller
TCP/IP	**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol

8014396/131W/2019-03-06/en

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Further locations at **www.sick.com**

SICK AG | Waldkirch | Germany | www.sick.com

SICK
Sensor Intelligence.